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REPORT

to

SOUTH BAY CONSTRUCTION & DEVELOPMENT COMPANY

CAMPBELL, CALIFORNIA

on

SOIL AND FOUNDATION INVESTIGATION

ONE-STORY COMMERCIAL BUILDING

1555 PLYMOUTH STREET

MOUNTAIN VIEW, CALIFORNIA

by

ENGEOTECH, INC.

538 ALDO AVENUE

SANTA CLARA, CALIFORNIA

NOVEMBER 1982

ENGEOTECH, INC.

Soil and Geological Engineers

538 Aldo Ave. Santa Clara, CA 95050 (408) 988-8225

File No. ET2-0214-S1
November 8, 1982

South Bay Construction & Development Company
511 Division Street
Campbell, California 95008

Attention: Mr. Roger B. Dennis

Subject: Proposed Commercial Building
1555 Plymouth Street
Mountain View, California
SOIL AND FOUNDATION INVESTIGATION

Gentlemen:

We are pleased to transmit herein the results of our soil and foundation investigation performed on the site for the proposed Commercial Building to be located on Plymouth Street in Mountain View, California. This investigation was conducted in accordance with your authorization.

Thie report presents the results derived from our field investigation, laboratory testing, and our conclusion based on these. Our findings indicate that the subject site is suitable for the proposed building provided the recommendations contained in this report are carefully followed.

We are pleased to have been of assistance to you on this project. If you have any question, please give us a call at your convenience.

yours truly,

ENGEOTECH, INC.

Muhammad Hussain

Muhammad Hussain, P.E.

Copies: 4 to South Bay Construction & Development Company

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SOIL INVESTIGATION

Objective and Scope

This report presents the results of our soil and foundation investigation performed on the subject site located on Plymouth Street in Mountain View, California. The site is located to the east of the existing buildings that are being revamped and improved. It is located near the intersection of Plymouth Street and Huff Avenue. This investigation was performed to evaluate the surface and subsurface soil conditions at the subject site. Based on the results of our investigation, the objective was to provide recommendations for grading & earthwork, foundations, and slabs-on-grade construction for the proposed Commercial Building at the site on Plymouth Street in Mountain View, California.

The scope of the work performed for this investigation consisted of the following:

1. A site reconnaissance by the Soils Engineer;
2. Drilling of four exploratory test borings;
3. Sampling of surface and subsurface soils;
4. Laboratory testing of the samples obtained in the field;
5. Engineering analysis of the field and laboratory data; and
6. Preparation of this report.

Site Description

The site for the proposed building id situated to the south of Plymouth Street in Mountain View, California. There are commercial buildings to the west of the site that are being improved. An old drive in theatre is situated to the south

of the site. Residential houses occupy the east of the site.

The total area of the site is approximately 3.13± acres and the building area for the proposed building is 42,752.4 square feet. The site was used to test rides for the amusement park and has deep reinforced concrete footings over most of the area. These footings are about 1.5 feet above the existing ground surface. There are different types of underground structures scattered over the site. A sparse growth of weeds is covering the site.

The site description is based on the site reconnaissance by the Soils and the plans prepared by South Bay Construction & Development Co., Inc. of Campbell, California. The location of the site in relation to its surroundings is shown in Figure 1 (Site Plan) of Appendix "A".

Field Investigation

A detailed field investigation was conducted to obtain the surface and subsurface soil samples and other pertinent data for the project. The field investigation consisted of a site reconnaissance by the Soils Engineer and drilling of four exploratory test borings. The borings were drilled on November 3. 1982. The depth of the borings ranged from 20 to 25 feet below existing ground surface. All the drilling was accomplished with a truck-mounted, power-driven drill rig using 6-inch diameter augers. The soils encountered were logged continuously in the field during drilling operations. Relatively undisturbed soil samples were obtained by hammering the split-tube sampler into the ground with a 140-pound hammer falling 30 inches. Penetration Resistance (Blow Counts) were recorded for each sample. Bulk sample of the near-surface soil were collected for

laboratory analysis. Figure 2 through 5 show the depths and descriptions of the soils encountered and the vertical locations of the relatively undisturbed samples.

Laboratory Investigation

The samples collected in the field were subjected to different tests in our laboratory to determine the physical and engineering properties of the foundation soils at the site. All the relatively undisturbed samples collected from the borings were tested for their in-place moisture contents and dry densities in order to determine their consistencies throughout the explored soil profile. Unconfines compression test was performed on selected relatively undisturbed sample to establish strength parameters of the foundation soils. Atterberg Limit tests were conducted on the near-surface soil for the purposes of identification and classification of the soil type and to determine its expansion and shrinkage potential. The results of the laboratory tests are presented in Table 1 and in Figure 6 of Appendix "A".

Subsurface Soil Conditions

The soils at the site are fairly uniform throughout the area. The soils at and near the surface consist of silty clay which extend to about 6 feet below existing ground surface. There is about 12 to 18 inches of fill (sandy gravels) material covering the whole area. The soils between 6 and 11 feet consist mainly of sandy clay with varying amount of gravles at different locations. A layer of abour 5 feet of sandy gravels was encountered at 11 to 16 feet below existing ground surface. Blue clay material exists below the gravel layer.

Concrete reinforced footings are visible over most of the site. Stockpiles of material occupy the east and south sides of the site. Moisture content increased with depth. The stiffness and density of the materials in the subsurface layers increased with depth also. Free ground water was encountered at about 9 feet below the existing ground surface. A detailed description and Penetration Resistance of the soils is shown in the "Logs of Borings" in Appendix "A".

CONCLUSIONS

It is our opinion that the proposed concrete tilt-up Commercial Building can be constructed on the site provided the recommendations of this report are incorporated into the plans and specifications of the project. The soils at the site have adequate strength to support, in their undisturbed condition or as properly engineered fill, the loads anticipated from the proposed building, without detrimental settlement.

Native soils, with the exception of organically contaminated surface soils, are suitable for engineered fill. The material containing organics or other deleterious matter may be used in the landscaping areas only.

The proposed structure may be supported on continuous perimeter foundations with isolated interior spread footings, or by end bearing straight shaft or belled-end caissons type footings. Recommendations for these types of foundations, grading, and slabs-on-grade are discussed in the following pages.

RECOMMENDATIONS

A. GRADING AND EARTHWORK

1. General

The placement of fill and control of any grading operations at the project site should be done in accordance with the recommendations of this report. These recommendations set the minimum standards to satisfy other requirements of this report. All the grading work should be performed under the supervision of a representative from our firm. Sufficient notification prior to commencement of any grading operations is essential so that the work is properly observed.

2. Stripping and Clearing

The site should be stripped of the weeds and cleared of all the deleterious matter. No extensive stripping is neede except to remove the weeds. The material at the surface (Fill) should not be removed.

The reinforced concrete footings should be cut about 1.5 feet below the existing ground surface. All the undergroung structures should be removed and hauled away from the site. Big chunks of concrete could be broken to small pieces and used in the filling operations. This must be done under the direct supervision of a Soils Engineer from our firm. The depressions caused by the removal of the underground structures should be backfilled under the supervision of the Soils Engineer also.

3. Subgrade Preparation

After stripping the site and backfilling the depressions, the areas to receive engineered fill or building should be moisture conditioned and rolled to compact the fill already placed at the site. The building area may be brought to the desired grade with the material cut from the parking areas and the in the stockpiles already at the site. Some of the material in the stockpiles contain big chunks of concrete and other deleterious matter which should be removed and hauled away from the site.

4. Material for Fill

Native soils, free of organics and other deleterious matter, are suitable for engineered fill. The imported material, if needed, should be:

(a) Free of organics, debris, and other deleterious material;

(b) Granular in nature;

(c) Free of rocks in excess of 4 inches in size;

(d) Contain no more than 20% by dry weight of rocks between 2 to 4 inches when the rocks are uniformly distributed within the fill material;

(e) Possess sufficient fine soils to provide a competent matrix surrounding all rocks;

(f) Have a Plasticity Index (P.I.) of 12 or less; and

(g) Have Resistance "R"-Value in the order of 25.

5. Compaction

All engineered fill should be placed in uniform horizontal lifts of not more than 8 inches in uncompacted thickness and compacted to the following standards.

The existing fill material in the building pad areas should be rolled afetr moisture conditioning and compacted to 90% minimum relative compaction. Native soil used as fill should also be moisture conditioned and compacted to 90% relative compaction. The areas under the pavement should be compacted to at least 90% relative compaction after rough grading. The baserock on the building pad and under the pavement should, however, be compacted to 95% minimu relative compaction. The percent of relative compaction obtained must be based on the maximum dry density resulting from a laboratory compaction curve performed on the material as described in ASTM D1557-70 Test Designations. This test will also determine the optimum moisture content for the material.

If field density tests indicate that the density of any layer of fill, or portion thereof, is below the required compaction, the particular layer of fill, or portion thereof, shall be until the required compaction is obtained. Any fill placed without the approval of the Soils Engineer will have to be taken out and replaced under proper supervision.

6. Trench Backfill

Utility trenches that cross under the building pad or pavements should be back-filled with engineered fill and compacted. If on-site soil is used, the material should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted by mechanical means to a minimum of 90% relative compaction. Imported sand may be used for backfilling the utility trenches provided it is compacted to at least 90% relative compaction. Water jetting associated with compaction using vibratory equipment will be permitted only with imported sand backfill and with the approval of the Soils Engineer.

Where utility trenches cross under or through perimeter footings, they should be completely sealed to prevent moisture intrusion into the areas under the slabs or footings. The sealing of the trenches should be accomplished by compacting impervious material and should extend at least 3 feet on either side of the exterior footings.

7. Surface Drainage

The final exterior grade adjacent to the building should be such that the surface drainage will flow away from the structures. Rain water discharge at the down-spouts should be directed onto the pavement section, splash blocks, or other acceptable facilities that will prevent water from ponding in the areas adjacent to the foundations. The parking areas should be graded properly to drain the water to the drainage facilities effectively.

B. FOUNDATIONS

1. Footings

After the aformentioned site preparation procedures are completed, it is our opinion that the proposed Commercial Building on Plymouth Street may be supported on continuous perimeter foundations with isolated interior spread footings or by end bearing straight shaft or belled-end caissons. Recommendations for these types of foundations are disvussed in the following paragraphs.

All continuous perimeter and isolated interior spread footings sahll be founded a minimum of 18 inches into the final compacted soil building pad. For the foregoing conditions, the footings may be designed for an allowable bearing pressure of 1900 p.s.f. This bearing value is for dead plus live loads and may be increased by one-third to include short-term seismic and wind effects.

Straight shaft or belled-end caissons type of foundations should be embedded at least 8 feet below the existing grade. The allowable bearing value for this type of foundations is 5000 p.s.f.

If drilled caissons are use, they must be used for all interior and exterior columns. The Soils Engineer should inspect all the drilled caissons and footing excavations prior to concrete pouring.

In order to maintain adequate support for footings, the bottom of the utility trenches located adjacent to or within the buildings should not extend below an imaginary plane having an inclination of 2 horizontal to 1 vertical downward from the bottom edge of the footings.

Final design of foundations and reinforcing required shall be determined by the Engineer responsible for the design of Structures.

2. Concrete Slabs-on-Grade

A minimum of 4 inches of Class 2 baserock and 2 inches of sand should be used between the finished subgrade and the concrete slabs. The baserock should be compacted to the standards mentioned in A.5 "Compaction". The sand should be wetted wirh water before poring concrete.

Use of a vapor barrier under the concrete slabs is optional depending upon the nature of the floor coverings. Plastic membrane, if used should be placed between the baserock and the sand.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings. If any unusual soil conditions are encountered during construction, or if the proposed construction will differ from that planned at the present time, ENGEOTECH, INC., should be notified for supplemental recommendations.

2. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the recommendations and information contained herein are called to the attention of the Architect and Engineers for the project and are incorporated into the plans and specifications.

3. The findings of this report are valid as of the present time. However, passing of time will change the conditions of the existing property due to natural processes, or the works of man. In addition, legislation or the broadening of knowledge may require other recommendations. Accordingly, the findings of this report may be invalidated, wholly or partly, by changes outside of our control. Therefore, this report should not be relied upon after a period of three years without being reviewed by a Soil Engineer.

4. The conclusions and recommendations contained herein are professional opinions derived in accordance with the current standards of professional practice and no warranty is intended, expressed or implied.

APPENDIX "A"

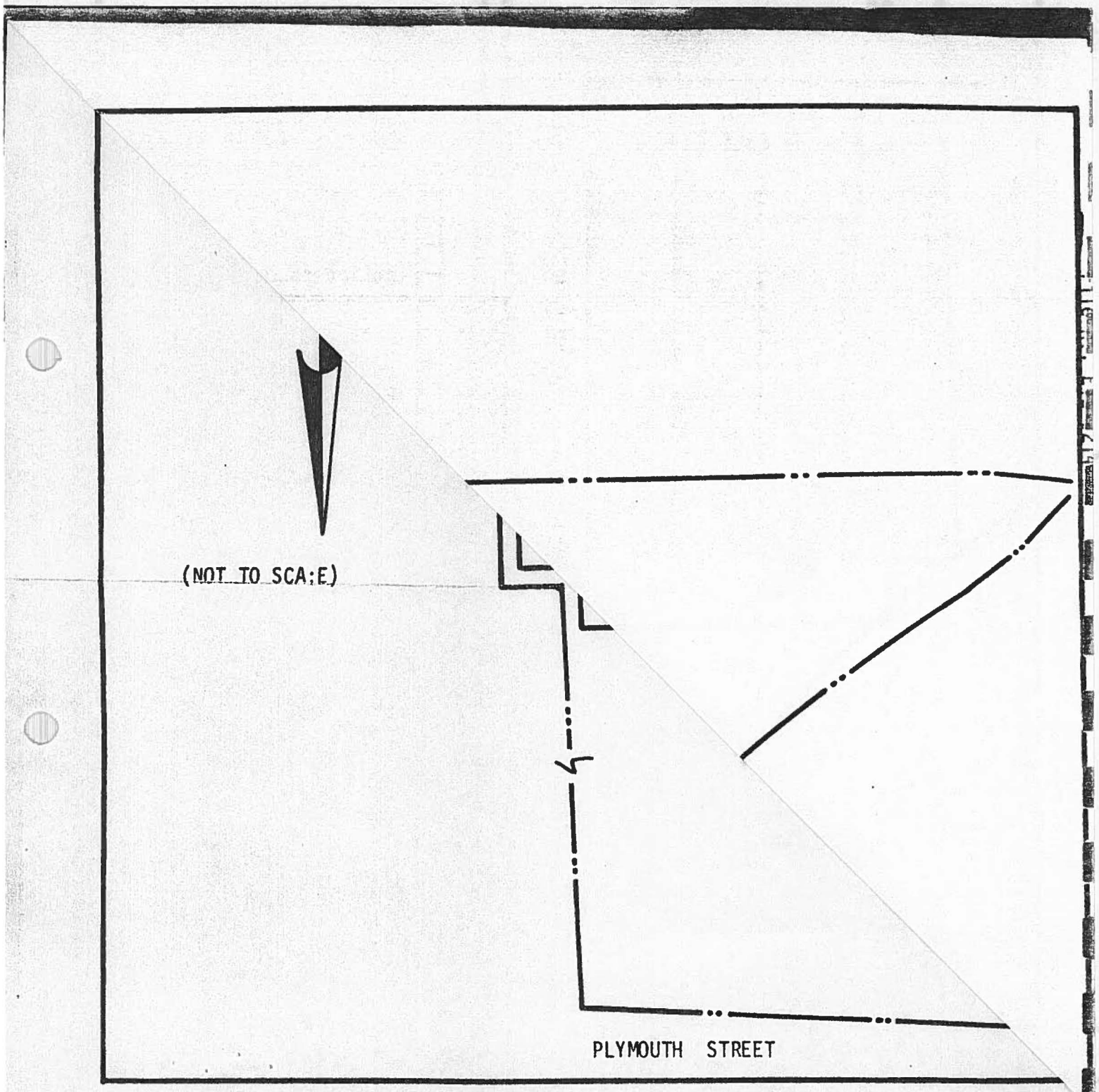


Figure 1 - Site Plan and Approximate Location of Borings

EXPLORATORY BORING LOG

JOB NO. ET2-0214-S1

DATE DRILLED 11-3-1982

BORING NO. B-1

LOGGED BY M.H.

IN PLACE							
DRY DENSITY P.C.F.	MOISTURE CONTENT % DRY WT.	PENETRATION RESISTANCE BLOWS/FT.	UNCONFINED COMP. STRENGTH K.S.F.	SAMPLE NO.	DEPTH IN FT.	BORING LOG	DESCRIPTION & REMARKS
101.4	15.8	24	4.3	1-1	3-4		Top one foot fill Black silty Clay; Moist, stiff
							Bluish brown sandy Clay; Wet, stiff
104.6	16.4	35		1-2	10-11		Water @ 10'
NO RECOVERY		38		1-3	14-15		Bluish sandy Gravels; Gravels upto 1.5 inches in diameter Wet, dense
							Blue silty Clay; Wet, very stiff
100.7	29.8	29		1-4	22-23		Blue sandy Clay; Wet, stiff
							Boring terminated @ 25 '

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FIGURE NO. 2 - LOG OF TEST BORING

EXPLORATORY BORING LOG

JOB NO. ET2-0214-S1 DATE DRILLED 11-3-1982

BORING NO. B-2 LOGGED BY M.H.

IN PLACE: DRY DENSITY P.C.F.	IN PLACE: MOISTURE CONTENT % DRY WT.	PENETRATION RESISTANCE BLOWS/FT.	UNCONFINED COMP. STRENGTH K.S.F.	SAMPLE NO.	DEPTH IN FT.	BORING LOG	DESCRIPTION & REMARKS
102.5	17.8	28		2-1	4-5		Top one foot Fill Dark brown silty Clay; Moist, stiff
							Brown sandy Clay; Wet, stiff
NO RECOVERY		41		2-2	11-12		Bluish sandy Gravels /some clay; Wet, very dense
NO RECOVERY		43		2-3	16-17		Similar material but less clay;
							Bluish gravelly Sand w/clay; Wet, very dense
							Reddish brown sandy Clay; Wet, very stiff
							Boring terminated @ 25'

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FIGURE NO. 3 - LOG OF TEST BORING

EXPLORATORY BORING LOG

JOB NO. ET2-0214-S1

DATE DRILLED 11-3-1982

BORING NO. B-3

LOGGED BY M.H.

IN PLACE							
DRY DENSITY P.C.F.	MOISTURE CONTENT % DRY WT.	PENETRATION RESISTANCE BLOWS/FT.	UNCONFINED COMP. STRENGTH K.S.F.	SAMPLE NO.	DEPTH IN FT.	BORING LOG	DESCRIPTION & REMARKS
							Top one foot Fill Dark brown silty Clay; Moist, stiff
105.0	18.3	30		3-1	6-7		Wet, stiff Blue silty Clay w/sand
107.3	11.3	45		3-2	11-12		Bluish gravelly Sand w/clay; Wet, very dense
							Blue sandy Clay; Wet, stiff
100.6	28.4	29		3-3	17-18		Blue Clay (Blue Mud) Wet, very stiff
							Blue sandy Clay; Some gravels Wet, very stiff
							Boring terminated @ 25'

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FIGURE NO. 4 - LOG OF TEST BORING

EXPLORATORY BORING LOG

JOB NO. ET2-0214-S1 DATE DRILLED 11-3-1982

BORING NO. B-4 LOGGED BY M.H.

IN PLACE: DRY DENSITY P.C.F.	IN PLACE: MOISTURE CONTENT % DRY WT.	PENETRATION RESISTANCE BLOWS/FT.	UNCONFINED COMP. STRENGTH K.S.F.	SAMPLE NO.	DEPTH IN FT.	BORING LOG	DESCRIPTION & REMARKS
101.1	16.7	30		4-1	5-6		Top 1.5 feet Fill Dark brown silty Clay; Moist, stiff
							Bluish brown silty Clay; Some Gravels Wet; stiff
				Water @	10'		Bluish sandy Clay w/gravels; Wet, stiff
NO RECOVERY		41		4-2	12-13		Bluish sandy Gravels; Wet, very dense
99.4	31.2	26		4-3	17-18		Blue Clay; Wet, stiff
							Boring terminated @ 20'

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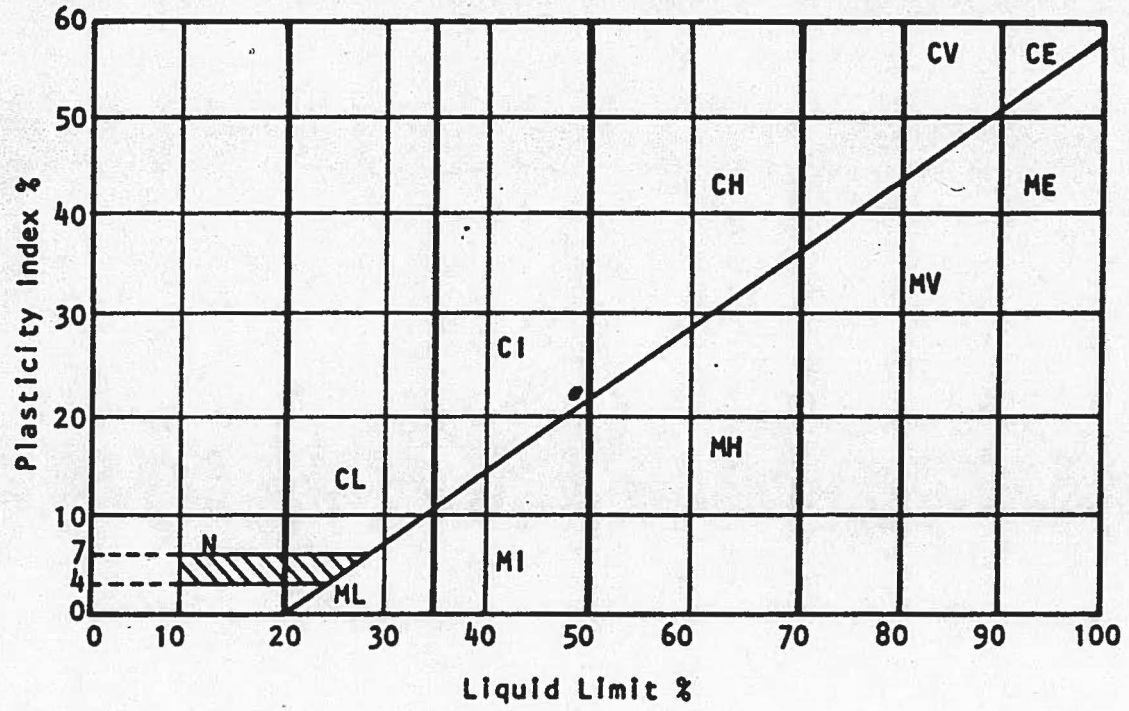
FIGURE NO. 5 LOG OF TEST BORING

TABLE I

SUMMARY OF MOISTURE, DENSITY,
UNCONFINED COMPRESSION AND DIRECT SHEAR TESTING

Sample No.	Depth Ft.	In-Place Conditions		Unconfined Compressive Strength k.s.f.	Direct Shear Testing	
		Moisture Content % Dry Wt.	Dry Density p.c.f.		Angle of Internal Friction Degrees	Unit Cohesion p.s.f.
1-1	3-4	15.8	101.4	4.3		
1-2	10-11	16.4	104.6			
1-3	14-15	NO RECOVERY				
1-4	22-23	29.8	100.7			
2-1	4-5	17.8	102.5			
2-2	11-12	NO RECOVERY				
2-3	16-17	NO RECOVERY				
3-1	6-7	18.3	105.0			
3-2	11-12	11.3	107.3			
3-3	17-18	28.4	100.6			
4-1	5-6	16.7	101.1			
4-2	12-13	NO RECOVERY				
4-3	17-18	31.2	99.4			

PLASTICITY CHART



PLASTICITY DATA

Key Symbol	Hole No.	Depth Ft.	Liquid Limit %	Plasti-city Index %	Unified Soil Clas-sification Symbol*
●	BAG "A"	1.5-2	48.6	21.4	CI

* Soil type classification based on British suggested revisions to Unified Soils Classification System

Figure 6 - Atterberg Limit Tests

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GOOGLE NORTH BAYSHORE
CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, COMMONS, AND SPACE PARK CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PRELIMINARY GEOTECHNICAL REPORT

SUBMITTED TO
CBRE@Google
1600 Amphitheatre Parkway
Mountain View, CA 94043

PREPARED BY
ENGEO Incorporated

November 27, 2019

PROJECT NO.
15949.000.000

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Project No.
15949.000.000

November 27, 2019

Ms. Lisa Herrera
CBRE@Google
1600 Amphitheatre Parkway
Mountain View, CA 94043

Subject: Google North Bayshore
Charleston South, Joaquin, and Plymouth Campuses
Mountain View, California

PRELIMINARY GEOTECHNICAL REPORT

Dear Ms. Herrera:

We are pleased to present this preliminary geotechnical evaluation report for the five Google campuses, known as Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses, located in Mountain View, California. These five campuses are part of the Google North Bayshore project. This report presents our preliminary geotechnical observations, as well as our preliminary conclusions and recommendations for the subject campuses.

Based on the results of our exploration, the future development at these sites is feasible from a geotechnical standpoint. Recommendations presented in this report should be considered during the schematic design. A design-level exploration should be conducted prior to site development once detailed plans have been prepared.

If you have any questions or comments regarding this report, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Bahareh Heidarzadeh, PhD, PE

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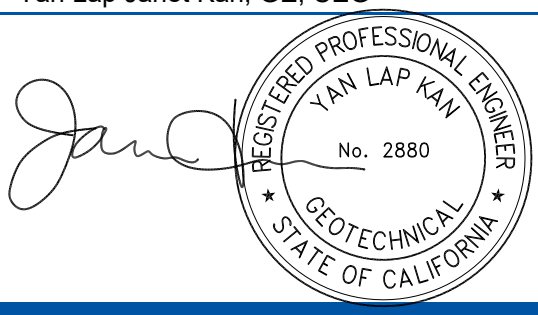
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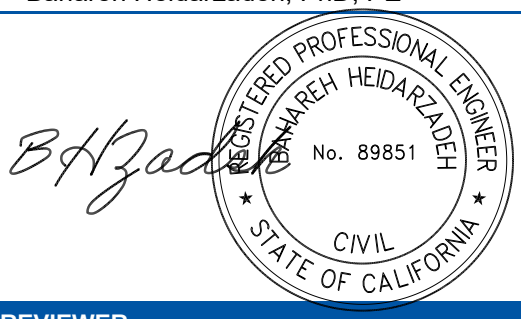
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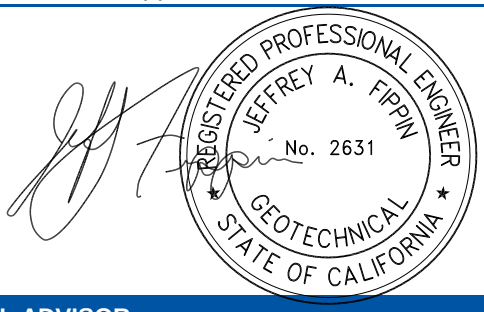
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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this preliminary geotechnical report is to provide an assessment of geotechnical conditions and concerns associated with the five subject campuses and provide preliminary recommendations to support planning of Google development at the subject properties. At the time of preparation of this report, no schematic design was available. Our services included the following tasks:

- Reviewed available literature and geologic maps.
- Reviewed historic aerial photos.
- Obtained appropriate Santa Clara Valley Water District permits.
- Notified Underground Services Alert a minimum of 48 hours prior to our exploration.
- Retained a private utility locator to clear the proposed exploration locations of existing utilities.
- Prepared a work plan, including proposed locations for our explorations, as well as excavation checklists showing their proximity to existing utilities.
- Performed subsurface field exploration.
- Performed laboratory testing on soil samples collected.
- Analyzed geotechnical data collected.
- Interpreted subsurface field exploration data.
- Evaluated potential geotechnical concerns.
- Performed a code-based seismic hazard analysis.
- Provided preliminary foundation recommendations in this report.
- Provided earthwork recommendations.

We prepared this report for the exclusive use of CBRE@Google and its consultants for planning purposes. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without our express written consent.

1.2 SITE LOCATION AND DESCRIPTION

The five subject campuses, Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses, are located in Mountain View, California, on average approximately 2 miles south of the San Francisco Bay as shown on the Vicinity Map (Figure 1). The Site Plan (Figures 2A, 2B, 2C, 2D, and 2E) show the boundaries of the campuses and the locations of our explorations.

The Charleston South project site is approximately 22 acres in area and is bounded by Charleston Road to the north, Huff Avenue to the west, Plymouth Street to the south, and Joaquin Road to the east.

The Joaquin site is approximately 9 acres in area and is bounded by North Shoreline Blvd. to the east, the Plymouth Street and Common Campus to the south, Joaquin Road to the west, and a bike road and a surface parking lot to the north.

The Plymouth site is approximately 5 acres in area and is bounded by Plymouth Street to the north, Alta Avenue to the west, and a building at 1625 Plymouth Street identified on Google Maps as US-MTV-Plym1625 to the east. California US 101 runs to the south of the site.

The Commons site is approximately 3½ acres in area and is bounded by the Joaqiun Campus to the north and west, surface parking lots to the south and west, and N Shoreline Boulevard to the east. Plymouth Street divides the two halves of this campus.

The Space Park Site is approximately 2 acres in area and is bounded by the North Shoreline Boulevard to the west, a building at the address 1625 N Shoreline Blvd to the north, a building at 1390 Pear Ave Ste D, identified on Google Maps as Cucina Venti Restaurant to the south, and a building at 1350 Pear Avenue, identified on Google Maps as RENVU Solar Equipment Distribution, to the east.

1.3 FIELD EXPLORATION

Our field exploration for the five campuses included advancing 18 Cone Penetration Tests (CPTs) and drilling 10 borings as summarized in Table 1.3-1.

TABLE 1.3-1: Field Explorations

CAMPUS	CPT/BORINGS	PUSHED/DRILLED DEPTH (feet bgs)	PUSHED/DRILLED ELEVATION (WGS84[1]) (feet)	DATE COMPLETED
Charleston South	1-SCPT04	100.6	-87.6	May 8, 2019
	1-CPT13	100.6	-87.6	May 14, 2019
	1-CPT14	120.6	-107.6	May 14, 2019
	1-CPT15	80.5	-66.5	May 8, 2019
	1-CPT16	80.5	-63.5	May 9, 2019
	1-CPT17	100.6	-83.6	May 10, 2019
	1-CPT18	100.6	-85.6	May 11, 2019
	1-B08	101.5	-88.5	May 14, 2019
	1-B09	103.0	-89.0	May 16, 2019
	1-B10	51.5	-34.5	May 17, 2019
Joaquin	1-CPT01	50.5	-34.5	May 7, 2019
	1-SCPT02	100.6	-84.6	May 7, 2019
	1-CPT03	120.6	-103.6	May 8, 2019
	1-CPT06	120.6	-103.6	May 7, 2019
	1-B01	101.5	-85.5	May 19, 2019
	1-B02	101.5	-83.5	May 19, 2019
	1-B04	81.5	-65.5	June 9, 2019

[1] **World geodetic System (WGS84)**

CAMPUS	CPT/BORINGS	PUSHED/DRILLED DEPTH (feet bgs)	PUSHED/DRILLED ELEVATION (WGS84[1]) (feet)	DATE COMPLETED
Plymouth	1-CPT09	100.6	-79.6	May 13, 2019
	1-SCPT10	80.5	-61.5	May 13, 2019
	1-CPT11	100.6	-82.6	May 14, 2019
	1-CPT12	80.5	-60.5	May 14, 2019
	1-B07	81.5	-62.5	June 7, 2019
Commons	1-CPT5	80.5	-62.5	July 9, 2019
	1-CPT7	80.5	-61.5	July 8, 2019
	1-B3	81.5	-66.5	July 10, 2019
	1-B5	46.5	-30.0	July 9, 2019
Space Park	1-CPT8	120.6	-102.6	July 8, 2019
	1-B6	81.5	-68.5	July 8, 2019

We recorded the locations of the explorations using the GIS-based, Collector Application, on a smart phone. We show the locations of the explorations on Figures 2A to 2E.

1.3.1 Borings

We observed the drilling of 10 borings at the locations shown on the Site Plans, Figures 2A to 2E. An ENGEO representative observed the drilling and logged the subsurface conditions at each location. We retained the services of a drilling contractor using two truck-mounted drill rigs. We advanced the borings using the mud rotary drilling method with a 4-inch-diameter tricore roller cone drill bit. We advanced the borings to depths ranging from 46.5 to 120.5 feet below existing grade. To address environmental concerns, we cased all the exploratory borings to 50 feet below existing grade. We did not observe the artesian aquifer in the exploratory borings. We permitted and backfilled the borings in accordance with the requirements of the Santa Clara Valley Water District (SCVWD).

We obtained soil samples at various intervals using standard penetration test (SPT) samplers with a 2-inch outside diameter (O.D. split-spoon sampler) and California Modified samplers with 2½-inch inside diameter (I.D.). We obtained the blow counts shown on our bore logs with an automatic trip, 140-pound hammer with a 30-inch free fall. We drove the sampler 18 inches and recorded the number of blows for each 6 inches of penetration. We have not converted the blow counts presented on the borelogs using any correction factors. We also obtained hydraulically pushed Shelby tubes, and Dames and Moore samplers at select locations. We present the fluid pressures recorded for the hydraulically pushed samples on the exploration logs in Appendix A.

We contained soil cuttings and excess fluids in 55-gallon steel drums, which we sampled according to procedures described in the gSAFE document, *EHS Processes to Haul Soil off Site*. The findings and recommendations for disposal were presented under a separate cover.

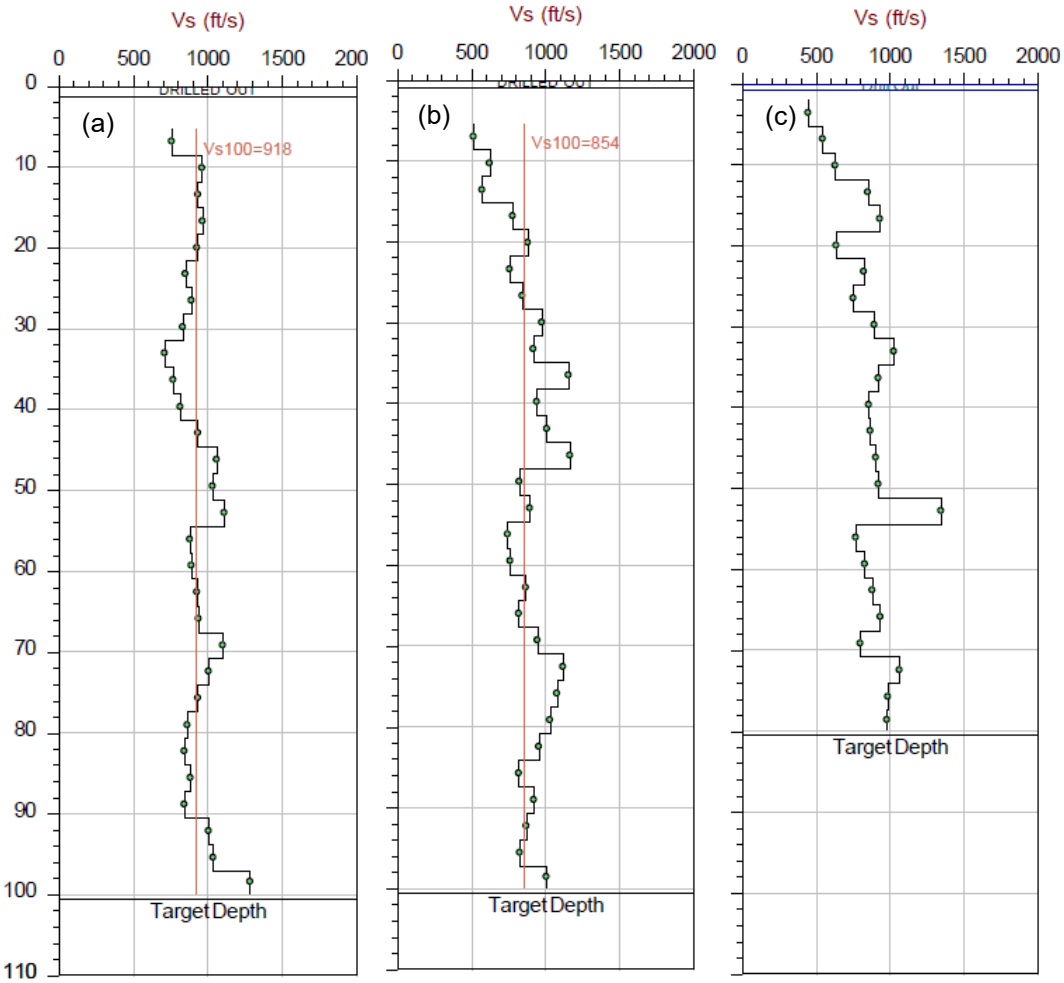
We provide additional information about specific subsurface conditions at each location in our exploration logs in Appendix A. The soil type, color, consistency, and visual classification provided in the logs are generally accordance with the Unified Soil Classification System.

1.3.2 Cone Penetration Tests

We retained the services of a contractor with a CPT rig to advance CPTs at 18 locations to depths of approximately 50.5 to 120.5 feet below the ground surface (bgs) in general accordance with ASTM D-5778. We drilled mud-rotary borings in proximity to 1-SCPT02, 1-SCPT04, 1-SCPT10, and 1-CPT18 to allow direct comparison of the data (matched pairs). Measurements include the tip resistance to penetration of the cone (Qc), the resistance of the friction sleeve (Fs), and pore pressure (U) (Robertson and Campanella, 1988).

We performed shear wave velocity (V_S) measurements in 1-SCPT02, 1-SCPT04, and 1-SCPT10, using the downhole seismic method specified in ASTM D-7400. We present the CPT logs and the V_S profiles in Appendix B. As shown in Appendix B, the time-averaged shear wave velocity over the top 100 feet or 30 meters (V_{S30}) representative of the five campuses ranges from 808 to 918 feet/sec. The results are shown in the Exhibit 1.3.2-1.

EXHIBIT 1.3.2-1: Seismic Cone Penetration Vs Measurements at (a) Charleston South (b) Joaquin, and (c) Plymouth* Campuses



*Plymouth Vs30 is calculated to be 808 feet/sec, assuming the Vs between 80 to 100 feet is 900 feet/sec.

1.4 LABORATORY TESTING

We performed laboratory tests on select soil samples to evaluate their engineering properties. For this project, we performed laboratory testing as shown in the table below.

TABLE 1.4-1: Laboratory Testing

SOIL CHARACTERISTIC	TESTING METHOD	LOCATION OF RESULTS
Natural Unit Weight	ASTM D7263	Appendix A
Natural Moisture Content	ASTM D2216	Appendix A
Plasticity Index (PI) (Wet Method)	ASTM D4318	Appendix C
Grain Size Distribution	ASTM D1140	Appendix C
Consolidation – Constant Rate of Strain	ASTM D4186	Appendix C
Cyclic Simple Shear (CSS)	ASTM D6528	Appendix C
Triaxial Compression – Consolidated, Undrained (TXCU)	ASTM D4767	Appendix C
Triaxial Compression – Unconsolidated, Undrained (TXUU)	ASTM D2850	Appendix C
Unconfined Compression	ASTM D2166	Appendix C
Corrosivity	ASTM Methods	Appendix D

2.0 FINDINGS

2.1 SITE HISTORY

We reviewed historic aerial photographs for the sites from dates ranging between 1948 and present[2]. Historic topographic maps suggest that the sites may have been used for limited agricultural purposes and were mostly undeveloped or occupied by single-family houses and farmlands prior to being completely developed in the 1980s. As described in Section 1.2 of this report, currently, the sites encompass several existing buildings, asphalt concrete-paved parking areas, trees, and associated landscaping.

2.2 REGIONAL AND SITE GEOLOGY

These sites are located at the northwestern end of the Santa Clara Valley in the Coast Ranges geomorphic province of California. The Coast Ranges are dominated by a series of northwest-trending ridges and valleys formed by faulting and folding of the earth's crust. The Santa Clara Valley region lies to the east of the San Andreas Fault and to the west of the Hayward and Calaveras Faults.

Geologic mapping prepared by Brabb et al. (2000) (Figure 3) indicates that the sites are underlain by Holocene-age basin deposits (Qhb) consisting of very fine silty clay to clay deposits occupying flat-floored basins at the distal edge of alluvial fans adjacent to bay mud. These deposits are known to contain unconsolidated, locally organic, plastic silt and silty clay.

[2] https://www.historicaerials.com

2.3 SEISMICITY

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 4 shows the approximate locations of active faults and significant historic earthquakes recorded within the San Francisco Bay Region. The Mountain View area contains numerous active earthquake faults. The nearest active faults are the Monte Vista-Shannon, San Andreas, Hayward, and Calaveras faults, which are capable of producing earthquakes with moment magnitudes of 6.86, 7.85, 6.84, and 7.28, respectively. We list details of these active faults in Table 2.3-1. 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) (Bryant and Hart, 2007).

TABLE 2.3-1: Active Faults According to UCERF3 Capable of Producing Significant Ground Shaking
(Latitude: 37.41923° Longitude: -122.081701° - at the centroid of the sites)[3]

SOURCE	CLOSEST DISTANCE (miles) | (km)	MOMENT MAGNITUDE (M_W)	FAULT MECHANISM
Monte Vista-Shannon	4.95 | 7.97	6.86	Reverse
San Andreas (Peninsula)	8.08 | 13.0	7.85	Strike Slip
Hayward	10.8 | 17.38	6.84	Strike Slip
Calaveras	14.51 | 23.35	7.28	Strike Slip

The sites are not located within a designated Alquist-Priolo Earthquake Fault Zone and no known surface expression of active faults is believed to exist within the site; as such, the risk of fault rupture through the site is considered low.

2.4 SURFACE AND SUBSURFACE CONDITIONS

Current ground surface elevations at the fives campuses range from approximately 13 to 21 feet (WGS84[4]). Current surface conditions consist of paved parking and landscape areas.

2.4.1 Charleston South Campus

In our explorations at the Charleston South Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to hard, sandy lean and fat clay.

In the northern part of the campus (1-B08), below the fill, we encountered basin deposits composed of lean clays interbedded with dense poorly graded sand, well-graded gravel, and silty clayey sand. We encountered a 10-foot-thick layer of dense, poorly graded sand and well-graded gravel at 8 feet bgs, and 2- to 5-foot-thick layers of medium dense to very dense, poorly graded sand and silty sand at various depths.

In the middle (1-B09) and southern (1-B10) part of the site, below the fill, we encountered basin deposits composed of medium stiff to very stiff fat and lean clays interbedded with more granular soil. We encountered an approximately 20-foot-thick layer of medium dense to dense clayey sand

[3] https://earthquake.usgs.gov/hazards/interactive/
[4] World Geodetic System (WGS84)

at 39 feet bgs. Additionally, we encountered sandy silt, silty sand, and medium dense to dense clayey sand layers up to 7 feet thick at various depths.

We present an idealized subsurface profile for the Charleston South site for preliminary design purposes only. Variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.1-1: Generalized Subsurface Profile for Charleston South Campus

DEPTH (feet)	ELEVATION (WGS84)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 6.5	CL/CH	Stiff to very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
8 to 11	6.5 to 3.5	SP/GW	Dense, Poorly Graded Sand and Well Graded Gravel
11 to 40	3.5 to -25.5	CL	Stiff, Lean Clay
40 to 48	-25.5 to -33.5	SC	Dense, Clayey Sand
48 to 55	-33.5 to -40.5	SC	Medium Dense Clayey Sand
Below 55	Below -40.5	CL/CH	Medium Stiff to Very Stiff, Lean Clay to Fat Clay

*Based on average surface elevation of 14.6 feet

2.4.2 Joaquin Campus

At the Joaquin Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to very stiff lean clay and fat clay. Below the fill, we encountered basin deposits composed of stiff to hard lean, fat, and sandy clay interbedded with medium dense to dense well-graded sand, well-graded gravel, and clayey sand. A 16-foot-thick layer of clayey sand was encountered at 23 feet bgs in 1-B04 and 20-foot-thick layer of clayey sand was encountered at 78 feet bgs in 1-B01. Towards the south of the site, the clayey sand layers become less dense; however, we have limited subsurface information in this area due to presence of existing building.

We present an idealized subsurface profile for the Joaquin site for preliminary design purposes only. Variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.2-1: Generalized Subsurface Profile for Joaquin Campus

DEPTH (feet)	ELEVATION (WGS84)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 8.5	CL/CH	Stiff to very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
8 to 21	8.5 to -4.5	CL/SC	Stiff to very stiff, Clayey Sand to Sandy Lean Clay
21 to 30	-4.5 to -13.5	CH/CL	Stiff to very stiff, Fat Clay and Lean Clay
30 to 40	-13.5 to -23.5	GC/SP	Medium dense, Clayey Gravel and Poorly Graded Sand
40 to 50	-23.5 to -33.5	CL	Stiff to very stiff, Lean Clay
50 to 60	-33.5 to -43.5	SC	Medium dense, Clayey Sand
Below 60	Below -43.5	CL/CH	Very stiff to hard, Lean Clay and Fat Clay

*Based on average surface elevation of 16.6 feet

2.4.3 Plymouth Campus

In our explorations at the Plymouth Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to very stiff lean clay and sandy silt. Below the fill, we encountered basin deposits composed of stiff to very stiff lean, fat, and sandy clay interbedded with medium dense clayey sand, well-graded sand, and sandy silt to silty sand. We encountered a 15-foot-thick layer of sandy silt to silty sand at 55 feet bgs in 1-B07.

We present an idealized subsurface profile for the Plymouth site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.3-1: Generalized Subsurface Profile for Plymouth Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 11.5	CL/ML	Stiff to very stiff, Lean and Sandy Silt (Non-Engineered Surficial Fill)
8 to 20	11.5 to -0.5	SC	Medium dense, Clayey Sand with Gravel
20 to 33	-0.5 to -13.5	CL/SC	Stiff to very stiff, Sandy Clay and Clayey Sand
33 to 40	-13.5 to -20.5	SW	Medium dense, Well Graded Sand with Clay and Gravel
40 to 50	-20.5 to -30.5	CL	Medium stiff to stiff, Lean Clay and Sandy Clay
50 to 70	-30.5 to -50.5	SM/ML	Medium stiff to stiff, Sandy silt to silty sand
Below 70	Below -50.5	CH	Very stiff, Fat Clay

*Based on average surface elevation of 19.4 feet

2.4.4 Commons Campus

In our explorations at the Commons Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of very stiff fat clay and fat clay with sand. Below the fill, in the northern portion of the site, we encountered a 7-foot-thick layer of medium dense to dense poorly graded sand with gravel. In the southern portion of the site, below the fill, we encountered a 15-foot-thick layer of silty sand with gravel that is medium dense on the top, but becomes loose towards the bottom. This layer is potentially liquefiable. Below this granular layer, we encounter basin deposits composed of stiff to very stiff lean and fat clay with and without sand interbedded with medium dense clayey sand and silty sand.

We present an idealized subsurface profile for the Commons site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.4-1: Generalized Subsurface Profile for Commons Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 10	Above 8.5	CL/CH	Very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
10 to 23	8.5 to -4.5	SM/SP-SM	Dense to Medium Dense Silty Sand and Poorly Graded Sand with Gravel and Silt
23 to 35	-4.5 to -16.5	CL	Stiff Lean Clay
35 to 40	-16.5 to -21.5	CL	Very Stiff, Lean Clay.
40 to 45	-21.5 to -26.5	SC/SM	Medium Dense, Clayey Sand and Silty Sand

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
45 to 50	-26.5 to -31.5	CL	Stiff, Lean Clay
50 to 75	-31.5 to -56.5	CL	Stiff to Very Stiff, Lean Clay
75 to 80	-56.5 to -61.5	SP-SC	Poorly Graded Sand with Clay
Below 80	Below -61.5	CL	Very Stiff, Lean Clay

*Based on average surface elevation of 18.6 feet

2.4.5 Space Park Campus

In our explorations at the Space Park Campus, we encountered 8 to 10 feet of surficial non-engineered fill consisting of stiff to very stiff fat clay. Below the fill, we encountered basin deposits composed of stiff to very stiff lean and sandy clay interbedded with medium dense clayey sand, poorly graded sand with clay and gravel, poorly graded gravel with clay, silty sand, and silt.

We present an idealized subsurface profile for the Space Park site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.5-1: Generalized Subsurface Profile for Space Park Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 11	CH	Stiff to Hard, Fat Clay (Non-Engineered Surficial Fill)
8 to 18	11 to 1	CL	Stiff to Very Stiff, Lean Clay
18 to 35	1 to -16	CL	Hard, Lean Clay
35 to 45	-16 to -26	SC/SP-SC	Loose to Dense, Clayey Sand and Poorly Graded Sand with Clay and Gravel
45 to 60	-26 to -41	CL	Medium Stiff to Hard, Sandy Clay
60 to 70	-41 to -51	ML	Stiff, Silt
70 to 82	-51 to -63	SM/GP	Medium Dense to Dense, Silty Sand and Sandy Gravel to Gravelly Sand
Below 80	Below -61	CL	Very Stiff, Lean Clay

*Based on average surface elevation of 18.9 feet

2.5 GROUNDWATER CONDITIONS

We observed groundwater at shallow depths in a few of the borings before switching from solid flight auger to mud-rotary drilling methods. We observed groundwater at depths ranging from 5½ to 7½ feet, which corresponds to approximately Elevation 5½ to 9½ feet (WGS84). We summarize our groundwater observations in Table 2.5-1.

In addition to observing the groundwater level in a few borings, we performed pore pressure dissipation tests in the CPTs. These tests suggest that the groundwater level is approximately 3 to 11 feet deep below existing grade, which corresponds to approximately Elevation 5 to 14 feet (WGS84), as presented in Table 2.5-1 below.

TABLE 2.5-1: Recorded Groundwater Levels (at Time of Exploration)

CAMPUS	BORING / CPT	GROUNDWATER DEPTH (feet bgs)	GROUNDWATER ELEVATION (WGS84, feet)
Charleston South	1-SCPT04	8.1*	4.9*
	1-CPT13	8.5*	4.5*
	1-CPT14	7.0*	6*
	1-CPT15	6.2*	7.8*
	1-CPT16	8.1*	8.9*
	1-CPT17	4.8*	12.2*
	1-CPT18	3.1*	11.9*
	1-B08	7.5	5.5
	1-B09	5.5	9.5
	1-B10	7.5	9.5
Joaquin	1-CPT01	11.1*	4.9*
	1-SCPT02	8.9*	7.1*
	1-CPT03	9.0*	8.0*
	1-CPT06	8.2*	7.8*
	1-B01	Not obtained due to drilling method	
	1-B02	Not obtained due to drilling method	
	1-B04	Not obtained due to drilling method	
Plymouth	1-CPT09	6.8*	14.2*
	1-CPT10	4.8*	14.2*
	1-CPT11	6.2*	11.8*
	1-CPT12	6.3*	13.7*
	1-B07	Not obtained due to drilling method	
Commons	1-CPT5	7.7*	10.9*
	1-CPT7	8.1*	10.5*
	1-B3	Not obtained due to drilling method	
	1-B5	Not obtained due to drilling method	
Space Park	1-CPT8	6.0*	12.9*
	1-B6	Not obtained due to drilling method	

*Assumed phreatic surface based on pore pressure dissipation tests assuming hydrostatic conditions.

Plate 1.2 of the Seismic Hazard Zone Report for the Mountain View Quadrangle (2006) indicates the highest historical groundwater within the sites vicinity to be less than approximately 5 feet below the ground surface. For purposes of our analyses and recommendations, we consider an appropriate design groundwater depth of 6 feet below ground surface, which corresponds to an elevation range of 4½ to 14 feet (WGS84).

Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation practices, and other factors not evident at the time measurements were made. Excavations for utility installation may encounter groundwater, depending upon the time of year of construction.

3.0 DISCUSSION AND CONCLUSIONS

Based on the exploration and laboratory test results, the project site is feasible for the future developments provided the recommendations contained in this report are properly incorporated into the design plans and specifications.

The potential geotechnical concerns for the future site redevelopment are as follows:

- The potential for liquefaction of coarse-grained material and cyclic softening of some of the fine-grained soil materials below the groundwater table during a seismic event.
- The presence of groundwater and its influence on below-grade construction.
- The potential need for shoring systems for below-grade construction, if planned, to protect the excavation walls, adjacent streets and improvements, and the potential need for dewatering of excavations extending below the groundwater surface.
- The potential for flooding due to sea-level rise.
- The potential settlement of medium stiff clayey and silty deposits under new loads, such as placement of additional fill and high building loads.

We evaluate the geologic hazards common around the bay area in the following sections.

3.1 SEISMIC HAZARDS

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking and liquefaction. The following sections present a discussion of these hazards as they apply to the site. Based on topographic and lithologic data, the risk of regional subsidence or uplift, lurching, landslides, tsunamis, or seiches is low to negligible at the site.

3.1.1 Ground Rupture

Since there are no known active faults crossing the property and the site is not located within an Earthquake Fault Special Study Zone, ground rupture is unlikely at the subject property.

3.1.2 Ground Shaking

Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead and live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the actual forces that would be associated with a major earthquake. Therefore, structures should be able to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse, but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1996). Section 3.3 presents California Building Code (CBC, 2019) seismic design.

3.1.3 Liquefaction / Cyclic Softening

The site is located within a State of California Seismic Hazard Zone (CGS, 2006) for areas that may be susceptible to liquefaction (Figure 5).

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. The soil most susceptible to liquefaction is clean, loose, saturated, uniformly graded fine sand below the groundwater table. Empirical evidence indicates that loose silty sand is also potentially liquefiable. When seismic ground shaking occurs, the soil is subjected to cyclic shear stresses that can cause excess hydrostatic pressures to develop. If excess hydrostatic pressures exceed the effective confining stress from the overlying soil, the sand may undergo deformation. If the sand undergoes virtually unlimited deformation without developing significant resistance, it is said to have liquefied and, if the sand consolidates or vents to the surface during and following liquefaction, ground settlement and surface deformation may occur. In addition to liquefaction of sandy materials, clayey soil can also undergo “cyclic-softening” or strength loss as a result of cyclic loading. We considered both liquefaction and cyclic-softening hazards in our analyses.

3.1.3.1 Liquefaction Analysis Overview

We divided the soil into their “sand-like” and “clay-like” behaviors using procedures presented in Boulanger and Idriss (2008). We then performed an initial liquefaction susceptibility assessment based on the methodologies presented by Bray and Sancio (2006). Section 3.1.3.2 presents the details of our screening of soil samples for liquefaction susceptibility. We also performed cyclic simple shear (CSS) testing on a representative sample of fine-grained deposits to more accurately assess the cyclic response of the fine-grained soil.

We then performed an analysis of liquefaction potential based on the CPT data using the computer software CLiq (Version 2.2.1.4) developed by GeoLogismiki. The software incorporates the procedure introduced by the 1996 National Center for Earthquake Engineering Research (NCEER) workshop and the 1998 NCEER/National Science Foundation (NSF) workshop. The workshops are summarized by Youd et al. (2001) and updated by Robertson (2009).

After obtaining CLiq analysis results, we used in-situ data (blow counts and soil descriptions), laboratory data (PI, moisture content, fines content, and cyclic simple shear (CSS) test), and Boulanger and Idriss (2008) and Bray and Sancio (2006) methodologies to establish a relationship between soil that is potentially liquefiable in the CPTs by comparing them to adjacent “matched-pair” borings. To assess seismically induced settlement of potentially liquefiable soil, we considered the methodology presented by Zhang et al. (2002). The details and results of our analyses are presented in the following sections.

3.1.3.2 Liquefaction Susceptibility Screening of Soil Samples

Boulanger and Idriss (2008) found that for practical purposes, soil can be divided into either ‘sand-like’ or ‘clay-like’ behavior. Where sand-like soil can experience ‘liquefaction’ and clay-like soil can experience ‘cyclic failure or softening’. In general, sand-like soil is gravel, sand and very-low plasticity silt; whereas, clay-like soil comprises low-plasticity clay and plastic silt.

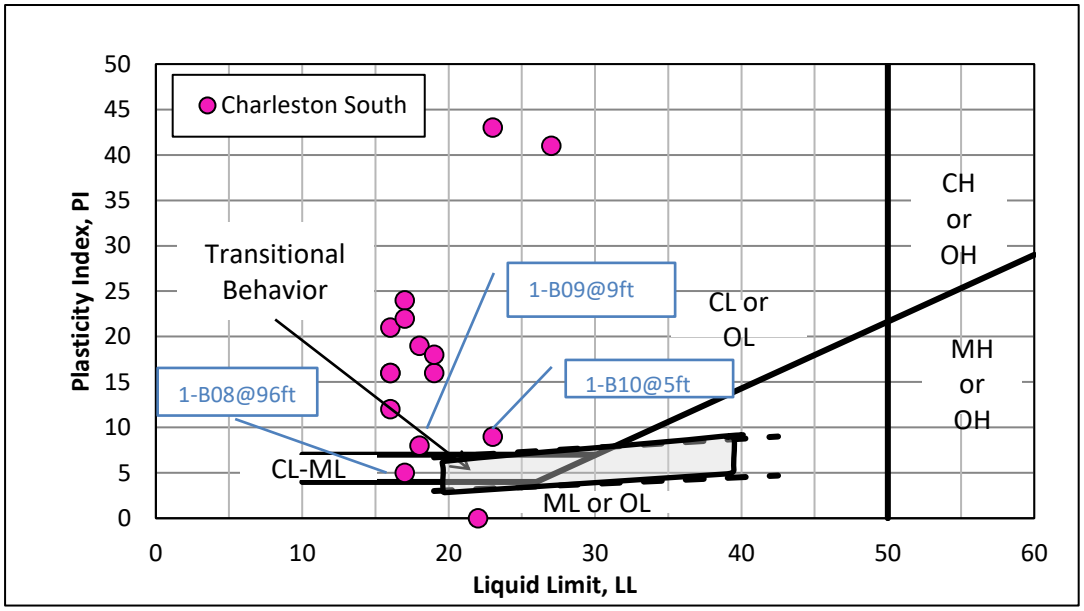
In order to evaluate the clay-like, intermediate and sand-like behavior of the fine-grained soil at the site, we plotted the PI and liquid limit (LL) of the onsite soil relative to the soil behavior limits. We then considered the criteria presented by Bray and Sancio to assess the potential for liquefaction triggering on the site soil. Bray and Sancio observed that soil with a plasticity

index (PI) less than 12 and a water content (w_c) to liquid limit (LL) ratio of more than 0.85 is susceptible to liquefaction/cyclic-softening. Soil with PI greater than 18 and/or w_c/LL less than 0.8 were deemed not to be susceptible to liquefaction/cyclic-softening because they are too plastic and/or their water contents are too low.

Charleston South Campus

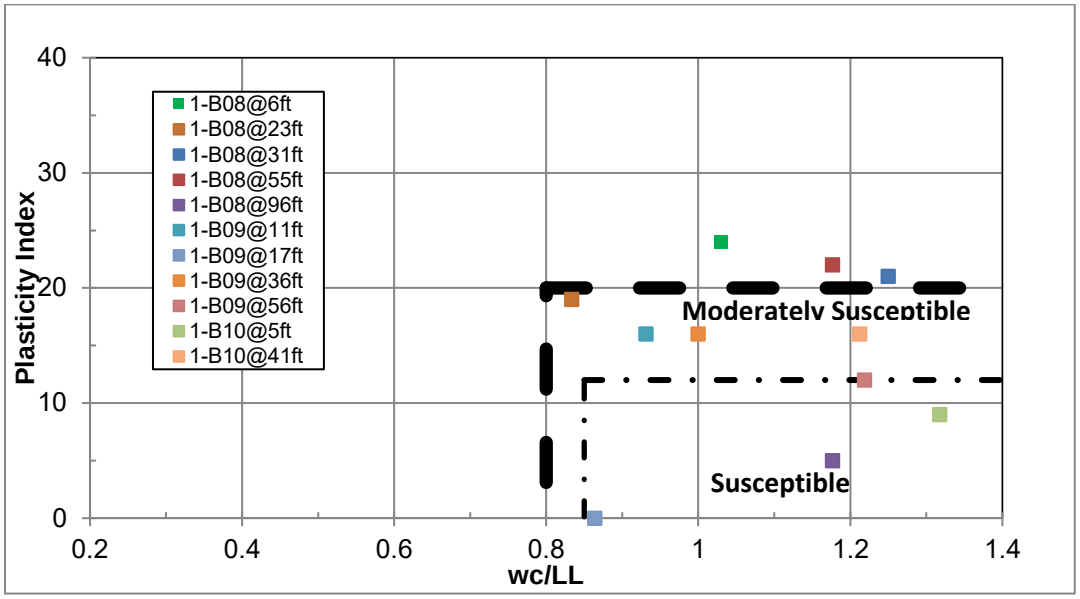
Based on Idriss and Boulanger (2008), at the Charleston South site, the majority of fine-grained soil should be classified as 'clay-like' other than the material at Boring 1-B08 at 96 feet below ground surface, at Boring 1-B09 at 9 feet below ground surface, and at Boring 1-B10 at 5 feet below ground surface, where soil should be considered as 'transitional'. We ignore any liquefaction above the groundwater table (6 feet bgs). In addition, since liquefaction/cyclic softening of material below 60 feet will not likely manifest to the surface, we do not consider susceptibility of material at 96 feet below ground surface.

EXHIBIT 3.1.3.2-1: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Charleston South Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-2, the majority of the laboratory data plot as moderately susceptible and susceptible to liquefaction.

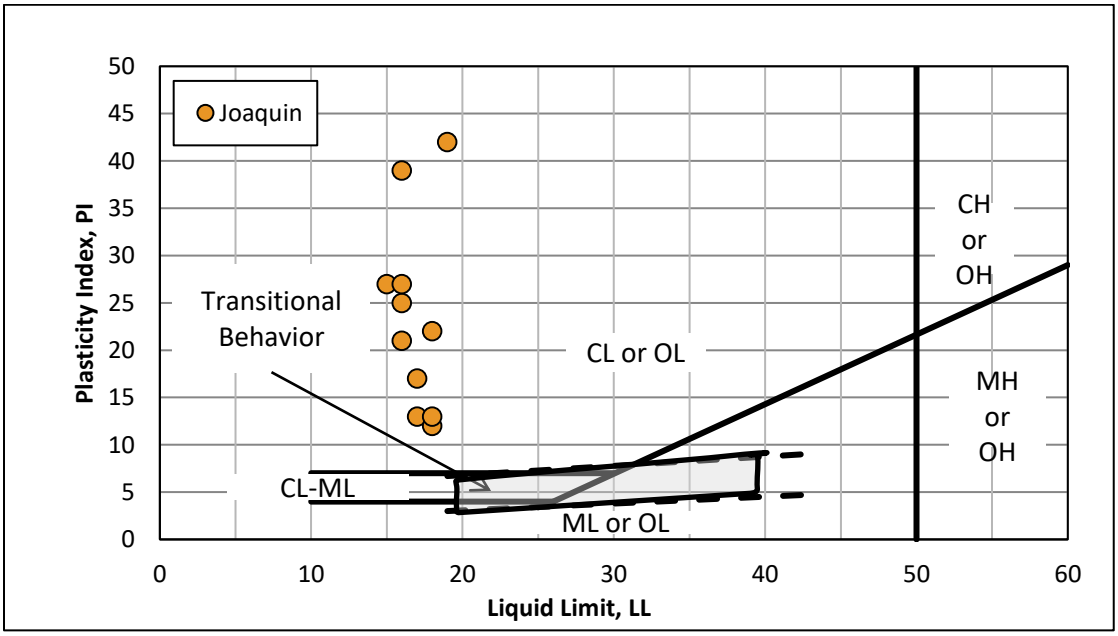
EXHIBIT 3.1.3.2-2: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Charleston South Campus



Joaquin Campus

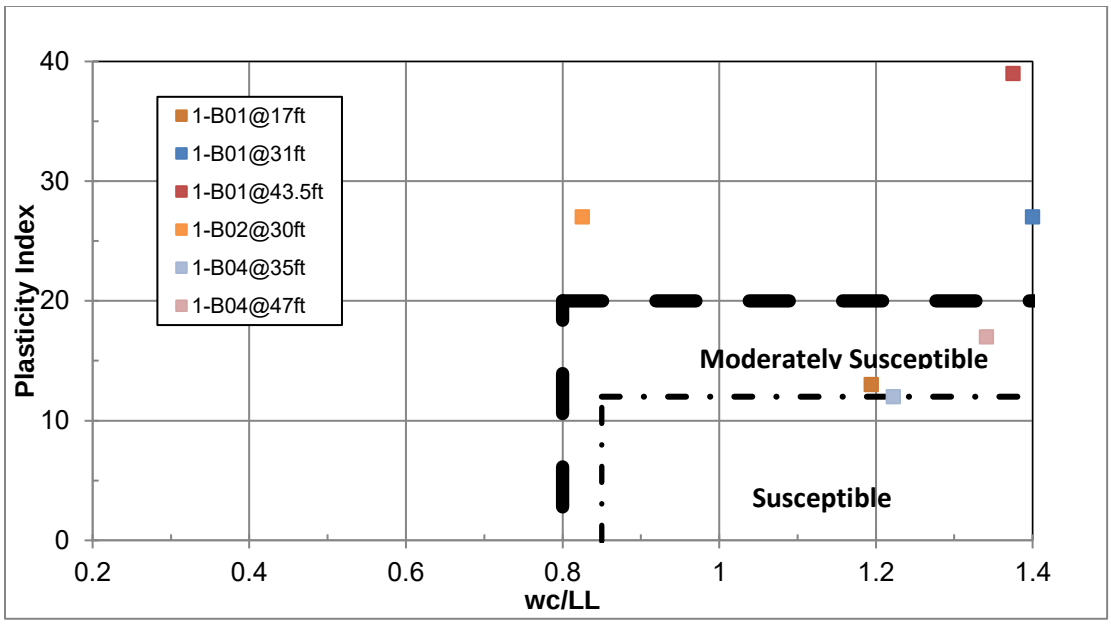
Based on Idriss and Boulanger (2008), we conclude the majority of fine-grained soil at the Joaquin site should be considered as 'clay-like' as shown in Exhibit 3.1.3.2-3.

EXHIBIT 3.1.3.2-3: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Joaquin Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-4, the majority of the laboratory data plot as not susceptible to liquefaction other than a clayey gravel with sand layer (Boring 1-B01 at 17 feet bgs), a clayey sand layer (Boring 1-B04 at 35 feet bgs), and a lean clay with sand layer (Boring 1-B04 at 47 feet bgs), which plot as moderately susceptible to liquefaction.

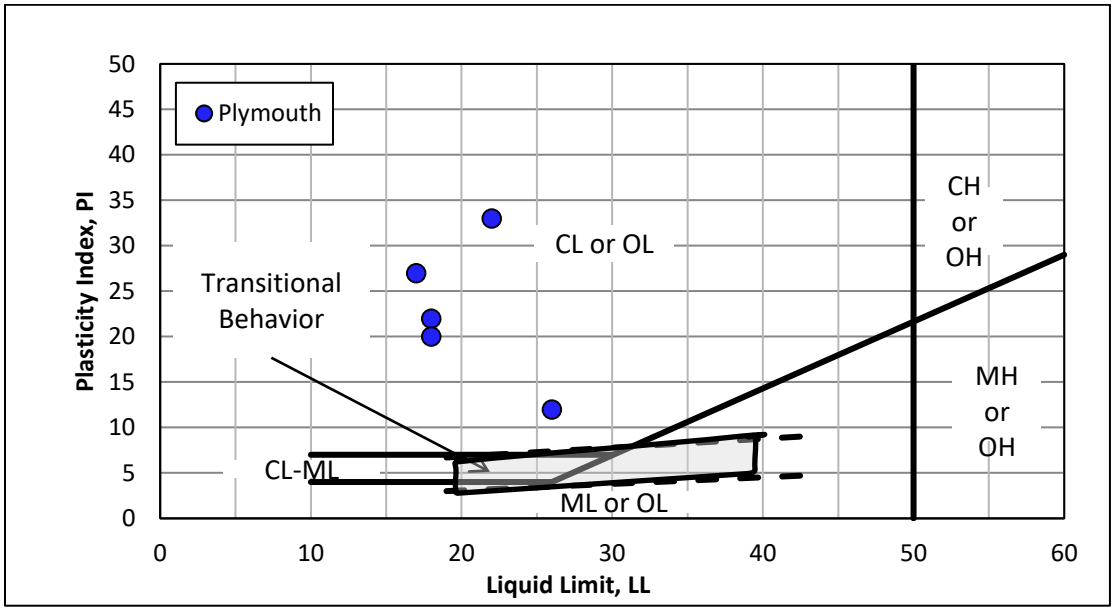
EXHIBIT 3.1.3.2-4: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Joaquin Campus



Plymouth Campus

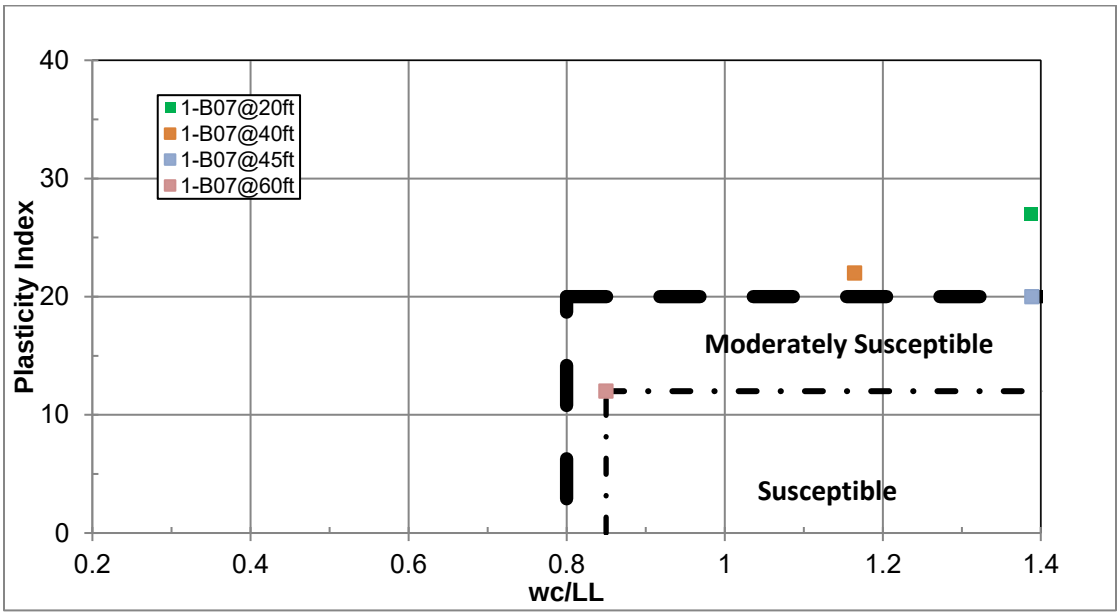
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-5, the majority of fine-grained soil at the Plymouth sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-5: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Plymouth Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-6, the majority of the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Plymouth site other than a sandy clay layer (Boring 1-B07 at 45 feet bgs) and a sandy silt to silty sand layer (Boring 1-B07 at 60 feet bgs).

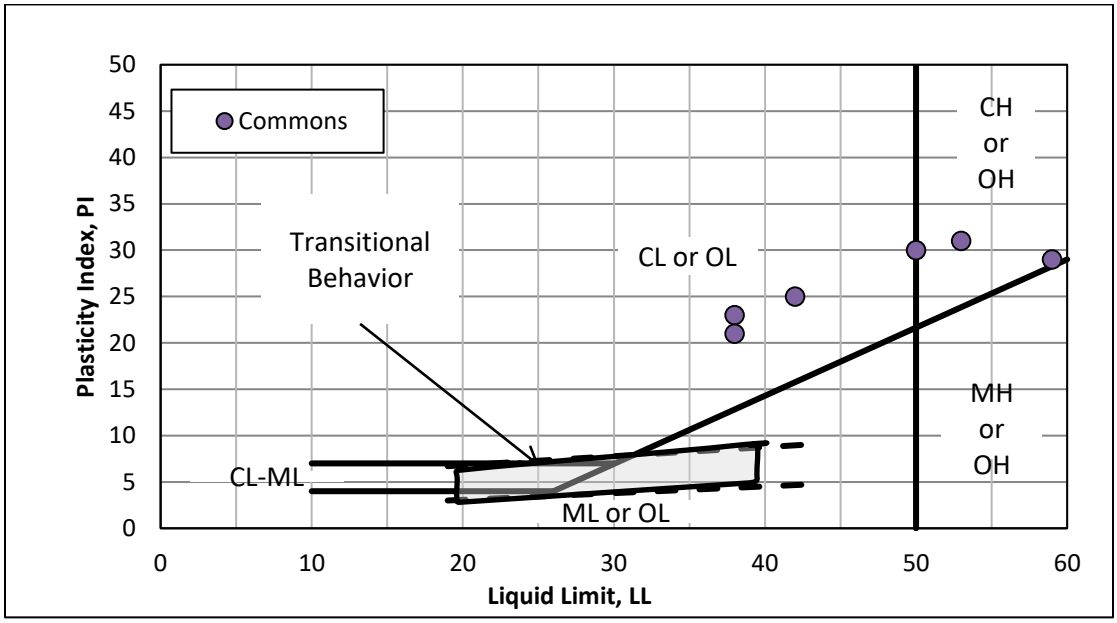
EXHIBIT 3.1.3.2-6: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Plymouth Campus



Commons Campus

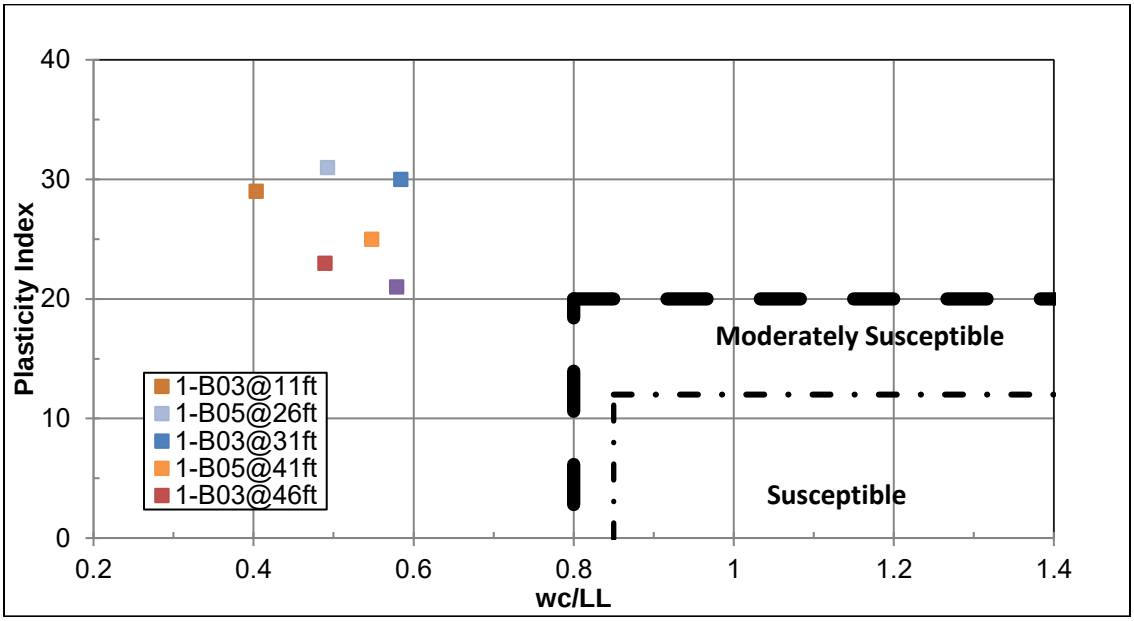
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-7, the majority of fine-grained soil at the Commons sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-7: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Commons Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-8, all the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Commons site.

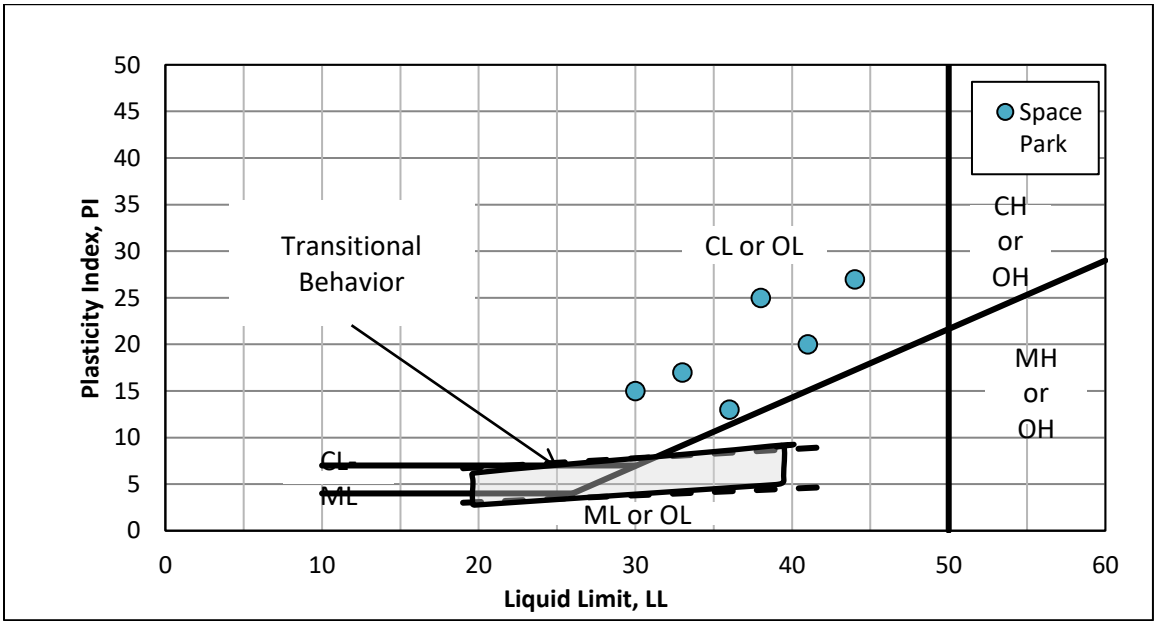
EXHIBIT 3.1.3.2-8: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Commons Campus



Space Park Campus

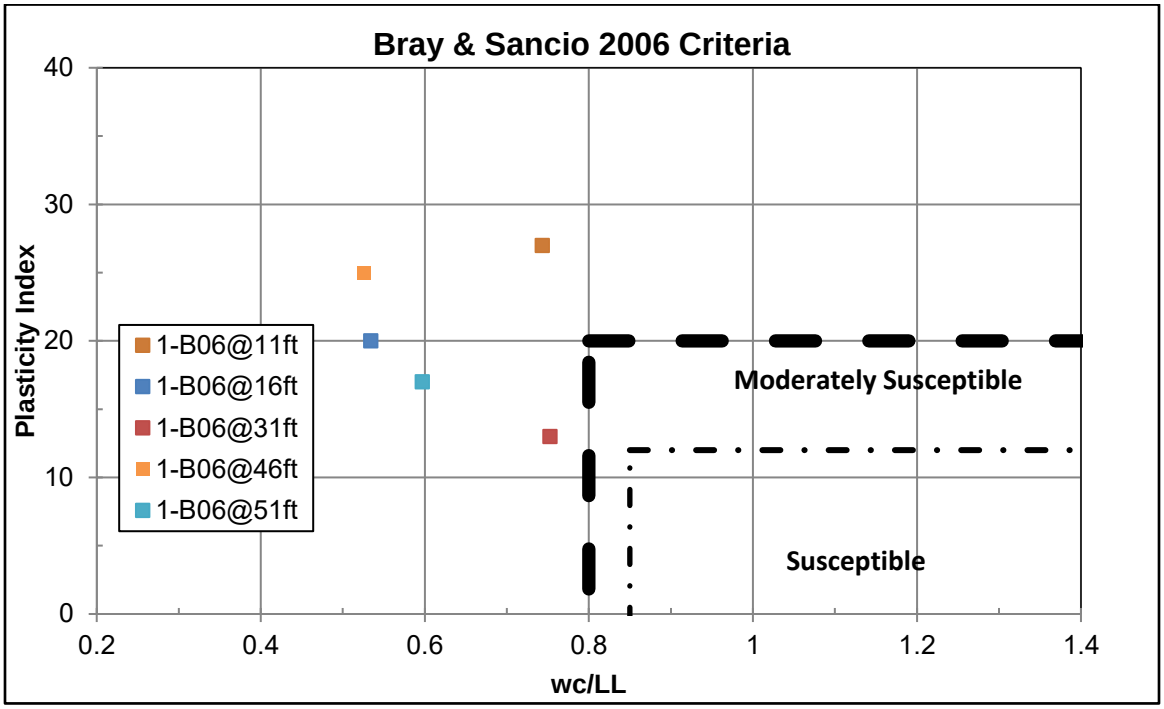
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-9, the majority of fine-grained soil at the Space Park sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-9: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Space Park Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-10, all the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Space Park site. Although, at 36 feet, an Atterberg Limit test indicates the soil is a clay, based on grain-size analysis the soil encountered in the boring at that depth is sand; we used a SPT-blow-count-based method to further evaluate the liquefaction potential of this layer, which indicates susceptibility to liquefaction.

EXHIBIT 3.1.3.2-10: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Space Park Campus



3.1.3.3 Liquefaction Analysis of CPT Data and Matched-Pair Borings

We performed an analysis of liquefaction potential based on the CPT data using the computer software CLiq (Version 2.2.1.4) developed by GeoLogismiki. The software incorporates the procedure introduced by the 1996 National Center for Earthquake Engineering Research (NCEER) workshop and the 1998 NCEER/National Science Foundation (NSF) workshop. The workshops are summarized by Youd et al. (2001) and updated by Robertson (2009). We estimated the Cyclic Stress Ratio (CSR) for an average Maximum Considered Earthquake (MCE) Peak Ground Acceleration (PGA_M) value of 0.66g[5] as outlined in the latest California building code with an earthquake magnitude of 7.85 on San Andreas Fault. We used a groundwater depth of 6 feet for this analysis.

We then compared the zones calculated to be liquefiable using CLiq to soil zones that were not susceptible to liquefaction or cyclic softening according to Bray and Sancio (2006) in the adjacent borings. Appendix E presents the results of the CLiq analyses. Table 3.1.3.3-1 presents the matched-pair borings and CPTs for each campus.

[5] Refer to Section 3.3 for CBC 2019 seismic design parameters

TABLE 3.1.3.3-1: Matched-Pair Borings and CPTs

CAMPUS	MATCHED-PAIR	
	BORING	CPT
Charleston South	1-B08	1-SCPT04
	1-B09	1-CPT18
Joaquin	1-B01	1-SCPT02
Plymouth	1-B07	1-SCPT10

Please note that borings and CPTs advanced within Commons and Space Park are generally spaced over 100 feet apart. As such, they are not listed as matched pairs in Table 3.1.3.3-1. However, where soil stratigraphy encountered in the borings and CPTs are consistent, we used information gathered from the borings to adjust which layers are susceptible to liquefaction; therefore, we adjusted our estimates of liquefaction-induced settlement calculated from the CPT for both the Commons and Space Park Campuses.

3.1.3.4 Cyclic Simple Shear Tests

Since the Bray and Sancio method is considered a screening test of potential for liquefaction susceptibility, we performed cyclic simple shear (CSS) on select samples of fine-grained deposits recovered from one of our Dames and Moore samplers to more accurately assess the cyclic response of the fine-grained site soil. The CSS testing allows us to directly test if a soil is liquefiable and not rely solely on simplified, empirical methods of liquefaction analyses.

We performed CSS testing on a fine-grained sample recovered at the Charleston South Campus from Boring 1-B09 at a depth of approximately 16 feet below the ground surface. We subjected this sample to a cyclic stress ratio (CSR) of 0.47. Based on review of the CSS test results (Appendix C), although the sample did not exhibit full cyclic softening behavior according to generation of excess pore water pressure criterion, the single amplitude shear strain reached eight percent at ten cycles indicating the soil sample experienced cyclic softening based on the excess shear strain criterion. We compared the CSS test result to the corresponding matched-pair CPT (1-CPT18). The comparison shows the calculated factor of safety against cyclic softening of less than 1.0 according to CPT-based cyclic softening triggering analyses (CLiq Analyses) is justifiable.

3.1.3.5 Liquefaction Analysis Conclusion

Using Idriss and Boulanger (2008) and Bray and Sancio (2006) criteria, the results of CSS testing, as well as comparison of matched-pair borings and CPTs, we conclude that a soil behavior index (Ic) of 2.6 is acceptable to use as the cutoff between soil that is sand-like and soil that is clay-like (except at 1-CPT05 and 1-CPT08, where we conclude an Ic of 2.5 is appropriate. We performed our analyses using the method by Idriss and Boulanger (2008), without clay-like behavior; we also ignored any settlement below 60 feet bgs.

In addition, at the Space Park Campus, we used the SPT-blow-count-based method by Idriss and Boulanger 2008, to evaluate the liquefaction settlement in the sand layer at Boring 1-B06, from 33.5 to 40 feet bgs; this layer is not captured by any of the CPTs.

Based on site-specific study of the liquefaction hazard, we estimate the overall total liquefaction-induced settlement resulting from a California Building Code Maximum Considered

Earthquake at Joaquin, Plymouth, Charleston South, Commons, and Space Park Campuses could be up to 2 inches. In some isolated areas, the settlement may be up to 3 inches. The potential differential settlement associated with the liquefaction is likely about half of the total settlement over a span of 30 feet. Based on our experience on other similar projects, the magnitude of liquefaction-induced settlement can be accommodated by the foundation systems discussed in Section 5.0 of this report.

TABLE 3.1.3.5-1: Liquefaction-Induced Settlement after Calibration with Borings

CAMPUS	CPT	SETTLEMENT (INCHES)*
Joaquin	1-CPT01	**2.5**
	1-SCPT02	0.9
	1-CPT03	1.8
	1-CPT06	**2.5**
Plymouth	1-CPT09	**2.5**
	1-SCPT10	1.5
	1-CPT11	0.8
	1-CPT12	0.6
Charleston South	1-SCPT04	**2.4**
	1-CPT13	2.0
	1-CPT14	1.2
	1-CPT15	1.2
	1-CPT16	**2.5**
	1-CPT17	1.9
	1-CPT18	1.4
Commons	1-CPT5	**0.5**
	1-CPT7	**0.5**
Space Park	1-CPT8	**3.0**

*Maximum liquefaction induced settlement for each campus are bolded.

3.1.4 Lateral Spreading

Lateral spreading is a failure within a nearly horizontal soil zone (possibly due to liquefaction) that causes the overlying soil mass to move toward a free face or down a gentle slope. The closest free face to these campuses is the Permanente Creek, which is more than 400 feet to the west. Therefore, the risk of lateral spreading at the project site is low.

3.1.5 Flooding

Federal Emergency Management Agency (FEMA) Flood Insurance Maps (Figure 6) indicate that the three sites are within a special flood hazard area subject to inundation by 0.2-percent annual chances of flood. Based on our review of the Precise Plan, dated February 2018 and the City of Mountain View study of 50-year sea-level rise, areas below 13.2 feet above mean sea level will be susceptible to flooding by 2057. The Civil Engineer should review pertinent information relating to possible flood levels for the subject site based on final pad elevations and provide appropriate design measures for development of the project.

3.2 STATIC CONSOLIDATION SETTLEMENT

Our explorations did not encounter highly compressible clay layers and the clayey materials tended to be overconsolidated. Based on the plasticity index (PI), moisture density, and the consolidation test results presented in Appendix C, we do not anticipate the static consolidation settlement to be a controlling hazard at these sites. However, during the design-level analysis, once the development plans and proposed grades are available, if deemed necessary in collaboration with the structural engineer, we may recommend to model anticipated settlement from the proposed structure and fill placement using a 3-dimensional finite-element analysis with PLAXIS 3D.

3.3 2019 CBC SEISMIC DESIGN PARAMETERS

Based on the subsurface conditions encountered and CPT shear wave velocity testing, we classified the five sites as Site Class D in accordance with the 2019 California Building Code (CBC). 2019 CBC is based on the 2016 edition of the American Society of Civil Engineers document titled “Minimum Design Loads and Associated Criteria for Buildings and Other Structures” (ASCE 71-16).

We provide the 2019 CBC seismic design parameters for a Site Class D in Tables 3.3-1 to 3.3-3 for the three campuses, which includes design spectral response acceleration parameters based on the mapped Risk-Targeted Maximum Considered Earthquake (MCE_R) spectral response acceleration parameters.

TABLE 3.3-1: 2019 CBC Seismic Design Parameters, Charleston Campus (Latitude: 37.418704° Longitude: -122.081702°)

PARAMETER FOR CHARLESTON CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.502
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.502
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.618
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.679
Long-period transition-period, T_L (sec)	12

TABLE 3.3-2: 2019 CBC Seismic Design Parameters, Joaquin Campus (Latitude: 37.417614° Longitude: -122.079461°)

PARAMETER FOR JOAQUIN CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0

PARAMETER FOR JOAQUIN CAMPUS	VALUE
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.601
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.661
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-3: 2019 CBC Seismic Design Parameters, Plymouth Campus (Latitude: 37.41611° Longitude: -122.084262°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.602
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.662
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-4: 2019 CBC Seismic Design Parameters, Commons Campus (Latitude: 37.416649° Longitude: -122.078783°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.603
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.663
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-5: 2019 CBC Seismic Design Parameters, Space Park Campus (Latitude: 37.416335° Longitude: -122.077089°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.6
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.661
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

Based on Section 11.4.8 of ASCE 7-16, a ground motion hazard analysis needs to be performed in accordance with Section 21.2 for structures on Site Class D with S_1 greater than or equal to 0.2 unless the structural engineer elects to take the exception described in Section 11.4.8. Once the concept designs are available, we can provide site-specific ground motion hazard analyses under a separate cover.

3.4 SHALLOW GROUNDWATER AND EXCAVATION CONSIDERATIONS

Based on our findings described in Section 2.7 of this report and depending on the future proposed developments, groundwater may impact design of below-grade improvements, such as basements, and construction at these sites. Shallow groundwater conditions may result in the following impacts:

1. Require construction dewatering.
2. Result in unstable conditions at the base of excavation requiring stabilization prior to improvement construction.
3. Cause moisture damage to sensitive floor coverings.
4. Transmit moisture vapor through slabs causing excessive mold/mildew build-up, fogging of windows, and damage to computers and other sensitive equipment.
5. Require waterproofing for the proposed basement structures, if any.

During excavation of the below-grade improvements, if considered in the design, the sides of the excavation may need to be shored. The primary considerations related to the selection of the shoring systems are:

1. Distance of the excavation from improvements sensitive to movement that will remain after building construction, and
2. Potential presence of groundwater during construction, and the need to keep the dewatering to a minimum due to environmental concerns.

3.5 SOIL CORROSION POTENTIAL

As part of this study, we collected eight soil samples and submitted them to a California State certified analytical lab for determination of redox potential, pH, resistivity, sulfate, and chloride. The following results are considered representative of the alluvial deposits in the area and the corrosion potential of the soil on buried concrete structures and metal pipes. The results are included in Appendix D and summarized in the table below.

TABLE 3.5-1: Corrosivity Test Results

CAMPUS	SAMPLE LOCATION	DEPTH (feet)	REDOX (mV)	pH	RESISTIVITY (OHMS-CM)	CHLORIDE* (mg/kg)	SULFATE* (mg/kg)
Joaquin	1-B04	20.5	240	8.23	1,200	N.D.	87
Plymouth	1-B07	5.0	170	8.29	1,100	31	140
	1-B07	25.5	140	8.30	1,200	N.D.	97
Commons	1-B03	8.5	230	8.21	1,900	N.D.	110
	1-B03	41	220	8.22	2,400	N.D.	54
Space Park	1-B06	8	210	8.26	1,100	N.D.	210
	1-B06	26	210	8.47	1,500	N.D.	110
	1-B06	40.5	220	8.38	4,900	N.D.	36

* ASTM D4327

The 2019 CBC references the 2014 American Concrete Institute Manual, ACI 318-14, Chapter 19, Sections 19.3.1.1 for structural concrete requirements. Based on the test results and ACI criteria, the tested soil would classify as 'Not Applicable' for sulfate exposure; there is no requirement for cement type or water-cement ratio for this category; however, a minimum concrete compressive strength of 2,500 psi is specified by the building code. For this sulfate range, we recommend Type II cement and a concrete mix design for foundations and building slabs-on-grade that incorporates a maximum water-cement ratio of 0.5. It should be noted, however, that the structural engineering design requirements for concrete may result in more stringent concrete specifications.

Soil with a pH less than 6.0 is considered to be corrosive to buried metal piping and reinforced concrete structures. The samples had a pH of above 8.0, which does not present corrosion concerns for buried iron, steel, mortar-coated steel, or reinforced concrete structures.

Based on the resistivity measurements, all eight samples are classified as "corrosive" to buried metal piping. 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 criteria nature of the structure. All buried metallic pressure piping, such as ductile iron firewater pipelines, should be protected against corrosion.

If it is desired to investigate this further, we recommend a corrosion consultant be retained to evaluate whether specific corrosion recommendations are advised for the project.

4.0 EARTHWORK RECOMMENDATIONS

The relative compaction and optimum moisture content of soil and aggregate base referred to in this report are based on the most recent ASTM D1557 test method. Compacted soil is not

acceptable if it is unstable. It should exhibit only minimal flexing or pumping, as determined by a representative of our firm.

As used in this report, the term “moisture condition” refers to adjusting the moisture content of the soil by either drying if too wet or adding water if too dry. We define “structural areas” as any area sensitive to settlement of compacted soil. These areas include, but are not limited to building pads, sidewalks, pavement areas, and retaining walls.

4.1 DEMOLITION AND STRIPPING

Grading operations should be observed and tested by our qualified field representative. We should be notified a minimum of three days prior to grading in order to coordinate our schedule with the grading contractor.

Site development should commence with the removal of existing pavement and buildings as well as excavation and removal of buried structures, including utilities and foundations. All debris and soft compressible soil should be removed from any location to be graded, from areas to receive fill or structures, and from areas to serve as borrow. The depth of removal should be determined by our representative in the field at the time of grading.

Existing vegetation should be removed from areas to receive fill or improvements and those areas to serve for borrow. Tree roots should be removed to a depth of at least 3 feet below existing grade. Any topsoil that will be retained for future use in landscape areas should be stockpiled in areas where it will not interfere with grading operations. All excavations from demolition below design grades should be cleaned to a firm undisturbed native soil surface determined by our representative. This surface should then be scarified, moisture conditioned, and backfilled with compacted engineered fill. All backfill materials should be placed and compacted as engineered fill according to the recommendations in Sections 4.4 and 4.5.

Materials and debris should be removed from the project site. With the exception of construction debris (wood, brick, asphalt, concrete, metal, etc.), organically contaminated materials (soil which contains more than 3 percent organic content by weight), and environmentally impacted soil (if any), the upper 10 feet of subsurface material is suitable for reuse as engineered fill.

4.2 EXISTING FILL REMOVAL

If existing non-engineered fill is encountered during construction, we recommend removal of the fill to competent native soil, as evaluated by our field representative. If in a fill area, the base of the subexcavations should be processed, moisture conditioned (as needed), and compacted in accordance with the recommendations for engineered fill.

If existing fill is left in place in portions of the site that are being developed with walkways or other improvements that are not sensitive to settlement, on-going maintenance should be anticipated.

4.3 OVER-OPTIMUM SOIL MOISTURE CONDITIONS

The contractor should anticipate encountering excessively over-optimum (wet) soil moisture conditions during winter or spring grading, or during or following periods of rain. Wet soil can make proper compaction difficult or impossible.

Wet soil conditions can be mitigated by:

1. Frequent spreading and mixing during warm dry weather.
2. Mixing with drier materials.
3. Mixing with a lime, lime-flyash, or cement product; or
4. Stabilizing with aggregate, geotextile stabilization fabric, or both.

We should evaluate Options 3 and 4 prior to implementation.

4.4 ACCEPTABLE FILL

4.4.1 Soil

Onsite soil material is suitable as fill material provided it is processed to remove concentrations of organic material, debris, and particles greater than 6 inches in maximum dimension.

Imported fill materials should meet the above requirements and have a plasticity index less than 12 and at least 20 percent passing the No. 200 sieve. It is important that we sample and test proposed imported fill materials at least 5 days prior to delivery to the site.

4.4.2 Reuse of Onsite Recycled Materials

If desired, the existing asphalt, aggregate and concrete can be considered for use as recycled aggregate to replace some of the import aggregate base for pavements, as well as for structural fill. The material will need to be broken down, but not pulverized, to have a maximum particle size less than 6 inches if used for fill and should conform to the gradations of aggregate base if used to substitute for roadway base.

4.5 FILL COMPACTION

4.5.1 Grading in Structural Areas

After removing the loose soil, the contractor should scarify to a depth of at least 8 inches then moisture condition and compact the subgrade in accordance with the table below. The loose lift thickness should not exceed 8 inches or the depth of penetration of the compaction equipment used, whichever is less.

TABLE 4.5.1-1: Fill Placement Requirements

MATERIALS		FILL LOCATION	MINIMUM RELATIVE COMPACTION (%)	MINIMUM MOISTURE CONTENT (PERCENTAGE POINTS ABOVE OPTIMUM)
Low-Expansive	PI < 25	General Fill	90	3
		Upper 6 inches in Pavement Areas	95	1

The contractor should compact the pavement Caltrans Class 2 Aggregate Base to at least 95 percent relative compaction (ASTM D1557), at a moisture content above the optimum.

4.5.2 Landscape Fill

In landscaping areas, the contractor should process, place, and compact fill in accordance with Section 4.5.1, but to at least 85 percent relative compaction.

4.5.3 Underground Utility Backfill

The contractor is responsible for conducting trenching and shoring in accordance with CALOSHA requirements. Project consultants involved in utility design should specify pipe-bedding materials.

Utility trench backfill should conform to the recommendations in Section 4.5.1. Where utility trenches cross underneath buildings, we recommend that a plug be placed within the trench backfill to help prevent the normally granular bedding materials from acting as a conduit for water to enter beneath or into the building. The plug should be constructed using a sand-cement slurry (minimum 28-day compressive strength of 500 psi) or relatively impermeable native soil for pipe bedding and backfill. We recommend that the plug extend a distance of at least 3 feet in each direction from the point where the utility enters the building perimeter.

Jetting of backfill is not an acceptable means of compaction. Thicker loose lift thicknesses may be allowed based on acceptable density test results, where increased effort is applied to rocky fill, or for the first lift of fill over pipe bedding.

4.6 SITE DRAINAGE

The project Civil Engineer is responsible for designing surface drainage improvements. With regard to geotechnical engineering issues, finish grades should be sloped away from buildings and pavements to the maximum extent practical. The latest California Building Code Section 1804.4 specifies minimum slopes of pervious surfaces be at least 5 percent away from foundations.

Landscaped areas are planned at finished grade elevations, as well as on top of structures. Proper subsurface drainage is required to prevent ponding on covered roofs or along walls. The roofs and drainage systems should be designed with appropriate slope to expediently transfer moisture across and off the roofs.

4.7 STORMWATER BIORETENTION AREAS

We generally encountered a layer of high-plasticity clay directly beneath the aggregate base. Thus, the existing site soil is not likely to have adequate permeability for stormwater infiltration, unless subdrains are installed. We recommend assuming little stormwater infiltration will occur through the existing site soil.

If bioretention areas are planned, we recommend that, when practical, they be placed a minimum of 5 feet away from property lines and structural site improvements, such as buildings, streets, retaining walls, and sidewalks/driveways. When this is not practical, bioretention areas located within 5 feet of structural site improvements can either:

1. Be constructed with structural side walls capable of withstanding the loads from the adjacent improvements, or

2. Incorporate filter material compacted to between 85 and 90 percent relative compaction (ASTM D1557, latest edition) and a waterproofing system designed to reduce the potential for moisture transmission into the subgrade soil beneath the adjacent improvement.

In addition, site improvements located adjacent to bioretention areas that are underlain by base rock, sand, or other imported granular materials, should be designed with a deepened edge that extends to the bottom of the imported material underlying the improvement.

Where adjacent site improvements include buildings greater than three stories, streets steeper than 3 percent, or design elements that will experience lateral loads (such as from impact or traffic), additional design considerations may be required. In addition, although not recommended, if trees are to be planted within bioretention areas, HDPE Tree Boxes that extend below the bottom of the bioretention system should be installed to reduce potential impact to subdrain systems that may be part of the bioretention area design. For this condition, the waterproofing system should be connected to the HPDE Tree Box with a waterproof seal.

Given the nature of bioretention systems and possible proximity to improvements, we recommend that we be retained to review design plans and provide testing and observation services during the installation of linings, compaction of the filter material, and connection of designed drains.

It should be noted that the contractor is responsible for conducting all excavation and shoring in a manner that does not cause damage to adjacent improvements during construction and future maintenance of the bioretention areas. As with any excavation adjacent to improvements, the contractor should minimize the exposure time such that the improvements are not detrimentally impacted.

5.0 PRELIMINARY FOUNDATION RECOMMENDATIONS

The main consideration in foundation design for this project is the potential for seismically induced settlement, as well as static settlement induced by civil fill placement and building loads. We developed foundation recommendations using data obtained from our exploration and engineering analysis. Since the development concepts were not available at the time of preparation of this report, we studied alternative foundation options as a function of number of above-grade and subterranean stories as presented in Table 5.0-1, and Table 5.0-2.

TABLE 5.0-1: Preliminary Foundation Matrix, Charleston South, Joaquin, Plymouth, and Space Park

FOUNDATION TYPES	NUMBER OF ABOVE-GRADE STORIES	NUMBER OF BELOW-GRADE STORIES
Structural Mat Foundation	up to 3 stories	0 (at grade)
	up to 5 stories	1*
	up to 6 stories	2*
Deep Foundation	over 5 stories	any

*Not applicable to Space Park without ground improvement as recommended in Section 4.8

TABLE 5.0-2: Preliminary Foundation Matrix, Commons

FOUNDATION TYPES	NUMBER OF ABOVE-GRADE STORIES	NUMBER OF BELOW-GRADE STORIES
Structural Mat Foundation	up to 6 stories	2
Deep Foundation	over 5 stories	any

For small axillary structures, such as trellis, light poles or garbage enclosures, shallow footings may be used as foundation support.

5.1 STRUCTURAL MAT FOUNDATIONS

A combination of a structural mat foundation and waterproofing is a common system for structures founded below the groundwater table. This option avoids the need for permanent dewatering. Based on the depth of the excavation and groundwater depths, the mat foundation may have to be designed to resist hydrostatic uplift forces.

The thickness of the structural mat will be driven by the structural design. Similar buildings with similar constraints may have mat foundations that are 30 inches or thicker.

Table 5.1-1 and Table 5.1-2 present average allowable bearing pressures that the structural mat should be designed to as a function of below-grade stories.

TABLE 5.1-1: Average Allowable Bearing Pressures, Charleston South, Joaquin, Plymouth, and Commons

ALLOWABLE BEARING PRESSURE (psf*)	NUMBER OF BELOW-GRADE STORIES)	ANTICIPATED TOTAL STATIC AND SEISMIC SETTLEMENT (inches)
1,500**	0 (at grade)	2½
2,000**	1	
3,000	2	

*pounds per square foot (psf)
** Do not apply to Commons Campus

TABLE 5.1-2: Average Allowable Bearing Pressures, Space Park

ALLOWABLE BEARING PRESSURE (psf*)	NUMBER OF BELOW-GRADE STORIES)	ANTICIPATED TOTAL STATIC AND SEISMIC SETTLEMENT (inches)
1,500	0 (at grade)	3
2,000**	1	
3,000**	2	

*pounds per square foot (psf)
**At the Space Park Campus, applicable only after ground improvement as recommended in Section 5.5.

The allowable bearing capacities presented in Table 5.1-1 and Table 5.1-2 may be increased to 3,000 psf in areas of loading concentration. The allowable bearing pressures presented in Table 5.1-1 and 5.1-2 may be increased by one-third when considering transient loads, such as wind or seismic.

If a spring constant is needed for design, a preliminary modulus of subgrade reaction (k_s) of 100 pounds per square inch per inch of deflection (psi/in) for a 1 foot by 1 foot plate can be used for static loading at all campuses and seismic loading at all campuses excluding Space Park Campus; at Space Park, a k_s of 100 psi/in can be used for on-grade construction only. At Space Park Campus, we recommend that ground improvement be implemented if a basement is constructed due to the elevations where soil subject to cyclic-liquefaction are located; modulus for a mat bearing on ground improvement will need to be determined based on the type of ground improvement and spacing. During the design-level studies, the structural engineer should provide us with mat pressures and deflections based on these recommendations to optimize the design of the mat.

Resistance to short-duration (earthquake and wind-induced) lateral loads may be provided by frictional resistance between the foundation concrete and the bearing soil and by passive earth pressure acting against the side of the foundation. A coefficient of friction of 0.30 can be used between concrete and the subgrade. Where the bottom of the mat will be underlain by a waterproofing membrane, the coefficient of friction should be reduced to 0.15 to 0.20 between the membrane and the subgrade (depending on membrane properties).

5.2 DEEP FOUNDATIONS

A deep foundation system can be used to support buildings with more than five stories. Deep foundations will gain support through skin friction and end bearing in the subsurface soil. There are many deep foundation systems available, including driven precast concrete or steel piles, Cast-in-Drilled Hole (CIDH), EDTTEX[6], Tubex or Torque-down piles and auger-cast displacement piles (ACP). Pile groups are expected to be connected by pile caps and interior grade beams.

Based on our experience in similar projects, ACP and CIDH piles are preferred deep foundation systems in order to reduce noise impacts to occupants in nearby structures. ACPs are deep foundation elements that are constructed by rotating a continuous flight hollow-stem auger into the soil. Concrete or grout is pumped under pressure through the hollow stem as the auger is withdrawn and a reinforcing cage can be installed while the concrete or grout is still in a fluid condition. CIDHs are a high-capacity deep foundation system that is constructed by drilling a cylindrical borehole to design diameter and depth, lowering reinforcing steel (rebar) into the drilled shaft, and then filling the shaft with concrete.

ACP, EDTTEX, Tubex or other torque down piles are typically designed and constructed by a specialty contractor using proprietary means and methods. Driven piles and CIDH, if selected, can be designed by the project structural engineer in collaboration with us. Any deep foundation design be verified via full-scale load tests to assess the axial capacity.

5.2.1 Preliminary Pile Capacities

Based on the subsurface conditions at these sites and our experience with similar projects, we provide the following preliminary estimates of pile foundation axial capacity to support your project's scoping and conceptual planning phase.

We utilized the idealized soil profile presented in Section 2.5 to estimate the preliminary vertical pile capacity of a single 16-inch-diameter ACP. Table 5.2-1 presents ultimate vertical ACP

[6] The EDTTEX piles are steel and concrete pipe composite piles that are into ground under very heavy torque and down pressure.

capacities for static and seismic conditions. We used post-liquefaction/liquefaction residual shear strength per Olson and Stark (2002) and Idriss and Boulanger (2008) for seismic considerations due to liquefaction and cyclic softening, respectively.

TABLE 5.2-1: Preliminary Ultimate Vertical Pile Capacities for 16-inch ACP

CAMPUS	DEPTH TO REACH 200 TONS OF ULTIMATE PILE CAPACITY (feet)*	
	STATIC CONDITION	SEISMIC CONDITION
Charleston South	88	102
Joaquin	75	81
Plymouth	93	96
Commons	75	79
Space Park	77	82

*Once the development plans are available, we should update these values with downdrag considerations.

We anticipate a total static and seismic settlement of less than 1 inch and differential settlement of less than ½ inch under pile supported structures. We also anticipate the differential settlement between pile-supported and surrounding areas to be up to approximately 1½ inches following an earthquake that results in liquefaction. Entry and pipe connections to deep-foundation-supported buildings should be assessed to confirm the anticipated differential settlement can be tolerated; otherwise, flexible entry and pipe connections may be considered.

We will evaluate the lateral capacities and soil-structure interaction parameters during the design-level studies once the development plans are available. Design axial capacity values of piles should be verified via full-scale load tests prior to construction of production piles.

5.3 SPREAD FOOTINGS

Spread footings may be used to support small auxiliary structures. Continuous or isolated spread footings should bear in competent native soil or compacted fill. Minimum footing dimensions are presented in Table 5.3.1-1 below.

TABLE 5.3.1-1: Minimum Footing Dimensions

FOOTING TYPE	*MINIMUM DEPTH (INCHES)	MINIMUM WIDTH (INCHES)
Continuous	12	18
Isolated	12	18

* below lowest adjacent pad grade

The minimum footing depths shown above are taken from lowest adjacent pad grade. To limit total static settlement to less than 1 inch, shallow footings should be designed with a maximum allowable bearing pressure of 1,500 psf for dead-plus-live loads. The maximum allowable bearing pressure is a net value; the weight of the footing may be neglected for design purposes. Footings located adjacent to utility trenches should have their bearing surfaces below an imaginary 1:1 (horizontal:vertical) plane projected upward from the bottom edge of the trench to the footing.

This bearing capacity may be increased by one-third for the short-term effects of wind or seismic loading. However, seismically induced settlement in the range of 2½ to 3 inches (reference

Section 3.1.3 for estimates by Campus) should be expected for auxiliary structures supported on shallow footings, unless the risk of liquefaction is mitigated by ground improvement methods.

Lateral loads may be resisted by friction along the base and by passive pressure along the sides of shallow footings. A coefficient of friction of 0.30 can be used between concrete and the subgrade.

5.4 BASE HEAVE AND UPLIFT FORCES

If subterranean stories are considered, the excavation subgrade may experience heave during excavation and recompression during foundation construction. Shoring walls or groundwater cut-off systems should be designed to reduce the risk of subgrade heave on the project.

Moreover, due to shallow groundwater conditions, the weight of the building should be assessed to determine whether there is sufficient weight to offset the hydrostatic uplift loads when subterranean stories are planned. Hydrostatic uplift forces should be estimated assuming buoyancy below the design groundwater at a depth of 6 feet. Uplift resistance can be provided by the weight of the foundation elements and structural loads. Additional resistance to uplift may be provided by installing hold-down piers or anchors in conjunction with mat foundation or evaluating tension resistance from foundation piles. Hold-down piers or anchors may be evaluated using a preliminary allowable skin friction of 500 psf.

The risk of base heave and hydrostatic uplift should be assessed as part of the shoring and dewatering system design.

5.5 GROUND IMPROVEMENT

As described in Sections 3.1.3 and 5.1, at the Space Park Campus, to use a mat foundation in conjunction with one or two below-grade stories, ground improvement is recommended. The ground improvement should reduce the potential liquefaction-induced settlement and provide an improved bearing capacity to support shallow foundation loads. Ground improvement should target the near-surface liquefaction-susceptible deposit of silty and sandy soil described in Section 2.4.5. Based on our exploration, we recommend ground improvement elements extend to Elevation -33 feet or deeper. Based on our experience, ground improvement methods such as deep soil mixing, drilled displacement columns, or rammed aggregate piers are effective in mitigation of the potentially liquefiable/cyclic softening soil.

The benefits of deep soil mixing and drilled displacement columns include low vibration during construction and little to no soil spoils. Rammed aggregate piers and rapid impaction compaction could generate strong vibrations, making these two methods less desirable in a developed environment.

Soil improvement is typically procured as a design-build element of a project. The selection and design of the ground improvement system should be determined with input from an experienced general contractor. This allows consideration of individual specialty contractors' proprietary means and methods in selecting the most cost-effective approach that meets specific project performance and quality objectives. Conceptual ground improvement plans should show the extent of the work, coordination with other elements, including foundations, utilities, and project phasing requirements. We can assist in the preparation of a design-build Request for Proposal (RFP) for the ground improvement and should review the design submittal prior to construction. During ground improvement selection, we should be consulted regarding the selected method

and provided opportunity to work with the design-build contractor to develop the appropriate design bearing capacity and update our estimate of differential settlement.

Future collaboration with the structural engineer and ground improvement contractor will be important to develop specific foundation and ground improvement recommendations once final structural details and loading are developed.

The ground improvement design should yield a total post-construction seismically induced settlement of 1 inch or less. At a minimum, ground improvement should be utilized within the building pad and should be performed on a uniform grid so that the effective modulus of the soil during liquefaction is at least 150 psi/in. If the design team considers foregoing ground improvement measures in surface parking and landscape areas, maintenance and repairs should be expected in future seismic events to repair improvements such as sidewalks and walkways as needed. We anticipate that differential settlement between ground improved areas and surrounding unimproved areas could be up to approximately 3 inches. Entry and pipe connections should be assessed to confirm the anticipated differential settlement can be tolerated; otherwise, flexible entry and pipe connections may be considered.

6.0 SECONDARY SLABS-ON-GRADE

Exterior flatwork includes items such as concrete sidewalks, steps, and outdoor plazas exposed to foot traffic only. Concrete flatwork should have a minimum thickness of 4 inches and include control and construction joints in accordance with current Portland Cement Association Guidelines.

Exterior slabs should slope away from the buildings to prevent water from flowing toward the foundations. Site soil should be moistened just prior to concrete placement.

We recommend that flatwork leading to a building entrance area be structurally independent of the building foundation to allow for differential movement between the flatwork and the building. Where smooth transition to provide access is necessary (ADA ramps), a hinge-slab should be designed to accommodate movements of approximately ½ inch. Flatwork should be reinforced to allow for the appropriate span in the event of settlement. Maintenance or replacement of entry slabs should also be expected following a seismic event as the ground settles at the perimeter of buildings.

7.0 DESIGN-LEVEL GEOTECHNICAL REPORT

This report presents preliminary geotechnical findings, conclusions and recommendations intended for preliminary planning purposes only. A design-level geotechnical exploration and assessment should be performed when development plans are available and existing buildings are demolished.

The design-level geotechnical report should further discuss topics presented in this report and address the following items:

- Additional explorations after demolition of existing buildings to support design-level recommendations.
- Site-specific seismic hazard analysis based on CBC 2019 (ASCE 7-16), if needed based on the proposed buildings.

- 3-dimensional finite-element analysis with PLAXIS 3D model to evaluate anticipated settlement from the proposed structures and fill placement, if needed.
- Deep foundation design parameters, including lateral capacities, group effects and pile response.
- Considerations during design of dewatering and shoring systems.
- Ground improvement design as needed.

8.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report presents geotechnical recommendations for design of the Google North Bayshore (Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses) project discussed in Section 1.3. If changes occur in the nature or design of the project, we should be allowed to review this report and provide additional recommendations. 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, 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; therefore, we are unable to guarantee or warrant the results of our services.

This report is based upon field and other conditions discovered at the time of report preparation. We developed this report with limited subsurface exploration data. We assumed that our subsurface exploration data are representative of the actual subsurface conditions across the site. Considering possible underground variability of soil, rock, fill, and groundwater, additional unexpected costs may be incurred in completing the project. We recommend that the owner establish a contingency fund to cover such costs. If unexpected conditions are encountered, ENGEO should be notified immediately to review these conditions and provide additional and/or modified recommendations, as necessary.

Our services did not include excavation sloping or shoring, soil volume change factors, flood potential, or a geohazard exploration. In addition, our geotechnical exploration did not include work to determine the existence of possible hazardous materials. If any hazardous materials are encountered during construction, the proper regulatory officials should be notified immediately.

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Actual field or other conditions will necessitate clarifications, adjustments, modifications or other changes to ENGEO's recommendations. Therefore, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include onsite construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from

the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

We determined the boundaries designating the interface between layers on the exploration logs using visual observations. The transition between the materials may be abrupt or gradual. The exploration logs contain information concerning samples recovered, indications of the presence of various materials such as clay, sand, silt, rock, existing fill, etc., and observations of groundwater encountered. The field logs also contain our interpretation of the subsurface conditions between sample locations. Therefore, the logs contain both factual and interpretative information. Our recommendations are based on the contents of the final logs, which represent our interpretation of the field logs.

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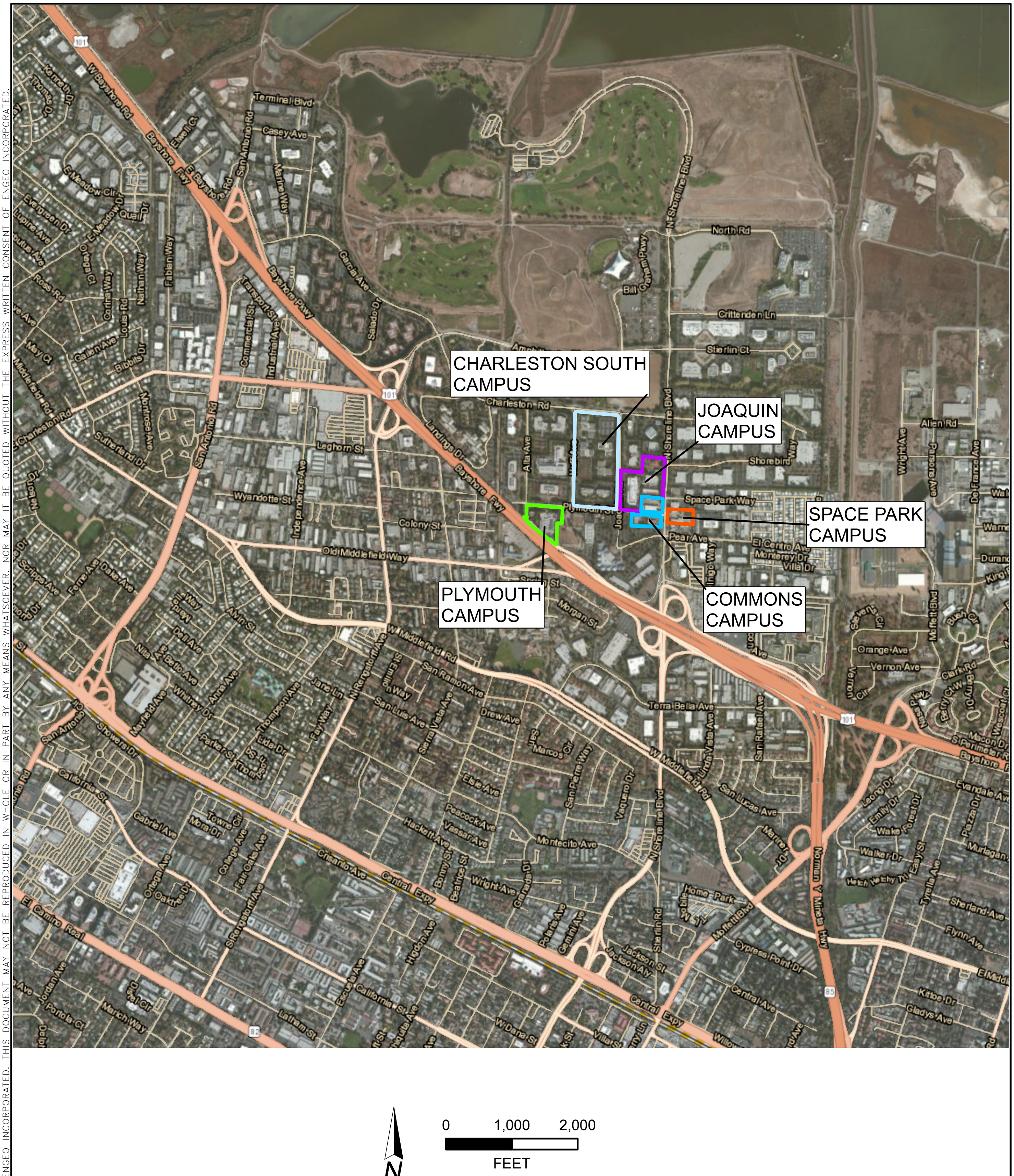
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FIGURES

FIGURE 1: Vicinity Map
FIGURE 2A: Site Plan – Charleston South Campus
FIGURE 2B: Site Plan – Joaquin Campus
FIGURE 2C: Site Plan – Plymouth Campus
FIGURE 2D: Site Plan – Space Park Campus
FIGURE 2E: Site Plan – Commons Campus
FIGURE 3: Regional Geologic Map
FIGURE 4: Seismic Hazard Zones Map
FIGURE 5: Regional Faulting and Seismicity
FIGURE 6: FEMA Flood Insurance Map



BASEMAP SOURCE: ESRI MAPPING SERVICE

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VICINITY MAP

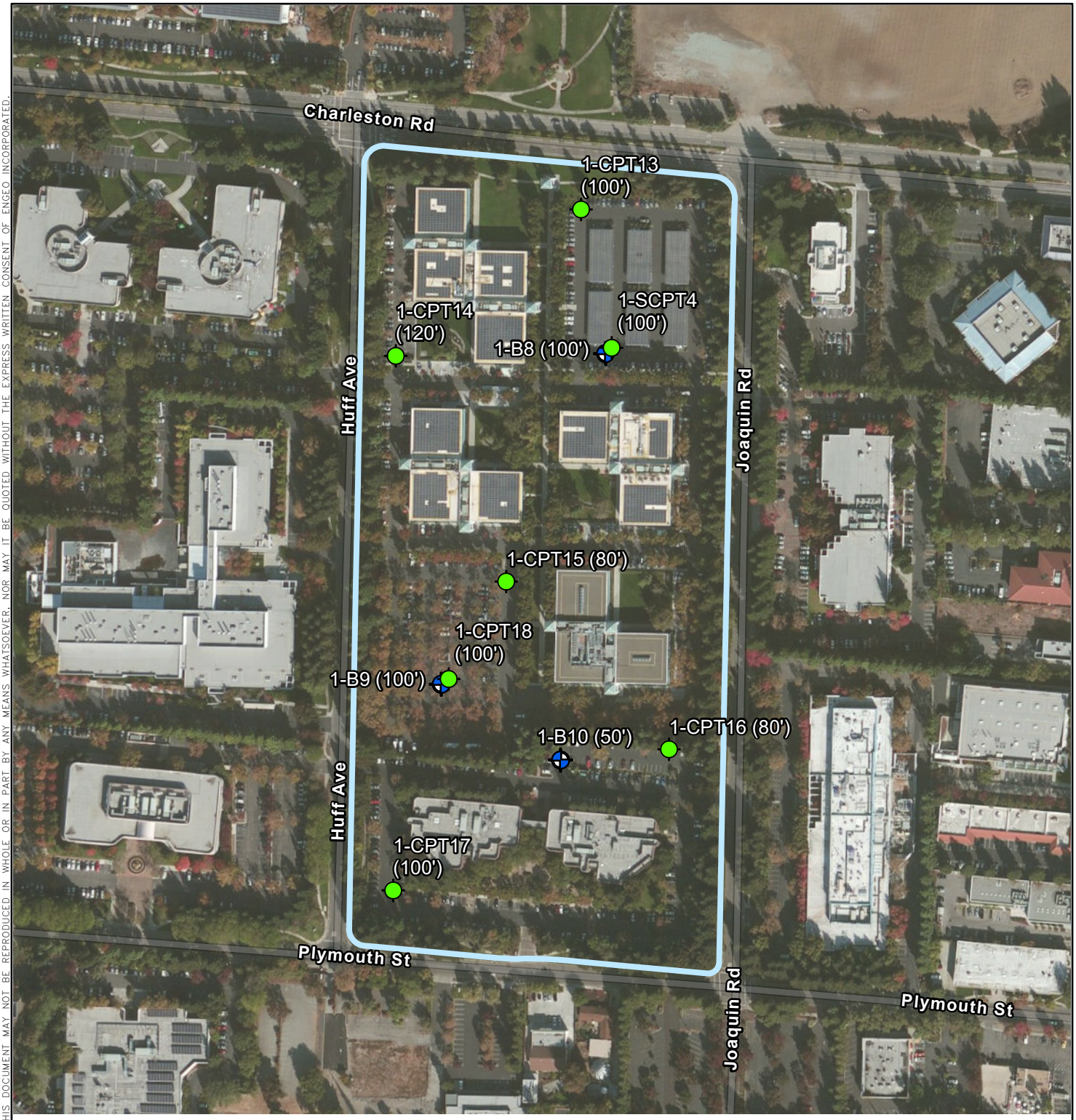
GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. : 15949.000.000	FIGURE NO. 1
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FEET

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- PROJECT SITE
- CPT (ENGEO, 2019)
- BORING (ENGEO, 2019)

BASEMAP SOURCE: ESRI MAPPING SERVICE

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SITE PLAN - CHARLESTON SOUTH CAMPUS

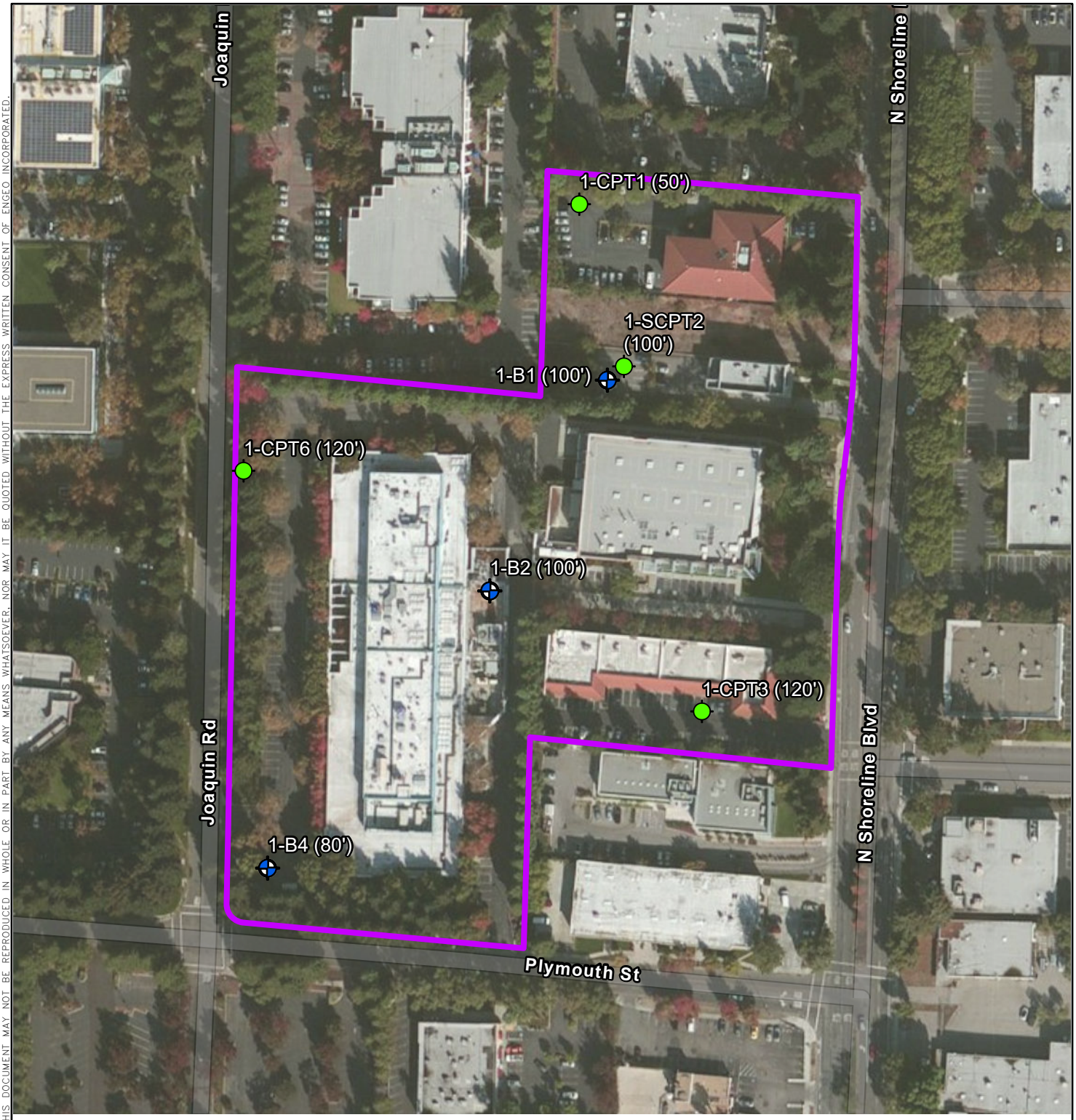
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MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
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FIGURE NO. 2A

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- PROJECT SITE
- CPT (ENGEO, 2019)
- BORING (ENGEO, 2019)

BASEMAP SOURCE: ESRI MAPPING SERVICE

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SITE PLAN - JOAQUIN CAMPUS

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
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FIGURE NO. 2B

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FEET

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- PROJECT SITE
- CPT (ENGEO, 2019)
- BORING (ENGEO, 2019)

BASEMAP SOURCE: ESRI MAPPING SERVICE

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SITE PLAN - PLYMOUTH CAMPUS

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
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FIGURE NO. 2C

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USER: QLIANG

ORIGINAL FIGURE PRINTED IN COLOR



N

0 50 100

FEET

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- PROJECT SITE
- CPT (ENGEO, 2019)
- BORING (ENGEO, 2019)

BASEMAP SOURCE: ESRI MAPPING SERVICE

ENGEO Expect Excellence

SITE PLAN - SPACE PARK CAMPUS

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

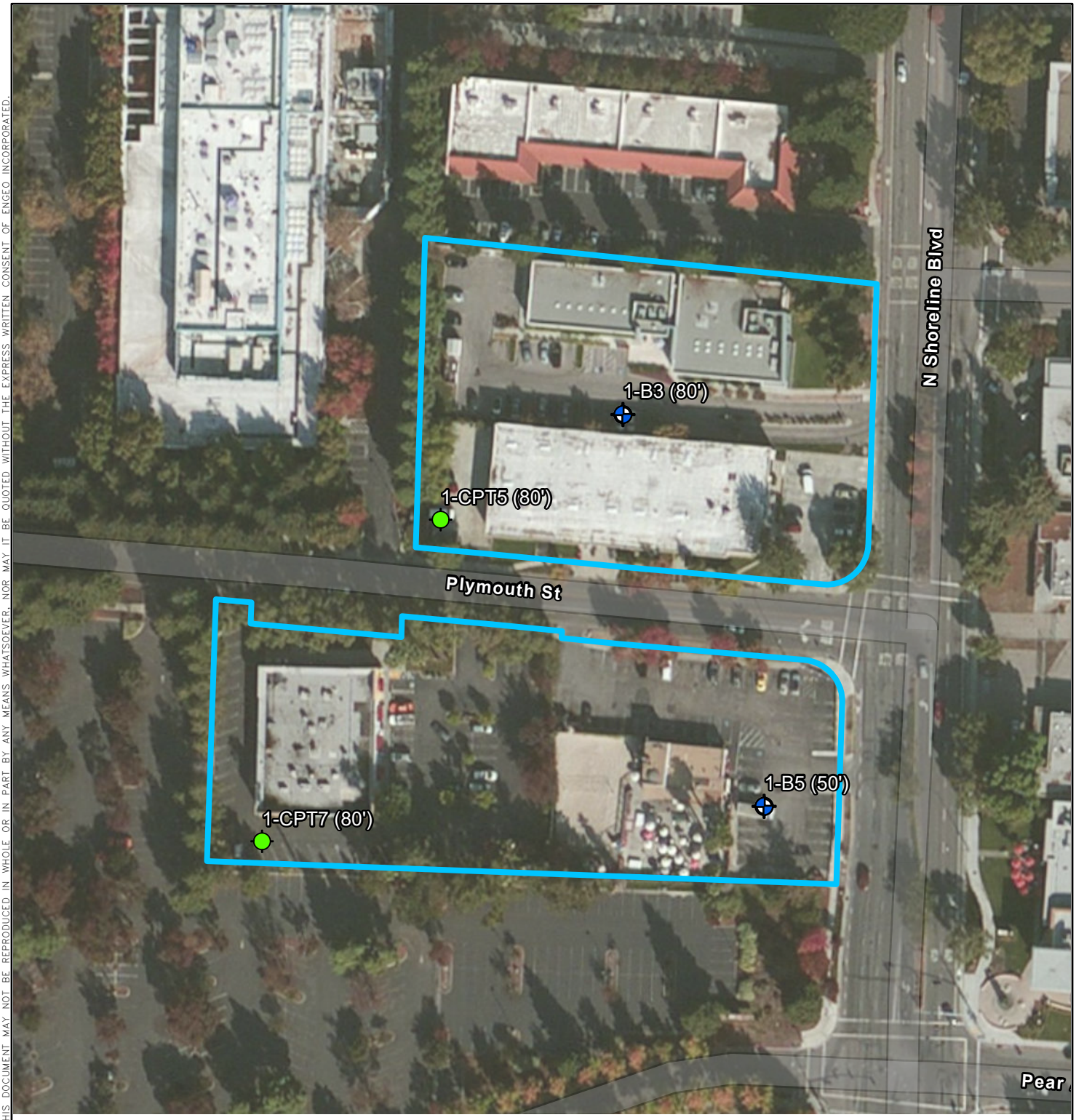
PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
DRAWN BY: QRL	CHECKED BY: JK

FIGURE NO. 2D

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USER: QLIANG

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N

0 50 100

FEET

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- PROJECT SITE
- CPT (ENGEO, 2019)
- BORING (ENGEO, 2019)

BASEMAP SOURCE: ESRI MAPPING SERVICE

ENGEO Expect Excellence

SITE PLAN - COMMONS CAMPUS

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

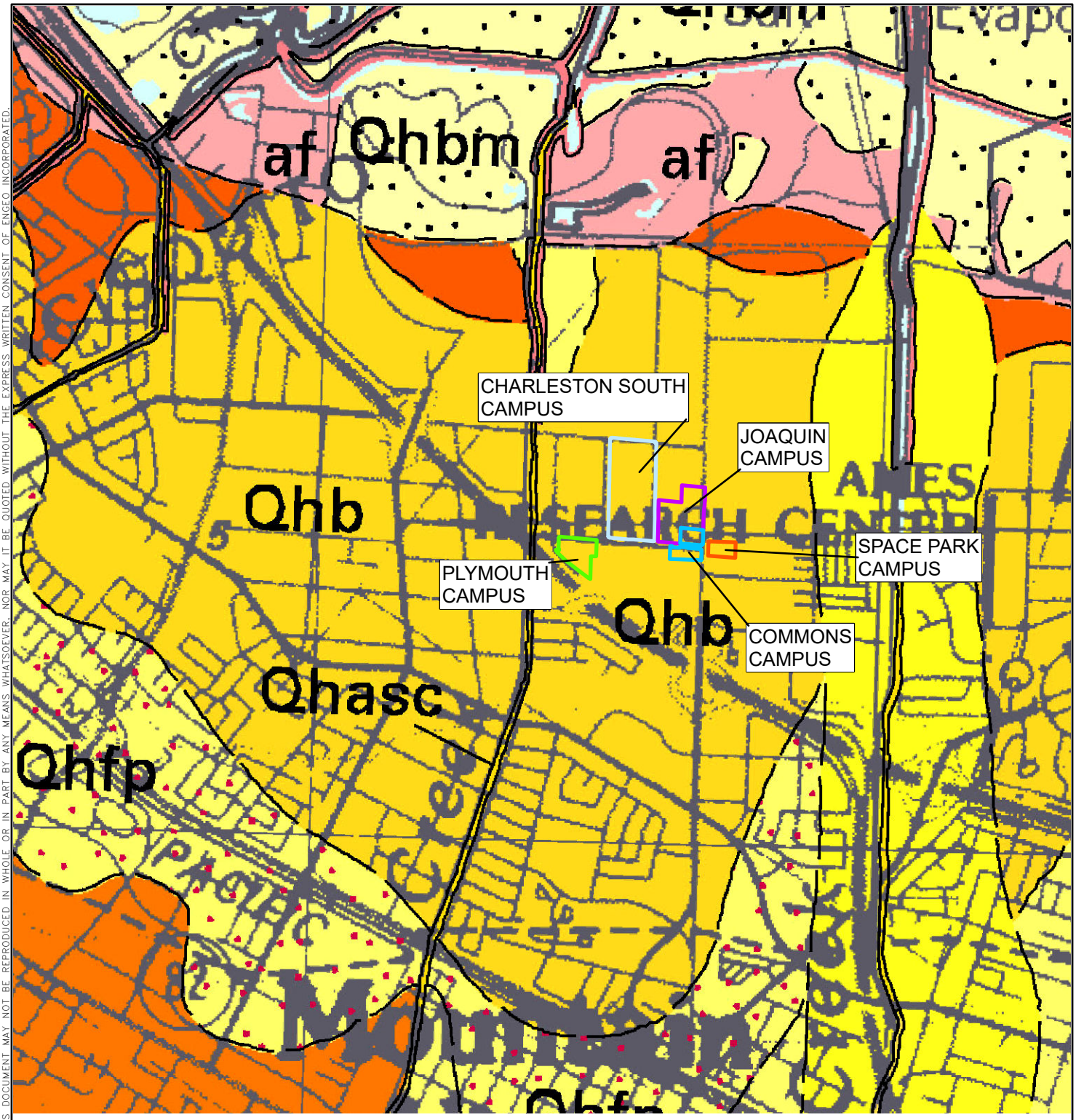
PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
DRAWN BY: QRL	CHECKED BY: JK

FIGURE NO. 2E

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USER: QLIANG

ORIGINAL FIGURE PRINTED IN COLOR



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0 1,000 2,000

FEET

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

af	ARTIFICIAL FILL (HISTORIC)
Qhasc	ARTIFICIAL STREAM CHANNELS (HISTORIC)
Qhbm	BAY MUD (HOLOCENE)
Qhb	BASIN DEPOSITS (HOLOCENE)
Qhfp	FLOOD-PLAIN DEPOSITS (HOLOCENE)

BASEMAP SOURCE: BRABB 2000

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REGIONAL GEOLOGIC MAP

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

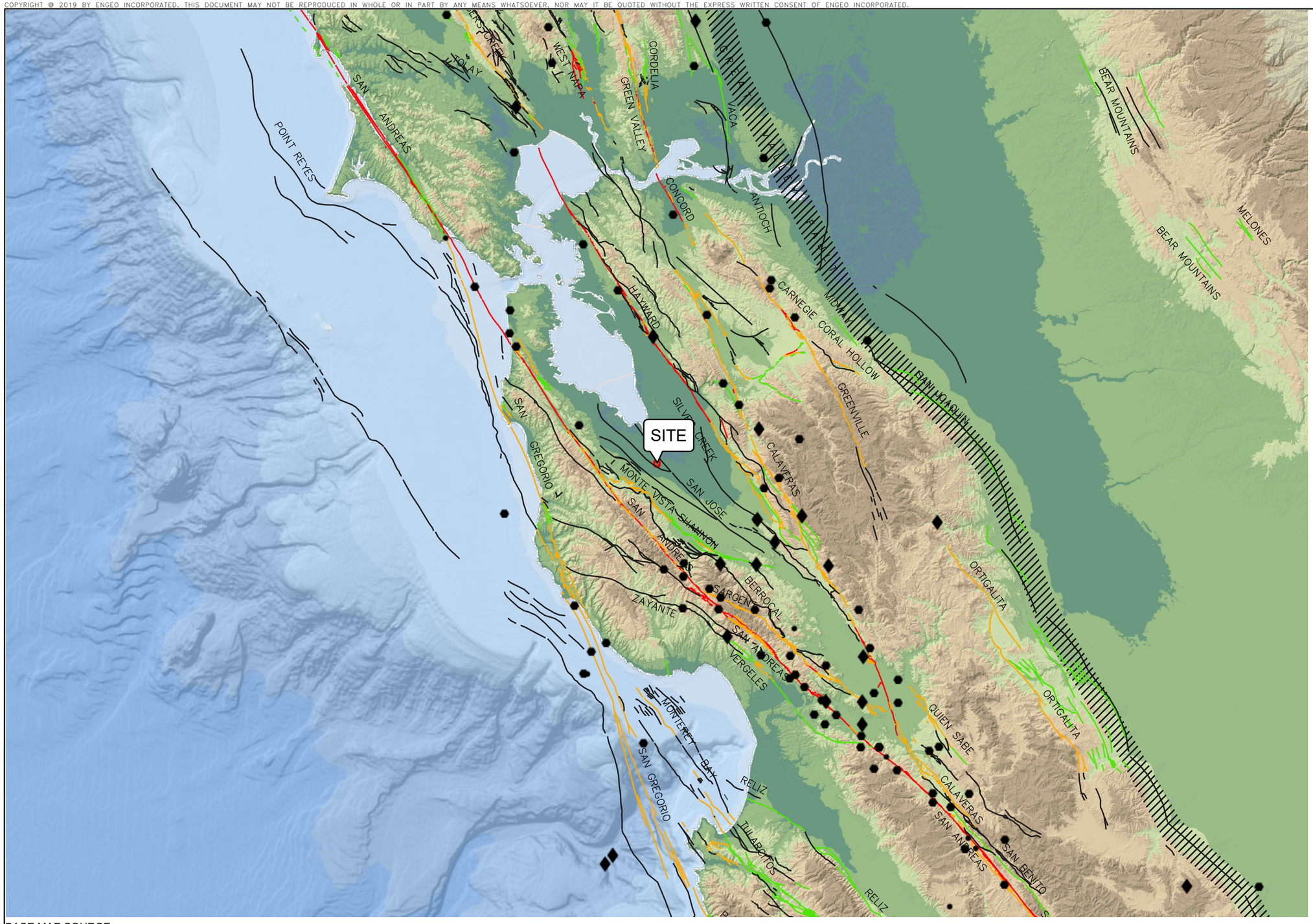
PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
DRAWN BY: QRL	CHECKED BY: JK

FIGURE NO. 3

PATH: G:\DRAFTING\DRAFTING2_DWG_13000 PLUS\15949\000\072219GEX\GOOGLE NORTH BAYSHORE CHARLESTON SOUTH.APRX
USER: QLIANG

ORIGINAL FIGURE PRINTED IN COLOR

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N

0 7.5 15

Miles

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

EARTHQUAKE

- MAGNITUDE 7+
- MAGNITUDE 6-7
- MAGNITUDE 5-6

USGS QUATERNARY FAULTS

- HISTORICAL
- LATEST QUATERNARY
- LATE QUATERNARY
- UNDIFFERENTIATED QUATERNARY
- HISTORIC BLIND THRUST FAULT ZONE

BASE MAP SOURCE

ESRI, GARMIN, GEBCO, NOAA NGDC, AND OTHER CONTRIBUTORS
COLOR HILLSHADE IMAGE BASED ON THE NATIONAL ELEVATION DATA SET (NED) AT 30 METER RESOLUTION
U.S.G.S. QUATERNARY FAULT DATABASE, 2018
U.S.G.S. HISTORIC EARTHQUAKE DATABASE (1800-PRESENT)

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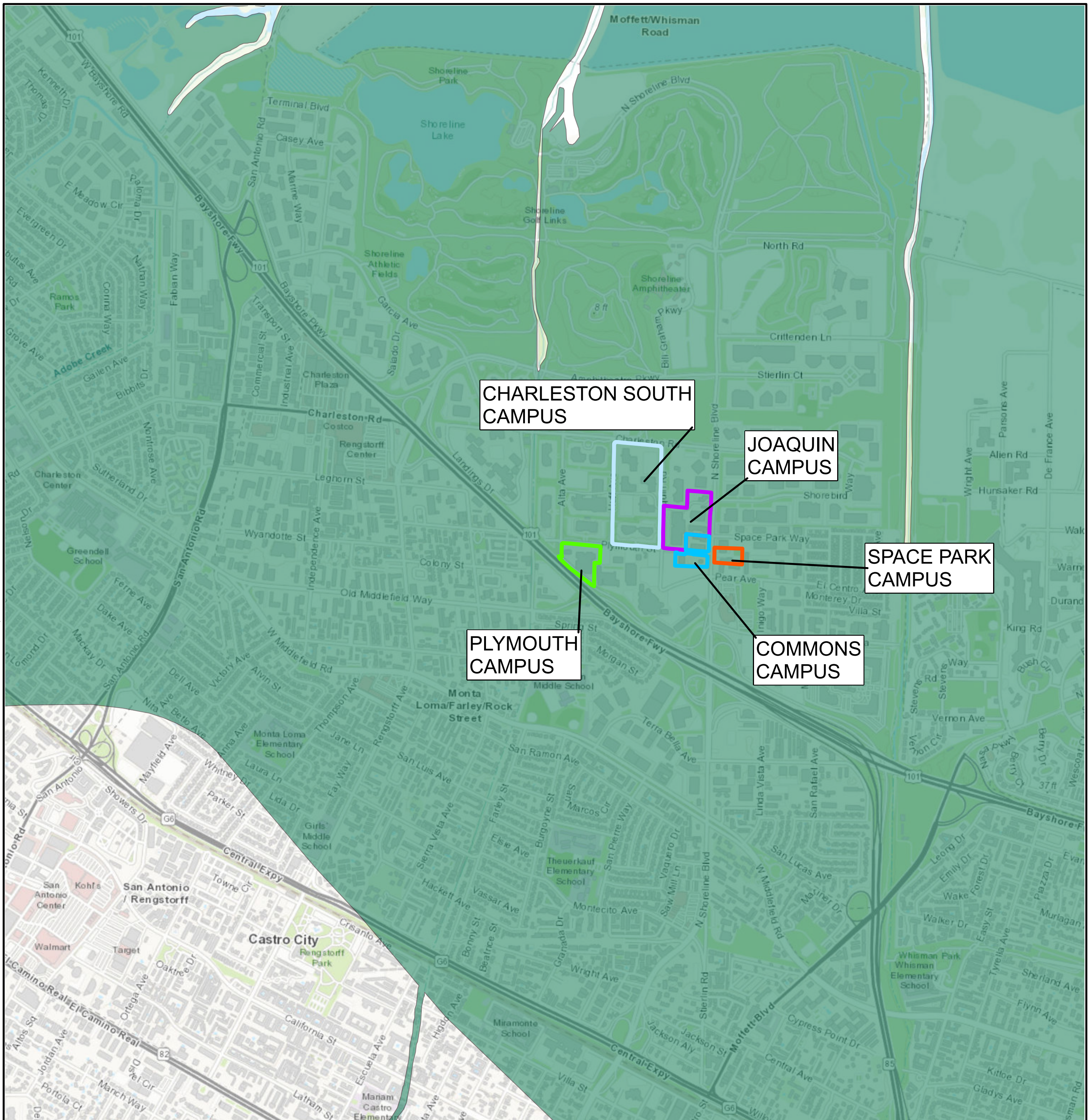
REGIONAL FAULTING AND SEISMICITY

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. : 15949.000.000		FIGURE NO. 4
SCALE: AS SHOWN		
DRAWN BY: QRL	CHECKED BY: JK	

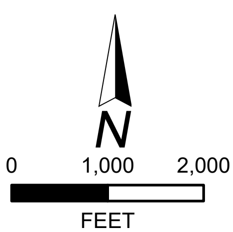
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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE



Liquefaction Zone
Areas where historical occurrence of liquefaction, or local geological,geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required

BASEMAP SOURCE: ESRI MAPPING SERVICE
CALIFORNIA DEPARTMENT OF CONSERVATION, CALIFORNIA GEOLOGICAL SURVEY

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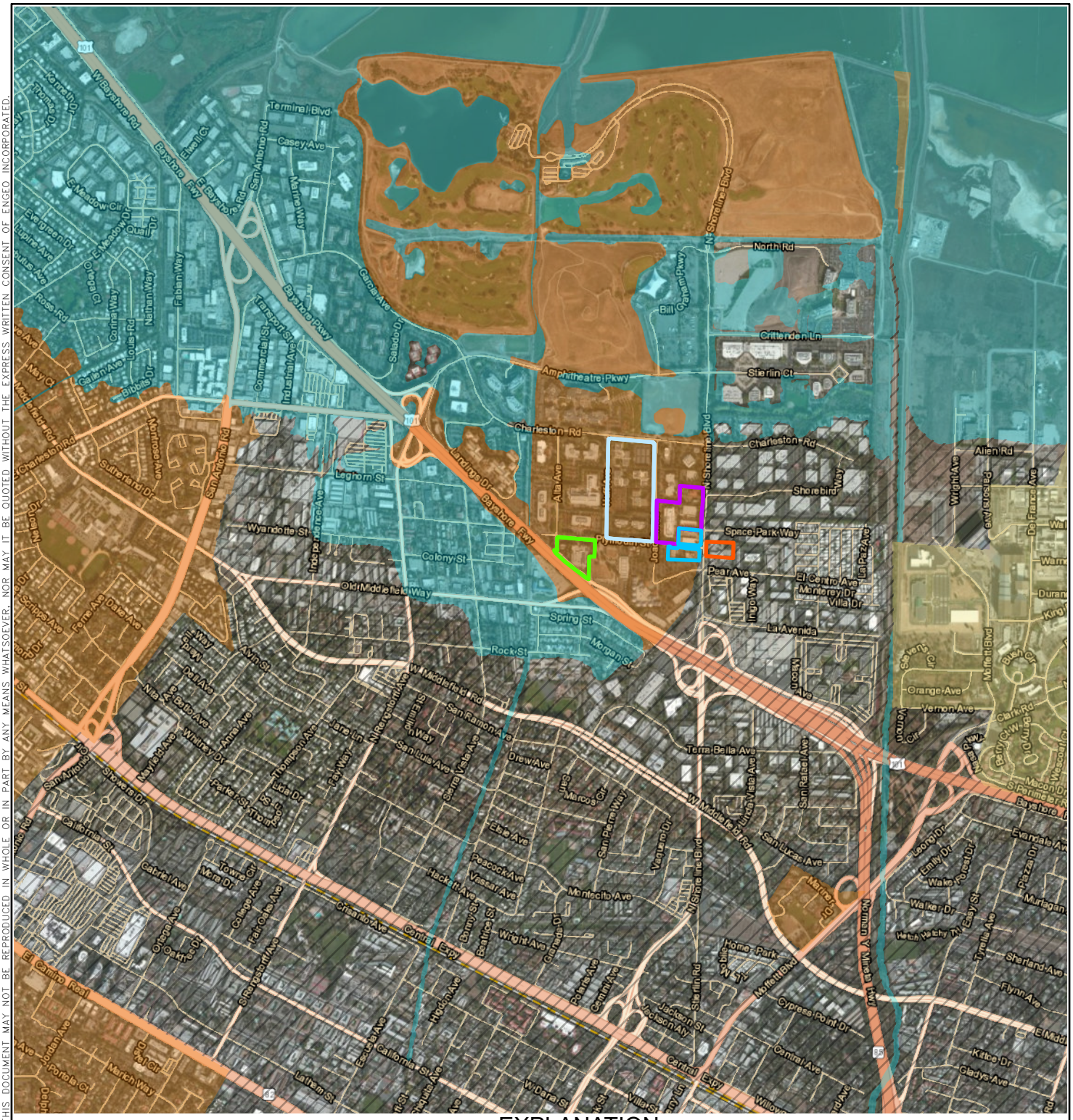
SEISMIC HAZARDS ZONE MAP
GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. : 15949.000.000	FIGURE NO. 5
SCALE: AS SHOWN	
DRAWN BY: QRL	CHECKED BY: JK

PATH: G:\DRAFTING\DRAFTING2_DWG_13000 PLUS\15949\000\072219GEX\GOOGLE NORTH BAYSHORE CHARLESTON SOUTH.APRX
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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- 1% ANNUAL CHANCE FLOOD HAZARD
- AREA OF UNDETERMINED FLOOD HAZARD
- 0.2% ANNUAL CHANCE FLOOD HAZARD
- AREA WITH REDUCED RISK DUE TO LEVEE
- CHARLESTON SOUTH CAMPUS
- JOAQUIN CAMPUS
- PLYMOUTH CAMPUS
- SPACE PARK CAMPUS
- COMMONS CAMPUS

N

0 1,000 2,000

FEET

BASEMAP SOURCE: ESRI MAPPING SERVICE CALIFORNIA GEOLOGICAL SURVEY, 2009

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FEMA FLOOD INSURANCE MAP

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
DRAWN BY: QRL	CHECKED BY: JK

FIGURE NO. 6

PATH: G:\DRAFTING\DRAFTING2_DWG_13000 PLUS\15949\000\072219GEX\GOOGLE NORTH BAYSHORE CHARLESTON SOUTH.APRX
USER: QLIANG

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APPENDIX A

EXPLORATION LOGS

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
- Dames and Moore Piston
- 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-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			4" Aggregate Base												
			LEAN CLAY (CL), dark grayish brown, dry, low plasticity, some fine-grained sand												
	10														
5			olive brown, moist, very stiff, medium plasticity, slow dilatency			36									
	5														
10			CLAYEY SAND TO SANDY LEAN CLAY (CL-SC), pale olive, stiff to very stiff, wet, medium plasticity, rapid dilatancy, fine-grained sand			150-300 psi	26	18	8	51	18	112.5		4.0*	PP
	0		SANDY CLAY (CL), pale olive, stiff, wet, medium plasticity, rapid dilatancy			9	37	16	21	62	24.8	103.3	1377		UC
15			CLAYEY GRAVEL WITH SAND (GC), greenish gray, medium dense to dense, rapid dilatancy, 15% fine-grained sand, 35% to 30% fine gravel			31	30	17	13	40	20.3	112.5			
	-5		WELL GRADED SAND WITH SILT AND GRAVEL (SW), greenish gray, medium dense, wet, trace silt and clay			18				7					
20			WELL GRADED GRAVEL WITH SAND AND SILT (GW), greenish gray, medium dense, wet, 35% to 45% coarse sand												
			FAT CLAY (CH), grayish green, medium stiff, wet, high plasticity, 5% to 10% coarse-grained sand			7					28.2	98.5		.5*	PP
	-10														
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), grayish green, very stiff, wet, high plasticity, 5% to 10% coarse-grained sand			30					22.6	105.5	6386		UC
	-15														
30			GRAVELLY LEAN CLAY (GC-CL), pale olive, stiff to very stiff, wet, medium plasticity, 50% to 55% fine angular to subangular gravel, trace fine-grained sand			21	42	15	27	53				2.0*	PP
	-20														
35			POORLY GRADED SAND WITH GRAVEL (SP), dense, wet, 25% to 35% coarse gravel, trace silt and clay			41									
	-25														
40			LEAN CLAY (CL), yellowish brown, very stiff, medium plasticity, no dilatancy, trace fine, subrounded gravel			16					22	106.8		2.5*	PP
	-30														
45			FAT CLAY (CH), pale olive, stiff, moist, high plasticity, slow dilatancy, with 5% to 10% fine rounded gravel			12	55	16	39	92					
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), pale olive mottled with pale yellow, hard, moist, high plasticity, slow dilatancy, with 5% to 10% fine rounded gravel			40					21.1	109.4	3508.2		UU
55	-40														
	-45														
60			POORLY GRADED GRAVEL (GP), dark gray, dense, angular to subangular			44								>4.5*	PP
	-50		LEAN CLAY (CL), pale olive mottled with pale yellow, hard, low plasticity, trace gravel												
65															
	-55														
70			Trace fine-grained sand grayish green, moist, low to medium plasticity, trace fine-grained sand, slow dilatency			58					27.6	96.3		>4.5*	PP
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), pale olive mottled with pale yellow, hard, low plasticity, trace gravel												
	-65		CLAYEY SAND (SC), grayish green, very dense, wet, high plasticity clay			35				43					
80															
	-70														
85															
	-75														
90			Medium dense			18					26.5	99.4			
	-80														
95															
	-85														
100															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), grayish green with pale olive, very stiff, wet, high plasticity, no dilatancy, trace fine-grained sand			29								2.5*	PP
			Boring Terminated at a depth of 101.5 feet below ground surface on May 19, 2019. Unable to determine groundwater depth due to drilling method.												

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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt 13" Aggregate Base												
			SANDY LEAN CLAY WITH GRAVEL (CL), dark brown, moist, low plasticity, fine- to coarse-grained sand, subangular to subrounded fine gravel												
			LEAN CLAY WITH SAND (CL), dark brown to black, very stiff, moist, medium plasticity, high toughness, fine- to coarse-grained sand, some fine subrounded gravel												
5	10		FAT CLAY (CH), dark brown to black, very stiff, moist, high plasticity, with subangular to subrounded fine gravel light olive brown, no gravel			18	61	19	42	82				3.5*	PP
10	5		medium stiff			7					12.5				
			WELL GRADED GRAVEL WITH SAND (GW), dark gray, loose, wet, angular, subrounded, coarse-grained sand, trace clay												
15	0		possilbe low blow counts due to rock wedged in SPT shoe			4									
			LEAN GRAVELLY CLAY (CL), grayish green, medium stiff, wet, medium plasticity, low toughness, fine subrounded gravel			8	41	16	25	65			600*		TV
20	-5		POORLY GRADED SAND (SP), grayish green, loose to medium dense, wet, with some fine angular gravel Disturbed samples. Initially no recovery, then samples were taken by pushing sampler.			12									
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY CLAY (CL), grayish green, wet, trace coarse-grained sand			200-600 psi									
			WELL GRADED GRAVEL WITH SAND (GW), greenish gray, loose to medium dense, wet, angular, subrounded, fine- to coarse-grained sand, few silt			12									
			SILT (ML), greenish gray, stiff, wet, low plasticity, medium toughness												
	-15														
30			CLAYEY SAND (SC), light yellowish brown, medium dense, wet, medium plasticity, with some coarse subangular gravel			22	43	16	27	26	13.2	120.9		3.75*	PP
	-20														
35			CLAYEY GRAVEL WITH SAND (GC), light yellowish brown, medium dense, wet, 35% to 40% fines, 30% to 35% fine subangular gravel			20				36					
			LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, with some silt			11									
	-25														
40			POORLY GRADED SAND (SP), light yellowish brown to gray, medium dense, wet, with some fine subangular gravel and clay												
			LEAN CLAY (CL), light yellowish brown, very stiff, wet, medium plasticity, high toughness			17									
	-30														
45			LEAN CLAY (CL), olive brown, stiff, wet, medium plasticity, with fine to coarse angular to subrounded gravel			22					14.92	123.2	1171		UU
	-35														
50															

ENGEO
Expect Excellence

LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), yellowish brown, medium dense, wet, fine-to medium-grained sand, some fine subrounded gravel			30					16	117.7			
	-40		LEAN CLAY (CL), reddish brown, very stiff, wet, low plasticity, medium toughness, with silt and some fine- to medium-grained sand												
55															
	-45														
60						22					22	106		>4.5*	PP
	-50														
65															
	-55														
70			Greenish gray, stiff, medium plasticity, no sand			16					25.25	101.7	1237		UU
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), reddish brown, very stiff, wet, low plasticity, medium toughness, with silt and some fine- to medium-grained sand												
80	-65		Olive brown, with some silt and trace sand			19							600*		TV
85	-70		POORLY GRADED SAND WITH GRAVEL (SP), olive brown to gray, medium dense, wet, angular to subangular fine gravel												
			LEAN CLAY (CL), olive brown to gray, very stiff, wet, medium plasticity, high toughness			32									
90	-75														
95	-80														
100	-85														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive brown to gray, very stiff, wet, medium plasticity, high toughness			40					30.1	93.8	3600*	3*	PP+TV
			Boring Terminated at a depth of 101.5 feet below ground surface on May 19, 2019. Unable to determine groundwater depth due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

LOG OF BORING 1-B03

ENGEO Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2" Asphalt 12" Aggregate Base FAT CLAY (CH), very dark brownish gray, moist to dry												
5	10		Very stiff, fissured			20	86	19	67	96	30.9	88		3.7*	PP
			Light olive, stiff, moist, medium plasticity			10								1.0*	PP
10	5		Pale olive			10	59	30	29	99	23.8	102.1	1487.4		UU
15	0		POORLY GRADED SAND WITH GRAVEL AND SILT (SP-SM), dark brown, dense, wet			42					9.2	132.1			
20	-5		Medium dense			24				9					
			LEAN CLAY WITH SAND (CL), reddish yellow mottled with olive, stiff, moist, high plasticity												
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B03

ENGEO Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), reddish yellow mottled with olive, stiff, moist, high plasticity			15					30.1	93.7	1080.1		UU
30	-15		FAT CLAY (CH), dark reddish yellow mottled with olive, very stiff, trace coarse gravel			15	50	20	30	81	29.2			2.1*	PP
35	-20					27								2.75*	PP
40	-25		Stiff, fine-to-coarse-grained sand, trace fine gravel			13								1.5*	PP
45	-30		CLAYEY SAND (SC), dark yellowish brown, medium dense, fine- to-coarse-grained sand			24	38	15	23	39	18.6				
			FAT CLAY (CH), dark yellowish brown, stiff to very stiff, moist, high plasticity			14								2.0*	PP
50	-35														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

ENGEO
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LOG OF BORING 1-B03

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), pale olive to olive, very stiff, moist, high plasticity, fine- to-coarse-grained sand			35	38	17	21		22	106.1		2.75*	PP
55	-40														
60	-45		Reddish yellow mottled with pale olive			32					23.5	104.9		2.9*	PP
65	-50														
			LEAN CLAY (CL), olive to olive gray, stiff, moist, high plasticity												
70	-55					20					29.3	94.8		1.75*	PP
75	-60														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B03

Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive to olive gray, stiff, moist, high plasticity												
80	-65		POORLY GRADED SAND WITH CLAY (SP-SC), dark olive gray, wet, coarse-grained sand			57				10	22.4	103			
			Boring terminated at a depth of 81.5 feet below ground surface. Groundwater not encountered due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B04

ENGEO Expect Excellence

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2" Asphalt												
			11" Aggregate Base												
			LEAN CLAY (CL), very dark brownish gray, moist, low plasticity, trace fine- to coarse-grained sand, trace organics												
	10														
5			LEAN CLAY WITH GRAVEL (CL), light greenish gray, stiff, moist, low plasticity, 10% to 15% gravel, 5% to 10% fine- to coarse-grained sand, trace organics			8									
	5		SANDY LEAN CLAY (CL), olive brown, very stiff, moist, 35% to 40% fine- to coarse-grained sand, trace fine gravel			18	NP	NP	NP		17.4	117.4		3.0*	PP
10			POORLY GRADED SAND WITH SILT (SP), olive brown, medium dense, wet, 10% to 15% fines, trace fine gravel			19				11					
	0														
15			SANDY FAT CLAY (CH), dark greenish gray, medium stiff, moist, 30% to 35% fine- to coarse-grained sand			7								2.25*	PP
	-5														
20			FAT CLAY WITH SAND (CH), dark yellowish brown mottled with greenish gray, medium stiff to stiff, moist, medium plasticity, weak cementation, fine- to coarse-grained sand, trace fine gravel, with iron oxide staining			9					23.9	102		1.0*	PP
	-10		CLAYEY SAND (SC), dark yellowish brown mottled with greenish gray, loose to medium dense, moist, 35% to 40% fines												
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), dark yellowish brown mottled with greenish gray, loose to medium dense, moist, 35% to 40% fines			11	40	18	22	38				.75*	PP
	-15														
30			Medium dense			14					16.2	120.7			
	-20														
35			25% to 35% fines			16	30	18	12	30					
	-25														
			FAT CLAY WITH SAND (CH), dark yellowish brown, stiff to very stiff, moist, 25% to 30% fine to coarse sand, trace fine gravel												
40						15								3.75*	PP
	-30														
45															
			LEAN CLAY WITH SAND (ML), dark yellowish brown, stiff, wet, 40% to 45% fine- to medium-grained sand			13	34	17	17	58	22.8	106.6		1.25*	PP
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (ML), dark yellowish brown, stiff, wet, 40% to 45% fine- to medium-grained sand			34									
			CLAYEY SAND TO SANDY CLAY (SC-CL), dark yellowish brown, loose to medium stiff, moist, 45% to 50% fines			4	31	18	13	46				1.0*	PP
			FAT CLAY WITH SAND (CH), dark olive mottled with dark greenish gray, very stiff, moist, 15% to 20% fine- to medium-grained sand, trace fine to coarse gravel			29					22.5	106	1637		UU
			Medium stiff to stiff			12								1.25*	PP

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	-65		FAT CLAY WITH SAND (CH), dark olive mottled with dark greenish gray, very stiff, moist, 15% to 20% fine- to medium-grained sand, trace fine to coarse gravel												
80			Very stiff to hard			40					18	113.1	3469		UU
			Boring Terminated at a depth of 81.5 feet below ground surface on June 9, 2019. Groundwater not encountered due to drilling method												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

LOG OF BORING 1-B05

ENGEO Expect Excellence

LATITUDE: 37.41608056 LONGITUDE: -122.0784306

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/9/2019
HOLE DEPTH: 46.5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (WGS84): Approx. 16 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	15		4" Asphalt 10" Aggregate Base												
5	10		FAT CLAY WITH SAND (CH), very dark brown, very stiff, moist, medium plasticity, no dilatency, some <1/4" pockets of pale yellow sand/weathered sandstone			13								2.75*	PP
						17	68	17	51	74	36.4	82.9			
10	5		SILTY SAND WITH GRAVEL (SM), pale olive mottled with reddish yellow, medium dense, moist With interbeded clay			25				20					
15	0		POORLY GRADED SAND WITH GRAVEL gray, wet, angular gravel			9									
			no recovery from samples taken between 15 feet and 18 feet			6									
20	-5					17				12					
25			FAT CLAY (CH), pale olive mottled with reddish yellow, stiff to very stiff, medium plasticity, no dilatancy, trace coarse-grained sand												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B05

ENGEO Expect Excellence

LATITUDE: 37.41608056 LONGITUDE: -122.0784306

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/9/2019
HOLE DEPTH: 46.5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (WGS84): Approx. 16 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	-10		FAT CLAY (CH), pale olive mottled with reddish yellow, stiff to very stiff, medium plasticity, no dilatancy, trace coarse-grained sand			15	53	22	31	95				2.75*	PP
30	-15					15					26.1	99	1209.3		UU
35	-20		SANDY CLAY TO CLAYEY SAND (CL-SC), pale olive, rapid dilatancy			14				45					
40	-25		LEAN CLAY WITH SAND (CL), pale olive, stiff, moist, medium plasticity			9	42	17	25	84	23				
45	-30					24								3.25*	PP
			Boring terminated at a depth of 46.5 feet below the ground surface on 7/9/2019. Groundwater not encountered due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B6

ENGEO Expect Excellence

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			6" Asphaltic Concrete												
			12" AGGREGATE BASE (AB)												
	10		FAT CLAY (CH), dark greenish gray, stiff, slightly moist, medium plasticity												
5			Dark olive mottled with greenish gray, hard, high plasticity			27	73	20	53	97	27.5	93.5		>4.5*	PP
	5		Very stiff			14								3.75*	PP
10			LEAN CLAY (CL), light grayish green, stiff, moist, low plasticity, slow dilatancy, trace fine-grained sand			12	44	17	27	82	32.7	92.3		2.0*	PP
	0														
15			SANDY LEAN CLAY (CL), greenish brown, very stiff, wet, high plasticity, fine-grained sand			7	41	21	20	58	21.9	109	2141.9		UU
	-5		Trace gravel												
20			No recovery			7									
	-10														
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

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LOG OF BORING 1-B6

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY LEAN CLAY (CL), greenish brown, very stiff, wet, high plasticity, fine-grained sand Hard, moist			29								>4.5*	PP
	-15														
30			LEAN CLAY WITH SAND (CL), greenish gray, stiff, wet, trace fine gravel			18	36	23	13		27.1	100	1003.4		UU
	-20														
			POORLY GRADED SAND (SP), dark gray, medium dense												
35			CLAYEY SAND WITH GRAVEL (SC), pale yellow mottled with reddish yellow, loose to medium dense, wet, low plasticity			13	30	15	15	20	23	110.7	1200*		TV
	-25														
40			POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), gray, medium dense to dense			45				6					
	-30														
45			SANDY LEAN CLAY (CL), pale olive mottled with reddish yellow, medium stiff, wet, medium plasticity			7	38	13	25	60					
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

ENGEO
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LOG OF BORING 1-B6

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			POORLY GRADED GRAVEL WITH CLAY (GP-GC), gray, medium dense to dense, fine to coarse gravel, trace fine-grained sand, trace to little fines			25	33	16	17		19.7	112		4.5*	PP
			LEAN CLAY (CL), pale olive, hard, moist, low plasticity, trace fine-grained sand												
	-40														
55															
	-45														
60			POORLY GRADED GRAVEL (GP), gray, loose to medium dense, subrounded			21									
			SILT (ML), light yellowish brown, stiff, moist, low plasticity, fine-grained sand												
	-50														
65															
	-55														
70			SILTY SAND (SM), olive brown, medium dense, wet			19				37	24.9	102.8			
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B6

ENGEO Expect Excellence

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY SAND (SM), olive brown, medium dense, wet												
	-65														
80			SANDY GRAVEL TO GRAVELLY SAND (GP), gray to black, dense, wet, subrounded coarse gravel, angular medium-grained sand			60									
			Boring terminated at a depth of 81.5 feet below ground surface on July 8, 2019. Groundwater not observed due to method of drilling.												

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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
0	15		1" Asphalt 1.5 feet Aggregate Base												
			LEAN CLAY (CL), very dark brownish gray, moist, medium plasticity, trace fine- to medium-grained sand, trace organics												
5	10		SANDY SILT (ML), light greenish gray, stiff, moist, low plasticity, 35% to 45% fine-grained sand			13	33	19	14	67				3.5*	PP
						200 psi				57	24.4	103.6			
10	5		POORLY GRADED GRAVEL (GP), dark olive brown												
						28				8					
15	0		CLAYEY SAND WITH GRAVEL (SC), dark olive brown, medium dense to dense, 15% gravel			30				13	13.1				
20	-5		SANDY CLAY (CL), bluish gray, stiff, moist, medium plasticity, 30% to 35% coarse-grained sand, trace gravel			14	44	17	27	69	23.6	103.3	1341		UU
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), bluish gray, stiff, moist, medium plasticity, trace fine-grained sand, no gravel			12					26.3	99.9		2.0*	PP
	-10														
30			35% to 40% fine- to coarse-grained sand			25									
	-15		CLAYEY SAND (SC), bluish gray, medium dense, moist, 25% to 30% fines												
			WELL GRADED SAND WITH CLAY AND GRAVEL (SW), dark yellowish brown, medium dense, wet, 5% to 10% fines, 5% to 10% gravel												
35						25				9					
	-20														
			LEAN CLAY WITH SAND (CL), yellowish brown to olive brown, hard, moist, high plasticity, 10% to 15% fine- to coarse-grained sand, with iron staining												
40						54	40	18	22		20.96	108.2	3620		UU
	-25														
45			SANDY CLAY (CL), yellowish brown, medium stiff to stiff, moist, medium plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel			13	38	18	20	60	25	102.2		1*	PP
	-30														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), yellowish brown, medium stiff to stiff, moist, low plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel			3									
55	-35		SANDY SILT TO SILTY SAND (SM-ML), yellowish brown, medium stiff to stiff, moist, low plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel												
60	-40		Medium stiff			11	38	26	12	55	22.1	103.1		.75*	PP
65	-45														
70	-50		FAT CLAY (CH), dark greenish gray, stiff, moist, high plasticity, moderate cementation, trace fine-grained sand			16	55	22	33					3.0*	PP
75	-55														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), dark greenish gray, stiff, moist, high plasticity, moderate cementation, trace fine-grained sand												
	-60		SANDY SILT TO SILTY SAND (SM-MH), olive brown mottled with greenish gray, medium stiff to stiff, wet, 45% to 50% fine-grained sand and trace coarse gravel												
80			FAT CLAY (CH), dark yellowish brown mottled with dark greenish gray, stiff, high plasticity			17	NP	NP	NP	53				3.5*	PP
			Boring Terminated at a depth of 81.5 feet below ground surface on June 8, 2019. Groundwater not encountered due to drilling method												

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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			8" Aggregate Base												
			LEAN CLAY (CL), bluish black, moist, high toughness, few fine- to medium-grained sand, trace angular fine gravel												
5	5		Gray, very stiff, medium toughness, trace fine-grained sand and angular fine gravel			13	41	17	24	61	17.5	110.8	600*	3.5*	PP+TV
			POORLY GRADED SAND WITH GRAVEL (SP), gray, dense, wet, subrounded to subangular fine gravel, trace clay		▽										
10	0					43				9					
			WELL GRADED GRAVEL WITH SAND (GW), brown, dense, wet, fine- to coarse-grained sand, subrounded to angular gravel, trace clay												
15	-5					39									
			Dames and Moore piston sampler unable to advance at 400 psi			32								>4.5*	PP
			LEAN CLAY WITH SAND (CL), greenish blue, hard, wet, medium plasticity, high toughness, fine-grained sand												
20	-10					11	37	18	19	74					
			Light brown with gray, stiff, medium toughness, some silt												
25	-15														

LOG - GEOTECHNICAL_SU+QU W/ ELEV_MULTIPLE PARCEL GEX_CHARLESTON S.GPJ_ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), greenish blue, hard, wet, medium plasticity, high toughness, fine-grained sand			16							1000*	2.5*	PP+TV
			Stiff to very stiff, trace fine- to medium-grained sand												
30	-20		SANDY CLAY TO CLAYEY SAND (CL-SC), light brown with gray, stiff, wet			12	37	16	21	52	26.4	99.9	600*	1.25*	PP+TV
35	-25					9					25.53	102.3	348		UU
40	-30					350 psi				6	18.4				
			POORLY GRADED SAND (SP), dark brown, wet												
			SANDY LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, trace fine subangular gravel												
45	-35					22							1000*	1.25*	PP+TV
			POORLY GRADED SAND (SP), light yellowish brown, medium dense, few fine subrounded gravel, trace silt												
50	-40														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			POORLY GRADED SAND (SP), light yellowish brown, medium dense, few fine subrounded gravel, trace silt			28									
			LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, some silt												
55	-45					11	39	17	22	88					
			sand in cuttings												
60	-50		olive brown, trace fine-grained sand			14									
65	-55														
70	-60		very stiff to hard			35					23.5	102.3	6841		CU
			POORLY GRADED SAND (SP), olive brown, medium dense, wet, medium plasticity, medium toughness, trace fine-grained sand												
75	-65														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, medium toughness, trace fine-grained sand			30								3.75*	PP
80	-70					21							1100*	1.75*	PP+TV
85	-75					25					25.7	100.6	1200*	1.5*	PP+TV
90	-80		more silt			32							800*	1.75*	PP+TV
			SILTY CLAYEY SAND TO SANDY SILT AND CLAY (SC-SM) TO (CL-ML) olive brown, very dense, wet												
95	-85					56	22	17	5	45					
			SANDY LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, high toughness, fine- to medium-grained sand												
100	-90														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, high toughness, fine- to medium-grained sand			24									
			Boring Terminated at a depth of 101.5 feet below ground surface on May 14, 2019. Groundwater encountered at a depth of 7.5 feet below ground surface.												

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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			6" Aggregate Base												
	10		FAT CLAY WITH SAND (CH), dark brownish gray, moist, fine- to medium-grained sand, trace gravel and organics												
5			SANDY CLAY (CH), dark greenish gray with pale olive, stiff, moist, 10% to 15% fine- to medium-grained sand		▽	12	68	27	41	80			1600*	1.75*	PP+TV
	5		LEAN CLAY WITH SAND (CL), olive gray, medium stiff, fine- to medium-grained sand			9					23.5	104.8	566		UU
10			CLAYEY SAND TO SANDY CLAY (CL-SC), dark olive gray, medium dense, 10% to 15% fine gravel with iron staining			18	32	16	16	30	14.9	120.5			
	0					15					16.2				
			SANDY SILT TO SILTY SAND (SM-ML), dark brownish gray, 30% to 35% fine-grained sand												
15			Dark olive gray to dark brownish gray			75 psi	22	22	NP	52					
	-5														
			FAT CLAY WITH SAND TO SANDY CLAY (SC-CH), reddish yellow, stiff, moist, 25% to 30% fine- to coarse-grained sand, 15% to 20% fine to coarse gravel												
20						17				55				3.25*	PP
	-10		FAT CLAY WITH SAND (CH), dark bluish gray, very stiff, moist, 20% to 25% fine- to coarse-grained sand												
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), dark gray, stiff, moist, trace sand			10									
	-15														
30			Medium stiff			4					26.4	99.9	1221		CU
	-20														
35			SANDY LEAN CLAY (CL), dark bluish gray, medium stiff, moist dark bluish gray reddish yellow, medium stiff			6	35	19	16	56			2200*	4.25*	PP+TV
	-25														
			CLAYEY SAND WITH GRAVEL (SC), reddish yellow, dense, wet												
40						39					10				
	-30														
45			medium dense			16				25					
	-35														
			FAT CLAY (CH), olive brown, medium stiff, moist, 5% to 10% fine- to medium-grained sand												
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), yellowish brown, medium dense, moist, 40% to 45% clay			13							900*	1.5*	PP+TV
55	-40		Loose to medium dense, fine- to coarse-grained sand, trace fine gravel			11	28	16	12	34	19				
60	-45		FAT CLAY WITH SAND (CH), yellowish brown, medium stiff, moist, 20% to 25% fine- to coarse-grained sand			16							968		UU
65	-50														
70	-55		Olive gray, hard, 15% to 20% sand			65					19.4	108.7	3500*	4.2*	PP+TV
75	-60														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
80	-65		FAT CLAY WITH SAND (CH), yellowish brown, medium stiff, moist, 20% to 25% fine- to coarse-grained sand												
						72					21.3	106.2	3000*	>4.5*	PP+TV
85	-70														
90	-75														
						57					20.7	107.9		>4.5*	PP
95	-80														
100	-85		WELL GRADED SAND (SW), grayish brown to yellowish brown, dense, wet, 5% to 10% fines, trace fine gravel												

LOG - GEOTECHNICAL_SU+QU W/ ELEV_MULTIPLE PARCEL GEX_CHARLESTON S.GPJ_ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			WELL GRADED SAND (SW), grayish brown to yellowish brown, dense, wet, 5% to 10% fines, trace fine gravel			50/4.5"									
	-90		Very dense			79									
			Boring Terminated at a depth of 103 feet below ground surface on May 16, 2019. Groundwater encountered at a depth of 5.5 feet below ground surface.												

ENGEO
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LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2.5" Asphalt 15.5" Aggregate Base												
			LEAN CLAY (CL), dark gray to dark greenish gray, moist, 10% to 15% fine- to coarse-grained sand												
5	10		olive gray to gray, hard			26	32	23	9		30.3	89.6		4*	PP
10	5		FAT CLAY WITH SAND (CH), olive, stiff, wet, 20% to 25% fine- to medium-grained sand			16					24.1		1000*	1.5*	PP+TV
15	0		SANDY FAT CLAY (CH), olive gray to gray, stiff, moist, fine-grained sand			7	66	23	43	79					
20	-5		FAT CLAY (CH), greenish gray, medium stiff to stiff, 10% to 15% fine- to medium- grained sand, trace gravel			8					16	122.5	1000*	1.5*	PP+TV
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), very dark grayish brown to olive, stiff, moist, fine- to coarse-grained sand, trace gravel			14	37	19	18	63				2.5*	PP
	-15		FAT CLAY WITH SAND (CH), yellowish brown, stiff, moist, 15% to 20% fine- to coarse-grained sand												
30						11					22.9	105.2		.9235	UC
	-20														
35			dark yellowish brown with manganese staining			12							1200*	1*	PP+TV
			CLAYEY SAND (SC), dark yellowish brown, medium dense, wet, 25% to 30% clay												
	-25														
40						15	32	16	16	34	19.4				
	-30		FAT CLAY (CH), pale olive, stiff to very stiff, moist, 5% to 10% fine- to coare-grained sand, trace fine gravel												
45						20					28.3	96.3		1.44	UC
	-35		WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown, dense, moist, 5% to 10% fines												
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown, dense, moist, 5% to 10% fines			34				14					
			Boring Terminated at a depth of 51.5 feet below ground surface on May 17, 2019. Groundwater encountered at a depth of 7.5 feet below ground surface.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19



APPENDIX B

CONE PENETRATION TEST LOGS

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

CONETEC

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Explorations
Start Date:	07-May-2019
End Date:	Ongoing

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Location	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting (m)	Refer to Notation Number
1-CPT-01	19-56067_1CP1	Joaquin	7-May-2019	448:T1500F15U500	11.1	50.52	4141718	581484	
1-CPT-06	19-56067_1CP6	Joaquin	7-May-2019	448:T1500F15U500	8.2	120.57	4141642	581391	
1-SCPT-02	19-56067_1SP2	Joaquin	7-May-2019	448:T1500F15U500	8.9	100.56	4141669	581498	
1-CPT-15	19-56067_1CP15	Charleson South	8-May-2019	448:T1500F15U500	6.2	80.54	4141706	581239	
1-CPT-03	19-56067_1CP3	Joaquin	8-May-2019	448:T1500F15U500	9.0	120.57	4141559	581533	
1-SCPT-04	19-56067_1SCP4	Charleson South	8-May-2019	448:T1500F15U500	8.1	100.56	4141829	581289	
1-CPT-16	19-56067_1CP16	Charleson South	9-May-2019	448:T1500F15U500	8.1	80.54	4141607	581331	
1-CPT-17	19-56067_1CP17	Charleson South	10-May-2019	483:T1500F15U500	4.8	100.56	4141531	581178	
1-CPT-18	19-56067_1CP18	Charleson South	11-May-2019	483:T1500F15U500	3.1	100.56	4141640	581199	
1-CPT-09	19-56067_1CP09	Plymouth	13-May-2019	483:T1500F15U500	6.8	100.56	4141336	581070	
1-SCPT-10	19-56067_1SP10	Plymouth	13-May-2019	483:T1500F15U500	4.8	80.54	4141481	581034	
1-CPT-11	19-56067_1CP11	Plymouth	14-May-2019	483:T1500F15U500	6.2	100.56	4141486	580955	
1-CPT-12	19-56067_1CP12	Plymouth	14-May-2019	483:T1500F15U500	6.3	80.54	4141408	580971	
1-CPT-13B	19-56067_1CP13B	Charleson South	14-May-2019	483:T1500F15U500	8.5	100.56	4141903	581272	
1-CPT-14B	19-56067_1CP14B	Charleson South	14-May-2019	483:T1500F15U500	7.0	120.57	4141826	581178	
2-CPT-14	19-56067_2CP14	Commons	09-Jul-2019	494:T1500F15U500	8.4	100.56	4142405	579889	
2-SCPT-13	19-56067_2SP13	Commons	09-Jul-2019	494:T1500F15U500	8.4	100.64	4142585	579861	
1-CPT8	19-56067_1CP08	Space Park	08-Jul-2019	494:T1500F15U500	6.0	120.57	4141466	581660	

1. The assumed phreatic surface was based on pore pressure dissipation tests unless otherwise noted. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.
3.The assumed phreatic surface was based on an adjacent CPT.

Job No:	19-56067
Client:	ENGEO Incorporated
Project:	Google Explorations
Start Date:	07-Jul-2019
End Date:	09-Jul-2019

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting[2] (m)	Refer to Notation Number
1-CPT-05	19-56067_1CP05	09-Jul-2019	494:T1500F15U500	7.7	80.54	4141489	581482	
1-CPT-07	19-56067_1CP07	08-Jul-2019	494:T1500F15U500	8.1	80.54	4141420	581440	
1-CPT-08	19-56067_1CP08	08-Jul-2019	494:T1500F15U500	6.0	120.57	4141466	581660	
2-CPT-06	19-56067_2CP06	07-Jul-2019	391:T1500F15U500	13.3	73.49	4142562	582145	
2-CPT-12	19-56067_2CP12	08-Jul-2019	494:T1500F15U500	7.4	120.57	4141958	580418	
2-CPT-14	19-56067_2CP14	09-Jul-2019	494:T1500F15U500	8.4	100.56	4142405	579889	
2-SCPT-13	19-56067_2SP13	09-Jul-2019	494:T1500F15U500	8.4	100.64	4142585	579861	
3-CPT-14	19-56067_3CP14	07-Jul-2019	391:T1500F15U500	23.8	23.87	4143226	579724	

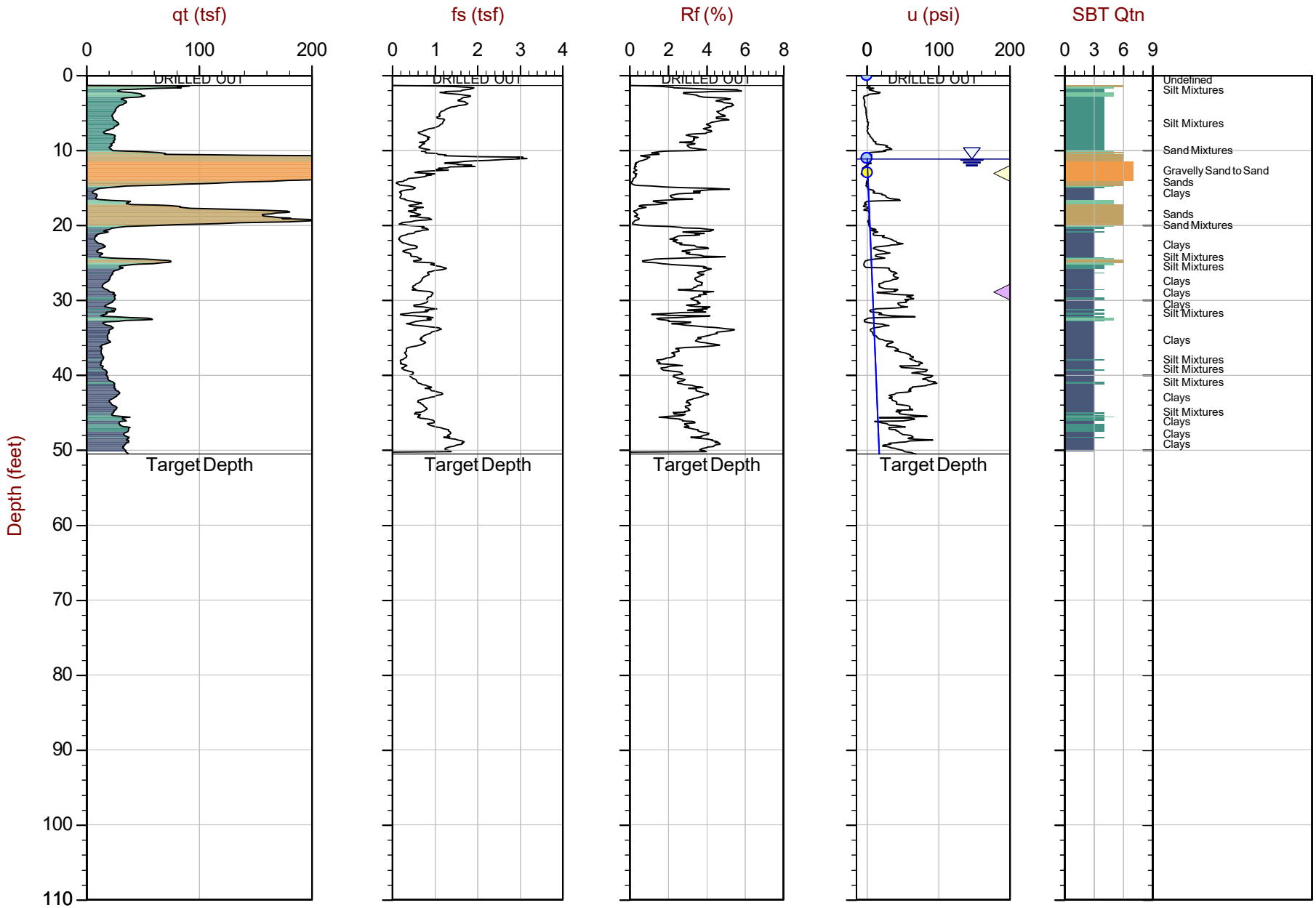
1. The assumed phreatic surface was based on the results of the shallowest pore pressure dissipation test performed within the sounding. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 20:27
Site: Google Joaquin Exploration

Sounding: 1-CPT-01
Cone: 448:T1500F15U500



Max Depth: 15.400 m / 50.52 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP1.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141718m E: 581484m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

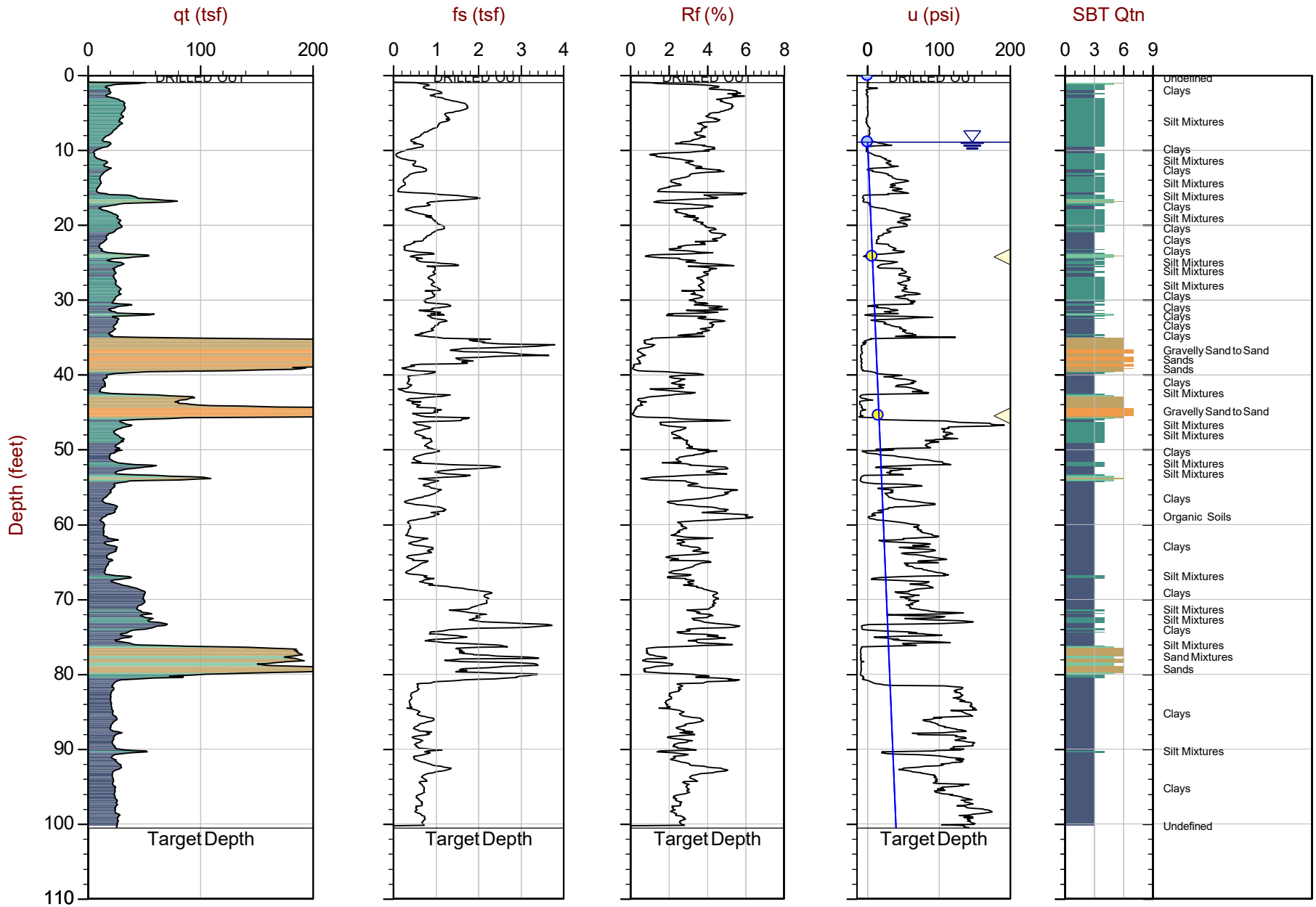
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 21:48
Site: Google Joaquin Exploration

Sounding: 1-SCPT-02
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP2.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141669m E: 581498m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

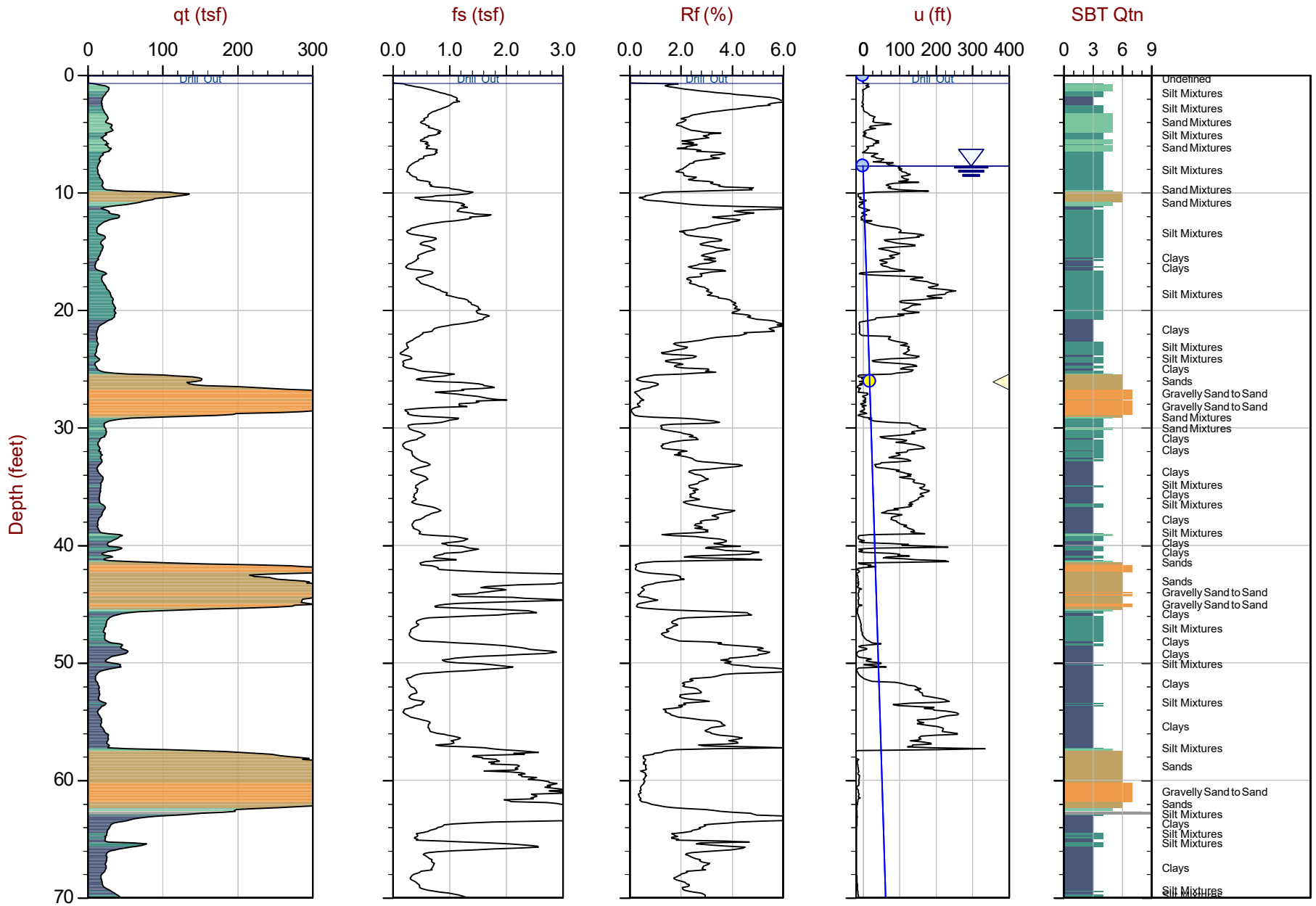
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-09 10:29
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-05
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP05.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141489m E: 581482m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

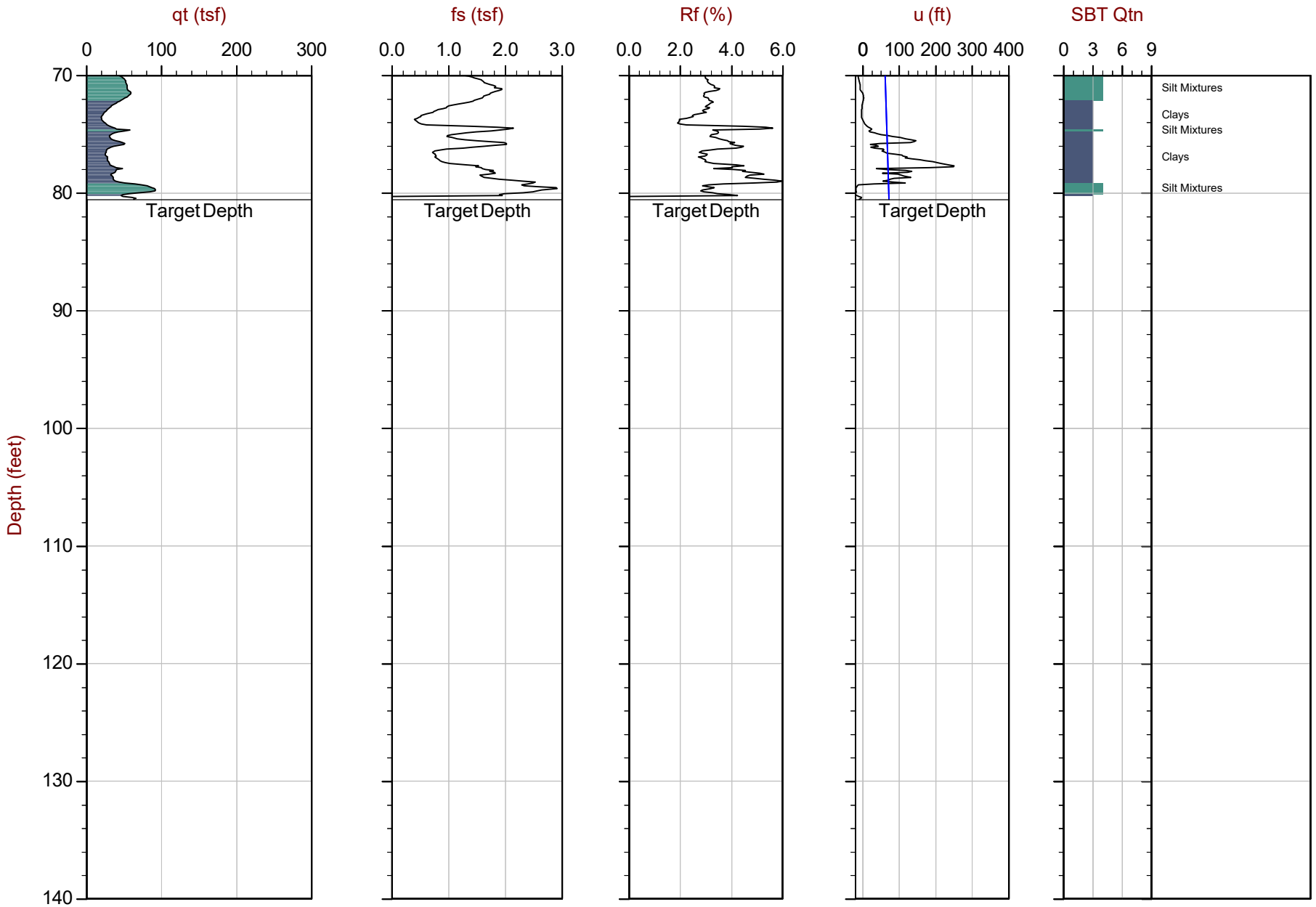
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-09 10:29
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-05
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP05.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141489m E: 581482m
Sheet No: 2 of 2

Overplot Item: Ueq Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

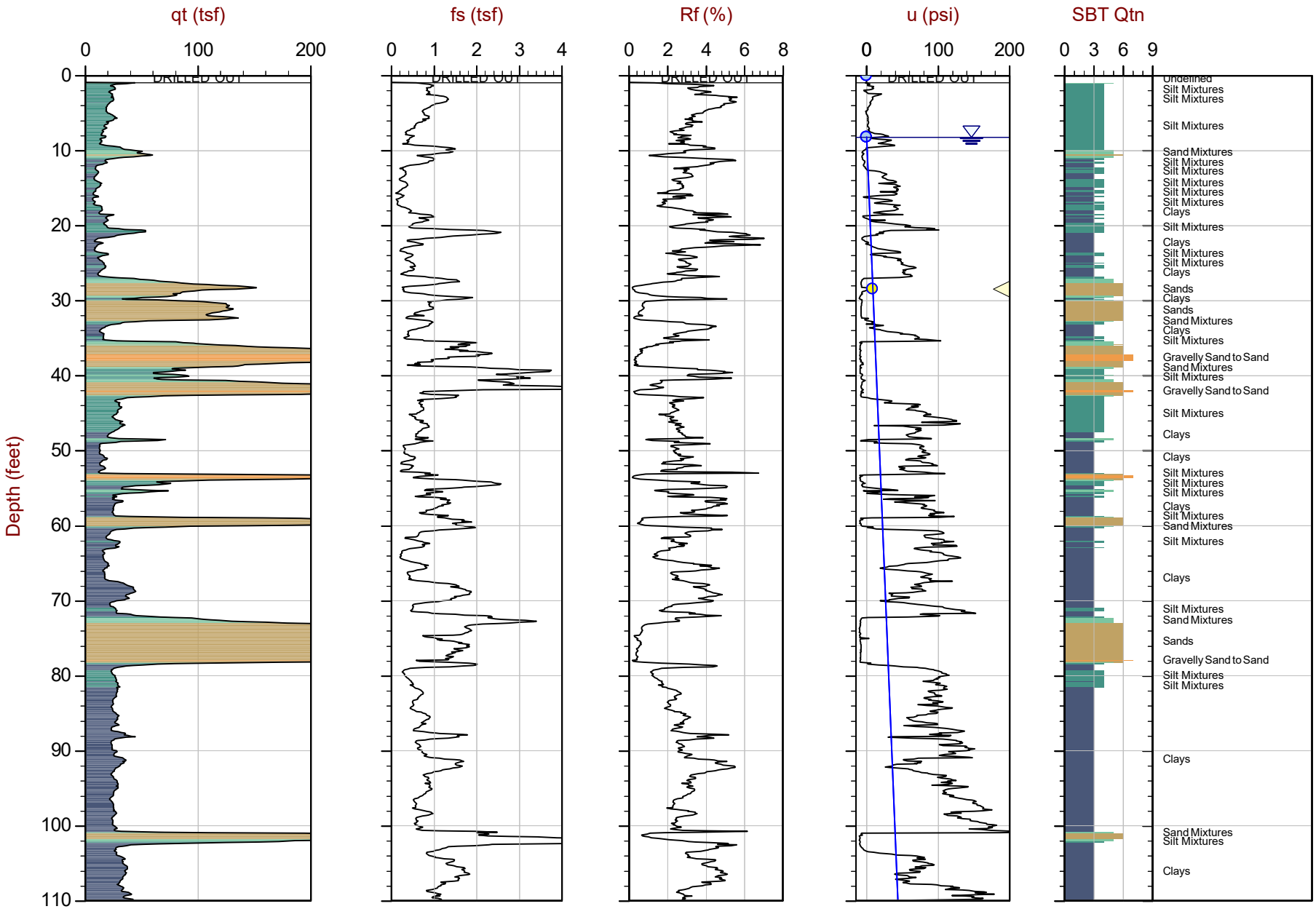
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 23:56
Site: Google Joaquin Exploration

Sounding: 1-CPT-06
Cone: 448:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP6.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141642m E: 581391m
Page No: 1 of 2

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

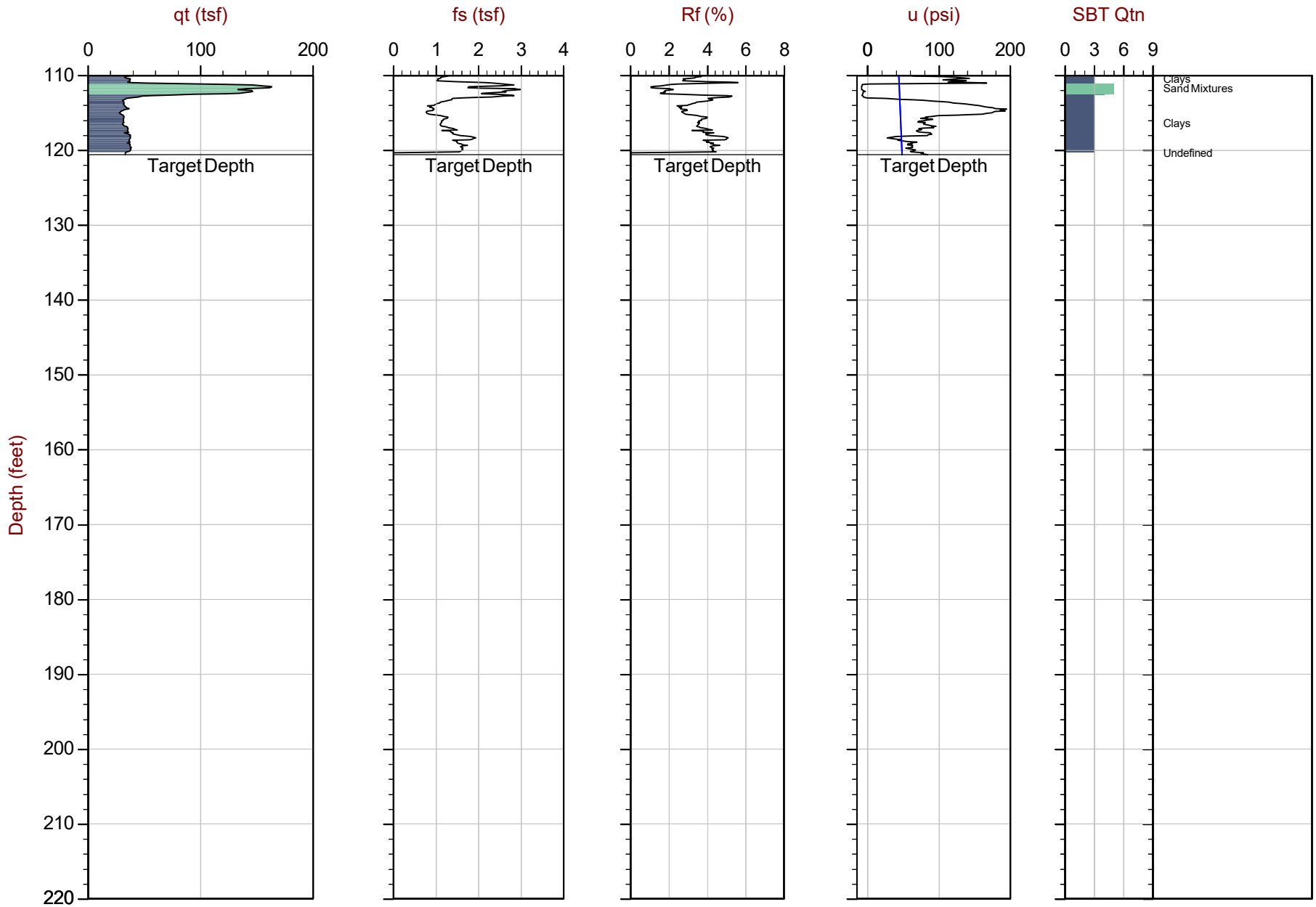
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 23:56
Site: Google Joaquin Exploration

Sounding: 1-CPT-06
Cone: 448:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP6.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141642m E: 581391m
Page No: 2 of 2

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

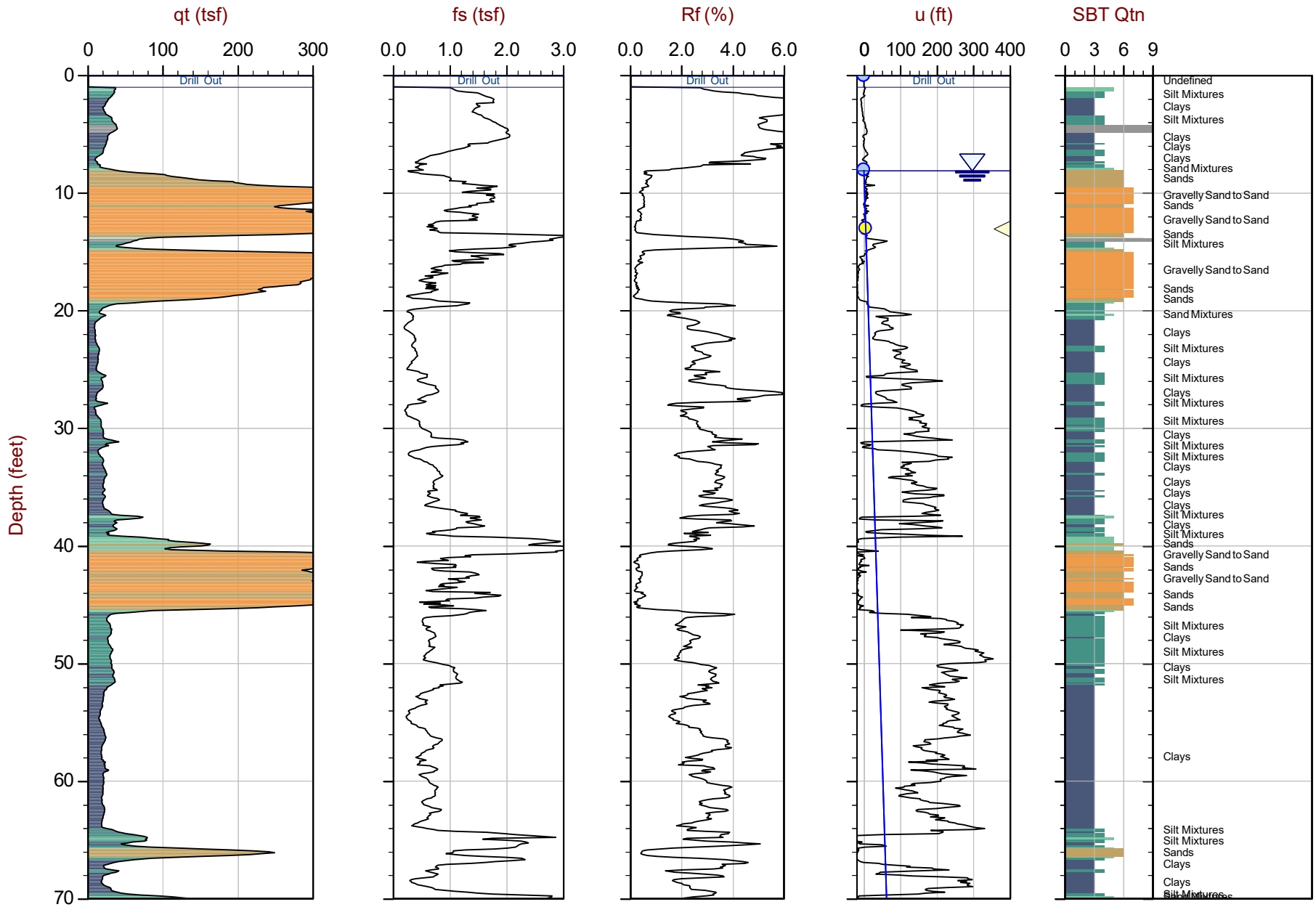
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 08:07
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-07
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP07.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141420m E: 581440m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

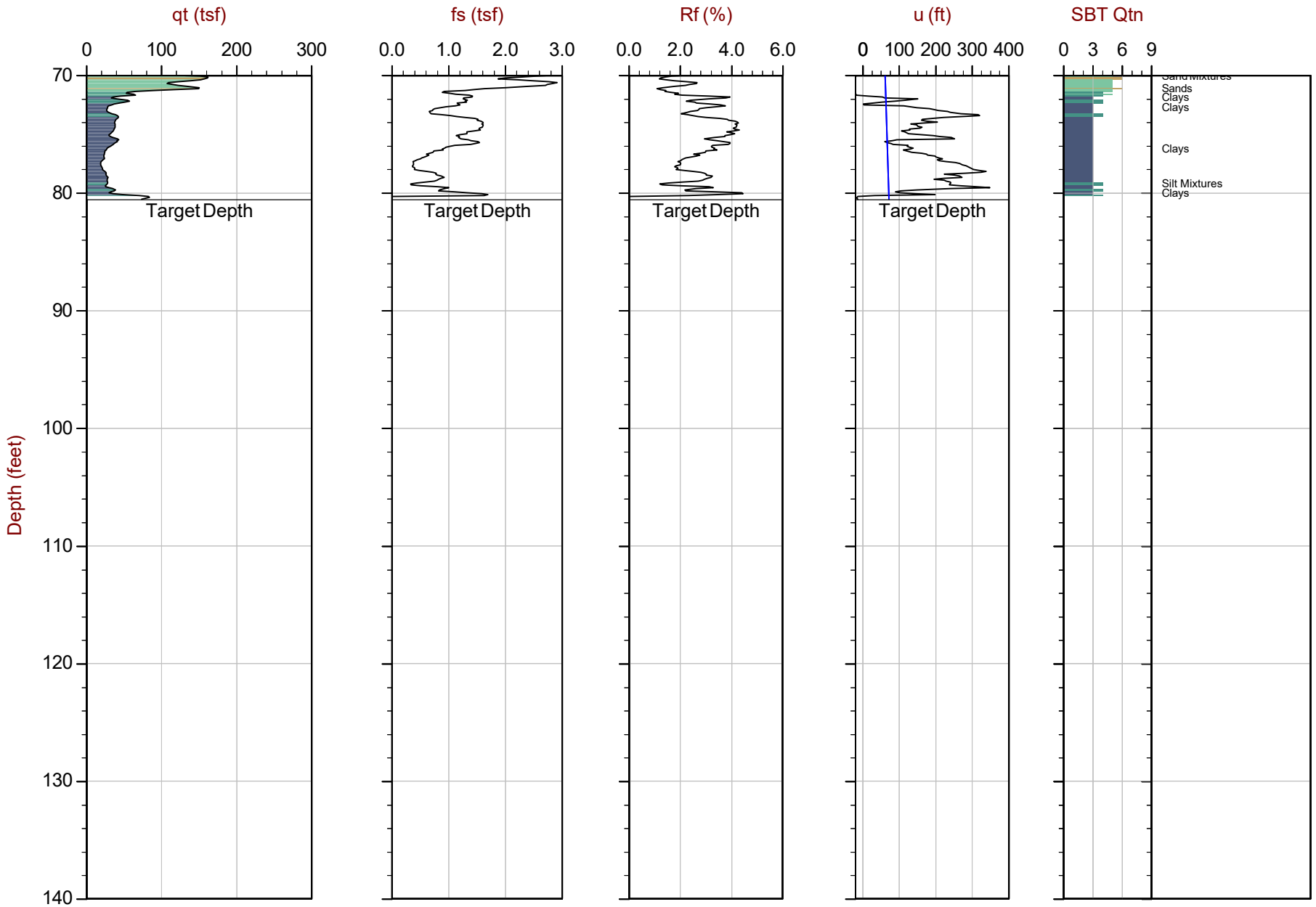
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 08:07
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-07
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP07.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141420m E: 581440m
Sheet No: 2 of 2

Overplot Item: Ueq Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

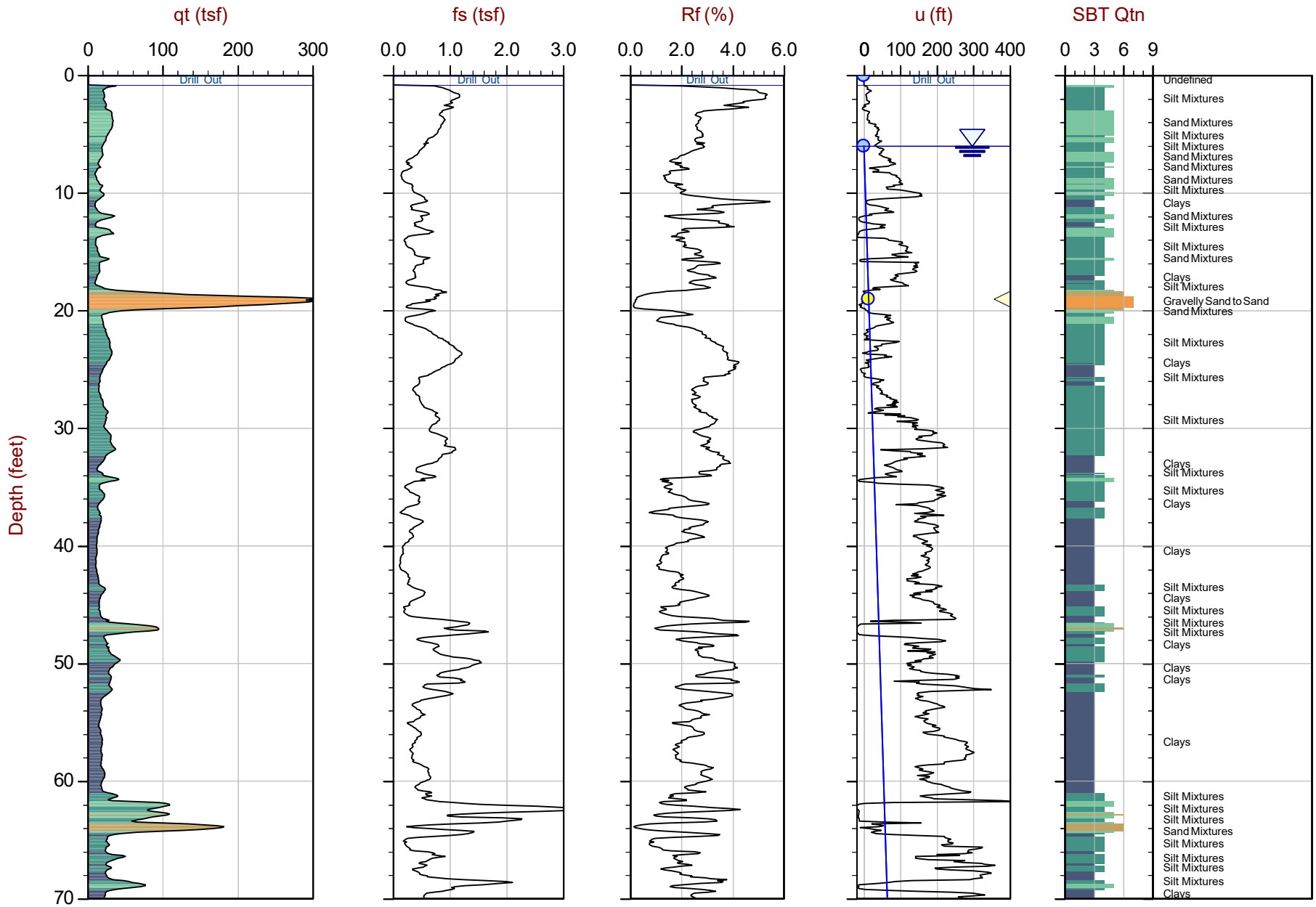
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 09:25
Site: Google Space Campus Exploration

Sounding: 1-CPT-08
Cone: 494:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP08.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141466m E: 581660m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

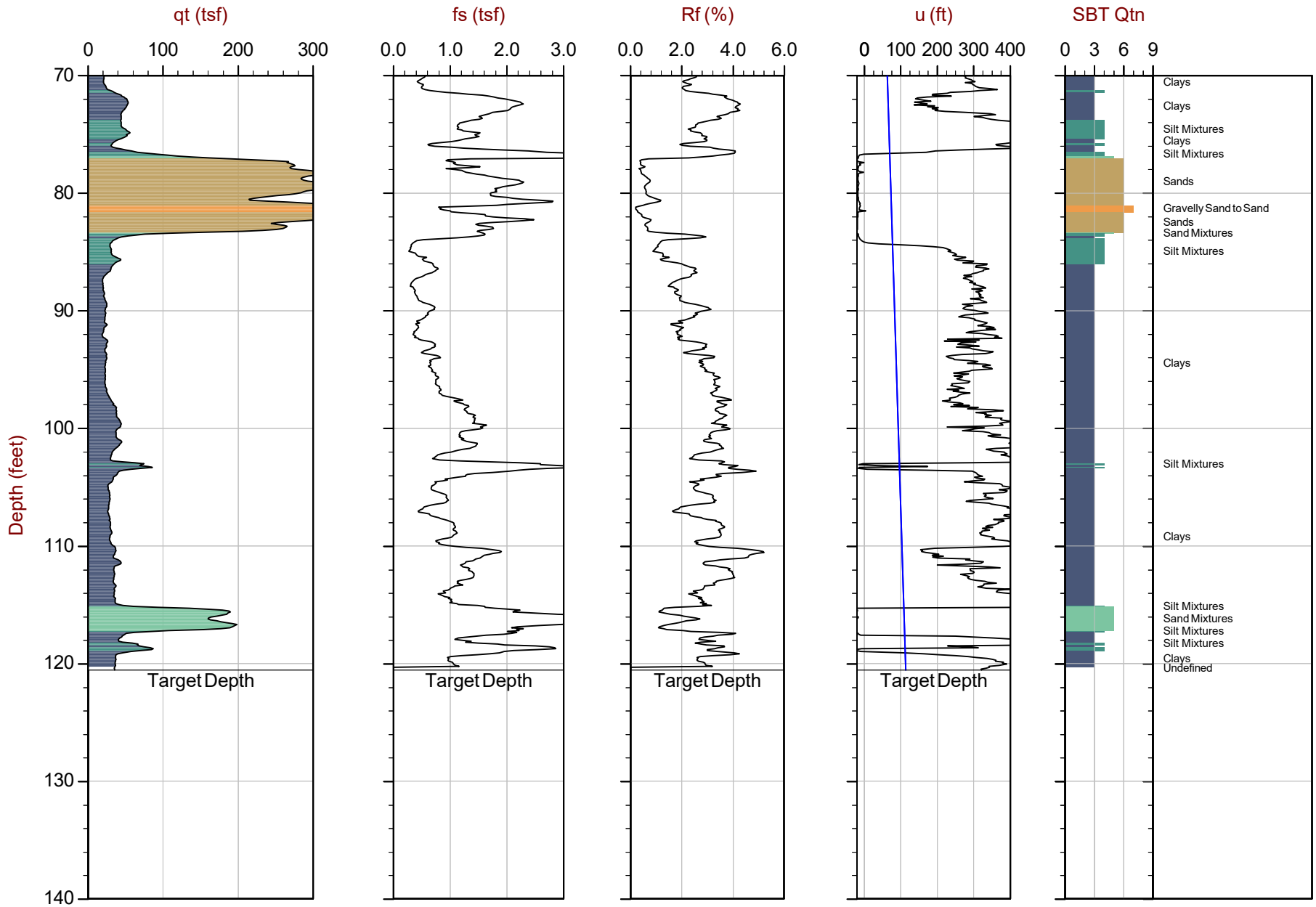
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 09:25
Site: Google Space Campus Exploration

Sounding: 1-CPT-08
Cone: 494:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP08.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141466m E: 581660m
Sheet No: 2 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

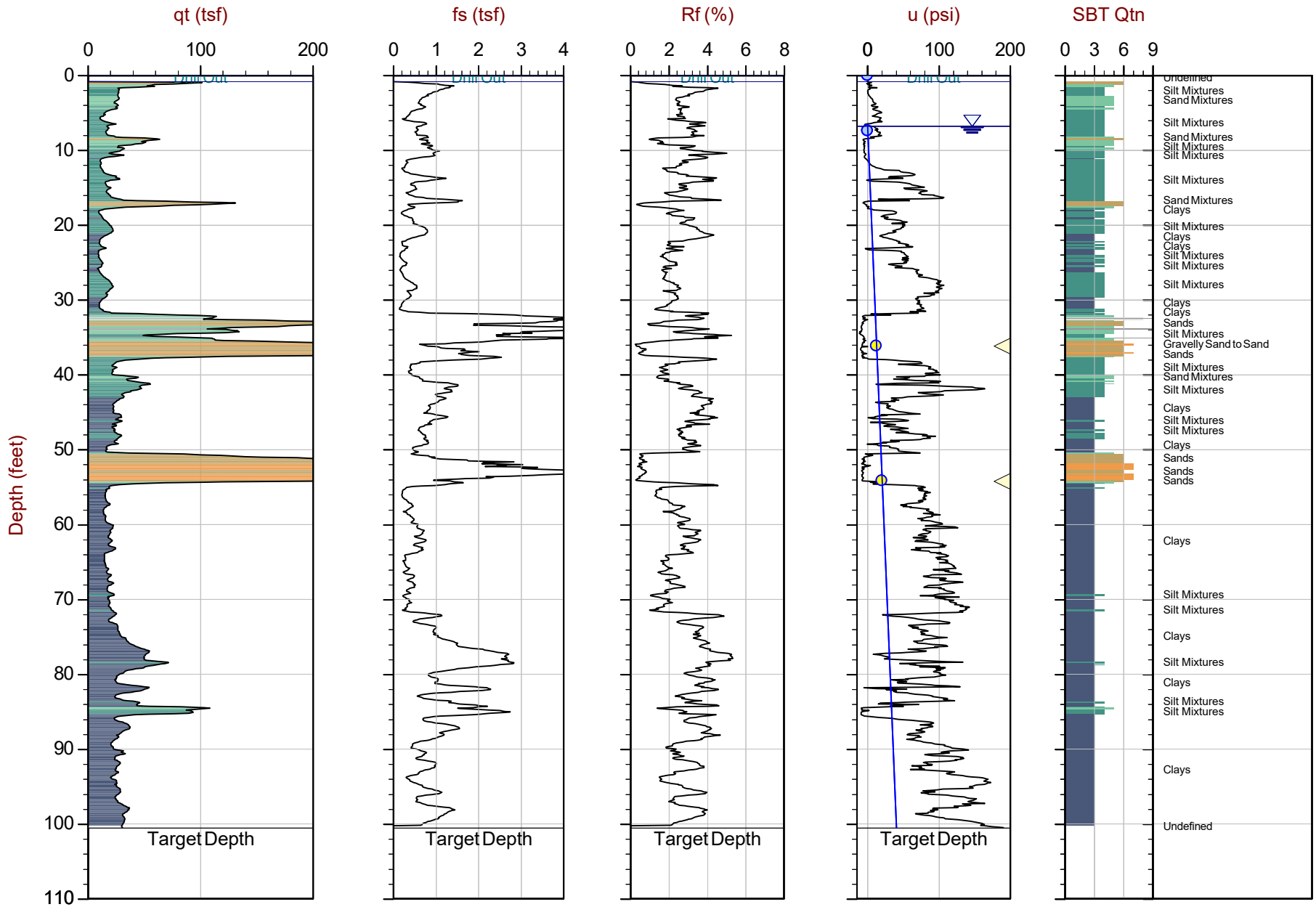
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 10:36
Site: Google Plymouth Exploration

Sounding: 1-CPT-09
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP09.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141336m E: 581070m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

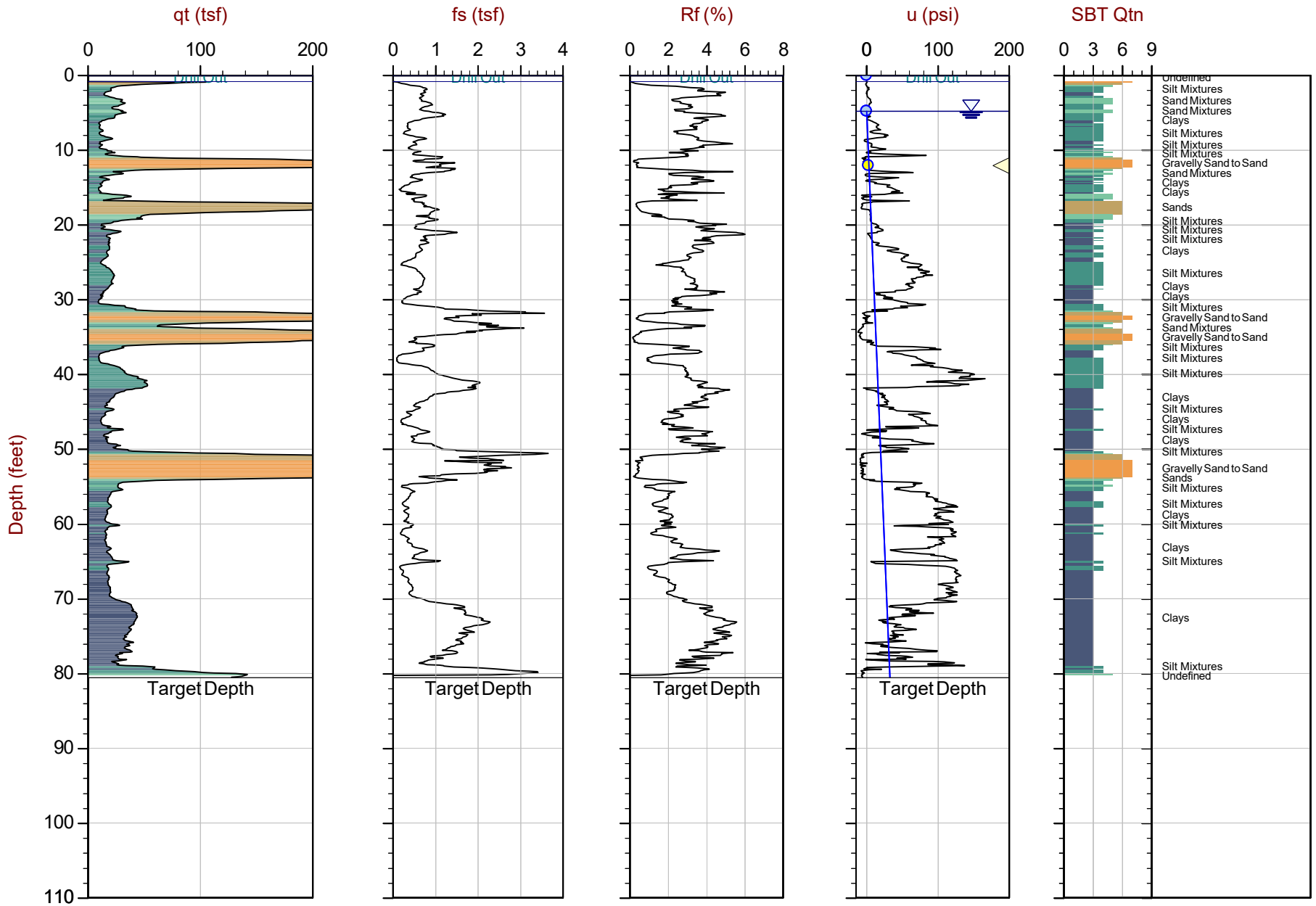
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 08:52
Site: Google Plymouth Exploration

Sounding: 1-SCPT-10
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP10.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141481m E: 581034m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

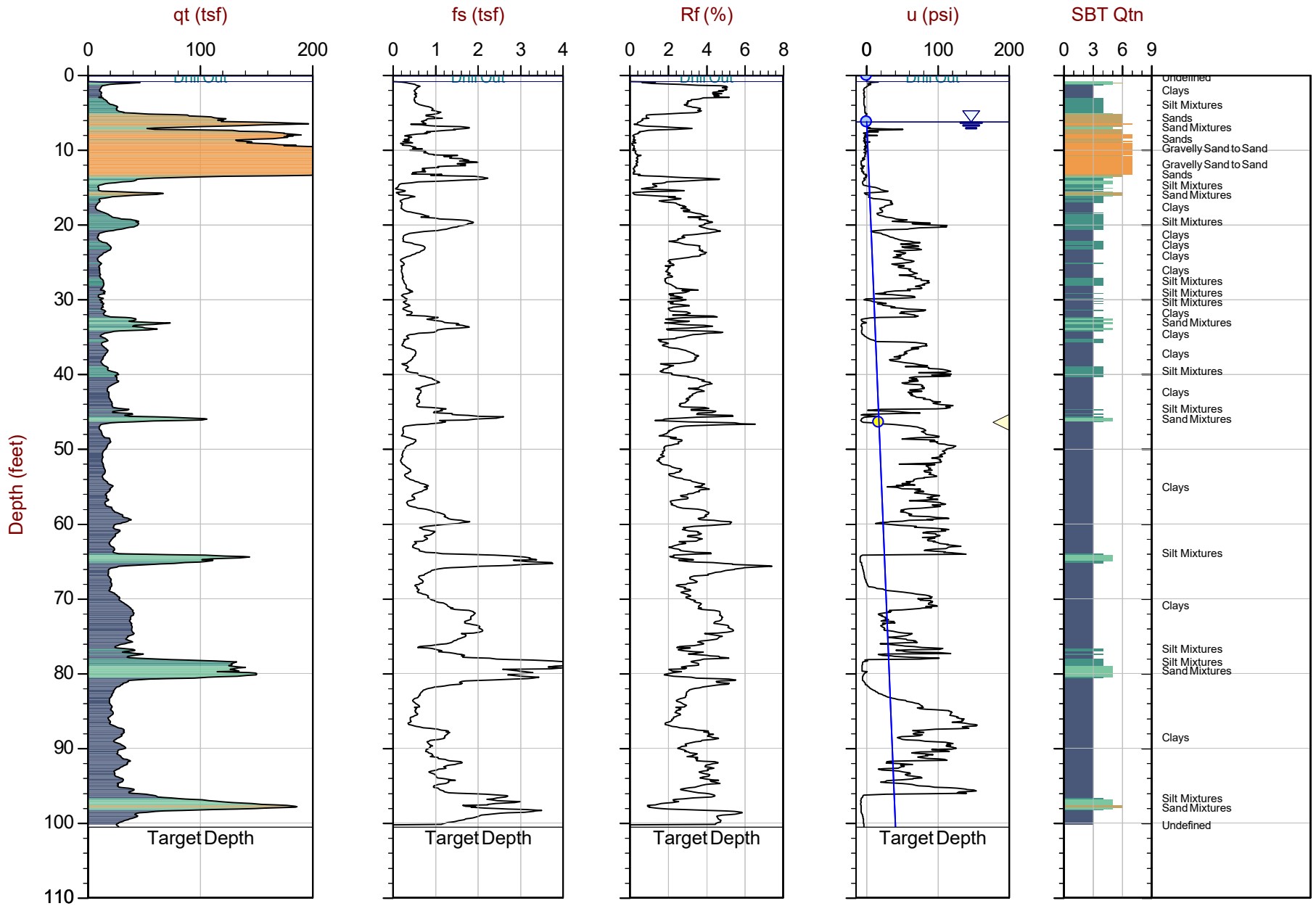
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 10:58
Site: Google Plymouth Exploration

Sounding: 1-CPT-11
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP11.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141486m E: 580955m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

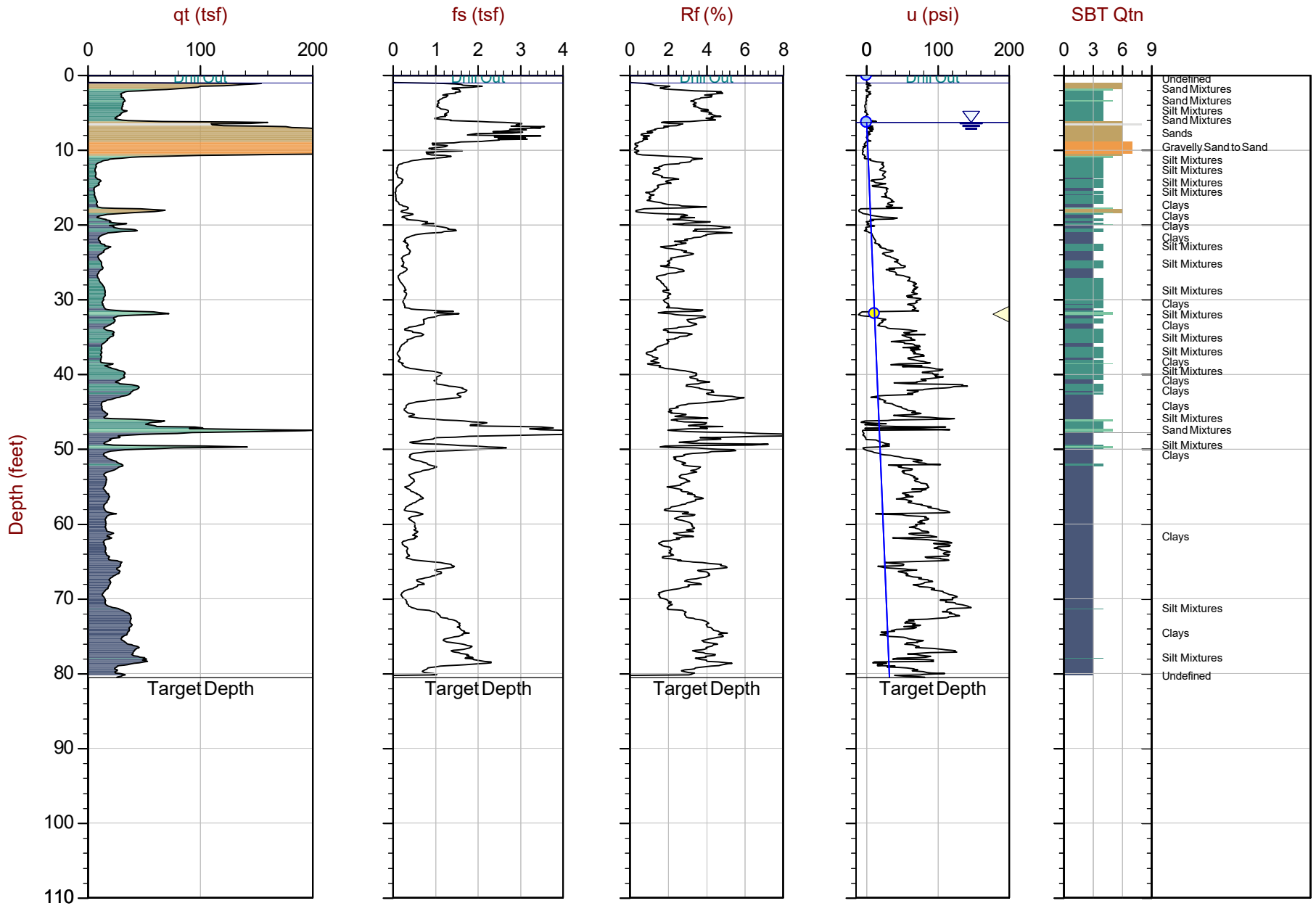
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 12:24
Site: Google Plymouth Exploration

Sounding: 1-CPT-12
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP12.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141408m E: 580971m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

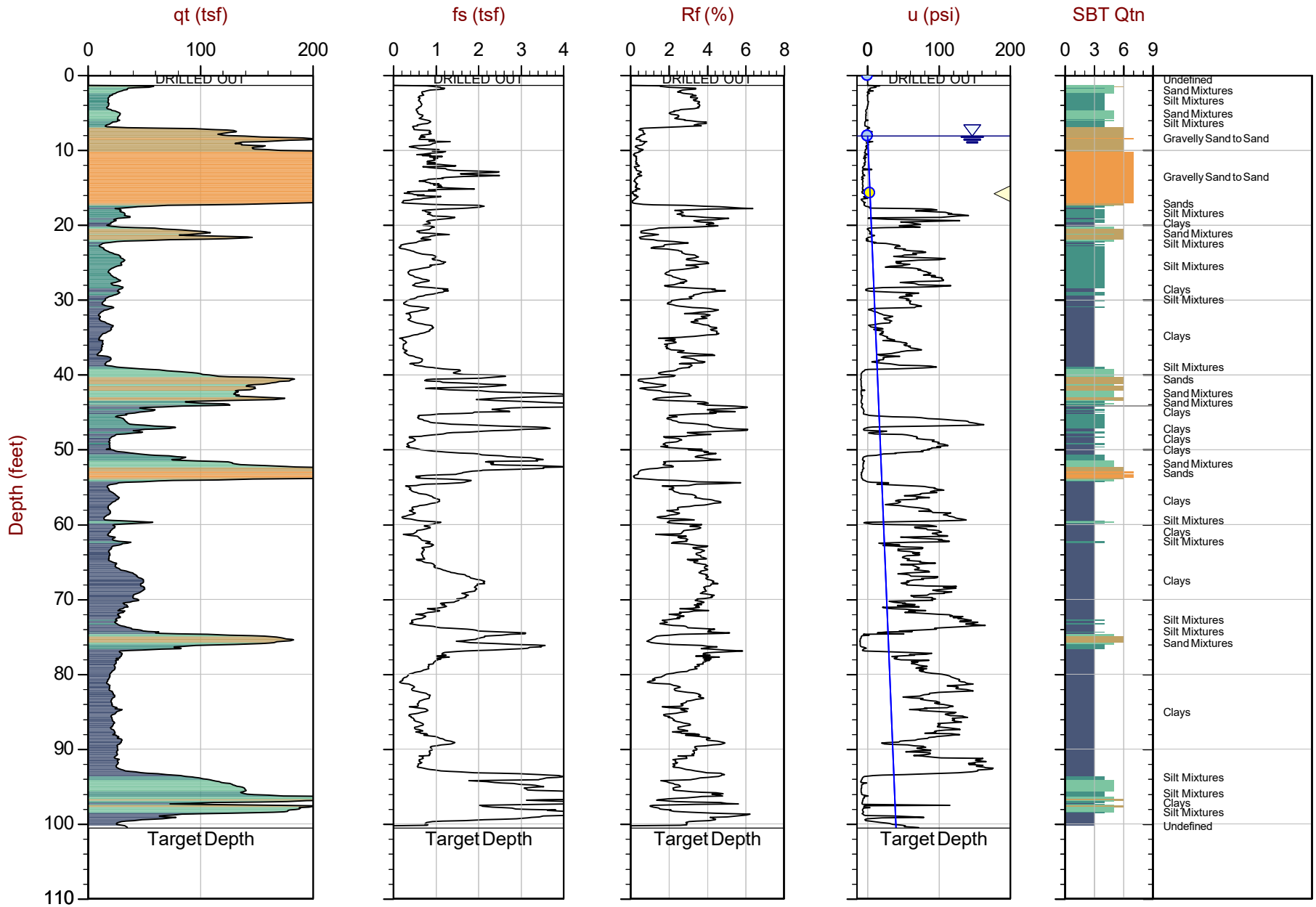
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 21:45
Site: Google Charleston South Exploration

Sounding: 1-SCPT-04
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SCP4.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141829m E: 581289m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

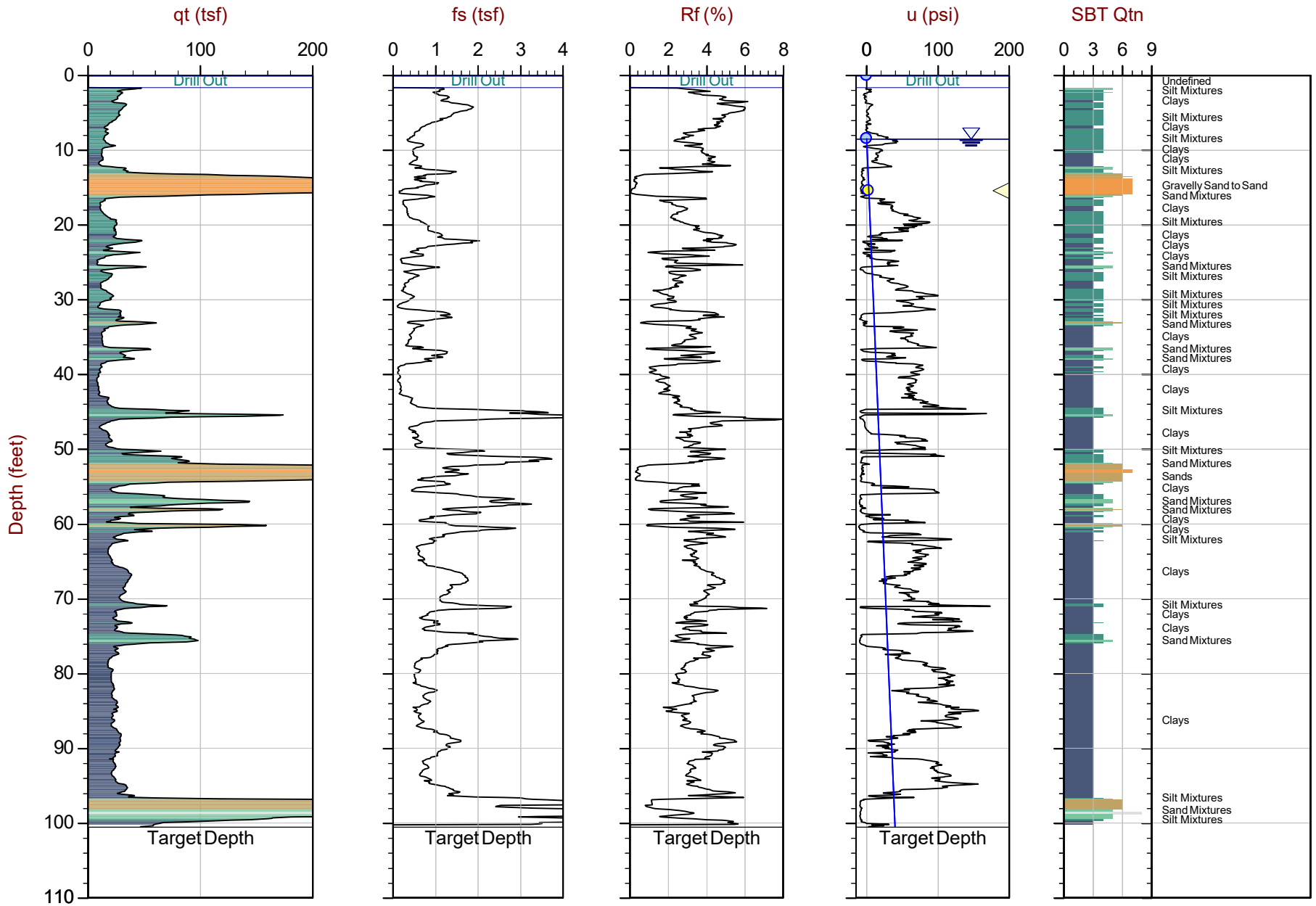
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 08:10
Site: Google Charleston South Exploration

Sounding: 1-CPT-13B
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP13B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141903m E: 581272m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

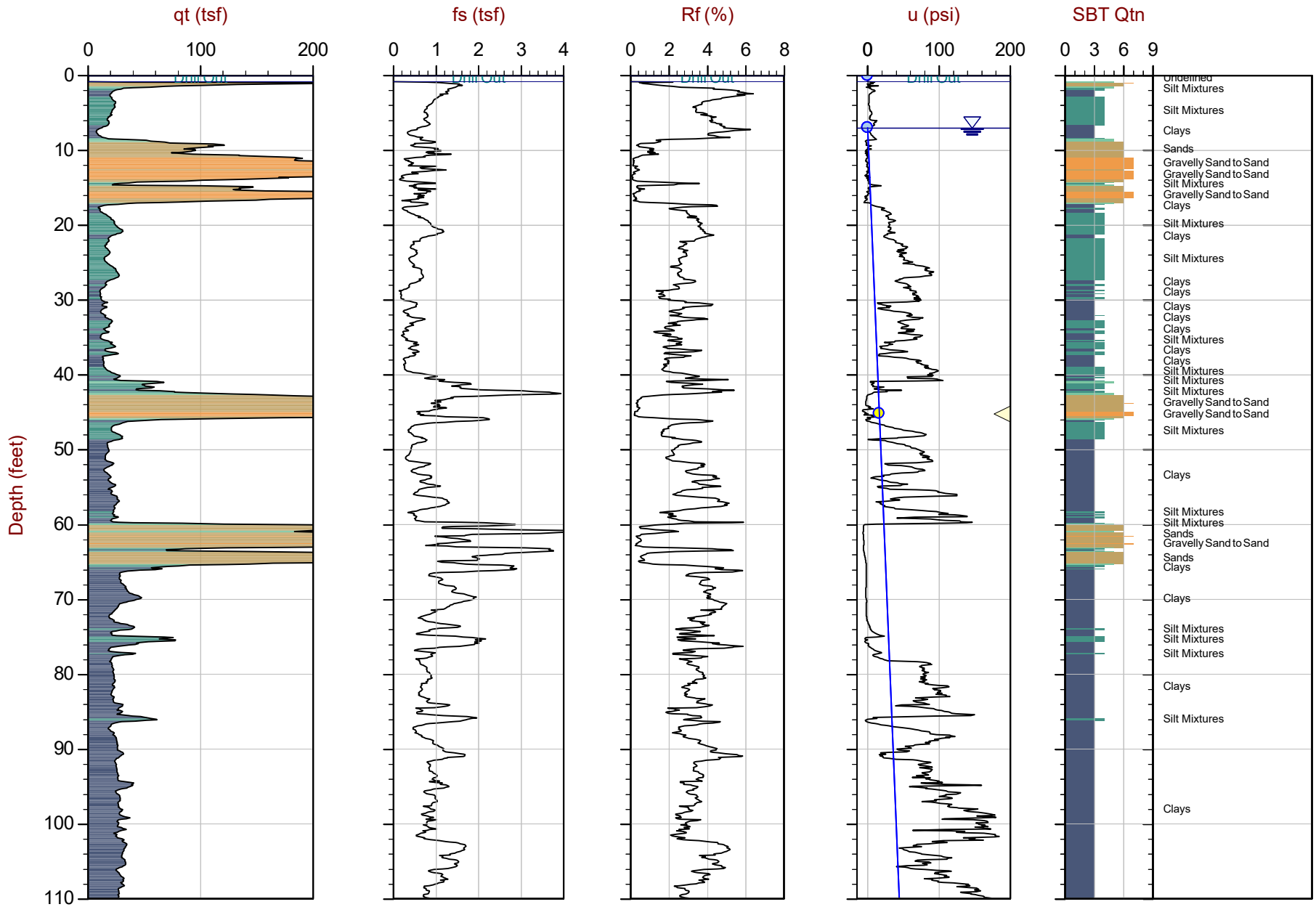
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 09:26
Site: Google Charleston South Exploration

Sounding: 1-CPT-14B
Cone: 483:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP14B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141826m E: 581178m
Page No: 1 of 2

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

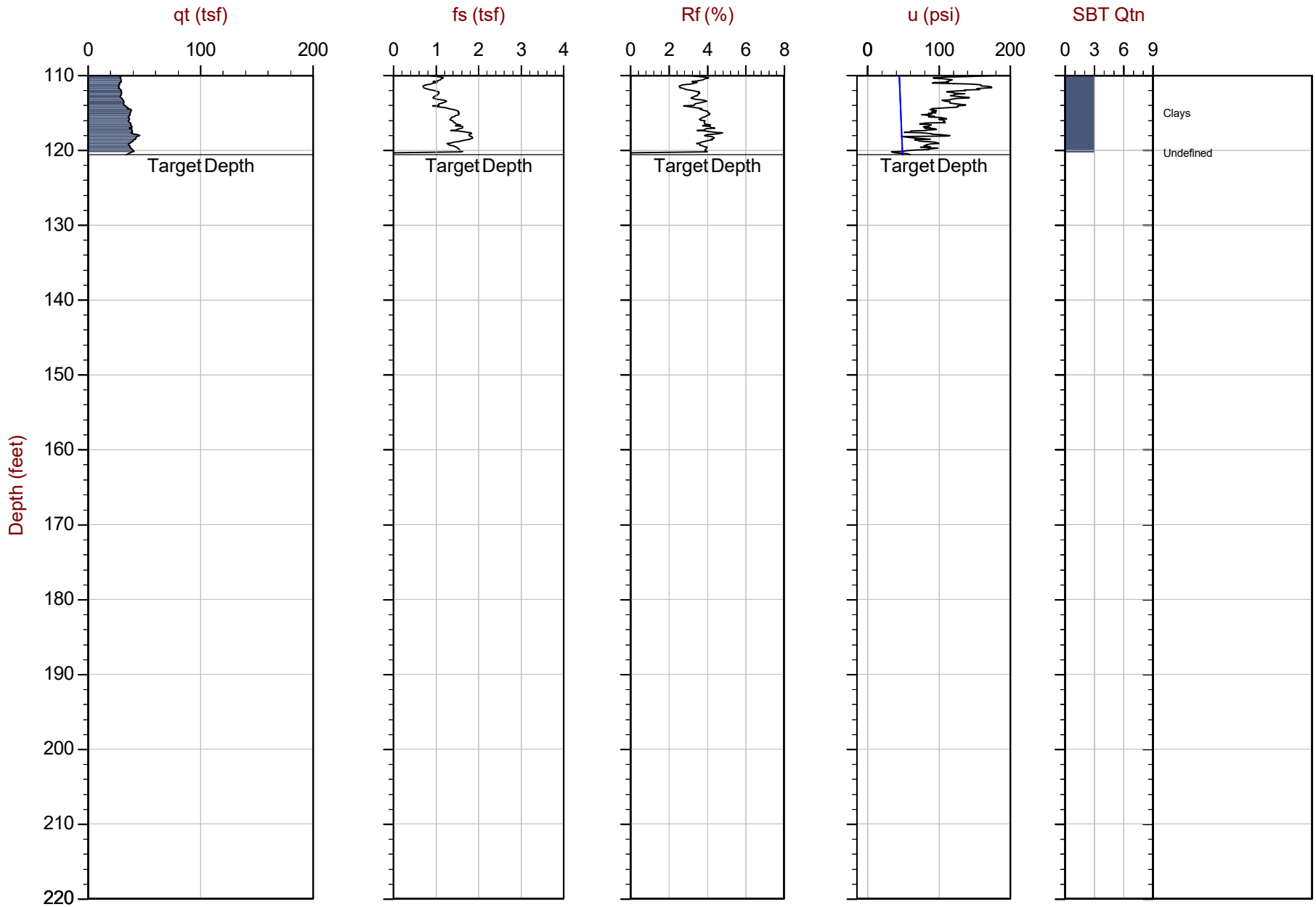
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 09:26
Site: Google Charleston South Exploration

Sounding: 1-CPT-14B
Cone: 483:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP14B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141826m E: 581178m
Page No: 2 of 2

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

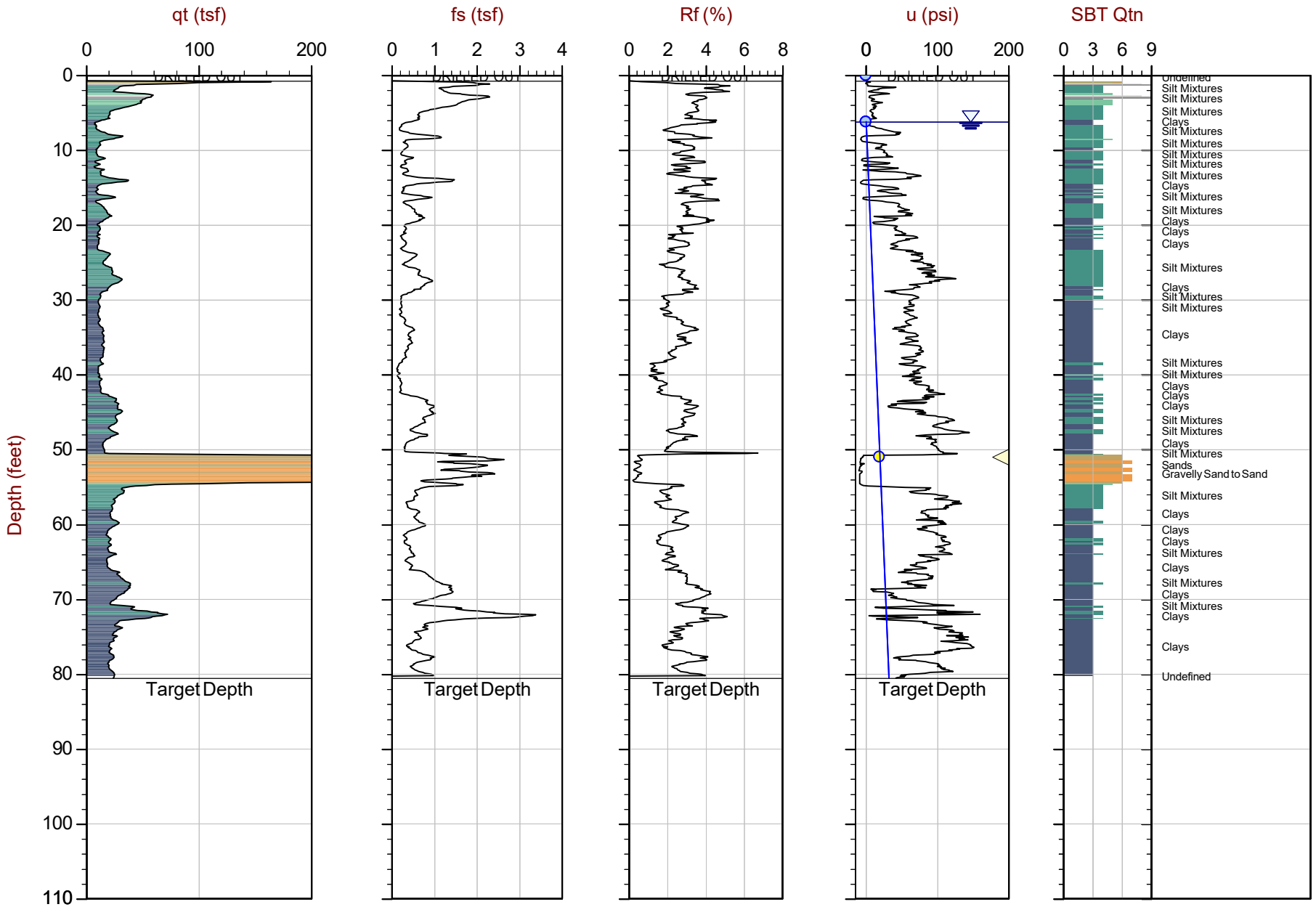
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 23:33
Site: Google Charleston South Exploration

Sounding: 1-CPT-15
Cone: 448:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP15.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141706m E: 581239m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

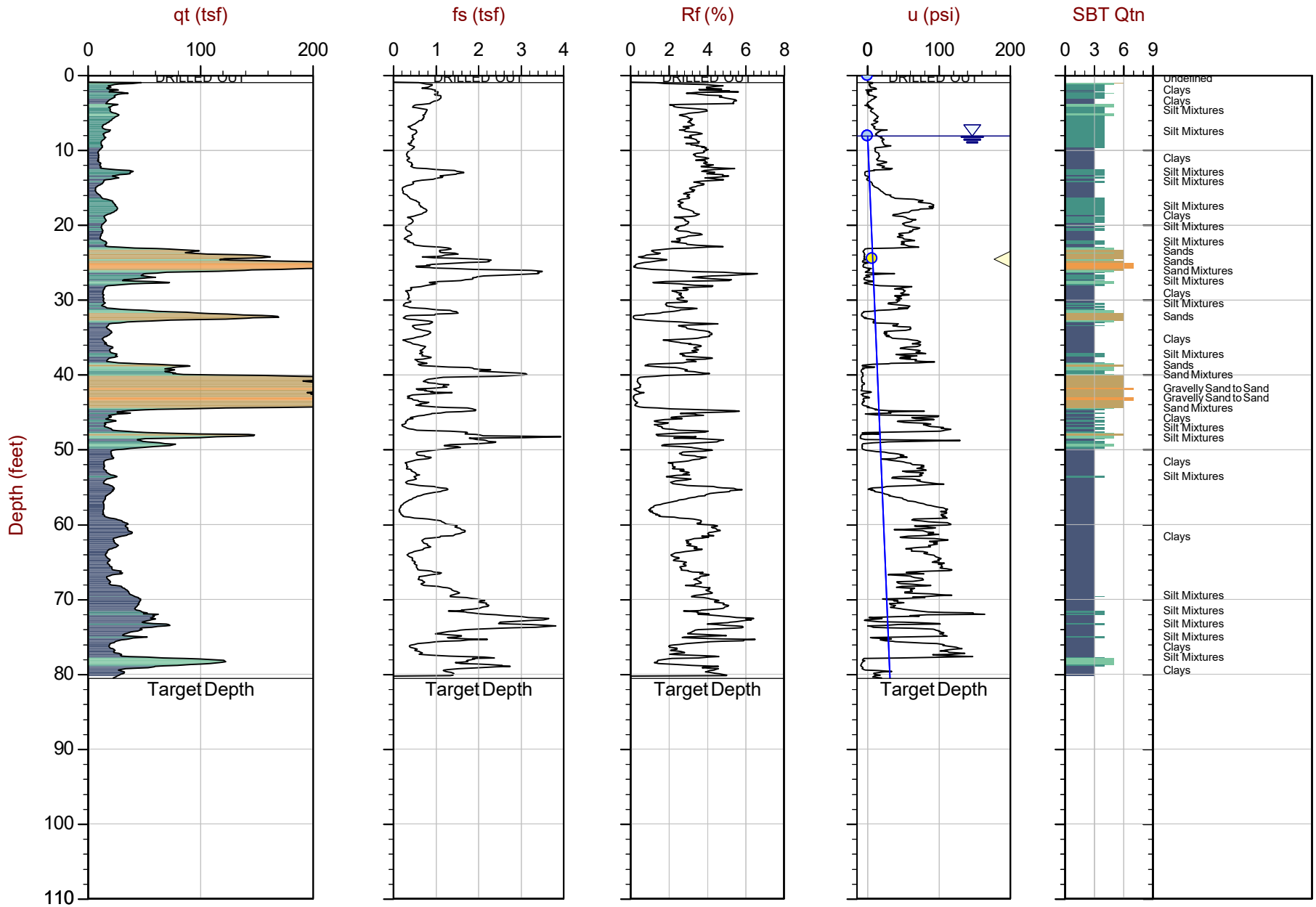
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-09 21:38
Site: Google Charleston South Exploration

Sounding: 1-CPT-16
Cone: 448:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP16.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141607m E: 581331m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

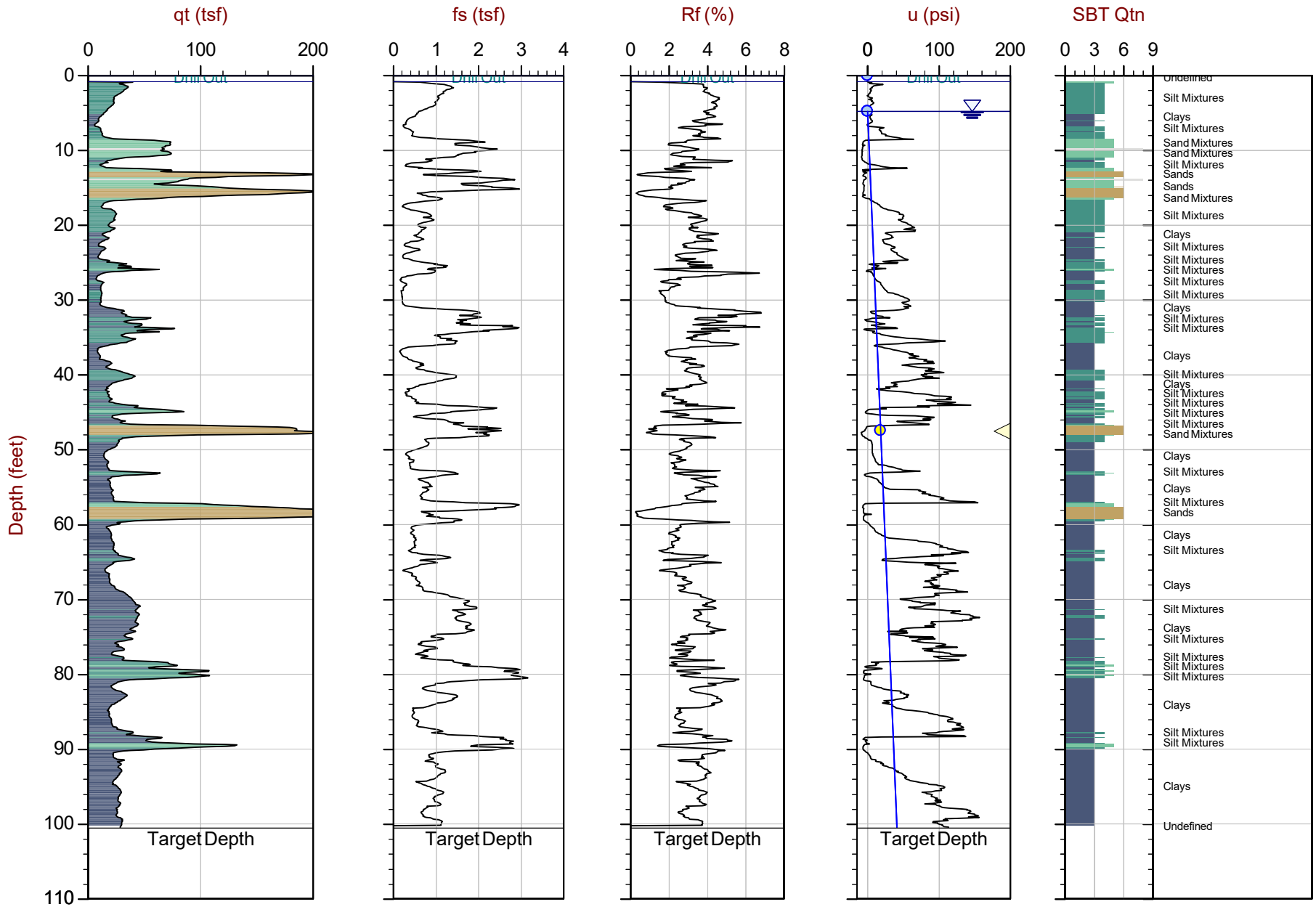
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-10 22:48
Site: Google Charleston South Exploration

Sounding: 1-CPT-17
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP17.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141531m E: 581178m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

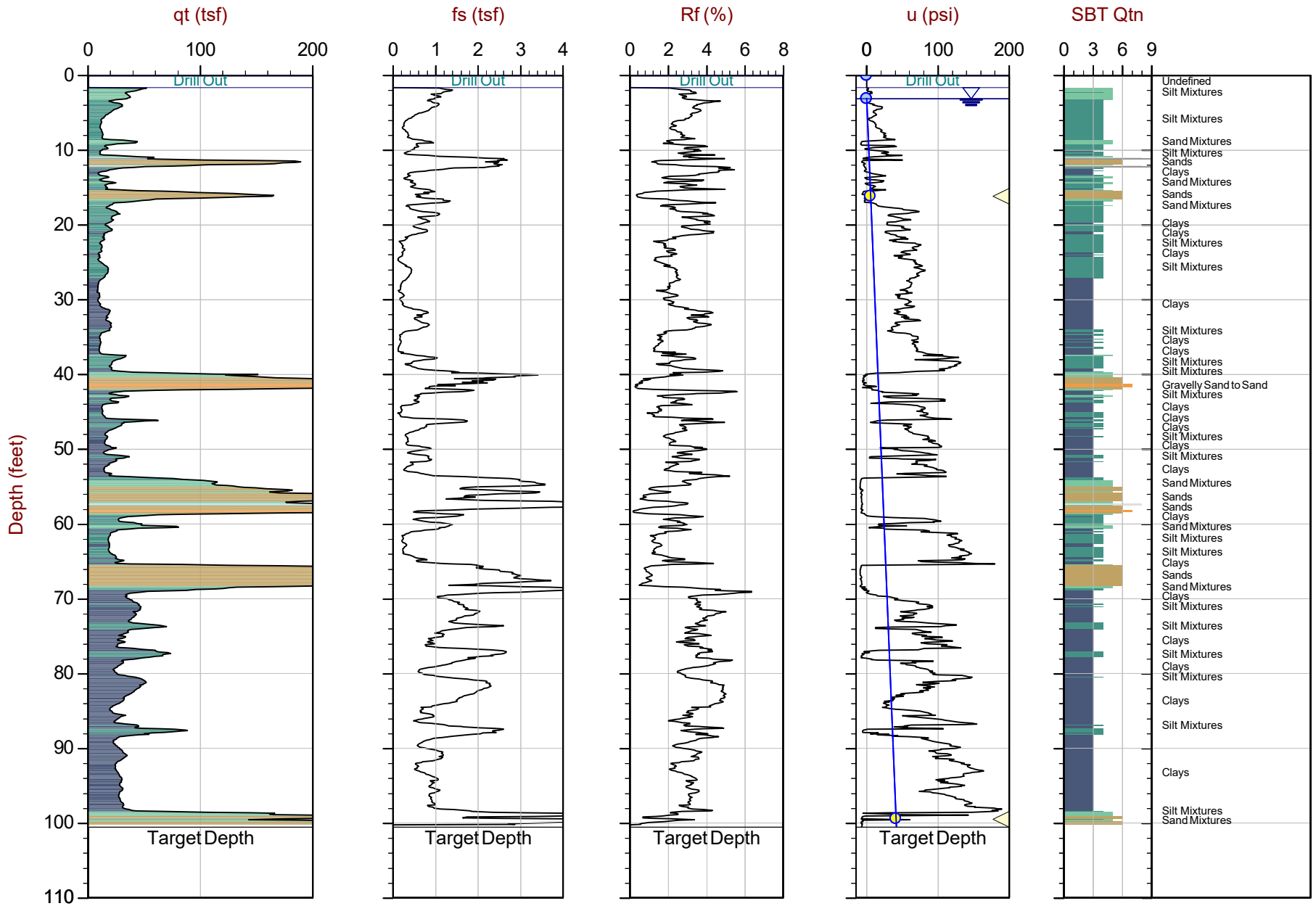
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-11 00:05
Site: Google Charleston South Exploration

Sounding: 1-CPT-18
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP18.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141640m E: 581199m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Plots

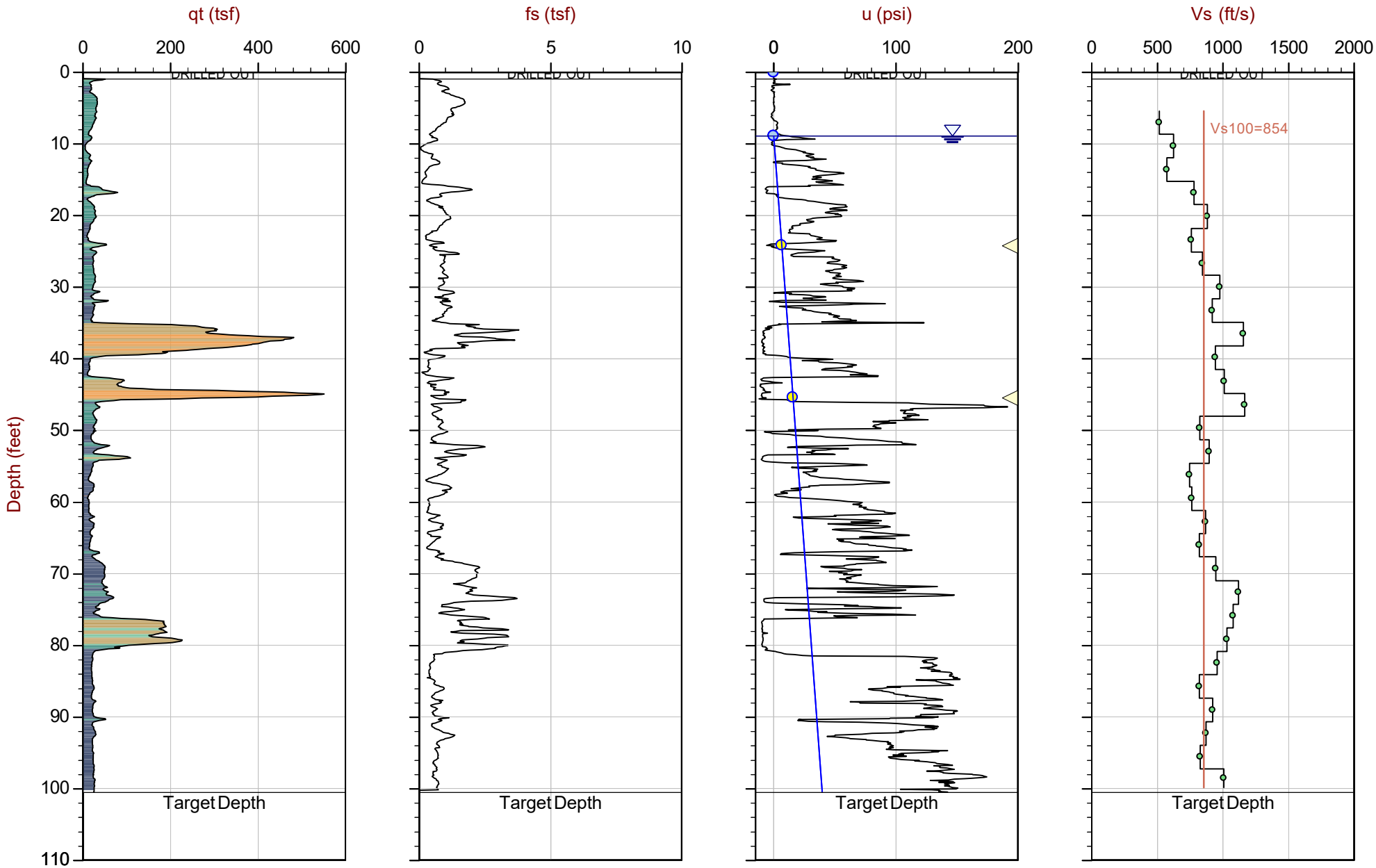
CONETEC

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 21:48
Site: Google Joaquin Exploration

Sounding: 1-SCPT-02
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP2.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141669m E: 581498m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

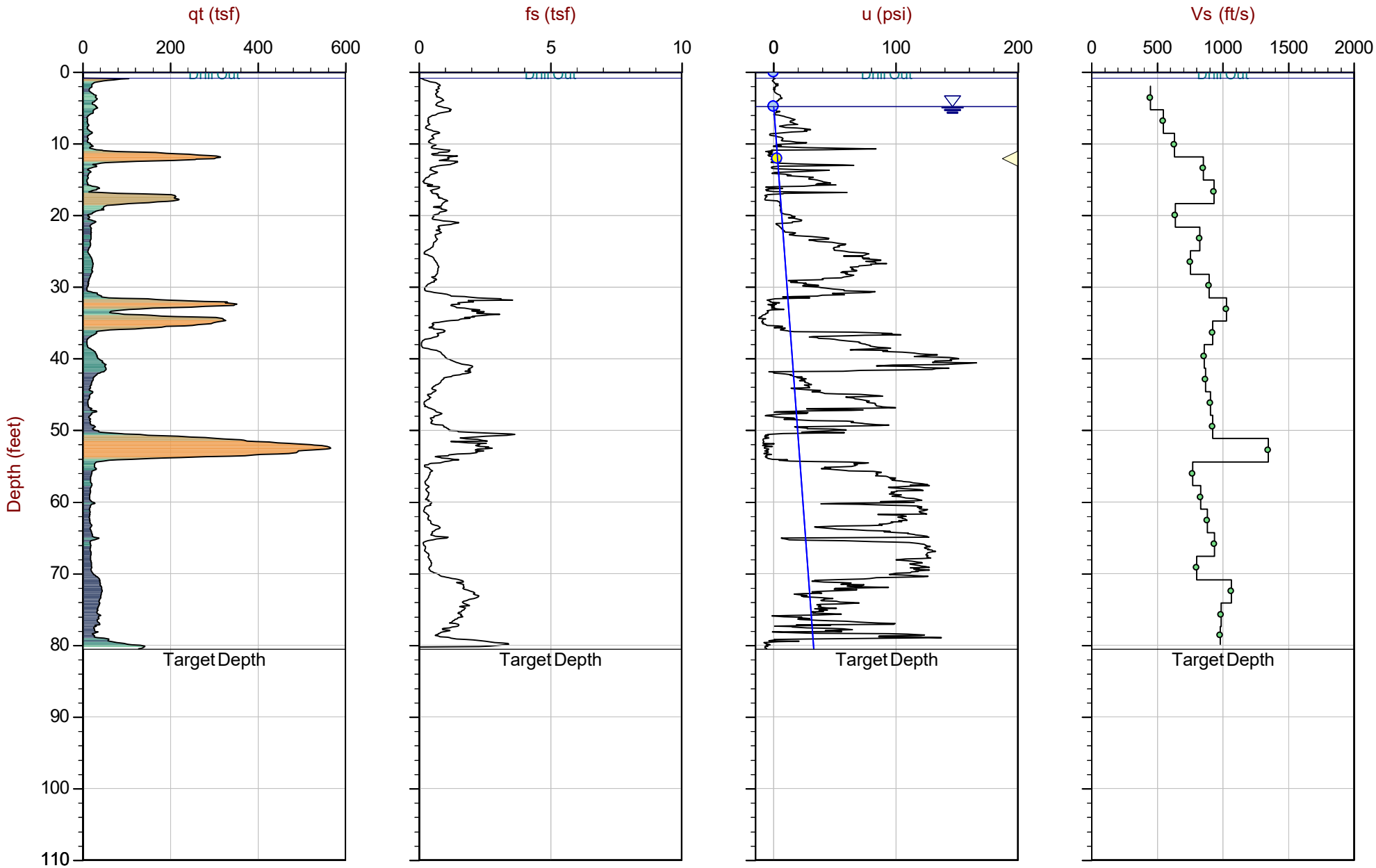
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 08:52
Site: Google Plymouth Exploration

Sounding: 1-SCPT-10
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP10.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141481m E: 581034m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

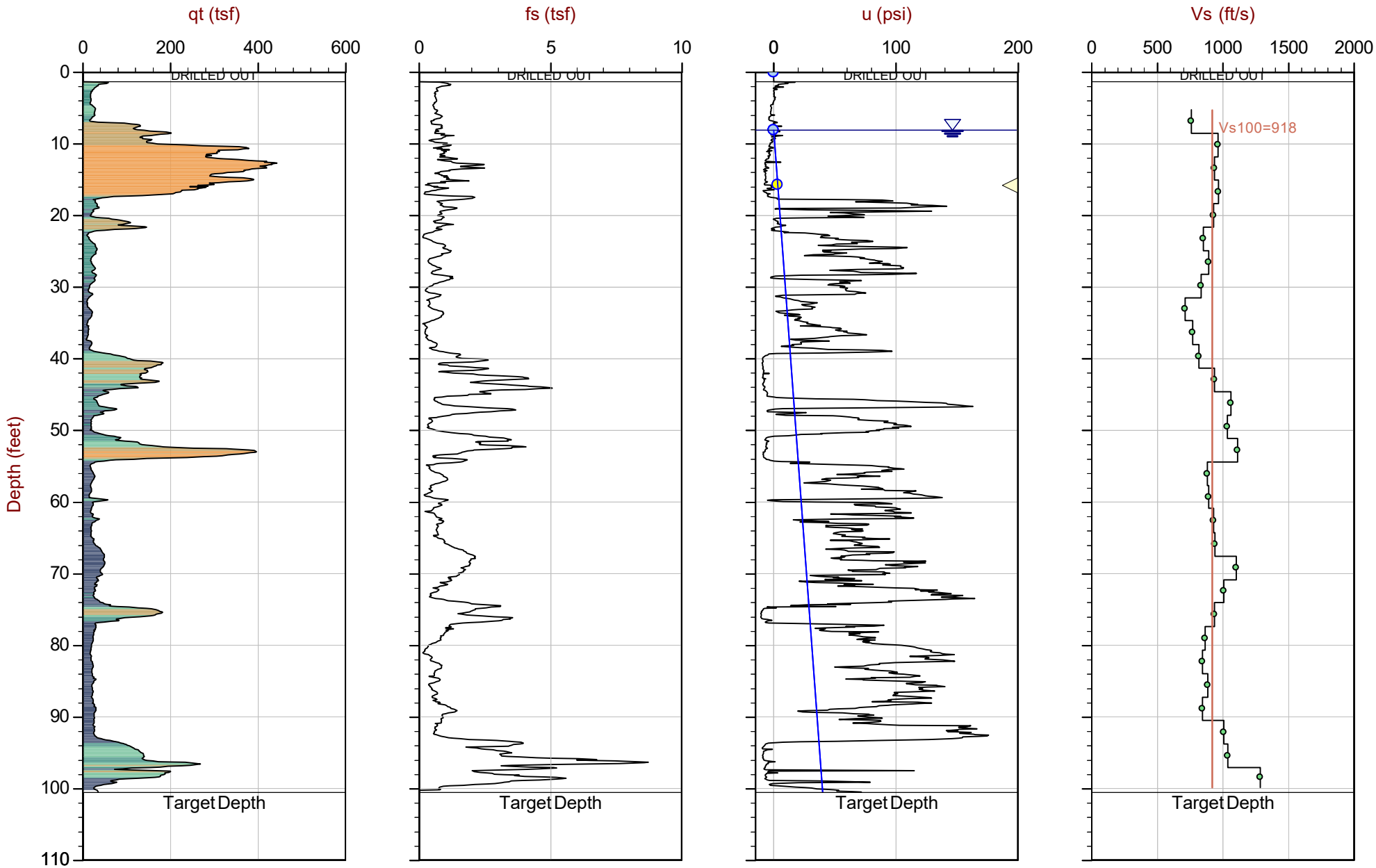
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 21:45
Site: Google Charleston South Exploration

Sounding: 1-SCPT-04
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SCP4.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141829m E: 581289m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Tabular Results

CONETEC

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Joaquin
Sounding ID:	1-SCPT-02
Date:	07-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.13
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
6.07	5.41	5.82			
9.35	8.69	8.95	3.13	6.07	516
12.63	11.97	12.16	3.21	5.13	626
15.91	15.26	15.40	3.24	5.65	573
19.13	18.47	18.59	3.19	4.08	782
22.47	21.82	21.92	3.33	3.77	883
25.75	25.10	25.19	3.27	4.29	762
29.04	28.38	28.46	3.27	3.87	845
32.32	31.66	31.73	3.27	3.35	977
35.60	34.94	35.01	3.27	3.56	920
38.88	38.22	38.28	3.28	2.83	1159
42.16	41.50	41.56	3.28	3.47	945
45.54	44.88	44.93	3.38	3.34	1012
48.72	48.06	48.11	3.18	2.72	1168
52.00	51.35	51.39	3.28	3.98	824
55.28	54.63	54.67	3.28	3.66	895
58.56	57.91	57.95	3.28	4.40	746
61.84	61.19	61.22	3.28	4.29	764
65.12	64.47	64.50	3.28	3.77	870
68.31	67.65	67.68	3.18	3.87	821
71.69	71.03	71.06	3.38	3.56	949
74.97	74.31	74.34	3.28	2.93	1119
78.25	77.59	77.62	3.28	3.03	1081
81.53	80.87	80.90	3.28	3.17	1033
84.81	84.15	84.18	3.28	3.42	959
88.09	87.43	87.46	3.28	3.98	823
91.37	90.72	90.74	3.28	3.55	925
94.65	94.00	94.02	3.28	3.75	874
97.93	97.28	97.30	3.28	3.96	828
100.56	99.90	99.92	2.62	2.61	1007

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Plymouth
Sounding ID:	1-SCPT-10
Date:	13-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.10
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
2.62	1.97	2.07			
5.91	5.25	5.29	3.22	7.18	448
9.19	8.53	8.55	3.27	5.95	549
12.47	11.81	11.83	3.27	5.18	633
15.75	15.09	15.11	3.28	3.84	854
19.03	18.37	18.38	3.28	3.51	934
22.31	21.65	21.66	3.28	5.14	638
25.59	24.93	24.94	3.28	3.98	824
28.87	28.22	28.22	3.28	4.34	755
32.15	31.50	31.50	3.28	3.65	898
35.43	34.78	34.78	3.28	3.18	1030
38.71	38.06	38.06	3.28	3.55	925
41.99	41.34	41.34	3.28	3.81	861
45.28	44.62	44.62	3.28	3.77	871
48.56	47.90	47.90	3.28	3.62	907
51.84	51.18	51.19	3.28	3.55	923
55.12	54.46	54.47	3.28	2.43	1347
58.40	57.74	57.75	3.28	4.26	770
61.68	61.02	61.03	3.28	3.94	833
64.96	64.30	64.31	3.28	3.72	882
68.24	67.58	67.59	3.28	3.50	938
71.52	70.87	70.87	3.28	4.09	802
74.80	74.15	74.15	3.28	3.08	1065
78.08	77.43	77.43	3.28	3.32	987
80.54	79.89	79.89	2.46	2.50	983

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Charleston South
Sounding ID:	1-SCPT-04
Date:	08-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.10
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

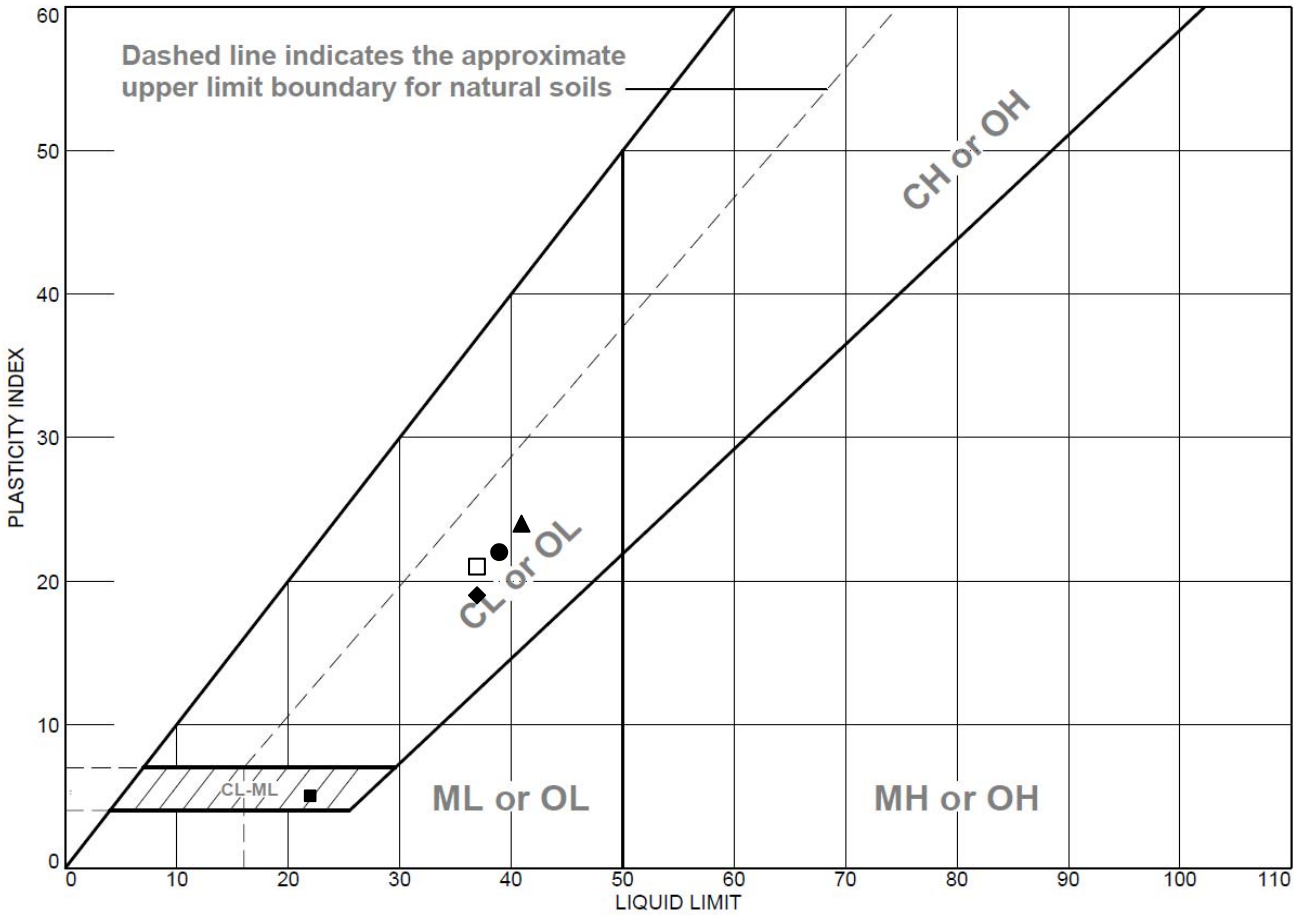
Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.91	5.25	5.65			
9.19	8.53	8.78	3.13	4.12	761
12.47	11.81	12.00	3.21	3.33	964
15.75	15.09	15.24	3.24	3.46	937
19.03	18.37	18.49	3.26	3.37	967
22.31	21.65	21.76	3.26	3.50	932
25.59	24.93	25.02	3.27	3.83	852
28.87	28.22	28.29	3.27	3.67	892
32.15	31.50	31.57	3.27	3.92	836
35.37	34.71	34.77	3.21	4.50	713
38.71	38.06	38.12	3.34	4.33	771
41.99	41.34	41.39	3.28	4.00	819
45.28	44.62	44.67	3.28	3.50	937
48.56	47.90	47.95	3.28	3.08	1063
51.84	51.18	51.22	3.28	3.17	1035
55.12	54.46	54.50	3.28	2.94	1115
58.40	57.74	57.78	3.28	3.71	884
61.58	60.93	60.96	3.18	3.56	894
64.96	64.30	64.34	3.38	3.63	932
68.24	67.58	67.62	3.28	3.49	940
71.52	70.87	70.90	3.28	2.97	1103
74.70	74.05	74.08	3.18	3.16	1007
78.08	77.43	77.46	3.38	3.61	936
81.36	80.71	80.74	3.28	3.79	865
84.65	83.99	84.02	3.28	3.88	845
87.93	87.27	87.30	3.28	3.70	886
91.21	90.55	90.58	3.28	3.88	845
94.49	93.83	93.86	3.28	3.25	1010
97.77	97.11	97.14	3.28	3.16	1039
100.56	99.90	99.92	2.79	2.17	1287



APPENDIX C

LABORATORY TEST DATA

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	41	17	24		61.4	CL
◆	See exploration logs	37	18	19		74	CL
□	See exploration logs	37	16	21		51.9	CL
●	See exploration logs	39	17	22		88.3	CL
■	See exploration logs	22	17	5		44.6	SC-SM

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B8 **Depth:** 5.5-6.5
◆ **Sample Number:** 1-B8 **Depth:** 22-23.5
□ **Sample Number:** 1-B8 **Depth:** 30.5-31.5
● **Sample Number:** 1-B8 **Depth:** 54-55.5
■ **Sample Number:** 1-B8 **Depth:** 95-96.5

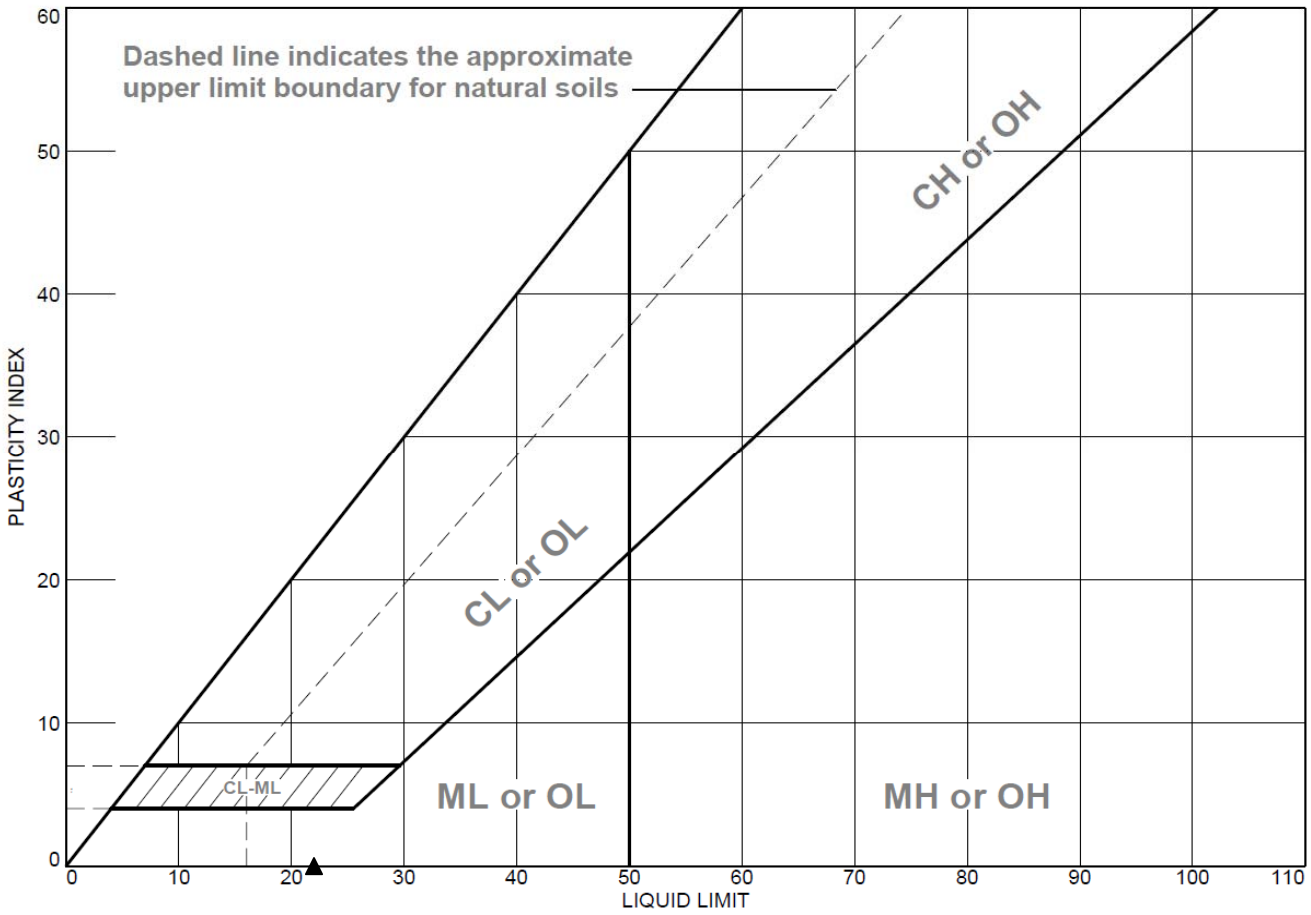
ENGEO Expect Excellence

Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
■ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	22	22	0		51.8	ML

Project No.: 15949.000.000 **Date:** 6/14/2019

Project Name: GEX for Multiple Parcels

Project location: Sunnyvale, California

Client: Google, LLC

▲ **Sample Number:** 1-B9 **Depth:** 15-18 ft

Remarks:

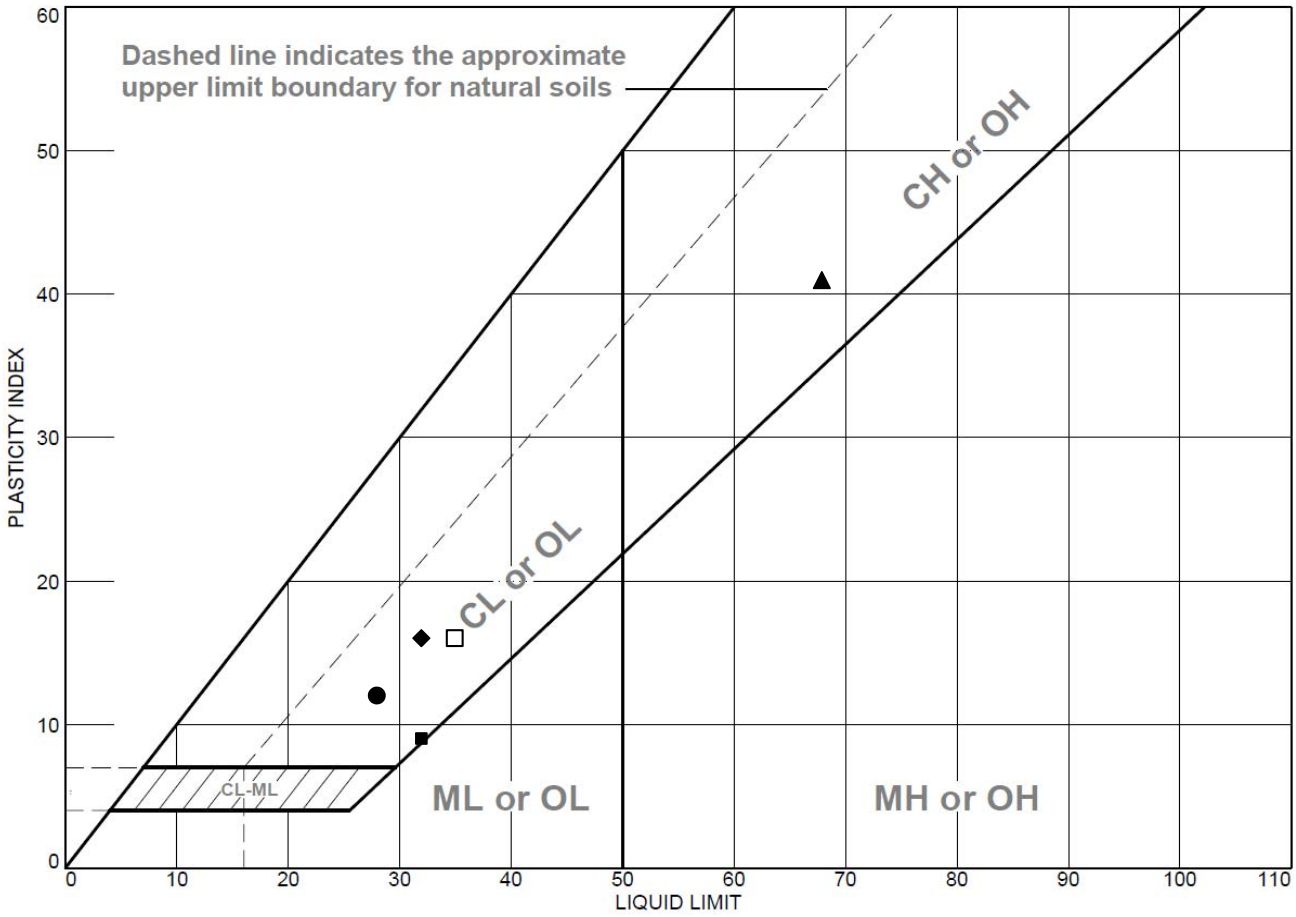
PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method A, USCS: ASTM D2487

ENGEO
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Tested By: M. Quasem Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	68	27	41		80.2	CH
◆	See exploration logs	32	16	16		30	SC
□	See exploration logs	35	19	16		56.5	CL
●	See exploration logs	28	16	12		34	SC
■	See exploration logs	32	23	9			

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B9 **Depth:** 5.5-6.5
◆ **Sample Number:** 1-B9 **Depth:** 10.5-11.5
□ **Sample Number:** 1-B9 **Depth:** 35-36.5
● **Sample Number:** 1-B9 **Depth:** 55-56.5
■ **Sample Number:** 1-B10 **Depth:** 5-6.5

Remarks:

▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

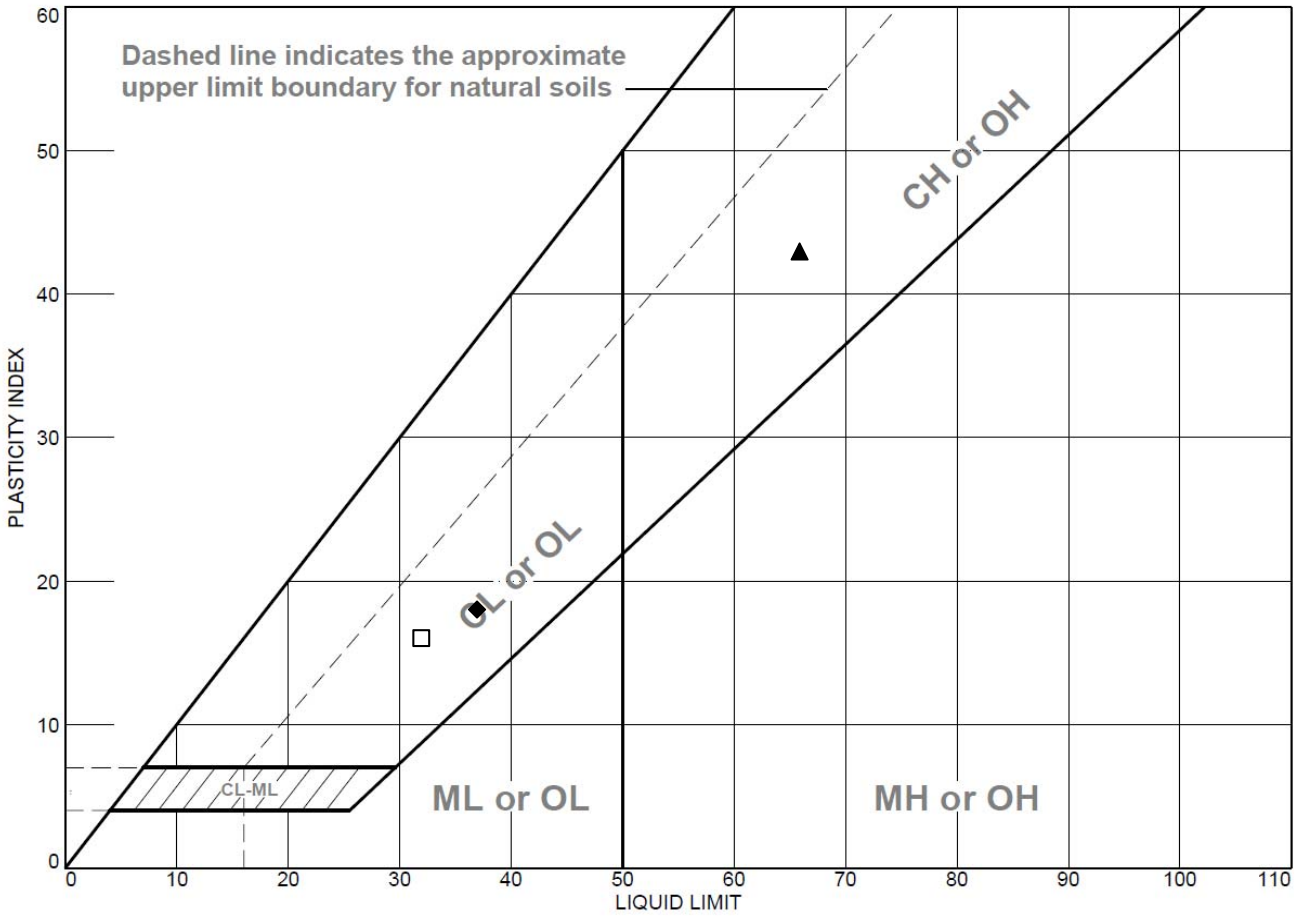
■ PI: ASTM D4318, Wet Method

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	66	23	43		79.2	CH
◆	See exploration logs	37	19	18		63	CL
□	See exploration logs	32	16	16		34.1	SC

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC
▲ **Sample Number:** 1-B10 **Depth:** 15-16.5
◆ **Sample Number:** 1-B10 **Depth:** 25-26.5
□ **Sample Number:** 1-B10 **Depth:** 40-41.5

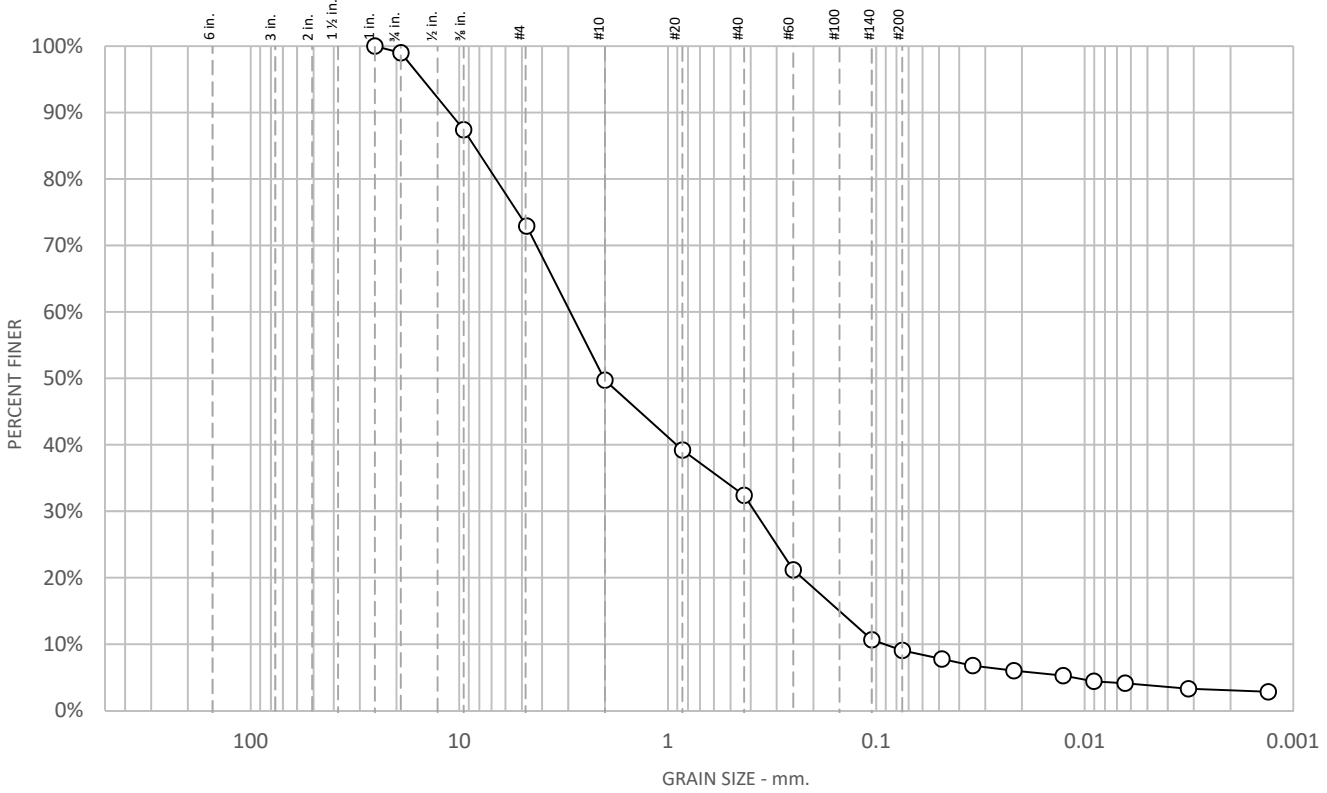
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	1.0	26.0	23.2	17.3	23.3	6.0	3.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	99.0		
⅜ in.	87.4		
#4	72.9		
#10	49.7		
#20	39.2		
#40	32.4		
#60	21.2		
#140	10.7		
#200	9.1		
0.0485 mm.	7.8		
0.0345 mm.	6.8		
0.0219 mm.	6.0		
0.0127 mm.	5.3		
0.0090 mm.	4.4		
0.0064 mm.	4.1		
0.0032 mm.	3.3		
0.0013 mm.	2.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 11.1207 mm D_{85} = 8.4848 mm D_{60} = 2.9346 mm
D_{50} = 2.0208 mm D_{30} = 0.3830 mm D_{15} = 0.1502 mm
D_{10} = 0.0915 mm C_u = 32.09 C_c = 0.55

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B8 @ 10-11.5

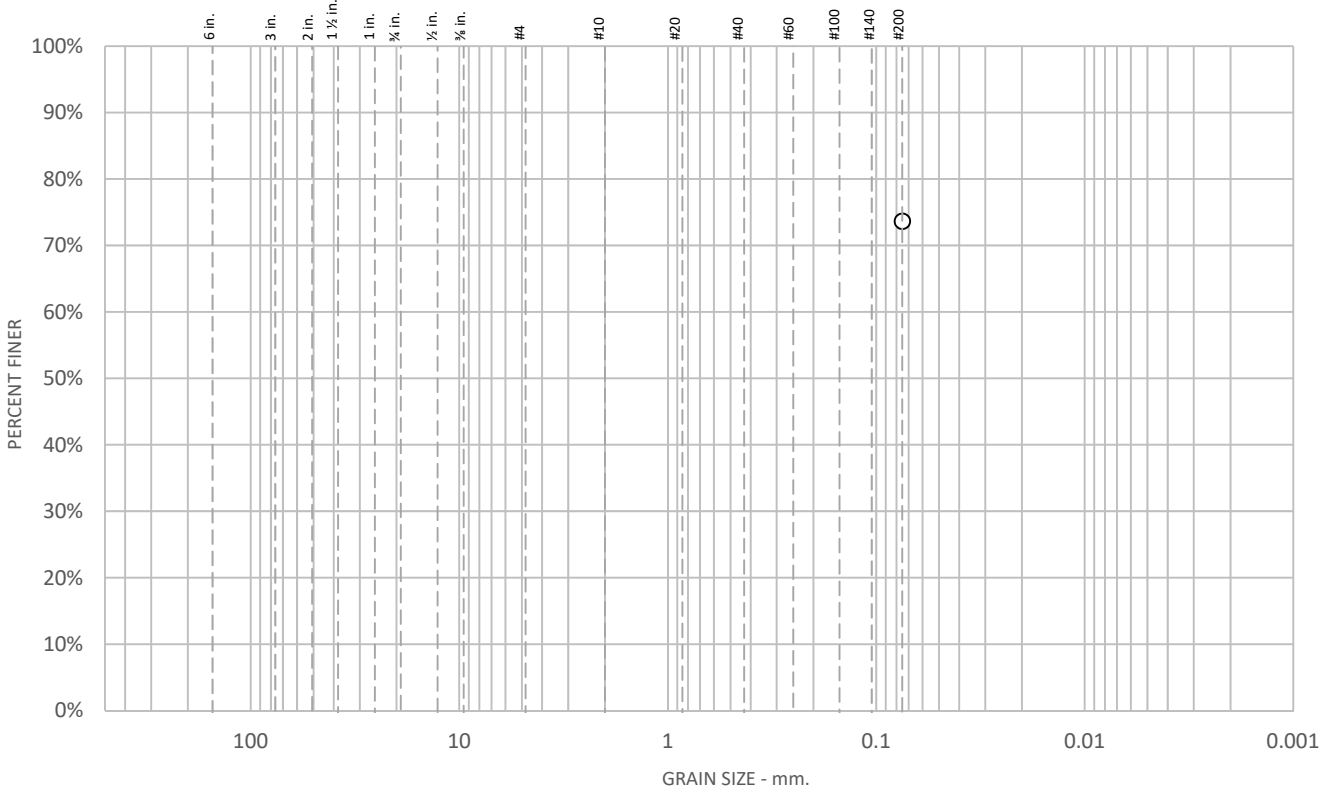
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	74		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 37 PI = 19

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 182.8 g

Sample Number: 1-B8 @ 22-23.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

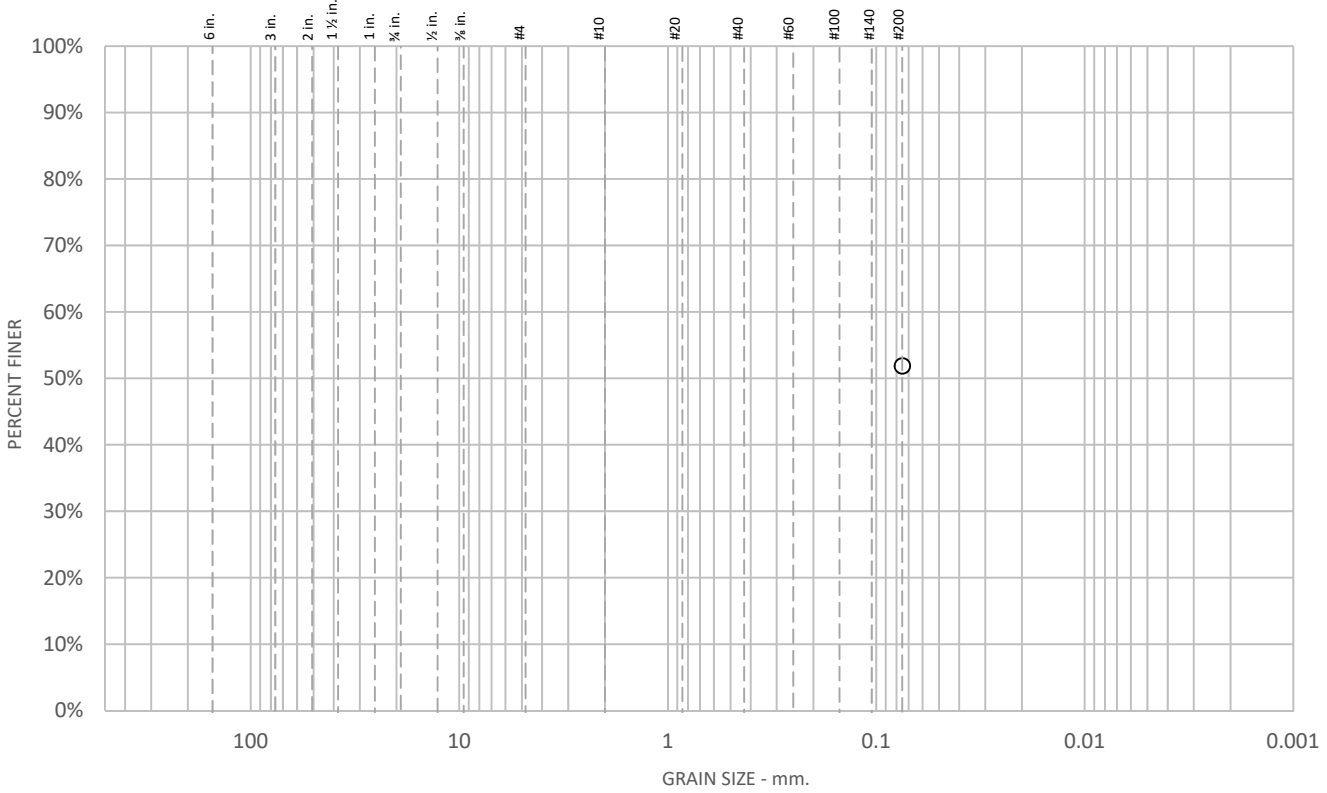
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	51.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 37 PI = 21

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 198.4 g

Sample Number: 1-B8 @ 30.5-31.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

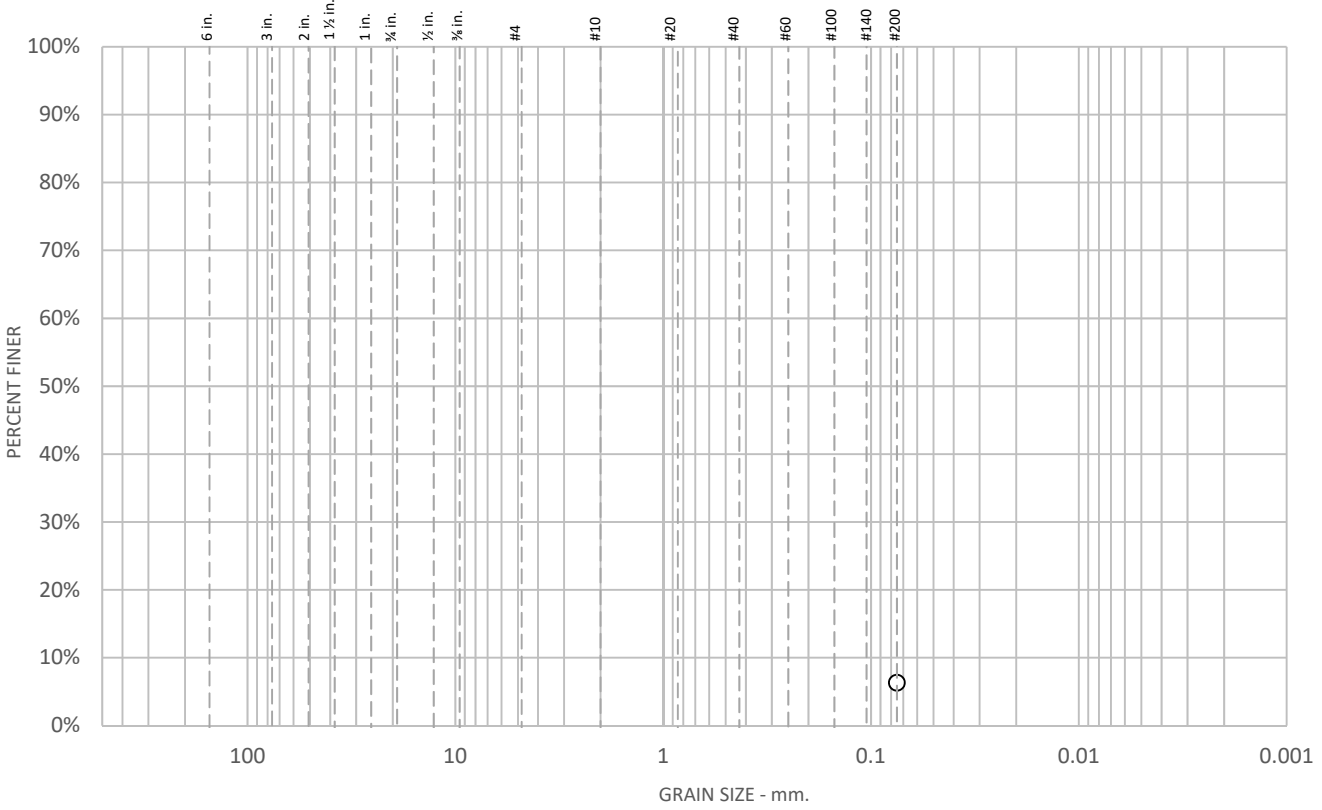
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	6		

* (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 =

Remarks

ASTM D1140, Method A
Soak time = 60 min
Dry sample weight = 629.9 g

Sample Number: 1-B8 @ 41-41.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

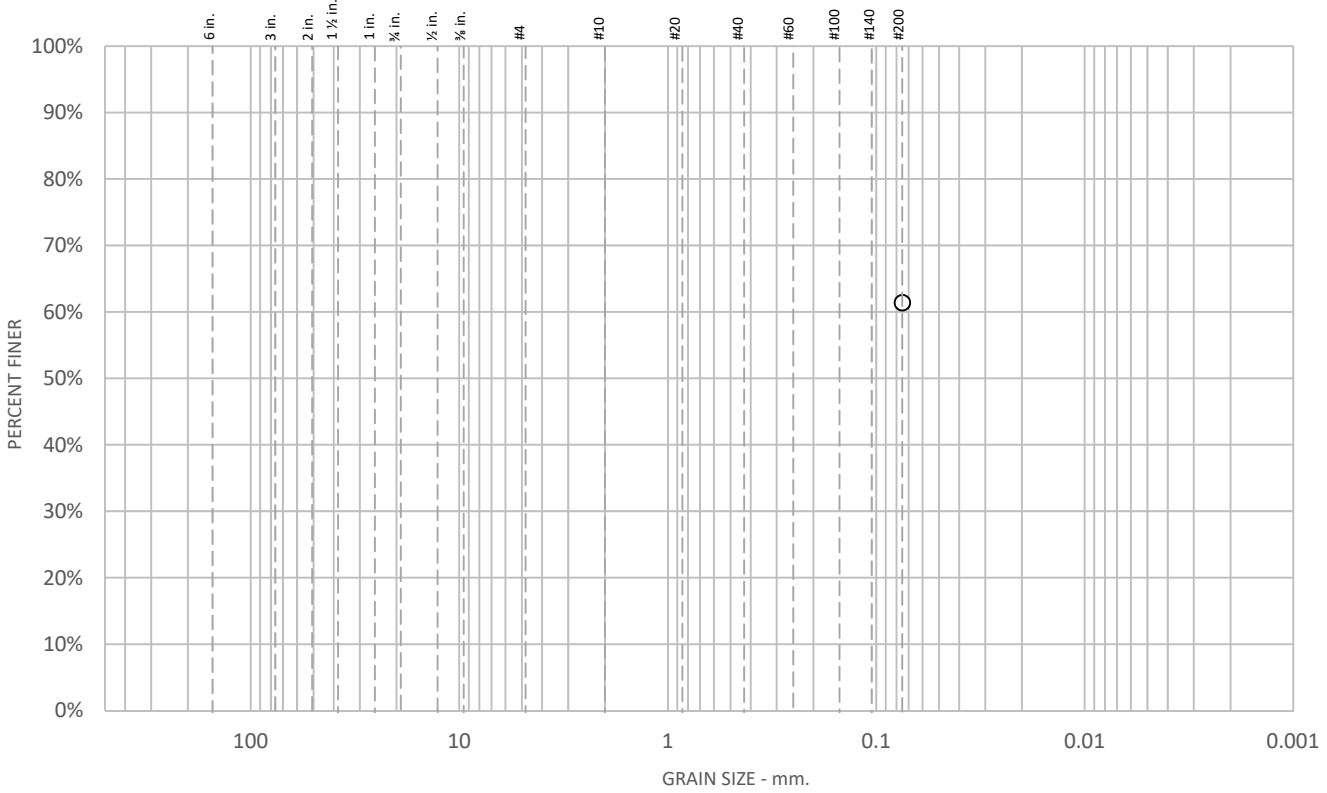
Project Number: 15949.000.000
Date: 6/13/2019

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Tested By: M. Quasem
Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	61.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 41 PI = 24

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 129.7 g

Sample Number: 1-B8 @ 5.5-6.5

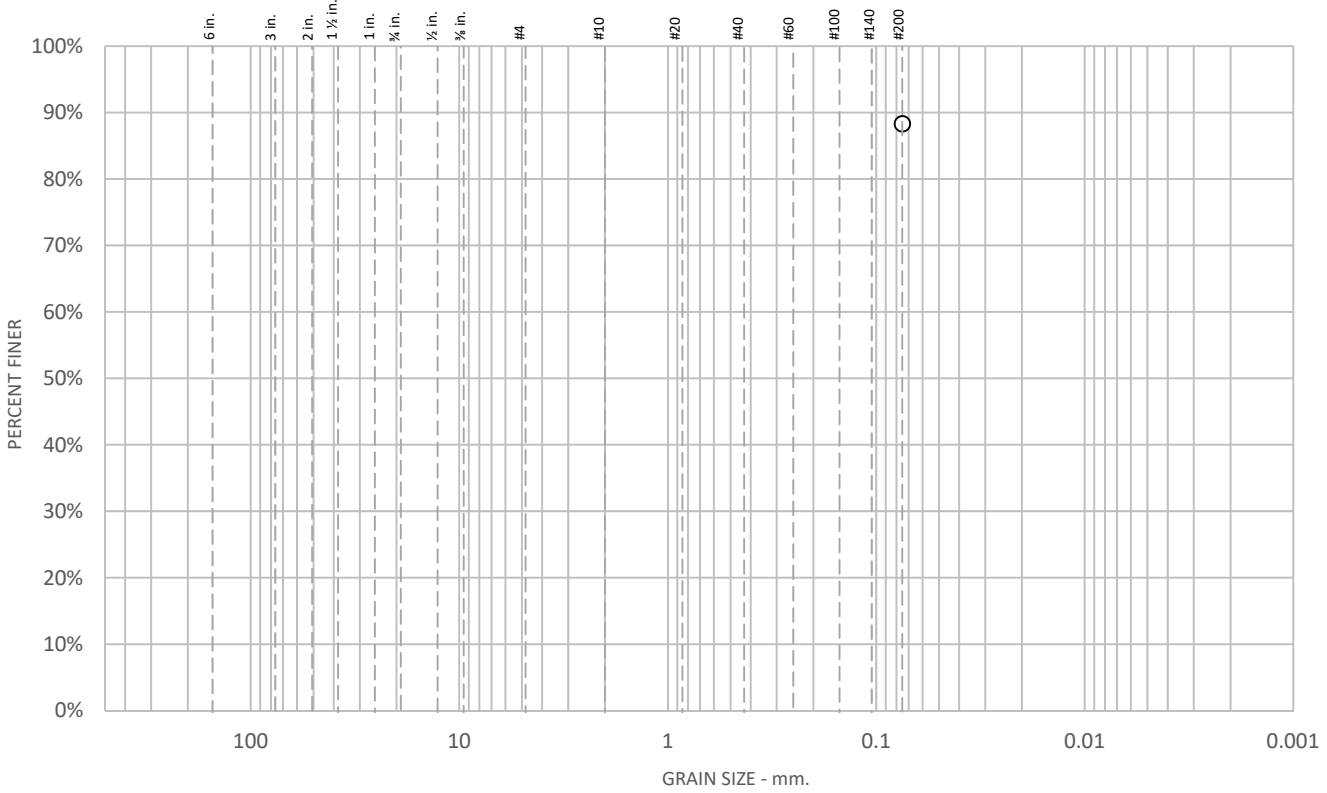
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/23/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						88.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	88.3		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 39 PI = 22

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 212.7 g

Sample Number: 1-B8 @ 54-55.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

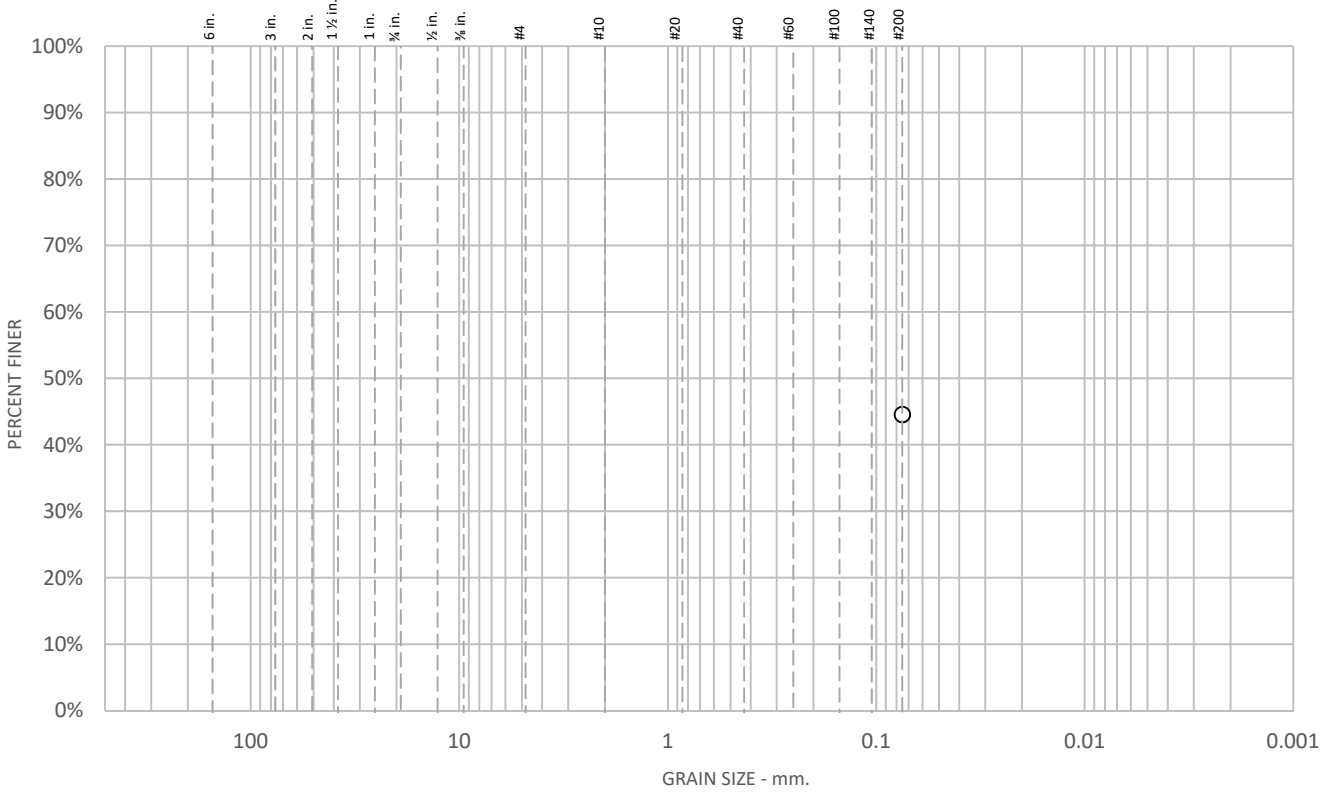
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	44.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 22 PI = 5

Coefficients

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

Classification

USCS = SC-SM

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 196.8 g

Sample Number: 1-B8 @ 95-96.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

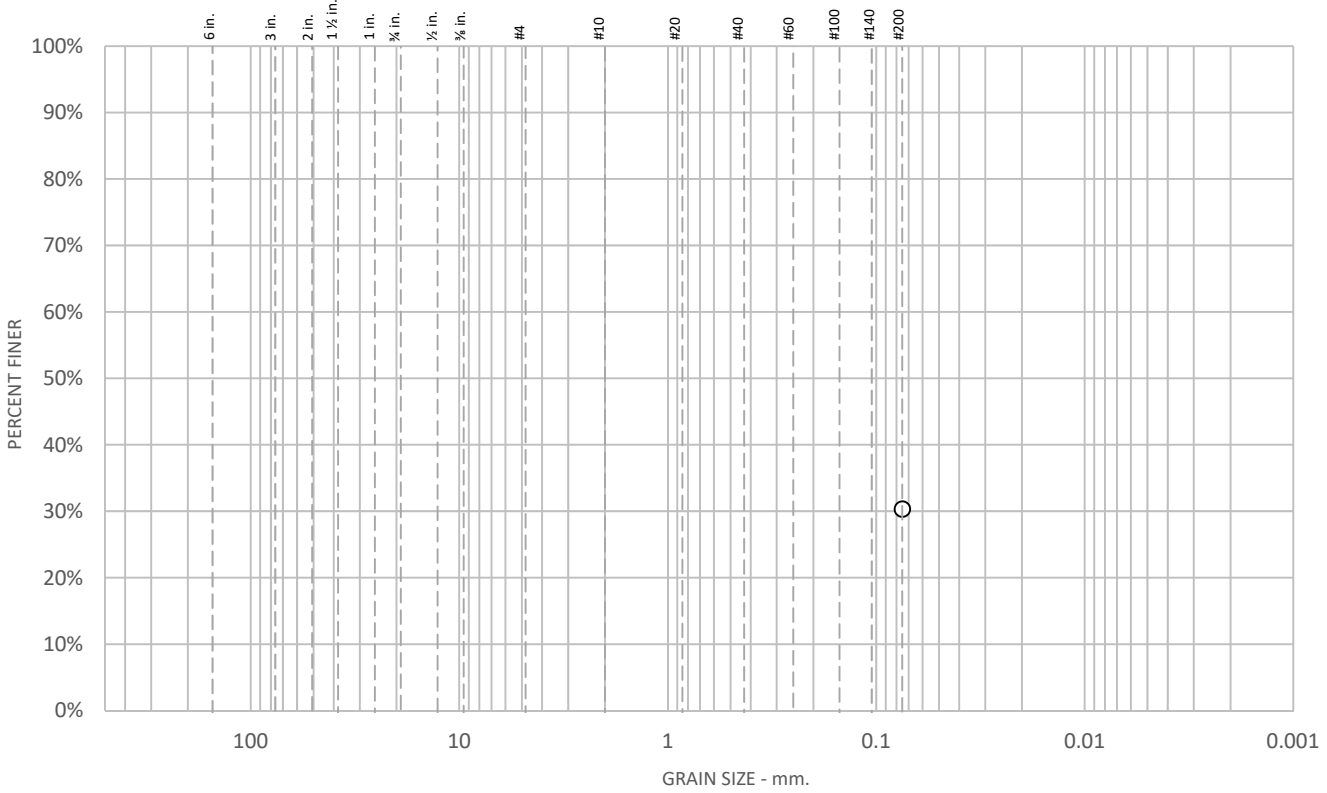
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	30		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 32 PI = 16

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 194.6 g

Sample Number: 1-B9 @ 10.5-11.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

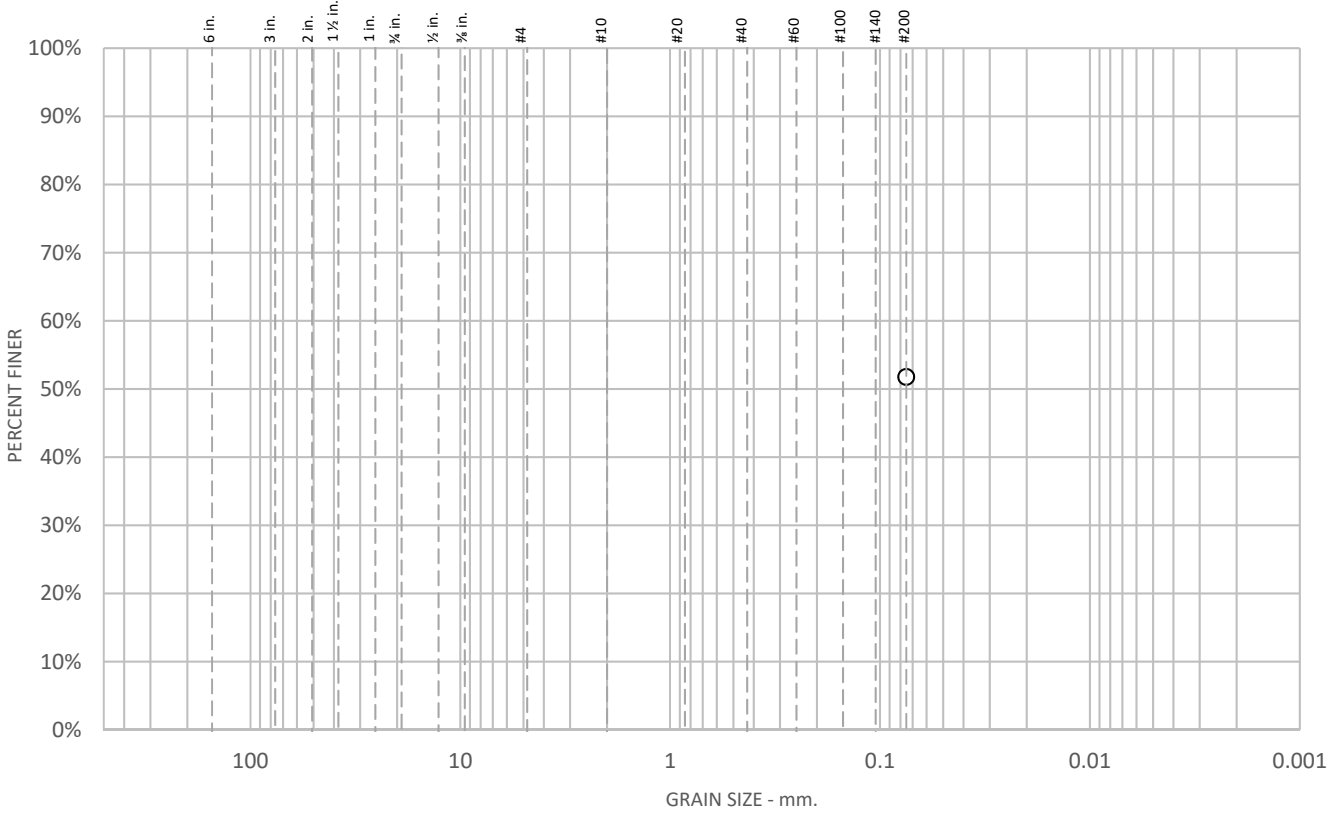
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	51.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 22 LL = 22 PI = 0

Coefficients

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

Classification

USCS = ML

Remarks

PI: ASTM D4318, Wet Method
ASTM D1140, Method A
Soak time = 12 min
Dry sample weight = 126.76 g

Sample Number: 1-B9 @ 15-18

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

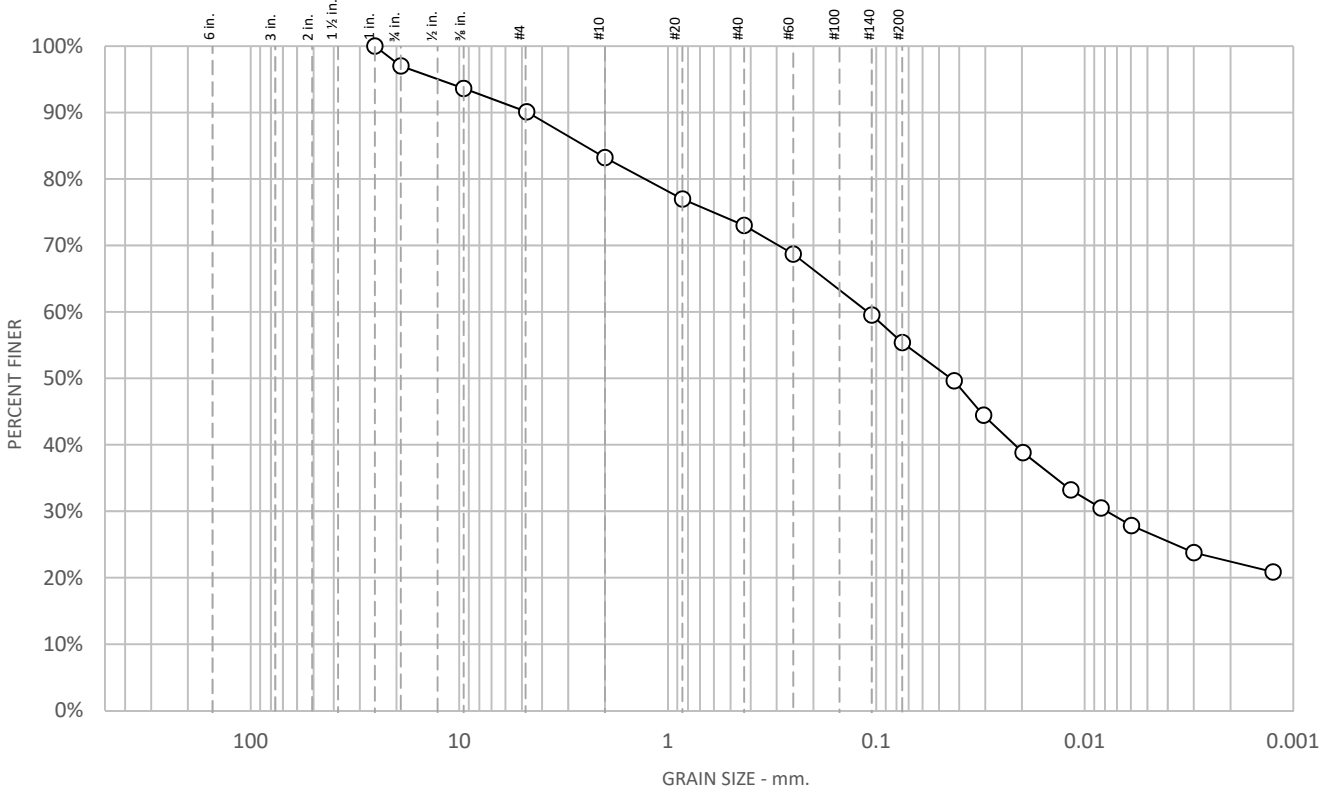
Project Number: 15949.000.000
Date: 6/14/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	3.0	6.9	6.9	10.2	17.6	33.0	22.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	97.0		
⅜ in.	93.6		
#4	90.1		
#10	83.2		
#20	77.0		
#40	73.0		
#60	68.7		
#140	59.5		
#200	55.4		
0.0423 mm.	49.6		
0.0306 mm.	44.4		
0.0198 mm.	38.8		
0.0117 mm.	33.2		
0.0084 mm.	30.5		
0.0060 mm.	27.8		
0.0030 mm.	23.8		
0.0013 mm.	20.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 4.6817 mm D_{85} = 2.5007 mm D_{60} = 0.1098 mm

D_{50} = 0.0439 mm D_{30} = 0.0078 mm D_{15} =

D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422

Silt/clay division of 0.002mm used

Sample Number: 1-B9 @ 20-21.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB

Project: GEX for Multiple Parcels **Date:** 6/12/2019

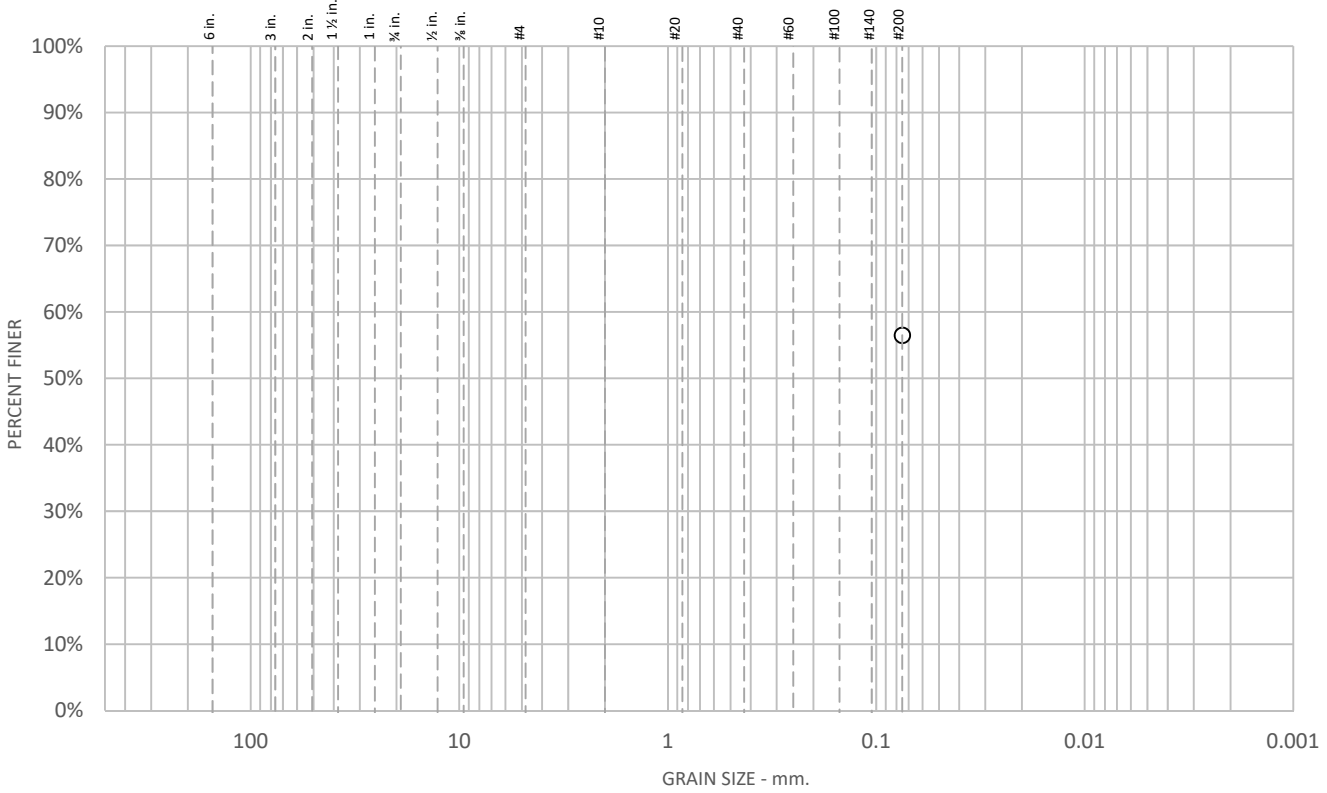
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	56.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 35 PI = 16

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 169.5 g

Sample Number: 1-B9 @ 35-36.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

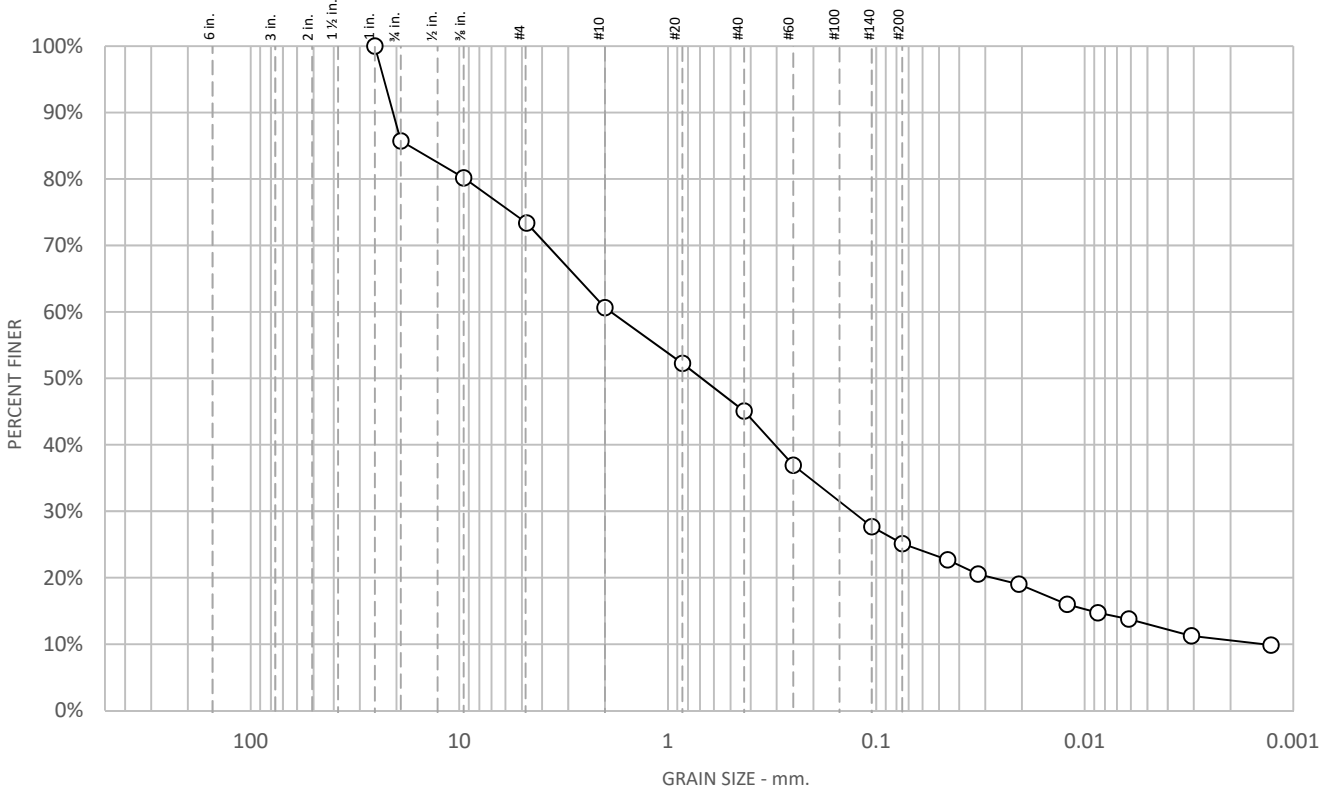
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	14.3	12.3	12.7	15.6	20.0	14.6	10.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	85.7		
⅜ in.	80.2		
#4	73.4		
#10	60.6		
#20	52.2		
#40	45.1		
#60	36.9		
#140	27.7		
#200	25.1		
0.0455 mm.	22.7		
0.0325 mm.	20.5		
0.0207 mm.	19.0		
0.0122 mm.	16.0		
0.0087 mm.	14.7		
0.0062 mm.	13.8		
0.0031 mm.	11.3		
0.0013 mm.	9.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 20.7605 mm D_{85} = 17.3783 mm D_{60} = 1.8730 mm
D_{50} = 0.6865 mm D_{30} = 0.1306 mm D_{15} = 0.0093 mm
D_{10} = 0.0014 mm C_u = 1342.09 C_c = 6.52

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B9 @ 45.46.5

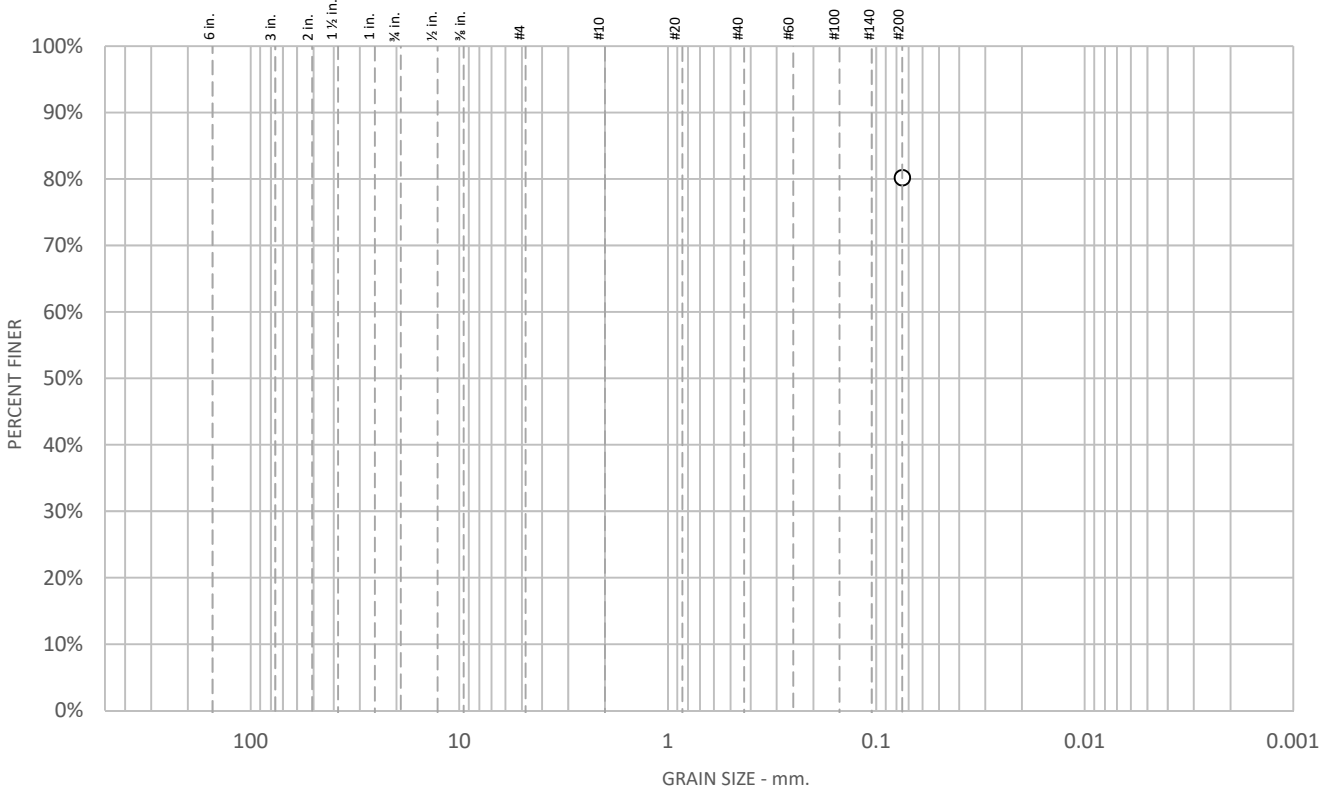
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						80.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	80.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 27 LL = 68 PI = 41

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 158.9 g

Sample Number: 1-B9 @ 5.5-6.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

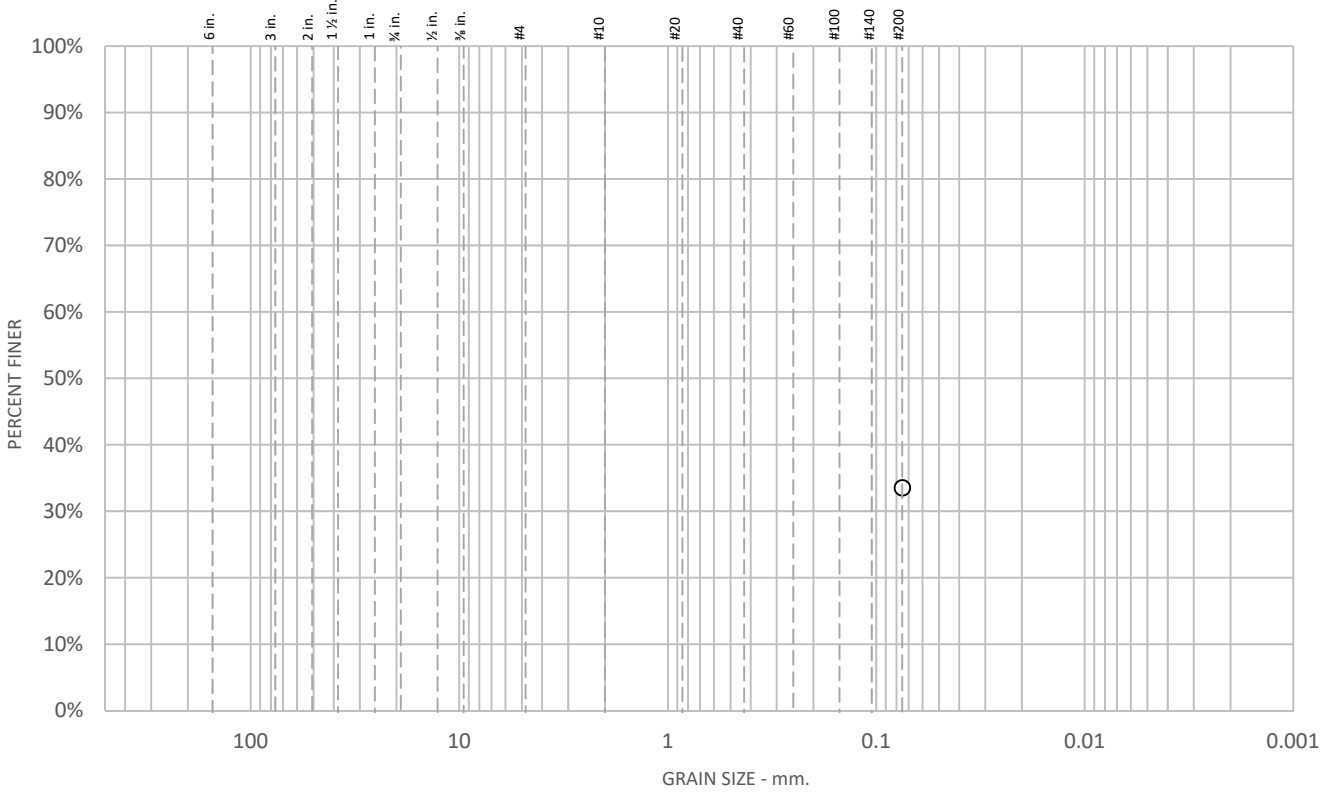
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 28 PI = 12

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 209.7 g

Sample Number: 1-B9 @ 55-56.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

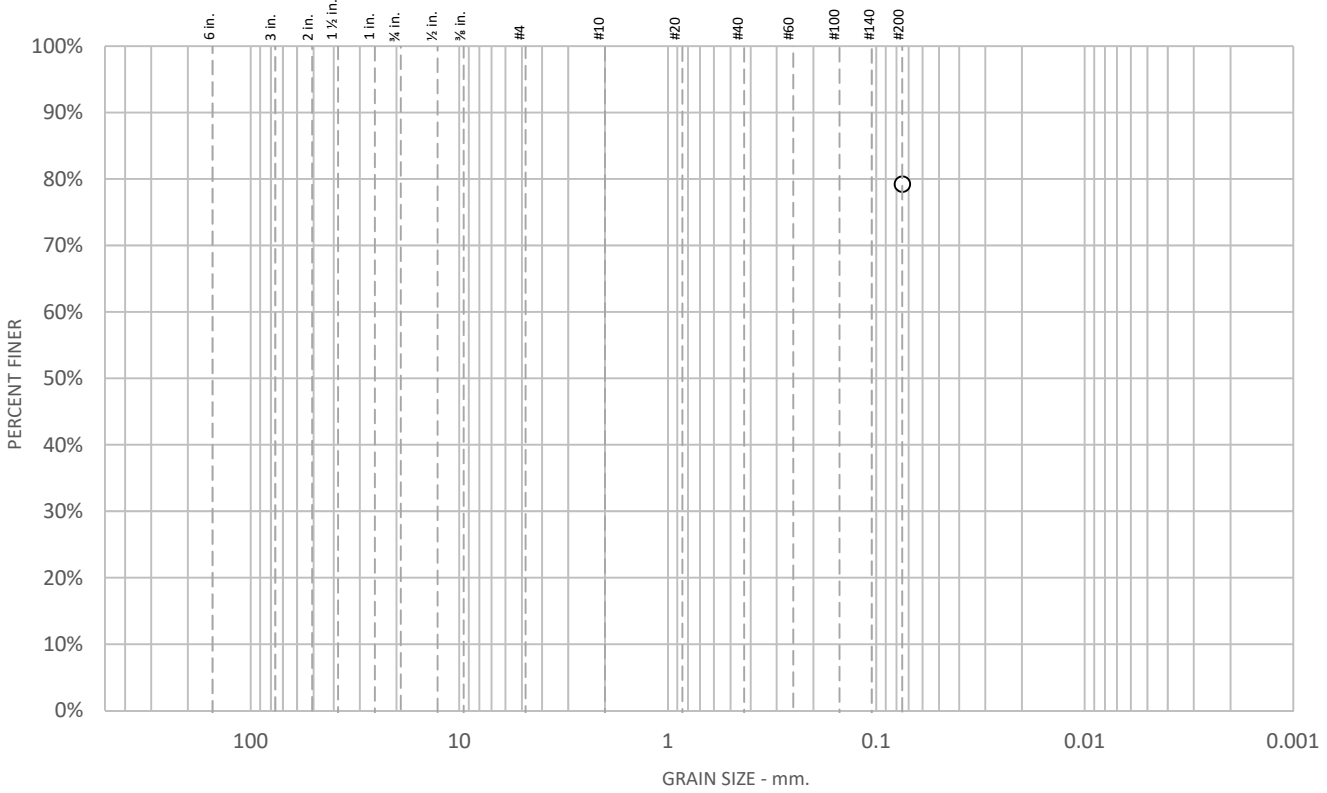
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						79.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	79.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 23 LL = 66 PI = 43

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 188.2 g

Sample Number: 1-B10 @ 15-16.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

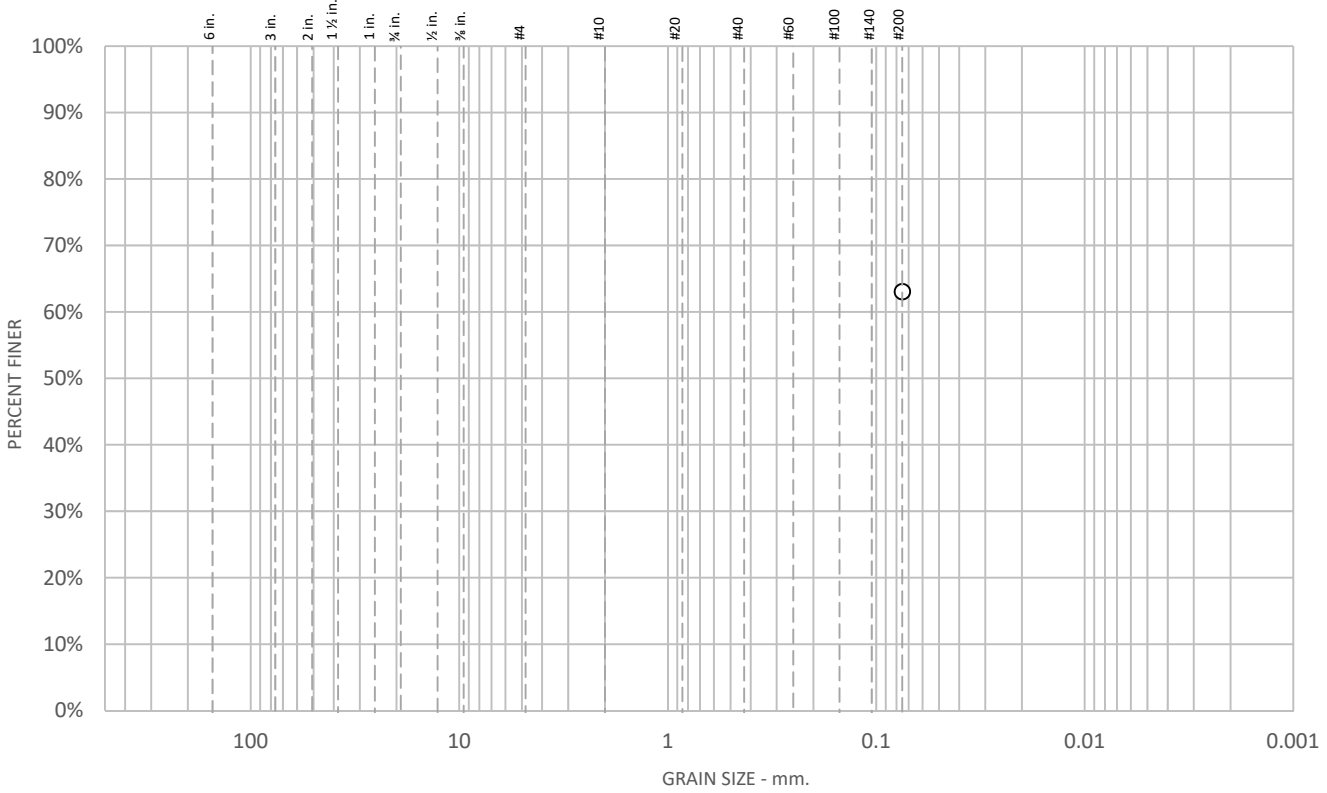
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						63.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	63.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 37 PI = 18

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 205.9 g

Sample Number: 1-B10 @ 25-26.5

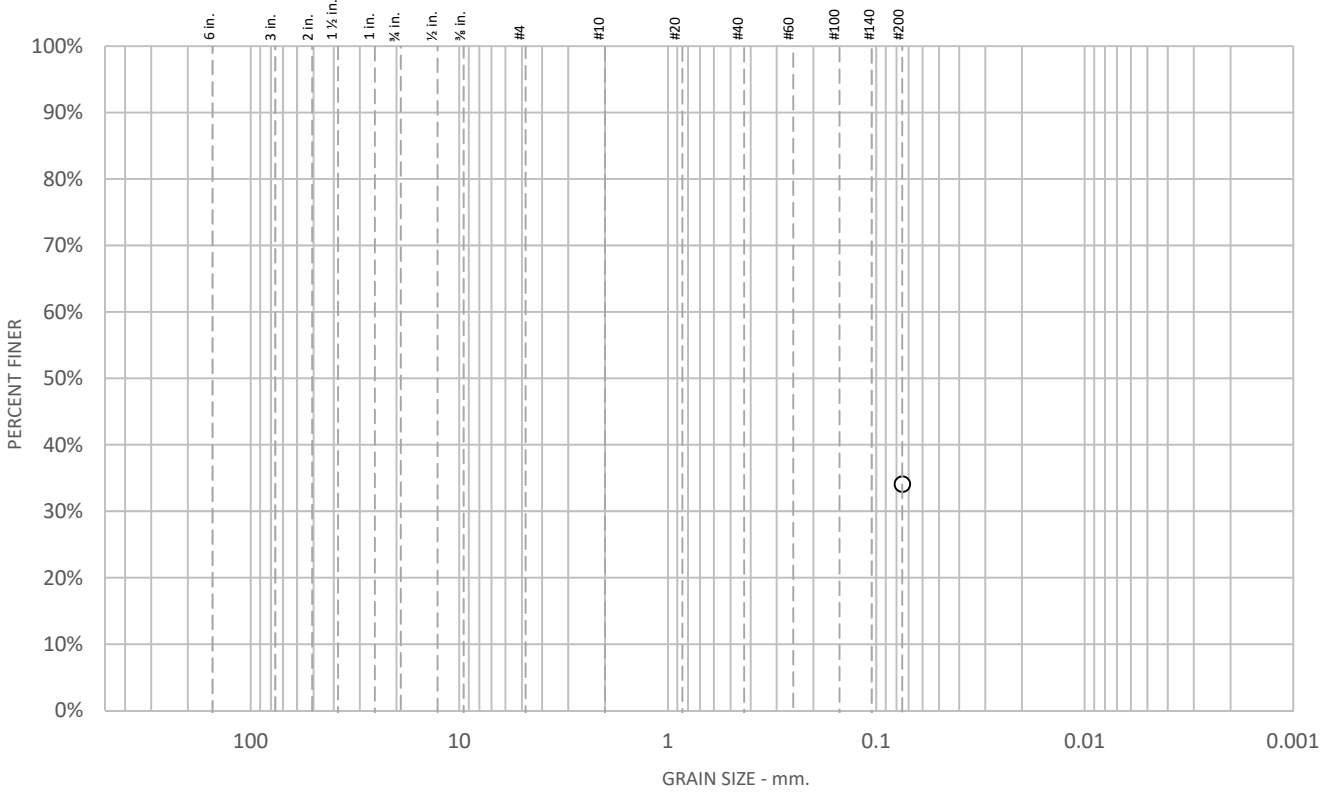
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 32 PI = 16

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 189.9 g

Sample Number: 1-B10 @ 40-41.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

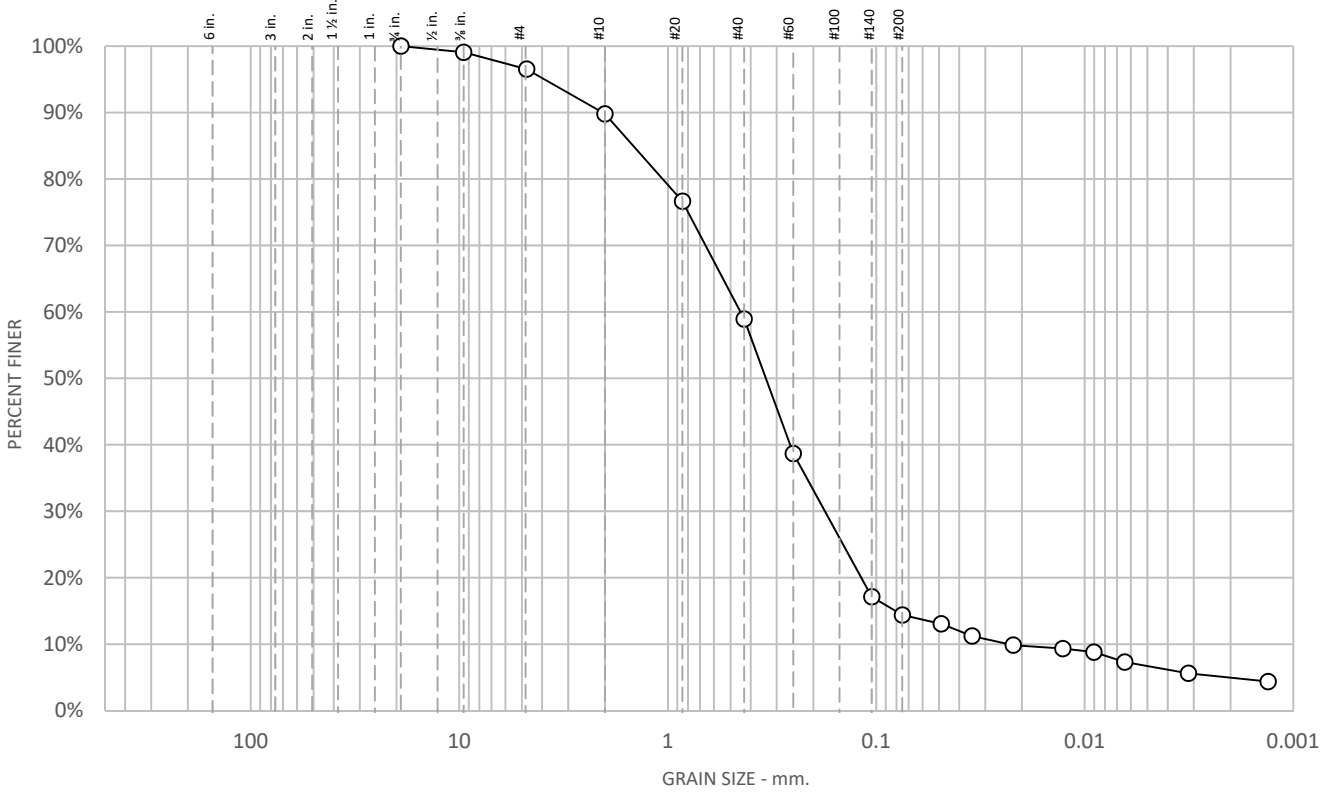
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	3.5	6.7	30.9	44.5	9.4	5.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.1		
#4	96.5		
#10	89.8		
#20	76.6		
#40	58.9		
#60	38.7		
#140	17.1		
#200	14.4		
0.0488 mm.	13.0		
0.0347 mm.	11.2		
0.0220 mm.	9.9		
0.0127 mm.	9.3		
0.0090 mm.	8.8		
0.0064 mm.	7.3		
0.0032 mm.	5.6		
0.0013 mm.	4.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 2.0536 mm D_{85} = 1.4639 mm D_{60} = 0.4479 mm
D_{50} = 0.3385 mm D_{30} = 0.1763 mm D_{15} = 0.0809 mm
D_{10} = 0.0231 mm C_u = 19.35 C_c = 3.00

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B10 @ 50-51.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Isotropic Consolidated Undrained Triaxial Test

ASTM D4767

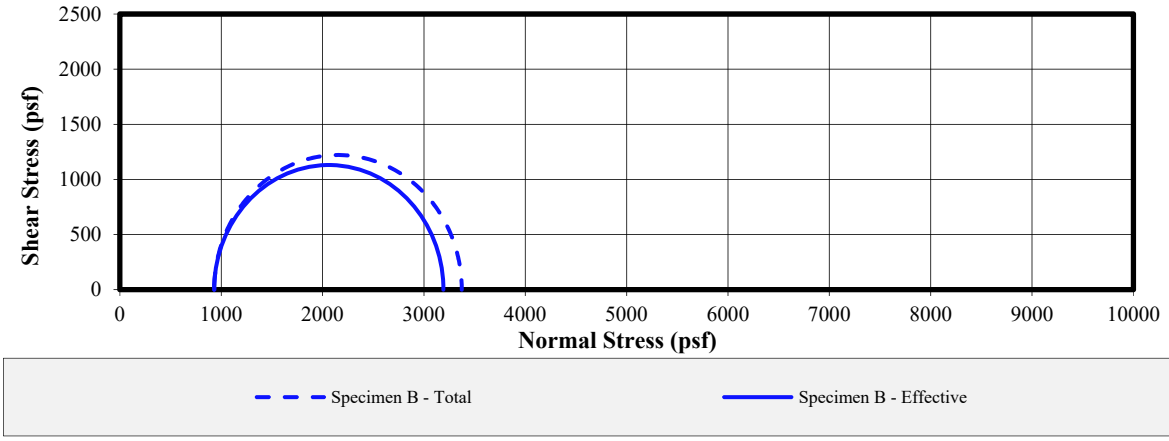
Date: 6/19/19

Checked By: D. Seibold

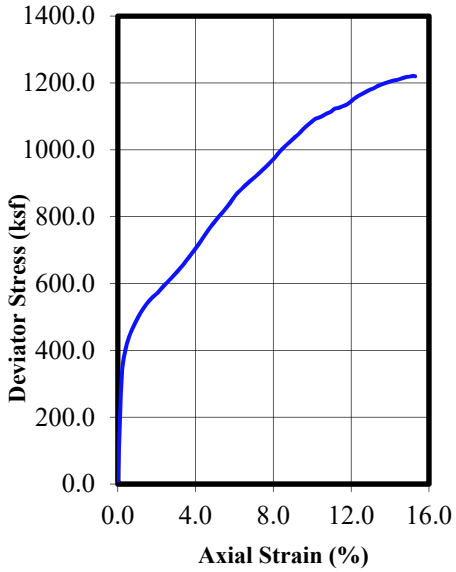
Date: 6/19/19

Tested By: G. Criste

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial		1-B9@30.5		
Height-to-Diameter Ratio		2.080		
Water Content (%)		26.4		
Dry Density (pcf)		99.9		
Saturation (%)		99.66		
Void Ratio		0.736		
Diameter (in)		2.392		
Height (in)		4.976		
ASTM D854 - Measured				
Specific Gravity		2.779		
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
After Consolidation		**1-B9@30.5**		
Void Ratio		0.737		
Water Content (%)		25.81		
Dry Density (pcf)		99.90		
Eff. Consol. Press. (psf)		7.1		
Back Pressure (psf)		43.0		
Saturation (%)		100.0		
B-Value		0.96		
Strain Rate (in./min.)		0.02411		
Height-to-Diameter Ratio		2.063		
After Shear		**1-B9@30.5**		
σ'1 at Failure (psf)		3187.4		
σ'3 at Failure (psf)		744.7		
t_{50} (min)		0.820		
t_{90} (min)		1.476		
Corrected Peak Deviator Stress (psf):		2442.7		

Maximium Deviator Stress Criterion	
C (psf)	
C' (psf)	
Ø (deg)	
Ø' (deg)	

Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B9
Sample Number:	1
Depth:	30.5-31.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type	Consolidated Undrained
Remarks	

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Isotropic Consolidated Undrained Triaxial Test

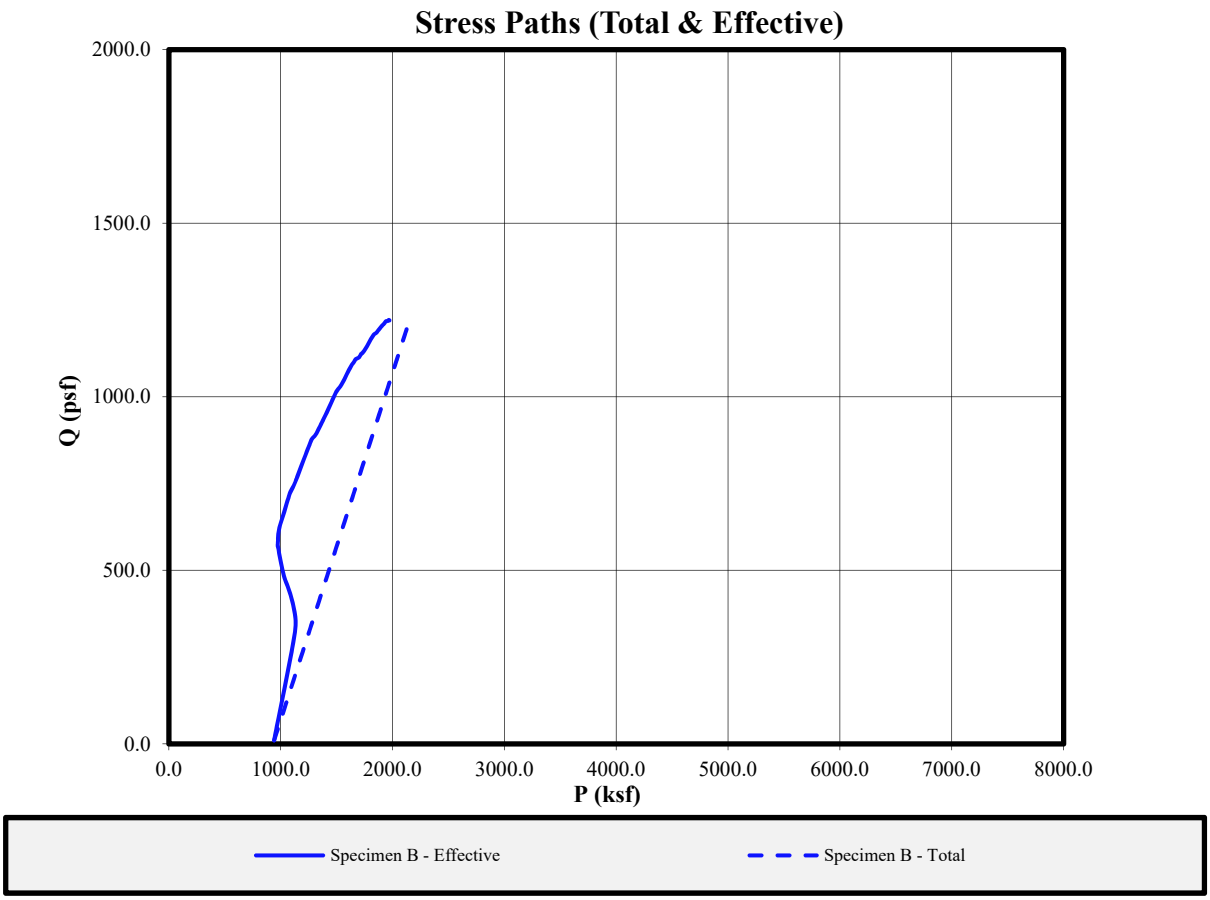
ASTM D4767

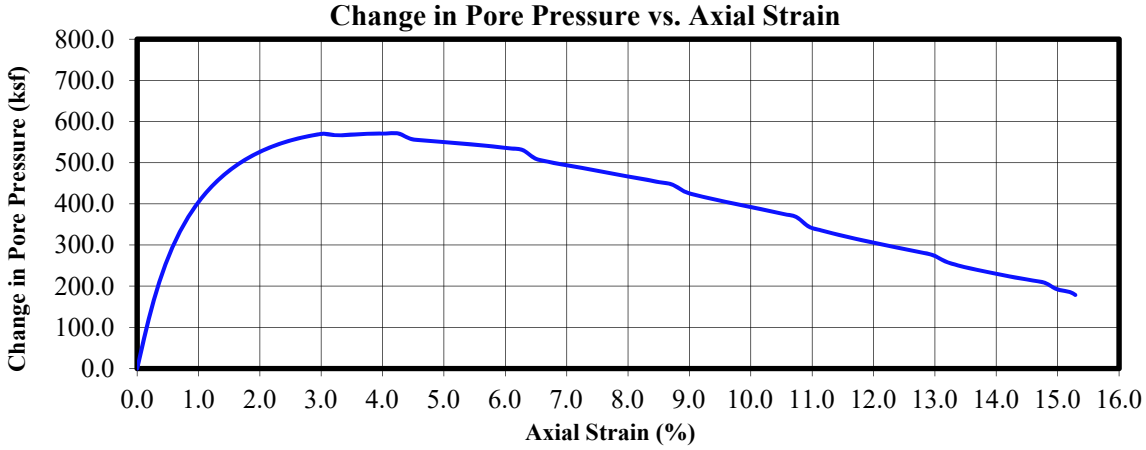
Date: 6/19/19

Checked By: D. Seibold

Date: 6/19/19

Tested By: G. Criste





Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B9
Sample Number:	1
Depth:	30.5-31.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type:	Consolidated Undrained
Remarks:	

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Isotropic Consolidated Undrained Triaxial Test

ASTM D4767

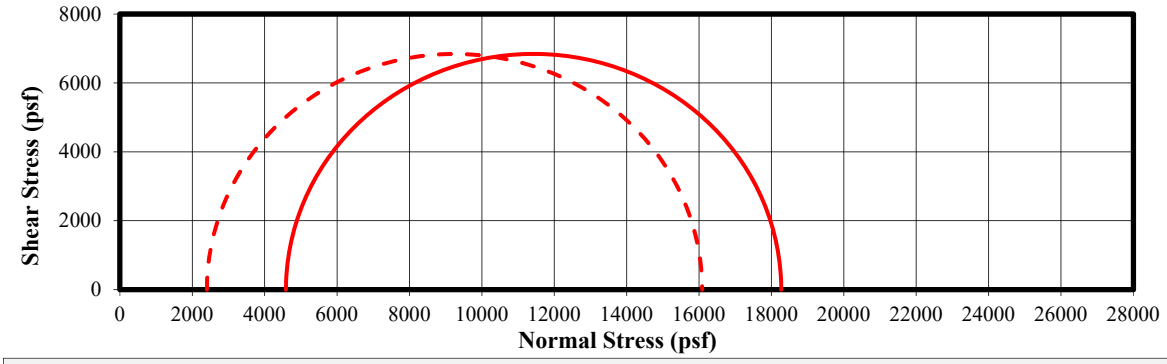
Date: 6/19/19

Checked By: D. Seibold

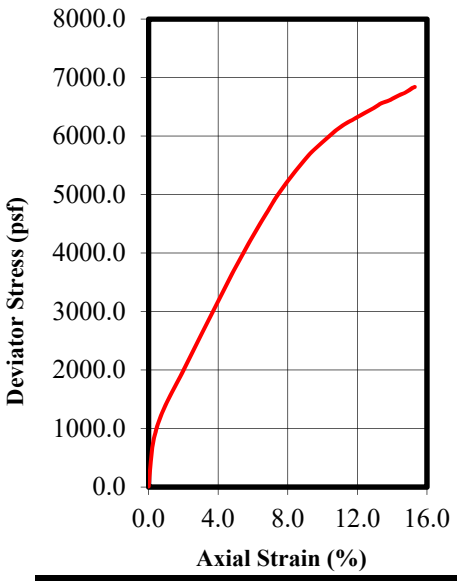
Date: 6/19/19

Tested By: G. Criste

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial			1-B8@70.5	
Height-to-Diameter Ratio			2.094	
Water Content (%)			26.0	
Dry Density (pcf)			100.4	
Saturation (%)			99.39	
Void Ratio			0.728	
Diameter (in)			2.386	
Height (in)			4.998	
ASTM D854 - Measured				
Specific Gravity			2.779	
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
After Consolidation			**1-B8@70.5**	
Void Ratio			0.697	
Water Content (%)			23.50	
Dry Density (pcf)			102.30	
Eff. Consol. Press. (psf)			13.5	
Back Pressure (psf)			45.0	
Saturation (%)			100.0	
B-Value			0.97	
Strain Rate (in./min.)			0.02518	
Height-to-Diameter Ratio			2.076	
After Shear			**1-B8@70.5**	
σ'1 at Failure (psf)			18271.0	
σ'3 at Failure (psf)			4588.8	
t_{50} (min)			0.421	
t_{90} (min)			0.757	
Corrected Peak Deviator Stress (psf):			13682.2	

Maximium Deviator Stress Criterion	
C (psf)	
C' (psf)	
Ø (deg)	
Ø' (deg)	

Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B8
Sample Number:	Multiple
Depth:	70.5-71.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type	Consolidated Undrained
Remarks	

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Isotropic Consolidated Undrained Triaxial Test

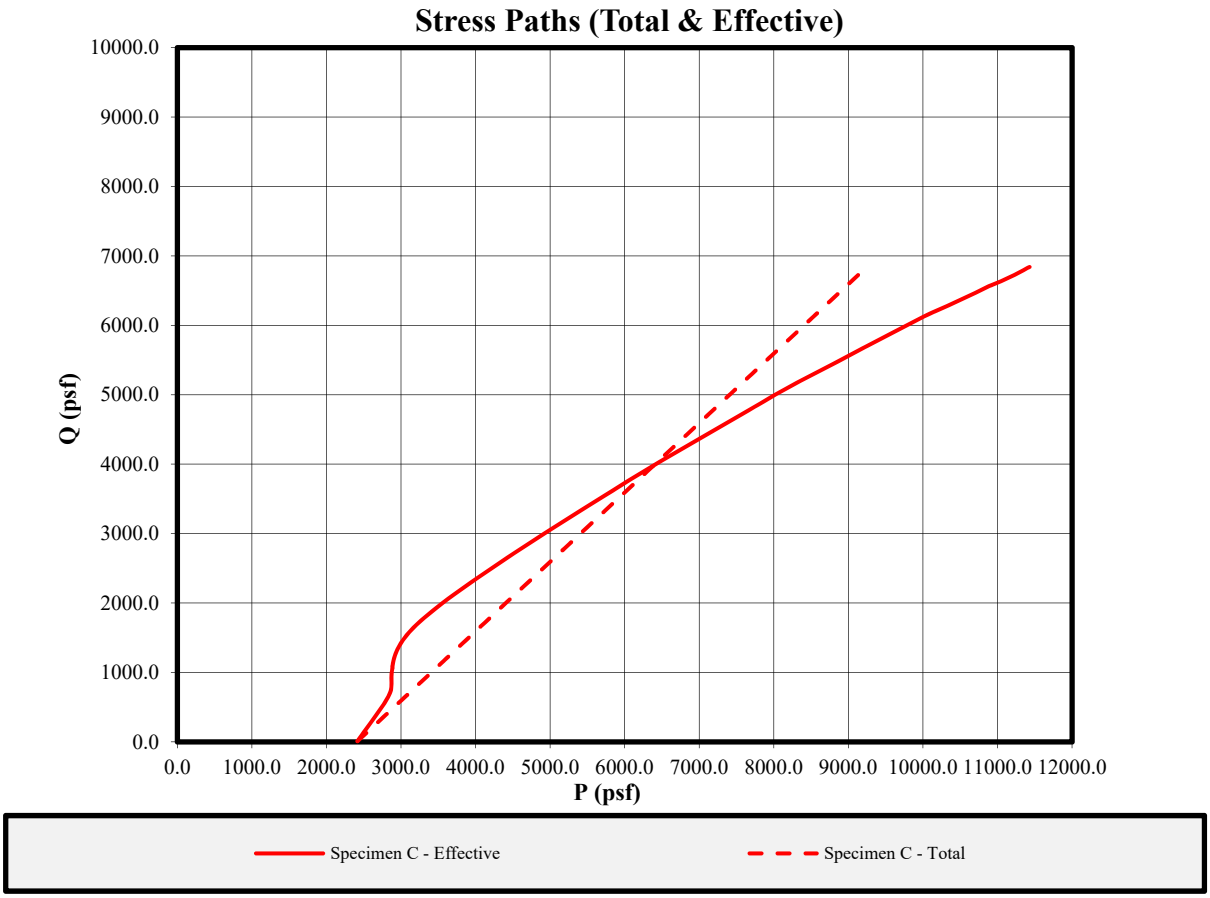
ASTM D4767

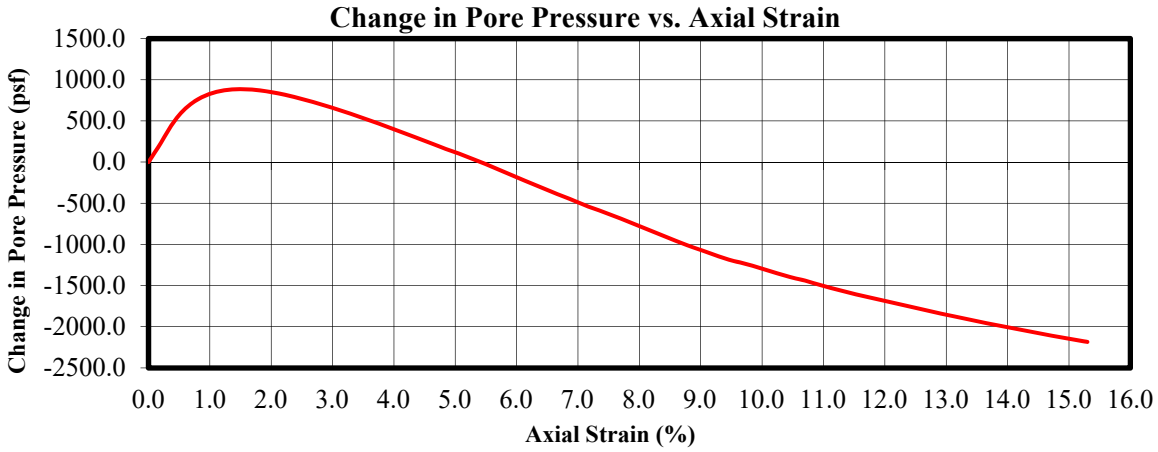
Date: 6/19/19

Checked By: D. Seibold

Date: 6/19/19

Tested By: G. Criste





Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B8
Sample Number:	Multiple
Depth:	70.5-71.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type:	Consolidated Undrained
Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

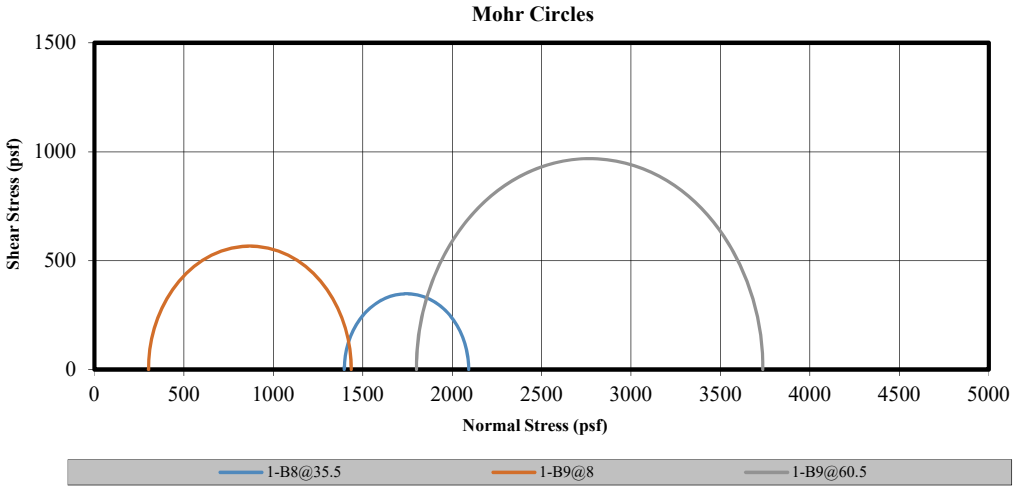
ASTM D2850

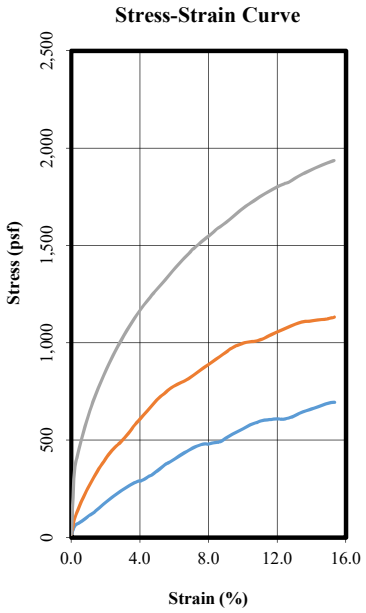
Date: 06/07/19

Checked By: G. Criste

Date: 6/7/2019

Tested By: N. Buckton





Before Test	Specimen 1-B8@35.5	1-B9@8	1-B9@60.5	
Water Content (%)	25.53	23.50	20.55	
Dry Density (pcf)	102.30	104.80	108.50	
Saturation (%)	99.91	99.94	98.92	
Void Ratio	0.72	0.65	0.56	
Diameter (in)	2.402	2.394	2.389	
Height (in)	4.897	4.984	5.547	
Height-to-Diameter Ratio	2.039	2.082	2.322	
ASTM D4318 - Wet Method				
Liquid Limit	n/a	n/a	n/a	
Plastic Limit	n/a	n/a	n/a	
ASTM D854 - Assumed				
Specific Gravity	2.819	2.775	2.720	
After Test	**1-B8@35.5**	**1-B9@8**	**1-B9@60.5**	
Water Content (%)	25.53	23.50	20.55	
Saturation (%)	99.91	99.93	98.92	
Strain Rate (in/min)	0.05	0.05	0.05	
Peak Deviator Stress (psf)	695.1	1132.7	1936.7	
Axial Strain @ Failure (%)	15.341	15.327	15.301	
	Cell Pressure			
Cell (psf)	1396.8	302.4	1800.0	
Back (psf)	n/a	n/a	n/a	
	Principle Stresses at Failure			
σ1 (psf)	2091.9	1435.1	3736.7	
σ3 (psf)	1396.8	302.4	1800.0	
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		347.5	566.3	968.4	
Friction Angle Ø	n/a		n/a	n/a	n/a	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

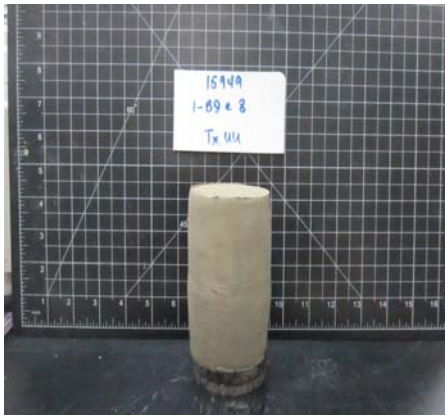
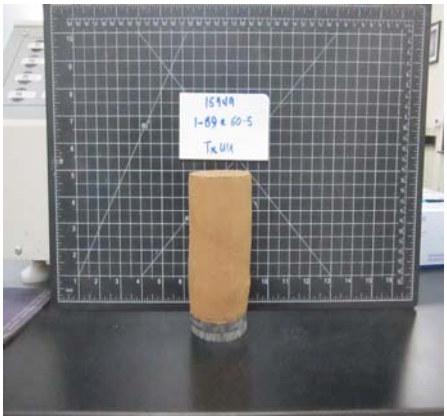
Date: 06/07/19

Checked By: G. Criste

Date: 6/7/2019

Tested By: N. Buckton

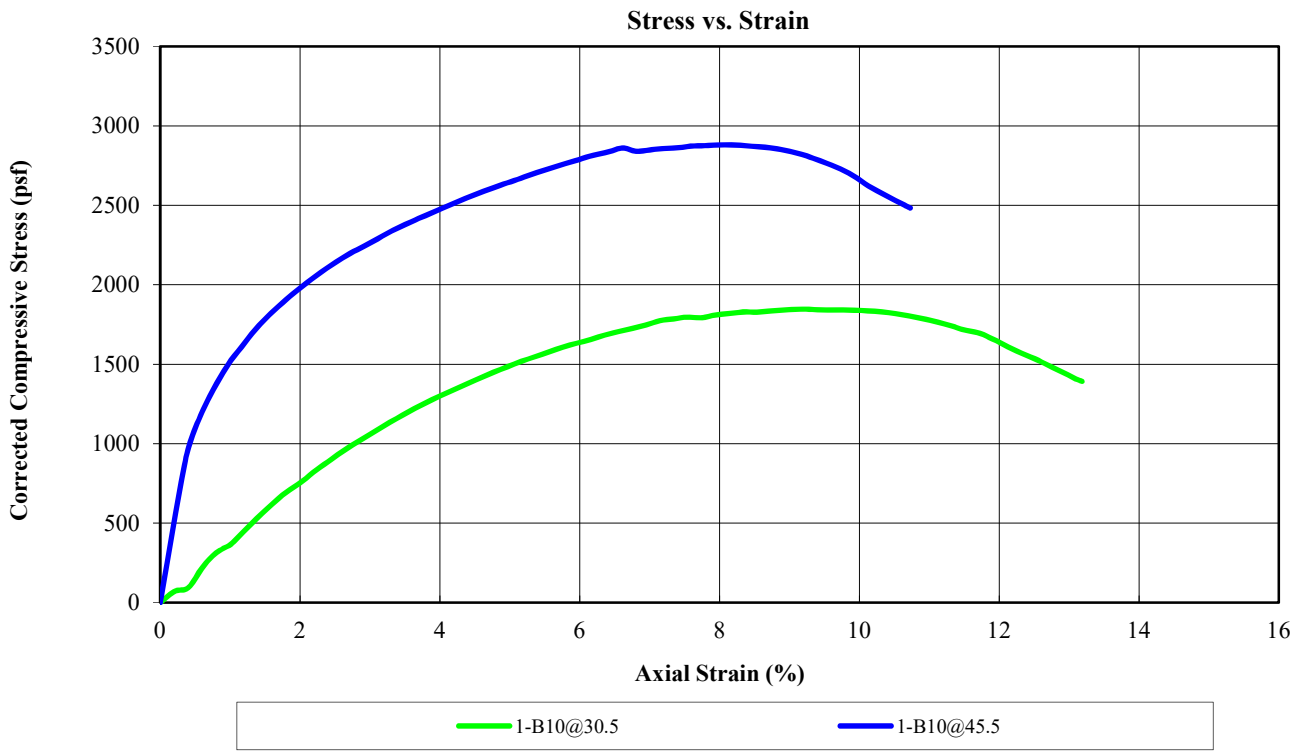
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B8@35.5	SAMPLE NUMBER: 1-B9@8
	
SAMPLE NUMBER: 1-B9@60.5	**SAMPLE NUMBER:**
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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UNCONFINED COMPRESSION TEST REPORT
ASTM D2166



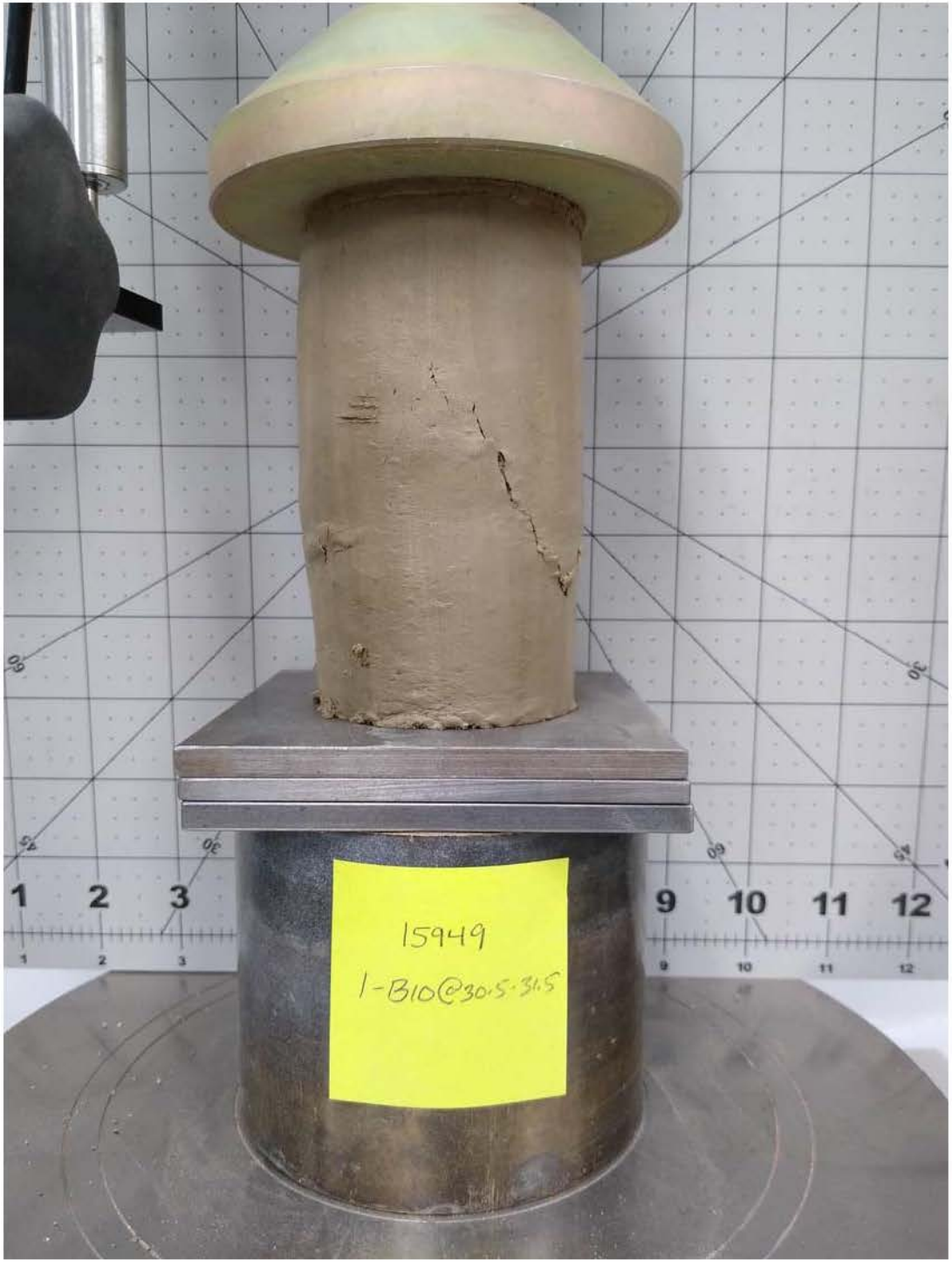
BEFORE TEST	SPECIMEN 1-B10@30.5	1-B10@45.5
Moisture Content (%)	22.9	28.3
Dry Density (pcf)	105.2	96.3
Saturation (%)	100.0	100.0
Void Ratio	0.57	0.72
Diameter (in)	2.395	2.392
Height (in)	5.11	5.20
Height-To-Diameter Ratio	2.13	2.17
TEST DATA		
Unconfined Compressive Strength (psf)	1847	2881
Undrained Shear Strength (psf)	923	1440
Strain Rate (in./min.)	0.05	0.05
Specific Gravity	2.650	2.650
Strain at Failure (%)	9.14	8.17
Liquid Limit		
Plastic Limit		
Test Remarks		

SPECIMEN	DESCRIPTION
1-B10@30.5	See exploration logs
1-B10@45.5	See exploration logs

PROJECT NAME: GEX for Multiple Parcels
PROJECT NO: 15949.000.000
CLIENT: Google, LLC
LOCATION: 1-B10@30.5
PHASE NO: LAB

Report Date: 06/12/19
Tested By: R. Montalvo
Reviewed By: M. Gilbert

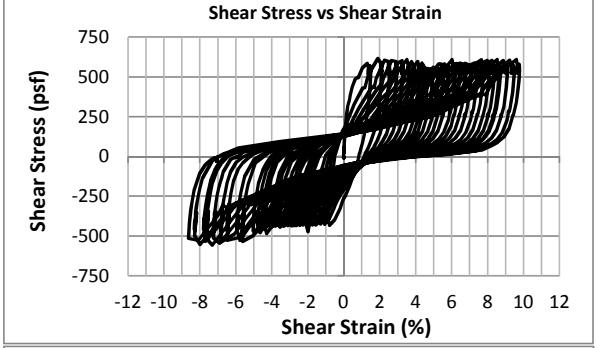
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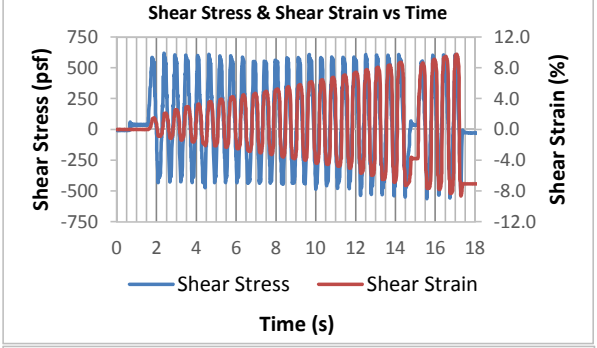

15949
1-B10@30.5-31.5

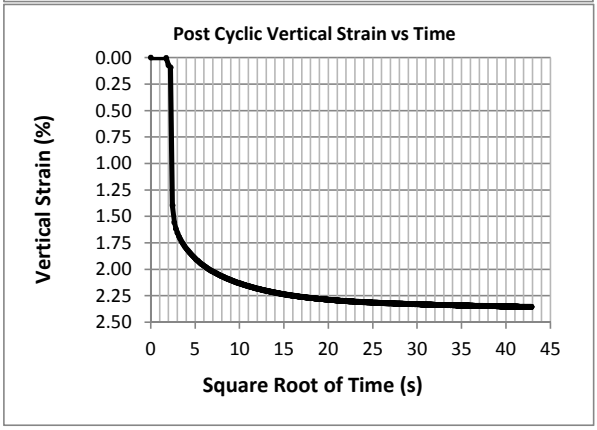

15949
1-B10@45.5-46.5

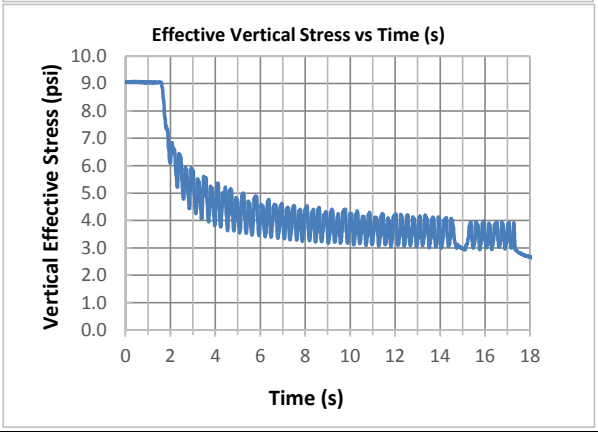
Cyclic Simple Shear

ASTM D6528 - Modified









Test Conditions		Results		Maximum	Minimum
Confining Condition	Plain Membrane w/Chamber Pressure	Vertical Effective Stress (psf)	Deviatoric	783.5	-54.8
Applied Lateral Effective Stress (psf)	520.0		Isotropic	520.0	520.0
Resulting K_o after applied, σ_{vc}'	0.398	Shear Strain (%)		9.8	-8.6
Applied Loading Frequency (Hz)	0.500	Post Cyclic Vertical Strain (%)		2.36	
Cycle Limit, N	27				
Single Amp. Strain (+/-)	9.2	**Cyclic Preshear Specimen Condition**			
Applied τ_{cyc} (psf)	617	Preshear Moisture Content (%)		23.93%	
Applied σ_{vc}' (psf)	1308	Preshear Void Ratio		0.6554	
Applied CSR	0.472	Preshear Saturation (%)		100.36%	
		Preshear Dry Density (pcf)		103.53	

Test Date: 6/18/2019

ASTM D2216	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	25.75%	22.72%	**Liquid Limit:**	
Dry Density (pcf):	102.99	105.52	**Plastic Limit:**	
Saturation (%):	96.53%	100.00%	**ASTM D854 - Measured**	
Void Ratio:	0.7331	0.6229	**Specific Gravity:**	2.748
			Soil Description:	See exploration logs

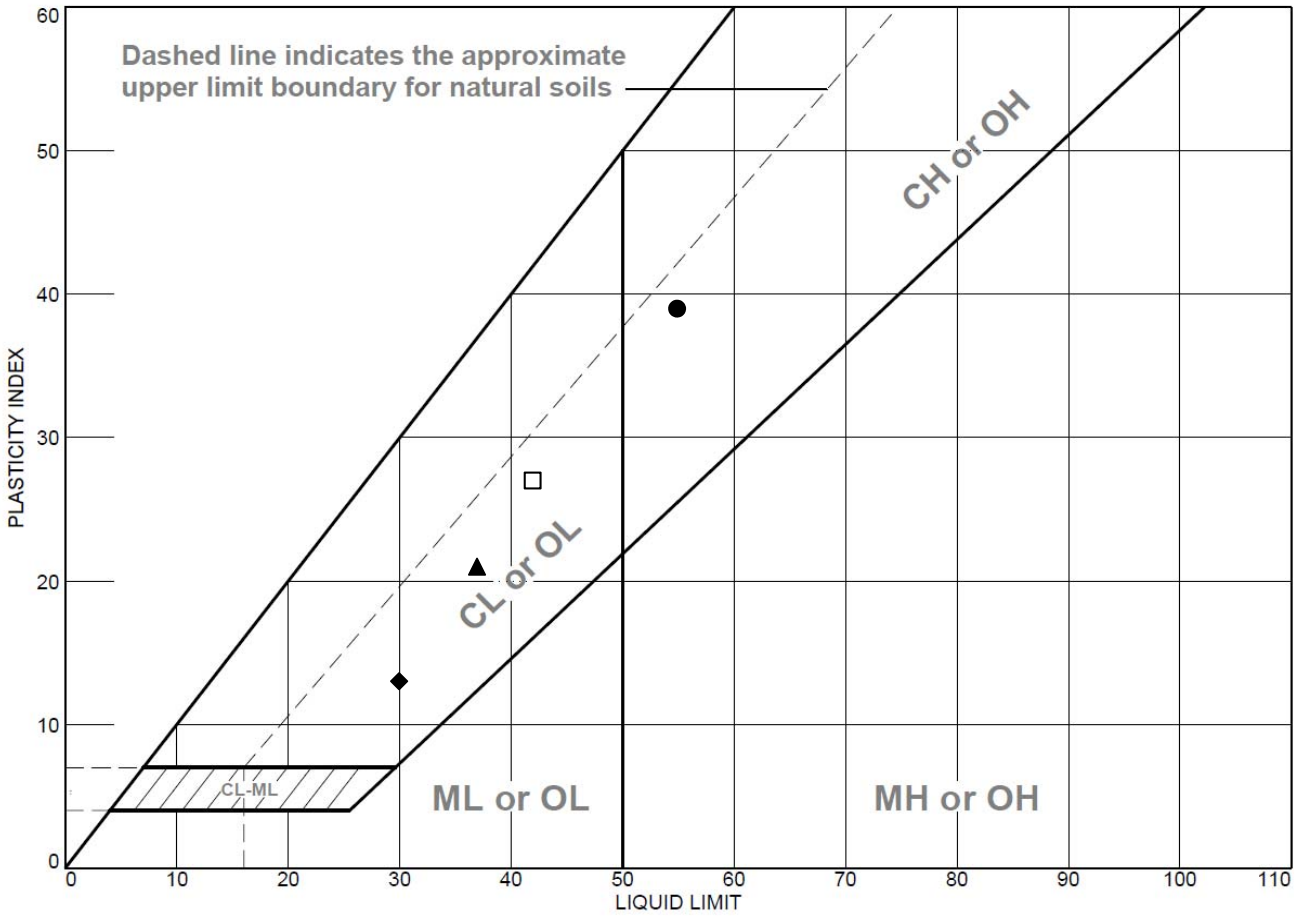
Project Number:	15949.000.000	**Depth:**	15.5-15.75 ft.
Sample Number:	1-B9 @ 15-16.5	**Boring #:**	1-B9
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

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Remarks:


15949
CSS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	37	16	21	87.8	62.3	CL
◆	See exploration logs	30	17	13		40.2	
□	See exploration logs	42	15	27		52.9	CL
●	See exploration logs	55	16	39		92	CH

Project No.: 15949.000.000 PHLAB **Date:** 6/19/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B1 **Depth:** 13-14.5
◆ **Sample Number:** 1-B1 **Depth:** 16-17.5
□ **Sample Number:** 1-B1 **Depth:** 30.5-31.5
● **Sample Number:** 1-B1 **Depth:** 43-44.5

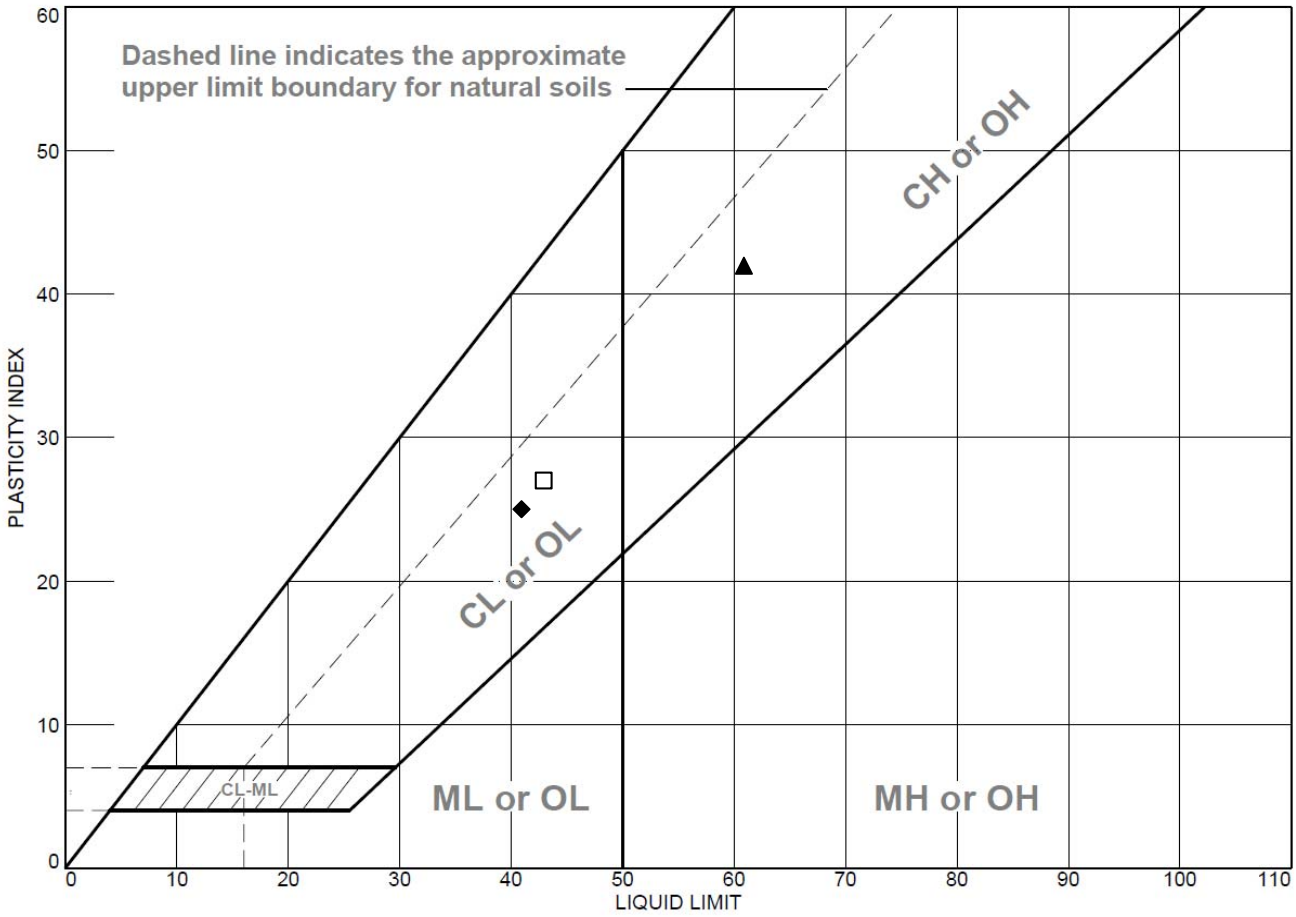
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	61	19	42		82.5	CH
◆	See exploration logs	41	16	25		64.8	CL
□	See exploration logs	43	16	27		25.6	

Project No.: 15949.000.000 PHLAB **Date:** 6/19/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B2 **Depth:** 6.5-7
◆ **Sample Number:** 1-B2 **Depth:** 15-16.5
□ **Sample Number:** 1-B2 **Depth:** 30-31.5

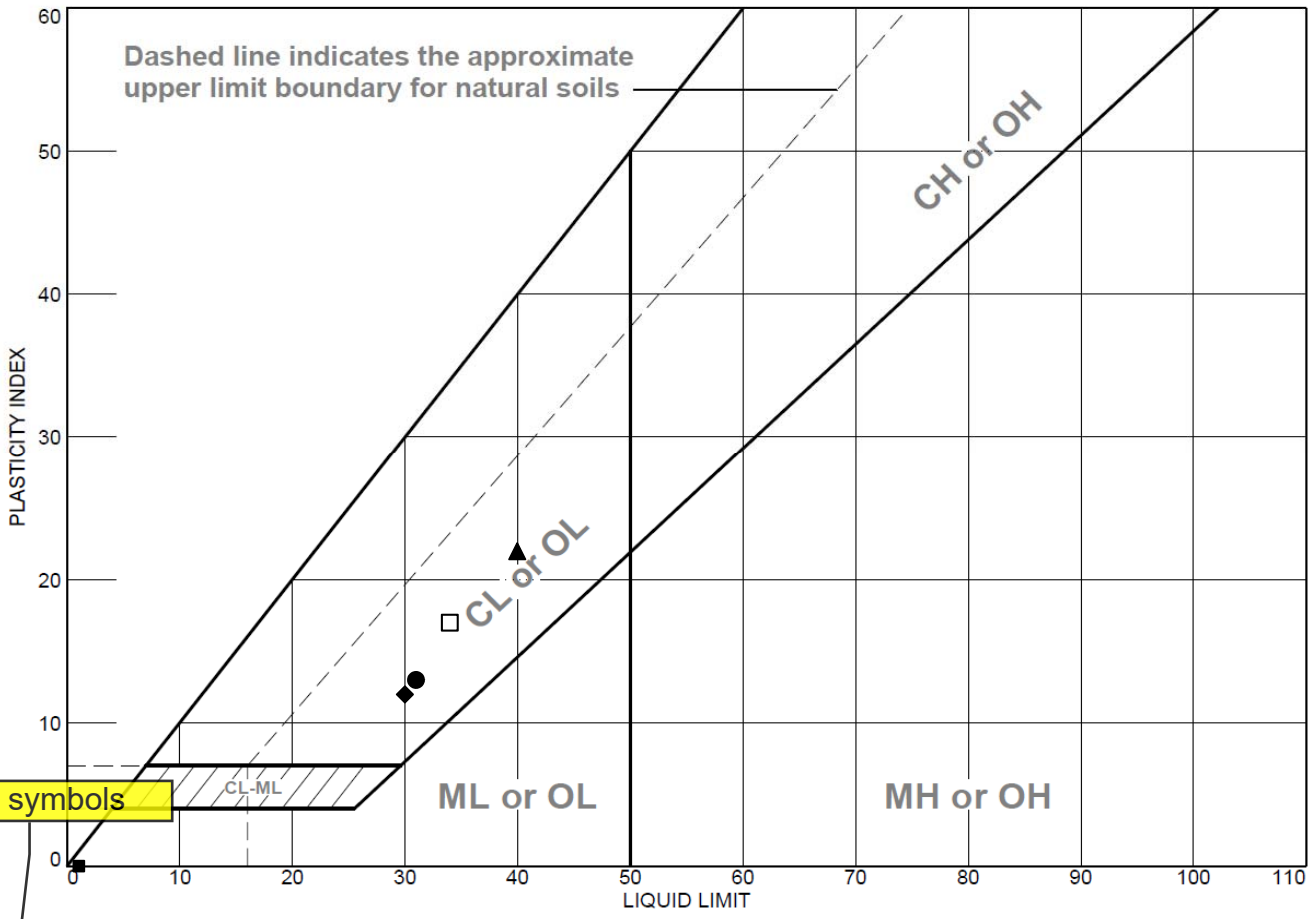
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

ENGEO Expect Excellence

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



missing symbols

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	See exploration logs	40	18	22		37.7	
	See exploration logs	30	18	12		30.2	
	See exploration logs	34	17	17	79.2	58	
	See exploration logs	31	18	13		46.4	
	See exploration logs	NV	NP	NP			

Project No.: 15949.000.000 **Date:** 6/20/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

Sample Number: 1-B4 **Depth:** 25.5-26.5
Sample Number: 1-B4 **Depth:** 35.5-36.5
Sample Number: 1-B4 **Depth:** 46-47.5
Sample Number: 1-B4 **Depth:** 52-53
Sample Number: 1-B4 **Depth:** 8.5-9

missing symbols

Remarks:

PI: ASTM D4318, Wet Method, GS: ASTM D1140

PI: ASTM D4318, Wet Method, GS: ASTM D1140

PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

PI: ASTM D4318, Wet Method, GS: ASTM D1140

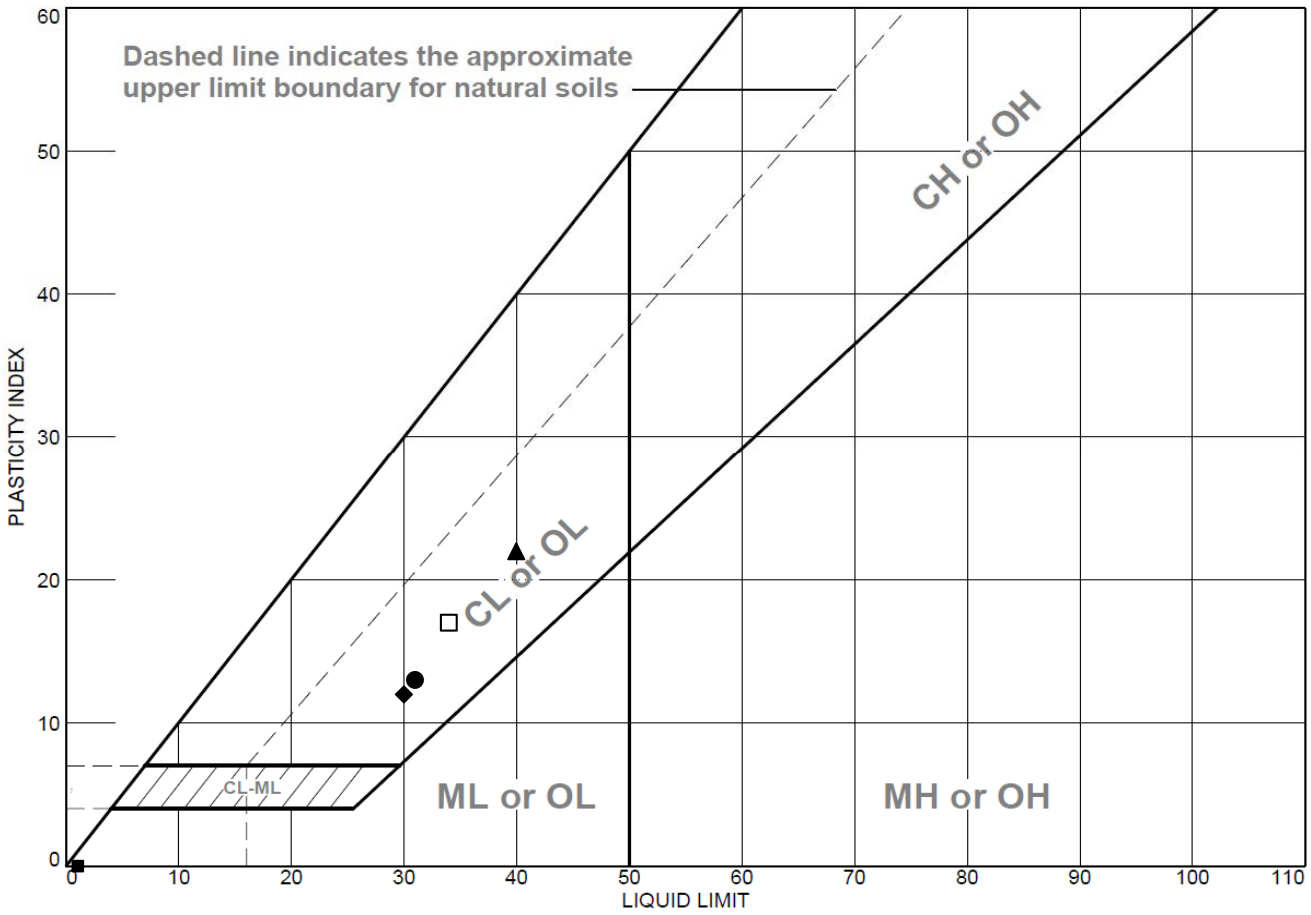
PI: ASTM D4318, Wet Method

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	40	18	22		37.7	
◆	See exploration logs	30	18	12		30.2	
□	See exploration logs	34	17	17	79.2	58	
●	See exploration logs	31	18	13		46.4	
■	See exploration logs	NV	NP	NP			

Project No.: 15949.000.000 **Date:** 6/20/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

▲ **Sample Number:** 1-B4 **Depth:** 25.5-26.5
◆ **Sample Number:** 1-B4 **Depth:** 35.5-36.5
□ **Sample Number:** 1-B4 **Depth:** 46-47.5
● **Sample Number:** 1-B4 **Depth:** 52-53
■ **Sample Number:** 1-B4 **Depth:** 8.5-9

Remarks:

▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140

◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140

□ PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

● PI: ASTM D4318, Wet Method, GS: ASTM D1140

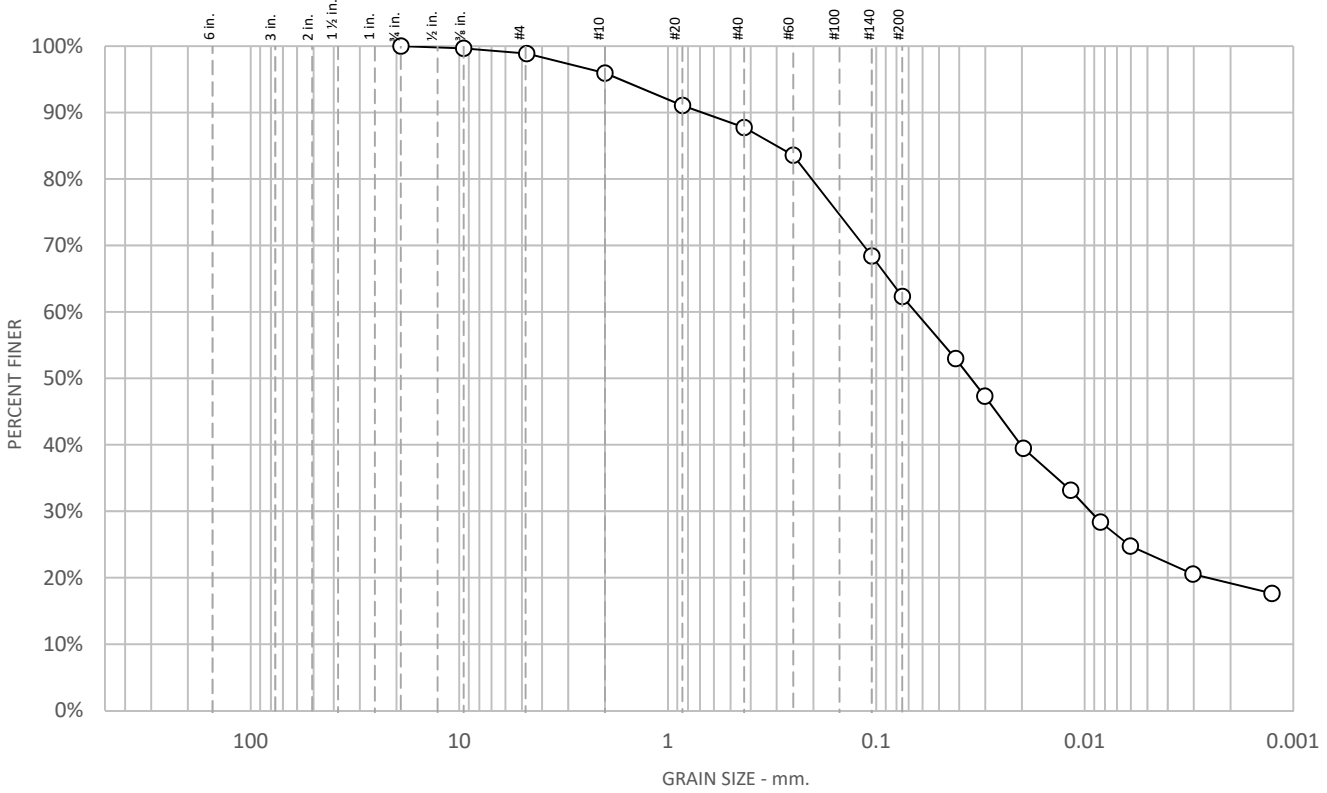
■ PI: ASTM D4318, Wet Method

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	1.1	2.9	8.2	25.4	43.2	19.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.7		
#4	98.9		
#10	95.9		
#20	91.1		
#40	87.8		
#60	83.6		
#140	68.4		
#200	62.3		
0.0416 mm.	53.0		
0.0302 mm.	47.3		
0.0197 mm.	39.5		
0.0117 mm.	33.2		
0.0084 mm.	28.4		
0.0060 mm.	24.7		
0.0030 mm.	20.5		
0.0013 mm.	17.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 37 PI = 21

Coefficients

D_{90} = 0.6832 mm D_{85} = 0.3009 mm D_{60} = 0.0648 mm
D_{50} = 0.0352 mm D_{30} = 0.0094 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS = CL

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B1 @ 13-14.5

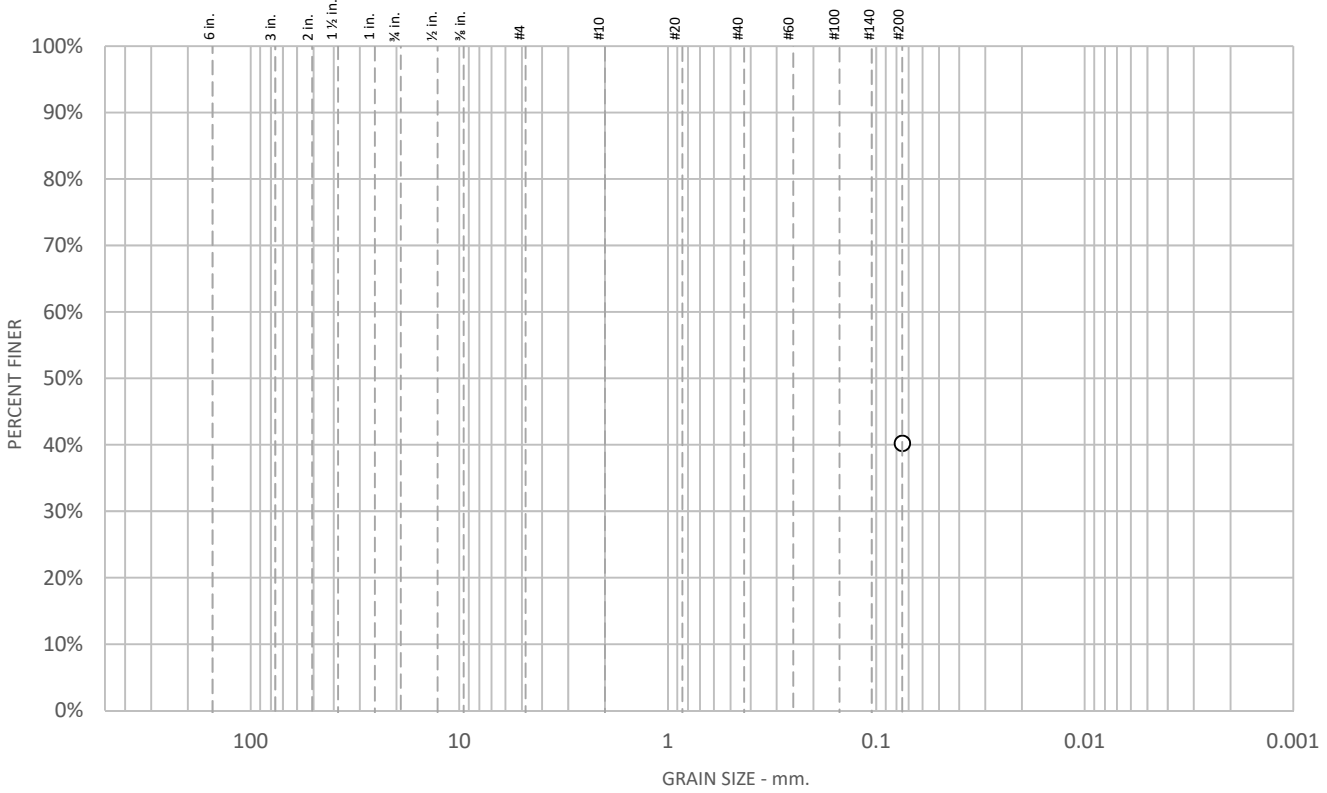
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	40.2		

* (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 =

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 176 g

Sample Number: 1-B1 @ 16-17.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

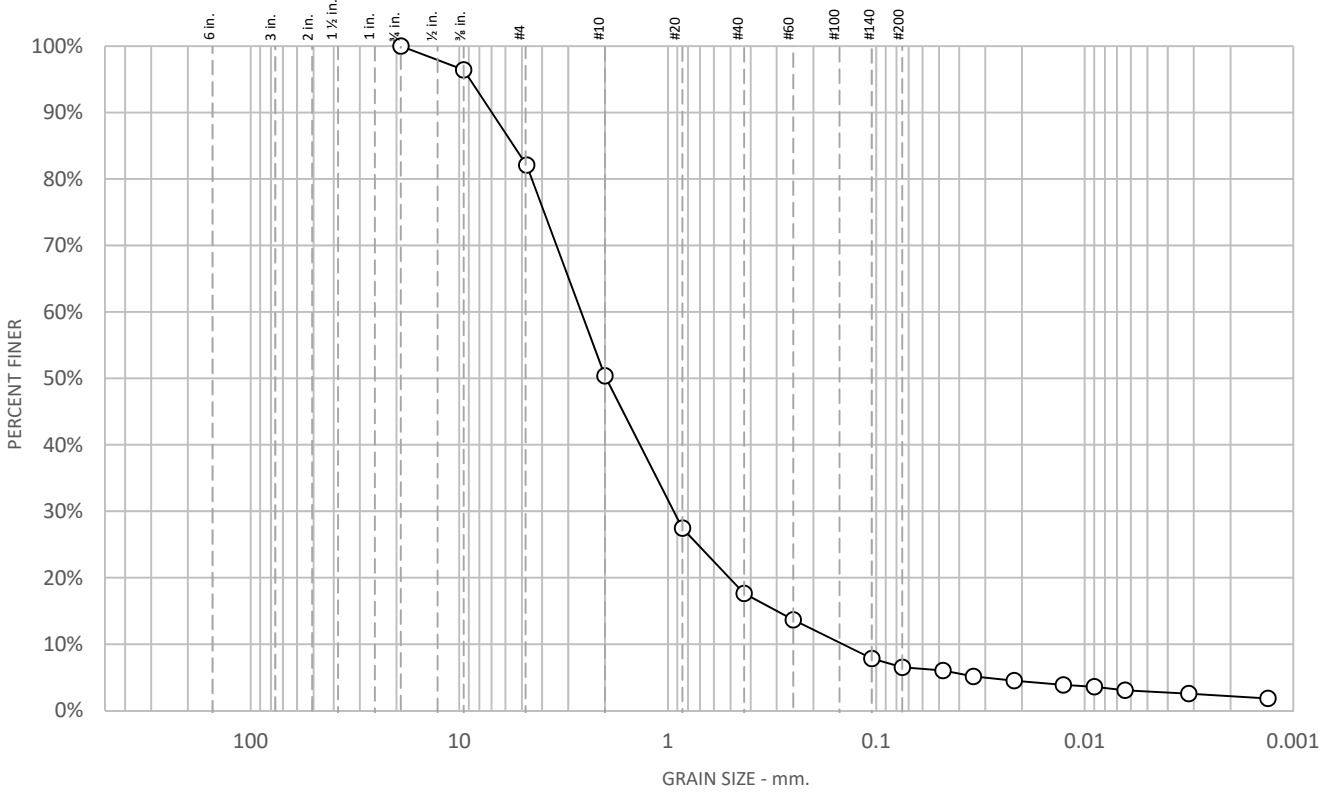
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	17.9	31.7	32.8	11.1	4.3	2.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	96.4		
#4	82.1		
#10	50.4		
#20	27.5		
#40	17.6		
#60	13.6		
#140	7.8		
#200	6.5		
0.0479 mm.	6.0		
0.0342 mm.	5.1		
0.0218 mm.	4.5		
0.0127 mm.	3.9		
0.0090 mm.	3.6		
0.0064 mm.	3.1		
0.0032 mm.	2.5		
0.0013 mm.	1.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 6.9733 mm D_{85} = 5.4695 mm D_{60} = 2.6000 mm
D_{50} = 1.9718 mm D_{30} = 0.9347 mm D_{15} = 0.3006 mm
D_{10} = 0.1450 mm C_u = 17.94 C_c = 2.32

Classification

USCS = SW

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B1 @ 17.5

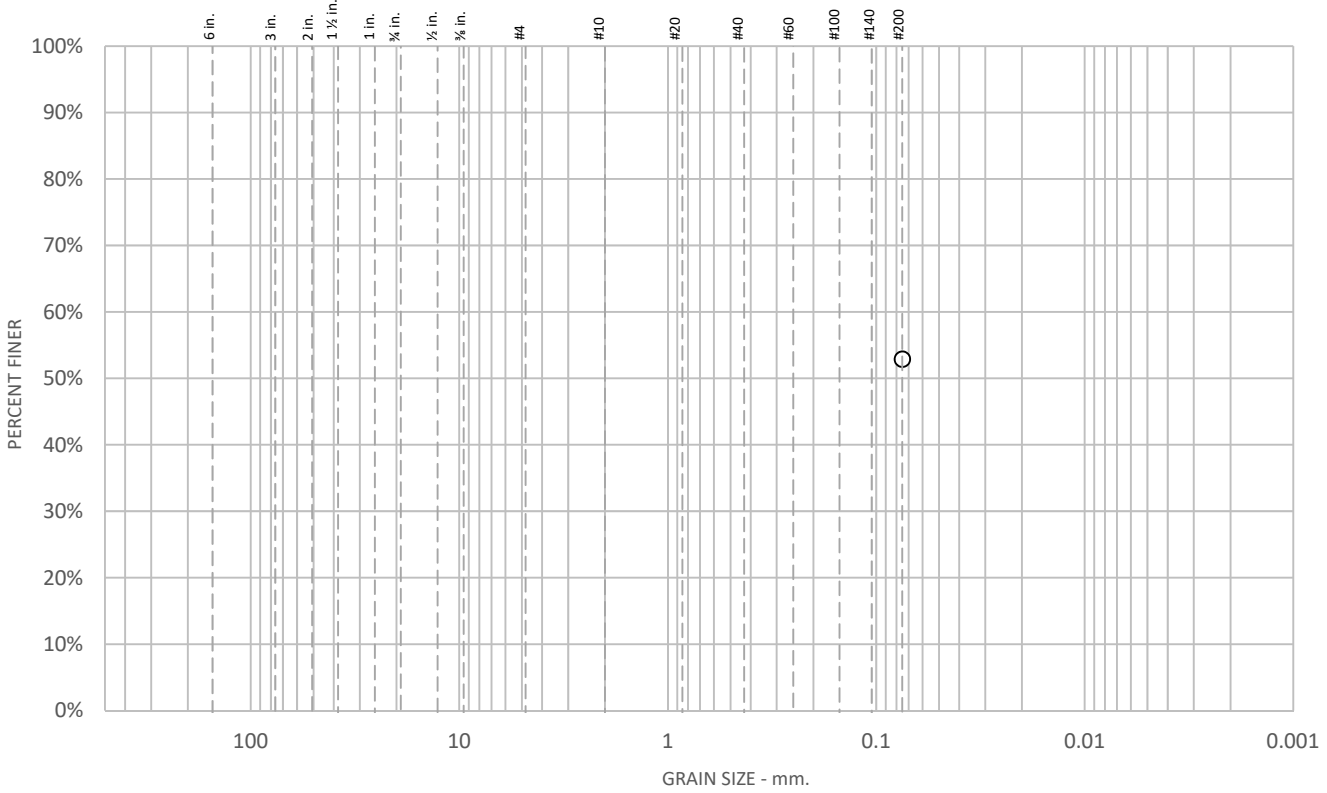
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	52.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 15 LL = 42 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 184.2 g

Sample Number: 1-B1 @ 30.5-31.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

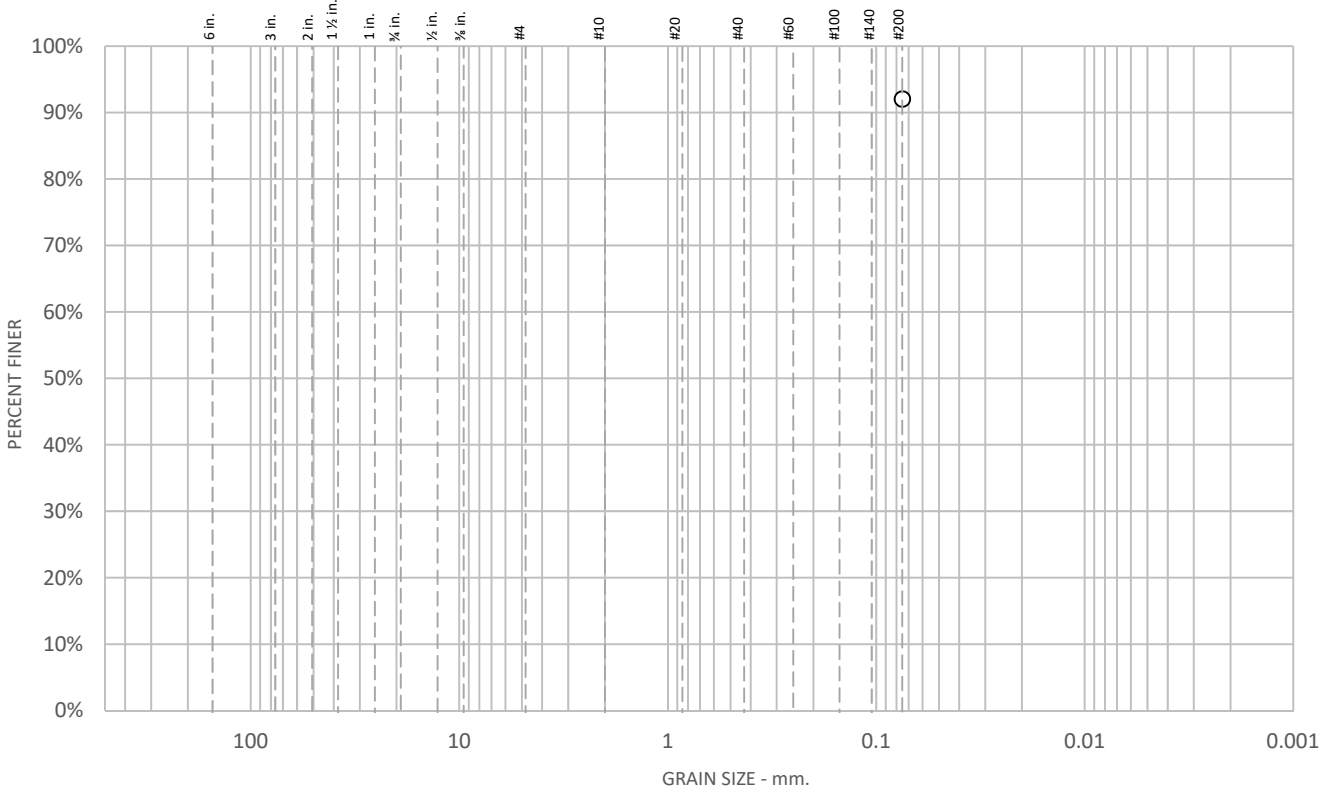
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						92.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	92.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 55 PI = 39

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 62.8 g

Sample Number: 1-B1 @ 43-44.5

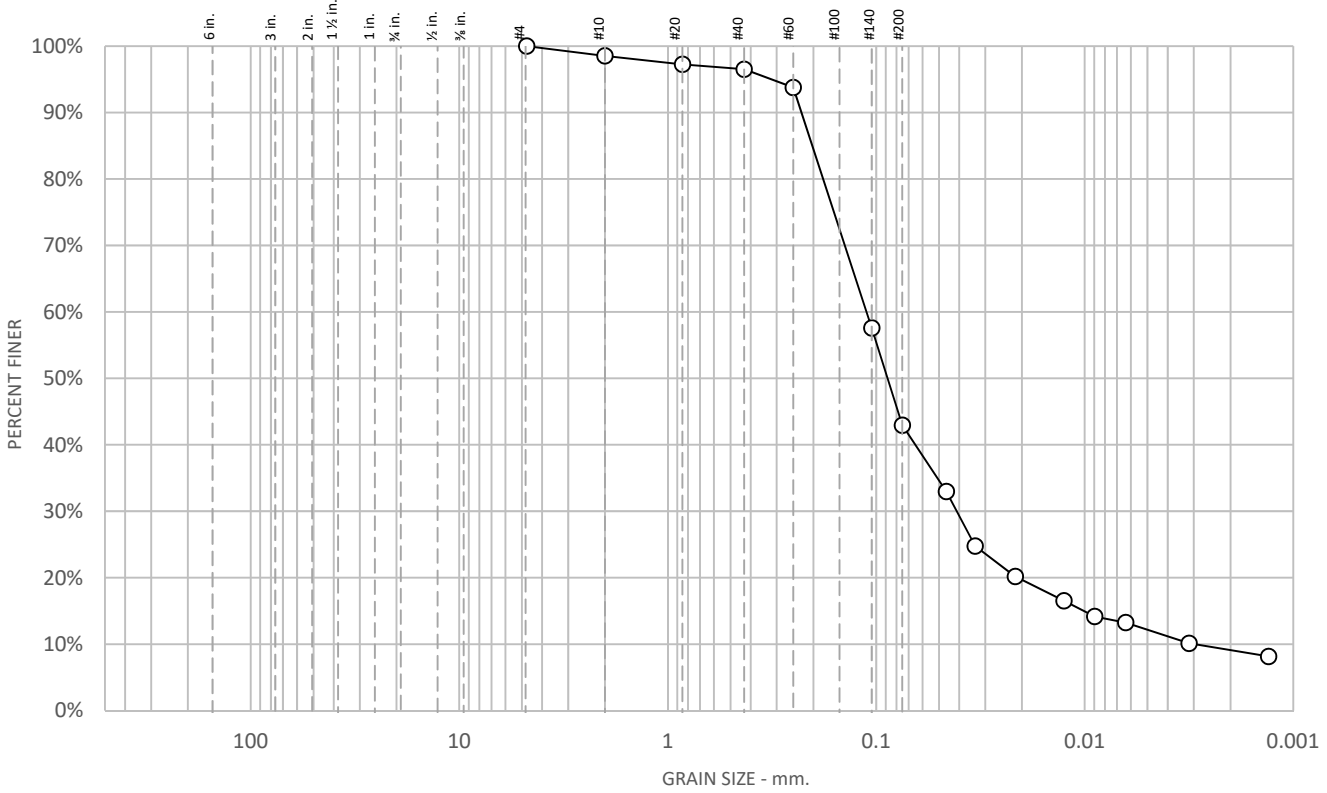
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			1.5	2.0	53.6	33.9	9.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.5		
#20	97.2		
#40	96.5		
#60	93.8		
#140	57.6		
#200	42.9		
0.0461 mm.	33.0		
0.0335 mm.	24.7		
0.0215 mm.	20.2		
0.0126 mm.	16.5		
0.0090 mm.	14.2		
0.0064 mm.	13.3		
0.0032 mm.	10.1		
0.0013 mm.	8.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2284 mm D_{85} = 0.2026 mm D_{60} = 0.1113 mm
D_{50} = 0.0882 mm D_{30} = 0.0411 mm D_{15} = 0.0101 mm
D_{10} = 0.0030 mm C_u = 37.28 C_c = 5.08

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B1 @ 78-79.5

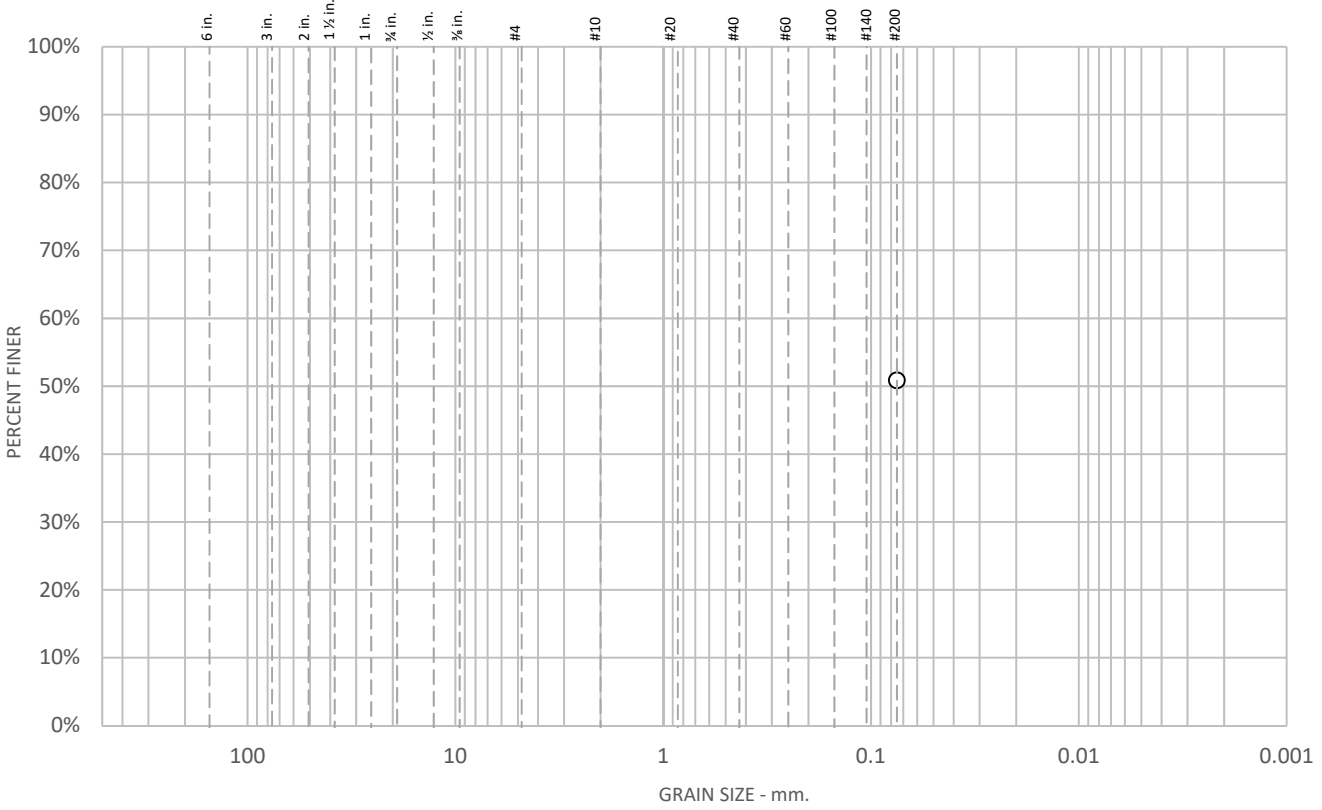
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						50.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	50.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 26 PI = 8

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 212 g

Sample Number: 1-B1 @ 9-11.5 @ 9-11.5 feet

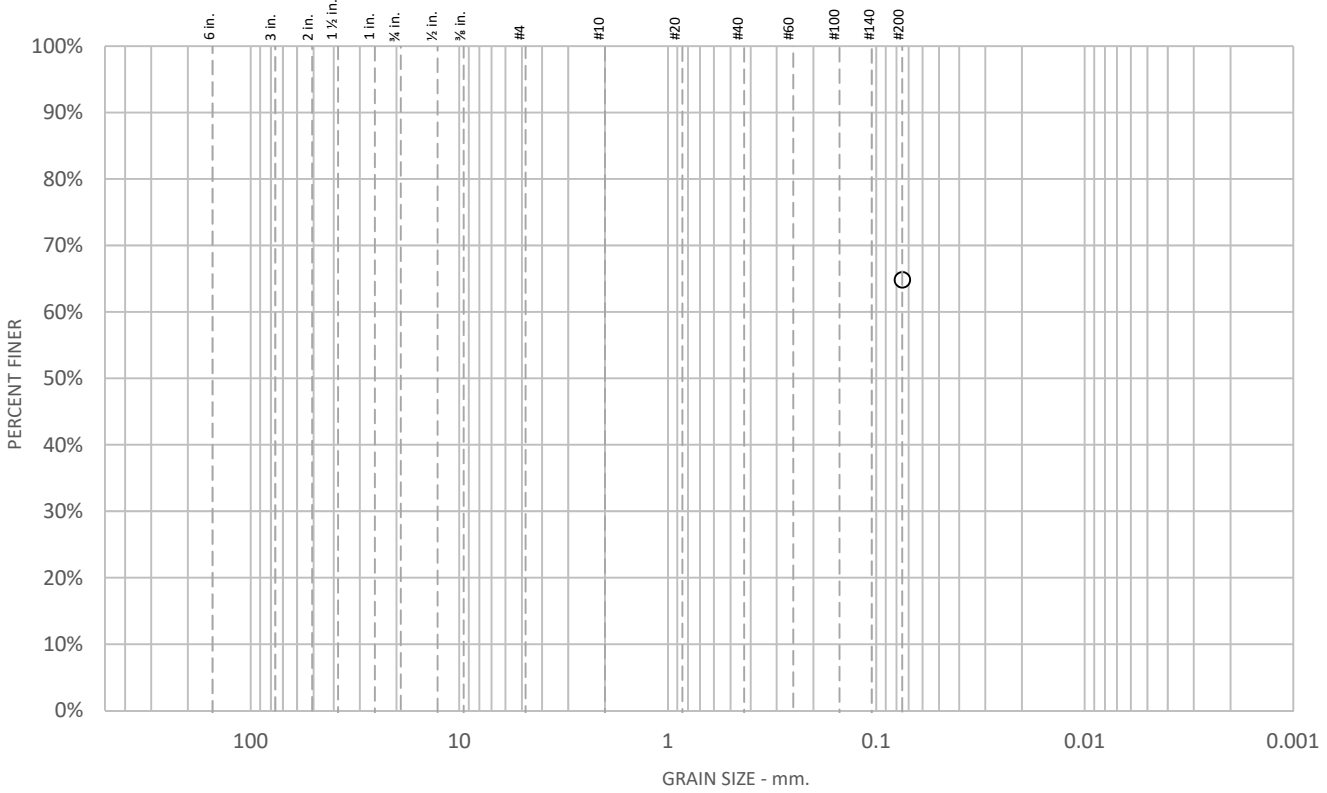
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	64.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 41 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 178.5 g

Sample Number: 1-B2 @ 6.5-7

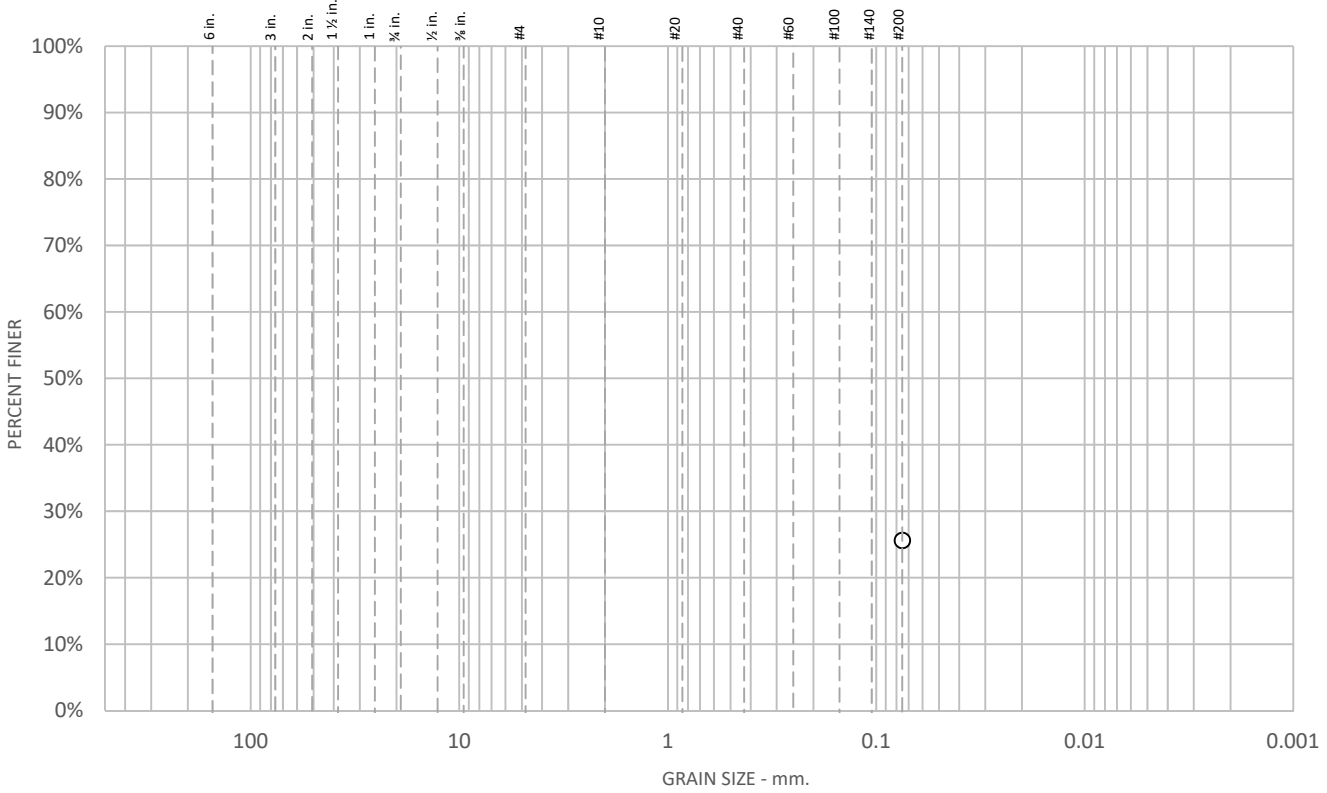
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						26	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	26		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 43 PI = 27

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 221.5 g

Sample Number: 1-B2 @ 30-31.5

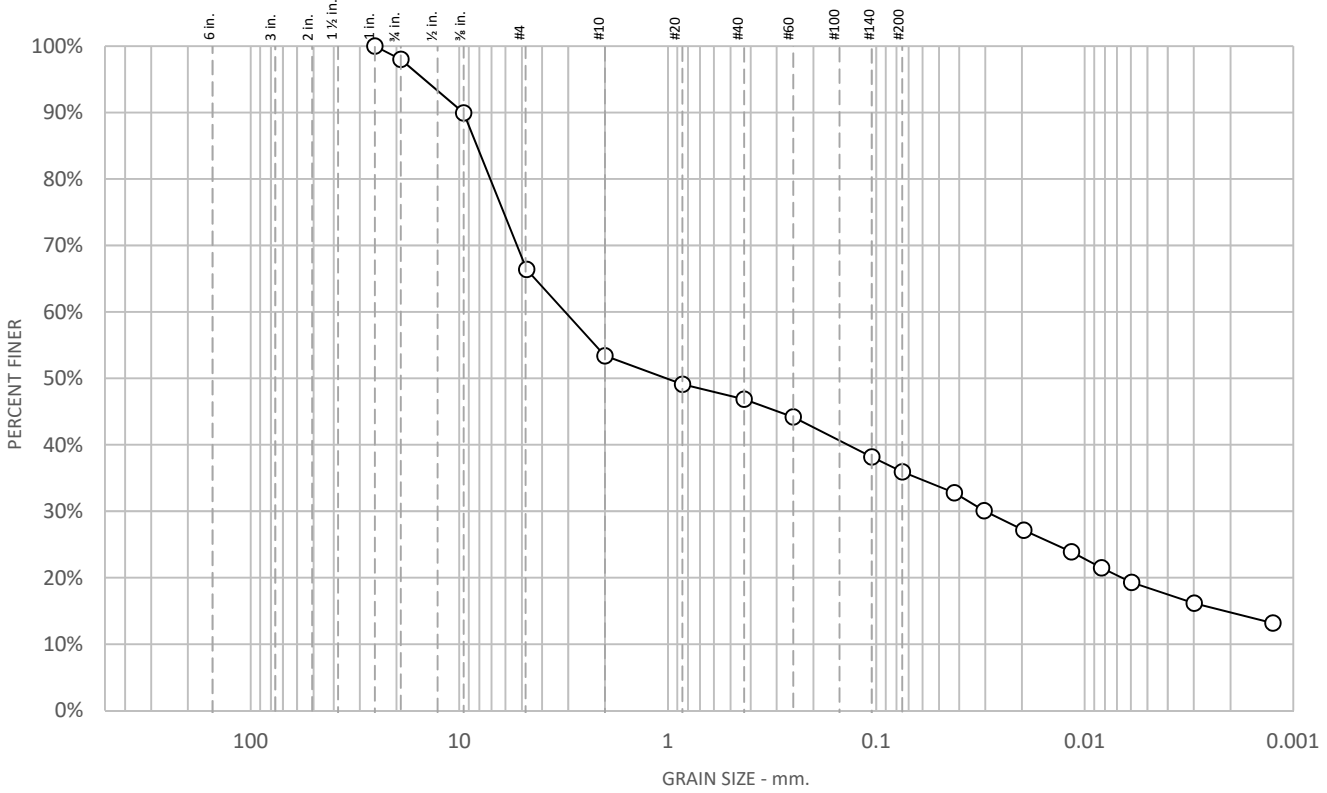
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	2.0	31.6	13.0	6.5	10.9	21.1	14.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	98.0		
⅜ in.	89.9		
#4	66.4		
#10	53.4		
#20	49.1		
#40	46.9		
#60	44.2		
#140	38.2		
#200	35.9		
0.0422 mm.	32.8		
0.0304 mm.	30.1		
0.0196 mm.	27.1		
0.0116 mm.	23.9		
0.0083 mm.	21.5		
0.0060 mm.	19.3		
0.0030 mm.	16.2		
0.0013 mm.	13.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 9.5704 mm D_{85} = 8.2307 mm D_{60} = 3.1043 mm

D_{50} = 1.0152 mm D_{30} = 0.0300 mm D_{15} = 0.0021 mm

D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422

Silt/clay division of 0.002mm used

Sample Number: 1-B2 @ 35-36.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB

Project: GEX for Multiple Parcels **Date:** 6/20/2019

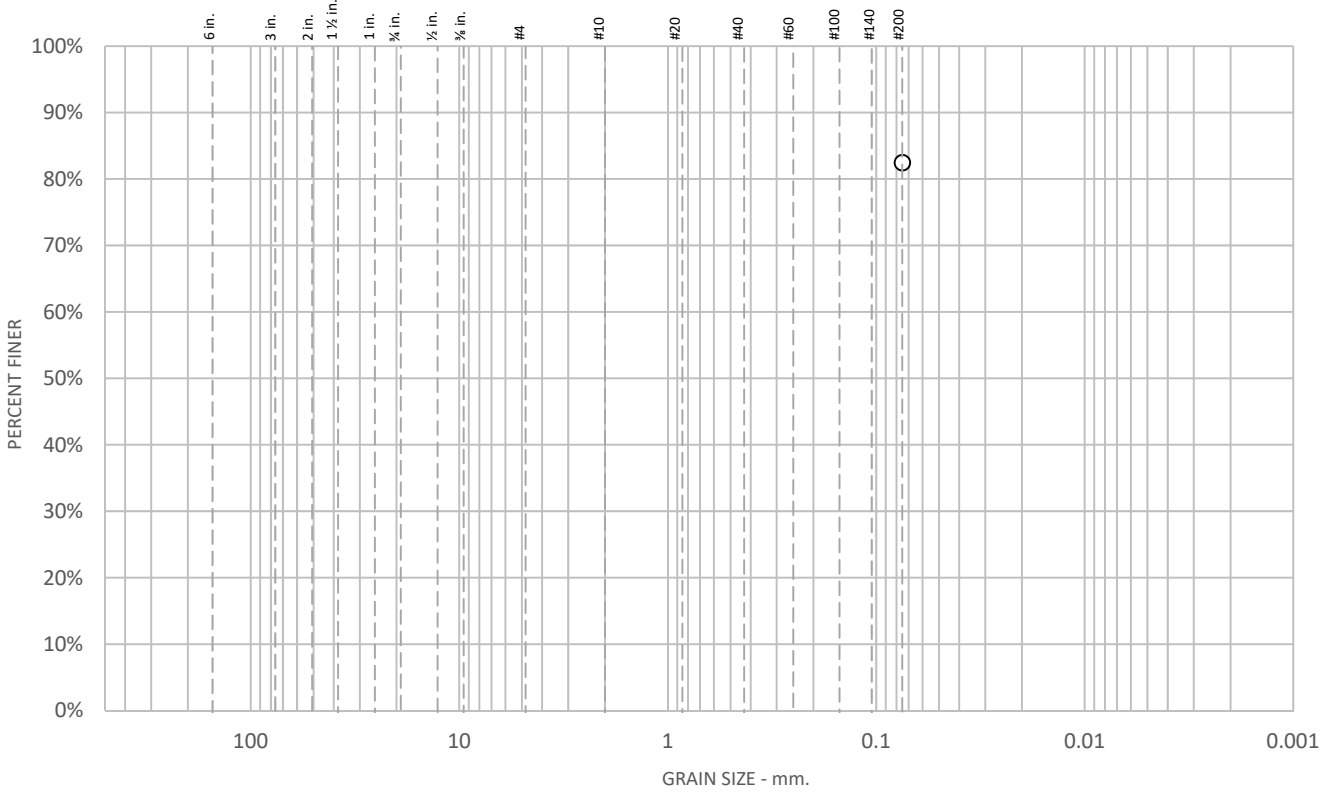
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						82	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	82		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 61 PI = 42

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 179.5 g

Sample Number: 1-B2 @ 6.5-7

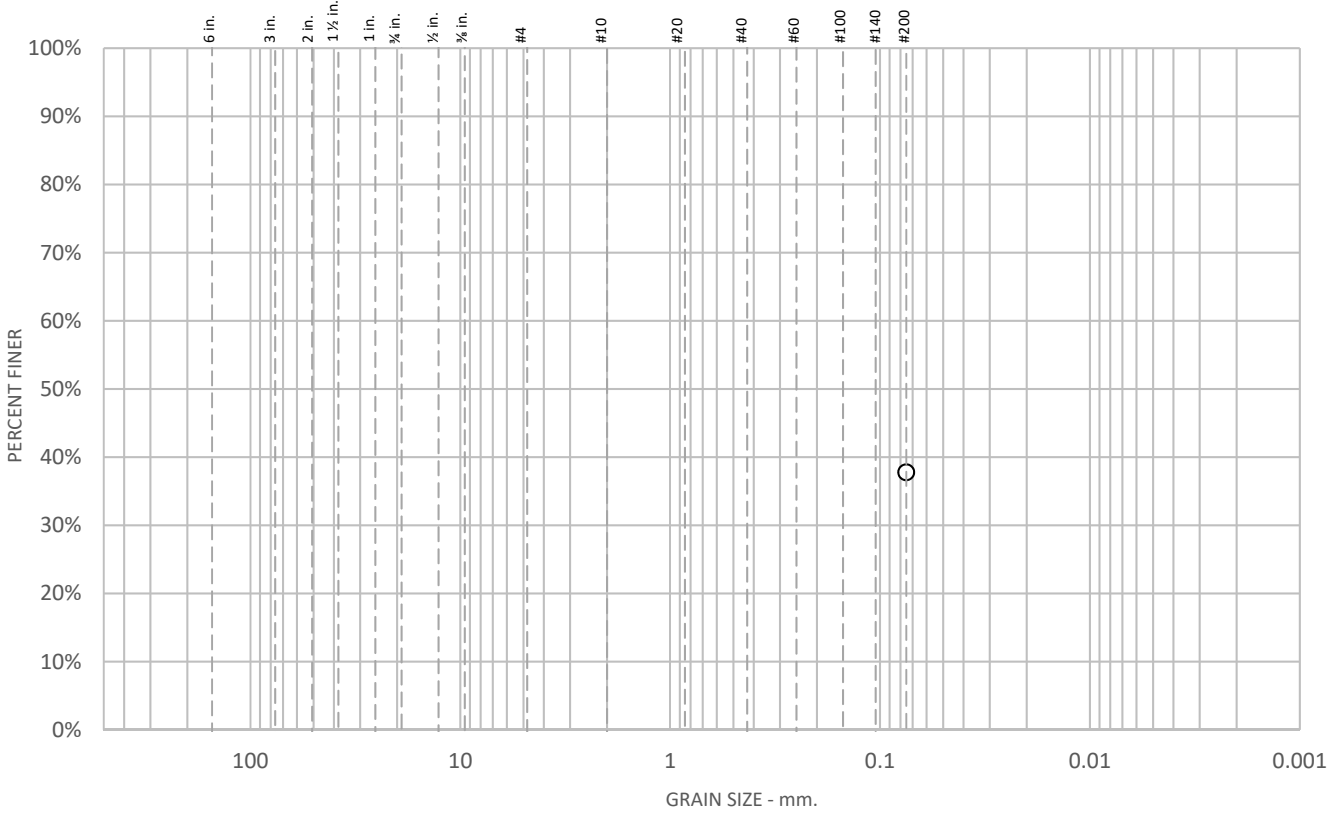
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	37.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 40 PI = 22

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 126.6 g

Sample Number: 1-B4 @ 25.5-26.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

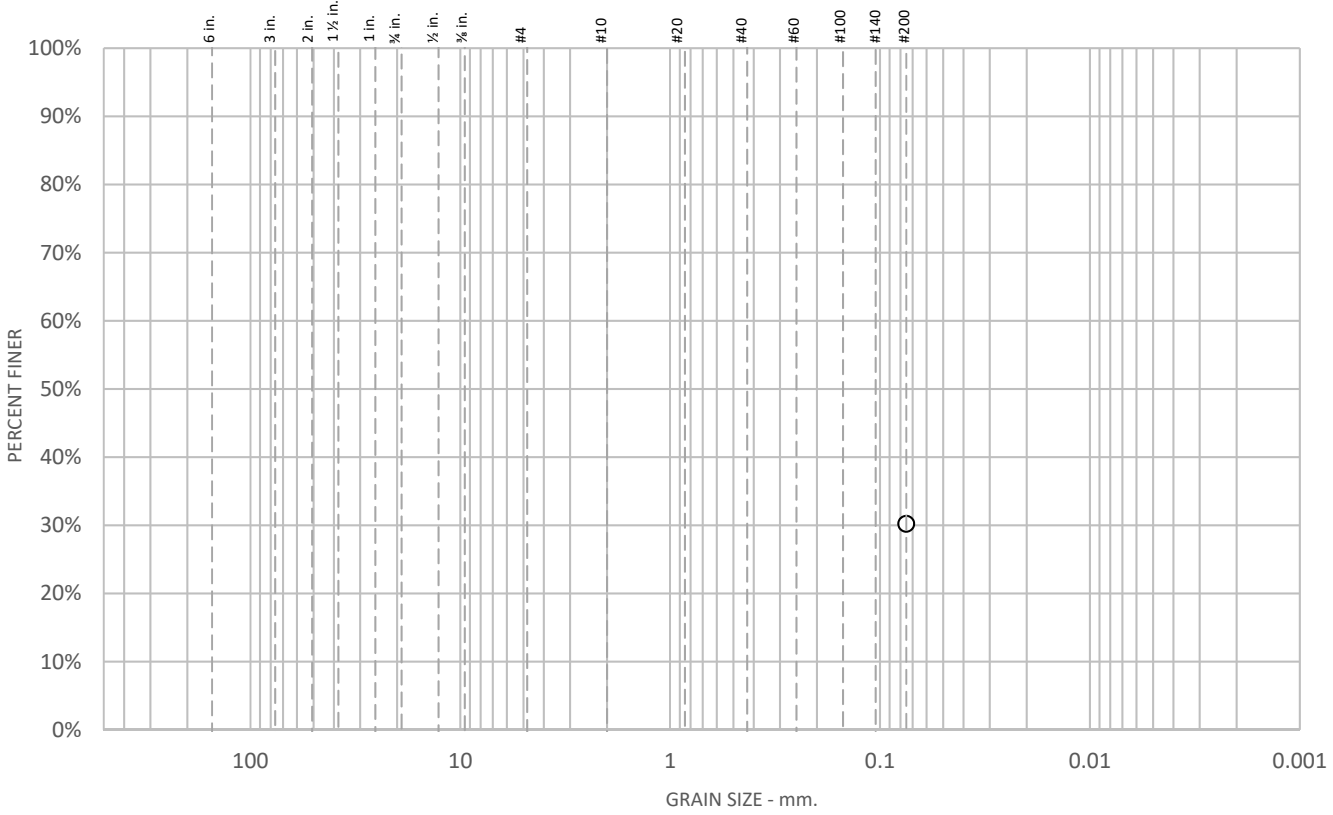
Project Number: 15949.000.000
Date: 6/18/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	30.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 30 PI = 12

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 845.15 g

Sample Number: 1-B4 @ 35.5-36.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

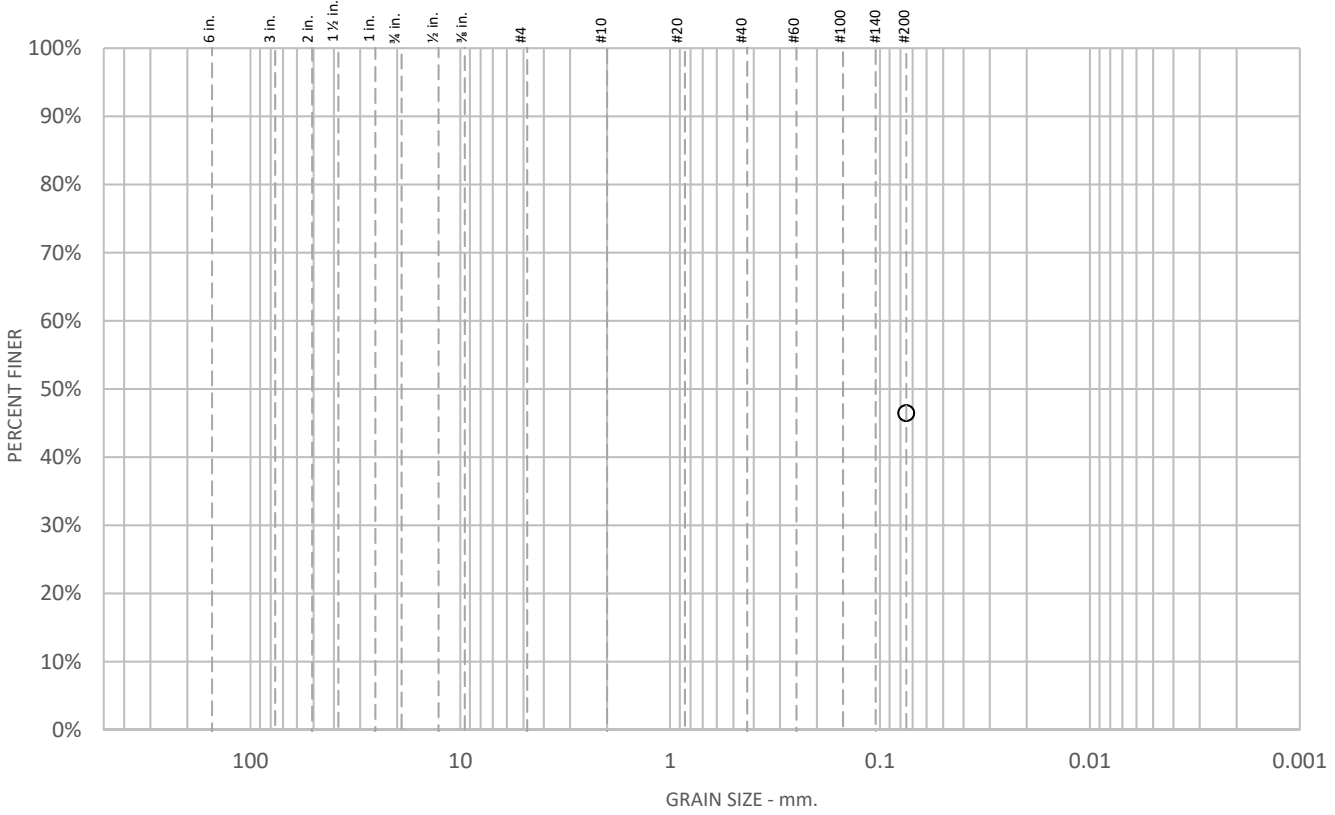
ENGEO Expect Excellence

Tested By: M. Quasem

Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						46.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	46.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 31 PI = 13

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 106.82 g

Sample Number: 1-B4 @ 52-53

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

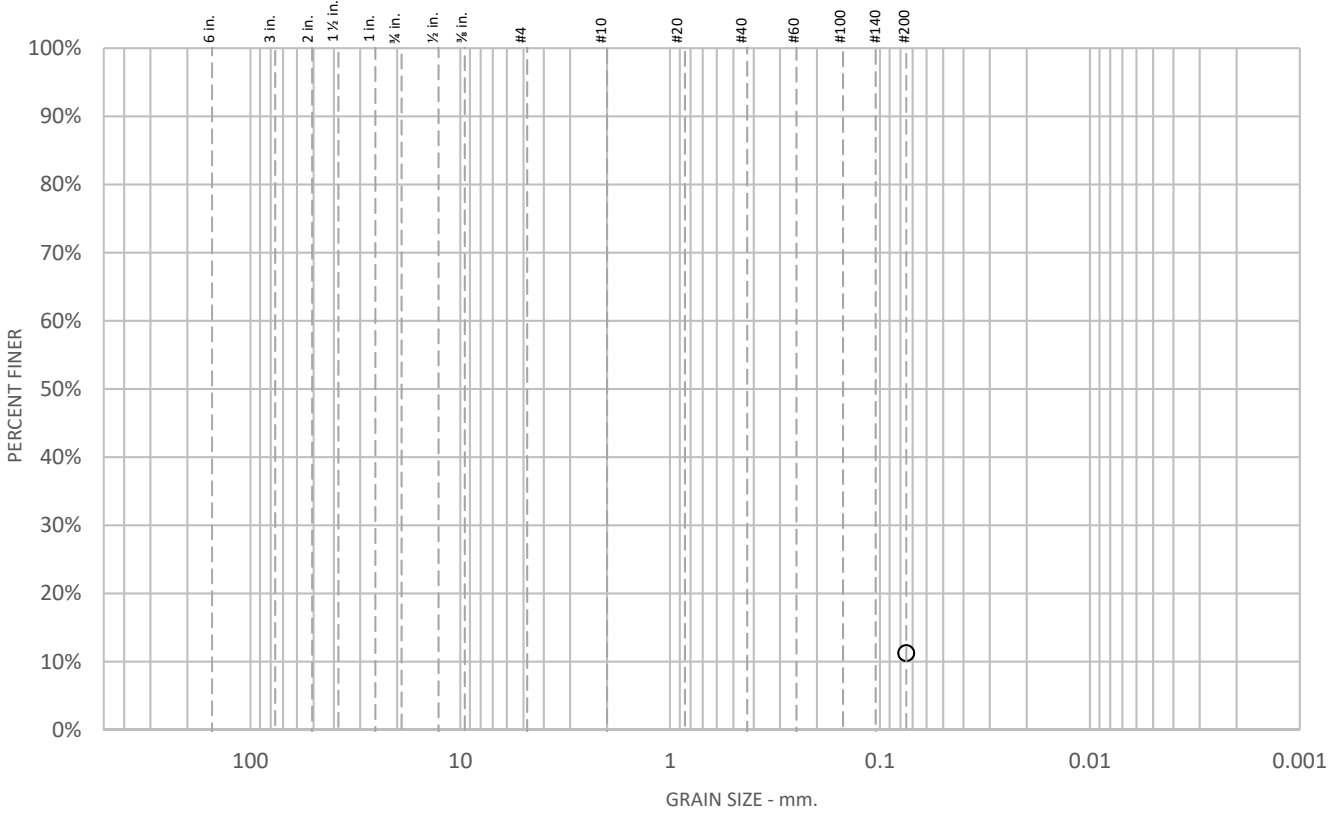
ENGEO Expect Excellence

Tested By: M. Quasem

Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						11.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	11.2		

* (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 =

Remarks

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 587.76 g

Sample Number: 1-B4 @ 9-10.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

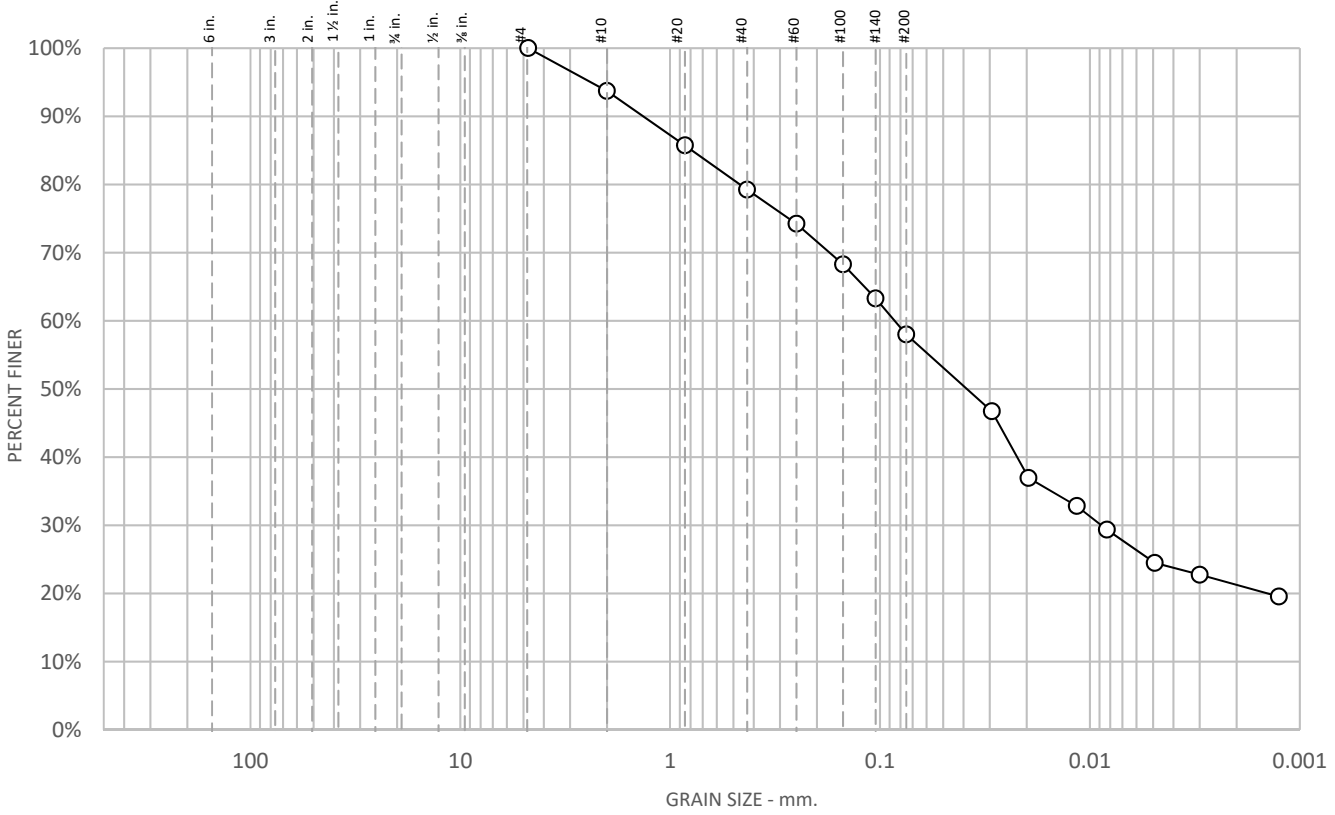
Project Number: 15949.000.000
Date: 6/18/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			6.3	14.5	21.2	36.7	21.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	93.7		
#20	85.7		
#40	79.2		
#60	74.2		
#100	68.3		
#140	63.3		
#200	58.0		
0.0293 mm.	46.7		
0.0196 mm.	36.9		
0.0115 mm.	32.8		
0.0083 mm.	29.4		
0.0049 mm.	24.5		
0.0030 mm.	22.7		
0.0013 mm.	19.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 34 PI = 17

Coefficients

D_{90} = 1.3429 mm D_{85} = 0.7870 mm D_{60} = 0.0852 mm
D_{50} = 0.0385 mm D_{30} = 0.0088 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method

Sample Number: 1-B4 @ 46-47.5

Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Isotropic Unconsolidated Undrained Triaxial Test

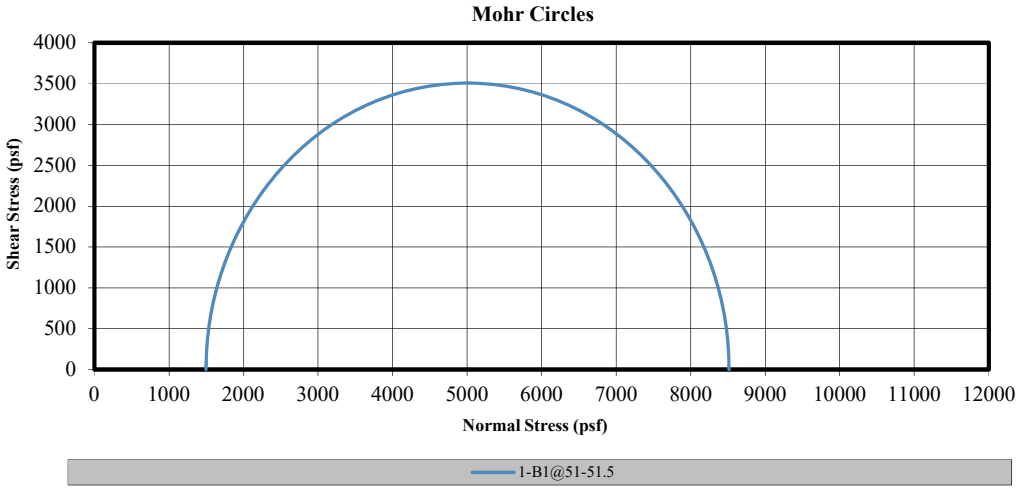
ASTM D2850

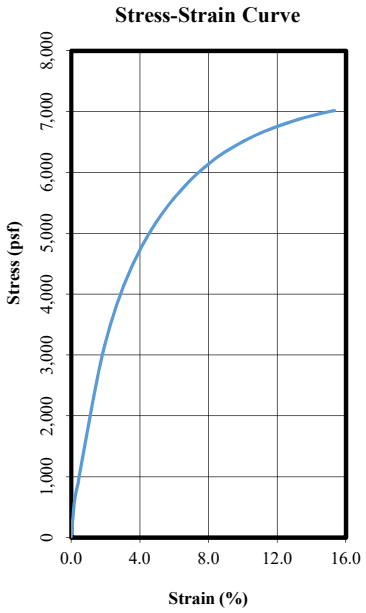
Date: 06/18/19

Checked By: D. Seibold

Date: 6/18/2019

Tested By: G. Criste





Before Test	Specimen 1-B1@51-51.5			
Water Content (%)	21.08			
Dry Density (pcf)	109.40			
Saturation (%)	98.83			
Void Ratio	0.60			
Diameter (in)	2.385			
Height (in)	5.055			
Height-to-Diameter Ratio	2.119			
ASTM D4318 - Wet Method				
Liquid Limit	n/a			
Plastic Limit	n/a			
ASTM D854 - Measured				
Specific Gravity	2.800			
After Test	**1-B1@51-51.5**			
Water Content (%)	21.08			
Saturation (%)	98.83			
Strain Rate (in/min)	0.05			
Peak Deviator Stress (psf)	7016.4			
Axial Strain @ Failure (%)	15.333			
	Cell Pressure			
Cell (psf)	1497.6			
Back (psf)	n/a			
	Principle Stresses at Failure			
σ1 (psf)	8514.0			
σ3 (psf)	1497.6			
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		3508.2			
Friction Angle Ø	n/a		n/a			

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/18/19

Checked By: D. Seibold

Date: 6/18/2019

Tested By: G. Criste

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B1@51-51.5	
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

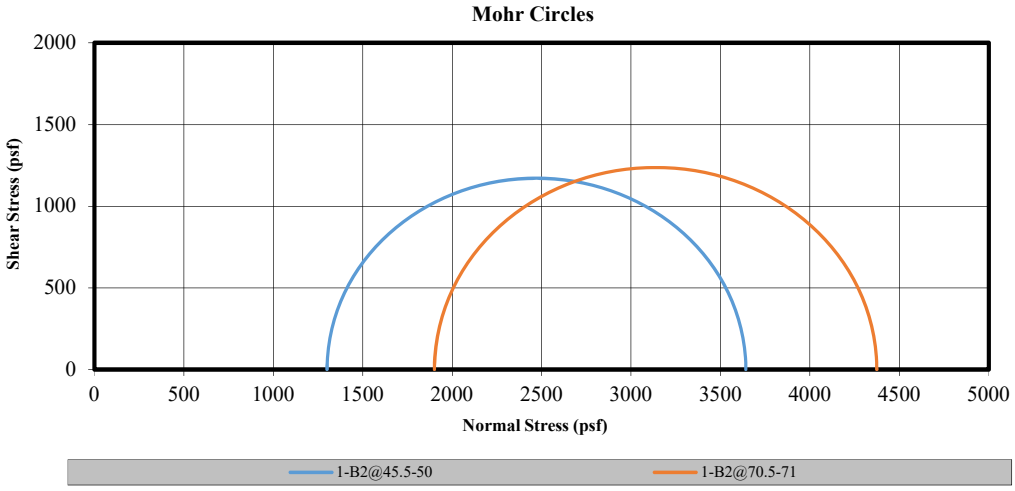
ASTM D2850

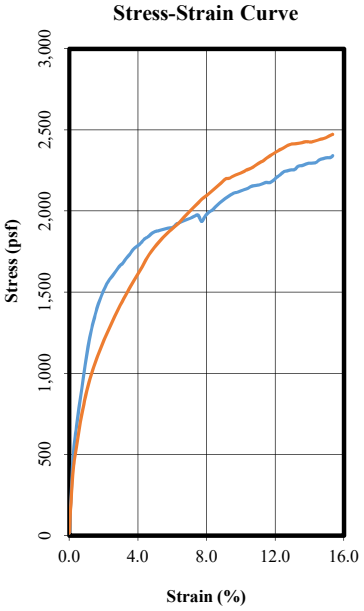
Date: 06/24/19

Checked By: G. Criste

Date: 6/24/2019

Tested By: M. Quasem





Before Test	Specimen 1-B2@45.5-46	1-B2@70.5-71		
Water Content (%)	14.92	25.23		
Dry Density (pcf)	123.20	101.70		
Saturation (%)	100.73	100.84		
Void Ratio	0.41	0.69		
Diameter (in)	2.383	2.373		
Height (in)	4.800	5.050		
Height-to-Diameter Ratio	2.014	2.128		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.790	2.750		
After Test	**1-B2@45.5-46**	**1-B2@70.5-71**		
Water Content (%)	14.92	25.23		
Saturation (%)	100.00	100.00		
Strain Rate (in/min)	15.00	15.00		
Peak Deviator Stress (psf)	2341.2	2473.1		
Axial Strain @ Failure (%)	15.340	15.342		
	Cell Pressure			
Cell (psf)	1300.3	1900.8		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3641.6	4373.9		
σ3 (psf)	1300.3	1900.8		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1170.6	1236.6		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Projects
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

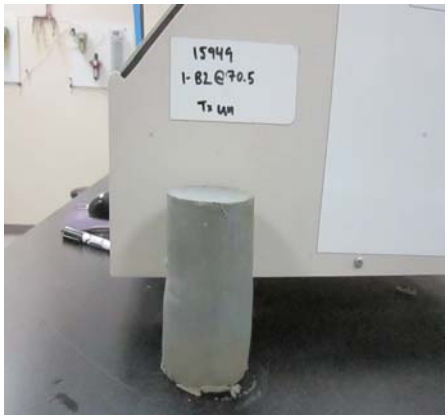
Date: 06/24/19

Checked By: G. Criste

Date: 6/24/2019

Tested By: M. Quasem

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B2@45.5-46	SAMPLE NUMBER: 1-B2@70.5-71
	
SAMPLE NUMBER:	**SAMPLE NUMBER:**

Project Information	
Project Name:	GEX for Multiple Projects
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

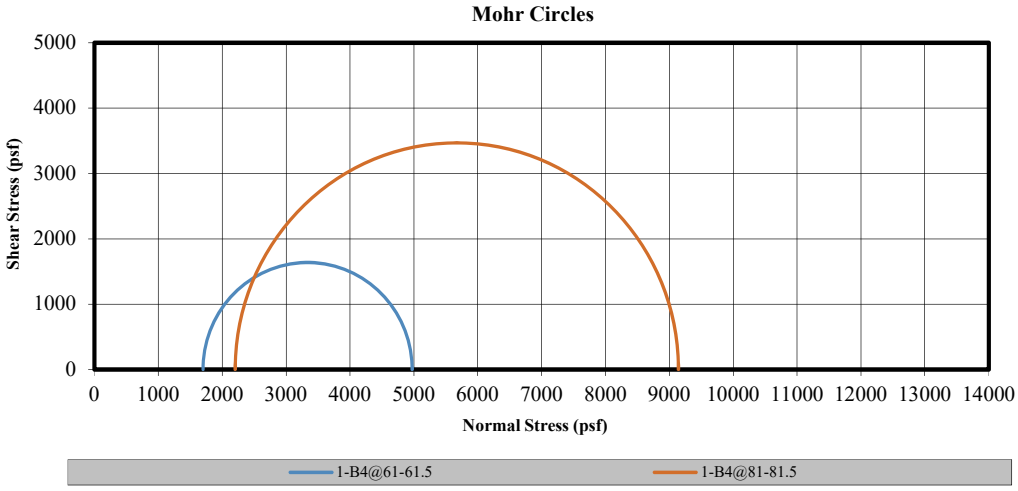
ASTM D2850

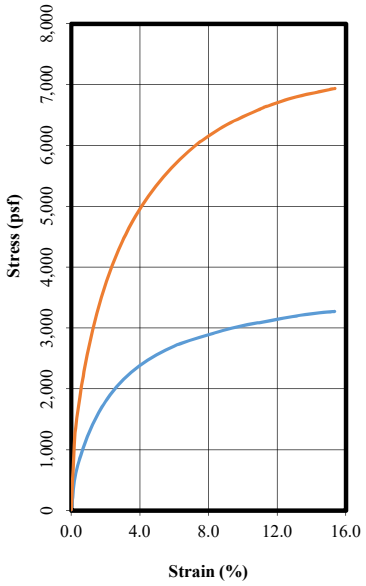
Date: 06/17/19

Checked By: G. Criste

Date: 6/17/2019

Tested By: N. Buckton





Before Test	Specimen 1-B4@61-61.5	1-B4@81-81.5		
Water Content (%)	22.50	18.03		
Dry Density (pcf)	106.00	113.10		
Saturation (%)	99.93	97.89		
Void Ratio	0.62	0.50		
Diameter (in)	2.417	2.418		
Height (in)	5.026	5.062		
Height-to-Diameter Ratio	2.079	2.093		
ASTM D4318 - Wet Method				
Liquid Limit	n/a	n/a		
Plastic Limit	n/a	n/a		
ASTM D854 - Assumed				
Specific Gravity	2.749	2.720		
After Test	1-B4@61-61.5	1-B4@81-81.5		
Water Content (%)	22.50	18.03		
Saturation (%)	99.93	97.88		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	3274.1	6938.3		
Axial Strain @ Failure (%)	15.340	15.358		
	Cell Pressure			
Cell (psf)	1699.2	2203.2		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	4973.3	9141.5		
σ3 (psf)	1699.2	2203.2		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1637.1	3469.2		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/17/19

Checked By: G. Criste

Date: 6/17/2019

Tested By: N. Buckton

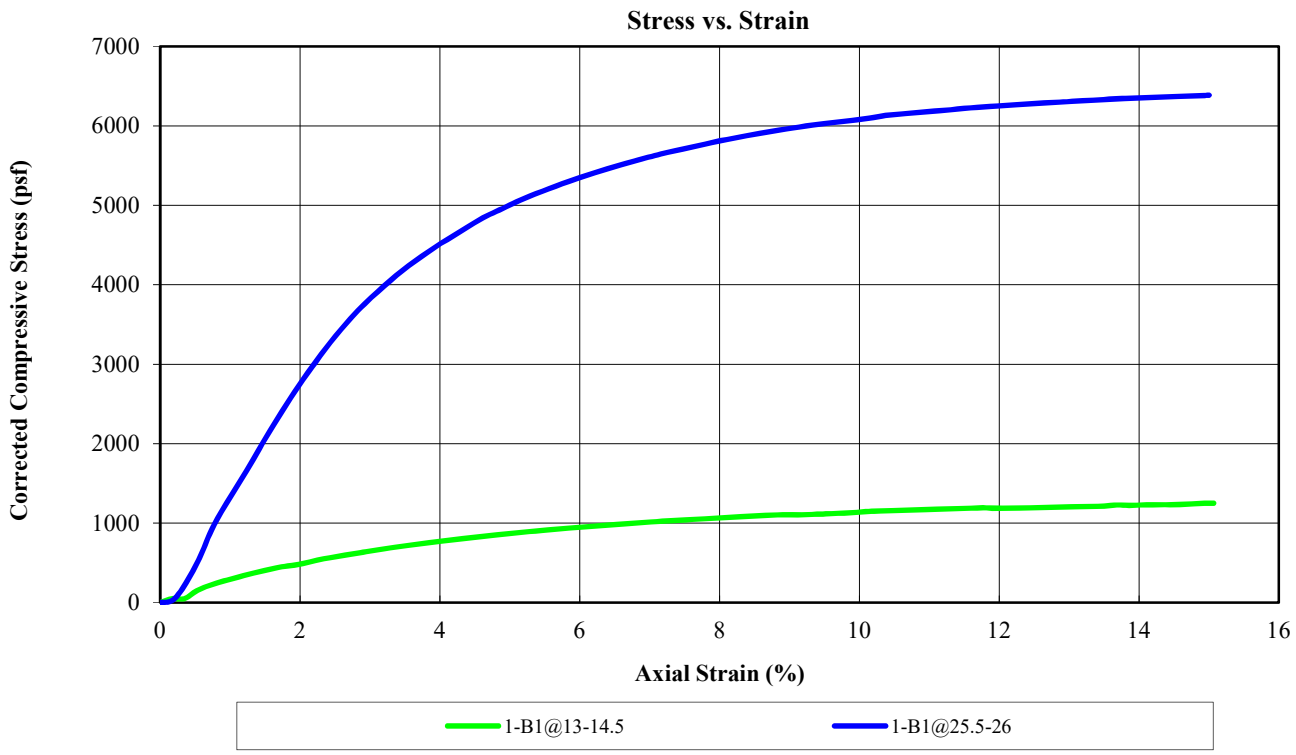
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B4@61-61.5	SAMPLE NUMBER: 1-B4@81-81.5
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

UNCONFINED COMPRESSION TEST REPORT
ASTM D2166



	SPECIMEN	
BEFORE TEST	**1-B1@13-14.5**	**1-B1@25.5-26**
Moisture Content (%)	24.8	22.6
Dry Density (pcf)	103.3	105.5
Saturation (%)	100.0	100.0
Void Ratio	0.60	0.57
Diameter (in)	2.394	2.391
Height (in)	5.85	5.37
Height-To-Diameter Ratio	2.44	2.25
TEST DATA		
Unconfined Compressive Strength (psf)	1377	6386
Undrained Shear Strength (psf)	688	3193
Strain Rate (in./min.)	0.05	0.05
Specific Gravity	2.650	2.650
Strain at Failure (%)	15.00	15.00
Liquid Limit		
Plastic Limit		
Test Remarks	Specific gravity of 2.65 assumed.	

SPECIMEN	DESCRIPTION
1-B1@13-14.5	See exploration logs
1-B1@25.5-26	See exploration logs

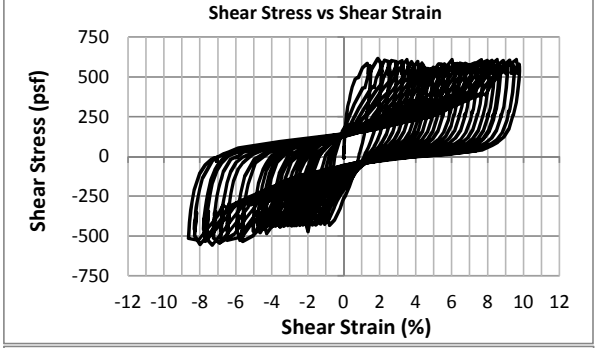
PROJECT NAME: GEX for Multiple Parcels
PROJECT NO: 15949.000.000
CLIENT: Google, LLC
LOCATION: Mountain View, CA
PHASE NO: LAB

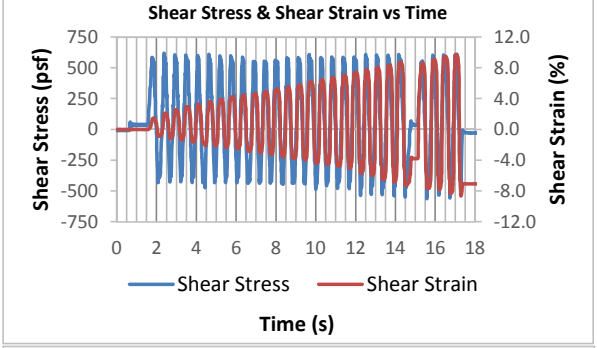
Report Date: 06/19/19
Tested By: R. Montalvo
Reviewed By: M. Gilbert

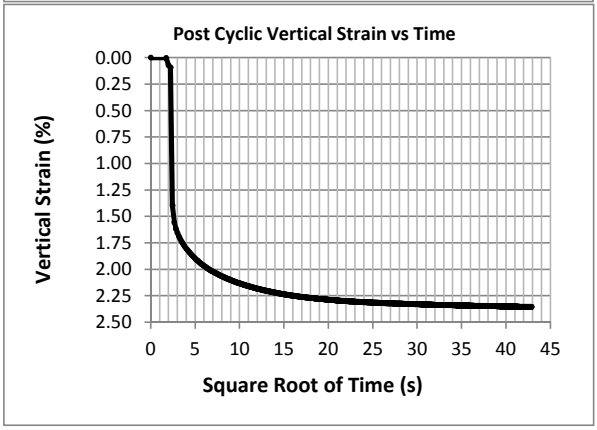
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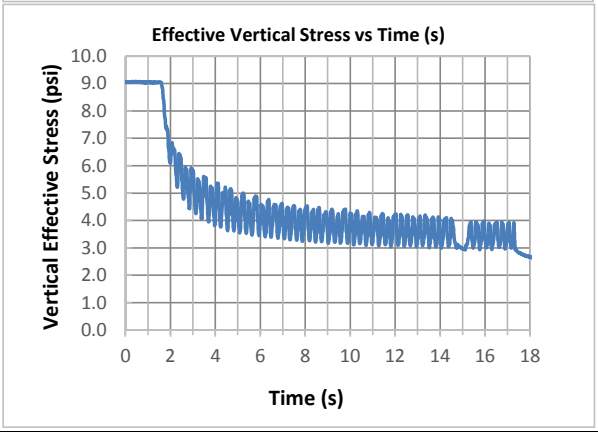
Cyclic Simple Shear

ASTM D6528 - Modified









Test Conditions		Results		Maximum	Minimum
Confining Condition	Plain Membrane w/Chamber Pressure	Vertical Effective Stress (psf)	Deviatoric	783.5	-54.8
Applied Lateral Effective Stress (psf)	520.0		Isotropic	520.0	520.0
Resulting K_o after applied, σ_{vc}'	0.398	Shear Strain (%)		9.8	-8.6
Applied Loading Frequency (Hz)	0.500	Post Cyclic Vertical Strain (%)		2.36	
Cycle Limit, N	27				
Single Amp. Strain (+/-)	9.2	**Cyclic Preshear Specimen Condition**			
Applied τ_{cyc} (psf)	617	Preshear Moisture Content (%)		23.93%	
Applied σ_{vc}' (psf)	1308	Preshear Void Ratio		0.6554	
Applied CSR	0.472	Preshear Saturation (%)		100.36%	
		Preshear Dry Density (pcf)		103.53	

Test Date: 6/18/2019

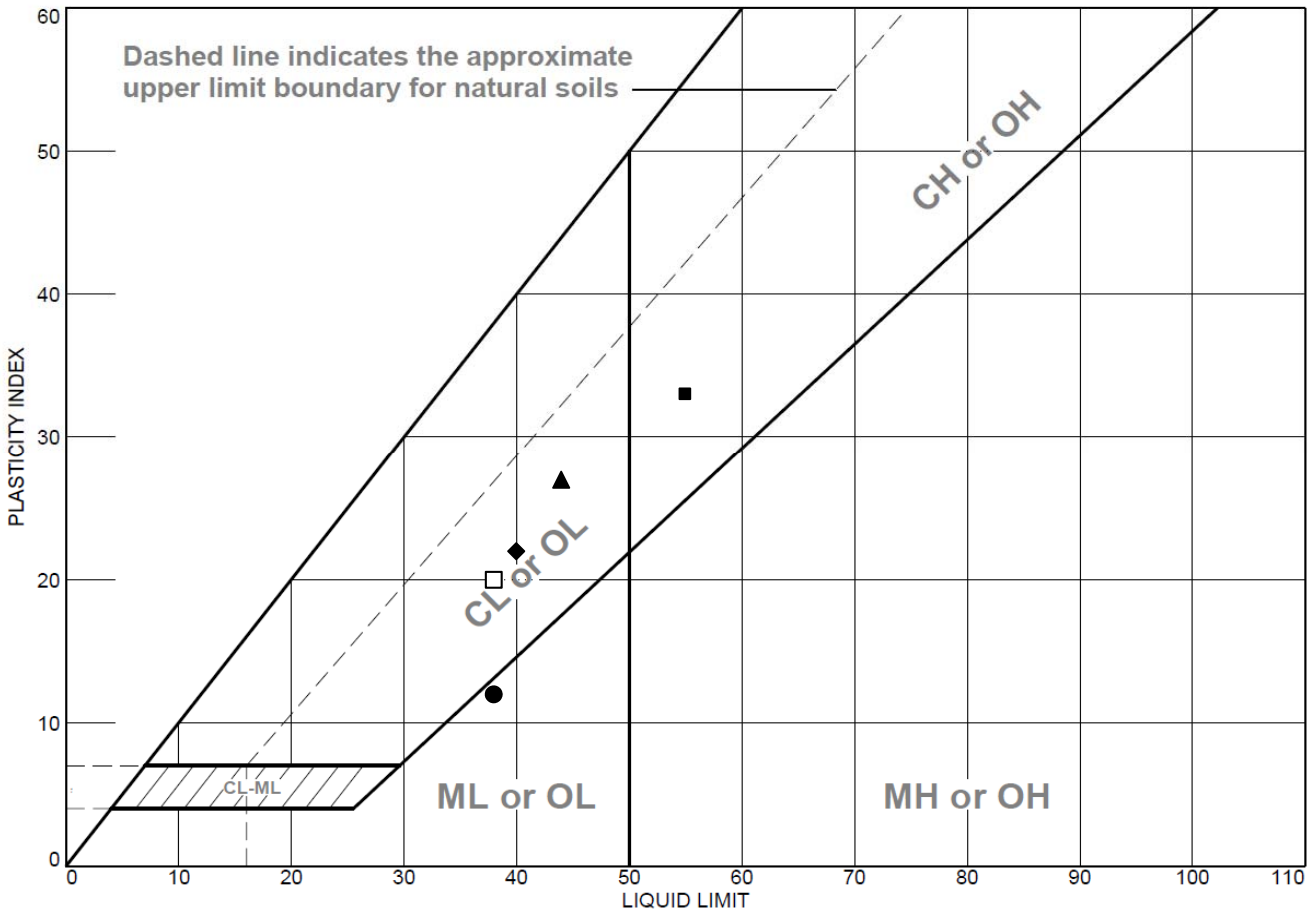
ASTM D2216	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	25.75%	22.72%	**Liquid Limit:**	
Dry Density (pcf):	102.99	105.52	**Plastic Limit:**	
Saturation (%):	96.53%	100.00%	**ASTM D854 - Measured**	
Void Ratio:	0.7331	0.6229	**Specific Gravity:**	2.748
			Soil Description:	See exploration logs

Project Number:	15949.000.000	**Depth:**	15.5-15.75 ft.
Sample Number:	1-B9 @ 15-16.5	**Boring #:**	1-B9
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

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Remarks:

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	44	17	27		68.6	
◆	See exploration logs	40	18	22			
□	See exploration logs	38	18	20		60.2	
●	See exploration logs	38	26	12		54.5	
■	See exploration logs	55	22	33			

Project No.: 15949.000.000 **Date:** 6/18/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

▲ **Sample Number:** 1-B7 **Depth:** 20-21.5
◆ **Sample Number:** 1-B7 **Depth:** 40-41.5
□ **Sample Number:** 1-B7 **Depth:** 45-46.5
● **Sample Number:** 1-B7 **Depth:** 60-61.5
■ **Sample Number:** 1-B7 **Depth:** 70-71.5

Remarks:

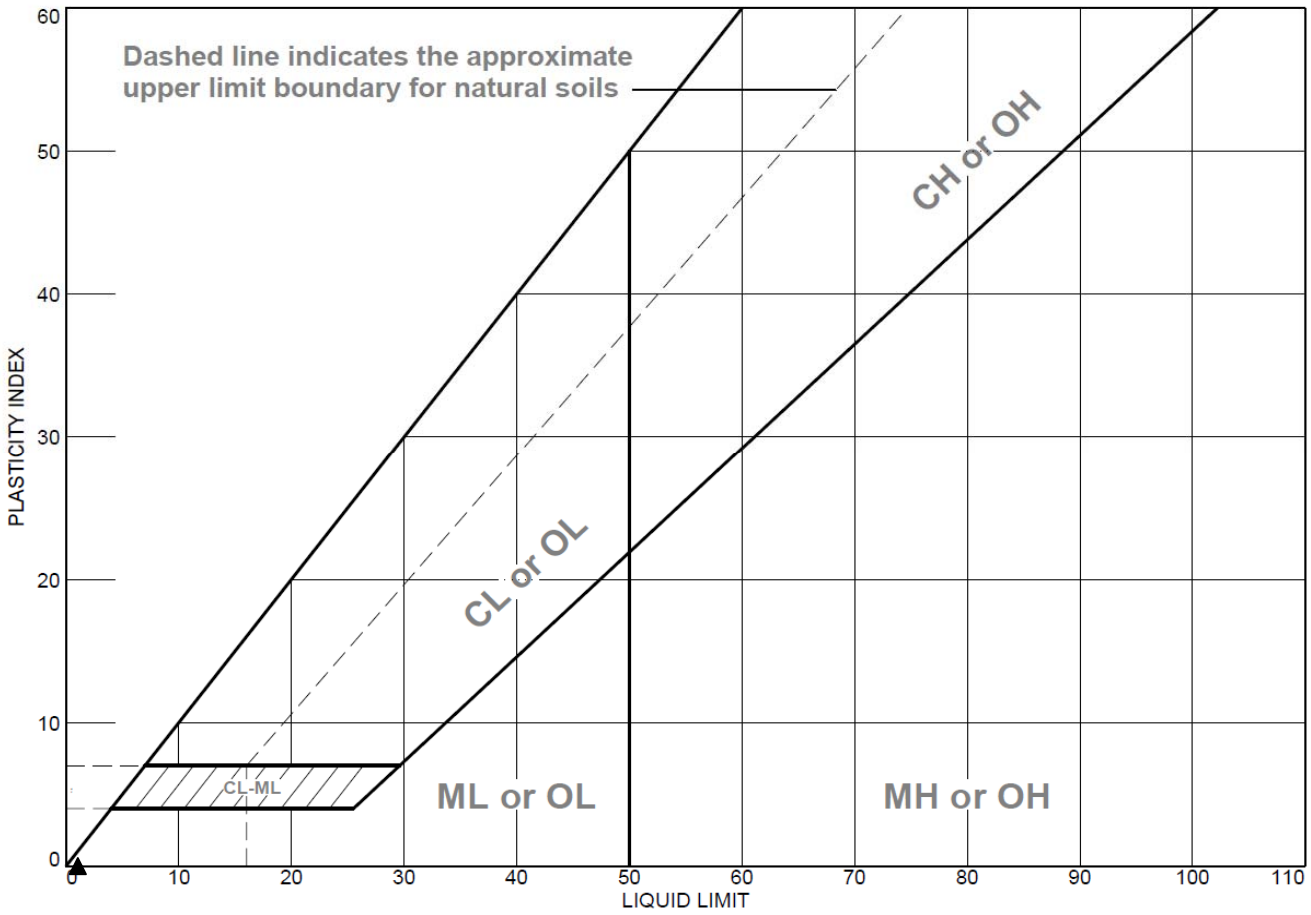
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140
◆ PI: ASTM D4318, Wet Method
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140
● PI: ASTM D4318, Wet Method, GS: ASTM D1140
■ PI: ASTM D4318, Wet Method

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	NV	NP	NP		52.9	

Project No.: 15949.000.000 **Date:** 6/18/2019

Project Name: GEX for Multiple Parcels

Project location: Sunnyvale, California

Client: Google LLC

▲ **Sample Number:** 1-B7 **Depth:** 80-81

Remarks:

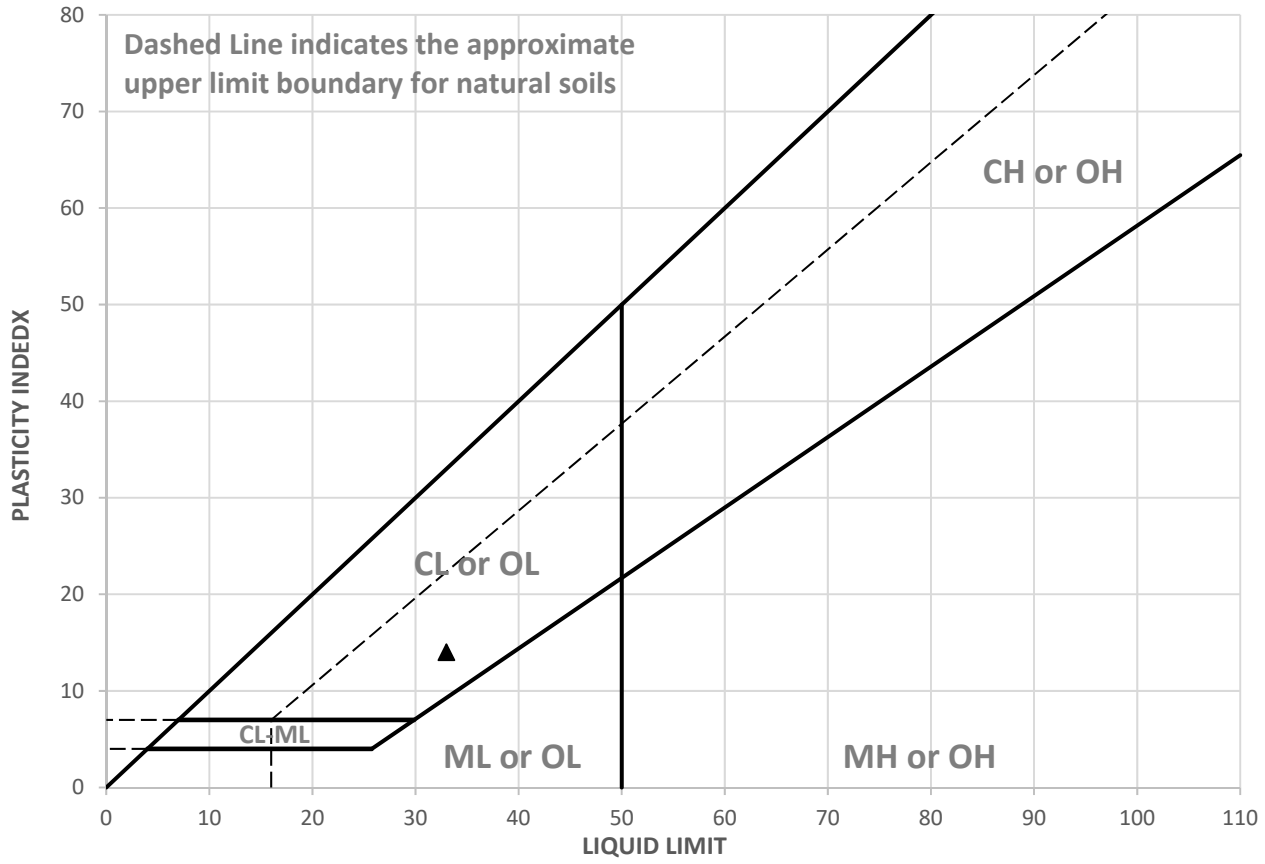
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
See exploration logs	33	19	14	90.2	67.4	CL

Project No.: 15949.000.000 **Date:** 7/25/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google, LLC
Sample Number: 1-B7@5-6.5 **Depth:** 5.0-6.5 ft

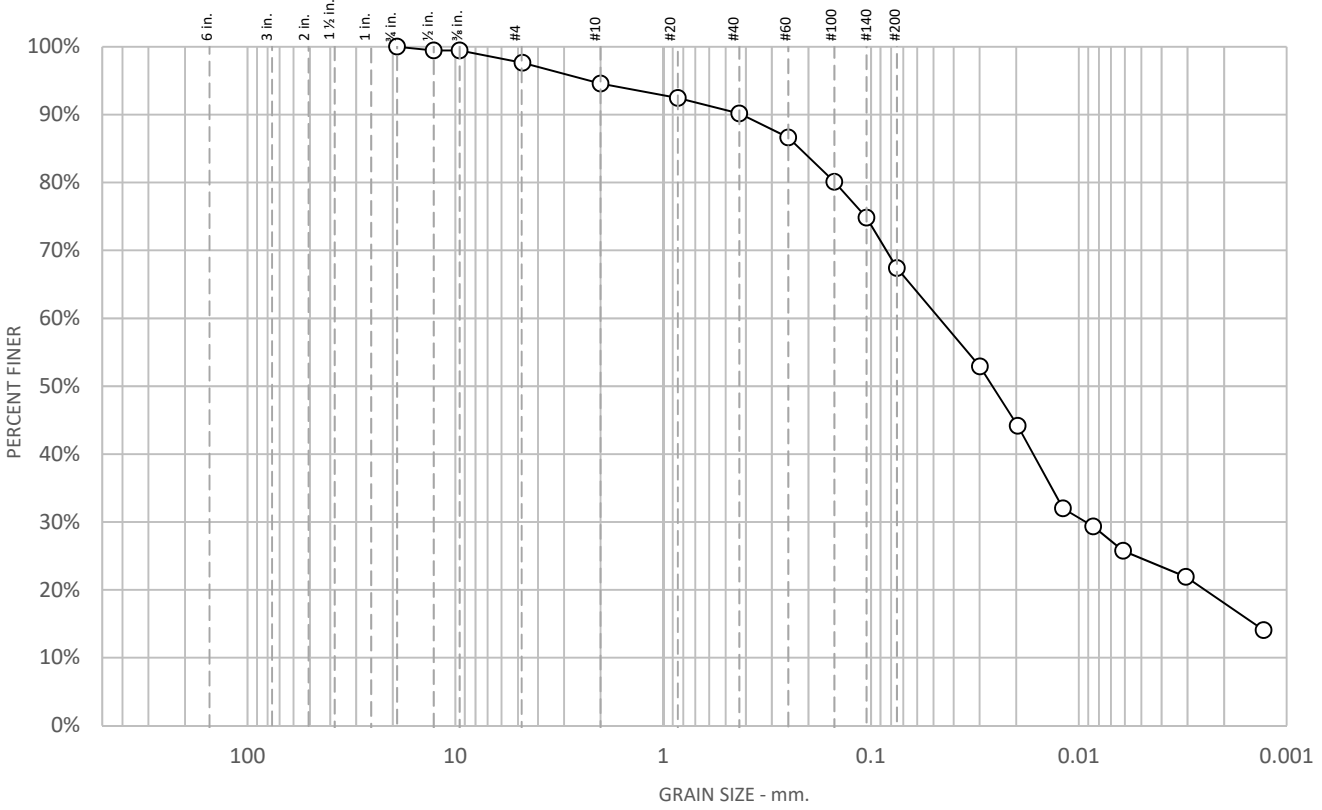
Remarks:
PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.6	1.8	3.1	4.4	22.8	49.3	18.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
½ in.	99.4		
⅜ in.	99.4		
#4	97.6		
#10	94.6		
#20	92.5		
#40	90.2		
#60	86.6		
#100	80.1		
#140	74.8		
#200	67.4		
0.0299 mm.	52.9		
0.0197 mm.	44.2		
0.0119 mm.	32.0		
0.0085 mm.	29.3		
0.0061 mm.	25.7		
0.0031 mm.	21.9		
0.0013 mm.	14.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 33 PI = 14

Coefficients

D_{90} = 0.4196 mm D_{85} = 0.2201 mm D_{60} = 0.0469 mm
D_{50} = 0.0260 mm D_{30} = 0.0093 mm D_{15} = 0.0014 mm
D_{10} = C_u = C_c =

Classification

USCS = CL

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B7 @ 5.0-6.5 feet

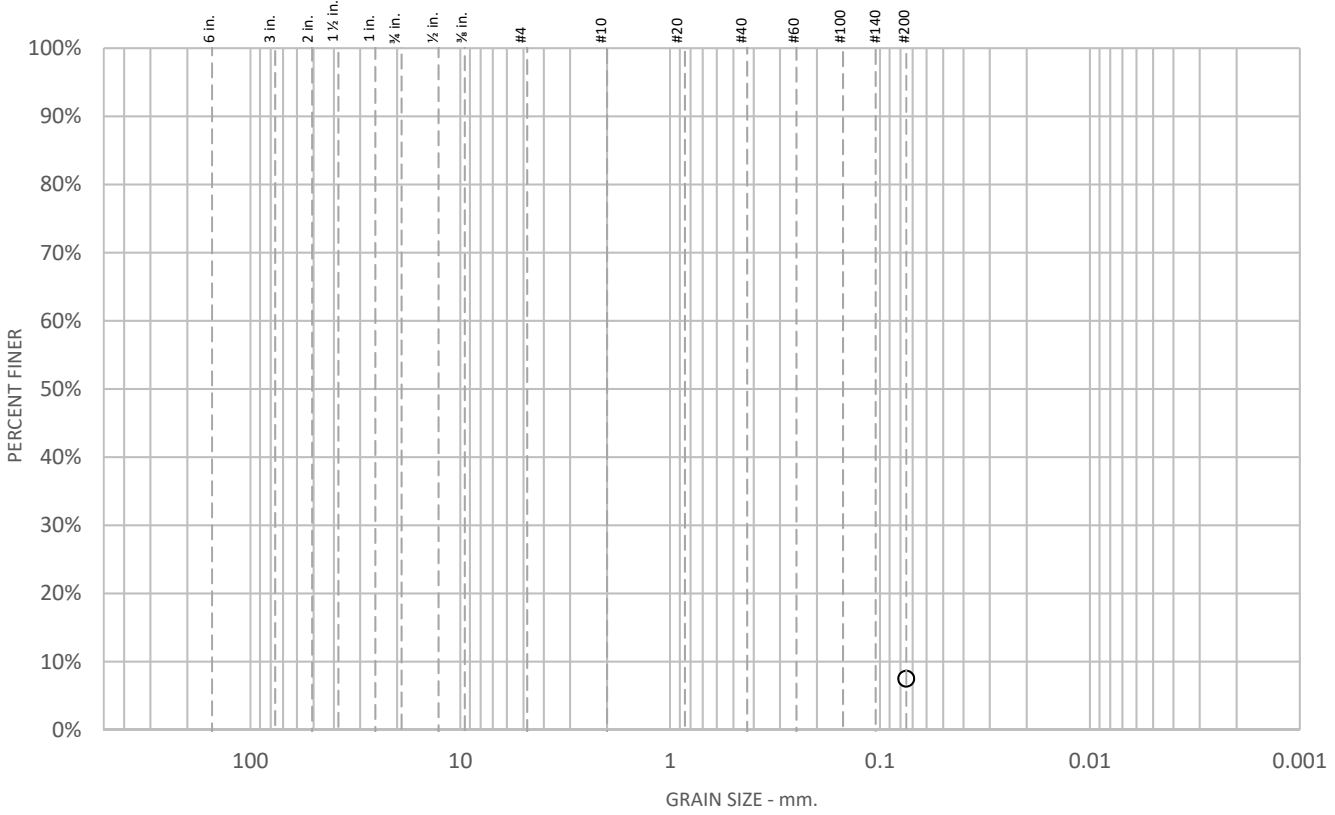
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 7/25/2019
Project location: Sunnyvale, California

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	7.5		

* (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 =

Remarks

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 269.82 g

Sample Number: 1-B7 @ 12-13.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

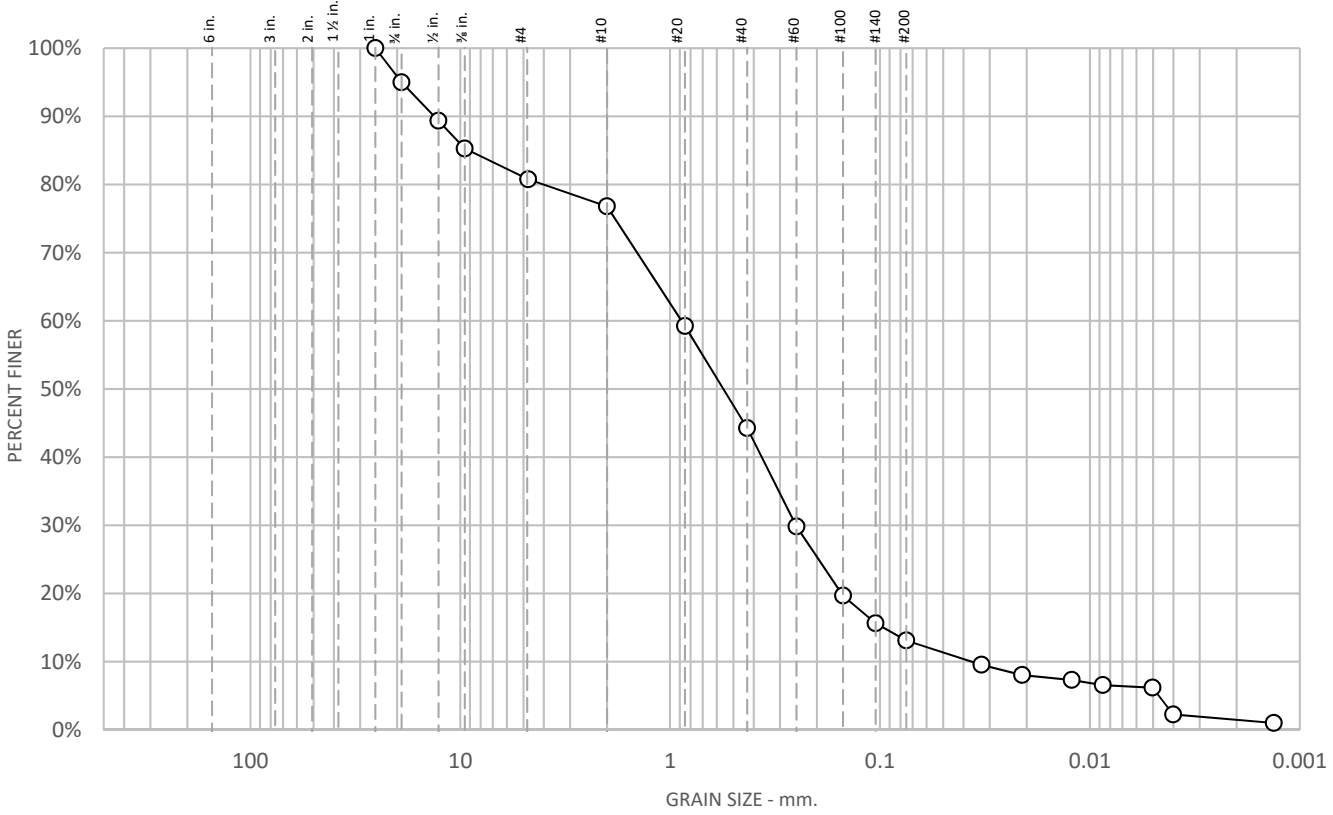
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	5.0	14.2	4.0	32.5	31.2	11.7	1.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	95.0		
½ in.	89.3		
⅜ in.	85.3		
#4	80.8		
#10	76.8		
#20	59.2		
#40	44.3		
#60	29.8		
#100	19.7		
#140	15.6		
#200	13.1		
0.0329 mm.	9.5		
0.0210 mm.	8.0		
0.0122 mm.	7.3		
0.0087 mm.	6.6		
0.0050 mm.	6.2		
0.0040 mm.	2.2		
0.0013 mm.	1.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 13.3146 mm D_{85} = 9.1304 mm D_{60} = 0.8825 mm
D_{50} = 0.5583 mm D_{30} = 0.2516 mm D_{15} = 0.0965 mm
D_{10} = 0.0366 mm C_u = 24.12 C_c = 1.96

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 15A

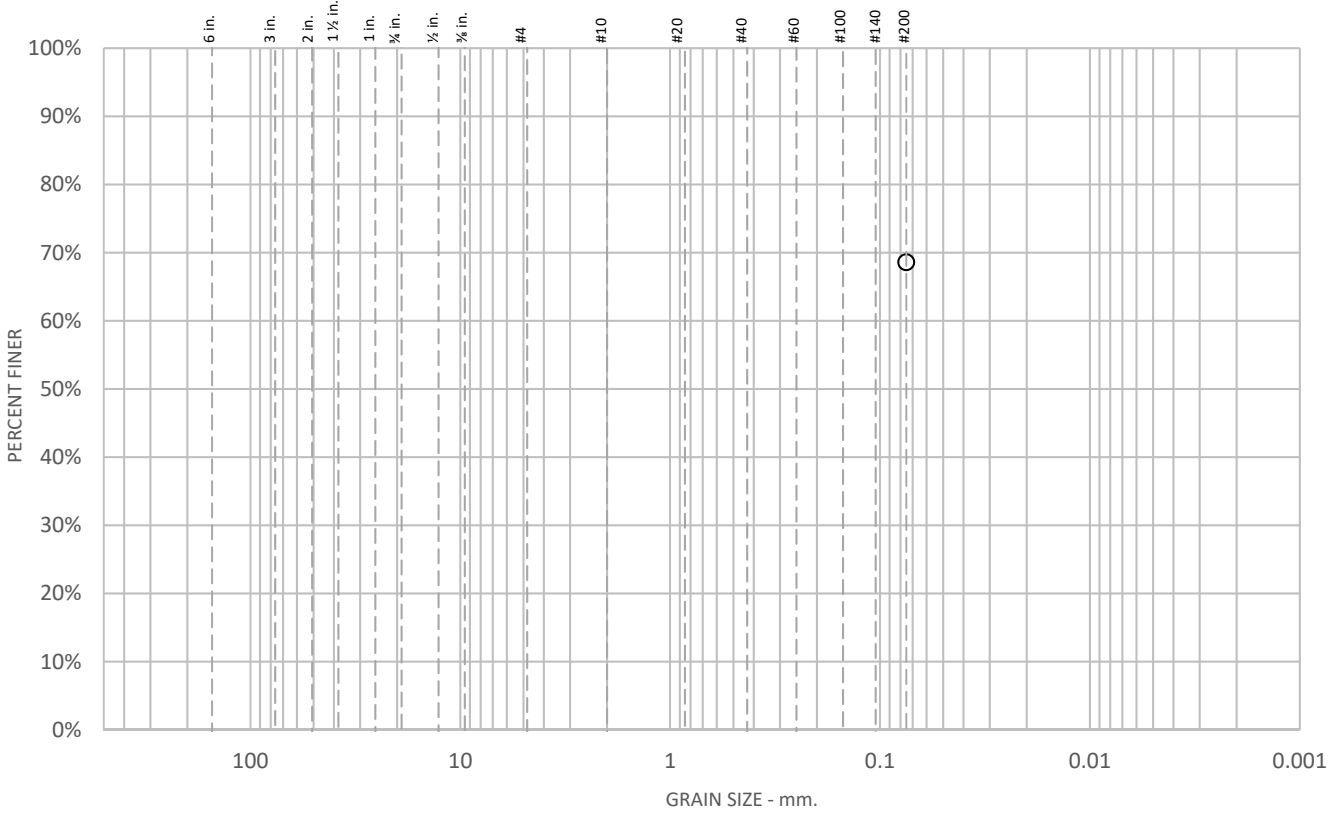
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						68.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	68.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 44 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 312.28 g

Sample Number: 1-B7 @ 20-21.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

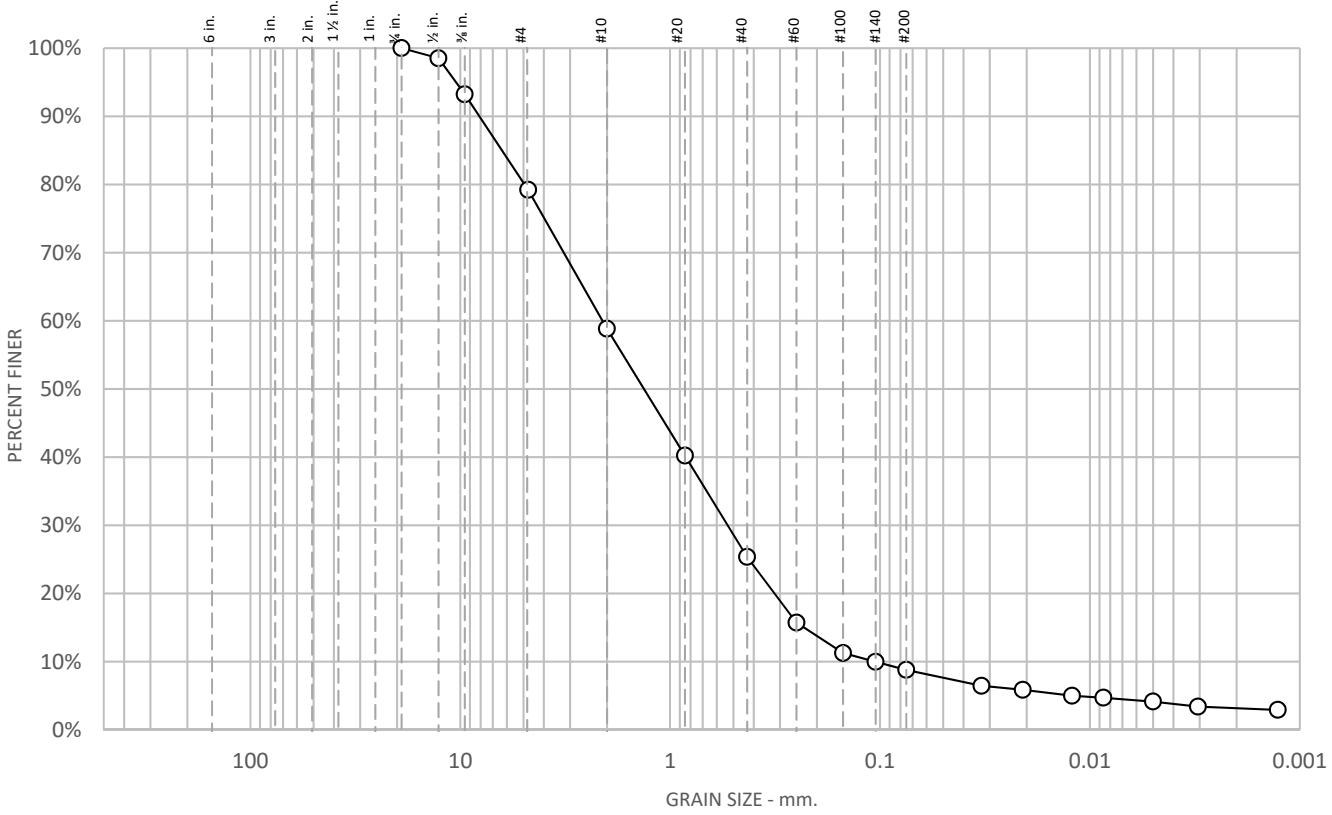
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem
Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	20.8	20.4	33.5	16.6	5.6	3.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
½ in.	98.5		
⅜ in.	93.2		
#4	79.2		
#10	58.8		
#20	40.2		
#40	25.4		
#60	15.7		
#100	11.3		
#140	10.0		
#200	8.8		
0.0328 mm.	6.4		
0.0209 mm.	5.9		
0.0122 mm.	5.0		
0.0086 mm.	4.7		
0.0050 mm.	4.1		
0.0031 mm.	3.4		
0.0013 mm.	2.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 8.1141 mm D_{85} = 6.3321 mm D_{60} = 2.1018 mm
D_{50} = 1.3328 mm D_{30} = 0.5321 mm D_{15} = 0.2302 mm
D_{10} = 0.1060 mm C_u = 19.83 C_c = 1.27

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 34-35.5

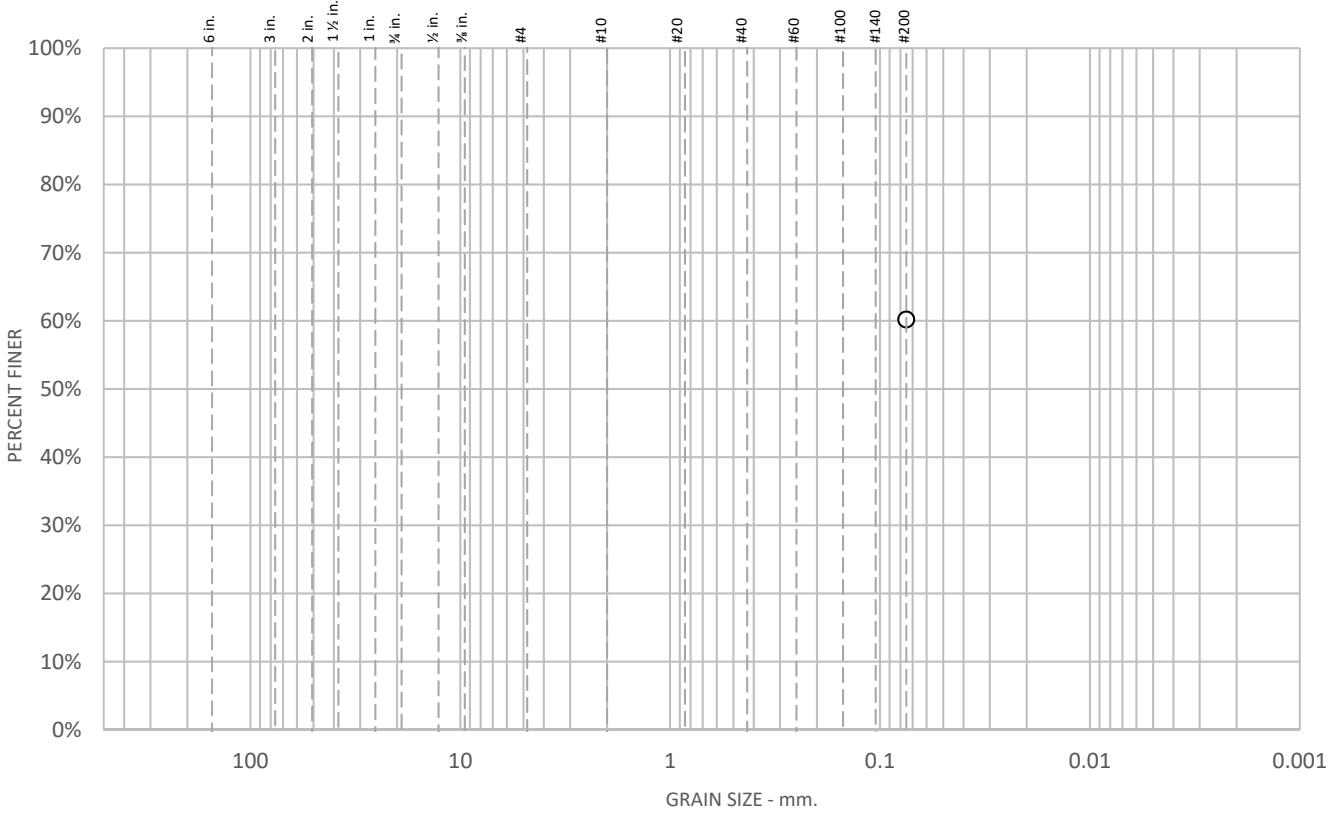
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	60.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 38 PI = 20

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 96.28 g

Sample Number: 1-B7 @ 45-46.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

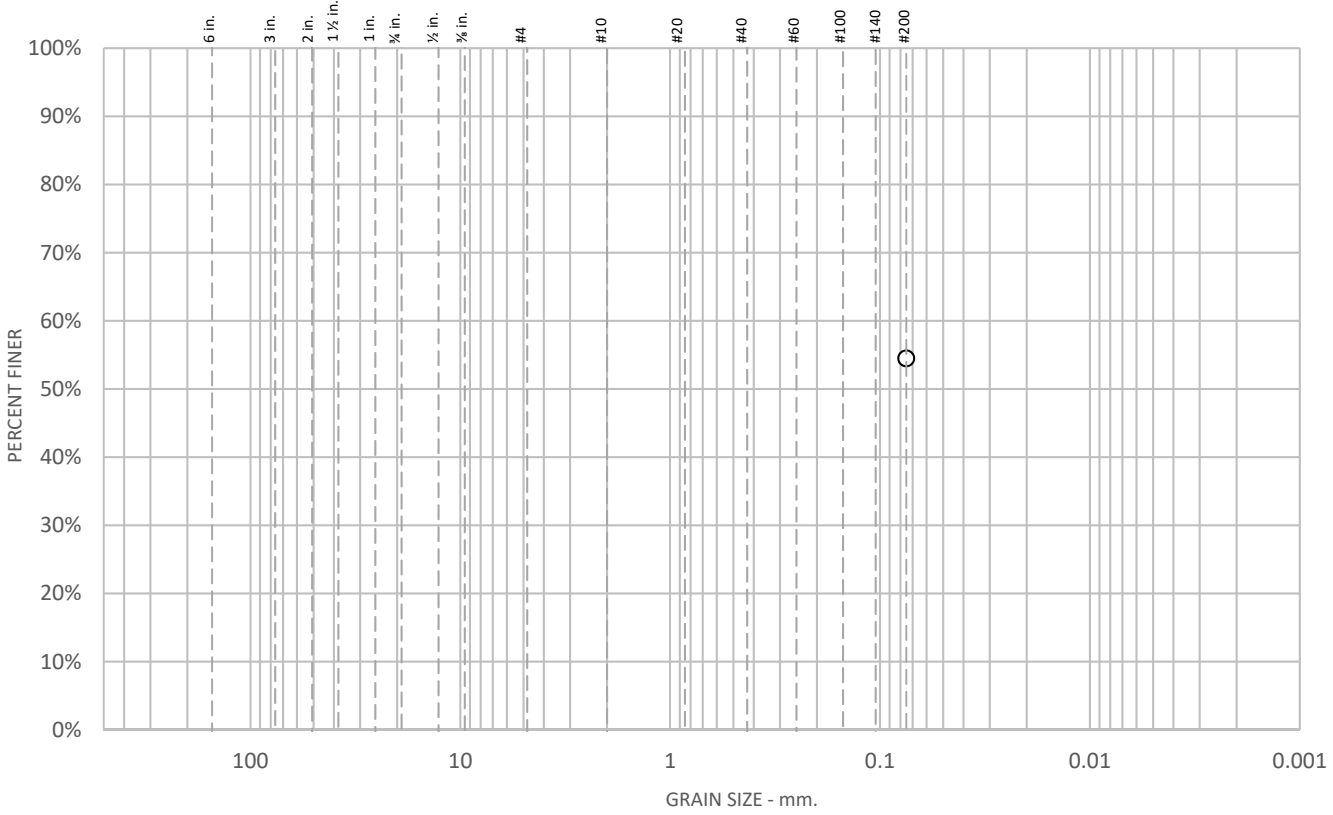
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						54.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	54.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 26 LL = 38 PI = 12

Coefficients

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

Classification

USCS = ML

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 118.25 g

Sample Number: 1-B7 @ 61-61.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

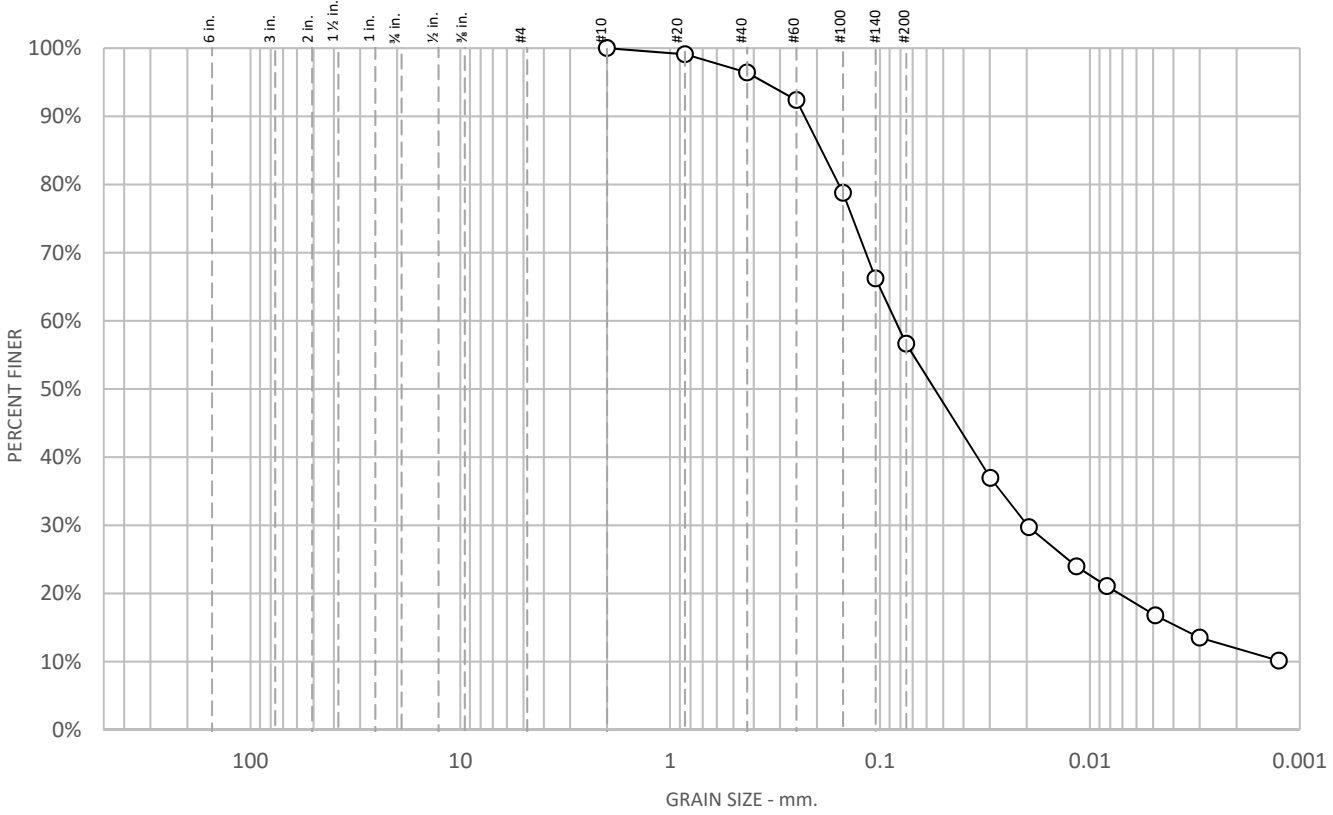
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				3.6	39.8	44.7	11.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.1		
#40	96.4		
#60	92.4		
#100	78.8		
#140	66.2		
#200	56.6		
0.0298 mm.	36.9		
0.0195 mm.	29.7		
0.0116 mm.	23.9		
0.0083 mm.	21.1		
0.0049 mm.	16.8		
0.0030 mm.	13.5		
0.0013 mm.	10.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2287 mm D_{85} = 0.1896 mm D_{60} = 0.0844 mm
D_{50} = 0.0550 mm D_{30} = 0.0198 mm D_{15} = 0.0037 mm
D_{10} = C_u = C_c =

Classification

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 8.0-10.0

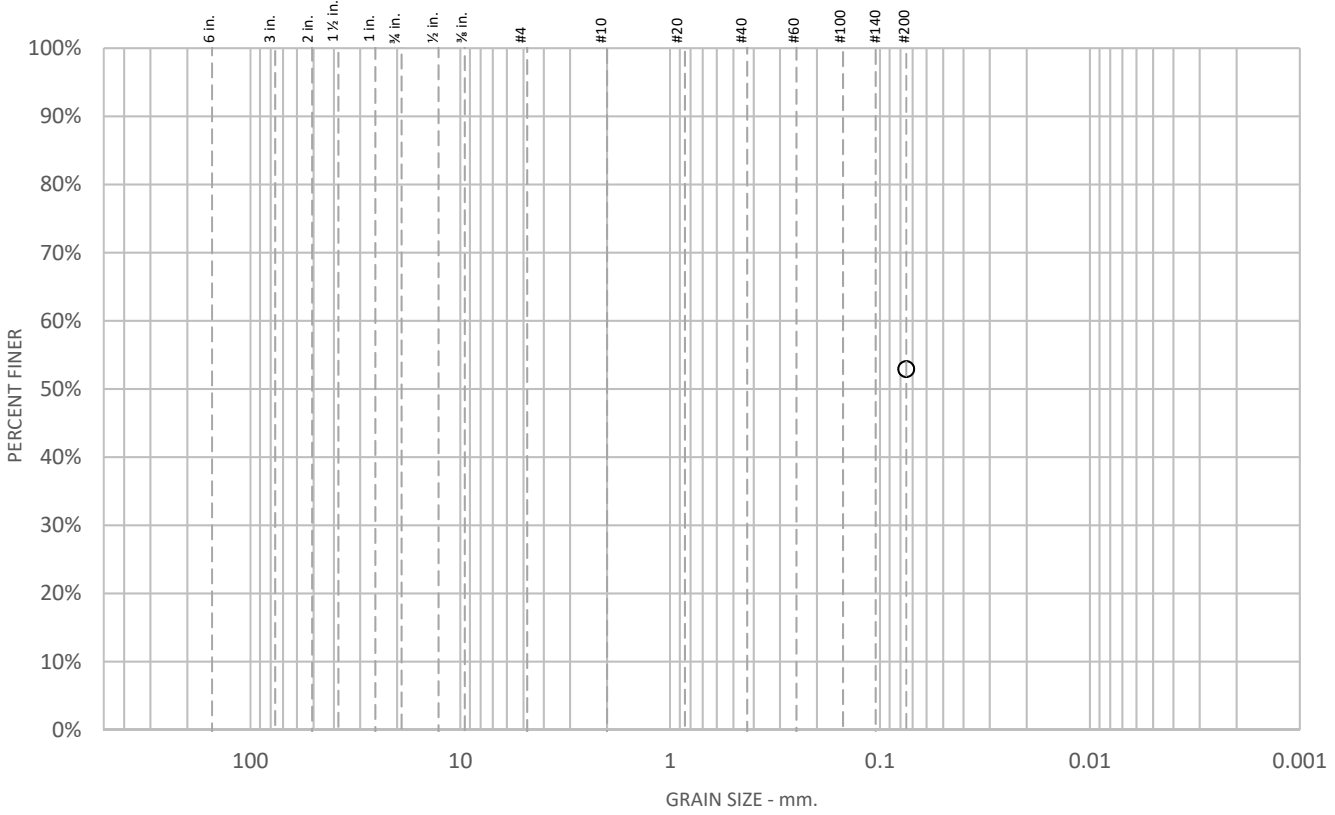
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	52.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = NP LL = NV PI = NP

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 173.83 g

Sample Number: 1-B7 @ 80-81

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Isotropic Unconsolidated Undrained Triaxial Test

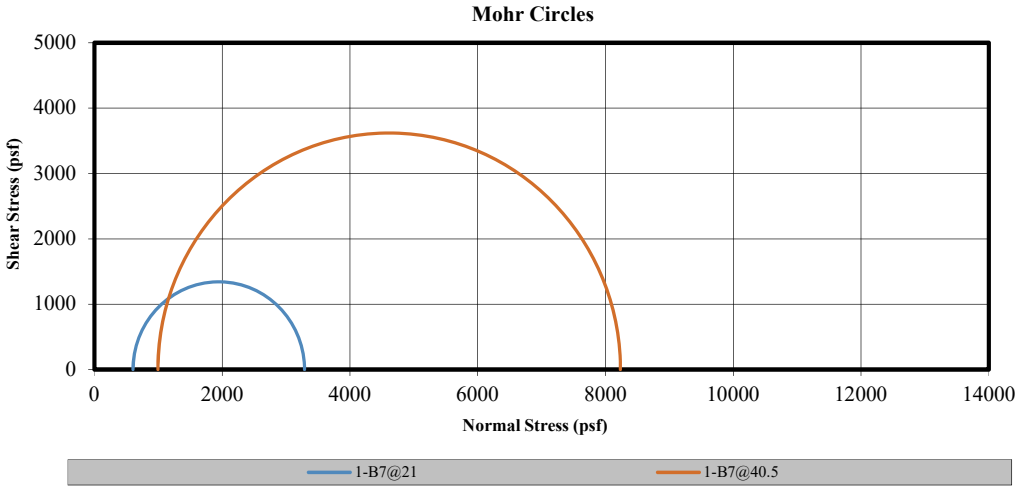
ASTM D2850

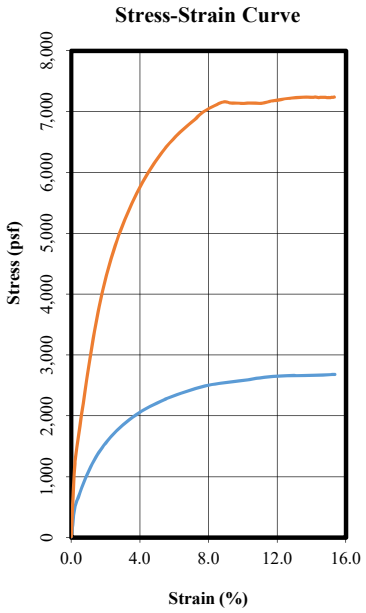
Date: 06/14/19

Checked By: G. Criste

Date: 6/14/2019

Tested By: N. Buckton





Before Test	Specimen 1-B7@21	1-B7@40.5		
Water Content (%)	23.62	20.96		
Dry Density (pcf)	103.30	108.20		
Saturation (%)	99.84	99.76		
Void Ratio	0.64	0.57		
Diameter (in)	2.404	2.404		
Height (in)	5.005	5.067		
Height-to-Diameter Ratio	2.082	2.108		
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
ASTM D854 - Assumed				
Specific Gravity	2.720	2.725		
After Test	**1-B7@21**	**1-B7@40.5**		
Water Content (%)	23.62	20.96		
Saturation (%)	99.84	99.76		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	2682.7	7239.9		
Axial Strain @ Failure (%)	15.352	13.619		
	Cell Pressure			
Cell (psf)	604.8	993.6		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3287.5	8233.5		
σ3 (psf)	604.8	993.6		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1341.3	3619.9		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/14/19

Checked By: G. Criste

Date: 6/14/2019

Tested By: N. Buckton

SPECIMEN PHOTOS

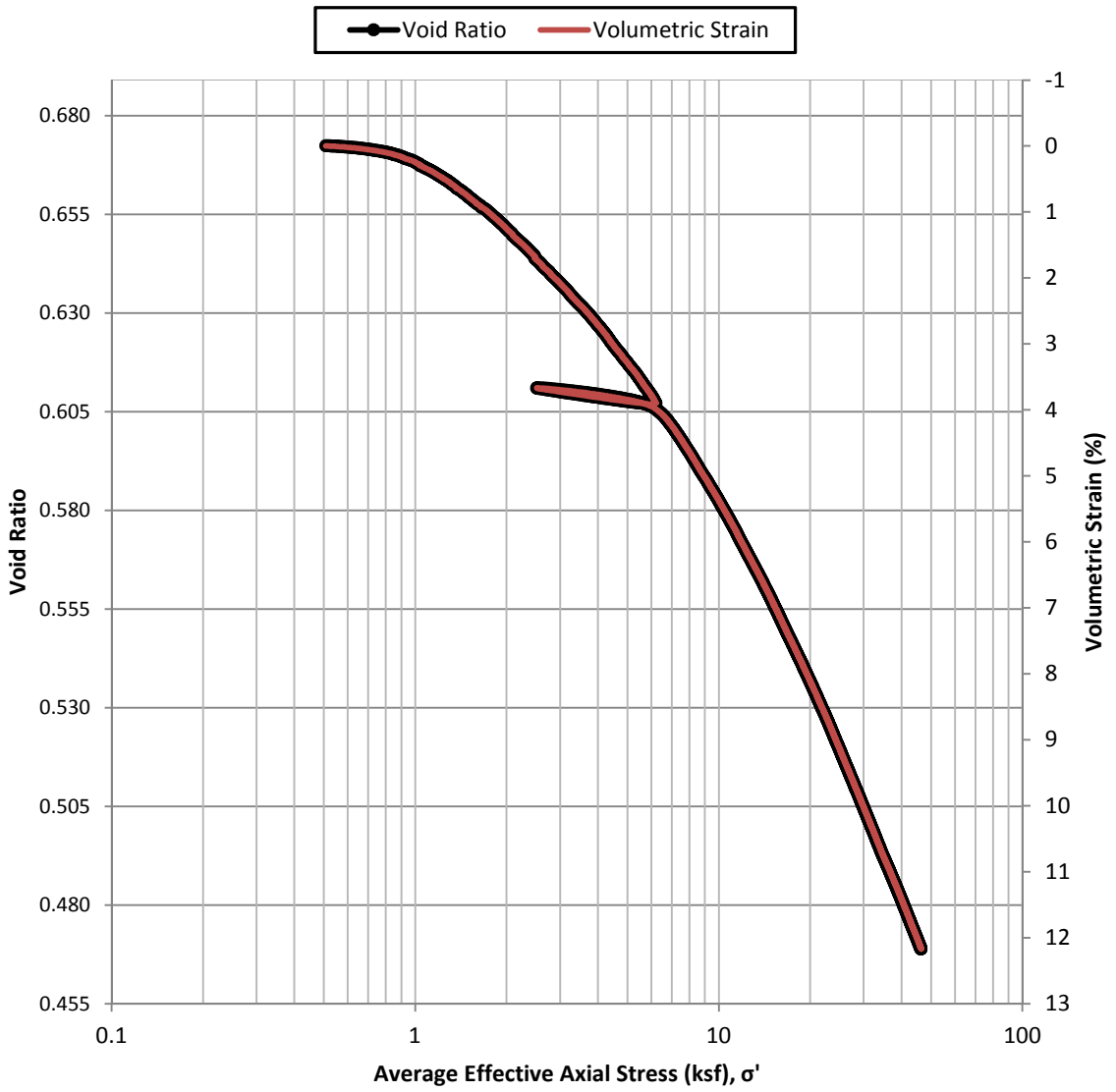
SAMPLE NUMBER: 1-B7@21	SAMPLE NUMBER: 1-B7@40.5
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Constant Rate of Strain Consolidation
ASTM D4186

Void Ratio & Volumetric Strain Vs Average Effective Axial Stress (ksf), σ'



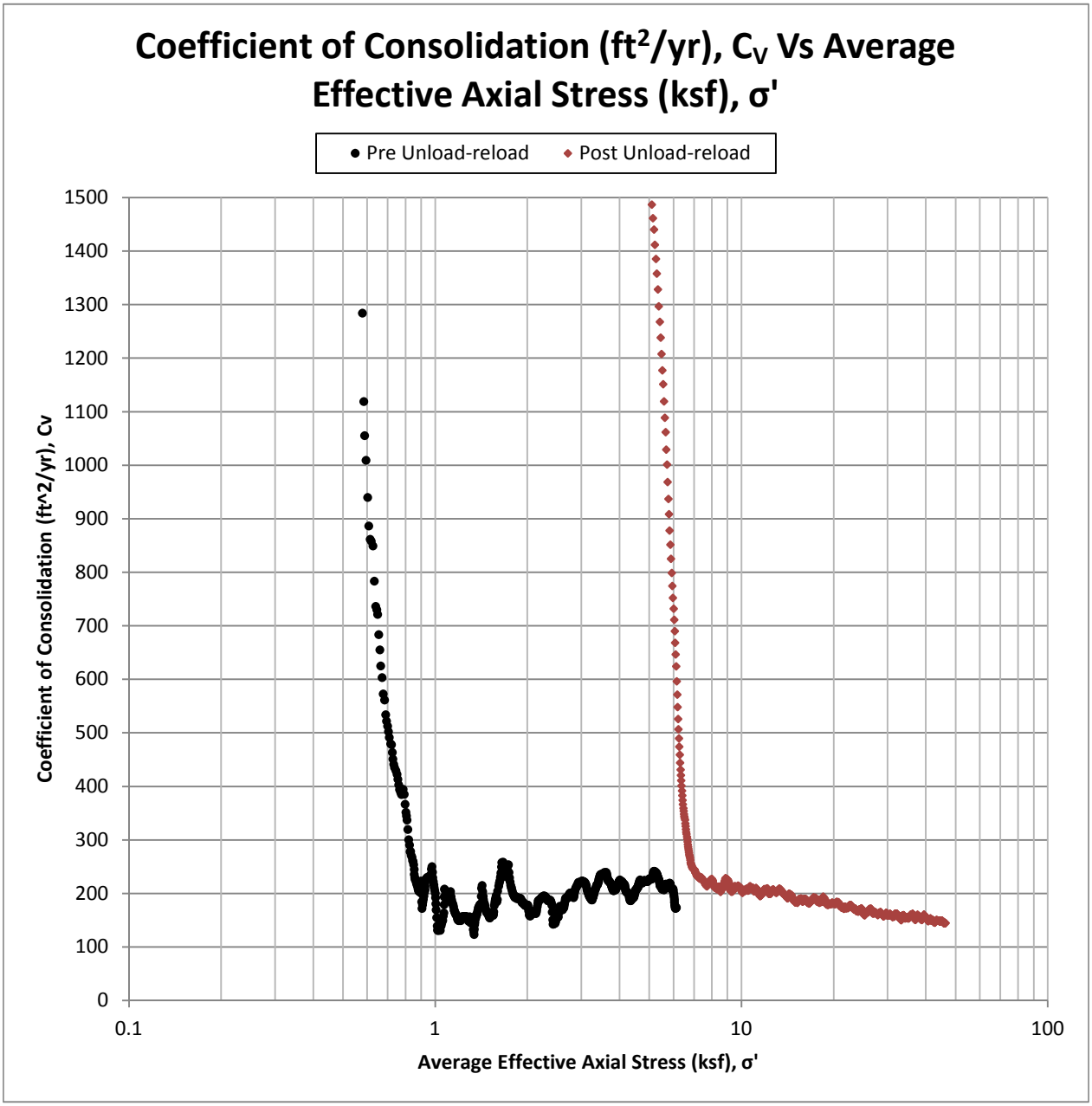
ASTM D2216			Report Date: 6/20/2019	
	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	24.42%	17.91%	Liquid Limit:	
Dry Density (pcf):	103.59	117.96	Plastic Limit:	
Saturation (%):	100.96%	100.00%	ASTM D854 - Measured	
Void Ratio:	0.6723	0.4687	Specific Gravity:	2.780
			Soil Description:	See exploration logs

Project Number:	15949.000.000	Depth:	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	Boring #:	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	Reviewed By:	J. Kan

ENGEO Expect Excellence

Remarks:

Constant Rate of Strain Consolidation
ASTM D4186



ASTM D2216			ASTM D4318 - Wet Method	
	As Received	Final	Liquid Limit:	
Moisture (%):	24.42%	17.91%	Plastic Limit:	
Dry Density (pcf):	103.59	117.96	ASTM D854 - Measured	
Saturation (%):	100.96%	100.00%	Specific Gravity:	2.780
Void Ratio:	0.6723	0.4687	Soil Description:	See exploration logs

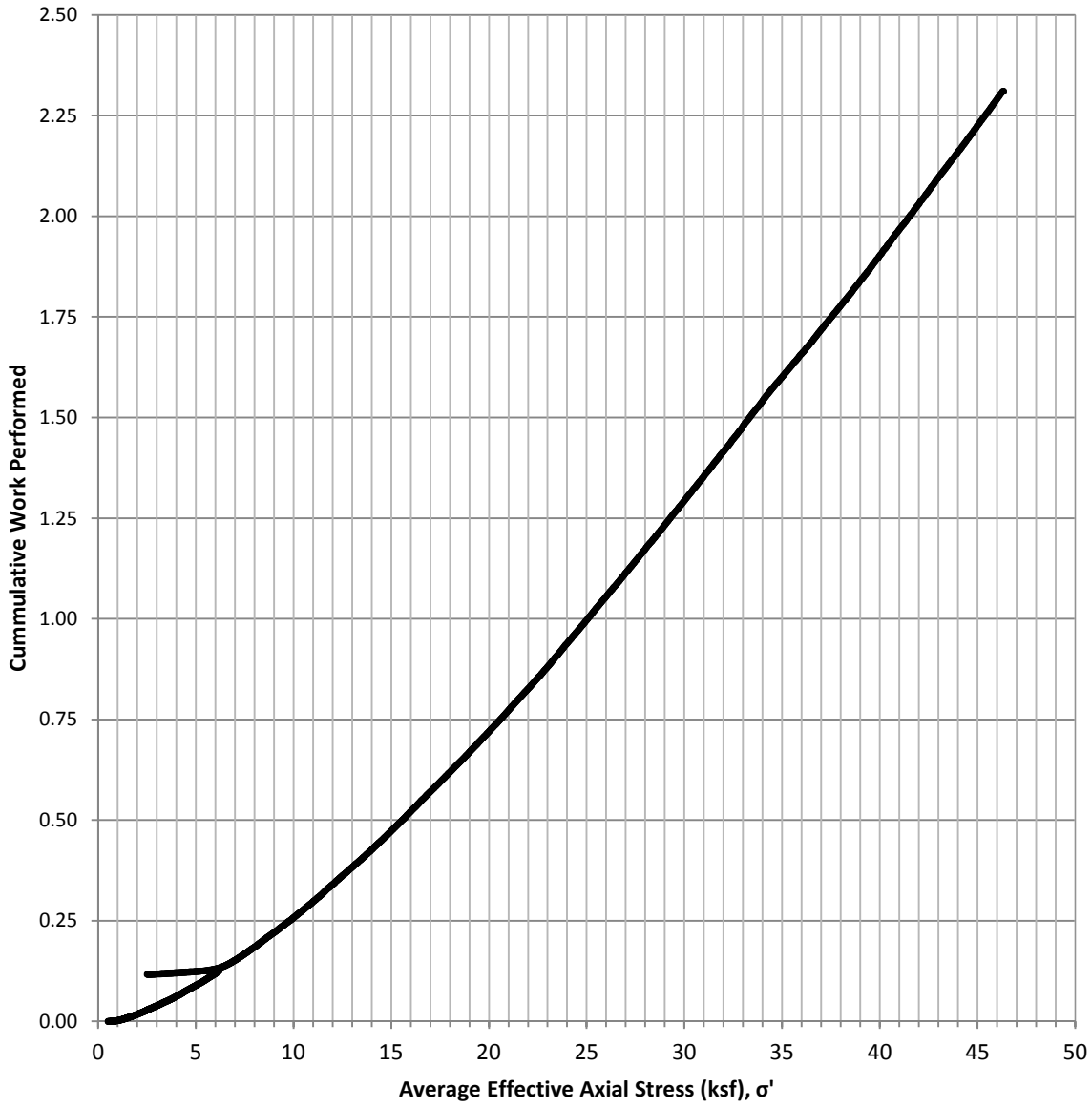
Report Date: 6/20/2019

Project Number:	15949.000.000	**Depth:**	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	**Boring #:**	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

Remarks:

ENGEO Expect Excellence

Constant Rate of Strain Consolidation
ASTM D4186



ASTM D2216			ASTM D4318 - Wet Method	
	As Received	Final		
Moisture (%):	24.42%	17.91%	Liquid Limit:	
Dry Density (pcf):	103.59	117.96	Plastic Limit:	
Saturation (%):	100.96%	100.00%	ASTM D854 - Measured	
Void Ratio:	0.6723	0.4687	Specific Gravity:	2.780
			Soil Description:	See exploration logs

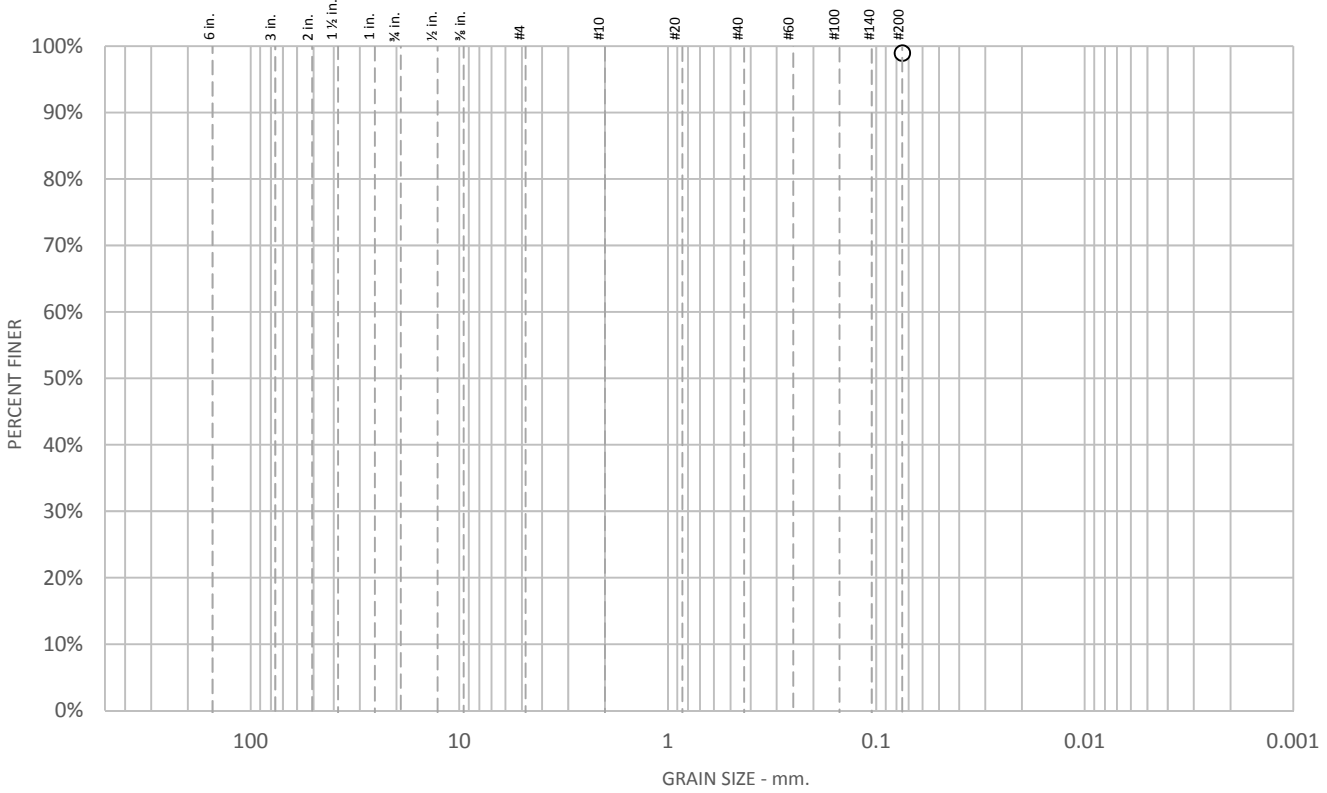
Report Date: 6/20/2019

Project Number:	15949.000.000	**Depth:**	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	**Boring #:**	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

Remarks:

ENGEO Expect Excellence

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						98.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	98.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 30 LL = 59 PI = 29

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 81.69 g

Sample Number: 1-B3 @ 10

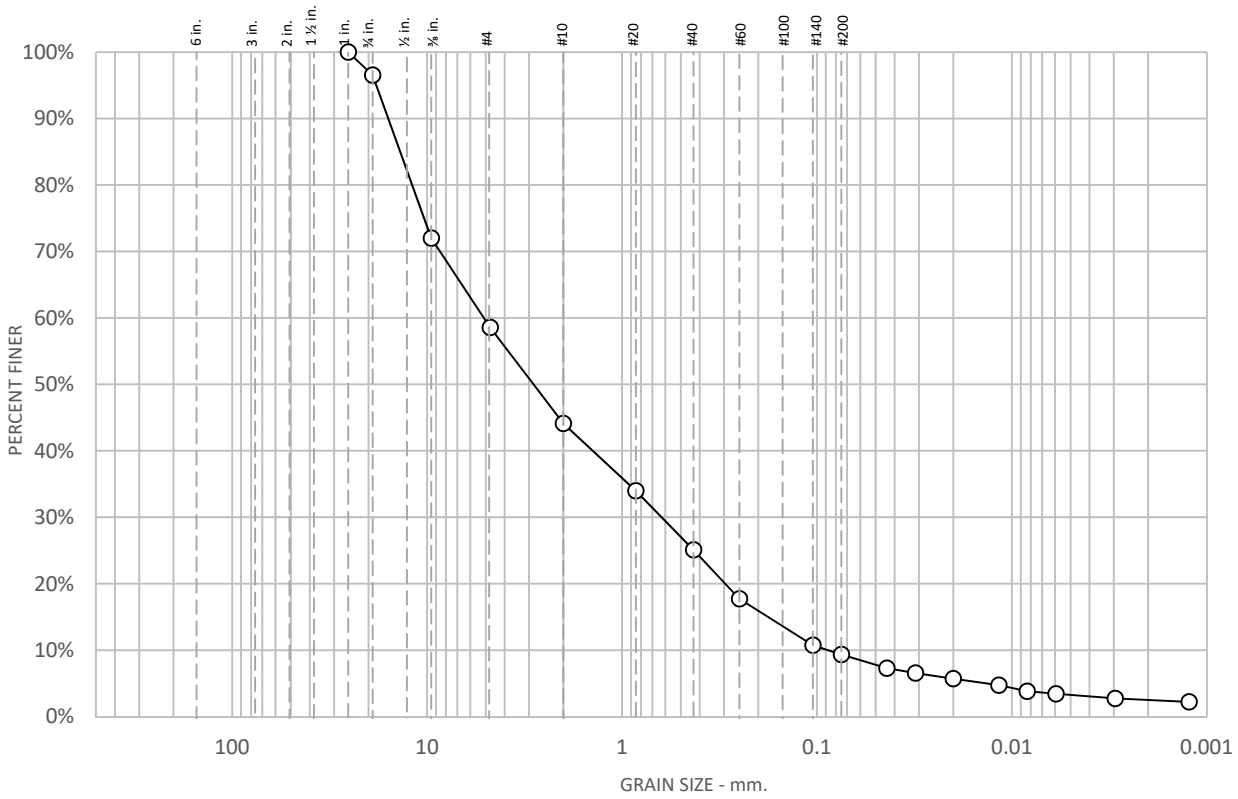
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California
Project Number: 15949.000.000
Date: 9/18/2019

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	3.6	37.9	14.4	19.0	15.8	6.8	2.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	96.5		
⅜ in.	72.0		
#4	58.6		
#10	44.1		
#20	34.0		
#40	25.1		
#60	17.7		
#140	10.7		
#200	9.3		
0.0438 mm.	7.3		
0.0313 mm.	6.6		
0.0200 mm.	5.7		
0.0117 mm.	4.7		
0.0084 mm.	3.8		
0.0059 mm.	3.4		
0.0030 mm.	2.7		
0.0012 mm.	2.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 15.8399 mm D_{85} = 13.7521 mm D_{60} = 5.1171 mm
D_{50} = 2.8439 mm D_{30} = 0.6264 mm D_{15} = 0.1783 mm
D_{10} = 0.0879 mm C_u = 58.25 C_c = 0.87

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B3 @ 21

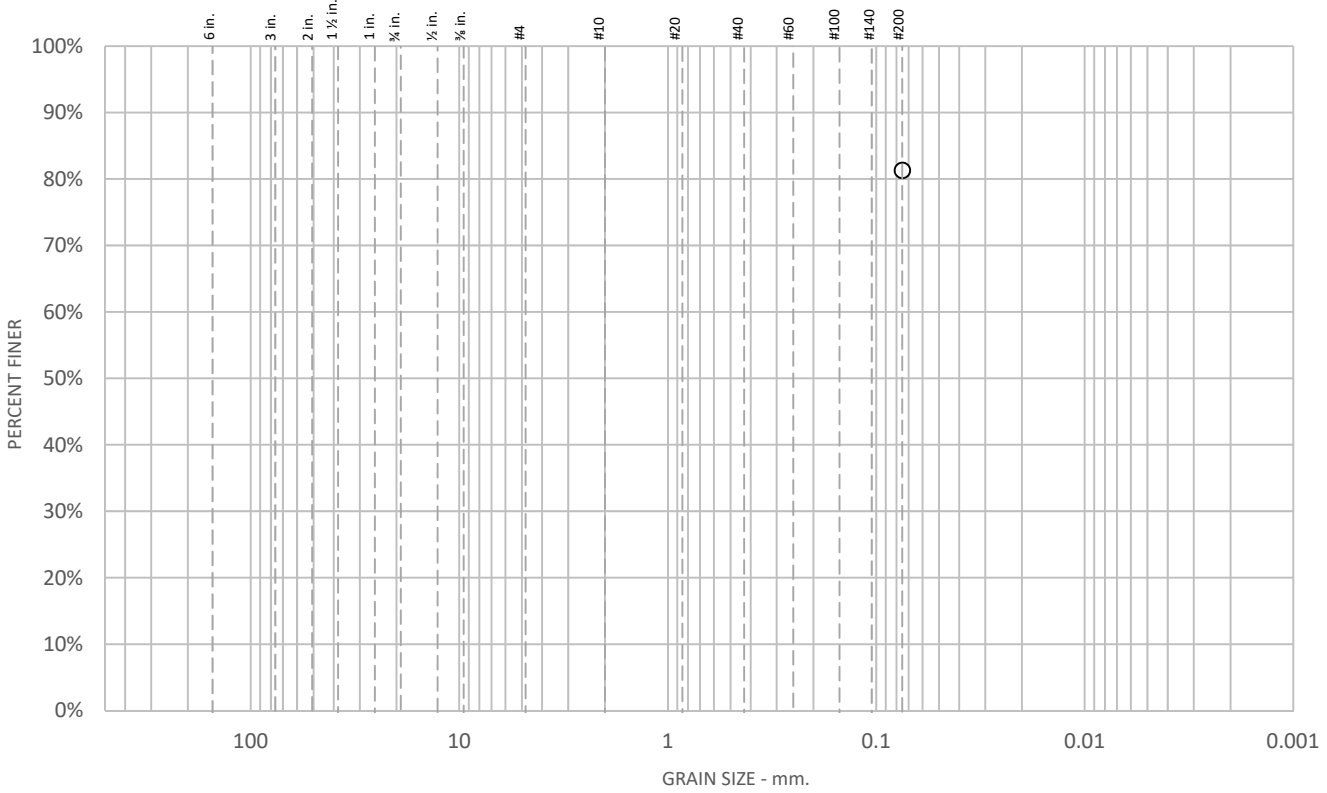
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	81.3		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 20 LL = 50 PI = 30

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 176.5 g

Sample Number: 1-B3 @ 30.5

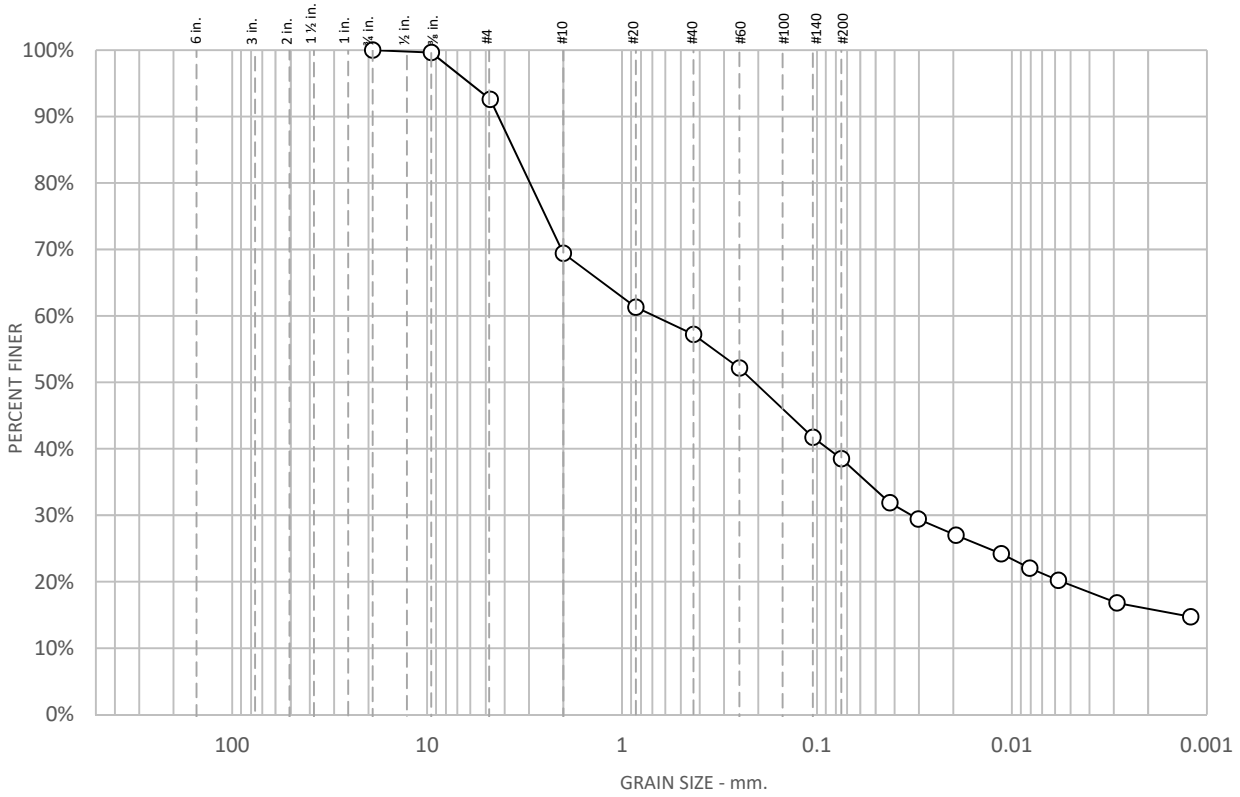
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	7.4	23.2	12.2	18.7	22.6	15.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.6		
#4	92.6		
#10	69.4		
#20	61.3		
#40	57.2		
#60	52.2		
#140	41.7		
#200	38.5		
0.0423 mm.	31.9		
0.0303 mm.	29.4		
0.0194 mm.	27.0		
0.0113 mm.	24.2		
0.0081 mm.	22.0		
0.0058 mm.	20.2		
0.0029 mm.	16.8		
0.0012 mm.	14.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 15 LL = 38 PI = 23

Coefficients

D_{90} = 4.3115 mm D_{85} = 3.5778 mm D_{60} = 0.6831 mm
D_{50} = 0.2089 mm D_{30} = 0.0327 mm D_{15} = 0.0014 mm
D_{10} = C_u = C_c =

Classification

USCS = SC

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B3 @ 45.5

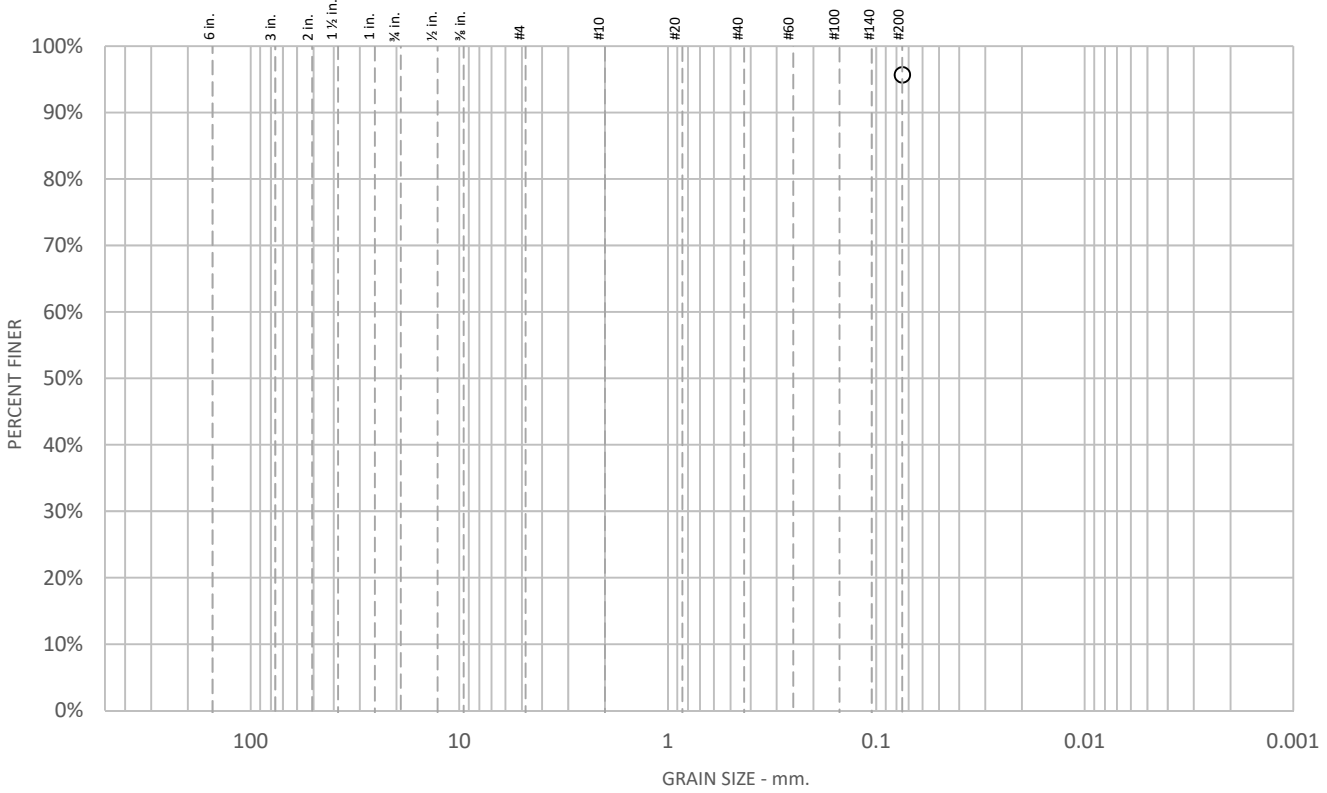
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						95.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	95.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 86 PI = 67

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 179.7 g

Sample Number: 1-B3 @ 5.5

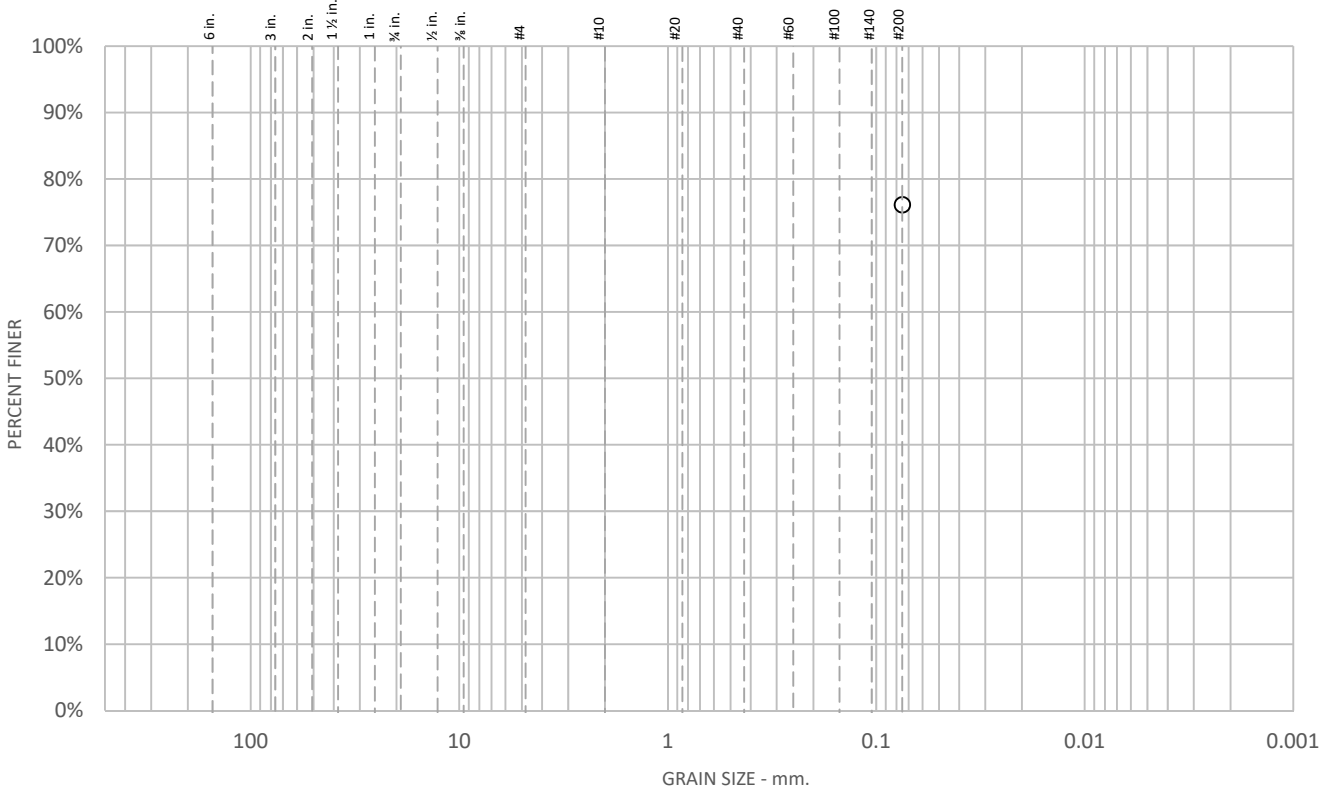
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	76.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 38 PI = 21

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 192.2 g

Sample Number: 1-B3 @ 50.5

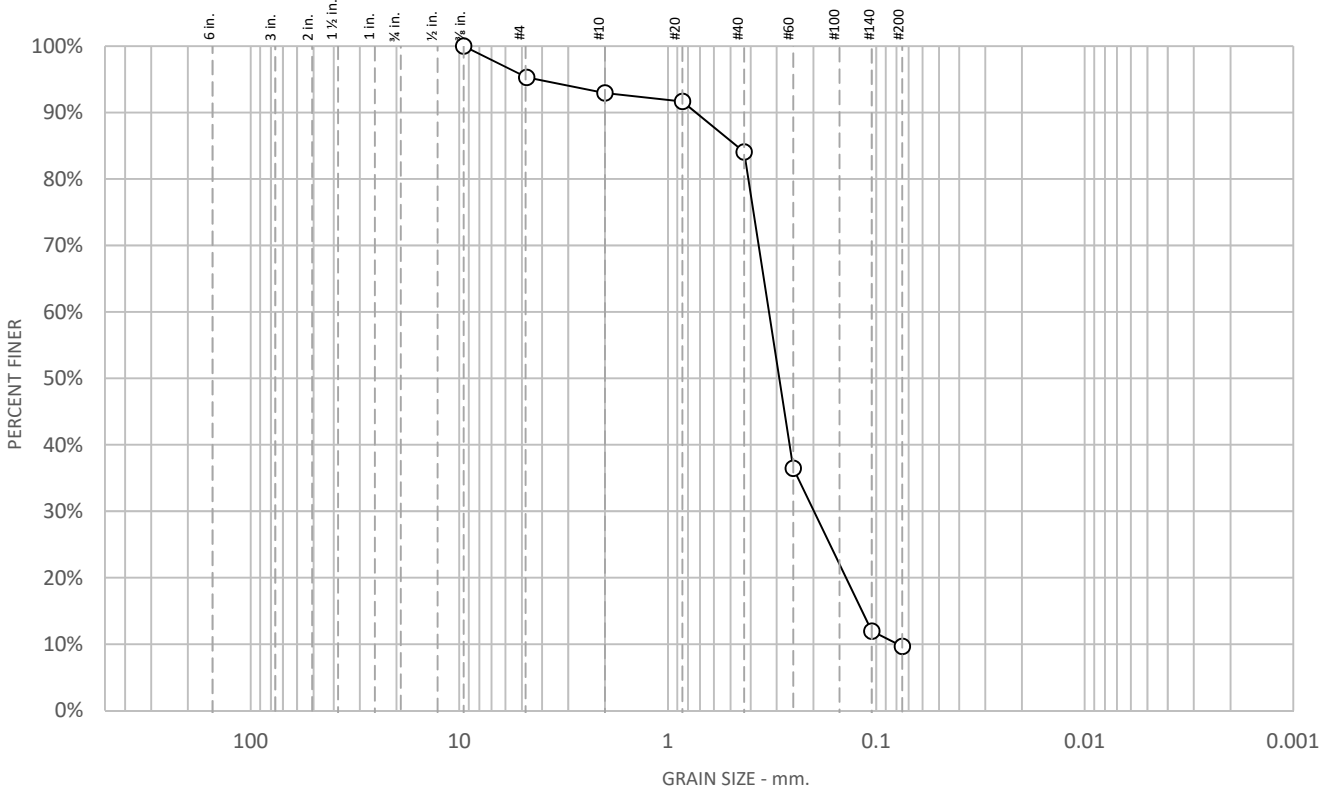
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		4.7	2.4	8.9	74.4	9.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
⅜ in.	100.0		
#4	95.3		
#10	92.9		
#20	91.7		
#40	84.1		
#60	36.5		
#140	12.0		
#200	9.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.7317 mm D_{85} = 0.4672 mm D_{60} = 0.3269 mm
D_{50} = 0.2917 mm D_{30} = 0.1989 mm D_{15} = 0.1170 mm
D_{10} = 0.0789 mm C_u = 4.14 C_c = 1.53

Classification

USCS = SW

Remarks

USCS: ASTM D2487 ASTM D6913, Method B

Sample Number: 1-B3 @ 80.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	1-B3	1-B3	1-B3	1-B3	1-B3	1-B3		
DEPTH (ft.):	5.5	16	50.5	61	70.5	80.5		
MOISTURE CONTENT (%):	30.9	9.2	22.0	23.5	29.3	22.4		
DRY DENSITY (lbs/ft^3):	88.0	132.1	106.1	104.9	94.8	103.0		

Testing remarks:

PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NUMBER: 15959.000.000
CLIENT: Google, LLC
PHASE NUMBER: LAB

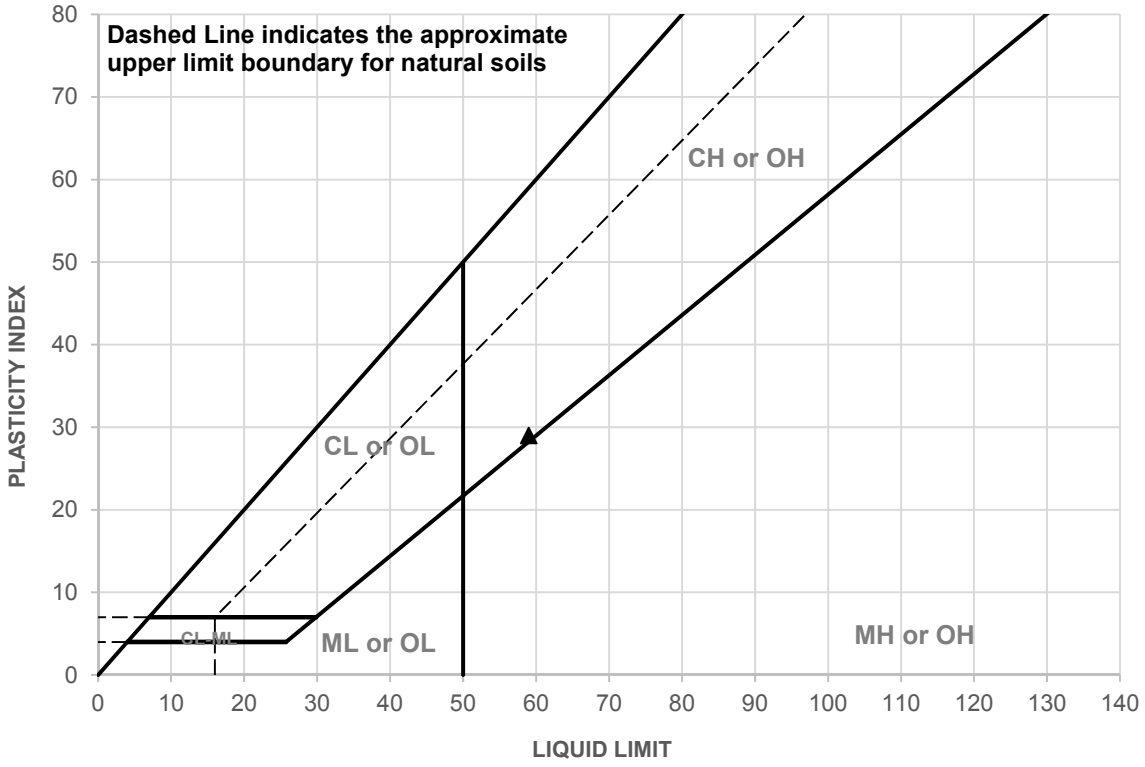
DATE: 09/09/19

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 2213 Plaza Dr., Rocklin, CA 95765. Phone No. (916) 786-8883.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



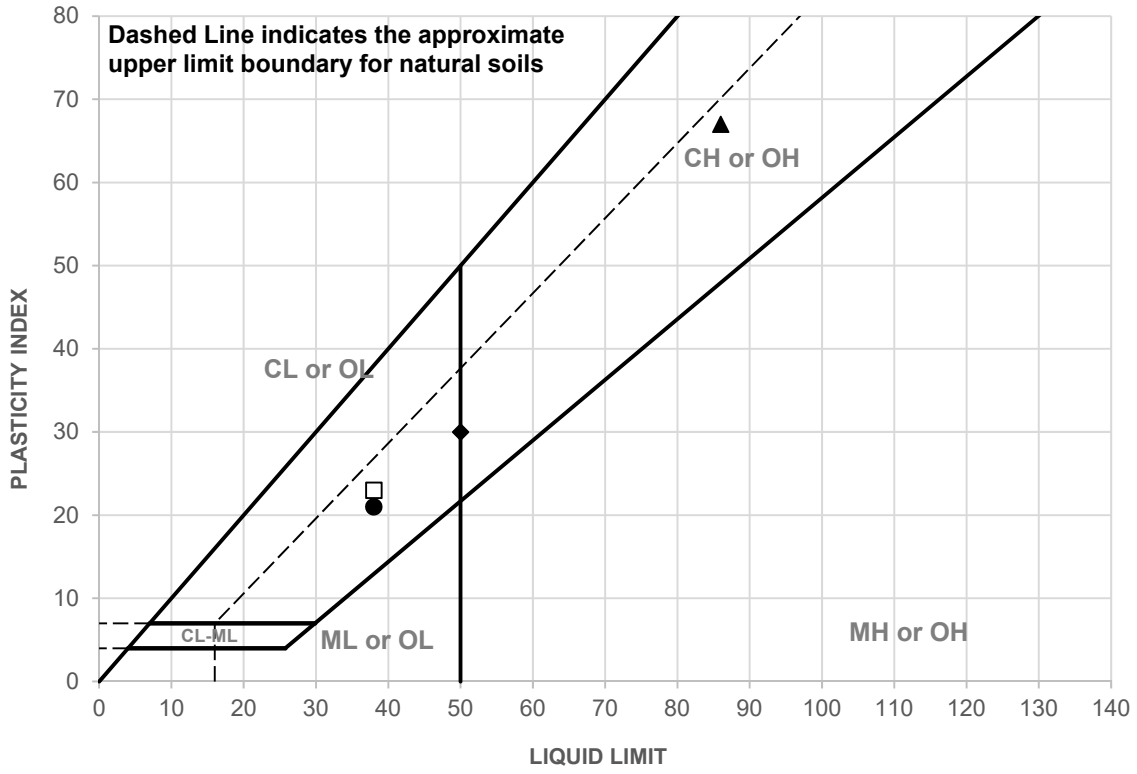
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B3 @ 10	10 ft	See exploration logs	59	30	29

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B3 @ 10	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/18/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B3	5.5	See exploration logs	86	19	67
◆	1-B3	30.5	See exploration logs	50	20	30
□	1-B3	45.5	See exploration logs	38	15	23
●	1-B3	50.5	See exploration logs	38	17	21

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B3	PI: ASTM D4318, Wet Method	
◆	1-B3	PI: ASTM D4318, Wet Method	
□	1-B3	PI: ASTM D4318, Wet Method	
●	1-B3	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B3@21

Description: See exploration logs — USCS: SP

%Passing #4: 58.6

Method used: **B**

Temperature (^{o}C): **23.4** — ***Specific gravity at 20 ^{o} C:*** **2.885**

Sample 2: 1-B3@45.5

Description: See exploration logs — USCS: SC

%Passing #4: 92.6

Method used: **B**

Temperature (^{o}C): **23.4** — ***Specific gravity at 20 ^{o} C:*** **2.826**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** — **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER:

ENGEO Expect Excellence

Tested by: R. Montalvo — Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

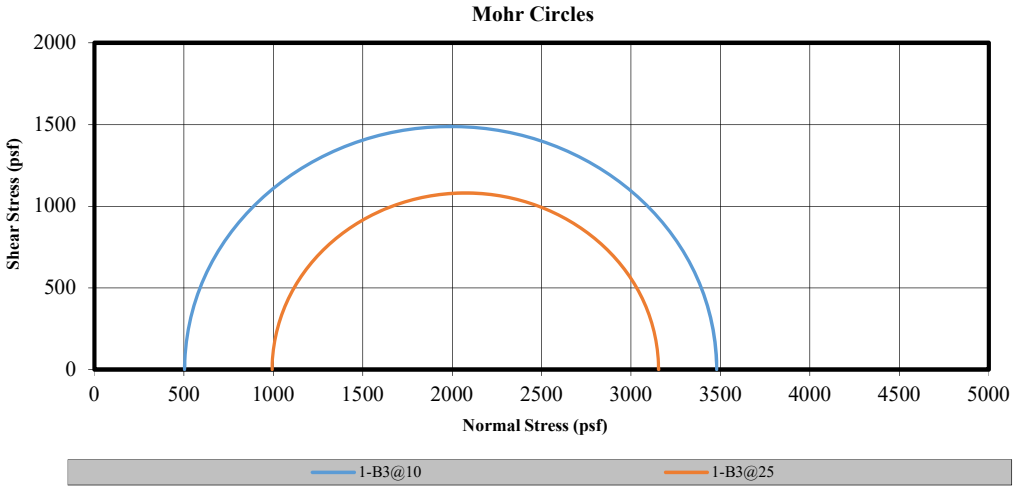
ASTM D2850

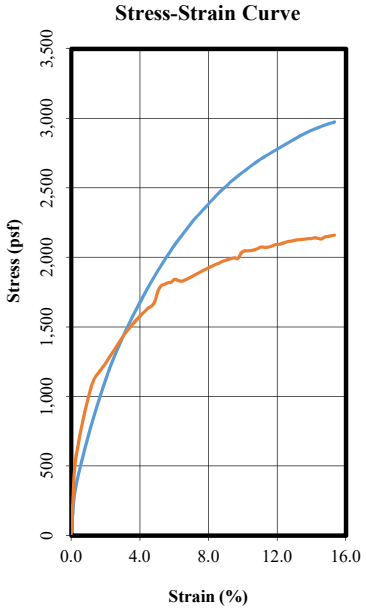
Date: 09/10/19

Checked By: G. Criste

Date: 9/10/2019

Tested By: M. Quasem





Before Test	Specimen 1-B3@10	1-B3@25		
Water Content (%)	23.84	30.11		
Dry Density (pcf)	102.10	93.70		
Saturation (%)	97.69	100.00		
Void Ratio	0.66	0.81		
Diameter (in)	2.400	2.380		
Height (in)	5.100	5.150		
Height-to-Diameter Ratio	2.125	2.164		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.720	2.720		
After Test	**1-B3@10**	**1-B3@25**		
Water Content (%)	23.84	30.11		
Saturation (%)	97.68	100.00		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	2974.7	2160.2		
Axial Strain @ Failure (%)	15.329	15.331		
	Cell Pressure			
Cell (psf)	504.0	993.6		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3478.7	3153.8		
σ3 (psf)	504.0	993.6		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1487.4	1080.1		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 09/10/19

Checked By: G. Criste

Date: 9/10/2019

Tested By: M. Quasem

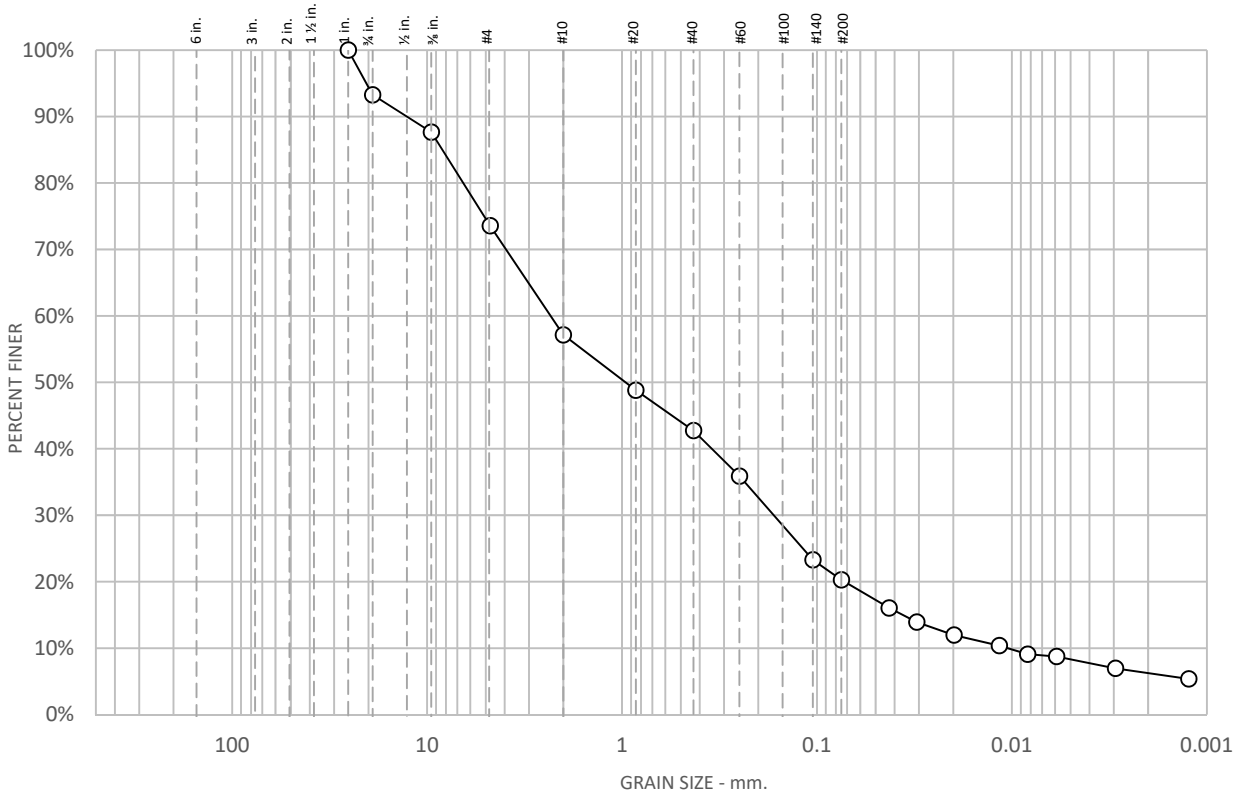
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B3@10	SAMPLE NUMBER: 1-B3@25
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	6.8	19.7	16.4	14.4	22.5	14.0	6.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	93.3		
⅜ in.	87.7		
#4	73.6		
#10	57.2		
#20	48.8		
#40	42.7		
#60	35.9		
#140	23.3		
#200	20.3		
0.0427 mm.	16.1		
0.0308 mm.	13.9		
0.0198 mm.	12.0		
0.0116 mm.	10.4		
0.0083 mm.	9.1		
0.0059 mm.	8.7		
0.0029 mm.	7.0		
0.0012 mm.	5.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 12.7236 mm D_{85} = 8.3544 mm D_{60} = 2.3233 mm
D_{50} = 0.9596 mm D_{30} = 0.1667 mm D_{15} = 0.0363 mm
D_{10} = 0.0105 mm C_u = 220.57 C_c = 1.14

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 10

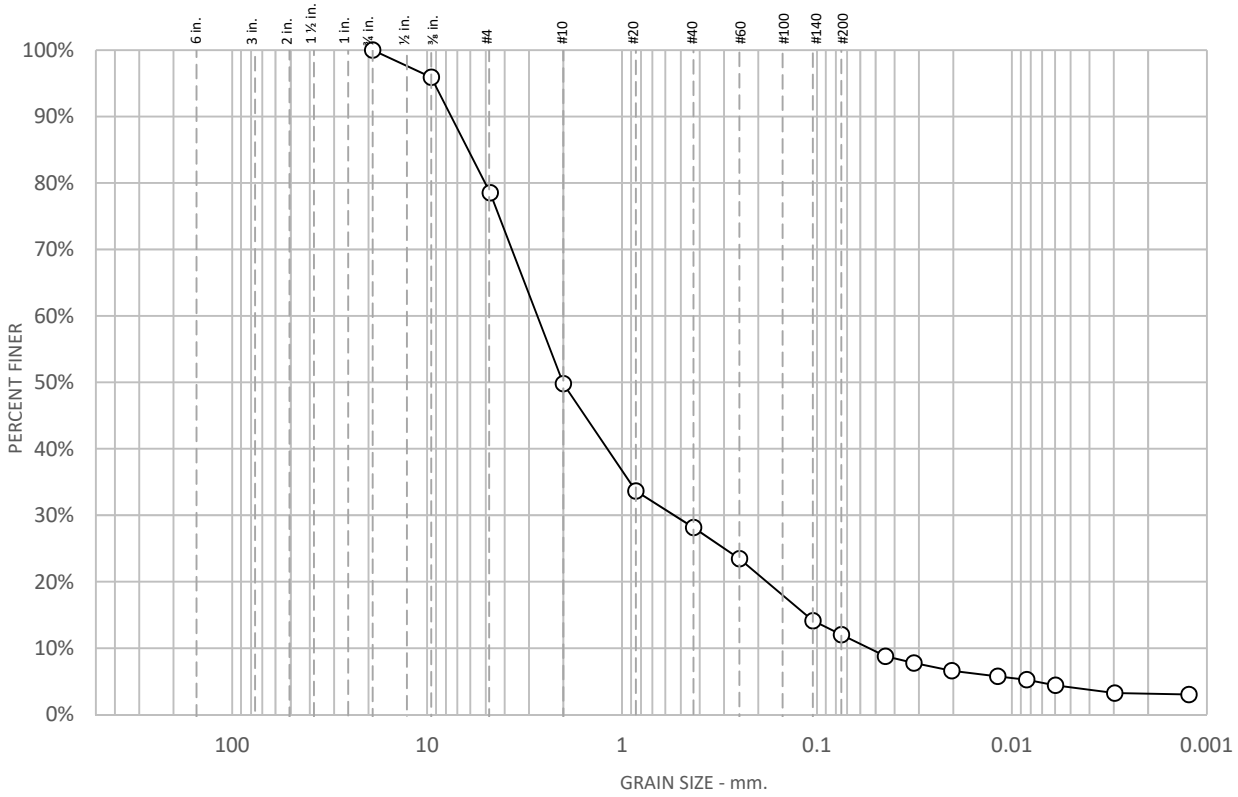
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	21.5	28.7	21.6	16.1	8.9	3.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	95.9		
#4	78.5		
#10	49.8		
#20	33.6		
#40	28.2		
#60	23.5		
#140	14.1		
#200	12.0		
0.0446 mm.	8.8		
0.0318 mm.	7.8		
0.0203 mm.	6.6		
0.0118 mm.	5.8		
0.0084 mm.	5.2		
0.0060 mm.	4.4		
0.0030 mm.	3.2		
0.0012 mm.	3.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 7.5207 mm D_{85} = 6.1570 mm D_{60} = 2.7190 mm
D_{50} = 2.0116 mm D_{30} = 0.5405 mm D_{15} = 0.1139 mm
D_{10} = 0.0543 mm C_u = 50.09 C_c = 1.98

Classification

USCS = SW

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 18

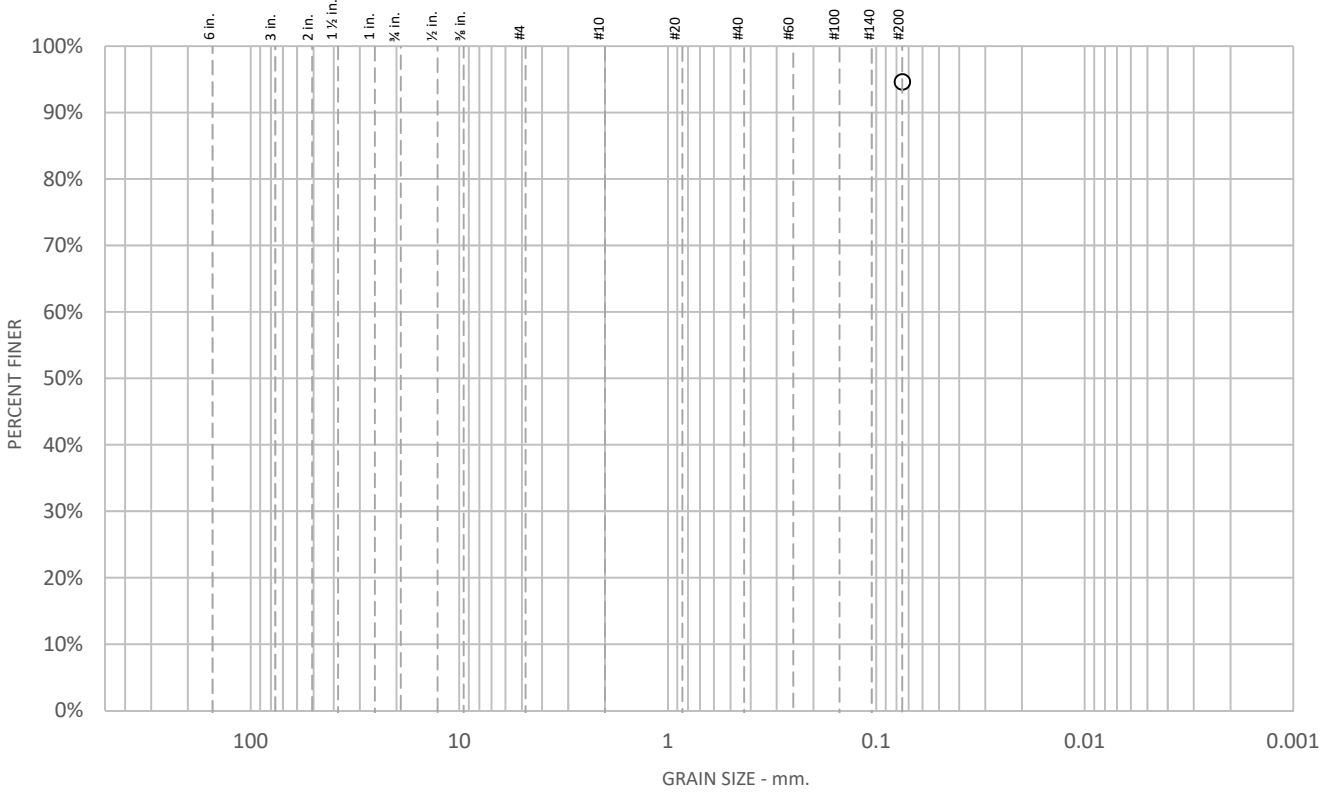
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						94.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	94.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 22 LL = 53 PI = 31

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 170.5 g

Sample Number: 1-B5 @ 25.5

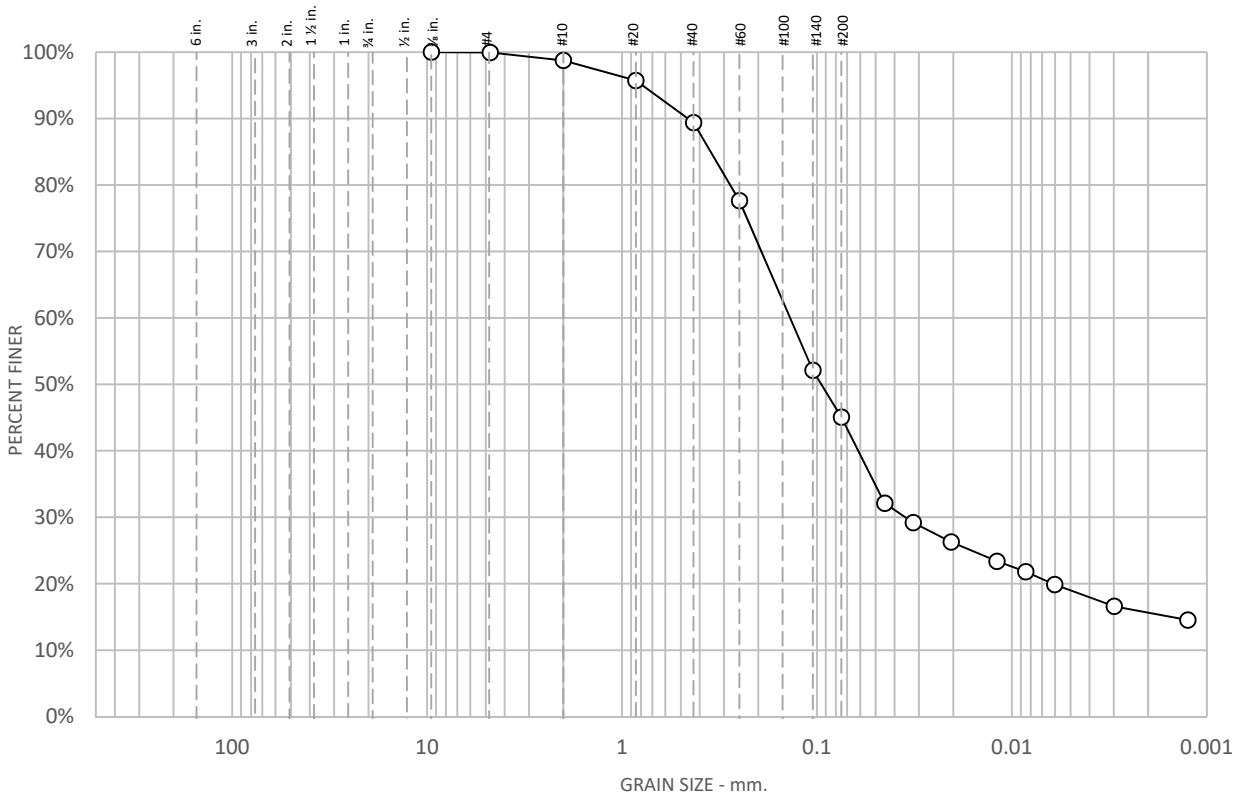
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		0.1	1.2	9.4	44.3	29.4	15.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
⅜ in.	100.0		
#4	99.9		
#10	98.7		
#20	95.7		
#40	89.4		
#60	77.6		
#140	52.1		
#200	45.0		
0.0450 mm.	32.1		
0.0321 mm.	29.2		
0.0205 mm.	26.3		
0.0119 mm.	23.4		
0.0085 mm.	21.8		
0.0060 mm.	19.9		
0.0030 mm.	16.6		
0.0013 mm.	14.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.4590 mm D_{85} = 0.3512 mm D_{60} = 0.1373 mm
D_{50} = 0.0950 mm D_{30} = 0.0353 mm D_{15} = 0.0015 mm
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 36

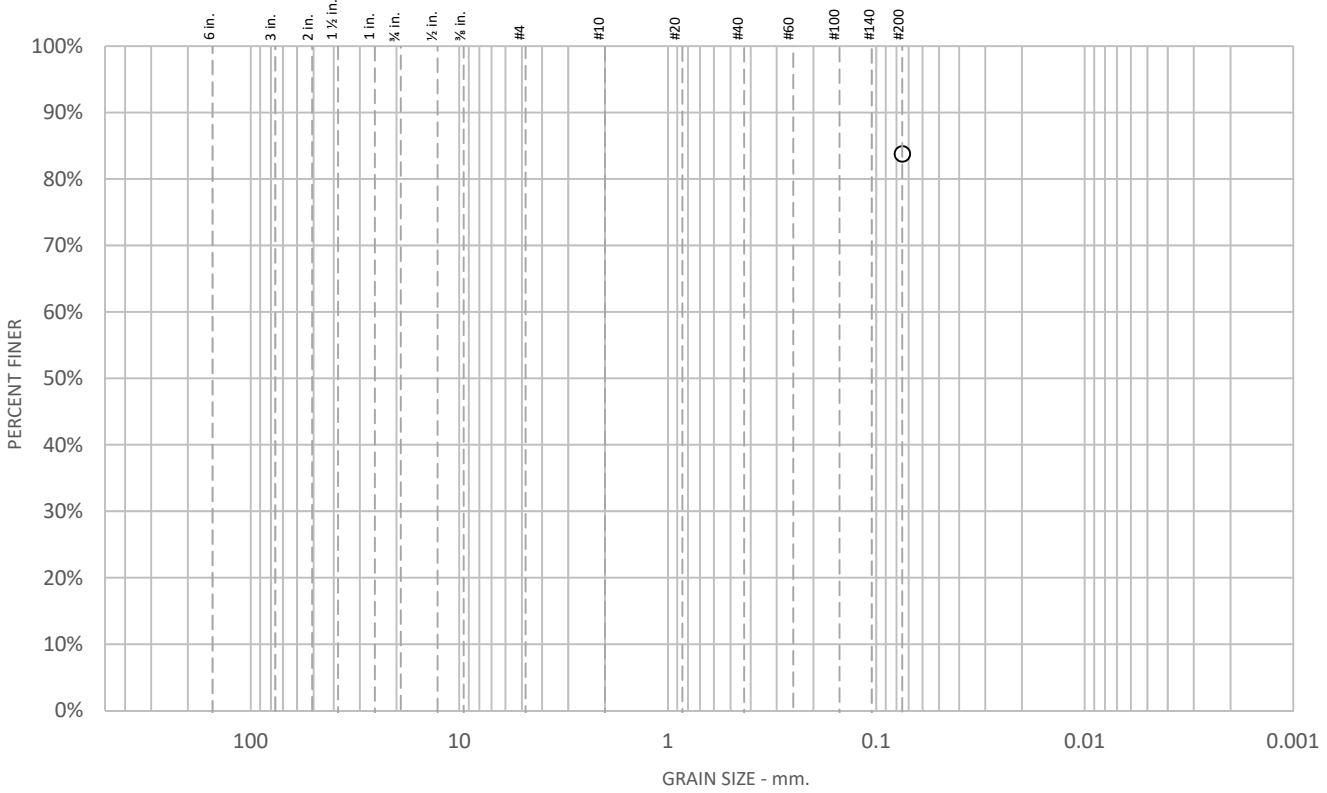
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						83.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	83.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 42 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 181.2 g

Sample Number: 1-B5 @ 40

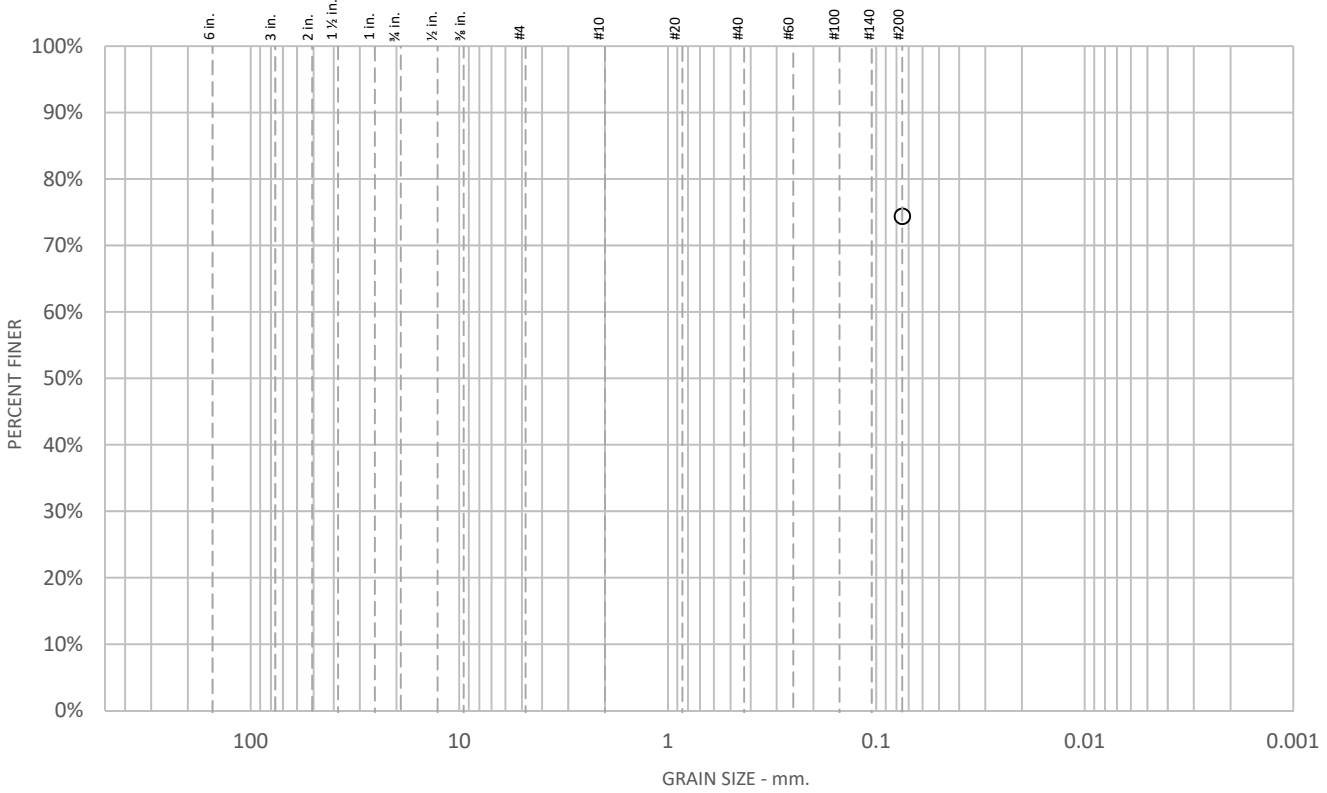
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	74		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 68 PI = 51

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 160.4 g

Sample Number: 1-B5 @ 8

Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	**1-B5**							
DEPTH (ft.):	**8**							
MOISTURE CONTENT (%):	**36.4**							
DRY DENSITY (lbs/ft^3):	**82.9**							

Testing remarks:

PROJECT NAME: **NBS Infrastructure Master Planning FIG2**
PROJECT NUMBER: **15959.000.000**
CLIENT: **Google, LLC**
PHASE NUMBER: **LAB**

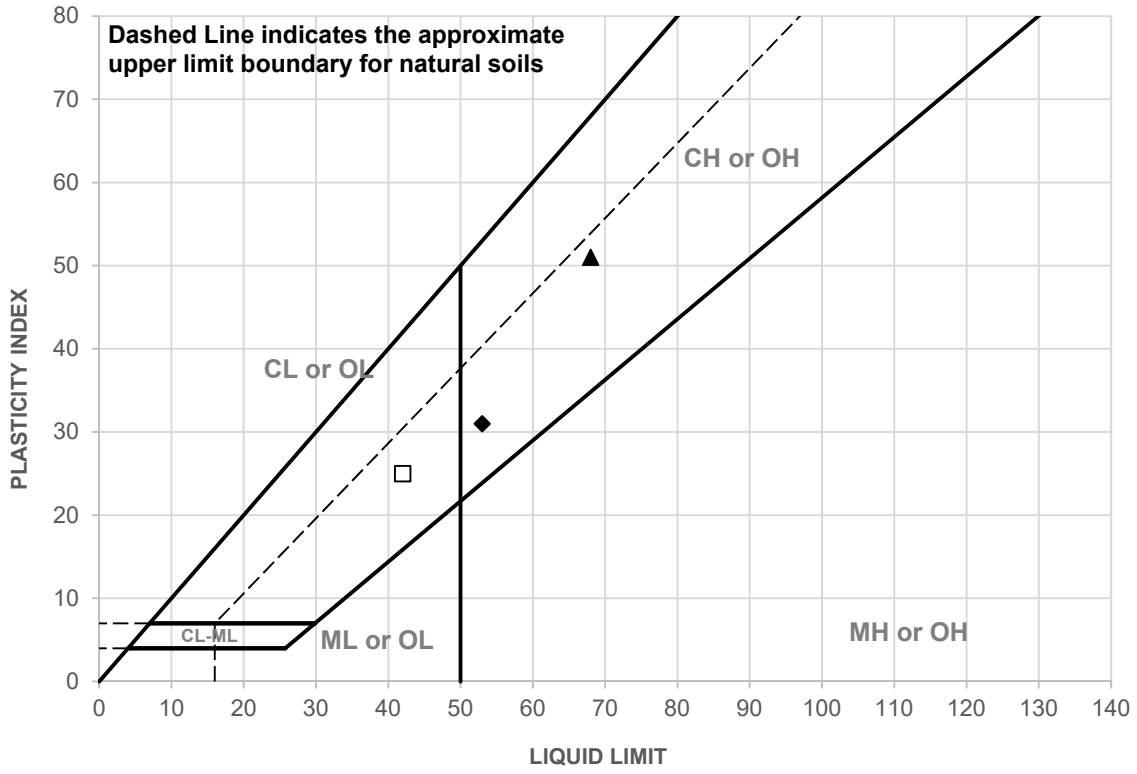
DATE: **09/09/19**

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 3420 Fostoria Way, Suite E, Danville, CA 94526. Phone No. (925) 355-9047.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B5	8	See exploration logs	68	17	51
◆	1-B5	25.5	See exploration logs	53	22	31
□	1-B5	40	See exploration logs	42	17	25

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B5	PI: ASTM D4318, Wet Method	
◆	1-B5	PI: ASTM D4318, Wet Method	
□	1-B5	PI: ASTM D4318, Wet Method	

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Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B5@10

Description: USCS: n/a

%Passing #4: 73.6

Method used: **B**

Temperature (°C): **23.3** ***Specific gravity at 20° C:*** **2.813**

Sample 2: 1-B5@18

Description: USCS: SW

%Passing #4: 78.5

Method used: **B**

Temperature (°C): **23.5** ***Specific gravity at 20° C:*** **2.883**

Sample 3: 1-B5@36

Description: USCS: n/a

%Passing #4: 99.9

Method used: **B**

Temperature (°C): **23.4** ***Specific gravity at 20° C:*** **2.774**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER:

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

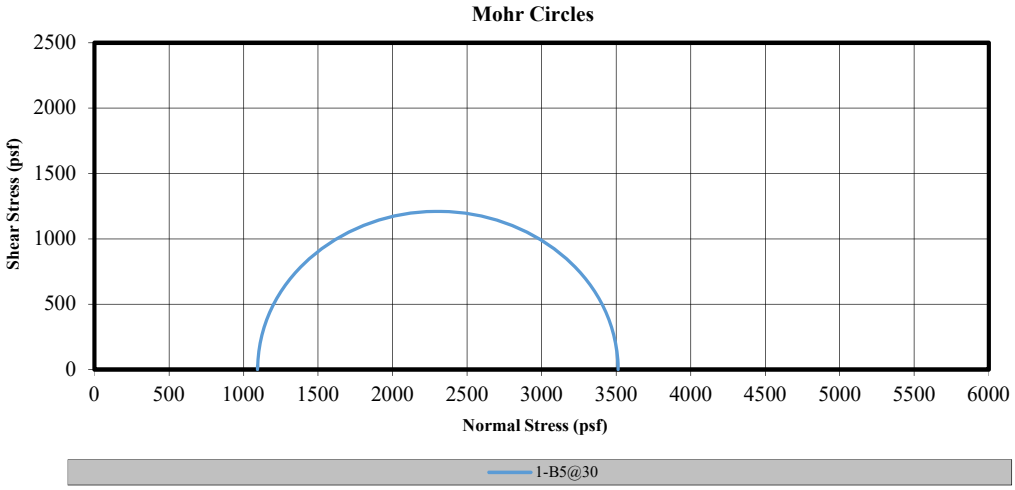
ASTM D2850

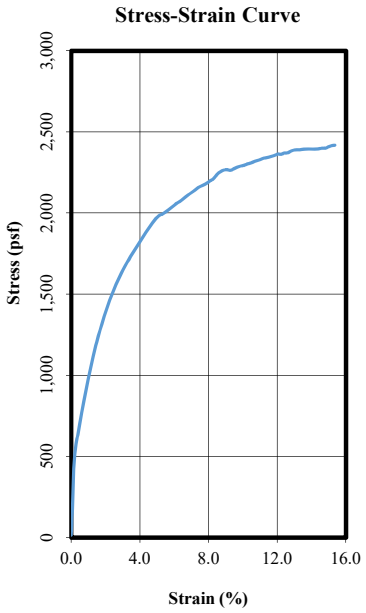
Date: 09/11/19

Checked By: G. Criste

Date: 9/11/2019

Tested By: M. Quasem





Before Test	Specimen 1-B5@30			
Water Content (%)	26.07			
Dry Density (pcf)	99.00			
Saturation (%)	99.14			
Void Ratio	0.72			
Diameter (in)	2.380			
Height (in)	5.070			
Height-to-Diameter Ratio	2.130			
ASTM D4318 - Wet Method				
Liquid Limit	-			
Plastic Limit	-			
ASTM D854 - Assumed				
Specific Gravity	2.720			
After Test	**1-B5@30**			
Water Content (%)	26.07			
Saturation (%)	99.14			
Strain Rate (in/min)	0.05			
Peak Deviator Stress (psf)	2418.5			
Axial Strain @ Failure (%)	15.347			
	Cell Pressure			
Cell (psf)	1094.4			
Back (psf)	n/a			
	Principle Stresses at Failure			
σ1 (psf)	3512.9			
σ3 (psf)	1094.4			
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1209.3			
Friction Angle Ø	n/a		n/a			

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

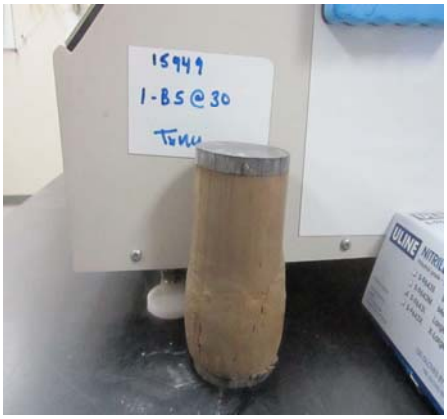
Date: 09/11/19

Checked By: G. Criste

Date: 9/11/2019

Tested By: M. Quasem

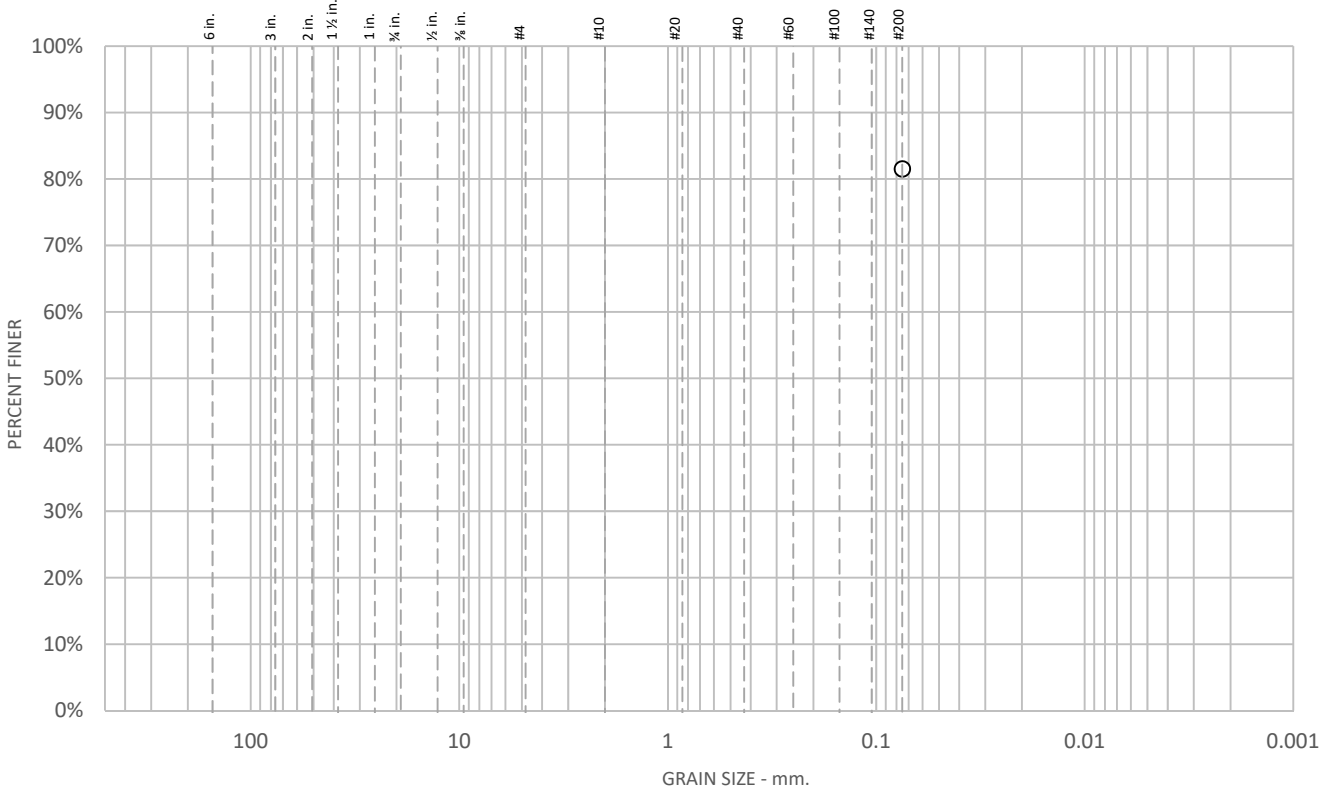
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B5@30	
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	81.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 44 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 178.5 g

Sample Number: 1-B6 @ 10

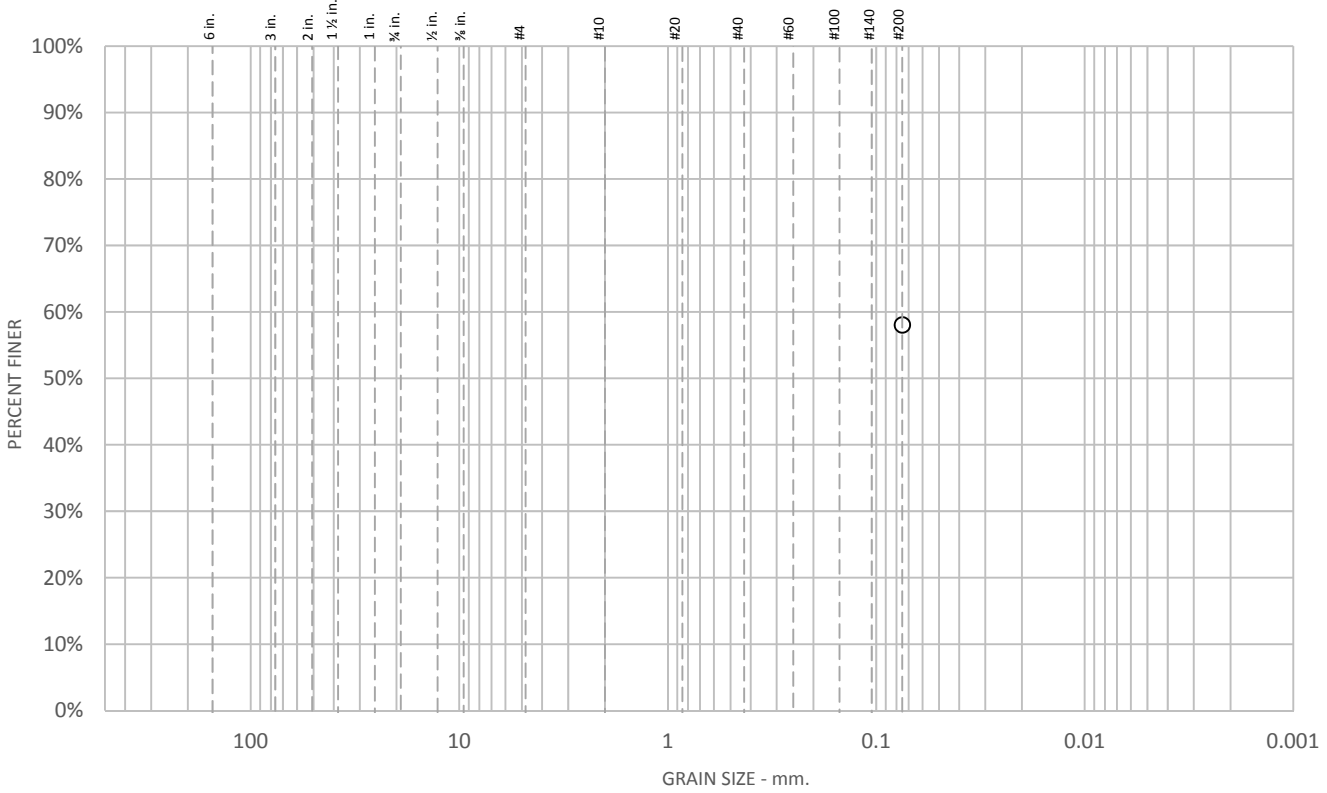
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	58		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 21 LL = 41 PI = 20

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method A
Soak time = 180 min
Dry sample weight = 70.64 g

Sample Number: 1-B6 @ 16.5 @ 16.5 ft

Client: Google LLC
Project: NBS Infrastructure Master Planning F1G2
Project location: Mountain View, California

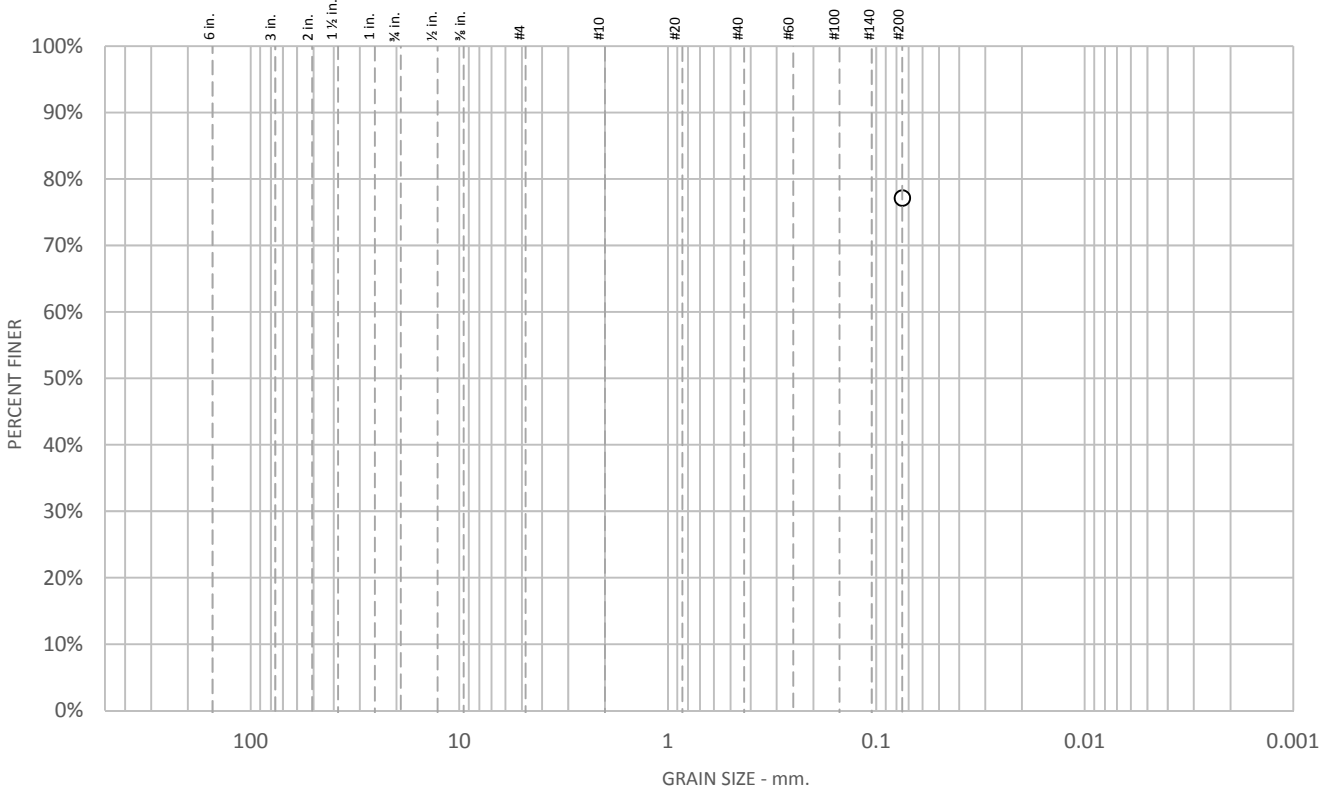
Project Number: 15949.000.000
Date: 9/17/2019

ENGEO Expect Excellence

Tested By: W. Miller
Checked By: D. Seibold

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						77.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	77.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 23 LL = 36 PI = 13

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method A
Soak time = 180 min
Dry sample weight = 91.29 g

Sample Number: 1-B6 @ 30

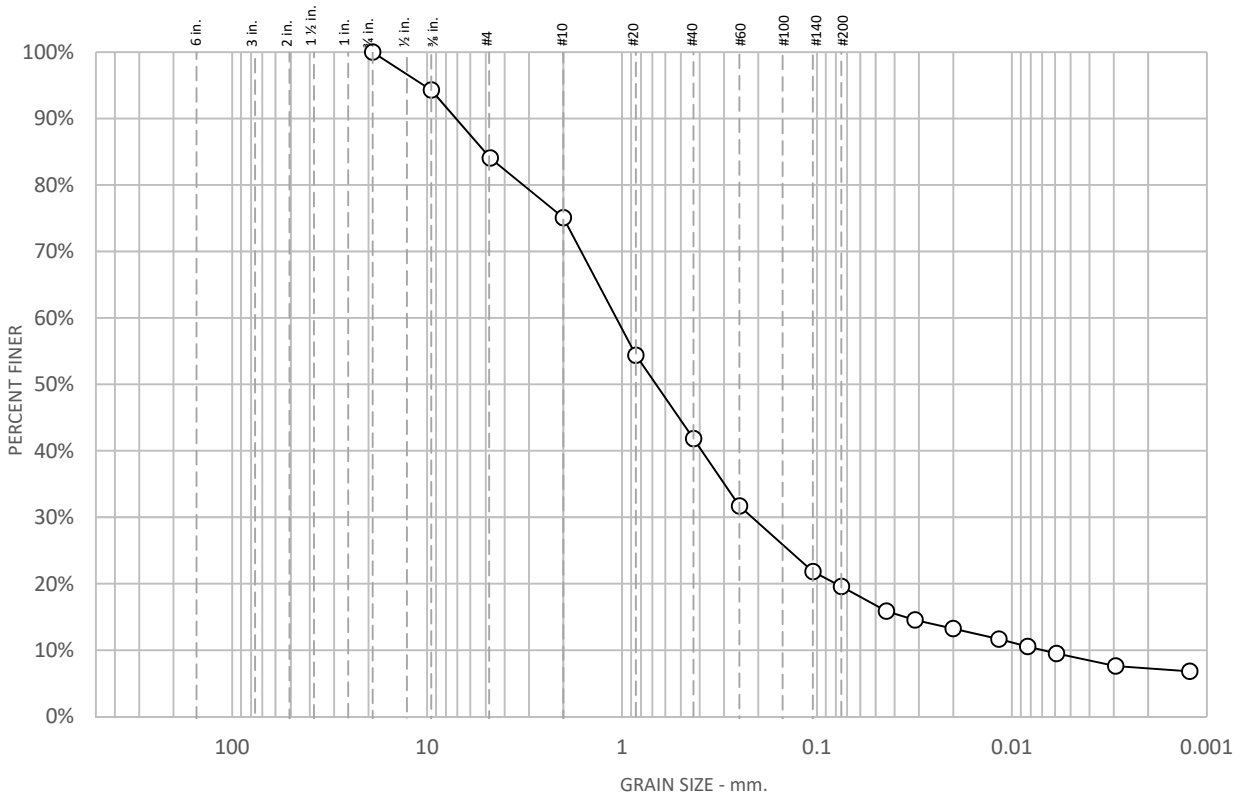
Client: Google LLC **Project Number:** 15949.000.000
Project: NBS Infrastructure Master Planning F1G2 **Date:** 9/18/2019
Project location: Mountain View, California

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	15.9	9.0	33.2	22.3	12.3	7.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	94.3		
#4	84.1		
#10	75.1		
#20	54.4		
#40	41.8		
#60	31.7		
#140	21.8		
#200	19.6		
0.0441 mm.	15.9		
0.0314 mm.	14.6		
0.0200 mm.	13.2		
0.0117 mm.	11.7		
0.0083 mm.	10.6		
0.0059 mm.	9.5		
0.0029 mm.	7.6		
0.0012 mm.	6.8		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.875

Atterberg Limits

PL = 15 LL = 30 PI = 15

Coefficients

D_{90} = 7.1115 mm D_{85} = 5.0596 mm D_{60} = 1.0722 mm
D_{50} = 0.6700 mm D_{30} = 0.2156 mm D_{15} = 0.0353 mm
D_{10} = 0.0069 mm C_u = 154.43 C_c = 6.24

Classification

USCS = SC

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B6 @ 35.5

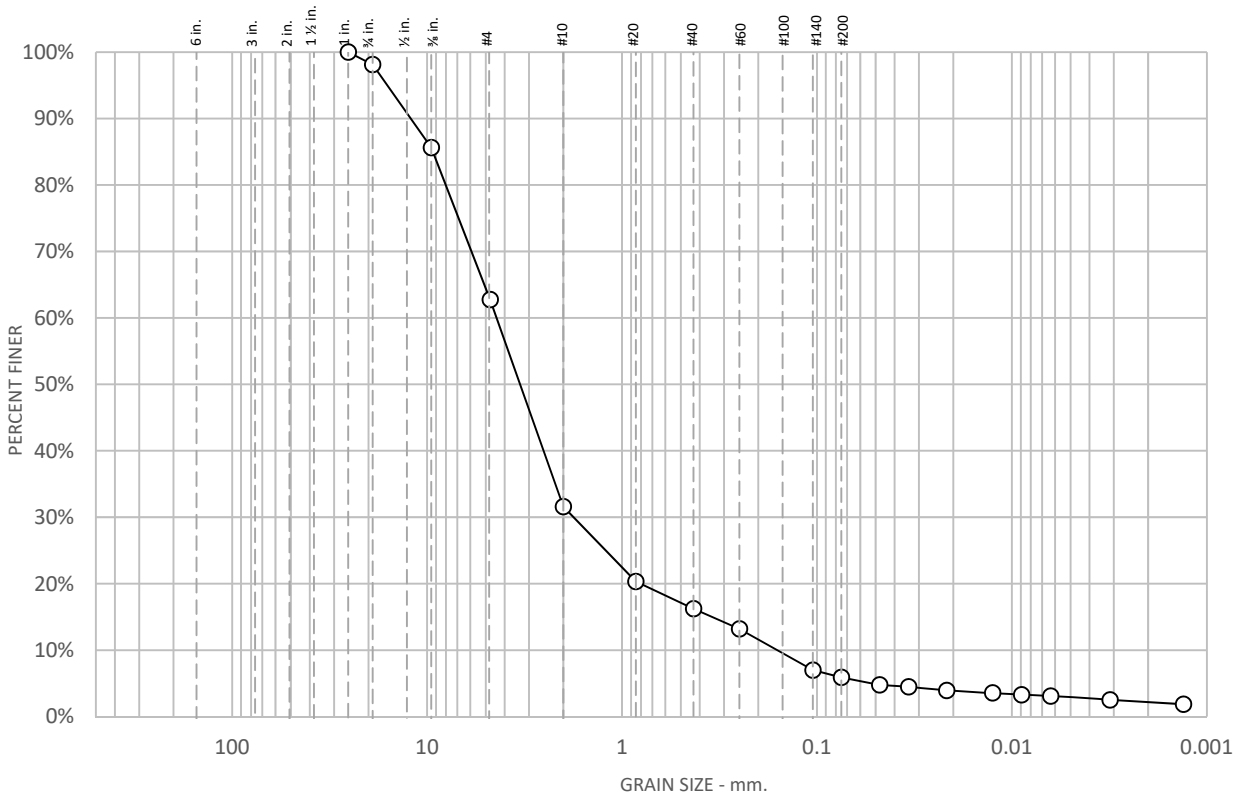
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	1.9	35.3	31.2	15.4	10.3	3.7	2.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	98.1		
⅜ in.	85.6		
#4	62.8		
#10	31.6		
#20	20.3		
#40	16.2		
#60	13.2		
#140	7.0		
#200	5.9		
0.0477 mm.	4.8		
0.0339 mm.	4.5		
0.0216 mm.	3.9		
0.0126 mm.	3.6		
0.0089 mm.	3.3		
0.0063 mm.	3.1		
0.0031 mm.	2.5		
0.0013 mm.	1.9		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.890.

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 12.1402 mm D_{85} = 9.3444 mm D_{60} = 4.3996 mm
D_{50} = 3.3331 mm D_{30} = 1.7711 mm D_{15} = 0.3449 mm
D_{10} = 0.1598 mm C_u = 27.54 C_c = 4.46

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B6 @ 40

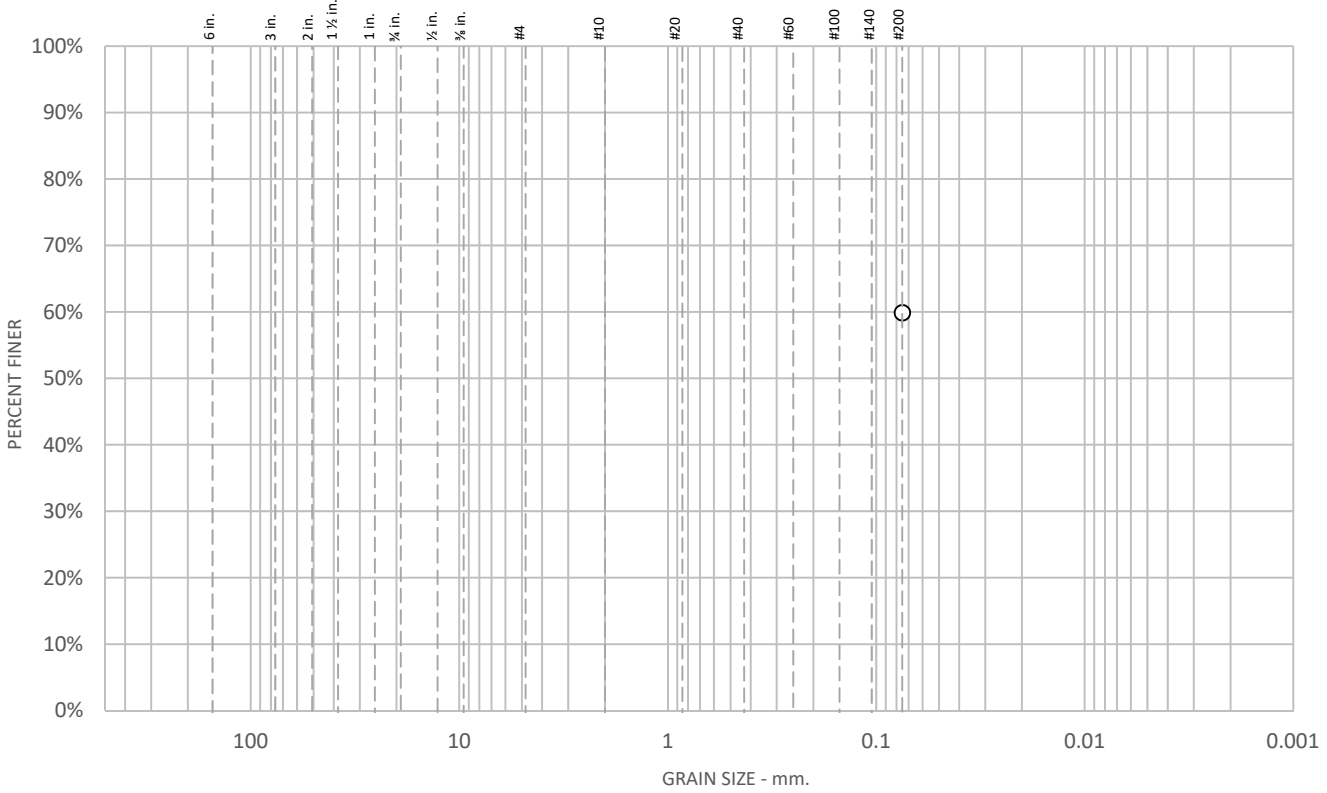
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	59.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 13 LL = 38 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 123.1 g

Sample Number: 1-B6 @ 45

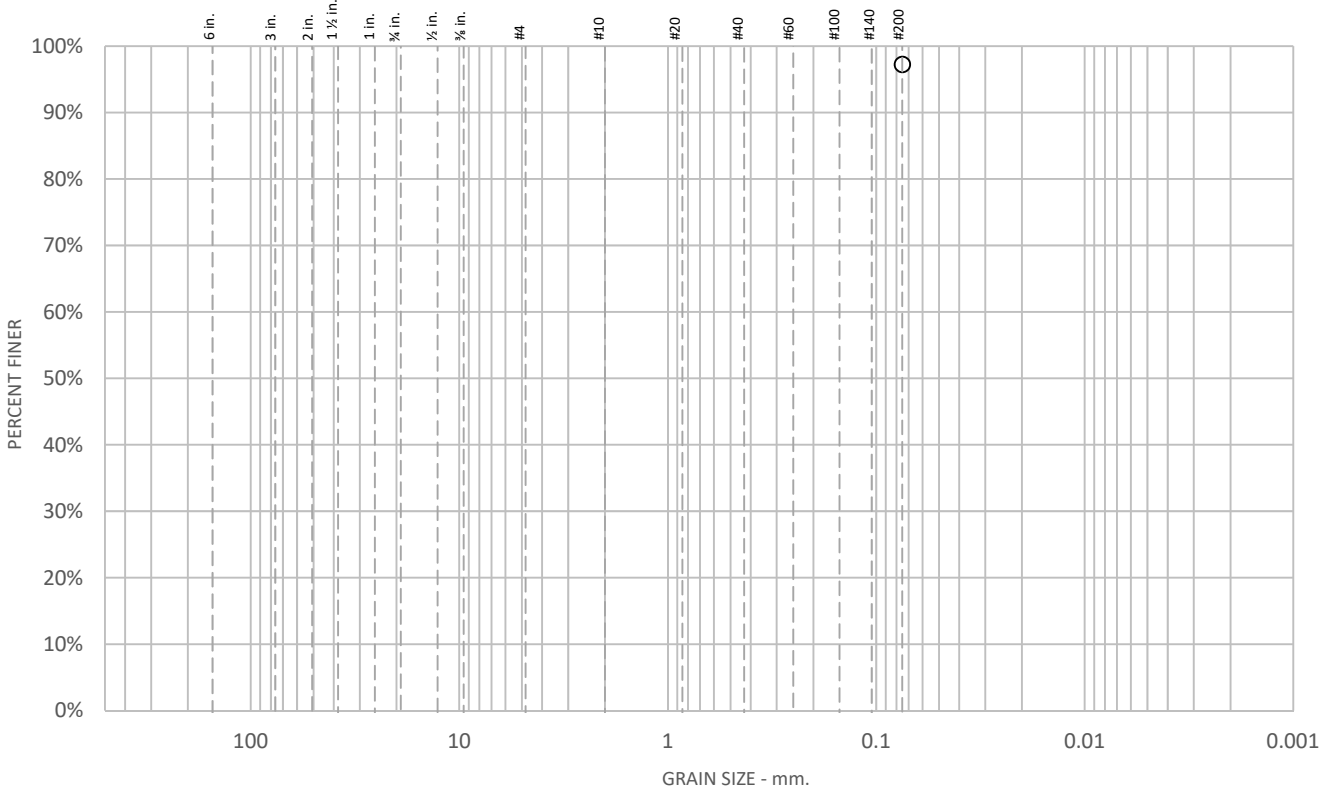
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						97.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	97.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 20 LL = 73 PI = 53

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 174 g

Sample Number: 1-B6 @ 5.5

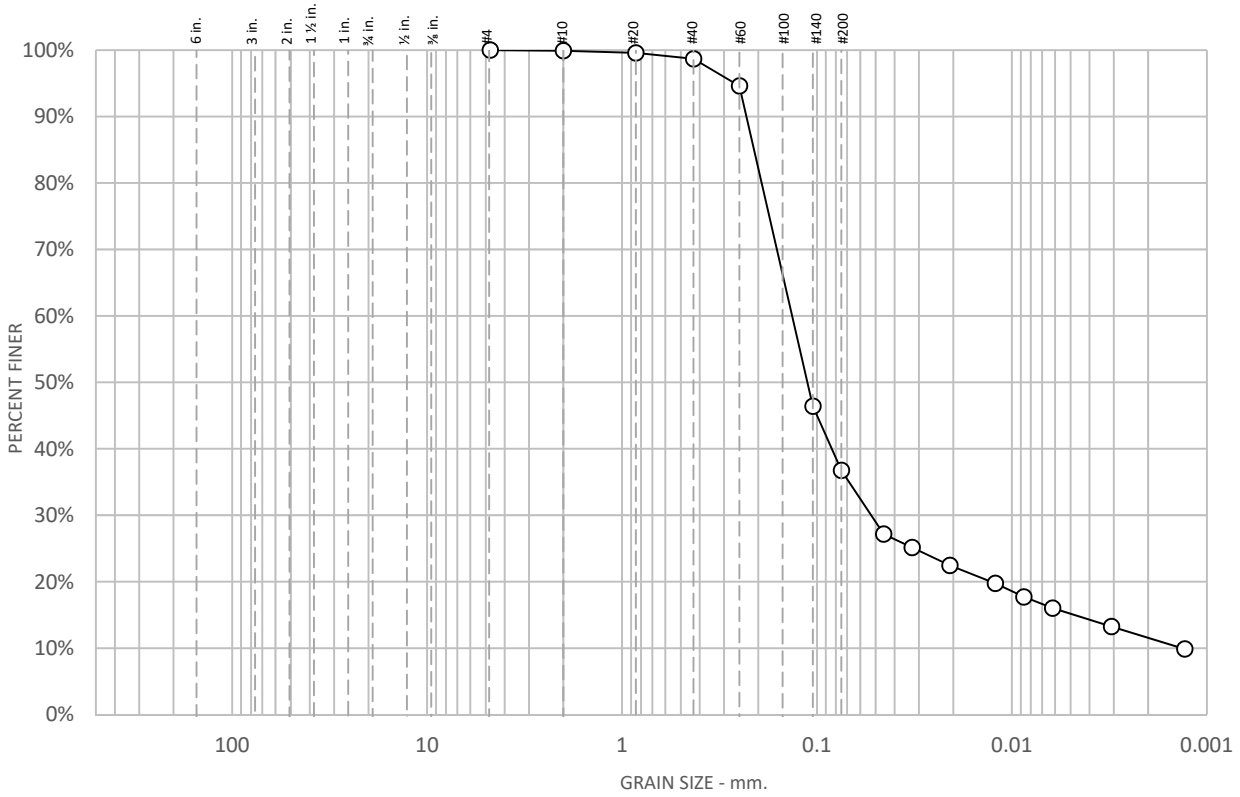
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			0.1	1.2	61.9	25.2	11.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.6		
#40	98.7		
#60	94.6		
#140	46.4		
#200	36.8		
0.0455 mm.	27.2		
0.0325 mm.	25.1		
0.0208 mm.	22.4		
0.0122 mm.	19.7		
0.0087 mm.	17.7		
0.0062 mm.	16.0		
0.0031 mm.	13.2		
0.0013 mm.	9.9		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.732.

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2301 mm D_{85} = 0.2103 mm D_{60} = 0.1341 mm
D_{50} = 0.1120 mm D_{30} = 0.0527 mm D_{15} = 0.0048 mm
D_{10} = 0.0013 mm C_u = 99.82 C_c = 15.44

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B6 @ 70

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	1-B6	1-B6	1-B6	1-B6	1-B6			
DEPTH (ft.):	5.5	10	35.5	50.5	70			
MOISTURE CONTENT (%):	27.5	32.7	23.0	19.7	24.9			
DRY DENSITY (lbs/ft^3):	93.5	92.3	110.7	112.0	102.8			

Testing remarks:

PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NUMBER: 15959.000.000
CLIENT: Google, LLC
PHASE NUMBER: LAB

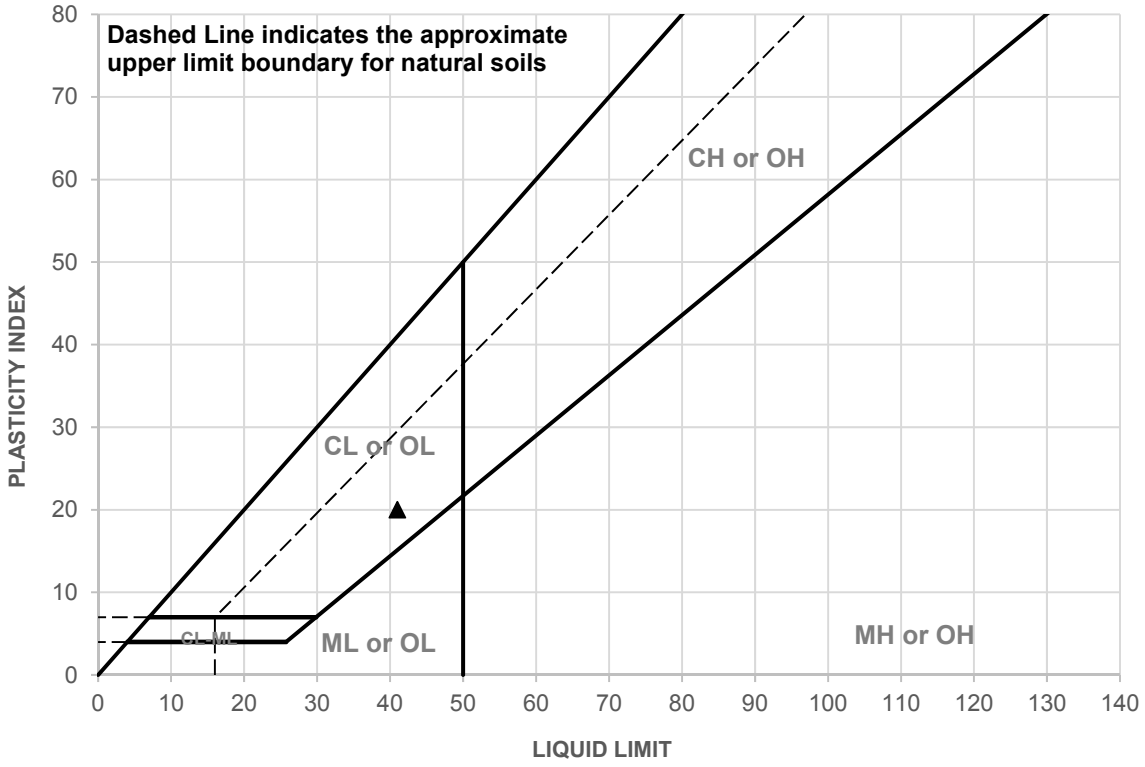
DATE: 09/09/19

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 2213 Plaza Dr., Rocklin, CA 95765. Phone No. (916) 786-8883.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



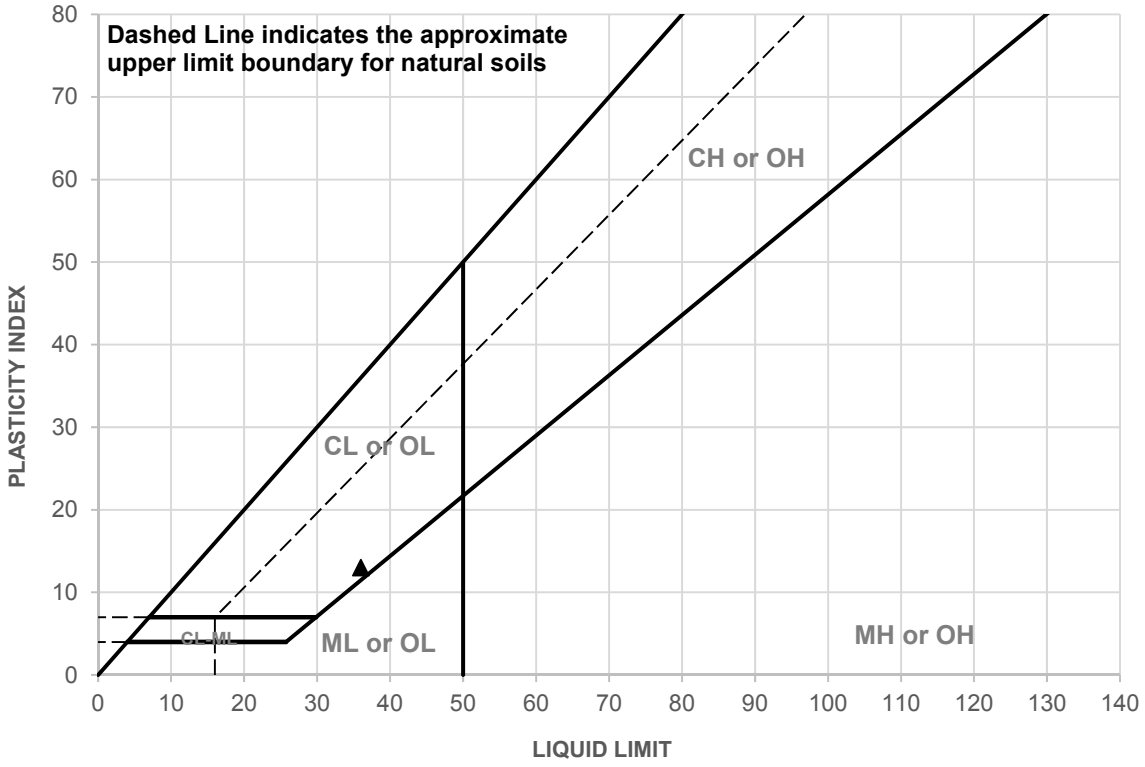
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6 @ 16.5	16-16.5 ft	See exploration logs	41	21	20

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6 @ 16.5	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/17/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



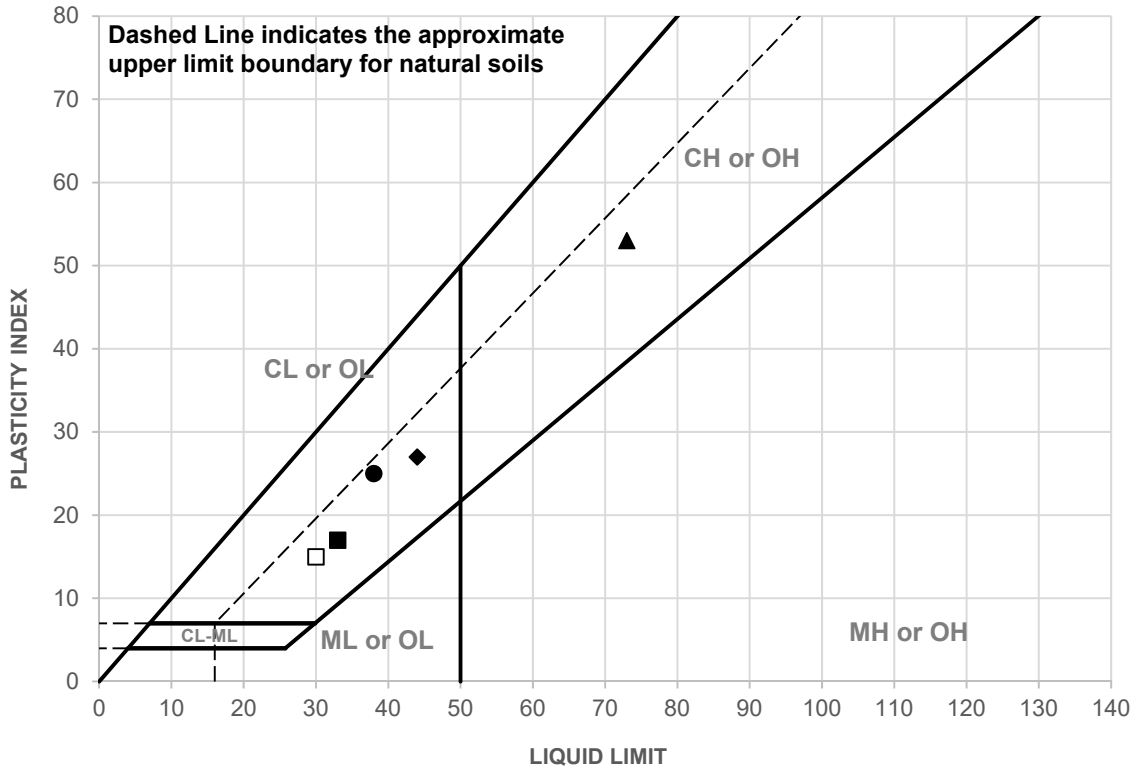
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6 @ 30	30 ft	See exploration logs	36	23	13

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6 @ 30	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/18/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6	5.5	See exploration logs	73	20	53
◆	1-B6	10	See exploration logs	44	17	27
□	1-B6	35.5	See exploration logs	30	15	15
●	1-B6	45	See exploration logs	38	13	25
■	1-B6	50.5	See exploration logs	33	16	17

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6	PI: ASTM D4318, Wet Method	
◆	1-B6	PI: ASTM D4318, Wet Method	
□	1-B6	PI: ASTM D4318, Wet Method	
●	1-B6	PI: ASTM D4318, Wet Method	
■	1-B6	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B6@35.5

Description: See exploration logs — USCS: SC

%Passing #4: 84.1

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.875**

Sample 2: 1-B6@40

Description: See exploration logs — USCS: SP

%Passing #4: 62.8

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.890**

Sample 3: 1-B6@70

Description: See exploration logs — USCS: n/a

%Passing #4: 100.0

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.732**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** — **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER: **LAB**

ENGEO Expect Excellence

Tested by: R. Montalvo — Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

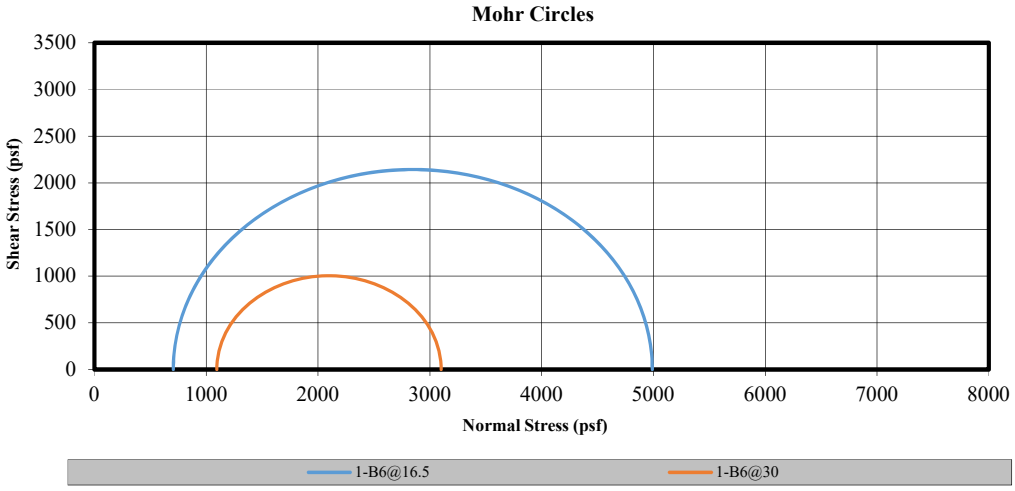
ASTM D2850

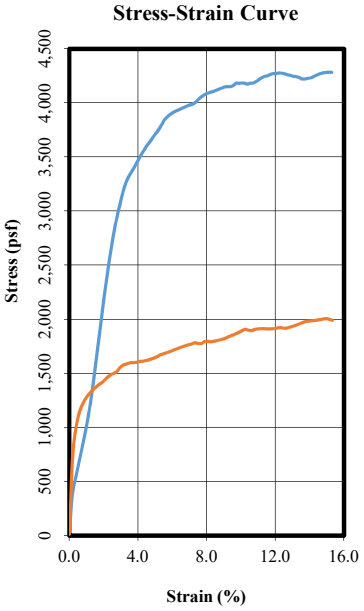
Date: 09/13/19

Checked By: G. Criste

Date: 9/13/2019

Tested By: M. Quasem





Before Test	Specimen 1-B6@16.5	1-B6@30		
Water Content (%)	21.94	27.08		
Dry Density (pcf)	109.00	100.00		
Saturation (%)	100.00	100.00		
Void Ratio	0.62	0.76		
Diameter (in)	2.850	2.370		
Height (in)	5.970	5.070		
Height-to-Diameter Ratio	2.095	2.139		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.820	2.820		
After Test	**1-B6@16.5**	**1-B6@30**		
Water Content (%)	21.94	27.08		
Saturation (%)	100.00	100.00		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	4283.9	2006.7		
Axial Strain @ Failure (%)	15.244	14.990		
	Cell Pressure			
Cell (psf)	705.6	1094.4		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	4989.5	3101.1		
σ3 (psf)	705.6	1094.4		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		2141.9	1003.4		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Montain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 09/13/19

Checked By: G. Criste

Date: 9/13/2019

Tested By: M. Quasem

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B6@16.5	SAMPLE NUMBER: 1-B6@30
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Montain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence



APPENDIX D

CORROSIVITY TEST RESULTS (CERCO Analytical)

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

25 June, 2019

Job No. 1906091
Cust. No. 10169

Mr. Bahareh Heidarzadeh
ENGEO Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Subject: Project No.: 15949.000.000
Project Name: Mountain View Multiple Parcels
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Heidarzadeh:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on June 17, 2019. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, all samples are 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 are none detected & 31 mg/kg, are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations ranged from 87 to 140 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 ranged from 8.23 to 8.30, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials ranged from 140 to 240-mV. Samples No.002 & No.003 are indicative of potentially "moderately corrosive" soils and Sample No.001 is indicative of potentially "slightly corrosive" soils resulting from anaerobic 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.: 15949.000.000
Client's Project Name: Mountain View Multiple Parcels
Date Sampled: 14-Jun-19
Date Received: 17-Jun-19
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 25-Jun-2019

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)*
1906091-001	1-B4 20.5	240	8.23	-	1,200	N.D.	N.D.	87
1906091-002	1-B7 5	170	8.29	-	1,100	N.D.	31	140
1906091-003	1-B7 25.5	140	8.30	-	1,200	N.D.	N.D.	97

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
	20-Jun-2019	20-Jun-2019	-	17-Jun-2019	12-Jun-2019	20-Jun-2019	20-Jun-2019

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

1906091

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 15949.000.000	PROJECT NAME: Mountain View Multiple Parcels
SAMPLED BY: (SIGNATURE/PRINT) Bofei Xu	
PROJECT MANAGER: Bahareh Heidarzadeh/Janet Kan	
ROUTING: E-MAIL bheidarzadeh@engeo.com	Hard Copy NA

SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE	Redox	Resistivity	pH	Sulfide	Sulfate	Chloride	REMARKS REQUIRED DETECTION LIMITS
1-B4 20.5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary
1-B7 5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary
1-B7 25.5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
	6/14/19 4:02PM			6/17/19 10:15	
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
	6/17/19 1500				
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	

ENGEO INCORPORATED

2010 CROW CANYON PLACE, SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000 FAX (888) 279-2698
WWW.ENGEO.COM

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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

23 September, 2019

Job No. 1909026
Cust. No. 10169

Ms. Bahareh Heidarzadeh
ENGEO Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Subject: Project No.: 15949.000.000
Project Name: Mountain View Multiple Parcels
Corrosivity Analysis – ASTM Test Methods

Dear Ms. Heidarzadeh:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on September 05, 2019. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No.010 is classified as "severely corrosive", Samples No.001, No.002, No.004, No.006, No.008 & No.009 are classified as "corrosive" and Samples No.003, No.005 & No.007 are classified as "moderately 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 ranged from none detected to 740 mg/kg and are determined to be sufficient to attack steel embedded in a concrete mortar coating. 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 ranged from 16 to 220 mg/kg and are determined to be sufficient to potentially be detrimental to reinforced concrete structures and cement mortar-coated steel at these locations. Therefore, concrete that comes into contact with this soil should use sulfate resistant cement such as Type II, with a maximum water-to-cement ratio of 0.55.

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

The pH of the soils ranged from 8.21 to 8.85, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials ranged from 180 to 230-mV. Samples No.008 & No.009 are indicative of potentially "moderately corrosive" soils and all remaining samples are indicative of potentially "slightly corrosive" soils resulting from anaerobic 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.

for, 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.: 15949.000.000
Client's Project Name: Mountain View Mulitple Parcels
Date Sampled: 5-Sep-19
Date Received: 5-Sep-19
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 23-Sep-2019

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)*
1909026-001	1-B6/8'	210	8.26	-	1,100	N.D.	N.D.	210
1909026-002	1-B6/26'	210	8.47	-	1,500	N.D.	N.D.	110
1909026-003	1-B6/40.5'	220	8.38	-	4,900	N.D.	N.D.	36
1909026-004	1-B3/8.5'	230	8.21	-	1,900	N.D.	N.D.	110
1909026-005	1-B3/41'	220	8.22	-	2,400	N.D.	N.D.	54
1909026-006	2-B4/10'	220	8.37	-	1,700	N.D.	22	56
1909026-007	2-B4/40.5'	220	8.38	-	2,400	N.D.	N.D.	17
1909026-008	3-B2/10.5'	180	8.64	-	1,500	N.D.	N.D.	16
1909026-009	3-B2/35.5'	190	8.31	-	1,400	N.D.	36	32
1909026-010	3-B3/30.5'	220	8.85	-	300	N.D.	740	220

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
	20-Sep-2019	20-Sep-2019	-	20-Sep-2019	12-Sep-2019	20-Sep-2019	20-Sep-2019

Steven Moore
for 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

CHAIN OF CUSTODY RECORD

CA 1909096

PROJECT NUMBER: 15949.000.000	PROJECT NAME: Mountain View Multiple Parcels
SAMPLED BY: (SIGNATURE/PRINT) Bofei Xu	
PROJECT MANAGER: Bahareh Heidarzadeh/Janet Kan	
ROUTING: E-MAIL bheidarzadeh@engeo.com	Hard Copy NA

	SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE	Redox	Resistivity	pH	Sulfide	Sulfate	Chloride	REMARKS REQUIRED DETECTION LIMITS
001	1-B6 / 8'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include Evaluation Summary
002	1-B6 / 26'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include Evaluation Summary
003	1-B6 / 40.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
004	1-B3 / 8.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
005	1-B3 / 41'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
006	2-B4 / 10'	090519		Soil	1	Bag		X	X	X	X	X	X	Include E.S.
007	2-B4 / 40.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
008	3-B2 / 10.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
009	3-B2 / 35.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
010	3-B3 / 30.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Bofei Xu	9/5 2:00pm			9/5 1520	
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	

ENGEO INCORPORATED

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SAN RAMON, CALIFORNIA 94583
(925) 866-9000 FAX (888) 279-2698
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APPENDIX E

LIQUEFACTION ANALYSIS

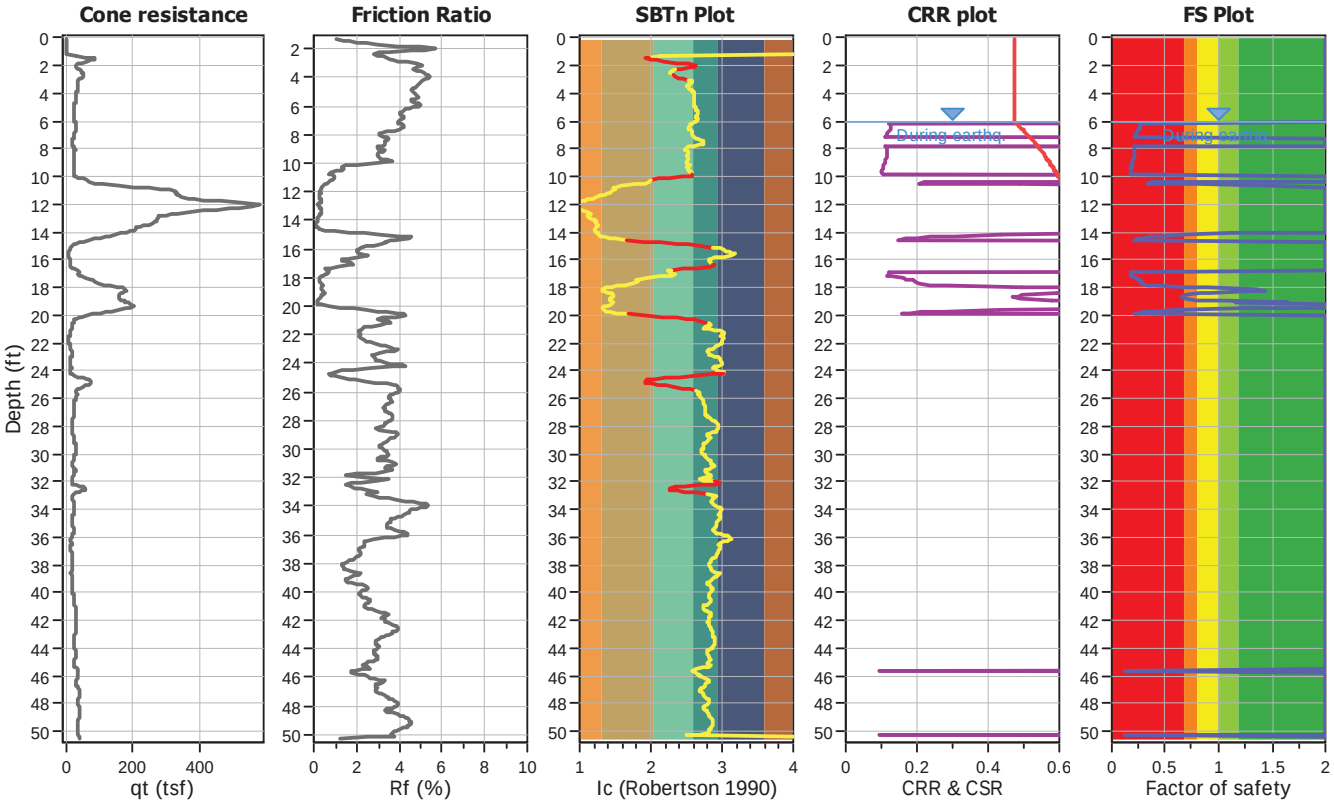
LIQUEFACTION ANALYSIS REPORT

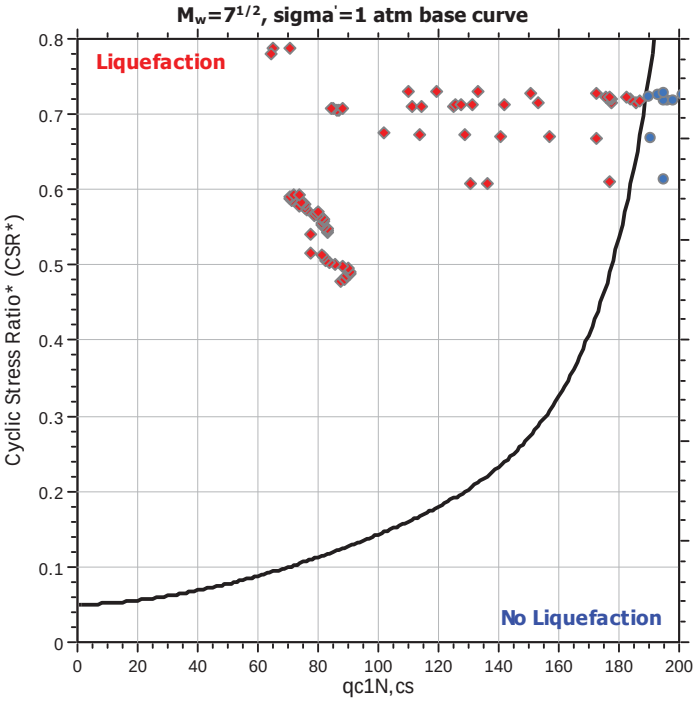
Project title : Google Parcels GEX **Location : Mountain View, CA**

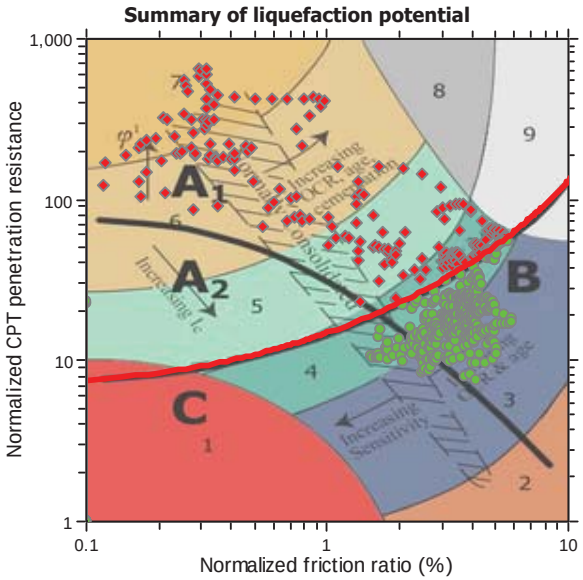
CPT file : 1-CPT1

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

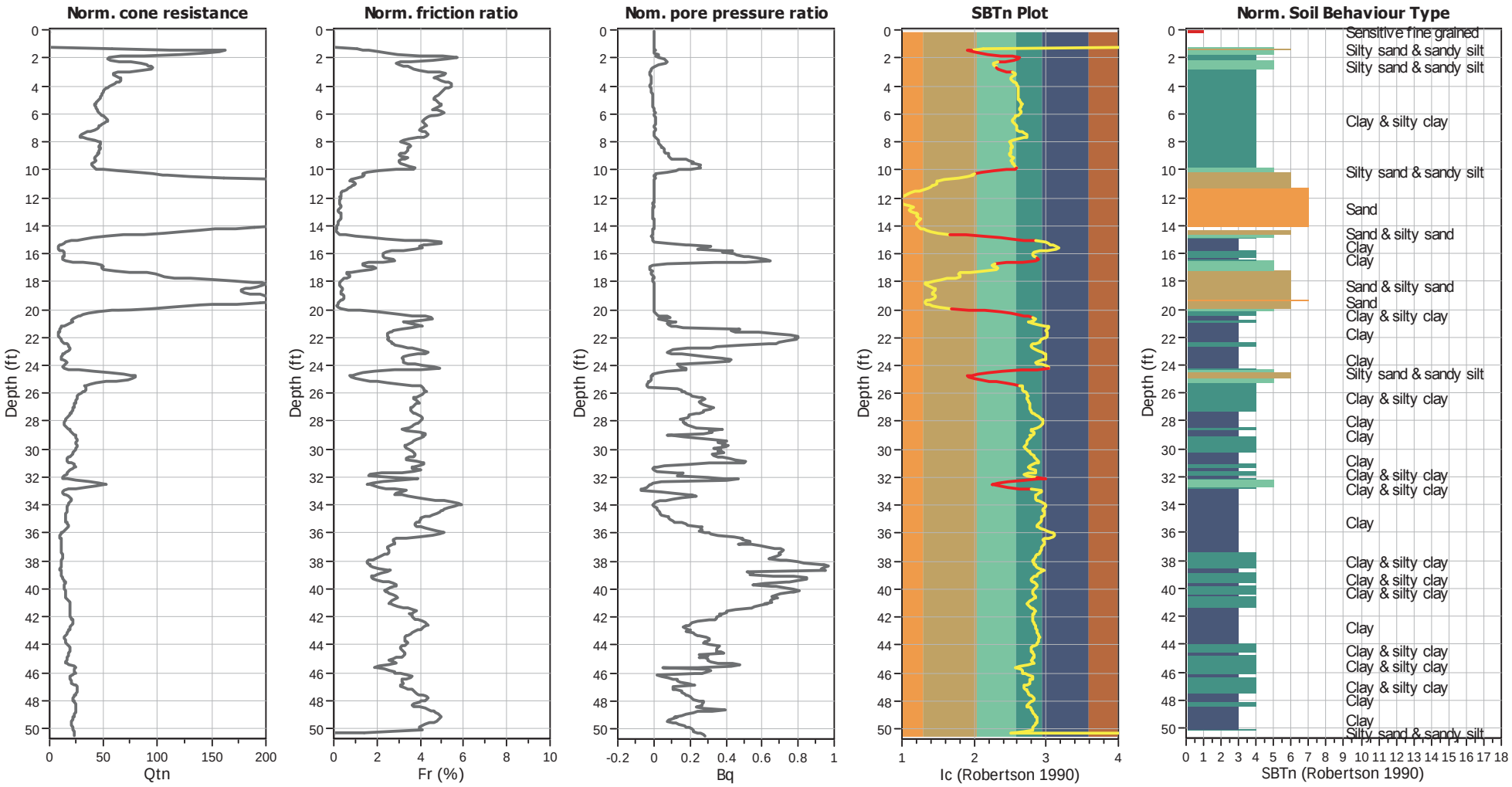






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



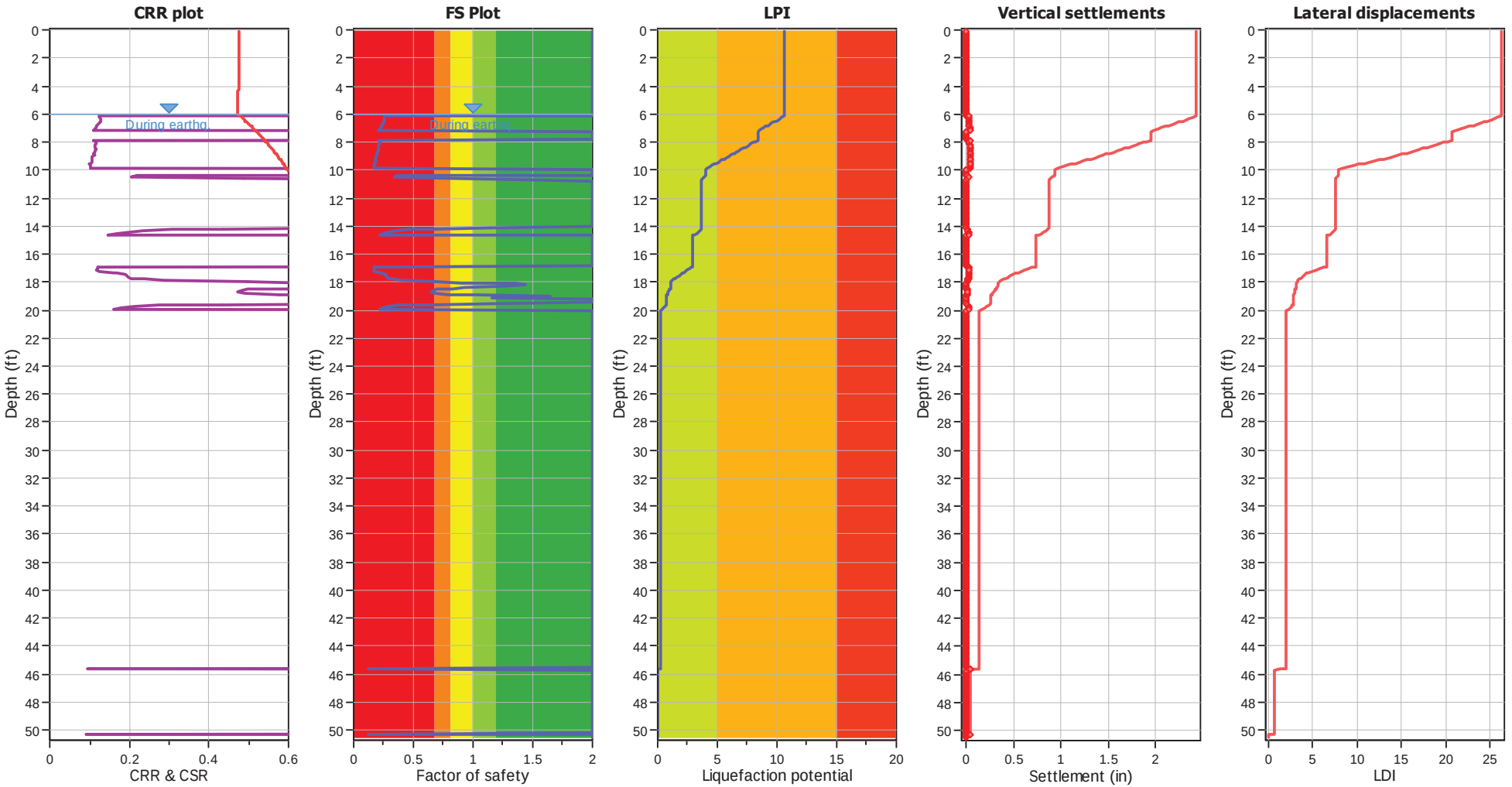
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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LIQUEFACTION ANALYSIS REPORT

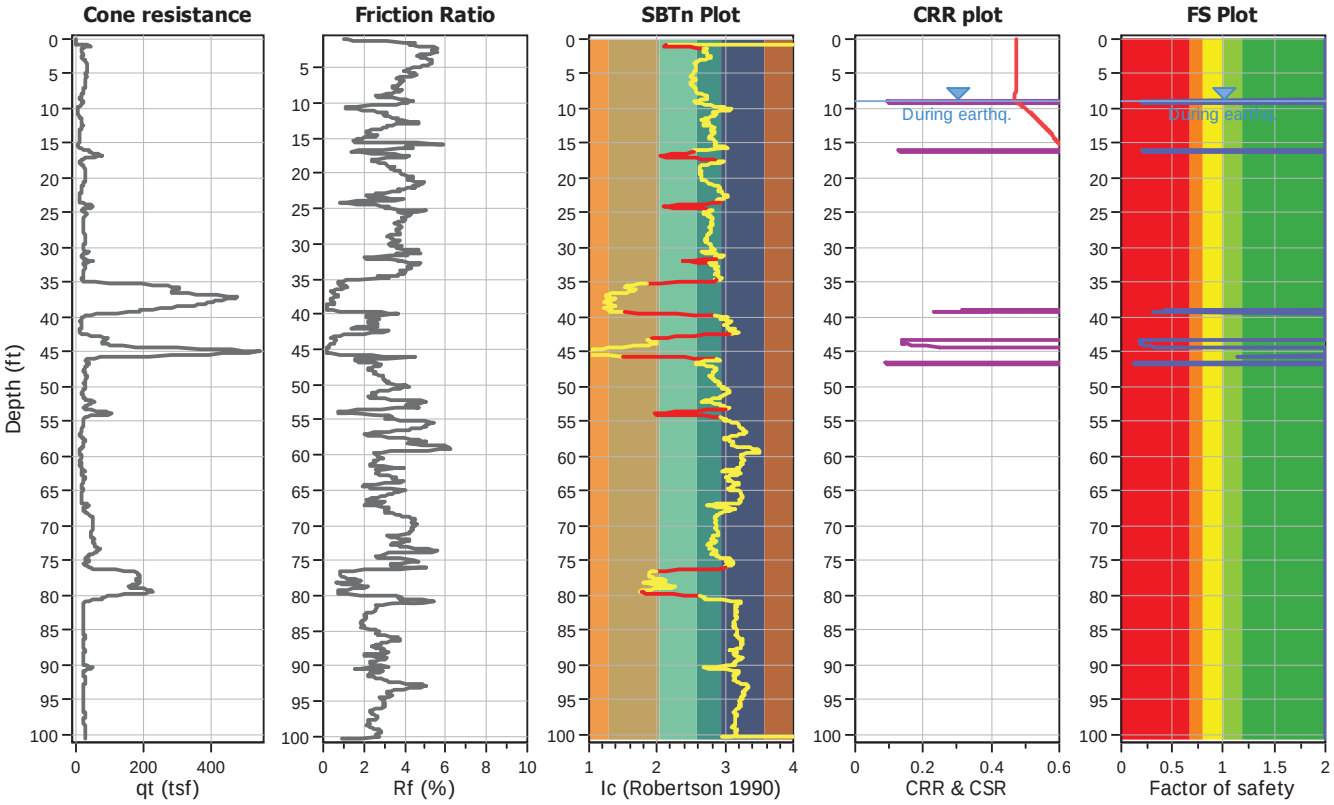
Project title : Google Parcels GEX

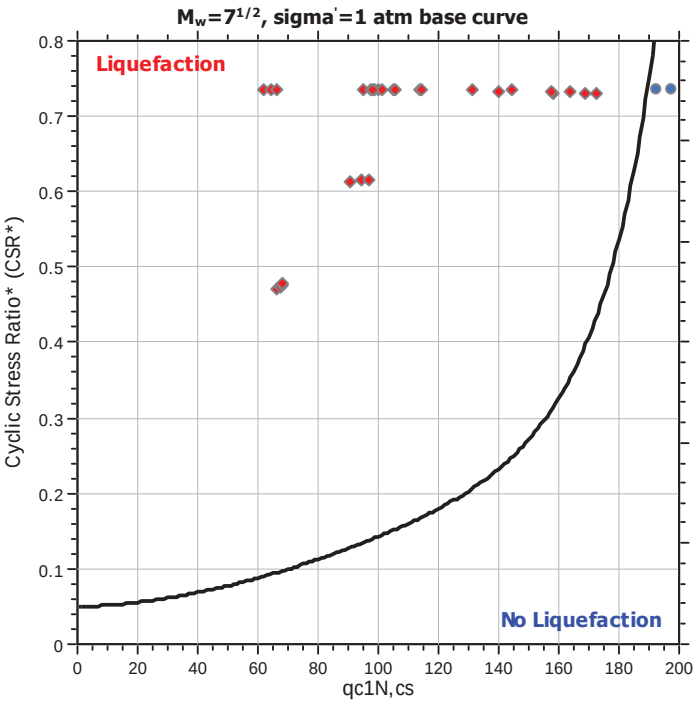
Location : Mountain View, CA

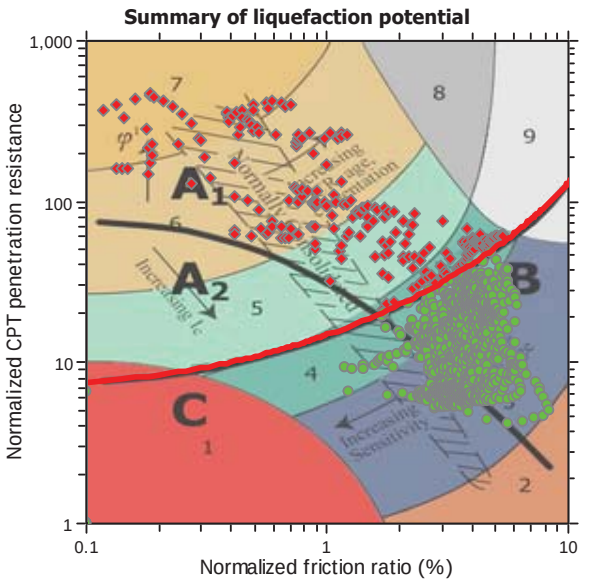
CPT file : 1-SCPT2

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	8.90 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	8.90 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

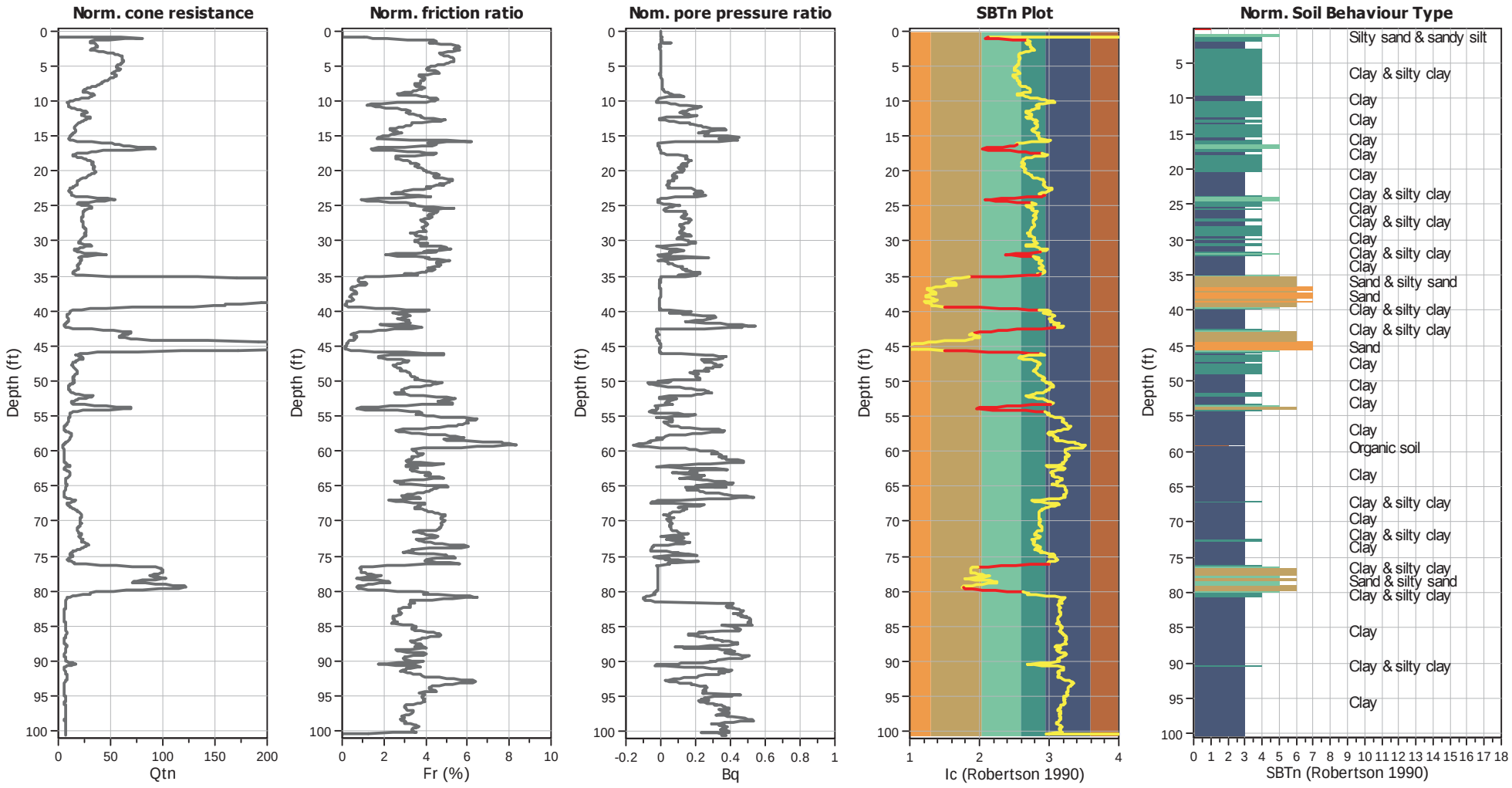






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



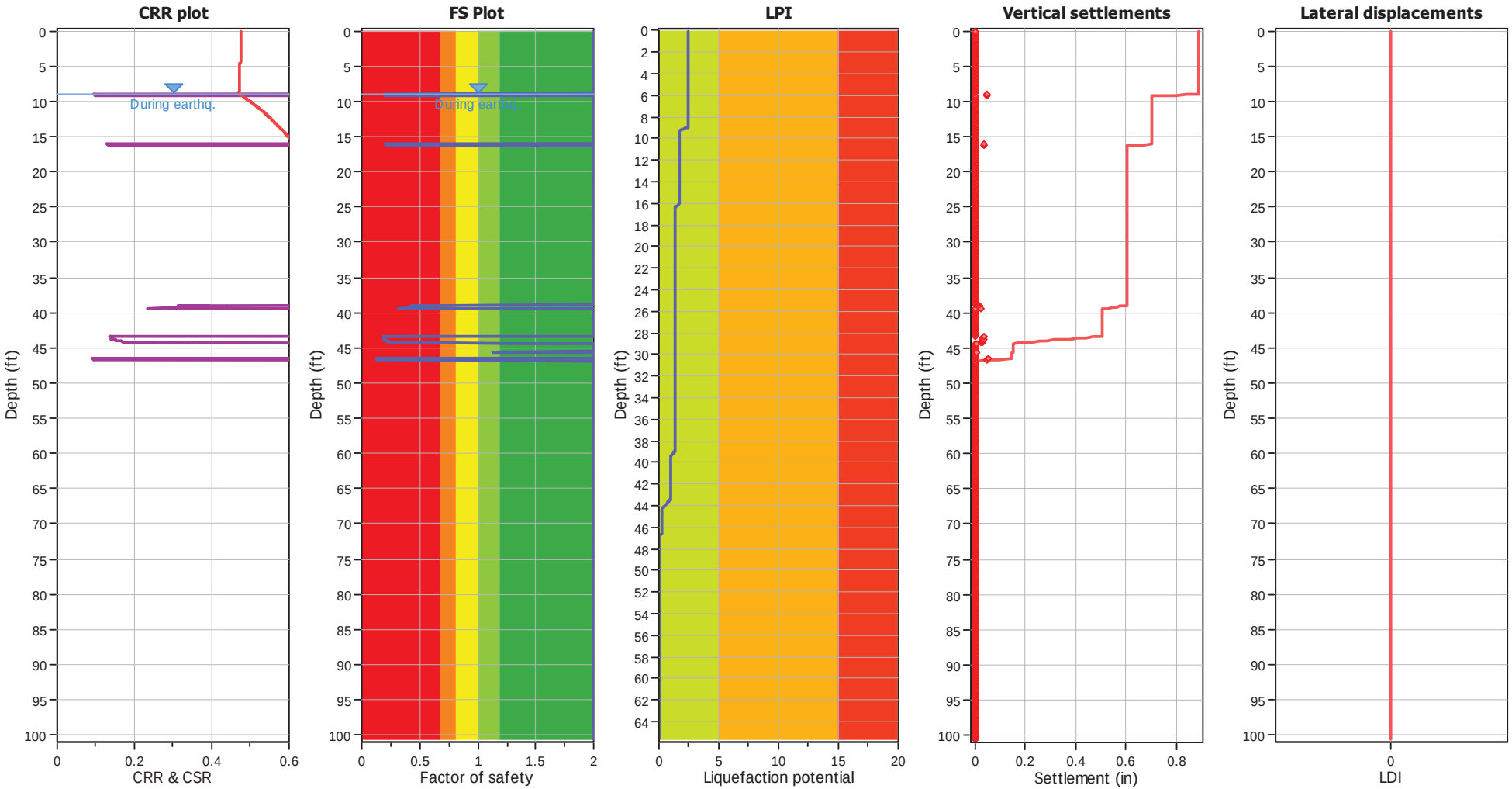
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	8.90 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.90 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	8.90 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.90 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

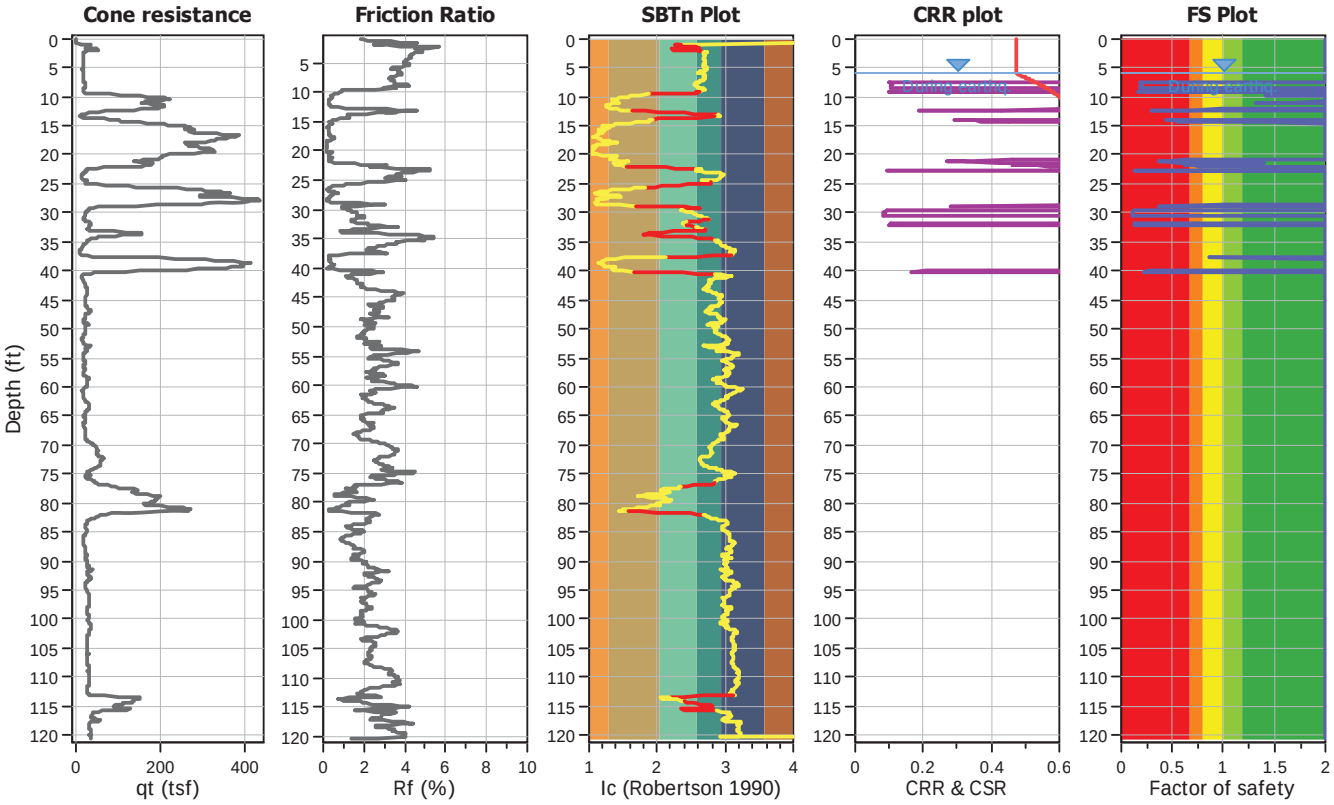
LIQUEFACTION ANALYSIS REPORT

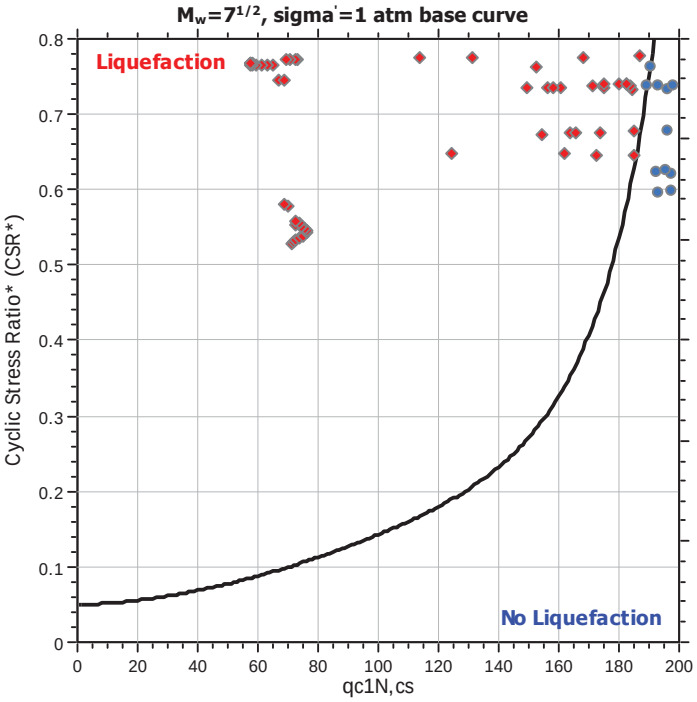
Project title : Google Parcels GEX **Location : Mountain View, CA**

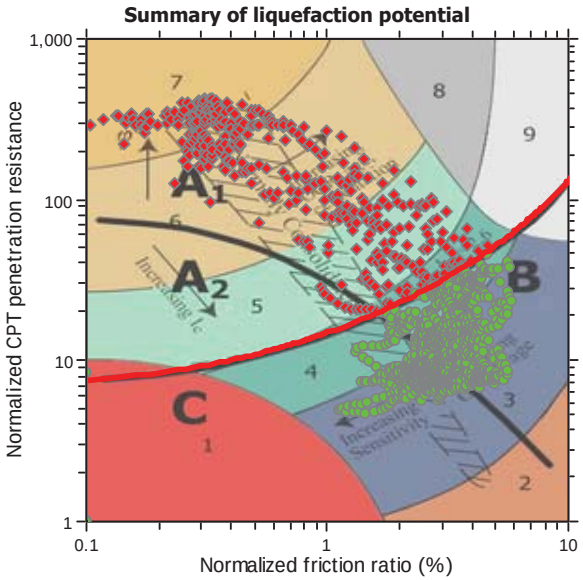
CPT file : 1-CPT3

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

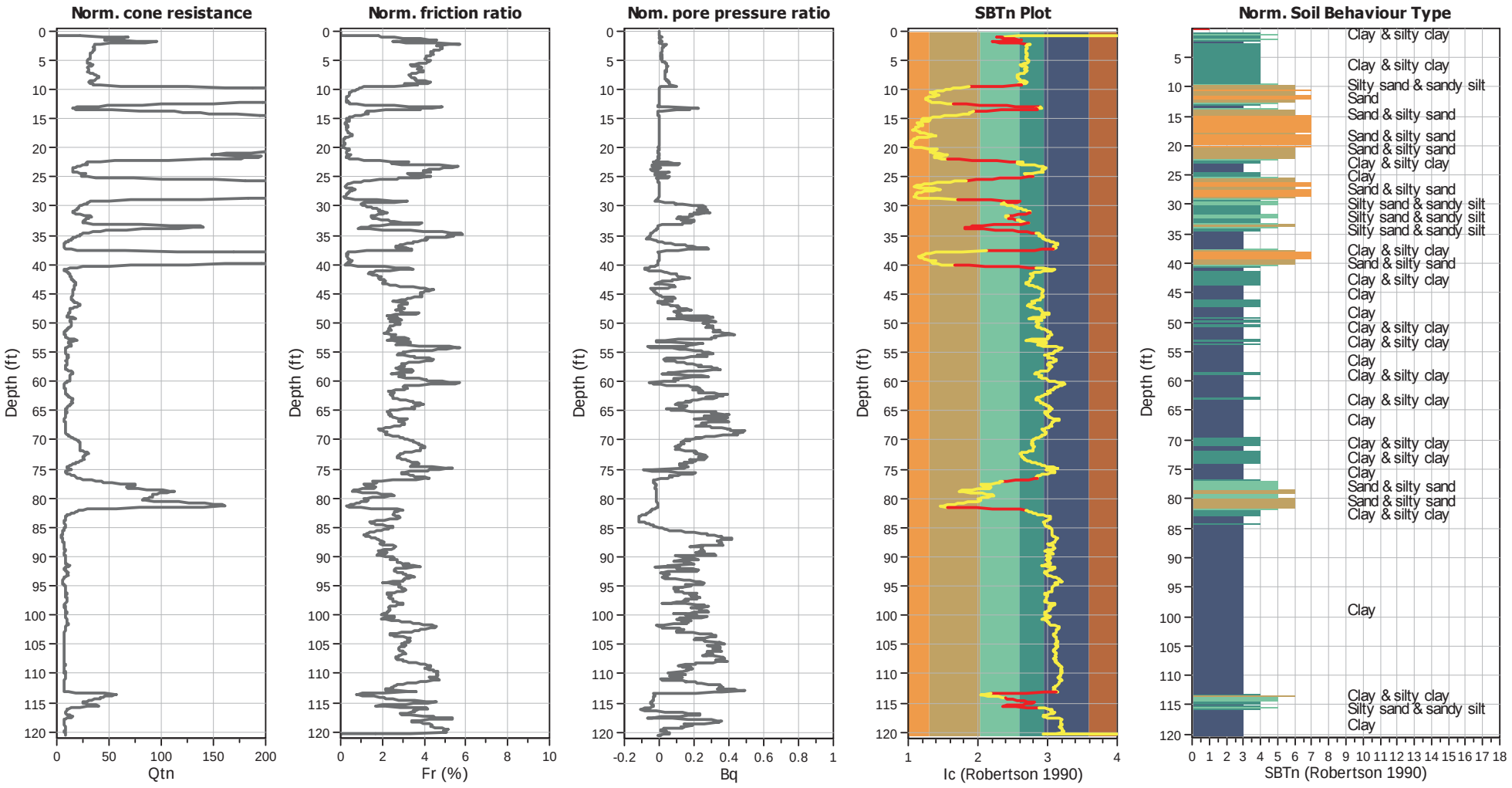






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



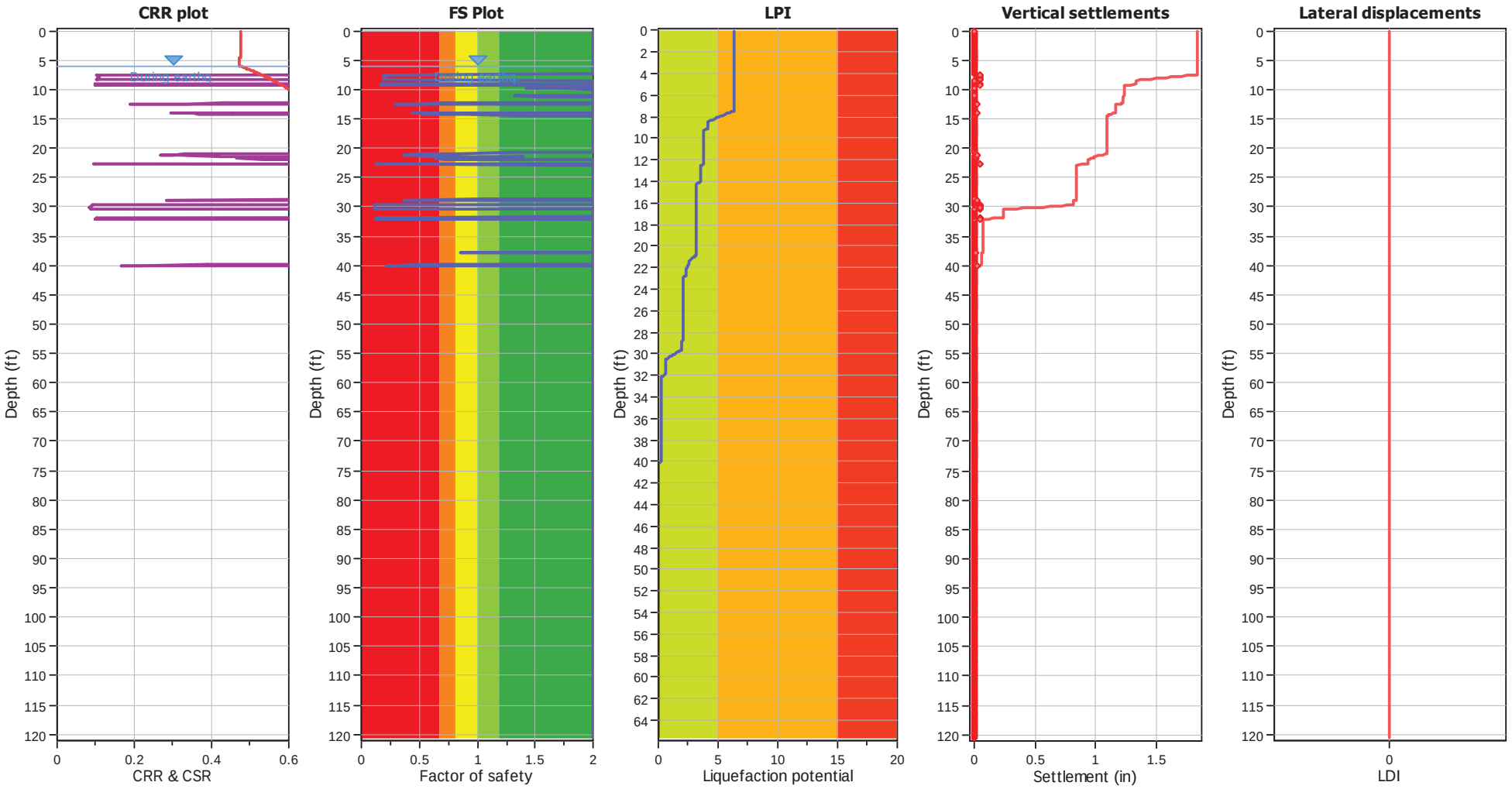
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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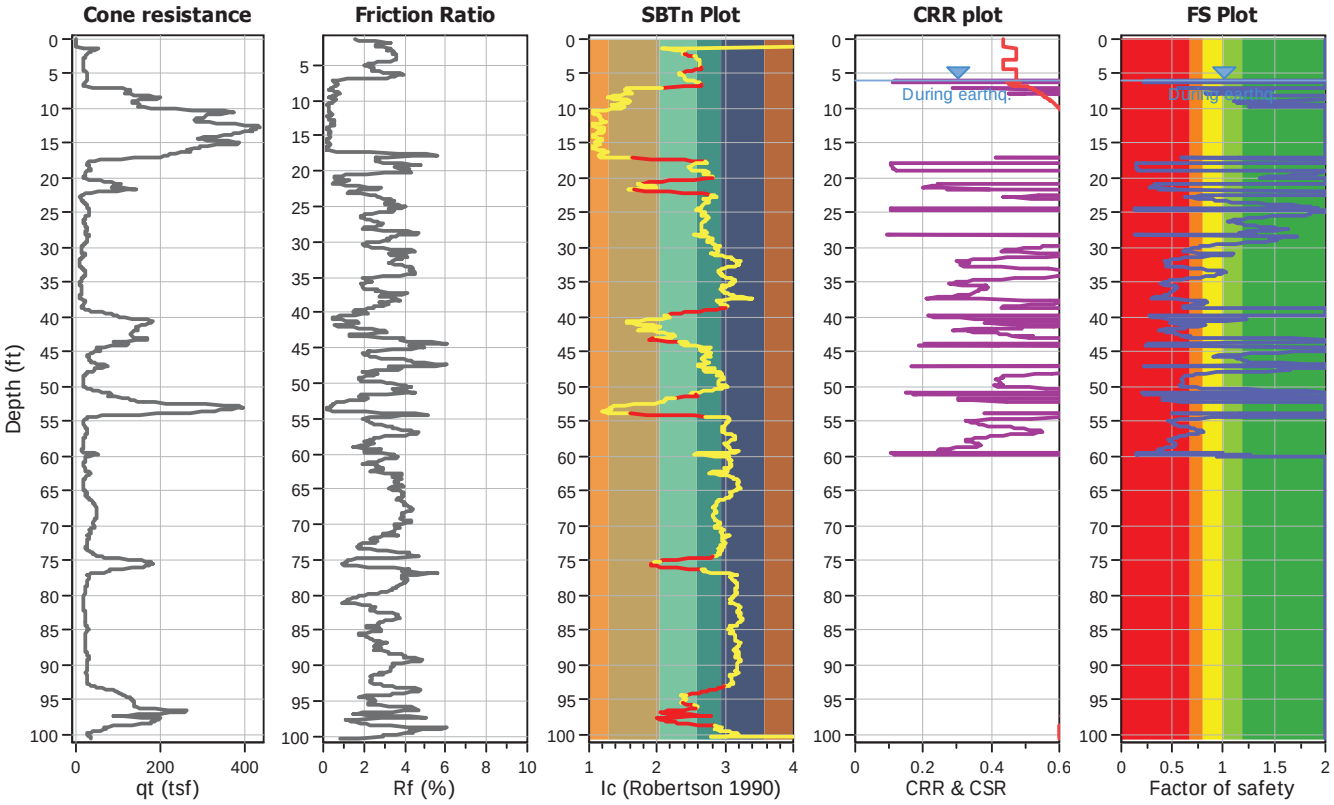
LIQUEFACTION ANALYSIS REPORT

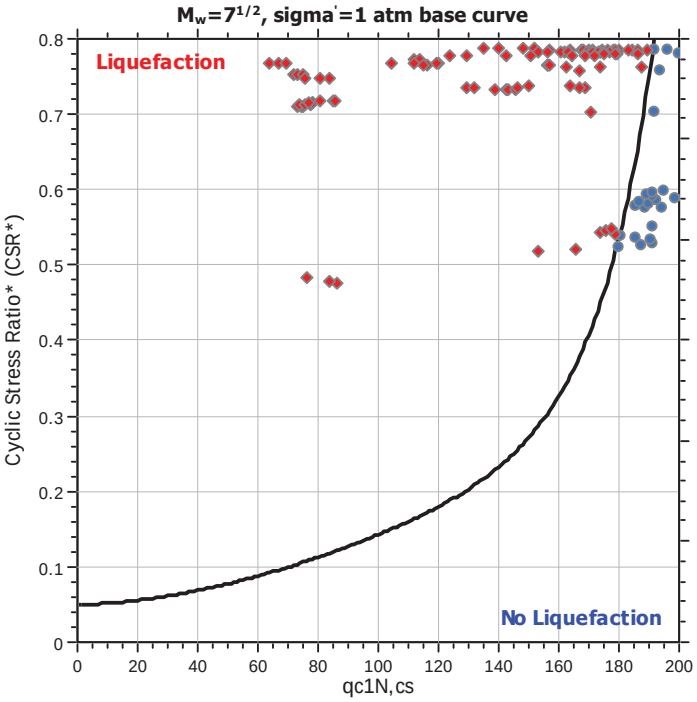
Project title : **Location :**

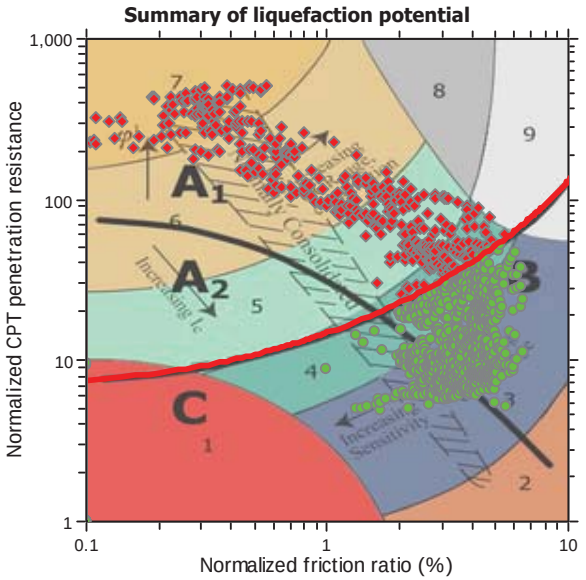
CPT file : 1-SCPT4

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

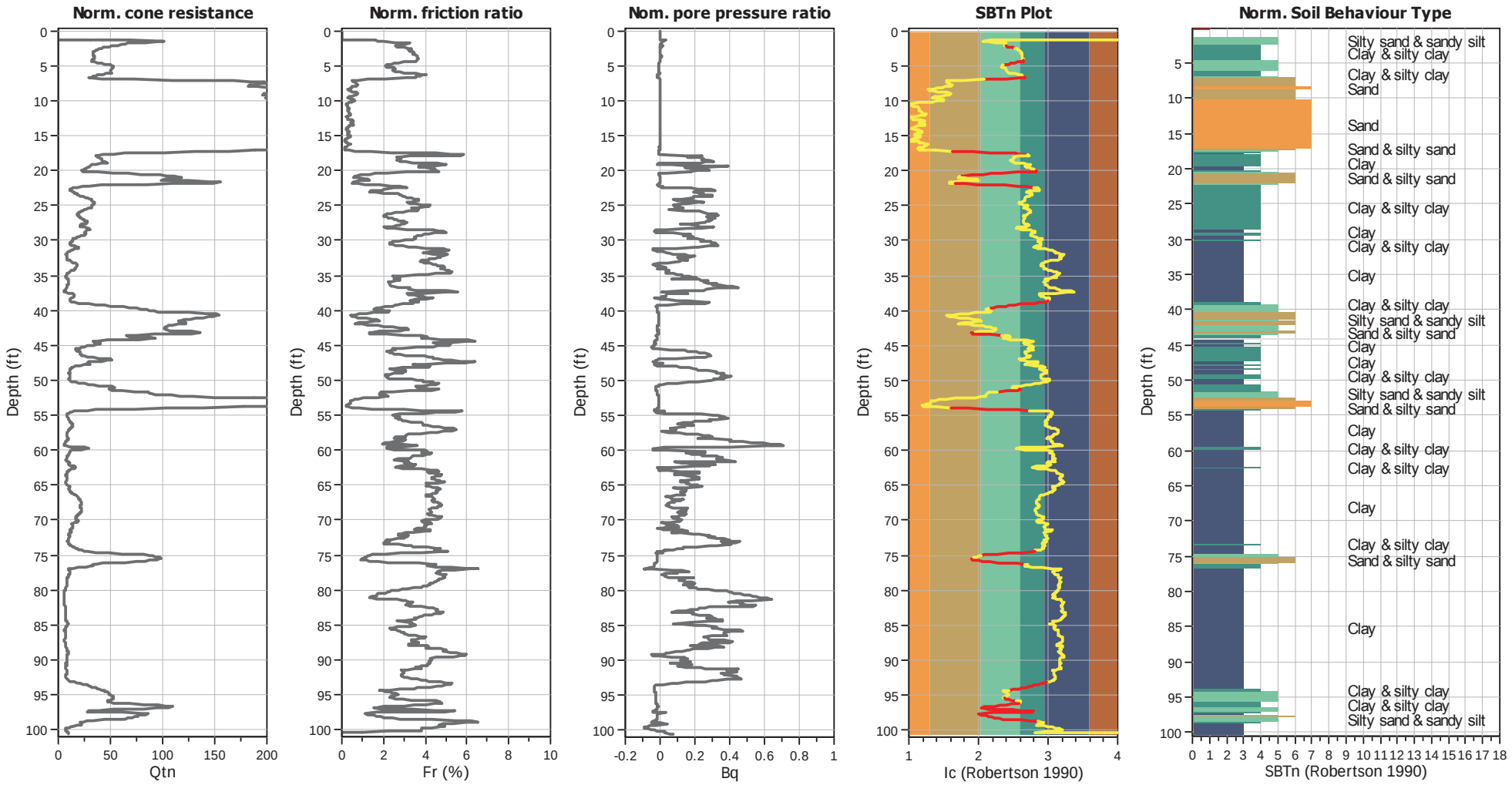






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



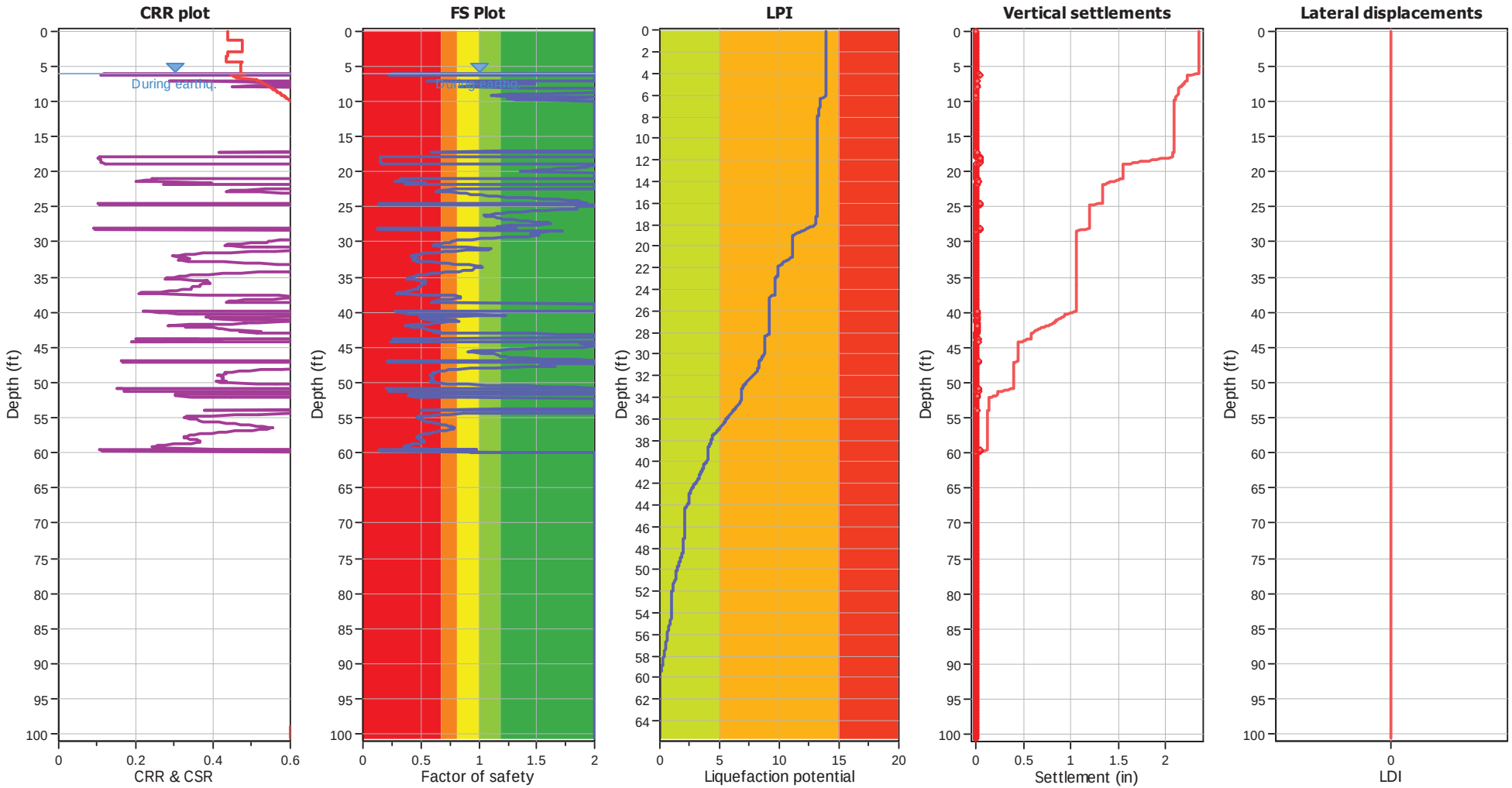
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

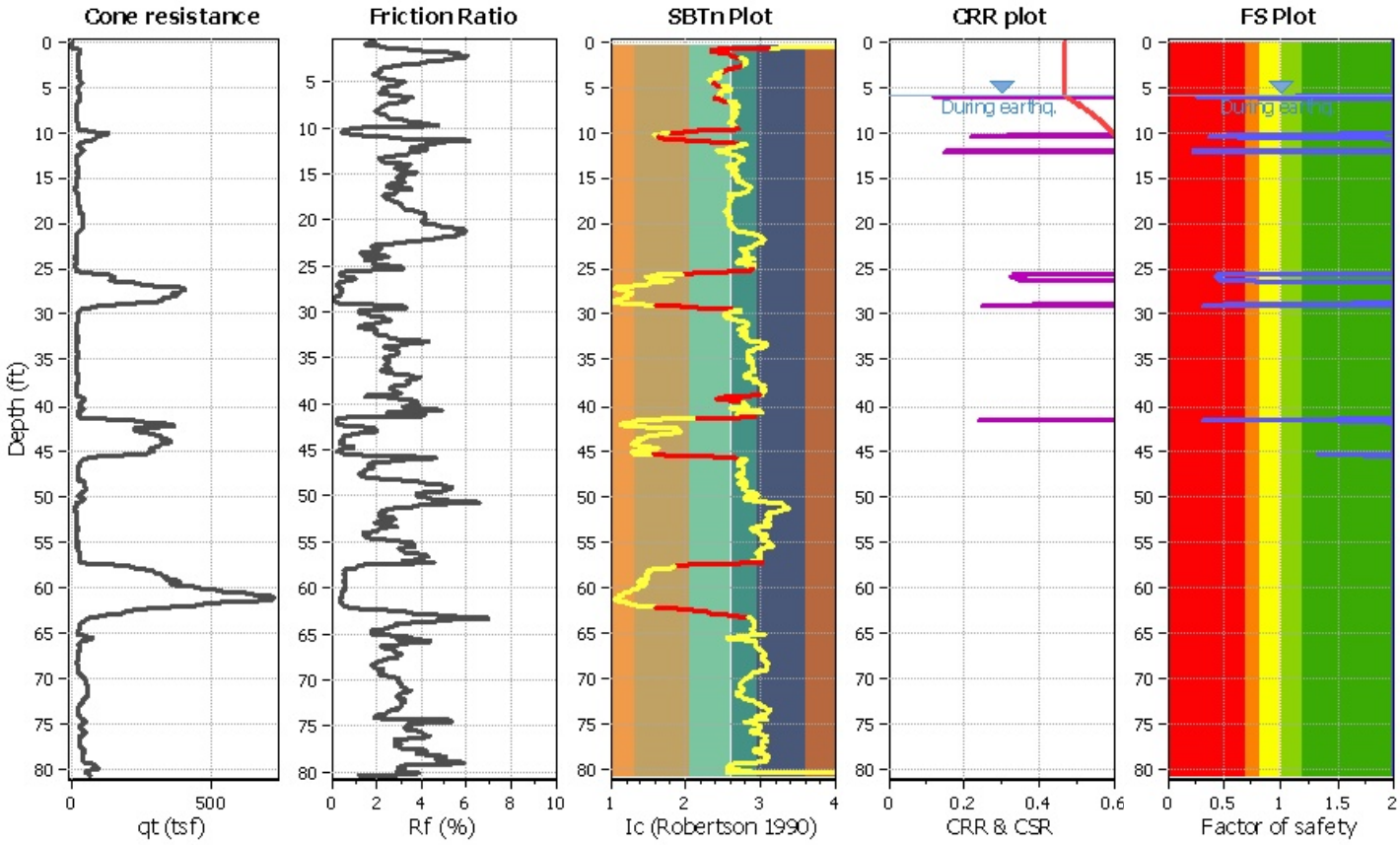
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

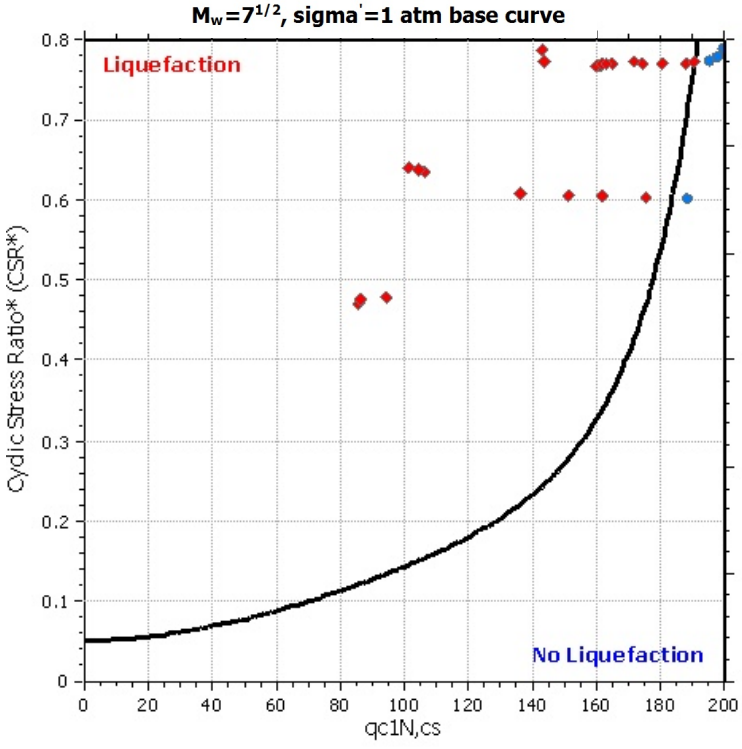
CPT file : 1-CPT5

Input parameters and analysis data

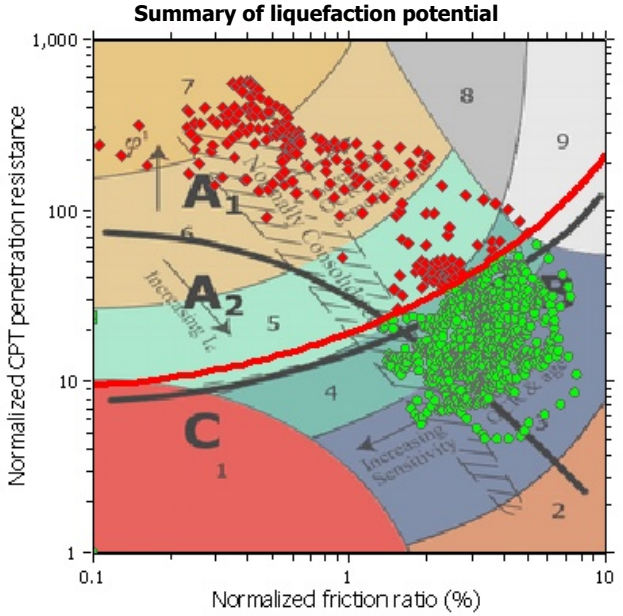
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.50	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

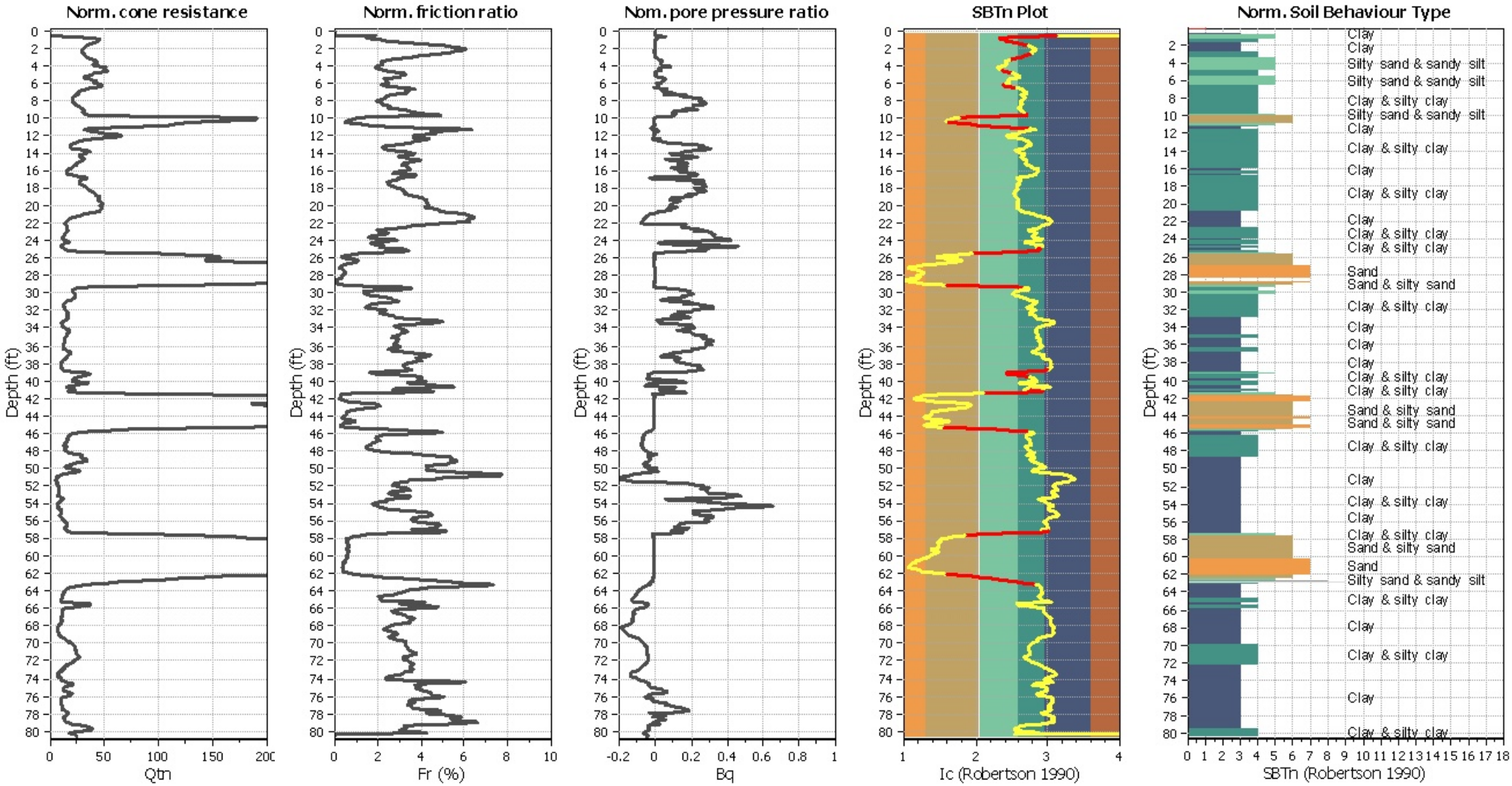


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



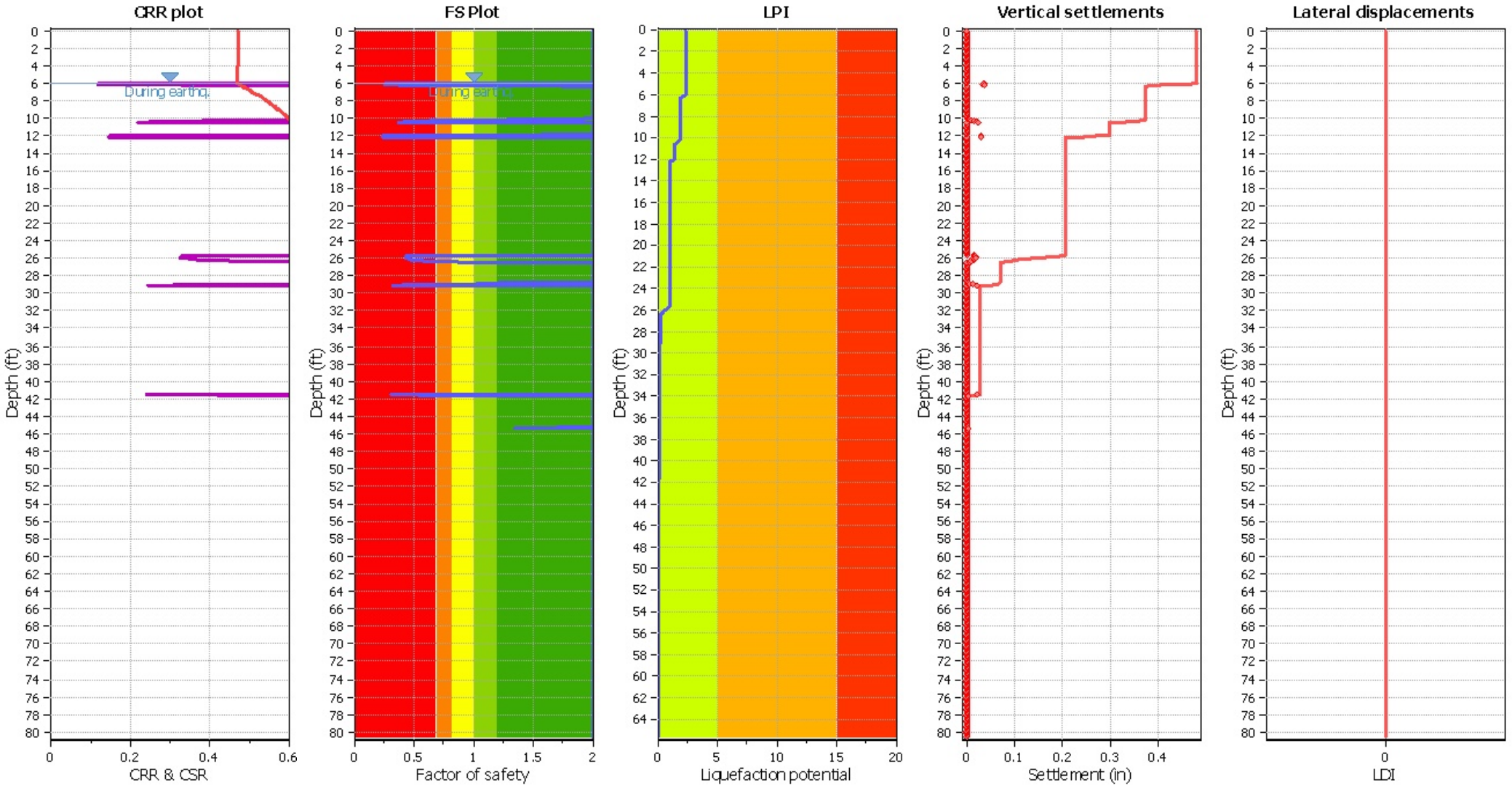
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
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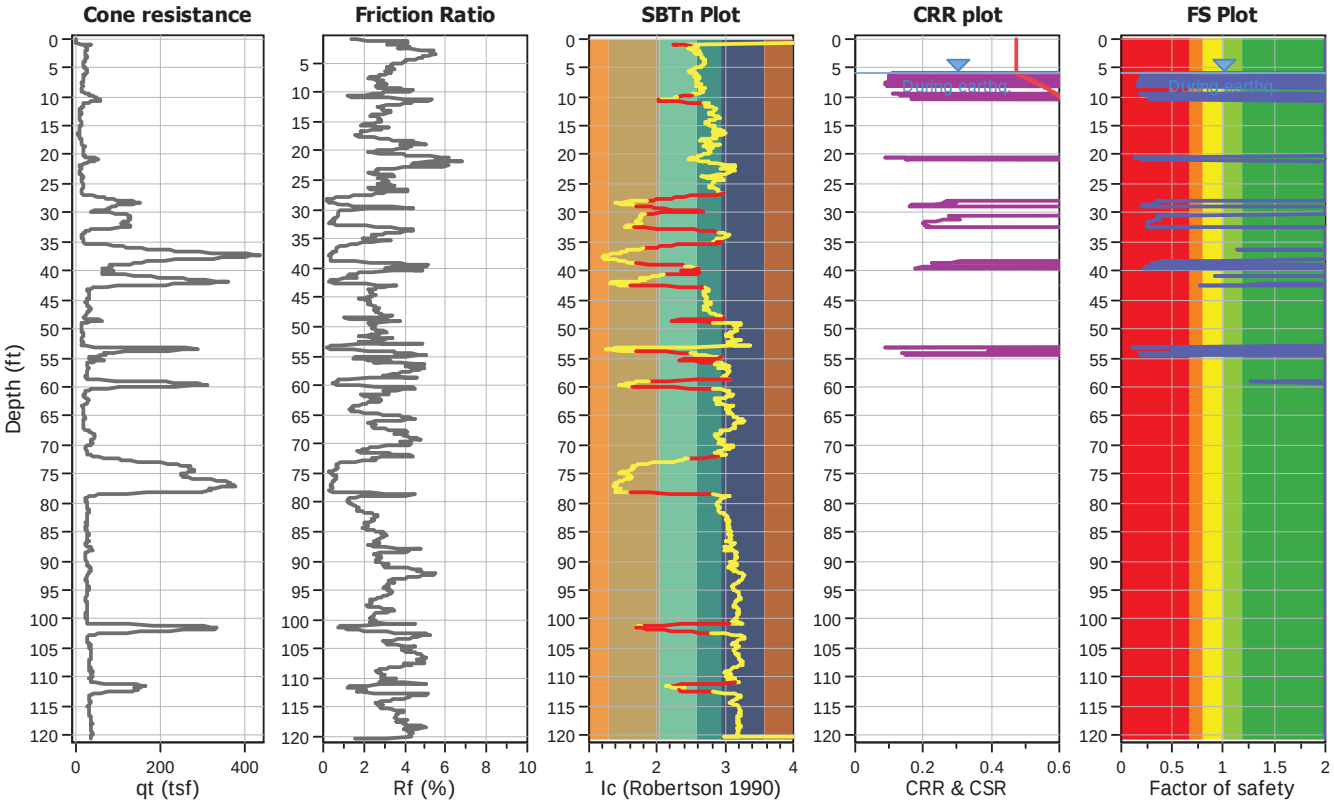
LIQUEFACTION ANALYSIS REPORT

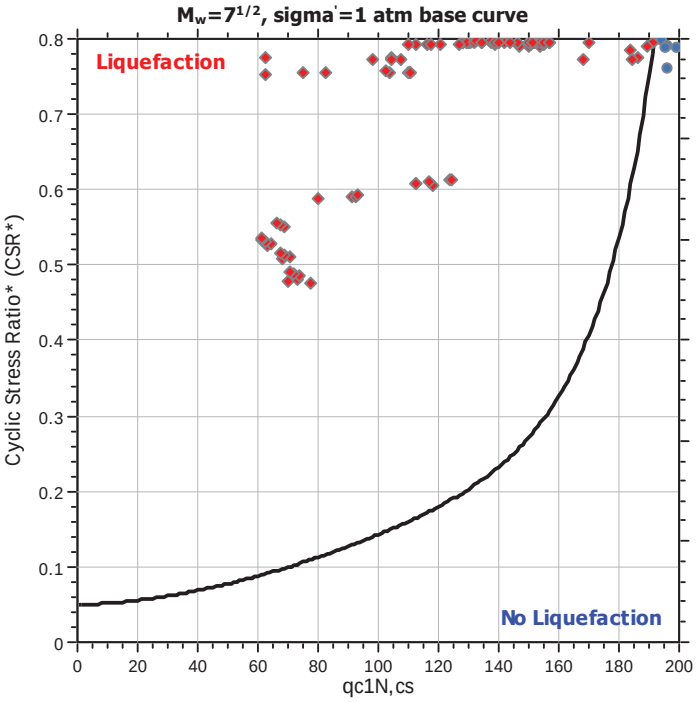
Project title : Google Parcels GEX **Location : Mountain View, CA**

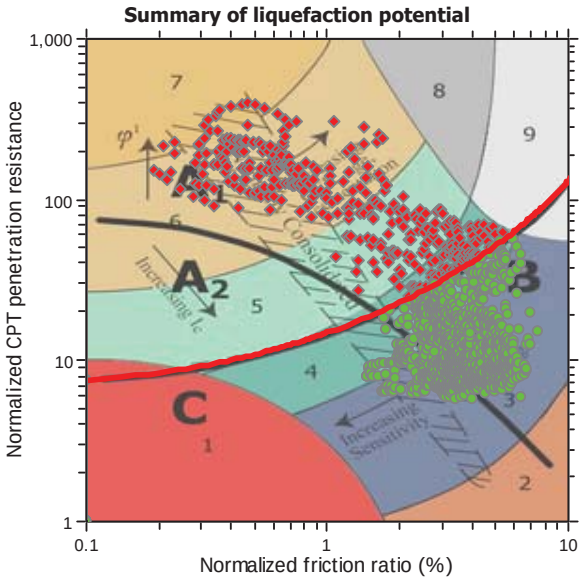
CPT file : 1-CPT6

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method

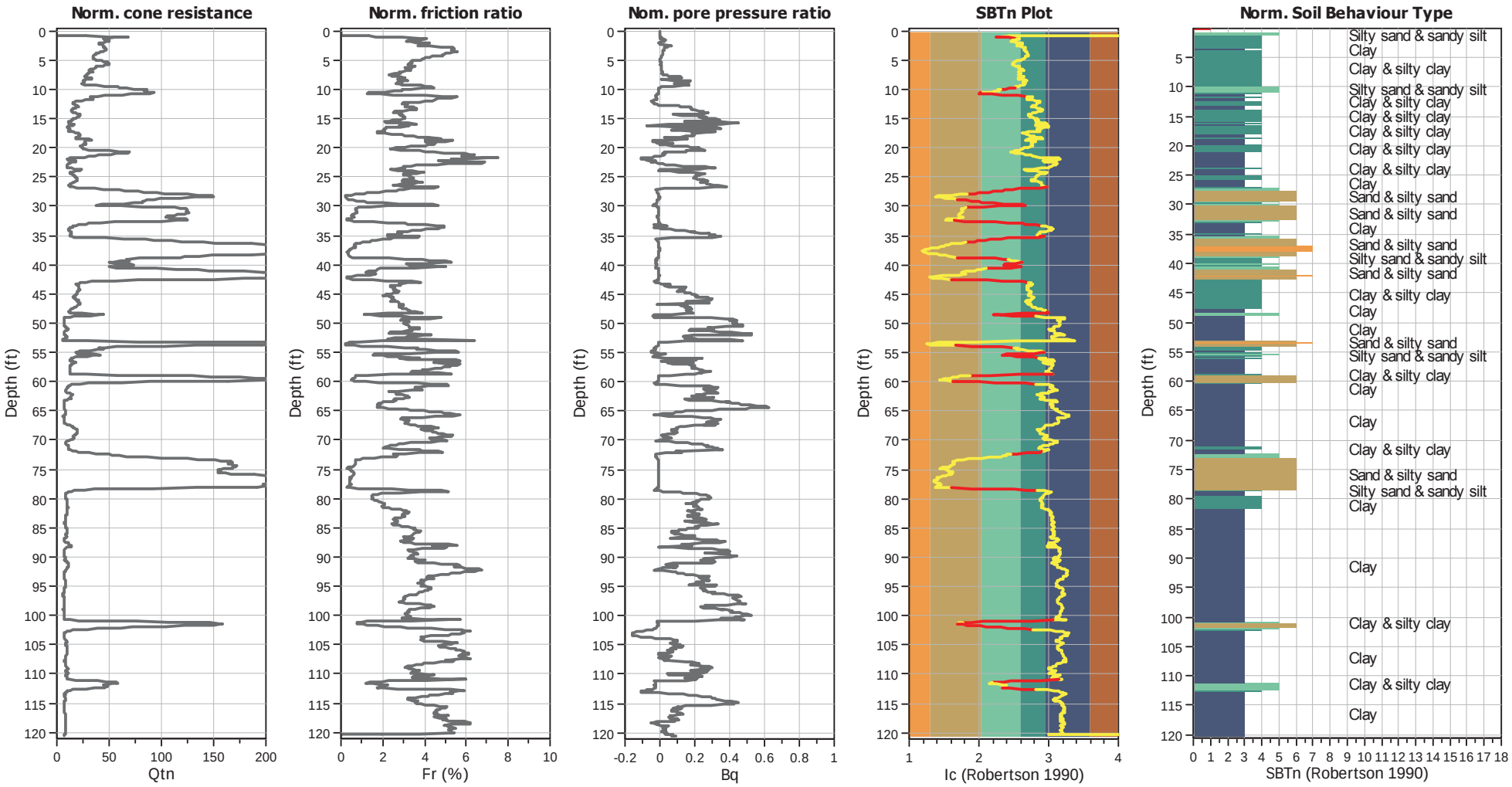






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



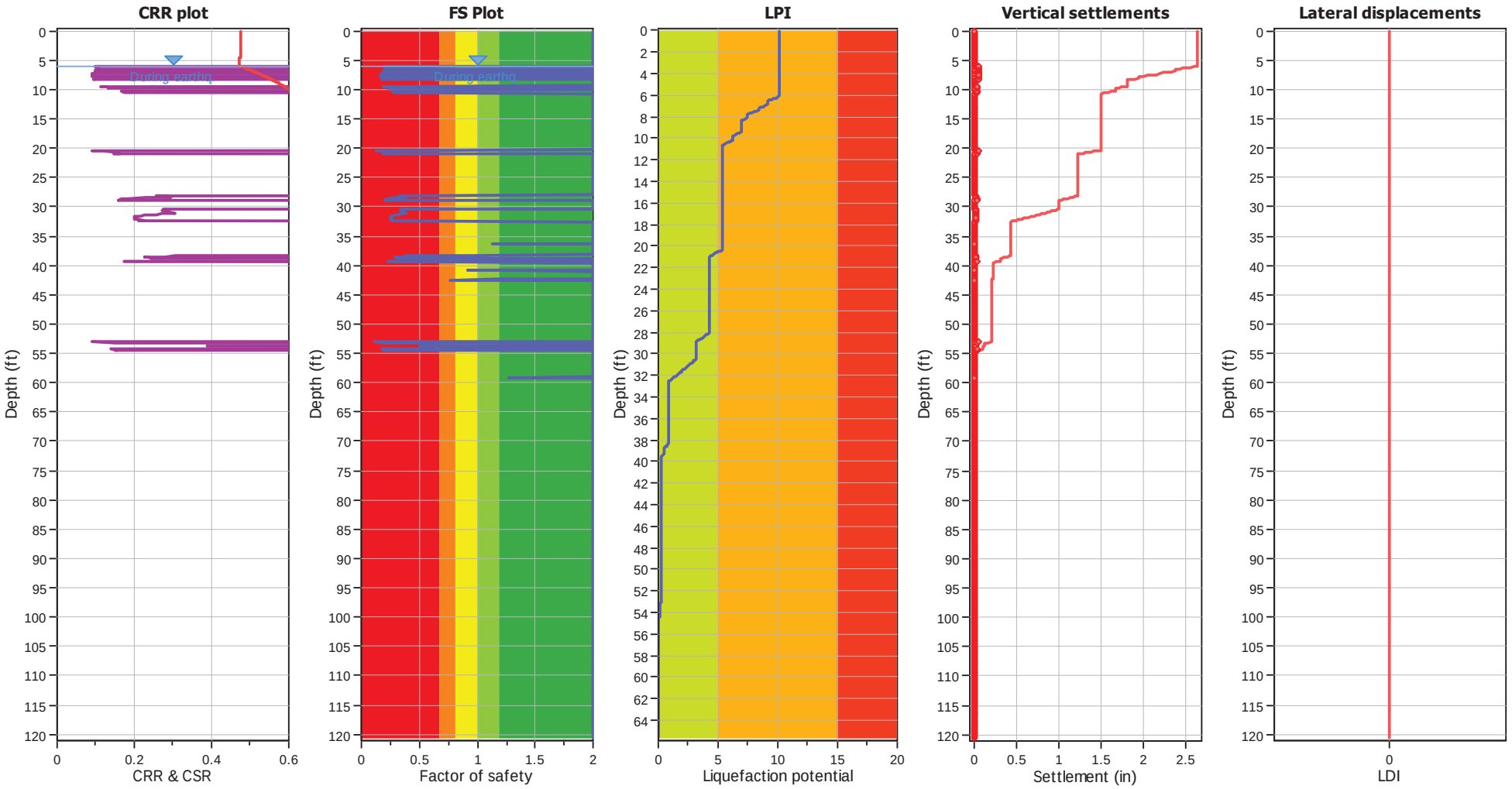
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

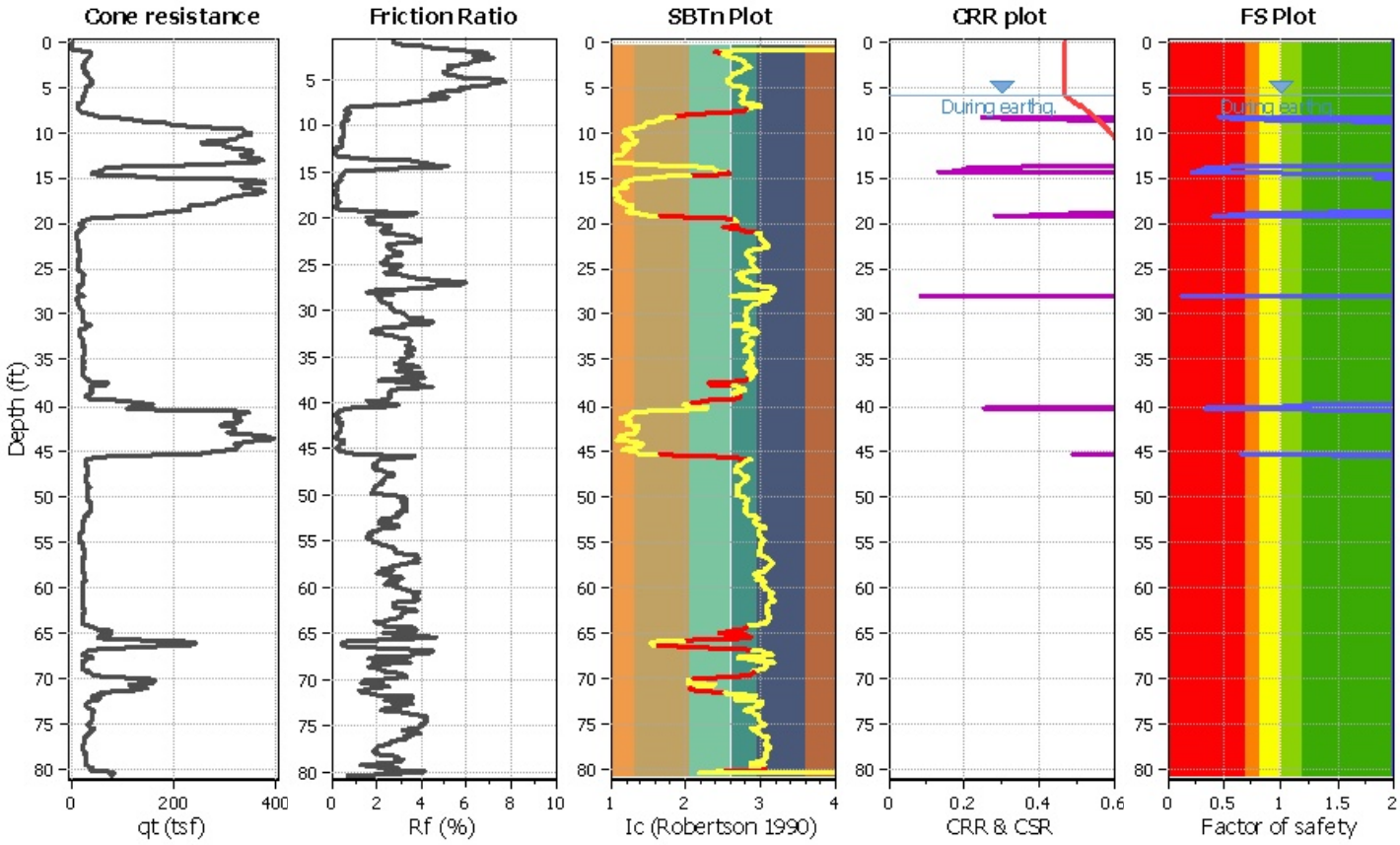
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

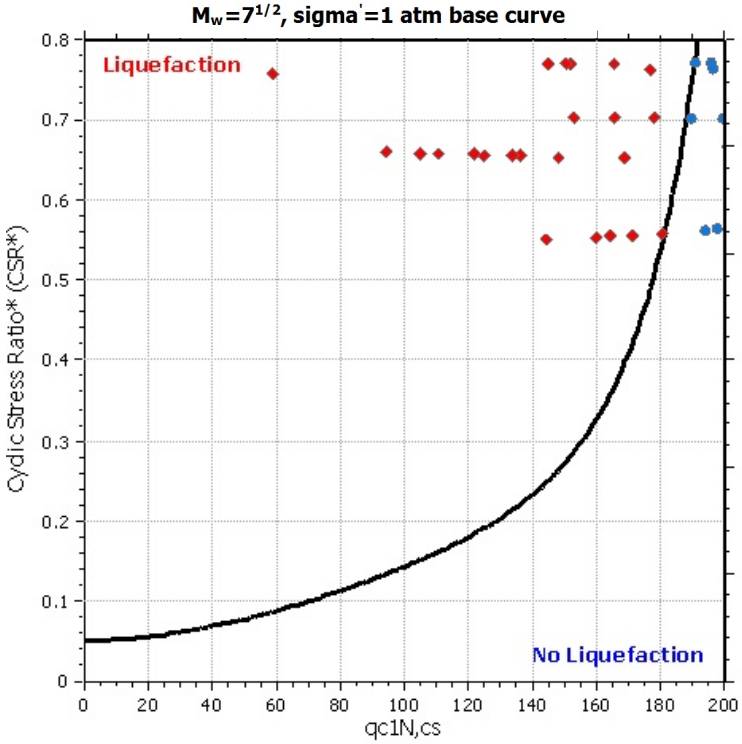
CPT file : 1-CPT7

Input parameters and analysis data

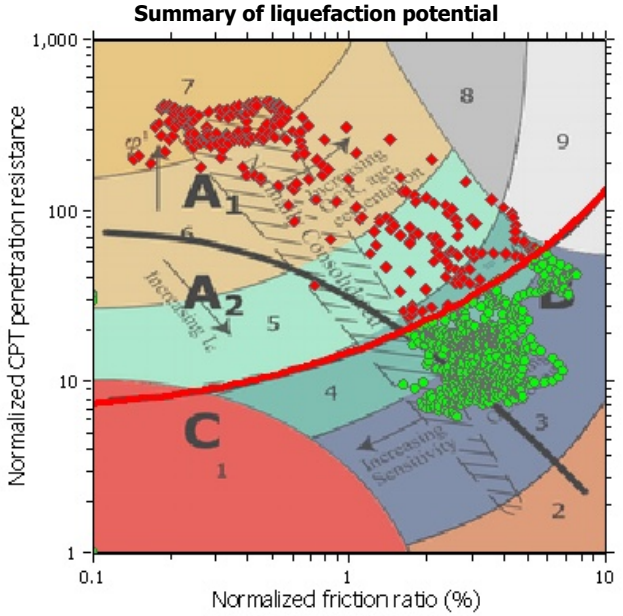
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

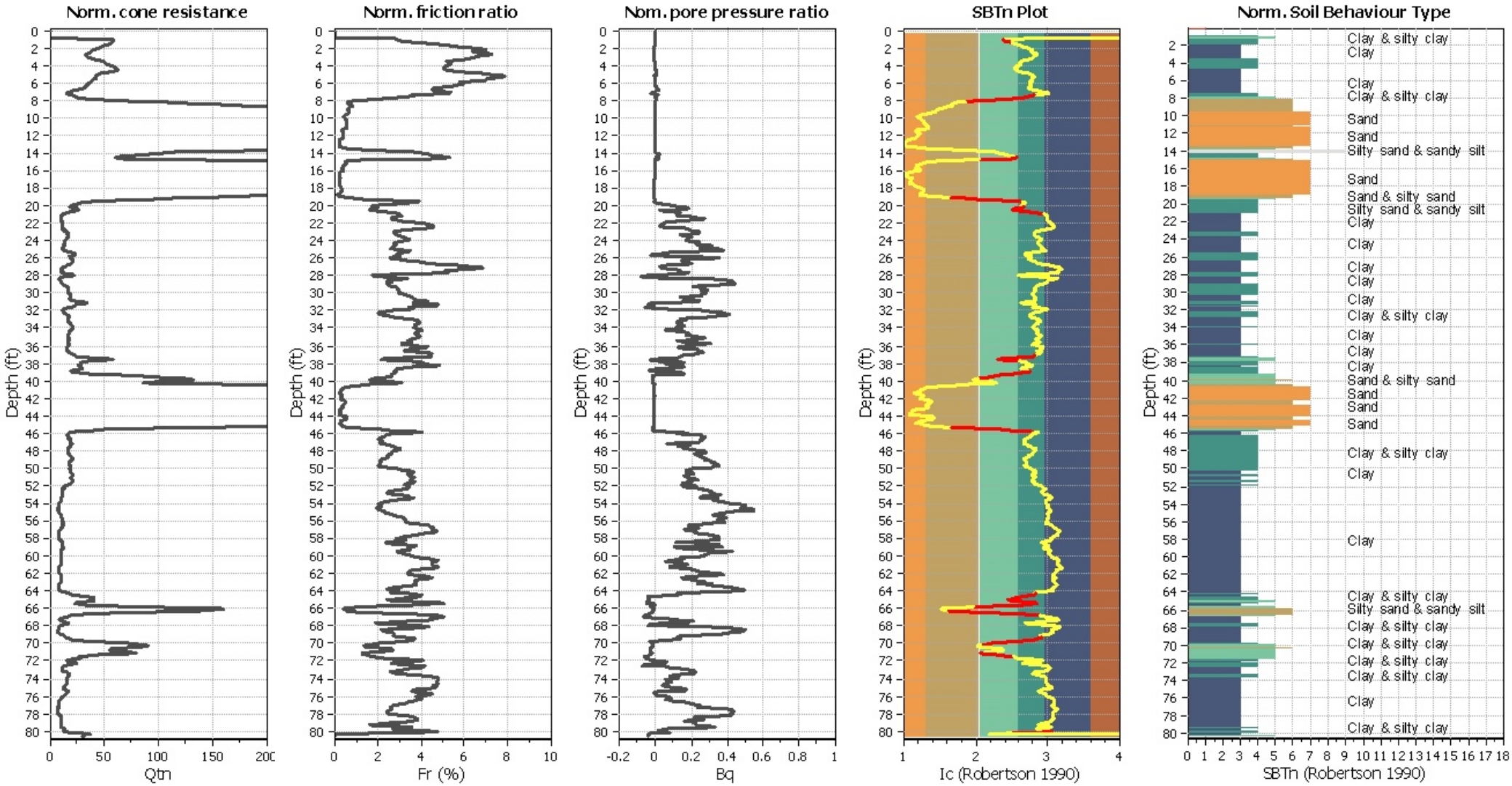


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



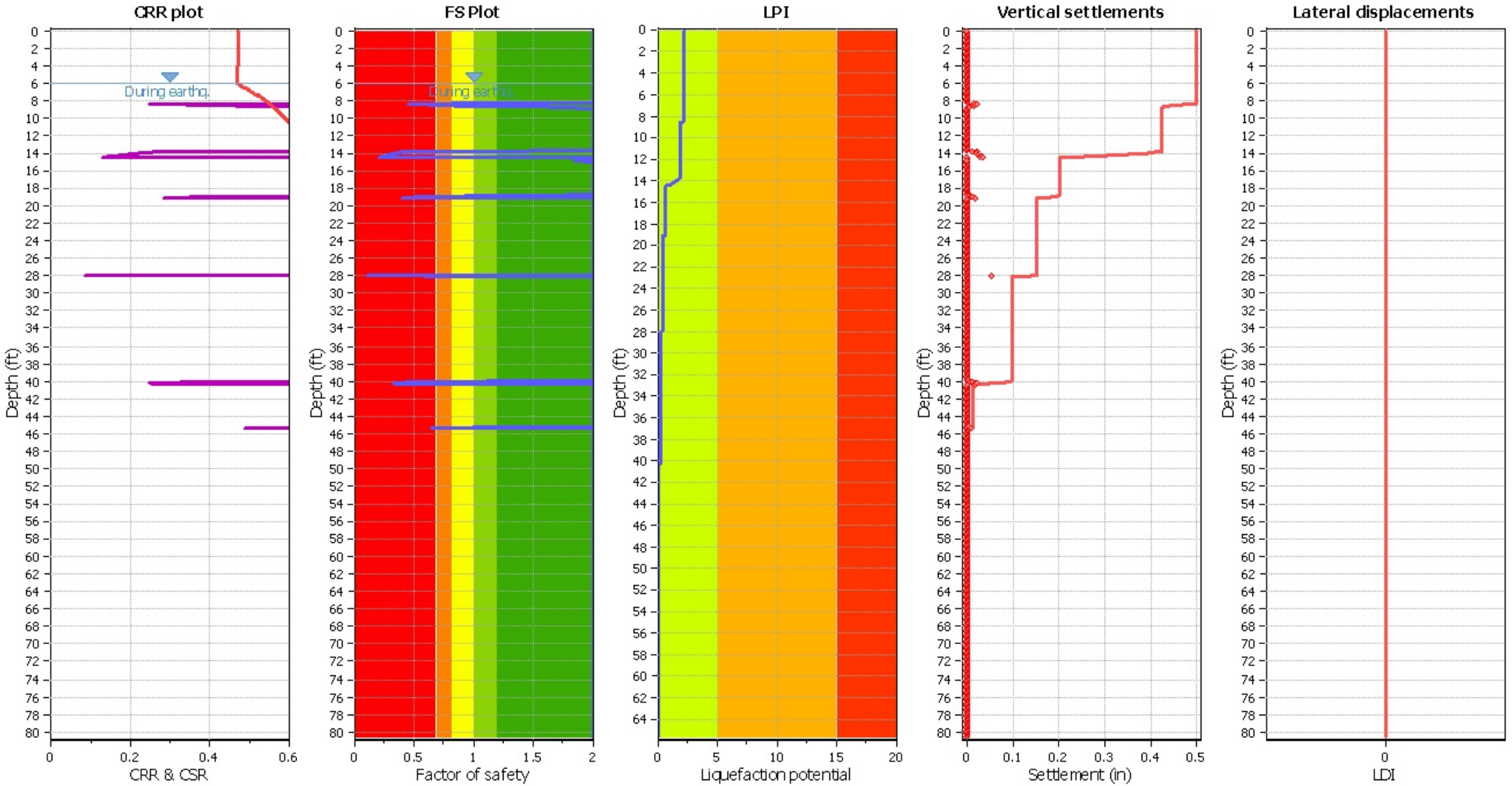
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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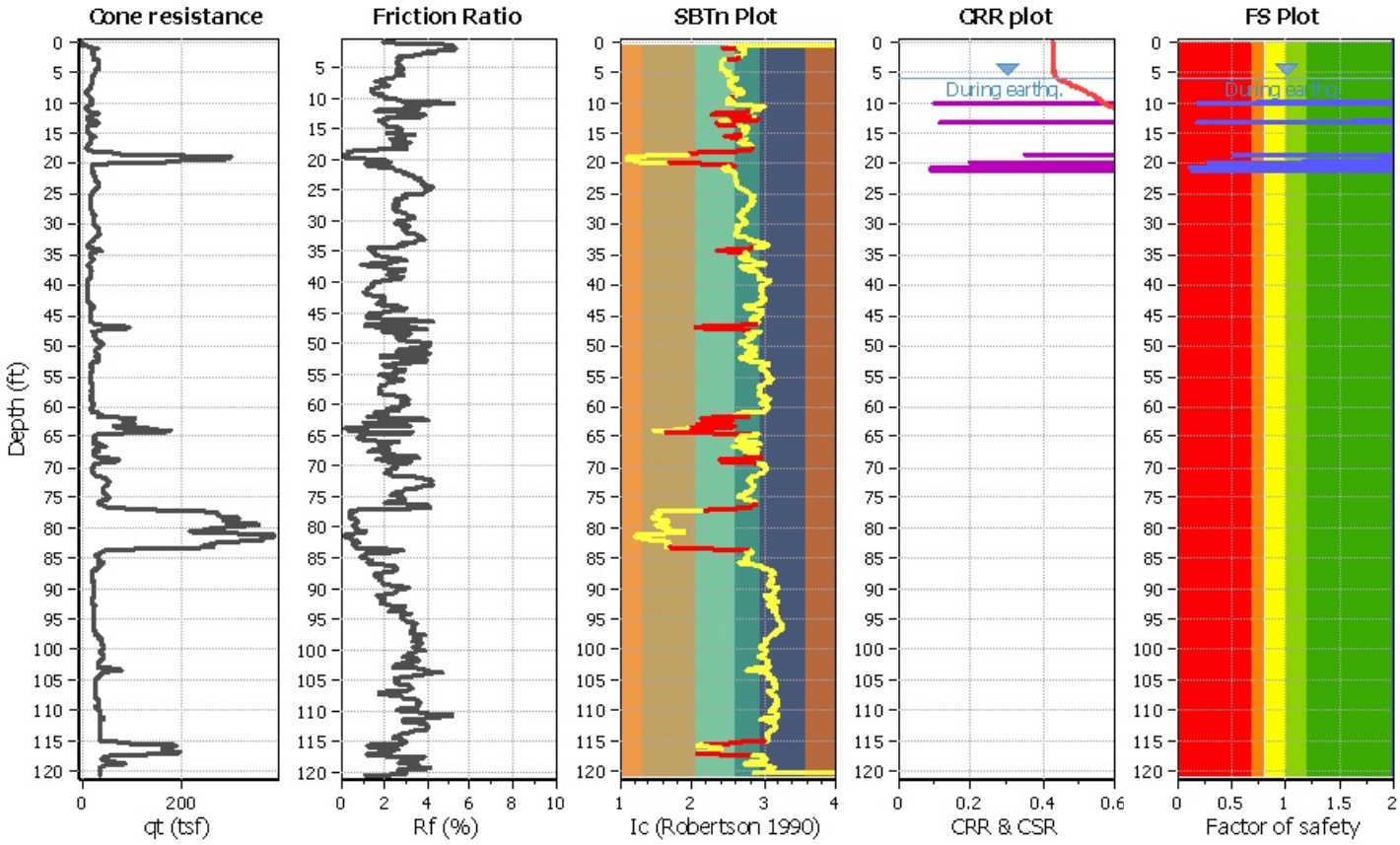
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

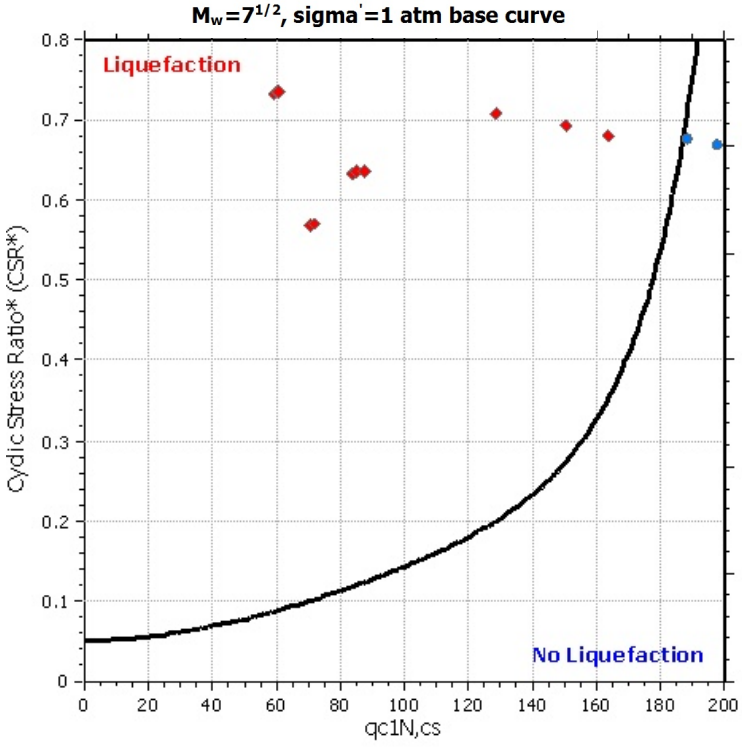
CPT file : 1-CPT8

Input parameters and analysis data

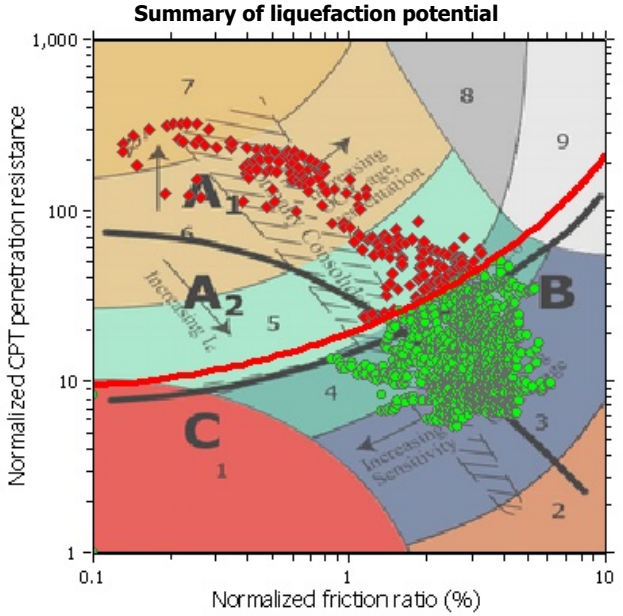
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.50	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

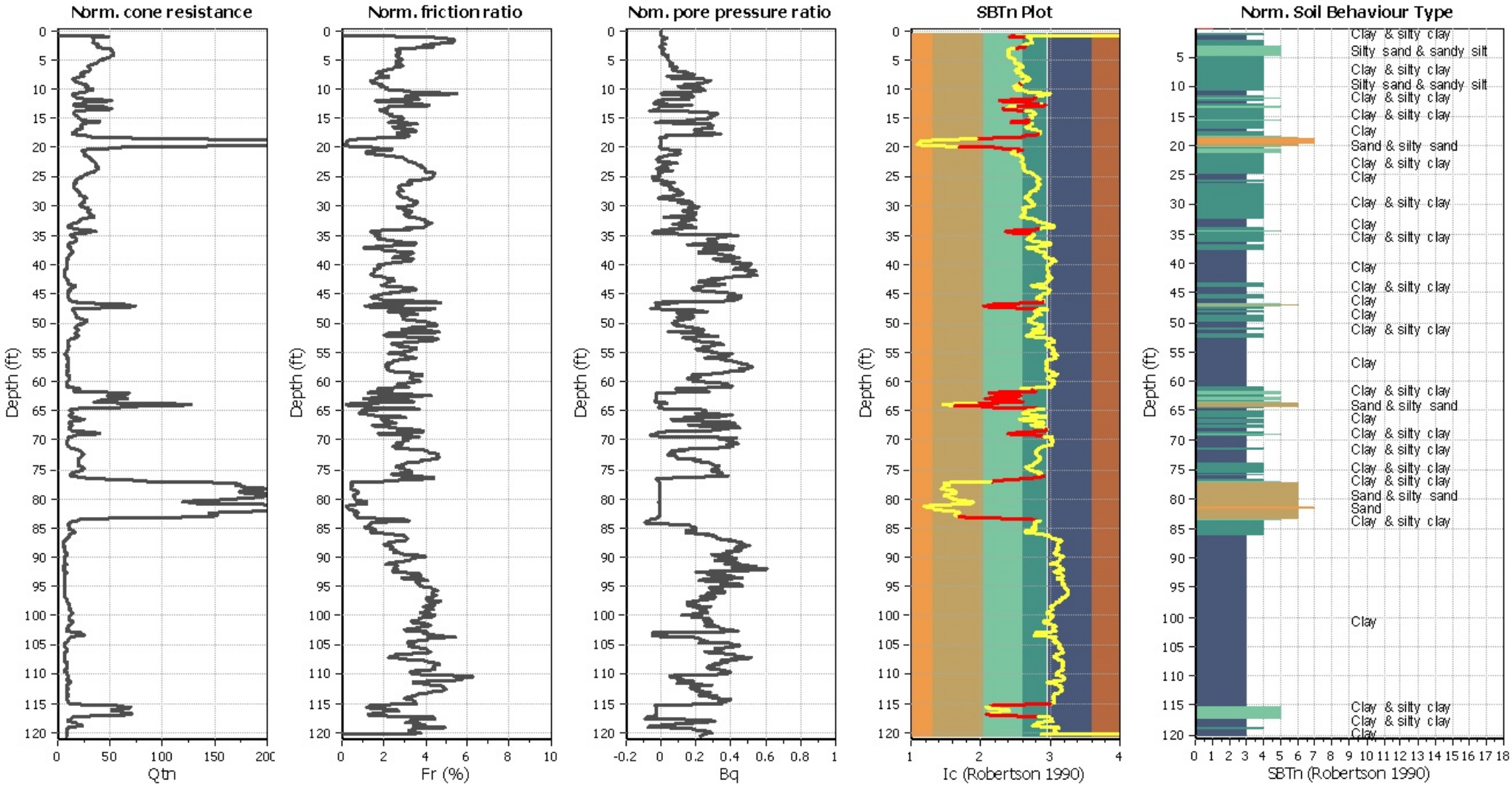


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



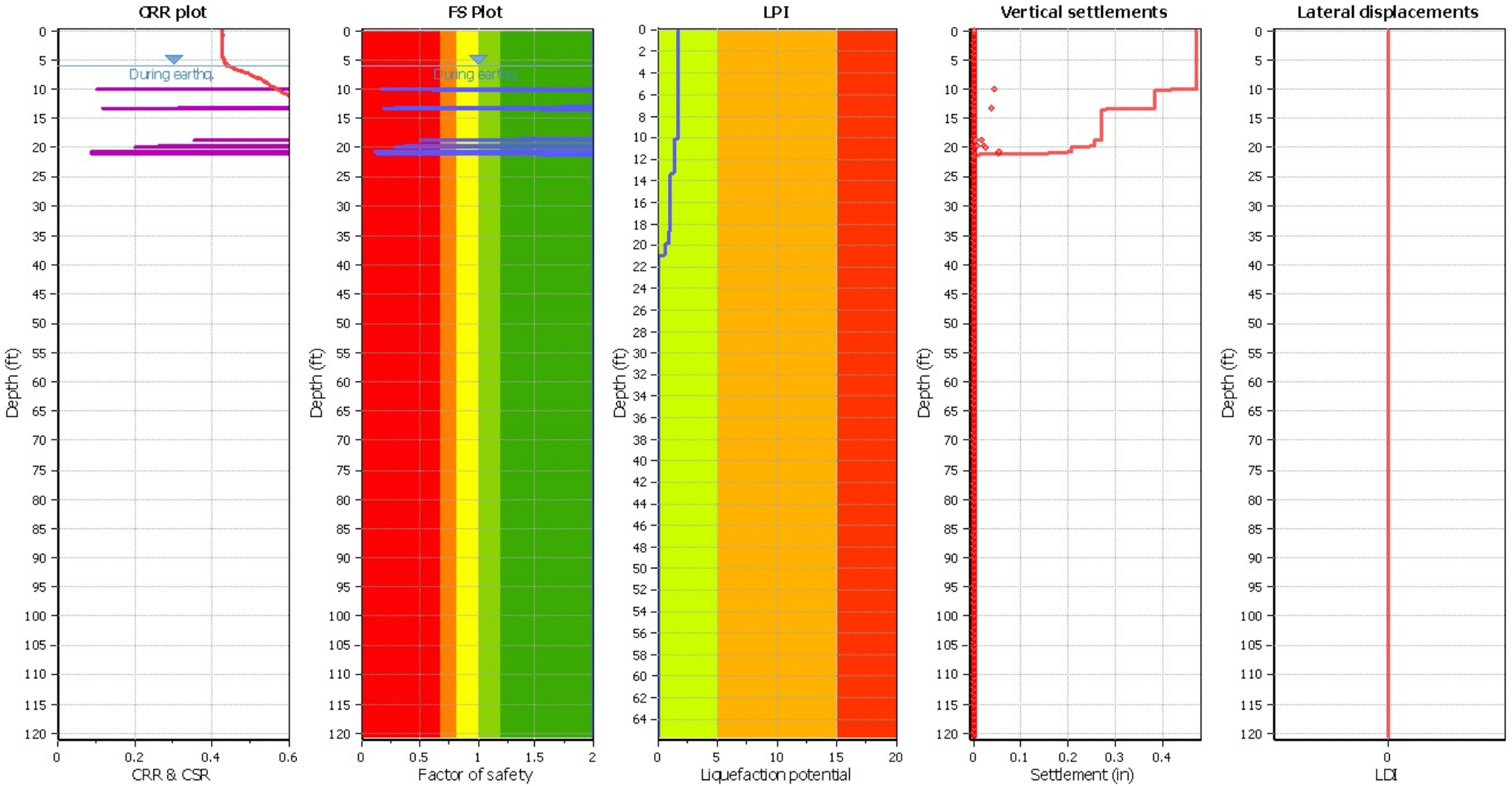
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

ENGEO
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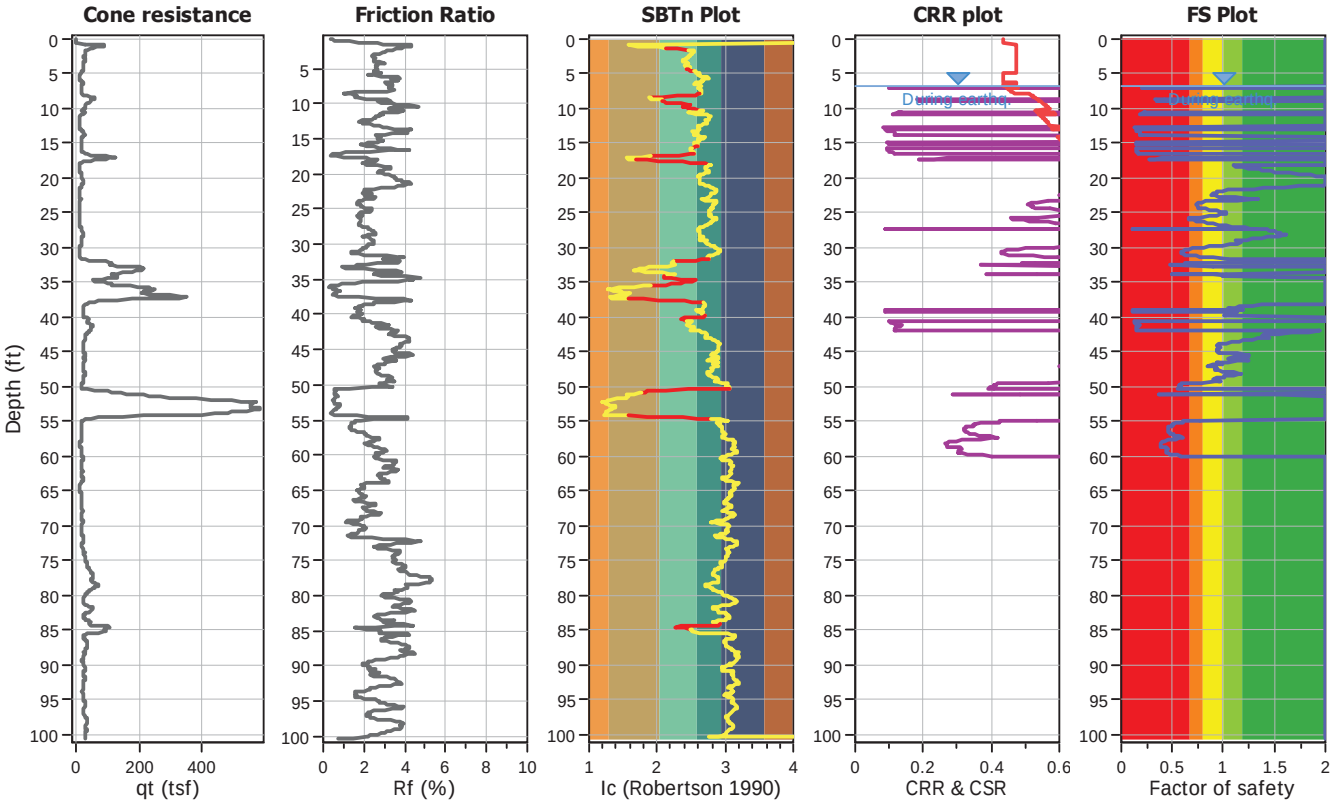
LIQUEFACTION ANALYSIS REPORT

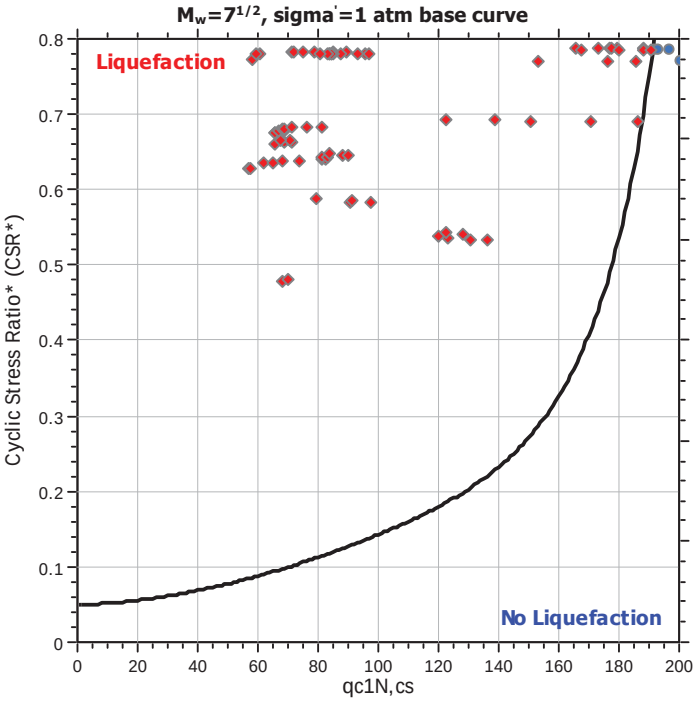
Project title : **Location :**

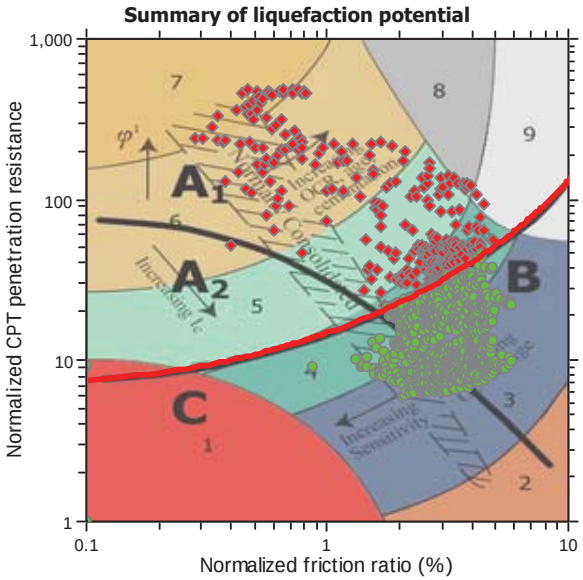
CPT file : 1-CPT9

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.80 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

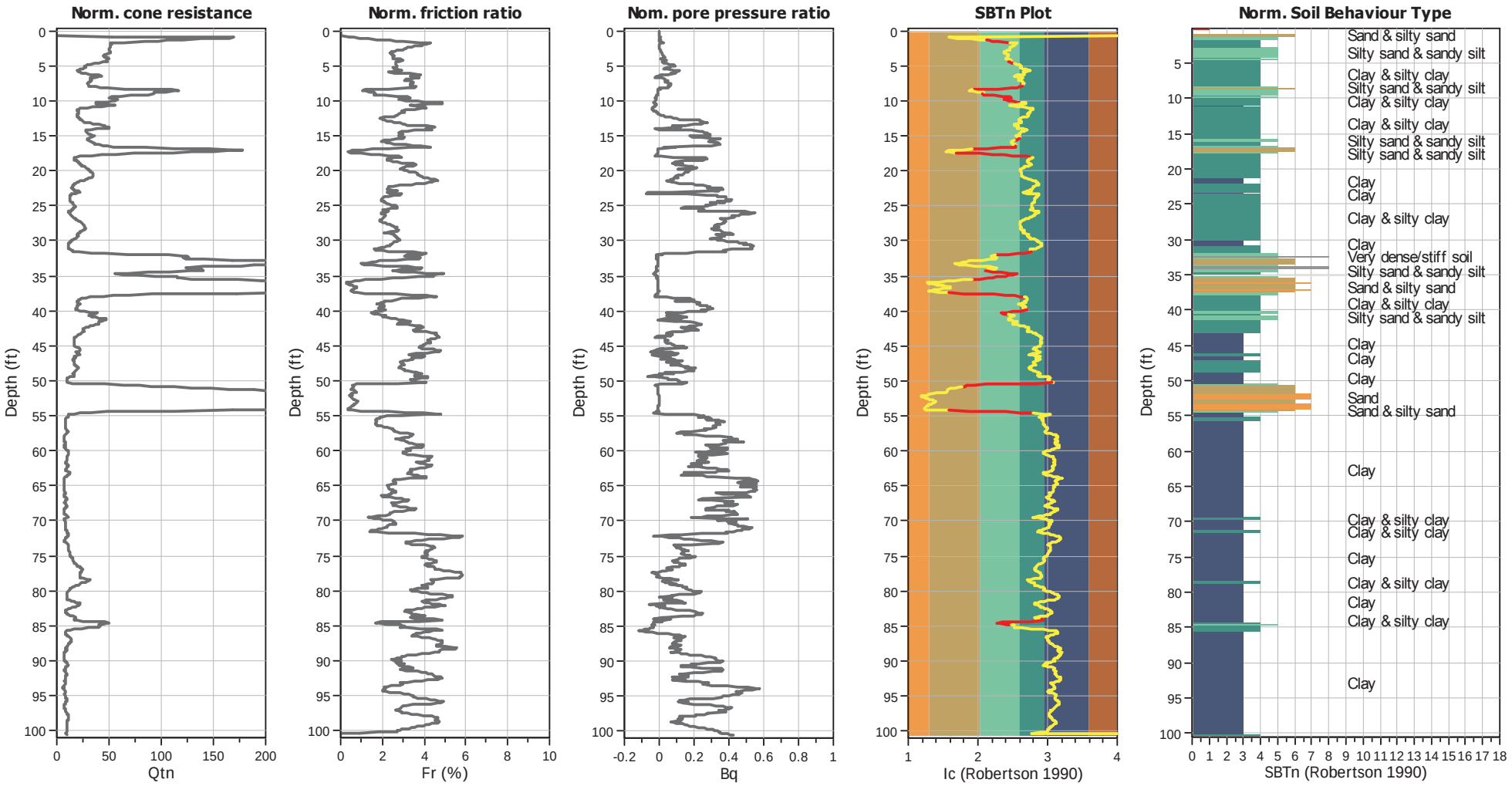






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



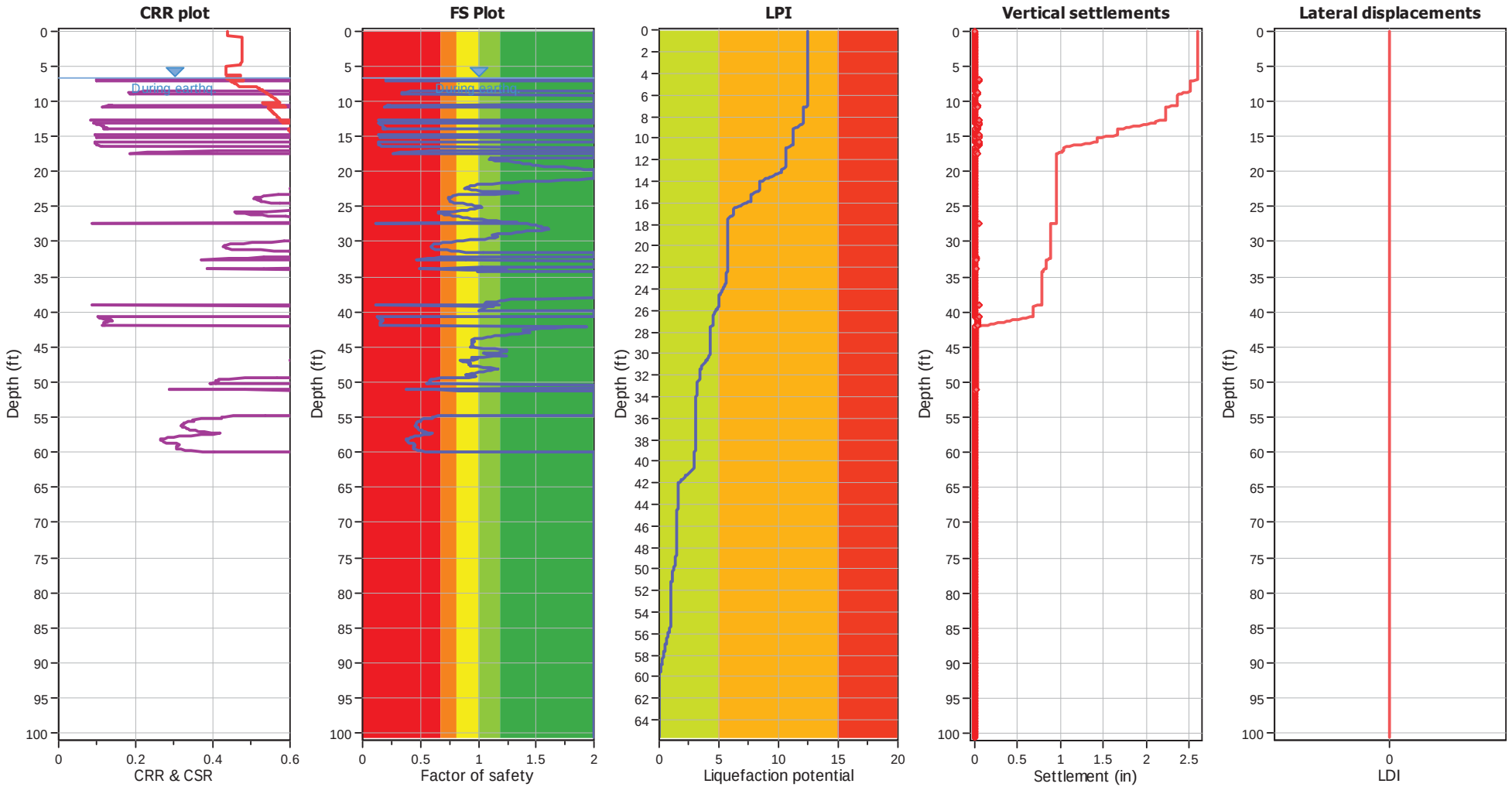
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.80 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.80 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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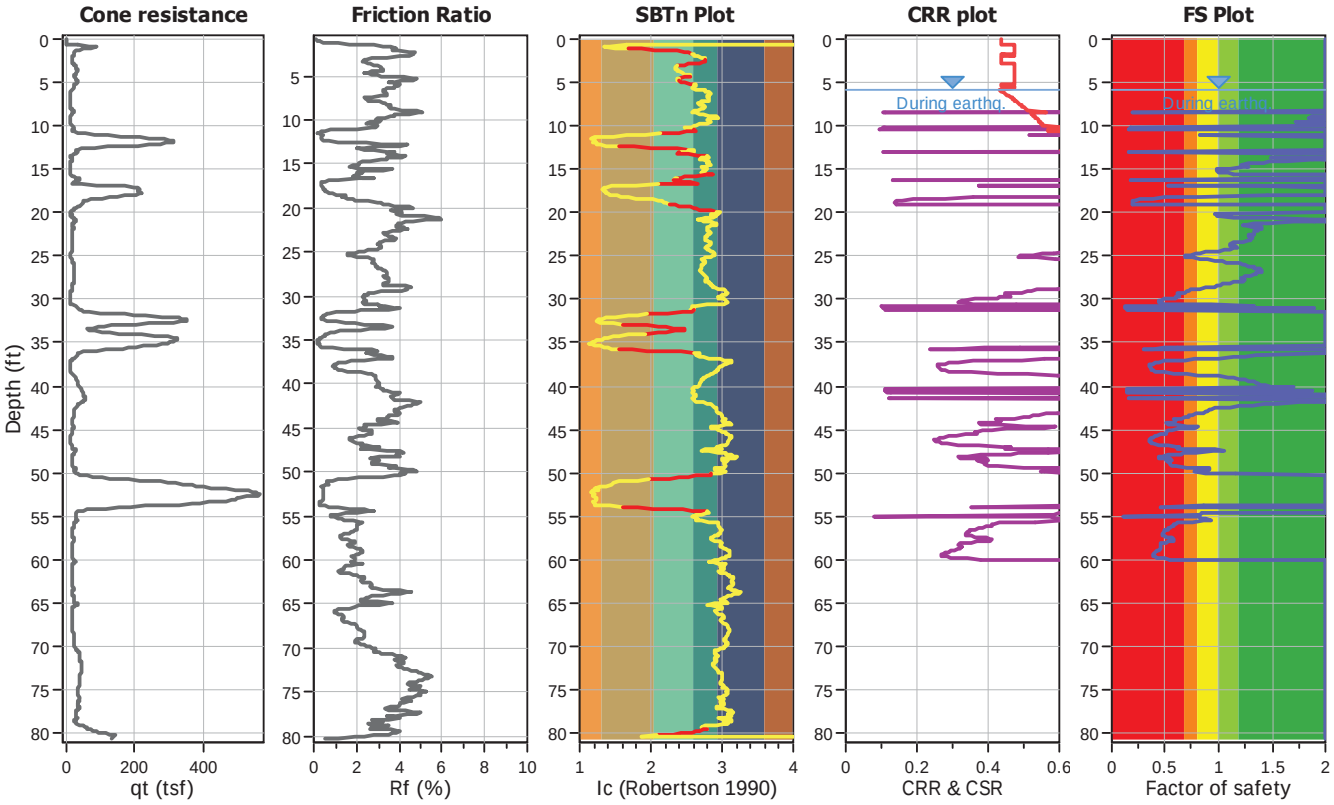
LIQUEFACTION ANALYSIS REPORT

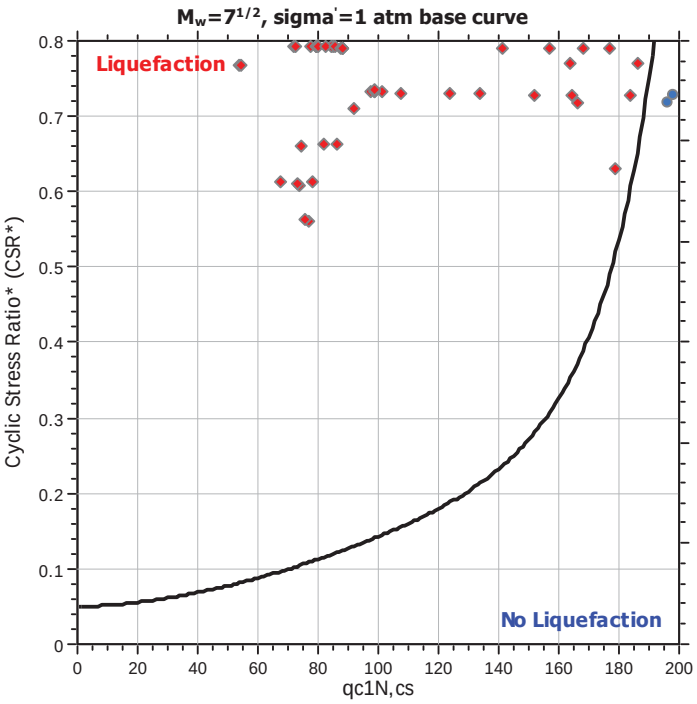
Project title : **Location :**

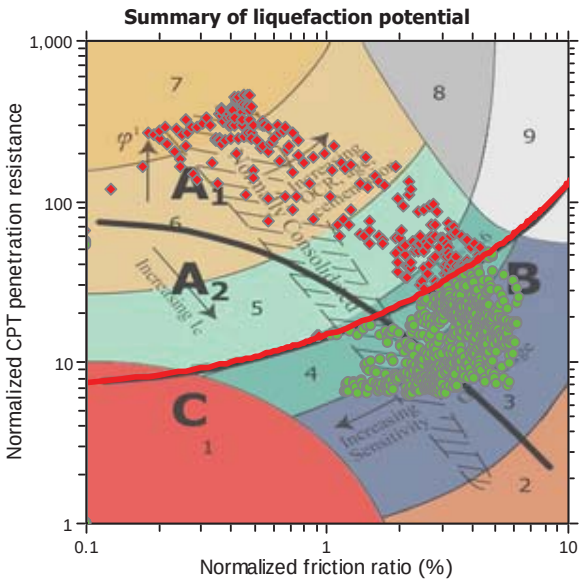
CPT file : 1-SCPT10

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

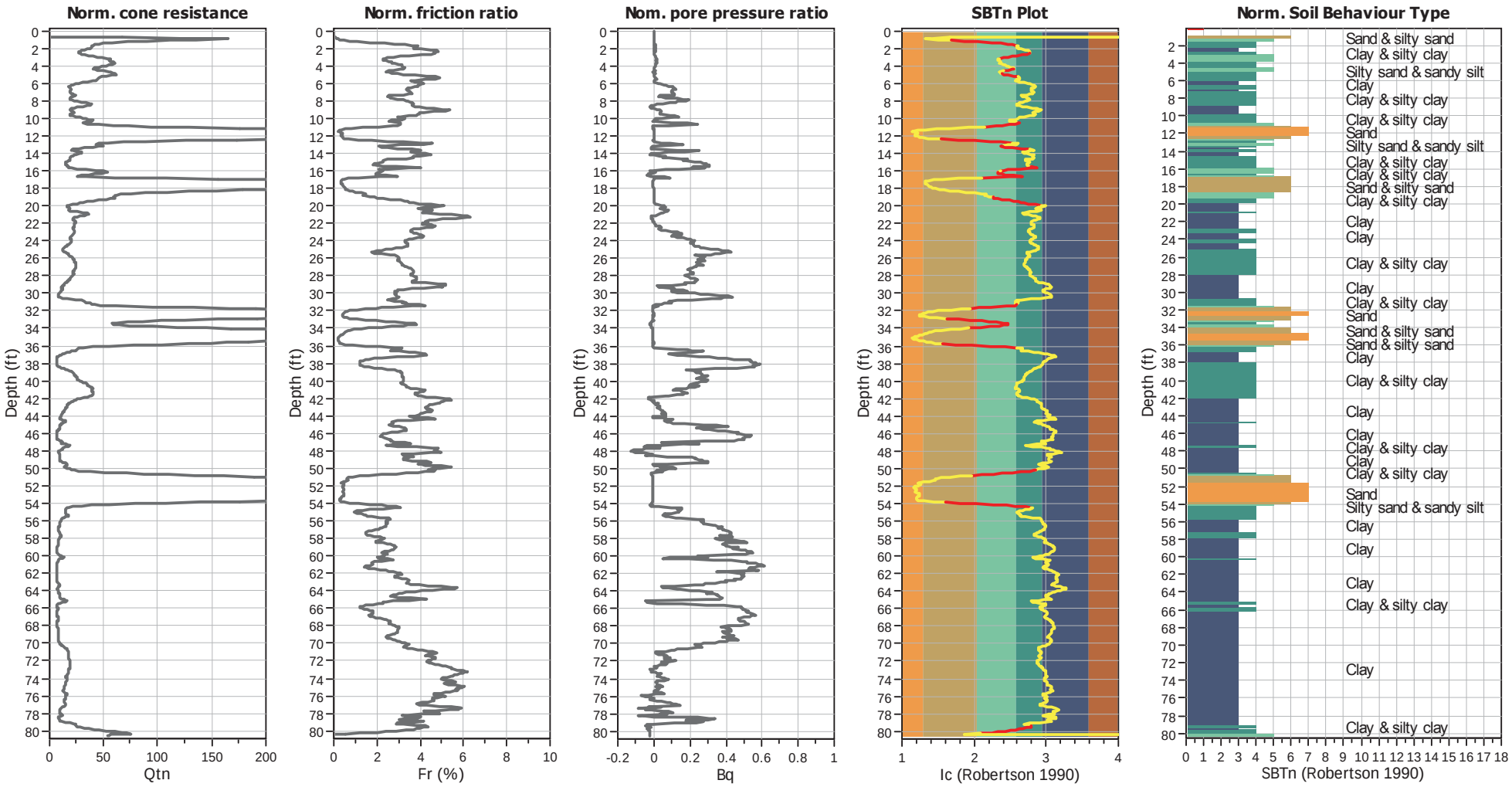






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



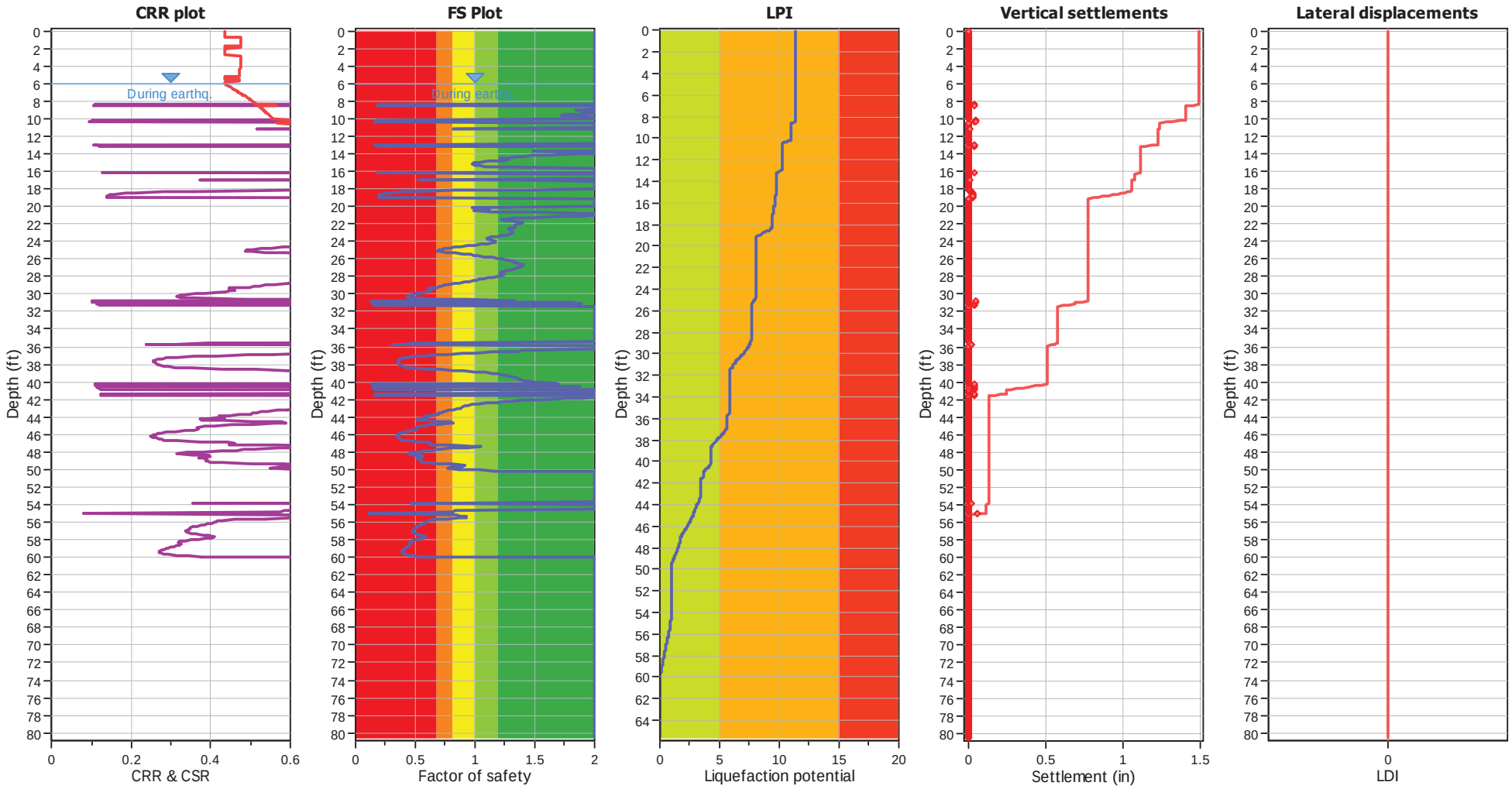
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

ENGEO
Expect Excellence

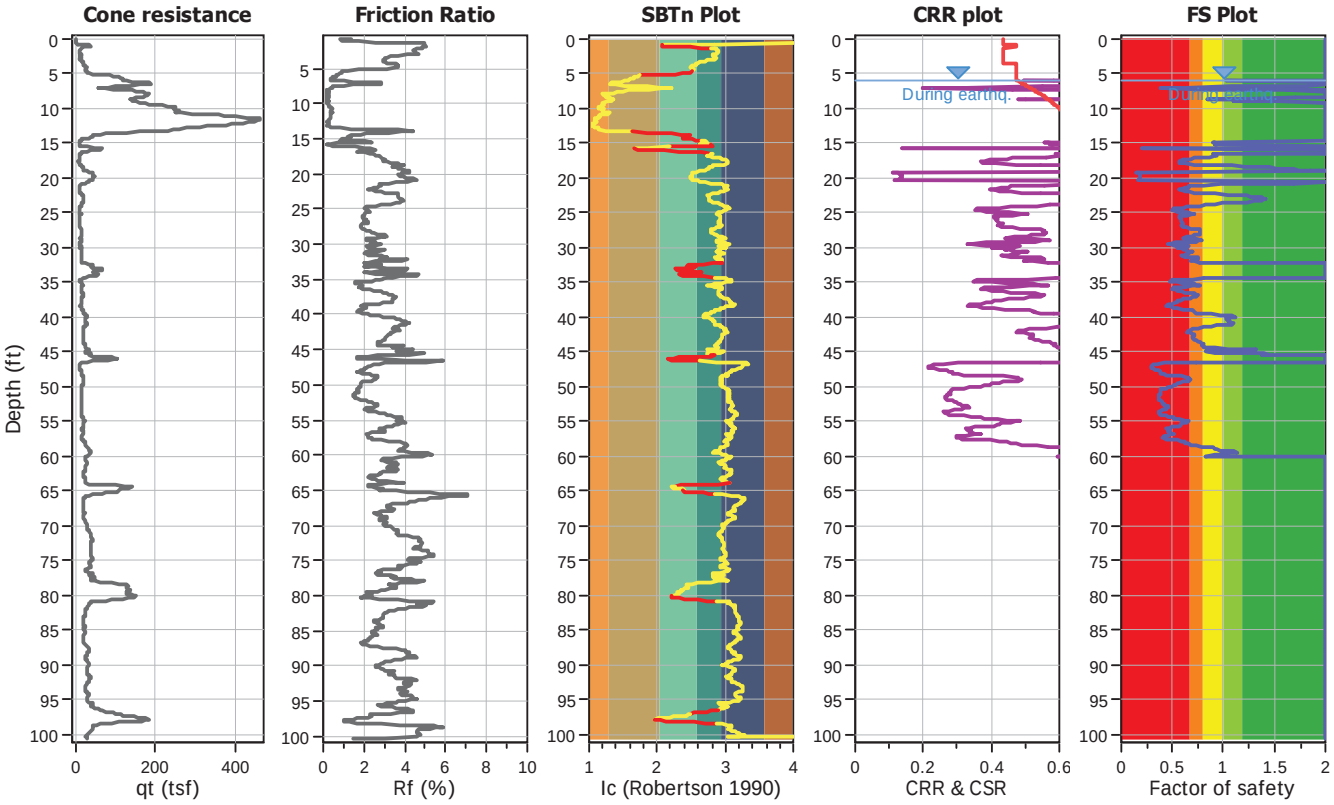
LIQUEFACTION ANALYSIS REPORT

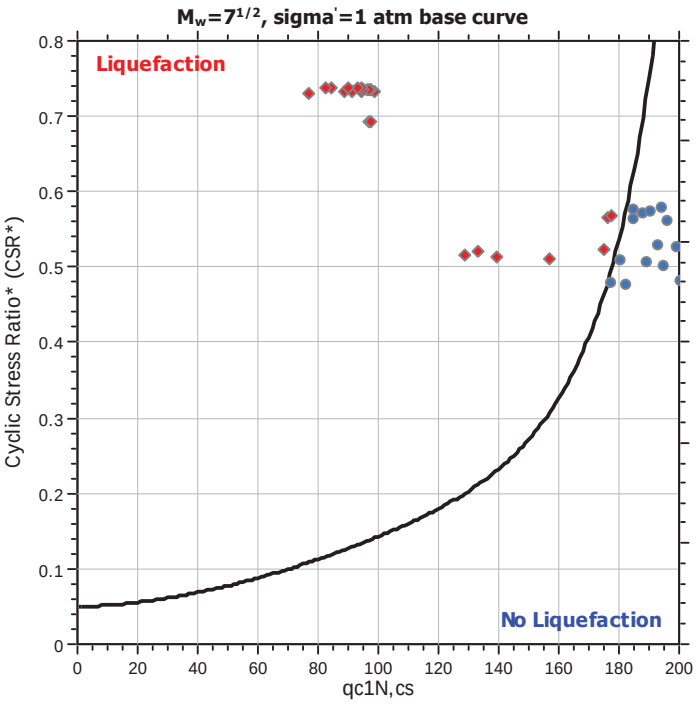
Project title : **Location :**

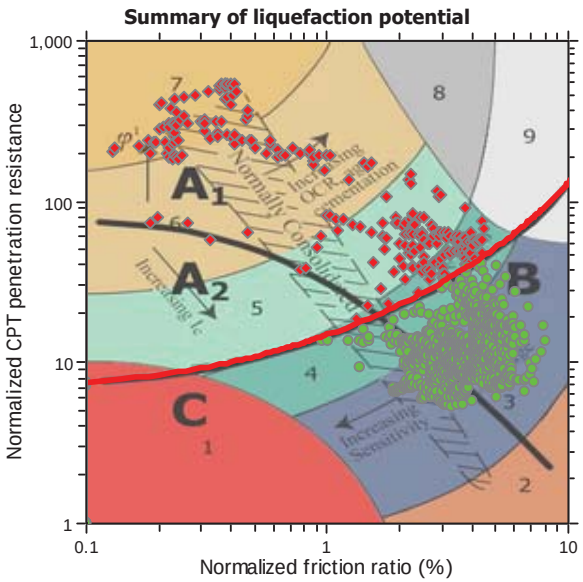
CPT file : 1-CPT11

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method

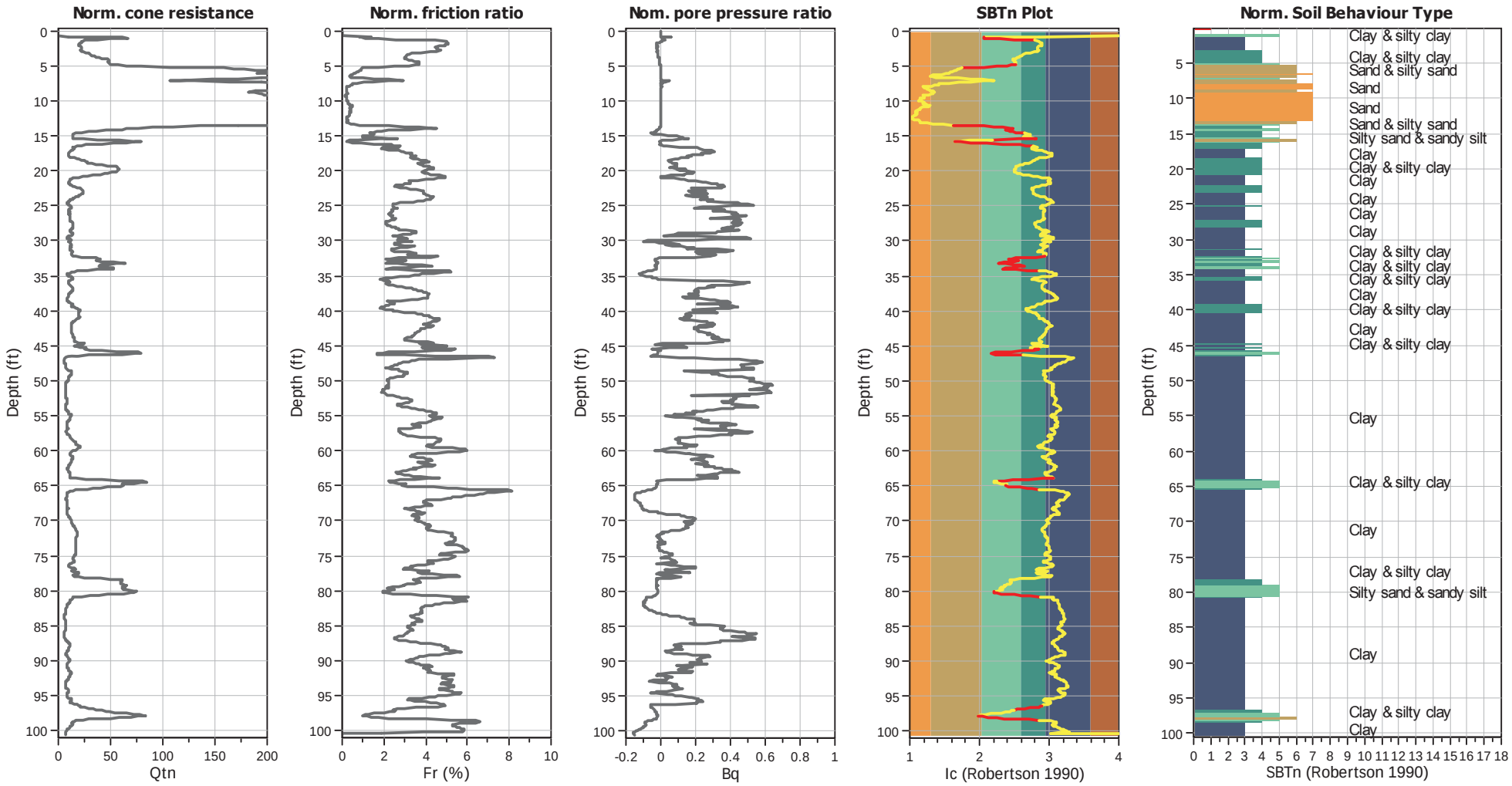






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



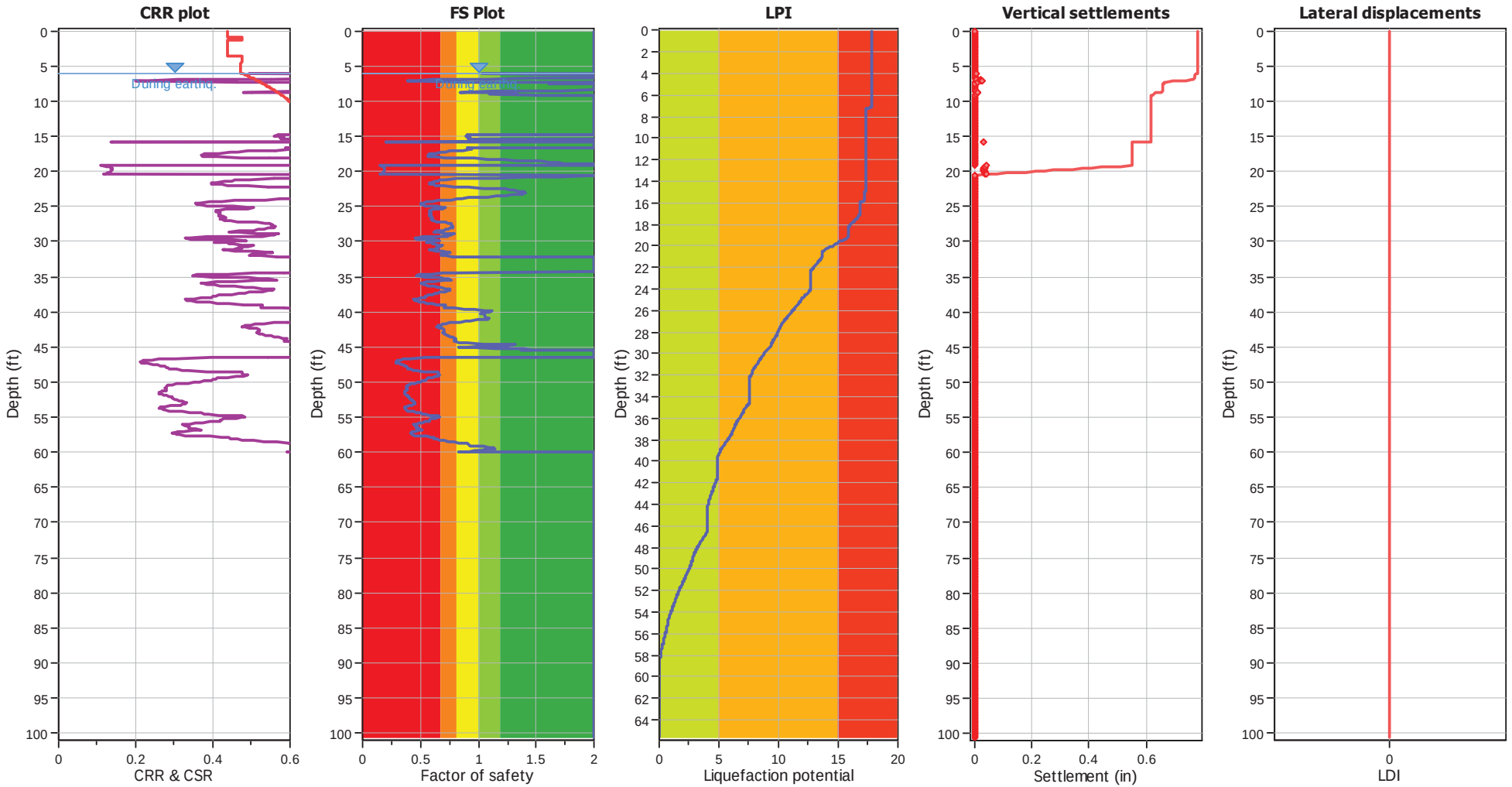
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

ENGEO
Expect Excellence

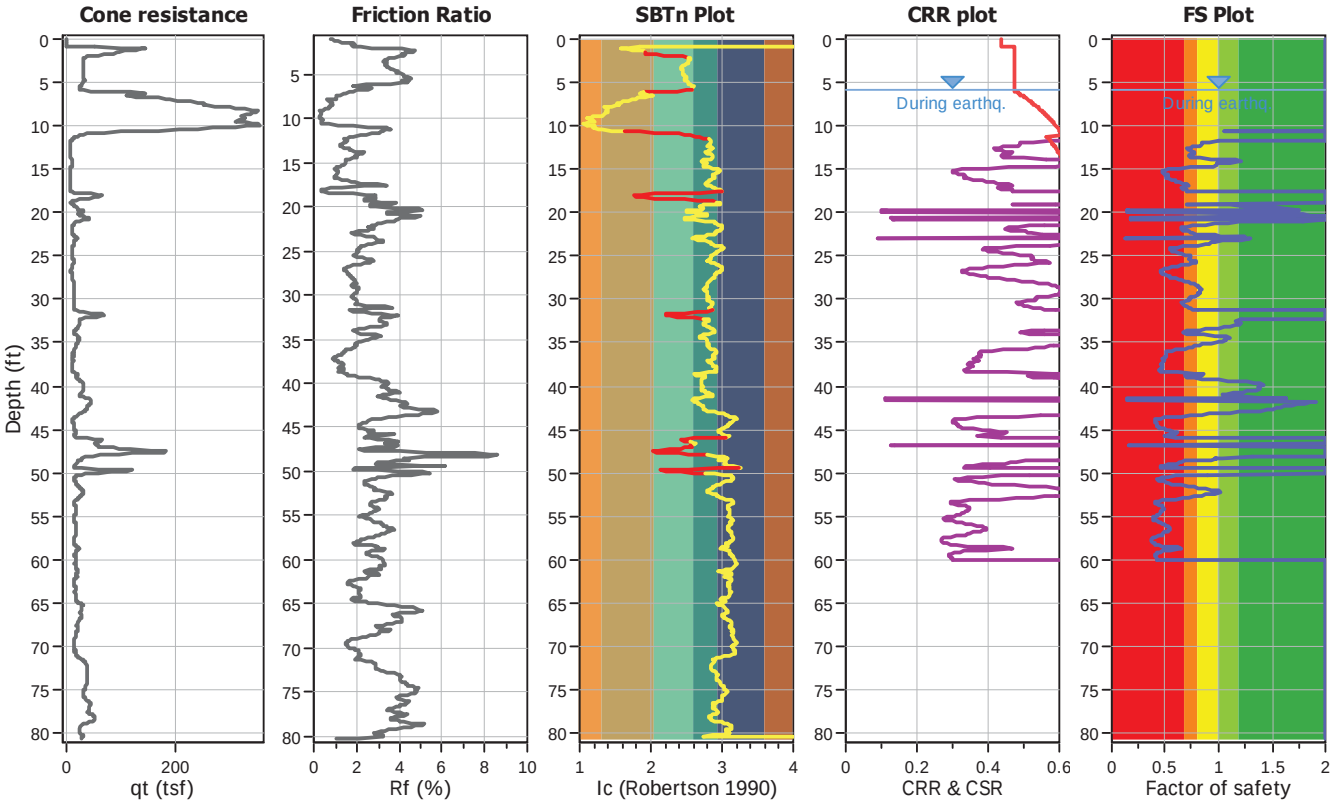
LIQUEFACTION ANALYSIS REPORT

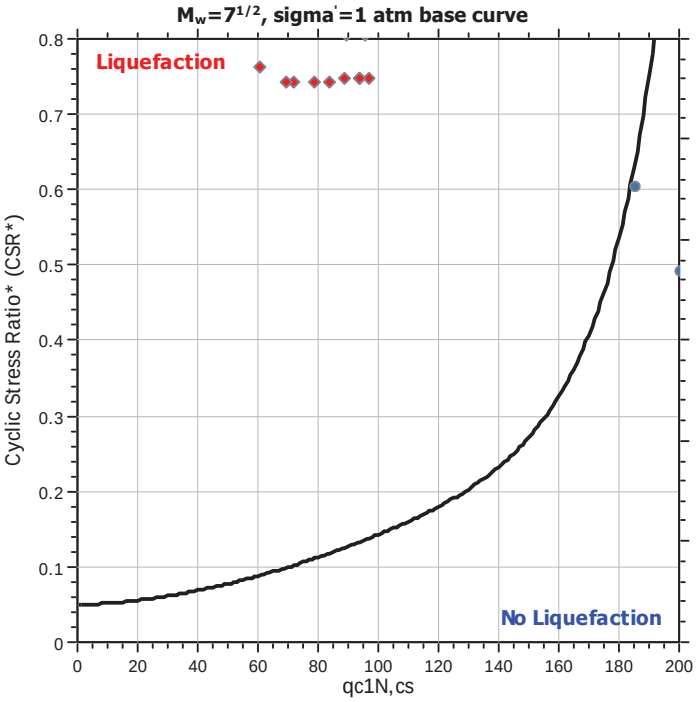
Project title : **Location :**

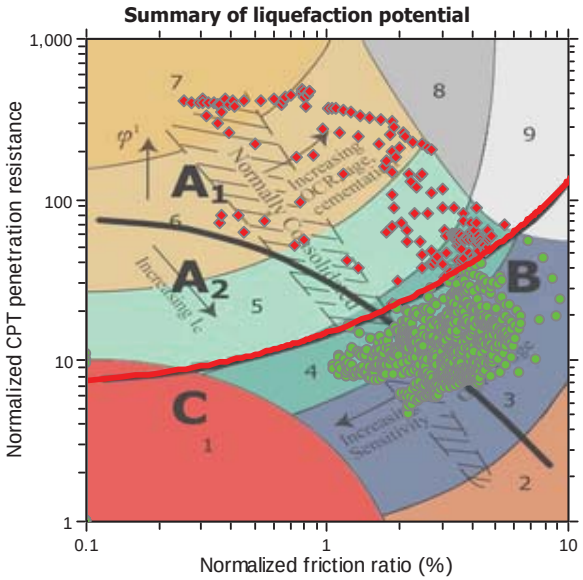
CPT file : 1-CPT12

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

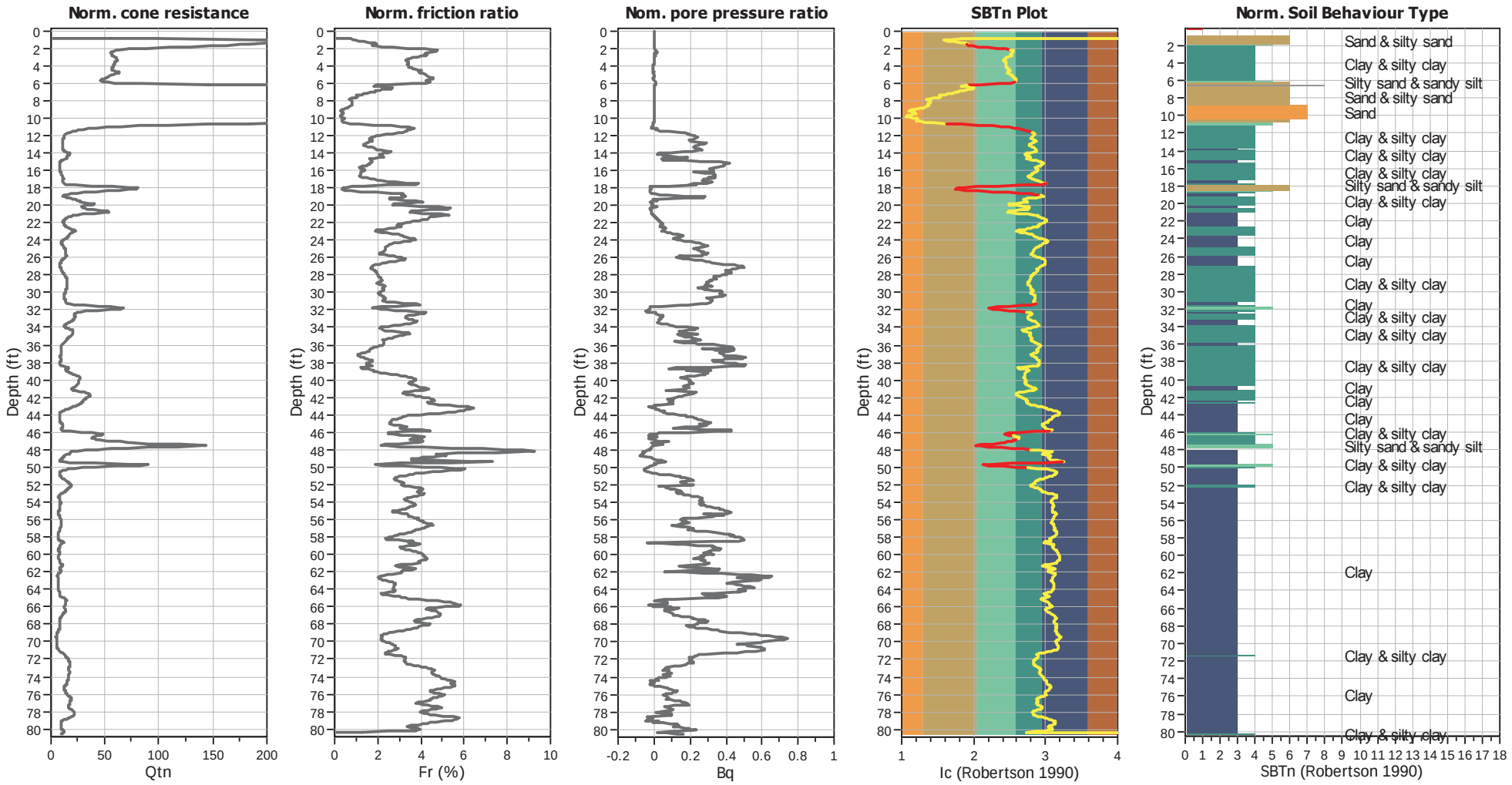






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



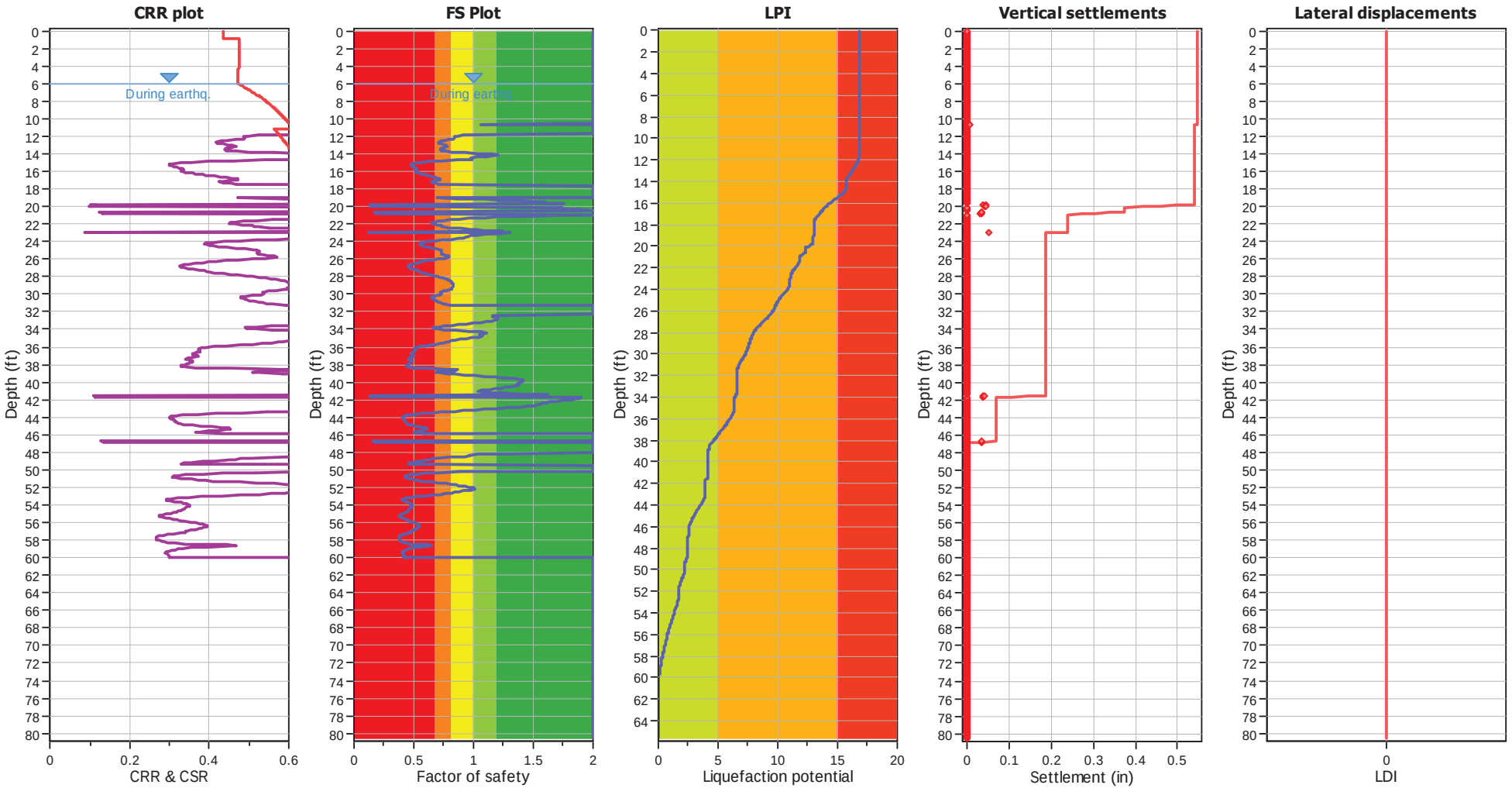
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

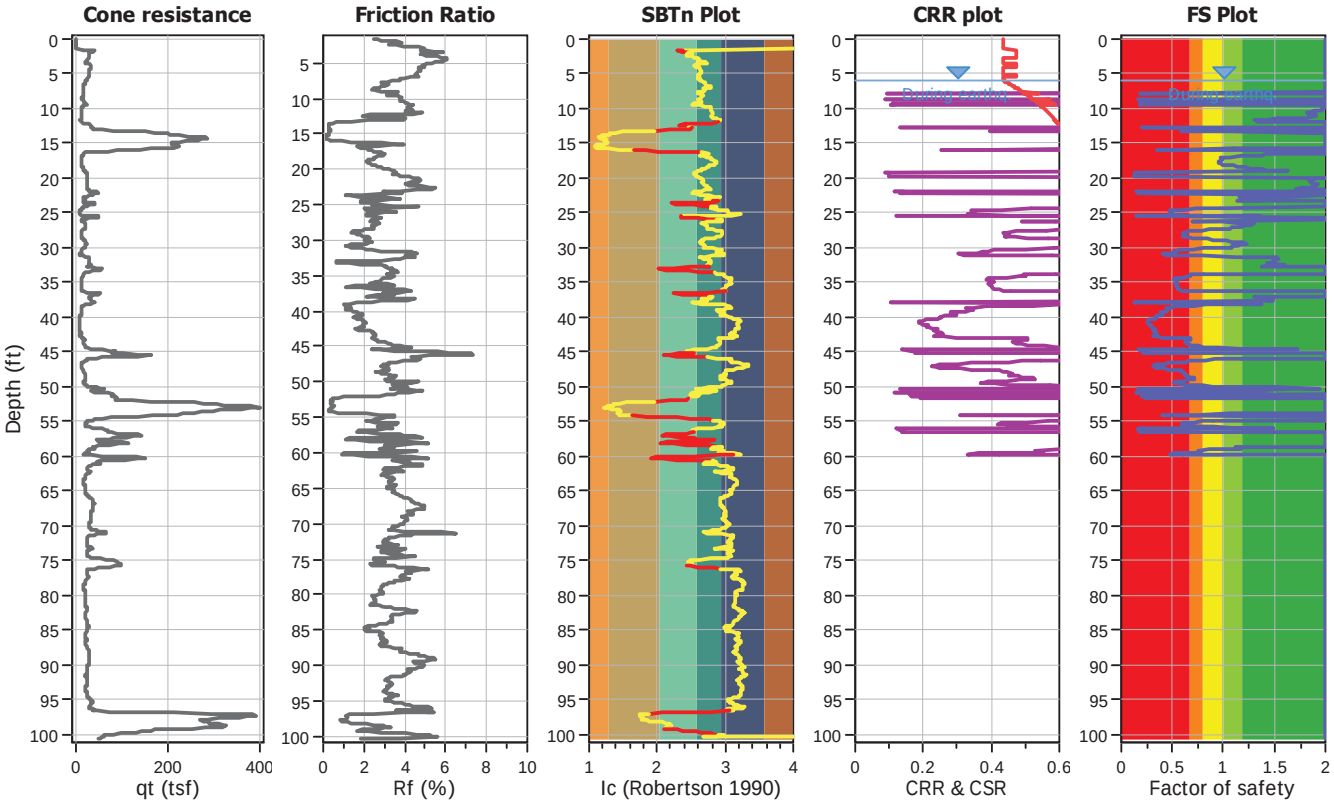
LIQUEFACTION ANALYSIS REPORT

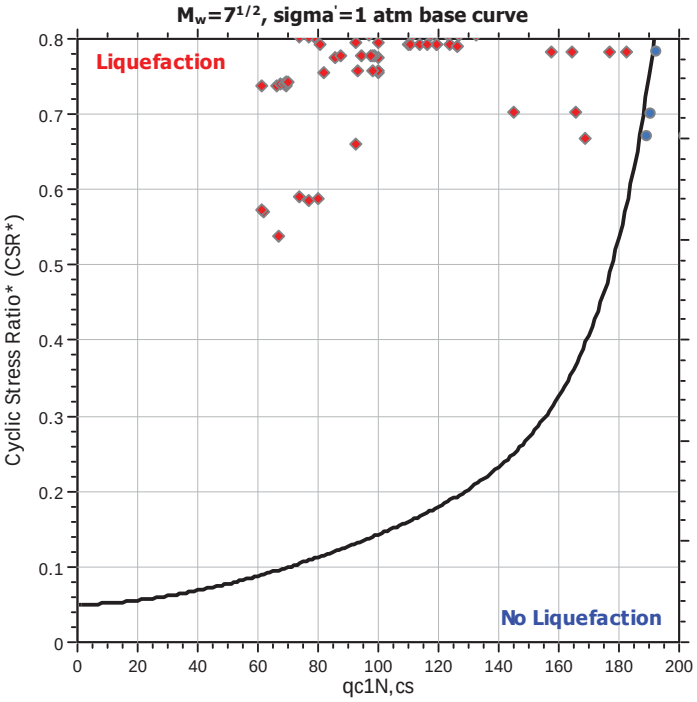
Project title : **Location :**

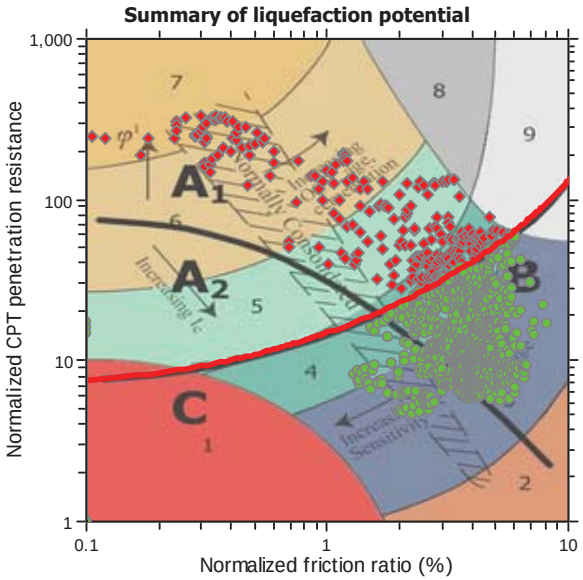
CPT file : 1-CPT13

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

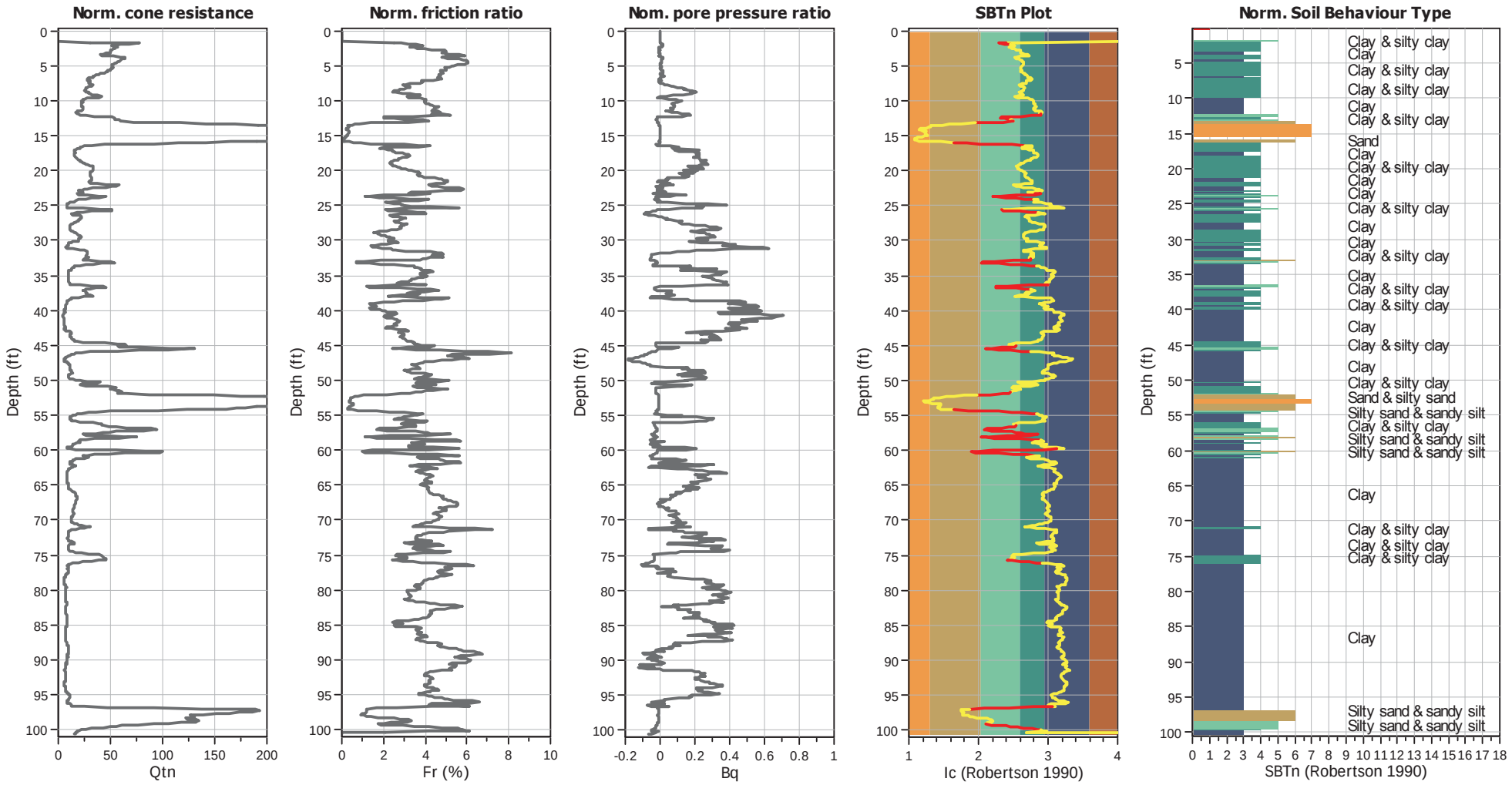






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



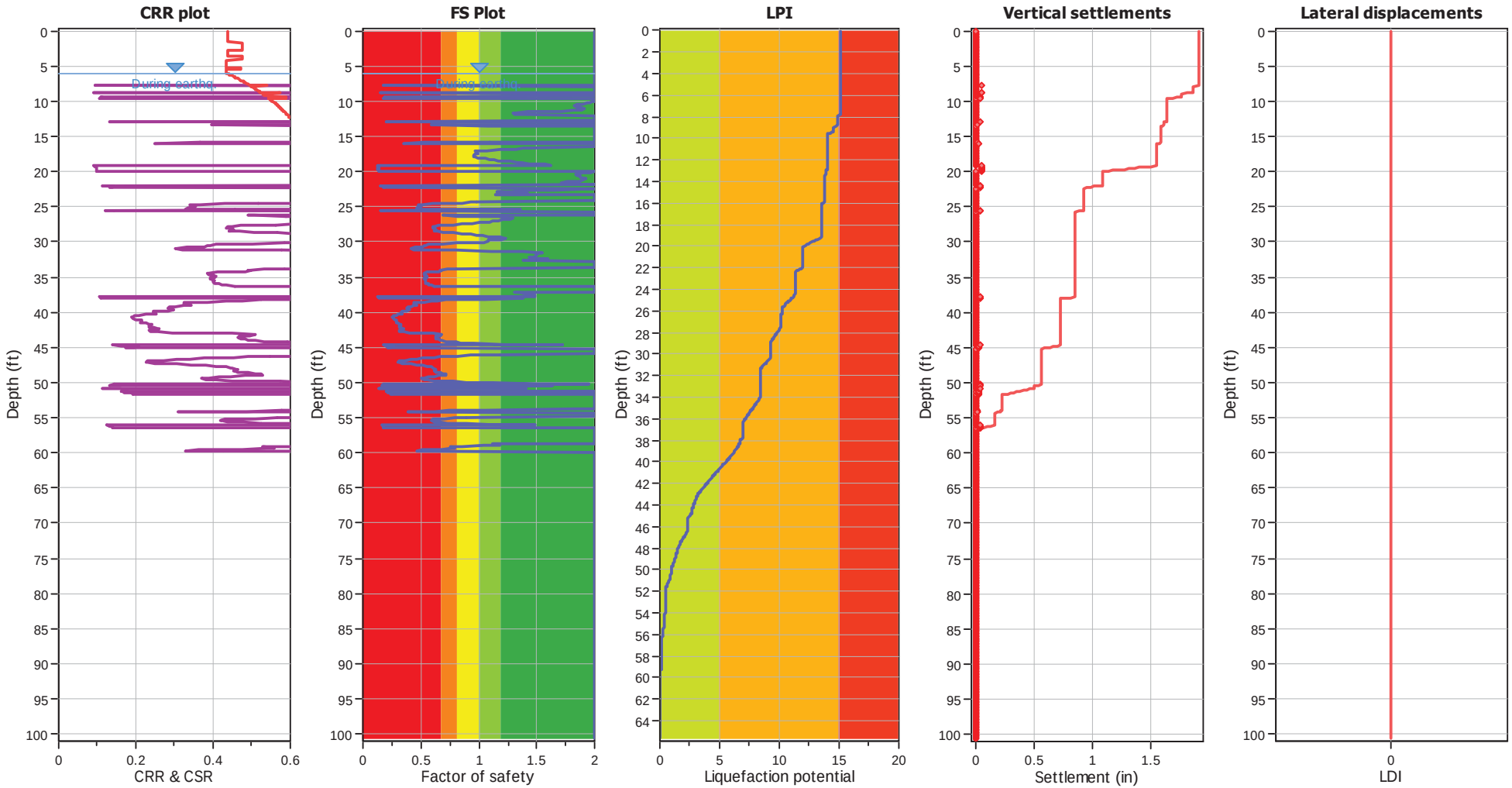
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

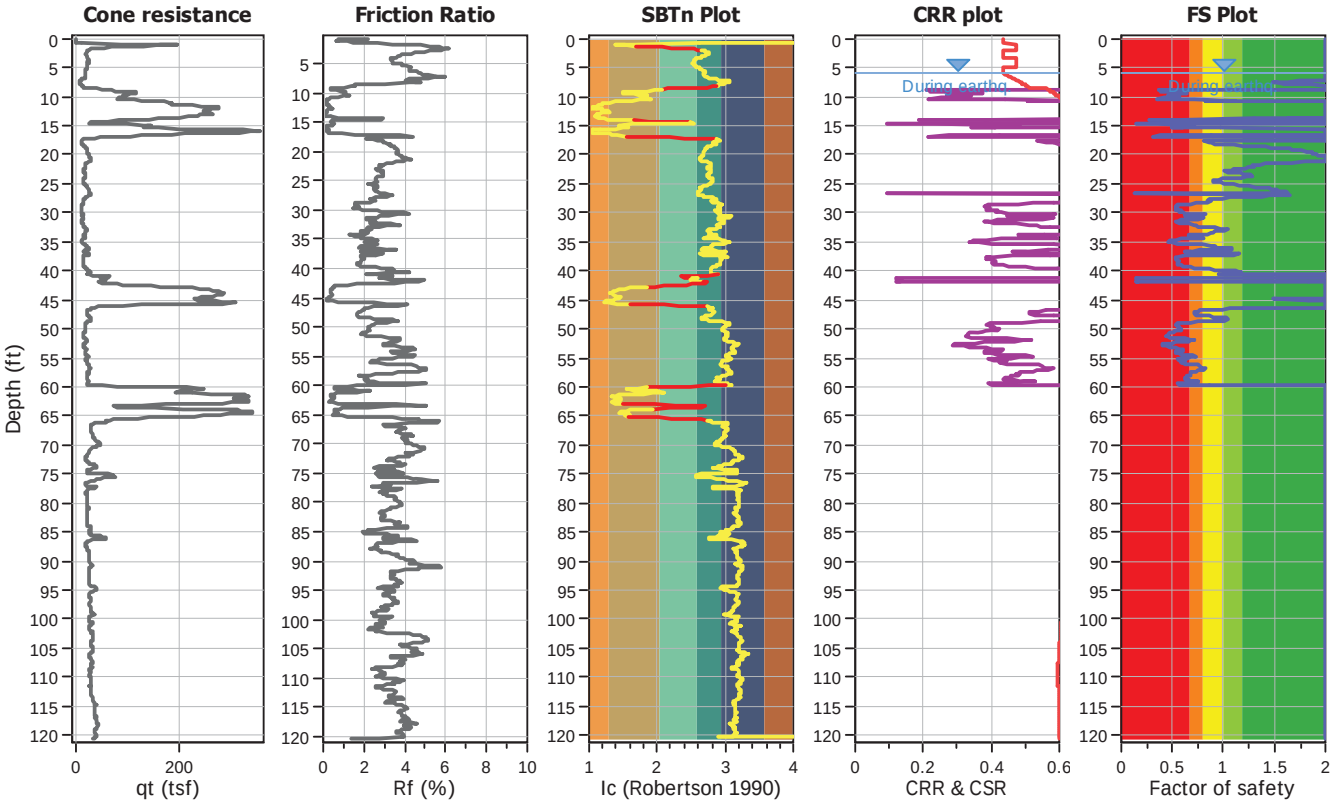
LIQUEFACTION ANALYSIS REPORT

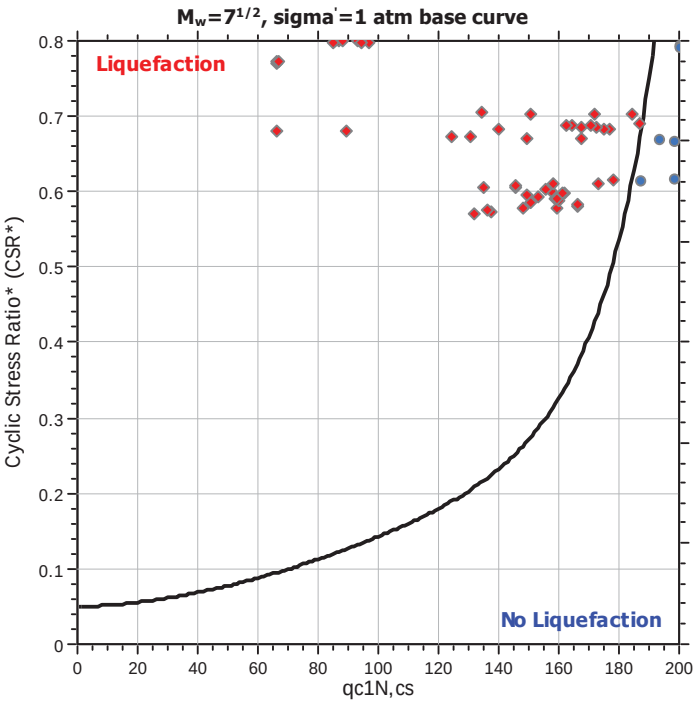
Project title : **Location :**

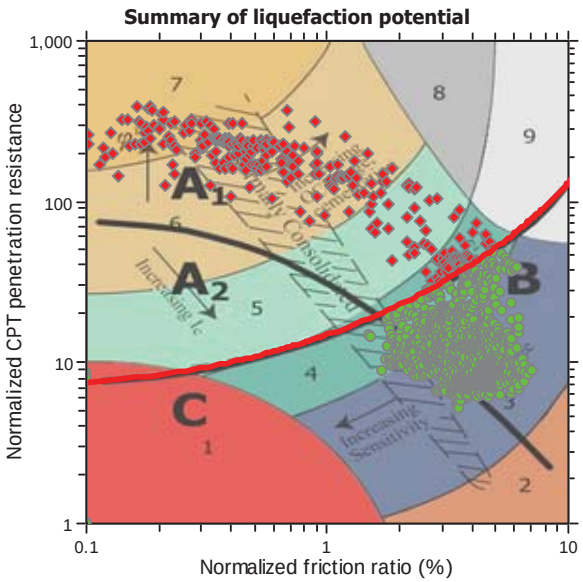
CPT file : 1-CPT14

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

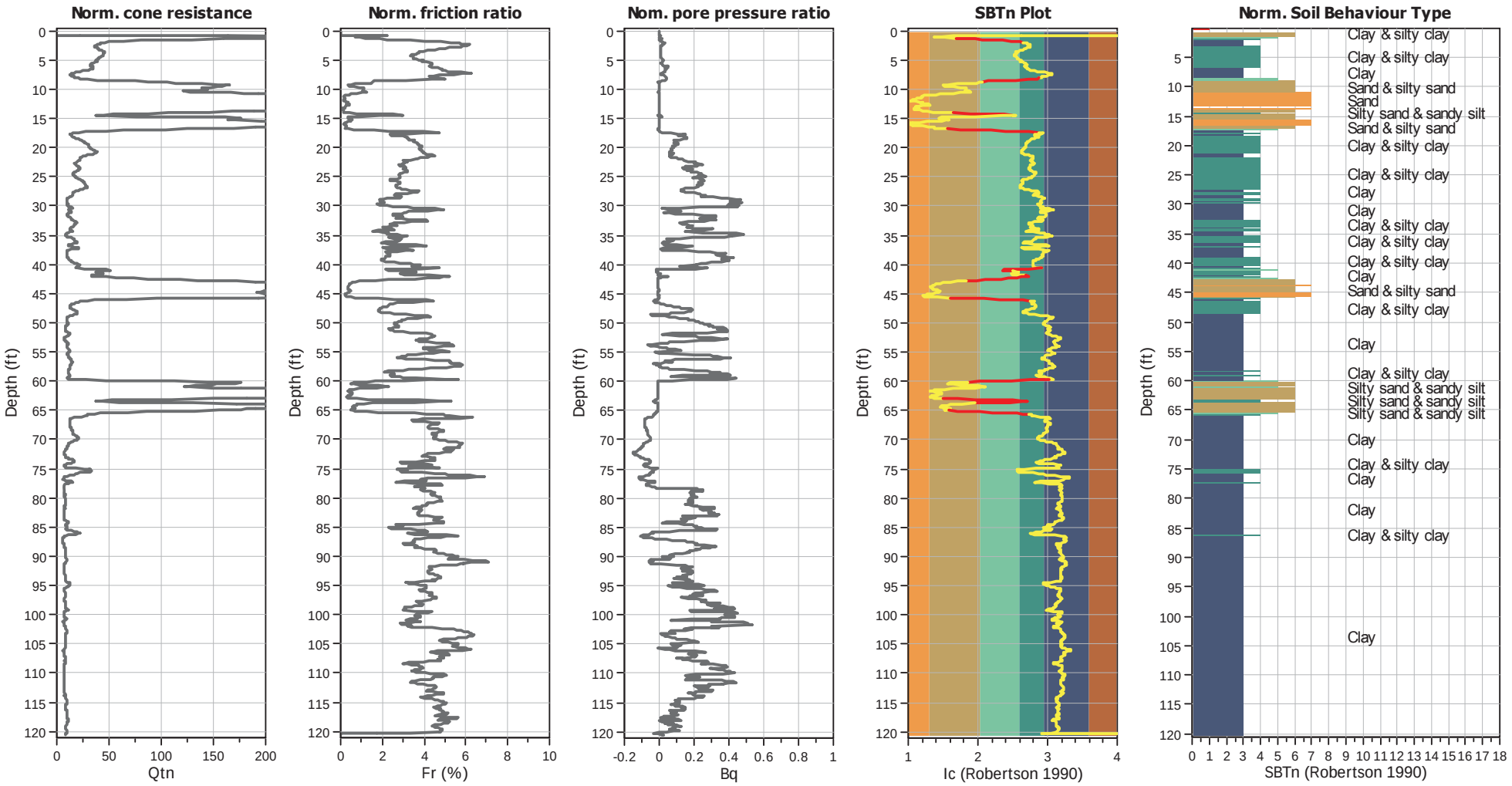






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



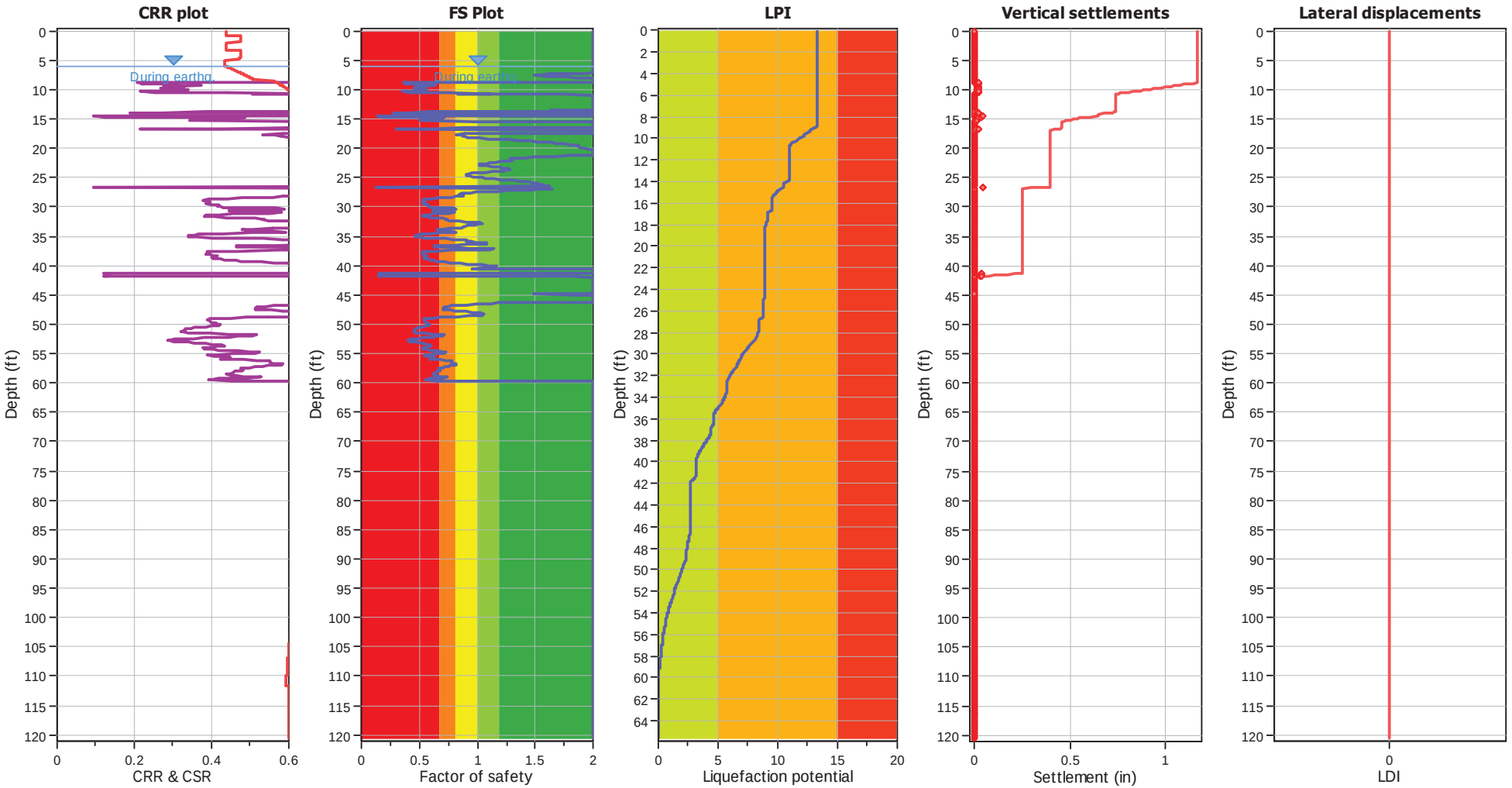
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

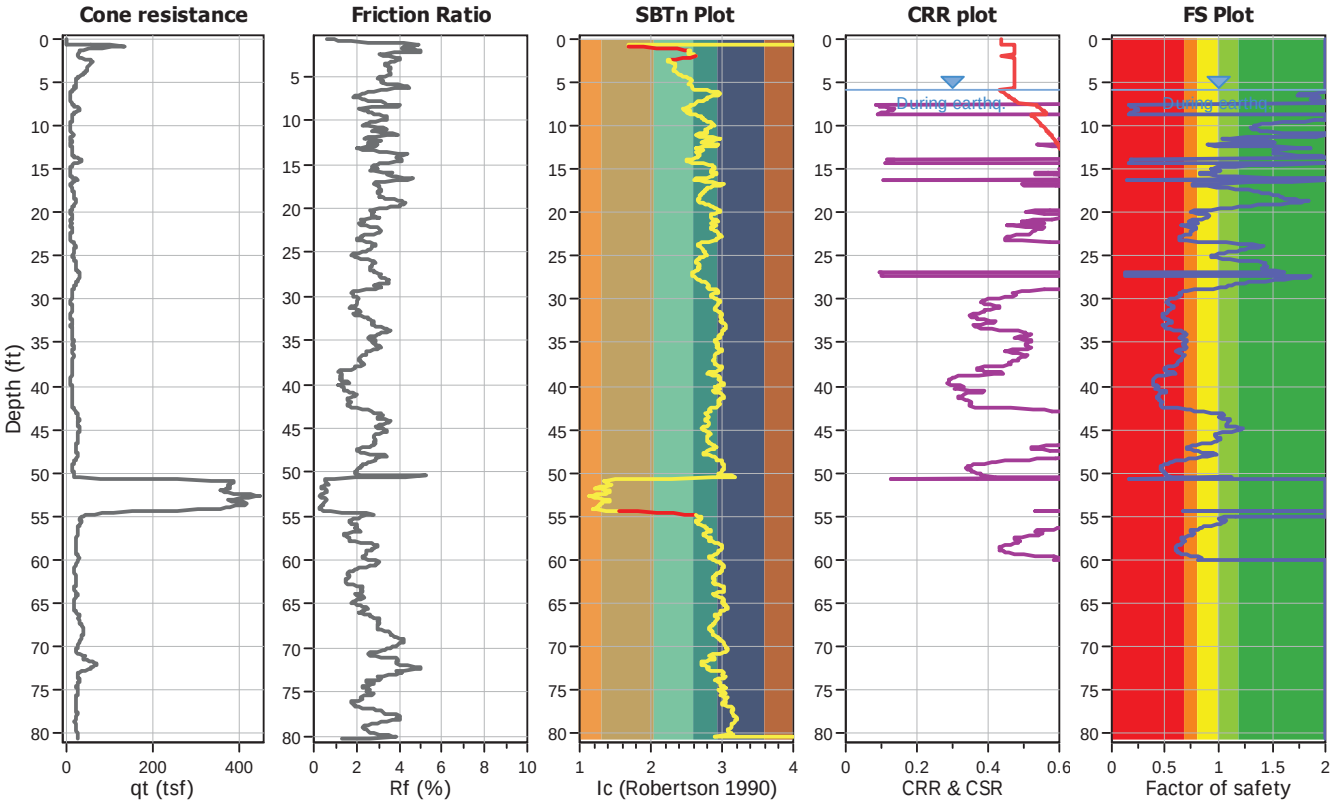
LIQUEFACTION ANALYSIS REPORT

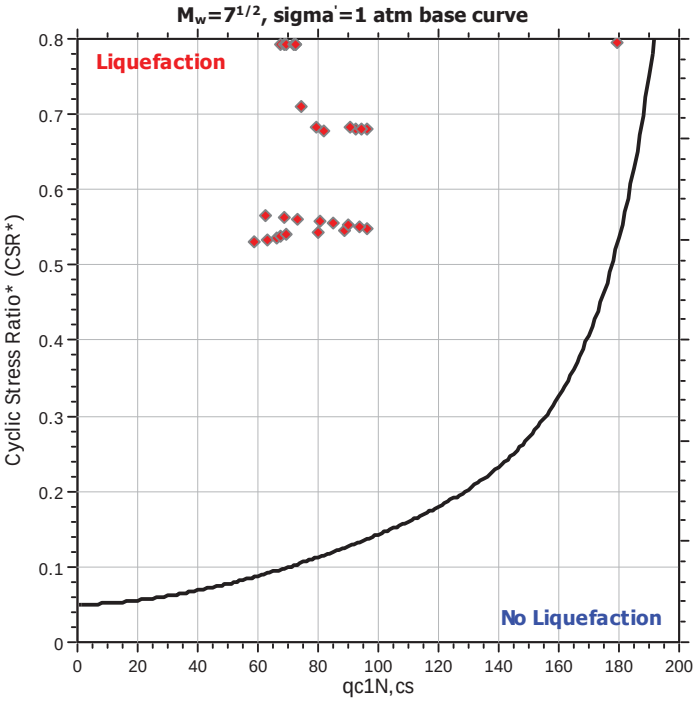
Project title : **Location :**

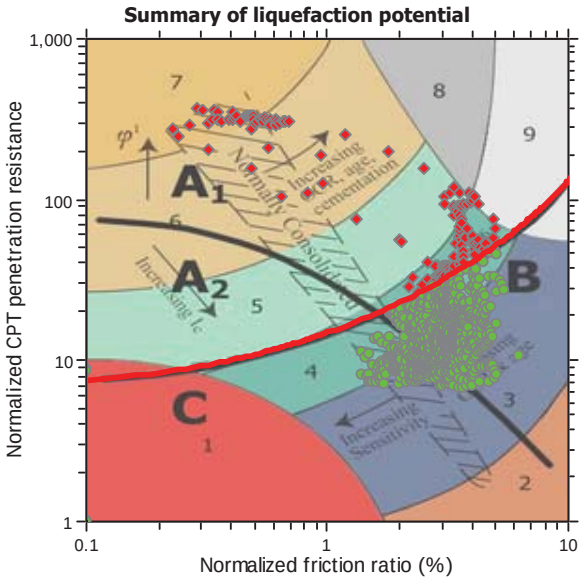
CPT file : 1-CPT15

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

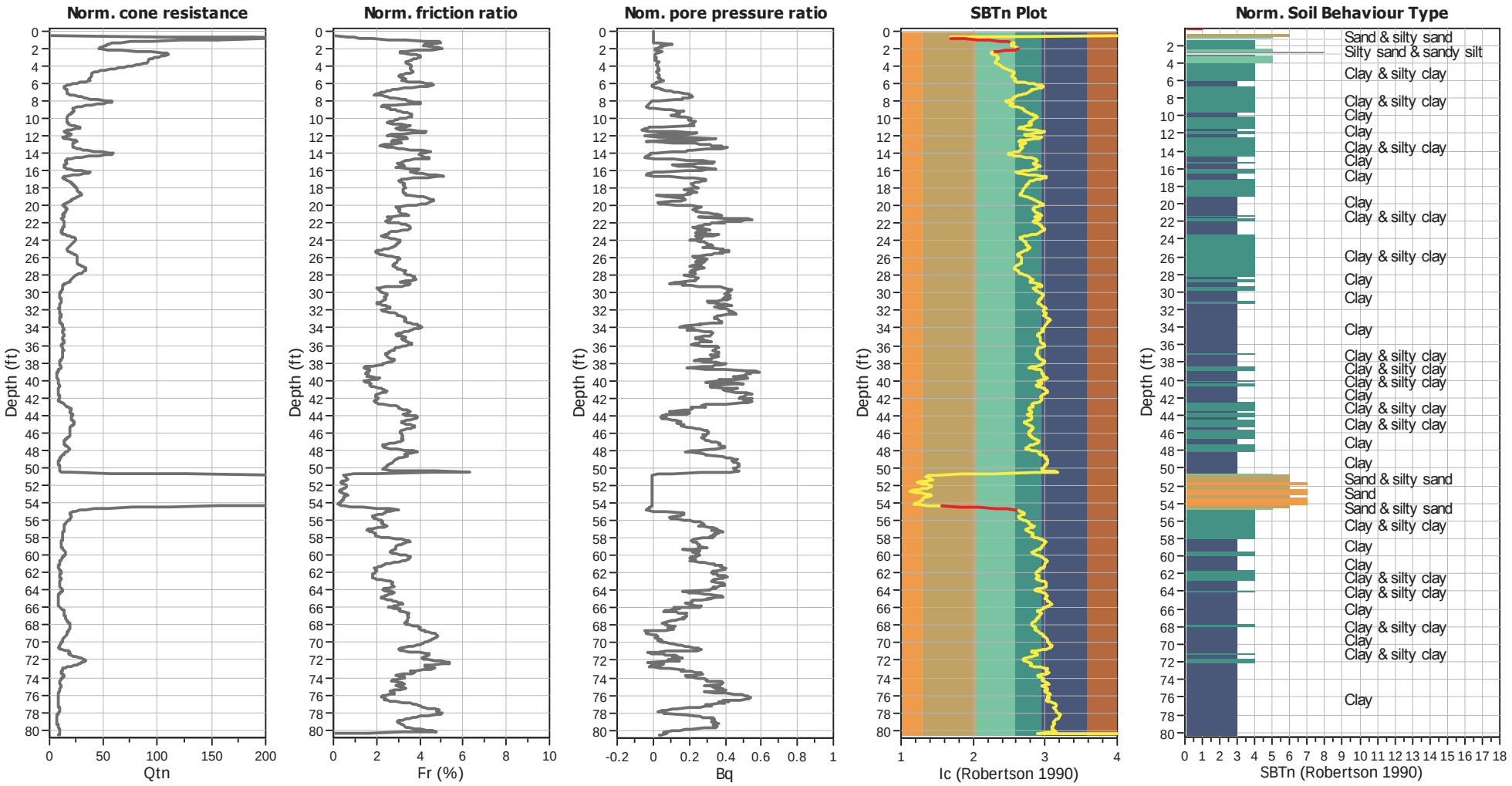






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



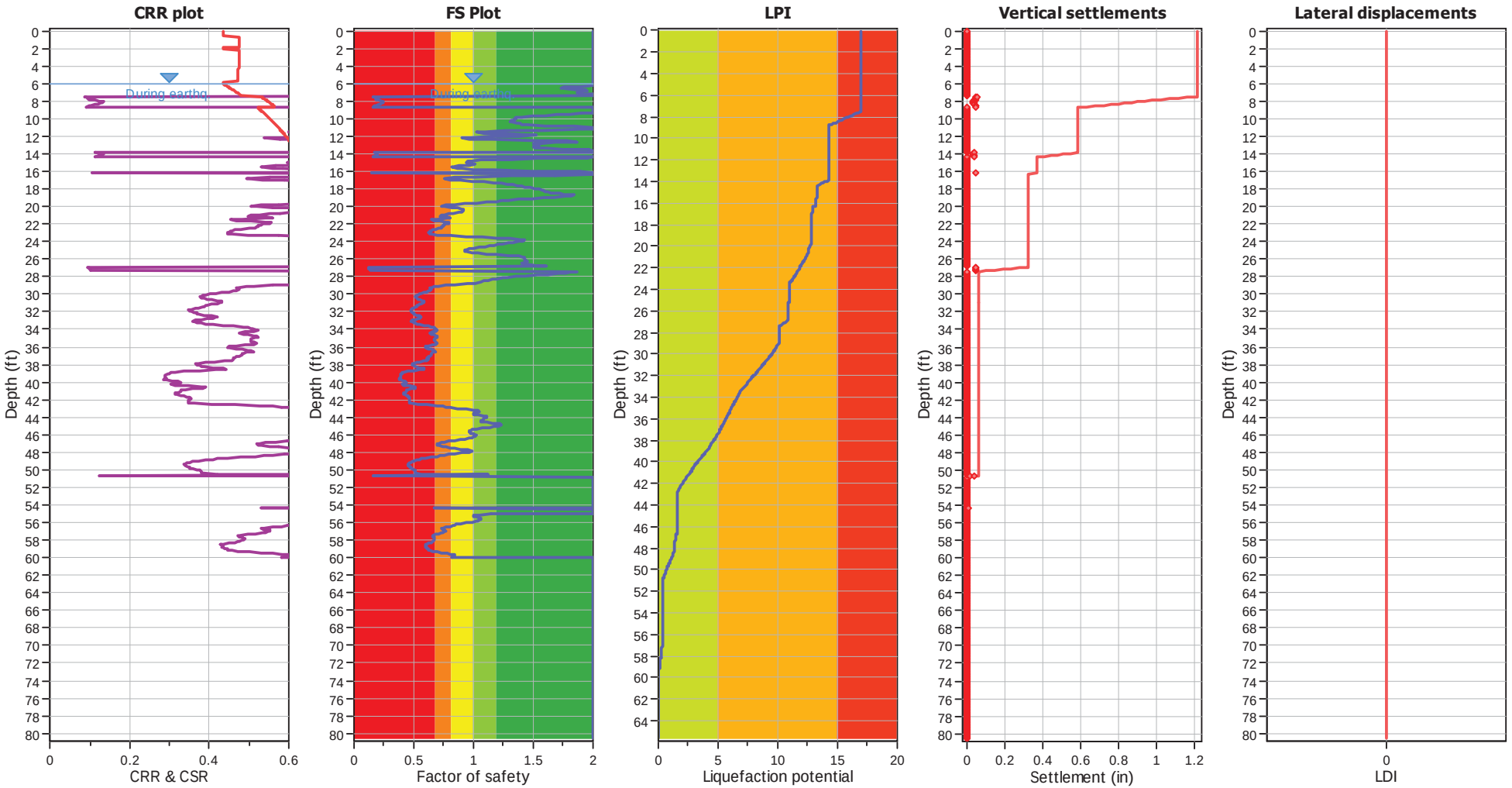
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

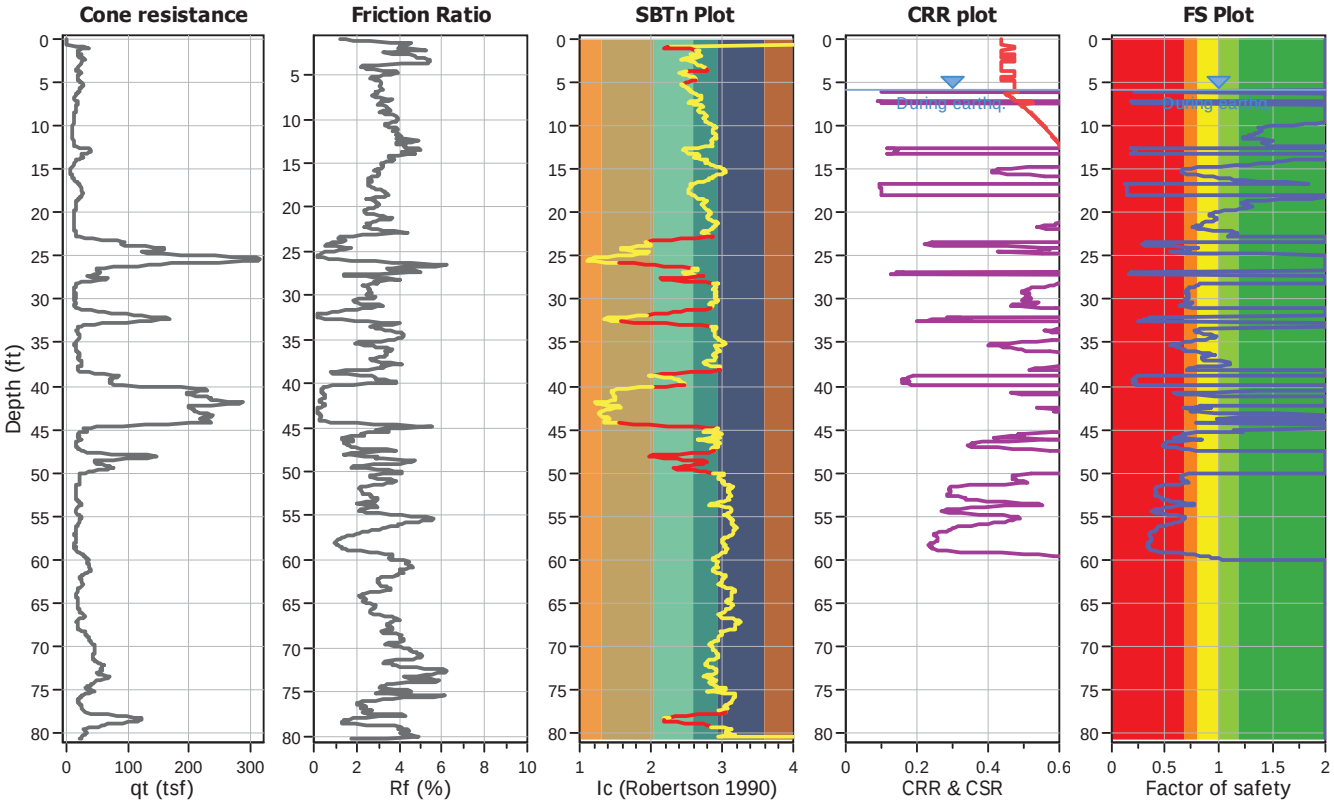
LIQUEFACTION ANALYSIS REPORT

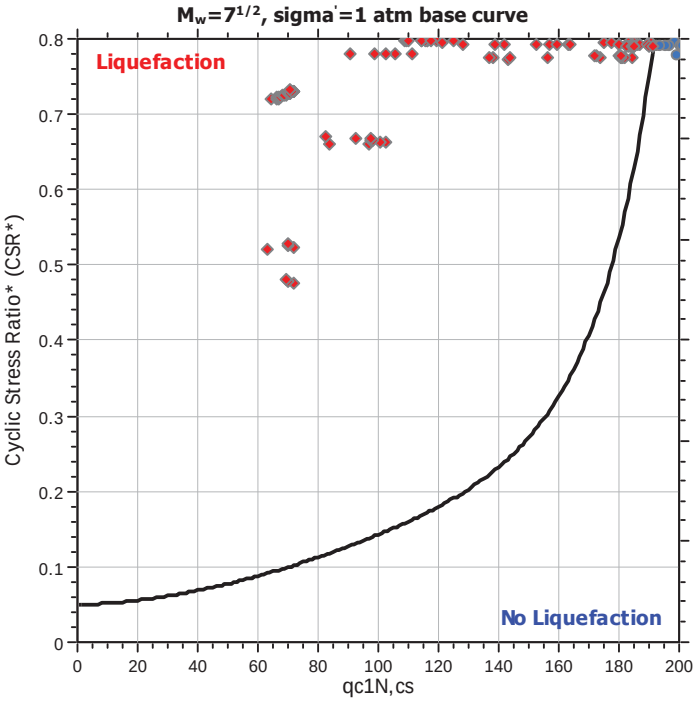
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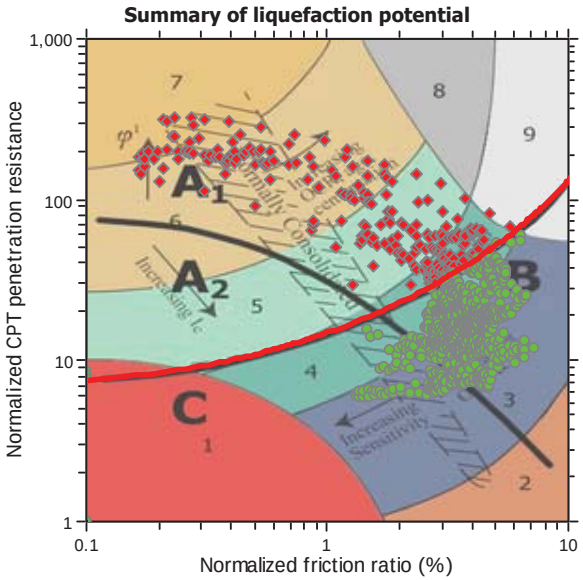
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Input parameters and analysis data

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Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
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Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

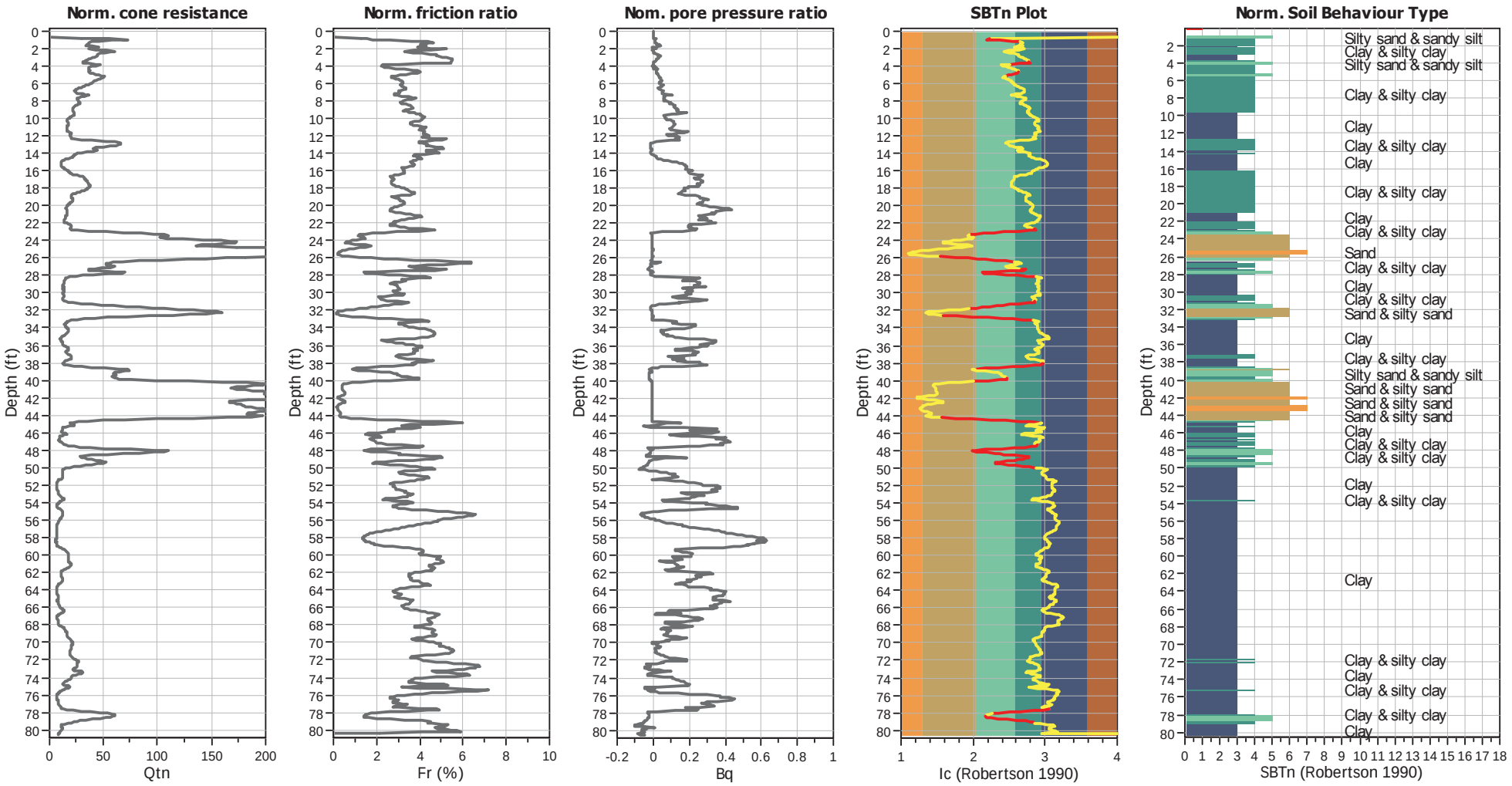






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



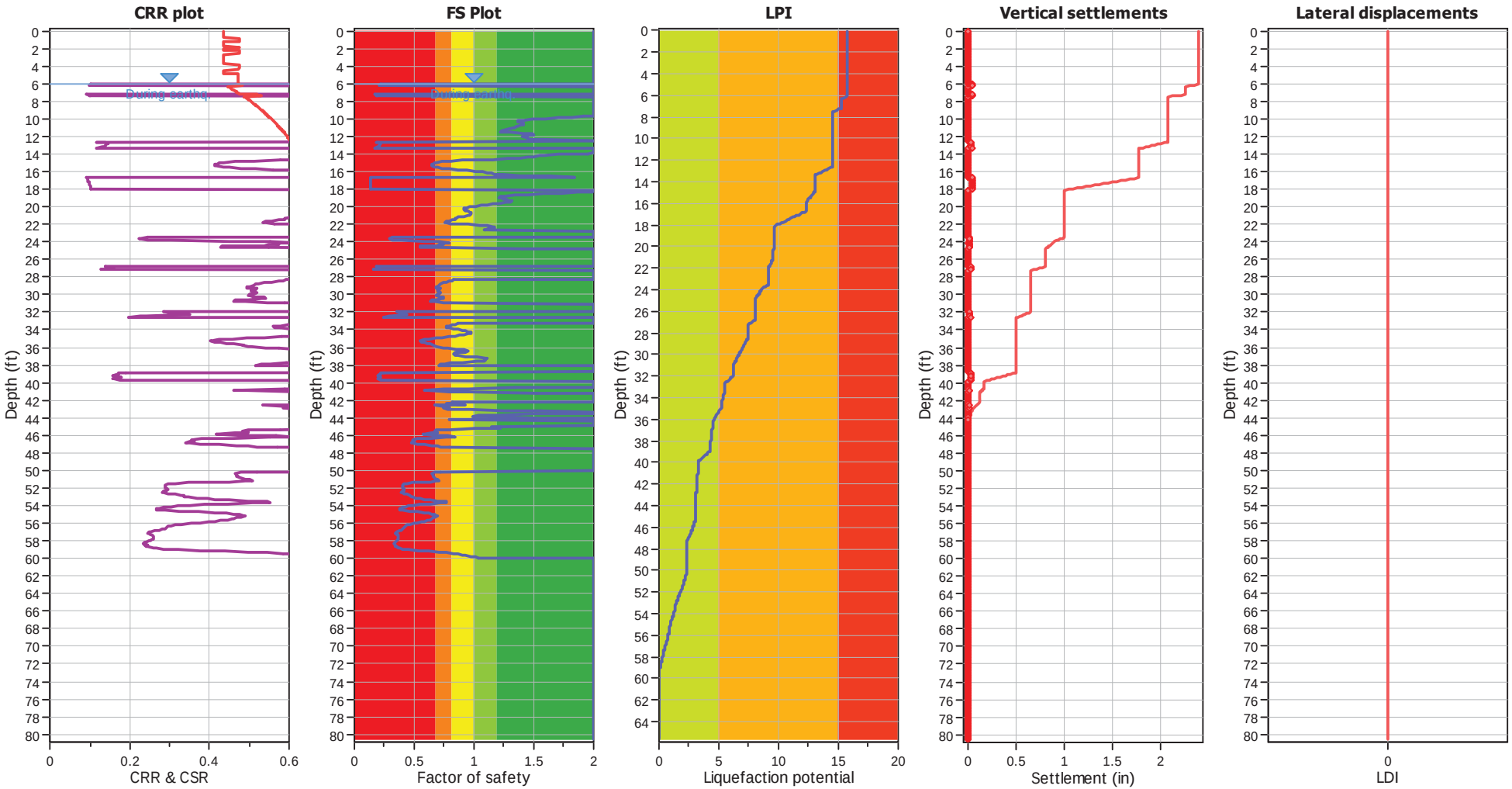
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

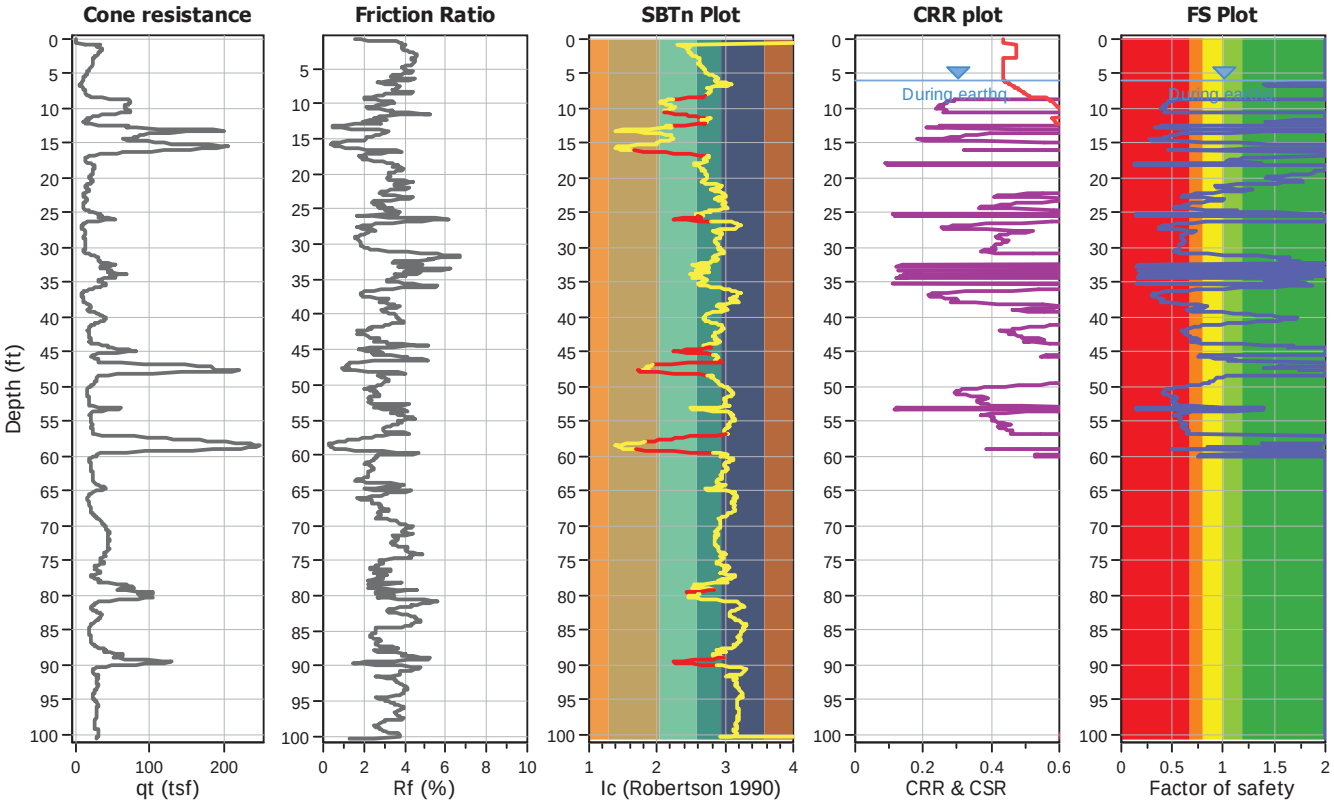
LIQUEFACTION ANALYSIS REPORT

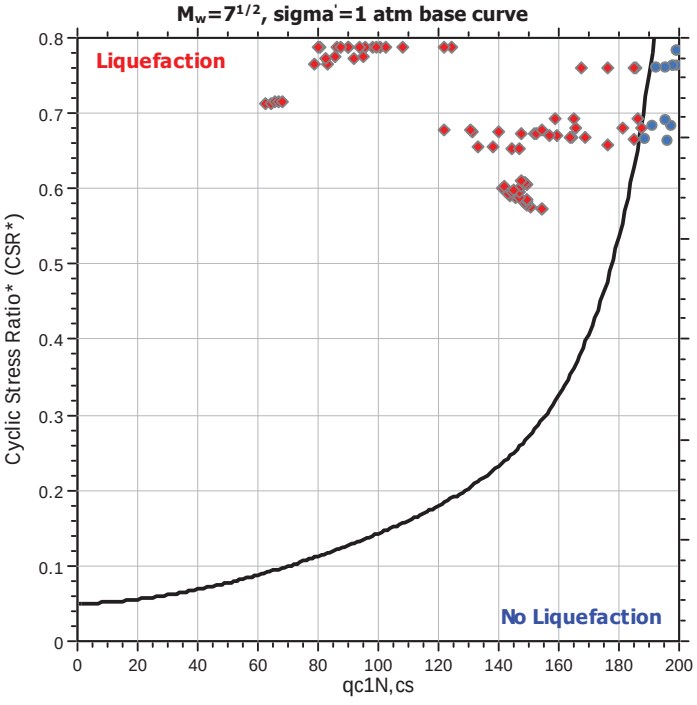
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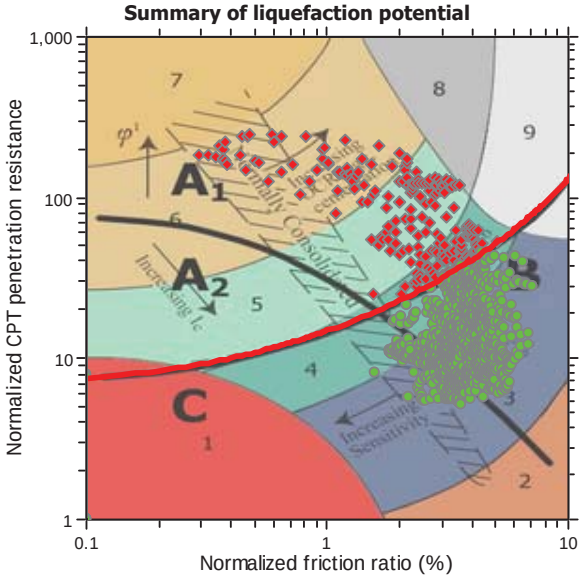
CPT file : 1-CPT17

Input parameters and analysis data

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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

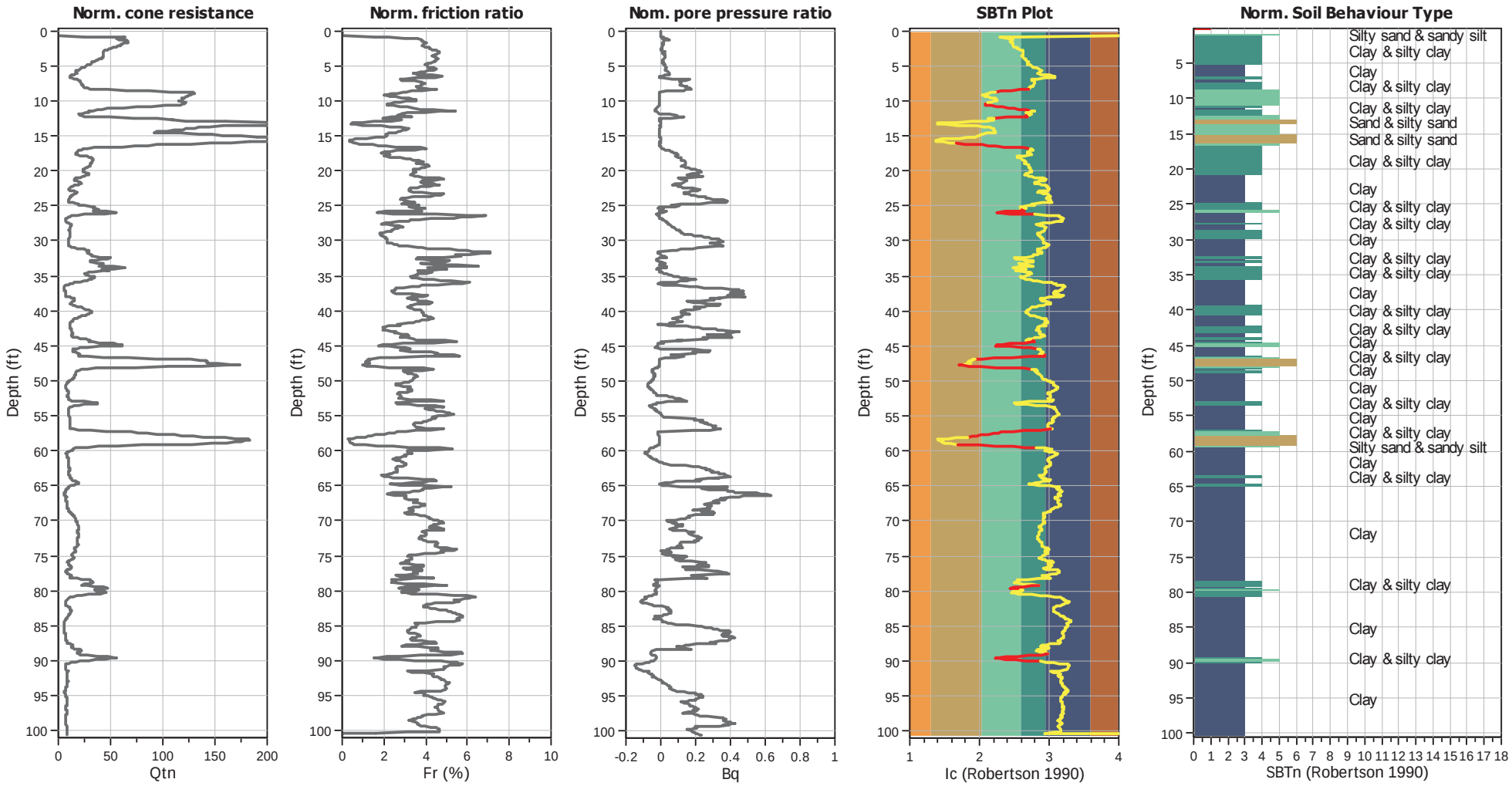






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
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Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



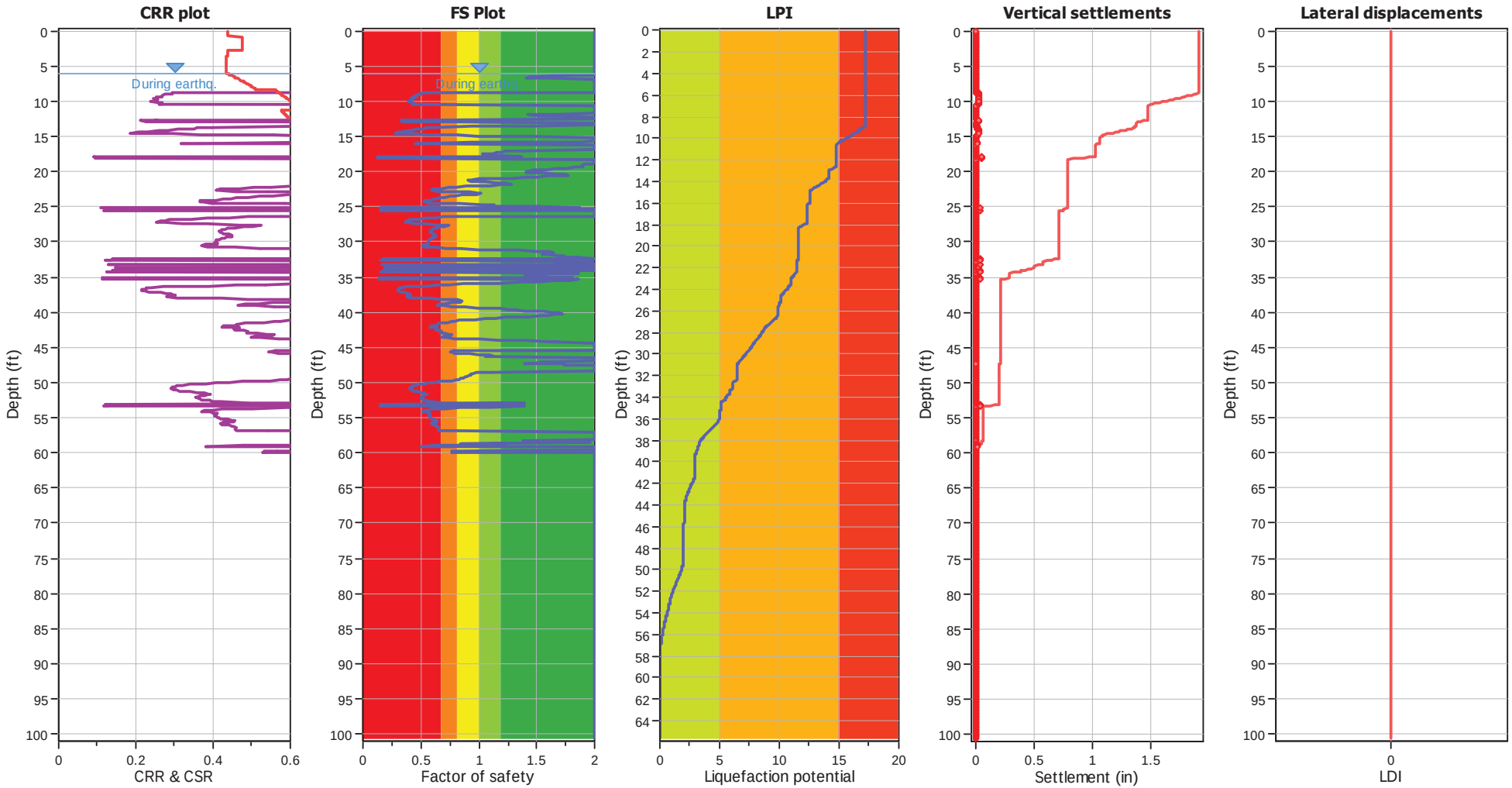
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

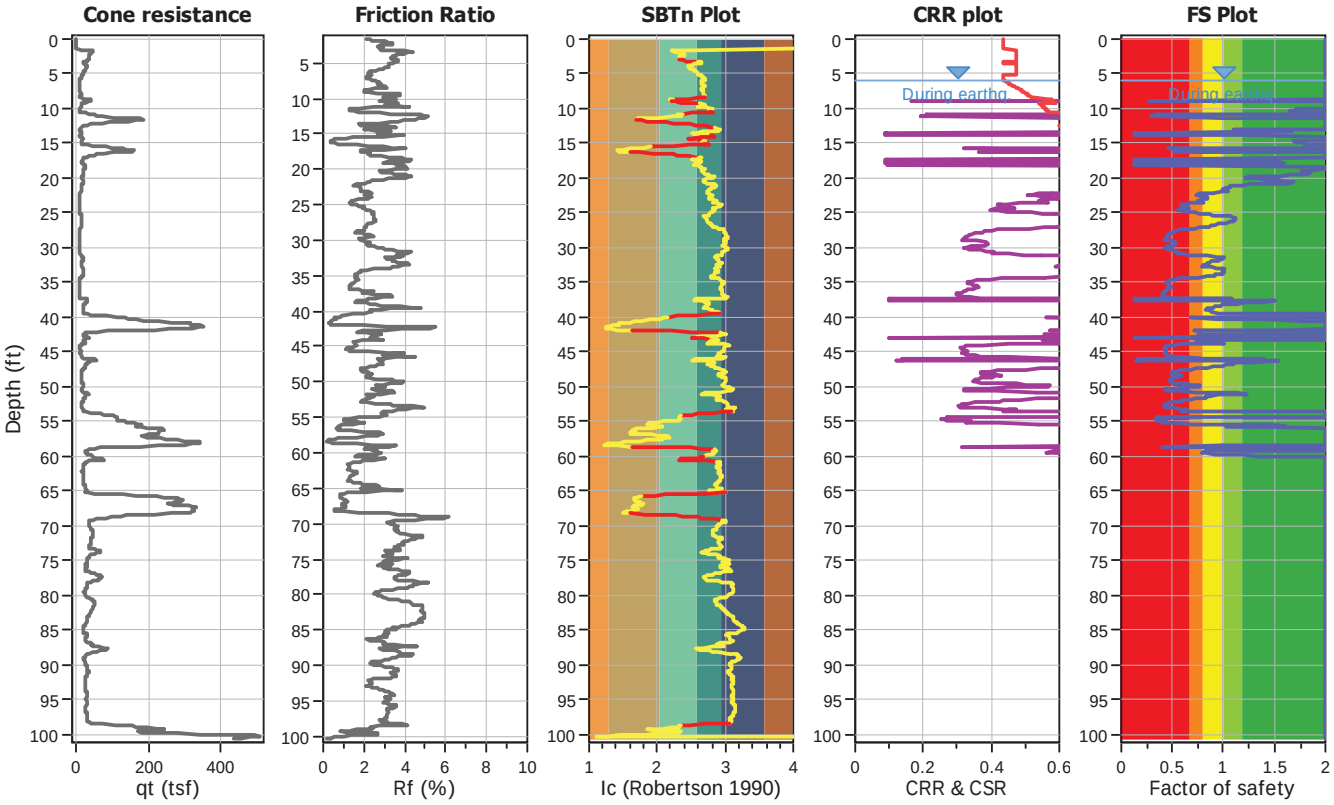
LIQUEFACTION ANALYSIS REPORT

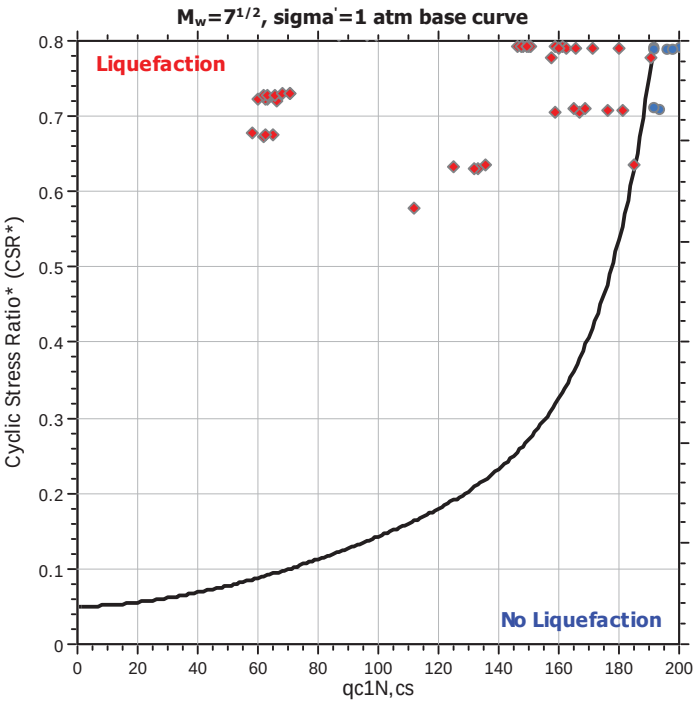
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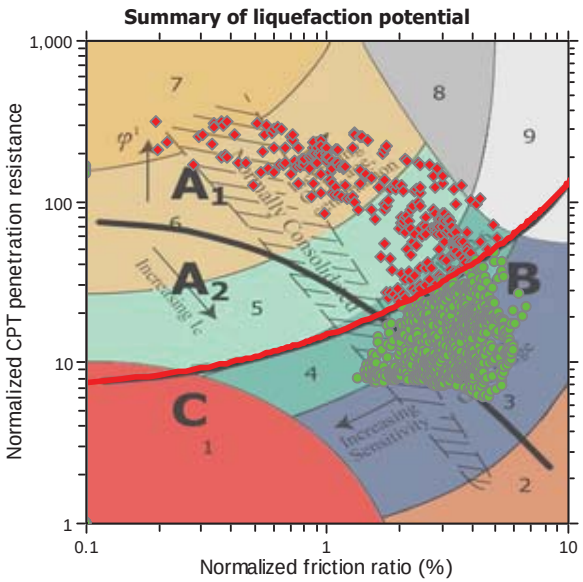
CPT file : 1-CPT18

Input parameters and analysis data

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Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

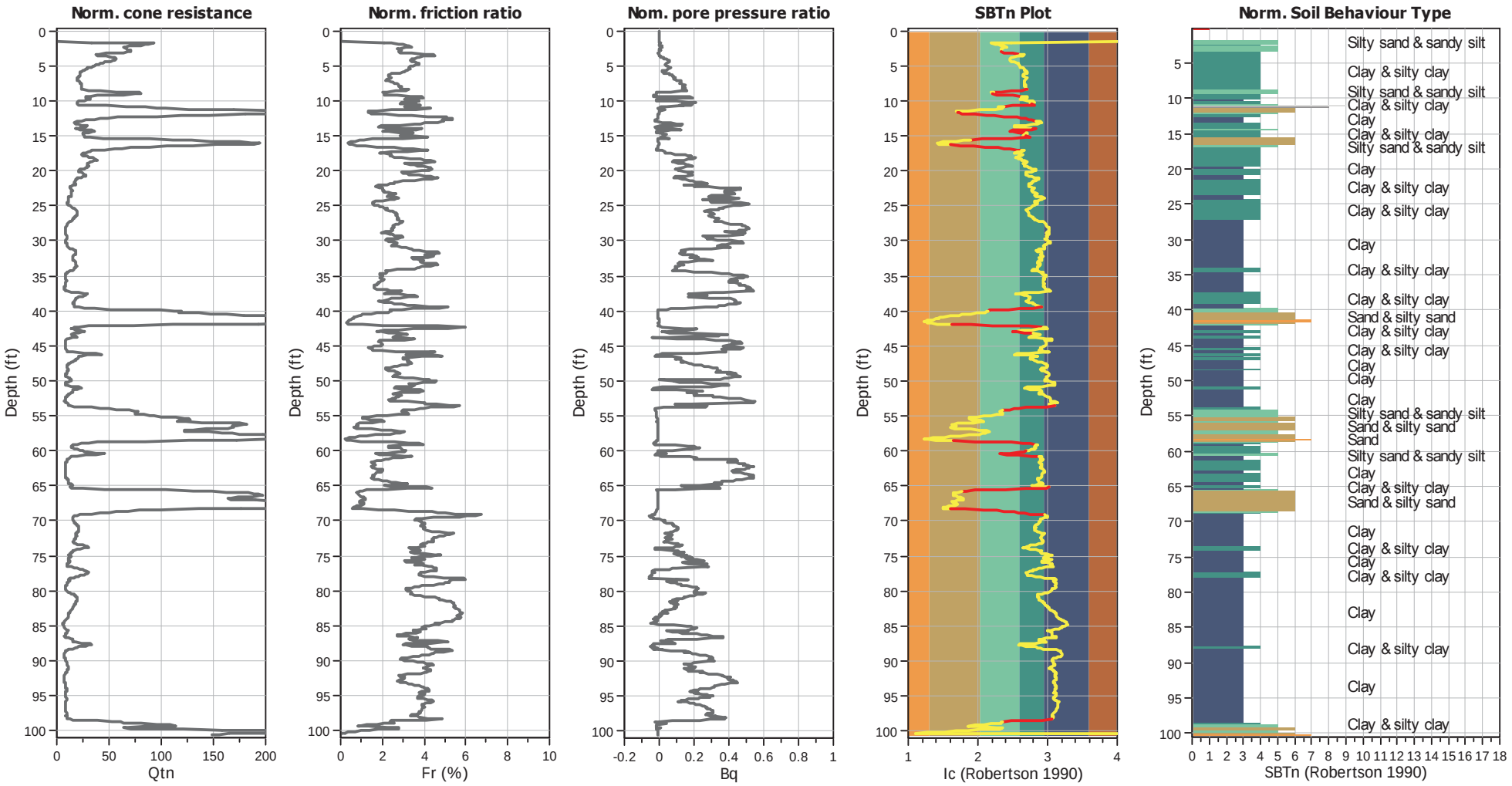






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
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Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



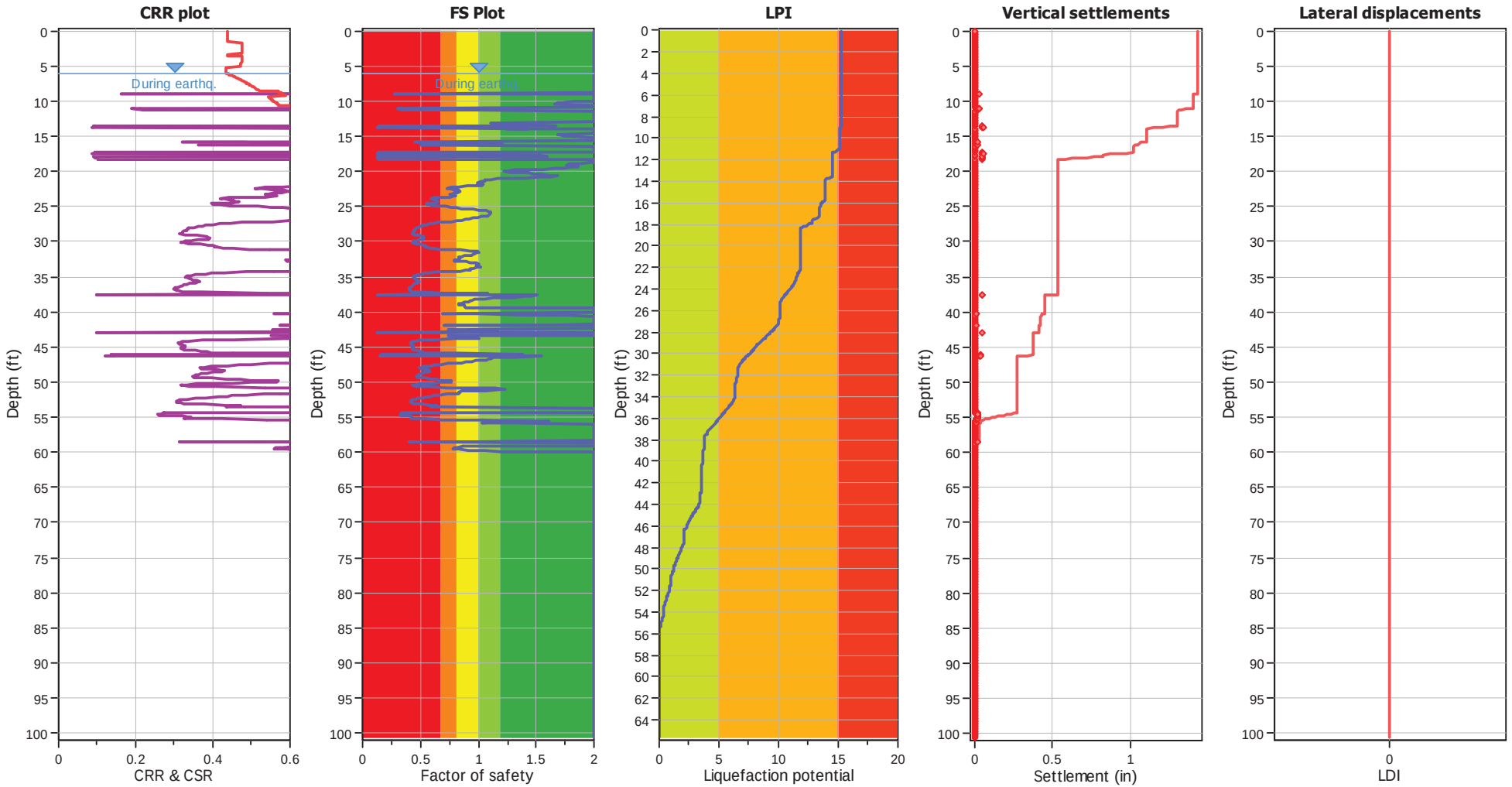
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
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4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
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- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk



ENGEO
Expect Excellence



GOOGLE NORTH BAYSHORE
CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, COMMONS, AND SPACE PARK CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PRELIMINARY GEOTECHNICAL REPORT

SUBMITTED TO
CBRE@Google
1600 Amphitheatre Parkway
Mountain View, CA 94043

PREPARED BY
ENGEO Incorporated

November 27, 2019

PROJECT NO.
15949.000.000

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Expect Excellence

Project No.
15949.000.000

November 27, 2019

Ms. Lisa Herrera
CBRE@Google
1600 Amphitheatre Parkway
Mountain View, CA 94043

Subject: Google North Bayshore
Charleston South, Joaquin, and Plymouth Campuses
Mountain View, California

PRELIMINARY GEOTECHNICAL REPORT

Dear Ms. Herrera:

We are pleased to present this preliminary geotechnical evaluation report for the five Google campuses, known as Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses, located in Mountain View, California. These five campuses are part of the Google North Bayshore project. This report presents our preliminary geotechnical observations, as well as our preliminary conclusions and recommendations for the subject campuses.

Based on the results of our exploration, the future development at these sites is feasible from a geotechnical standpoint. Recommendations presented in this report should be considered during the schematic design. A design-level exploration should be conducted prior to site development once detailed plans have been prepared.

If you have any questions or comments regarding this report, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Bahareh Heidarzadeh, PhD, PE

Yan Lap Janet Kan, GE, CEG

REGISTERED PROFESSIONAL ENGINEER
YAN LAP KAN
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STATE OF CALIFORNIA

Jeff Fippin, GE

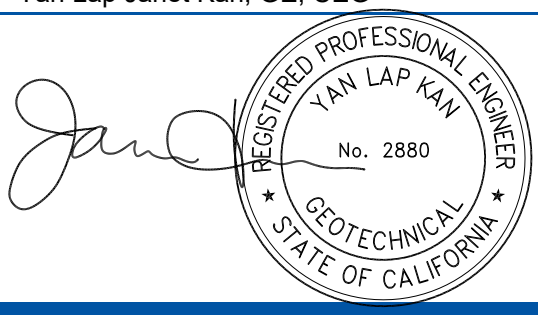
REGISTERED PROFESSIONAL ENGINEER
JEFFREY A. FIPPIN
No. 2631
GEOTECHNICAL
STATE OF CALIFORNIA

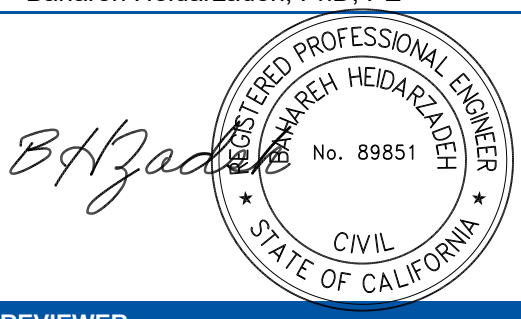
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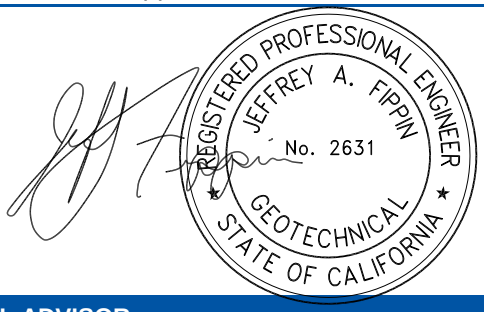
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VERSION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES	PAGES AFFECTED
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1	November 27, 2019	Final	All

SIGNATURES

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APPENDIX D – Corrosivity Test Results by CERCO Analytical

APPENDIX E – Liquefaction Analysis

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this preliminary geotechnical report is to provide an assessment of geotechnical conditions and concerns associated with the five subject campuses and provide preliminary recommendations to support planning of Google development at the subject properties. At the time of preparation of this report, no schematic design was available. Our services included the following tasks:

- Reviewed available literature and geologic maps.
- Reviewed historic aerial photos.
- Obtained appropriate Santa Clara Valley Water District permits.
- Notified Underground Services Alert a minimum of 48 hours prior to our exploration.
- Retained a private utility locator to clear the proposed exploration locations of existing utilities.
- Prepared a work plan, including proposed locations for our explorations, as well as excavation checklists showing their proximity to existing utilities.
- Performed subsurface field exploration.
- Performed laboratory testing on soil samples collected.
- Analyzed geotechnical data collected.
- Interpreted subsurface field exploration data.
- Evaluated potential geotechnical concerns.
- Performed a code-based seismic hazard analysis.
- Provided preliminary foundation recommendations in this report.
- Provided earthwork recommendations.

We prepared this report for the exclusive use of CBRE@Google and its consultants for planning purposes. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without our express written consent.

1.2 SITE LOCATION AND DESCRIPTION

The five subject campuses, Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses, are located in Mountain View, California, on average approximately 2 miles south of the San Francisco Bay as shown on the Vicinity Map (Figure 1). The Site Plan (Figures 2A, 2B, 2C, 2D, and 2E) show the boundaries of the campuses and the locations of our explorations.

The Charleston South project site is approximately 22 acres in area and is bounded by Charleston Road to the north, Huff Avenue to the west, Plymouth Street to the south, and Joaquin Road to the east.

The Joaquin site is approximately 9 acres in area and is bounded by North Shoreline Blvd. to the east, the Plymouth Street and Common Campus to the south, Joaquin Road to the west, and a bike road and a surface parking lot to the north.

The Plymouth site is approximately 5 acres in area and is bounded by Plymouth Street to the north, Alta Avenue to the west, and a building at 1625 Plymouth Street identified on Google Maps as US-MTV-Plym1625 to the east. California US 101 runs to the south of the site.

The Commons site is approximately 3½ acres in area and is bounded by the Joaqiun Campus to the north and west, surface parking lots to the south and west, and N Shoreline Boulevard to the east. Plymouth Street divides the two halves of this campus.

The Space Park Site is approximately 2 acres in area and is bounded by the North Shoreline Boulevard to the west, a building at the address 1625 N Shoreline Blvd to the north, a building at 1390 Pear Ave Ste D, identified on Google Maps as Cucina Venti Restaurant to the south, and a building at 1350 Pear Avenue, identified on Google Maps as RENVU Solar Equipment Distribution, to the east.

1.3 FIELD EXPLORATION

Our field exploration for the five campuses included advancing 18 Cone Penetration Tests (CPTs) and drilling 10 borings as summarized in Table 1.3-1.

TABLE 1.3-1: Field Explorations

CAMPUS	CPT/BORINGS	PUSHED/DRILLED DEPTH (feet bgs)	PUSHED/DRILLED ELEVATION (WGS84[1]) (feet)	DATE COMPLETED
Charleston South	1-SCPT04	100.6	-87.6	May 8, 2019
	1-CPT13	100.6	-87.6	May 14, 2019
	1-CPT14	120.6	-107.6	May 14, 2019
	1-CPT15	80.5	-66.5	May 8, 2019
	1-CPT16	80.5	-63.5	May 9, 2019
	1-CPT17	100.6	-83.6	May 10, 2019
	1-CPT18	100.6	-85.6	May 11, 2019
	1-B08	101.5	-88.5	May 14, 2019
	1-B09	103.0	-89.0	May 16, 2019
	1-B10	51.5	-34.5	May 17, 2019
Joaquin	1-CPT01	50.5	-34.5	May 7, 2019
	1-SCPT02	100.6	-84.6	May 7, 2019
	1-CPT03	120.6	-103.6	May 8, 2019
	1-CPT06	120.6	-103.6	May 7, 2019
	1-B01	101.5	-85.5	May 19, 2019
	1-B02	101.5	-83.5	May 19, 2019
	1-B04	81.5	-65.5	June 9, 2019

[1] **World geodetic System (WGS84)**

CAMPUS	CPT/BORINGS	PUSHED/DRILLED DEPTH (feet bgs)	PUSHED/DRILLED ELEVATION (WGS84[1]) (feet)	DATE COMPLETED
Plymouth	1-CPT09	100.6	-79.6	May 13, 2019
	1-SCPT10	80.5	-61.5	May 13, 2019
	1-CPT11	100.6	-82.6	May 14, 2019
	1-CPT12	80.5	-60.5	May 14, 2019
	1-B07	81.5	-62.5	June 7, 2019
Commons	1-CPT5	80.5	-62.5	July 9, 2019
	1-CPT7	80.5	-61.5	July 8, 2019
	1-B3	81.5	-66.5	July 10, 2019
	1-B5	46.5	-30.0	July 9, 2019
Space Park	1-CPT8	120.6	-102.6	July 8, 2019
	1-B6	81.5	-68.5	July 8, 2019

We recorded the locations of the explorations using the GIS-based, Collector Application, on a smart phone. We show the locations of the explorations on Figures 2A to 2E.

1.3.1 Borings

We observed the drilling of 10 borings at the locations shown on the Site Plans, Figures 2A to 2E. An ENGEO representative observed the drilling and logged the subsurface conditions at each location. We retained the services of a drilling contractor using two truck-mounted drill rigs. We advanced the borings using the mud rotary drilling method with a 4-inch-diameter tricore roller cone drill bit. We advanced the borings to depths ranging from 46.5 to 120.5 feet below existing grade. To address environmental concerns, we cased all the exploratory borings to 50 feet below existing grade. We did not observe the artesian aquifer in the exploratory borings. We permitted and backfilled the borings in accordance with the requirements of the Santa Clara Valley Water District (SCVWD).

We obtained soil samples at various intervals using standard penetration test (SPT) samplers with a 2-inch outside diameter (O.D. split-spoon sampler) and California Modified samplers with 2½-inch inside diameter (I.D.). We obtained the blow counts shown on our bore logs with an automatic trip, 140-pound hammer with a 30-inch free fall. We drove the sampler 18 inches and recorded the number of blows for each 6 inches of penetration. We have not converted the blow counts presented on the borelogs using any correction factors. We also obtained hydraulically pushed Shelby tubes, and Dames and Moore samplers at select locations. We present the fluid pressures recorded for the hydraulically pushed samples on the exploration logs in Appendix A.

We contained soil cuttings and excess fluids in 55-gallon steel drums, which we sampled according to procedures described in the gSAFE document, *EHS Processes to Haul Soil off Site*. The findings and recommendations for disposal were presented under a separate cover.

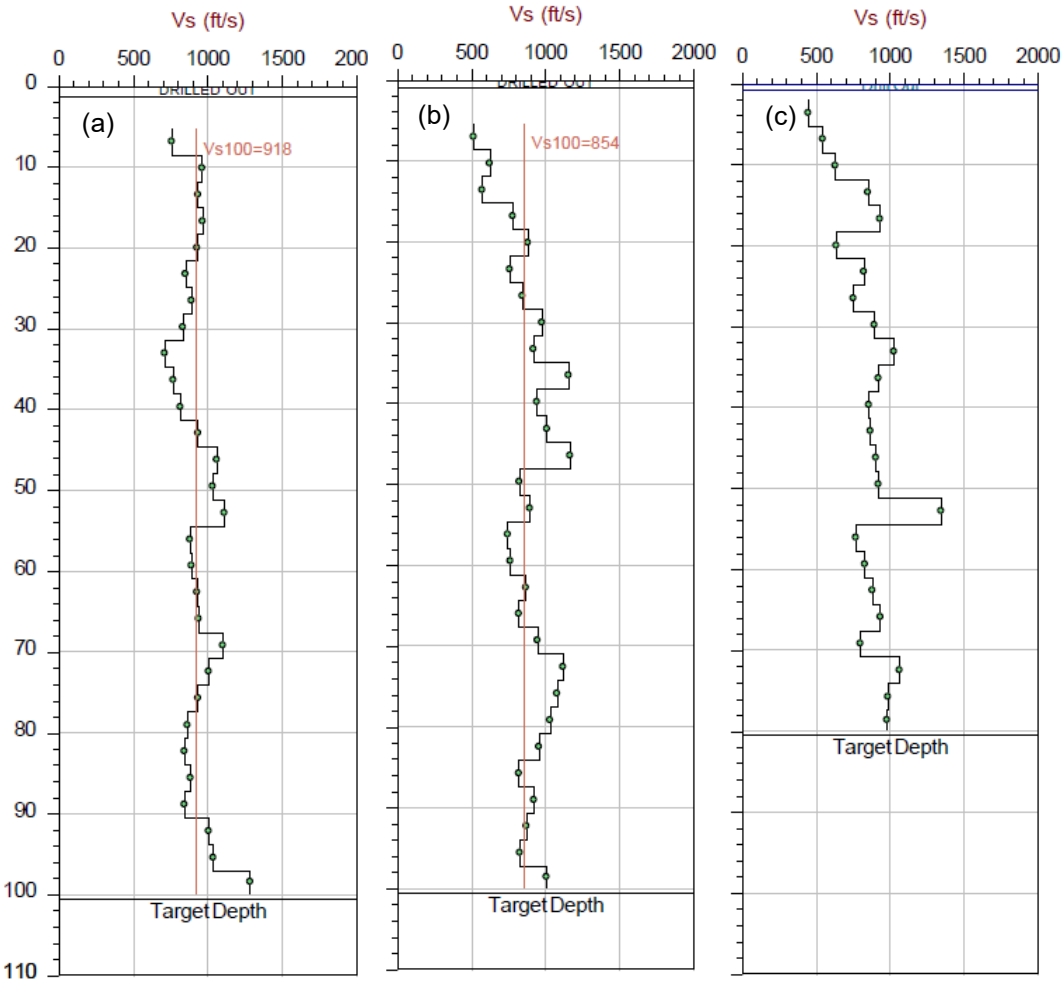
We provide additional information about specific subsurface conditions at each location in our exploration logs in Appendix A. The soil type, color, consistency, and visual classification provided in the logs are generally accordance with the Unified Soil Classification System.

1.3.2 Cone Penetration Tests

We retained the services of a contractor with a CPT rig to advance CPTs at 18 locations to depths of approximately 50.5 to 120.5 feet below the ground surface (bgs) in general accordance with ASTM D-5778. We drilled mud-rotary borings in proximity to 1-SCPT02, 1-SCPT04, 1-SCPT10, and 1-CPT18 to allow direct comparison of the data (matched pairs). Measurements include the tip resistance to penetration of the cone (Qc), the resistance of the friction sleeve (Fs), and pore pressure (U) (Robertson and Campanella, 1988).

We performed shear wave velocity (V_S) measurements in 1-SCPT02, 1-SCPT04, and 1-SCPT10, using the downhole seismic method specified in ASTM D-7400. We present the CPT logs and the V_S profiles in Appendix B. As shown in Appendix B, the time-averaged shear wave velocity over the top 100 feet or 30 meters (V_{S30}) representative of the five campuses ranges from 808 to 918 feet/sec. The results are shown in the Exhibit 1.3.2-1.

EXHIBIT 1.3.2-1: Seismic Cone Penetration Vs Measurements at (a) Charleston South (b) Joaquin, and (c) Plymouth* Campuses



*Plymouth Vs30 is calculated to be 808 feet/sec, assuming the Vs between 80 to 100 feet is 900 feet/sec.

1.4 LABORATORY TESTING

We performed laboratory tests on select soil samples to evaluate their engineering properties. For this project, we performed laboratory testing as shown in the table below.

TABLE 1.4-1: Laboratory Testing

SOIL CHARACTERISTIC	TESTING METHOD	LOCATION OF RESULTS
Natural Unit Weight	ASTM D7263	Appendix A
Natural Moisture Content	ASTM D2216	Appendix A
Plasticity Index (PI) (Wet Method)	ASTM D4318	Appendix C
Grain Size Distribution	ASTM D1140	Appendix C
Consolidation – Constant Rate of Strain	ASTM D4186	Appendix C
Cyclic Simple Shear (CSS)	ASTM D6528	Appendix C
Triaxial Compression – Consolidated, Undrained (TXCU)	ASTM D4767	Appendix C
Triaxial Compression – Unconsolidated, Undrained (TXUU)	ASTM D2850	Appendix C
Unconfined Compression	ASTM D2166	Appendix C
Corrosivity	ASTM Methods	Appendix D

2.0 FINDINGS

2.1 SITE HISTORY

We reviewed historic aerial photographs for the sites from dates ranging between 1948 and present[2]. Historic topographic maps suggest that the sites may have been used for limited agricultural purposes and were mostly undeveloped or occupied by single-family houses and farmlands prior to being completely developed in the 1980s. As described in Section 1.2 of this report, currently, the sites encompass several existing buildings, asphalt concrete-paved parking areas, trees, and associated landscaping.

2.2 REGIONAL AND SITE GEOLOGY

These sites are located at the northwestern end of the Santa Clara Valley in the Coast Ranges geomorphic province of California. The Coast Ranges are dominated by a series of northwest-trending ridges and valleys formed by faulting and folding of the earth's crust. The Santa Clara Valley region lies to the east of the San Andreas Fault and to the west of the Hayward and Calaveras Faults.

Geologic mapping prepared by Brabb et al. (2000) (Figure 3) indicates that the sites are underlain by Holocene-age basin deposits (Qhb) consisting of very fine silty clay to clay deposits occupying flat-floored basins at the distal edge of alluvial fans adjacent to bay mud. These deposits are known to contain unconsolidated, locally organic, plastic silt and silty clay.

[2] https://www.historicaerials.com

2.3 SEISMICITY

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 4 shows the approximate locations of active faults and significant historic earthquakes recorded within the San Francisco Bay Region. The Mountain View area contains numerous active earthquake faults. The nearest active faults are the Monte Vista-Shannon, San Andreas, Hayward, and Calaveras faults, which are capable of producing earthquakes with moment magnitudes of 6.86, 7.85, 6.84, and 7.28, respectively. We list details of these active faults in Table 2.3-1. 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) (Bryant and Hart, 2007).

TABLE 2.3-1: Active Faults According to UCERF3 Capable of Producing Significant Ground Shaking
(Latitude: 37.41923° Longitude: -122.081701° - at the centroid of the sites)[3]

SOURCE	CLOSEST DISTANCE (miles) | (km)	MOMENT MAGNITUDE (M_W)	FAULT MECHANISM
Monte Vista-Shannon	4.95 | 7.97	6.86	Reverse
San Andreas (Peninsula)	8.08 | 13.0	7.85	Strike Slip
Hayward	10.8 | 17.38	6.84	Strike Slip
Calaveras	14.51 | 23.35	7.28	Strike Slip

The sites are not located within a designated Alquist-Priolo Earthquake Fault Zone and no known surface expression of active faults is believed to exist within the site; as such, the risk of fault rupture through the site is considered low.

2.4 SURFACE AND SUBSURFACE CONDITIONS

Current ground surface elevations at the fives campuses range from approximately 13 to 21 feet (WGS84[4]). Current surface conditions consist of paved parking and landscape areas.

2.4.1 Charleston South Campus

In our explorations at the Charleston South Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to hard, sandy lean and fat clay.

In the northern part of the campus (1-B08), below the fill, we encountered basin deposits composed of lean clays interbedded with dense poorly graded sand, well-graded gravel, and silty clayey sand. We encountered a 10-foot-thick layer of dense, poorly graded sand and well-graded gravel at 8 feet bgs, and 2- to 5-foot-thick layers of medium dense to very dense, poorly graded sand and silty sand at various depths.

In the middle (1-B09) and southern (1-B10) part of the site, below the fill, we encountered basin deposits composed of medium stiff to very stiff fat and lean clays interbedded with more granular soil. We encountered an approximately 20-foot-thick layer of medium dense to dense clayey sand

[3] https://earthquake.usgs.gov/hazards/interactive/
[4] World Geodetic System (WGS84)

at 39 feet bgs. Additionally, we encountered sandy silt, silty sand, and medium dense to dense clayey sand layers up to 7 feet thick at various depths.

We present an idealized subsurface profile for the Charleston South site for preliminary design purposes only. Variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.1-1: Generalized Subsurface Profile for Charleston South Campus

DEPTH (feet)	ELEVATION (WGS84)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 6.5	CL/CH	Stiff to very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
8 to 11	6.5 to 3.5	SP/GW	Dense, Poorly Graded Sand and Well Graded Gravel
11 to 40	3.5 to -25.5	CL	Stiff, Lean Clay
40 to 48	-25.5 to -33.5	SC	Dense, Clayey Sand
48 to 55	-33.5 to -40.5	SC	Medium Dense Clayey Sand
Below 55	Below -40.5	CL/CH	Medium Stiff to Very Stiff, Lean Clay to Fat Clay

*Based on average surface elevation of 14.6 feet

2.4.2 Joaquin Campus

At the Joaquin Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to very stiff lean clay and fat clay. Below the fill, we encountered basin deposits composed of stiff to hard lean, fat, and sandy clay interbedded with medium dense to dense well-graded sand, well-graded gravel, and clayey sand. A 16-foot-thick layer of clayey sand was encountered at 23 feet bgs in 1-B04 and 20-foot-thick layer of clayey sand was encountered at 78 feet bgs in 1-B01. Towards the south of the site, the clayey sand layers become less dense; however, we have limited subsurface information in this area due to presence of existing building.

We present an idealized subsurface profile for the Joaquin site for preliminary design purposes only. Variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.2-1: Generalized Subsurface Profile for Joaquin Campus

DEPTH (feet)	ELEVATION (WGS84)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 8.5	CL/CH	Stiff to very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
8 to 21	8.5 to -4.5	CL/SC	Stiff to very stiff, Clayey Sand to Sandy Lean Clay
21 to 30	-4.5 to -13.5	CH/CL	Stiff to very stiff, Fat Clay and Lean Clay
30 to 40	-13.5 to -23.5	GC/SP	Medium dense, Clayey Gravel and Poorly Graded Sand
40 to 50	-23.5 to -33.5	CL	Stiff to very stiff, Lean Clay
50 to 60	-33.5 to -43.5	SC	Medium dense, Clayey Sand
Below 60	Below -43.5	CL/CH	Very stiff to hard, Lean Clay and Fat Clay

*Based on average surface elevation of 16.6 feet

2.4.3 Plymouth Campus

In our explorations at the Plymouth Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to very stiff lean clay and sandy silt. Below the fill, we encountered basin deposits composed of stiff to very stiff lean, fat, and sandy clay interbedded with medium dense clayey sand, well-graded sand, and sandy silt to silty sand. We encountered a 15-foot-thick layer of sandy silt to silty sand at 55 feet bgs in 1-B07.

We present an idealized subsurface profile for the Plymouth site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.3-1: Generalized Subsurface Profile for Plymouth Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 11.5	CL/ML	Stiff to very stiff, Lean and Sandy Silt (Non-Engineered Surficial Fill)
8 to 20	11.5 to -0.5	SC	Medium dense, Clayey Sand with Gravel
20 to 33	-0.5 to -13.5	CL/SC	Stiff to very stiff, Sandy Clay and Clayey Sand
33 to 40	-13.5 to -20.5	SW	Medium dense, Well Graded Sand with Clay and Gravel
40 to 50	-20.5 to -30.5	CL	Medium stiff to stiff, Lean Clay and Sandy Clay
50 to 70	-30.5 to -50.5	SM/ML	Medium stiff to stiff, Sandy silt to silty sand
Below 70	Below -50.5	CH	Very stiff, Fat Clay

*Based on average surface elevation of 19.4 feet

2.4.4 Commons Campus

In our explorations at the Commons Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of very stiff fat clay and fat clay with sand. Below the fill, in the northern portion of the site, we encountered a 7-foot-thick layer of medium dense to dense poorly graded sand with gravel. In the southern portion of the site, below the fill, we encountered a 15-foot-thick layer of silty sand with gravel that is medium dense on the top, but becomes loose towards the bottom. This layer is potentially liquefiable. Below this granular layer, we encounter basin deposits composed of stiff to very stiff lean and fat clay with and without sand interbedded with medium dense clayey sand and silty sand.

We present an idealized subsurface profile for the Commons site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.4-1: Generalized Subsurface Profile for Commons Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 10	Above 8.5	CL/CH	Very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
10 to 23	8.5 to -4.5	SM/SP-SM	Dense to Medium Dense Silty Sand and Poorly Graded Sand with Gravel and Silt
23 to 35	-4.5 to -16.5	CL	Stiff Lean Clay
35 to 40	-16.5 to -21.5	CL	Very Stiff, Lean Clay.
40 to 45	-21.5 to -26.5	SC/SM	Medium Dense, Clayey Sand and Silty Sand

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
45 to 50	-26.5 to -31.5	CL	Stiff, Lean Clay
50 to 75	-31.5 to -56.5	CL	Stiff to Very Stiff, Lean Clay
75 to 80	-56.5 to -61.5	SP-SC	Poorly Graded Sand with Clay
Below 80	Below -61.5	CL	Very Stiff, Lean Clay

*Based on average surface elevation of 18.6 feet

2.4.5 Space Park Campus

In our explorations at the Space Park Campus, we encountered 8 to 10 feet of surficial non-engineered fill consisting of stiff to very stiff fat clay. Below the fill, we encountered basin deposits composed of stiff to very stiff lean and sandy clay interbedded with medium dense clayey sand, poorly graded sand with clay and gravel, poorly graded gravel with clay, silty sand, and silt.

We present an idealized subsurface profile for the Space Park site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.5-1: Generalized Subsurface Profile for Space Park Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 11	CH	Stiff to Hard, Fat Clay (Non-Engineered Surficial Fill)
8 to 18	11 to 1	CL	Stiff to Very Stiff, Lean Clay
18 to 35	1 to -16	CL	Hard, Lean Clay
35 to 45	-16 to -26	SC/SP-SC	Loose to Dense, Clayey Sand and Poorly Graded Sand with Clay and Gravel
45 to 60	-26 to -41	CL	Medium Stiff to Hard, Sandy Clay
60 to 70	-41 to -51	ML	Stiff, Silt
70 to 82	-51 to -63	SM/GP	Medium Dense to Dense, Silty Sand and Sandy Gravel to Gravelly Sand
Below 80	Below -61	CL	Very Stiff, Lean Clay

*Based on average surface elevation of 18.9 feet

2.5 GROUNDWATER CONDITIONS

We observed groundwater at shallow depths in a few of the borings before switching from solid flight auger to mud-rotary drilling methods. We observed groundwater at depths ranging from 5½ to 7½ feet, which corresponds to approximately Elevation 5½ to 9½ feet (WGS84). We summarize our groundwater observations in Table 2.5-1.

In addition to observing the groundwater level in a few borings, we performed pore pressure dissipation tests in the CPTs. These tests suggest that the groundwater level is approximately 3 to 11 feet deep below existing grade, which corresponds to approximately Elevation 5 to 14 feet (WGS84), as presented in Table 2.5-1 below.

TABLE 2.5-1: Recorded Groundwater Levels (at Time of Exploration)

CAMPUS	BORING / CPT	GROUNDWATER DEPTH (feet bgs)	GROUNDWATER ELEVATION (WGS84, feet)
Charleston South	1-SCPT04	8.1*	4.9*
	1-CPT13	8.5*	4.5*
	1-CPT14	7.0*	6*
	1-CPT15	6.2*	7.8*
	1-CPT16	8.1*	8.9*
	1-CPT17	4.8*	12.2*
	1-CPT18	3.1*	11.9*
	1-B08	7.5	5.5
	1-B09	5.5	9.5
	1-B10	7.5	9.5
Joaquin	1-CPT01	11.1*	4.9*
	1-SCPT02	8.9*	7.1*
	1-CPT03	9.0*	8.0*
	1-CPT06	8.2*	7.8*
	1-B01	Not obtained due to drilling method	
	1-B02	Not obtained due to drilling method	
	1-B04	Not obtained due to drilling method	
Plymouth	1-CPT09	6.8*	14.2*
	1-CPT10	4.8*	14.2*
	1-CPT11	6.2*	11.8*
	1-CPT12	6.3*	13.7*
	1-B07	Not obtained due to drilling method	
Commons	1-CPT5	7.7*	10.9*
	1-CPT7	8.1*	10.5*
	1-B3	Not obtained due to drilling method	
	1-B5	Not obtained due to drilling method	
Space Park	1-CPT8	6.0*	12.9*
	1-B6	Not obtained due to drilling method	

*Assumed phreatic surface based on pore pressure dissipation tests assuming hydrostatic conditions.

Plate 1.2 of the Seismic Hazard Zone Report for the Mountain View Quadrangle (2006) indicates the highest historical groundwater within the sites vicinity to be less than approximately 5 feet below the ground surface. For purposes of our analyses and recommendations, we consider an appropriate design groundwater depth of 6 feet below ground surface, which corresponds to an elevation range of 4½ to 14 feet (WGS84).

Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation practices, and other factors not evident at the time measurements were made. Excavations for utility installation may encounter groundwater, depending upon the time of year of construction.

3.0 DISCUSSION AND CONCLUSIONS

Based on the exploration and laboratory test results, the project site is feasible for the future developments provided the recommendations contained in this report are properly incorporated into the design plans and specifications.

The potential geotechnical concerns for the future site redevelopment are as follows:

- The potential for liquefaction of coarse-grained material and cyclic softening of some of the fine-grained soil materials below the groundwater table during a seismic event.
- The presence of groundwater and its influence on below-grade construction.
- The potential need for shoring systems for below-grade construction, if planned, to protect the excavation walls, adjacent streets and improvements, and the potential need for dewatering of excavations extending below the groundwater surface.
- The potential for flooding due to sea-level rise.
- The potential settlement of medium stiff clayey and silty deposits under new loads, such as placement of additional fill and high building loads.

We evaluate the geologic hazards common around the bay area in the following sections.

3.1 SEISMIC HAZARDS

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking and liquefaction. The following sections present a discussion of these hazards as they apply to the site. Based on topographic and lithologic data, the risk of regional subsidence or uplift, lurching, landslides, tsunamis, or seiches is low to negligible at the site.

3.1.1 Ground Rupture

Since there are no known active faults crossing the property and the site is not located within an Earthquake Fault Special Study Zone, ground rupture is unlikely at the subject property.

3.1.2 Ground Shaking

Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead and live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the actual forces that would be associated with a major earthquake. Therefore, structures should be able to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse, but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1996). Section 3.3 presents California Building Code (CBC, 2019) seismic design.

3.1.3 Liquefaction / Cyclic Softening

The site is located within a State of California Seismic Hazard Zone (CGS, 2006) for areas that may be susceptible to liquefaction (Figure 5).

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. The soil most susceptible to liquefaction is clean, loose, saturated, uniformly graded fine sand below the groundwater table. Empirical evidence indicates that loose silty sand is also potentially liquefiable. When seismic ground shaking occurs, the soil is subjected to cyclic shear stresses that can cause excess hydrostatic pressures to develop. If excess hydrostatic pressures exceed the effective confining stress from the overlying soil, the sand may undergo deformation. If the sand undergoes virtually unlimited deformation without developing significant resistance, it is said to have liquefied and, if the sand consolidates or vents to the surface during and following liquefaction, ground settlement and surface deformation may occur. In addition to liquefaction of sandy materials, clayey soil can also undergo “cyclic-softening” or strength loss as a result of cyclic loading. We considered both liquefaction and cyclic-softening hazards in our analyses.

3.1.3.1 Liquefaction Analysis Overview

We divided the soil into their “sand-like” and “clay-like” behaviors using procedures presented in Boulanger and Idriss (2008). We then performed an initial liquefaction susceptibility assessment based on the methodologies presented by Bray and Sancio (2006). Section 3.1.3.2 presents the details of our screening of soil samples for liquefaction susceptibility. We also performed cyclic simple shear (CSS) testing on a representative sample of fine-grained deposits to more accurately assess the cyclic response of the fine-grained soil.

We then performed an analysis of liquefaction potential based on the CPT data using the computer software CLiq (Version 2.2.1.4) developed by GeoLogismiki. The software incorporates the procedure introduced by the 1996 National Center for Earthquake Engineering Research (NCEER) workshop and the 1998 NCEER/National Science Foundation (NSF) workshop. The workshops are summarized by Youd et al. (2001) and updated by Robertson (2009).

After obtaining CLiq analysis results, we used in-situ data (blow counts and soil descriptions), laboratory data (PI, moisture content, fines content, and cyclic simple shear (CSS) test), and Boulanger and Idriss (2008) and Bray and Sancio (2006) methodologies to establish a relationship between soil that is potentially liquefiable in the CPTs by comparing them to adjacent “matched-pair” borings. To assess seismically induced settlement of potentially liquefiable soil, we considered the methodology presented by Zhang et al. (2002). The details and results of our analyses are presented in the following sections.

3.1.3.2 Liquefaction Susceptibility Screening of Soil Samples

Boulanger and Idriss (2008) found that for practical purposes, soil can be divided into either ‘sand-like’ or ‘clay-like’ behavior. Where sand-like soil can experience ‘liquefaction’ and clay-like soil can experience ‘cyclic failure or softening’. In general, sand-like soil is gravel, sand and very-low plasticity silt; whereas, clay-like soil comprises low-plasticity clay and plastic silt.

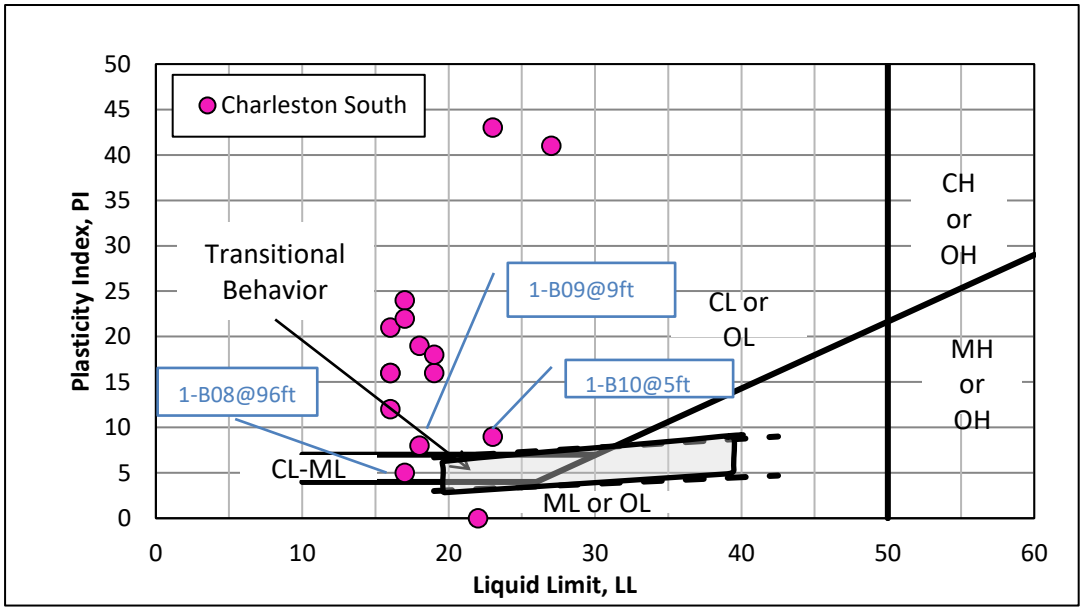
In order to evaluate the clay-like, intermediate and sand-like behavior of the fine-grained soil at the site, we plotted the PI and liquid limit (LL) of the onsite soil relative to the soil behavior limits. We then considered the criteria presented by Bray and Sancio to assess the potential for liquefaction triggering on the site soil. Bray and Sancio observed that soil with a plasticity

index (PI) less than 12 and a water content (w_c) to liquid limit (LL) ratio of more than 0.85 is susceptible to liquefaction/cyclic-softening. Soil with PI greater than 18 and/or w_c/LL less than 0.8 were deemed not to be susceptible to liquefaction/cyclic-softening because they are too plastic and/or their water contents are too low.

Charleston South Campus

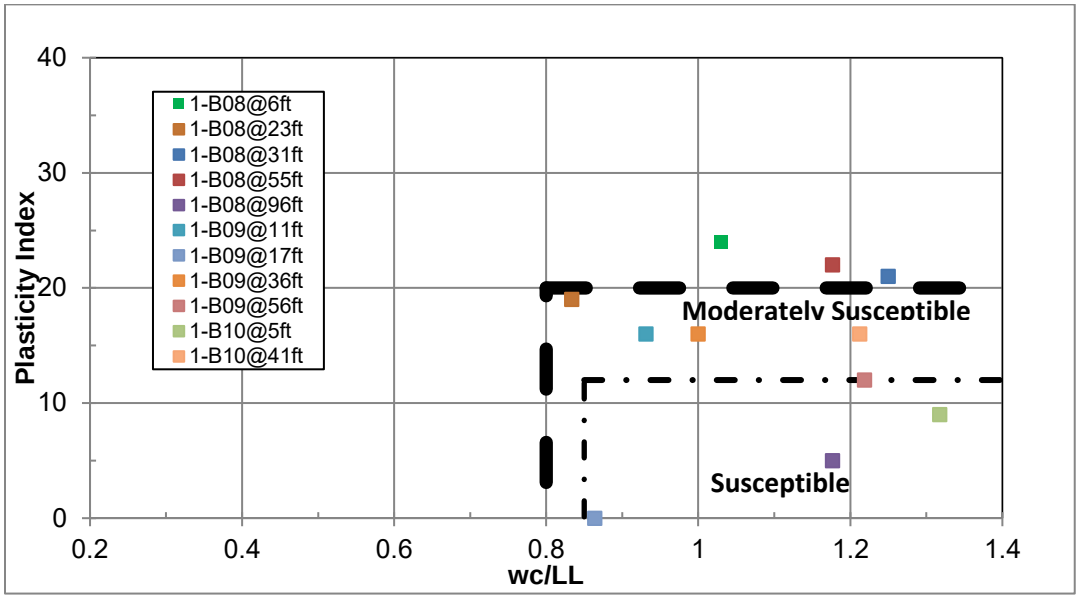
Based on Idriss and Boulanger (2008), at the Charleston South site, the majority of fine-grained soil should be classified as 'clay-like' other than the material at Boring 1-B08 at 96 feet below ground surface, at Boring 1-B09 at 9 feet below ground surface, and at Boring 1-B10 at 5 feet below ground surface, where soil should be considered as 'transitional'. We ignore any liquefaction above the groundwater table (6 feet bgs). In addition, since liquefaction/cyclic softening of material below 60 feet will not likely manifest to the surface, we do not consider susceptibility of material at 96 feet below ground surface.

EXHIBIT 3.1.3.2-1: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Charleston South Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-2, the majority of the laboratory data plot as moderately susceptible and susceptible to liquefaction.

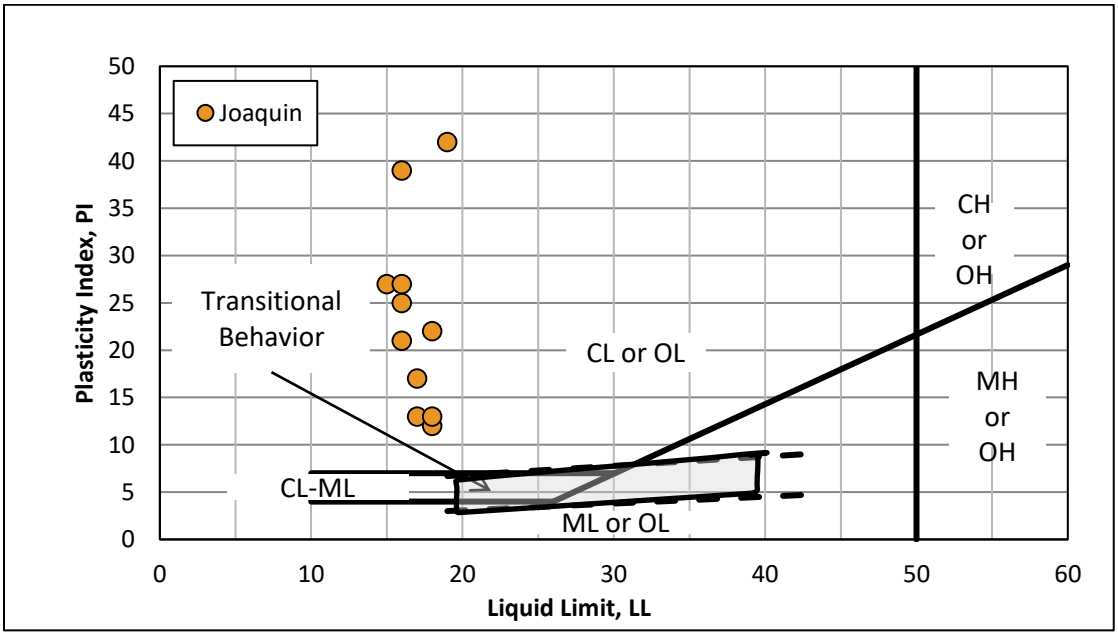
EXHIBIT 3.1.3.2-2: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Charleston South Campus



Joaquin Campus

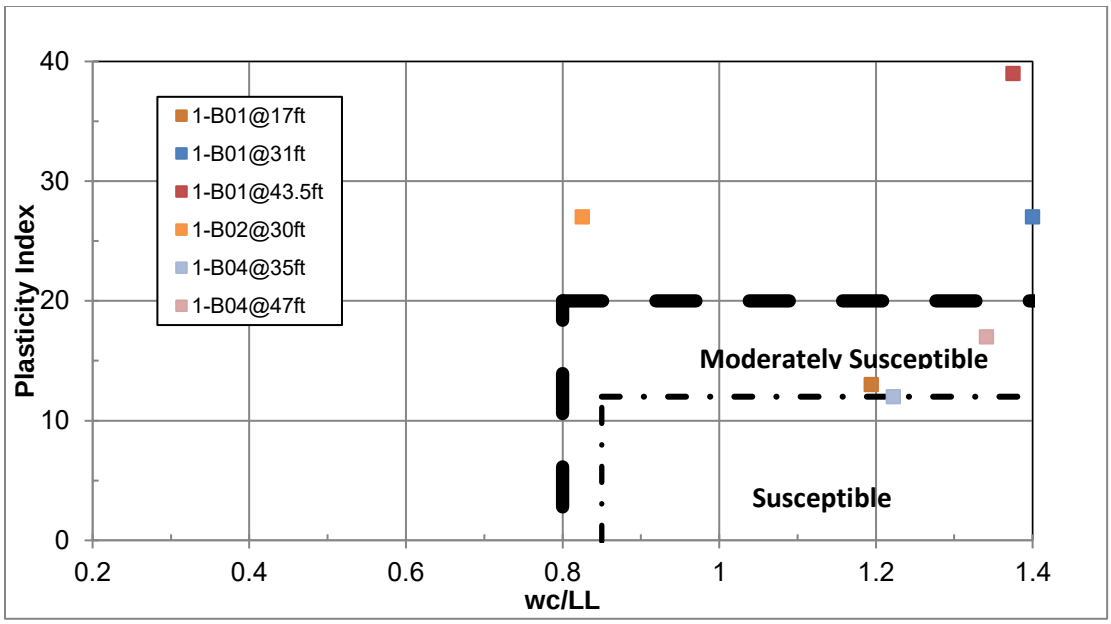
Based on Idriss and Boulanger (2008), we conclude the majority of fine-grained soil at the Joaquin site should be considered as 'clay-like' as shown in Exhibit 3.1.3.2-3.

EXHIBIT 3.1.3.2-3: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Joaquin Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-4, the majority of the laboratory data plot as not susceptible to liquefaction other than a clayey gravel with sand layer (Boring 1-B01 at 17 feet bgs), a clayey sand layer (Boring 1-B04 at 35 feet bgs), and a lean clay with sand layer (Boring 1-B04 at 47 feet bgs), which plot as moderately susceptible to liquefaction.

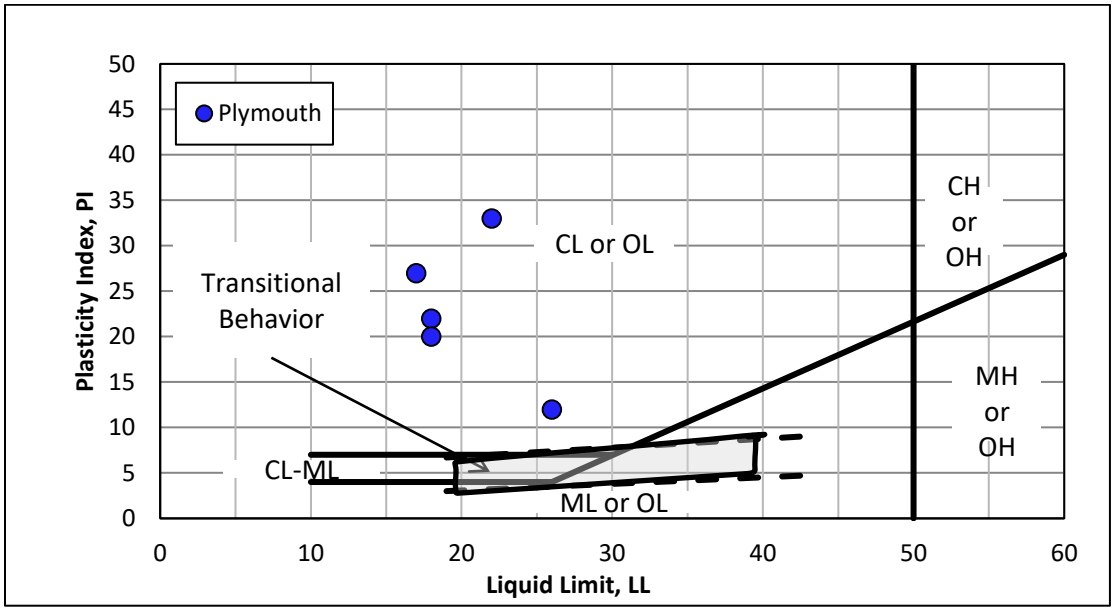
EXHIBIT 3.1.3.2-4: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Joaquin Campus



Plymouth Campus

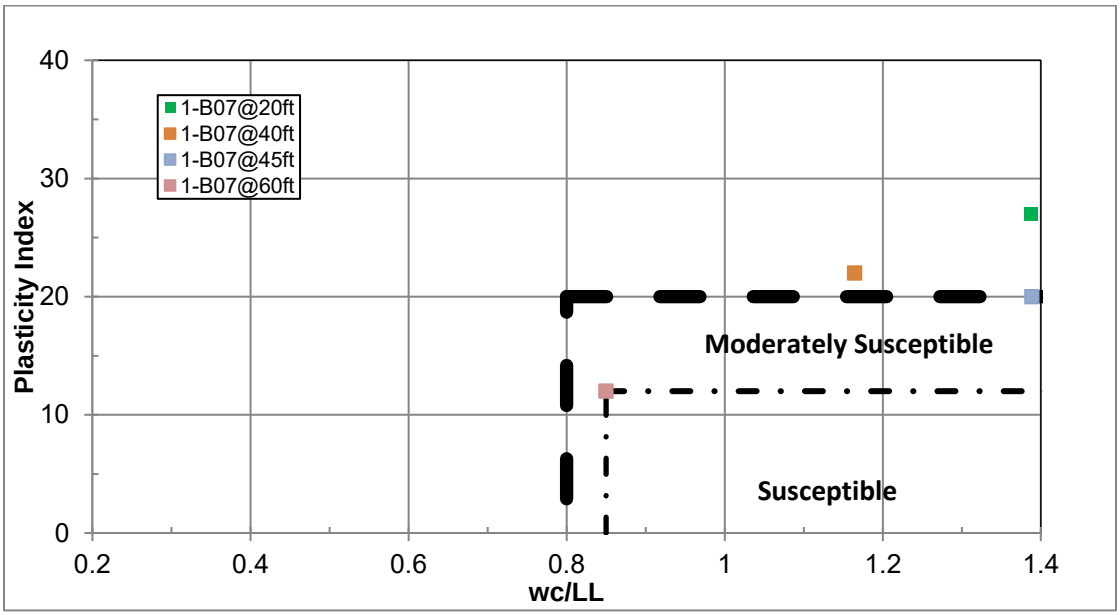
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-5, the majority of fine-grained soil at the Plymouth sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-5: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Plymouth Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-6, the majority of the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Plymouth site other than a sandy clay layer (Boring 1-B07 at 45 feet bgs) and a sandy silt to silty sand layer (Boring 1-B07 at 60 feet bgs).

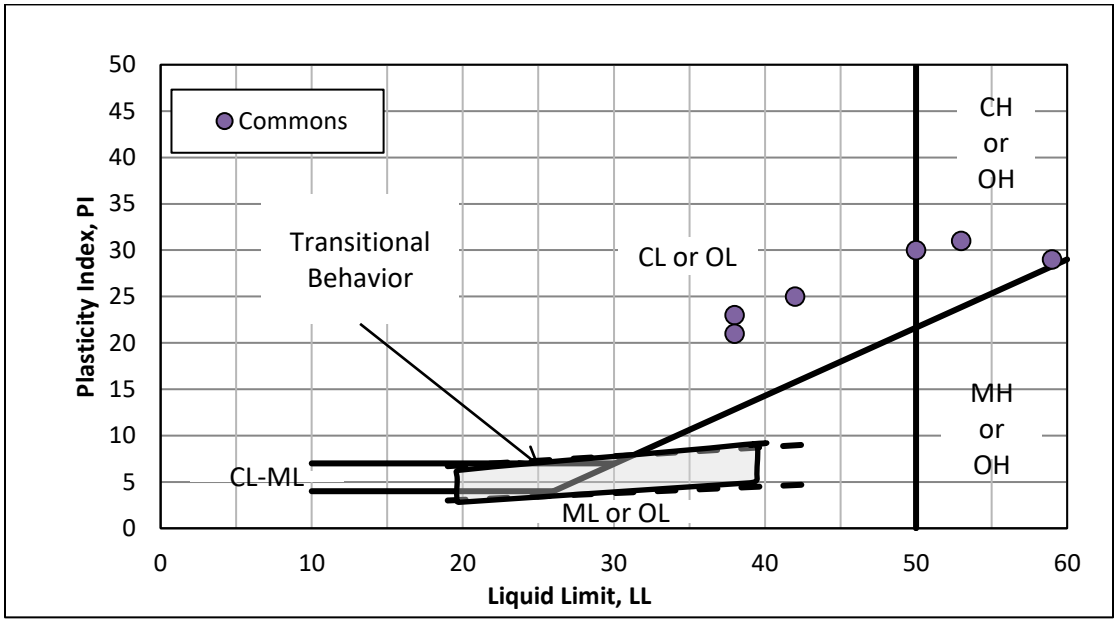
EXHIBIT 3.1.3.2-6: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Plymouth Campus



Commons Campus

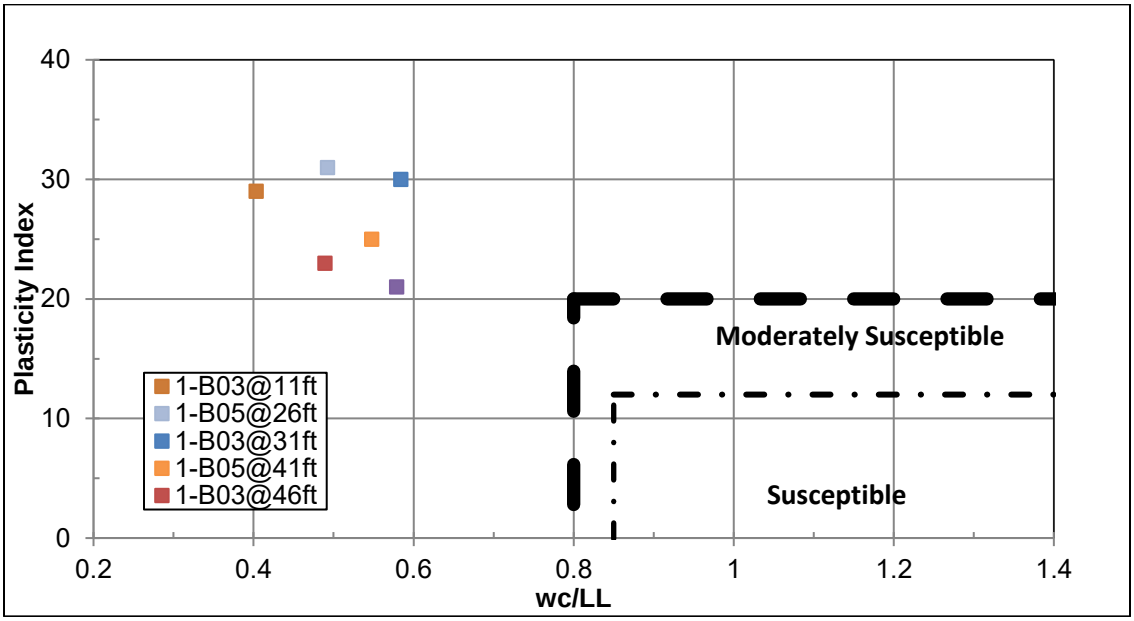
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-7, the majority of fine-grained soil at the Commons sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-7: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Commons Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-8, all the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Commons site.

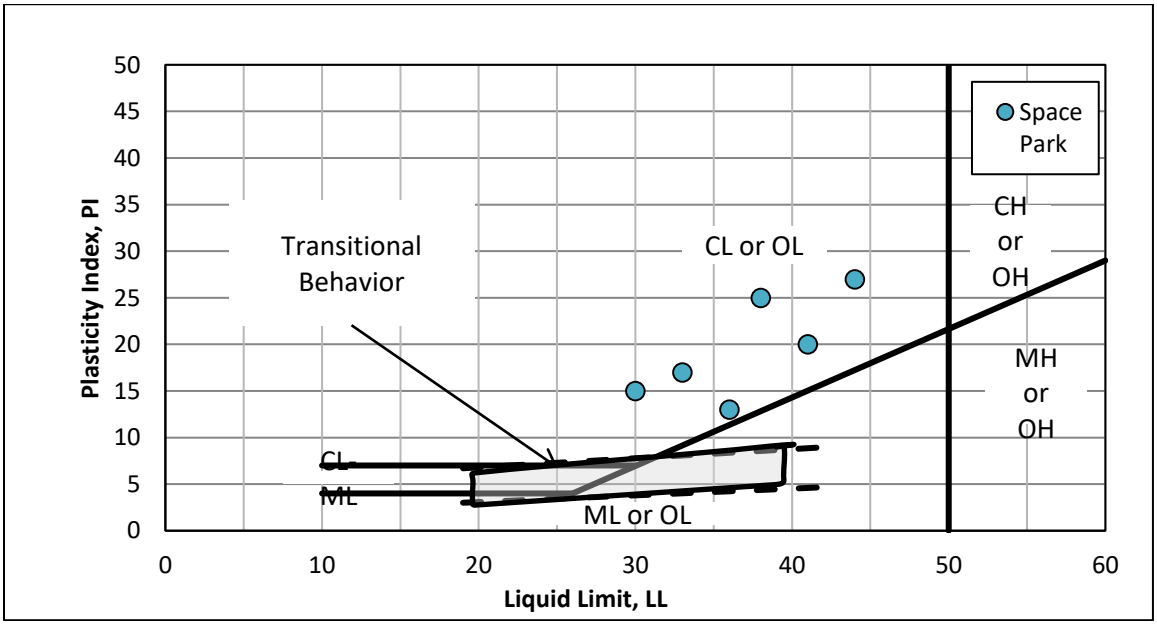
EXHIBIT 3.1.3.2-8: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Commons Campus



Space Park Campus

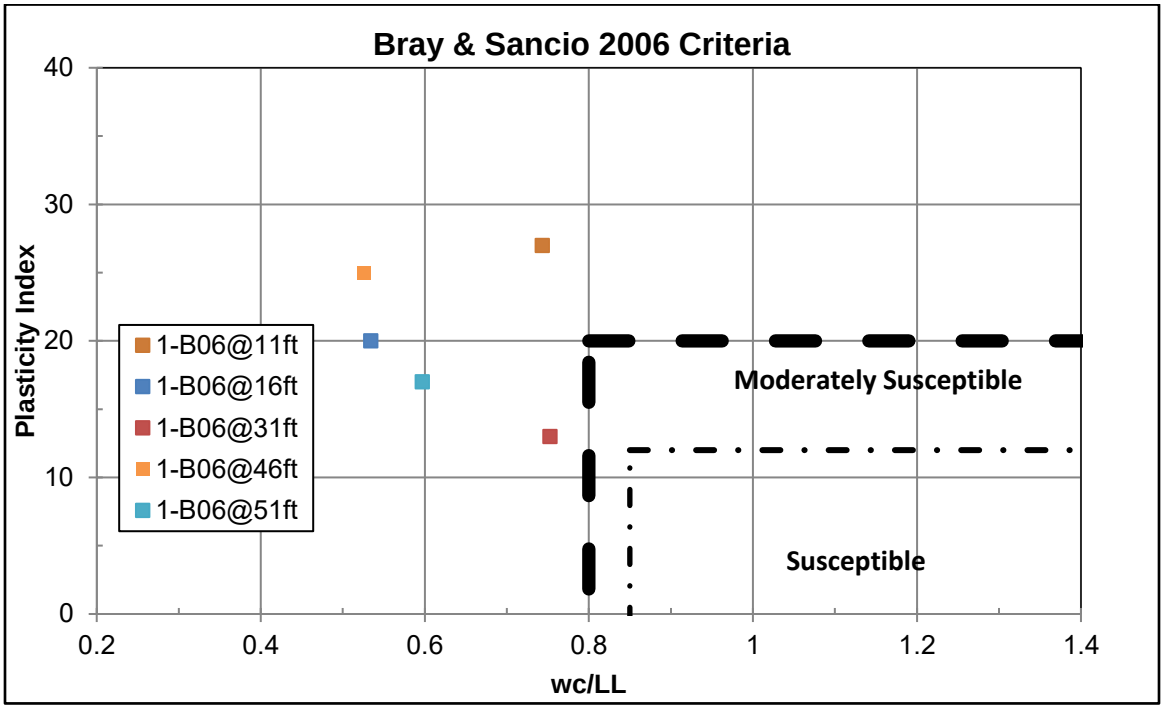
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-9, the majority of fine-grained soil at the Space Park sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-9: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Space Park Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-10, all the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Space Park site. Although, at 36 feet, an Atterberg Limit test indicates the soil is a clay, based on grain-size analysis the soil encountered in the boring at that depth is sand; we used a SPT-blow-count-based method to further evaluate the liquefaction potential of this layer, which indicates susceptibility to liquefaction.

EXHIBIT 3.1.3.2-10: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Space Park Campus



3.1.3.3 Liquefaction Analysis of CPT Data and Matched-Pair Borings

We performed an analysis of liquefaction potential based on the CPT data using the computer software CLiq (Version 2.2.1.4) developed by GeoLogismiki. The software incorporates the procedure introduced by the 1996 National Center for Earthquake Engineering Research (NCEER) workshop and the 1998 NCEER/National Science Foundation (NSF) workshop. The workshops are summarized by Youd et al. (2001) and updated by Robertson (2009). We estimated the Cyclic Stress Ratio (CSR) for an average Maximum Considered Earthquake (MCE) Peak Ground Acceleration (PGA_M) value of 0.66g[5] as outlined in the latest California building code with an earthquake magnitude of 7.85 on San Andreas Fault. We used a groundwater depth of 6 feet for this analysis.

We then compared the zones calculated to be liquefiable using CLiq to soil zones that were not susceptible to liquefaction or cyclic softening according to Bray and Sancio (2006) in the adjacent borings. Appendix E presents the results of the CLiq analyses. Table 3.1.3.3-1 presents the matched-pair borings and CPTs for each campus.

[5] Refer to Section 3.3 for CBC 2019 seismic design parameters

TABLE 3.1.3.3-1: Matched-Pair Borings and CPTs

CAMPUS	MATCHED-PAIR	
	BORING	CPT
Charleston South	1-B08	1-SCPT04
	1-B09	1-CPT18
Joaquin	1-B01	1-SCPT02
Plymouth	1-B07	1-SCPT10

Please note that borings and CPTs advanced within Commons and Space Park are generally spaced over 100 feet apart. As such, they are not listed as matched pairs in Table 3.1.3.3-1. However, where soil stratigraphy encountered in the borings and CPTs are consistent, we used information gathered from the borings to adjust which layers are susceptible to liquefaction; therefore, we adjusted our estimates of liquefaction-induced settlement calculated from the CPT for both the Commons and Space Park Campuses.

3.1.3.4 Cyclic Simple Shear Tests

Since the Bray and Sancio method is considered a screening test of potential for liquefaction susceptibility, we performed cyclic simple shear (CSS) on select samples of fine-grained deposits recovered from one of our Dames and Moore samplers to more accurately assess the cyclic response of the fine-grained site soil. The CSS testing allows us to directly test if a soil is liquefiable and not rely solely on simplified, empirical methods of liquefaction analyses.

We performed CSS testing on a fine-grained sample recovered at the Charleston South Campus from Boring 1-B09 at a depth of approximately 16 feet below the ground surface. We subjected this sample to a cyclic stress ratio (CSR) of 0.47. Based on review of the CSS test results (Appendix C), although the sample did not exhibit full cyclic softening behavior according to generation of excess pore water pressure criterion, the single amplitude shear strain reached eight percent at ten cycles indicating the soil sample experienced cyclic softening based on the excess shear strain criterion. We compared the CSS test result to the corresponding matched-pair CPT (1-CPT18). The comparison shows the calculated factor of safety against cyclic softening of less than 1.0 according to CPT-based cyclic softening triggering analyses (CLiq Analyses) is justifiable.

3.1.3.5 Liquefaction Analysis Conclusion

Using Idriss and Boulanger (2008) and Bray and Sancio (2006) criteria, the results of CSS testing, as well as comparison of matched-pair borings and CPTs, we conclude that a soil behavior index (Ic) of 2.6 is acceptable to use as the cutoff between soil that is sand-like and soil that is clay-like (except at 1-CPT05 and 1-CPT08, where we conclude an Ic of 2.5 is appropriate. We performed our analyses using the method by Idriss and Boulanger (2008), without clay-like behavior; we also ignored any settlement below 60 feet bgs.

In addition, at the Space Park Campus, we used the SPT-blow-count-based method by Idriss and Boulanger 2008, to evaluate the liquefaction settlement in the sand layer at Boring 1-B06, from 33.5 to 40 feet bgs; this layer is not captured by any of the CPTs.

Based on site-specific study of the liquefaction hazard, we estimate the overall total liquefaction-induced settlement resulting from a California Building Code Maximum Considered

Earthquake at Joaquin, Plymouth, Charleston South, Commons, and Space Park Campuses could be up to 2 inches. In some isolated areas, the settlement may be up to 3 inches. The potential differential settlement associated with the liquefaction is likely about half of the total settlement over a span of 30 feet. Based on our experience on other similar projects, the magnitude of liquefaction-induced settlement can be accommodated by the foundation systems discussed in Section 5.0 of this report.

TABLE 3.1.3.5-1: Liquefaction-Induced Settlement after Calibration with Borings

CAMPUS	CPT	SETTLEMENT (INCHES)*
Joaquin	1-CPT01	**2.5**
	1-SCPT02	0.9
	1-CPT03	1.8
	1-CPT06	**2.5**
Plymouth	1-CPT09	**2.5**
	1-SCPT10	1.5
	1-CPT11	0.8
	1-CPT12	0.6
Charleston South	1-SCPT04	**2.4**
	1-CPT13	2.0
	1-CPT14	1.2
	1-CPT15	1.2
	1-CPT16	**2.5**
	1-CPT17	1.9
	1-CPT18	1.4
Commons	1-CPT5	**0.5**
	1-CPT7	**0.5**
Space Park	1-CPT8	**3.0**

*Maximum liquefaction induced settlement for each campus are bolded.

3.1.4 Lateral Spreading

Lateral spreading is a failure within a nearly horizontal soil zone (possibly due to liquefaction) that causes the overlying soil mass to move toward a free face or down a gentle slope. The closest free face to these campuses is the Permanente Creek, which is more than 400 feet to the west. Therefore, the risk of lateral spreading at the project site is low.

3.1.5 Flooding

Federal Emergency Management Agency (FEMA) Flood Insurance Maps (Figure 6) indicate that the three sites are within a special flood hazard area subject to inundation by 0.2-percent annual chances of flood. Based on our review of the Precise Plan, dated February 2018 and the City of Mountain View study of 50-year sea-level rise, areas below 13.2 feet above mean sea level will be susceptible to flooding by 2057. The Civil Engineer should review pertinent information relating to possible flood levels for the subject site based on final pad elevations and provide appropriate design measures for development of the project.

3.2 STATIC CONSOLIDATION SETTLEMENT

Our explorations did not encounter highly compressible clay layers and the clayey materials tended to be overconsolidated. Based on the plasticity index (PI), moisture density, and the consolidation test results presented in Appendix C, we do not anticipate the static consolidation settlement to be a controlling hazard at these sites. However, during the design-level analysis, once the development plans and proposed grades are available, if deemed necessary in collaboration with the structural engineer, we may recommend to model anticipated settlement from the proposed structure and fill placement using a 3-dimensional finite-element analysis with PLAXIS 3D.

3.3 2019 CBC SEISMIC DESIGN PARAMETERS

Based on the subsurface conditions encountered and CPT shear wave velocity testing, we classified the five sites as Site Class D in accordance with the 2019 California Building Code (CBC). 2019 CBC is based on the 2016 edition of the American Society of Civil Engineers document titled “Minimum Design Loads and Associated Criteria for Buildings and Other Structures” (ASCE 71-16).

We provide the 2019 CBC seismic design parameters for a Site Class D in Tables 3.3-1 to 3.3-3 for the three campuses, which includes design spectral response acceleration parameters based on the mapped Risk-Targeted Maximum Considered Earthquake (MCE_R) spectral response acceleration parameters.

TABLE 3.3-1: 2019 CBC Seismic Design Parameters, Charleston Campus (Latitude: 37.418704° Longitude: -122.081702°)

PARAMETER FOR CHARLESTON CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.502
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.502
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.618
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.679
Long-period transition-period, T_L (sec)	12

TABLE 3.3-2: 2019 CBC Seismic Design Parameters, Joaquin Campus (Latitude: 37.417614° Longitude: -122.079461°)

PARAMETER FOR JOAQUIN CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0

PARAMETER FOR JOAQUIN CAMPUS	VALUE
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.601
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.661
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-3: 2019 CBC Seismic Design Parameters, Plymouth Campus (Latitude: 37.41611° Longitude: -122.084262°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.602
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.662
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-4: 2019 CBC Seismic Design Parameters, Commons Campus (Latitude: 37.416649° Longitude: -122.078783°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.603
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.663
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-5: 2019 CBC Seismic Design Parameters, Space Park Campus (Latitude: 37.416335° Longitude: -122.077089°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.6
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.661
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

Based on Section 11.4.8 of ASCE 7-16, a ground motion hazard analysis needs to be performed in accordance with Section 21.2 for structures on Site Class D with S_1 greater than or equal to 0.2 unless the structural engineer elects to take the exception described in Section 11.4.8. Once the concept designs are available, we can provide site-specific ground motion hazard analyses under a separate cover.

3.4 SHALLOW GROUNDWATER AND EXCAVATION CONSIDERATIONS

Based on our findings described in Section 2.7 of this report and depending on the future proposed developments, groundwater may impact design of below-grade improvements, such as basements, and construction at these sites. Shallow groundwater conditions may result in the following impacts:

1. Require construction dewatering.
2. Result in unstable conditions at the base of excavation requiring stabilization prior to improvement construction.
3. Cause moisture damage to sensitive floor coverings.
4. Transmit moisture vapor through slabs causing excessive mold/mildew build-up, fogging of windows, and damage to computers and other sensitive equipment.
5. Require waterproofing for the proposed basement structures, if any.

During excavation of the below-grade improvements, if considered in the design, the sides of the excavation may need to be shored. The primary considerations related to the selection of the shoring systems are:

1. Distance of the excavation from improvements sensitive to movement that will remain after building construction, and
2. Potential presence of groundwater during construction, and the need to keep the dewatering to a minimum due to environmental concerns.

3.5 SOIL CORROSION POTENTIAL

As part of this study, we collected eight soil samples and submitted them to a California State certified analytical lab for determination of redox potential, pH, resistivity, sulfate, and chloride. The following results are considered representative of the alluvial deposits in the area and the corrosion potential of the soil on buried concrete structures and metal pipes. The results are included in Appendix D and summarized in the table below.

TABLE 3.5-1: Corrosivity Test Results

CAMPUS	SAMPLE LOCATION	DEPTH (feet)	REDOX (mV)	pH	RESISTIVITY (OHMS-CM)	CHLORIDE* (mg/kg)	SULFATE* (mg/kg)
Joaquin	1-B04	20.5	240	8.23	1,200	N.D.	87
Plymouth	1-B07	5.0	170	8.29	1,100	31	140
	1-B07	25.5	140	8.30	1,200	N.D.	97
Commons	1-B03	8.5	230	8.21	1,900	N.D.	110
	1-B03	41	220	8.22	2,400	N.D.	54
Space Park	1-B06	8	210	8.26	1,100	N.D.	210
	1-B06	26	210	8.47	1,500	N.D.	110
	1-B06	40.5	220	8.38	4,900	N.D.	36

* ASTM D4327

The 2019 CBC references the 2014 American Concrete Institute Manual, ACI 318-14, Chapter 19, Sections 19.3.1.1 for structural concrete requirements. Based on the test results and ACI criteria, the tested soil would classify as 'Not Applicable' for sulfate exposure; there is no requirement for cement type or water-cement ratio for this category; however, a minimum concrete compressive strength of 2,500 psi is specified by the building code. For this sulfate range, we recommend Type II cement and a concrete mix design for foundations and building slabs-on-grade that incorporates a maximum water-cement ratio of 0.5. It should be noted, however, that the structural engineering design requirements for concrete may result in more stringent concrete specifications.

Soil with a pH less than 6.0 is considered to be corrosive to buried metal piping and reinforced concrete structures. The samples had a pH of above 8.0, which does not present corrosion concerns for buried iron, steel, mortar-coated steel, or reinforced concrete structures.

Based on the resistivity measurements, all eight samples are classified as "corrosive" to buried metal piping. 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 criteria nature of the structure. All buried metallic pressure piping, such as ductile iron firewater pipelines, should be protected against corrosion.

If it is desired to investigate this further, we recommend a corrosion consultant be retained to evaluate whether specific corrosion recommendations are advised for the project.

4.0 EARTHWORK RECOMMENDATIONS

The relative compaction and optimum moisture content of soil and aggregate base referred to in this report are based on the most recent ASTM D1557 test method. Compacted soil is not

acceptable if it is unstable. It should exhibit only minimal flexing or pumping, as determined by a representative of our firm.

As used in this report, the term “moisture condition” refers to adjusting the moisture content of the soil by either drying if too wet or adding water if too dry. We define “structural areas” as any area sensitive to settlement of compacted soil. These areas include, but are not limited to building pads, sidewalks, pavement areas, and retaining walls.

4.1 DEMOLITION AND STRIPPING

Grading operations should be observed and tested by our qualified field representative. We should be notified a minimum of three days prior to grading in order to coordinate our schedule with the grading contractor.

Site development should commence with the removal of existing pavement and buildings as well as excavation and removal of buried structures, including utilities and foundations. All debris and soft compressible soil should be removed from any location to be graded, from areas to receive fill or structures, and from areas to serve as borrow. The depth of removal should be determined by our representative in the field at the time of grading.

Existing vegetation should be removed from areas to receive fill or improvements and those areas to serve for borrow. Tree roots should be removed to a depth of at least 3 feet below existing grade. Any topsoil that will be retained for future use in landscape areas should be stockpiled in areas where it will not interfere with grading operations. All excavations from demolition below design grades should be cleaned to a firm undisturbed native soil surface determined by our representative. This surface should then be scarified, moisture conditioned, and backfilled with compacted engineered fill. All backfill materials should be placed and compacted as engineered fill according to the recommendations in Sections 4.4 and 4.5.

Materials and debris should be removed from the project site. With the exception of construction debris (wood, brick, asphalt, concrete, metal, etc.), organically contaminated materials (soil which contains more than 3 percent organic content by weight), and environmentally impacted soil (if any), the upper 10 feet of subsurface material is suitable for reuse as engineered fill.

4.2 EXISTING FILL REMOVAL

If existing non-engineered fill is encountered during construction, we recommend removal of the fill to competent native soil, as evaluated by our field representative. If in a fill area, the base of the subexcavations should be processed, moisture conditioned (as needed), and compacted in accordance with the recommendations for engineered fill.

If existing fill is left in place in portions of the site that are being developed with walkways or other improvements that are not sensitive to settlement, on-going maintenance should be anticipated.

4.3 OVER-OPTIMUM SOIL MOISTURE CONDITIONS

The contractor should anticipate encountering excessively over-optimum (wet) soil moisture conditions during winter or spring grading, or during or following periods of rain. Wet soil can make proper compaction difficult or impossible.

Wet soil conditions can be mitigated by:

1. Frequent spreading and mixing during warm dry weather.
2. Mixing with drier materials.
3. Mixing with a lime, lime-flyash, or cement product; or
4. Stabilizing with aggregate, geotextile stabilization fabric, or both.

We should evaluate Options 3 and 4 prior to implementation.

4.4 ACCEPTABLE FILL

4.4.1 Soil

Onsite soil material is suitable as fill material provided it is processed to remove concentrations of organic material, debris, and particles greater than 6 inches in maximum dimension.

Imported fill materials should meet the above requirements and have a plasticity index less than 12 and at least 20 percent passing the No. 200 sieve. It is important that we sample and test proposed imported fill materials at least 5 days prior to delivery to the site.

4.4.2 Reuse of Onsite Recycled Materials

If desired, the existing asphalt, aggregate and concrete can be considered for use as recycled aggregate to replace some of the import aggregate base for pavements, as well as for structural fill. The material will need to be broken down, but not pulverized, to have a maximum particle size less than 6 inches if used for fill and should conform to the gradations of aggregate base if used to substitute for roadway base.

4.5 FILL COMPACTION

4.5.1 Grading in Structural Areas

After removing the loose soil, the contractor should scarify to a depth of at least 8 inches then moisture condition and compact the subgrade in accordance with the table below. The loose lift thickness should not exceed 8 inches or the depth of penetration of the compaction equipment used, whichever is less.

TABLE 4.5.1-1: Fill Placement Requirements

MATERIALS		FILL LOCATION	MINIMUM RELATIVE COMPACTION (%)	MINIMUM MOISTURE CONTENT (PERCENTAGE POINTS ABOVE OPTIMUM)
Low-Expansive	PI < 25	General Fill	90	3
		Upper 6 inches in Pavement Areas	95	1

The contractor should compact the pavement Caltrans Class 2 Aggregate Base to at least 95 percent relative compaction (ASTM D1557), at a moisture content above the optimum.

4.5.2 Landscape Fill

In landscaping areas, the contractor should process, place, and compact fill in accordance with Section 4.5.1, but to at least 85 percent relative compaction.

4.5.3 Underground Utility Backfill

The contractor is responsible for conducting trenching and shoring in accordance with CALOSHA requirements. Project consultants involved in utility design should specify pipe-bedding materials.

Utility trench backfill should conform to the recommendations in Section 4.5.1. Where utility trenches cross underneath buildings, we recommend that a plug be placed within the trench backfill to help prevent the normally granular bedding materials from acting as a conduit for water to enter beneath or into the building. The plug should be constructed using a sand-cement slurry (minimum 28-day compressive strength of 500 psi) or relatively impermeable native soil for pipe bedding and backfill. We recommend that the plug extend a distance of at least 3 feet in each direction from the point where the utility enters the building perimeter.

Jetting of backfill is not an acceptable means of compaction. Thicker loose lift thicknesses may be allowed based on acceptable density test results, where increased effort is applied to rocky fill, or for the first lift of fill over pipe bedding.

4.6 SITE DRAINAGE

The project Civil Engineer is responsible for designing surface drainage improvements. With regard to geotechnical engineering issues, finish grades should be sloped away from buildings and pavements to the maximum extent practical. The latest California Building Code Section 1804.4 specifies minimum slopes of pervious surfaces be at least 5 percent away from foundations.

Landscaped areas are planned at finished grade elevations, as well as on top of structures. Proper subsurface drainage is required to prevent ponding on covered roofs or along walls. The roofs and drainage systems should be designed with appropriate slope to expediently transfer moisture across and off the roofs.

4.7 STORMWATER BIORETENTION AREAS

We generally encountered a layer of high-plasticity clay directly beneath the aggregate base. Thus, the existing site soil is not likely to have adequate permeability for stormwater infiltration, unless subdrains are installed. We recommend assuming little stormwater infiltration will occur through the existing site soil.

If bioretention areas are planned, we recommend that, when practical, they be placed a minimum of 5 feet away from property lines and structural site improvements, such as buildings, streets, retaining walls, and sidewalks/driveways. When this is not practical, bioretention areas located within 5 feet of structural site improvements can either:

1. Be constructed with structural side walls capable of withstanding the loads from the adjacent improvements, or

2. Incorporate filter material compacted to between 85 and 90 percent relative compaction (ASTM D1557, latest edition) and a waterproofing system designed to reduce the potential for moisture transmission into the subgrade soil beneath the adjacent improvement.

In addition, site improvements located adjacent to bioretention areas that are underlain by base rock, sand, or other imported granular materials, should be designed with a deepened edge that extends to the bottom of the imported material underlying the improvement.

Where adjacent site improvements include buildings greater than three stories, streets steeper than 3 percent, or design elements that will experience lateral loads (such as from impact or traffic), additional design considerations may be required. In addition, although not recommended, if trees are to be planted within bioretention areas, HDPE Tree Boxes that extend below the bottom of the bioretention system should be installed to reduce potential impact to subdrain systems that may be part of the bioretention area design. For this condition, the waterproofing system should be connected to the HPDE Tree Box with a waterproof seal.

Given the nature of bioretention systems and possible proximity to improvements, we recommend that we be retained to review design plans and provide testing and observation services during the installation of linings, compaction of the filter material, and connection of designed drains.

It should be noted that the contractor is responsible for conducting all excavation and shoring in a manner that does not cause damage to adjacent improvements during construction and future maintenance of the bioretention areas. As with any excavation adjacent to improvements, the contractor should minimize the exposure time such that the improvements are not detrimentally impacted.

5.0 PRELIMINARY FOUNDATION RECOMMENDATIONS

The main consideration in foundation design for this project is the potential for seismically induced settlement, as well as static settlement induced by civil fill placement and building loads. We developed foundation recommendations using data obtained from our exploration and engineering analysis. Since the development concepts were not available at the time of preparation of this report, we studied alternative foundation options as a function of number of above-grade and subterranean stories as presented in Table 5.0-1, and Table 5.0-2.

TABLE 5.0-1: Preliminary Foundation Matrix, Charleston South, Joaquin, Plymouth, and Space Park

FOUNDATION TYPES	NUMBER OF ABOVE-GRADE STORIES	NUMBER OF BELOW-GRADE STORIES
Structural Mat Foundation	up to 3 stories	0 (at grade)
	up to 5 stories	1*
	up to 6 stories	2*
Deep Foundation	over 5 stories	any

*Not applicable to Space Park without ground improvement as recommended in Section 4.8

TABLE 5.0-2: Preliminary Foundation Matrix, Commons

FOUNDATION TYPES	NUMBER OF ABOVE-GRADE STORIES	NUMBER OF BELOW-GRADE STORIES
Structural Mat Foundation	up to 6 stories	2
Deep Foundation	over 5 stories	any

For small axillary structures, such as trellis, light poles or garbage enclosures, shallow footings may be used as foundation support.

5.1 STRUCTURAL MAT FOUNDATIONS

A combination of a structural mat foundation and waterproofing is a common system for structures founded below the groundwater table. This option avoids the need for permanent dewatering. Based on the depth of the excavation and groundwater depths, the mat foundation may have to be designed to resist hydrostatic uplift forces.

The thickness of the structural mat will be driven by the structural design. Similar buildings with similar constraints may have mat foundations that are 30 inches or thicker.

Table 5.1-1 and Table 5.1-2 present average allowable bearing pressures that the structural mat should be designed to as a function of below-grade stories.

TABLE 5.1-1: Average Allowable Bearing Pressures, Charleston South, Joaquin, Plymouth, and Commons

ALLOWABLE BEARING PRESSURE (psf*)	NUMBER OF BELOW-GRADE STORIES)	ANTICIPATED TOTAL STATIC AND SEISMIC SETTLEMENT (inches)
1,500**	0 (at grade)	2½
2,000**	1	
3,000	2	

*pounds per square foot (psf)
** Do not apply to Commons Campus

TABLE 5.1-2: Average Allowable Bearing Pressures, Space Park

ALLOWABLE BEARING PRESSURE (psf*)	NUMBER OF BELOW-GRADE STORIES)	ANTICIPATED TOTAL STATIC AND SEISMIC SETTLEMENT (inches)
1,500	0 (at grade)	3
2,000**	1	
3,000**	2	

*pounds per square foot (psf)
**At the Space Park Campus, applicable only after ground improvement as recommended in Section 5.5.

The allowable bearing capacities presented in Table 5.1-1 and Table 5.1-2 may be increased to 3,000 psf in areas of loading concentration. The allowable bearing pressures presented in Table 5.1-1 and 5.1-2 may be increased by one-third when considering transient loads, such as wind or seismic.

If a spring constant is needed for design, a preliminary modulus of subgrade reaction (k_s) of 100 pounds per square inch per inch of deflection (psi/in) for a 1 foot by 1 foot plate can be used for static loading at all campuses and seismic loading at all campuses excluding Space Park Campus; at Space Park, a k_s of 100 psi/in can be used for on-grade construction only. At Space Park Campus, we recommend that ground improvement be implemented if a basement is constructed due to the elevations where soil subject to cyclic-liquefaction are located; modulus for a mat bearing on ground improvement will need to be determined based on the type of ground improvement and spacing. During the design-level studies, the structural engineer should provide us with mat pressures and deflections based on these recommendations to optimize the design of the mat.

Resistance to short-duration (earthquake and wind-induced) lateral loads may be provided by frictional resistance between the foundation concrete and the bearing soil and by passive earth pressure acting against the side of the foundation. A coefficient of friction of 0.30 can be used between concrete and the subgrade. Where the bottom of the mat will be underlain by a waterproofing membrane, the coefficient of friction should be reduced to 0.15 to 0.20 between the membrane and the subgrade (depending on membrane properties).

5.2 DEEP FOUNDATIONS

A deep foundation system can be used to support buildings with more than five stories. Deep foundations will gain support through skin friction and end bearing in the subsurface soil. There are many deep foundation systems available, including driven precast concrete or steel piles, Cast-in-Drilled Hole (CIDH), EDTTEX[6], Tubex or Torque-down piles and auger-cast displacement piles (ACP). Pile groups are expected to be connected by pile caps and interior grade beams.

Based on our experience in similar projects, ACP and CIDH piles are preferred deep foundation systems in order to reduce noise impacts to occupants in nearby structures. ACPs are deep foundation elements that are constructed by rotating a continuous flight hollow-stem auger into the soil. Concrete or grout is pumped under pressure through the hollow stem as the auger is withdrawn and a reinforcing cage can be installed while the concrete or grout is still in a fluid condition. CIDHs are a high-capacity deep foundation system that is constructed by drilling a cylindrical borehole to design diameter and depth, lowering reinforcing steel (rebar) into the drilled shaft, and then filling the shaft with concrete.

ACP, EDTTEX, Tubex or other torque down piles are typically designed and constructed by a specialty contractor using proprietary means and methods. Driven piles and CIDH, if selected, can be designed by the project structural engineer in collaboration with us. Any deep foundation design be verified via full-scale load tests to assess the axial capacity.

5.2.1 Preliminary Pile Capacities

Based on the subsurface conditions at these sites and our experience with similar projects, we provide the following preliminary estimates of pile foundation axial capacity to support your project's scoping and conceptual planning phase.

We utilized the idealized soil profile presented in Section 2.5 to estimate the preliminary vertical pile capacity of a single 16-inch-diameter ACP. Table 5.2-1 presents ultimate vertical ACP

[6] The EDTTEX piles are steel and concrete pipe composite piles that are into ground under very heavy torque and down pressure.

capacities for static and seismic conditions. We used post-liquefaction/liquefaction residual shear strength per Olson and Stark (2002) and Idriss and Boulanger (2008) for seismic considerations due to liquefaction and cyclic softening, respectively.

TABLE 5.2-1: Preliminary Ultimate Vertical Pile Capacities for 16-inch ACP

CAMPUS	DEPTH TO REACH 200 TONS OF ULTIMATE PILE CAPACITY (feet)*	
	STATIC CONDITION	SEISMIC CONDITION
Charleston South	88	102
Joaquin	75	81
Plymouth	93	96
Commons	75	79
Space Park	77	82

*Once the development plans are available, we should update these values with downdrag considerations.

We anticipate a total static and seismic settlement of less than 1 inch and differential settlement of less than ½ inch under pile supported structures. We also anticipate the differential settlement between pile-supported and surrounding areas to be up to approximately 1½ inches following an earthquake that results in liquefaction. Entry and pipe connections to deep-foundation-supported buildings should be assessed to confirm the anticipated differential settlement can be tolerated; otherwise, flexible entry and pipe connections may be considered.

We will evaluate the lateral capacities and soil-structure interaction parameters during the design-level studies once the development plans are available. Design axial capacity values of piles should be verified via full-scale load tests prior to construction of production piles.

5.3 SPREAD FOOTINGS

Spread footings may be used to support small auxiliary structures. Continuous or isolated spread footings should bear in competent native soil or compacted fill. Minimum footing dimensions are presented in Table 5.3.1-1 below.

TABLE 5.3.1-1: Minimum Footing Dimensions

FOOTING TYPE	*MINIMUM DEPTH (INCHES)	MINIMUM WIDTH (INCHES)
Continuous	12	18
Isolated	12	18

* below lowest adjacent pad grade

The minimum footing depths shown above are taken from lowest adjacent pad grade. To limit total static settlement to less than 1 inch, shallow footings should be designed with a maximum allowable bearing pressure of 1,500 psf for dead-plus-live loads. The maximum allowable bearing pressure is a net value; the weight of the footing may be neglected for design purposes. Footings located adjacent to utility trenches should have their bearing surfaces below an imaginary 1:1 (horizontal:vertical) plane projected upward from the bottom edge of the trench to the footing.

This bearing capacity may be increased by one-third for the short-term effects of wind or seismic loading. However, seismically induced settlement in the range of 2½ to 3 inches (reference

Section 3.1.3 for estimates by Campus) should be expected for auxiliary structures supported on shallow footings, unless the risk of liquefaction is mitigated by ground improvement methods.

Lateral loads may be resisted by friction along the base and by passive pressure along the sides of shallow footings. A coefficient of friction of 0.30 can be used between concrete and the subgrade.

5.4 BASE HEAVE AND UPLIFT FORCES

If subterranean stories are considered, the excavation subgrade may experience heave during excavation and recompression during foundation construction. Shoring walls or groundwater cut-off systems should be designed to reduce the risk of subgrade heave on the project.

Moreover, due to shallow groundwater conditions, the weight of the building should be assessed to determine whether there is sufficient weight to offset the hydrostatic uplift loads when subterranean stories are planned. Hydrostatic uplift forces should be estimated assuming buoyancy below the design groundwater at a depth of 6 feet. Uplift resistance can be provided by the weight of the foundation elements and structural loads. Additional resistance to uplift may be provided by installing hold-down piers or anchors in conjunction with mat foundation or evaluating tension resistance from foundation piles. Hold-down piers or anchors may be evaluated using a preliminary allowable skin friction of 500 psf.

The risk of base heave and hydrostatic uplift should be assessed as part of the shoring and dewatering system design.

5.5 GROUND IMPROVEMENT

As described in Sections 3.1.3 and 5.1, at the Space Park Campus, to use a mat foundation in conjunction with one or two below-grade stories, ground improvement is recommended. The ground improvement should reduce the potential liquefaction-induced settlement and provide an improved bearing capacity to support shallow foundation loads. Ground improvement should target the near-surface liquefaction-susceptible deposit of silty and sandy soil described in Section 2.4.5. Based on our exploration, we recommend ground improvement elements extend to Elevation -33 feet or deeper. Based on our experience, ground improvement methods such as deep soil mixing, drilled displacement columns, or rammed aggregate piers are effective in mitigation of the potentially liquefiable/cyclic softening soil.

The benefits of deep soil mixing and drilled displacement columns include low vibration during construction and little to no soil spoils. Rammed aggregate piers and rapid impaction compaction could generate strong vibrations, making these two methods less desirable in a developed environment.

Soil improvement is typically procured as a design-build element of a project. The selection and design of the ground improvement system should be determined with input from an experienced general contractor. This allows consideration of individual specialty contractors' proprietary means and methods in selecting the most cost-effective approach that meets specific project performance and quality objectives. Conceptual ground improvement plans should show the extent of the work, coordination with other elements, including foundations, utilities, and project phasing requirements. We can assist in the preparation of a design-build Request for Proposal (RFP) for the ground improvement and should review the design submittal prior to construction. During ground improvement selection, we should be consulted regarding the selected method

and provided opportunity to work with the design-build contractor to develop the appropriate design bearing capacity and update our estimate of differential settlement.

Future collaboration with the structural engineer and ground improvement contractor will be important to develop specific foundation and ground improvement recommendations once final structural details and loading are developed.

The ground improvement design should yield a total post-construction seismically induced settlement of 1 inch or less. At a minimum, ground improvement should be utilized within the building pad and should be performed on a uniform grid so that the effective modulus of the soil during liquefaction is at least 150 psi/in. If the design team considers foregoing ground improvement measures in surface parking and landscape areas, maintenance and repairs should be expected in future seismic events to repair improvements such as sidewalks and walkways as needed. We anticipate that differential settlement between ground improved areas and surrounding unimproved areas could be up to approximately 3 inches. Entry and pipe connections should be assessed to confirm the anticipated differential settlement can be tolerated; otherwise, flexible entry and pipe connections may be considered.

6.0 SECONDARY SLABS-ON-GRADE

Exterior flatwork includes items such as concrete sidewalks, steps, and outdoor plazas exposed to foot traffic only. Concrete flatwork should have a minimum thickness of 4 inches and include control and construction joints in accordance with current Portland Cement Association Guidelines.

Exterior slabs should slope away from the buildings to prevent water from flowing toward the foundations. Site soil should be moistened just prior to concrete placement.

We recommend that flatwork leading to a building entrance area be structurally independent of the building foundation to allow for differential movement between the flatwork and the building. Where smooth transition to provide access is necessary (ADA ramps), a hinge-slab should be designed to accommodate movements of approximately ½ inch. Flatwork should be reinforced to allow for the appropriate span in the event of settlement. Maintenance or replacement of entry slabs should also be expected following a seismic event as the ground settles at the perimeter of buildings.

7.0 DESIGN-LEVEL GEOTECHNICAL REPORT

This report presents preliminary geotechnical findings, conclusions and recommendations intended for preliminary planning purposes only. A design-level geotechnical exploration and assessment should be performed when development plans are available and existing buildings are demolished.

The design-level geotechnical report should further discuss topics presented in this report and address the following items:

- Additional explorations after demolition of existing buildings to support design-level recommendations.
- Site-specific seismic hazard analysis based on CBC 2019 (ASCE 7-16), if needed based on the proposed buildings.

- 3-dimensional finite-element analysis with PLAXIS 3D model to evaluate anticipated settlement from the proposed structures and fill placement, if needed.
- Deep foundation design parameters, including lateral capacities, group effects and pile response.
- Considerations during design of dewatering and shoring systems.
- Ground improvement design as needed.

8.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report presents geotechnical recommendations for design of the Google North Bayshore (Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses) project discussed in Section 1.3. If changes occur in the nature or design of the project, we should be allowed to review this report and provide additional recommendations. 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, 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; therefore, we are unable to guarantee or warrant the results of our services.

This report is based upon field and other conditions discovered at the time of report preparation. We developed this report with limited subsurface exploration data. We assumed that our subsurface exploration data are representative of the actual subsurface conditions across the site. Considering possible underground variability of soil, rock, fill, and groundwater, additional unexpected costs may be incurred in completing the project. We recommend that the owner establish a contingency fund to cover such costs. If unexpected conditions are encountered, ENGEO should be notified immediately to review these conditions and provide additional and/or modified recommendations, as necessary.

Our services did not include excavation sloping or shoring, soil volume change factors, flood potential, or a geohazard exploration. In addition, our geotechnical exploration did not include work to determine the existence of possible hazardous materials. If any hazardous materials are encountered during construction, the proper regulatory officials should be notified immediately.

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Actual field or other conditions will necessitate clarifications, adjustments, modifications or other changes to ENGEO's recommendations. Therefore, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include onsite construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from

the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

We determined the boundaries designating the interface between layers on the exploration logs using visual observations. The transition between the materials may be abrupt or gradual. The exploration logs contain information concerning samples recovered, indications of the presence of various materials such as clay, sand, silt, rock, existing fill, etc., and observations of groundwater encountered. The field logs also contain our interpretation of the subsurface conditions between sample locations. Therefore, the logs contain both factual and interpretative information. Our recommendations are based on the contents of the final logs, which represent our interpretation of the field logs.

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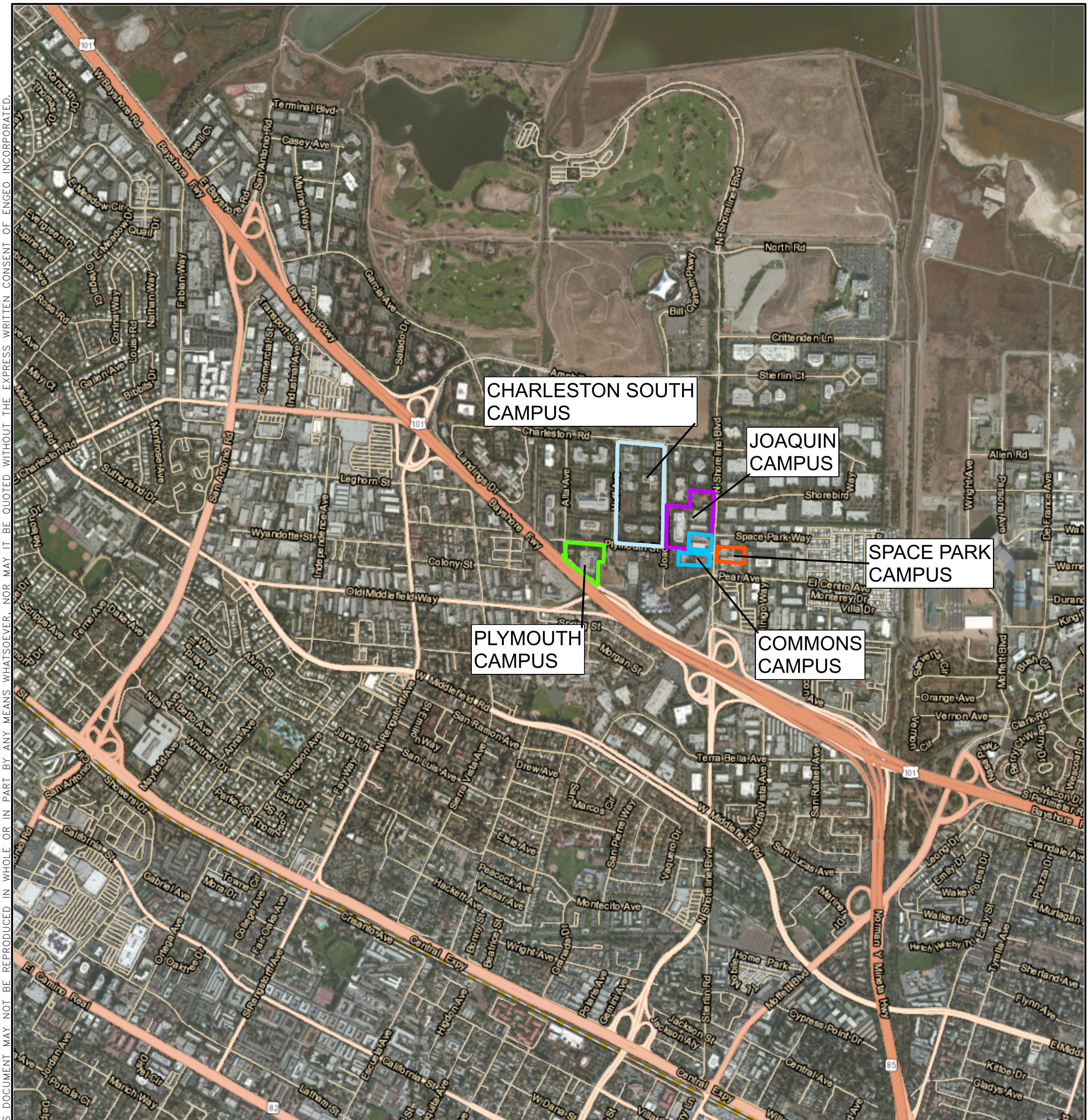
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FIGURES

FIGURE 1: Vicinity Map
FIGURE 2A: Site Plan – Charleston South Campus
FIGURE 2B: Site Plan – Joaquin Campus
FIGURE 2C: Site Plan – Plymouth Campus
FIGURE 2D: Site Plan – Space Park Campus
FIGURE 2E: Site Plan – Commons Campus
FIGURE 3: Regional Geologic Map
FIGURE 4: Seismic Hazard Zones Map
FIGURE 5: Regional Faulting and Seismicity
FIGURE 6: FEMA Flood Insurance Map



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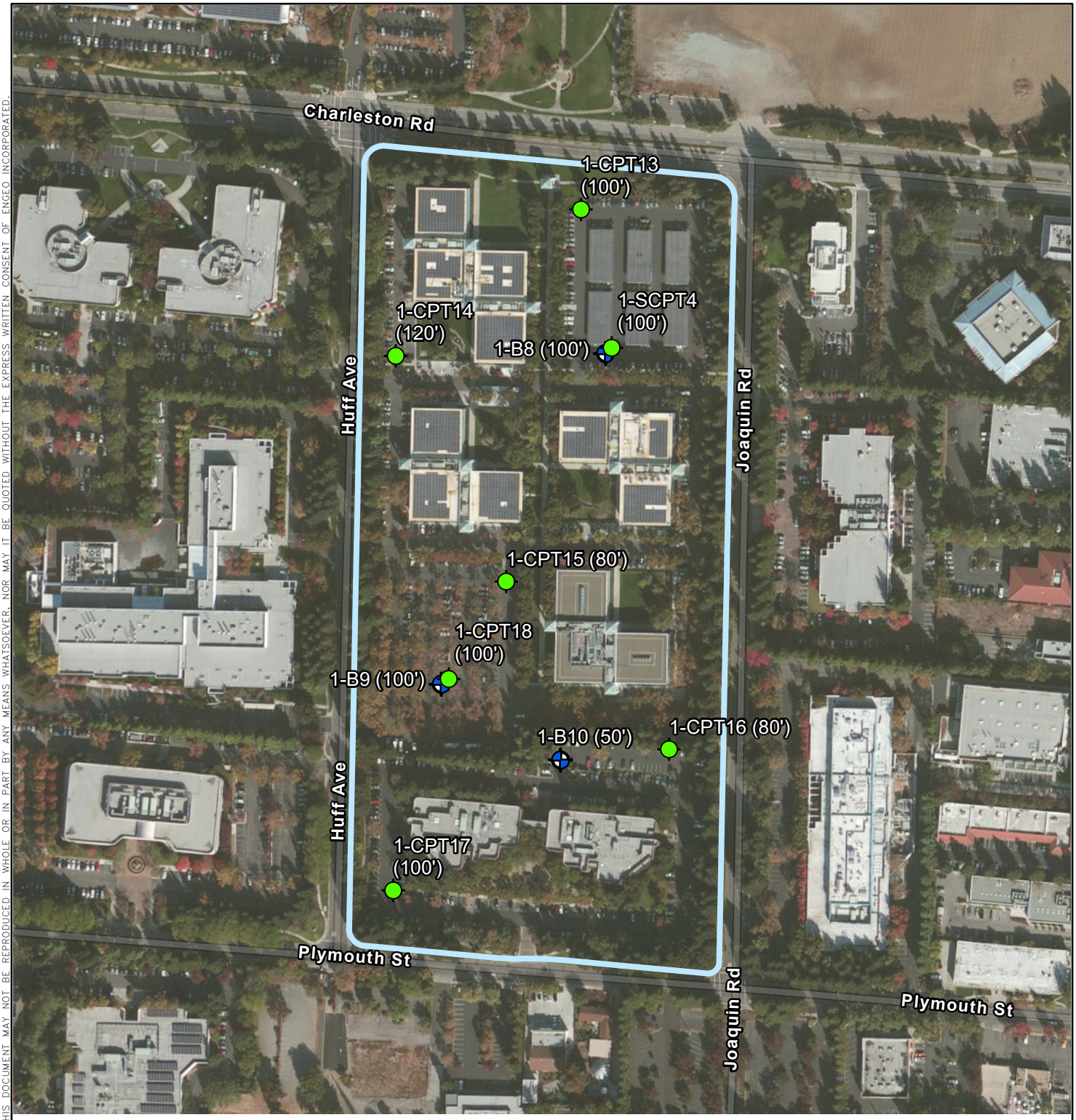
VICINITY MAP
GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

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EXPLANATION

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SITE PLAN - CHARLESTON SOUTH CAMPUS

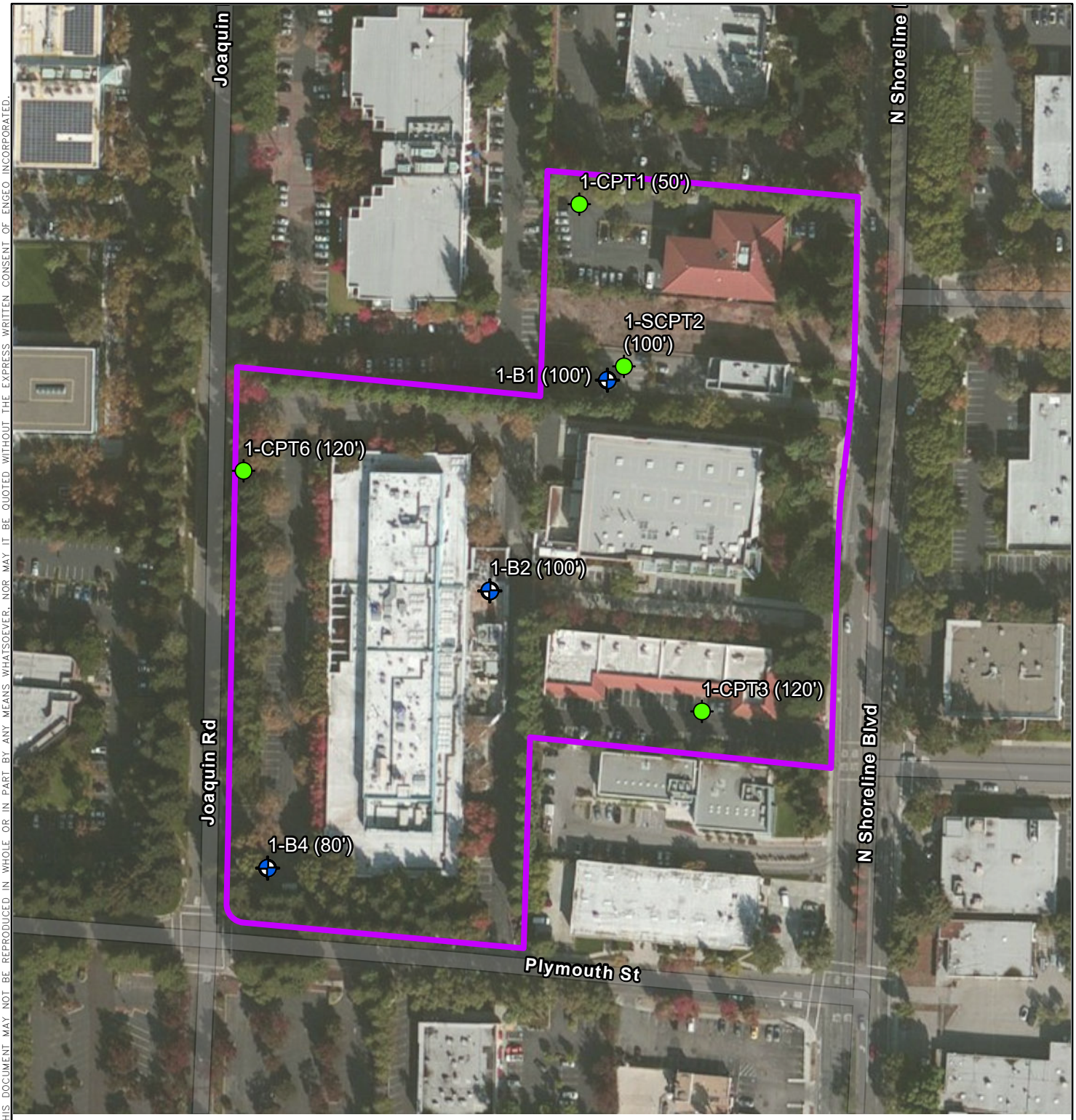
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FIGURE NO. 2A

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SITE PLAN - JOAQUIN CAMPUS

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FIGURE NO. 2B

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SITE PLAN - PLYMOUTH CAMPUS

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FIGURE NO. 2C

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SITE PLAN - SPACE PARK CAMPUS

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MOUNTAIN VIEW, CALIFORNIA

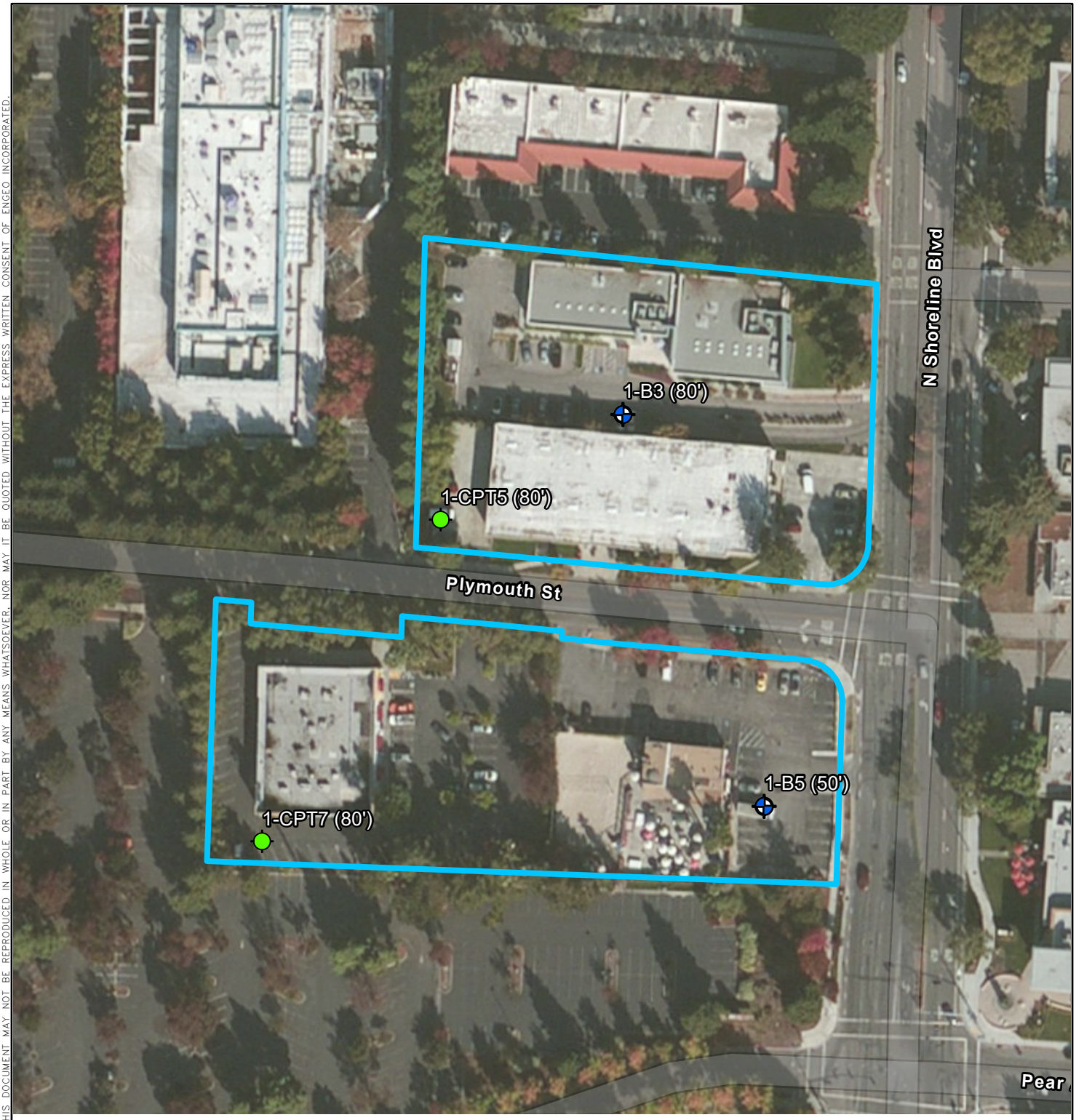
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EXPLANATION

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SITE PLAN - COMMONS CAMPUS

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MOUNTAIN VIEW, CALIFORNIA

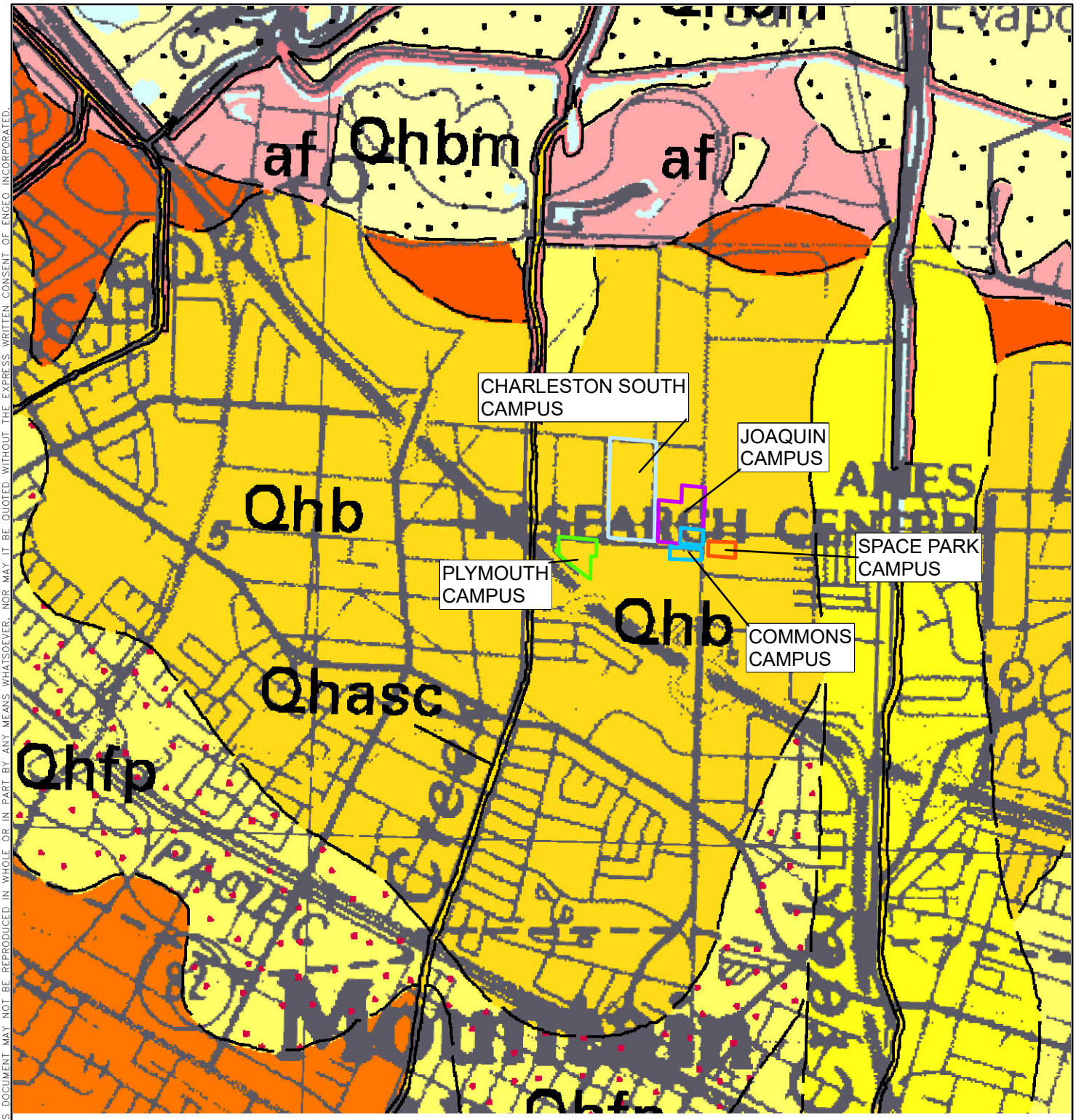
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FIGURE NO. 2E

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

af	ARTIFICIAL FILL (HISTORIC)
Qhasc	ARTIFICIAL STREAM CHANNELS (HISTORIC)
Qhbm	BAY MUD (HOLOCENE)
Qhb	BASIN DEPOSITS (HOLOCENE)
Qhfp	FLOOD-PLAIN DEPOSITS (HOLOCENE)

BASEMAP SOURCE: BRABB 2000

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REGIONAL GEOLOGIC MAP

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

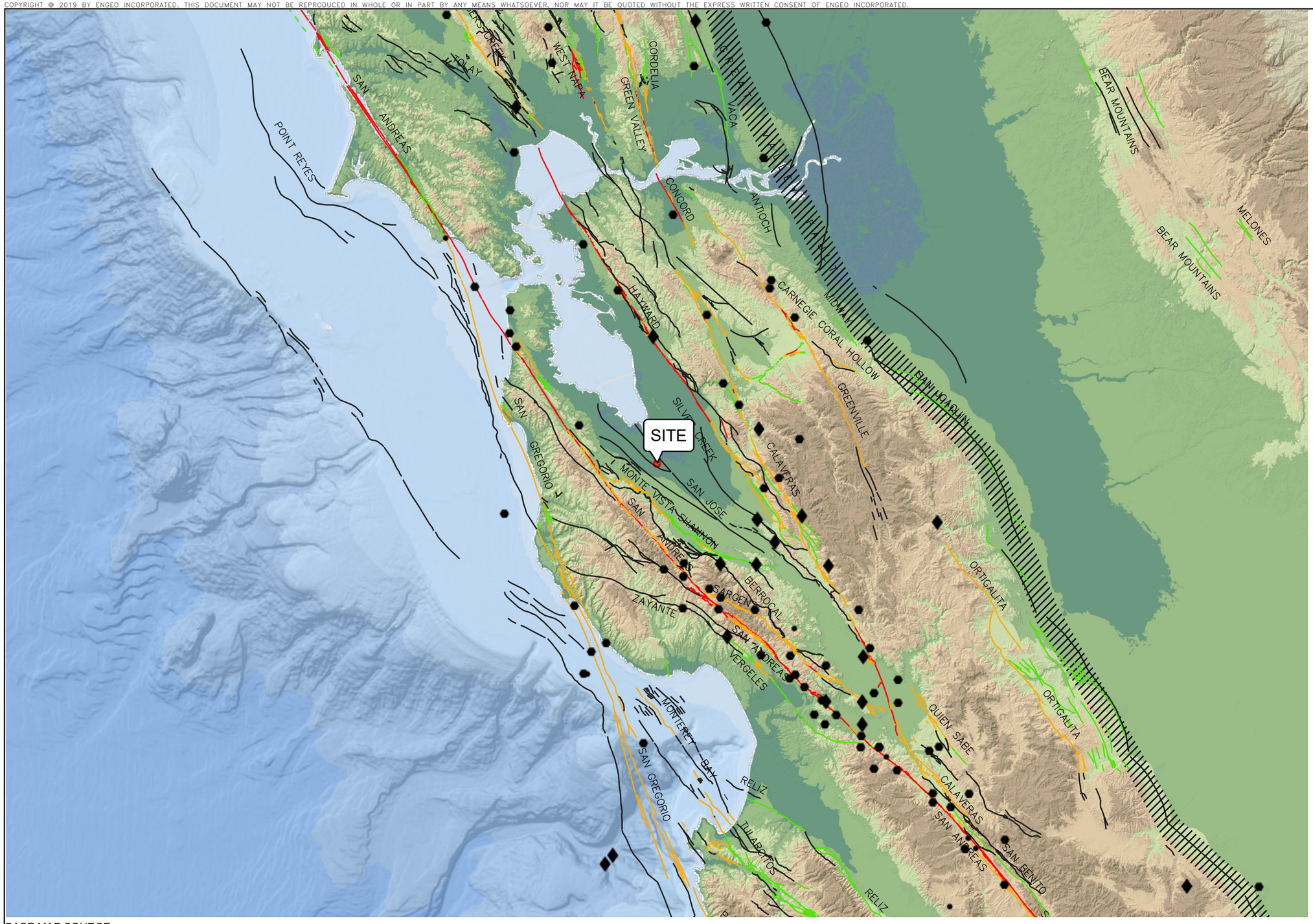
PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
DRAWN BY: QRL	CHECKED BY: JK

FIGURE NO. 3

PATH: G:\DRAFTING\DRAFTING2_DWG_13000 PLUS\15949\000\072219GEX\GOOGLE NORTH BAYSHORE CHARLESTON SOUTH.APRX
USER: QLIANG

ORIGINAL FIGURE PRINTED IN COLOR

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N

0 7.5 15

Miles

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

EARTHQUAKE

- MAGNITUDE 7+
- MAGNITUDE 6-7
- MAGNITUDE 5-6

USGS QUATERNARY FAULTS

- HISTORICAL
- LATEST QUATERNARY
- LATE QUATERNARY
- UNDIFFERENTIATED QUATERNARY
- HISTORIC BLIND THRUST FAULT ZONE

BASE MAP SOURCE

ESRI, GARMIN, GEBCO, NOAA NGDC, AND OTHER CONTRIBUTORS
COLOR HILLSHADE IMAGE BASED ON THE NATIONAL ELEVATION DATA SET (NED) AT 30 METER RESOLUTION
U.S.G.S. QUATERNARY FAULT DATABASE, 2018
U.S.G.S. HISTORIC EARTHQUAKE DATABASE (1800-PRESENT)

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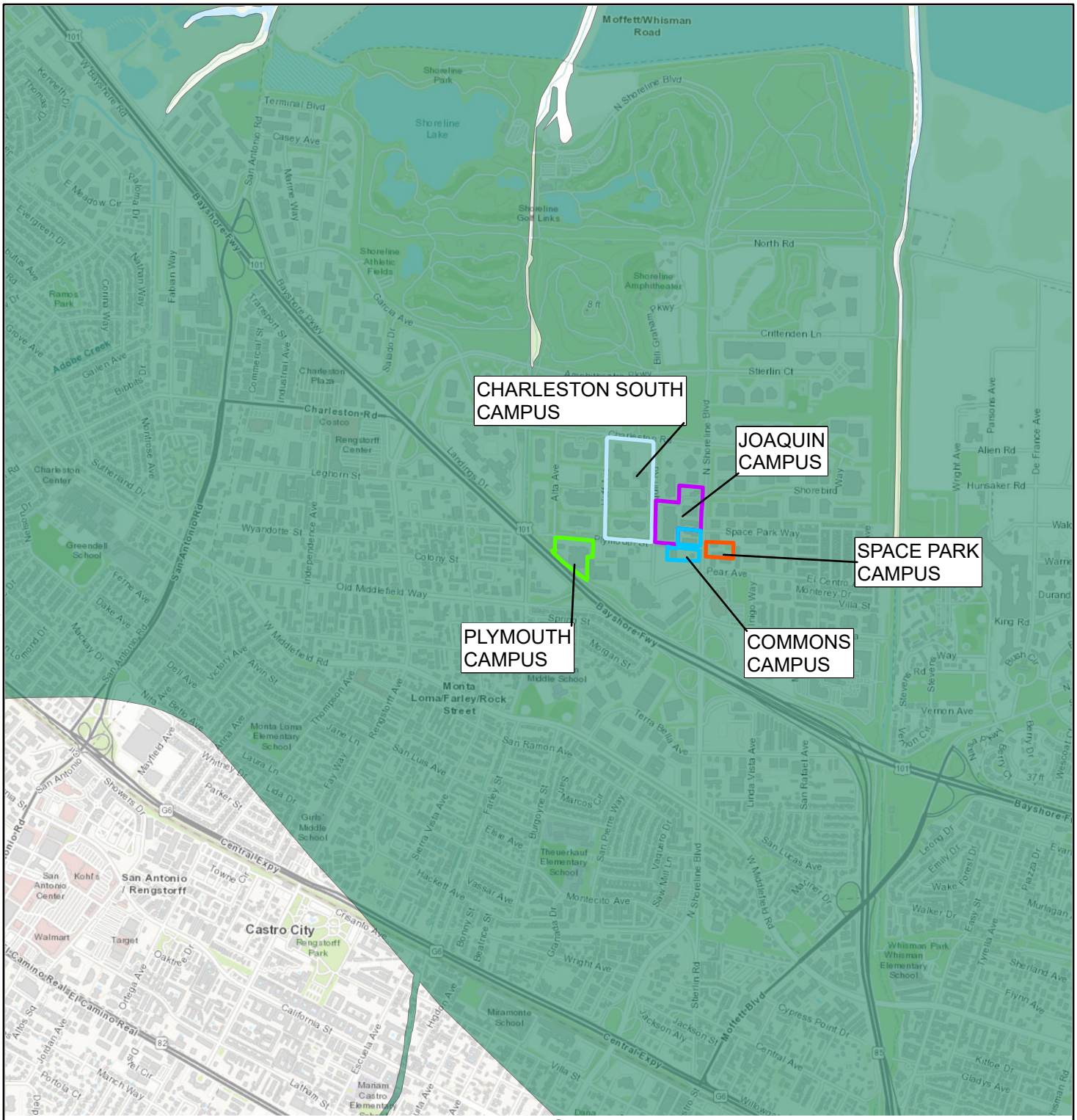
REGIONAL FAULTING AND SEISMICITY

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. : 15949.000.000		FIGURE NO. 4
SCALE: AS SHOWN		
DRAWN BY: QRL	CHECKED BY: JK	

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USER: QLIANG

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

Liquefaction Zone
Areas where historical occurrence of liquefaction, or local geological,geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required

N

0 1,000 2,000

FEET

BASEMAP SOURCE: ESRI MAPPING SERVICE
CALIFORNIA DEPARTMENT OF CONSERVATION, CALIFORNIA GEOLOGICAL SURVEY

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SEISMIC HAZARDS ZONE MAP

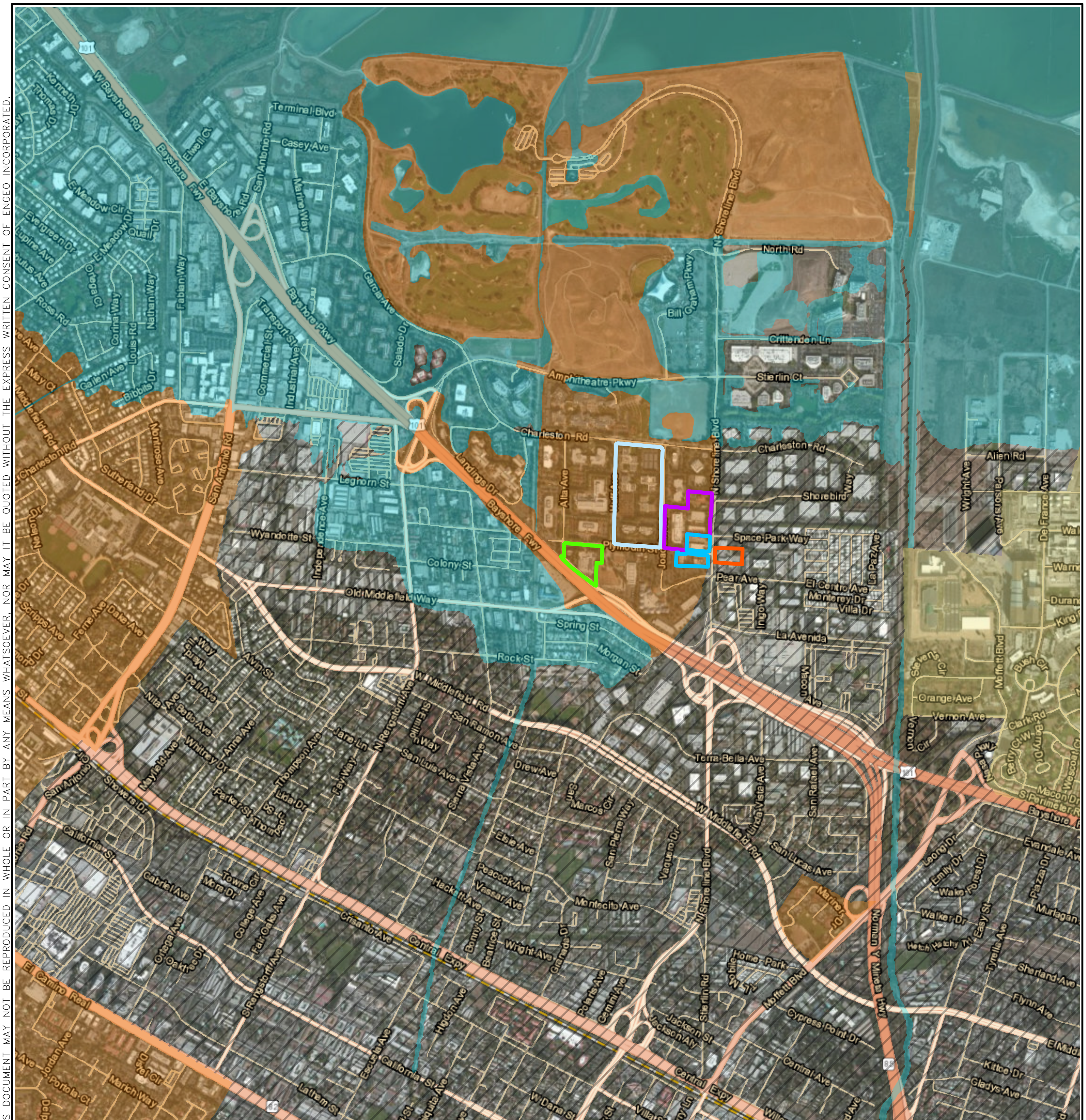
GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
DRAWN BY: QRL	CHECKED BY: JK

FIGURE NO. 5

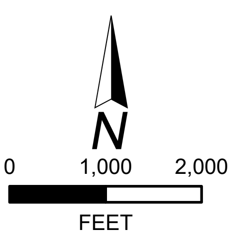
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USER: QLIANG

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE



- 1% ANNUAL CHANCE FLOOD HAZARD
- AREA OF UNDETERMINED FLOOD HAZARD
- 0.2% ANNUAL CHANCE FLOOD HAZARD
- AREA WITH REDUCED RISK DUE TO LEVEE
- CHARLESTON SOUTH CAMPUS
- JOAQUIN CAMPUS
- PLYMOUTH CAMPUS
- SPACE PARK CAMPUS
- COMMONS CAMPUS

BASEMAP SOURCE: ESRI MAPPING SERVICE CALIFORNIA GEOLOGICAL SURVEY, 2009

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FEMA FLOOD INSURANCE MAP

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
DRAWN BY: QRL	CHECKED BY: JK
FIGURE NO.	6

PATH: G:\DRAFTING\DRAFTING2_DWG_13000 PLUS\15949\000\072219GEX\GOOGLE NORTH BAYSHORE CHARLESTON SOUTH.APRX
USER: QLIANG

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APPENDIX A

EXPLORATION LOGS

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
- Dames and Moore Piston
- 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-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			4" Aggregate Base												
			LEAN CLAY (CL), dark grayish brown, dry, low plasticity, some fine-grained sand												
	10														
5			olive brown, moist, very stiff, medium plasticity, slow dilatency			36									
	5														
10			CLAYEY SAND TO SANDY LEAN CLAY (CL-SC), pale olive, stiff to very stiff, wet, medium plasticity, rapid dilatancy, fine-grained sand			150-300 psi	26	18	8	51	18	112.5		4.0*	PP
	0		SANDY CLAY (CL), pale olive, stiff, wet, medium plasticity, rapid dilatancy			9	37	16	21	62	24.8	103.3	1377		UC
15			CLAYEY GRAVEL WITH SAND (GC), greenish gray, medium dense to dense, rapid dilatancy, 15% fine-grained sand, 35% to 30% fine gravel			31	30	17	13	40	20.3	112.5			
	-5		WELL GRADED SAND WITH SILT AND GRAVEL (SW), greenish gray, medium dense, wet, trace silt and clay			18				7					
20			WELL GRADED GRAVEL WITH SAND AND SILT (GW), greenish gray, medium dense, wet, 35% to 45% coarse sand												
			FAT CLAY (CH), grayish green, medium stiff, wet, high plasticity, 5% to 10% coarse-grained sand			7					28.2	98.5		.5*	PP
	-10														
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

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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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), grayish green, very stiff, wet, high plasticity, 5% to 10% coarse-grained sand			30					22.6	105.5	6386		UC
	-15														
30			GRAVELLY LEAN CLAY (GC-CL), pale olive, stiff to very stiff, wet, medium plasticity, 50% to 55% fine angular to subangular gravel, trace fine-grained sand			21	42	15	27	53				2.0*	PP
	-20														
35			POORLY GRADED SAND WITH GRAVEL (SP), dense, wet, 25% to 35% coarse gravel, trace silt and clay			41									
	-25														
40			LEAN CLAY (CL), yellowish brown, very stiff, medium plasticity, no dilatancy, trace fine, subrounded gravel			16					22	106.8		2.5*	PP
	-30														
45			FAT CLAY (CH), pale olive, stiff, moist, high plasticity, slow dilatancy, with 5% to 10% fine rounded gravel			12	55	16	39	92					
	-35														
50															

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LOG OF BORING 1-B01

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Mountain View, CA
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DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), pale olive mottled with pale yellow, hard, moist, high plasticity, slow dilatancy, with 5% to 10% fine rounded gravel			40					21.1	109.4	3508.2		UU
55	-40														
	-45														
60			POORLY GRADED GRAVEL (GP), dark gray, dense, angular to subangular			44								>4.5*	PP
	-50		LEAN CLAY (CL), pale olive mottled with pale yellow, hard, low plasticity, trace gravel												
65															
	-55														
70			Trace fine-grained sand grayish green, moist, low to medium plasticity, trace fine-grained sand, slow dilatency			58					27.6	96.3		>4.5*	PP
	-60														
75															

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LOG OF BORING 1-B01

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DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), pale olive mottled with pale yellow, hard, low plasticity, trace gravel												
	-65		CLAYEY SAND (SC), grayish green, very dense, wet, high plasticity clay			35				43					
80															
	-70														
85															
	-75														
90			Medium dense			18					26.5	99.4			
	-80														
95															
	-85														
100															

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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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), grayish green with pale olive, very stiff, wet, high plasticity, no dilatancy, trace fine-grained sand			29								2.5*	PP
			Boring Terminated at a depth of 101.5 feet below ground surface on May 19, 2019. Unable to determine groundwater depth due to drilling method.												

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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt 13" Aggregate Base												
			SANDY LEAN CLAY WITH GRAVEL (CL), dark brown, moist, low plasticity, fine- to coarse-grained sand, subangular to subrounded fine gravel												
			LEAN CLAY WITH SAND (CL), dark brown to black, very stiff, moist, medium plasticity, high toughness, fine- to coarse-grained sand, some fine subrounded gravel												
5	10		FAT CLAY (CH), dark brown to black, very stiff, moist, high plasticity, with subangular to subrounded fine gravel light olive brown, no gravel			18	61	19	42	82				3.5*	PP
10	5		medium stiff			7					12.5				
			WELL GRADED GRAVEL WITH SAND (GW), dark gray, loose, wet, angular, subrounded, coarse-grained sand, trace clay												
15	0		possilbe low blow counts due to rock wedged in SPT shoe			4									
			LEAN GRAVELLY CLAY (CL), grayish green, medium stiff, wet, medium plasticity, low toughness, fine subrounded gravel			8	41	16	25	65			600*		TV
20	-5		POORLY GRADED SAND (SP), grayish green, loose to medium dense, wet, with some fine angular gravel Disturbed samples. Initially no recovery, then samples were taken by pushing sampler.			12									
25	-10														

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LOG OF BORING 1-B02

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DATE DRILLED: 5/18/2019
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LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY CLAY (CL), grayish green, wet, trace coarse-grained sand			200-600 psi									
			WELL GRADED GRAVEL WITH SAND (GW), greenish gray, loose to medium dense, wet, angular, subrounded, fine- to coarse-grained sand, few silt			12									
			SILT (ML), greenish gray, stiff, wet, low plasticity, medium toughness												
	-15														
30			CLAYEY SAND (SC), light yellowish brown, medium dense, wet, medium plasticity, with some coarse subangular gravel			22	43	16	27	26	13.2	120.9		3.75*	PP
	-20														
35			CLAYEY GRAVEL WITH SAND (GC), light yellowish brown, medium dense, wet, 35% to 40% fines, 30% to 35% fine subangular gravel			20				36					
			LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, with some silt			11									
	-25														
40			POORLY GRADED SAND (SP), light yellowish brown to gray, medium dense, wet, with some fine subangular gravel and clay												
			LEAN CLAY (CL), light yellowish brown, very stiff, wet, medium plasticity, high toughness			17									
	-30														
45			LEAN CLAY (CL), olive brown, stiff, wet, medium plasticity, with fine to coarse angular to subrounded gravel			22					14.92	123.2	1171		UU
	-35														
50															

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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), yellowish brown, medium dense, wet, fine-to medium-grained sand, some fine subrounded gravel			30					16	117.7			
	-40		LEAN CLAY (CL), reddish brown, very stiff, wet, low plasticity, medium toughness, with silt and some fine- to medium-grained sand												
55															
	-45														
60						22					22	106		>4.5*	PP
	-50														
65															
	-55														
70			Greenish gray, stiff, medium plasticity, no sand			16					25.25	101.7	1237		UU
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), reddish brown, very stiff, wet, low plasticity, medium toughness, with silt and some fine- to medium-grained sand												
80	-65		Olive brown, with some silt and trace sand			19							600*		TV
85	-70		POORLY GRADED SAND WITH GRAVEL (SP), olive brown to gray, medium dense, wet, angular to subangular fine gravel												
			LEAN CLAY (CL), olive brown to gray, very stiff, wet, medium plasticity, high toughness			32									
90	-75														
95	-80														
100	-85														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive brown to gray, very stiff, wet, medium plasticity, high toughness			40					30.1	93.8	3600*	3*	PP+TV
			Boring Terminated at a depth of 101.5 feet below ground surface on May 19, 2019. Unable to determine groundwater depth due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

LOG OF BORING 1-B03

ENGEO Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2" Asphalt 12" Aggregate Base FAT CLAY (CH), very dark brownish gray, moist to dry												
5	10		Very stiff, fissured			20	86	19	67	96	30.9	88		3.7*	PP
			Light olive, stiff, moist, medium plasticity			10								1.0*	PP
10	5		Pale olive			10	59	30	29	99	23.8	102.1	1487.4		UU
15	0		POORLY GRADED SAND WITH GRAVEL AND SILT (SP-SM), dark brown, dense, wet			42					9.2	132.1			
20	-5		Medium dense			24				9					
			LEAN CLAY WITH SAND (CL), reddish yellow mottled with olive, stiff, moist, high plasticity												
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B03

ENGEO Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), reddish yellow mottled with olive, stiff, moist, high plasticity			15					30.1	93.7	1080.1		UU
30	-15		FAT CLAY (CH), dark reddish yellow mottled with olive, very stiff, trace coarse gravel			15	50	20	30	81	29.2			2.1*	PP
35	-20					27								2.75*	PP
40	-25		Stiff, fine-to-coarse-grained sand, trace fine gravel			13								1.5*	PP
45	-30		CLAYEY SAND (SC), dark yellowish brown, medium dense, fine- to-coarse-grained sand			24	38	15	23	39	18.6				
			FAT CLAY (CH), dark yellowish brown, stiff to very stiff, moist, high plasticity			14								2.0*	PP
50	-35														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

ENGEO
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LOG OF BORING 1-B03

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), pale olive to olive, very stiff, moist, high plasticity, fine- to-coarse-grained sand			35	38	17	21		22	106.1		2.75*	PP
55	-40														
60	-45		Reddish yellow mottled with pale olive			32					23.5	104.9		2.9*	PP
65	-50														
			LEAN CLAY (CL), olive to olive gray, stiff, moist, high plasticity												
70	-55					20					29.3	94.8		1.75*	PP
75	-60														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B03

Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive to olive gray, stiff, moist, high plasticity												
80	-65		POORLY GRADED SAND WITH CLAY (SP-SC), dark olive gray, wet, coarse-grained sand			57				10	22.4	103			
			Boring terminated at a depth of 81.5 feet below ground surface. Groundwater not encountered due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B04

ENGEO Expect Excellence

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2" Asphalt												
			11" Aggregate Base												
			LEAN CLAY (CL), very dark brownish gray, moist, low plasticity, trace fine- to coarse-grained sand, trace organics												
	10														
5			LEAN CLAY WITH GRAVEL (CL), light greenish gray, stiff, moist, low plasticity, 10% to 15% gravel, 5% to 10% fine- to coarse-grained sand, trace organics			8									
	5		SANDY LEAN CLAY (CL), olive brown, very stiff, moist, 35% to 40% fine- to coarse-grained sand, trace fine gravel			18	NP	NP	NP		17.4	117.4		3.0*	PP
10			POORLY GRADED SAND WITH SILT (SP), olive brown, medium dense, wet, 10% to 15% fines, trace fine gravel			19				11					
	0														
15			SANDY FAT CLAY (CH), dark greenish gray, medium stiff, moist, 30% to 35% fine- to coarse-grained sand			7								2.25*	PP
	-5														
20			FAT CLAY WITH SAND (CH), dark yellowish brown mottled with greenish gray, medium stiff to stiff, moist, medium plasticity, weak cementation, fine- to coarse-grained sand, trace fine gravel, with iron oxide staining			9					23.9	102		1.0*	PP
	-10		CLAYEY SAND (SC), dark yellowish brown mottled with greenish gray, loose to medium dense, moist, 35% to 40% fines												
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), dark yellowish brown mottled with greenish gray, loose to medium dense, moist, 35% to 40% fines			11	40	18	22	38				.75*	PP
	-15														
30			Medium dense			14					16.2	120.7			
	-20														
35			25% to 35% fines			16	30	18	12	30					
	-25														
			FAT CLAY WITH SAND (CH), dark yellowish brown, stiff to very stiff, moist, 25% to 30% fine to coarse sand, trace fine gravel												
40						15								3.75*	PP
	-30														
45															
			LEAN CLAY WITH SAND (ML), dark yellowish brown, stiff, wet, 40% to 45% fine- to medium-grained sand			13	34	17	17	58	22.8	106.6		1.25*	PP
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (ML), dark yellowish brown, stiff, wet, 40% to 45% fine- to medium-grained sand			34									
			CLAYEY SAND TO SANDY CLAY (SC-CL), dark yellowish brown, loose to medium stiff, moist, 45% to 50% fines			4	31	18	13	46				1.0*	PP
			FAT CLAY WITH SAND (CH), dark olive mottled with dark greenish gray, very stiff, moist, 15% to 20% fine- to medium-grained sand, trace fine to coarse gravel			29					22.5	106	1637		UU
			Medium stiff to stiff			12								1.25*	PP

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	-65		FAT CLAY WITH SAND (CH), dark olive mottled with dark greenish gray, very stiff, moist, 15% to 20% fine- to medium-grained sand, trace fine to coarse gravel												
80			Very stiff to hard			40					18	113.1	3469		UU
			Boring Terminated at a depth of 81.5 feet below ground surface on June 9, 2019. Groundwater not encountered due to drilling method												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

LOG OF BORING 1-B05

ENGEO Expect Excellence

LATITUDE: 37.41608056 LONGITUDE: -122.0784306

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/9/2019
HOLE DEPTH: 46.5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (WGS84): Approx. 16 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	15		4" Asphalt 10" Aggregate Base												
5	10		FAT CLAY WITH SAND (CH), very dark brown, very stiff, moist, medium plasticity, no dilatency, some <1/4" pockets of pale yellow sand/weathered sandstone			13								2.75*	PP
						17	68	17	51	74	36.4	82.9			
10	5		SILTY SAND WITH GRAVEL (SM), pale olive mottled with reddish yellow, medium dense, moist With interbeded clay			25				20					
15	0		POORLY GRADED SAND WITH GRAVEL gray, wet, angular gravel			9									
			no recovery from samples taken between 15 feet and 18 feet			6									
20	-5					17				12					
25			FAT CLAY (CH), pale olive mottled with reddish yellow, stiff to very stiff, medium plasticity, no dilatancy, trace coarse-grained sand												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B05

ENGEO Expect Excellence

LATITUDE: 37.41608056 LONGITUDE: -122.0784306

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/9/2019
HOLE DEPTH: 46.5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (WGS84): Approx. 16 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	-10		FAT CLAY (CH), pale olive mottled with reddish yellow, stiff to very stiff, medium plasticity, no dilatancy, trace coarse-grained sand			15	53	22	31	95				2.75*	PP
30	-15					15					26.1	99	1209.3		UU
35	-20		SANDY CLAY TO CLAYEY SAND (CL-SC), pale olive, rapid dilatancy			14				45					
40	-25		LEAN CLAY WITH SAND (CL), pale olive, stiff, moist, medium plasticity			9	42	17	25	84	23				
45	-30					24								3.25*	PP
			Boring terminated at a depth of 46.5 feet below the ground surface on 7/9/2019. Groundwater not encountered due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B6

ENGEO Expect Excellence

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			6" Asphaltic Concrete												
			12" AGGREGATE BASE (AB)												
	10		FAT CLAY (CH), dark greenish gray, stiff, slightly moist, medium plasticity												
5			Dark olive mottled with greenish gray, hard, high plasticity			27	73	20	53	97	27.5	93.5		>4.5*	PP
	5		Very stiff			14								3.75*	PP
10			LEAN CLAY (CL), light grayish green, stiff, moist, low plasticity, slow dilatancy, trace fine-grained sand			12	44	17	27	82	32.7	92.3		2.0*	PP
	0														
15			SANDY LEAN CLAY (CL), greenish brown, very stiff, wet, high plasticity, fine-grained sand			7	41	21	20	58	21.9	109	2141.9		UU
	-5		Trace gravel												
20			No recovery			7									
	-10														
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

ENGEO
Expect Excellence

LOG OF BORING 1-B6

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY LEAN CLAY (CL), greenish brown, very stiff, wet, high plasticity, fine-grained sand Hard, moist			29								>4.5*	PP
	-15														
30			LEAN CLAY WITH SAND (CL), greenish gray, stiff, wet, trace fine gravel			18	36	23	13		27.1	100	1003.4		UU
	-20														
			POORLY GRADED SAND (SP), dark gray, medium dense												
35			CLAYEY SAND WITH GRAVEL (SC), pale yellow mottled with reddish yellow, loose to medium dense, wet, low plasticity			13	30	15	15	20	23	110.7	1200*		TV
	-25														
40			POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), gray, medium dense to dense			45				6					
	-30														
45			SANDY LEAN CLAY (CL), pale olive mottled with reddish yellow, medium stiff, wet, medium plasticity			7	38	13	25	60					
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

ENGEO
Expect Excellence

LOG OF BORING 1-B6

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			POORLY GRADED GRAVEL WITH CLAY (GP-GC), gray, medium dense to dense, fine to coarse gravel, trace fine-grained sand, trace to little fines			25	33	16	17		19.7	112		4.5*	PP
			LEAN CLAY (CL), pale olive, hard, moist, low plasticity, trace fine-grained sand												
	-40														
55															
	-45														
60			POORLY GRADED GRAVEL (GP), gray, loose to medium dense, subrounded			21									
			SILT (ML), light yellowish brown, stiff, moist, low plasticity, fine-grained sand												
	-50														
65															
	-55														
70			SILTY SAND (SM), olive brown, medium dense, wet			19				37	24.9	102.8			
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B6

ENGEO Expect Excellence

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY SAND (SM), olive brown, medium dense, wet												
	-65														
80			SANDY GRAVEL TO GRAVELLY SAND (GP), gray to black, dense, wet, subrounded coarse gravel, angular medium-grained sand			60									
			Boring terminated at a depth of 81.5 feet below ground surface on July 8, 2019. Groundwater not observed due to method of drilling.												

ENGEO
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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
0	15		1" Asphalt 1.5 feet Aggregate Base												
			LEAN CLAY (CL), very dark brownish gray, moist, medium plasticity, trace fine- to medium-grained sand, trace organics												
5	10		SANDY SILT (ML), light greenish gray, stiff, moist, low plasticity, 35% to 45% fine-grained sand			13	33	19	14	67				3.5*	PP
						200 psi				57	24.4	103.6			
10	5		POORLY GRADED GRAVEL (GP), dark olive brown												
						28				8					
15	0		CLAYEY SAND WITH GRAVEL (SC), dark olive brown, medium dense to dense, 15% gravel			30				13	13.1				
20	-5		SANDY CLAY (CL), bluish gray, stiff, moist, medium plasticity, 30% to 35% coarse-grained sand, trace gravel			14	44	17	27	69	23.6	103.3	1341		UU
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), bluish gray, stiff, moist, medium plasticity, trace fine-grained sand, no gravel			12					26.3	99.9		2.0*	PP
	-10														
30			35% to 40% fine- to coarse-grained sand			25									
	-15		CLAYEY SAND (SC), bluish gray, medium dense, moist, 25% to 30% fines												
			WELL GRADED SAND WITH CLAY AND GRAVEL (SW), dark yellowish brown, medium dense, wet, 5% to 10% fines, 5% to 10% gravel												
35						25				9					
	-20														
			LEAN CLAY WITH SAND (CL), yellowish brown to olive brown, hard, moist, high plasticity, 10% to 15% fine- to coarse-grained sand, with iron staining												
40						54	40	18	22		20.96	108.2	3620		UU
	-25														
45			SANDY CLAY (CL), yellowish brown, medium stiff to stiff, moist, medium plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel			13	38	18	20	60	25	102.2		1*	PP
	-30														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), yellowish brown, medium stiff to stiff, moist, low plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel			3									
55	-35		SANDY SILT TO SILTY SAND (SM-ML), yellowish brown, medium stiff to stiff, moist, low plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel												
60	-40		Medium stiff			11	38	26	12	55	22.1	103.1		.75*	PP
65	-45														
70	-50		FAT CLAY (CH), dark greenish gray, stiff, moist, high plasticity, moderate cementation, trace fine-grained sand			16	55	22	33					3.0*	PP
75	-55														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
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SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), dark greenish gray, stiff, moist, high plasticity, moderate cementation, trace fine-grained sand												
	-60		SANDY SILT TO SILTY SAND (SM-MH), olive brown mottled with greenish gray, medium stiff to stiff, wet, 45% to 50% fine-grained sand and trace coarse gravel												
80			FAT CLAY (CH), dark yellowish brown mottled with dark greenish gray, stiff, high plasticity			17	NP	NP	NP	53				3.5*	PP
			Boring Terminated at a depth of 81.5 feet below ground surface on June 8, 2019. Groundwater not encountered due to drilling method												

ENGEO
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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			8" Aggregate Base												
			LEAN CLAY (CL), bluish black, moist, high toughness, few fine- to medium-grained sand, trace angular fine gravel												
5	5		Gray, very stiff, medium toughness, trace fine-grained sand and angular fine gravel			13	41	17	24	61	17.5	110.8	600*	3.5*	PP+TV
			POORLY GRADED SAND WITH GRAVEL (SP), gray, dense, wet, subrounded to subangular fine gravel, trace clay		▽										
10	0					43				9					
			WELL GRADED GRAVEL WITH SAND (GW), brown, dense, wet, fine- to coarse-grained sand, subrounded to angular gravel, trace clay												
15	-5					39									
			Dames and Moore piston sampler unable to advance at 400 psi			32								>4.5*	PP
			LEAN CLAY WITH SAND (CL), greenish blue, hard, wet, medium plasticity, high toughness, fine-grained sand												
20	-10					11	37	18	19	74					
			Light brown with gray, stiff, medium toughness, some silt												
25	-15														

LOG - GEOTECHNICAL_SU+QU W/ ELEV_MULTIPLE PARCEL GEX_CHARLESTON S.GPJ_ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), greenish blue, hard, wet, medium plasticity, high toughness, fine-grained sand			16							1000*	2.5*	PP+TV
			Stiff to very stiff, trace fine- to medium-grained sand												
30	-20		SANDY CLAY TO CLAYEY SAND (CL-SC), light brown with gray, stiff, wet			12	37	16	21	52	26.4	99.9	600*	1.25*	PP+TV
35	-25					9					25.53	102.3	348		UU
40	-30					350 psi				6	18.4				
			POORLY GRADED SAND (SP), dark brown, wet												
			SANDY LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, trace fine subangular gravel												
45	-35					22							1000*	1.25*	PP+TV
			POORLY GRADED SAND (SP), light yellowish brown, medium dense, few fine subrounded gravel, trace silt												
50	-40														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			POORLY GRADED SAND (SP), light yellowish brown, medium dense, few fine subrounded gravel, trace silt			28									
			LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, some silt												
55	-45					11	39	17	22	88					
			sand in cuttings												
60	-50		olive brown, trace fine-grained sand			14									
65	-55														
70	-60		very stiff to hard			35					23.5	102.3	6841		CU
			POORLY GRADED SAND (SP), olive brown, medium dense, wet, medium plasticity, medium toughness, trace fine-grained sand												
75	-65														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, medium toughness, trace fine-grained sand			30								3.75*	PP
80	-70					21							1100*	1.75*	PP+TV
85	-75					25					25.7	100.6	1200*	1.5*	PP+TV
90	-80		more silt			32							800*	1.75*	PP+TV
			SILTY CLAYEY SAND TO SANDY SILT AND CLAY (SC-SM) TO (CL-ML) olive brown, very dense, wet												
95	-85					56	22	17	5	45					
			SANDY LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, high toughness, fine- to medium-grained sand												
100	-90														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, high toughness, fine- to medium-grained sand			24									
			Boring Terminated at a depth of 101.5 feet below ground surface on May 14, 2019. Groundwater encountered at a depth of 7.5 feet below ground surface.												

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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			6" Aggregate Base												
	10		FAT CLAY WITH SAND (CH), dark brownish gray, moist, fine- to medium-grained sand, trace gravel and organics												
5			SANDY CLAY (CH), dark greenish gray with pale olive, stiff, moist, 10% to 15% fine- to medium-grained sand		▽	12	68	27	41	80			1600*	1.75*	PP+TV
	5		LEAN CLAY WITH SAND (CL), olive gray, medium stiff, fine- to medium-grained sand			9					23.5	104.8	566		UU
10			CLAYEY SAND TO SANDY CLAY (CL-SC), dark olive gray, medium dense, 10% to 15% fine gravel with iron staining			18	32	16	16	30	14.9	120.5			
	0					15					16.2				
			SANDY SILT TO SILTY SAND (SM-ML), dark brownish gray, 30% to 35% fine-grained sand												
15			Dark olive gray to dark brownish gray			75 psi	22	22	NP	52					
	-5														
			FAT CLAY WITH SAND TO SANDY CLAY (SC-CH), reddish yellow, stiff, moist, 25% to 30% fine- to coarse-grained sand, 15% to 20% fine to coarse gravel												
20						17				55				3.25*	PP
	-10		FAT CLAY WITH SAND (CH), dark bluish gray, very stiff, moist, 20% to 25% fine- to coarse-grained sand												
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), dark gray, stiff, moist, trace sand			10									
	-15														
30			Medium stiff			4					26.4	99.9	1221		CU
	-20														
35			SANDY LEAN CLAY (CL), dark bluish gray, medium stiff, moist dark bluish gray reddish yellow, medium stiff			6	35	19	16	56			2200*	4.25*	PP+TV
	-25														
			CLAYEY SAND WITH GRAVEL (SC), reddish yellow, dense, wet												
40						39					10				
	-30														
45			medium dense			16				25					
	-35														
			FAT CLAY (CH), olive brown, medium stiff, moist, 5% to 10% fine- to medium-grained sand												
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), yellowish brown, medium dense, moist, 40% to 45% clay			13							900*	1.5*	PP+TV
55	-40		Loose to medium dense, fine- to coarse-grained sand, trace fine gravel			11	28	16	12	34	19				
60	-45		FAT CLAY WITH SAND (CH), yellowish brown, medium stiff, moist, 20% to 25% fine- to coarse-grained sand			16							968		UU
65	-50														
70	-55		Olive gray, hard, 15% to 20% sand			65					19.4	108.7	3500*	4.2*	PP+TV
75	-60														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
80	-65		FAT CLAY WITH SAND (CH), yellowish brown, medium stiff, moist, 20% to 25% fine- to coarse-grained sand												
						72					21.3	106.2	3000*	>4.5*	PP+TV
85	-70														
90	-75														
						57					20.7	107.9		>4.5*	PP
95	-80														
100	-85		WELL GRADED SAND (SW), grayish brown to yellowish brown, dense, wet, 5% to 10% fines, trace fine gravel												

LOG - GEOTECHNICAL_SU+QU W/ ELEV_MULTIPLE PARCEL GEX_CHARLESTON S.GPJ_ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			WELL GRADED SAND (SW), grayish brown to yellowish brown, dense, wet, 5% to 10% fines, trace fine gravel			50/4.5"									
	-90		Very dense			79									
			Boring Terminated at a depth of 103 feet below ground surface on May 16, 2019. Groundwater encountered at a depth of 5.5 feet below ground surface.												

ENGEO
Expect Excellence

LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2.5" Asphalt 15.5" Aggregate Base												
			LEAN CLAY (CL), dark gray to dark greenish gray, moist, 10% to 15% fine- to coarse-grained sand												
5	10		olive gray to gray, hard			26	32	23	9		30.3	89.6		4*	PP
10	5		FAT CLAY WITH SAND (CH), olive, stiff, wet, 20% to 25% fine- to medium-grained sand			16					24.1		1000*	1.5*	PP+TV
15	0		SANDY FAT CLAY (CH), olive gray to gray, stiff, moist, fine-grained sand			7	66	23	43	79					
20	-5		FAT CLAY (CH), greenish gray, medium stiff to stiff, 10% to 15% fine- to medium- grained sand, trace gravel			8					16	122.5	1000*	1.5*	PP+TV
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), very dark grayish brown to olive, stiff, moist, fine- to coarse-grained sand, trace gravel			14	37	19	18	63				2.5*	PP
	-15		FAT CLAY WITH SAND (CH), yellowish brown, stiff, moist, 15% to 20% fine- to coarse-grained sand												
30						11					22.9	105.2		.9235	UC
	-20														
35			dark yellowish brown with manganese staining			12							1200*	1*	PP+TV
			CLAYEY SAND (SC), dark yellowish brown, medium dense, wet, 25% to 30% clay												
	-25														
40						15	32	16	16	34	19.4				
	-30		FAT CLAY (CH), pale olive, stiff to very stiff, moist, 5% to 10% fine- to coare-grained sand, trace fine gravel												
45						20					28.3	96.3		1.44	UC
	-35		WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown, dense, moist, 5% to 10% fines												
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown, dense, moist, 5% to 10% fines			34				14					
			Boring Terminated at a depth of 51.5 feet below ground surface on May 17, 2019. Groundwater encountered at a depth of 7.5 feet below ground surface.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19



APPENDIX B

CONE PENETRATION TEST LOGS

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

CONETEC

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Explorations
Start Date:	07-May-2019
End Date:	Ongoing

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Location	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting (m)	Refer to Notation Number
1-CPT-01	19-56067_1CP1	Joaquin	7-May-2019	448:T1500F15U500	11.1	50.52	4141718	581484	
1-CPT-06	19-56067_1CP6	Joaquin	7-May-2019	448:T1500F15U500	8.2	120.57	4141642	581391	
1-SCPT-02	19-56067_1SP2	Joaquin	7-May-2019	448:T1500F15U500	8.9	100.56	4141669	581498	
1-CPT-15	19-56067_1CP15	Charleson South	8-May-2019	448:T1500F15U500	6.2	80.54	4141706	581239	
1-CPT-03	19-56067_1CP3	Joaquin	8-May-2019	448:T1500F15U500	9.0	120.57	4141559	581533	
1-SCPT-04	19-56067_1SCP4	Charleson South	8-May-2019	448:T1500F15U500	8.1	100.56	4141829	581289	
1-CPT-16	19-56067_1CP16	Charleson South	9-May-2019	448:T1500F15U500	8.1	80.54	4141607	581331	
1-CPT-17	19-56067_1CP17	Charleson South	10-May-2019	483:T1500F15U500	4.8	100.56	4141531	581178	
1-CPT-18	19-56067_1CP18	Charleson South	11-May-2019	483:T1500F15U500	3.1	100.56	4141640	581199	
1-CPT-09	19-56067_1CP09	Plymouth	13-May-2019	483:T1500F15U500	6.8	100.56	4141336	581070	
1-SCPT-10	19-56067_1SP10	Plymouth	13-May-2019	483:T1500F15U500	4.8	80.54	4141481	581034	
1-CPT-11	19-56067_1CP11	Plymouth	14-May-2019	483:T1500F15U500	6.2	100.56	4141486	580955	
1-CPT-12	19-56067_1CP12	Plymouth	14-May-2019	483:T1500F15U500	6.3	80.54	4141408	580971	
1-CPT-13B	19-56067_1CP13B	Charleson South	14-May-2019	483:T1500F15U500	8.5	100.56	4141903	581272	
1-CPT-14B	19-56067_1CP14B	Charleson South	14-May-2019	483:T1500F15U500	7.0	120.57	4141826	581178	
2-CPT-14	19-56067_2CP14	Commons	09-Jul-2019	494:T1500F15U500	8.4	100.56	4142405	579889	
2-SCPT-13	19-56067_2SP13	Commons	09-Jul-2019	494:T1500F15U500	8.4	100.64	4142585	579861	
1-CPT8	19-56067_1CP08	Space Park	08-Jul-2019	494:T1500F15U500	6.0	120.57	4141466	581660	

1. The assumed phreatic surface was based on pore pressure dissipation tests unless otherwise noted. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.
3.The assumed phreatic surface was based on an adjacent CPT.

Job No:	19-56067
Client:	ENGEO Incorporated
Project:	Google Explorations
Start Date:	07-Jul-2019
End Date:	09-Jul-2019

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting[2] (m)	Refer to Notation Number
1-CPT-05	19-56067_1CP05	09-Jul-2019	494:T1500F15U500	7.7	80.54	4141489	581482	
1-CPT-07	19-56067_1CP07	08-Jul-2019	494:T1500F15U500	8.1	80.54	4141420	581440	
1-CPT-08	19-56067_1CP08	08-Jul-2019	494:T1500F15U500	6.0	120.57	4141466	581660	
2-CPT-06	19-56067_2CP06	07-Jul-2019	391:T1500F15U500	13.3	73.49	4142562	582145	
2-CPT-12	19-56067_2CP12	08-Jul-2019	494:T1500F15U500	7.4	120.57	4141958	580418	
2-CPT-14	19-56067_2CP14	09-Jul-2019	494:T1500F15U500	8.4	100.56	4142405	579889	
2-SCPT-13	19-56067_2SP13	09-Jul-2019	494:T1500F15U500	8.4	100.64	4142585	579861	
3-CPT-14	19-56067_3CP14	07-Jul-2019	391:T1500F15U500	23.8	23.87	4143226	579724	

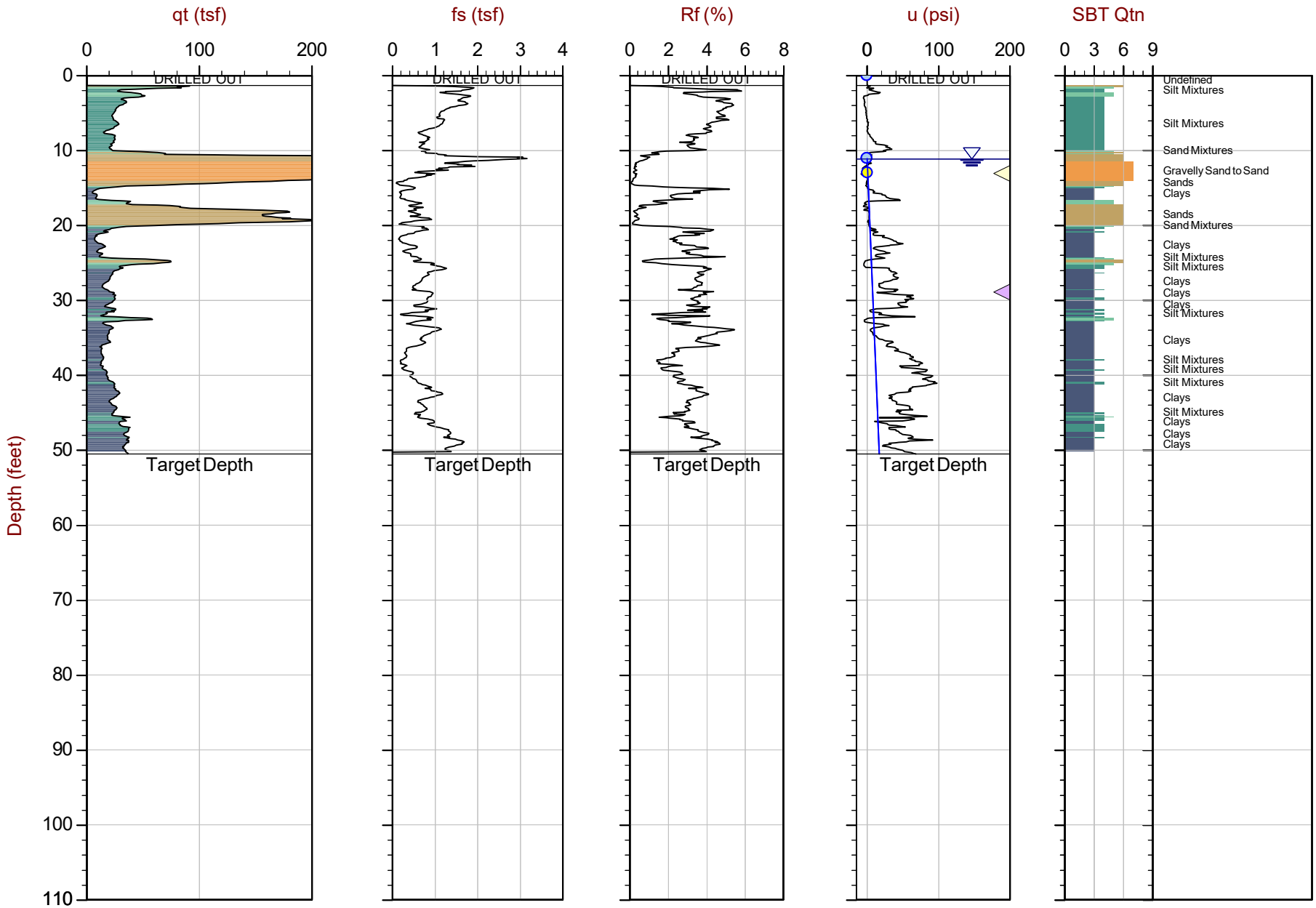
1. The assumed phreatic surface was based on the results of the shallowest pore pressure dissipation test performed within the sounding. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 20:27
Site: Google Joaquin Exploration

Sounding: 1-CPT-01
Cone: 448:T1500F15U500



Max Depth: 15.400 m / 50.52 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP1.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141718m E: 581484m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

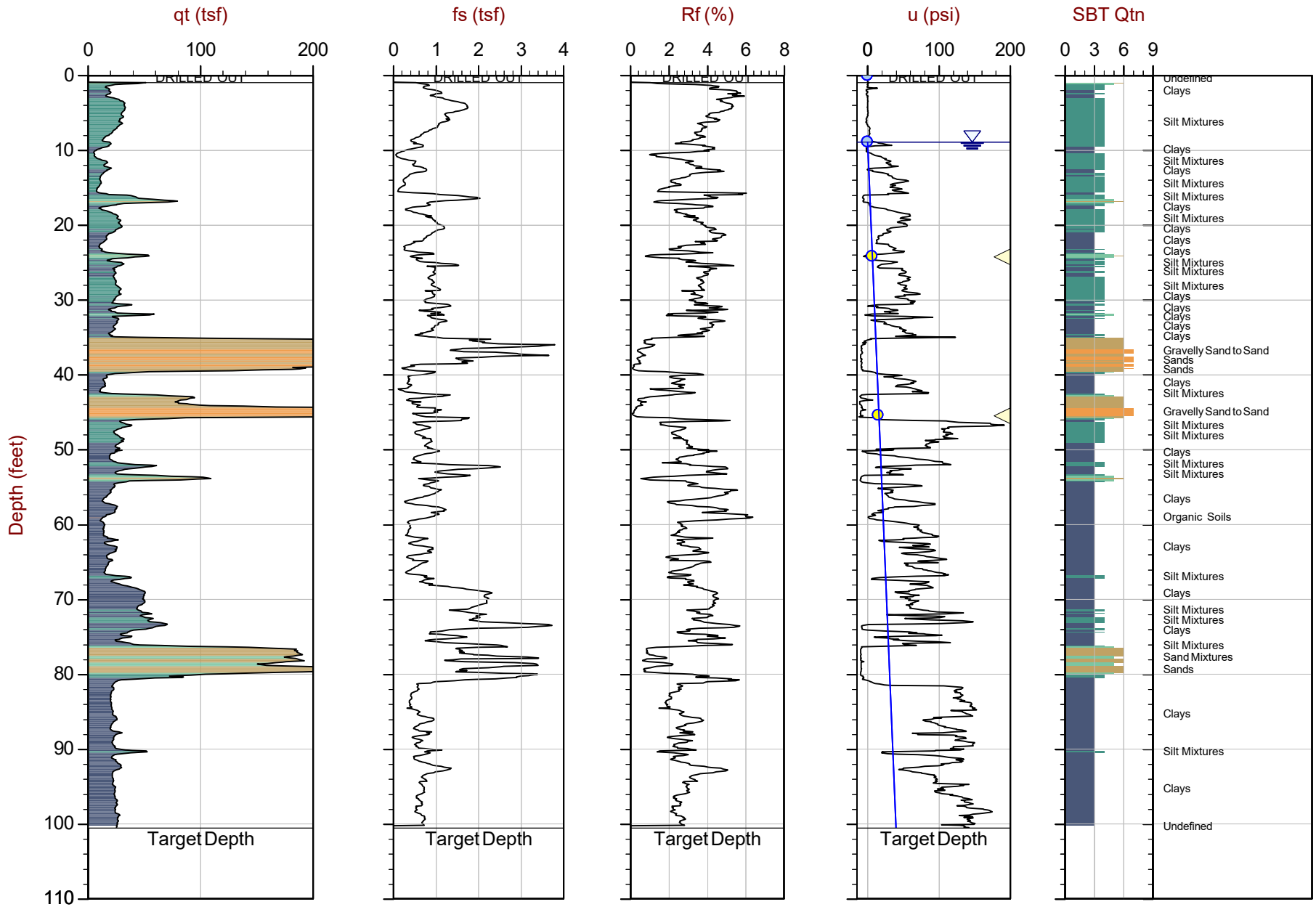
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 21:48
Site: Google Joaquin Exploration

Sounding: 1-SCPT-02
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP2.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141669m E: 581498m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

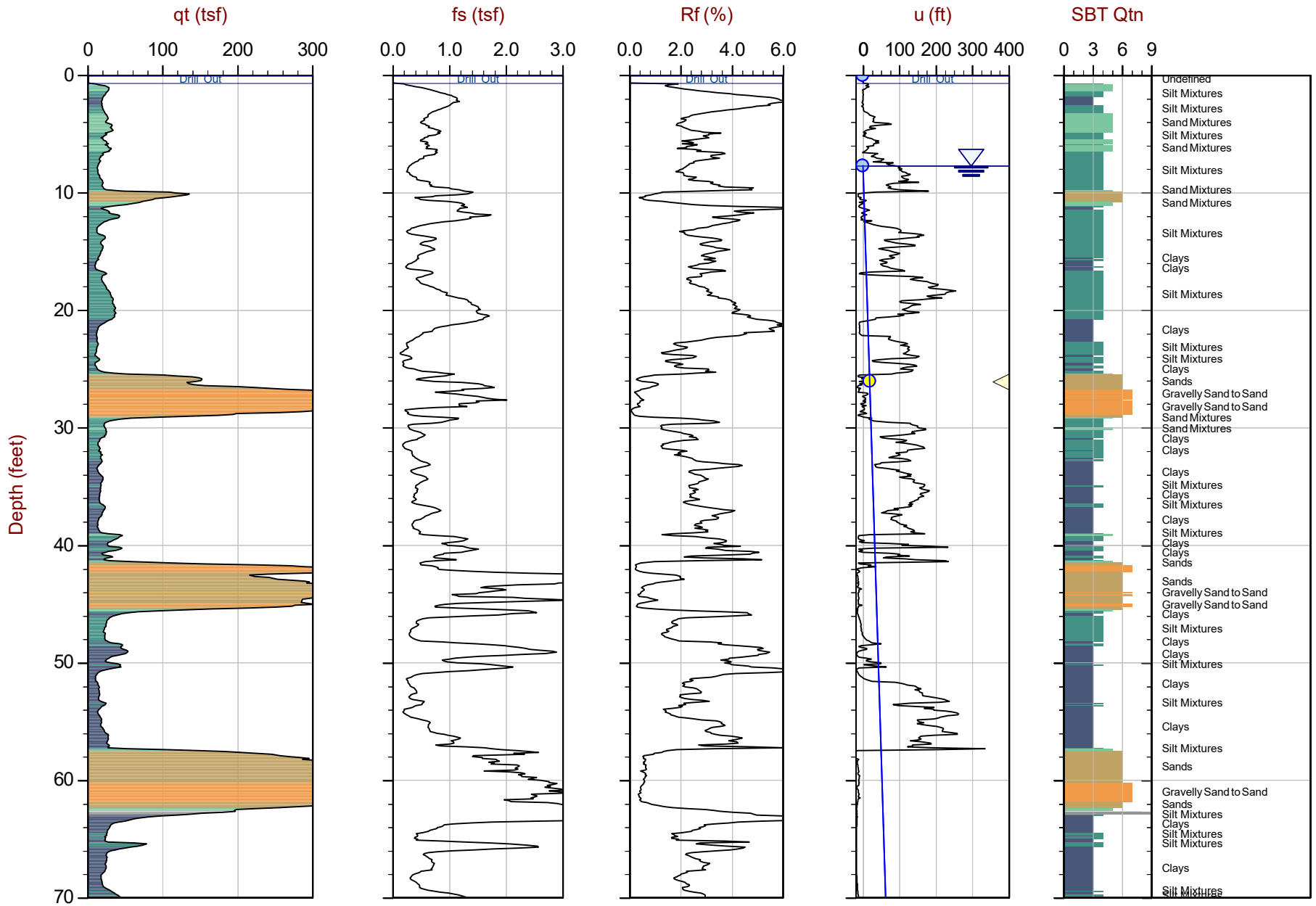
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-09 10:29
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-05
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP05.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141489m E: 581482m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

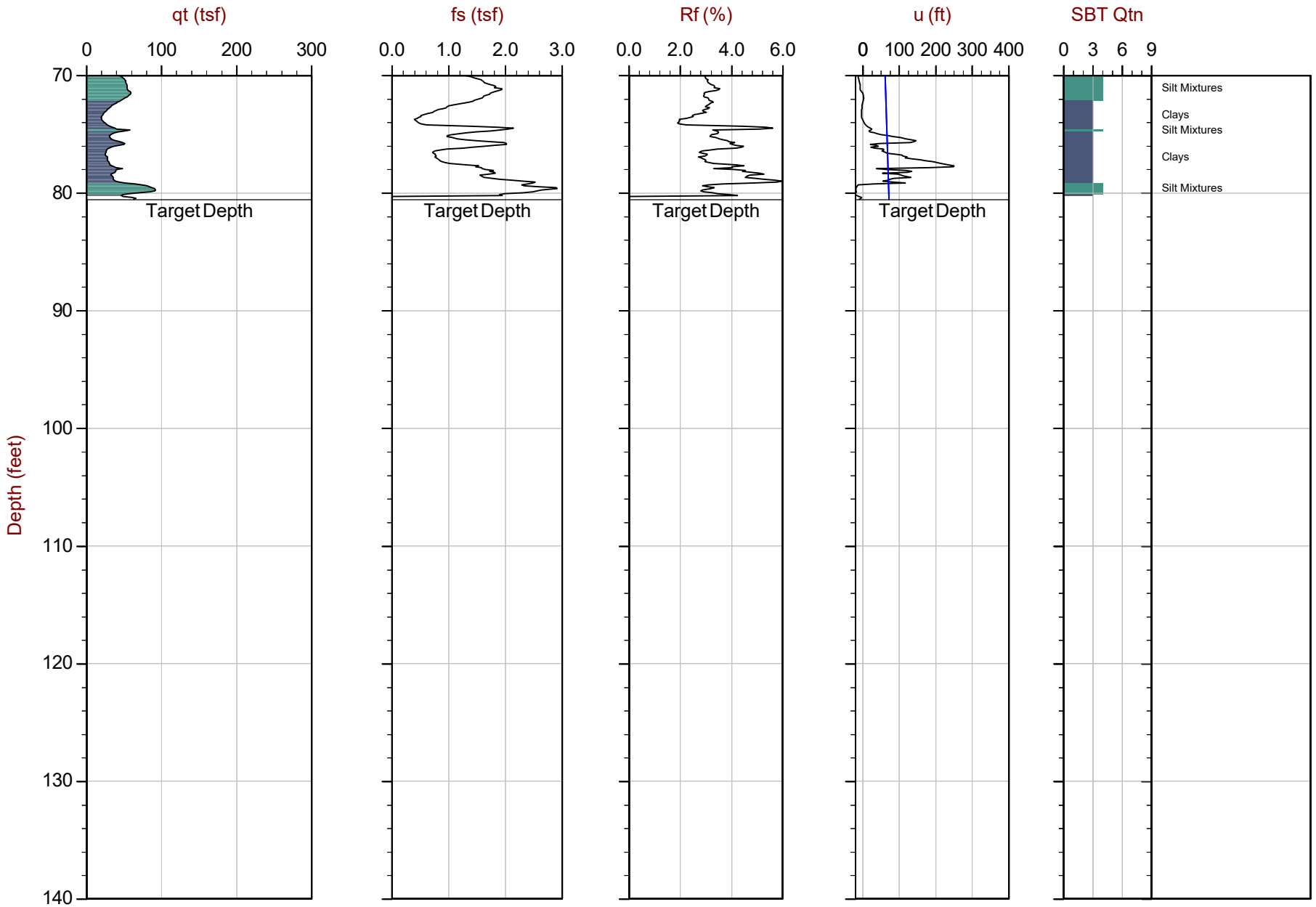
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-09 10:29
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-05
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP05.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141489m E: 581482m
Sheet No: 2 of 2

Overplot Item: Ueq Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

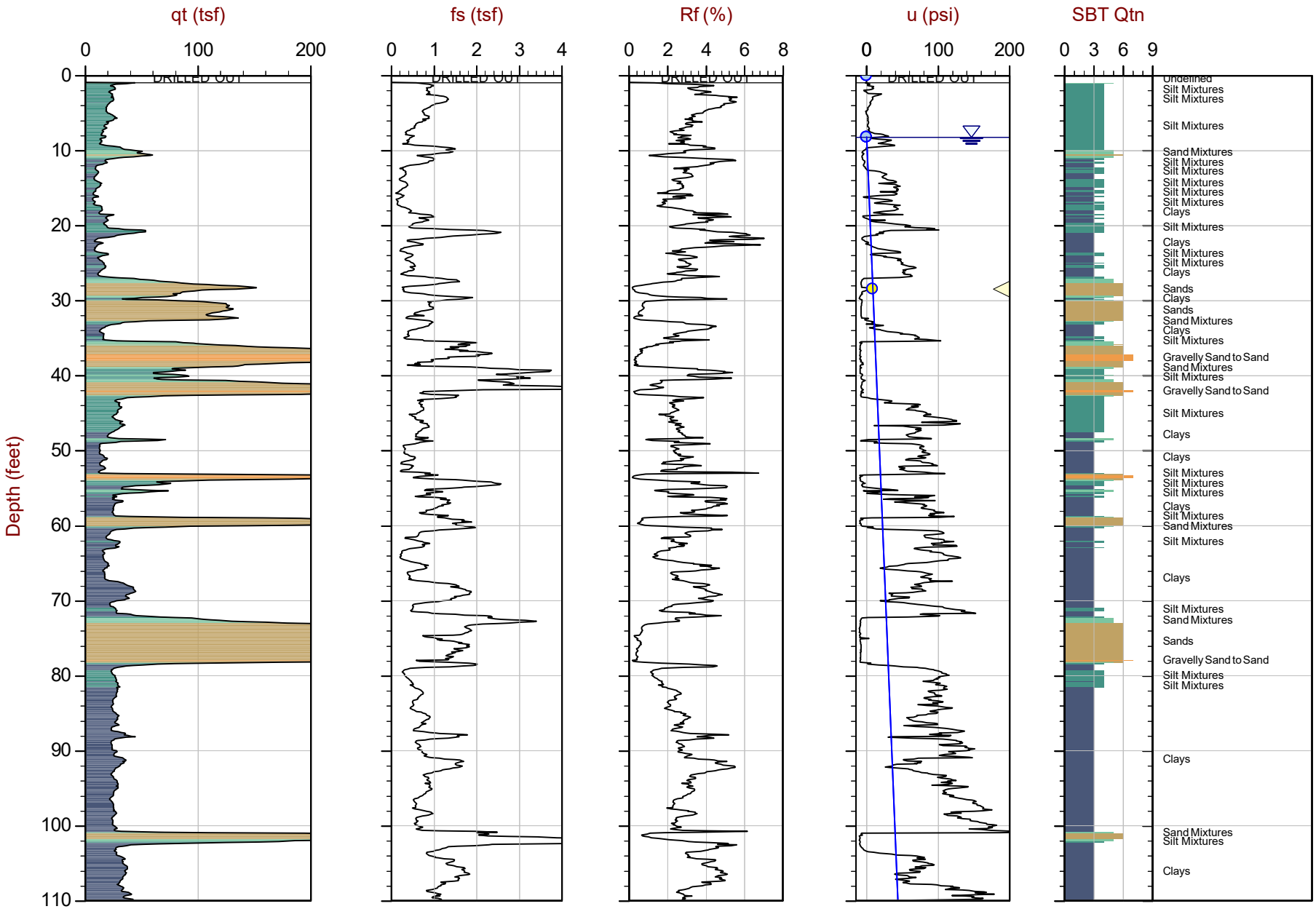
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 23:56
Site: Google Joaquin Exploration

Sounding: 1-CPT-06
Cone: 448:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP6.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141642m E: 581391m
Page No: 1 of 2

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

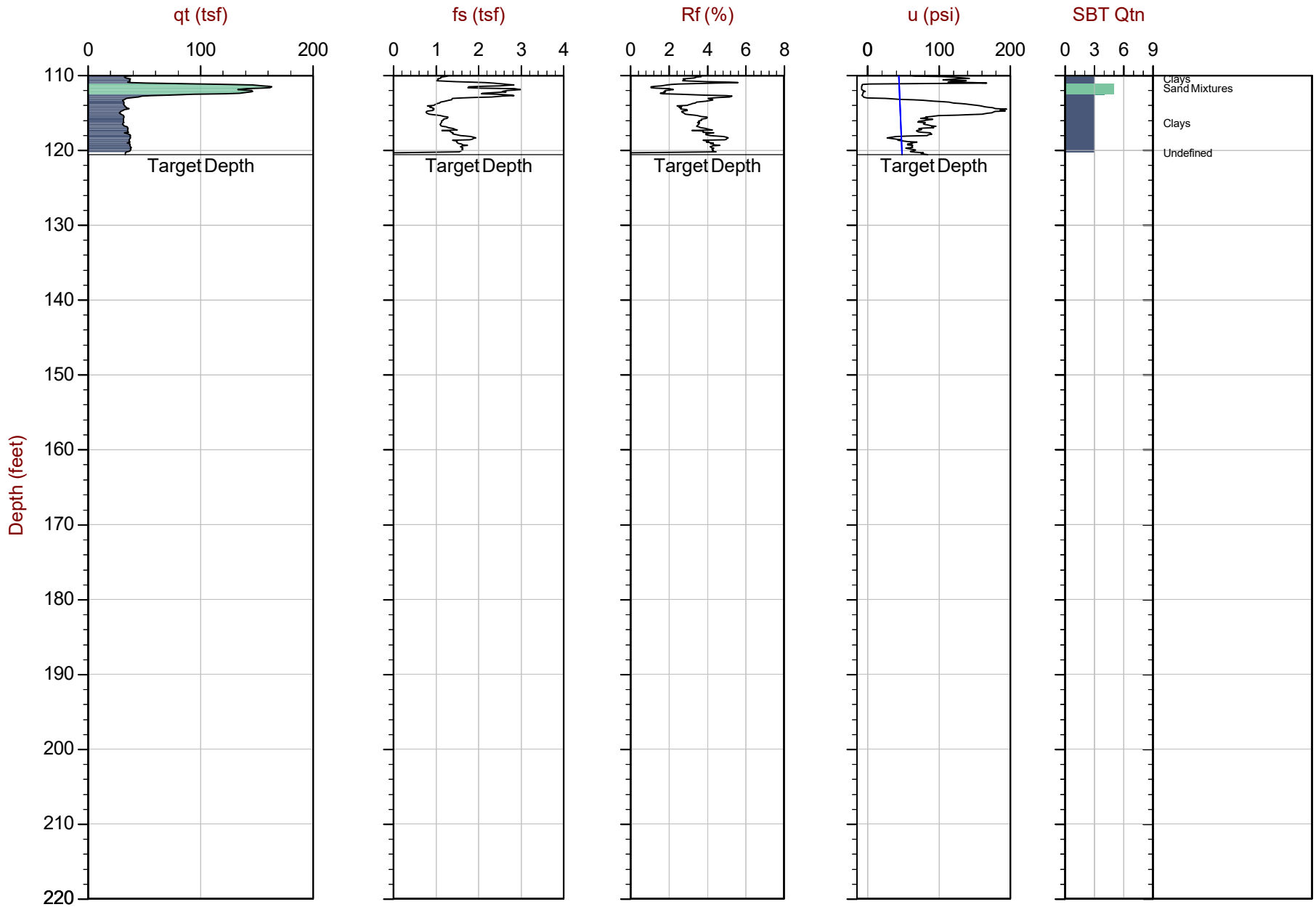
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 23:56
Site: Google Joaquin Exploration

Sounding: 1-CPT-06
Cone: 448:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP6.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141642m E: 581391m
Page No: 2 of 2

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

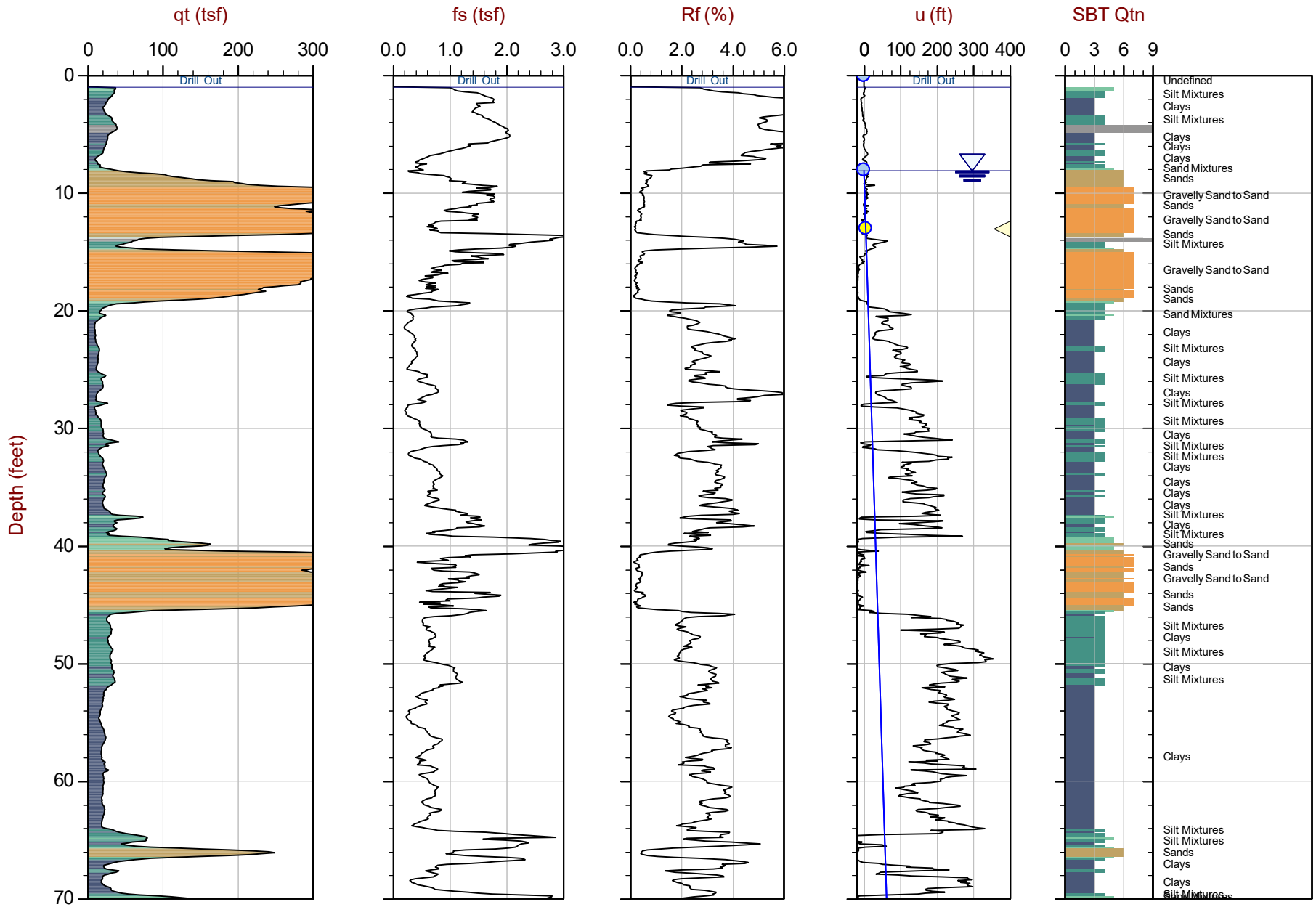
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 08:07
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-07
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP07.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141420m E: 581440m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

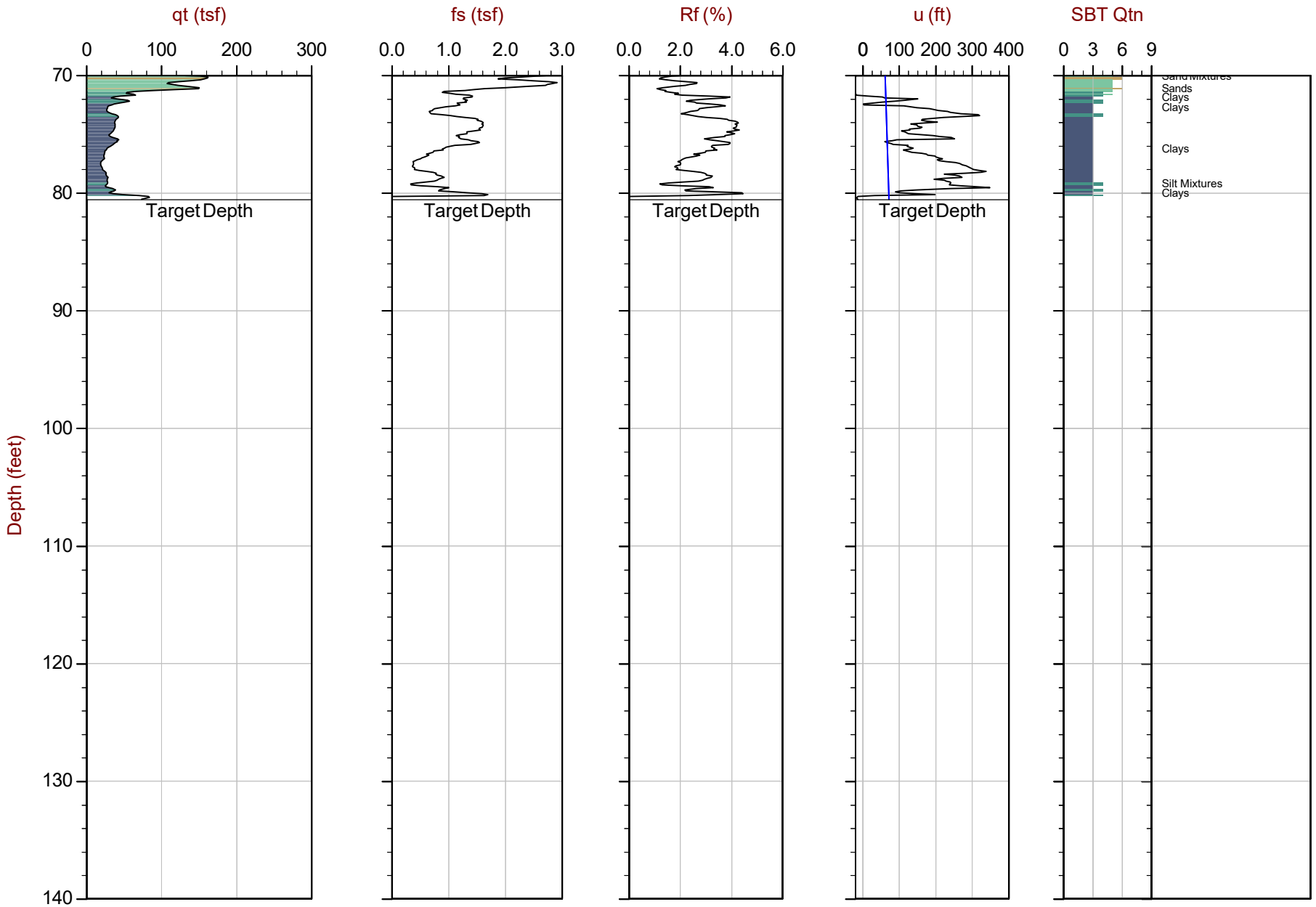
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 08:07
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-07
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP07.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141420m E: 581440m
Sheet No: 2 of 2

Overplot Item: Ueq Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

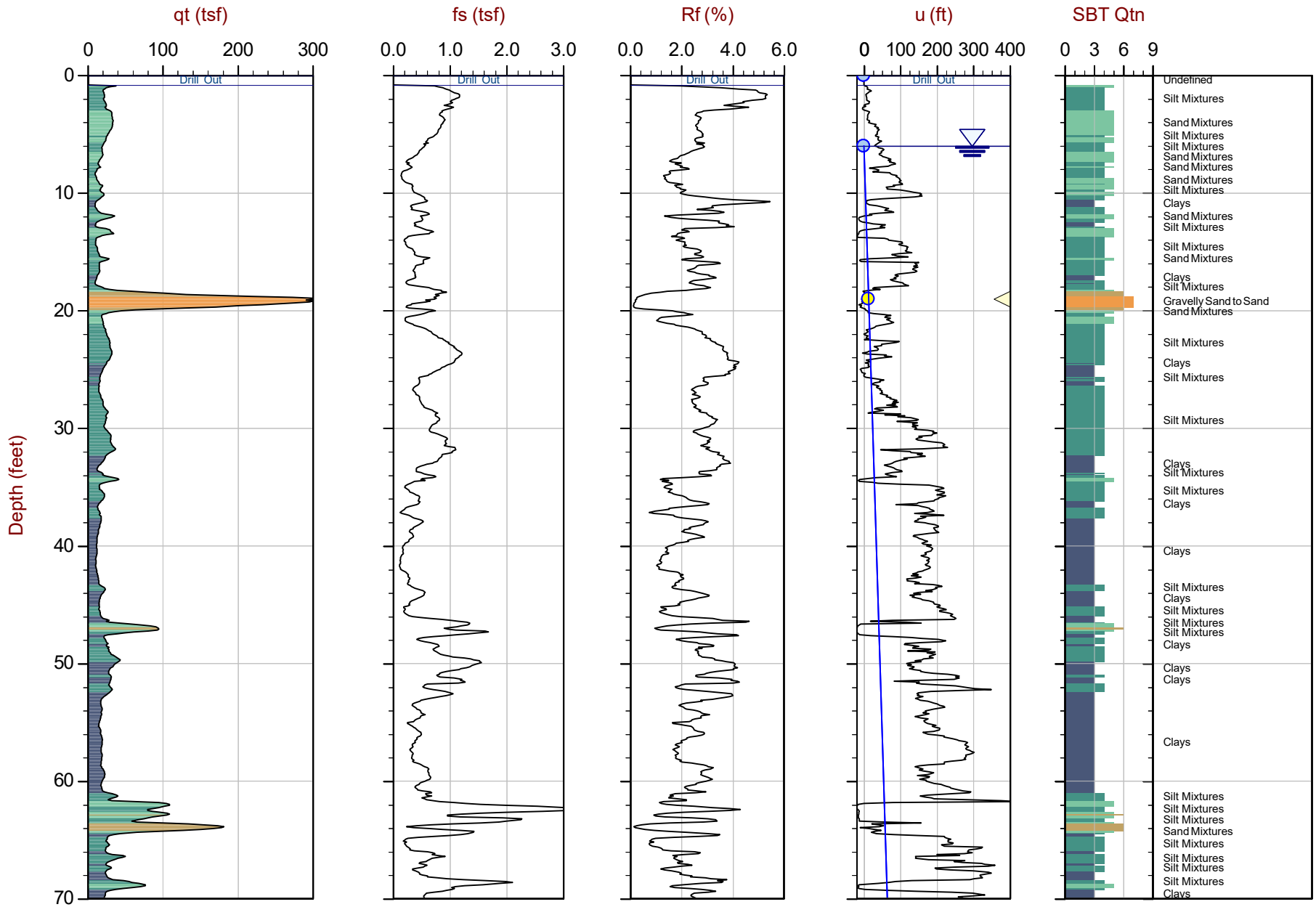
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 09:25
Site: Google Space Campus Exploration

Sounding: 1-CPT-08
Cone: 494:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP08.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141466m E: 581660m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

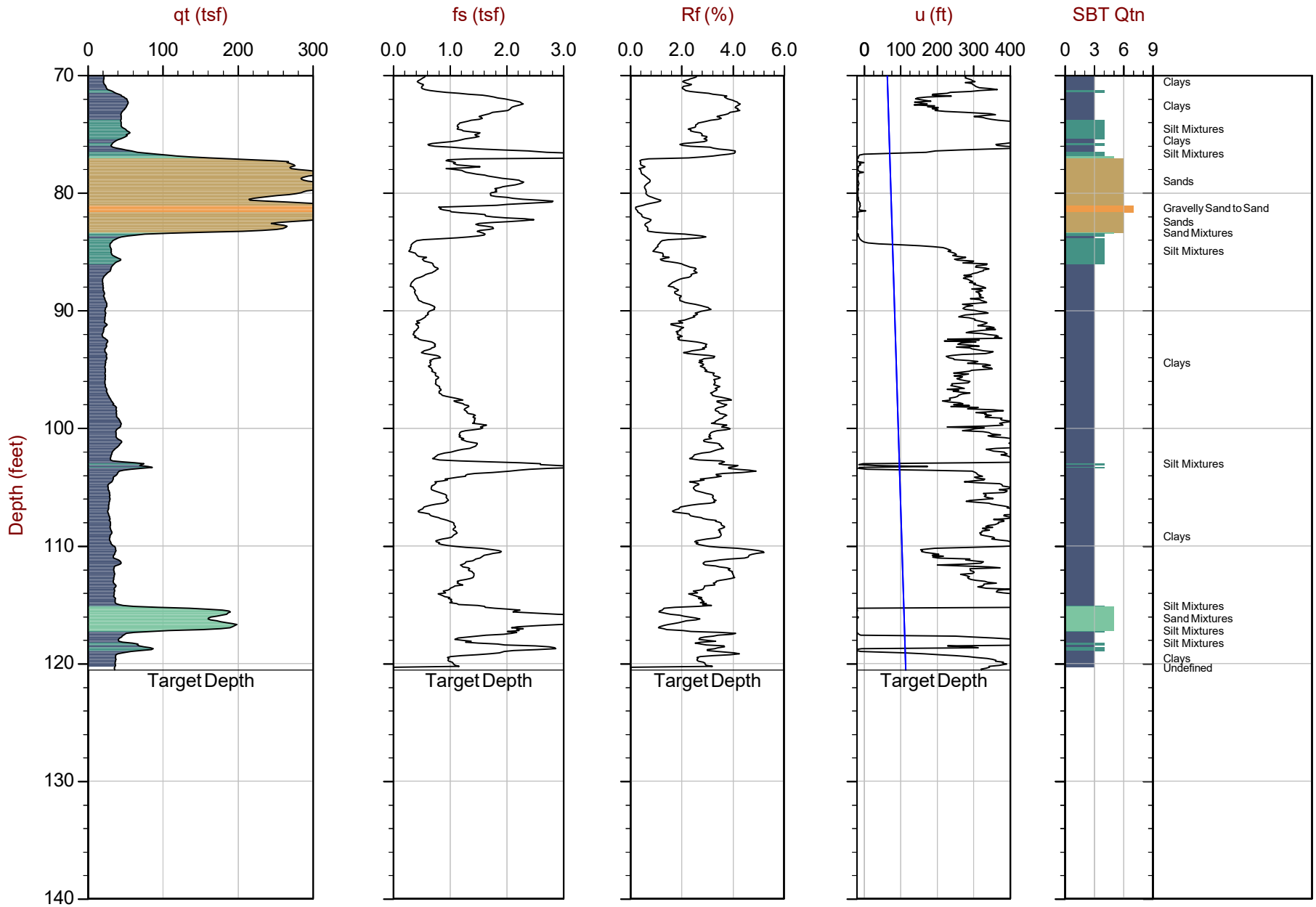
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 09:25
Site: Google Space Campus Exploration

Sounding: 1-CPT-08
Cone: 494:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP08.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141466m E: 581660m
Sheet No: 2 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

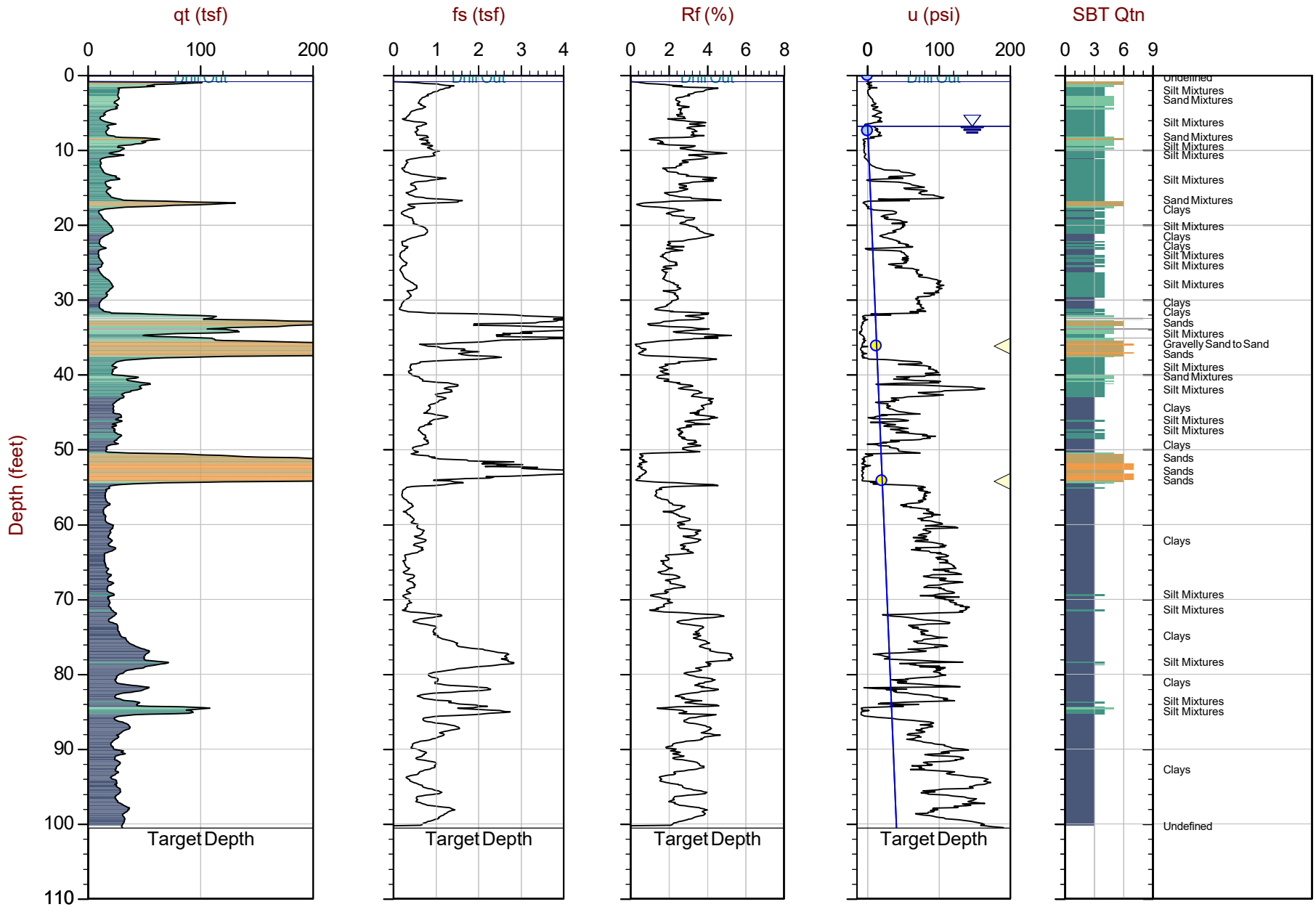
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 10:36
Site: Google Plymouth Exploration

Sounding: 1-CPT-09
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP09.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141336m E: 581070m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

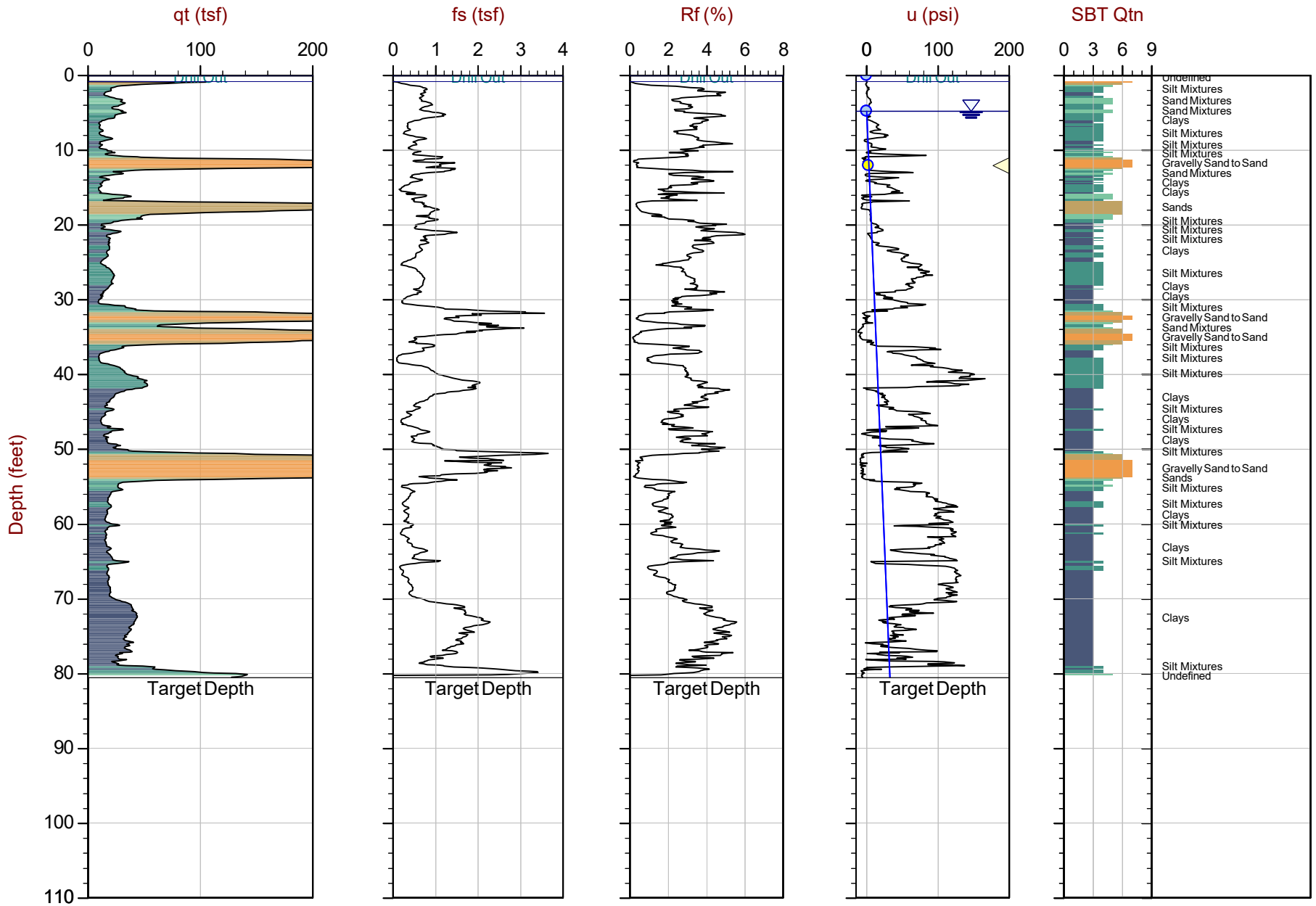
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 08:52
Site: Google Plymouth Exploration

Sounding: 1-SCPT-10
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP10.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141481m E: 581034m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

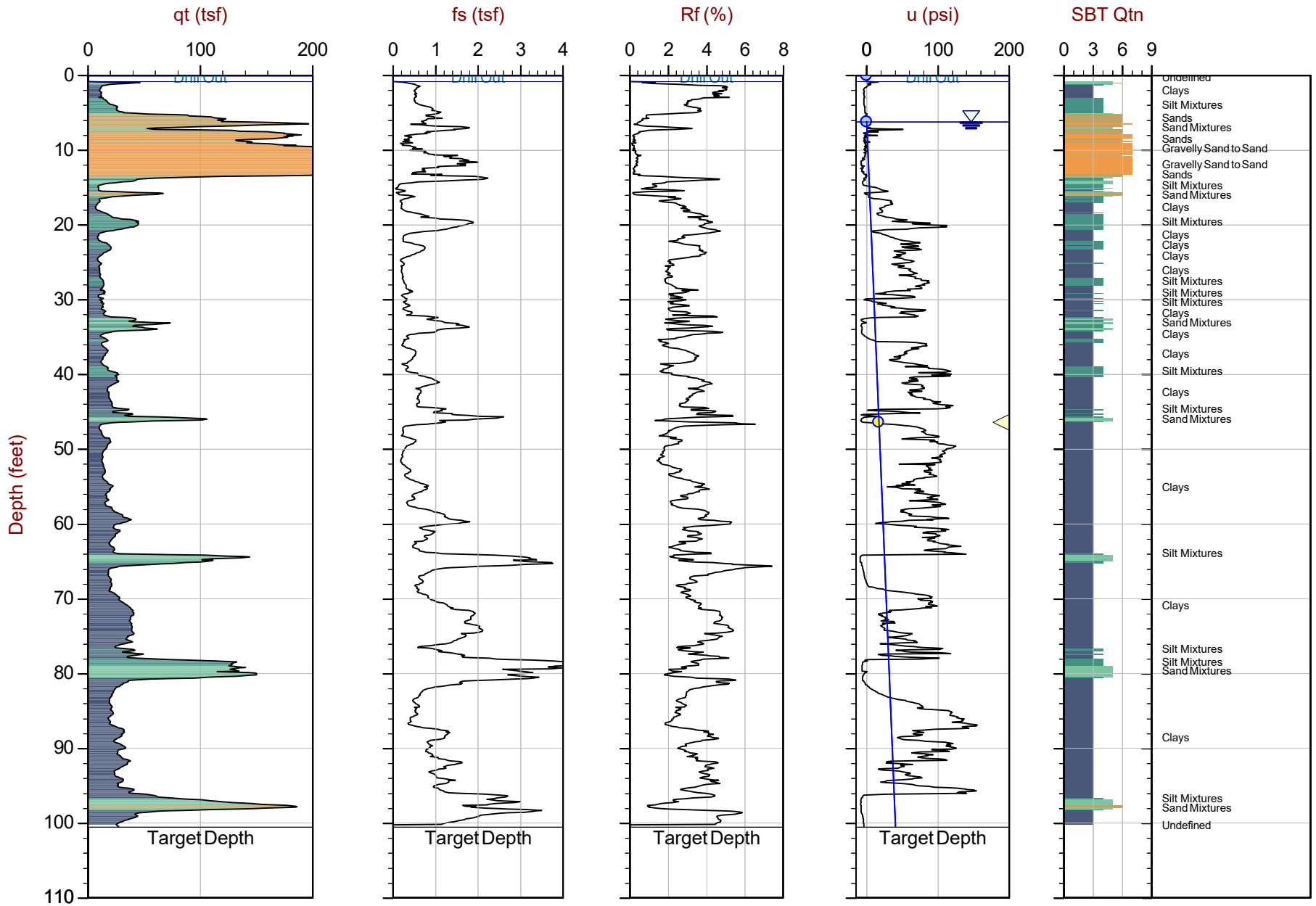
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 10:58
Site: Google Plymouth Exploration

Sounding: 1-CPT-11
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP11.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141486m E: 580955m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

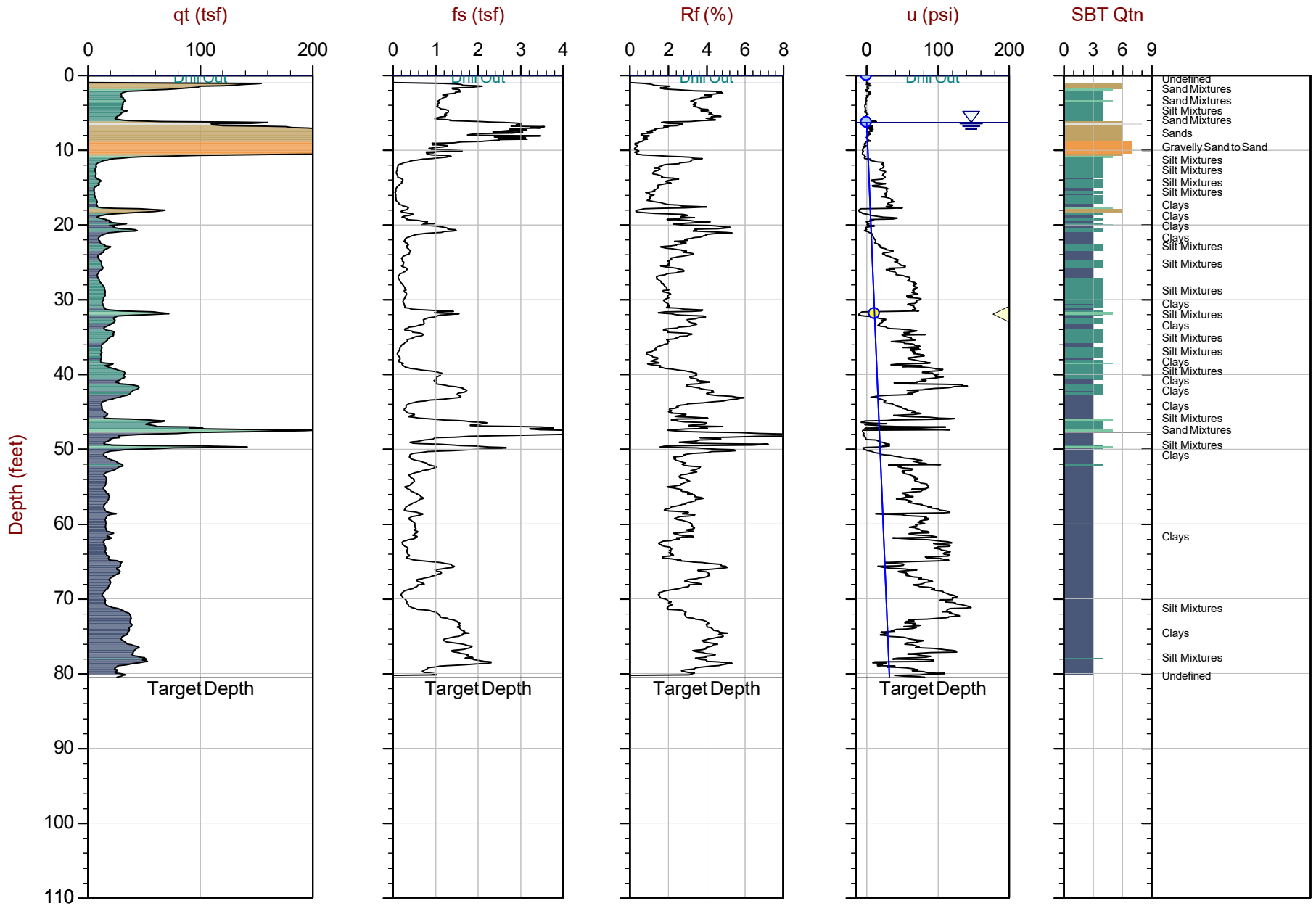
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 12:24
Site: Google Plymouth Exploration

Sounding: 1-CPT-12
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP12.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141408m E: 580971m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

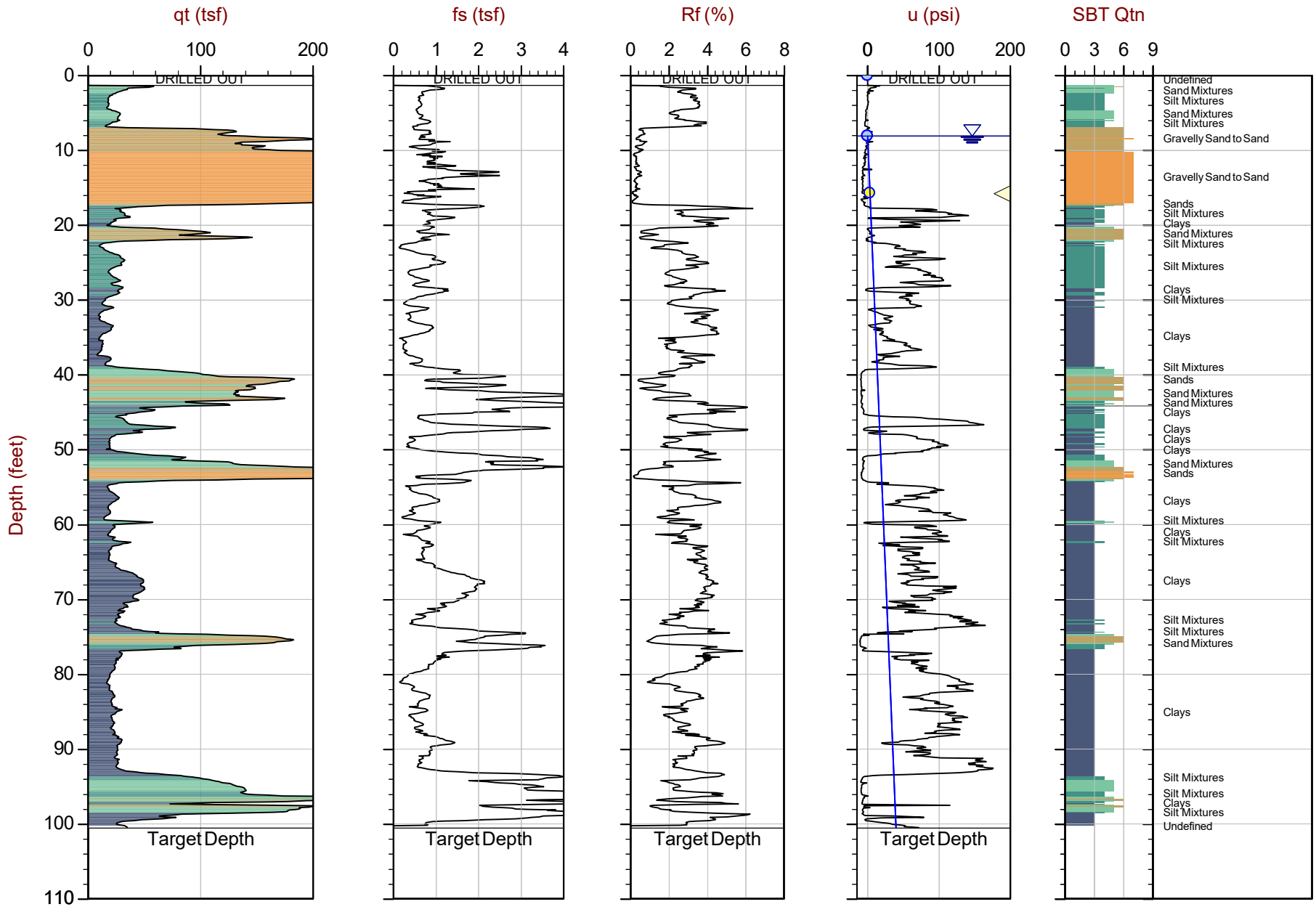
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 21:45
Site: Google Charleston South Exploration

Sounding: 1-SCPT-04
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SCP4.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141829m E: 581289m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

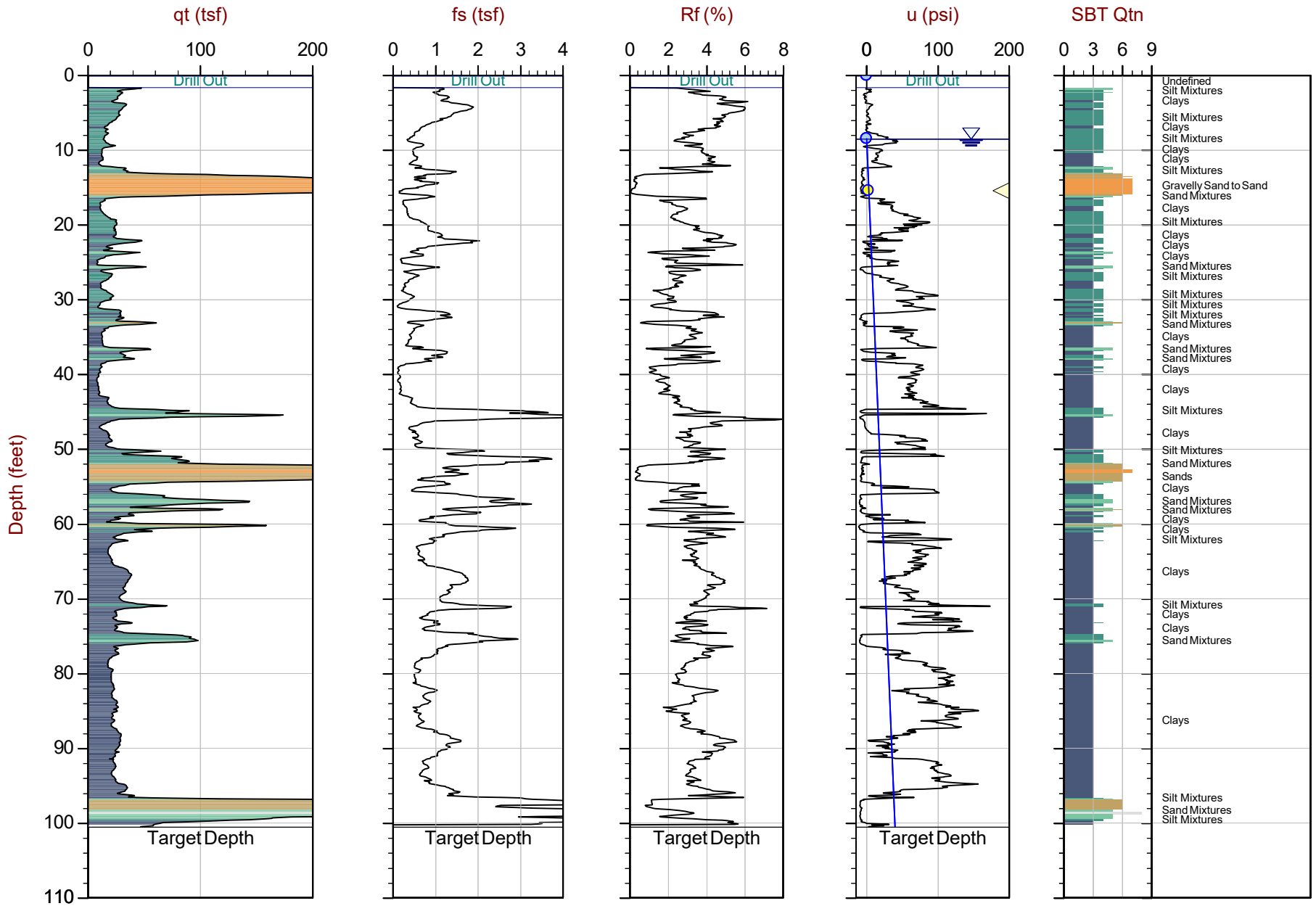
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 08:10
Site: Google Charleston South Exploration

Sounding: 1-CPT-13B
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP13B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141903m E: 581272m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

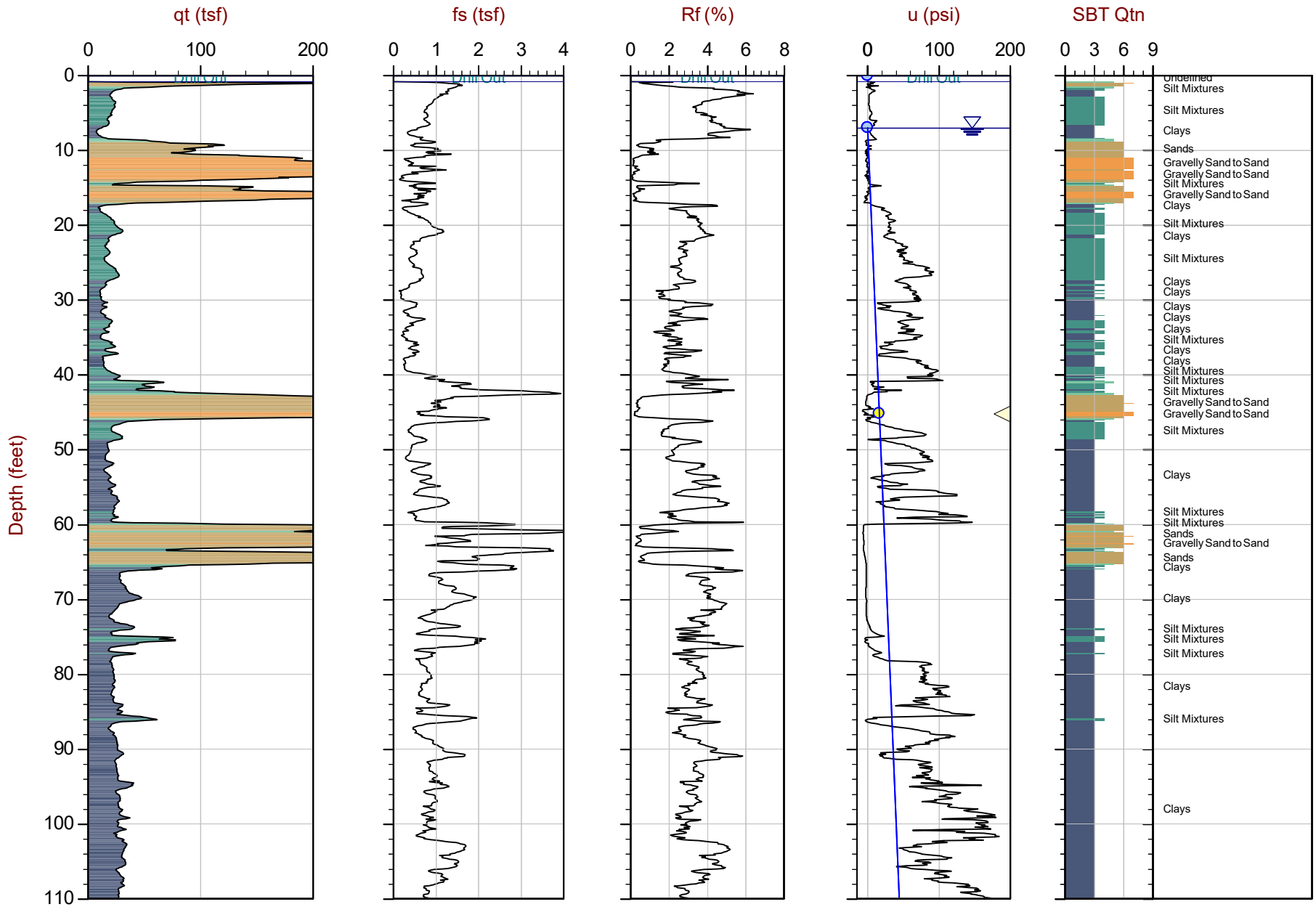
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 09:26
Site: Google Charleston South Exploration

Sounding: 1-CPT-14B
Cone: 483:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP14B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141826m E: 581178m
Page No: 1 of 2

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

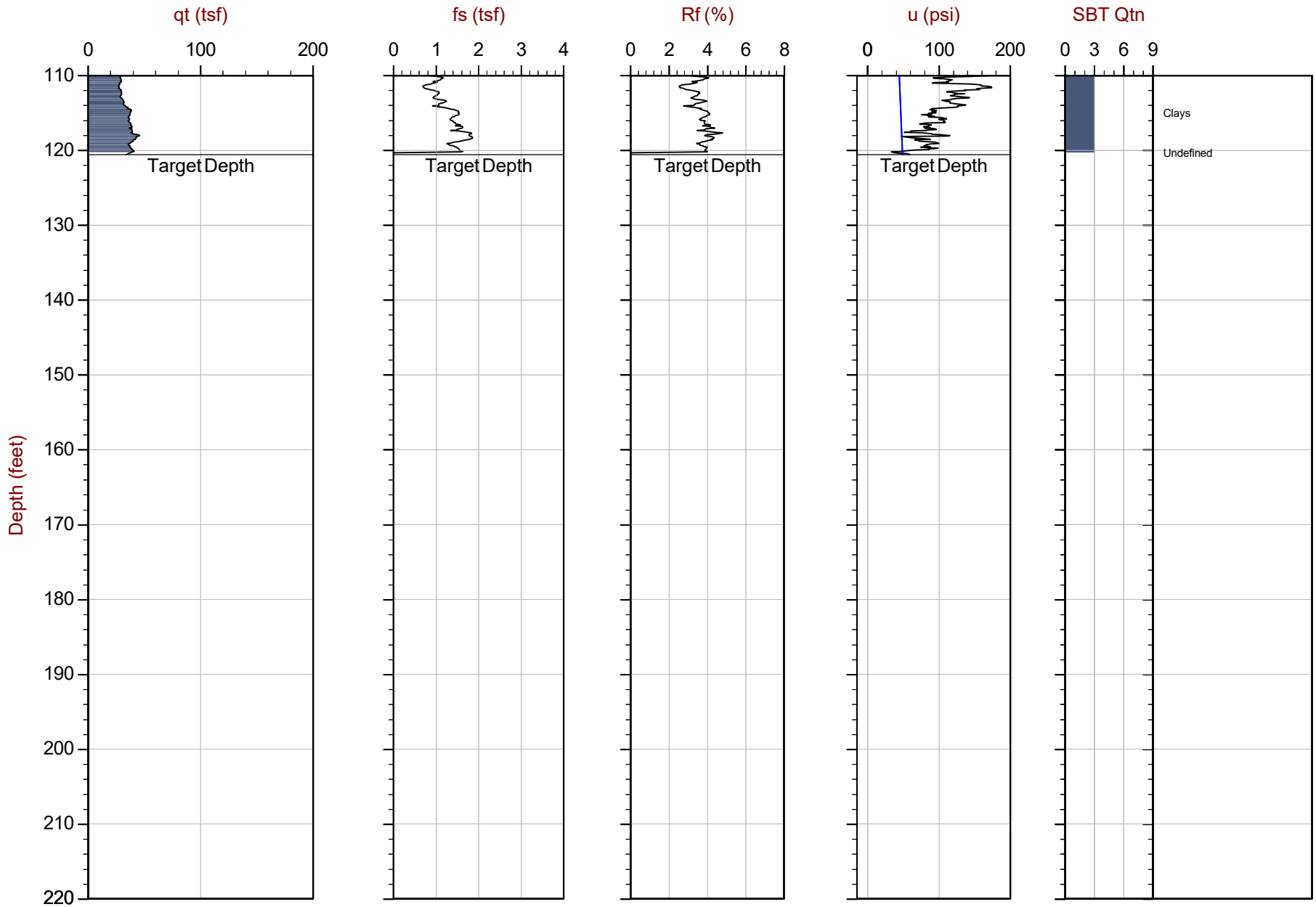
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 09:26
Site: Google Charleston South Exploration

Sounding: 1-CPT-14B
Cone: 483:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP14B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141826m E: 581178m
Page No: 2 of 2

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

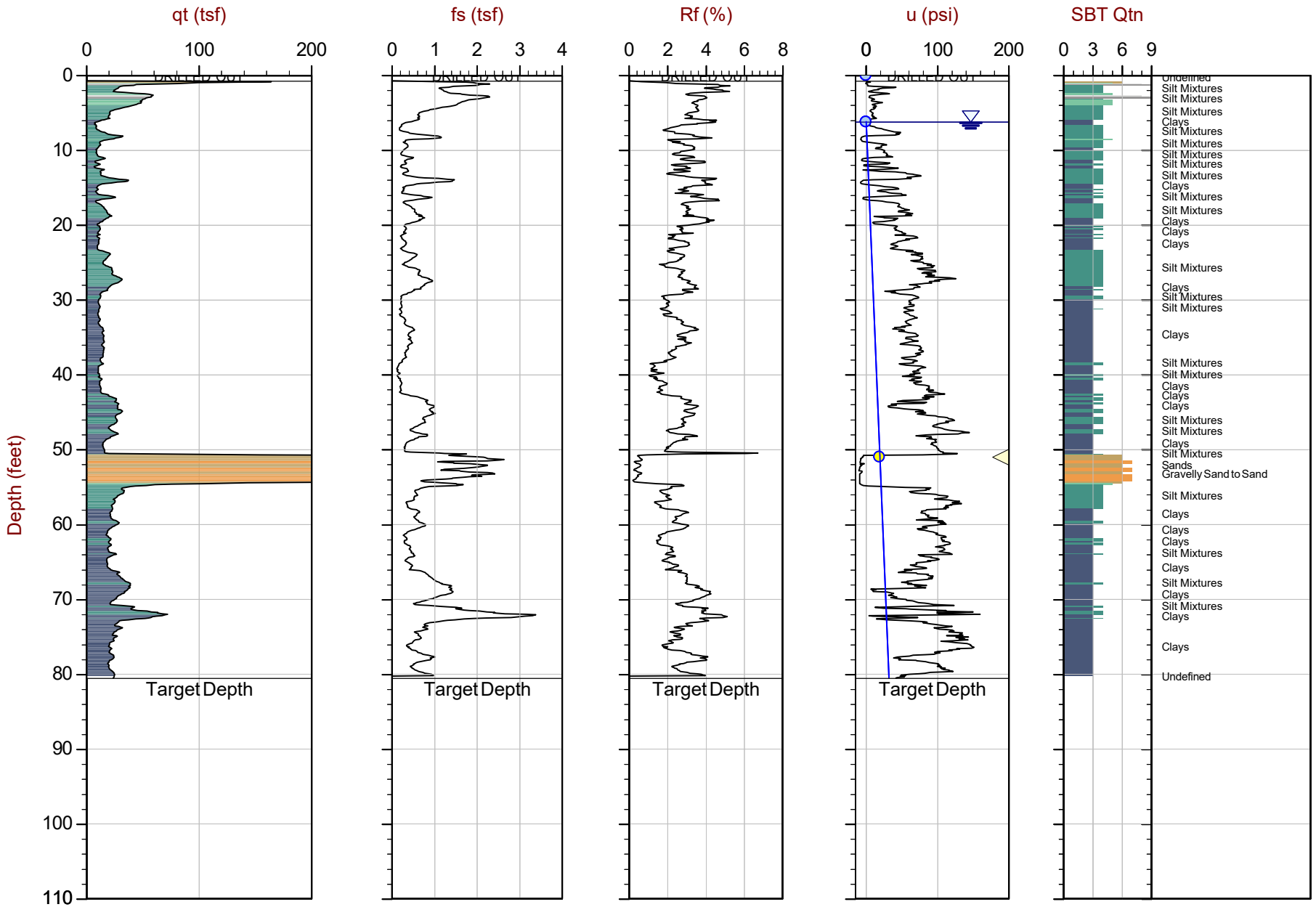
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 23:33
Site: Google Charleston South Exploration

Sounding: 1-CPT-15
Cone: 448:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP15.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141706m E: 581239m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

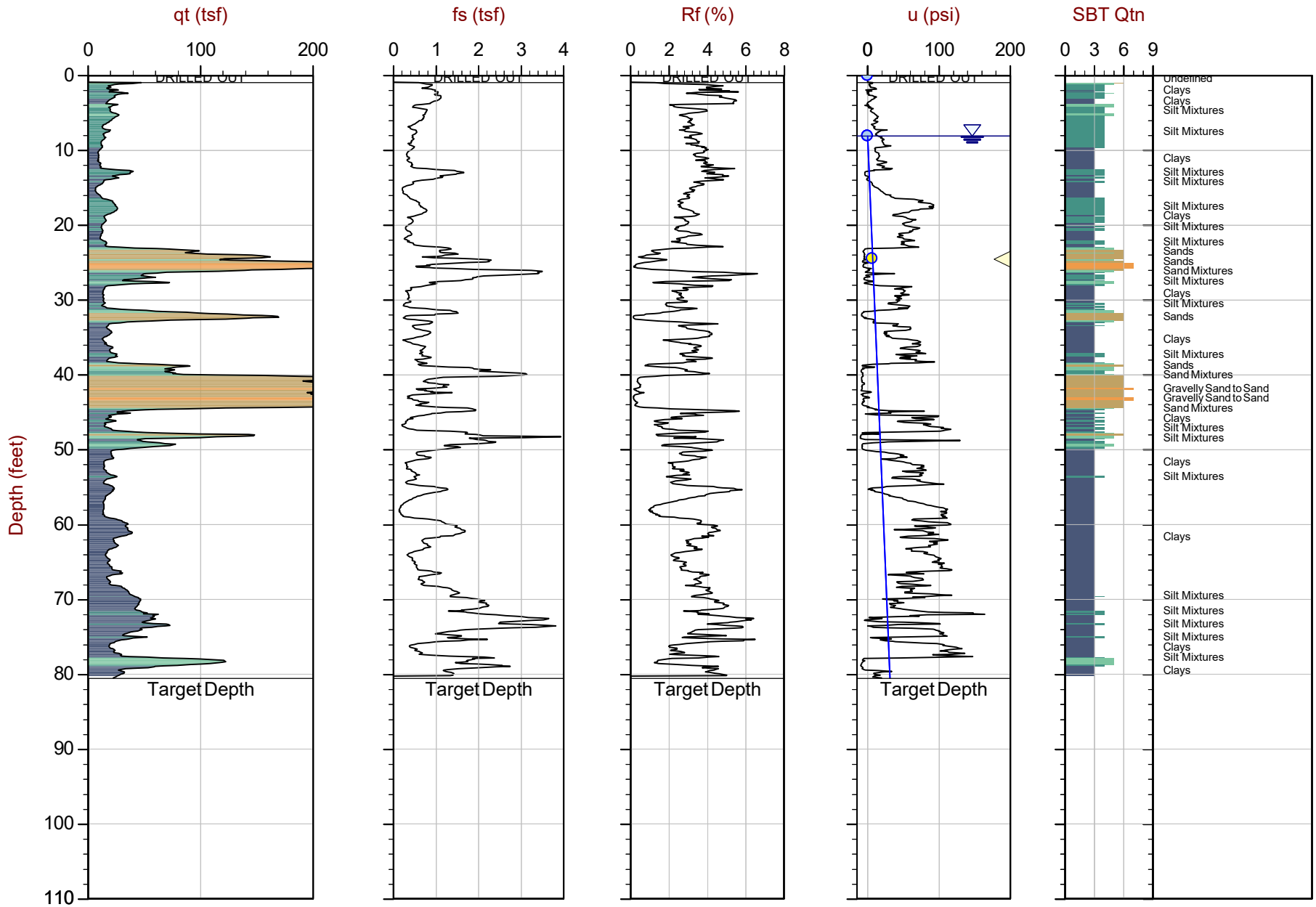
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-09 21:38
Site: Google Charleston South Exploration

Sounding: 1-CPT-16
Cone: 448:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP16.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141607m E: 581331m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

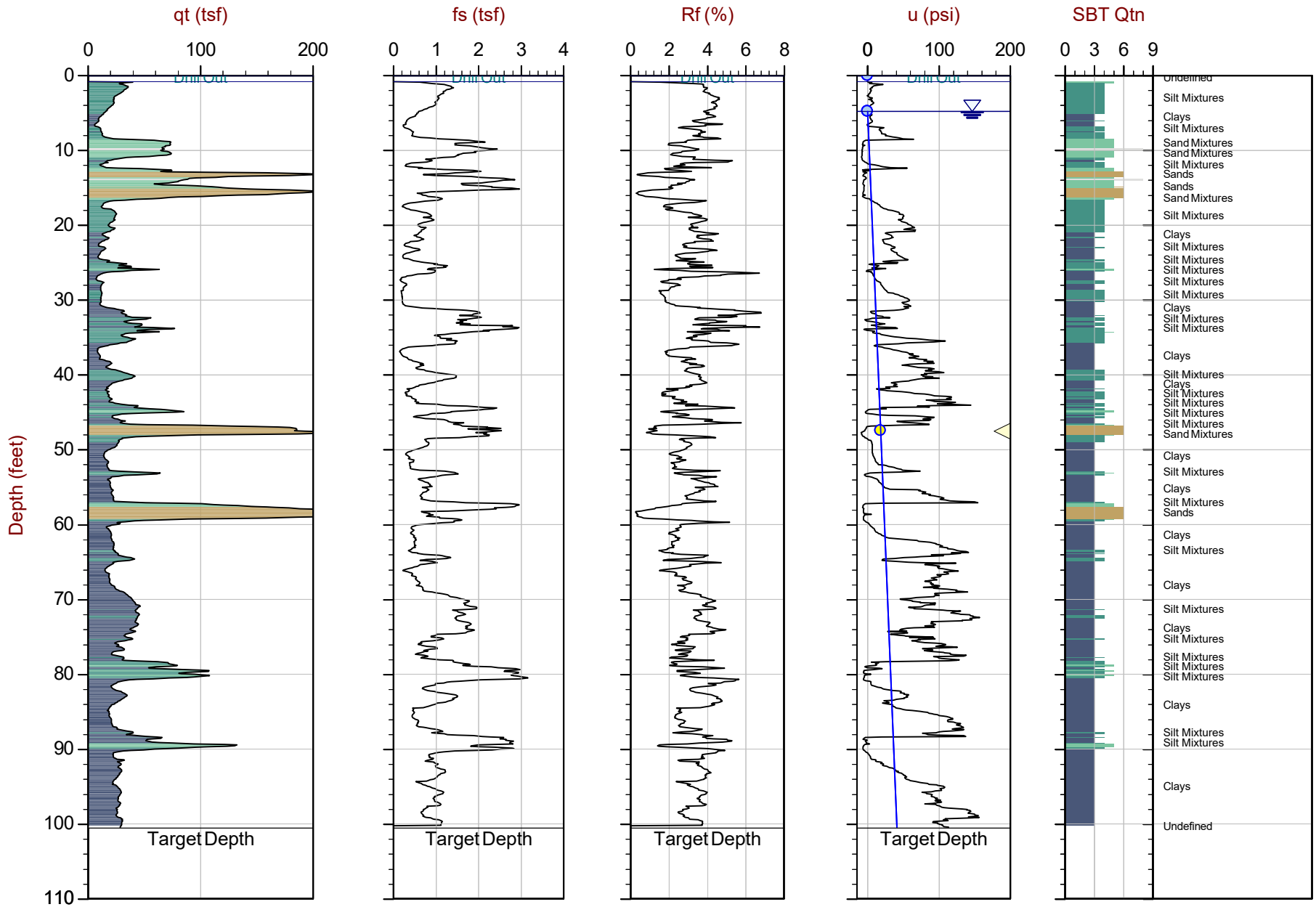
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-10 22:48
Site: Google Charleston South Exploration

Sounding: 1-CPT-17
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP17.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141531m E: 581178m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

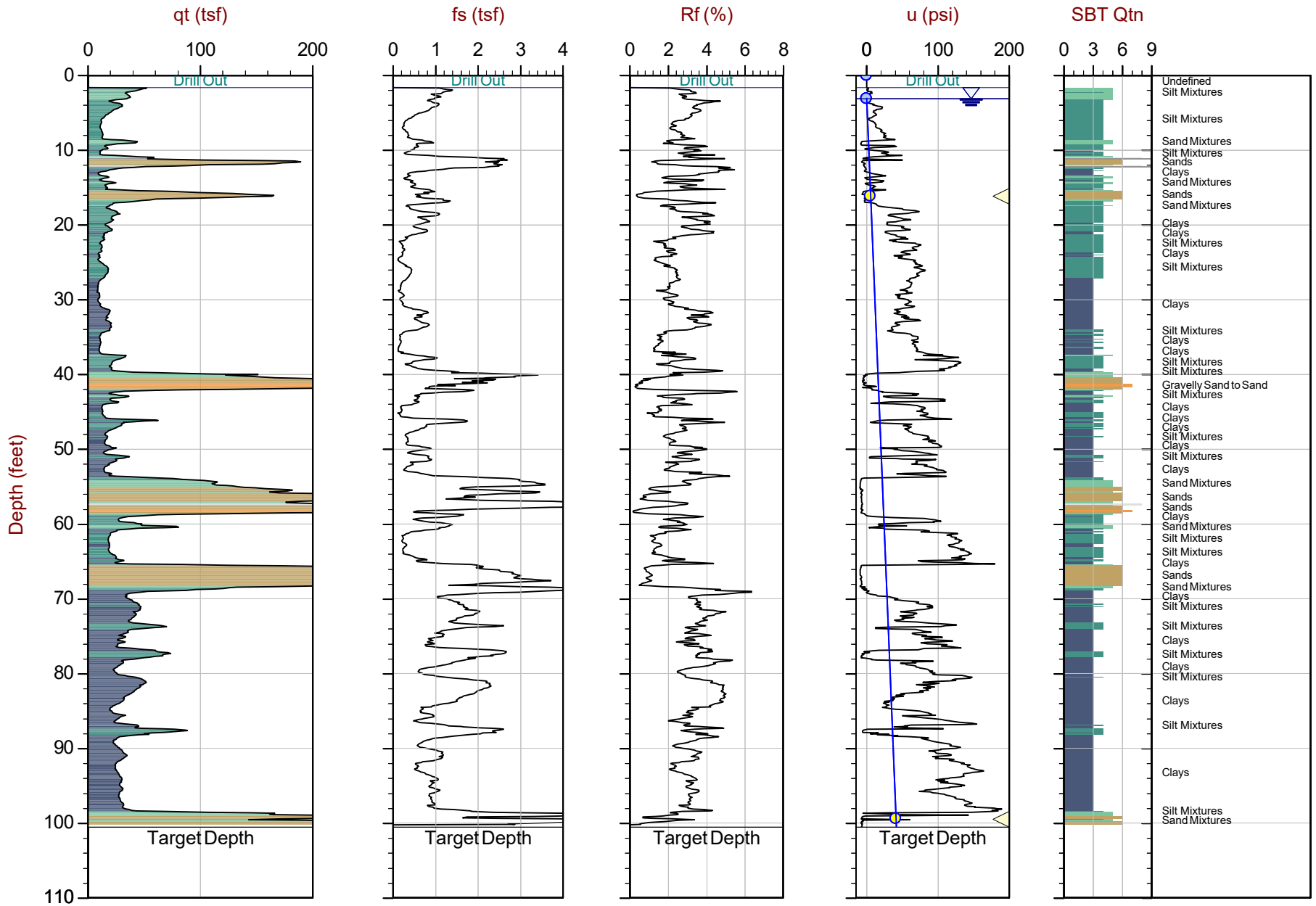
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-11 00:05
Site: Google Charleston South Exploration

Sounding: 1-CPT-18
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP18.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141640m E: 581199m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Plots

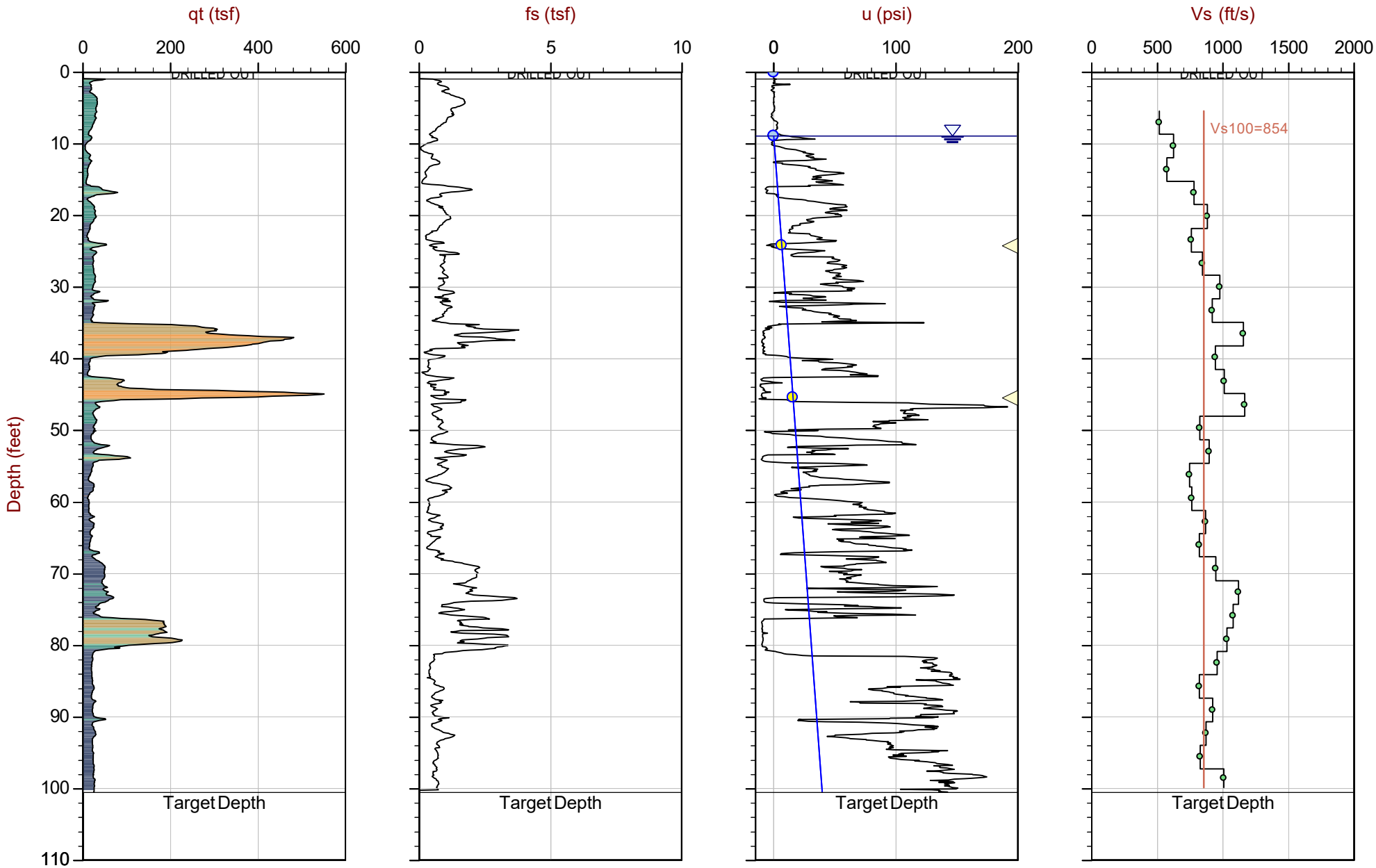
CONETEC

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 21:48
Site: Google Joaquin Exploration

Sounding: 1-SCPT-02
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP2.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141669m E: 581498m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

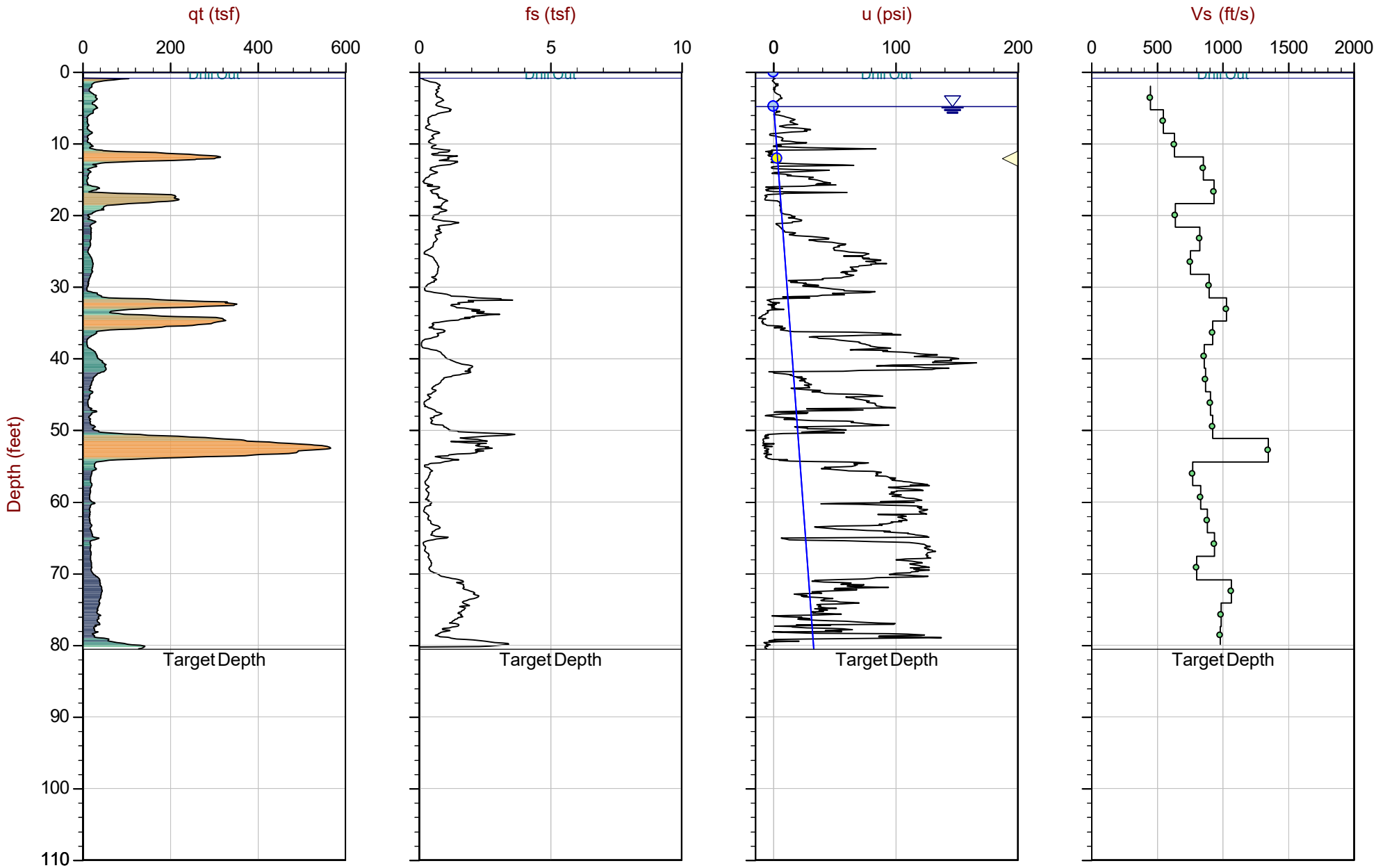
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 08:52
Site: Google Plymouth Exploration

Sounding: 1-SCPT-10
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP10.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141481m E: 581034m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

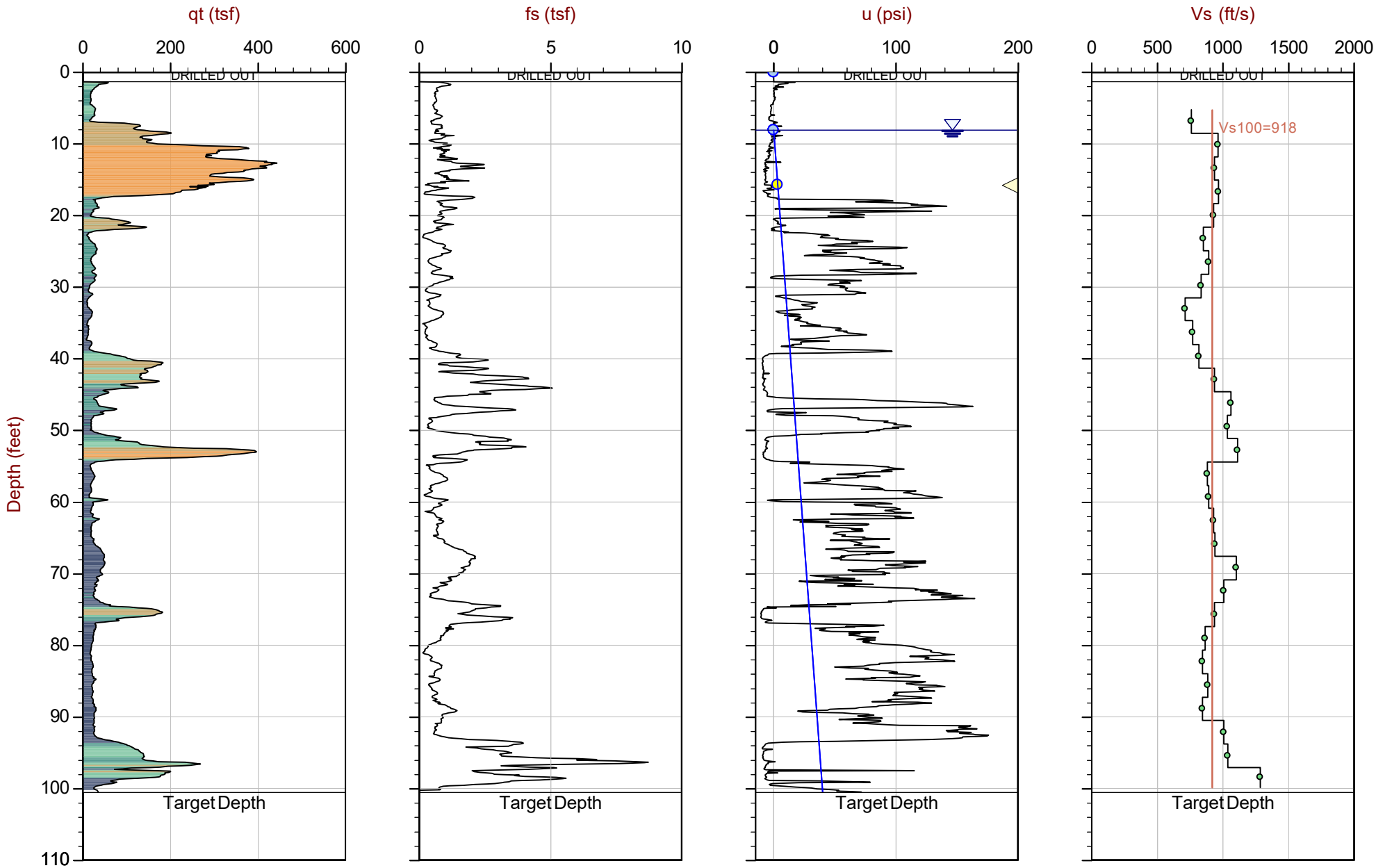
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 21:45
Site: Google Charleston South Exploration

Sounding: 1-SCPT-04
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SCP4.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141829m E: 581289m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Tabular Results

CONETEC

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Joaquin
Sounding ID:	1-SCPT-02
Date:	07-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.13
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
6.07	5.41	5.82			
9.35	8.69	8.95	3.13	6.07	516
12.63	11.97	12.16	3.21	5.13	626
15.91	15.26	15.40	3.24	5.65	573
19.13	18.47	18.59	3.19	4.08	782
22.47	21.82	21.92	3.33	3.77	883
25.75	25.10	25.19	3.27	4.29	762
29.04	28.38	28.46	3.27	3.87	845
32.32	31.66	31.73	3.27	3.35	977
35.60	34.94	35.01	3.27	3.56	920
38.88	38.22	38.28	3.28	2.83	1159
42.16	41.50	41.56	3.28	3.47	945
45.54	44.88	44.93	3.38	3.34	1012
48.72	48.06	48.11	3.18	2.72	1168
52.00	51.35	51.39	3.28	3.98	824
55.28	54.63	54.67	3.28	3.66	895
58.56	57.91	57.95	3.28	4.40	746
61.84	61.19	61.22	3.28	4.29	764
65.12	64.47	64.50	3.28	3.77	870
68.31	67.65	67.68	3.18	3.87	821
71.69	71.03	71.06	3.38	3.56	949
74.97	74.31	74.34	3.28	2.93	1119
78.25	77.59	77.62	3.28	3.03	1081
81.53	80.87	80.90	3.28	3.17	1033
84.81	84.15	84.18	3.28	3.42	959
88.09	87.43	87.46	3.28	3.98	823
91.37	90.72	90.74	3.28	3.55	925
94.65	94.00	94.02	3.28	3.75	874
97.93	97.28	97.30	3.28	3.96	828
100.56	99.90	99.92	2.62	2.61	1007

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Plymouth
Sounding ID:	1-SCPT-10
Date:	13-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.10
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
2.62	1.97	2.07			
5.91	5.25	5.29	3.22	7.18	448
9.19	8.53	8.55	3.27	5.95	549
12.47	11.81	11.83	3.27	5.18	633
15.75	15.09	15.11	3.28	3.84	854
19.03	18.37	18.38	3.28	3.51	934
22.31	21.65	21.66	3.28	5.14	638
25.59	24.93	24.94	3.28	3.98	824
28.87	28.22	28.22	3.28	4.34	755
32.15	31.50	31.50	3.28	3.65	898
35.43	34.78	34.78	3.28	3.18	1030
38.71	38.06	38.06	3.28	3.55	925
41.99	41.34	41.34	3.28	3.81	861
45.28	44.62	44.62	3.28	3.77	871
48.56	47.90	47.90	3.28	3.62	907
51.84	51.18	51.19	3.28	3.55	923
55.12	54.46	54.47	3.28	2.43	1347
58.40	57.74	57.75	3.28	4.26	770
61.68	61.02	61.03	3.28	3.94	833
64.96	64.30	64.31	3.28	3.72	882
68.24	67.58	67.59	3.28	3.50	938
71.52	70.87	70.87	3.28	4.09	802
74.80	74.15	74.15	3.28	3.08	1065
78.08	77.43	77.43	3.28	3.32	987
80.54	79.89	79.89	2.46	2.50	983

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Charleston South
Sounding ID:	1-SCPT-04
Date:	08-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.10
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

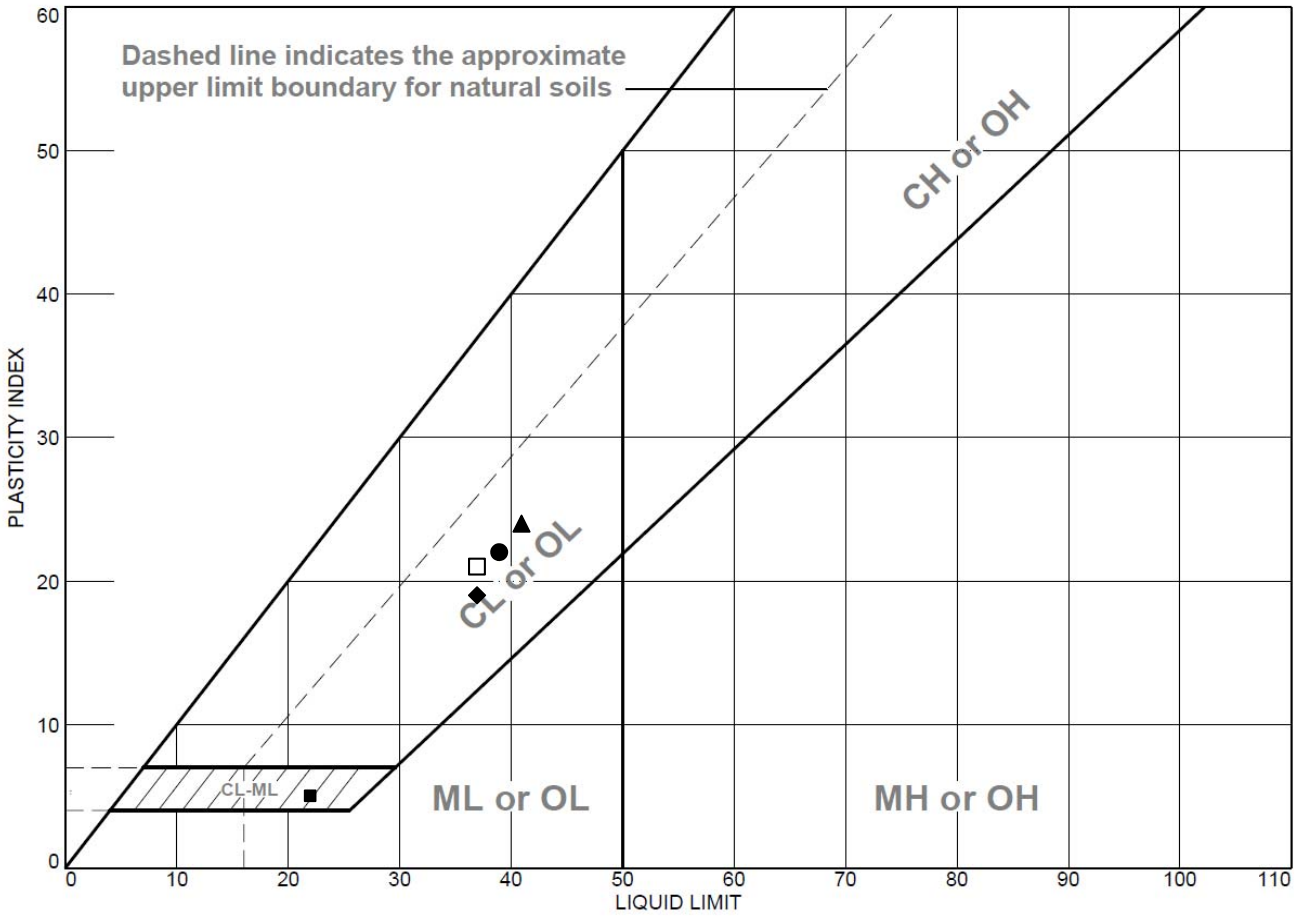
Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.91	5.25	5.65			
9.19	8.53	8.78	3.13	4.12	761
12.47	11.81	12.00	3.21	3.33	964
15.75	15.09	15.24	3.24	3.46	937
19.03	18.37	18.49	3.26	3.37	967
22.31	21.65	21.76	3.26	3.50	932
25.59	24.93	25.02	3.27	3.83	852
28.87	28.22	28.29	3.27	3.67	892
32.15	31.50	31.57	3.27	3.92	836
35.37	34.71	34.77	3.21	4.50	713
38.71	38.06	38.12	3.34	4.33	771
41.99	41.34	41.39	3.28	4.00	819
45.28	44.62	44.67	3.28	3.50	937
48.56	47.90	47.95	3.28	3.08	1063
51.84	51.18	51.22	3.28	3.17	1035
55.12	54.46	54.50	3.28	2.94	1115
58.40	57.74	57.78	3.28	3.71	884
61.58	60.93	60.96	3.18	3.56	894
64.96	64.30	64.34	3.38	3.63	932
68.24	67.58	67.62	3.28	3.49	940
71.52	70.87	70.90	3.28	2.97	1103
74.70	74.05	74.08	3.18	3.16	1007
78.08	77.43	77.46	3.38	3.61	936
81.36	80.71	80.74	3.28	3.79	865
84.65	83.99	84.02	3.28	3.88	845
87.93	87.27	87.30	3.28	3.70	886
91.21	90.55	90.58	3.28	3.88	845
94.49	93.83	93.86	3.28	3.25	1010
97.77	97.11	97.14	3.28	3.16	1039
100.56	99.90	99.92	2.79	2.17	1287



APPENDIX C

LABORATORY TEST DATA

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	41	17	24		61.4	CL
◆	See exploration logs	37	18	19		74	CL
□	See exploration logs	37	16	21		51.9	CL
●	See exploration logs	39	17	22		88.3	CL
■	See exploration logs	22	17	5		44.6	SC-SM

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B8 **Depth:** 5.5-6.5
◆ **Sample Number:** 1-B8 **Depth:** 22-23.5
□ **Sample Number:** 1-B8 **Depth:** 30.5-31.5
● **Sample Number:** 1-B8 **Depth:** 54-55.5
■ **Sample Number:** 1-B8 **Depth:** 95-96.5

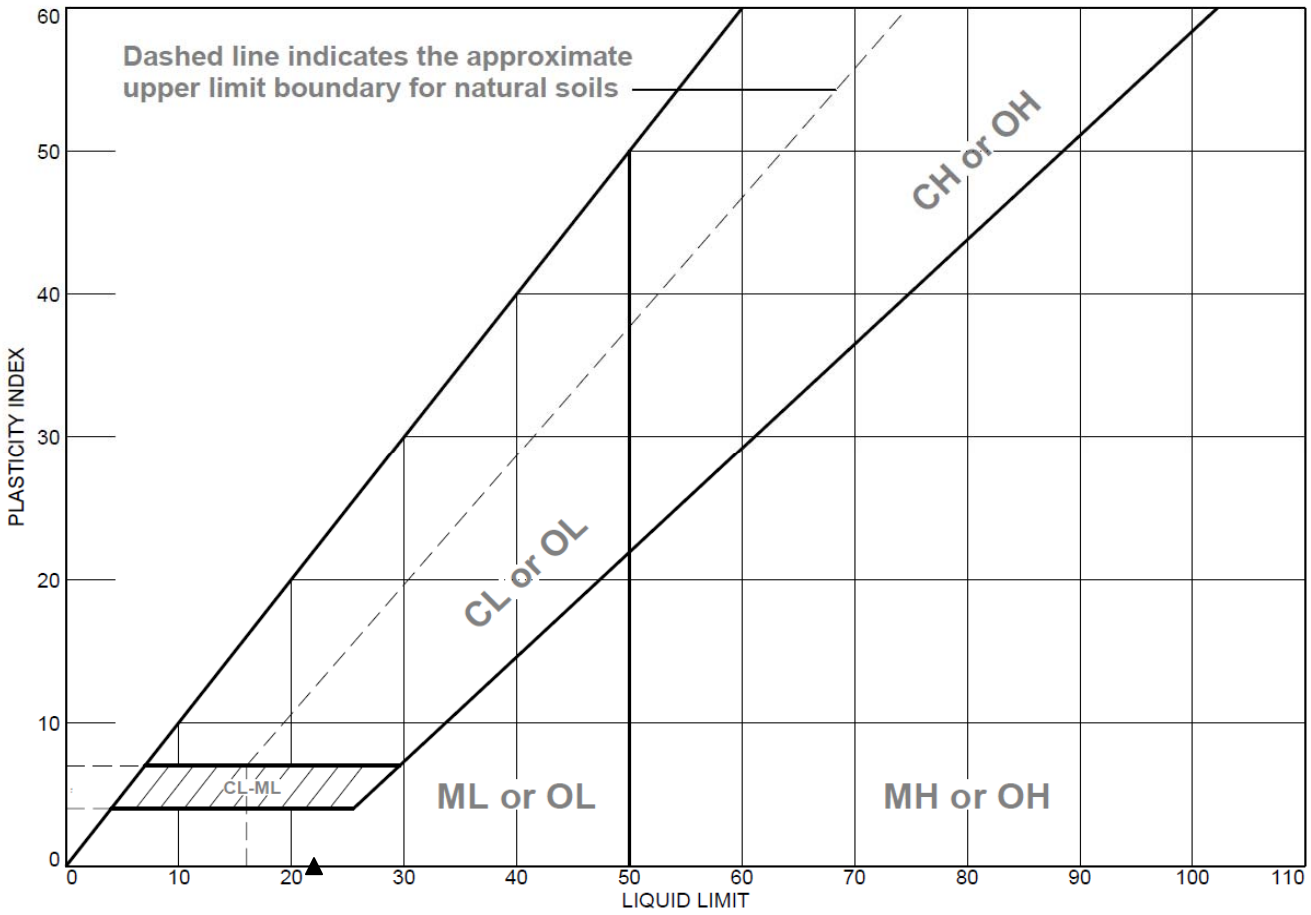
ENGEO Expect Excellence

Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
■ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	22	22	0		51.8	ML

Project No.: 15949.000.000 **Date:** 6/14/2019

Project Name: GEX for Multiple Parcels

Project location: Sunnyvale, California

Client: Google, LLC

▲ **Sample Number:** 1-B9 **Depth:** 15-18 ft

Remarks:

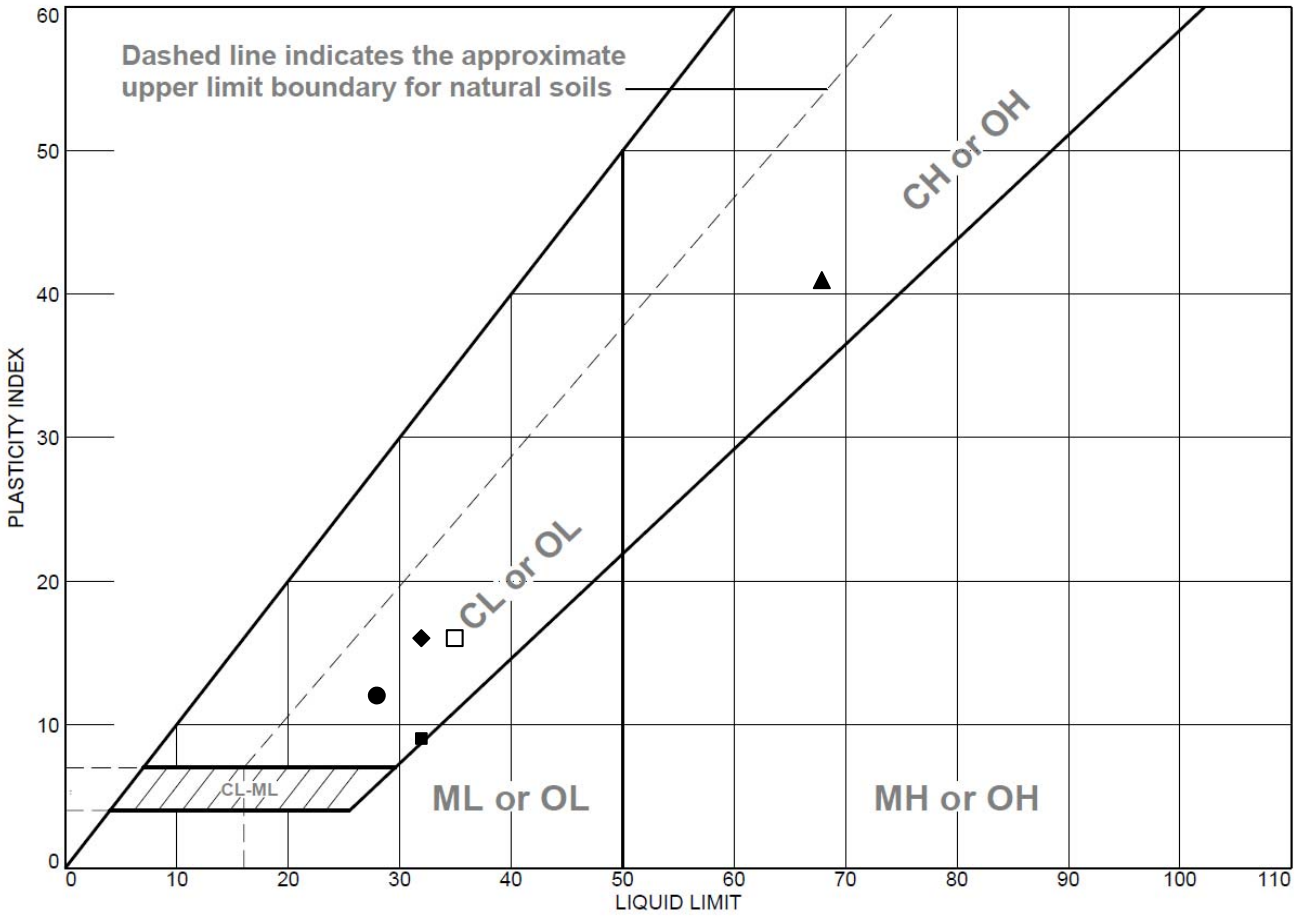
PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method A, USCS: ASTM D2487

ENGEO
Expect Excellence

Tested By: M. Quasem Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	68	27	41		80.2	CH
◆	See exploration logs	32	16	16		30	SC
□	See exploration logs	35	19	16		56.5	CL
●	See exploration logs	28	16	12		34	SC
■	See exploration logs	32	23	9			

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B9 **Depth:** 5.5-6.5
◆ **Sample Number:** 1-B9 **Depth:** 10.5-11.5
□ **Sample Number:** 1-B9 **Depth:** 35-36.5
● **Sample Number:** 1-B9 **Depth:** 55-56.5
■ **Sample Number:** 1-B10 **Depth:** 5-6.5

Remarks:

▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

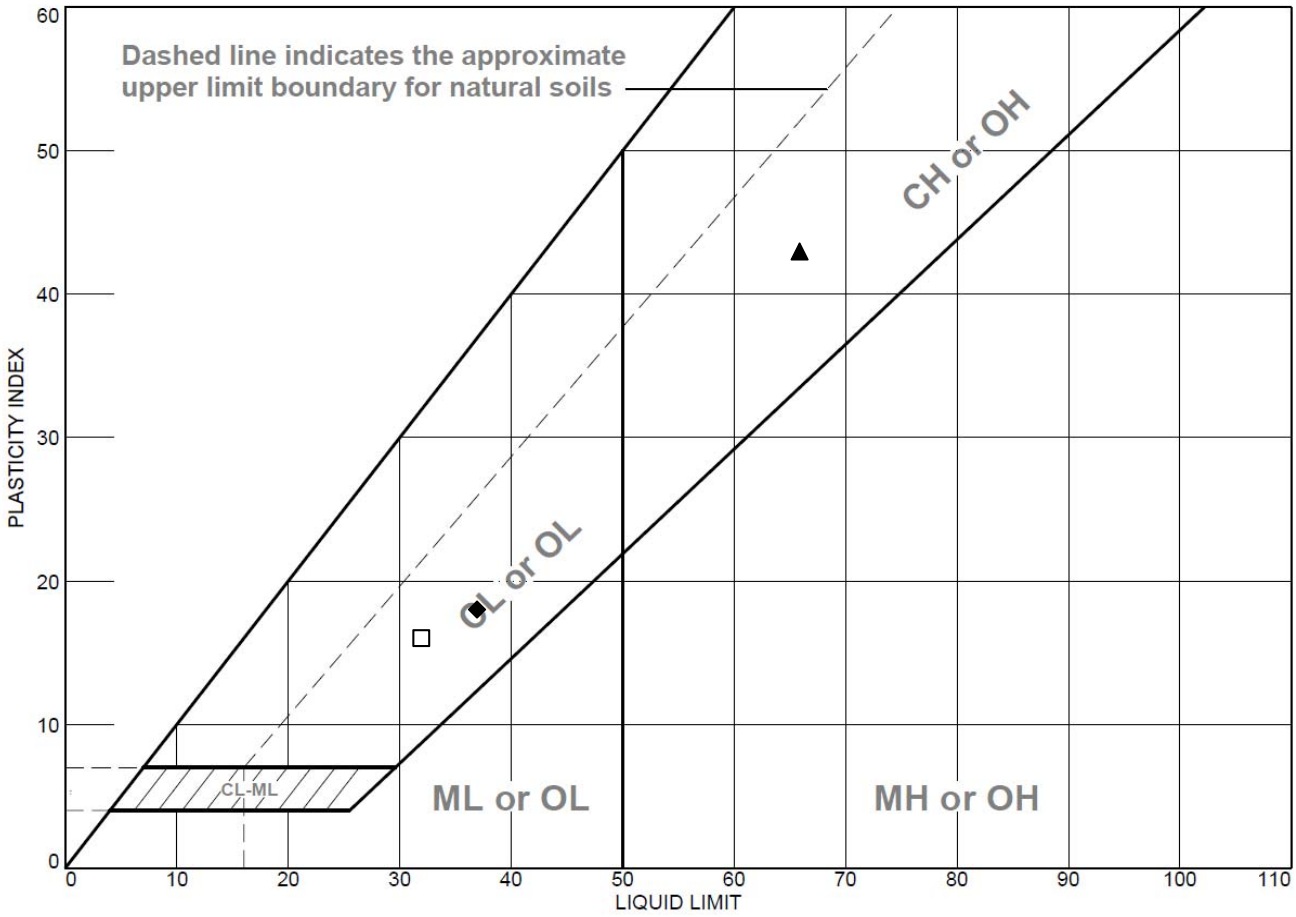
■ PI: ASTM D4318, Wet Method

ENGEO
Expect Excellence

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	66	23	43		79.2	CH
◆	See exploration logs	37	19	18		63	CL
□	See exploration logs	32	16	16		34.1	SC

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC
▲ **Sample Number:** 1-B10 **Depth:** 15-16.5
◆ **Sample Number:** 1-B10 **Depth:** 25-26.5
□ **Sample Number:** 1-B10 **Depth:** 40-41.5

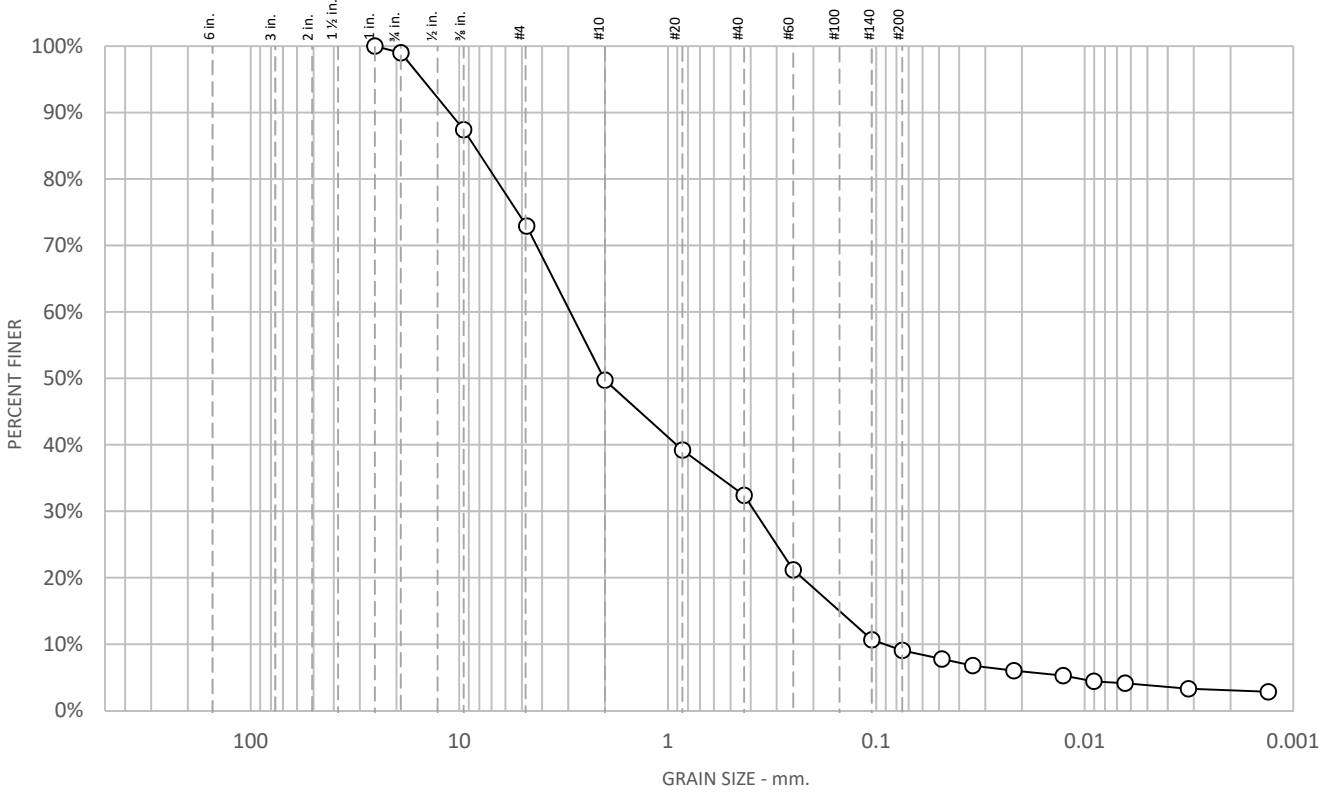
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	1.0	26.0	23.2	17.3	23.3	6.0	3.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	99.0		
⅜ in.	87.4		
#4	72.9		
#10	49.7		
#20	39.2		
#40	32.4		
#60	21.2		
#140	10.7		
#200	9.1		
0.0485 mm.	7.8		
0.0345 mm.	6.8		
0.0219 mm.	6.0		
0.0127 mm.	5.3		
0.0090 mm.	4.4		
0.0064 mm.	4.1		
0.0032 mm.	3.3		
0.0013 mm.	2.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 11.1207 mm D_{85} = 8.4848 mm D_{60} = 2.9346 mm
D_{50} = 2.0208 mm D_{30} = 0.3830 mm D_{15} = 0.1502 mm
D_{10} = 0.0915 mm C_u = 32.09 C_c = 0.55

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B8 @ 10-11.5

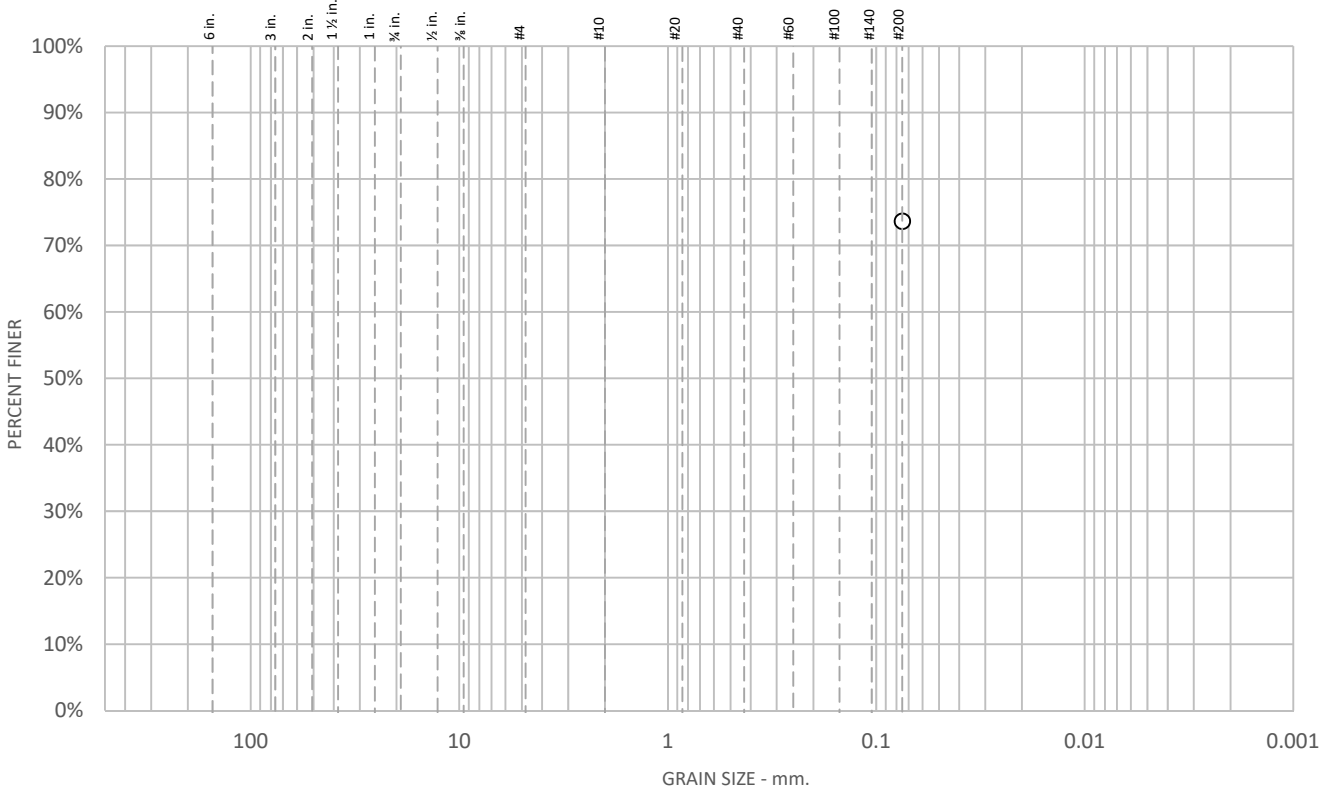
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	74		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 37 PI = 19

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 182.8 g

Sample Number: 1-B8 @ 22-23.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

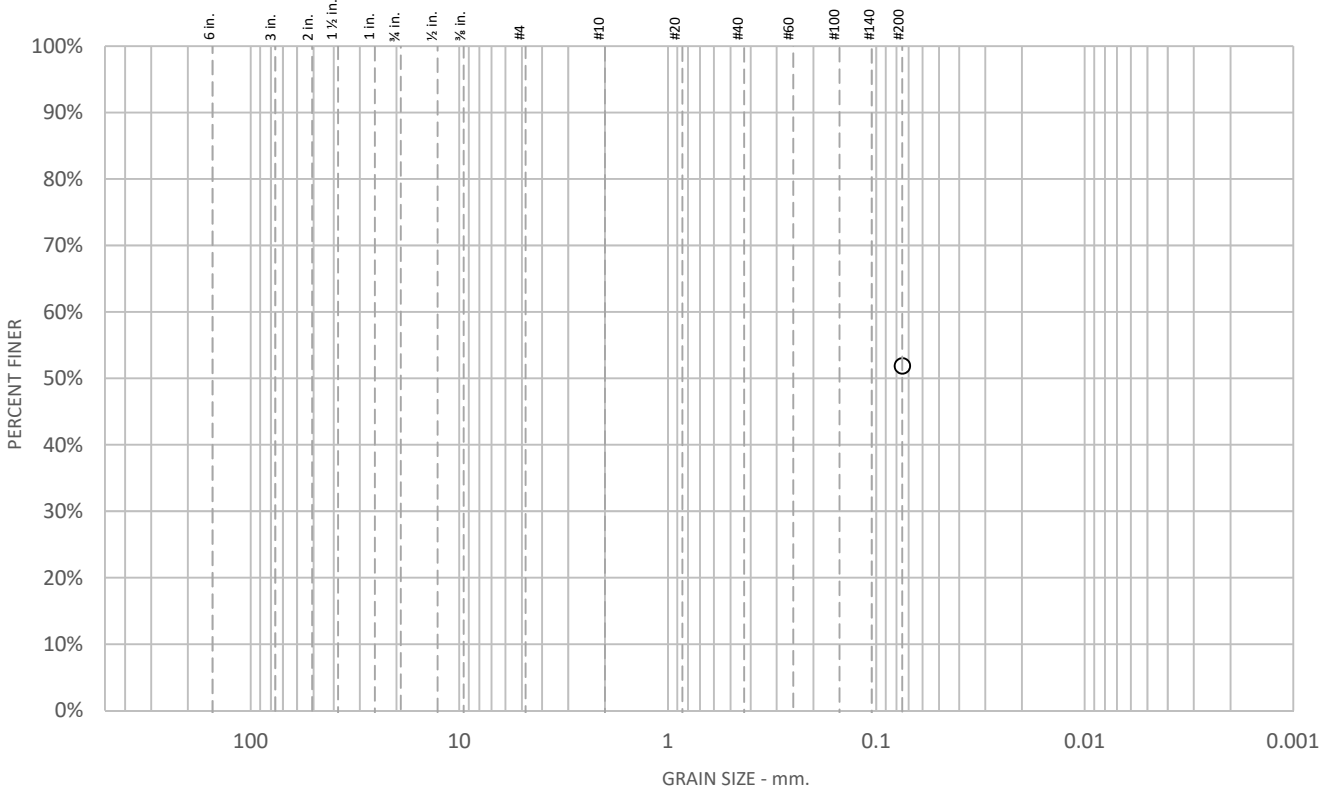
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	51.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 37 PI = 21

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 198.4 g

Sample Number: 1-B8 @ 30.5-31.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

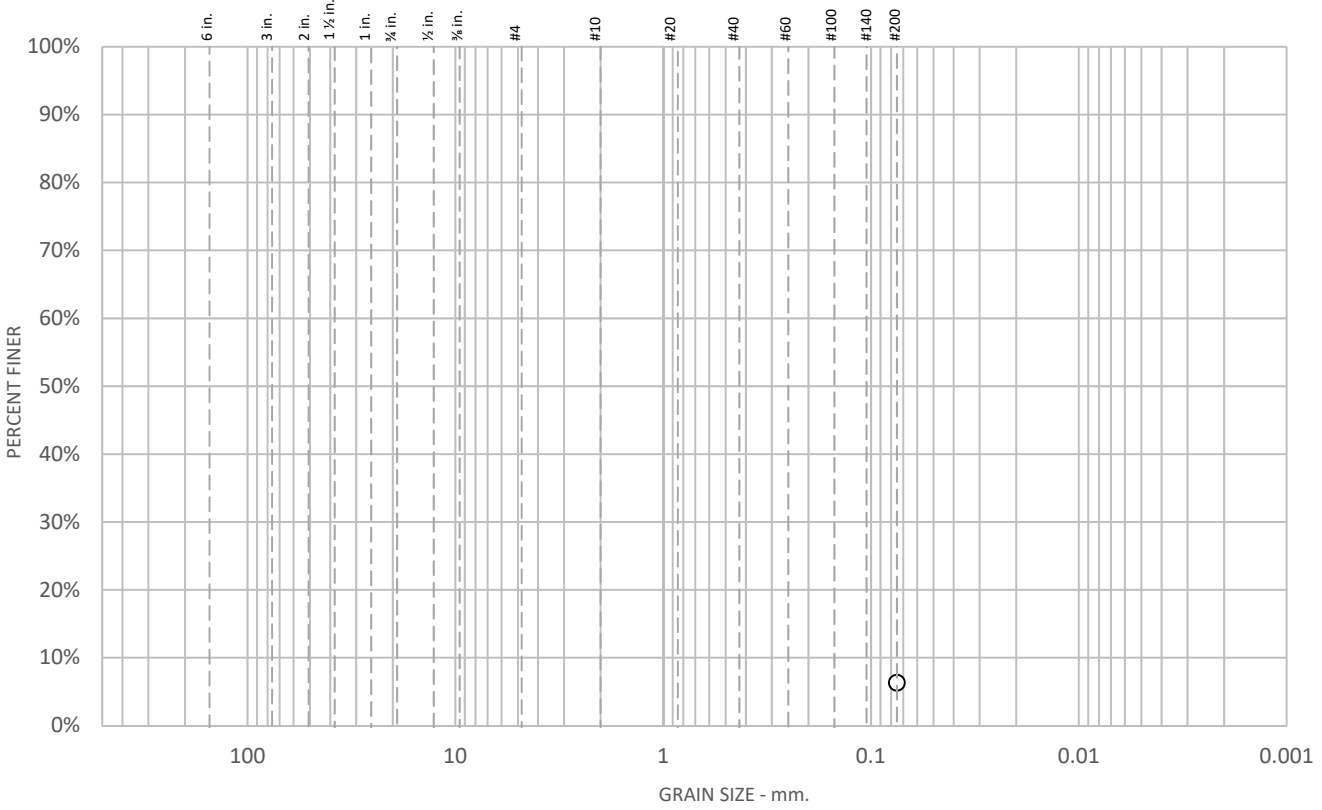
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	6		

* (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 =

Remarks

ASTM D1140, Method A
Soak time = 60 min
Dry sample weight = 629.9 g

Sample Number: 1-B8 @ 41-41.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

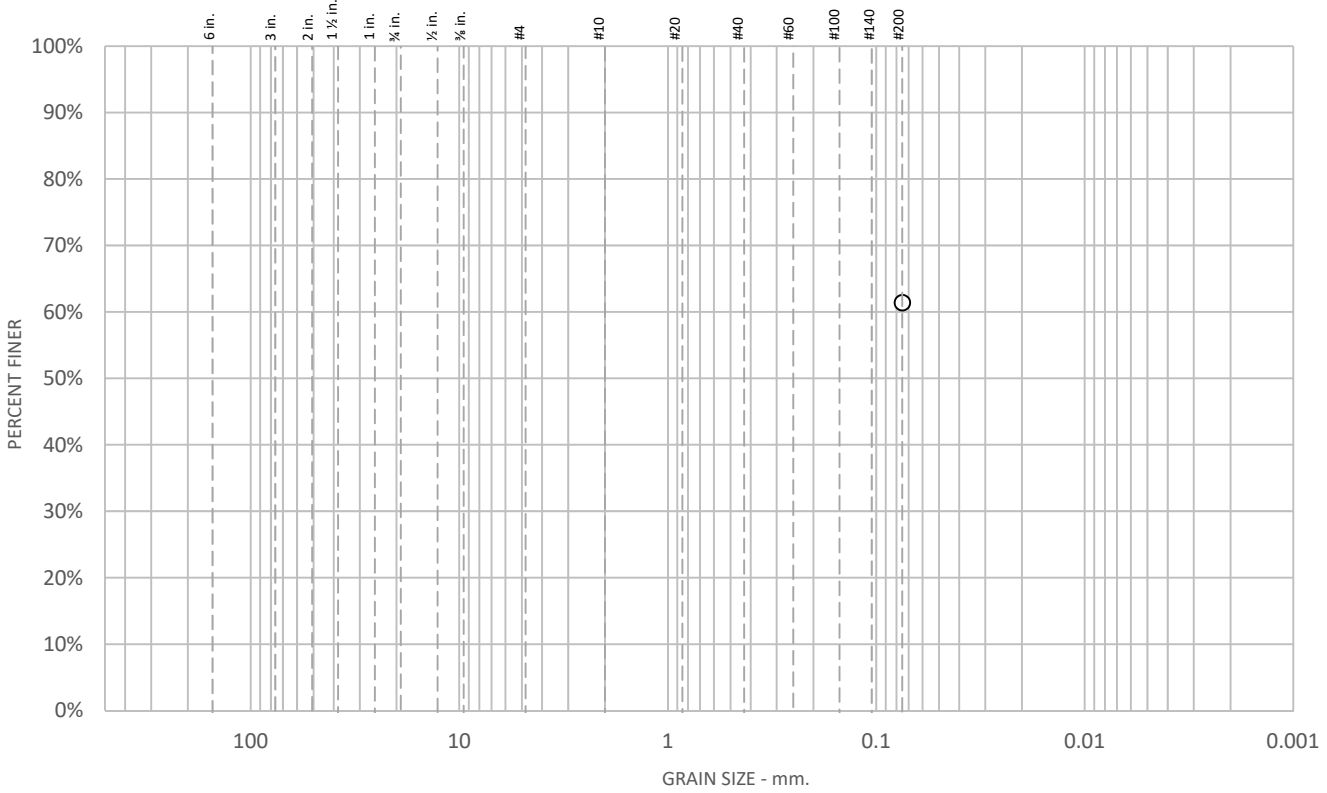
Project Number: 15949.000.000
Date: 6/13/2019

ENGEO Expect Excellence

Tested By: M. Quasem
Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	61.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 41 PI = 24

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 129.7 g

Sample Number: 1-B8 @ 5.5-6.5

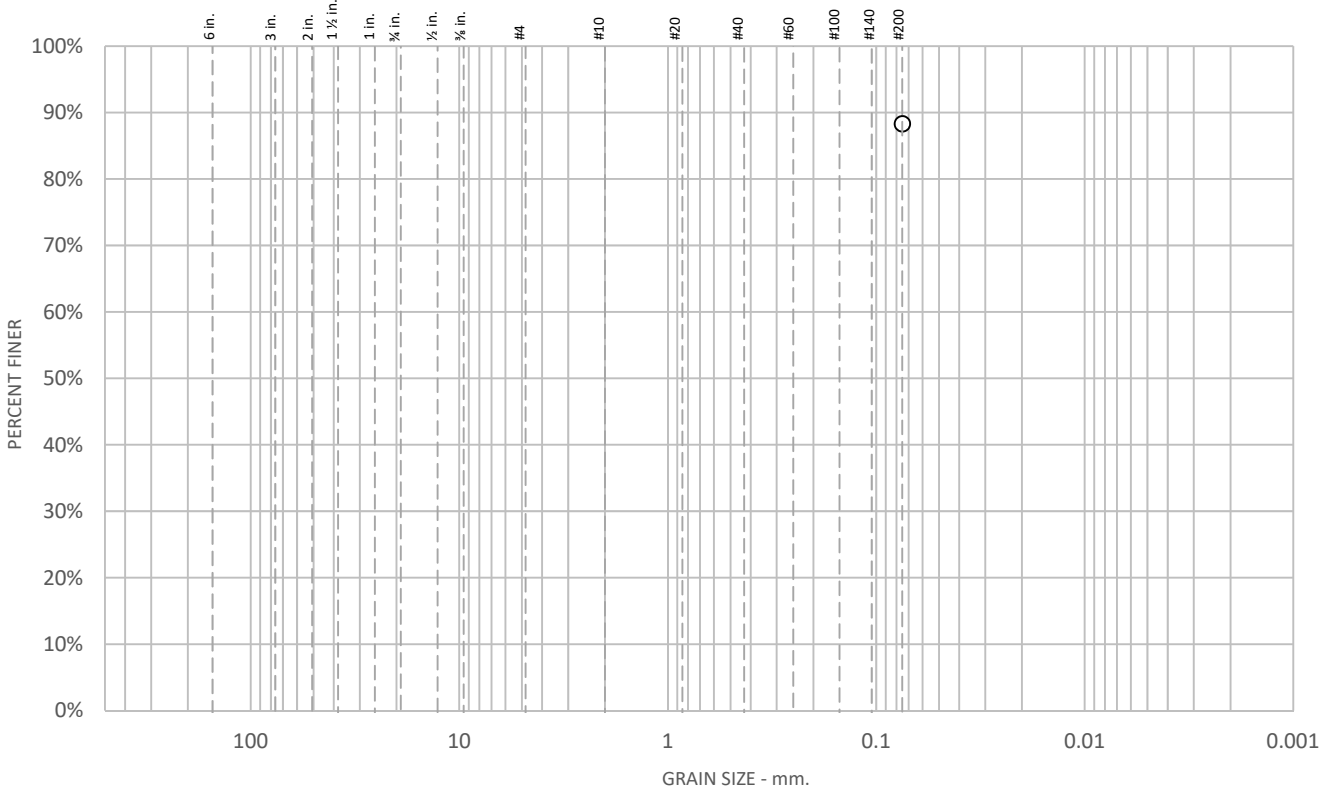
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/23/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						88.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	88.3		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 39 PI = 22

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 212.7 g

Sample Number: 1-B8 @ 54-55.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

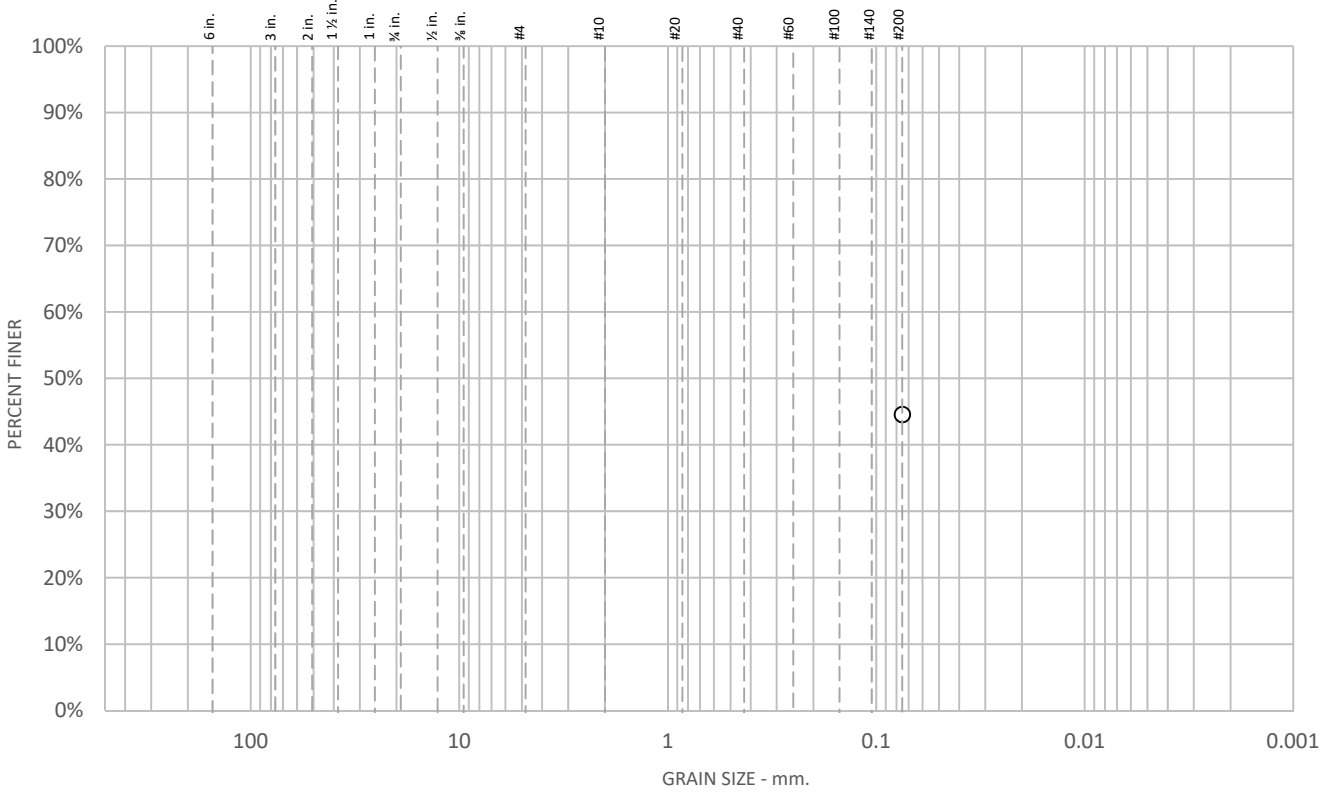
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	44.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 22 PI = 5

Coefficients

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

Classification

USCS = SC-SM

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 196.8 g

Sample Number: 1-B8 @ 95-96.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

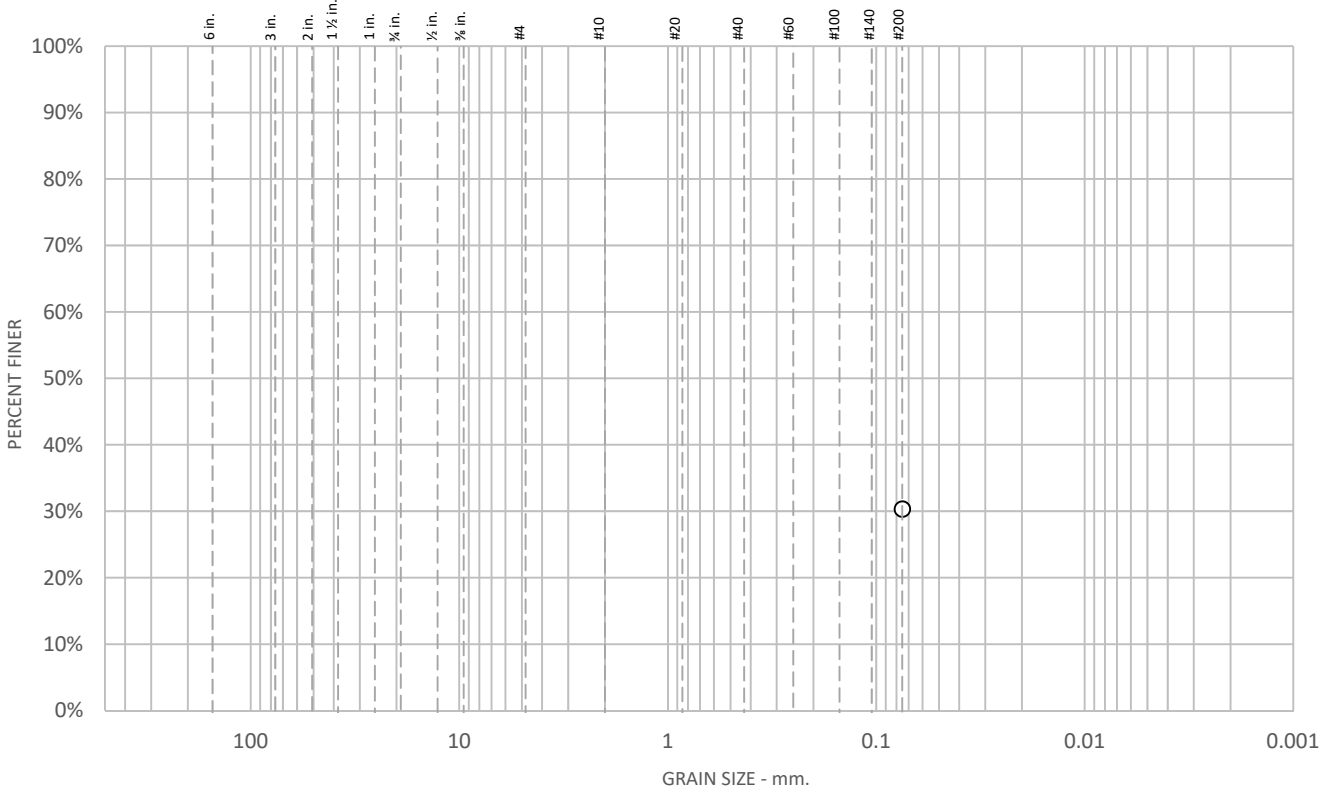
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	30		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 32 PI = 16

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 194.6 g

Sample Number: 1-B9 @ 10.5-11.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

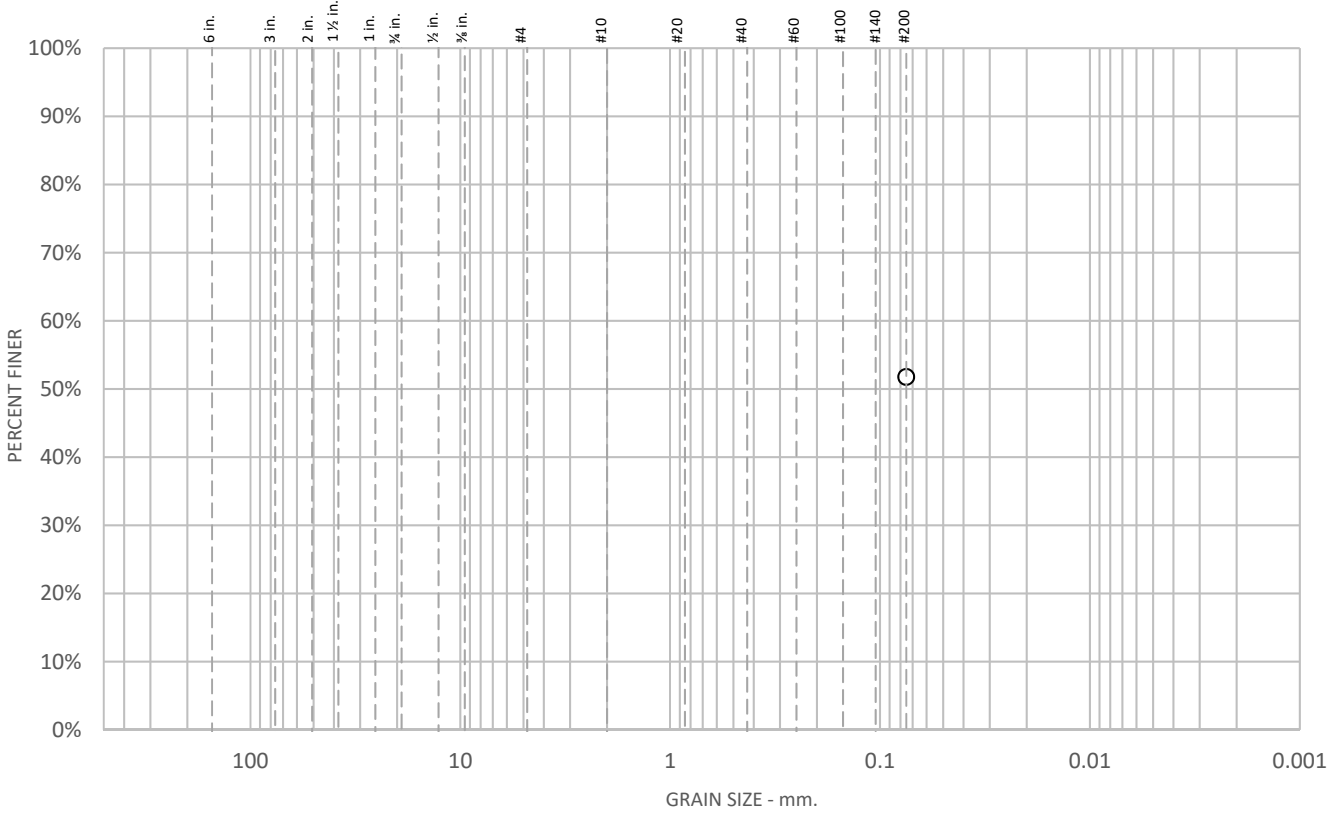
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	51.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 22 LL = 22 PI = 0

Coefficients

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

Classification

USCS = ML

Remarks

PI: ASTM D4318, Wet Method
ASTM D1140, Method A
Soak time = 12 min
Dry sample weight = 126.76 g

Sample Number: 1-B9 @ 15-18

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

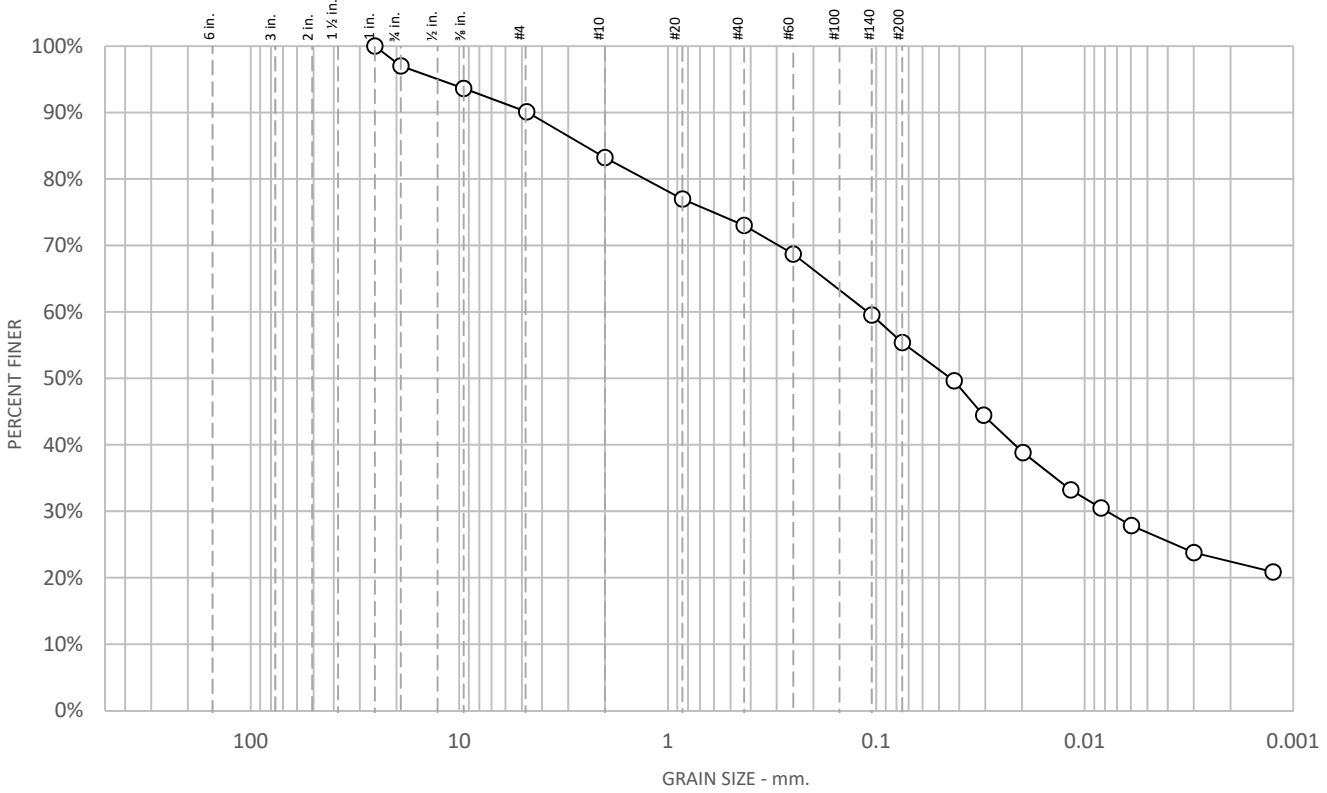
Project Number: 15949.000.000
Date: 6/14/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	3.0	6.9	6.9	10.2	17.6	33.0	22.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	97.0		
⅜ in.	93.6		
#4	90.1		
#10	83.2		
#20	77.0		
#40	73.0		
#60	68.7		
#140	59.5		
#200	55.4		
0.0423 mm.	49.6		
0.0306 mm.	44.4		
0.0198 mm.	38.8		
0.0117 mm.	33.2		
0.0084 mm.	30.5		
0.0060 mm.	27.8		
0.0030 mm.	23.8		
0.0013 mm.	20.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 4.6817 mm D_{85} = 2.5007 mm D_{60} = 0.1098 mm
D_{50} = 0.0439 mm D_{30} = 0.0078 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B9 @ 20-21.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

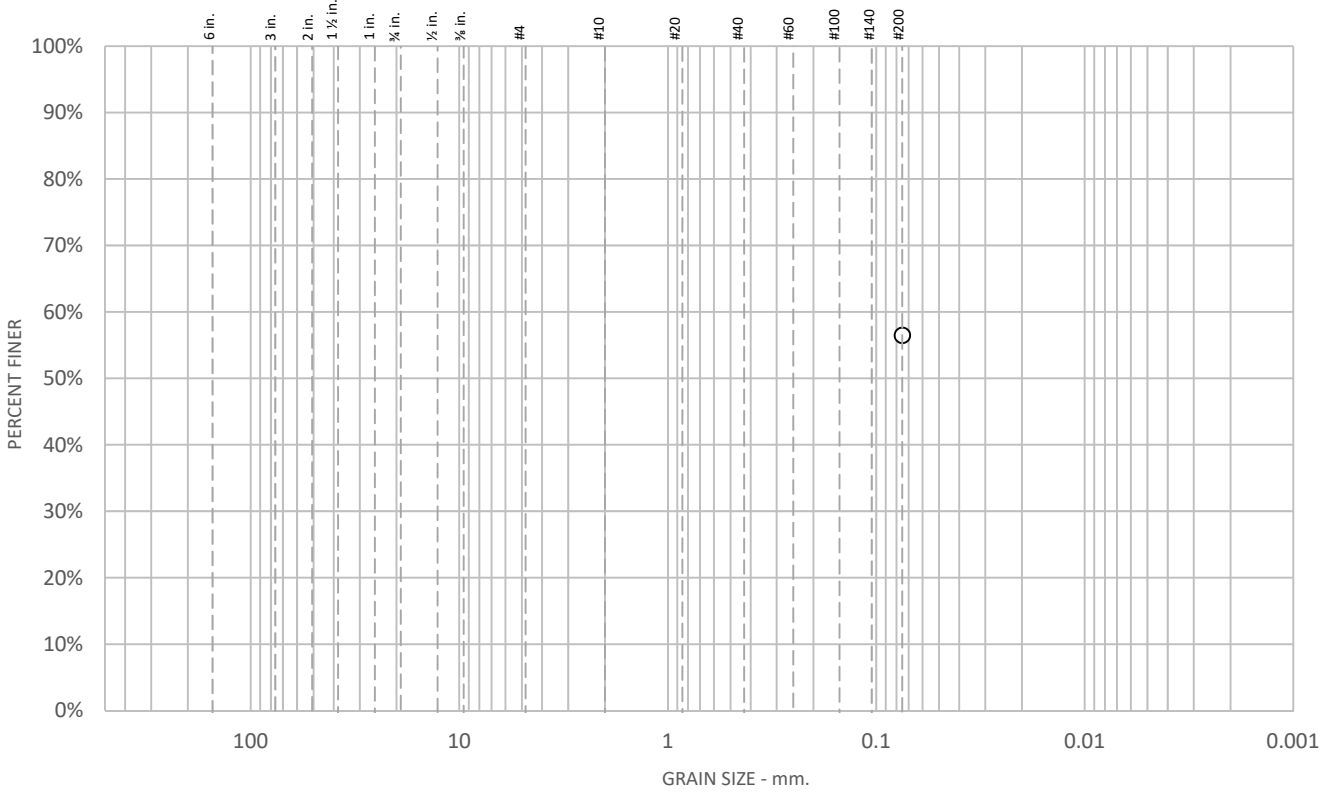
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	56.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 35 PI = 16

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 169.5 g

Sample Number: 1-B9 @ 35-36.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

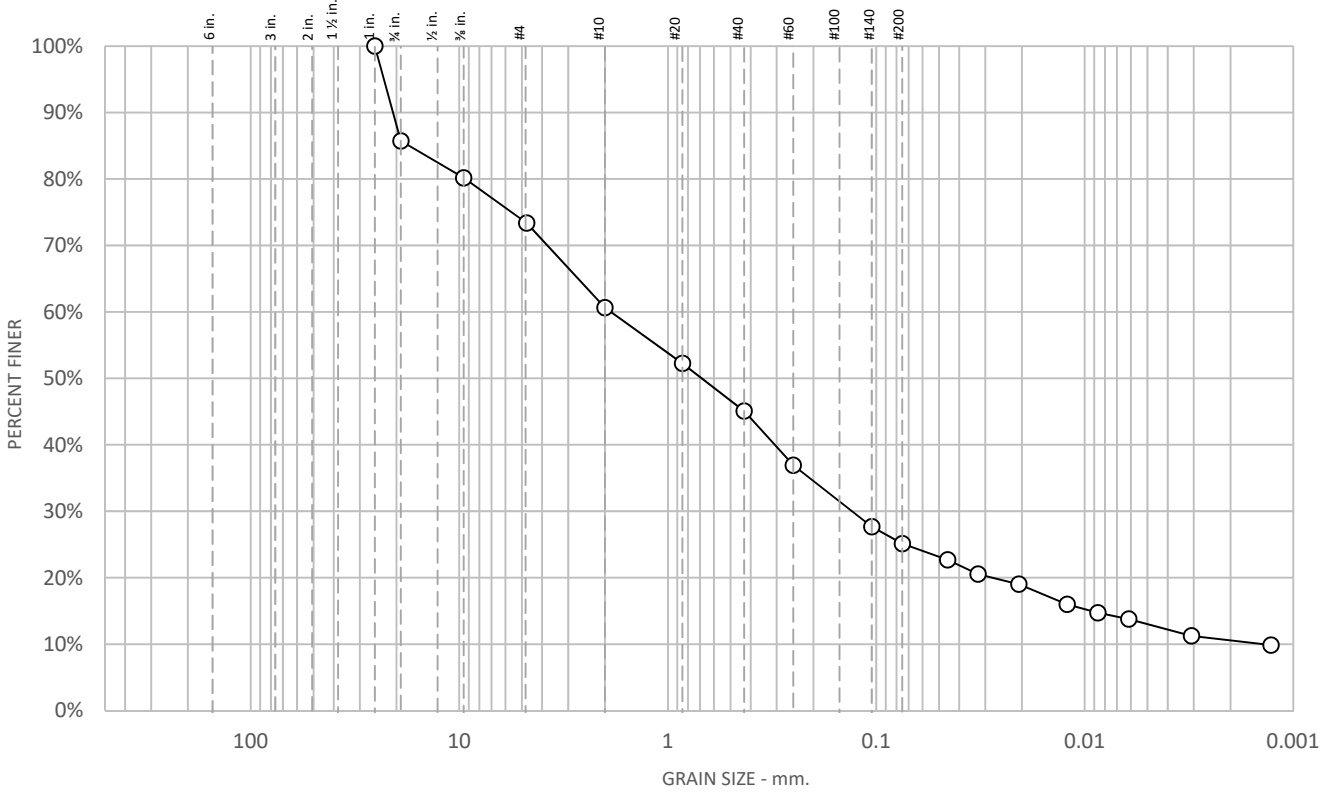
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	14.3	12.3	12.7	15.6	20.0	14.6	10.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	85.7		
⅜ in.	80.2		
#4	73.4		
#10	60.6		
#20	52.2		
#40	45.1		
#60	36.9		
#140	27.7		
#200	25.1		
0.0455 mm.	22.7		
0.0325 mm.	20.5		
0.0207 mm.	19.0		
0.0122 mm.	16.0		
0.0087 mm.	14.7		
0.0062 mm.	13.8		
0.0031 mm.	11.3		
0.0013 mm.	9.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 20.7605 mm D_{85} = 17.3783 mm D_{60} = 1.8730 mm
D_{50} = 0.6865 mm D_{30} = 0.1306 mm D_{15} = 0.0093 mm
D_{10} = 0.0014 mm C_u = 1342.09 C_c = 6.52

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B9 @ 45.46.5

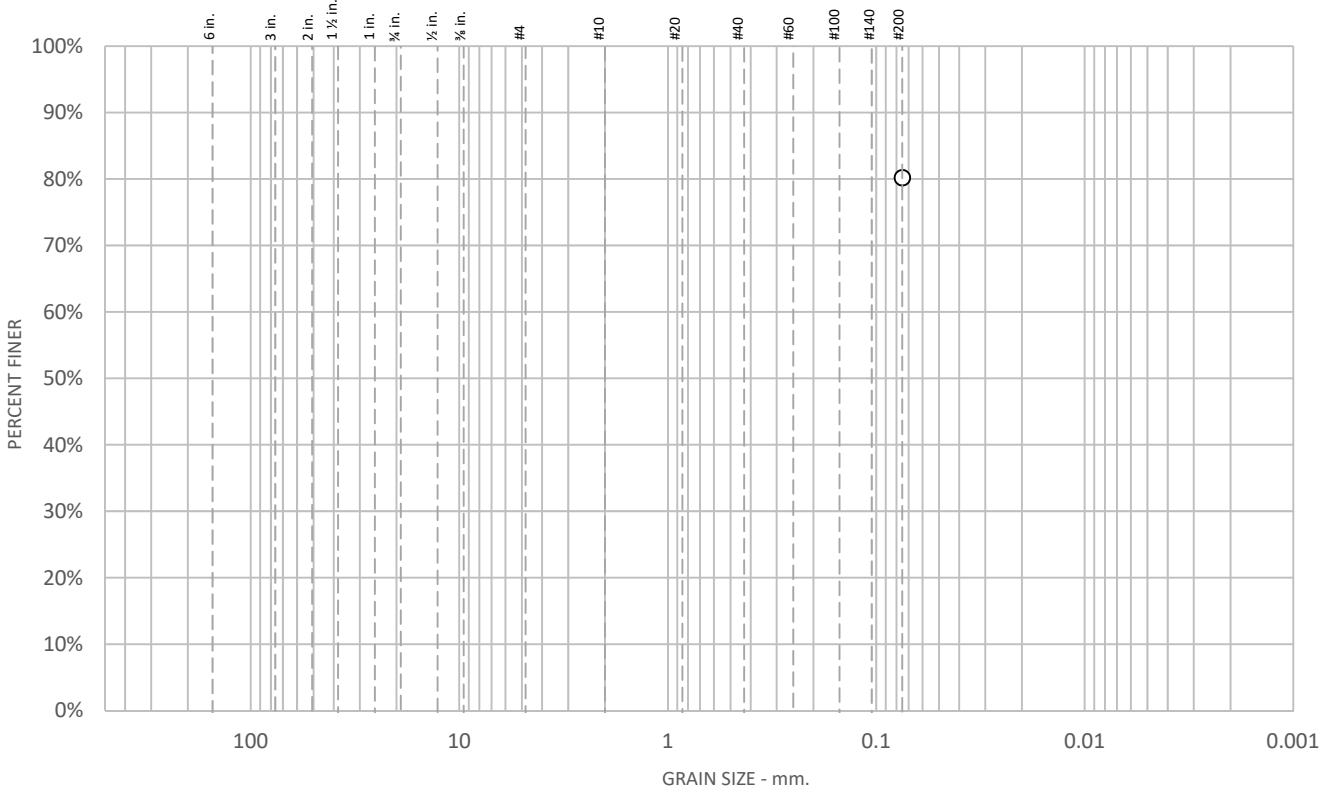
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						80.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	80.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 27 LL = 68 PI = 41

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 158.9 g

Sample Number: 1-B9 @ 5.5-6.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

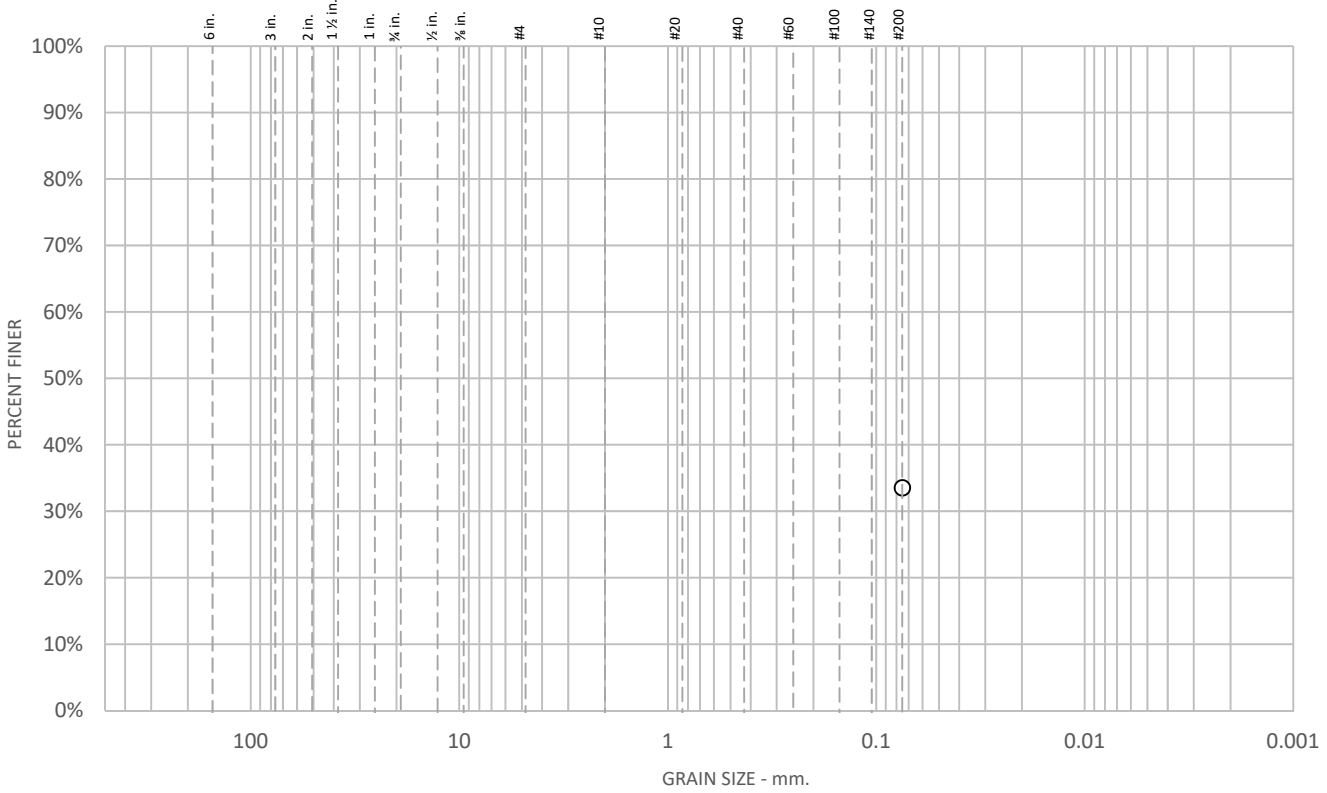
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 28 PI = 12

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 209.7 g

Sample Number: 1-B9 @ 55-56.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

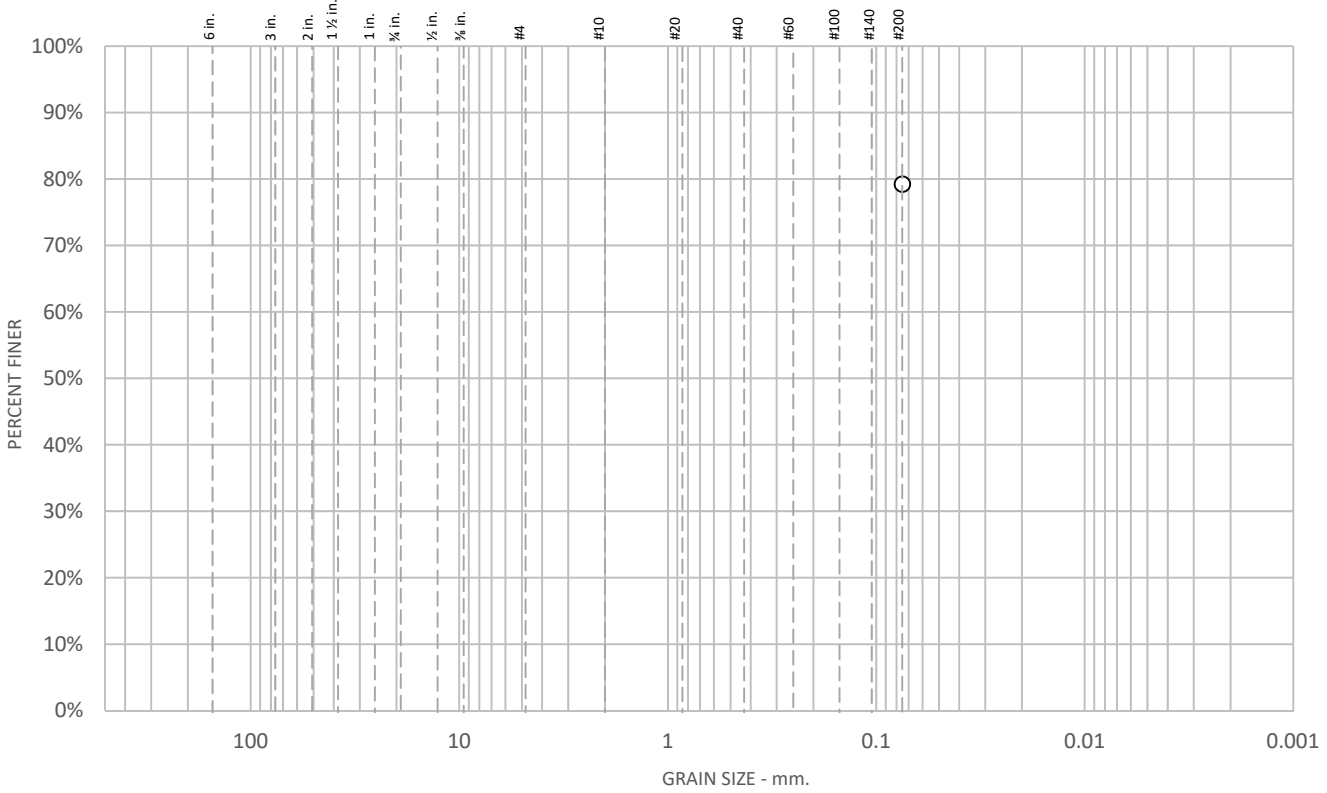
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						79.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	79.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 23 LL = 66 PI = 43

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 188.2 g

Sample Number: 1-B10 @ 15-16.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

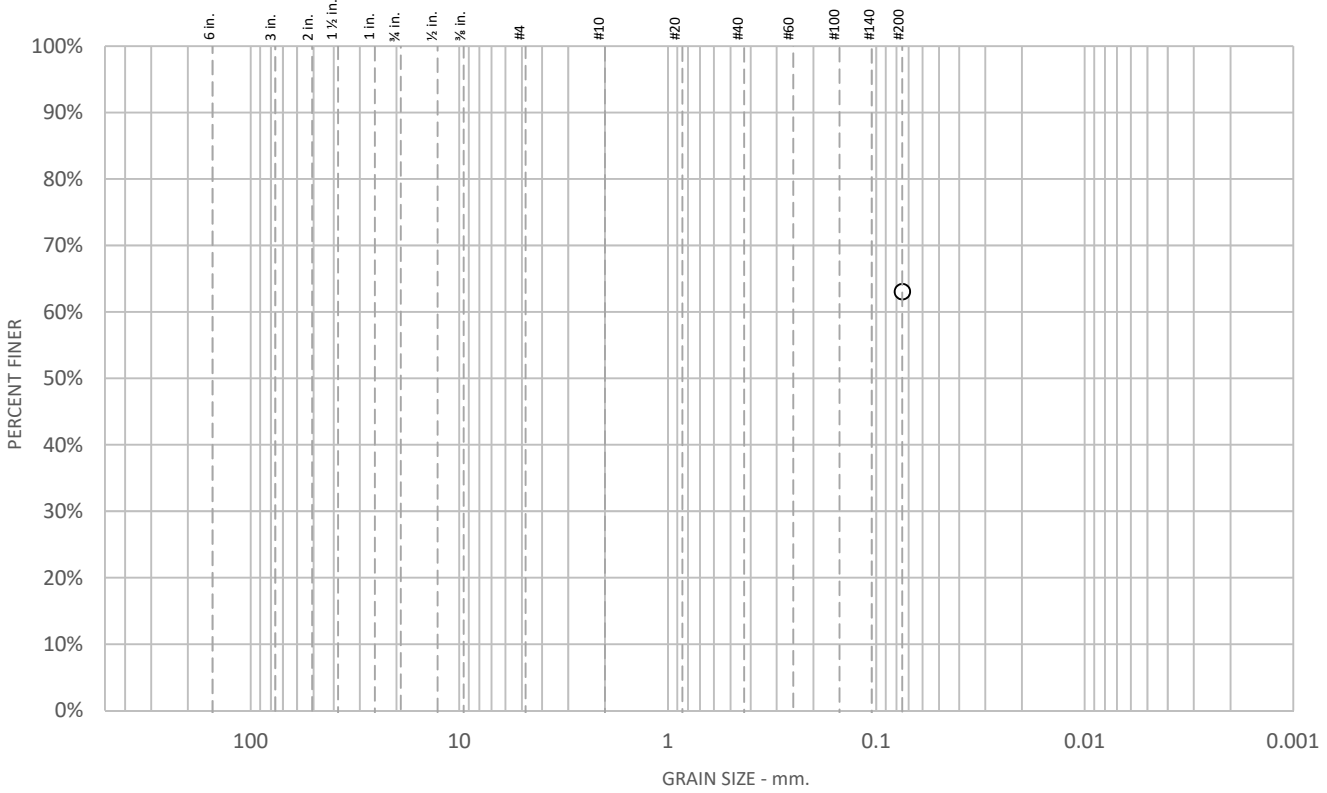
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						63.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	63.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 37 PI = 18

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 205.9 g

Sample Number: 1-B10 @ 25-26.5

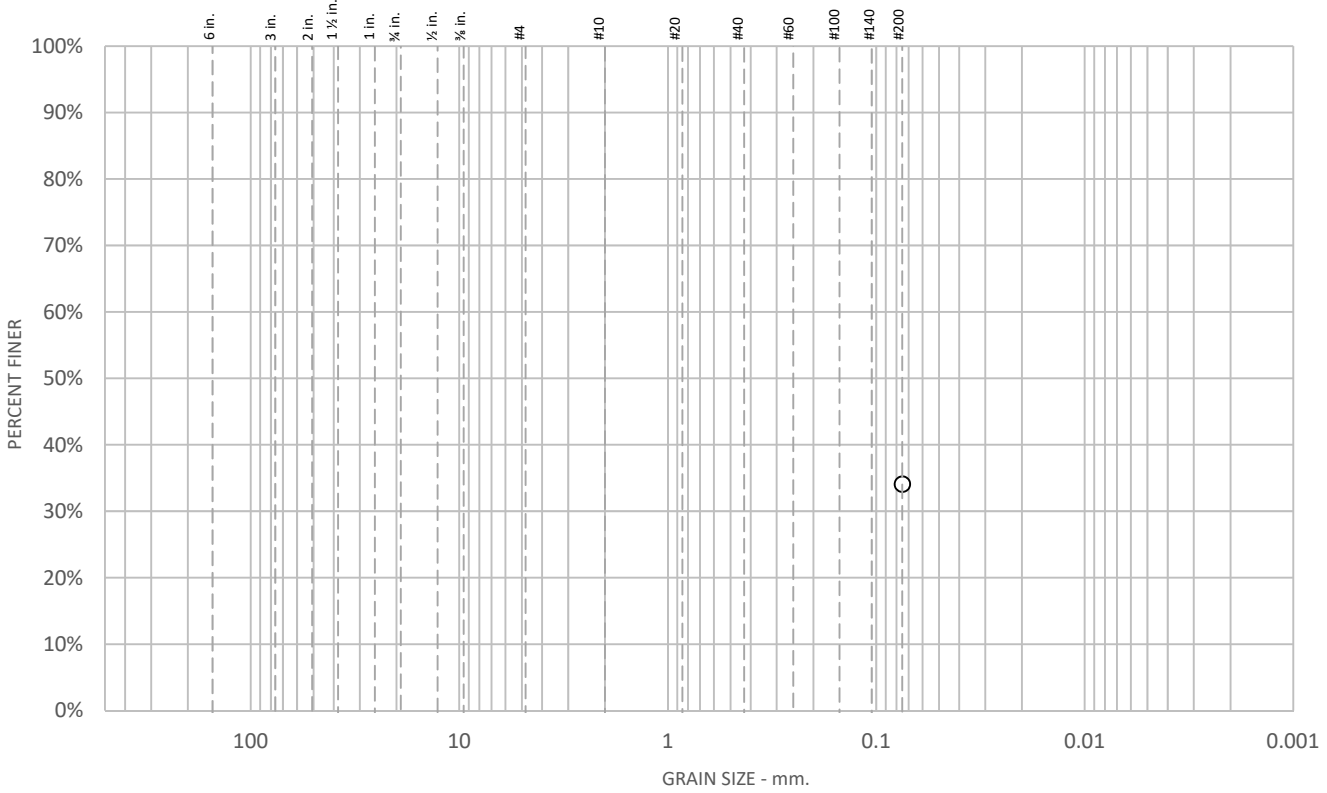
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 32 PI = 16

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 189.9 g

Sample Number: 1-B10 @ 40-41.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

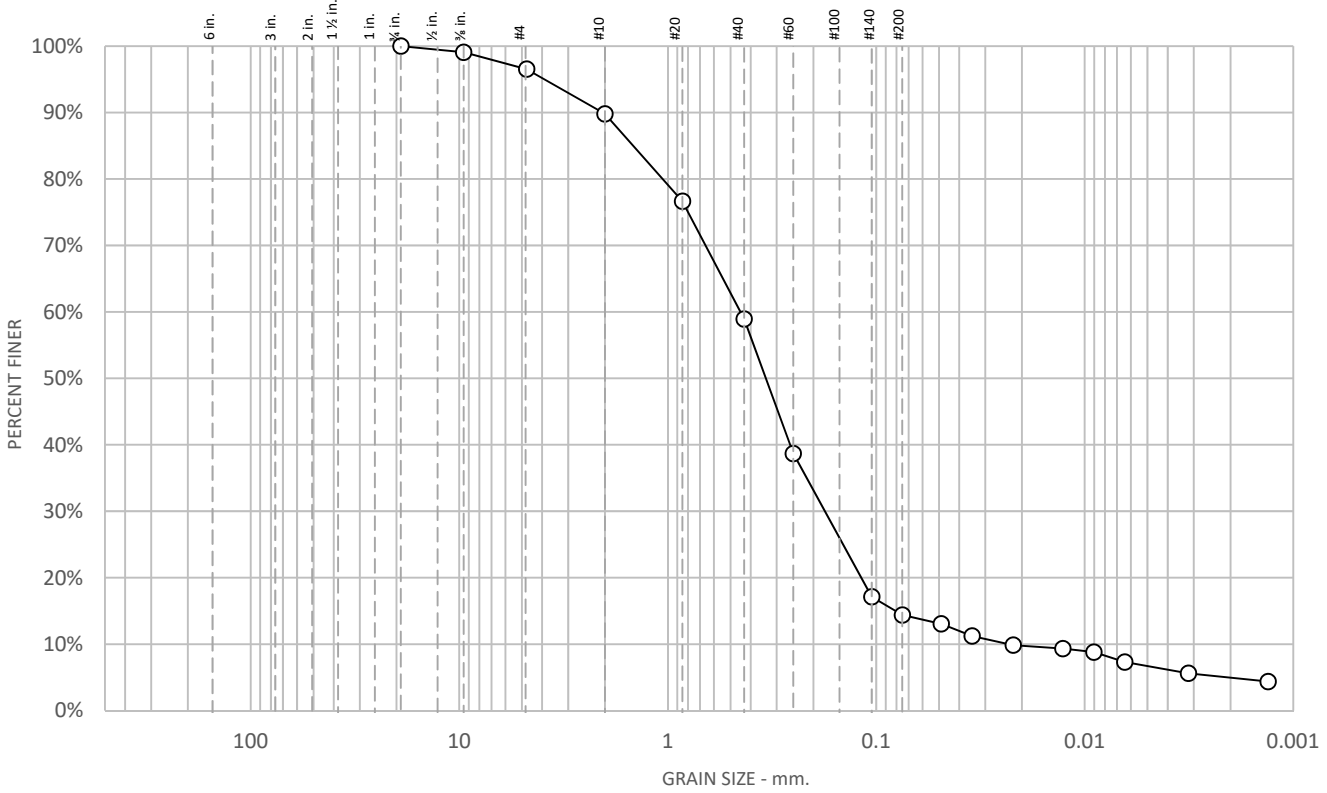
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	3.5	6.7	30.9	44.5	9.4	5.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.1		
#4	96.5		
#10	89.8		
#20	76.6		
#40	58.9		
#60	38.7		
#140	17.1		
#200	14.4		
0.0488 mm.	13.0		
0.0347 mm.	11.2		
0.0220 mm.	9.9		
0.0127 mm.	9.3		
0.0090 mm.	8.8		
0.0064 mm.	7.3		
0.0032 mm.	5.6		
0.0013 mm.	4.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 2.0536 mm D_{85} = 1.4639 mm D_{60} = 0.4479 mm
D_{50} = 0.3385 mm D_{30} = 0.1763 mm D_{15} = 0.0809 mm
D_{10} = 0.0231 mm C_u = 19.35 C_c = 3.00

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B10 @ 50-51.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Isotropic Consolidated Undrained Triaxial Test

ASTM D4767

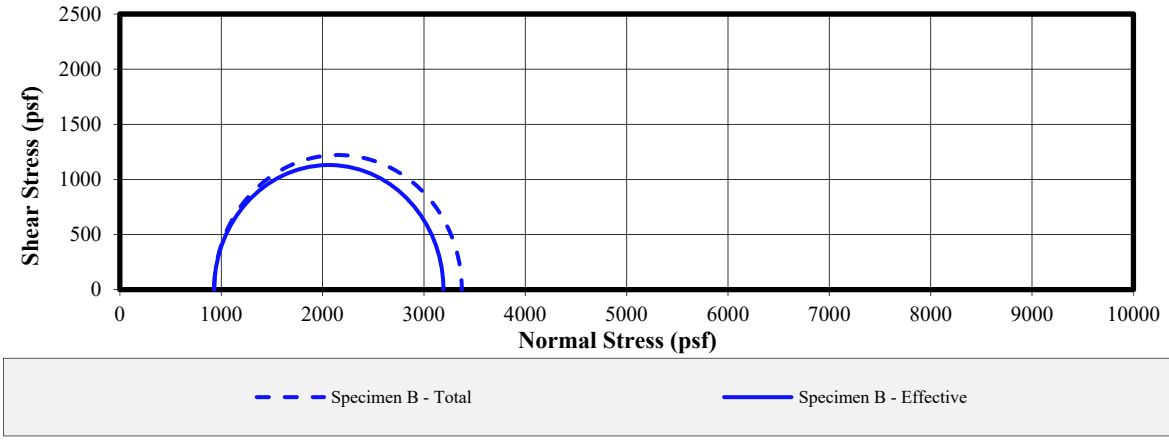
Date: 6/19/19

Checked By: D. Seibold

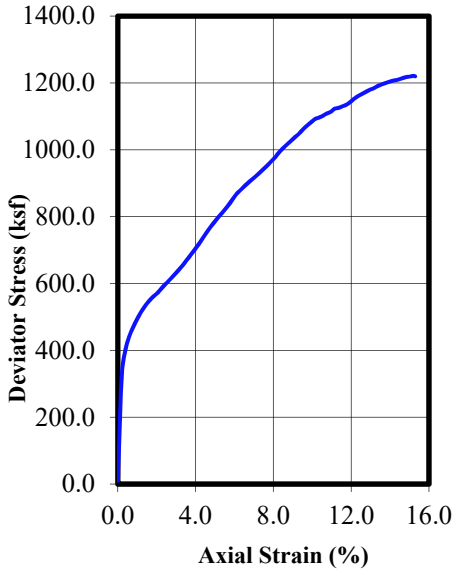
Date: 6/19/19

Tested By: G. Criste

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial		1-B9@30.5		
Height-to-Diameter Ratio		2.080		
Water Content (%)		26.4		
Dry Density (pcf)		99.9		
Saturation (%)		99.66		
Void Ratio		0.736		
Diameter (in)		2.392		
Height (in)		4.976		
ASTM D854 - Measured				
Specific Gravity		2.779		
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
After Consolidation		**1-B9@30.5**		
Void Ratio		0.737		
Water Content (%)		25.81		
Dry Density (pcf)		99.90		
Eff. Consol. Press. (psf)		7.1		
Back Pressure (psf)		43.0		
Saturation (%)		100.0		
B-Value		0.96		
Strain Rate (in./min.)		0.02411		
Height-to-Diameter Ratio		2.063		
After Shear		**1-B9@30.5**		
σ'1 at Failure (psf)		3187.4		
σ'3 at Failure (psf)		744.7		
t_{50} (min)		0.820		
t_{90} (min)		1.476		
Corrected Peak Deviator Stress (psf):		2442.7		

Maximium Deviator Stress Criterion	
C (psf)	
C' (psf)	
Ø (deg)	
Ø' (deg)	

Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B9
Sample Number:	1
Depth:	30.5-31.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type	Consolidated Undrained
Remarks	

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Isotropic Consolidated Undrained Triaxial Test

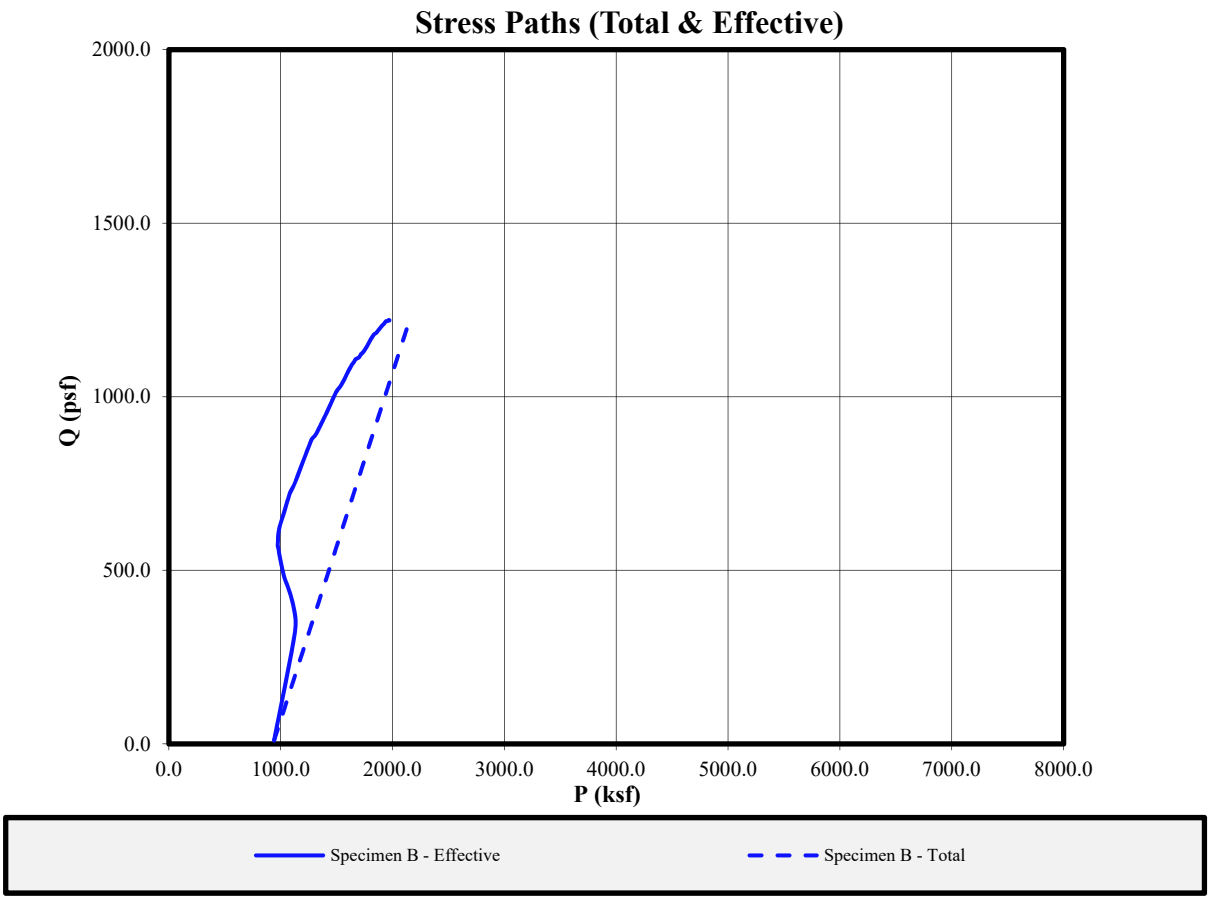
ASTM D4767

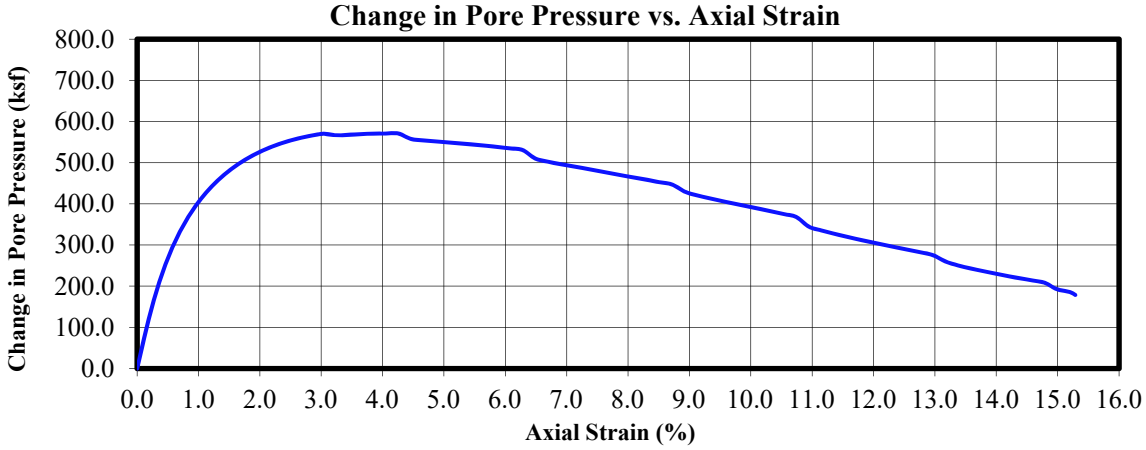
Date: 6/19/19

Checked By: D. Seibold

Date: 6/19/19

Tested By: G. Criste





Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B9
Sample Number:	1
Depth:	30.5-31.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type:	Consolidated Undrained
Remarks:	

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Isotropic Consolidated Undrained Triaxial Test

ASTM D4767

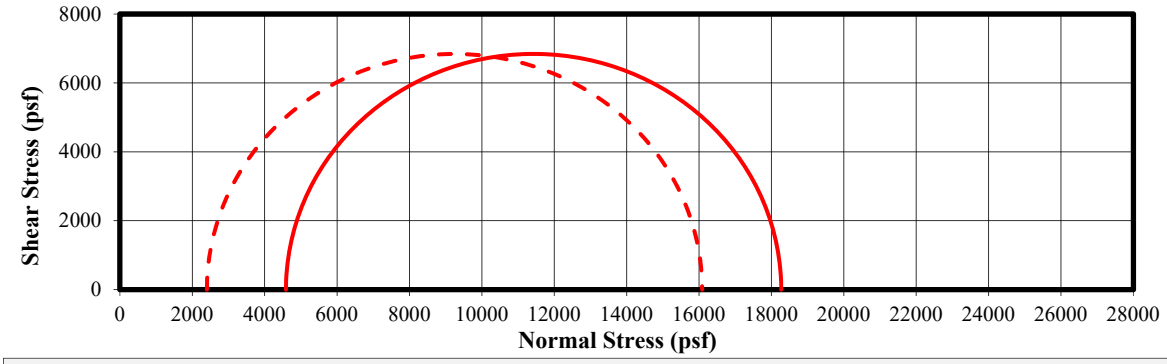
Date: 6/19/19

Checked By: D. Seibold

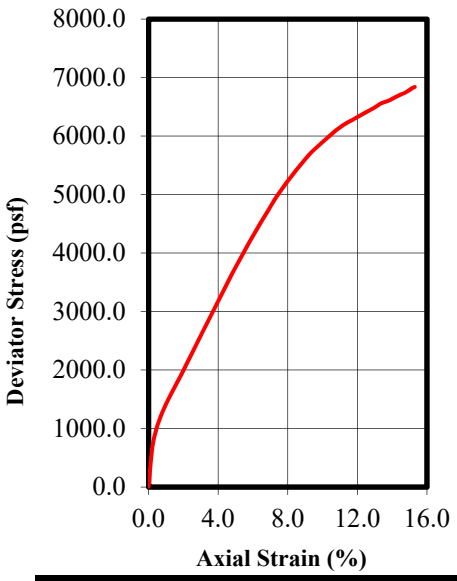
Date: 6/19/19

Tested By: G. Criste

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial			1-B8@70.5	
Height-to-Diameter Ratio			2.094	
Water Content (%)			26.0	
Dry Density (pcf)			100.4	
Saturation (%)			99.39	
Void Ratio			0.728	
Diameter (in)			2.386	
Height (in)			4.998	
ASTM D854 - Measured				
Specific Gravity			2.779	
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
After Consolidation			**1-B8@70.5**	
Void Ratio			0.697	
Water Content (%)			23.50	
Dry Density (pcf)			102.30	
Eff. Consol. Press. (psf)			13.5	
Back Pressure (psf)			45.0	
Saturation (%)			100.0	
B-Value			0.97	
Strain Rate (in./min.)			0.02518	
Height-to-Diameter Ratio			2.076	
After Shear			**1-B8@70.5**	
σ'1 at Failure (psf)			18271.0	
σ'3 at Failure (psf)			4588.8	
t_{50} (min)			0.421	
t_{90} (min)			0.757	
Corrected Peak Deviator Stress (psf):			13682.2	

Maximium Deviator Stress Criterion	
C (psf)	
C' (psf)	
Ø (deg)	
Ø' (deg)	

Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B8
Sample Number:	Multiple
Depth:	70.5-71.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type	Consolidated Undrained
Remarks	

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Isotropic Consolidated Undrained Triaxial Test

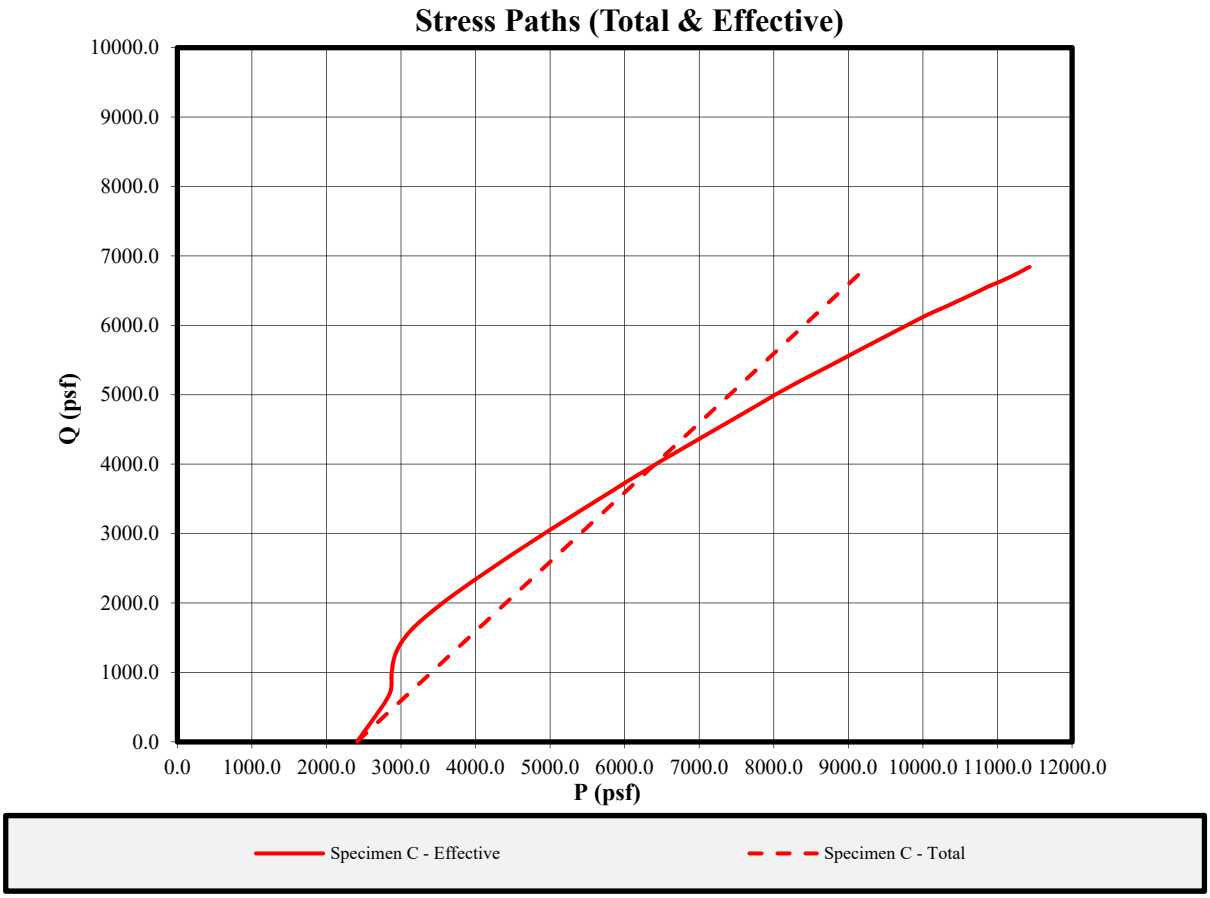
ASTM D4767

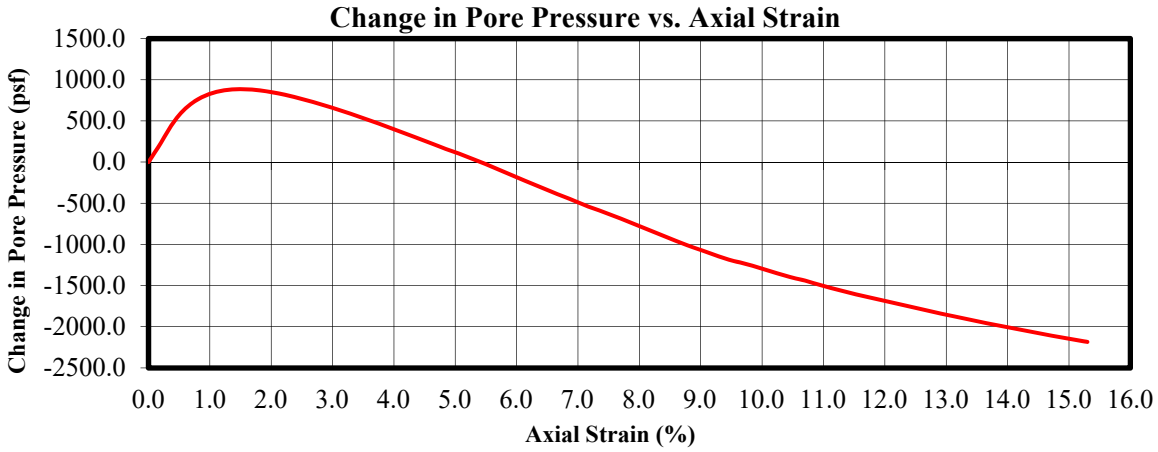
Date: 6/19/19

Checked By: D. Seibold

Date: 6/19/19

Tested By: G. Criste





Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B8
Sample Number:	Multiple
Depth:	70.5-71.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type:	Consolidated Undrained
Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

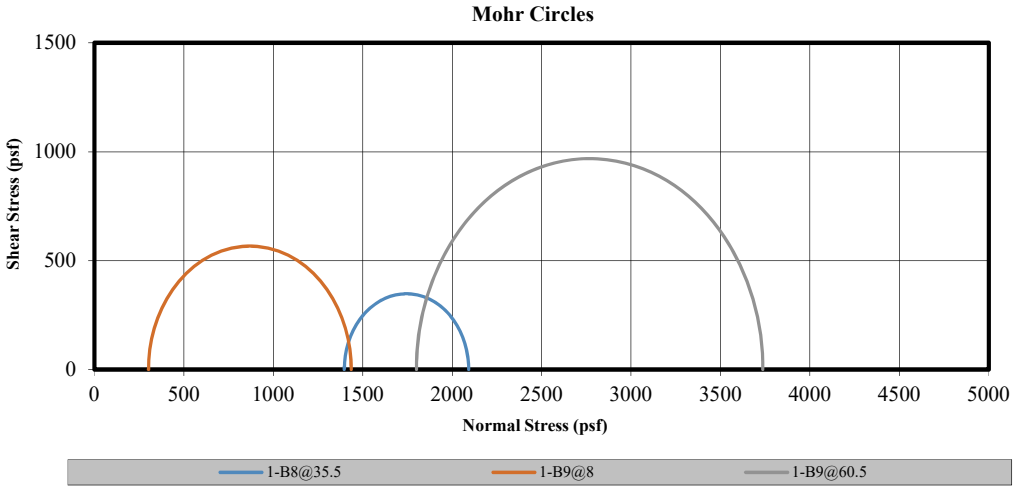
ASTM D2850

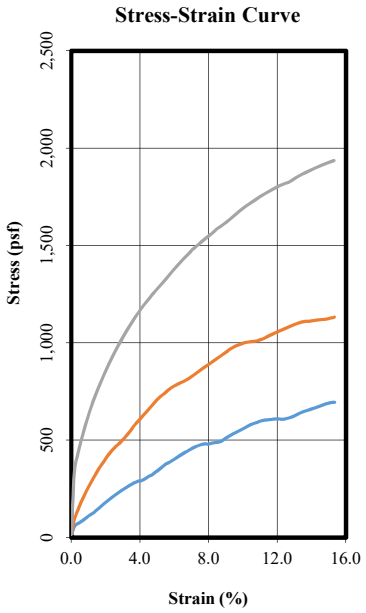
Date: 06/07/19

Checked By: G. Criste

Date: 6/7/2019

Tested By: N. Buckton





Before Test	Specimen 1-B8@35.5	1-B9@8	1-B9@60.5	
Water Content (%)	25.53	23.50	20.55	
Dry Density (pcf)	102.30	104.80	108.50	
Saturation (%)	99.91	99.94	98.92	
Void Ratio	0.72	0.65	0.56	
Diameter (in)	2.402	2.394	2.389	
Height (in)	4.897	4.984	5.547	
Height-to-Diameter Ratio	2.039	2.082	2.322	
ASTM D4318 - Wet Method				
Liquid Limit	n/a	n/a	n/a	
Plastic Limit	n/a	n/a	n/a	
ASTM D854 - Assumed				
Specific Gravity	2.819	2.775	2.720	
After Test	**1-B8@35.5**	**1-B9@8**	**1-B9@60.5**	
Water Content (%)	25.53	23.50	20.55	
Saturation (%)	99.91	99.93	98.92	
Strain Rate (in/min)	0.05	0.05	0.05	
Peak Deviator Stress (psf)	695.1	1132.7	1936.7	
Axial Strain @ Failure (%)	15.341	15.327	15.301	
	Cell Pressure			
Cell (psf)	1396.8	302.4	1800.0	
Back (psf)	n/a	n/a	n/a	
	Principle Stresses at Failure			
σ1 (psf)	2091.9	1435.1	3736.7	
σ3 (psf)	1396.8	302.4	1800.0	
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		347.5	566.3	968.4	
Friction Angle Ø	n/a		n/a	n/a	n/a	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

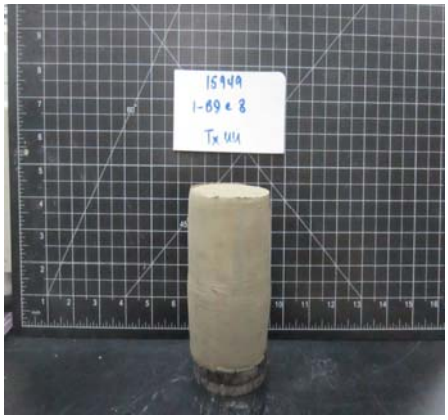
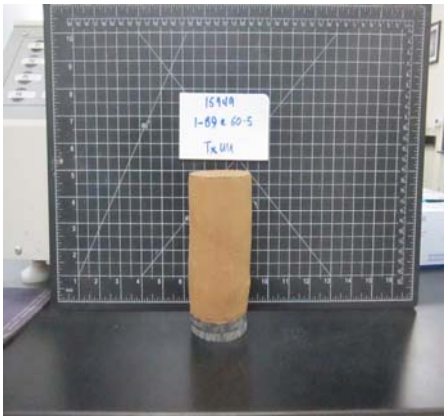
Date: 06/07/19

Checked By: G. Criste

Date: 6/7/2019

Tested By: N. Buckton

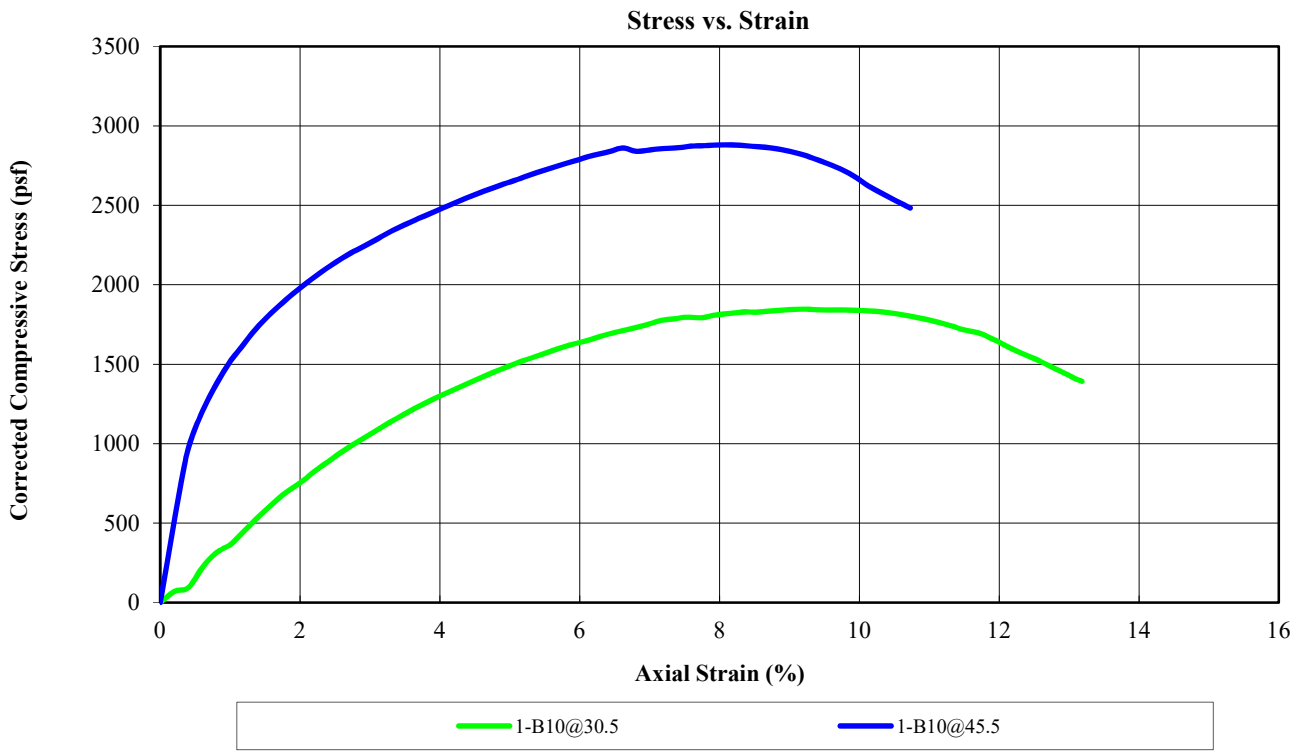
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B8@35.5	SAMPLE NUMBER: 1-B9@8
	
SAMPLE NUMBER: 1-B9@60.5	**SAMPLE NUMBER:**
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

UNCONFINED COMPRESSION TEST REPORT
ASTM D2166



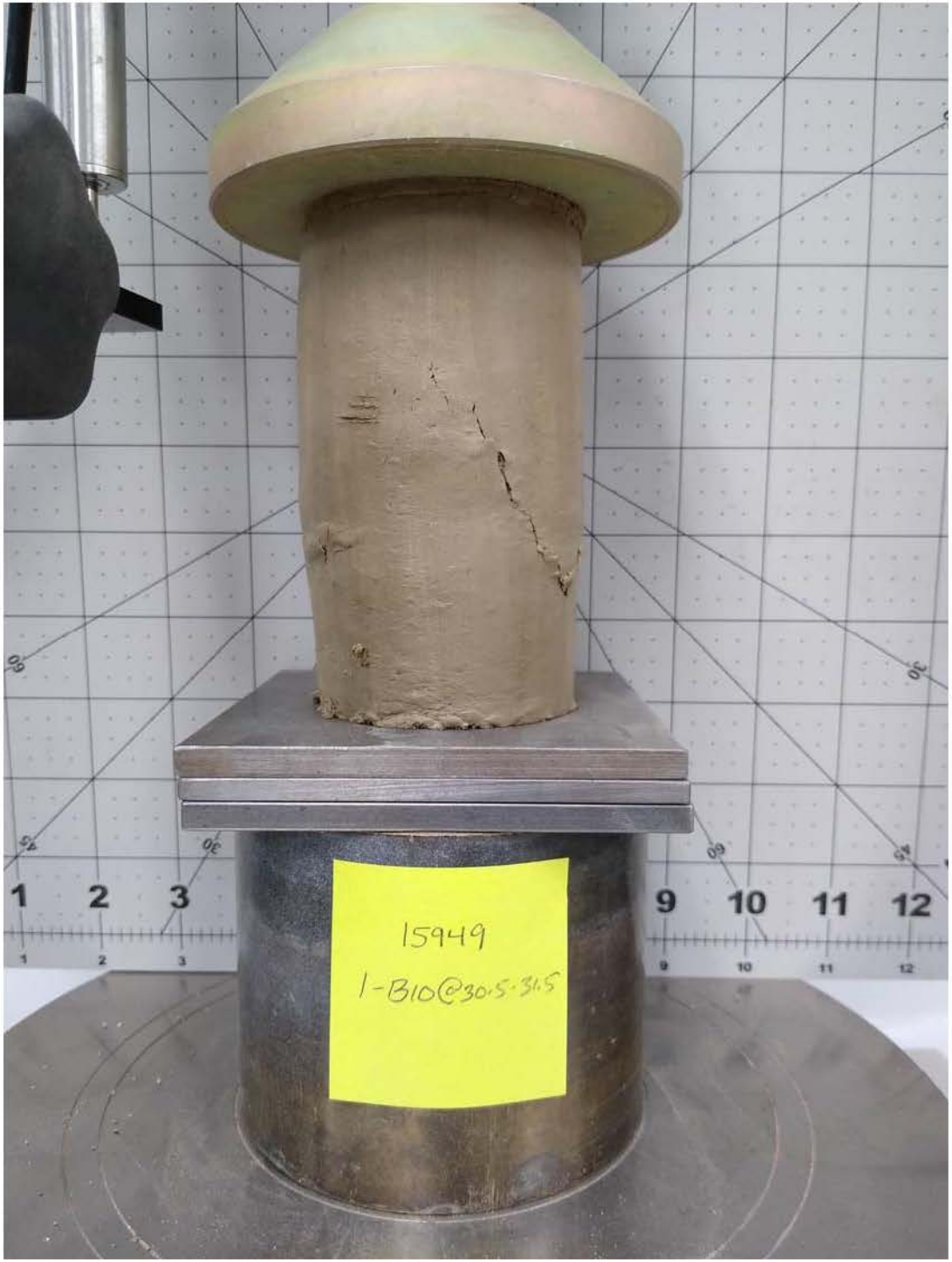
BEFORE TEST	SPECIMEN 1-B10@30.5	1-B10@45.5
Moisture Content (%)	22.9	28.3
Dry Density (pcf)	105.2	96.3
Saturation (%)	100.0	100.0
Void Ratio	0.57	0.72
Diameter (in)	2.395	2.392
Height (in)	5.11	5.20
Height-To-Diameter Ratio	2.13	2.17
TEST DATA		
Unconfined Compressive Strength (psf)	1847	2881
Undrained Shear Strength (psf)	923	1440
Strain Rate (in./min.)	0.05	0.05
Specific Gravity	2.650	2.650
Strain at Failure (%)	9.14	8.17
Liquid Limit		
Plastic Limit		
Test Remarks		

SPECIMEN	DESCRIPTION
1-B10@30.5	See exploration logs
1-B10@45.5	See exploration logs

PROJECT NAME: GEX for Multiple Parcels
PROJECT NO: 15949.000.000
CLIENT: Google, LLC
LOCATION: 1-B10@30.5
PHASE NO: LAB

Report Date: 06/12/19
Tested By: R. Montalvo
Reviewed By: M. Gilbert

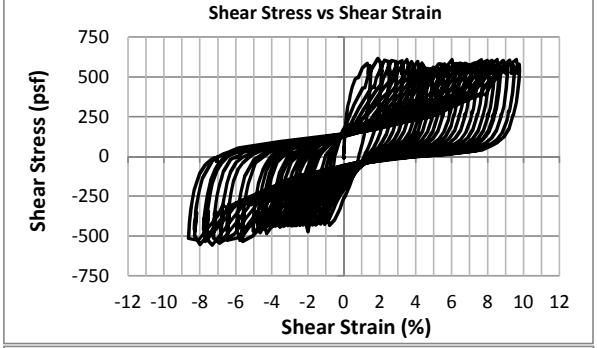
ENGEO
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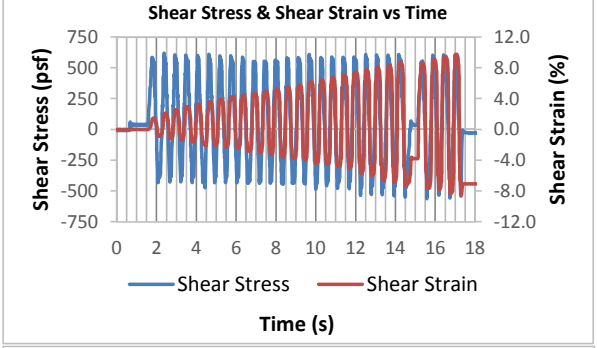

15949
1-B10@30.5-31.5

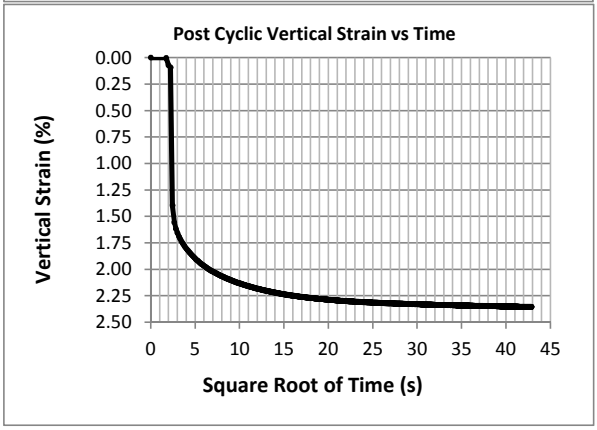

15949
1-B10@45.5-46.5

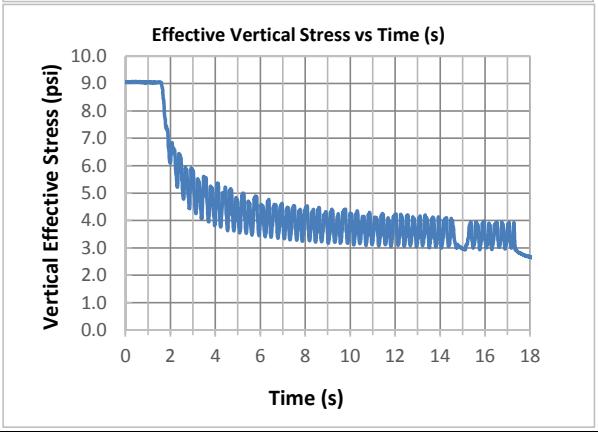
Cyclic Simple Shear

ASTM D6528 - Modified









Test Conditions		Results		Maximum	Minimum
Confining Condition	Plain Membrane w/Chamber Pressure	Vertical Effective Stress (psf)	Deviatoric	783.5	-54.8
Applied Lateral Effective Stress (psf)	520.0		Isotropic	520.0	520.0
Resulting K_o after applied, σ_{vc}'	0.398	Shear Strain (%)		9.8	-8.6
Applied Loading Frequency (Hz)	0.500	Post Cyclic Vertical Strain (%)		2.36	
Cycle Limit, N	27				
Single Amp. Strain (+/-)	9.2	**Cyclic Preshear Specimen Condition**			
Applied τ_{cyc} (psf)	617	Preshear Moisture Content (%)		23.93%	
Applied σ_{vc}' (psf)	1308	Preshear Void Ratio		0.6554	
Applied CSR	0.472	Preshear Saturation (%)		100.36%	
		Preshear Dry Density (pcf)		103.53	

Test Date: 6/18/2019

ASTM D2216	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	25.75%	22.72%	**Liquid Limit:**	
Dry Density (pcf):	102.99	105.52	**Plastic Limit:**	
Saturation (%):	96.53%	100.00%	**ASTM D854 - Measured**	
Void Ratio:	0.7331	0.6229	**Specific Gravity:**	2.748
			Soil Description:	See exploration logs

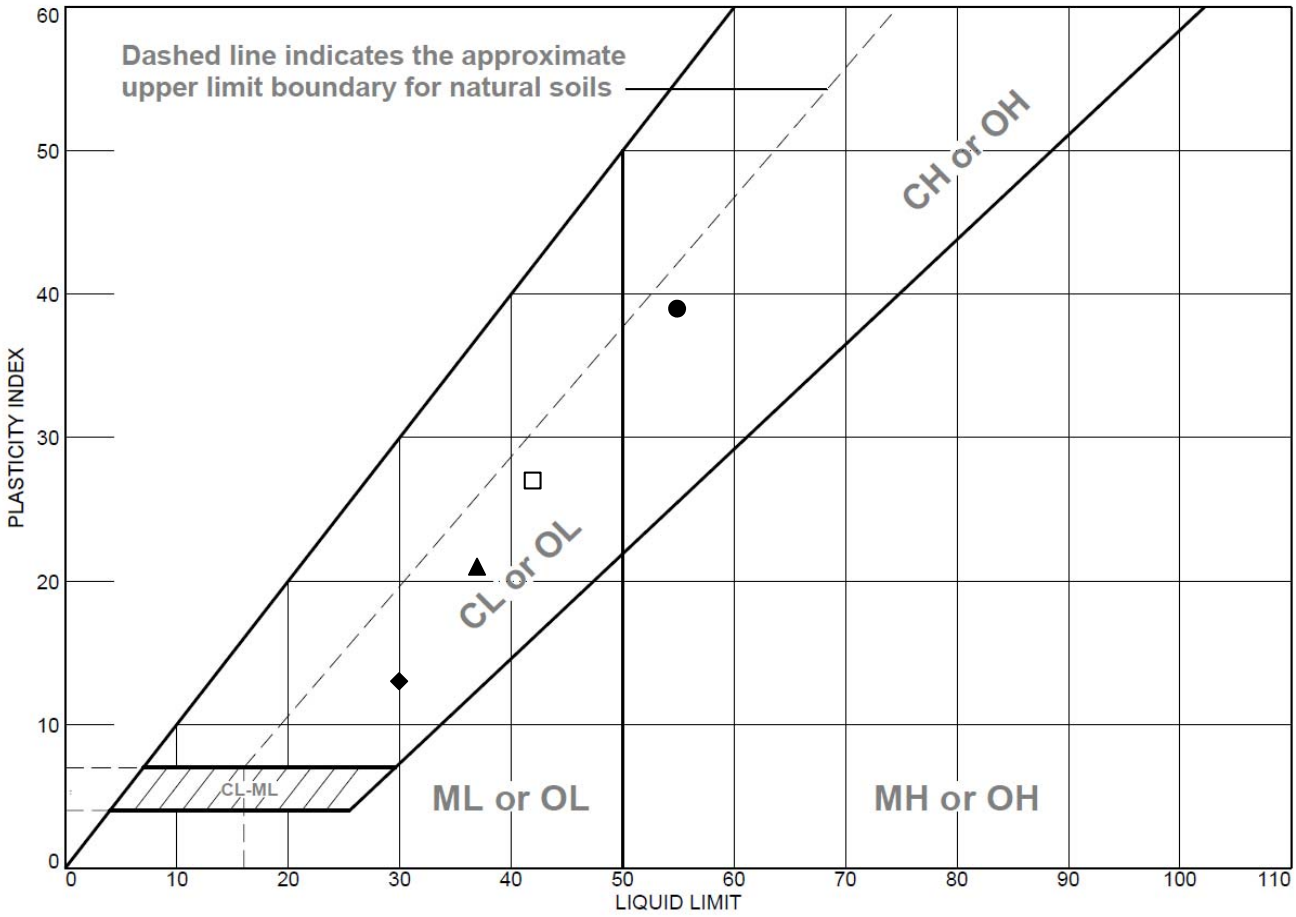
Project Number:	15949.000.000	**Depth:**	15.5-15.75 ft.
Sample Number:	1-B9 @ 15-16.5	**Boring #:**	1-B9
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

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Remarks:


15949
CSS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	37	16	21	87.8	62.3	CL
◆	See exploration logs	30	17	13		40.2	
□	See exploration logs	42	15	27		52.9	CL
●	See exploration logs	55	16	39		92	CH

Project No.: 15949.000.000 PHLAB **Date:** 6/19/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B1 **Depth:** 13-14.5
◆ **Sample Number:** 1-B1 **Depth:** 16-17.5
□ **Sample Number:** 1-B1 **Depth:** 30.5-31.5
● **Sample Number:** 1-B1 **Depth:** 43-44.5

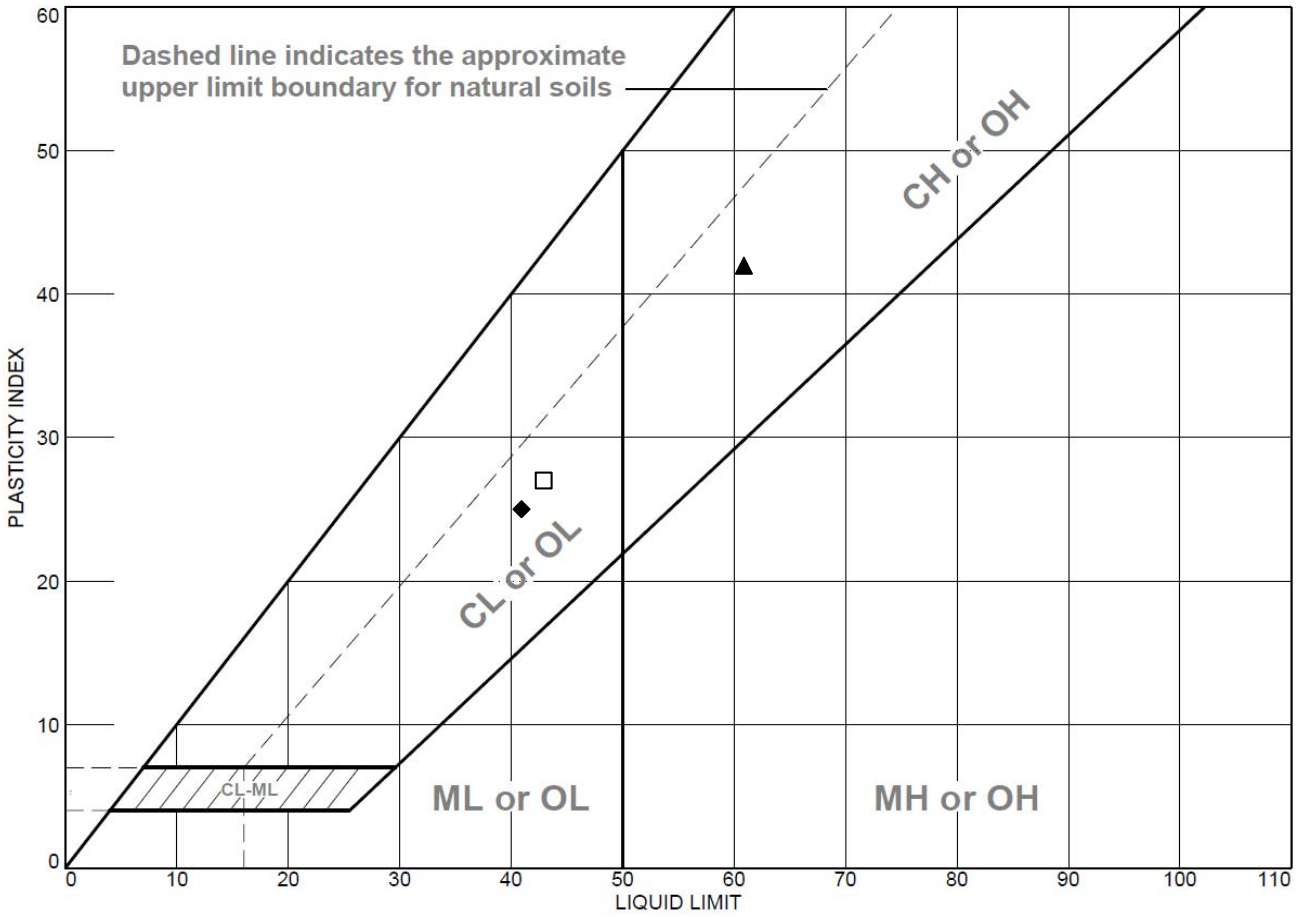
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	61	19	42		82.5	CH
◆	See exploration logs	41	16	25		64.8	CL
□	See exploration logs	43	16	27		25.6	

Project No.: 15949.000.000 PHLAB **Date:** 6/19/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B2 **Depth:** 6.5-7
◆ **Sample Number:** 1-B2 **Depth:** 15-16.5
□ **Sample Number:** 1-B2 **Depth:** 30-31.5

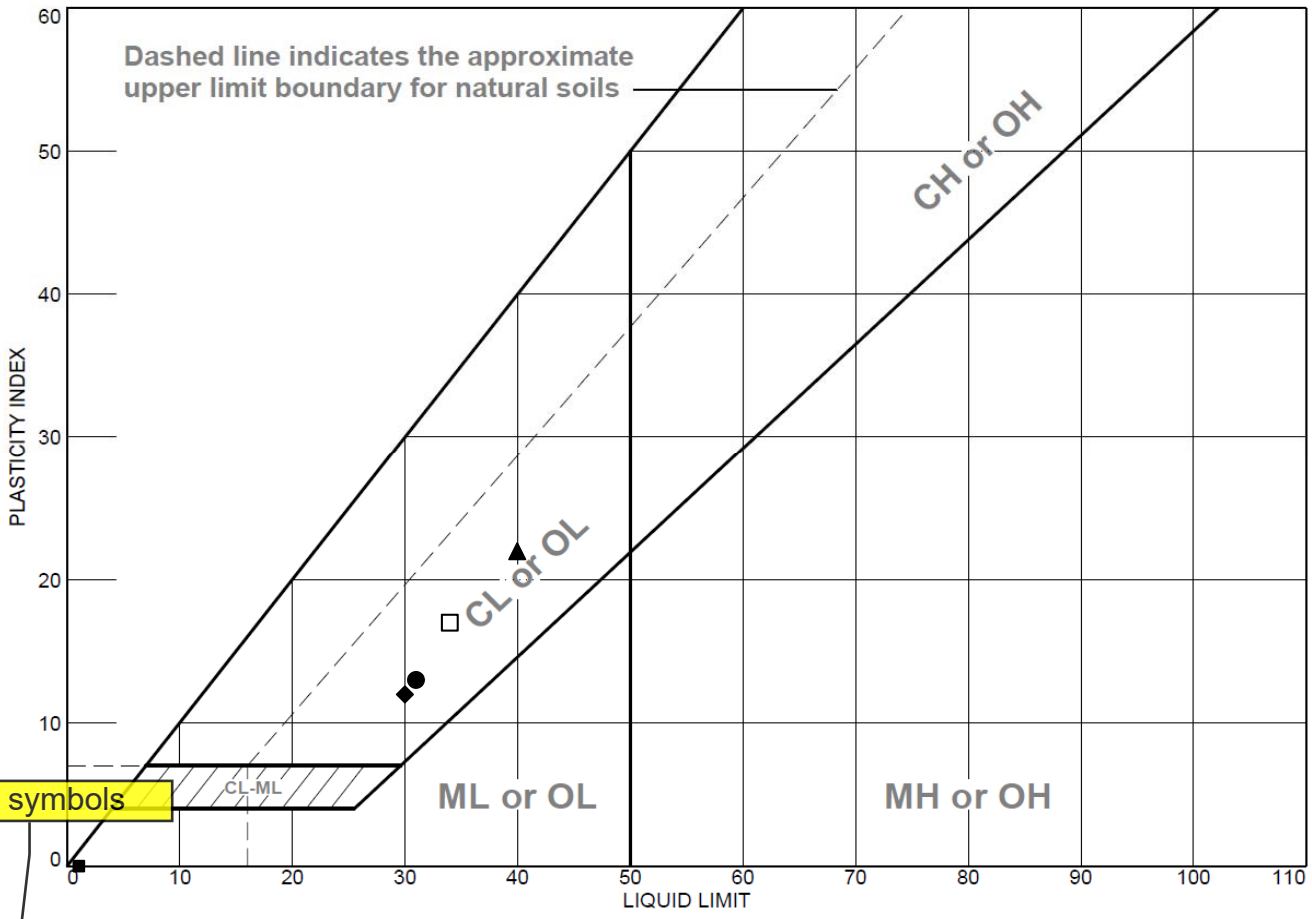
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



missing symbols

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	See exploration logs	40	18	22		37.7	
	See exploration logs	30	18	12		30.2	
	See exploration logs	34	17	17	79.2	58	
	See exploration logs	31	18	13		46.4	
	See exploration logs	NV	NP	NP			

Project No.: 15949.000.000 **Date:** 6/20/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

Sample Number: 1-B4 **Depth:** 25.5-26.5
Sample Number: 1-B4 **Depth:** 35.5-36.5
Sample Number: 1-B4 **Depth:** 46-47.5
Sample Number: 1-B4 **Depth:** 52-53
Sample Number: 1-B4 **Depth:** 8.5-9

missing symbols

Remarks:

PI: ASTM D4318, Wet Method, GS: ASTM D1140

PI: ASTM D4318, Wet Method, GS: ASTM D1140

PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

PI: ASTM D4318, Wet Method, GS: ASTM D1140

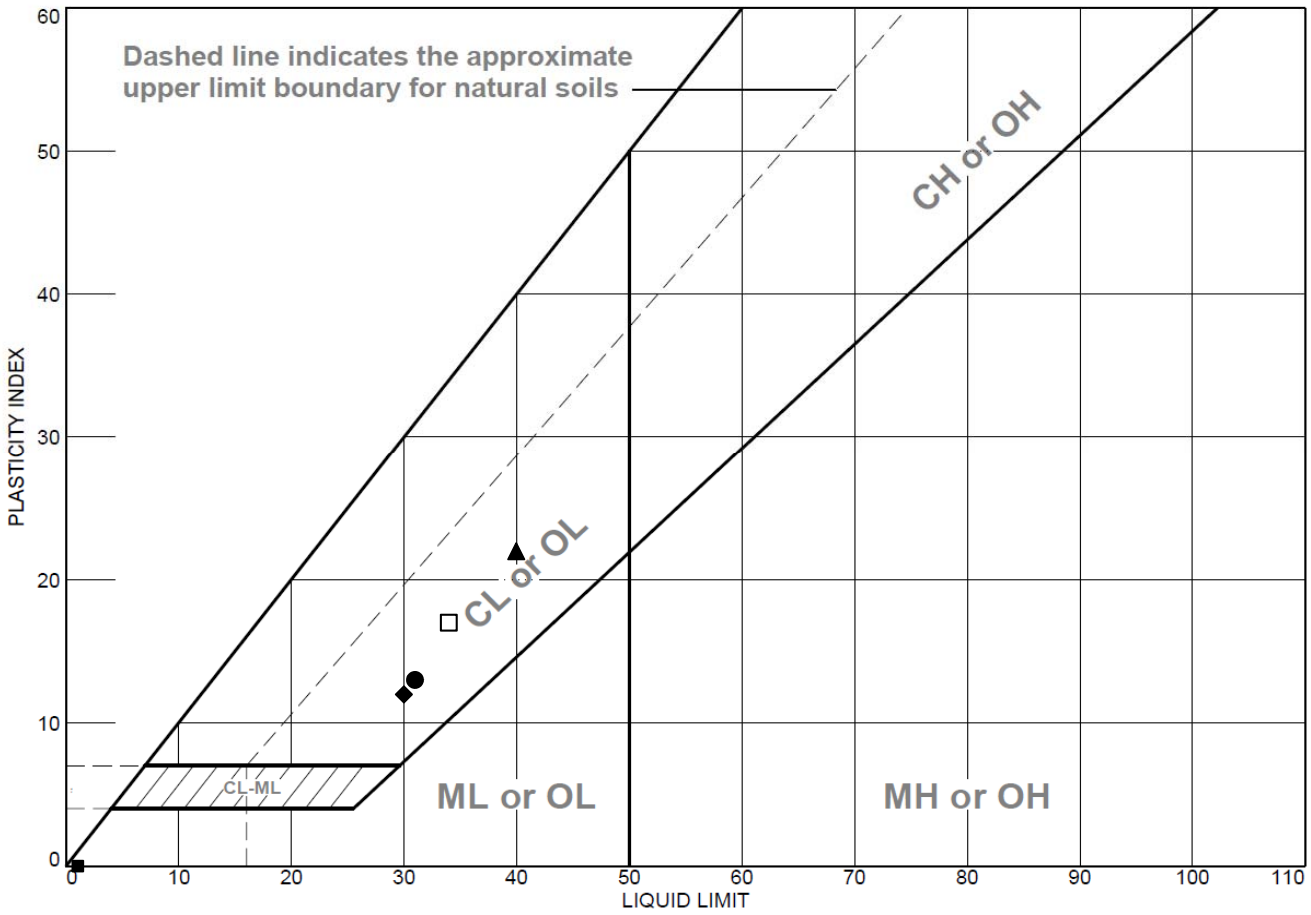
PI: ASTM D4318, Wet Method

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	40	18	22		37.7	
◆	See exploration logs	30	18	12		30.2	
□	See exploration logs	34	17	17	79.2	58	
●	See exploration logs	31	18	13		46.4	
■	See exploration logs	NV	NP	NP			

Project No.: 15949.000.000 **Date:** 6/20/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

▲ **Sample Number:** 1-B4 **Depth:** 25.5-26.5
◆ **Sample Number:** 1-B4 **Depth:** 35.5-36.5
□ **Sample Number:** 1-B4 **Depth:** 46-47.5
● **Sample Number:** 1-B4 **Depth:** 52-53
■ **Sample Number:** 1-B4 **Depth:** 8.5-9

Remarks:

▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140

◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140

□ PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

● PI: ASTM D4318, Wet Method, GS: ASTM D1140

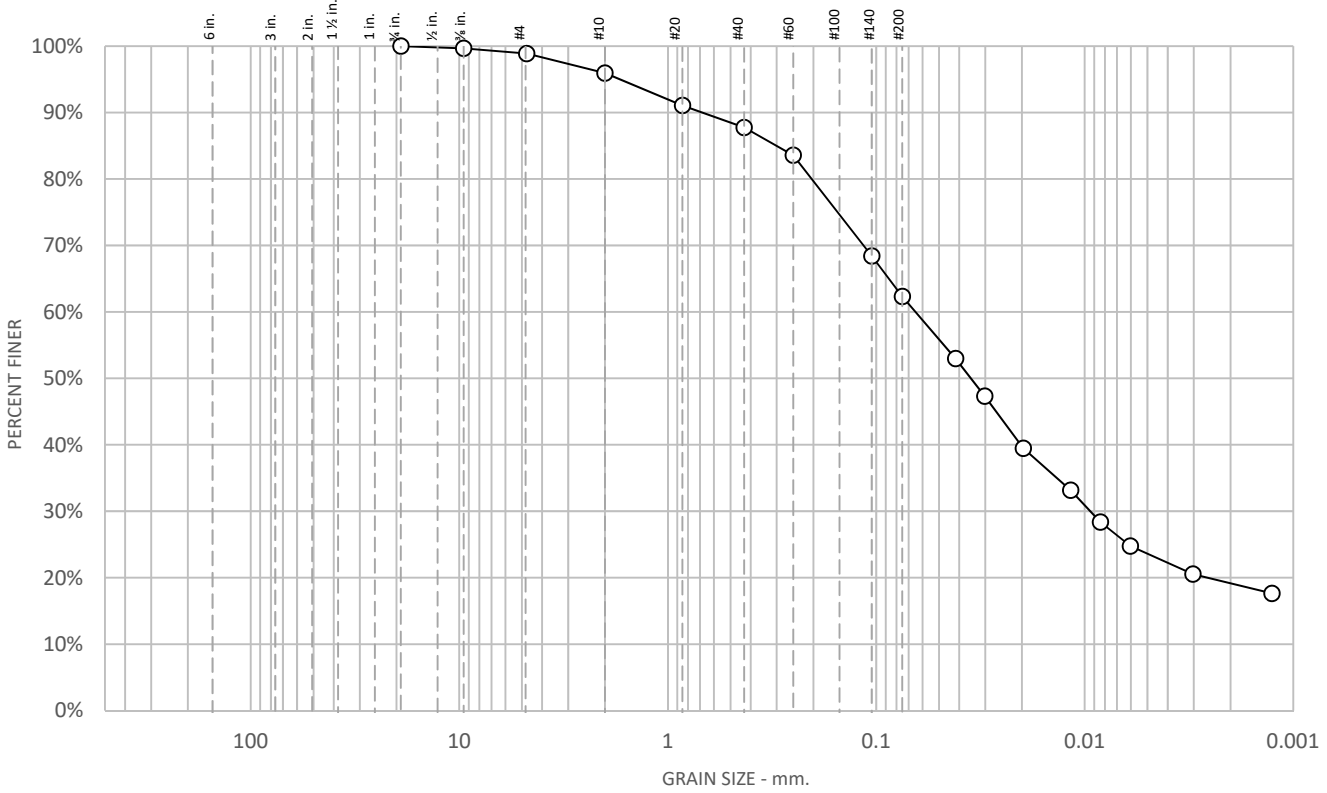
■ PI: ASTM D4318, Wet Method

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	1.1	2.9	8.2	25.4	43.2	19.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.7		
#4	98.9		
#10	95.9		
#20	91.1		
#40	87.8		
#60	83.6		
#140	68.4		
#200	62.3		
0.0416 mm.	53.0		
0.0302 mm.	47.3		
0.0197 mm.	39.5		
0.0117 mm.	33.2		
0.0084 mm.	28.4		
0.0060 mm.	24.7		
0.0030 mm.	20.5		
0.0013 mm.	17.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 37 PI = 21

Coefficients

D_{90} = 0.6832 mm D_{85} = 0.3009 mm D_{60} = 0.0648 mm
D_{50} = 0.0352 mm D_{30} = 0.0094 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS = CL

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B1 @ 13-14.5

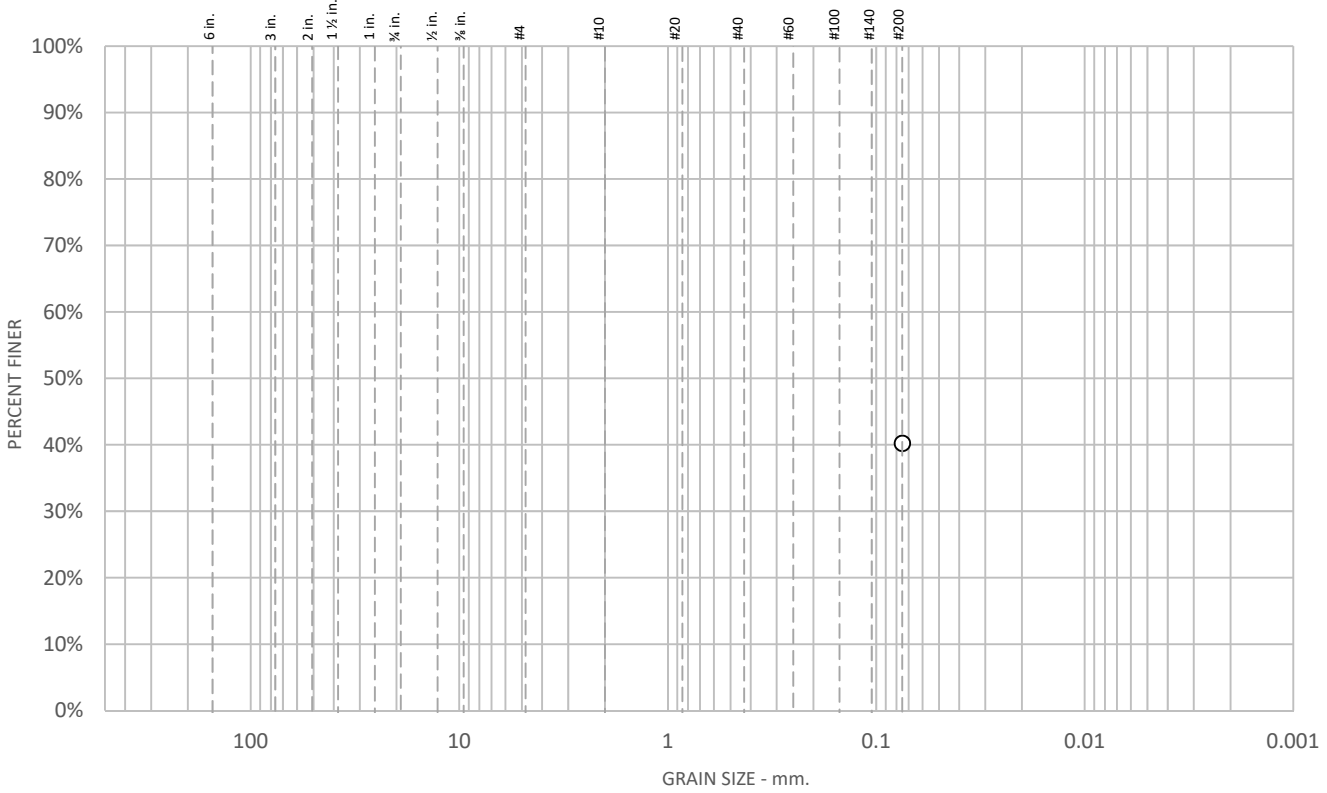
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	40.2		

* (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 =

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 176 g

Sample Number: 1-B1 @ 16-17.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

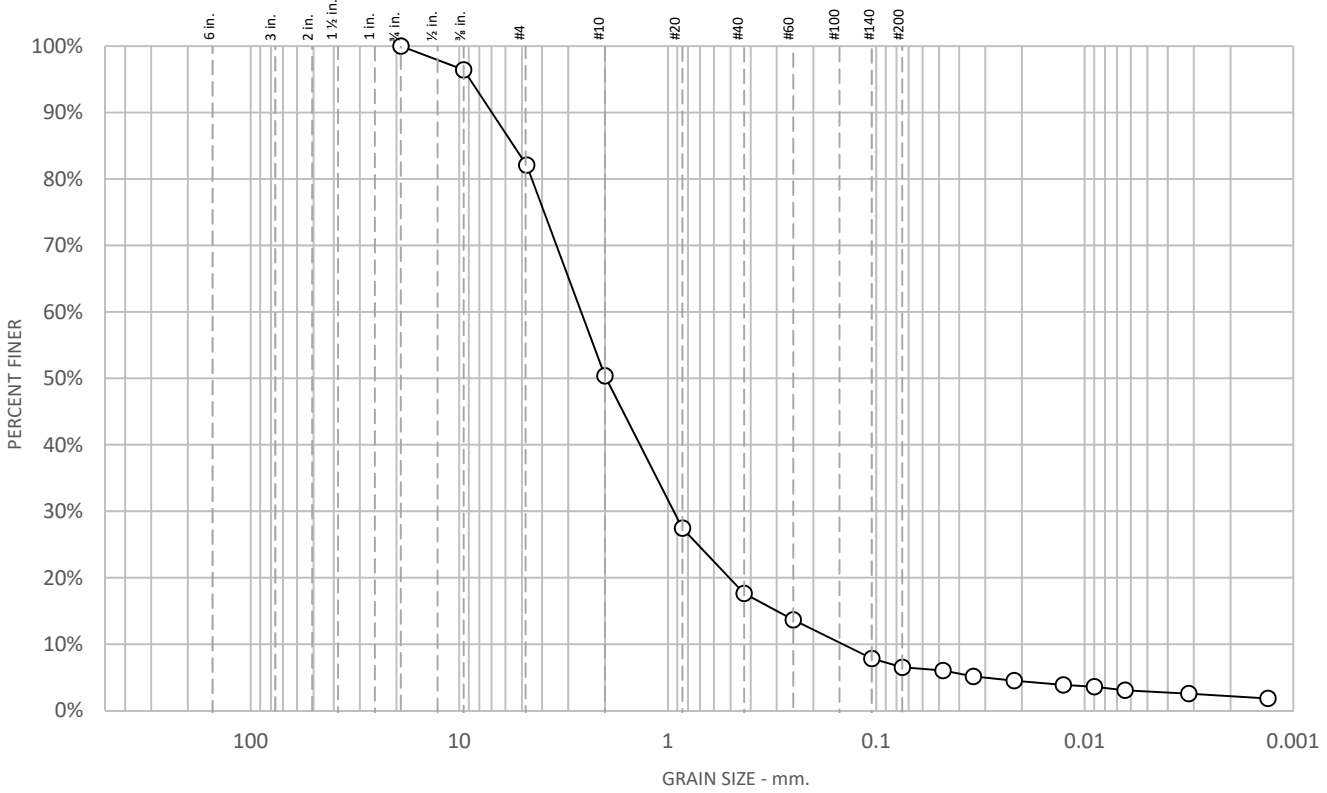
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	17.9	31.7	32.8	11.1	4.3	2.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	96.4		
#4	82.1		
#10	50.4		
#20	27.5		
#40	17.6		
#60	13.6		
#140	7.8		
#200	6.5		
0.0479 mm.	6.0		
0.0342 mm.	5.1		
0.0218 mm.	4.5		
0.0127 mm.	3.9		
0.0090 mm.	3.6		
0.0064 mm.	3.1		
0.0032 mm.	2.5		
0.0013 mm.	1.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 6.9733 mm D_{85} = 5.4695 mm D_{60} = 2.6000 mm
D_{50} = 1.9718 mm D_{30} = 0.9347 mm D_{15} = 0.3006 mm
D_{10} = 0.1450 mm C_u = 17.94 C_c = 2.32

Classification

USCS = SW

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B1 @ 17.5

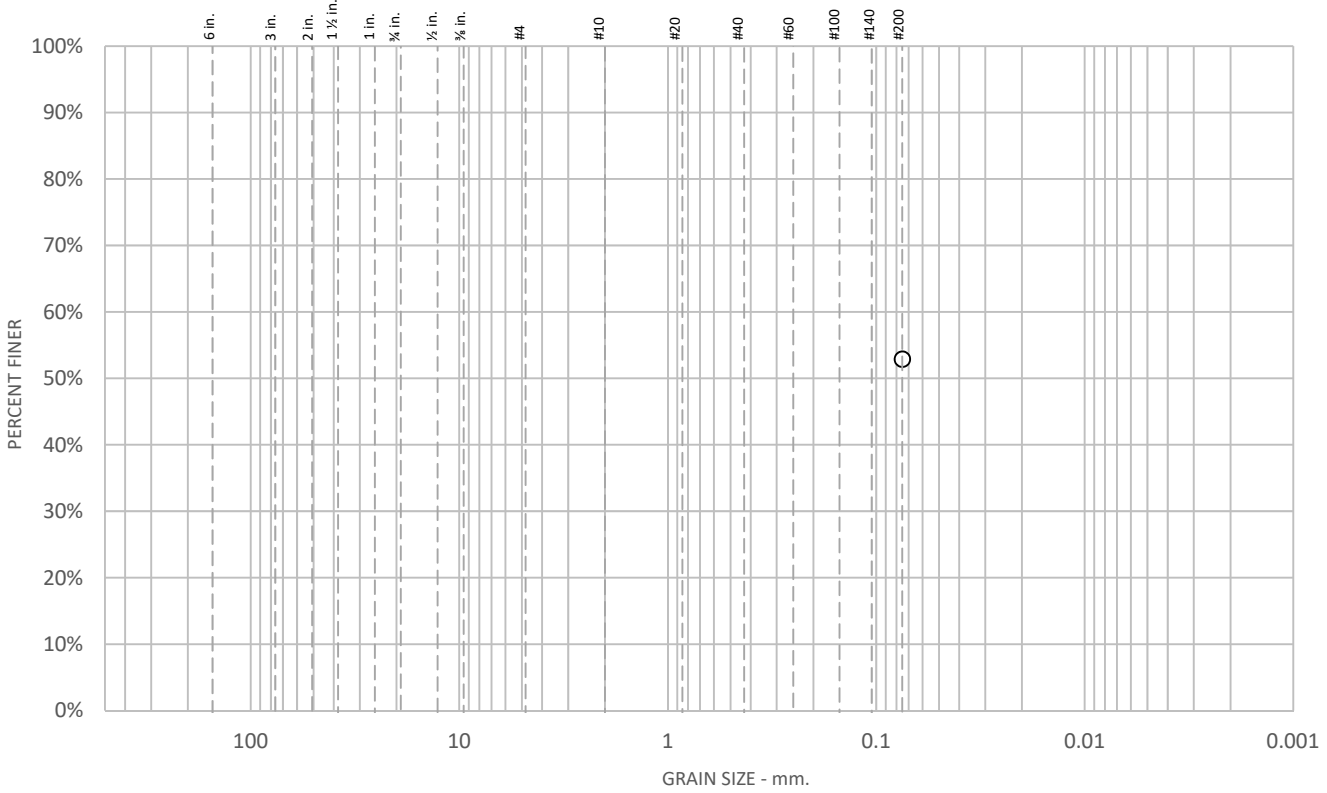
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	52.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 15 LL = 42 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 184.2 g

Sample Number: 1-B1 @ 30.5-31.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

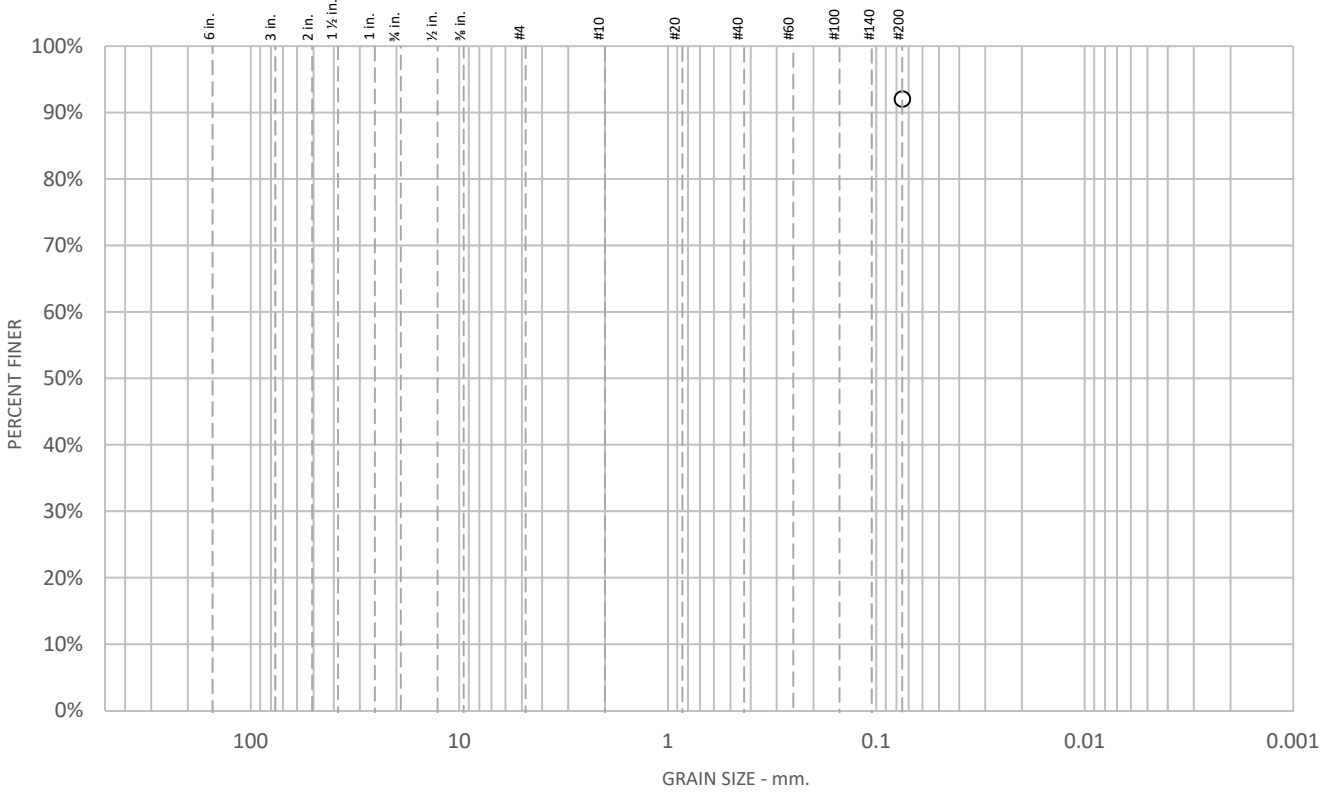
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						92.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	92.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 55 PI = 39

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 62.8 g

Sample Number: 1-B1 @ 43-44.5

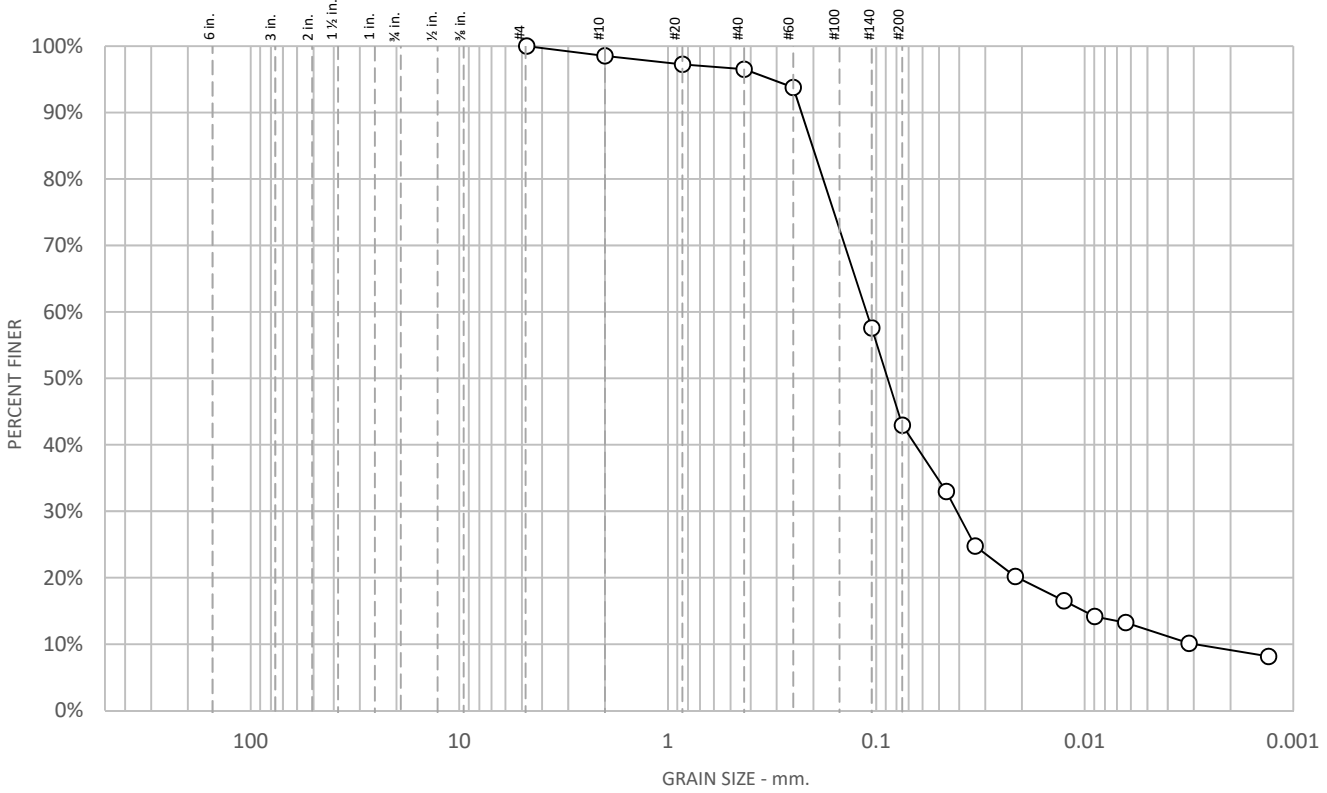
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			1.5	2.0	53.6	33.9	9.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.5		
#20	97.2		
#40	96.5		
#60	93.8		
#140	57.6		
#200	42.9		
0.0461 mm.	33.0		
0.0335 mm.	24.7		
0.0215 mm.	20.2		
0.0126 mm.	16.5		
0.0090 mm.	14.2		
0.0064 mm.	13.3		
0.0032 mm.	10.1		
0.0013 mm.	8.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2284 mm D_{85} = 0.2026 mm D_{60} = 0.1113 mm
D_{50} = 0.0882 mm D_{30} = 0.0411 mm D_{15} = 0.0101 mm
D_{10} = 0.0030 mm C_u = 37.28 C_c = 5.08

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B1 @ 78-79.5

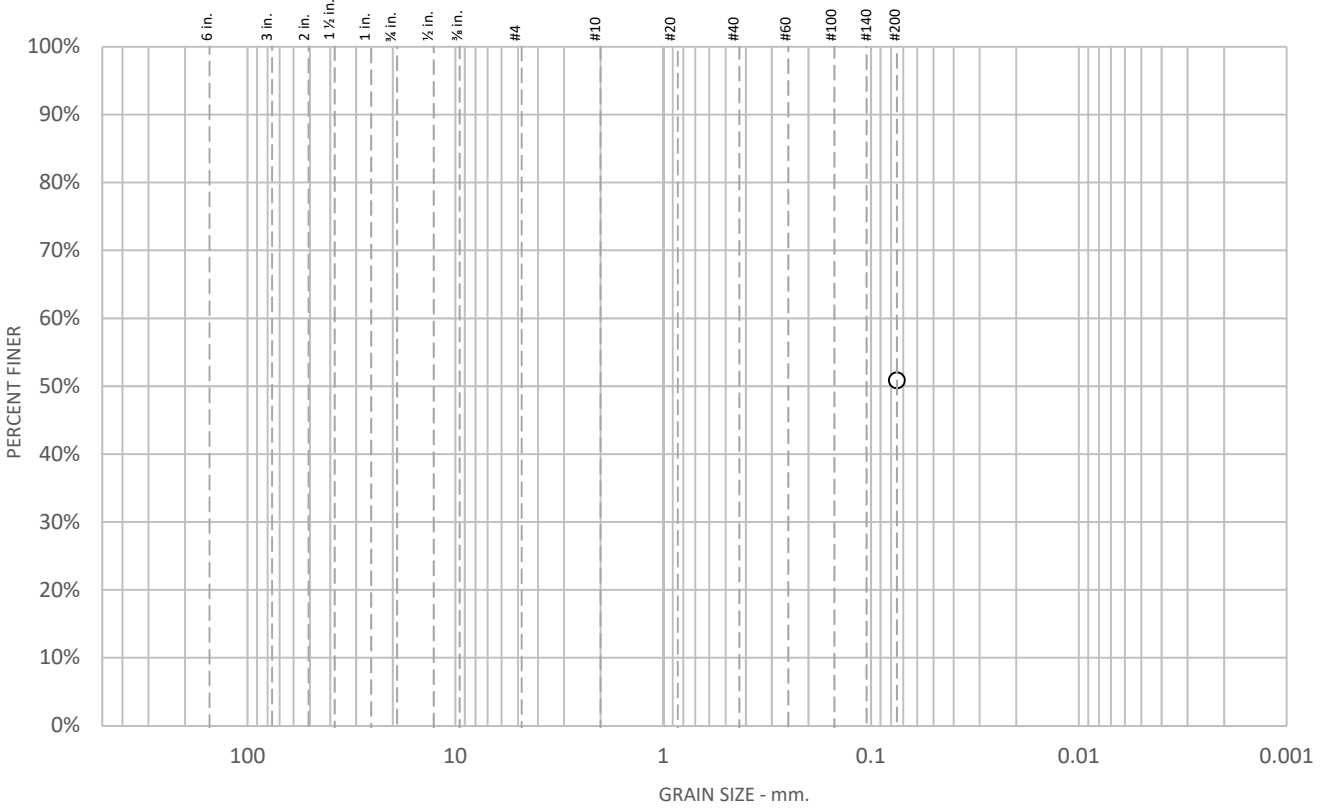
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						50.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	50.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 26 PI = 8

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 212 g

Sample Number: 1-B1 @ 9-11.5 @ 9-11.5 feet

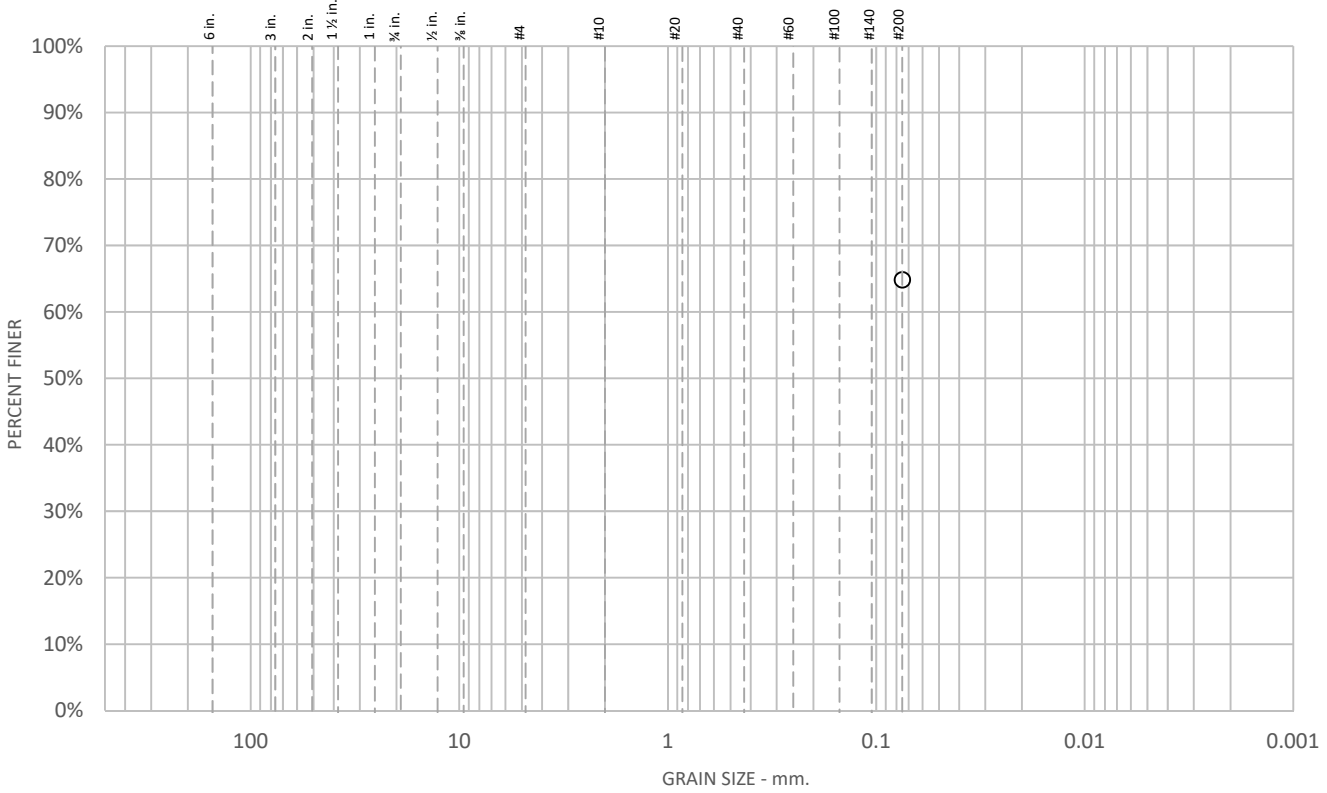
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	64.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 41 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 178.5 g

Sample Number: 1-B2 @ 6.5-7

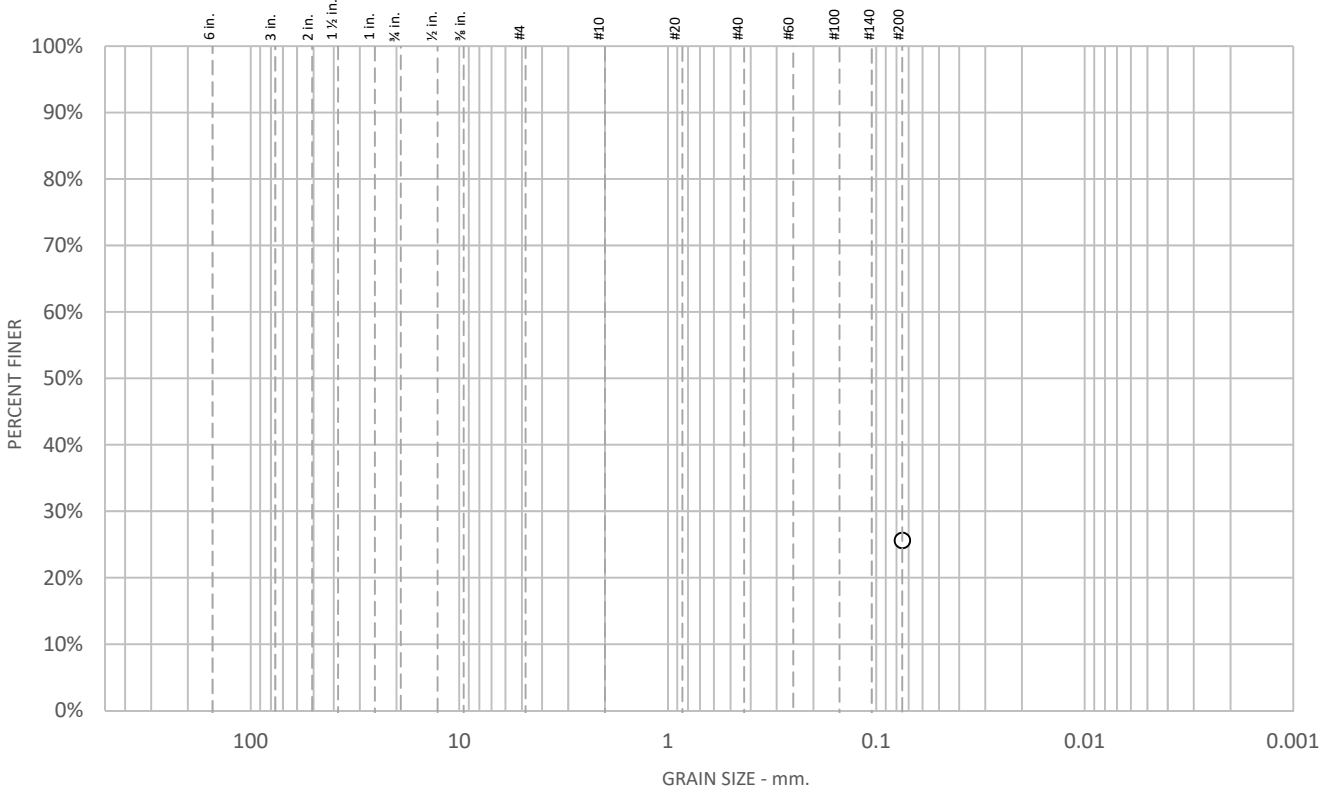
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						26	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	26		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 43 PI = 27

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 221.5 g

Sample Number: 1-B2 @ 30-31.5

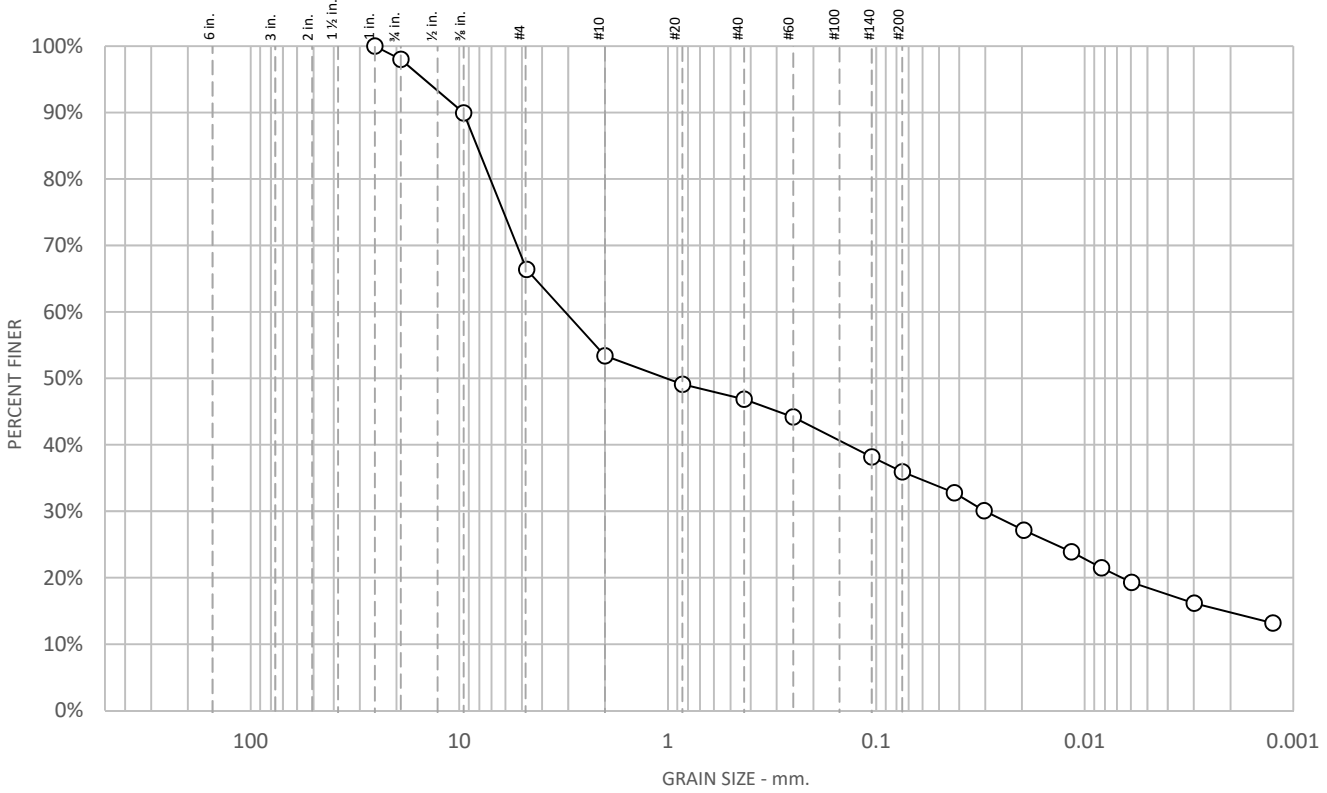
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	2.0	31.6	13.0	6.5	10.9	21.1	14.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	98.0		
⅜ in.	89.9		
#4	66.4		
#10	53.4		
#20	49.1		
#40	46.9		
#60	44.2		
#140	38.2		
#200	35.9		
0.0422 mm.	32.8		
0.0304 mm.	30.1		
0.0196 mm.	27.1		
0.0116 mm.	23.9		
0.0083 mm.	21.5		
0.0060 mm.	19.3		
0.0030 mm.	16.2		
0.0013 mm.	13.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 9.5704 mm D_{85} = 8.2307 mm D_{60} = 3.1043 mm

D_{50} = 1.0152 mm D_{30} = 0.0300 mm D_{15} = 0.0021 mm

D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422

Silt/clay division of 0.002mm used

Sample Number: 1-B2 @ 35-36.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB

Project: GEX for Multiple Parcels **Date:** 6/20/2019

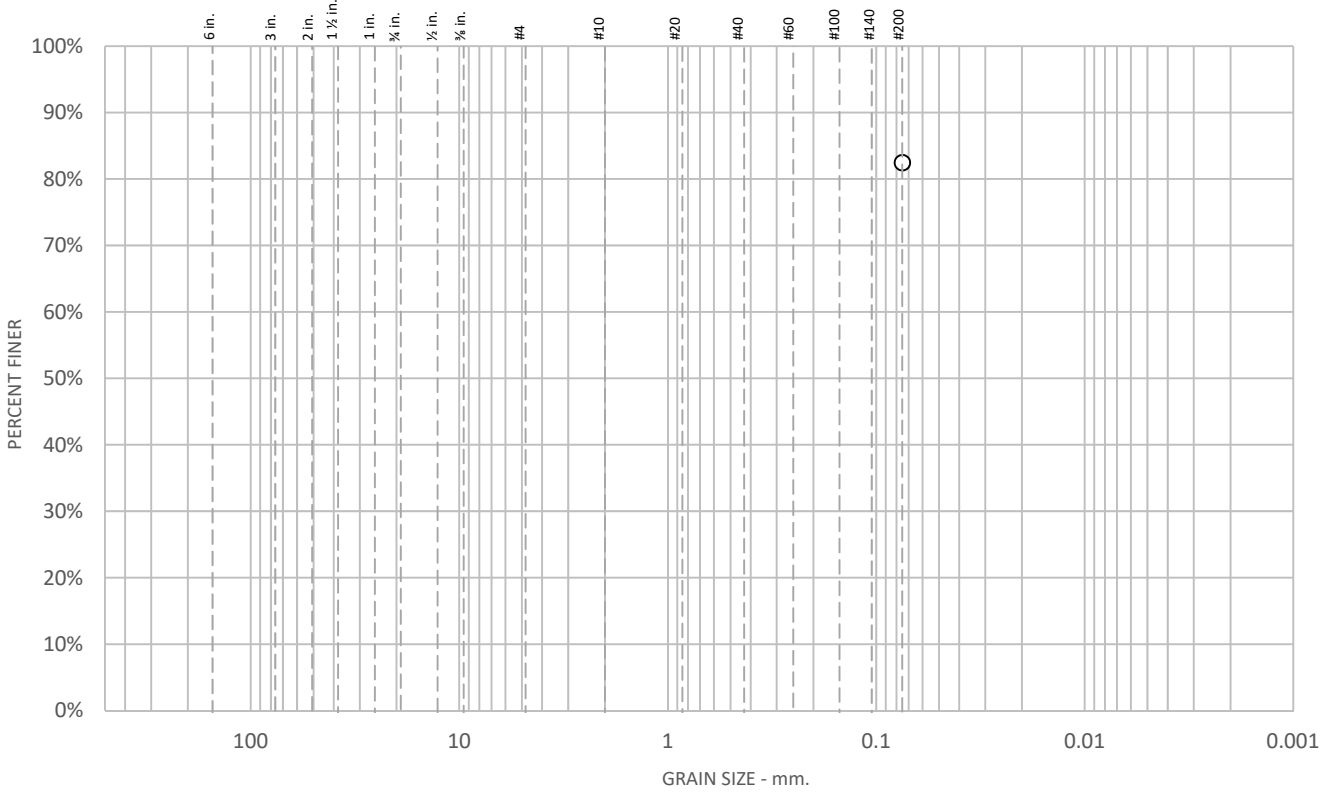
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						82	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	82		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 61 PI = 42

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 179.5 g

Sample Number: 1-B2 @ 6.5-7

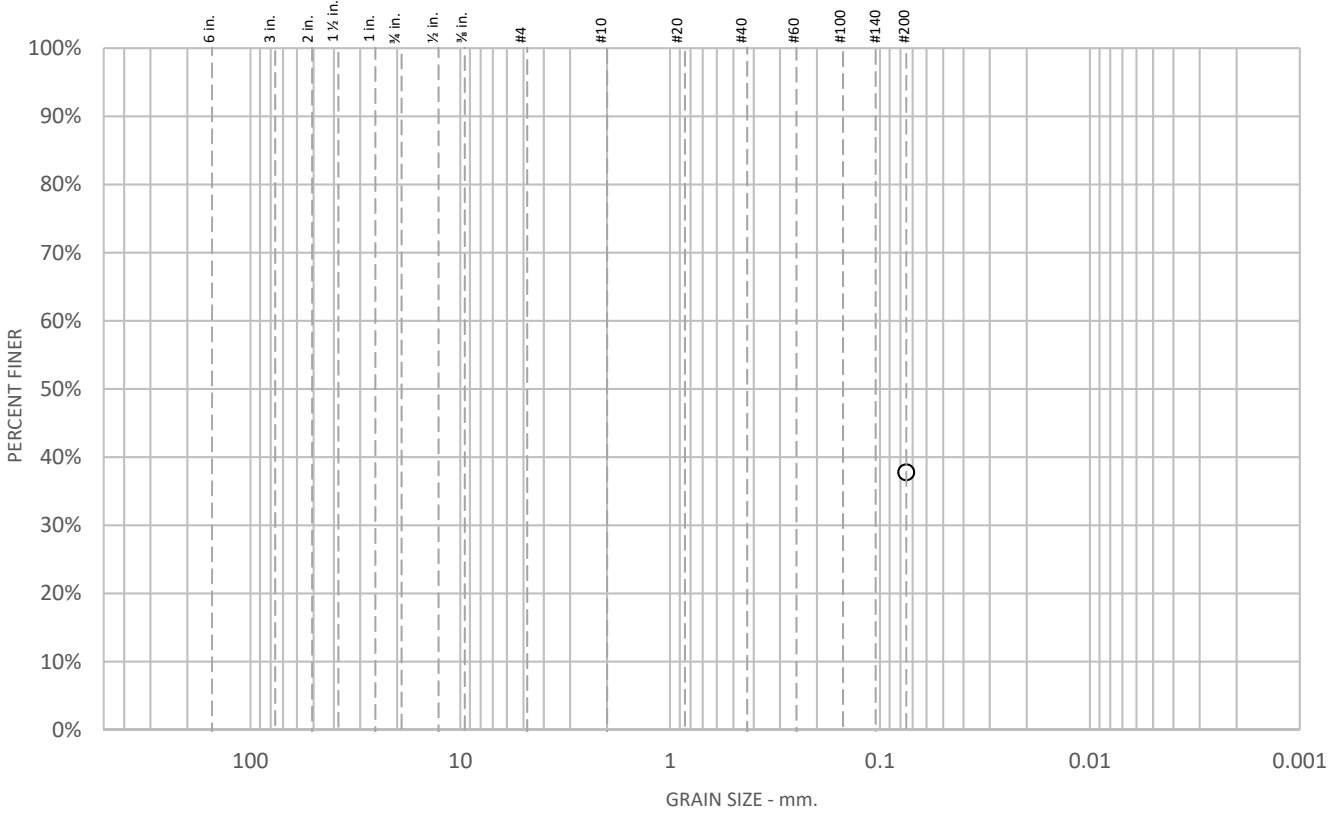
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	37.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 40 PI = 22

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 126.6 g

Sample Number: 1-B4 @ 25.5-26.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

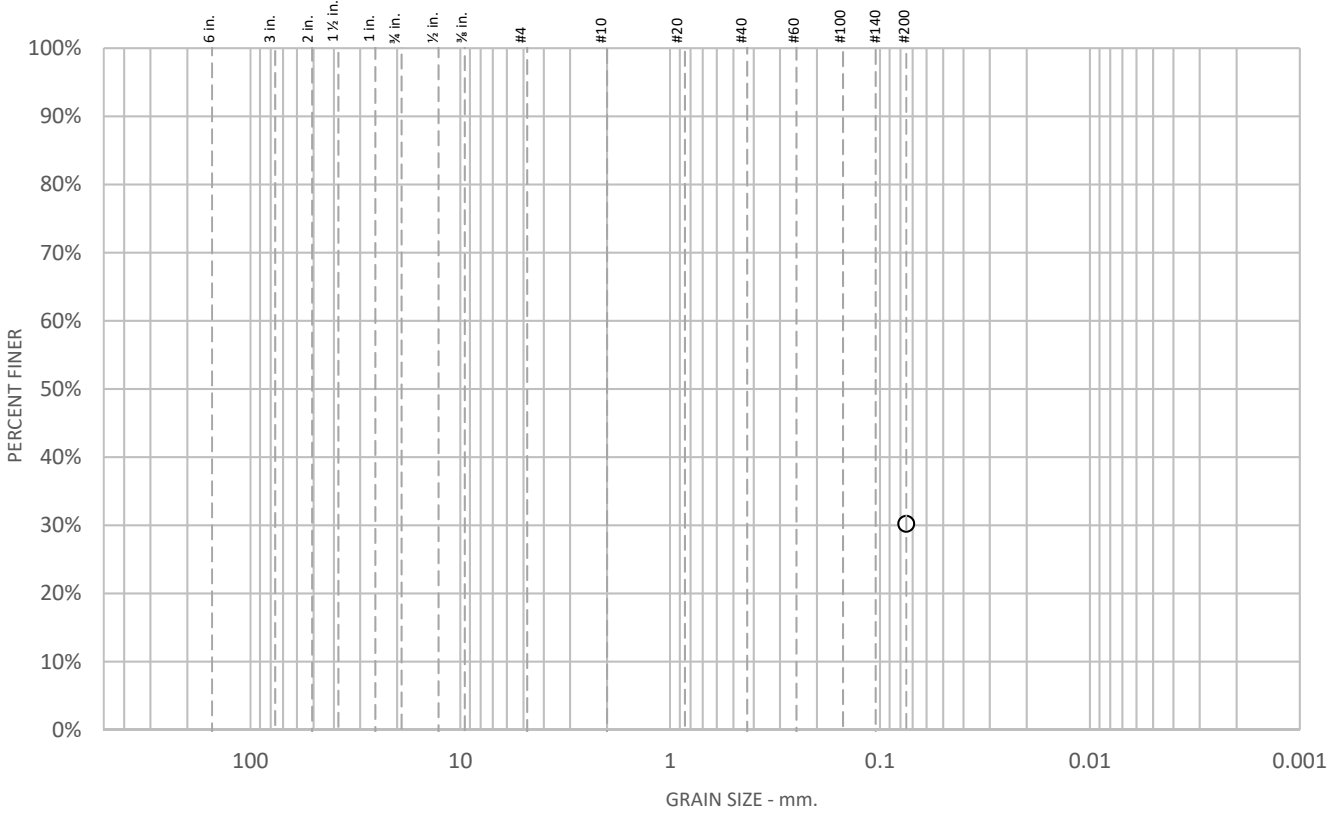
Project Number: 15949.000.000
Date: 6/18/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	30.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 30 PI = 12

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 845.15 g

Sample Number: 1-B4 @ 35.5-36.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

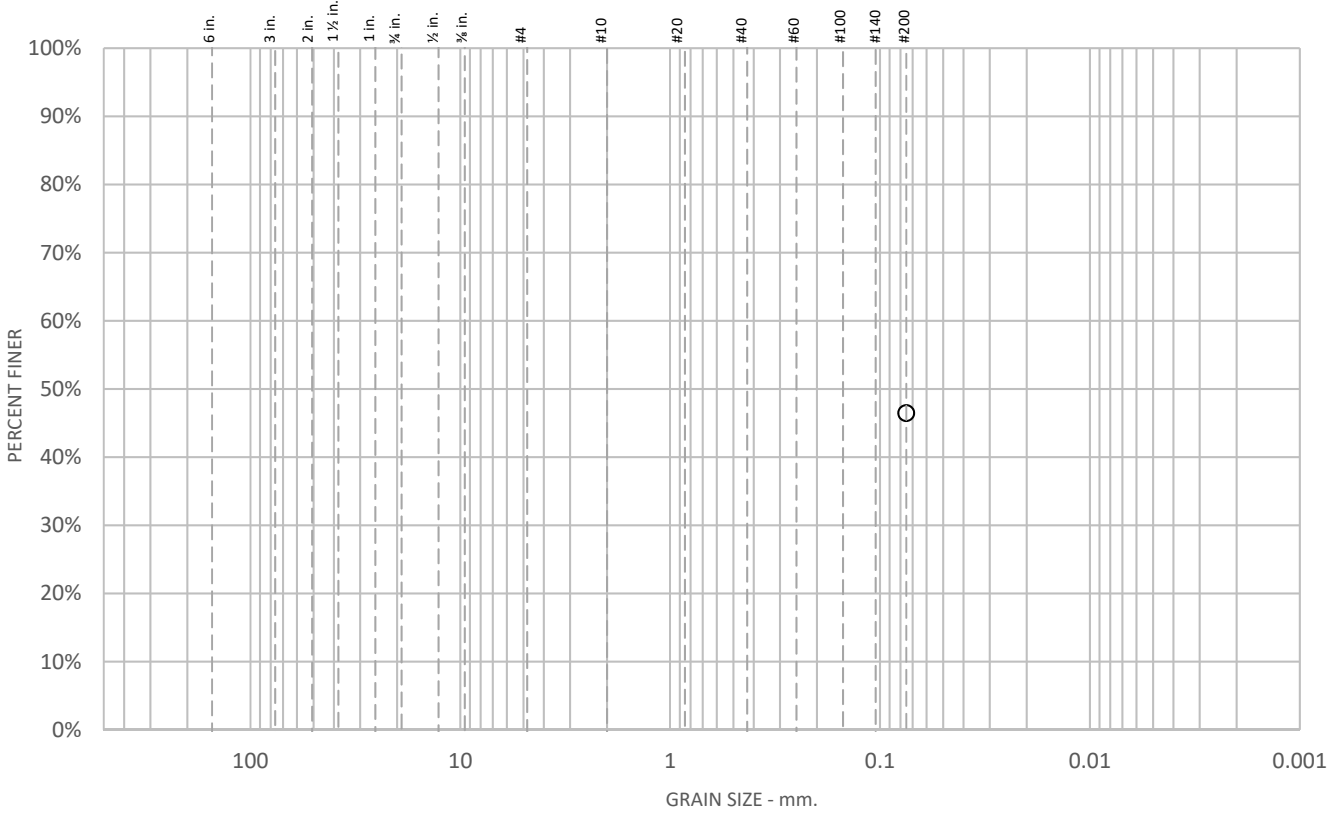
ENGEO Expect Excellence

Tested By: M. Quasem

Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						46.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	46.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 31 PI = 13

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 106.82 g

Sample Number: 1-B4 @ 52-53

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

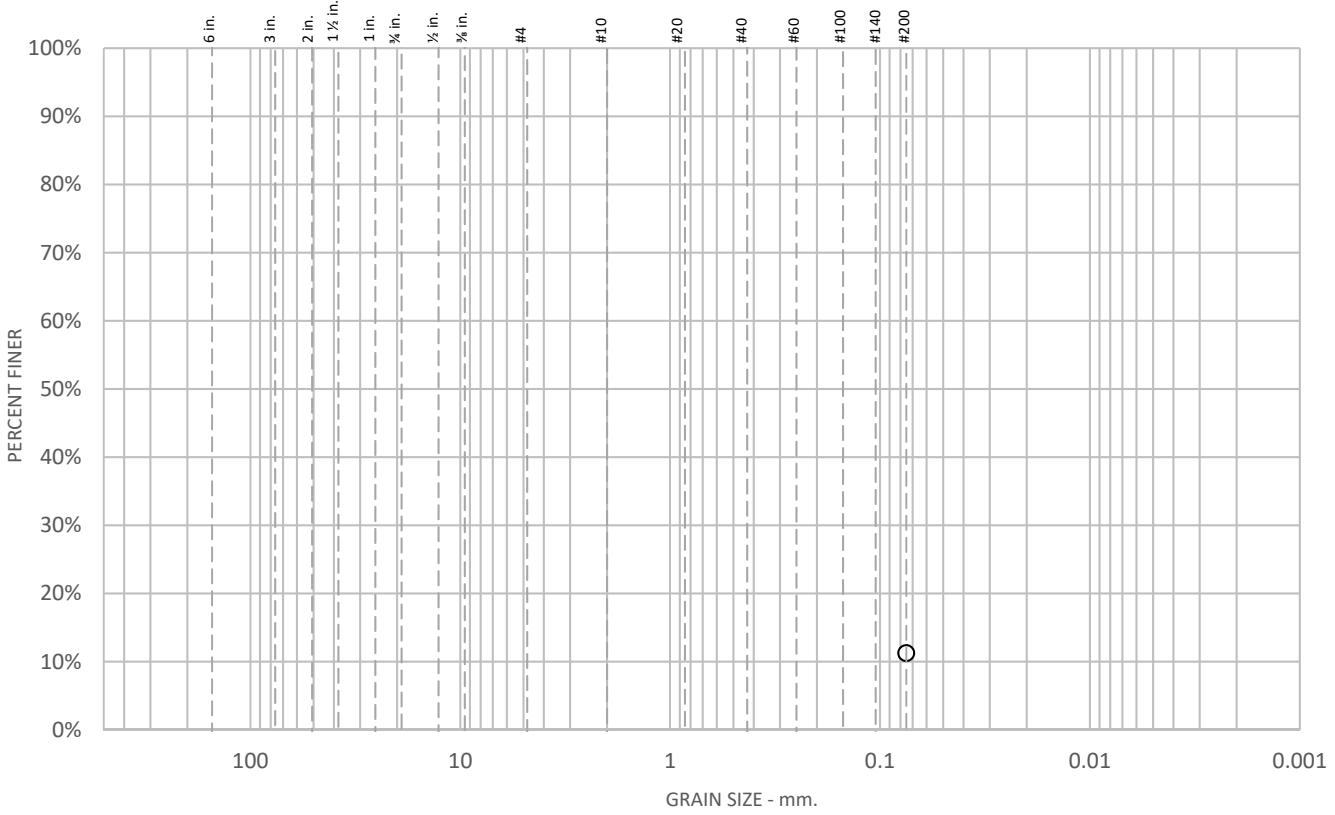
ENGEO Expect Excellence

Tested By: M. Quasem

Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						11.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	11.2		

* (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 =

Remarks

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 587.76 g

Sample Number: 1-B4 @ 9-10.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

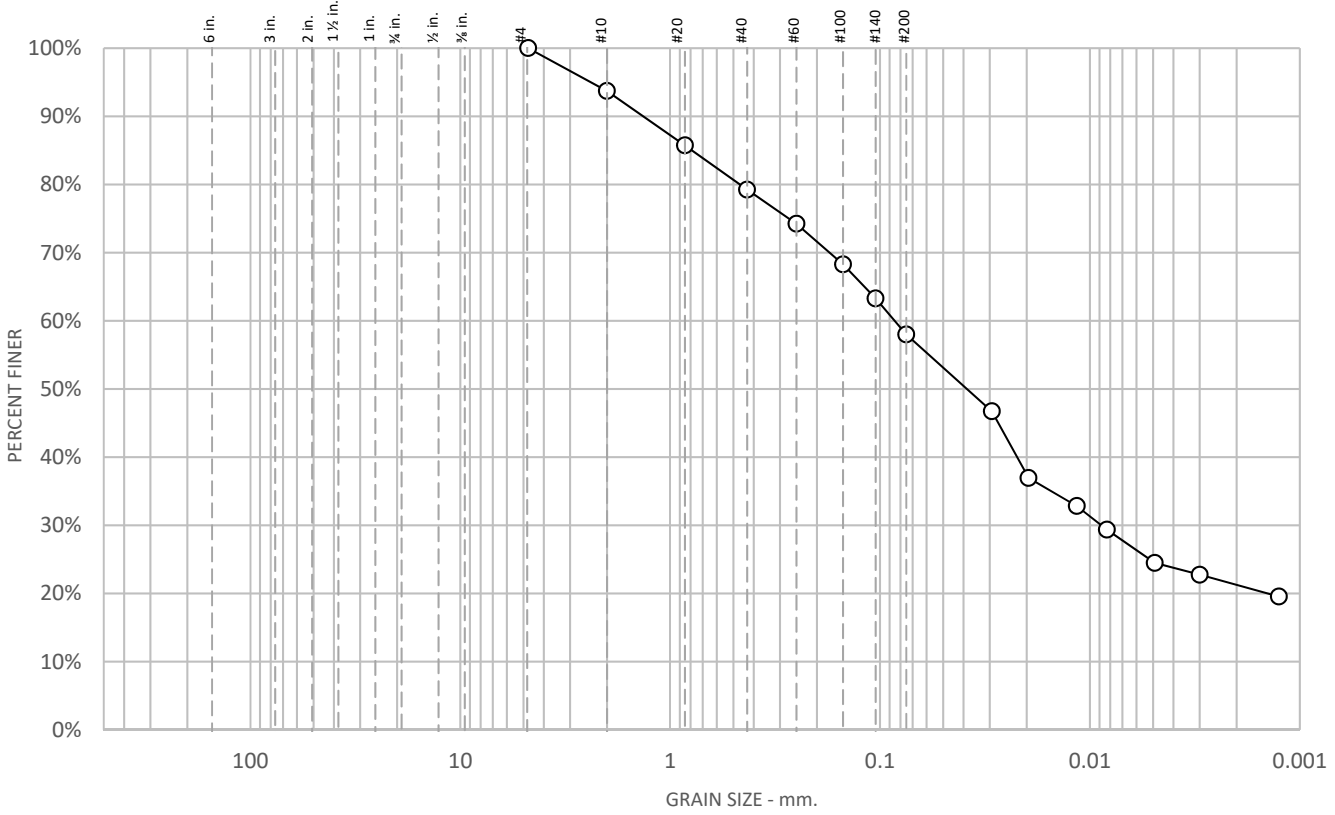
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			6.3	14.5	21.2	36.7	21.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	93.7		
#20	85.7		
#40	79.2		
#60	74.2		
#100	68.3		
#140	63.3		
#200	58.0		
0.0293 mm.	46.7		
0.0196 mm.	36.9		
0.0115 mm.	32.8		
0.0083 mm.	29.4		
0.0049 mm.	24.5		
0.0030 mm.	22.7		
0.0013 mm.	19.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 34 PI = 17

Coefficients

D_{90} = 1.3429 mm D_{85} = 0.7870 mm D_{60} = 0.0852 mm
D_{50} = 0.0385 mm D_{30} = 0.0088 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method

Sample Number: 1-B4 @ 46-47.5

Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Isotropic Unconsolidated Undrained Triaxial Test

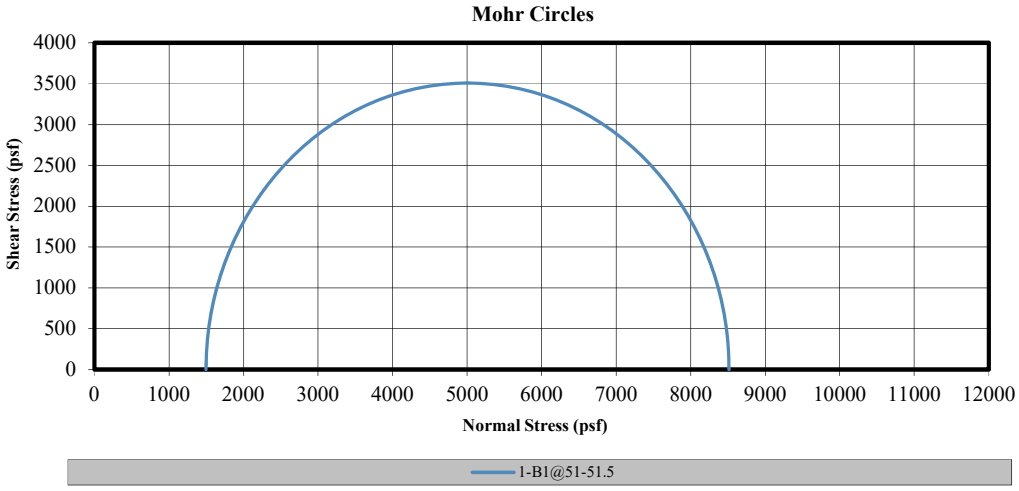
ASTM D2850

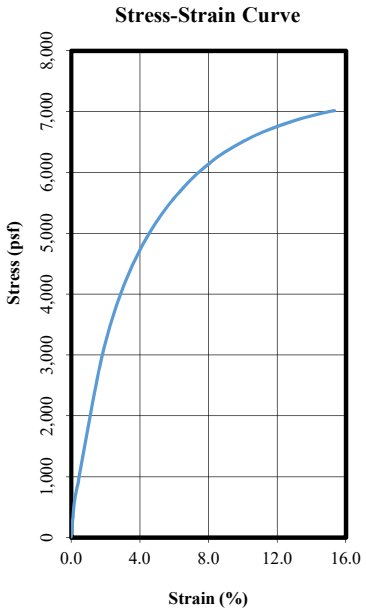
Date: 06/18/19

Checked By: D. Seibold

Date: 6/18/2019

Tested By: G. Criste





Before Test	Specimen 1-B1@51-51.5			
Water Content (%)	21.08			
Dry Density (pcf)	109.40			
Saturation (%)	98.83			
Void Ratio	0.60			
Diameter (in)	2.385			
Height (in)	5.055			
Height-to-Diameter Ratio	2.119			
ASTM D4318 - Wet Method				
Liquid Limit	n/a			
Plastic Limit	n/a			
ASTM D854 - Measured				
Specific Gravity	2.800			
After Test	**1-B1@51-51.5**			
Water Content (%)	21.08			
Saturation (%)	98.83			
Strain Rate (in/min)	0.05			
Peak Deviator Stress (psf)	7016.4			
Axial Strain @ Failure (%)	15.333			
	Cell Pressure			
Cell (psf)	1497.6			
Back (psf)	n/a			
	Principle Stresses at Failure			
σ1 (psf)	8514.0			
σ3 (psf)	1497.6			
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		3508.2			
Friction Angle Ø	n/a		n/a			

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/18/19

Checked By: D. Seibold

Date: 6/18/2019

Tested By: G. Criste

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B1@51-51.5	
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

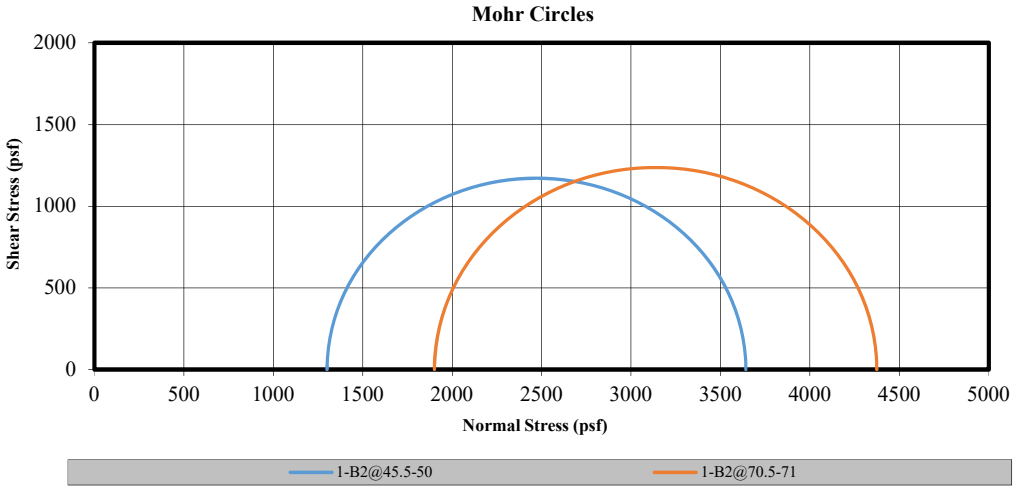
ASTM D2850

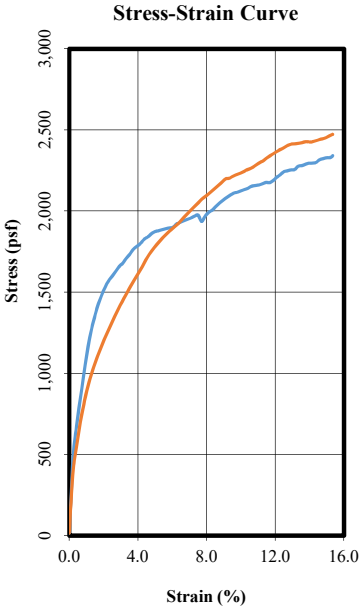
Date: 06/24/19

Checked By: G. Criste

Date: 6/24/2019

Tested By: M. Quasem





Before Test	Specimen 1-B2@45.5-46	1-B2@70.5-71		
Water Content (%)	14.92	25.23		
Dry Density (pcf)	123.20	101.70		
Saturation (%)	100.73	100.84		
Void Ratio	0.41	0.69		
Diameter (in)	2.383	2.373		
Height (in)	4.800	5.050		
Height-to-Diameter Ratio	2.014	2.128		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.790	2.750		
After Test	**1-B2@45.5-46**	**1-B2@70.5-71**		
Water Content (%)	14.92	25.23		
Saturation (%)	100.00	100.00		
Strain Rate (in/min)	15.00	15.00		
Peak Deviator Stress (psf)	2341.2	2473.1		
Axial Strain @ Failure (%)	15.340	15.342		
	Cell Pressure			
Cell (psf)	1300.3	1900.8		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3641.6	4373.9		
σ3 (psf)	1300.3	1900.8		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1170.6	1236.6		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Projects
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

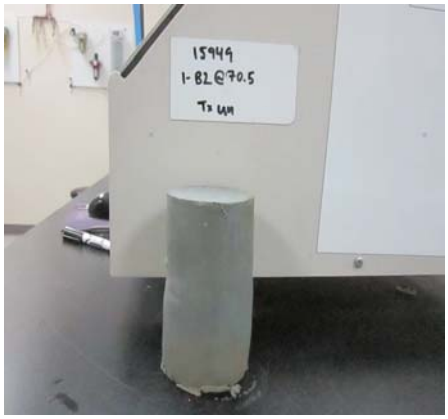
Date: 06/24/19

Checked By: G. Criste

Date: 6/24/2019

Tested By: M. Quasem

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B2@45.5-46	SAMPLE NUMBER: 1-B2@70.5-71
	
SAMPLE NUMBER:	**SAMPLE NUMBER:**

Project Information	
Project Name:	GEX for Multiple Projects
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

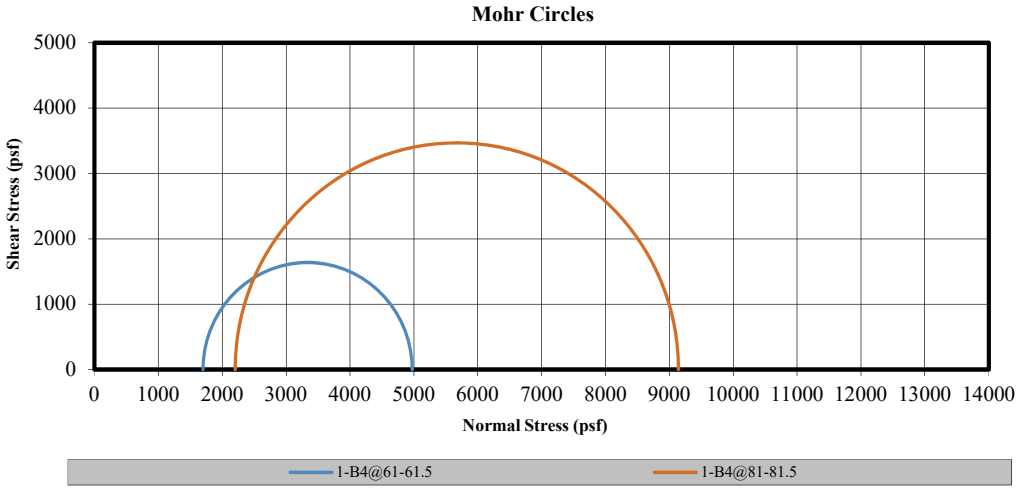
ASTM D2850

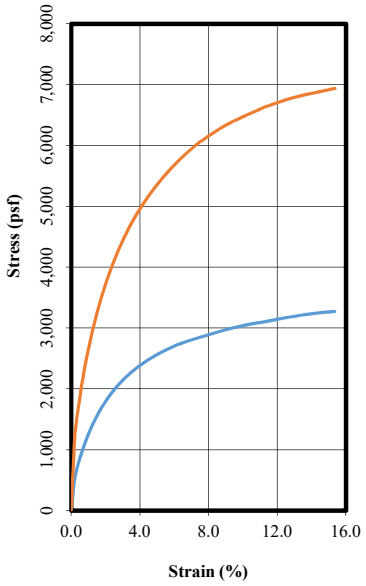
Date: 06/17/19

Checked By: G. Criste

Date: 6/17/2019

Tested By: N. Buckton





Before Test	Specimen 1-B4@61-61.5	1-B4@81-81.5		
Water Content (%)	22.50	18.03		
Dry Density (pcf)	106.00	113.10		
Saturation (%)	99.93	97.89		
Void Ratio	0.62	0.50		
Diameter (in)	2.417	2.418		
Height (in)	5.026	5.062		
Height-to-Diameter Ratio	2.079	2.093		
ASTM D4318 - Wet Method				
Liquid Limit	n/a	n/a		
Plastic Limit	n/a	n/a		
ASTM D854 - Assumed				
Specific Gravity	2.749	2.720		
After Test	1-B4@61-61.5	1-B4@81-81.5		
Water Content (%)	22.50	18.03		
Saturation (%)	99.93	97.88		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	3274.1	6938.3		
Axial Strain @ Failure (%)	15.340	15.358		
	Cell Pressure			
Cell (psf)	1699.2	2203.2		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	4973.3	9141.5		
σ3 (psf)	1699.2	2203.2		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1637.1	3469.2		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/17/19

Checked By: G. Criste

Date: 6/17/2019

Tested By: N. Buckton

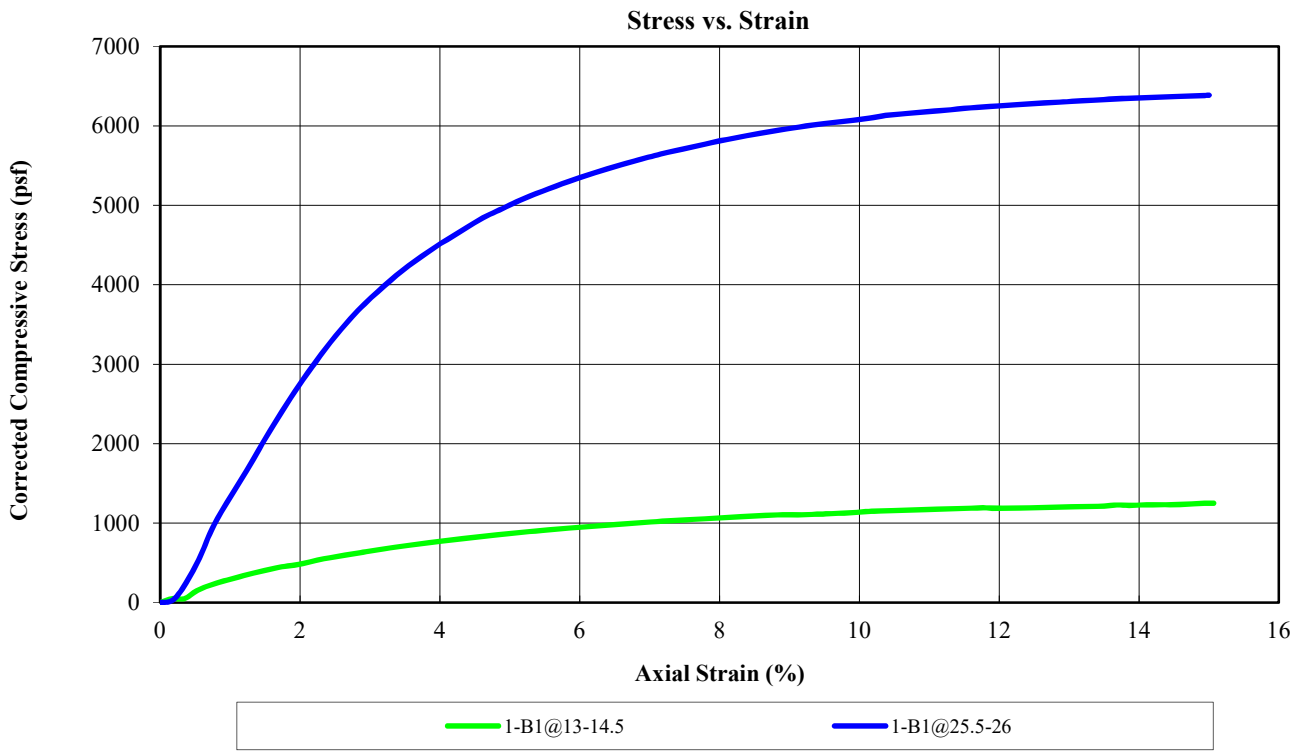
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B4@61-61.5	SAMPLE NUMBER: 1-B4@81-81.5
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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UNCONFINED COMPRESSION TEST REPORT
ASTM D2166



	SPECIMEN	
BEFORE TEST	**1-B1@13-14.5**	**1-B1@25.5-26**
Moisture Content (%)	24.8	22.6
Dry Density (pcf)	103.3	105.5
Saturation (%)	100.0	100.0
Void Ratio	0.60	0.57
Diameter (in)	2.394	2.391
Height (in)	5.85	5.37
Height-To-Diameter Ratio	2.44	2.25
TEST DATA		
Unconfined Compressive Strength (psf)	1377	6386
Undrained Shear Strength (psf)	688	3193
Strain Rate (in./min.)	0.05	0.05
Specific Gravity	2.650	2.650
Strain at Failure (%)	15.00	15.00
Liquid Limit		
Plastic Limit		
Test Remarks	Specific gravity of 2.65 assumed.	

SPECIMEN	DESCRIPTION
1-B1@13-14.5	See exploration logs
1-B1@25.5-26	See exploration logs

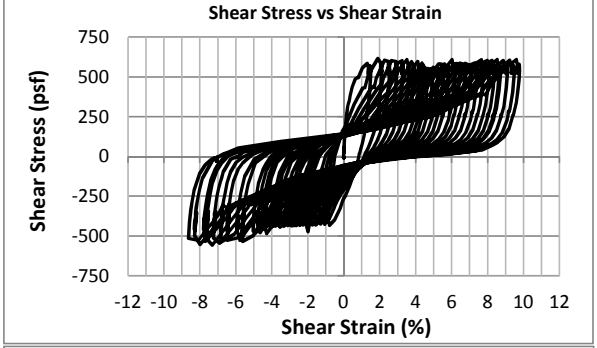
PROJECT NAME: GEX for Multiple Parcels
PROJECT NO: 15949.000.000
CLIENT: Google, LLC
LOCATION: Mountain View, CA
PHASE NO: LAB

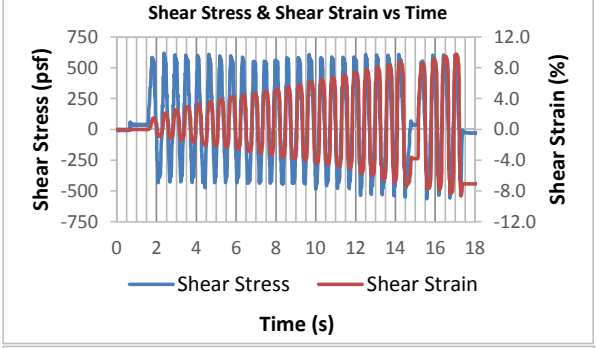
Report Date: 06/19/19
Tested By: R. Montalvo
Reviewed By: M. Gilbert

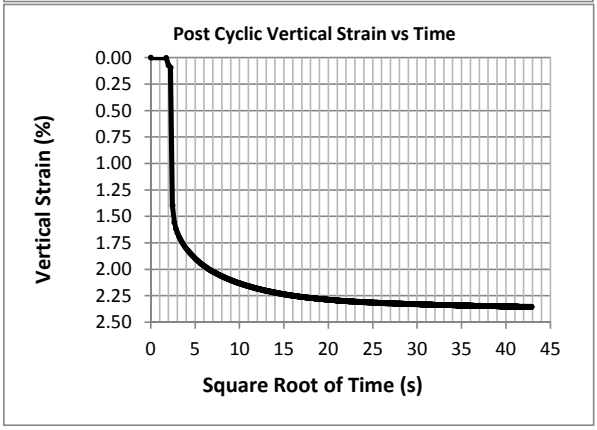
ENGEO
Expect Excellence

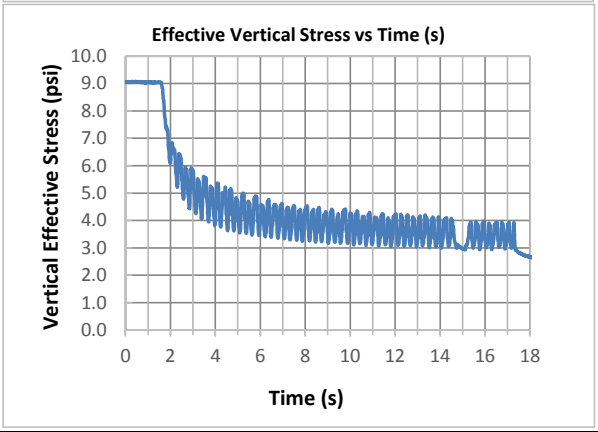
Cyclic Simple Shear

ASTM D6528 - Modified









Test Conditions		Results		Maximum	Minimum
Confining Condition	Plain Membrane w/Chamber Pressure	Vertical Effective Stress (psf)	Deviatoric	783.5	-54.8
Applied Lateral Effective Stress (psf)	520.0		Isotropic	520.0	520.0
Resulting K_o after applied, σ_{vc}'	0.398	Shear Strain (%)		9.8	-8.6
Applied Loading Frequency (Hz)	0.500	Post Cyclic Vertical Strain (%)		2.36	
Cycle Limit, N	27				
Single Amp. Strain (+/-)	9.2	**Cyclic Preshear Specimen Condition**			
Applied τ_{cyc} (psf)	617	Preshear Moisture Content (%)		23.93%	
Applied σ_{vc}' (psf)	1308	Preshear Void Ratio		0.6554	
Applied CSR	0.472	Preshear Saturation (%)		100.36%	
		Preshear Dry Density (pcf)		103.53	

Test Date: 6/18/2019

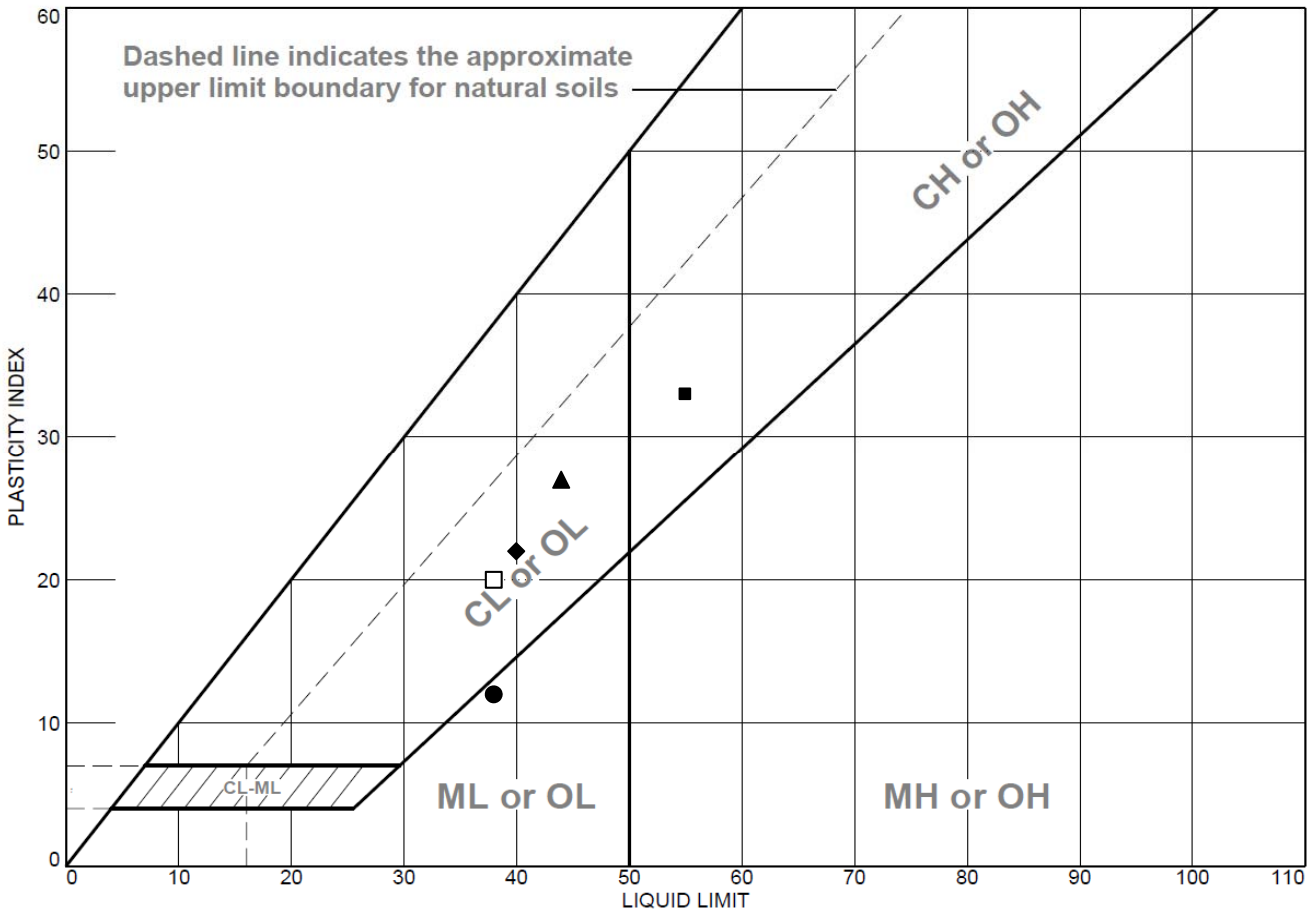
ASTM D2216	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	25.75%	22.72%	**Liquid Limit:**	
Dry Density (pcf):	102.99	105.52	**Plastic Limit:**	
Saturation (%):	96.53%	100.00%	**ASTM D854 - Measured**	
Void Ratio:	0.7331	0.6229	**Specific Gravity:**	2.748
			Soil Description:	See exploration logs

Project Number:	15949.000.000	**Depth:**	15.5-15.75 ft.
Sample Number:	1-B9 @ 15-16.5	**Boring #:**	1-B9
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

ENGEO Expect Excellence

Remarks:

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	44	17	27		68.6	
◆	See exploration logs	40	18	22			
□	See exploration logs	38	18	20		60.2	
●	See exploration logs	38	26	12		54.5	
■	See exploration logs	55	22	33			

Project No.: 15949.000.000 **Date:** 6/18/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

▲ **Sample Number:** 1-B7 **Depth:** 20-21.5
◆ **Sample Number:** 1-B7 **Depth:** 40-41.5
□ **Sample Number:** 1-B7 **Depth:** 45-46.5
● **Sample Number:** 1-B7 **Depth:** 60-61.5
■ **Sample Number:** 1-B7 **Depth:** 70-71.5

Remarks:

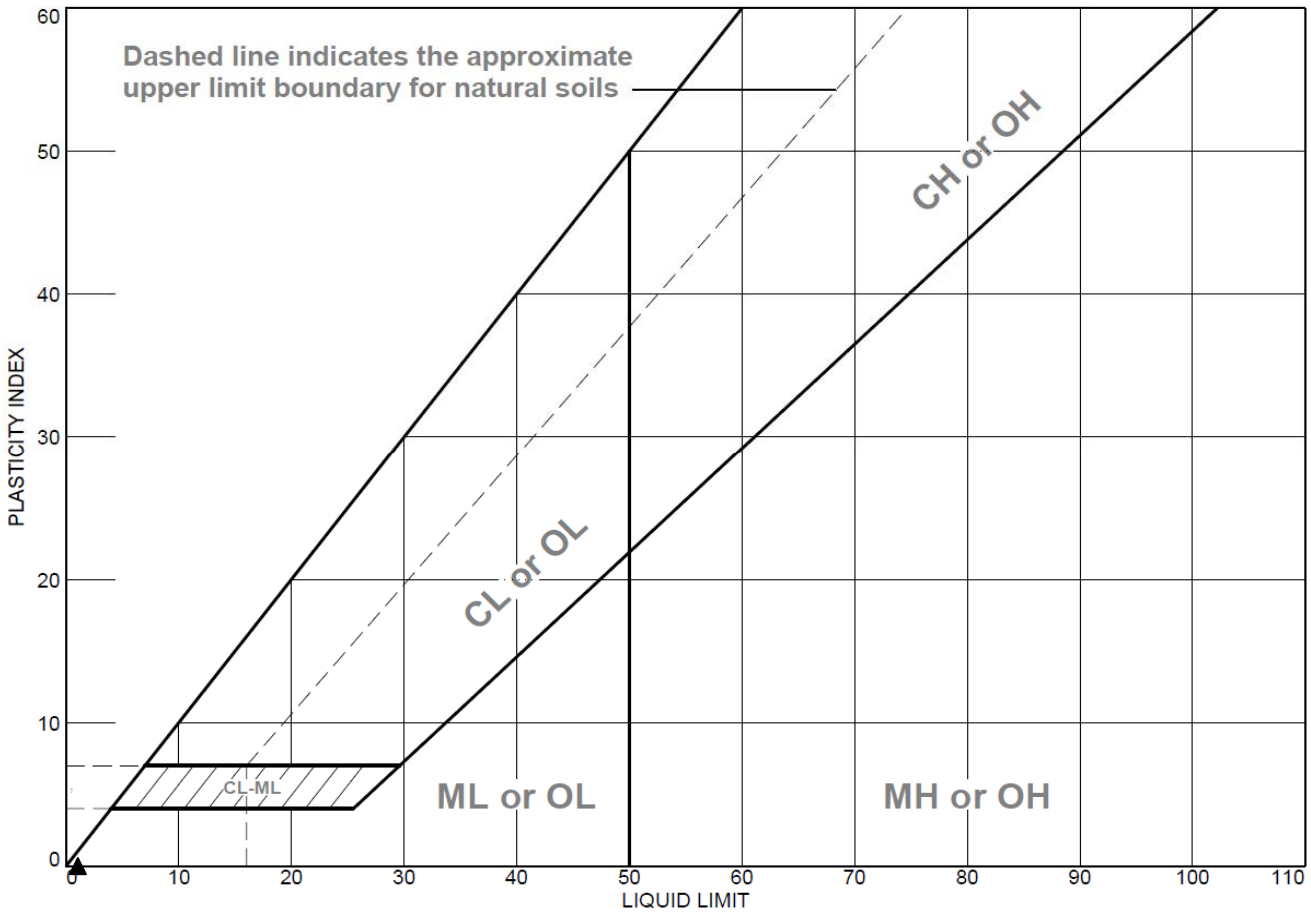
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140
◆ PI: ASTM D4318, Wet Method
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140
● PI: ASTM D4318, Wet Method, GS: ASTM D1140
■ PI: ASTM D4318, Wet Method

ENGEO
Expect Excellence

Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	NV	NP	NP		52.9	

Project No.: 15949.000.000 **Date:** 6/18/2019

Project Name: GEX for Multiple Parcels

Project location: Sunnyvale, California

Client: Google LLC

▲ **Sample Number:** 1-B7 **Depth:** 80-81

Remarks:

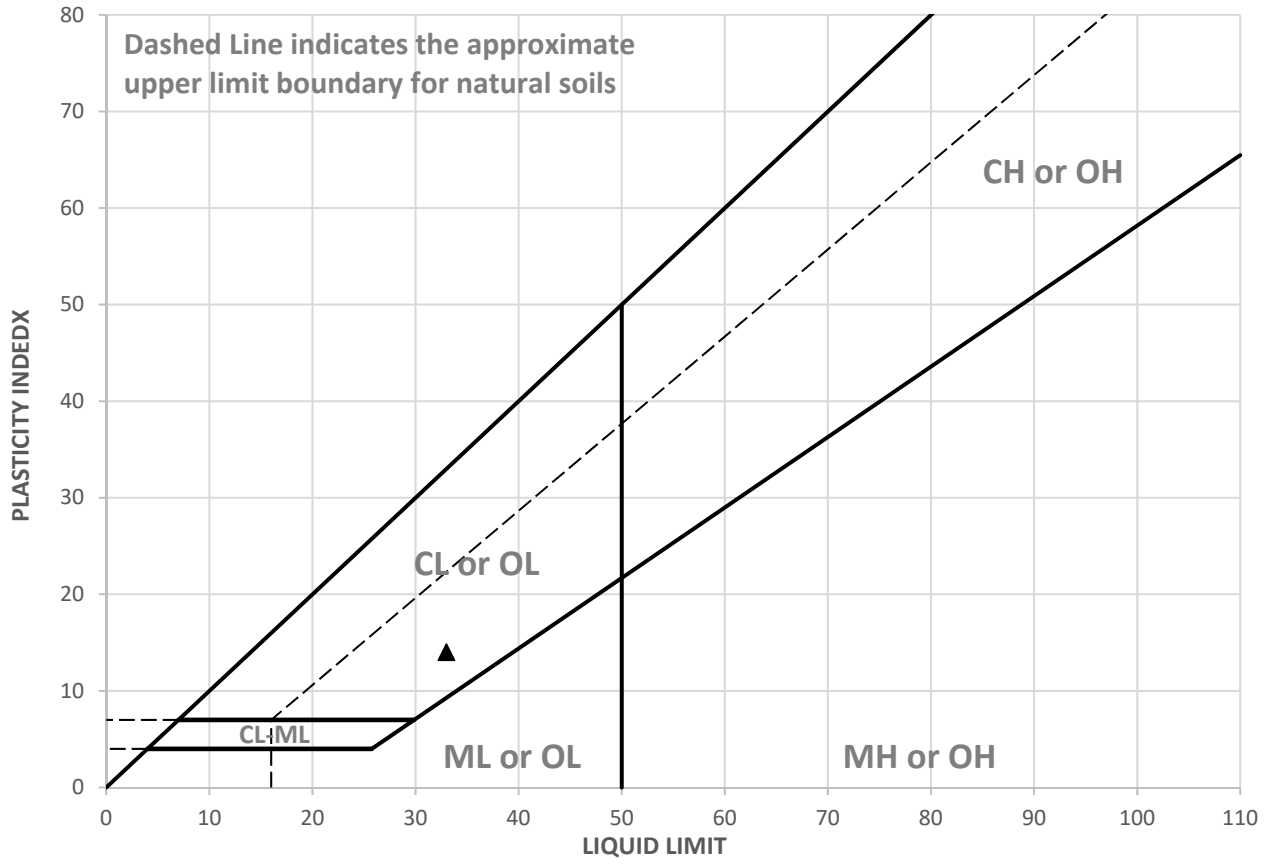
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140

ENGEO Expect Excellence

Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
See exploration logs	33	19	14	90.2	67.4	CL

Project No.: 15949.000.000 **Date:** 7/25/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google, LLC
Sample Number: 1-B7@5-6.5 **Depth:** 5.0-6.5 ft

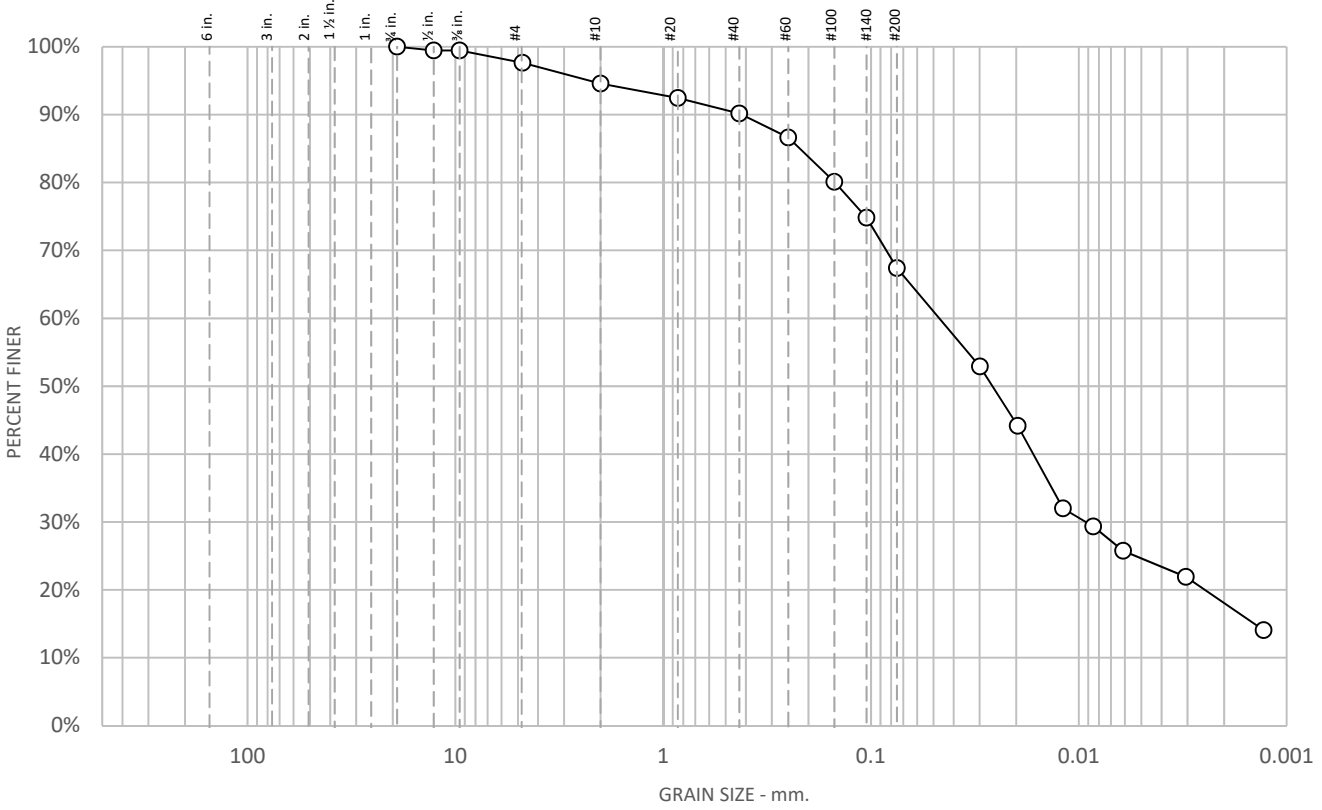
Remarks:
PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

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Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.6	1.8	3.1	4.4	22.8	49.3	18.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
½ in.	99.4		
⅜ in.	99.4		
#4	97.6		
#10	94.6		
#20	92.5		
#40	90.2		
#60	86.6		
#100	80.1		
#140	74.8		
#200	67.4		
0.0299 mm.	52.9		
0.0197 mm.	44.2		
0.0119 mm.	32.0		
0.0085 mm.	29.3		
0.0061 mm.	25.7		
0.0031 mm.	21.9		
0.0013 mm.	14.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 33 PI = 14

Coefficients

D_{90} = 0.4196 mm D_{85} = 0.2201 mm D_{60} = 0.0469 mm
D_{50} = 0.0260 mm D_{30} = 0.0093 mm D_{15} = 0.0014 mm
D_{10} = C_u = C_c =

Classification

USCS = CL

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B7 @ 5.0-6.5 feet

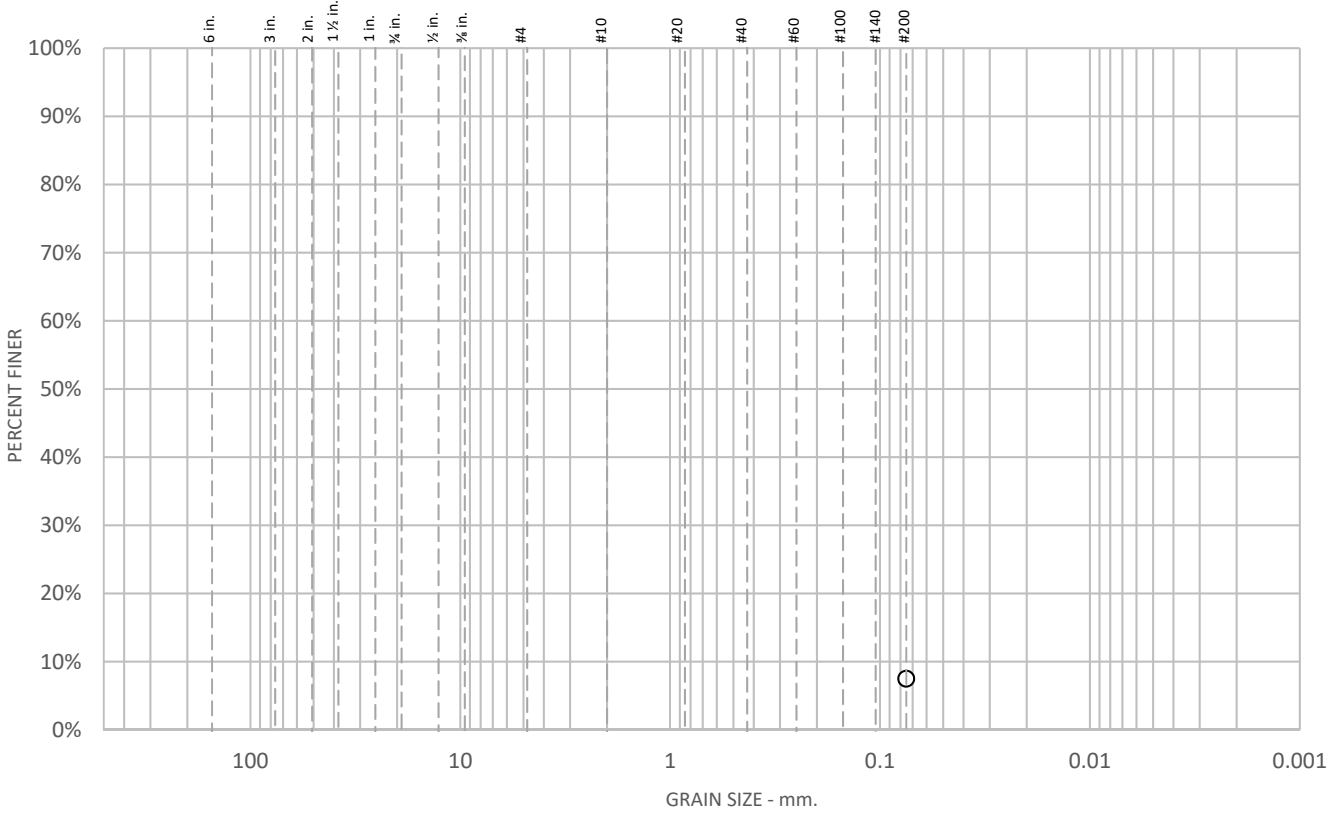
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 7/25/2019
Project location: Sunnyvale, California

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	7.5		

* (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 =

Remarks

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 269.82 g

Sample Number: 1-B7 @ 12-13.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

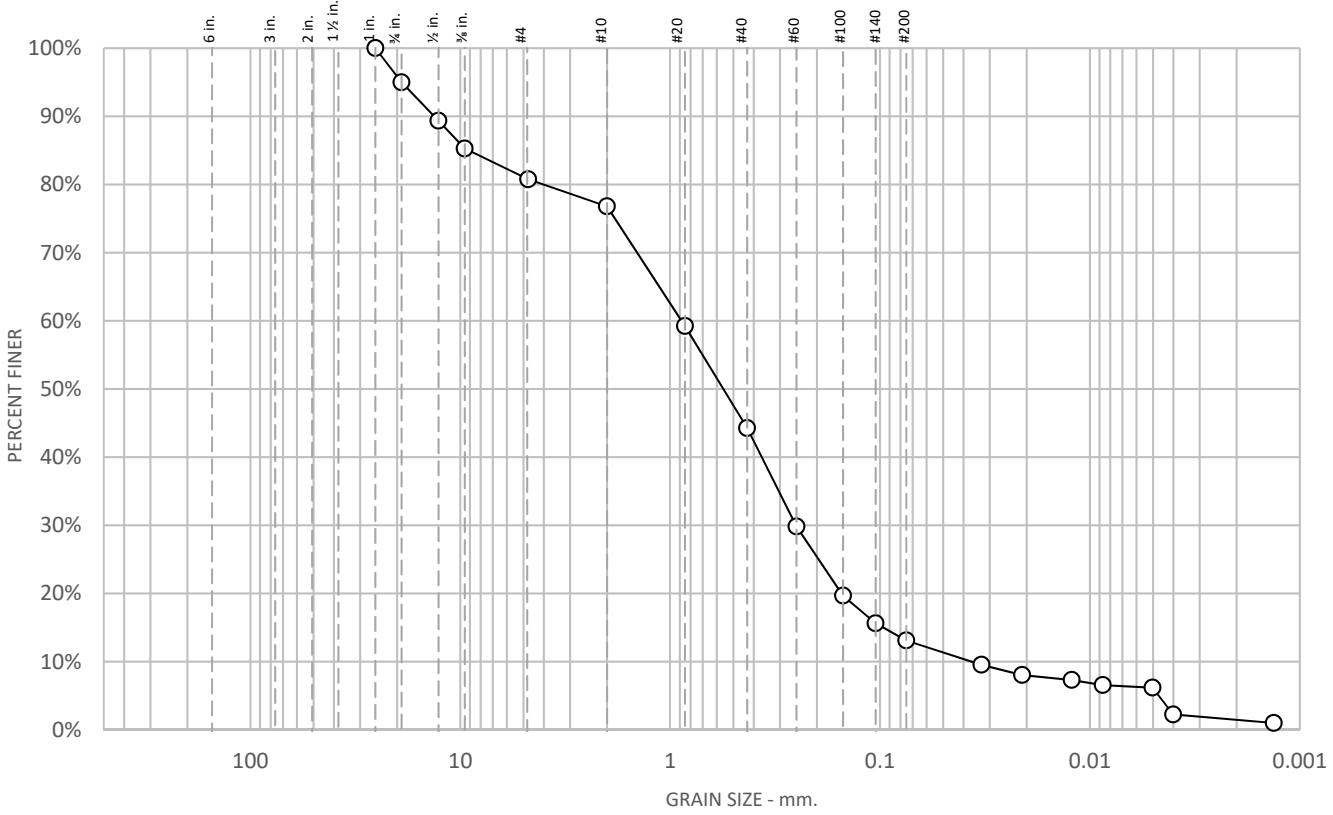
Project Number: 15949.000.000
Date: 6/18/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	5.0	14.2	4.0	32.5	31.2	11.7	1.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	95.0		
½ in.	89.3		
⅜ in.	85.3		
#4	80.8		
#10	76.8		
#20	59.2		
#40	44.3		
#60	29.8		
#100	19.7		
#140	15.6		
#200	13.1		
0.0329 mm.	9.5		
0.0210 mm.	8.0		
0.0122 mm.	7.3		
0.0087 mm.	6.6		
0.0050 mm.	6.2		
0.0040 mm.	2.2		
0.0013 mm.	1.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 13.3146 mm D_{85} = 9.1304 mm D_{60} = 0.8825 mm
D_{50} = 0.5583 mm D_{30} = 0.2516 mm D_{15} = 0.0965 mm
D_{10} = 0.0366 mm C_u = 24.12 C_c = 1.96

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 15A

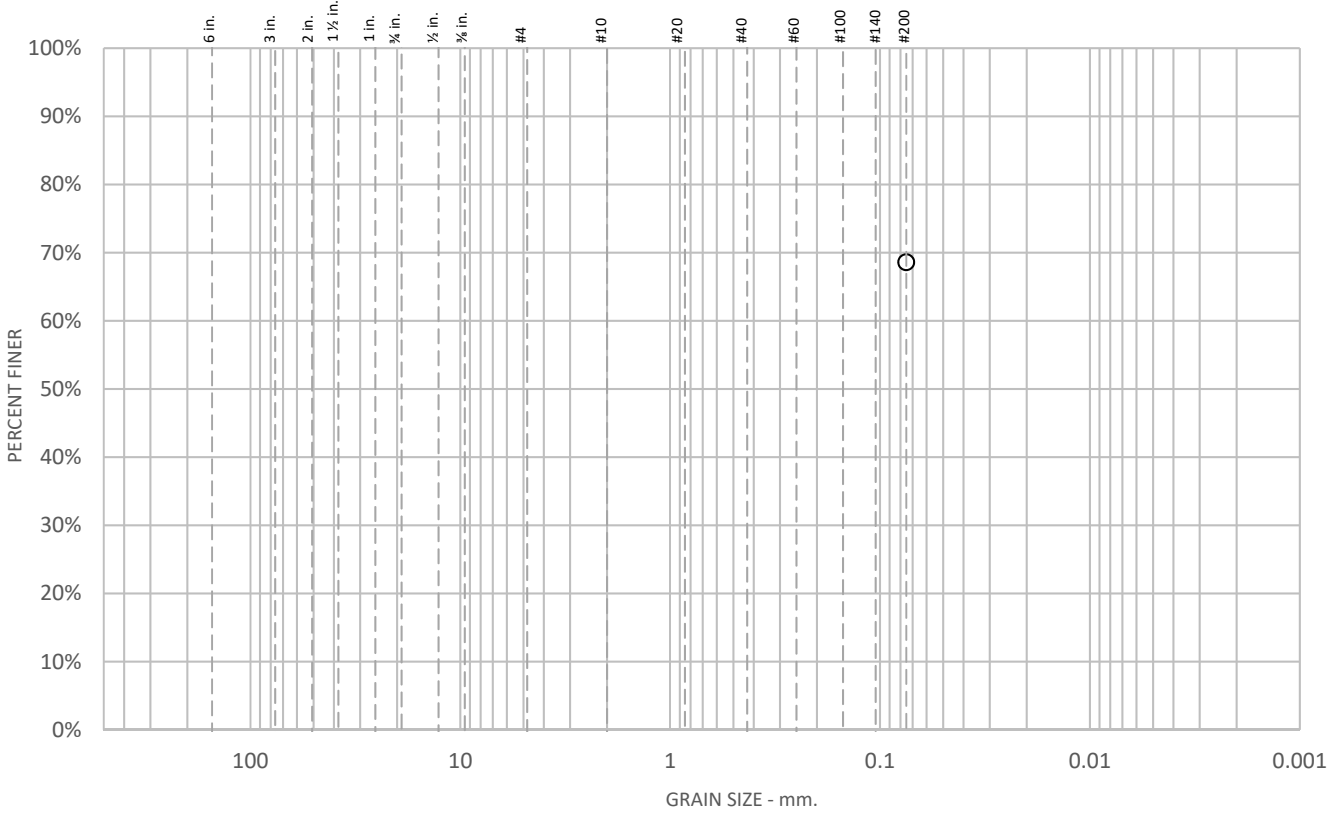
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						68.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	68.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 44 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 312.28 g

Sample Number: 1-B7 @ 20-21.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

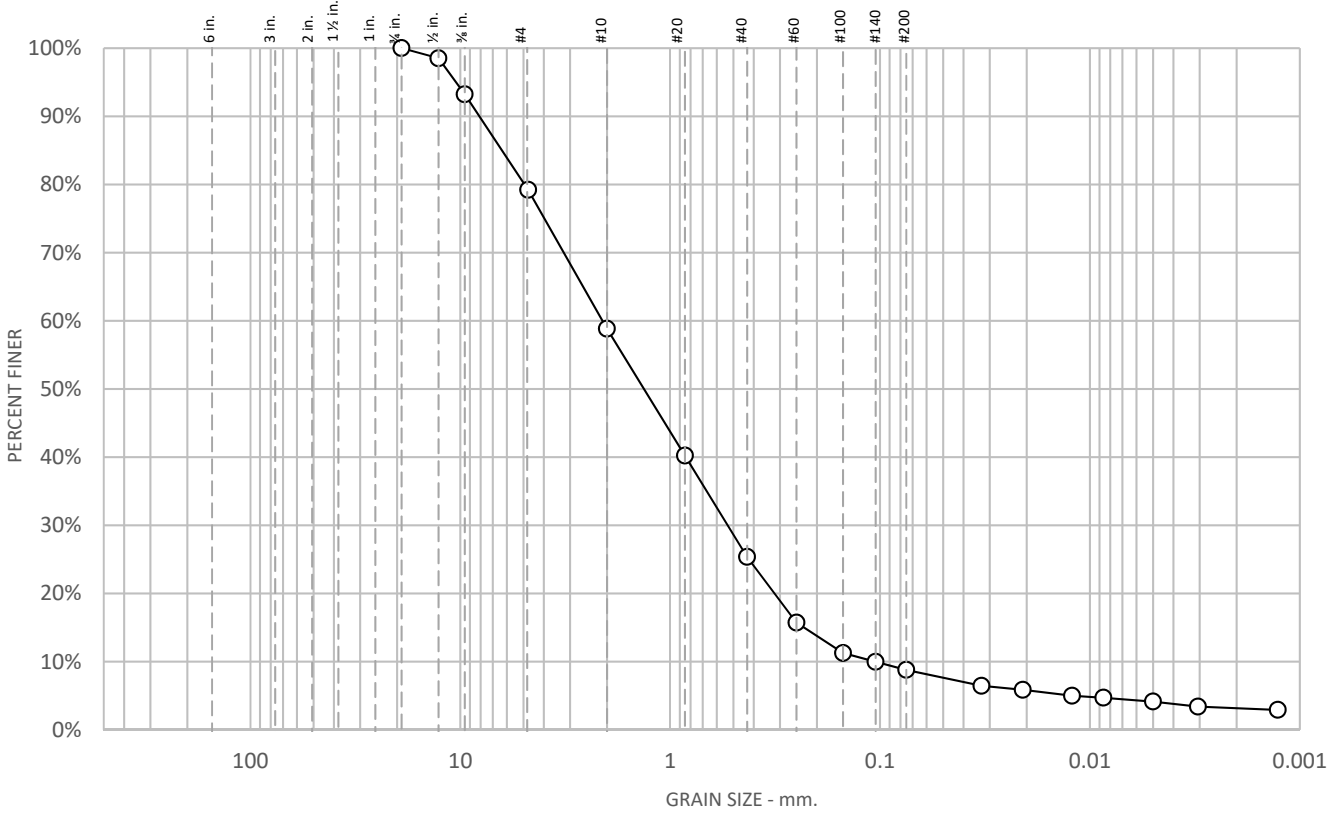
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem
Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	20.8	20.4	33.5	16.6	5.6	3.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
½ in.	98.5		
⅜ in.	93.2		
#4	79.2		
#10	58.8		
#20	40.2		
#40	25.4		
#60	15.7		
#100	11.3		
#140	10.0		
#200	8.8		
0.0328 mm.	6.4		
0.0209 mm.	5.9		
0.0122 mm.	5.0		
0.0086 mm.	4.7		
0.0050 mm.	4.1		
0.0031 mm.	3.4		
0.0013 mm.	2.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 8.1141 mm D_{85} = 6.3321 mm D_{60} = 2.1018 mm
D_{50} = 1.3328 mm D_{30} = 0.5321 mm D_{15} = 0.2302 mm
D_{10} = 0.1060 mm C_u = 19.83 C_c = 1.27

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 34-35.5

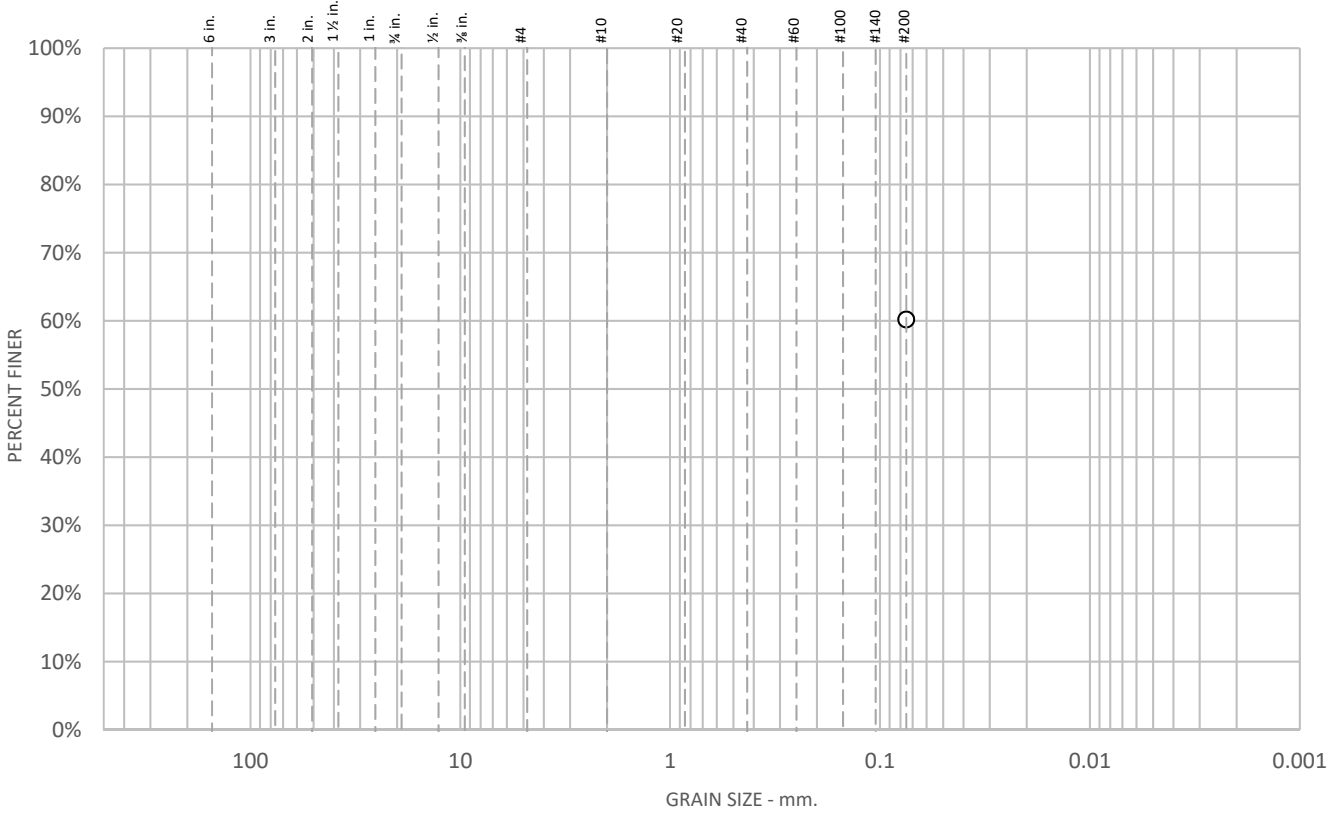
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	60.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 38 PI = 20

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 96.28 g

Sample Number: 1-B7 @ 45-46.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

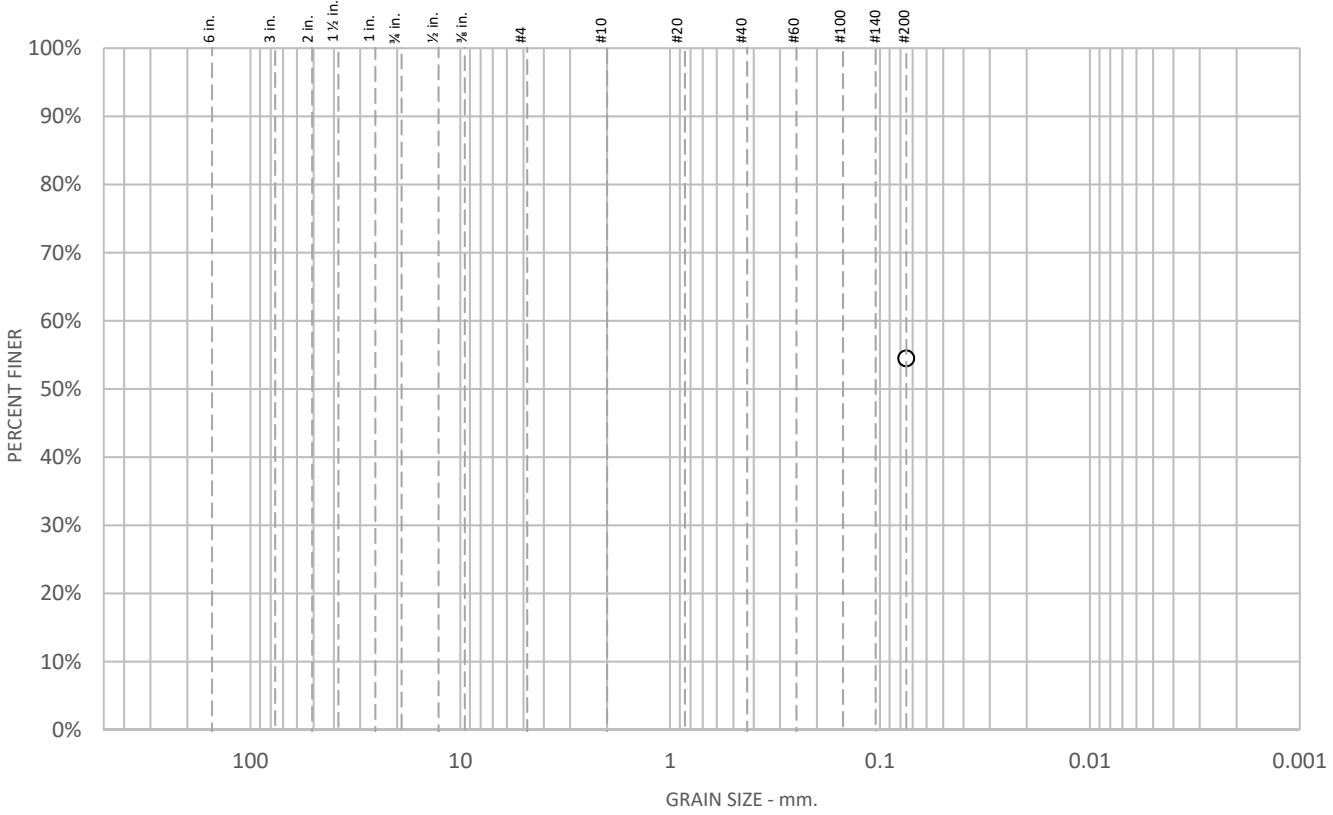
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						54.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	54.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 26 LL = 38 PI = 12

Coefficients

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

Classification

USCS = ML

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 118.25 g

Sample Number: 1-B7 @ 61-61.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

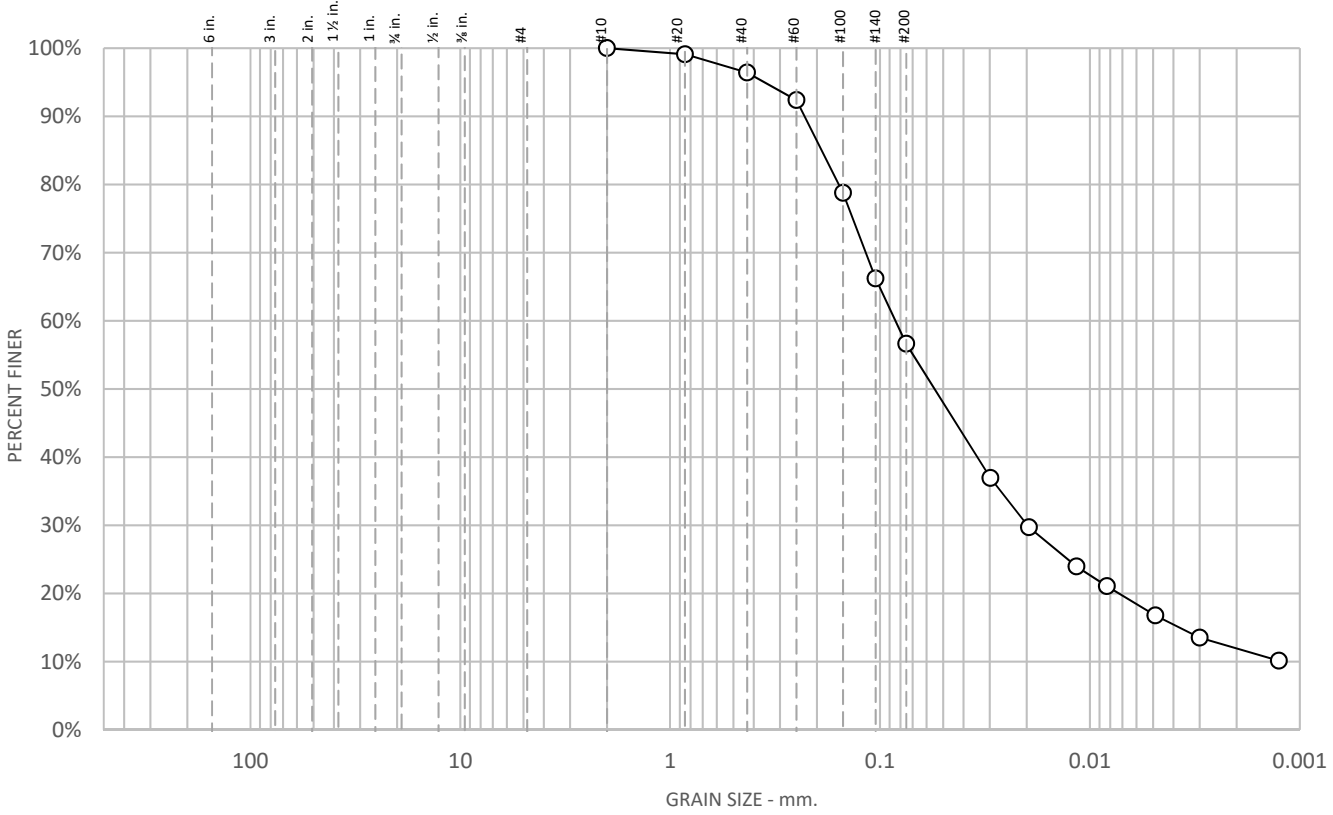
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				3.6	39.8	44.7	11.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.1		
#40	96.4		
#60	92.4		
#100	78.8		
#140	66.2		
#200	56.6		
0.0298 mm.	36.9		
0.0195 mm.	29.7		
0.0116 mm.	23.9		
0.0083 mm.	21.1		
0.0049 mm.	16.8		
0.0030 mm.	13.5		
0.0013 mm.	10.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2287 mm D_{85} = 0.1896 mm D_{60} = 0.0844 mm
D_{50} = 0.0550 mm D_{30} = 0.0198 mm D_{15} = 0.0037 mm
D_{10} = C_u = C_c =

Classification

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 8.0-10.0

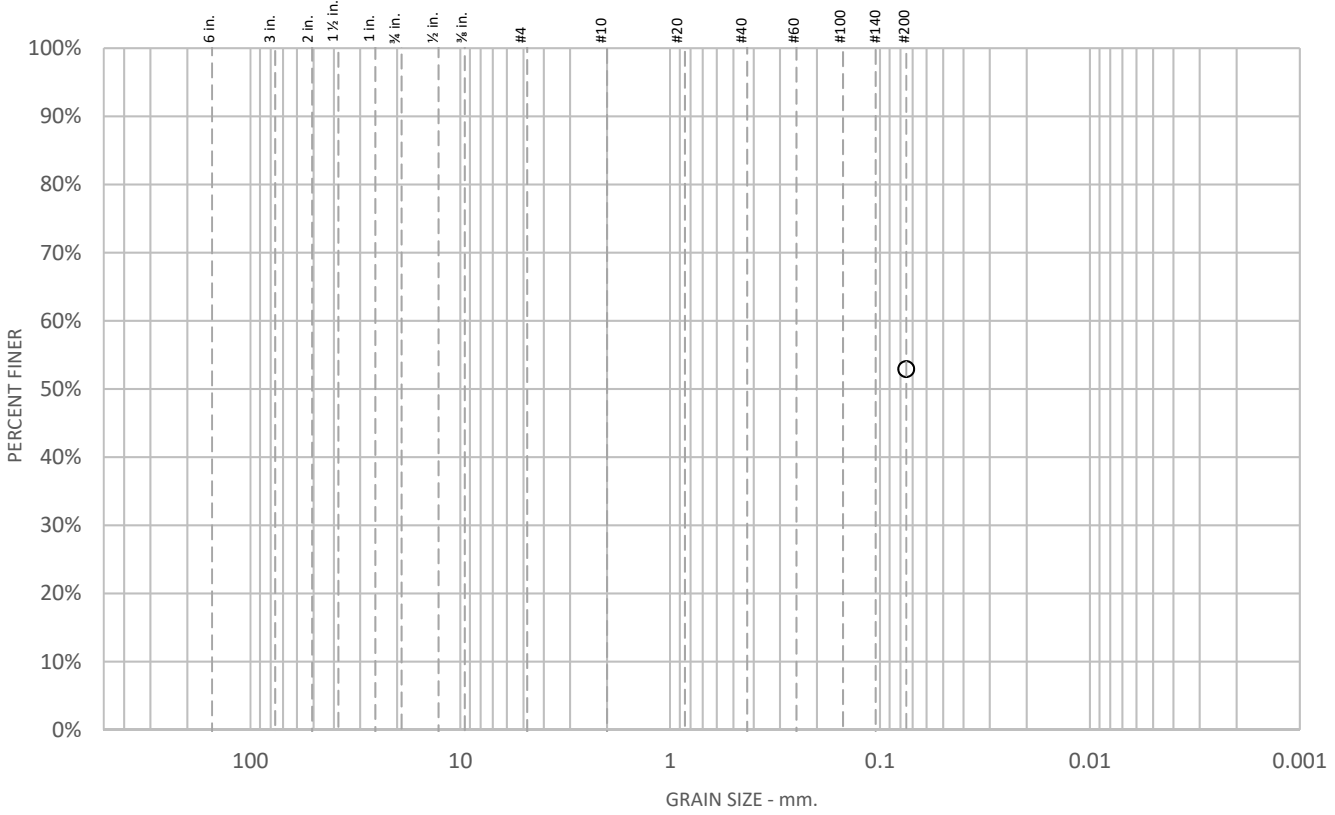
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	52.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = NP LL = NV PI = NP

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 173.83 g

Sample Number: 1-B7 @ 80-81

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Isotropic Unconsolidated Undrained Triaxial Test

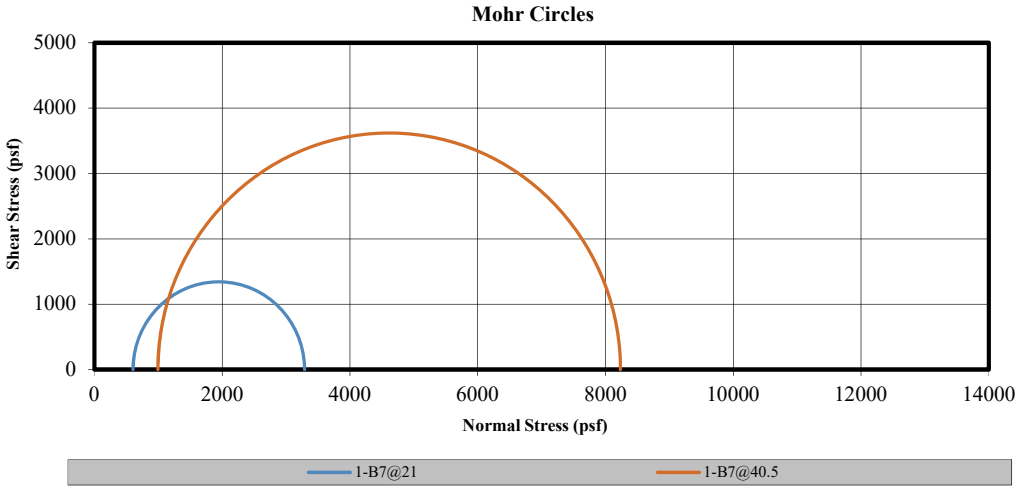
ASTM D2850

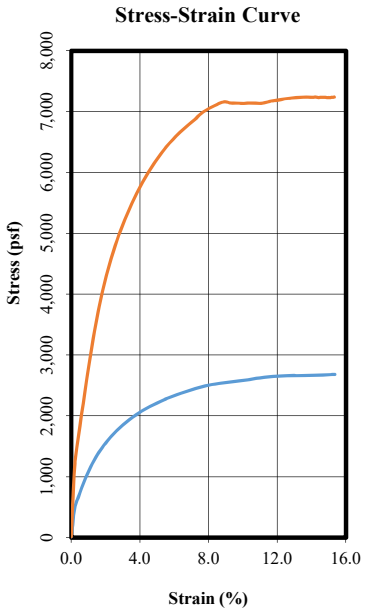
Date: 06/14/19

Checked By: G. Criste

Date: 6/14/2019

Tested By: N. Buckton





Before Test	Specimen 1-B7@21	1-B7@40.5		
Water Content (%)	23.62	20.96		
Dry Density (pcf)	103.30	108.20		
Saturation (%)	99.84	99.76		
Void Ratio	0.64	0.57		
Diameter (in)	2.404	2.404		
Height (in)	5.005	5.067		
Height-to-Diameter Ratio	2.082	2.108		
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
ASTM D854 - Assumed				
Specific Gravity	2.720	2.725		
After Test	**1-B7@21**	**1-B7@40.5**		
Water Content (%)	23.62	20.96		
Saturation (%)	99.84	99.76		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	2682.7	7239.9		
Axial Strain @ Failure (%)	15.352	13.619		
	Cell Pressure			
Cell (psf)	604.8	993.6		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3287.5	8233.5		
σ3 (psf)	604.8	993.6		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1341.3	3619.9		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/14/19

Checked By: G. Criste

Date: 6/14/2019

Tested By: N. Buckton

SPECIMEN PHOTOS

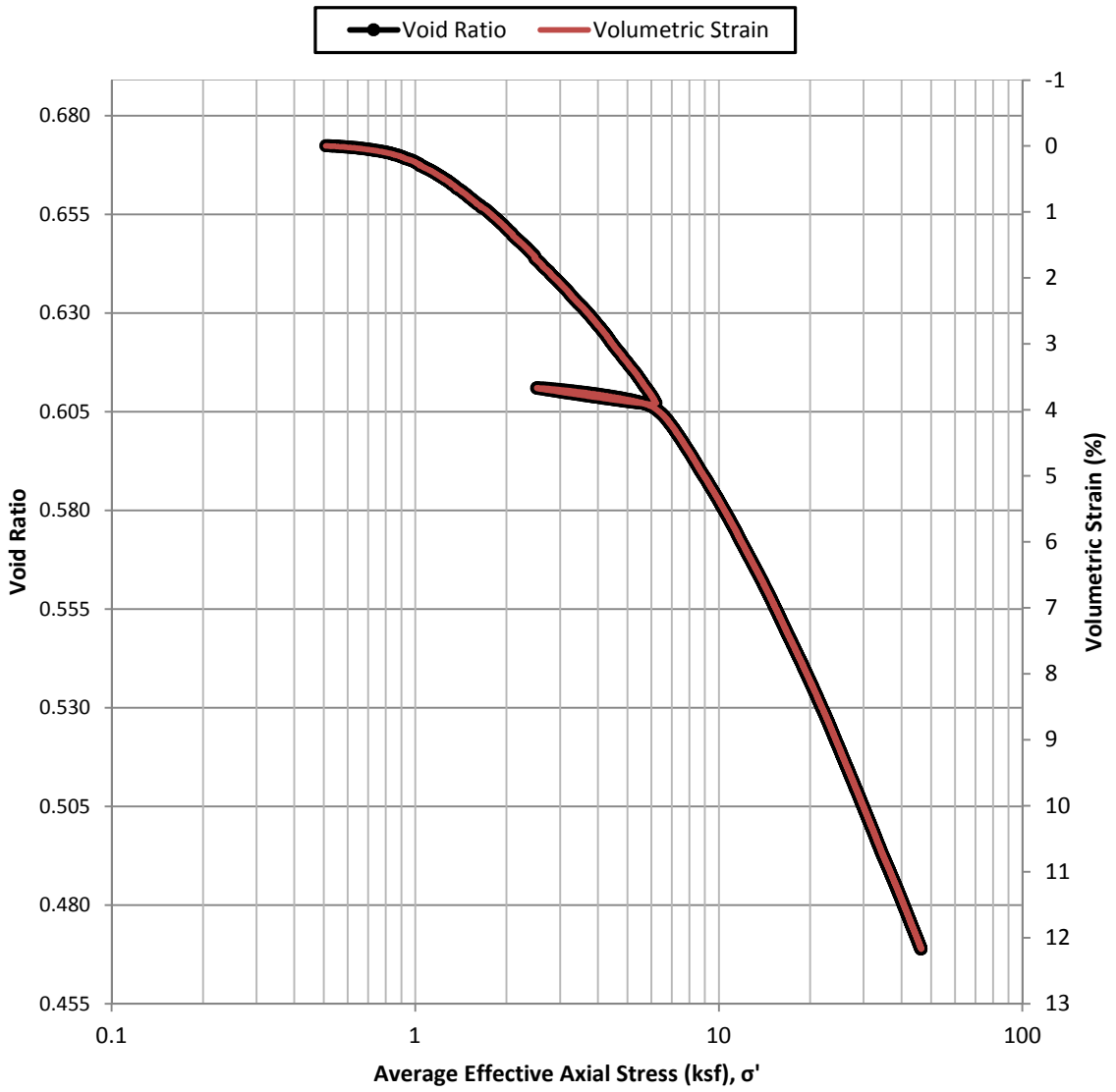
SAMPLE NUMBER: 1-B7@21	SAMPLE NUMBER: 1-B7@40.5
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Constant Rate of Strain Consolidation
ASTM D4186

Void Ratio & Volumetric Strain Vs Average Effective Axial Stress (ksf), σ'



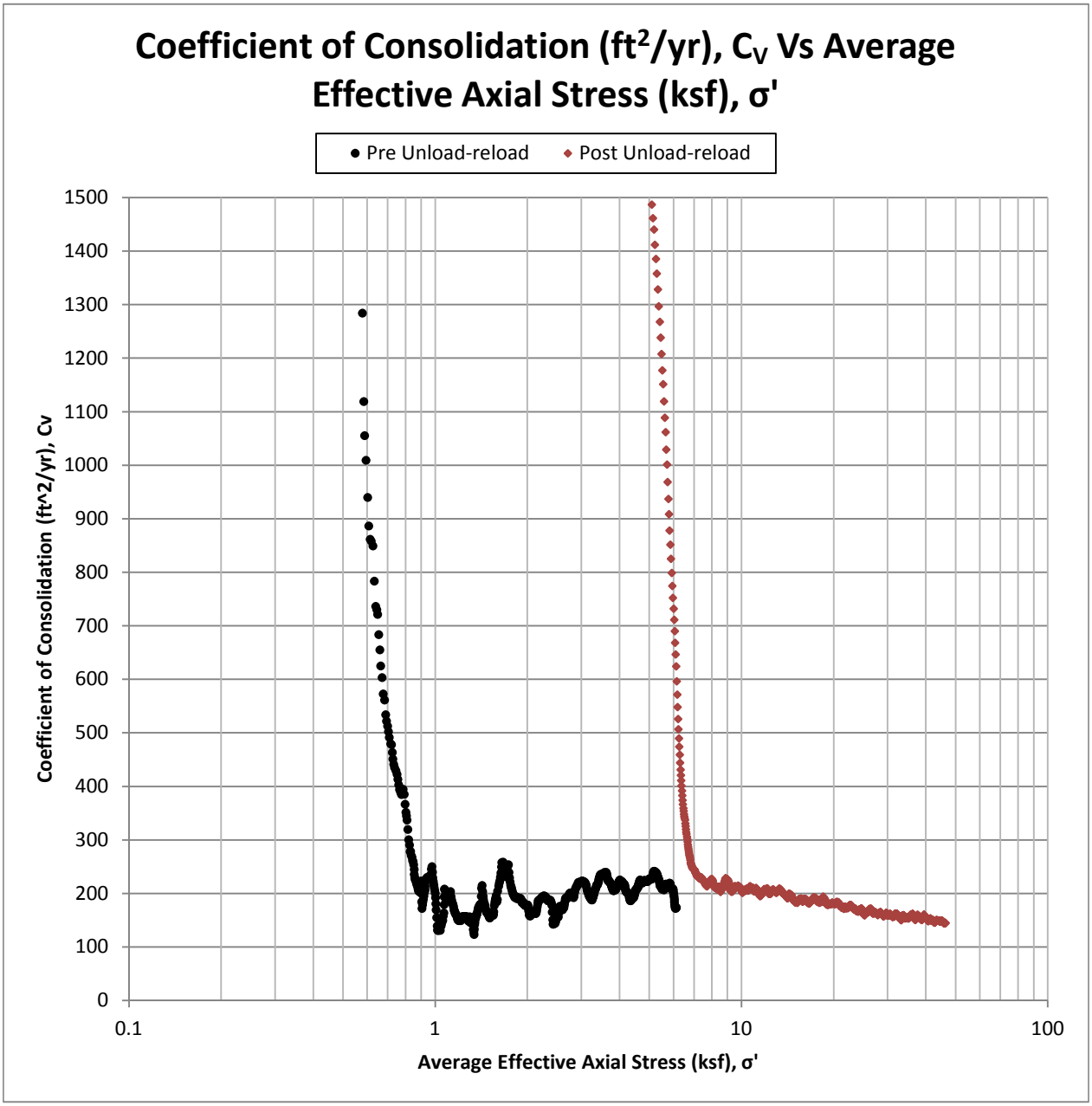
ASTM D2216			Report Date: 6/20/2019	
	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	24.42%	17.91%	Liquid Limit:	
Dry Density (pcf):	103.59	117.96	Plastic Limit:	
Saturation (%):	100.96%	100.00%	ASTM D854 - Measured	
Void Ratio:	0.6723	0.4687	Specific Gravity:	2.780
			Soil Description:	See exploration logs

Project Number:	15949.000.000	Depth:	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	Boring #:	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	Reviewed By:	J. Kan

ENGEO Expect Excellence

Remarks:

Constant Rate of Strain Consolidation
ASTM D4186



ASTM D2216			ASTM D4318 - Wet Method	
	As Received	Final	Liquid Limit:	
Moisture (%):	24.42%	17.91%	Plastic Limit:	
Dry Density (pcf):	103.59	117.96	ASTM D854 - Measured	
Saturation (%):	100.96%	100.00%	Specific Gravity:	2.780
Void Ratio:	0.6723	0.4687	Soil Description:	See exploration logs

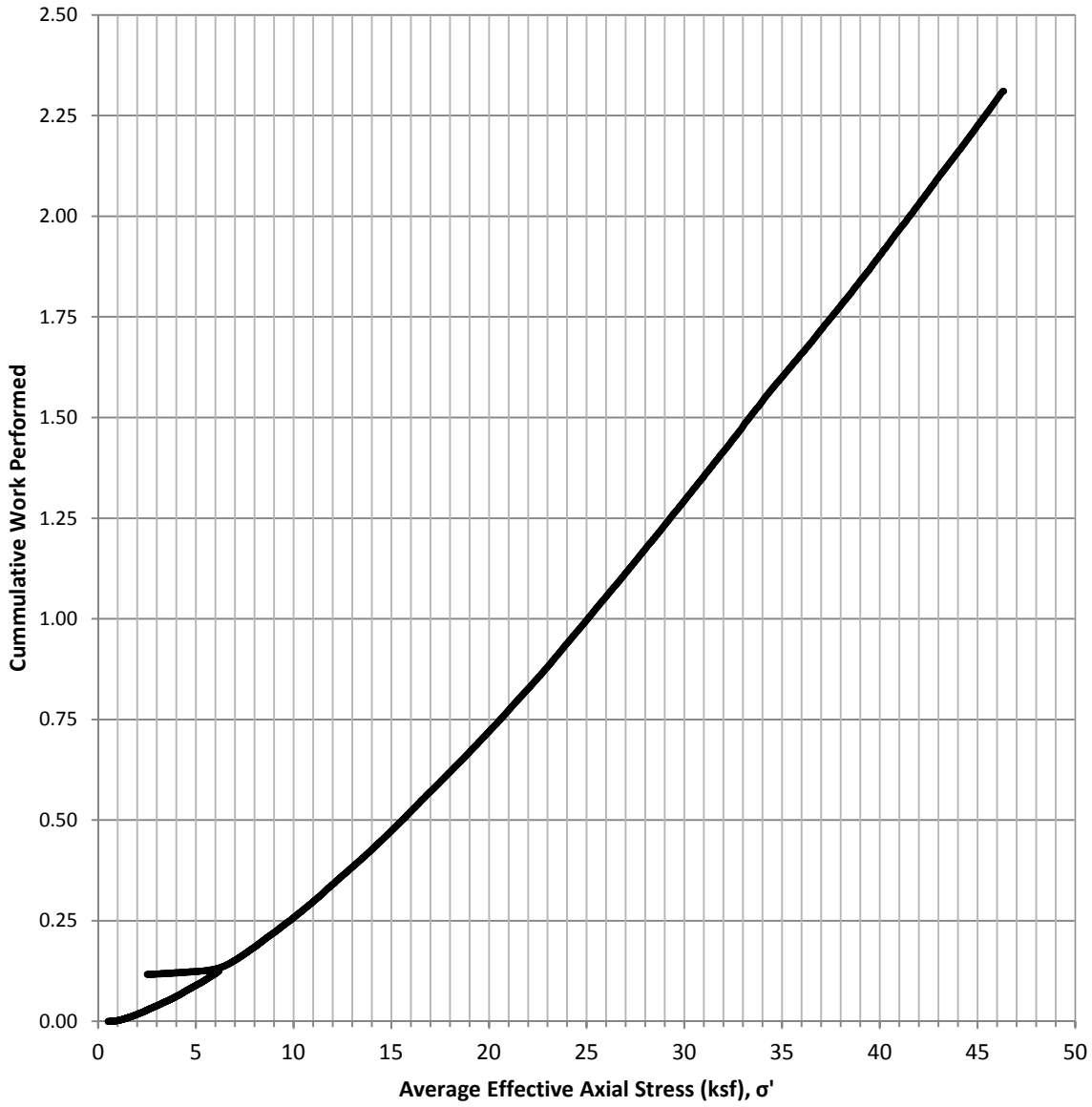
Report Date: 6/20/2019

Project Number:	15949.000.000	**Depth:**	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	**Boring #:**	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

Remarks:

ENGEO Expect Excellence

Constant Rate of Strain Consolidation
ASTM D4186



ASTM D2216			ASTM D4318 - Wet Method	
	As Received	Final		
Moisture (%):	24.42%	17.91%	Liquid Limit:	
Dry Density (pcf):	103.59	117.96	Plastic Limit:	
Saturation (%):	100.96%	100.00%	ASTM D854 - Measured	
Void Ratio:	0.6723	0.4687	Specific Gravity:	2.780
			Soil Description:	See exploration logs

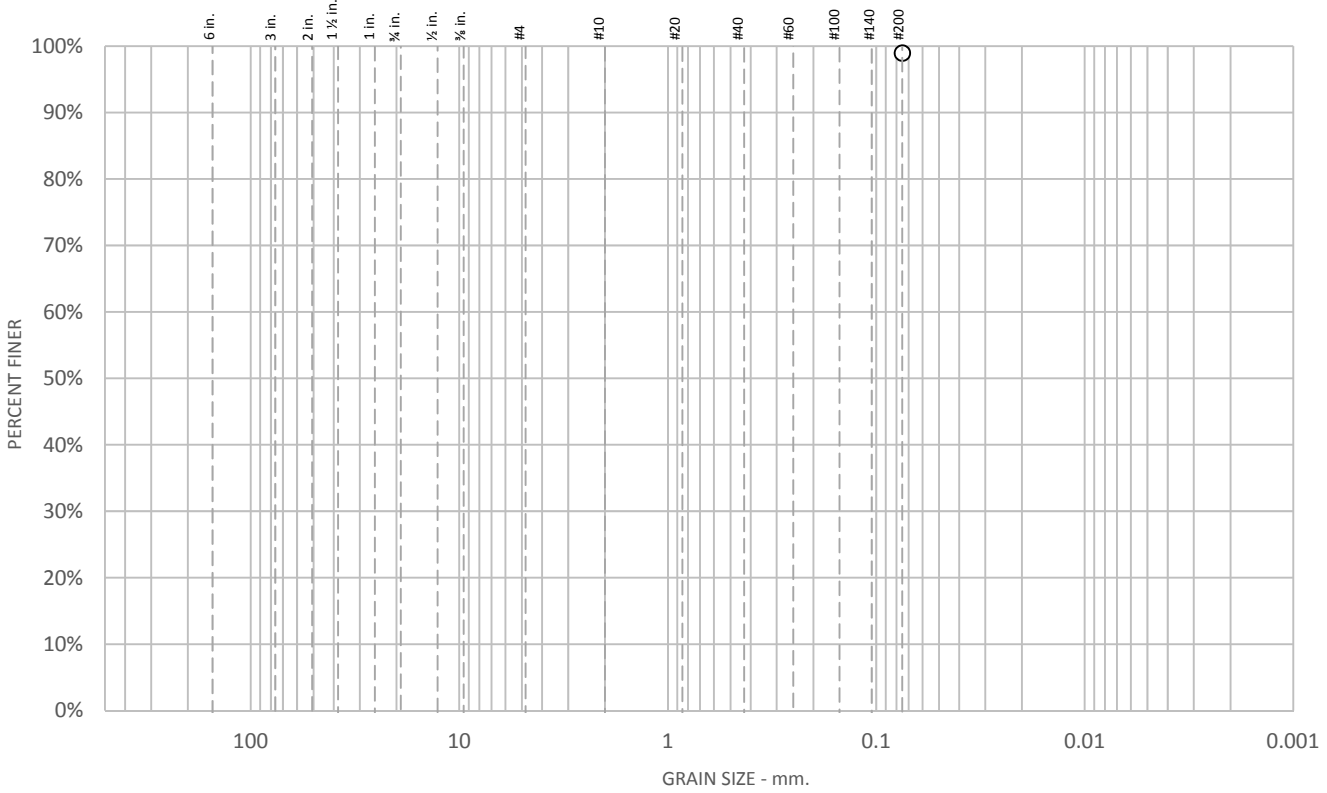
Report Date: 6/20/2019

Project Number:	15949.000.000	**Depth:**	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	**Boring #:**	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

Remarks:

ENGEO Expect Excellence

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						98.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	98.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 30 LL = 59 PI = 29

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 81.69 g

Sample Number: 1-B3 @ 10

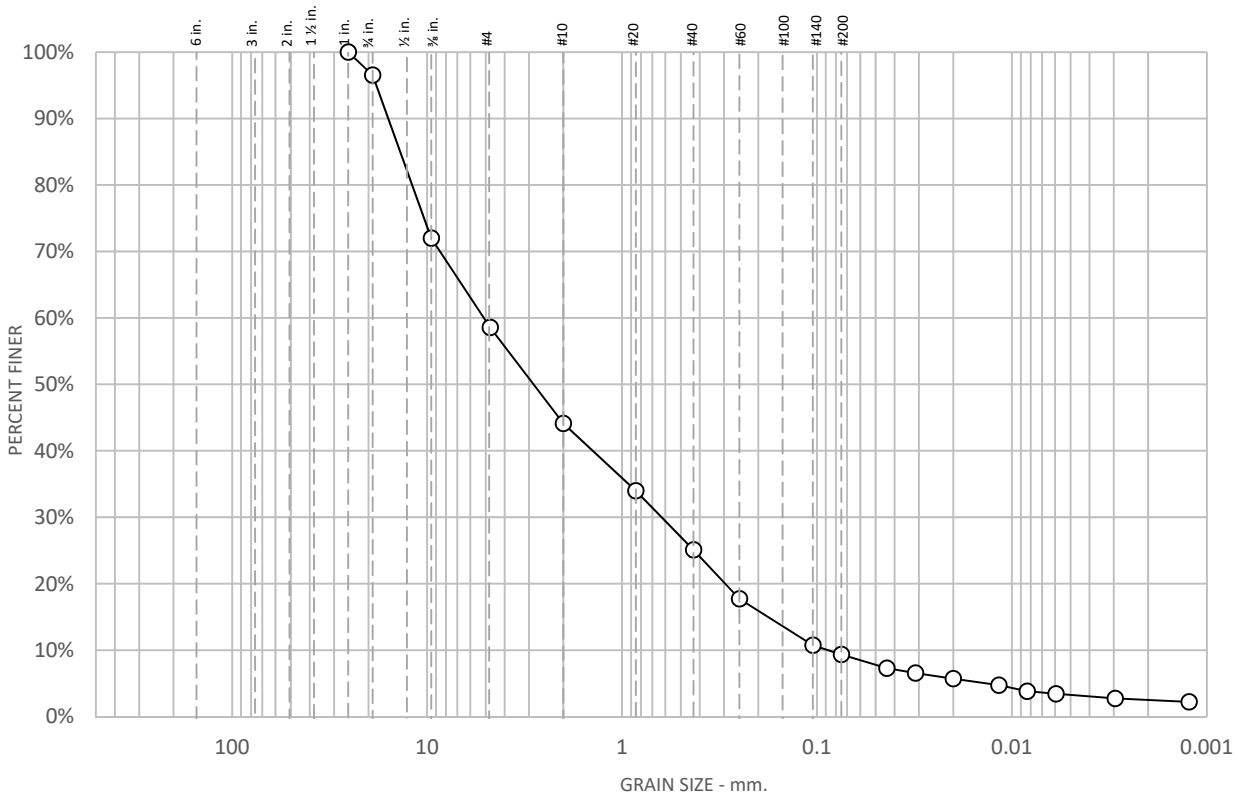
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California
Project Number: 15949.000.000
Date: 9/18/2019

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	3.6	37.9	14.4	19.0	15.8	6.8	2.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	96.5		
⅜ in.	72.0		
#4	58.6		
#10	44.1		
#20	34.0		
#40	25.1		
#60	17.7		
#140	10.7		
#200	9.3		
0.0438 mm.	7.3		
0.0313 mm.	6.6		
0.0200 mm.	5.7		
0.0117 mm.	4.7		
0.0084 mm.	3.8		
0.0059 mm.	3.4		
0.0030 mm.	2.7		
0.0012 mm.	2.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 15.8399 mm D_{85} = 13.7521 mm D_{60} = 5.1171 mm
D_{50} = 2.8439 mm D_{30} = 0.6264 mm D_{15} = 0.1783 mm
D_{10} = 0.0879 mm C_u = 58.25 C_c = 0.87

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B3 @ 21

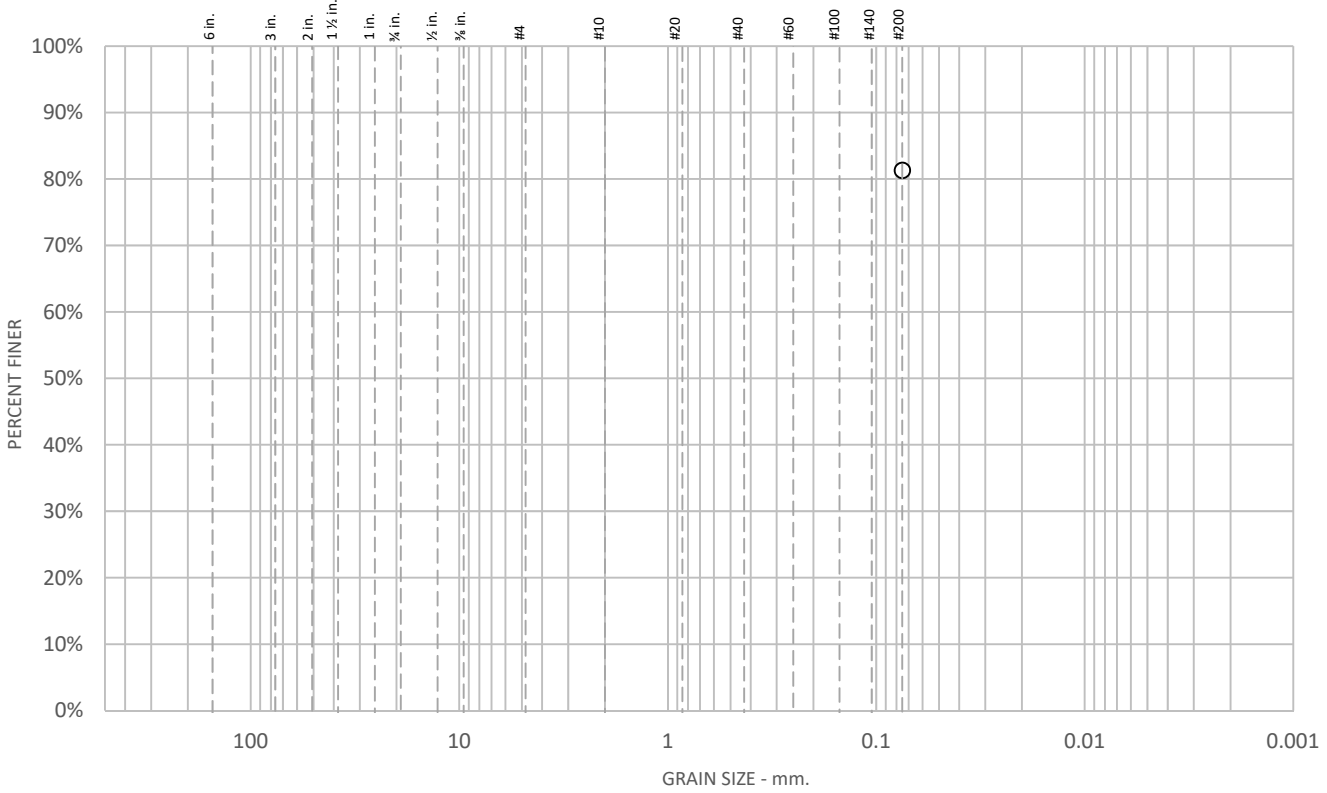
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	81.3		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 20 LL = 50 PI = 30

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 176.5 g

Sample Number: 1-B3 @ 30.5

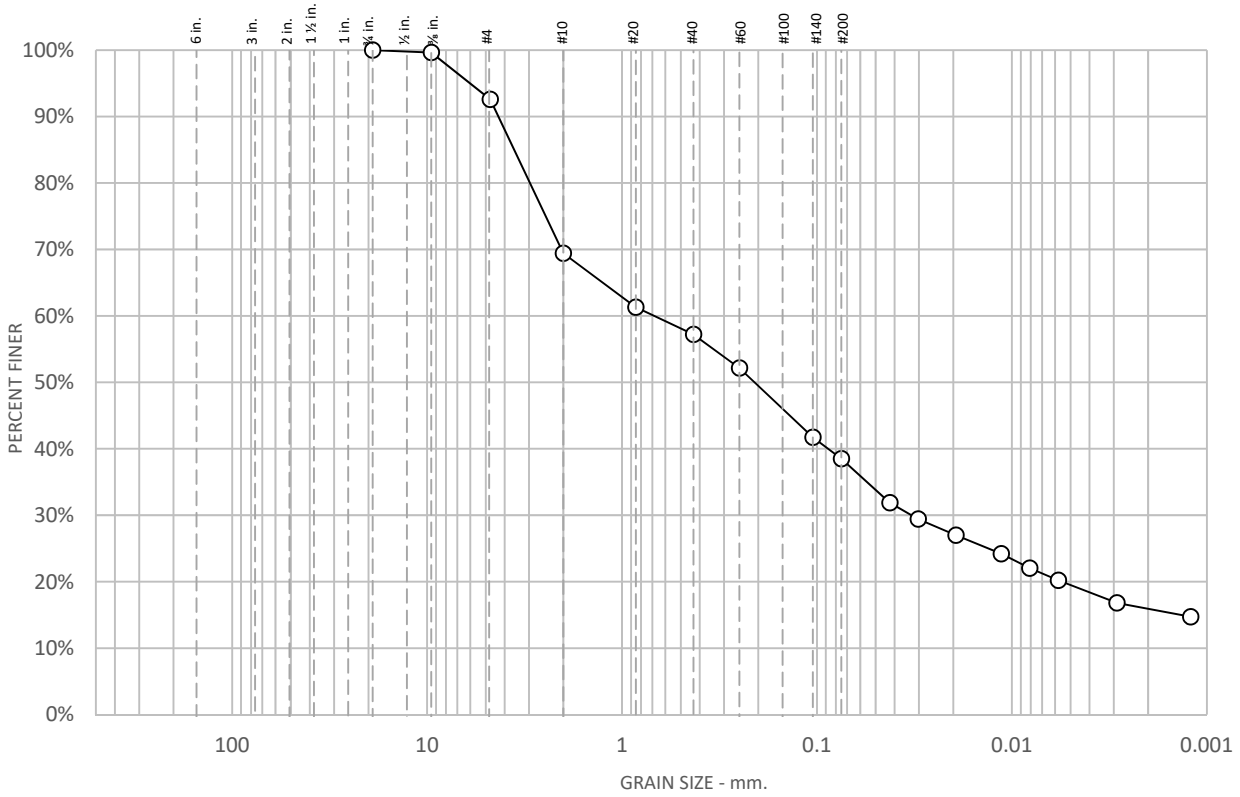
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	7.4	23.2	12.2	18.7	22.6	15.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.6		
#4	92.6		
#10	69.4		
#20	61.3		
#40	57.2		
#60	52.2		
#140	41.7		
#200	38.5		
0.0423 mm.	31.9		
0.0303 mm.	29.4		
0.0194 mm.	27.0		
0.0113 mm.	24.2		
0.0081 mm.	22.0		
0.0058 mm.	20.2		
0.0029 mm.	16.8		
0.0012 mm.	14.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 15 LL = 38 PI = 23

Coefficients

D_{90} = 4.3115 mm D_{85} = 3.5778 mm D_{60} = 0.6831 mm
D_{50} = 0.2089 mm D_{30} = 0.0327 mm D_{15} = 0.0014 mm
D_{10} = C_u = C_c =

Classification

USCS = SC

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B3 @ 45.5

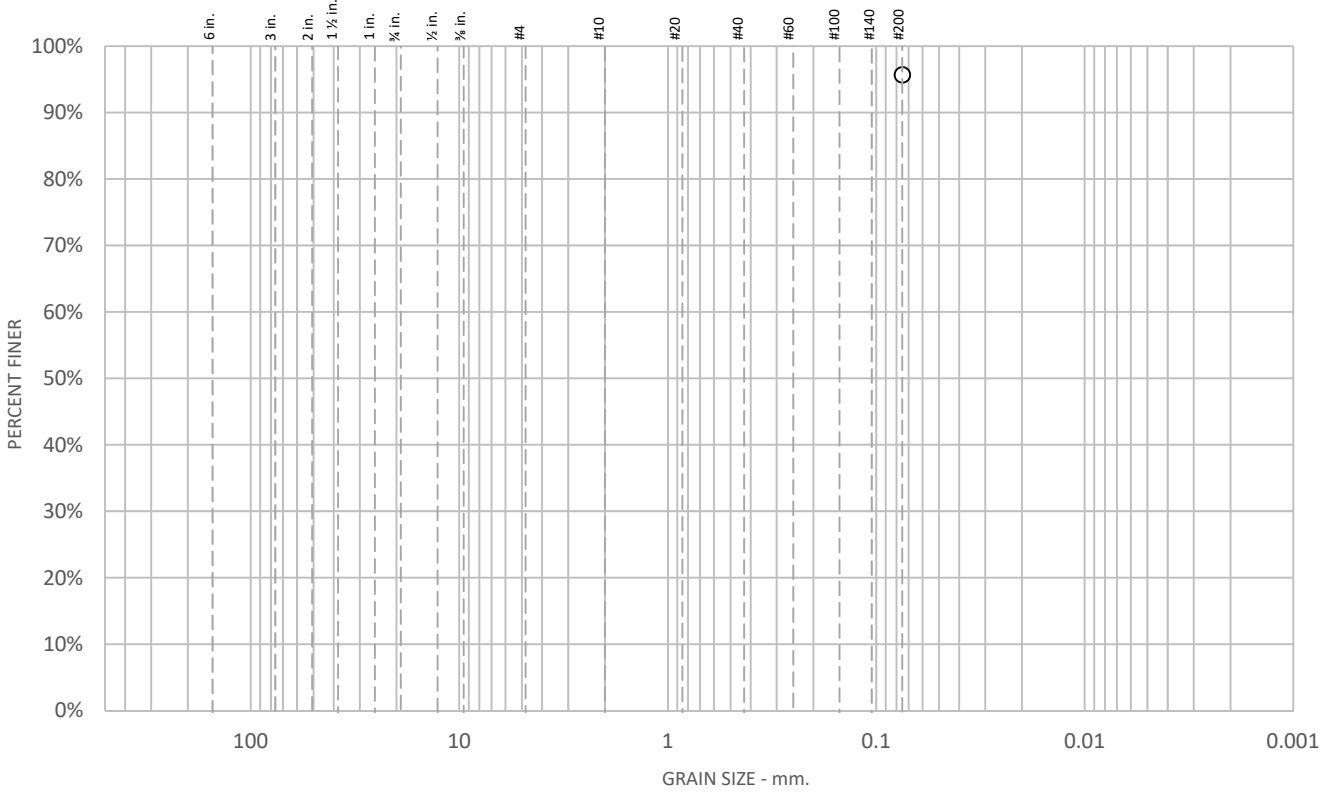
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						95.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	95.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 86 PI = 67

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 179.7 g

Sample Number: 1-B3 @ 5.5

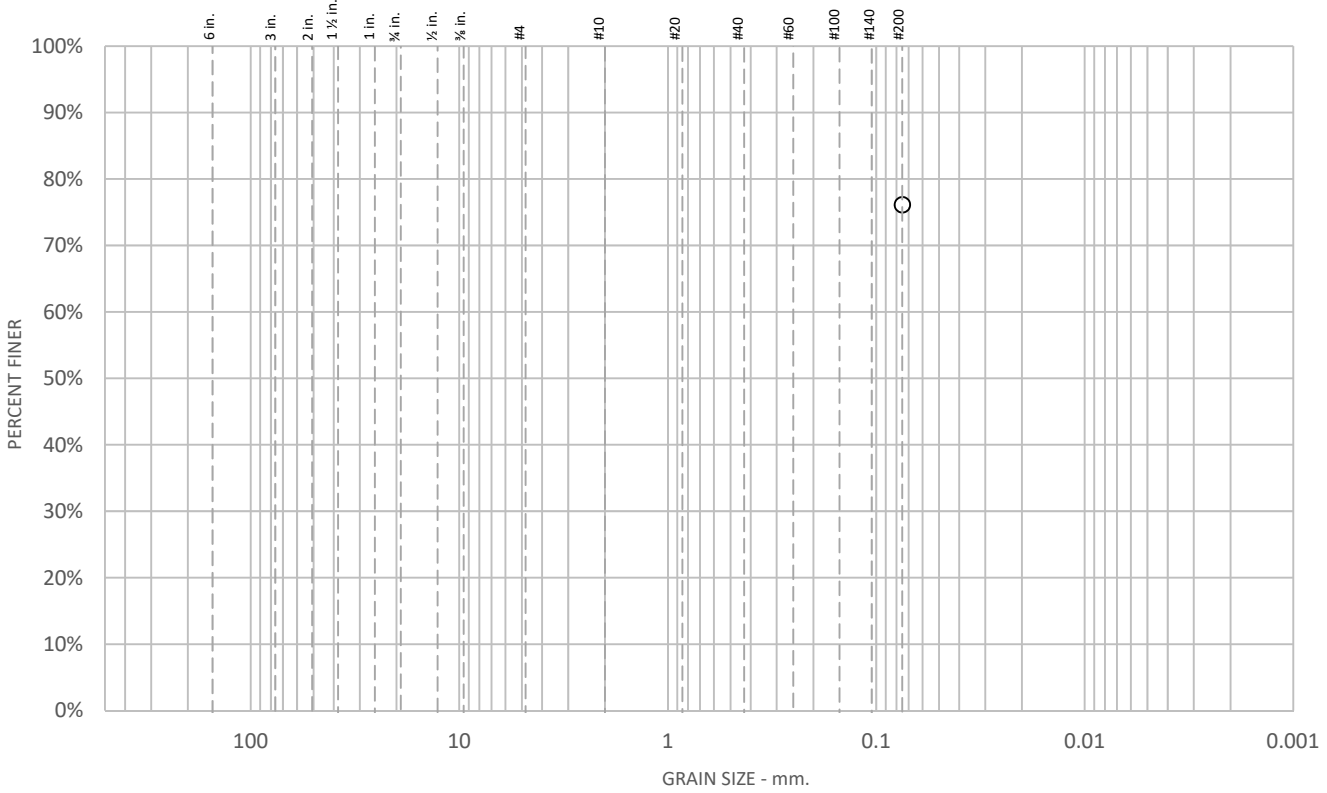
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	76.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 38 PI = 21

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 192.2 g

Sample Number: 1-B3 @ 50.5

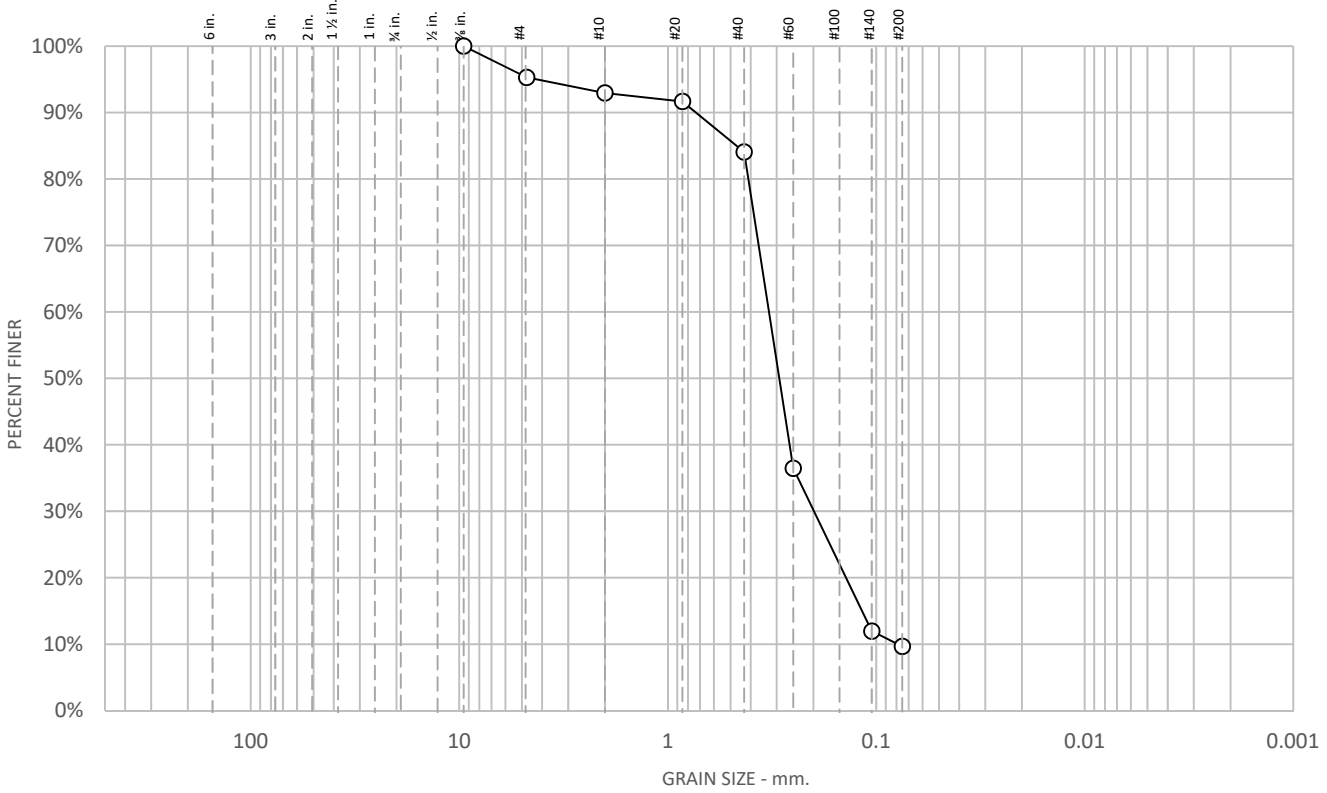
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		4.7	2.4	8.9	74.4	9.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
⅜ in.	100.0		
#4	95.3		
#10	92.9		
#20	91.7		
#40	84.1		
#60	36.5		
#140	12.0		
#200	9.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.7317 mm D_{85} = 0.4672 mm D_{60} = 0.3269 mm
D_{50} = 0.2917 mm D_{30} = 0.1989 mm D_{15} = 0.1170 mm
D_{10} = 0.0789 mm C_u = 4.14 C_c = 1.53

Classification

USCS = SW

Remarks

USCS: ASTM D2487 ASTM D6913, Method B

Sample Number: 1-B3 @ 80.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	1-B3	1-B3	1-B3	1-B3	1-B3	1-B3		
DEPTH (ft.):	5.5	16	50.5	61	70.5	80.5		
MOISTURE CONTENT (%):	30.9	9.2	22.0	23.5	29.3	22.4		
DRY DENSITY (lbs/ft^3):	88.0	132.1	106.1	104.9	94.8	103.0		

Testing remarks:

PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NUMBER: 15959.000.000
CLIENT: Google, LLC
PHASE NUMBER: LAB

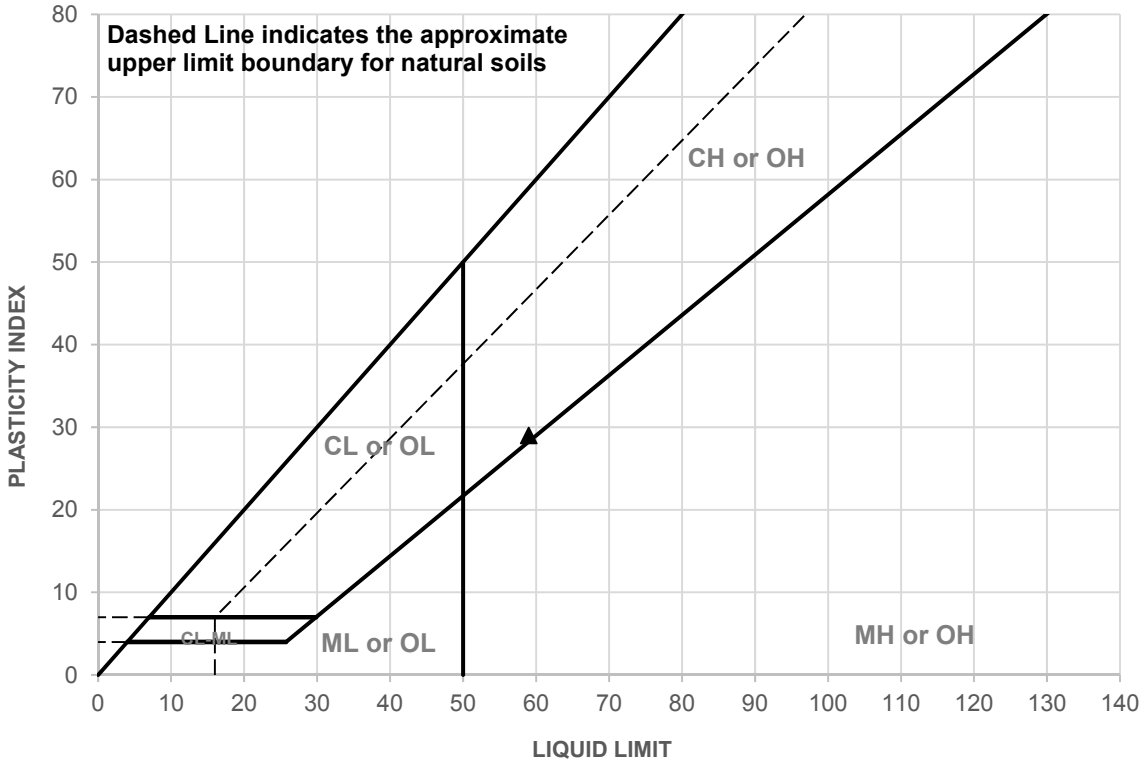
DATE: 09/09/19

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 2213 Plaza Dr., Rocklin, CA 95765. Phone No. (916) 786-8883.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



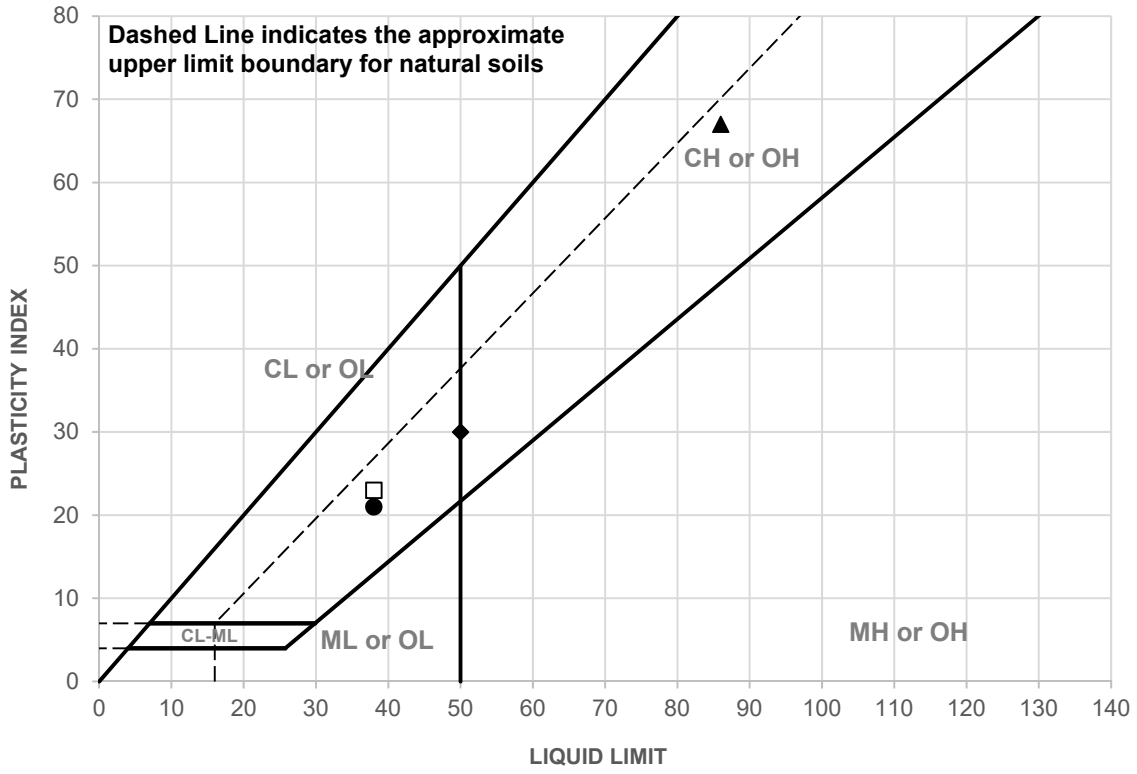
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B3 @ 10	10 ft	See exploration logs	59	30	29

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B3 @ 10	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/18/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B3	5.5	See exploration logs	86	19	67
◆	1-B3	30.5	See exploration logs	50	20	30
□	1-B3	45.5	See exploration logs	38	15	23
●	1-B3	50.5	See exploration logs	38	17	21

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B3	PI: ASTM D4318, Wet Method	
◆	1-B3	PI: ASTM D4318, Wet Method	
□	1-B3	PI: ASTM D4318, Wet Method	
●	1-B3	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B3@21

Description: See exploration logs — USCS: SP

%Passing #4: 58.6

Method used: **B**

Temperature (^{o}C): **23.4** — ***Specific gravity at 20 ^{o} C:*** **2.885**

Sample 2: 1-B3@45.5

Description: See exploration logs — USCS: SC

%Passing #4: 92.6

Method used: **B**

Temperature (^{o}C): **23.4** — ***Specific gravity at 20 ^{o} C:*** **2.826**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** — **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER:

ENGEO Expect Excellence

Tested by: R. Montalvo — Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

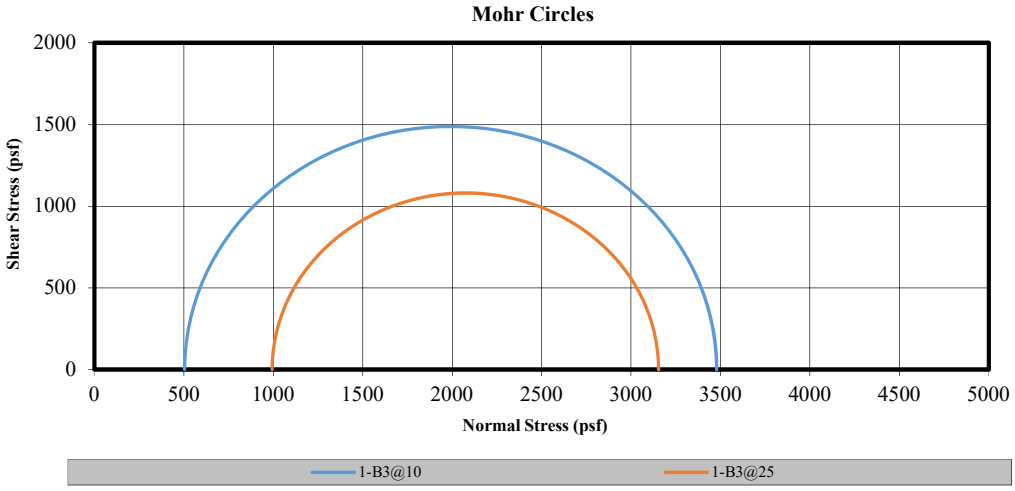
ASTM D2850

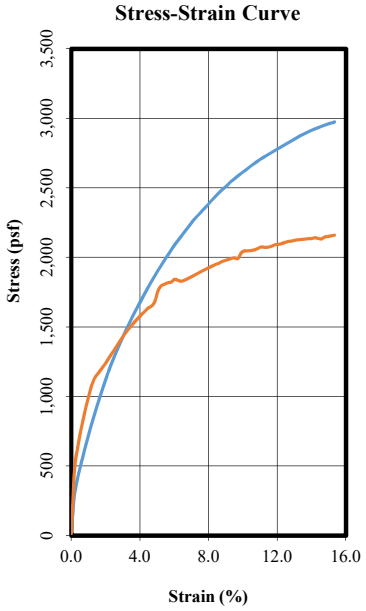
Date: 09/10/19

Checked By: G. Criste

Date: 9/10/2019

Tested By: M. Quasem





Before Test	Specimen 1-B3@10	1-B3@25		
Water Content (%)	23.84	30.11		
Dry Density (pcf)	102.10	93.70		
Saturation (%)	97.69	100.00		
Void Ratio	0.66	0.81		
Diameter (in)	2.400	2.380		
Height (in)	5.100	5.150		
Height-to-Diameter Ratio	2.125	2.164		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.720	2.720		
After Test	**1-B3@10**	**1-B3@25**		
Water Content (%)	23.84	30.11		
Saturation (%)	97.68	100.00		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	2974.7	2160.2		
Axial Strain @ Failure (%)	15.329	15.331		
	Cell Pressure			
Cell (psf)	504.0	993.6		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3478.7	3153.8		
σ3 (psf)	504.0	993.6		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1487.4	1080.1		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 09/10/19

Checked By: G. Criste

Date: 9/10/2019

Tested By: M. Quasem

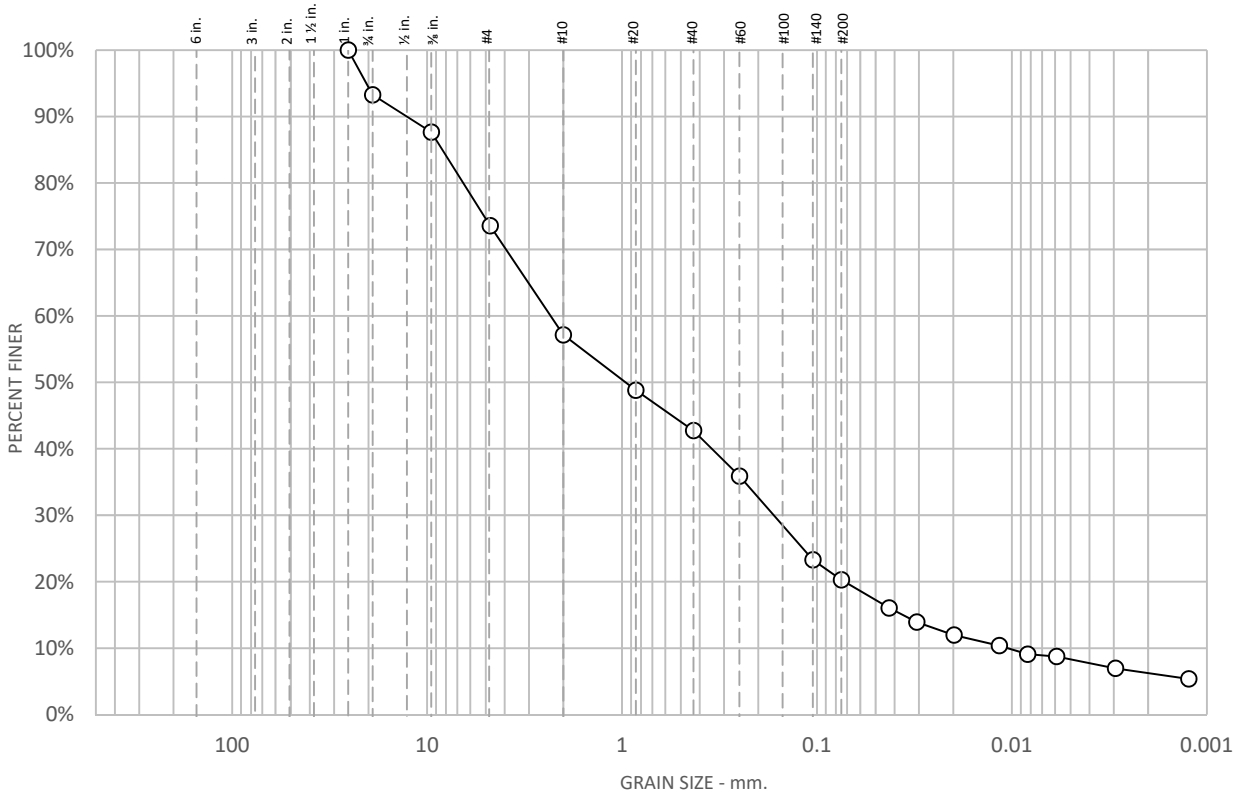
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B3@10	SAMPLE NUMBER: 1-B3@25
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	6.8	19.7	16.4	14.4	22.5	14.0	6.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	93.3		
⅜ in.	87.7		
#4	73.6		
#10	57.2		
#20	48.8		
#40	42.7		
#60	35.9		
#140	23.3		
#200	20.3		
0.0427 mm.	16.1		
0.0308 mm.	13.9		
0.0198 mm.	12.0		
0.0116 mm.	10.4		
0.0083 mm.	9.1		
0.0059 mm.	8.7		
0.0029 mm.	7.0		
0.0012 mm.	5.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 12.7236 mm D_{85} = 8.3544 mm D_{60} = 2.3233 mm
D_{50} = 0.9596 mm D_{30} = 0.1667 mm D_{15} = 0.0363 mm
D_{10} = 0.0105 mm C_u = 220.57 C_c = 1.14

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 10

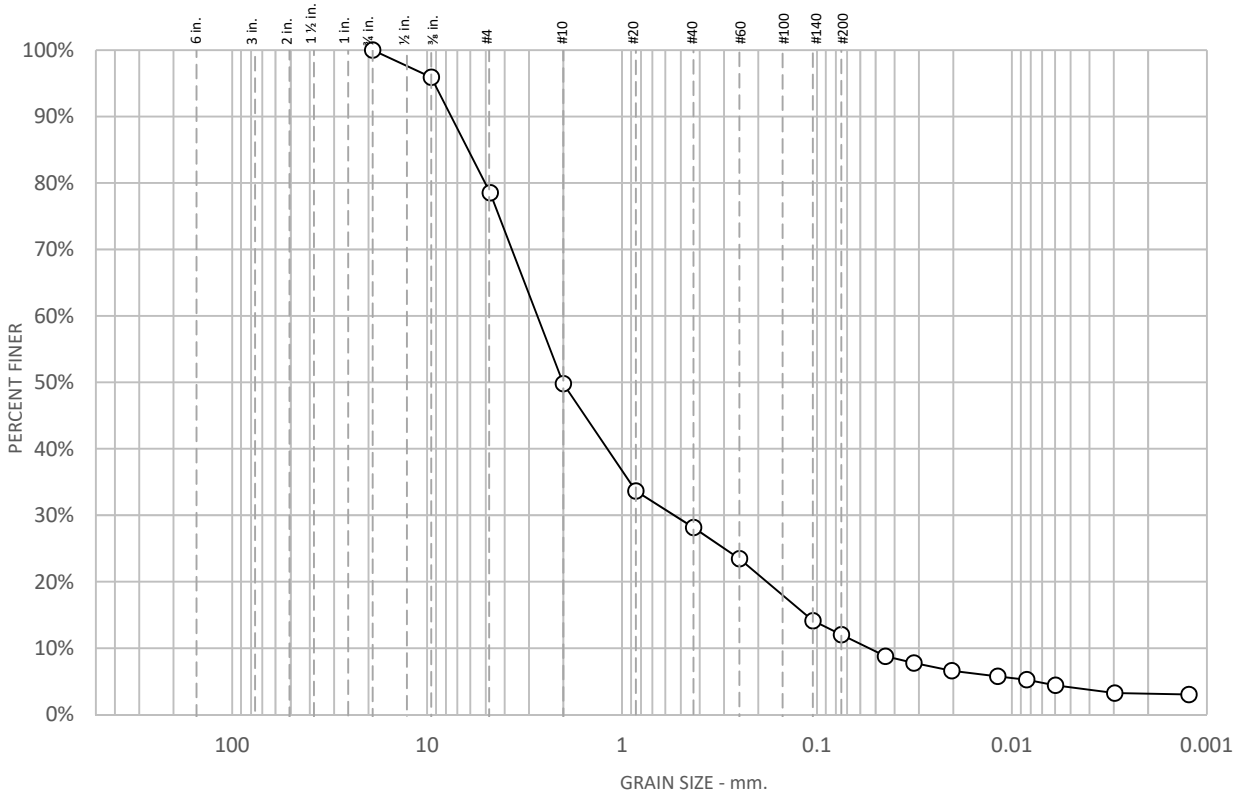
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	21.5	28.7	21.6	16.1	8.9	3.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	95.9		
#4	78.5		
#10	49.8		
#20	33.6		
#40	28.2		
#60	23.5		
#140	14.1		
#200	12.0		
0.0446 mm.	8.8		
0.0318 mm.	7.8		
0.0203 mm.	6.6		
0.0118 mm.	5.8		
0.0084 mm.	5.2		
0.0060 mm.	4.4		
0.0030 mm.	3.2		
0.0012 mm.	3.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 7.5207 mm D_{85} = 6.1570 mm D_{60} = 2.7190 mm
D_{50} = 2.0116 mm D_{30} = 0.5405 mm D_{15} = 0.1139 mm
D_{10} = 0.0543 mm C_u = 50.09 C_c = 1.98

Classification

USCS = SW

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 18

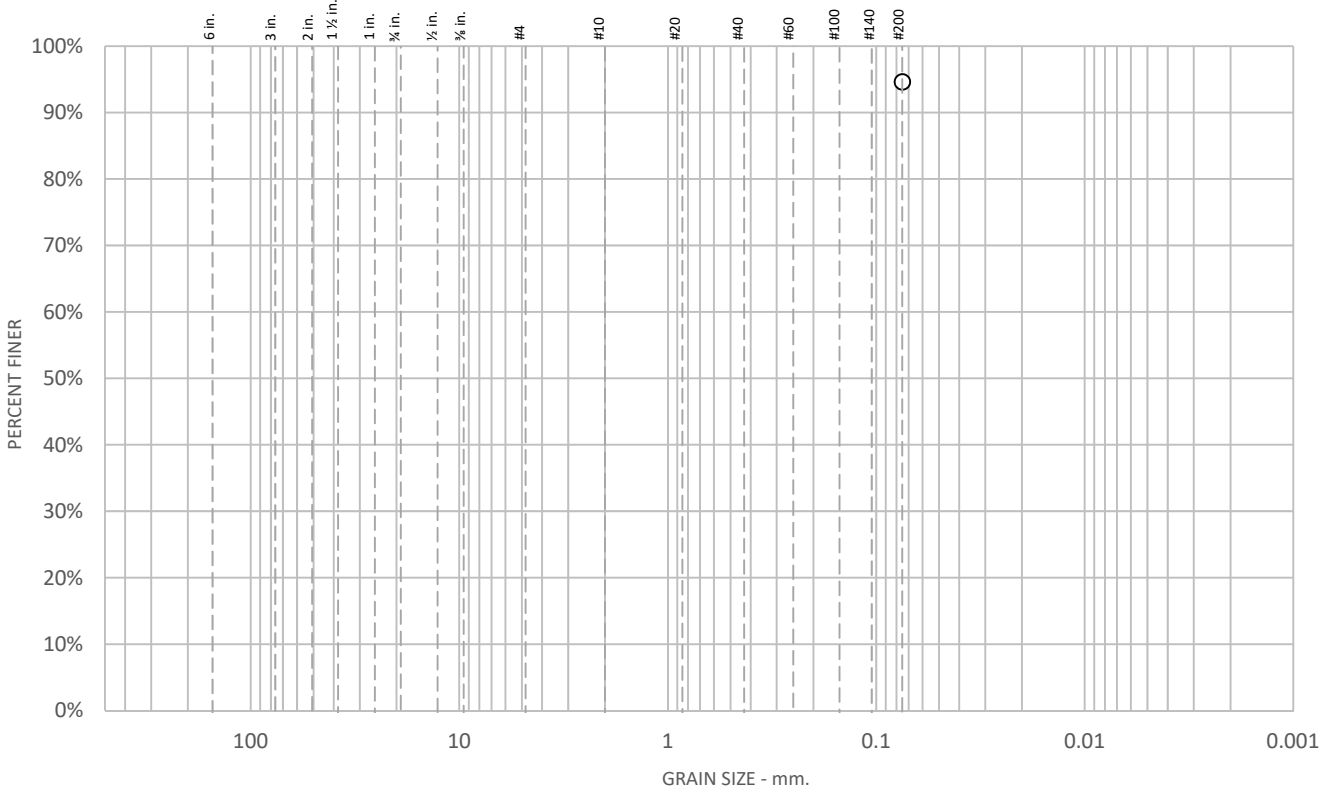
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						94.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	94.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 22 LL = 53 PI = 31

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 170.5 g

Sample Number: 1-B5 @ 25.5

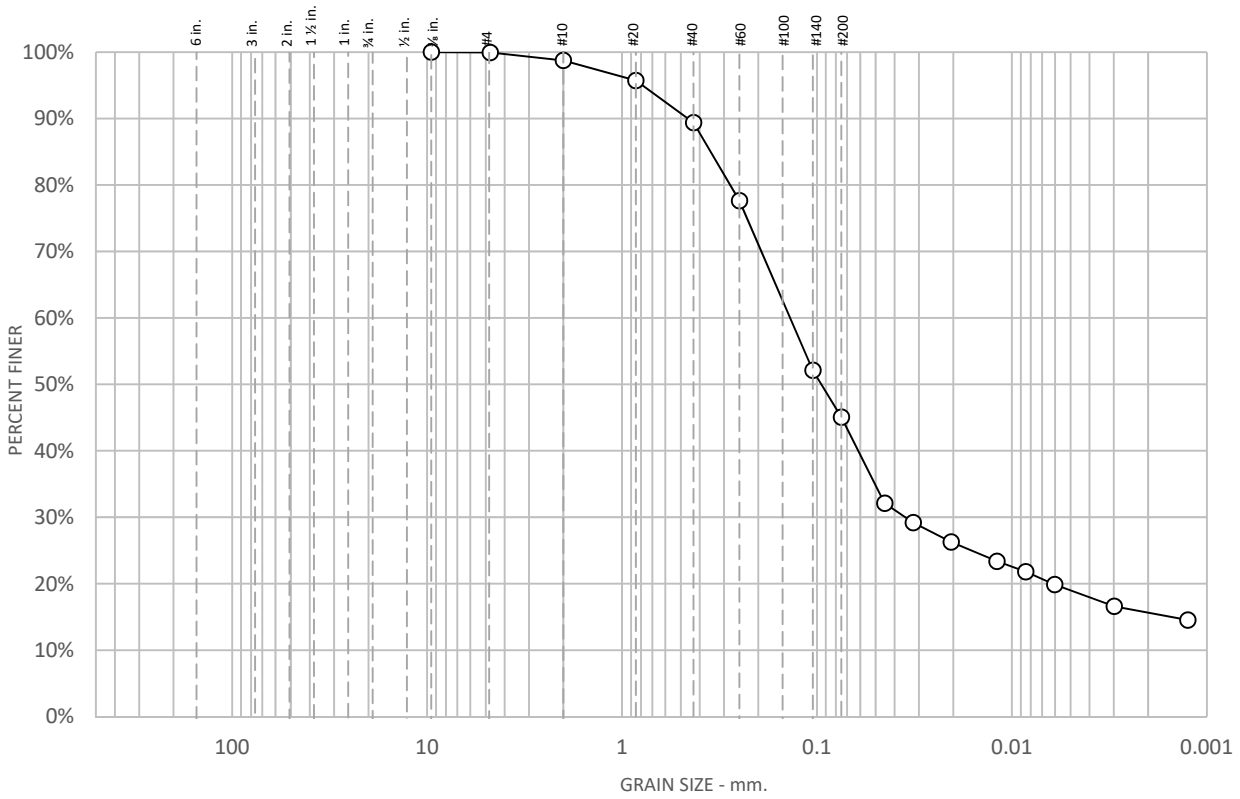
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		0.1	1.2	9.4	44.3	29.4	15.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
⅜ in.	100.0		
#4	99.9		
#10	98.7		
#20	95.7		
#40	89.4		
#60	77.6		
#140	52.1		
#200	45.0		
0.0450 mm.	32.1		
0.0321 mm.	29.2		
0.0205 mm.	26.3		
0.0119 mm.	23.4		
0.0085 mm.	21.8		
0.0060 mm.	19.9		
0.0030 mm.	16.6		
0.0013 mm.	14.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.4590 mm D_{85} = 0.3512 mm D_{60} = 0.1373 mm
D_{50} = 0.0950 mm D_{30} = 0.0353 mm D_{15} = 0.0015 mm
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 36

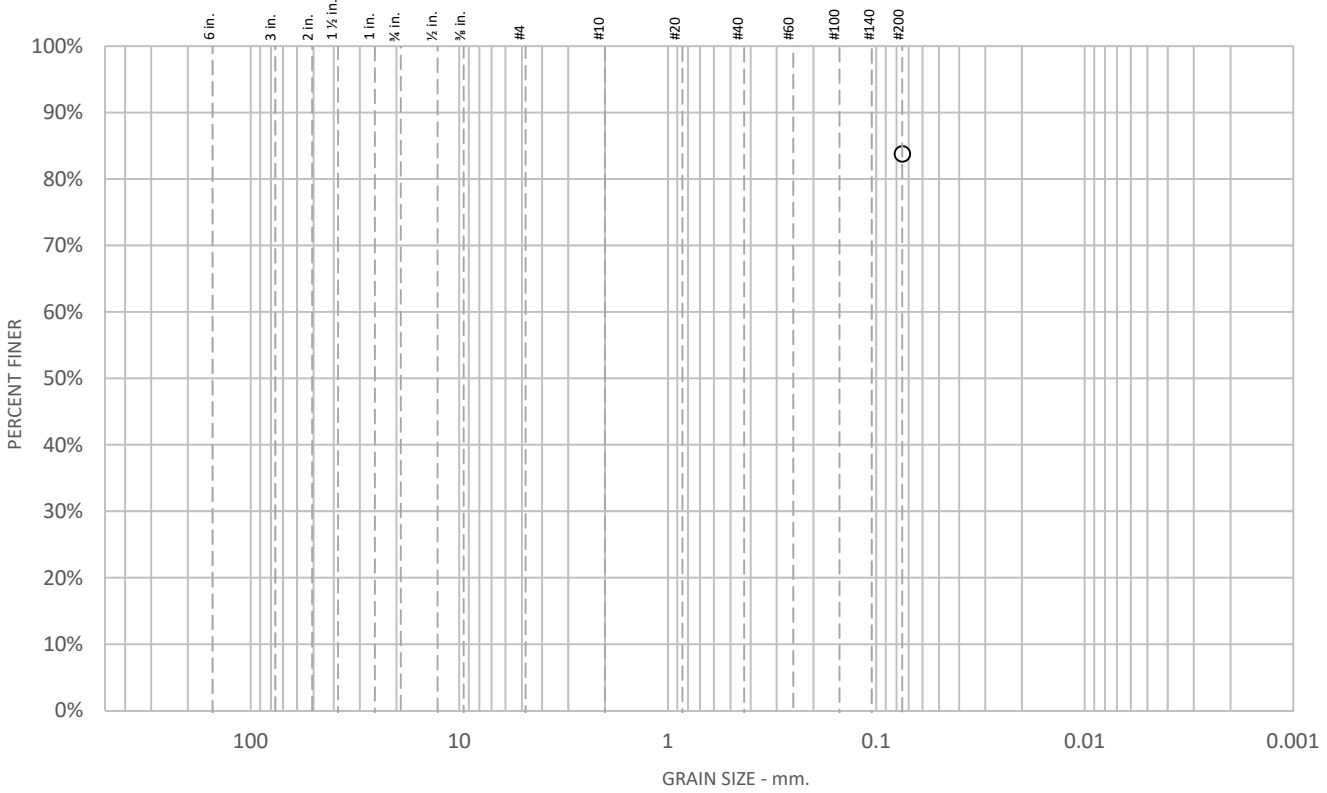
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						83.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	83.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 42 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 181.2 g

Sample Number: 1-B5 @ 40

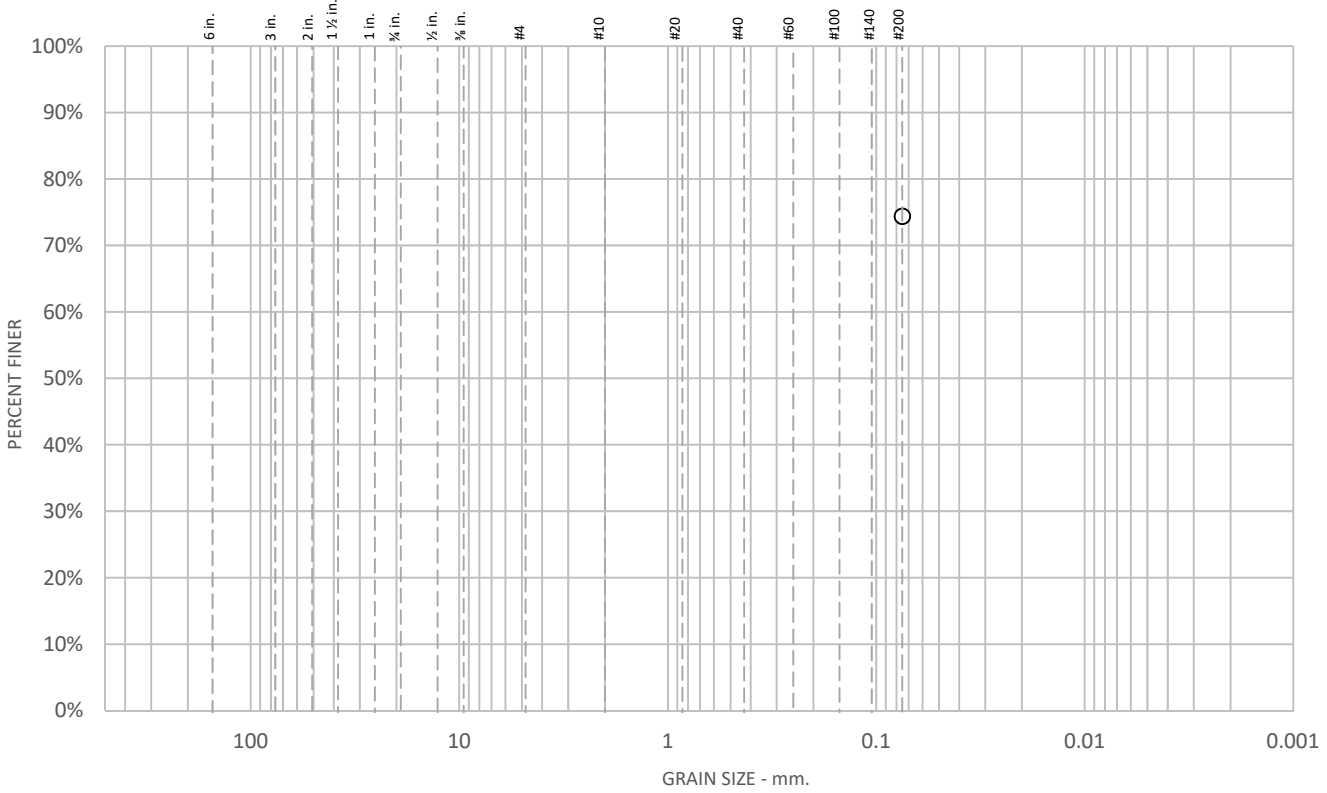
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	74		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 68 PI = 51

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 160.4 g

Sample Number: 1-B5 @ 8

Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	**1-B5**							
DEPTH (ft.):	**8**							
MOISTURE CONTENT (%):	**36.4**							
DRY DENSITY (lbs/ft^3):	**82.9**							

Testing remarks:

PROJECT NAME: **NBS Infrastructure Master Planning FIG2**
PROJECT NUMBER: **15959.000.000**
CLIENT: **Google, LLC**
PHASE NUMBER: **LAB**

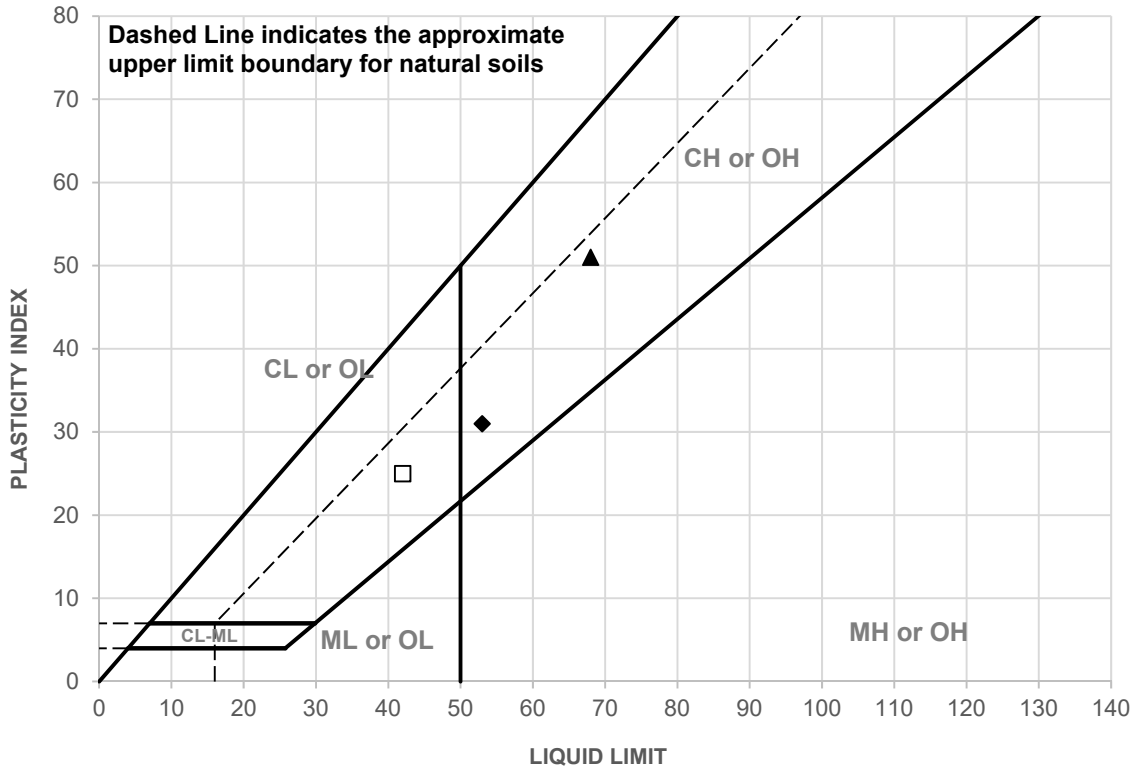
DATE: **09/09/19**

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 3420 Fostoria Way, Suite E, Danville, CA 94526. Phone No. (925) 355-9047.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B5	8	See exploration logs	68	17	51
◆	1-B5	25.5	See exploration logs	53	22	31
□	1-B5	40	See exploration logs	42	17	25

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B5	PI: ASTM D4318, Wet Method	
◆	1-B5	PI: ASTM D4318, Wet Method	
□	1-B5	PI: ASTM D4318, Wet Method	

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Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B5@10

Description: USCS: n/a

%Passing #4: 73.6

Method used: **B**

Temperature (°C): **23.3** ***Specific gravity at 20° C:*** **2.813**

Sample 2: 1-B5@18

Description: USCS: SW

%Passing #4: 78.5

Method used: **B**

Temperature (°C): **23.5** ***Specific gravity at 20° C:*** **2.883**

Sample 3: 1-B5@36

Description: USCS: n/a

%Passing #4: 99.9

Method used: **B**

Temperature (°C): **23.4** ***Specific gravity at 20° C:*** **2.774**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER:

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

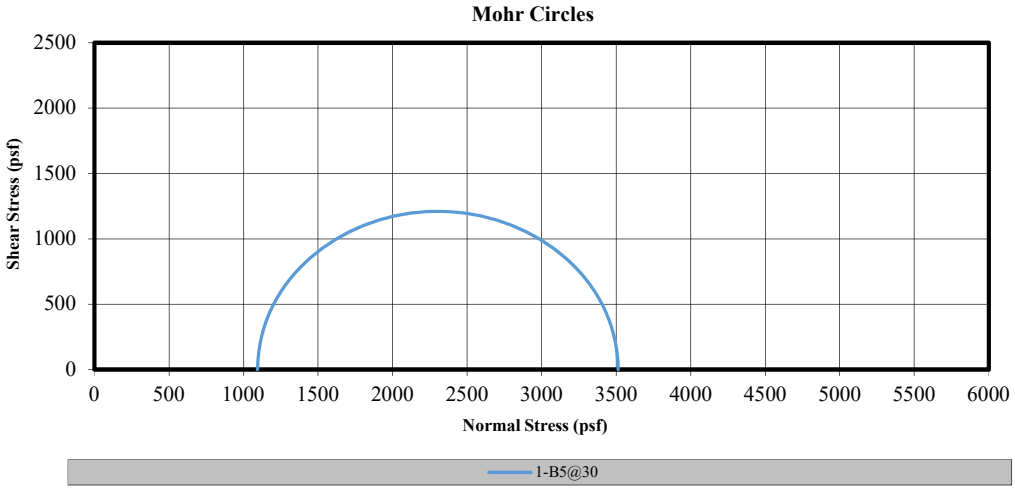
ASTM D2850

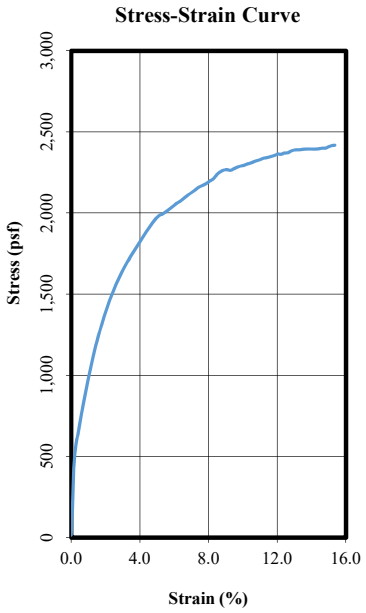
Date: 09/11/19

Checked By: G. Criste

Date: 9/11/2019

Tested By: M. Quasem





Before Test	Specimen 1-B5@30			
Water Content (%)	26.07			
Dry Density (pcf)	99.00			
Saturation (%)	99.14			
Void Ratio	0.72			
Diameter (in)	2.380			
Height (in)	5.070			
Height-to-Diameter Ratio	2.130			
ASTM D4318 - Wet Method				
Liquid Limit	-			
Plastic Limit	-			
ASTM D854 - Assumed				
Specific Gravity	2.720			
After Test	**1-B5@30**			
Water Content (%)	26.07			
Saturation (%)	99.14			
Strain Rate (in/min)	0.05			
Peak Deviator Stress (psf)	2418.5			
Axial Strain @ Failure (%)	15.347			
	Cell Pressure			
Cell (psf)	1094.4			
Back (psf)	n/a			
	Principle Stresses at Failure			
σ1 (psf)	3512.9			
σ3 (psf)	1094.4			
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1209.3			
Friction Angle Ø	n/a		n/a			

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

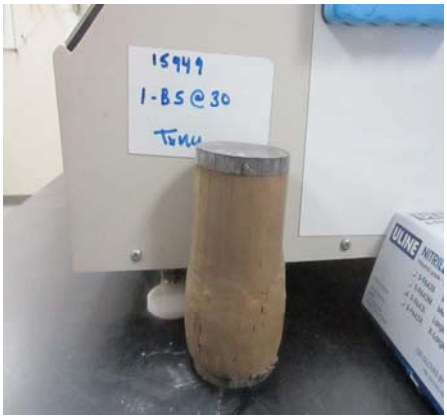
Date: 09/11/19

Checked By: G. Criste

Date: 9/11/2019

Tested By: M. Quasem

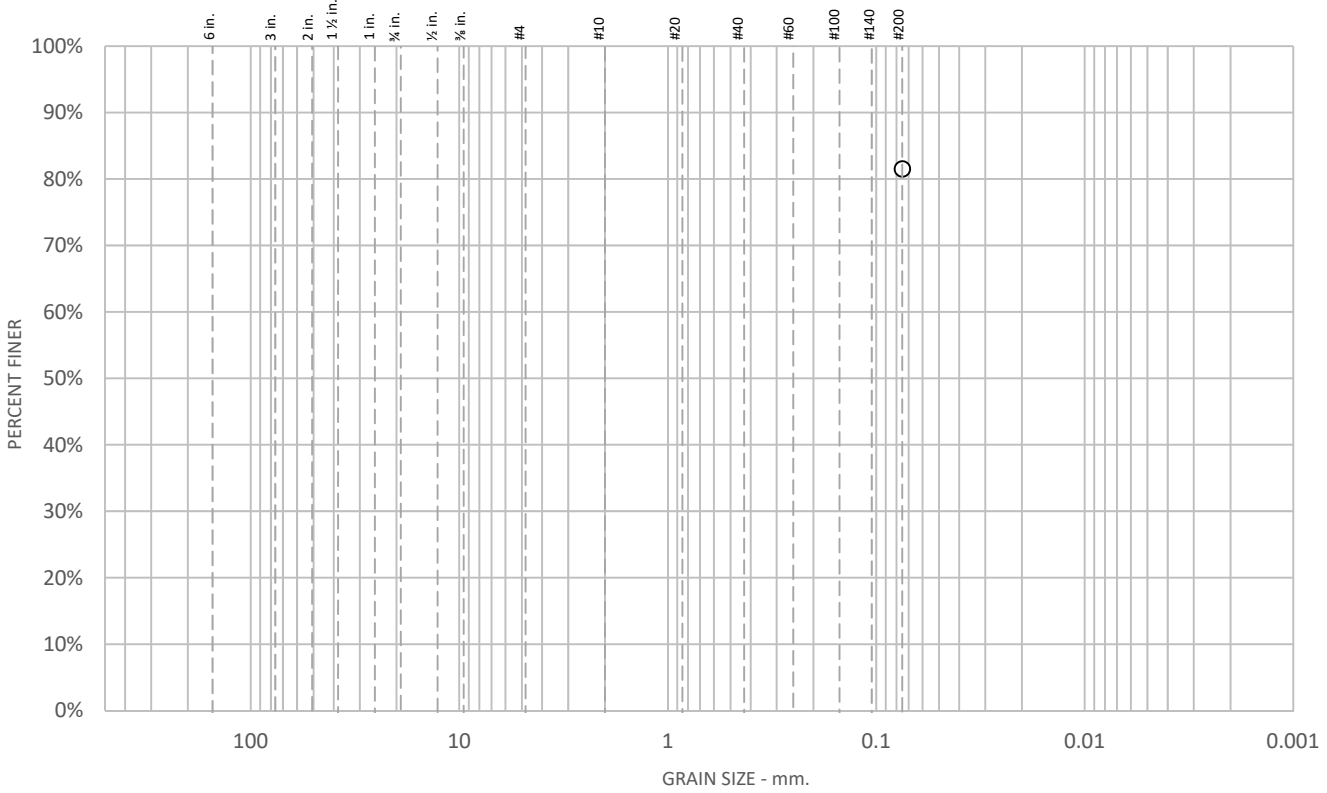
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B5@30	
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	81.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 44 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 178.5 g

Sample Number: 1-B6 @ 10

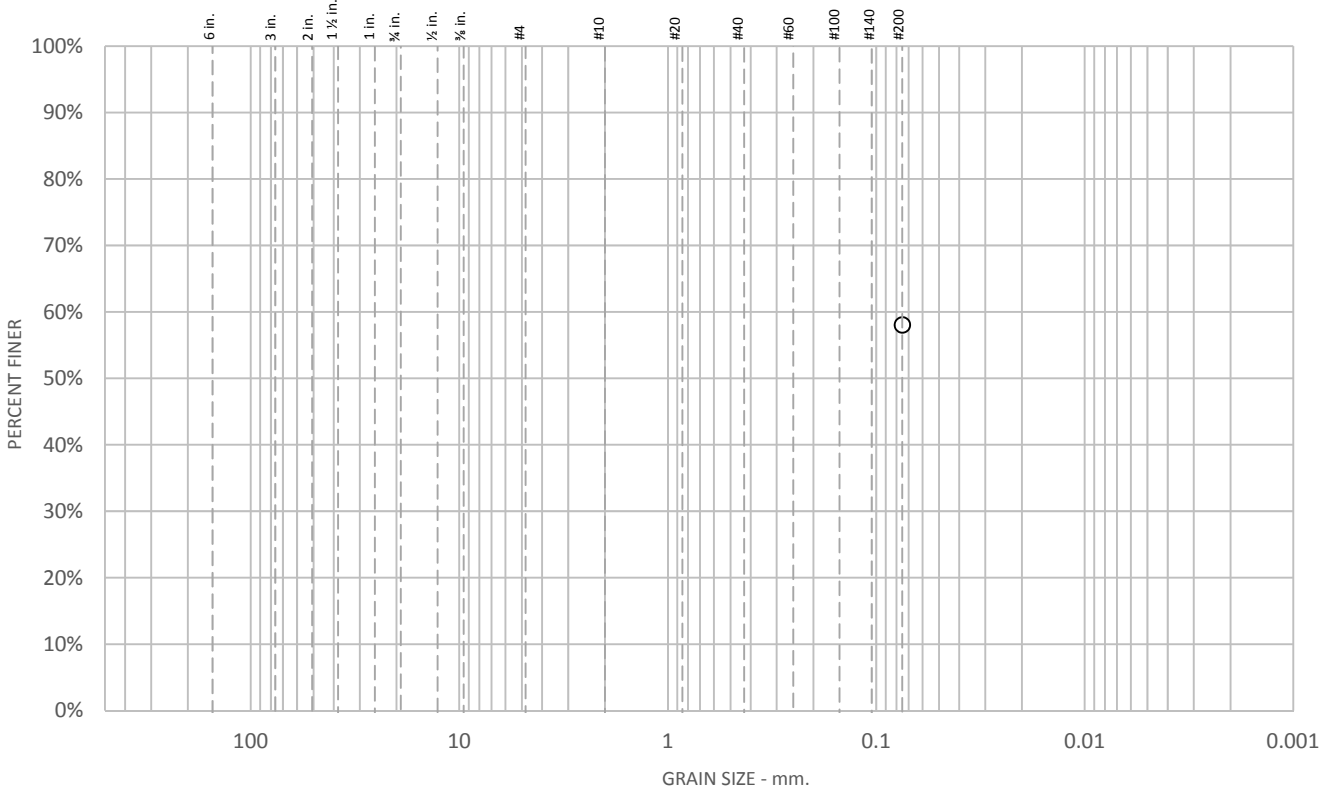
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	58		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 21 LL = 41 PI = 20

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method A
Soak time = 180 min
Dry sample weight = 70.64 g

Sample Number: 1-B6 @ 16.5 @ 16.5 ft

Client: Google LLC
Project: NBS Infrastructure Master Planning F1G2
Project location: Mountain View, California

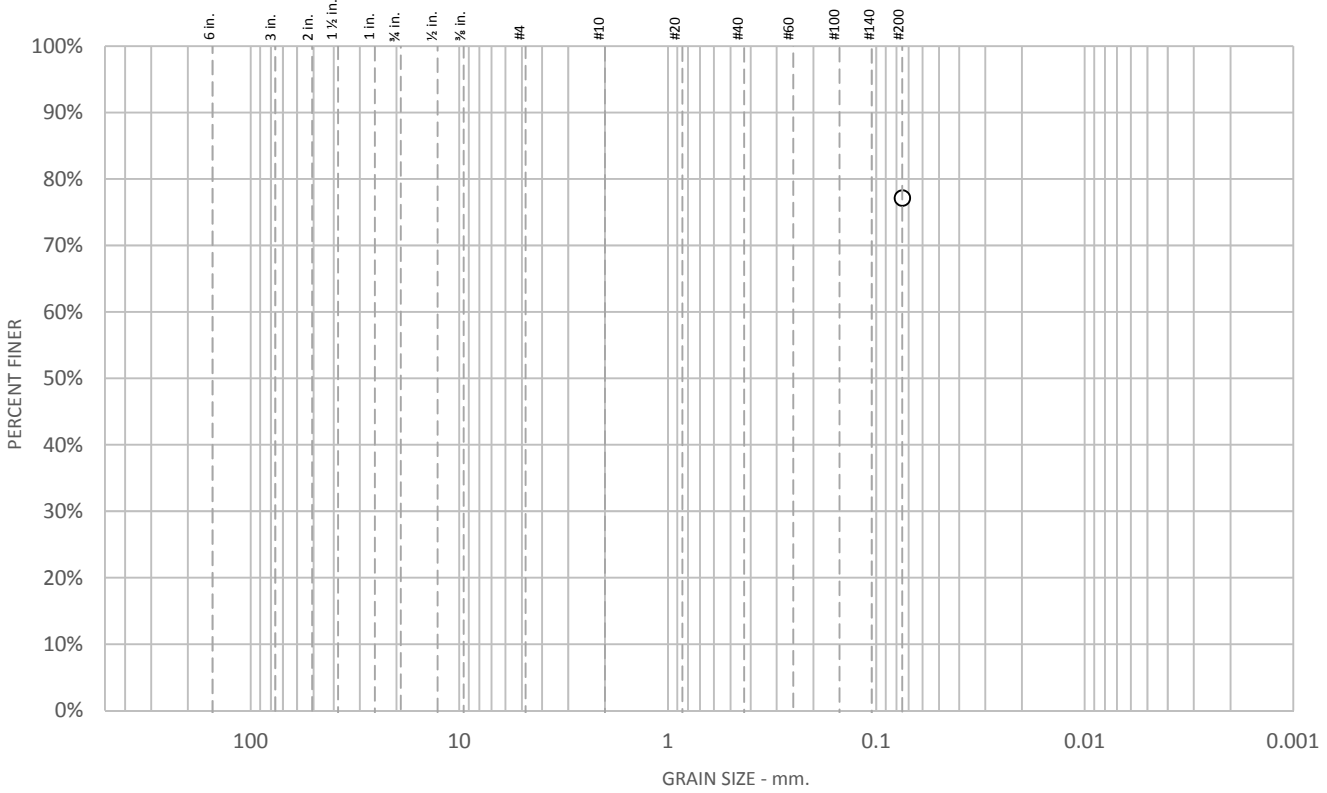
Project Number: 15949.000.000
Date: 9/17/2019

ENGEO Expect Excellence

Tested By: W. Miller
Checked By: D. Seibold

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						77.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	77.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 23 LL = 36 PI = 13

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method A
Soak time = 180 min
Dry sample weight = 91.29 g

Sample Number: 1-B6 @ 30

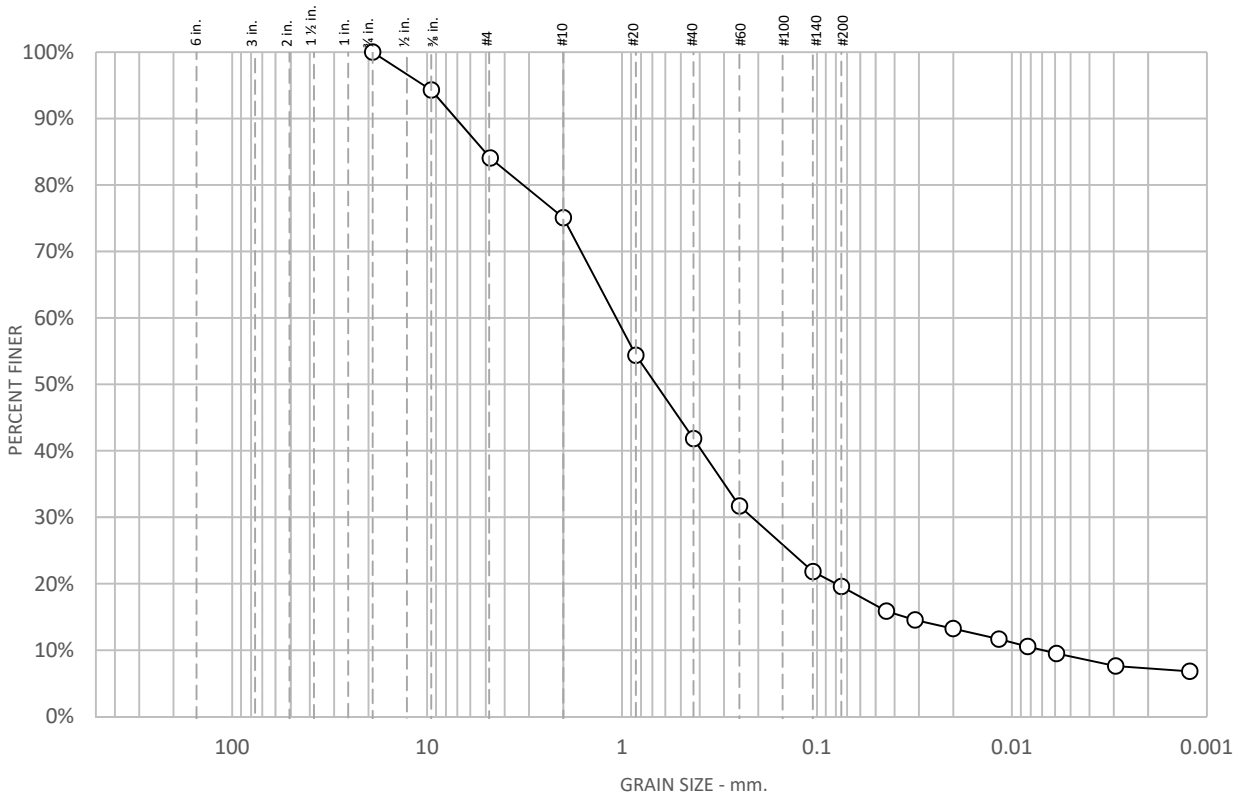
Client: Google LLC **Project Number:** 15949.000.000
Project: NBS Infrastructure Master Planning F1G2 **Date:** 9/18/2019
Project location: Mountain View, California

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	15.9	9.0	33.2	22.3	12.3	7.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	94.3		
#4	84.1		
#10	75.1		
#20	54.4		
#40	41.8		
#60	31.7		
#140	21.8		
#200	19.6		
0.0441 mm.	15.9		
0.0314 mm.	14.6		
0.0200 mm.	13.2		
0.0117 mm.	11.7		
0.0083 mm.	10.6		
0.0059 mm.	9.5		
0.0029 mm.	7.6		
0.0012 mm.	6.8		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.875

Atterberg Limits

PL = 15 LL = 30 PI = 15

Coefficients

D_{90} = 7.1115 mm D_{85} = 5.0596 mm D_{60} = 1.0722 mm
D_{50} = 0.6700 mm D_{30} = 0.2156 mm D_{15} = 0.0353 mm
D_{10} = 0.0069 mm C_u = 154.43 C_c = 6.24

Classification

USCS = SC

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B6 @ 35.5

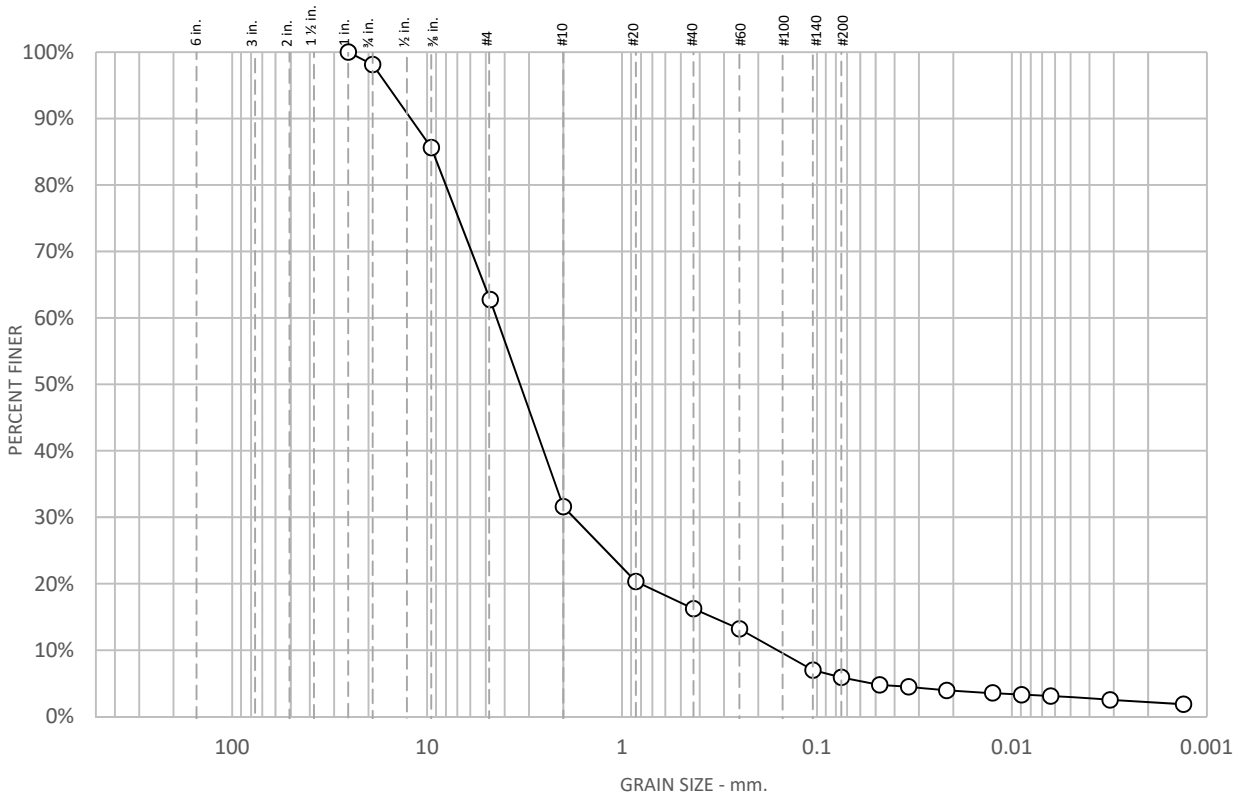
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	1.9	35.3	31.2	15.4	10.3	3.7	2.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	98.1		
⅜ in.	85.6		
#4	62.8		
#10	31.6		
#20	20.3		
#40	16.2		
#60	13.2		
#140	7.0		
#200	5.9		
0.0477 mm.	4.8		
0.0339 mm.	4.5		
0.0216 mm.	3.9		
0.0126 mm.	3.6		
0.0089 mm.	3.3		
0.0063 mm.	3.1		
0.0031 mm.	2.5		
0.0013 mm.	1.9		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.890.

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 12.1402 mm D_{85} = 9.3444 mm D_{60} = 4.3996 mm
D_{50} = 3.3331 mm D_{30} = 1.7711 mm D_{15} = 0.3449 mm
D_{10} = 0.1598 mm C_u = 27.54 C_c = 4.46

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B6 @ 40

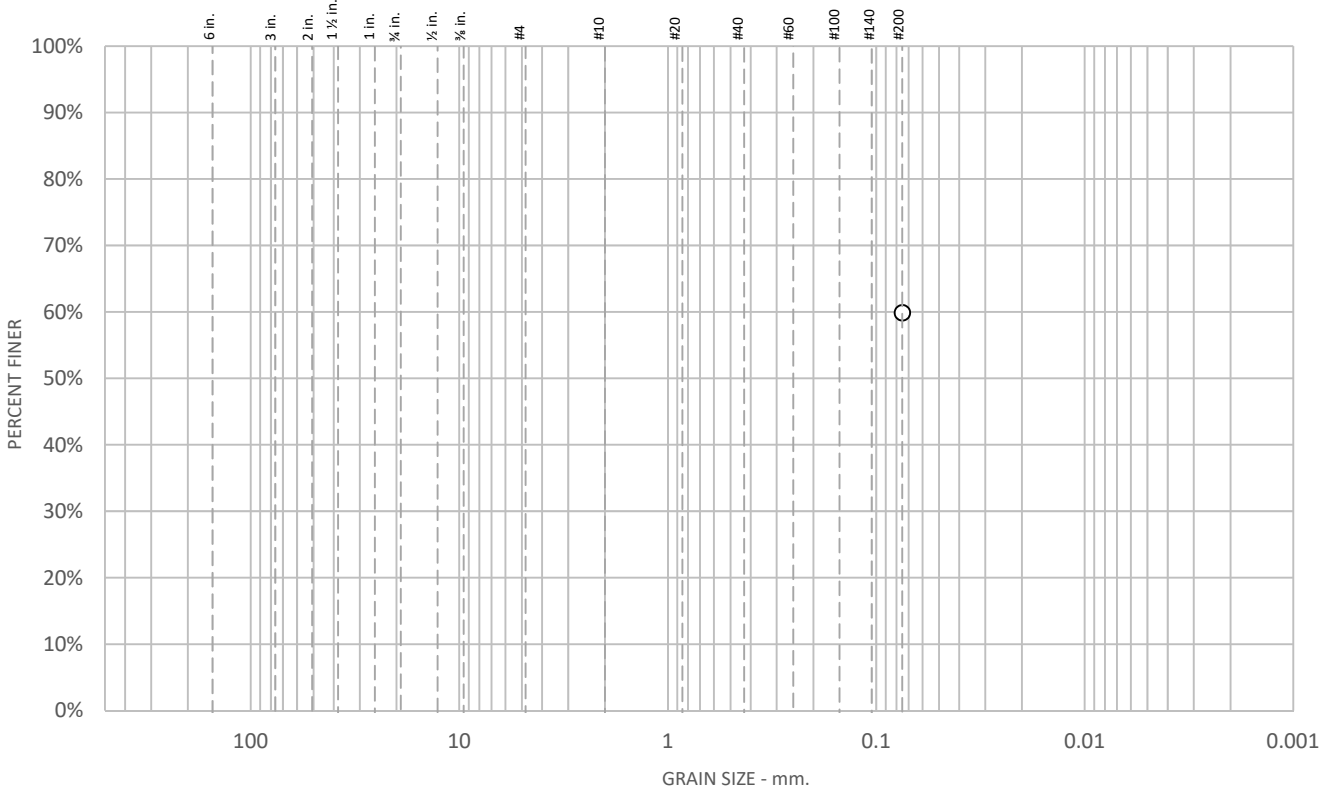
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	59.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 13 LL = 38 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 123.1 g

Sample Number: 1-B6 @ 45

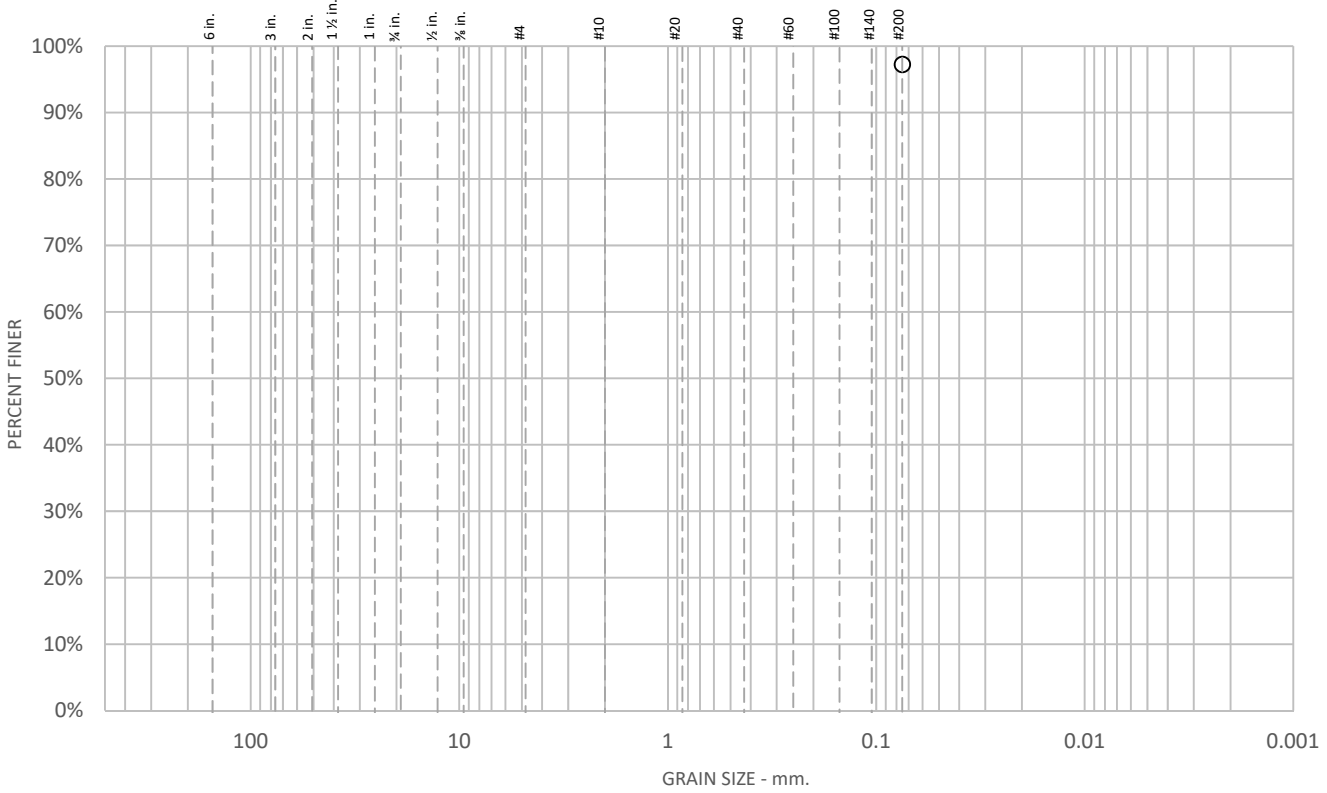
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						97.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	97.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 20 LL = 73 PI = 53

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 174 g

Sample Number: 1-B6 @ 5.5

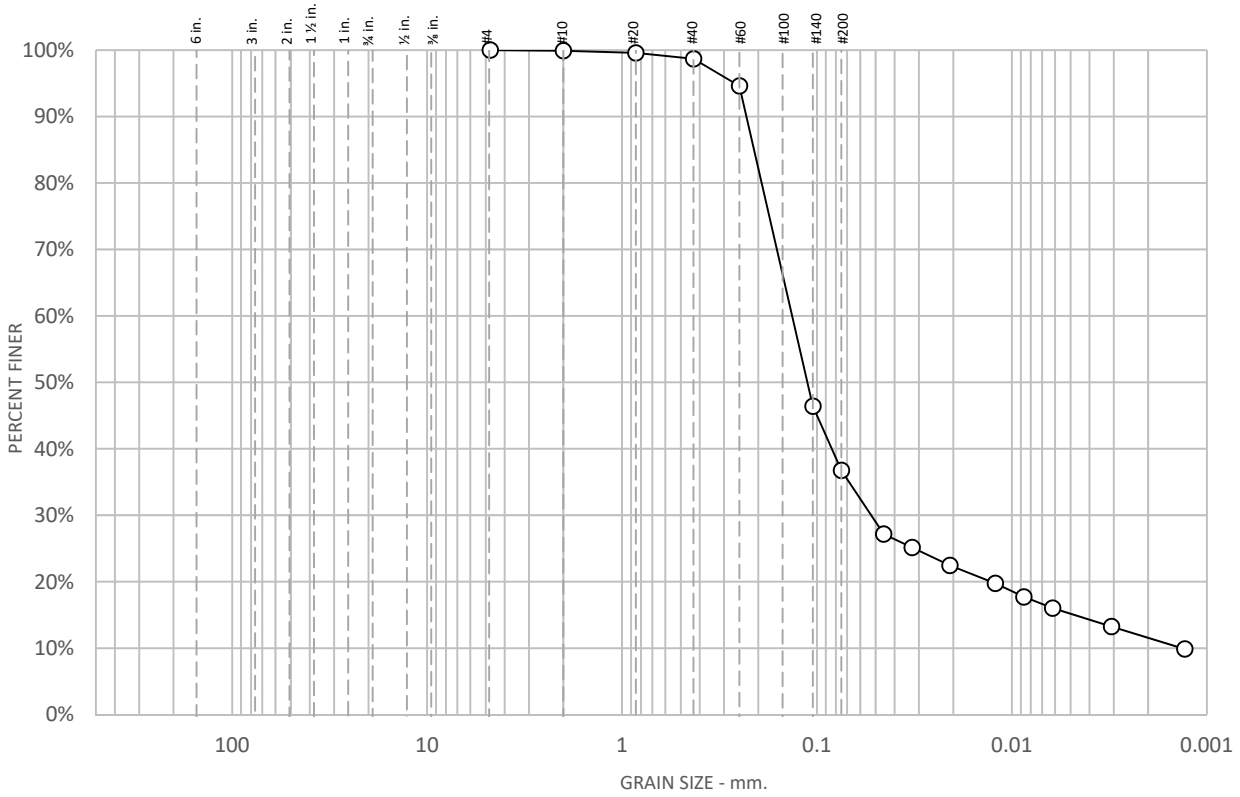
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			0.1	1.2	61.9	25.2	11.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.6		
#40	98.7		
#60	94.6		
#140	46.4		
#200	36.8		
0.0455 mm.	27.2		
0.0325 mm.	25.1		
0.0208 mm.	22.4		
0.0122 mm.	19.7		
0.0087 mm.	17.7		
0.0062 mm.	16.0		
0.0031 mm.	13.2		
0.0013 mm.	9.9		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.732.

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2301 mm D_{85} = 0.2103 mm D_{60} = 0.1341 mm
D_{50} = 0.1120 mm D_{30} = 0.0527 mm D_{15} = 0.0048 mm
D_{10} = 0.0013 mm C_u = 99.82 C_c = 15.44

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B6 @ 70

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	1-B6	1-B6	1-B6	1-B6	1-B6			
DEPTH (ft.):	5.5	10	35.5	50.5	70			
MOISTURE CONTENT (%):	27.5	32.7	23.0	19.7	24.9			
DRY DENSITY (lbs/ft^3):	93.5	92.3	110.7	112.0	102.8			

Testing remarks:

PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NUMBER: 15959.000.000
CLIENT: Google, LLC
PHASE NUMBER: LAB

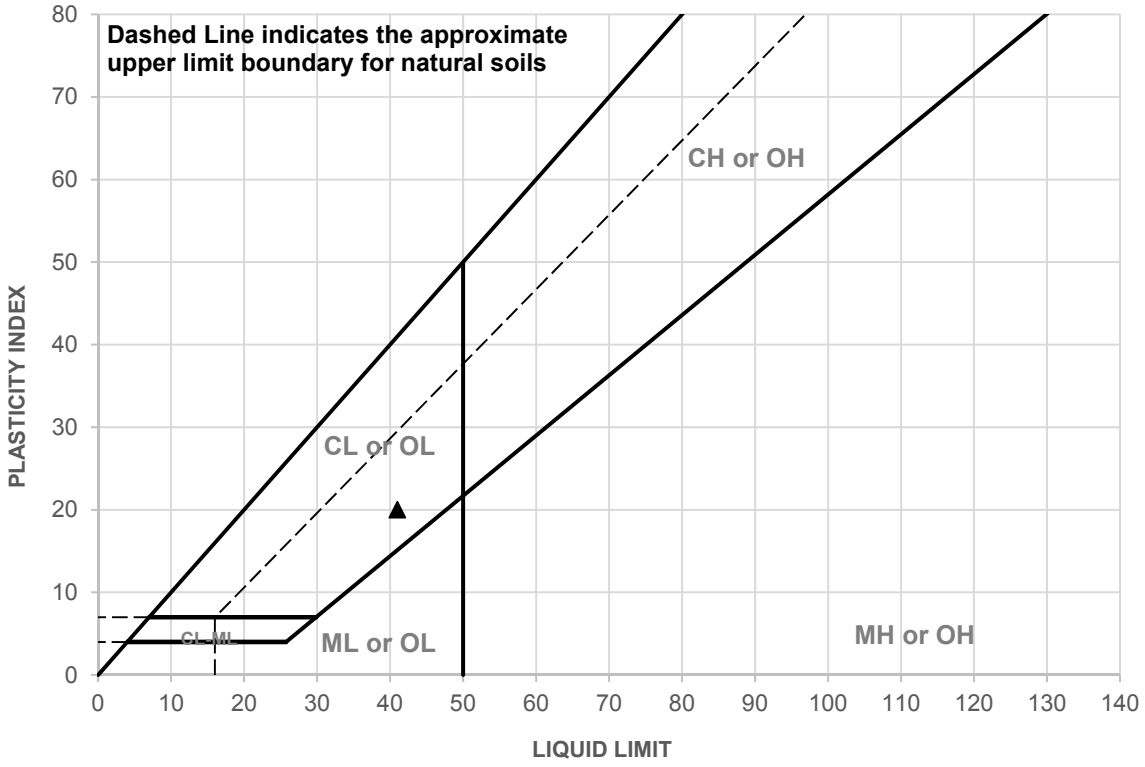
DATE: 09/09/19

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 2213 Plaza Dr., Rocklin, CA 95765. Phone No. (916) 786-8883.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



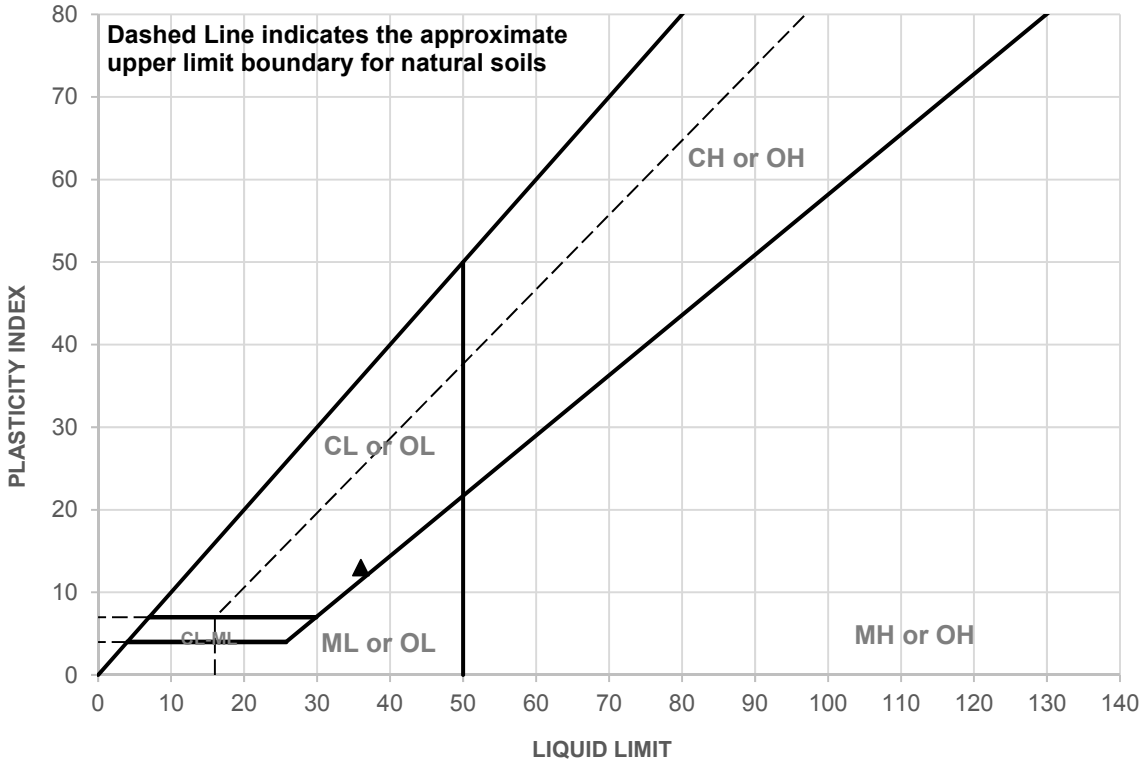
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6 @ 16.5	16-16.5 ft	See exploration logs	41	21	20

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6 @ 16.5	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/17/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



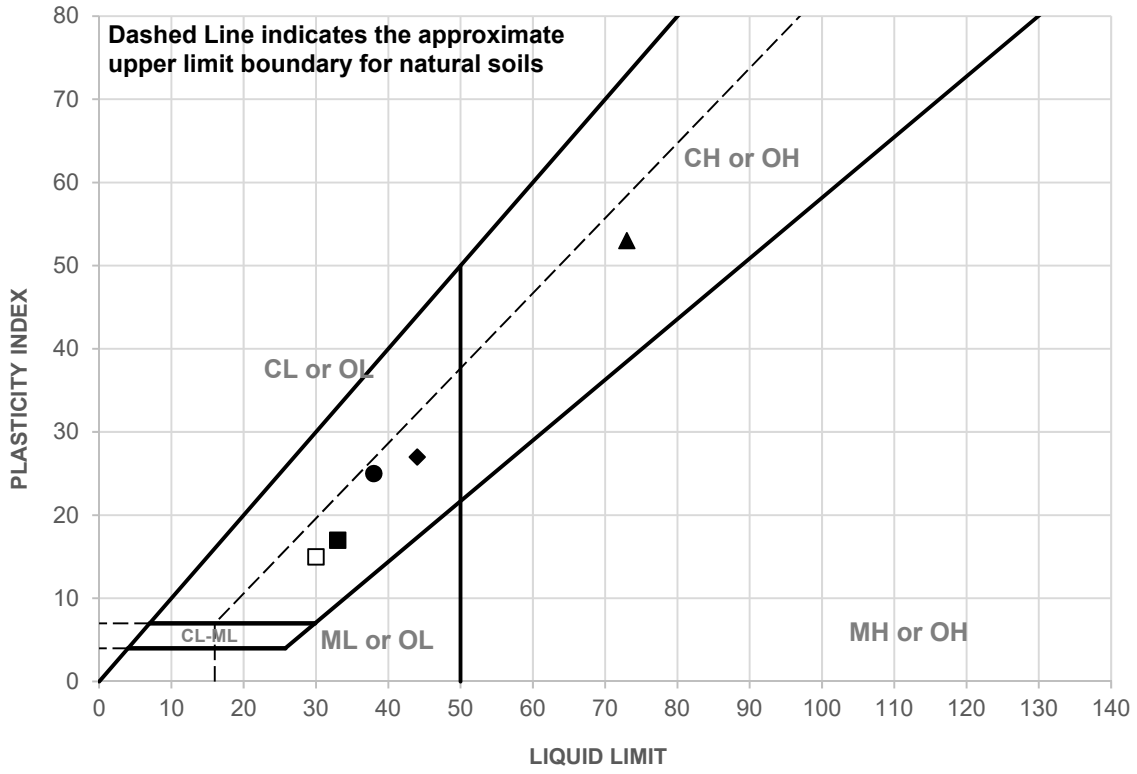
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6 @ 30	30 ft	See exploration logs	36	23	13

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6 @ 30	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/18/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6	5.5	See exploration logs	73	20	53
◆	1-B6	10	See exploration logs	44	17	27
□	1-B6	35.5	See exploration logs	30	15	15
●	1-B6	45	See exploration logs	38	13	25
■	1-B6	50.5	See exploration logs	33	16	17

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6	PI: ASTM D4318, Wet Method	
◆	1-B6	PI: ASTM D4318, Wet Method	
□	1-B6	PI: ASTM D4318, Wet Method	
●	1-B6	PI: ASTM D4318, Wet Method	
■	1-B6	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B6@35.5

Description: See exploration logs — USCS: SC

%Passing #4: 84.1

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.875**

Sample 2: 1-B6@40

Description: See exploration logs — USCS: SP

%Passing #4: 62.8

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.890**

Sample 3: 1-B6@70

Description: See exploration logs — USCS: n/a

%Passing #4: 100.0

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.732**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** — **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER: **LAB**

ENGEO Expect Excellence

Tested by: R. Montalvo — Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

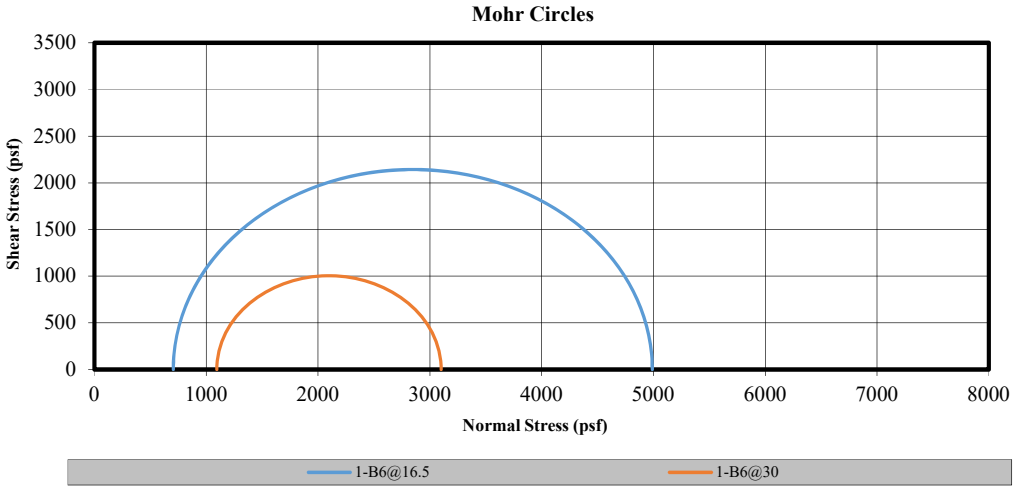
ASTM D2850

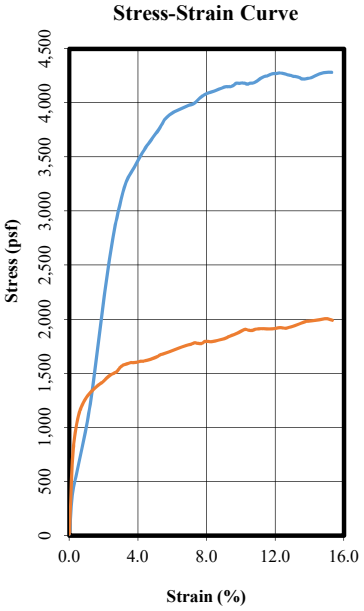
Date: 09/13/19

Checked By: G. Criste

Date: 9/13/2019

Tested By: M. Quasem





Before Test	Specimen 1-B6@16.5	1-B6@30		
Water Content (%)	21.94	27.08		
Dry Density (pcf)	109.00	100.00		
Saturation (%)	100.00	100.00		
Void Ratio	0.62	0.76		
Diameter (in)	2.850	2.370		
Height (in)	5.970	5.070		
Height-to-Diameter Ratio	2.095	2.139		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.820	2.820		
After Test	**1-B6@16.5**	**1-B6@30**		
Water Content (%)	21.94	27.08		
Saturation (%)	100.00	100.00		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	4283.9	2006.7		
Axial Strain @ Failure (%)	15.244	14.990		
	Cell Pressure			
Cell (psf)	705.6	1094.4		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	4989.5	3101.1		
σ3 (psf)	705.6	1094.4		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		2141.9	1003.4		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Montain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 09/13/19

Checked By: G. Criste

Date: 9/13/2019

Tested By: M. Quasem

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B6@16.5	SAMPLE NUMBER: 1-B6@30
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Montain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence



APPENDIX D

CORROSIVITY TEST RESULTS (CERCO Analytical)

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

25 June, 2019

Job No. 1906091
Cust. No. 10169

Mr. Bahareh Heidarzadeh
ENGEO Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Subject: Project No.: 15949.000.000
Project Name: Mountain View Multiple Parcels
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Heidarzadeh:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on June 17, 2019. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, all samples are 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 are none detected & 31 mg/kg, are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations ranged from 87 to 140 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 ranged from 8.23 to 8.30, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials ranged from 140 to 240-mV. Samples No.002 & No.003 are indicative of potentially "moderately corrosive" soils and Sample No.001 is indicative of potentially "slightly corrosive" soils resulting from anaerobic 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.: 15949.000.000
Client's Project Name: Mountain View Multiple Parcels
Date Sampled: 14-Jun-19
Date Received: 17-Jun-19
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 25-Jun-2019

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)*
1906091-001	1-B4 20.5	240	8.23	-	1,200	N.D.	N.D.	87
1906091-002	1-B7 5	170	8.29	-	1,100	N.D.	31	140
1906091-003	1-B7 25.5	140	8.30	-	1,200	N.D.	N.D.	97

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
	20-Jun-2019	20-Jun-2019	-	17-Jun-2019	12-Jun-2019	20-Jun-2019	20-Jun-2019

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

1906091

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 15949.000.000	PROJECT NAME: Mountain View Multiple Parcels
SAMPLED BY: (SIGNATURE/PRINT) Bofei Xu	
PROJECT MANAGER: Bahareh Heidarzadeh/Janet Kan	
ROUTING: E-MAIL bheidarzadeh@engeo.com	Hard Copy NA

SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE	Redox	Resistivity	pH	Sulfide	Sulfate	Chloride	REMARKS REQUIRED DETECTION LIMITS
1-B4 20.5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary
1-B7 5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary
1-B7 25.5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
	6/14/19 4:02PM			6/17/19 10:15	
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
	6/17/19 1500				
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	

ENGEO INCORPORATED

2010 CROW CANYON PLACE, SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000 FAX (888) 279-2698
WWW.ENGEO.COM

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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

23 September, 2019

Job No. 1909026
Cust. No. 10169

Ms. Bahareh Heidarzadeh
ENGEO Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Subject: Project No.: 15949.000.000
Project Name: Mountain View Multiple Parcels
Corrosivity Analysis – ASTM Test Methods

Dear Ms. Heidarzadeh:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on September 05, 2019. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No.010 is classified as "severely corrosive", Samples No.001, No.002, No.004, No.006, No.008 & No.009 are classified as "corrosive" and Samples No.003, No.005 & No.007 are classified as "moderately 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 ranged from none detected to 740 mg/kg and are determined to be sufficient to attack steel embedded in a concrete mortar coating. 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 ranged from 16 to 220 mg/kg and are determined to be sufficient to potentially be detrimental to reinforced concrete structures and cement mortar-coated steel at these locations. Therefore, concrete that comes into contact with this soil should use sulfate resistant cement such as Type II, with a maximum water-to-cement ratio of 0.55.

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

The pH of the soils ranged from 8.21 to 8.85, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials ranged from 180 to 230-mV. Samples No.008 & No.009 are indicative of potentially "moderately corrosive" soils and all remaining samples are indicative of potentially "slightly corrosive" soils resulting from anaerobic 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.

for, 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.: 15949.000.000
Client's Project Name: Mountain View Mulitple Parcels
Date Sampled: 5-Sep-19
Date Received: 5-Sep-19
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 23-Sep-2019

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)*
1909026-001	1-B6/8'	210	8.26	-	1,100	N.D.	N.D.	210
1909026-002	1-B6/26'	210	8.47	-	1,500	N.D.	N.D.	110
1909026-003	1-B6/40.5'	220	8.38	-	4,900	N.D.	N.D.	36
1909026-004	1-B3/8.5'	230	8.21	-	1,900	N.D.	N.D.	110
1909026-005	1-B3/41'	220	8.22	-	2,400	N.D.	N.D.	54
1909026-006	2-B4/10'	220	8.37	-	1,700	N.D.	22	56
1909026-007	2-B4/40.5'	220	8.38	-	2,400	N.D.	N.D.	17
1909026-008	3-B2/10.5'	180	8.64	-	1,500	N.D.	N.D.	16
1909026-009	3-B2/35.5'	190	8.31	-	1,400	N.D.	36	32
1909026-010	3-B3/30.5'	220	8.85	-	300	N.D.	740	220

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
	20-Sep-2019	20-Sep-2019	-	20-Sep-2019	12-Sep-2019	20-Sep-2019	20-Sep-2019

Steven Moore
for 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

CHAIN OF CUSTODY RECORD

CA 1909096

PROJECT NUMBER: 15949.000.000	PROJECT NAME: Mountain View Multiple Parcels
SAMPLED BY: (SIGNATURE/PRINT) Bofei Xu	
PROJECT MANAGER: Bahareh Heidarzadeh/Janet Kan	
ROUTING: E-MAIL bheidarzadeh@engeo.com	Hard Copy NA

	SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE	Redox	Resistivity	pH	Sulfide	Sulfate	Chloride	REMARKS REQUIRED DETECTION LIMITS
001	1-B6 / 8'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include Evaluation Summary
002	1-B6 / 26'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include Evaluation Summary
003	1-B6 / 40.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
004	1-B3 / 8.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
005	1-B3 / 41'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
006	2-B4 / 10'	090519		Soil	1	Bag		X	X	X	X	X	X	Include E.S.
007	2-B4 / 40.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
008	3-B2 / 10.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
009	3-B2 / 35.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
010	3-B3 / 30.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Bofei Xu	9/5 2:00pm			9/5 1520	
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	

ENGEO INCORPORATED

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SAN RAMON, CALIFORNIA 94583
(925) 866-9000 FAX (888) 279-2698
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APPENDIX E

LIQUEFACTION ANALYSIS

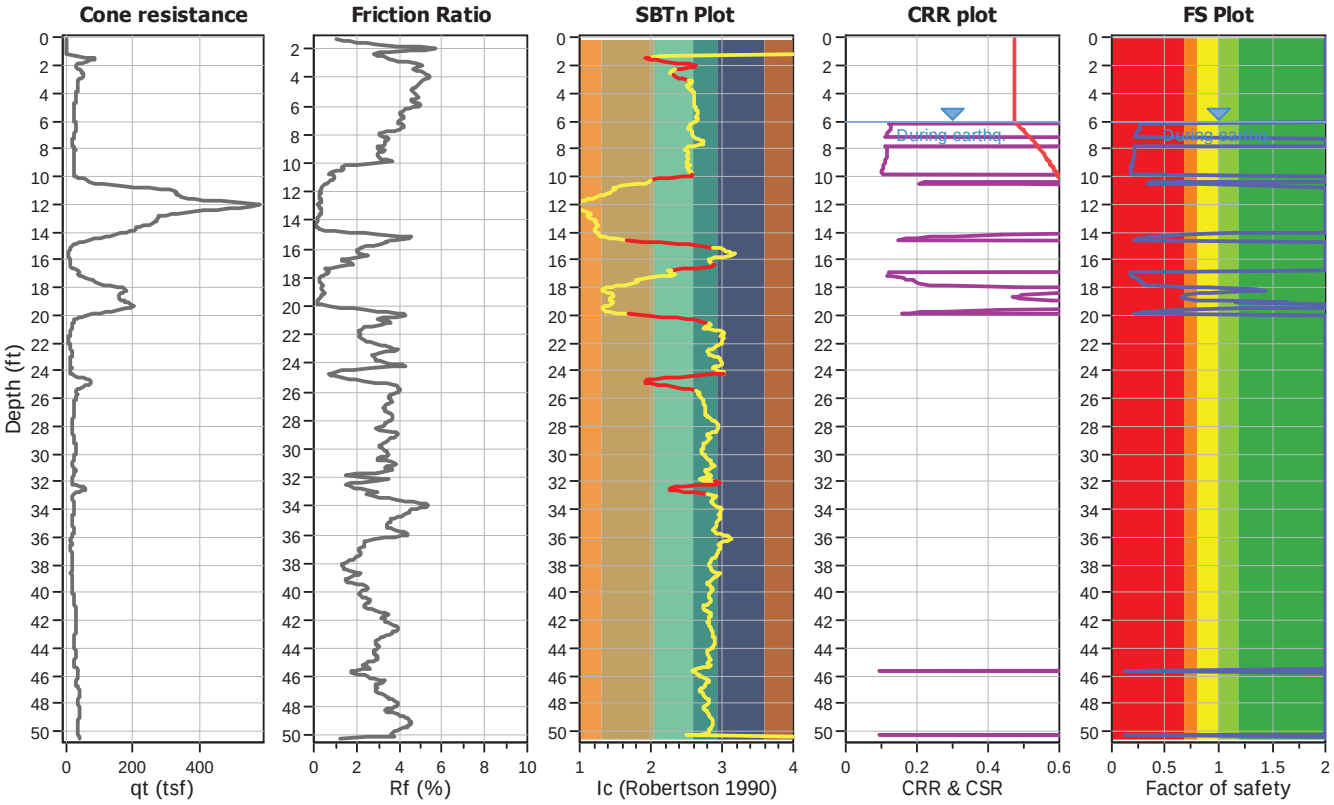
LIQUEFACTION ANALYSIS REPORT

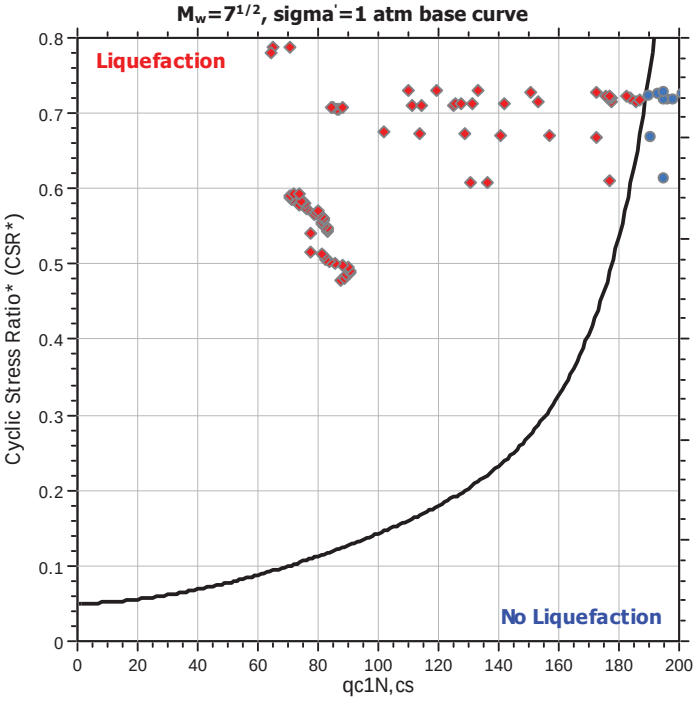
Project title : Google Parcels GEX **Location : Mountain View, CA**

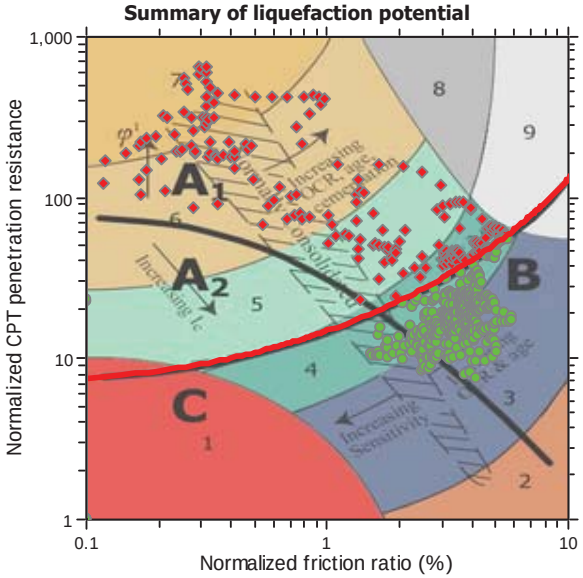
CPT file : 1-CPT1

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

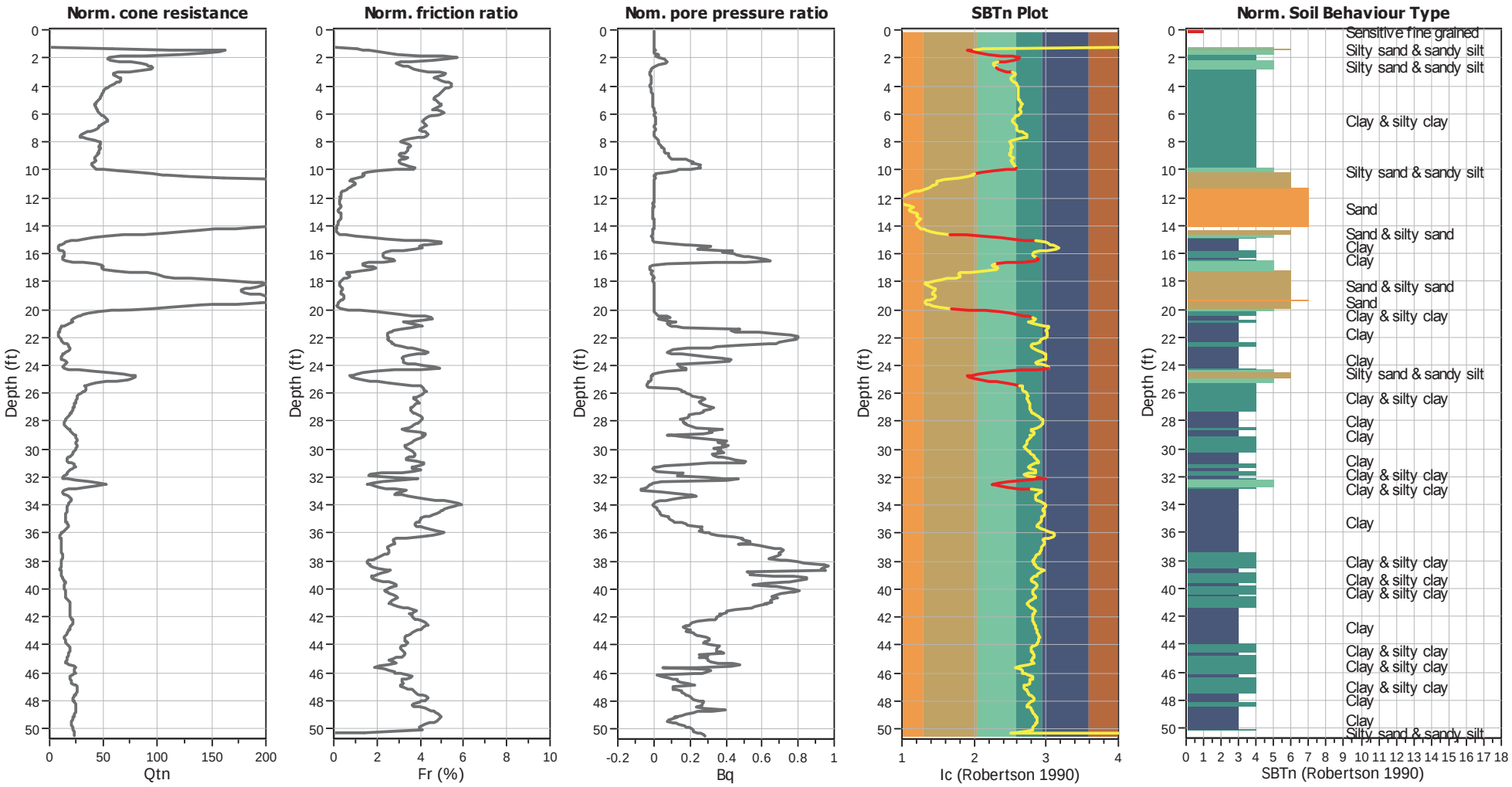






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



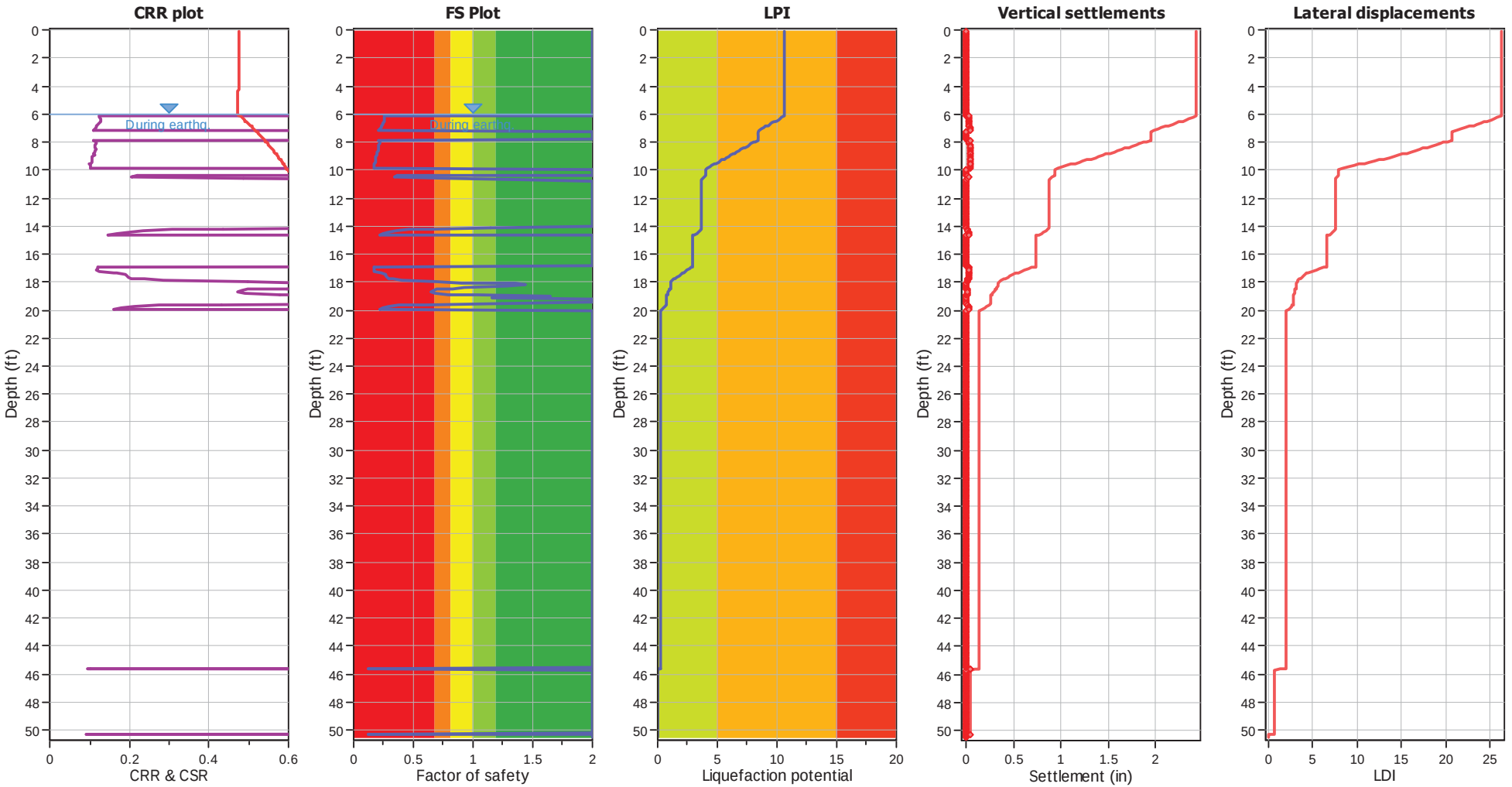
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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LIQUEFACTION ANALYSIS REPORT

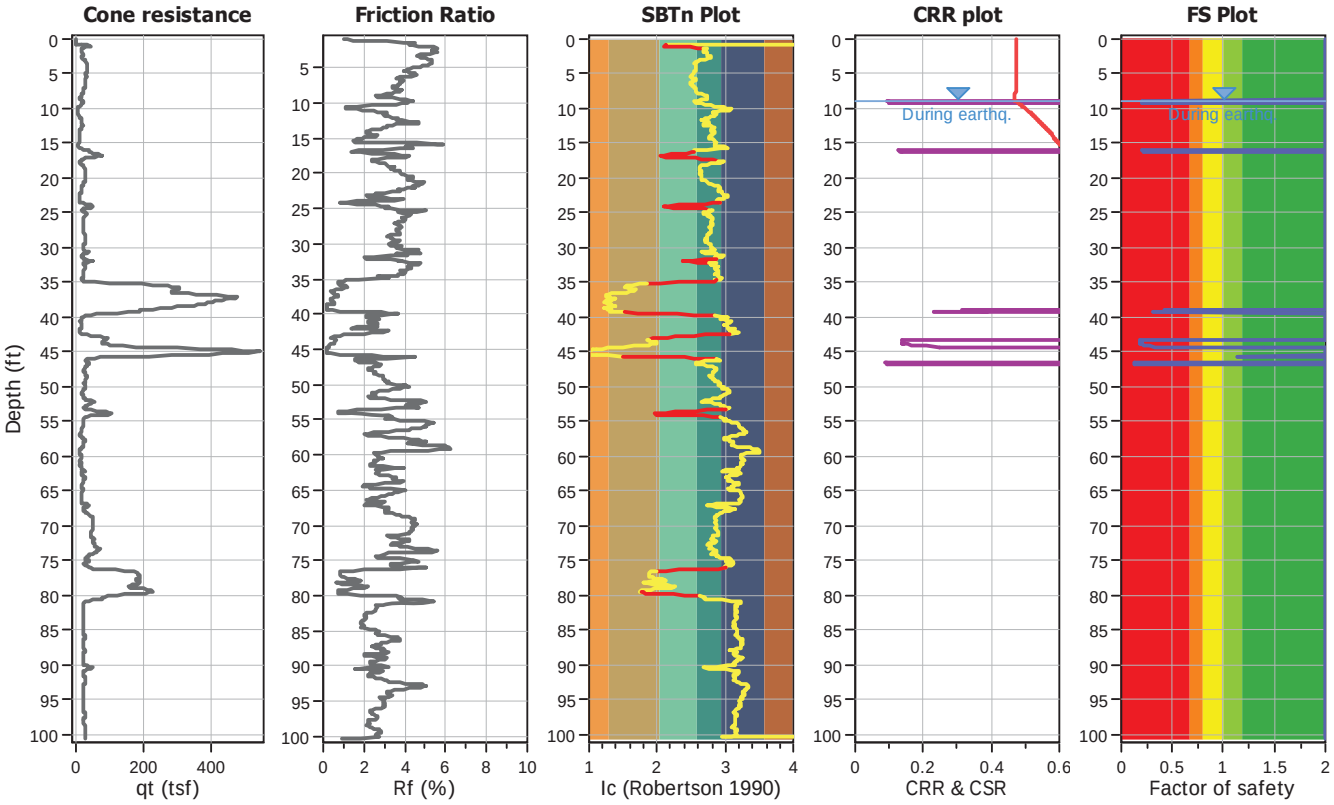
Project title : Google Parcels GEX

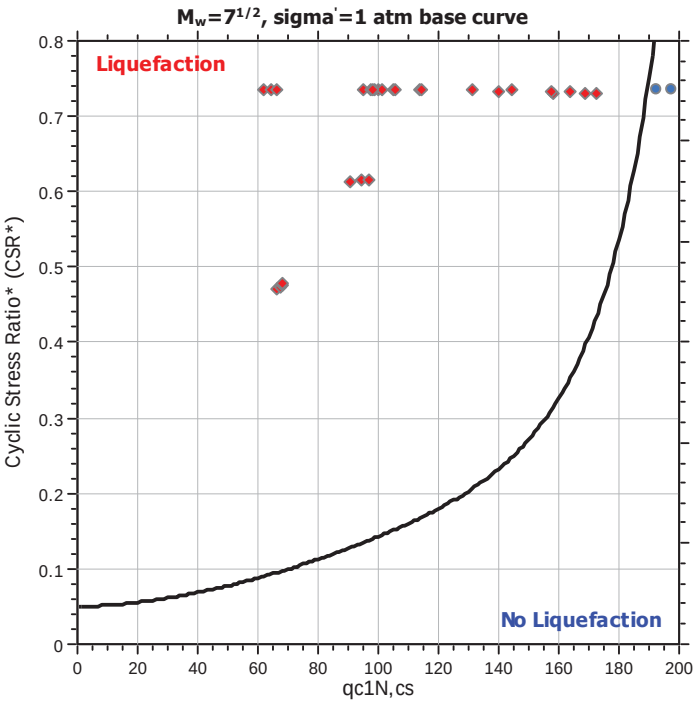
Location : Mountain View, CA

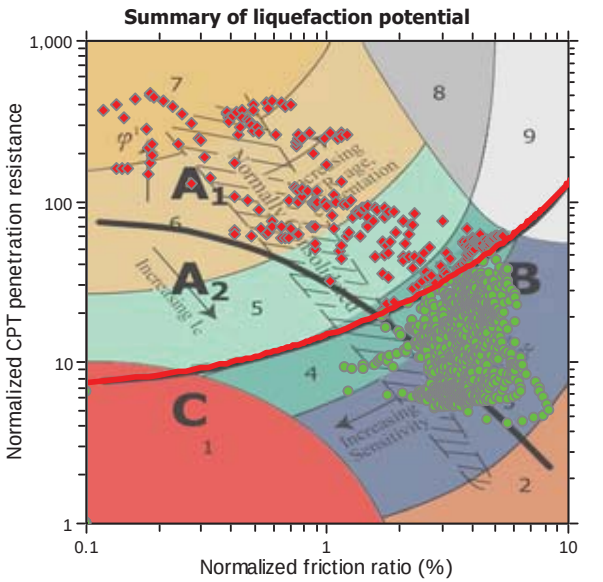
CPT file : 1-SCPT2

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	8.90 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	8.90 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

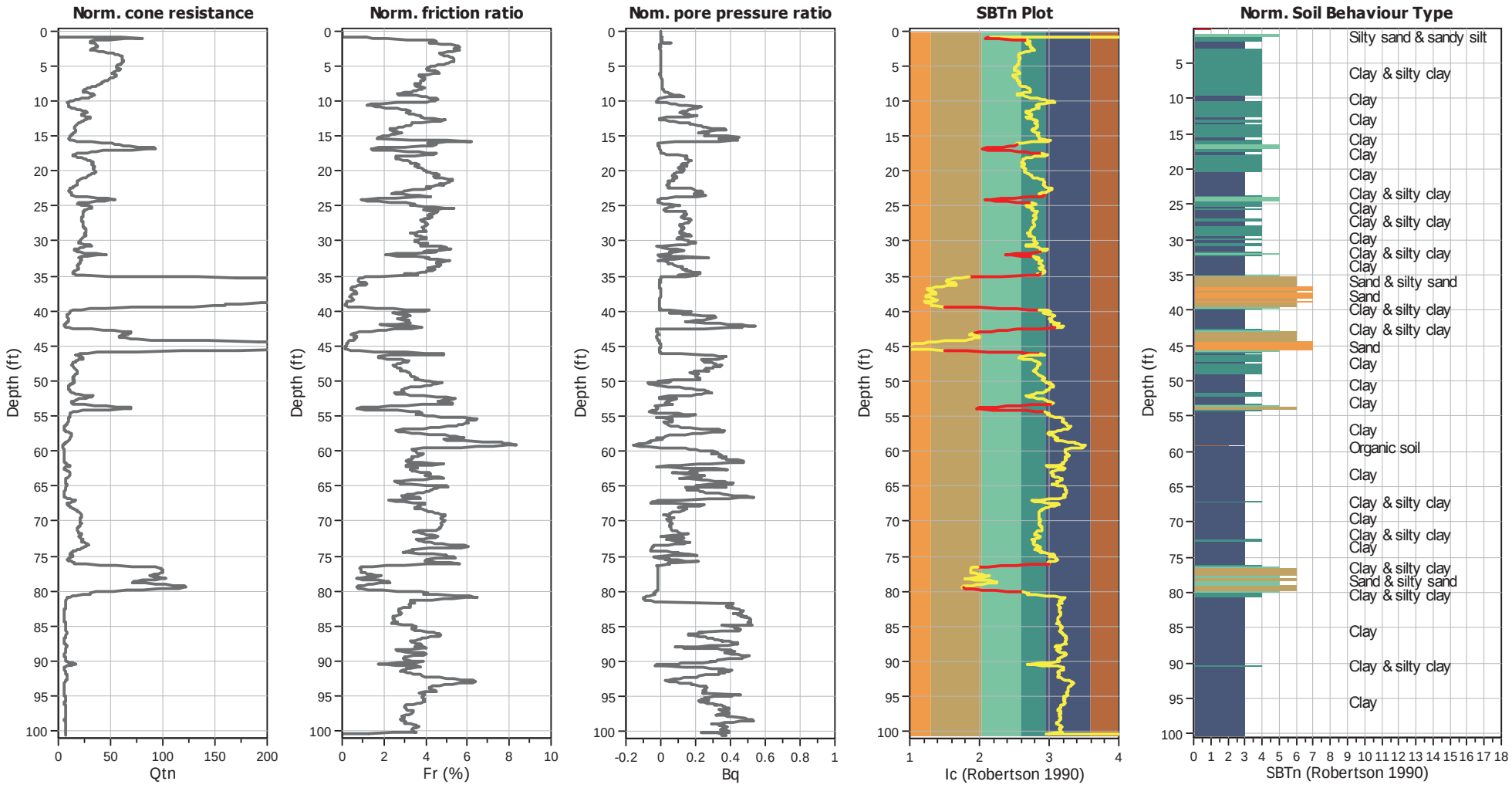






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



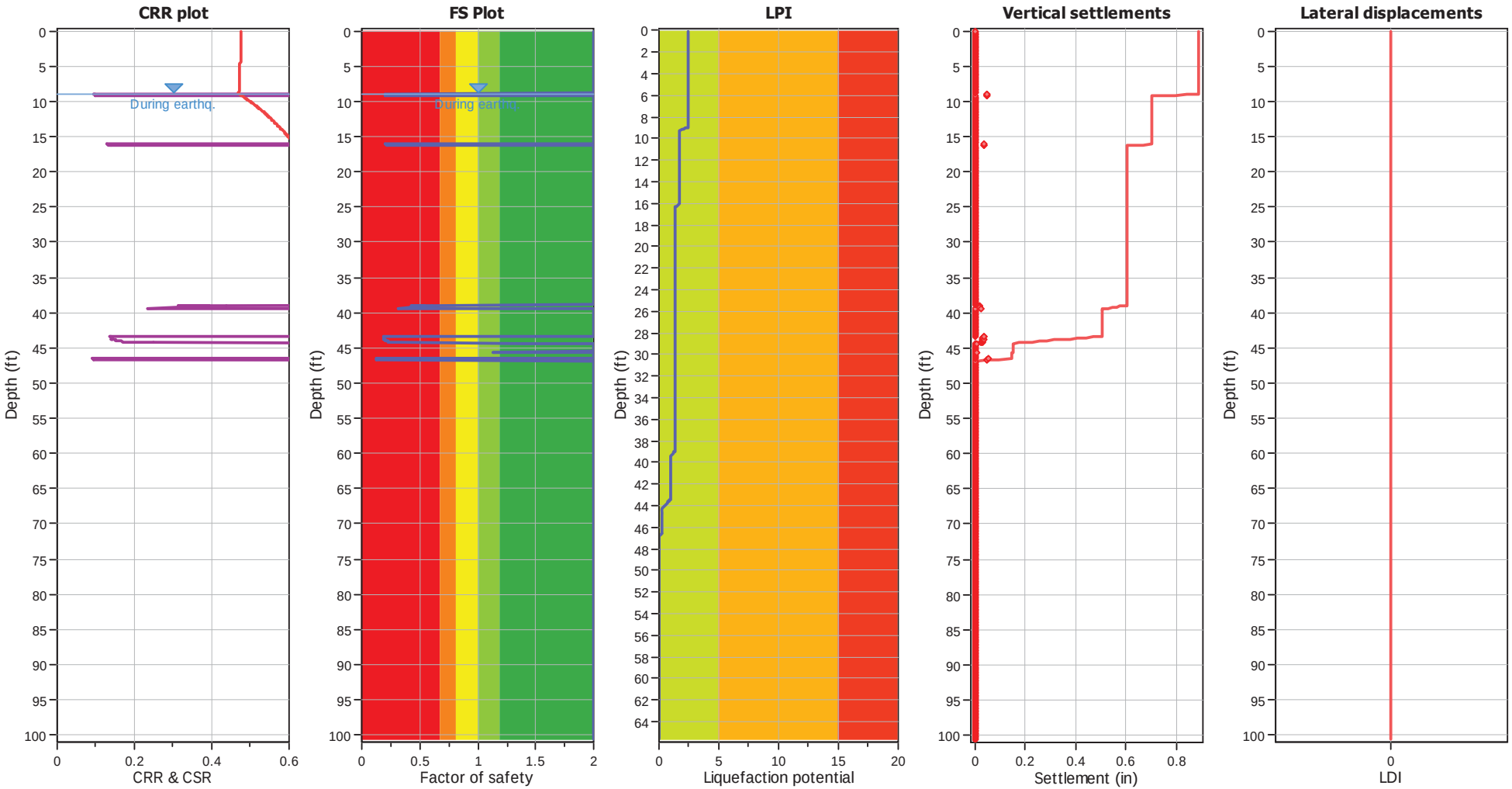
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	8.90 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.90 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	8.90 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.90 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

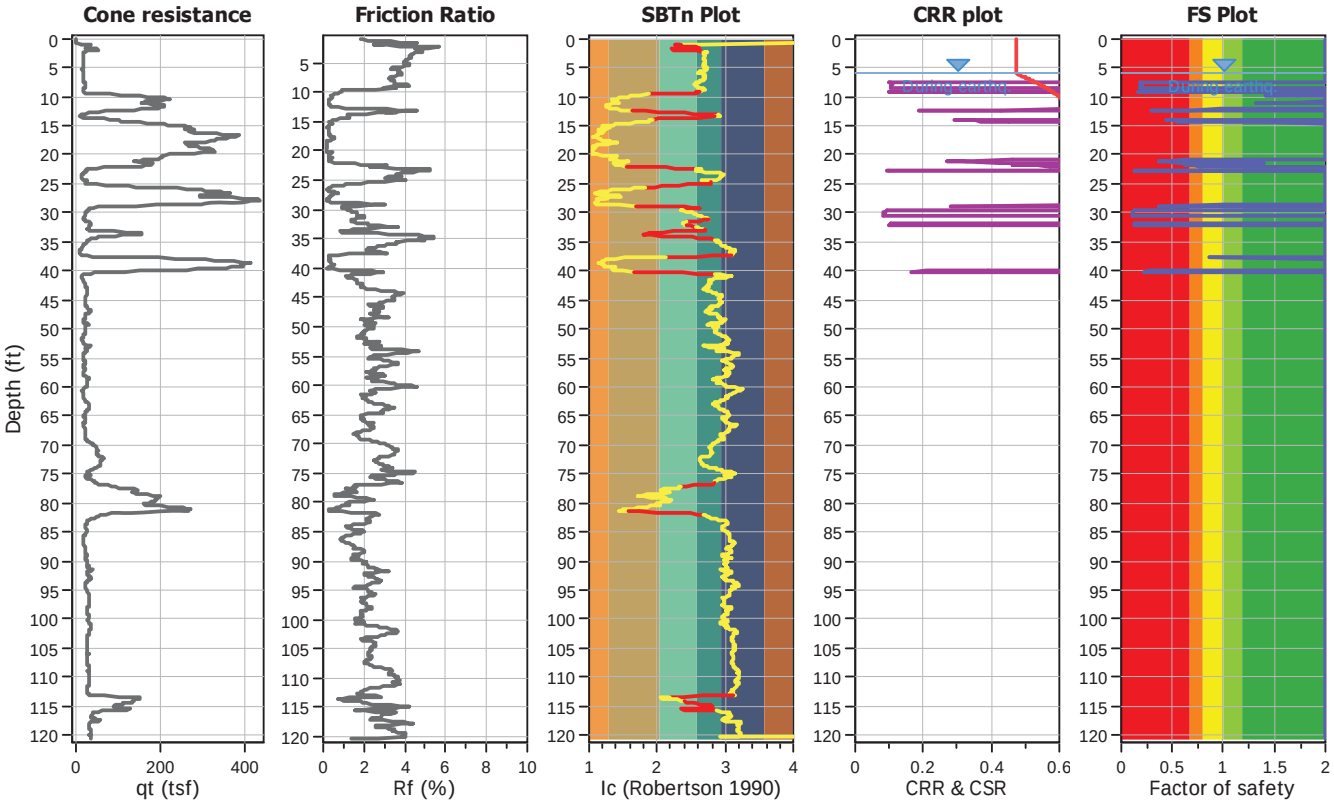
LIQUEFACTION ANALYSIS REPORT

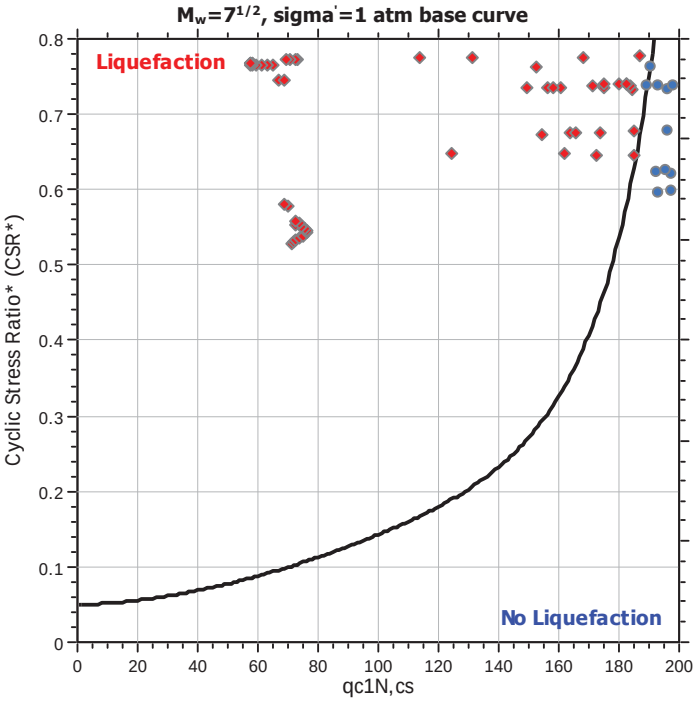
Project title : Google Parcels GEX **Location : Mountain View, CA**

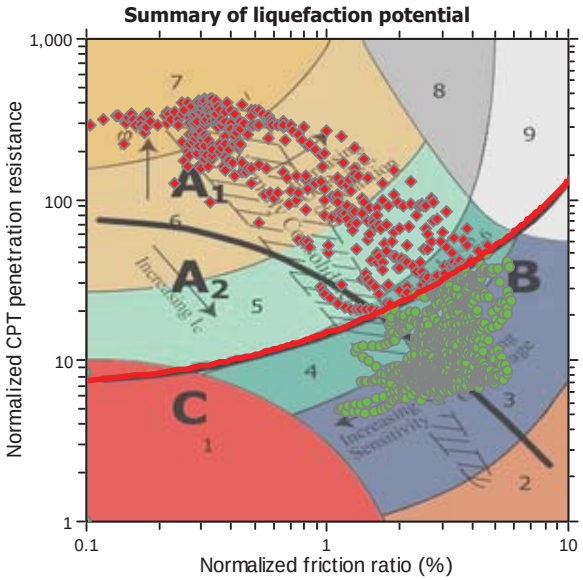
CPT file : 1-CPT3

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

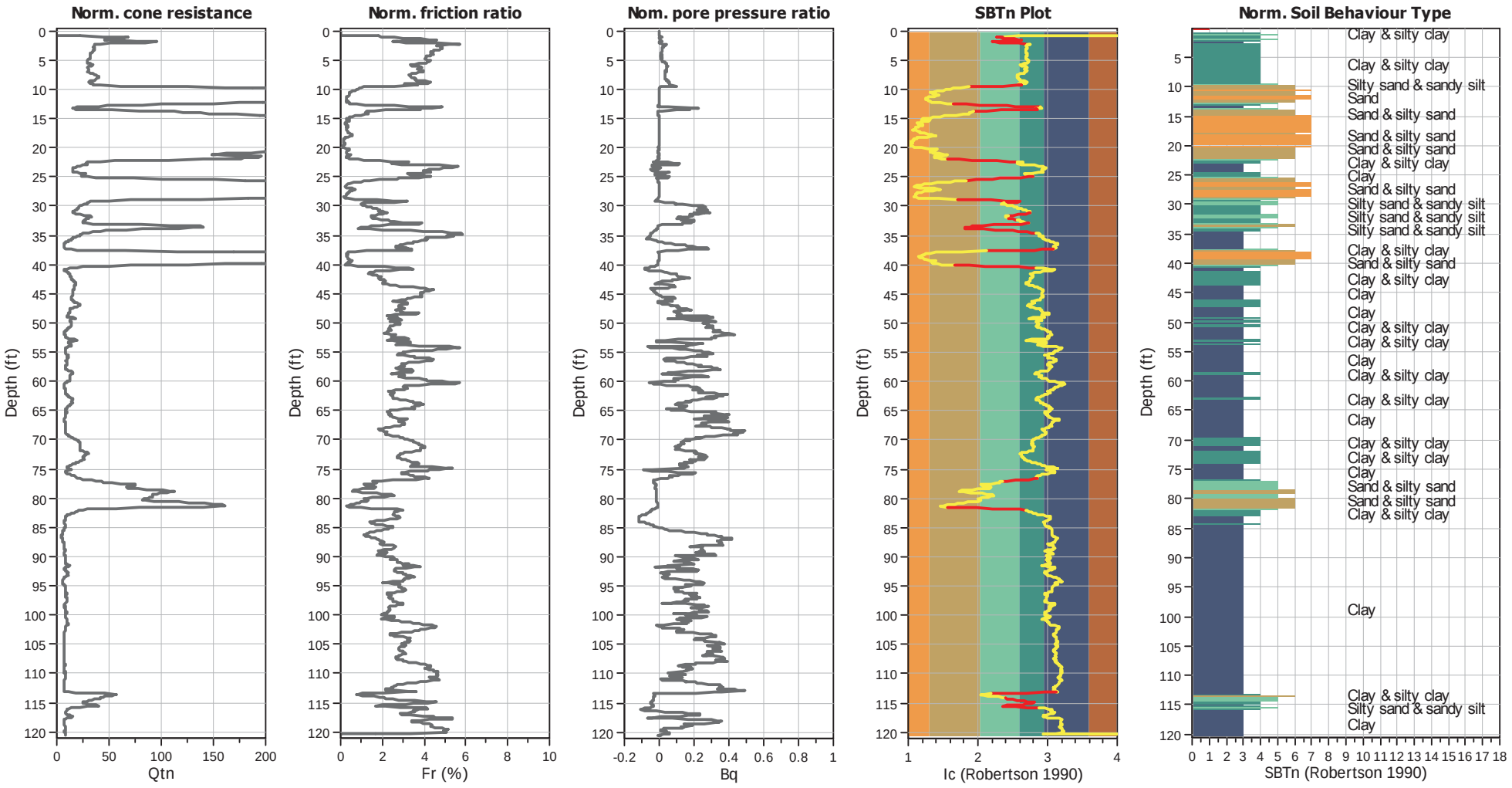






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



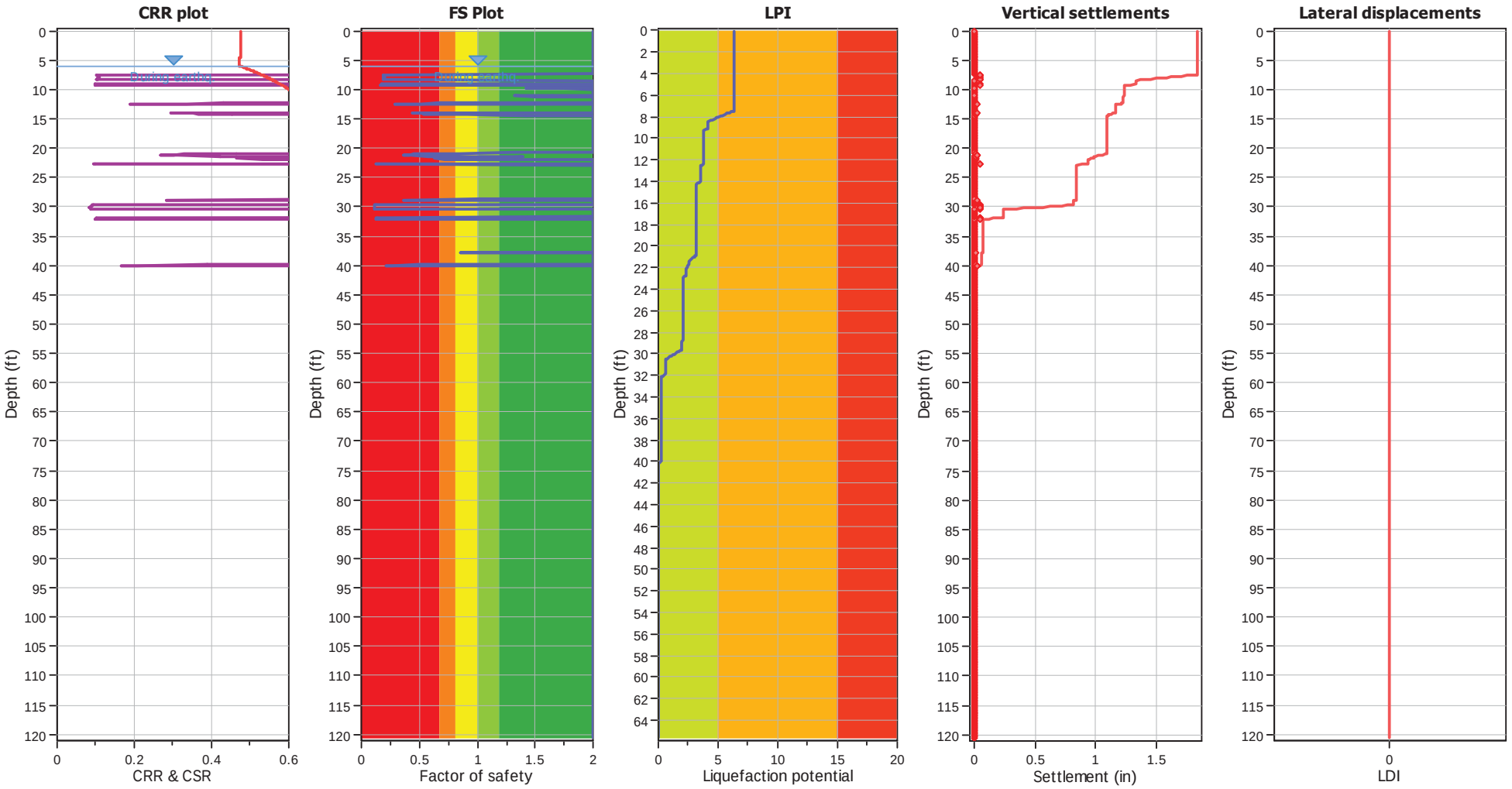
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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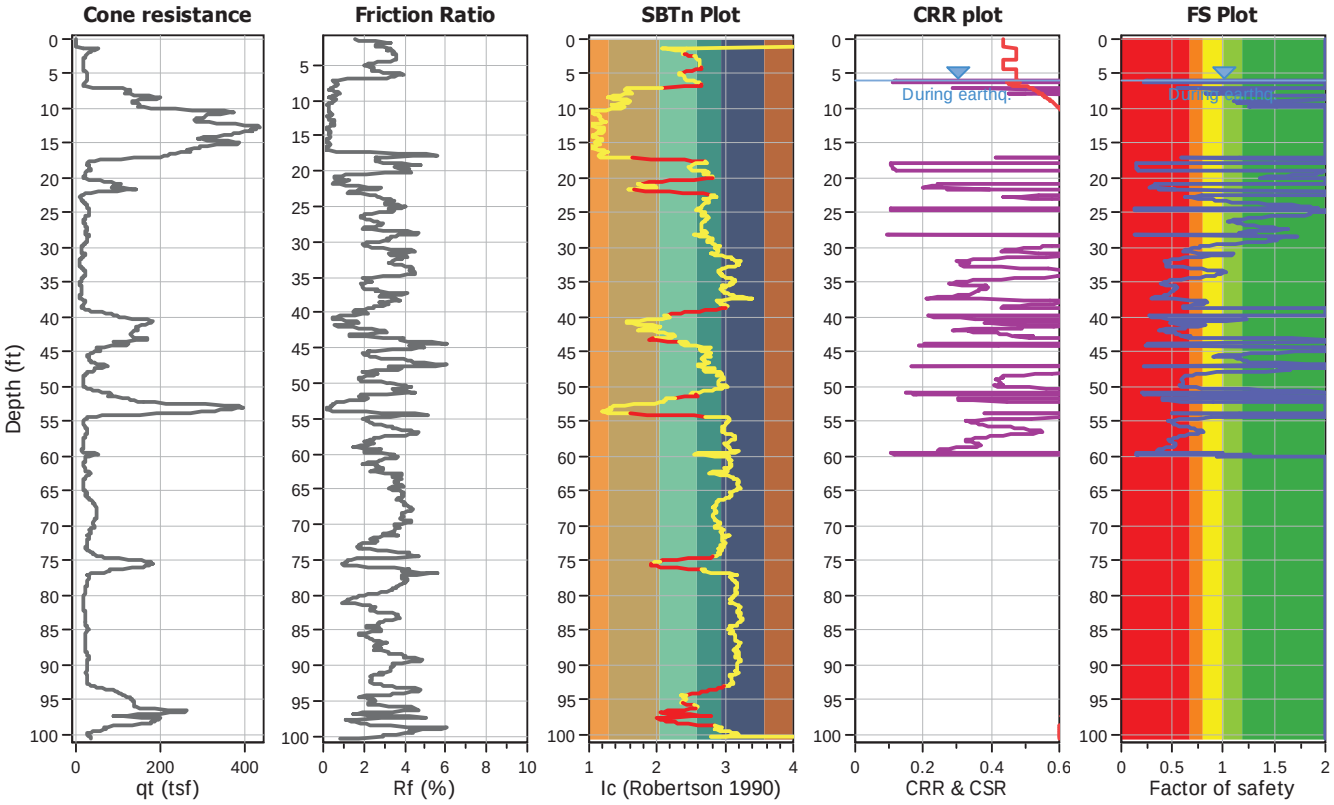
LIQUEFACTION ANALYSIS REPORT

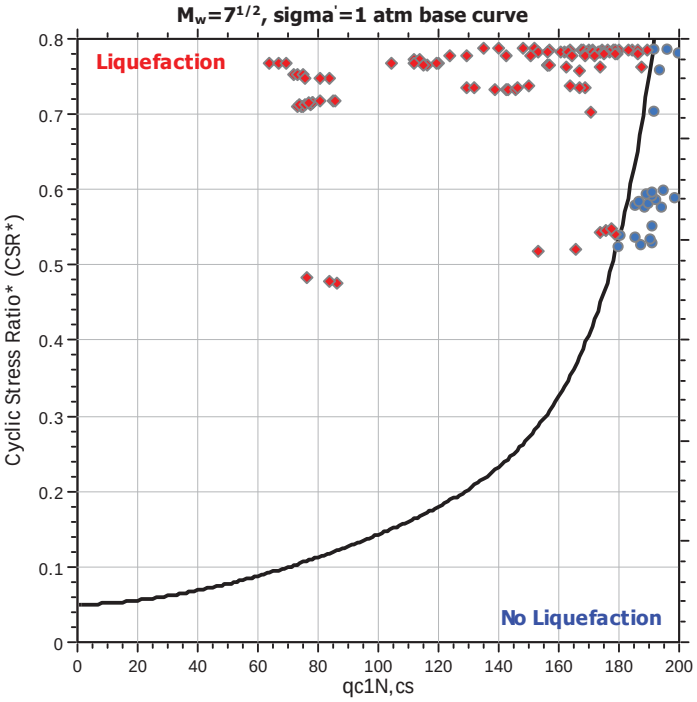
Project title : **Location :**

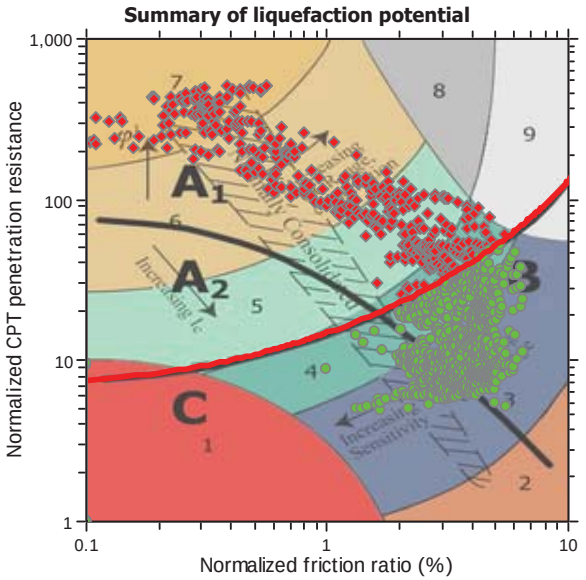
CPT file : 1-SCPT4

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

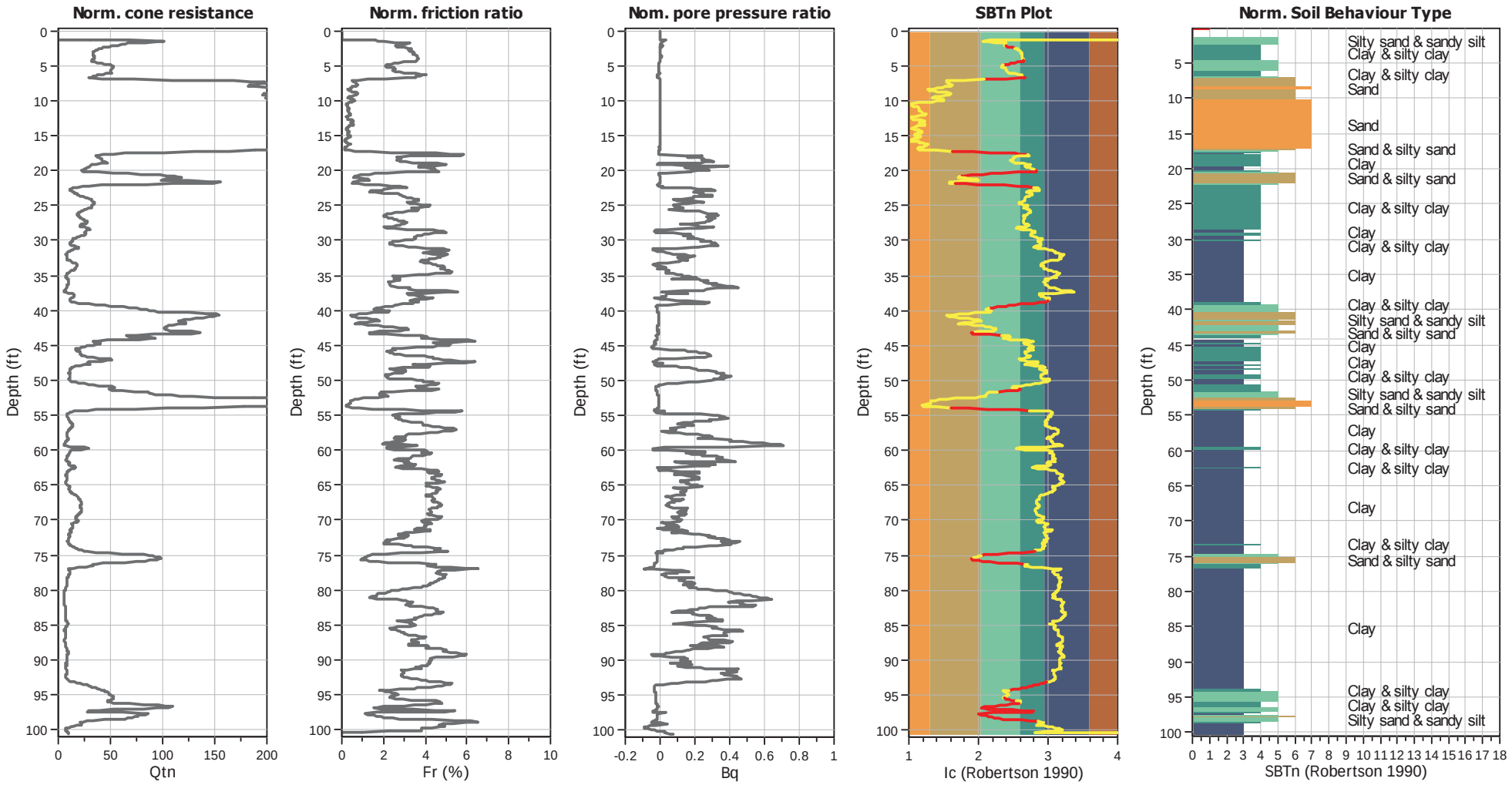






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



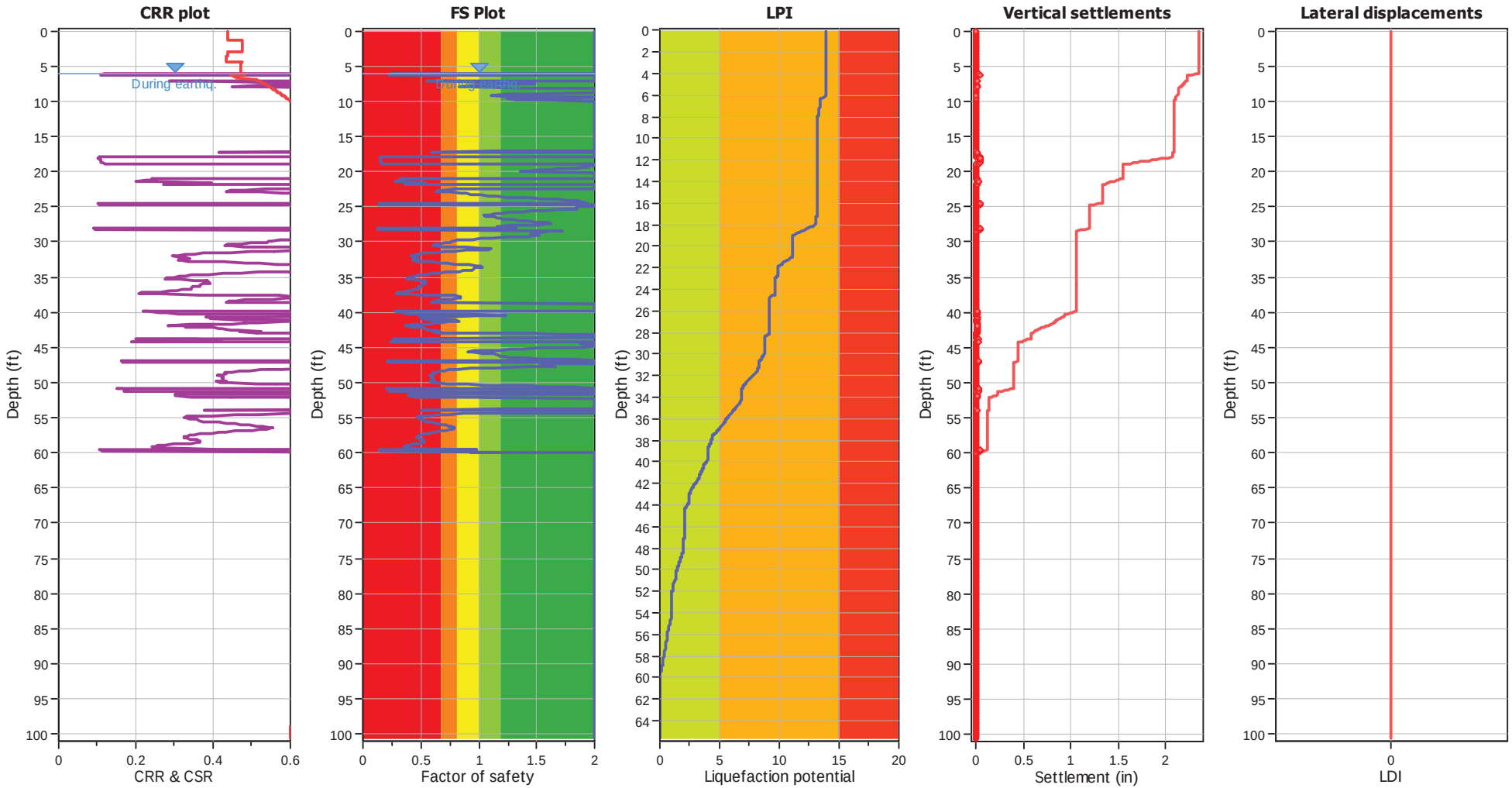
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

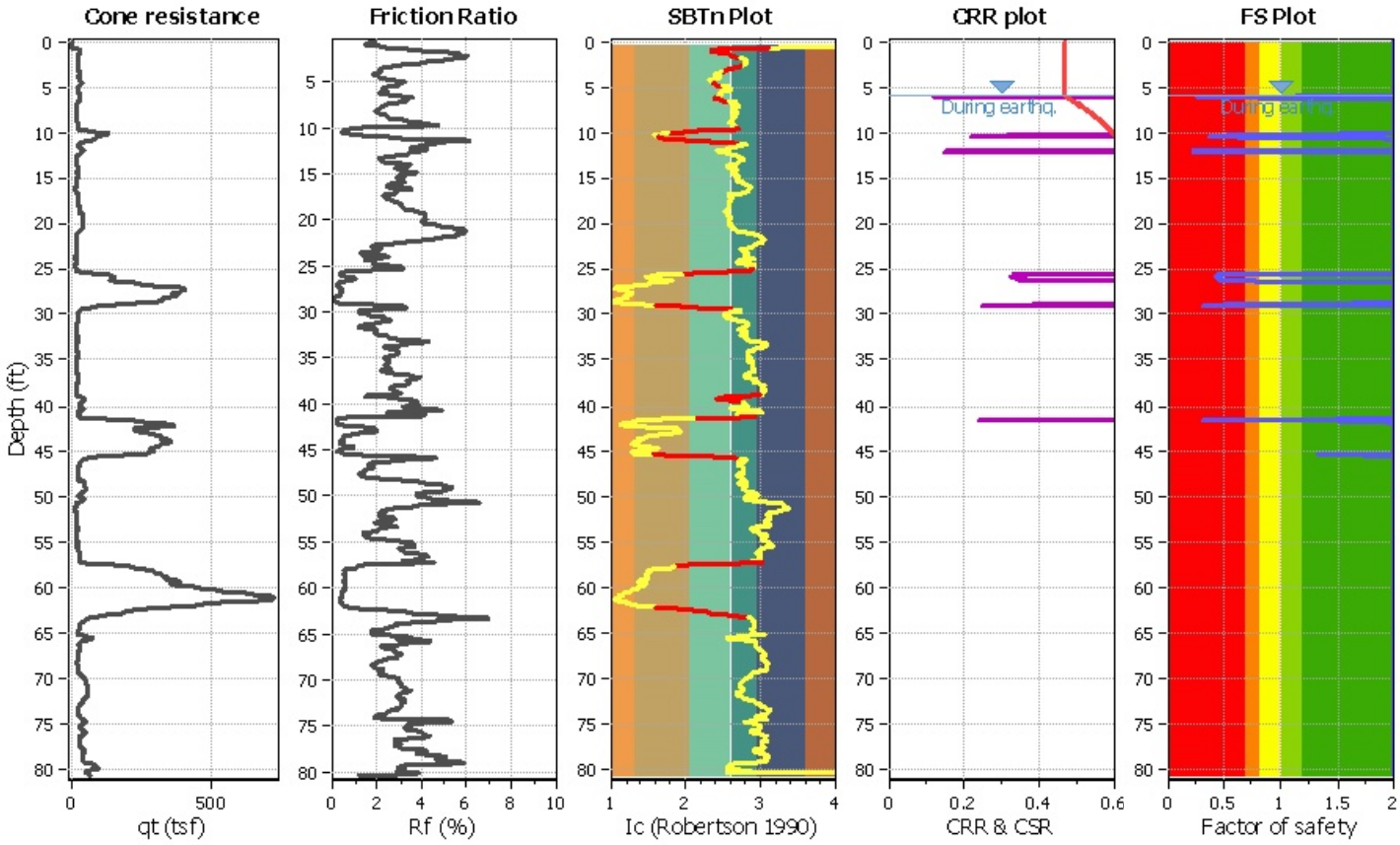
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

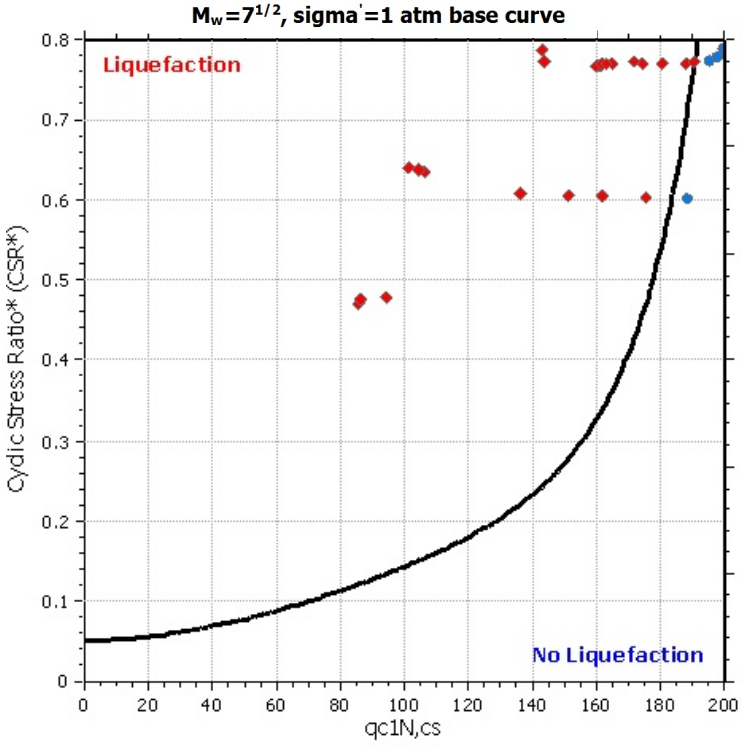
CPT file : 1-CPT5

Input parameters and analysis data

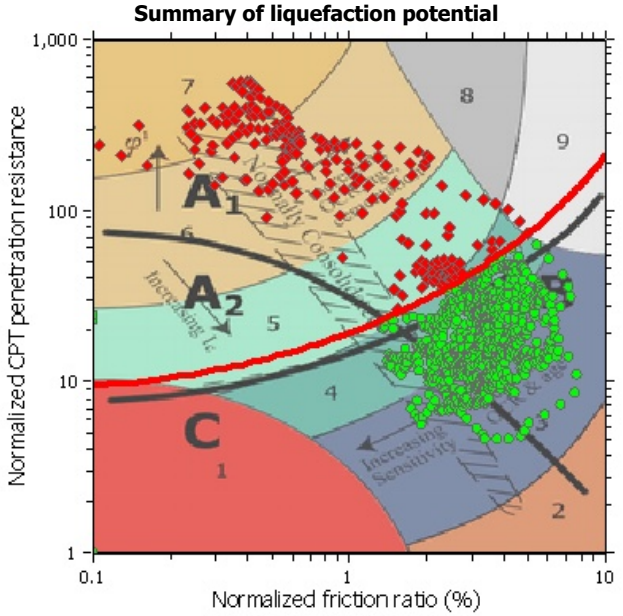
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.50	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

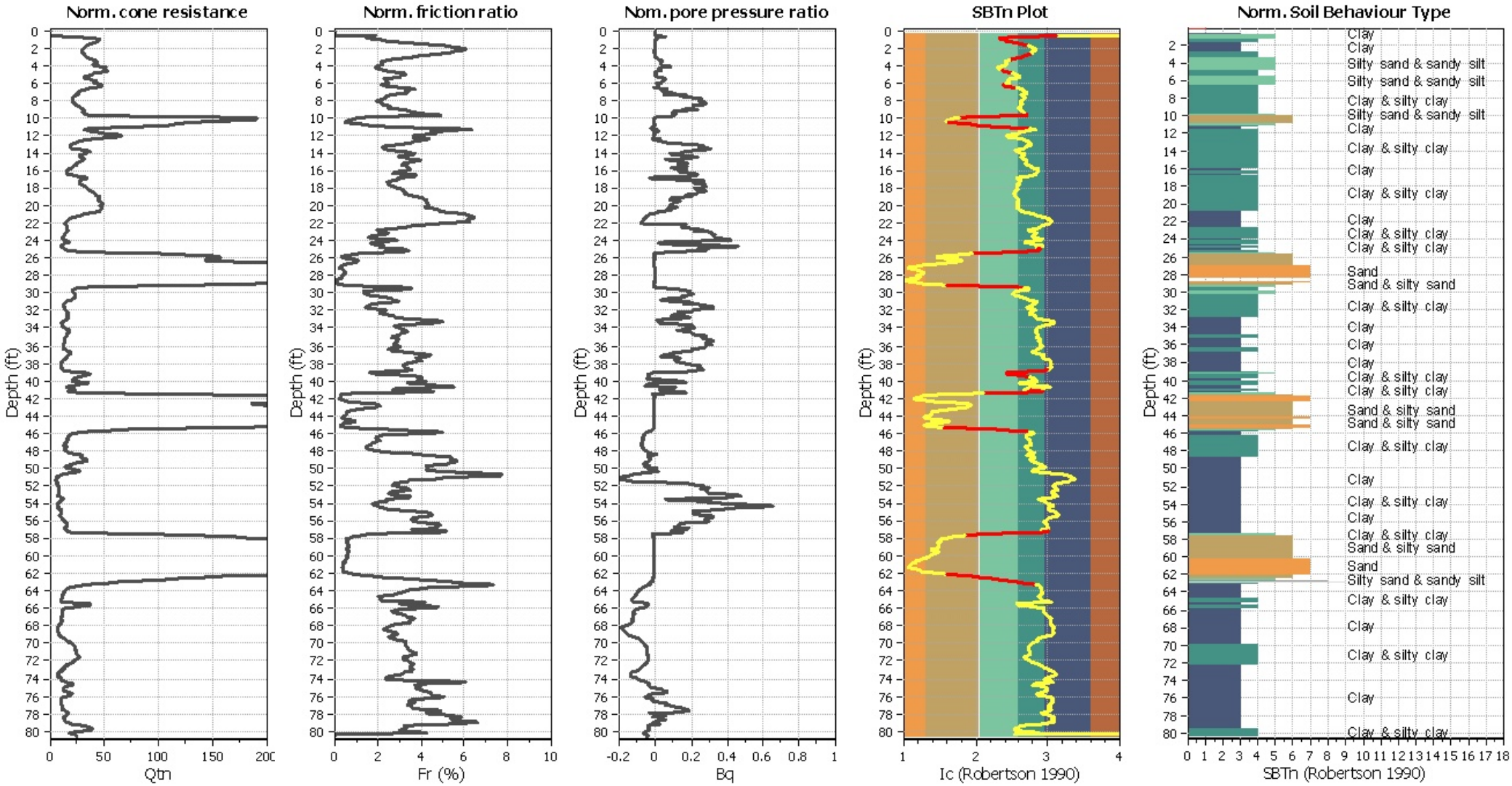


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



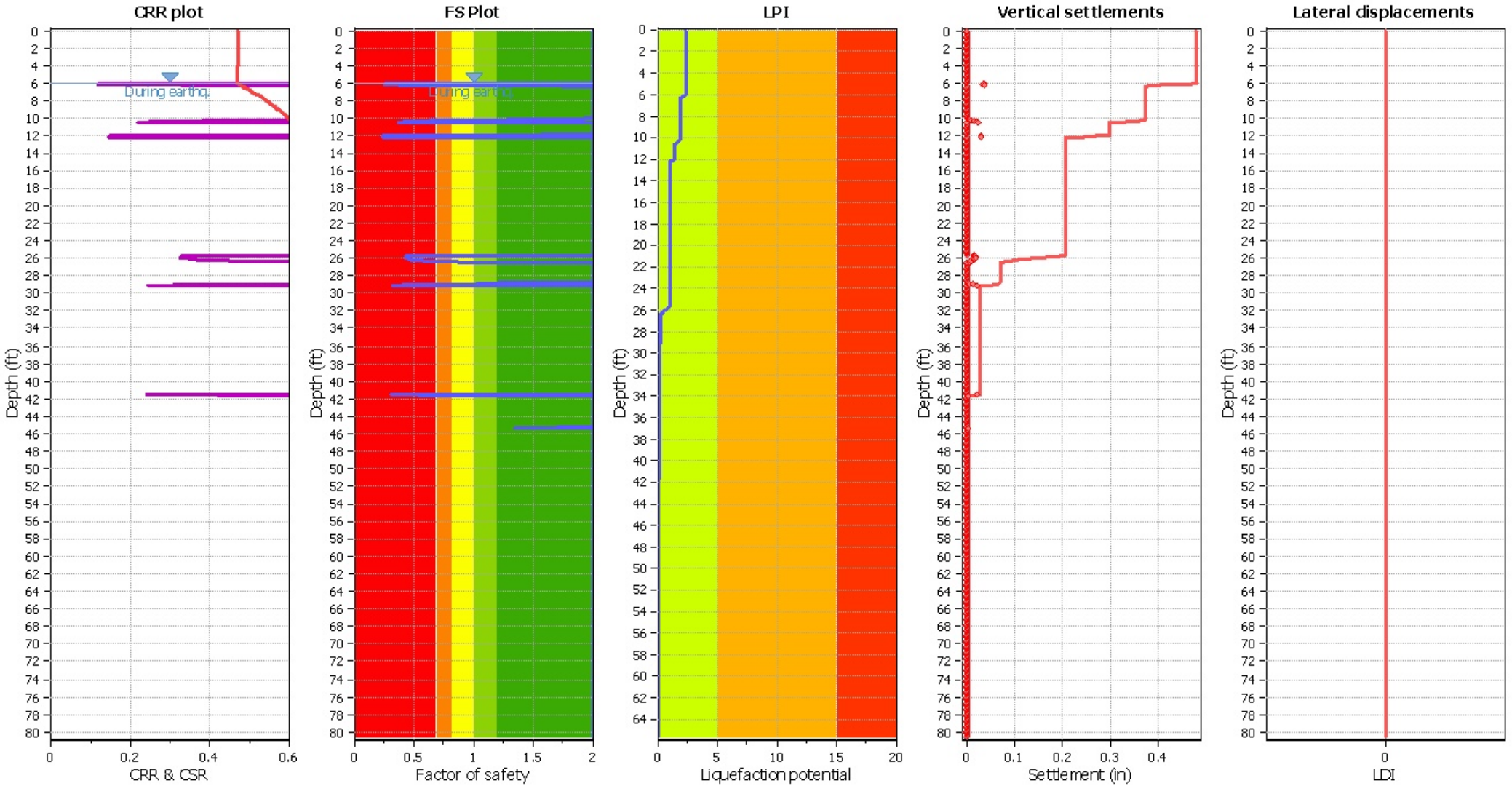
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

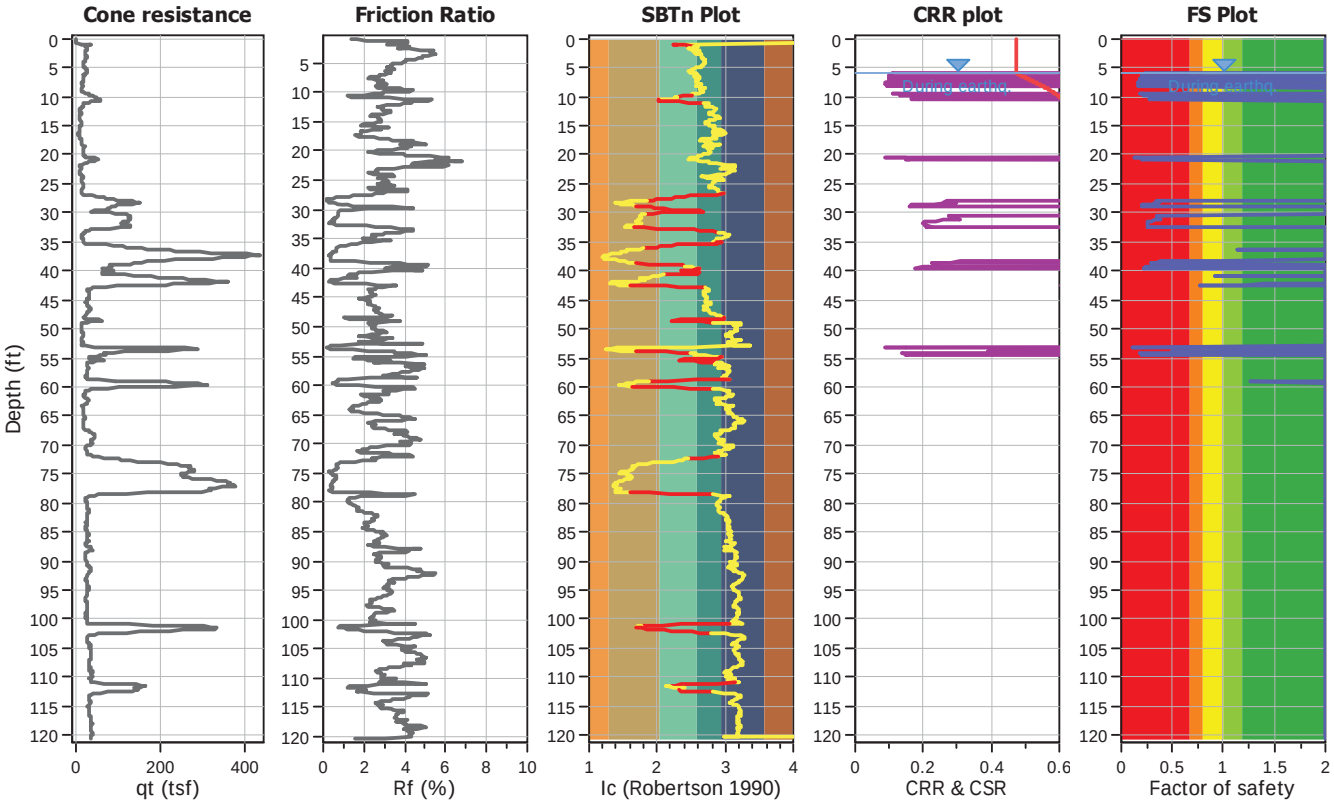
LIQUEFACTION ANALYSIS REPORT

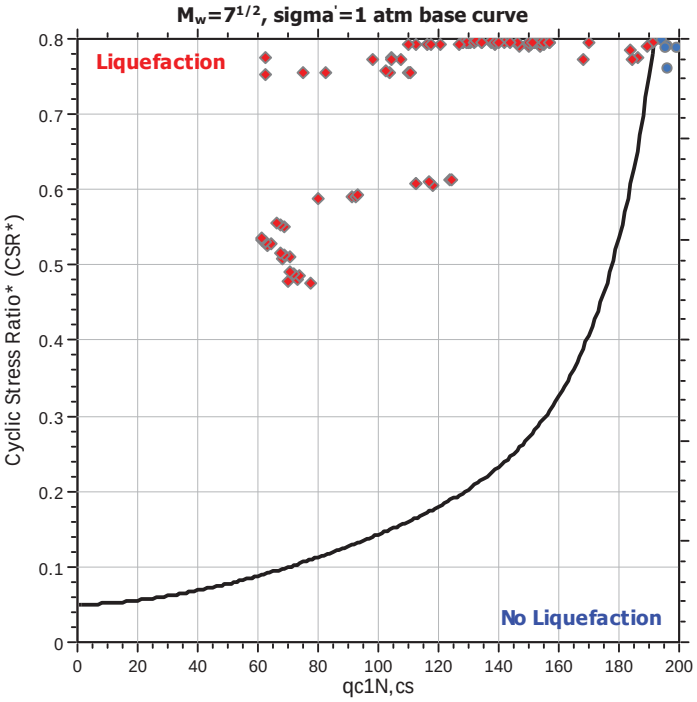
Project title : Google Parcels GEX **Location : Mountain View, CA**

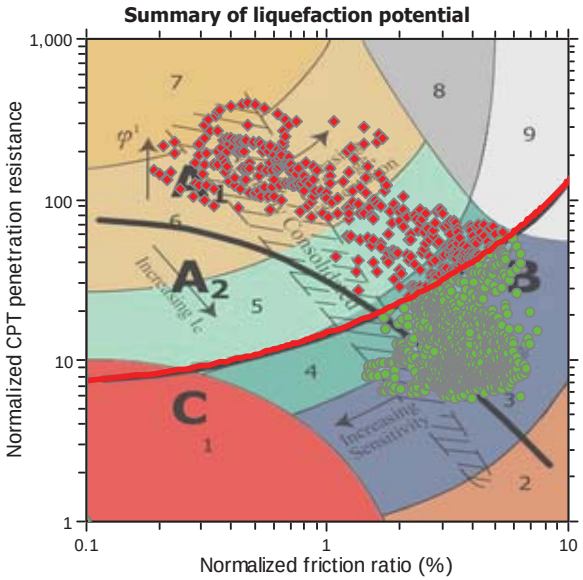
CPT file : 1-CPT6

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method

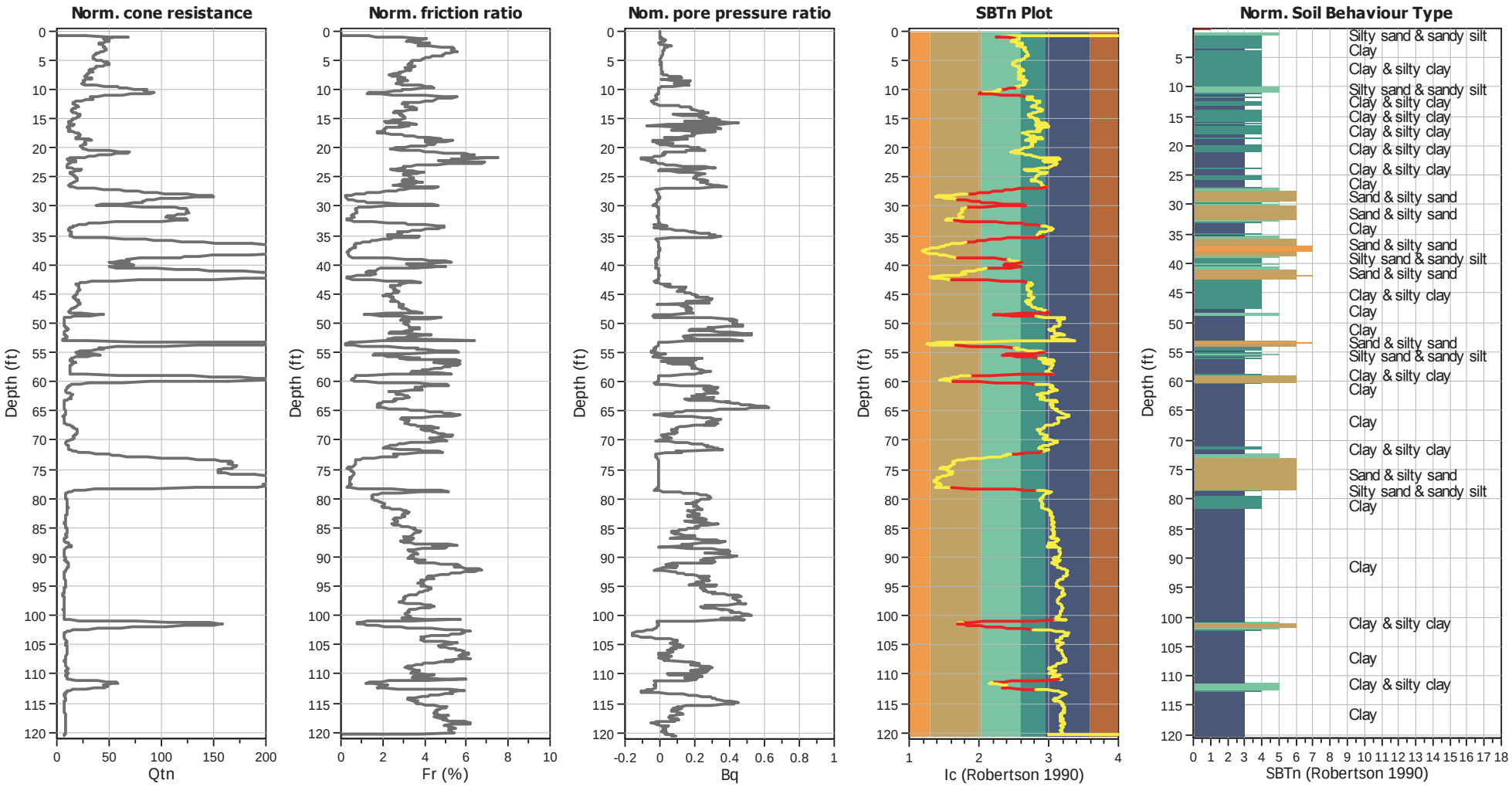






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



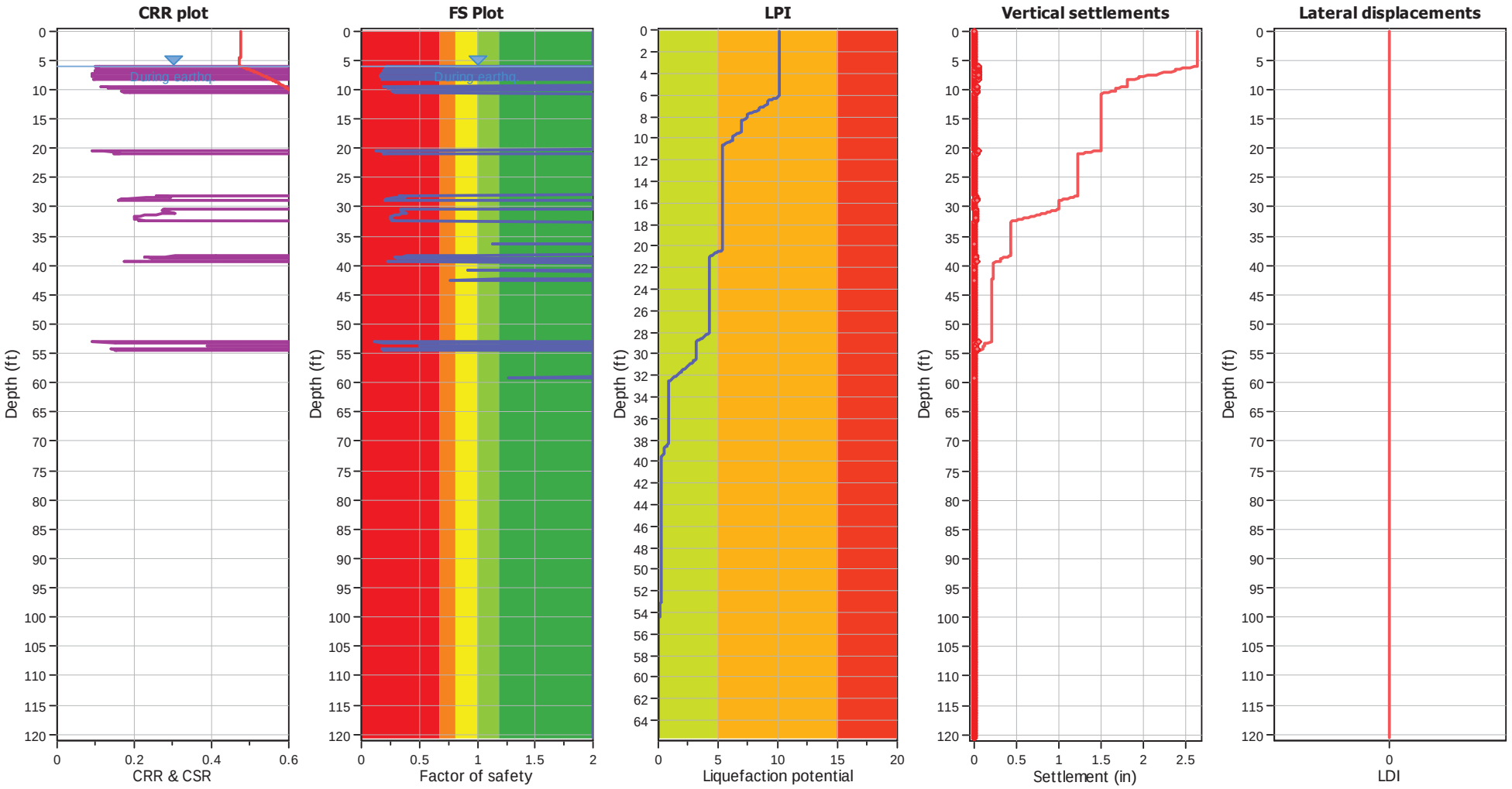
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

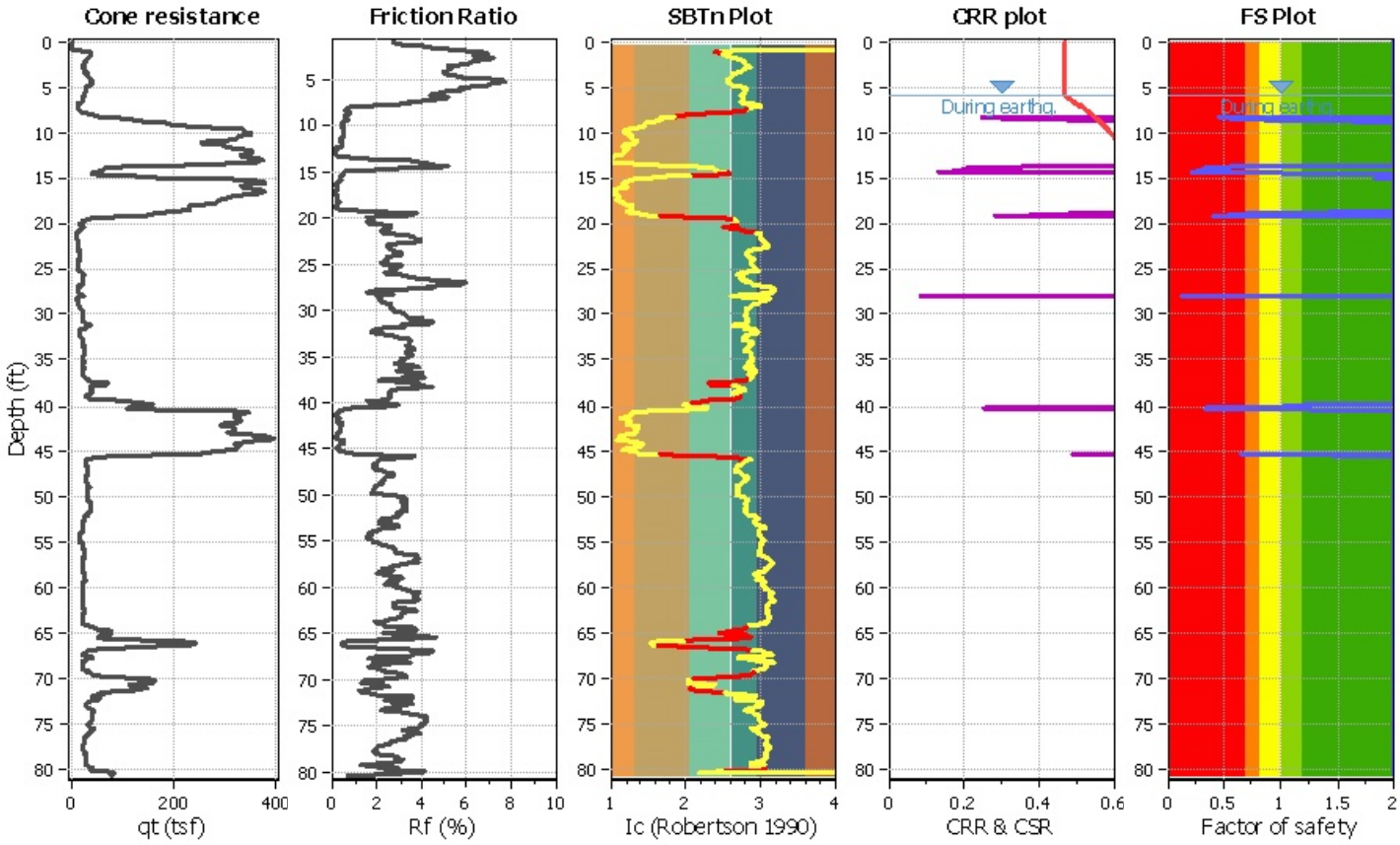
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

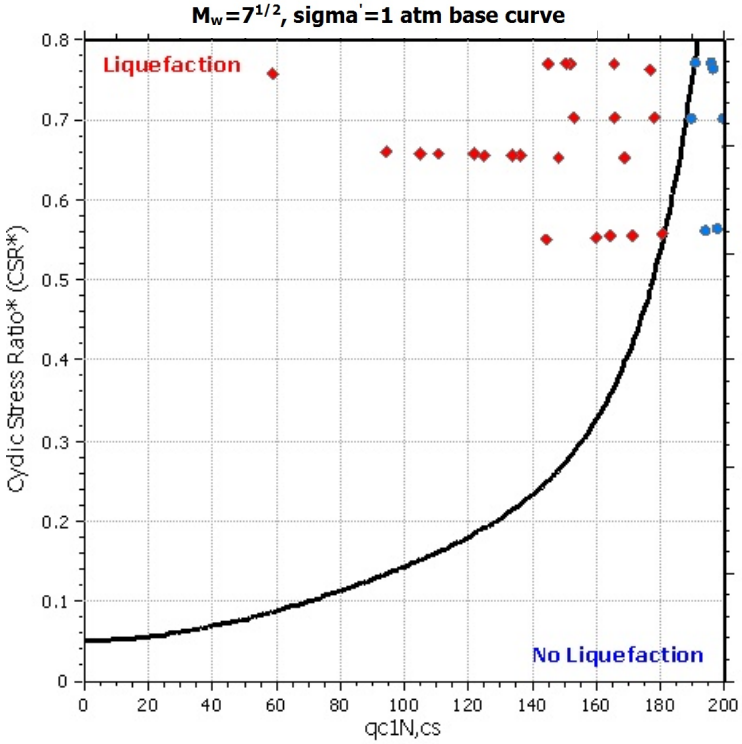
CPT file : 1-CPT7

Input parameters and analysis data

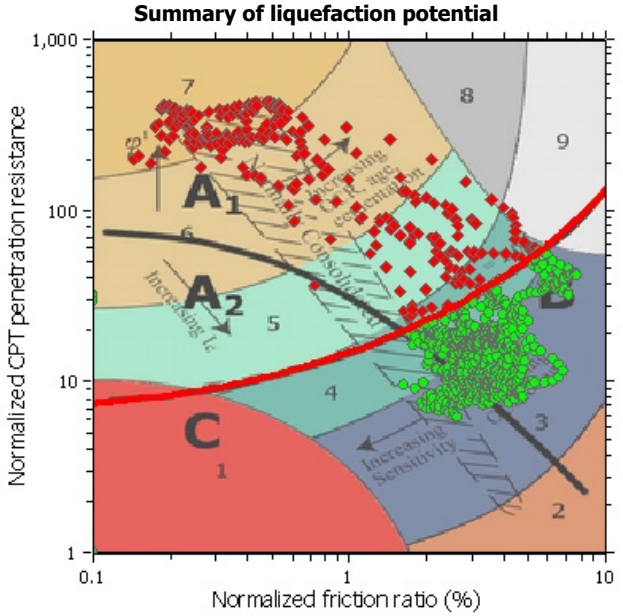
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

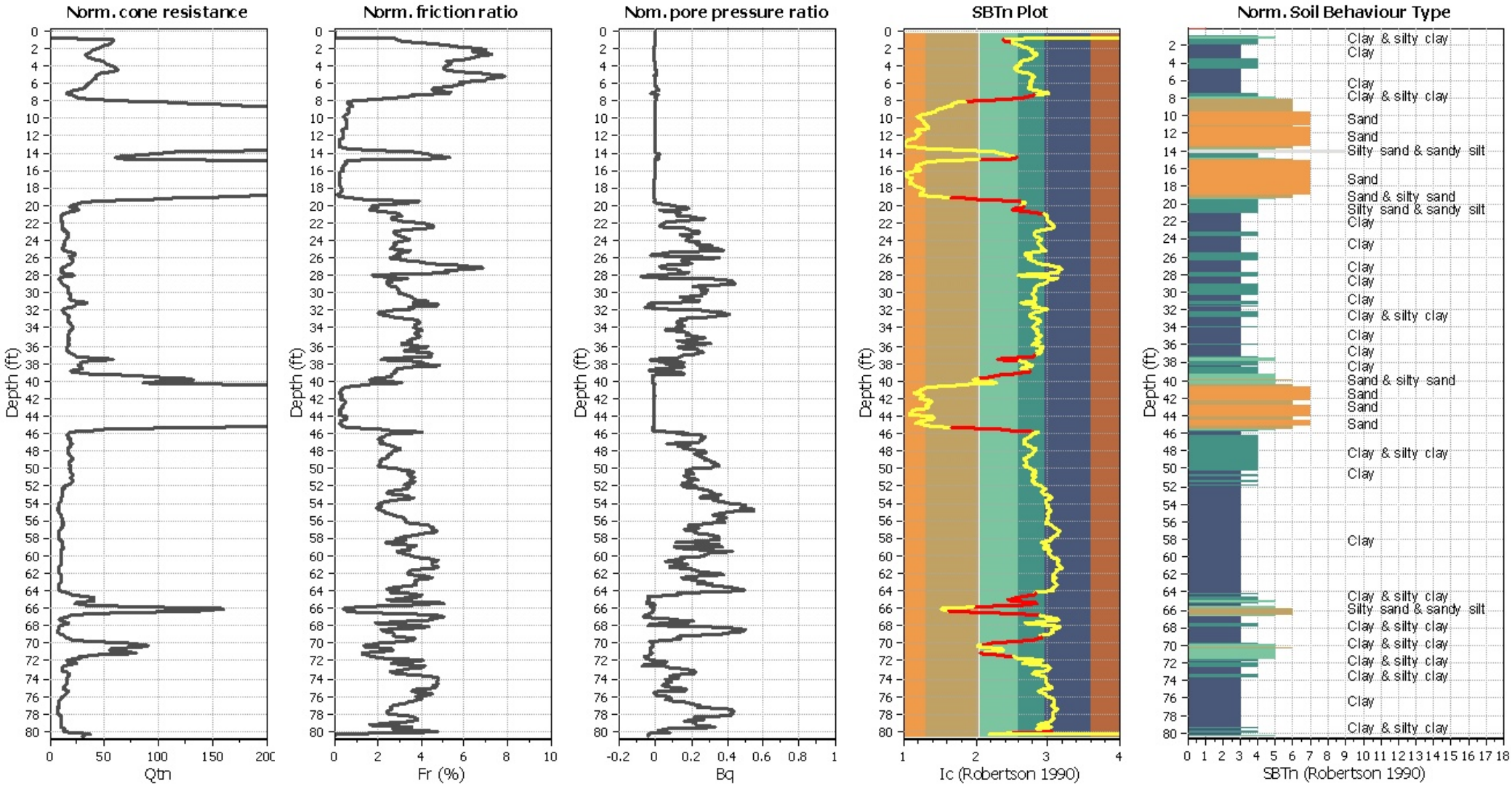


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



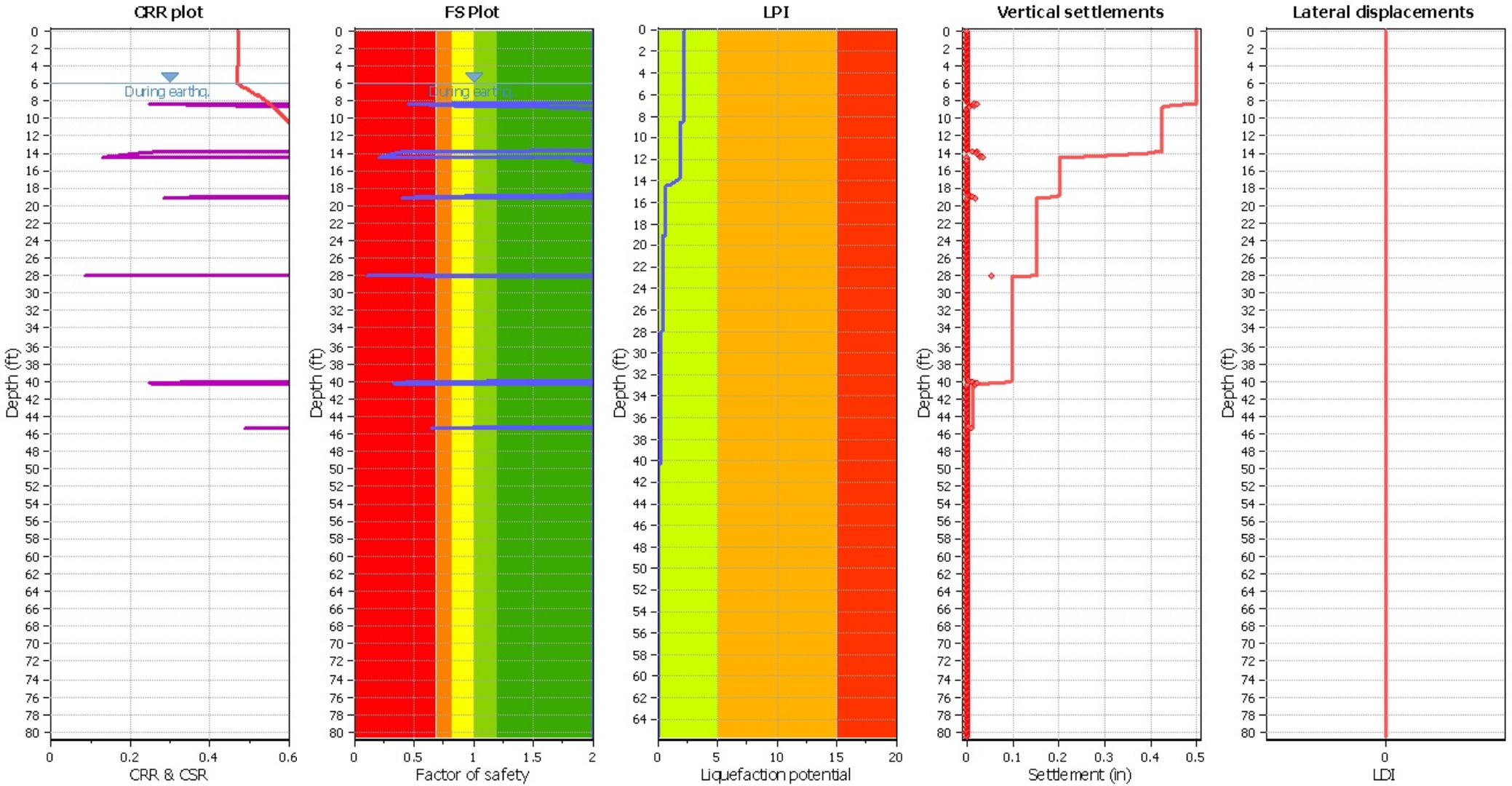
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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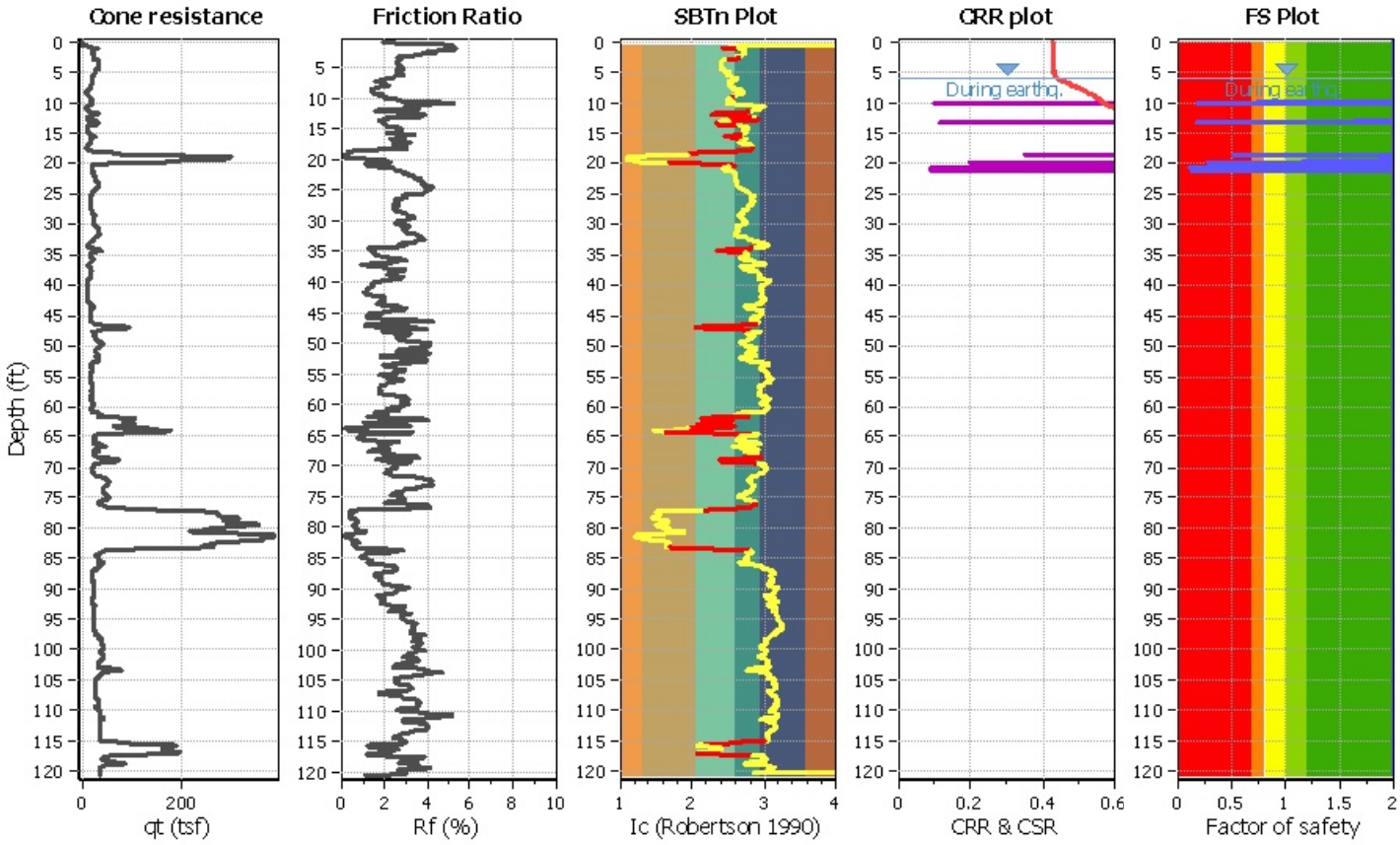
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

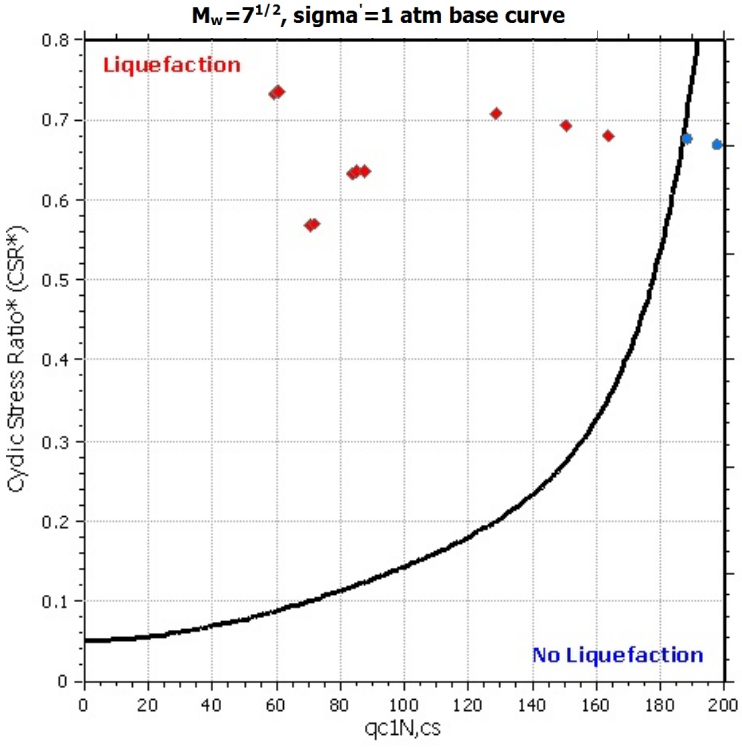
CPT file : 1-CPT8

Input parameters and analysis data

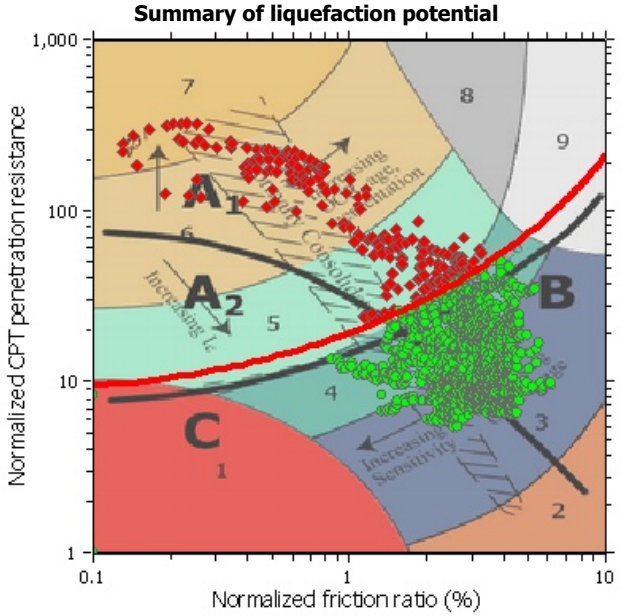
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.50	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

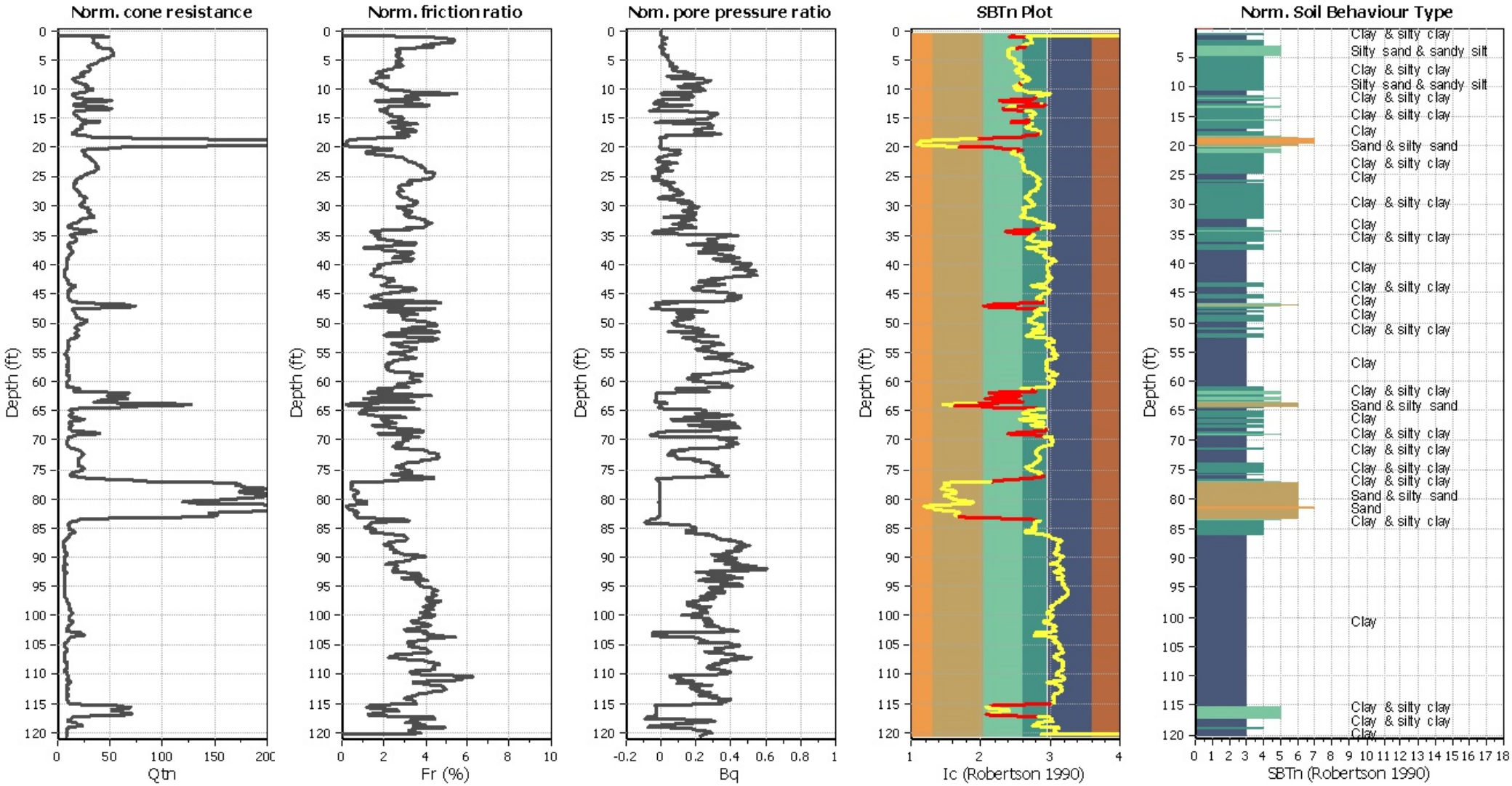


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



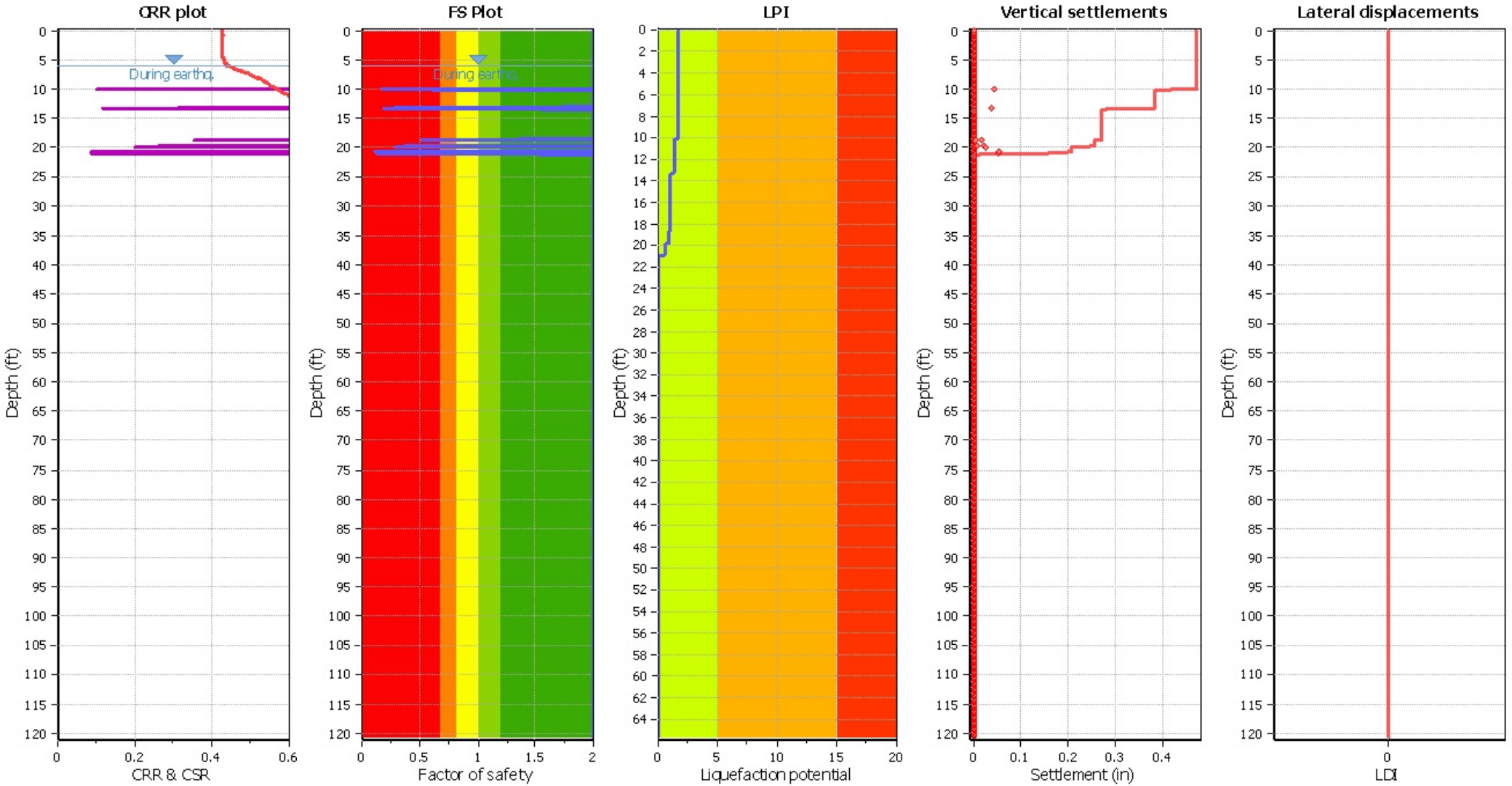
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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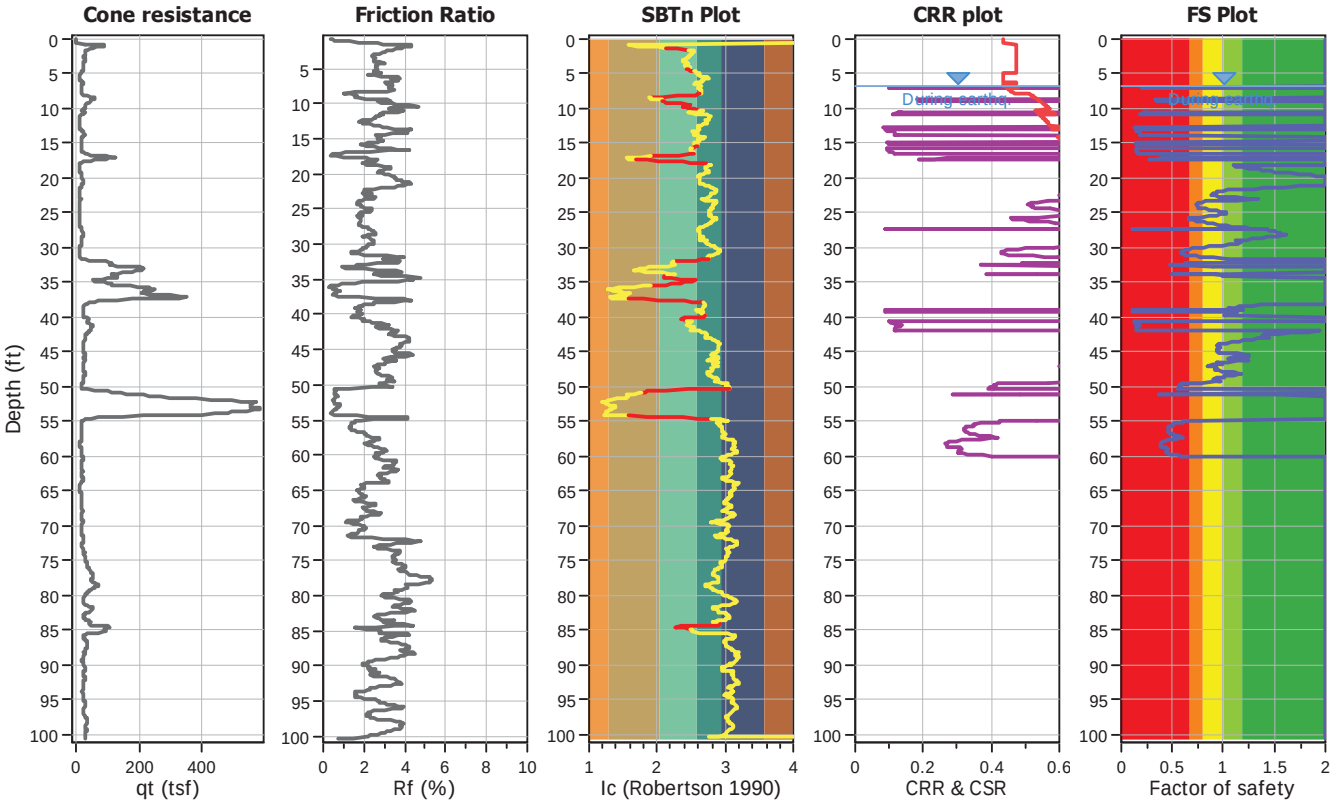
LIQUEFACTION ANALYSIS REPORT

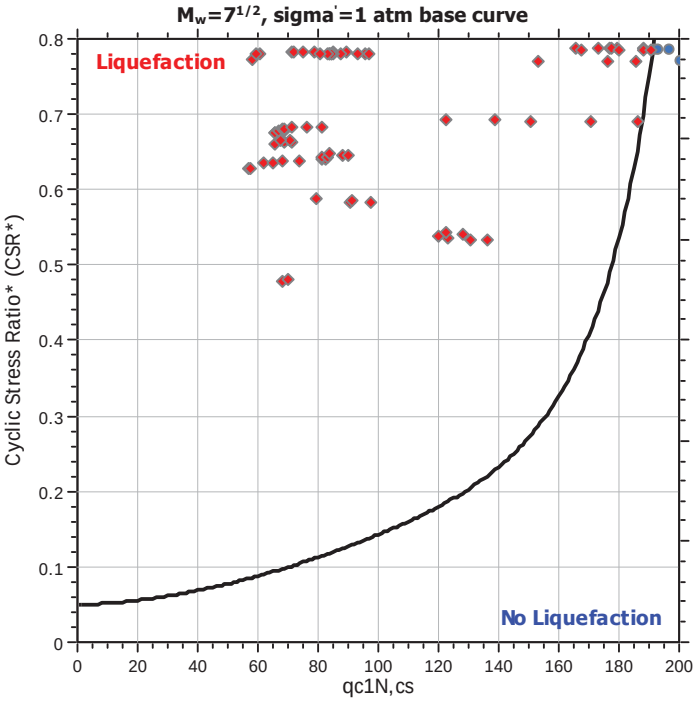
Project title : **Location :**

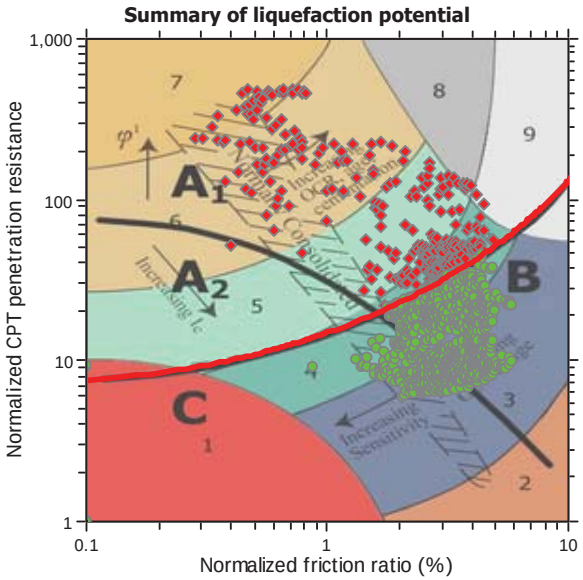
CPT file : 1-CPT9

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.80 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

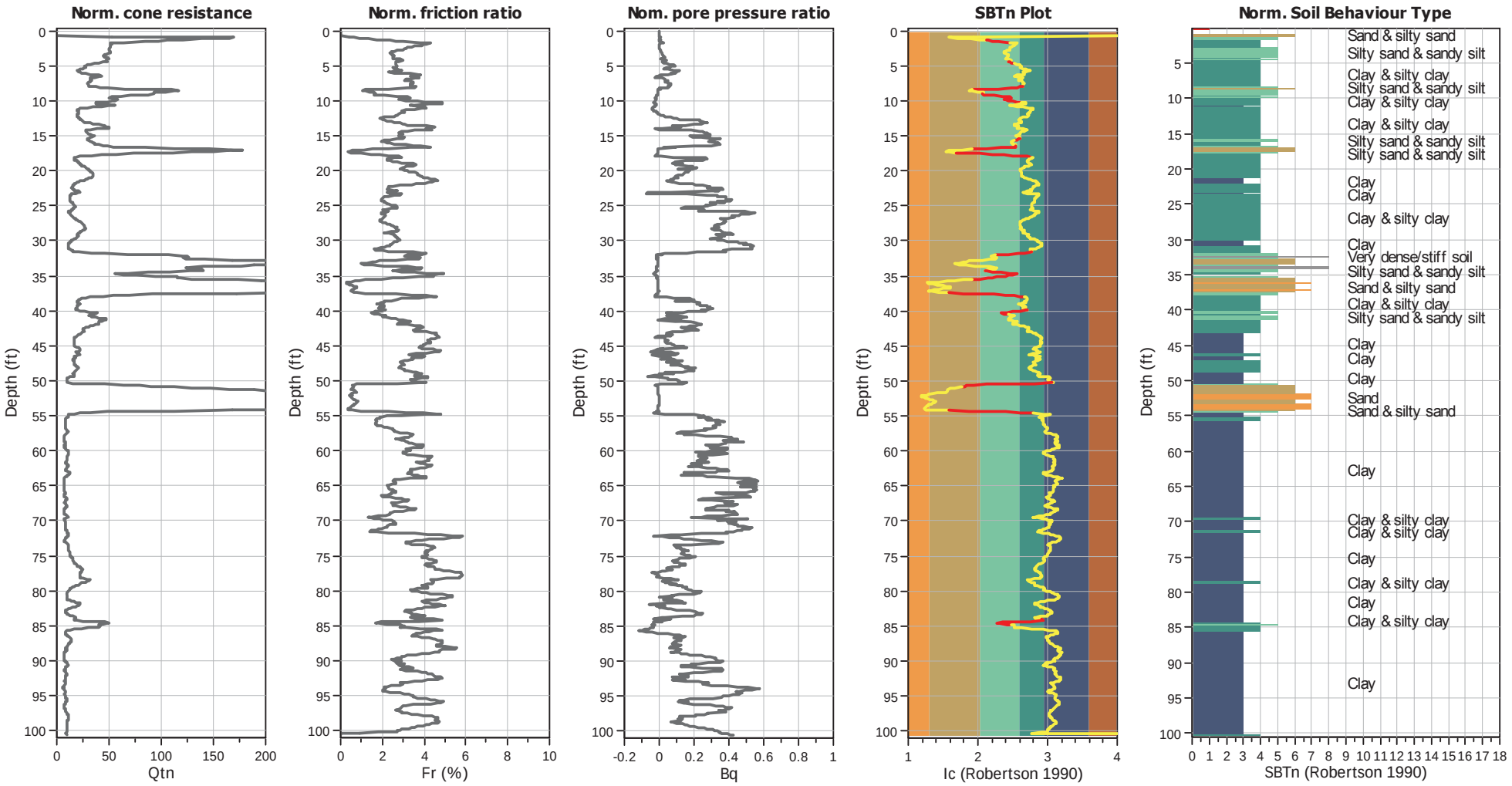






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



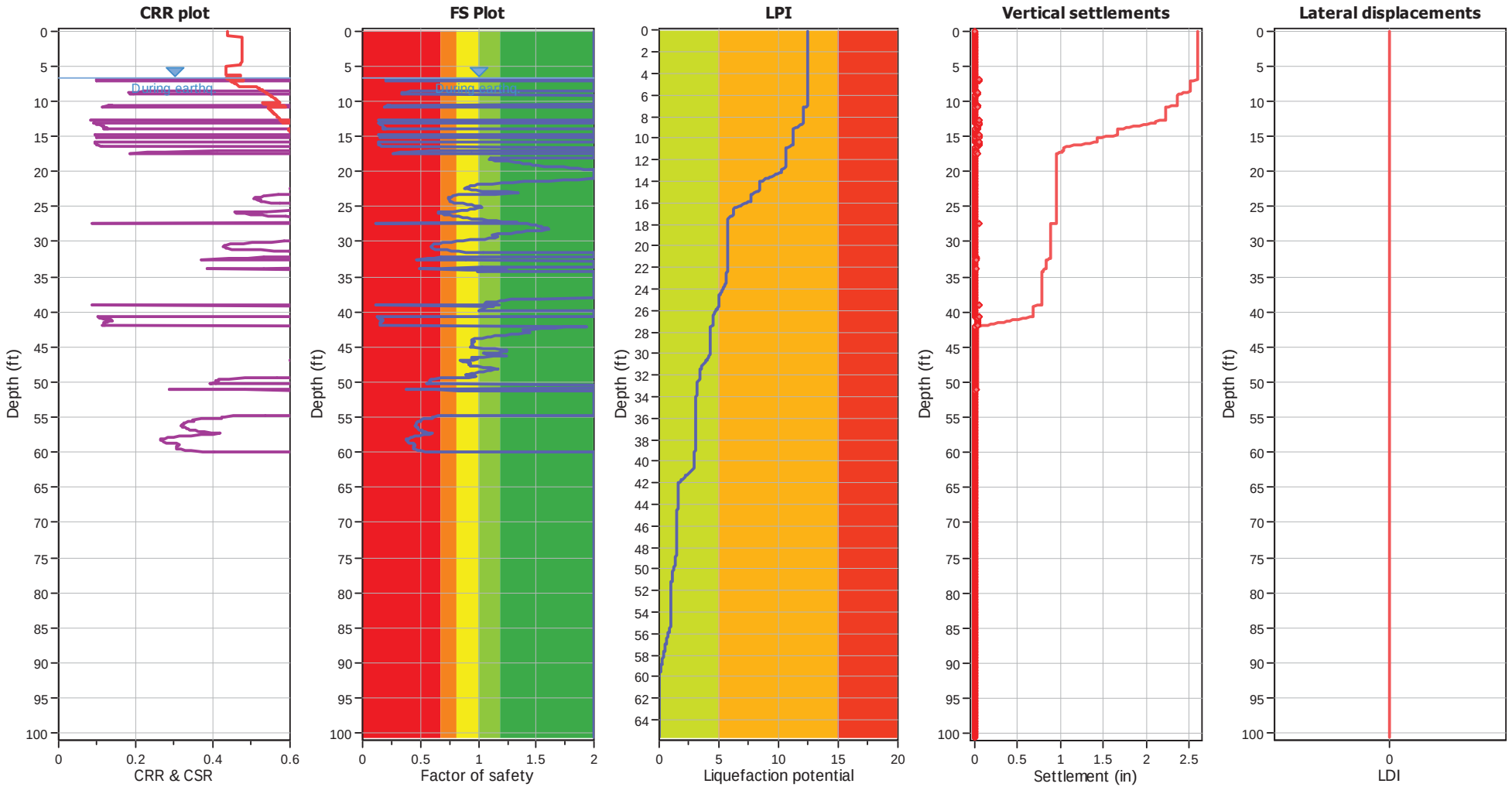
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.80 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.80 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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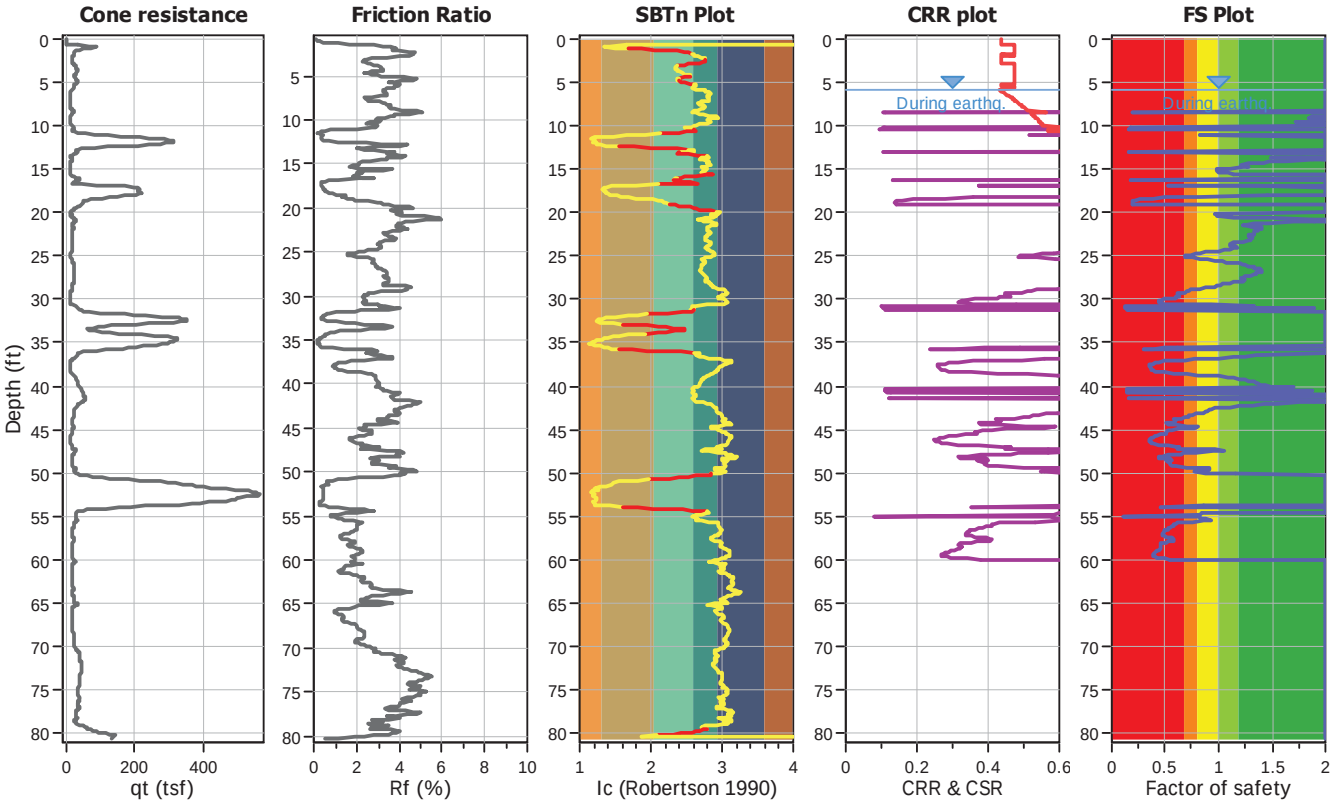
LIQUEFACTION ANALYSIS REPORT

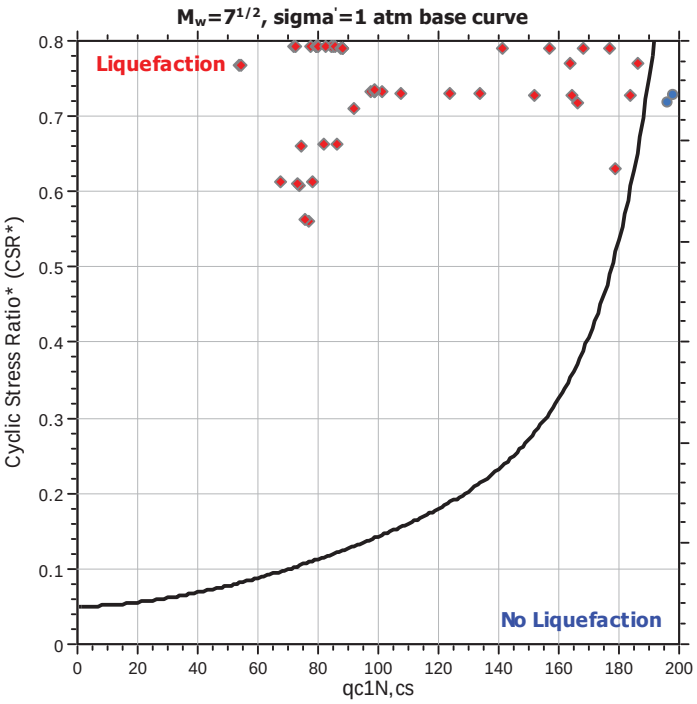
Project title : **Location :**

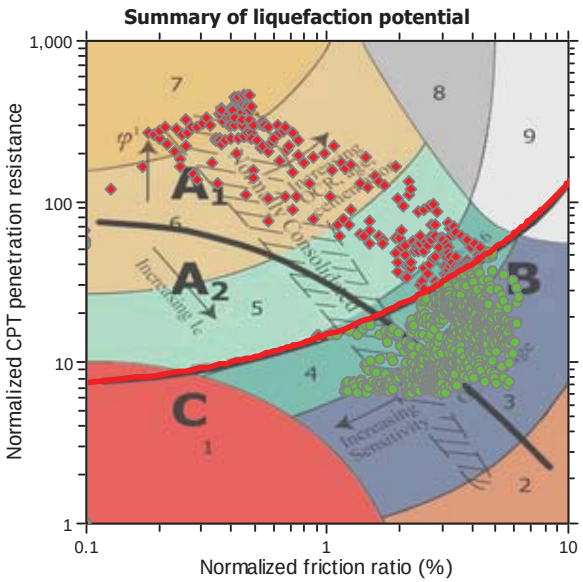
CPT file : 1-SCPT10

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

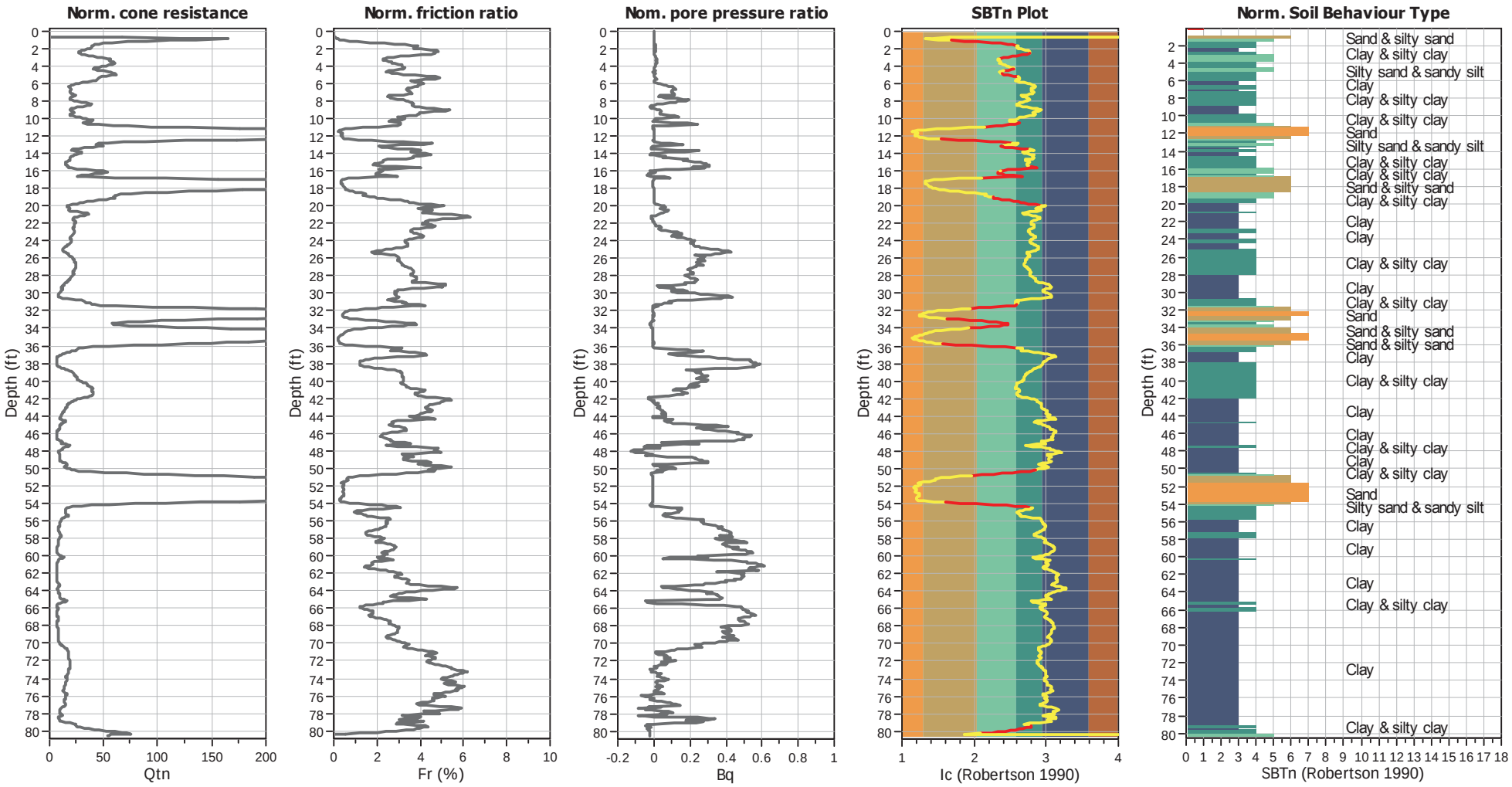






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



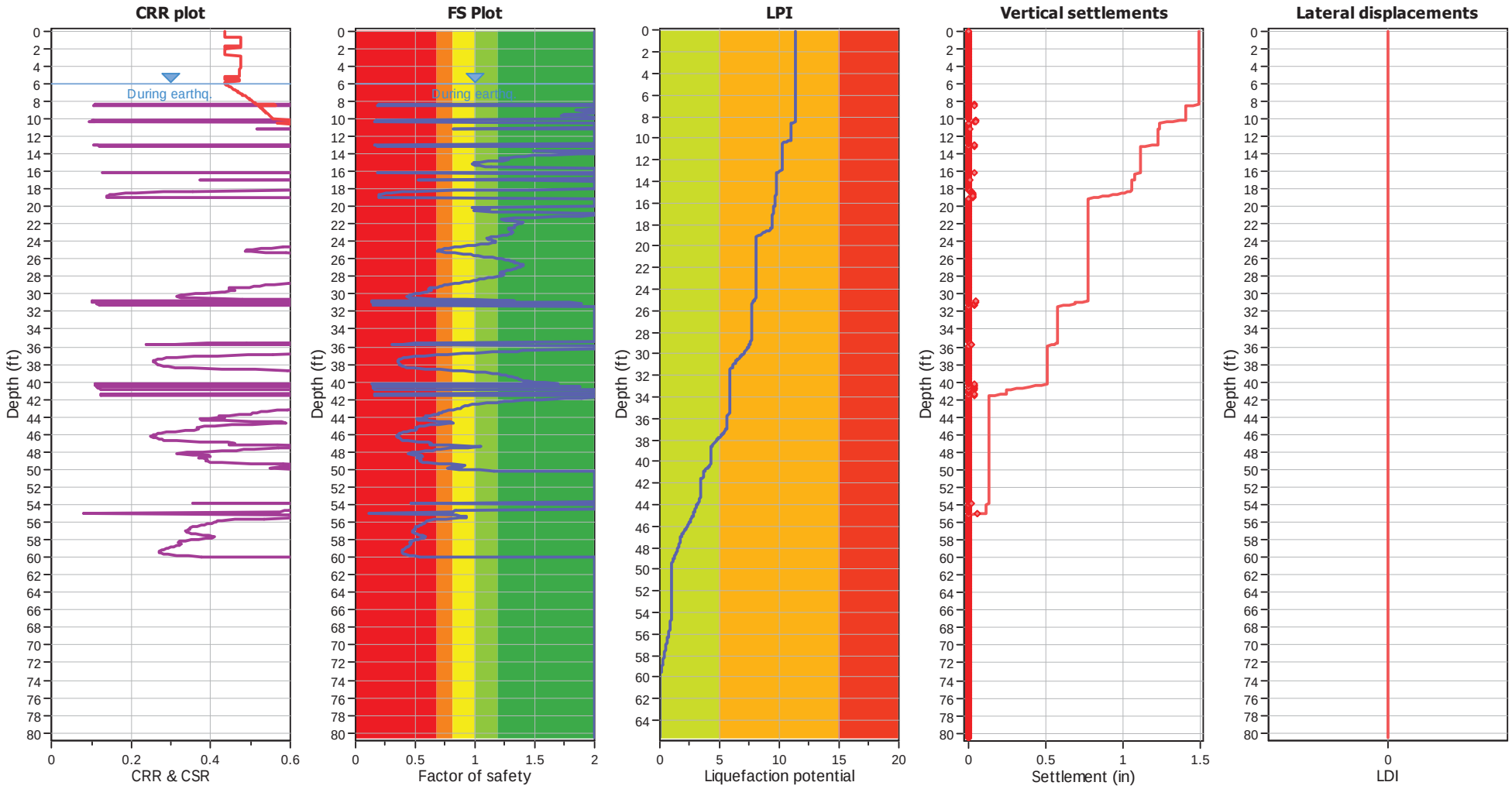
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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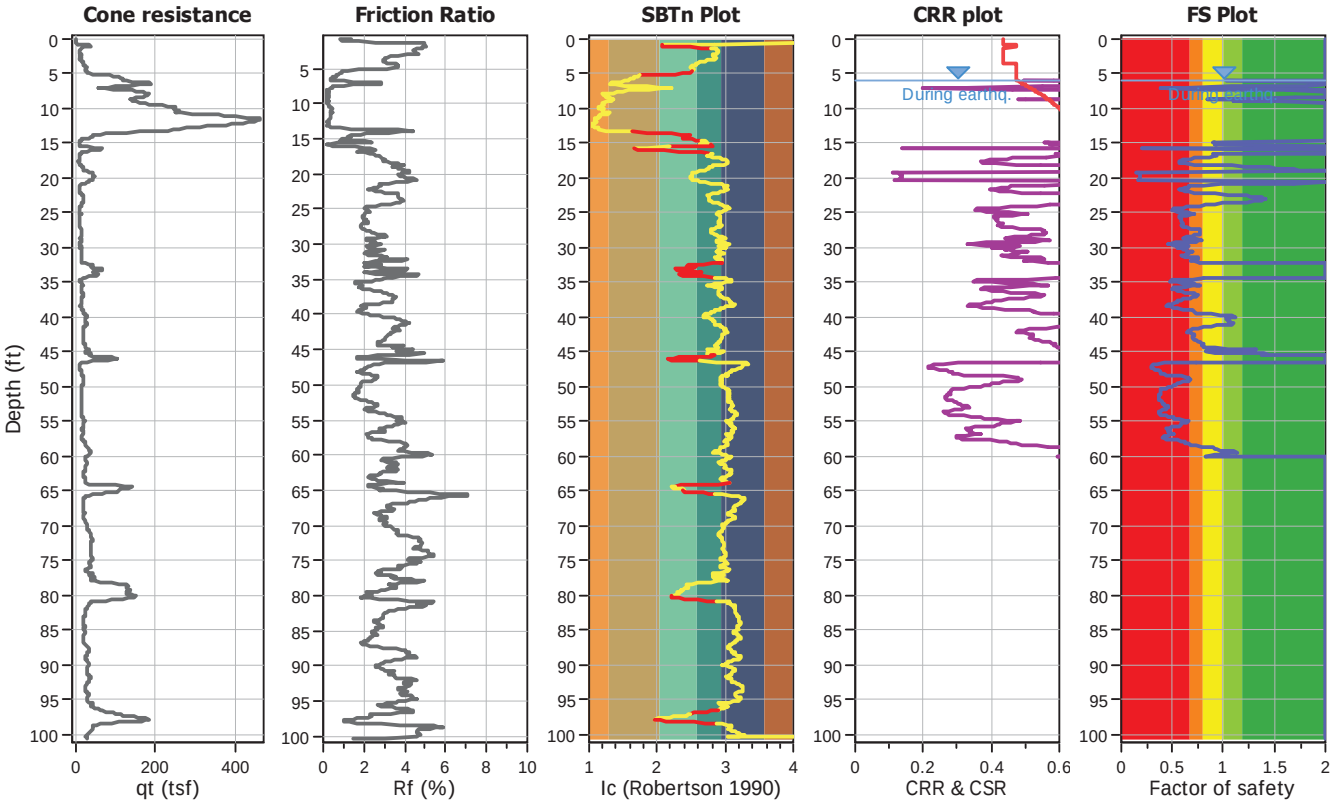
LIQUEFACTION ANALYSIS REPORT

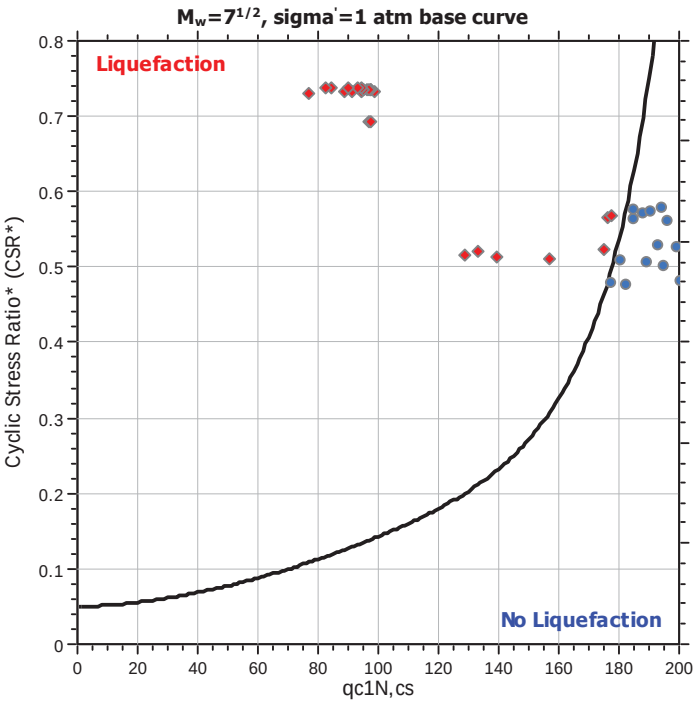
Project title : **Location :**

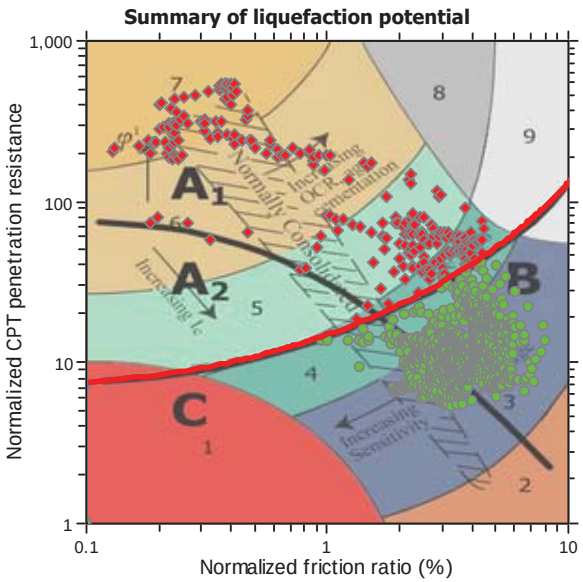
CPT file : 1-CPT11

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method

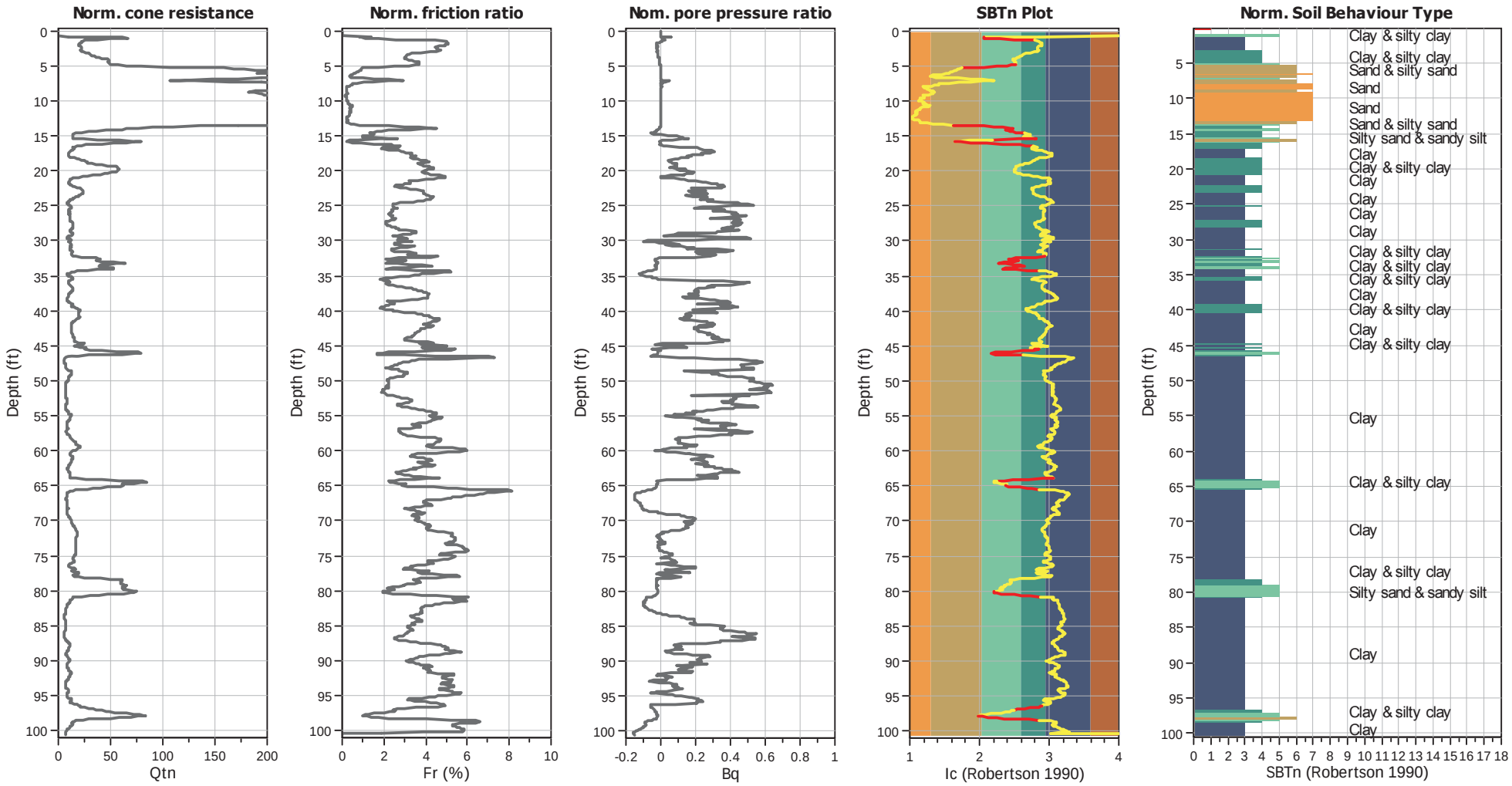






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



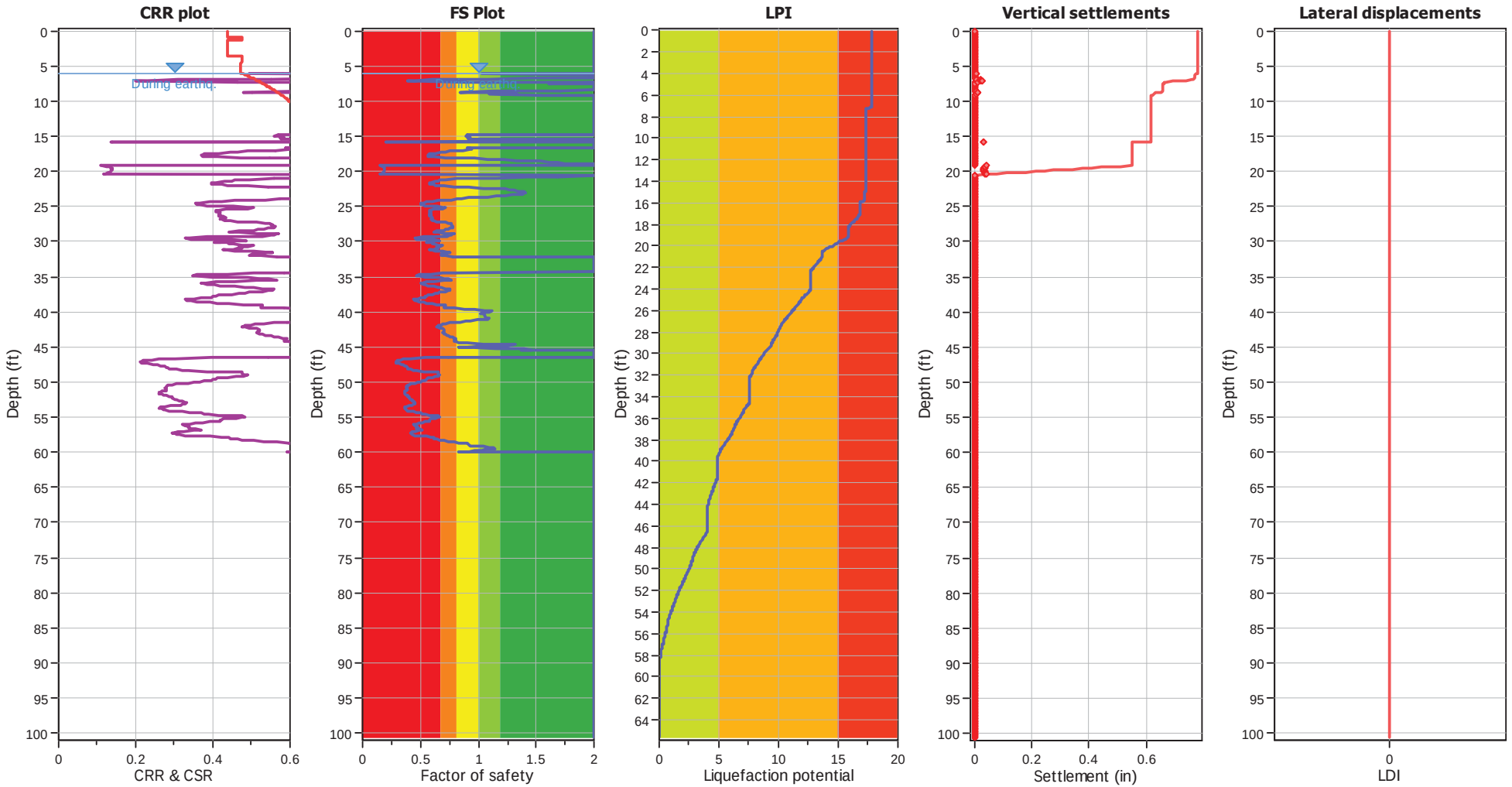
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

ENGEO
Expect Excellence

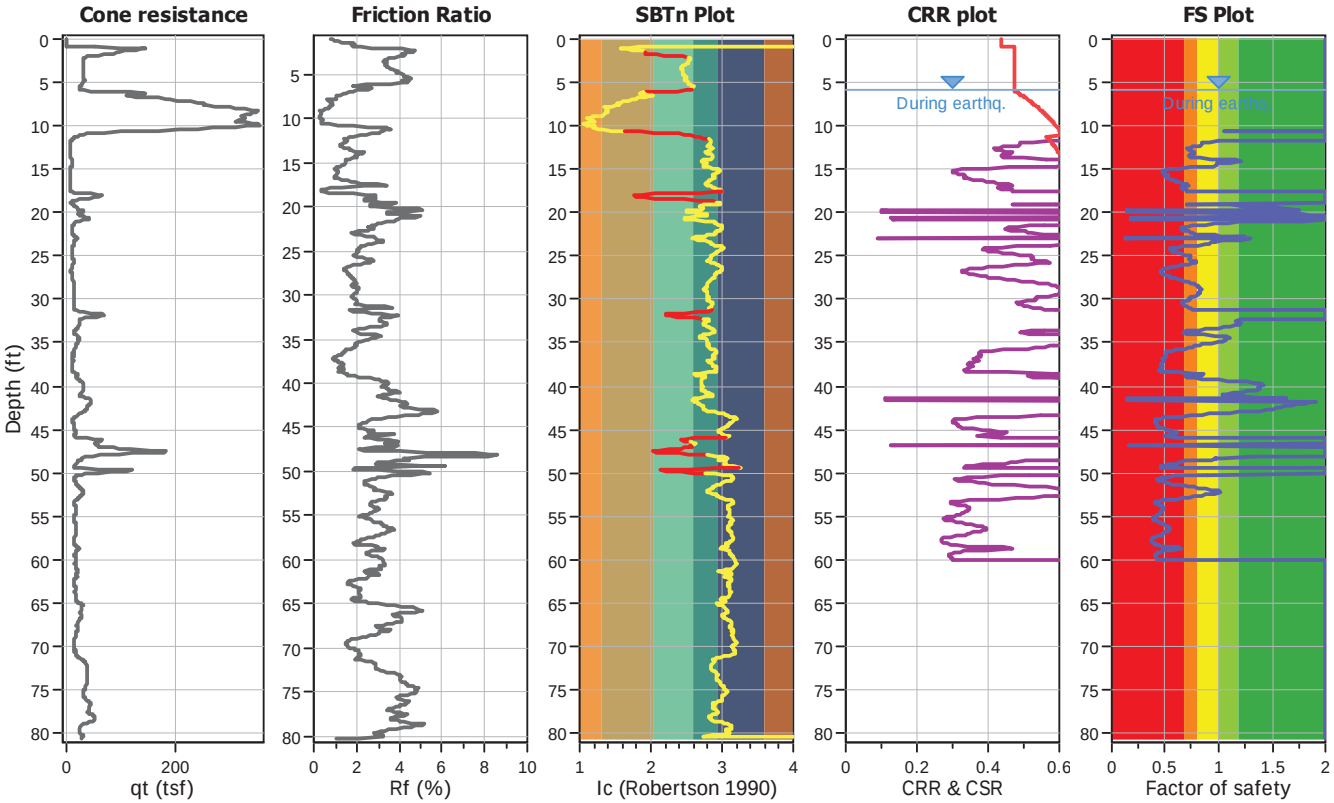
LIQUEFACTION ANALYSIS REPORT

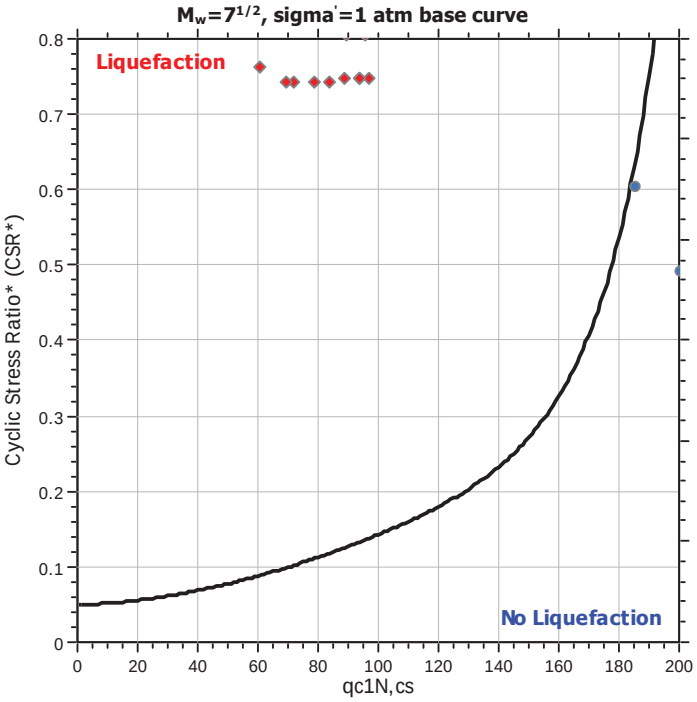
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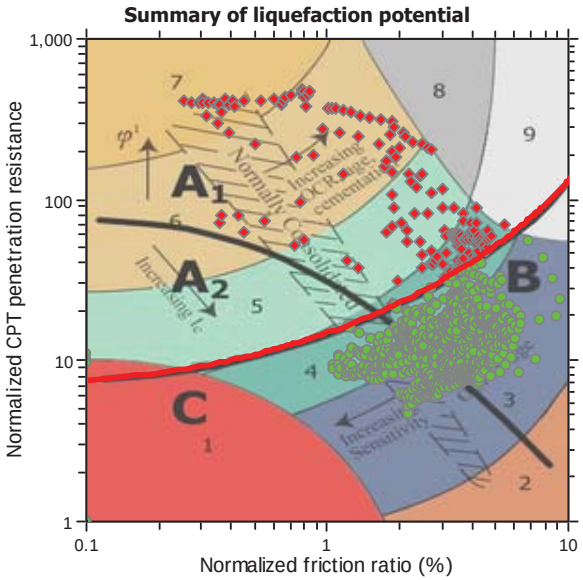
CPT file : 1-CPT12

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

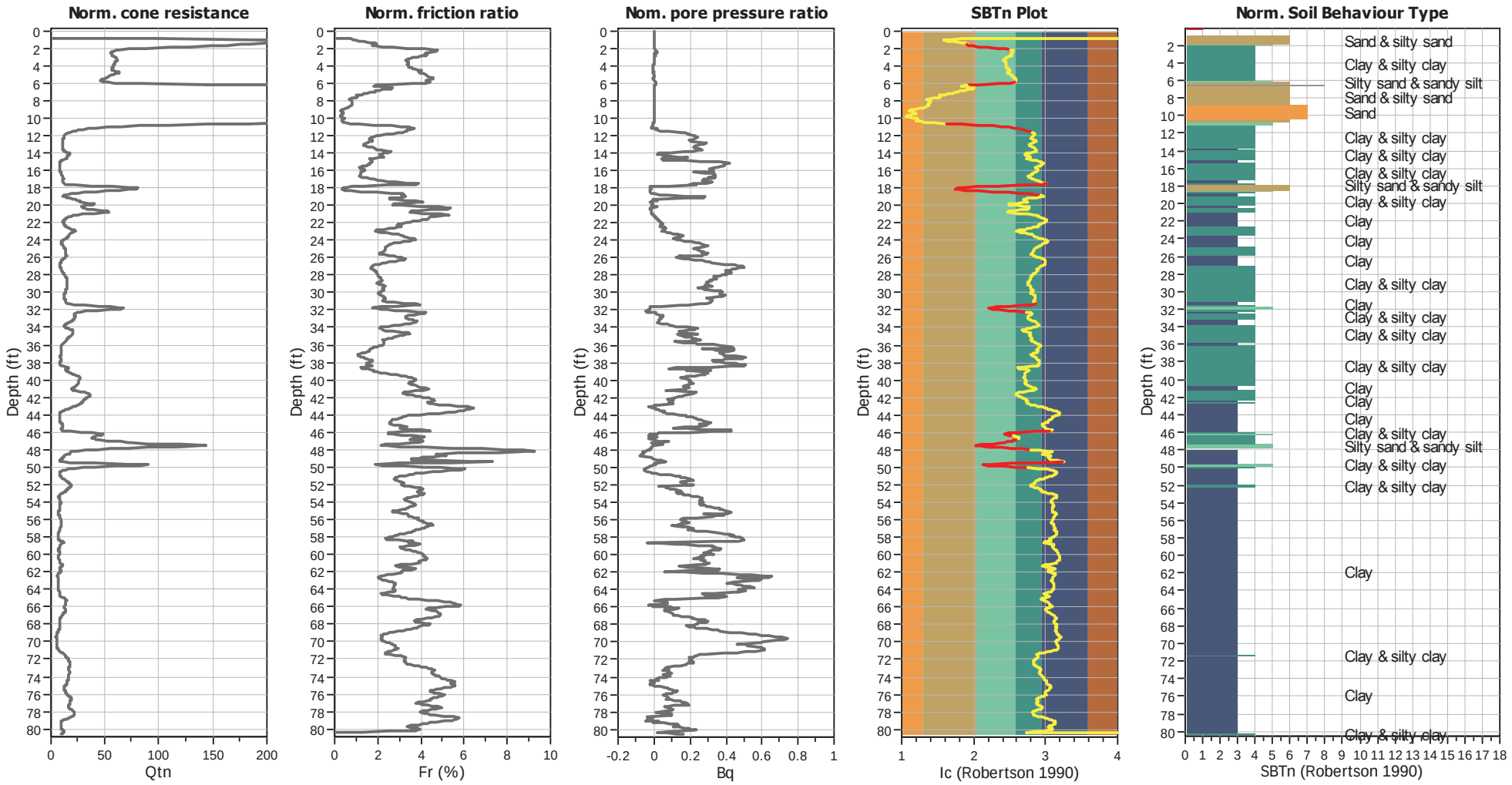






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



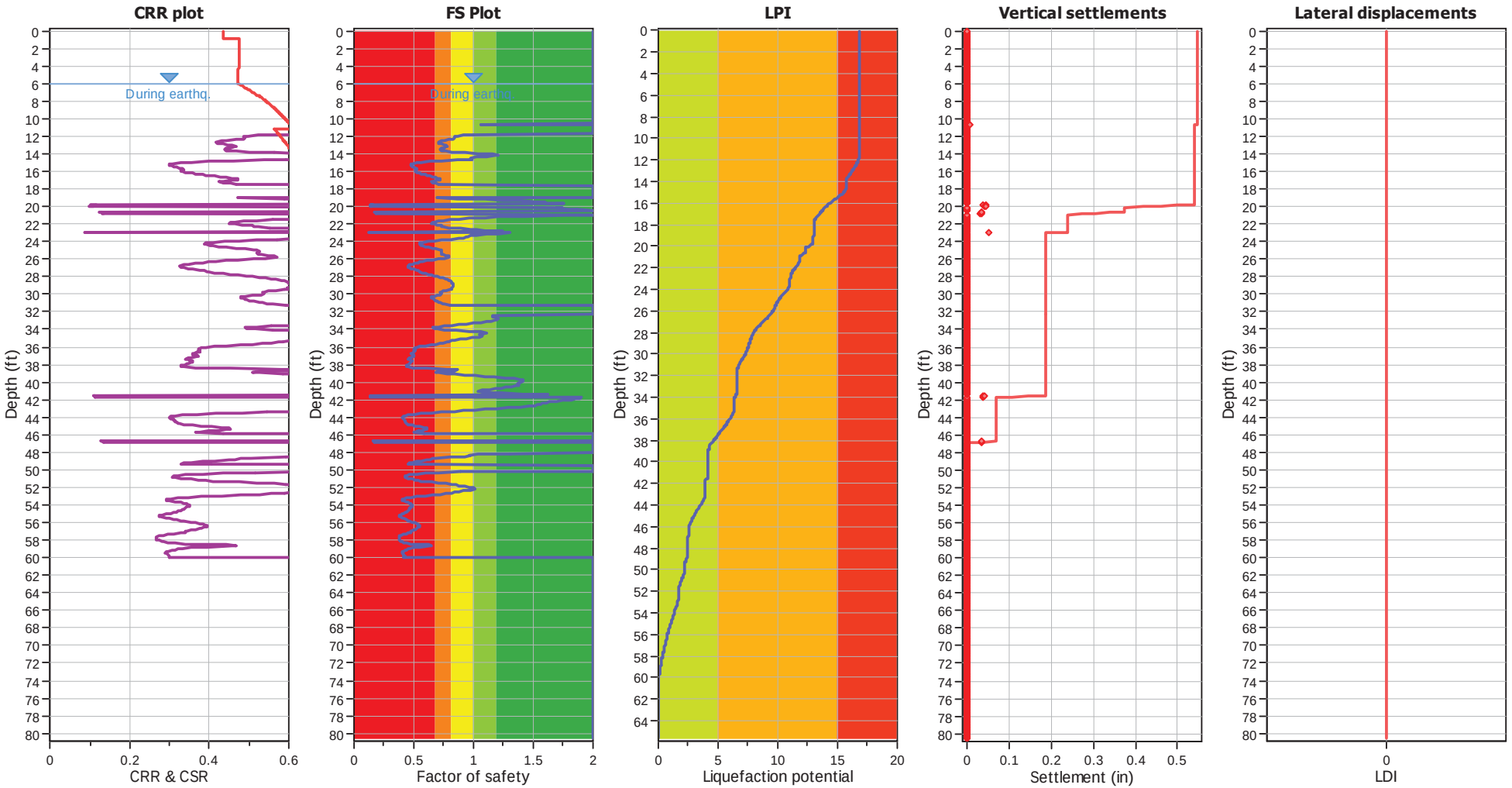
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

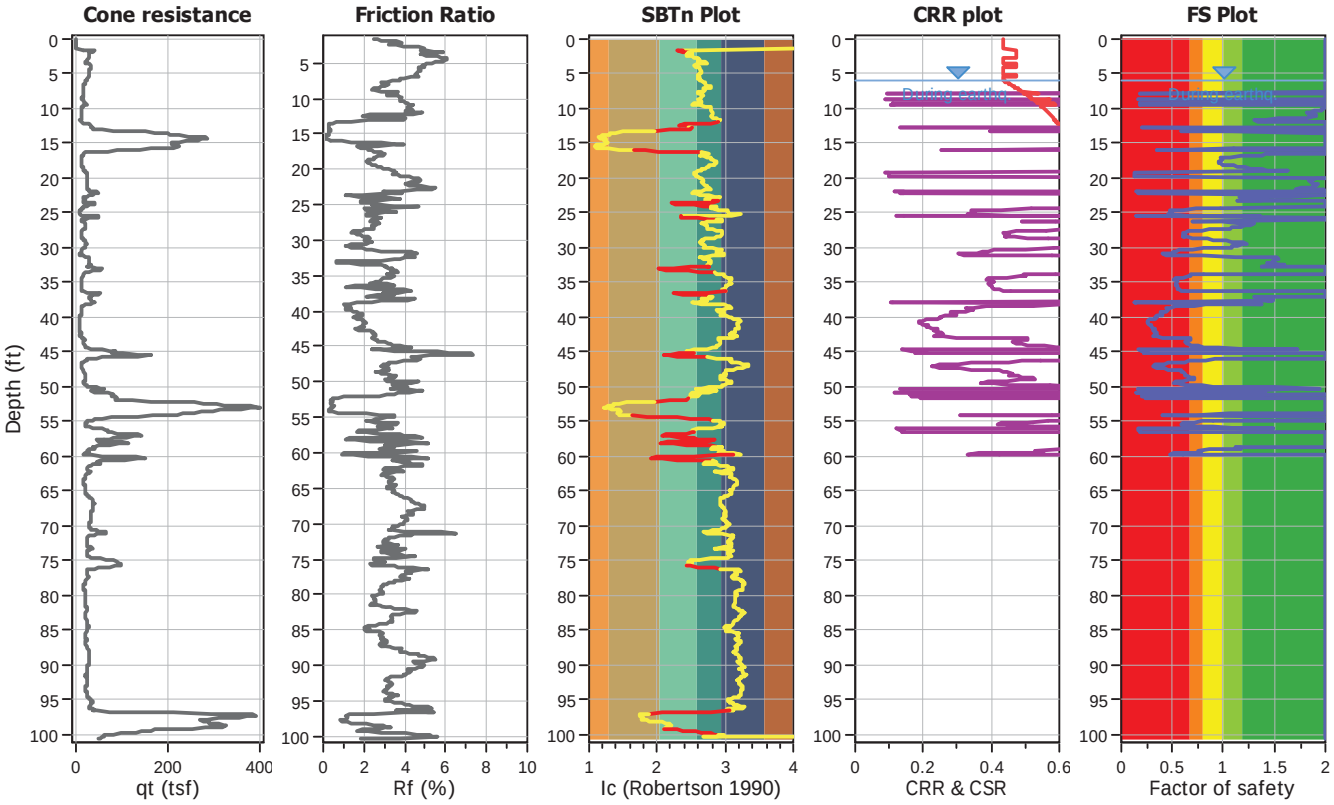
LIQUEFACTION ANALYSIS REPORT

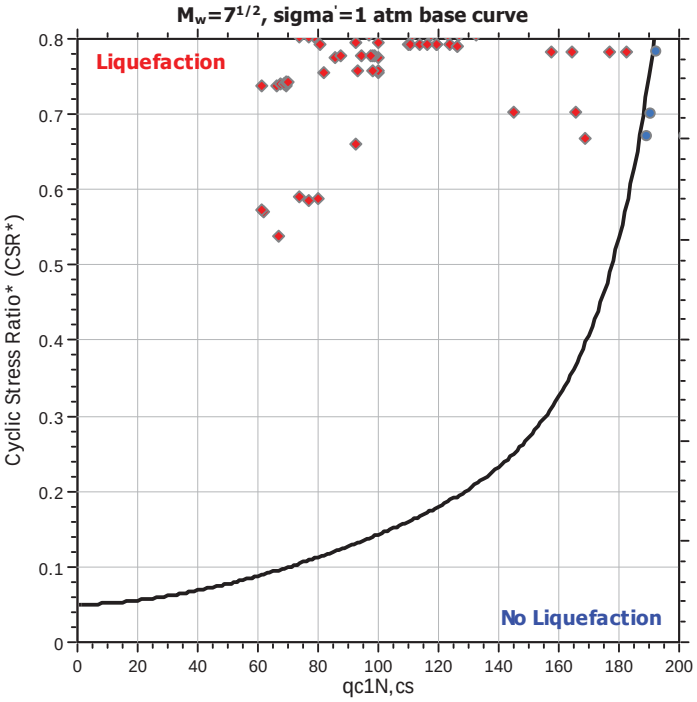
Project title : **Location :**

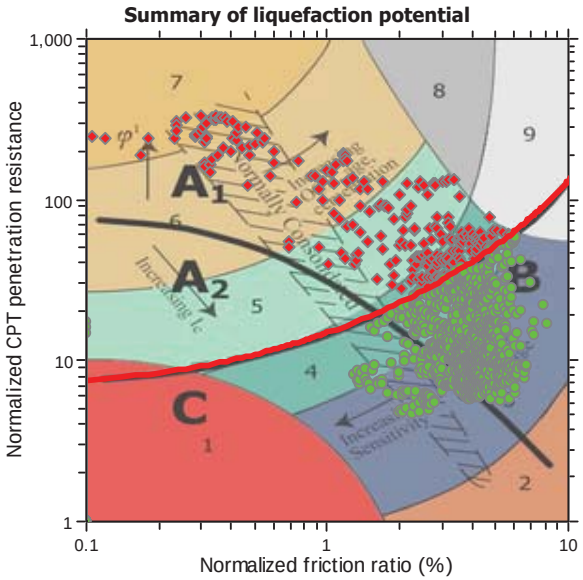
CPT file : 1-CPT13

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

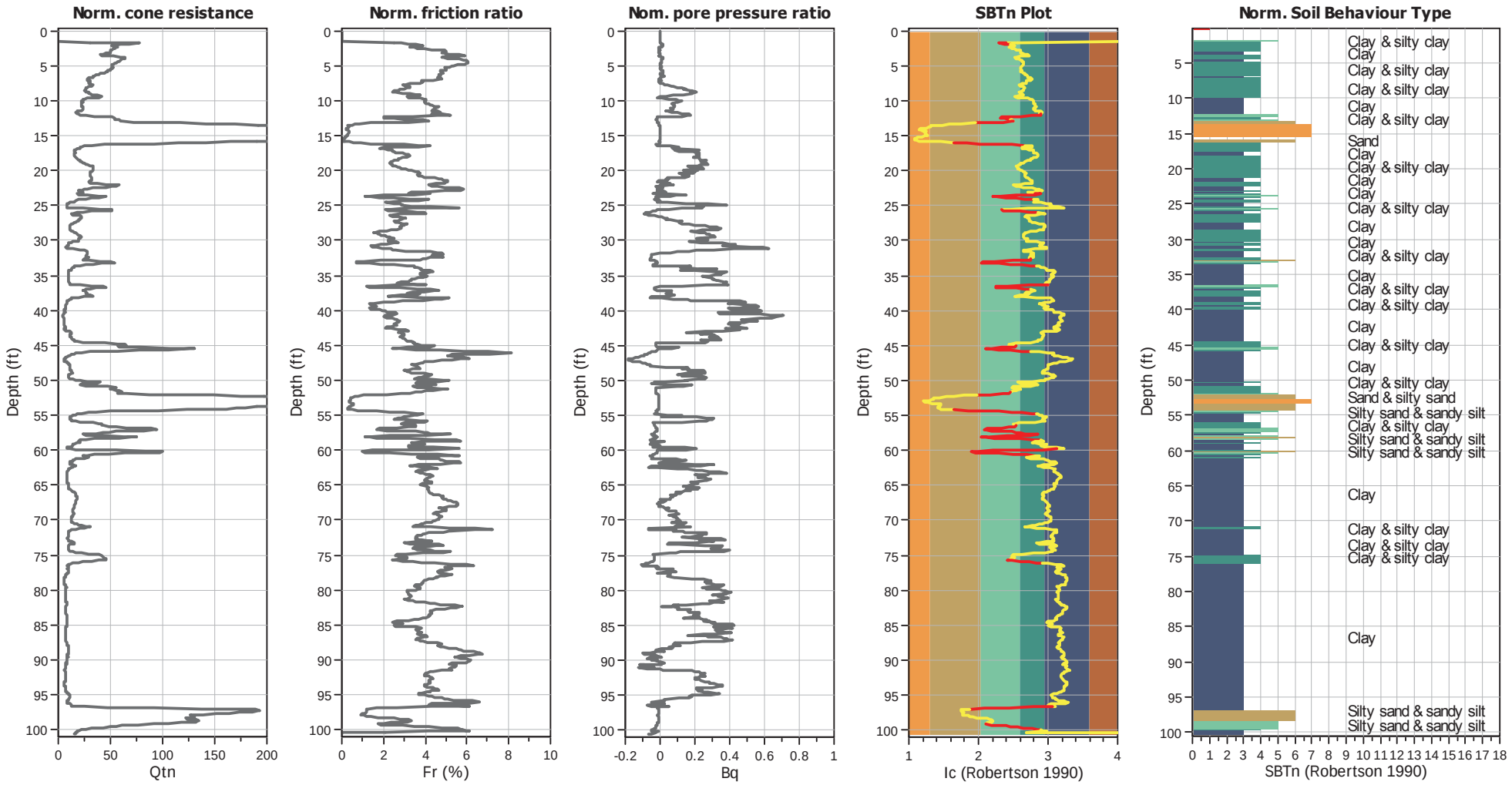






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



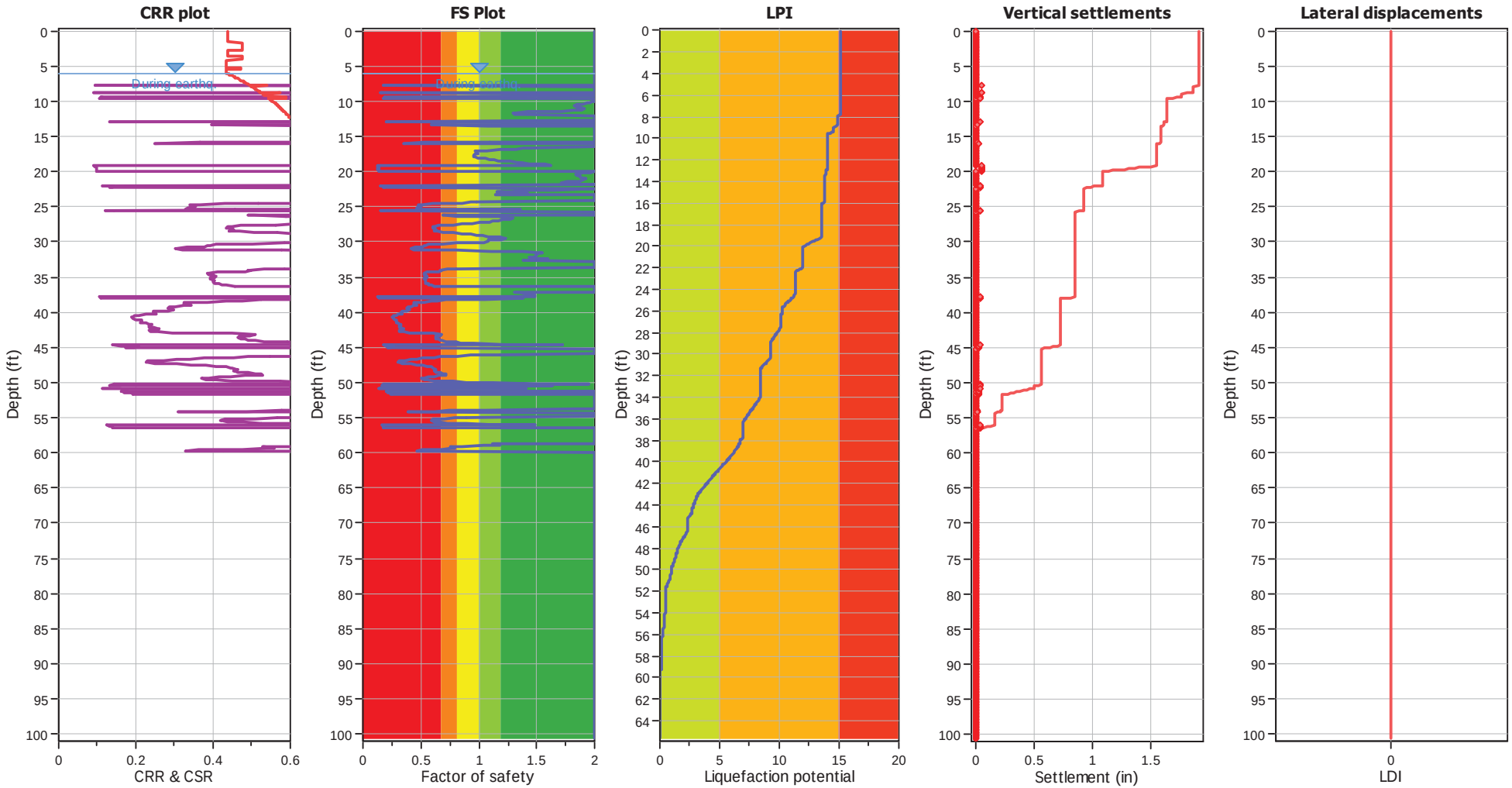
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

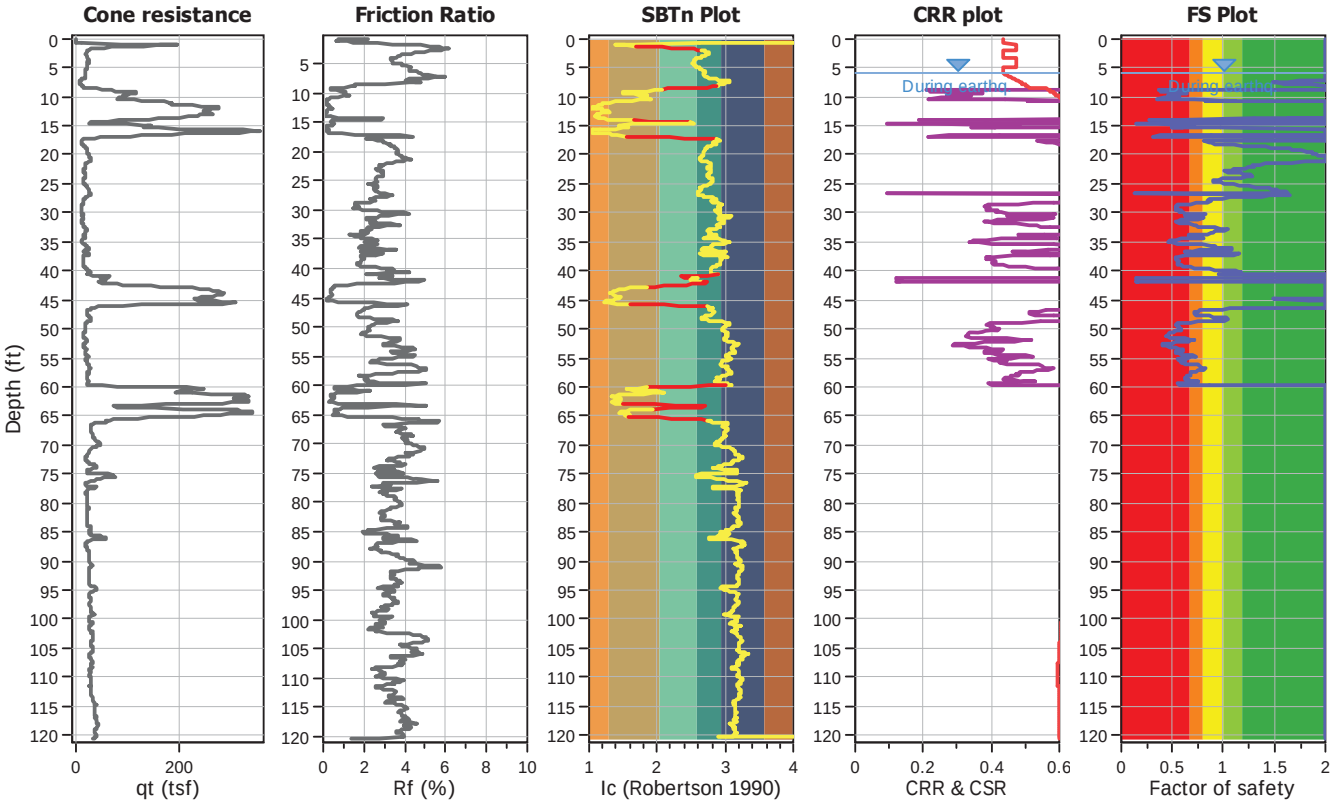
LIQUEFACTION ANALYSIS REPORT

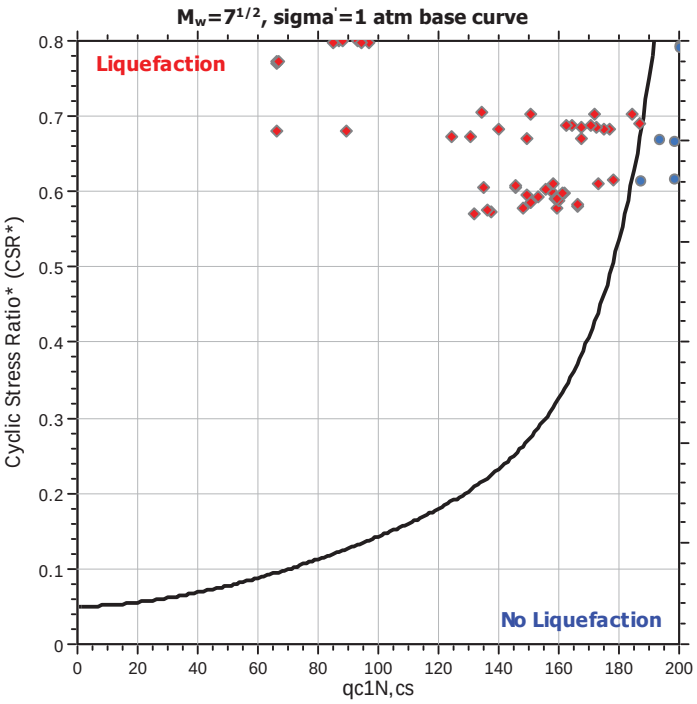
Project title : **Location :**

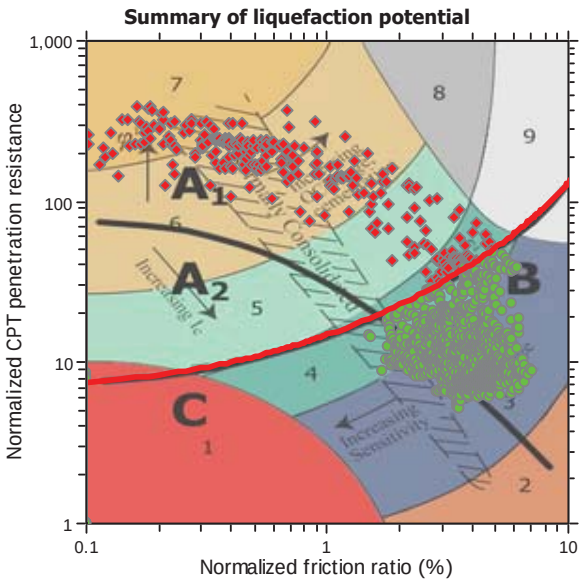
CPT file : 1-CPT14

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

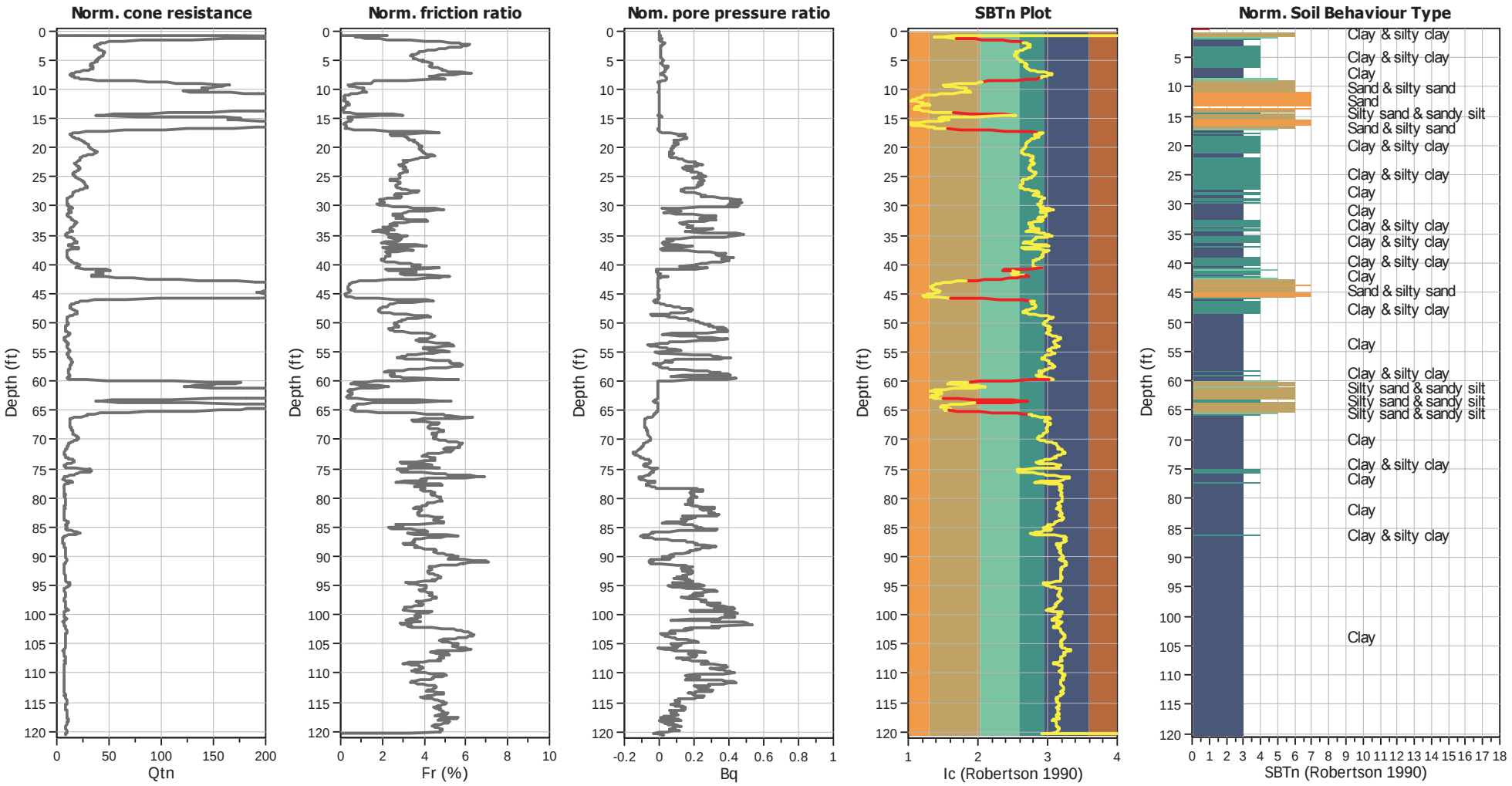






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



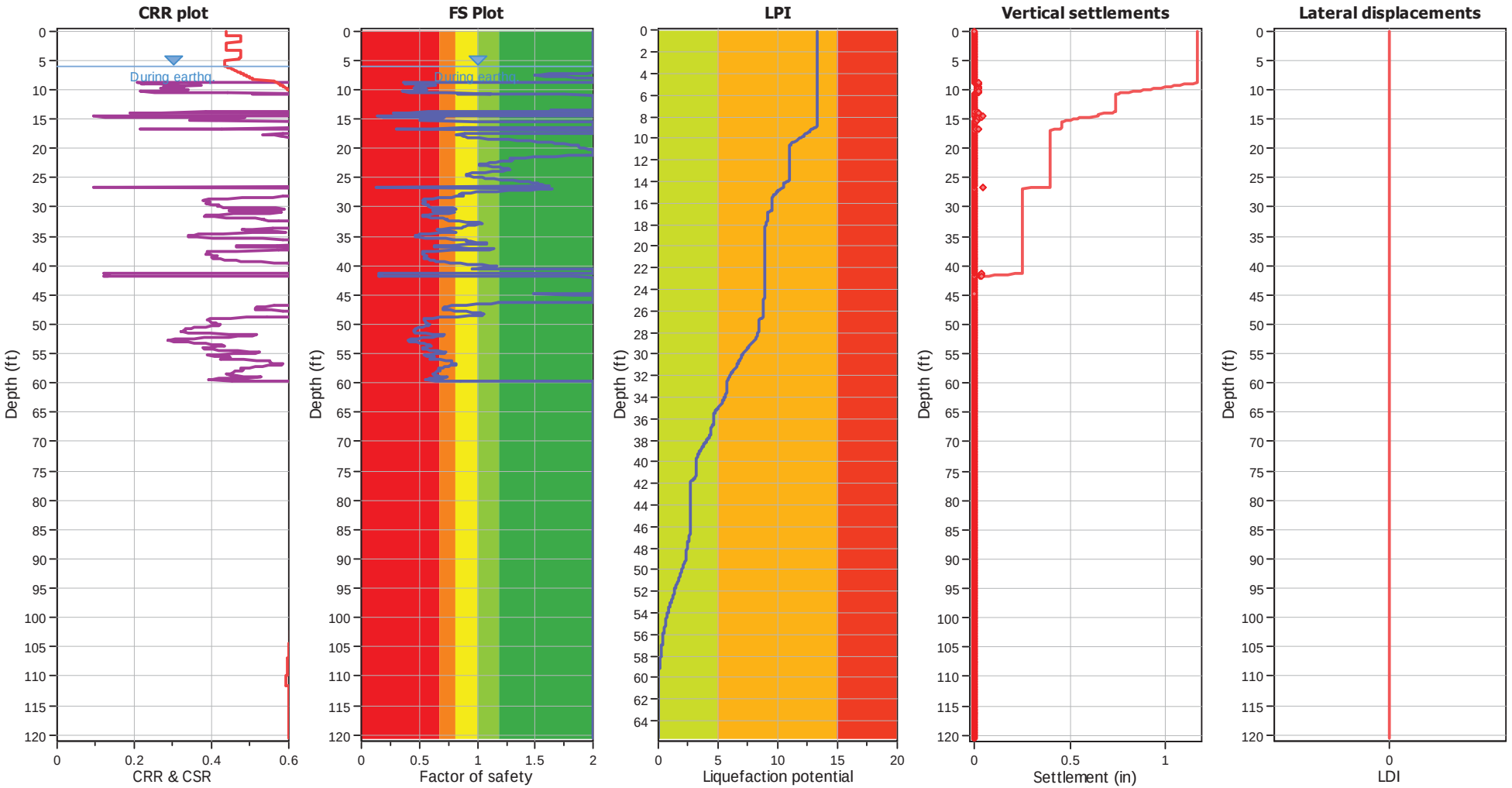
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

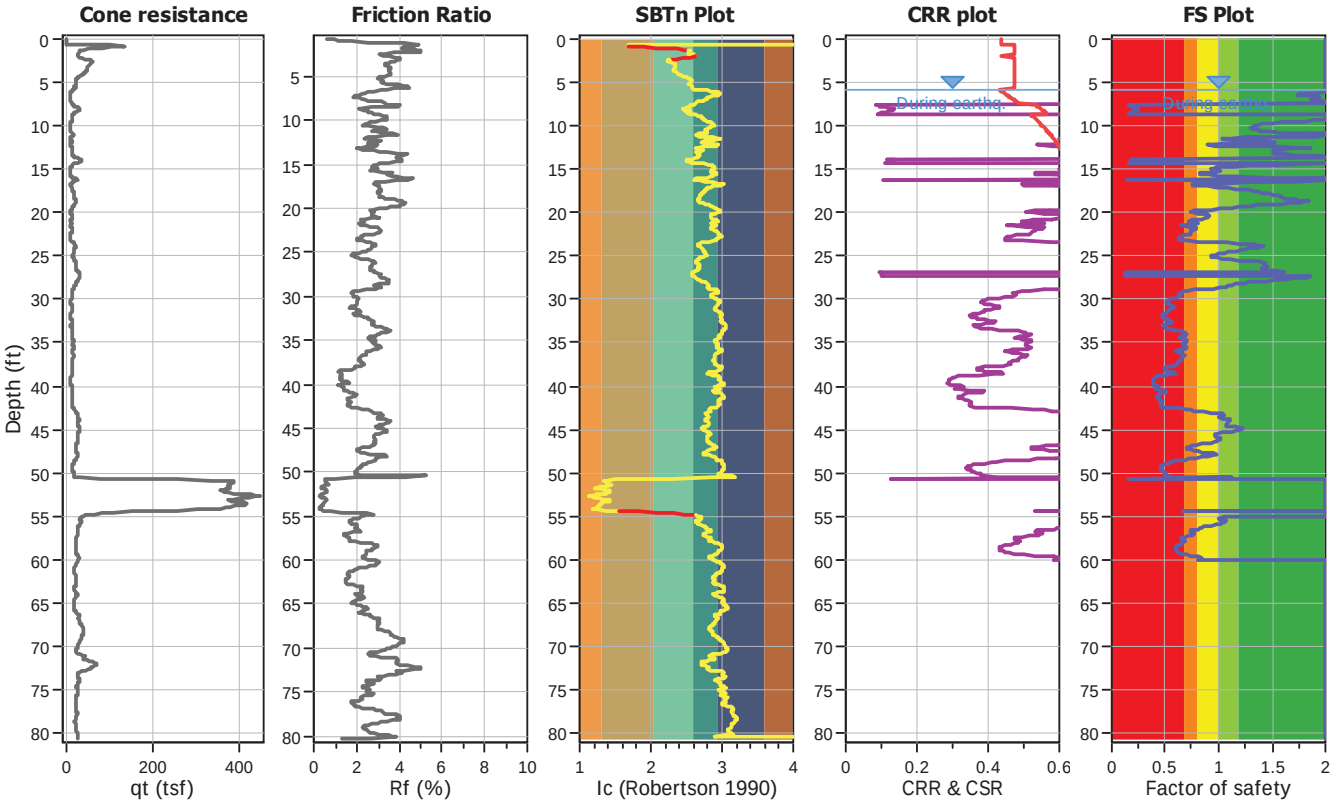
LIQUEFACTION ANALYSIS REPORT

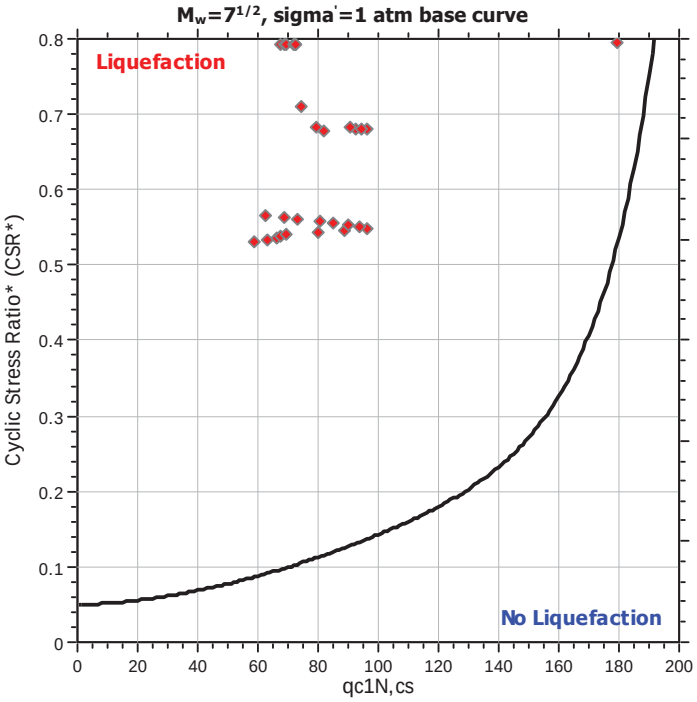
Project title : **Location :**

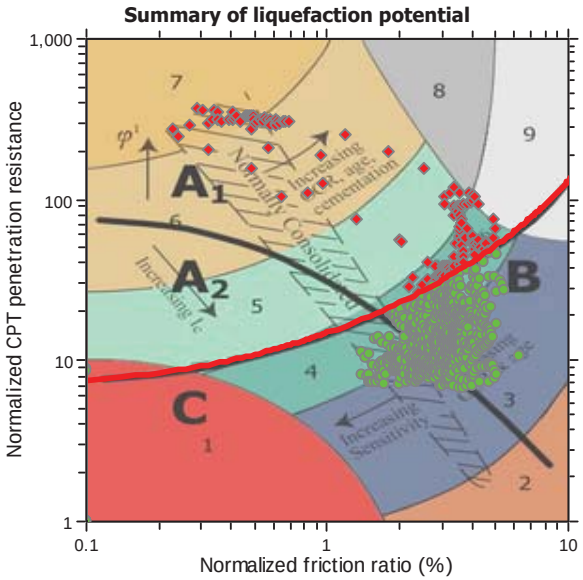
CPT file : 1-CPT15

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

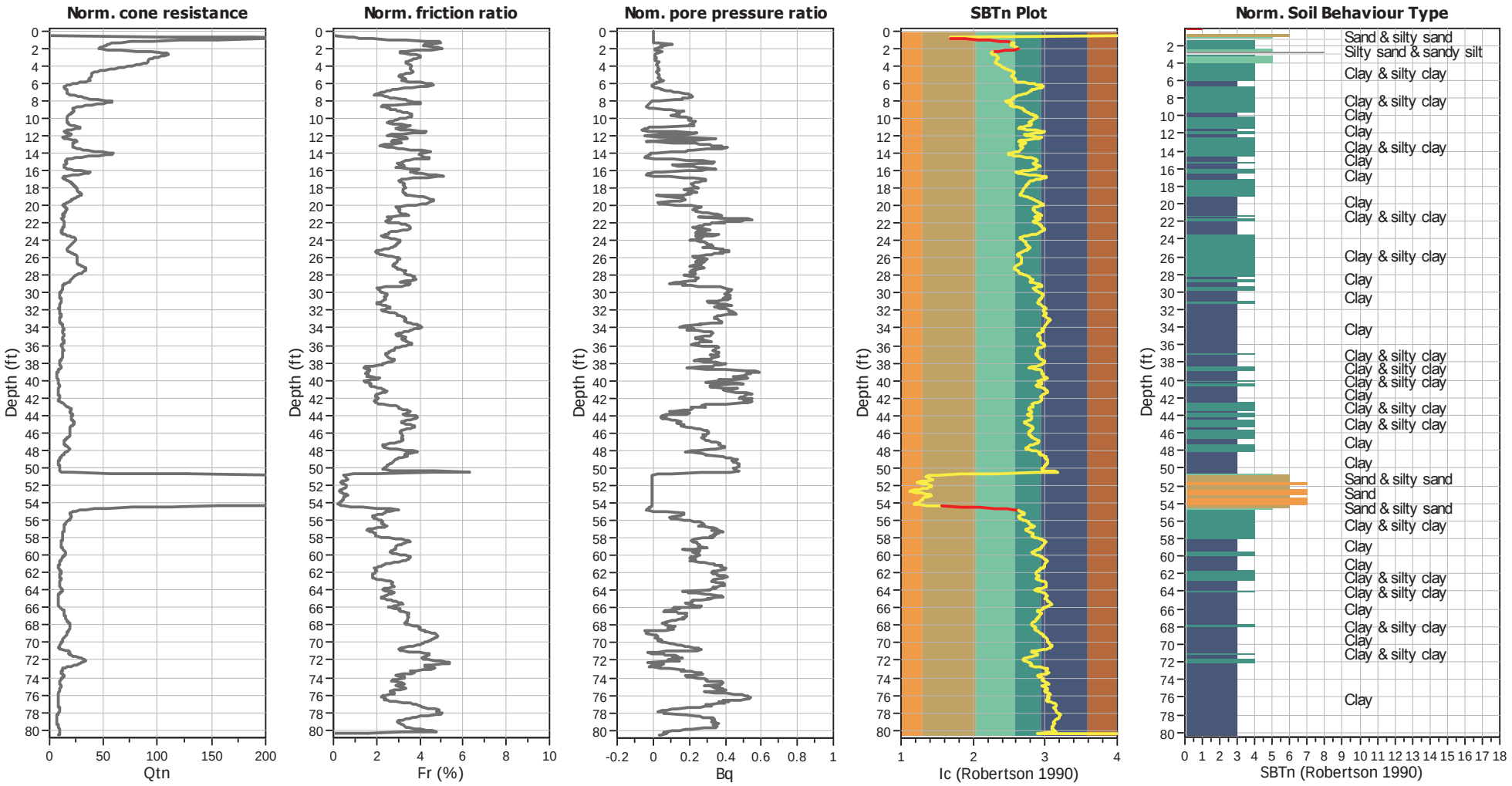






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



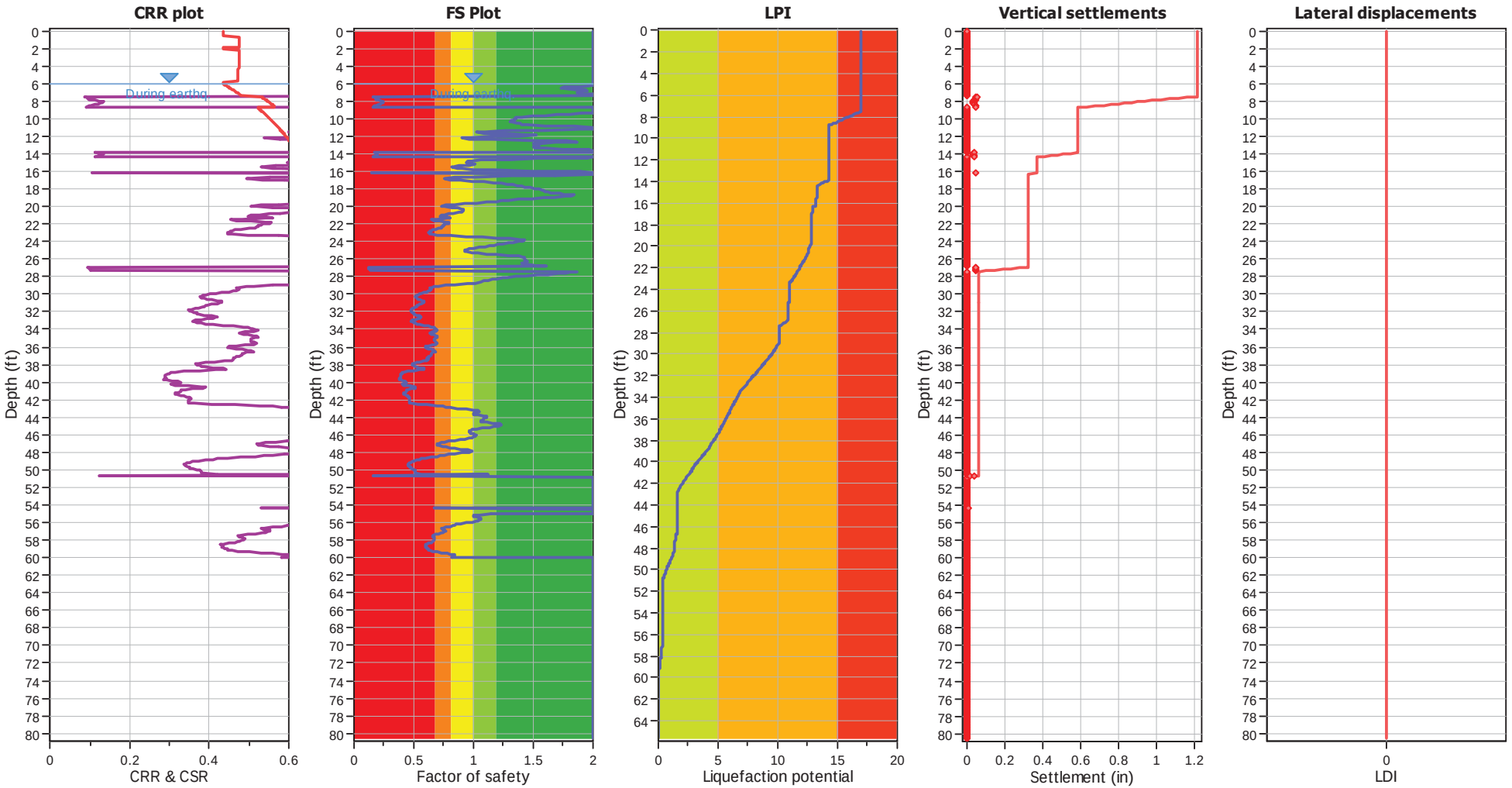
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

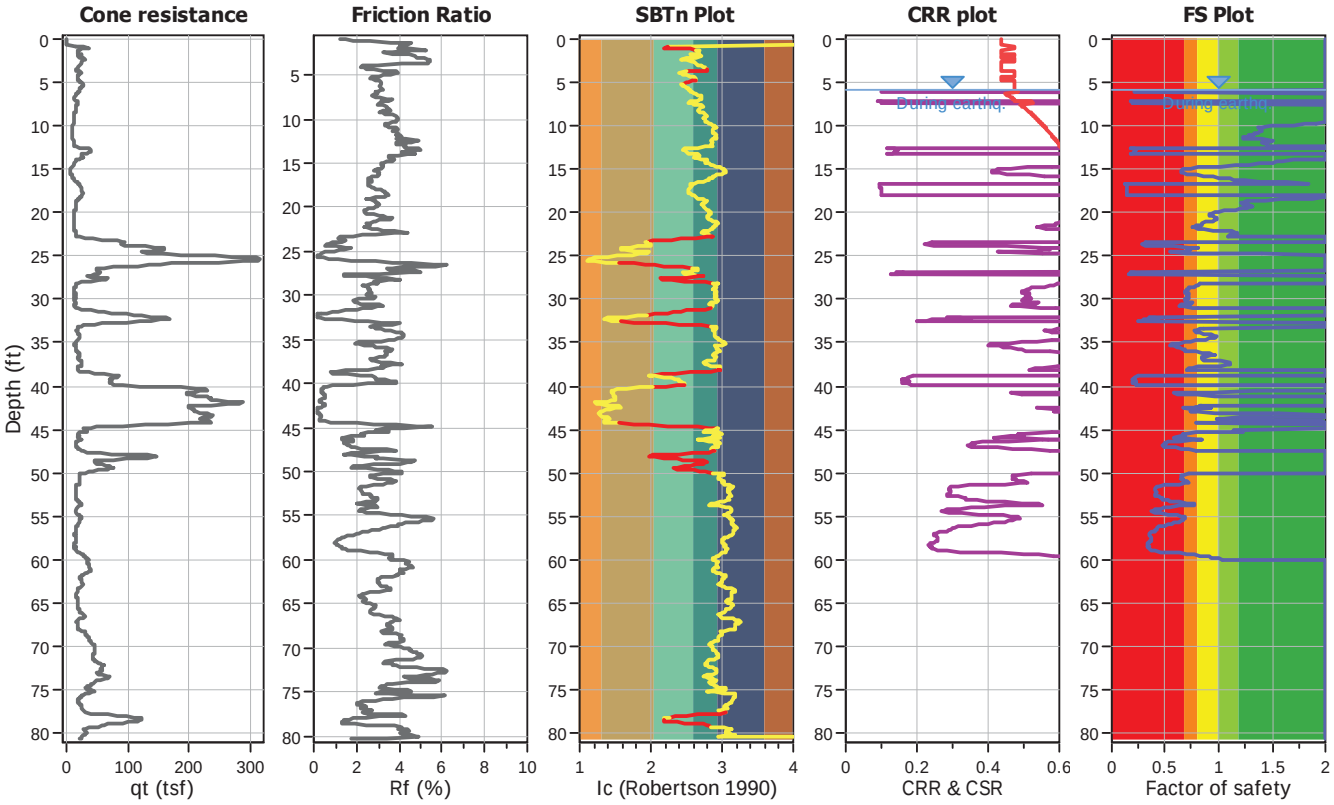
LIQUEFACTION ANALYSIS REPORT

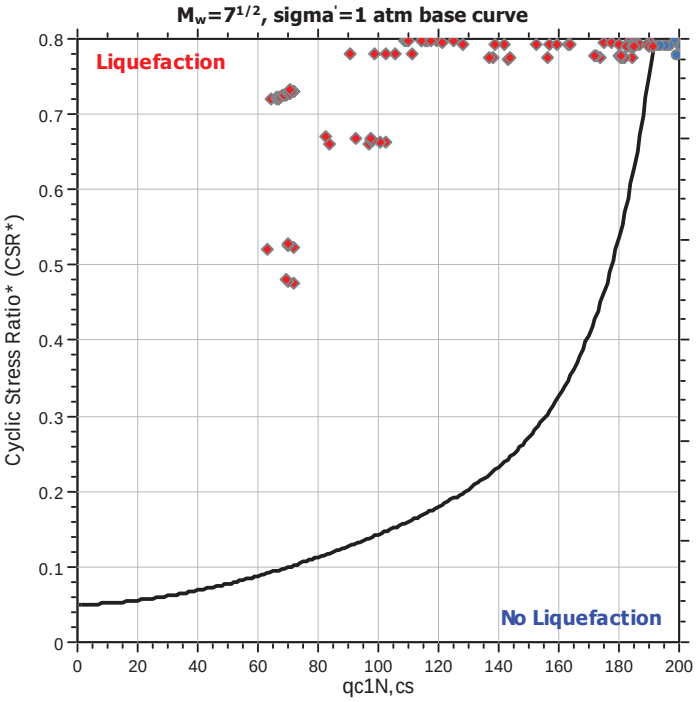
Project title : **Location :**

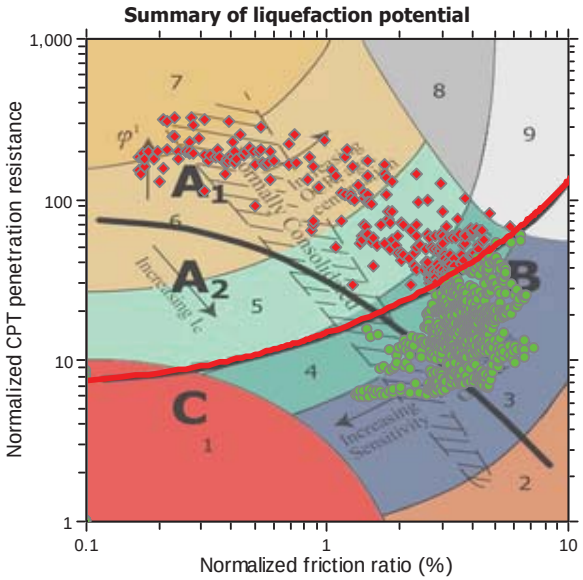
CPT file : 1-CPT16

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

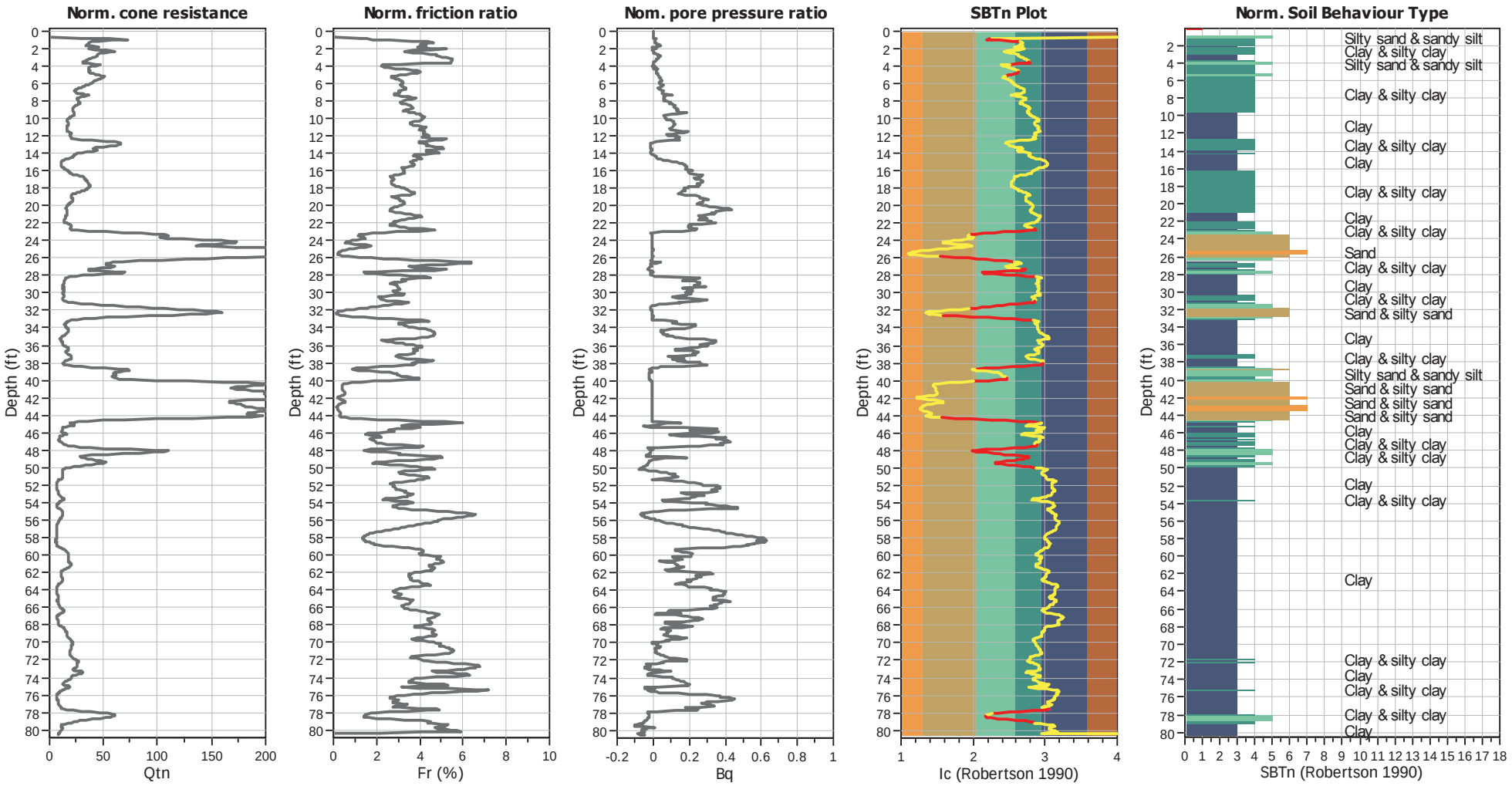






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



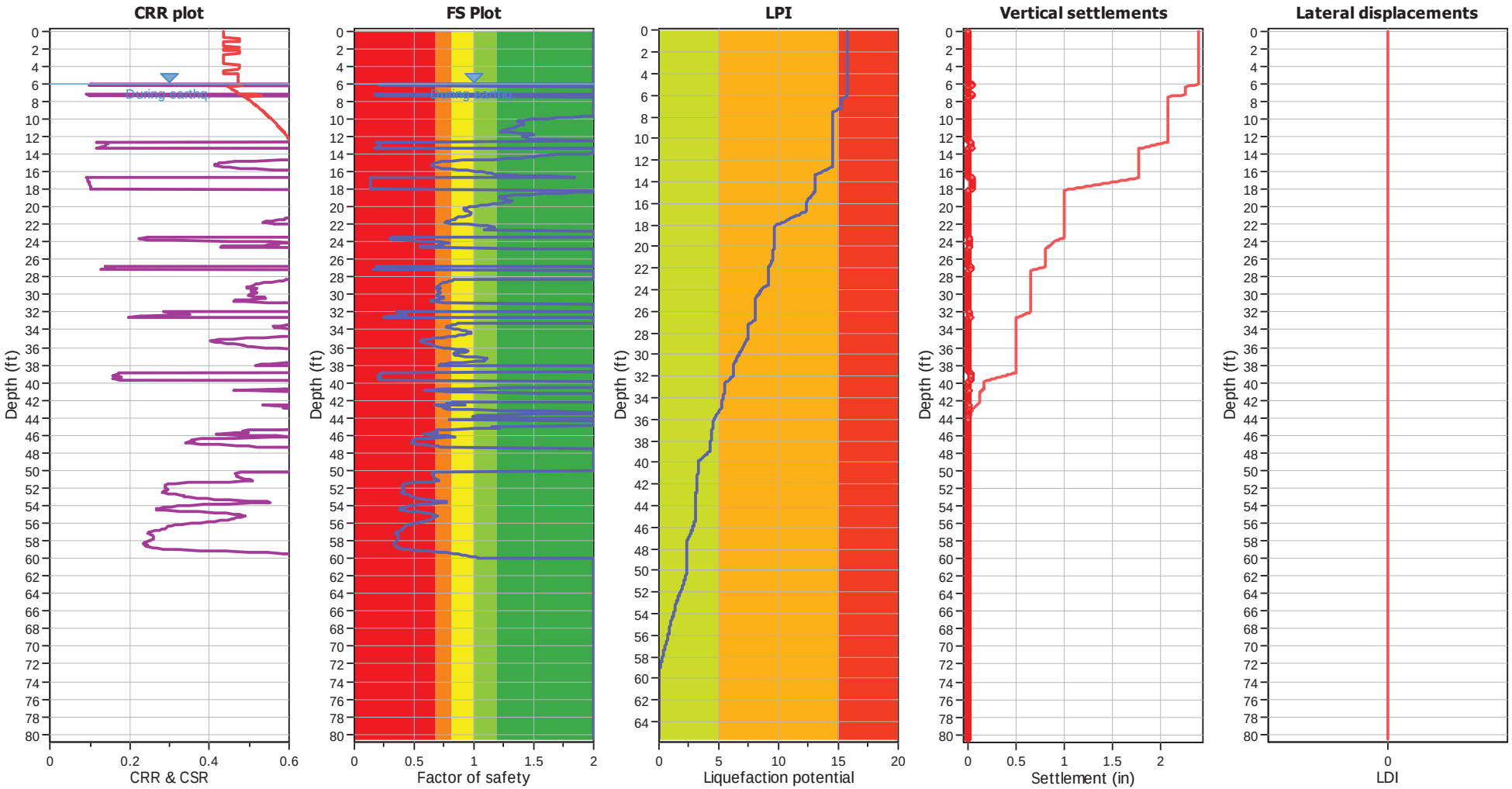
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

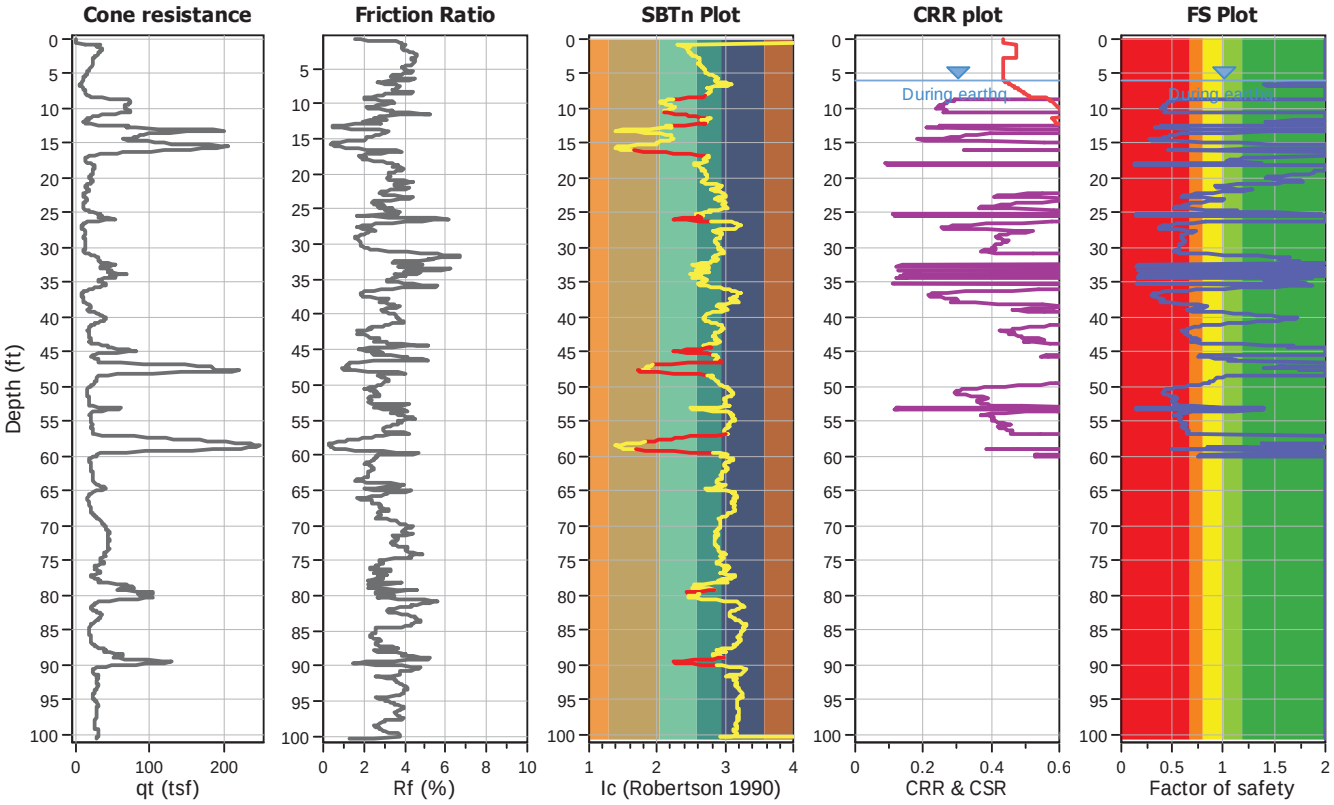
LIQUEFACTION ANALYSIS REPORT

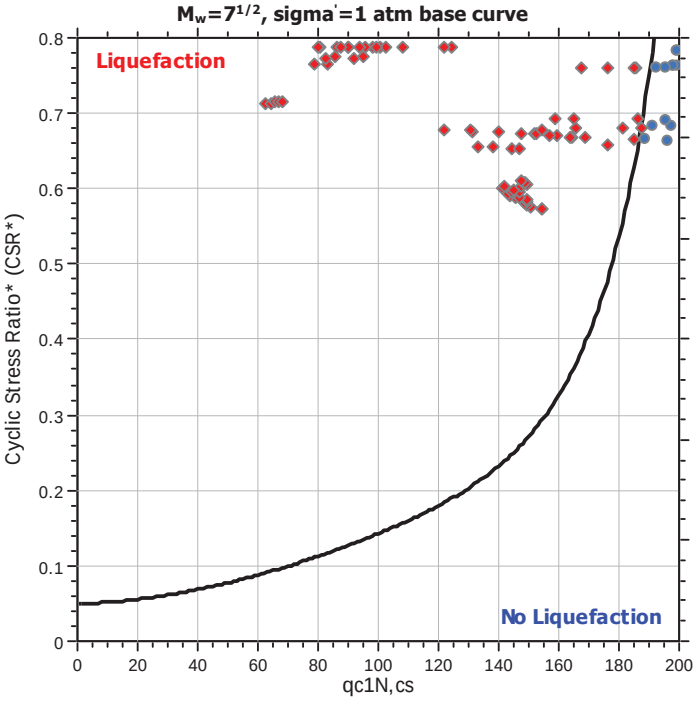
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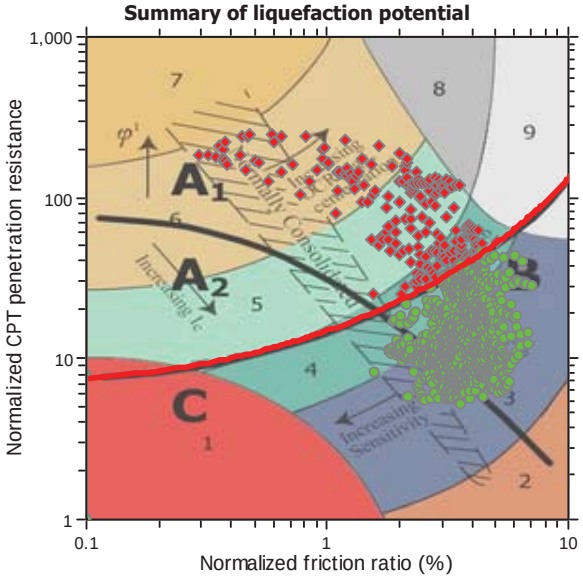
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Input parameters and analysis data

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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

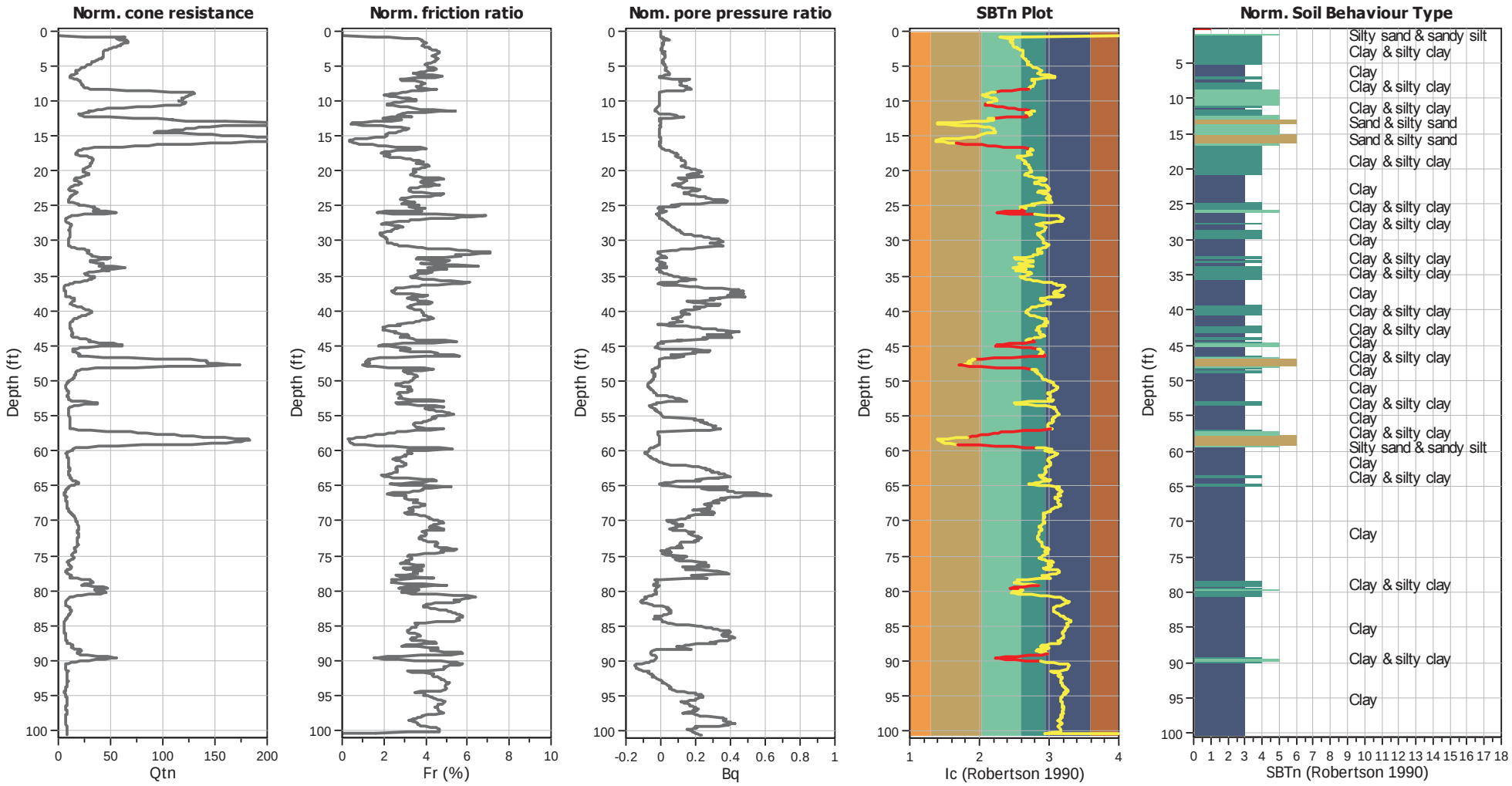






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



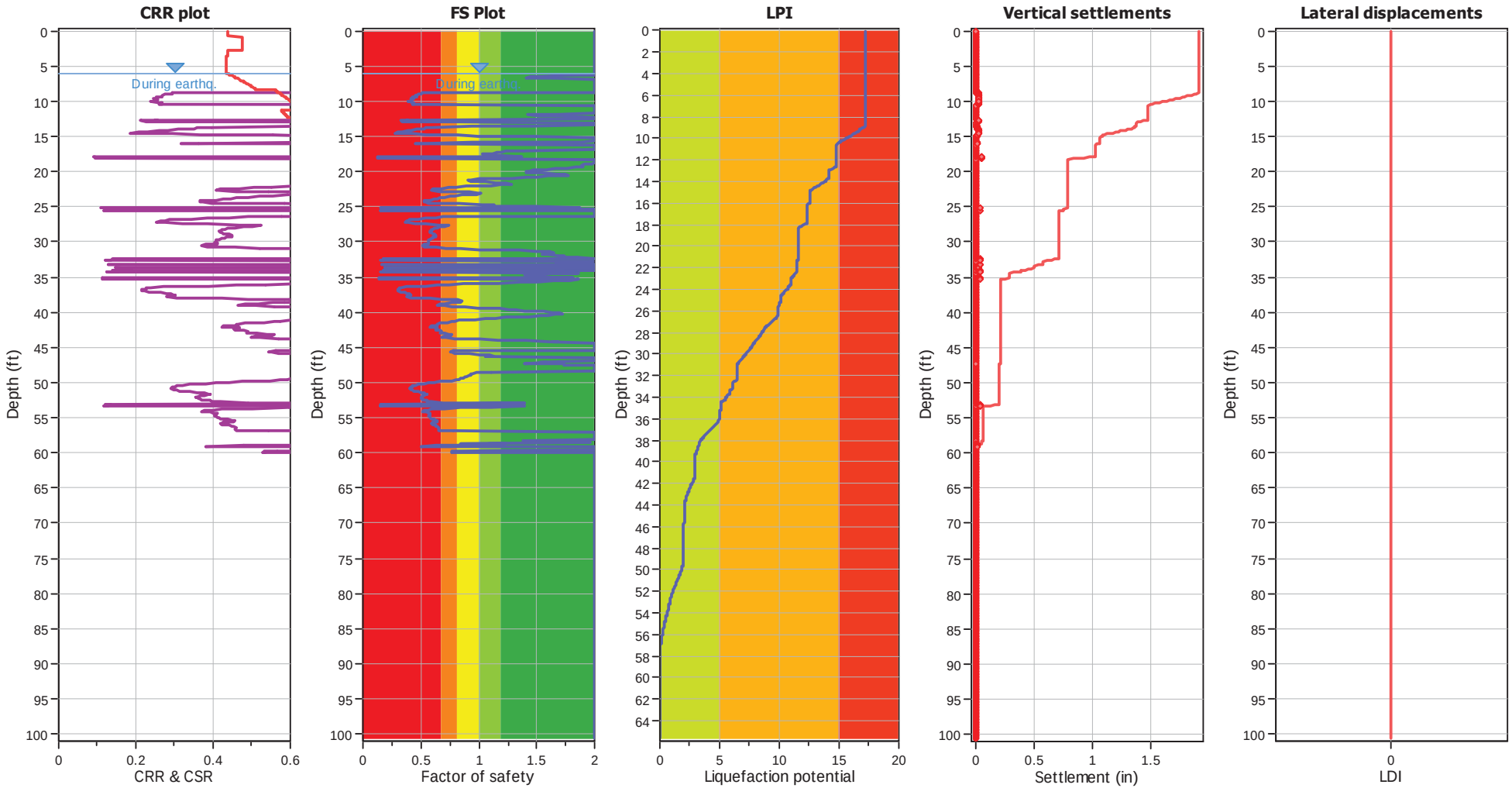
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Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

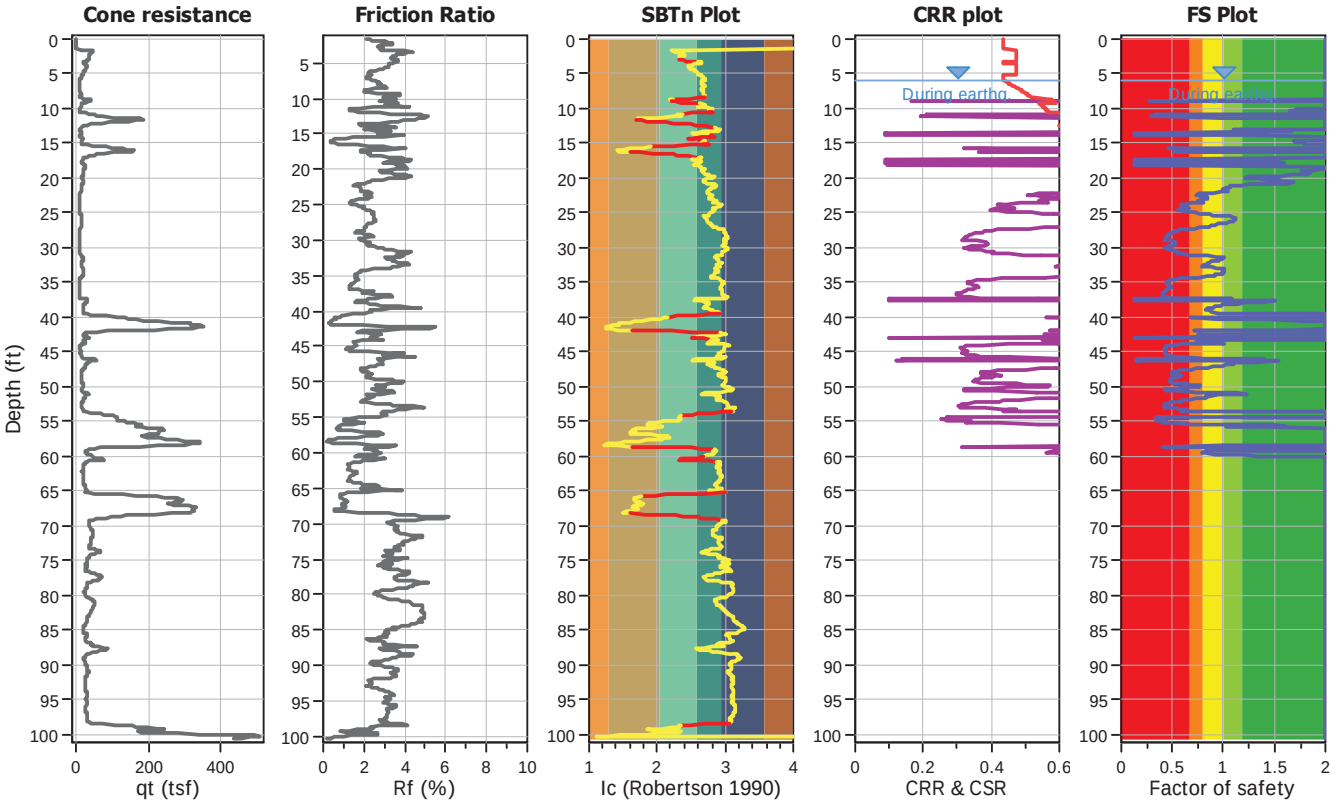
LIQUEFACTION ANALYSIS REPORT

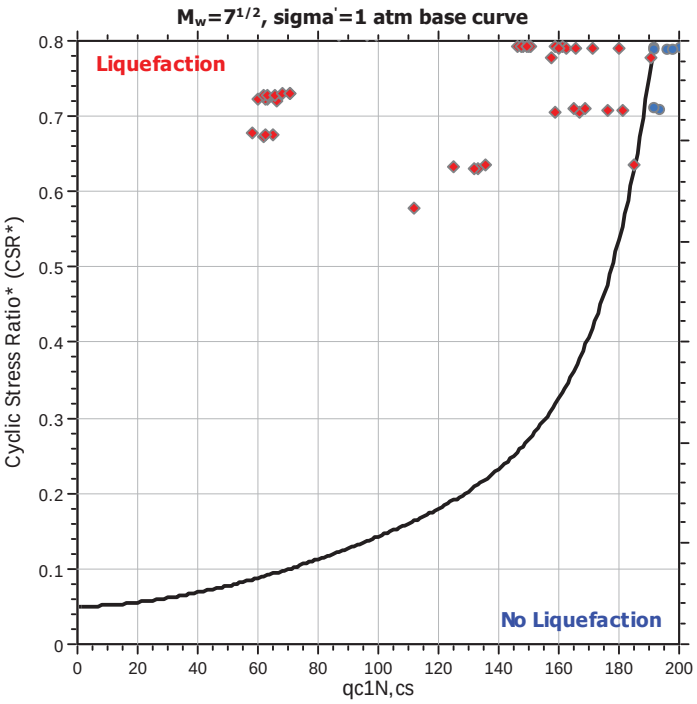
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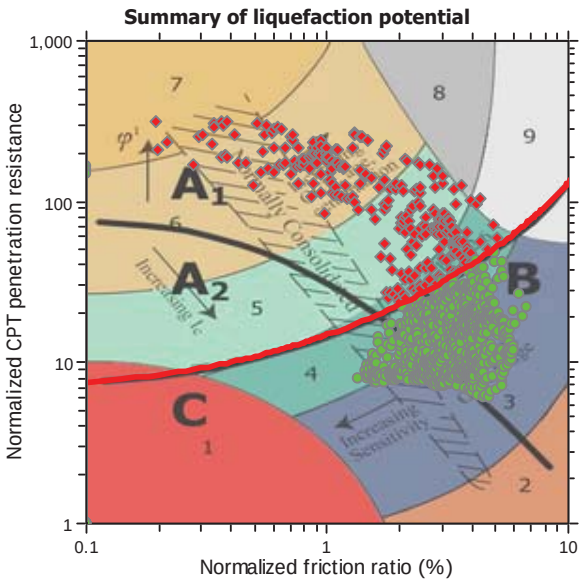
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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

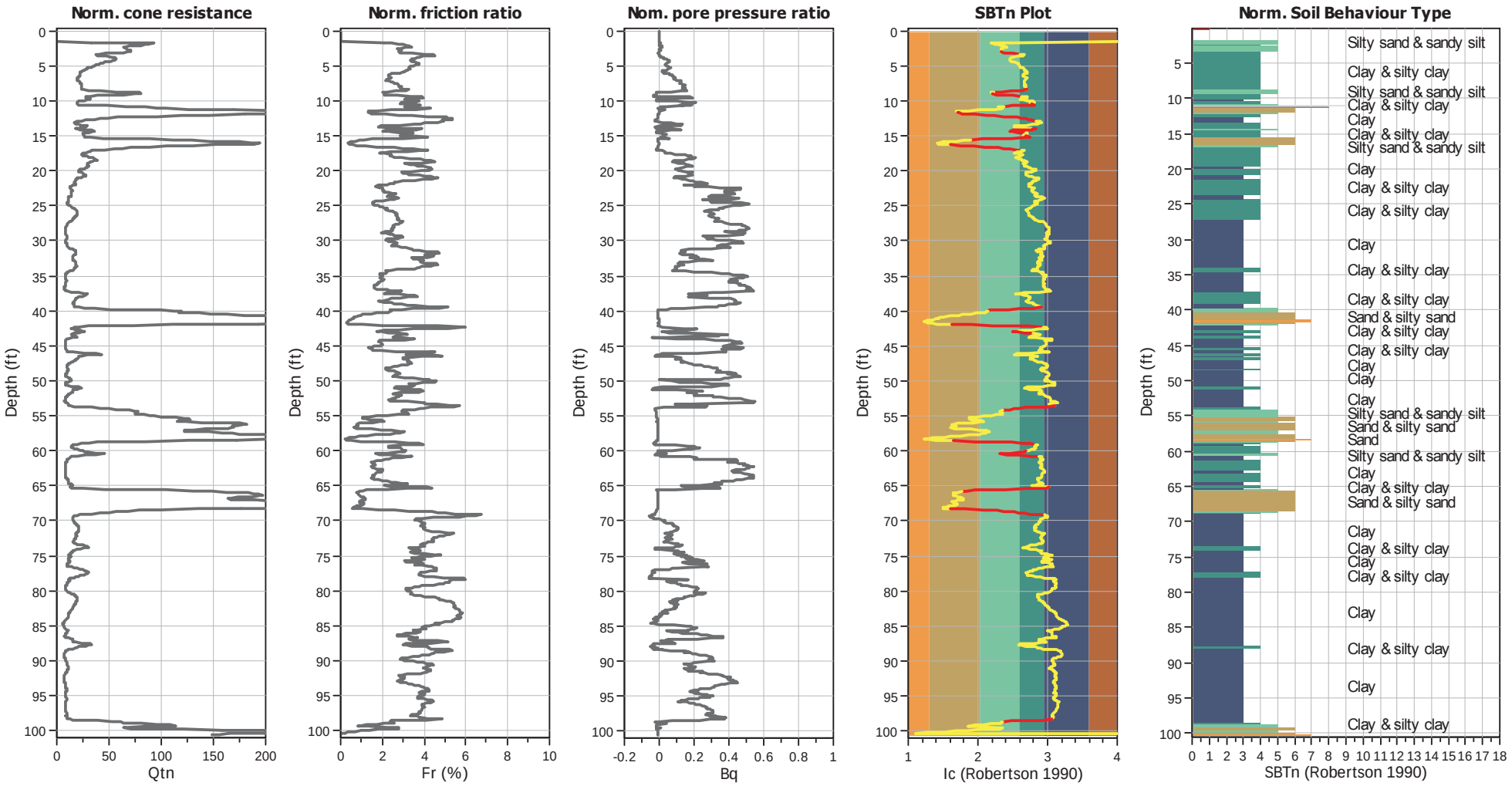






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
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CPT basic interpretation plots (normalized)



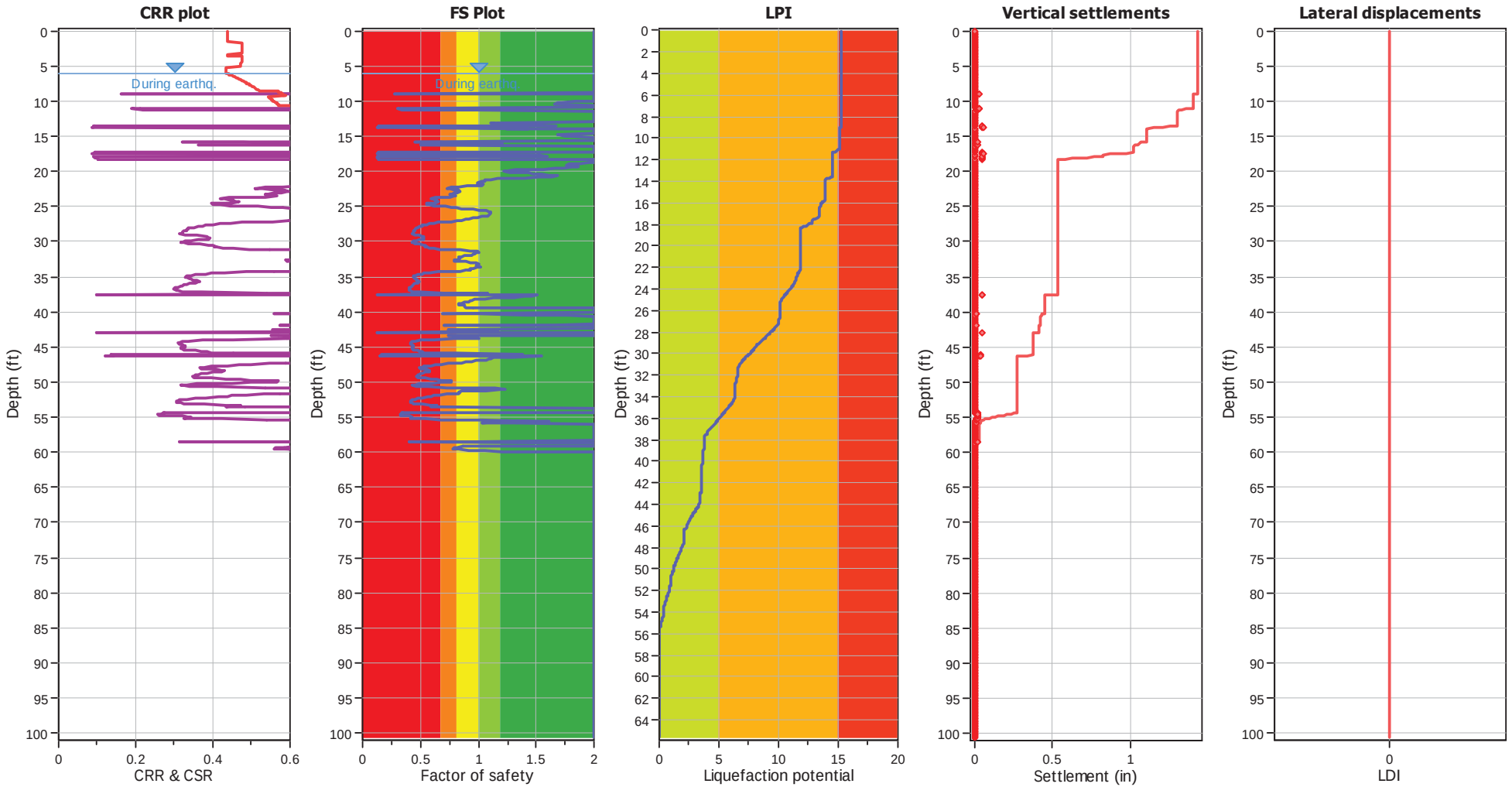
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
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Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
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7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

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Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
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Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
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F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk



ENGEO
Expect Excellence



GOOGLE NORTH BAYSHORE
CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, COMMONS, AND SPACE PARK CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PRELIMINARY GEOTECHNICAL REPORT

SUBMITTED TO
CBRE@Google
1600 Amphitheatre Parkway
Mountain View, CA 94043

PREPARED BY
ENGEO Incorporated

November 27, 2019

PROJECT NO.
15949.000.000

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Expect Excellence

Project No.
15949.000.000

November 27, 2019

Ms. Lisa Herrera
CBRE@Google
1600 Amphitheatre Parkway
Mountain View, CA 94043

Subject: Google North Bayshore
Charleston South, Joaquin, and Plymouth Campuses
Mountain View, California

PRELIMINARY GEOTECHNICAL REPORT

Dear Ms. Herrera:

We are pleased to present this preliminary geotechnical evaluation report for the five Google campuses, known as Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses, located in Mountain View, California. These five campuses are part of the Google North Bayshore project. This report presents our preliminary geotechnical observations, as well as our preliminary conclusions and recommendations for the subject campuses.

Based on the results of our exploration, the future development at these sites is feasible from a geotechnical standpoint. Recommendations presented in this report should be considered during the schematic design. A design-level exploration should be conducted prior to site development once detailed plans have been prepared.

If you have any questions or comments regarding this report, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Bahareh Heidarzadeh, PhD, PE

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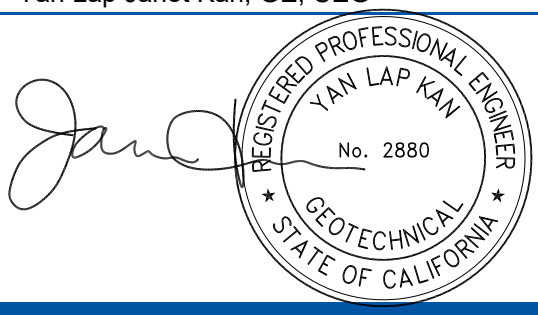
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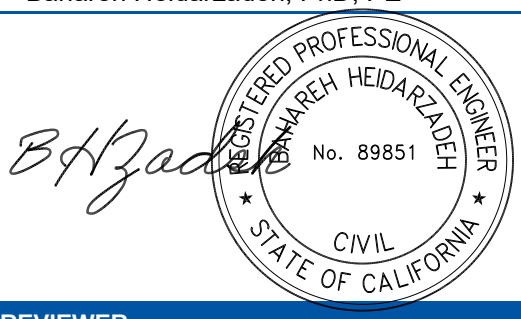
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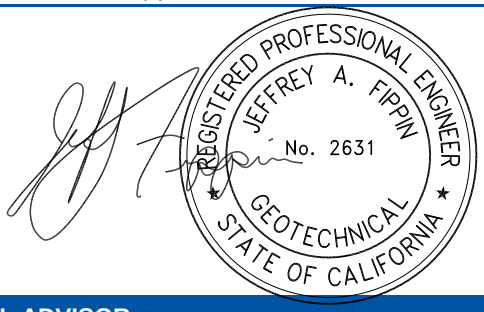
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APPENDIX C – Laboratory Test Data

APPENDIX D – Corrosivity Test Results by CERCO Analytical

APPENDIX E – Liquefaction Analysis

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this preliminary geotechnical report is to provide an assessment of geotechnical conditions and concerns associated with the five subject campuses and provide preliminary recommendations to support planning of Google development at the subject properties. At the time of preparation of this report, no schematic design was available. Our services included the following tasks:

- Reviewed available literature and geologic maps.
- Reviewed historic aerial photos.
- Obtained appropriate Santa Clara Valley Water District permits.
- Notified Underground Services Alert a minimum of 48 hours prior to our exploration.
- Retained a private utility locator to clear the proposed exploration locations of existing utilities.
- Prepared a work plan, including proposed locations for our explorations, as well as excavation checklists showing their proximity to existing utilities.
- Performed subsurface field exploration.
- Performed laboratory testing on soil samples collected.
- Analyzed geotechnical data collected.
- Interpreted subsurface field exploration data.
- Evaluated potential geotechnical concerns.
- Performed a code-based seismic hazard analysis.
- Provided preliminary foundation recommendations in this report.
- Provided earthwork recommendations.

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1.2 SITE LOCATION AND DESCRIPTION

The five subject campuses, Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses, are located in Mountain View, California, on average approximately 2 miles south of the San Francisco Bay as shown on the Vicinity Map (Figure 1). The Site Plan (Figures 2A, 2B, 2C, 2D, and 2E) show the boundaries of the campuses and the locations of our explorations.

The Charleston South project site is approximately 22 acres in area and is bounded by Charleston Road to the north, Huff Avenue to the west, Plymouth Street to the south, and Joaquin Road to the east.

The Joaquin site is approximately 9 acres in area and is bounded by North Shoreline Blvd. to the east, the Plymouth Street and Common Campus to the south, Joaquin Road to the west, and a bike road and a surface parking lot to the north.

The Plymouth site is approximately 5 acres in area and is bounded by Plymouth Street to the north, Alta Avenue to the west, and a building at 1625 Plymouth Street identified on Google Maps as US-MTV-Plym1625 to the east. California US 101 runs to the south of the site.

The Commons site is approximately 3½ acres in area and is bounded by the Joaqiun Campus to the north and west, surface parking lots to the south and west, and N Shoreline Boulevard to the east. Plymouth Street divides the two halves of this campus.

The Space Park Site is approximately 2 acres in area and is bounded by the North Shoreline Boulevard to the west, a building at the address 1625 N Shoreline Blvd to the north, a building at 1390 Pear Ave Ste D, identified on Google Maps as Cucina Venti Restaurant to the south, and a building at 1350 Pear Avenue, identified on Google Maps as RENVU Solar Equipment Distribution, to the east.

1.3 FIELD EXPLORATION

Our field exploration for the five campuses included advancing 18 Cone Penetration Tests (CPTs) and drilling 10 borings as summarized in Table 1.3-1.

TABLE 1.3-1: Field Explorations

CAMPUS	CPT/BORINGS	PUSHED/DRILLED DEPTH (feet bgs)	PUSHED/DRILLED ELEVATION (WGS84[1]) (feet)	DATE COMPLETED
Charleston South	1-SCPT04	100.6	-87.6	May 8, 2019
	1-CPT13	100.6	-87.6	May 14, 2019
	1-CPT14	120.6	-107.6	May 14, 2019
	1-CPT15	80.5	-66.5	May 8, 2019
	1-CPT16	80.5	-63.5	May 9, 2019
	1-CPT17	100.6	-83.6	May 10, 2019
	1-CPT18	100.6	-85.6	May 11, 2019
	1-B08	101.5	-88.5	May 14, 2019
	1-B09	103.0	-89.0	May 16, 2019
	1-B10	51.5	-34.5	May 17, 2019
Joaquin	1-CPT01	50.5	-34.5	May 7, 2019
	1-SCPT02	100.6	-84.6	May 7, 2019
	1-CPT03	120.6	-103.6	May 8, 2019
	1-CPT06	120.6	-103.6	May 7, 2019
	1-B01	101.5	-85.5	May 19, 2019
	1-B02	101.5	-83.5	May 19, 2019
	1-B04	81.5	-65.5	June 9, 2019

[1] **World geodetic System (WGS84)**

CAMPUS	CPT/BORINGS	PUSHED/DRILLED DEPTH (feet bgs)	PUSHED/DRILLED ELEVATION (WGS84[1]) (feet)	DATE COMPLETED
Plymouth	1-CPT09	100.6	-79.6	May 13, 2019
	1-SCPT10	80.5	-61.5	May 13, 2019
	1-CPT11	100.6	-82.6	May 14, 2019
	1-CPT12	80.5	-60.5	May 14, 2019
	1-B07	81.5	-62.5	June 7, 2019
Commons	1-CPT5	80.5	-62.5	July 9, 2019
	1-CPT7	80.5	-61.5	July 8, 2019
	1-B3	81.5	-66.5	July 10, 2019
	1-B5	46.5	-30.0	July 9, 2019
Space Park	1-CPT8	120.6	-102.6	July 8, 2019
	1-B6	81.5	-68.5	July 8, 2019

We recorded the locations of the explorations using the GIS-based, Collector Application, on a smart phone. We show the locations of the explorations on Figures 2A to 2E.

1.3.1 Borings

We observed the drilling of 10 borings at the locations shown on the Site Plans, Figures 2A to 2E. An ENGEO representative observed the drilling and logged the subsurface conditions at each location. We retained the services of a drilling contractor using two truck-mounted drill rigs. We advanced the borings using the mud rotary drilling method with a 4-inch-diameter tricore roller cone drill bit. We advanced the borings to depths ranging from 46.5 to 120.5 feet below existing grade. To address environmental concerns, we cased all the exploratory borings to 50 feet below existing grade. We did not observe the artesian aquifer in the exploratory borings. We permitted and backfilled the borings in accordance with the requirements of the Santa Clara Valley Water District (SCVWD).

We obtained soil samples at various intervals using standard penetration test (SPT) samplers with a 2-inch outside diameter (O.D. split-spoon sampler) and California Modified samplers with 2½-inch inside diameter (I.D.). We obtained the blow counts shown on our bore logs with an automatic trip, 140-pound hammer with a 30-inch free fall. We drove the sampler 18 inches and recorded the number of blows for each 6 inches of penetration. We have not converted the blow counts presented on the borelogs using any correction factors. We also obtained hydraulically pushed Shelby tubes, and Dames and Moore samplers at select locations. We present the fluid pressures recorded for the hydraulically pushed samples on the exploration logs in Appendix A.

We contained soil cuttings and excess fluids in 55-gallon steel drums, which we sampled according to procedures described in the gSAFE document, *EHS Processes to Haul Soil off Site*. The findings and recommendations for disposal were presented under a separate cover.

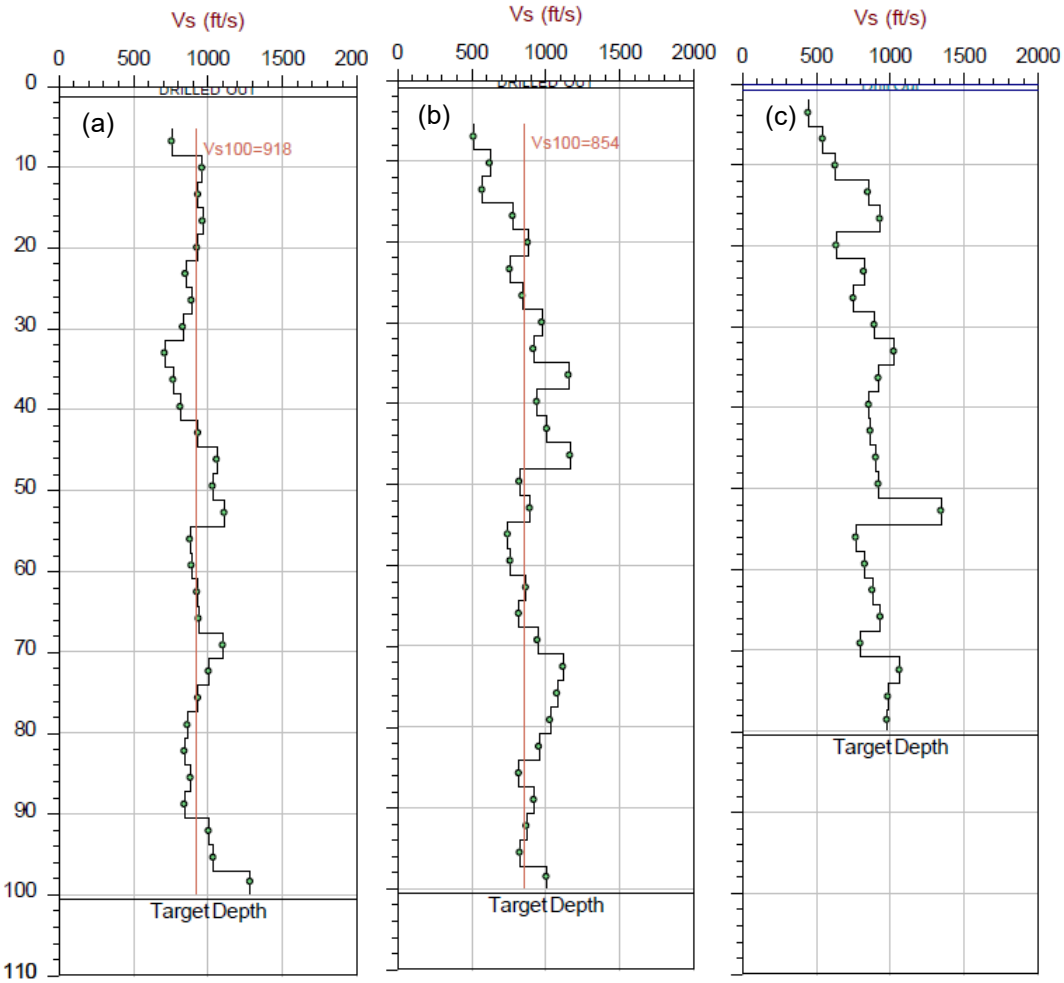
We provide additional information about specific subsurface conditions at each location in our exploration logs in Appendix A. The soil type, color, consistency, and visual classification provided in the logs are generally accordance with the Unified Soil Classification System.

1.3.2 Cone Penetration Tests

We retained the services of a contractor with a CPT rig to advance CPTs at 18 locations to depths of approximately 50.5 to 120.5 feet below the ground surface (bgs) in general accordance with ASTM D-5778. We drilled mud-rotary borings in proximity to 1-SCPT02, 1-SCPT04, 1-SCPT10, and 1-CPT18 to allow direct comparison of the data (matched pairs). Measurements include the tip resistance to penetration of the cone (Qc), the resistance of the friction sleeve (Fs), and pore pressure (U) (Robertson and Campanella, 1988).

We performed shear wave velocity (V_S) measurements in 1-SCPT02, 1-SCPT04, and 1-SCPT10, using the downhole seismic method specified in ASTM D-7400. We present the CPT logs and the V_S profiles in Appendix B. As shown in Appendix B, the time-averaged shear wave velocity over the top 100 feet or 30 meters (V_{S30}) representative of the five campuses ranges from 808 to 918 feet/sec. The results are shown in the Exhibit 1.3.2-1.

EXHIBIT 1.3.2-1: Seismic Cone Penetration Vs Measurements at (a) Charleston South (b) Joaquin, and (c) Plymouth* Campuses



*Plymouth Vs30 is calculated to be 808 feet/sec, assuming the Vs between 80 to 100 feet is 900 feet/sec.

1.4 LABORATORY TESTING

We performed laboratory tests on select soil samples to evaluate their engineering properties. For this project, we performed laboratory testing as shown in the table below.

TABLE 1.4-1: Laboratory Testing

SOIL CHARACTERISTIC	TESTING METHOD	LOCATION OF RESULTS
Natural Unit Weight	ASTM D7263	Appendix A
Natural Moisture Content	ASTM D2216	Appendix A
Plasticity Index (PI) (Wet Method)	ASTM D4318	Appendix C
Grain Size Distribution	ASTM D1140	Appendix C
Consolidation – Constant Rate of Strain	ASTM D4186	Appendix C
Cyclic Simple Shear (CSS)	ASTM D6528	Appendix C
Triaxial Compression – Consolidated, Undrained (TXCU)	ASTM D4767	Appendix C
Triaxial Compression – Unconsolidated, Undrained (TXUU)	ASTM D2850	Appendix C
Unconfined Compression	ASTM D2166	Appendix C
Corrosivity	ASTM Methods	Appendix D

2.0 FINDINGS

2.1 SITE HISTORY

We reviewed historic aerial photographs for the sites from dates ranging between 1948 and present[2]. Historic topographic maps suggest that the sites may have been used for limited agricultural purposes and were mostly undeveloped or occupied by single-family houses and farmlands prior to being completely developed in the 1980s. As described in Section 1.2 of this report, currently, the sites encompass several existing buildings, asphalt concrete-paved parking areas, trees, and associated landscaping.

2.2 REGIONAL AND SITE GEOLOGY

These sites are located at the northwestern end of the Santa Clara Valley in the Coast Ranges geomorphic province of California. The Coast Ranges are dominated by a series of northwest-trending ridges and valleys formed by faulting and folding of the earth's crust. The Santa Clara Valley region lies to the east of the San Andreas Fault and to the west of the Hayward and Calaveras Faults.

Geologic mapping prepared by Brabb et al. (2000) (Figure 3) indicates that the sites are underlain by Holocene-age basin deposits (Qhb) consisting of very fine silty clay to clay deposits occupying flat-floored basins at the distal edge of alluvial fans adjacent to bay mud. These deposits are known to contain unconsolidated, locally organic, plastic silt and silty clay.

[2] https://www.historicaerials.com

2.3 SEISMICITY

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 4 shows the approximate locations of active faults and significant historic earthquakes recorded within the San Francisco Bay Region. The Mountain View area contains numerous active earthquake faults. The nearest active faults are the Monte Vista-Shannon, San Andreas, Hayward, and Calaveras faults, which are capable of producing earthquakes with moment magnitudes of 6.86, 7.85, 6.84, and 7.28, respectively. We list details of these active faults in Table 2.3-1. 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) (Bryant and Hart, 2007).

TABLE 2.3-1: Active Faults According to UCERF3 Capable of Producing Significant Ground Shaking
(Latitude: 37.41923° Longitude: -122.081701° - at the centroid of the sites)[3]

SOURCE	CLOSEST DISTANCE (miles) | (km)	MOMENT MAGNITUDE (M_W)	FAULT MECHANISM
Monte Vista-Shannon	4.95 | 7.97	6.86	Reverse
San Andreas (Peninsula)	8.08 | 13.0	7.85	Strike Slip
Hayward	10.8 | 17.38	6.84	Strike Slip
Calaveras	14.51 | 23.35	7.28	Strike Slip

The sites are not located within a designated Alquist-Priolo Earthquake Fault Zone and no known surface expression of active faults is believed to exist within the site; as such, the risk of fault rupture through the site is considered low.

2.4 SURFACE AND SUBSURFACE CONDITIONS

Current ground surface elevations at the fives campuses range from approximately 13 to 21 feet (WGS84[4]). Current surface conditions consist of paved parking and landscape areas.

2.4.1 Charleston South Campus

In our explorations at the Charleston South Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to hard, sandy lean and fat clay.

In the northern part of the campus (1-B08), below the fill, we encountered basin deposits composed of lean clays interbedded with dense poorly graded sand, well-graded gravel, and silty clayey sand. We encountered a 10-foot-thick layer of dense, poorly graded sand and well-graded gravel at 8 feet bgs, and 2- to 5-foot-thick layers of medium dense to very dense, poorly graded sand and silty sand at various depths.

In the middle (1-B09) and southern (1-B10) part of the site, below the fill, we encountered basin deposits composed of medium stiff to very stiff fat and lean clays interbedded with more granular soil. We encountered an approximately 20-foot-thick layer of medium dense to dense clayey sand

[3] https://earthquake.usgs.gov/hazards/interactive/
[4] World Geodetic System (WGS84)

at 39 feet bgs. Additionally, we encountered sandy silt, silty sand, and medium dense to dense clayey sand layers up to 7 feet thick at various depths.

We present an idealized subsurface profile for the Charleston South site for preliminary design purposes only. Variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.1-1: Generalized Subsurface Profile for Charleston South Campus

DEPTH (feet)	ELEVATION (WGS84)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 6.5	CL/CH	Stiff to very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
8 to 11	6.5 to 3.5	SP/GW	Dense, Poorly Graded Sand and Well Graded Gravel
11 to 40	3.5 to -25.5	CL	Stiff, Lean Clay
40 to 48	-25.5 to -33.5	SC	Dense, Clayey Sand
48 to 55	-33.5 to -40.5	SC	Medium Dense Clayey Sand
Below 55	Below -40.5	CL/CH	Medium Stiff to Very Stiff, Lean Clay to Fat Clay

*Based on average surface elevation of 14.6 feet

2.4.2 Joaquin Campus

At the Joaquin Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to very stiff lean clay and fat clay. Below the fill, we encountered basin deposits composed of stiff to hard lean, fat, and sandy clay interbedded with medium dense to dense well-graded sand, well-graded gravel, and clayey sand. A 16-foot-thick layer of clayey sand was encountered at 23 feet bgs in 1-B04 and 20-foot-thick layer of clayey sand was encountered at 78 feet bgs in 1-B01. Towards the south of the site, the clayey sand layers become less dense; however, we have limited subsurface information in this area due to presence of existing building.

We present an idealized subsurface profile for the Joaquin site for preliminary design purposes only. Variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.2-1: Generalized Subsurface Profile for Joaquin Campus

DEPTH (feet)	ELEVATION (WGS84)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 8.5	CL/CH	Stiff to very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
8 to 21	8.5 to -4.5	CL/SC	Stiff to very stiff, Clayey Sand to Sandy Lean Clay
21 to 30	-4.5 to -13.5	CH/CL	Stiff to very stiff, Fat Clay and Lean Clay
30 to 40	-13.5 to -23.5	GC/SP	Medium dense, Clayey Gravel and Poorly Graded Sand
40 to 50	-23.5 to -33.5	CL	Stiff to very stiff, Lean Clay
50 to 60	-33.5 to -43.5	SC	Medium dense, Clayey Sand
Below 60	Below -43.5	CL/CH	Very stiff to hard, Lean Clay and Fat Clay

*Based on average surface elevation of 16.6 feet

2.4.3 Plymouth Campus

In our explorations at the Plymouth Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to very stiff lean clay and sandy silt. Below the fill, we encountered basin deposits composed of stiff to very stiff lean, fat, and sandy clay interbedded with medium dense clayey sand, well-graded sand, and sandy silt to silty sand. We encountered a 15-foot-thick layer of sandy silt to silty sand at 55 feet bgs in 1-B07.

We present an idealized subsurface profile for the Plymouth site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.3-1: Generalized Subsurface Profile for Plymouth Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 11.5	CL/ML	Stiff to very stiff, Lean and Sandy Silt (Non-Engineered Surficial Fill)
8 to 20	11.5 to -0.5	SC	Medium dense, Clayey Sand with Gravel
20 to 33	-0.5 to -13.5	CL/SC	Stiff to very stiff, Sandy Clay and Clayey Sand
33 to 40	-13.5 to -20.5	SW	Medium dense, Well Graded Sand with Clay and Gravel
40 to 50	-20.5 to -30.5	CL	Medium stiff to stiff, Lean Clay and Sandy Clay
50 to 70	-30.5 to -50.5	SM/ML	Medium stiff to stiff, Sandy silt to silty sand
Below 70	Below -50.5	CH	Very stiff, Fat Clay

*Based on average surface elevation of 19.4 feet

2.4.4 Commons Campus

In our explorations at the Commons Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of very stiff fat clay and fat clay with sand. Below the fill, in the northern portion of the site, we encountered a 7-foot-thick layer of medium dense to dense poorly graded sand with gravel. In the southern portion of the site, below the fill, we encountered a 15-foot-thick layer of silty sand with gravel that is medium dense on the top, but becomes loose towards the bottom. This layer is potentially liquefiable. Below this granular layer, we encounter basin deposits composed of stiff to very stiff lean and fat clay with and without sand interbedded with medium dense clayey sand and silty sand.

We present an idealized subsurface profile for the Commons site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.4-1: Generalized Subsurface Profile for Commons Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 10	Above 8.5	CL/CH	Very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
10 to 23	8.5 to -4.5	SM/SP-SM	Dense to Medium Dense Silty Sand and Poorly Graded Sand with Gravel and Silt
23 to 35	-4.5 to -16.5	CL	Stiff Lean Clay
35 to 40	-16.5 to -21.5	CL	Very Stiff, Lean Clay.
40 to 45	-21.5 to -26.5	SC/SM	Medium Dense, Clayey Sand and Silty Sand

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
45 to 50	-26.5 to -31.5	CL	Stiff, Lean Clay
50 to 75	-31.5 to -56.5	CL	Stiff to Very Stiff, Lean Clay
75 to 80	-56.5 to -61.5	SP-SC	Poorly Graded Sand with Clay
Below 80	Below -61.5	CL	Very Stiff, Lean Clay

*Based on average surface elevation of 18.6 feet

2.4.5 Space Park Campus

In our explorations at the Space Park Campus, we encountered 8 to 10 feet of surficial non-engineered fill consisting of stiff to very stiff fat clay. Below the fill, we encountered basin deposits composed of stiff to very stiff lean and sandy clay interbedded with medium dense clayey sand, poorly graded sand with clay and gravel, poorly graded gravel with clay, silty sand, and silt.

We present an idealized subsurface profile for the Space Park site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.5-1: Generalized Subsurface Profile for Space Park Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 11	CH	Stiff to Hard, Fat Clay (Non-Engineered Surficial Fill)
8 to 18	11 to 1	CL	Stiff to Very Stiff, Lean Clay
18 to 35	1 to -16	CL	Hard, Lean Clay
35 to 45	-16 to -26	SC/SP-SC	Loose to Dense, Clayey Sand and Poorly Graded Sand with Clay and Gravel
45 to 60	-26 to -41	CL	Medium Stiff to Hard, Sandy Clay
60 to 70	-41 to -51	ML	Stiff, Silt
70 to 82	-51 to -63	SM/GP	Medium Dense to Dense, Silty Sand and Sandy Gravel to Gravelly Sand
Below 80	Below -61	CL	Very Stiff, Lean Clay

*Based on average surface elevation of 18.9 feet

2.5 GROUNDWATER CONDITIONS

We observed groundwater at shallow depths in a few of the borings before switching from solid flight auger to mud-rotary drilling methods. We observed groundwater at depths ranging from 5½ to 7½ feet, which corresponds to approximately Elevation 5½ to 9½ feet (WGS84). We summarize our groundwater observations in Table 2.5-1.

In addition to observing the groundwater level in a few borings, we performed pore pressure dissipation tests in the CPTs. These tests suggest that the groundwater level is approximately 3 to 11 feet deep below existing grade, which corresponds to approximately Elevation 5 to 14 feet (WGS84), as presented in Table 2.5-1 below.

TABLE 2.5-1: Recorded Groundwater Levels (at Time of Exploration)

CAMPUS	BORING / CPT	GROUNDWATER DEPTH (feet bgs)	GROUNDWATER ELEVATION (WGS84, feet)
Charleston South	1-SCPT04	8.1*	4.9*
	1-CPT13	8.5*	4.5*
	1-CPT14	7.0*	6*
	1-CPT15	6.2*	7.8*
	1-CPT16	8.1*	8.9*
	1-CPT17	4.8*	12.2*
	1-CPT18	3.1*	11.9*
	1-B08	7.5	5.5
	1-B09	5.5	9.5
	1-B10	7.5	9.5
Joaquin	1-CPT01	11.1*	4.9*
	1-SCPT02	8.9*	7.1*
	1-CPT03	9.0*	8.0*
	1-CPT06	8.2*	7.8*
	1-B01	Not obtained due to drilling method	
	1-B02	Not obtained due to drilling method	
	1-B04	Not obtained due to drilling method	
Plymouth	1-CPT09	6.8*	14.2*
	1-CPT10	4.8*	14.2*
	1-CPT11	6.2*	11.8*
	1-CPT12	6.3*	13.7*
	1-B07	Not obtained due to drilling method	
Commons	1-CPT5	7.7*	10.9*
	1-CPT7	8.1*	10.5*
	1-B3	Not obtained due to drilling method	
	1-B5	Not obtained due to drilling method	
Space Park	1-CPT8	6.0*	12.9*
	1-B6	Not obtained due to drilling method	

*Assumed phreatic surface based on pore pressure dissipation tests assuming hydrostatic conditions.

Plate 1.2 of the Seismic Hazard Zone Report for the Mountain View Quadrangle (2006) indicates the highest historical groundwater within the sites vicinity to be less than approximately 5 feet below the ground surface. For purposes of our analyses and recommendations, we consider an appropriate design groundwater depth of 6 feet below ground surface, which corresponds to an elevation range of 4½ to 14 feet (WGS84).

Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation practices, and other factors not evident at the time measurements were made. Excavations for utility installation may encounter groundwater, depending upon the time of year of construction.

3.0 DISCUSSION AND CONCLUSIONS

Based on the exploration and laboratory test results, the project site is feasible for the future developments provided the recommendations contained in this report are properly incorporated into the design plans and specifications.

The potential geotechnical concerns for the future site redevelopment are as follows:

- The potential for liquefaction of coarse-grained material and cyclic softening of some of the fine-grained soil materials below the groundwater table during a seismic event.
- The presence of groundwater and its influence on below-grade construction.
- The potential need for shoring systems for below-grade construction, if planned, to protect the excavation walls, adjacent streets and improvements, and the potential need for dewatering of excavations extending below the groundwater surface.
- The potential for flooding due to sea-level rise.
- The potential settlement of medium stiff clayey and silty deposits under new loads, such as placement of additional fill and high building loads.

We evaluate the geologic hazards common around the bay area in the following sections.

3.1 SEISMIC HAZARDS

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking and liquefaction. The following sections present a discussion of these hazards as they apply to the site. Based on topographic and lithologic data, the risk of regional subsidence or uplift, lurching, landslides, tsunamis, or seiches is low to negligible at the site.

3.1.1 Ground Rupture

Since there are no known active faults crossing the property and the site is not located within an Earthquake Fault Special Study Zone, ground rupture is unlikely at the subject property.

3.1.2 Ground Shaking

Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead and live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the actual forces that would be associated with a major earthquake. Therefore, structures should be able to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse, but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1996). Section 3.3 presents California Building Code (CBC, 2019) seismic design.

3.1.3 Liquefaction / Cyclic Softening

The site is located within a State of California Seismic Hazard Zone (CGS, 2006) for areas that may be susceptible to liquefaction (Figure 5).

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. The soil most susceptible to liquefaction is clean, loose, saturated, uniformly graded fine sand below the groundwater table. Empirical evidence indicates that loose silty sand is also potentially liquefiable. When seismic ground shaking occurs, the soil is subjected to cyclic shear stresses that can cause excess hydrostatic pressures to develop. If excess hydrostatic pressures exceed the effective confining stress from the overlying soil, the sand may undergo deformation. If the sand undergoes virtually unlimited deformation without developing significant resistance, it is said to have liquefied and, if the sand consolidates or vents to the surface during and following liquefaction, ground settlement and surface deformation may occur. In addition to liquefaction of sandy materials, clayey soil can also undergo “cyclic-softening” or strength loss as a result of cyclic loading. We considered both liquefaction and cyclic-softening hazards in our analyses.

3.1.3.1 Liquefaction Analysis Overview

We divided the soil into their “sand-like” and “clay-like” behaviors using procedures presented in Boulanger and Idriss (2008). We then performed an initial liquefaction susceptibility assessment based on the methodologies presented by Bray and Sancio (2006). Section 3.1.3.2 presents the details of our screening of soil samples for liquefaction susceptibility. We also performed cyclic simple shear (CSS) testing on a representative sample of fine-grained deposits to more accurately assess the cyclic response of the fine-grained soil.

We then performed an analysis of liquefaction potential based on the CPT data using the computer software CLiq (Version 2.2.1.4) developed by GeoLogismiki. The software incorporates the procedure introduced by the 1996 National Center for Earthquake Engineering Research (NCEER) workshop and the 1998 NCEER/National Science Foundation (NSF) workshop. The workshops are summarized by Youd et al. (2001) and updated by Robertson (2009).

After obtaining CLiq analysis results, we used in-situ data (blow counts and soil descriptions), laboratory data (PI, moisture content, fines content, and cyclic simple shear (CSS) test), and Boulanger and Idriss (2008) and Bray and Sancio (2006) methodologies to establish a relationship between soil that is potentially liquefiable in the CPTs by comparing them to adjacent “matched-pair” borings. To assess seismically induced settlement of potentially liquefiable soil, we considered the methodology presented by Zhang et al. (2002). The details and results of our analyses are presented in the following sections.

3.1.3.2 Liquefaction Susceptibility Screening of Soil Samples

Boulanger and Idriss (2008) found that for practical purposes, soil can be divided into either ‘sand-like’ or ‘clay-like’ behavior. Where sand-like soil can experience ‘liquefaction’ and clay-like soil can experience ‘cyclic failure or softening’. In general, sand-like soil is gravel, sand and very-low plasticity silt; whereas, clay-like soil comprises low-plasticity clay and plastic silt.

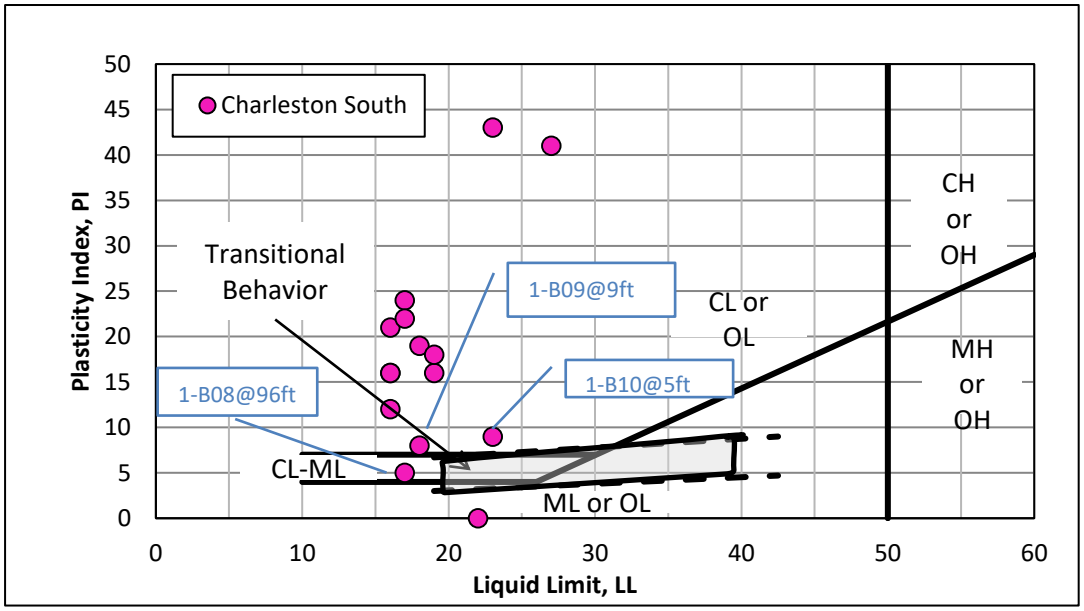
In order to evaluate the clay-like, intermediate and sand-like behavior of the fine-grained soil at the site, we plotted the PI and liquid limit (LL) of the onsite soil relative to the soil behavior limits. We then considered the criteria presented by Bray and Sancio to assess the potential for liquefaction triggering on the site soil. Bray and Sancio observed that soil with a plasticity

index (PI) less than 12 and a water content (w_c) to liquid limit (LL) ratio of more than 0.85 is susceptible to liquefaction/cyclic-softening. Soil with PI greater than 18 and/or w_c/LL less than 0.8 were deemed not to be susceptible to liquefaction/cyclic-softening because they are too plastic and/or their water contents are too low.

Charleston South Campus

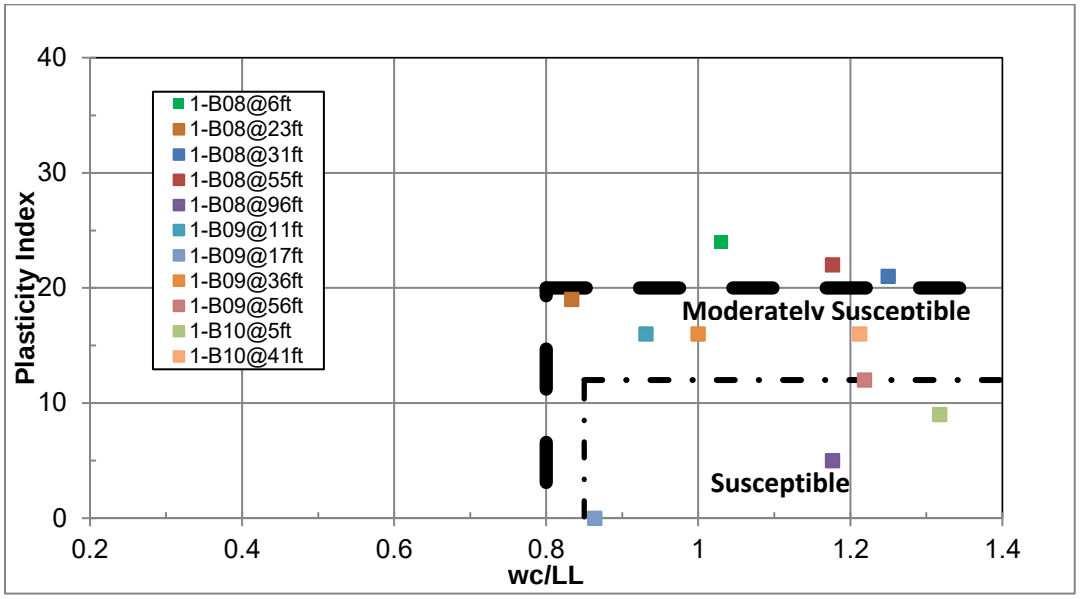
Based on Idriss and Boulanger (2008), at the Charleston South site, the majority of fine-grained soil should be classified as 'clay-like' other than the material at Boring 1-B08 at 96 feet below ground surface, at Boring 1-B09 at 9 feet below ground surface, and at Boring 1-B10 at 5 feet below ground surface, where soil should be considered as 'transitional'. We ignore any liquefaction above the groundwater table (6 feet bgs). In addition, since liquefaction/cyclic softening of material below 60 feet will not likely manifest to the surface, we do not consider susceptibility of material at 96 feet below ground surface.

EXHIBIT 3.1.3.2-1: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Charleston South Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-2, the majority of the laboratory data plot as moderately susceptible and susceptible to liquefaction.

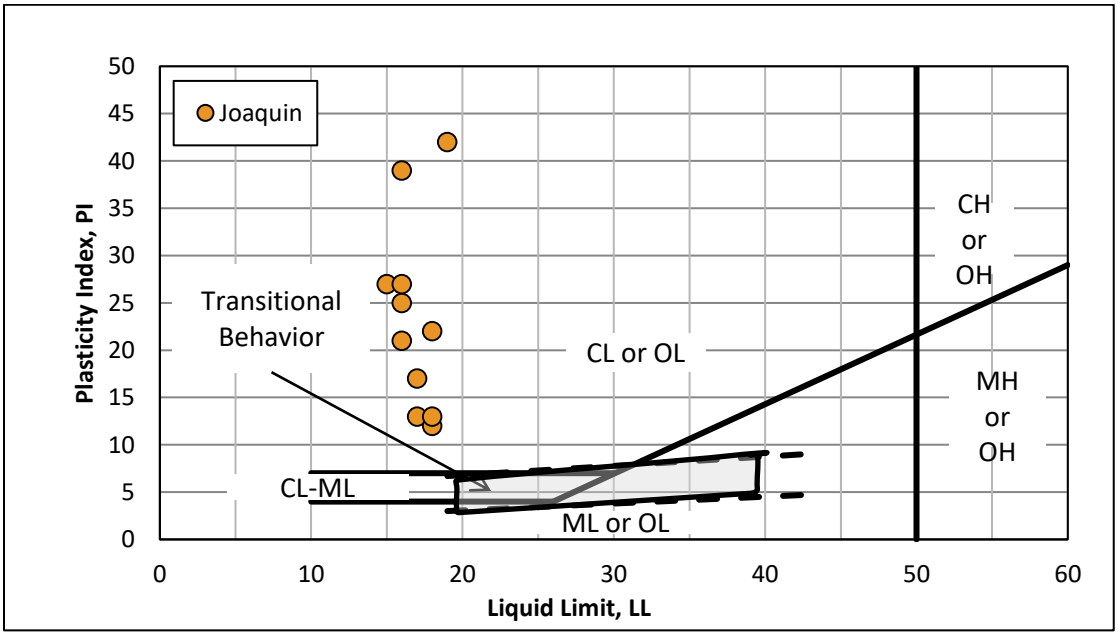
EXHIBIT 3.1.3.2-2: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Charleston South Campus



Joaquin Campus

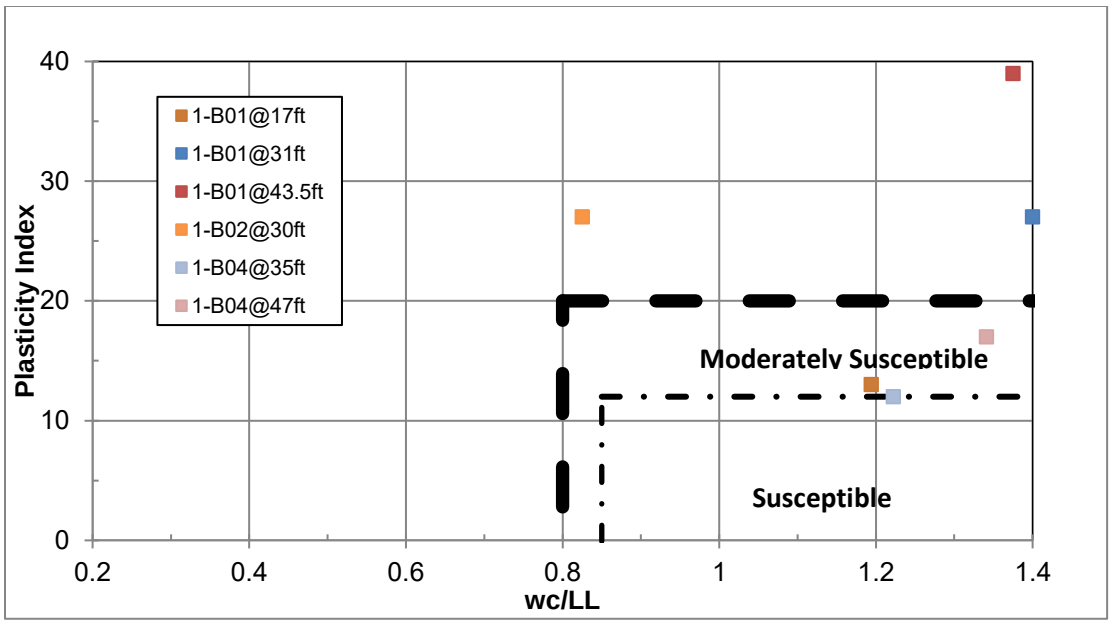
Based on Idriss and Boulanger (2008), we conclude the majority of fine-grained soil at the Joaquin site should be considered as 'clay-like' as shown in Exhibit 3.1.3.2-3.

EXHIBIT 3.1.3.2-3: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Joaquin Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-4, the majority of the laboratory data plot as not susceptible to liquefaction other than a clayey gravel with sand layer (Boring 1-B01 at 17 feet bgs), a clayey sand layer (Boring 1-B04 at 35 feet bgs), and a lean clay with sand layer (Boring 1-B04 at 47 feet bgs), which plot as moderately susceptible to liquefaction.

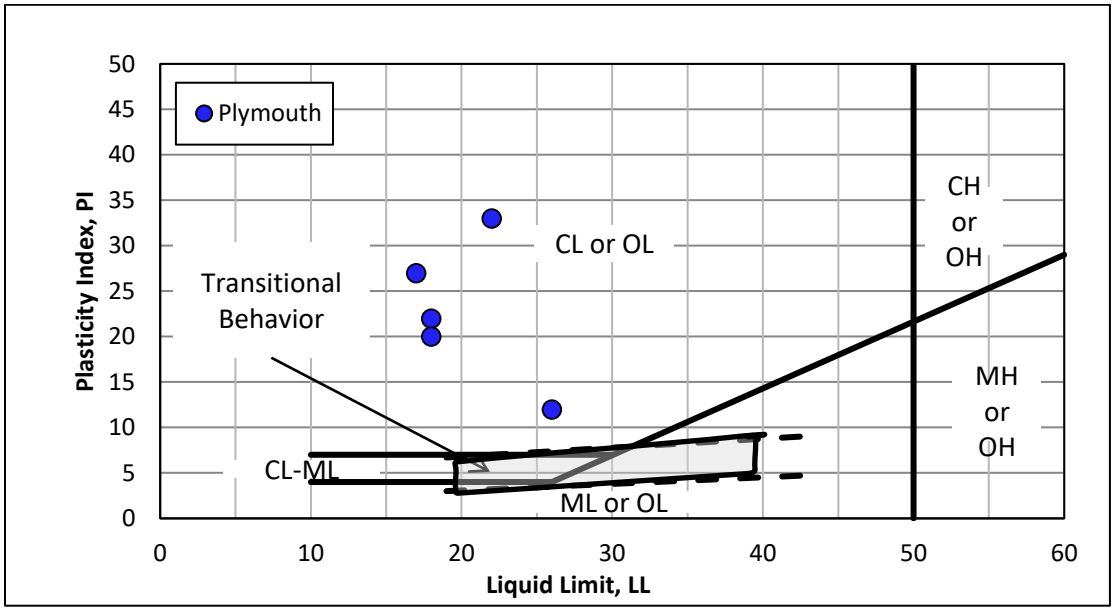
EXHIBIT 3.1.3.2-4: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Joaquin Campus



Plymouth Campus

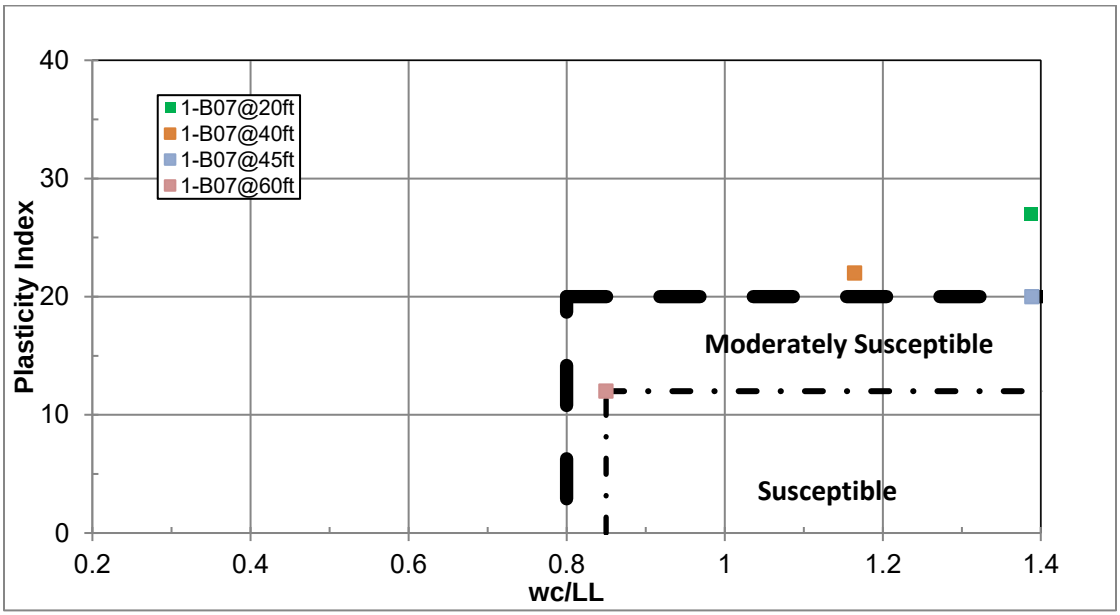
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-5, the majority of fine-grained soil at the Plymouth sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-5: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Plymouth Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-6, the majority of the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Plymouth site other than a sandy clay layer (Boring 1-B07 at 45 feet bgs) and a sandy silt to silty sand layer (Boring 1-B07 at 60 feet bgs).

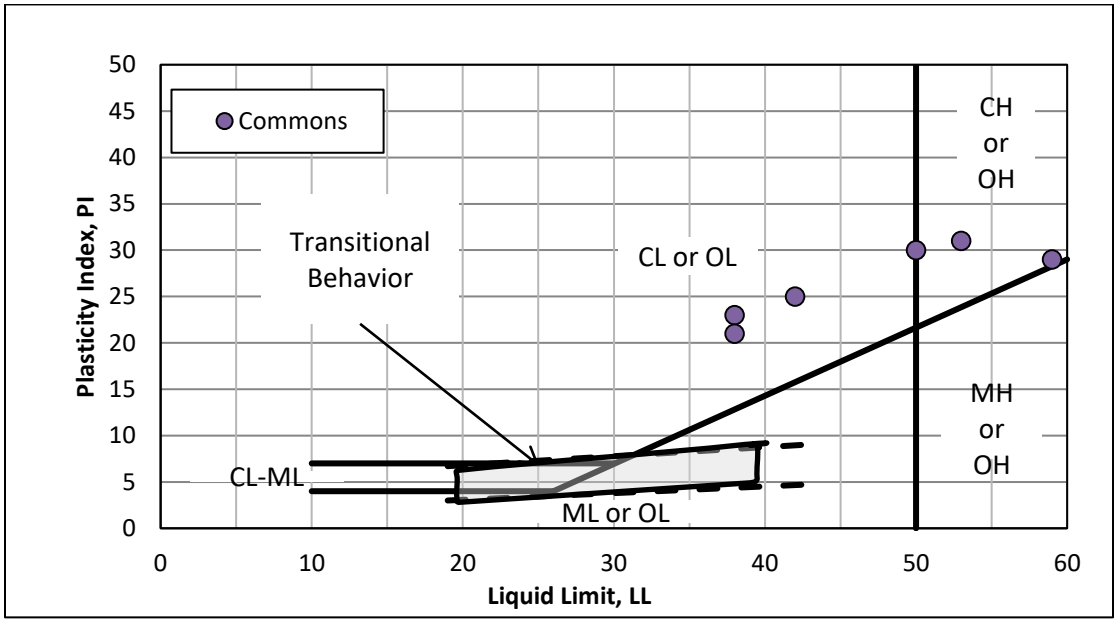
EXHIBIT 3.1.3.2-6: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Plymouth Campus



Commons Campus

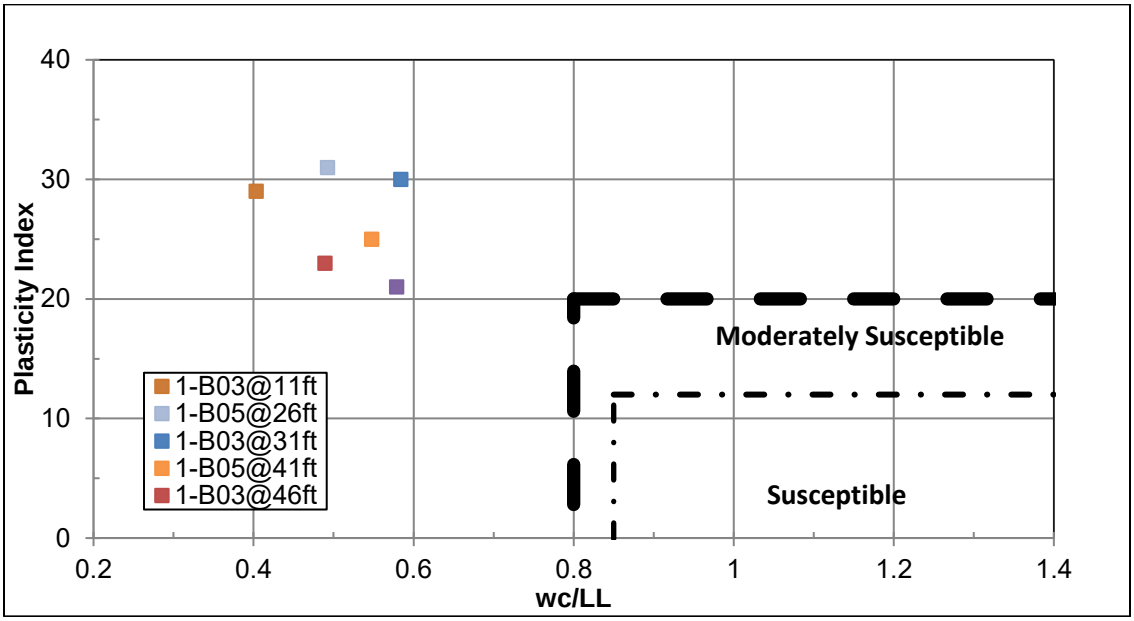
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-7, the majority of fine-grained soil at the Commons sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-7: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Commons Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-8, all the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Commons site.

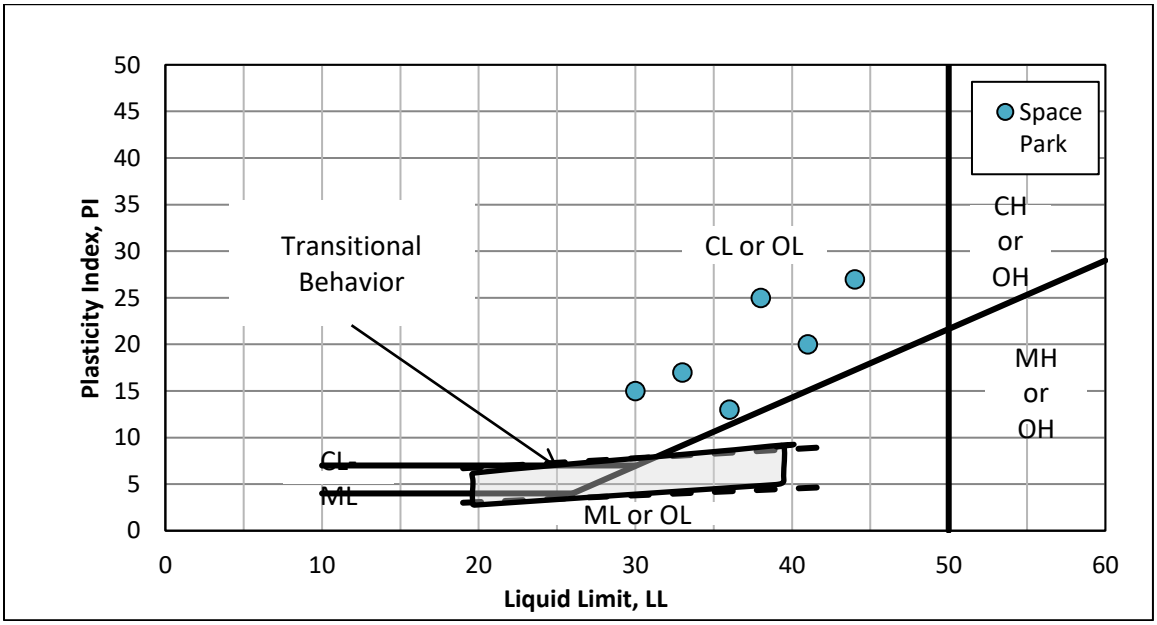
EXHIBIT 3.1.3.2-8: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Commons Campus



Space Park Campus

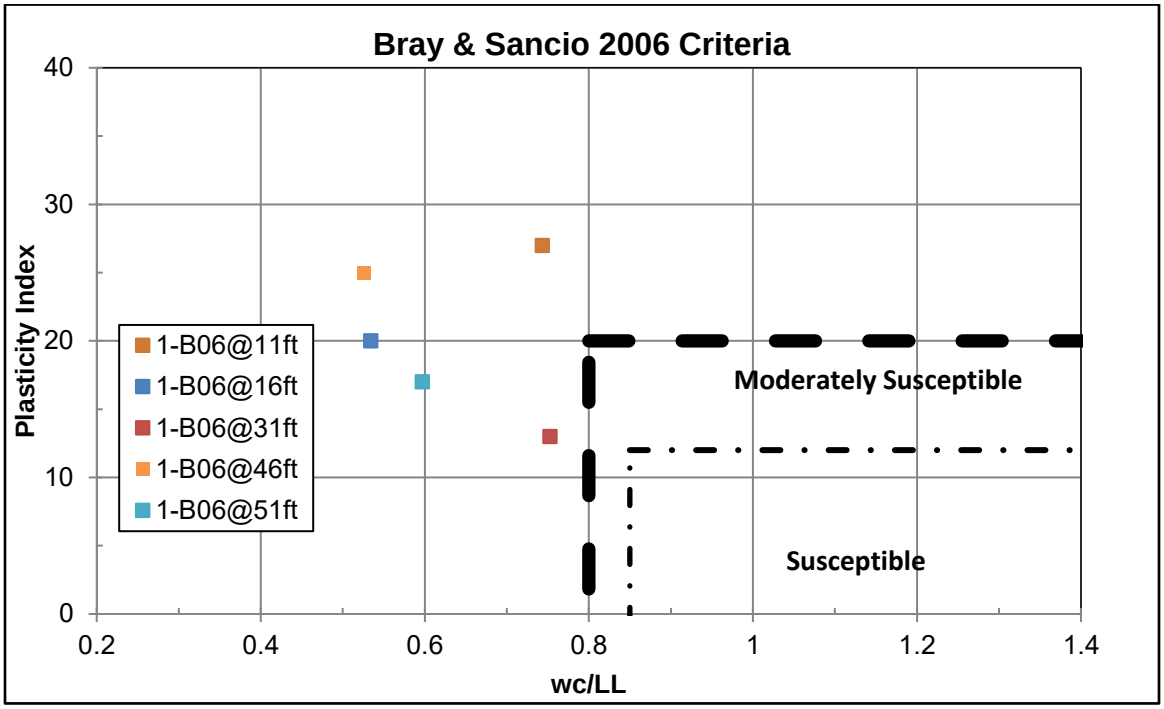
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-9, the majority of fine-grained soil at the Space Park sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-9: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Space Park Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-10, all the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Space Park site. Although, at 36 feet, an Atterberg Limit test indicates the soil is a clay, based on grain-size analysis the soil encountered in the boring at that depth is sand; we used a SPT-blow-count-based method to further evaluate the liquefaction potential of this layer, which indicates susceptibility to liquefaction.

EXHIBIT 3.1.3.2-10: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Space Park Campus



3.1.3.3 Liquefaction Analysis of CPT Data and Matched-Pair Borings

We performed an analysis of liquefaction potential based on the CPT data using the computer software CLiq (Version 2.2.1.4) developed by GeoLogismiki. The software incorporates the procedure introduced by the 1996 National Center for Earthquake Engineering Research (NCEER) workshop and the 1998 NCEER/National Science Foundation (NSF) workshop. The workshops are summarized by Youd et al. (2001) and updated by Robertson (2009). We estimated the Cyclic Stress Ratio (CSR) for an average Maximum Considered Earthquake (MCE) Peak Ground Acceleration (PGA_M) value of 0.66g[5] as outlined in the latest California building code with an earthquake magnitude of 7.85 on San Andreas Fault. We used a groundwater depth of 6 feet for this analysis.

We then compared the zones calculated to be liquefiable using CLiq to soil zones that were not susceptible to liquefaction or cyclic softening according to Bray and Sancio (2006) in the adjacent borings. Appendix E presents the results of the CLiq analyses. Table 3.1.3.3-1 presents the matched-pair borings and CPTs for each campus.

[5] Refer to Section 3.3 for CBC 2019 seismic design parameters

TABLE 3.1.3.3-1: Matched-Pair Borings and CPTs

CAMPUS	MATCHED-PAIR	
	BORING	CPT
Charleston South	1-B08	1-SCPT04
	1-B09	1-CPT18
Joaquin	1-B01	1-SCPT02
Plymouth	1-B07	1-SCPT10

Please note that borings and CPTs advanced within Commons and Space Park are generally spaced over 100 feet apart. As such, they are not listed as matched pairs in Table 3.1.3.3-1. However, where soil stratigraphy encountered in the borings and CPTs are consistent, we used information gathered from the borings to adjust which layers are susceptible to liquefaction; therefore, we adjusted our estimates of liquefaction-induced settlement calculated from the CPT for both the Commons and Space Park Campuses.

3.1.3.4 Cyclic Simple Shear Tests

Since the Bray and Sancio method is considered a screening test of potential for liquefaction susceptibility, we performed cyclic simple shear (CSS) on select samples of fine-grained deposits recovered from one of our Dames and Moore samplers to more accurately assess the cyclic response of the fine-grained site soil. The CSS testing allows us to directly test if a soil is liquefiable and not rely solely on simplified, empirical methods of liquefaction analyses.

We performed CSS testing on a fine-grained sample recovered at the Charleston South Campus from Boring 1-B09 at a depth of approximately 16 feet below the ground surface. We subjected this sample to a cyclic stress ratio (CSR) of 0.47. Based on review of the CSS test results (Appendix C), although the sample did not exhibit full cyclic softening behavior according to generation of excess pore water pressure criterion, the single amplitude shear strain reached eight percent at ten cycles indicating the soil sample experienced cyclic softening based on the excess shear strain criterion. We compared the CSS test result to the corresponding matched-pair CPT (1-CPT18). The comparison shows the calculated factor of safety against cyclic softening of less than 1.0 according to CPT-based cyclic softening triggering analyses (CLiq Analyses) is justifiable.

3.1.3.5 Liquefaction Analysis Conclusion

Using Idriss and Boulanger (2008) and Bray and Sancio (2006) criteria, the results of CSS testing, as well as comparison of matched-pair borings and CPTs, we conclude that a soil behavior index (Ic) of 2.6 is acceptable to use as the cutoff between soil that is sand-like and soil that is clay-like (except at 1-CPT05 and 1-CPT08, where we conclude an Ic of 2.5 is appropriate. We performed our analyses using the method by Idriss and Boulanger (2008), without clay-like behavior; we also ignored any settlement below 60 feet bgs.

In addition, at the Space Park Campus, we used the SPT-blow-count-based method by Idriss and Boulanger 2008, to evaluate the liquefaction settlement in the sand layer at Boring 1-B06, from 33.5 to 40 feet bgs; this layer is not captured by any of the CPTs.

Based on site-specific study of the liquefaction hazard, we estimate the overall total liquefaction-induced settlement resulting from a California Building Code Maximum Considered

Earthquake at Joaquin, Plymouth, Charleston South, Commons, and Space Park Campuses could be up to 2 inches. In some isolated areas, the settlement may be up to 3 inches. The potential differential settlement associated with the liquefaction is likely about half of the total settlement over a span of 30 feet. Based on our experience on other similar projects, the magnitude of liquefaction-induced settlement can be accommodated by the foundation systems discussed in Section 5.0 of this report.

TABLE 3.1.3.5-1: Liquefaction-Induced Settlement after Calibration with Borings

CAMPUS	CPT	SETTLEMENT (INCHES)*
Joaquin	1-CPT01	**2.5**
	1-SCPT02	0.9
	1-CPT03	1.8
	1-CPT06	**2.5**
Plymouth	1-CPT09	**2.5**
	1-SCPT10	1.5
	1-CPT11	0.8
	1-CPT12	0.6
Charleston South	1-SCPT04	**2.4**
	1-CPT13	2.0
	1-CPT14	1.2
	1-CPT15	1.2
	1-CPT16	**2.5**
	1-CPT17	1.9
	1-CPT18	1.4
Commons	1-CPT5	**0.5**
	1-CPT7	**0.5**
Space Park	1-CPT8	**3.0**

*Maximum liquefaction induced settlement for each campus are bolded.

3.1.4 Lateral Spreading

Lateral spreading is a failure within a nearly horizontal soil zone (possibly due to liquefaction) that causes the overlying soil mass to move toward a free face or down a gentle slope. The closest free face to these campuses is the Permanente Creek, which is more than 400 feet to the west. Therefore, the risk of lateral spreading at the project site is low.

3.1.5 Flooding

Federal Emergency Management Agency (FEMA) Flood Insurance Maps (Figure 6) indicate that the three sites are within a special flood hazard area subject to inundation by 0.2-percent annual chances of flood. Based on our review of the Precise Plan, dated February 2018 and the City of Mountain View study of 50-year sea-level rise, areas below 13.2 feet above mean sea level will be susceptible to flooding by 2057. The Civil Engineer should review pertinent information relating to possible flood levels for the subject site based on final pad elevations and provide appropriate design measures for development of the project.

3.2 STATIC CONSOLIDATION SETTLEMENT

Our explorations did not encounter highly compressible clay layers and the clayey materials tended to be overconsolidated. Based on the plasticity index (PI), moisture density, and the consolidation test results presented in Appendix C, we do not anticipate the static consolidation settlement to be a controlling hazard at these sites. However, during the design-level analysis, once the development plans and proposed grades are available, if deemed necessary in collaboration with the structural engineer, we may recommend to model anticipated settlement from the proposed structure and fill placement using a 3-dimensional finite-element analysis with PLAXIS 3D.

3.3 2019 CBC SEISMIC DESIGN PARAMETERS

Based on the subsurface conditions encountered and CPT shear wave velocity testing, we classified the five sites as Site Class D in accordance with the 2019 California Building Code (CBC). 2019 CBC is based on the 2016 edition of the American Society of Civil Engineers document titled “Minimum Design Loads and Associated Criteria for Buildings and Other Structures” (ASCE 71-16).

We provide the 2019 CBC seismic design parameters for a Site Class D in Tables 3.3-1 to 3.3-3 for the three campuses, which includes design spectral response acceleration parameters based on the mapped Risk-Targeted Maximum Considered Earthquake (MCE_R) spectral response acceleration parameters.

TABLE 3.3-1: 2019 CBC Seismic Design Parameters, Charleston Campus (Latitude: 37.418704° Longitude: -122.081702°)

PARAMETER FOR CHARLESTON CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.502
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.502
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.618
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.679
Long-period transition-period, T_L (sec)	12

TABLE 3.3-2: 2019 CBC Seismic Design Parameters, Joaquin Campus (Latitude: 37.417614° Longitude: -122.079461°)

PARAMETER FOR JOAQUIN CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0

PARAMETER FOR JOAQUIN CAMPUS	VALUE
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.601
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.661
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-3: 2019 CBC Seismic Design Parameters, Plymouth Campus (Latitude: 37.41611° Longitude: -122.084262°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.602
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.662
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-4: 2019 CBC Seismic Design Parameters, Commons Campus (Latitude: 37.416649° Longitude: -122.078783°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.603
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.663
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-5: 2019 CBC Seismic Design Parameters, Space Park Campus (Latitude: 37.416335° Longitude: -122.077089°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.6
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.661
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

Based on Section 11.4.8 of ASCE 7-16, a ground motion hazard analysis needs to be performed in accordance with Section 21.2 for structures on Site Class D with S_1 greater than or equal to 0.2 unless the structural engineer elects to take the exception described in Section 11.4.8. Once the concept designs are available, we can provide site-specific ground motion hazard analyses under a separate cover.

3.4 SHALLOW GROUNDWATER AND EXCAVATION CONSIDERATIONS

Based on our findings described in Section 2.7 of this report and depending on the future proposed developments, groundwater may impact design of below-grade improvements, such as basements, and construction at these sites. Shallow groundwater conditions may result in the following impacts:

1. Require construction dewatering.
2. Result in unstable conditions at the base of excavation requiring stabilization prior to improvement construction.
3. Cause moisture damage to sensitive floor coverings.
4. Transmit moisture vapor through slabs causing excessive mold/mildew build-up, fogging of windows, and damage to computers and other sensitive equipment.
5. Require waterproofing for the proposed basement structures, if any.

During excavation of the below-grade improvements, if considered in the design, the sides of the excavation may need to be shored. The primary considerations related to the selection of the shoring systems are:

1. Distance of the excavation from improvements sensitive to movement that will remain after building construction, and
2. Potential presence of groundwater during construction, and the need to keep the dewatering to a minimum due to environmental concerns.

3.5 SOIL CORROSION POTENTIAL

As part of this study, we collected eight soil samples and submitted them to a California State certified analytical lab for determination of redox potential, pH, resistivity, sulfate, and chloride. The following results are considered representative of the alluvial deposits in the area and the corrosion potential of the soil on buried concrete structures and metal pipes. The results are included in Appendix D and summarized in the table below.

TABLE 3.5-1: Corrosivity Test Results

CAMPUS	SAMPLE LOCATION	DEPTH (feet)	REDOX (mV)	pH	RESISTIVITY (OHMS-CM)	CHLORIDE* (mg/kg)	SULFATE* (mg/kg)
Joaquin	1-B04	20.5	240	8.23	1,200	N.D.	87
Plymouth	1-B07	5.0	170	8.29	1,100	31	140
	1-B07	25.5	140	8.30	1,200	N.D.	97
Commons	1-B03	8.5	230	8.21	1,900	N.D.	110
	1-B03	41	220	8.22	2,400	N.D.	54
Space Park	1-B06	8	210	8.26	1,100	N.D.	210
	1-B06	26	210	8.47	1,500	N.D.	110
	1-B06	40.5	220	8.38	4,900	N.D.	36

* ASTM D4327

The 2019 CBC references the 2014 American Concrete Institute Manual, ACI 318-14, Chapter 19, Sections 19.3.1.1 for structural concrete requirements. Based on the test results and ACI criteria, the tested soil would classify as 'Not Applicable' for sulfate exposure; there is no requirement for cement type or water-cement ratio for this category; however, a minimum concrete compressive strength of 2,500 psi is specified by the building code. For this sulfate range, we recommend Type II cement and a concrete mix design for foundations and building slabs-on-grade that incorporates a maximum water-cement ratio of 0.5. It should be noted, however, that the structural engineering design requirements for concrete may result in more stringent concrete specifications.

Soil with a pH less than 6.0 is considered to be corrosive to buried metal piping and reinforced concrete structures. The samples had a pH of above 8.0, which does not present corrosion concerns for buried iron, steel, mortar-coated steel, or reinforced concrete structures.

Based on the resistivity measurements, all eight samples are classified as "corrosive" to buried metal piping. 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 criteria nature of the structure. All buried metallic pressure piping, such as ductile iron firewater pipelines, should be protected against corrosion.

If it is desired to investigate this further, we recommend a corrosion consultant be retained to evaluate whether specific corrosion recommendations are advised for the project.

4.0 EARTHWORK RECOMMENDATIONS

The relative compaction and optimum moisture content of soil and aggregate base referred to in this report are based on the most recent ASTM D1557 test method. Compacted soil is not

acceptable if it is unstable. It should exhibit only minimal flexing or pumping, as determined by a representative of our firm.

As used in this report, the term “moisture condition” refers to adjusting the moisture content of the soil by either drying if too wet or adding water if too dry. We define “structural areas” as any area sensitive to settlement of compacted soil. These areas include, but are not limited to building pads, sidewalks, pavement areas, and retaining walls.

4.1 DEMOLITION AND STRIPPING

Grading operations should be observed and tested by our qualified field representative. We should be notified a minimum of three days prior to grading in order to coordinate our schedule with the grading contractor.

Site development should commence with the removal of existing pavement and buildings as well as excavation and removal of buried structures, including utilities and foundations. All debris and soft compressible soil should be removed from any location to be graded, from areas to receive fill or structures, and from areas to serve as borrow. The depth of removal should be determined by our representative in the field at the time of grading.

Existing vegetation should be removed from areas to receive fill or improvements and those areas to serve for borrow. Tree roots should be removed to a depth of at least 3 feet below existing grade. Any topsoil that will be retained for future use in landscape areas should be stockpiled in areas where it will not interfere with grading operations. All excavations from demolition below design grades should be cleaned to a firm undisturbed native soil surface determined by our representative. This surface should then be scarified, moisture conditioned, and backfilled with compacted engineered fill. All backfill materials should be placed and compacted as engineered fill according to the recommendations in Sections 4.4 and 4.5.

Materials and debris should be removed from the project site. With the exception of construction debris (wood, brick, asphalt, concrete, metal, etc.), organically contaminated materials (soil which contains more than 3 percent organic content by weight), and environmentally impacted soil (if any), the upper 10 feet of subsurface material is suitable for reuse as engineered fill.

4.2 EXISTING FILL REMOVAL

If existing non-engineered fill is encountered during construction, we recommend removal of the fill to competent native soil, as evaluated by our field representative. If in a fill area, the base of the subexcavations should be processed, moisture conditioned (as needed), and compacted in accordance with the recommendations for engineered fill.

If existing fill is left in place in portions of the site that are being developed with walkways or other improvements that are not sensitive to settlement, on-going maintenance should be anticipated.

4.3 OVER-OPTIMUM SOIL MOISTURE CONDITIONS

The contractor should anticipate encountering excessively over-optimum (wet) soil moisture conditions during winter or spring grading, or during or following periods of rain. Wet soil can make proper compaction difficult or impossible.

Wet soil conditions can be mitigated by:

1. Frequent spreading and mixing during warm dry weather.
2. Mixing with drier materials.
3. Mixing with a lime, lime-flyash, or cement product; or
4. Stabilizing with aggregate, geotextile stabilization fabric, or both.

We should evaluate Options 3 and 4 prior to implementation.

4.4 ACCEPTABLE FILL

4.4.1 Soil

Onsite soil material is suitable as fill material provided it is processed to remove concentrations of organic material, debris, and particles greater than 6 inches in maximum dimension.

Imported fill materials should meet the above requirements and have a plasticity index less than 12 and at least 20 percent passing the No. 200 sieve. It is important that we sample and test proposed imported fill materials at least 5 days prior to delivery to the site.

4.4.2 Reuse of Onsite Recycled Materials

If desired, the existing asphalt, aggregate and concrete can be considered for use as recycled aggregate to replace some of the import aggregate base for pavements, as well as for structural fill. The material will need to be broken down, but not pulverized, to have a maximum particle size less than 6 inches if used for fill and should conform to the gradations of aggregate base if used to substitute for roadway base.

4.5 FILL COMPACTION

4.5.1 Grading in Structural Areas

After removing the loose soil, the contractor should scarify to a depth of at least 8 inches then moisture condition and compact the subgrade in accordance with the table below. The loose lift thickness should not exceed 8 inches or the depth of penetration of the compaction equipment used, whichever is less.

TABLE 4.5.1-1: Fill Placement Requirements

MATERIALS		FILL LOCATION	MINIMUM RELATIVE COMPACTION (%)	MINIMUM MOISTURE CONTENT (PERCENTAGE POINTS ABOVE OPTIMUM)
Low-Expansive	PI < 25	General Fill	90	3
		Upper 6 inches in Pavement Areas	95	1

The contractor should compact the pavement Caltrans Class 2 Aggregate Base to at least 95 percent relative compaction (ASTM D1557), at a moisture content above the optimum.

4.5.2 Landscape Fill

In landscaping areas, the contractor should process, place, and compact fill in accordance with Section 4.5.1, but to at least 85 percent relative compaction.

4.5.3 Underground Utility Backfill

The contractor is responsible for conducting trenching and shoring in accordance with CALOSHA requirements. Project consultants involved in utility design should specify pipe-bedding materials.

Utility trench backfill should conform to the recommendations in Section 4.5.1. Where utility trenches cross underneath buildings, we recommend that a plug be placed within the trench backfill to help prevent the normally granular bedding materials from acting as a conduit for water to enter beneath or into the building. The plug should be constructed using a sand-cement slurry (minimum 28-day compressive strength of 500 psi) or relatively impermeable native soil for pipe bedding and backfill. We recommend that the plug extend a distance of at least 3 feet in each direction from the point where the utility enters the building perimeter.

Jetting of backfill is not an acceptable means of compaction. Thicker loose lift thicknesses may be allowed based on acceptable density test results, where increased effort is applied to rocky fill, or for the first lift of fill over pipe bedding.

4.6 SITE DRAINAGE

The project Civil Engineer is responsible for designing surface drainage improvements. With regard to geotechnical engineering issues, finish grades should be sloped away from buildings and pavements to the maximum extent practical. The latest California Building Code Section 1804.4 specifies minimum slopes of pervious surfaces be at least 5 percent away from foundations.

Landscaped areas are planned at finished grade elevations, as well as on top of structures. Proper subsurface drainage is required to prevent ponding on covered roofs or along walls. The roofs and drainage systems should be designed with appropriate slope to expediently transfer moisture across and off the roofs.

4.7 STORMWATER BIORETENTION AREAS

We generally encountered a layer of high-plasticity clay directly beneath the aggregate base. Thus, the existing site soil is not likely to have adequate permeability for stormwater infiltration, unless subdrains are installed. We recommend assuming little stormwater infiltration will occur through the existing site soil.

If bioretention areas are planned, we recommend that, when practical, they be placed a minimum of 5 feet away from property lines and structural site improvements, such as buildings, streets, retaining walls, and sidewalks/driveways. When this is not practical, bioretention areas located within 5 feet of structural site improvements can either:

1. Be constructed with structural side walls capable of withstanding the loads from the adjacent improvements, or

2. Incorporate filter material compacted to between 85 and 90 percent relative compaction (ASTM D1557, latest edition) and a waterproofing system designed to reduce the potential for moisture transmission into the subgrade soil beneath the adjacent improvement.

In addition, site improvements located adjacent to bioretention areas that are underlain by base rock, sand, or other imported granular materials, should be designed with a deepened edge that extends to the bottom of the imported material underlying the improvement.

Where adjacent site improvements include buildings greater than three stories, streets steeper than 3 percent, or design elements that will experience lateral loads (such as from impact or traffic), additional design considerations may be required. In addition, although not recommended, if trees are to be planted within bioretention areas, HDPE Tree Boxes that extend below the bottom of the bioretention system should be installed to reduce potential impact to subdrain systems that may be part of the bioretention area design. For this condition, the waterproofing system should be connected to the HPDE Tree Box with a waterproof seal.

Given the nature of bioretention systems and possible proximity to improvements, we recommend that we be retained to review design plans and provide testing and observation services during the installation of linings, compaction of the filter material, and connection of designed drains.

It should be noted that the contractor is responsible for conducting all excavation and shoring in a manner that does not cause damage to adjacent improvements during construction and future maintenance of the bioretention areas. As with any excavation adjacent to improvements, the contractor should minimize the exposure time such that the improvements are not detrimentally impacted.

5.0 PRELIMINARY FOUNDATION RECOMMENDATIONS

The main consideration in foundation design for this project is the potential for seismically induced settlement, as well as static settlement induced by civil fill placement and building loads. We developed foundation recommendations using data obtained from our exploration and engineering analysis. Since the development concepts were not available at the time of preparation of this report, we studied alternative foundation options as a function of number of above-grade and subterranean stories as presented in Table 5.0-1, and Table 5.0-2.

TABLE 5.0-1: Preliminary Foundation Matrix, Charleston South, Joaquin, Plymouth, and Space Park

FOUNDATION TYPES	NUMBER OF ABOVE-GRADE STORIES	NUMBER OF BELOW-GRADE STORIES
Structural Mat Foundation	up to 3 stories	0 (at grade)
	up to 5 stories	1*
	up to 6 stories	2*
Deep Foundation	over 5 stories	any

*Not applicable to Space Park without ground improvement as recommended in Section 4.8

TABLE 5.0-2: Preliminary Foundation Matrix, Commons

FOUNDATION TYPES	NUMBER OF ABOVE-GRADE STORIES	NUMBER OF BELOW-GRADE STORIES
Structural Mat Foundation	up to 6 stories	2
Deep Foundation	over 5 stories	any

For small axillary structures, such as trellis, light poles or garbage enclosures, shallow footings may be used as foundation support.

5.1 STRUCTURAL MAT FOUNDATIONS

A combination of a structural mat foundation and waterproofing is a common system for structures founded below the groundwater table. This option avoids the need for permanent dewatering. Based on the depth of the excavation and groundwater depths, the mat foundation may have to be designed to resist hydrostatic uplift forces.

The thickness of the structural mat will be driven by the structural design. Similar buildings with similar constraints may have mat foundations that are 30 inches or thicker.

Table 5.1-1 and Table 5.1-2 present average allowable bearing pressures that the structural mat should be designed to as a function of below-grade stories.

TABLE 5.1-1: Average Allowable Bearing Pressures, Charleston South, Joaquin, Plymouth, and Commons

ALLOWABLE BEARING PRESSURE (psf*)	NUMBER OF BELOW-GRADE STORIES)	ANTICIPATED TOTAL STATIC AND SEISMIC SETTLEMENT (inches)
1,500**	0 (at grade)	2½
2,000**	1	
3,000	2	

*pounds per square foot (psf)
** Do not apply to Commons Campus

TABLE 5.1-2: Average Allowable Bearing Pressures, Space Park

ALLOWABLE BEARING PRESSURE (psf*)	NUMBER OF BELOW-GRADE STORIES)	ANTICIPATED TOTAL STATIC AND SEISMIC SETTLEMENT (inches)
1,500	0 (at grade)	3
2,000**	1	
3,000**	2	

*pounds per square foot (psf)
**At the Space Park Campus, applicable only after ground improvement as recommended in Section 5.5.

The allowable bearing capacities presented in Table 5.1-1 and Table 5.1-2 may be increased to 3,000 psf in areas of loading concentration. The allowable bearing pressures presented in Table 5.1-1 and 5.1-2 may be increased by one-third when considering transient loads, such as wind or seismic.

If a spring constant is needed for design, a preliminary modulus of subgrade reaction (k_s) of 100 pounds per square inch per inch of deflection (psi/in) for a 1 foot by 1 foot plate can be used for static loading at all campuses and seismic loading at all campuses excluding Space Park Campus; at Space Park, a k_s of 100 psi/in can be used for on-grade construction only. At Space Park Campus, we recommend that ground improvement be implemented if a basement is constructed due to the elevations where soil subject to cyclic-liquefaction are located; modulus for a mat bearing on ground improvement will need to be determined based on the type of ground improvement and spacing. During the design-level studies, the structural engineer should provide us with mat pressures and deflections based on these recommendations to optimize the design of the mat.

Resistance to short-duration (earthquake and wind-induced) lateral loads may be provided by frictional resistance between the foundation concrete and the bearing soil and by passive earth pressure acting against the side of the foundation. A coefficient of friction of 0.30 can be used between concrete and the subgrade. Where the bottom of the mat will be underlain by a waterproofing membrane, the coefficient of friction should be reduced to 0.15 to 0.20 between the membrane and the subgrade (depending on membrane properties).

5.2 DEEP FOUNDATIONS

A deep foundation system can be used to support buildings with more than five stories. Deep foundations will gain support through skin friction and end bearing in the subsurface soil. There are many deep foundation systems available, including driven precast concrete or steel piles, Cast-in-Drilled Hole (CIDH), EDTTEX[6], Tubex or Torque-down piles and auger-cast displacement piles (ACP). Pile groups are expected to be connected by pile caps and interior grade beams.

Based on our experience in similar projects, ACP and CIDH piles are preferred deep foundation systems in order to reduce noise impacts to occupants in nearby structures. ACPs are deep foundation elements that are constructed by rotating a continuous flight hollow-stem auger into the soil. Concrete or grout is pumped under pressure through the hollow stem as the auger is withdrawn and a reinforcing cage can be installed while the concrete or grout is still in a fluid condition. CIDHs are a high-capacity deep foundation system that is constructed by drilling a cylindrical borehole to design diameter and depth, lowering reinforcing steel (rebar) into the drilled shaft, and then filling the shaft with concrete.

ACP, EDTTEX, Tubex or other torque down piles are typically designed and constructed by a specialty contractor using proprietary means and methods. Driven piles and CIDH, if selected, can be designed by the project structural engineer in collaboration with us. Any deep foundation design be verified via full-scale load tests to assess the axial capacity.

5.2.1 Preliminary Pile Capacities

Based on the subsurface conditions at these sites and our experience with similar projects, we provide the following preliminary estimates of pile foundation axial capacity to support your project's scoping and conceptual planning phase.

We utilized the idealized soil profile presented in Section 2.5 to estimate the preliminary vertical pile capacity of a single 16-inch-diameter ACP. Table 5.2-1 presents ultimate vertical ACP

[6] The EDTTEX piles are steel and concrete pipe composite piles that are into ground under very heavy torque and down pressure.

capacities for static and seismic conditions. We used post-liquefaction/liquefaction residual shear strength per Olson and Stark (2002) and Idriss and Boulanger (2008) for seismic considerations due to liquefaction and cyclic softening, respectively.

TABLE 5.2-1: Preliminary Ultimate Vertical Pile Capacities for 16-inch ACP

CAMPUS	DEPTH TO REACH 200 TONS OF ULTIMATE PILE CAPACITY (feet)*	
	STATIC CONDITION	SEISMIC CONDITION
Charleston South	88	102
Joaquin	75	81
Plymouth	93	96
Commons	75	79
Space Park	77	82

*Once the development plans are available, we should update these values with downdrag considerations.

We anticipate a total static and seismic settlement of less than 1 inch and differential settlement of less than ½ inch under pile supported structures. We also anticipate the differential settlement between pile-supported and surrounding areas to be up to approximately 1½ inches following an earthquake that results in liquefaction. Entry and pipe connections to deep-foundation-supported buildings should be assessed to confirm the anticipated differential settlement can be tolerated; otherwise, flexible entry and pipe connections may be considered.

We will evaluate the lateral capacities and soil-structure interaction parameters during the design-level studies once the development plans are available. Design axial capacity values of piles should be verified via full-scale load tests prior to construction of production piles.

5.3 SPREAD FOOTINGS

Spread footings may be used to support small auxiliary structures. Continuous or isolated spread footings should bear in competent native soil or compacted fill. Minimum footing dimensions are presented in Table 5.3.1-1 below.

TABLE 5.3.1-1: Minimum Footing Dimensions

FOOTING TYPE	*MINIMUM DEPTH (INCHES)	MINIMUM WIDTH (INCHES)
Continuous	12	18
Isolated	12	18

* below lowest adjacent pad grade

The minimum footing depths shown above are taken from lowest adjacent pad grade. To limit total static settlement to less than 1 inch, shallow footings should be designed with a maximum allowable bearing pressure of 1,500 psf for dead-plus-live loads. The maximum allowable bearing pressure is a net value; the weight of the footing may be neglected for design purposes. Footings located adjacent to utility trenches should have their bearing surfaces below an imaginary 1:1 (horizontal:vertical) plane projected upward from the bottom edge of the trench to the footing.

This bearing capacity may be increased by one-third for the short-term effects of wind or seismic loading. However, seismically induced settlement in the range of 2½ to 3 inches (reference

Section 3.1.3 for estimates by Campus) should be expected for auxiliary structures supported on shallow footings, unless the risk of liquefaction is mitigated by ground improvement methods.

Lateral loads may be resisted by friction along the base and by passive pressure along the sides of shallow footings. A coefficient of friction of 0.30 can be used between concrete and the subgrade.

5.4 BASE HEAVE AND UPLIFT FORCES

If subterranean stories are considered, the excavation subgrade may experience heave during excavation and recompression during foundation construction. Shoring walls or groundwater cut-off systems should be designed to reduce the risk of subgrade heave on the project.

Moreover, due to shallow groundwater conditions, the weight of the building should be assessed to determine whether there is sufficient weight to offset the hydrostatic uplift loads when subterranean stories are planned. Hydrostatic uplift forces should be estimated assuming buoyancy below the design groundwater at a depth of 6 feet. Uplift resistance can be provided by the weight of the foundation elements and structural loads. Additional resistance to uplift may be provided by installing hold-down piers or anchors in conjunction with mat foundation or evaluating tension resistance from foundation piles. Hold-down piers or anchors may be evaluated using a preliminary allowable skin friction of 500 psf.

The risk of base heave and hydrostatic uplift should be assessed as part of the shoring and dewatering system design.

5.5 GROUND IMPROVEMENT

As described in Sections 3.1.3 and 5.1, at the Space Park Campus, to use a mat foundation in conjunction with one or two below-grade stories, ground improvement is recommended. The ground improvement should reduce the potential liquefaction-induced settlement and provide an improved bearing capacity to support shallow foundation loads. Ground improvement should target the near-surface liquefaction-susceptible deposit of silty and sandy soil described in Section 2.4.5. Based on our exploration, we recommend ground improvement elements extend to Elevation -33 feet or deeper. Based on our experience, ground improvement methods such as deep soil mixing, drilled displacement columns, or rammed aggregate piers are effective in mitigation of the potentially liquefiable/cyclic softening soil.

The benefits of deep soil mixing and drilled displacement columns include low vibration during construction and little to no soil spoils. Rammed aggregate piers and rapid impaction compaction could generate strong vibrations, making these two methods less desirable in a developed environment.

Soil improvement is typically procured as a design-build element of a project. The selection and design of the ground improvement system should be determined with input from an experienced general contractor. This allows consideration of individual specialty contractors' proprietary means and methods in selecting the most cost-effective approach that meets specific project performance and quality objectives. Conceptual ground improvement plans should show the extent of the work, coordination with other elements, including foundations, utilities, and project phasing requirements. We can assist in the preparation of a design-build Request for Proposal (RFP) for the ground improvement and should review the design submittal prior to construction. During ground improvement selection, we should be consulted regarding the selected method

and provided opportunity to work with the design-build contractor to develop the appropriate design bearing capacity and update our estimate of differential settlement.

Future collaboration with the structural engineer and ground improvement contractor will be important to develop specific foundation and ground improvement recommendations once final structural details and loading are developed.

The ground improvement design should yield a total post-construction seismically induced settlement of 1 inch or less. At a minimum, ground improvement should be utilized within the building pad and should be performed on a uniform grid so that the effective modulus of the soil during liquefaction is at least 150 psi/in. If the design team considers foregoing ground improvement measures in surface parking and landscape areas, maintenance and repairs should be expected in future seismic events to repair improvements such as sidewalks and walkways as needed. We anticipate that differential settlement between ground improved areas and surrounding unimproved areas could be up to approximately 3 inches. Entry and pipe connections should be assessed to confirm the anticipated differential settlement can be tolerated; otherwise, flexible entry and pipe connections may be considered.

6.0 SECONDARY SLABS-ON-GRADE

Exterior flatwork includes items such as concrete sidewalks, steps, and outdoor plazas exposed to foot traffic only. Concrete flatwork should have a minimum thickness of 4 inches and include control and construction joints in accordance with current Portland Cement Association Guidelines.

Exterior slabs should slope away from the buildings to prevent water from flowing toward the foundations. Site soil should be moistened just prior to concrete placement.

We recommend that flatwork leading to a building entrance area be structurally independent of the building foundation to allow for differential movement between the flatwork and the building. Where smooth transition to provide access is necessary (ADA ramps), a hinge-slab should be designed to accommodate movements of approximately ½ inch. Flatwork should be reinforced to allow for the appropriate span in the event of settlement. Maintenance or replacement of entry slabs should also be expected following a seismic event as the ground settles at the perimeter of buildings.

7.0 DESIGN-LEVEL GEOTECHNICAL REPORT

This report presents preliminary geotechnical findings, conclusions and recommendations intended for preliminary planning purposes only. A design-level geotechnical exploration and assessment should be performed when development plans are available and existing buildings are demolished.

The design-level geotechnical report should further discuss topics presented in this report and address the following items:

- Additional explorations after demolition of existing buildings to support design-level recommendations.
- Site-specific seismic hazard analysis based on CBC 2019 (ASCE 7-16), if needed based on the proposed buildings.

- 3-dimensional finite-element analysis with PLAXIS 3D model to evaluate anticipated settlement from the proposed structures and fill placement, if needed.
- Deep foundation design parameters, including lateral capacities, group effects and pile response.
- Considerations during design of dewatering and shoring systems.
- Ground improvement design as needed.

8.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report presents geotechnical recommendations for design of the Google North Bayshore (Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses) project discussed in Section 1.3. If changes occur in the nature or design of the project, we should be allowed to review this report and provide additional recommendations. 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, 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; therefore, we are unable to guarantee or warrant the results of our services.

This report is based upon field and other conditions discovered at the time of report preparation. We developed this report with limited subsurface exploration data. We assumed that our subsurface exploration data are representative of the actual subsurface conditions across the site. Considering possible underground variability of soil, rock, fill, and groundwater, additional unexpected costs may be incurred in completing the project. We recommend that the owner establish a contingency fund to cover such costs. If unexpected conditions are encountered, ENGEO should be notified immediately to review these conditions and provide additional and/or modified recommendations, as necessary.

Our services did not include excavation sloping or shoring, soil volume change factors, flood potential, or a geohazard exploration. In addition, our geotechnical exploration did not include work to determine the existence of possible hazardous materials. If any hazardous materials are encountered during construction, the proper regulatory officials should be notified immediately.

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Actual field or other conditions will necessitate clarifications, adjustments, modifications or other changes to ENGEO's recommendations. Therefore, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include onsite construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from

the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

We determined the boundaries designating the interface between layers on the exploration logs using visual observations. The transition between the materials may be abrupt or gradual. The exploration logs contain information concerning samples recovered, indications of the presence of various materials such as clay, sand, silt, rock, existing fill, etc., and observations of groundwater encountered. The field logs also contain our interpretation of the subsurface conditions between sample locations. Therefore, the logs contain both factual and interpretative information. Our recommendations are based on the contents of the final logs, which represent our interpretation of the field logs.

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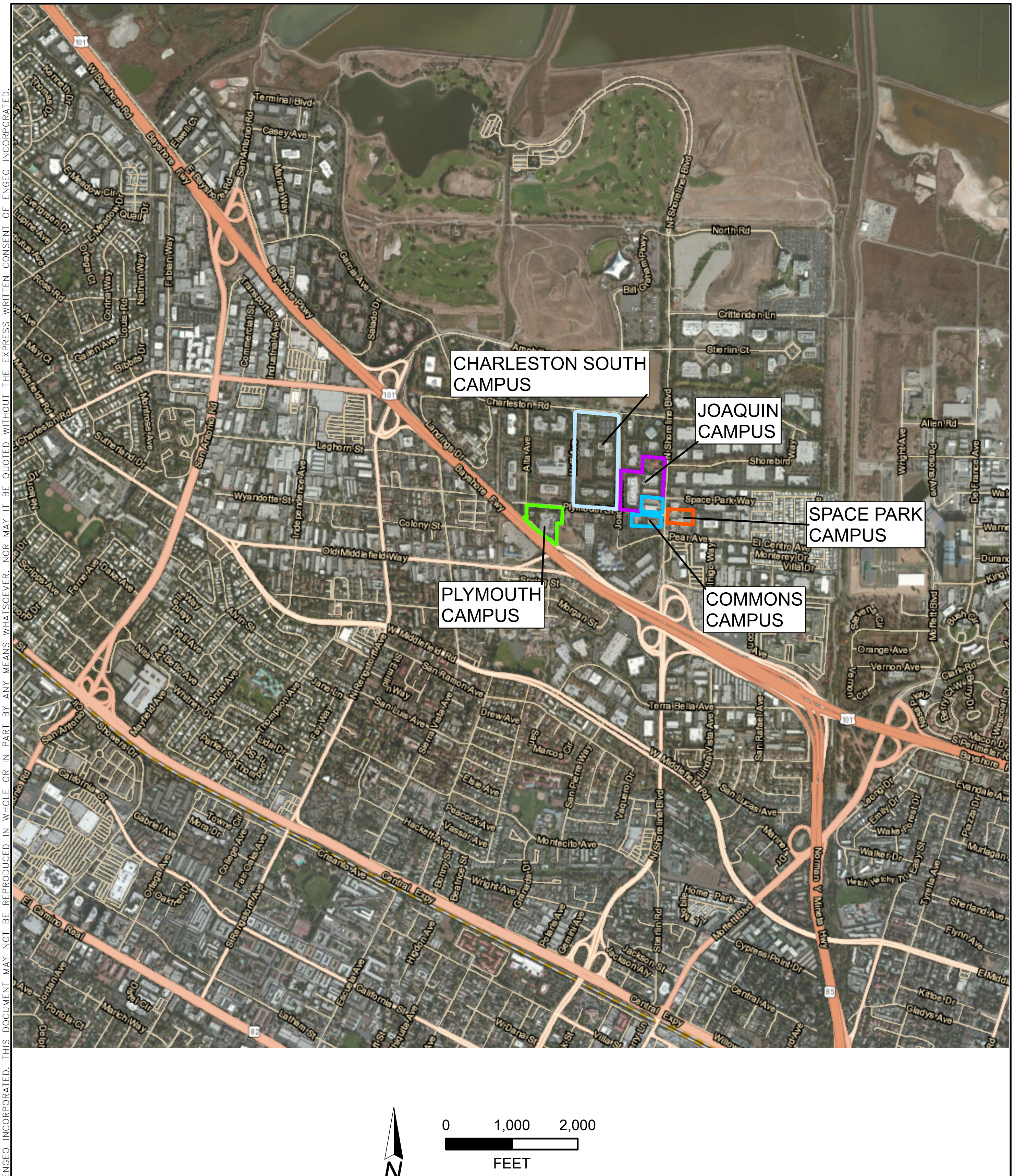
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FIGURES

FIGURE 1: Vicinity Map
FIGURE 2A: Site Plan – Charleston South Campus
FIGURE 2B: Site Plan – Joaquin Campus
FIGURE 2C: Site Plan – Plymouth Campus
FIGURE 2D: Site Plan – Space Park Campus
FIGURE 2E: Site Plan – Commons Campus
FIGURE 3: Regional Geologic Map
FIGURE 4: Seismic Hazard Zones Map
FIGURE 5: Regional Faulting and Seismicity
FIGURE 6: FEMA Flood Insurance Map



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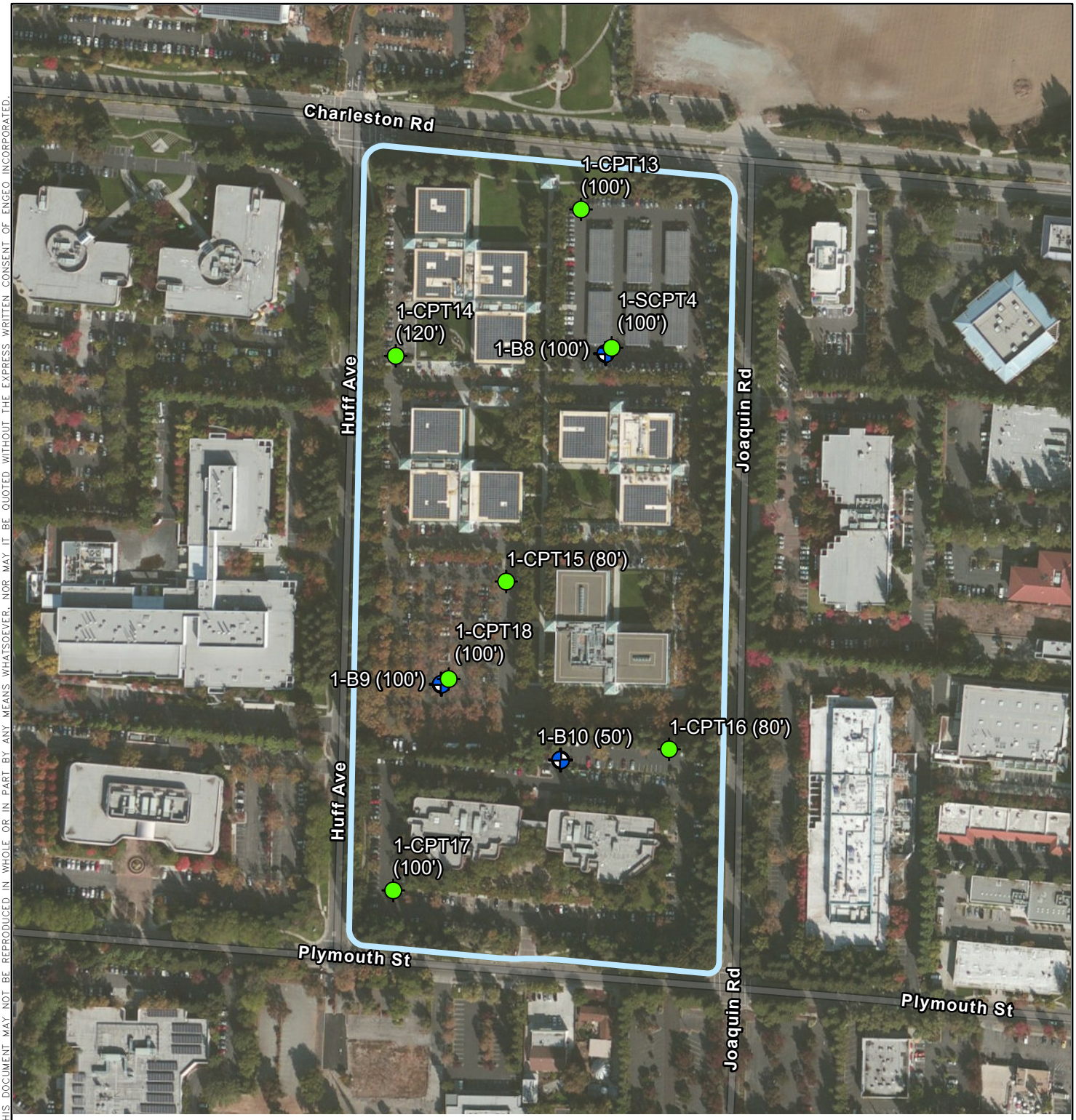
VICINITY MAP
GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. : 15949.000.000	FIGURE NO. 1
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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- PROJECT SITE
- CPT (ENGEO, 2019)
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SITE PLAN - CHARLESTON SOUTH CAMPUS

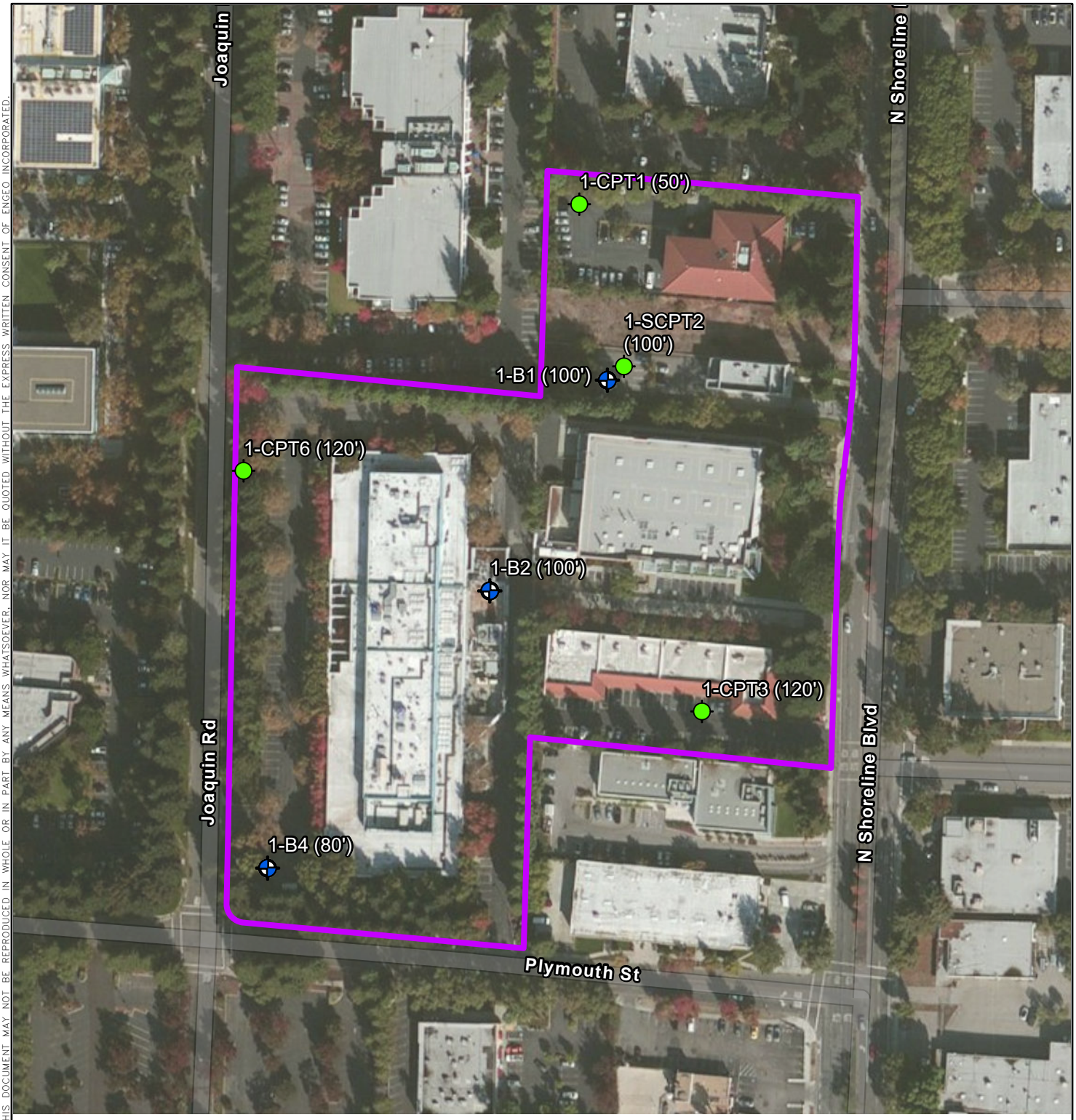
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FIGURE NO. 2A

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SITE PLAN - JOAQUIN CAMPUS

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MOUNTAIN VIEW, CALIFORNIA

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FIGURE NO. 2B

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SITE PLAN - PLYMOUTH CAMPUS

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SITE PLAN - SPACE PARK CAMPUS

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MOUNTAIN VIEW, CALIFORNIA

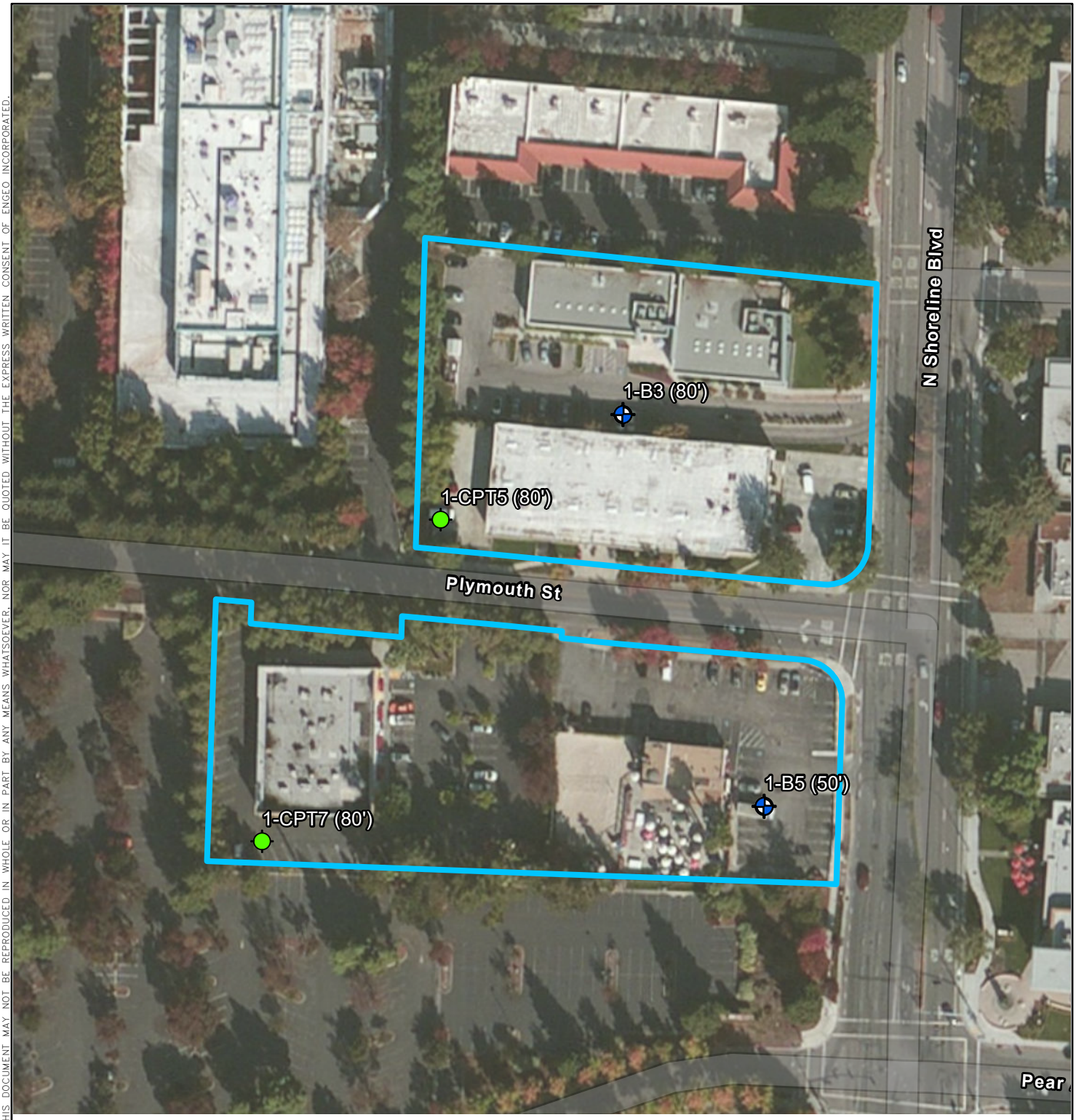
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SITE PLAN - COMMONS CAMPUS

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MOUNTAIN VIEW, CALIFORNIA

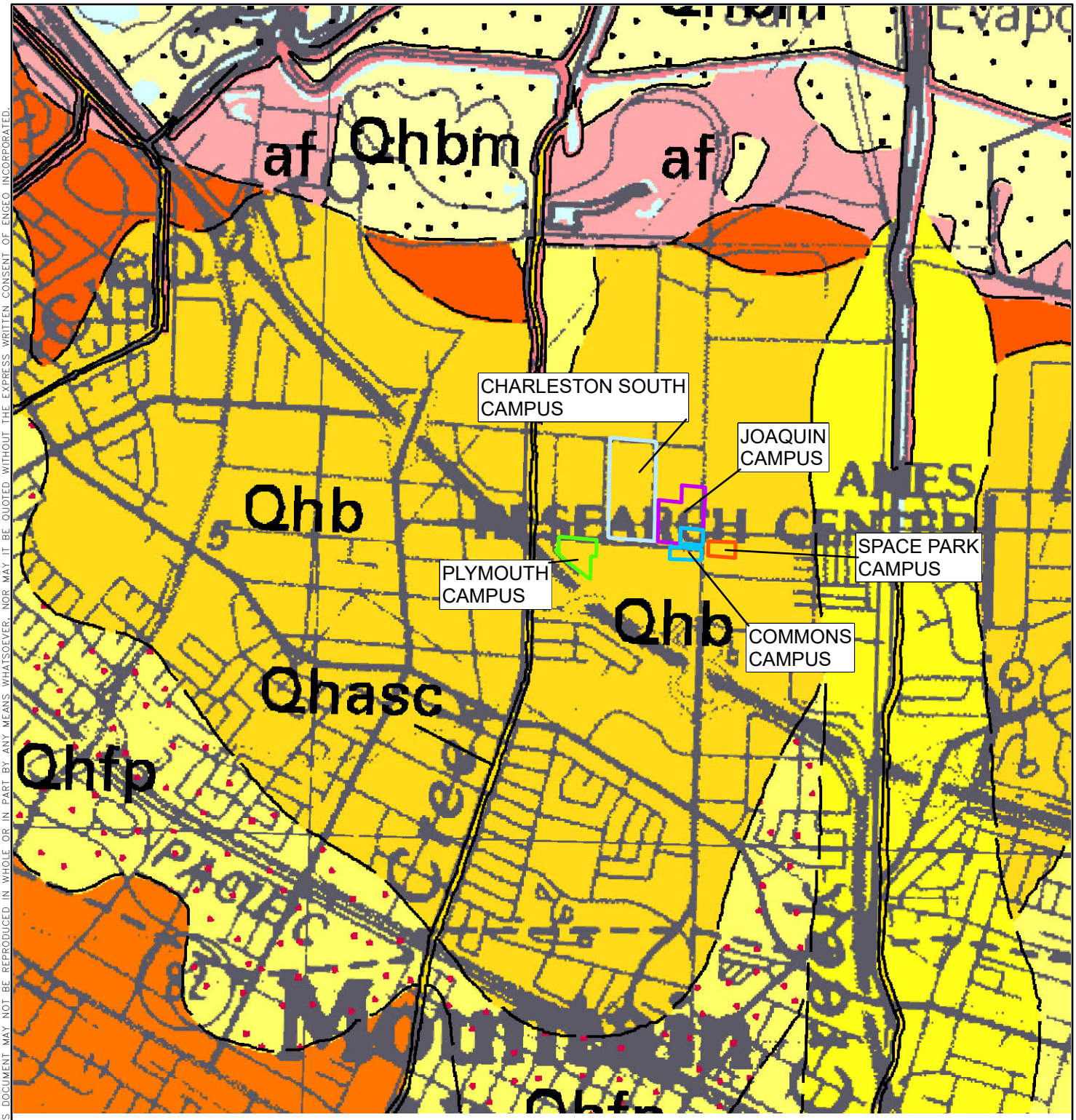
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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

af	ARTIFICIAL FILL (HISTORIC)
Qhasc	ARTIFICIAL STREAM CHANNELS (HISTORIC)
Qhbm	BAY MUD (HOLOCENE)
Qhb	BASIN DEPOSITS (HOLOCENE)
Qhfp	FLOOD-PLAIN DEPOSITS (HOLOCENE)

BASEMAP SOURCE: BRABB 2000

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REGIONAL GEOLOGIC MAP

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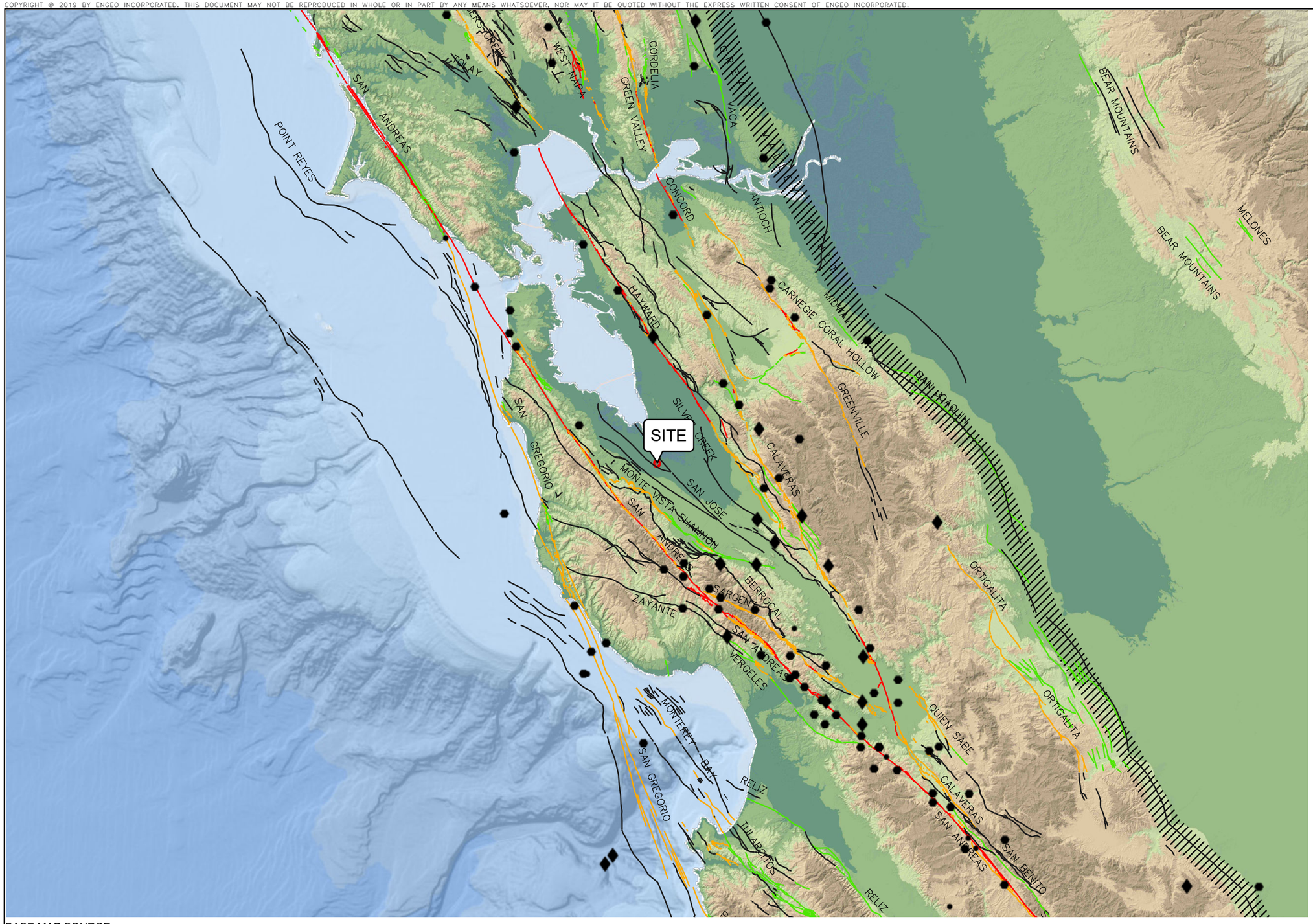
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FIGURE NO. 3

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Miles

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

EARTHQUAKE

- MAGNITUDE 7+
- MAGNITUDE 6-7
- MAGNITUDE 5-6

USGS QUATERNARY FAULTS

- HISTORICAL
- LATEST QUATERNARY
- LATE QUATERNARY
- UNDIFFERENTIATED QUATERNARY
- HISTORIC BLIND THRUST FAULT ZONE

BASE MAP SOURCE

ESRI, GARMIN, GEBCO, NOAA NGDC, AND OTHER CONTRIBUTORS
COLOR HILLSHADE IMAGE BASED ON THE NATIONAL ELEVATION DATA SET (NED) AT 30 METER RESOLUTION
U.S.G.S. QUATERNARY FAULT DATABASE, 2018
U.S.G.S. HISTORIC EARTHQUAKE DATABASE (1800-PRESENT)

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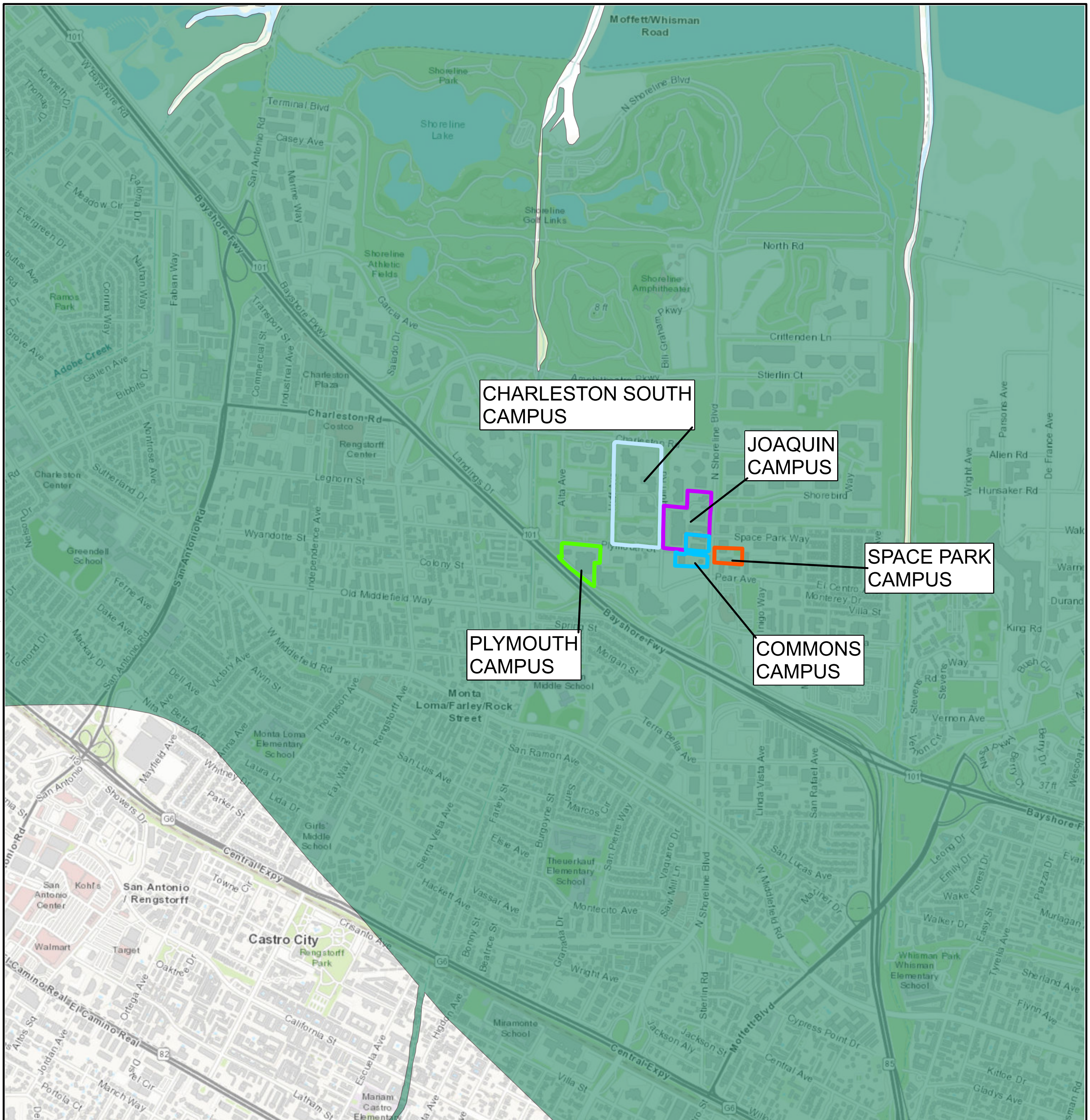
REGIONAL FAULTING AND SEISMICITY

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

Liquefaction Zone
Areas where historical occurrence of liquefaction, or local geological,geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required

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BASEMAP SOURCE: ESRI MAPPING SERVICE
CALIFORNIA DEPARTMENT OF CONSERVATION, CALIFORNIA GEOLOGICAL SURVEY

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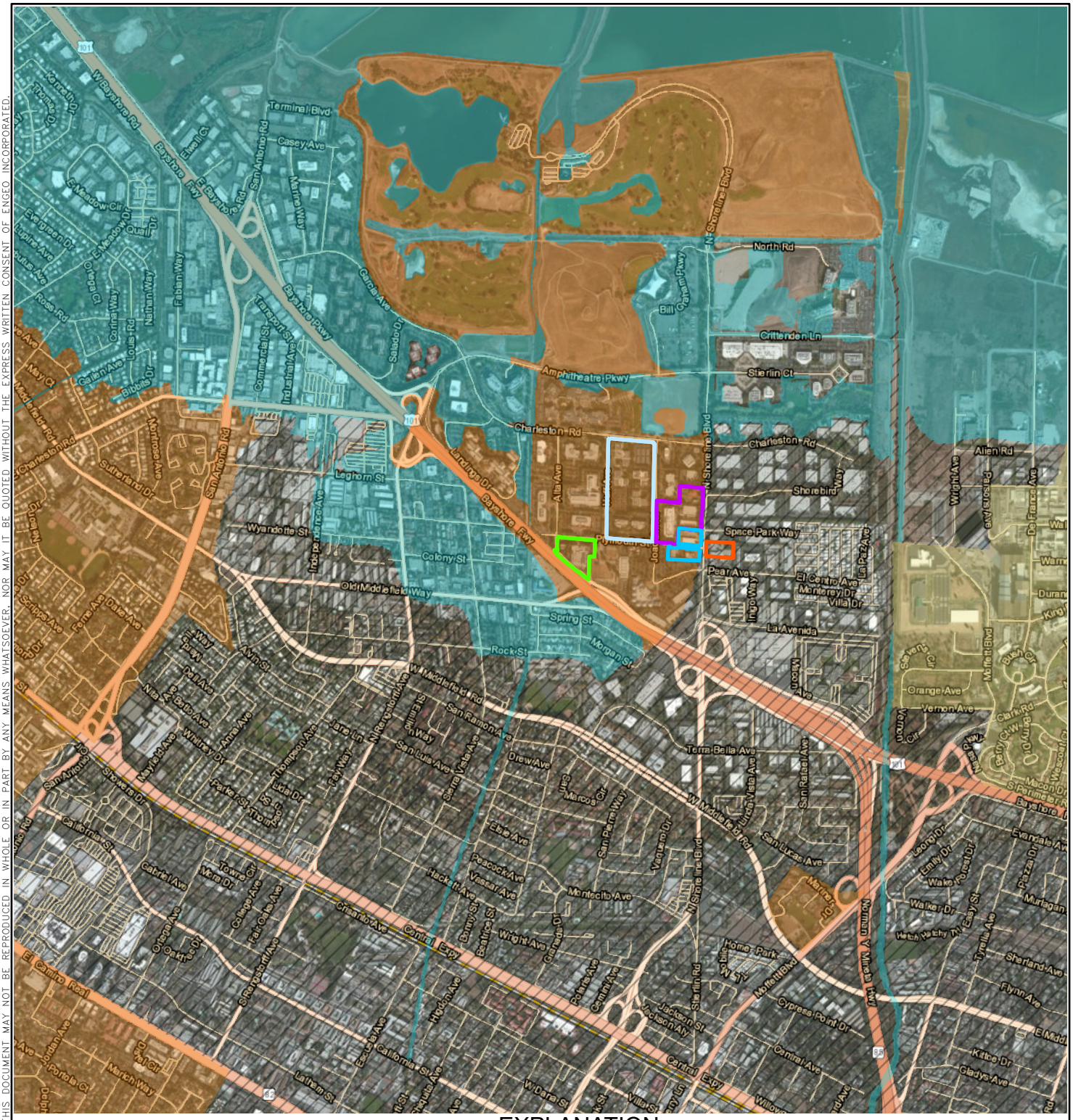
SEISMIC HAZARDS ZONE MAP
GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. : 15949.000.000		FIGURE NO. 5
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EXPLANATION

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- 1% ANNUAL CHANCE FLOOD HAZARD
- AREA OF UNDETERMINED FLOOD HAZARD
- 0.2% ANNUAL CHANCE FLOOD HAZARD
- AREA WITH REDUCED RISK DUE TO LEVEE
- CHARLESTON SOUTH CAMPUS
- JOAQUIN CAMPUS
- PLYMOUTH CAMPUS
- SPACE PARK CAMPUS
- COMMONS CAMPUS

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FEET

BASEMAP SOURCE: ESRI MAPPING SERVICE CALIFORNIA GEOLOGICAL SURVEY, 2009

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FEMA FLOOD INSURANCE MAP

GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. :	15949.000.000
SCALE:	AS SHOWN
DRAWN BY: QRL	CHECKED BY: JK

FIGURE NO. 6

PATH: G:\DRAFTING\DRAFTING2_DWG_13000 PLUS\15949\000\072219GEX\GOOGLE NORTH BAYSHORE CHARLESTON SOUTH.APRX
USER: QLIANG

ORIGINAL FIGURE PRINTED IN COLOR



APPENDIX A

EXPLORATION LOGS

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
- Dames and Moore Piston
- 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-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			4" Aggregate Base												
			LEAN CLAY (CL), dark grayish brown, dry, low plasticity, some fine-grained sand												
	10														
5			olive brown, moist, very stiff, medium plasticity, slow dilatency			36									
	5														
10			CLAYEY SAND TO SANDY LEAN CLAY (CL-SC), pale olive, stiff to very stiff, wet, medium plasticity, rapid dilatancy, fine-grained sand			150-300 psi	26	18	8	51	18	112.5		4.0*	PP
	0		SANDY CLAY (CL), pale olive, stiff, wet, medium plasticity, rapid dilatancy			9	37	16	21	62	24.8	103.3	1377		UC
15			CLAYEY GRAVEL WITH SAND (GC), greenish gray, medium dense to dense, rapid dilatancy, 15% fine-grained sand, 35% to 30% fine gravel			31	30	17	13	40	20.3	112.5			
	-5		WELL GRADED SAND WITH SILT AND GRAVEL (SW), greenish gray, medium dense, wet, trace silt and clay			18				7					
20			WELL GRADED GRAVEL WITH SAND AND SILT (GW), greenish gray, medium dense, wet, 35% to 45% coarse sand												
			FAT CLAY (CH), grayish green, medium stiff, wet, high plasticity, 5% to 10% coarse-grained sand			7					28.2	98.5		.5*	PP
	-10														
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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			FAT CLAY (CH), grayish green, very stiff, wet, high plasticity, 5% to 10% coarse-grained sand			30					22.6	105.5	6386		UC
	-15														
30			GRAVELLY LEAN CLAY (GC-CL), pale olive, stiff to very stiff, wet, medium plasticity, 50% to 55% fine angular to subangular gravel, trace fine-grained sand			21	42	15	27	53				2.0*	PP
	-20														
35			POORLY GRADED SAND WITH GRAVEL (SP), dense, wet, 25% to 35% coarse gravel, trace silt and clay			41									
	-25														
40			LEAN CLAY (CL), yellowish brown, very stiff, medium plasticity, no dilatancy, trace fine, subrounded gravel			16					22	106.8		2.5*	PP
	-30														
45			FAT CLAY (CH), pale olive, stiff, moist, high plasticity, slow dilatancy, with 5% to 10% fine rounded gravel			12	55	16	39	92					
	-35														
50															

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Google North Bayshore
Mountain View, CA
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			FAT CLAY (CH), pale olive mottled with pale yellow, hard, moist, high plasticity, slow dilatancy, with 5% to 10% fine rounded gravel			40					21.1	109.4	3508.2		UU
55	-40														
	-45														
60			POORLY GRADED GRAVEL (GP), dark gray, dense, angular to subangular			44								>4.5*	PP
	-50		LEAN CLAY (CL), pale olive mottled with pale yellow, hard, low plasticity, trace gravel												
65															
	-55														
70			Trace fine-grained sand grayish green, moist, low to medium plasticity, trace fine-grained sand, slow dilatency			58					27.6	96.3		>4.5*	PP
	-60														
75															

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			LEAN CLAY (CL), pale olive mottled with pale yellow, hard, low plasticity, trace gravel												
	-65		CLAYEY SAND (SC), grayish green, very dense, wet, high plasticity clay			35				43					
80															
	-70														
85															
	-75														
90			Medium dense			18					26.5	99.4			
	-80														
95															
	-85														
100															

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			FAT CLAY (CH), grayish green with pale olive, very stiff, wet, high plasticity, no dilatancy, trace fine-grained sand			29								2.5*	PP
			Boring Terminated at a depth of 101.5 feet below ground surface on May 19, 2019. Unable to determine groundwater depth due to drilling method.												

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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt 13" Aggregate Base												
			SANDY LEAN CLAY WITH GRAVEL (CL), dark brown, moist, low plasticity, fine- to coarse-grained sand, subangular to subrounded fine gravel												
			LEAN CLAY WITH SAND (CL), dark brown to black, very stiff, moist, medium plasticity, high toughness, fine- to coarse-grained sand, some fine subrounded gravel												
5	10		FAT CLAY (CH), dark brown to black, very stiff, moist, high plasticity, with subangular to subrounded fine gravel light olive brown, no gravel			18	61	19	42	82				3.5*	PP
10	5		medium stiff			7					12.5				
			WELL GRADED GRAVEL WITH SAND (GW), dark gray, loose, wet, angular, subrounded, coarse-grained sand, trace clay												
15	0		possilbe low blow counts due to rock wedged in SPT shoe			4									
			LEAN GRAVELLY CLAY (CL), grayish green, medium stiff, wet, medium plasticity, low toughness, fine subrounded gravel			8	41	16	25	65			600*		TV
20	-5		POORLY GRADED SAND (SP), grayish green, loose to medium dense, wet, with some fine angular gravel Disturbed samples. Initially no recovery, then samples were taken by pushing sampler.			12									
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
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SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY CLAY (CL), grayish green, wet, trace coarse-grained sand			200-600 psi									
			WELL GRADED GRAVEL WITH SAND (GW), greenish gray, loose to medium dense, wet, angular, subrounded, fine- to coarse-grained sand, few silt			12									
			SILT (ML), greenish gray, stiff, wet, low plasticity, medium toughness												
	-15														
30			CLAYEY SAND (SC), light yellowish brown, medium dense, wet, medium plasticity, with some coarse subangular gravel			22	43	16	27	26	13.2	120.9		3.75*	PP
	-20														
35			CLAYEY GRAVEL WITH SAND (GC), light yellowish brown, medium dense, wet, 35% to 40% fines, 30% to 35% fine subangular gravel			20				36					
			LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, with some silt			11									
	-25														
40			POORLY GRADED SAND (SP), light yellowish brown to gray, medium dense, wet, with some fine subangular gravel and clay												
			LEAN CLAY (CL), light yellowish brown, very stiff, wet, medium plasticity, high toughness			17									
	-30														
45			LEAN CLAY (CL), olive brown, stiff, wet, medium plasticity, with fine to coarse angular to subrounded gravel			22					14.92	123.2	1171		UU
	-35														
50															

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LOG OF BORING 1-B02

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15949.000.000

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LOGGED / REVIEWED BY: J. Tognolini / JK
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DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), yellowish brown, medium dense, wet, fine-to medium-grained sand, some fine subrounded gravel			30					16	117.7			
	-40		LEAN CLAY (CL), reddish brown, very stiff, wet, low plasticity, medium toughness, with silt and some fine- to medium-grained sand												
55															
	-45														
60						22					22	106		>4.5*	PP
	-50														
65															
	-55														
70			Greenish gray, stiff, medium plasticity, no sand			16					25.25	101.7	1237		UU
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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			LEAN CLAY (CL), reddish brown, very stiff, wet, low plasticity, medium toughness, with silt and some fine- to medium-grained sand												
80	-65		Olive brown, with some silt and trace sand			19							600*		TV
85	-70		POORLY GRADED SAND WITH GRAVEL (SP), olive brown to gray, medium dense, wet, angular to subangular fine gravel												
			LEAN CLAY (CL), olive brown to gray, very stiff, wet, medium plasticity, high toughness			32									
90	-75														
95	-80														
100	-85														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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			LEAN CLAY (CL), olive brown to gray, very stiff, wet, medium plasticity, high toughness			40					30.1	93.8	3600*	3*	PP+TV
			Boring Terminated at a depth of 101.5 feet below ground surface on May 19, 2019. Unable to determine groundwater depth due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

LOG OF BORING 1-B03

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LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2" Asphalt 12" Aggregate Base FAT CLAY (CH), very dark brownish gray, moist to dry												
5	10		Very stiff, fissured			20	86	19	67	96	30.9	88		3.7*	PP
			Light olive, stiff, moist, medium plasticity			10								1.0*	PP
10	5		Pale olive			10	59	30	29	99	23.8	102.1	1487.4		UU
15	0		POORLY GRADED SAND WITH GRAVEL AND SILT (SP-SM), dark brown, dense, wet			42					9.2	132.1			
20	-5		Medium dense			24				9					
			LEAN CLAY WITH SAND (CL), reddish yellow mottled with olive, stiff, moist, high plasticity												
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B03

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			LEAN CLAY WITH SAND (CL), reddish yellow mottled with olive, stiff, moist, high plasticity			15					30.1	93.7	1080.1		UU
30	-15		FAT CLAY (CH), dark reddish yellow mottled with olive, very stiff, trace coarse gravel			15	50	20	30	81	29.2			2.1*	PP
35	-20					27								2.75*	PP
40	-25		Stiff, fine-to-coarse-grained sand, trace fine gravel			13								1.5*	PP
45	-30		CLAYEY SAND (SC), dark yellowish brown, medium dense, fine- to-coarse-grained sand			24	38	15	23	39	18.6				
			FAT CLAY (CH), dark yellowish brown, stiff to very stiff, moist, high plasticity			14								2.0*	PP
50	-35														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

ENGEO
Expect Excellence

LOG OF BORING 1-B03

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), pale olive to olive, very stiff, moist, high plasticity, fine- to-coarse-grained sand			35	38	17	21		22	106.1		2.75*	PP
55	-40														
60	-45		Reddish yellow mottled with pale olive			32					23.5	104.9		2.9*	PP
65	-50														
			LEAN CLAY (CL), olive to olive gray, stiff, moist, high plasticity												
70	-55					20					29.3	94.8		1.75*	PP
75	-60														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B03

Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive to olive gray, stiff, moist, high plasticity												
80	-65		POORLY GRADED SAND WITH CLAY (SP-SC), dark olive gray, wet, coarse-grained sand			57				10	22.4	103			
			Boring terminated at a depth of 81.5 feet below ground surface. Groundwater not encountered due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B04

ENGEO Expect Excellence

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2" Asphalt												
			11" Aggregate Base												
			LEAN CLAY (CL), very dark brownish gray, moist, low plasticity, trace fine- to coarse-grained sand, trace organics												
	10														
5			LEAN CLAY WITH GRAVEL (CL), light greenish gray, stiff, moist, low plasticity, 10% to 15% gravel, 5% to 10% fine- to coarse-grained sand, trace organics			8									
	5		SANDY LEAN CLAY (CL), olive brown, very stiff, moist, 35% to 40% fine- to coarse-grained sand, trace fine gravel			18	NP	NP	NP		17.4	117.4		3.0*	PP
10			POORLY GRADED SAND WITH SILT (SP), olive brown, medium dense, wet, 10% to 15% fines, trace fine gravel			19				11					
	0														
15			SANDY FAT CLAY (CH), dark greenish gray, medium stiff, moist, 30% to 35% fine- to coarse-grained sand			7								2.25*	PP
	-5														
20			FAT CLAY WITH SAND (CH), dark yellowish brown mottled with greenish gray, medium stiff to stiff, moist, medium plasticity, weak cementation, fine- to coarse-grained sand, trace fine gravel, with iron oxide staining			9					23.9	102		1.0*	PP
	-10		CLAYEY SAND (SC), dark yellowish brown mottled with greenish gray, loose to medium dense, moist, 35% to 40% fines												
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), dark yellowish brown mottled with greenish gray, loose to medium dense, moist, 35% to 40% fines			11	40	18	22	38				.75*	PP
	-15														
30			Medium dense			14					16.2	120.7			
	-20														
35			25% to 35% fines			16	30	18	12	30					
	-25														
			FAT CLAY WITH SAND (CH), dark yellowish brown, stiff to very stiff, moist, 25% to 30% fine to coarse sand, trace fine gravel												
40						15								3.75*	PP
	-30														
45															
			LEAN CLAY WITH SAND (ML), dark yellowish brown, stiff, wet, 40% to 45% fine- to medium-grained sand			13	34	17	17	58	22.8	106.6		1.25*	PP
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (ML), dark yellowish brown, stiff, wet, 40% to 45% fine- to medium-grained sand			34									
			CLAYEY SAND TO SANDY CLAY (SC-CL), dark yellowish brown, loose to medium stiff, moist, 45% to 50% fines			4	31	18	13	46				1.0*	PP
			FAT CLAY WITH SAND (CH), dark olive mottled with dark greenish gray, very stiff, moist, 15% to 20% fine- to medium-grained sand, trace fine to coarse gravel			29					22.5	106	1637		UU
			Medium stiff to stiff			12								1.25*	PP

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	-65		FAT CLAY WITH SAND (CH), dark olive mottled with dark greenish gray, very stiff, moist, 15% to 20% fine- to medium-grained sand, trace fine to coarse gravel												
80			Very stiff to hard			40					18	113.1	3469		UU
			Boring Terminated at a depth of 81.5 feet below ground surface on June 9, 2019. Groundwater not encountered due to drilling method												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

LOG OF BORING 1-B05

ENGEO Expect Excellence

LATITUDE: 37.41608056 LONGITUDE: -122.0784306

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/9/2019
HOLE DEPTH: 46.5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (WGS84): Approx. 16 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	15		4" Asphalt 10" Aggregate Base												
5	10		FAT CLAY WITH SAND (CH), very dark brown, very stiff, moist, medium plasticity, no dilatency, some <1/4" pockets of pale yellow sand/weathered sandstone			13								2.75*	PP
						17	68	17	51	74	36.4	82.9			
10	5		SILTY SAND WITH GRAVEL (SM), pale olive mottled with reddish yellow, medium dense, moist With interbeded clay			25				20					
15	0		POORLY GRADED SAND WITH GRAVEL gray, wet, angular gravel			9									
			no recovery from samples taken between 15 feet and 18 feet			6									
20	-5					17				12					
25			FAT CLAY (CH), pale olive mottled with reddish yellow, stiff to very stiff, medium plasticity, no dilatancy, trace coarse-grained sand												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B05

ENGEO Expect Excellence

LATITUDE: 37.41608056 LONGITUDE: -122.0784306

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/9/2019
HOLE DEPTH: 46.5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (WGS84): Approx. 16 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	-10		FAT CLAY (CH), pale olive mottled with reddish yellow, stiff to very stiff, medium plasticity, no dilatancy, trace coarse-grained sand			15	53	22	31	95				2.75*	PP
30	-15					15					26.1	99	1209.3		UU
35	-20		SANDY CLAY TO CLAYEY SAND (CL-SC), pale olive, rapid dilatancy			14				45					
40	-25		LEAN CLAY WITH SAND (CL), pale olive, stiff, moist, medium plasticity			9	42	17	25	84	23				
45	-30					24								3.25*	PP
			Boring terminated at a depth of 46.5 feet below the ground surface on 7/9/2019. Groundwater not encountered due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B6

ENGEO Expect Excellence

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			6" Asphaltic Concrete												
			12" AGGREGATE BASE (AB)												
	10		FAT CLAY (CH), dark greenish gray, stiff, slightly moist, medium plasticity												
5			Dark olive mottled with greenish gray, hard, high plasticity			27	73	20	53	97	27.5	93.5		>4.5*	PP
	5		Very stiff			14								3.75*	PP
10			LEAN CLAY (CL), light grayish green, stiff, moist, low plasticity, slow dilatancy, trace fine-grained sand			12	44	17	27	82	32.7	92.3		2.0*	PP
	0														
15			SANDY LEAN CLAY (CL), greenish brown, very stiff, wet, high plasticity, fine-grained sand			7	41	21	20	58	21.9	109	2141.9		UU
	-5		Trace gravel												
20			No recovery			7									
	-10														
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

ENGEO
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LOG OF BORING 1-B6

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY LEAN CLAY (CL), greenish brown, very stiff, wet, high plasticity, fine-grained sand Hard, moist			29								>4.5*	PP
	-15														
30			LEAN CLAY WITH SAND (CL), greenish gray, stiff, wet, trace fine gravel			18	36	23	13		27.1	100	1003.4		UU
	-20														
			POORLY GRADED SAND (SP), dark gray, medium dense												
35			CLAYEY SAND WITH GRAVEL (SC), pale yellow mottled with reddish yellow, loose to medium dense, wet, low plasticity			13	30	15	15	20	23	110.7	1200*		TV
	-25														
40			POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), gray, medium dense to dense			45				6					
	-30														
45			SANDY LEAN CLAY (CL), pale olive mottled with reddish yellow, medium stiff, wet, medium plasticity			7	38	13	25	60					
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

ENGEO
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LOG OF BORING 1-B6

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			POORLY GRADED GRAVEL WITH CLAY (GP-GC), gray, medium dense to dense, fine to coarse gravel, trace fine-grained sand, trace to little fines			25	33	16	17		19.7	112		4.5*	PP
			LEAN CLAY (CL), pale olive, hard, moist, low plasticity, trace fine-grained sand												
	-40														
55															
	-45														
60			POORLY GRADED GRAVEL (GP), gray, loose to medium dense, subrounded			21									
			SILT (ML), light yellowish brown, stiff, moist, low plasticity, fine-grained sand												
	-50														
65															
	-55														
70			SILTY SAND (SM), olive brown, medium dense, wet			19				37	24.9	102.8			
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B6

ENGEO Expect Excellence

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY SAND (SM), olive brown, medium dense, wet												
	-65														
80			SANDY GRAVEL TO GRAVELLY SAND (GP), gray to black, dense, wet, subrounded coarse gravel, angular medium-grained sand			60									
			Boring terminated at a depth of 81.5 feet below ground surface on July 8, 2019. Groundwater not observed due to method of drilling.												

ENGEO
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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
0	15		1" Asphalt 1.5 feet Aggregate Base												
			LEAN CLAY (CL), very dark brownish gray, moist, medium plasticity, trace fine- to medium-grained sand, trace organics												
5	10		SANDY SILT (ML), light greenish gray, stiff, moist, low plasticity, 35% to 45% fine-grained sand			13	33	19	14	67				3.5*	PP
						200 psi				57	24.4	103.6			
10	5		POORLY GRADED GRAVEL (GP), dark olive brown												
						28				8					
15	0		CLAYEY SAND WITH GRAVEL (SC), dark olive brown, medium dense to dense, 15% gravel			30				13	13.1				
20	-5		SANDY CLAY (CL), bluish gray, stiff, moist, medium plasticity, 30% to 35% coarse-grained sand, trace gravel			14	44	17	27	69	23.6	103.3	1341		UU
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), bluish gray, stiff, moist, medium plasticity, trace fine-grained sand, no gravel			12					26.3	99.9		2.0*	PP
	-10														
30			35% to 40% fine- to coarse-grained sand			25									
	-15		CLAYEY SAND (SC), bluish gray, medium dense, moist, 25% to 30% fines												
			WELL GRADED SAND WITH CLAY AND GRAVEL (SW), dark yellowish brown, medium dense, wet, 5% to 10% fines, 5% to 10% gravel												
35						25				9					
	-20														
			LEAN CLAY WITH SAND (CL), yellowish brown to olive brown, hard, moist, high plasticity, 10% to 15% fine- to coarse-grained sand, with iron staining												
40						54	40	18	22		20.96	108.2	3620		UU
	-25														
45			SANDY CLAY (CL), yellowish brown, medium stiff to stiff, moist, medium plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel			13	38	18	20	60	25	102.2		1*	PP
	-30														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), yellowish brown, medium stiff to stiff, moist, low plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel			3									
55	-35		SANDY SILT TO SILTY SAND (SM-ML), yellowish brown, medium stiff to stiff, moist, low plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel												
60	-40		Medium stiff			11	38	26	12	55	22.1	103.1		.75*	PP
65	-45														
70	-50		FAT CLAY (CH), dark greenish gray, stiff, moist, high plasticity, moderate cementation, trace fine-grained sand			16	55	22	33					3.0*	PP
75	-55														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B07

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DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), dark greenish gray, stiff, moist, high plasticity, moderate cementation, trace fine-grained sand												
	-60		SANDY SILT TO SILTY SAND (SM-MH), olive brown mottled with greenish gray, medium stiff to stiff, wet, 45% to 50% fine-grained sand and trace coarse gravel												
80			FAT CLAY (CH), dark yellowish brown mottled with dark greenish gray, stiff, high plasticity			17	NP	NP	NP	53				3.5*	PP
			Boring Terminated at a depth of 81.5 feet below ground surface on June 8, 2019. Groundwater not encountered due to drilling method												

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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			8" Aggregate Base												
			LEAN CLAY (CL), bluish black, moist, high toughness, few fine- to medium-grained sand, trace angular fine gravel												
5	5		Gray, very stiff, medium toughness, trace fine-grained sand and angular fine gravel			13	41	17	24	61	17.5	110.8	600*	3.5*	PP+TV
			POORLY GRADED SAND WITH GRAVEL (SP), gray, dense, wet, subrounded to subangular fine gravel, trace clay		▽										
10	0					43				9					
			WELL GRADED GRAVEL WITH SAND (GW), brown, dense, wet, fine- to coarse-grained sand, subrounded to angular gravel, trace clay												
15	-5					39									
			Dames and Moore piston sampler unable to advance at 400 psi			32								>4.5*	PP
			LEAN CLAY WITH SAND (CL), greenish blue, hard, wet, medium plasticity, high toughness, fine-grained sand												
20	-10					11	37	18	19	74					
			Light brown with gray, stiff, medium toughness, some silt												
25	-15														

LOG - GEOTECHNICAL_SU+QU W/ ELEV_MULTIPLE PARCEL GEX_CHARLESTON S.GPJ_ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), greenish blue, hard, wet, medium plasticity, high toughness, fine-grained sand			16							1000*	2.5*	PP+TV
			Stiff to very stiff, trace fine- to medium-grained sand												
30	-20		SANDY CLAY TO CLAYEY SAND (CL-SC), light brown with gray, stiff, wet			12	37	16	21	52	26.4	99.9	600*	1.25*	PP+TV
35	-25					9					25.53	102.3	348		UU
40	-30					350 psi				6	18.4				
			POORLY GRADED SAND (SP), dark brown, wet												
			SANDY LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, trace fine subangular gravel												
45	-35					22							1000*	1.25*	PP+TV
			POORLY GRADED SAND (SP), light yellowish brown, medium dense, few fine subrounded gravel, trace silt												
50	-40														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			POORLY GRADED SAND (SP), light yellowish brown, medium dense, few fine subrounded gravel, trace silt			28									
			LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, some silt												
55	-45					11	39	17	22	88					
			sand in cuttings												
60	-50		olive brown, trace fine-grained sand			14									
65	-55														
70	-60		very stiff to hard			35					23.5	102.3	6841		CU
			POORLY GRADED SAND (SP), olive brown, medium dense, wet, medium plasticity, medium toughness, trace fine-grained sand												
75	-65														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

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Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
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SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, medium toughness, trace fine-grained sand			30								3.75*	PP
80	-70					21							1100*	1.75*	PP+TV
85	-75					25					25.7	100.6	1200*	1.5*	PP+TV
90	-80		more silt			32							800*	1.75*	PP+TV
			SILTY CLAYEY SAND TO SANDY SILT AND CLAY (SC-SM) TO (CL-ML) olive brown, very dense, wet												
95	-85					56	22	17	5	45					
			SANDY LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, high toughness, fine- to medium-grained sand												
100	-90														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
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SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, high toughness, fine- to medium-grained sand			24									
			Boring Terminated at a depth of 101.5 feet below ground surface on May 14, 2019. Groundwater encountered at a depth of 7.5 feet below ground surface.												

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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			6" Aggregate Base												
	10		FAT CLAY WITH SAND (CH), dark brownish gray, moist, fine- to medium-grained sand, trace gravel and organics												
5			SANDY CLAY (CH), dark greenish gray with pale olive, stiff, moist, 10% to 15% fine- to medium-grained sand		▽	12	68	27	41	80			1600*	1.75*	PP+TV
	5		LEAN CLAY WITH SAND (CL), olive gray, medium stiff, fine- to medium-grained sand			9					23.5	104.8	566		UU
10			CLAYEY SAND TO SANDY CLAY (CL-SC), dark olive gray, medium dense, 10% to 15% fine gravel with iron staining			18	32	16	16	30	14.9	120.5			
	0					15					16.2				
			SANDY SILT TO SILTY SAND (SM-ML), dark brownish gray, 30% to 35% fine-grained sand												
15			Dark olive gray to dark brownish gray			75 psi	22	22	NP	52					
	-5														
			FAT CLAY WITH SAND TO SANDY CLAY (SC-CH), reddish yellow, stiff, moist, 25% to 30% fine- to coarse-grained sand, 15% to 20% fine to coarse gravel												
20						17				55				3.25*	PP
	-10		FAT CLAY WITH SAND (CH), dark bluish gray, very stiff, moist, 20% to 25% fine- to coarse-grained sand												
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
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SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), dark gray, stiff, moist, trace sand			10									
	-15														
30			Medium stiff			4					26.4	99.9	1221		CU
	-20														
35			SANDY LEAN CLAY (CL), dark bluish gray, medium stiff, moist dark bluish gray reddish yellow, medium stiff			6	35	19	16	56			2200*	4.25*	PP+TV
	-25														
			CLAYEY SAND WITH GRAVEL (SC), reddish yellow, dense, wet												
40						39					10				
	-30														
45			medium dense			16				25					
	-35														
			FAT CLAY (CH), olive brown, medium stiff, moist, 5% to 10% fine- to medium-grained sand												
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), yellowish brown, medium dense, moist, 40% to 45% clay			13							900*	1.5*	PP+TV
55	-40		Loose to medium dense, fine- to coarse-grained sand, trace fine gravel			11	28	16	12	34	19				
60	-45		FAT CLAY WITH SAND (CH), yellowish brown, medium stiff, moist, 20% to 25% fine- to coarse-grained sand			16							968		UU
65	-50														
70	-55		Olive gray, hard, 15% to 20% sand			65					19.4	108.7	3500*	4.2*	PP+TV
75	-60														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
80	-65		FAT CLAY WITH SAND (CH), yellowish brown, medium stiff, moist, 20% to 25% fine- to coarse-grained sand												
						72					21.3	106.2	3000*	>4.5*	PP+TV
85	-70														
90	-75														
						57					20.7	107.9		>4.5*	PP
95	-80														
100	-85		WELL GRADED SAND (SW), grayish brown to yellowish brown, dense, wet, 5% to 10% fines, trace fine gravel												

LOG - GEOTECHNICAL_SU+QU W/ ELEV_MULTIPLE PARCEL GEX_CHARLESTON S.GPJ_ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			WELL GRADED SAND (SW), grayish brown to yellowish brown, dense, wet, 5% to 10% fines, trace fine gravel			50/4.5"									
	-90		Very dense			79									
			Boring Terminated at a depth of 103 feet below ground surface on May 16, 2019. Groundwater encountered at a depth of 5.5 feet below ground surface.												

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LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2.5" Asphalt 15.5" Aggregate Base												
			LEAN CLAY (CL), dark gray to dark greenish gray, moist, 10% to 15% fine- to coarse-grained sand												
5	10		olive gray to gray, hard			26	32	23	9		30.3	89.6		4*	PP
10	5		FAT CLAY WITH SAND (CH), olive, stiff, wet, 20% to 25% fine- to medium-grained sand			16					24.1		1000*	1.5*	PP+TV
15	0		SANDY FAT CLAY (CH), olive gray to gray, stiff, moist, fine-grained sand			7	66	23	43	79					
20	-5		FAT CLAY (CH), greenish gray, medium stiff to stiff, 10% to 15% fine- to medium- grained sand, trace gravel			8					16	122.5	1000*	1.5*	PP+TV
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), very dark grayish brown to olive, stiff, moist, fine- to coarse-grained sand, trace gravel			14	37	19	18	63				2.5*	PP
	-15		FAT CLAY WITH SAND (CH), yellowish brown, stiff, moist, 15% to 20% fine- to coarse-grained sand												
30						11					22.9	105.2		.9235	UC
	-20														
35			dark yellowish brown with manganese staining			12							1200*	1*	PP+TV
			CLAYEY SAND (SC), dark yellowish brown, medium dense, wet, 25% to 30% clay												
	-25														
40						15	32	16	16	34	19.4				
	-30		FAT CLAY (CH), pale olive, stiff to very stiff, moist, 5% to 10% fine- to coare-grained sand, trace fine gravel												
45						20					28.3	96.3		1.44	UC
	-35		WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown, dense, moist, 5% to 10% fines												
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown, dense, moist, 5% to 10% fines			34				14					
			Boring Terminated at a depth of 51.5 feet below ground surface on May 17, 2019. Groundwater encountered at a depth of 7.5 feet below ground surface.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19



APPENDIX B

CONE PENETRATION TEST LOGS

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

CONETEC

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Explorations
Start Date:	07-May-2019
End Date:	Ongoing

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Location	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting (m)	Refer to Notation Number
1-CPT-01	19-56067_1CP1	Joaquin	7-May-2019	448:T1500F15U500	11.1	50.52	4141718	581484	
1-CPT-06	19-56067_1CP6	Joaquin	7-May-2019	448:T1500F15U500	8.2	120.57	4141642	581391	
1-SCPT-02	19-56067_1SP2	Joaquin	7-May-2019	448:T1500F15U500	8.9	100.56	4141669	581498	
1-CPT-15	19-56067_1CP15	Charleson South	8-May-2019	448:T1500F15U500	6.2	80.54	4141706	581239	
1-CPT-03	19-56067_1CP3	Joaquin	8-May-2019	448:T1500F15U500	9.0	120.57	4141559	581533	
1-SCPT-04	19-56067_1SCP4	Charleson South	8-May-2019	448:T1500F15U500	8.1	100.56	4141829	581289	
1-CPT-16	19-56067_1CP16	Charleson South	9-May-2019	448:T1500F15U500	8.1	80.54	4141607	581331	
1-CPT-17	19-56067_1CP17	Charleson South	10-May-2019	483:T1500F15U500	4.8	100.56	4141531	581178	
1-CPT-18	19-56067_1CP18	Charleson South	11-May-2019	483:T1500F15U500	3.1	100.56	4141640	581199	
1-CPT-09	19-56067_1CP09	Plymouth	13-May-2019	483:T1500F15U500	6.8	100.56	4141336	581070	
1-SCPT-10	19-56067_1SP10	Plymouth	13-May-2019	483:T1500F15U500	4.8	80.54	4141481	581034	
1-CPT-11	19-56067_1CP11	Plymouth	14-May-2019	483:T1500F15U500	6.2	100.56	4141486	580955	
1-CPT-12	19-56067_1CP12	Plymouth	14-May-2019	483:T1500F15U500	6.3	80.54	4141408	580971	
1-CPT-13B	19-56067_1CP13B	Charleson South	14-May-2019	483:T1500F15U500	8.5	100.56	4141903	581272	
1-CPT-14B	19-56067_1CP14B	Charleson South	14-May-2019	483:T1500F15U500	7.0	120.57	4141826	581178	
2-CPT-14	19-56067_2CP14	Commons	09-Jul-2019	494:T1500F15U500	8.4	100.56	4142405	579889	
2-SCPT-13	19-56067_2SP13	Commons	09-Jul-2019	494:T1500F15U500	8.4	100.64	4142585	579861	
1-CPT8	19-56067_1CP08	Space Park	08-Jul-2019	494:T1500F15U500	6.0	120.57	4141466	581660	

1. The assumed phreatic surface was based on pore pressure dissipation tests unless otherwise noted. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.
3.The assumed phreatic surface was based on an adjacent CPT.

Job No:	19-56067
Client:	ENGEO Incorporated
Project:	Google Explorations
Start Date:	07-Jul-2019
End Date:	09-Jul-2019

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting[2] (m)	Refer to Notation Number
1-CPT-05	19-56067_1CP05	09-Jul-2019	494:T1500F15U500	7.7	80.54	4141489	581482	
1-CPT-07	19-56067_1CP07	08-Jul-2019	494:T1500F15U500	8.1	80.54	4141420	581440	
1-CPT-08	19-56067_1CP08	08-Jul-2019	494:T1500F15U500	6.0	120.57	4141466	581660	
2-CPT-06	19-56067_2CP06	07-Jul-2019	391:T1500F15U500	13.3	73.49	4142562	582145	
2-CPT-12	19-56067_2CP12	08-Jul-2019	494:T1500F15U500	7.4	120.57	4141958	580418	
2-CPT-14	19-56067_2CP14	09-Jul-2019	494:T1500F15U500	8.4	100.56	4142405	579889	
2-SCPT-13	19-56067_2SP13	09-Jul-2019	494:T1500F15U500	8.4	100.64	4142585	579861	
3-CPT-14	19-56067_3CP14	07-Jul-2019	391:T1500F15U500	23.8	23.87	4143226	579724	

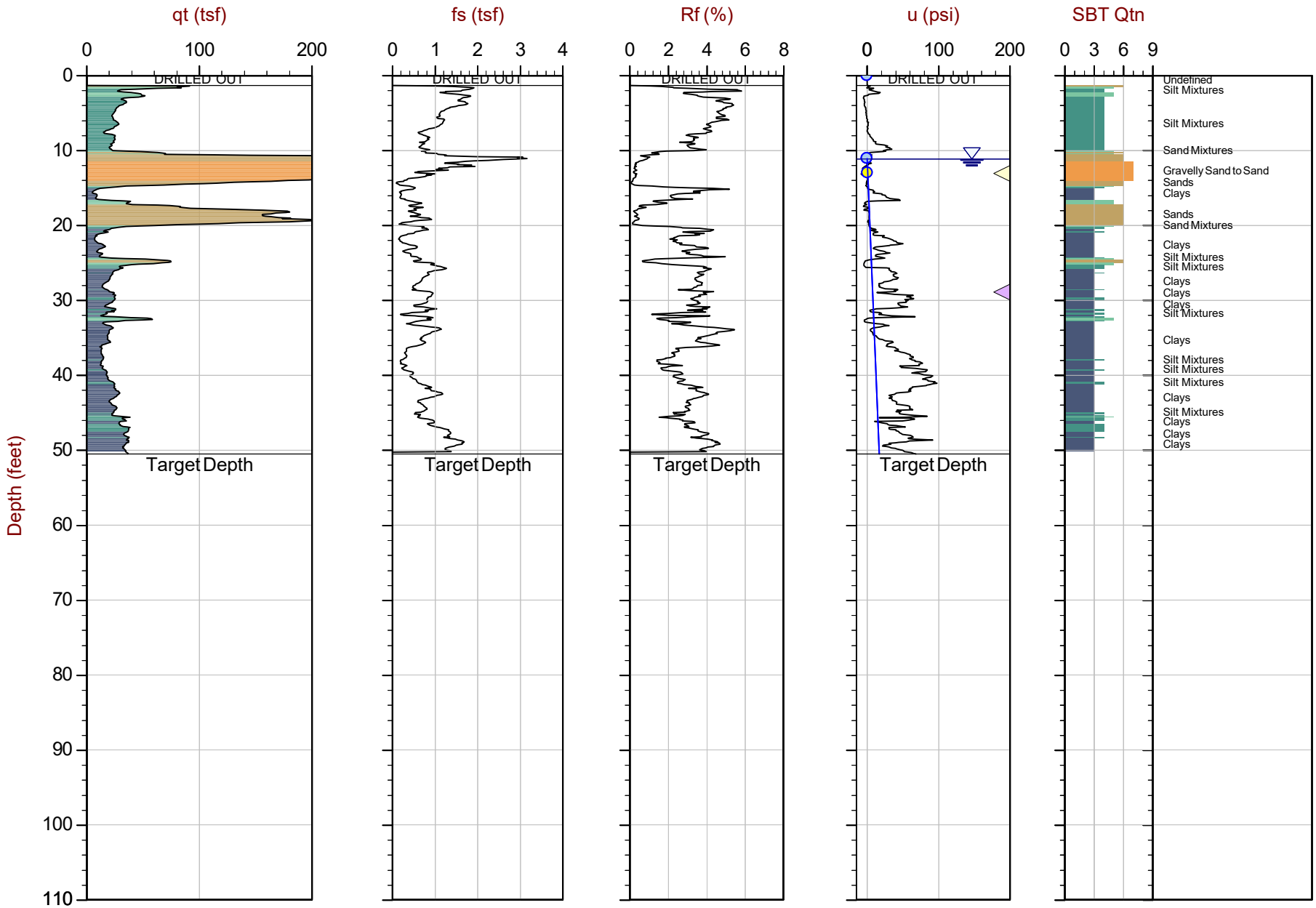
1. The assumed phreatic surface was based on the results of the shallowest pore pressure dissipation test performed within the sounding. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 20:27
Site: Google Joaquin Exploration

Sounding: 1-CPT-01
Cone: 448:T1500F15U500



Max Depth: 15.400 m / 50.52 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP1.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141718m E: 581484m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

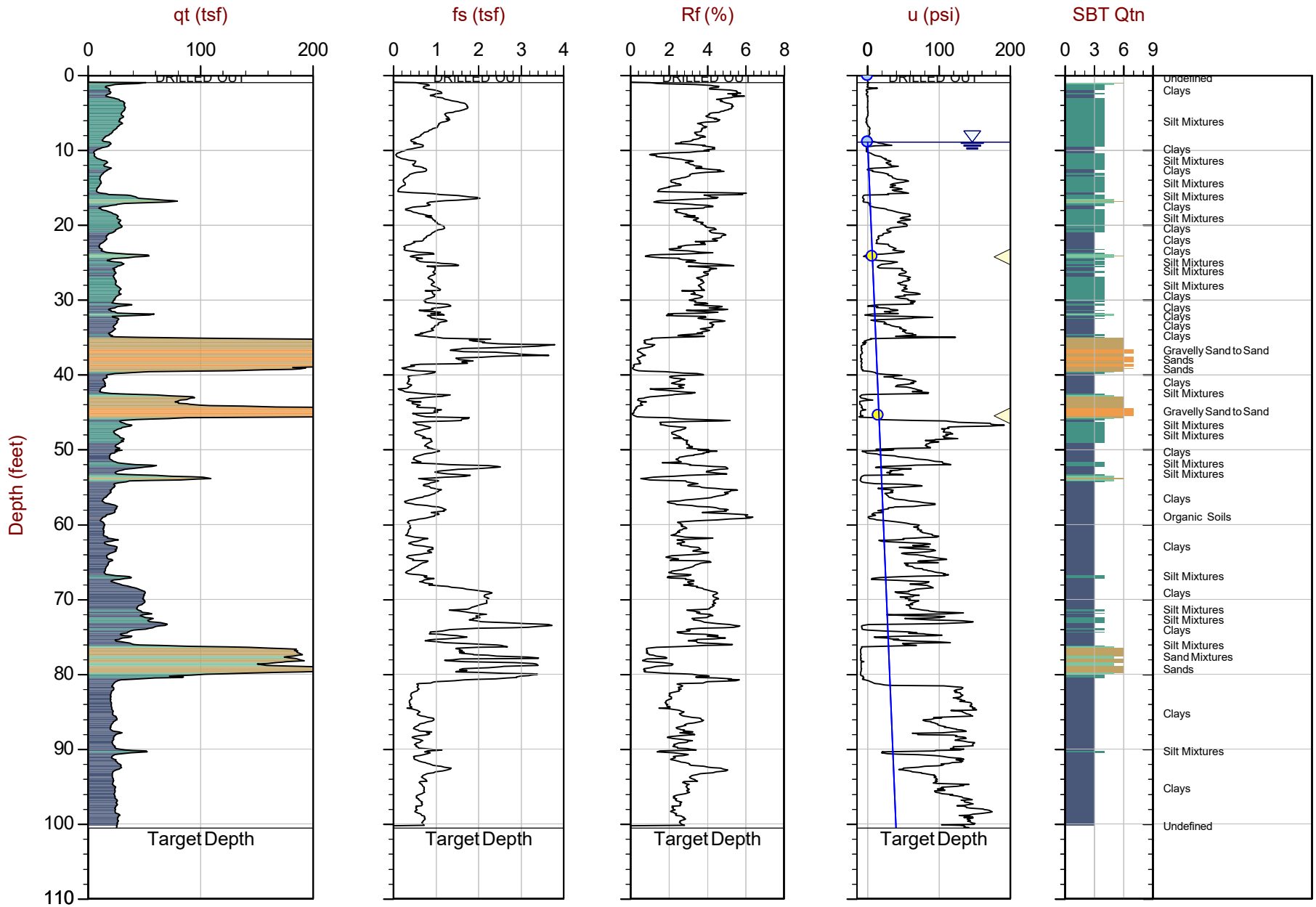
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 21:48
Site: Google Joaquin Exploration

Sounding: 1-SCPT-02
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP2.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141669m E: 581498m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

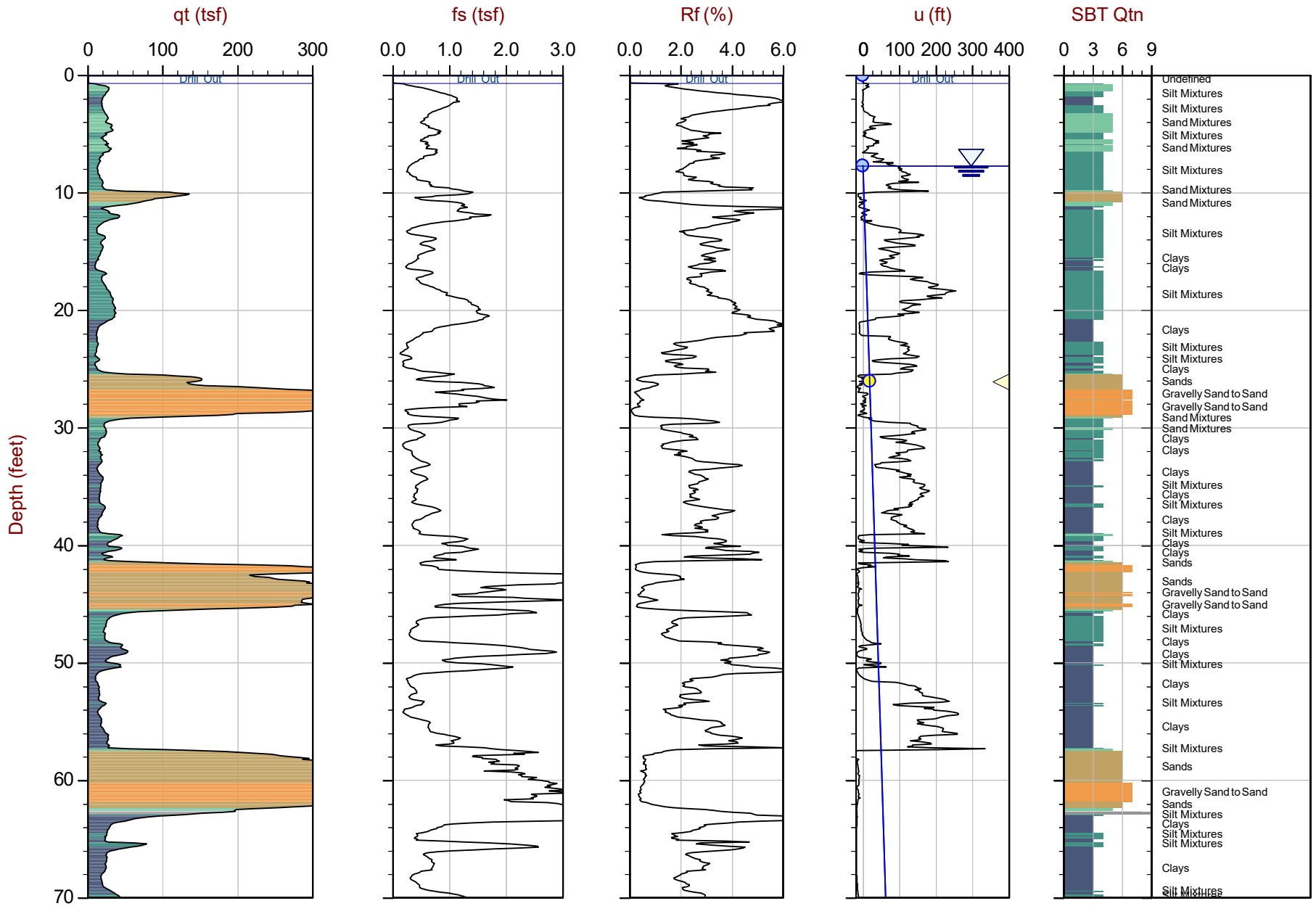
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-09 10:29
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-05
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP05.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141489m E: 581482m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

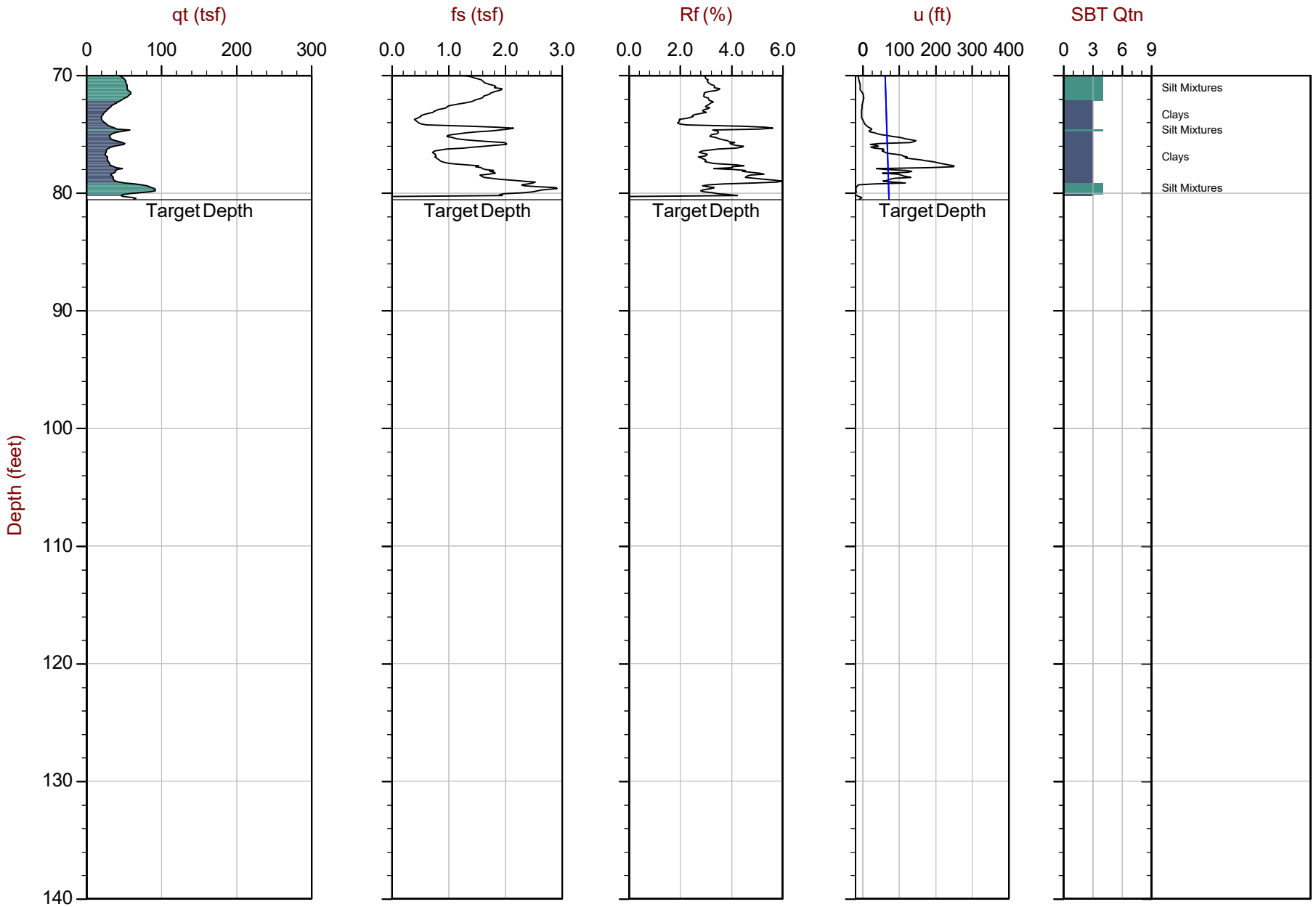
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-09 10:29
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-05
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP05.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141489m E: 581482m
Sheet No: 2 of 2

Overplot Item: Ueq Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

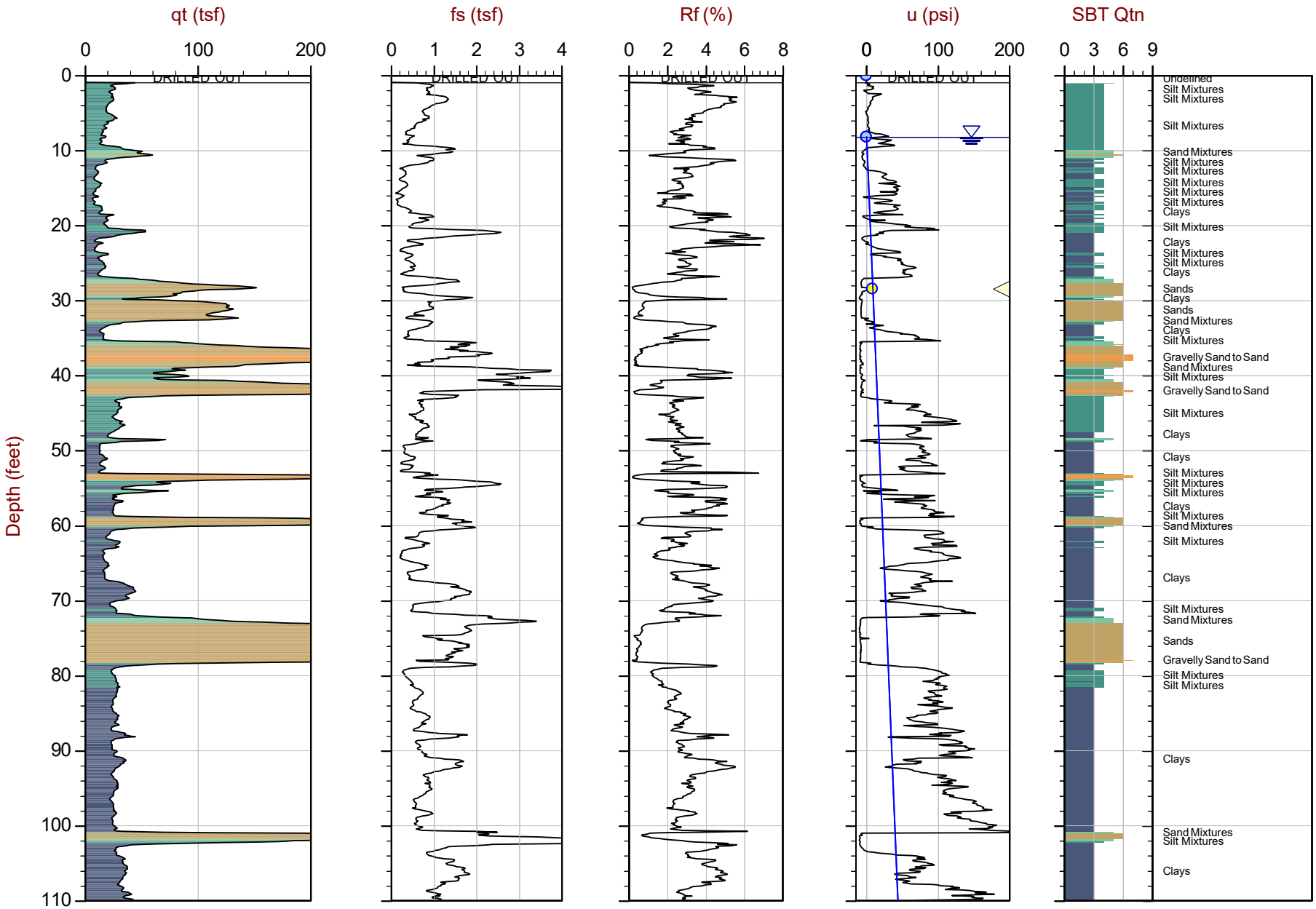
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 23:56
Site: Google Joaquin Exploration

Sounding: 1-CPT-06
Cone: 448:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP6.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141642m E: 581391m
Page No: 1 of 2

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

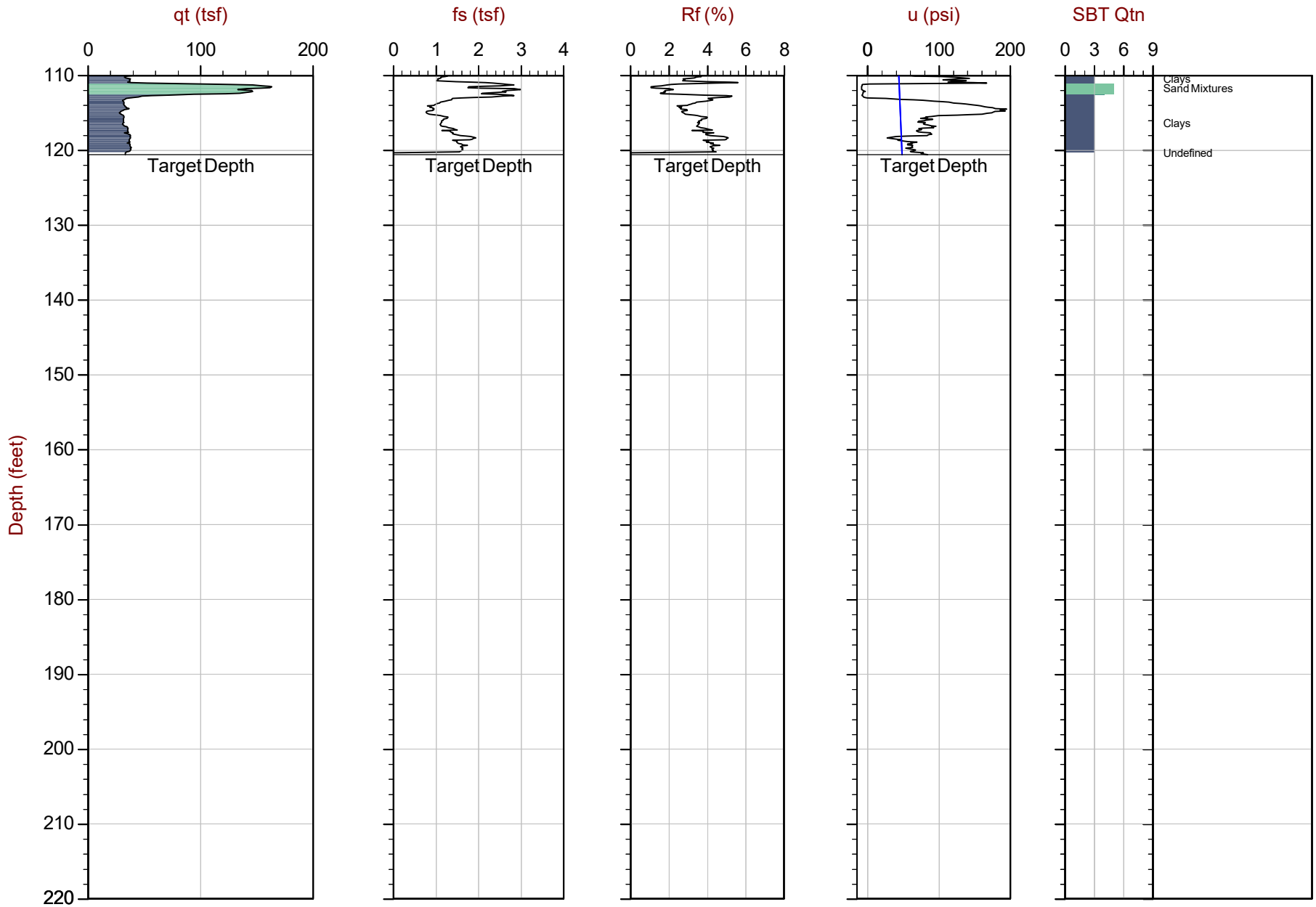
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 23:56
Site: Google Joaquin Exploration

Sounding: 1-CPT-06
Cone: 448:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP6.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141642m E: 581391m
Page No: 2 of 2

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

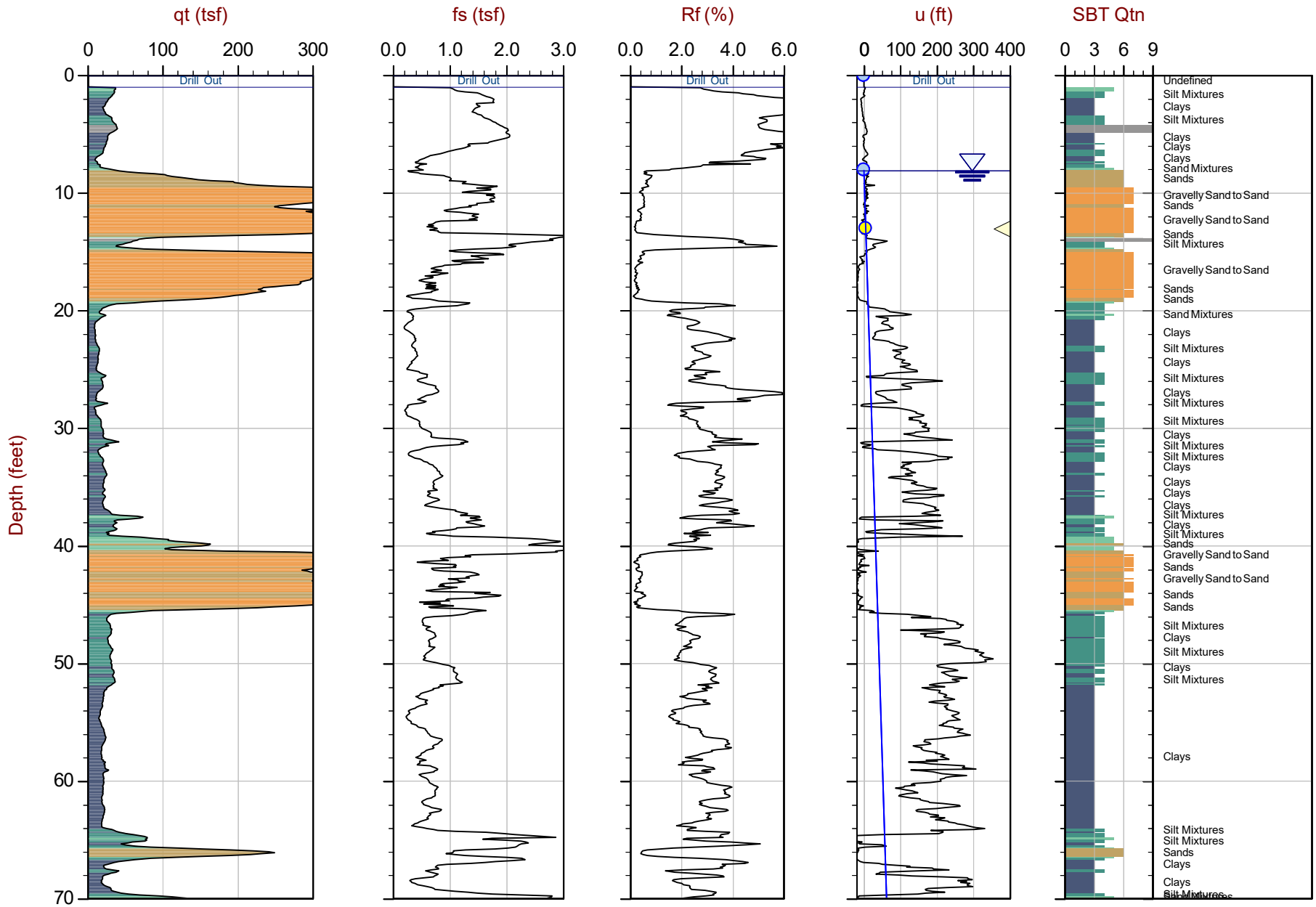
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 08:07
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-07
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP07.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141420m E: 581440m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

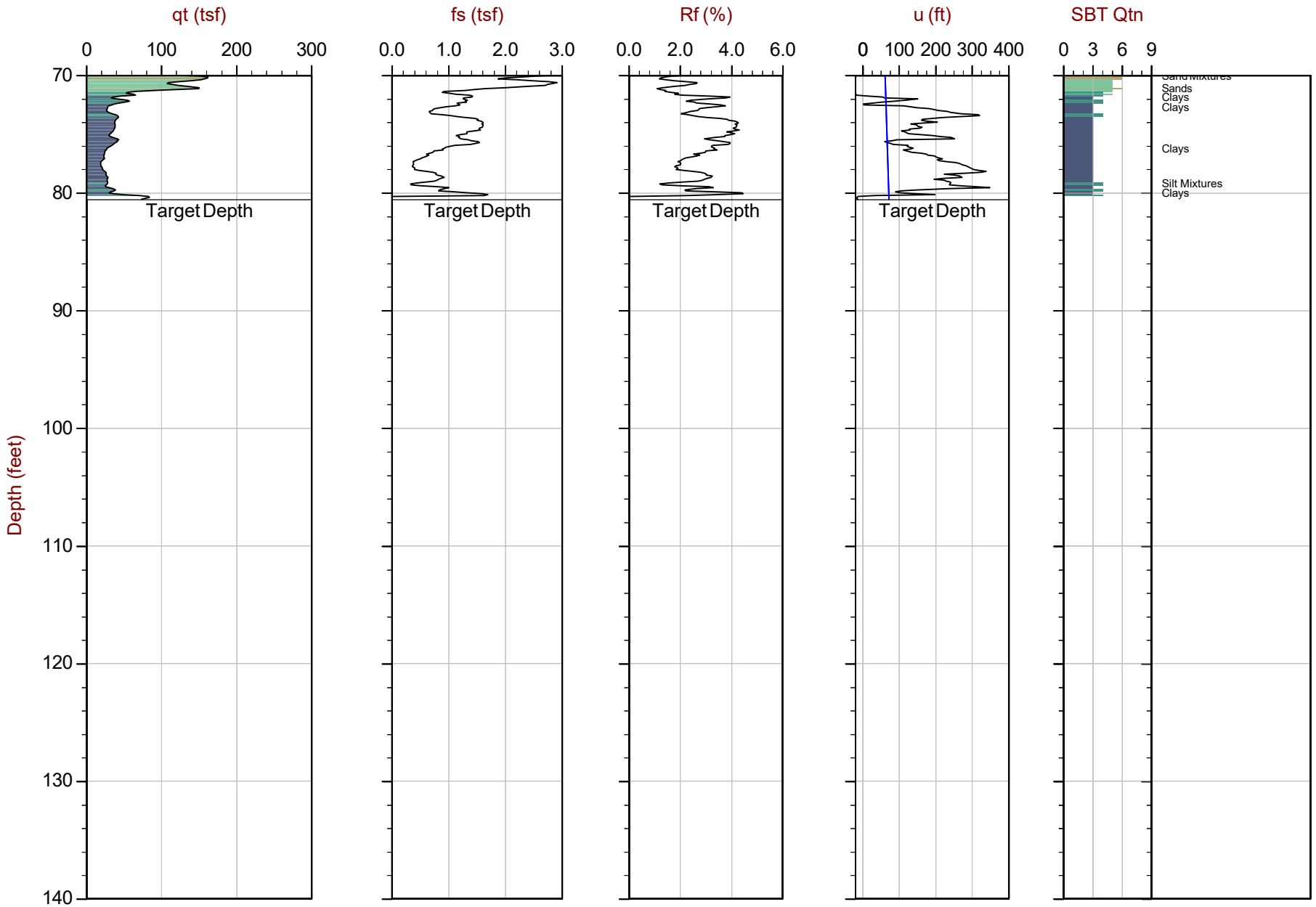
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 08:07
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-07
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP07.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141420m E: 581440m
Sheet No: 2 of 2

Overplot Item: Ueq Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

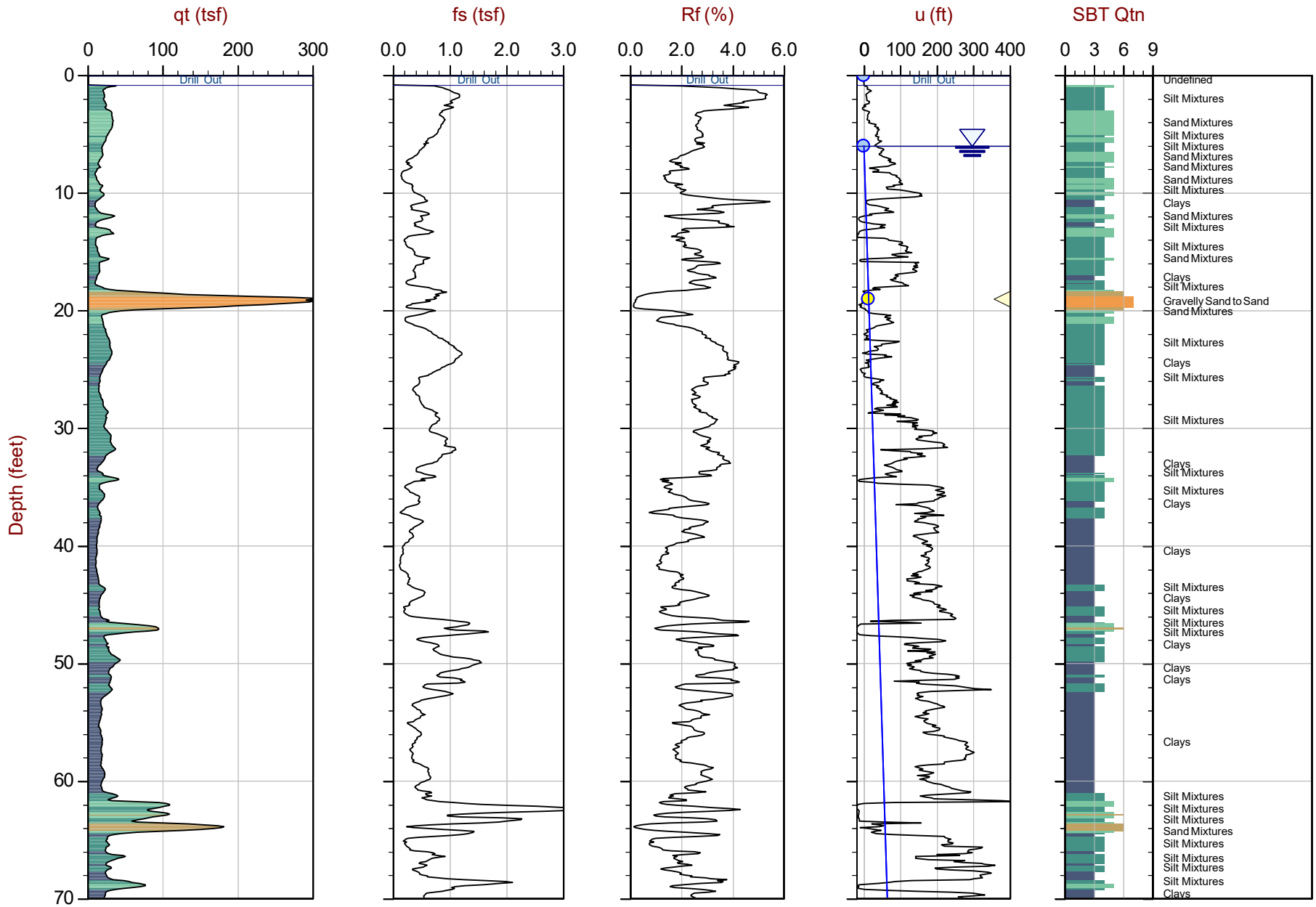
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 09:25
Site: Google Space Campus Exploration

Sounding: 1-CPT-08
Cone: 494:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP08.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141466m E: 581660m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

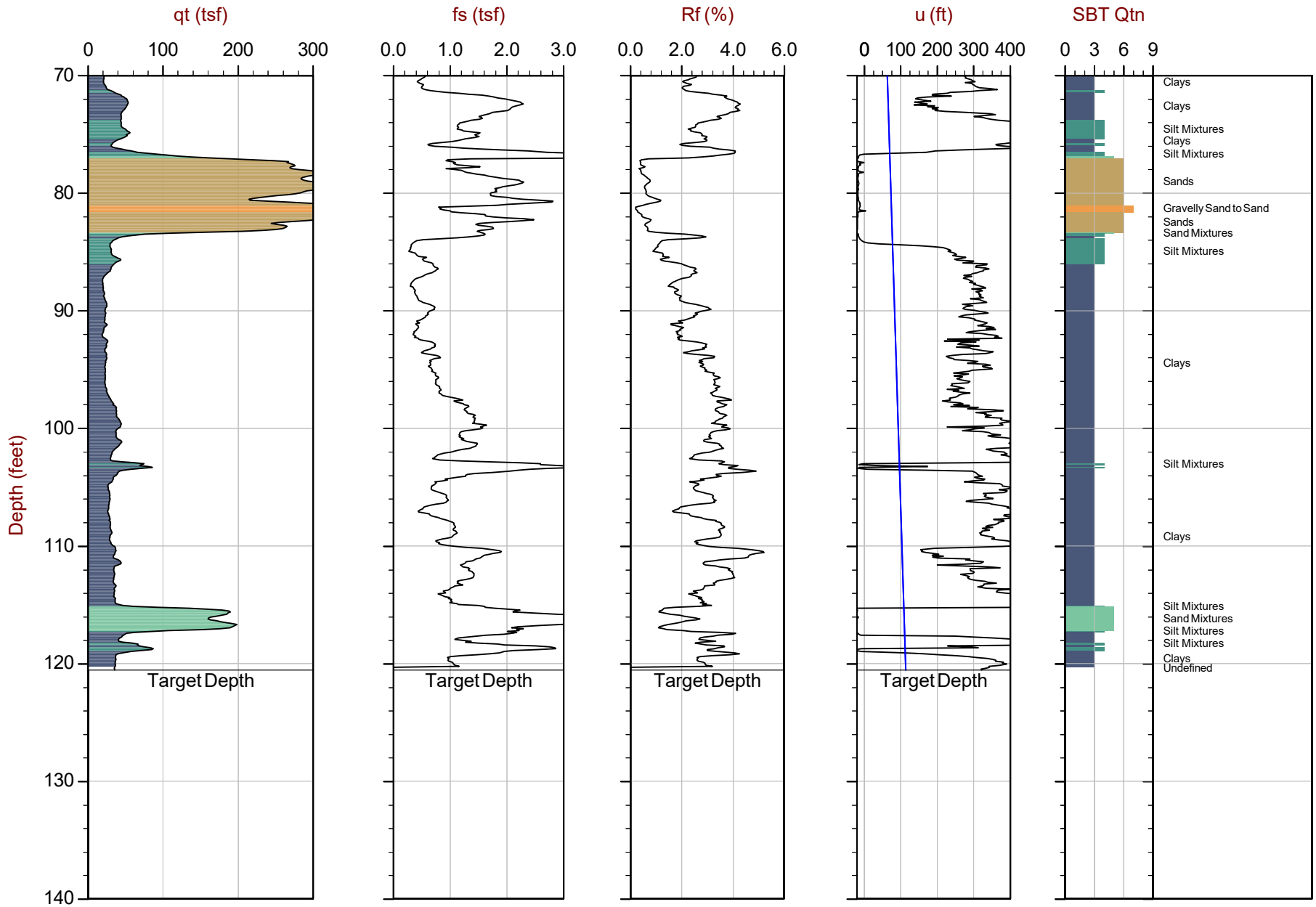
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 09:25
Site: Google Space Campus Exploration

Sounding: 1-CPT-08
Cone: 494:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP08.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141466m E: 581660m
Sheet No: 2 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

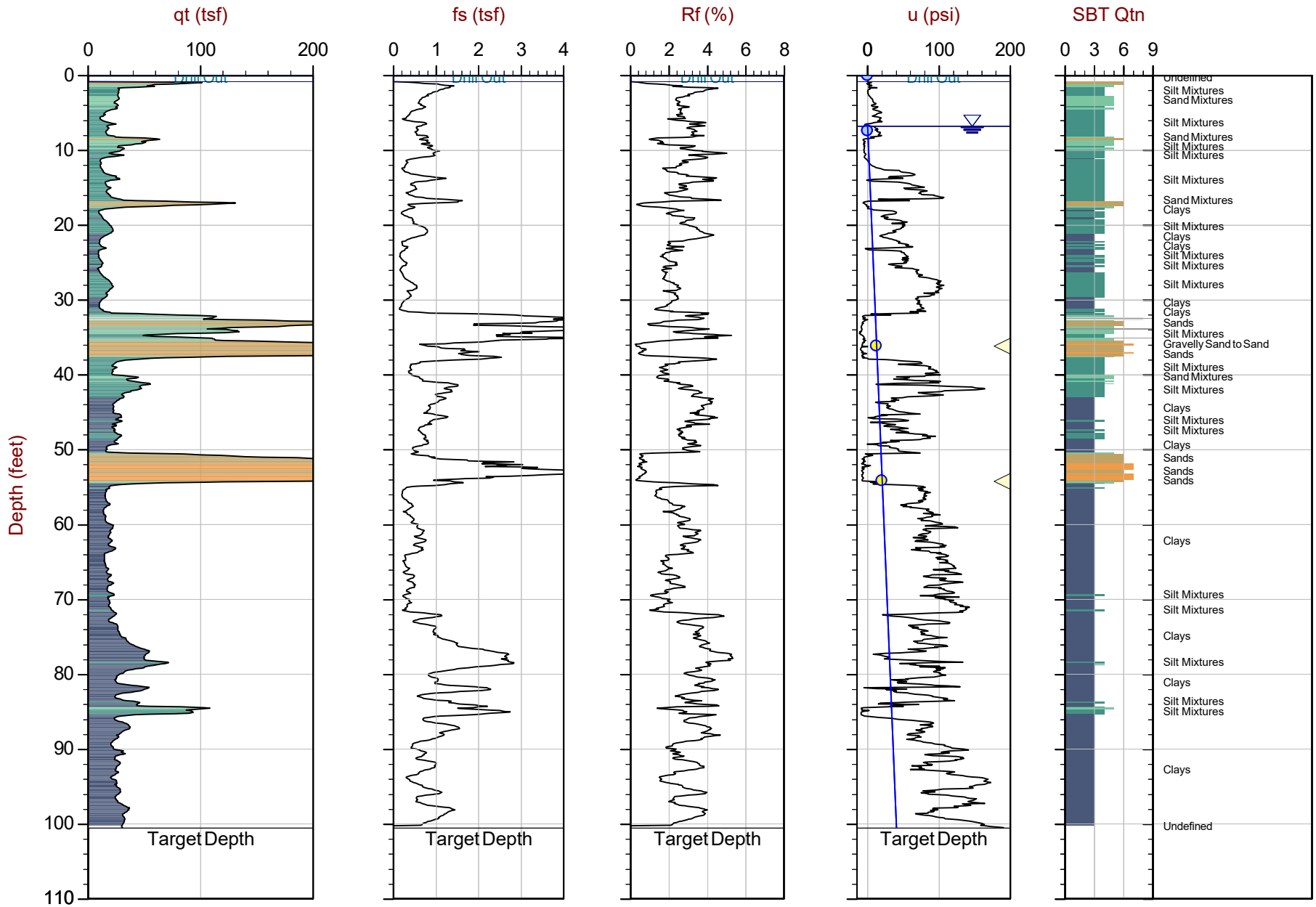
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 10:36
Site: Google Plymouth Exploration

Sounding: 1-CPT-09
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP09.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141336m E: 581070m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

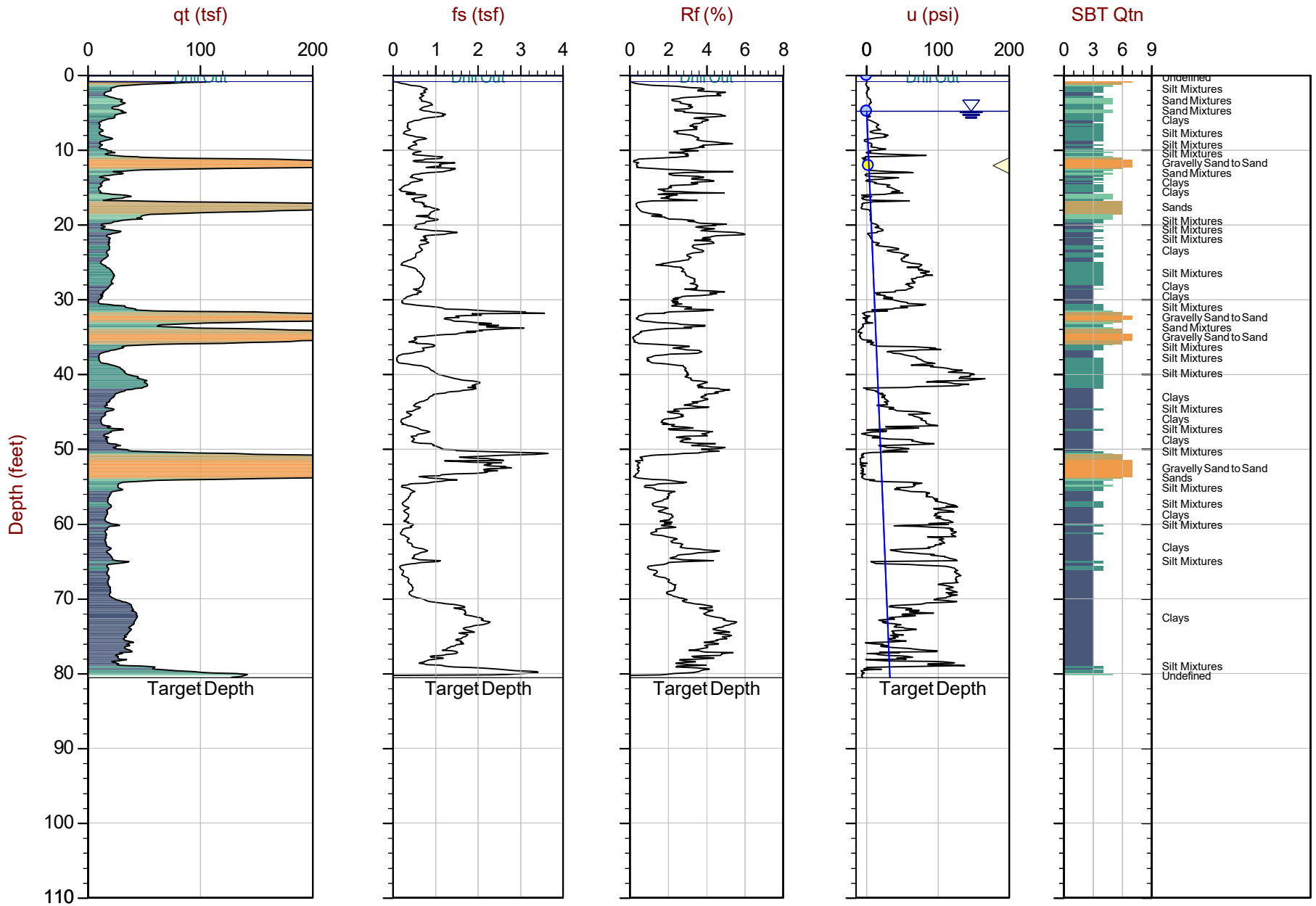
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 08:52
Site: Google Plymouth Exploration

Sounding: 1-SCPT-10
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP10.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141481m E: 581034m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

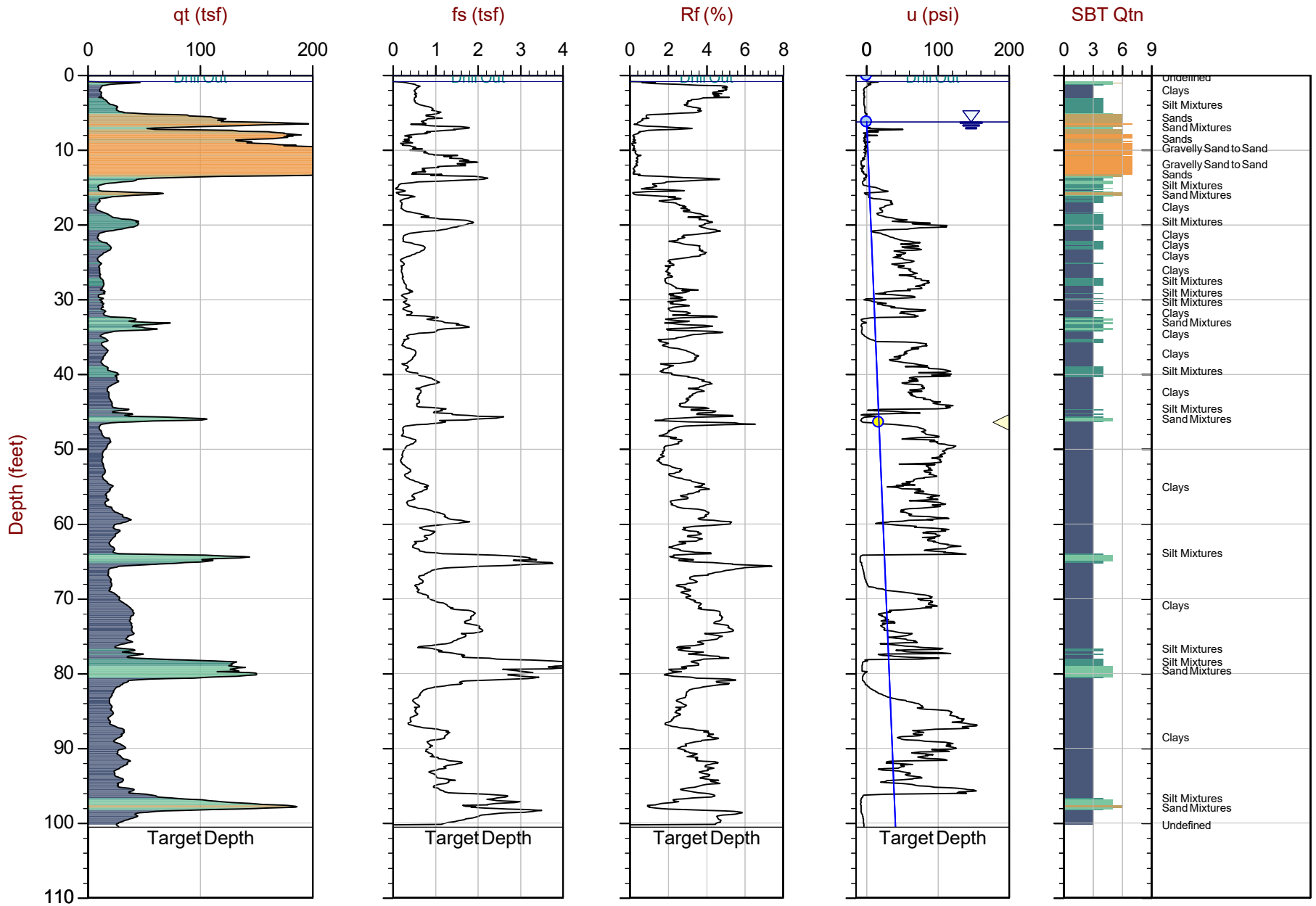
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 10:58
Site: Google Plymouth Exploration

Sounding: 1-CPT-11
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP11.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141486m E: 580955m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

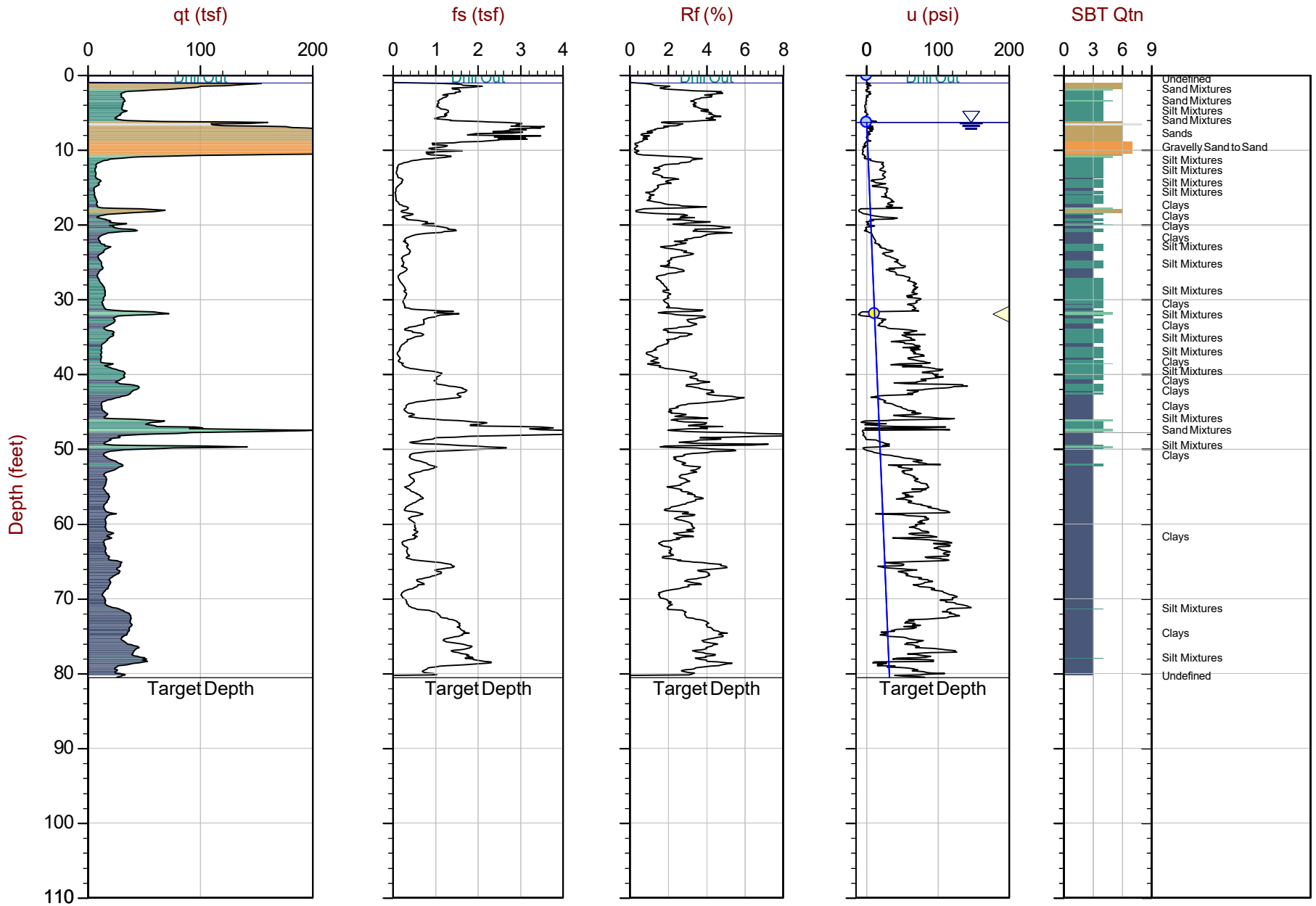
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 12:24
Site: Google Plymouth Exploration

Sounding: 1-CPT-12
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP12.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141408m E: 580971m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

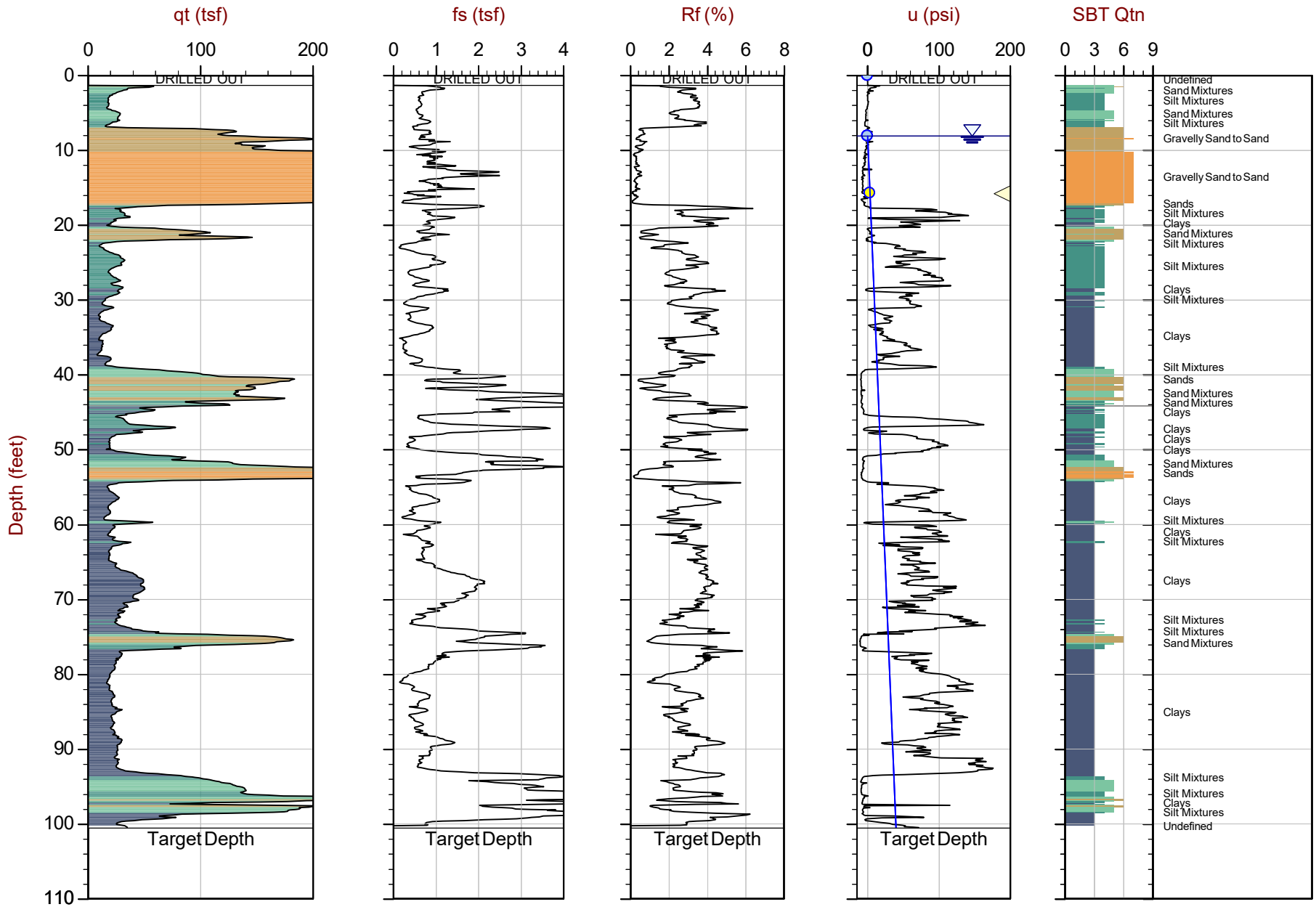
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 21:45
Site: Google Charleston South Exploration

Sounding: 1-SCPT-04
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SCP4.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141829m E: 581289m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

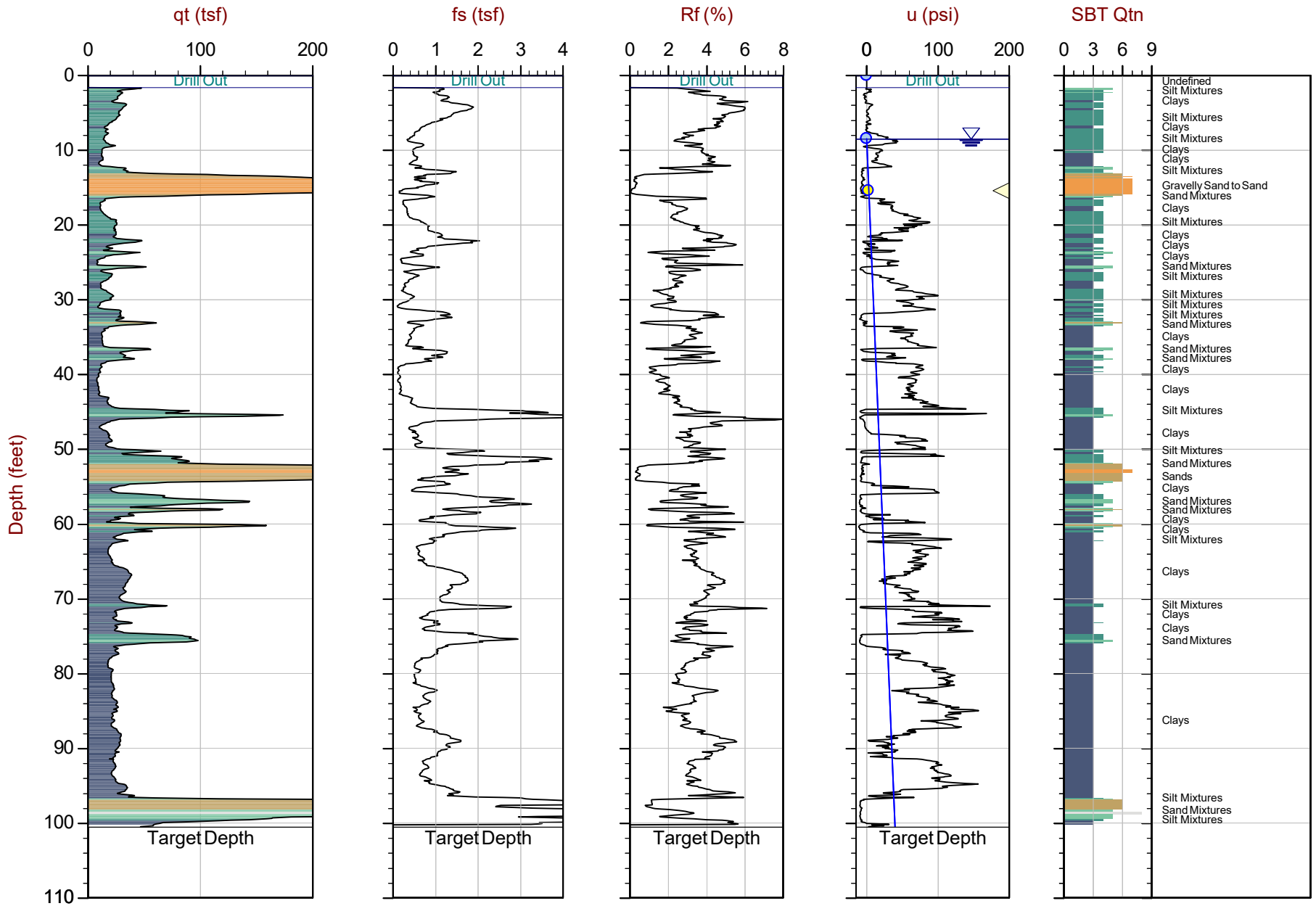
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 08:10
Site: Google Charleston South Exploration

Sounding: 1-CPT-13B
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP13B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141903m E: 581272m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

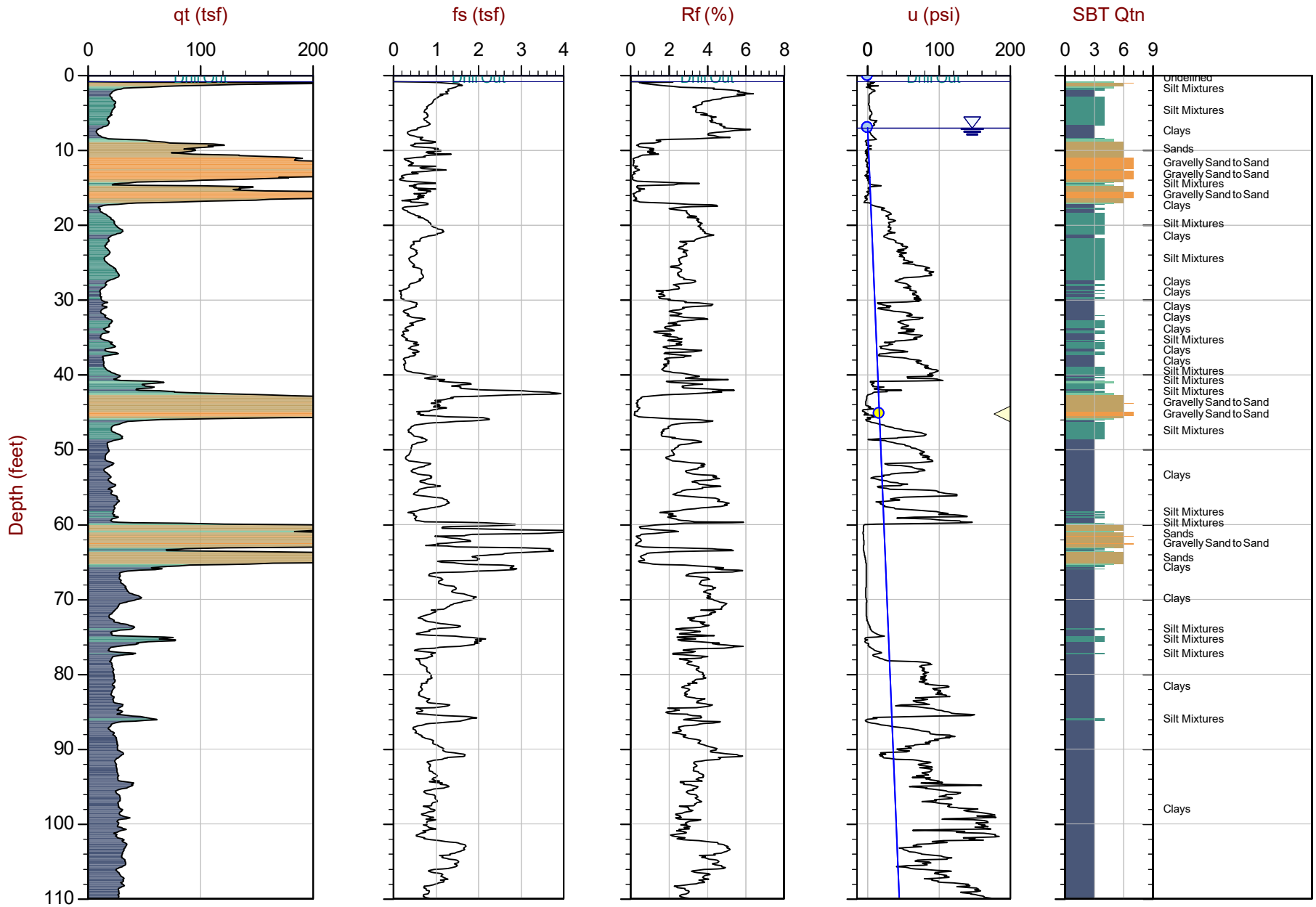
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 09:26
Site: Google Charleston South Exploration

Sounding: 1-CPT-14B
Cone: 483:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP14B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141826m E: 581178m
Page No: 1 of 2

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

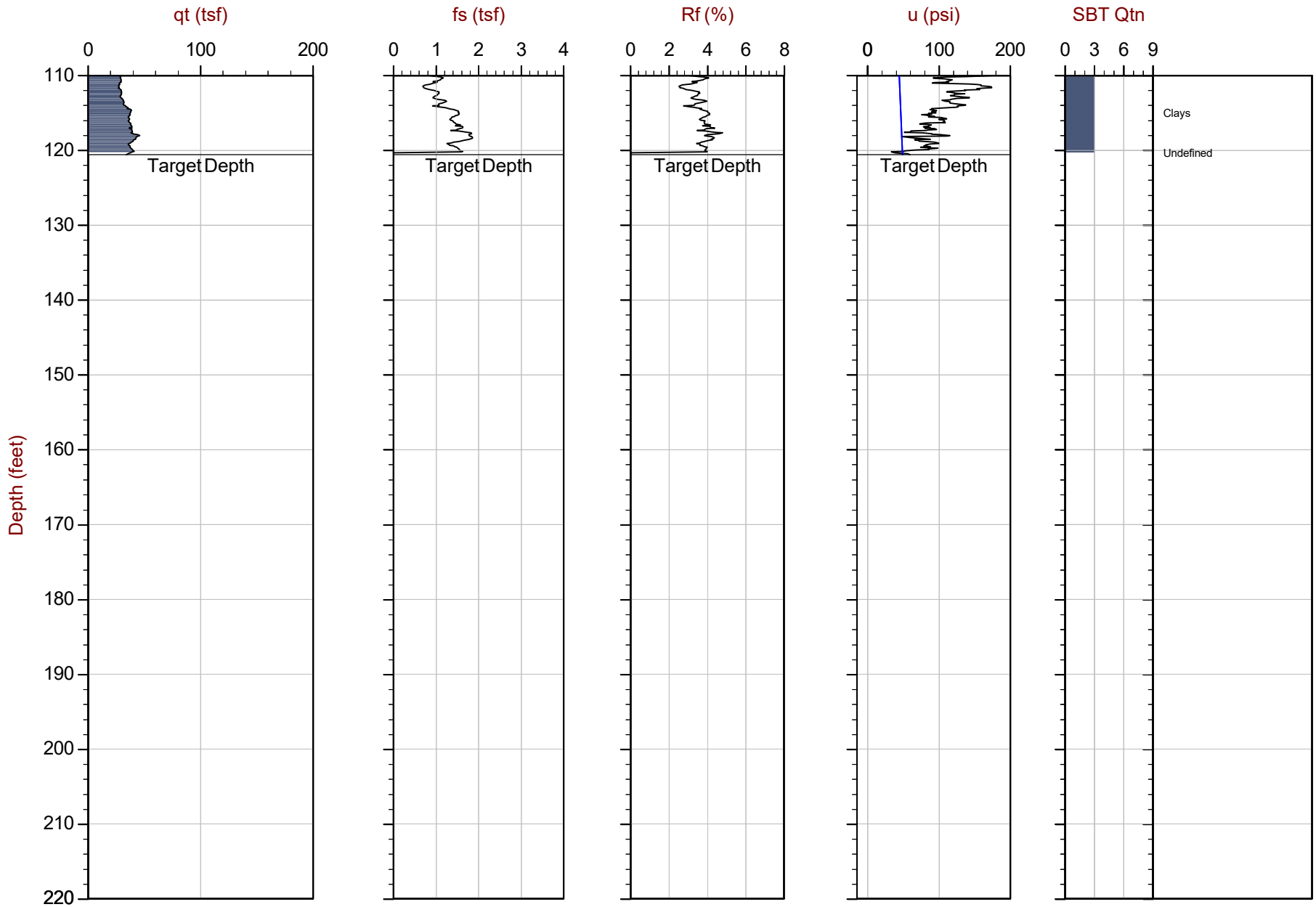
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 09:26
Site: Google Charleston South Exploration

Sounding: 1-CPT-14B
Cone: 483:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP14B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141826m E: 581178m
Page No: 2 of 2

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

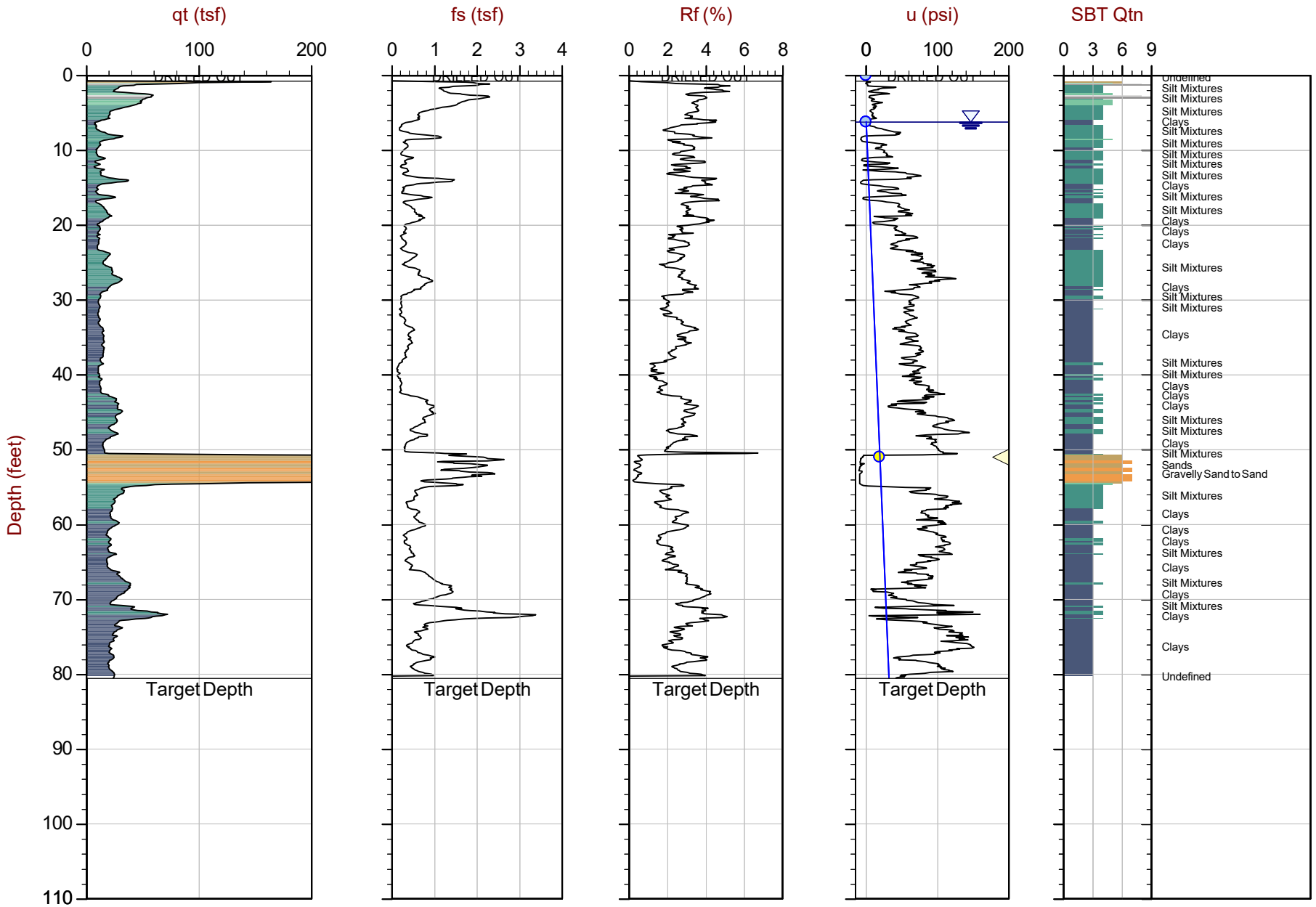
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 23:33
Site: Google Charleston South Exploration

Sounding: 1-CPT-15
Cone: 448:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP15.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141706m E: 581239m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

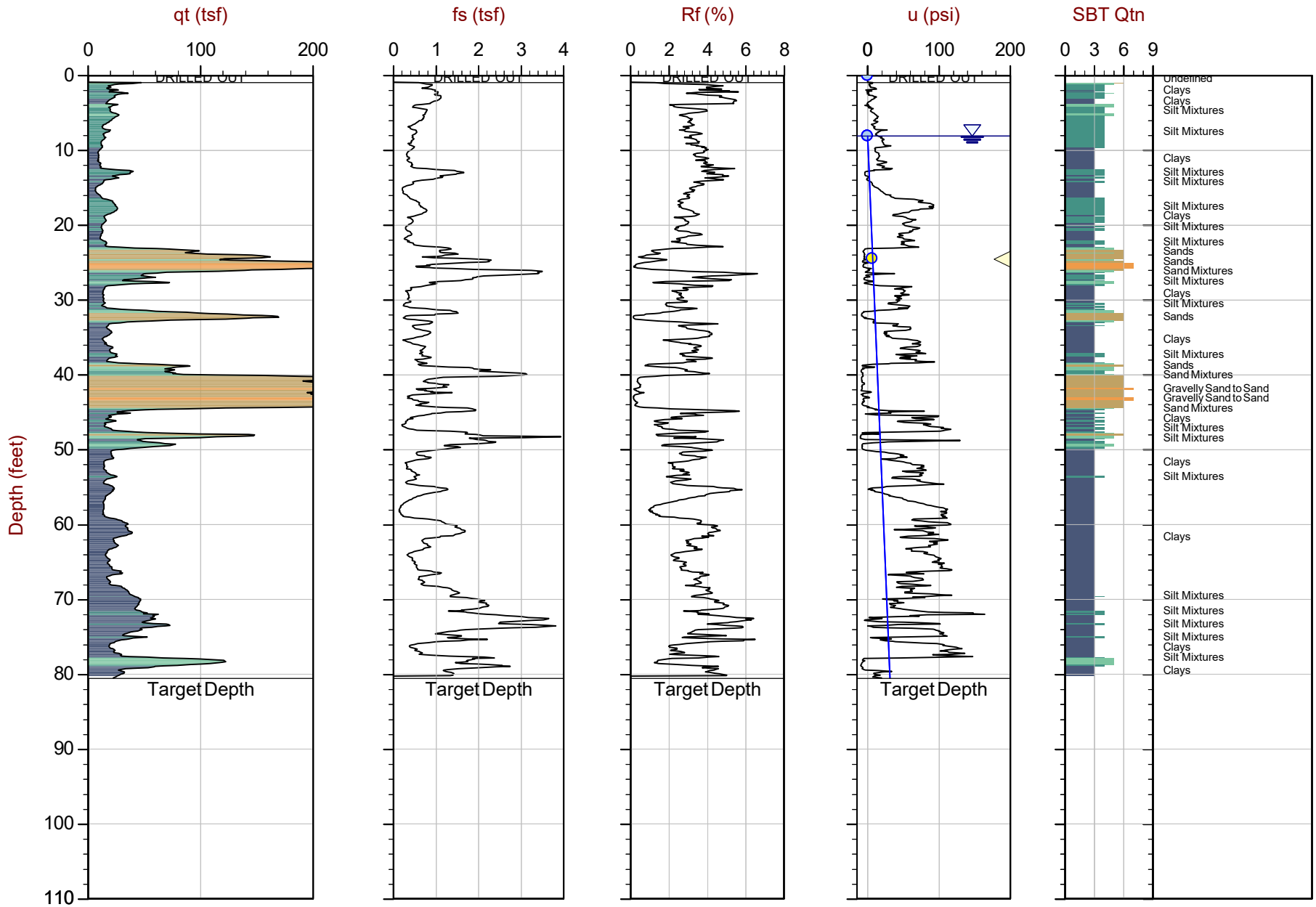
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-09 21:38
Site: Google Charleston South Exploration

Sounding: 1-CPT-16
Cone: 448:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP16.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141607m E: 581331m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

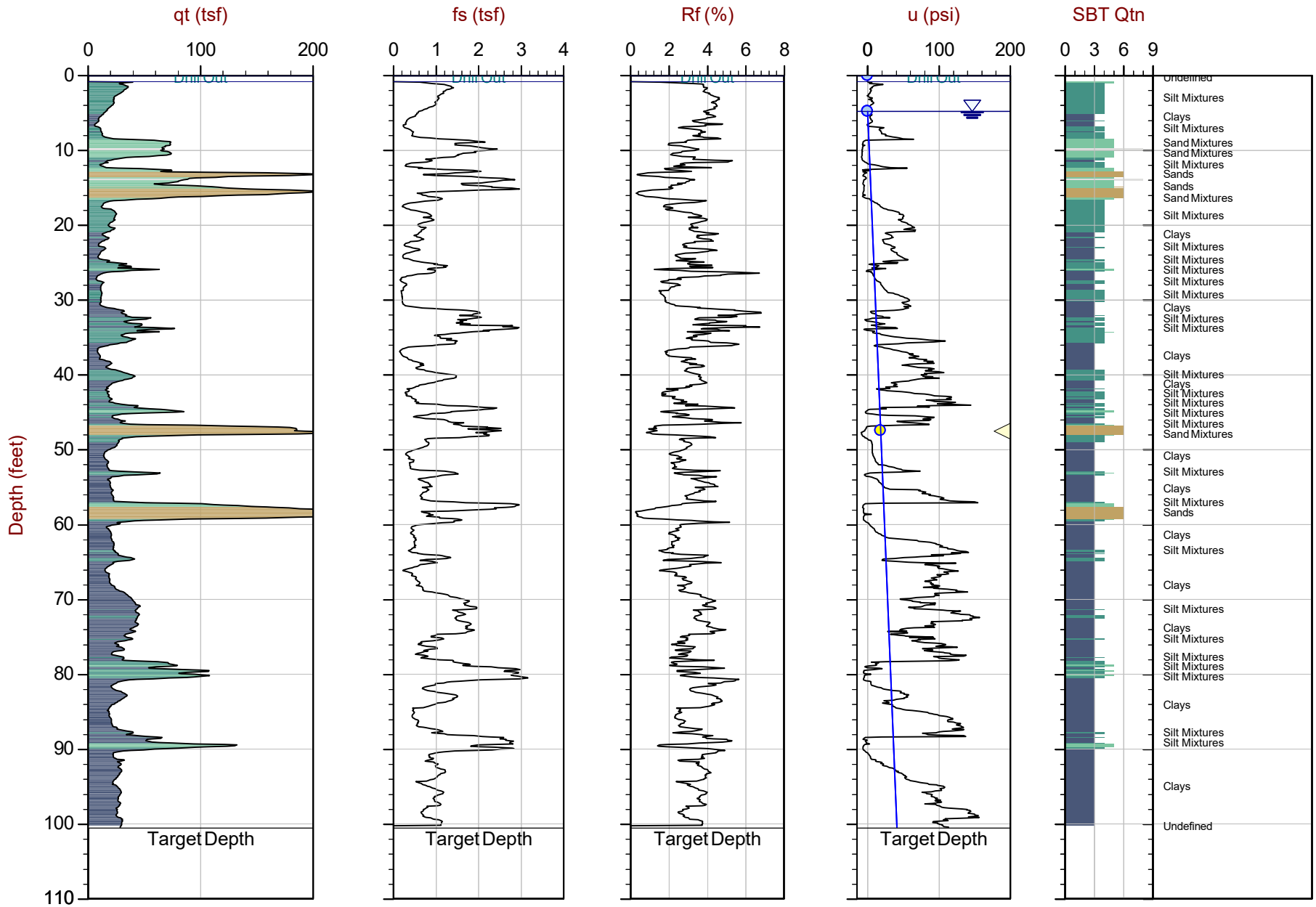
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-10 22:48
Site: Google Charleston South Exploration

Sounding: 1-CPT-17
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP17.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141531m E: 581178m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

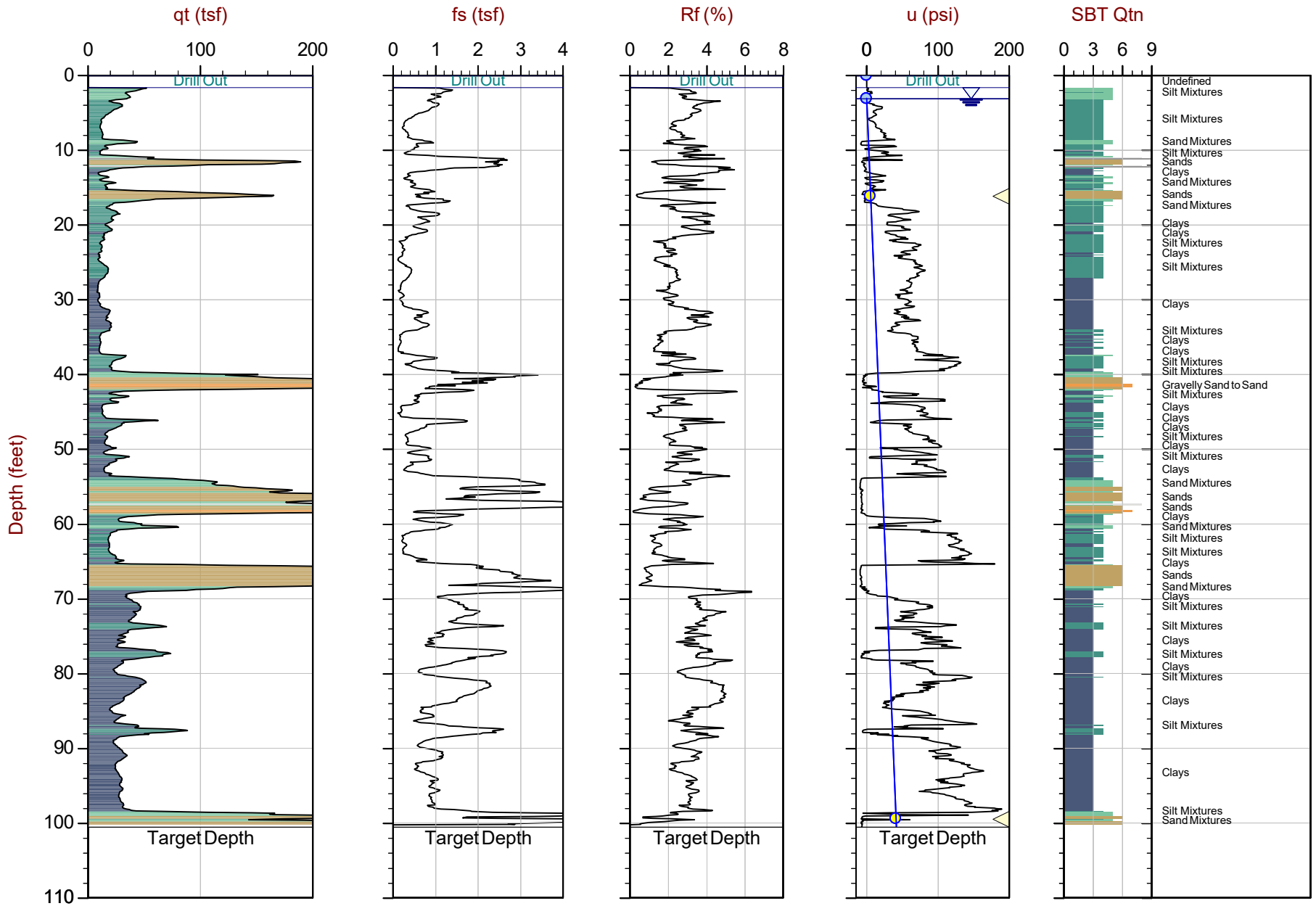
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-11 00:05
Site: Google Charleston South Exploration

Sounding: 1-CPT-18
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP18.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141640m E: 581199m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Plots

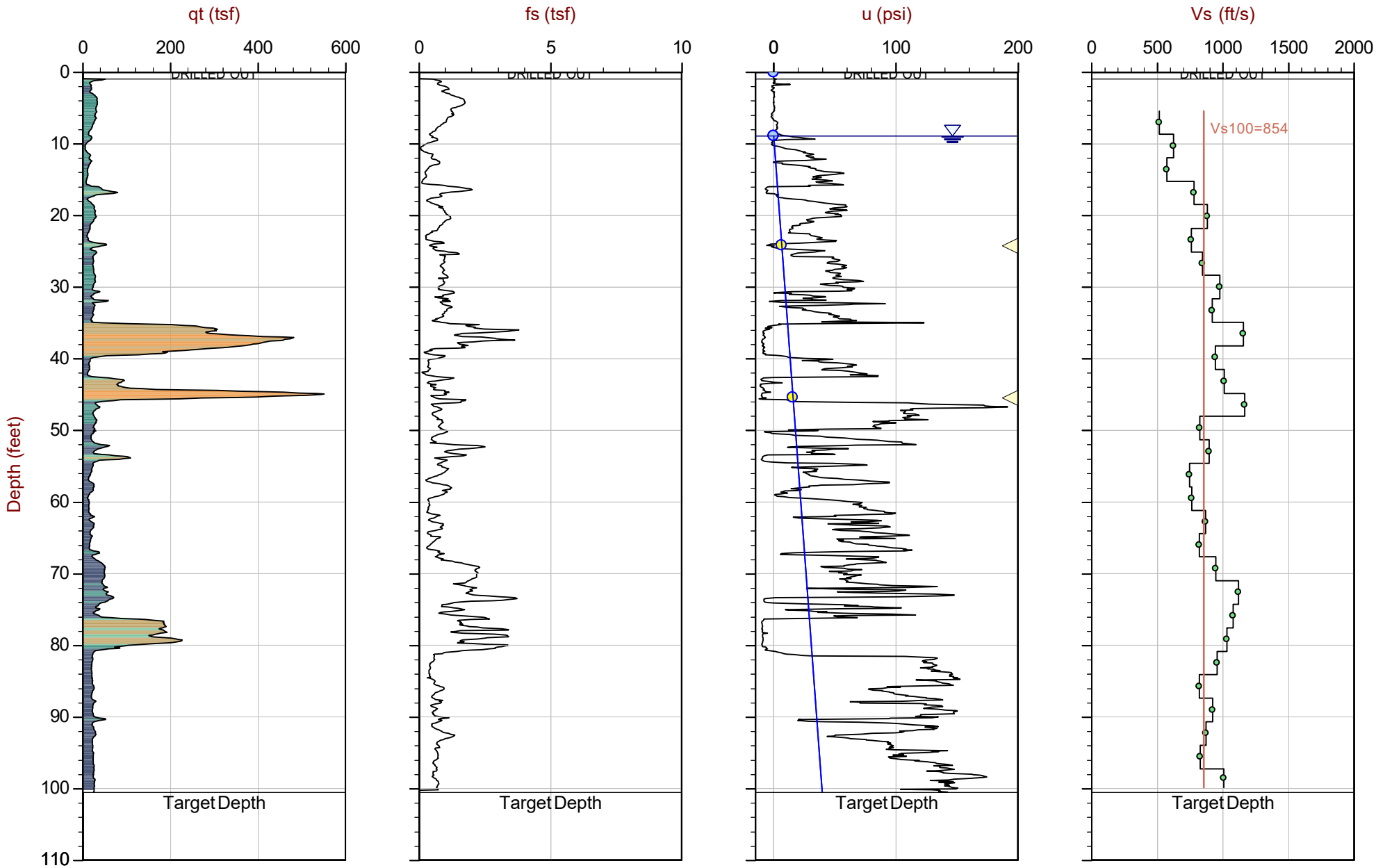
CONETEC

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 21:48
Site: Google Joaquin Exploration

Sounding: 1-SCPT-02
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP2.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141669m E: 581498m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

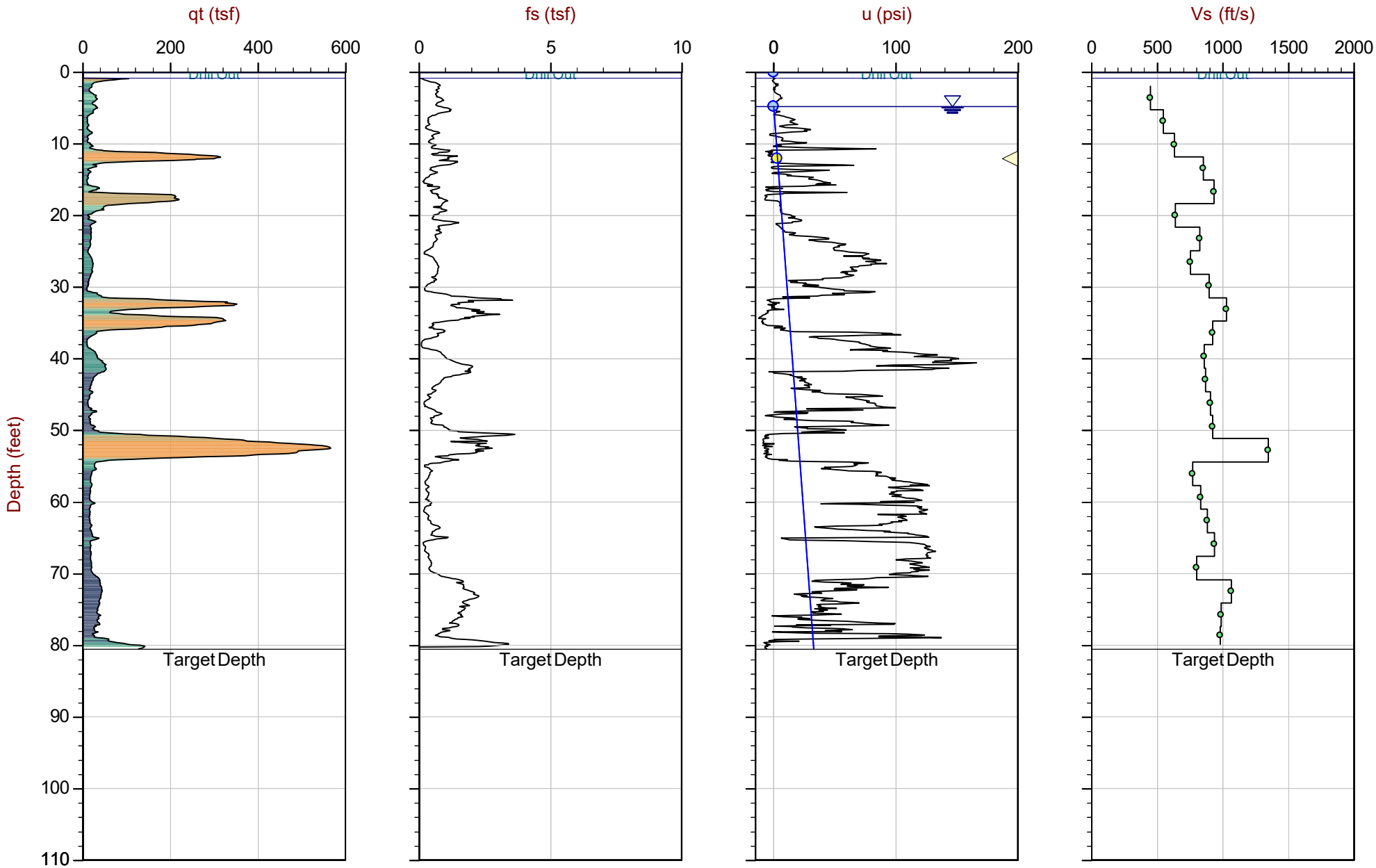
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 08:52
Site: Google Plymouth Exploration

Sounding: 1-SCPT-10
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP10.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141481m E: 581034m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

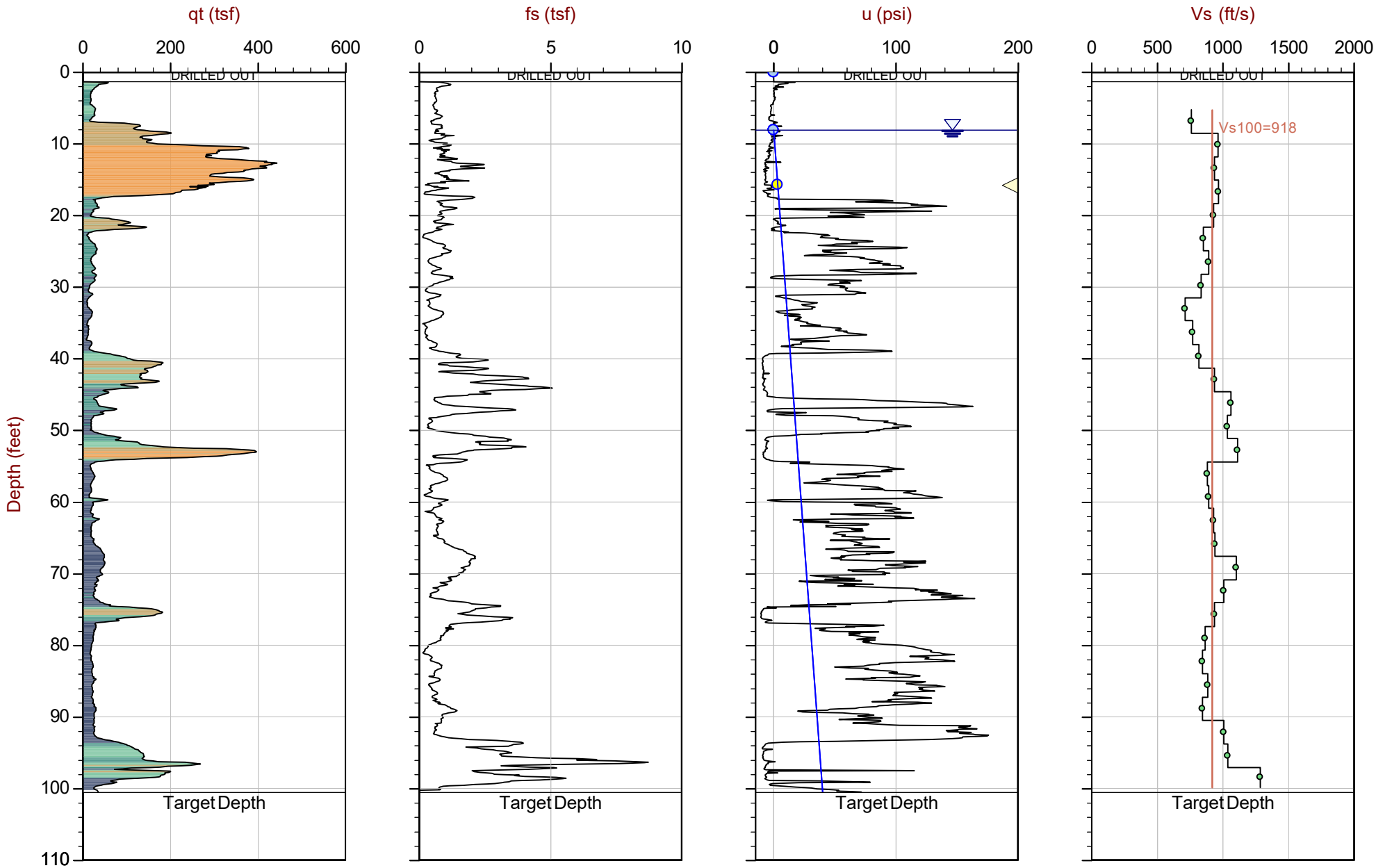
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 21:45
Site: Google Charleston South Exploration

Sounding: 1-SCPT-04
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SCP4.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141829m E: 581289m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Tabular Results

CONETEC

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Joaquin
Sounding ID:	1-SCPT-02
Date:	07-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.13
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
6.07	5.41	5.82			
9.35	8.69	8.95	3.13	6.07	516
12.63	11.97	12.16	3.21	5.13	626
15.91	15.26	15.40	3.24	5.65	573
19.13	18.47	18.59	3.19	4.08	782
22.47	21.82	21.92	3.33	3.77	883
25.75	25.10	25.19	3.27	4.29	762
29.04	28.38	28.46	3.27	3.87	845
32.32	31.66	31.73	3.27	3.35	977
35.60	34.94	35.01	3.27	3.56	920
38.88	38.22	38.28	3.28	2.83	1159
42.16	41.50	41.56	3.28	3.47	945
45.54	44.88	44.93	3.38	3.34	1012
48.72	48.06	48.11	3.18	2.72	1168
52.00	51.35	51.39	3.28	3.98	824
55.28	54.63	54.67	3.28	3.66	895
58.56	57.91	57.95	3.28	4.40	746
61.84	61.19	61.22	3.28	4.29	764
65.12	64.47	64.50	3.28	3.77	870
68.31	67.65	67.68	3.18	3.87	821
71.69	71.03	71.06	3.38	3.56	949
74.97	74.31	74.34	3.28	2.93	1119
78.25	77.59	77.62	3.28	3.03	1081
81.53	80.87	80.90	3.28	3.17	1033
84.81	84.15	84.18	3.28	3.42	959
88.09	87.43	87.46	3.28	3.98	823
91.37	90.72	90.74	3.28	3.55	925
94.65	94.00	94.02	3.28	3.75	874
97.93	97.28	97.30	3.28	3.96	828
100.56	99.90	99.92	2.62	2.61	1007

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Plymouth
Sounding ID:	1-SCPT-10
Date:	13-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.10
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
2.62	1.97	2.07			
5.91	5.25	5.29	3.22	7.18	448
9.19	8.53	8.55	3.27	5.95	549
12.47	11.81	11.83	3.27	5.18	633
15.75	15.09	15.11	3.28	3.84	854
19.03	18.37	18.38	3.28	3.51	934
22.31	21.65	21.66	3.28	5.14	638
25.59	24.93	24.94	3.28	3.98	824
28.87	28.22	28.22	3.28	4.34	755
32.15	31.50	31.50	3.28	3.65	898
35.43	34.78	34.78	3.28	3.18	1030
38.71	38.06	38.06	3.28	3.55	925
41.99	41.34	41.34	3.28	3.81	861
45.28	44.62	44.62	3.28	3.77	871
48.56	47.90	47.90	3.28	3.62	907
51.84	51.18	51.19	3.28	3.55	923
55.12	54.46	54.47	3.28	2.43	1347
58.40	57.74	57.75	3.28	4.26	770
61.68	61.02	61.03	3.28	3.94	833
64.96	64.30	64.31	3.28	3.72	882
68.24	67.58	67.59	3.28	3.50	938
71.52	70.87	70.87	3.28	4.09	802
74.80	74.15	74.15	3.28	3.08	1065
78.08	77.43	77.43	3.28	3.32	987
80.54	79.89	79.89	2.46	2.50	983

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Charleston South
Sounding ID:	1-SCPT-04
Date:	08-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.10
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

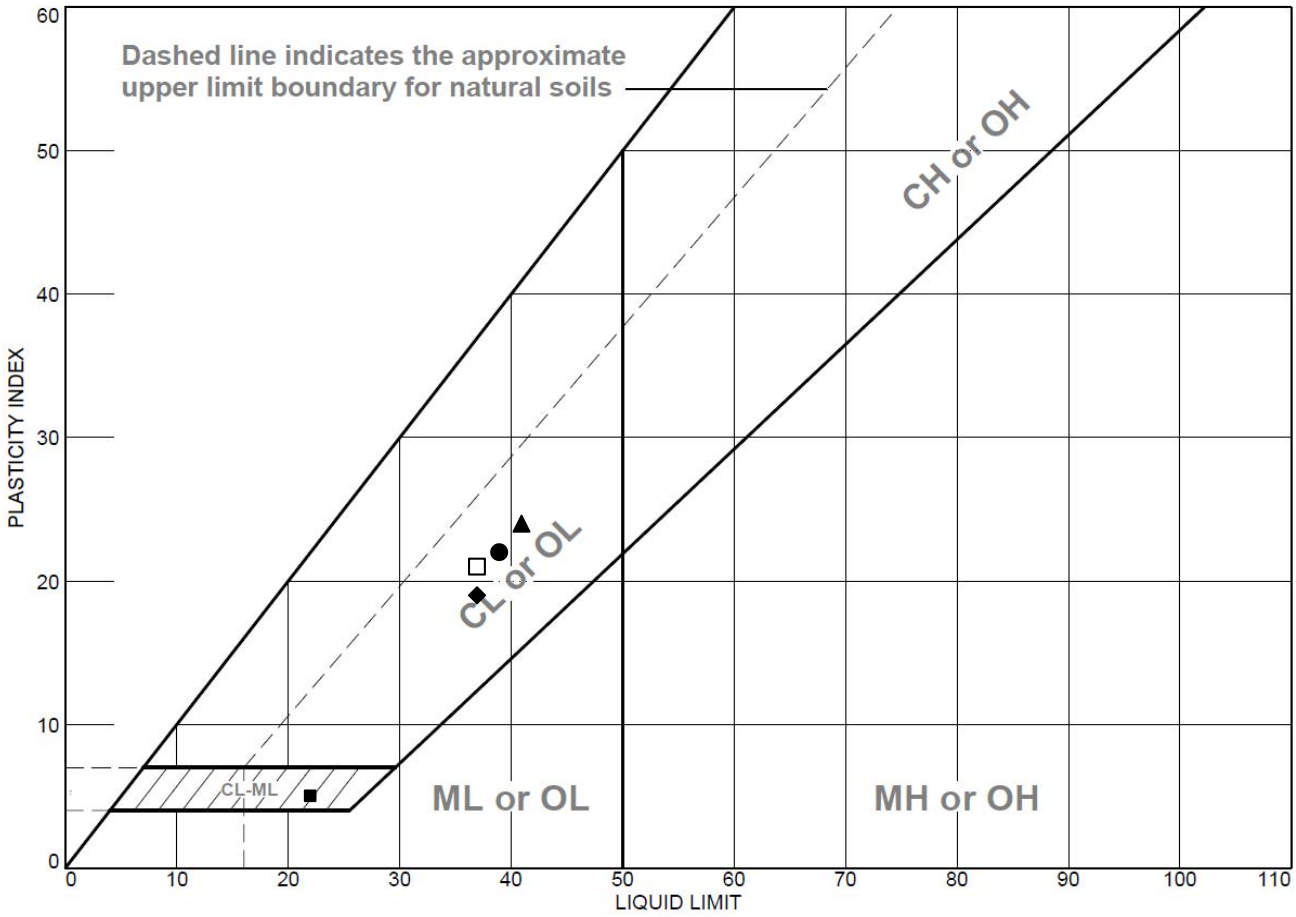
Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.91	5.25	5.65			
9.19	8.53	8.78	3.13	4.12	761
12.47	11.81	12.00	3.21	3.33	964
15.75	15.09	15.24	3.24	3.46	937
19.03	18.37	18.49	3.26	3.37	967
22.31	21.65	21.76	3.26	3.50	932
25.59	24.93	25.02	3.27	3.83	852
28.87	28.22	28.29	3.27	3.67	892
32.15	31.50	31.57	3.27	3.92	836
35.37	34.71	34.77	3.21	4.50	713
38.71	38.06	38.12	3.34	4.33	771
41.99	41.34	41.39	3.28	4.00	819
45.28	44.62	44.67	3.28	3.50	937
48.56	47.90	47.95	3.28	3.08	1063
51.84	51.18	51.22	3.28	3.17	1035
55.12	54.46	54.50	3.28	2.94	1115
58.40	57.74	57.78	3.28	3.71	884
61.58	60.93	60.96	3.18	3.56	894
64.96	64.30	64.34	3.38	3.63	932
68.24	67.58	67.62	3.28	3.49	940
71.52	70.87	70.90	3.28	2.97	1103
74.70	74.05	74.08	3.18	3.16	1007
78.08	77.43	77.46	3.38	3.61	936
81.36	80.71	80.74	3.28	3.79	865
84.65	83.99	84.02	3.28	3.88	845
87.93	87.27	87.30	3.28	3.70	886
91.21	90.55	90.58	3.28	3.88	845
94.49	93.83	93.86	3.28	3.25	1010
97.77	97.11	97.14	3.28	3.16	1039
100.56	99.90	99.92	2.79	2.17	1287



APPENDIX C

LABORATORY TEST DATA

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	41	17	24		61.4	CL
◆	See exploration logs	37	18	19		74	CL
□	See exploration logs	37	16	21		51.9	CL
●	See exploration logs	39	17	22		88.3	CL
■	See exploration logs	22	17	5		44.6	SC-SM

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B8 **Depth:** 5.5-6.5
◆ **Sample Number:** 1-B8 **Depth:** 22-23.5
□ **Sample Number:** 1-B8 **Depth:** 30.5-31.5
● **Sample Number:** 1-B8 **Depth:** 54-55.5
■ **Sample Number:** 1-B8 **Depth:** 95-96.5

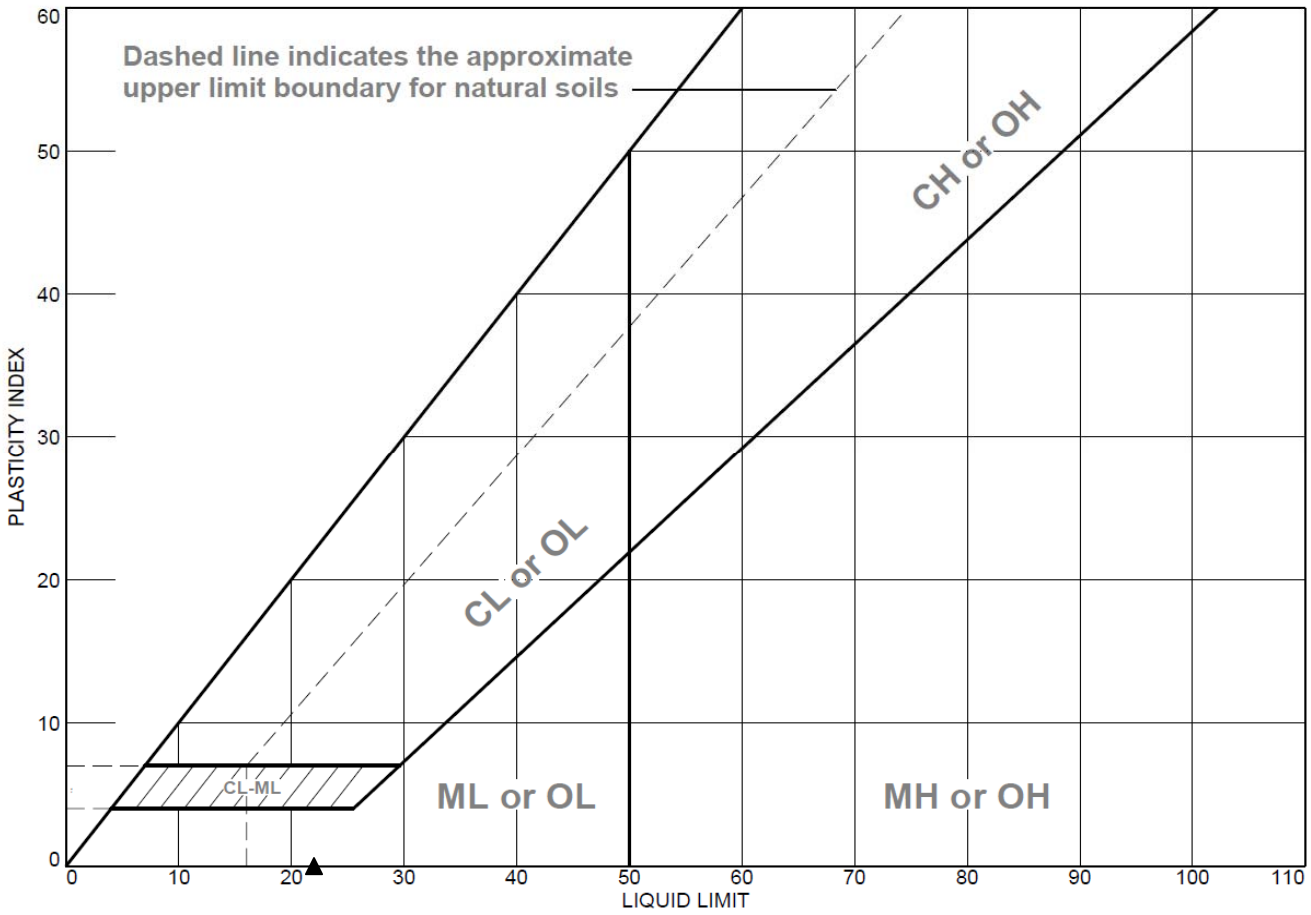
ENGEO Expect Excellence

Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
■ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	22	22	0		51.8	ML

Project No.: 15949.000.000 **Date:** 6/14/2019

Project Name: GEX for Multiple Parcels

Project location: Sunnyvale, California

Client: Google, LLC

▲ **Sample Number:** 1-B9 **Depth:** 15-18 ft

Remarks:

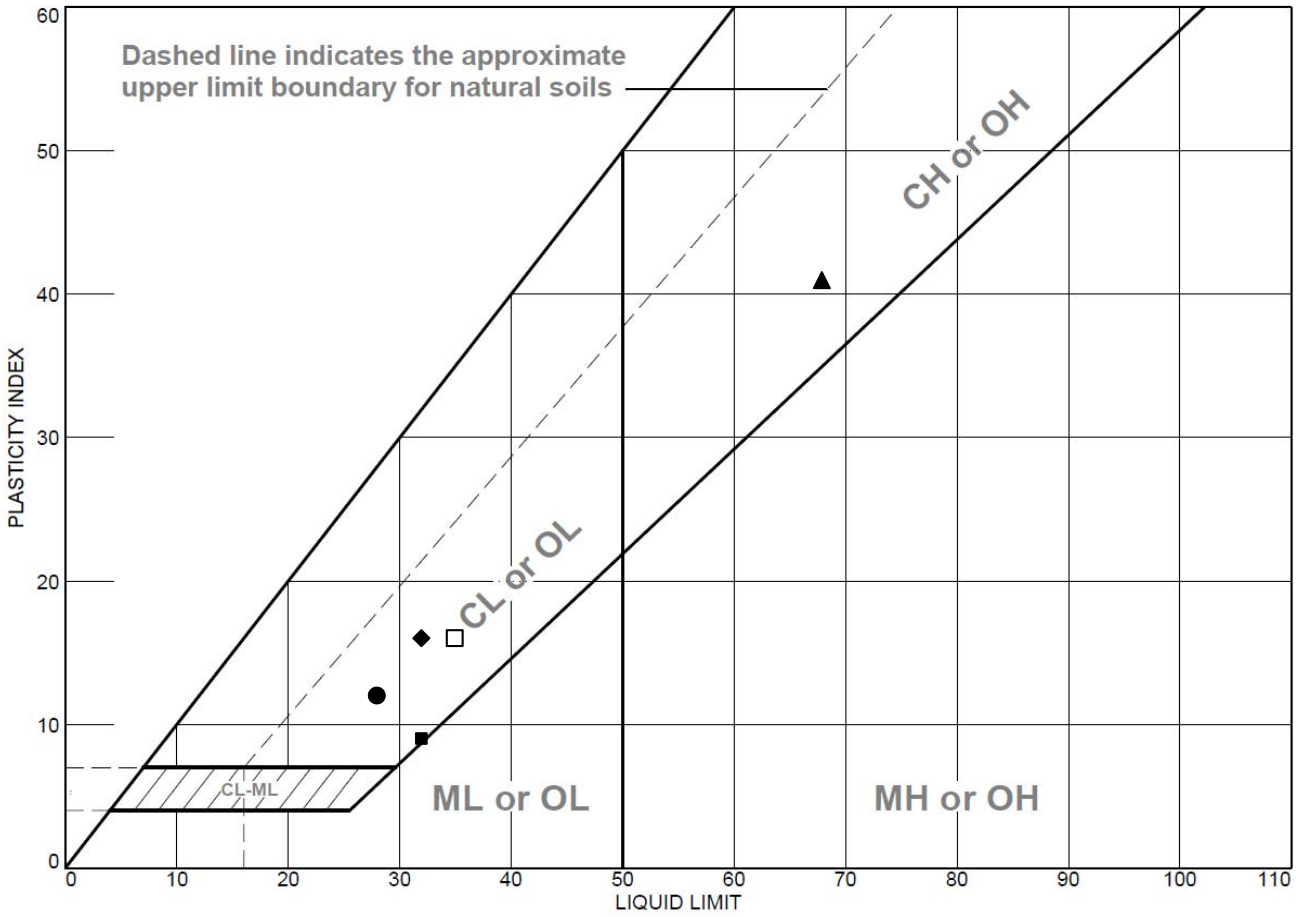
PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method A, USCS: ASTM D2487

ENGEO
Expect Excellence

Tested By: M. Quasem Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	68	27	41		80.2	CH
◆	See exploration logs	32	16	16		30	SC
□	See exploration logs	35	19	16		56.5	CL
●	See exploration logs	28	16	12		34	SC
■	See exploration logs	32	23	9			

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B9 **Depth:** 5.5-6.5
◆ **Sample Number:** 1-B9 **Depth:** 10.5-11.5
□ **Sample Number:** 1-B9 **Depth:** 35-36.5
● **Sample Number:** 1-B9 **Depth:** 55-56.5
■ **Sample Number:** 1-B10 **Depth:** 5-6.5

Remarks:

▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

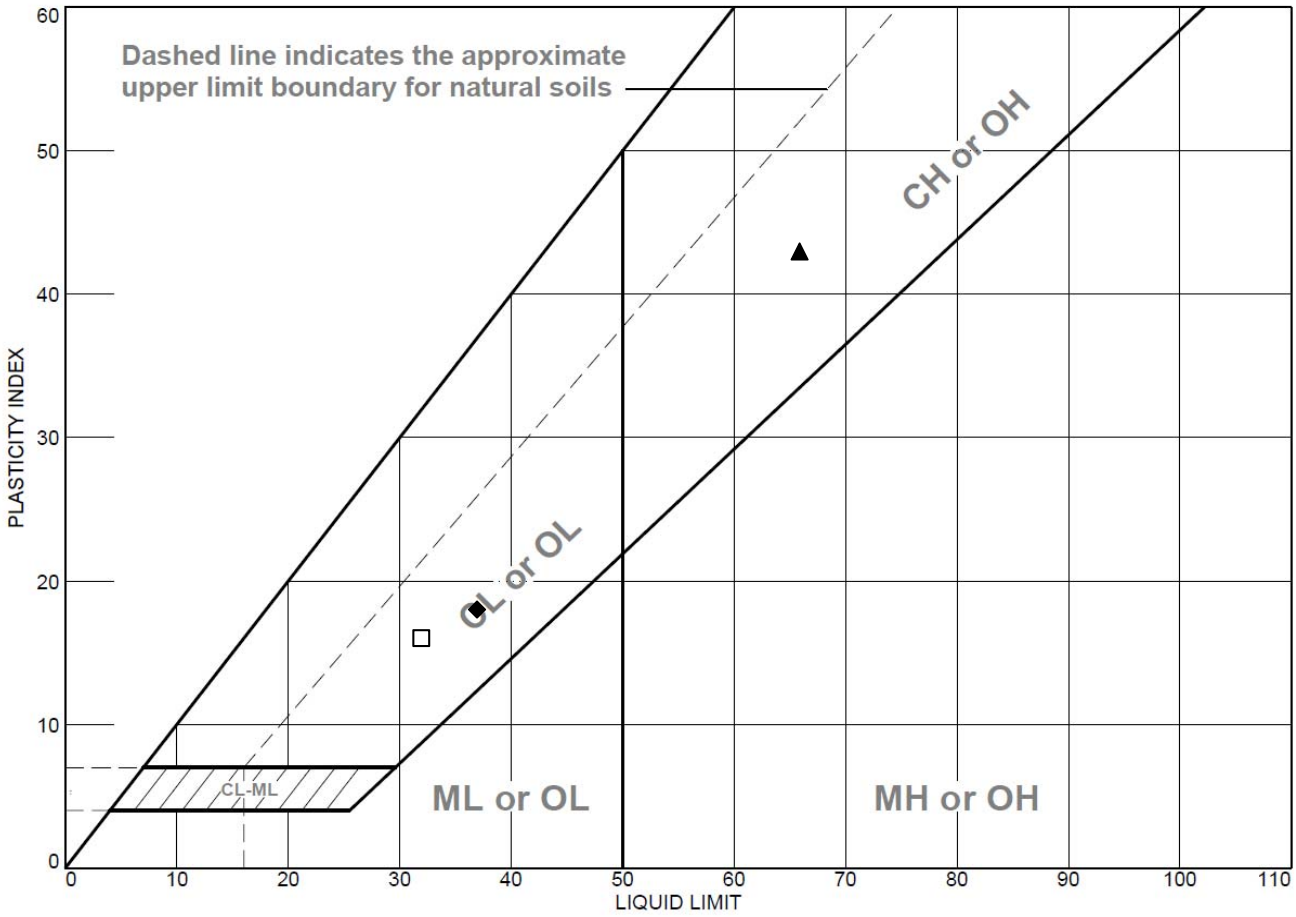
■ PI: ASTM D4318, Wet Method

ENGEO
Expect Excellence

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	66	23	43		79.2	CH
◆	See exploration logs	37	19	18		63	CL
□	See exploration logs	32	16	16		34.1	SC

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC
▲ **Sample Number:** 1-B10 **Depth:** 15-16.5
◆ **Sample Number:** 1-B10 **Depth:** 25-26.5
□ **Sample Number:** 1-B10 **Depth:** 40-41.5

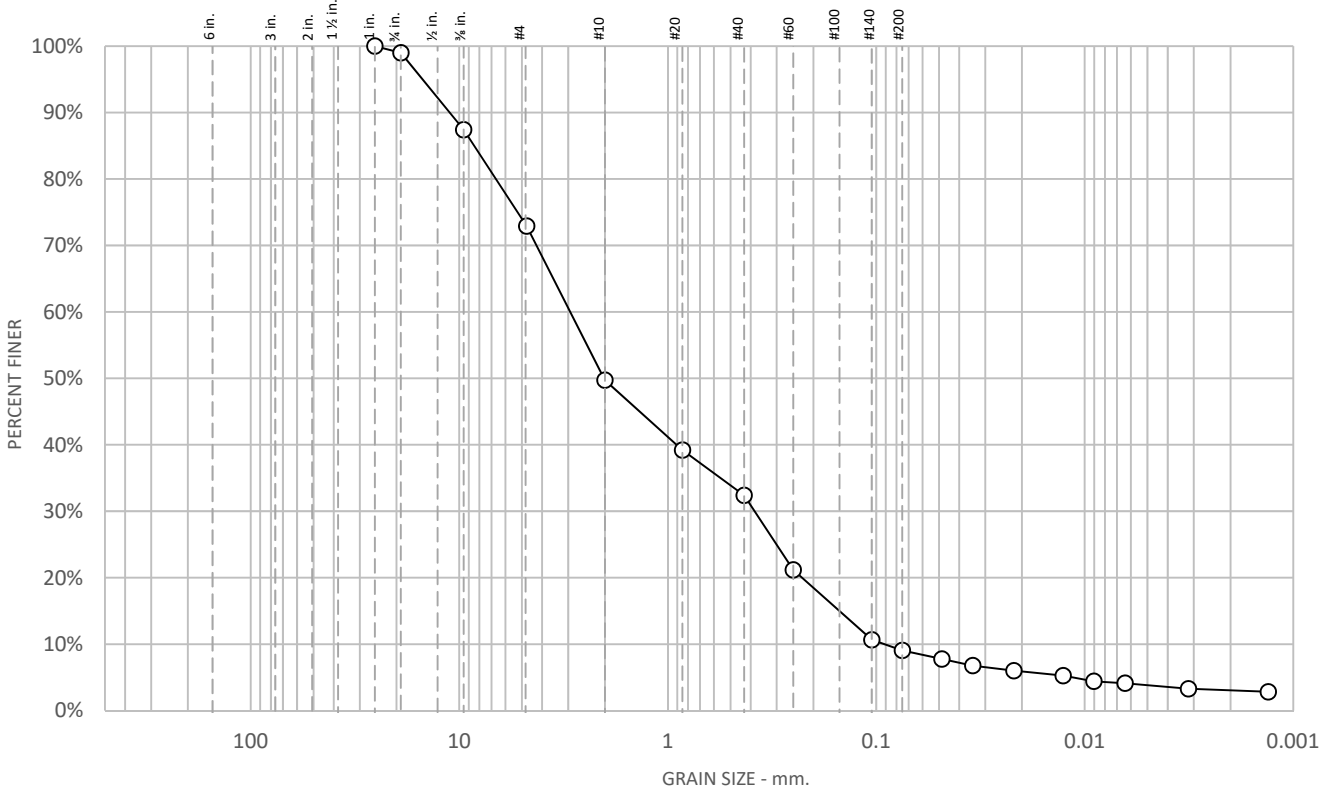
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

ENGEO Expect Excellence

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	1.0	26.0	23.2	17.3	23.3	6.0	3.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	99.0		
⅜ in.	87.4		
#4	72.9		
#10	49.7		
#20	39.2		
#40	32.4		
#60	21.2		
#140	10.7		
#200	9.1		
0.0485 mm.	7.8		
0.0345 mm.	6.8		
0.0219 mm.	6.0		
0.0127 mm.	5.3		
0.0090 mm.	4.4		
0.0064 mm.	4.1		
0.0032 mm.	3.3		
0.0013 mm.	2.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 11.1207 mm D_{85} = 8.4848 mm D_{60} = 2.9346 mm
D_{50} = 2.0208 mm D_{30} = 0.3830 mm D_{15} = 0.1502 mm
D_{10} = 0.0915 mm C_u = 32.09 C_c = 0.55

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B8 @ 10-11.5

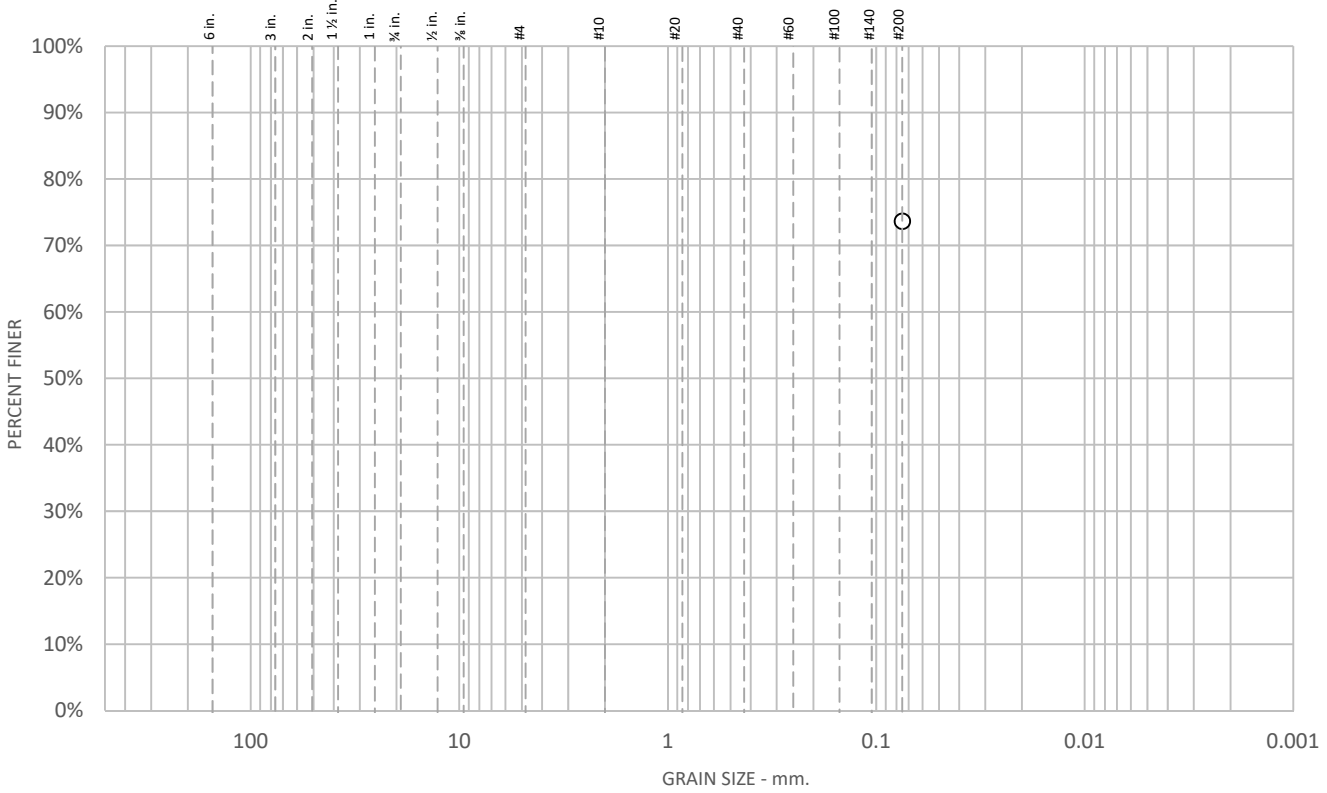
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	74		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 37 PI = 19

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 182.8 g

Sample Number: 1-B8 @ 22-23.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

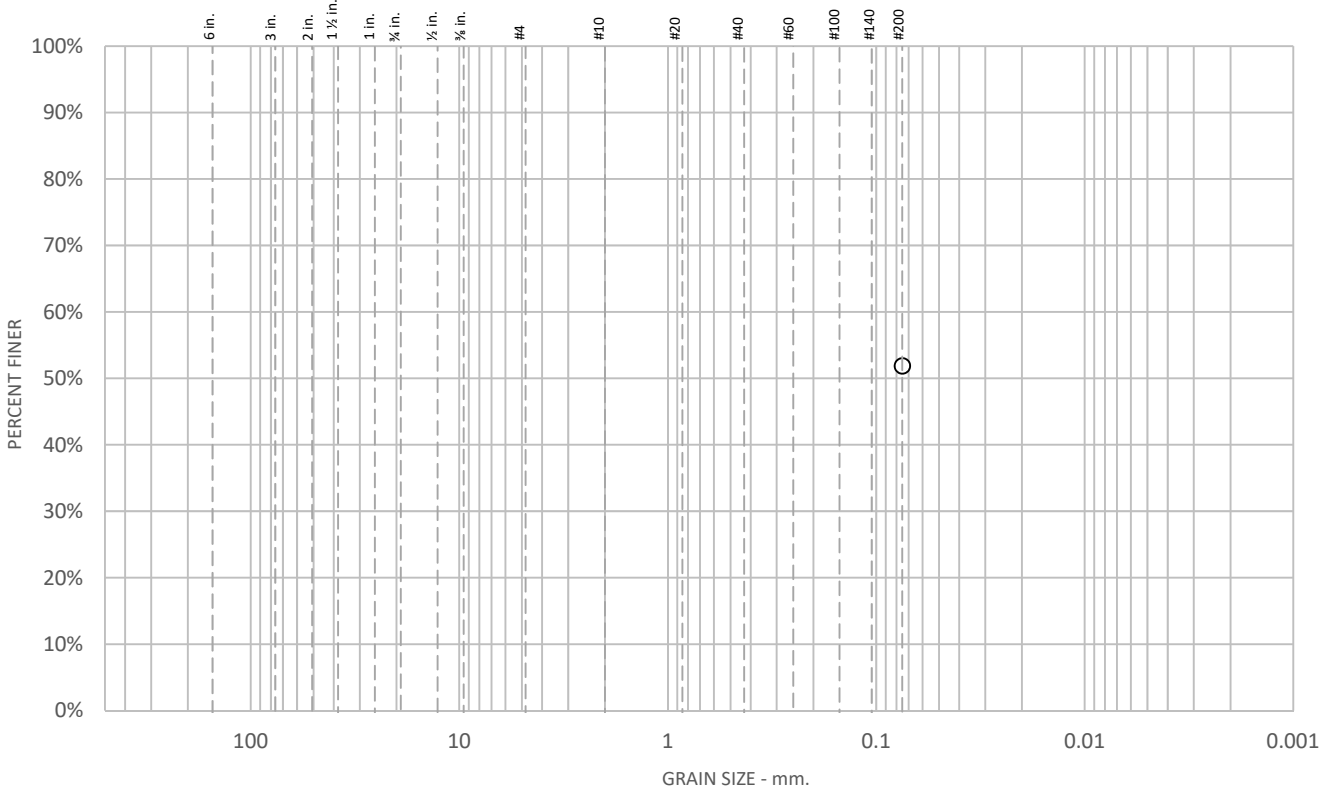
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	51.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 37 PI = 21

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 198.4 g

Sample Number: 1-B8 @ 30.5-31.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

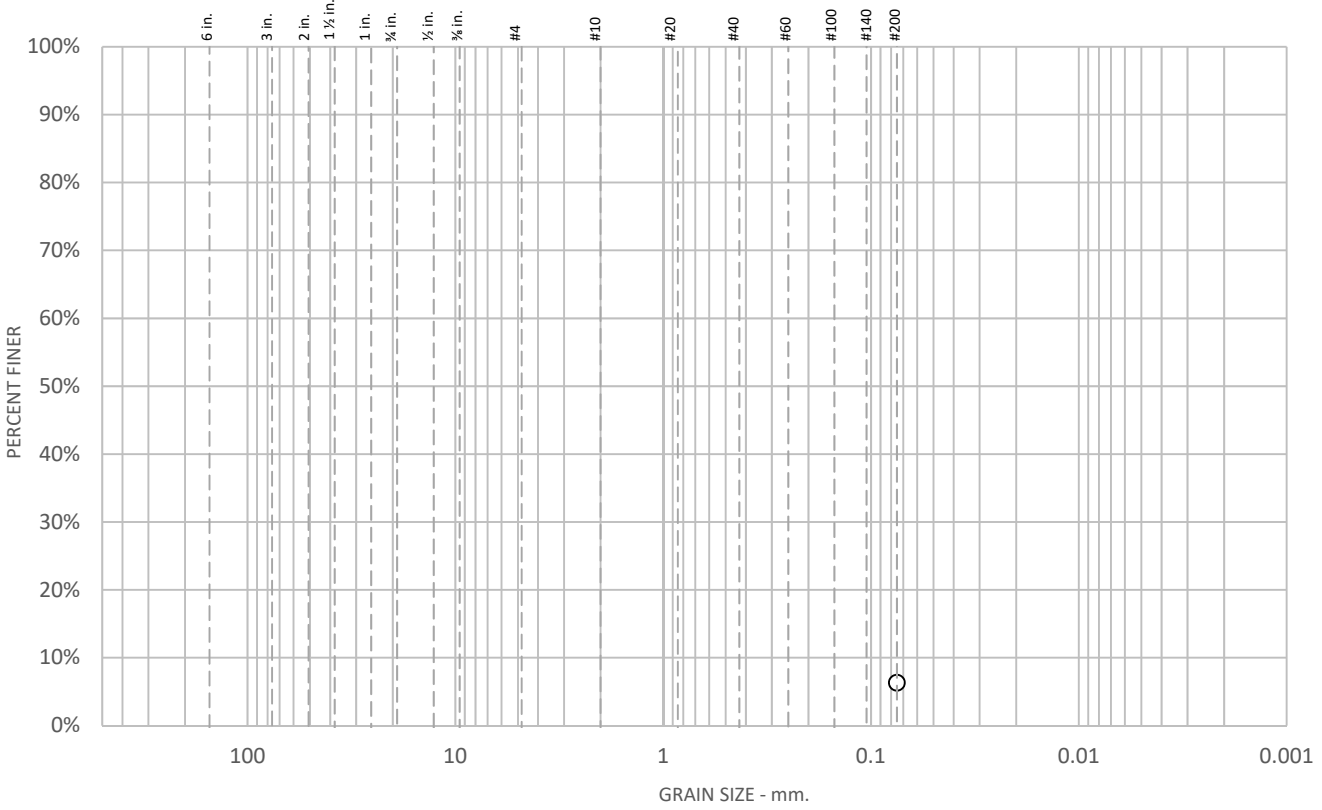
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	6		

* (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 =

Remarks

ASTM D1140, Method A
Soak time = 60 min
Dry sample weight = 629.9 g

Sample Number: 1-B8 @ 41-41.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

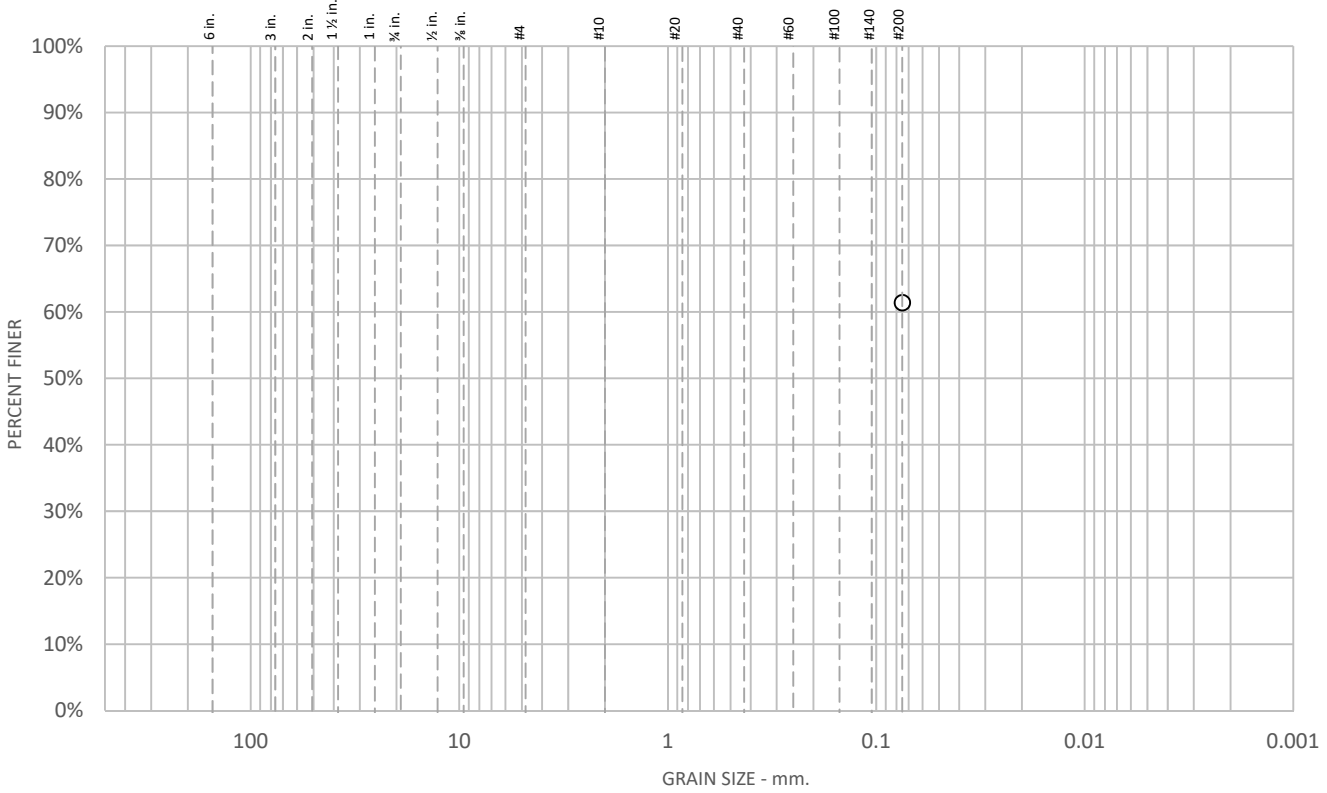
Project Number: 15949.000.000
Date: 6/13/2019

ENGEO Expect Excellence

Tested By: M. Quasem
Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	61.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 41 PI = 24

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 129.7 g

Sample Number: 1-B8 @ 5.5-6.5

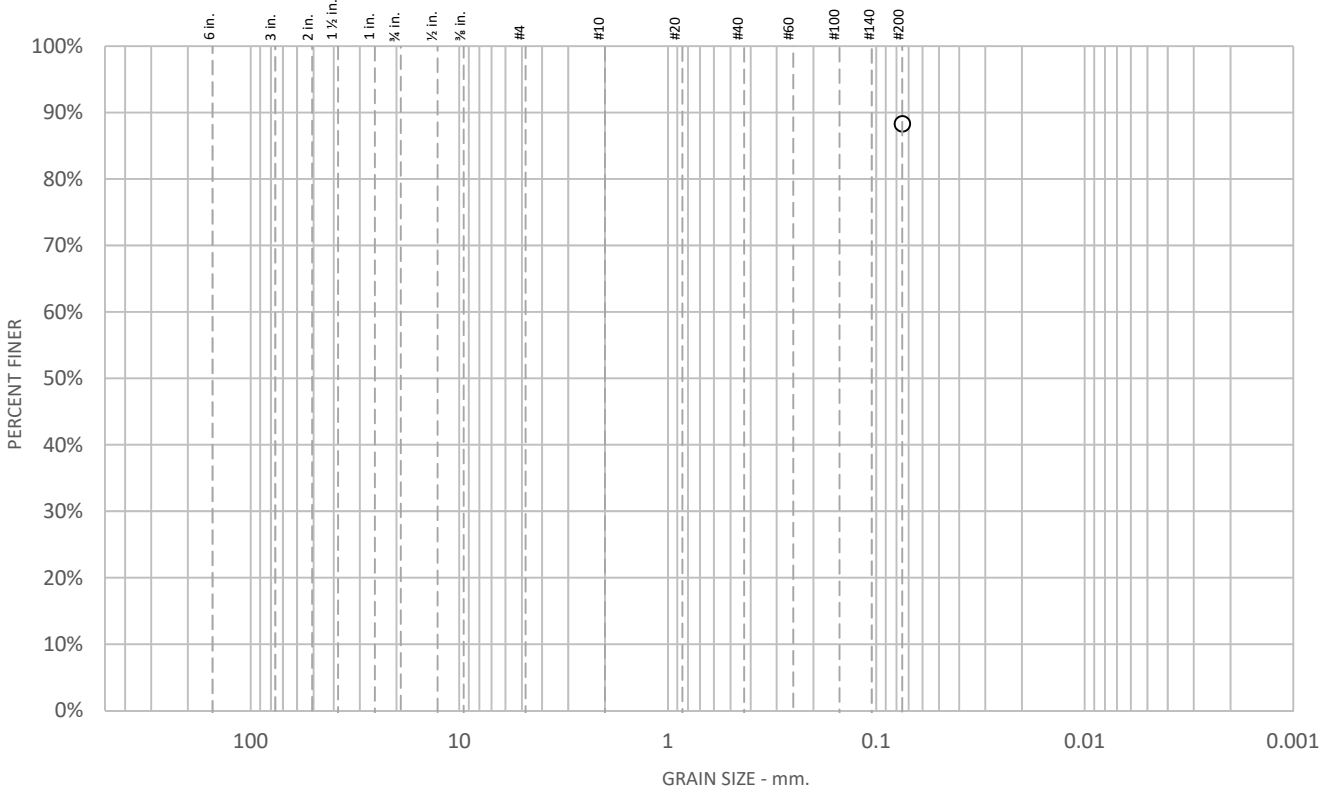
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/23/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						88.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	88.3		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 39 PI = 22

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 212.7 g

Sample Number: 1-B8 @ 54-55.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

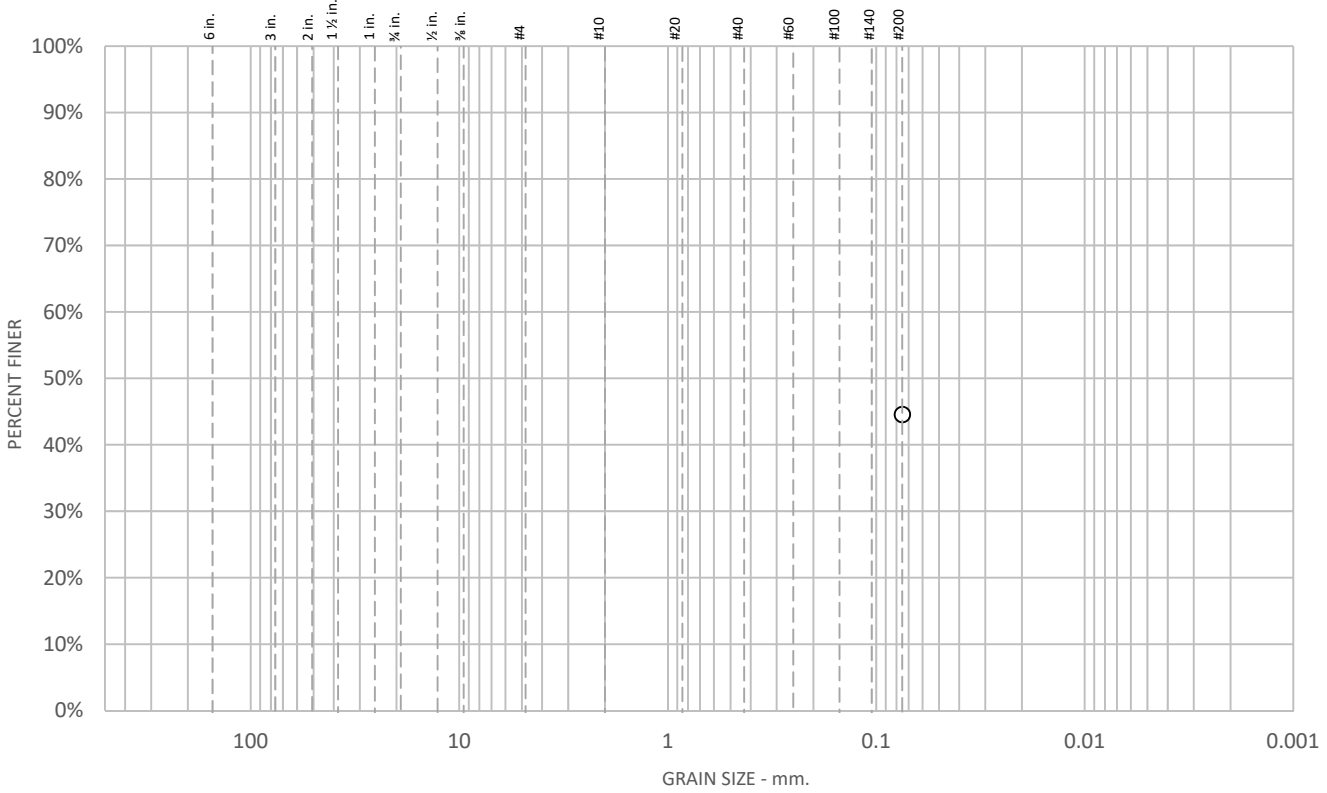
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	44.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 22 PI = 5

Coefficients

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

Classification

USCS = SC-SM

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 196.8 g

Sample Number: 1-B8 @ 95-96.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

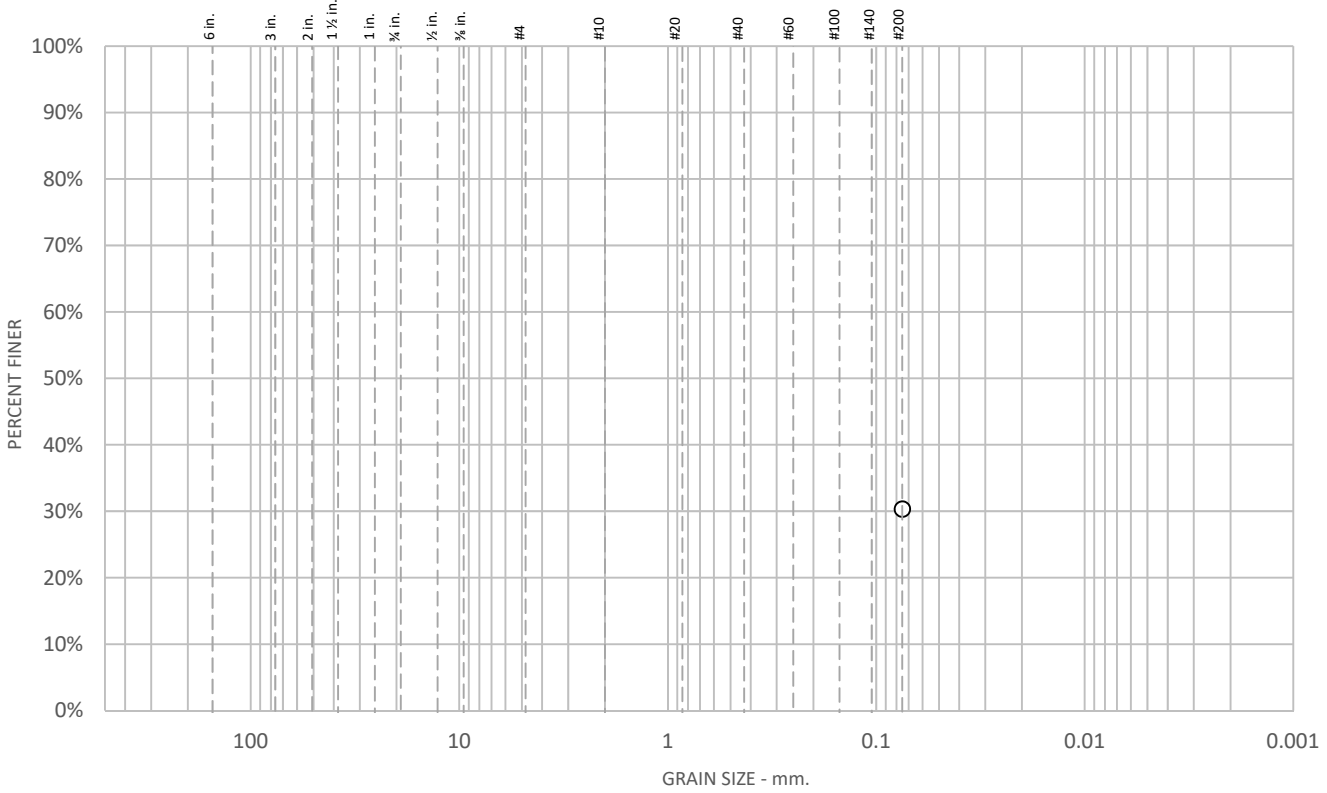
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	30		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 32 PI = 16

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 194.6 g

Sample Number: 1-B9 @ 10.5-11.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

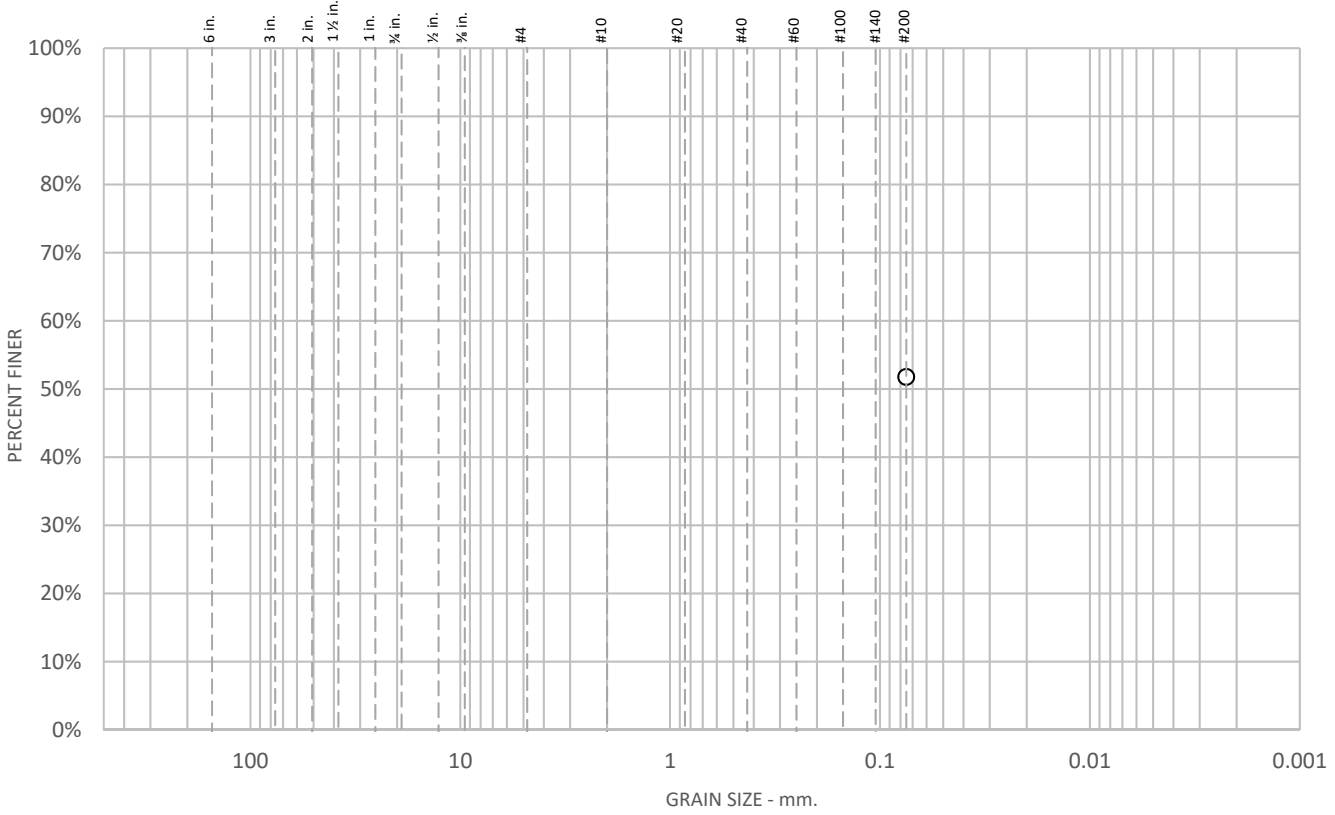
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	51.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 22 LL = 22 PI = 0

Coefficients

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

Classification

USCS = ML

Remarks

PI: ASTM D4318, Wet Method
ASTM D1140, Method A
Soak time = 12 min
Dry sample weight = 126.76 g

Sample Number: 1-B9 @ 15-18

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

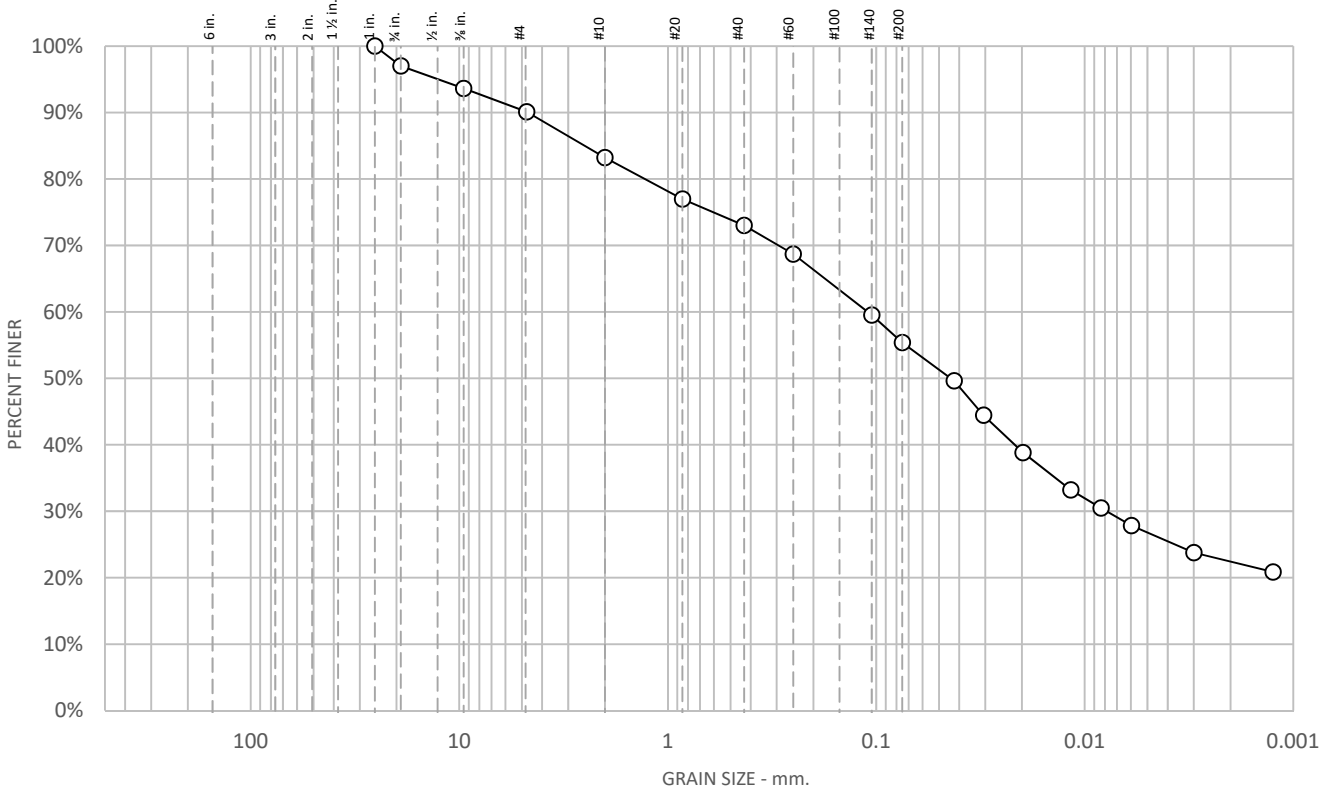
Project Number: 15949.000.000
Date: 6/14/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	3.0	6.9	6.9	10.2	17.6	33.0	22.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	97.0		
⅜ in.	93.6		
#4	90.1		
#10	83.2		
#20	77.0		
#40	73.0		
#60	68.7		
#140	59.5		
#200	55.4		
0.0423 mm.	49.6		
0.0306 mm.	44.4		
0.0198 mm.	38.8		
0.0117 mm.	33.2		
0.0084 mm.	30.5		
0.0060 mm.	27.8		
0.0030 mm.	23.8		
0.0013 mm.	20.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 4.6817 mm D_{85} = 2.5007 mm D_{60} = 0.1098 mm
D_{50} = 0.0439 mm D_{30} = 0.0078 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B9 @ 20-21.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

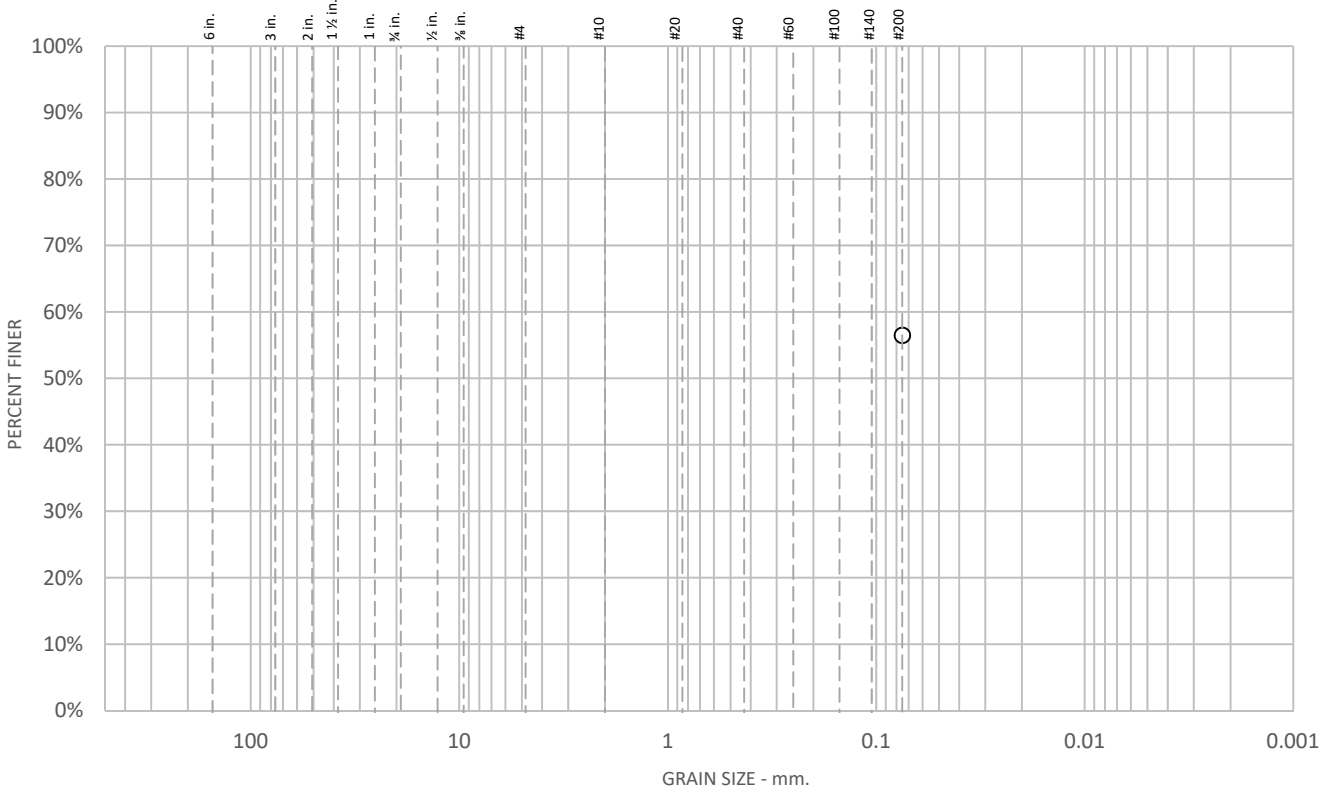
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	56.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 35 PI = 16

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 169.5 g

Sample Number: 1-B9 @ 35-36.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

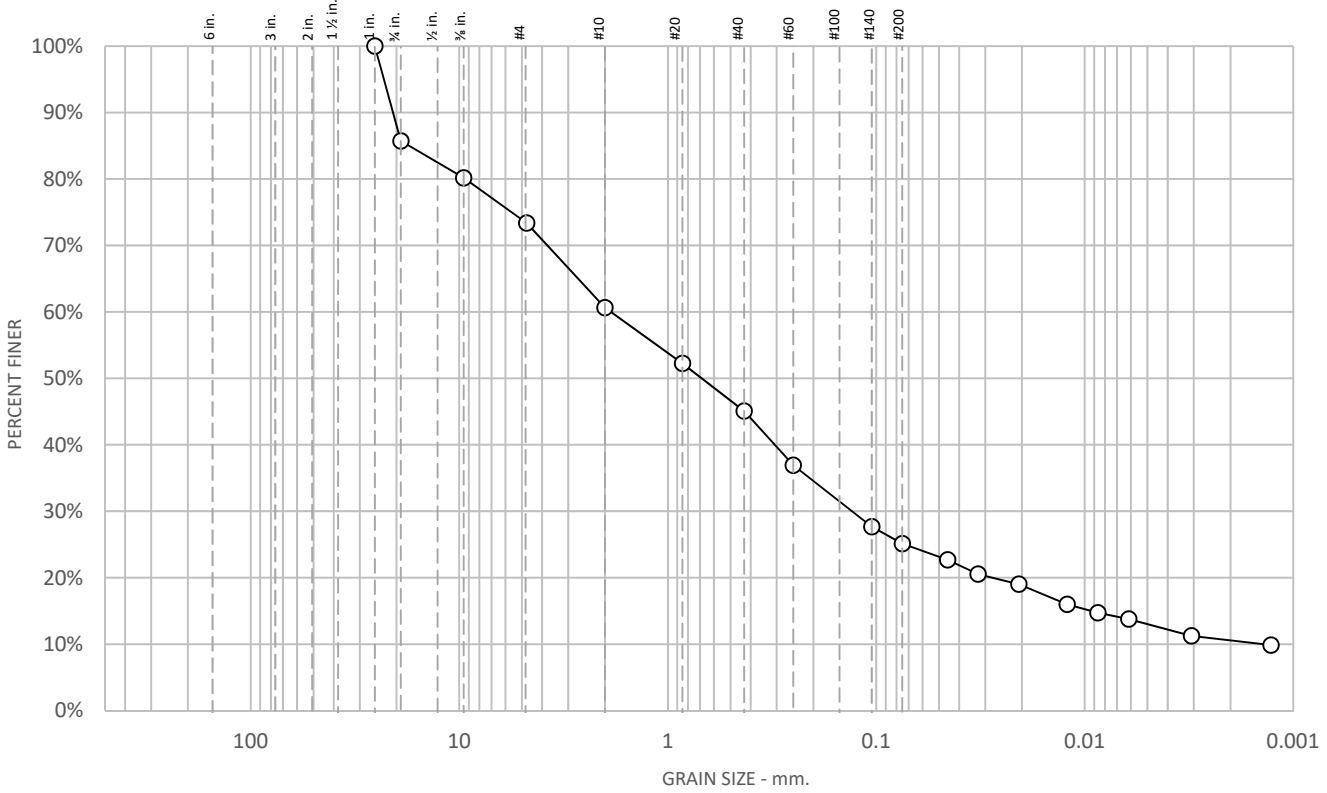
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	14.3	12.3	12.7	15.6	20.0	14.6	10.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	85.7		
⅜ in.	80.2		
#4	73.4		
#10	60.6		
#20	52.2		
#40	45.1		
#60	36.9		
#140	27.7		
#200	25.1		
0.0455 mm.	22.7		
0.0325 mm.	20.5		
0.0207 mm.	19.0		
0.0122 mm.	16.0		
0.0087 mm.	14.7		
0.0062 mm.	13.8		
0.0031 mm.	11.3		
0.0013 mm.	9.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 20.7605 mm D_{85} = 17.3783 mm D_{60} = 1.8730 mm
D_{50} = 0.6865 mm D_{30} = 0.1306 mm D_{15} = 0.0093 mm
D_{10} = 0.0014 mm C_u = 1342.09 C_c = 6.52

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B9 @ 45.46.5

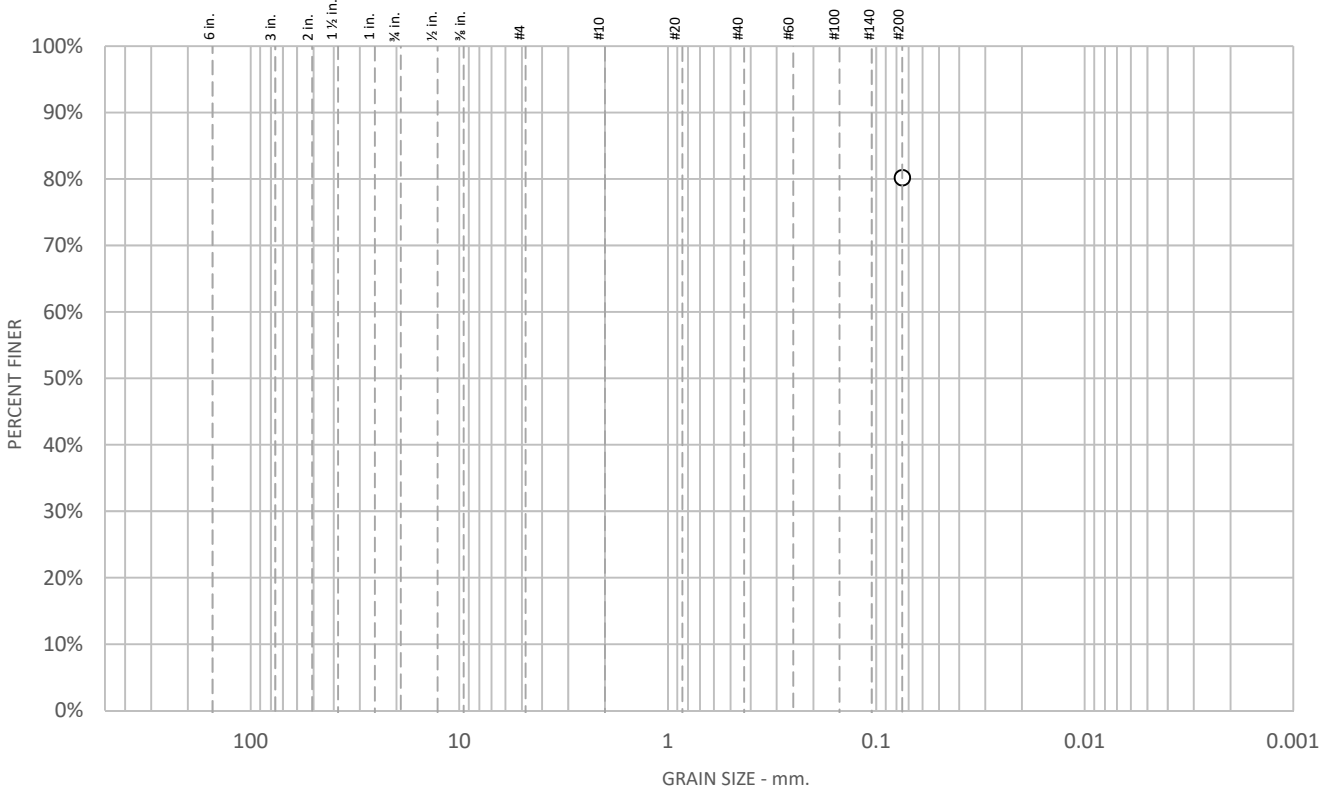
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						80.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	80.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 27 LL = 68 PI = 41

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 158.9 g

Sample Number: 1-B9 @ 5.5-6.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

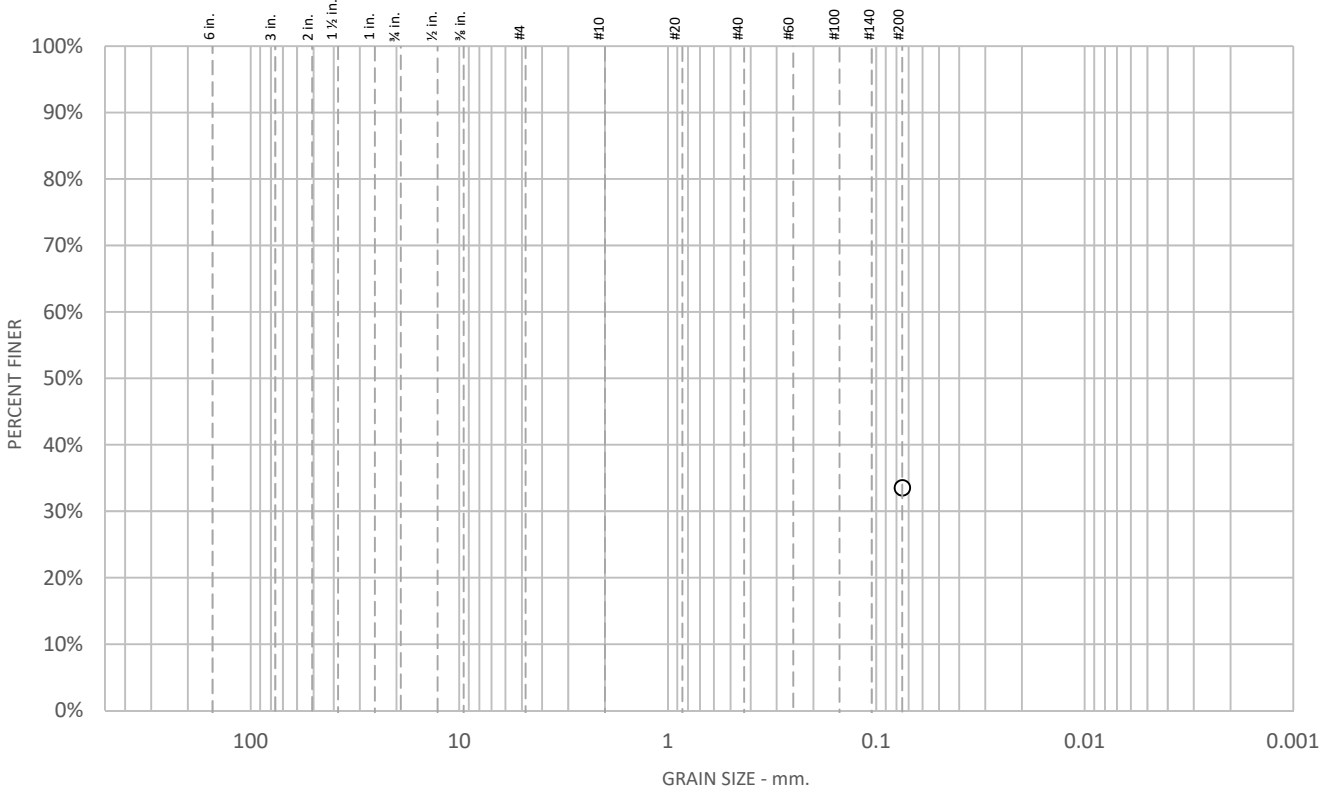
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 28 PI = 12

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 209.7 g

Sample Number: 1-B9 @ 55-56.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

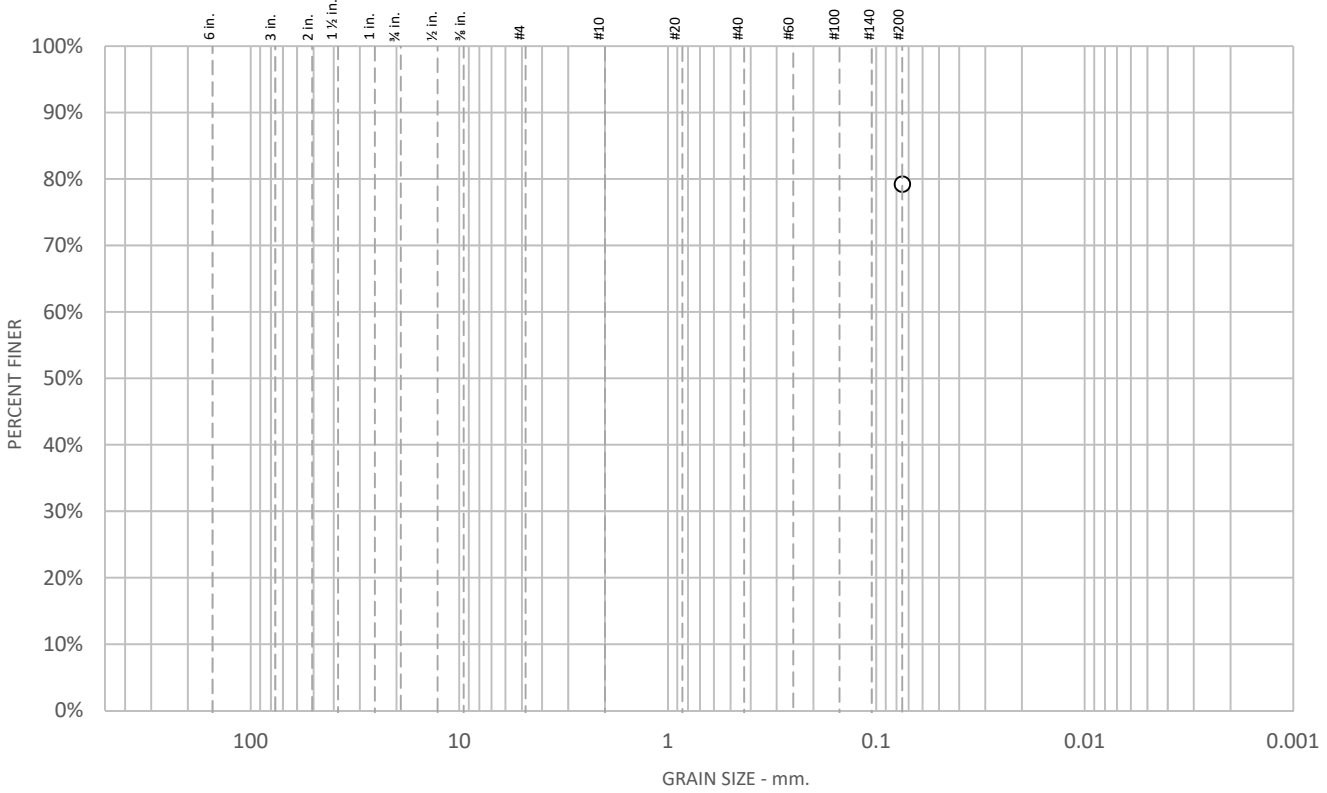
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						79.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	79.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 23 LL = 66 PI = 43

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 188.2 g

Sample Number: 1-B10 @ 15-16.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

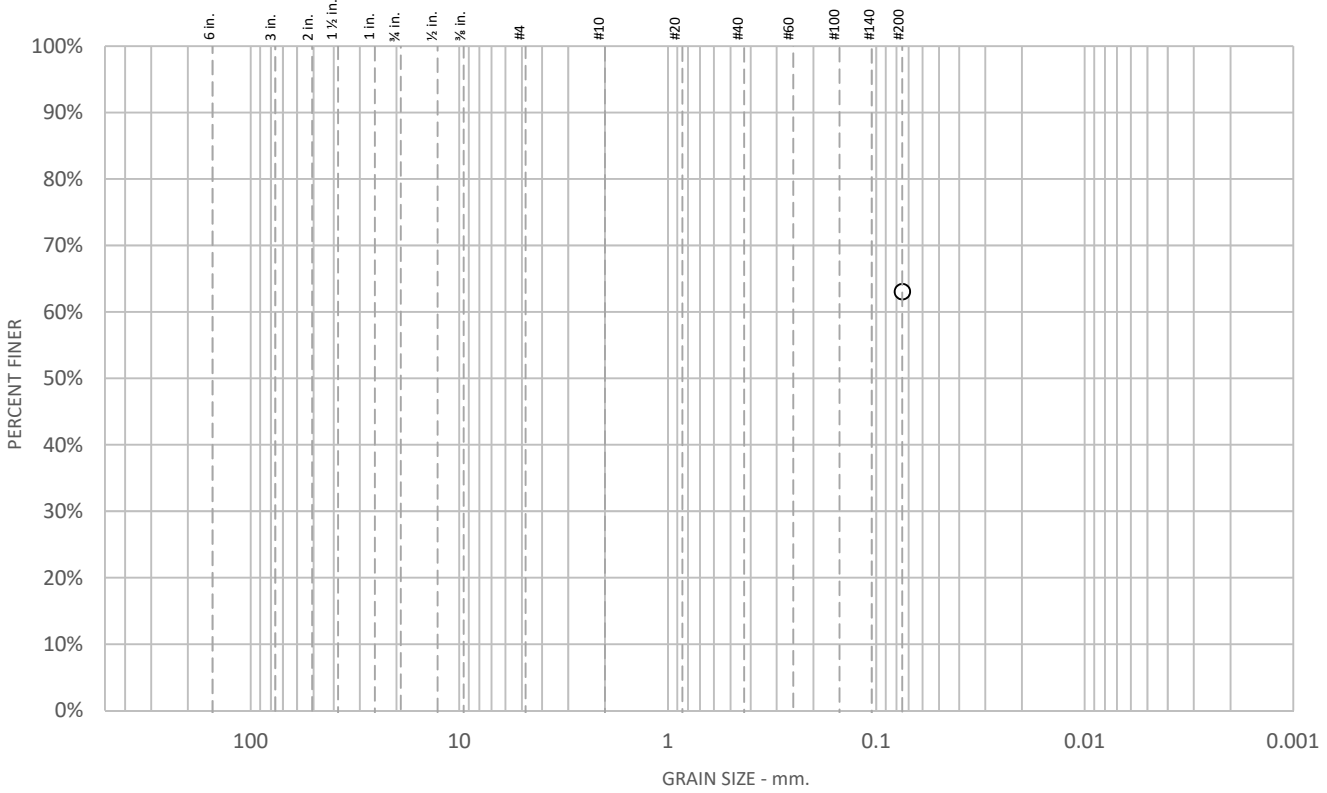
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						63.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	63.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 37 PI = 18

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 205.9 g

Sample Number: 1-B10 @ 25-26.5

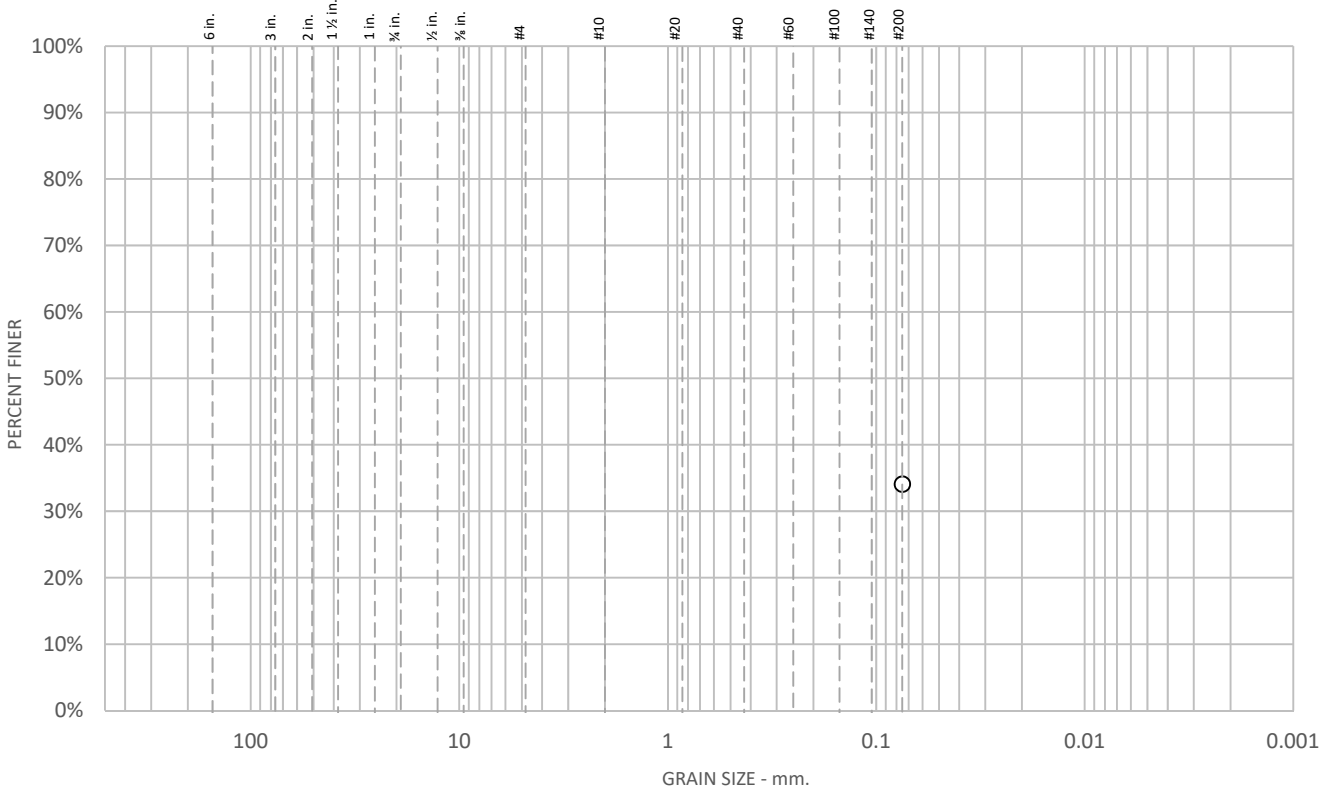
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 32 PI = 16

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 189.9 g

Sample Number: 1-B10 @ 40-41.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

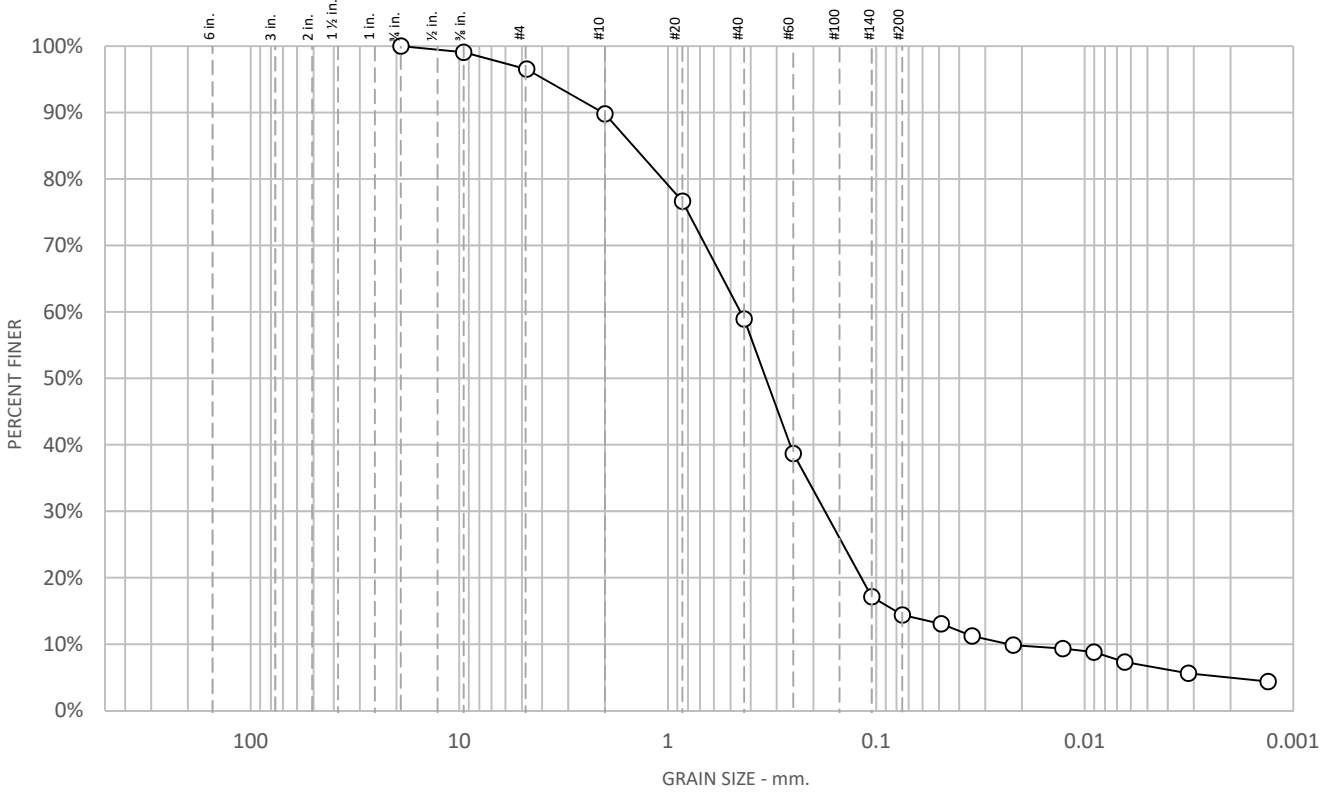
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	3.5	6.7	30.9	44.5	9.4	5.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.1		
#4	96.5		
#10	89.8		
#20	76.6		
#40	58.9		
#60	38.7		
#140	17.1		
#200	14.4		
0.0488 mm.	13.0		
0.0347 mm.	11.2		
0.0220 mm.	9.9		
0.0127 mm.	9.3		
0.0090 mm.	8.8		
0.0064 mm.	7.3		
0.0032 mm.	5.6		
0.0013 mm.	4.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 2.0536 mm D_{85} = 1.4639 mm D_{60} = 0.4479 mm
D_{50} = 0.3385 mm D_{30} = 0.1763 mm D_{15} = 0.0809 mm
D_{10} = 0.0231 mm C_u = 19.35 C_c = 3.00

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B10 @ 50-51.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Isotropic Consolidated Undrained Triaxial Test

ASTM D4767

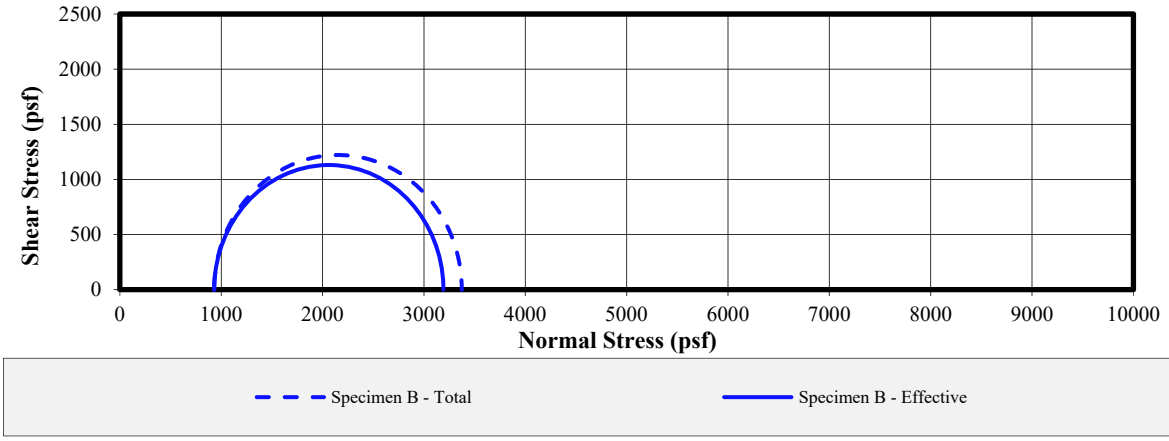
Date: 6/19/19

Checked By: D. Seibold

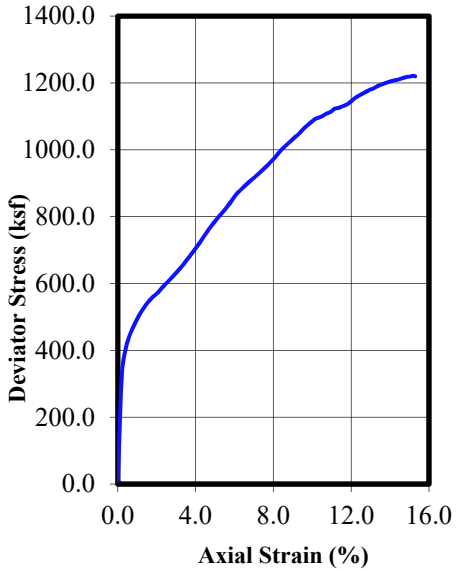
Date: 6/19/19

Tested By: G. Criste

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial		1-B9@30.5		
Height-to-Diameter Ratio		2.080		
Water Content (%)		26.4		
Dry Density (pcf)		99.9		
Saturation (%)		99.66		
Void Ratio		0.736		
Diameter (in)		2.392		
Height (in)		4.976		
ASTM D854 - Measured				
Specific Gravity		2.779		
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
After Consolidation		**1-B9@30.5**		
Void Ratio		0.737		
Water Content (%)		25.81		
Dry Density (pcf)		99.90		
Eff. Consol. Press. (psf)		7.1		
Back Pressure (psf)		43.0		
Saturation (%)		100.0		
B-Value		0.96		
Strain Rate (in./min.)		0.02411		
Height-to-Diameter Ratio		2.063		
After Shear		**1-B9@30.5**		
σ'1 at Failure (psf)		3187.4		
σ'3 at Failure (psf)		744.7		
t_{50} (min)		0.820		
t_{90} (min)		1.476		
Corrected Peak Deviator Stress (psf):		2442.7		

Maximium Deviator Stress Criterion	
C (psf)	
C' (psf)	
Ø (deg)	
Ø' (deg)	

Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B9
Sample Number:	1
Depth:	30.5-31.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type	Consolidated Undrained
Remarks	

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Isotropic Consolidated Undrained Triaxial Test

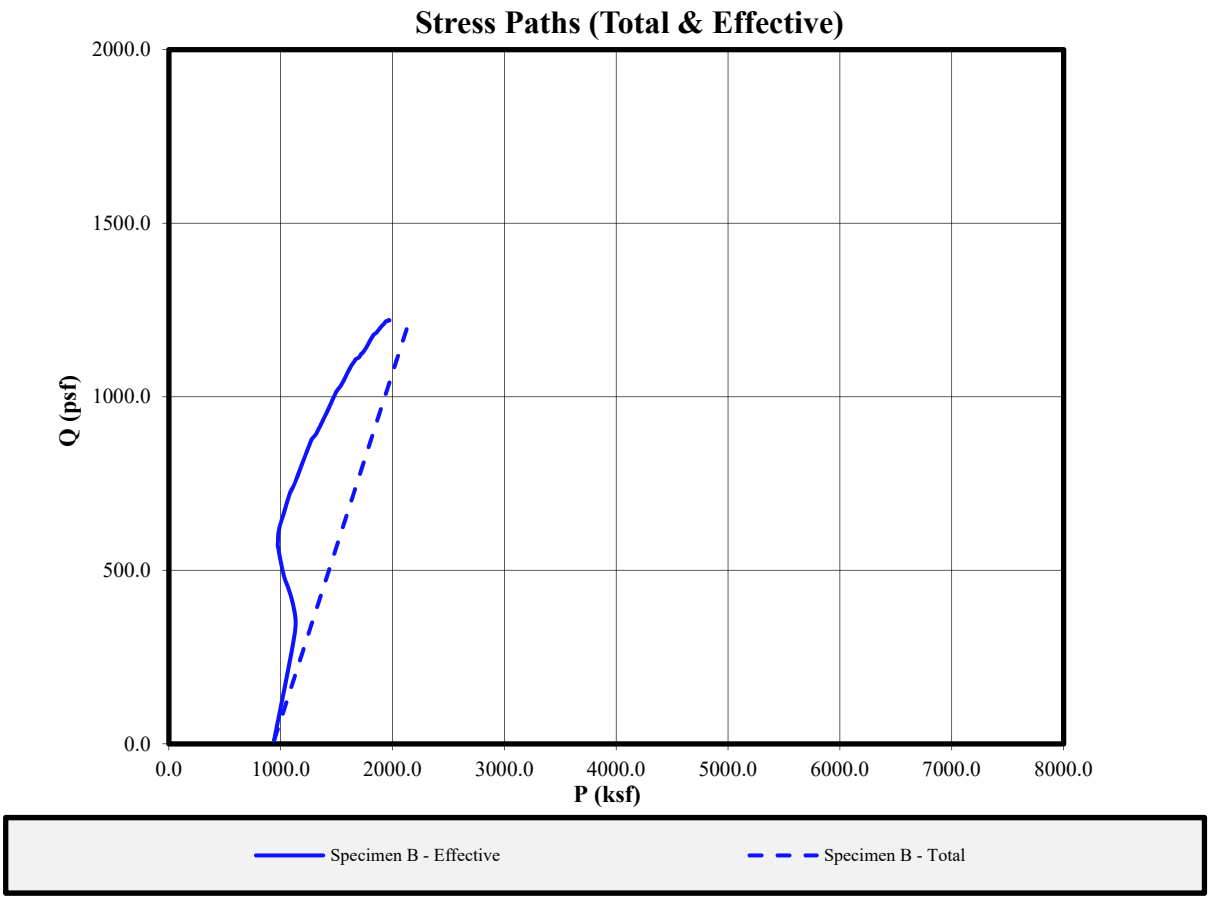
ASTM D4767

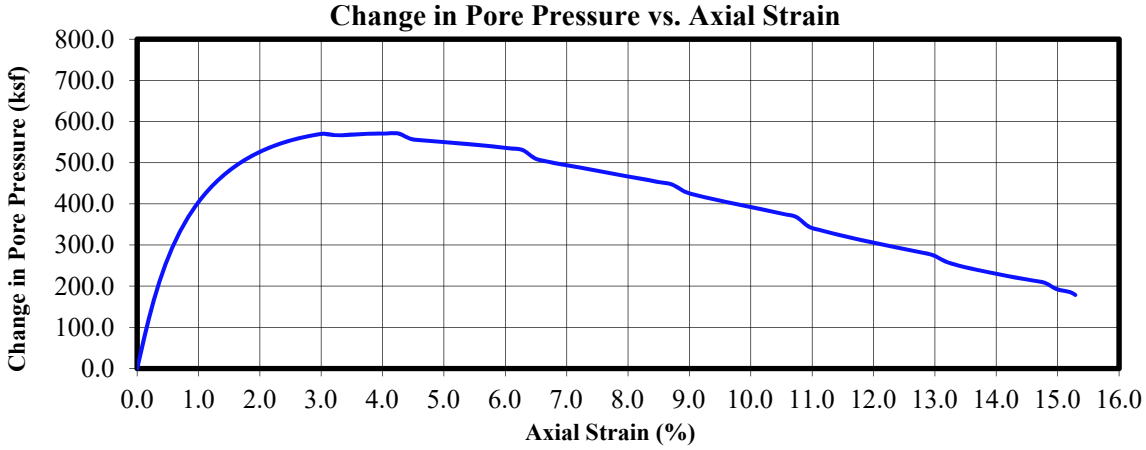
Date: 6/19/19

Checked By: D. Seibold

Date: 6/19/19

Tested By: G. Criste





Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B9
Sample Number:	1
Depth:	30.5-31.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type:	Consolidated Undrained
Remarks:	

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Isotropic Consolidated Undrained Triaxial Test

ASTM D4767

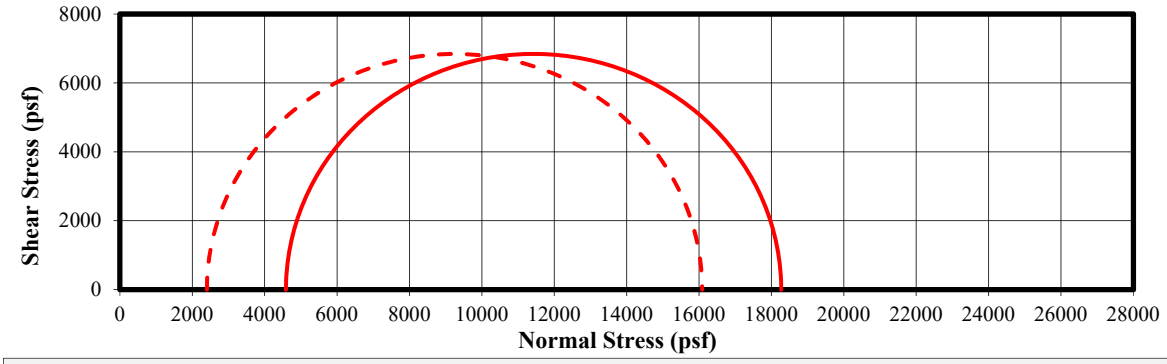
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Checked By: D. Seibold

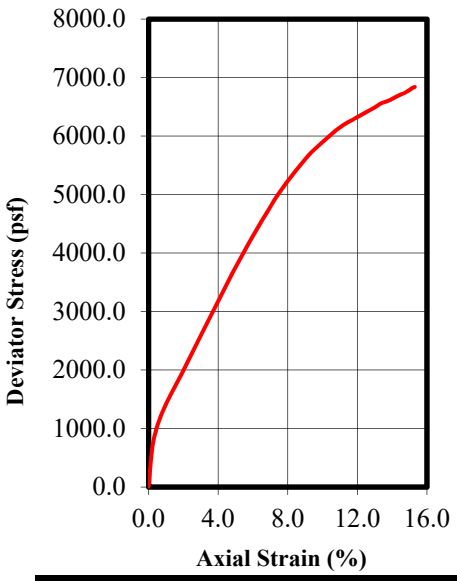
Date: 6/19/19

Tested By: G. Criste

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial			1-B8@70.5	
Height-to-Diameter Ratio			2.094	
Water Content (%)			26.0	
Dry Density (pcf)			100.4	
Saturation (%)			99.39	
Void Ratio			0.728	
Diameter (in)			2.386	
Height (in)			4.998	
ASTM D854 - Measured				
Specific Gravity			2.779	
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
After Consolidation			**1-B8@70.5**	
Void Ratio			0.697	
Water Content (%)			23.50	
Dry Density (pcf)			102.30	
Eff. Consol. Press. (psf)			13.5	
Back Pressure (psf)			45.0	
Saturation (%)			100.0	
B-Value			0.97	
Strain Rate (in./min.)			0.02518	
Height-to-Diameter Ratio			2.076	
After Shear			**1-B8@70.5**	
σ'1 at Failure (psf)			18271.0	
σ'3 at Failure (psf)			4588.8	
t_{50} (min)			0.421	
t_{90} (min)			0.757	
Corrected Peak Deviator Stress (psf):			13682.2	

Maximium Deviator Stress Criterion	
C (psf)	
C' (psf)	
Ø (deg)	
Ø' (deg)	

Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B8
Sample Number:	Multiple
Depth:	70.5-71.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type	Consolidated Undrained
Remarks	

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Isotropic Consolidated Undrained Triaxial Test

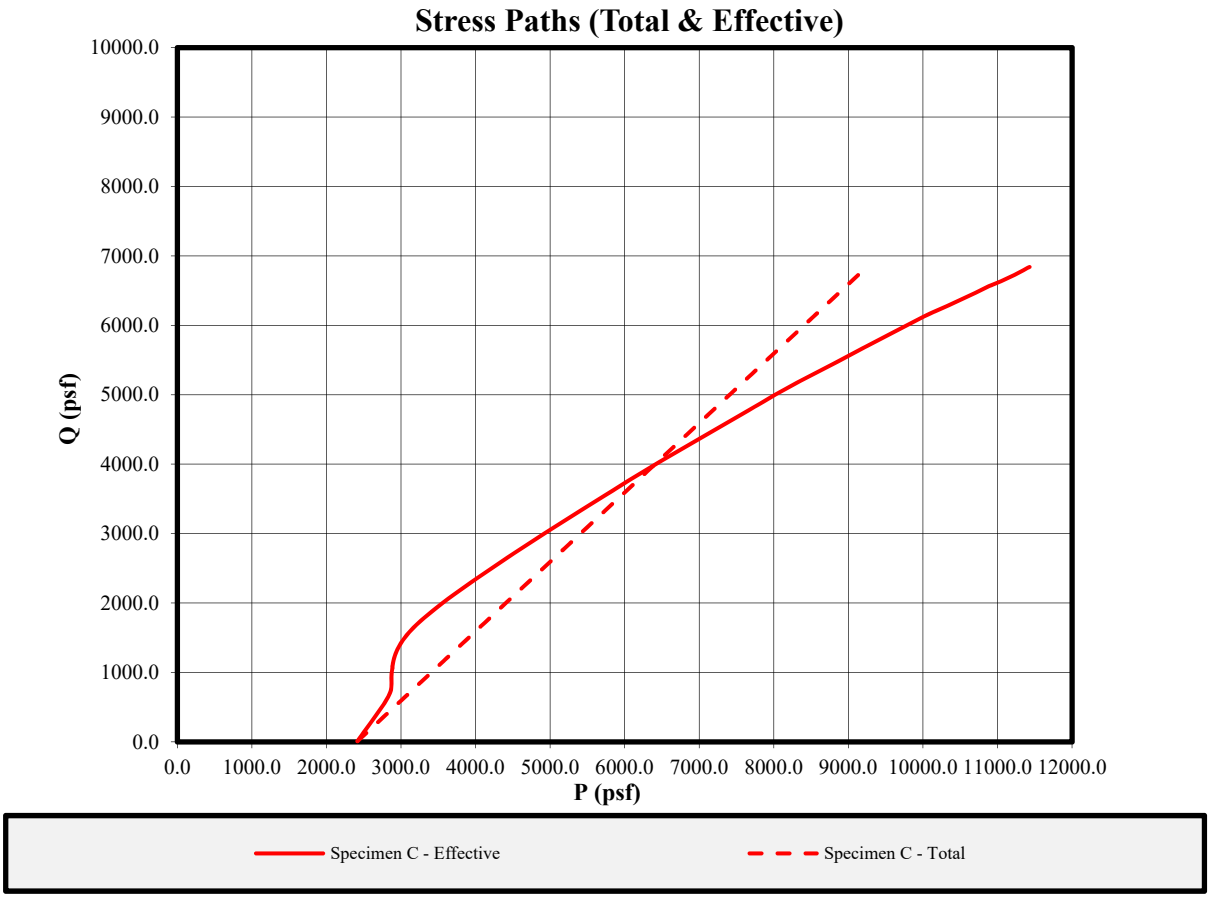
ASTM D4767

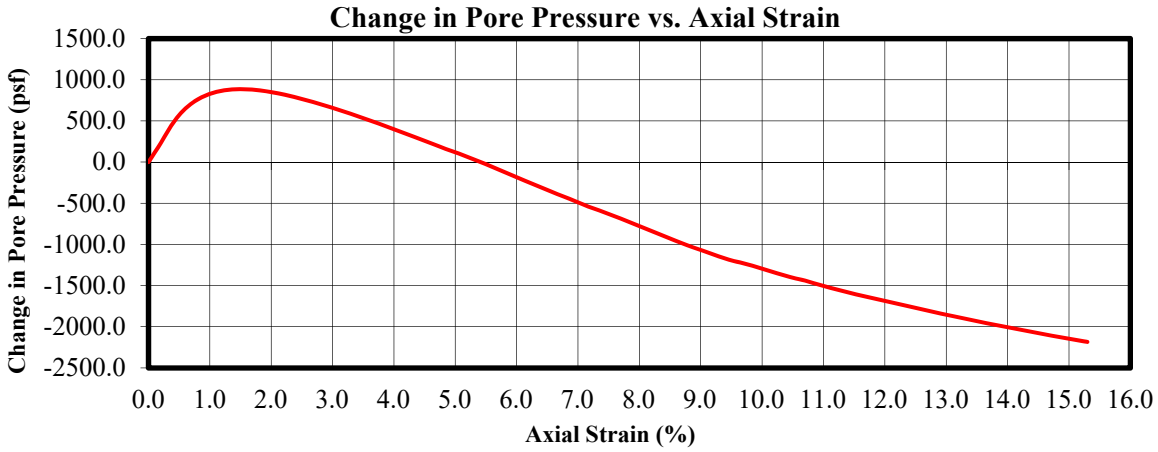
Date: 6/19/19

Checked By: D. Seibold

Date: 6/19/19

Tested By: G. Criste





Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B8
Sample Number:	Multiple
Depth:	70.5-71.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type:	Consolidated Undrained
Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

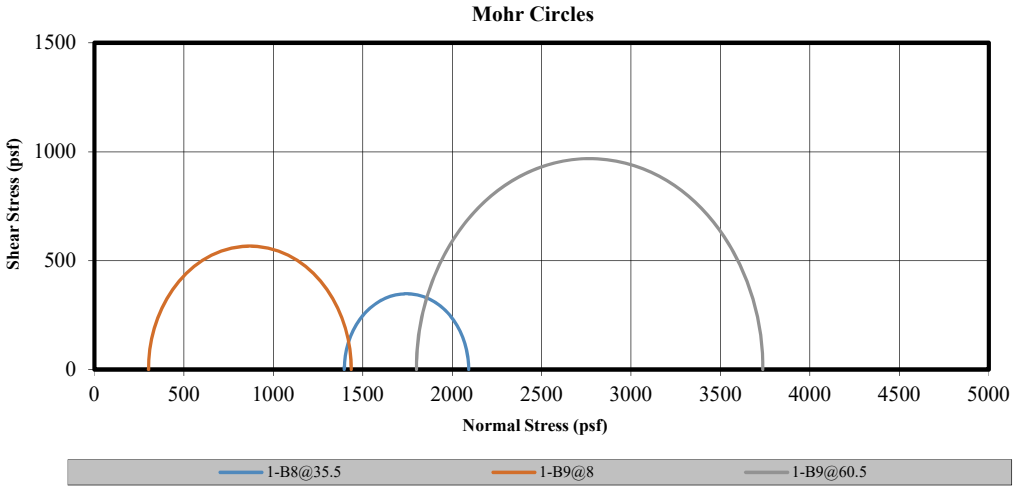
ASTM D2850

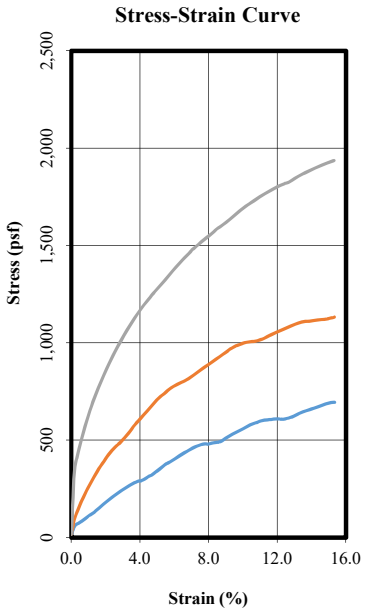
Date: 06/07/19

Checked By: G. Criste

Date: 6/7/2019

Tested By: N. Buckton





Before Test	Specimen 1-B8@35.5	1-B9@8	1-B9@60.5	
Water Content (%)	25.53	23.50	20.55	
Dry Density (pcf)	102.30	104.80	108.50	
Saturation (%)	99.91	99.94	98.92	
Void Ratio	0.72	0.65	0.56	
Diameter (in)	2.402	2.394	2.389	
Height (in)	4.897	4.984	5.547	
Height-to-Diameter Ratio	2.039	2.082	2.322	
ASTM D4318 - Wet Method				
Liquid Limit	n/a	n/a	n/a	
Plastic Limit	n/a	n/a	n/a	
ASTM D854 - Assumed				
Specific Gravity	2.819	2.775	2.720	
After Test	**1-B8@35.5**	**1-B9@8**	**1-B9@60.5**	
Water Content (%)	25.53	23.50	20.55	
Saturation (%)	99.91	99.93	98.92	
Strain Rate (in/min)	0.05	0.05	0.05	
Peak Deviator Stress (psf)	695.1	1132.7	1936.7	
Axial Strain @ Failure (%)	15.341	15.327	15.301	
	Cell Pressure			
Cell (psf)	1396.8	302.4	1800.0	
Back (psf)	n/a	n/a	n/a	
	Principle Stresses at Failure			
σ1 (psf)	2091.9	1435.1	3736.7	
σ3 (psf)	1396.8	302.4	1800.0	
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		347.5	566.3	968.4	
Friction Angle Ø	n/a		n/a	n/a	n/a	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

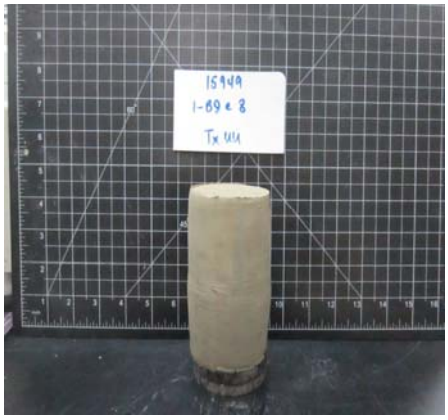
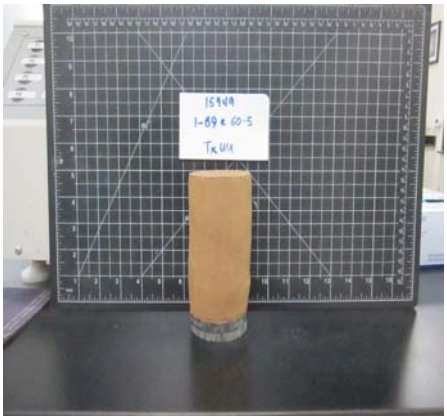
Date: 06/07/19

Checked By: G. Criste

Date: 6/7/2019

Tested By: N. Buckton

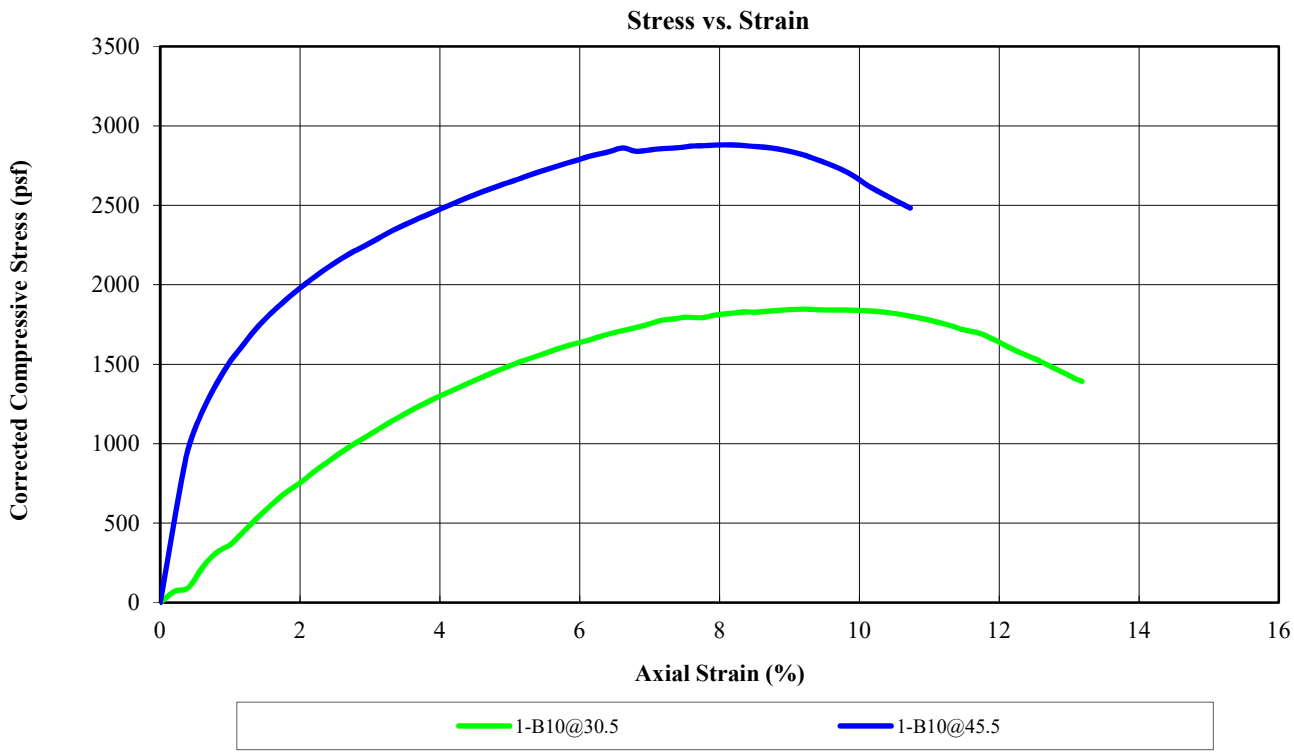
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B8@35.5	SAMPLE NUMBER: 1-B9@8
	
SAMPLE NUMBER: 1-B9@60.5	**SAMPLE NUMBER:**
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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UNCONFINED COMPRESSION TEST REPORT
ASTM D2166



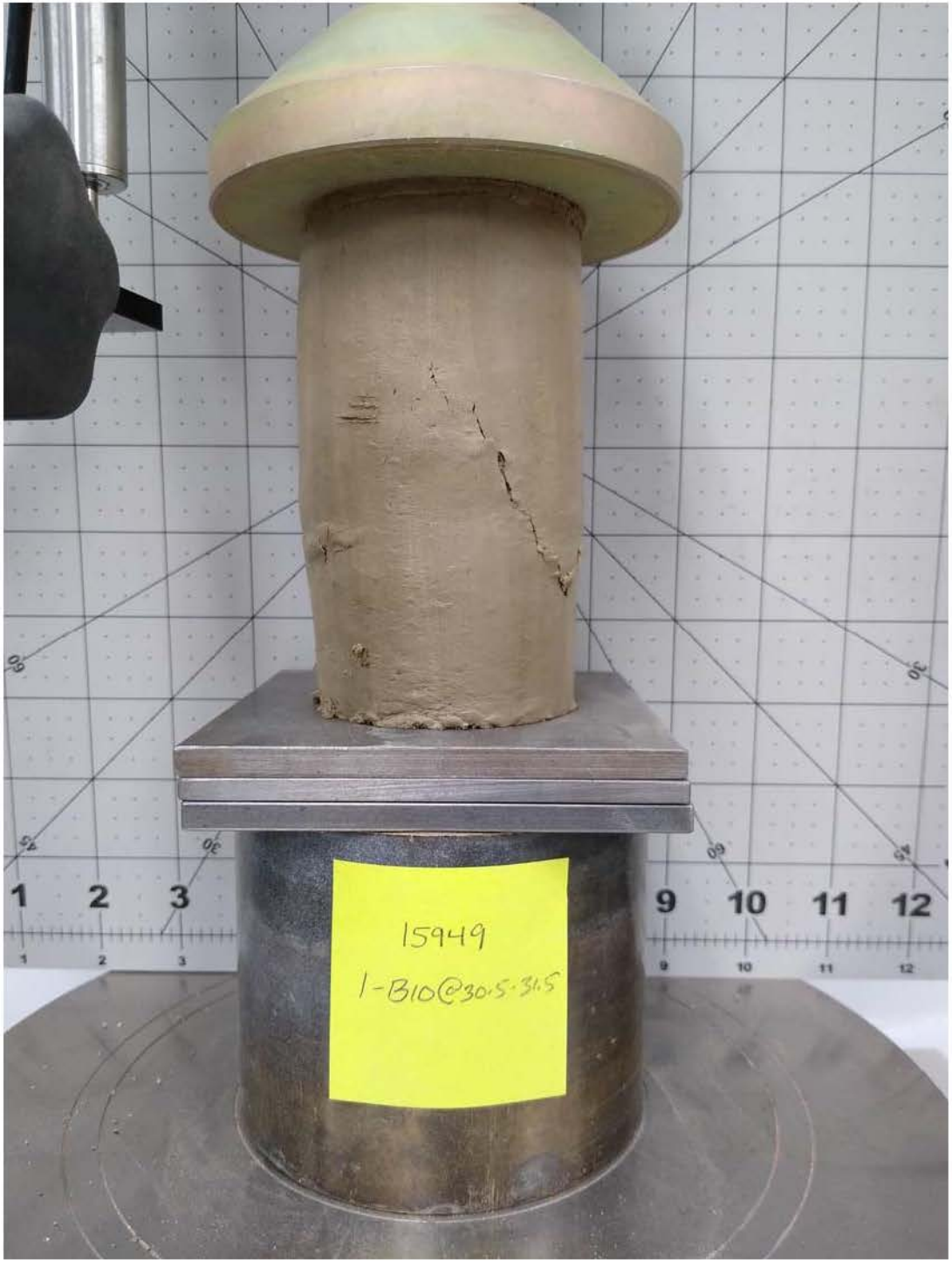
BEFORE TEST	SPECIMEN 1-B10@30.5	1-B10@45.5
Moisture Content (%)	22.9	28.3
Dry Density (pcf)	105.2	96.3
Saturation (%)	100.0	100.0
Void Ratio	0.57	0.72
Diameter (in)	2.395	2.392
Height (in)	5.11	5.20
Height-To-Diameter Ratio	2.13	2.17
TEST DATA		
Unconfined Compressive Strength (psf)	1847	2881
Undrained Shear Strength (psf)	923	1440
Strain Rate (in./min.)	0.05	0.05
Specific Gravity	2.650	2.650
Strain at Failure (%)	9.14	8.17
Liquid Limit		
Plastic Limit		
Test Remarks		

SPECIMEN	DESCRIPTION
1-B10@30.5	See exploration logs
1-B10@45.5	See exploration logs

PROJECT NAME: GEX for Multiple Parcels
PROJECT NO: 15949.000.000
CLIENT: Google, LLC
LOCATION: 1-B10@30.5
PHASE NO: LAB

Report Date: 06/12/19
Tested By: R. Montalvo
Reviewed By: M. Gilbert

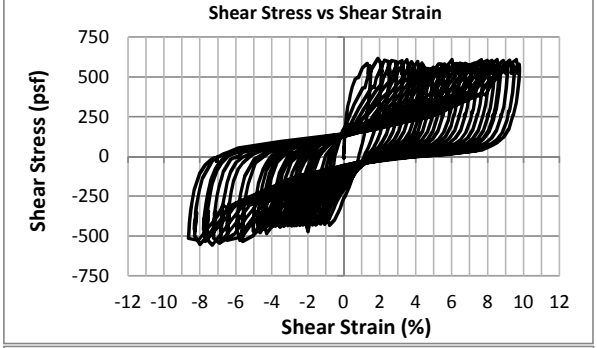
ENGEO
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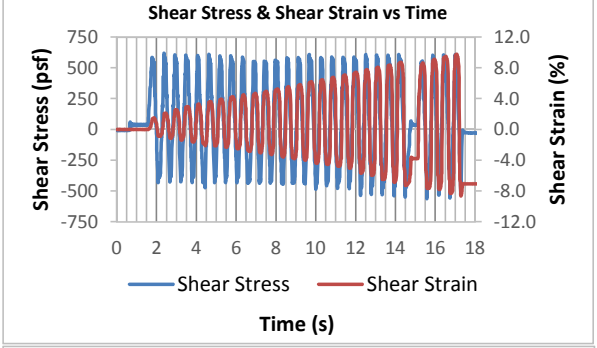

15949
1-B10@30.5-31.5

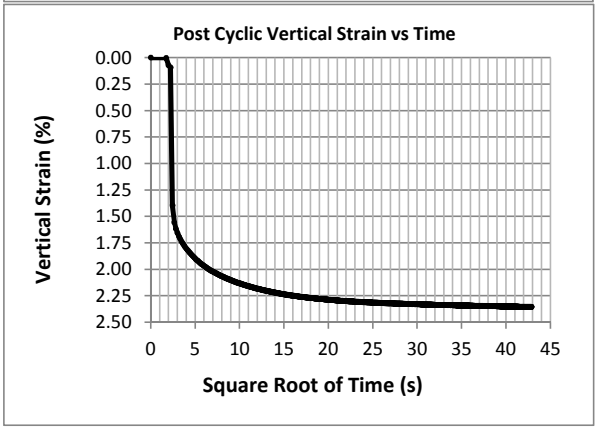

15949
1-B10@45.5-46.5

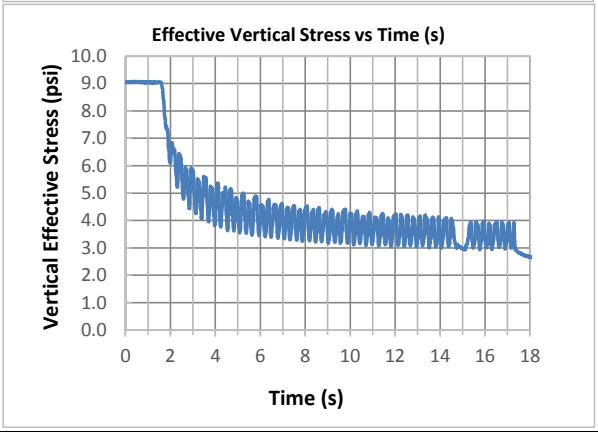
Cyclic Simple Shear

ASTM D6528 - Modified









Test Conditions		Results		Maximum	Minimum
Confining Condition	Plain Membrane w/Chamber Pressure	Vertical Effective Stress (psf)	Deviatoric	783.5	-54.8
Applied Lateral Effective Stress (psf)	520.0		Isotropic	520.0	520.0
Resulting K_o after applied, σ_{vc}'	0.398	Shear Strain (%)		9.8	-8.6
Applied Loading Frequency (Hz)	0.500	Post Cyclic Vertical Strain (%)		2.36	
Cycle Limit, N	27				
Single Amp. Strain (+/-)	9.2	**Cyclic Preshear Specimen Condition**			
Applied τ_{cyc} (psf)	617	Preshear Moisture Content (%)		23.93%	
Applied σ_{vc}' (psf)	1308	Preshear Void Ratio		0.6554	
Applied CSR	0.472	Preshear Saturation (%)		100.36%	
		Preshear Dry Density (pcf)		103.53	

Test Date: 6/18/2019

ASTM D2216	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	25.75%	22.72%	**Liquid Limit:**	
Dry Density (pcf):	102.99	105.52	**Plastic Limit:**	
Saturation (%):	96.53%	100.00%	**ASTM D854 - Measured**	
Void Ratio:	0.7331	0.6229	**Specific Gravity:**	2.748
			Soil Description:	See exploration logs

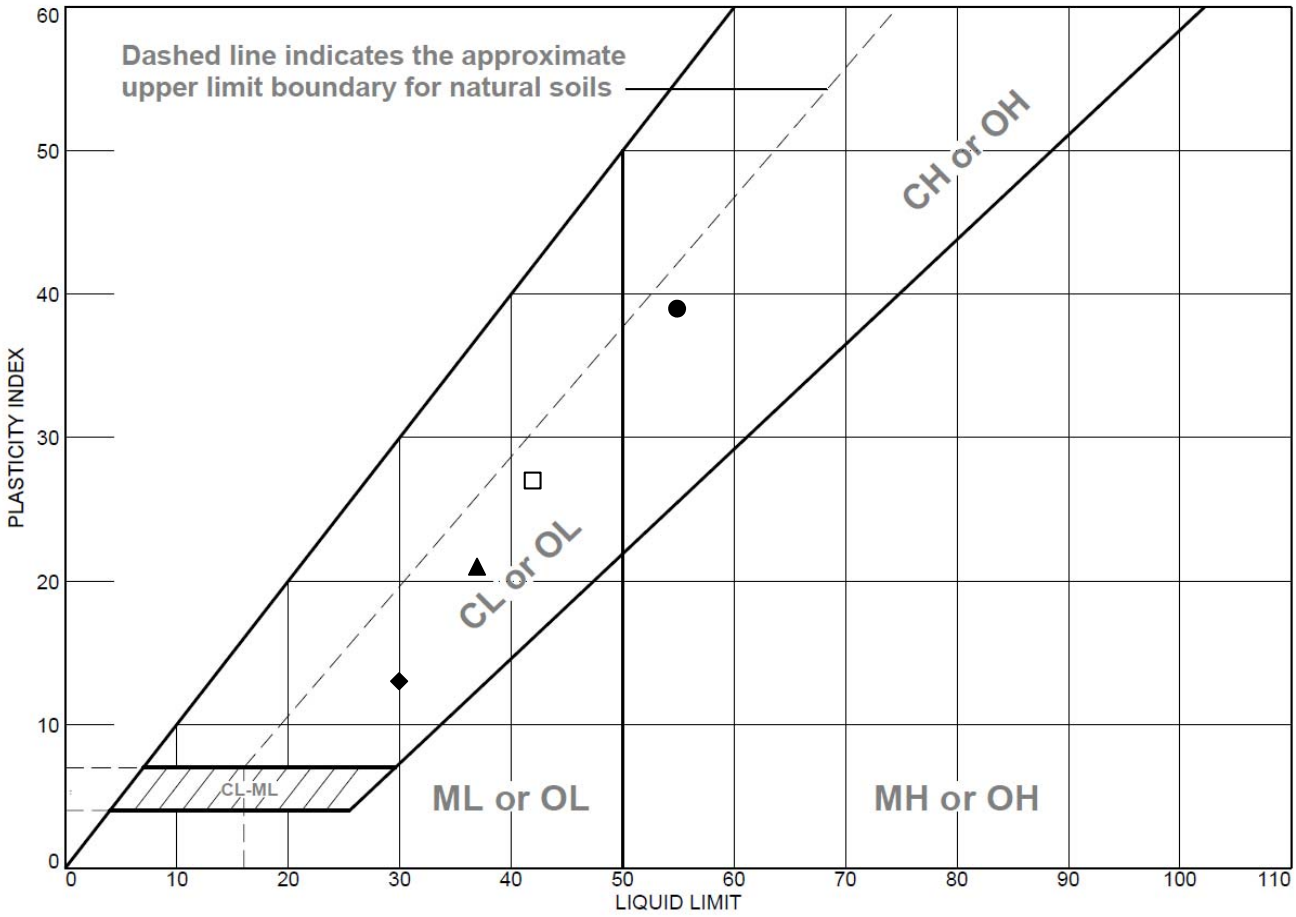
Project Number:	15949.000.000	**Depth:**	15.5-15.75 ft.
Sample Number:	1-B9 @ 15-16.5	**Boring #:**	1-B9
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

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Remarks:


15949
CSS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	37	16	21	87.8	62.3	CL
◆	See exploration logs	30	17	13		40.2	
□	See exploration logs	42	15	27		52.9	CL
●	See exploration logs	55	16	39		92	CH

Project No.: 15949.000.000 PHLAB **Date:** 6/19/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B1 **Depth:** 13-14.5
◆ **Sample Number:** 1-B1 **Depth:** 16-17.5
□ **Sample Number:** 1-B1 **Depth:** 30.5-31.5
● **Sample Number:** 1-B1 **Depth:** 43-44.5

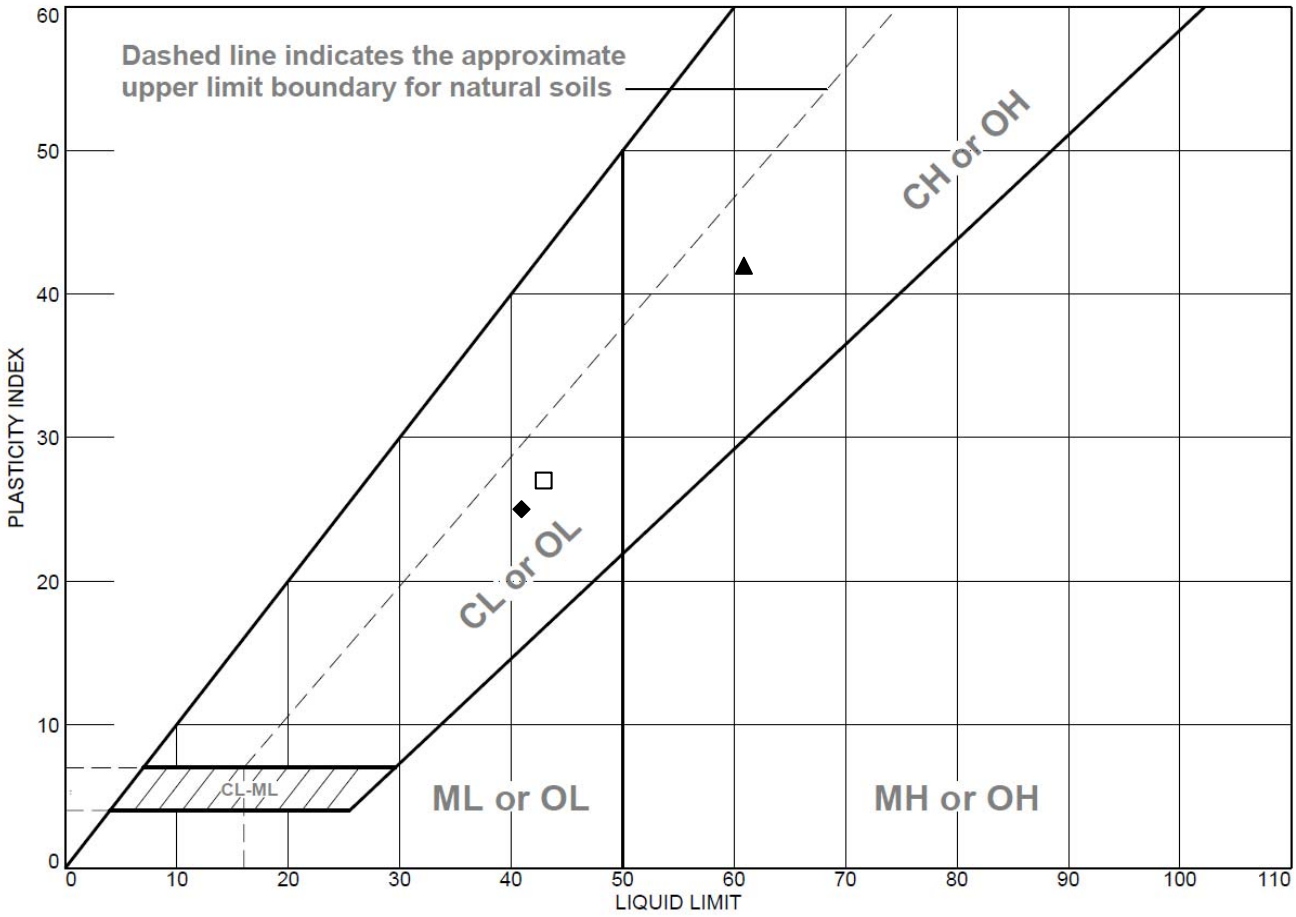
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	61	19	42		82.5	CH
◆	See exploration logs	41	16	25		64.8	CL
□	See exploration logs	43	16	27		25.6	

Project No.: 15949.000.000 PHLAB **Date:** 6/19/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B2 **Depth:** 6.5-7
◆ **Sample Number:** 1-B2 **Depth:** 15-16.5
□ **Sample Number:** 1-B2 **Depth:** 30-31.5

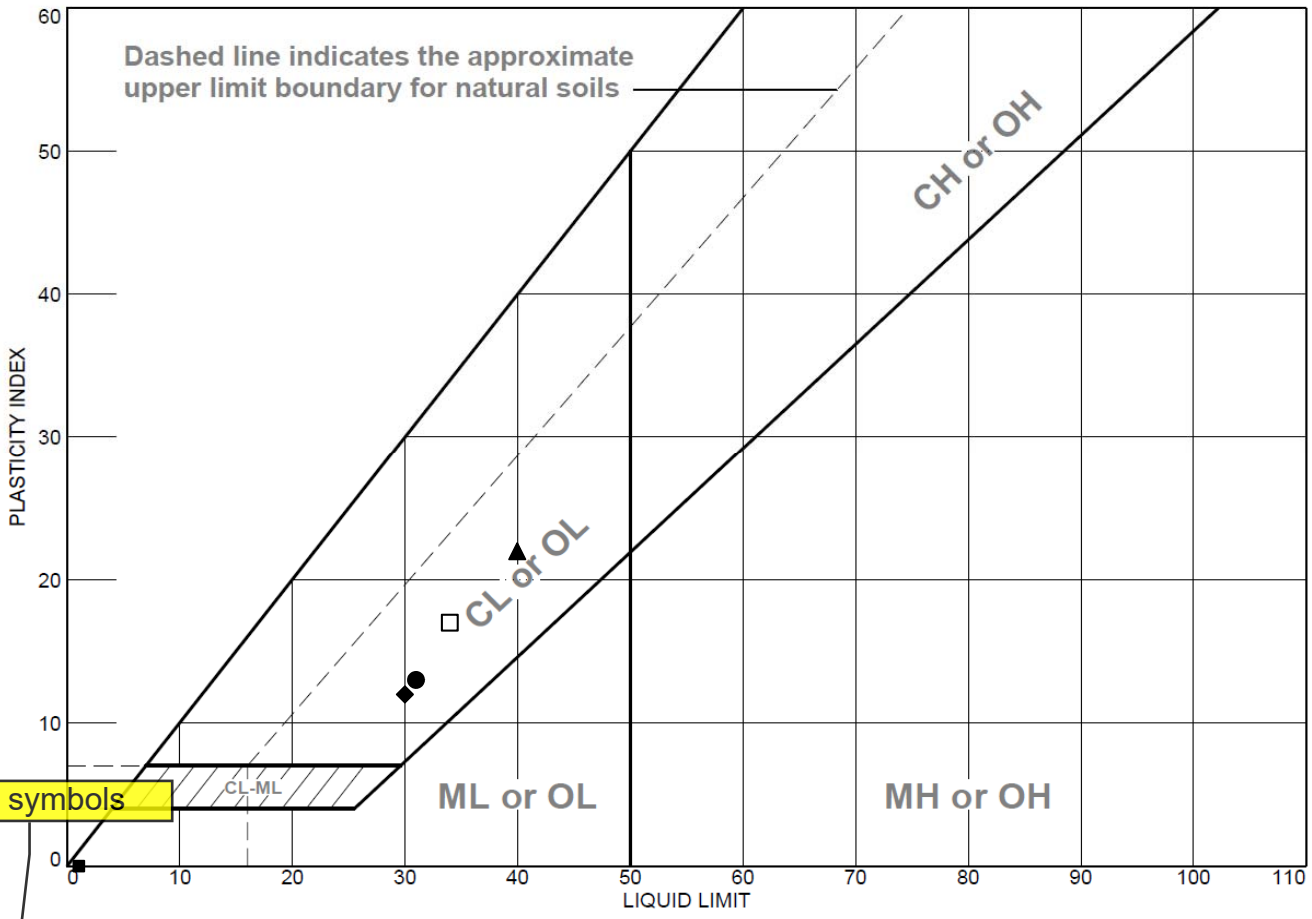
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



missing symbols

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	See exploration logs	40	18	22		37.7	
	See exploration logs	30	18	12		30.2	
	See exploration logs	34	17	17	79.2	58	
	See exploration logs	31	18	13		46.4	
	See exploration logs	NV	NP	NP			

Project No.: 15949.000.000 **Date:** 6/20/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

Sample Number: 1-B4 **Depth:** 25.5-26.5
Sample Number: 1-B4 **Depth:** 35.5-36.5
Sample Number: 1-B4 **Depth:** 46-47.5
Sample Number: 1-B4 **Depth:** 52-53
Sample Number: 1-B4 **Depth:** 8.5-9

missing symbols

Remarks:

PI: ASTM D4318, Wet Method, GS: ASTM D1140

PI: ASTM D4318, Wet Method, GS: ASTM D1140

PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

PI: ASTM D4318, Wet Method, GS: ASTM D1140

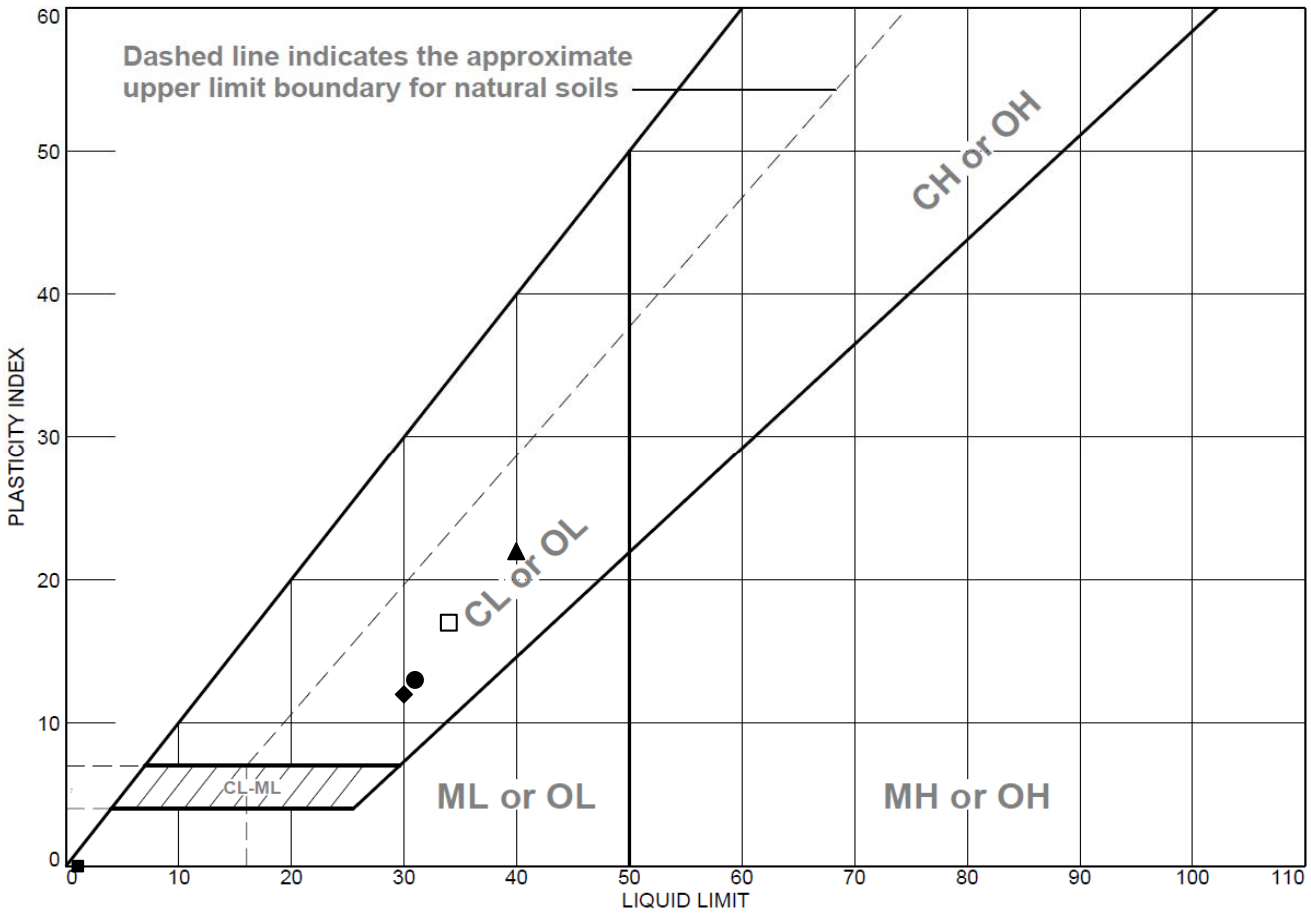
PI: ASTM D4318, Wet Method

ENGEO Expect Excellence

Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	40	18	22		37.7	
◆	See exploration logs	30	18	12		30.2	
□	See exploration logs	34	17	17	79.2	58	
●	See exploration logs	31	18	13		46.4	
■	See exploration logs	NV	NP	NP			

Project No.: 15949.000.000 **Date:** 6/20/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

▲ **Sample Number:** 1-B4 **Depth:** 25.5-26.5
◆ **Sample Number:** 1-B4 **Depth:** 35.5-36.5
□ **Sample Number:** 1-B4 **Depth:** 46-47.5
● **Sample Number:** 1-B4 **Depth:** 52-53
■ **Sample Number:** 1-B4 **Depth:** 8.5-9

Remarks:

▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140

◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140

□ PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

● PI: ASTM D4318, Wet Method, GS: ASTM D1140

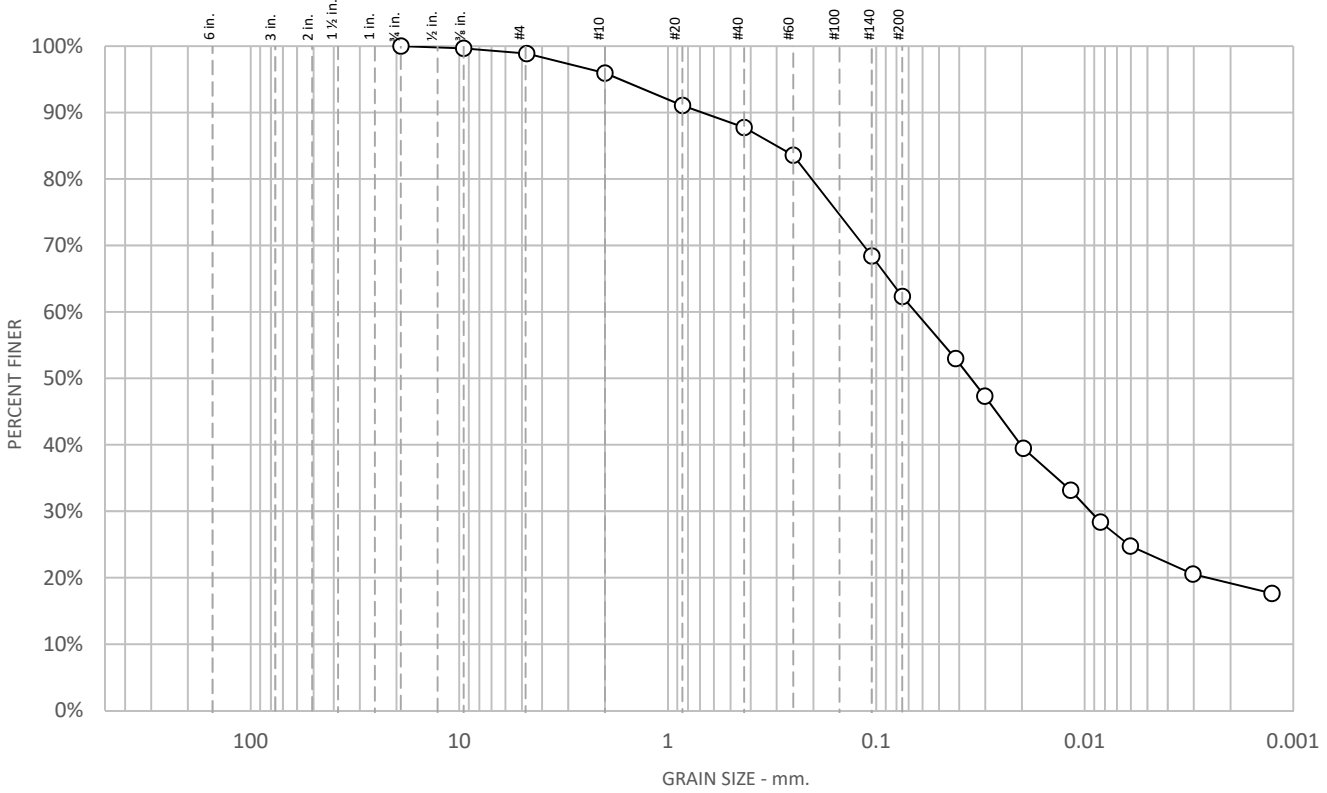
■ PI: ASTM D4318, Wet Method

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Expect Excellence

Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	1.1	2.9	8.2	25.4	43.2	19.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.7		
#4	98.9		
#10	95.9		
#20	91.1		
#40	87.8		
#60	83.6		
#140	68.4		
#200	62.3		
0.0416 mm.	53.0		
0.0302 mm.	47.3		
0.0197 mm.	39.5		
0.0117 mm.	33.2		
0.0084 mm.	28.4		
0.0060 mm.	24.7		
0.0030 mm.	20.5		
0.0013 mm.	17.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 37 PI = 21

Coefficients

D_{90} = 0.6832 mm D_{85} = 0.3009 mm D_{60} = 0.0648 mm
D_{50} = 0.0352 mm D_{30} = 0.0094 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS = CL

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B1 @ 13-14.5

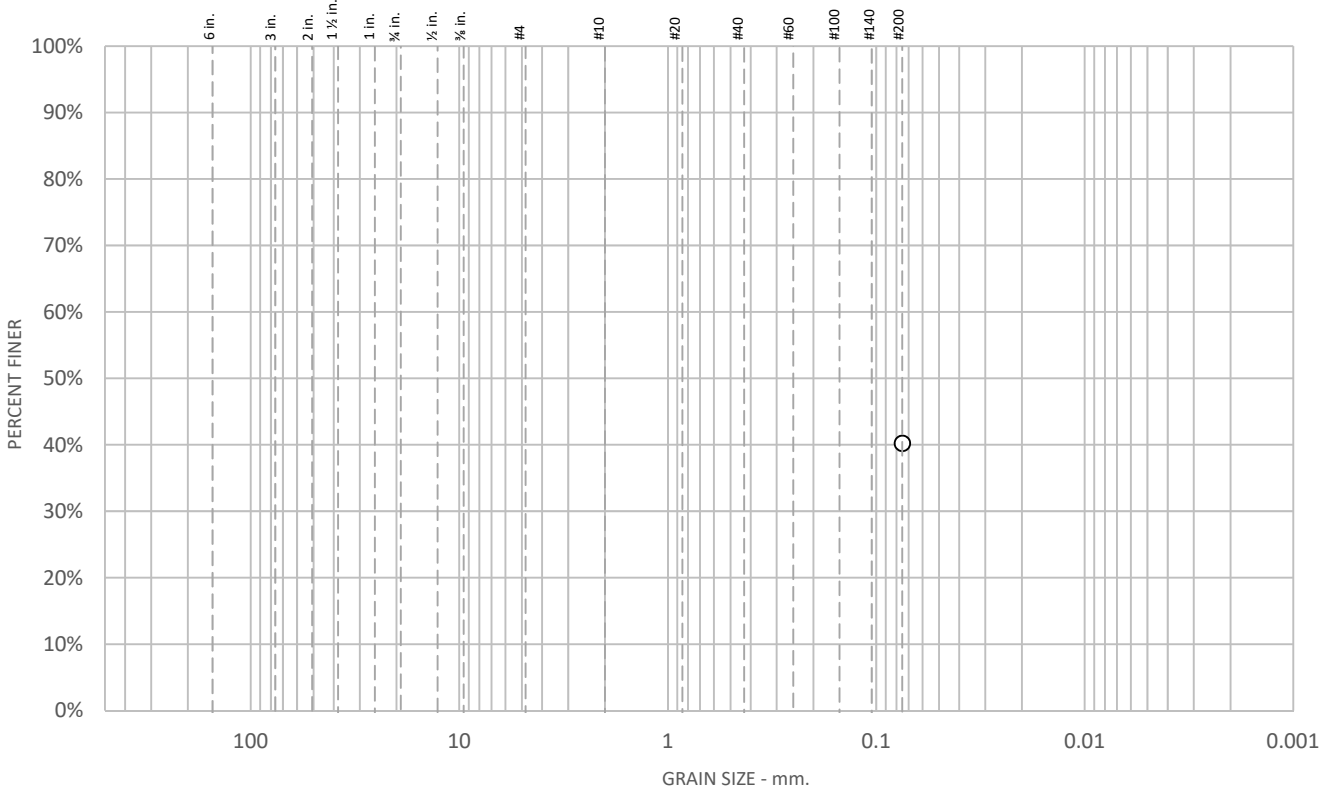
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	40.2		

* (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 =

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 176 g

Sample Number: 1-B1 @ 16-17.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

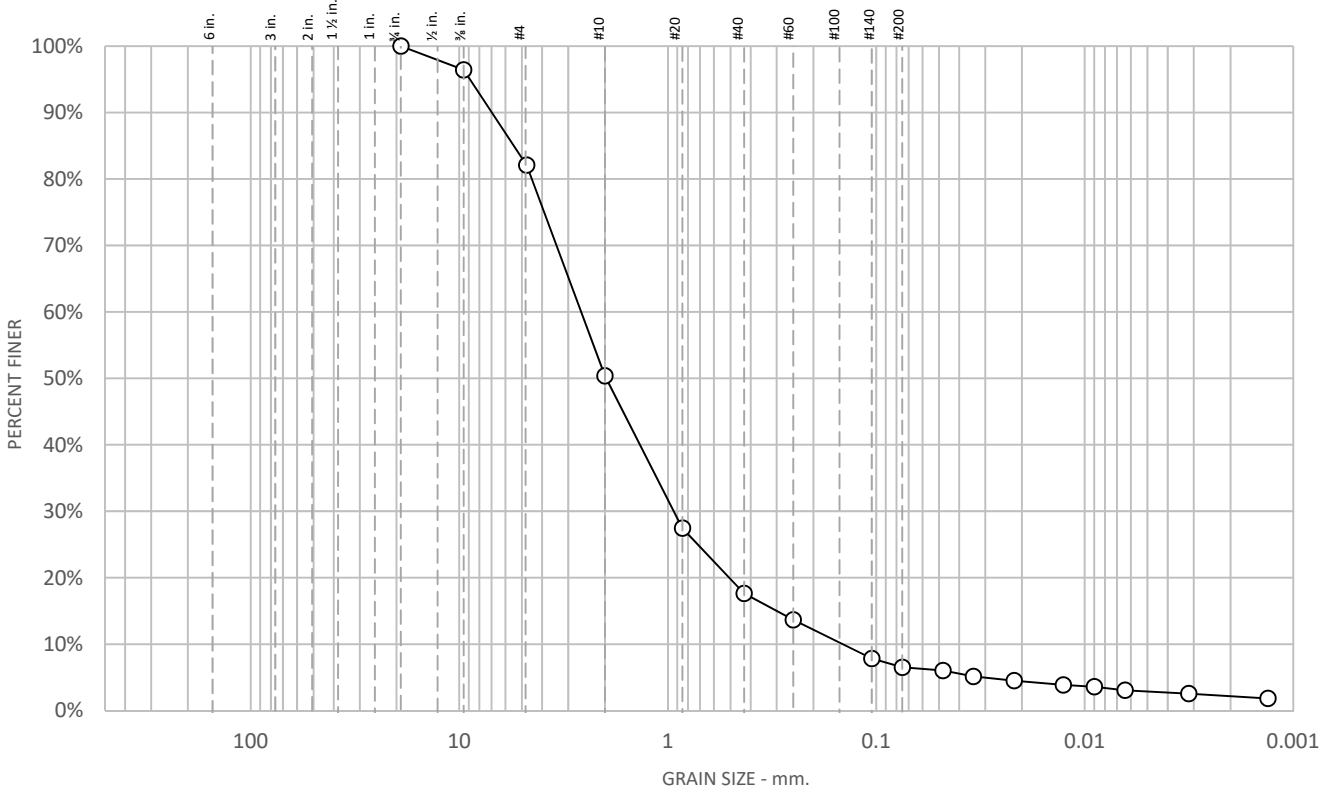
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	17.9	31.7	32.8	11.1	4.3	2.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	96.4		
#4	82.1		
#10	50.4		
#20	27.5		
#40	17.6		
#60	13.6		
#140	7.8		
#200	6.5		
0.0479 mm.	6.0		
0.0342 mm.	5.1		
0.0218 mm.	4.5		
0.0127 mm.	3.9		
0.0090 mm.	3.6		
0.0064 mm.	3.1		
0.0032 mm.	2.5		
0.0013 mm.	1.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 6.9733 mm D_{85} = 5.4695 mm D_{60} = 2.6000 mm
D_{50} = 1.9718 mm D_{30} = 0.9347 mm D_{15} = 0.3006 mm
D_{10} = 0.1450 mm C_u = 17.94 C_c = 2.32

Classification

USCS = SW

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B1 @ 17.5

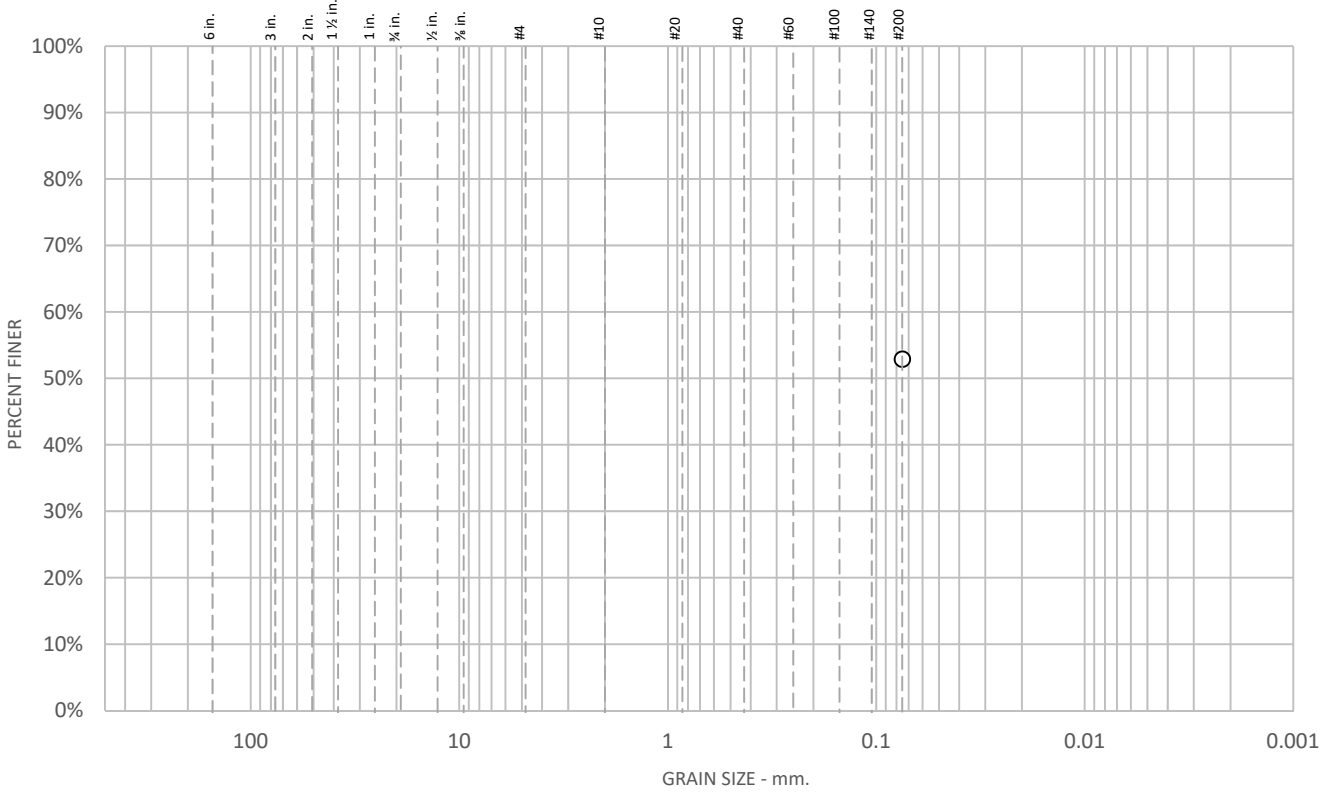
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	52.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 15 LL = 42 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 184.2 g

Sample Number: 1-B1 @ 30.5-31.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

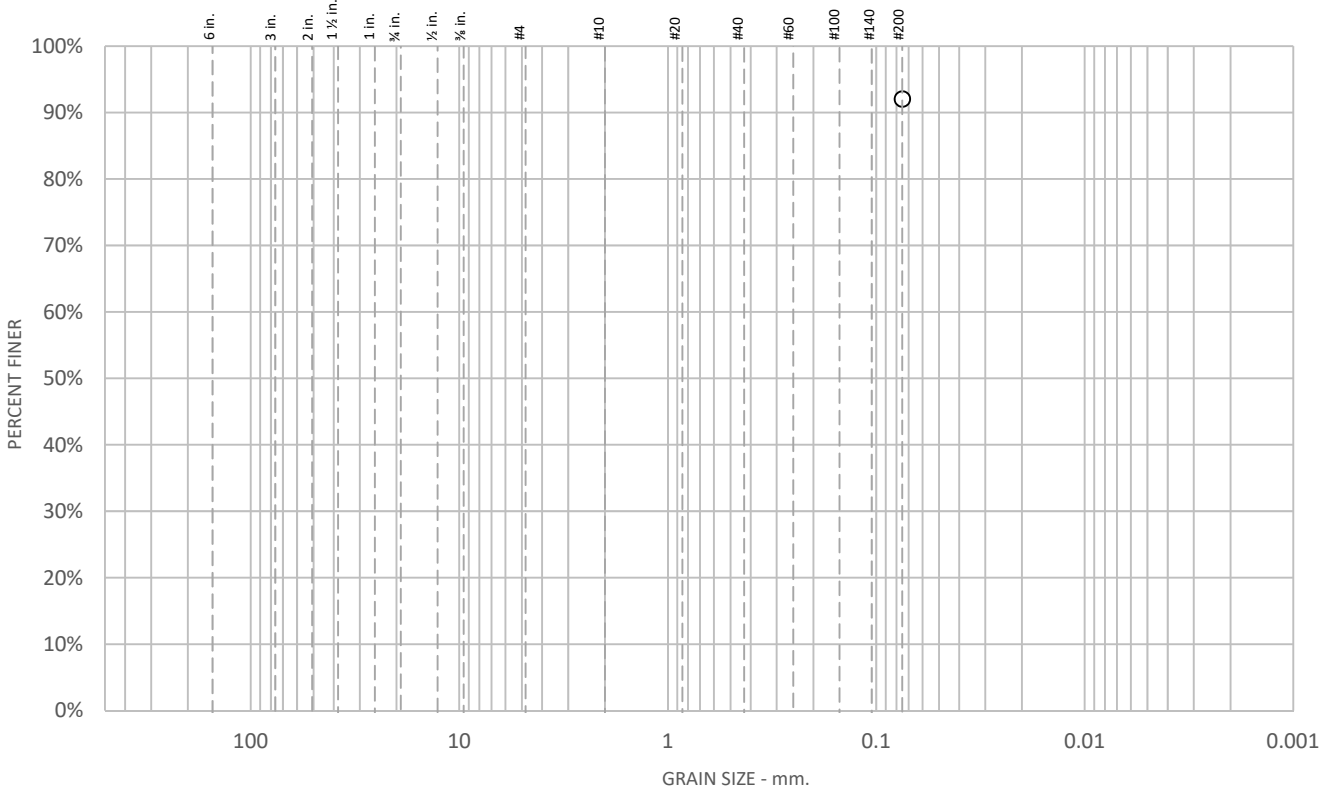
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						92.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	92.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 55 PI = 39

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 62.8 g

Sample Number: 1-B1 @ 43-44.5

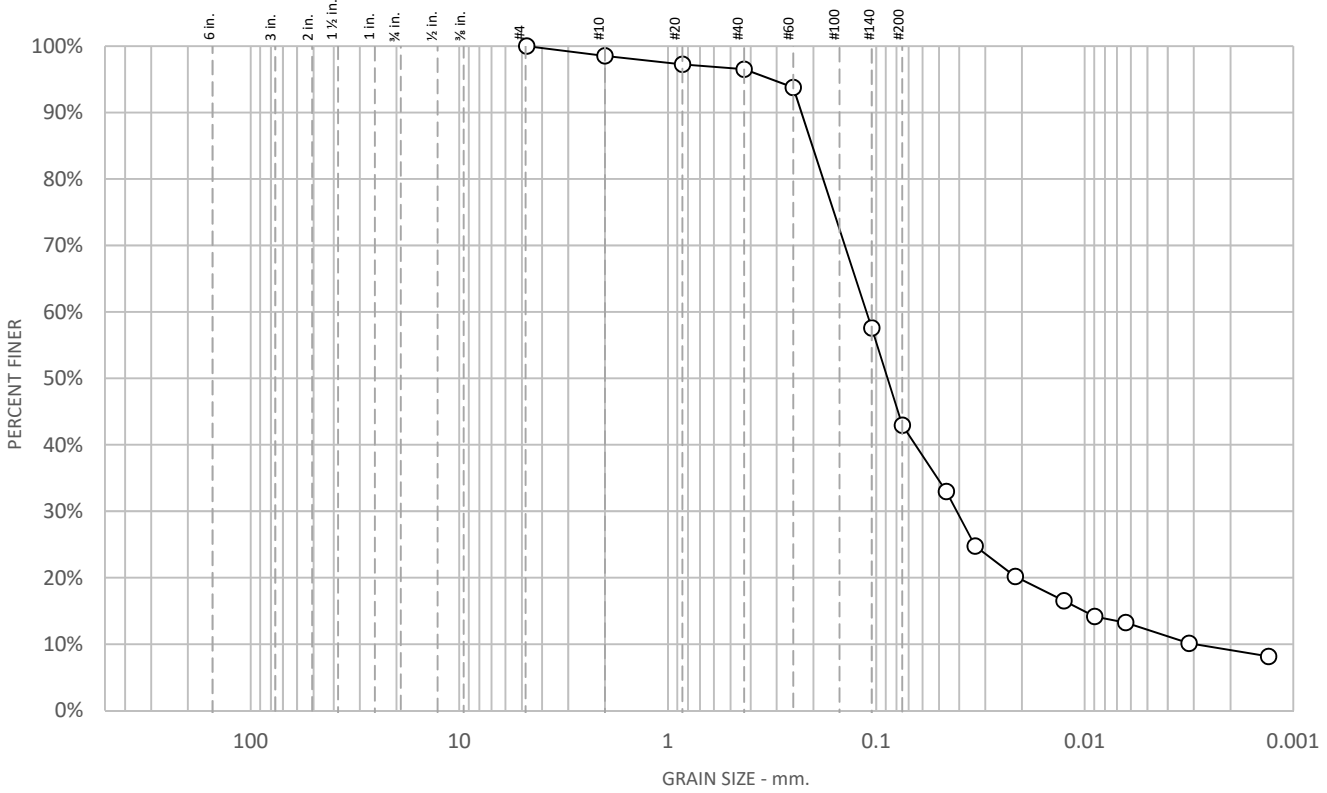
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			1.5	2.0	53.6	33.9	9.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.5		
#20	97.2		
#40	96.5		
#60	93.8		
#140	57.6		
#200	42.9		
0.0461 mm.	33.0		
0.0335 mm.	24.7		
0.0215 mm.	20.2		
0.0126 mm.	16.5		
0.0090 mm.	14.2		
0.0064 mm.	13.3		
0.0032 mm.	10.1		
0.0013 mm.	8.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2284 mm D_{85} = 0.2026 mm D_{60} = 0.1113 mm
D_{50} = 0.0882 mm D_{30} = 0.0411 mm D_{15} = 0.0101 mm
D_{10} = 0.0030 mm C_u = 37.28 C_c = 5.08

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B1 @ 78-79.5

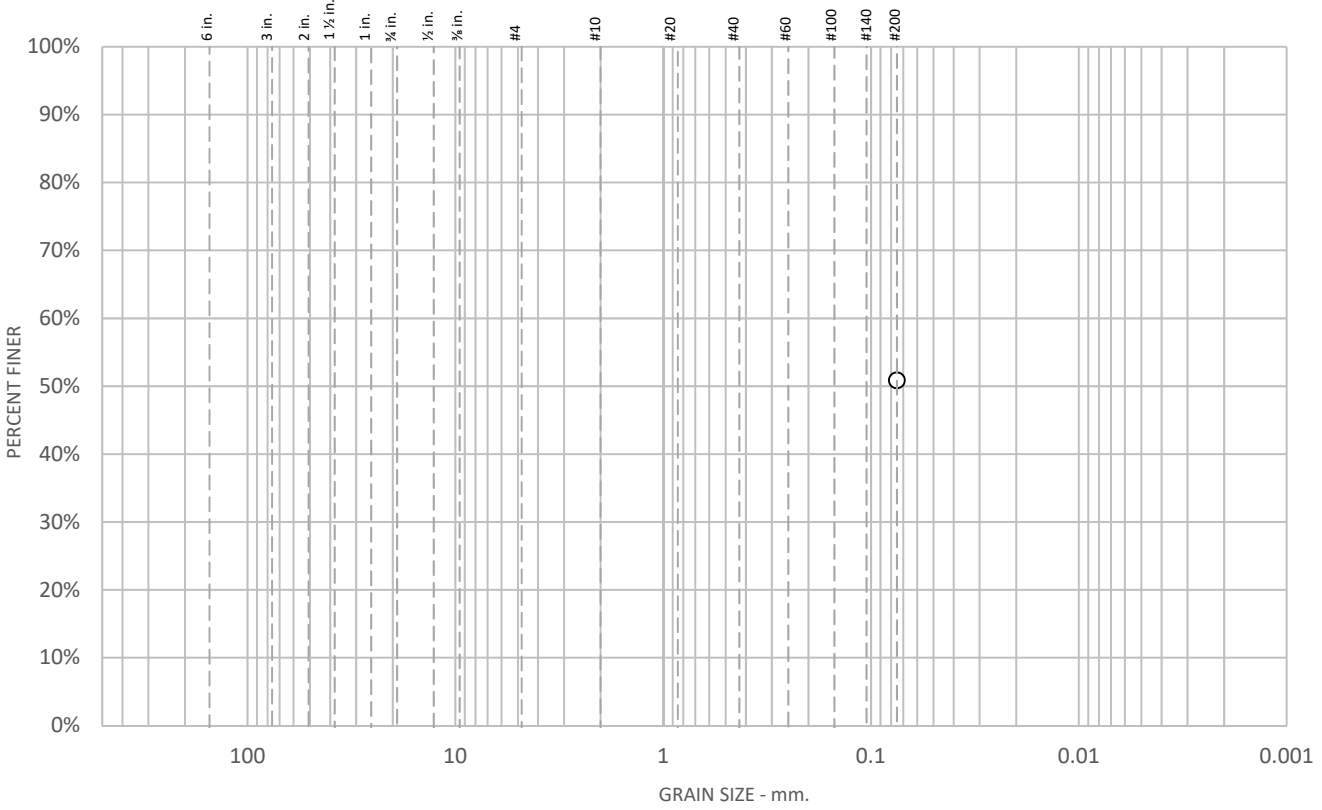
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						50.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	50.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 26 PI = 8

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 212 g

Sample Number: 1-B1 @ 9-11.5 @ 9-11.5 feet

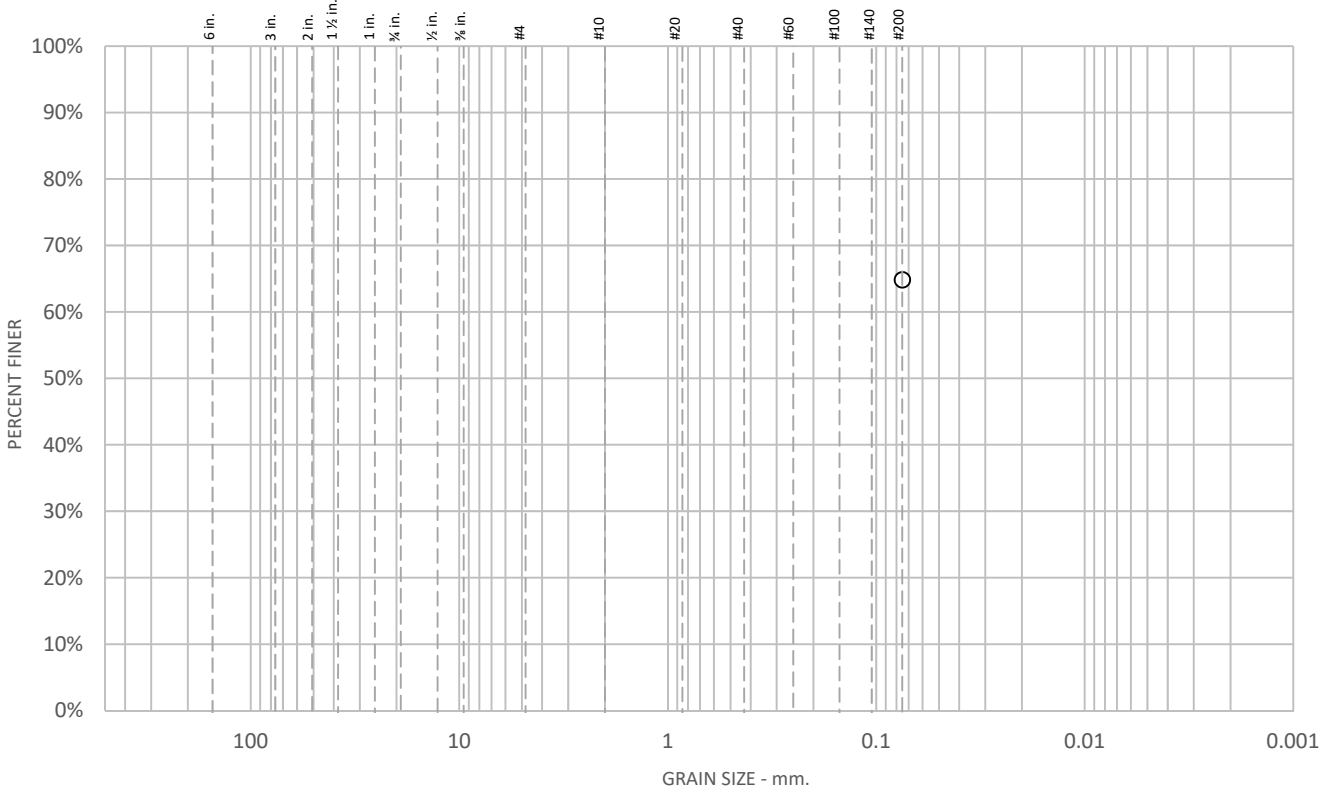
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	64.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 41 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 178.5 g

Sample Number: 1-B2 @ 6.5-7

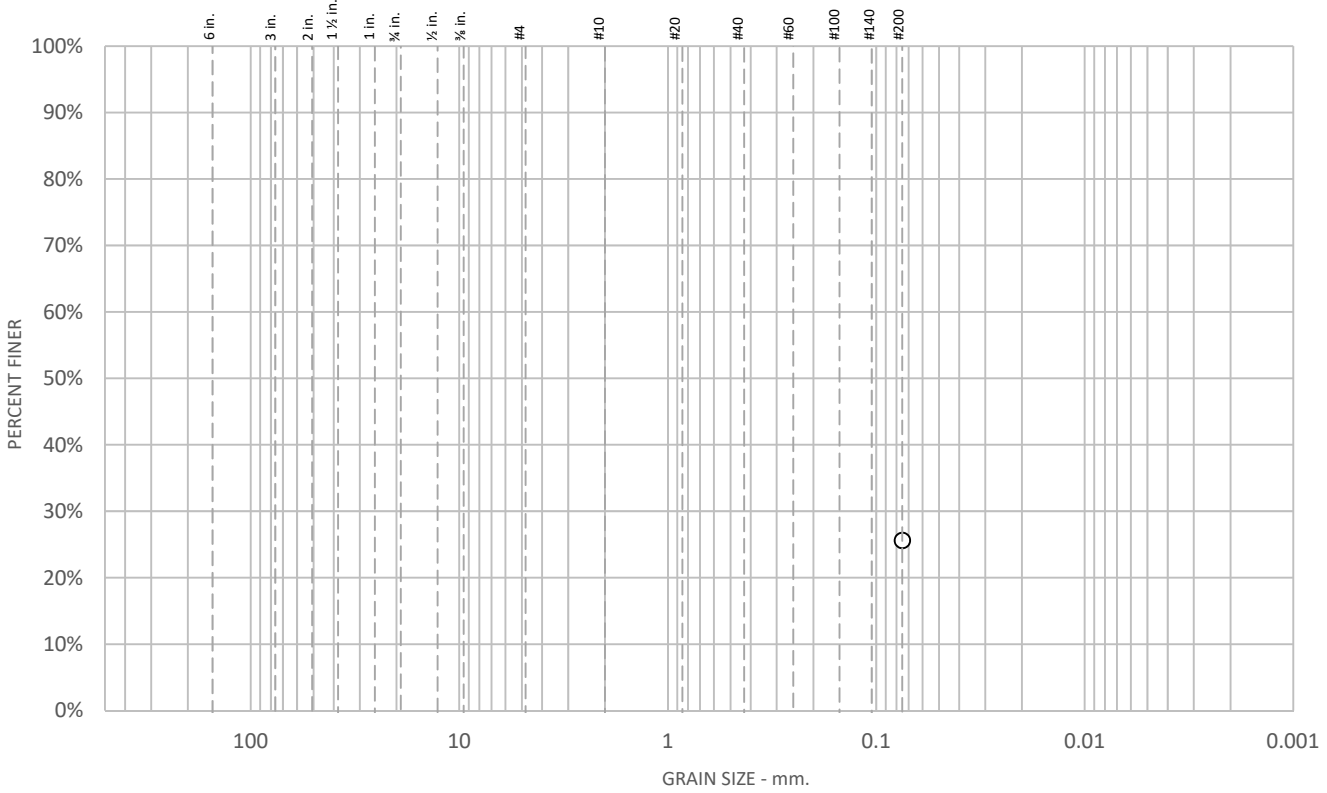
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						26	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	26		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 43 PI = 27

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 221.5 g

Sample Number: 1-B2 @ 30-31.5

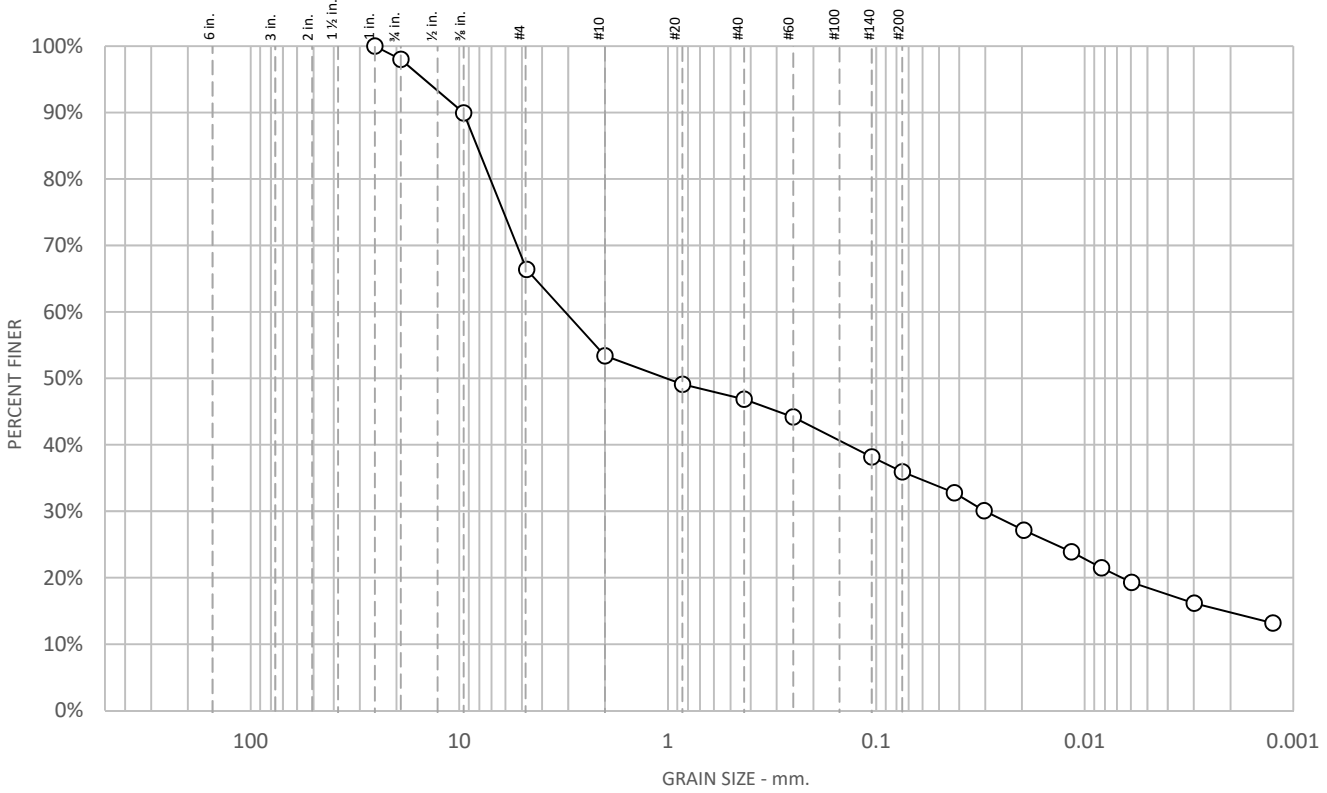
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	2.0	31.6	13.0	6.5	10.9	21.1	14.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	98.0		
⅜ in.	89.9		
#4	66.4		
#10	53.4		
#20	49.1		
#40	46.9		
#60	44.2		
#140	38.2		
#200	35.9		
0.0422 mm.	32.8		
0.0304 mm.	30.1		
0.0196 mm.	27.1		
0.0116 mm.	23.9		
0.0083 mm.	21.5		
0.0060 mm.	19.3		
0.0030 mm.	16.2		
0.0013 mm.	13.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 9.5704 mm D_{85} = 8.2307 mm D_{60} = 3.1043 mm

D_{50} = 1.0152 mm D_{30} = 0.0300 mm D_{15} = 0.0021 mm

D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422

Silt/clay division of 0.002mm used

Sample Number: 1-B2 @ 35-36.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB

Project: GEX for Multiple Parcels **Date:** 6/20/2019

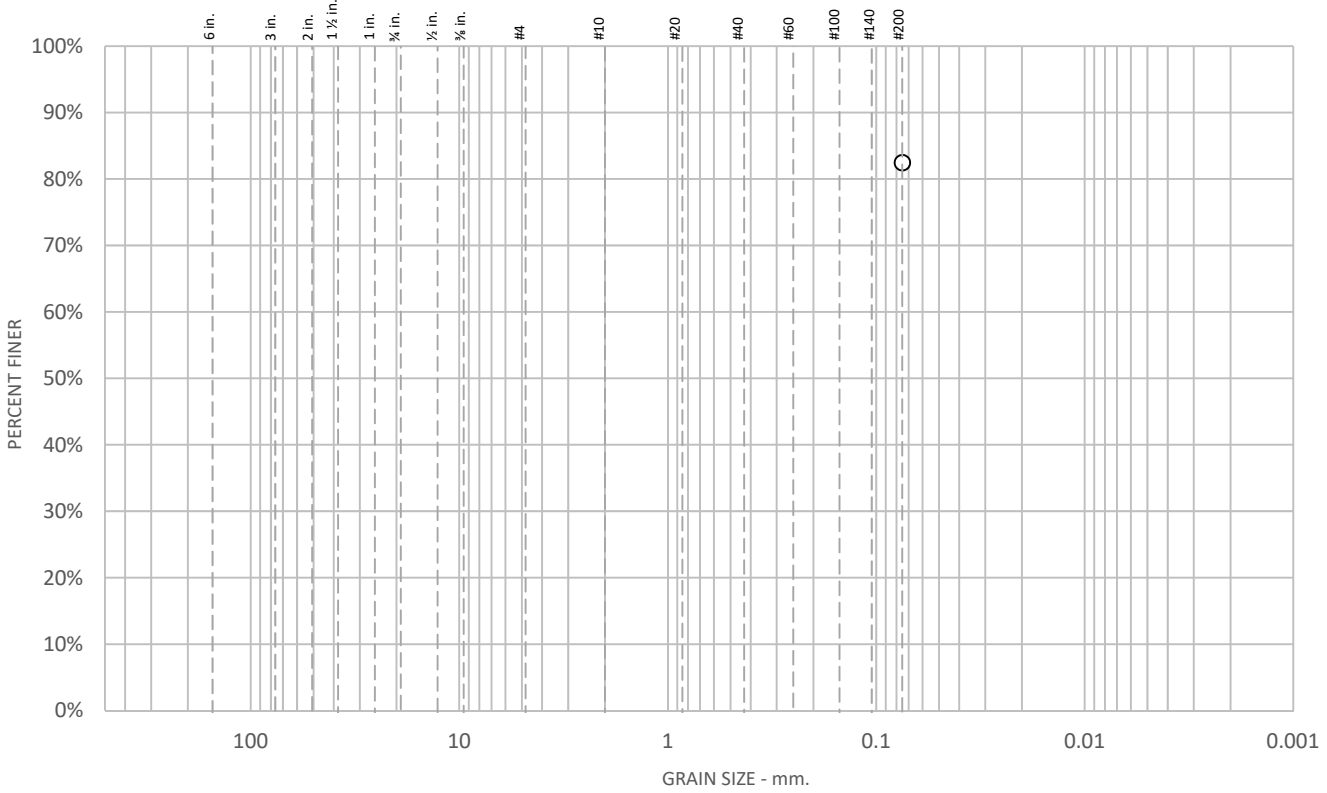
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						82	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	82		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 61 PI = 42

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 179.5 g

Sample Number: 1-B2 @ 6.5-7

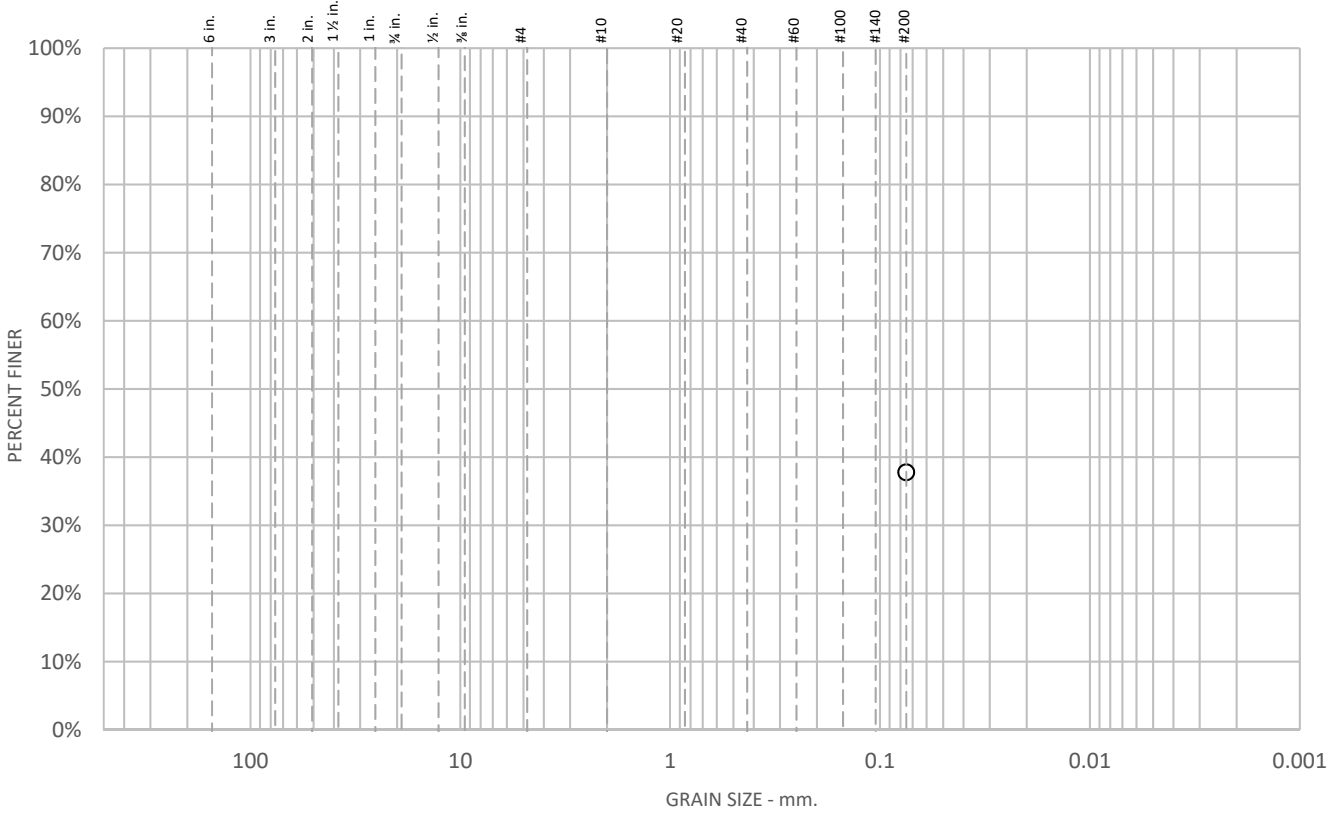
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	37.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 40 PI = 22

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 126.6 g

Sample Number: 1-B4 @ 25.5-26.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

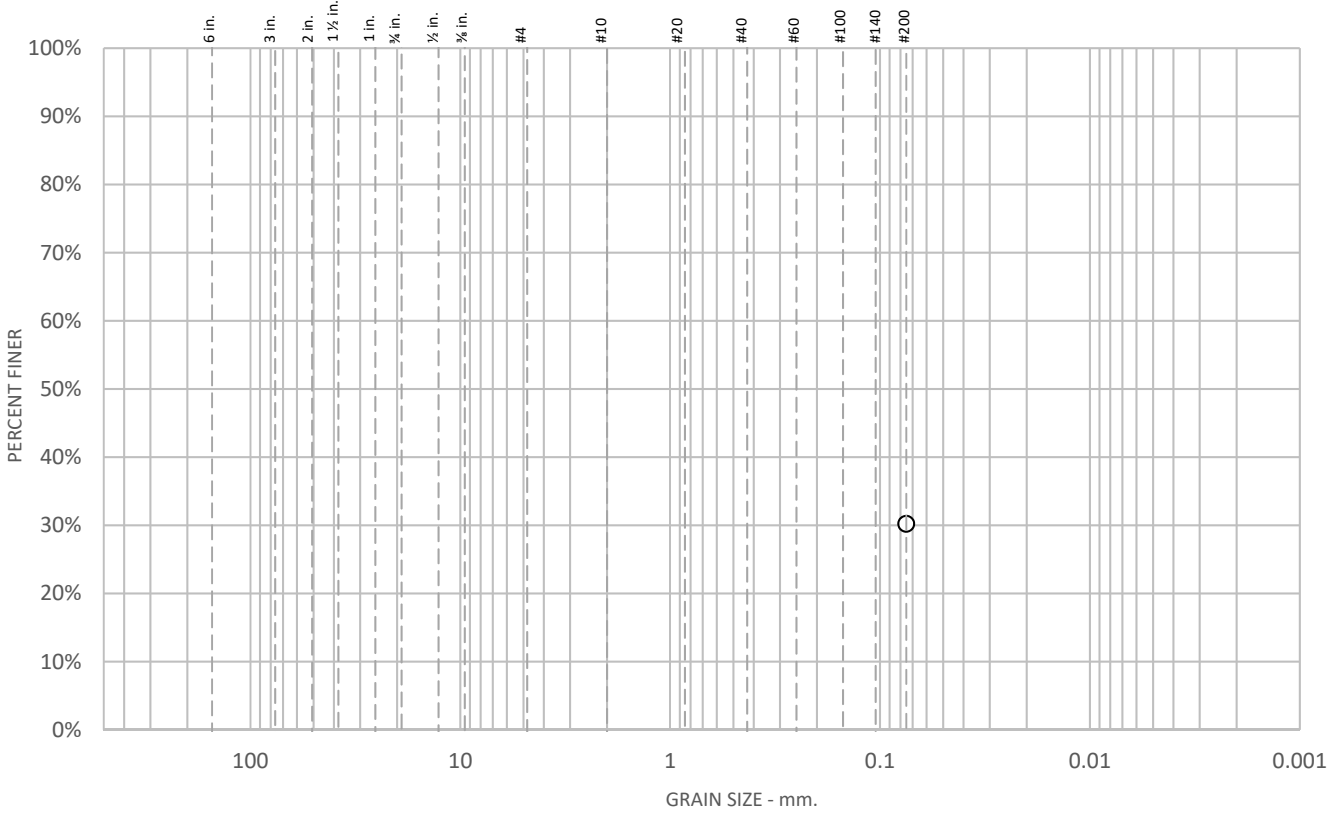
Project Number: 15949.000.000
Date: 6/18/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	30.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 30 PI = 12

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 845.15 g

Sample Number: 1-B4 @ 35.5-36.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

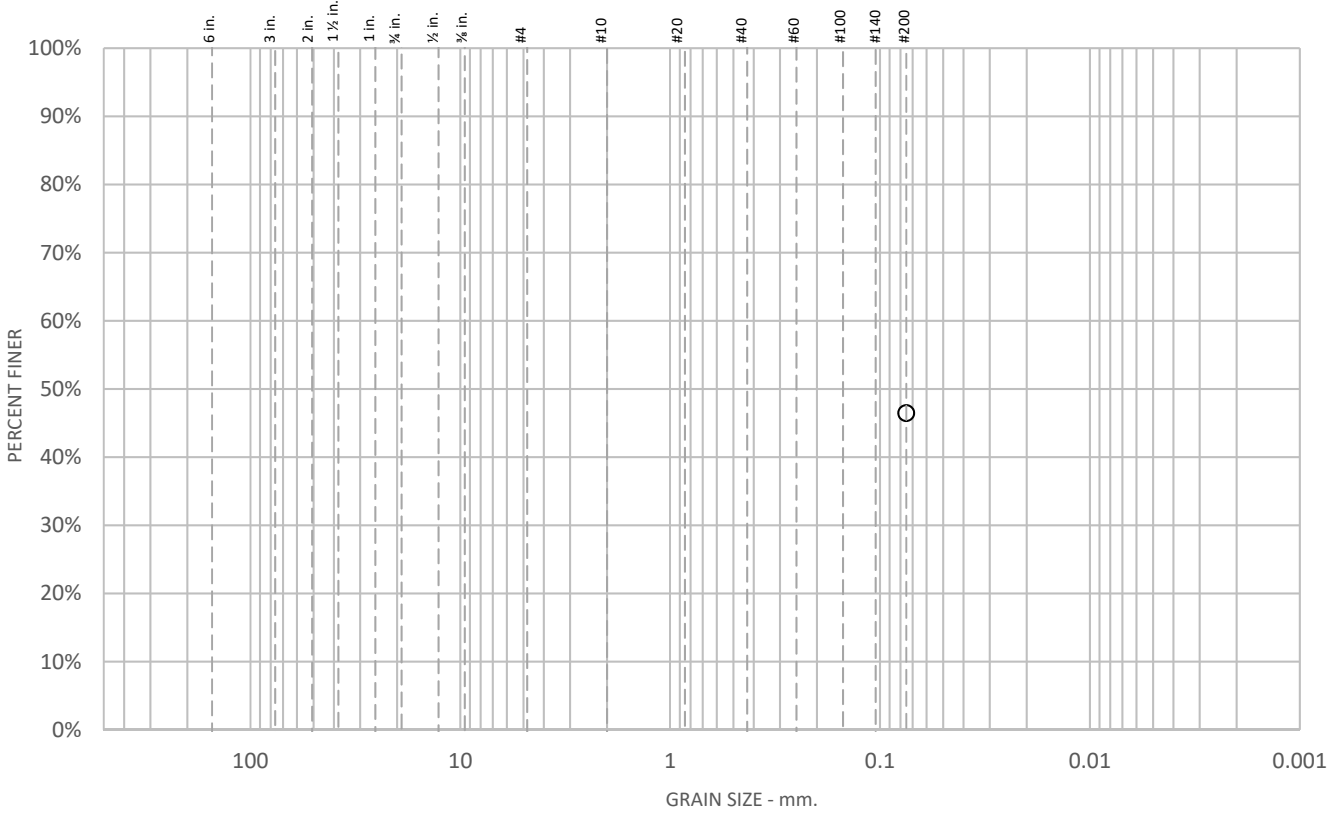
ENGEO Expect Excellence

Tested By: M. Quasem

Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						46.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	46.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 31 PI = 13

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 106.82 g

Sample Number: 1-B4 @ 52-53

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

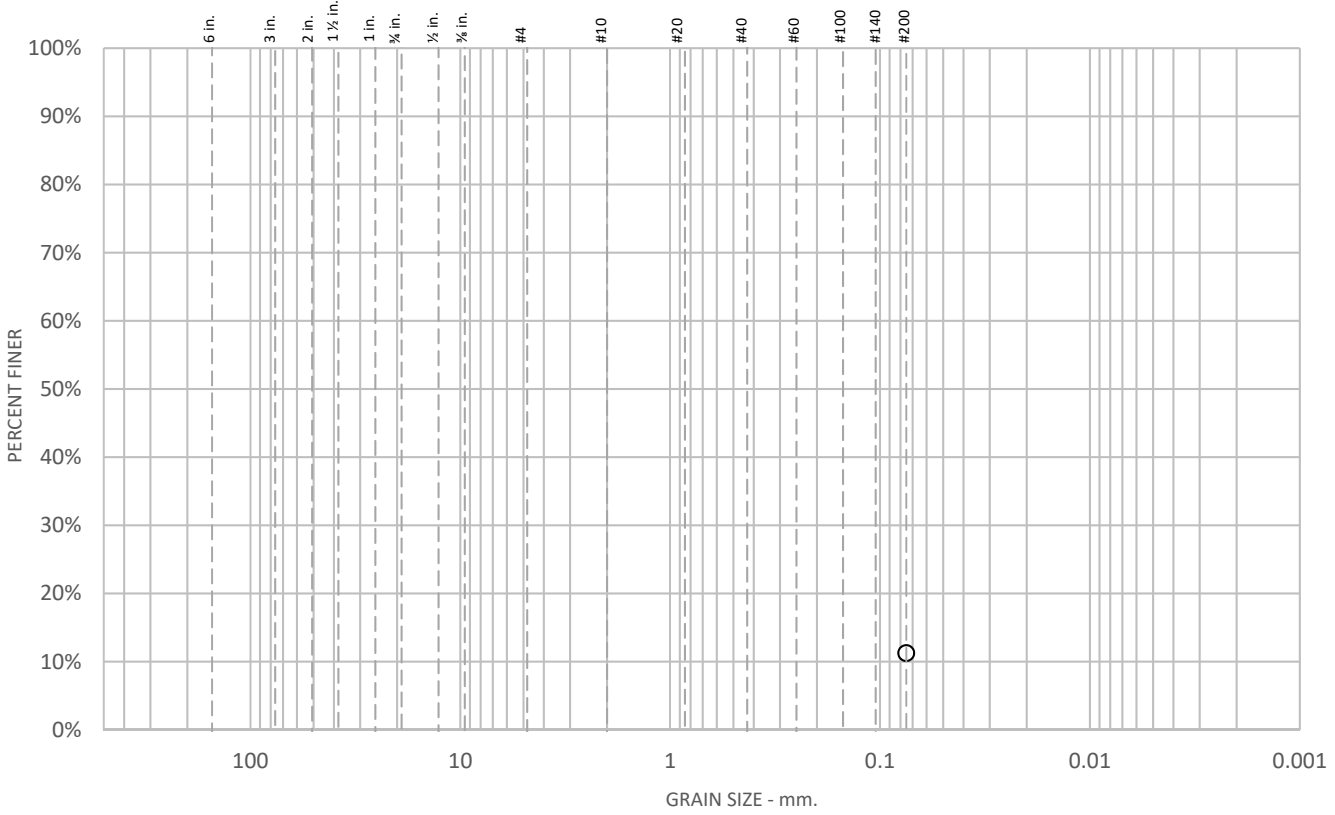
ENGEO Expect Excellence

Tested By: M. Quasem

Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						11.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	11.2		

* (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 =

Remarks

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 587.76 g

Sample Number: 1-B4 @ 9-10.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

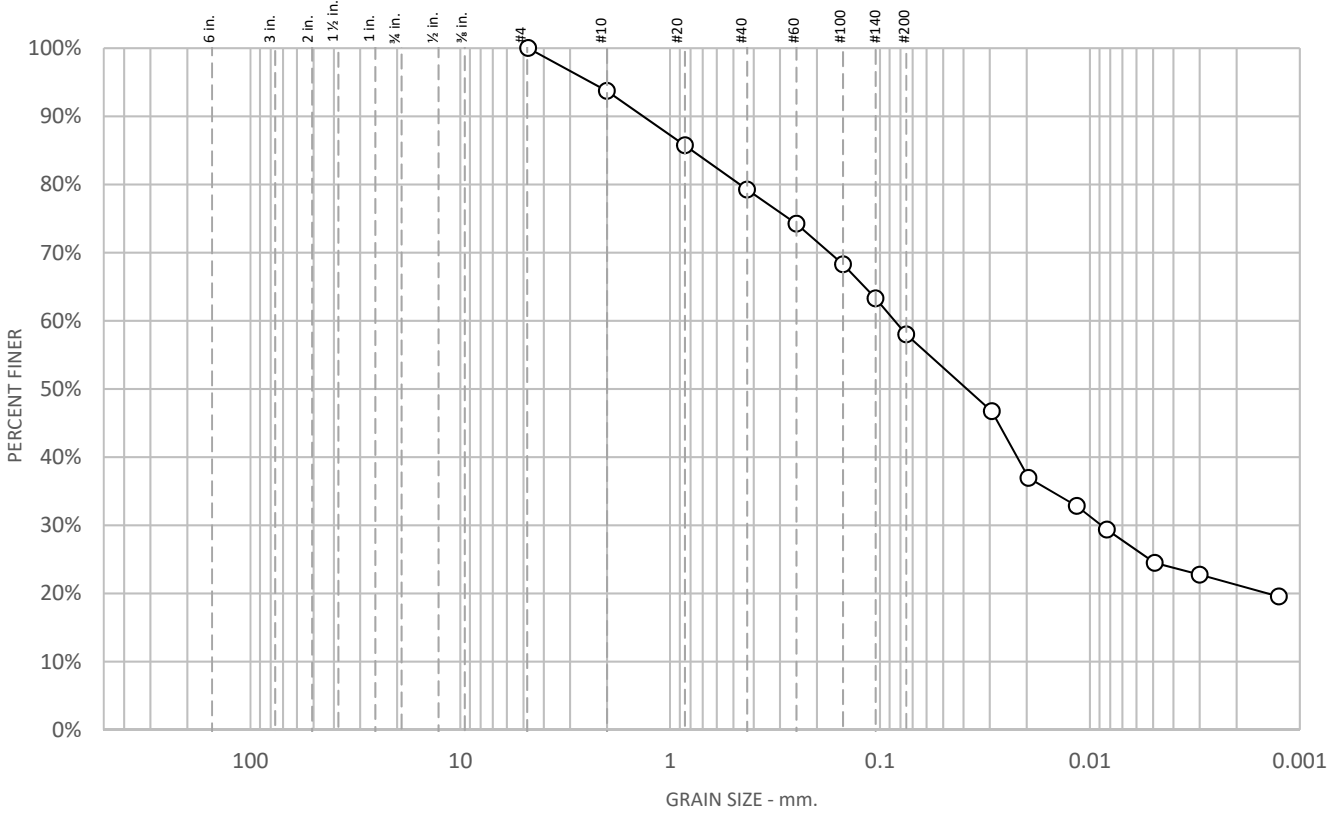
Project Number: 15949.000.000
Date: 6/18/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			6.3	14.5	21.2	36.7	21.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	93.7		
#20	85.7		
#40	79.2		
#60	74.2		
#100	68.3		
#140	63.3		
#200	58.0		
0.0293 mm.	46.7		
0.0196 mm.	36.9		
0.0115 mm.	32.8		
0.0083 mm.	29.4		
0.0049 mm.	24.5		
0.0030 mm.	22.7		
0.0013 mm.	19.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 34 PI = 17

Coefficients

D_{90} = 1.3429 mm D_{85} = 0.7870 mm D_{60} = 0.0852 mm
D_{50} = 0.0385 mm D_{30} = 0.0088 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method

Sample Number: 1-B4 @ 46-47.5

Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Isotropic Unconsolidated Undrained Triaxial Test

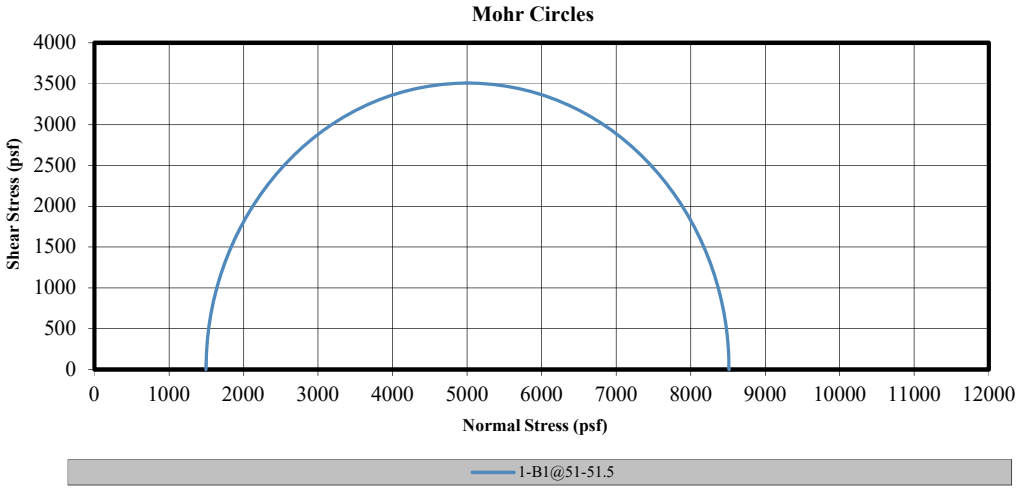
ASTM D2850

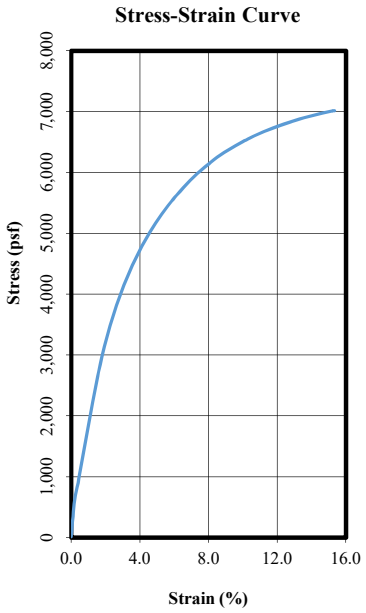
Date: 06/18/19

Checked By: D. Seibold

Date: 6/18/2019

Tested By: G. Criste





Before Test	Specimen 1-B1@51-51.5			
Water Content (%)	21.08			
Dry Density (pcf)	109.40			
Saturation (%)	98.83			
Void Ratio	0.60			
Diameter (in)	2.385			
Height (in)	5.055			
Height-to-Diameter Ratio	2.119			
ASTM D4318 - Wet Method				
Liquid Limit	n/a			
Plastic Limit	n/a			
ASTM D854 - Measured				
Specific Gravity	2.800			
After Test	**1-B1@51-51.5**			
Water Content (%)	21.08			
Saturation (%)	98.83			
Strain Rate (in/min)	0.05			
Peak Deviator Stress (psf)	7016.4			
Axial Strain @ Failure (%)	15.333			
	Cell Pressure			
Cell (psf)	1497.6			
Back (psf)	n/a			
	Principle Stresses at Failure			
σ1 (psf)	8514.0			
σ3 (psf)	1497.6			
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		3508.2			
Friction Angle Ø	n/a		n/a			

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/18/19

Checked By: D. Seibold

Date: 6/18/2019

Tested By: G. Criste

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B1@51-51.5	
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

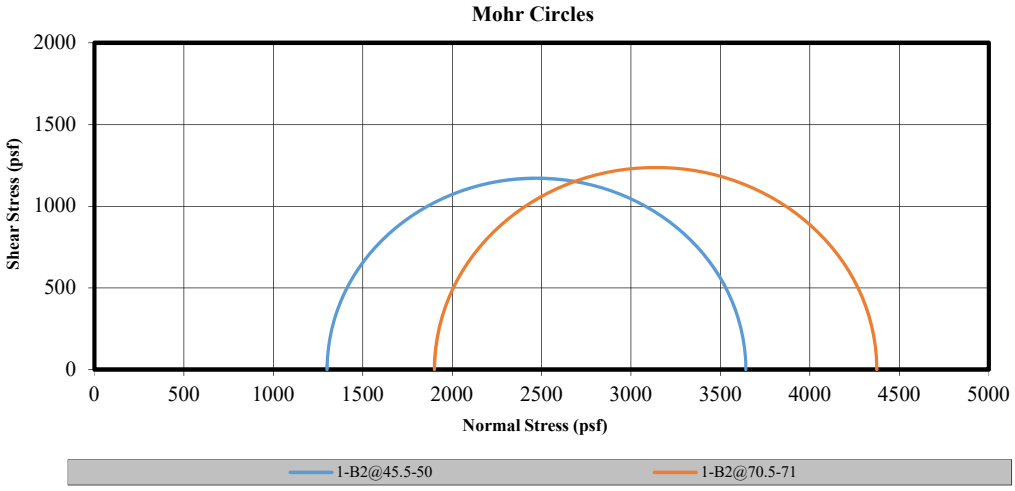
ASTM D2850

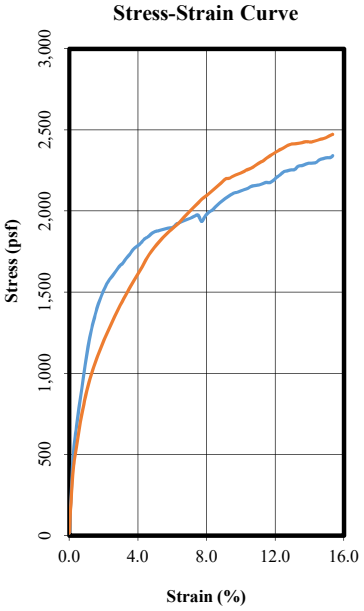
Date: 06/24/19

Checked By: G. Criste

Date: 6/24/2019

Tested By: M. Quasem





Before Test	Specimen 1-B2@45.5-46	1-B2@70.5-71		
Water Content (%)	14.92	25.23		
Dry Density (pcf)	123.20	101.70		
Saturation (%)	100.73	100.84		
Void Ratio	0.41	0.69		
Diameter (in)	2.383	2.373		
Height (in)	4.800	5.050		
Height-to-Diameter Ratio	2.014	2.128		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.790	2.750		
After Test	**1-B2@45.5-46**	**1-B2@70.5-71**		
Water Content (%)	14.92	25.23		
Saturation (%)	100.00	100.00		
Strain Rate (in/min)	15.00	15.00		
Peak Deviator Stress (psf)	2341.2	2473.1		
Axial Strain @ Failure (%)	15.340	15.342		
	Cell Pressure			
Cell (psf)	1300.3	1900.8		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3641.6	4373.9		
σ3 (psf)	1300.3	1900.8		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1170.6	1236.6		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Projects
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

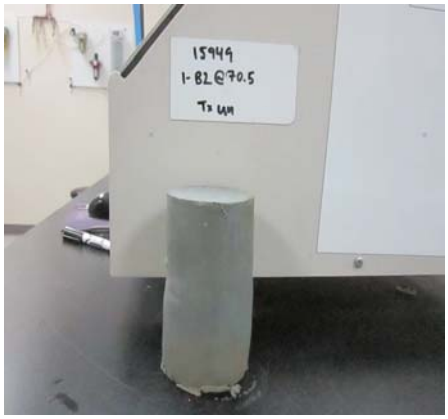
Date: 06/24/19

Checked By: G. Criste

Date: 6/24/2019

Tested By: M. Quasem

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B2@45.5-46	SAMPLE NUMBER: 1-B2@70.5-71
	
SAMPLE NUMBER:	**SAMPLE NUMBER:**

Project Information	
Project Name:	GEX for Multiple Projects
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

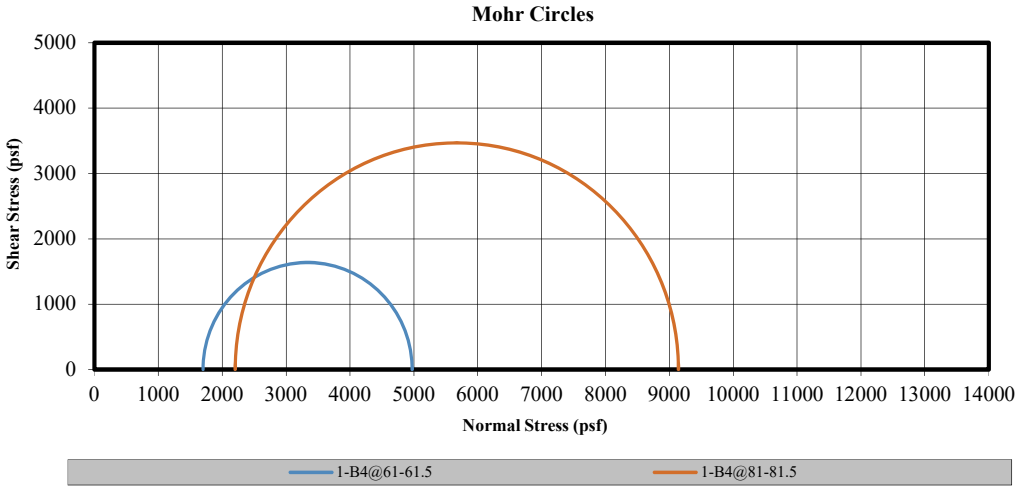
ASTM D2850

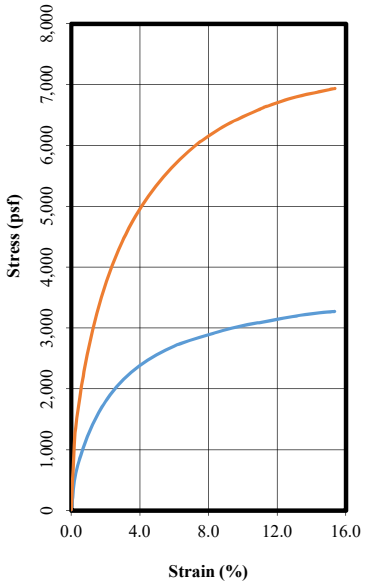
Date: 06/17/19

Checked By: G. Criste

Date: 6/17/2019

Tested By: N. Buckton





Before Test	Specimen 1-B4@61-61.5	1-B4@81-81.5		
Water Content (%)	22.50	18.03		
Dry Density (pcf)	106.00	113.10		
Saturation (%)	99.93	97.89		
Void Ratio	0.62	0.50		
Diameter (in)	2.417	2.418		
Height (in)	5.026	5.062		
Height-to-Diameter Ratio	2.079	2.093		
ASTM D4318 - Wet Method				
Liquid Limit	n/a	n/a		
Plastic Limit	n/a	n/a		
ASTM D854 - Assumed				
Specific Gravity	2.749	2.720		
After Test	1-B4@61-61.5	1-B4@81-81.5		
Water Content (%)	22.50	18.03		
Saturation (%)	99.93	97.88		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	3274.1	6938.3		
Axial Strain @ Failure (%)	15.340	15.358		
	Cell Pressure			
Cell (psf)	1699.2	2203.2		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	4973.3	9141.5		
σ3 (psf)	1699.2	2203.2		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1637.1	3469.2		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/17/19

Checked By: G. Criste

Date: 6/17/2019

Tested By: N. Buckton

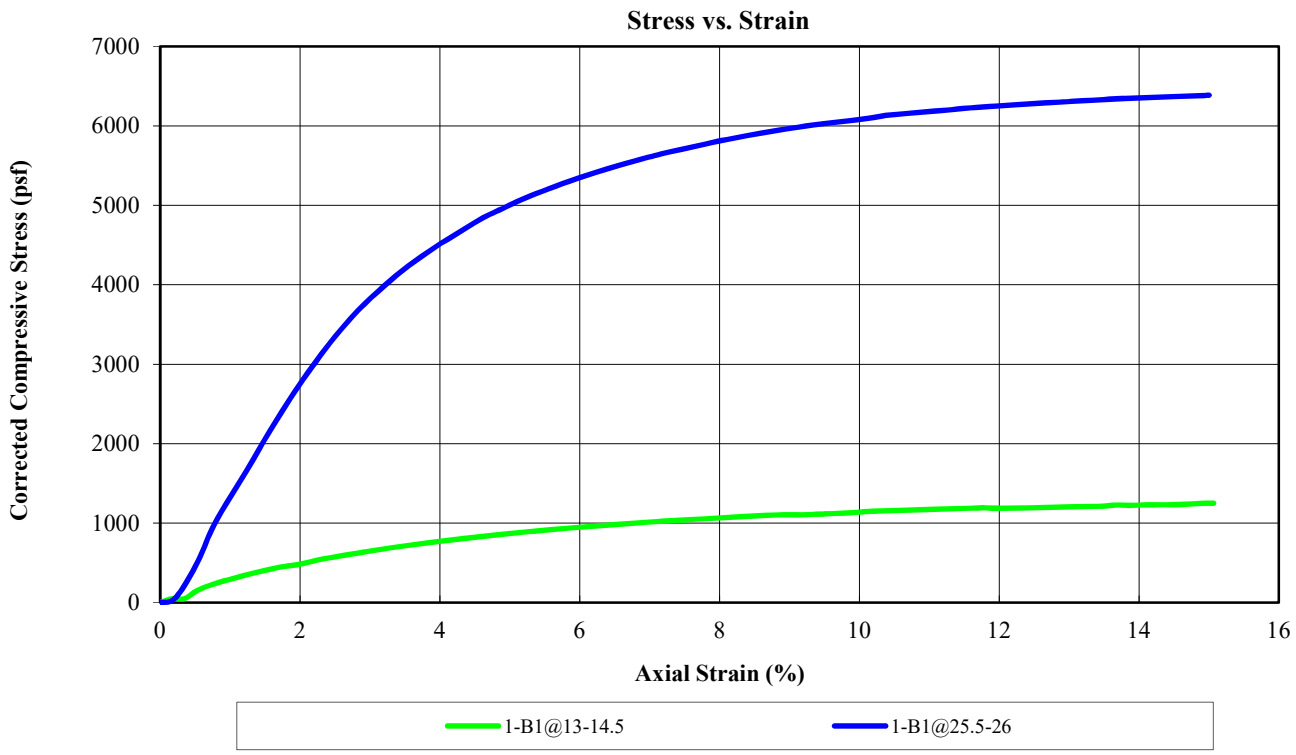
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B4@61-61.5	SAMPLE NUMBER: 1-B4@81-81.5
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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UNCONFINED COMPRESSION TEST REPORT
ASTM D2166



	SPECIMEN	
BEFORE TEST	**1-B1@13-14.5**	**1-B1@25.5-26**
Moisture Content (%)	24.8	22.6
Dry Density (pcf)	103.3	105.5
Saturation (%)	100.0	100.0
Void Ratio	0.60	0.57
Diameter (in)	2.394	2.391
Height (in)	5.85	5.37
Height-To-Diameter Ratio	2.44	2.25
TEST DATA		
Unconfined Compressive Strength (psf)	1377	6386
Undrained Shear Strength (psf)	688	3193
Strain Rate (in./min.)	0.05	0.05
Specific Gravity	2.650	2.650
Strain at Failure (%)	15.00	15.00
Liquid Limit		
Plastic Limit		
Test Remarks	Specific gravity of 2.65 assumed.	

SPECIMEN	DESCRIPTION
1-B1@13-14.5	See exploration logs
1-B1@25.5-26	See exploration logs

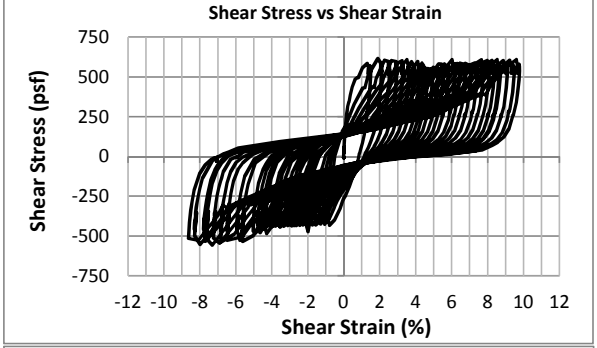
PROJECT NAME: GEX for Multiple Parcels
PROJECT NO: 15949.000.000
CLIENT: Google, LLC
LOCATION: Mountain View, CA
PHASE NO: LAB

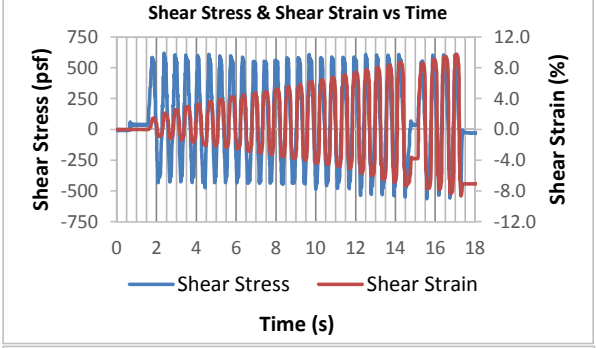
Report Date: 06/19/19
Tested By: R. Montalvo
Reviewed By: M. Gilbert

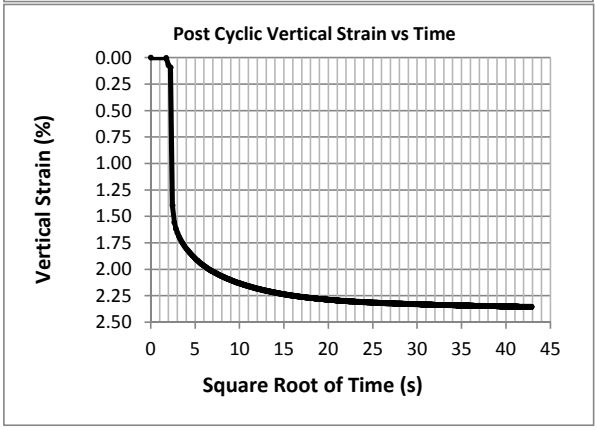
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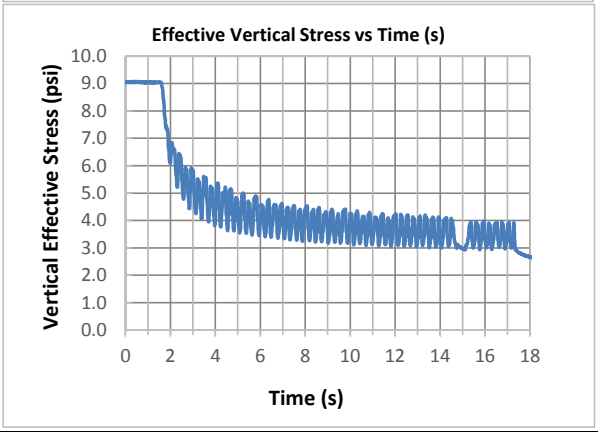
Cyclic Simple Shear

ASTM D6528 - Modified









Test Conditions		Results		Maximum	Minimum
Confining Condition	Plain Membrane w/Chamber Pressure	Vertical Effective Stress (psf)	Deviatoric	783.5	-54.8
Applied Lateral Effective Stress (psf)	520.0		Isotropic	520.0	520.0
Resulting K_o after applied, σ_{vc}'	0.398	Shear Strain (%)		9.8	-8.6
Applied Loading Frequency (Hz)	0.500	Post Cyclic Vertical Strain (%)		2.36	
Cycle Limit, N	27				
Single Amp. Strain (+/-)	9.2	**Cyclic Preshear Specimen Condition**			
Applied τ_{cyc} (psf)	617	Preshear Moisture Content (%)		23.93%	
Applied σ_{vc}' (psf)	1308	Preshear Void Ratio		0.6554	
Applied CSR	0.472	Preshear Saturation (%)		100.36%	
		Preshear Dry Density (pcf)		103.53	

Test Date: 6/18/2019

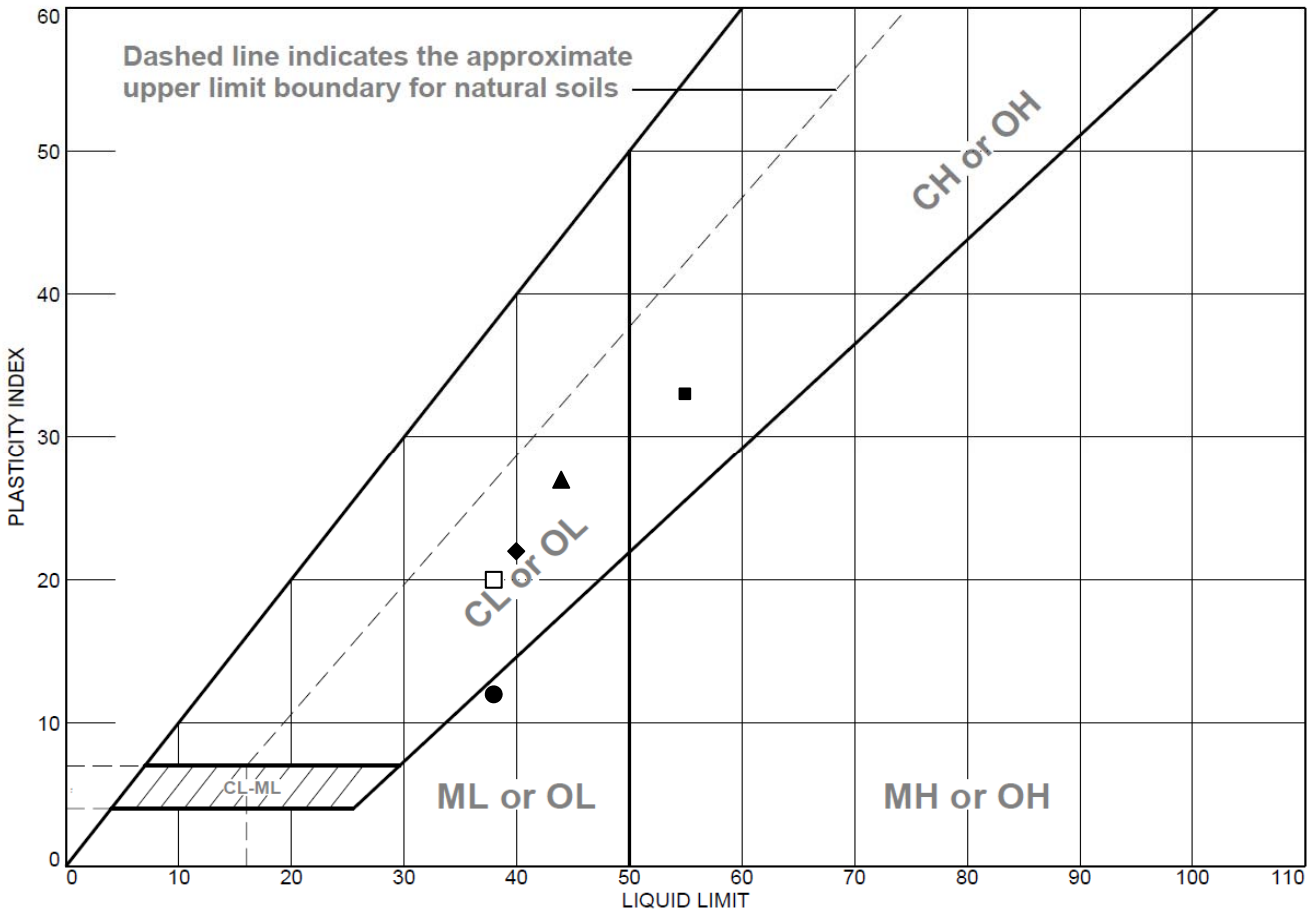
ASTM D2216	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	25.75%	22.72%	**Liquid Limit:**	
Dry Density (pcf):	102.99	105.52	**Plastic Limit:**	
Saturation (%):	96.53%	100.00%	**ASTM D854 - Measured**	
Void Ratio:	0.7331	0.6229	**Specific Gravity:**	2.748
			Soil Description:	See exploration logs

Project Number:	15949.000.000	**Depth:**	15.5-15.75 ft.
Sample Number:	1-B9 @ 15-16.5	**Boring #:**	1-B9
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

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Remarks:

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	44	17	27		68.6	
◆	See exploration logs	40	18	22			
□	See exploration logs	38	18	20		60.2	
●	See exploration logs	38	26	12		54.5	
■	See exploration logs	55	22	33			

Project No.: 15949.000.000 **Date:** 6/18/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

▲ **Sample Number:** 1-B7 **Depth:** 20-21.5
◆ **Sample Number:** 1-B7 **Depth:** 40-41.5
□ **Sample Number:** 1-B7 **Depth:** 45-46.5
● **Sample Number:** 1-B7 **Depth:** 60-61.5
■ **Sample Number:** 1-B7 **Depth:** 70-71.5

Remarks:

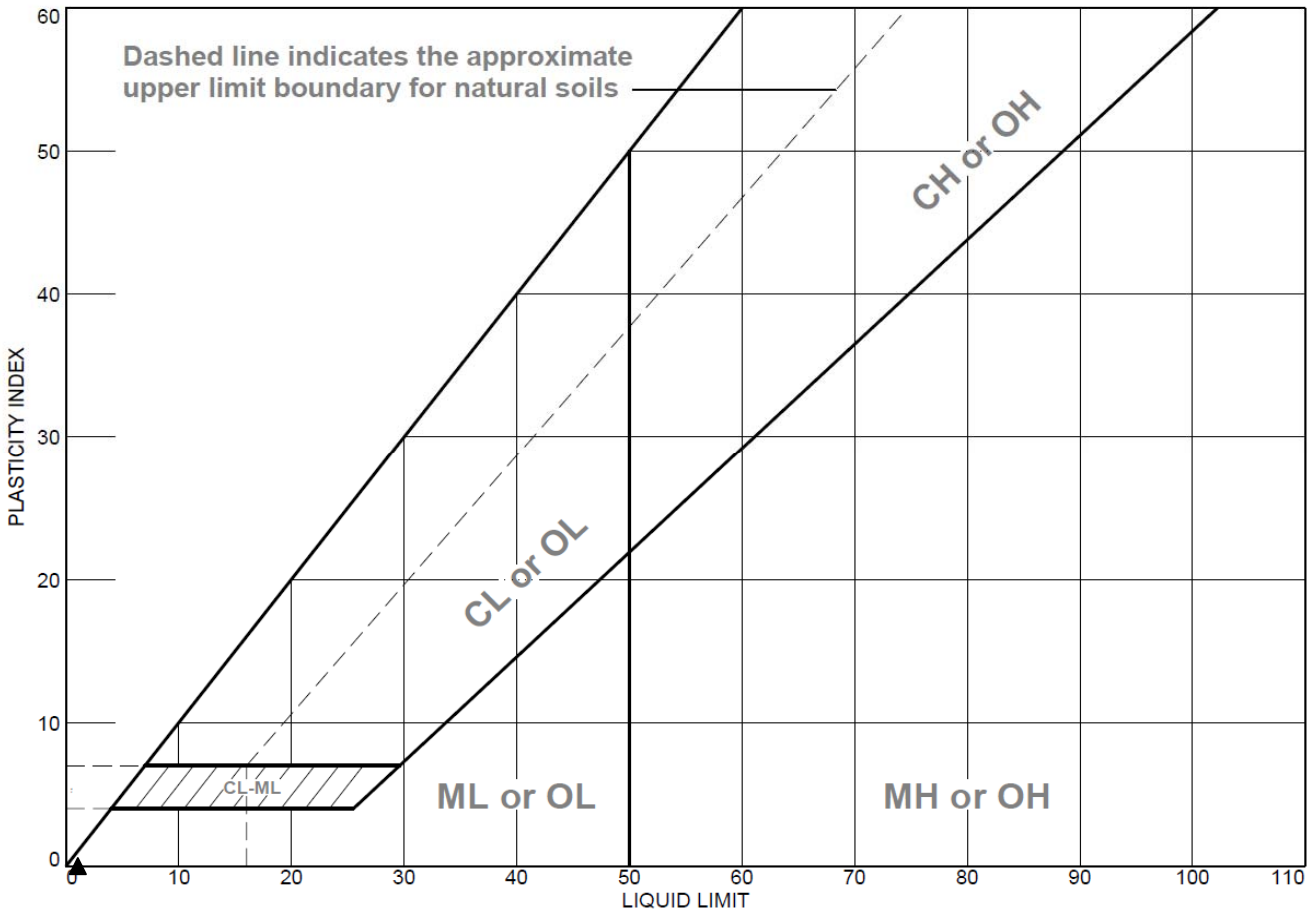
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140
◆ PI: ASTM D4318, Wet Method
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140
● PI: ASTM D4318, Wet Method, GS: ASTM D1140
■ PI: ASTM D4318, Wet Method

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	NV	NP	NP		52.9	

Project No.: 15949.000.000 **Date:** 6/18/2019

Project Name: GEX for Multiple Parcels

Project location: Sunnyvale, California

Client: Google LLC

▲ **Sample Number:** 1-B7 **Depth:** 80-81

Remarks:

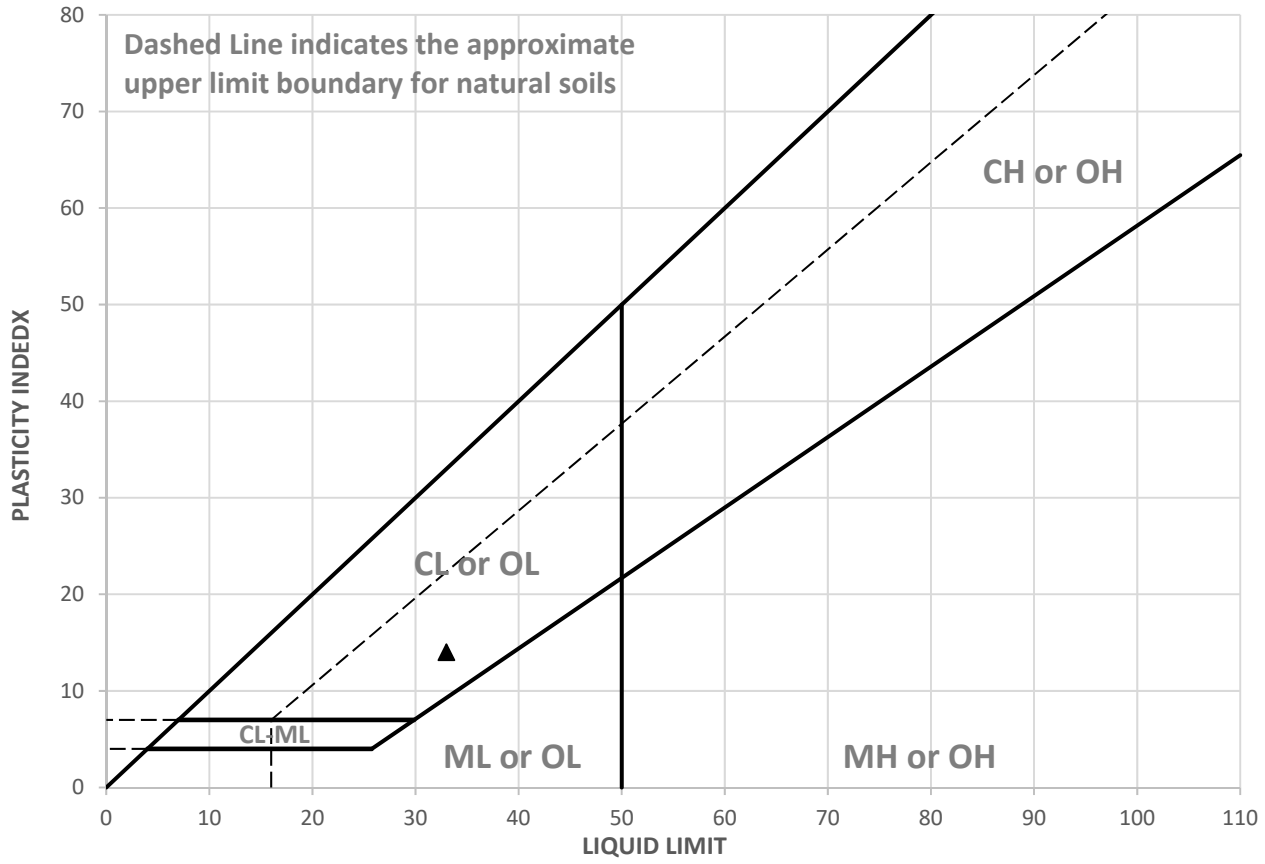
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
See exploration logs	33	19	14	90.2	67.4	CL

Project No.: 15949.000.000 **Date:** 7/25/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google, LLC
Sample Number: 1-B7@5-6.5 **Depth:** 5.0-6.5 ft

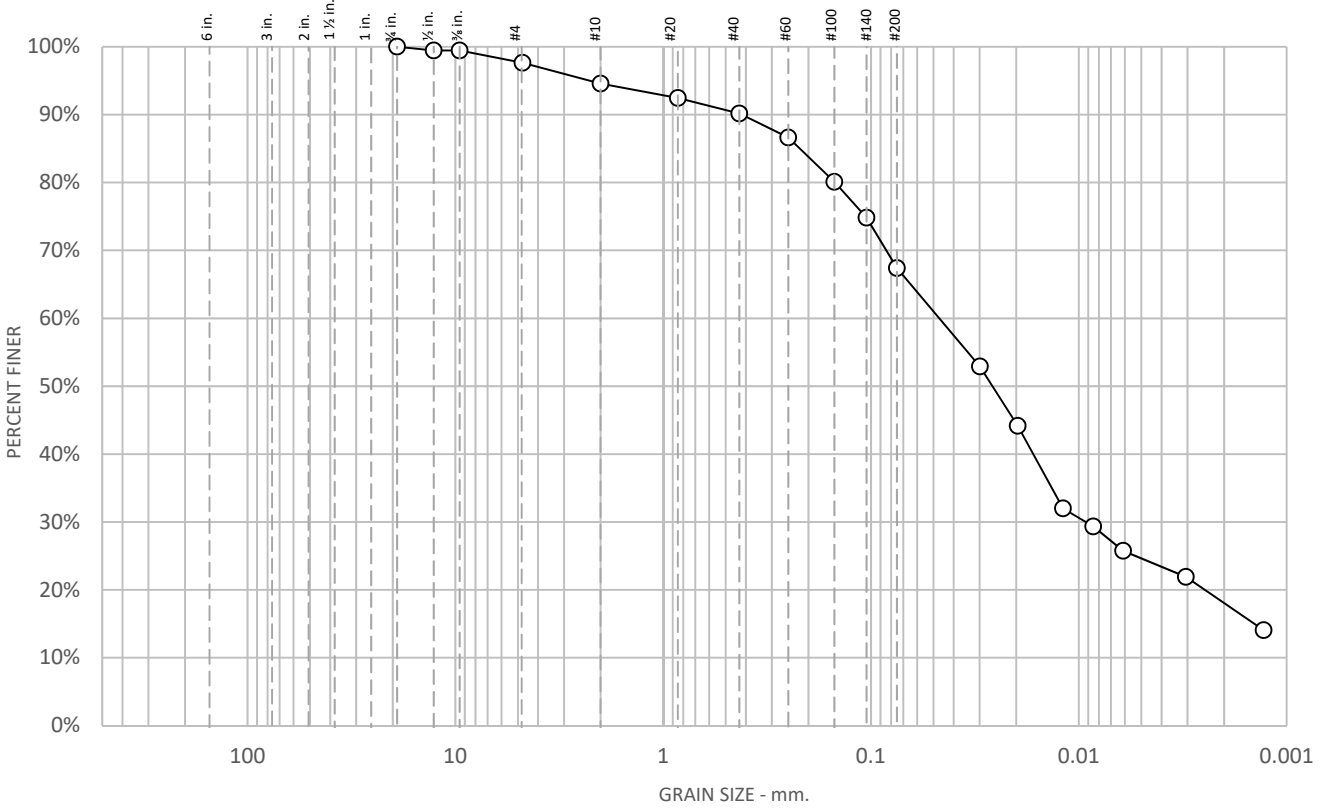
Remarks:
PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

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Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.6	1.8	3.1	4.4	22.8	49.3	18.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
½ in.	99.4		
⅜ in.	99.4		
#4	97.6		
#10	94.6		
#20	92.5		
#40	90.2		
#60	86.6		
#100	80.1		
#140	74.8		
#200	67.4		
0.0299 mm.	52.9		
0.0197 mm.	44.2		
0.0119 mm.	32.0		
0.0085 mm.	29.3		
0.0061 mm.	25.7		
0.0031 mm.	21.9		
0.0013 mm.	14.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 33 PI = 14

Coefficients

D_{90} = 0.4196 mm D_{85} = 0.2201 mm D_{60} = 0.0469 mm
D_{50} = 0.0260 mm D_{30} = 0.0093 mm D_{15} = 0.0014 mm
D_{10} = C_u = C_c =

Classification

USCS = CL

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B7 @ 5.0-6.5 feet

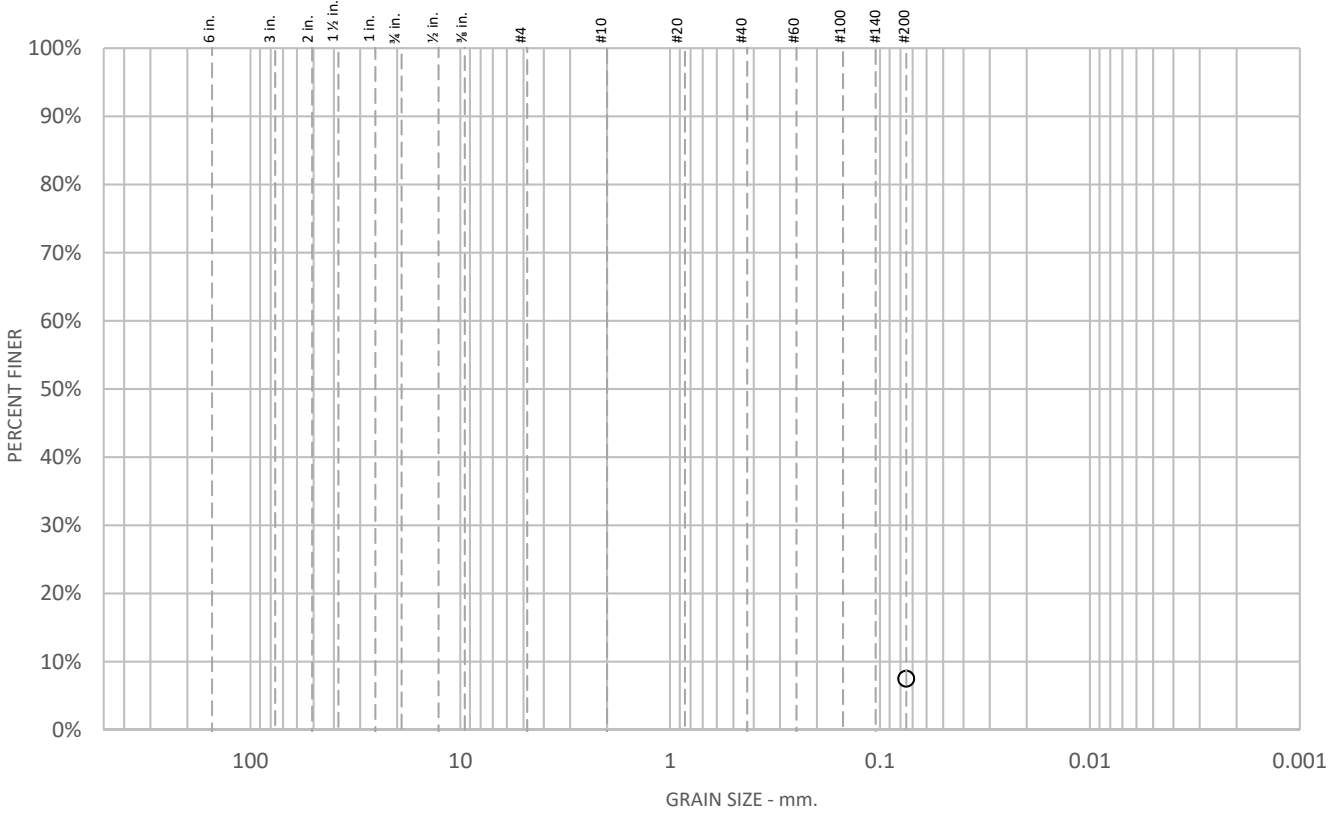
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 7/25/2019
Project location: Sunnyvale, California

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	7.5		

* (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 =

Remarks

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 269.82 g

Sample Number: 1-B7 @ 12-13.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

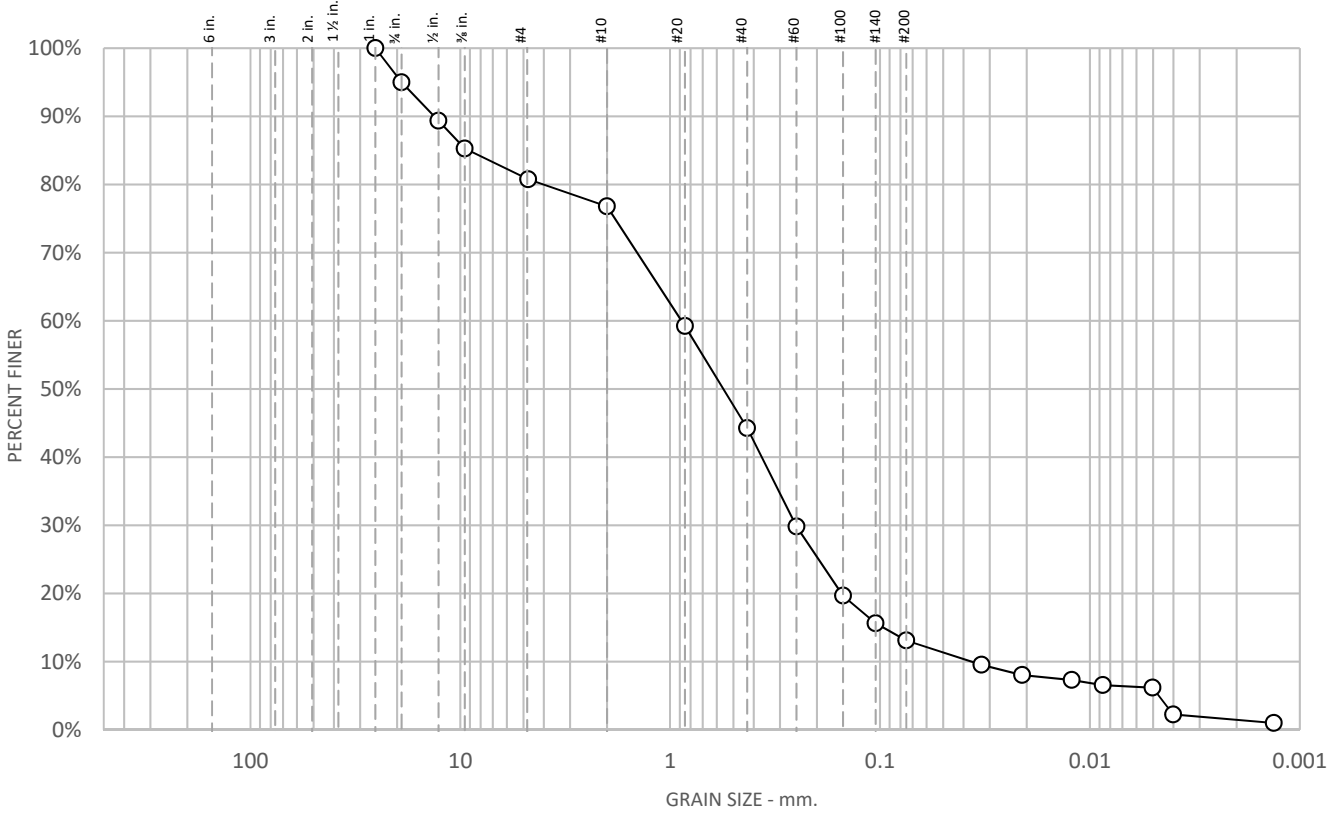
Project Number: 15949.000.000
Date: 6/18/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	5.0	14.2	4.0	32.5	31.2	11.7	1.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	95.0		
½ in.	89.3		
⅜ in.	85.3		
#4	80.8		
#10	76.8		
#20	59.2		
#40	44.3		
#60	29.8		
#100	19.7		
#140	15.6		
#200	13.1		
0.0329 mm.	9.5		
0.0210 mm.	8.0		
0.0122 mm.	7.3		
0.0087 mm.	6.6		
0.0050 mm.	6.2		
0.0040 mm.	2.2		
0.0013 mm.	1.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 13.3146 mm D_{85} = 9.1304 mm D_{60} = 0.8825 mm
D_{50} = 0.5583 mm D_{30} = 0.2516 mm D_{15} = 0.0965 mm
D_{10} = 0.0366 mm C_u = 24.12 C_c = 1.96

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 15A

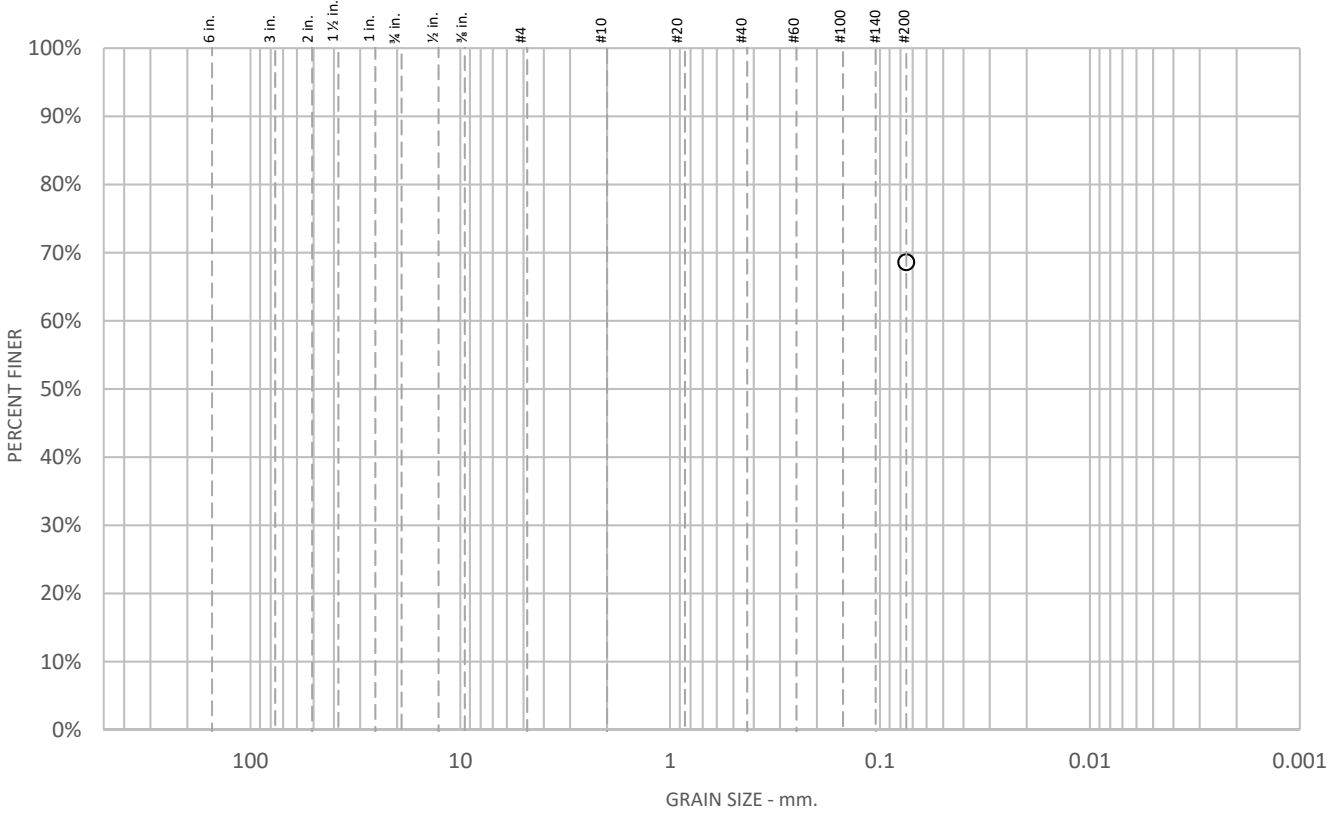
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						68.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	68.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 44 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 312.28 g

Sample Number: 1-B7 @ 20-21.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

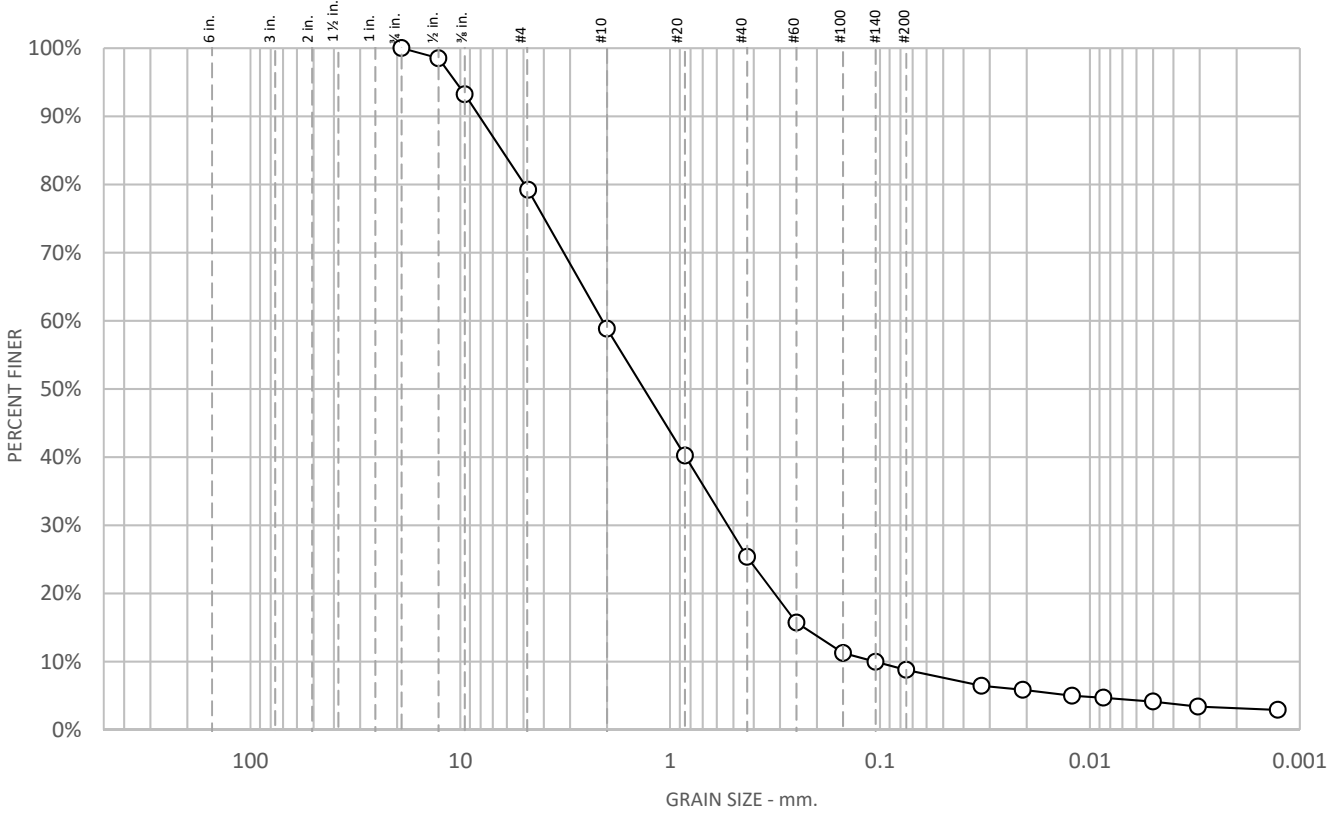
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem
Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	20.8	20.4	33.5	16.6	5.6	3.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
½ in.	98.5		
⅜ in.	93.2		
#4	79.2		
#10	58.8		
#20	40.2		
#40	25.4		
#60	15.7		
#100	11.3		
#140	10.0		
#200	8.8		
0.0328 mm.	6.4		
0.0209 mm.	5.9		
0.0122 mm.	5.0		
0.0086 mm.	4.7		
0.0050 mm.	4.1		
0.0031 mm.	3.4		
0.0013 mm.	2.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 8.1141 mm D_{85} = 6.3321 mm D_{60} = 2.1018 mm
D_{50} = 1.3328 mm D_{30} = 0.5321 mm D_{15} = 0.2302 mm
D_{10} = 0.1060 mm C_u = 19.83 C_c = 1.27

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 34-35.5

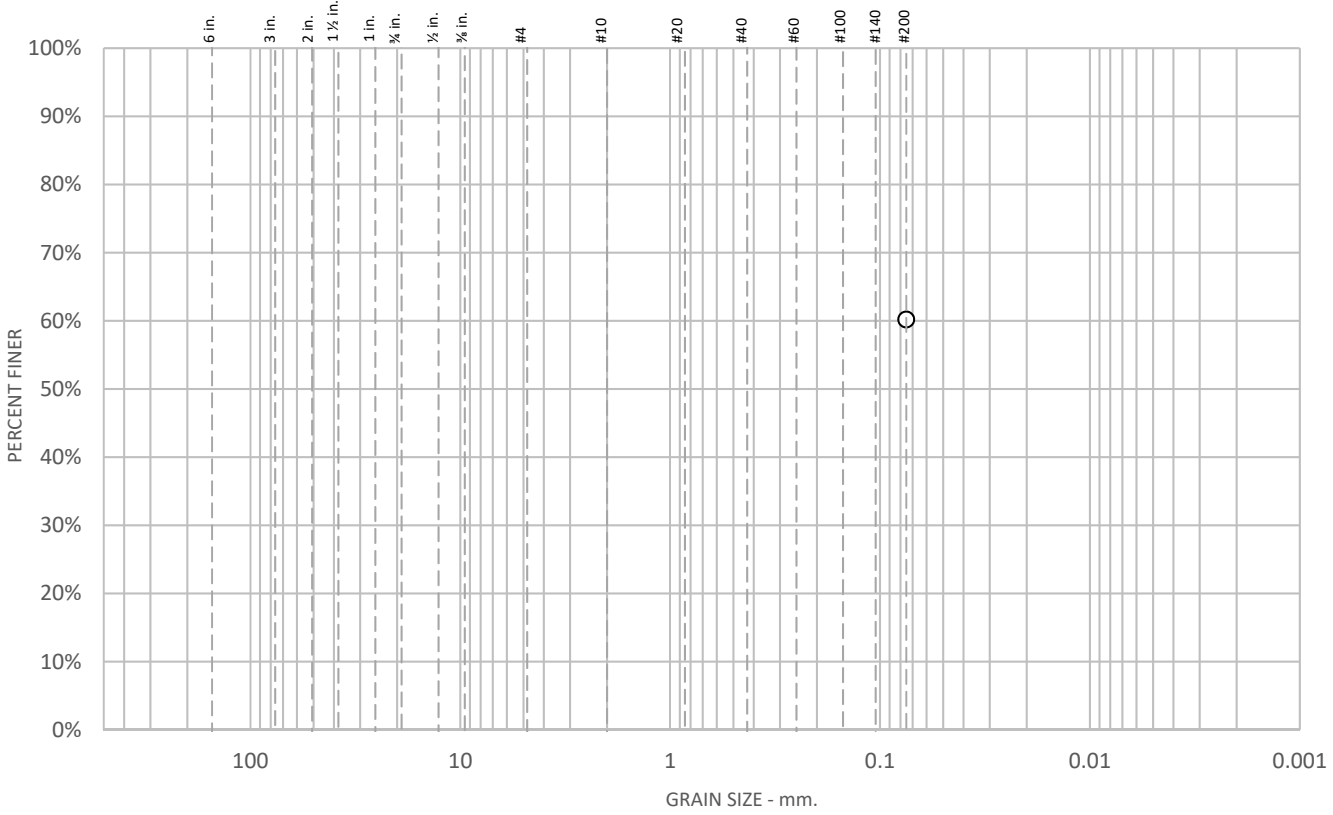
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	60.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 38 PI = 20

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 96.28 g

Sample Number: 1-B7 @ 45-46.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

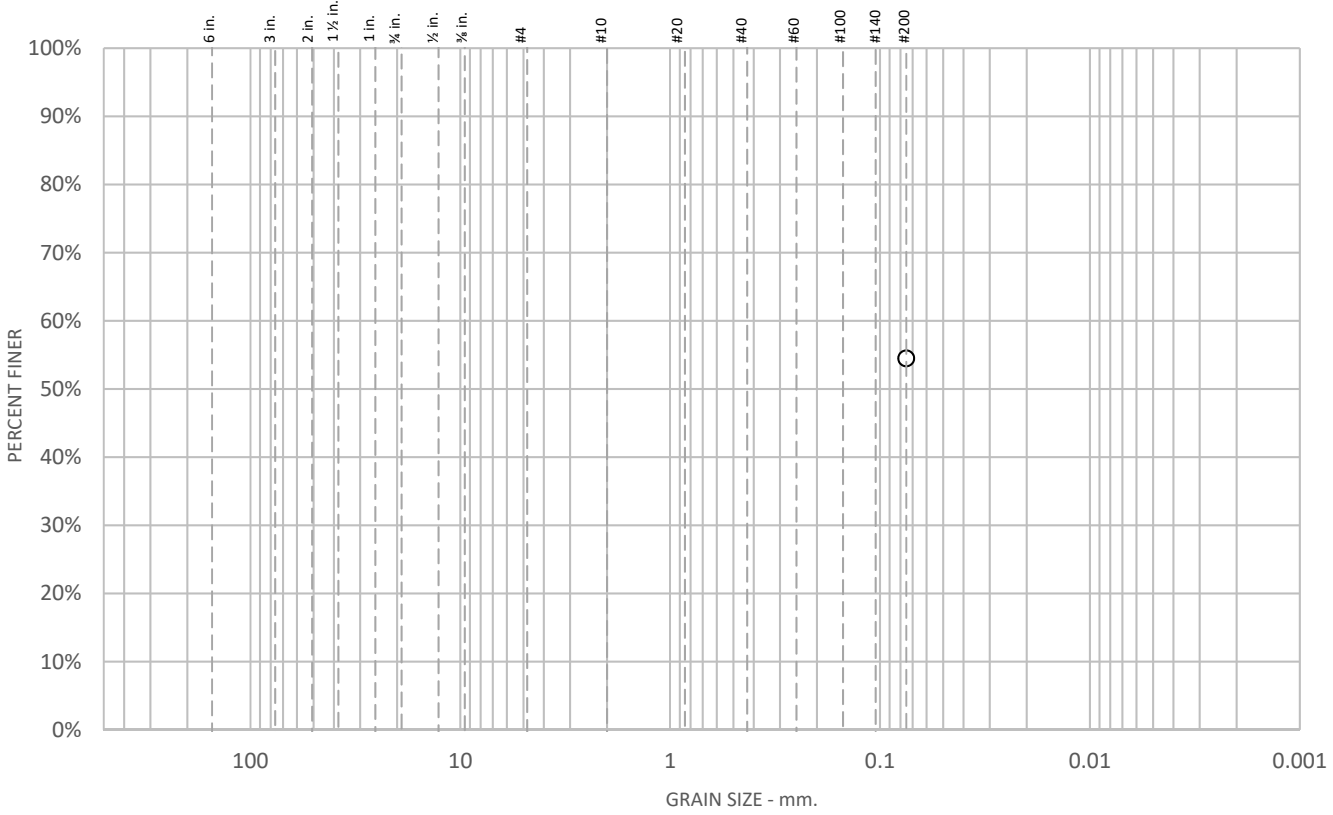
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						54.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	54.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 26 LL = 38 PI = 12

Coefficients

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

Classification

USCS = ML

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 118.25 g

Sample Number: 1-B7 @ 61-61.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

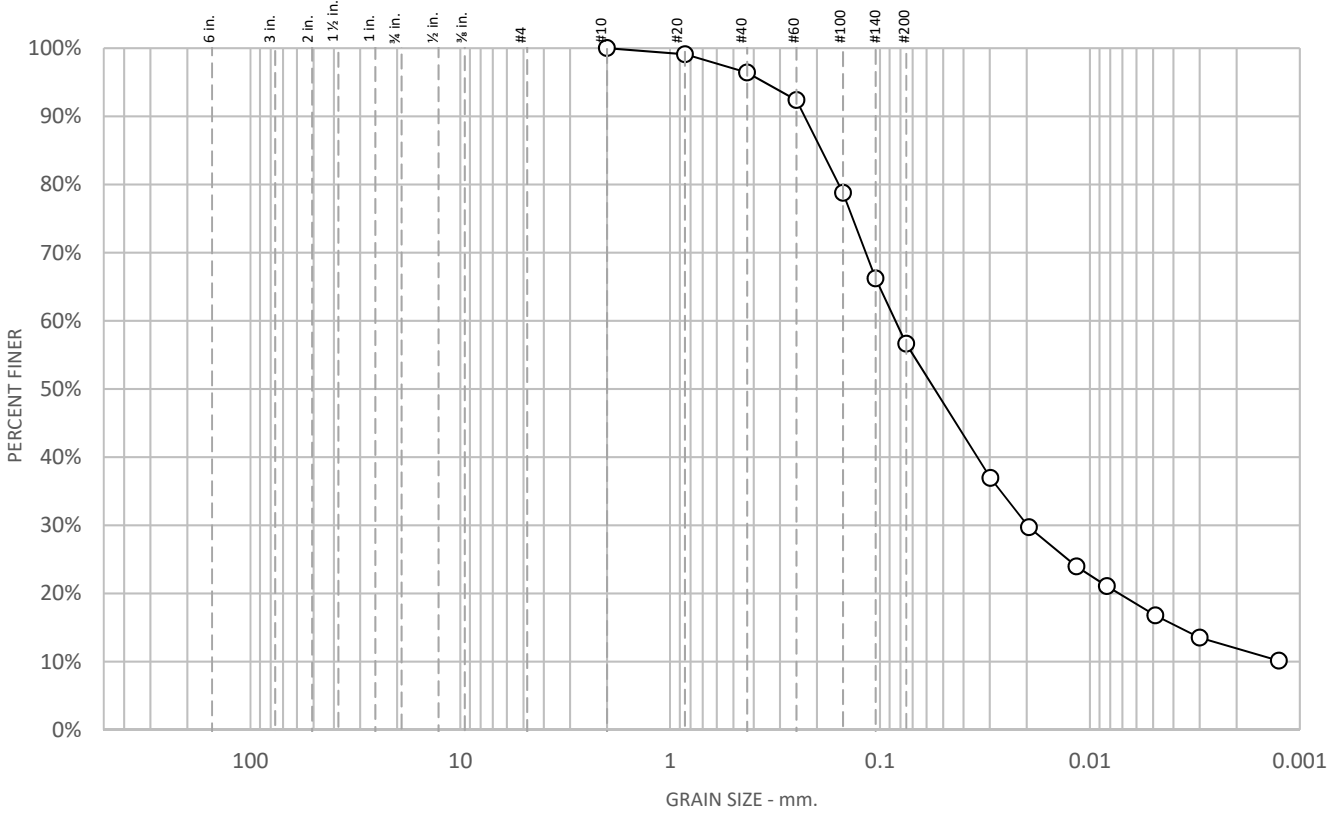
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				3.6	39.8	44.7	11.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.1		
#40	96.4		
#60	92.4		
#100	78.8		
#140	66.2		
#200	56.6		
0.0298 mm.	36.9		
0.0195 mm.	29.7		
0.0116 mm.	23.9		
0.0083 mm.	21.1		
0.0049 mm.	16.8		
0.0030 mm.	13.5		
0.0013 mm.	10.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2287 mm D_{85} = 0.1896 mm D_{60} = 0.0844 mm
D_{50} = 0.0550 mm D_{30} = 0.0198 mm D_{15} = 0.0037 mm
D_{10} = C_u = C_c =

Classification

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 8.0-10.0

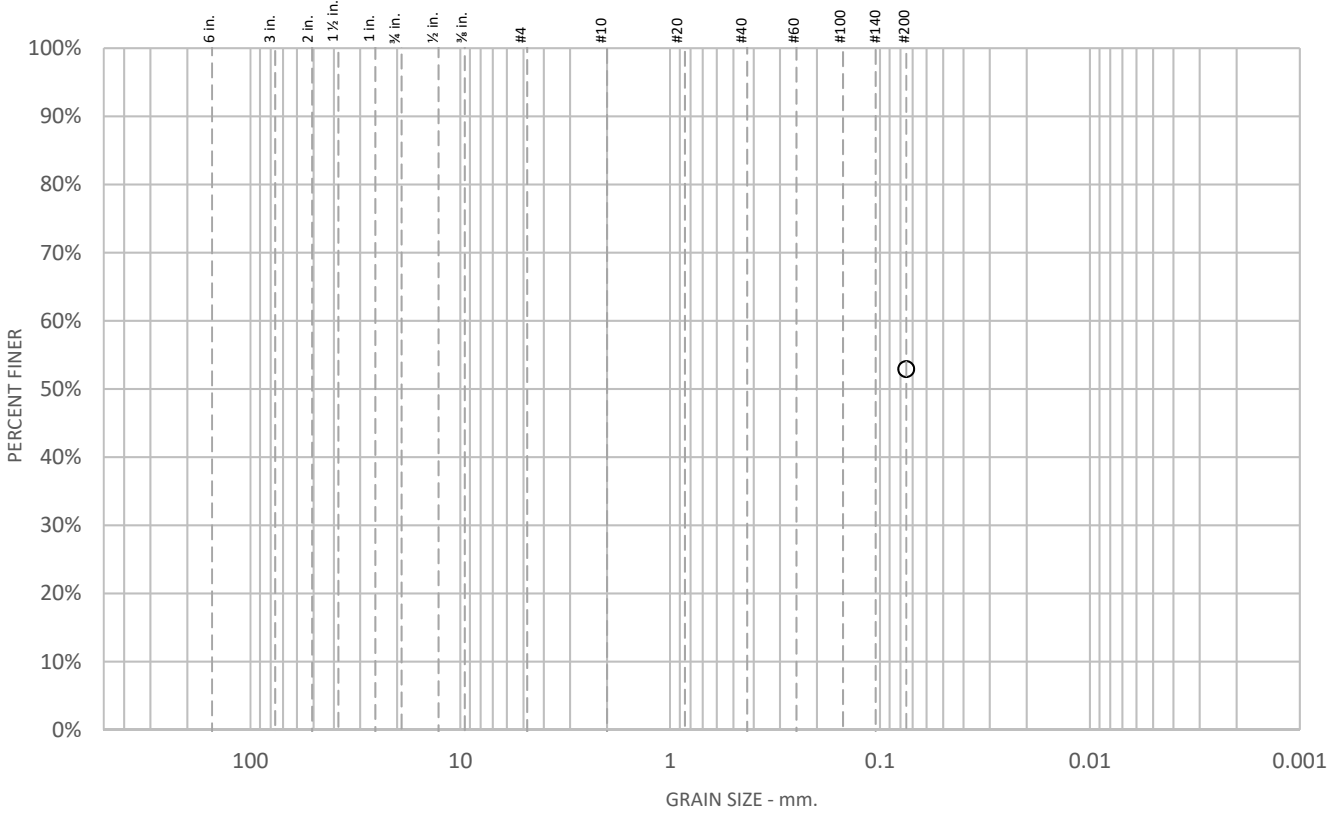
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	52.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = NP LL = NV PI = NP

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 173.83 g

Sample Number: 1-B7 @ 80-81

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Isotropic Unconsolidated Undrained Triaxial Test

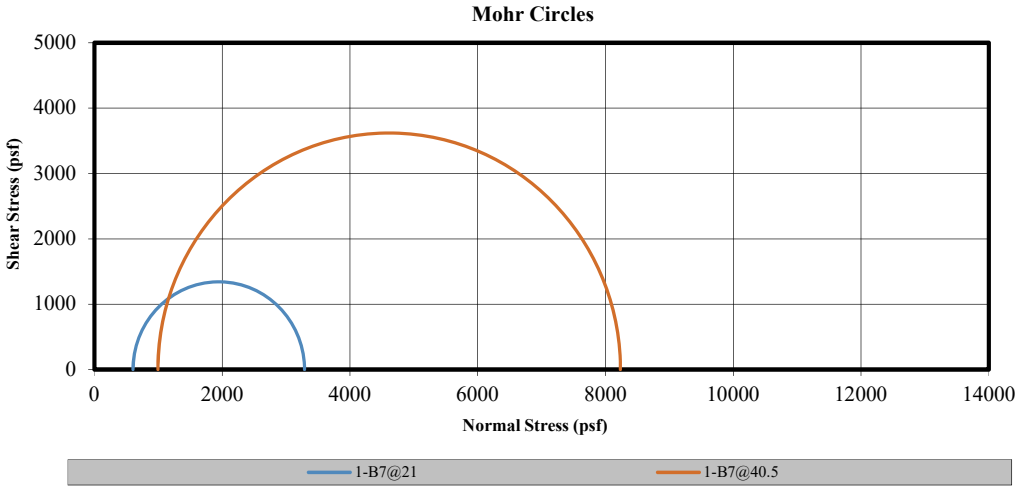
ASTM D2850

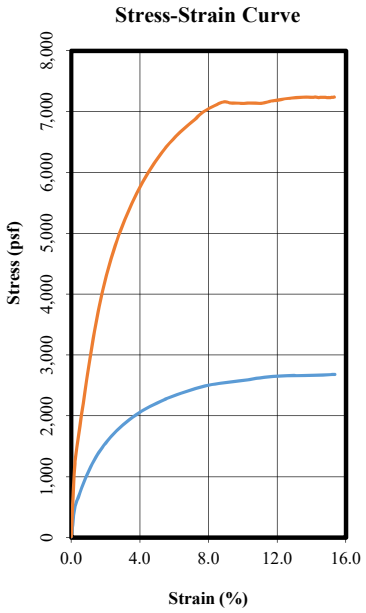
Date: 06/14/19

Checked By: G. Criste

Date: 6/14/2019

Tested By: N. Buckton





Before Test	Specimen 1-B7@21	1-B7@40.5		
Water Content (%)	23.62	20.96		
Dry Density (pcf)	103.30	108.20		
Saturation (%)	99.84	99.76		
Void Ratio	0.64	0.57		
Diameter (in)	2.404	2.404		
Height (in)	5.005	5.067		
Height-to-Diameter Ratio	2.082	2.108		
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
ASTM D854 - Assumed				
Specific Gravity	2.720	2.725		
After Test	**1-B7@21**	**1-B7@40.5**		
Water Content (%)	23.62	20.96		
Saturation (%)	99.84	99.76		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	2682.7	7239.9		
Axial Strain @ Failure (%)	15.352	13.619		
	Cell Pressure			
Cell (psf)	604.8	993.6		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3287.5	8233.5		
σ3 (psf)	604.8	993.6		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1341.3	3619.9		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/14/19

Checked By: G. Criste

Date: 6/14/2019

Tested By: N. Buckton

SPECIMEN PHOTOS

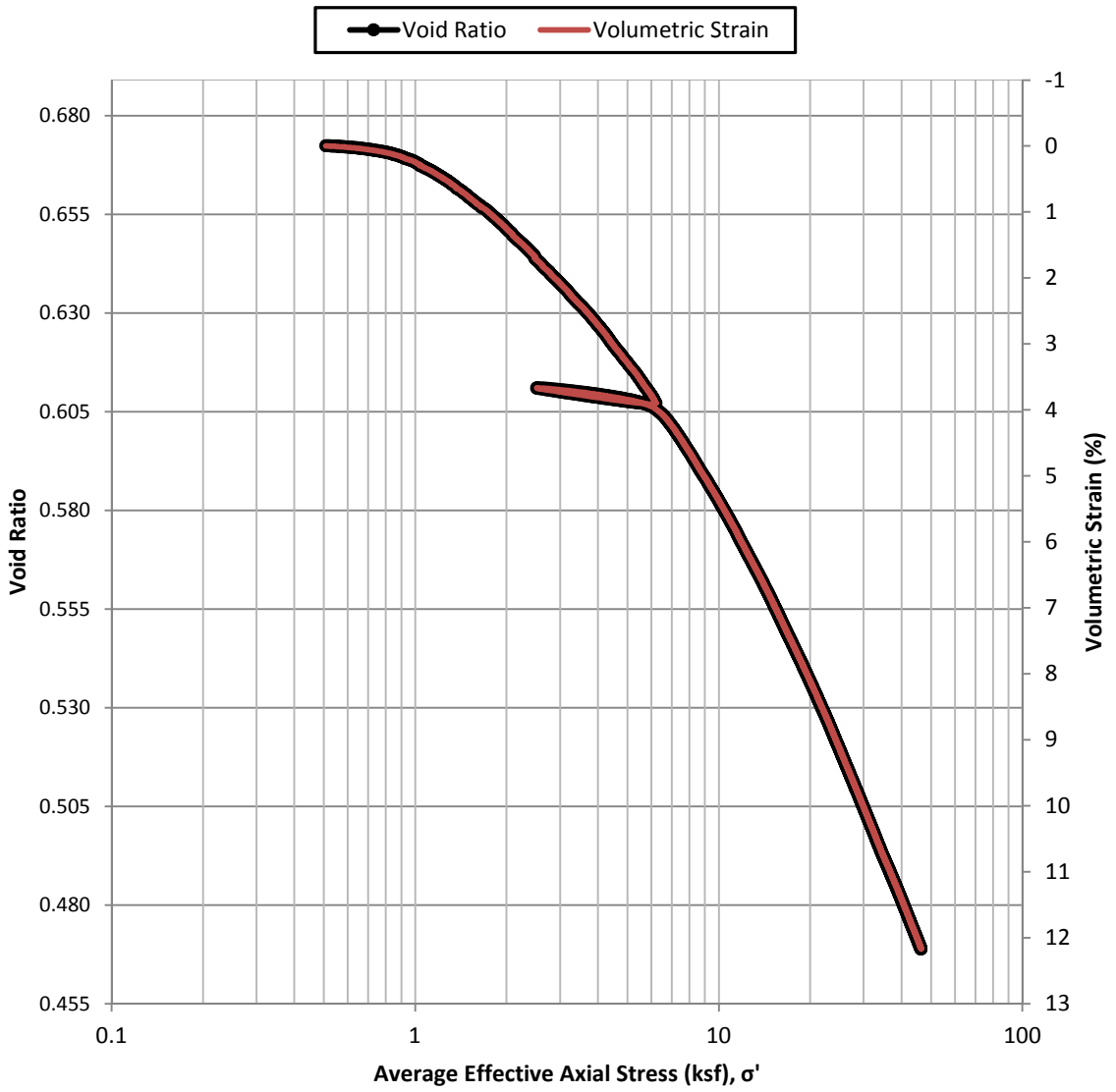
SAMPLE NUMBER: 1-B7@21	SAMPLE NUMBER: 1-B7@40.5
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Constant Rate of Strain Consolidation
ASTM D4186

Void Ratio & Volumetric Strain Vs Average Effective Axial Stress (ksf), σ'



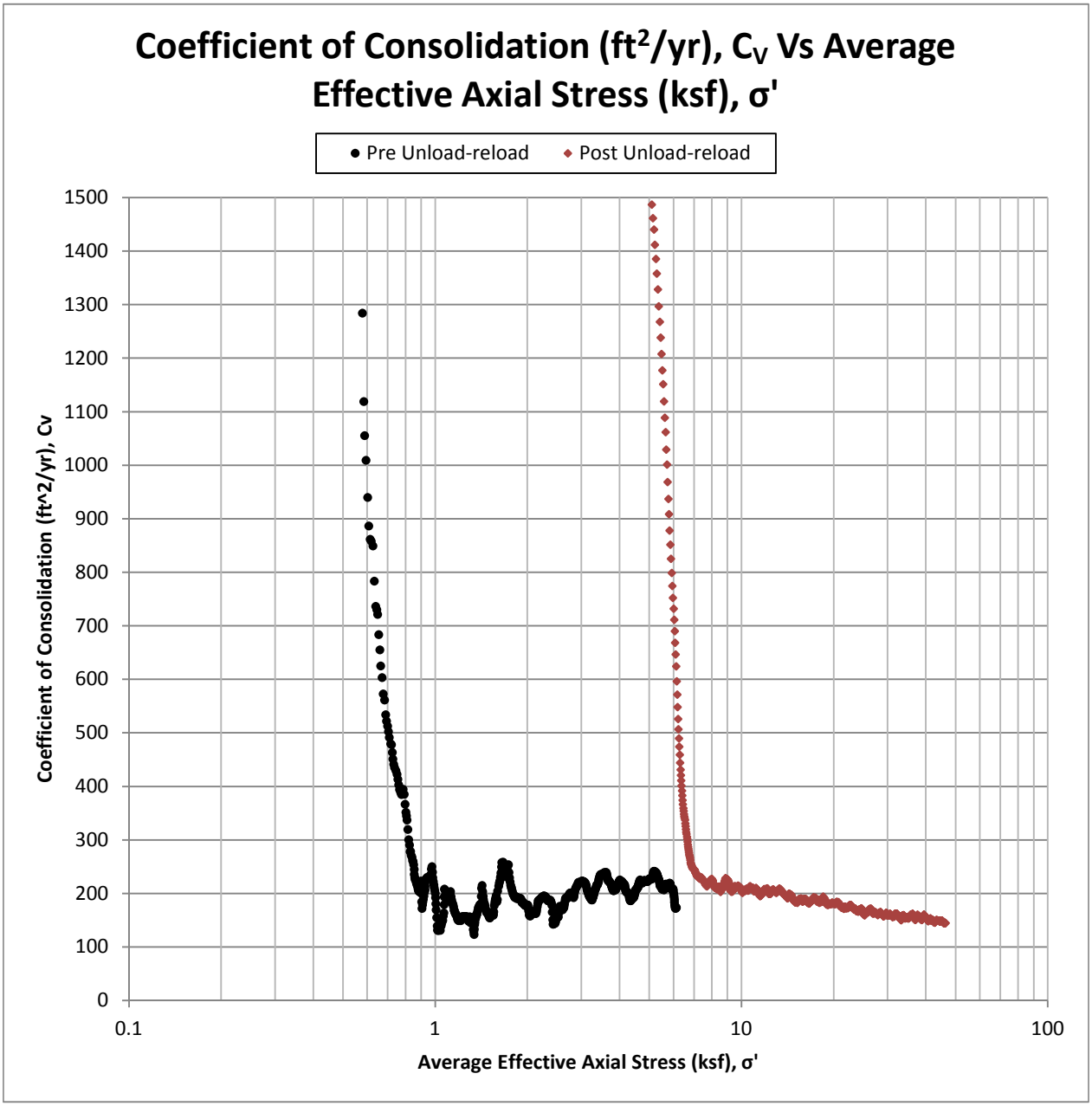
ASTM D2216			Report Date: 6/20/2019	
	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	24.42%	17.91%	Liquid Limit:	
Dry Density (pcf):	103.59	117.96	Plastic Limit:	
Saturation (%):	100.96%	100.00%	ASTM D854 - Measured	
Void Ratio:	0.6723	0.4687	Specific Gravity:	2.780
			Soil Description:	See exploration logs

Project Number:	15949.000.000	Depth:	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	Boring #:	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	Reviewed By:	J. Kan

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Remarks:

Constant Rate of Strain Consolidation
ASTM D4186



ASTM D2216			ASTM D4318 - Wet Method	
	As Received	Final	Liquid Limit:	
Moisture (%):	24.42%	17.91%	Plastic Limit:	
Dry Density (pcf):	103.59	117.96	ASTM D854 - Measured	
Saturation (%):	100.96%	100.00%	Specific Gravity:	2.780
Void Ratio:	0.6723	0.4687	Soil Description:	See exploration logs

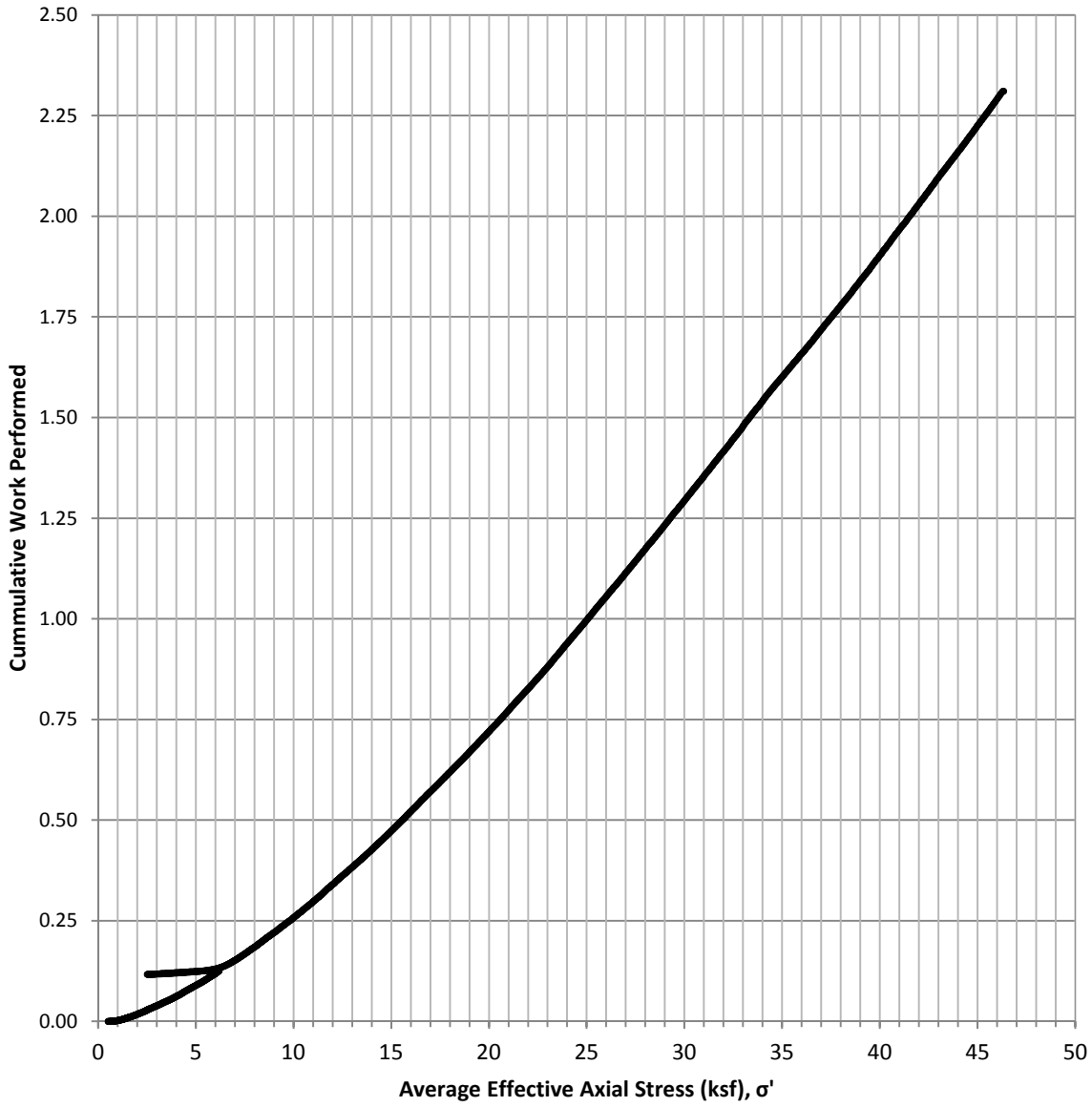
Report Date: 6/20/2019

Project Number:	15949.000.000	**Depth:**	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	**Boring #:**	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

Remarks:

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Constant Rate of Strain Consolidation
ASTM D4186



ASTM D2216			ASTM D4318 - Wet Method	
	As Received	Final		
Moisture (%):	24.42%	17.91%	Liquid Limit:	
Dry Density (pcf):	103.59	117.96	Plastic Limit:	
Saturation (%):	100.96%	100.00%	ASTM D854 - Measured	
Void Ratio:	0.6723	0.4687	Specific Gravity:	2.780
			Soil Description:	See exploration logs

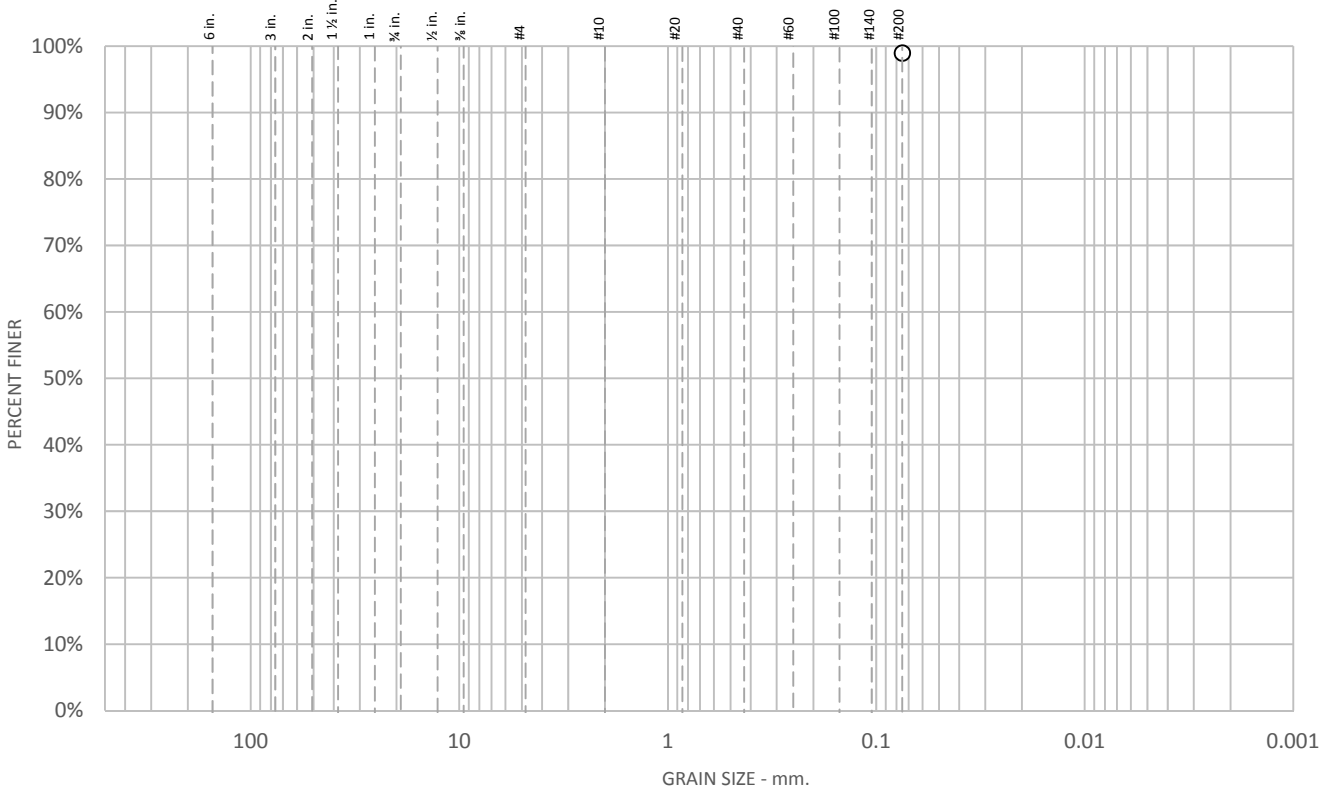
Report Date: 6/20/2019

Project Number:	15949.000.000	**Depth:**	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	**Boring #:**	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

Remarks:

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Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						98.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	98.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 30 LL = 59 PI = 29

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 81.69 g

Sample Number: 1-B3 @ 10

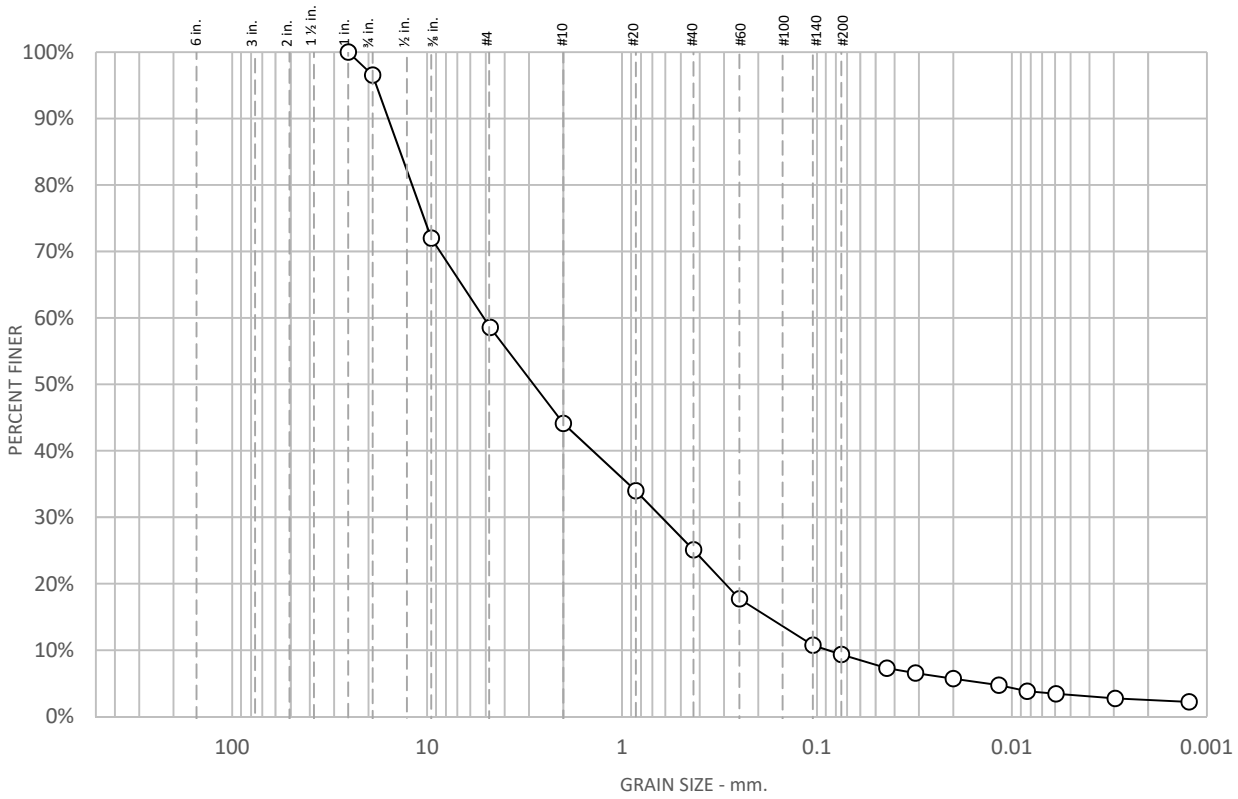
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California
Project Number: 15949.000.000
Date: 9/18/2019

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	3.6	37.9	14.4	19.0	15.8	6.8	2.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	96.5		
⅜ in.	72.0		
#4	58.6		
#10	44.1		
#20	34.0		
#40	25.1		
#60	17.7		
#140	10.7		
#200	9.3		
0.0438 mm.	7.3		
0.0313 mm.	6.6		
0.0200 mm.	5.7		
0.0117 mm.	4.7		
0.0084 mm.	3.8		
0.0059 mm.	3.4		
0.0030 mm.	2.7		
0.0012 mm.	2.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 15.8399 mm D_{85} = 13.7521 mm D_{60} = 5.1171 mm
D_{50} = 2.8439 mm D_{30} = 0.6264 mm D_{15} = 0.1783 mm
D_{10} = 0.0879 mm C_u = 58.25 C_c = 0.87

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B3 @ 21

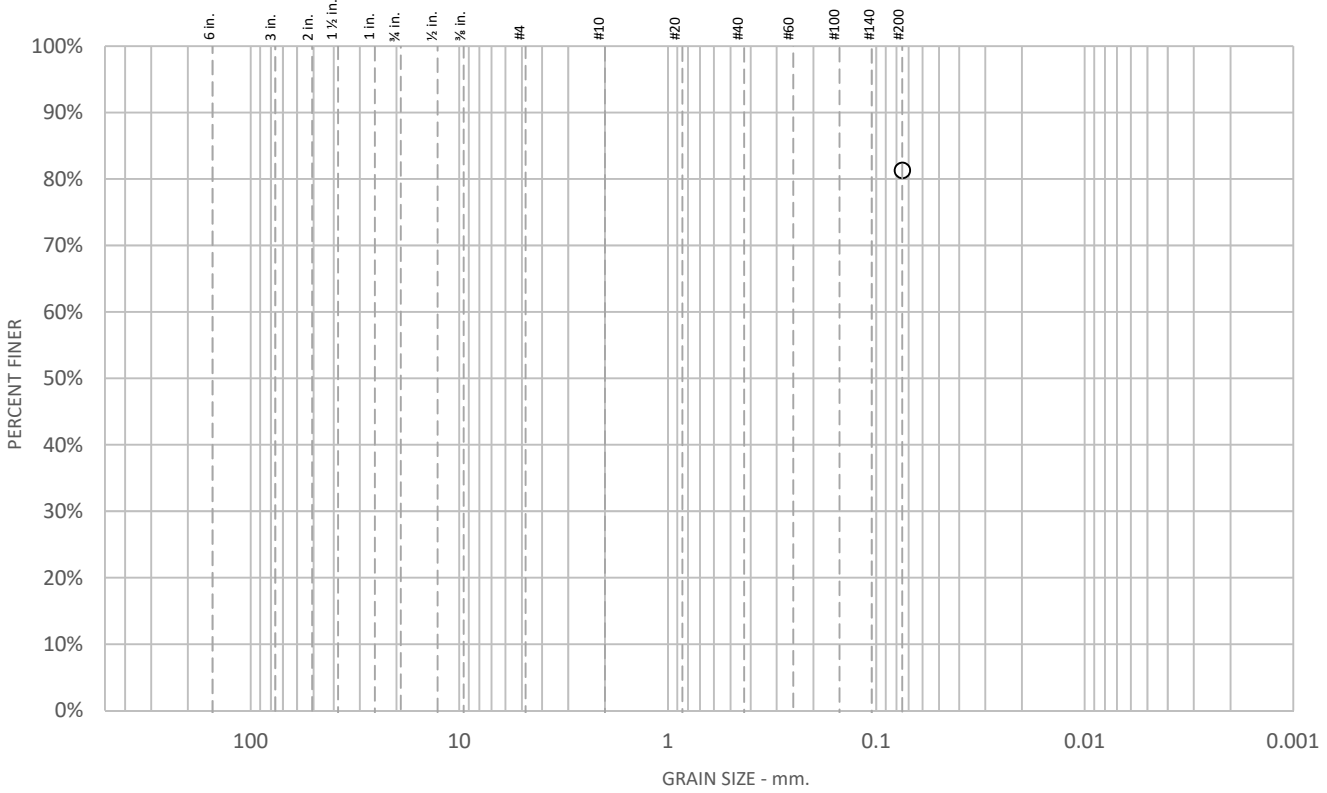
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	81.3		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 20 LL = 50 PI = 30

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 176.5 g

Sample Number: 1-B3 @ 30.5

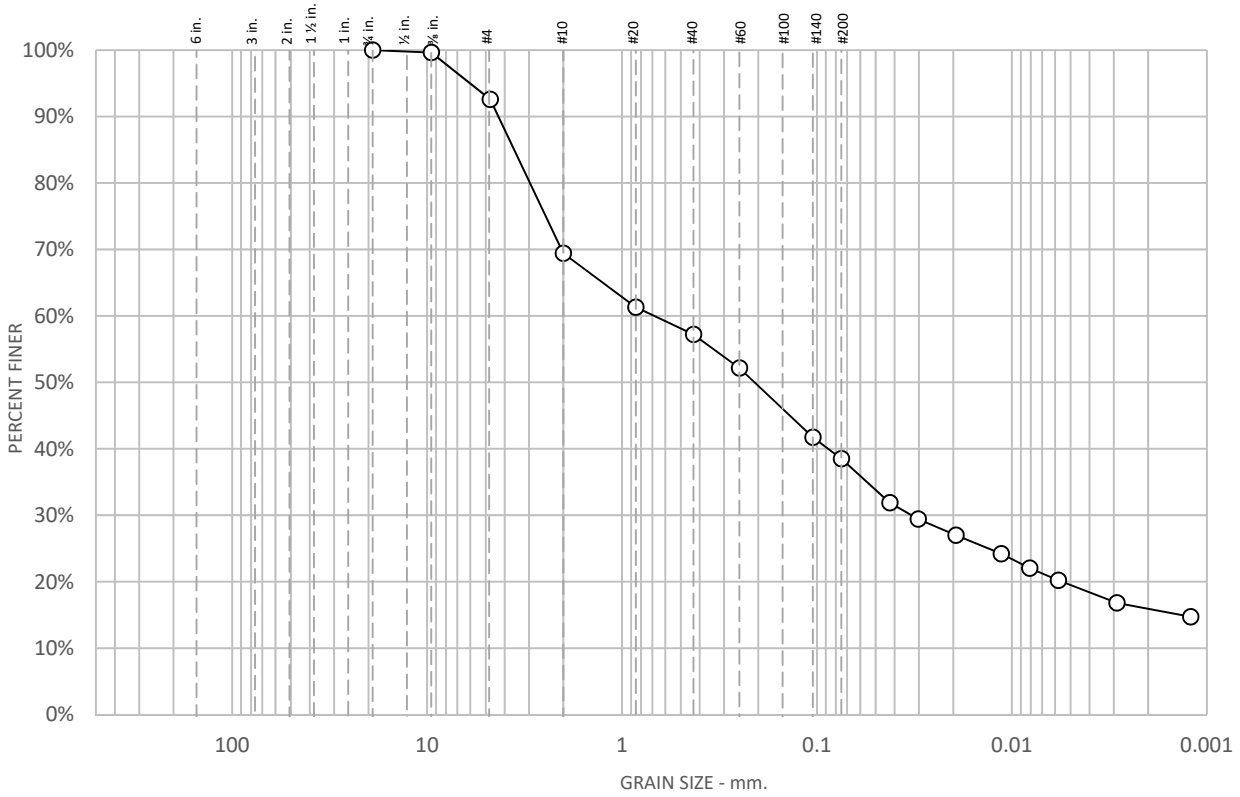
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	7.4	23.2	12.2	18.7	22.6	15.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.6		
#4	92.6		
#10	69.4		
#20	61.3		
#40	57.2		
#60	52.2		
#140	41.7		
#200	38.5		
0.0423 mm.	31.9		
0.0303 mm.	29.4		
0.0194 mm.	27.0		
0.0113 mm.	24.2		
0.0081 mm.	22.0		
0.0058 mm.	20.2		
0.0029 mm.	16.8		
0.0012 mm.	14.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 15 LL = 38 PI = 23

Coefficients

D_{90} = 4.3115 mm D_{85} = 3.5778 mm D_{60} = 0.6831 mm
D_{50} = 0.2089 mm D_{30} = 0.0327 mm D_{15} = 0.0014 mm
D_{10} = C_u = C_c =

Classification

USCS = SC

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B3 @ 45.5

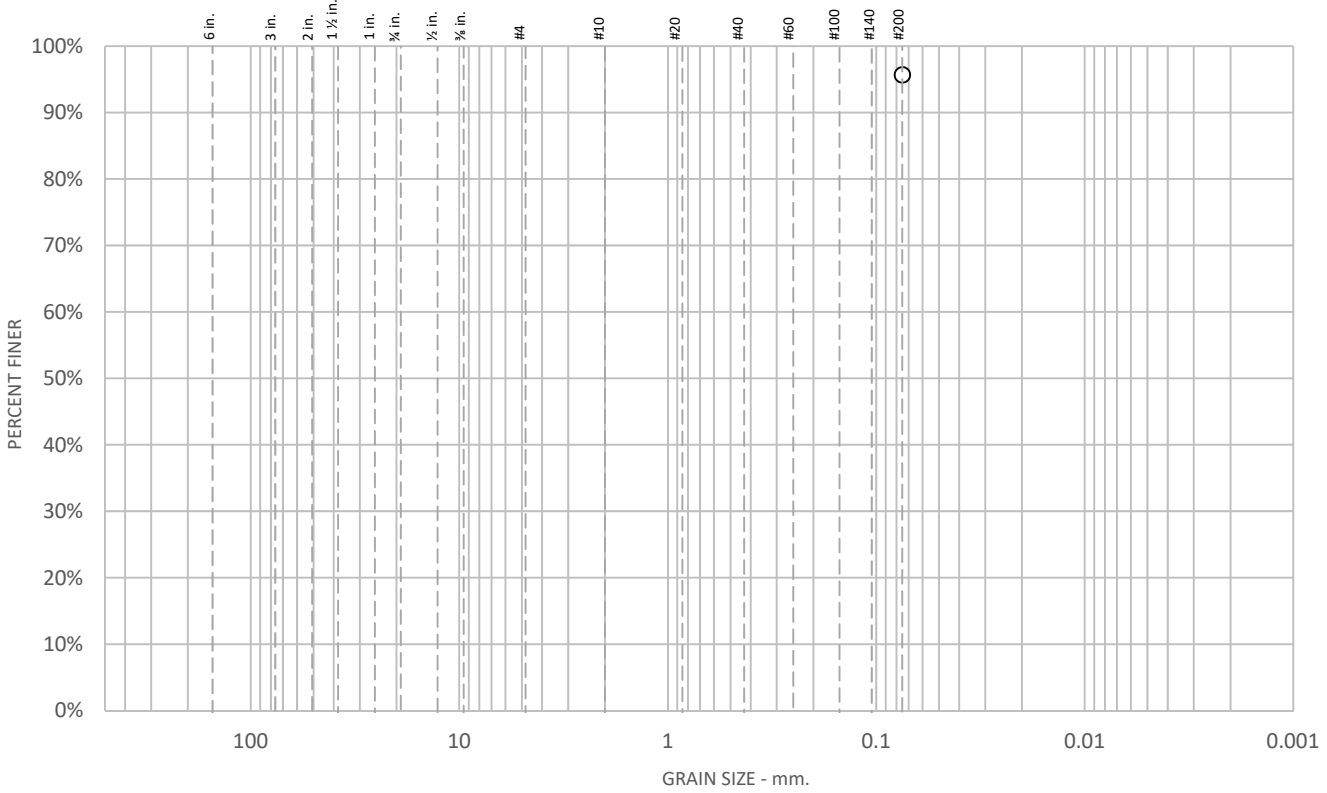
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						95.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	95.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 86 PI = 67

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 179.7 g

Sample Number: 1-B3 @ 5.5

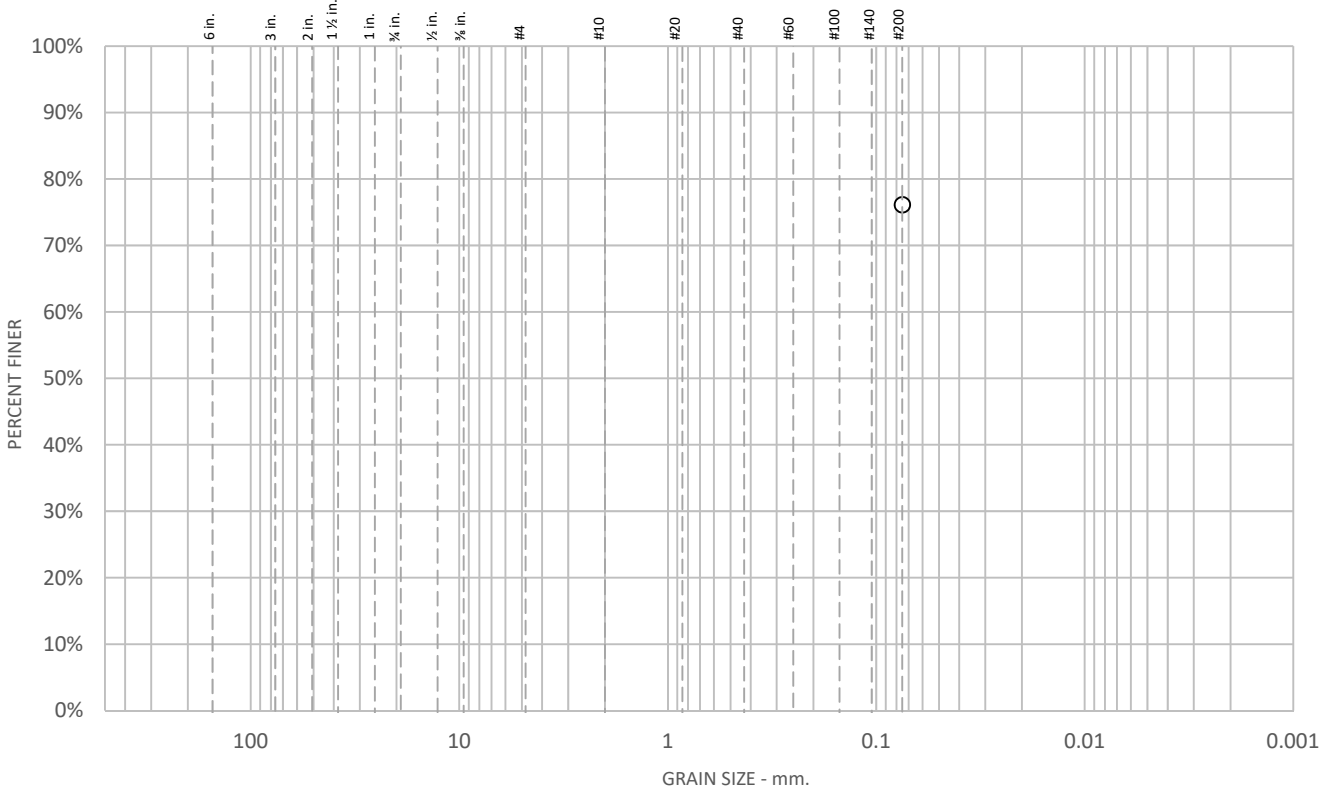
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	76.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 38 PI = 21

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 192.2 g

Sample Number: 1-B3 @ 50.5

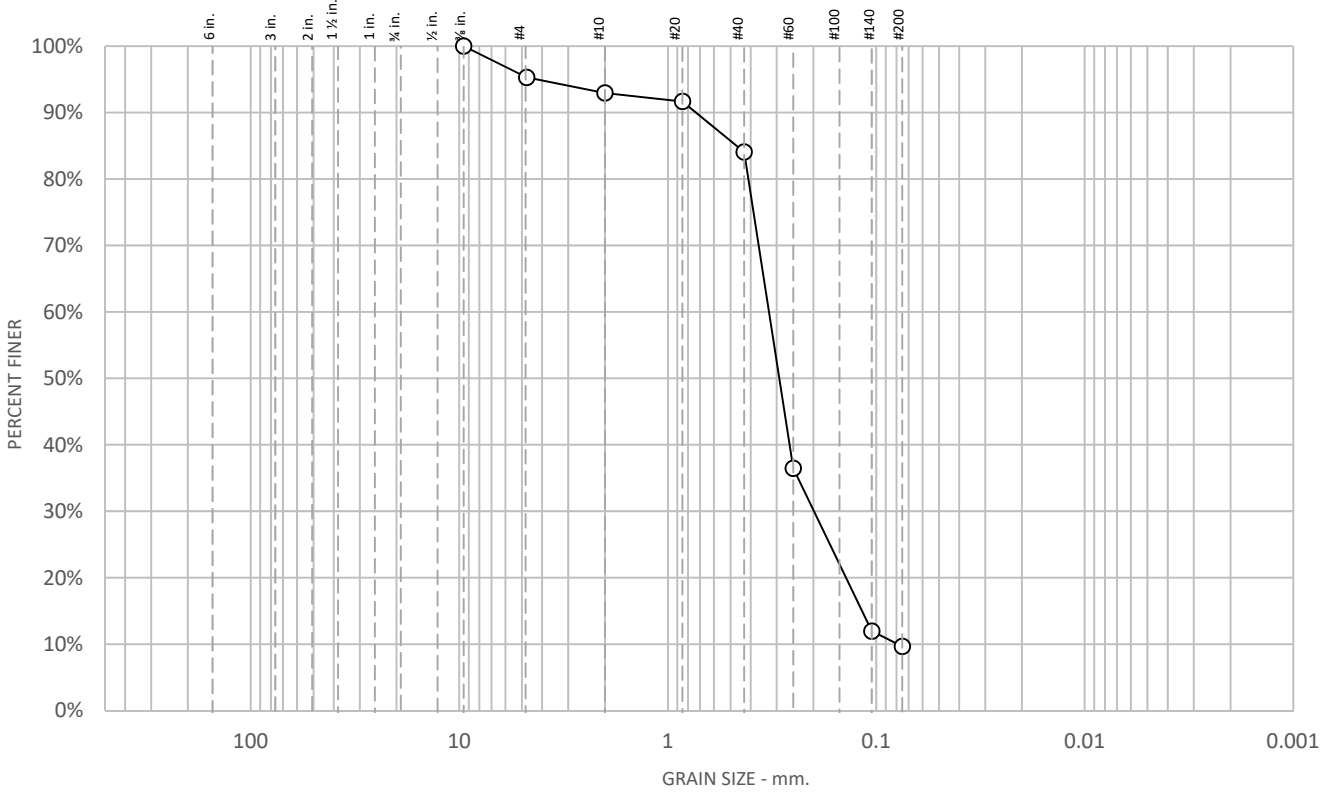
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		4.7	2.4	8.9	74.4	9.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
⅜ in.	100.0		
#4	95.3		
#10	92.9		
#20	91.7		
#40	84.1		
#60	36.5		
#140	12.0		
#200	9.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.7317 mm D_{85} = 0.4672 mm D_{60} = 0.3269 mm
D_{50} = 0.2917 mm D_{30} = 0.1989 mm D_{15} = 0.1170 mm
D_{10} = 0.0789 mm C_u = 4.14 C_c = 1.53

Classification

USCS = SW

Remarks

USCS: ASTM D2487 ASTM D6913, Method B

Sample Number: 1-B3 @ 80.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	1-B3	1-B3	1-B3	1-B3	1-B3	1-B3		
DEPTH (ft.):	5.5	16	50.5	61	70.5	80.5		
MOISTURE CONTENT (%):	30.9	9.2	22.0	23.5	29.3	22.4		
DRY DENSITY (lbs/ft^3):	88.0	132.1	106.1	104.9	94.8	103.0		

Testing remarks:

PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NUMBER: 15959.000.000
CLIENT: Google, LLC
PHASE NUMBER: LAB

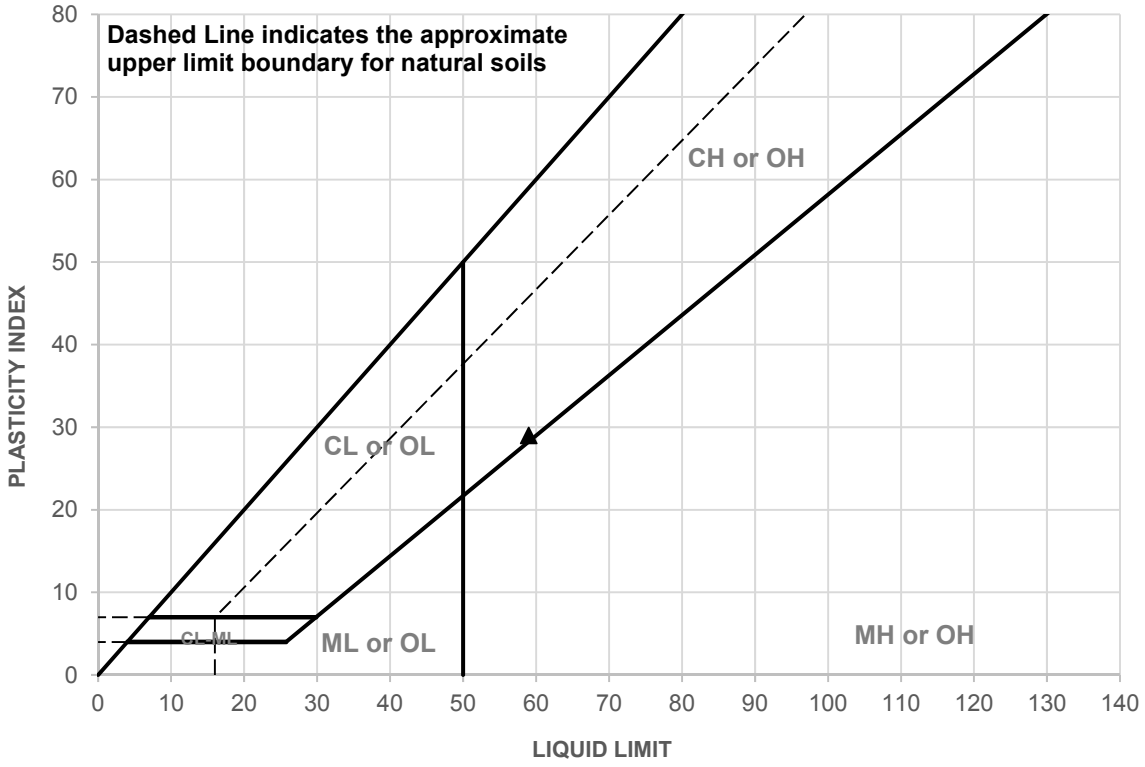
DATE: 09/09/19

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 2213 Plaza Dr., Rocklin, CA 95765. Phone No. (916) 786-8883.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



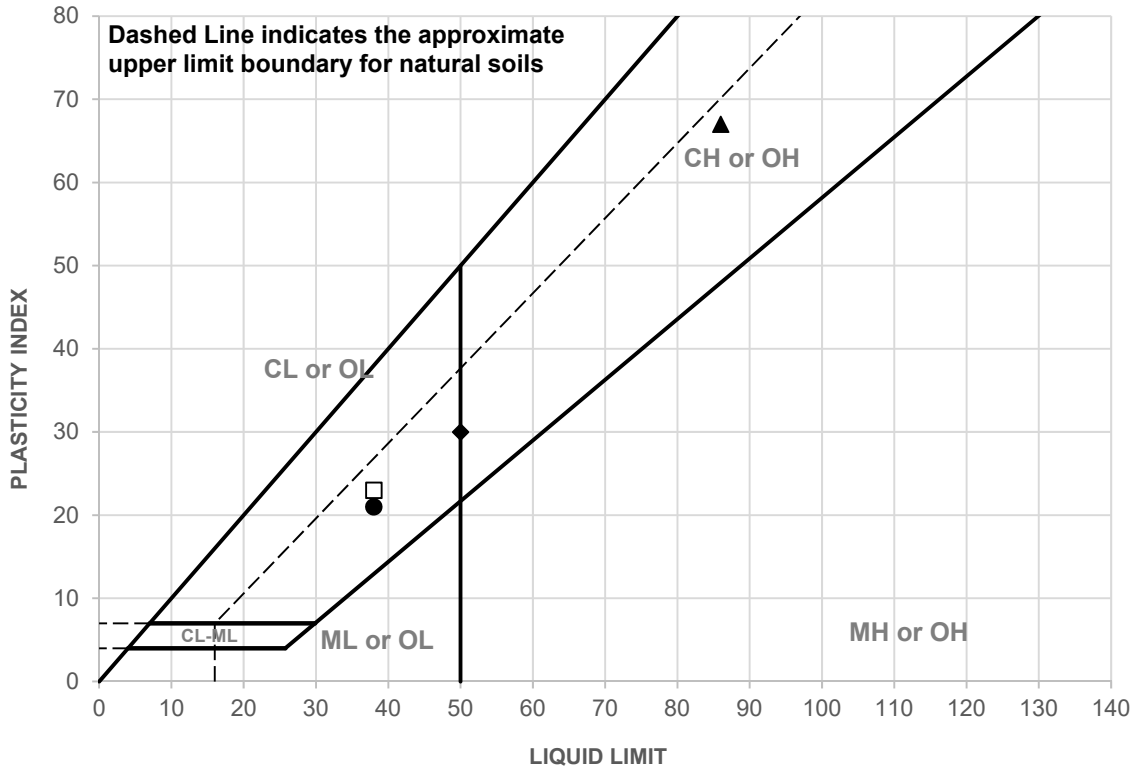
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B3 @ 10	10 ft	See exploration logs	59	30	29

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B3 @ 10	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/18/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B3	5.5	See exploration logs	86	19	67
◆	1-B3	30.5	See exploration logs	50	20	30
□	1-B3	45.5	See exploration logs	38	15	23
●	1-B3	50.5	See exploration logs	38	17	21

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B3	PI: ASTM D4318, Wet Method	
◆	1-B3	PI: ASTM D4318, Wet Method	
□	1-B3	PI: ASTM D4318, Wet Method	
●	1-B3	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B3@21

Description: See exploration logs — USCS: SP

%Passing #4: 58.6

Method used: **B**

Temperature (^{o}C): **23.4** — ***Specific gravity at 20 ^{o} C:*** **2.885**

Sample 2: 1-B3@45.5

Description: See exploration logs — USCS: SC

%Passing #4: 92.6

Method used: **B**

Temperature (^{o}C): **23.4** — ***Specific gravity at 20 ^{o} C:*** **2.826**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** — **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER:

ENGEO Expect Excellence

Tested by: R. Montalvo — Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

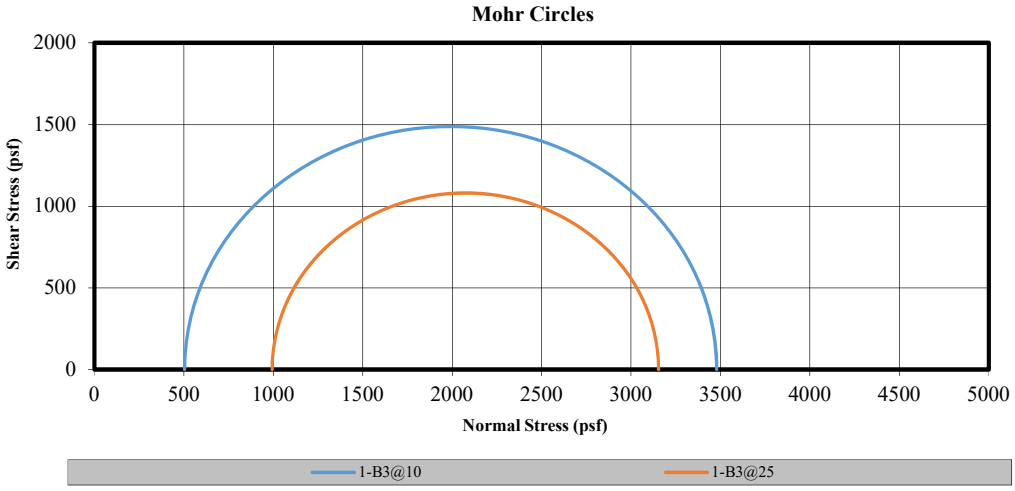
ASTM D2850

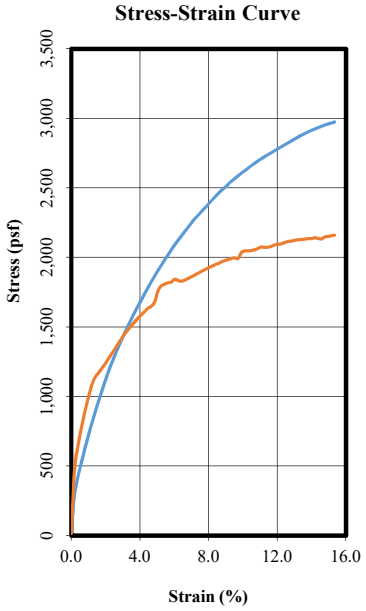
Date: 09/10/19

Checked By: G. Criste

Date: 9/10/2019

Tested By: M. Quasem





Before Test	Specimen 1-B3@10	1-B3@25		
Water Content (%)	23.84	30.11		
Dry Density (pcf)	102.10	93.70		
Saturation (%)	97.69	100.00		
Void Ratio	0.66	0.81		
Diameter (in)	2.400	2.380		
Height (in)	5.100	5.150		
Height-to-Diameter Ratio	2.125	2.164		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.720	2.720		
After Test	**1-B3@10**	**1-B3@25**		
Water Content (%)	23.84	30.11		
Saturation (%)	97.68	100.00		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	2974.7	2160.2		
Axial Strain @ Failure (%)	15.329	15.331		
	Cell Pressure			
Cell (psf)	504.0	993.6		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3478.7	3153.8		
σ3 (psf)	504.0	993.6		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1487.4	1080.1		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 09/10/19

Checked By: G. Criste

Date: 9/10/2019

Tested By: M. Quasem

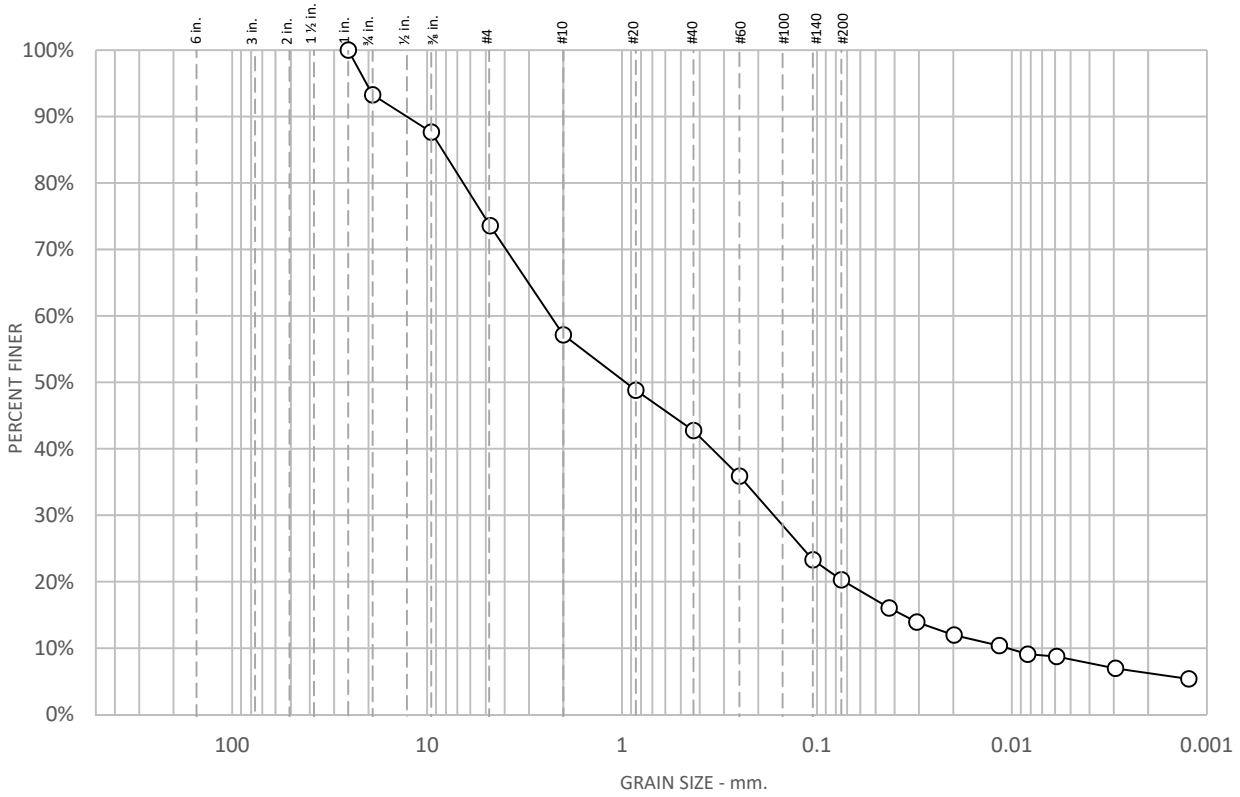
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B3@10	SAMPLE NUMBER: 1-B3@25
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	6.8	19.7	16.4	14.4	22.5	14.0	6.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	93.3		
⅜ in.	87.7		
#4	73.6		
#10	57.2		
#20	48.8		
#40	42.7		
#60	35.9		
#140	23.3		
#200	20.3		
0.0427 mm.	16.1		
0.0308 mm.	13.9		
0.0198 mm.	12.0		
0.0116 mm.	10.4		
0.0083 mm.	9.1		
0.0059 mm.	8.7		
0.0029 mm.	7.0		
0.0012 mm.	5.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 12.7236 mm D_{85} = 8.3544 mm D_{60} = 2.3233 mm
D_{50} = 0.9596 mm D_{30} = 0.1667 mm D_{15} = 0.0363 mm
D_{10} = 0.0105 mm C_u = 220.57 C_c = 1.14

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 10

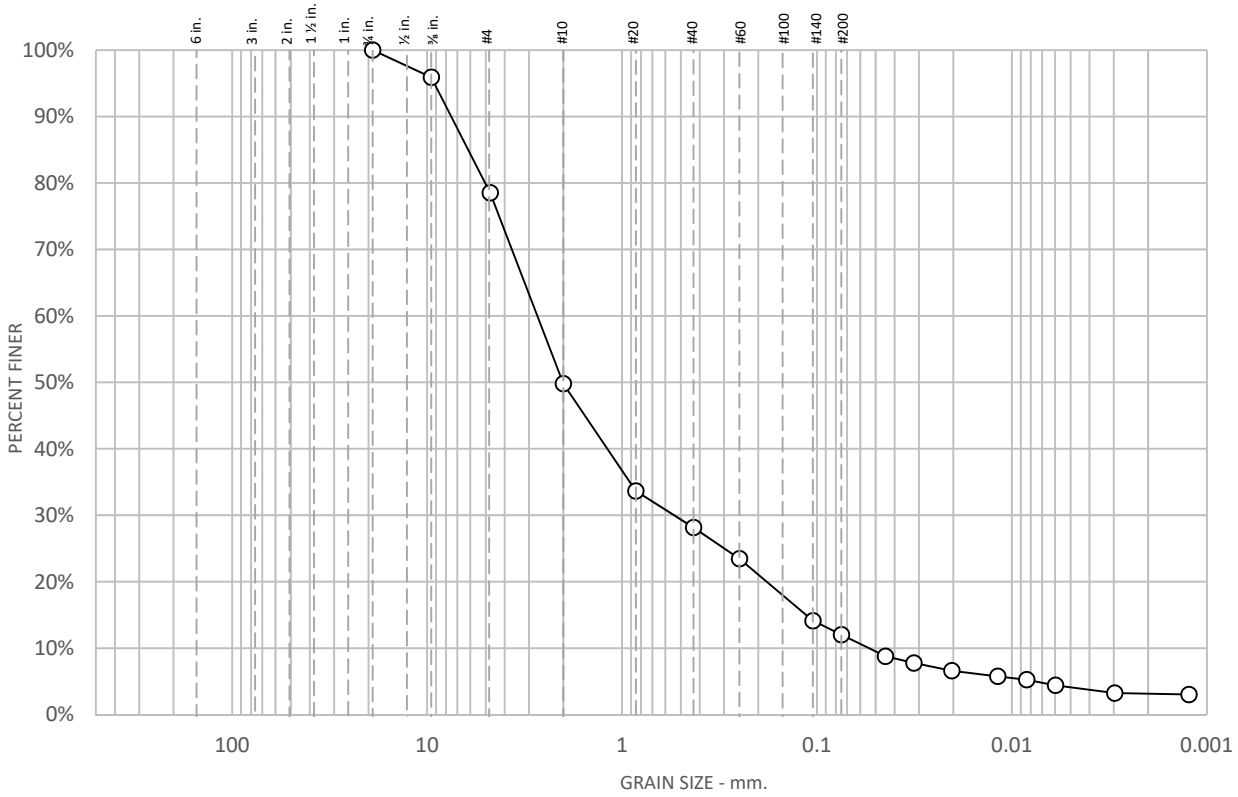
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	21.5	28.7	21.6	16.1	8.9	3.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	95.9		
#4	78.5		
#10	49.8		
#20	33.6		
#40	28.2		
#60	23.5		
#140	14.1		
#200	12.0		
0.0446 mm.	8.8		
0.0318 mm.	7.8		
0.0203 mm.	6.6		
0.0118 mm.	5.8		
0.0084 mm.	5.2		
0.0060 mm.	4.4		
0.0030 mm.	3.2		
0.0012 mm.	3.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 7.5207 mm D_{85} = 6.1570 mm D_{60} = 2.7190 mm
D_{50} = 2.0116 mm D_{30} = 0.5405 mm D_{15} = 0.1139 mm
D_{10} = 0.0543 mm C_u = 50.09 C_c = 1.98

Classification

USCS = SW

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 18

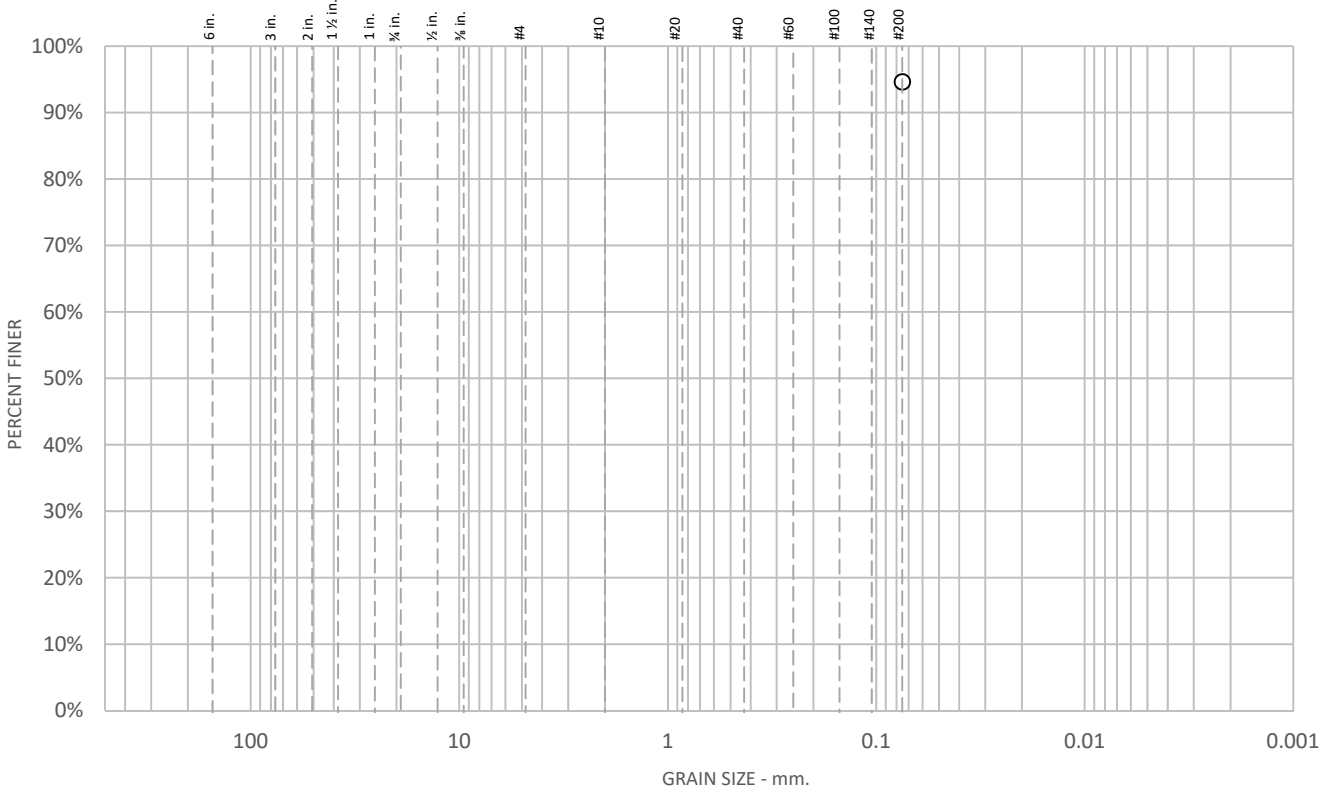
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						94.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	94.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 22 LL = 53 PI = 31

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 170.5 g

Sample Number: 1-B5 @ 25.5

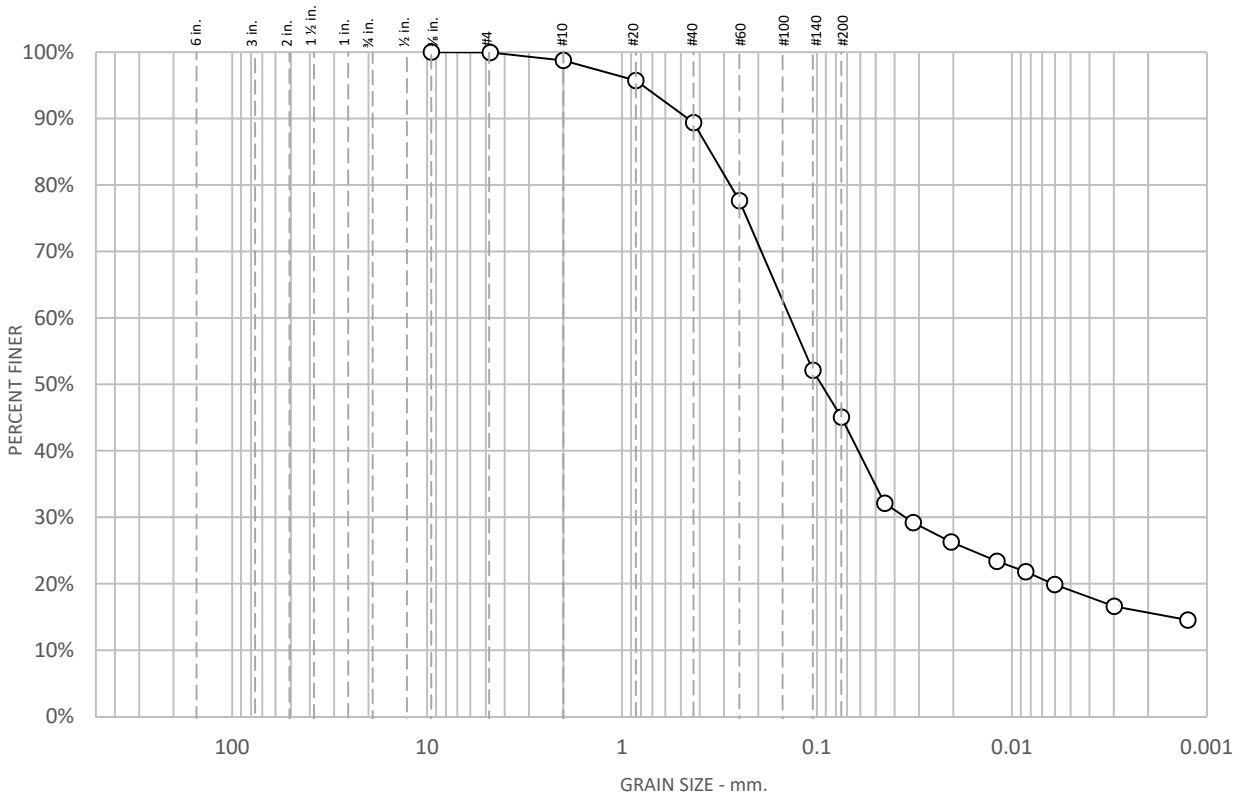
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		0.1	1.2	9.4	44.3	29.4	15.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
⅜ in.	100.0		
#4	99.9		
#10	98.7		
#20	95.7		
#40	89.4		
#60	77.6		
#140	52.1		
#200	45.0		
0.0450 mm.	32.1		
0.0321 mm.	29.2		
0.0205 mm.	26.3		
0.0119 mm.	23.4		
0.0085 mm.	21.8		
0.0060 mm.	19.9		
0.0030 mm.	16.6		
0.0013 mm.	14.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.4590 mm D_{85} = 0.3512 mm D_{60} = 0.1373 mm
D_{50} = 0.0950 mm D_{30} = 0.0353 mm D_{15} = 0.0015 mm
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 36

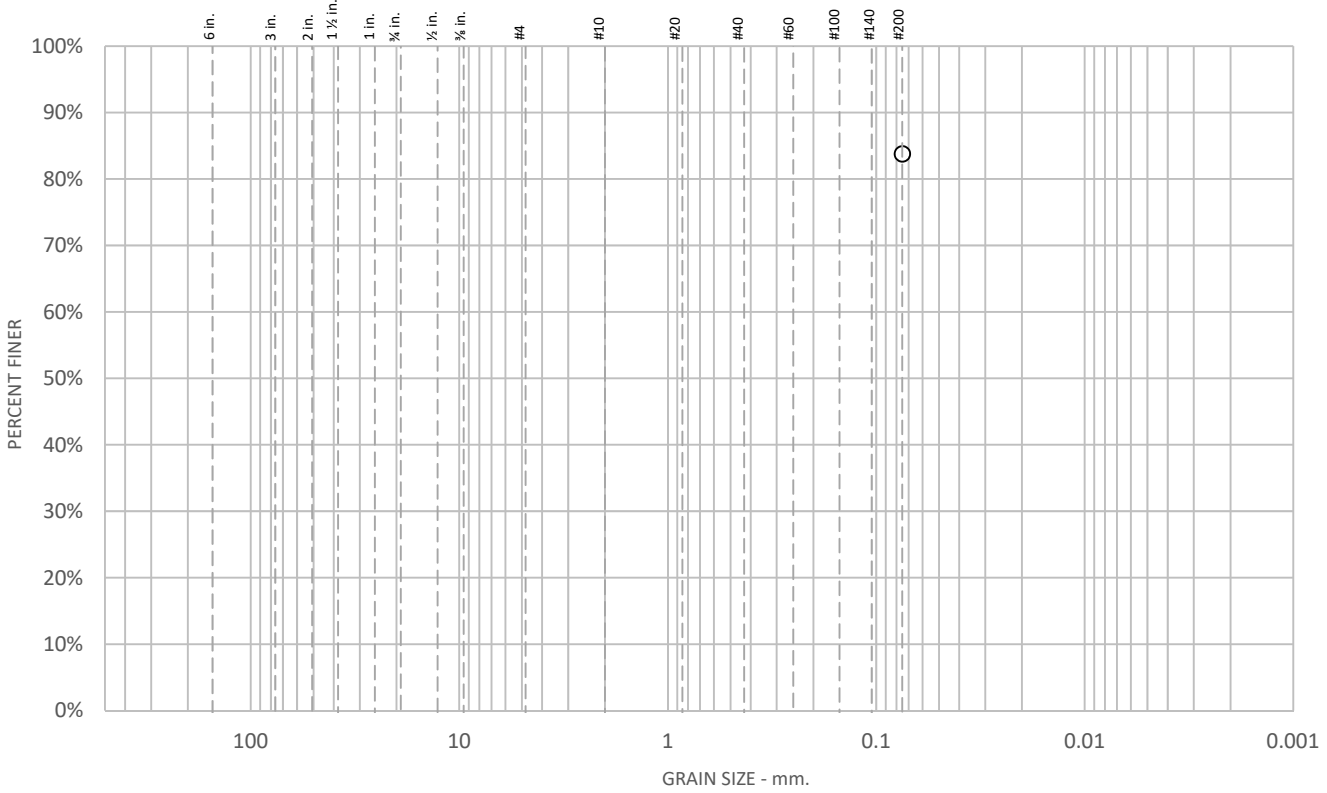
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						83.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	83.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 42 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 181.2 g

Sample Number: 1-B5 @ 40

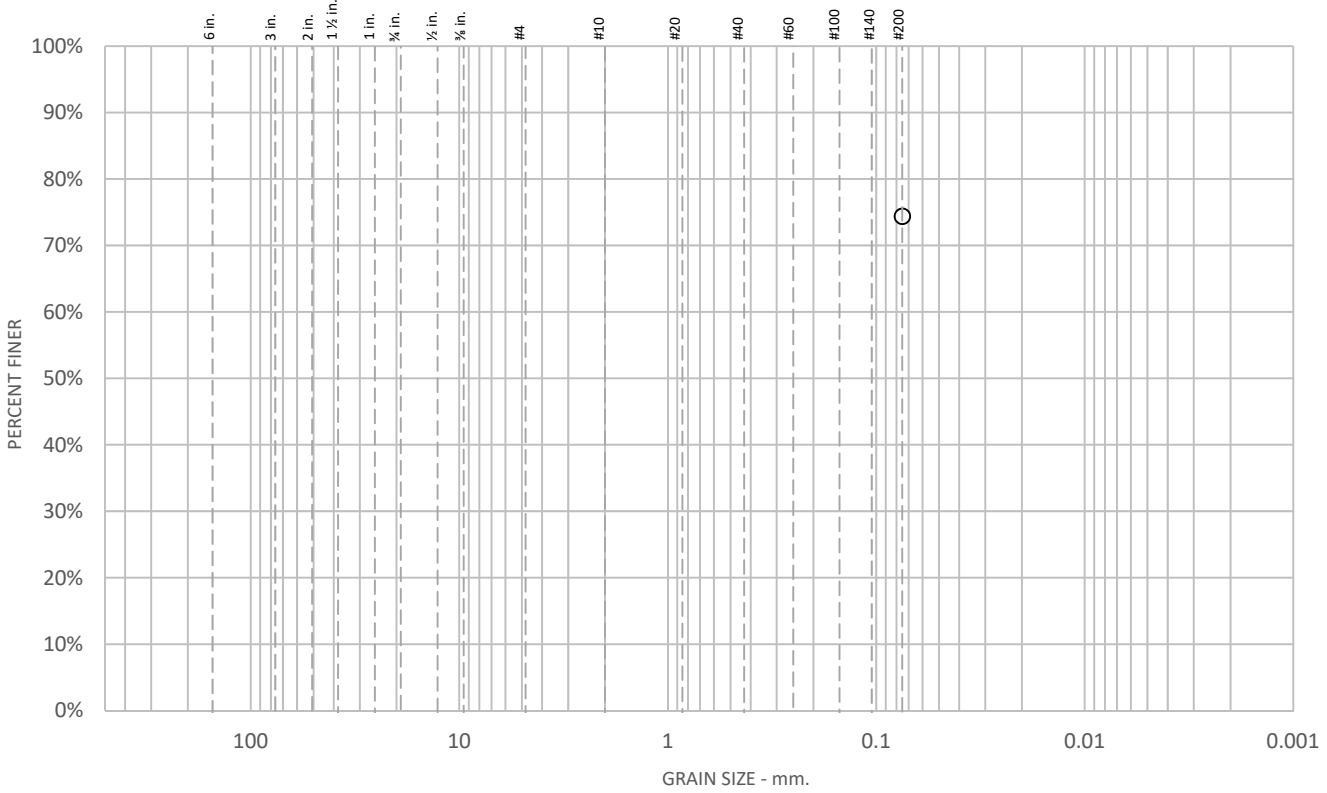
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	74		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 68 PI = 51

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 160.4 g

Sample Number: 1-B5 @ 8

Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	**1-B5**							
DEPTH (ft.):	**8**							
MOISTURE CONTENT (%):	**36.4**							
DRY DENSITY (lbs/ft^3):	**82.9**							

Testing remarks:

PROJECT NAME: **NBS Infrastructure Master Planning FIG2**
PROJECT NUMBER: **15959.000.000**
CLIENT: **Google, LLC**
PHASE NUMBER: **LAB**

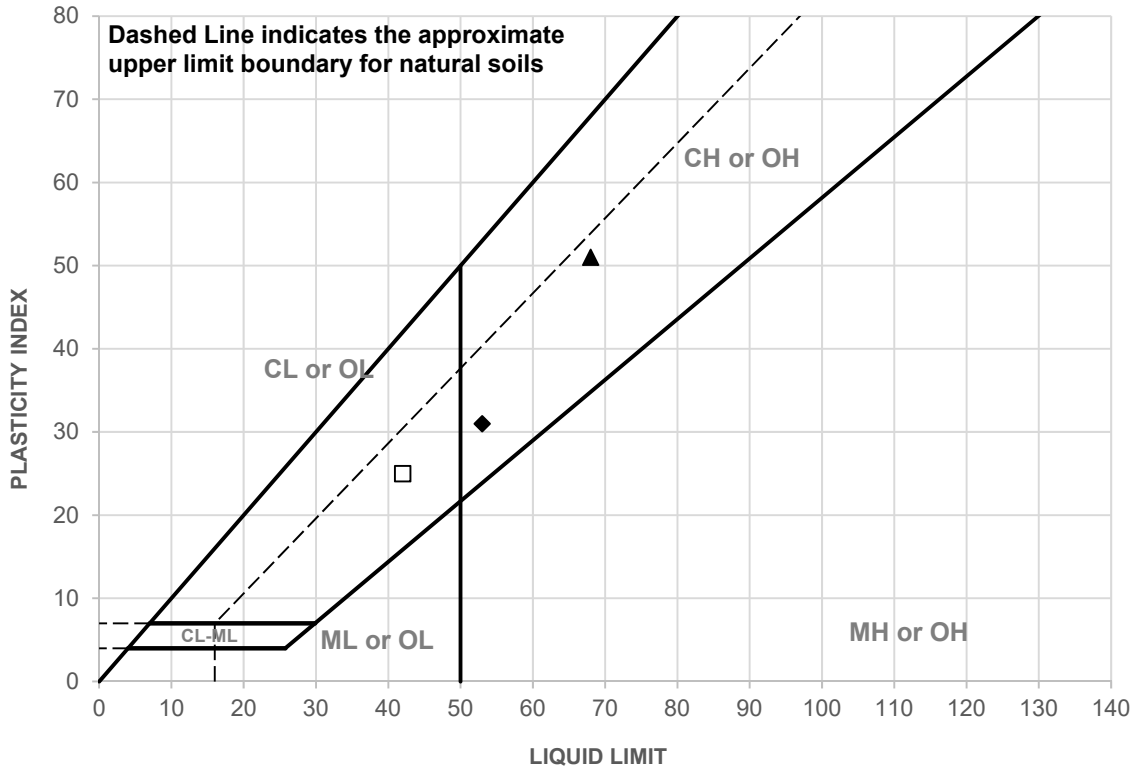
DATE: **09/09/19**

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 3420 Fostoria Way, Suite E, Danville, CA 94526. Phone No. (925) 355-9047.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B5	8	See exploration logs	68	17	51
◆	1-B5	25.5	See exploration logs	53	22	31
□	1-B5	40	See exploration logs	42	17	25

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B5	PI: ASTM D4318, Wet Method	
◆	1-B5	PI: ASTM D4318, Wet Method	
□	1-B5	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B5@10

Description: USCS: n/a

%Passing #4: 73.6

Method used: **B**

Temperature (°C): **23.3** ***Specific gravity at 20° C:*** **2.813**

Sample 2: 1-B5@18

Description: USCS: SW

%Passing #4: 78.5

Method used: **B**

Temperature (°C): **23.5** ***Specific gravity at 20° C:*** **2.883**

Sample 3: 1-B5@36

Description: USCS: n/a

%Passing #4: 99.9

Method used: **B**

Temperature (°C): **23.4** ***Specific gravity at 20° C:*** **2.774**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER:

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

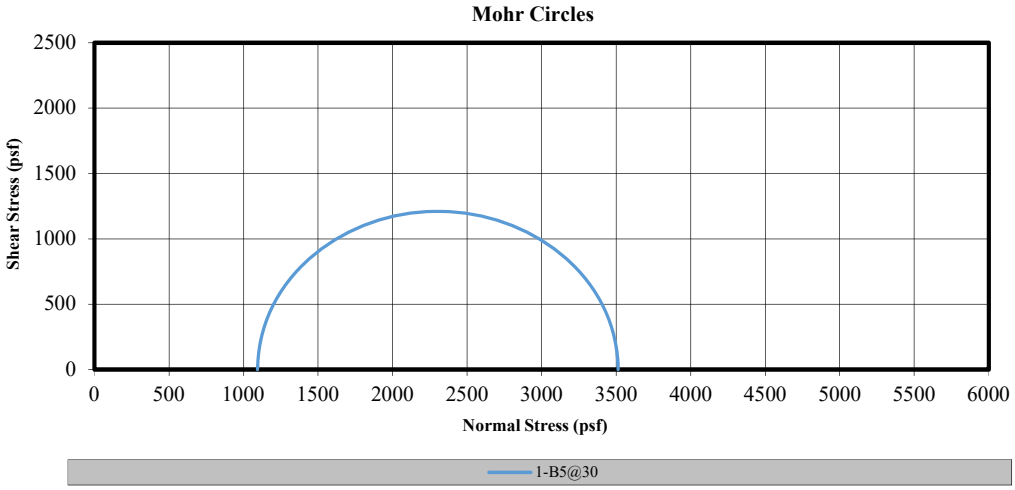
ASTM D2850

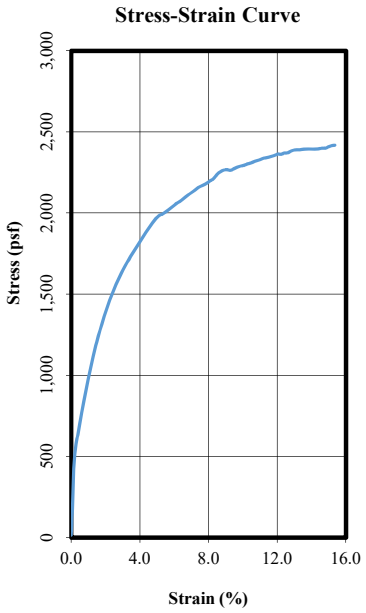
Date: 09/11/19

Checked By: G. Criste

Date: 9/11/2019

Tested By: M. Quasem





Before Test	Specimen 1-B5@30			
Water Content (%)	26.07			
Dry Density (pcf)	99.00			
Saturation (%)	99.14			
Void Ratio	0.72			
Diameter (in)	2.380			
Height (in)	5.070			
Height-to-Diameter Ratio	2.130			
ASTM D4318 - Wet Method				
Liquid Limit	-			
Plastic Limit	-			
ASTM D854 - Assumed				
Specific Gravity	2.720			
After Test	**1-B5@30**			
Water Content (%)	26.07			
Saturation (%)	99.14			
Strain Rate (in/min)	0.05			
Peak Deviator Stress (psf)	2418.5			
Axial Strain @ Failure (%)	15.347			
	Cell Pressure			
Cell (psf)	1094.4			
Back (psf)	n/a			
	Principle Stresses at Failure			
σ1 (psf)	3512.9			
σ3 (psf)	1094.4			
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1209.3			
Friction Angle Ø	n/a		n/a			

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

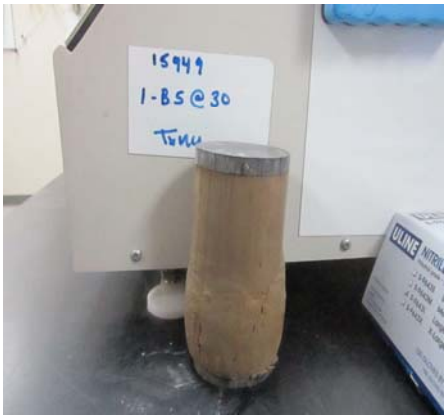
Date: 09/11/19

Checked By: G. Criste

Date: 9/11/2019

Tested By: M. Quasem

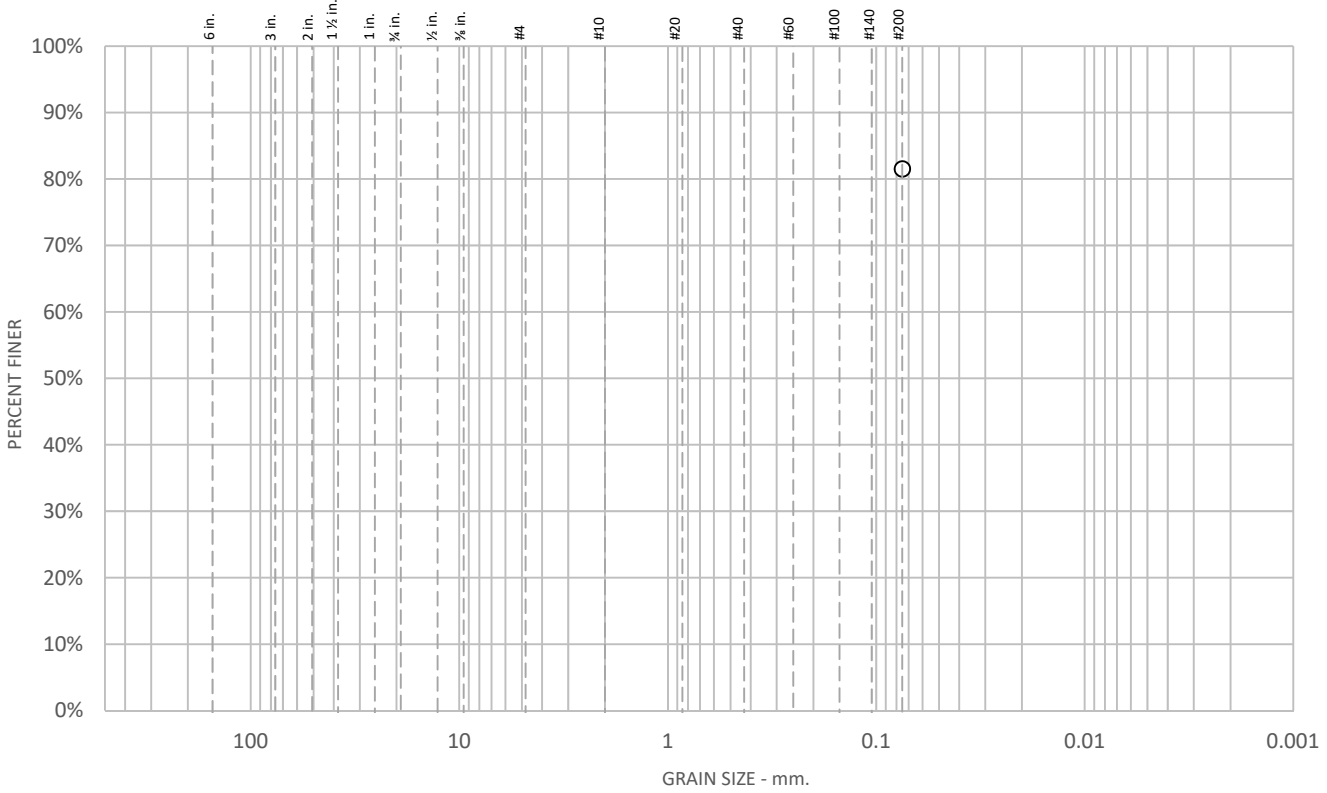
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B5@30	
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	81.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 44 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 178.5 g

Sample Number: 1-B6 @ 10

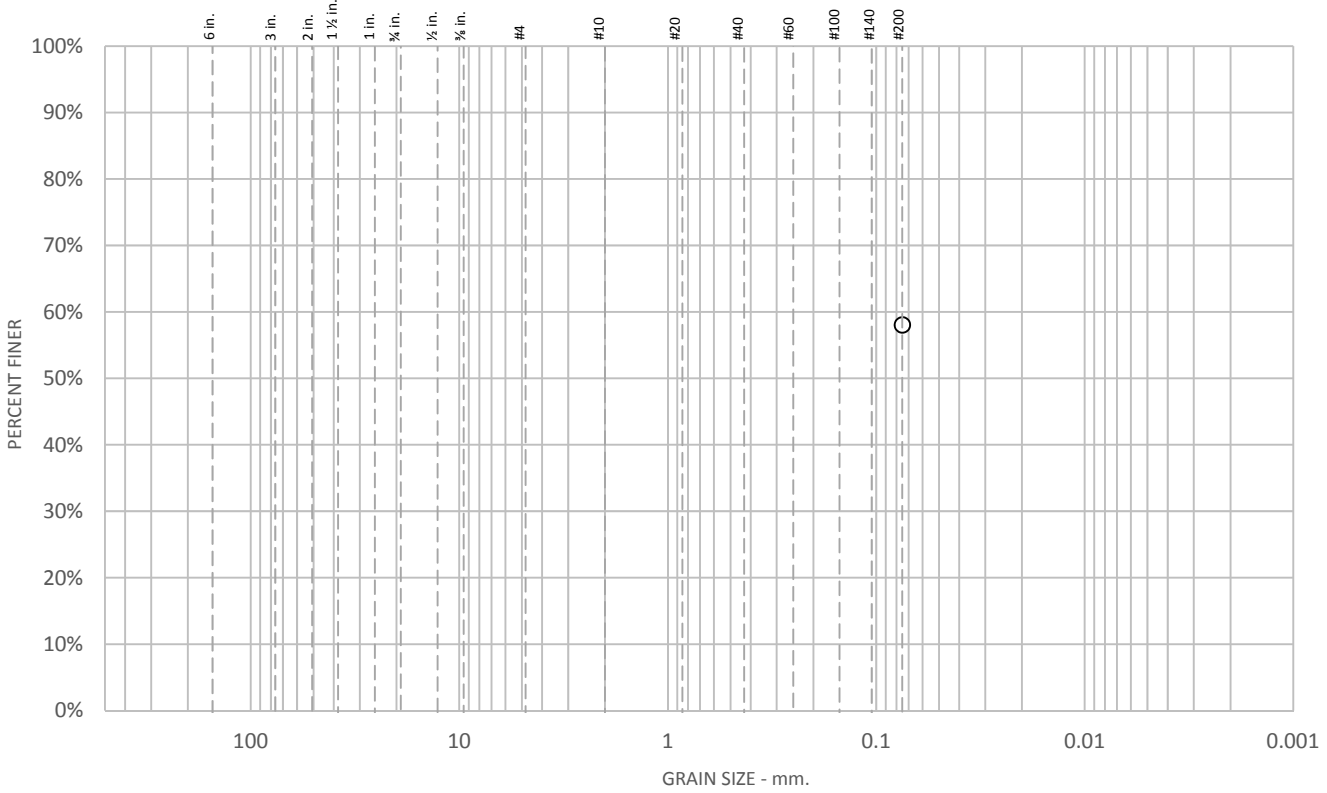
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	58		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 21 LL = 41 PI = 20

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method A
Soak time = 180 min
Dry sample weight = 70.64 g

Sample Number: 1-B6 @ 16.5 @ 16.5 ft

Client: Google LLC
Project: NBS Infrastructure Master Planning F1G2
Project location: Mountain View, California

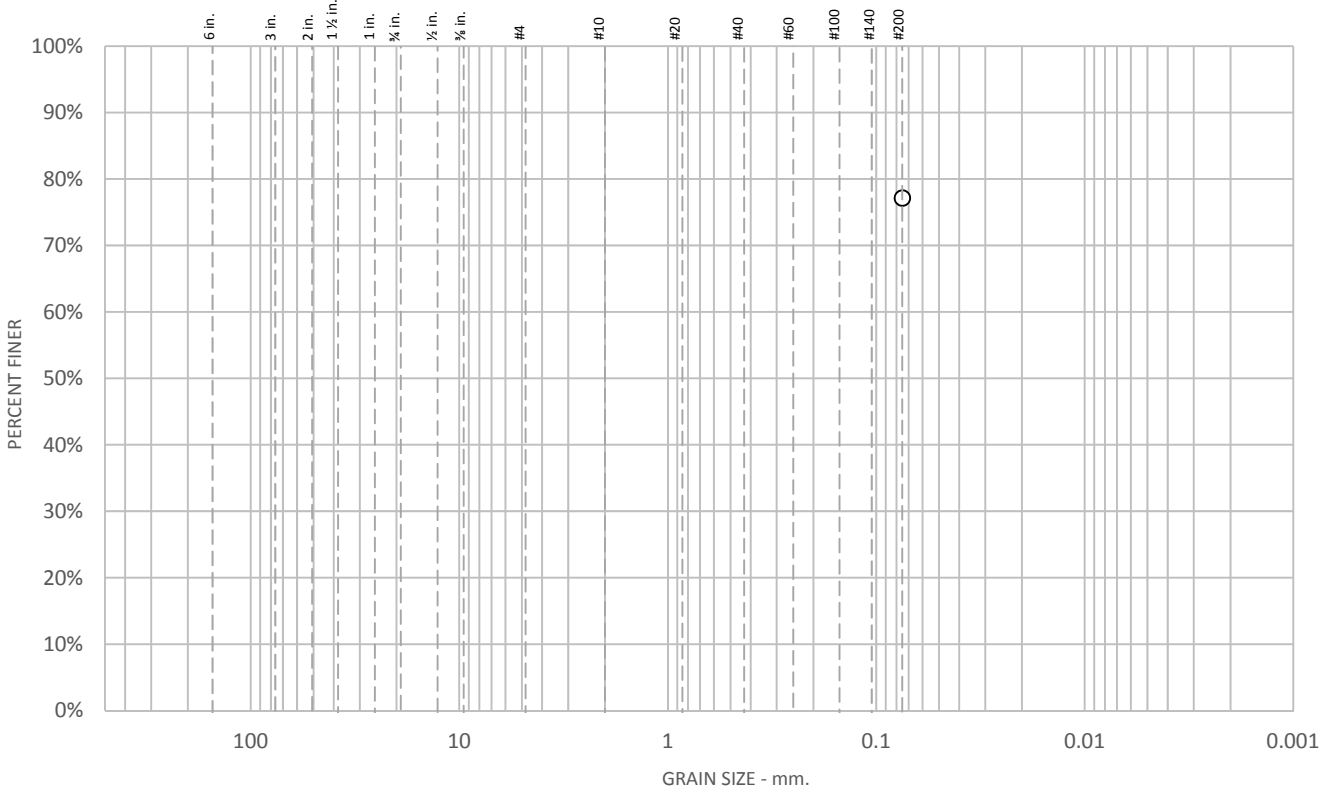
Project Number: 15949.000.000
Date: 9/17/2019

ENGEO Expect Excellence

Tested By: W. Miller
Checked By: D. Seibold

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						77.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	77.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 23 LL = 36 PI = 13

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method A
Soak time = 180 min
Dry sample weight = 91.29 g

Sample Number: 1-B6 @ 30

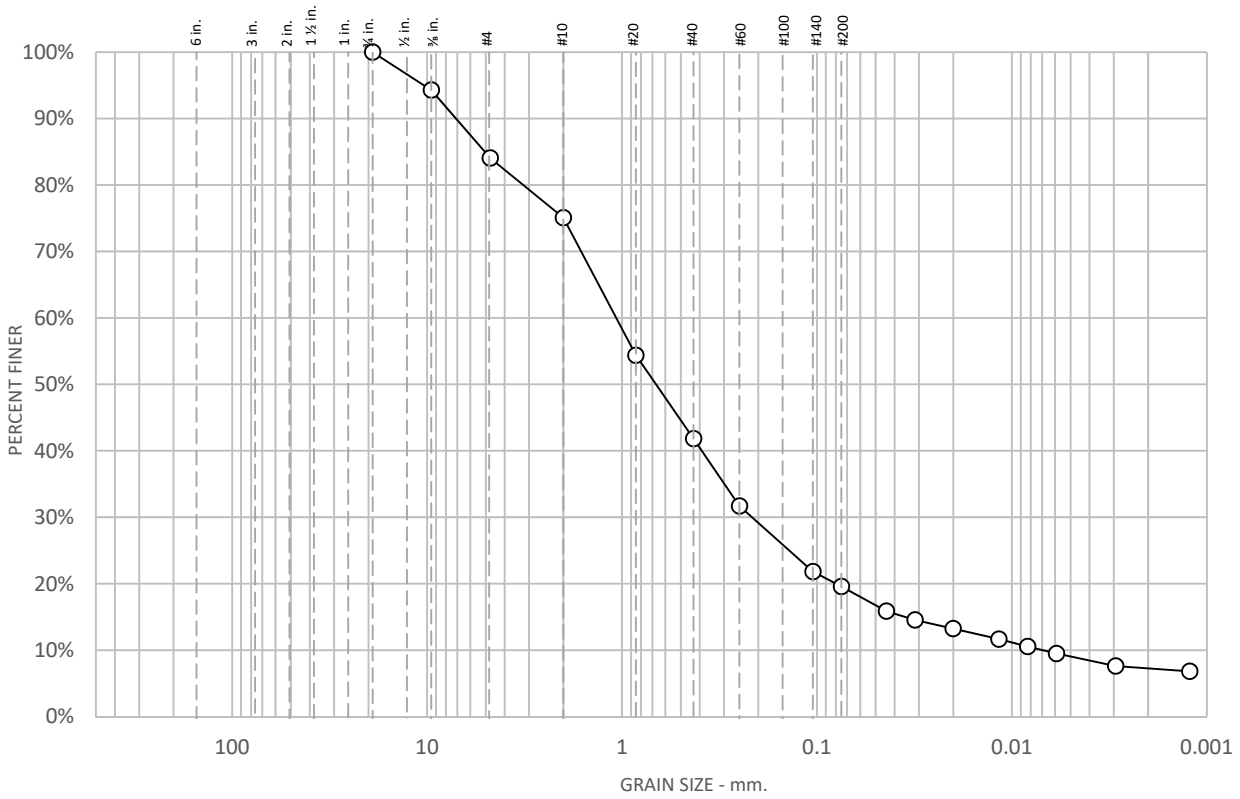
Client: Google LLC **Project Number:** 15949.000.000
Project: NBS Infrastructure Master Planning F1G2 **Date:** 9/18/2019
Project location: Mountain View, California

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	15.9	9.0	33.2	22.3	12.3	7.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	94.3		
#4	84.1		
#10	75.1		
#20	54.4		
#40	41.8		
#60	31.7		
#140	21.8		
#200	19.6		
0.0441 mm.	15.9		
0.0314 mm.	14.6		
0.0200 mm.	13.2		
0.0117 mm.	11.7		
0.0083 mm.	10.6		
0.0059 mm.	9.5		
0.0029 mm.	7.6		
0.0012 mm.	6.8		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.875

Atterberg Limits

PL = 15 LL = 30 PI = 15

Coefficients

D_{90} = 7.1115 mm D_{85} = 5.0596 mm D_{60} = 1.0722 mm
D_{50} = 0.6700 mm D_{30} = 0.2156 mm D_{15} = 0.0353 mm
D_{10} = 0.0069 mm C_u = 154.43 C_c = 6.24

Classification

USCS = SC

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B6 @ 35.5

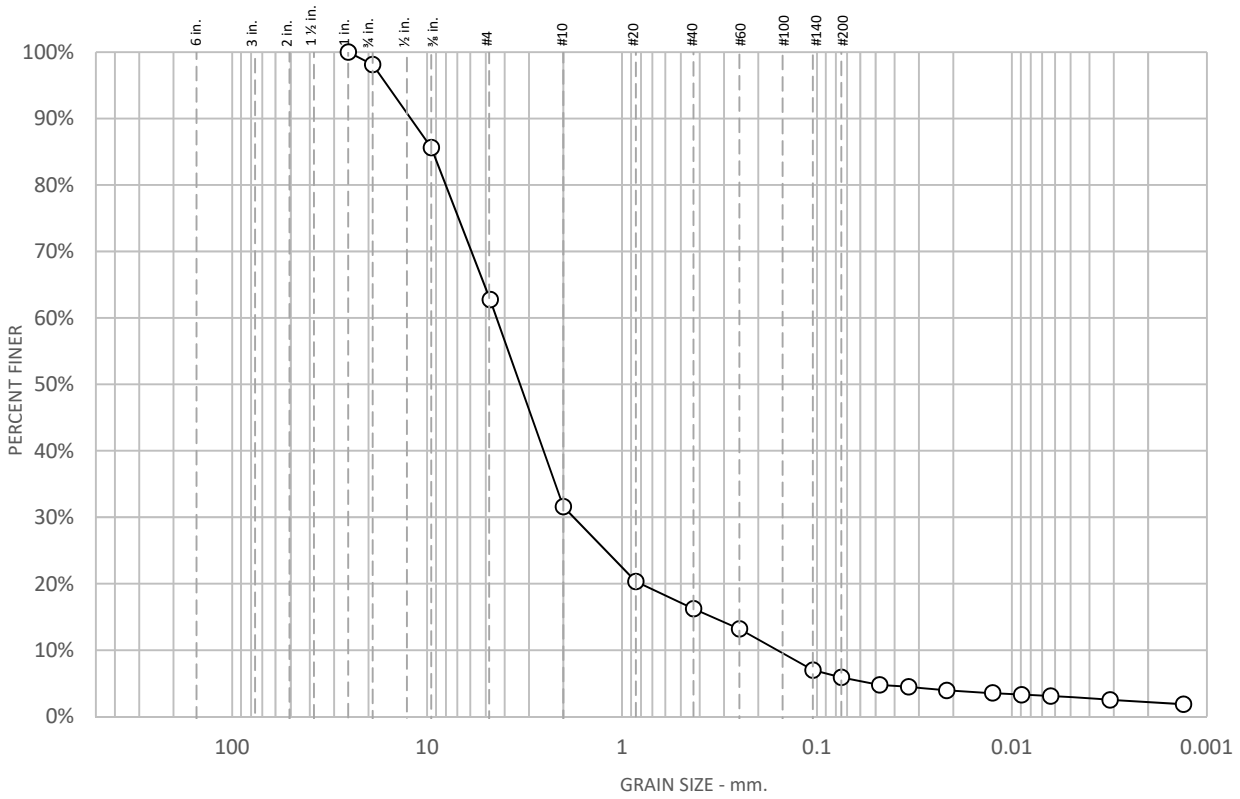
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	1.9	35.3	31.2	15.4	10.3	3.7	2.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	98.1		
⅜ in.	85.6		
#4	62.8		
#10	31.6		
#20	20.3		
#40	16.2		
#60	13.2		
#140	7.0		
#200	5.9		
0.0477 mm.	4.8		
0.0339 mm.	4.5		
0.0216 mm.	3.9		
0.0126 mm.	3.6		
0.0089 mm.	3.3		
0.0063 mm.	3.1		
0.0031 mm.	2.5		
0.0013 mm.	1.9		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.890.

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 12.1402 mm D_{85} = 9.3444 mm D_{60} = 4.3996 mm
D_{50} = 3.3331 mm D_{30} = 1.7711 mm D_{15} = 0.3449 mm
D_{10} = 0.1598 mm C_u = 27.54 C_c = 4.46

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B6 @ 40

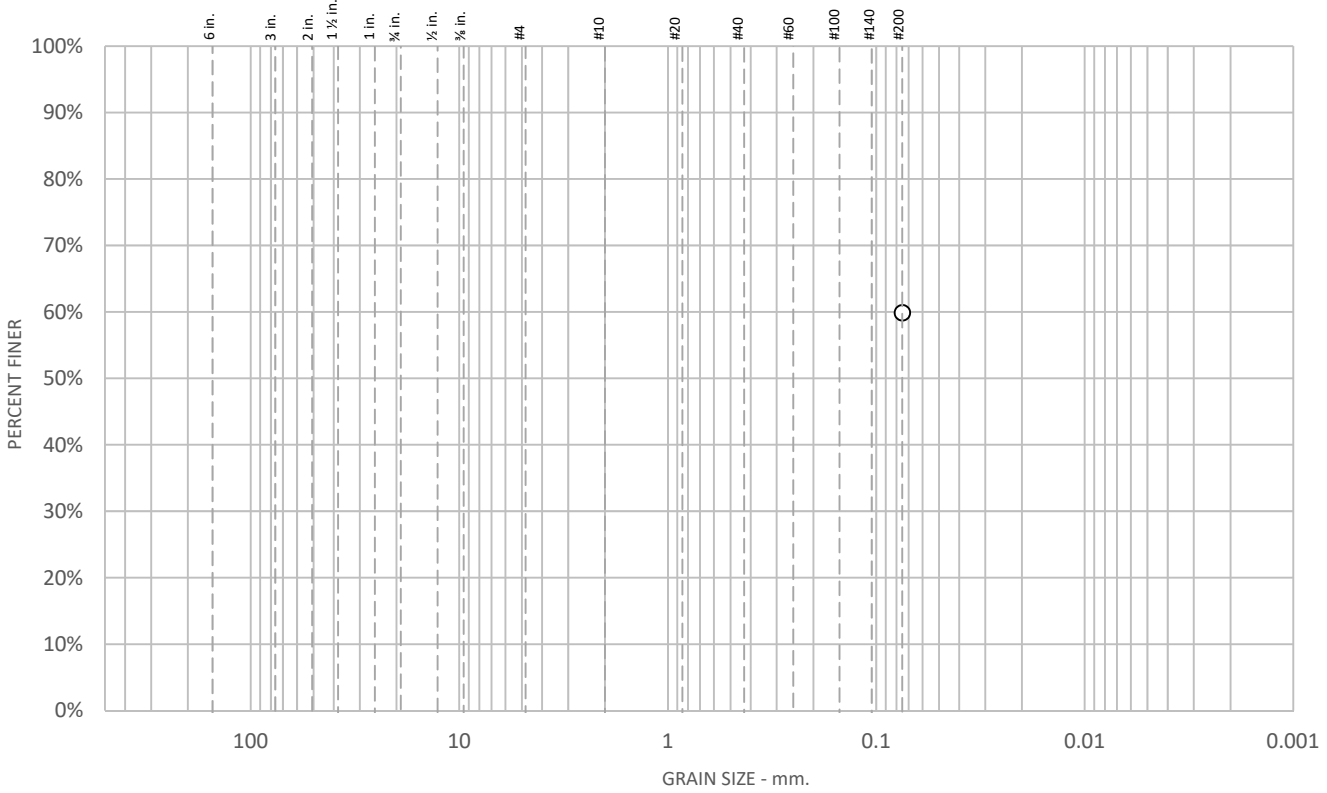
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	59.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 13 LL = 38 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 123.1 g

Sample Number: 1-B6 @ 45

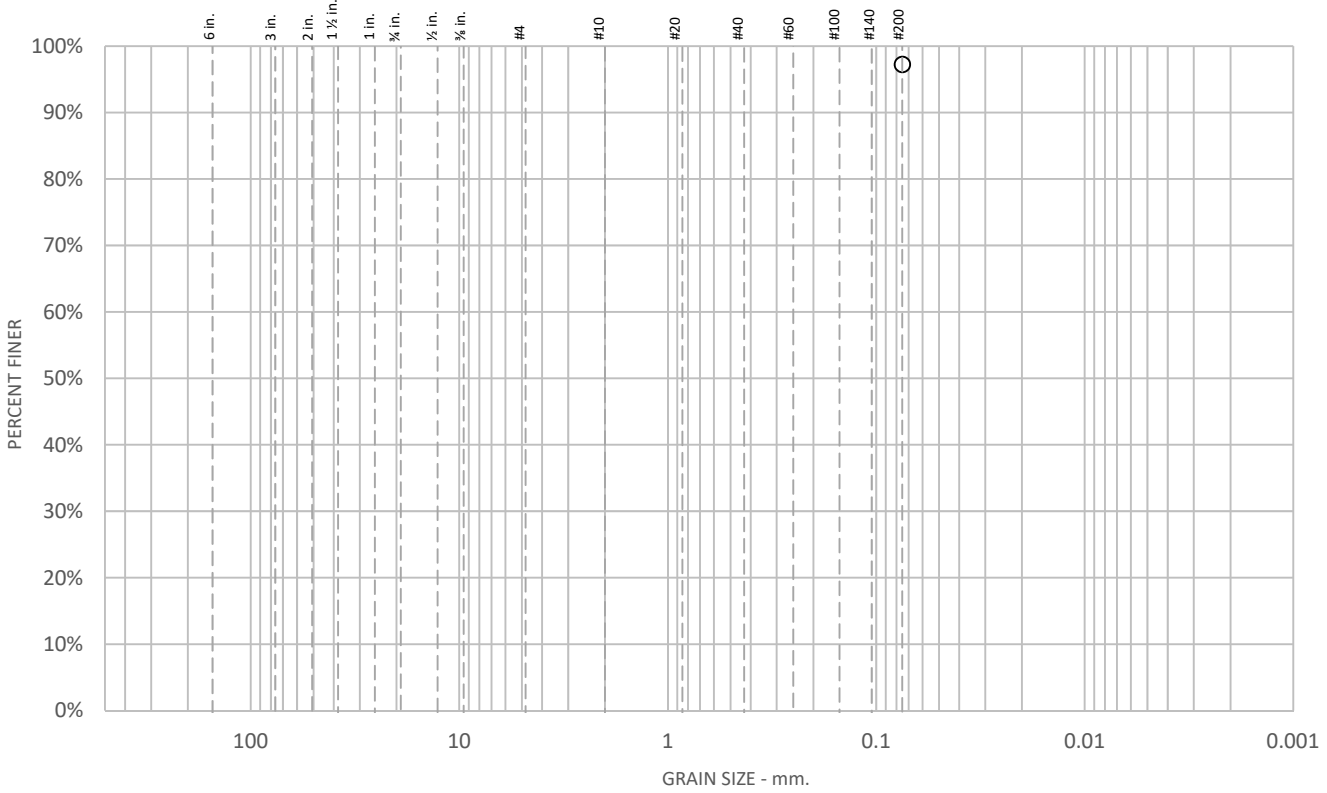
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						97.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	97.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 20 LL = 73 PI = 53

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 174 g

Sample Number: 1-B6 @ 5.5

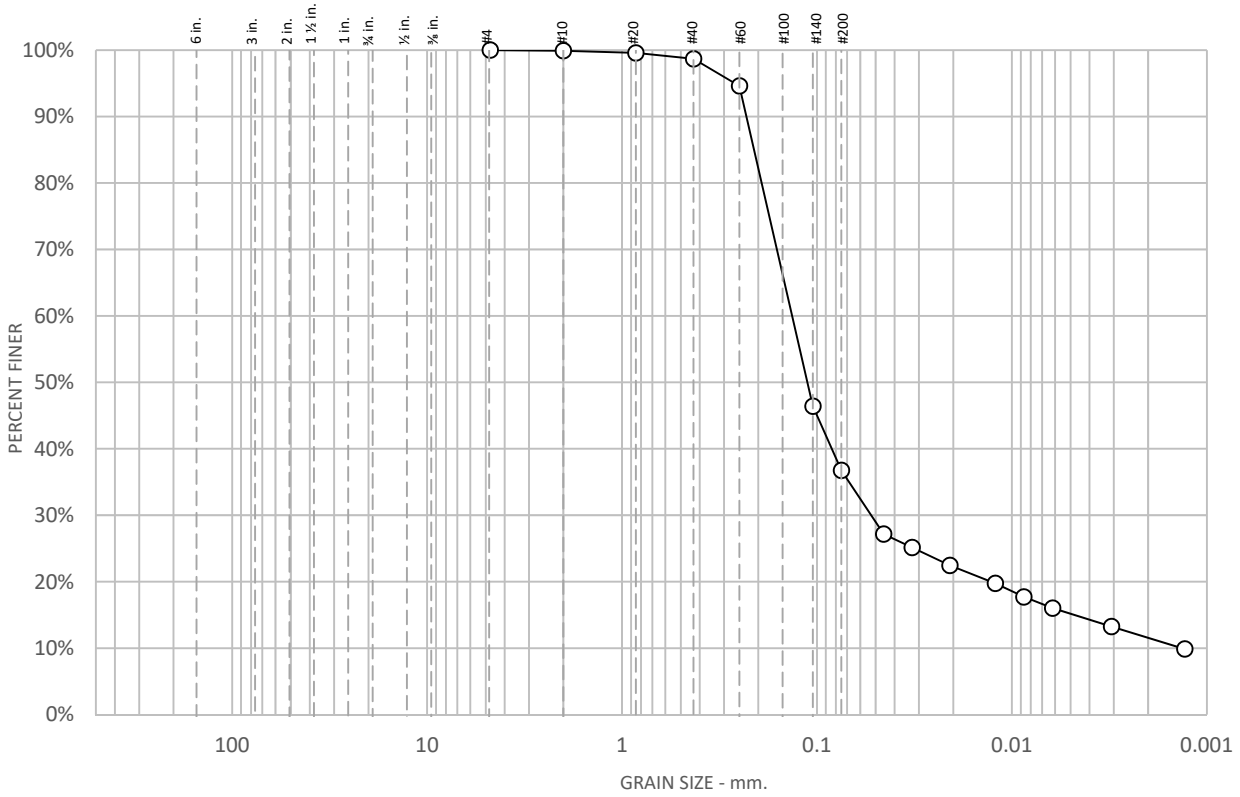
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			0.1	1.2	61.9	25.2	11.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.6		
#40	98.7		
#60	94.6		
#140	46.4		
#200	36.8		
0.0455 mm.	27.2		
0.0325 mm.	25.1		
0.0208 mm.	22.4		
0.0122 mm.	19.7		
0.0087 mm.	17.7		
0.0062 mm.	16.0		
0.0031 mm.	13.2		
0.0013 mm.	9.9		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.732.

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2301 mm D_{85} = 0.2103 mm D_{60} = 0.1341 mm
D_{50} = 0.1120 mm D_{30} = 0.0527 mm D_{15} = 0.0048 mm
D_{10} = 0.0013 mm C_u = 99.82 C_c = 15.44

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B6 @ 70

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	1-B6	1-B6	1-B6	1-B6	1-B6			
DEPTH (ft.):	5.5	10	35.5	50.5	70			
MOISTURE CONTENT (%):	27.5	32.7	23.0	19.7	24.9			
DRY DENSITY (lbs/ft^3):	93.5	92.3	110.7	112.0	102.8			

Testing remarks:

PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NUMBER: 15959.000.000
CLIENT: Google, LLC
PHASE NUMBER: LAB

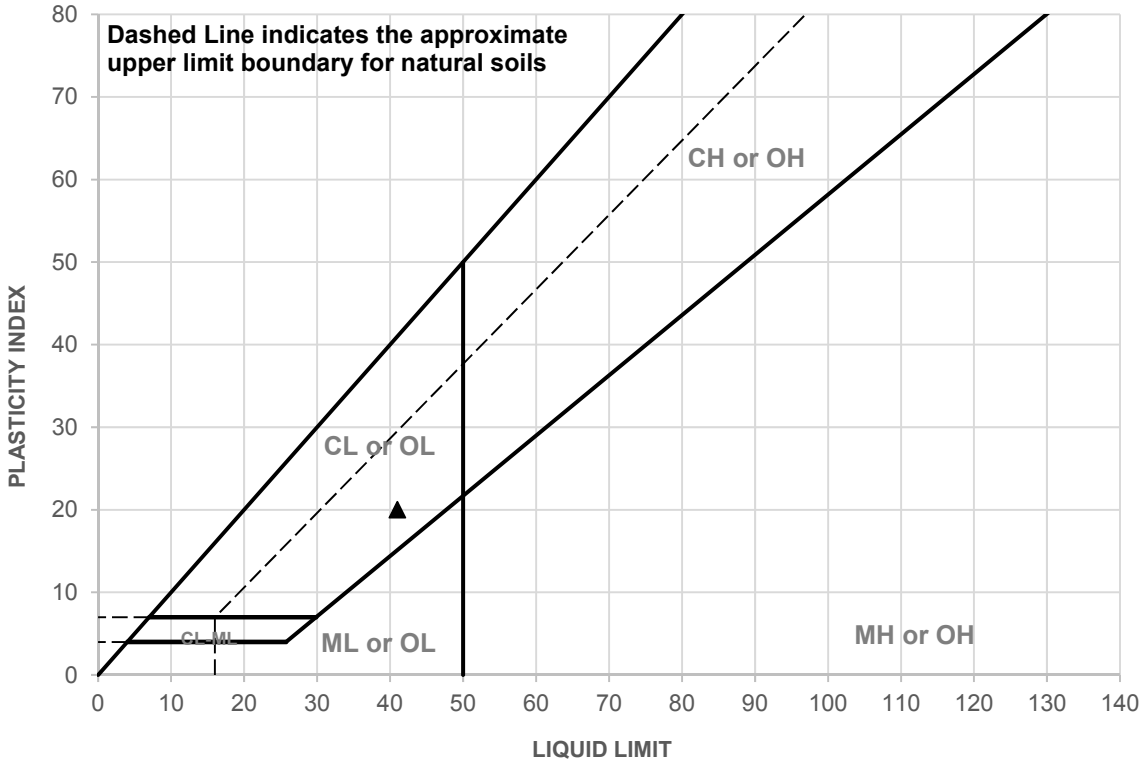
DATE: 09/09/19

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 2213 Plaza Dr., Rocklin, CA 95765. Phone No. (916) 786-8883.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



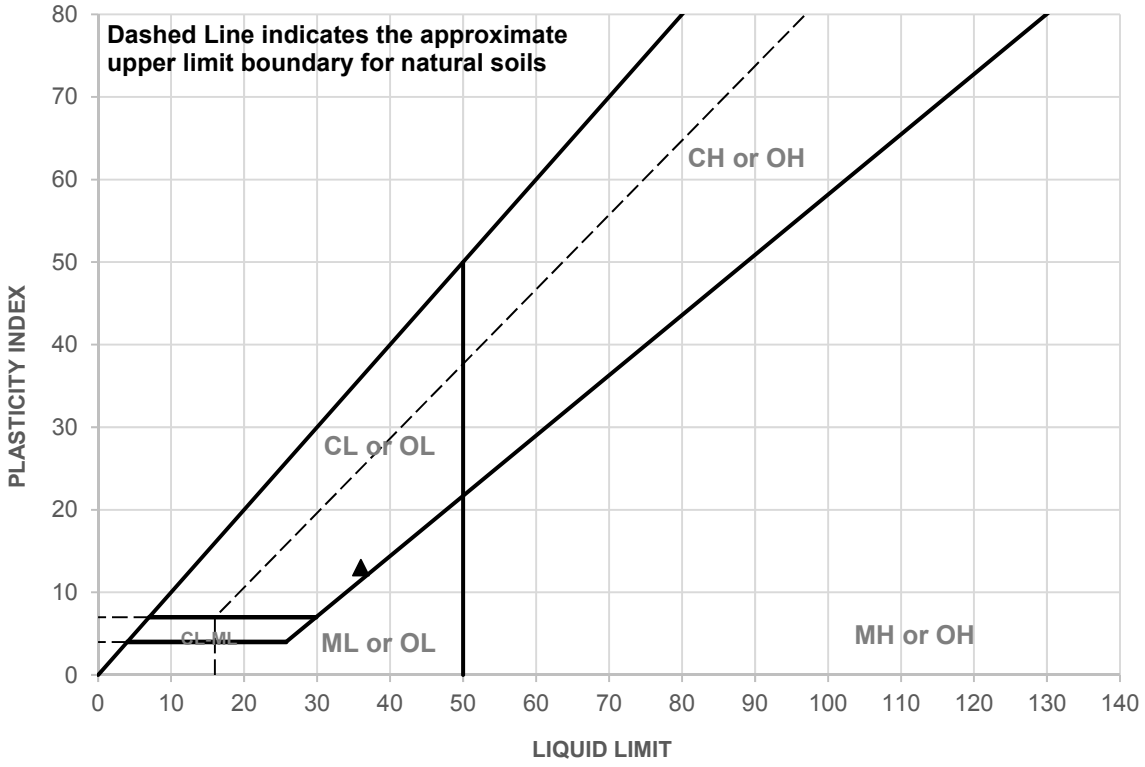
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6 @ 16.5	16-16.5 ft	See exploration logs	41	21	20

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6 @ 16.5	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/17/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



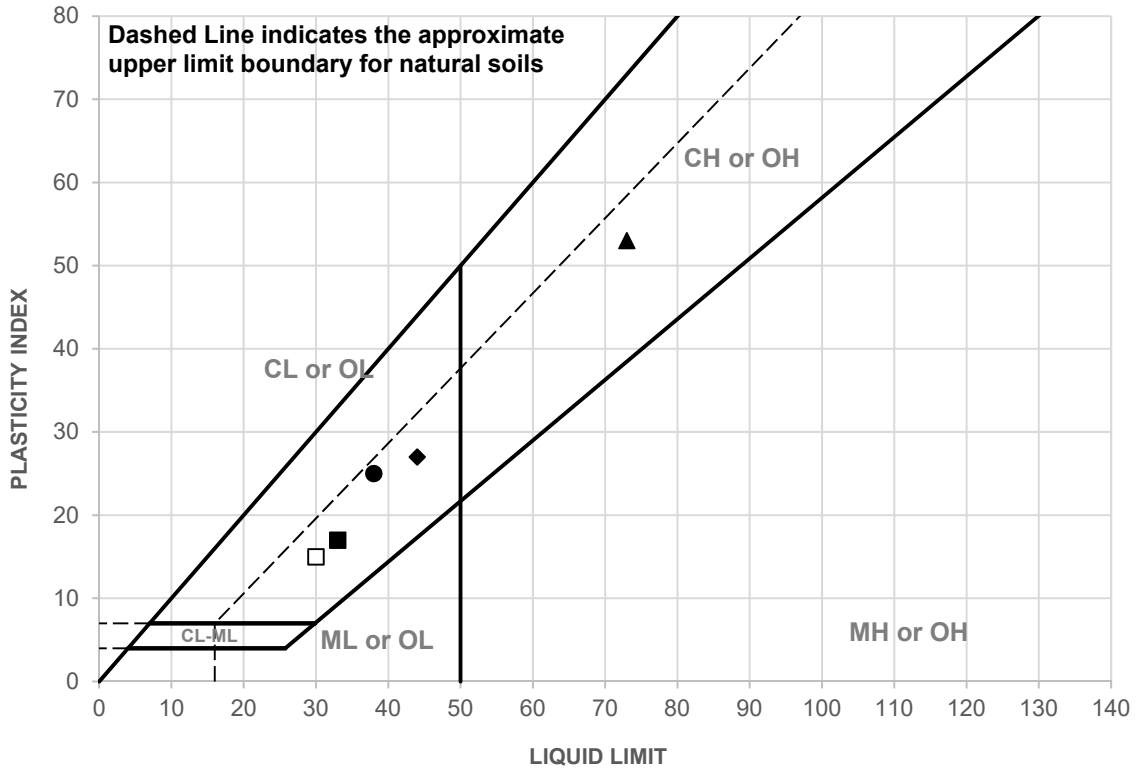
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6 @ 30	30 ft	See exploration logs	36	23	13

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6 @ 30	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/18/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6	5.5	See exploration logs	73	20	53
◆	1-B6	10	See exploration logs	44	17	27
□	1-B6	35.5	See exploration logs	30	15	15
●	1-B6	45	See exploration logs	38	13	25
■	1-B6	50.5	See exploration logs	33	16	17

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6	PI: ASTM D4318, Wet Method	
◆	1-B6	PI: ASTM D4318, Wet Method	
□	1-B6	PI: ASTM D4318, Wet Method	
●	1-B6	PI: ASTM D4318, Wet Method	
■	1-B6	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B6@35.5

Description: See exploration logs — USCS: SC

%Passing #4: 84.1

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.875**

Sample 2: 1-B6@40

Description: See exploration logs — USCS: SP

%Passing #4: 62.8

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.890**

Sample 3: 1-B6@70

Description: See exploration logs — USCS: n/a

%Passing #4: 100.0

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.732**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** — **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER: **LAB**

ENGEO Expect Excellence

Tested by: R. Montalvo — Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

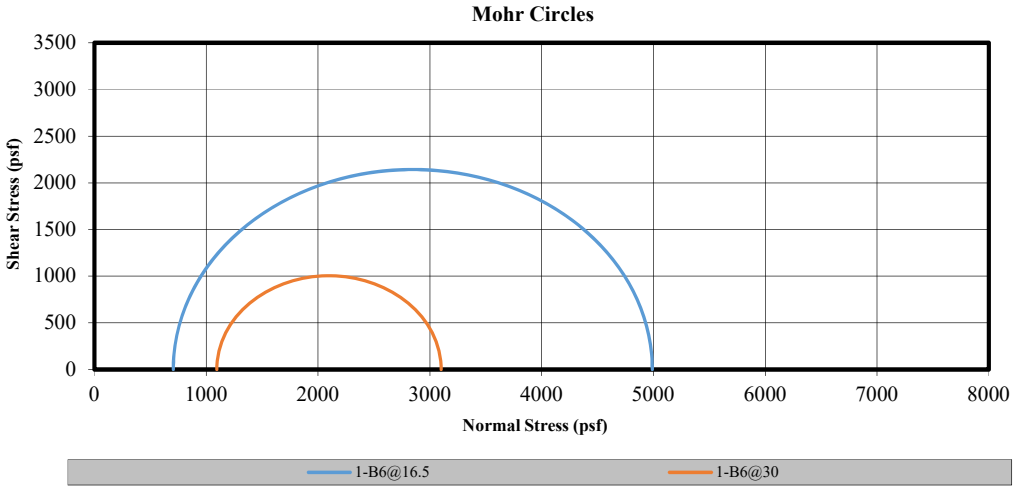
ASTM D2850

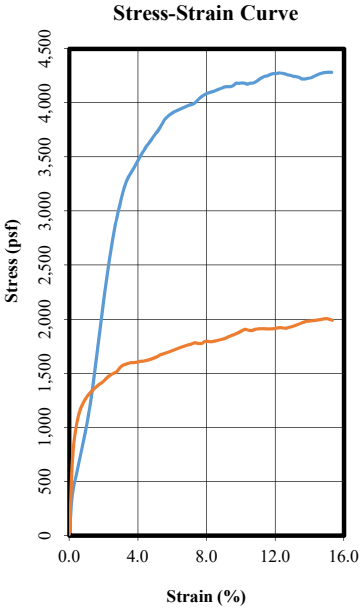
Date: 09/13/19

Checked By: G. Criste

Date: 9/13/2019

Tested By: M. Quasem





Before Test	Specimen 1-B6@16.5	1-B6@30		
Water Content (%)	21.94	27.08		
Dry Density (pcf)	109.00	100.00		
Saturation (%)	100.00	100.00		
Void Ratio	0.62	0.76		
Diameter (in)	2.850	2.370		
Height (in)	5.970	5.070		
Height-to-Diameter Ratio	2.095	2.139		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.820	2.820		
After Test	**1-B6@16.5**	**1-B6@30**		
Water Content (%)	21.94	27.08		
Saturation (%)	100.00	100.00		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	4283.9	2006.7		
Axial Strain @ Failure (%)	15.244	14.990		
	Cell Pressure			
Cell (psf)	705.6	1094.4		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	4989.5	3101.1		
σ3 (psf)	705.6	1094.4		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		2141.9	1003.4		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Montain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 09/13/19

Checked By: G. Criste

Date: 9/13/2019

Tested By: M. Quasem

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B6@16.5	SAMPLE NUMBER: 1-B6@30
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Montain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence



APPENDIX D

CORROSIVITY TEST RESULTS (CERCO Analytical)

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

25 June, 2019

Job No. 1906091
Cust. No. 10169

Mr. Bahareh Heidarzadeh
ENGEO Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Subject: Project No.: 15949.000.000
Project Name: Mountain View Multiple Parcels
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Heidarzadeh:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on June 17, 2019. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, all samples are 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 are none detected & 31 mg/kg, are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations ranged from 87 to 140 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 ranged from 8.23 to 8.30, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials ranged from 140 to 240-mV. Samples No.002 & No.003 are indicative of potentially "moderately corrosive" soils and Sample No.001 is indicative of potentially "slightly corrosive" soils resulting from anaerobic 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.: 15949.000.000
Client's Project Name: Mountain View Multiple Parcels
Date Sampled: 14-Jun-19
Date Received: 17-Jun-19
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 25-Jun-2019

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)*
1906091-001	1-B4 20.5	240	8.23	-	1,200	N.D.	N.D.	87
1906091-002	1-B7 5	170	8.29	-	1,100	N.D.	31	140
1906091-003	1-B7 25.5	140	8.30	-	1,200	N.D.	N.D.	97

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
	20-Jun-2019	20-Jun-2019	-	17-Jun-2019	12-Jun-2019	20-Jun-2019	20-Jun-2019

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

1906091

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 15949.000.000	PROJECT NAME: Mountain View Multiple Parcels
SAMPLED BY: (SIGNATURE/PRINT) Bofei Xu	
PROJECT MANAGER: Bahareh Heidarzadeh/Janet Kan	
ROUTING: E-MAIL bheidarzadeh@engeo.com	Hard Copy NA

SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE	Redox	Resistivity	pH	Sulfide	Sulfate	Chloride	REMARKS REQUIRED DETECTION LIMITS
1-B4 20.5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary
1-B7 5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary
1-B7 25.5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
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	6/17/19 1500				
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	

ENGEO INCORPORATED

2010 CROW CANYON PLACE, SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000 FAX (888) 279-2698
WWW.ENGEO.COM

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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

23 September, 2019

Job No. 1909026
Cust. No. 10169

Ms. Bahareh Heidarzadeh
ENGEO Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Subject: Project No.: 15949.000.000
Project Name: Mountain View Multiple Parcels
Corrosivity Analysis – ASTM Test Methods

Dear Ms. Heidarzadeh:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on September 05, 2019. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No.010 is classified as "severely corrosive", Samples No.001, No.002, No.004, No.006, No.008 & No.009 are classified as "corrosive" and Samples No.003, No.005 & No.007 are classified as "moderately 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 ranged from none detected to 740 mg/kg and are determined to be sufficient to attack steel embedded in a concrete mortar coating. 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 ranged from 16 to 220 mg/kg and are determined to be sufficient to potentially be detrimental to reinforced concrete structures and cement mortar-coated steel at these locations. Therefore, concrete that comes into contact with this soil should use sulfate resistant cement such as Type II, with a maximum water-to-cement ratio of 0.55.

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

The pH of the soils ranged from 8.21 to 8.85, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials ranged from 180 to 230-mV. Samples No.008 & No.009 are indicative of potentially "moderately corrosive" soils and all remaining samples are indicative of potentially "slightly corrosive" soils resulting from anaerobic 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.

for, 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.: 15949.000.000
Client's Project Name: Mountain View Mulitple Parcels
Date Sampled: 5-Sep-19
Date Received: 5-Sep-19
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 23-Sep-2019

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)*
1909026-001	1-B6/8'	210	8.26	-	1,100	N.D.	N.D.	210
1909026-002	1-B6/26'	210	8.47	-	1,500	N.D.	N.D.	110
1909026-003	1-B6/40.5'	220	8.38	-	4,900	N.D.	N.D.	36
1909026-004	1-B3/8.5'	230	8.21	-	1,900	N.D.	N.D.	110
1909026-005	1-B3/41'	220	8.22	-	2,400	N.D.	N.D.	54
1909026-006	2-B4/10'	220	8.37	-	1,700	N.D.	22	56
1909026-007	2-B4/40.5'	220	8.38	-	2,400	N.D.	N.D.	17
1909026-008	3-B2/10.5'	180	8.64	-	1,500	N.D.	N.D.	16
1909026-009	3-B2/35.5'	190	8.31	-	1,400	N.D.	36	32
1909026-010	3-B3/30.5'	220	8.85	-	300	N.D.	740	220

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
	20-Sep-2019	20-Sep-2019	-	20-Sep-2019	12-Sep-2019	20-Sep-2019	20-Sep-2019

Steven Moore
for 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

CHAIN OF CUSTODY RECORD

CA 1909096

PROJECT NUMBER: 15949.000.000	PROJECT NAME: Mountain View Multiple Parcels
SAMPLED BY: (SIGNATURE/PRINT) Bofei Xu	
PROJECT MANAGER: Bahareh Heidarzadeh/Janet Kan	
ROUTING: E-MAIL bheidarzadeh@engeo.com	Hard Copy NA

	SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE	Redox	Resistivity	pH	Sulfide	Sulfate	Chloride	REMARKS REQUIRED DETECTION LIMITS
001	1-B6 / 8'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include Evaluation Summary
002	1-B6 / 26'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include Evaluation Summary
003	1-B6 / 40.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
004	1-B3 / 8.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
005	1-B3 / 41'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
006	2-B4 / 10'	090519		Soil	1	Bag		X	X	X	X	X	X	Include E.S.
007	2-B4 / 40.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
008	3-B2 / 10.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
009	3-B2 / 35.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
010	3-B3 / 30.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Bofei Xu	9/5 2:00pm			9/5 1520	
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RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	

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2010 CROW CANYON PLACE, SUITE 250
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(925) 866-9000 FAX (888) 279-2698
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APPENDIX E

LIQUEFACTION ANALYSIS

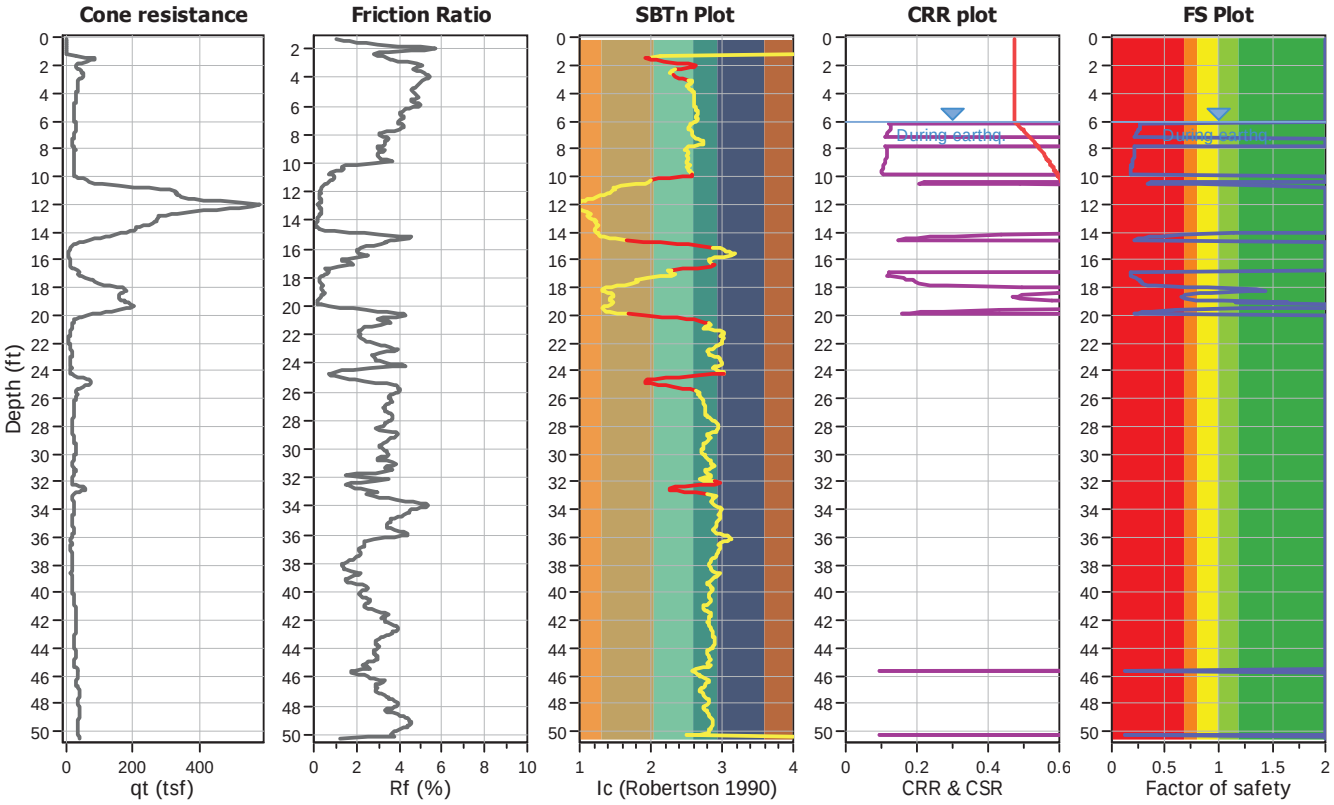
LIQUEFACTION ANALYSIS REPORT

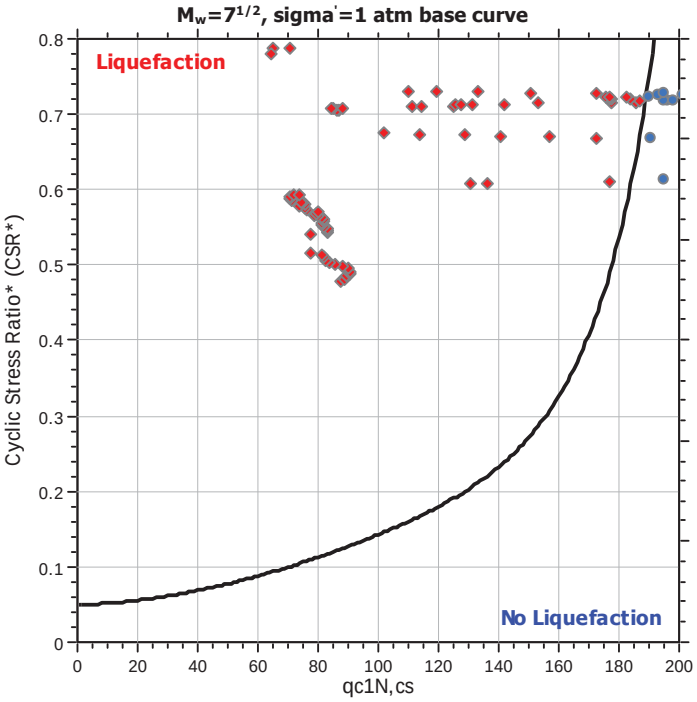
Project title : Google Parcels GEX **Location : Mountain View, CA**

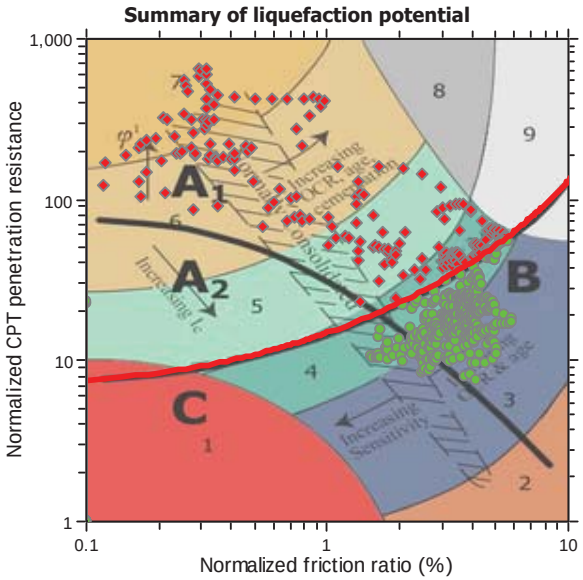
CPT file : 1-CPT1

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

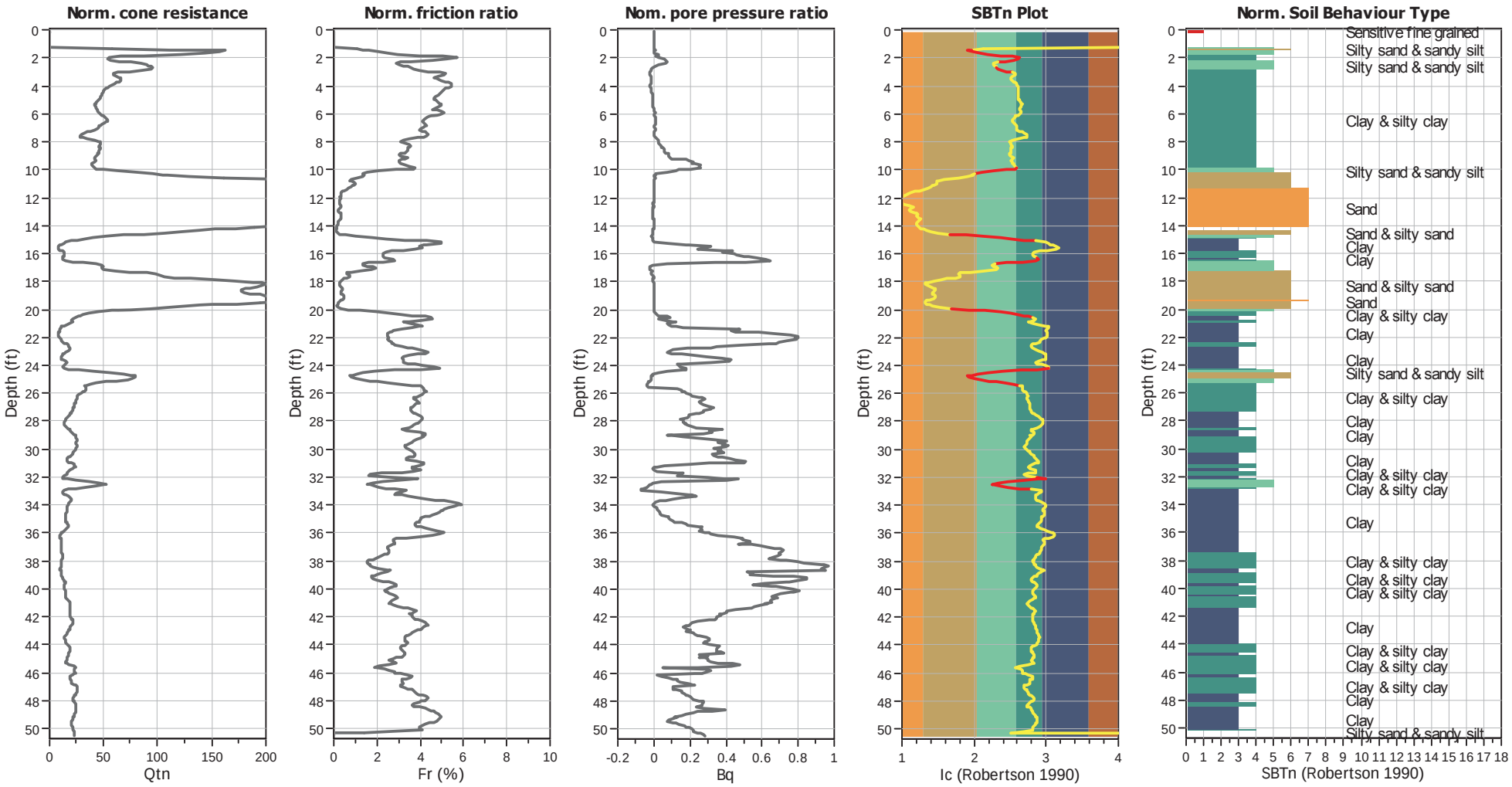






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



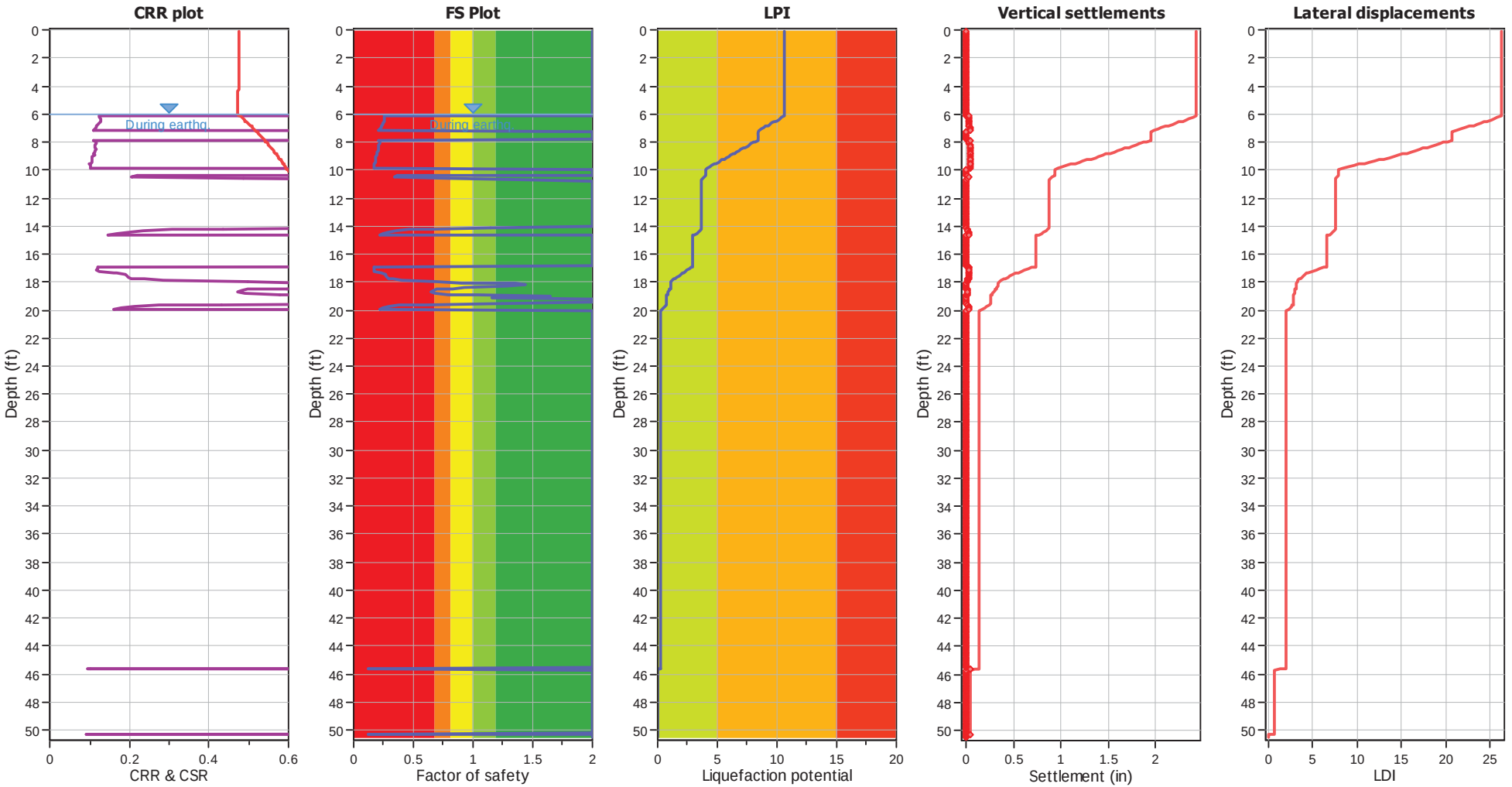
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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LIQUEFACTION ANALYSIS REPORT

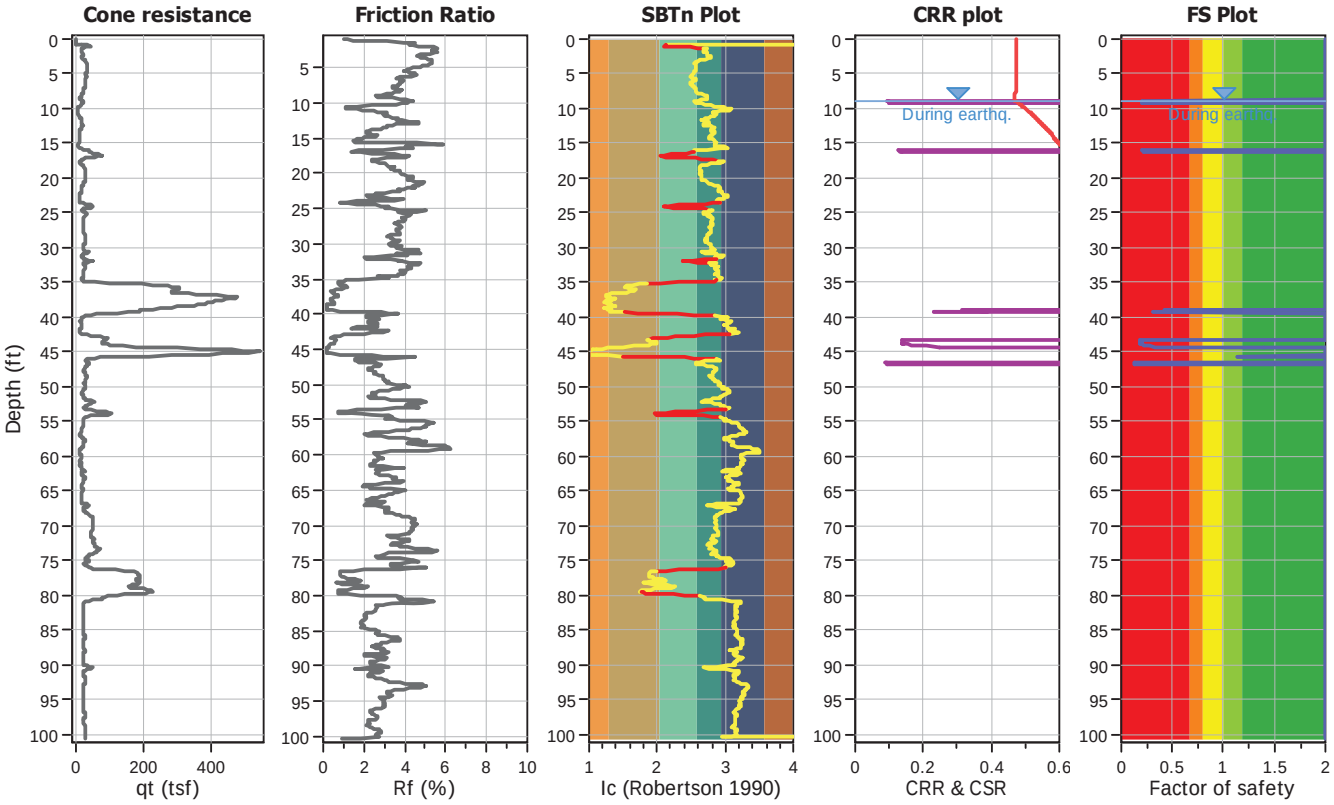
Project title : Google Parcels GEX

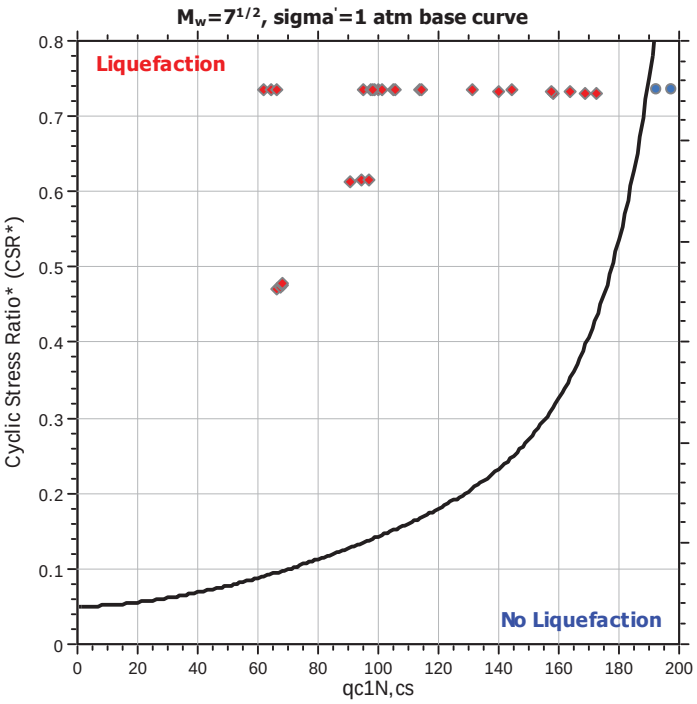
Location : Mountain View, CA

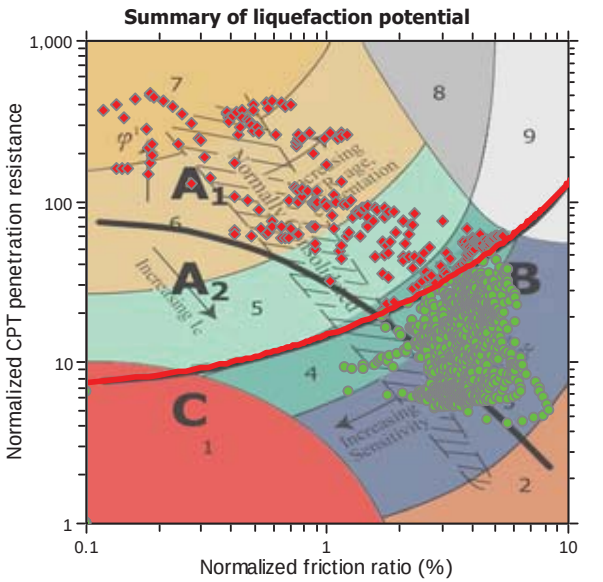
CPT file : 1-SCPT2

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	8.90 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	8.90 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

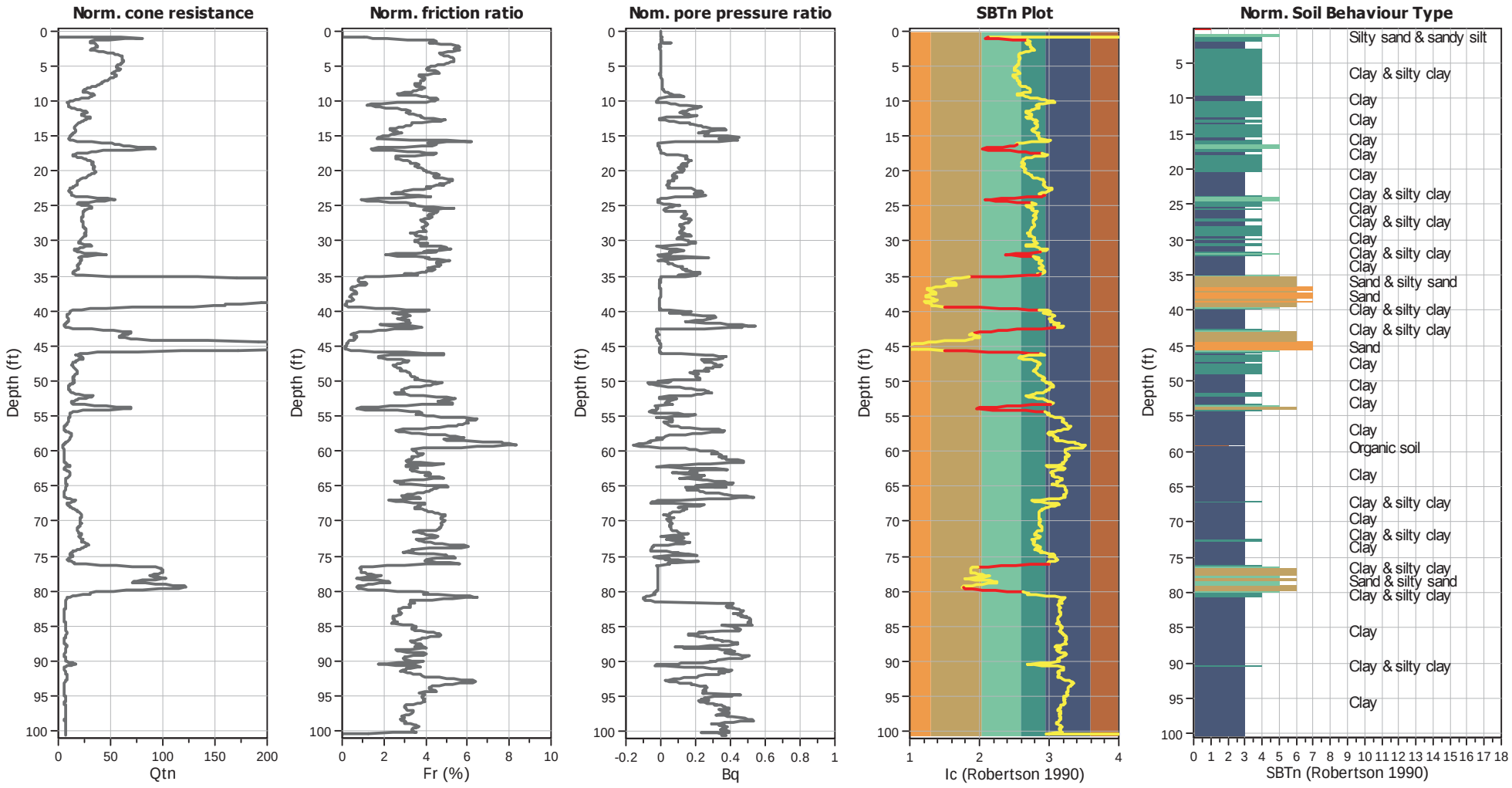






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



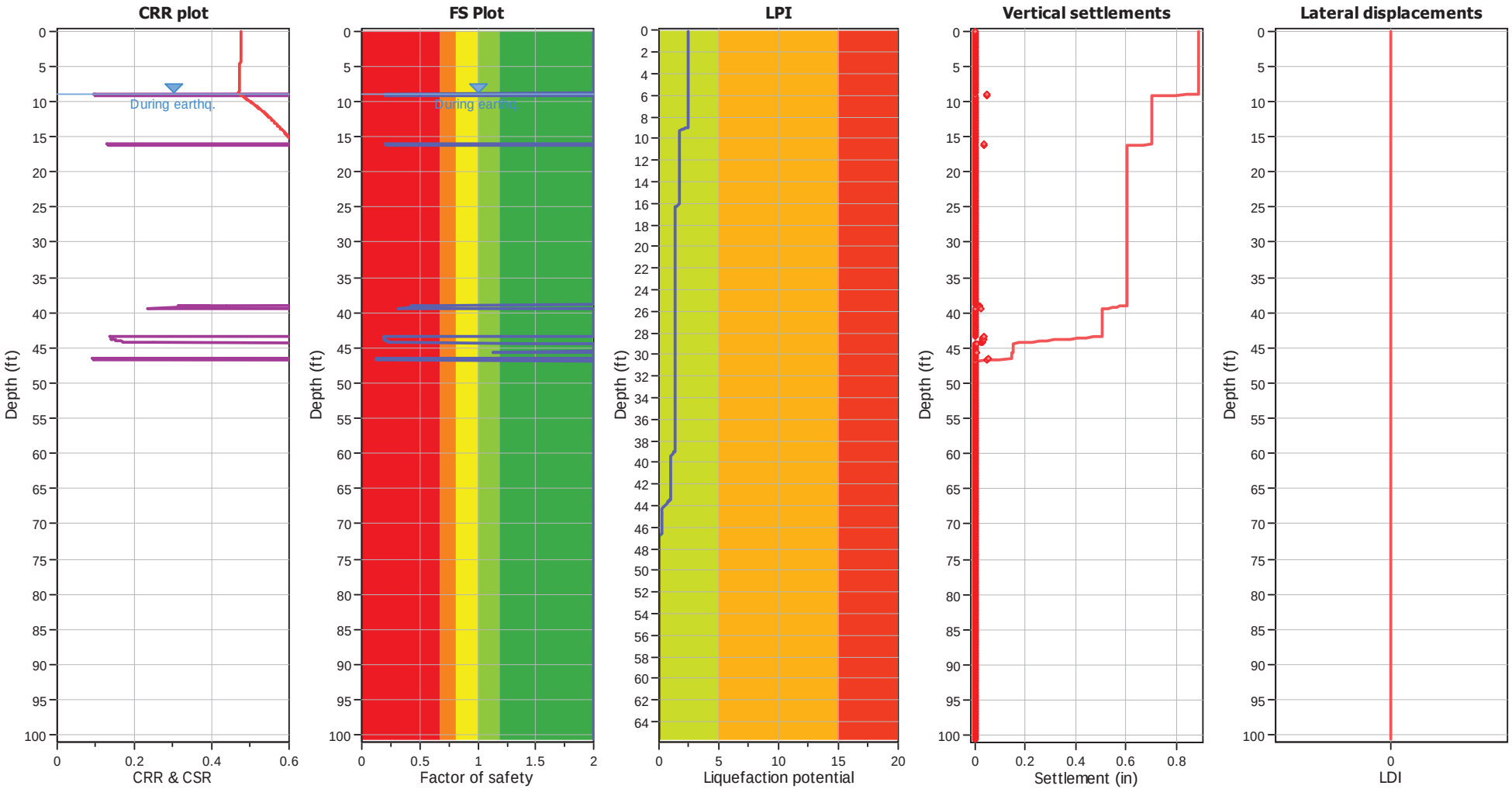
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	8.90 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.90 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	8.90 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.90 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

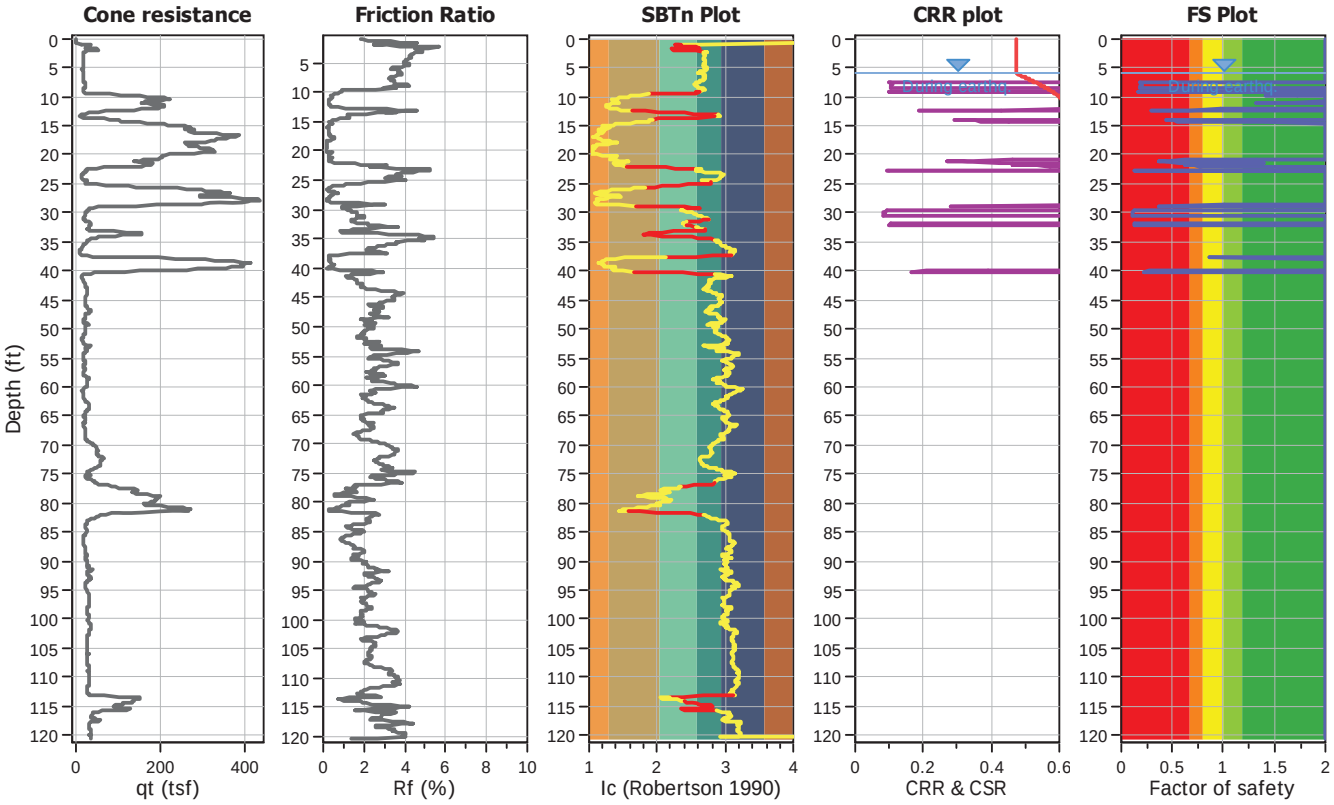
LIQUEFACTION ANALYSIS REPORT

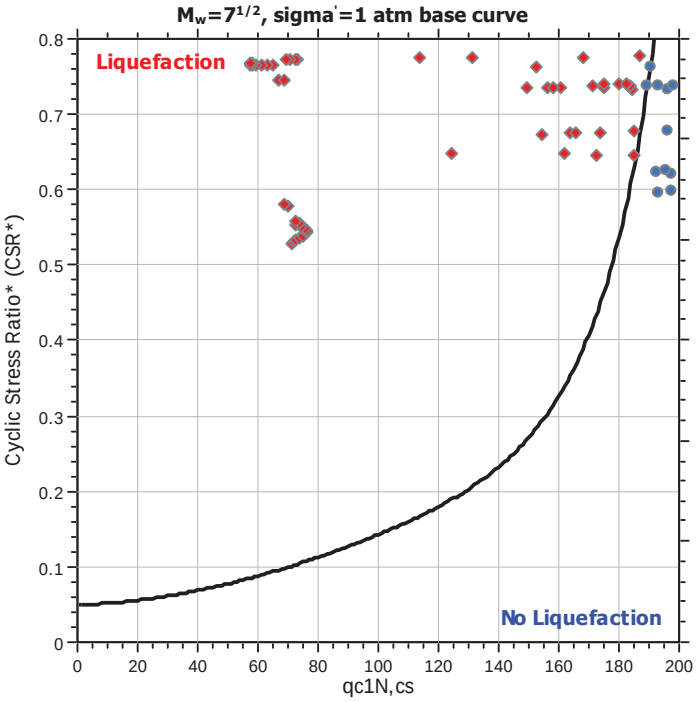
Project title : Google Parcels GEX **Location : Mountain View, CA**

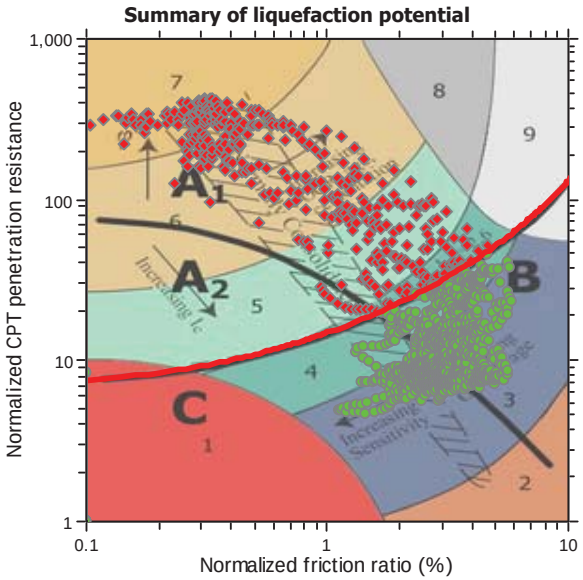
CPT file : 1-CPT3

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

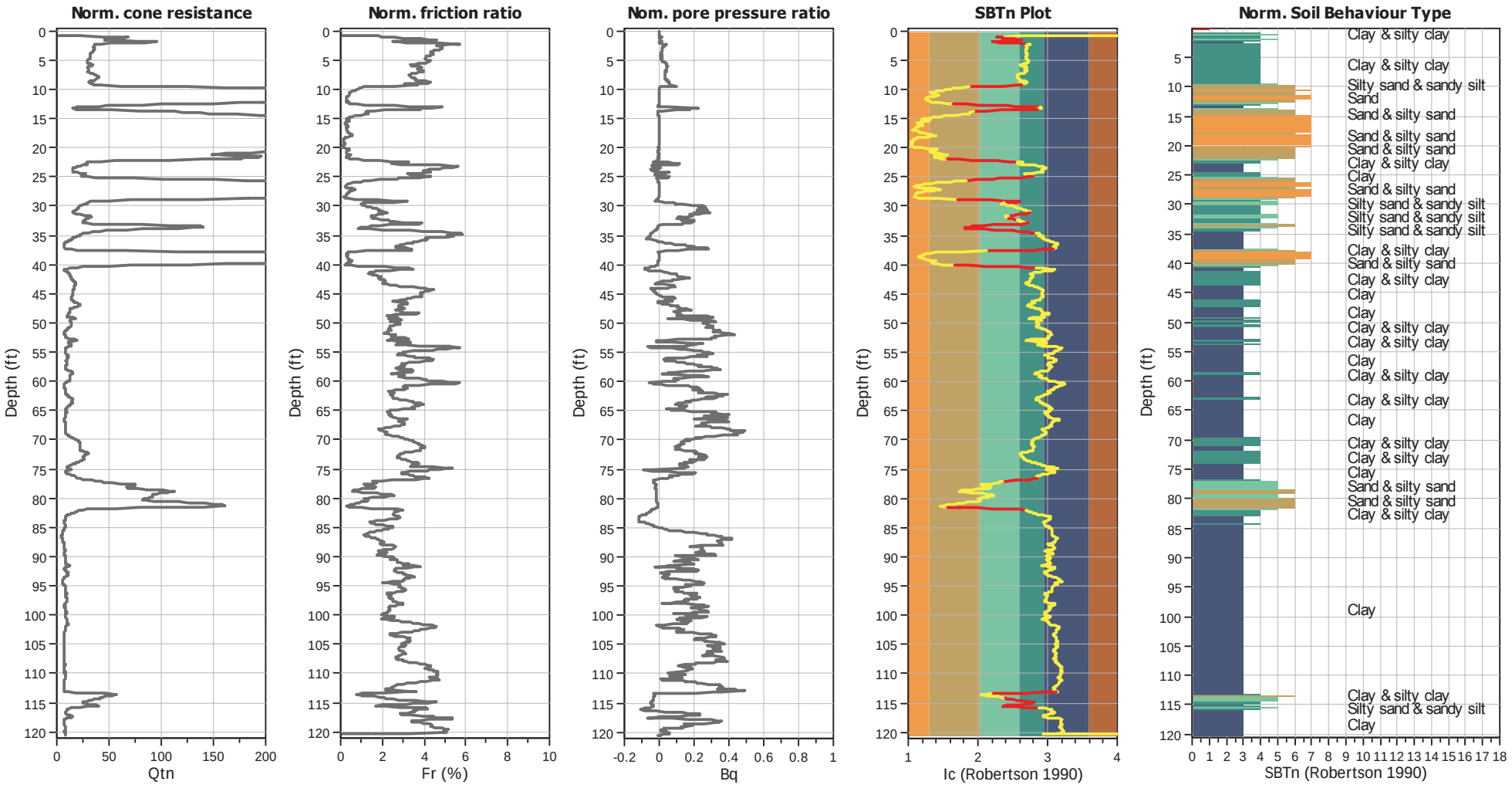






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



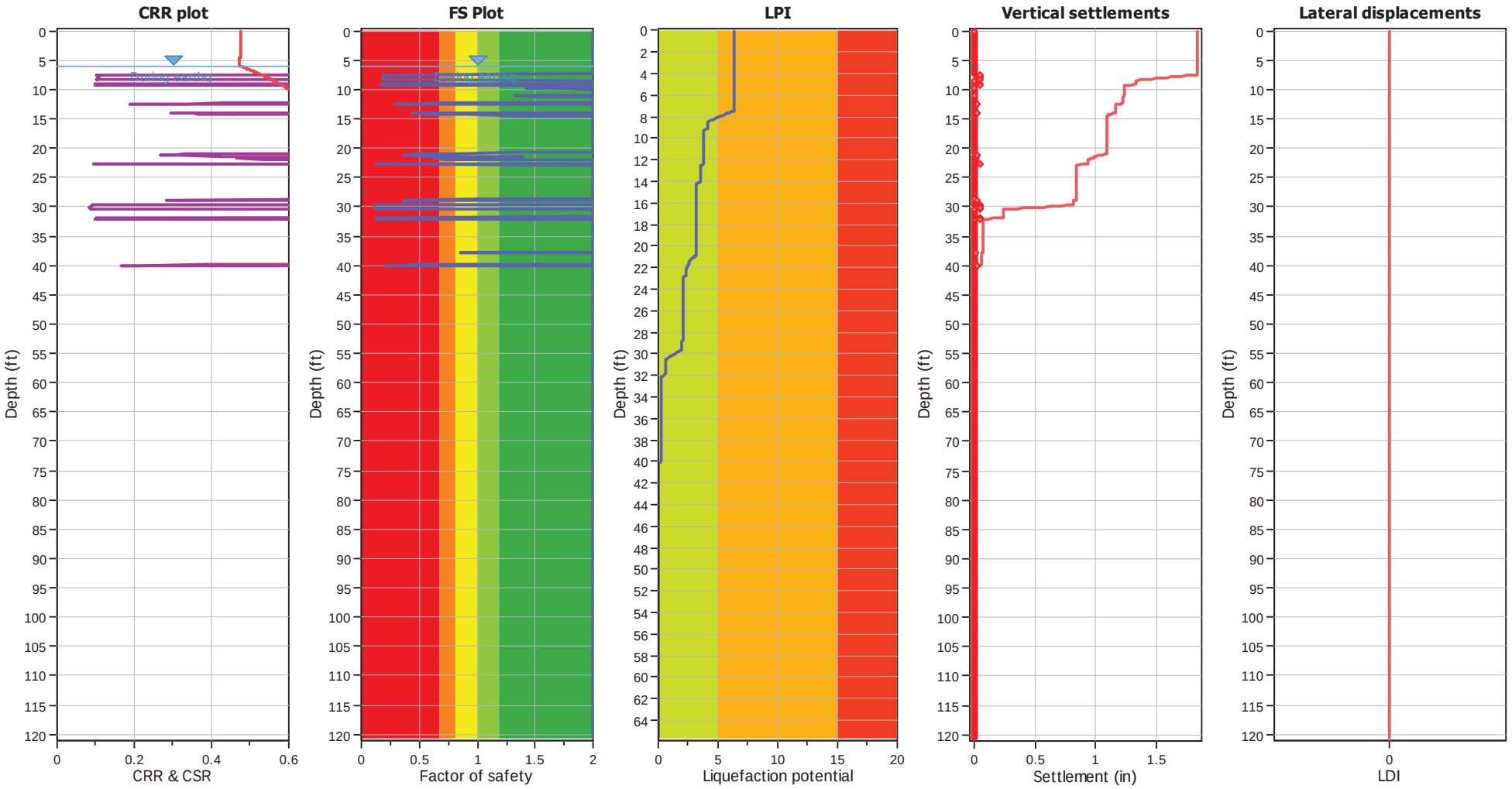
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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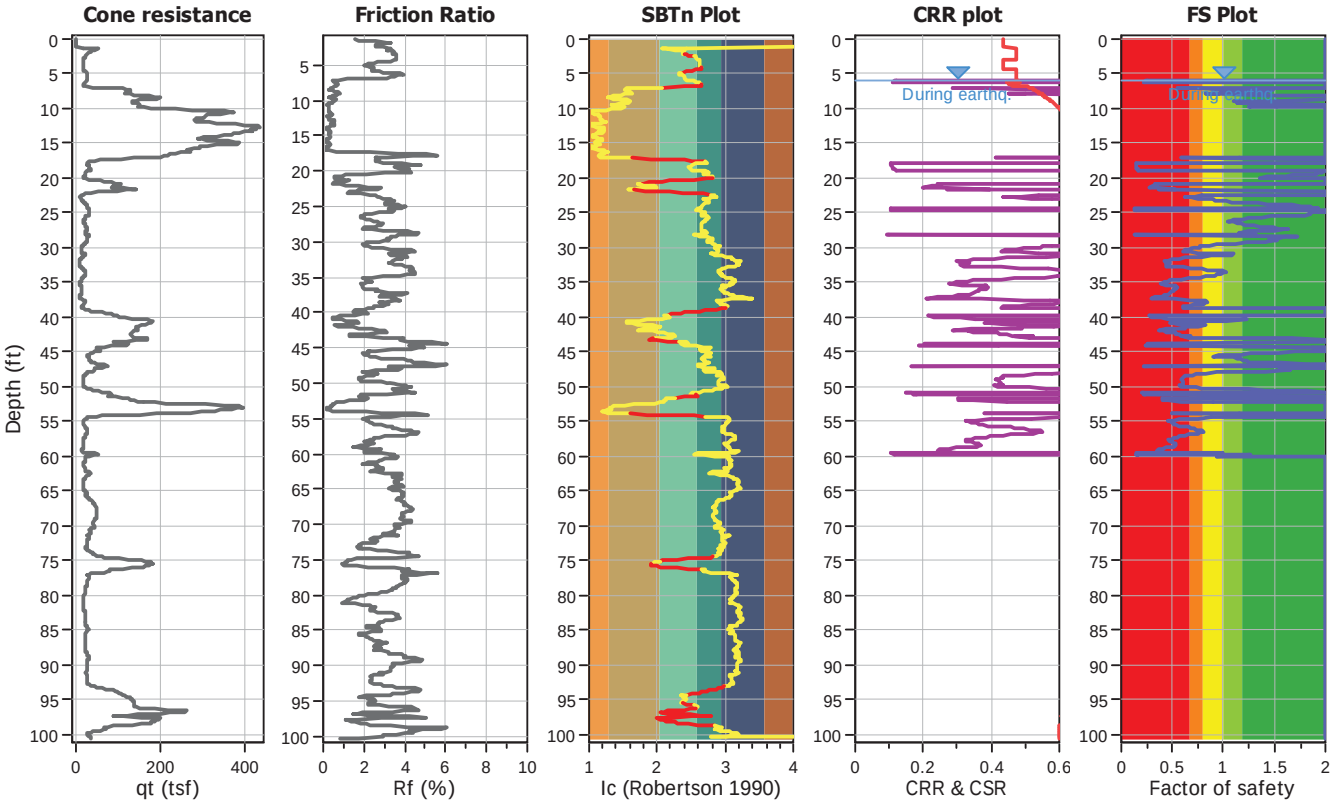
LIQUEFACTION ANALYSIS REPORT

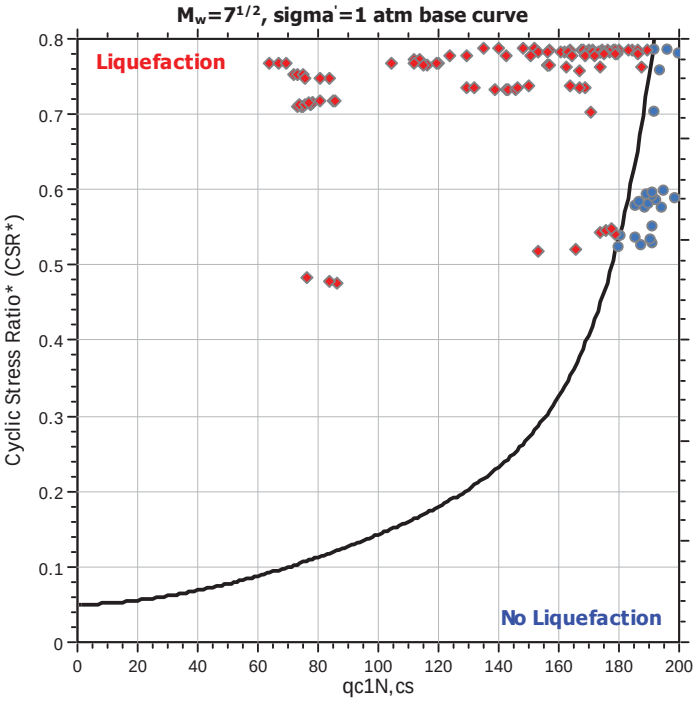
Project title : **Location :**

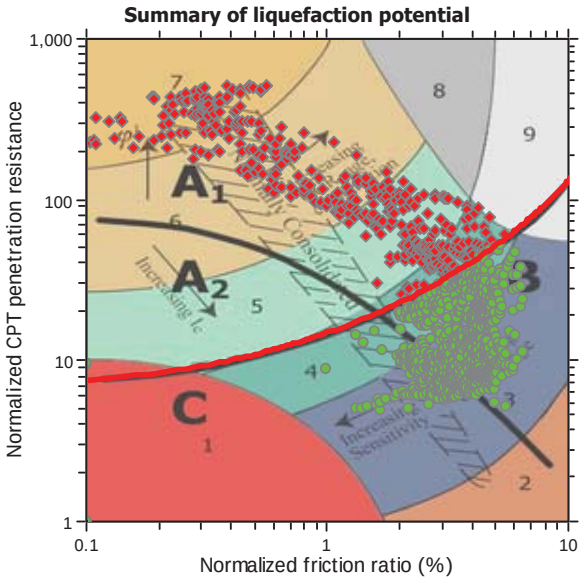
CPT file : 1-SCPT4

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

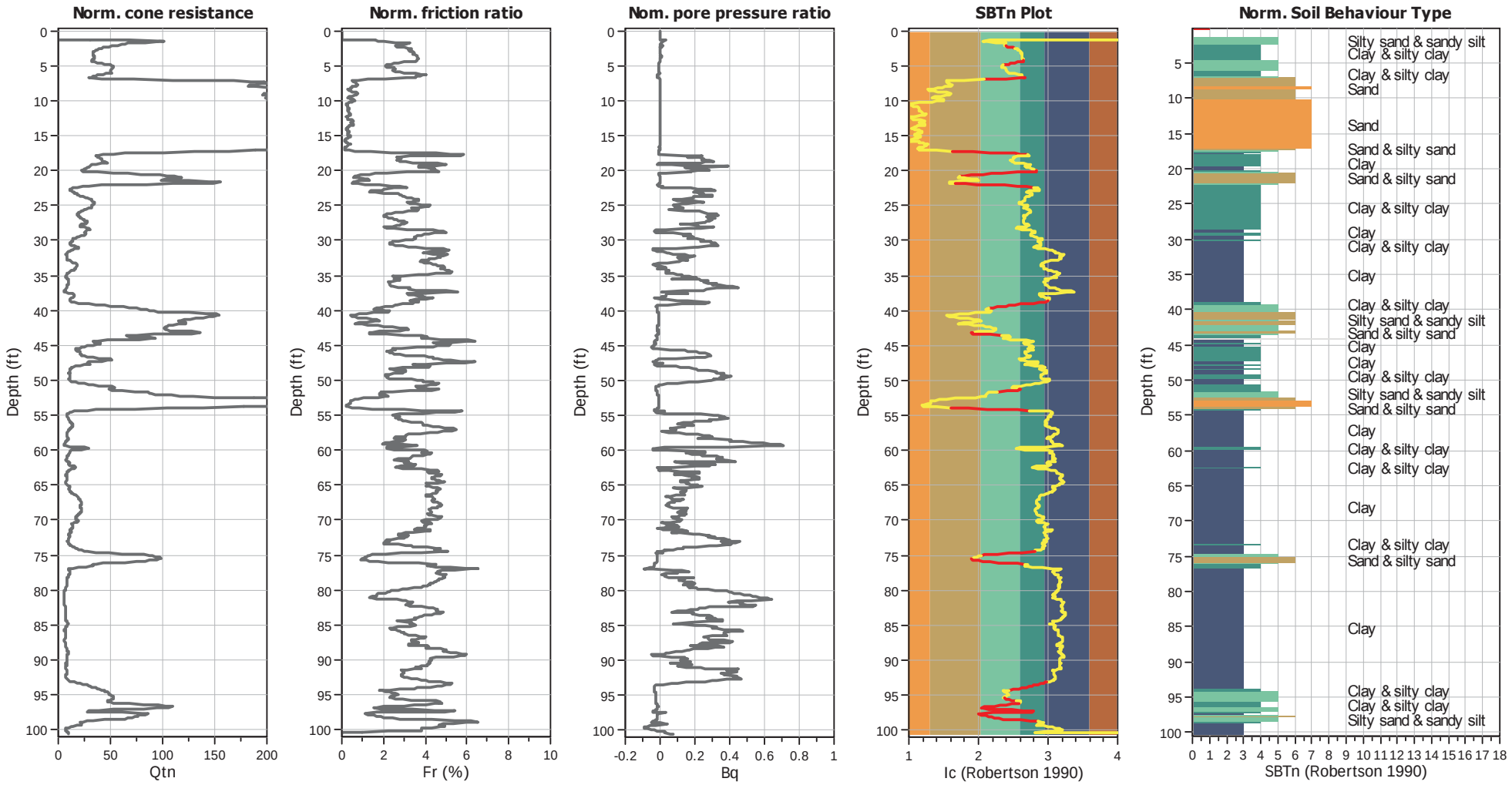






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



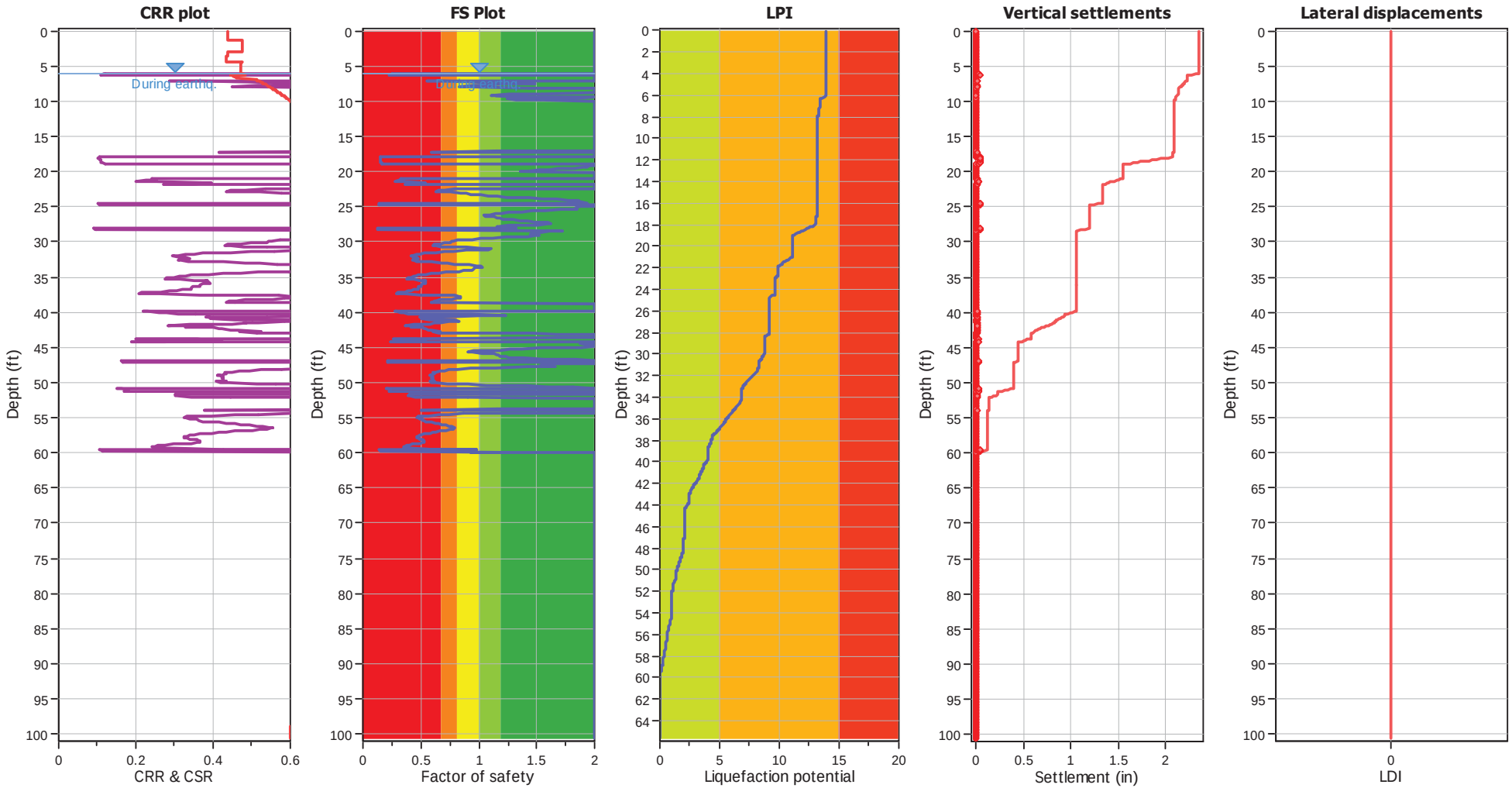
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

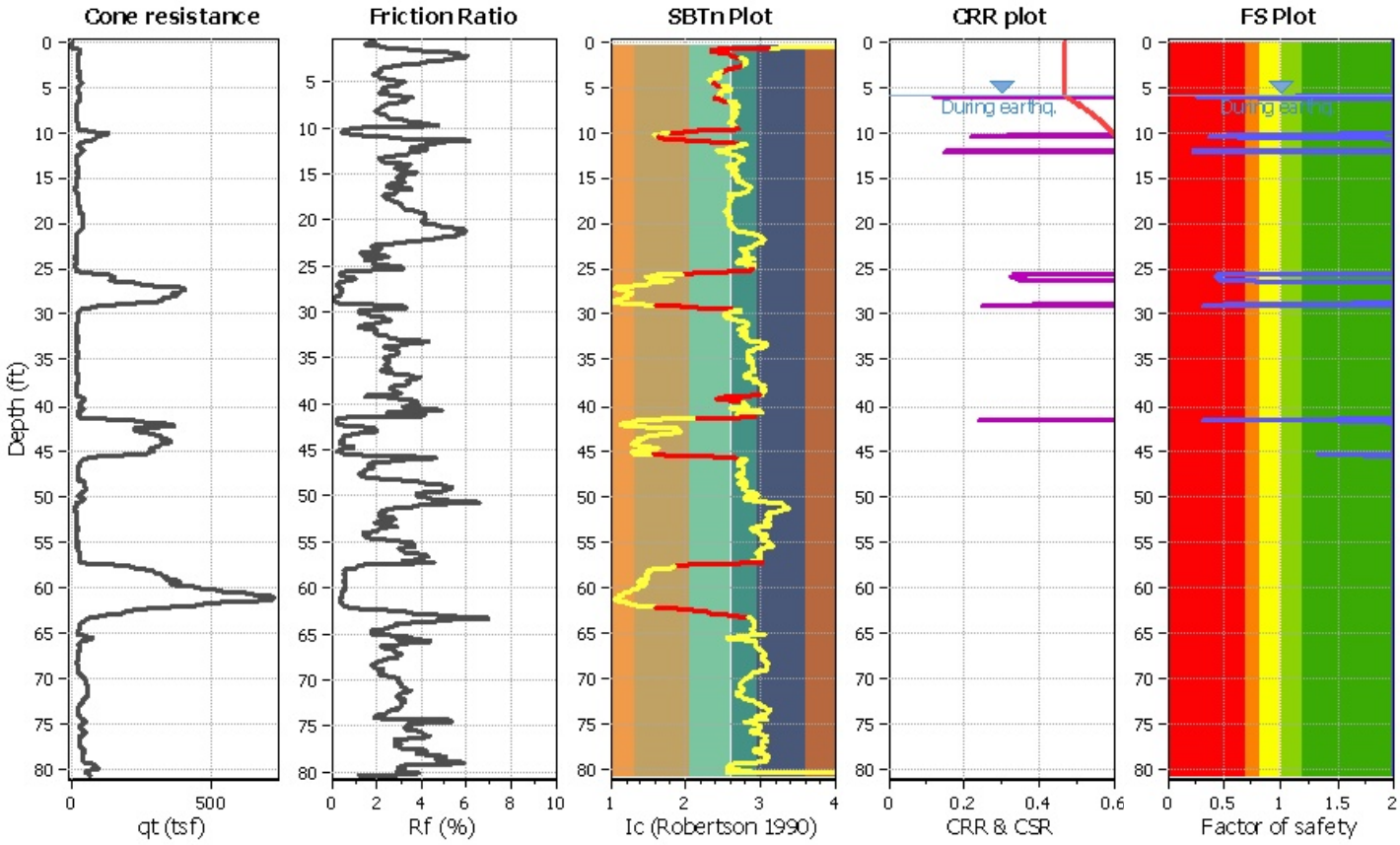
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

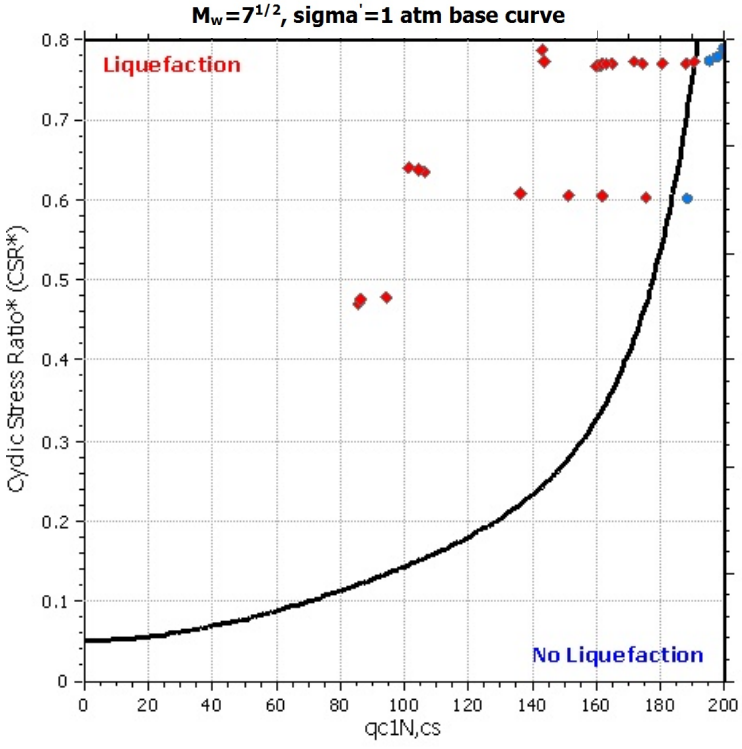
CPT file : 1-CPT5

Input parameters and analysis data

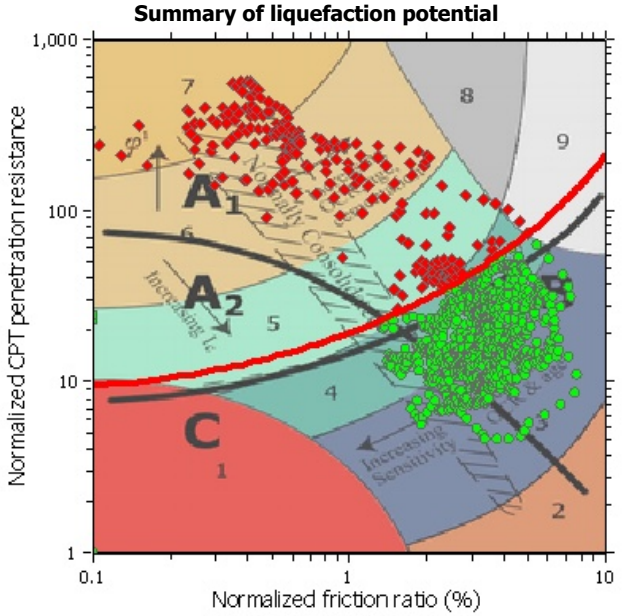
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.50	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

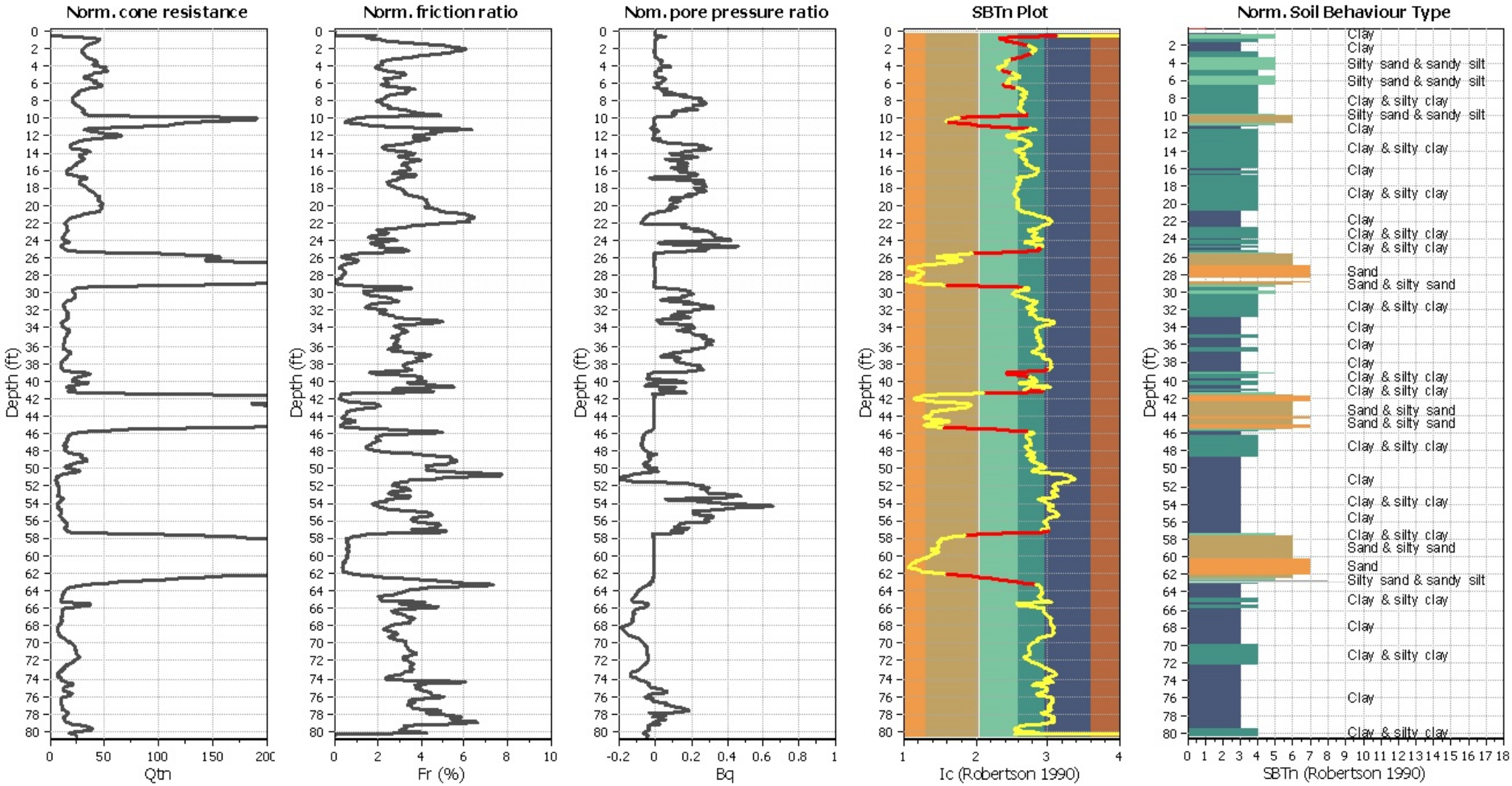


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



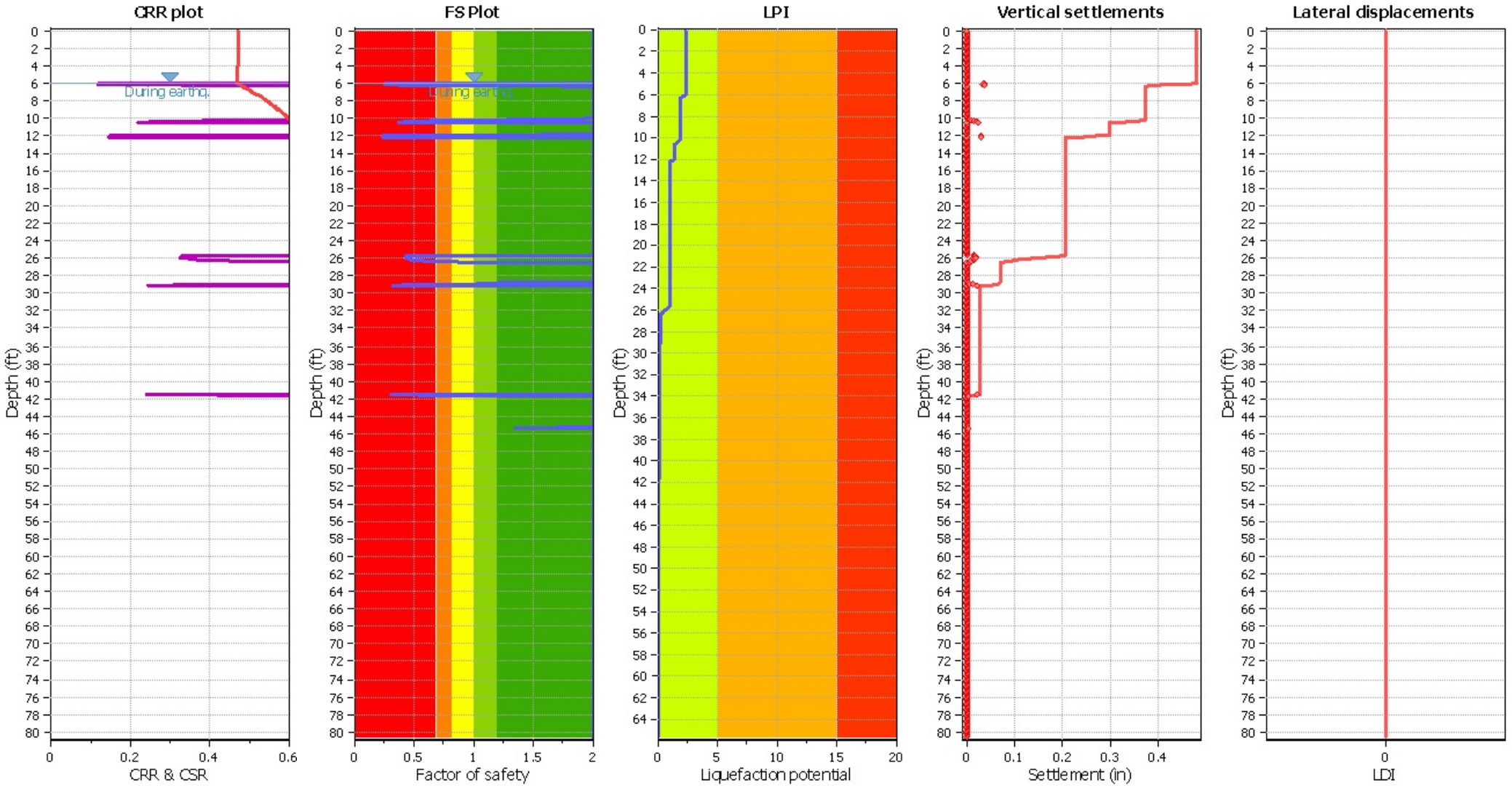
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

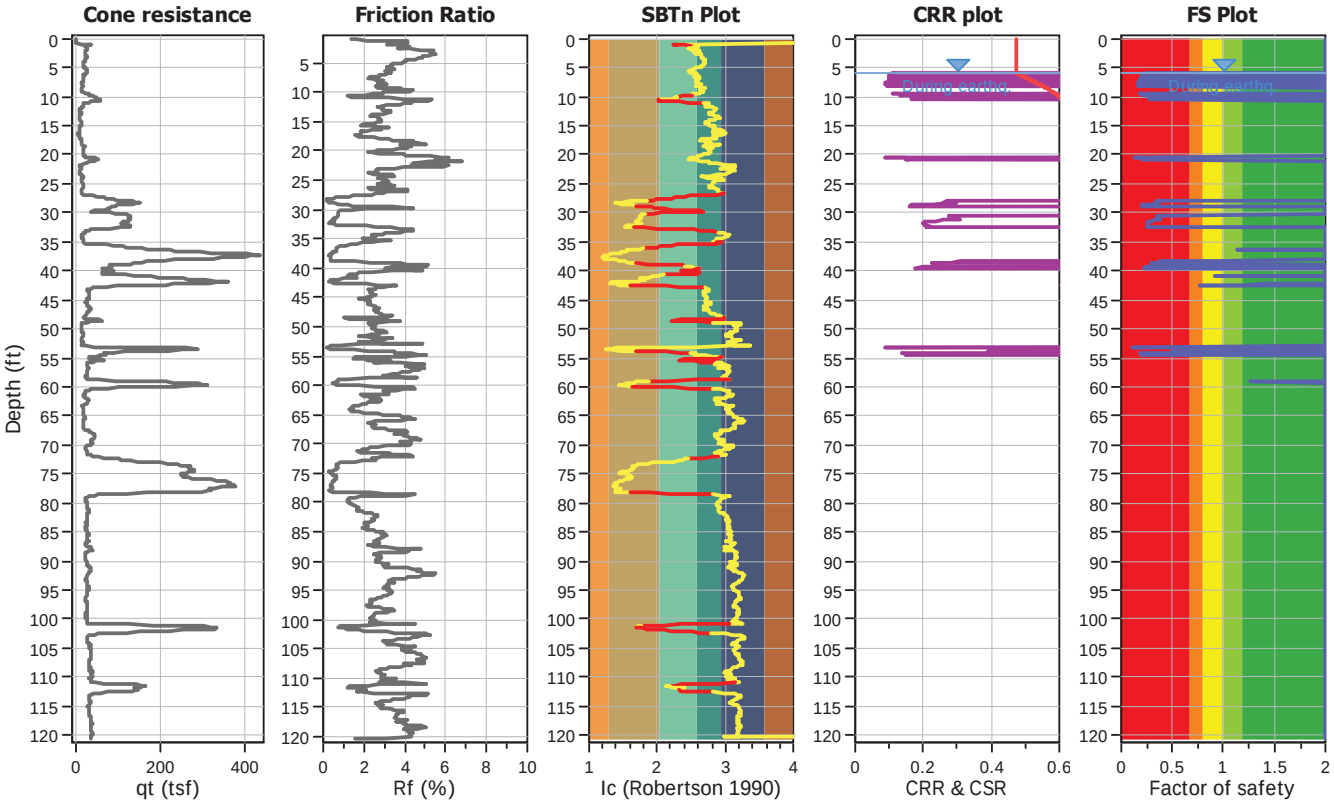
LIQUEFACTION ANALYSIS REPORT

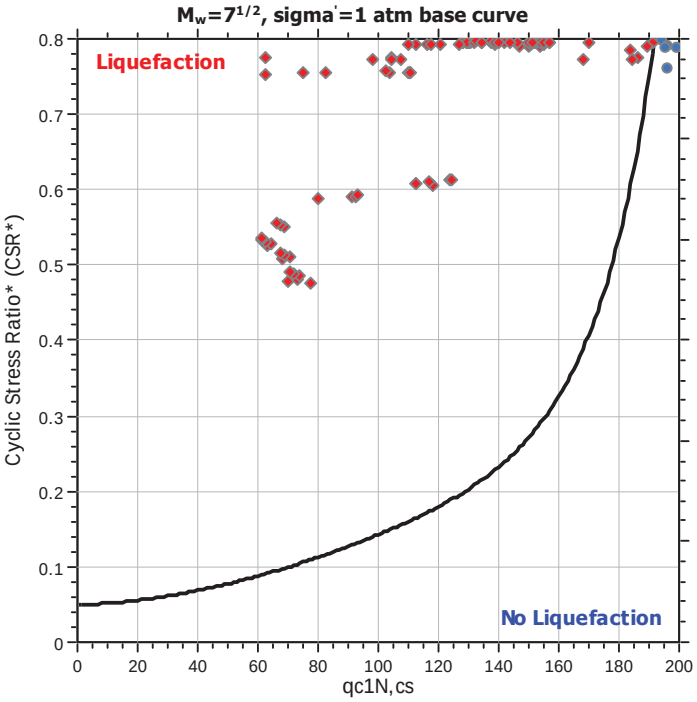
Project title : Google Parcels GEX **Location : Mountain View, CA**

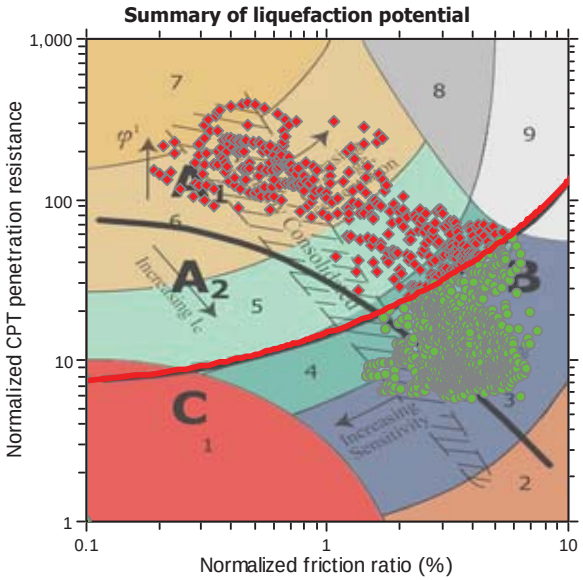
CPT file : 1-CPT6

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method

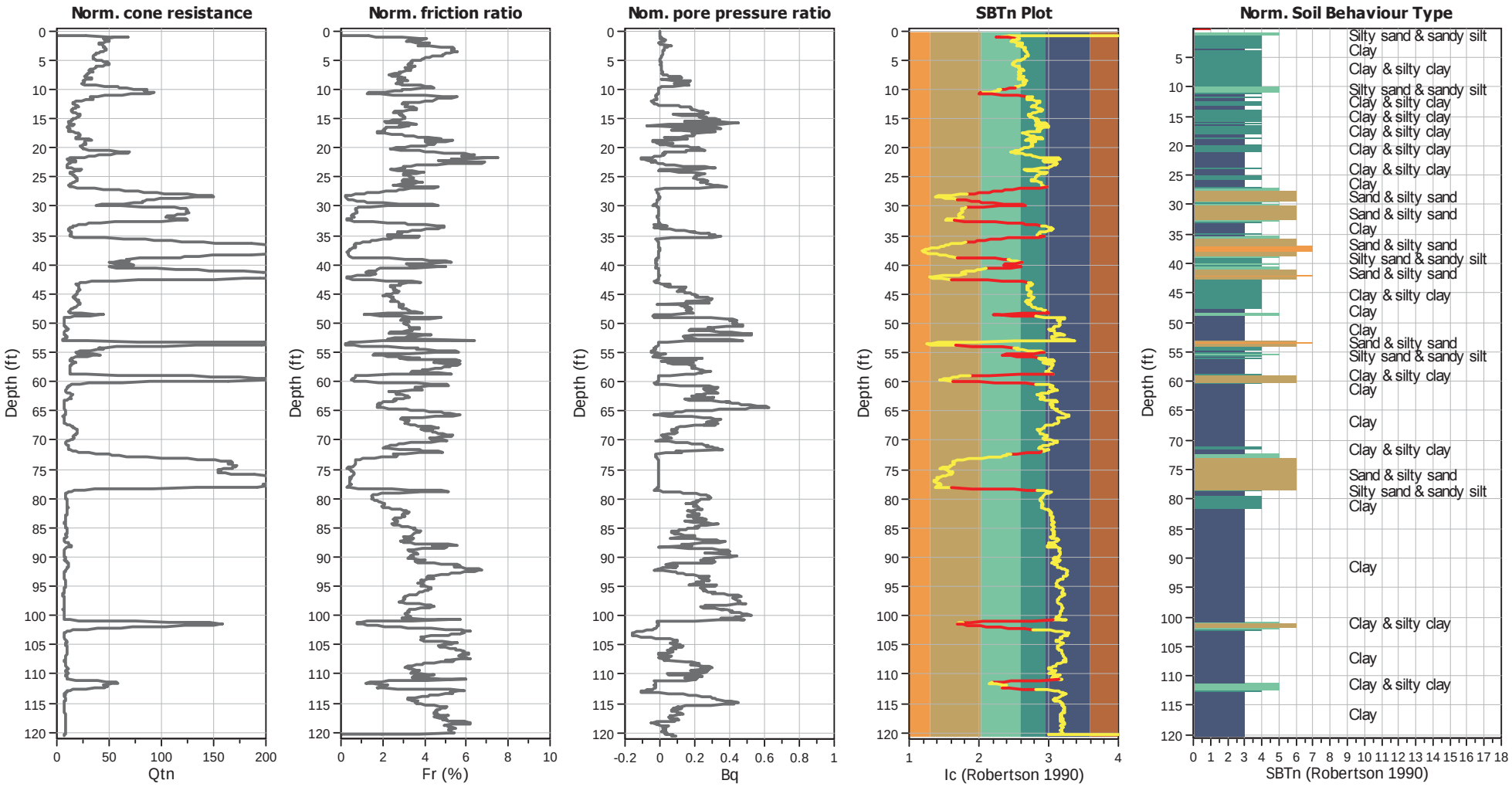






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



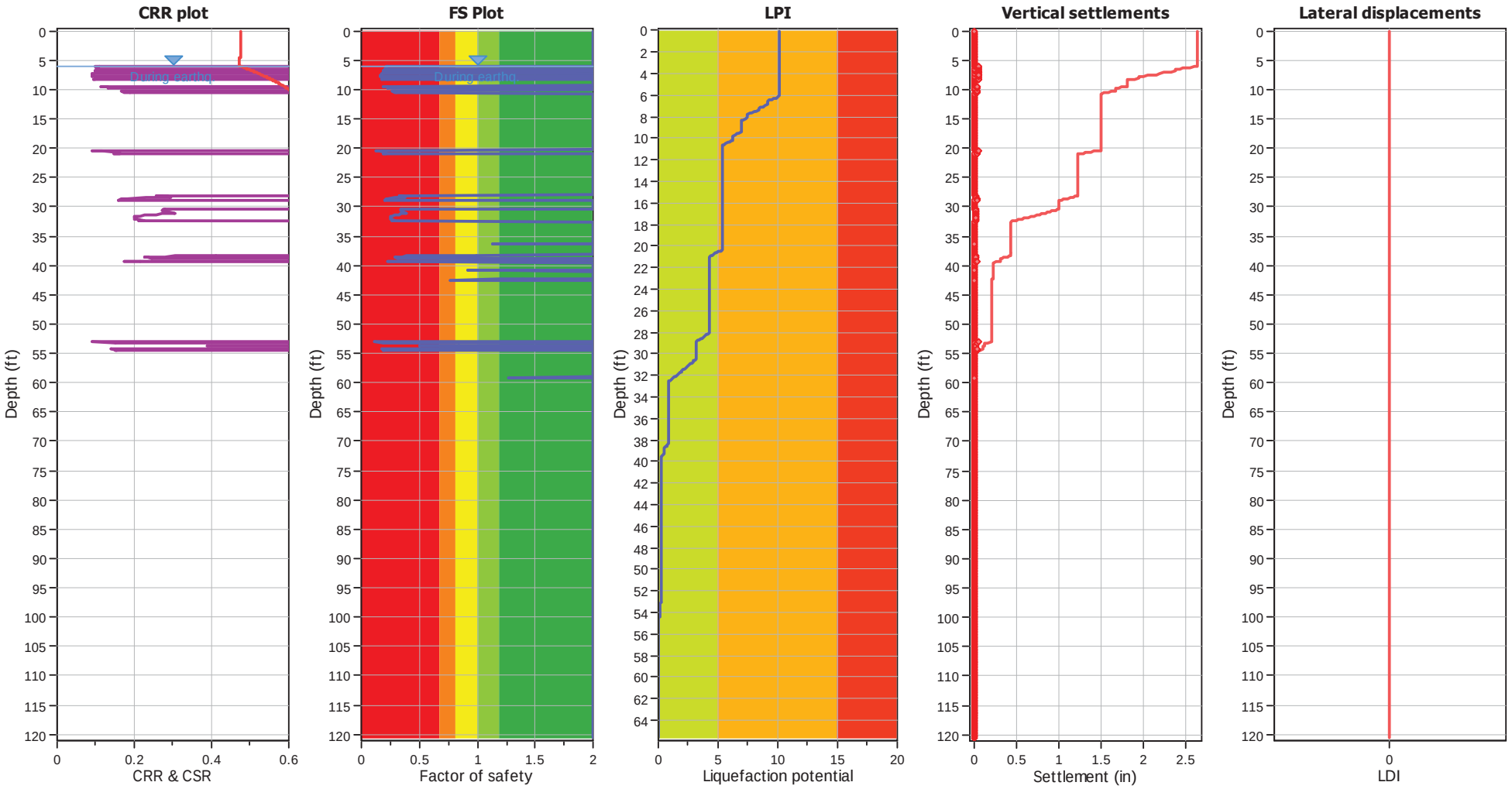
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

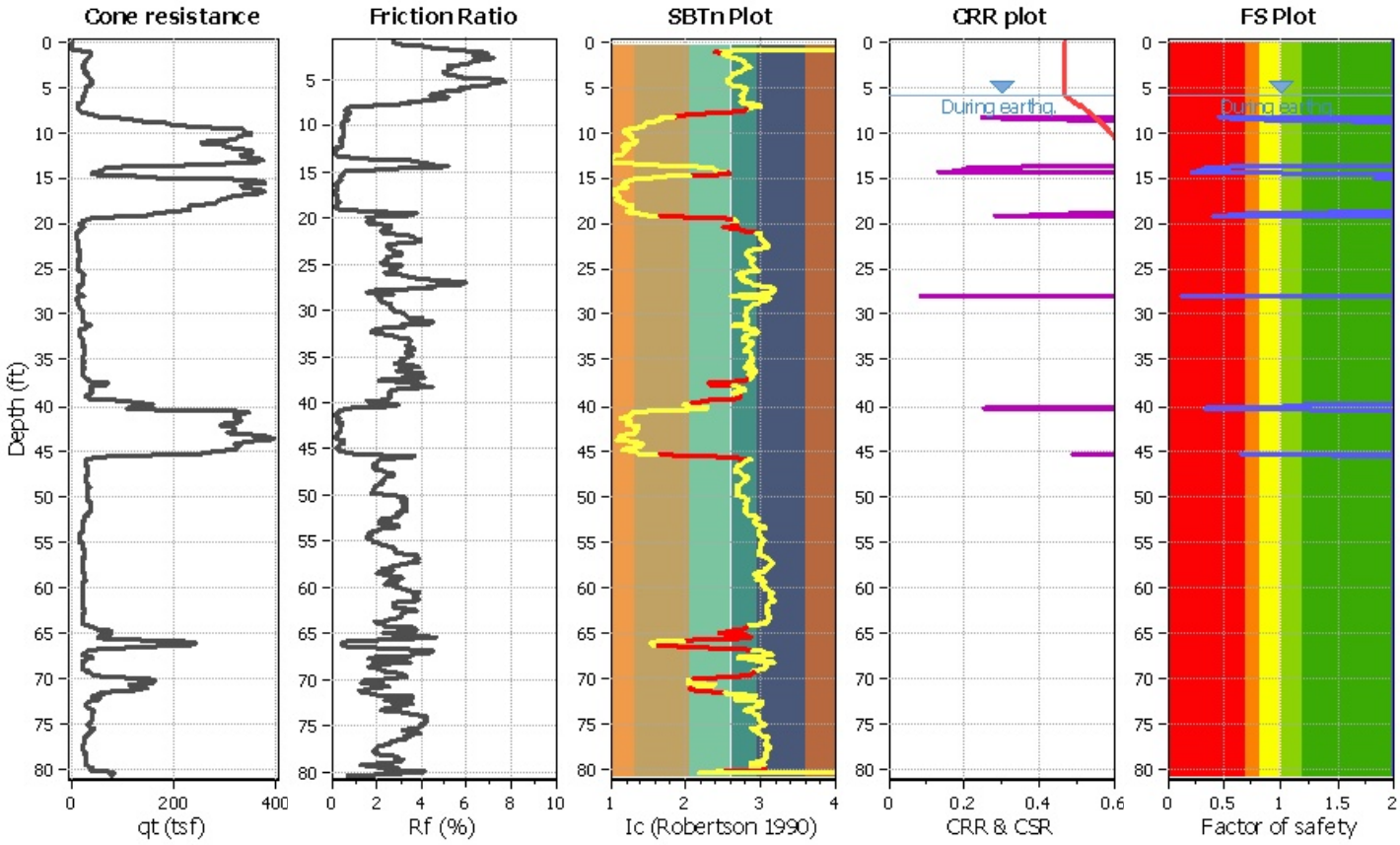
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

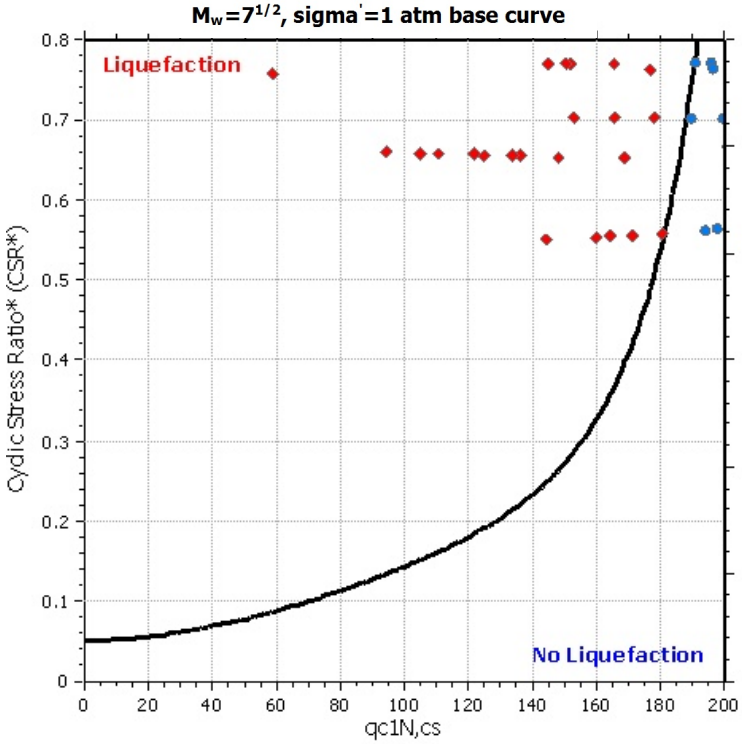
CPT file : 1-CPT7

Input parameters and analysis data

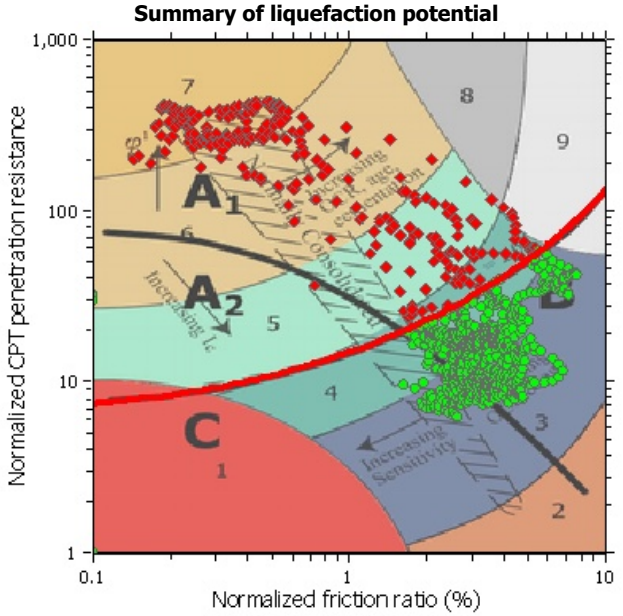
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

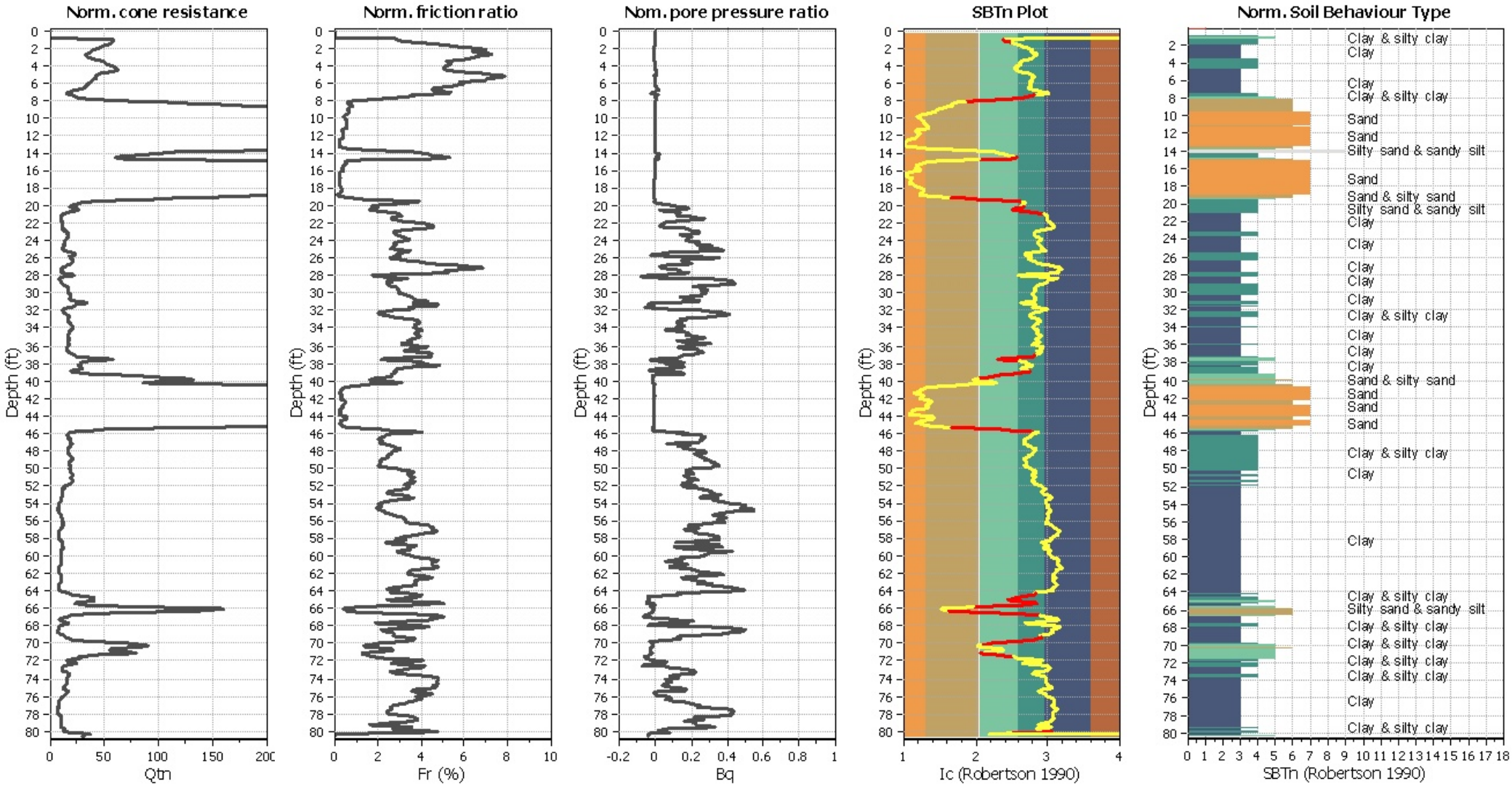


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



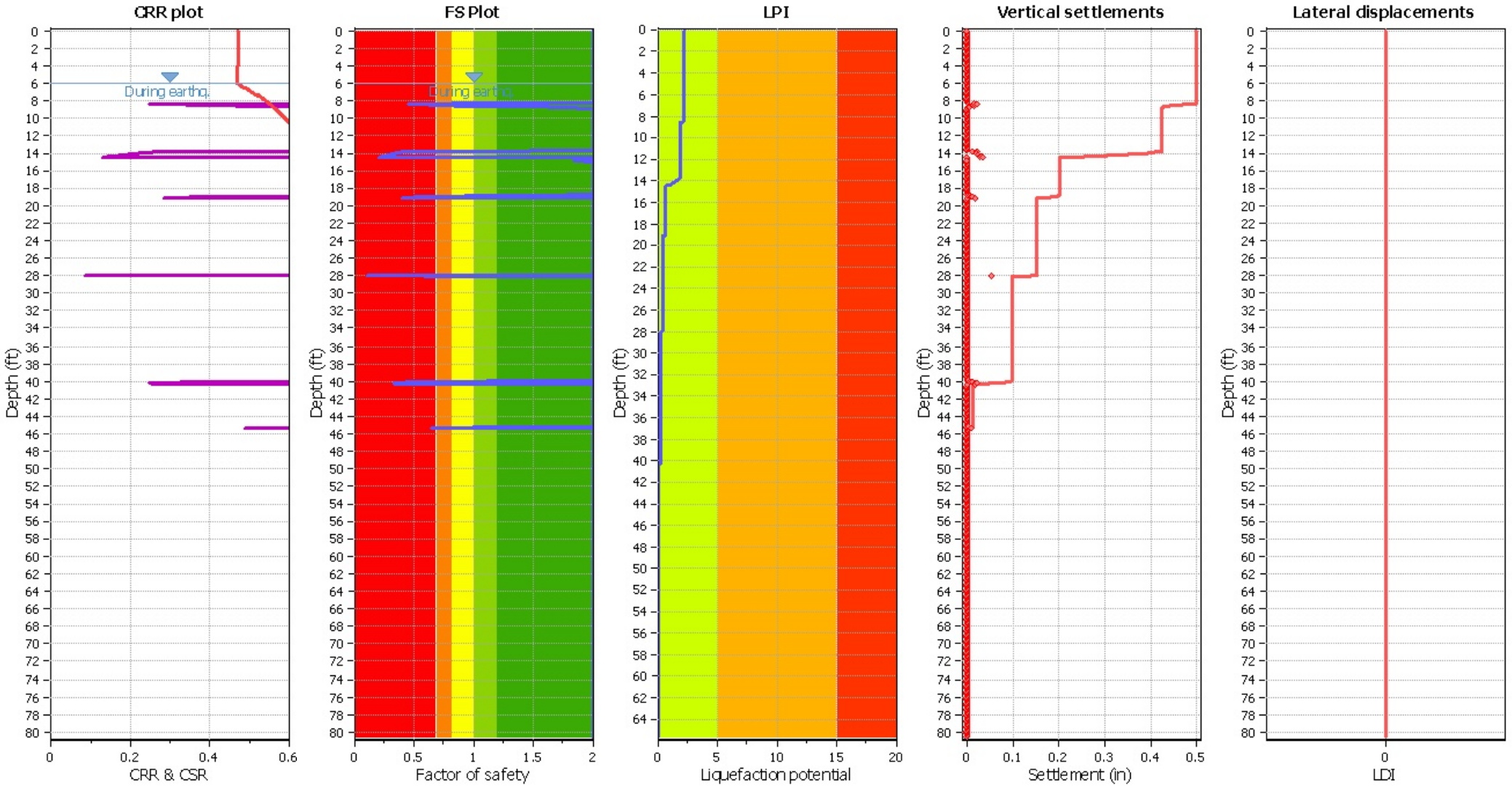
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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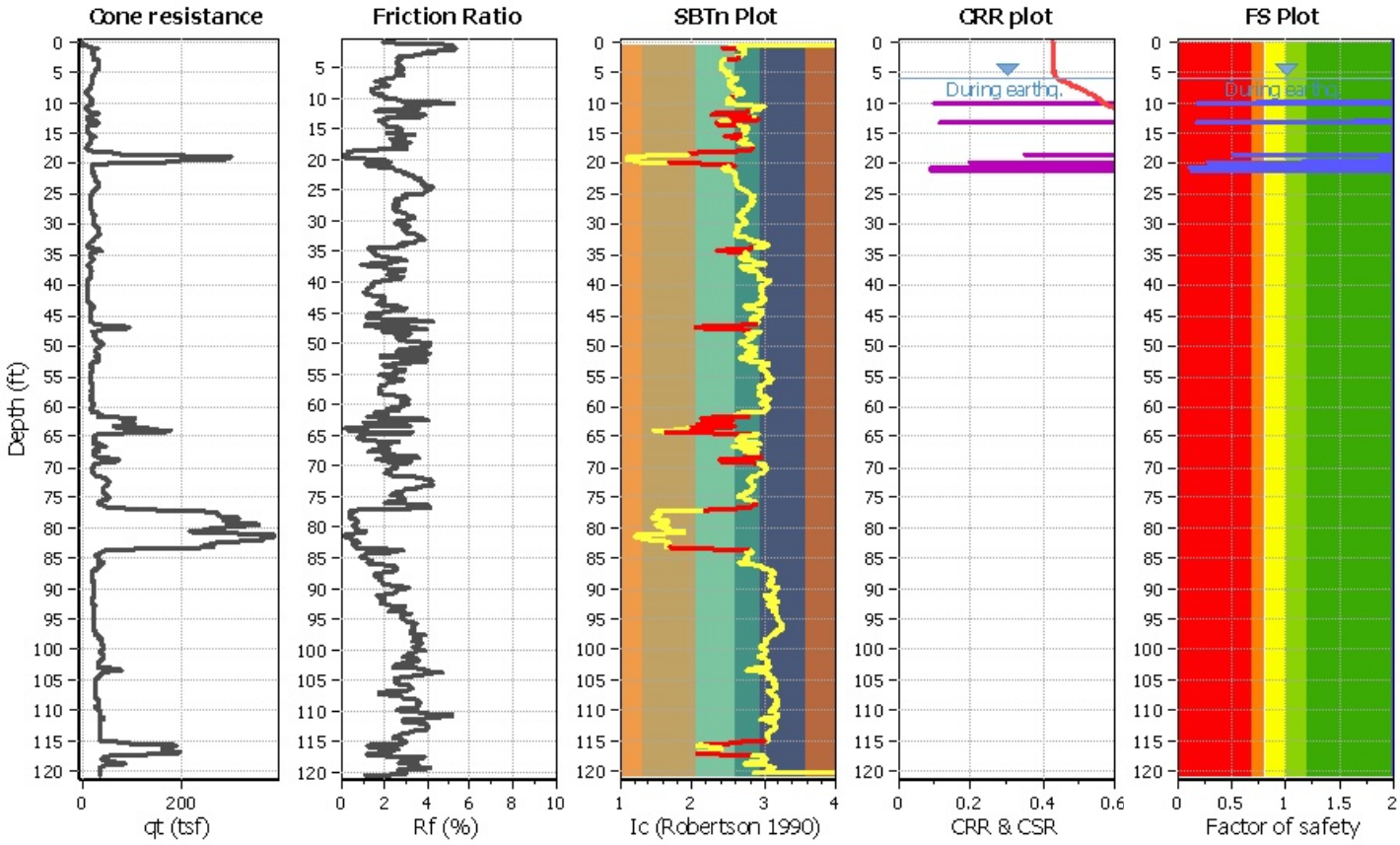
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

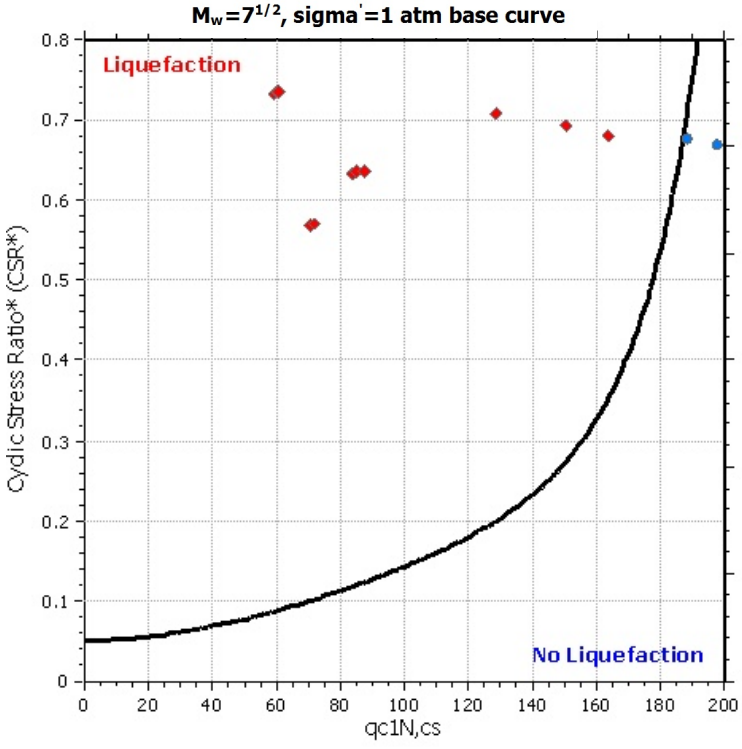
CPT file : 1-CPT8

Input parameters and analysis data

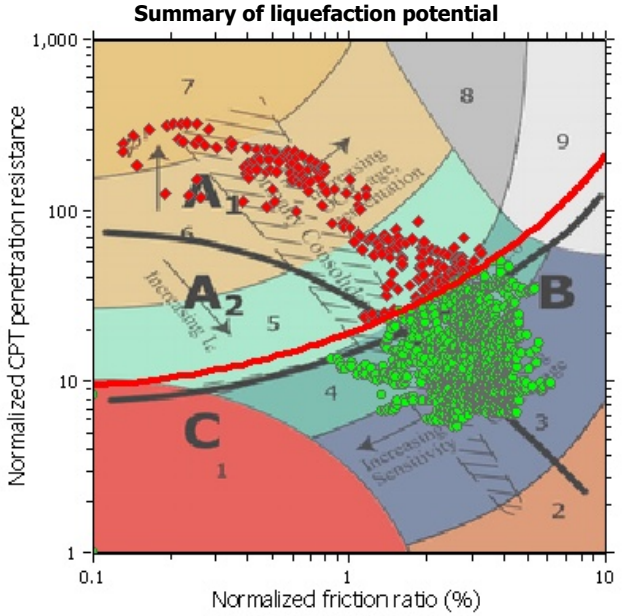
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.50	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

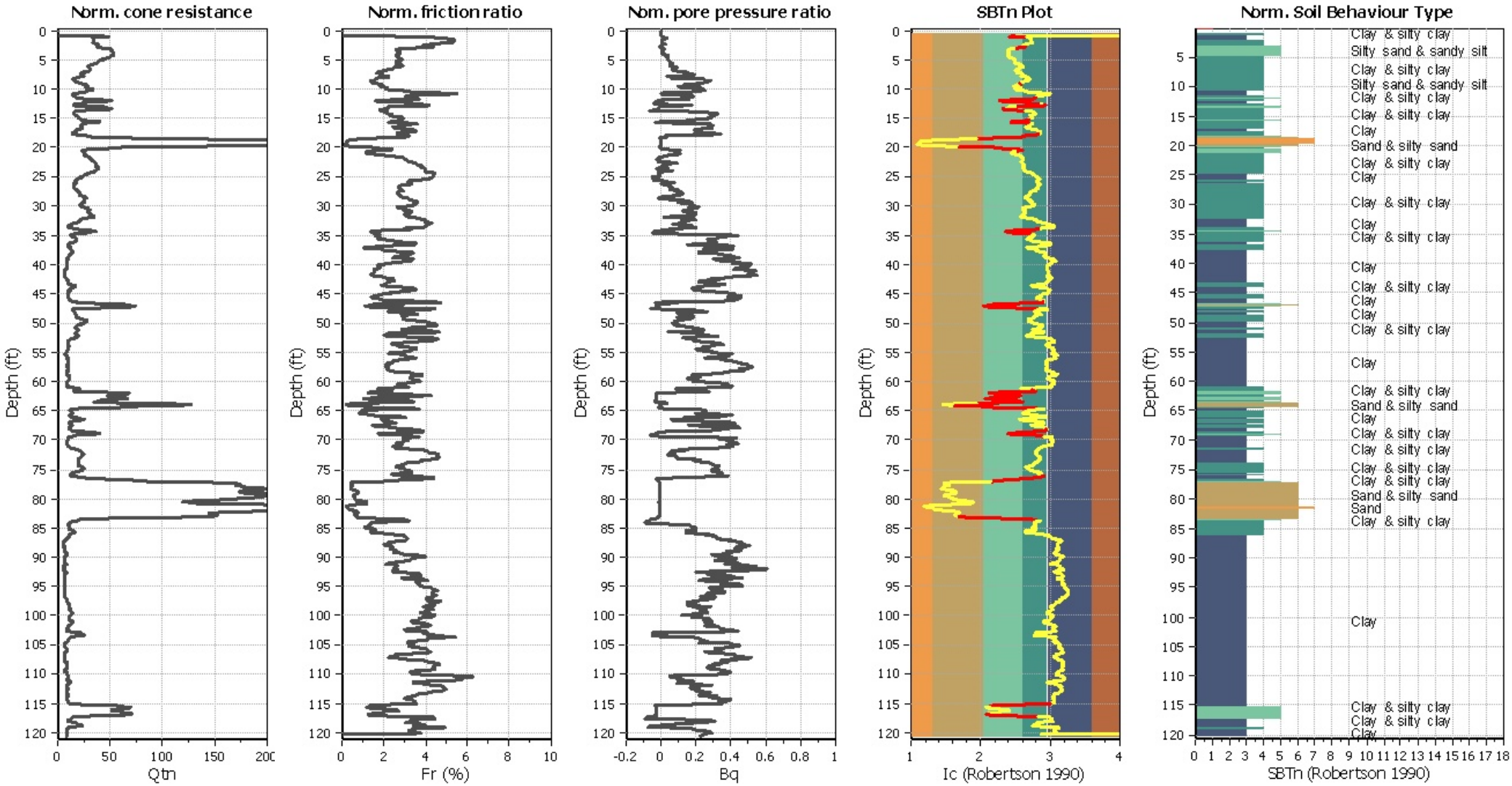


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



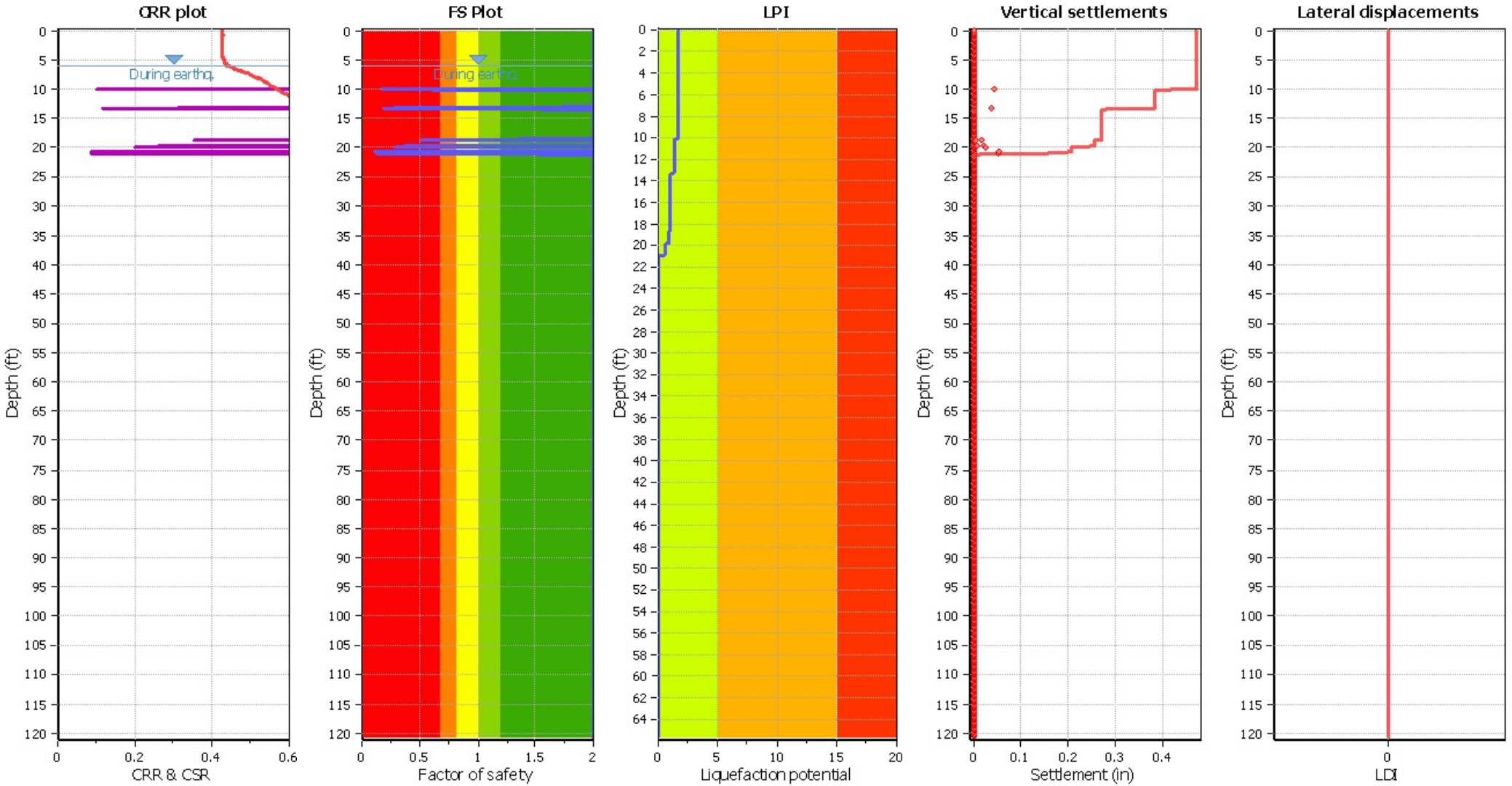
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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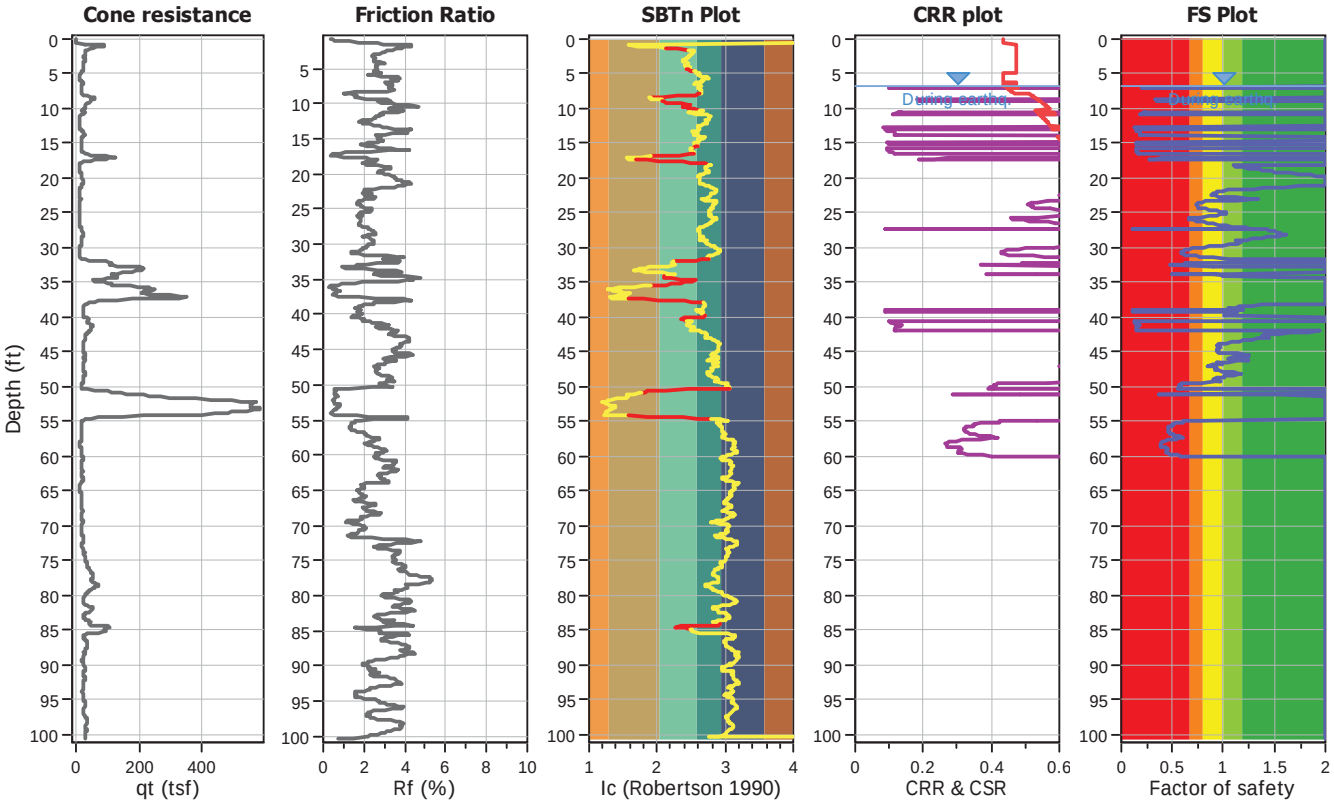
LIQUEFACTION ANALYSIS REPORT

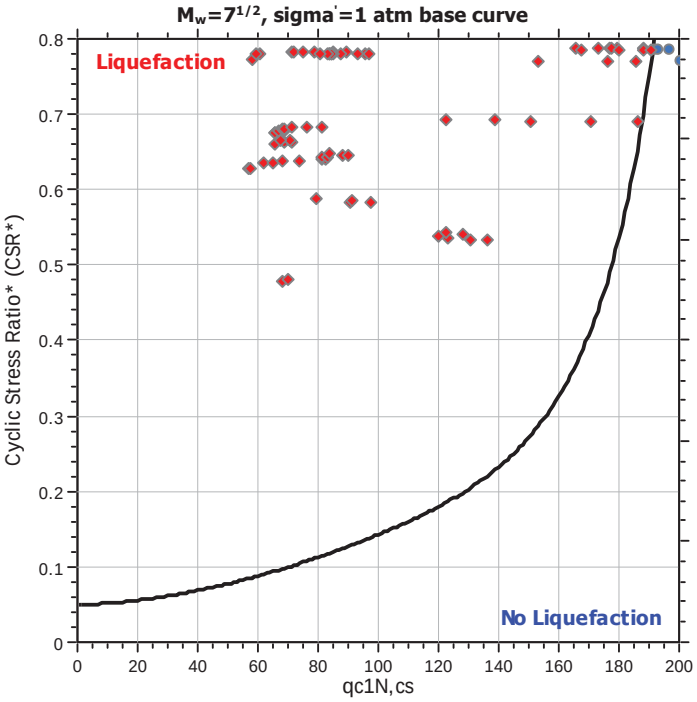
Project title : **Location :**

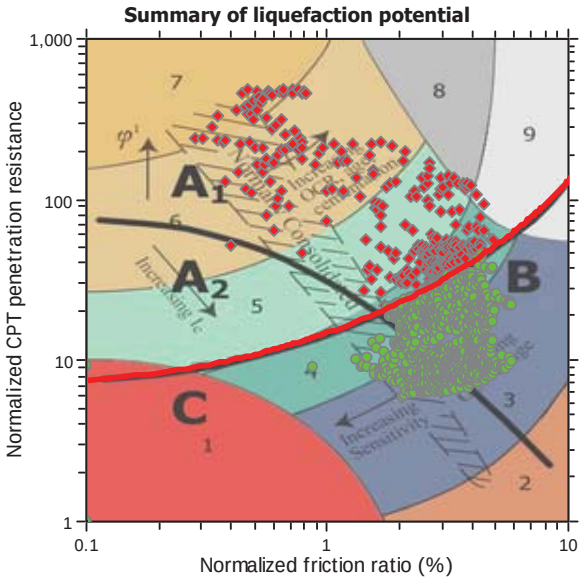
CPT file : 1-CPT9

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.80 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

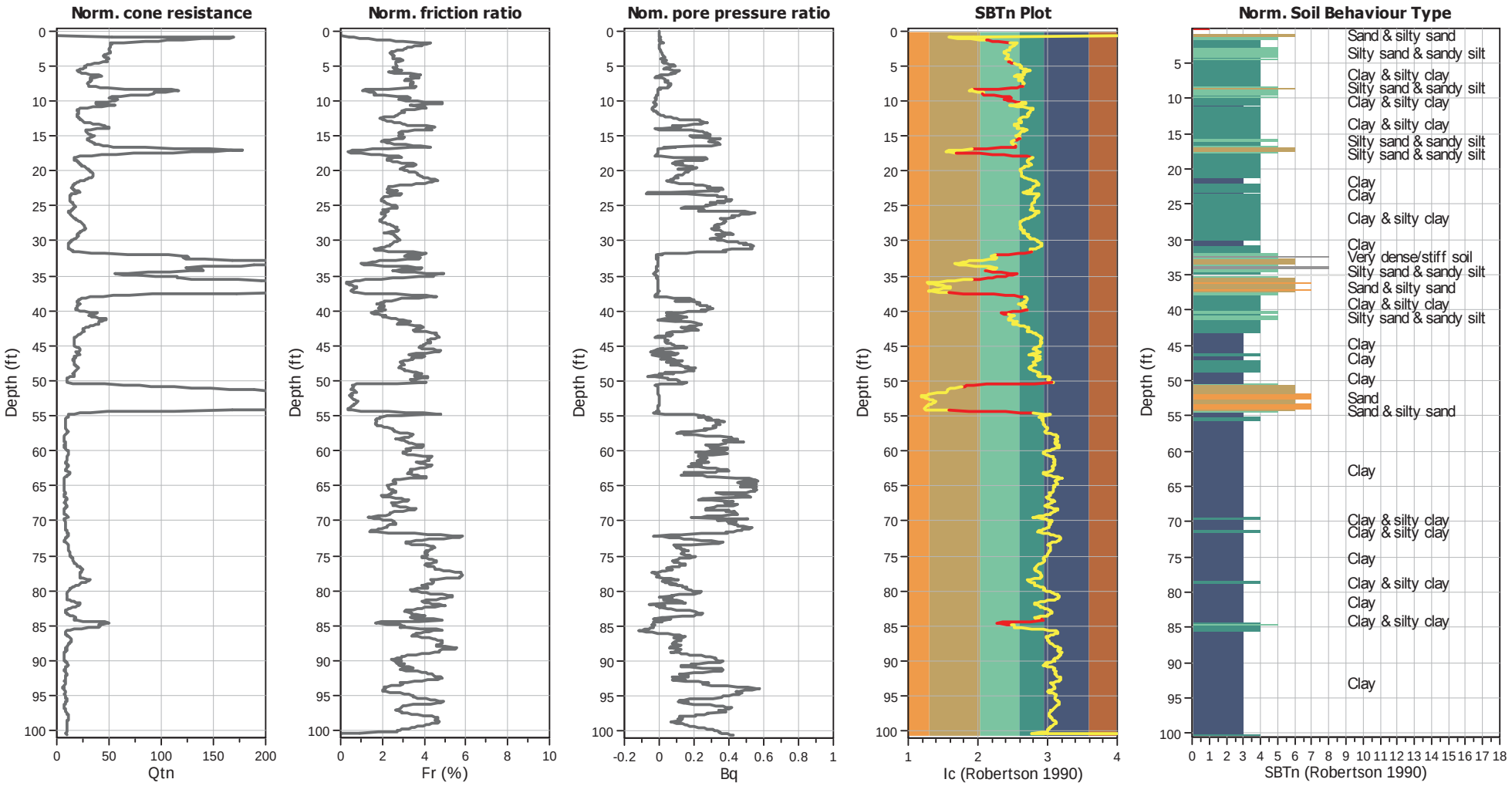






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



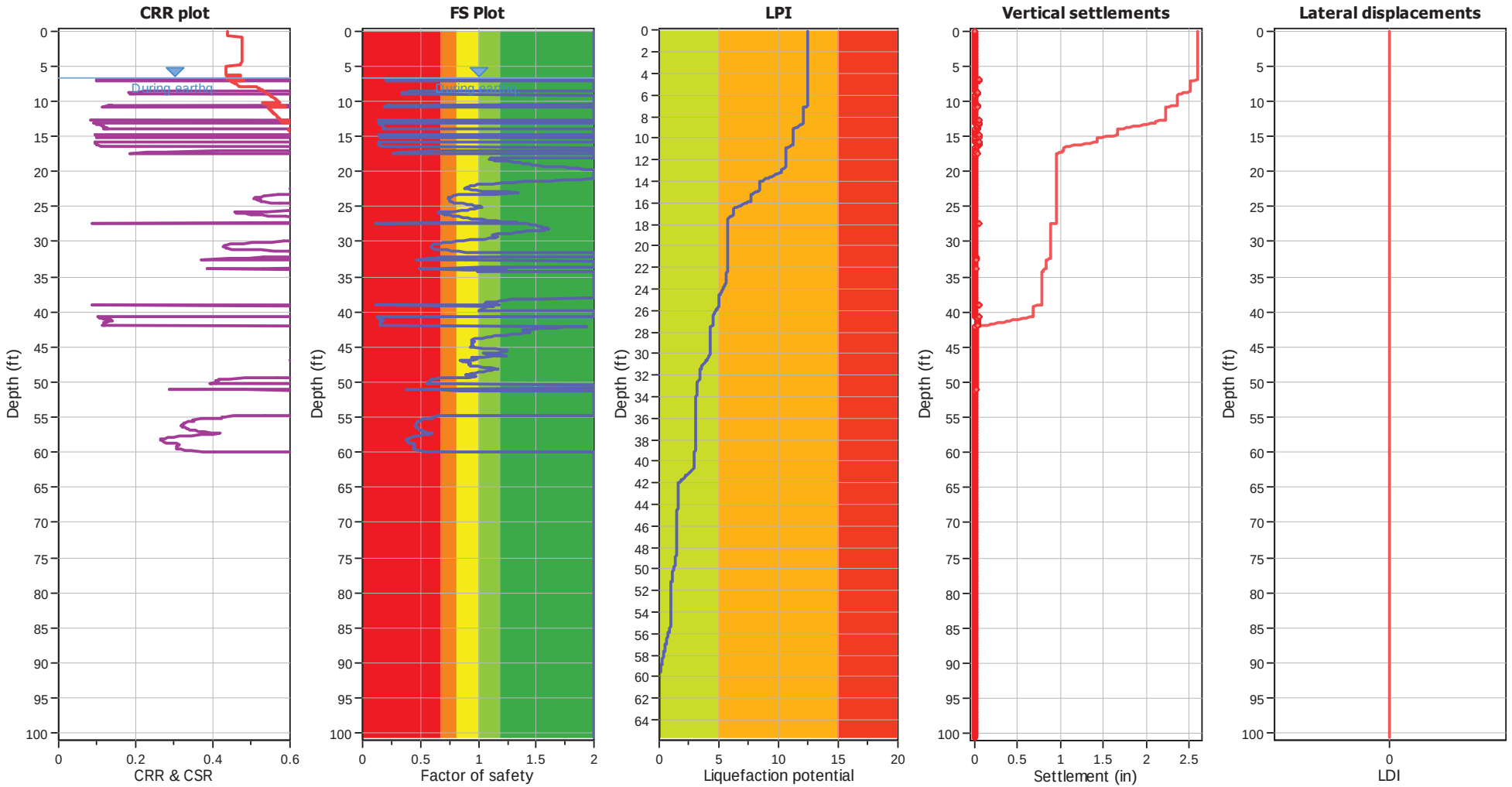
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.80 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.80 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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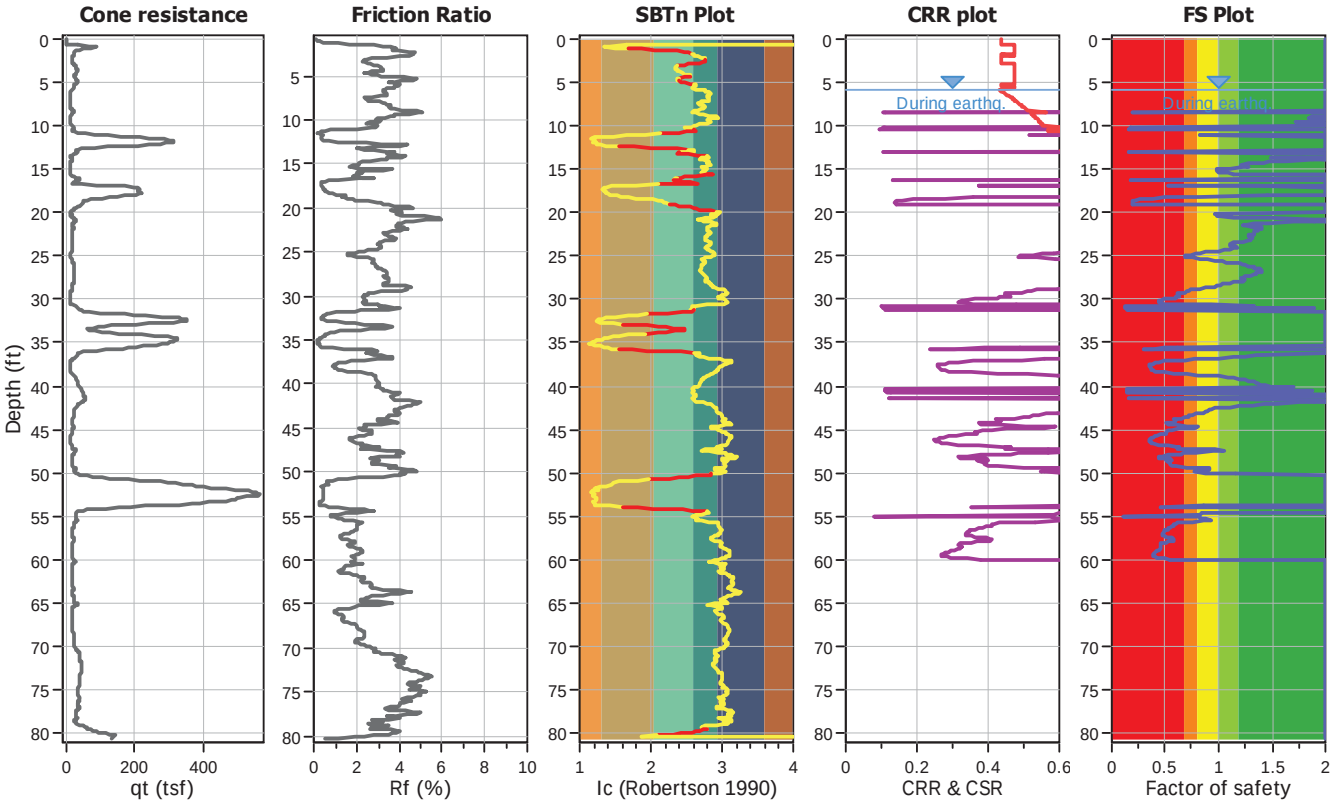
LIQUEFACTION ANALYSIS REPORT

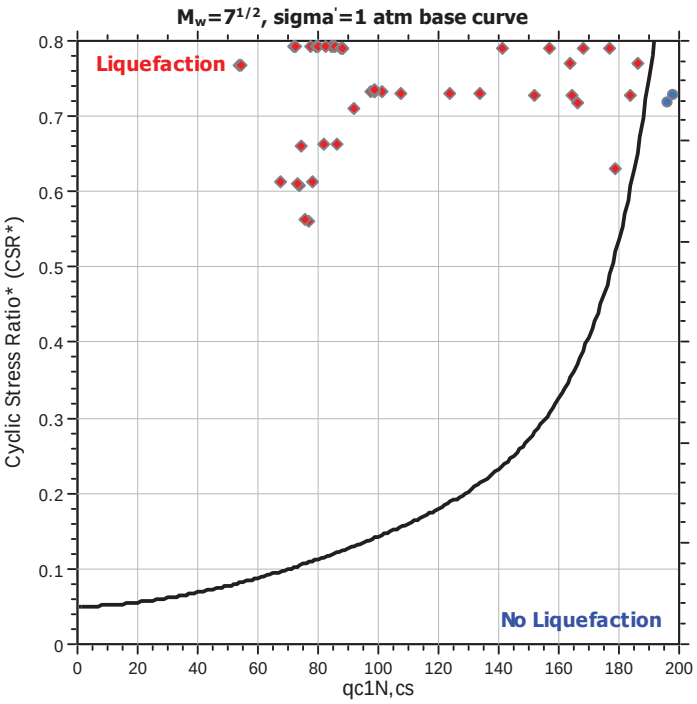
Project title : **Location :**

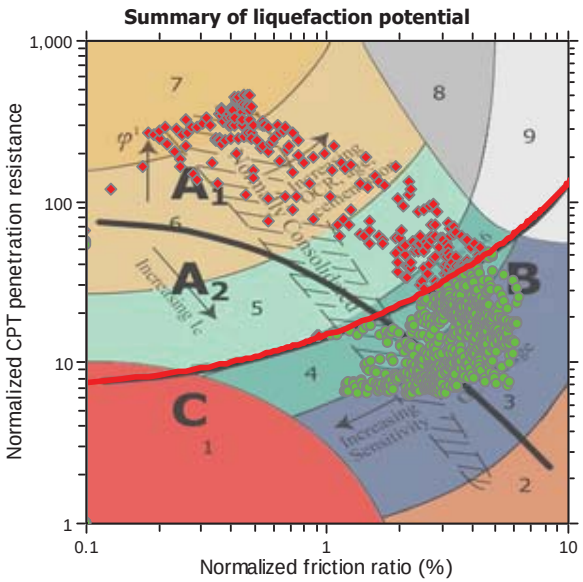
CPT file : 1-SCPT10

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

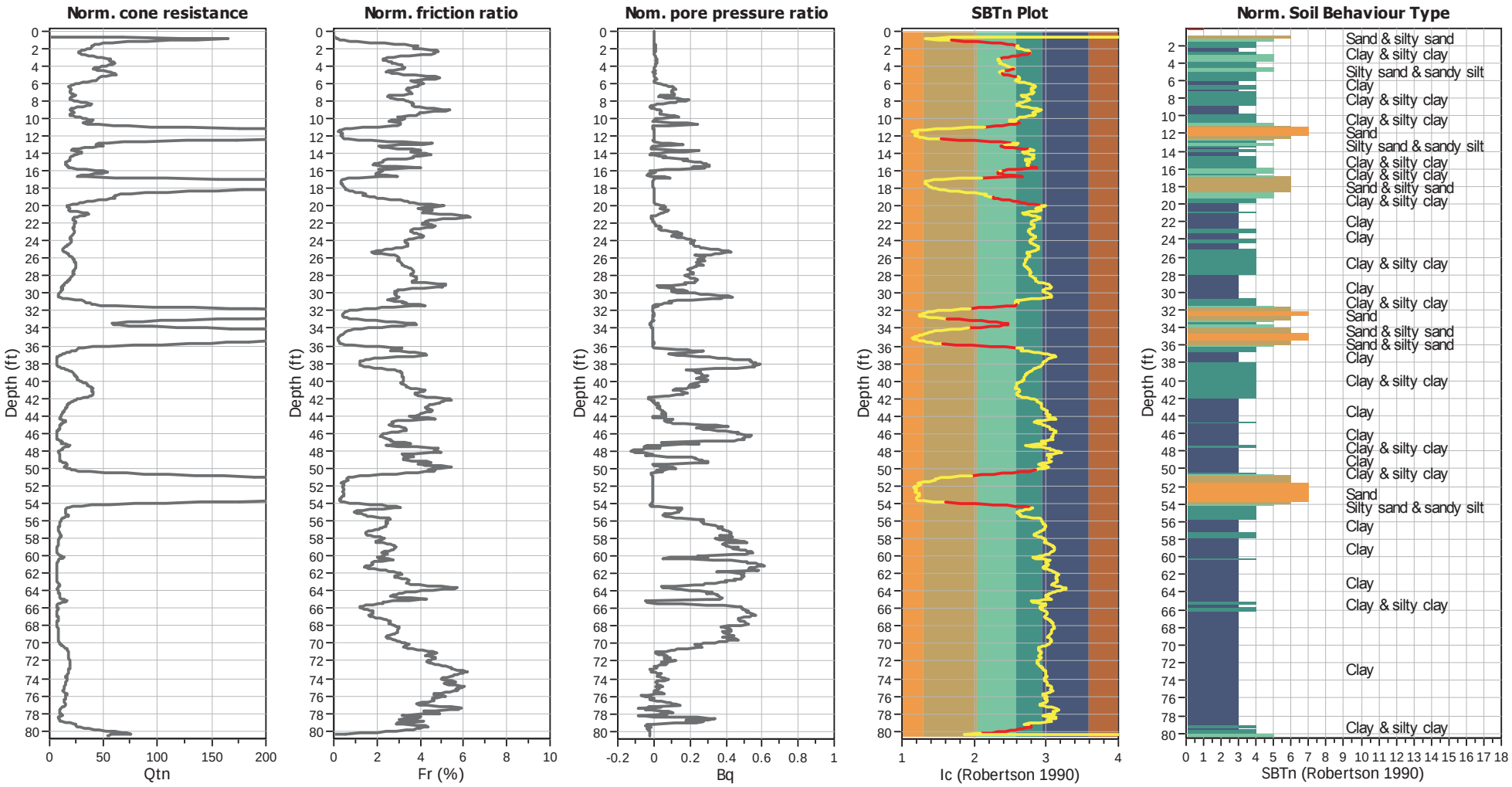






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



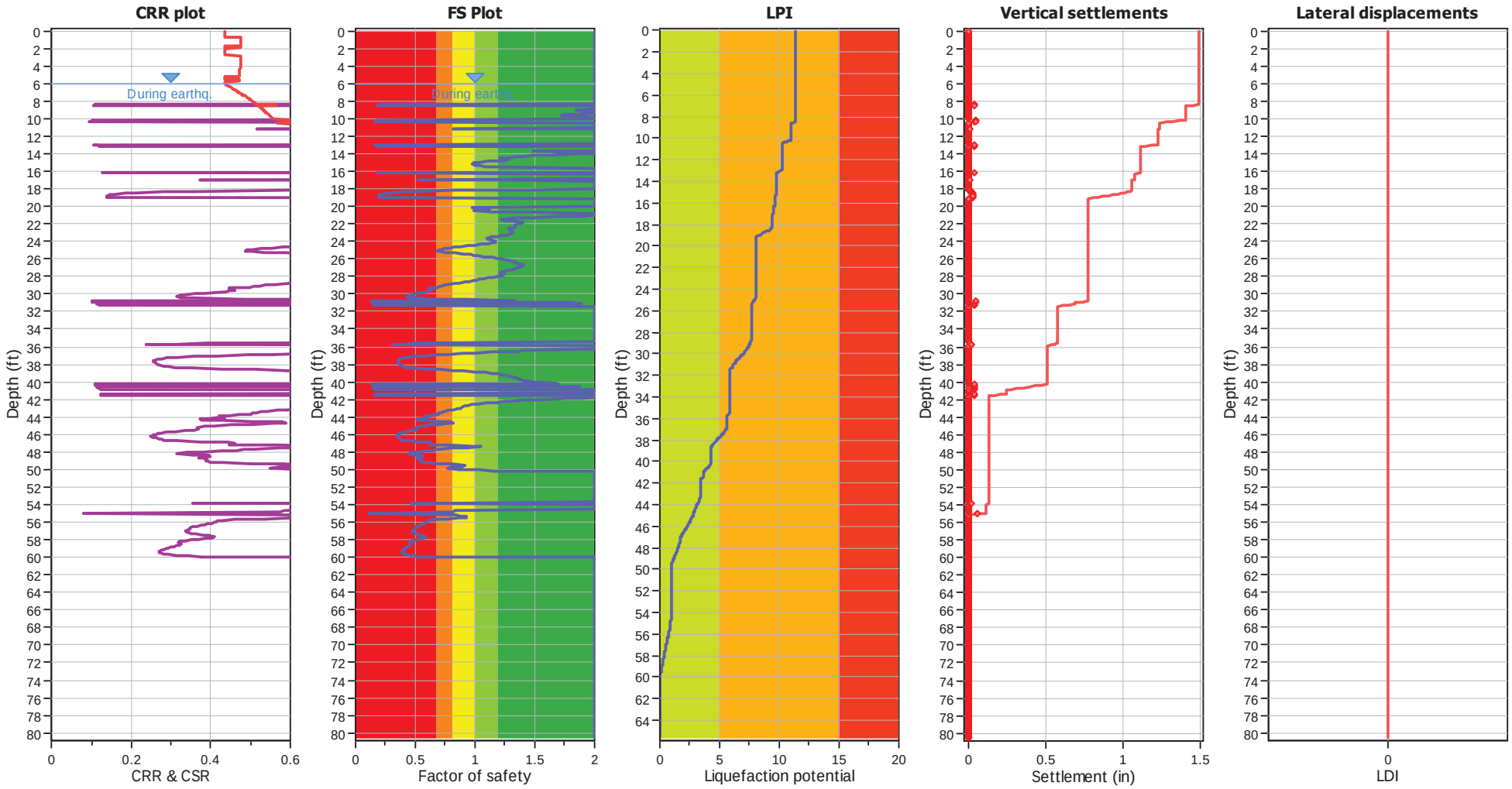
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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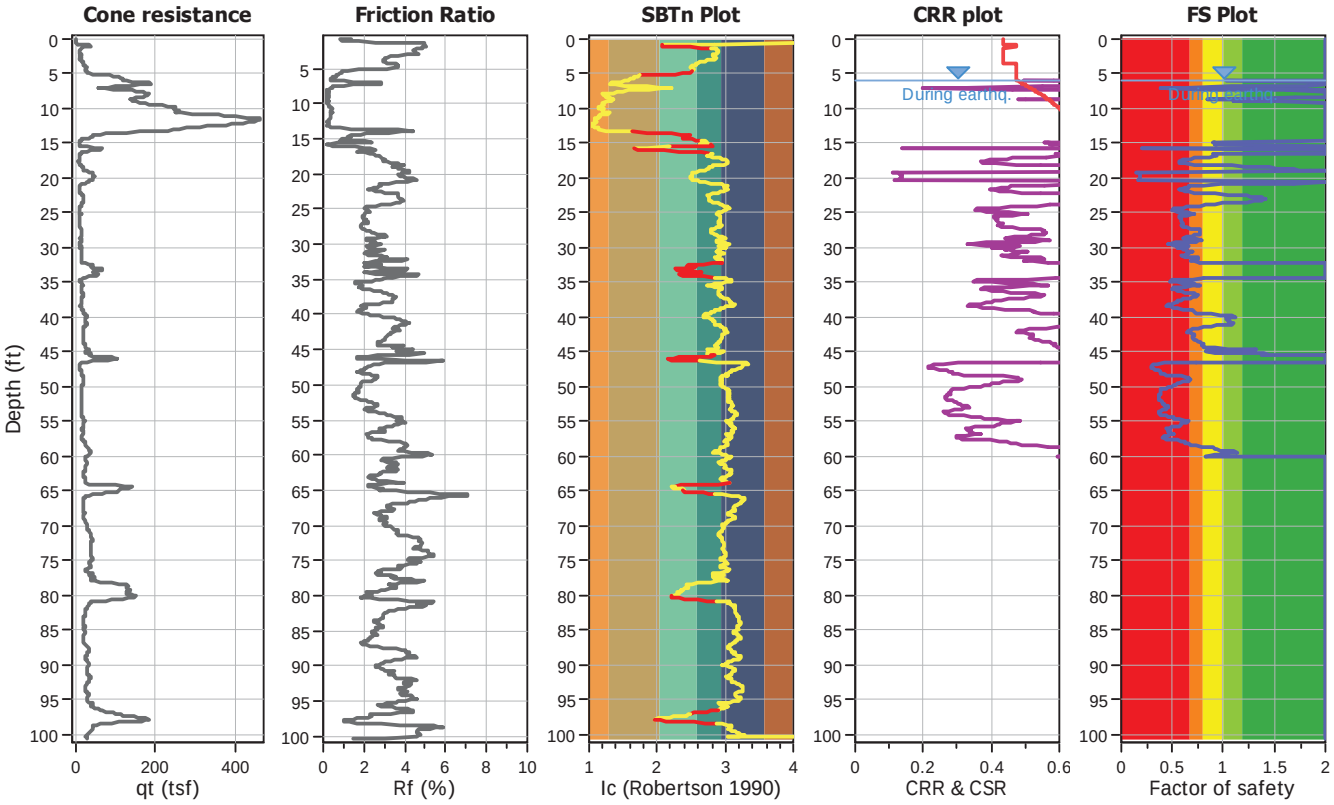
LIQUEFACTION ANALYSIS REPORT

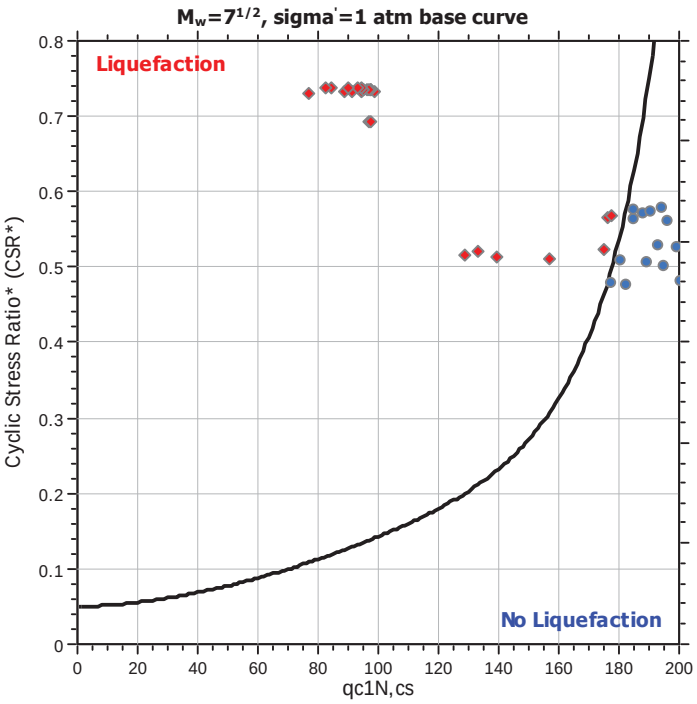
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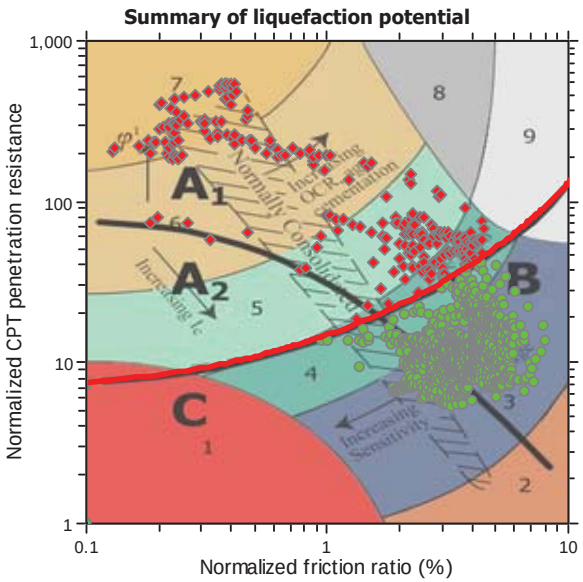
CPT file : 1-CPT11

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method

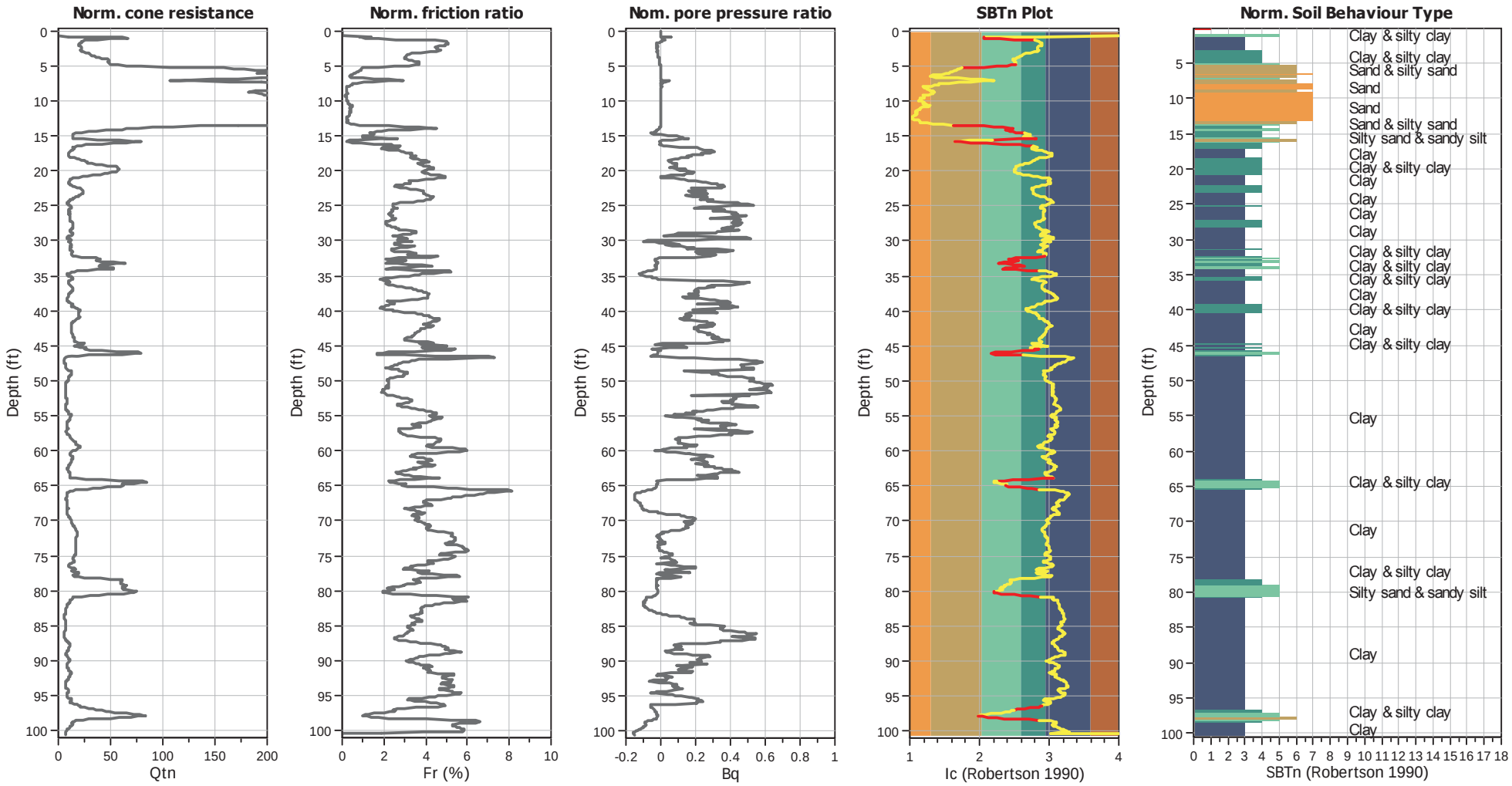






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



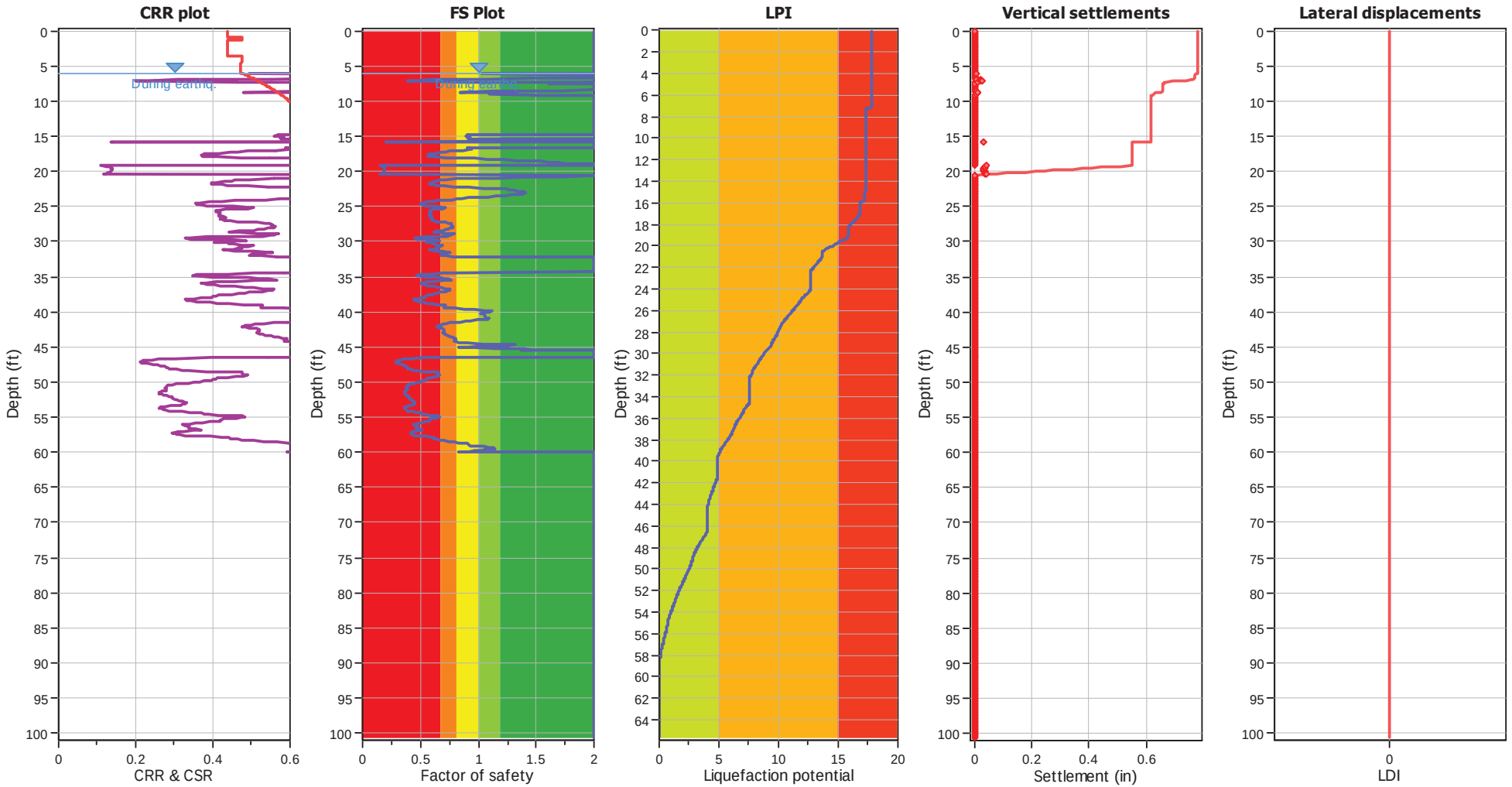
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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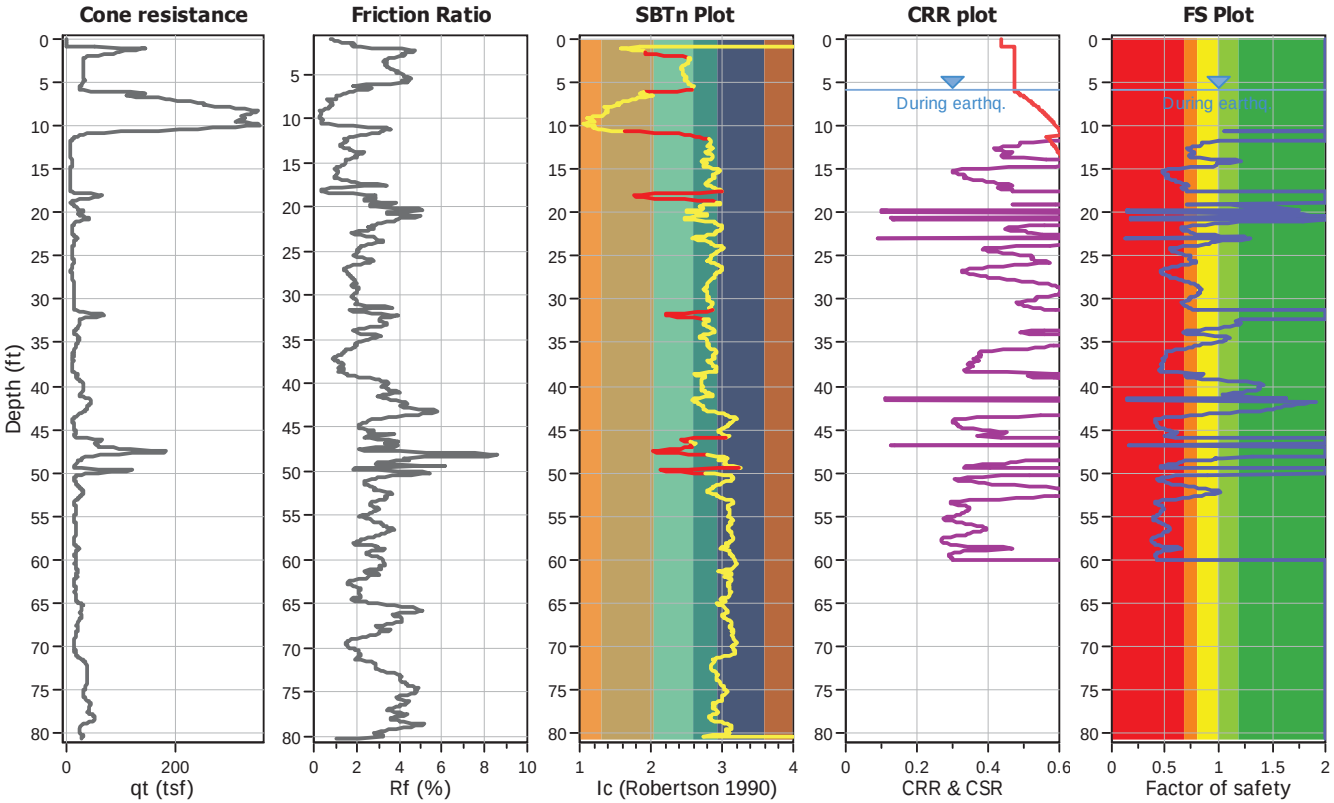
LIQUEFACTION ANALYSIS REPORT

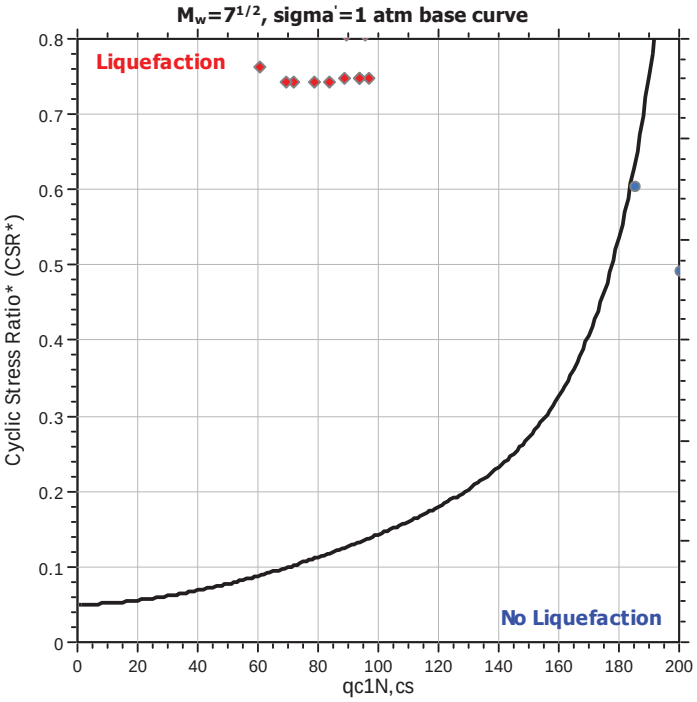
Project title : **Location :**

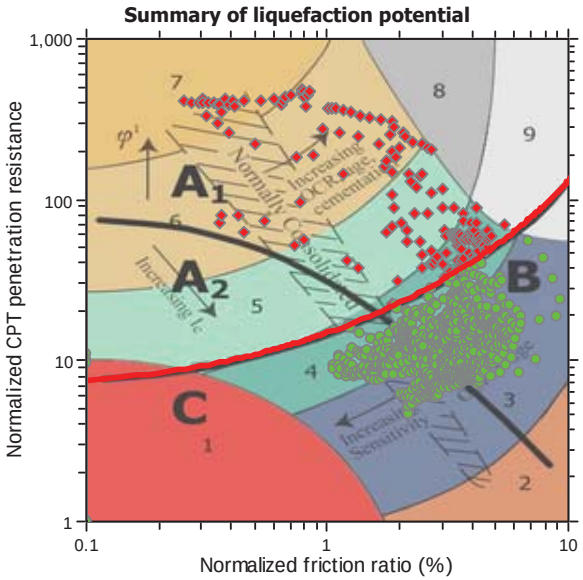
CPT file : 1-CPT12

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

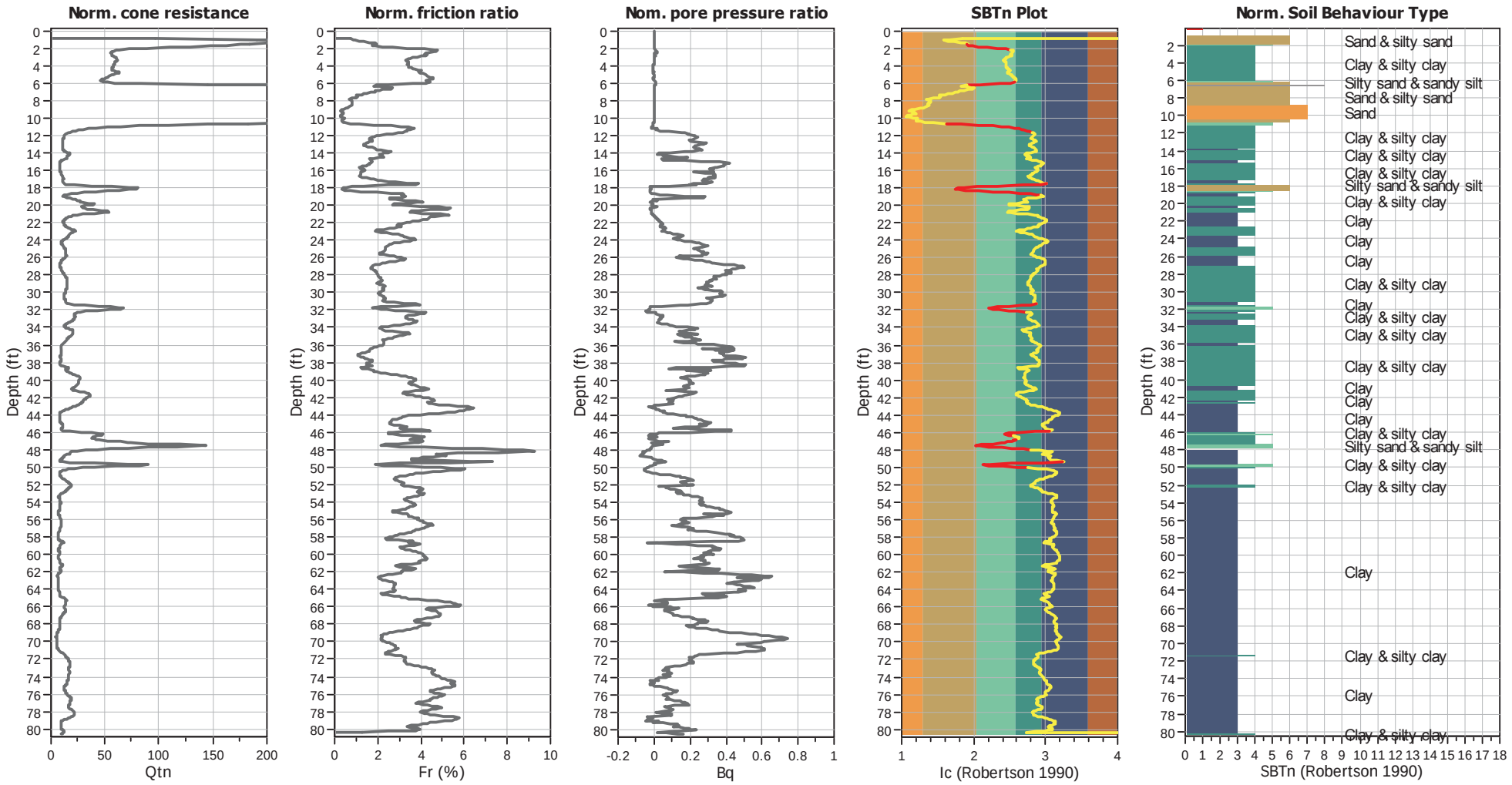






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



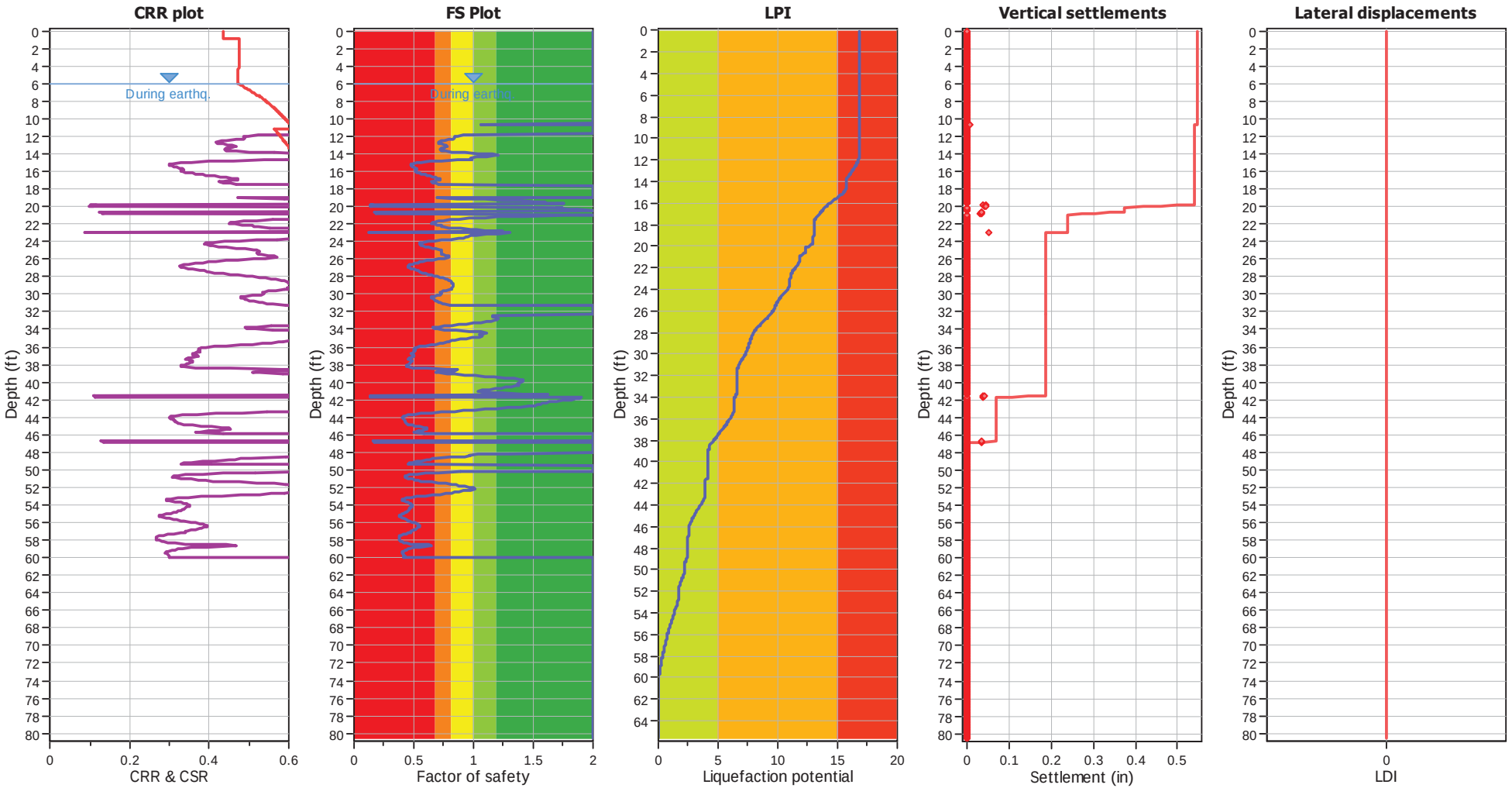
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

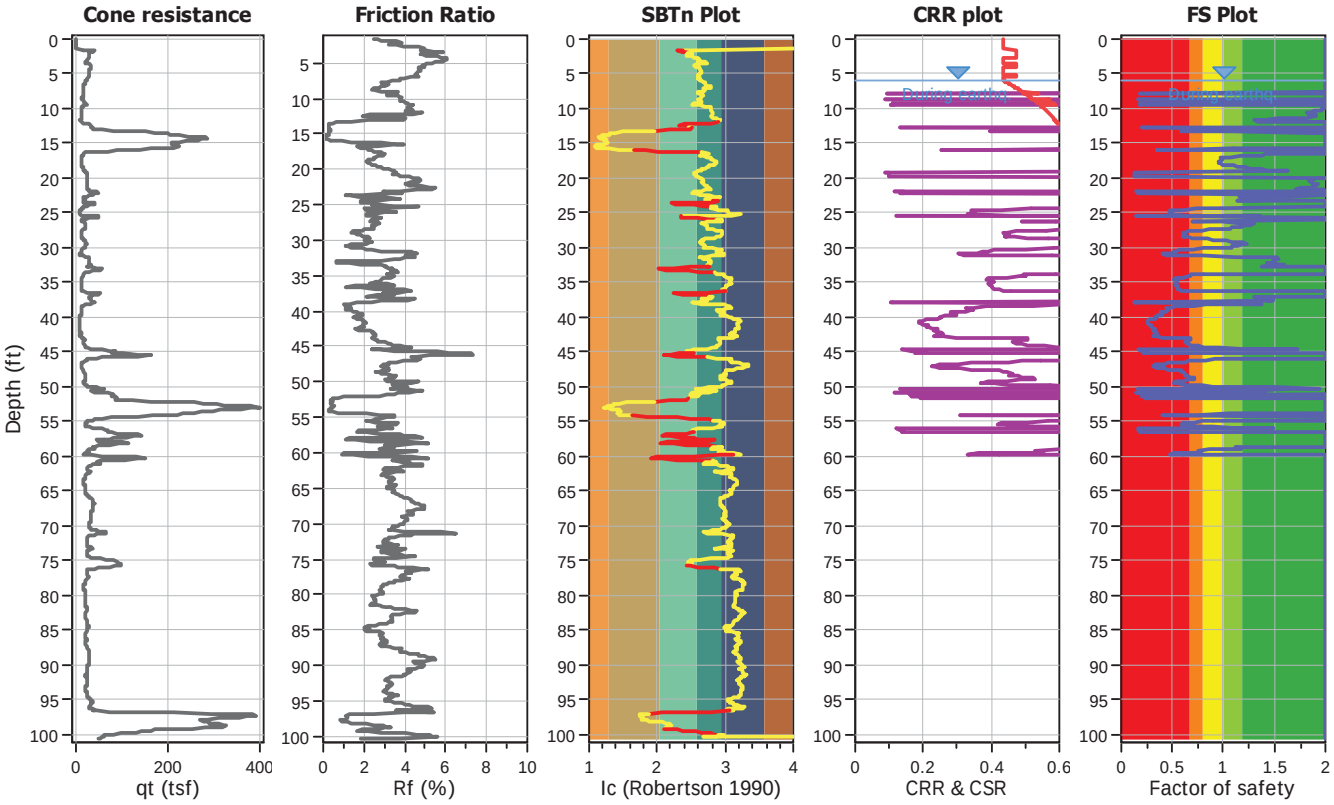
LIQUEFACTION ANALYSIS REPORT

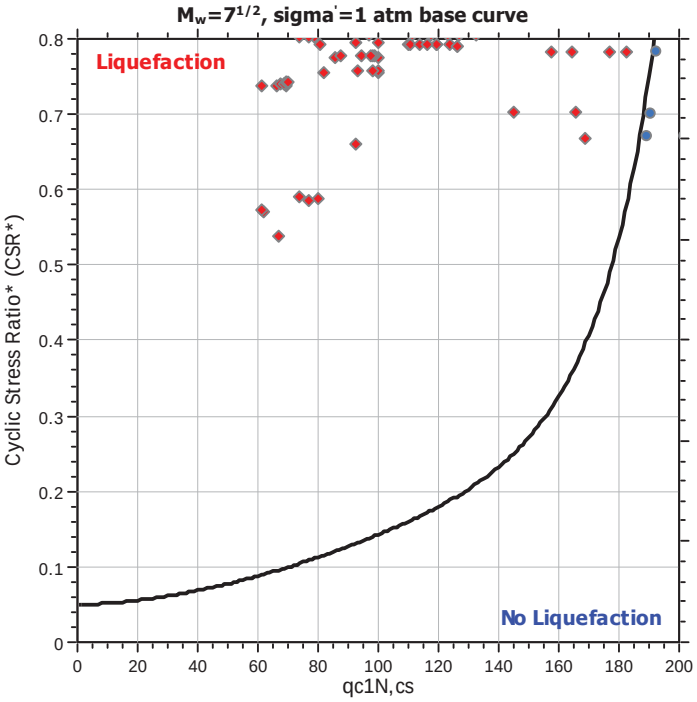
Project title : **Location :**

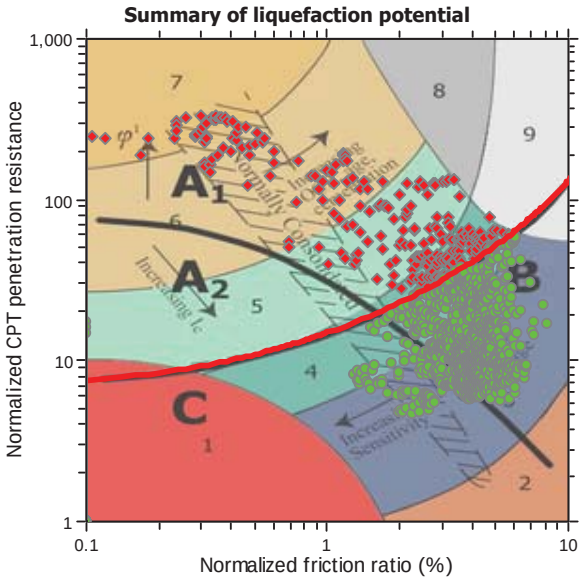
CPT file : 1-CPT13

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

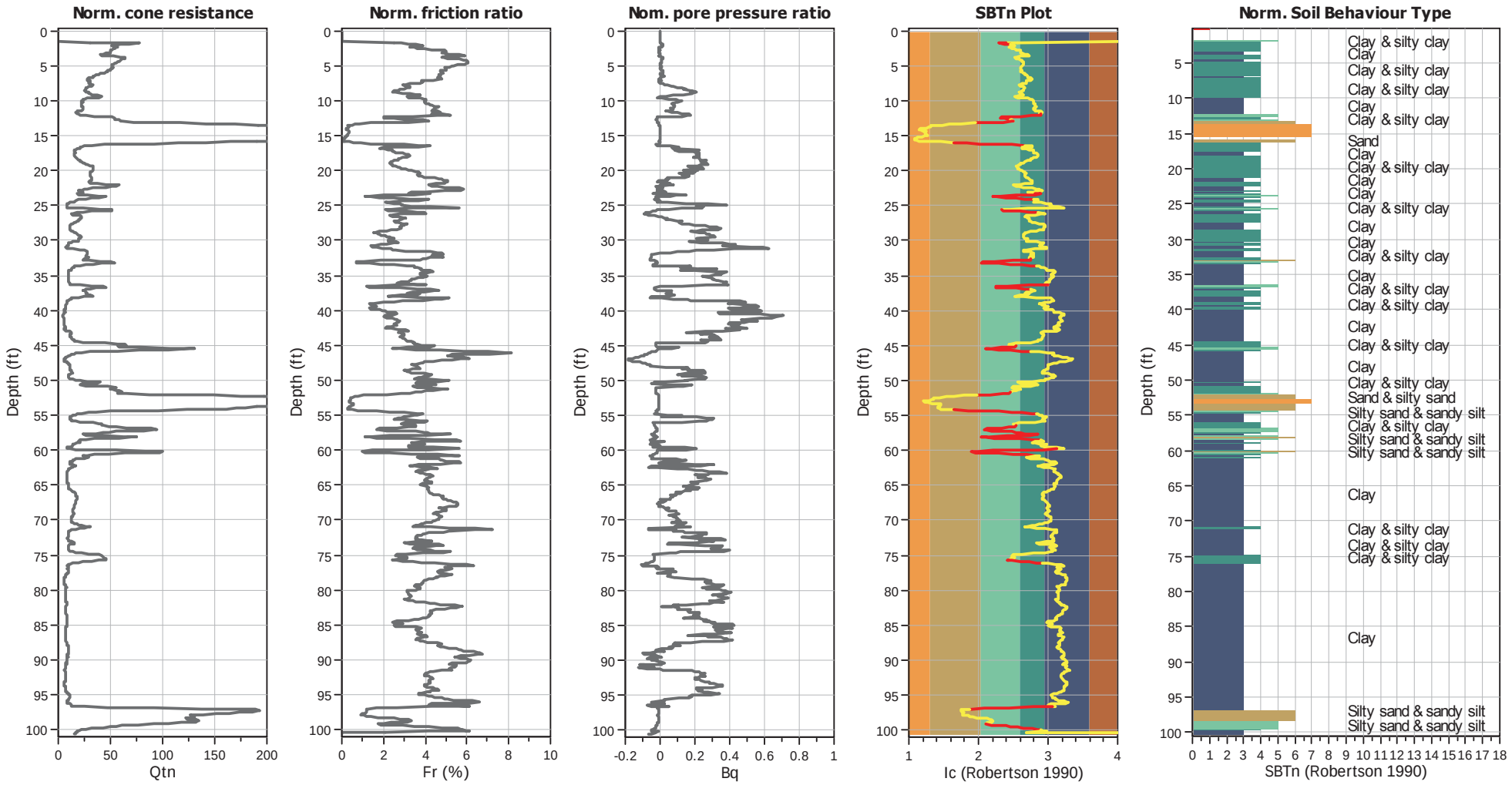






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



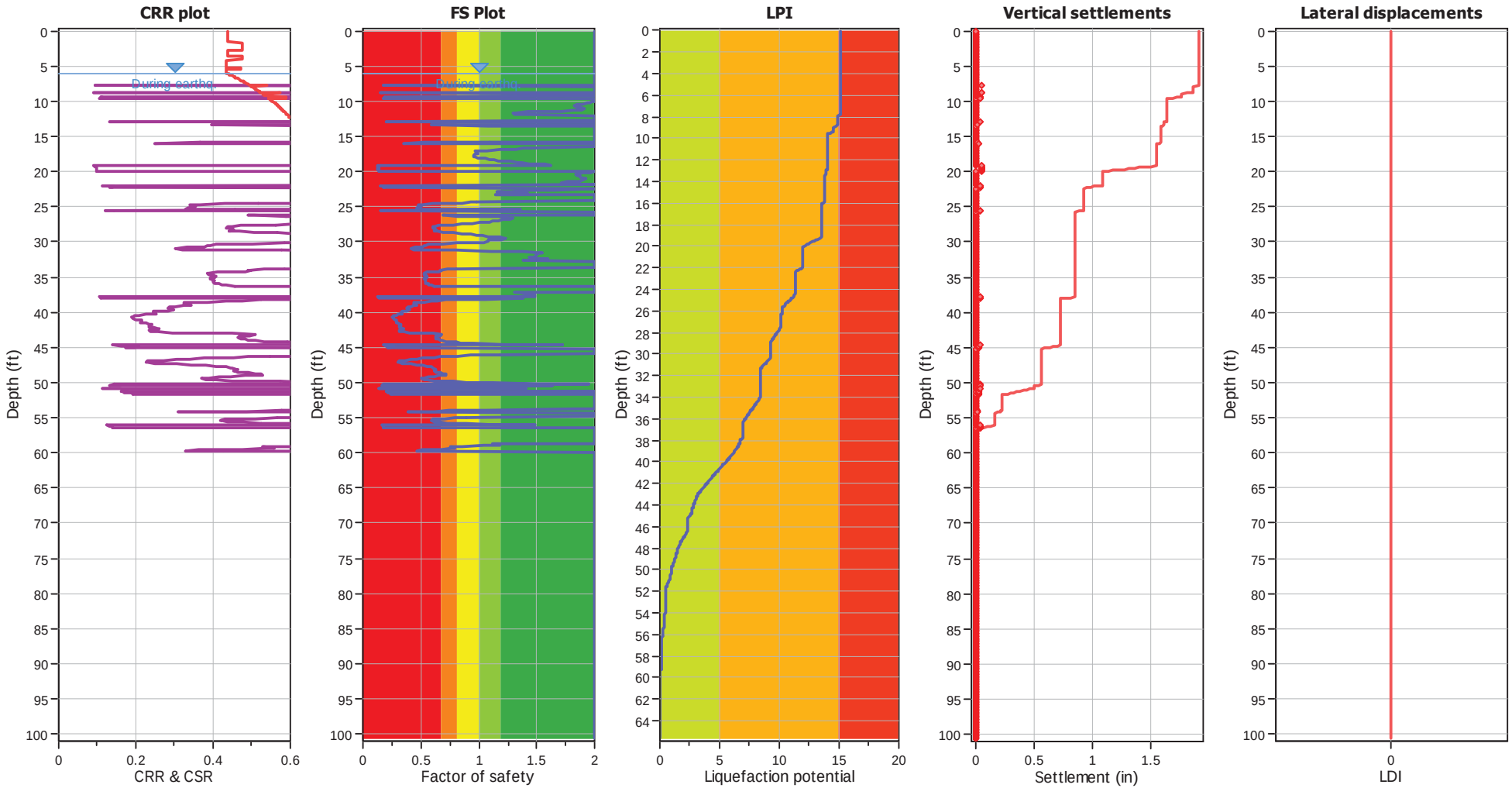
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

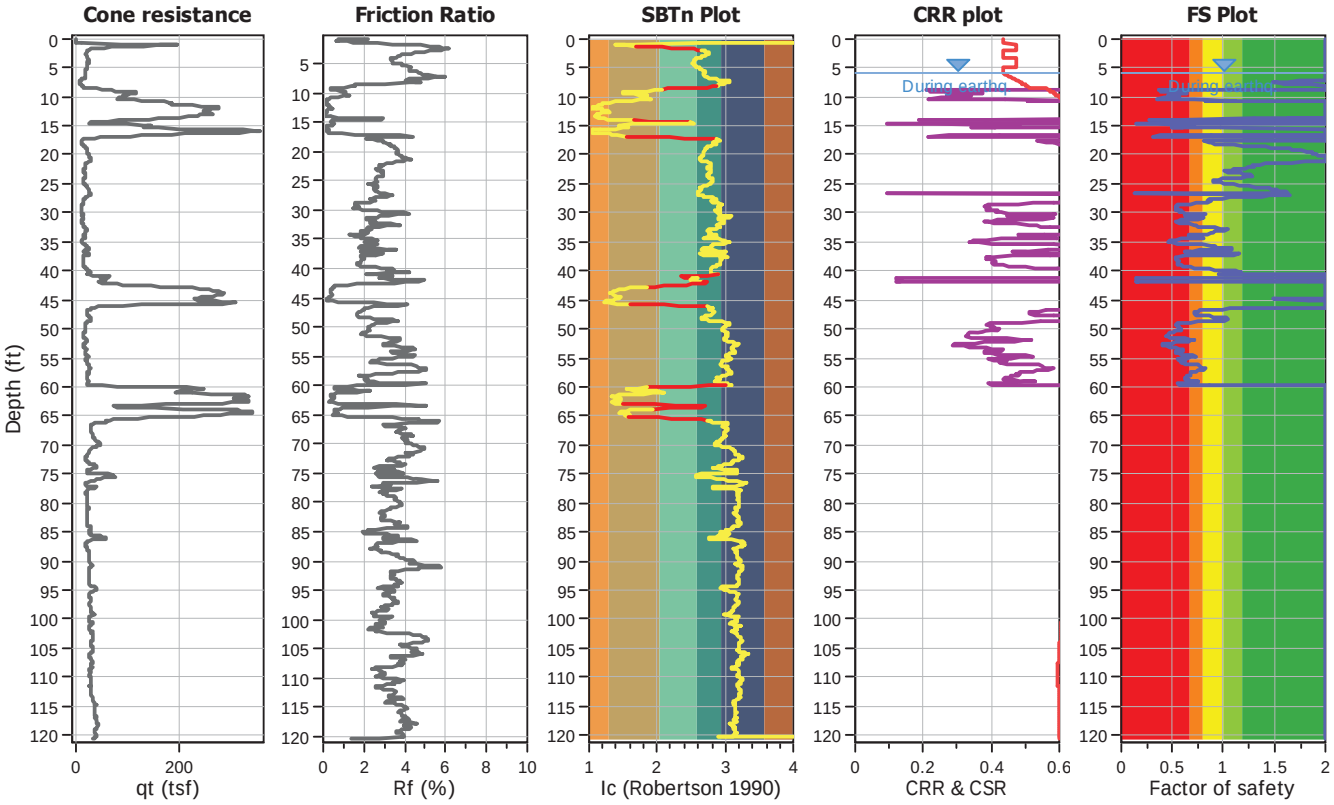
LIQUEFACTION ANALYSIS REPORT

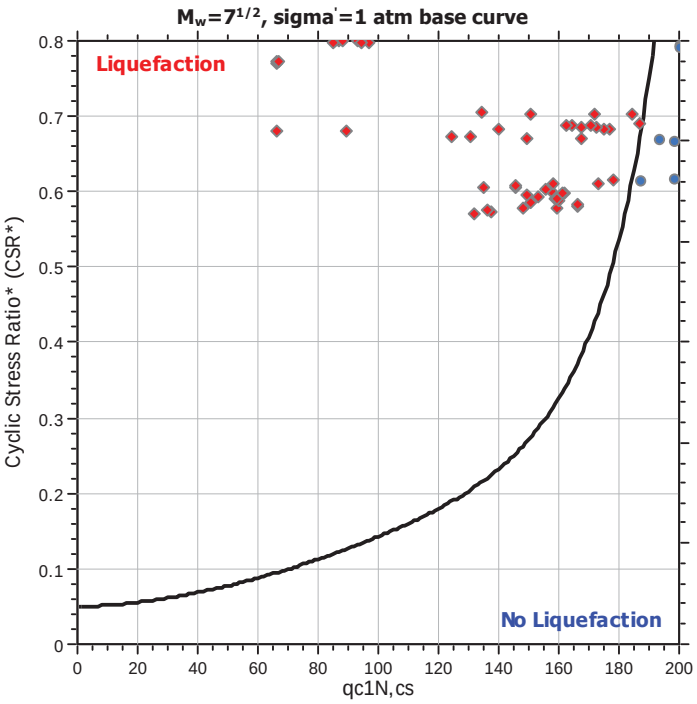
Project title : **Location :**

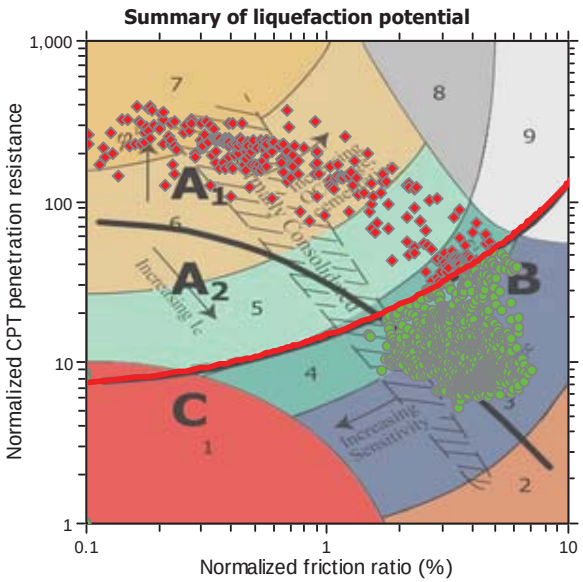
CPT file : 1-CPT14

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

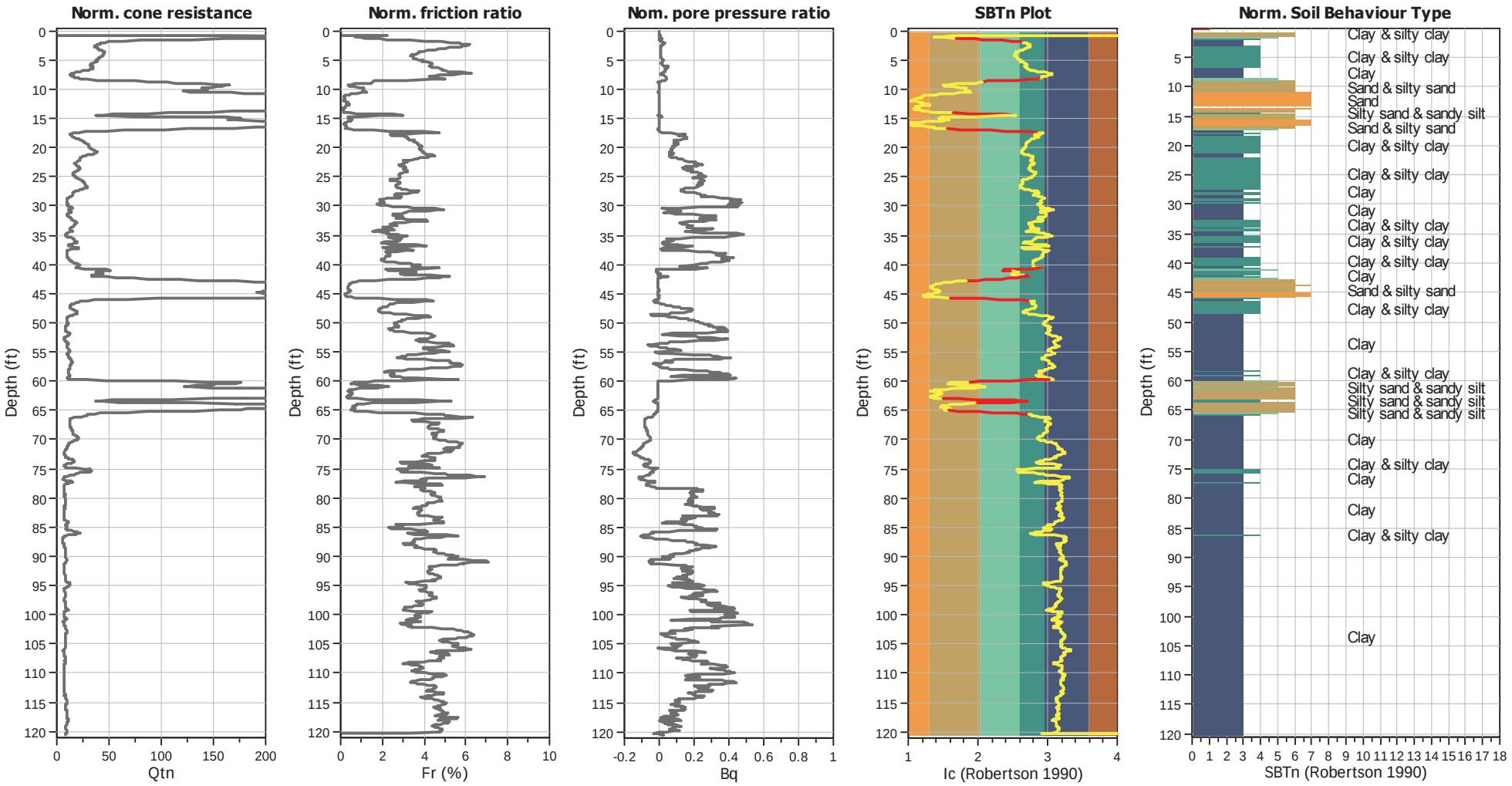






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



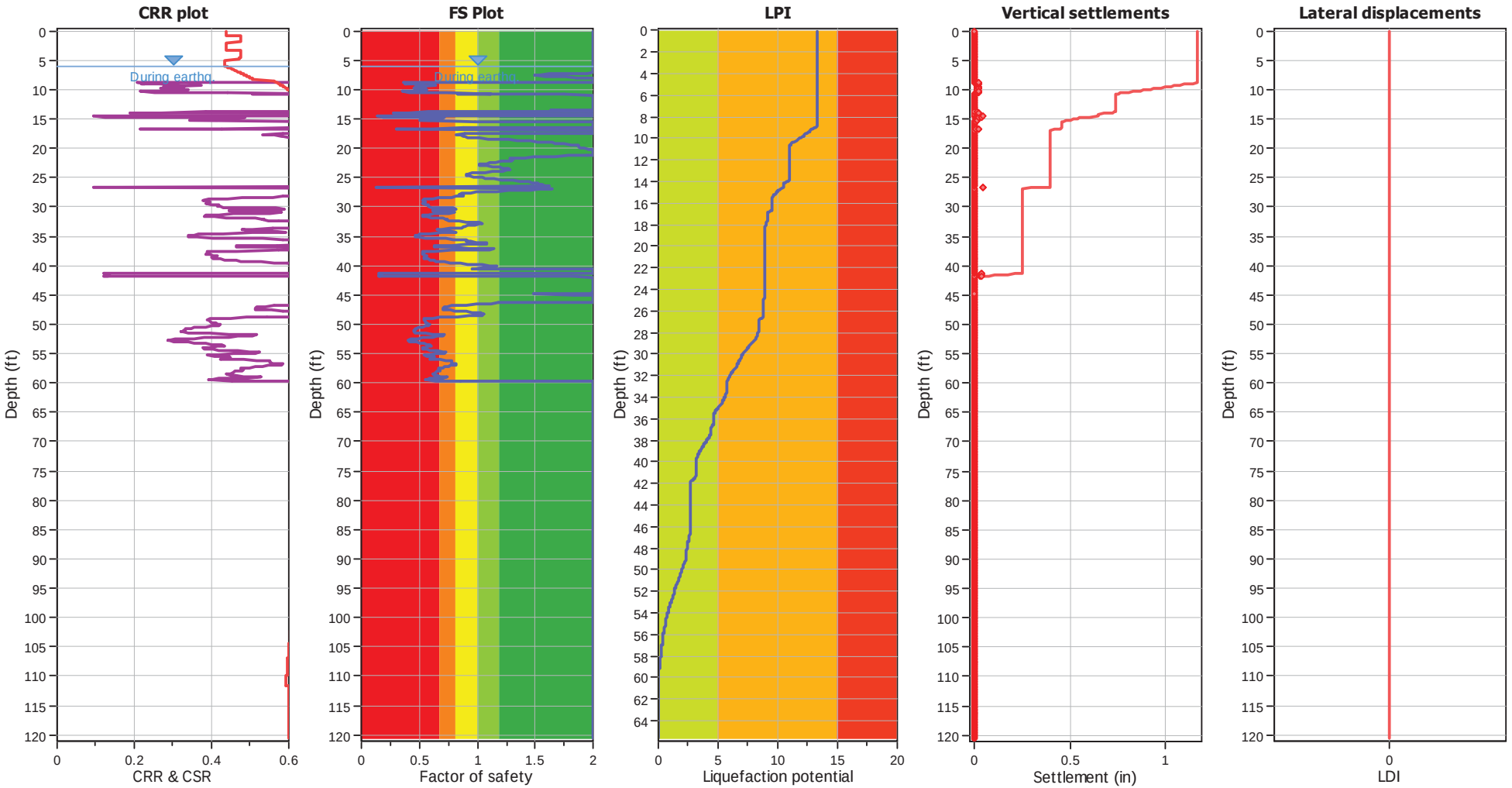
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

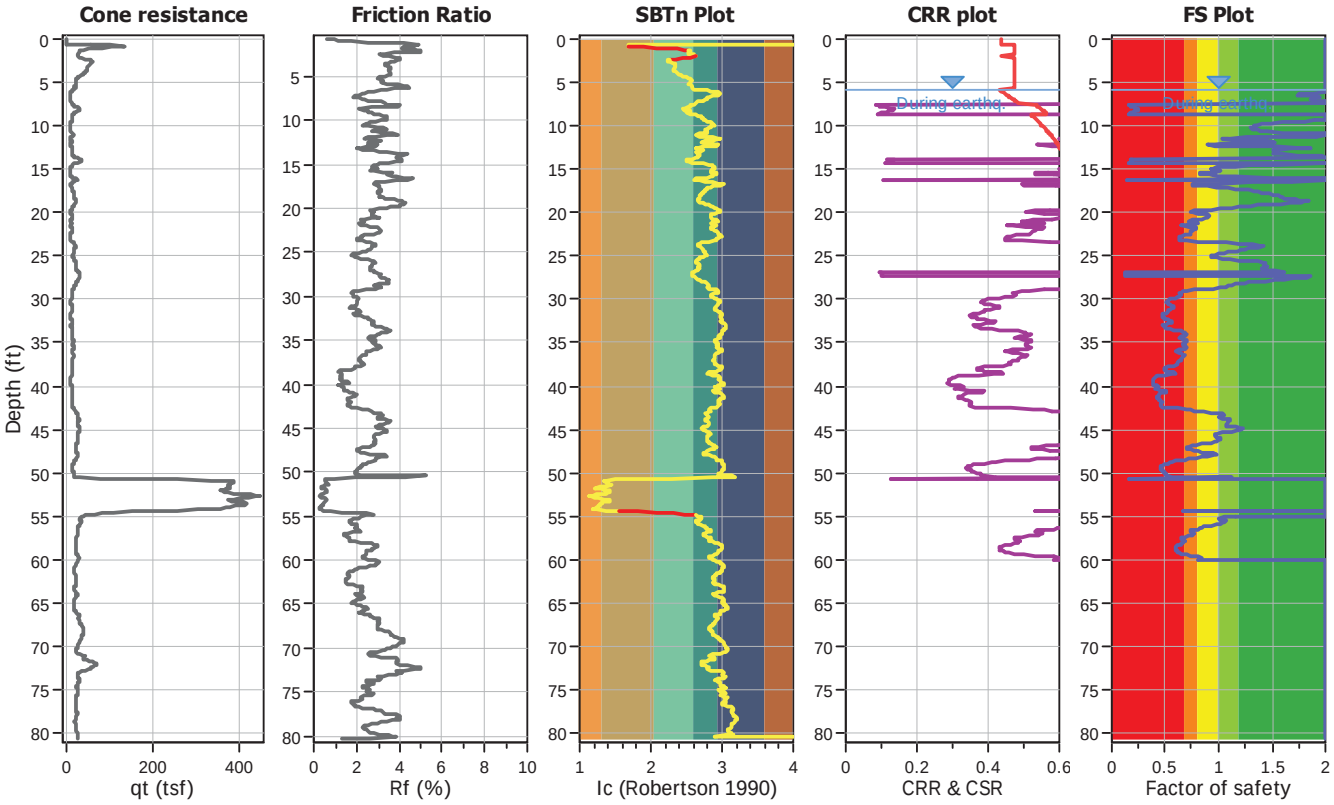
LIQUEFACTION ANALYSIS REPORT

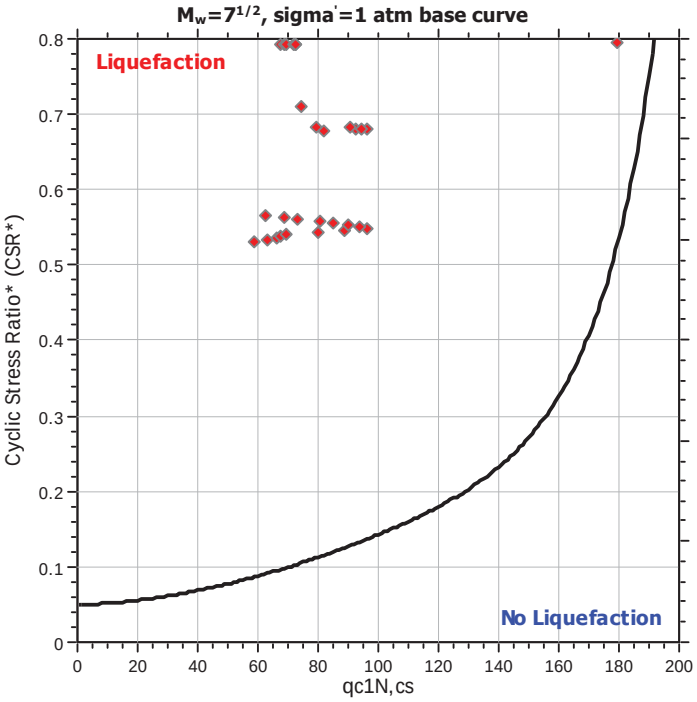
Project title : **Location :**

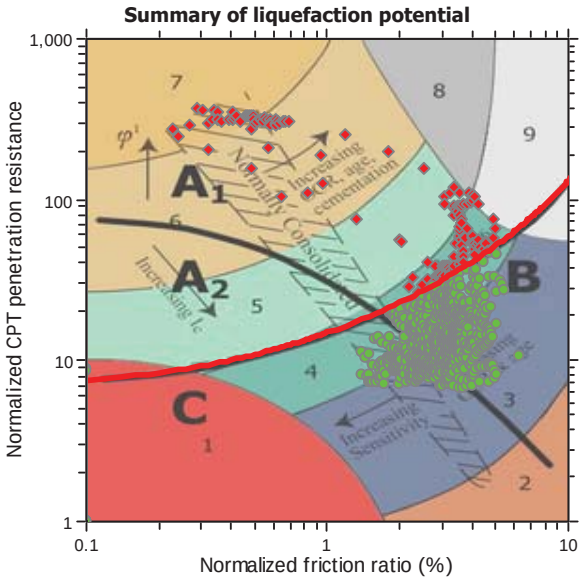
CPT file : 1-CPT15

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

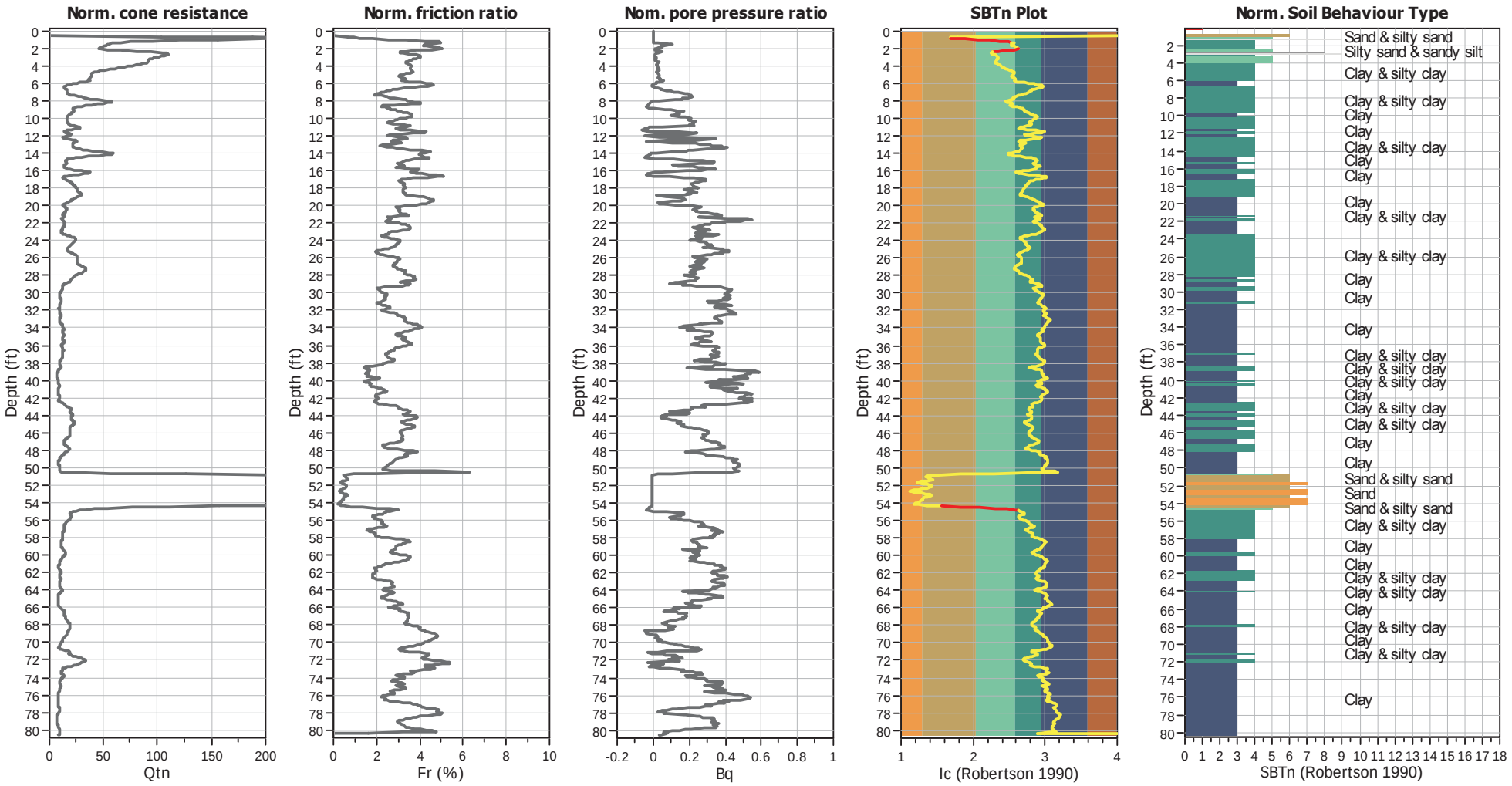






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



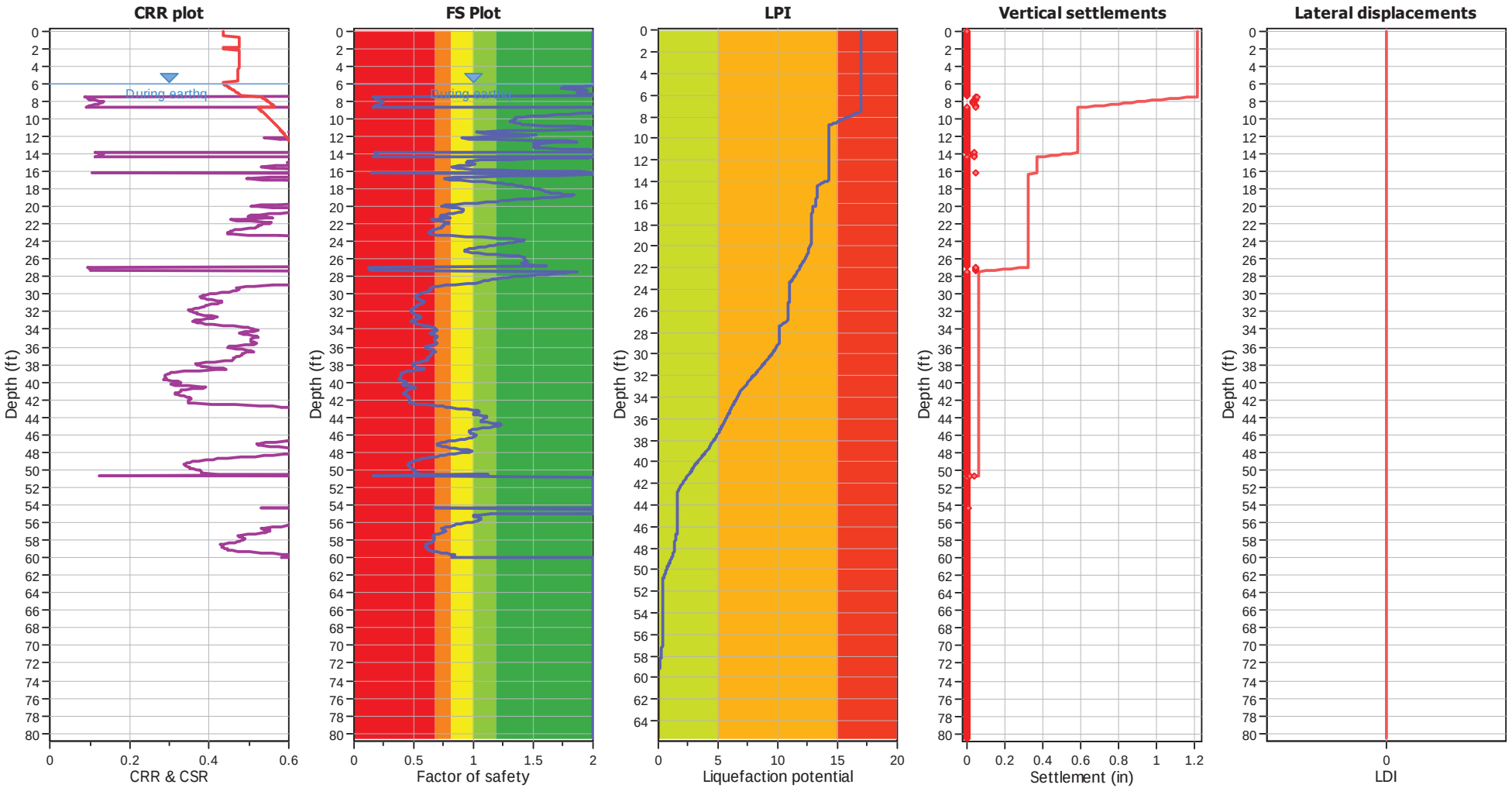
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

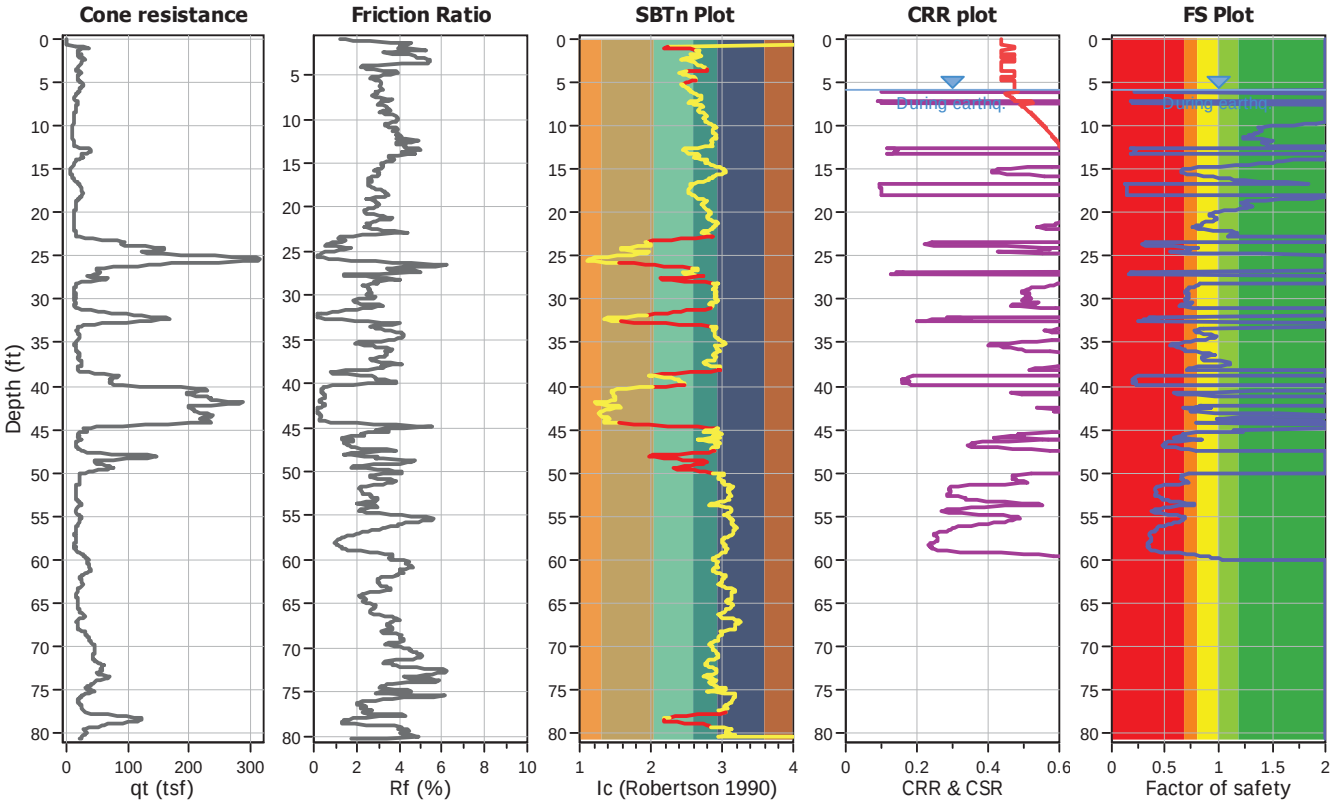
LIQUEFACTION ANALYSIS REPORT

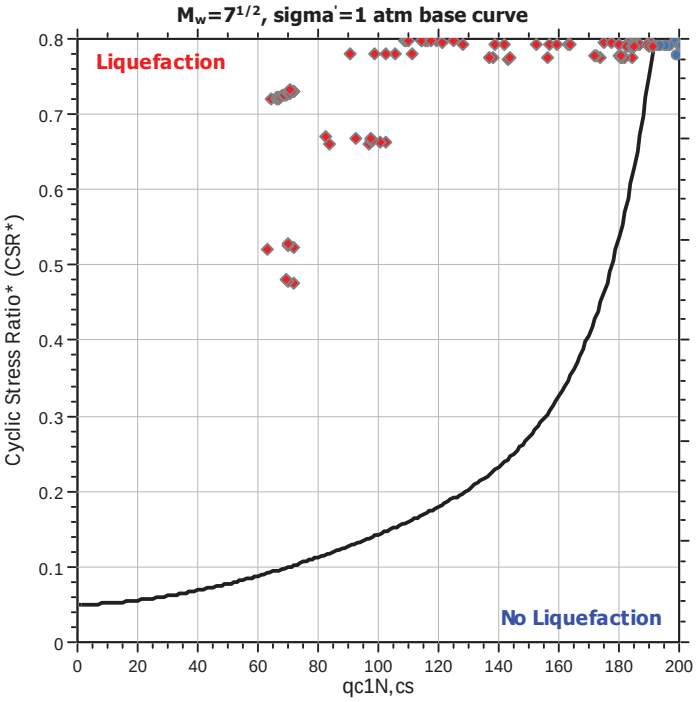
Project title : **Location :**

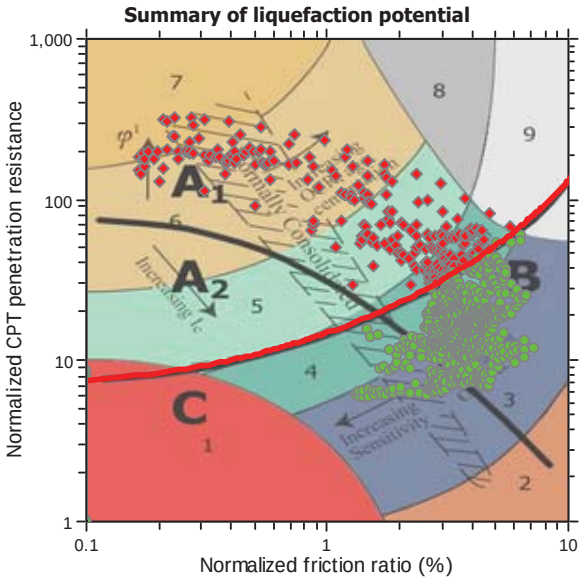
CPT file : 1-CPT16

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

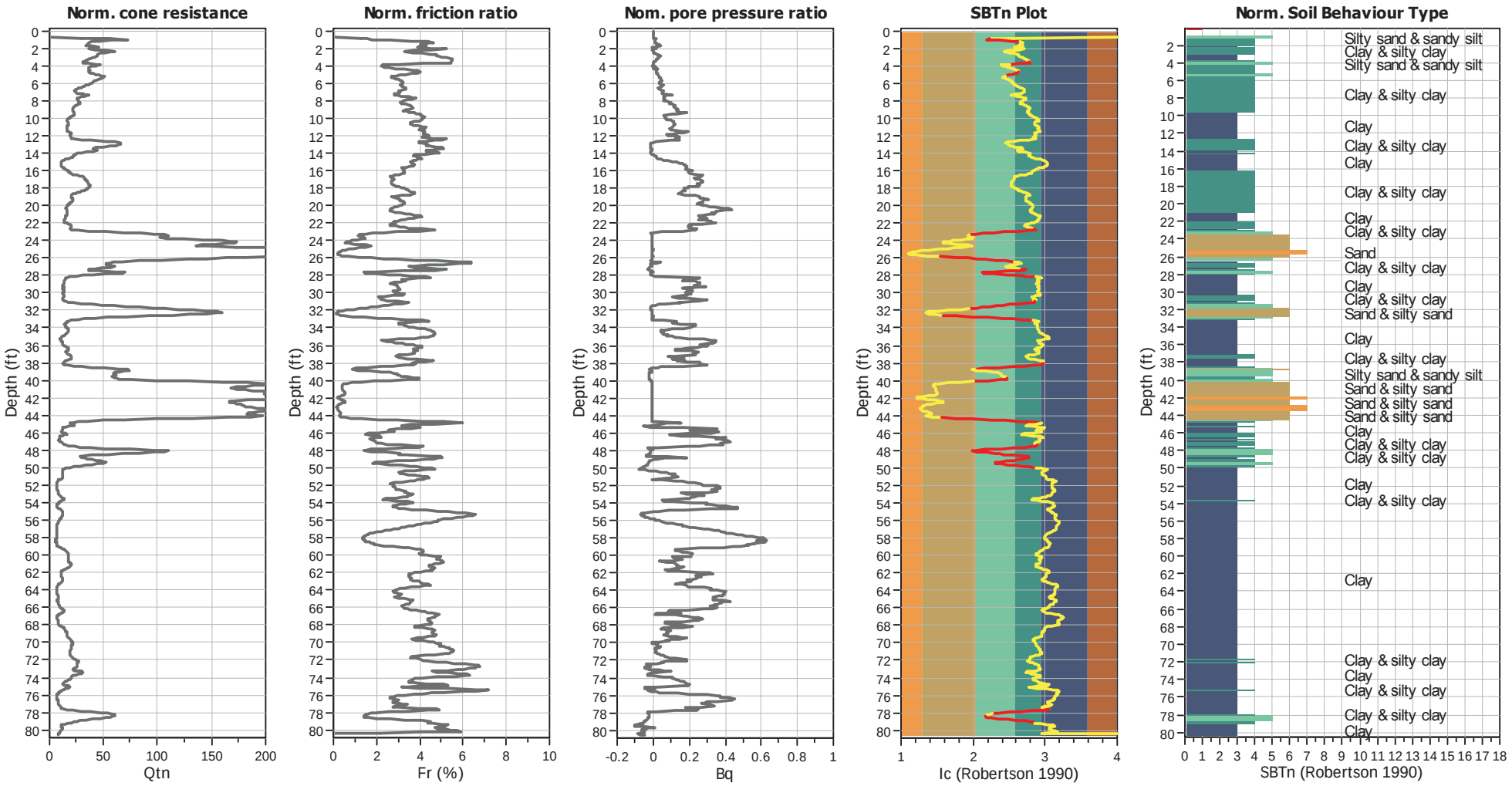






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



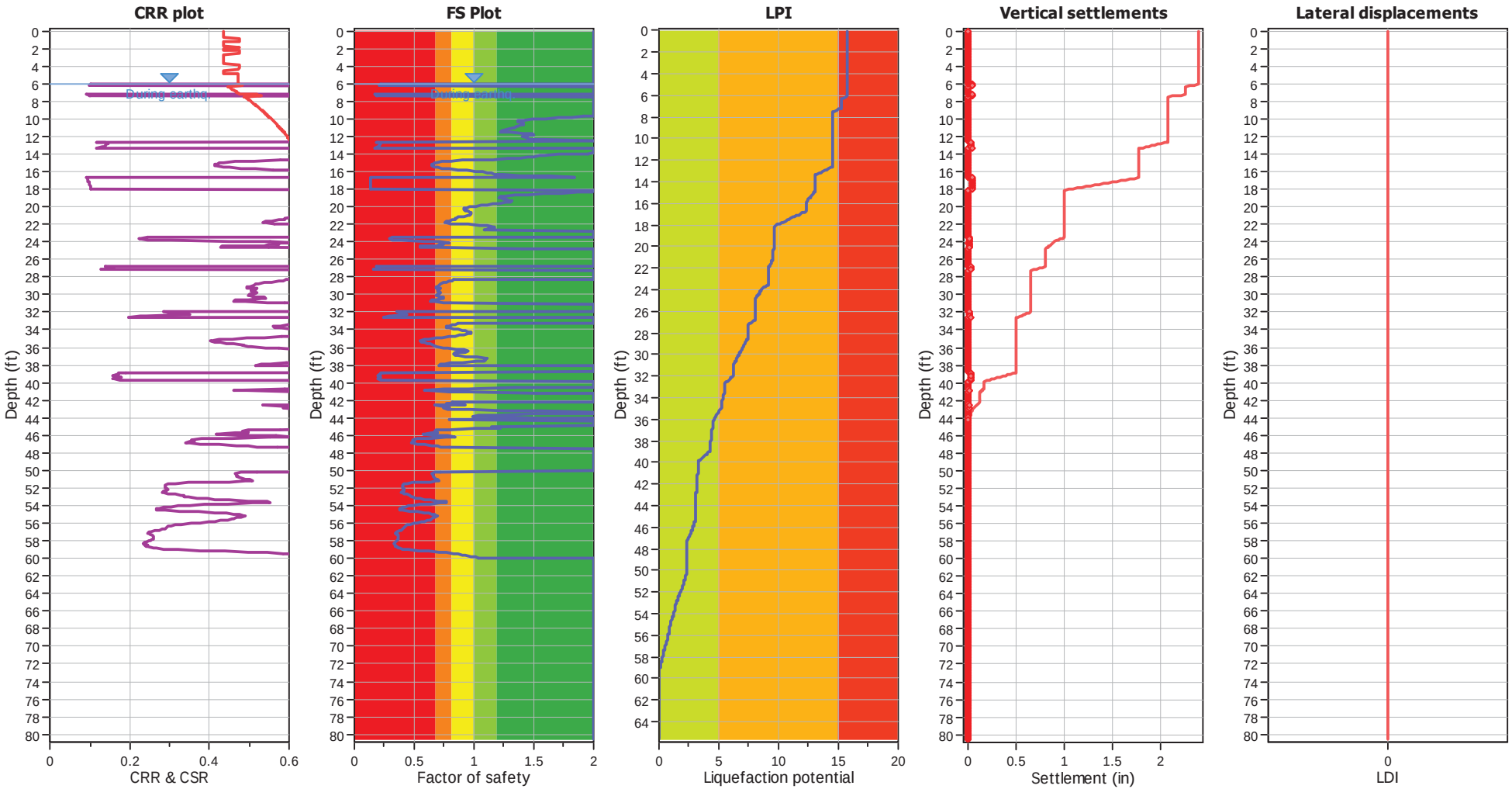
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

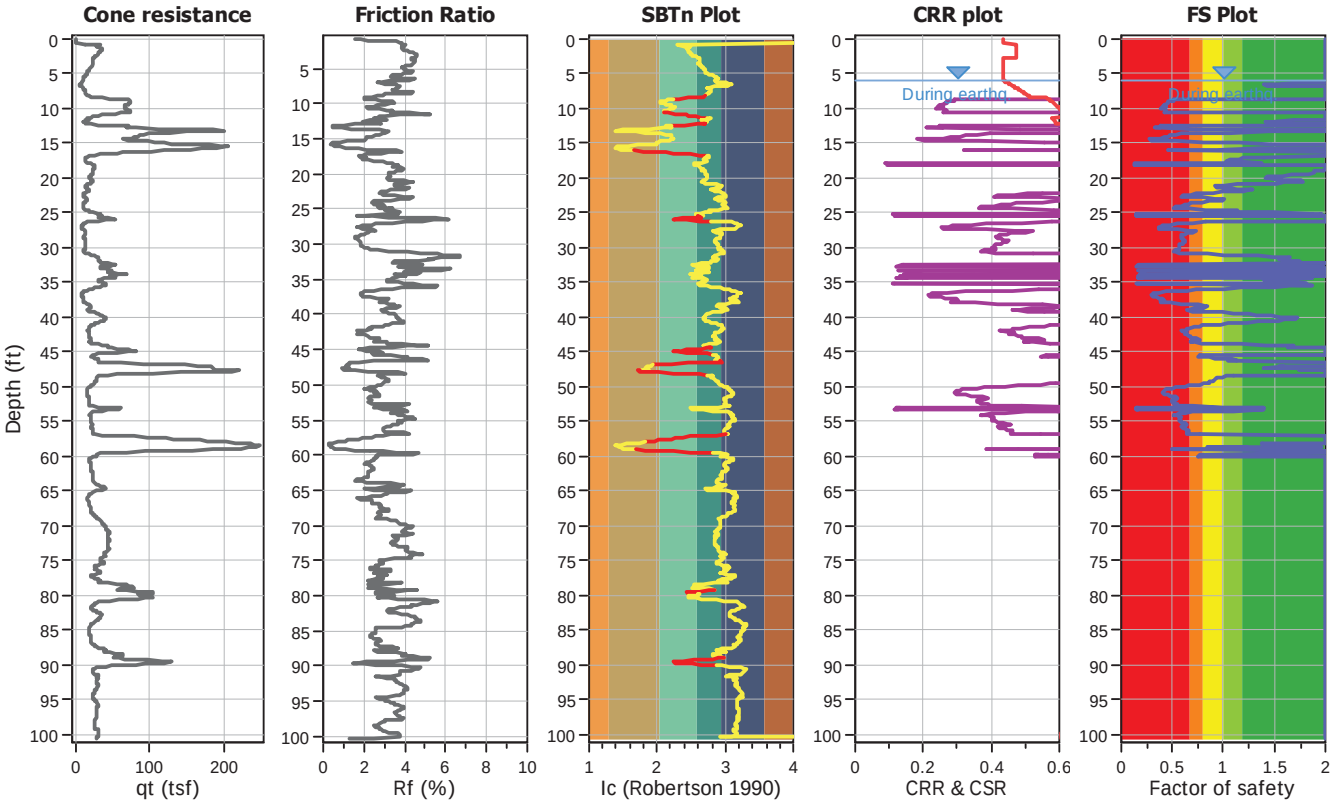
LIQUEFACTION ANALYSIS REPORT

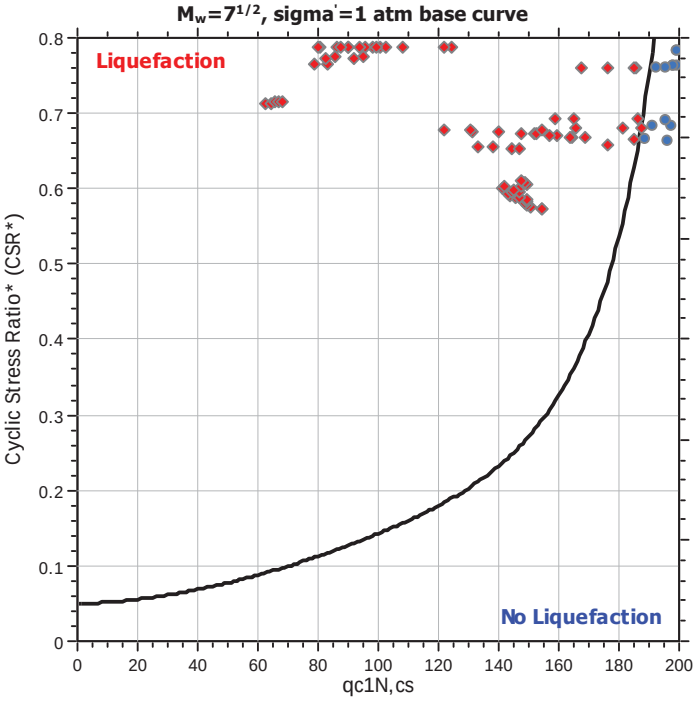
Project title : **Location :**

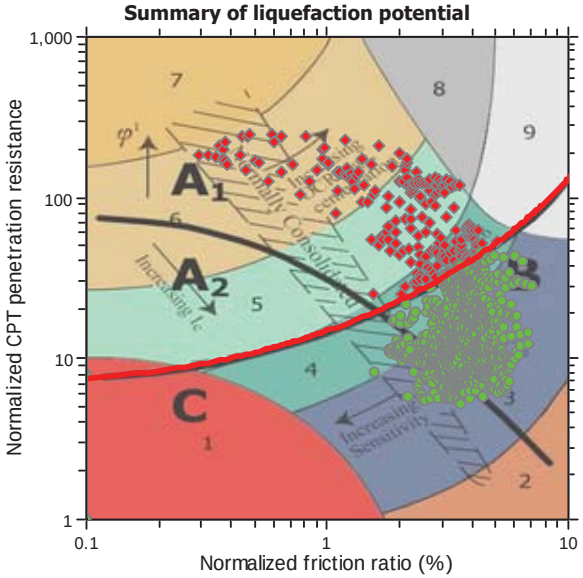
CPT file : 1-CPT17

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

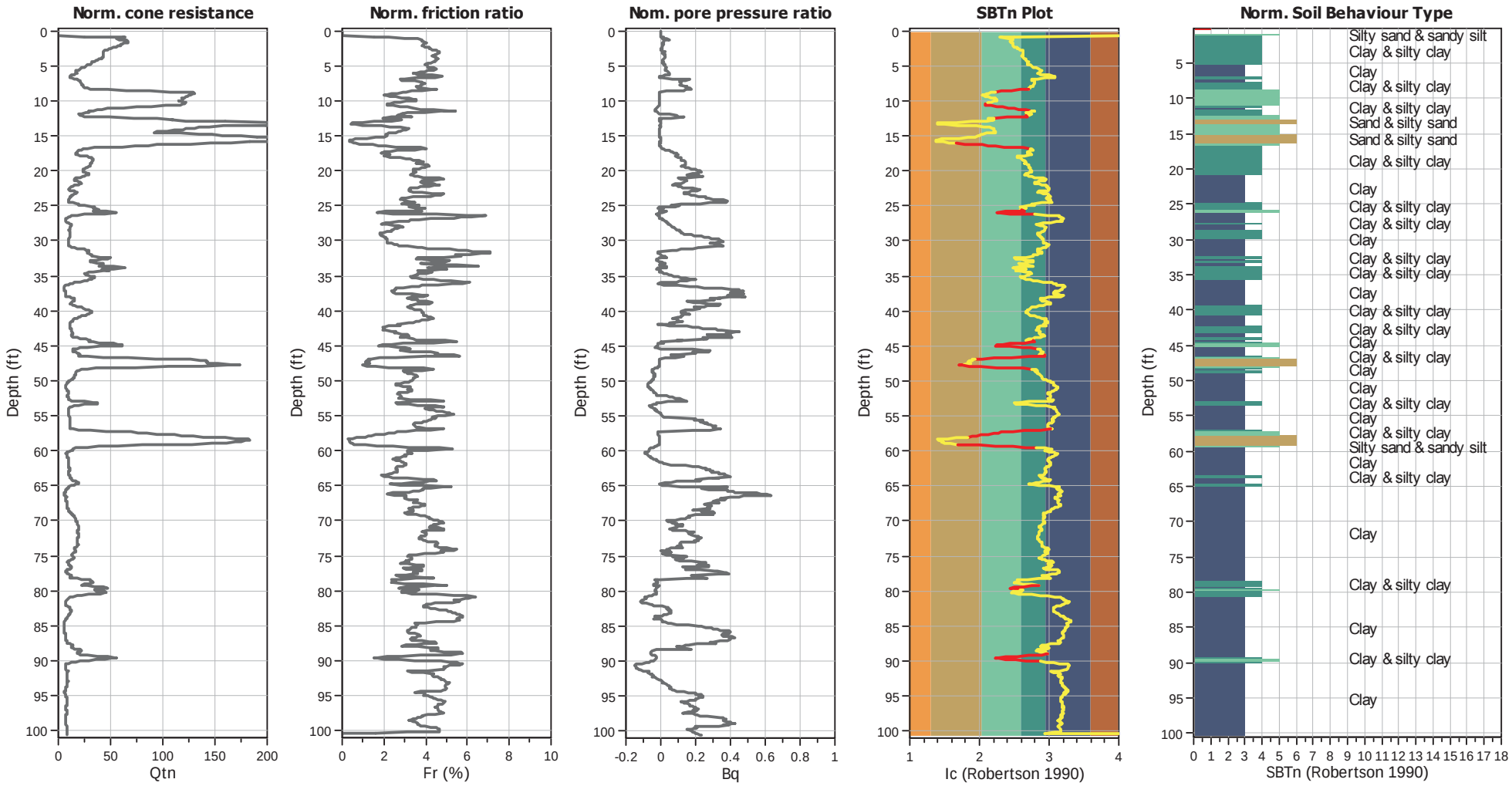






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



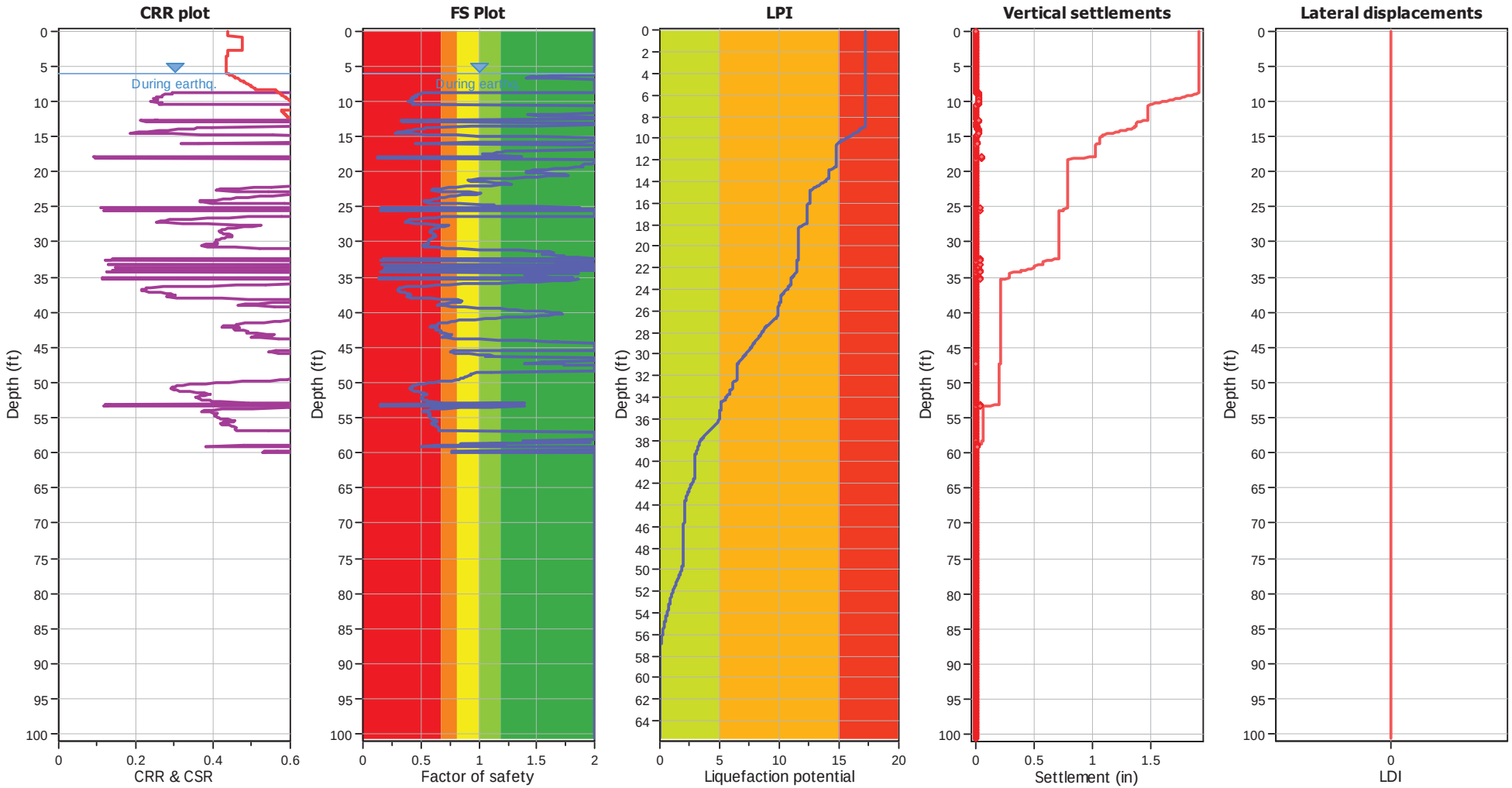
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

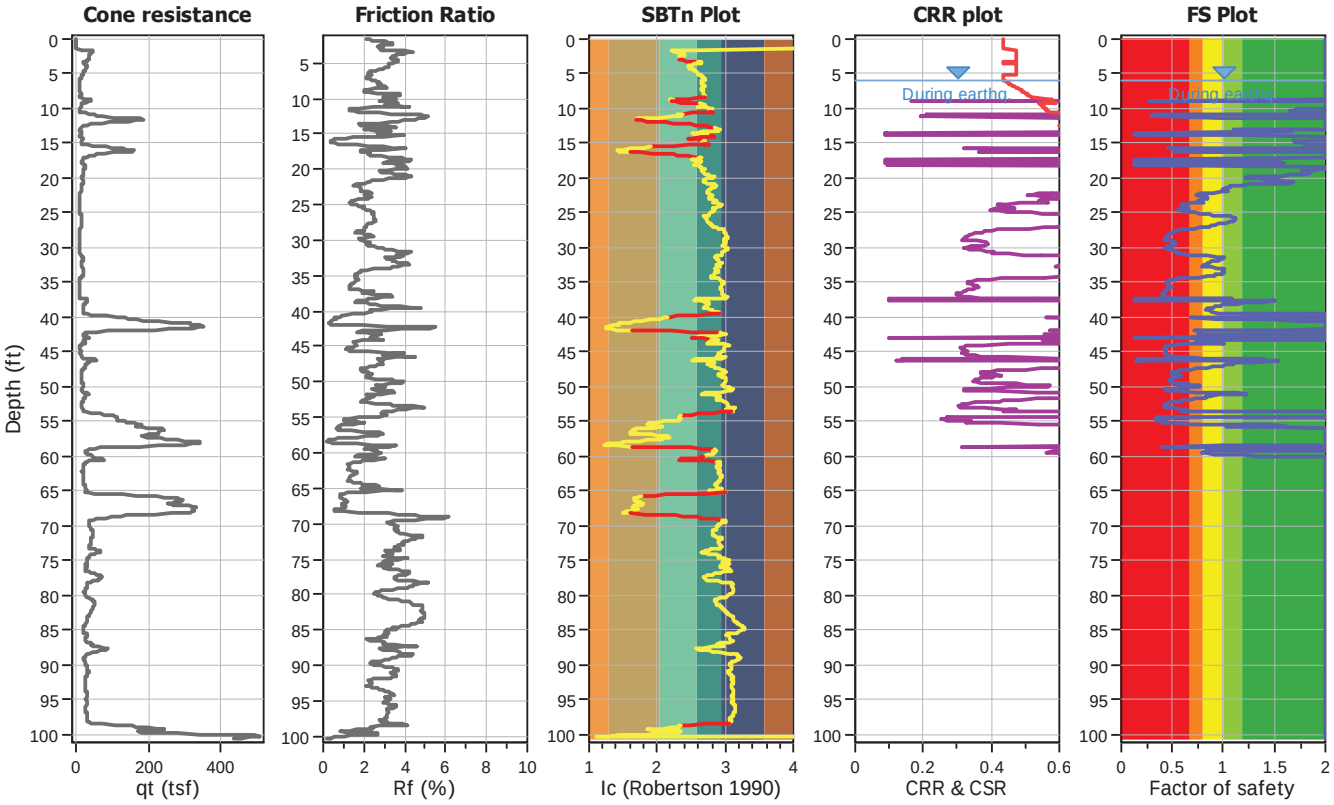
LIQUEFACTION ANALYSIS REPORT

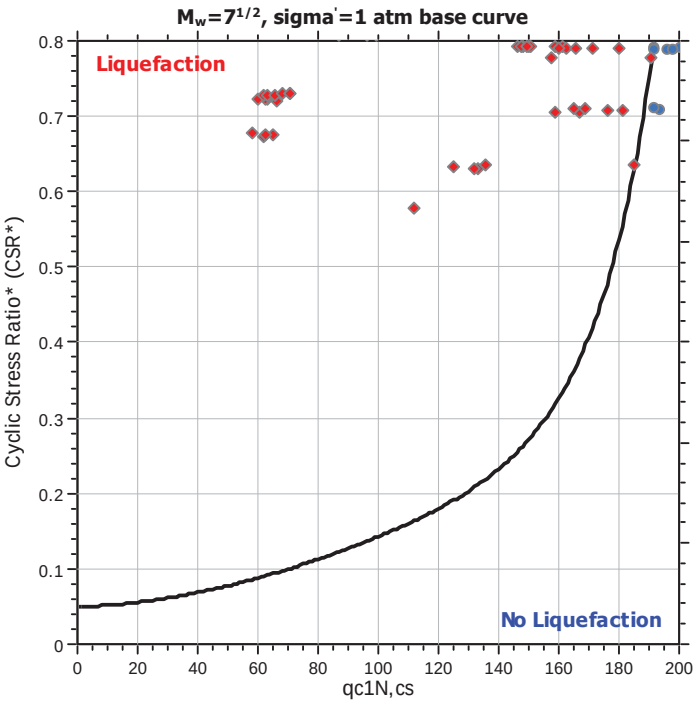
Project title : **Location :**

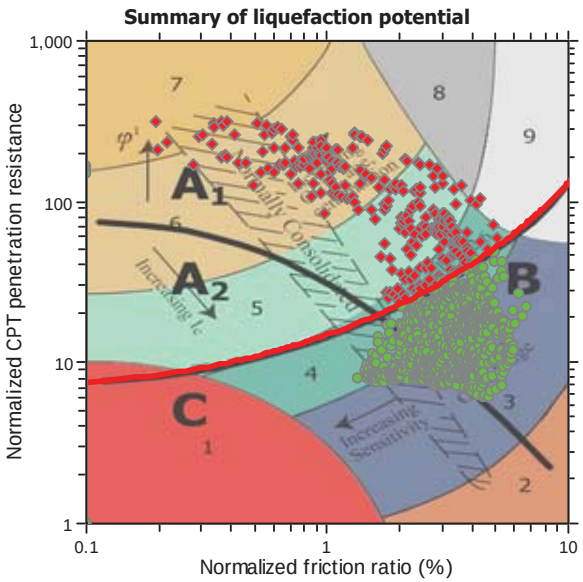
CPT file : 1-CPT18

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

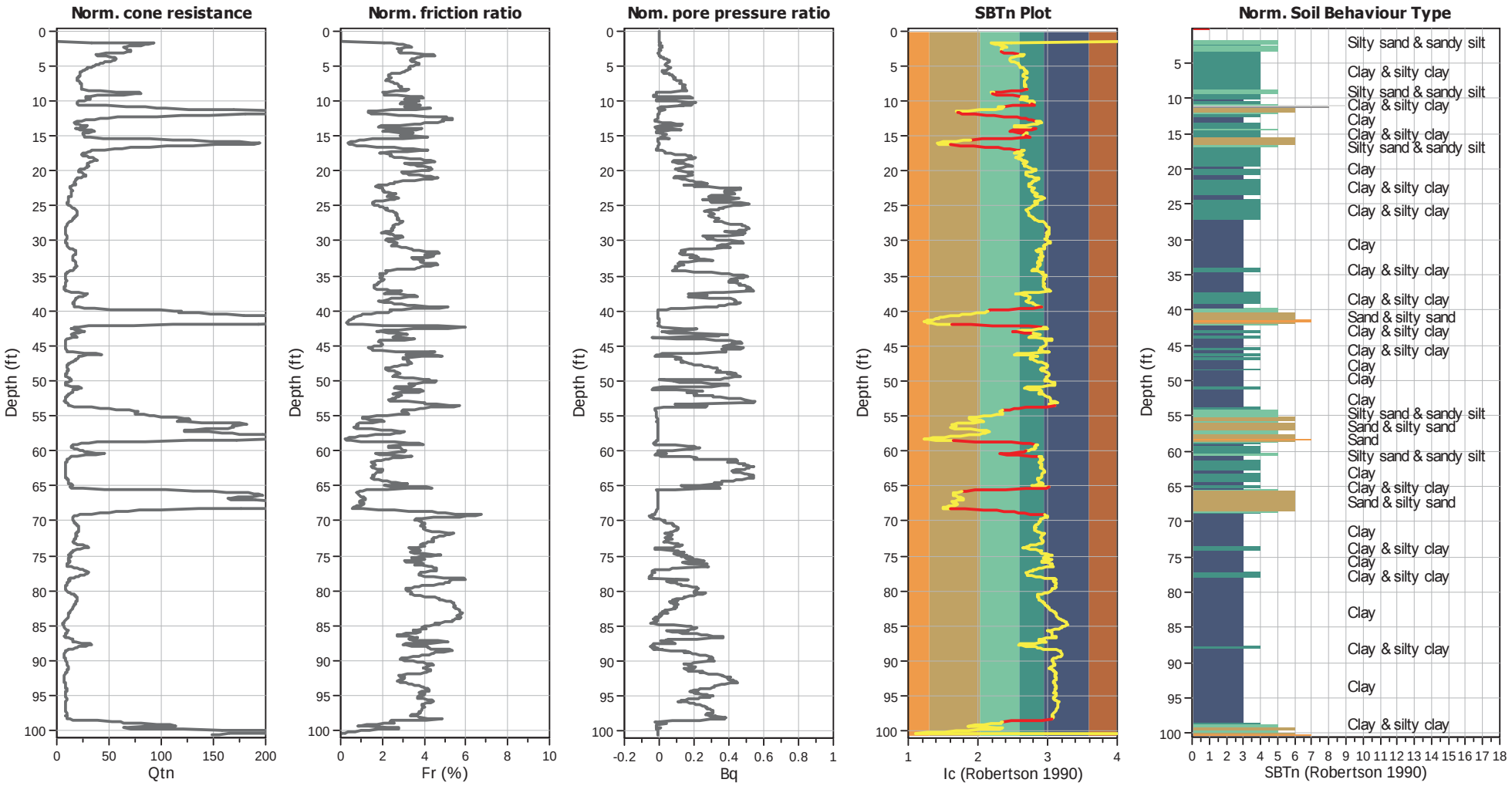






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



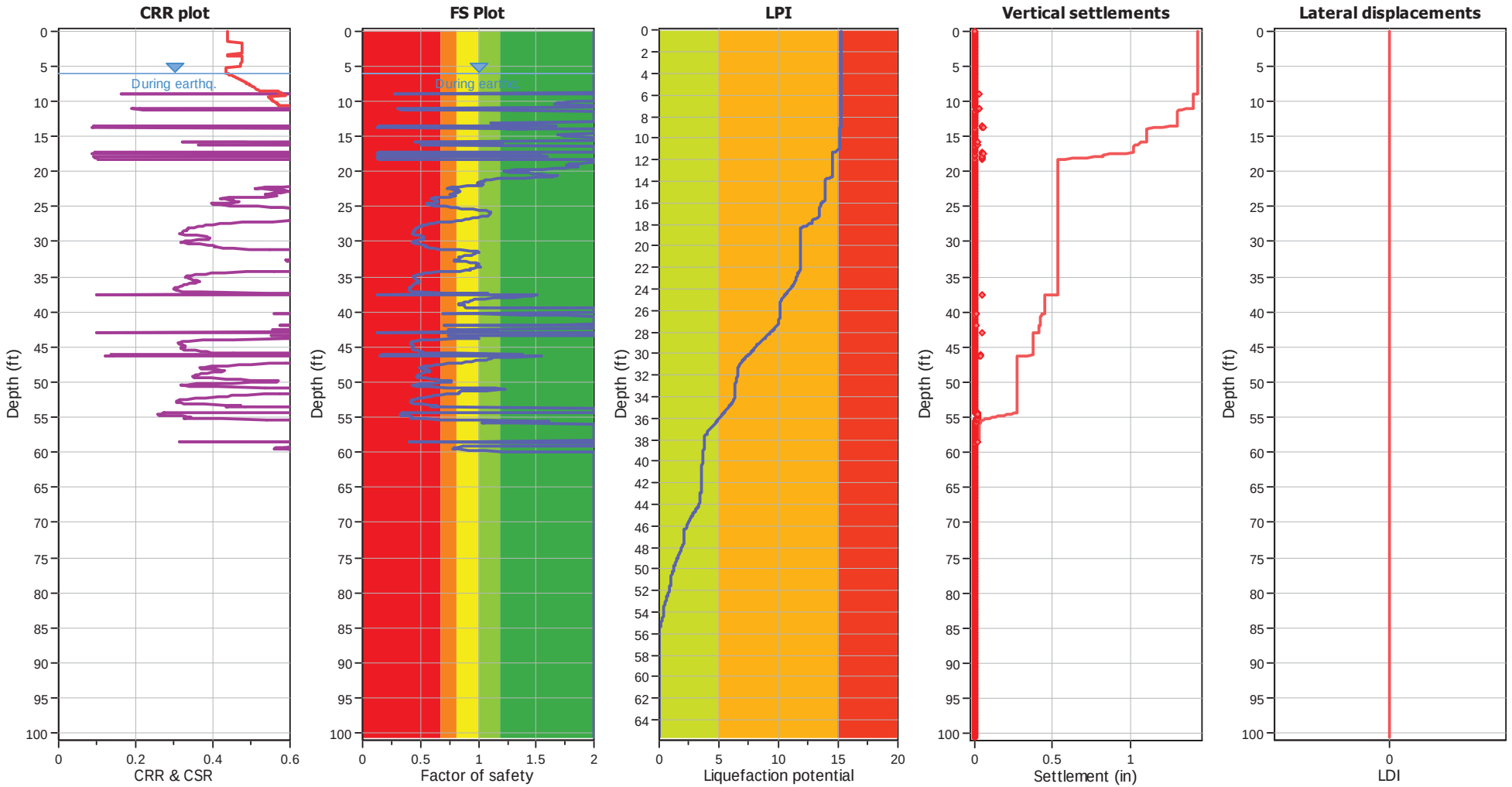
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk



ENGEO
Expect Excellence



GOOGLE NORTH BAYSHORE
CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, COMMONS, AND SPACE PARK CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PRELIMINARY GEOTECHNICAL REPORT

SUBMITTED TO
CBRE@Google
1600 Amphitheatre Parkway
Mountain View, CA 94043

PREPARED BY
ENGEO Incorporated

November 27, 2019

PROJECT NO.
15949.000.000

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Project No.
15949.000.000

November 27, 2019

Ms. Lisa Herrera
CBRE@Google
1600 Amphitheatre Parkway
Mountain View, CA 94043

Subject: Google North Bayshore
Charleston South, Joaquin, and Plymouth Campuses
Mountain View, California

PRELIMINARY GEOTECHNICAL REPORT

Dear Ms. Herrera:

We are pleased to present this preliminary geotechnical evaluation report for the five Google campuses, known as Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses, located in Mountain View, California. These five campuses are part of the Google North Bayshore project. This report presents our preliminary geotechnical observations, as well as our preliminary conclusions and recommendations for the subject campuses.

Based on the results of our exploration, the future development at these sites is feasible from a geotechnical standpoint. Recommendations presented in this report should be considered during the schematic design. A design-level exploration should be conducted prior to site development once detailed plans have been prepared.

If you have any questions or comments regarding this report, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

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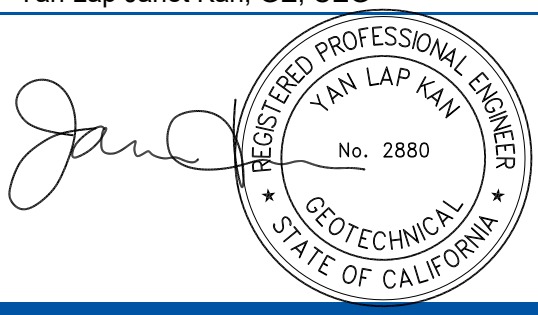
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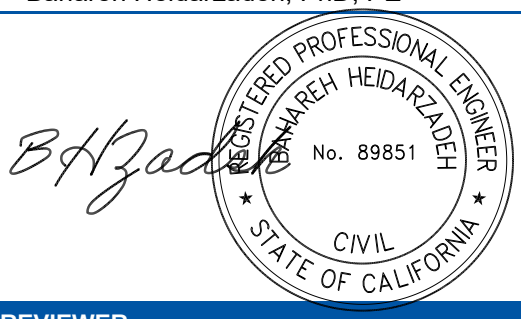
bh/jk/jaf/jf

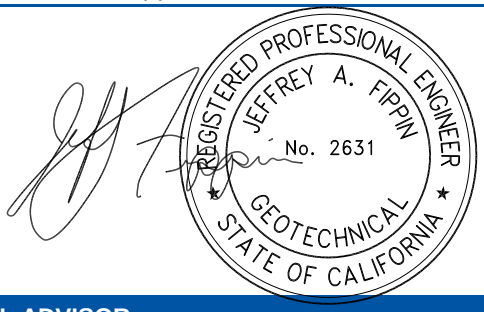
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APPENDIX C – Laboratory Test Data

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this preliminary geotechnical report is to provide an assessment of geotechnical conditions and concerns associated with the five subject campuses and provide preliminary recommendations to support planning of Google development at the subject properties. At the time of preparation of this report, no schematic design was available. Our services included the following tasks:

- Reviewed available literature and geologic maps.
- Reviewed historic aerial photos.
- Obtained appropriate Santa Clara Valley Water District permits.
- Notified Underground Services Alert a minimum of 48 hours prior to our exploration.
- Retained a private utility locator to clear the proposed exploration locations of existing utilities.
- Prepared a work plan, including proposed locations for our explorations, as well as excavation checklists showing their proximity to existing utilities.
- Performed subsurface field exploration.
- Performed laboratory testing on soil samples collected.
- Analyzed geotechnical data collected.
- Interpreted subsurface field exploration data.
- Evaluated potential geotechnical concerns.
- Performed a code-based seismic hazard analysis.
- Provided preliminary foundation recommendations in this report.
- Provided earthwork recommendations.

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1.2 SITE LOCATION AND DESCRIPTION

The five subject campuses, Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses, are located in Mountain View, California, on average approximately 2 miles south of the San Francisco Bay as shown on the Vicinity Map (Figure 1). The Site Plan (Figures 2A, 2B, 2C, 2D, and 2E) show the boundaries of the campuses and the locations of our explorations.

The Charleston South project site is approximately 22 acres in area and is bounded by Charleston Road to the north, Huff Avenue to the west, Plymouth Street to the south, and Joaquin Road to the east.

The Joaquin site is approximately 9 acres in area and is bounded by North Shoreline Blvd. to the east, the Plymouth Street and Common Campus to the south, Joaquin Road to the west, and a bike road and a surface parking lot to the north.

The Plymouth site is approximately 5 acres in area and is bounded by Plymouth Street to the north, Alta Avenue to the west, and a building at 1625 Plymouth Street identified on Google Maps as US-MTV-Plym1625 to the east. California US 101 runs to the south of the site.

The Commons site is approximately 3½ acres in area and is bounded by the Joaqiun Campus to the north and west, surface parking lots to the south and west, and N Shoreline Boulevard to the east. Plymouth Street divides the two halves of this campus.

The Space Park Site is approximately 2 acres in area and is bounded by the North Shoreline Boulevard to the west, a building at the address 1625 N Shoreline Blvd to the north, a building at 1390 Pear Ave Ste D, identified on Google Maps as Cucina Venti Restaurant to the south, and a building at 1350 Pear Avenue, identified on Google Maps as RENVU Solar Equipment Distribution, to the east.

1.3 FIELD EXPLORATION

Our field exploration for the five campuses included advancing 18 Cone Penetration Tests (CPTs) and drilling 10 borings as summarized in Table 1.3-1.

TABLE 1.3-1: Field Explorations

CAMPUS	CPT/BORINGS	PUSHED/DRILLED DEPTH (feet bgs)	PUSHED/DRILLED ELEVATION (WGS84[1]) (feet)	DATE COMPLETED
Charleston South	1-SCPT04	100.6	-87.6	May 8, 2019
	1-CPT13	100.6	-87.6	May 14, 2019
	1-CPT14	120.6	-107.6	May 14, 2019
	1-CPT15	80.5	-66.5	May 8, 2019
	1-CPT16	80.5	-63.5	May 9, 2019
	1-CPT17	100.6	-83.6	May 10, 2019
	1-CPT18	100.6	-85.6	May 11, 2019
	1-B08	101.5	-88.5	May 14, 2019
	1-B09	103.0	-89.0	May 16, 2019
	1-B10	51.5	-34.5	May 17, 2019
Joaquin	1-CPT01	50.5	-34.5	May 7, 2019
	1-SCPT02	100.6	-84.6	May 7, 2019
	1-CPT03	120.6	-103.6	May 8, 2019
	1-CPT06	120.6	-103.6	May 7, 2019
	1-B01	101.5	-85.5	May 19, 2019
	1-B02	101.5	-83.5	May 19, 2019
	1-B04	81.5	-65.5	June 9, 2019

[1] **World geodetic System (WGS84)**

CAMPUS	CPT/BORINGS	PUSHED/DRILLED DEPTH (feet bgs)	PUSHED/DRILLED ELEVATION (WGS84[1]) (feet)	DATE COMPLETED
Plymouth	1-CPT09	100.6	-79.6	May 13, 2019
	1-SCPT10	80.5	-61.5	May 13, 2019
	1-CPT11	100.6	-82.6	May 14, 2019
	1-CPT12	80.5	-60.5	May 14, 2019
	1-B07	81.5	-62.5	June 7, 2019
Commons	1-CPT5	80.5	-62.5	July 9, 2019
	1-CPT7	80.5	-61.5	July 8, 2019
	1-B3	81.5	-66.5	July 10, 2019
	1-B5	46.5	-30.0	July 9, 2019
Space Park	1-CPT8	120.6	-102.6	July 8, 2019
	1-B6	81.5	-68.5	July 8, 2019

We recorded the locations of the explorations using the GIS-based, Collector Application, on a smart phone. We show the locations of the explorations on Figures 2A to 2E.

1.3.1 Borings

We observed the drilling of 10 borings at the locations shown on the Site Plans, Figures 2A to 2E. An ENGEO representative observed the drilling and logged the subsurface conditions at each location. We retained the services of a drilling contractor using two truck-mounted drill rigs. We advanced the borings using the mud rotary drilling method with a 4-inch-diameter tricore roller cone drill bit. We advanced the borings to depths ranging from 46.5 to 120.5 feet below existing grade. To address environmental concerns, we cased all the exploratory borings to 50 feet below existing grade. We did not observe the artesian aquifer in the exploratory borings. We permitted and backfilled the borings in accordance with the requirements of the Santa Clara Valley Water District (SCVWD).

We obtained soil samples at various intervals using standard penetration test (SPT) samplers with a 2-inch outside diameter (O.D. split-spoon sampler) and California Modified samplers with 2½-inch inside diameter (I.D.). We obtained the blow counts shown on our bore logs with an automatic trip, 140-pound hammer with a 30-inch free fall. We drove the sampler 18 inches and recorded the number of blows for each 6 inches of penetration. We have not converted the blow counts presented on the borelogs using any correction factors. We also obtained hydraulically pushed Shelby tubes, and Dames and Moore samplers at select locations. We present the fluid pressures recorded for the hydraulically pushed samples on the exploration logs in Appendix A.

We contained soil cuttings and excess fluids in 55-gallon steel drums, which we sampled according to procedures described in the gSAFE document, *EHS Processes to Haul Soil off Site*. The findings and recommendations for disposal were presented under a separate cover.

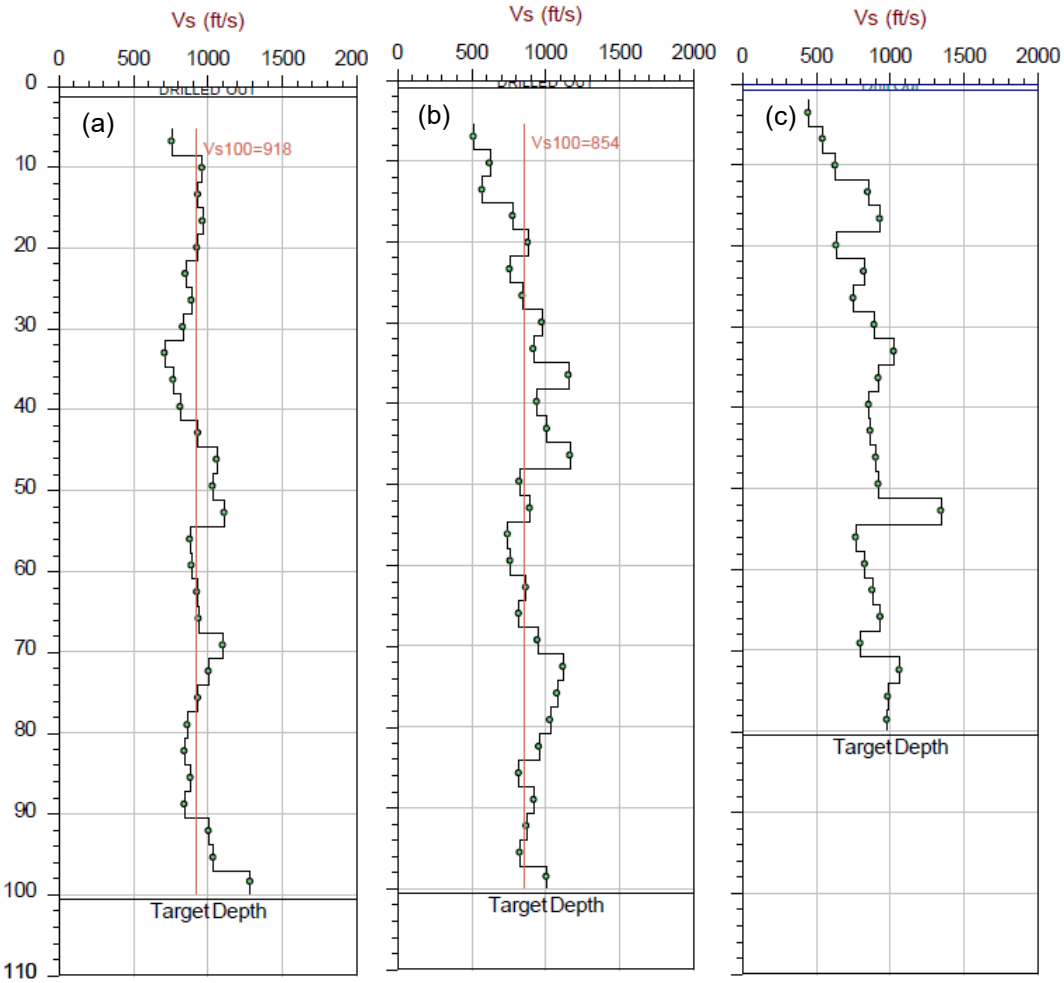
We provide additional information about specific subsurface conditions at each location in our exploration logs in Appendix A. The soil type, color, consistency, and visual classification provided in the logs are generally accordance with the Unified Soil Classification System.

1.3.2 Cone Penetration Tests

We retained the services of a contractor with a CPT rig to advance CPTs at 18 locations to depths of approximately 50.5 to 120.5 feet below the ground surface (bgs) in general accordance with ASTM D-5778. We drilled mud-rotary borings in proximity to 1-SCPT02, 1-SCPT04, 1-SCPT10, and 1-CPT18 to allow direct comparison of the data (matched pairs). Measurements include the tip resistance to penetration of the cone (Qc), the resistance of the friction sleeve (Fs), and pore pressure (U) (Robertson and Campanella, 1988).

We performed shear wave velocity (V_S) measurements in 1-SCPT02, 1-SCPT04, and 1-SCPT10, using the downhole seismic method specified in ASTM D-7400. We present the CPT logs and the V_S profiles in Appendix B. As shown in Appendix B, the time-averaged shear wave velocity over the top 100 feet or 30 meters (V_{S30}) representative of the five campuses ranges from 808 to 918 feet/sec. The results are shown in the Exhibit 1.3.2-1.

EXHIBIT 1.3.2-1: Seismic Cone Penetration Vs Measurements at (a) Charleston South (b) Joaquin, and (c) Plymouth* Campuses



*Plymouth Vs30 is calculated to be 808 feet/sec, assuming the Vs between 80 to 100 feet is 900 feet/sec.

1.4 LABORATORY TESTING

We performed laboratory tests on select soil samples to evaluate their engineering properties. For this project, we performed laboratory testing as shown in the table below.

TABLE 1.4-1: Laboratory Testing

SOIL CHARACTERISTIC	TESTING METHOD	LOCATION OF RESULTS
Natural Unit Weight	ASTM D7263	Appendix A
Natural Moisture Content	ASTM D2216	Appendix A
Plasticity Index (PI) (Wet Method)	ASTM D4318	Appendix C
Grain Size Distribution	ASTM D1140	Appendix C
Consolidation – Constant Rate of Strain	ASTM D4186	Appendix C
Cyclic Simple Shear (CSS)	ASTM D6528	Appendix C
Triaxial Compression – Consolidated, Undrained (TXCU)	ASTM D4767	Appendix C
Triaxial Compression – Unconsolidated, Undrained (TXUU)	ASTM D2850	Appendix C
Unconfined Compression	ASTM D2166	Appendix C
Corrosivity	ASTM Methods	Appendix D

2.0 FINDINGS

2.1 SITE HISTORY

We reviewed historic aerial photographs for the sites from dates ranging between 1948 and present[2]. Historic topographic maps suggest that the sites may have been used for limited agricultural purposes and were mostly undeveloped or occupied by single-family houses and farmlands prior to being completely developed in the 1980s. As described in Section 1.2 of this report, currently, the sites encompass several existing buildings, asphalt concrete-paved parking areas, trees, and associated landscaping.

2.2 REGIONAL AND SITE GEOLOGY

These sites are located at the northwestern end of the Santa Clara Valley in the Coast Ranges geomorphic province of California. The Coast Ranges are dominated by a series of northwest-trending ridges and valleys formed by faulting and folding of the earth's crust. The Santa Clara Valley region lies to the east of the San Andreas Fault and to the west of the Hayward and Calaveras Faults.

Geologic mapping prepared by Brabb et al. (2000) (Figure 3) indicates that the sites are underlain by Holocene-age basin deposits (Qhb) consisting of very fine silty clay to clay deposits occupying flat-floored basins at the distal edge of alluvial fans adjacent to bay mud. These deposits are known to contain unconsolidated, locally organic, plastic silt and silty clay.

[2] https://www.historicaerials.com

2.3 SEISMICITY

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 4 shows the approximate locations of active faults and significant historic earthquakes recorded within the San Francisco Bay Region. The Mountain View area contains numerous active earthquake faults. The nearest active faults are the Monte Vista-Shannon, San Andreas, Hayward, and Calaveras faults, which are capable of producing earthquakes with moment magnitudes of 6.86, 7.85, 6.84, and 7.28, respectively. We list details of these active faults in Table 2.3-1. 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) (Bryant and Hart, 2007).

TABLE 2.3-1: Active Faults According to UCERF3 Capable of Producing Significant Ground Shaking
(Latitude: 37.41923° Longitude: -122.081701° - at the centroid of the sites)[3]

SOURCE	CLOSEST DISTANCE (miles) | (km)	MOMENT MAGNITUDE (M_W)	FAULT MECHANISM
Monte Vista-Shannon	4.95 | 7.97	6.86	Reverse
San Andreas (Peninsula)	8.08 | 13.0	7.85	Strike Slip
Hayward	10.8 | 17.38	6.84	Strike Slip
Calaveras	14.51 | 23.35	7.28	Strike Slip

The sites are not located within a designated Alquist-Priolo Earthquake Fault Zone and no known surface expression of active faults is believed to exist within the site; as such, the risk of fault rupture through the site is considered low.

2.4 SURFACE AND SUBSURFACE CONDITIONS

Current ground surface elevations at the fives campuses range from approximately 13 to 21 feet (WGS84[4]). Current surface conditions consist of paved parking and landscape areas.

2.4.1 Charleston South Campus

In our explorations at the Charleston South Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to hard, sandy lean and fat clay.

In the northern part of the campus (1-B08), below the fill, we encountered basin deposits composed of lean clays interbedded with dense poorly graded sand, well-graded gravel, and silty clayey sand. We encountered a 10-foot-thick layer of dense, poorly graded sand and well-graded gravel at 8 feet bgs, and 2- to 5-foot-thick layers of medium dense to very dense, poorly graded sand and silty sand at various depths.

In the middle (1-B09) and southern (1-B10) part of the site, below the fill, we encountered basin deposits composed of medium stiff to very stiff fat and lean clays interbedded with more granular soil. We encountered an approximately 20-foot-thick layer of medium dense to dense clayey sand

[3] https://earthquake.usgs.gov/hazards/interactive/
[4] World Geodetic System (WGS84)

at 39 feet bgs. Additionally, we encountered sandy silt, silty sand, and medium dense to dense clayey sand layers up to 7 feet thick at various depths.

We present an idealized subsurface profile for the Charleston South site for preliminary design purposes only. Variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.1-1: Generalized Subsurface Profile for Charleston South Campus

DEPTH (feet)	ELEVATION (WGS84)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 6.5	CL/CH	Stiff to very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
8 to 11	6.5 to 3.5	SP/GW	Dense, Poorly Graded Sand and Well Graded Gravel
11 to 40	3.5 to -25.5	CL	Stiff, Lean Clay
40 to 48	-25.5 to -33.5	SC	Dense, Clayey Sand
48 to 55	-33.5 to -40.5	SC	Medium Dense Clayey Sand
Below 55	Below -40.5	CL/CH	Medium Stiff to Very Stiff, Lean Clay to Fat Clay

*Based on average surface elevation of 14.6 feet

2.4.2 Joaquin Campus

At the Joaquin Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to very stiff lean clay and fat clay. Below the fill, we encountered basin deposits composed of stiff to hard lean, fat, and sandy clay interbedded with medium dense to dense well-graded sand, well-graded gravel, and clayey sand. A 16-foot-thick layer of clayey sand was encountered at 23 feet bgs in 1-B04 and 20-foot-thick layer of clayey sand was encountered at 78 feet bgs in 1-B01. Towards the south of the site, the clayey sand layers become less dense; however, we have limited subsurface information in this area due to presence of existing building.

We present an idealized subsurface profile for the Joaquin site for preliminary design purposes only. Variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.2-1: Generalized Subsurface Profile for Joaquin Campus

DEPTH (feet)	ELEVATION (WGS84)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 8.5	CL/CH	Stiff to very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
8 to 21	8.5 to -4.5	CL/SC	Stiff to very stiff, Clayey Sand to Sandy Lean Clay
21 to 30	-4.5 to -13.5	CH/CL	Stiff to very stiff, Fat Clay and Lean Clay
30 to 40	-13.5 to -23.5	GC/SP	Medium dense, Clayey Gravel and Poorly Graded Sand
40 to 50	-23.5 to -33.5	CL	Stiff to very stiff, Lean Clay
50 to 60	-33.5 to -43.5	SC	Medium dense, Clayey Sand
Below 60	Below -43.5	CL/CH	Very stiff to hard, Lean Clay and Fat Clay

*Based on average surface elevation of 16.6 feet

2.4.3 Plymouth Campus

In our explorations at the Plymouth Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of stiff to very stiff lean clay and sandy silt. Below the fill, we encountered basin deposits composed of stiff to very stiff lean, fat, and sandy clay interbedded with medium dense clayey sand, well-graded sand, and sandy silt to silty sand. We encountered a 15-foot-thick layer of sandy silt to silty sand at 55 feet bgs in 1-B07.

We present an idealized subsurface profile for the Plymouth site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.3-1: Generalized Subsurface Profile for Plymouth Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 11.5	CL/ML	Stiff to very stiff, Lean and Sandy Silt (Non-Engineered Surficial Fill)
8 to 20	11.5 to -0.5	SC	Medium dense, Clayey Sand with Gravel
20 to 33	-0.5 to -13.5	CL/SC	Stiff to very stiff, Sandy Clay and Clayey Sand
33 to 40	-13.5 to -20.5	SW	Medium dense, Well Graded Sand with Clay and Gravel
40 to 50	-20.5 to -30.5	CL	Medium stiff to stiff, Lean Clay and Sandy Clay
50 to 70	-30.5 to -50.5	SM/ML	Medium stiff to stiff, Sandy silt to silty sand
Below 70	Below -50.5	CH	Very stiff, Fat Clay

*Based on average surface elevation of 19.4 feet

2.4.4 Commons Campus

In our explorations at the Commons Campus, we encountered up to 8 feet of surficial non-engineered fill consisting of very stiff fat clay and fat clay with sand. Below the fill, in the northern portion of the site, we encountered a 7-foot-thick layer of medium dense to dense poorly graded sand with gravel. In the southern portion of the site, below the fill, we encountered a 15-foot-thick layer of silty sand with gravel that is medium dense on the top, but becomes loose towards the bottom. This layer is potentially liquefiable. Below this granular layer, we encounter basin deposits composed of stiff to very stiff lean and fat clay with and without sand interbedded with medium dense clayey sand and silty sand.

We present an idealized subsurface profile for the Commons site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.4-1: Generalized Subsurface Profile for Commons Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 10	Above 8.5	CL/CH	Very stiff, Lean and Fat Clay (Non-Engineered Surficial Fill)
10 to 23	8.5 to -4.5	SM/SP-SM	Dense to Medium Dense Silty Sand and Poorly Graded Sand with Gravel and Silt
23 to 35	-4.5 to -16.5	CL	Stiff Lean Clay
35 to 40	-16.5 to -21.5	CL	Very Stiff, Lean Clay.
40 to 45	-21.5 to -26.5	SC/SM	Medium Dense, Clayey Sand and Silty Sand

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
45 to 50	-26.5 to -31.5	CL	Stiff, Lean Clay
50 to 75	-31.5 to -56.5	CL	Stiff to Very Stiff, Lean Clay
75 to 80	-56.5 to -61.5	SP-SC	Poorly Graded Sand with Clay
Below 80	Below -61.5	CL	Very Stiff, Lean Clay

*Based on average surface elevation of 18.6 feet

2.4.5 Space Park Campus

In our explorations at the Space Park Campus, we encountered 8 to 10 feet of surficial non-engineered fill consisting of stiff to very stiff fat clay. Below the fill, we encountered basin deposits composed of stiff to very stiff lean and sandy clay interbedded with medium dense clayey sand, poorly graded sand with clay and gravel, poorly graded gravel with clay, silty sand, and silt.

We present an idealized subsurface profile for the Space Park site for preliminary design purposes only; variations in the layering and thicknesses should be anticipated as the following table is for preliminary design purposes only and is not a basis for differing conditions during construction.

TABLE 2.4.5-1: Generalized Subsurface Profile for Space Park Campus

DEPTH (feet)	ELEVATION (WGS84, feet)*	USCS SOIL TYPE	DESCRIPTION
Above 8	Above 11	CH	Stiff to Hard, Fat Clay (Non-Engineered Surficial Fill)
8 to 18	11 to 1	CL	Stiff to Very Stiff, Lean Clay
18 to 35	1 to -16	CL	Hard, Lean Clay
35 to 45	-16 to -26	SC/SP-SC	Loose to Dense, Clayey Sand and Poorly Graded Sand with Clay and Gravel
45 to 60	-26 to -41	CL	Medium Stiff to Hard, Sandy Clay
60 to 70	-41 to -51	ML	Stiff, Silt
70 to 82	-51 to -63	SM/GP	Medium Dense to Dense, Silty Sand and Sandy Gravel to Gravelly Sand
Below 80	Below -61	CL	Very Stiff, Lean Clay

*Based on average surface elevation of 18.9 feet

2.5 GROUNDWATER CONDITIONS

We observed groundwater at shallow depths in a few of the borings before switching from solid flight auger to mud-rotary drilling methods. We observed groundwater at depths ranging from 5½ to 7½ feet, which corresponds to approximately Elevation 5½ to 9½ feet (WGS84). We summarize our groundwater observations in Table 2.5-1.

In addition to observing the groundwater level in a few borings, we performed pore pressure dissipation tests in the CPTs. These tests suggest that the groundwater level is approximately 3 to 11 feet deep below existing grade, which corresponds to approximately Elevation 5 to 14 feet (WGS84), as presented in Table 2.5-1 below.

TABLE 2.5-1: Recorded Groundwater Levels (at Time of Exploration)

CAMPUS	BORING / CPT	GROUNDWATER DEPTH (feet bgs)	GROUNDWATER ELEVATION (WGS84, feet)
Charleston South	1-SCPT04	8.1*	4.9*
	1-CPT13	8.5*	4.5*
	1-CPT14	7.0*	6*
	1-CPT15	6.2*	7.8*
	1-CPT16	8.1*	8.9*
	1-CPT17	4.8*	12.2*
	1-CPT18	3.1*	11.9*
	1-B08	7.5	5.5
	1-B09	5.5	9.5
	1-B10	7.5	9.5
Joaquin	1-CPT01	11.1*	4.9*
	1-SCPT02	8.9*	7.1*
	1-CPT03	9.0*	8.0*
	1-CPT06	8.2*	7.8*
	1-B01	Not obtained due to drilling method	
	1-B02	Not obtained due to drilling method	
	1-B04	Not obtained due to drilling method	
Plymouth	1-CPT09	6.8*	14.2*
	1-CPT10	4.8*	14.2*
	1-CPT11	6.2*	11.8*
	1-CPT12	6.3*	13.7*
	1-B07	Not obtained due to drilling method	
Commons	1-CPT5	7.7*	10.9*
	1-CPT7	8.1*	10.5*
	1-B3	Not obtained due to drilling method	
	1-B5	Not obtained due to drilling method	
Space Park	1-CPT8	6.0*	12.9*
	1-B6	Not obtained due to drilling method	

*Assumed phreatic surface based on pore pressure dissipation tests assuming hydrostatic conditions.

Plate 1.2 of the Seismic Hazard Zone Report for the Mountain View Quadrangle (2006) indicates the highest historical groundwater within the sites vicinity to be less than approximately 5 feet below the ground surface. For purposes of our analyses and recommendations, we consider an appropriate design groundwater depth of 6 feet below ground surface, which corresponds to an elevation range of 4½ to 14 feet (WGS84).

Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation practices, and other factors not evident at the time measurements were made. Excavations for utility installation may encounter groundwater, depending upon the time of year of construction.

3.0 DISCUSSION AND CONCLUSIONS

Based on the exploration and laboratory test results, the project site is feasible for the future developments provided the recommendations contained in this report are properly incorporated into the design plans and specifications.

The potential geotechnical concerns for the future site redevelopment are as follows:

- The potential for liquefaction of coarse-grained material and cyclic softening of some of the fine-grained soil materials below the groundwater table during a seismic event.
- The presence of groundwater and its influence on below-grade construction.
- The potential need for shoring systems for below-grade construction, if planned, to protect the excavation walls, adjacent streets and improvements, and the potential need for dewatering of excavations extending below the groundwater surface.
- The potential for flooding due to sea-level rise.
- The potential settlement of medium stiff clayey and silty deposits under new loads, such as placement of additional fill and high building loads.

We evaluate the geologic hazards common around the bay area in the following sections.

3.1 SEISMIC HAZARDS

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking and liquefaction. The following sections present a discussion of these hazards as they apply to the site. Based on topographic and lithologic data, the risk of regional subsidence or uplift, lurching, landslides, tsunamis, or seiches is low to negligible at the site.

3.1.1 Ground Rupture

Since there are no known active faults crossing the property and the site is not located within an Earthquake Fault Special Study Zone, ground rupture is unlikely at the subject property.

3.1.2 Ground Shaking

Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead and live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the actual forces that would be associated with a major earthquake. Therefore, structures should be able to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse, but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1996). Section 3.3 presents California Building Code (CBC, 2019) seismic design.

3.1.3 Liquefaction / Cyclic Softening

The site is located within a State of California Seismic Hazard Zone (CGS, 2006) for areas that may be susceptible to liquefaction (Figure 5).

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. The soil most susceptible to liquefaction is clean, loose, saturated, uniformly graded fine sand below the groundwater table. Empirical evidence indicates that loose silty sand is also potentially liquefiable. When seismic ground shaking occurs, the soil is subjected to cyclic shear stresses that can cause excess hydrostatic pressures to develop. If excess hydrostatic pressures exceed the effective confining stress from the overlying soil, the sand may undergo deformation. If the sand undergoes virtually unlimited deformation without developing significant resistance, it is said to have liquefied and, if the sand consolidates or vents to the surface during and following liquefaction, ground settlement and surface deformation may occur. In addition to liquefaction of sandy materials, clayey soil can also undergo “cyclic-softening” or strength loss as a result of cyclic loading. We considered both liquefaction and cyclic-softening hazards in our analyses.

3.1.3.1 Liquefaction Analysis Overview

We divided the soil into their “sand-like” and “clay-like” behaviors using procedures presented in Boulanger and Idriss (2008). We then performed an initial liquefaction susceptibility assessment based on the methodologies presented by Bray and Sancio (2006). Section 3.1.3.2 presents the details of our screening of soil samples for liquefaction susceptibility. We also performed cyclic simple shear (CSS) testing on a representative sample of fine-grained deposits to more accurately assess the cyclic response of the fine-grained soil.

We then performed an analysis of liquefaction potential based on the CPT data using the computer software CLiq (Version 2.2.1.4) developed by GeoLogismiki. The software incorporates the procedure introduced by the 1996 National Center for Earthquake Engineering Research (NCEER) workshop and the 1998 NCEER/National Science Foundation (NSF) workshop. The workshops are summarized by Youd et al. (2001) and updated by Robertson (2009).

After obtaining CLiq analysis results, we used in-situ data (blow counts and soil descriptions), laboratory data (PI, moisture content, fines content, and cyclic simple shear (CSS) test), and Boulanger and Idriss (2008) and Bray and Sancio (2006) methodologies to establish a relationship between soil that is potentially liquefiable in the CPTs by comparing them to adjacent “matched-pair” borings. To assess seismically induced settlement of potentially liquefiable soil, we considered the methodology presented by Zhang et al. (2002). The details and results of our analyses are presented in the following sections.

3.1.3.2 Liquefaction Susceptibility Screening of Soil Samples

Boulanger and Idriss (2008) found that for practical purposes, soil can be divided into either ‘sand-like’ or ‘clay-like’ behavior. Where sand-like soil can experience ‘liquefaction’ and clay-like soil can experience ‘cyclic failure or softening’. In general, sand-like soil is gravel, sand and very-low plasticity silt; whereas, clay-like soil comprises low-plasticity clay and plastic silt.

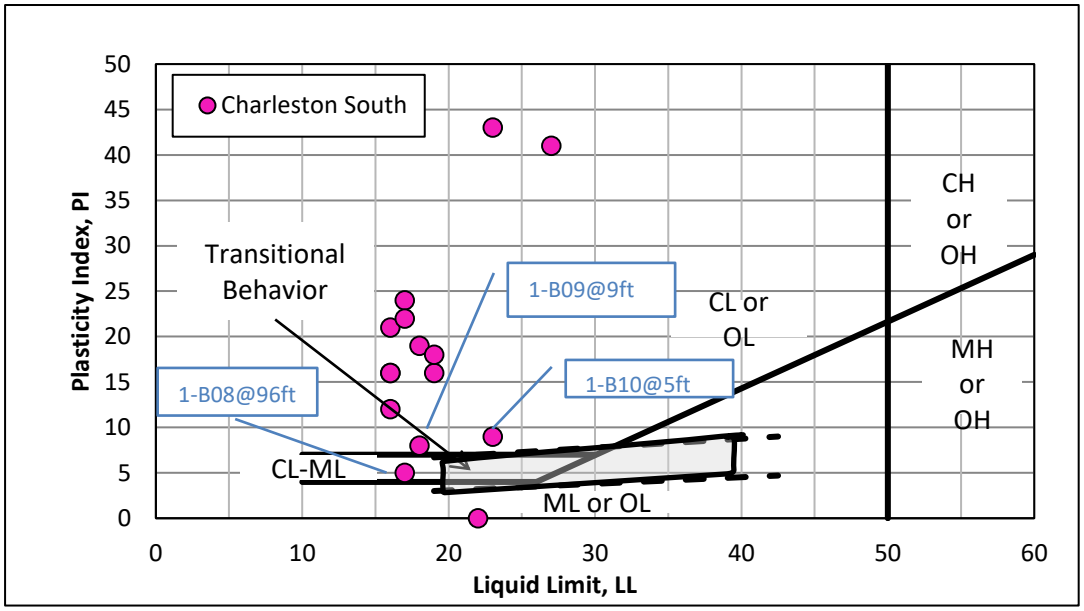
In order to evaluate the clay-like, intermediate and sand-like behavior of the fine-grained soil at the site, we plotted the PI and liquid limit (LL) of the onsite soil relative to the soil behavior limits. We then considered the criteria presented by Bray and Sancio to assess the potential for liquefaction triggering on the site soil. Bray and Sancio observed that soil with a plasticity

index (PI) less than 12 and a water content (w_c) to liquid limit (LL) ratio of more than 0.85 is susceptible to liquefaction/cyclic-softening. Soil with PI greater than 18 and/or w_c/LL less than 0.8 were deemed not to be susceptible to liquefaction/cyclic-softening because they are too plastic and/or their water contents are too low.

Charleston South Campus

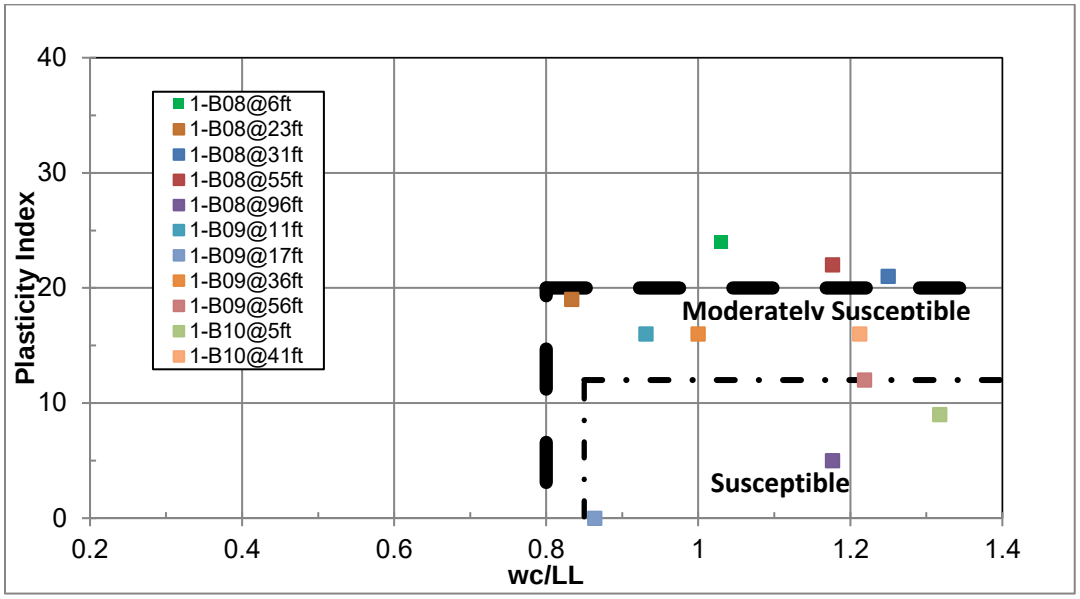
Based on Idriss and Boulanger (2008), at the Charleston South site, the majority of fine-grained soil should be classified as 'clay-like' other than the material at Boring 1-B08 at 96 feet below ground surface, at Boring 1-B09 at 9 feet below ground surface, and at Boring 1-B10 at 5 feet below ground surface, where soil should be considered as 'transitional'. We ignore any liquefaction above the groundwater table (6 feet bgs). In addition, since liquefaction/cyclic softening of material below 60 feet will not likely manifest to the surface, we do not consider susceptibility of material at 96 feet below ground surface.

EXHIBIT 3.1.3.2-1: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Charleston South Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-2, the majority of the laboratory data plot as moderately susceptible and susceptible to liquefaction.

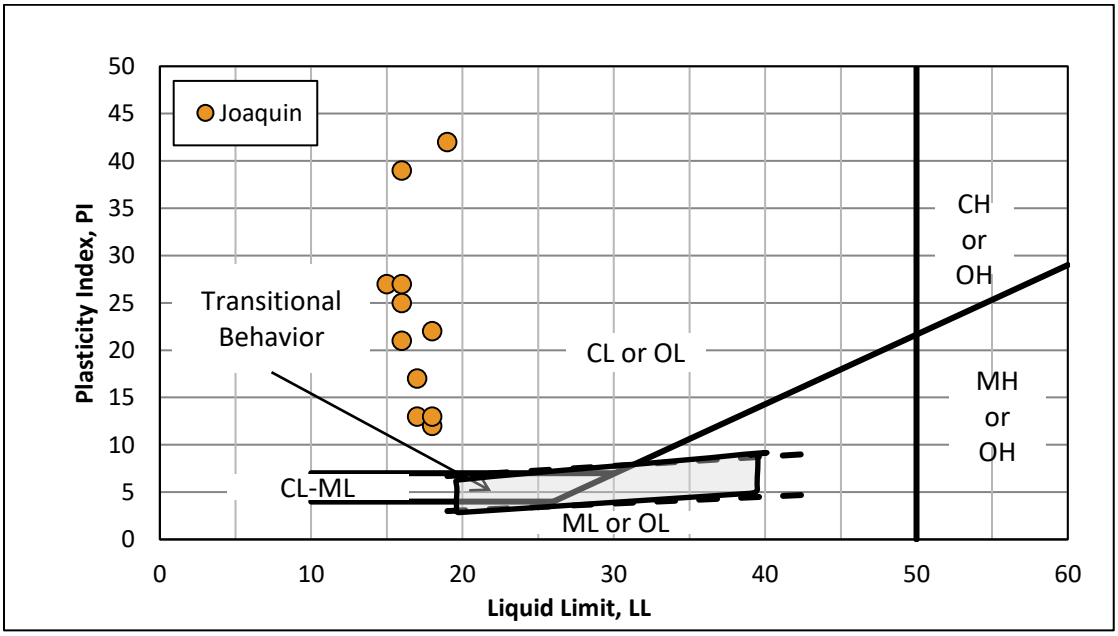
EXHIBIT 3.1.3.2-2: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Charleston South Campus



Joaquin Campus

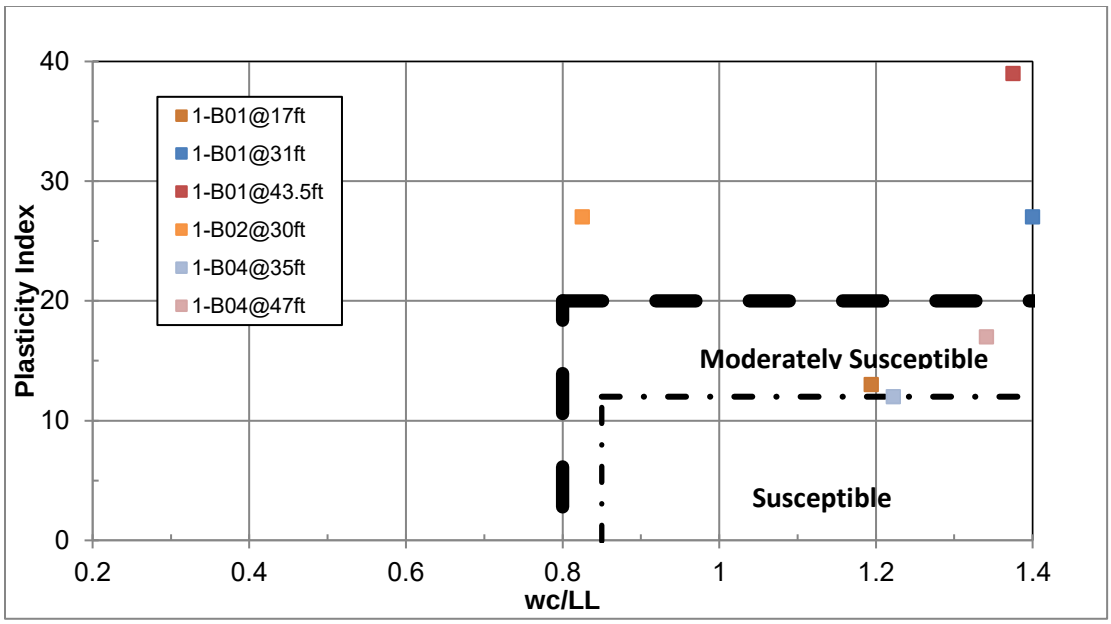
Based on Idriss and Boulanger (2008), we conclude the majority of fine-grained soil at the Joaquin site should be considered as 'clay-like' as shown in Exhibit 3.1.3.2-3.

EXHIBIT 3.1.3.2-3: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Joaquin Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-4, the majority of the laboratory data plot as not susceptible to liquefaction other than a clayey gravel with sand layer (Boring 1-B01 at 17 feet bgs), a clayey sand layer (Boring 1-B04 at 35 feet bgs), and a lean clay with sand layer (Boring 1-B04 at 47 feet bgs), which plot as moderately susceptible to liquefaction.

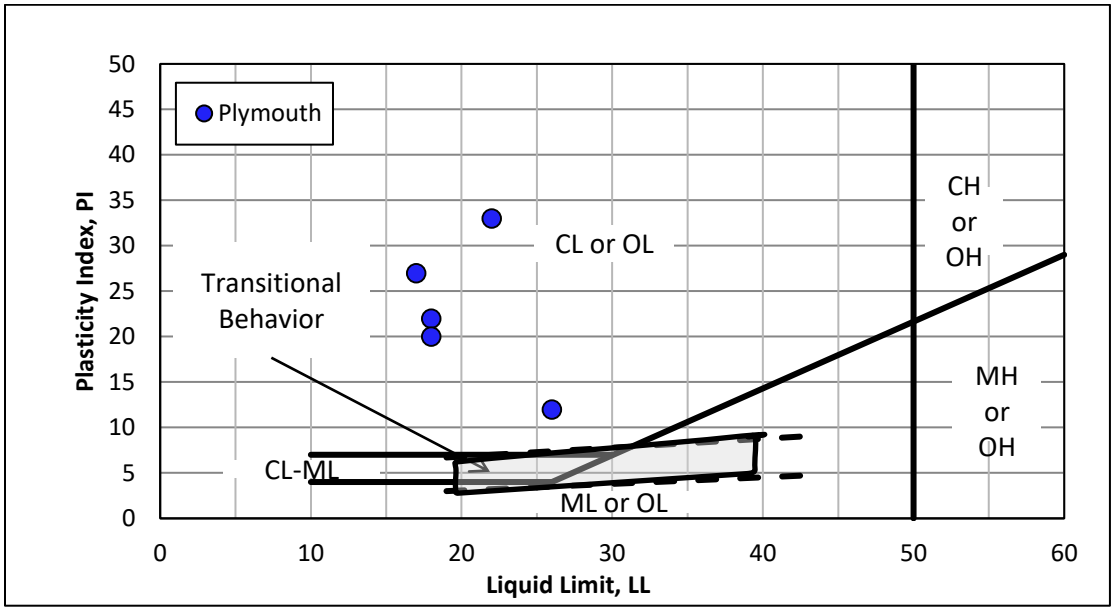
EXHIBIT 3.1.3.2-4: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Joaquin Campus



Plymouth Campus

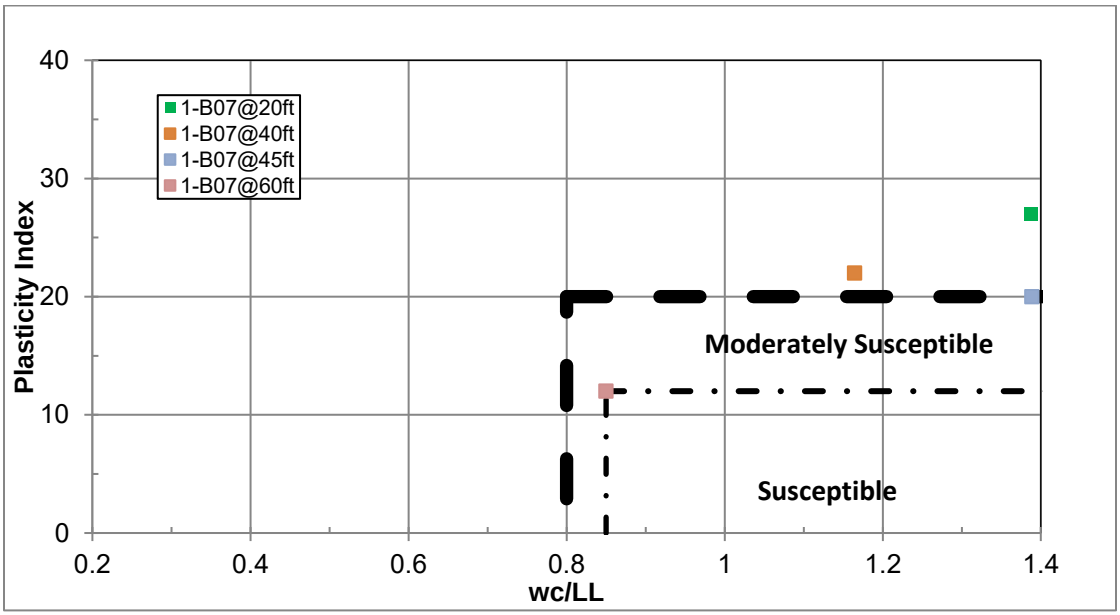
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-5, the majority of fine-grained soil at the Plymouth sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-5: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Plymouth Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-6, the majority of the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Plymouth site other than a sandy clay layer (Boring 1-B07 at 45 feet bgs) and a sandy silt to silty sand layer (Boring 1-B07 at 60 feet bgs).

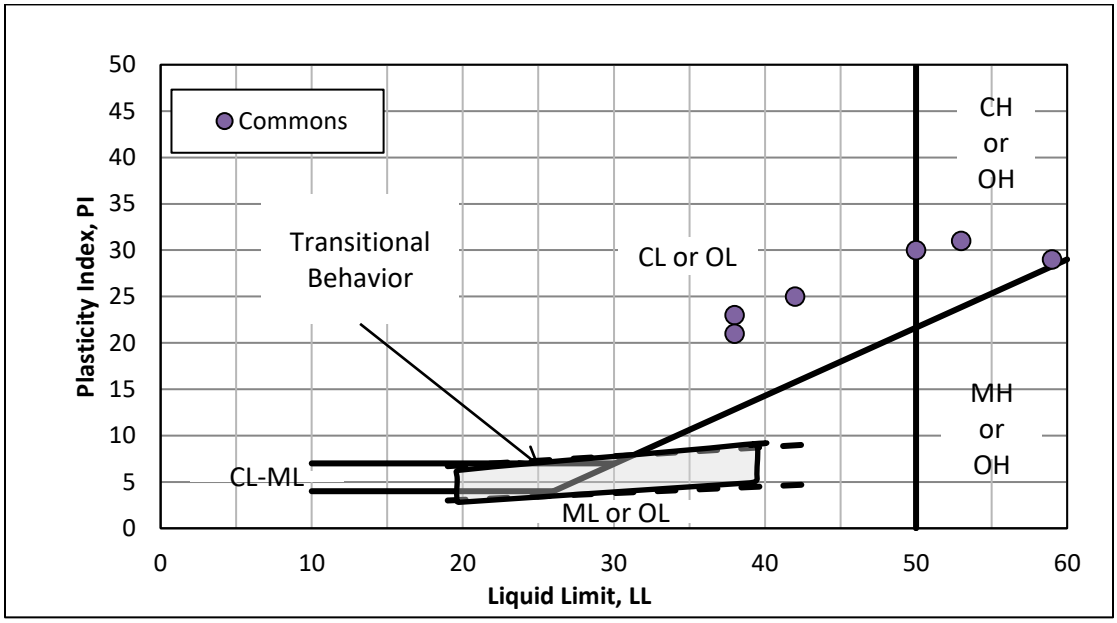
EXHIBIT 3.1.3.2-6: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Plymouth Campus



Commons Campus

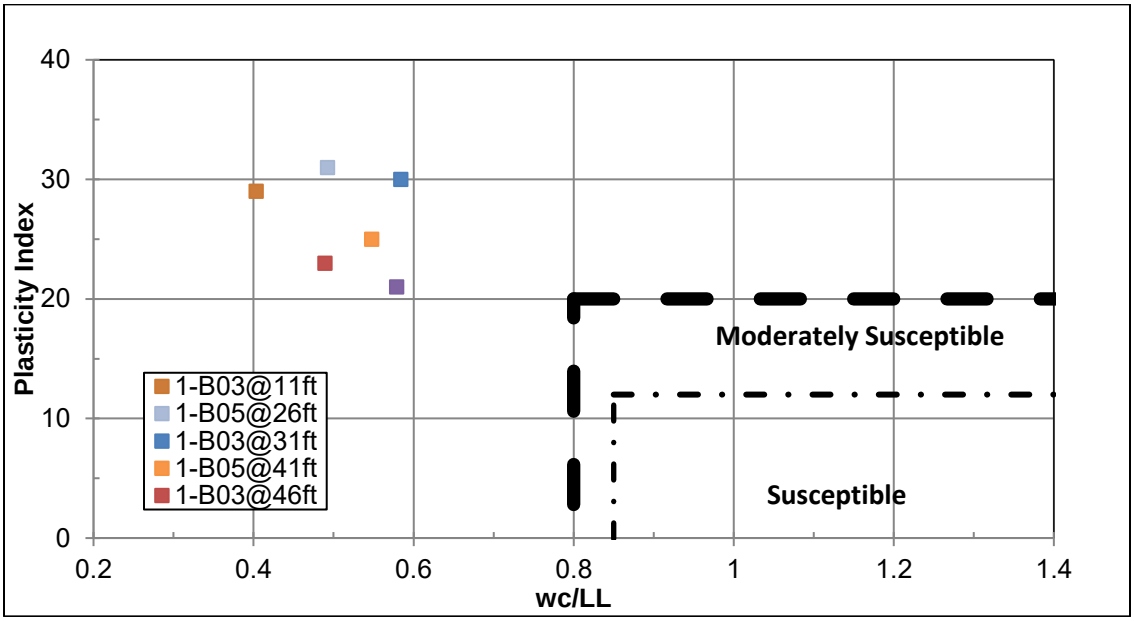
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-7, the majority of fine-grained soil at the Commons sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-7: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Commons Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-8, all the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Commons site.

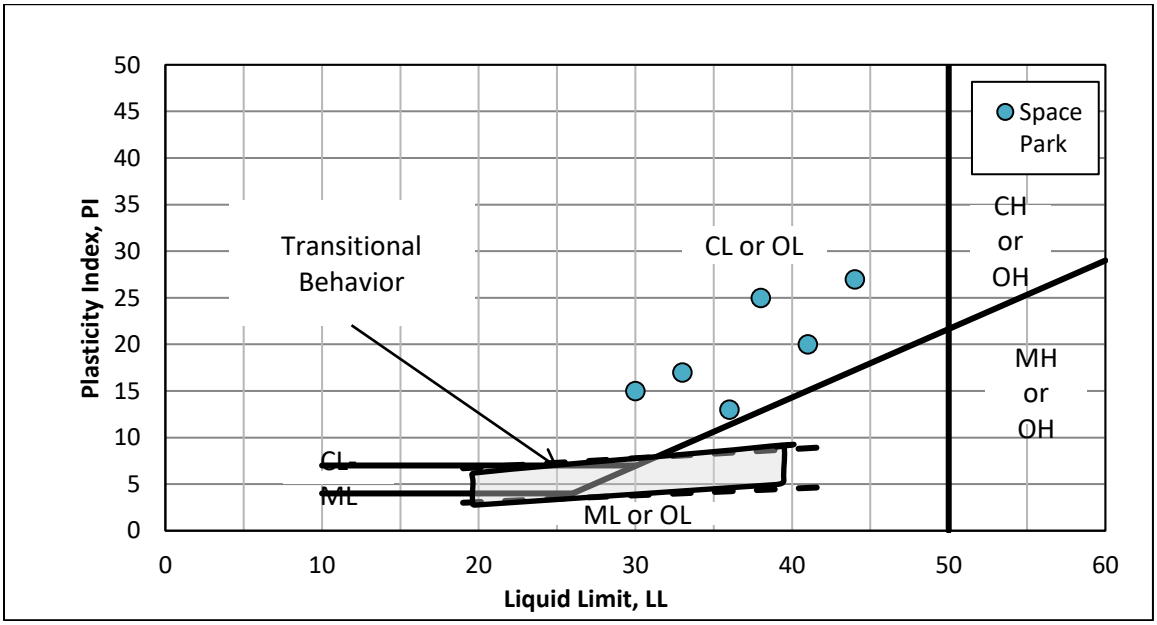
EXHIBIT 3.1.3.2-8: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Commons Campus



Space Park Campus

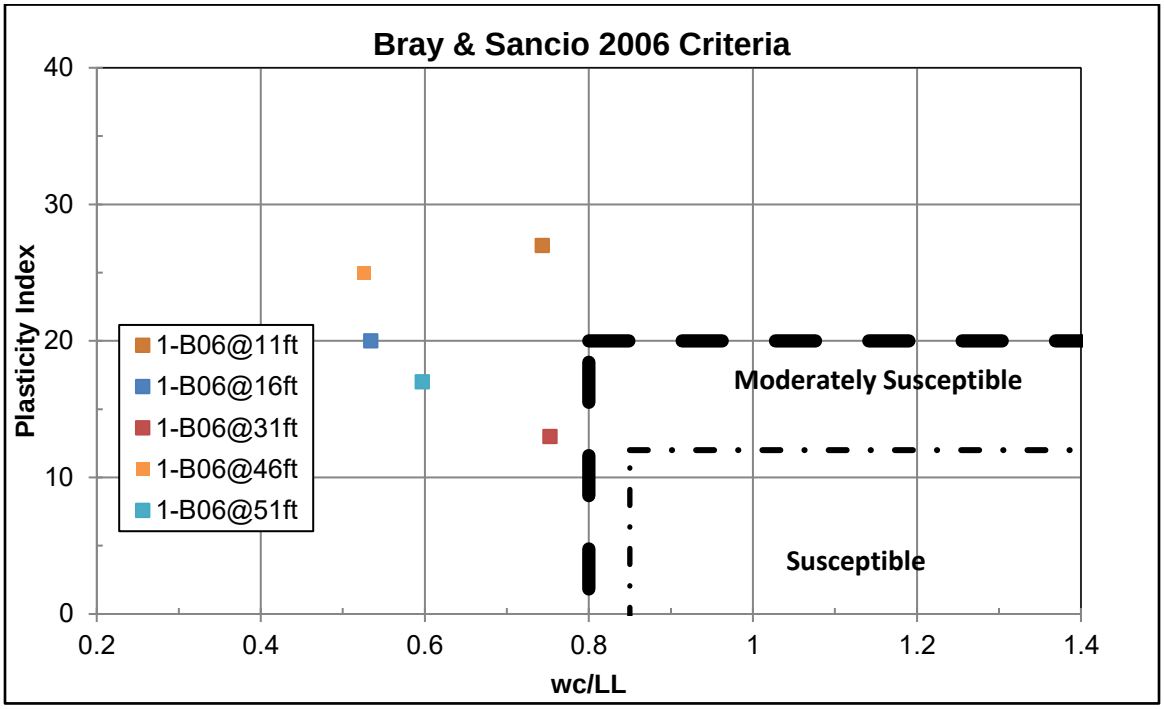
Based on Idriss and Boulanger (2008), as shown in Exhibit 3.1.3.2-9, the majority of fine-grained soil at the Space Park sites should be considered as 'clay-like'.

EXHIBIT 3.1.3.2-9: Idriss and Boulanger (2008) Methodology for Differentiating between Clay-like and Sand-like Behavior Based on Atterberg Limits – Space Park Campus



Based on the Bray and Sancio criteria, as shown in Exhibit 3.1.3.2-10, all the laboratory data plot as not susceptible to liquefaction/cyclic softening at the Space Park site. Although, at 36 feet, an Atterberg Limit test indicates the soil is a clay, based on grain-size analysis the soil encountered in the boring at that depth is sand; we used a SPT-blow-count-based method to further evaluate the liquefaction potential of this layer, which indicates susceptibility to liquefaction.

EXHIBIT 3.1.3.2-10: Assessment of the Liquefaction/Cyclic-Softening Potential of Fine-Grained Based on the Bray and Sancio (2006) Criteria – Space Park Campus



3.1.3.3 Liquefaction Analysis of CPT Data and Matched-Pair Borings

We performed an analysis of liquefaction potential based on the CPT data using the computer software CLiq (Version 2.2.1.4) developed by GeoLogismiki. The software incorporates the procedure introduced by the 1996 National Center for Earthquake Engineering Research (NCEER) workshop and the 1998 NCEER/National Science Foundation (NSF) workshop. The workshops are summarized by Youd et al. (2001) and updated by Robertson (2009). We estimated the Cyclic Stress Ratio (CSR) for an average Maximum Considered Earthquake (MCE) Peak Ground Acceleration (PGA_M) value of 0.66g[5] as outlined in the latest California building code with an earthquake magnitude of 7.85 on San Andreas Fault. We used a groundwater depth of 6 feet for this analysis.

We then compared the zones calculated to be liquefiable using CLiq to soil zones that were not susceptible to liquefaction or cyclic softening according to Bray and Sancio (2006) in the adjacent borings. Appendix E presents the results of the CLiq analyses. Table 3.1.3.3-1 presents the matched-pair borings and CPTs for each campus.

[5] Refer to Section 3.3 for CBC 2019 seismic design parameters

TABLE 3.1.3.3-1: Matched-Pair Borings and CPTs

CAMPUS	MATCHED-PAIR	
	BORING	CPT
Charleston South	1-B08	1-SCPT04
	1-B09	1-CPT18
Joaquin	1-B01	1-SCPT02
Plymouth	1-B07	1-SCPT10

Please note that borings and CPTs advanced within Commons and Space Park are generally spaced over 100 feet apart. As such, they are not listed as matched pairs in Table 3.1.3.3-1. However, where soil stratigraphy encountered in the borings and CPTs are consistent, we used information gathered from the borings to adjust which layers are susceptible to liquefaction; therefore, we adjusted our estimates of liquefaction-induced settlement calculated from the CPT for both the Commons and Space Park Campuses.

3.1.3.4 Cyclic Simple Shear Tests

Since the Bray and Sancio method is considered a screening test of potential for liquefaction susceptibility, we performed cyclic simple shear (CSS) on select samples of fine-grained deposits recovered from one of our Dames and Moore samplers to more accurately assess the cyclic response of the fine-grained site soil. The CSS testing allows us to directly test if a soil is liquefiable and not rely solely on simplified, empirical methods of liquefaction analyses.

We performed CSS testing on a fine-grained sample recovered at the Charleston South Campus from Boring 1-B09 at a depth of approximately 16 feet below the ground surface. We subjected this sample to a cyclic stress ratio (CSR) of 0.47. Based on review of the CSS test results (Appendix C), although the sample did not exhibit full cyclic softening behavior according to generation of excess pore water pressure criterion, the single amplitude shear strain reached eight percent at ten cycles indicating the soil sample experienced cyclic softening based on the excess shear strain criterion. We compared the CSS test result to the corresponding matched-pair CPT (1-CPT18). The comparison shows the calculated factor of safety against cyclic softening of less than 1.0 according to CPT-based cyclic softening triggering analyses (CLiq Analyses) is justifiable.

3.1.3.5 Liquefaction Analysis Conclusion

Using Idriss and Boulanger (2008) and Bray and Sancio (2006) criteria, the results of CSS testing, as well as comparison of matched-pair borings and CPTs, we conclude that a soil behavior index (Ic) of 2.6 is acceptable to use as the cutoff between soil that is sand-like and soil that is clay-like (except at 1-CPT05 and 1-CPT08, where we conclude an Ic of 2.5 is appropriate. We performed our analyses using the method by Idriss and Boulanger (2008), without clay-like behavior; we also ignored any settlement below 60 feet bgs.

In addition, at the Space Park Campus, we used the SPT-blow-count-based method by Idriss and Boulanger 2008, to evaluate the liquefaction settlement in the sand layer at Boring 1-B06, from 33.5 to 40 feet bgs; this layer is not captured by any of the CPTs.

Based on site-specific study of the liquefaction hazard, we estimate the overall total liquefaction-induced settlement resulting from a California Building Code Maximum Considered

Earthquake at Joaquin, Plymouth, Charleston South, Commons, and Space Park Campuses could be up to 2 inches. In some isolated areas, the settlement may be up to 3 inches. The potential differential settlement associated with the liquefaction is likely about half of the total settlement over a span of 30 feet. Based on our experience on other similar projects, the magnitude of liquefaction-induced settlement can be accommodated by the foundation systems discussed in Section 5.0 of this report.

TABLE 3.1.3.5-1: Liquefaction-Induced Settlement after Calibration with Borings

CAMPUS	CPT	SETTLEMENT (INCHES)*
Joaquin	1-CPT01	**2.5**
	1-SCPT02	0.9
	1-CPT03	1.8
	1-CPT06	**2.5**
Plymouth	1-CPT09	**2.5**
	1-SCPT10	1.5
	1-CPT11	0.8
	1-CPT12	0.6
Charleston South	1-SCPT04	**2.4**
	1-CPT13	2.0
	1-CPT14	1.2
	1-CPT15	1.2
	1-CPT16	**2.5**
	1-CPT17	1.9
	1-CPT18	1.4
Commons	1-CPT5	**0.5**
	1-CPT7	**0.5**
Space Park	1-CPT8	**3.0**

*Maximum liquefaction induced settlement for each campus are bolded.

3.1.4 Lateral Spreading

Lateral spreading is a failure within a nearly horizontal soil zone (possibly due to liquefaction) that causes the overlying soil mass to move toward a free face or down a gentle slope. The closest free face to these campuses is the Permanente Creek, which is more than 400 feet to the west. Therefore, the risk of lateral spreading at the project site is low.

3.1.5 Flooding

Federal Emergency Management Agency (FEMA) Flood Insurance Maps (Figure 6) indicate that the three sites are within a special flood hazard area subject to inundation by 0.2-percent annual chances of flood. Based on our review of the Precise Plan, dated February 2018 and the City of Mountain View study of 50-year sea-level rise, areas below 13.2 feet above mean sea level will be susceptible to flooding by 2057. The Civil Engineer should review pertinent information relating to possible flood levels for the subject site based on final pad elevations and provide appropriate design measures for development of the project.

3.2 STATIC CONSOLIDATION SETTLEMENT

Our explorations did not encounter highly compressible clay layers and the clayey materials tended to be overconsolidated. Based on the plasticity index (PI), moisture density, and the consolidation test results presented in Appendix C, we do not anticipate the static consolidation settlement to be a controlling hazard at these sites. However, during the design-level analysis, once the development plans and proposed grades are available, if deemed necessary in collaboration with the structural engineer, we may recommend to model anticipated settlement from the proposed structure and fill placement using a 3-dimensional finite-element analysis with PLAXIS 3D.

3.3 2019 CBC SEISMIC DESIGN PARAMETERS

Based on the subsurface conditions encountered and CPT shear wave velocity testing, we classified the five sites as Site Class D in accordance with the 2019 California Building Code (CBC). 2019 CBC is based on the 2016 edition of the American Society of Civil Engineers document titled “Minimum Design Loads and Associated Criteria for Buildings and Other Structures” (ASCE 71-16).

We provide the 2019 CBC seismic design parameters for a Site Class D in Tables 3.3-1 to 3.3-3 for the three campuses, which includes design spectral response acceleration parameters based on the mapped Risk-Targeted Maximum Considered Earthquake (MCE_R) spectral response acceleration parameters.

TABLE 3.3-1: 2019 CBC Seismic Design Parameters, Charleston Campus (Latitude: 37.418704° Longitude: -122.081702°)

PARAMETER FOR CHARLESTON CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.502
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.502
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.618
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.679
Long-period transition-period, T_L (sec)	12

TABLE 3.3-2: 2019 CBC Seismic Design Parameters, Joaquin Campus (Latitude: 37.417614° Longitude: -122.079461°)

PARAMETER FOR JOAQUIN CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0

PARAMETER FOR JOAQUIN CAMPUS	VALUE
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.601
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.661
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-3: 2019 CBC Seismic Design Parameters, Plymouth Campus (Latitude: 37.41611° Longitude: -122.084262°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.602
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.662
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-4: 2019 CBC Seismic Design Parameters, Commons Campus (Latitude: 37.416649° Longitude: -122.078783°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.603
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.663
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

TABLE 3.3-5: 2019 CBC Seismic Design Parameters, Space Park Campus (Latitude: 37.416335° Longitude: -122.077089°)

PARAMETER FOR PLYMOUTH CAMPUS	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.5
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.6
Site Coefficient, F_A	1.0
Site Coefficient, F_V	*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.5
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.0
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.6
Site Coefficient, F_{PGA}	1.1
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.661
Long-period transition-period, T_L (sec)	12

*Requires site-specific ground motion hazard analysis

Based on Section 11.4.8 of ASCE 7-16, a ground motion hazard analysis needs to be performed in accordance with Section 21.2 for structures on Site Class D with S_1 greater than or equal to 0.2 unless the structural engineer elects to take the exception described in Section 11.4.8. Once the concept designs are available, we can provide site-specific ground motion hazard analyses under a separate cover.

3.4 SHALLOW GROUNDWATER AND EXCAVATION CONSIDERATIONS

Based on our findings described in Section 2.7 of this report and depending on the future proposed developments, groundwater may impact design of below-grade improvements, such as basements, and construction at these sites. Shallow groundwater conditions may result in the following impacts:

1. Require construction dewatering.
2. Result in unstable conditions at the base of excavation requiring stabilization prior to improvement construction.
3. Cause moisture damage to sensitive floor coverings.
4. Transmit moisture vapor through slabs causing excessive mold/mildew build-up, fogging of windows, and damage to computers and other sensitive equipment.
5. Require waterproofing for the proposed basement structures, if any.

During excavation of the below-grade improvements, if considered in the design, the sides of the excavation may need to be shored. The primary considerations related to the selection of the shoring systems are:

1. Distance of the excavation from improvements sensitive to movement that will remain after building construction, and
2. Potential presence of groundwater during construction, and the need to keep the dewatering to a minimum due to environmental concerns.

3.5 SOIL CORROSION POTENTIAL

As part of this study, we collected eight soil samples and submitted them to a California State certified analytical lab for determination of redox potential, pH, resistivity, sulfate, and chloride. The following results are considered representative of the alluvial deposits in the area and the corrosion potential of the soil on buried concrete structures and metal pipes. The results are included in Appendix D and summarized in the table below.

TABLE 3.5-1: Corrosivity Test Results

CAMPUS	SAMPLE LOCATION	DEPTH (feet)	REDOX (mV)	pH	RESISTIVITY (OHMS-CM)	CHLORIDE* (mg/kg)	SULFATE* (mg/kg)
Joaquin	1-B04	20.5	240	8.23	1,200	N.D.	87
Plymouth	1-B07	5.0	170	8.29	1,100	31	140
	1-B07	25.5	140	8.30	1,200	N.D.	97
Commons	1-B03	8.5	230	8.21	1,900	N.D.	110
	1-B03	41	220	8.22	2,400	N.D.	54
Space Park	1-B06	8	210	8.26	1,100	N.D.	210
	1-B06	26	210	8.47	1,500	N.D.	110
	1-B06	40.5	220	8.38	4,900	N.D.	36

* ASTM D4327

The 2019 CBC references the 2014 American Concrete Institute Manual, ACI 318-14, Chapter 19, Sections 19.3.1.1 for structural concrete requirements. Based on the test results and ACI criteria, the tested soil would classify as 'Not Applicable' for sulfate exposure; there is no requirement for cement type or water-cement ratio for this category; however, a minimum concrete compressive strength of 2,500 psi is specified by the building code. For this sulfate range, we recommend Type II cement and a concrete mix design for foundations and building slabs-on-grade that incorporates a maximum water-cement ratio of 0.5. It should be noted, however, that the structural engineering design requirements for concrete may result in more stringent concrete specifications.

Soil with a pH less than 6.0 is considered to be corrosive to buried metal piping and reinforced concrete structures. The samples had a pH of above 8.0, which does not present corrosion concerns for buried iron, steel, mortar-coated steel, or reinforced concrete structures.

Based on the resistivity measurements, all eight samples are classified as "corrosive" to buried metal piping. 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 criteria nature of the structure. All buried metallic pressure piping, such as ductile iron firewater pipelines, should be protected against corrosion.

If it is desired to investigate this further, we recommend a corrosion consultant be retained to evaluate whether specific corrosion recommendations are advised for the project.

4.0 EARTHWORK RECOMMENDATIONS

The relative compaction and optimum moisture content of soil and aggregate base referred to in this report are based on the most recent ASTM D1557 test method. Compacted soil is not

acceptable if it is unstable. It should exhibit only minimal flexing or pumping, as determined by a representative of our firm.

As used in this report, the term “moisture condition” refers to adjusting the moisture content of the soil by either drying if too wet or adding water if too dry. We define “structural areas” as any area sensitive to settlement of compacted soil. These areas include, but are not limited to building pads, sidewalks, pavement areas, and retaining walls.

4.1 DEMOLITION AND STRIPPING

Grading operations should be observed and tested by our qualified field representative. We should be notified a minimum of three days prior to grading in order to coordinate our schedule with the grading contractor.

Site development should commence with the removal of existing pavement and buildings as well as excavation and removal of buried structures, including utilities and foundations. All debris and soft compressible soil should be removed from any location to be graded, from areas to receive fill or structures, and from areas to serve as borrow. The depth of removal should be determined by our representative in the field at the time of grading.

Existing vegetation should be removed from areas to receive fill or improvements and those areas to serve for borrow. Tree roots should be removed to a depth of at least 3 feet below existing grade. Any topsoil that will be retained for future use in landscape areas should be stockpiled in areas where it will not interfere with grading operations. All excavations from demolition below design grades should be cleaned to a firm undisturbed native soil surface determined by our representative. This surface should then be scarified, moisture conditioned, and backfilled with compacted engineered fill. All backfill materials should be placed and compacted as engineered fill according to the recommendations in Sections 4.4 and 4.5.

Materials and debris should be removed from the project site. With the exception of construction debris (wood, brick, asphalt, concrete, metal, etc.), organically contaminated materials (soil which contains more than 3 percent organic content by weight), and environmentally impacted soil (if any), the upper 10 feet of subsurface material is suitable for reuse as engineered fill.

4.2 EXISTING FILL REMOVAL

If existing non-engineered fill is encountered during construction, we recommend removal of the fill to competent native soil, as evaluated by our field representative. If in a fill area, the base of the subexcavations should be processed, moisture conditioned (as needed), and compacted in accordance with the recommendations for engineered fill.

If existing fill is left in place in portions of the site that are being developed with walkways or other improvements that are not sensitive to settlement, on-going maintenance should be anticipated.

4.3 OVER-OPTIMUM SOIL MOISTURE CONDITIONS

The contractor should anticipate encountering excessively over-optimum (wet) soil moisture conditions during winter or spring grading, or during or following periods of rain. Wet soil can make proper compaction difficult or impossible.

Wet soil conditions can be mitigated by:

1. Frequent spreading and mixing during warm dry weather.
2. Mixing with drier materials.
3. Mixing with a lime, lime-flyash, or cement product; or
4. Stabilizing with aggregate, geotextile stabilization fabric, or both.

We should evaluate Options 3 and 4 prior to implementation.

4.4 ACCEPTABLE FILL

4.4.1 Soil

Onsite soil material is suitable as fill material provided it is processed to remove concentrations of organic material, debris, and particles greater than 6 inches in maximum dimension.

Imported fill materials should meet the above requirements and have a plasticity index less than 12 and at least 20 percent passing the No. 200 sieve. It is important that we sample and test proposed imported fill materials at least 5 days prior to delivery to the site.

4.4.2 Reuse of Onsite Recycled Materials

If desired, the existing asphalt, aggregate and concrete can be considered for use as recycled aggregate to replace some of the import aggregate base for pavements, as well as for structural fill. The material will need to be broken down, but not pulverized, to have a maximum particle size less than 6 inches if used for fill and should conform to the gradations of aggregate base if used to substitute for roadway base.

4.5 FILL COMPACTION

4.5.1 Grading in Structural Areas

After removing the loose soil, the contractor should scarify to a depth of at least 8 inches then moisture condition and compact the subgrade in accordance with the table below. The loose lift thickness should not exceed 8 inches or the depth of penetration of the compaction equipment used, whichever is less.

TABLE 4.5.1-1: Fill Placement Requirements

MATERIALS		FILL LOCATION	MINIMUM RELATIVE COMPACTION (%)	MINIMUM MOISTURE CONTENT (PERCENTAGE POINTS ABOVE OPTIMUM)
Low-Expansive	PI < 25	General Fill	90	3
		Upper 6 inches in Pavement Areas	95	1

The contractor should compact the pavement Caltrans Class 2 Aggregate Base to at least 95 percent relative compaction (ASTM D1557), at a moisture content above the optimum.

4.5.2 Landscape Fill

In landscaping areas, the contractor should process, place, and compact fill in accordance with Section 4.5.1, but to at least 85 percent relative compaction.

4.5.3 Underground Utility Backfill

The contractor is responsible for conducting trenching and shoring in accordance with CALOSHA requirements. Project consultants involved in utility design should specify pipe-bedding materials.

Utility trench backfill should conform to the recommendations in Section 4.5.1. Where utility trenches cross underneath buildings, we recommend that a plug be placed within the trench backfill to help prevent the normally granular bedding materials from acting as a conduit for water to enter beneath or into the building. The plug should be constructed using a sand-cement slurry (minimum 28-day compressive strength of 500 psi) or relatively impermeable native soil for pipe bedding and backfill. We recommend that the plug extend a distance of at least 3 feet in each direction from the point where the utility enters the building perimeter.

Jetting of backfill is not an acceptable means of compaction. Thicker loose lift thicknesses may be allowed based on acceptable density test results, where increased effort is applied to rocky fill, or for the first lift of fill over pipe bedding.

4.6 SITE DRAINAGE

The project Civil Engineer is responsible for designing surface drainage improvements. With regard to geotechnical engineering issues, finish grades should be sloped away from buildings and pavements to the maximum extent practical. The latest California Building Code Section 1804.4 specifies minimum slopes of pervious surfaces be at least 5 percent away from foundations.

Landscaped areas are planned at finished grade elevations, as well as on top of structures. Proper subsurface drainage is required to prevent ponding on covered roofs or along walls. The roofs and drainage systems should be designed with appropriate slope to expediently transfer moisture across and off the roofs.

4.7 STORMWATER BIORETENTION AREAS

We generally encountered a layer of high-plasticity clay directly beneath the aggregate base. Thus, the existing site soil is not likely to have adequate permeability for stormwater infiltration, unless subdrains are installed. We recommend assuming little stormwater infiltration will occur through the existing site soil.

If bioretention areas are planned, we recommend that, when practical, they be placed a minimum of 5 feet away from property lines and structural site improvements, such as buildings, streets, retaining walls, and sidewalks/driveways. When this is not practical, bioretention areas located within 5 feet of structural site improvements can either:

1. Be constructed with structural side walls capable of withstanding the loads from the adjacent improvements, or

2. Incorporate filter material compacted to between 85 and 90 percent relative compaction (ASTM D1557, latest edition) and a waterproofing system designed to reduce the potential for moisture transmission into the subgrade soil beneath the adjacent improvement.

In addition, site improvements located adjacent to bioretention areas that are underlain by base rock, sand, or other imported granular materials, should be designed with a deepened edge that extends to the bottom of the imported material underlying the improvement.

Where adjacent site improvements include buildings greater than three stories, streets steeper than 3 percent, or design elements that will experience lateral loads (such as from impact or traffic), additional design considerations may be required. In addition, although not recommended, if trees are to be planted within bioretention areas, HDPE Tree Boxes that extend below the bottom of the bioretention system should be installed to reduce potential impact to subdrain systems that may be part of the bioretention area design. For this condition, the waterproofing system should be connected to the HPDE Tree Box with a waterproof seal.

Given the nature of bioretention systems and possible proximity to improvements, we recommend that we be retained to review design plans and provide testing and observation services during the installation of linings, compaction of the filter material, and connection of designed drains.

It should be noted that the contractor is responsible for conducting all excavation and shoring in a manner that does not cause damage to adjacent improvements during construction and future maintenance of the bioretention areas. As with any excavation adjacent to improvements, the contractor should minimize the exposure time such that the improvements are not detrimentally impacted.

5.0 PRELIMINARY FOUNDATION RECOMMENDATIONS

The main consideration in foundation design for this project is the potential for seismically induced settlement, as well as static settlement induced by civil fill placement and building loads. We developed foundation recommendations using data obtained from our exploration and engineering analysis. Since the development concepts were not available at the time of preparation of this report, we studied alternative foundation options as a function of number of above-grade and subterranean stories as presented in Table 5.0-1, and Table 5.0-2.

TABLE 5.0-1: Preliminary Foundation Matrix, Charleston South, Joaquin, Plymouth, and Space Park

FOUNDATION TYPES	NUMBER OF ABOVE-GRADE STORIES	NUMBER OF BELOW-GRADE STORIES
Structural Mat Foundation	up to 3 stories	0 (at grade)
	up to 5 stories	1*
	up to 6 stories	2*
Deep Foundation	over 5 stories	any

*Not applicable to Space Park without ground improvement as recommended in Section 4.8

TABLE 5.0-2: Preliminary Foundation Matrix, Commons

FOUNDATION TYPES	NUMBER OF ABOVE-GRADE STORIES	NUMBER OF BELOW-GRADE STORIES
Structural Mat Foundation	up to 6 stories	2
Deep Foundation	over 5 stories	any

For small axillary structures, such as trellis, light poles or garbage enclosures, shallow footings may be used as foundation support.

5.1 STRUCTURAL MAT FOUNDATIONS

A combination of a structural mat foundation and waterproofing is a common system for structures founded below the groundwater table. This option avoids the need for permanent dewatering. Based on the depth of the excavation and groundwater depths, the mat foundation may have to be designed to resist hydrostatic uplift forces.

The thickness of the structural mat will be driven by the structural design. Similar buildings with similar constraints may have mat foundations that are 30 inches or thicker.

Table 5.1-1 and Table 5.1-2 present average allowable bearing pressures that the structural mat should be designed to as a function of below-grade stories.

TABLE 5.1-1: Average Allowable Bearing Pressures, Charleston South, Joaquin, Plymouth, and Commons

ALLOWABLE BEARING PRESSURE (psf*)	NUMBER OF BELOW-GRADE STORIES)	ANTICIPATED TOTAL STATIC AND SEISMIC SETTLEMENT (inches)
1,500**	0 (at grade)	2½
2,000**	1	
3,000	2	

*pounds per square foot (psf)
** Do not apply to Commons Campus

TABLE 5.1-2: Average Allowable Bearing Pressures, Space Park

ALLOWABLE BEARING PRESSURE (psf*)	NUMBER OF BELOW-GRADE STORIES)	ANTICIPATED TOTAL STATIC AND SEISMIC SETTLEMENT (inches)
1,500	0 (at grade)	3
2,000**	1	
3,000**	2	

*pounds per square foot (psf)
**At the Space Park Campus, applicable only after ground improvement as recommended in Section 5.5.

The allowable bearing capacities presented in Table 5.1-1 and Table 5.1-2 may be increased to 3,000 psf in areas of loading concentration. The allowable bearing pressures presented in Table 5.1-1 and 5.1-2 may be increased by one-third when considering transient loads, such as wind or seismic.

If a spring constant is needed for design, a preliminary modulus of subgrade reaction (k_s) of 100 pounds per square inch per inch of deflection (psi/in) for a 1 foot by 1 foot plate can be used for static loading at all campuses and seismic loading at all campuses excluding Space Park Campus; at Space Park, a k_s of 100 psi/in can be used for on-grade construction only. At Space Park Campus, we recommend that ground improvement be implemented if a basement is constructed due to the elevations where soil subject to cyclic-liquefaction are located; modulus for a mat bearing on ground improvement will need to be determined based on the type of ground improvement and spacing. During the design-level studies, the structural engineer should provide us with mat pressures and deflections based on these recommendations to optimize the design of the mat.

Resistance to short-duration (earthquake and wind-induced) lateral loads may be provided by frictional resistance between the foundation concrete and the bearing soil and by passive earth pressure acting against the side of the foundation. A coefficient of friction of 0.30 can be used between concrete and the subgrade. Where the bottom of the mat will be underlain by a waterproofing membrane, the coefficient of friction should be reduced to 0.15 to 0.20 between the membrane and the subgrade (depending on membrane properties).

5.2 DEEP FOUNDATIONS

A deep foundation system can be used to support buildings with more than five stories. Deep foundations will gain support through skin friction and end bearing in the subsurface soil. There are many deep foundation systems available, including driven precast concrete or steel piles, Cast-in-Drilled Hole (CIDH), EDTTEX[6], Tubex or Torque-down piles and auger-cast displacement piles (ACP). Pile groups are expected to be connected by pile caps and interior grade beams.

Based on our experience in similar projects, ACP and CIDH piles are preferred deep foundation systems in order to reduce noise impacts to occupants in nearby structures. ACPs are deep foundation elements that are constructed by rotating a continuous flight hollow-stem auger into the soil. Concrete or grout is pumped under pressure through the hollow stem as the auger is withdrawn and a reinforcing cage can be installed while the concrete or grout is still in a fluid condition. CIDHs are a high-capacity deep foundation system that is constructed by drilling a cylindrical borehole to design diameter and depth, lowering reinforcing steel (rebar) into the drilled shaft, and then filling the shaft with concrete.

ACP, EDTTEX, Tubex or other torque down piles are typically designed and constructed by a specialty contractor using proprietary means and methods. Driven piles and CIDH, if selected, can be designed by the project structural engineer in collaboration with us. Any deep foundation design be verified via full-scale load tests to assess the axial capacity.

5.2.1 Preliminary Pile Capacities

Based on the subsurface conditions at these sites and our experience with similar projects, we provide the following preliminary estimates of pile foundation axial capacity to support your project's scoping and conceptual planning phase.

We utilized the idealized soil profile presented in Section 2.5 to estimate the preliminary vertical pile capacity of a single 16-inch-diameter ACP. Table 5.2-1 presents ultimate vertical ACP

[6] The EDTTEX piles are steel and concrete pipe composite piles that are into ground under very heavy torque and down pressure.

capacities for static and seismic conditions. We used post-liquefaction/liquefaction residual shear strength per Olson and Stark (2002) and Idriss and Boulanger (2008) for seismic considerations due to liquefaction and cyclic softening, respectively.

TABLE 5.2-1: Preliminary Ultimate Vertical Pile Capacities for 16-inch ACP

CAMPUS	DEPTH TO REACH 200 TONS OF ULTIMATE PILE CAPACITY (feet)*	
	STATIC CONDITION	SEISMIC CONDITION
Charleston South	88	102
Joaquin	75	81
Plymouth	93	96
Commons	75	79
Space Park	77	82

*Once the development plans are available, we should update these values with downdrag considerations.

We anticipate a total static and seismic settlement of less than 1 inch and differential settlement of less than ½ inch under pile supported structures. We also anticipate the differential settlement between pile-supported and surrounding areas to be up to approximately 1½ inches following an earthquake that results in liquefaction. Entry and pipe connections to deep-foundation-supported buildings should be assessed to confirm the anticipated differential settlement can be tolerated; otherwise, flexible entry and pipe connections may be considered.

We will evaluate the lateral capacities and soil-structure interaction parameters during the design-level studies once the development plans are available. Design axial capacity values of piles should be verified via full-scale load tests prior to construction of production piles.

5.3 SPREAD FOOTINGS

Spread footings may be used to support small auxiliary structures. Continuous or isolated spread footings should bear in competent native soil or compacted fill. Minimum footing dimensions are presented in Table 5.3.1-1 below.

TABLE 5.3.1-1: Minimum Footing Dimensions

FOOTING TYPE	*MINIMUM DEPTH (INCHES)	MINIMUM WIDTH (INCHES)
Continuous	12	18
Isolated	12	18

* below lowest adjacent pad grade

The minimum footing depths shown above are taken from lowest adjacent pad grade. To limit total static settlement to less than 1 inch, shallow footings should be designed with a maximum allowable bearing pressure of 1,500 psf for dead-plus-live loads. The maximum allowable bearing pressure is a net value; the weight of the footing may be neglected for design purposes. Footings located adjacent to utility trenches should have their bearing surfaces below an imaginary 1:1 (horizontal:vertical) plane projected upward from the bottom edge of the trench to the footing.

This bearing capacity may be increased by one-third for the short-term effects of wind or seismic loading. However, seismically induced settlement in the range of 2½ to 3 inches (reference

Section 3.1.3 for estimates by Campus) should be expected for auxiliary structures supported on shallow footings, unless the risk of liquefaction is mitigated by ground improvement methods.

Lateral loads may be resisted by friction along the base and by passive pressure along the sides of shallow footings. A coefficient of friction of 0.30 can be used between concrete and the subgrade.

5.4 BASE HEAVE AND UPLIFT FORCES

If subterranean stories are considered, the excavation subgrade may experience heave during excavation and recompression during foundation construction. Shoring walls or groundwater cut-off systems should be designed to reduce the risk of subgrade heave on the project.

Moreover, due to shallow groundwater conditions, the weight of the building should be assessed to determine whether there is sufficient weight to offset the hydrostatic uplift loads when subterranean stories are planned. Hydrostatic uplift forces should be estimated assuming buoyancy below the design groundwater at a depth of 6 feet. Uplift resistance can be provided by the weight of the foundation elements and structural loads. Additional resistance to uplift may be provided by installing hold-down piers or anchors in conjunction with mat foundation or evaluating tension resistance from foundation piles. Hold-down piers or anchors may be evaluated using a preliminary allowable skin friction of 500 psf.

The risk of base heave and hydrostatic uplift should be assessed as part of the shoring and dewatering system design.

5.5 GROUND IMPROVEMENT

As described in Sections 3.1.3 and 5.1, at the Space Park Campus, to use a mat foundation in conjunction with one or two below-grade stories, ground improvement is recommended. The ground improvement should reduce the potential liquefaction-induced settlement and provide an improved bearing capacity to support shallow foundation loads. Ground improvement should target the near-surface liquefaction-susceptible deposit of silty and sandy soil described in Section 2.4.5. Based on our exploration, we recommend ground improvement elements extend to Elevation -33 feet or deeper. Based on our experience, ground improvement methods such as deep soil mixing, drilled displacement columns, or rammed aggregate piers are effective in mitigation of the potentially liquefiable/cyclic softening soil.

The benefits of deep soil mixing and drilled displacement columns include low vibration during construction and little to no soil spoils. Rammed aggregate piers and rapid impaction compaction could generate strong vibrations, making these two methods less desirable in a developed environment.

Soil improvement is typically procured as a design-build element of a project. The selection and design of the ground improvement system should be determined with input from an experienced general contractor. This allows consideration of individual specialty contractors' proprietary means and methods in selecting the most cost-effective approach that meets specific project performance and quality objectives. Conceptual ground improvement plans should show the extent of the work, coordination with other elements, including foundations, utilities, and project phasing requirements. We can assist in the preparation of a design-build Request for Proposal (RFP) for the ground improvement and should review the design submittal prior to construction. During ground improvement selection, we should be consulted regarding the selected method

and provided opportunity to work with the design-build contractor to develop the appropriate design bearing capacity and update our estimate of differential settlement.

Future collaboration with the structural engineer and ground improvement contractor will be important to develop specific foundation and ground improvement recommendations once final structural details and loading are developed.

The ground improvement design should yield a total post-construction seismically induced settlement of 1 inch or less. At a minimum, ground improvement should be utilized within the building pad and should be performed on a uniform grid so that the effective modulus of the soil during liquefaction is at least 150 psi/in. If the design team considers foregoing ground improvement measures in surface parking and landscape areas, maintenance and repairs should be expected in future seismic events to repair improvements such as sidewalks and walkways as needed. We anticipate that differential settlement between ground improved areas and surrounding unimproved areas could be up to approximately 3 inches. Entry and pipe connections should be assessed to confirm the anticipated differential settlement can be tolerated; otherwise, flexible entry and pipe connections may be considered.

6.0 SECONDARY SLABS-ON-GRADE

Exterior flatwork includes items such as concrete sidewalks, steps, and outdoor plazas exposed to foot traffic only. Concrete flatwork should have a minimum thickness of 4 inches and include control and construction joints in accordance with current Portland Cement Association Guidelines.

Exterior slabs should slope away from the buildings to prevent water from flowing toward the foundations. Site soil should be moistened just prior to concrete placement.

We recommend that flatwork leading to a building entrance area be structurally independent of the building foundation to allow for differential movement between the flatwork and the building. Where smooth transition to provide access is necessary (ADA ramps), a hinge-slab should be designed to accommodate movements of approximately ½ inch. Flatwork should be reinforced to allow for the appropriate span in the event of settlement. Maintenance or replacement of entry slabs should also be expected following a seismic event as the ground settles at the perimeter of buildings.

7.0 DESIGN-LEVEL GEOTECHNICAL REPORT

This report presents preliminary geotechnical findings, conclusions and recommendations intended for preliminary planning purposes only. A design-level geotechnical exploration and assessment should be performed when development plans are available and existing buildings are demolished.

The design-level geotechnical report should further discuss topics presented in this report and address the following items:

- Additional explorations after demolition of existing buildings to support design-level recommendations.
- Site-specific seismic hazard analysis based on CBC 2019 (ASCE 7-16), if needed based on the proposed buildings.

- 3-dimensional finite-element analysis with PLAXIS 3D model to evaluate anticipated settlement from the proposed structures and fill placement, if needed.
- Deep foundation design parameters, including lateral capacities, group effects and pile response.
- Considerations during design of dewatering and shoring systems.
- Ground improvement design as needed.

8.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report presents geotechnical recommendations for design of the Google North Bayshore (Charleston South, Joaquin, Plymouth, Commons, and Space Park Campuses) project discussed in Section 1.3. If changes occur in the nature or design of the project, we should be allowed to review this report and provide additional recommendations. 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, 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; therefore, we are unable to guarantee or warrant the results of our services.

This report is based upon field and other conditions discovered at the time of report preparation. We developed this report with limited subsurface exploration data. We assumed that our subsurface exploration data are representative of the actual subsurface conditions across the site. Considering possible underground variability of soil, rock, fill, and groundwater, additional unexpected costs may be incurred in completing the project. We recommend that the owner establish a contingency fund to cover such costs. If unexpected conditions are encountered, ENGEO should be notified immediately to review these conditions and provide additional and/or modified recommendations, as necessary.

Our services did not include excavation sloping or shoring, soil volume change factors, flood potential, or a geohazard exploration. In addition, our geotechnical exploration did not include work to determine the existence of possible hazardous materials. If any hazardous materials are encountered during construction, the proper regulatory officials should be notified immediately.

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Actual field or other conditions will necessitate clarifications, adjustments, modifications or other changes to ENGEO's recommendations. Therefore, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include onsite construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from

the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

We determined the boundaries designating the interface between layers on the exploration logs using visual observations. The transition between the materials may be abrupt or gradual. The exploration logs contain information concerning samples recovered, indications of the presence of various materials such as clay, sand, silt, rock, existing fill, etc., and observations of groundwater encountered. The field logs also contain our interpretation of the subsurface conditions between sample locations. Therefore, the logs contain both factual and interpretative information. Our recommendations are based on the contents of the final logs, which represent our interpretation of the field logs.

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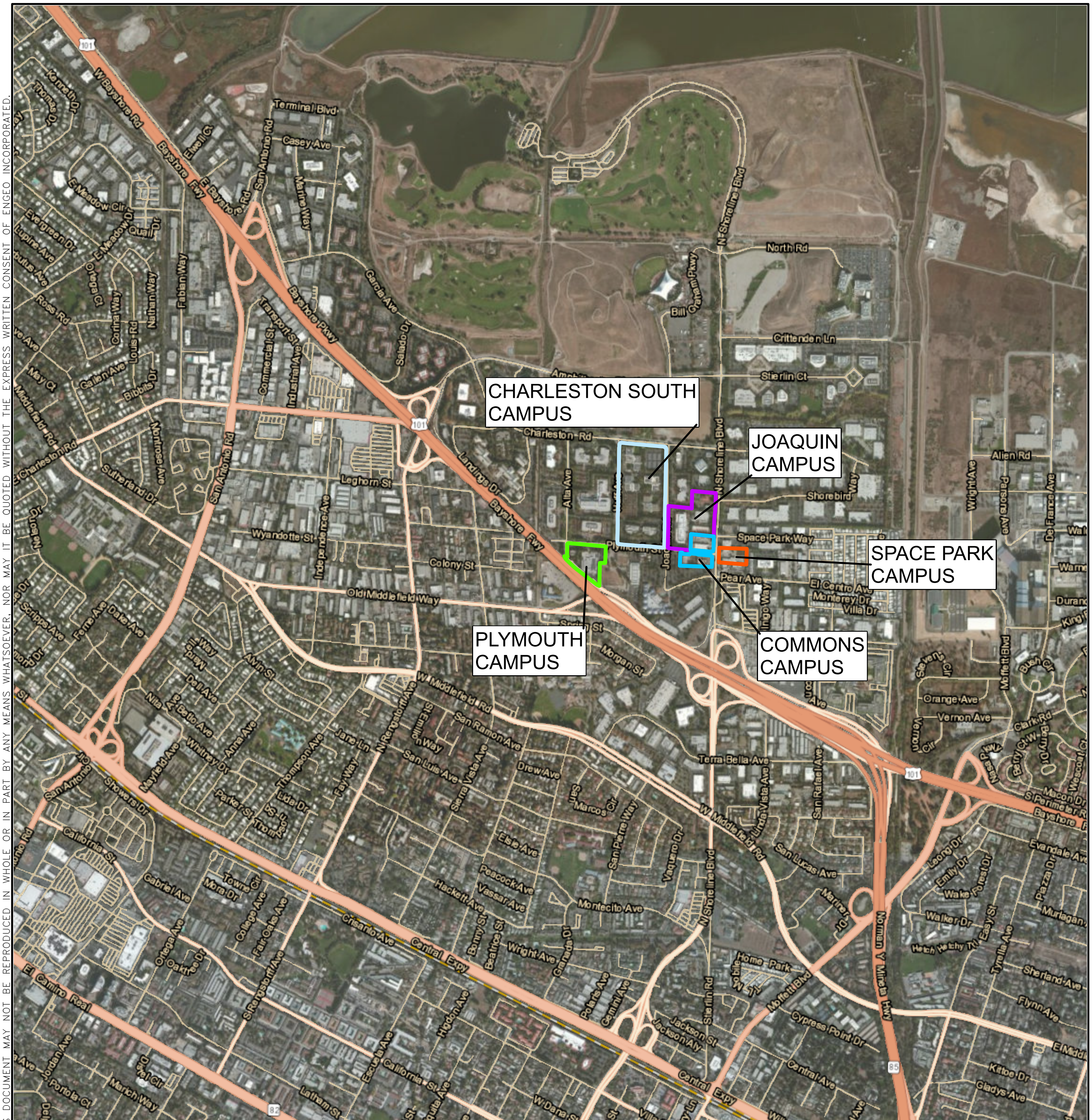
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FIGURES

FIGURE 1: Vicinity Map
FIGURE 2A: Site Plan – Charleston South Campus
FIGURE 2B: Site Plan – Joaquin Campus
FIGURE 2C: Site Plan – Plymouth Campus
FIGURE 2D: Site Plan – Space Park Campus
FIGURE 2E: Site Plan – Commons Campus
FIGURE 3: Regional Geologic Map
FIGURE 4: Seismic Hazard Zones Map
FIGURE 5: Regional Faulting and Seismicity
FIGURE 6: FEMA Flood Insurance Map



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BASEMAP SOURCE: ESRI MAPPING SERVICE

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VICINITY MAP

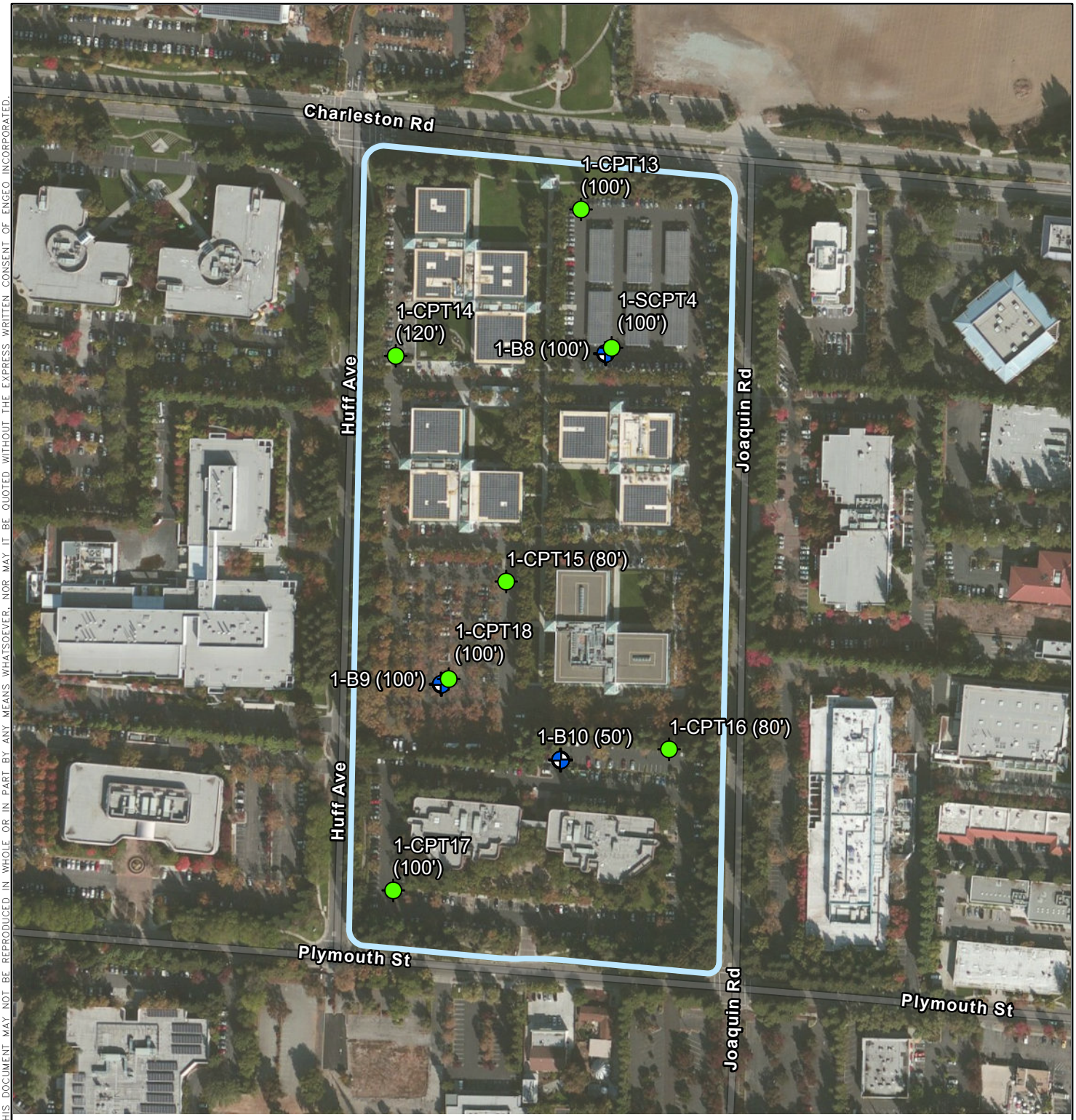
GOOGLE NORTH BAYSHORE CHARLESTON SOUTH, JOAQUIN, PLYMOUTH, SPACE PARK AND COMMONS CAMPUSES
MOUNTAIN VIEW, CALIFORNIA

PROJECT NO. : 15949.000.000	FIGURE NO. 1
SCALE: AS SHOWN	
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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- PROJECT SITE
- CPT (ENGEO, 2019)
- BORING (ENGEO, 2019)

BASEMAP SOURCE: ESRI MAPPING SERVICE

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SITE PLAN - CHARLESTON SOUTH CAMPUS

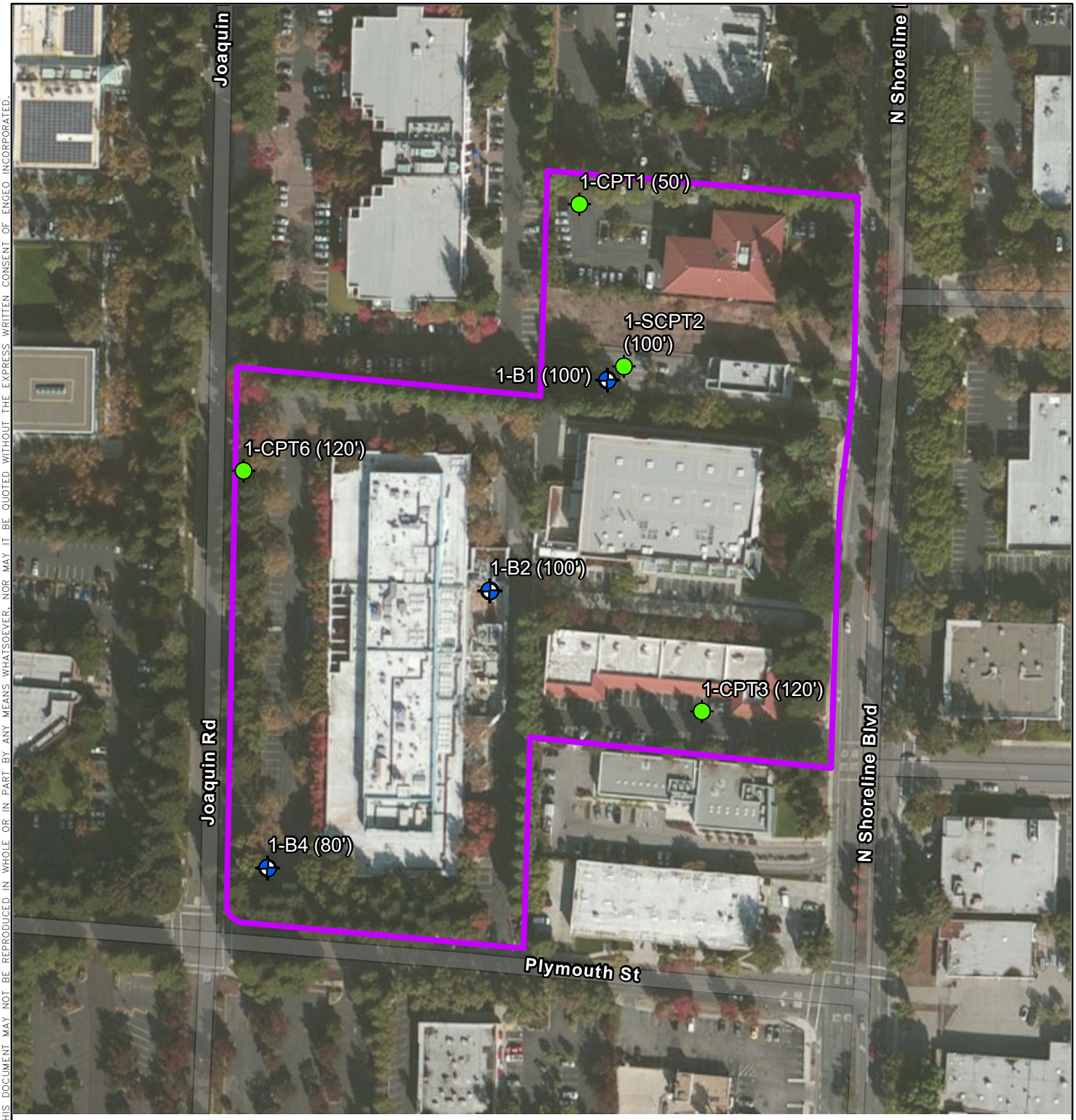
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SITE PLAN - JOAQUIN CAMPUS

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MOUNTAIN VIEW, CALIFORNIA

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FIGURE NO. 2B

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BASEMAP SOURCE: ESRI MAPPING SERVICE

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SITE PLAN - PLYMOUTH CAMPUS

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MOUNTAIN VIEW, CALIFORNIA

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FIGURE NO. 2C

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EXPLANATION

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- BORING (ENGEO, 2019)

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SITE PLAN - SPACE PARK CAMPUS

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MOUNTAIN VIEW, CALIFORNIA

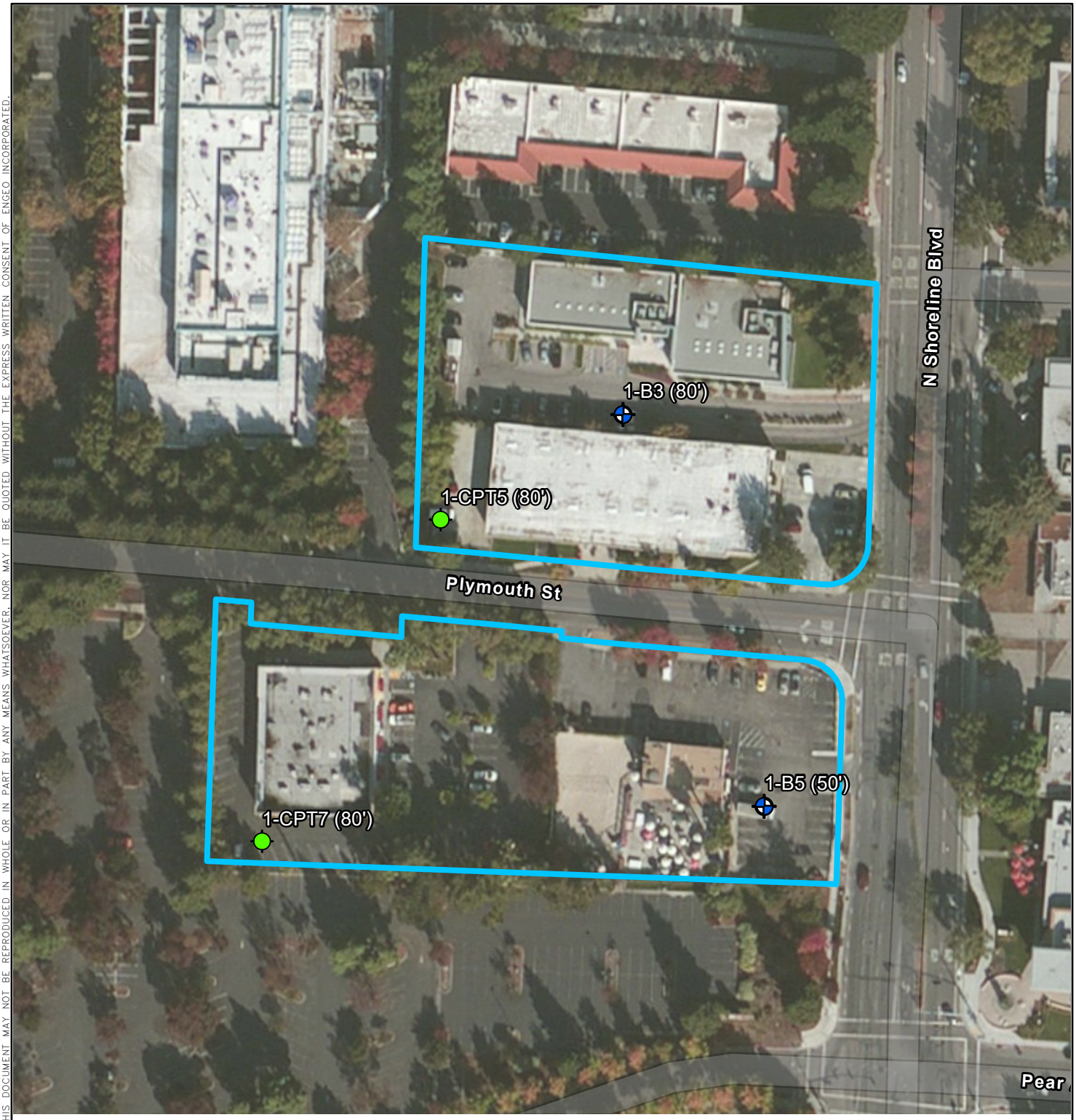
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EXPLANATION

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- PROJECT SITE
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SITE PLAN - COMMONS CAMPUS

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MOUNTAIN VIEW, CALIFORNIA

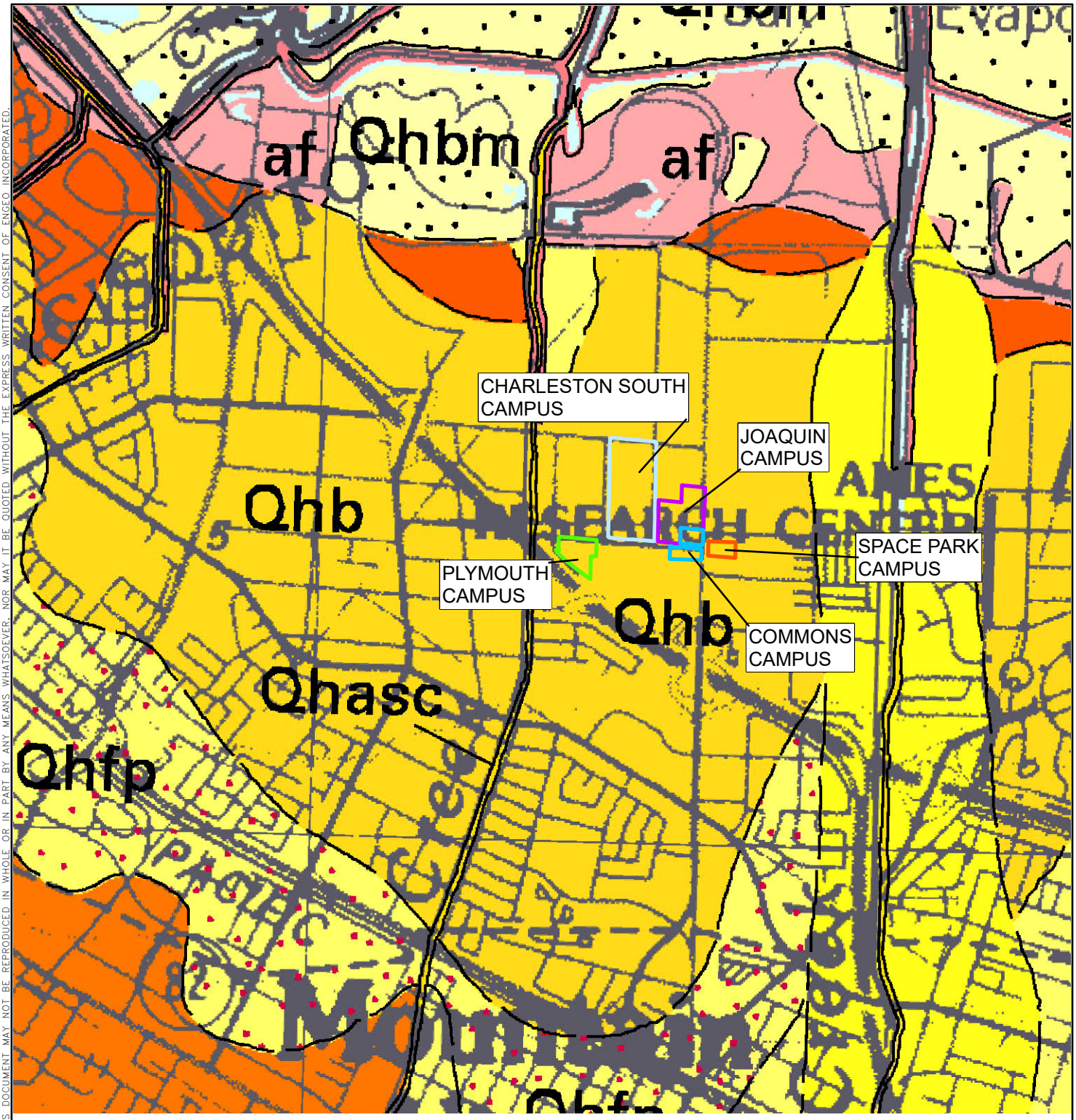
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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

af	ARTIFICIAL FILL (HISTORIC)
Qhasc	ARTIFICIAL STREAM CHANNELS (HISTORIC)
Qhbm	BAY MUD (HOLOCENE)
Qhb	BASIN DEPOSITS (HOLOCENE)
Qhfp	FLOOD-PLAIN DEPOSITS (HOLOCENE)

BASEMAP SOURCE: BRABB 2000

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REGIONAL GEOLOGIC MAP

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MOUNTAIN VIEW, CALIFORNIA

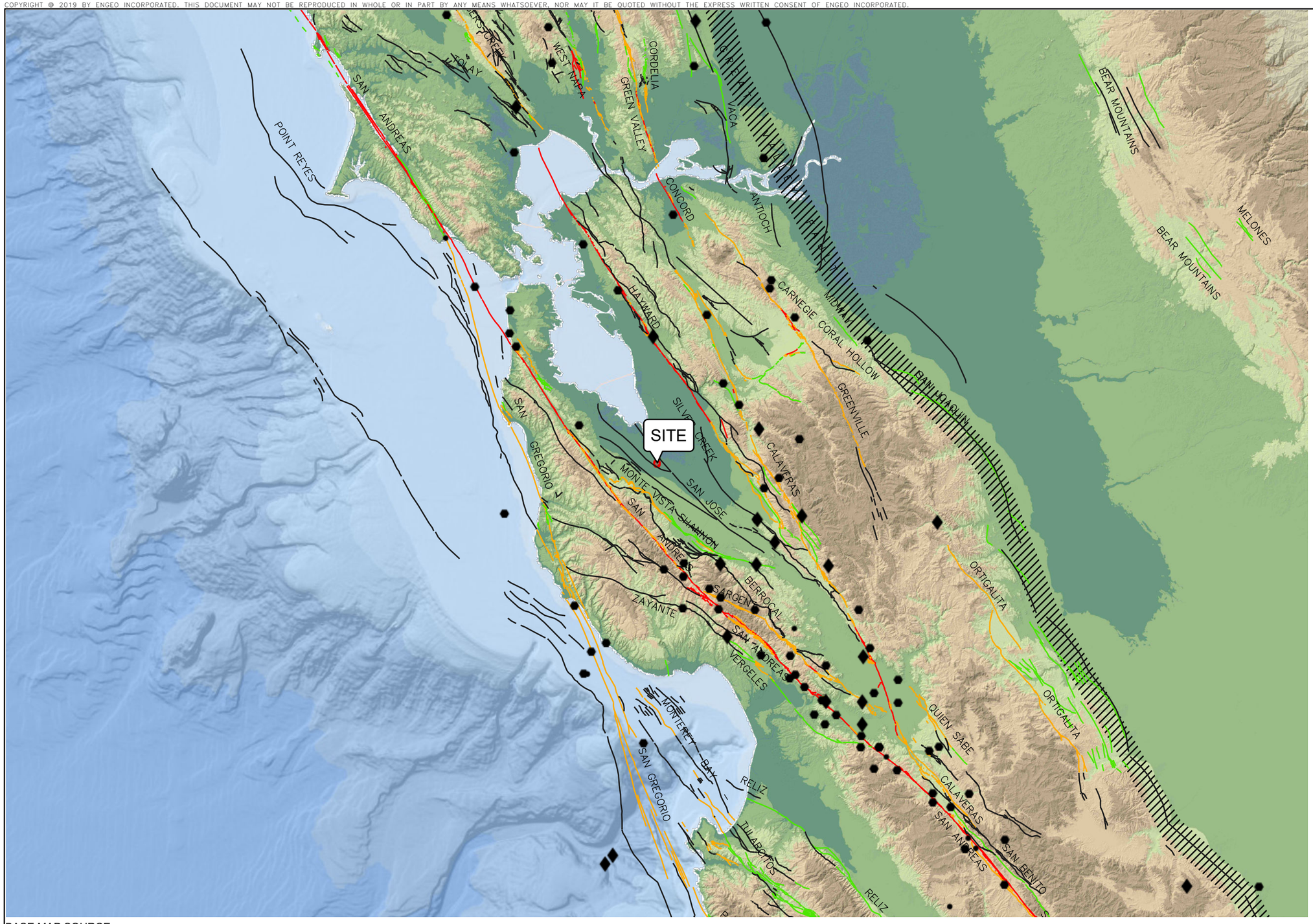
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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

EARTHQUAKE

- MAGNITUDE 7+
- MAGNITUDE 6-7
- MAGNITUDE 5-6

USGS QUATERNARY FAULTS

- HISTORICAL
- LATEST QUATERNARY
- LATE QUATERNARY
- UNDIFFERENTIATED QUATERNARY
- HISTORIC BLIND THRUST FAULT ZONE

BASE MAP SOURCE

ESRI, GARMIN, GEBCO, NOAA NGDC, AND OTHER CONTRIBUTORS
COLOR HILLSHADE IMAGE BASED ON THE NATIONAL ELEVATION DATA SET (NED) AT 30 METER RESOLUTION
U.S.G.S. QUATERNARY FAULT DATABASE, 2018
U.S.G.S. HISTORIC EARTHQUAKE DATABASE (1800-PRESENT)

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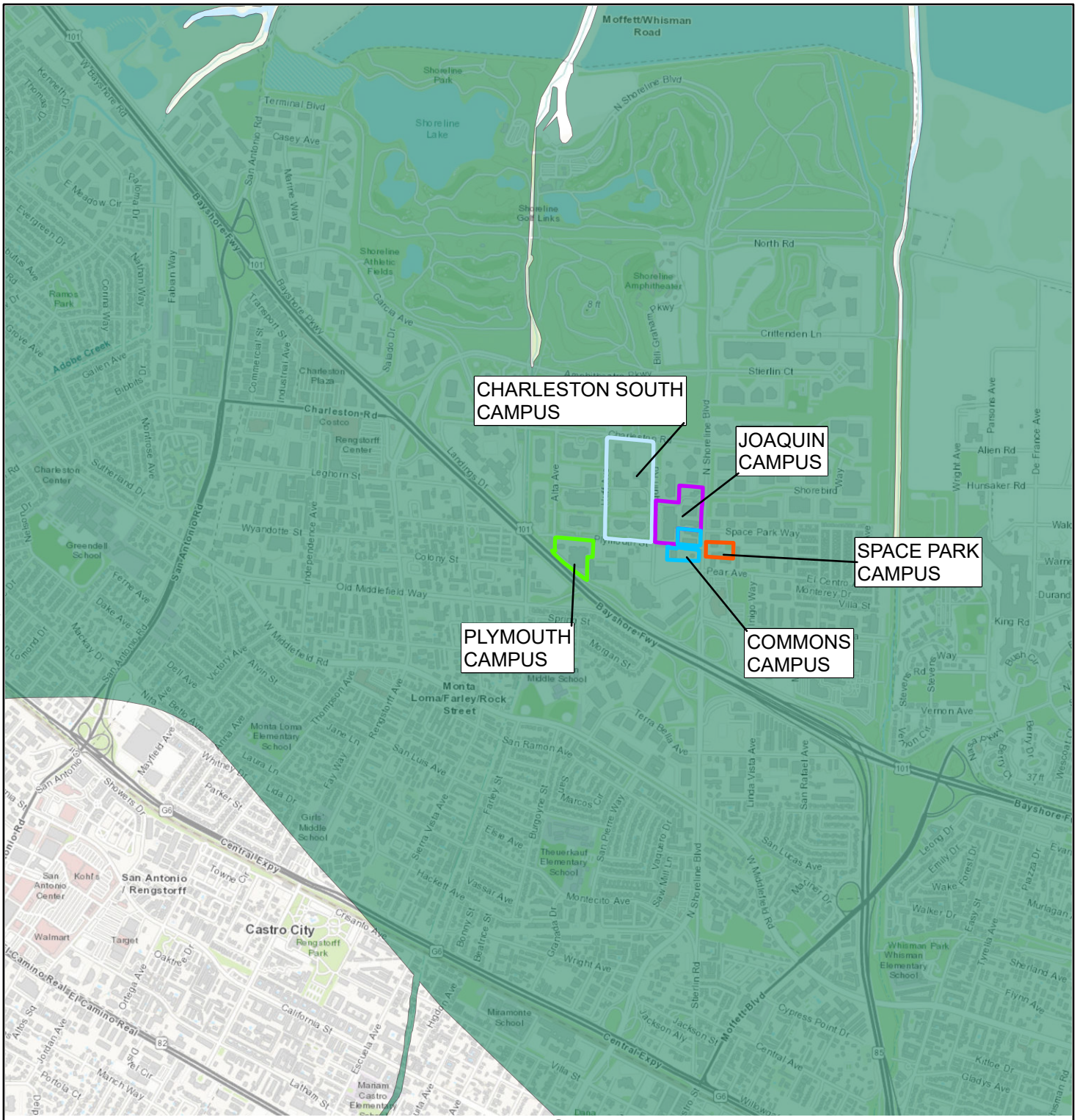
REGIONAL FAULTING AND SEISMICITY

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

Liquefaction Zone
Areas where historical occurrence of liquefaction, or local geological,geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required

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BASEMAP SOURCE: ESRI MAPPING SERVICE
CALIFORNIA DEPARTMENT OF CONSERVATION, CALIFORNIA GEOLOGICAL SURVEY

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SEISMIC HAZARDS ZONE MAP

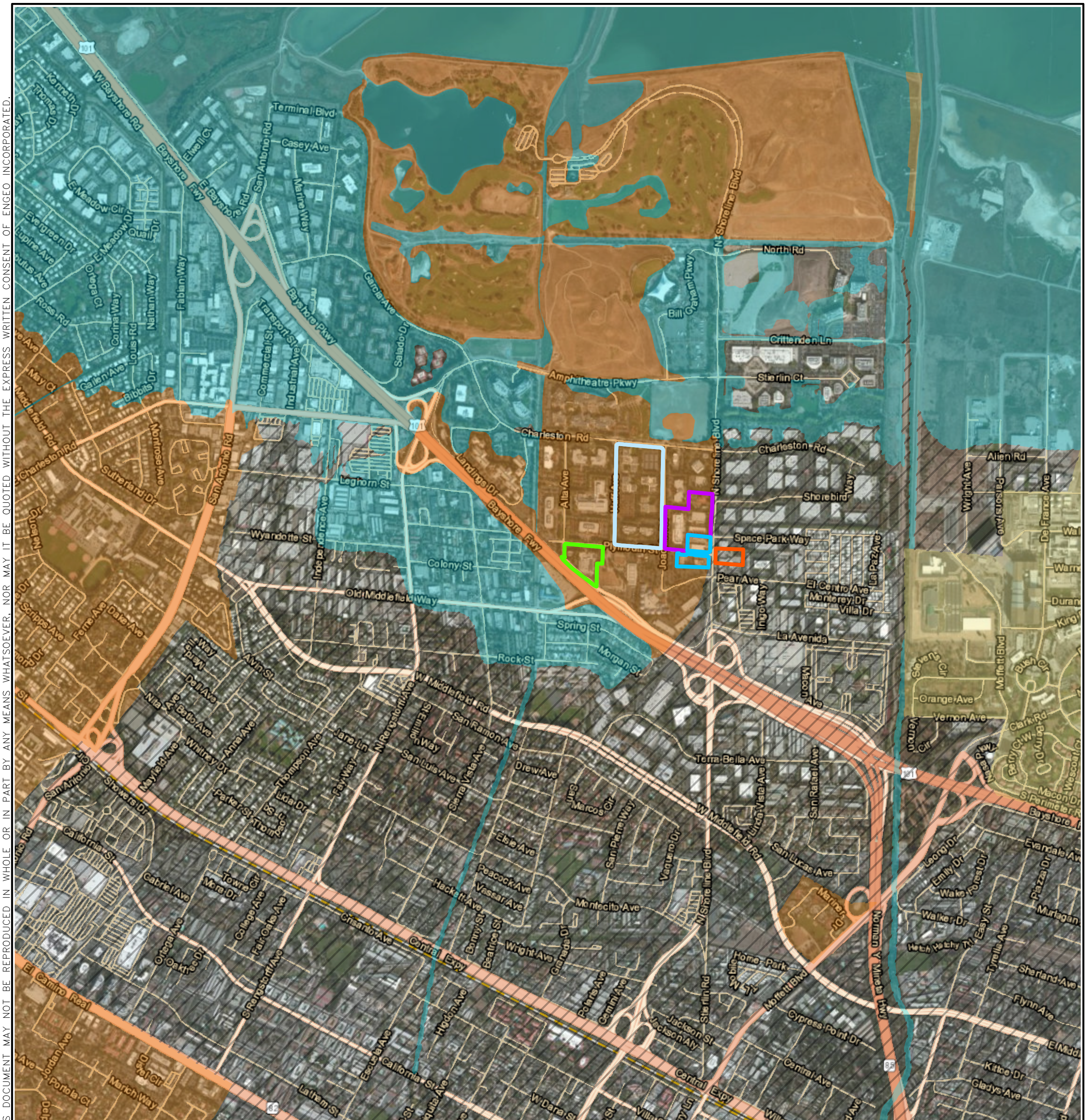
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FIGURE NO. 5

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- 1% ANNUAL CHANCE FLOOD HAZARD
- AREA OF UNDETERMINED FLOOD HAZARD
- 0.2% ANNUAL CHANCE FLOOD HAZARD
- AREA WITH REDUCED RISK DUE TO LEVEE
- CHARLESTON SOUTH CAMPUS
- JOAQUIN CAMPUS
- PLYMOUTH CAMPUS
- SPACE PARK CAMPUS
- COMMONS CAMPUS

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BASEMAP SOURCE: ESRI MAPPING SERVICE CALIFORNIA GEOLOGICAL SURVEY, 2009

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FEMA FLOOD INSURANCE MAP

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APPENDIX A

EXPLORATION LOGS

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
- Dames and Moore Piston
- 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-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			4" Aggregate Base												
			LEAN CLAY (CL), dark grayish brown, dry, low plasticity, some fine-grained sand												
	10														
5			olive brown, moist, very stiff, medium plasticity, slow dilatency			36									
	5														
10			CLAYEY SAND TO SANDY LEAN CLAY (CL-SC), pale olive, stiff to very stiff, wet, medium plasticity, rapid dilatancy, fine-grained sand			150-300 psi	26	18	8	51	18	112.5		4.0*	PP
	0		SANDY CLAY (CL), pale olive, stiff, wet, medium plasticity, rapid dilatancy			9	37	16	21	62	24.8	103.3	1377		UC
15			CLAYEY GRAVEL WITH SAND (GC), greenish gray, medium dense to dense, rapid dilatancy, 15% fine-grained sand, 35% to 30% fine gravel			31	30	17	13	40	20.3	112.5			
	-5		WELL GRADED SAND WITH SILT AND GRAVEL (SW), greenish gray, medium dense, wet, trace silt and clay			18				7					
20			WELL GRADED GRAVEL WITH SAND AND SILT (GW), greenish gray, medium dense, wet, 35% to 45% coarse sand												
			FAT CLAY (CH), grayish green, medium stiff, wet, high plasticity, 5% to 10% coarse-grained sand			7					28.2	98.5		.5*	PP
	-10														
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), grayish green, very stiff, wet, high plasticity, 5% to 10% coarse-grained sand			30					22.6	105.5	6386		UC
	-15														
30			GRAVELLY LEAN CLAY (GC-CL), pale olive, stiff to very stiff, wet, medium plasticity, 50% to 55% fine angular to subangular gravel, trace fine-grained sand			21	42	15	27	53				2.0*	PP
	-20														
35			POORLY GRADED SAND WITH GRAVEL (SP), dense, wet, 25% to 35% coarse gravel, trace silt and clay			41									
	-25														
40			LEAN CLAY (CL), yellowish brown, very stiff, medium plasticity, no dilatancy, trace fine, subrounded gravel			16					22	106.8		2.5*	PP
	-30														
45			FAT CLAY (CH), pale olive, stiff, moist, high plasticity, slow dilatancy, with 5% to 10% fine rounded gravel			12	55	16	39	92					
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), pale olive mottled with pale yellow, hard, moist, high plasticity, slow dilatancy, with 5% to 10% fine rounded gravel			40					21.1	109.4	3508.2		UU
55	-40														
	-45														
60			POORLY GRADED GRAVEL (GP), dark gray, dense, angular to subangular			44								>4.5*	PP
	-50		LEAN CLAY (CL), pale olive mottled with pale yellow, hard, low plasticity, trace gravel												
65															
	-55														
70			Trace fine-grained sand grayish green, moist, low to medium plasticity, trace fine-grained sand, slow dilatency			58					27.6	96.3		>4.5*	PP
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
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Mountain View, CA
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DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), pale olive mottled with pale yellow, hard, low plasticity, trace gravel												
	-65		CLAYEY SAND (SC), grayish green, very dense, wet, high plasticity clay			35				43					
80															
	-70														
85															
	-75														
90			Medium dense			18					26.5	99.4			
	-80														
95															
	-85														
100															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B01

LATITUDE: 37.41827778 LONGITUDE: -122.0789722

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
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LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), grayish green with pale olive, very stiff, wet, high plasticity, no dilatancy, trace fine-grained sand			29								2.5*	PP
			Boring Terminated at a depth of 101.5 feet below ground surface on May 19, 2019. Unable to determine groundwater depth due to drilling method.												

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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt 13" Aggregate Base												
			SANDY LEAN CLAY WITH GRAVEL (CL), dark brown, moist, low plasticity, fine- to coarse-grained sand, subangular to subrounded fine gravel												
			LEAN CLAY WITH SAND (CL), dark brown to black, very stiff, moist, medium plasticity, high toughness, fine- to coarse-grained sand, some fine subrounded gravel												
5	10		FAT CLAY (CH), dark brown to black, very stiff, moist, high plasticity, with subangular to subrounded fine gravel light olive brown, no gravel			18	61	19	42	82				3.5*	PP
10	5		medium stiff			7					12.5				
			WELL GRADED GRAVEL WITH SAND (GW), dark gray, loose, wet, angular, subrounded, coarse-grained sand, trace clay												
15	0		possilbe low blow counts due to rock wedged in SPT shoe			4									
			LEAN GRAVELLY CLAY (CL), grayish green, medium stiff, wet, medium plasticity, low toughness, fine subrounded gravel			8	41	16	25	65			600*		TV
20	-5		POORLY GRADED SAND (SP), grayish green, loose to medium dense, wet, with some fine angular gravel Disturbed samples. Initially no recovery, then samples were taken by pushing sampler.			12									
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY CLAY (CL), grayish green, wet, trace coarse-grained sand			200-600 psi									
			WELL GRADED GRAVEL WITH SAND (GW), greenish gray, loose to medium dense, wet, angular, subrounded, fine- to coarse-grained sand, few silt			12									
			SILT (ML), greenish gray, stiff, wet, low plasticity, medium toughness												
	-15														
30			CLAYEY SAND (SC), light yellowish brown, medium dense, wet, medium plasticity, with some coarse subangular gravel			22	43	16	27	26	13.2	120.9		3.75*	PP
	-20														
35			CLAYEY GRAVEL WITH SAND (GC), light yellowish brown, medium dense, wet, 35% to 40% fines, 30% to 35% fine subangular gravel			20				36					
			LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, with some silt			11									
	-25														
40			POORLY GRADED SAND (SP), light yellowish brown to gray, medium dense, wet, with some fine subangular gravel and clay												
			LEAN CLAY (CL), light yellowish brown, very stiff, wet, medium plasticity, high toughness			17									
	-30														
45			LEAN CLAY (CL), olive brown, stiff, wet, medium plasticity, with fine to coarse angular to subrounded gravel			22					14.92	123.2	1171		UU
	-35														
50															

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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

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Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
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DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), yellowish brown, medium dense, wet, fine-to medium-grained sand, some fine subrounded gravel			30					16	117.7			
	-40		LEAN CLAY (CL), reddish brown, very stiff, wet, low plasticity, medium toughness, with silt and some fine- to medium-grained sand												
55															
	-45														
60						22					22	106		>4.5*	PP
	-50														
65															
	-55														
70			Greenish gray, stiff, medium plasticity, no sand			16					25.25	101.7	1237		UU
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
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SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), reddish brown, very stiff, wet, low plasticity, medium toughness, with silt and some fine- to medium-grained sand												
80	-65		Olive brown, with some silt and trace sand			19							600*		TV
85	-70		POORLY GRADED SAND WITH GRAVEL (SP), olive brown to gray, medium dense, wet, angular to subangular fine gravel												
			LEAN CLAY (CL), olive brown to gray, very stiff, wet, medium plasticity, high toughness			32									
90	-75														
95	-80														
100	-85														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B02

LATITUDE: 37.4177 LONGITUDE: -122.079425

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/18/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive brown to gray, very stiff, wet, medium plasticity, high toughness			40					30.1	93.8	3600*	3*	PP+TV
			Boring Terminated at a depth of 101.5 feet below ground surface on May 19, 2019. Unable to determine groundwater depth due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

LOG OF BORING 1-B03

ENGEO Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2" Asphalt 12" Aggregate Base FAT CLAY (CH), very dark brownish gray, moist to dry												
5	10		Very stiff, fissured			20	86	19	67	96	30.9	88		3.7*	PP
			Light olive, stiff, moist, medium plasticity			10								1.0*	PP
10	5		Pale olive			10	59	30	29	99	23.8	102.1	1487.4		UU
15	0		POORLY GRADED SAND WITH GRAVEL AND SILT (SP-SM), dark brown, dense, wet			42					9.2	132.1			
20	-5		Medium dense			24				9					
			LEAN CLAY WITH SAND (CL), reddish yellow mottled with olive, stiff, moist, high plasticity												
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B03

ENGEO Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), reddish yellow mottled with olive, stiff, moist, high plasticity			15					30.1	93.7	1080.1		UU
30	-15		FAT CLAY (CH), dark reddish yellow mottled with olive, very stiff, trace coarse gravel			15	50	20	30	81	29.2			2.1*	PP
35	-20					27								2.75*	PP
40	-25		Stiff, fine-to-coarse-grained sand, trace fine gravel			13								1.5*	PP
45	-30		CLAYEY SAND (SC), dark yellowish brown, medium dense, fine- to-coarse-grained sand			24	38	15	23	39	18.6				
			FAT CLAY (CH), dark yellowish brown, stiff to very stiff, moist, high plasticity			14								2.0*	PP
50	-35														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

ENGEO
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LOG OF BORING 1-B03

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), pale olive to olive, very stiff, moist, high plasticity, fine- to-coarse-grained sand			35	38	17	21		22	106.1		2.75*	PP
55	-40														
60	-45		Reddish yellow mottled with pale olive			32					23.5	104.9		2.9*	PP
65	-50														
			LEAN CLAY (CL), olive to olive gray, stiff, moist, high plasticity												
70	-55					20					29.3	94.8		1.75*	PP
75	-60														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B03

Expect Excellence

LATITUDE: 37.41685 LONGITUDE: -122.0787972

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/10/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 2.0 in.
SURF ELEV (WGS84): Approx. 15 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive to olive gray, stiff, moist, high plasticity												
80	-65		POORLY GRADED SAND WITH CLAY (SP-SC), dark olive gray, wet, coarse-grained sand			57				10	22.4	103			
			Boring terminated at a depth of 81.5 feet below ground surface. Groundwater not encountered due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B04

ENGEO Expect Excellence

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2" Asphalt												
			11" Aggregate Base												
			LEAN CLAY (CL), very dark brownish gray, moist, low plasticity, trace fine- to coarse-grained sand, trace organics												
	10														
5			LEAN CLAY WITH GRAVEL (CL), light greenish gray, stiff, moist, low plasticity, 10% to 15% gravel, 5% to 10% fine- to coarse-grained sand, trace organics			8									
	5		SANDY LEAN CLAY (CL), olive brown, very stiff, moist, 35% to 40% fine- to coarse-grained sand, trace fine gravel			18	NP	NP	NP		17.4	117.4		3.0*	PP
10			POORLY GRADED SAND WITH SILT (SP), olive brown, medium dense, wet, 10% to 15% fines, trace fine gravel			19				11					
	0														
15			SANDY FAT CLAY (CH), dark greenish gray, medium stiff, moist, 30% to 35% fine- to coarse-grained sand			7								2.25*	PP
	-5														
20			FAT CLAY WITH SAND (CH), dark yellowish brown mottled with greenish gray, medium stiff to stiff, moist, medium plasticity, weak cementation, fine- to coarse-grained sand, trace fine gravel, with iron oxide staining			9					23.9	102		1.0*	PP
	-10		CLAYEY SAND (SC), dark yellowish brown mottled with greenish gray, loose to medium dense, moist, 35% to 40% fines												
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), dark yellowish brown mottled with greenish gray, loose to medium dense, moist, 35% to 40% fines			11	40	18	22	38				.75*	PP
	-15														
30			Medium dense			14					16.2	120.7			
	-20														
35			25% to 35% fines			16	30	18	12	30					
	-25														
			FAT CLAY WITH SAND (CH), dark yellowish brown, stiff to very stiff, moist, 25% to 30% fine to coarse sand, trace fine gravel												
40						15								3.75*	PP
	-30														
45															
			LEAN CLAY WITH SAND (ML), dark yellowish brown, stiff, wet, 40% to 45% fine- to medium-grained sand			13	34	17	17	58	22.8	106.6		1.25*	PP
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (ML), dark yellowish brown, stiff, wet, 40% to 45% fine- to medium-grained sand			34									
			CLAYEY SAND TO SANDY CLAY (SC-CL), dark yellowish brown, loose to medium stiff, moist, 45% to 50% fines			4	31	18	13	46				1.0*	PP
			FAT CLAY WITH SAND (CH), dark olive mottled with dark greenish gray, very stiff, moist, 15% to 20% fine- to medium-grained sand, trace fine to coarse gravel			29					22.5	106	1637		UU
			Medium stiff to stiff			12								1.25*	PP

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B04

LATITUDE: 37.4167889 LONGITUDE: -122.08025

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): 13 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	-65		FAT CLAY WITH SAND (CH), dark olive mottled with dark greenish gray, very stiff, moist, 15% to 20% fine- to medium-grained sand, trace fine to coarse gravel												
80			Very stiff to hard			40					18	113.1	3469		UU
			Boring Terminated at a depth of 81.5 feet below ground surface on June 9, 2019. Groundwater not encountered due to drilling method												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_JOAQUIN.GPJ ENGEO INC.GDT 9/13/19

LOG OF BORING 1-B05

ENGEO Expect Excellence

LATITUDE: 37.41608056 LONGITUDE: -122.0784306

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/9/2019
HOLE DEPTH: 46.5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (WGS84): Approx. 16 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	15		4" Asphalt 10" Aggregate Base												
5	10		FAT CLAY WITH SAND (CH), very dark brown, very stiff, moist, medium plasticity, no dilatency, some <1/4" pockets of pale yellow sand/weathered sandstone			13								2.75*	PP
						17	68	17	51	74	36.4	82.9			
10	5		SILTY SAND WITH GRAVEL (SM), pale olive mottled with reddish yellow, medium dense, moist With interbeded clay			25				20					
15	0		POORLY GRADED SAND WITH GRAVEL gray, wet, angular gravel			9									
			no recovery from samples taken between 15 feet and 18 feet			6									
20	-5					17				12					
25			FAT CLAY (CH), pale olive mottled with reddish yellow, stiff to very stiff, medium plasticity, no dilatancy, trace coarse-grained sand												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B05

ENGEO Expect Excellence

LATITUDE: 37.41608056 LONGITUDE: -122.0784306

Geotechnical Exploration
Google Multiple Parcels
Mountain View, CA
15949.000.000

DATE DRILLED: 7/9/2019
HOLE DEPTH: 46.5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (WGS84): Approx. 16 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	-10		FAT CLAY (CH), pale olive mottled with reddish yellow, stiff to very stiff, medium plasticity, no dilatancy, trace coarse-grained sand			15	53	22	31	95				2.75*	PP
30	-15					15					26.1	99	1209.3		UU
35	-20		SANDY CLAY TO CLAYEY SAND (CL-SC), pale olive, rapid dilatancy			14				45					
40	-25		LEAN CLAY WITH SAND (CL), pale olive, stiff, moist, medium plasticity			9	42	17	25	84	23				
45	-30					24								3.25*	PP
			Boring terminated at a depth of 46.5 feet below the ground surface on 7/9/2019. Groundwater not encountered due to drilling method.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_MASTER.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B6

ENGEO Expect Excellence

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			6" Asphaltic Concrete												
			12" AGGREGATE BASE (AB)												
	10		FAT CLAY (CH), dark greenish gray, stiff, slightly moist, medium plasticity												
5			Dark olive mottled with greenish gray, hard, high plasticity			27	73	20	53	97	27.5	93.5		>4.5*	PP
	5		Very stiff			14								3.75*	PP
10			LEAN CLAY (CL), light grayish green, stiff, moist, low plasticity, slow dilatancy, trace fine-grained sand			12	44	17	27	82	32.7	92.3		2.0*	PP
	0														
15			SANDY LEAN CLAY (CL), greenish brown, very stiff, wet, high plasticity, fine-grained sand			7	41	21	20	58	21.9	109	2141.9		UU
	-5		Trace gravel												
20			No recovery			7									
	-10														
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

ENGEO
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LOG OF BORING 1-B6

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY LEAN CLAY (CL), greenish brown, very stiff, wet, high plasticity, fine-grained sand Hard, moist			29								>4.5*	PP
	-15														
30			LEAN CLAY WITH SAND (CL), greenish gray, stiff, wet, trace fine gravel			18	36	23	13		27.1	100	1003.4		UU
	-20														
			POORLY GRADED SAND (SP), dark gray, medium dense												
35			CLAYEY SAND WITH GRAVEL (SC), pale yellow mottled with reddish yellow, loose to medium dense, wet, low plasticity			13	30	15	15	20	23	110.7	1200*		TV
	-25														
40			POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), gray, medium dense to dense			45				6					
	-30														
45			SANDY LEAN CLAY (CL), pale olive mottled with reddish yellow, medium stiff, wet, medium plasticity			7	38	13	25	60					
	-35														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

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LOG OF BORING 1-B6

LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			POORLY GRADED GRAVEL WITH CLAY (GP-GC), gray, medium dense to dense, fine to coarse gravel, trace fine-grained sand, trace to little fines			25	33	16	17		19.7	112		4.5*	PP
			LEAN CLAY (CL), pale olive, hard, moist, low plasticity, trace fine-grained sand												
	-40														
55															
	-45														
60			POORLY GRADED GRAVEL (GP), gray, loose to medium dense, subrounded			21									
			SILT (ML), light yellowish brown, stiff, moist, low plasticity, fine-grained sand												
	-50														
65															
	-55														
70			SILTY SAND (SM), olive brown, medium dense, wet			19				37	24.9	102.8			
	-60														
75															

LOG - GEOTECHNICAL_SU+QU W/ ELEV 1-B6 & 2-B4.GPJ ENGEO INC.GDT 11/19/19

LOG OF BORING 1-B6

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LATITUDE: 37.416335 LONGITUDE: -122.077089

Geotechnical Exploration
Google Multiple Parcels
Mountain View
15949.000.000

DATE DRILLED: 7/8/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 13 ft.

LOGGED / REVIEWED BY: J. Chen / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY SAND (SM), olive brown, medium dense, wet												
	-65														
80			SANDY GRAVEL TO GRAVELLY SAND (GP), gray to black, dense, wet, subrounded coarse gravel, angular medium-grained sand			60									
			Boring terminated at a depth of 81.5 feet below ground surface on July 8, 2019. Groundwater not observed due to method of drilling.												

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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
0	15		1" Asphalt 1.5 feet Aggregate Base												
			LEAN CLAY (CL), very dark brownish gray, moist, medium plasticity, trace fine- to medium-grained sand, trace organics												
5	10		SANDY SILT (ML), light greenish gray, stiff, moist, low plasticity, 35% to 45% fine-grained sand			13	33	19	14	67				3.5*	PP
						200 psi				57	24.4	103.6			
10	5		POORLY GRADED GRAVEL (GP), dark olive brown												
						28				8					
15	0		CLAYEY SAND WITH GRAVEL (SC), dark olive brown, medium dense to dense, 15% gravel			30				13	13.1				
20	-5		SANDY CLAY (CL), bluish gray, stiff, moist, medium plasticity, 30% to 35% coarse-grained sand, trace gravel			14	44	17	27	69	23.6	103.3	1341		UU
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), bluish gray, stiff, moist, medium plasticity, trace fine-grained sand, no gravel			12					26.3	99.9		2.0*	PP
	-10														
30			35% to 40% fine- to coarse-grained sand			25									
	-15		CLAYEY SAND (SC), bluish gray, medium dense, moist, 25% to 30% fines												
			WELL GRADED SAND WITH CLAY AND GRAVEL (SW), dark yellowish brown, medium dense, wet, 5% to 10% fines, 5% to 10% gravel												
35						25				9					
	-20														
			LEAN CLAY WITH SAND (CL), yellowish brown to olive brown, hard, moist, high plasticity, 10% to 15% fine- to coarse-grained sand, with iron staining												
40						54	40	18	22		20.96	108.2	3620		UU
	-25														
45			SANDY CLAY (CL), yellowish brown, medium stiff to stiff, moist, medium plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel			13	38	18	20	60	25	102.2		1*	PP
	-30														
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

ENGEO
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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY CLAY (CL), yellowish brown, medium stiff to stiff, moist, low plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel			3									
55	-35		SANDY SILT TO SILTY SAND (SM-ML), yellowish brown, medium stiff to stiff, moist, low plasticity, 40% to 45% fine- to coarse-grained sand, trace fine gravel												
60	-40		Medium stiff			11	38	26	12	55	22.1	103.1		.75*	PP
65	-45														
70	-50		FAT CLAY (CH), dark greenish gray, stiff, moist, high plasticity, moderate cementation, trace fine-grained sand			16	55	22	33					3.0*	PP
75	-55														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_PLYMOUTH.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B07

LATITUDE: 37.41650833 LONGITUDE: -122.0843833

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 6/7/2019
HOLE DEPTH: 81.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 17 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			FAT CLAY (CH), dark greenish gray, stiff, moist, high plasticity, moderate cementation, trace fine-grained sand												
	-60		SANDY SILT TO SILTY SAND (SM-MH), olive brown mottled with greenish gray, medium stiff to stiff, wet, 45% to 50% fine-grained sand and trace coarse gravel												
80			FAT CLAY (CH), dark yellowish brown mottled with dark greenish gray, stiff, high plasticity			17	NP	NP	NP	53				3.5*	PP
			Boring Terminated at a depth of 81.5 feet below ground surface on June 8, 2019. Groundwater not encountered due to drilling method												

ENGEO
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LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			8" Aggregate Base												
			LEAN CLAY (CL), bluish black, moist, high toughness, few fine- to medium-grained sand, trace angular fine gravel												
5	5		Gray, very stiff, medium toughness, trace fine-grained sand and angular fine gravel			13	41	17	24	61	17.5	110.8	600*	3.5*	PP+TV
			POORLY GRADED SAND WITH GRAVEL (SP), gray, dense, wet, subrounded to subangular fine gravel, trace clay		▽										
10	0					43				9					
			WELL GRADED GRAVEL WITH SAND (GW), brown, dense, wet, fine- to coarse-grained sand, subrounded to angular gravel, trace clay												
15	-5					39									
			Dames and Moore piston sampler unable to advance at 400 psi			32								>4.5*	PP
			LEAN CLAY WITH SAND (CL), greenish blue, hard, wet, medium plasticity, high toughness, fine-grained sand												
20	-10					11	37	18	19	74					
			Light brown with gray, stiff, medium toughness, some silt												
25	-15														

LOG - GEOTECHNICAL_SU+QU W/ ELEV_MULTIPLE PARCEL GEX_CHARLESTON S.GPJ_ENGEO INC.GDT 9/13/19

ENGEO
Expect Excellence

LOG OF BORING 1-B08

LATITUDE: 37.419675 LONGITUDE: -122.0813361

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/13/2019
HOLE DEPTH: 101.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY WITH SAND (CL), greenish blue, hard, wet, medium plasticity, high toughness, fine-grained sand			16							1000*	2.5*	PP+TV
			Stiff to very stiff, trace fine- to medium-grained sand												
30	-20		SANDY CLAY TO CLAYEY SAND (CL-SC), light brown with gray, stiff, wet			12	37	16	21	52	26.4	99.9	600*	1.25*	PP+TV
35	-25					9					25.53	102.3	348		UU
40	-30					350 psi				6	18.4				
			POORLY GRADED SAND (SP), dark brown, wet												
			SANDY LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, trace fine subangular gravel												
45	-35					22							1000*	1.25*	PP+TV
			POORLY GRADED SAND (SP), light yellowish brown, medium dense, few fine subrounded gravel, trace silt												
50	-40														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			POORLY GRADED SAND (SP), light yellowish brown, medium dense, few fine subrounded gravel, trace silt			28									
			LEAN CLAY (CL), light yellowish brown, stiff, wet, medium plasticity, medium toughness, some silt												
55	-45					11	39	17	22	88					
			sand in cuttings												
60	-50		olive brown, trace fine-grained sand			14									
65	-55														
70	-60		very stiff to hard			35					23.5	102.3	6841		CU
			POORLY GRADED SAND (SP), olive brown, medium dense, wet, medium plasticity, medium toughness, trace fine-grained sand												
75	-65														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, medium toughness, trace fine-grained sand			30								3.75*	PP
80	-70					21							1100*	1.75*	PP+TV
85	-75					25					25.7	100.6	1200*	1.5*	PP+TV
90	-80		more silt			32							800*	1.75*	PP+TV
			SILTY CLAYEY SAND TO SANDY SILT AND CLAY (SC-SM) TO (CL-ML) olive brown, very dense, wet												
95	-85					56	22	17	5	45					
			SANDY LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, high toughness, fine- to medium-grained sand												
100	-90														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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SURF ELEV (WGS84): Approx. 10 ft.

LOGGED / REVIEWED BY: J. Tognolini / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SANDY LEAN CLAY (CL), olive brown, very stiff, wet, medium plasticity, high toughness, fine- to medium-grained sand			24									
			Boring Terminated at a depth of 101.5 feet below ground surface on May 14, 2019. Groundwater encountered at a depth of 7.5 feet below ground surface.												

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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			3" Asphalt												
			6" Aggregate Base												
	10		FAT CLAY WITH SAND (CH), dark brownish gray, moist, fine- to medium-grained sand, trace gravel and organics												
5			SANDY CLAY (CH), dark greenish gray with pale olive, stiff, moist, 10% to 15% fine- to medium-grained sand		▽	12	68	27	41	80			1600*	1.75*	PP+TV
	5		LEAN CLAY WITH SAND (CL), olive gray, medium stiff, fine- to medium-grained sand			9					23.5	104.8	566		UU
10			CLAYEY SAND TO SANDY CLAY (CL-SC), dark olive gray, medium dense, 10% to 15% fine gravel with iron staining			18	32	16	16	30	14.9	120.5			
	0					15					16.2				
			SANDY SILT TO SILTY SAND (SM-ML), dark brownish gray, 30% to 35% fine-grained sand												
15			Dark olive gray to dark brownish gray			75 psi	22	22	NP	52					
	-5														
			FAT CLAY WITH SAND TO SANDY CLAY (SC-CH), reddish yellow, stiff, moist, 25% to 30% fine- to coarse-grained sand, 15% to 20% fine to coarse gravel												
20						17				55				3.25*	PP
	-10		FAT CLAY WITH SAND (CH), dark bluish gray, very stiff, moist, 20% to 25% fine- to coarse-grained sand												
25															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
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SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			LEAN CLAY (CL), dark gray, stiff, moist, trace sand			10									
	-15														
30			Medium stiff			4					26.4	99.9	1221		CU
	-20														
35			SANDY LEAN CLAY (CL), dark bluish gray, medium stiff, moist dark bluish gray reddish yellow, medium stiff			6	35	19	16	56			2200*	4.25*	PP+TV
	-25														
			CLAYEY SAND WITH GRAVEL (SC), reddish yellow, dense, wet												
40						39					10				
	-30														
45			medium dense			16				25					
	-35														
			FAT CLAY (CH), olive brown, medium stiff, moist, 5% to 10% fine- to medium-grained sand												
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B09

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Mountain View, CA
15949.000.000

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LOGGED / REVIEWED BY: B. Xu / JK
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DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), yellowish brown, medium dense, moist, 40% to 45% clay			13							900*	1.5*	PP+TV
55	-40		Loose to medium dense, fine- to coarse-grained sand, trace fine gravel			11	28	16	12	34	19				
60	-45		FAT CLAY WITH SAND (CH), yellowish brown, medium stiff, moist, 20% to 25% fine- to coarse-grained sand			16							968		UU
65	-50														
70	-55		Olive gray, hard, 15% to 20% sand			65					19.4	108.7	3500*	4.2*	PP+TV
75	-60														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
80	-65		FAT CLAY WITH SAND (CH), yellowish brown, medium stiff, moist, 20% to 25% fine- to coarse-grained sand												
						72					21.3	106.2	3000*	>4.5*	PP+TV
85	-70														
90	-75														
						57					20.7	107.9		>4.5*	PP
95	-80														
100	-85		WELL GRADED SAND (SW), grayish brown to yellowish brown, dense, wet, 5% to 10% fines, trace fine gravel												

LOG - GEOTECHNICAL_SU+QU W/ ELEV_MULTIPLE PARCEL GEX_CHARLESTON S.GPJ_ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B09

LATITUDE: 37.41805611 LONGITUDE: -122.0822028

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/15/2019
HOLE DEPTH: 103 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 12 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			WELL GRADED SAND (SW), grayish brown to yellowish brown, dense, wet, 5% to 10% fines, trace fine gravel			50/4.5"									
	-90		Very dense			79									
			Boring Terminated at a depth of 103 feet below ground surface on May 16, 2019. Groundwater encountered at a depth of 5.5 feet below ground surface.												

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LOG OF BORING 1-B10

LATITUDE: 37.41764167 LONGITUDE: -122.0815472

Geotechnical Exploration
Google North Bayshore
Mountain View, CA
15949.000.000

DATE DRILLED: 5/17/2019
HOLE DEPTH: 51.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			2.5" Asphalt 15.5" Aggregate Base												
			LEAN CLAY (CL), dark gray to dark greenish gray, moist, 10% to 15% fine- to coarse-grained sand												
5	10		olive gray to gray, hard			26	32	23	9		30.3	89.6		4*	PP
10	5		FAT CLAY WITH SAND (CH), olive, stiff, wet, 20% to 25% fine- to medium-grained sand			16					24.1		1000*	1.5*	PP+TV
15	0		SANDY FAT CLAY (CH), olive gray to gray, stiff, moist, fine-grained sand			7	66	23	43	79					
20	-5		FAT CLAY (CH), greenish gray, medium stiff to stiff, 10% to 15% fine- to medium- grained sand, trace gravel			8					16	122.5	1000*	1.5*	PP+TV
25	-10														

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B10

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HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 14 ft.

LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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			SANDY CLAY (CL), very dark grayish brown to olive, stiff, moist, fine- to coarse-grained sand, trace gravel			14	37	19	18	63				2.5*	PP
	-15		FAT CLAY WITH SAND (CH), yellowish brown, stiff, moist, 15% to 20% fine- to coarse-grained sand												
30						11					22.9	105.2		.9235	UC
	-20														
35			dark yellowish brown with manganese staining			12							1200*	1*	PP+TV
			CLAYEY SAND (SC), dark yellowish brown, medium dense, wet, 25% to 30% clay												
	-25														
40						15	32	16	16	34	19.4				
	-30		FAT CLAY (CH), pale olive, stiff to very stiff, moist, 5% to 10% fine- to coare-grained sand, trace fine gravel												
45						20					28.3	96.3		1.44	UC
	-35		WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown, dense, moist, 5% to 10% fines												
50															

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19

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LOG OF BORING 1-B10

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Mountain View, CA
15949.000.000

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HOLE DIAMETER: 4.0 in.
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LOGGED / REVIEWED BY: B. Xu / JK
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

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)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown, dense, moist, 5% to 10% fines			34				14					
			Boring Terminated at a depth of 51.5 feet below ground surface on May 17, 2019. Groundwater encountered at a depth of 7.5 feet below ground surface.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV MULTIPLE PARCEL GEX_CHARLESTON S.GPJ ENGEO INC.GDT 9/13/19



APPENDIX B

CONE PENETRATION TEST LOGS

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

CONETEC

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Explorations
Start Date:	07-May-2019
End Date:	Ongoing

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Location	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting (m)	Refer to Notation Number
1-CPT-01	19-56067_1CP1	Joaquin	7-May-2019	448:T1500F15U500	11.1	50.52	4141718	581484	
1-CPT-06	19-56067_1CP6	Joaquin	7-May-2019	448:T1500F15U500	8.2	120.57	4141642	581391	
1-SCPT-02	19-56067_1SP2	Joaquin	7-May-2019	448:T1500F15U500	8.9	100.56	4141669	581498	
1-CPT-15	19-56067_1CP15	Charleson South	8-May-2019	448:T1500F15U500	6.2	80.54	4141706	581239	
1-CPT-03	19-56067_1CP3	Joaquin	8-May-2019	448:T1500F15U500	9.0	120.57	4141559	581533	
1-SCPT-04	19-56067_1SCP4	Charleson South	8-May-2019	448:T1500F15U500	8.1	100.56	4141829	581289	
1-CPT-16	19-56067_1CP16	Charleson South	9-May-2019	448:T1500F15U500	8.1	80.54	4141607	581331	
1-CPT-17	19-56067_1CP17	Charleson South	10-May-2019	483:T1500F15U500	4.8	100.56	4141531	581178	
1-CPT-18	19-56067_1CP18	Charleson South	11-May-2019	483:T1500F15U500	3.1	100.56	4141640	581199	
1-CPT-09	19-56067_1CP09	Plymouth	13-May-2019	483:T1500F15U500	6.8	100.56	4141336	581070	
1-SCPT-10	19-56067_1SP10	Plymouth	13-May-2019	483:T1500F15U500	4.8	80.54	4141481	581034	
1-CPT-11	19-56067_1CP11	Plymouth	14-May-2019	483:T1500F15U500	6.2	100.56	4141486	580955	
1-CPT-12	19-56067_1CP12	Plymouth	14-May-2019	483:T1500F15U500	6.3	80.54	4141408	580971	
1-CPT-13B	19-56067_1CP13B	Charleson South	14-May-2019	483:T1500F15U500	8.5	100.56	4141903	581272	
1-CPT-14B	19-56067_1CP14B	Charleson South	14-May-2019	483:T1500F15U500	7.0	120.57	4141826	581178	
2-CPT-14	19-56067_2CP14	Commons	09-Jul-2019	494:T1500F15U500	8.4	100.56	4142405	579889	
2-SCPT-13	19-56067_2SP13	Commons	09-Jul-2019	494:T1500F15U500	8.4	100.64	4142585	579861	
1-CPT8	19-56067_1CP08	Space Park	08-Jul-2019	494:T1500F15U500	6.0	120.57	4141466	581660	

1. The assumed phreatic surface was based on pore pressure dissipation tests unless otherwise noted. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.
3.The assumed phreatic surface was based on an adjacent CPT.

Job No:	19-56067
Client:	ENGEO Incorporated
Project:	Google Explorations
Start Date:	07-Jul-2019
End Date:	09-Jul-2019

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting[2] (m)	Refer to Notation Number
1-CPT-05	19-56067_1CP05	09-Jul-2019	494:T1500F15U500	7.7	80.54	4141489	581482	
1-CPT-07	19-56067_1CP07	08-Jul-2019	494:T1500F15U500	8.1	80.54	4141420	581440	
1-CPT-08	19-56067_1CP08	08-Jul-2019	494:T1500F15U500	6.0	120.57	4141466	581660	
2-CPT-06	19-56067_2CP06	07-Jul-2019	391:T1500F15U500	13.3	73.49	4142562	582145	
2-CPT-12	19-56067_2CP12	08-Jul-2019	494:T1500F15U500	7.4	120.57	4141958	580418	
2-CPT-14	19-56067_2CP14	09-Jul-2019	494:T1500F15U500	8.4	100.56	4142405	579889	
2-SCPT-13	19-56067_2SP13	09-Jul-2019	494:T1500F15U500	8.4	100.64	4142585	579861	
3-CPT-14	19-56067_3CP14	07-Jul-2019	391:T1500F15U500	23.8	23.87	4143226	579724	

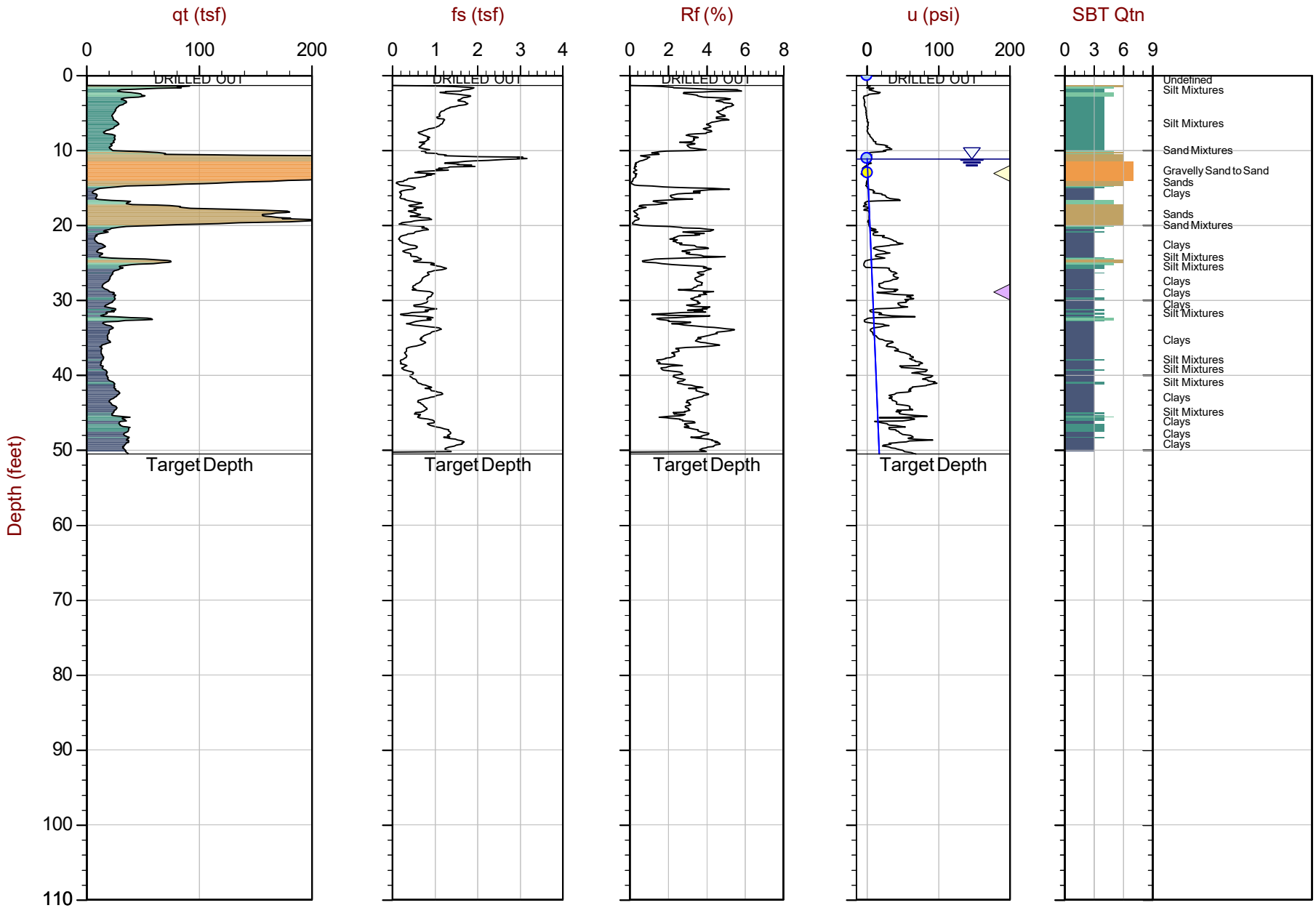
1. The assumed phreatic surface was based on the results of the shallowest pore pressure dissipation test performed within the sounding. Hydrostatic conditions were assumed for the calculated parameters.
2. The coordinates were acquired using consumer grade GPS equipment, datum: WGS 1984 / UTM Zone 10 North.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 20:27
Site: Google Joaquin Exploration

Sounding: 1-CPT-01
Cone: 448:T1500F15U500



Max Depth: 15.400 m / 50.52 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP1.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141718m E: 581484m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

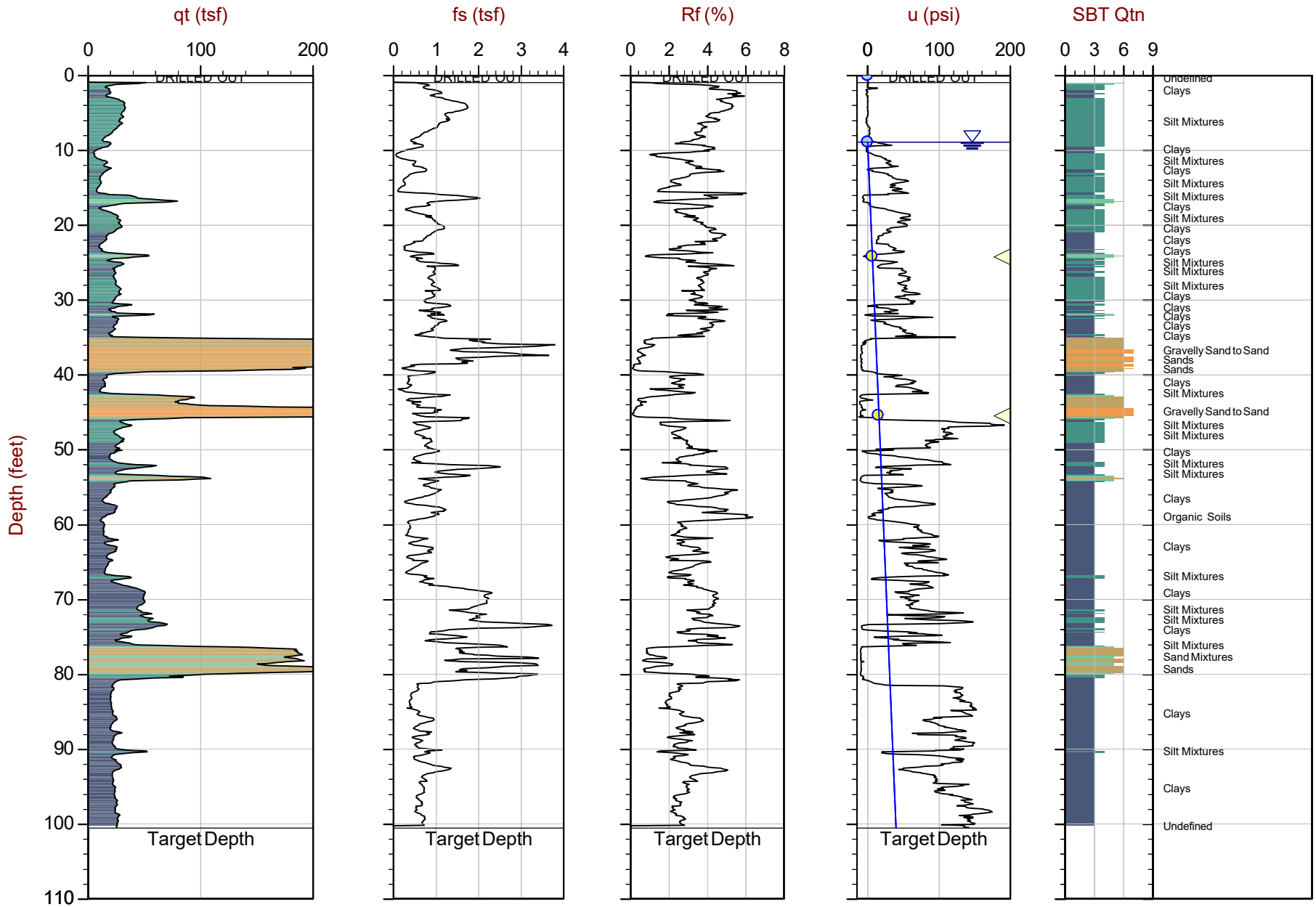
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 21:48
Site: Google Joaquin Exploration

Sounding: 1-SCPT-02
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP2.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141669m E: 581498m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

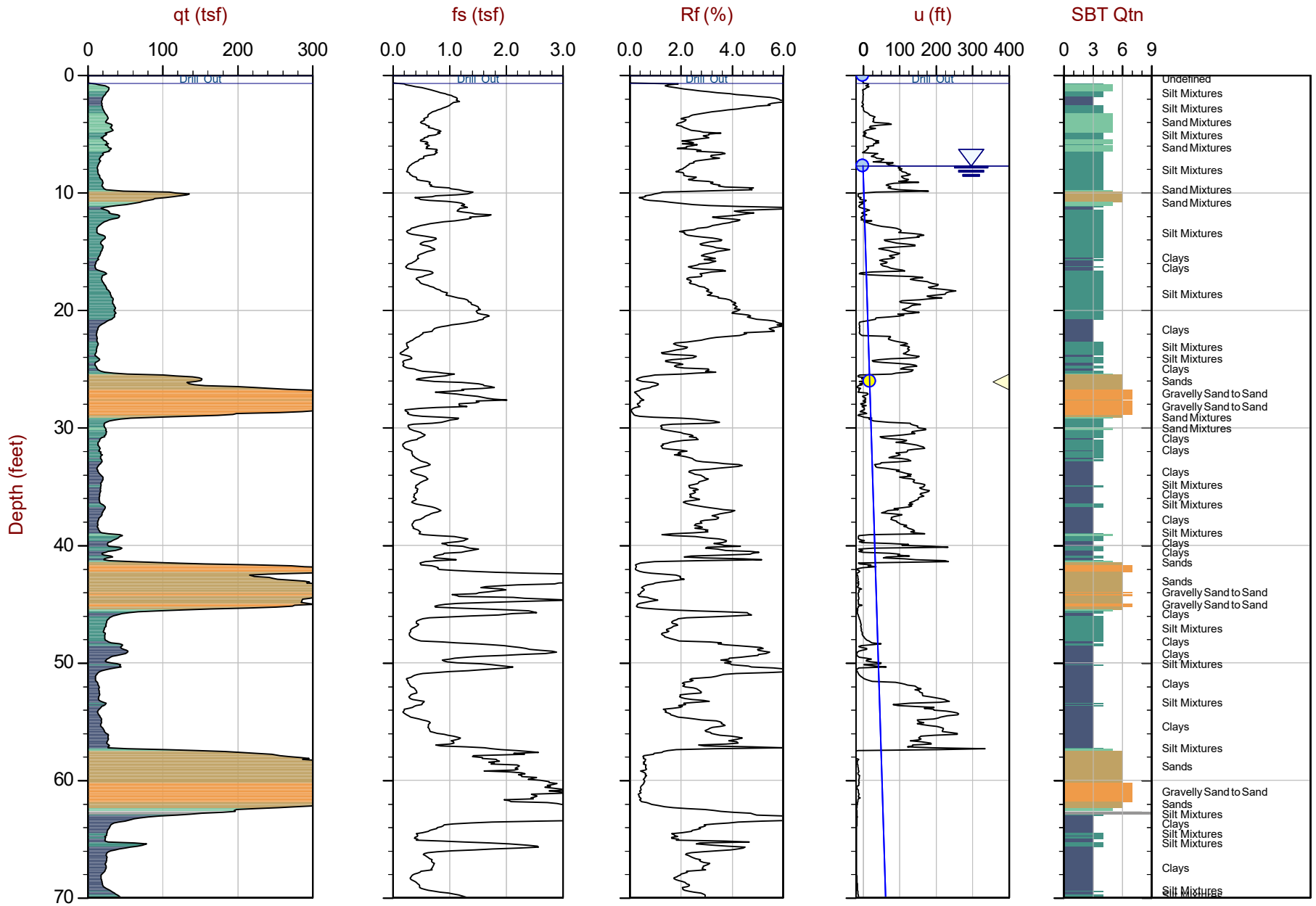
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-09 10:29
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-05
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP05.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141489m E: 581482m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

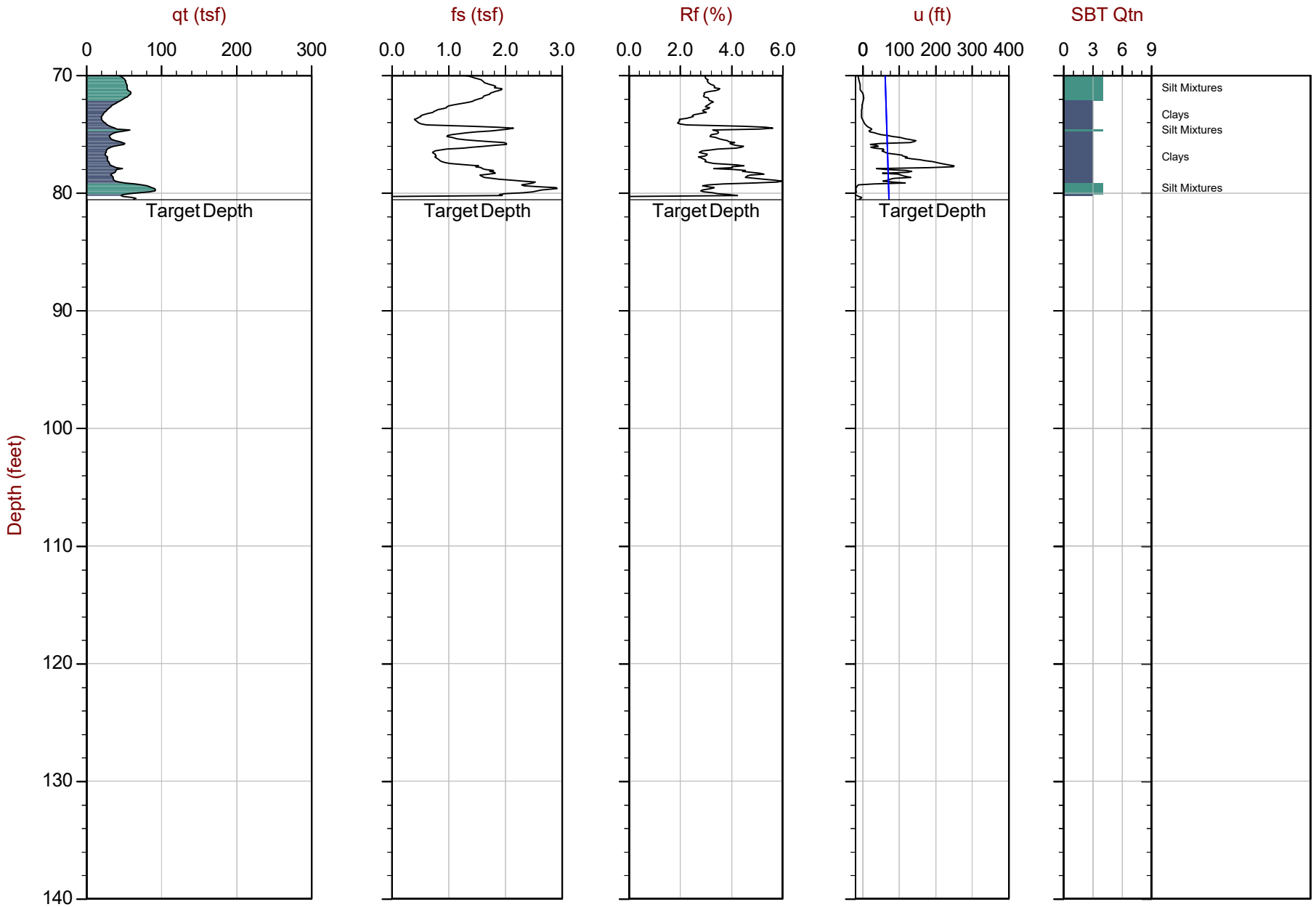
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-09 10:29
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-05
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP05.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141489m E: 581482m
Sheet No: 2 of 2

Overplot Item: Ueq Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

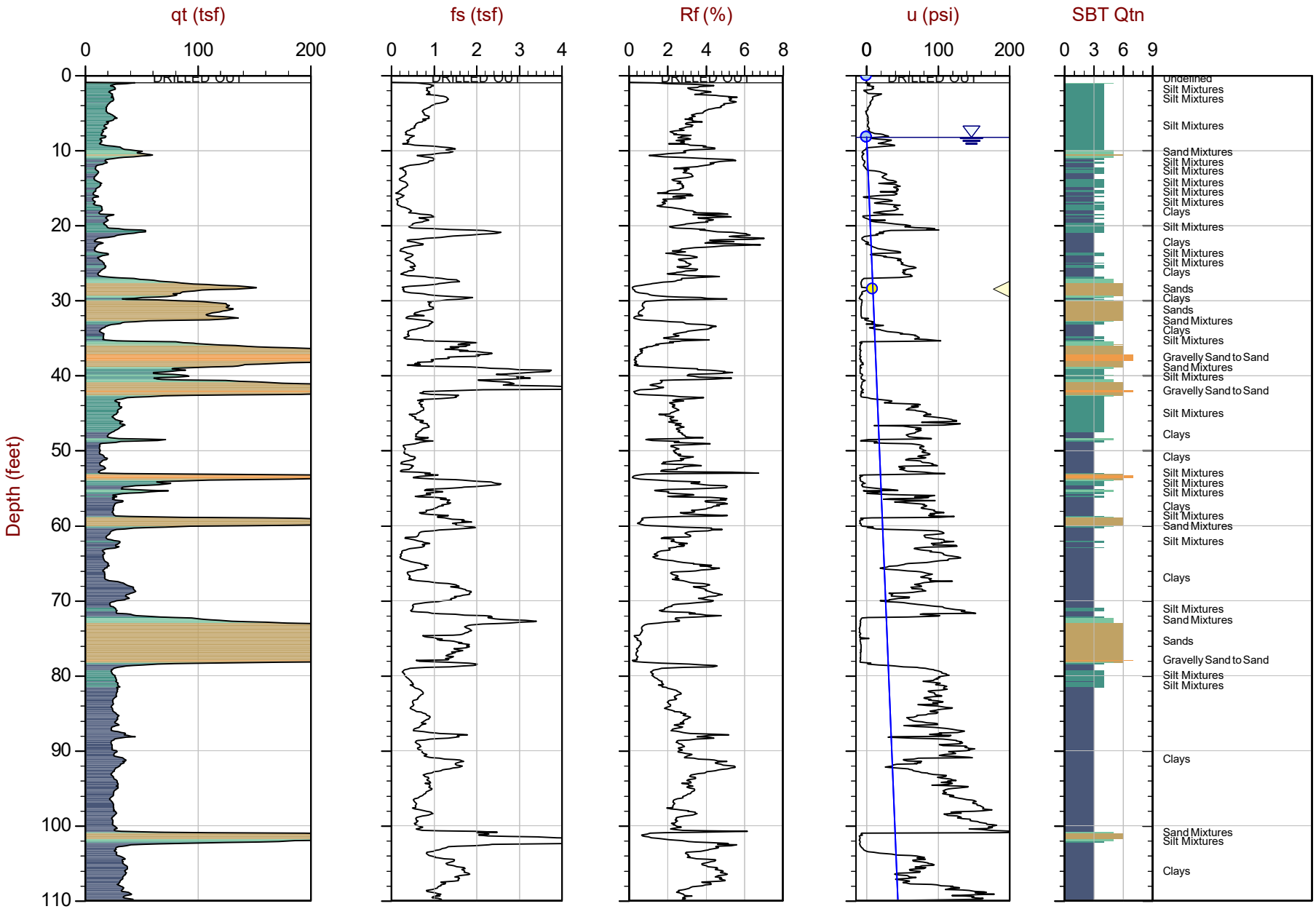
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 23:56
Site: Google Joaquin Exploration

Sounding: 1-CPT-06
Cone: 448:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP6.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141642m E: 581391m
Page No: 1 of 2

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

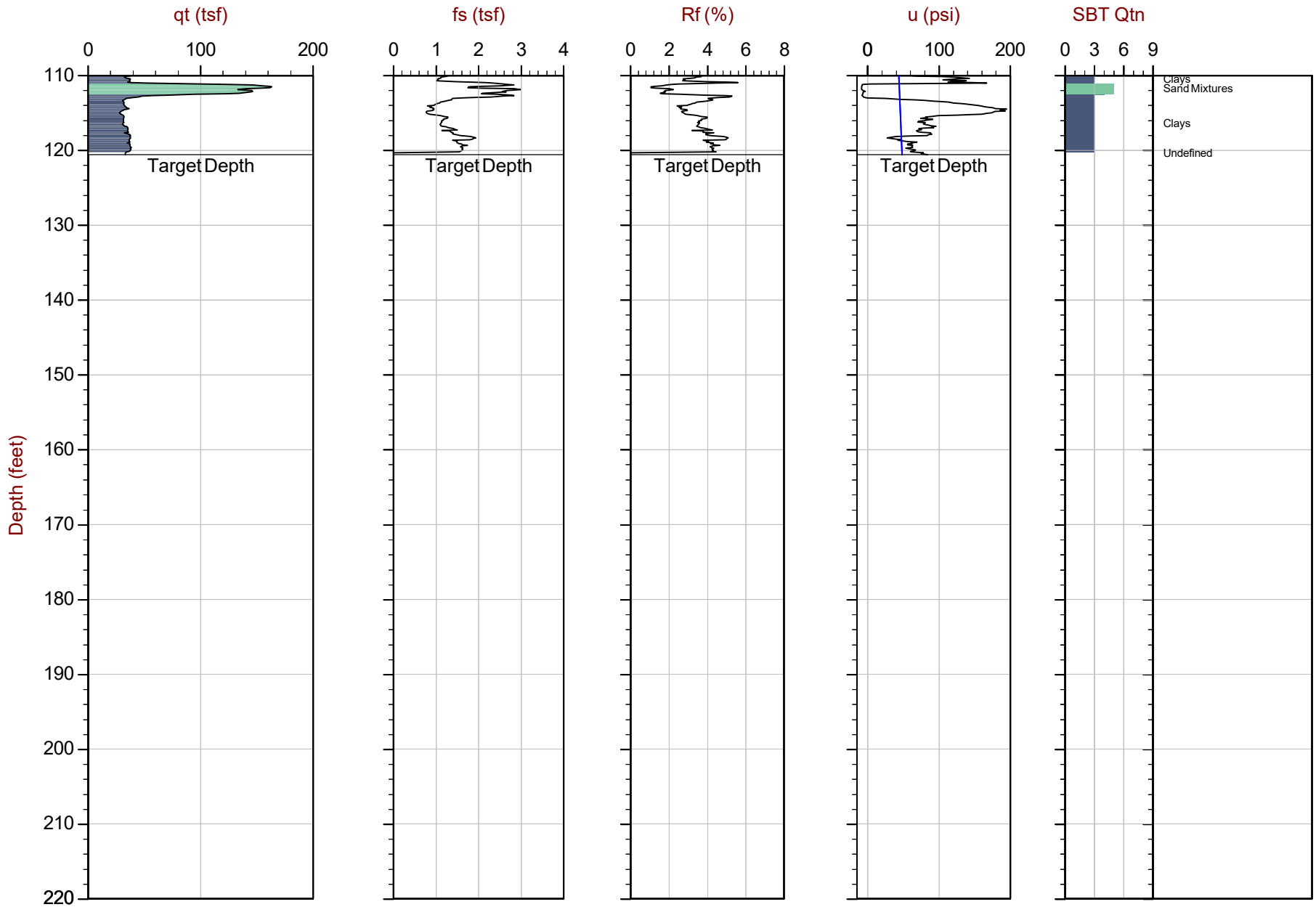
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 23:56
Site: Google Joaquin Exploration

Sounding: 1-CPT-06
Cone: 448:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP6.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141642m E: 581391m
Page No: 2 of 2

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

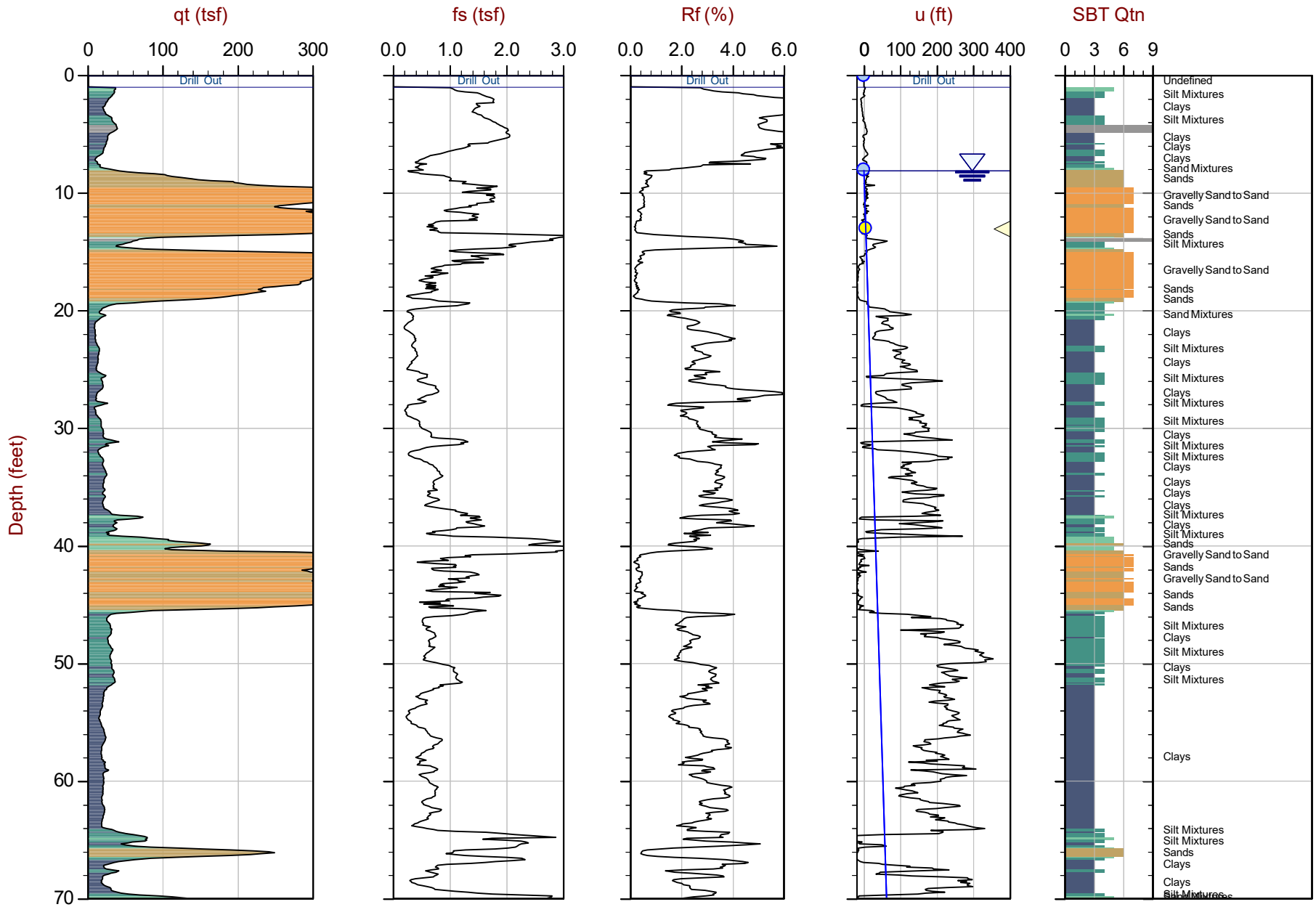
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 08:07
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-07
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP07.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141420m E: 581440m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

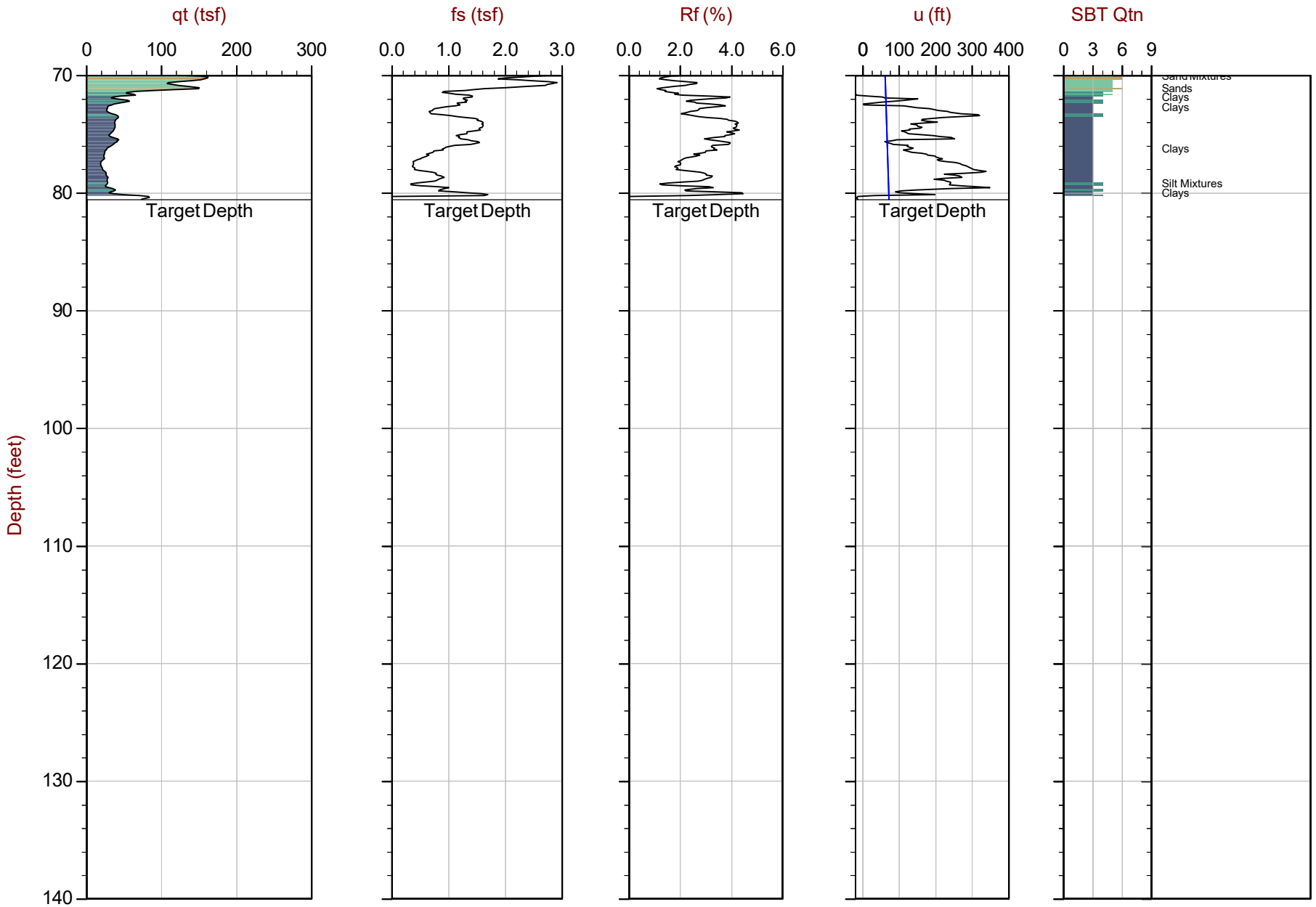
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 08:07
Site: Google Plymouth Campus Exploration

Sounding: 1-CPT-07
Cone: 494:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP07.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141420m E: 581440m
Sheet No: 2 of 2

Overplot Item: Ueq Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

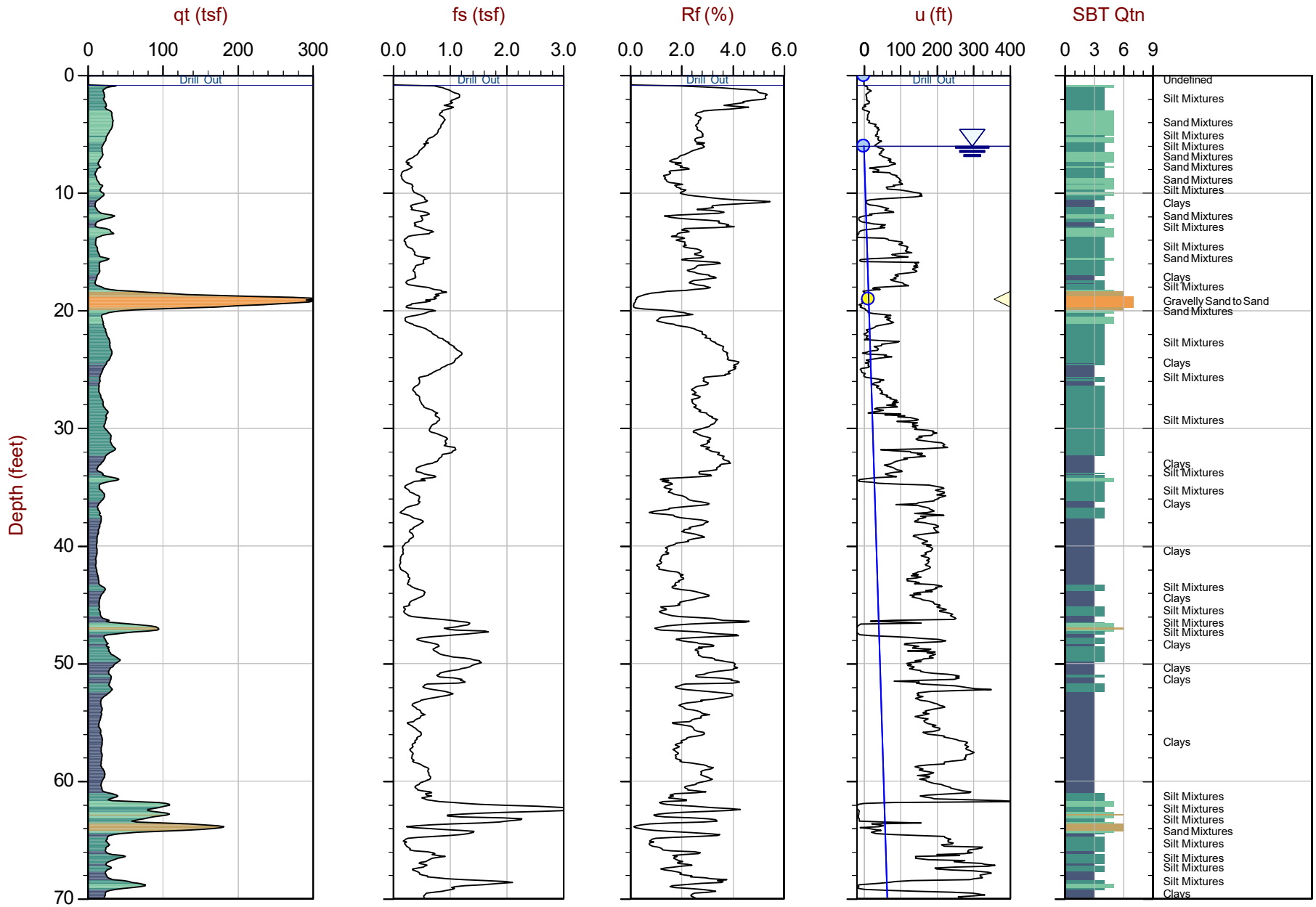
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 09:25
Site: Google Space Campus Exploration

Sounding: 1-CPT-08
Cone: 494:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP08.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141466m E: 581660m
Sheet No: 1 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

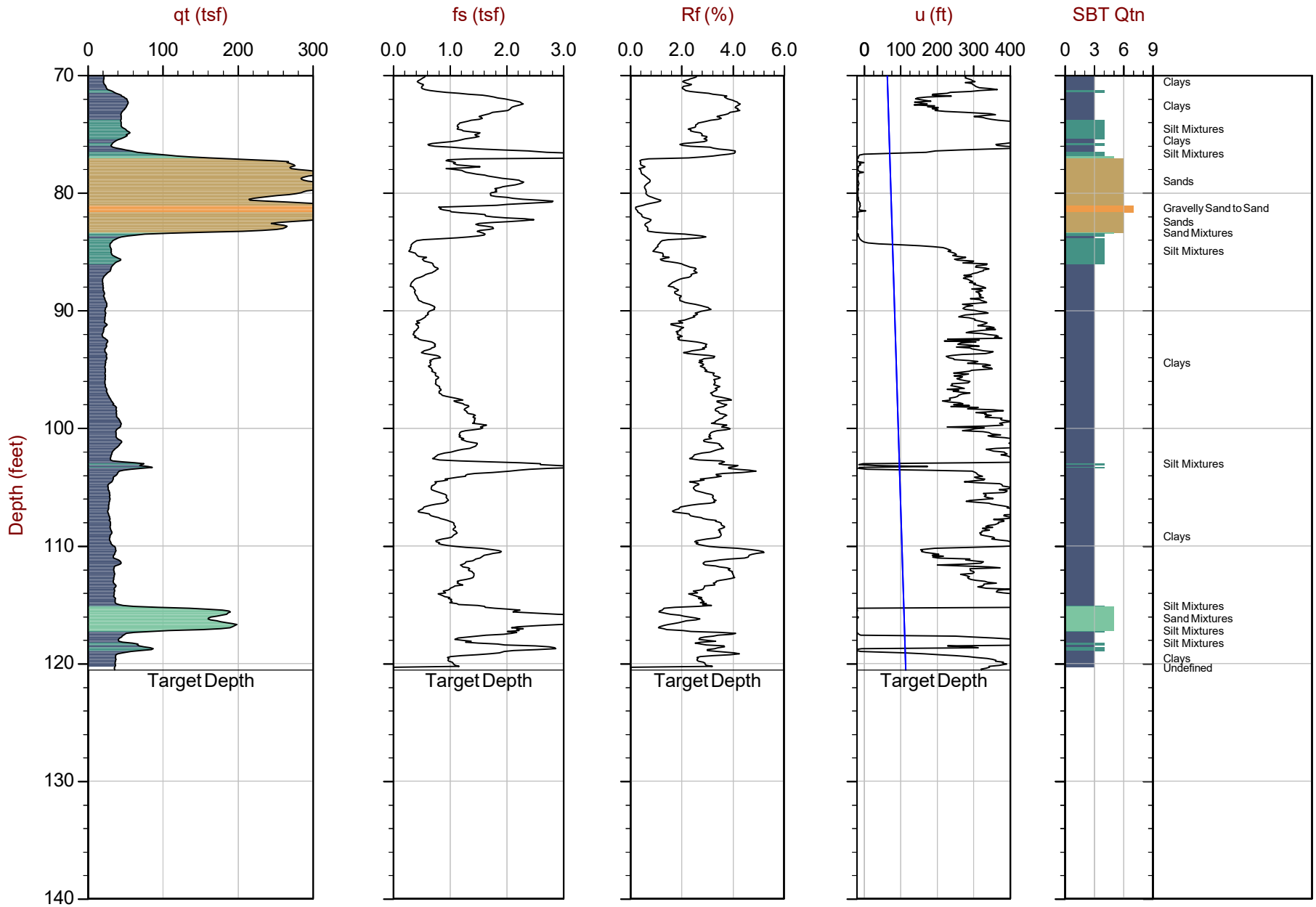
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-07-08 09:25
Site: Google Space Campus Exploration

Sounding: 1-CPT-08
Cone: 494:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP08.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141466m E: 581660m
Sheet No: 2 of 2

Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Hydrostatic Line

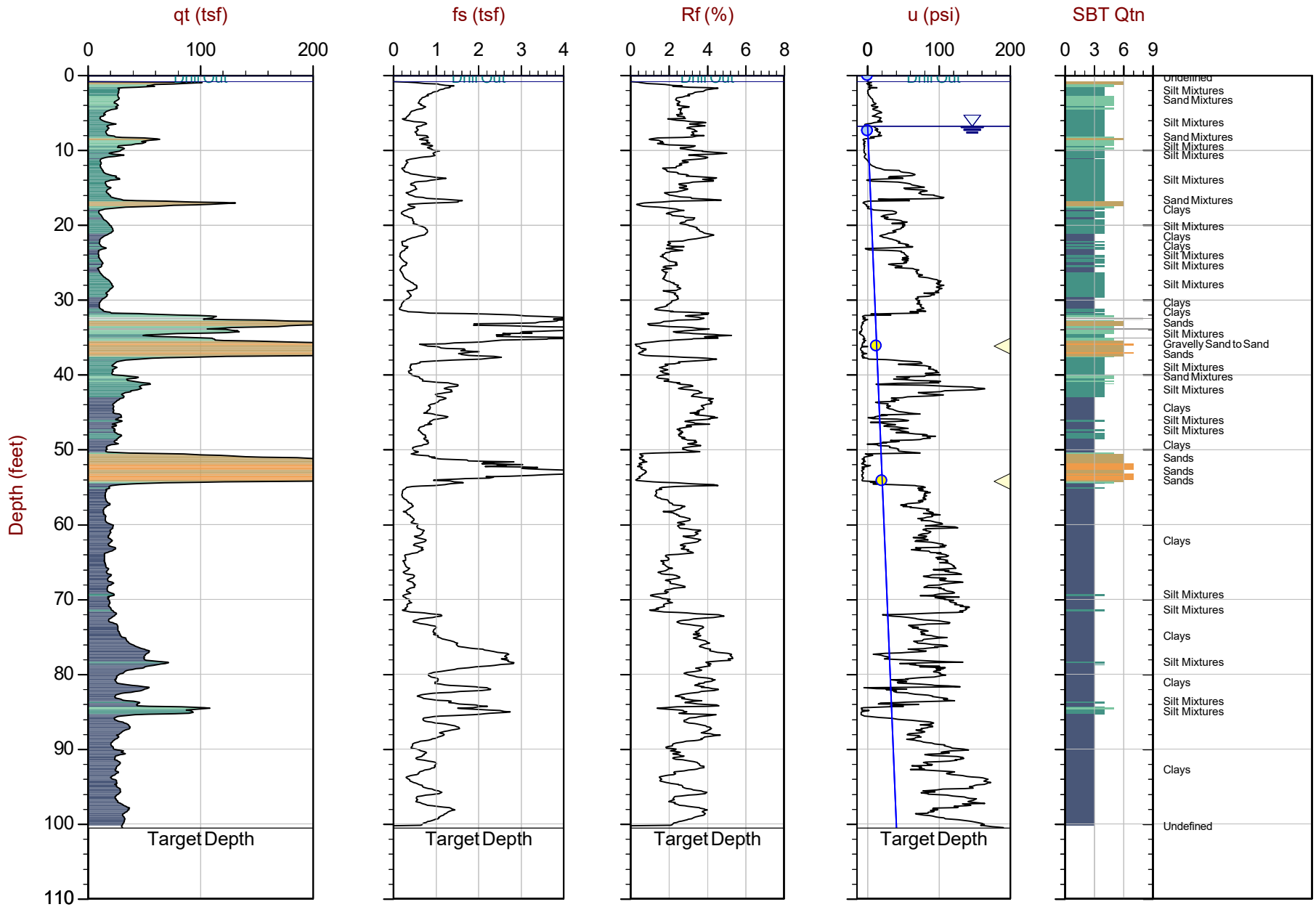
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 10:36
Site: Google Plymouth Exploration

Sounding: 1-CPT-09
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP09.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141336m E: 581070m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

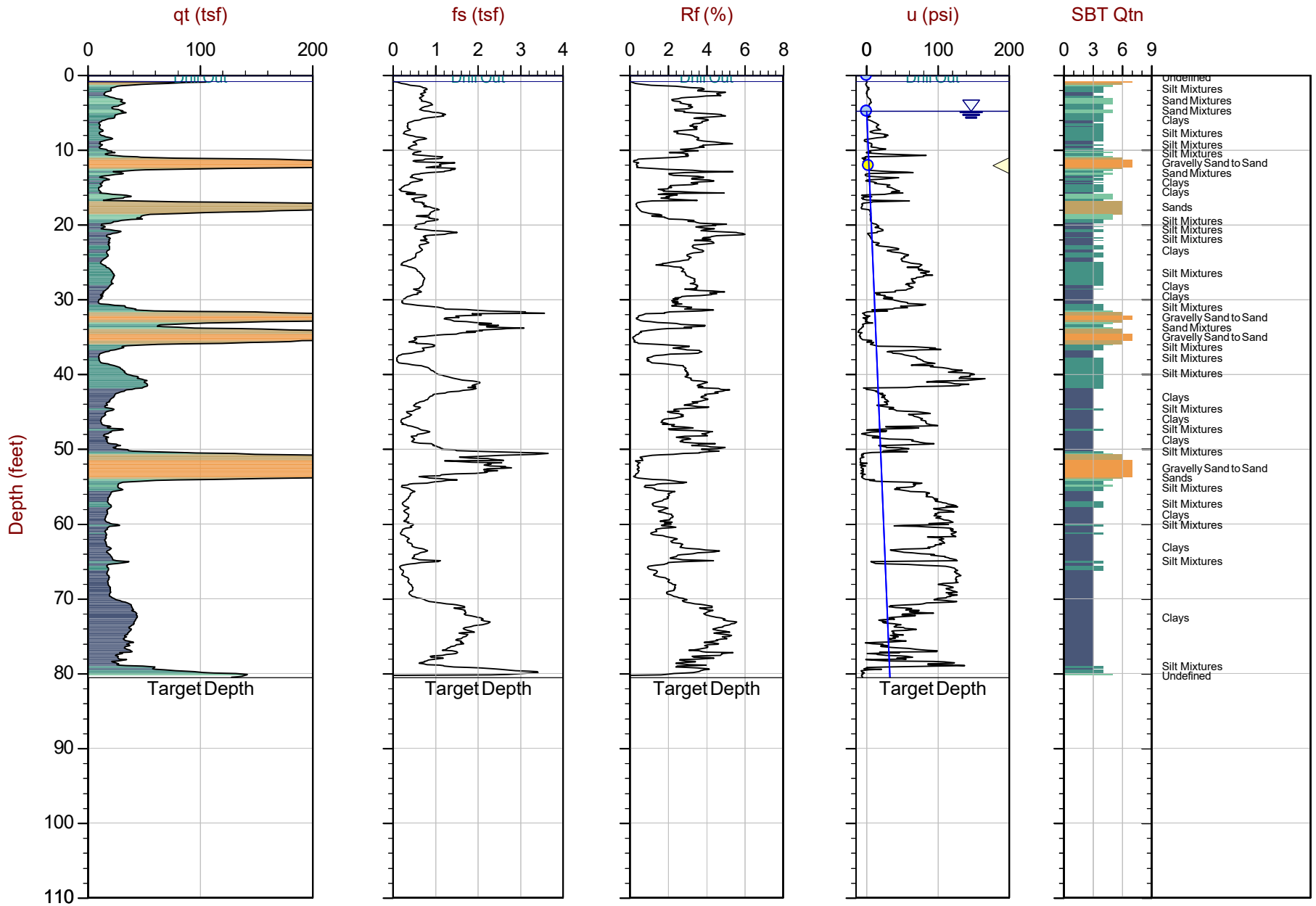
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 08:52
Site: Google Plymouth Exploration

Sounding: 1-SCPT-10
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP10.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141481m E: 581034m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

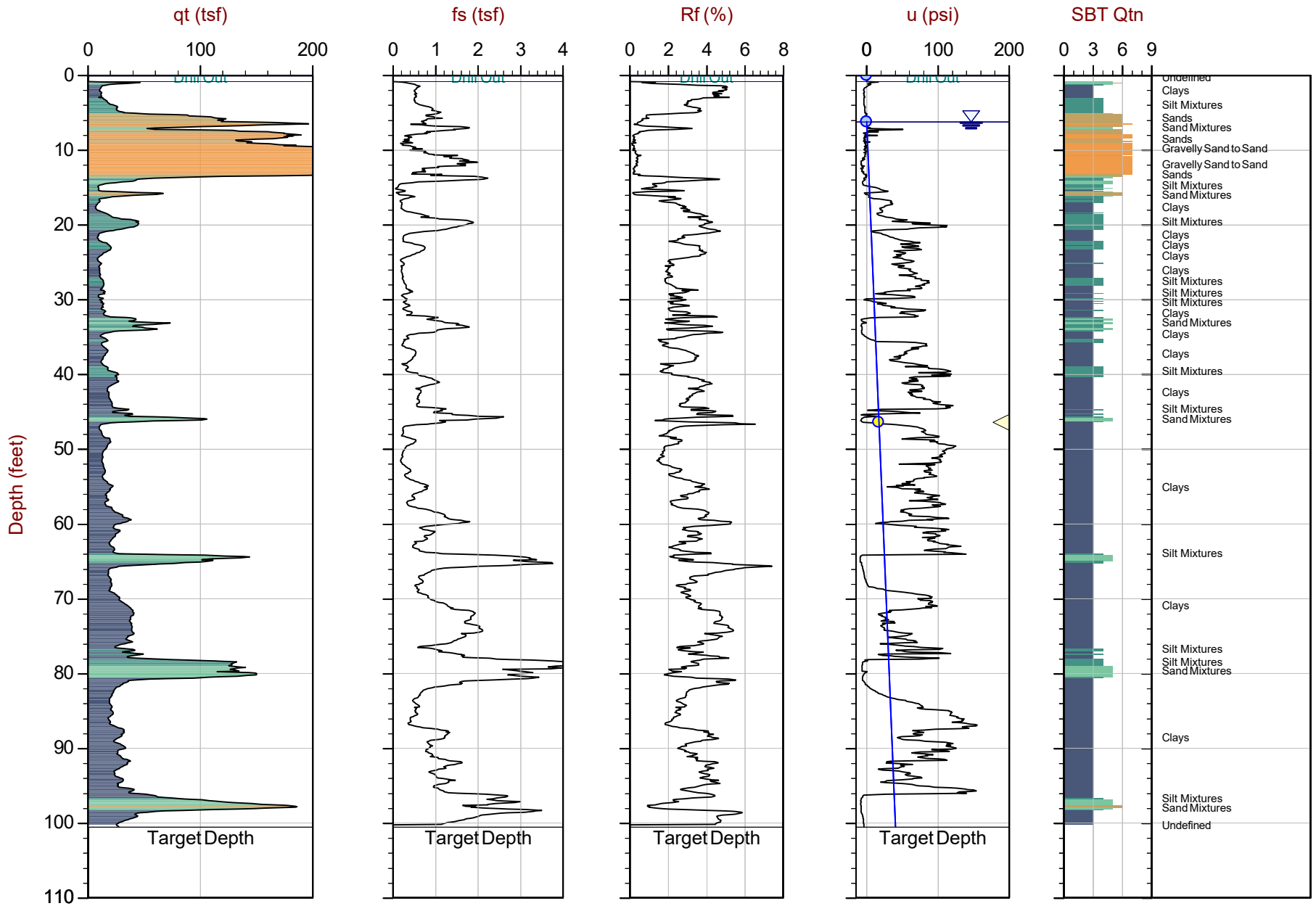
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 10:58
Site: Google Plymouth Exploration

Sounding: 1-CPT-11
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP11.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141486m E: 580955m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

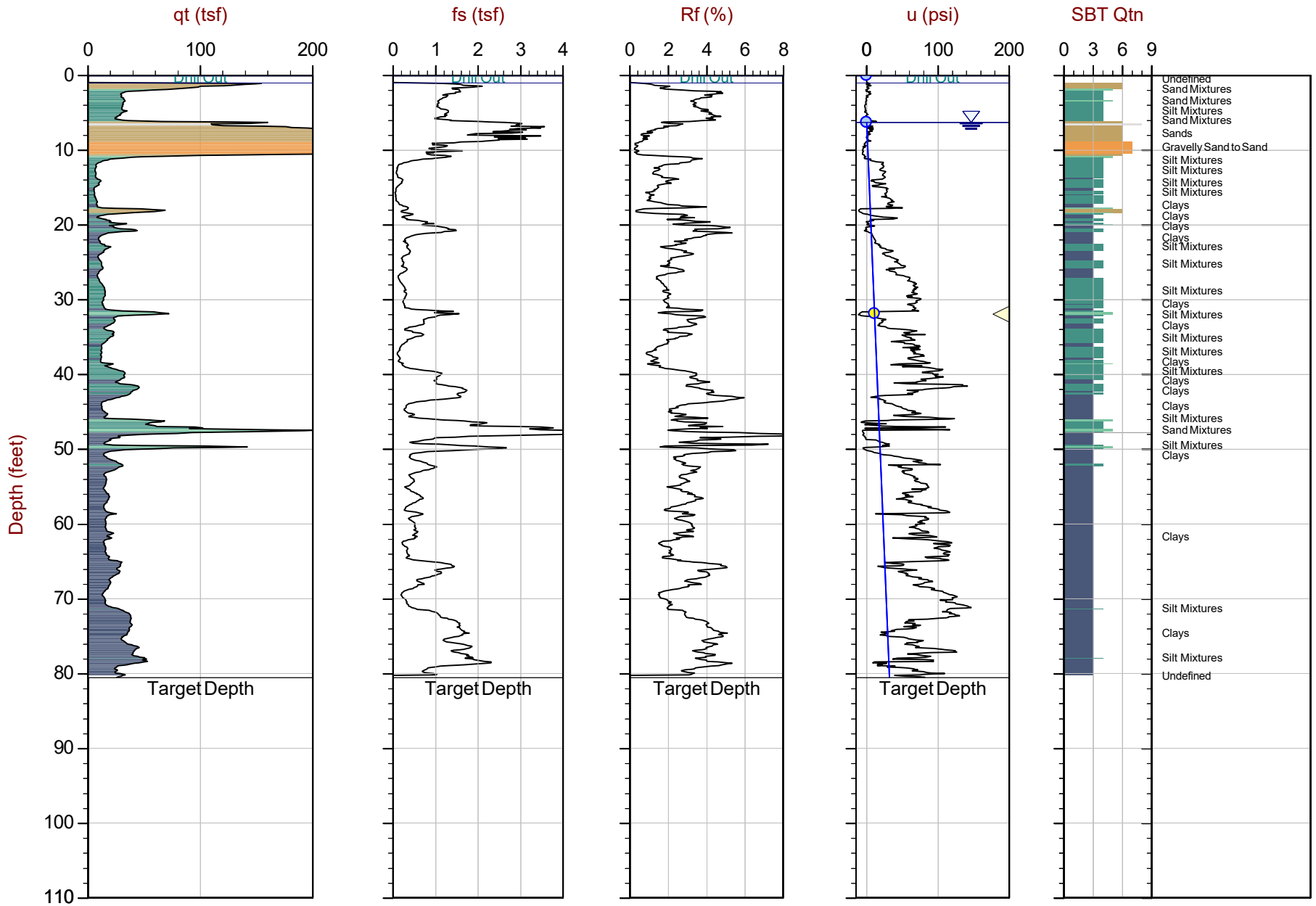
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 12:24
Site: Google Plymouth Exploration

Sounding: 1-CPT-12
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP12.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141408m E: 580971m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

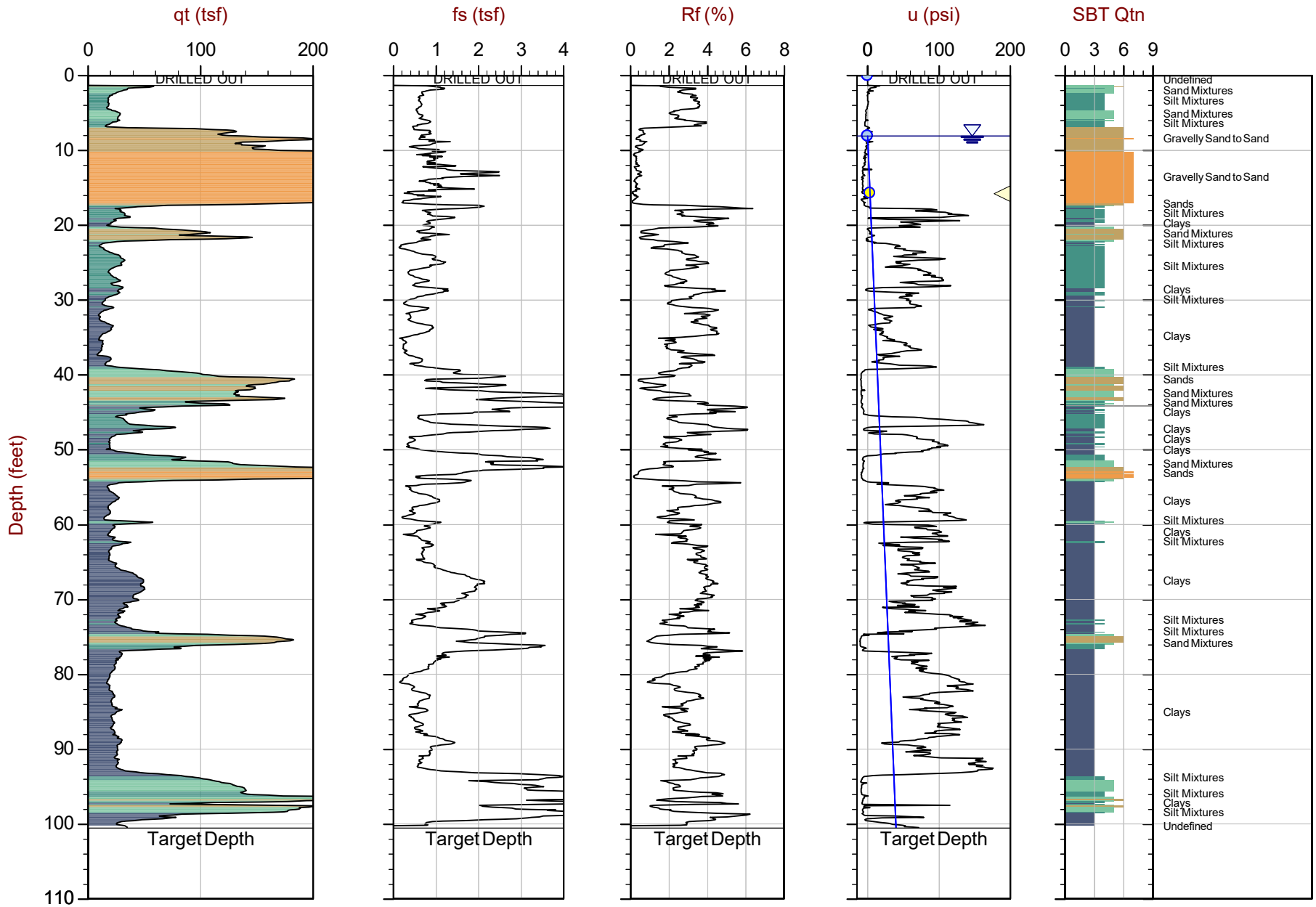
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 21:45
Site: Google Charleston South Exploration

Sounding: 1-SCPT-04
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SCP4.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141829m E: 581289m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

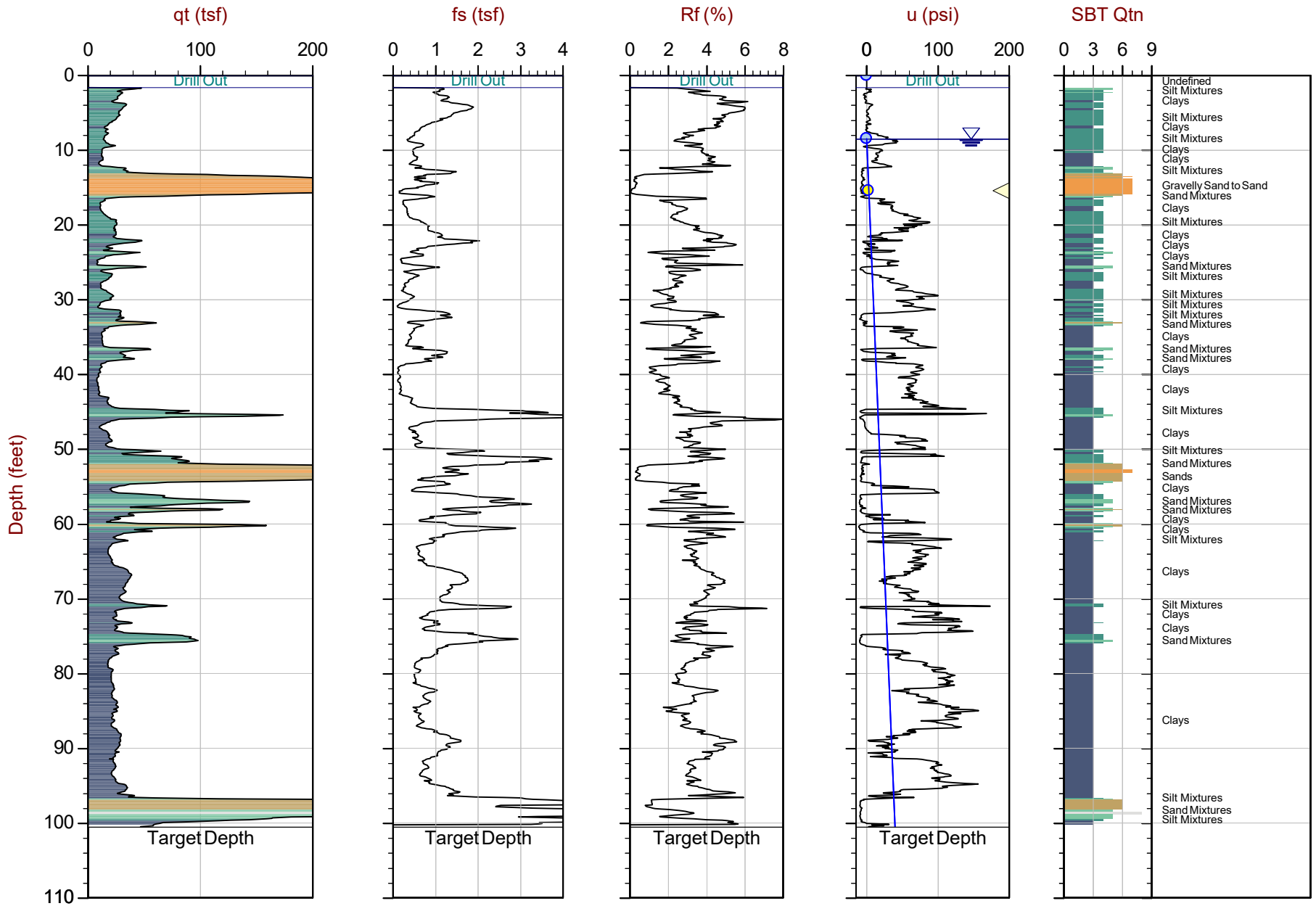
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 08:10
Site: Google Charleston South Exploration

Sounding: 1-CPT-13B
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP13B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141903m E: 581272m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

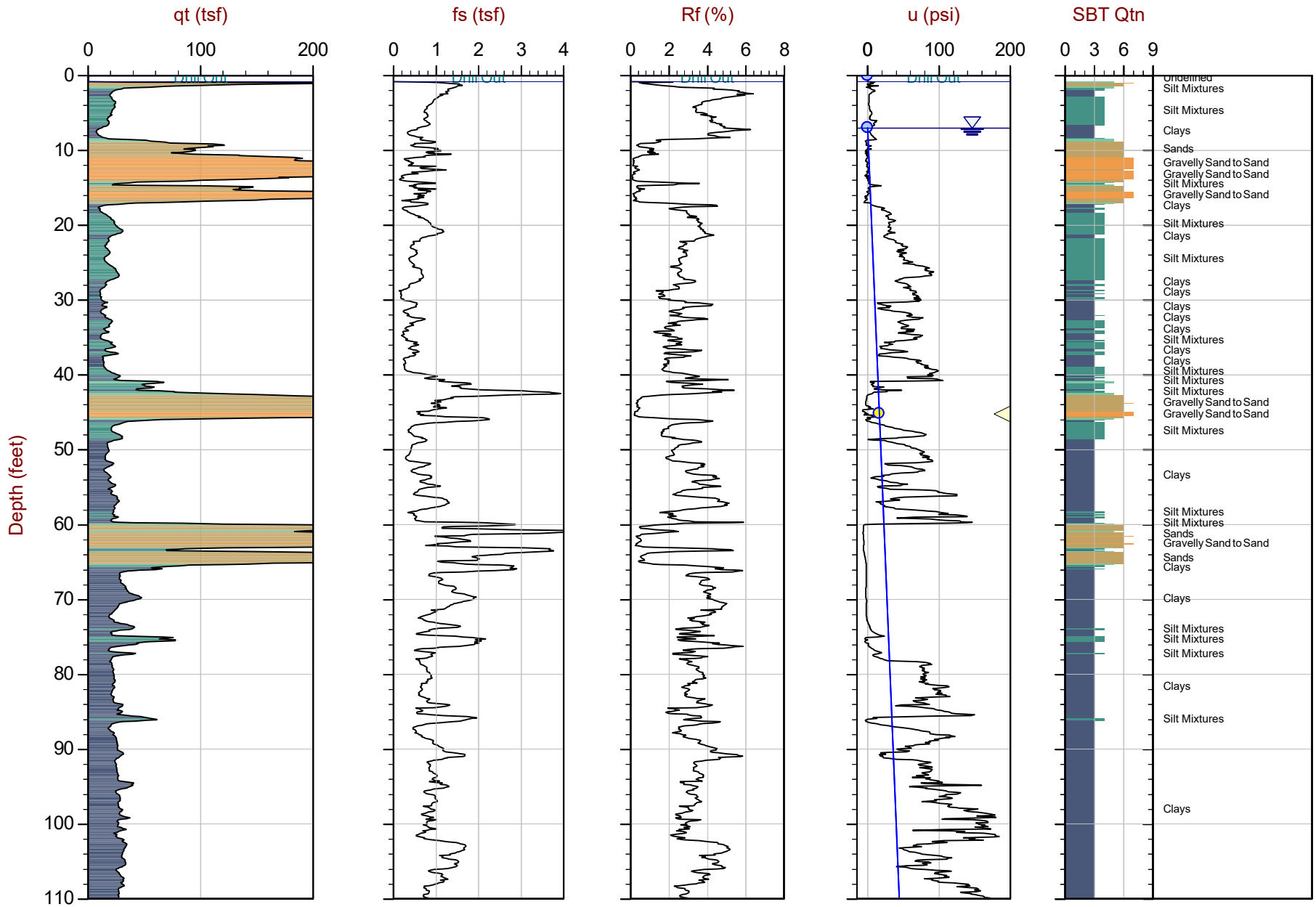
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 09:26
Site: Google Charleston South Exploration

Sounding: 1-CPT-14B
Cone: 483:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP14B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141826m E: 581178m
Page No: 1 of 2

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

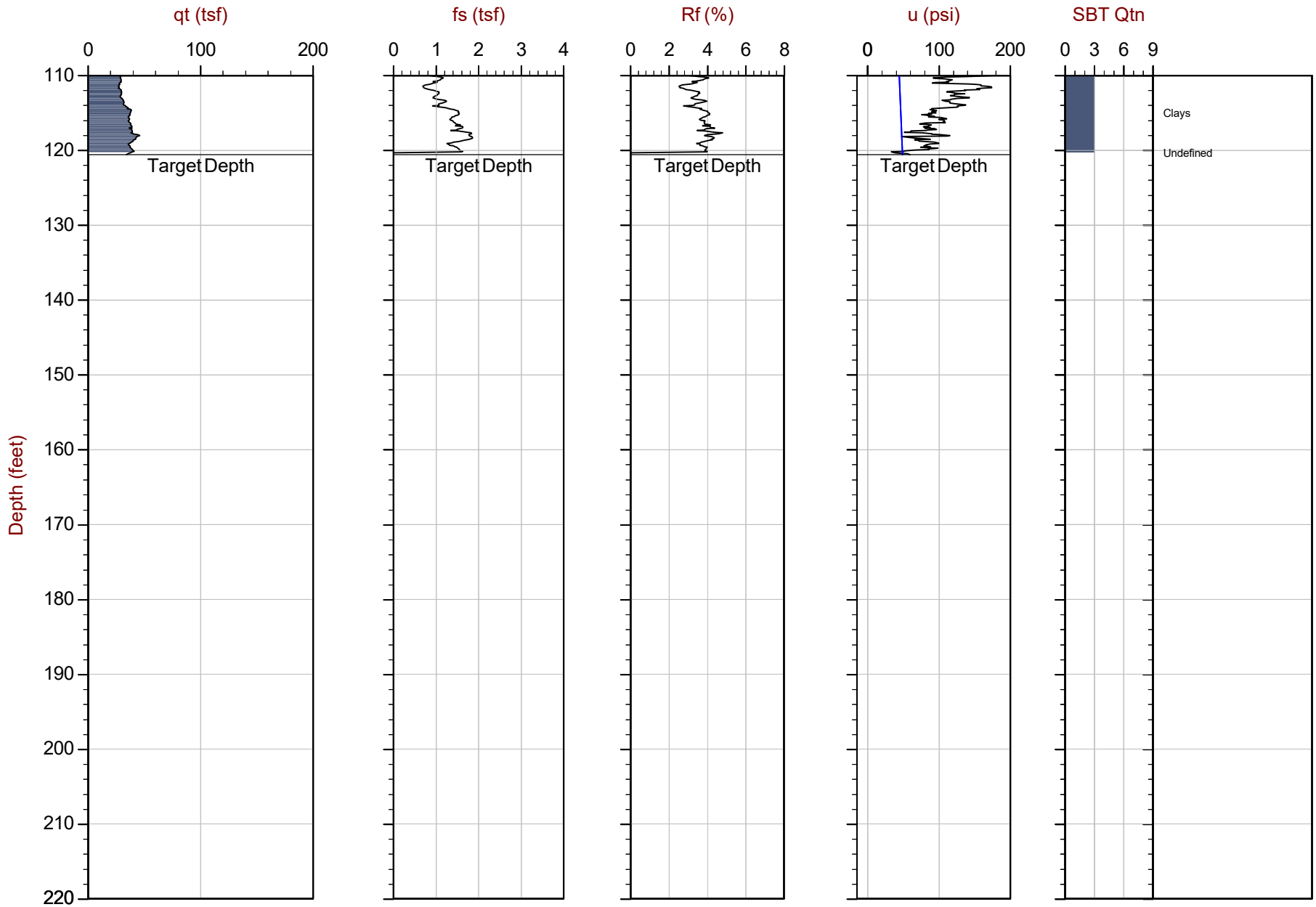
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-14 09:26
Site: Google Charleston South Exploration

Sounding: 1-CPT-14B
Cone: 483:T1500F15U500



Max Depth: 36.750 m / 120.57 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP14B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141826m E: 581178m
Page No: 2 of 2

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

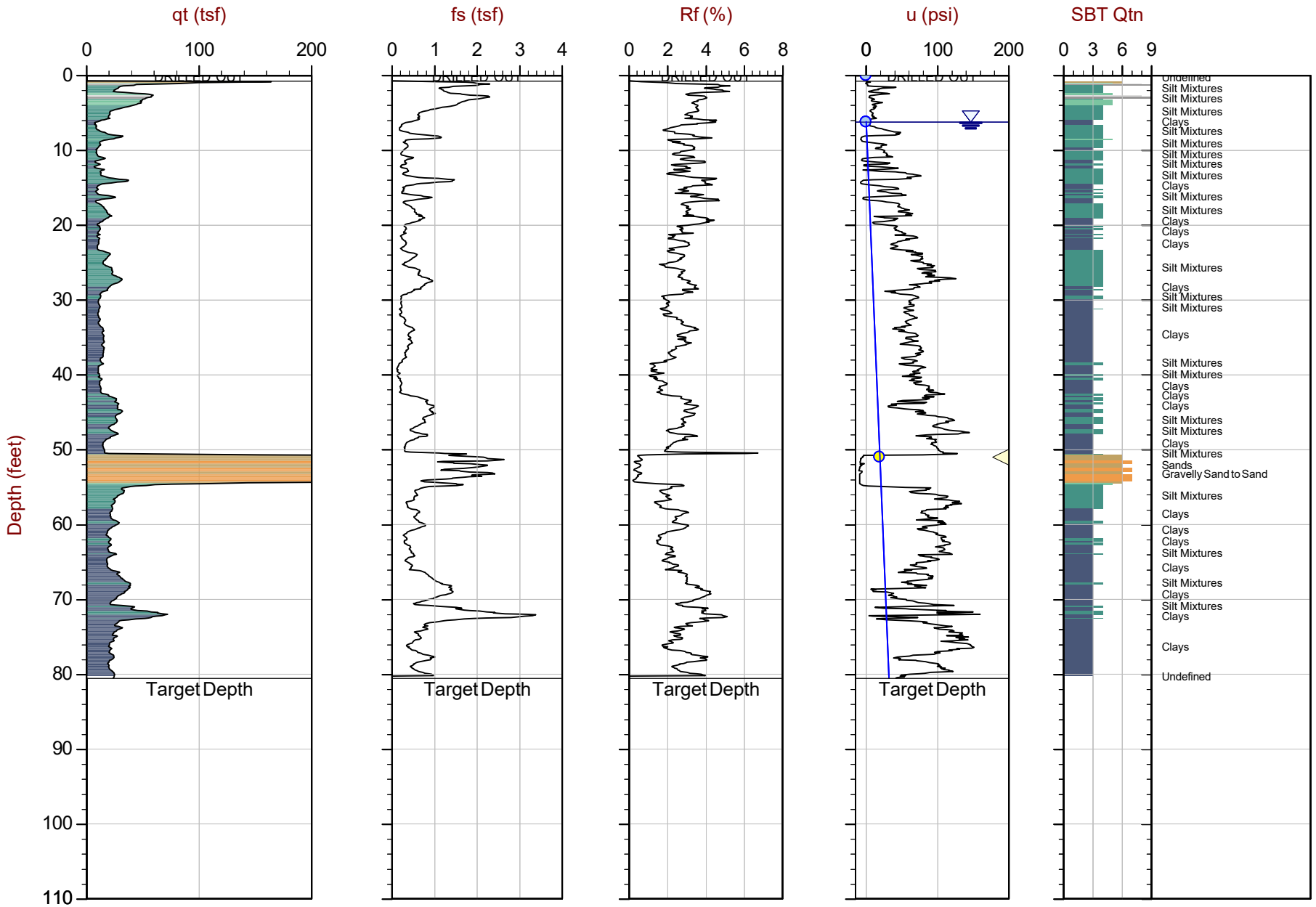
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 23:33
Site: Google Charleston South Exploration

Sounding: 1-CPT-15
Cone: 448:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP15.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141706m E: 581239m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

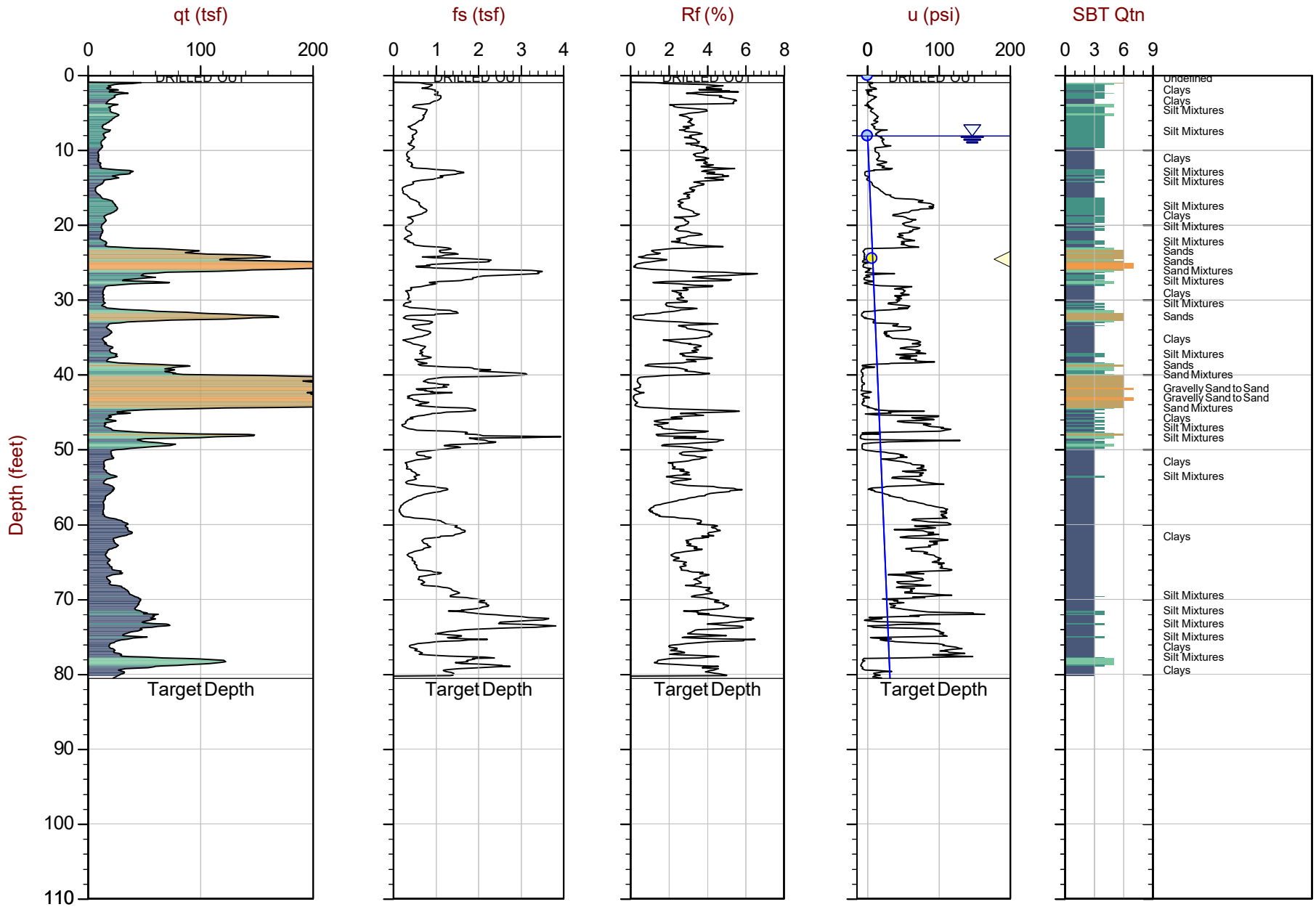
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-09 21:38
Site: Google Charleston South Exploration

Sounding: 1-CPT-16
Cone: 448:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP16.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141607m E: 581331m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

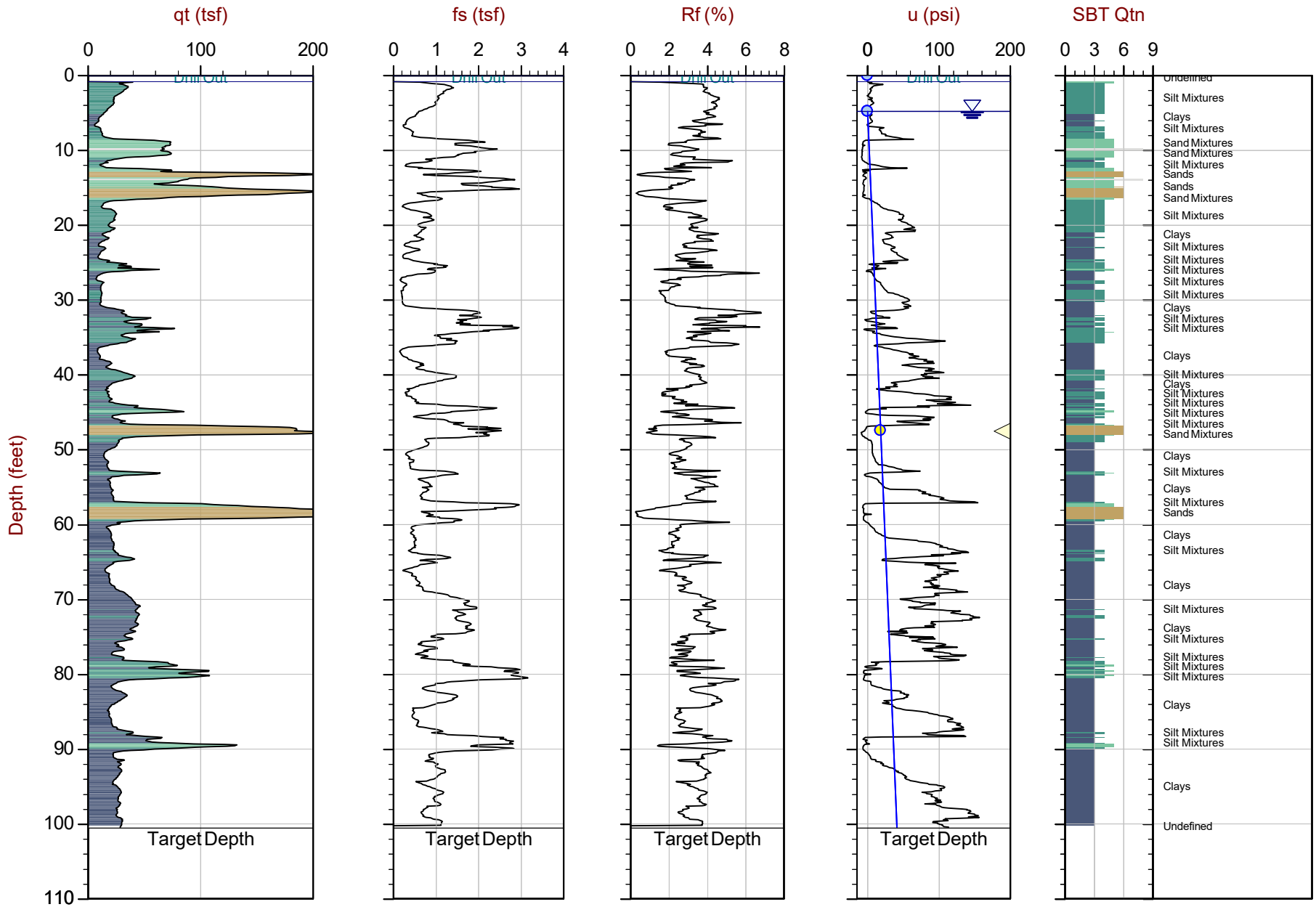
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-10 22:48
Site: Google Charleston South Exploration

Sounding: 1-CPT-17
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP17.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141531m E: 581178m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

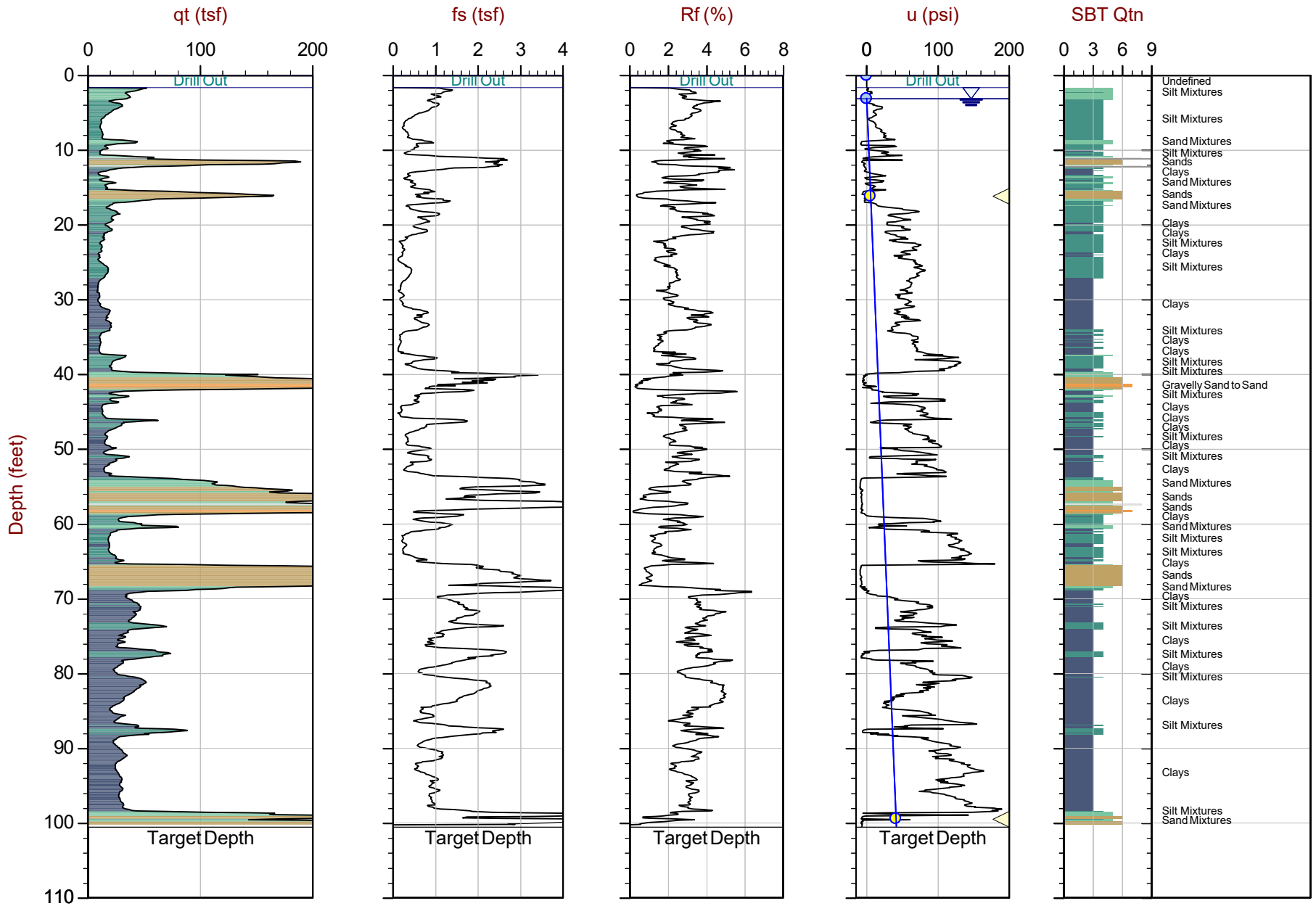
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-11 00:05
Site: Google Charleston South Exploration

Sounding: 1-CPT-18
Cone: 483:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1CP18.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141640m E: 581199m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Plots

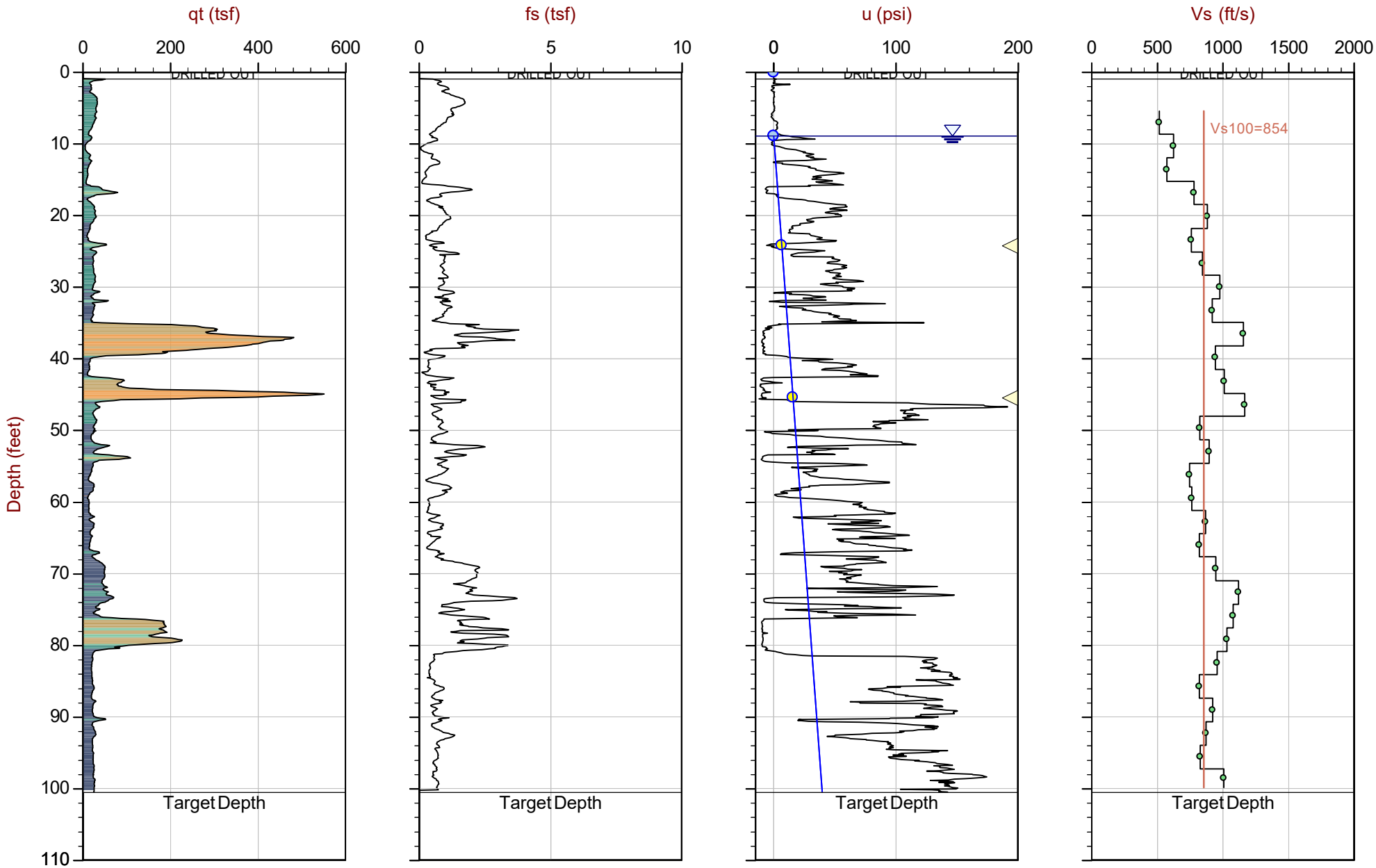
CONETEC

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-07 21:48
Site: Google Joaquin Exploration

Sounding: 1-SCPT-02
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP2.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141669m E: 581498m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

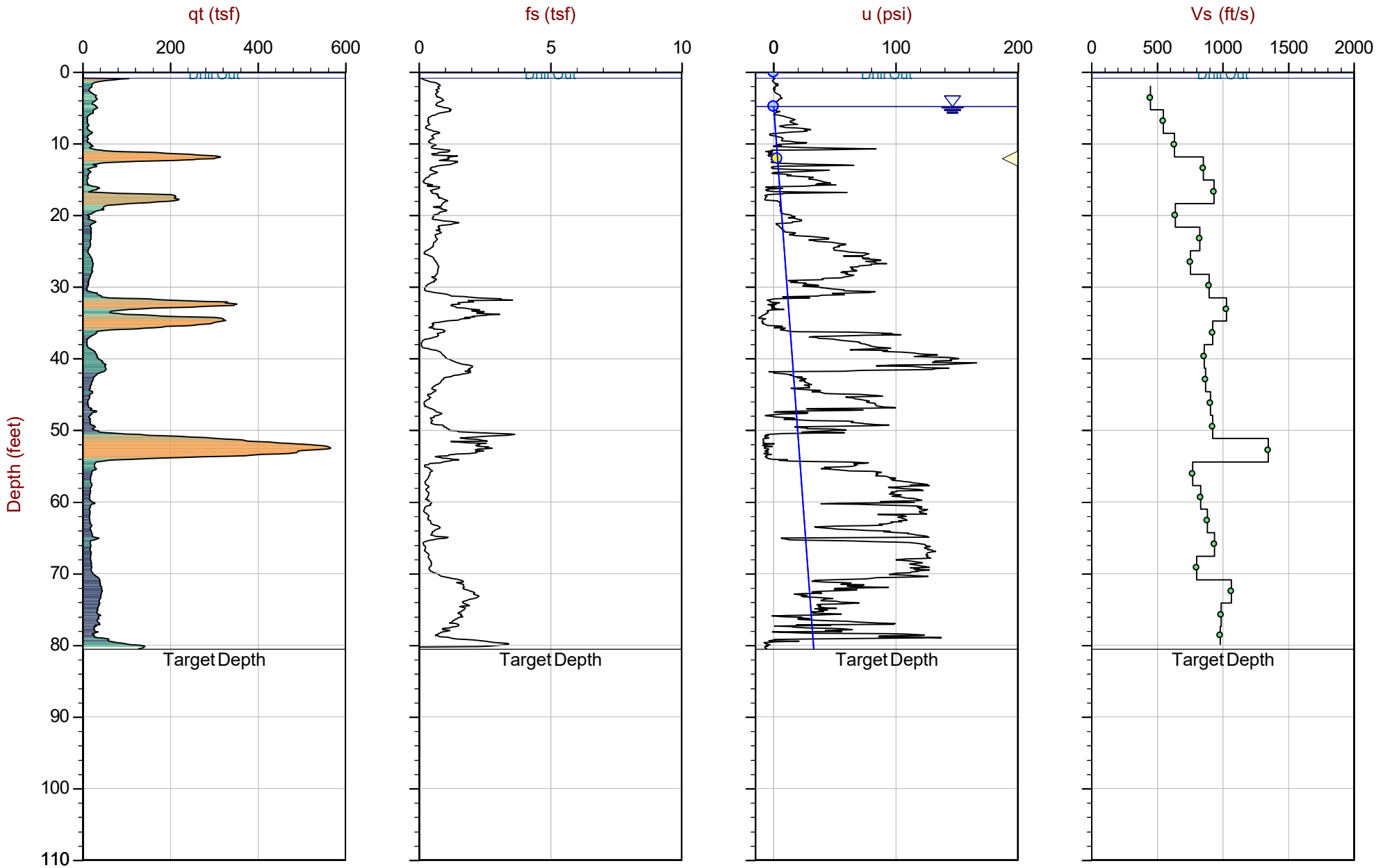
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-13 08:52
Site: Google Plymouth Exploration

Sounding: 1-SCPT-10
Cone: 483:T1500F15U500



Max Depth: 24.550 m / 80.54 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SP10.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141481m E: 581034m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

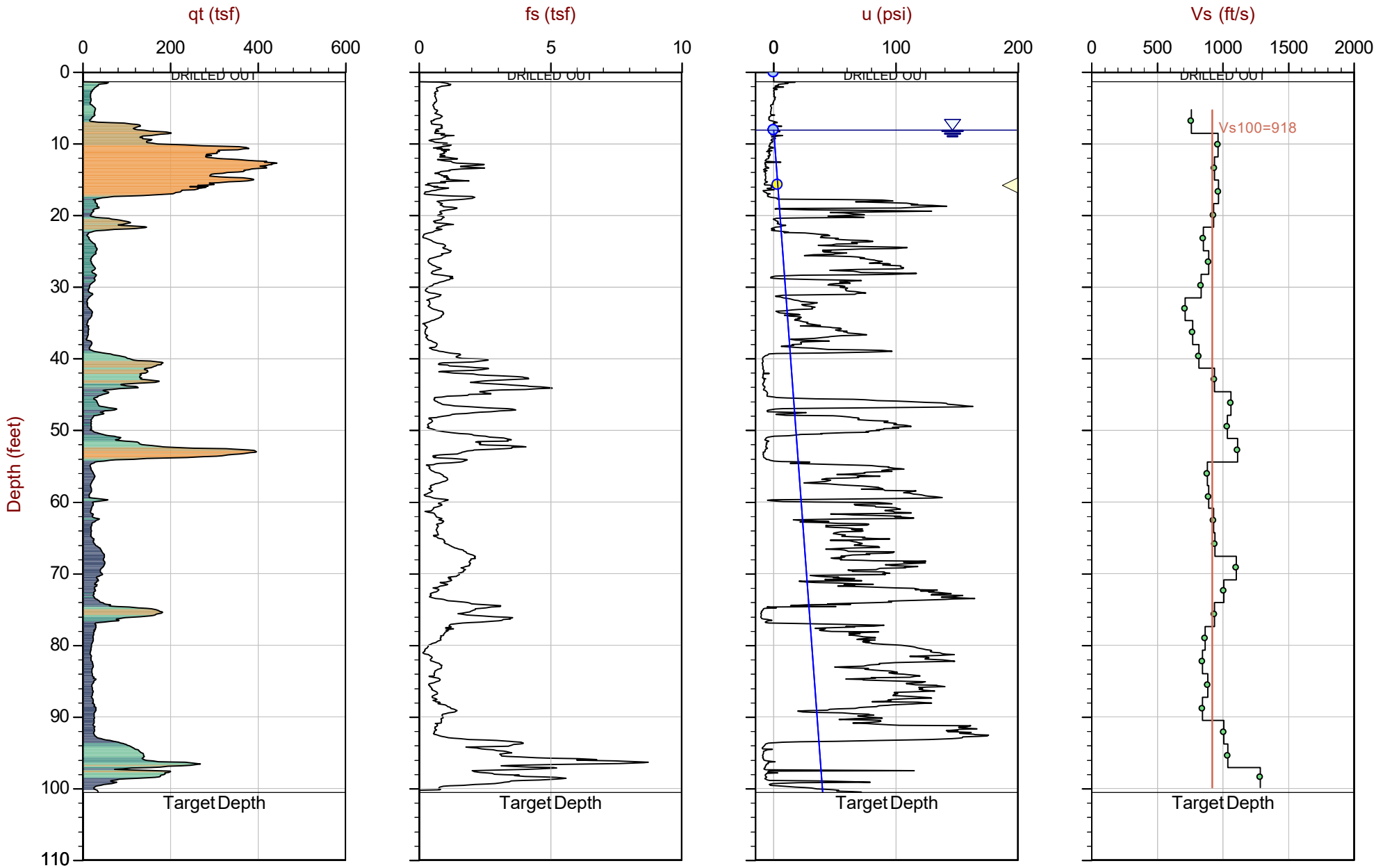
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 19-56067
Date: 2019-05-08 21:45
Site: Google Charleston South Exploration

Sounding: 1-SCPT-04
Cone: 448:T1500F15U500



Max Depth: 30.650 m / 100.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 19-56067_1SCP4.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10N N: 4141829m E: 581289m
Page No: 1 of 1

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Tabular Results

CONETEC

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Joaquin
Sounding ID:	1-SCPT-02
Date:	07-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.13
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
6.07	5.41	5.82			
9.35	8.69	8.95	3.13	6.07	516
12.63	11.97	12.16	3.21	5.13	626
15.91	15.26	15.40	3.24	5.65	573
19.13	18.47	18.59	3.19	4.08	782
22.47	21.82	21.92	3.33	3.77	883
25.75	25.10	25.19	3.27	4.29	762
29.04	28.38	28.46	3.27	3.87	845
32.32	31.66	31.73	3.27	3.35	977
35.60	34.94	35.01	3.27	3.56	920
38.88	38.22	38.28	3.28	2.83	1159
42.16	41.50	41.56	3.28	3.47	945
45.54	44.88	44.93	3.38	3.34	1012
48.72	48.06	48.11	3.18	2.72	1168
52.00	51.35	51.39	3.28	3.98	824
55.28	54.63	54.67	3.28	3.66	895
58.56	57.91	57.95	3.28	4.40	746
61.84	61.19	61.22	3.28	4.29	764
65.12	64.47	64.50	3.28	3.77	870
68.31	67.65	67.68	3.18	3.87	821
71.69	71.03	71.06	3.38	3.56	949
74.97	74.31	74.34	3.28	2.93	1119
78.25	77.59	77.62	3.28	3.03	1081
81.53	80.87	80.90	3.28	3.17	1033
84.81	84.15	84.18	3.28	3.42	959
88.09	87.43	87.46	3.28	3.98	823
91.37	90.72	90.74	3.28	3.55	925
94.65	94.00	94.02	3.28	3.75	874
97.93	97.28	97.30	3.28	3.96	828
100.56	99.90	99.92	2.62	2.61	1007

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Plymouth
Sounding ID:	1-SCPT-10
Date:	13-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.10
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
2.62	1.97	2.07			
5.91	5.25	5.29	3.22	7.18	448
9.19	8.53	8.55	3.27	5.95	549
12.47	11.81	11.83	3.27	5.18	633
15.75	15.09	15.11	3.28	3.84	854
19.03	18.37	18.38	3.28	3.51	934
22.31	21.65	21.66	3.28	5.14	638
25.59	24.93	24.94	3.28	3.98	824
28.87	28.22	28.22	3.28	4.34	755
32.15	31.50	31.50	3.28	3.65	898
35.43	34.78	34.78	3.28	3.18	1030
38.71	38.06	38.06	3.28	3.55	925
41.99	41.34	41.34	3.28	3.81	861
45.28	44.62	44.62	3.28	3.77	871
48.56	47.90	47.90	3.28	3.62	907
51.84	51.18	51.19	3.28	3.55	923
55.12	54.46	54.47	3.28	2.43	1347
58.40	57.74	57.75	3.28	4.26	770
61.68	61.02	61.03	3.28	3.94	833
64.96	64.30	64.31	3.28	3.72	882
68.24	67.58	67.59	3.28	3.50	938
71.52	70.87	70.87	3.28	4.09	802
74.80	74.15	74.15	3.28	3.08	1065
78.08	77.43	77.43	3.28	3.32	987
80.54	79.89	79.89	2.46	2.50	983

Job No:	19-56067
Client:	ENGEO Inc.
Project:	Google Charleston South
Sounding ID:	1-SCPT-04
Date:	08-May-2019
Seismic Source:	Beam
Source Offset (ft):	2.10
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

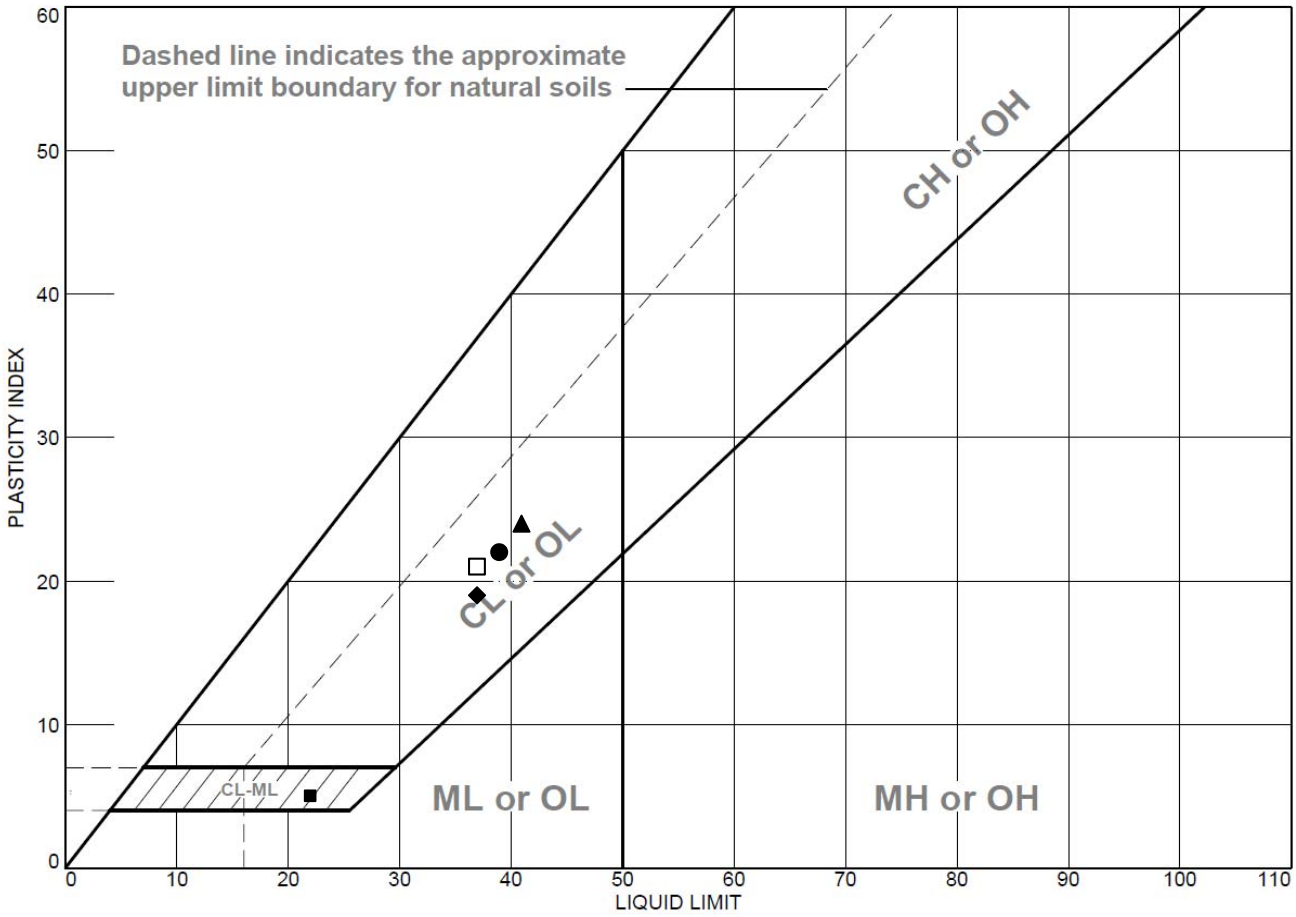
Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.91	5.25	5.65			
9.19	8.53	8.78	3.13	4.12	761
12.47	11.81	12.00	3.21	3.33	964
15.75	15.09	15.24	3.24	3.46	937
19.03	18.37	18.49	3.26	3.37	967
22.31	21.65	21.76	3.26	3.50	932
25.59	24.93	25.02	3.27	3.83	852
28.87	28.22	28.29	3.27	3.67	892
32.15	31.50	31.57	3.27	3.92	836
35.37	34.71	34.77	3.21	4.50	713
38.71	38.06	38.12	3.34	4.33	771
41.99	41.34	41.39	3.28	4.00	819
45.28	44.62	44.67	3.28	3.50	937
48.56	47.90	47.95	3.28	3.08	1063
51.84	51.18	51.22	3.28	3.17	1035
55.12	54.46	54.50	3.28	2.94	1115
58.40	57.74	57.78	3.28	3.71	884
61.58	60.93	60.96	3.18	3.56	894
64.96	64.30	64.34	3.38	3.63	932
68.24	67.58	67.62	3.28	3.49	940
71.52	70.87	70.90	3.28	2.97	1103
74.70	74.05	74.08	3.18	3.16	1007
78.08	77.43	77.46	3.38	3.61	936
81.36	80.71	80.74	3.28	3.79	865
84.65	83.99	84.02	3.28	3.88	845
87.93	87.27	87.30	3.28	3.70	886
91.21	90.55	90.58	3.28	3.88	845
94.49	93.83	93.86	3.28	3.25	1010
97.77	97.11	97.14	3.28	3.16	1039
100.56	99.90	99.92	2.79	2.17	1287



APPENDIX C

LABORATORY TEST DATA

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	41	17	24		61.4	CL
◆	See exploration logs	37	18	19		74	CL
□	See exploration logs	37	16	21		51.9	CL
●	See exploration logs	39	17	22		88.3	CL
■	See exploration logs	22	17	5		44.6	SC-SM

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B8 **Depth:** 5.5-6.5
◆ **Sample Number:** 1-B8 **Depth:** 22-23.5
□ **Sample Number:** 1-B8 **Depth:** 30.5-31.5
● **Sample Number:** 1-B8 **Depth:** 54-55.5
■ **Sample Number:** 1-B8 **Depth:** 95-96.5

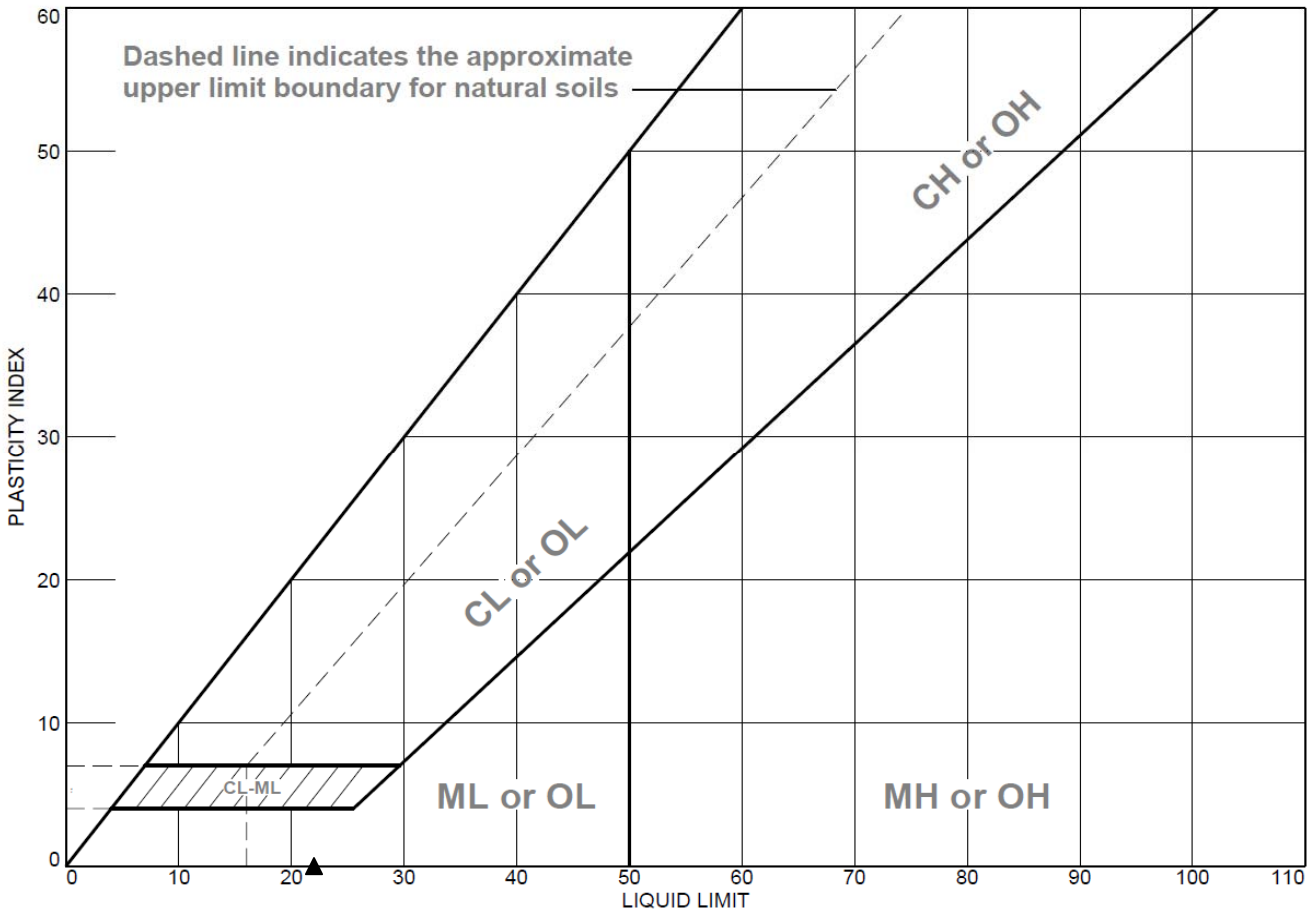
ENGEO Expect Excellence

Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
■ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	22	22	0		51.8	ML

Project No.: 15949.000.000 **Date:** 6/14/2019

Project Name: GEX for Multiple Parcels

Project location: Sunnyvale, California

Client: Google, LLC

▲ **Sample Number:** 1-B9 **Depth:** 15-18 ft

Remarks:

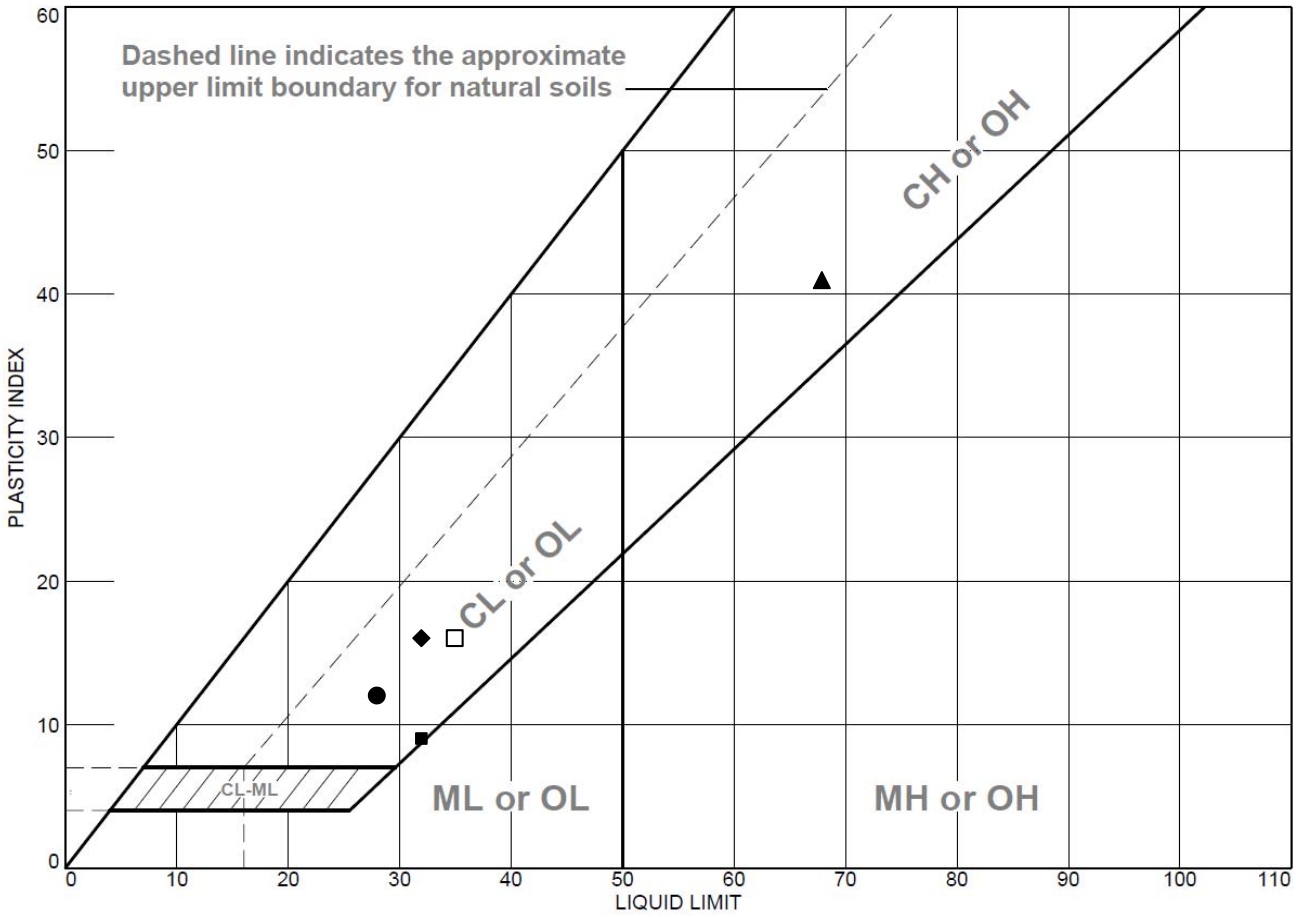
PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method A, USCS: ASTM D2487

ENGEO
Expect Excellence

Tested By: M. Quasem Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	68	27	41		80.2	CH
◆	See exploration logs	32	16	16		30	SC
□	See exploration logs	35	19	16		56.5	CL
●	See exploration logs	28	16	12		34	SC
■	See exploration logs	32	23	9			

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B9 **Depth:** 5.5-6.5
◆ **Sample Number:** 1-B9 **Depth:** 10.5-11.5
□ **Sample Number:** 1-B9 **Depth:** 35-36.5
● **Sample Number:** 1-B9 **Depth:** 55-56.5
■ **Sample Number:** 1-B10 **Depth:** 5-6.5

Remarks:

▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

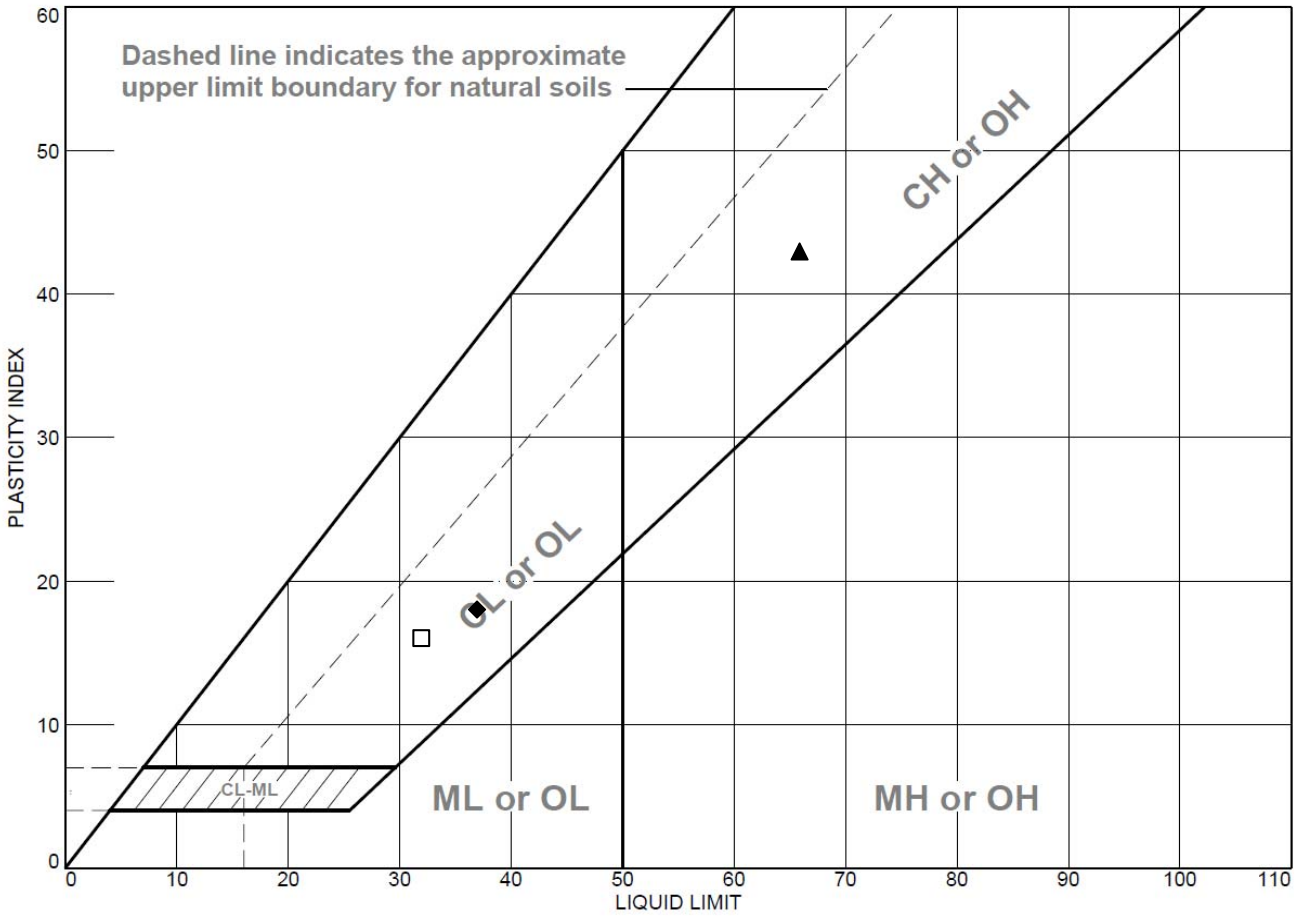
■ PI: ASTM D4318, Wet Method

ENGEO
Expect Excellence

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	66	23	43		79.2	CH
◆	See exploration logs	37	19	18		63	CL
□	See exploration logs	32	16	16		34.1	SC

Project No.: 15949.000.000 PHLAB **Date:** 6/12/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC
▲ **Sample Number:** 1-B10 **Depth:** 15-16.5
◆ **Sample Number:** 1-B10 **Depth:** 25-26.5
□ **Sample Number:** 1-B10 **Depth:** 40-41.5

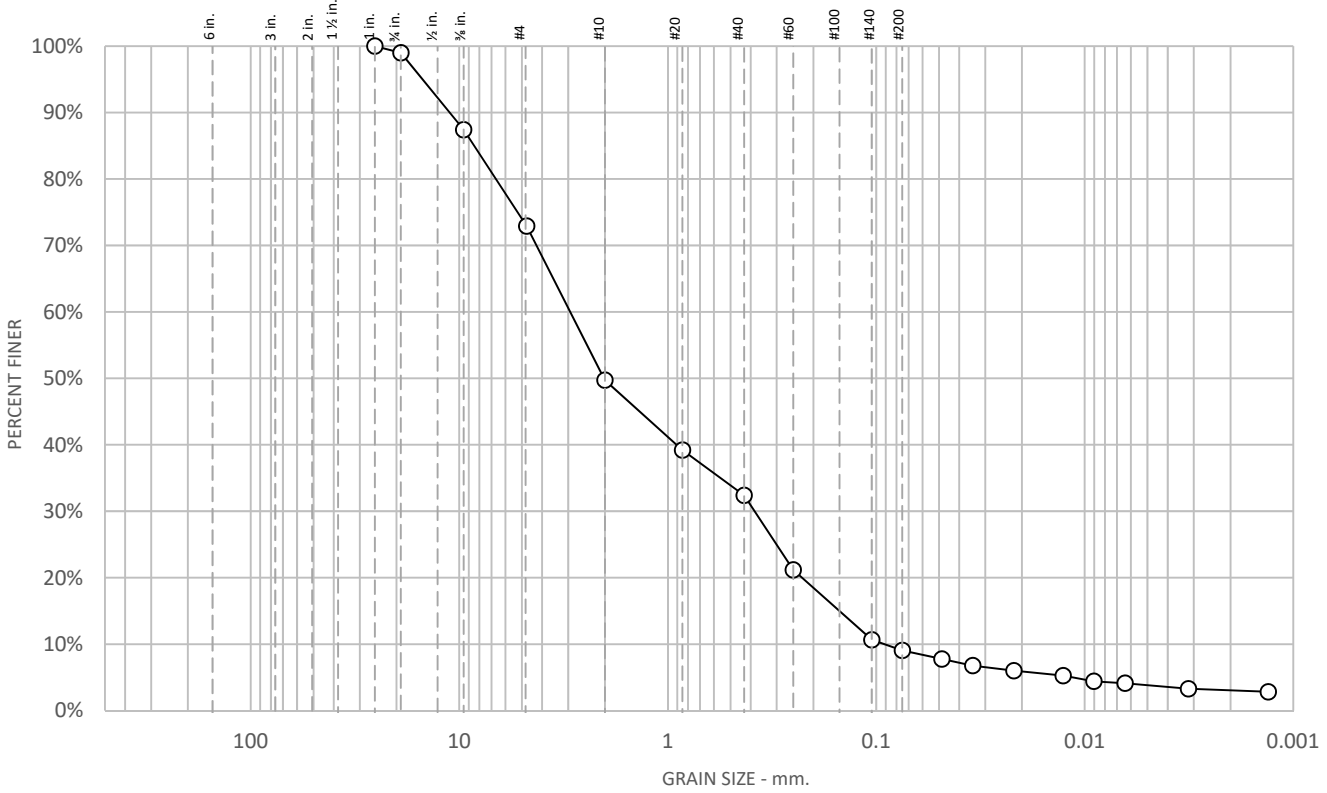
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

ENGEO Expect Excellence

Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	1.0	26.0	23.2	17.3	23.3	6.0	3.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	99.0		
⅜ in.	87.4		
#4	72.9		
#10	49.7		
#20	39.2		
#40	32.4		
#60	21.2		
#140	10.7		
#200	9.1		
0.0485 mm.	7.8		
0.0345 mm.	6.8		
0.0219 mm.	6.0		
0.0127 mm.	5.3		
0.0090 mm.	4.4		
0.0064 mm.	4.1		
0.0032 mm.	3.3		
0.0013 mm.	2.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 11.1207 mm D_{85} = 8.4848 mm D_{60} = 2.9346 mm
D_{50} = 2.0208 mm D_{30} = 0.3830 mm D_{15} = 0.1502 mm
D_{10} = 0.0915 mm C_u = 32.09 C_c = 0.55

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B8 @ 10-11.5

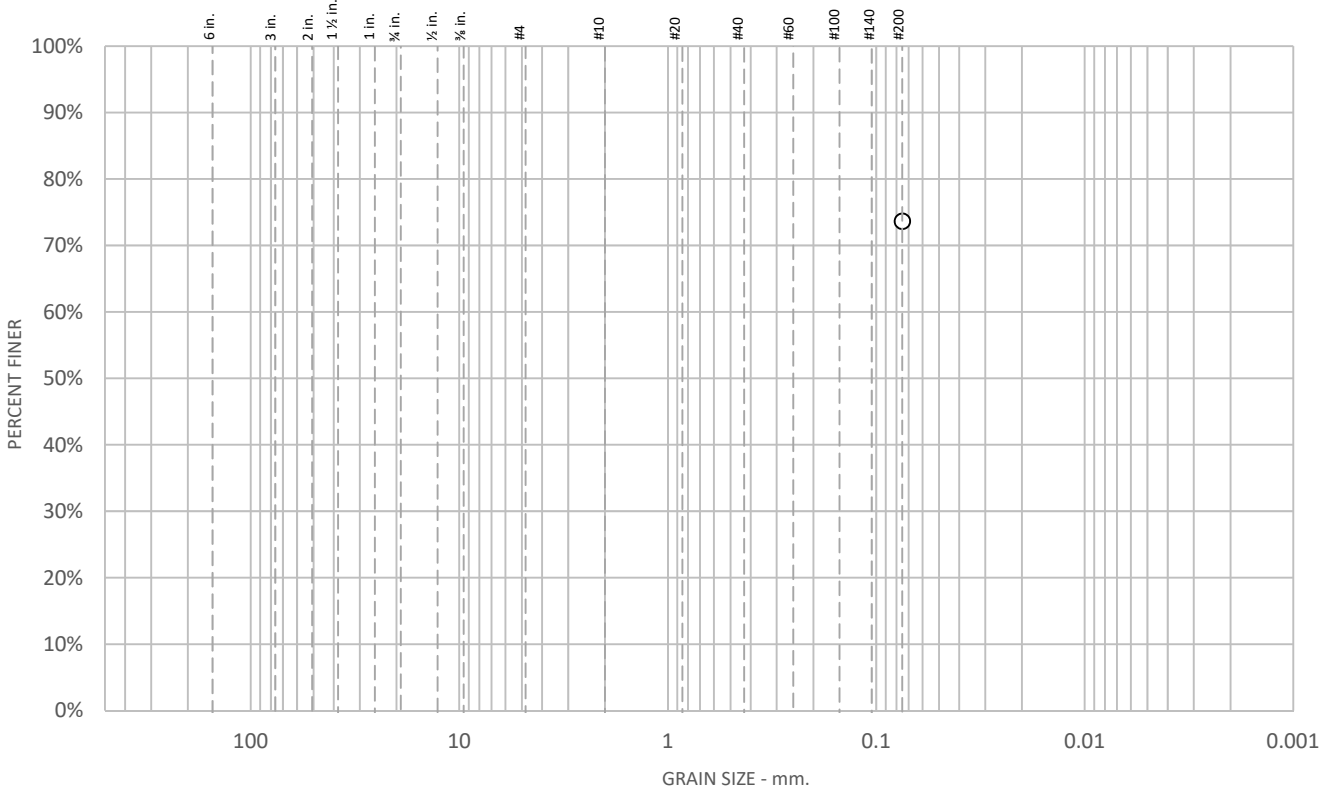
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	74		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 37 PI = 19

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 182.8 g

Sample Number: 1-B8 @ 22-23.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

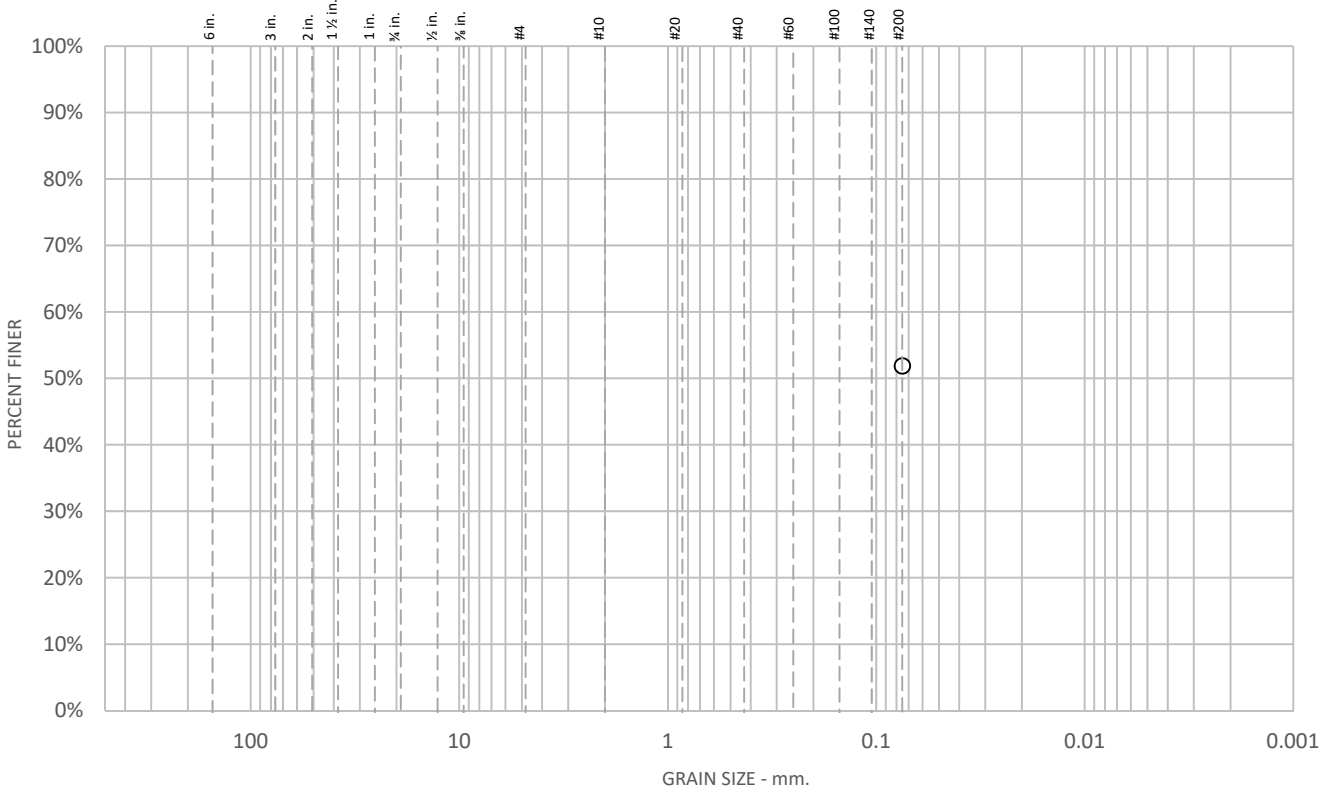
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	51.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 37 PI = 21

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 198.4 g

Sample Number: 1-B8 @ 30.5-31.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

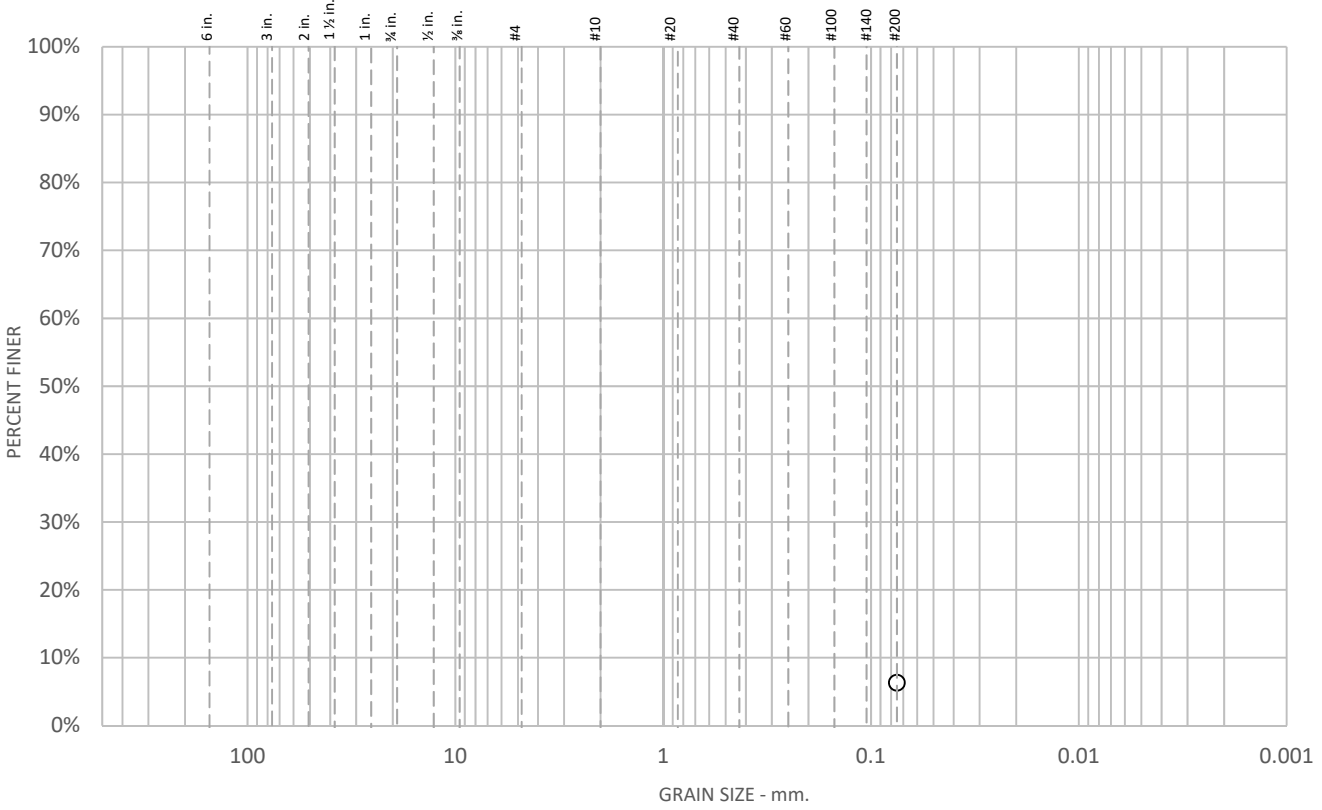
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	6		

* (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 =

Remarks

ASTM D1140, Method A
Soak time = 60 min
Dry sample weight = 629.9 g

Sample Number: 1-B8 @ 41-41.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

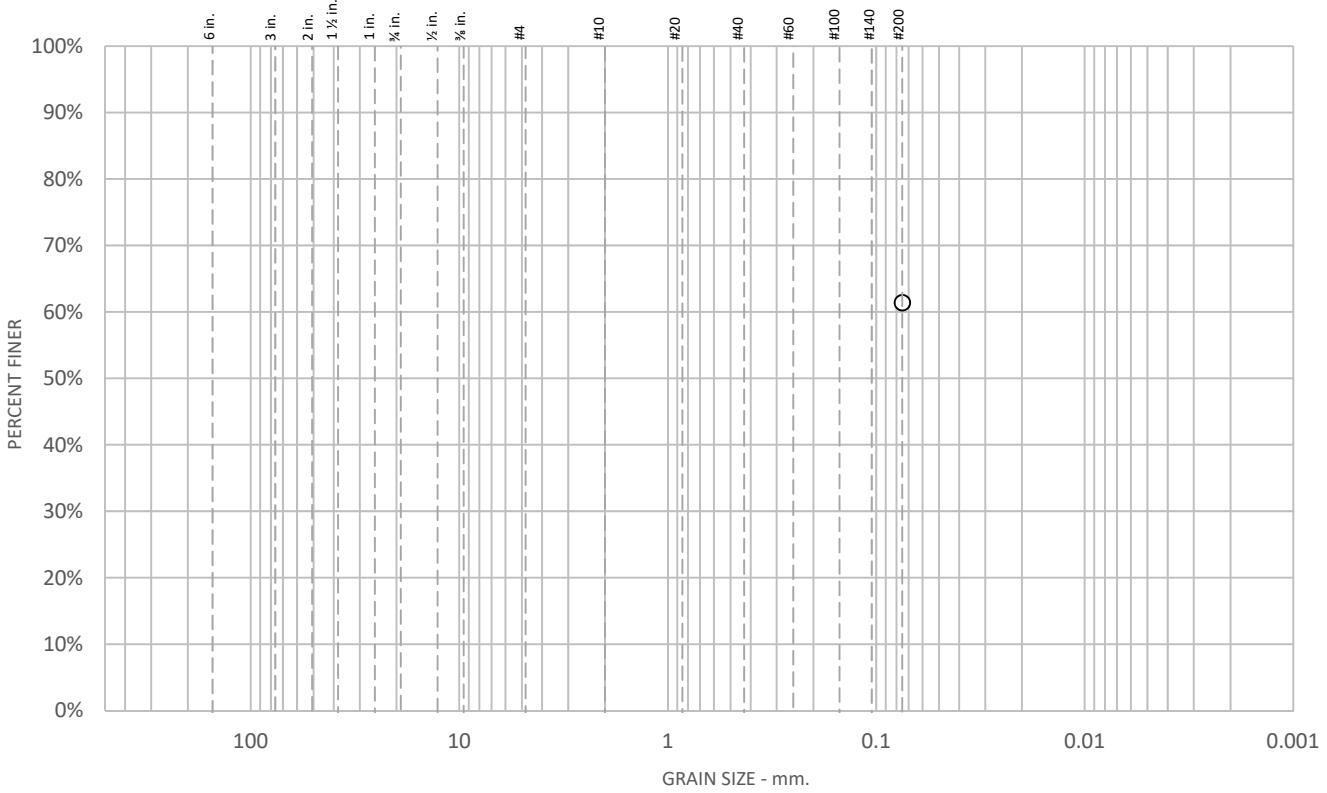
Project Number: 15949.000.000
Date: 6/13/2019

ENGEO Expect Excellence

Tested By: M. Quasem
Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	61.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 41 PI = 24

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 129.7 g

Sample Number: 1-B8 @ 5.5-6.5

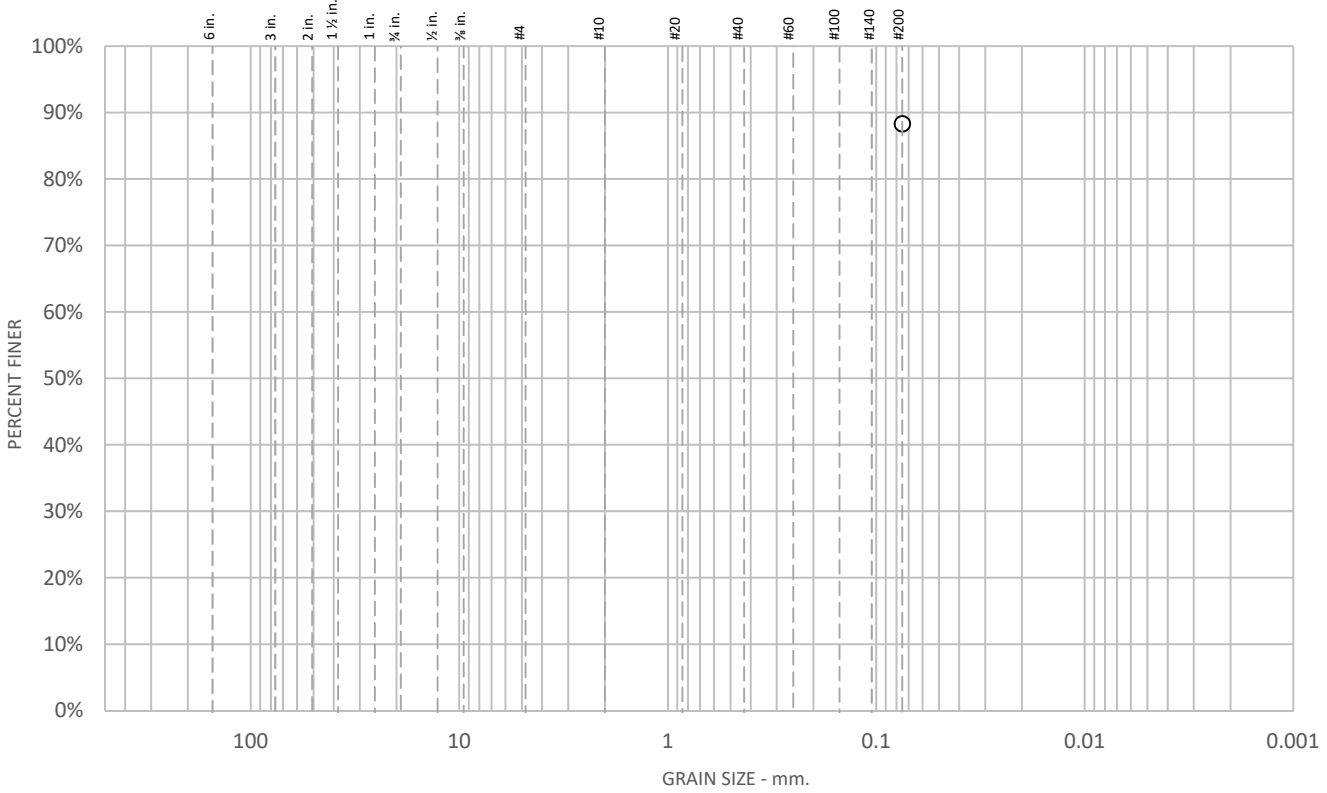
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/23/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						88.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	88.3		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 39 PI = 22

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 212.7 g

Sample Number: 1-B8 @ 54-55.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

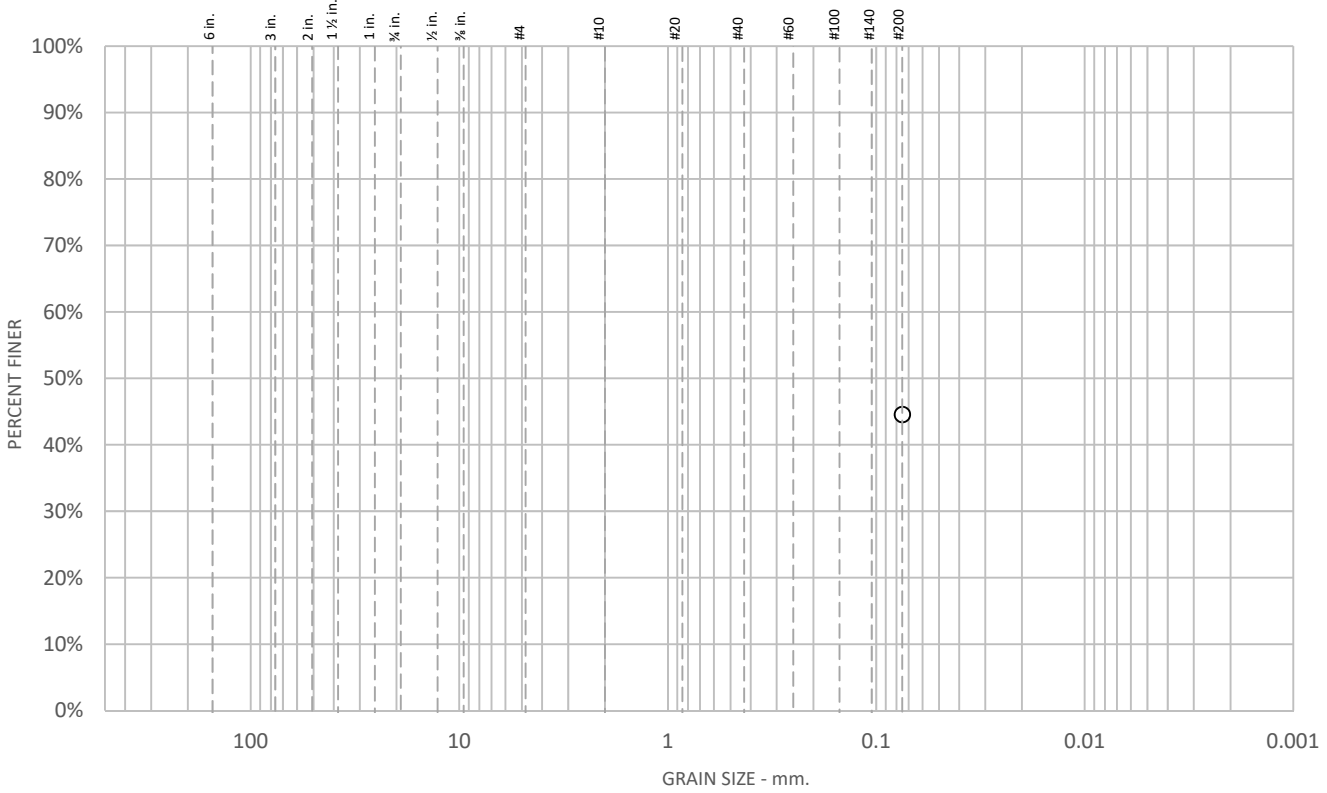
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	44.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 22 PI = 5

Coefficients

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

Classification

USCS = SC-SM

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 196.8 g

Sample Number: 1-B8 @ 95-96.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

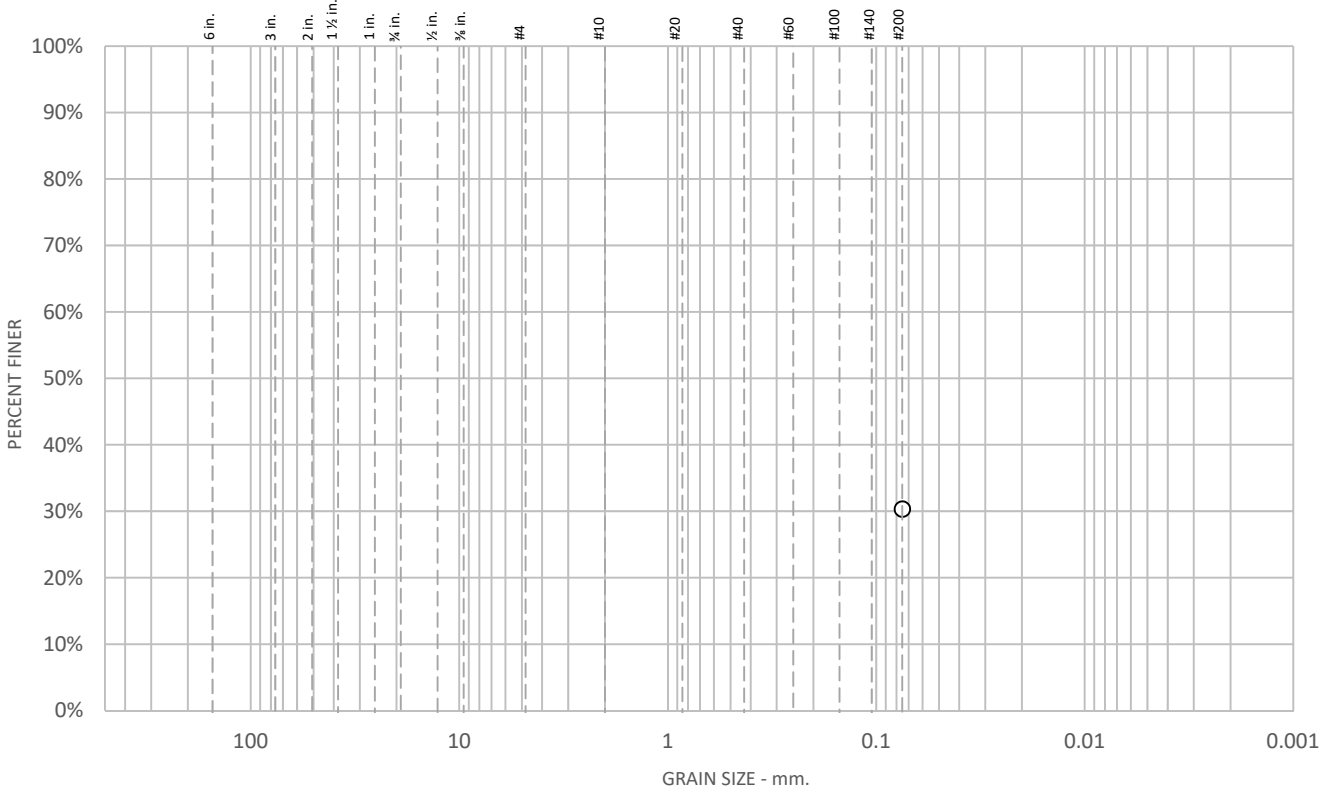
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	30		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 32 PI = 16

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 194.6 g

Sample Number: 1-B9 @ 10.5-11.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

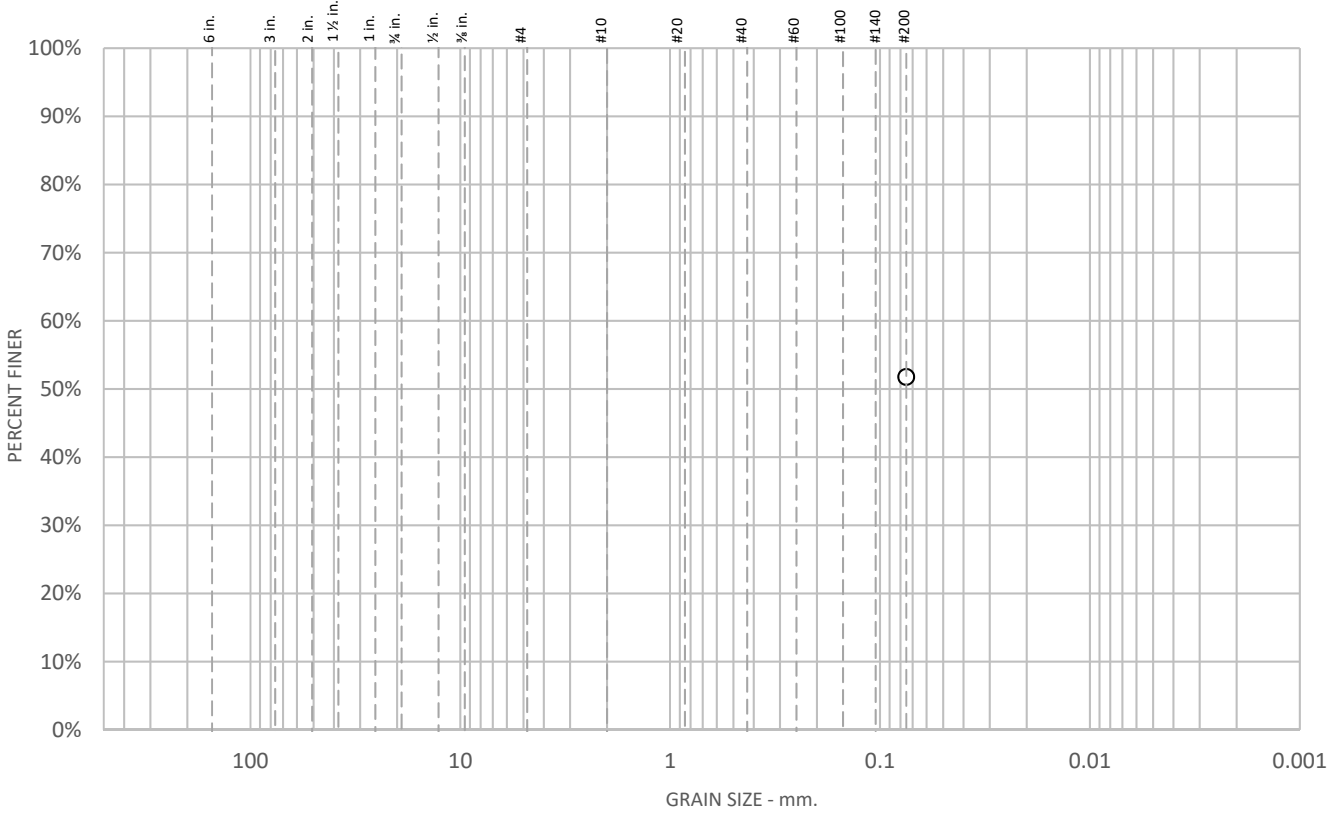
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	51.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 22 LL = 22 PI = 0

Coefficients

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

Classification

USCS = ML

Remarks

PI: ASTM D4318, Wet Method
ASTM D1140, Method A
Soak time = 12 min
Dry sample weight = 126.76 g

Sample Number: 1-B9 @ 15-18

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

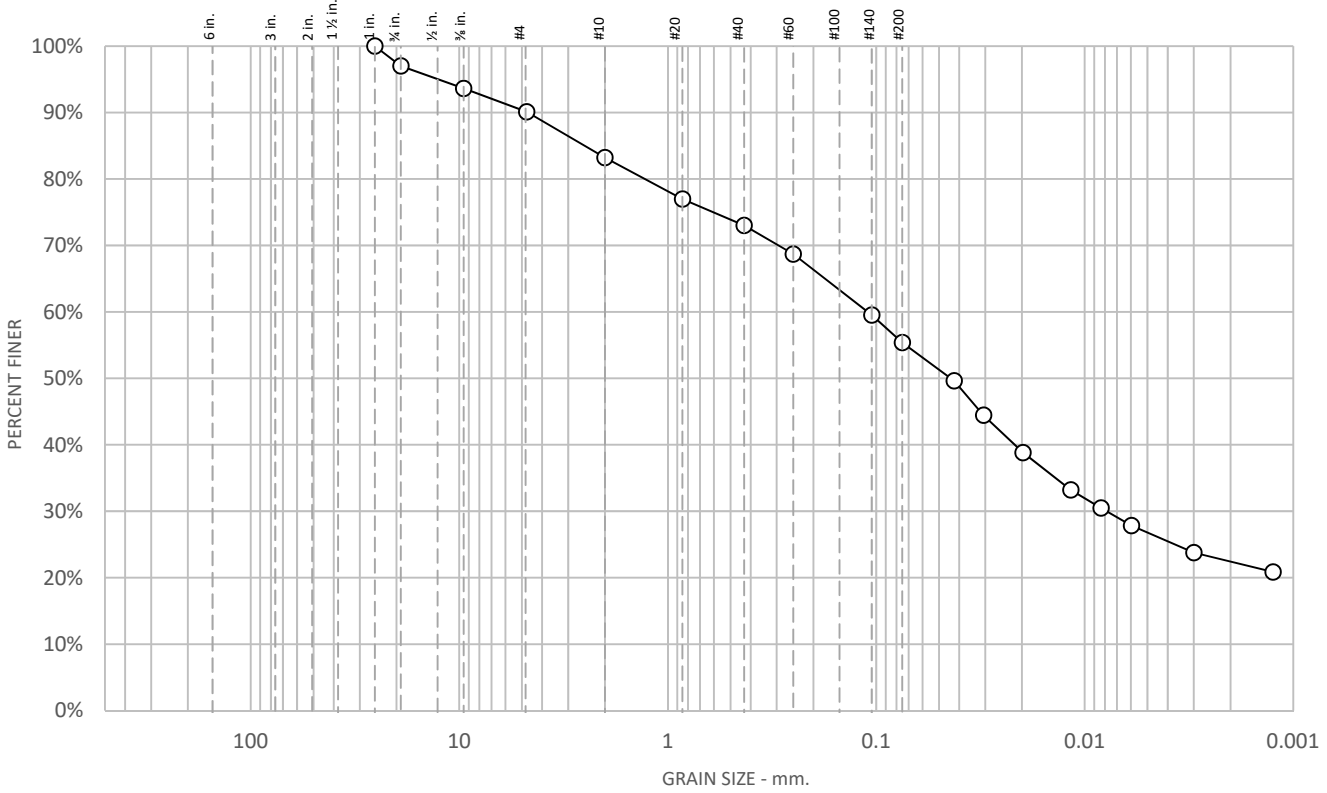
Project Number: 15949.000.000
Date: 6/14/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	3.0	6.9	6.9	10.2	17.6	33.0	22.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	97.0		
⅜ in.	93.6		
#4	90.1		
#10	83.2		
#20	77.0		
#40	73.0		
#60	68.7		
#140	59.5		
#200	55.4		
0.0423 mm.	49.6		
0.0306 mm.	44.4		
0.0198 mm.	38.8		
0.0117 mm.	33.2		
0.0084 mm.	30.5		
0.0060 mm.	27.8		
0.0030 mm.	23.8		
0.0013 mm.	20.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 4.6817 mm D_{85} = 2.5007 mm D_{60} = 0.1098 mm
D_{50} = 0.0439 mm D_{30} = 0.0078 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B9 @ 20-21.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

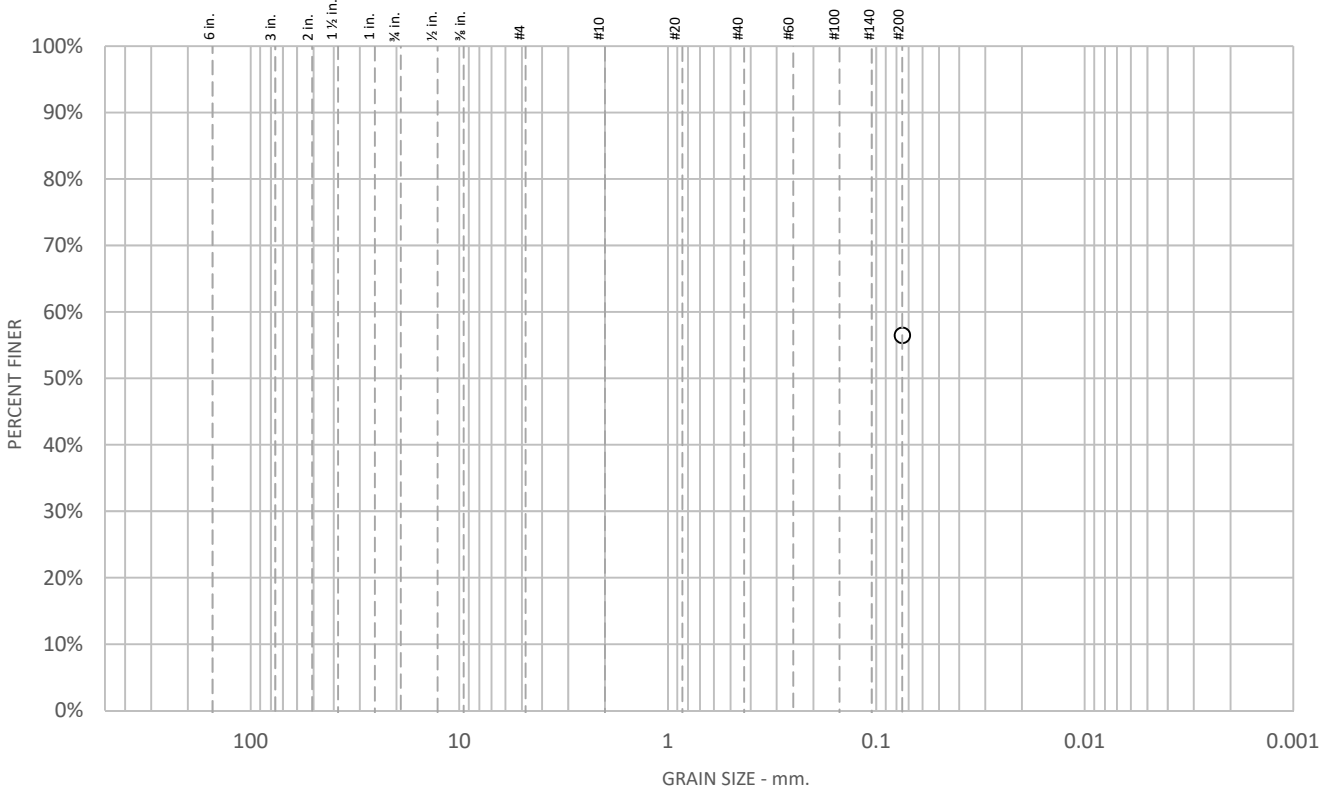
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	56.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 35 PI = 16

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 169.5 g

Sample Number: 1-B9 @ 35-36.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

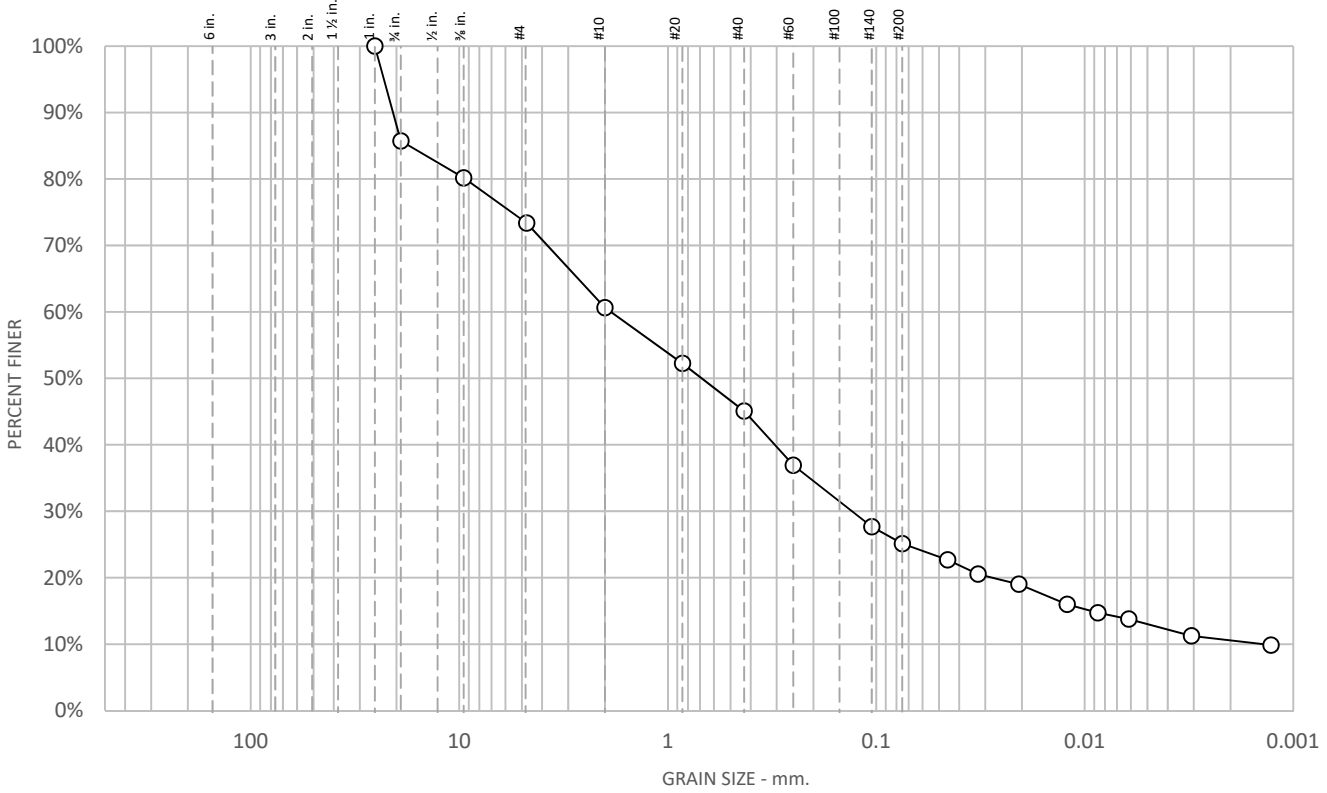
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	14.3	12.3	12.7	15.6	20.0	14.6	10.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	85.7		
⅜ in.	80.2		
#4	73.4		
#10	60.6		
#20	52.2		
#40	45.1		
#60	36.9		
#140	27.7		
#200	25.1		
0.0455 mm.	22.7		
0.0325 mm.	20.5		
0.0207 mm.	19.0		
0.0122 mm.	16.0		
0.0087 mm.	14.7		
0.0062 mm.	13.8		
0.0031 mm.	11.3		
0.0013 mm.	9.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 20.7605 mm D_{85} = 17.3783 mm D_{60} = 1.8730 mm
D_{50} = 0.6865 mm D_{30} = 0.1306 mm D_{15} = 0.0093 mm
D_{10} = 0.0014 mm C_u = 1342.09 C_c = 6.52

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B9 @ 45.46.5

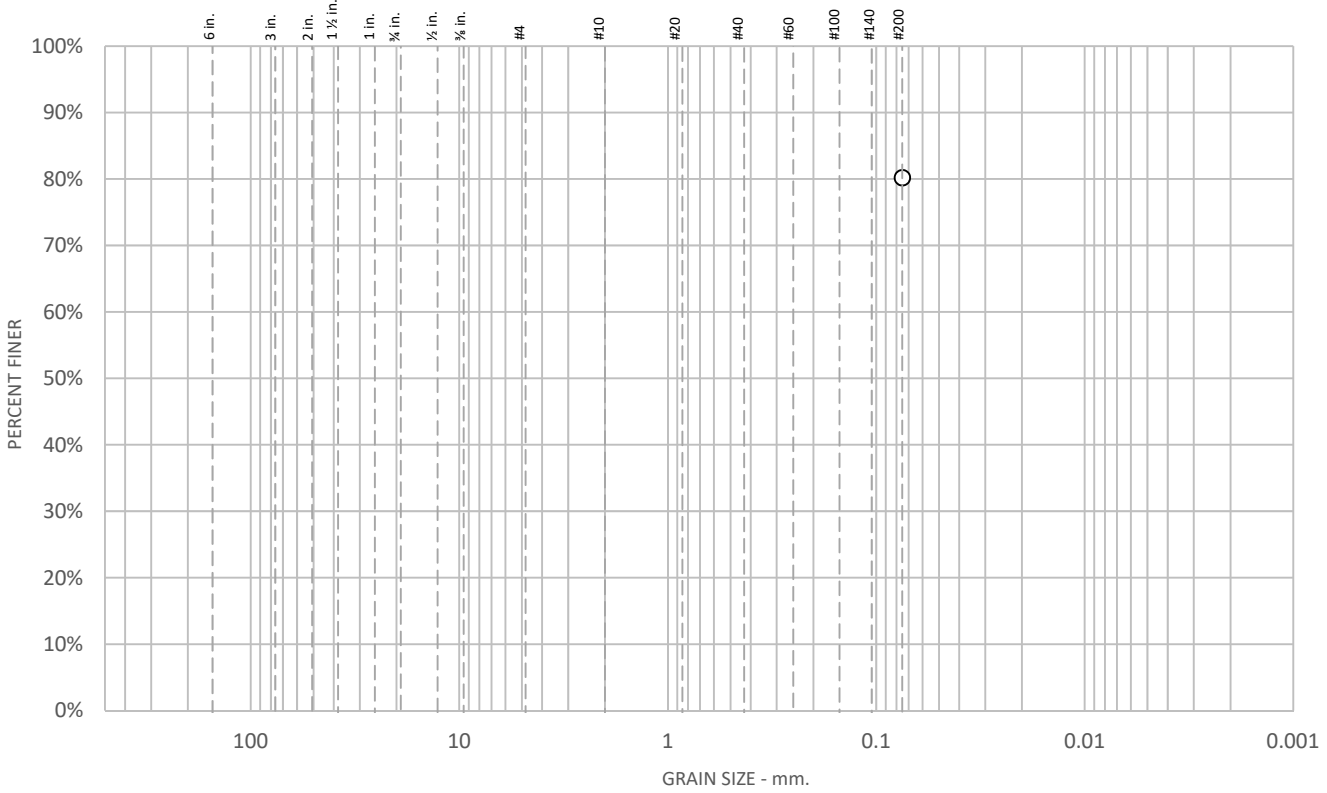
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						80.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	80.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 27 LL = 68 PI = 41

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 158.9 g

Sample Number: 1-B9 @ 5.5-6.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

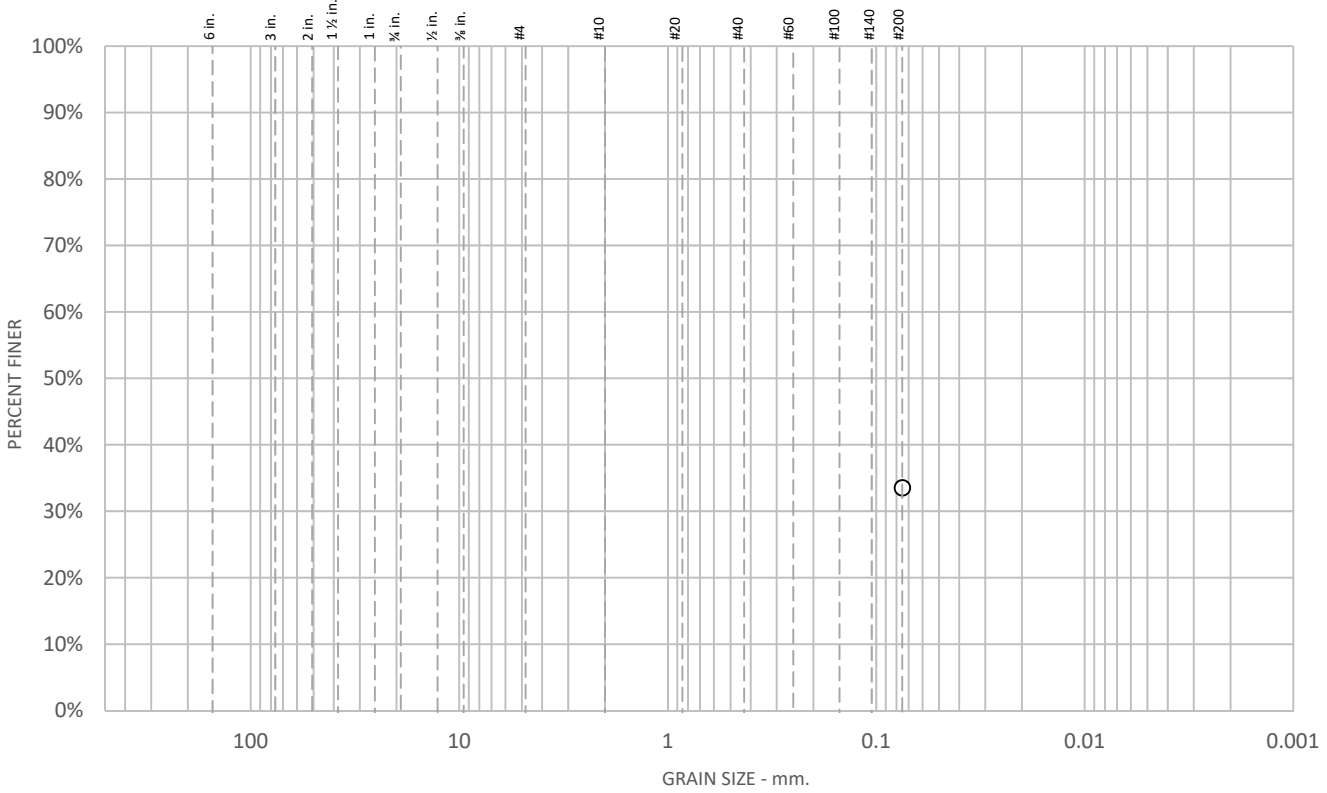
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 28 PI = 12

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 209.7 g

Sample Number: 1-B9 @ 55-56.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

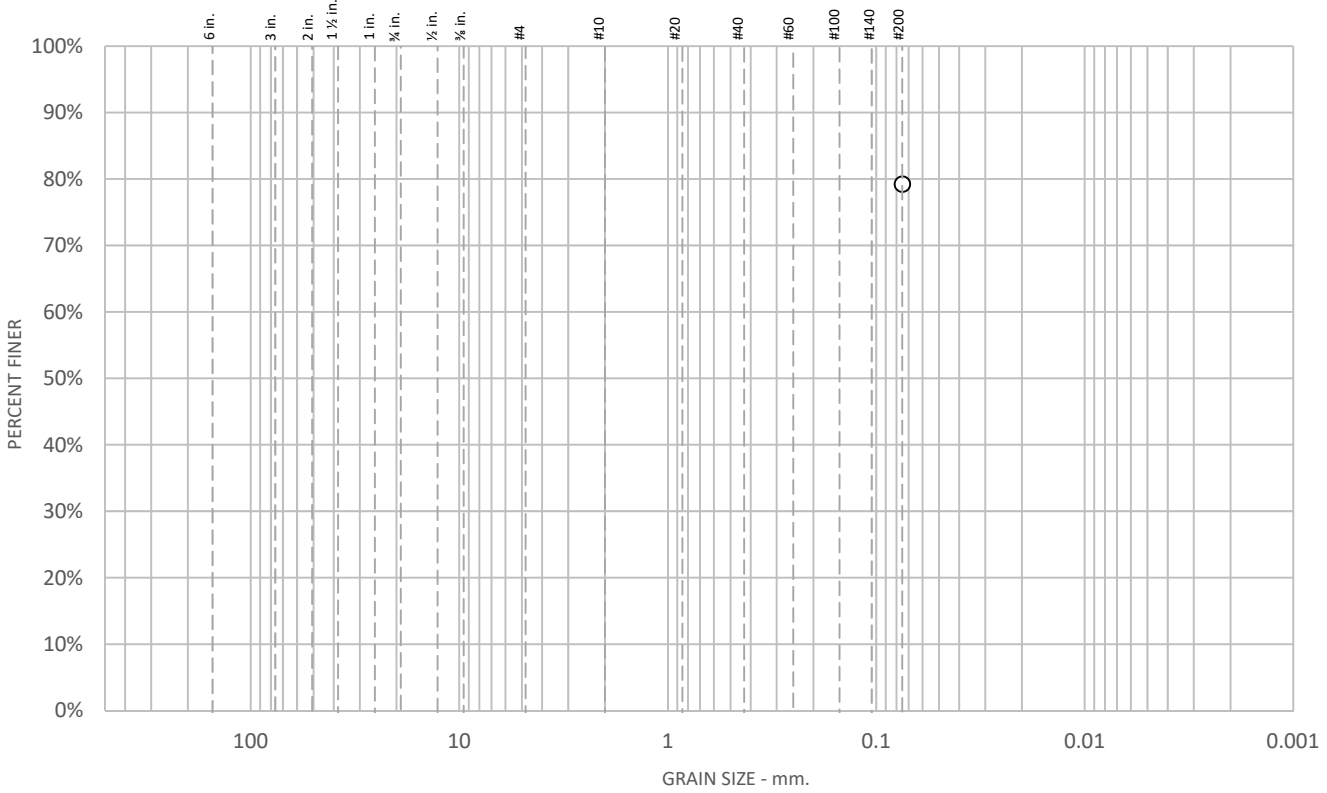
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						79.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	79.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 23 LL = 66 PI = 43

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 188.2 g

Sample Number: 1-B10 @ 15-16.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

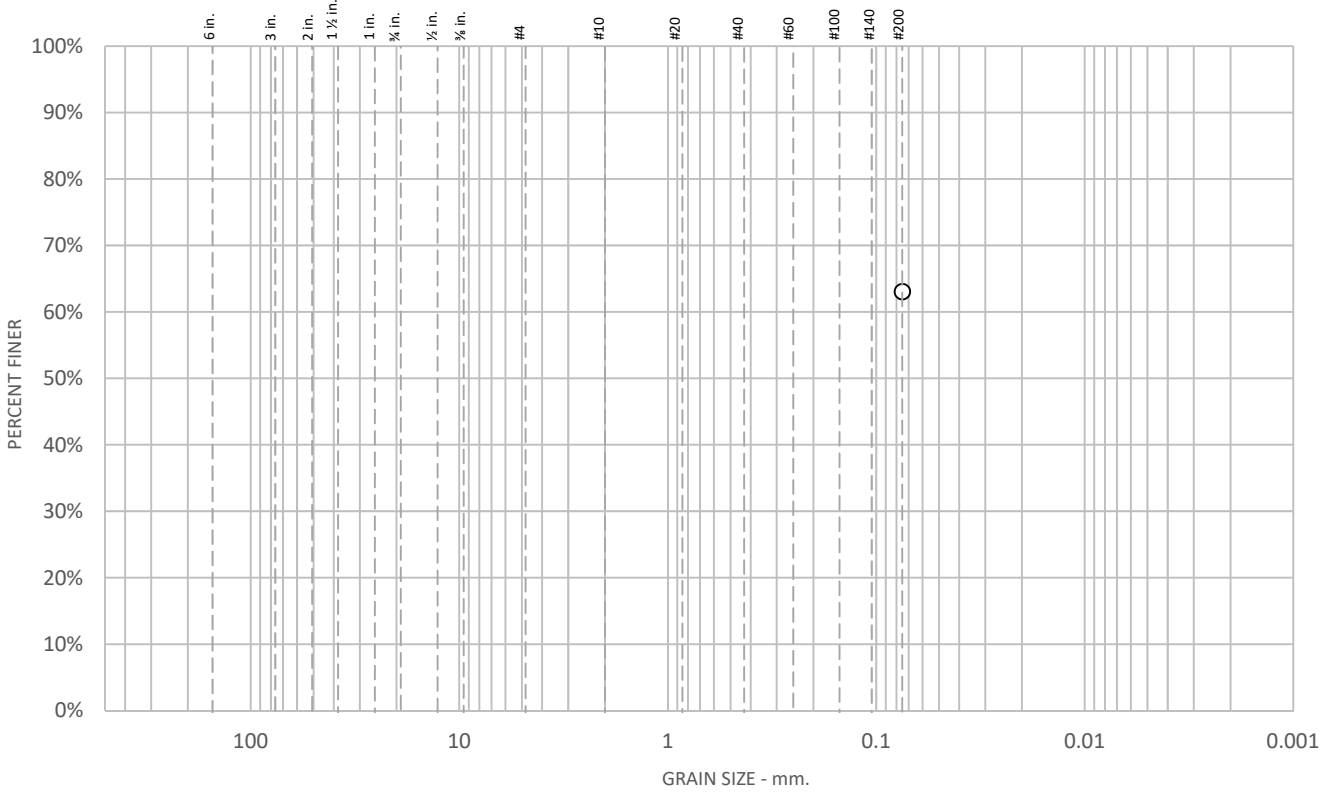
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						63.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	63.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 37 PI = 18

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 205.9 g

Sample Number: 1-B10 @ 25-26.5

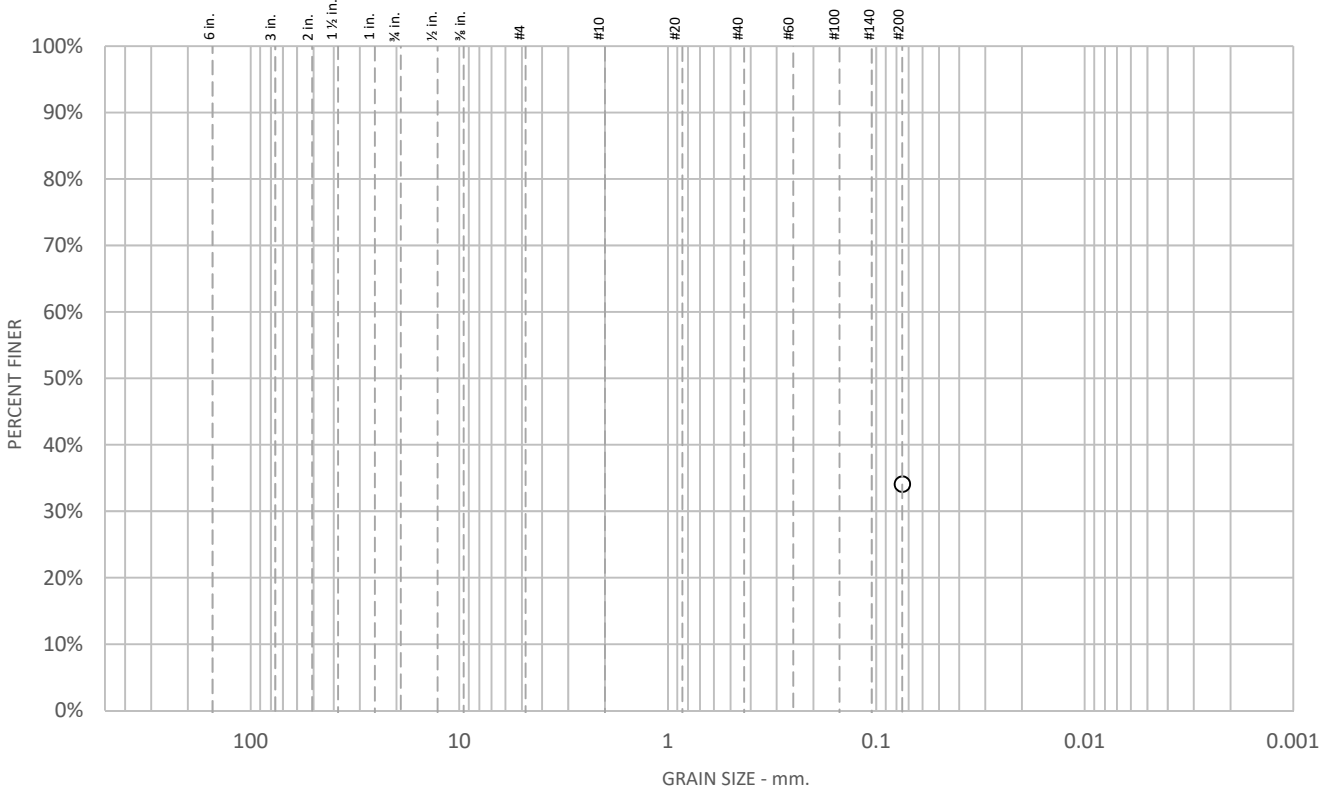
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 32 PI = 16

Coefficients

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

Classification

USCS = SC

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 189.9 g

Sample Number: 1-B10 @ 40-41.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountian View, CA

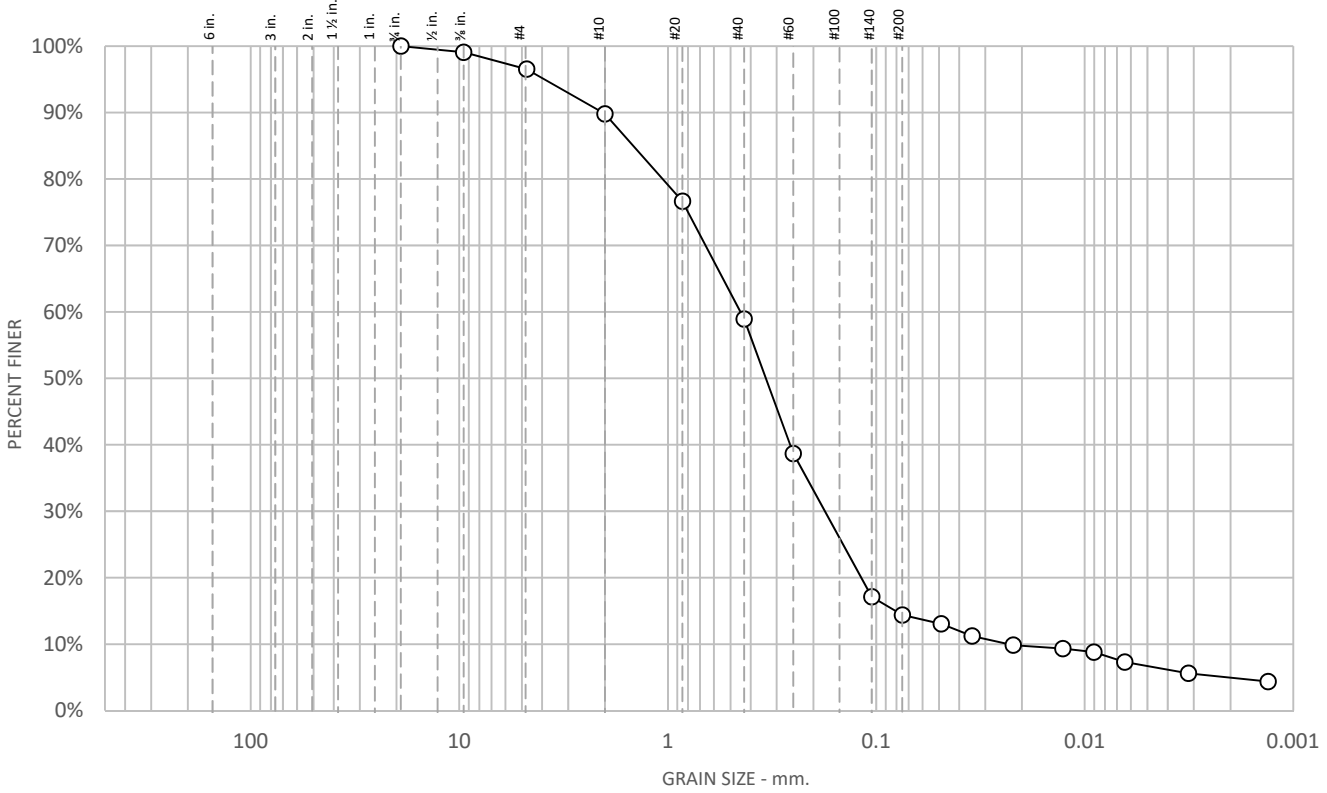
Project Number: 15949.000.000 PHLAB
Date: 6/12/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	3.5	6.7	30.9	44.5	9.4	5.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.1		
#4	96.5		
#10	89.8		
#20	76.6		
#40	58.9		
#60	38.7		
#140	17.1		
#200	14.4		
0.0488 mm.	13.0		
0.0347 mm.	11.2		
0.0220 mm.	9.9		
0.0127 mm.	9.3		
0.0090 mm.	8.8		
0.0064 mm.	7.3		
0.0032 mm.	5.6		
0.0013 mm.	4.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 2.0536 mm D_{85} = 1.4639 mm D_{60} = 0.4479 mm
D_{50} = 0.3385 mm D_{30} = 0.1763 mm D_{15} = 0.0809 mm
D_{10} = 0.0231 mm C_u = 19.35 C_c = 3.00

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B10 @ 50-51.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/12/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Isotropic Consolidated Undrained Triaxial Test

ASTM D4767

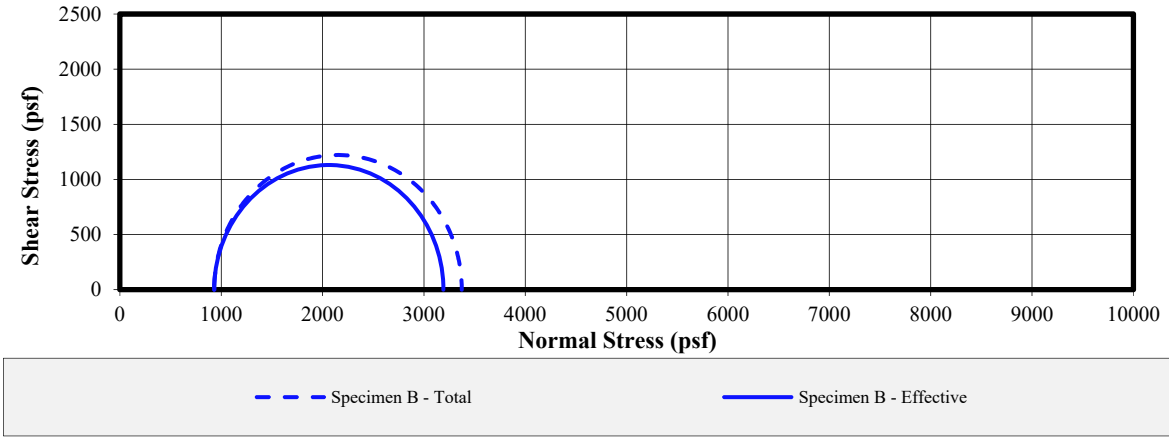
Date: 6/19/19

Checked By: D. Seibold

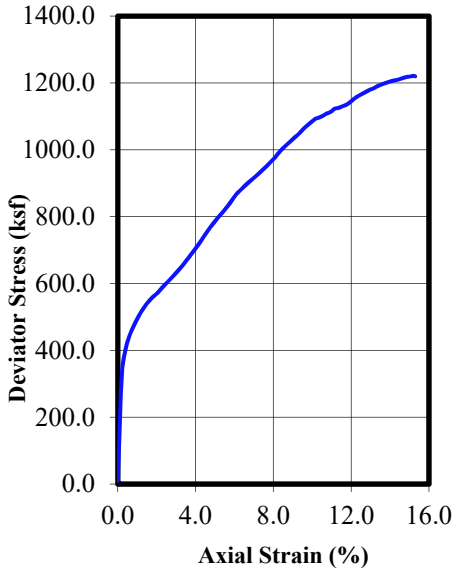
Date: 6/19/19

Tested By: G. Criste

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial		1-B9@30.5		
Height-to-Diameter Ratio		2.080		
Water Content (%)		26.4		
Dry Density (pcf)		99.9		
Saturation (%)		99.66		
Void Ratio		0.736		
Diameter (in)		2.392		
Height (in)		4.976		
ASTM D854 - Measured				
Specific Gravity		2.779		
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
After Consolidation		**1-B9@30.5**		
Void Ratio		0.737		
Water Content (%)		25.81		
Dry Density (pcf)		99.90		
Eff. Consol. Press. (psf)		7.1		
Back Pressure (psf)		43.0		
Saturation (%)		100.0		
B-Value		0.96		
Strain Rate (in./min.)		0.02411		
Height-to-Diameter Ratio		2.063		
After Shear		**1-B9@30.5**		
σ'1 at Failure (psf)		3187.4		
σ'3 at Failure (psf)		744.7		
t_{50} (min)		0.820		
t_{90} (min)		1.476		
Corrected Peak Deviator Stress (psf):		2442.7		

Maximium Deviator Stress Criterion	
C (psf)	
C' (psf)	
Ø (deg)	
Ø' (deg)	

Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B9
Sample Number:	1
Depth:	30.5-31.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type	Consolidated Undrained
Remarks	

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Isotropic Consolidated Undrained Triaxial Test

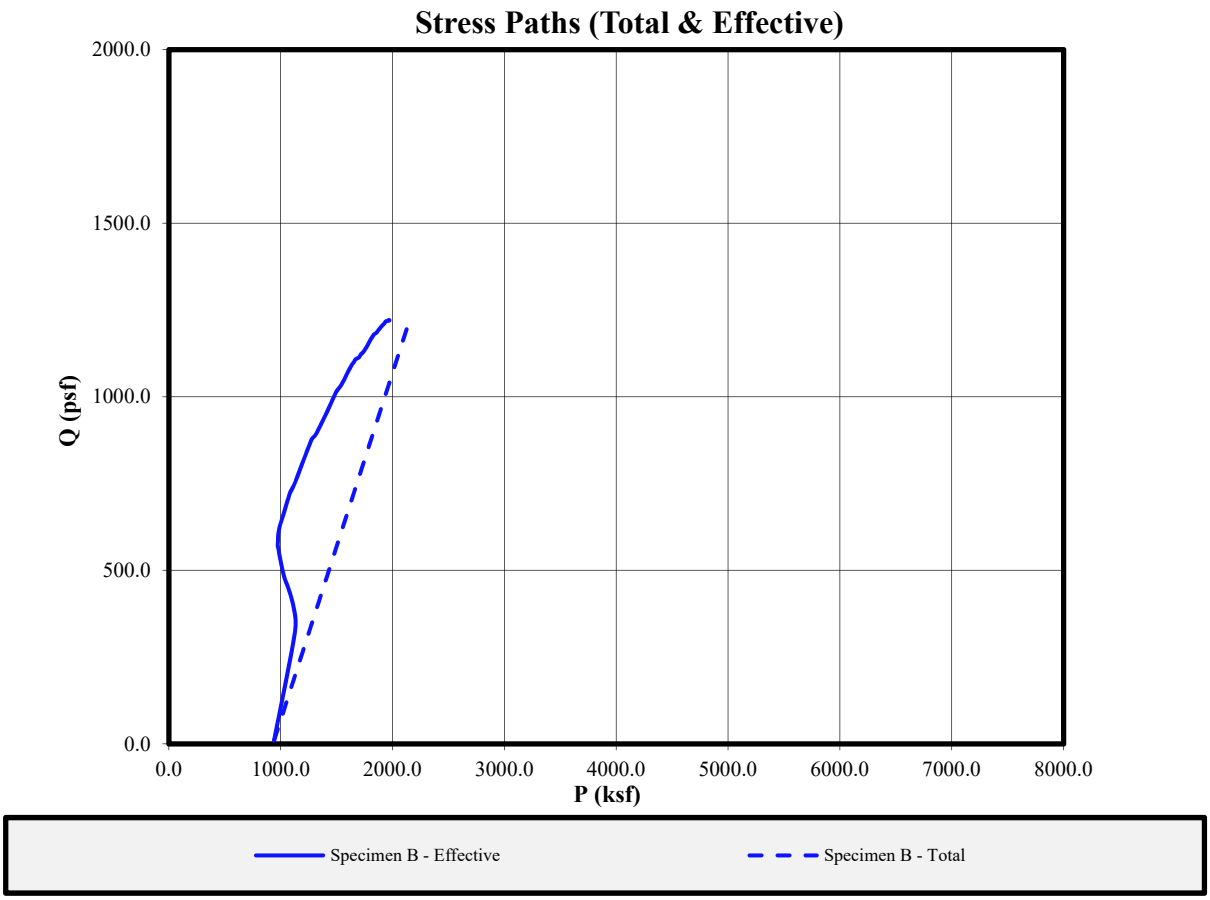
ASTM D4767

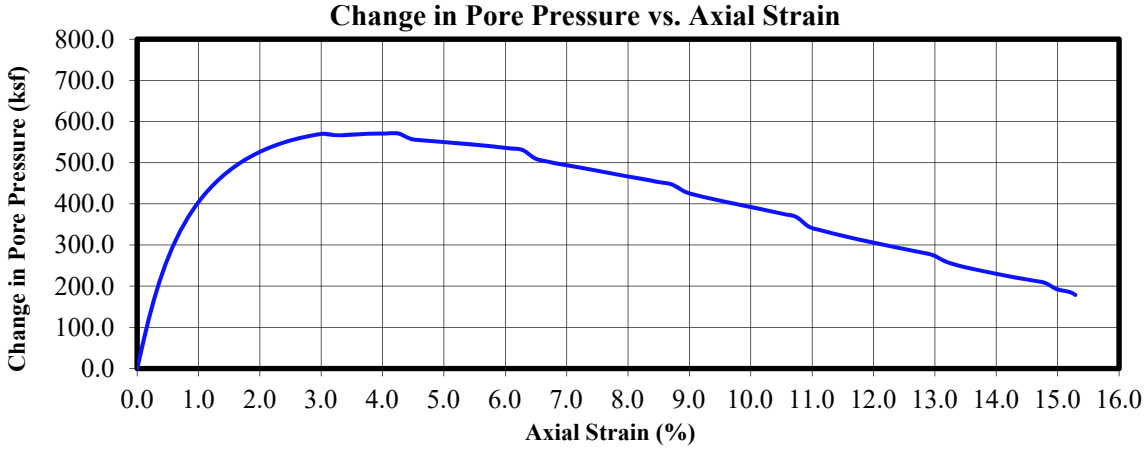
Date: 6/19/19

Checked By: D. Seibold

Date: 6/19/19

Tested By: G. Criste





Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B9
Sample Number:	1
Depth:	30.5-31.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type:	Consolidated Undrained
Remarks:	

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Isotropic Consolidated Undrained Triaxial Test

ASTM D4767

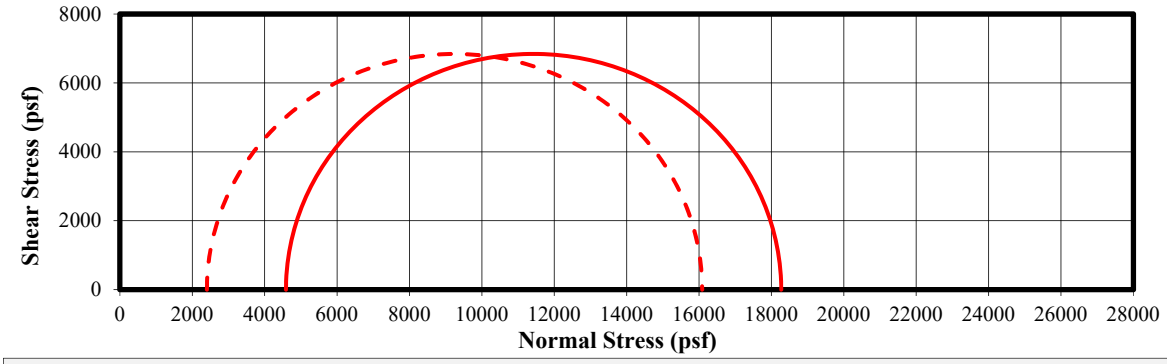
Date: 6/19/19

Checked By: D. Seibold

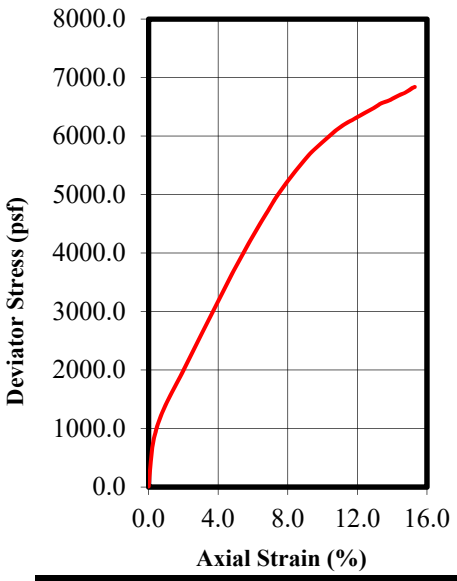
Date: 6/19/19

Tested By: G. Criste

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial			1-B8@70.5	
Height-to-Diameter Ratio			2.094	
Water Content (%)			26.0	
Dry Density (pcf)			100.4	
Saturation (%)			99.39	
Void Ratio			0.728	
Diameter (in)			2.386	
Height (in)			4.998	
ASTM D854 - Measured				
Specific Gravity			2.779	
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
After Consolidation			**1-B8@70.5**	
Void Ratio			0.697	
Water Content (%)			23.50	
Dry Density (pcf)			102.30	
Eff. Consol. Press. (psf)			13.5	
Back Pressure (psf)			45.0	
Saturation (%)			100.0	
B-Value			0.97	
Strain Rate (in./min.)			0.02518	
Height-to-Diameter Ratio			2.076	
After Shear			**1-B8@70.5**	
σ'1 at Failure (psf)			18271.0	
σ'3 at Failure (psf)			4588.8	
t_{50} (min)			0.421	
t_{90} (min)			0.757	
Corrected Peak Deviator Stress (psf):			13682.2	

Maximium Deviator Stress Criterion	
C (psf)	
C' (psf)	
Ø (deg)	
Ø' (deg)	

Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B8
Sample Number:	Multiple
Depth:	70.5-71.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type	Consolidated Undrained
Remarks	

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Isotropic Consolidated Undrained Triaxial Test

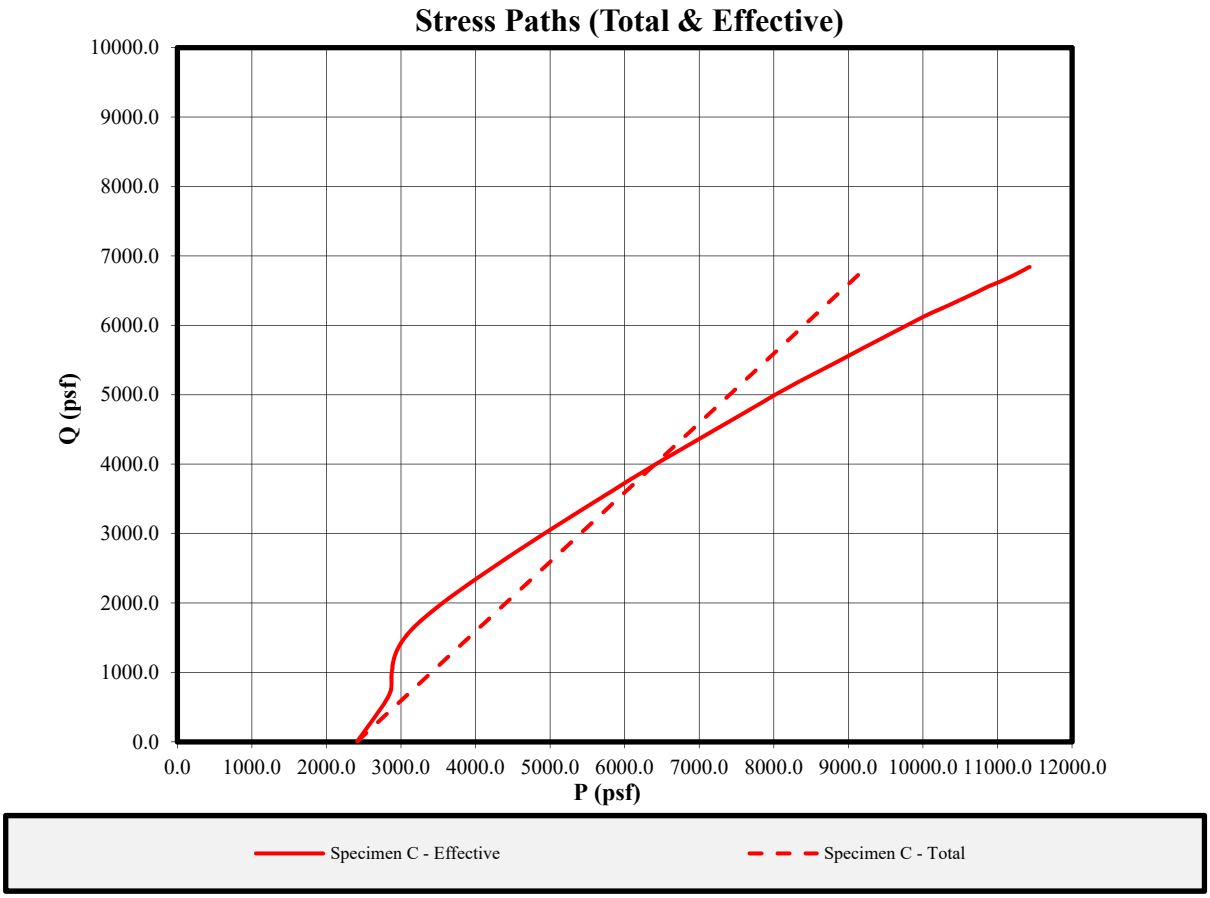
ASTM D4767

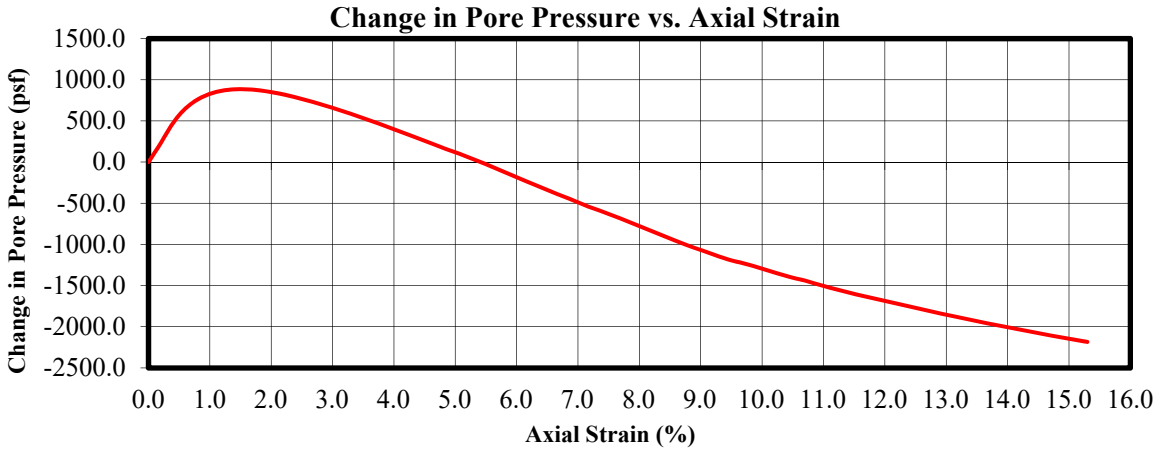
Date: 6/19/19

Checked By: D. Seibold

Date: 6/19/19

Tested By: G. Criste





Project:	GEX for Multiple Parcels
Location:	Sunnyvale, California
Project Number:	15949.000.000
Boring Number:	1-B8
Sample Number:	Multiple
Depth:	70.5-71.0 feet
Sample Type:	Undisturbed
Description:	See exploration logs
Test Type:	Consolidated Undrained
Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

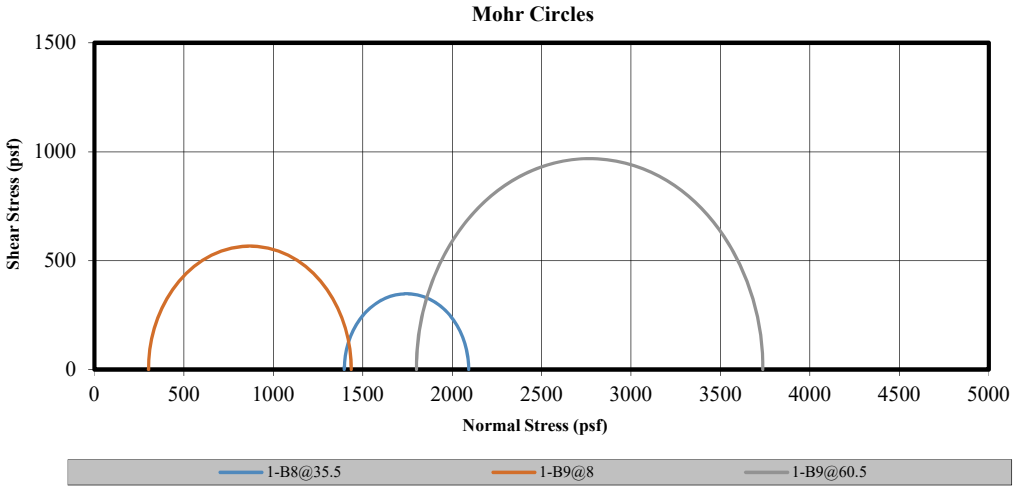
ASTM D2850

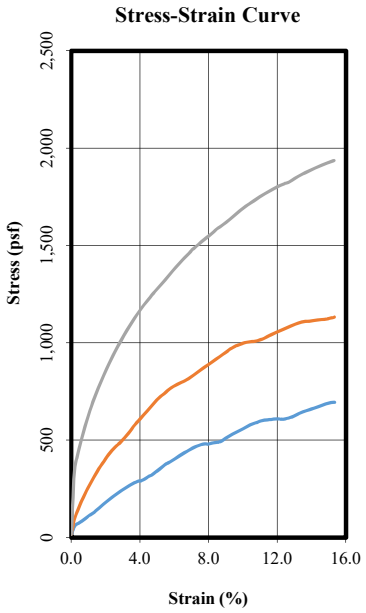
Date: 06/07/19

Checked By: G. Criste

Date: 6/7/2019

Tested By: N. Buckton





Before Test	Specimen 1-B8@35.5	1-B9@8	1-B9@60.5	
Water Content (%)	25.53	23.50	20.55	
Dry Density (pcf)	102.30	104.80	108.50	
Saturation (%)	99.91	99.94	98.92	
Void Ratio	0.72	0.65	0.56	
Diameter (in)	2.402	2.394	2.389	
Height (in)	4.897	4.984	5.547	
Height-to-Diameter Ratio	2.039	2.082	2.322	
ASTM D4318 - Wet Method				
Liquid Limit	n/a	n/a	n/a	
Plastic Limit	n/a	n/a	n/a	
ASTM D854 - Assumed				
Specific Gravity	2.819	2.775	2.720	
After Test	**1-B8@35.5**	**1-B9@8**	**1-B9@60.5**	
Water Content (%)	25.53	23.50	20.55	
Saturation (%)	99.91	99.93	98.92	
Strain Rate (in/min)	0.05	0.05	0.05	
Peak Deviator Stress (psf)	695.1	1132.7	1936.7	
Axial Strain @ Failure (%)	15.341	15.327	15.301	
	Cell Pressure			
Cell (psf)	1396.8	302.4	1800.0	
Back (psf)	n/a	n/a	n/a	
	Principle Stresses at Failure			
σ1 (psf)	2091.9	1435.1	3736.7	
σ3 (psf)	1396.8	302.4	1800.0	
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		347.5	566.3	968.4	
Friction Angle Ø	n/a		n/a	n/a	n/a	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

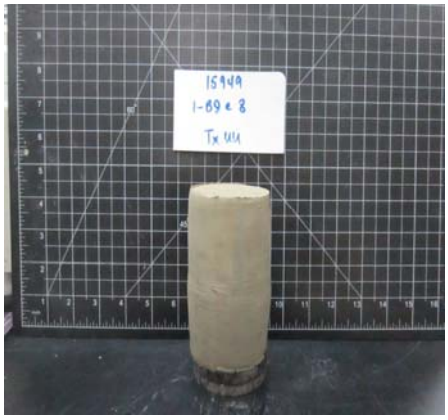
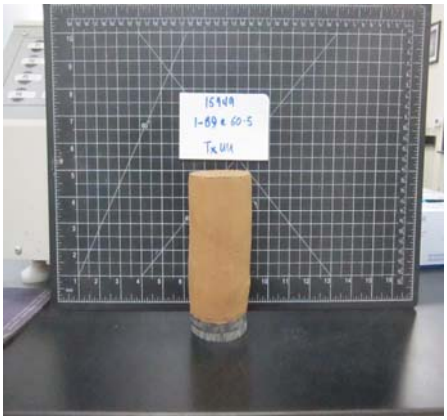
Date: 06/07/19

Checked By: G. Criste

Date: 6/7/2019

Tested By: N. Buckton

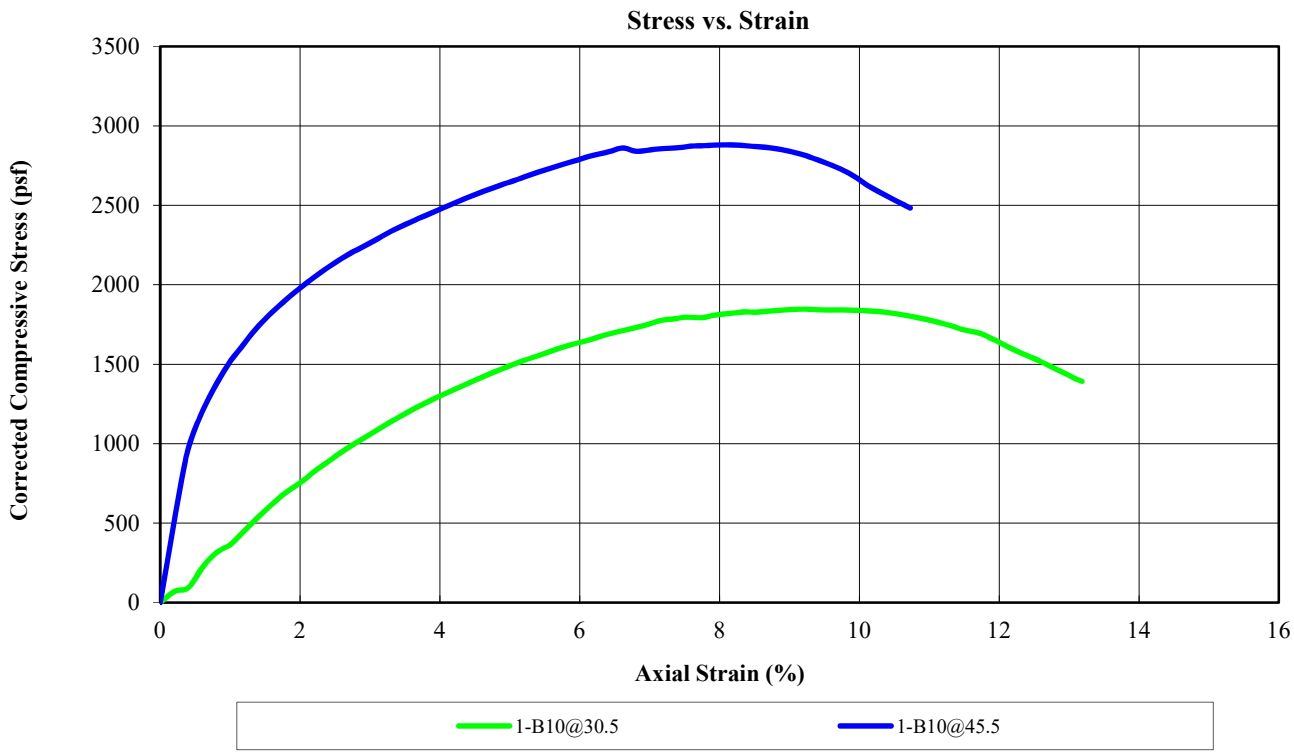
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B8@35.5	SAMPLE NUMBER: 1-B9@8
	
SAMPLE NUMBER: 1-B9@60.5	**SAMPLE NUMBER:**
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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UNCONFINED COMPRESSION TEST REPORT
ASTM D2166



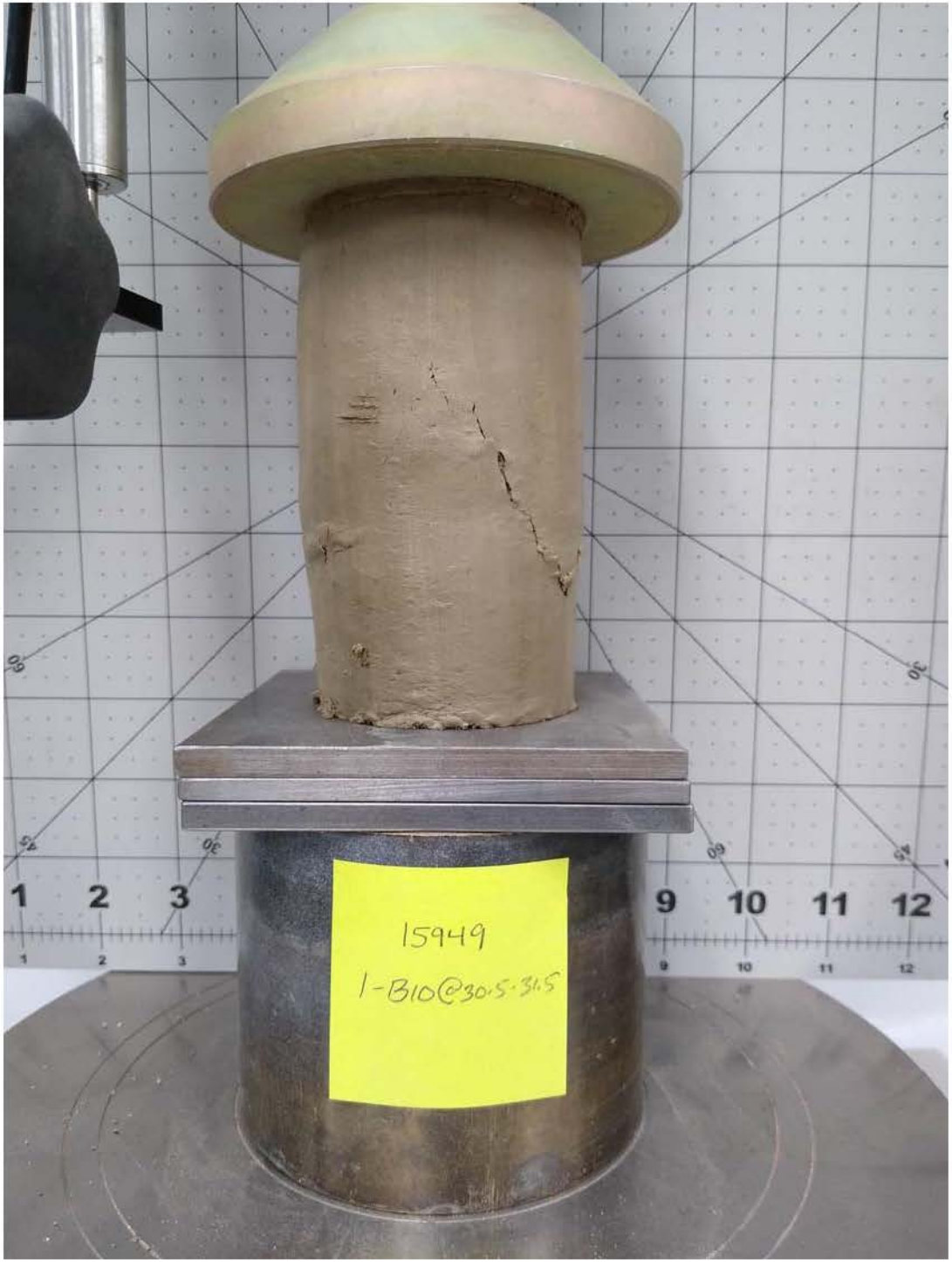
BEFORE TEST	SPECIMEN 1-B10@30.5	1-B10@45.5
Moisture Content (%)	22.9	28.3
Dry Density (pcf)	105.2	96.3
Saturation (%)	100.0	100.0
Void Ratio	0.57	0.72
Diameter (in)	2.395	2.392
Height (in)	5.11	5.20
Height-To-Diameter Ratio	2.13	2.17
TEST DATA		
Unconfined Compressive Strength (psf)	1847	2881
Undrained Shear Strength (psf)	923	1440
Strain Rate (in./min.)	0.05	0.05
Specific Gravity	2.650	2.650
Strain at Failure (%)	9.14	8.17
Liquid Limit		
Plastic Limit		
Test Remarks		

SPECIMEN	DESCRIPTION
1-B10@30.5	See exploration logs
1-B10@45.5	See exploration logs

PROJECT NAME: GEX for Multiple Parcels
PROJECT NO: 15949.000.000
CLIENT: Google, LLC
LOCATION: 1-B10@30.5
PHASE NO: LAB

Report Date: 06/12/19
Tested By: R. Montalvo
Reviewed By: M. Gilbert

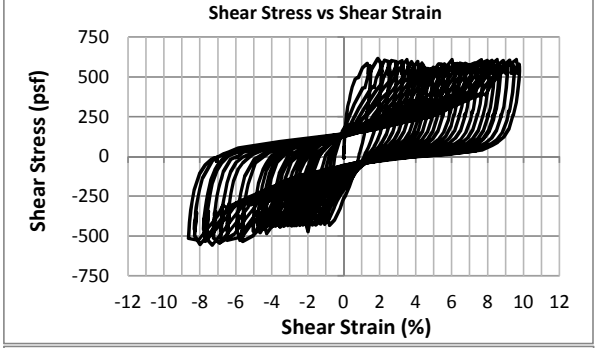
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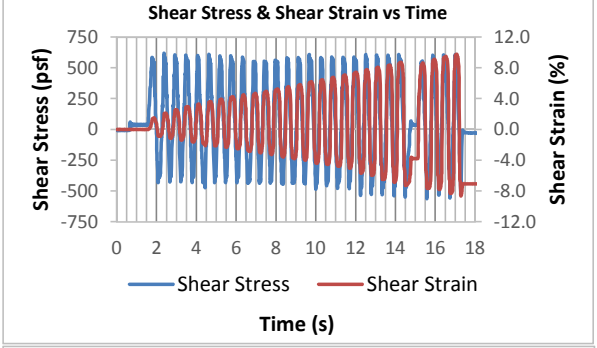

15949
1-B10@30.5-31.5

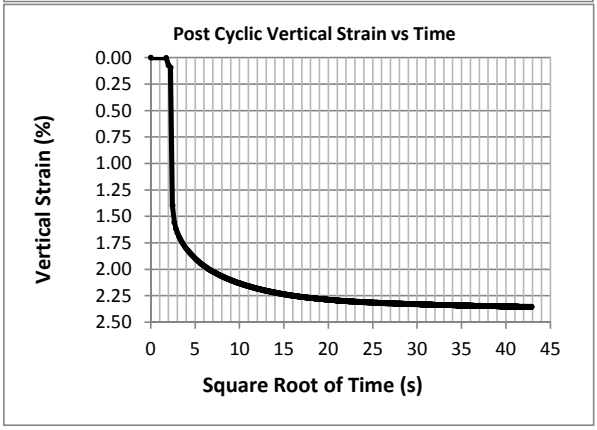

15949
1-B10@45.5-46.5

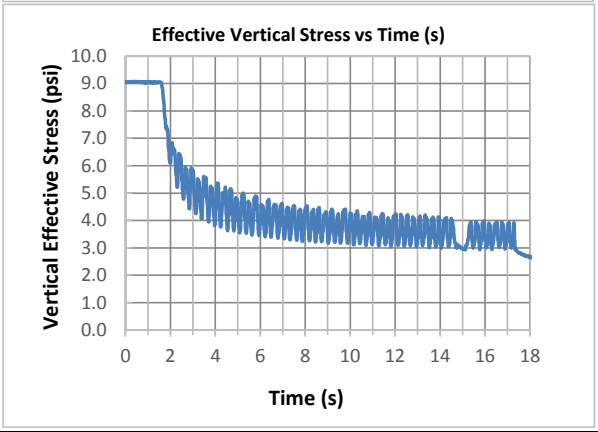
Cyclic Simple Shear

ASTM D6528 - Modified









Test Conditions		Results		Maximum	Minimum
Confining Condition	Plain Membrane w/Chamber Pressure	Vertical Effective Stress (psf)	Deviatoric	783.5	-54.8
Applied Lateral Effective Stress (psf)	520.0		Isotropic	520.0	520.0
Resulting K_o after applied, σ_{vc}'	0.398	Shear Strain (%)		9.8	-8.6
Applied Loading Frequency (Hz)	0.500	Post Cyclic Vertical Strain (%)		2.36	
Cycle Limit, N	27				
Single Amp. Strain (+/-)	9.2	**Cyclic Preshear Specimen Condition**			
Applied τ_{cyc} (psf)	617	Preshear Moisture Content (%)		23.93%	
Applied σ_{vc}' (psf)	1308	Preshear Void Ratio		0.6554	
Applied CSR	0.472	Preshear Saturation (%)		100.36%	
		Preshear Dry Density (pcf)		103.53	

Test Date: 6/18/2019

ASTM D2216	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	25.75%	22.72%	**Liquid Limit:**	
Dry Density (pcf):	102.99	105.52	**Plastic Limit:**	
Saturation (%):	96.53%	100.00%	**ASTM D854 - Measured**	
Void Ratio:	0.7331	0.6229	**Specific Gravity:**	2.748
			Soil Description:	See exploration logs

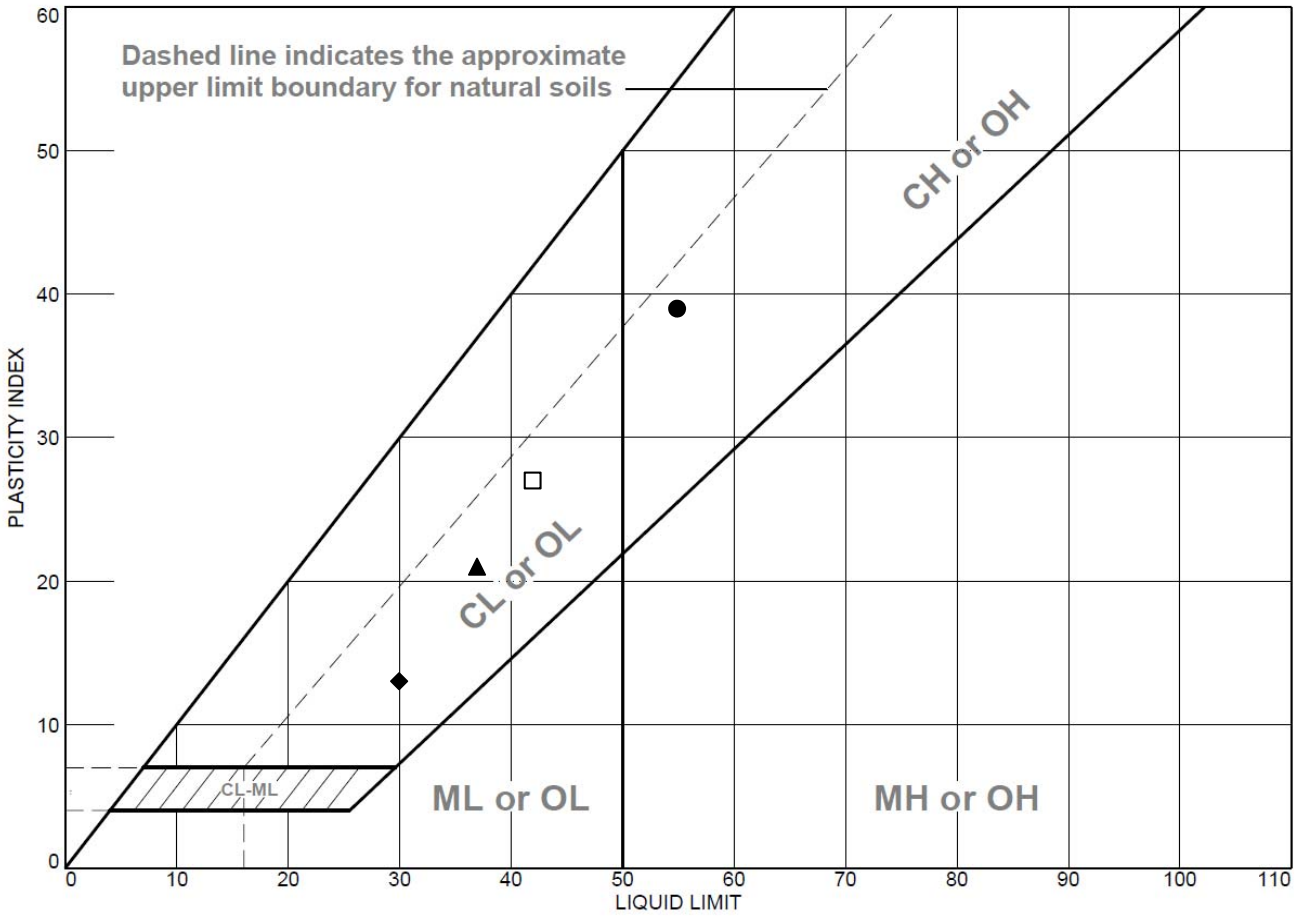
Project Number:	15949.000.000	**Depth:**	15.5-15.75 ft.
Sample Number:	1-B9 @ 15-16.5	**Boring #:**	1-B9
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

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Remarks:


15949
CSS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	37	16	21	87.8	62.3	CL
◆	See exploration logs	30	17	13		40.2	
□	See exploration logs	42	15	27		52.9	CL
●	See exploration logs	55	16	39		92	CH

Project No.: 15949.000.000 PHLAB **Date:** 6/19/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B1 **Depth:** 13-14.5
◆ **Sample Number:** 1-B1 **Depth:** 16-17.5
□ **Sample Number:** 1-B1 **Depth:** 30.5-31.5
● **Sample Number:** 1-B1 **Depth:** 43-44.5

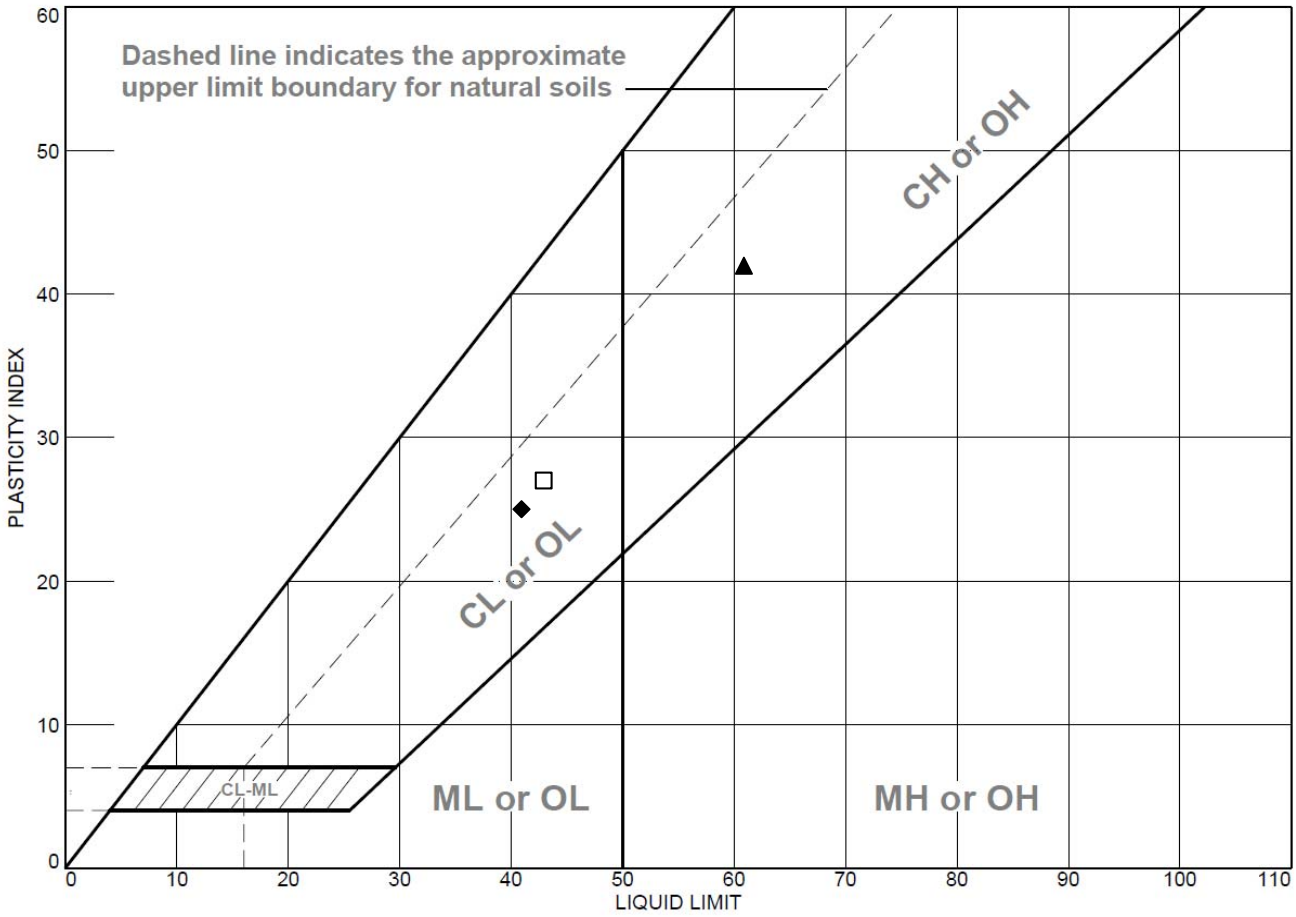
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
● PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	61	19	42		82.5	CH
◆	See exploration logs	41	16	25		64.8	CL
□	See exploration logs	43	16	27		25.6	

Project No.: 15949.000.000 PHLAB **Date:** 6/19/2019
Project Name: GEX for Multiple Parcels
Project location: Mountain View, CA
Client: Google, LLC

▲ **Sample Number:** 1-B2 **Depth:** 6.5-7
◆ **Sample Number:** 1-B2 **Depth:** 15-16.5
□ **Sample Number:** 1-B2 **Depth:** 30-31.5

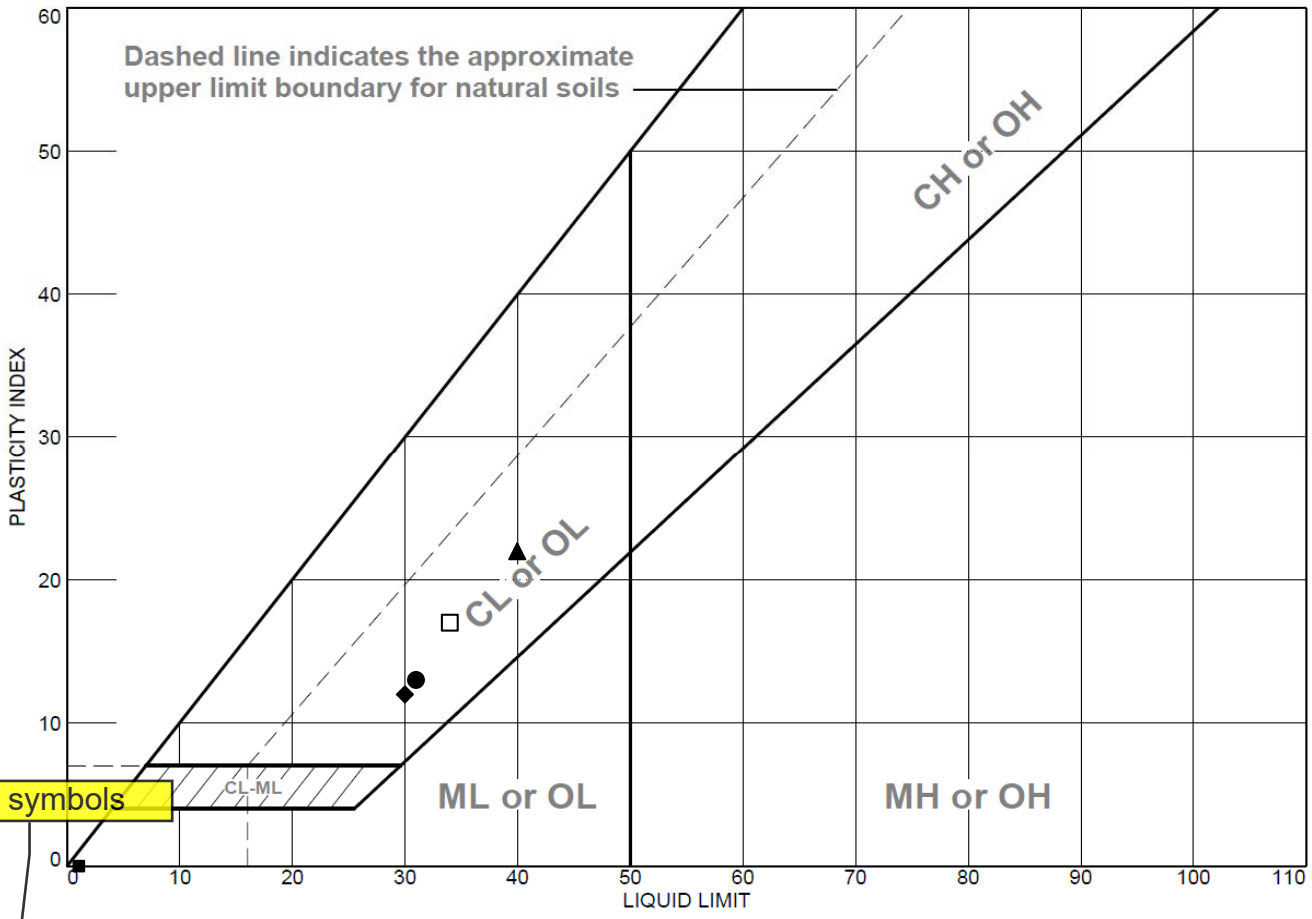
Remarks:
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140, Method B, USCS: ASTM D2487

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Tested By: R. Montalvo Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

LIQUID AND PLASTIC LIMITS TEST REPORT



missing symbols

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
	See exploration logs	40	18	22		37.7	
	See exploration logs	30	18	12		30.2	
	See exploration logs	34	17	17	79.2	58	
	See exploration logs	31	18	13		46.4	
	See exploration logs	NV	NP	NP			

Project No.: 15949.000.000 **Date:** 6/20/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

Sample Number: 1-B4 **Depth:** 25.5-26.5
Sample Number: 1-B4 **Depth:** 35.5-36.5
Sample Number: 1-B4 **Depth:** 46-47.5
Sample Number: 1-B4 **Depth:** 52-53
Sample Number: 1-B4 **Depth:** 8.5-9

missing symbols

Remarks:

PI: ASTM D4318, Wet Method, GS: ASTM D1140

PI: ASTM D4318, Wet Method, GS: ASTM D1140

PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

PI: ASTM D4318, Wet Method, GS: ASTM D1140

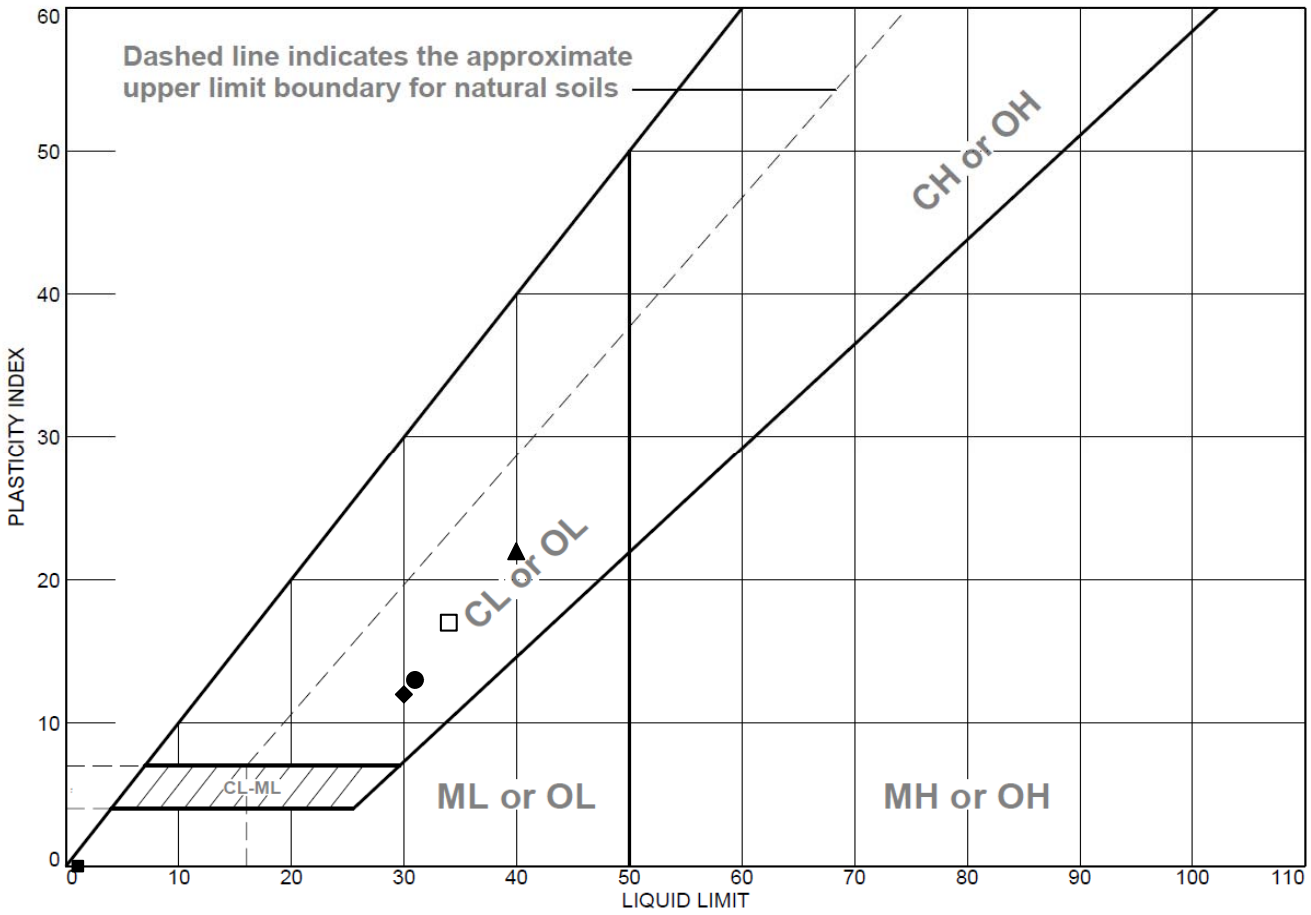
PI: ASTM D4318, Wet Method

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	40	18	22		37.7	
◆	See exploration logs	30	18	12		30.2	
□	See exploration logs	34	17	17	79.2	58	
●	See exploration logs	31	18	13		46.4	
■	See exploration logs	NV	NP	NP			

Project No.: 15949.000.000 **Date:** 6/20/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

▲ **Sample Number:** 1-B4 **Depth:** 25.5-26.5
◆ **Sample Number:** 1-B4 **Depth:** 35.5-36.5
□ **Sample Number:** 1-B4 **Depth:** 46-47.5
● **Sample Number:** 1-B4 **Depth:** 52-53
■ **Sample Number:** 1-B4 **Depth:** 8.5-9

Remarks:

▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140

◆ PI: ASTM D4318, Wet Method, GS: ASTM D1140

□ PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

● PI: ASTM D4318, Wet Method, GS: ASTM D1140

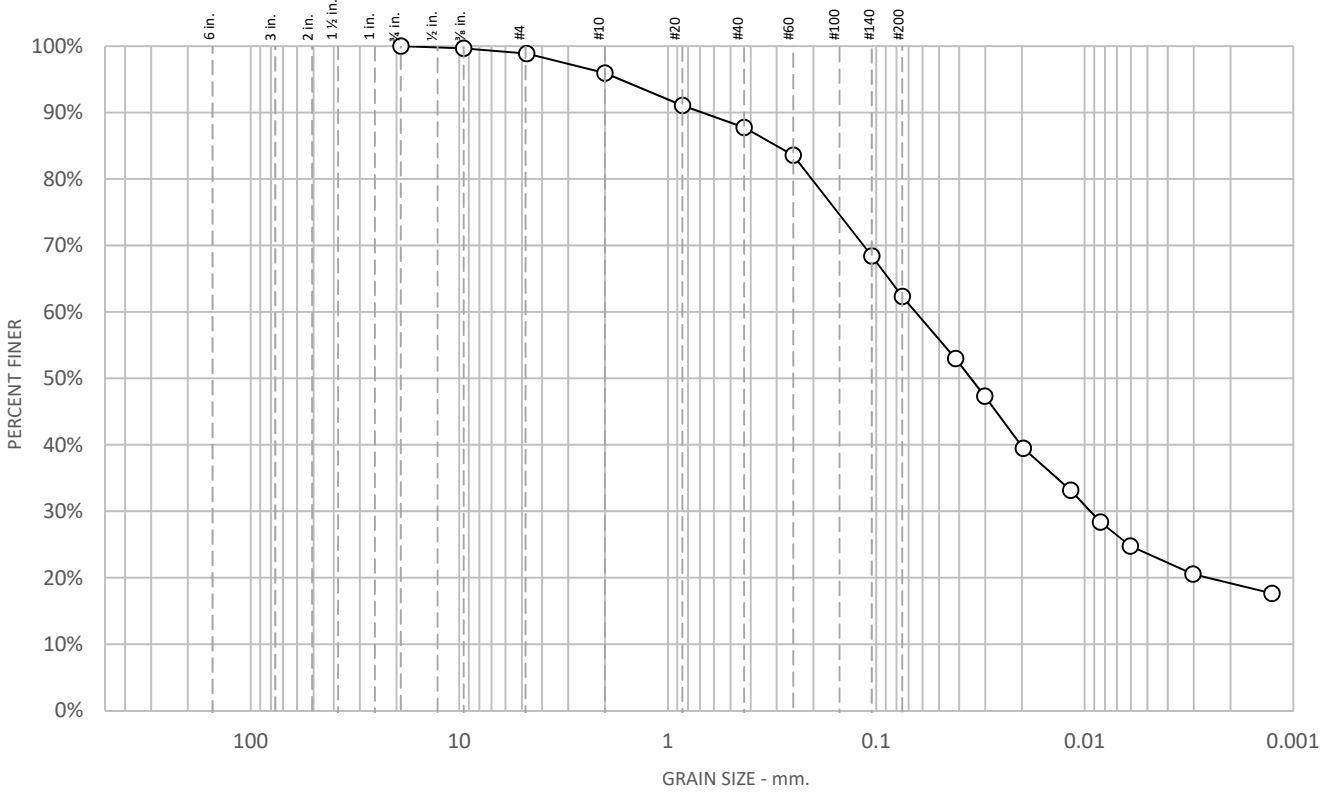
■ PI: ASTM D4318, Wet Method

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Expect Excellence

Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	1.1	2.9	8.2	25.4	43.2	19.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.7		
#4	98.9		
#10	95.9		
#20	91.1		
#40	87.8		
#60	83.6		
#140	68.4		
#200	62.3		
0.0416 mm.	53.0		
0.0302 mm.	47.3		
0.0197 mm.	39.5		
0.0117 mm.	33.2		
0.0084 mm.	28.4		
0.0060 mm.	24.7		
0.0030 mm.	20.5		
0.0013 mm.	17.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 37 PI = 21

Coefficients

D_{90} = 0.6832 mm D_{85} = 0.3009 mm D_{60} = 0.0648 mm
D_{50} = 0.0352 mm D_{30} = 0.0094 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS = CL

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B1 @ 13-14.5

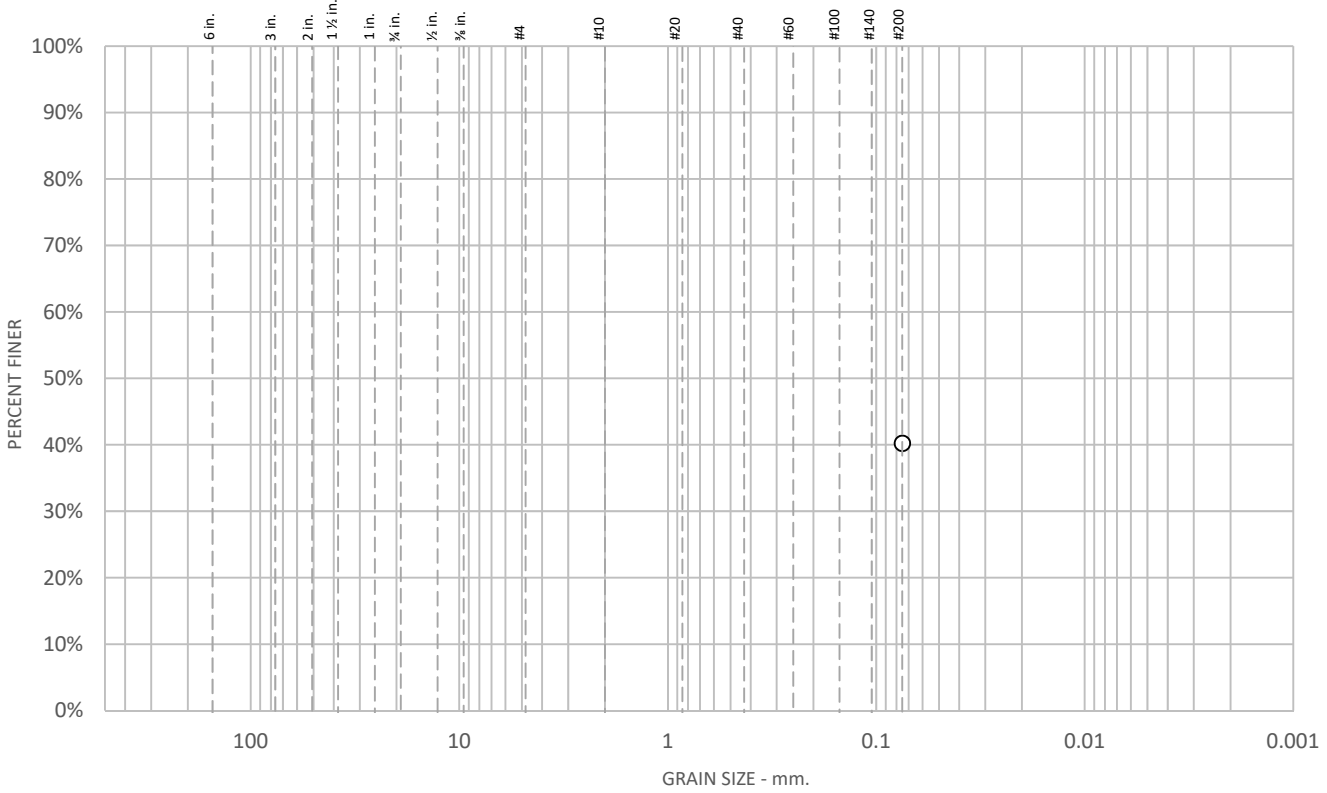
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	40.2		

* (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 =

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 176 g

Sample Number: 1-B1 @ 16-17.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

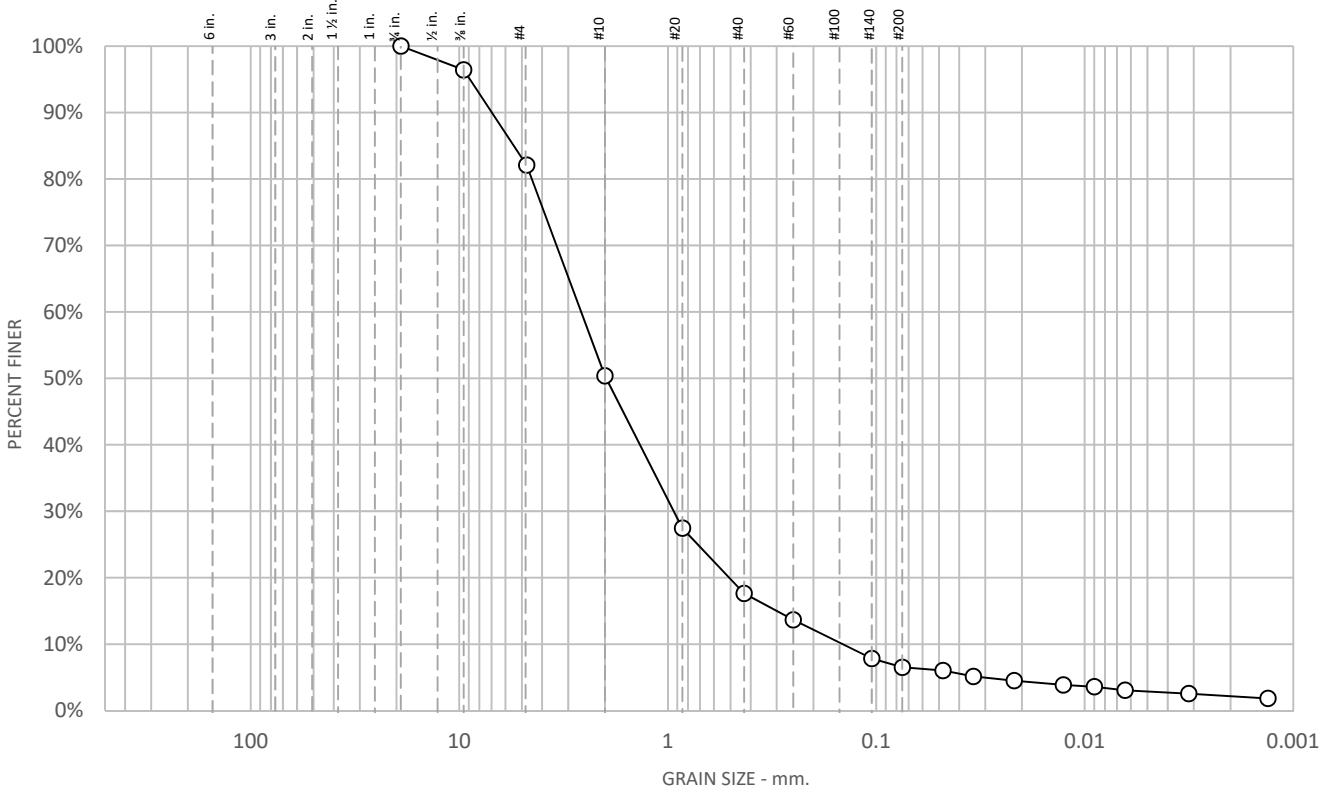
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	17.9	31.7	32.8	11.1	4.3	2.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	96.4		
#4	82.1		
#10	50.4		
#20	27.5		
#40	17.6		
#60	13.6		
#140	7.8		
#200	6.5		
0.0479 mm.	6.0		
0.0342 mm.	5.1		
0.0218 mm.	4.5		
0.0127 mm.	3.9		
0.0090 mm.	3.6		
0.0064 mm.	3.1		
0.0032 mm.	2.5		
0.0013 mm.	1.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 6.9733 mm D_{85} = 5.4695 mm D_{60} = 2.6000 mm
D_{50} = 1.9718 mm D_{30} = 0.9347 mm D_{15} = 0.3006 mm
D_{10} = 0.1450 mm C_u = 17.94 C_c = 2.32

Classification

USCS = SW

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B1 @ 17.5

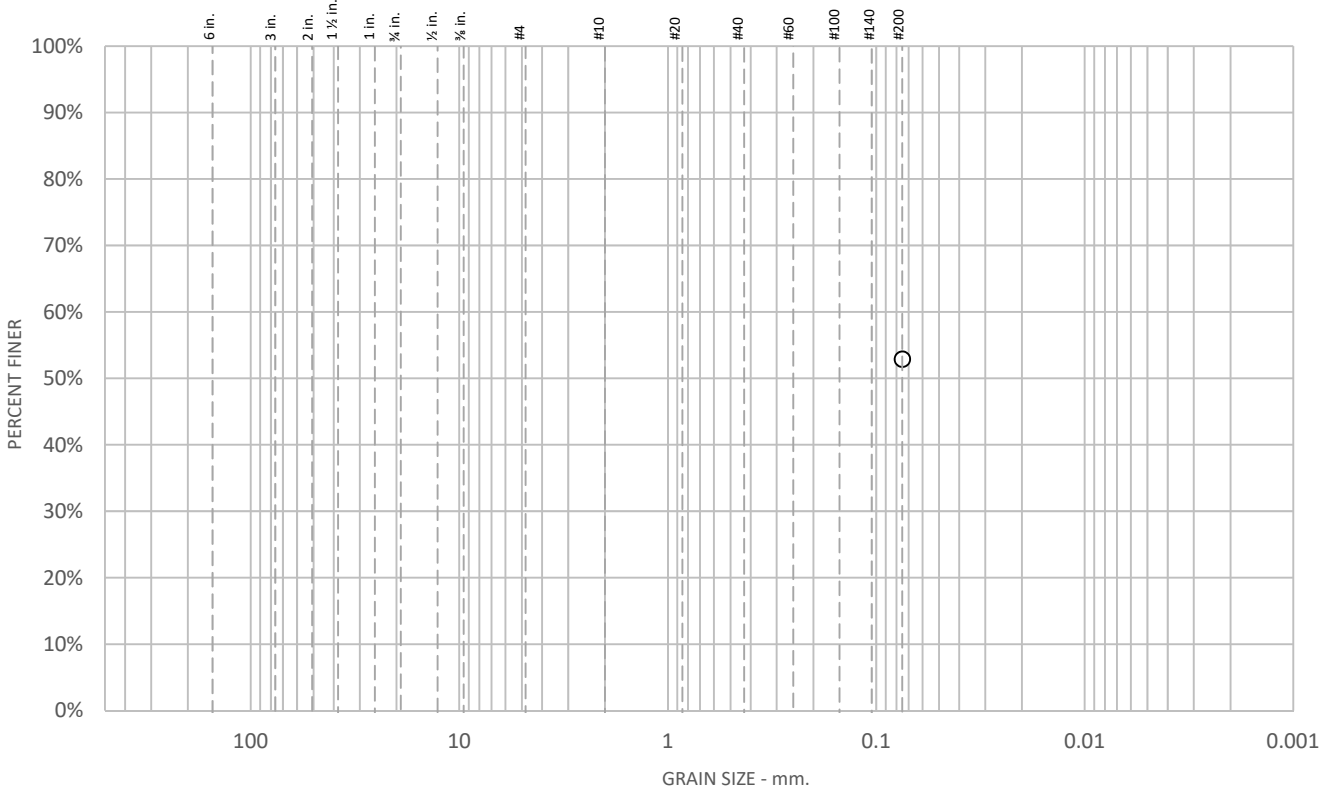
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	52.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 15 LL = 42 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 184.2 g

Sample Number: 1-B1 @ 30.5-31.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA

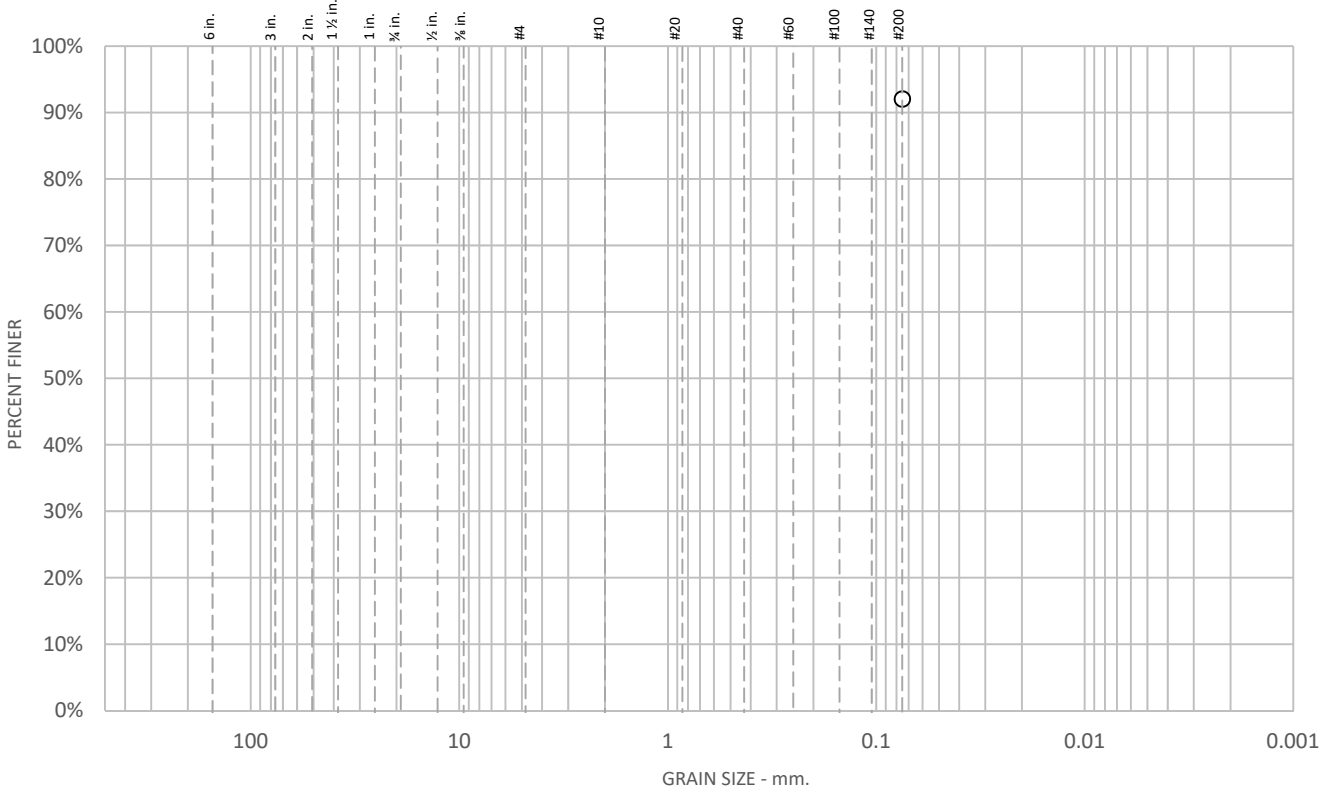
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						92.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	92.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 55 PI = 39

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 62.8 g

Sample Number: 1-B1 @ 43-44.5

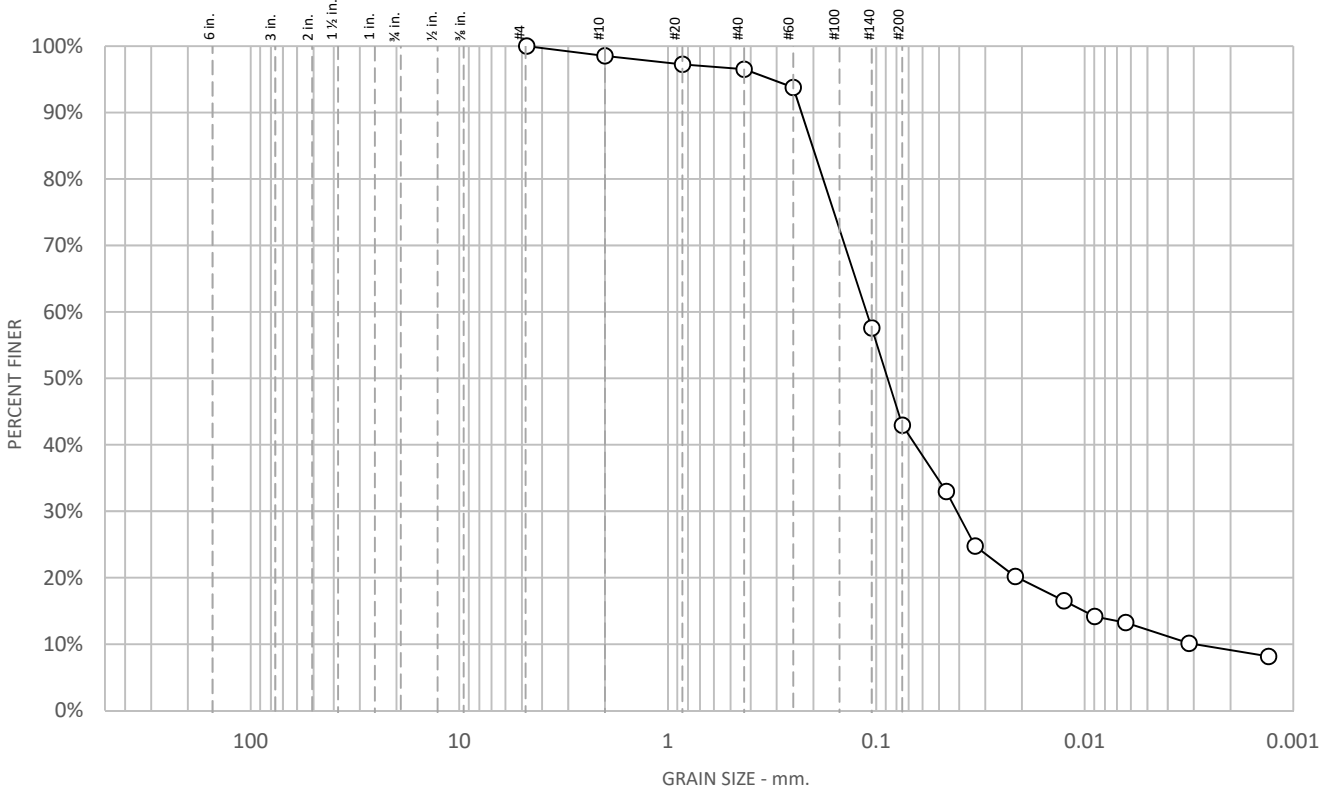
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			1.5	2.0	53.6	33.9	9.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.5		
#20	97.2		
#40	96.5		
#60	93.8		
#140	57.6		
#200	42.9		
0.0461 mm.	33.0		
0.0335 mm.	24.7		
0.0215 mm.	20.2		
0.0126 mm.	16.5		
0.0090 mm.	14.2		
0.0064 mm.	13.3		
0.0032 mm.	10.1		
0.0013 mm.	8.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2284 mm D_{85} = 0.2026 mm D_{60} = 0.1113 mm
D_{50} = 0.0882 mm D_{30} = 0.0411 mm D_{15} = 0.0101 mm
D_{10} = 0.0030 mm C_u = 37.28 C_c = 5.08

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B1 @ 78-79.5

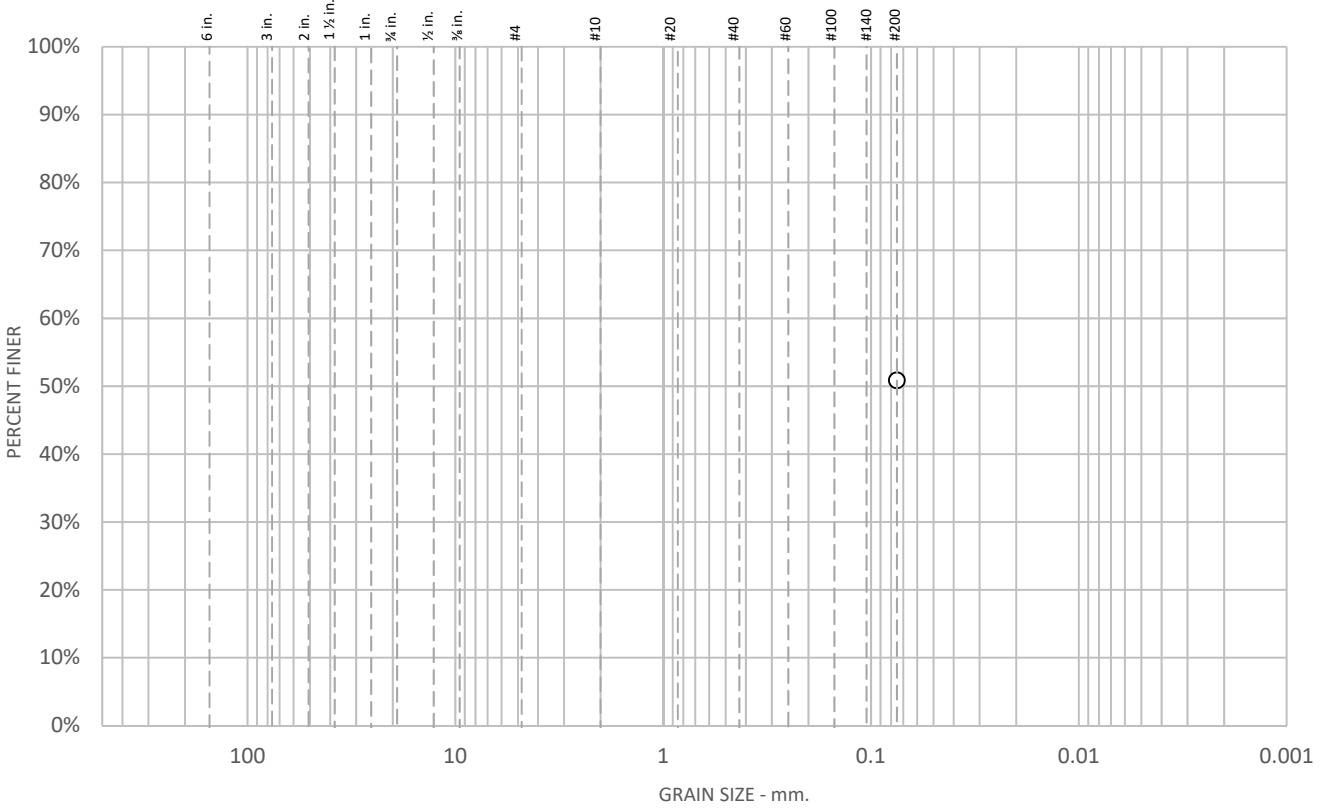
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: GEX for Multiple Parcels **Date:** 6/20/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						50.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	50.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 26 PI = 8

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 212 g

Sample Number: 1-B1 @ 9-11.5 @ 9-11.5 feet

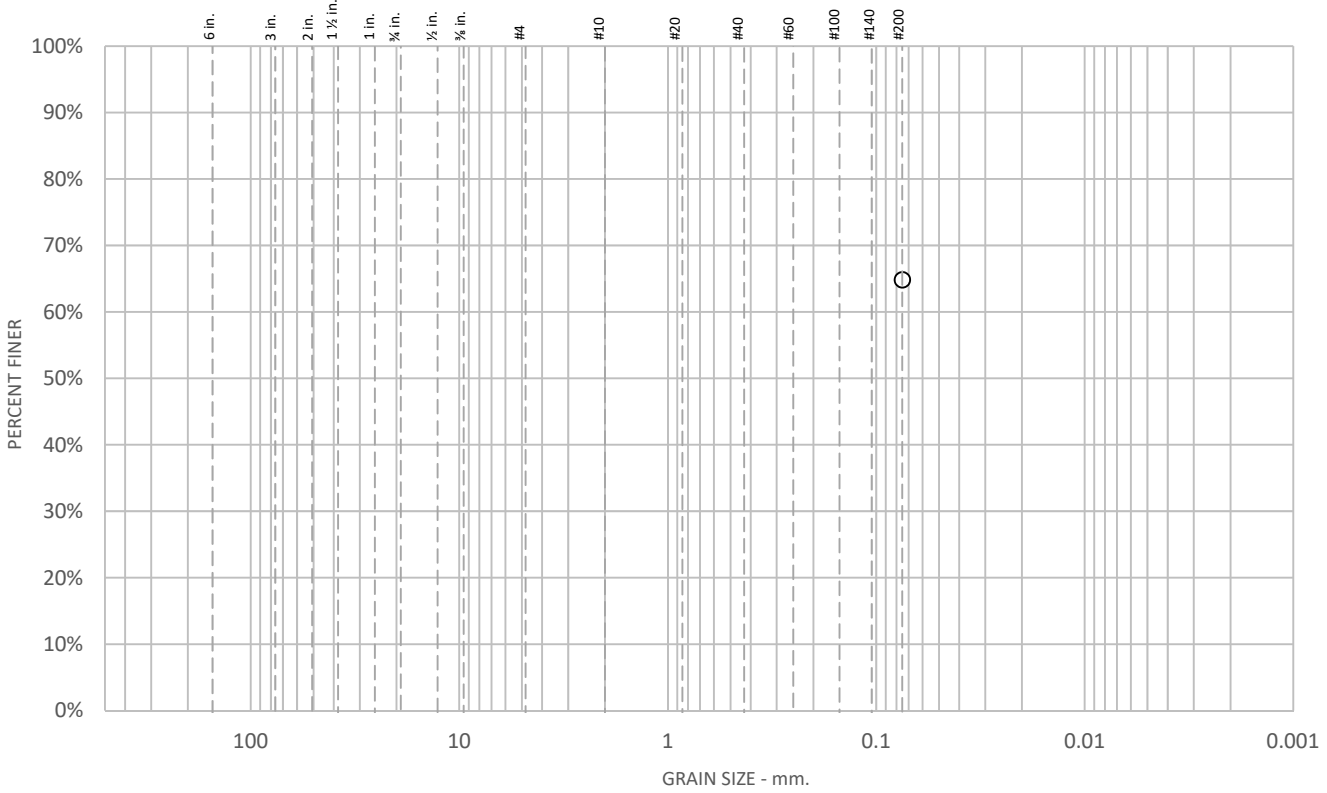
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	64.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 41 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 178.5 g

Sample Number: 1-B2 @ 6.5-7

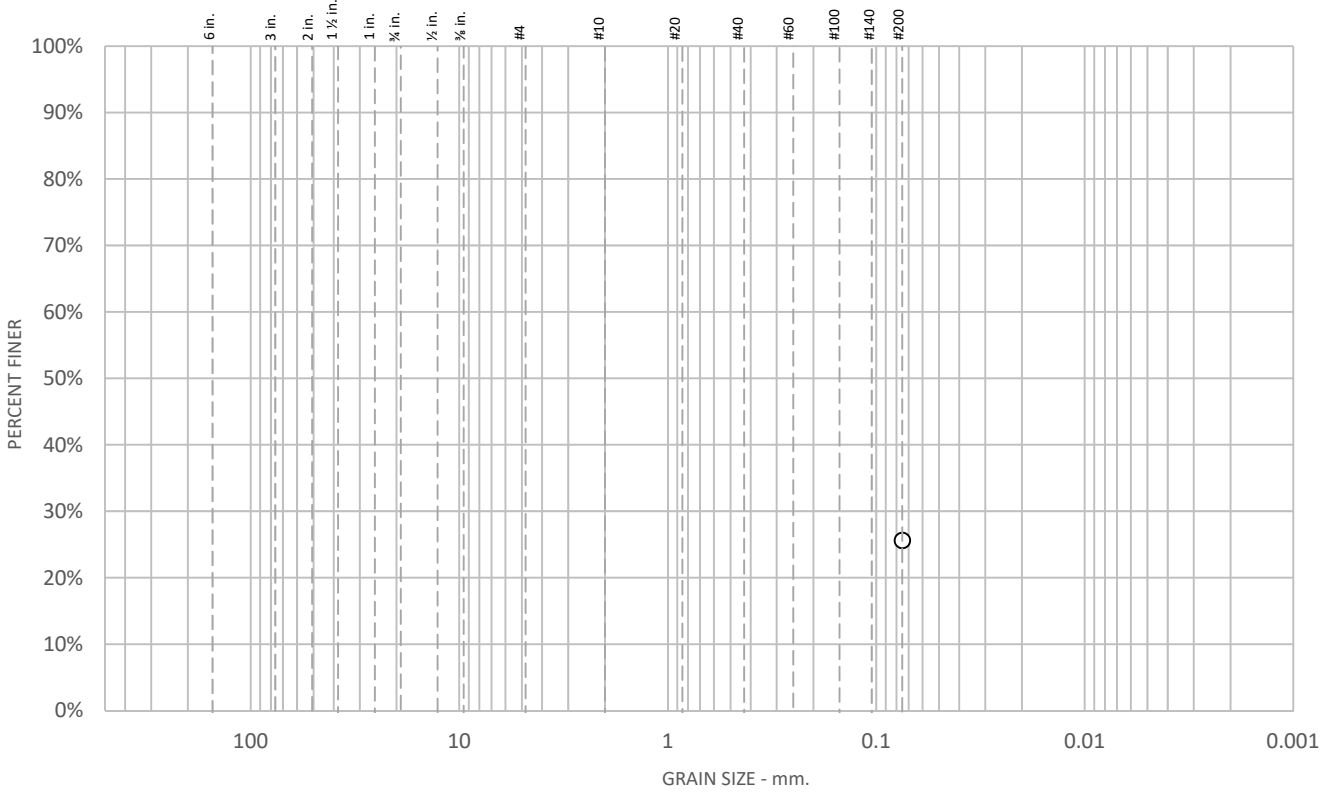
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						26	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	26		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 16 LL = 43 PI = 27

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 221.5 g

Sample Number: 1-B2 @ 30-31.5

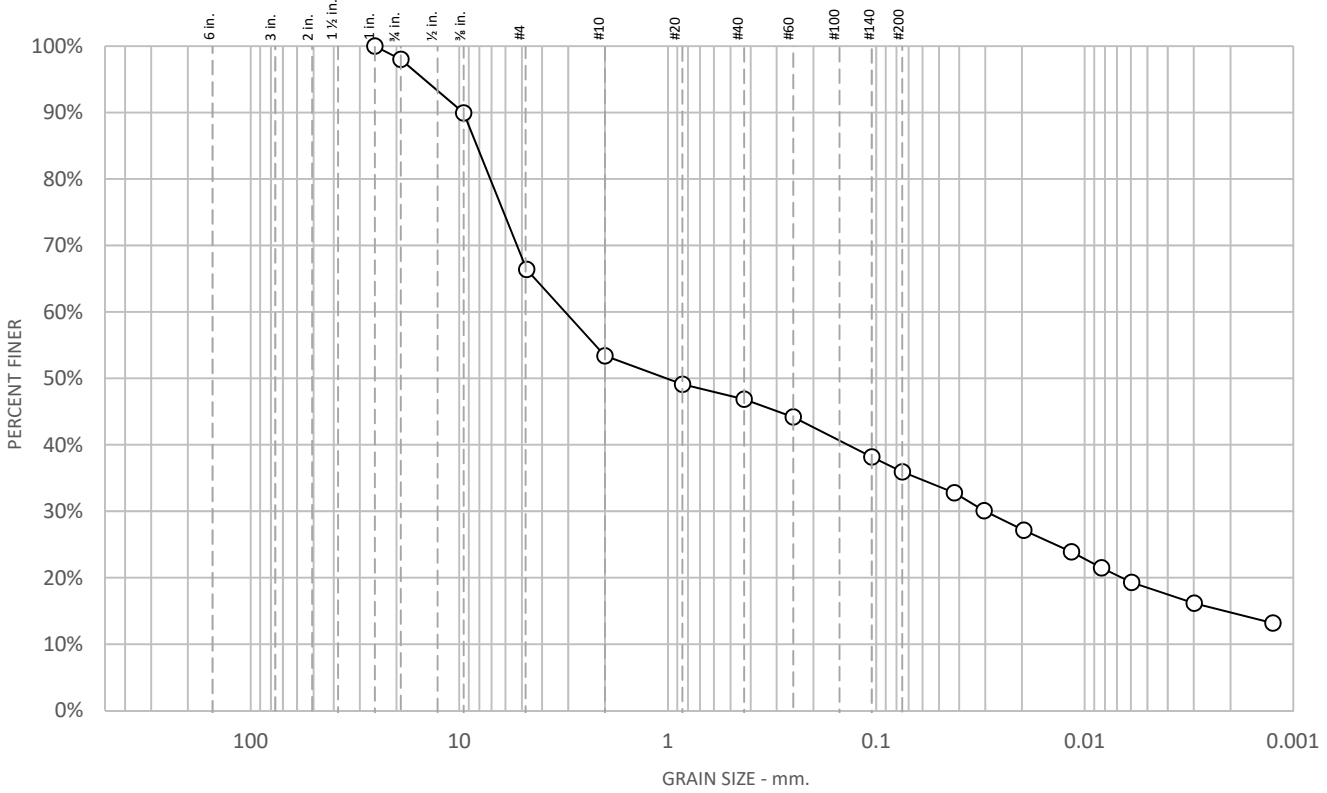
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	2.0	31.6	13.0	6.5	10.9	21.1	14.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	98.0		
⅜ in.	89.9		
#4	66.4		
#10	53.4		
#20	49.1		
#40	46.9		
#60	44.2		
#140	38.2		
#200	35.9		
0.0422 mm.	32.8		
0.0304 mm.	30.1		
0.0196 mm.	27.1		
0.0116 mm.	23.9		
0.0083 mm.	21.5		
0.0060 mm.	19.3		
0.0030 mm.	16.2		
0.0013 mm.	13.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 9.5704 mm D_{85} = 8.2307 mm D_{60} = 3.1043 mm

D_{50} = 1.0152 mm D_{30} = 0.0300 mm D_{15} = 0.0021 mm

D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422

Silt/clay division of 0.002mm used

Sample Number: 1-B2 @ 35-36.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB

Project: GEX for Multiple Parcels **Date:** 6/20/2019

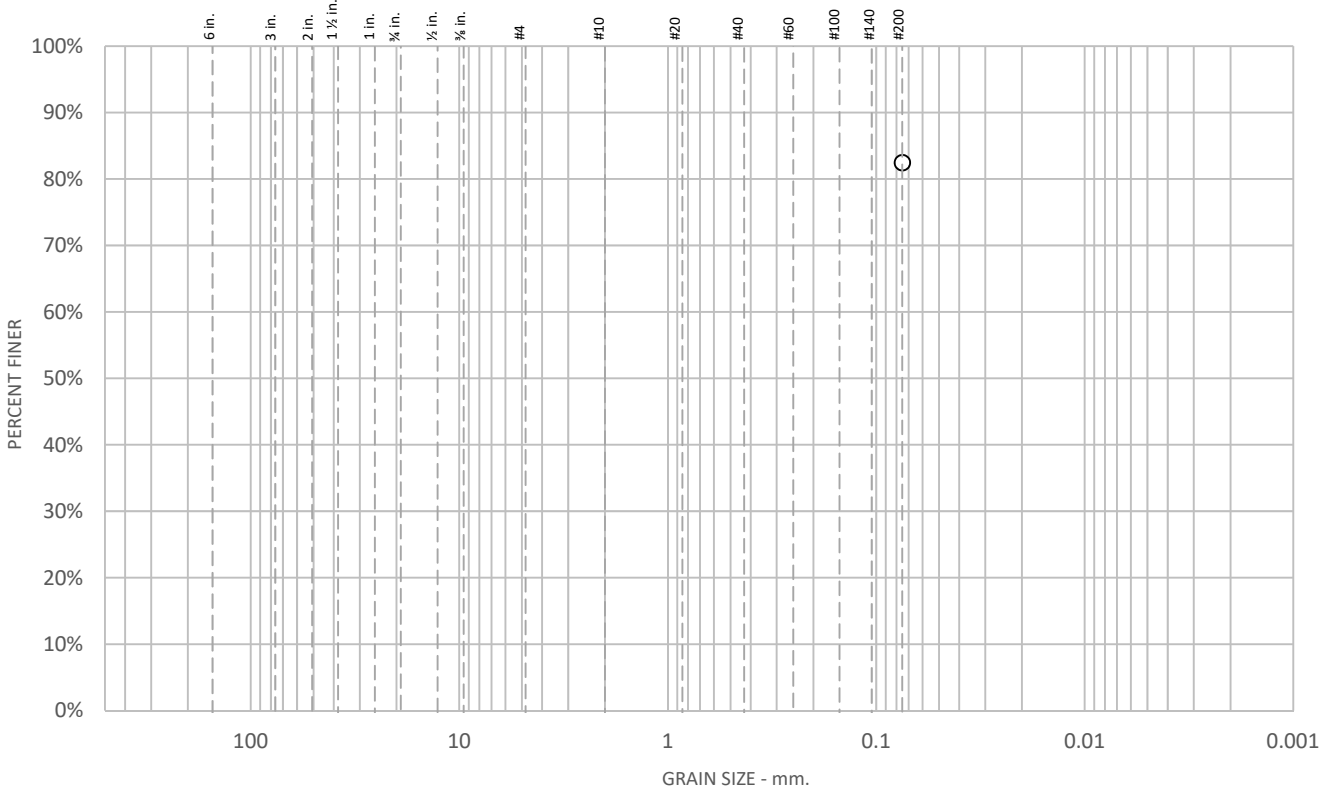
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						82	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	82		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 61 PI = 42

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 179.5 g

Sample Number: 1-B2 @ 6.5-7

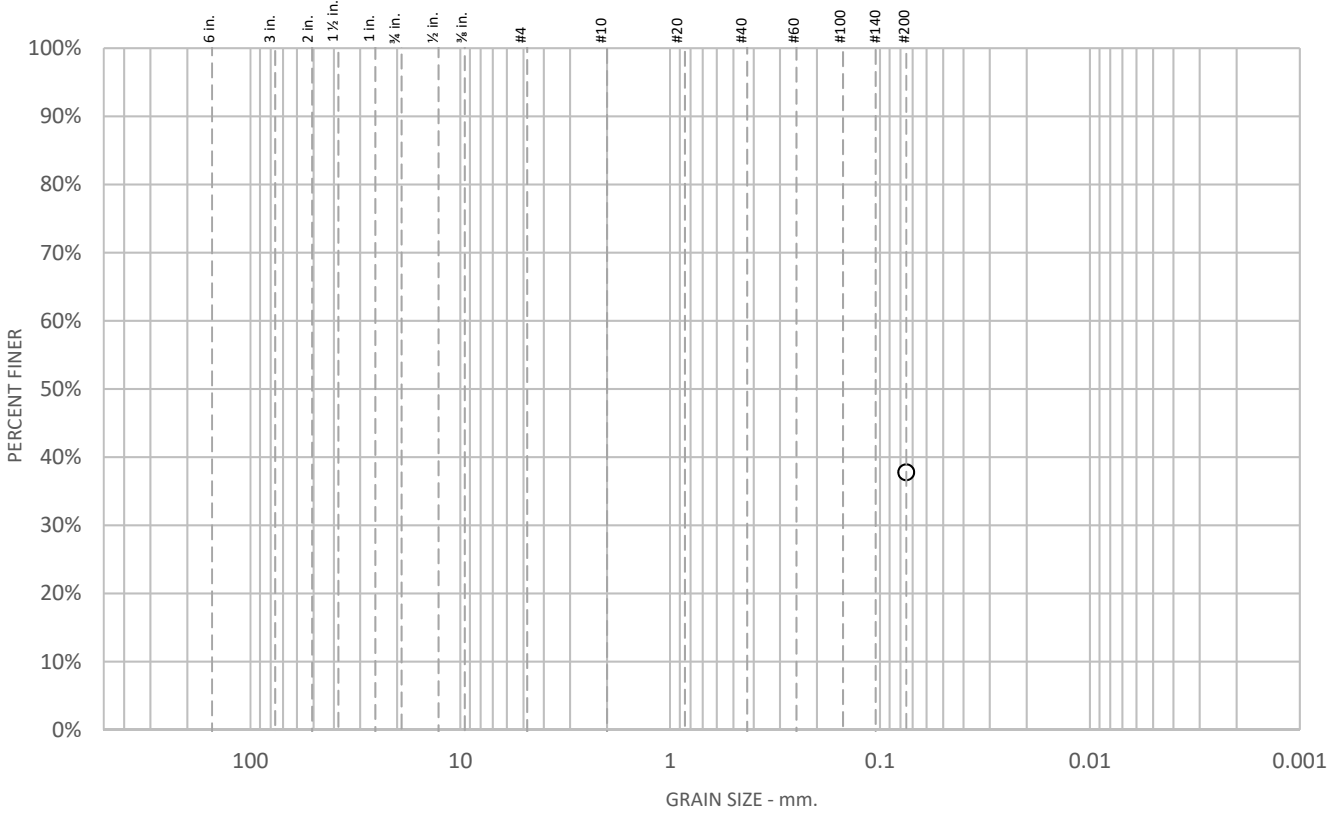
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 6/19/2019

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Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						37.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	37.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 40 PI = 22

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 126.6 g

Sample Number: 1-B4 @ 25.5-26.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

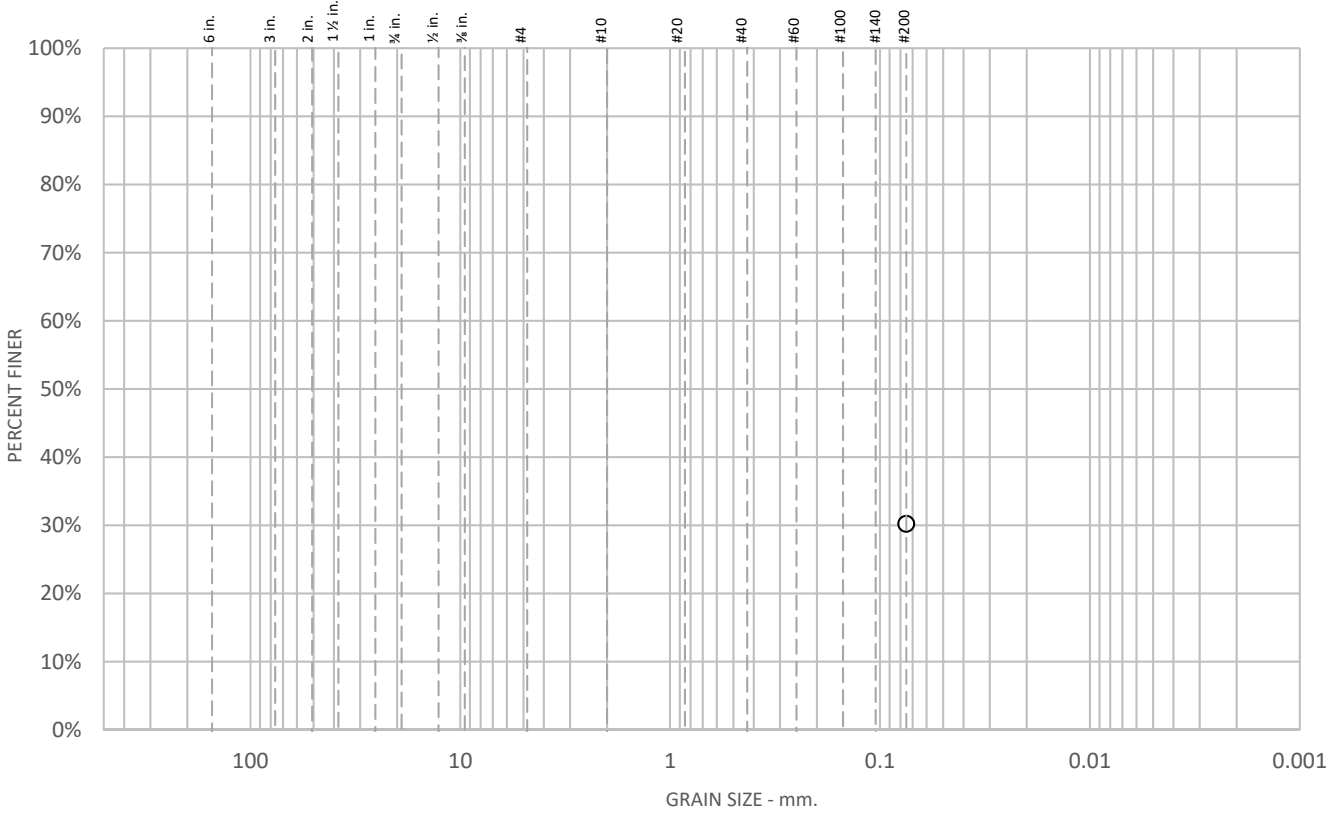
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	30.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 30 PI = 12

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 845.15 g

Sample Number: 1-B4 @ 35.5-36.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

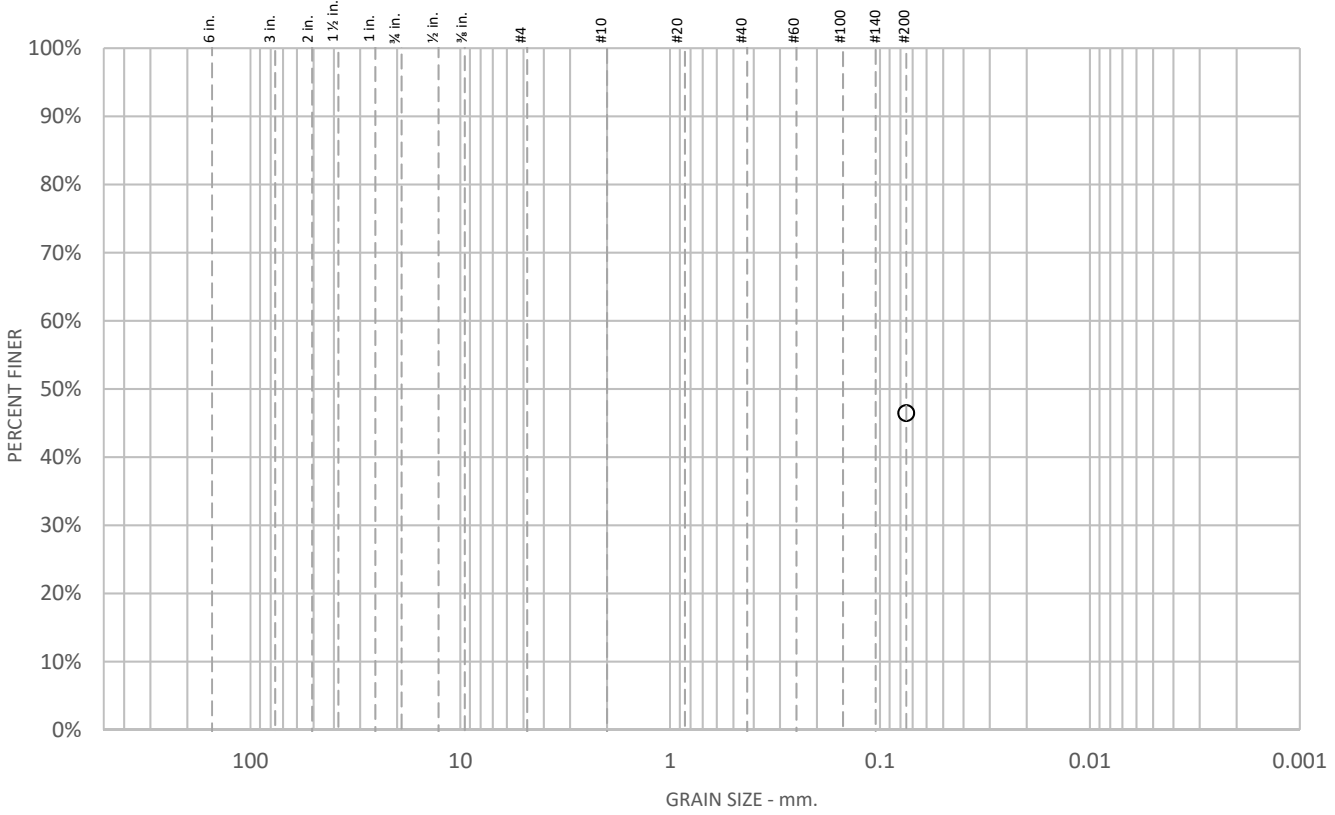
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Tested By: M. Quasem

Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						46.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	46.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 31 PI = 13

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 106.82 g

Sample Number: 1-B4 @ 52-53

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

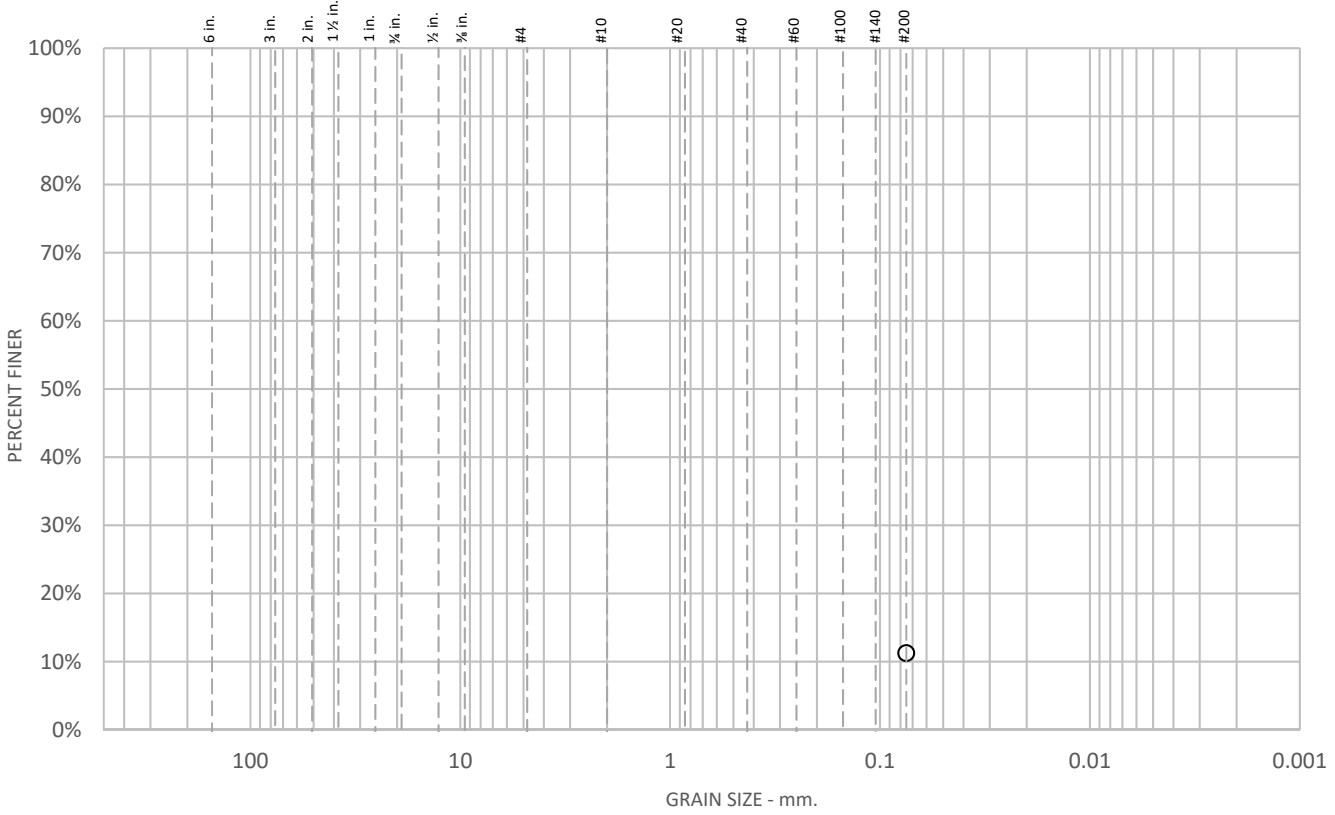
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Tested By: M. Quasem

Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						11.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	11.2		

* (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 =

Remarks

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 587.76 g

Sample Number: 1-B4 @ 9-10.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

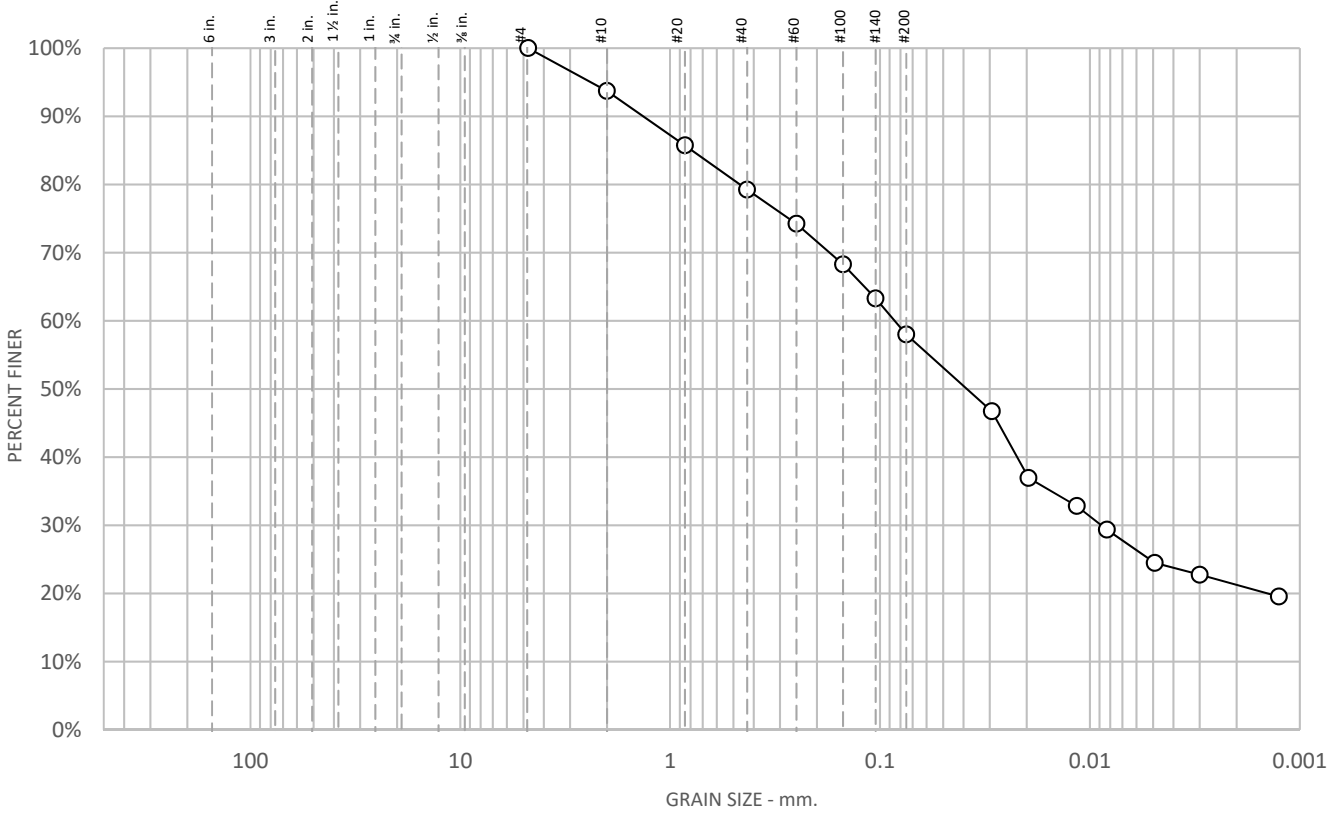
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			6.3	14.5	21.2	36.7	21.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	93.7		
#20	85.7		
#40	79.2		
#60	74.2		
#100	68.3		
#140	63.3		
#200	58.0		
0.0293 mm.	46.7		
0.0196 mm.	36.9		
0.0115 mm.	32.8		
0.0083 mm.	29.4		
0.0049 mm.	24.5		
0.0030 mm.	22.7		
0.0013 mm.	19.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 34 PI = 17

Coefficients

D_{90} = 1.3429 mm D_{85} = 0.7870 mm D_{60} = 0.0852 mm
D_{50} = 0.0385 mm D_{30} = 0.0088 mm D_{15} =
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method

Sample Number: 1-B4 @ 46-47.5

Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Isotropic Unconsolidated Undrained Triaxial Test

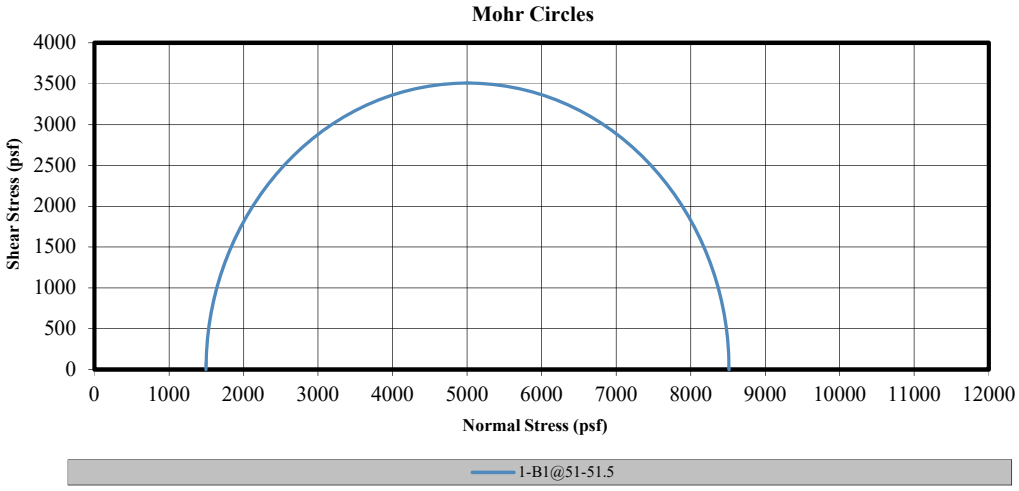
ASTM D2850

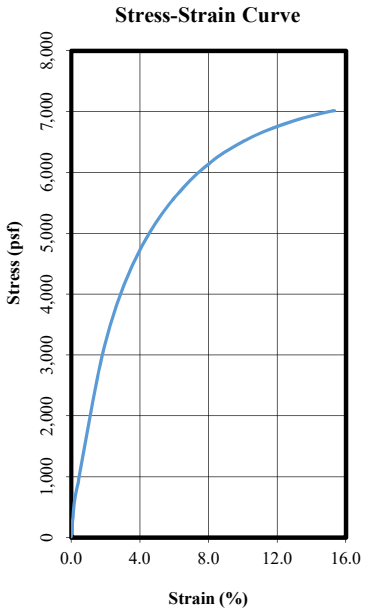
Date: 06/18/19

Checked By: D. Seibold

Date: 6/18/2019

Tested By: G. Criste





Before Test	Specimen 1-B1@51-51.5			
Water Content (%)	21.08			
Dry Density (pcf)	109.40			
Saturation (%)	98.83			
Void Ratio	0.60			
Diameter (in)	2.385			
Height (in)	5.055			
Height-to-Diameter Ratio	2.119			
ASTM D4318 - Wet Method				
Liquid Limit	n/a			
Plastic Limit	n/a			
ASTM D854 - Measured				
Specific Gravity	2.800			
After Test	**1-B1@51-51.5**			
Water Content (%)	21.08			
Saturation (%)	98.83			
Strain Rate (in/min)	0.05			
Peak Deviator Stress (psf)	7016.4			
Axial Strain @ Failure (%)	15.333			
	Cell Pressure			
Cell (psf)	1497.6			
Back (psf)	n/a			
	Principle Stresses at Failure			
σ1 (psf)	8514.0			
σ3 (psf)	1497.6			
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		3508.2			
Friction Angle Ø	n/a		n/a			

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/18/19

Checked By: D. Seibold

Date: 6/18/2019

Tested By: G. Criste

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B1@51-51.5	
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

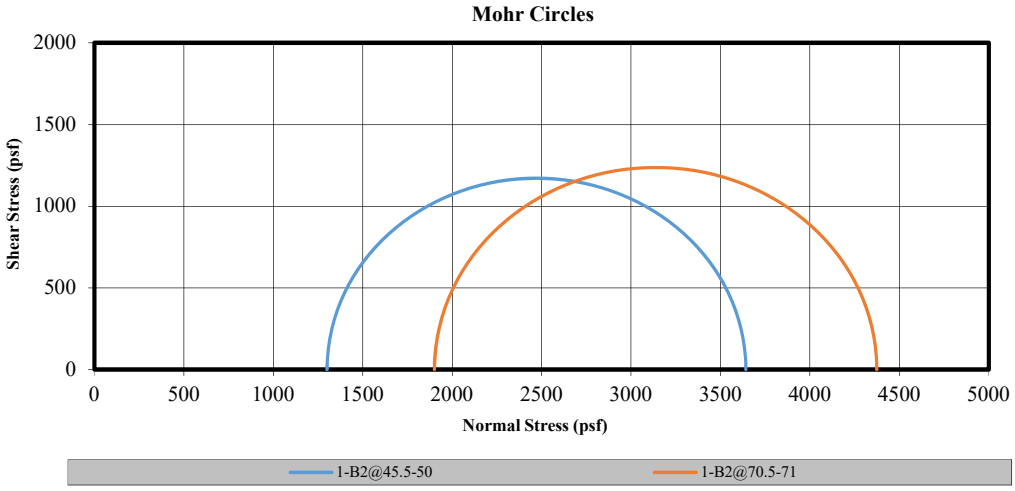
ASTM D2850

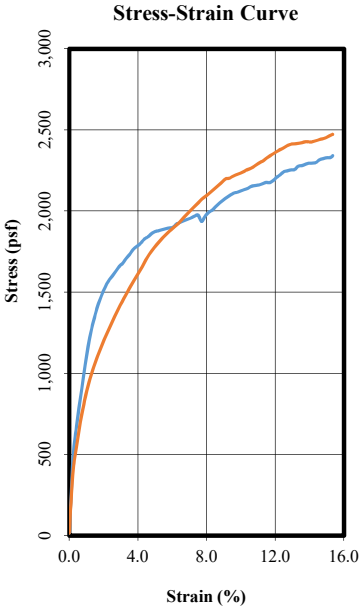
Date: 06/24/19

Checked By: G. Criste

Date: 6/24/2019

Tested By: M. Quasem





Before Test	Specimen 1-B2@45.5-46	1-B2@70.5-71		
Water Content (%)	14.92	25.23		
Dry Density (pcf)	123.20	101.70		
Saturation (%)	100.73	100.84		
Void Ratio	0.41	0.69		
Diameter (in)	2.383	2.373		
Height (in)	4.800	5.050		
Height-to-Diameter Ratio	2.014	2.128		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.790	2.750		
After Test	**1-B2@45.5-46**	**1-B2@70.5-71**		
Water Content (%)	14.92	25.23		
Saturation (%)	100.00	100.00		
Strain Rate (in/min)	15.00	15.00		
Peak Deviator Stress (psf)	2341.2	2473.1		
Axial Strain @ Failure (%)	15.340	15.342		
	Cell Pressure			
Cell (psf)	1300.3	1900.8		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3641.6	4373.9		
σ3 (psf)	1300.3	1900.8		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1170.6	1236.6		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Projects
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

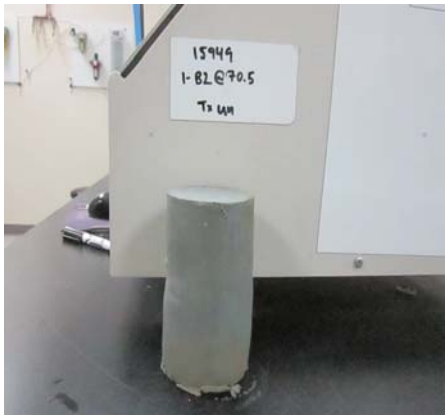
Date: 06/24/19

Checked By: G. Criste

Date: 6/24/2019

Tested By: M. Quasem

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B2@45.5-46	SAMPLE NUMBER: 1-B2@70.5-71
	
SAMPLE NUMBER:	**SAMPLE NUMBER:**

Project Information	
Project Name:	GEX for Multiple Projects
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

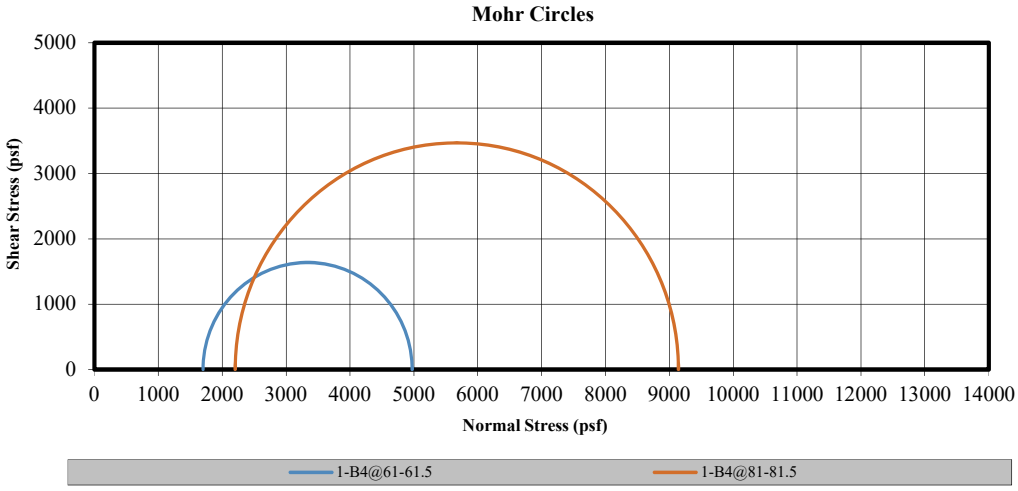
ASTM D2850

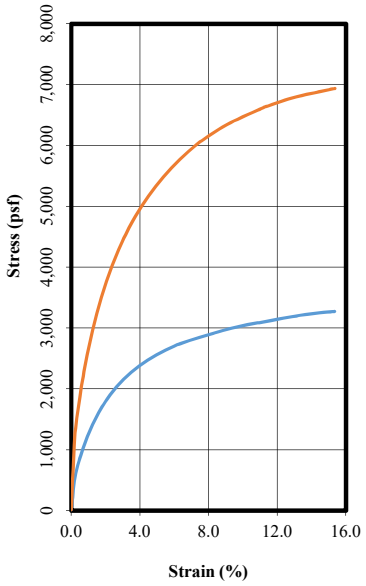
Date: 06/17/19

Checked By: G. Criste

Date: 6/17/2019

Tested By: N. Buckton





Before Test	Specimen 1-B4@61-61.5	1-B4@81-81.5		
Water Content (%)	22.50	18.03		
Dry Density (pcf)	106.00	113.10		
Saturation (%)	99.93	97.89		
Void Ratio	0.62	0.50		
Diameter (in)	2.417	2.418		
Height (in)	5.026	5.062		
Height-to-Diameter Ratio	2.079	2.093		
ASTM D4318 - Wet Method				
Liquid Limit	n/a	n/a		
Plastic Limit	n/a	n/a		
ASTM D854 - Assumed				
Specific Gravity	2.749	2.720		
After Test	1-B4@61-61.5	1-B4@81-81.5		
Water Content (%)	22.50	18.03		
Saturation (%)	99.93	97.88		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	3274.1	6938.3		
Axial Strain @ Failure (%)	15.340	15.358		
	Cell Pressure			
Cell (psf)	1699.2	2203.2		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	4973.3	9141.5		
σ3 (psf)	1699.2	2203.2		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1637.1	3469.2		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/17/19

Checked By: G. Criste

Date: 6/17/2019

Tested By: N. Buckton

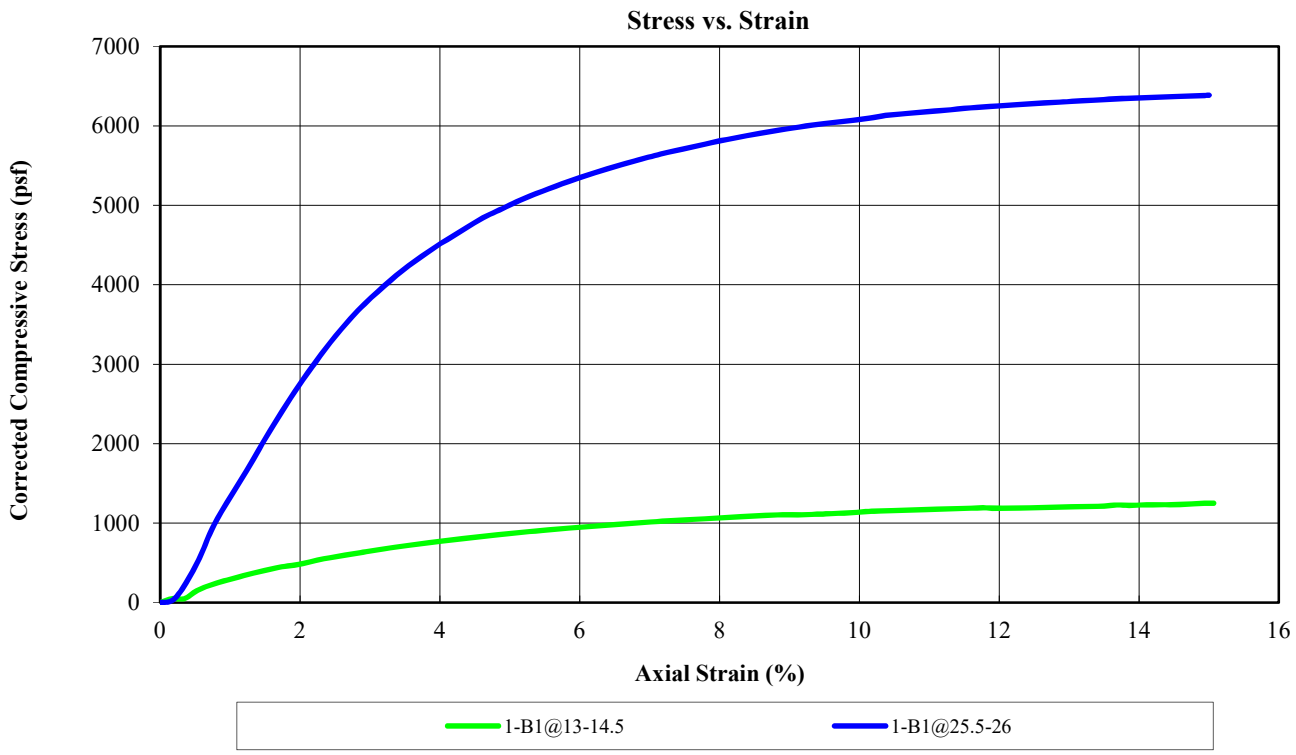
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B4@61-61.5	SAMPLE NUMBER: 1-B4@81-81.5
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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UNCONFINED COMPRESSION TEST REPORT
ASTM D2166



	SPECIMEN	
BEFORE TEST	**1-B1@13-14.5**	**1-B1@25.5-26**
Moisture Content (%)	24.8	22.6
Dry Density (pcf)	103.3	105.5
Saturation (%)	100.0	100.0
Void Ratio	0.60	0.57
Diameter (in)	2.394	2.391
Height (in)	5.85	5.37
Height-To-Diameter Ratio	2.44	2.25
TEST DATA		
Unconfined Compressive Strength (psf)	1377	6386
Undrained Shear Strength (psf)	688	3193
Strain Rate (in./min.)	0.05	0.05
Specific Gravity	2.650	2.650
Strain at Failure (%)	15.00	15.00
Liquid Limit		
Plastic Limit		
Test Remarks	Specific gravity of 2.65 assumed.	

SPECIMEN	DESCRIPTION
1-B1@13-14.5	See exploration logs
1-B1@25.5-26	See exploration logs

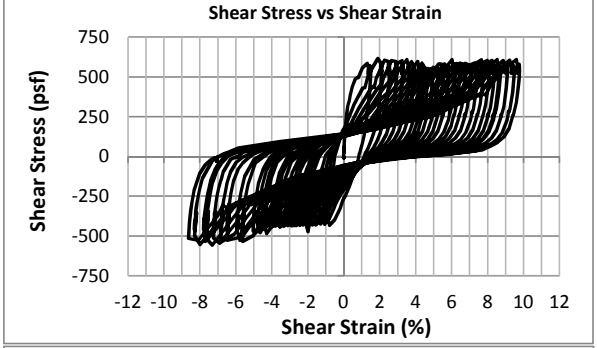
PROJECT NAME: GEX for Multiple Parcels
PROJECT NO: 15949.000.000
CLIENT: Google, LLC
LOCATION: Mountain View, CA
PHASE NO: LAB

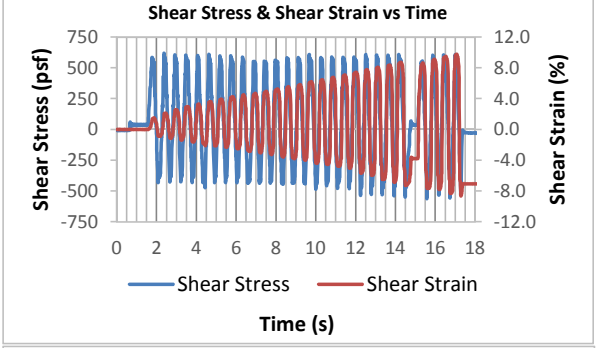
Report Date: 06/19/19
Tested By: R. Montalvo
Reviewed By: M. Gilbert

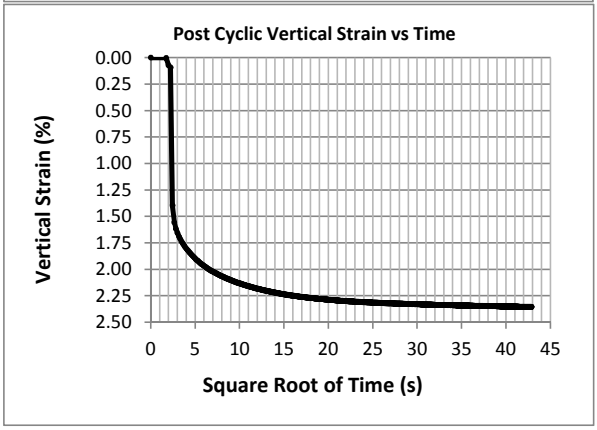
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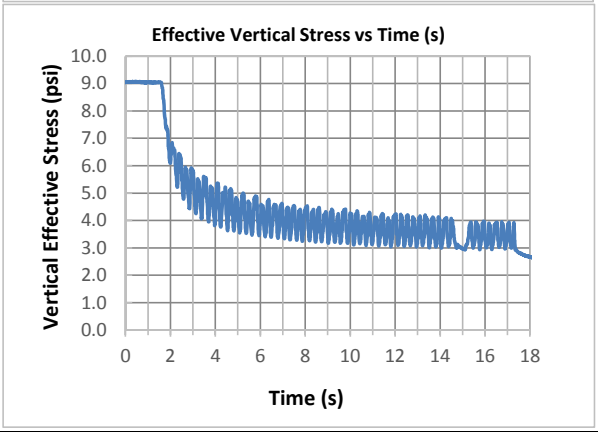
Cyclic Simple Shear

ASTM D6528 - Modified









Test Conditions		Results		Maximum	Minimum
Confining Condition	Plain Membrane w/Chamber Pressure	Vertical Effective Stress (psf)	Deviatoric	783.5	-54.8
Applied Lateral Effective Stress (psf)	520.0		Isotropic	520.0	520.0
Resulting K_o after applied, σ_{vc}'	0.398	Shear Strain (%)		9.8	-8.6
Applied Loading Frequency (Hz)	0.500	Post Cyclic Vertical Strain (%)		2.36	
Cycle Limit, N	27				
Single Amp. Strain (+/-)	9.2	**Cyclic Preshear Specimen Condition**			
Applied τ_{cyc} (psf)	617	Preshear Moisture Content (%)		23.93%	
Applied σ_{vc}' (psf)	1308	Preshear Void Ratio		0.6554	
Applied CSR	0.472	Preshear Saturation (%)		100.36%	
		Preshear Dry Density (pcf)		103.53	

Test Date: 6/18/2019

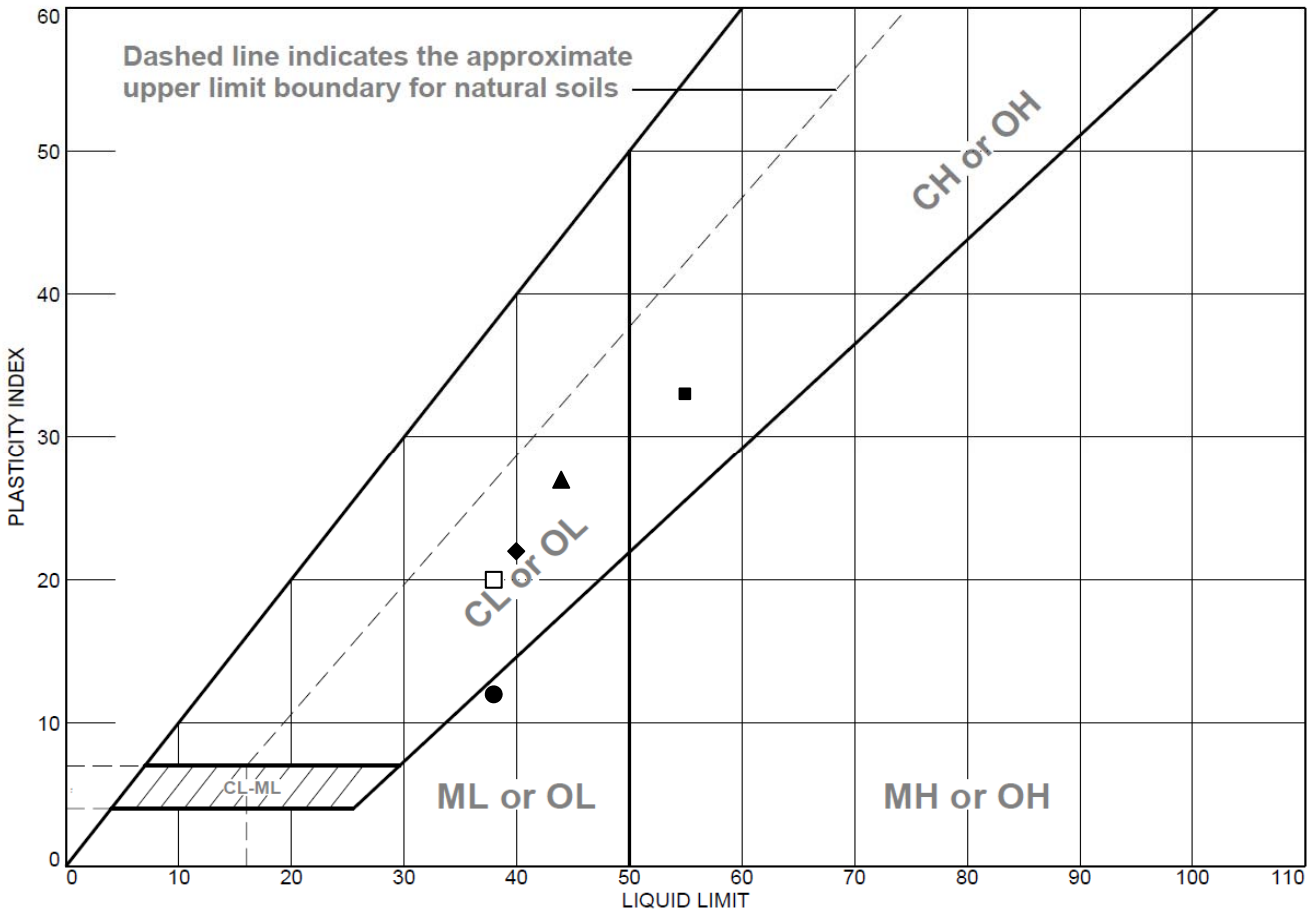
ASTM D2216	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	25.75%	22.72%	**Liquid Limit:**	
Dry Density (pcf):	102.99	105.52	**Plastic Limit:**	
Saturation (%):	96.53%	100.00%	**ASTM D854 - Measured**	
Void Ratio:	0.7331	0.6229	**Specific Gravity:**	2.748
			Soil Description:	See exploration logs

Project Number:	15949.000.000	**Depth:**	15.5-15.75 ft.
Sample Number:	1-B9 @ 15-16.5	**Boring #:**	1-B9
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

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Remarks:

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	44	17	27		68.6	
◆	See exploration logs	40	18	22			
□	See exploration logs	38	18	20		60.2	
●	See exploration logs	38	26	12		54.5	
■	See exploration logs	55	22	33			

Project No.: 15949.000.000 **Date:** 6/18/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google LLC

▲ **Sample Number:** 1-B7 **Depth:** 20-21.5
◆ **Sample Number:** 1-B7 **Depth:** 40-41.5
□ **Sample Number:** 1-B7 **Depth:** 45-46.5
● **Sample Number:** 1-B7 **Depth:** 60-61.5
■ **Sample Number:** 1-B7 **Depth:** 70-71.5

Remarks:

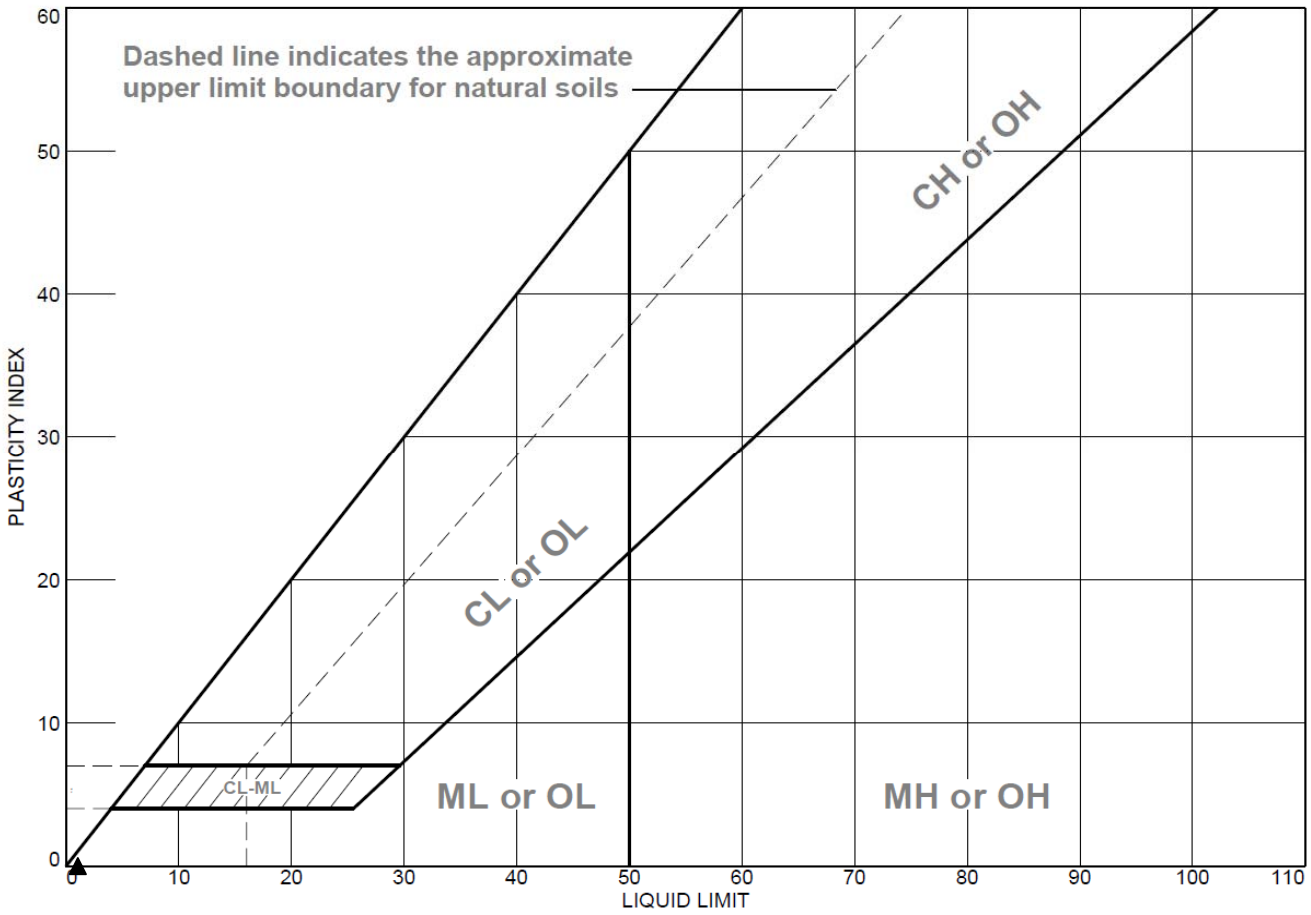
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140
◆ PI: ASTM D4318, Wet Method
□ PI: ASTM D4318, Wet Method, GS: ASTM D1140
● PI: ASTM D4318, Wet Method, GS: ASTM D1140
■ PI: ASTM D4318, Wet Method

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
▲	See exploration logs	NV	NP	NP		52.9	

Project No.: 15949.000.000 **Date:** 6/18/2019

Project Name: GEX for Multiple Parcels

Project location: Sunnyvale, California

Client: Google LLC

▲ **Sample Number:** 1-B7 **Depth:** 80-81

Remarks:

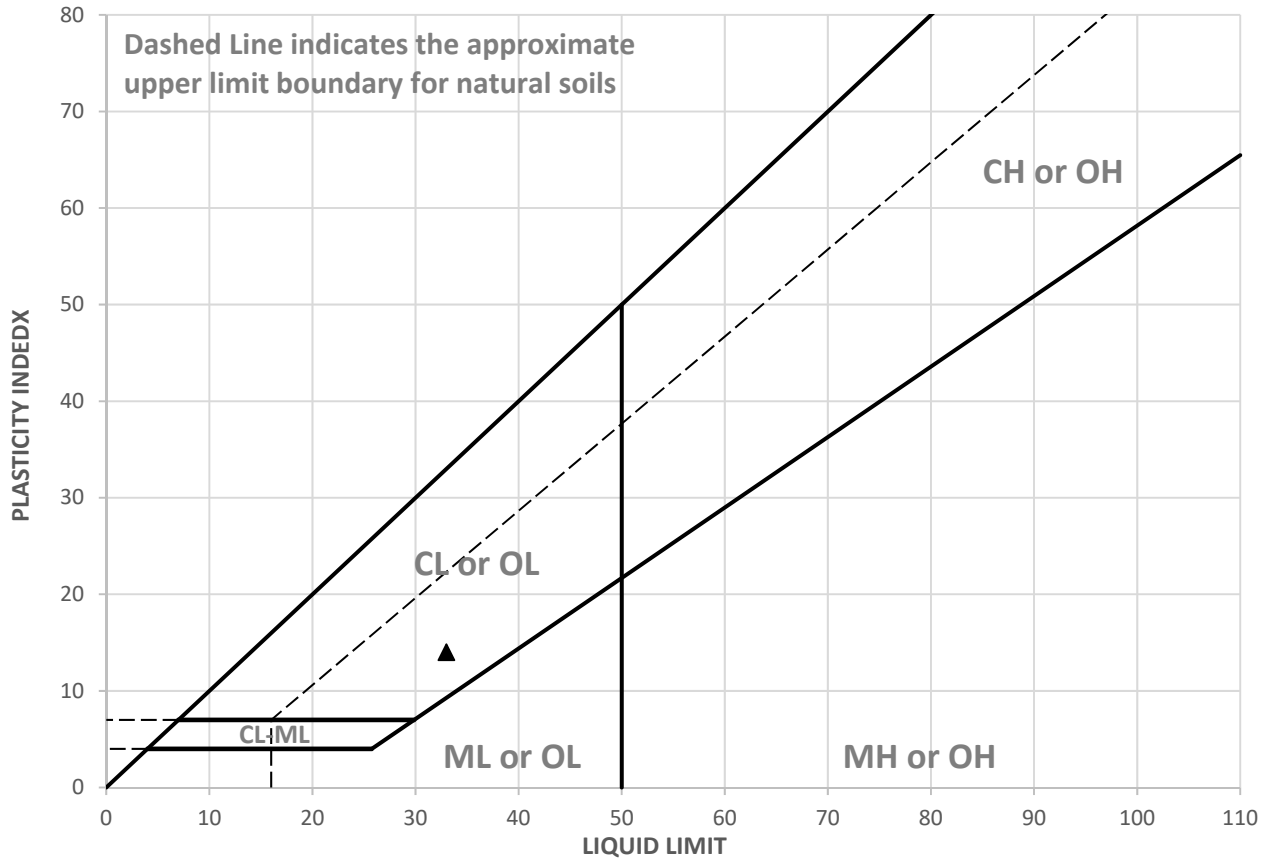
▲ PI: ASTM D4318, Wet Method, GS: ASTM D1140

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Tested By: M. Quasem Checked By: W. Miller

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
See exploration logs	33	19	14	90.2	67.4	CL

Project No.: 15949.000.000 **Date:** 7/25/2019
Project Name: GEX for Multiple Parcels
Project location: Sunnyvale, California
Client: Google, LLC
Sample Number: 1-B7@5-6.5 **Depth:** 5.0-6.5 ft

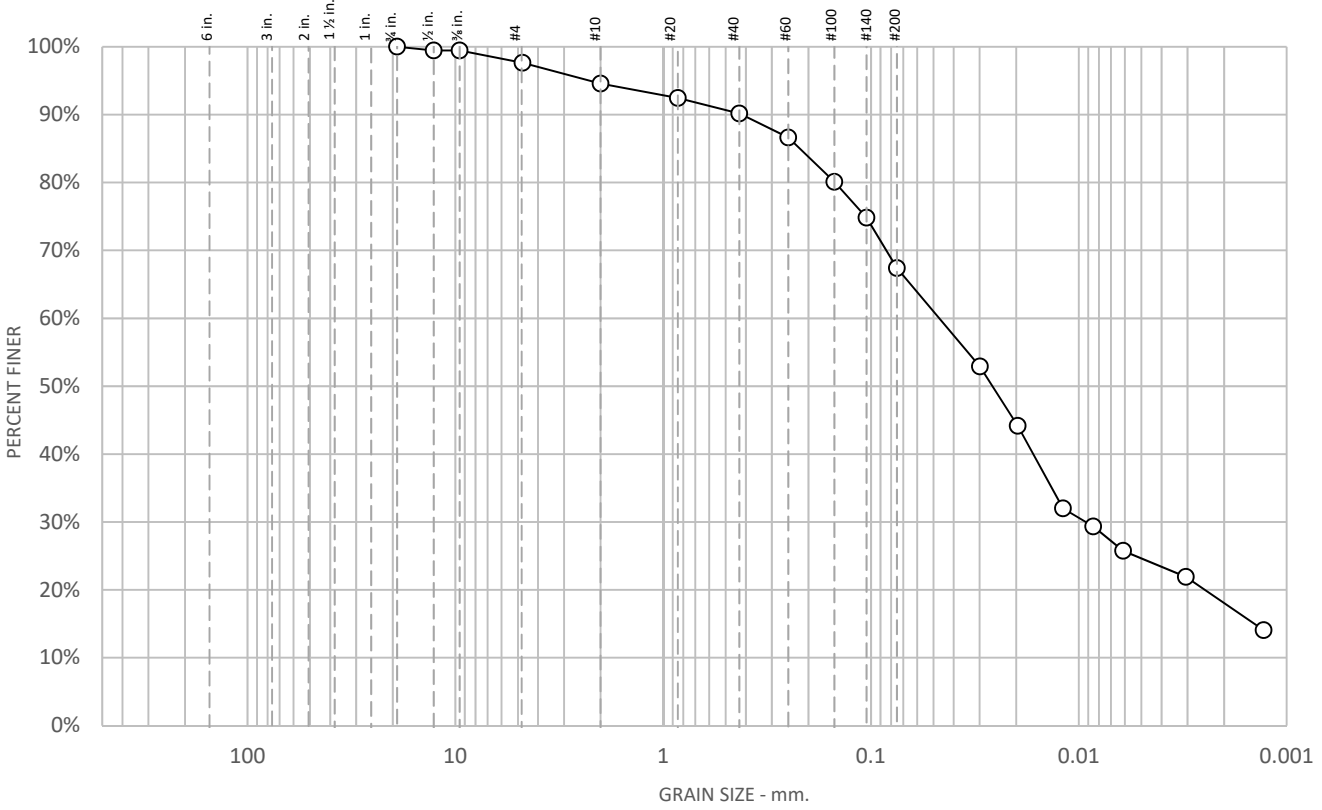
Remarks:
PI: ASTM D4318, Wet Method, GS: ASTM D422, USCS: ASTM D2487

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.6	1.8	3.1	4.4	22.8	49.3	18.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
½ in.	99.4		
⅜ in.	99.4		
#4	97.6		
#10	94.6		
#20	92.5		
#40	90.2		
#60	86.6		
#100	80.1		
#140	74.8		
#200	67.4		
0.0299 mm.	52.9		
0.0197 mm.	44.2		
0.0119 mm.	32.0		
0.0085 mm.	29.3		
0.0061 mm.	25.7		
0.0031 mm.	21.9		
0.0013 mm.	14.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 33 PI = 14

Coefficients

D_{90} = 0.4196 mm D_{85} = 0.2201 mm D_{60} = 0.0469 mm
D_{50} = 0.0260 mm D_{30} = 0.0093 mm D_{15} = 0.0014 mm
D_{10} = C_u = C_c =

Classification

USCS = CL

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B7 @ 5.0-6.5 feet

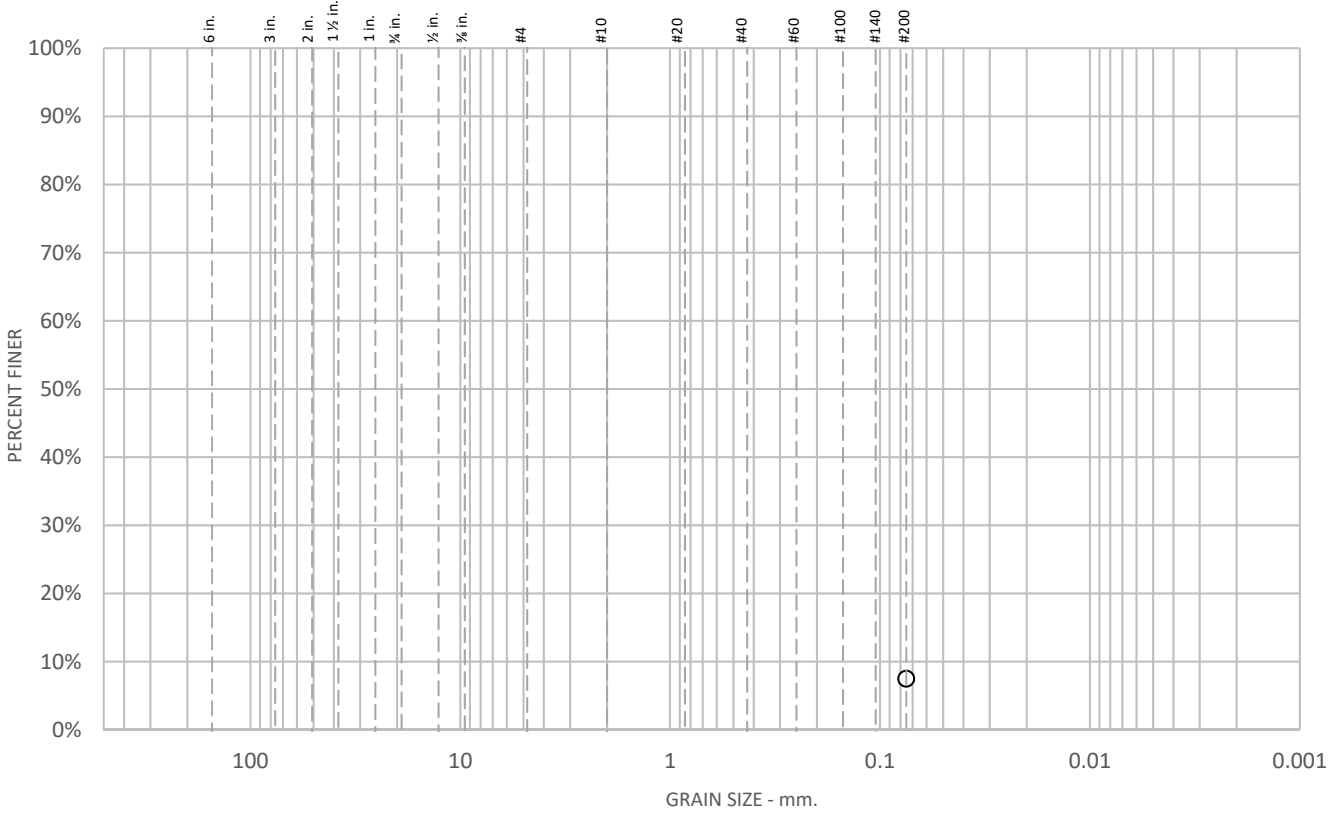
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 7/25/2019
Project location: Sunnyvale, California

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	7.5		

* (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 =

Remarks

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 269.82 g

Sample Number: 1-B7 @ 12-13.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

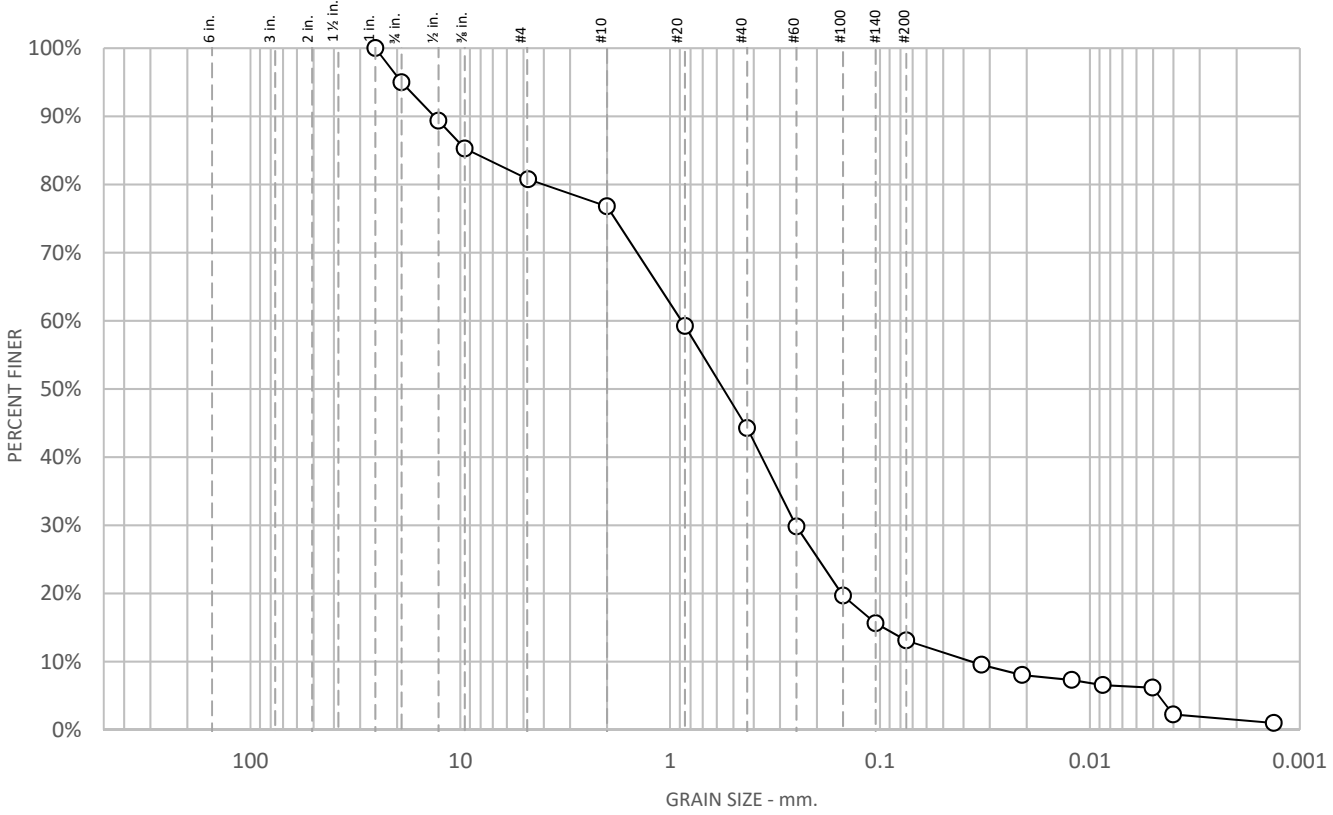
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	5.0	14.2	4.0	32.5	31.2	11.7	1.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	95.0		
½ in.	89.3		
⅜ in.	85.3		
#4	80.8		
#10	76.8		
#20	59.2		
#40	44.3		
#60	29.8		
#100	19.7		
#140	15.6		
#200	13.1		
0.0329 mm.	9.5		
0.0210 mm.	8.0		
0.0122 mm.	7.3		
0.0087 mm.	6.6		
0.0050 mm.	6.2		
0.0040 mm.	2.2		
0.0013 mm.	1.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 13.3146 mm D_{85} = 9.1304 mm D_{60} = 0.8825 mm
D_{50} = 0.5583 mm D_{30} = 0.2516 mm D_{15} = 0.0965 mm
D_{10} = 0.0366 mm C_u = 24.12 C_c = 1.96

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 15A

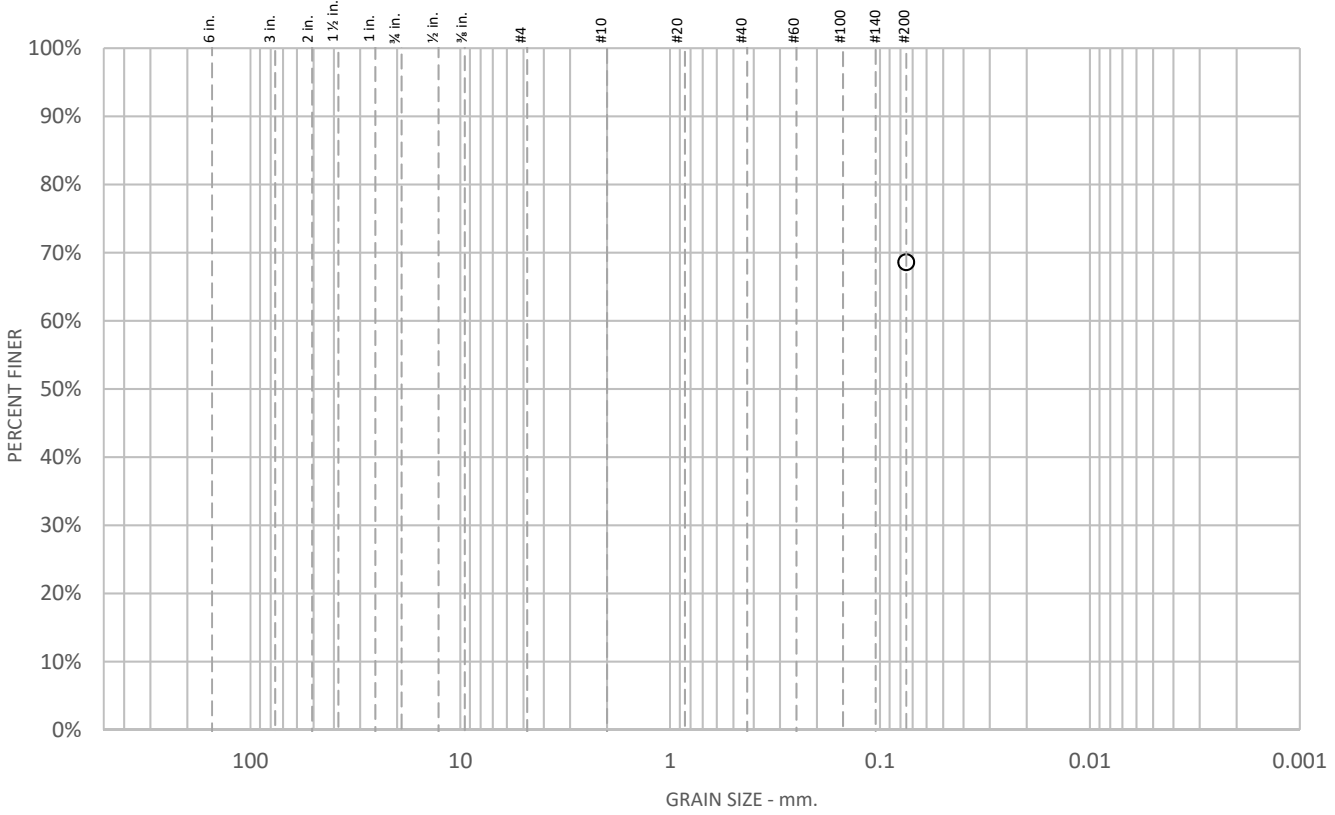
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						68.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	68.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 44 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 312.28 g

Sample Number: 1-B7 @ 20-21.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

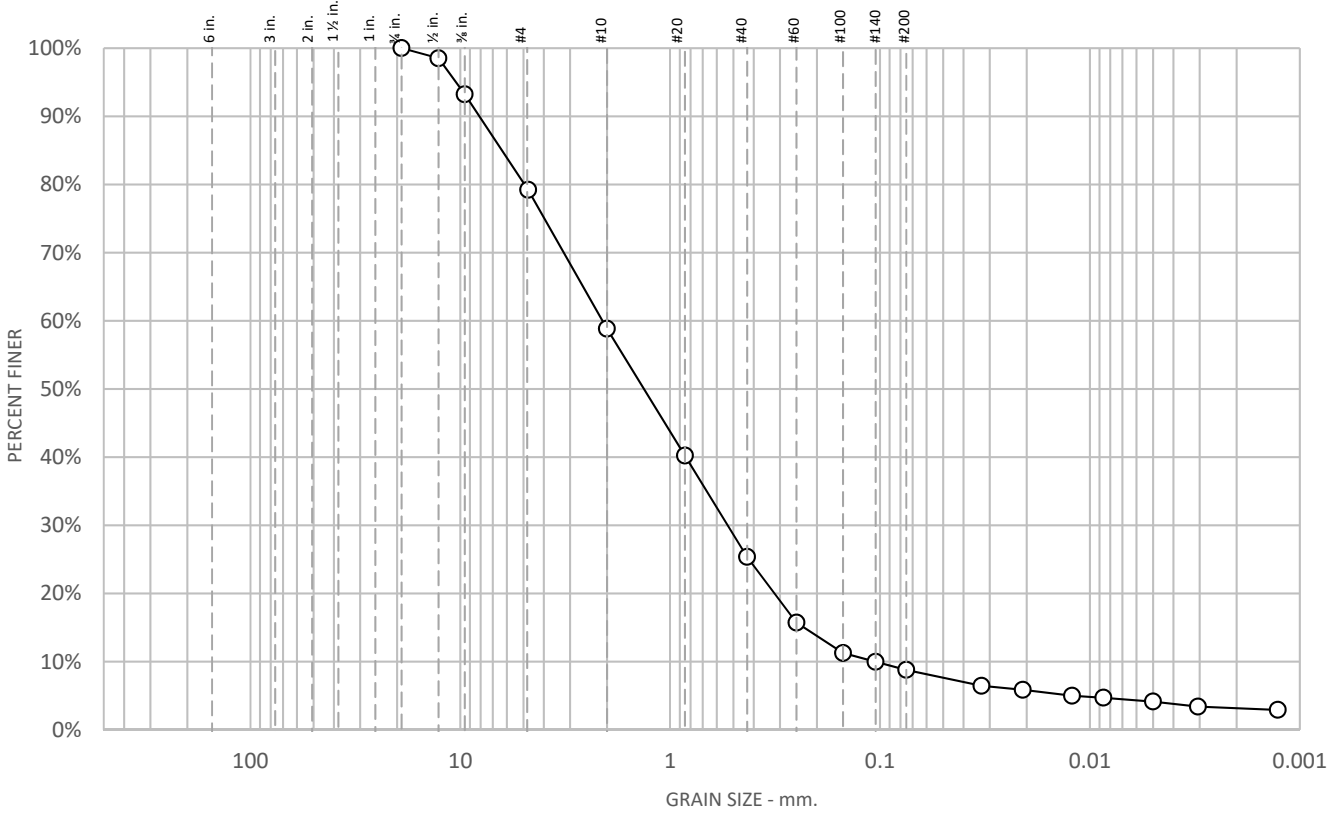
Project Number: 15949.000.000
Date: 6/18/2019

ENGEO Expect Excellence

Tested By: M. Quasem
Checked By: G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	20.8	20.4	33.5	16.6	5.6	3.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
½ in.	98.5		
⅜ in.	93.2		
#4	79.2		
#10	58.8		
#20	40.2		
#40	25.4		
#60	15.7		
#100	11.3		
#140	10.0		
#200	8.8		
0.0328 mm.	6.4		
0.0209 mm.	5.9		
0.0122 mm.	5.0		
0.0086 mm.	4.7		
0.0050 mm.	4.1		
0.0031 mm.	3.4		
0.0013 mm.	2.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 8.1141 mm D_{85} = 6.3321 mm D_{60} = 2.1018 mm
D_{50} = 1.3328 mm D_{30} = 0.5321 mm D_{15} = 0.2302 mm
D_{10} = 0.1060 mm C_u = 19.83 C_c = 1.27

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 34-35.5

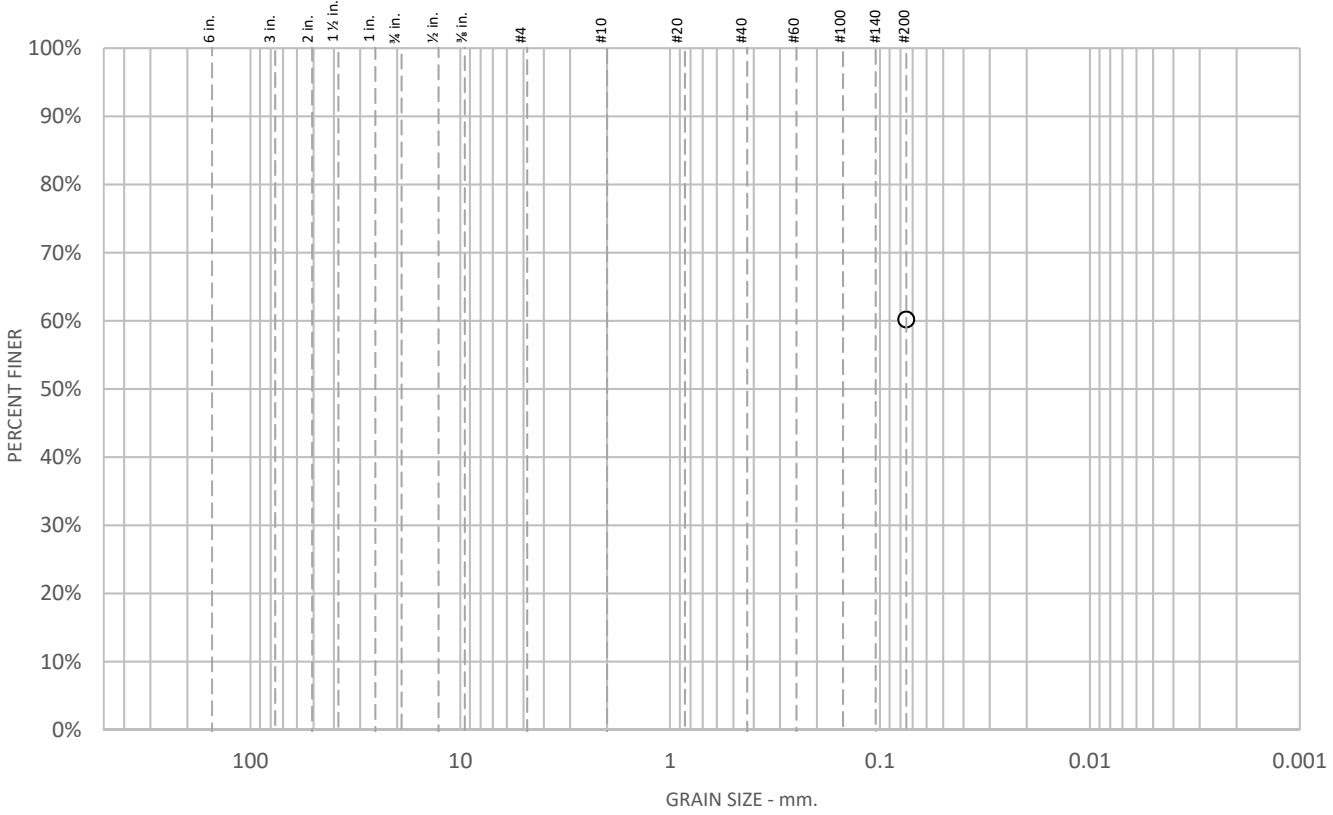
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	60.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 18 LL = 38 PI = 20

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 96.28 g

Sample Number: 1-B7 @ 45-46.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

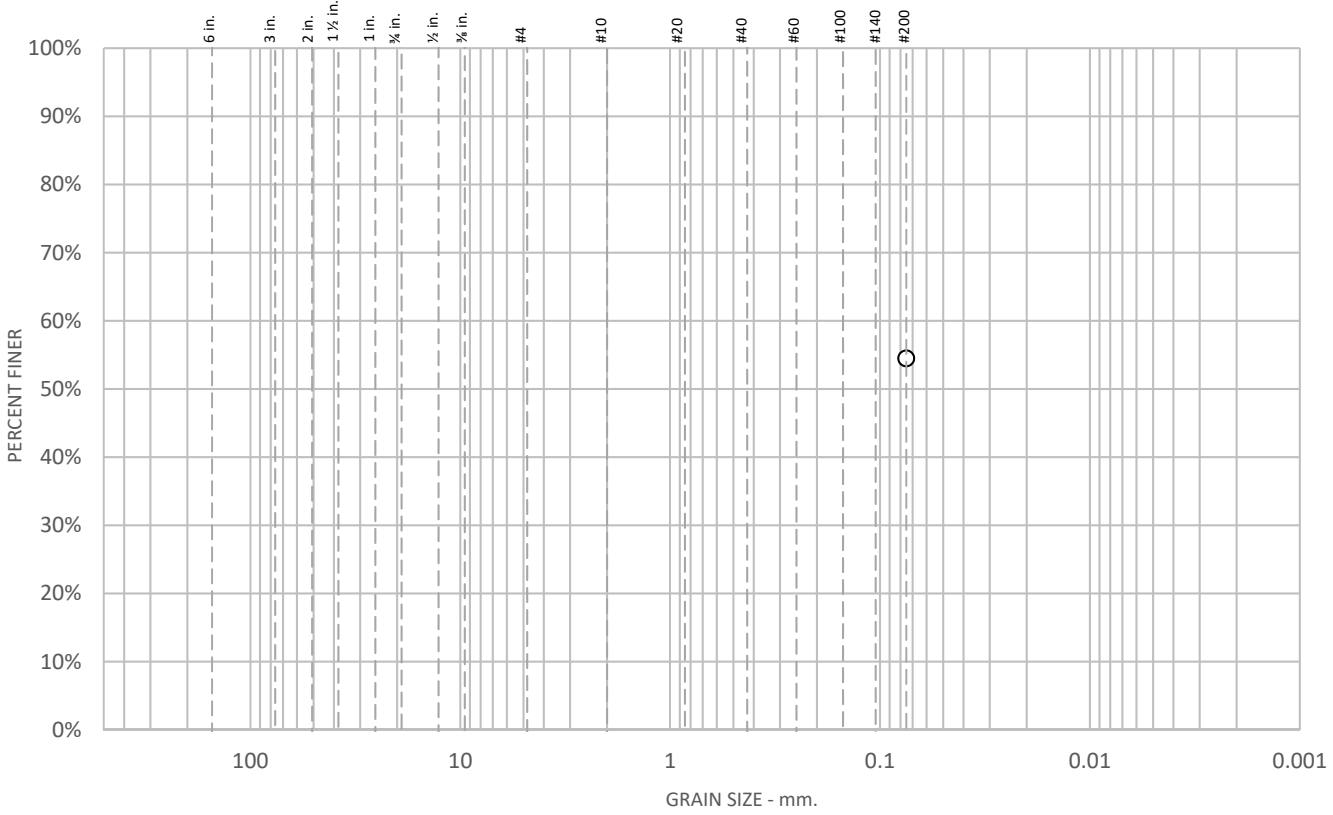
Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						54.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	54.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 26 LL = 38 PI = 12

Coefficients

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

Classification

USCS = ML

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 118.25 g

Sample Number: 1-B7 @ 61-61.5

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

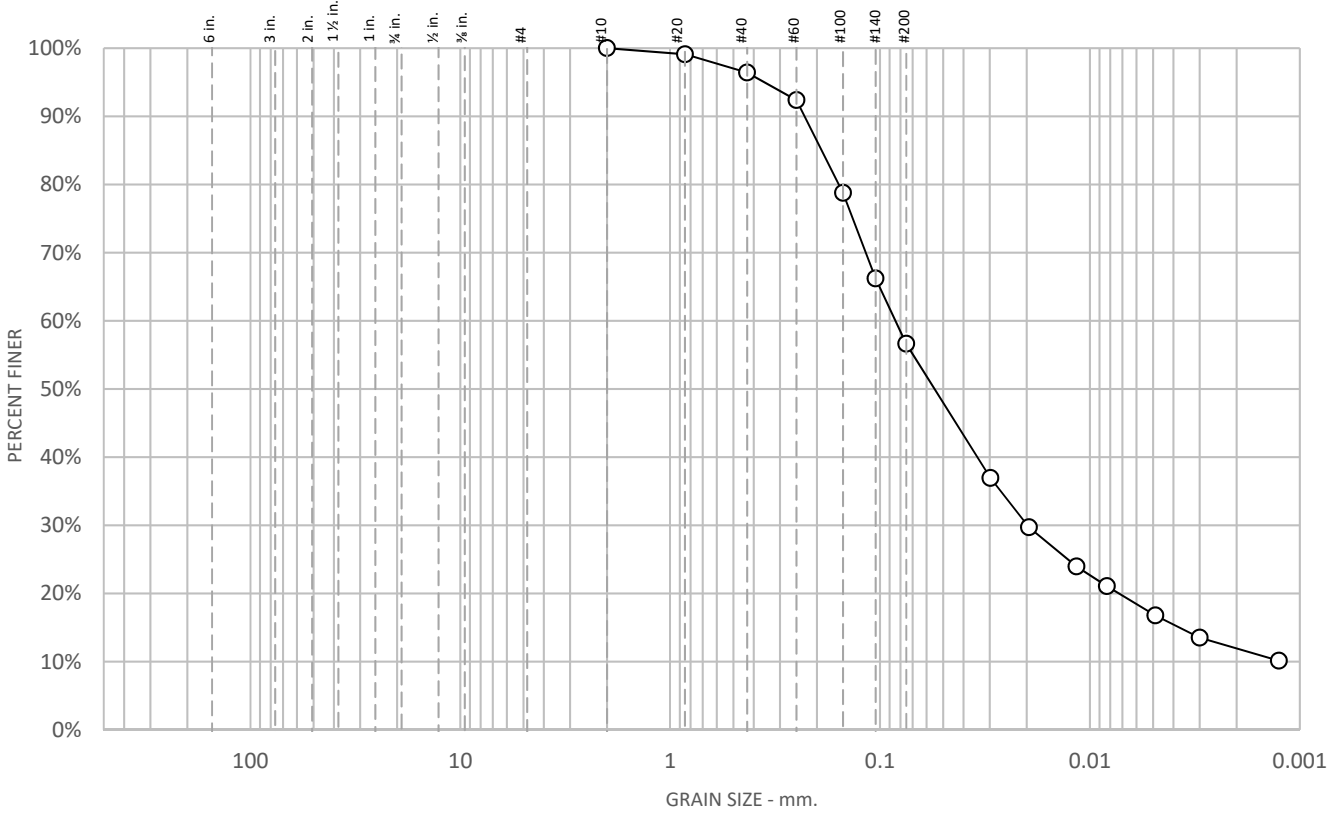
Project Number: 15949.000.000
Date: 6/18/2019

ENGEO Expect Excellence

Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				3.6	39.8	44.7	11.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.1		
#40	96.4		
#60	92.4		
#100	78.8		
#140	66.2		
#200	56.6		
0.0298 mm.	36.9		
0.0195 mm.	29.7		
0.0116 mm.	23.9		
0.0083 mm.	21.1		
0.0049 mm.	16.8		
0.0030 mm.	13.5		
0.0013 mm.	10.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2287 mm D_{85} = 0.1896 mm D_{60} = 0.0844 mm
D_{50} = 0.0550 mm D_{30} = 0.0198 mm D_{15} = 0.0037 mm
D_{10} = C_u = C_c =

Classification

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B7 @ 8.0-10.0

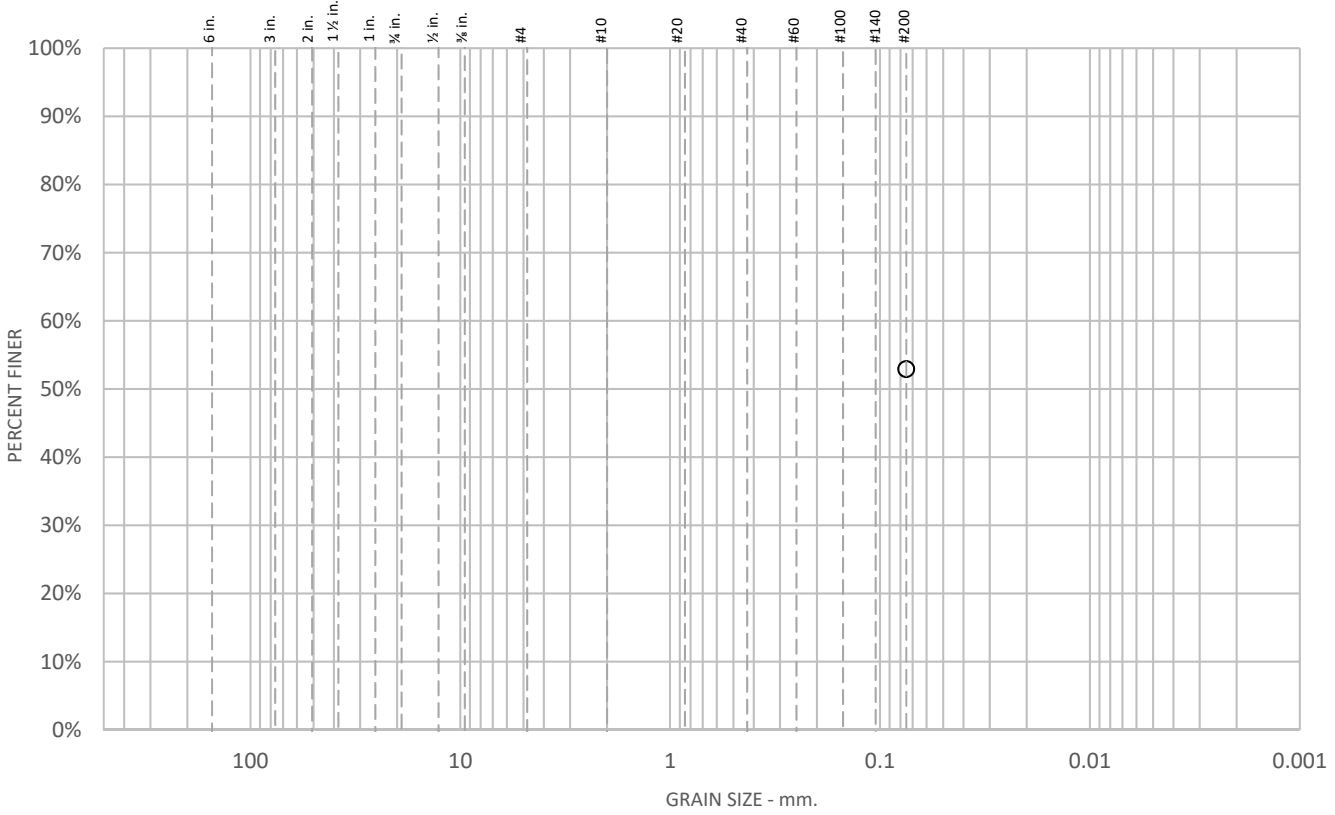
Client: Google, LLC **Project Number:** 15949.000.000
Project: GEX for Multiple Parcels **Date:** 6/18/2019
Project location: Sunnyvale, California

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						52.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	52.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = NP LL = NV PI = NP

Coefficients

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

Classification

USCS =

Remarks

PI: ASTM D4318, Wet Method

ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 173.83 g

Sample Number: 1-B7 @ 80-81

Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California

Project Number: 15949.000.000
Date: 6/18/2019

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Tested By: M. Quasem **Checked By:** G. Criste

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Isotropic Unconsolidated Undrained Triaxial Test

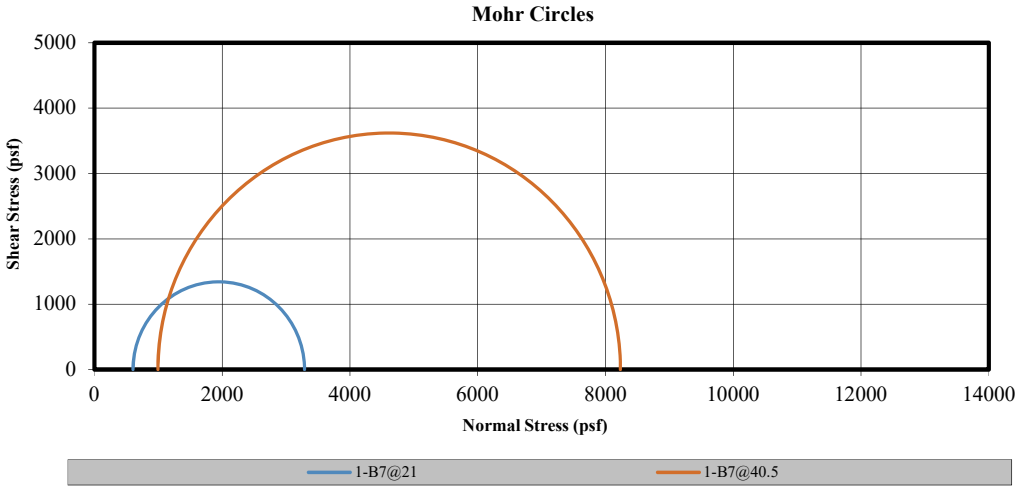
ASTM D2850

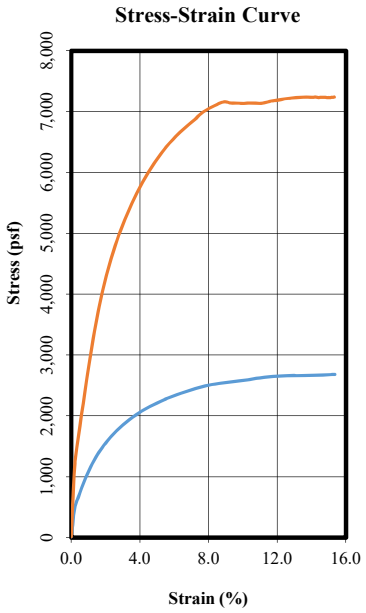
Date: 06/14/19

Checked By: G. Criste

Date: 6/14/2019

Tested By: N. Buckton





Before Test	Specimen 1-B7@21	1-B7@40.5		
Water Content (%)	23.62	20.96		
Dry Density (pcf)	103.30	108.20		
Saturation (%)	99.84	99.76		
Void Ratio	0.64	0.57		
Diameter (in)	2.404	2.404		
Height (in)	5.005	5.067		
Height-to-Diameter Ratio	2.082	2.108		
ASTM D4318 - Wet Method				
Liquid Limit				
Plastic Limit				
ASTM D854 - Assumed				
Specific Gravity	2.720	2.725		
After Test	**1-B7@21**	**1-B7@40.5**		
Water Content (%)	23.62	20.96		
Saturation (%)	99.84	99.76		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	2682.7	7239.9		
Axial Strain @ Failure (%)	15.352	13.619		
	Cell Pressure			
Cell (psf)	604.8	993.6		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3287.5	8233.5		
σ3 (psf)	604.8	993.6		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1341.3	3619.9		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 06/14/19

Checked By: G. Criste

Date: 6/14/2019

Tested By: N. Buckton

SPECIMEN PHOTOS

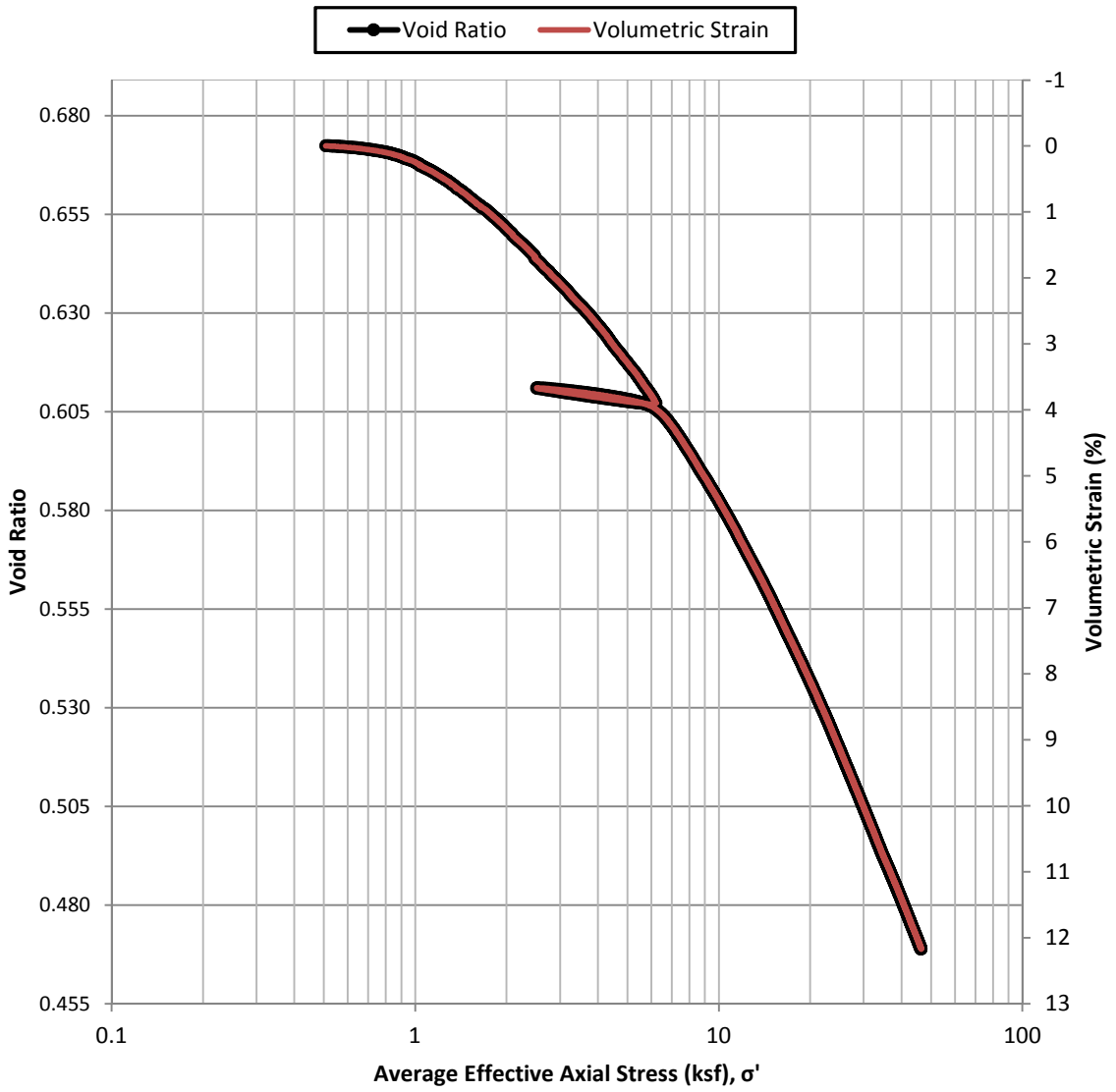
SAMPLE NUMBER: 1-B7@21	SAMPLE NUMBER: 1-B7@40.5
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Sunnyvale, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

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Constant Rate of Strain Consolidation
ASTM D4186

Void Ratio & Volumetric Strain Vs Average Effective Axial Stress (ksf), σ'



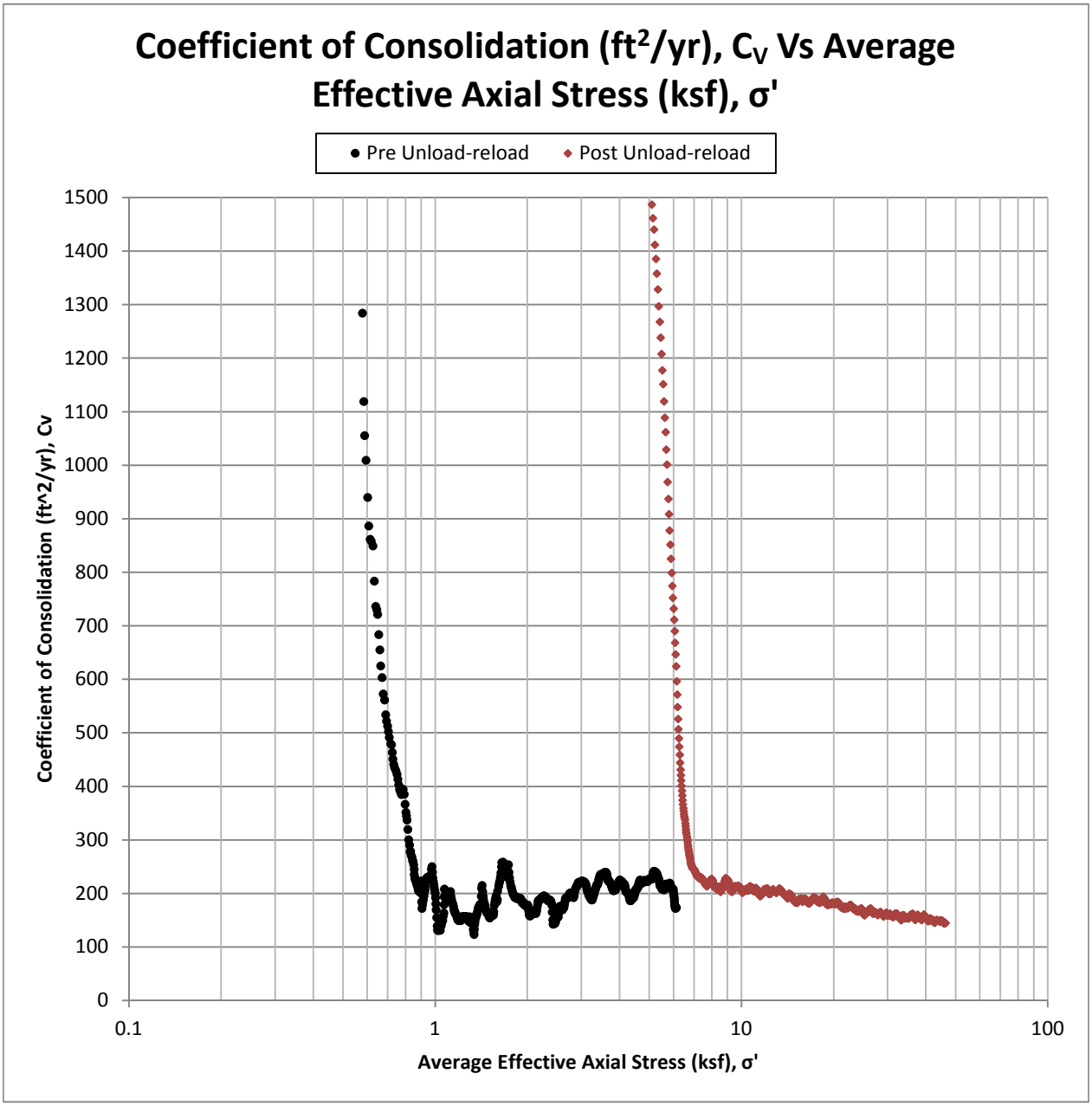
ASTM D2216			Report Date: 6/20/2019	
	As Received	Final	ASTM D4318 - Wet Method	
Moisture (%):	24.42%	17.91%	Liquid Limit:	
Dry Density (pcf):	103.59	117.96	Plastic Limit:	
Saturation (%):	100.96%	100.00%	ASTM D854 - Measured	
Void Ratio:	0.6723	0.4687	Specific Gravity:	2.780
			Soil Description:	See exploration logs

Project Number:	15949.000.000	Depth:	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	Boring #:	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	Reviewed By:	J. Kan

ENGEO Expect Excellence

Remarks:

Constant Rate of Strain Consolidation
ASTM D4186



ASTM D2216			ASTM D4318 - Wet Method	
	As Received	Final	Liquid Limit:	
Moisture (%):	24.42%	17.91%	Plastic Limit:	
Dry Density (pcf):	103.59	117.96	ASTM D854 - Measured	
Saturation (%):	100.96%	100.00%	Specific Gravity:	2.780
Void Ratio:	0.6723	0.4687	Soil Description:	See exploration logs

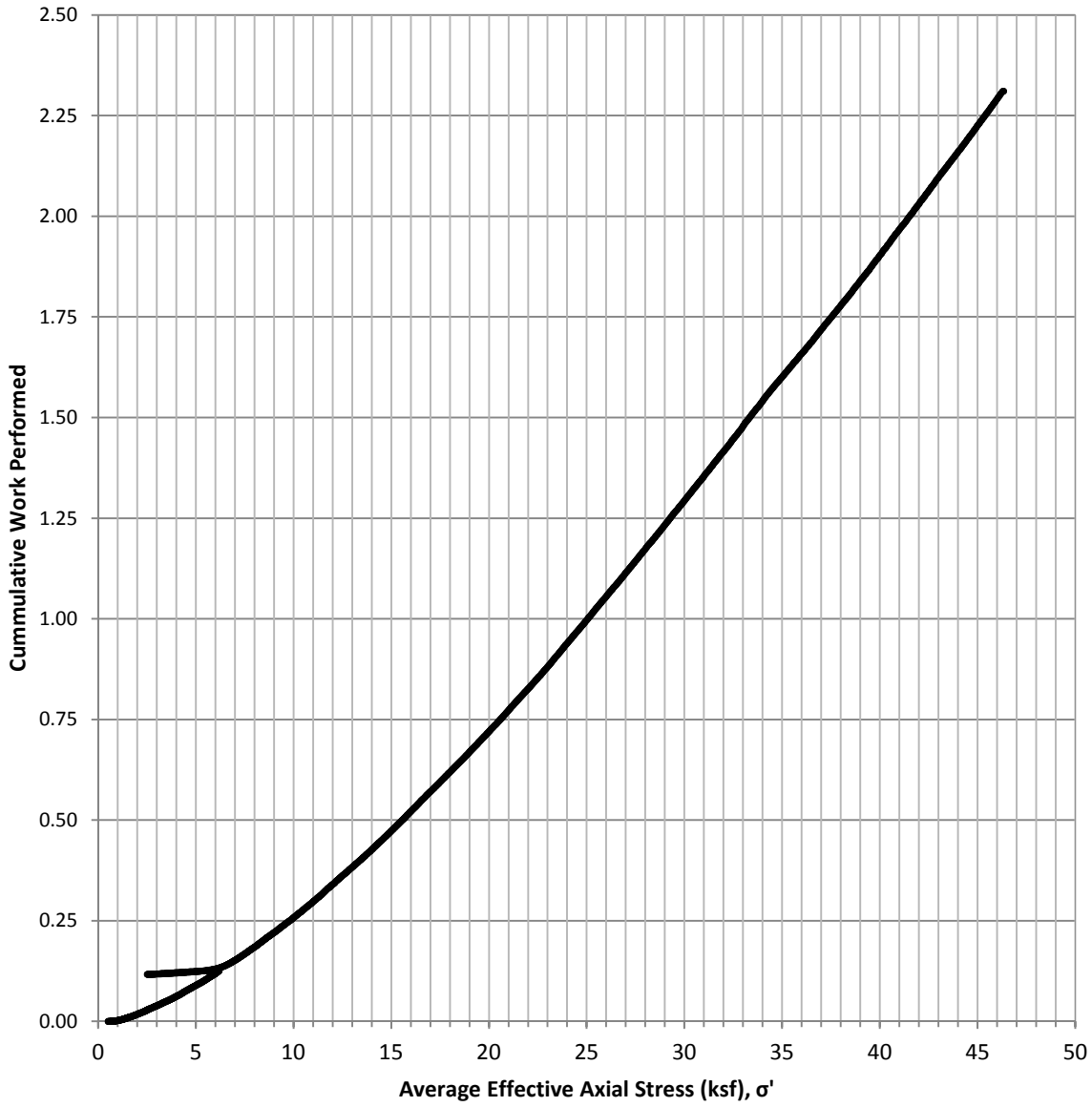
Report Date: 6/20/2019

Project Number:	15949.000.000	**Depth:**	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	**Boring #:**	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

Remarks:

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Constant Rate of Strain Consolidation
ASTM D4186



ASTM D2216			ASTM D4318 - Wet Method	
	As Received	Final		
Moisture (%):	24.42%	17.91%	Liquid Limit:	
Dry Density (pcf):	103.59	117.96	Plastic Limit:	
Saturation (%):	100.96%	100.00%	ASTM D854 - Measured	
Void Ratio:	0.6723	0.4687	Specific Gravity:	2.780
			Soil Description:	See exploration logs

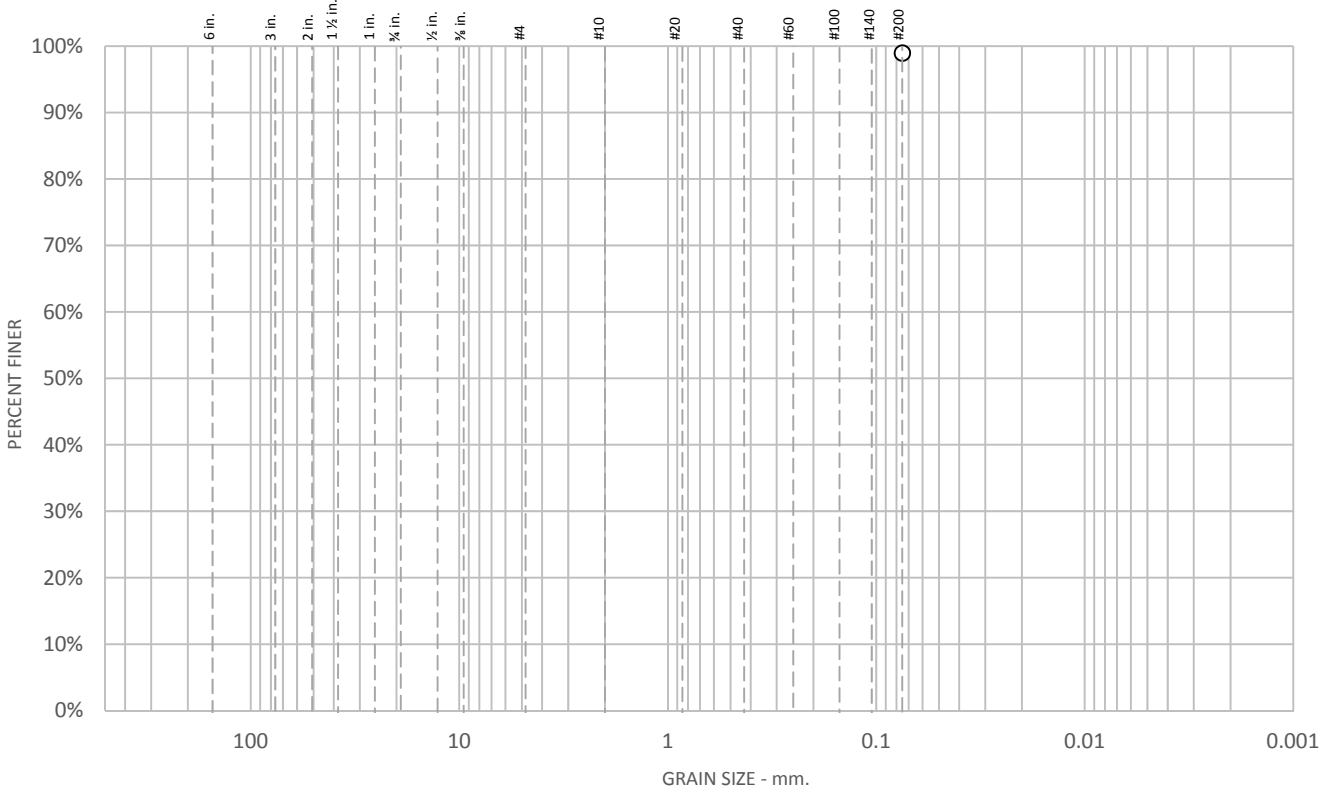
Report Date: 6/20/2019

Project Number:	15949.000.000	**Depth:**	8.75-9 ft.
Sample Number:	1-B7 @ 8-10	**Boring #:**	1-B7
Project Name:	1600 Amphitheater Parkway		
Client:	Google LLC		
Location:	Mountain View, California		
Tested By:	D. Seibold	**Reviewed By:**	J. Kan

Remarks:

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Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						98.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	98.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 30 LL = 59 PI = 29

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 120 min
Dry sample weight = 81.69 g

Sample Number: 1-B3 @ 10

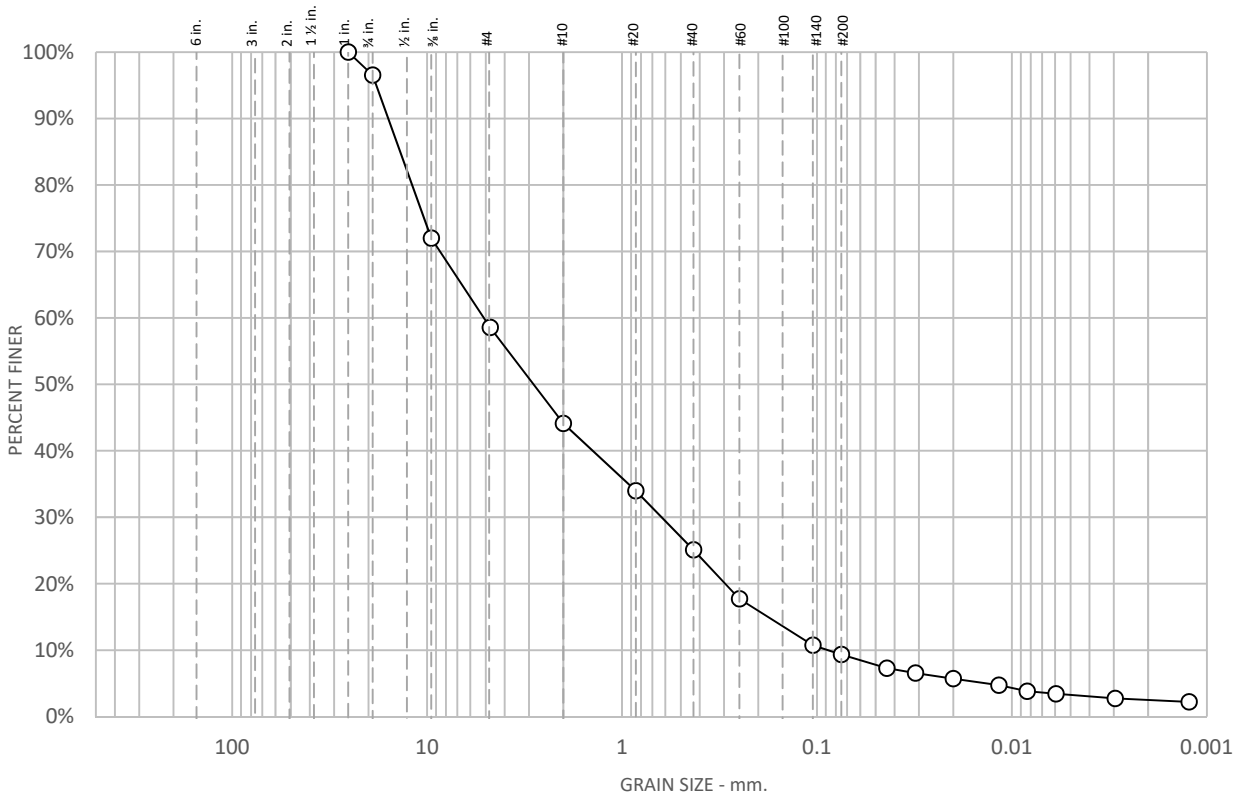
Client: Google, LLC
Project: GEX for Multiple Parcels
Project location: Sunnyvale, California
Project Number: 15949.000.000
Date: 9/18/2019

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	3.6	37.9	14.4	19.0	15.8	6.8	2.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	96.5		
⅜ in.	72.0		
#4	58.6		
#10	44.1		
#20	34.0		
#40	25.1		
#60	17.7		
#140	10.7		
#200	9.3		
0.0438 mm.	7.3		
0.0313 mm.	6.6		
0.0200 mm.	5.7		
0.0117 mm.	4.7		
0.0084 mm.	3.8		
0.0059 mm.	3.4		
0.0030 mm.	2.7		
0.0012 mm.	2.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 15.8399 mm D_{85} = 13.7521 mm D_{60} = 5.1171 mm
D_{50} = 2.8439 mm D_{30} = 0.6264 mm D_{15} = 0.1783 mm
D_{10} = 0.0879 mm C_u = 58.25 C_c = 0.87

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B3 @ 21

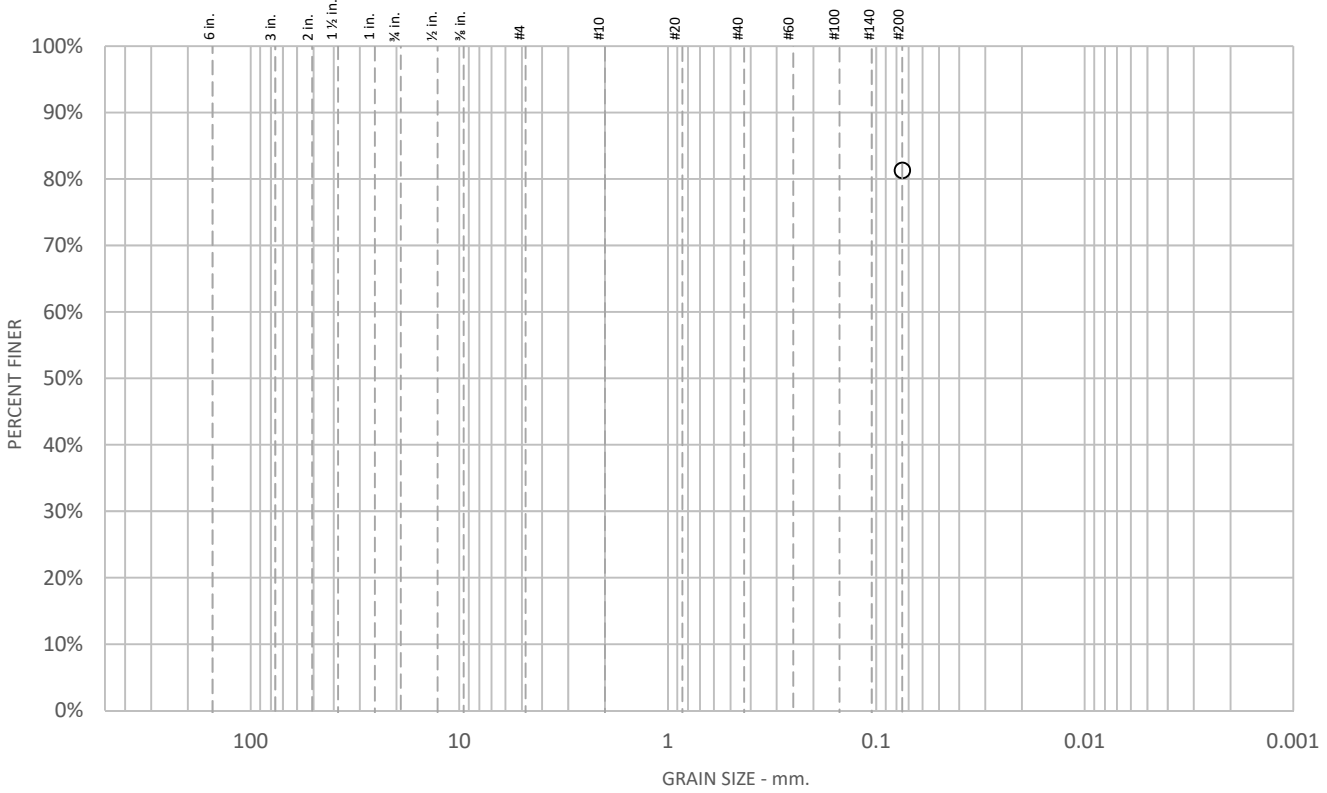
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	81.3		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 20 LL = 50 PI = 30

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 176.5 g

Sample Number: 1-B3 @ 30.5

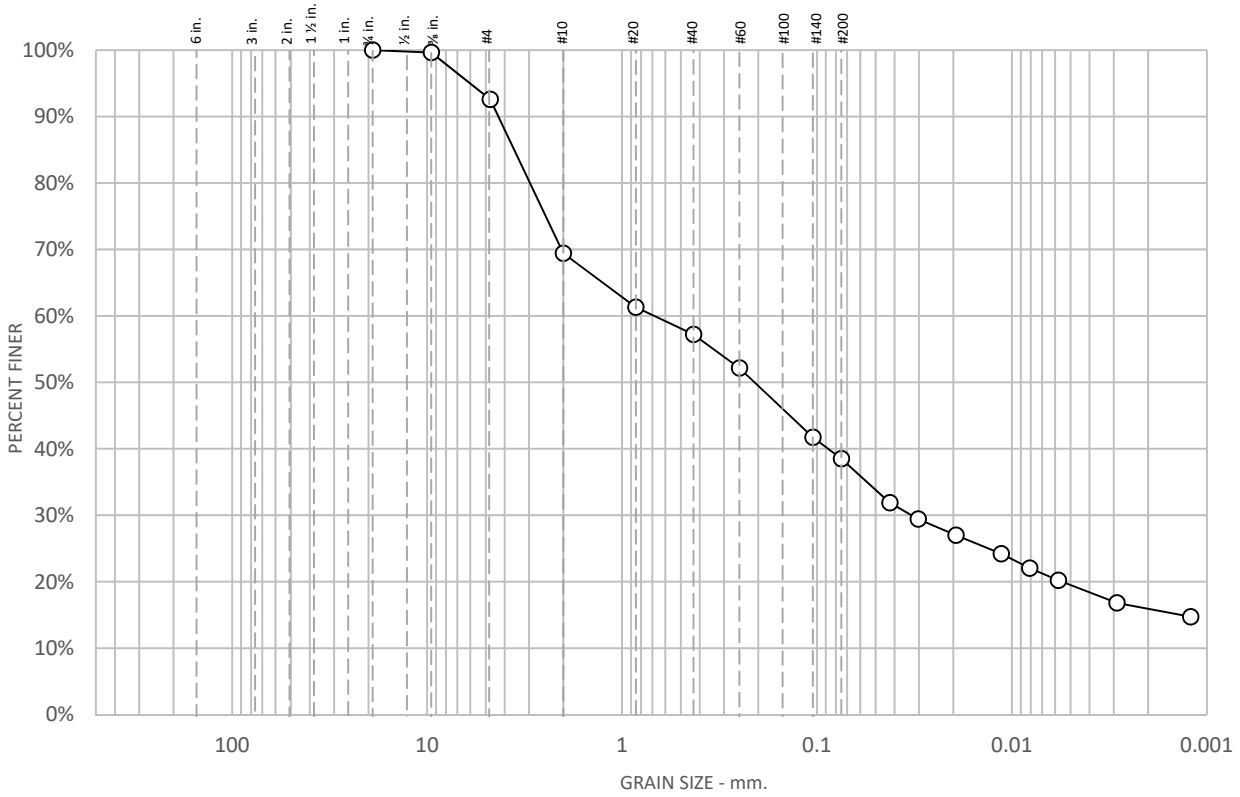
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	7.4	23.2	12.2	18.7	22.6	15.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	99.6		
#4	92.6		
#10	69.4		
#20	61.3		
#40	57.2		
#60	52.2		
#140	41.7		
#200	38.5		
0.0423 mm.	31.9		
0.0303 mm.	29.4		
0.0194 mm.	27.0		
0.0113 mm.	24.2		
0.0081 mm.	22.0		
0.0058 mm.	20.2		
0.0029 mm.	16.8		
0.0012 mm.	14.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 15 LL = 38 PI = 23

Coefficients

D_{90} = 4.3115 mm D_{85} = 3.5778 mm D_{60} = 0.6831 mm
D_{50} = 0.2089 mm D_{30} = 0.0327 mm D_{15} = 0.0014 mm
D_{10} = C_u = C_c =

Classification

USCS = SC

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B3 @ 45.5

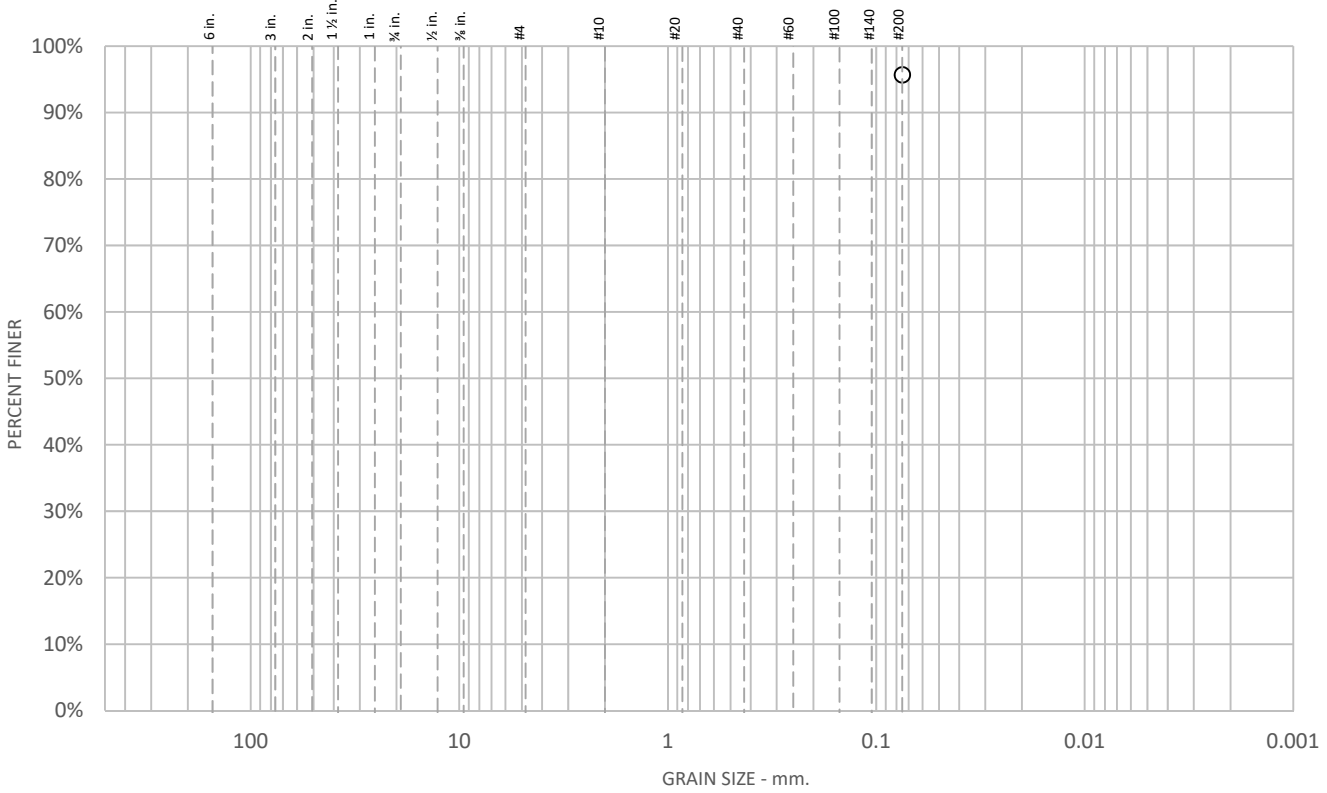
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						95.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	95.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 19 LL = 86 PI = 67

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 179.7 g

Sample Number: 1-B3 @ 5.5

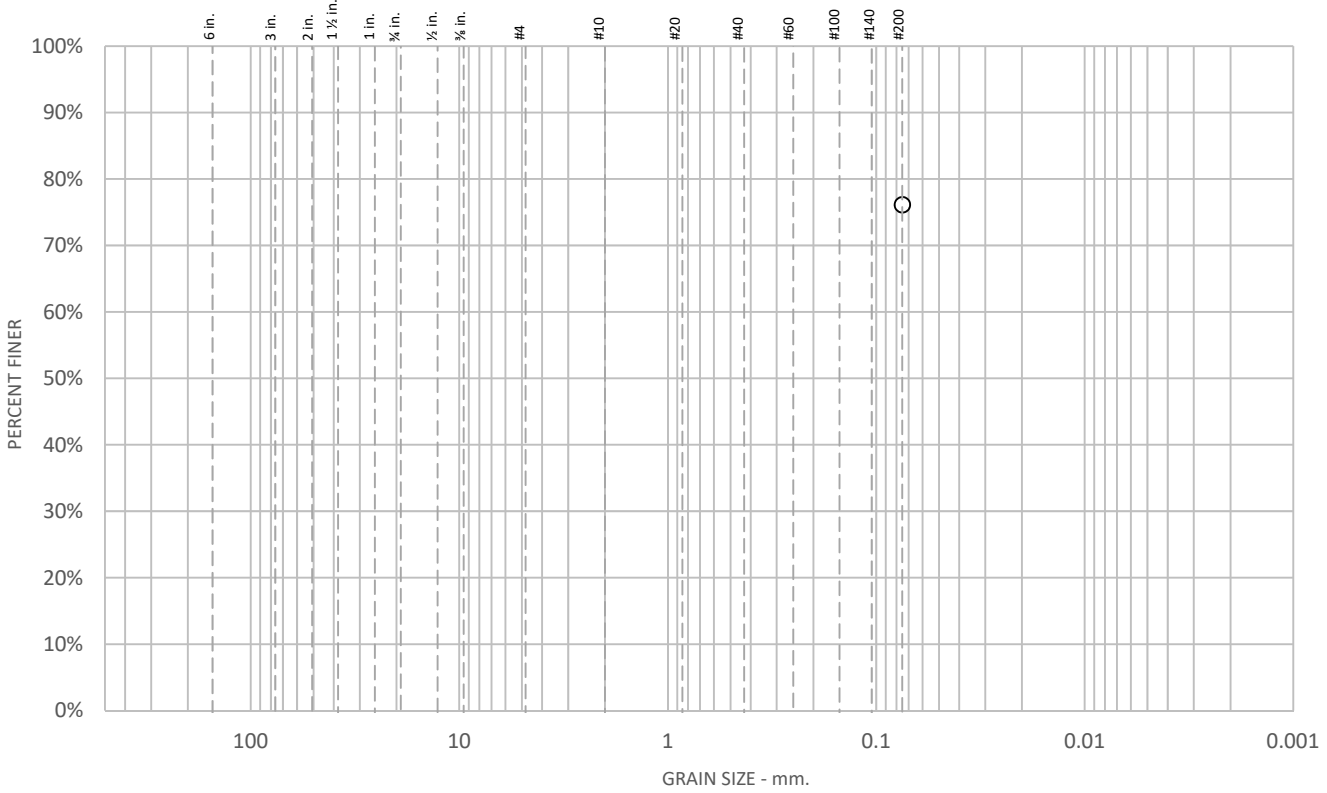
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	76.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 38 PI = 21

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 192.2 g

Sample Number: 1-B3 @ 50.5

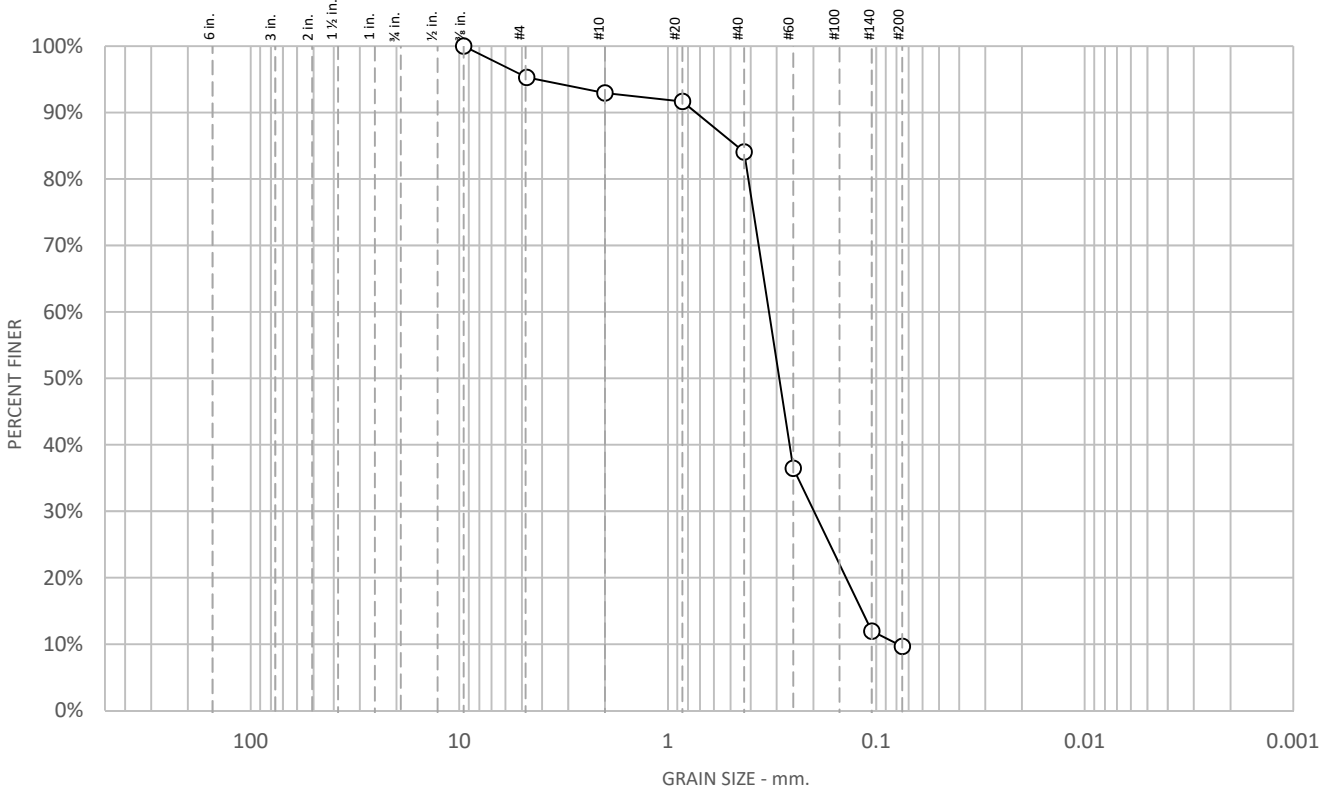
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		4.7	2.4	8.9	74.4	9.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
⅜ in.	100.0		
#4	95.3		
#10	92.9		
#20	91.7		
#40	84.1		
#60	36.5		
#140	12.0		
#200	9.7		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.7317 mm D_{85} = 0.4672 mm D_{60} = 0.3269 mm
D_{50} = 0.2917 mm D_{30} = 0.1989 mm D_{15} = 0.1170 mm
D_{10} = 0.0789 mm C_u = 4.14 C_c = 1.53

Classification

USCS = SW

Remarks

USCS: ASTM D2487 ASTM D6913, Method B

Sample Number: 1-B3 @ 80.5

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	1-B3	1-B3	1-B3	1-B3	1-B3	1-B3		
DEPTH (ft.):	5.5	16	50.5	61	70.5	80.5		
MOISTURE CONTENT (%):	30.9	9.2	22.0	23.5	29.3	22.4		
DRY DENSITY (lbs/ft^3):	88.0	132.1	106.1	104.9	94.8	103.0		

Testing remarks:

PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NUMBER: 15959.000.000
CLIENT: Google, LLC
PHASE NUMBER: LAB

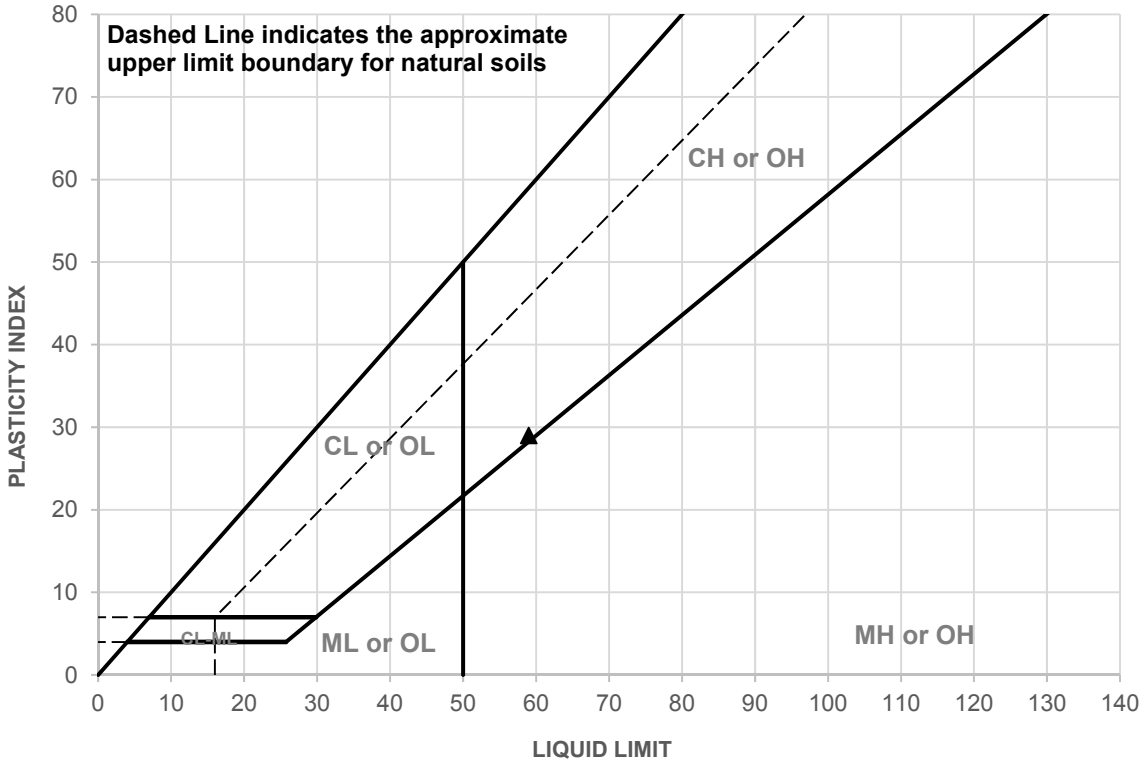
DATE: 09/09/19

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 2213 Plaza Dr., Rocklin, CA 95765. Phone No. (916) 786-8883.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



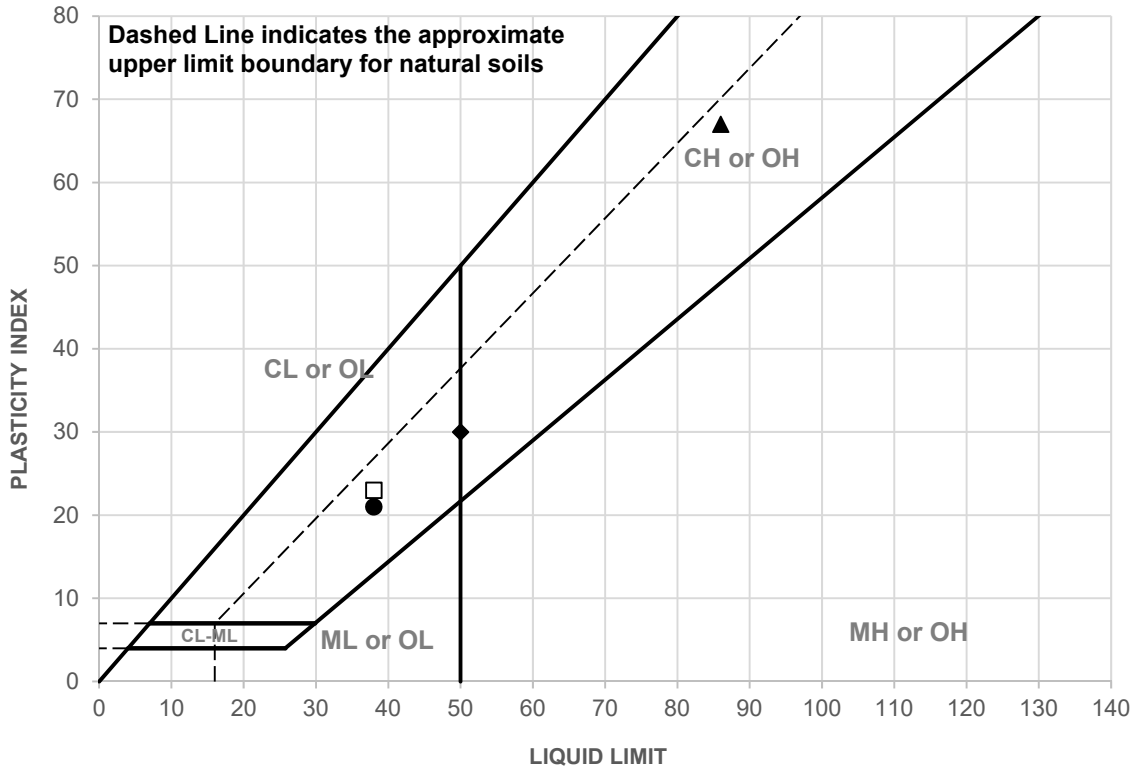
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B3 @ 10	10 ft	See exploration logs	59	30	29

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B3 @ 10	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/18/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B3	5.5	See exploration logs	86	19	67
◆	1-B3	30.5	See exploration logs	50	20	30
□	1-B3	45.5	See exploration logs	38	15	23
●	1-B3	50.5	See exploration logs	38	17	21

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B3	PI: ASTM D4318, Wet Method	
◆	1-B3	PI: ASTM D4318, Wet Method	
□	1-B3	PI: ASTM D4318, Wet Method	
●	1-B3	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B3@21

Description: See exploration logs — USCS: SP

%Passing #4: 58.6

Method used: **B**

Temperature (^{o}C): **23.4** — ***Specific gravity at 20 ^{o} C:*** **2.885**

Sample 2: 1-B3@45.5

Description: See exploration logs — USCS: SC

%Passing #4: 92.6

Method used: **B**

Temperature (^{o}C): **23.4** — ***Specific gravity at 20 ^{o} C:*** **2.826**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** — **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER:

ENGEO Expect Excellence

Tested by: R. Montalvo — Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

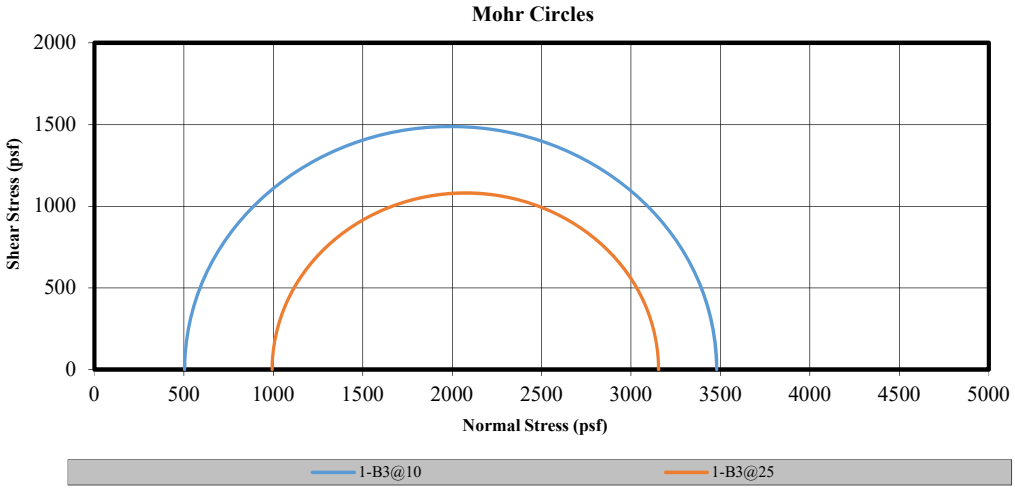
ASTM D2850

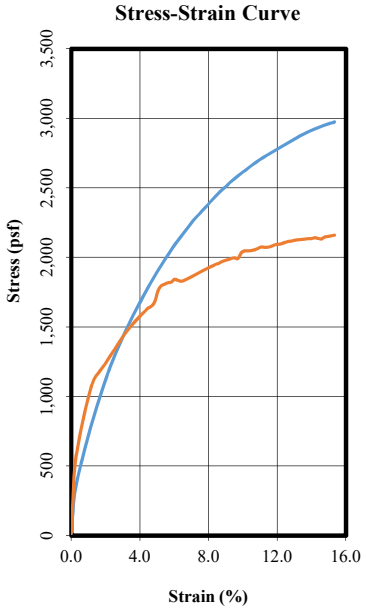
Date: 09/10/19

Checked By: G. Criste

Date: 9/10/2019

Tested By: M. Quasem





Before Test	Specimen 1-B3@10	1-B3@25		
Water Content (%)	23.84	30.11		
Dry Density (pcf)	102.10	93.70		
Saturation (%)	97.69	100.00		
Void Ratio	0.66	0.81		
Diameter (in)	2.400	2.380		
Height (in)	5.100	5.150		
Height-to-Diameter Ratio	2.125	2.164		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.720	2.720		
After Test	**1-B3@10**	**1-B3@25**		
Water Content (%)	23.84	30.11		
Saturation (%)	97.68	100.00		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	2974.7	2160.2		
Axial Strain @ Failure (%)	15.329	15.331		
	Cell Pressure			
Cell (psf)	504.0	993.6		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	3478.7	3153.8		
σ3 (psf)	504.0	993.6		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1487.4	1080.1		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 09/10/19

Checked By: G. Criste

Date: 9/10/2019

Tested By: M. Quasem

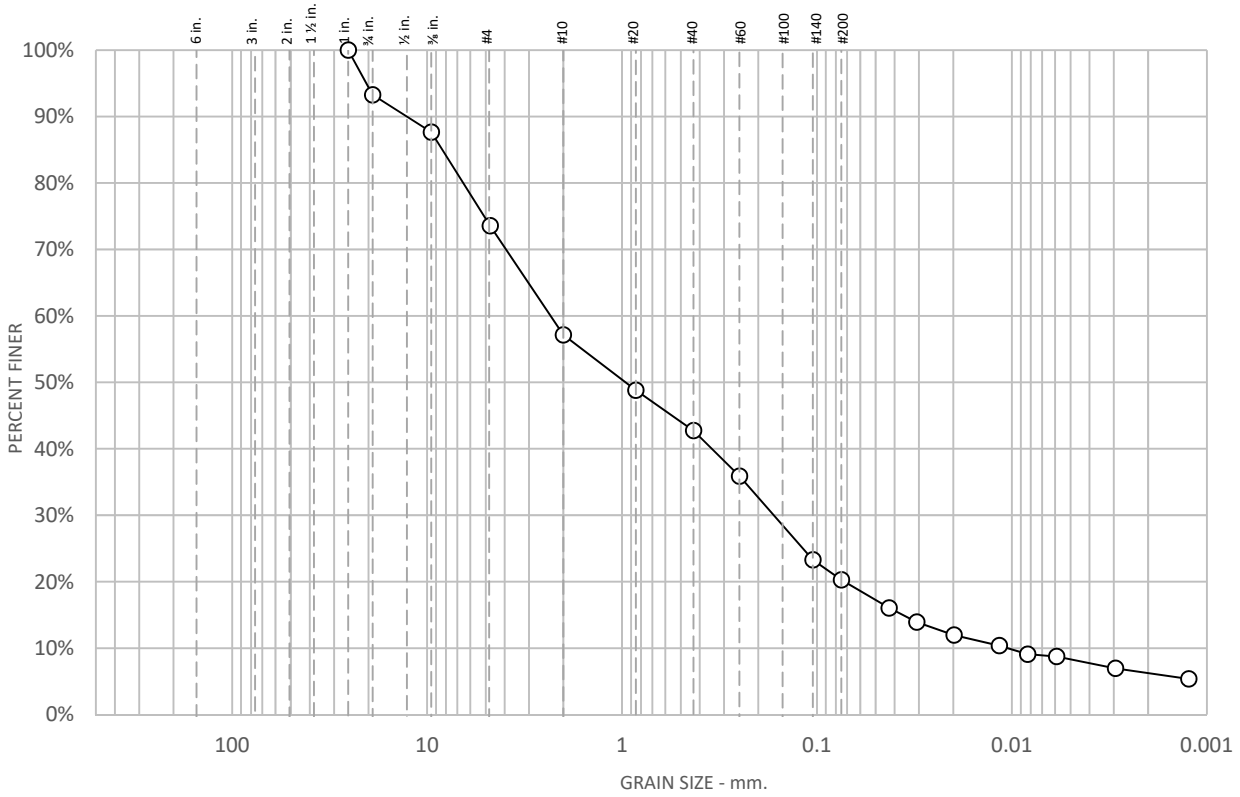
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B3@10	SAMPLE NUMBER: 1-B3@25
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	6.8	19.7	16.4	14.4	22.5	14.0	6.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	93.3		
⅜ in.	87.7		
#4	73.6		
#10	57.2		
#20	48.8		
#40	42.7		
#60	35.9		
#140	23.3		
#200	20.3		
0.0427 mm.	16.1		
0.0308 mm.	13.9		
0.0198 mm.	12.0		
0.0116 mm.	10.4		
0.0083 mm.	9.1		
0.0059 mm.	8.7		
0.0029 mm.	7.0		
0.0012 mm.	5.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 12.7236 mm D_{85} = 8.3544 mm D_{60} = 2.3233 mm
D_{50} = 0.9596 mm D_{30} = 0.1667 mm D_{15} = 0.0363 mm
D_{10} = 0.0105 mm C_u = 220.57 C_c = 1.14

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 10

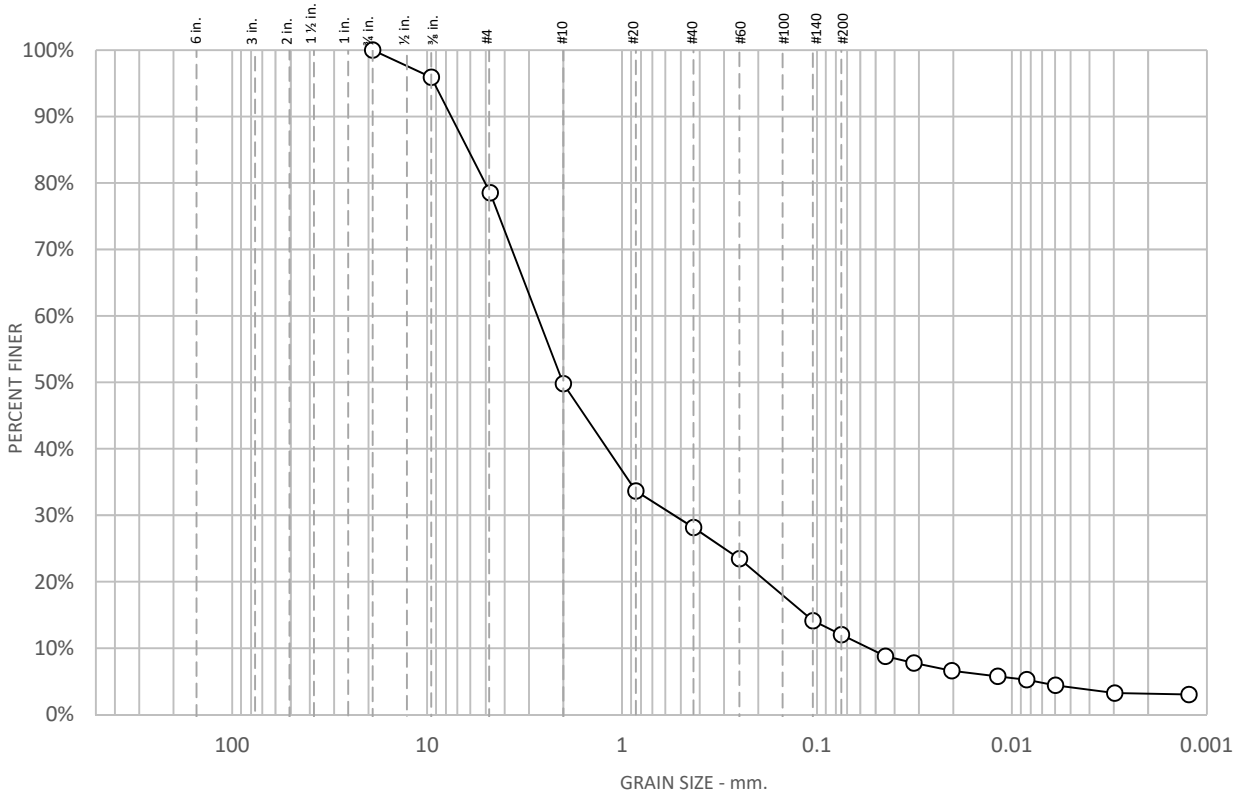
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	21.5	28.7	21.6	16.1	8.9	3.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	95.9		
#4	78.5		
#10	49.8		
#20	33.6		
#40	28.2		
#60	23.5		
#140	14.1		
#200	12.0		
0.0446 mm.	8.8		
0.0318 mm.	7.8		
0.0203 mm.	6.6		
0.0118 mm.	5.8		
0.0084 mm.	5.2		
0.0060 mm.	4.4		
0.0030 mm.	3.2		
0.0012 mm.	3.0		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 7.5207 mm D_{85} = 6.1570 mm D_{60} = 2.7190 mm
D_{50} = 2.0116 mm D_{30} = 0.5405 mm D_{15} = 0.1139 mm
D_{10} = 0.0543 mm C_u = 50.09 C_c = 1.98

Classification

USCS = SW

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 18

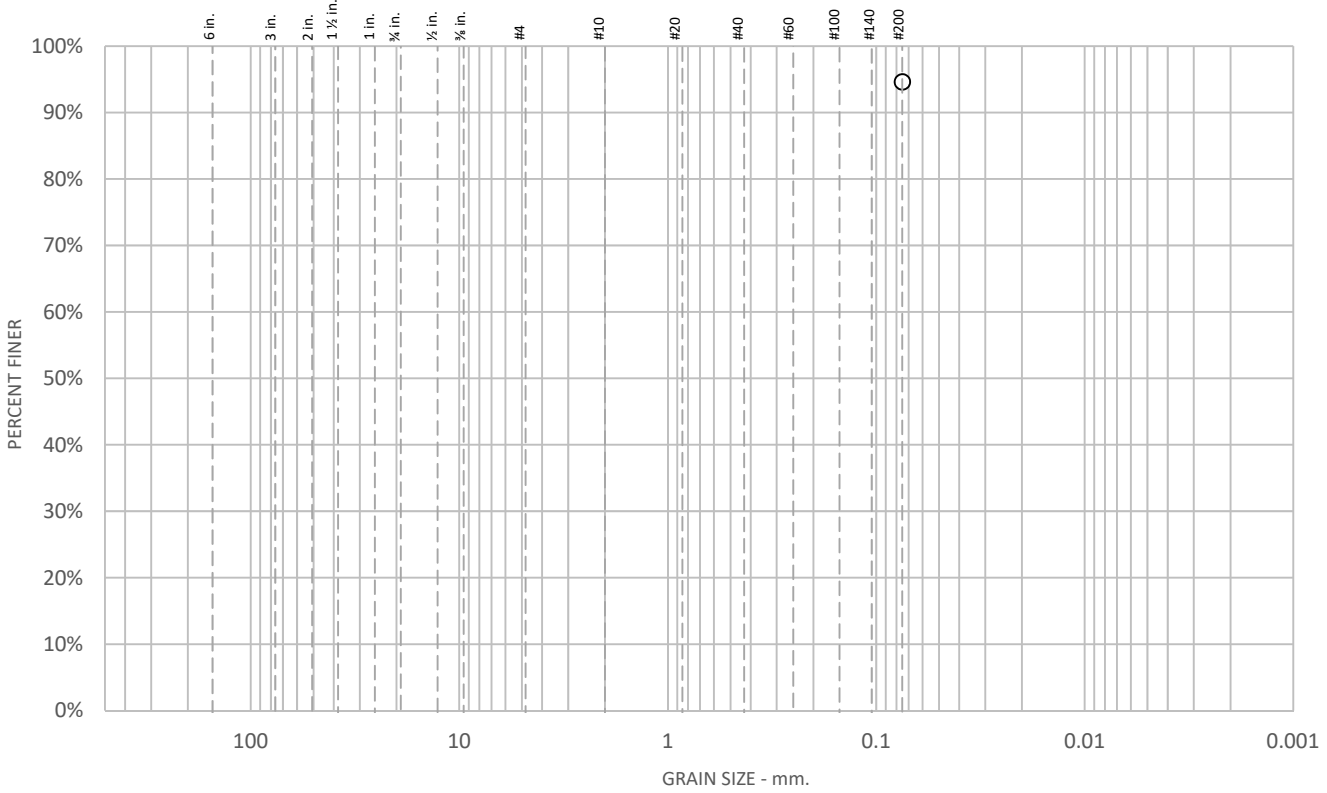
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

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Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						94.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	94.6		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 22 LL = 53 PI = 31

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 170.5 g

Sample Number: 1-B5 @ 25.5

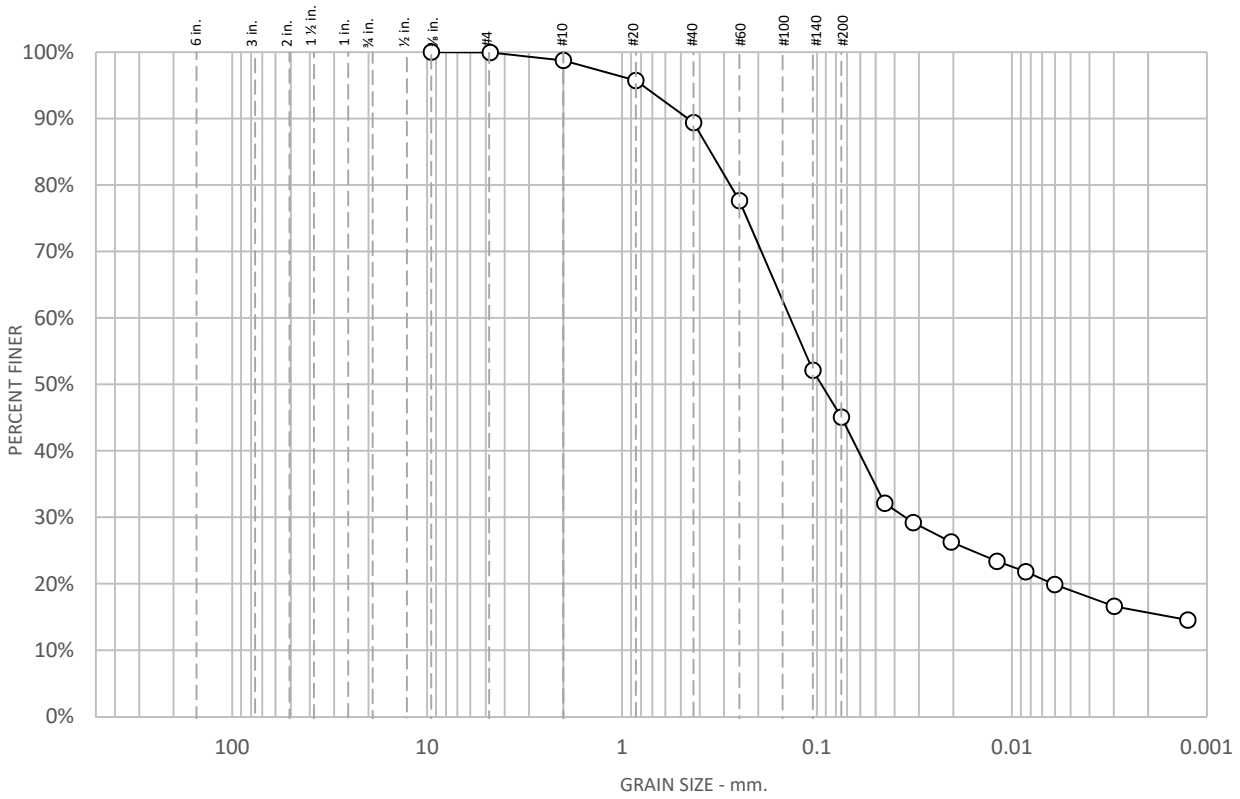
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		0.1	1.2	9.4	44.3	29.4	15.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
⅜ in.	100.0		
#4	99.9		
#10	98.7		
#20	95.7		
#40	89.4		
#60	77.6		
#140	52.1		
#200	45.0		
0.0450 mm.	32.1		
0.0321 mm.	29.2		
0.0205 mm.	26.3		
0.0119 mm.	23.4		
0.0085 mm.	21.8		
0.0060 mm.	19.9		
0.0030 mm.	16.6		
0.0013 mm.	14.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.4590 mm D_{85} = 0.3512 mm D_{60} = 0.1373 mm
D_{50} = 0.0950 mm D_{30} = 0.0353 mm D_{15} = 0.0015 mm
D_{10} = C_u = C_c =

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B5 @ 36

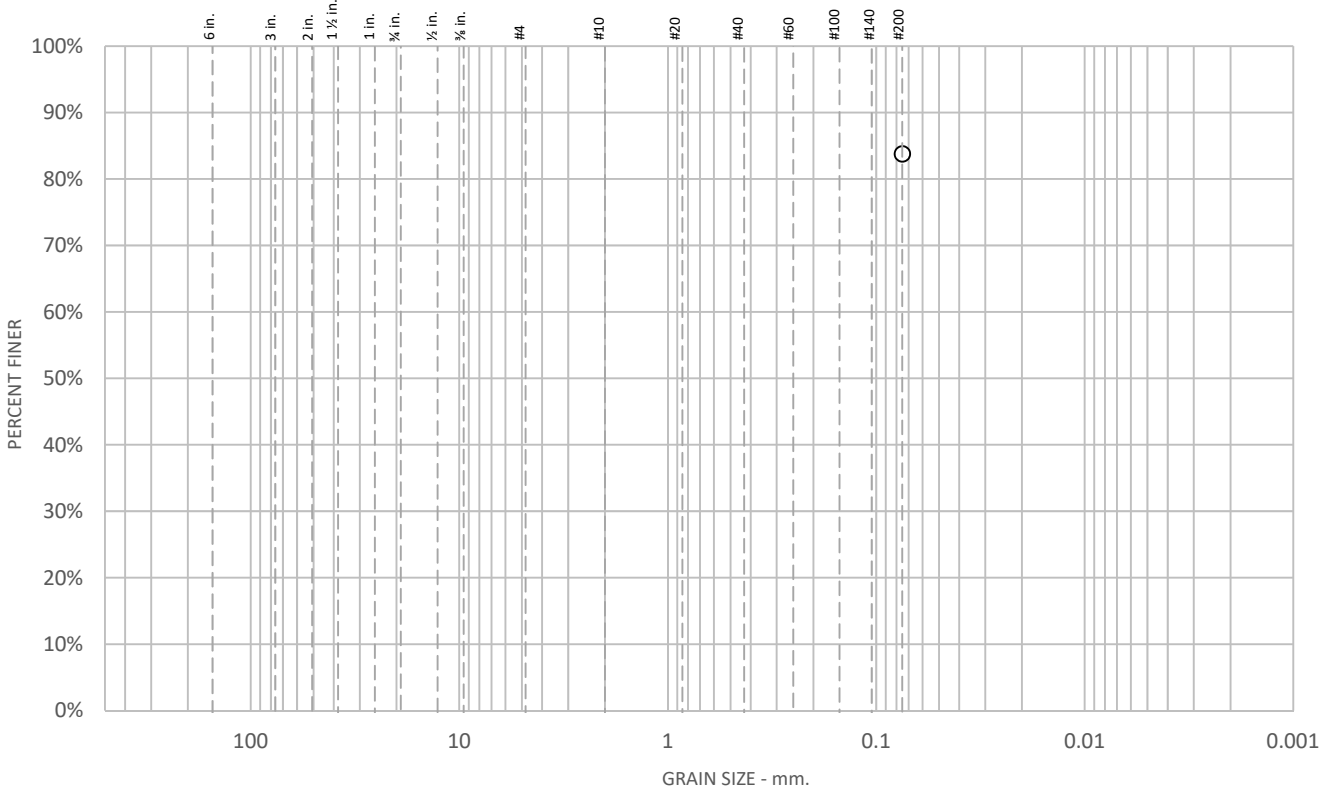
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						83.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	83.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 42 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 181.2 g

Sample Number: 1-B5 @ 40

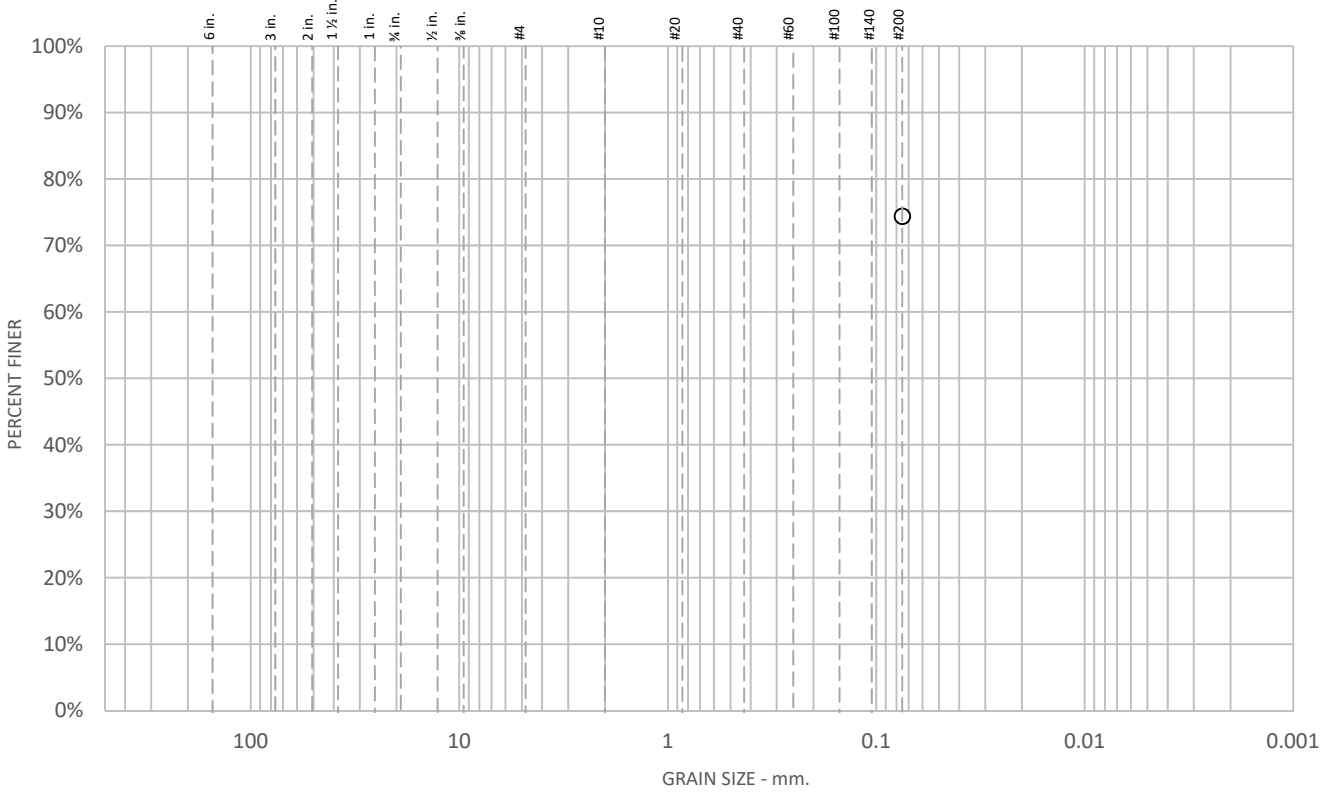
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						74	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	74		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 68 PI = 51

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 160.4 g

Sample Number: 1-B5 @ 8

Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	**1-B5**							
DEPTH (ft.):	**8**							
MOISTURE CONTENT (%):	**36.4**							
DRY DENSITY (lbs/ft^3):	**82.9**							

Testing remarks:

PROJECT NAME: **NBS Infrastructure Master Planning FIG2**
PROJECT NUMBER: **15959.000.000**
CLIENT: **Google, LLC**
PHASE NUMBER: **LAB**

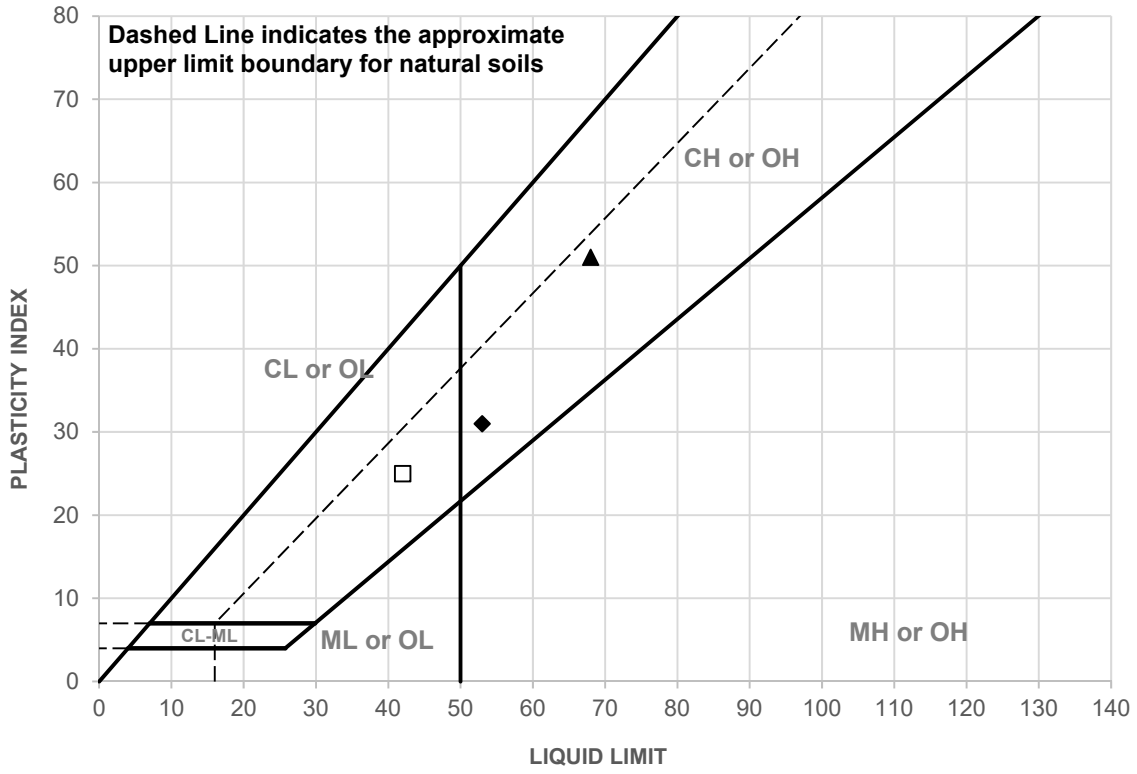
DATE: **09/09/19**

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 3420 Fostoria Way, Suite E, Danville, CA 94526. Phone No. (925) 355-9047.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B5	8	See exploration logs	68	17	51
◆	1-B5	25.5	See exploration logs	53	22	31
□	1-B5	40	See exploration logs	42	17	25

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B5	PI: ASTM D4318, Wet Method	
◆	1-B5	PI: ASTM D4318, Wet Method	
□	1-B5	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B5@10

Description: USCS: n/a

%Passing #4: 73.6

Method used: **B**

Temperature (°C): **23.3** ***Specific gravity at 20° C:*** **2.813**

Sample 2: 1-B5@18

Description: USCS: SW

%Passing #4: 78.5

Method used: **B**

Temperature (°C): **23.5** ***Specific gravity at 20° C:*** **2.883**

Sample 3: 1-B5@36

Description: USCS: n/a

%Passing #4: 99.9

Method used: **B**

Temperature (°C): **23.4** ***Specific gravity at 20° C:*** **2.774**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER:

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

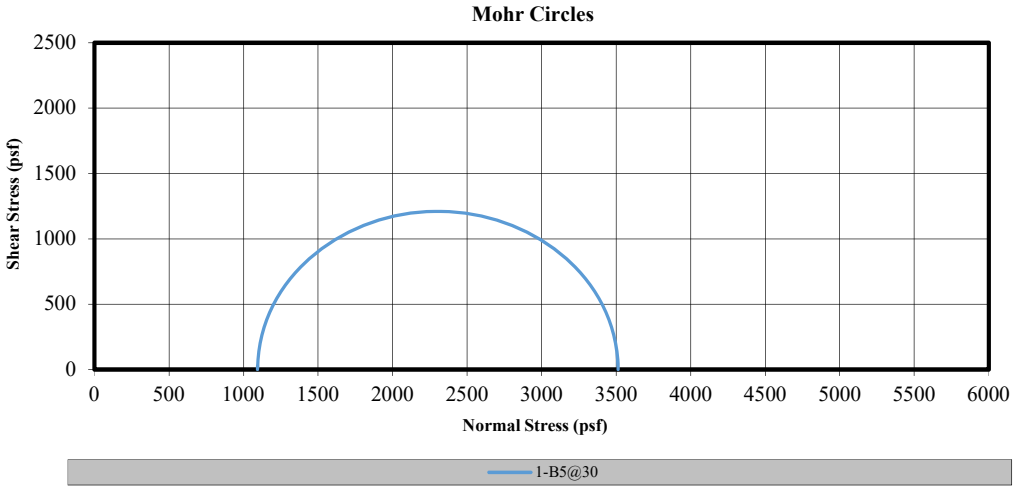
ASTM D2850

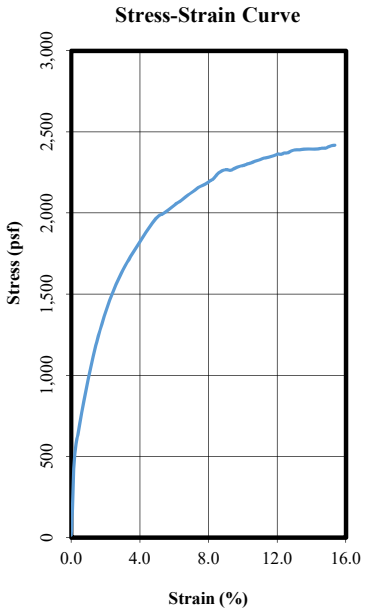
Date: 09/11/19

Checked By: G. Criste

Date: 9/11/2019

Tested By: M. Quasem





Before Test	Specimen 1-B5@30			
Water Content (%)	26.07			
Dry Density (pcf)	99.00			
Saturation (%)	99.14			
Void Ratio	0.72			
Diameter (in)	2.380			
Height (in)	5.070			
Height-to-Diameter Ratio	2.130			
ASTM D4318 - Wet Method				
Liquid Limit	-			
Plastic Limit	-			
ASTM D854 - Assumed				
Specific Gravity	2.720			
After Test	**1-B5@30**			
Water Content (%)	26.07			
Saturation (%)	99.14			
Strain Rate (in/min)	0.05			
Peak Deviator Stress (psf)	2418.5			
Axial Strain @ Failure (%)	15.347			
	Cell Pressure			
Cell (psf)	1094.4			
Back (psf)	n/a			
	Principle Stresses at Failure			
σ1 (psf)	3512.9			
σ3 (psf)	1094.4			
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		1209.3			
Friction Angle Ø	n/a		n/a			

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

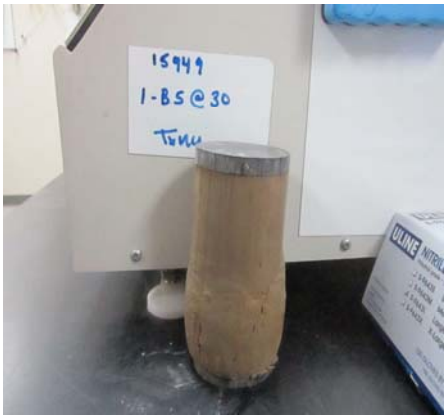
Date: 09/11/19

Checked By: G. Criste

Date: 9/11/2019

Tested By: M. Quasem

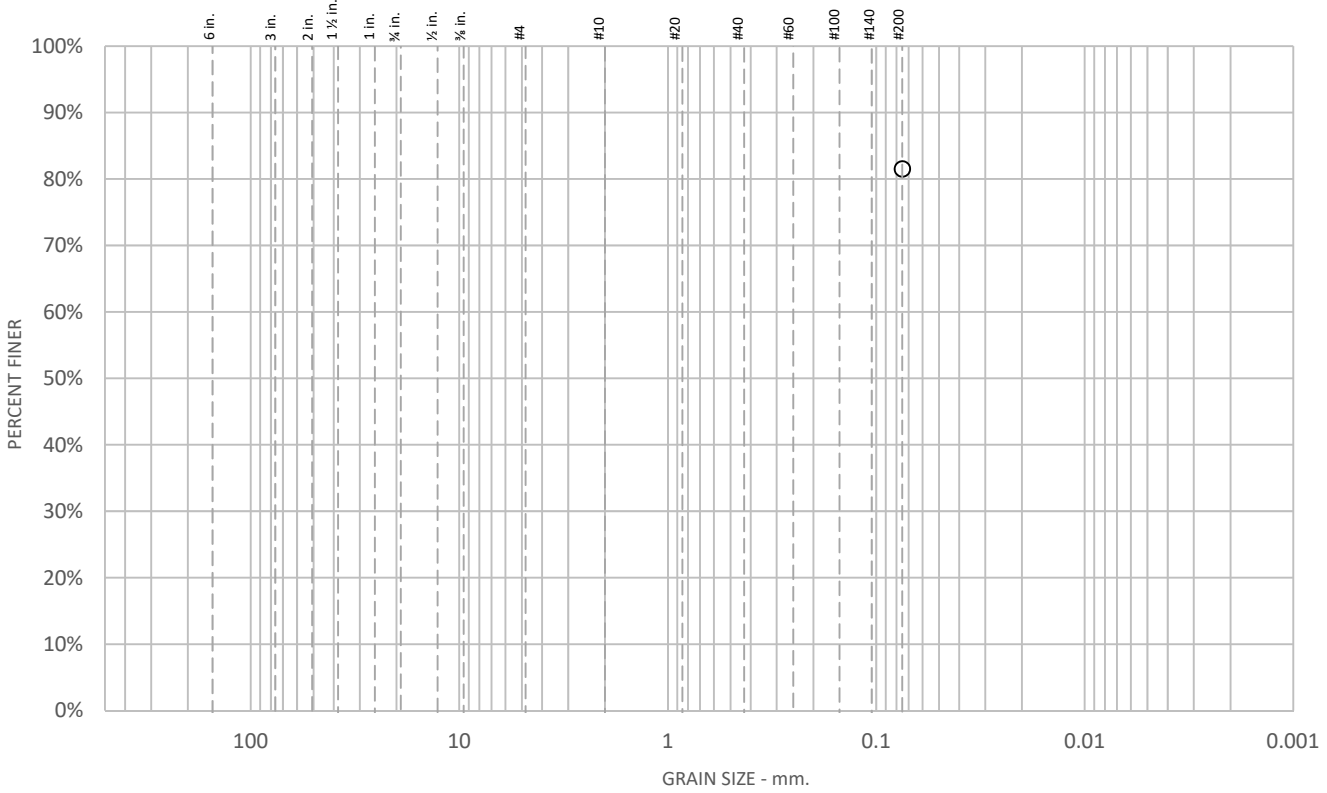
SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B5@30	
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Mountain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	81.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 17 LL = 44 PI = 27

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 178.5 g

Sample Number: 1-B6 @ 10

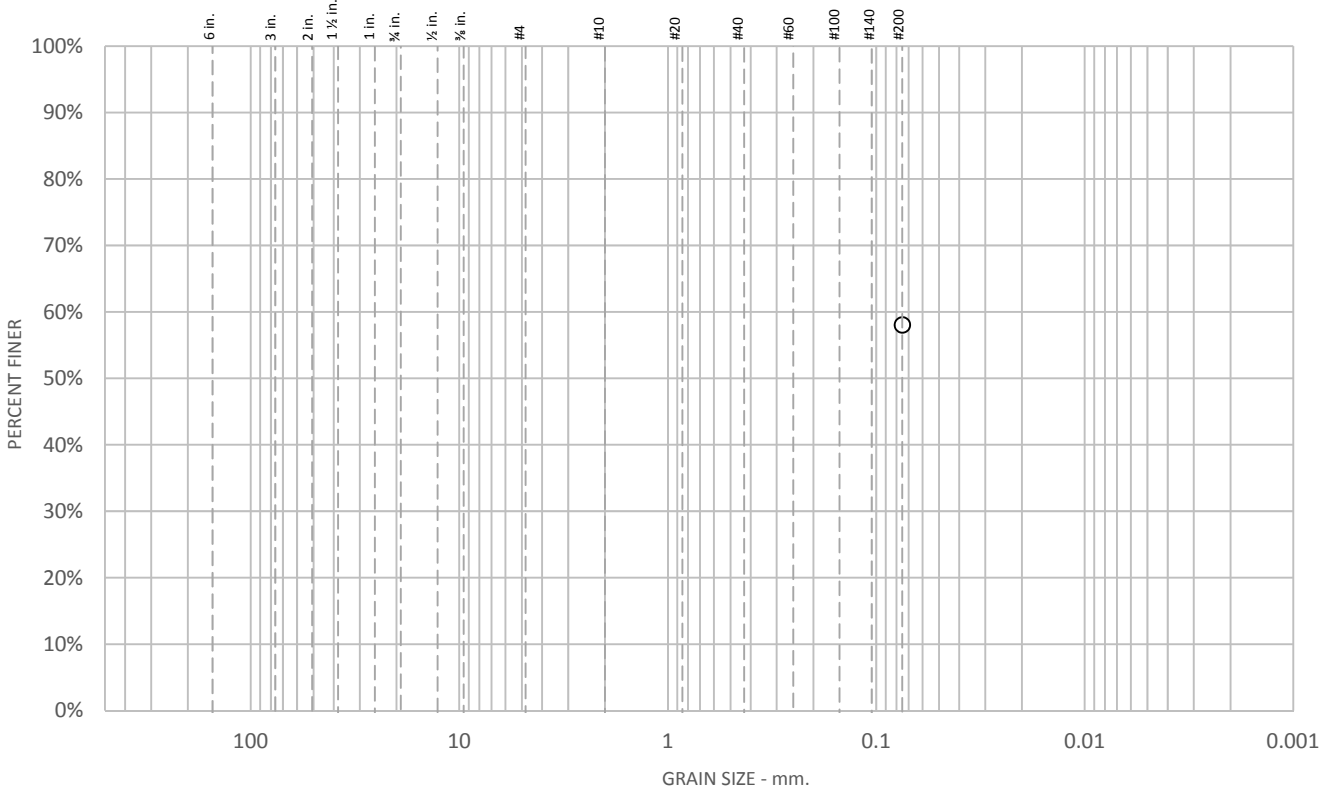
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						58	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	58		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 21 LL = 41 PI = 20

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method A
Soak time = 180 min
Dry sample weight = 70.64 g

Sample Number: 1-B6 @ 16.5 @ 16.5 ft

Client: Google LLC
Project: NBS Infrastructure Master Planning F1G2
Project location: Mountain View, California

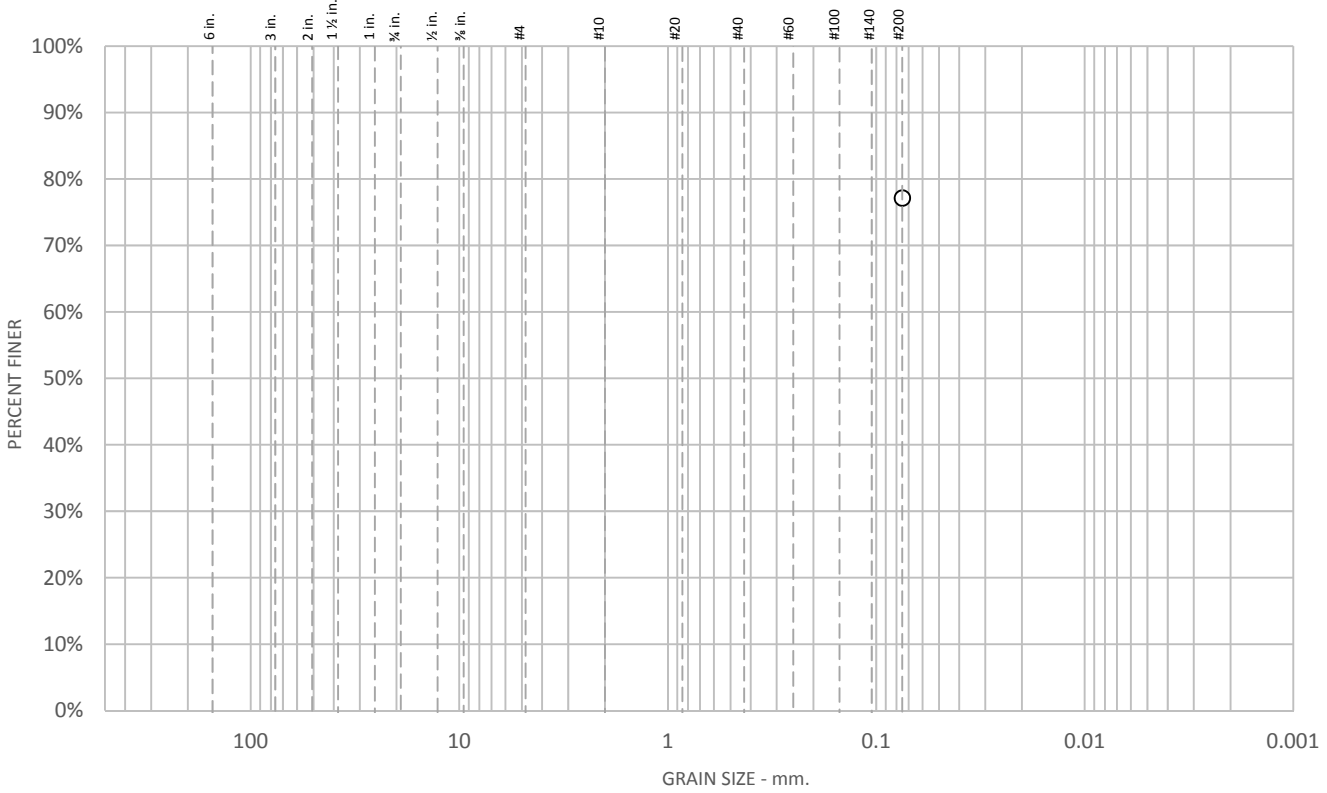
Project Number: 15949.000.000
Date: 9/17/2019

ENGEO Expect Excellence

Tested By: W. Miller
Checked By: D. Seibold

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						77.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	77.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 23 LL = 36 PI = 13

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method A
Soak time = 180 min
Dry sample weight = 91.29 g

Sample Number: 1-B6 @ 30

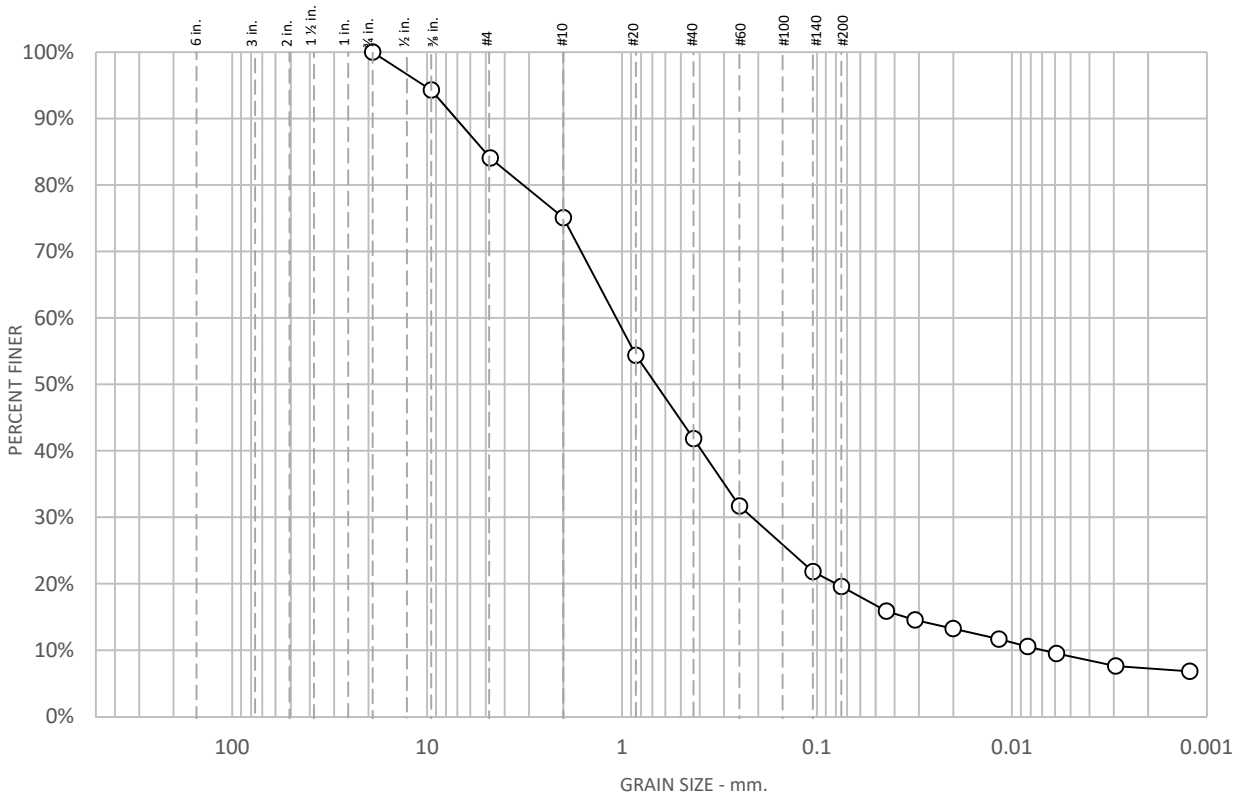
Client: Google LLC **Project Number:** 15949.000.000
Project: NBS Infrastructure Master Planning F1G2 **Date:** 9/18/2019
Project location: Mountain View, California

ENGEO Expect Excellence

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

Test Location: 3420 Fostoria Way, Suite E, Danville, CA 94526

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0.0	15.9	9.0	33.2	22.3	12.3	7.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
¾ in.	100.0		
⅜ in.	94.3		
#4	84.1		
#10	75.1		
#20	54.4		
#40	41.8		
#60	31.7		
#140	21.8		
#200	19.6		
0.0441 mm.	15.9		
0.0314 mm.	14.6		
0.0200 mm.	13.2		
0.0117 mm.	11.7		
0.0083 mm.	10.6		
0.0059 mm.	9.5		
0.0029 mm.	7.6		
0.0012 mm.	6.8		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.875

Atterberg Limits

PL = 15 LL = 30 PI = 15

Coefficients

D_{90} = 7.1115 mm D_{85} = 5.0596 mm D_{60} = 1.0722 mm
D_{50} = 0.6700 mm D_{30} = 0.2156 mm D_{15} = 0.0353 mm
D_{10} = 0.0069 mm C_u = 154.43 C_c = 6.24

Classification

USCS = SC

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
PI: ASTM D4318, Wet Method
USCS: ASTM D2487

Sample Number: 1-B6 @ 35.5

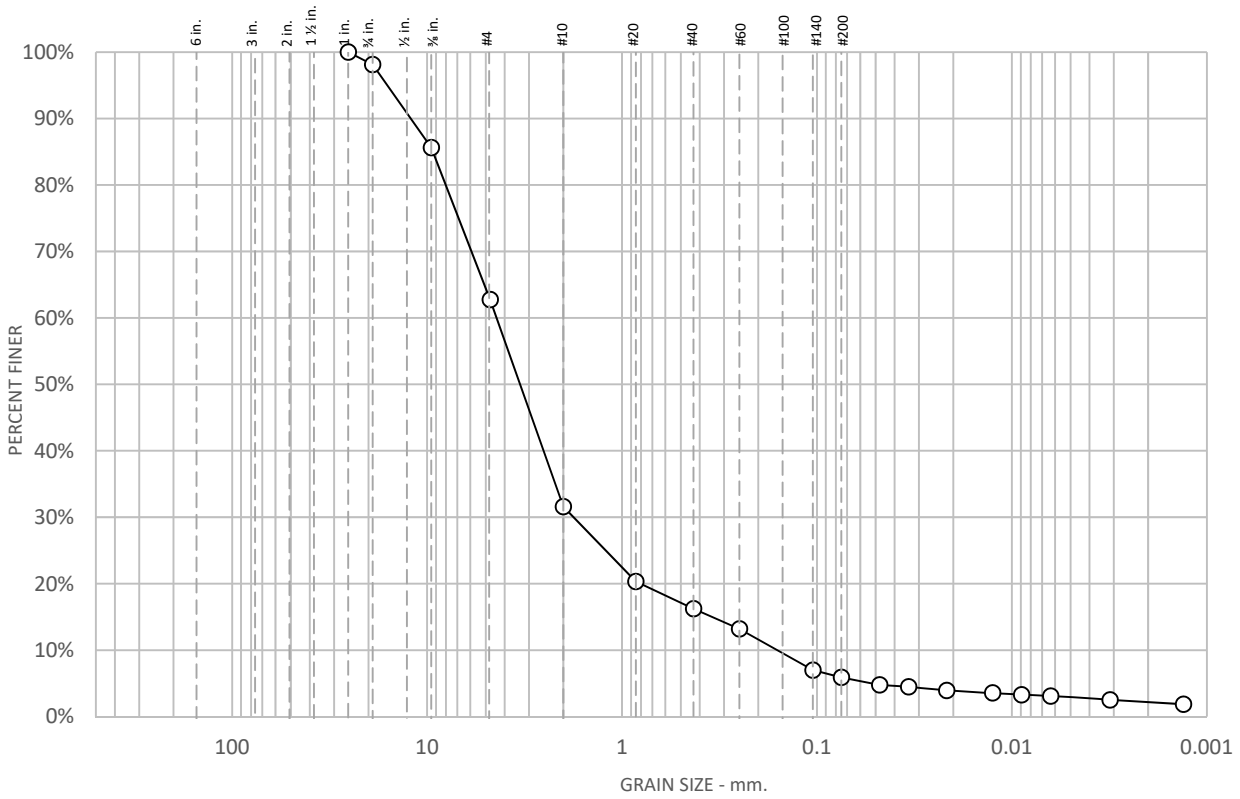
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	1.9	35.3	31.2	15.4	10.3	3.7	2.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
¾ in.	98.1		
⅜ in.	85.6		
#4	62.8		
#10	31.6		
#20	20.3		
#40	16.2		
#60	13.2		
#140	7.0		
#200	5.9		
0.0477 mm.	4.8		
0.0339 mm.	4.5		
0.0216 mm.	3.9		
0.0126 mm.	3.6		
0.0089 mm.	3.3		
0.0063 mm.	3.1		
0.0031 mm.	2.5		
0.0013 mm.	1.9		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.890.

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 12.1402 mm D_{85} = 9.3444 mm D_{60} = 4.3996 mm
D_{50} = 3.3331 mm D_{30} = 1.7711 mm D_{15} = 0.3449 mm
D_{10} = 0.1598 mm C_u = 27.54 C_c = 4.46

Classification

USCS = SP

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used
USCS: ASTM D2487

Sample Number: 1-B6 @ 40

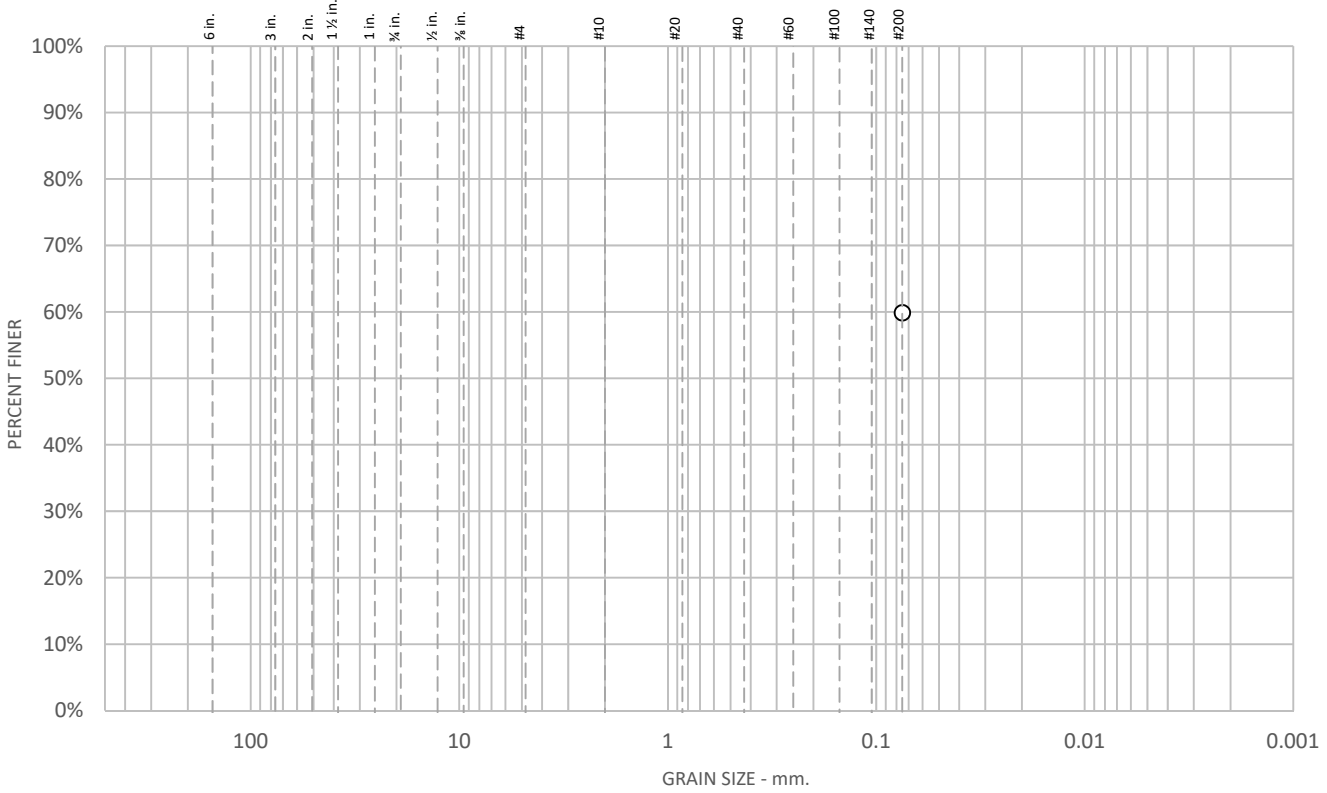
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	59.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 13 LL = 38 PI = 25

Coefficients

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

Classification

USCS = CL

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 123.1 g

Sample Number: 1-B6 @ 45

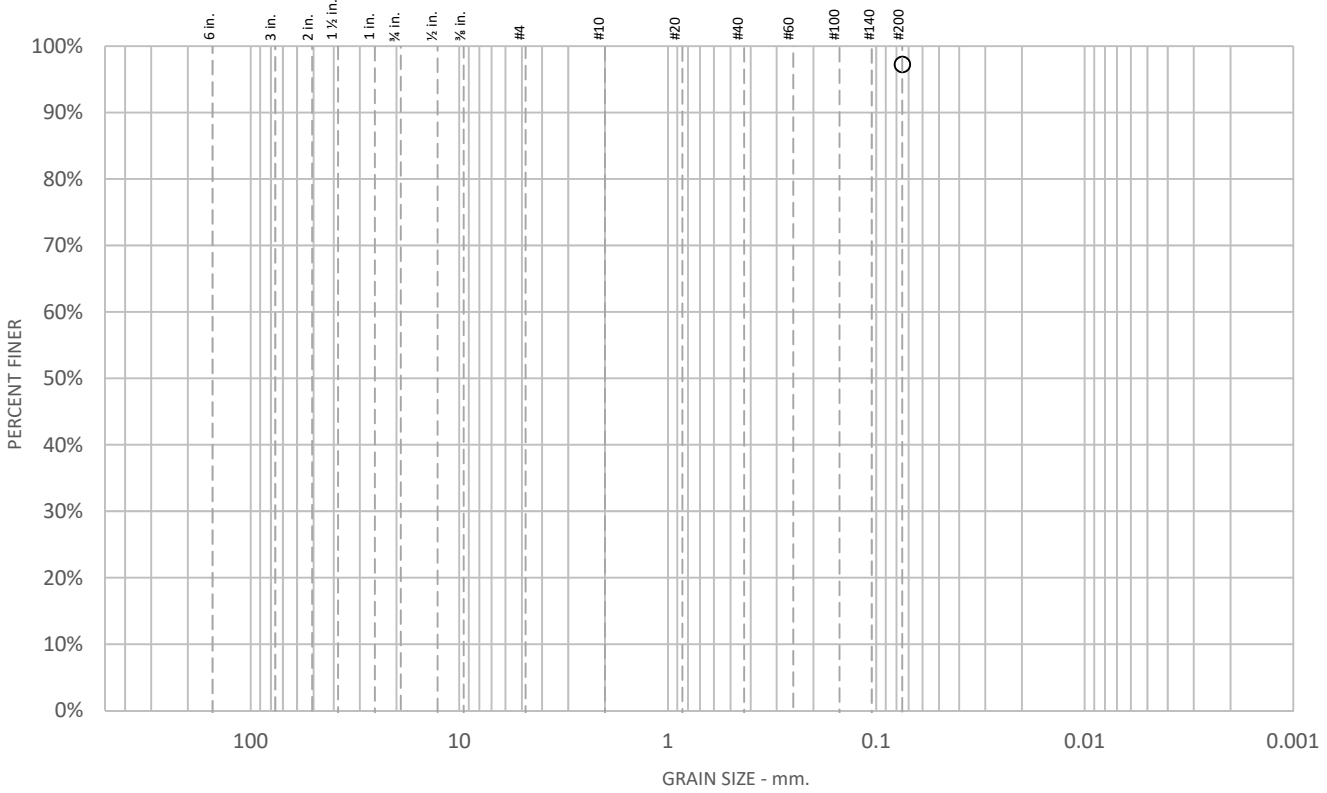
Client: Google, LLC
Project: NBS Infrastructure Master Planning FIG2
Project location: Mountain View, CA
Project Number: 15949.000.000 PHLAB
Date: 9/9/2019

ENGEO Expect Excellence

Tested By: R. Montalvo
Checked By: M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						97.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	97.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL = 20 LL = 73 PI = 53

Coefficients

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

Classification

USCS = CH

Remarks

PI: ASTM D4318, Wet Method
USCS: ASTM D2487
ASTM D1140, Method B
Soak time = 180 min
Dry sample weight = 174 g

Sample Number: 1-B6 @ 5.5

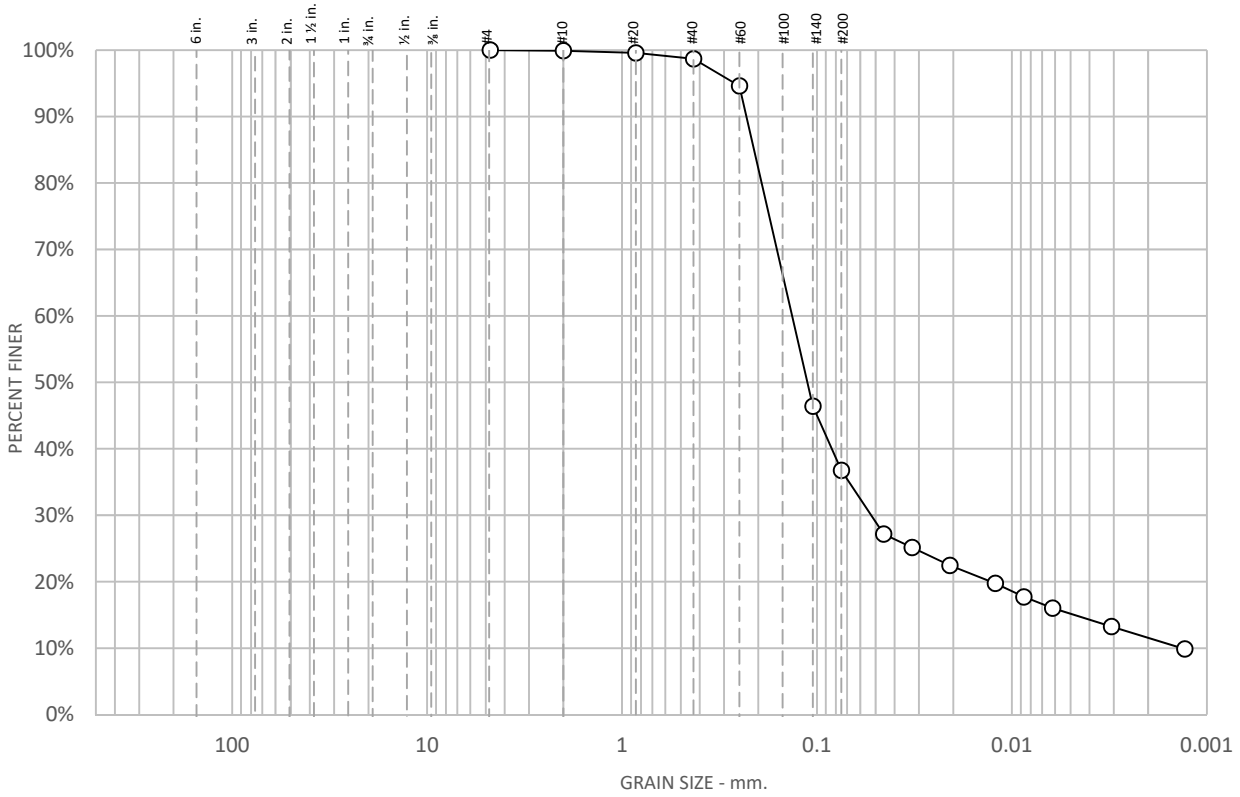
Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			0.1	1.2	61.9	25.2	11.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.6		
#40	98.7		
#60	94.6		
#140	46.4		
#200	36.8		
0.0455 mm.	27.2		
0.0325 mm.	25.1		
0.0208 mm.	22.4		
0.0122 mm.	19.7		
0.0087 mm.	17.7		
0.0062 mm.	16.0		
0.0031 mm.	13.2		
0.0013 mm.	9.9		

* (no specification provided)

Soil Description

See exploration logs.
Specific Gravity of -No.4 material = 2.732.

Atterberg Limits

PL = LL = PI =

Coefficients

D_{90} = 0.2301 mm D_{85} = 0.2103 mm D_{60} = 0.1341 mm
D_{50} = 0.1120 mm D_{30} = 0.0527 mm D_{15} = 0.0048 mm
D_{10} = 0.0013 mm C_u = 99.82 C_c = 15.44

Classification

USCS =

Remarks

GS: ASTM D422 ASTM D422
Silt/clay division of 0.002mm used

Sample Number: 1-B6 @ 70

Client: Google, LLC **Project Number:** 15949.000.000 PHLAB
Project: NBS Infrastructure Master Planning FIG2 **Date:** 9/9/2019
Project location: Mountain View, CA

ENGEO Expect Excellence

Tested By: R. Montalvo **Checked By:** M. Gilbert

Test Location: 2213 Plaza Drive, Rocklin, CA 95765

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	1-B6	1-B6	1-B6	1-B6	1-B6			
DEPTH (ft.):	5.5	10	35.5	50.5	70			
MOISTURE CONTENT (%):	27.5	32.7	23.0	19.7	24.9			
DRY DENSITY (lbs/ft^3):	93.5	92.3	110.7	112.0	102.8			

Testing remarks:

PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NUMBER: 15959.000.000
CLIENT: Google, LLC
PHASE NUMBER: LAB

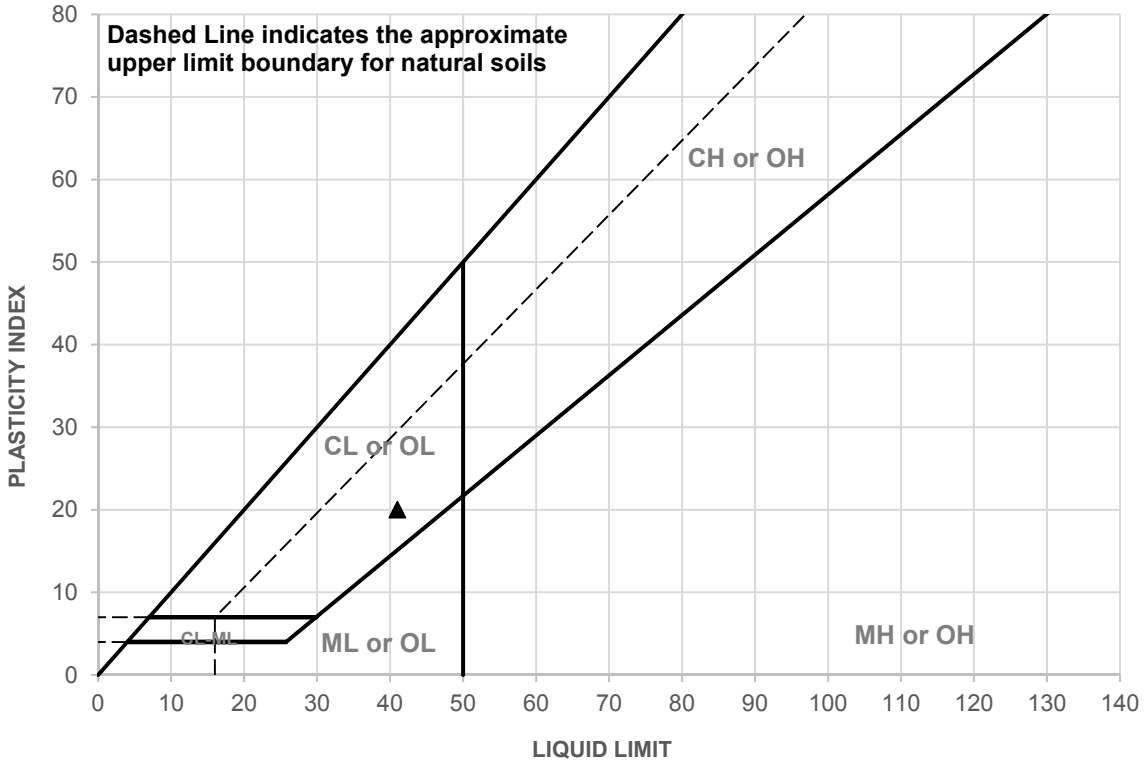
DATE: 09/09/19

ENGEO Expect Excellence

Tested by: R. Montalvo Reviewed by: M. Gilbert

Laboratory address: 2213 Plaza Dr., Rocklin, CA 95765. Phone No. (916) 786-8883.

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



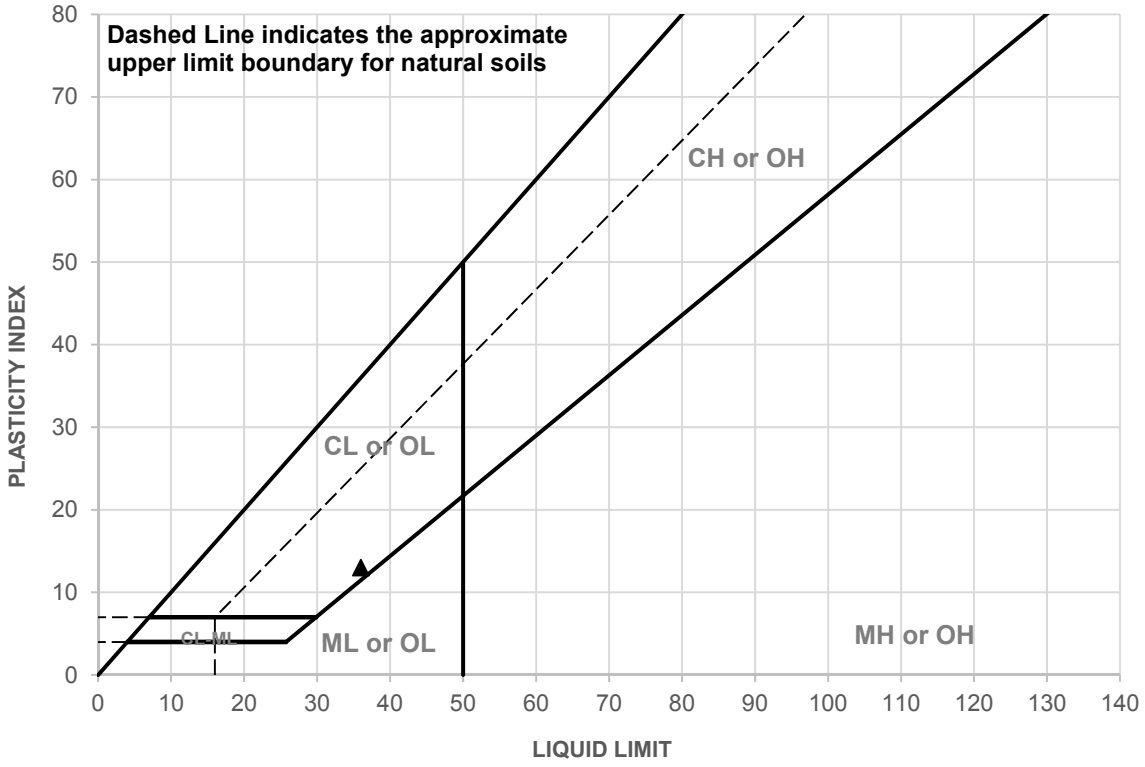
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6 @ 16.5	16-16.5 ft	See exploration logs	41	21	20

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6 @ 16.5	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/17/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



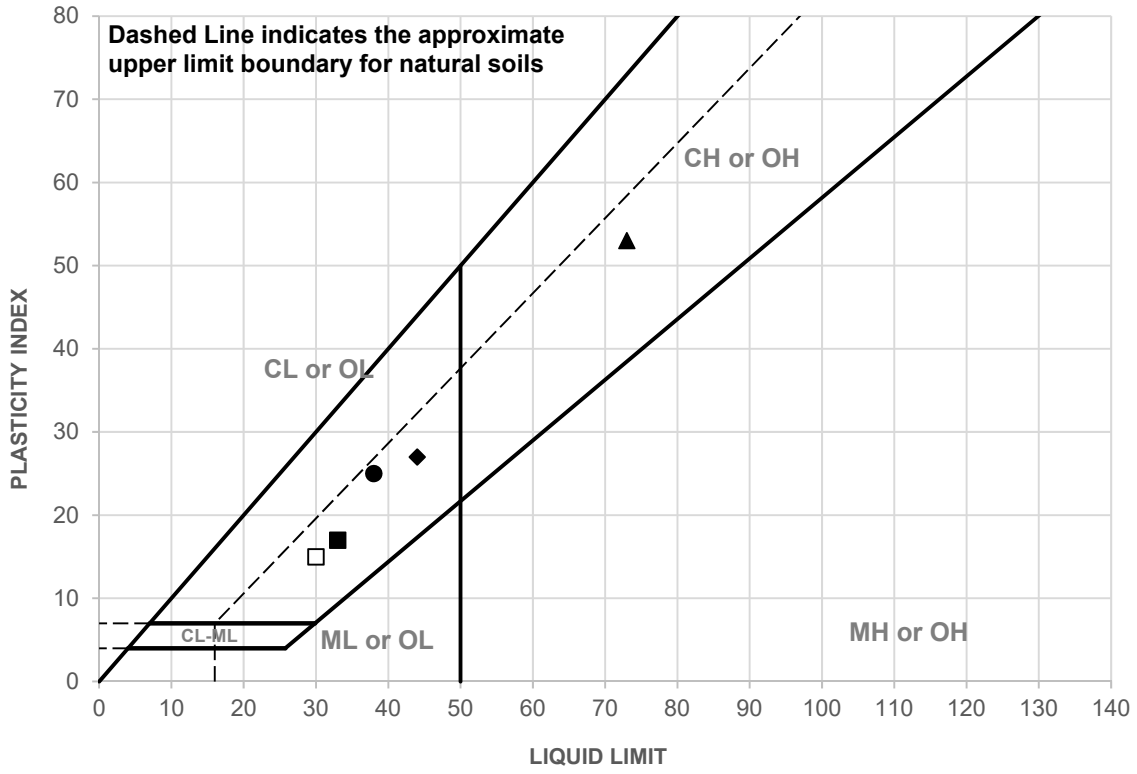
	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6 @ 30	30 ft	See exploration logs	36	23	13

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6 @ 30	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google LLC
PROJECT NAME: NBS Infrastructure Master Planning F1G2
PROJECT NO: 15949.000.000
PROJECT LOCATION: Mountain View, California
REPORT DATE: 9/18/2019
TESTED BY: M. Bromfield
REVIEWED BY: D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B6	5.5	See exploration logs	73	20	53
◆	1-B6	10	See exploration logs	44	17	27
□	1-B6	35.5	See exploration logs	30	15	15
●	1-B6	45	See exploration logs	38	13	25
■	1-B6	50.5	See exploration logs	33	16	17

	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B6	PI: ASTM D4318, Wet Method	
◆	1-B6	PI: ASTM D4318, Wet Method	
□	1-B6	PI: ASTM D4318, Wet Method	
●	1-B6	PI: ASTM D4318, Wet Method	
■	1-B6	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Google, LLC
PROJECT NAME: NBS Infrastructure Master Planning FIG2
PROJECT NO: 15949.000.000 PHLAB
PROJECT LOCATION: Mountain View, CA
REPORT DATE: 9/9/2019
TESTED BY: R. Montalvo
REVIEWED BY: M. Gilbert

Specific Gravity of Soil Solids By Water Pycnometer

ASTM D854

Sample 1: 1-B6@35.5

Description: See exploration logs — USCS: SC

%Passing #4: 84.1

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.875**

Sample 2: 1-B6@40

Description: See exploration logs — USCS: SP

%Passing #4: 62.8

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.890**

Sample 3: 1-B6@70

Description: See exploration logs — USCS: n/a

%Passing #4: 100.0

Method used: **B**

Temperature (°C): **23.3** — ***Specific gravity at 20 °C:*** **2.732**

PROJECT NAME: **NBS Infrastructure Master Planning FIG2** — **DATE:** **09/09/19**

PROJECT NUMBER: **15959.000.000**

CLIENT: **Google, LLC**

PHASE NUMBER: **LAB**

ENGEO Expect Excellence

Tested by: R. Montalvo — Reviewed by: M. Gilbert

Isotropic Unconsolidated Undrained Triaxial Test

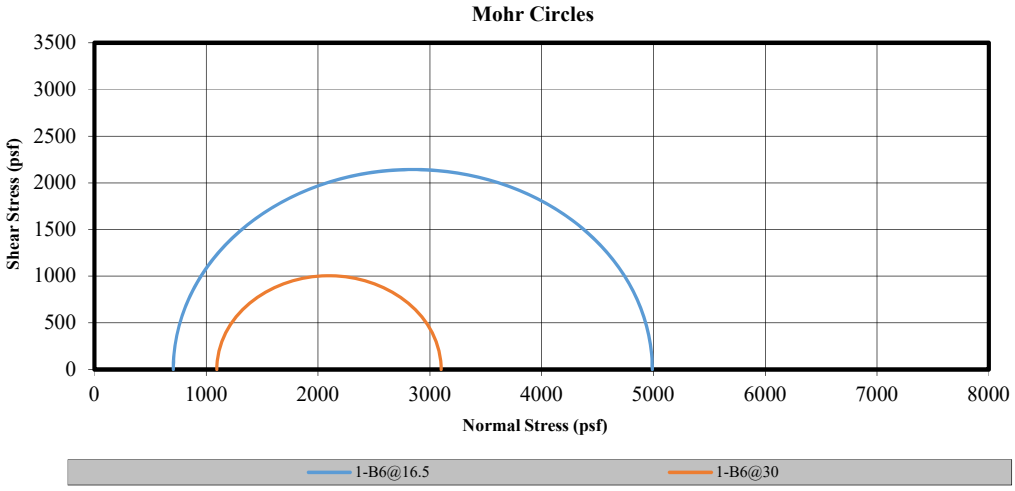
ASTM D2850

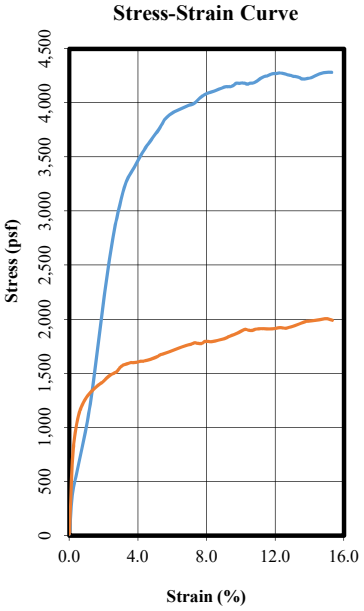
Date: 09/13/19

Checked By: G. Criste

Date: 9/13/2019

Tested By: M. Quasem





Before Test	Specimen 1-B6@16.5	1-B6@30		
Water Content (%)	21.94	27.08		
Dry Density (pcf)	109.00	100.00		
Saturation (%)	100.00	100.00		
Void Ratio	0.62	0.76		
Diameter (in)	2.850	2.370		
Height (in)	5.970	5.070		
Height-to-Diameter Ratio	2.095	2.139		
ASTM D4318 - Wet Method				
Liquid Limit	-	-		
Plastic Limit	-	-		
ASTM D854 - Assumed				
Specific Gravity	2.820	2.820		
After Test	**1-B6@16.5**	**1-B6@30**		
Water Content (%)	21.94	27.08		
Saturation (%)	100.00	100.00		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	4283.9	2006.7		
Axial Strain @ Failure (%)	15.244	14.990		
	Cell Pressure			
Cell (psf)	705.6	1094.4		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	4989.5	3101.1		
σ3 (psf)	705.6	1094.4		
Corrected Peak Deviator Stress				

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	n/a		2141.9	1003.4		
Friction Angle Ø	n/a		n/a	n/a		

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Montain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence

Isotropic Unconsolidated Undrained Triaxial Test

ASTM D2850

Date: 09/13/19

Checked By: G. Criste

Date: 9/13/2019

Tested By: M. Quasem

SPECIMEN PHOTOS

SAMPLE NUMBER: 1-B6@16.5	SAMPLE NUMBER: 1-B6@30
	

Project Information	
Project Name:	GEX for Multiple Parcels
Project Number:	15949.000.000
Project Location:	Montain View, California
Client:	Google, LLC
Description:	See exploration logs
Test Remarks:	

ENGEO Expect Excellence



APPENDIX D

CORROSIVITY TEST RESULTS (CERCO Analytical)

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

25 June, 2019

Job No. 1906091
Cust. No. 10169

Mr. Bahareh Heidarzadeh
ENGEO Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Subject: Project No.: 15949.000.000
Project Name: Mountain View Multiple Parcels
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Heidarzadeh:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on June 17, 2019. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, all samples are 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 are none detected & 31 mg/kg, are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations ranged from 87 to 140 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 ranged from 8.23 to 8.30, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials ranged from 140 to 240-mV. Samples No.002 & No.003 are indicative of potentially "moderately corrosive" soils and Sample No.001 is indicative of potentially "slightly corrosive" soils resulting from anaerobic 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.: 15949.000.000
Client's Project Name: Mountain View Multiple Parcels
Date Sampled: 14-Jun-19
Date Received: 17-Jun-19
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 25-Jun-2019

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)*
1906091-001	1-B4 20.5	240	8.23	-	1,200	N.D.	N.D.	87
1906091-002	1-B7 5	170	8.29	-	1,100	N.D.	31	140
1906091-003	1-B7 25.5	140	8.30	-	1,200	N.D.	N.D.	97

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
	20-Jun-2019	20-Jun-2019	-	17-Jun-2019	12-Jun-2019	20-Jun-2019	20-Jun-2019

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

1906091

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 15949.000.000	PROJECT NAME: Mountain View Multiple Parcels
SAMPLED BY: (SIGNATURE/PRINT) Bofei Xu	
PROJECT MANAGER: Bahareh Heidarzadeh/Janet Kan	
ROUTING: E-MAIL bheidarzadeh@engeo.com	Hard Copy NA

SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE	Redox	Resistivity	pH	Sulfide	Sulfate	Chloride	REMARKS REQUIRED DETECTION LIMITS
1-B4 20.5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary
1-B7 5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary
1-B7 25.5	6/14/2019			1			•	•	•	•	•	•	Include Evaluation Summary

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
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	6/17/19 1500				
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	

ENGEO INCORPORATED

2010 CROW CANYON PLACE, SUITE 250
SAN RAMON, CALIFORNIA 94583
(925) 866-9000 FAX (888) 279-2698
WWW.ENGEO.COM

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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

23 September, 2019

Job No. 1909026
Cust. No. 10169

Ms. Bahareh Heidarzadeh
ENGEO Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Subject: Project No.: 15949.000.000
Project Name: Mountain View Multiple Parcels
Corrosivity Analysis – ASTM Test Methods

Dear Ms. Heidarzadeh:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on September 05, 2019. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No.010 is classified as "severely corrosive", Samples No.001, No.002, No.004, No.006, No.008 & No.009 are classified as "corrosive" and Samples No.003, No.005 & No.007 are classified as "moderately 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 ranged from none detected to 740 mg/kg and are determined to be sufficient to attack steel embedded in a concrete mortar coating. 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 ranged from 16 to 220 mg/kg and are determined to be sufficient to potentially be detrimental to reinforced concrete structures and cement mortar-coated steel at these locations. Therefore, concrete that comes into contact with this soil should use sulfate resistant cement such as Type II, with a maximum water-to-cement ratio of 0.55.

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

The pH of the soils ranged from 8.21 to 8.85, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials ranged from 180 to 230-mV. Samples No.008 & No.009 are indicative of potentially "moderately corrosive" soils and all remaining samples are indicative of potentially "slightly corrosive" soils resulting from anaerobic 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.

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

JDH/jdl
Enclosure

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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.: 15949.000.000
Client's Project Name: Mountain View Mulitple Parcels
Date Sampled: 5-Sep-19
Date Received: 5-Sep-19
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 23-Sep-2019

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)*
1909026-001	1-B6/8'	210	8.26	-	1,100	N.D.	N.D.	210
1909026-002	1-B6/26'	210	8.47	-	1,500	N.D.	N.D.	110
1909026-003	1-B6/40.5'	220	8.38	-	4,900	N.D.	N.D.	36
1909026-004	1-B3/8.5'	230	8.21	-	1,900	N.D.	N.D.	110
1909026-005	1-B3/41'	220	8.22	-	2,400	N.D.	N.D.	54
1909026-006	2-B4/10'	220	8.37	-	1,700	N.D.	22	56
1909026-007	2-B4/40.5'	220	8.38	-	2,400	N.D.	N.D.	17
1909026-008	3-B2/10.5'	180	8.64	-	1,500	N.D.	N.D.	16
1909026-009	3-B2/35.5'	190	8.31	-	1,400	N.D.	36	32
1909026-010	3-B3/30.5'	220	8.85	-	300	N.D.	740	220

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
	20-Sep-2019	20-Sep-2019	-	20-Sep-2019	12-Sep-2019	20-Sep-2019	20-Sep-2019

Steven Moore
for 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

CHAIN OF CUSTODY RECORD

CA 1909096

PROJECT NUMBER: 15949.000.000	PROJECT NAME: Mountain View Multiple Parcels
SAMPLED BY: (SIGNATURE/PRINT) Bofei Xu	
PROJECT MANAGER: Bahareh Heidarzadeh/Janet Kan	
ROUTING: E-MAIL bheidarzadeh@engeo.com	Hard Copy NA

	SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE	Redox	Resistivity	pH	Sulfide	Sulfate	Chloride	REMARKS REQUIRED DETECTION LIMITS
001	1-B6 / 8'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include Evaluation Summary
002	1-B6 / 26'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include Evaluation Summary
003	1-B6 / 40.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
004	1-B3 / 8.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
005	1-B3 / 41'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
006	2-B4 / 10'	090519		Soil	1	Bag		X	X	X	X	X	X	Include E.S.
007	2-B4 / 40.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
008	3-B2 / 10.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
009	3-B2 / 35.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.
010	3-B3 / 30.5'	090519		Soil	1	2.5"x6"		X	X	X	X	X	X	Include E.S.

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Bofei Xu	9/5 2:00pm			9/5 1520	
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RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	

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APPENDIX E

LIQUEFACTION ANALYSIS

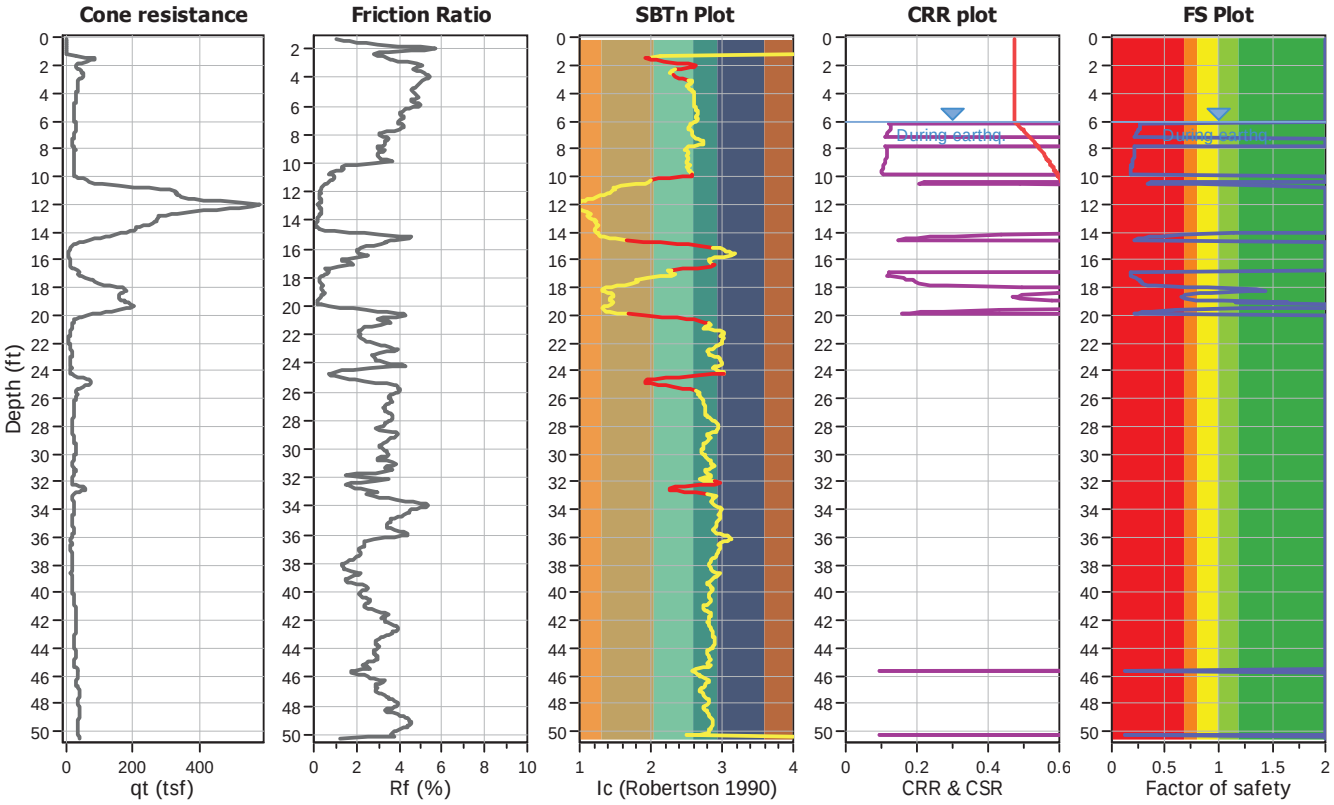
LIQUEFACTION ANALYSIS REPORT

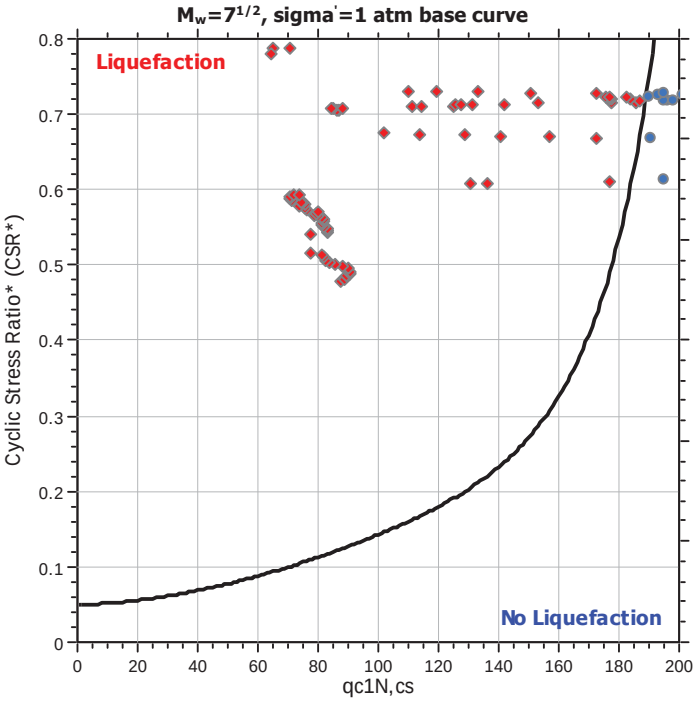
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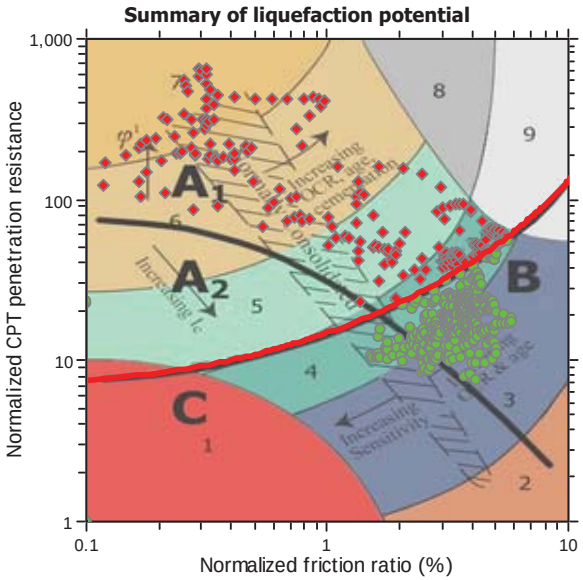
CPT file : 1-CPT1

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

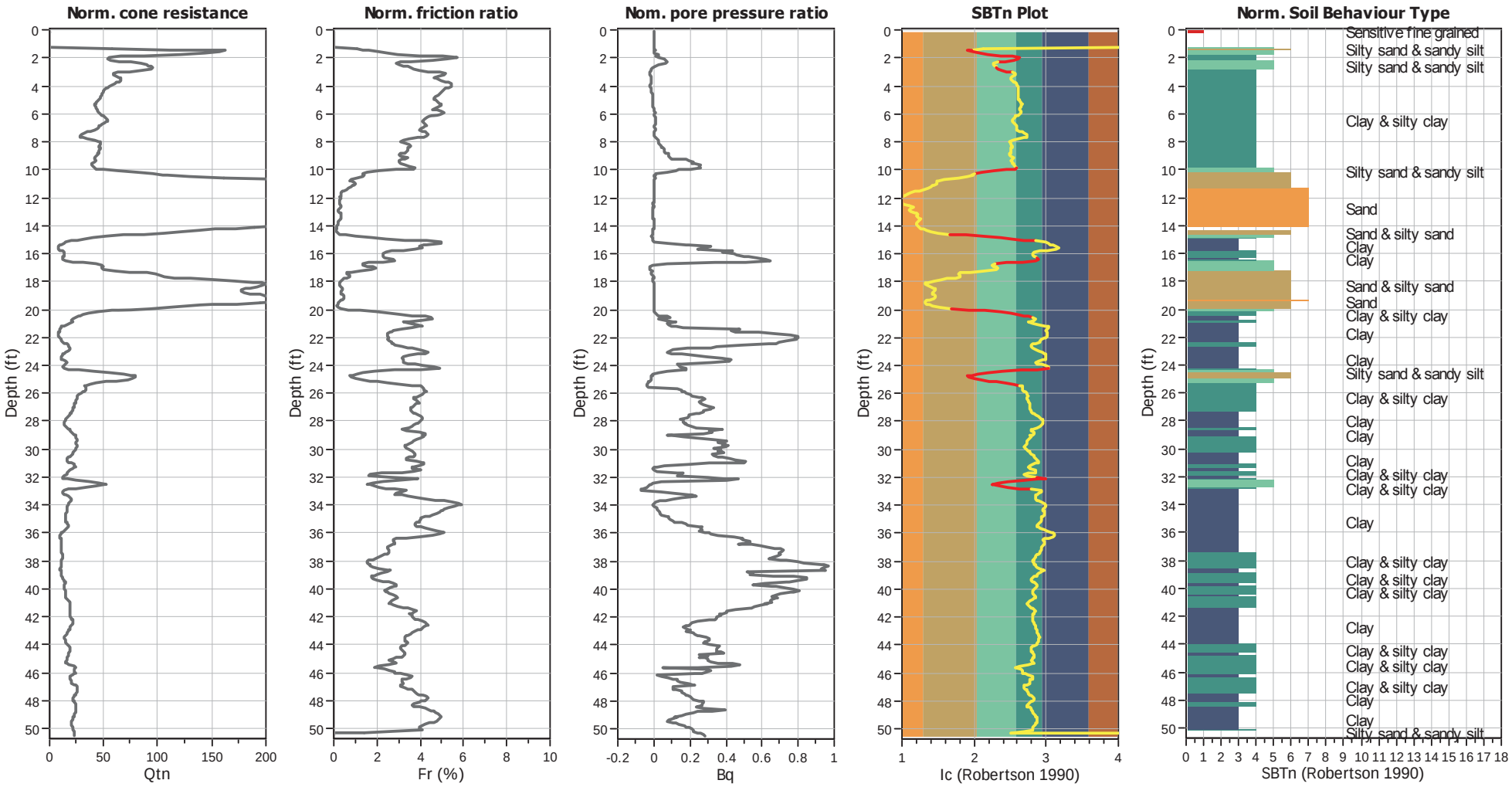






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



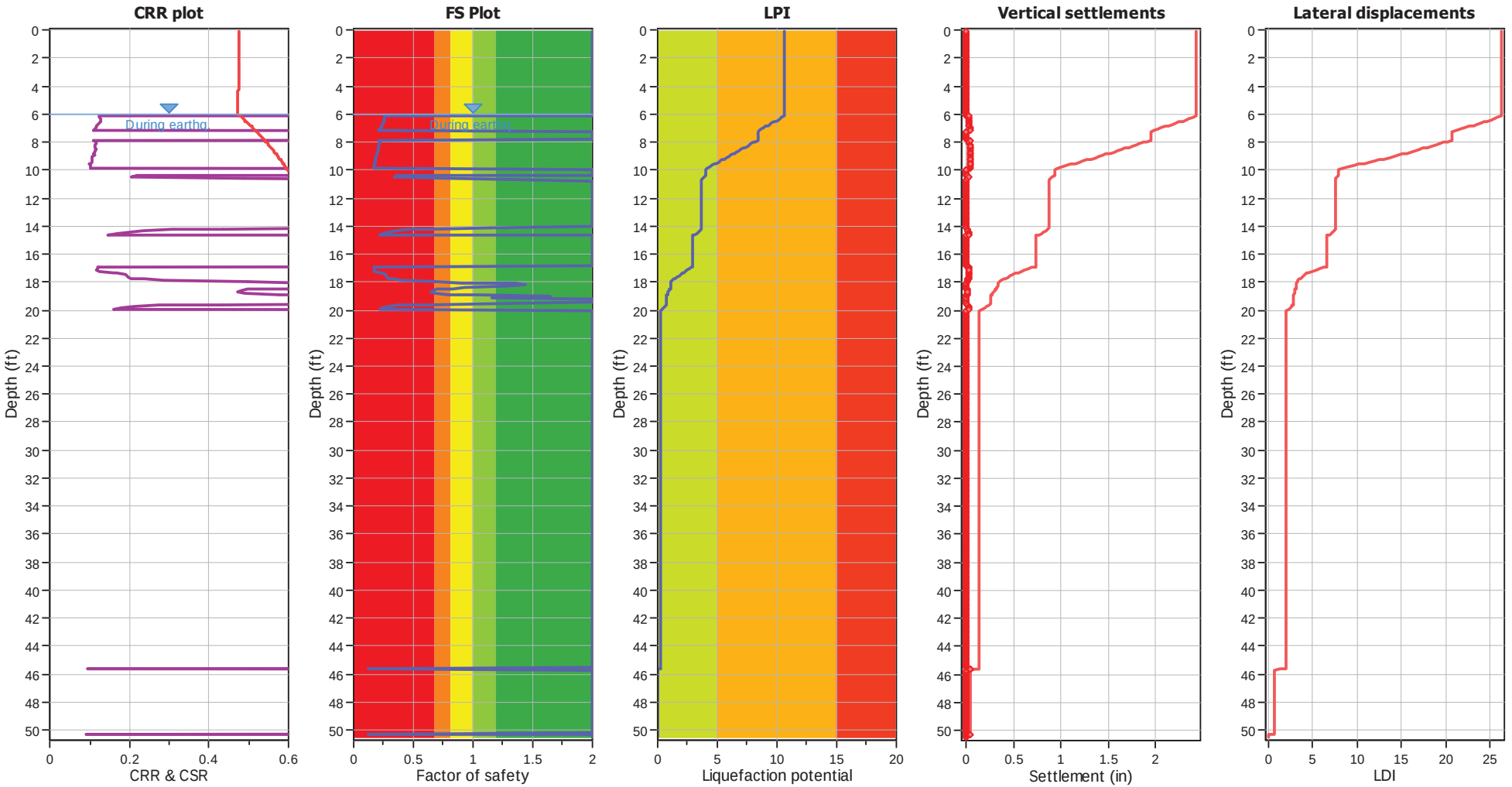
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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LIQUEFACTION ANALYSIS REPORT

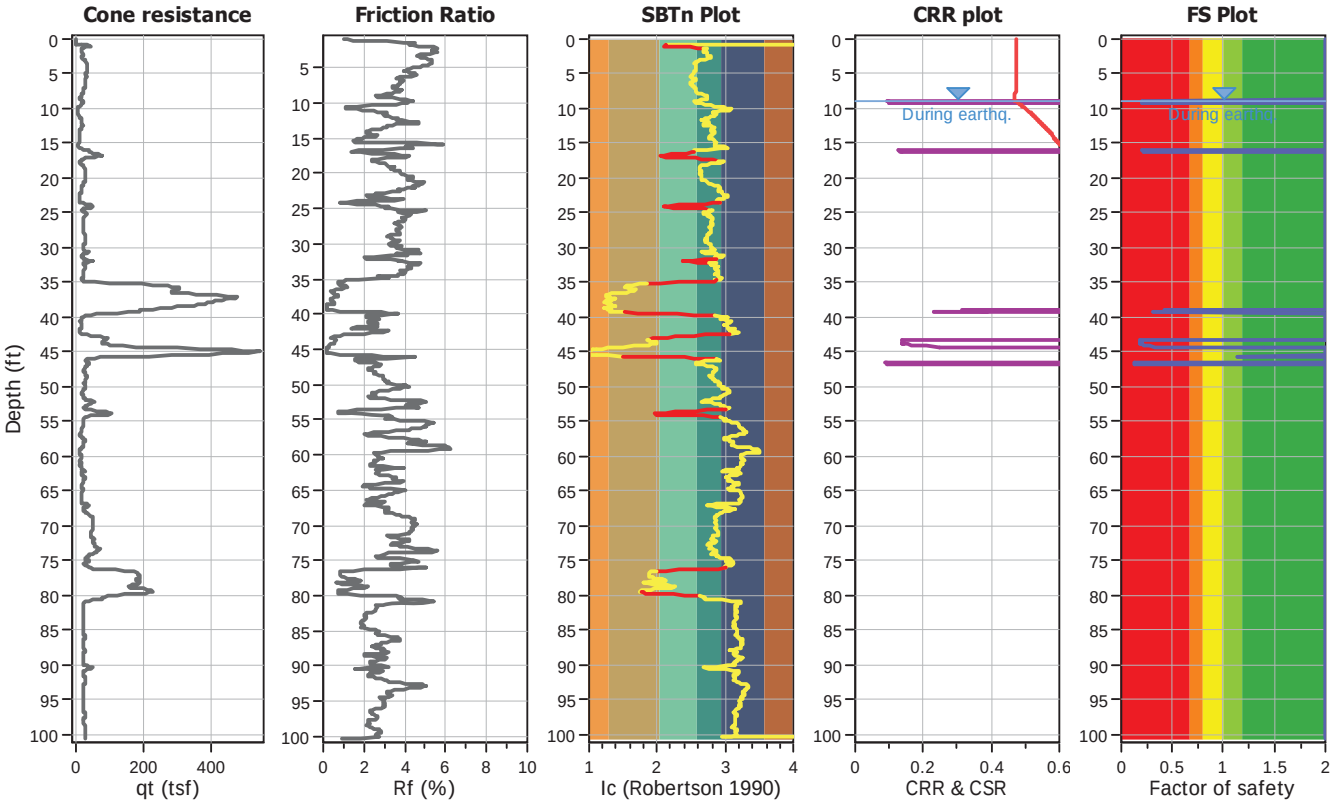
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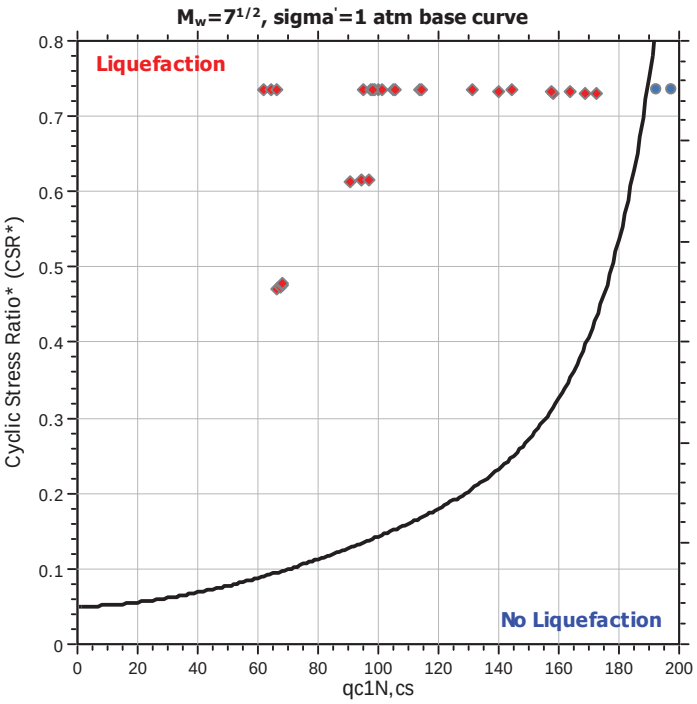
Location : Mountain View, CA

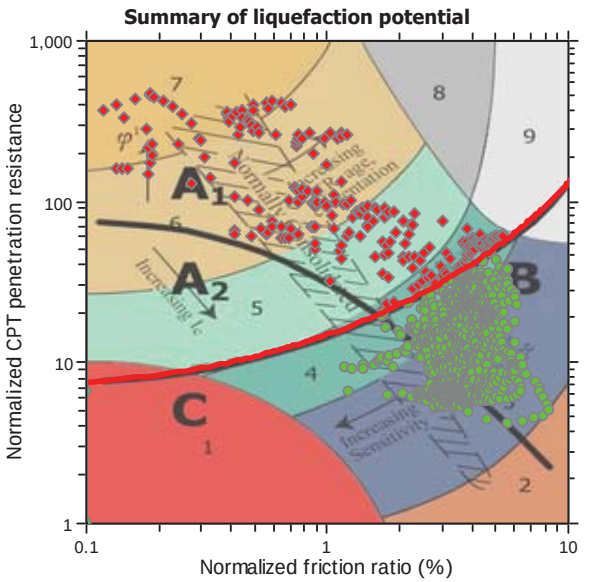
CPT file : 1-SCPT2

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	8.90 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	8.90 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

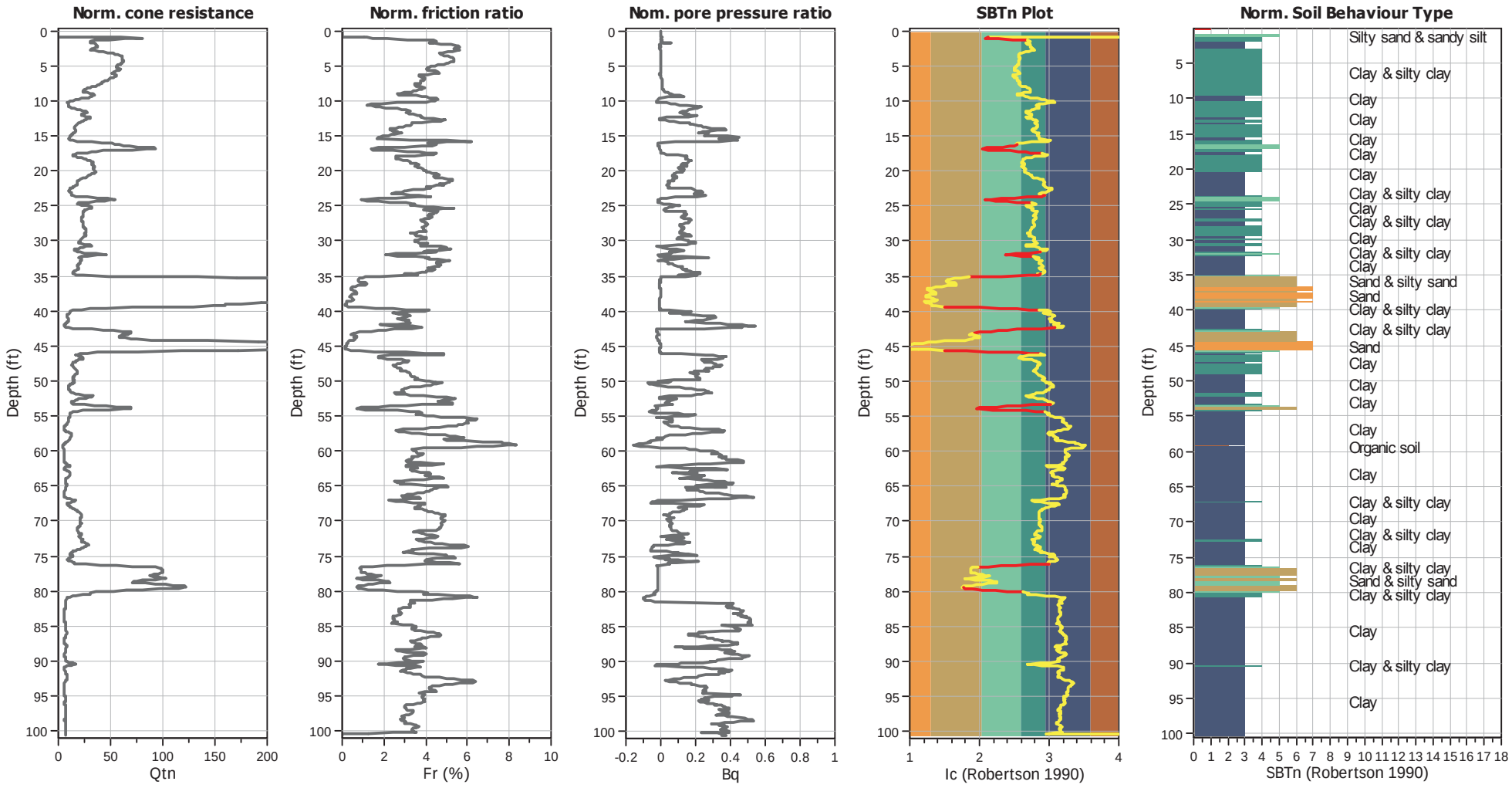






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



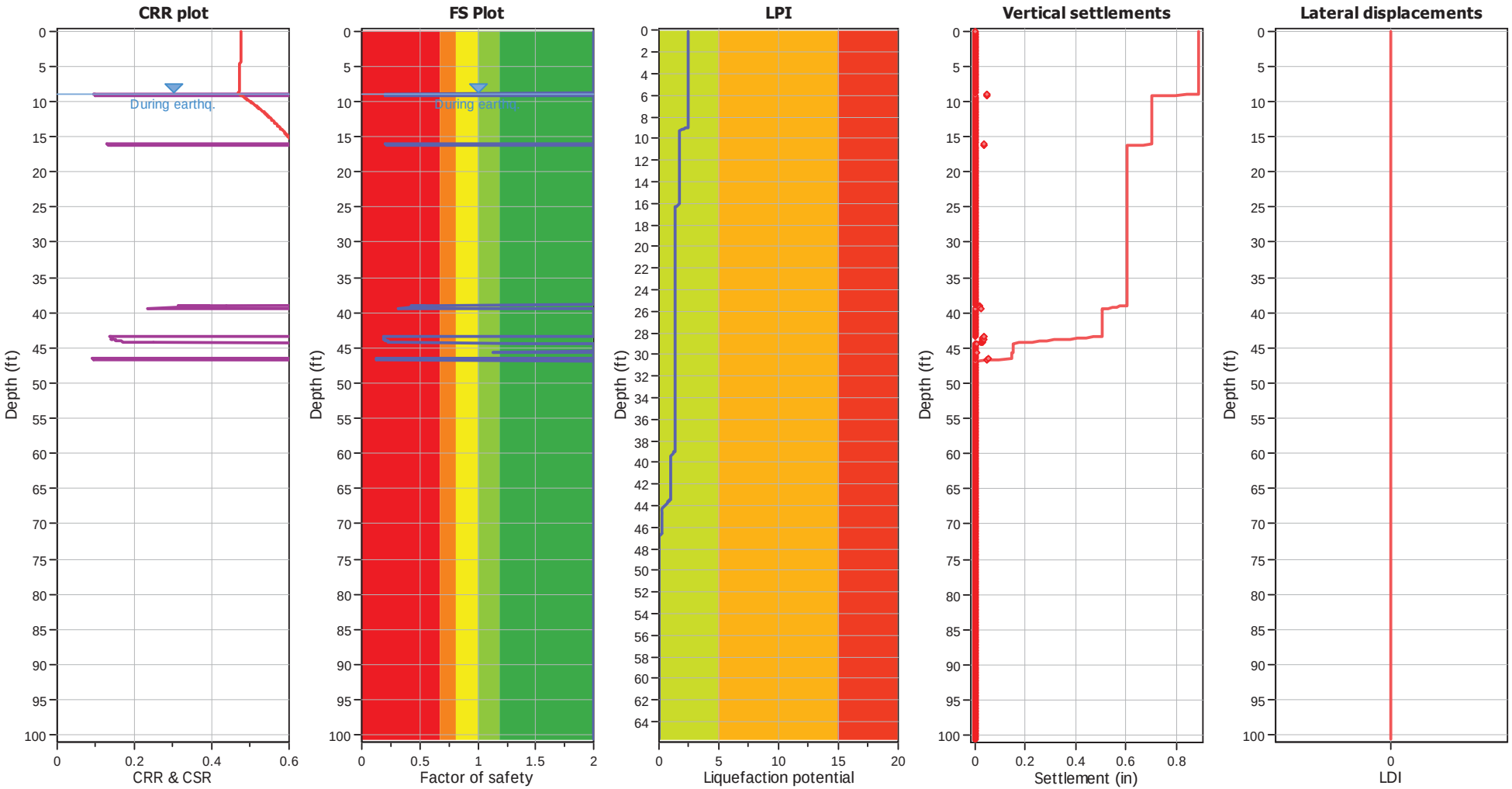
Input parameters and analysis data

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Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.90 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	8.90 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.90 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

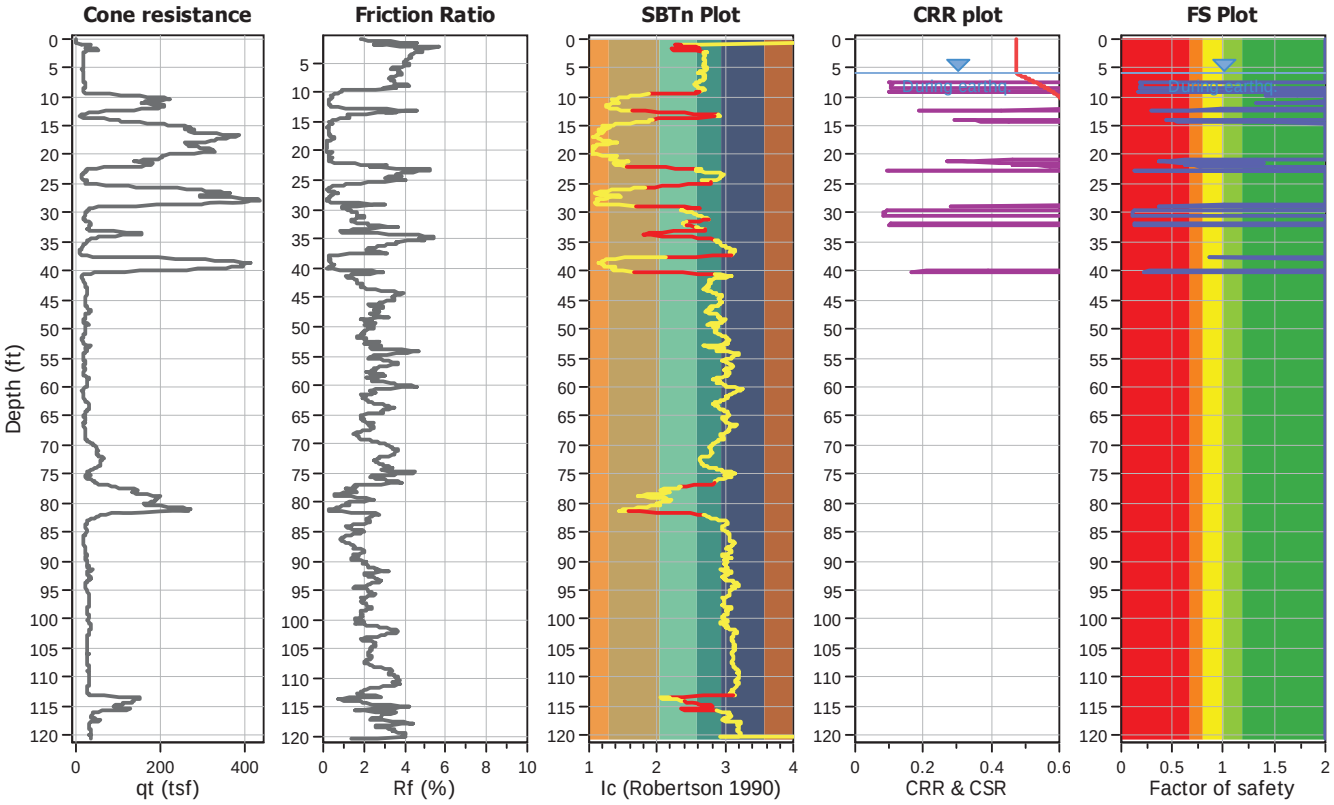
LIQUEFACTION ANALYSIS REPORT

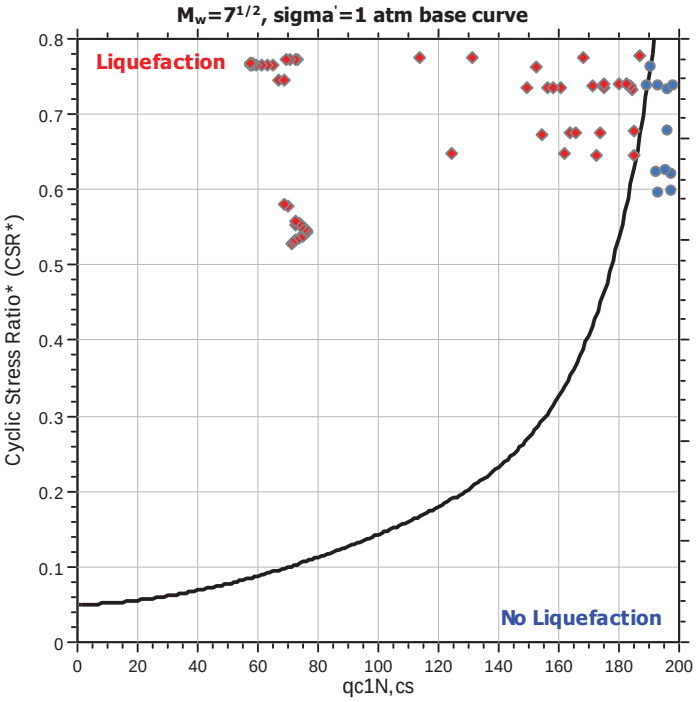
Project title : Google Parcels GEX **Location : Mountain View, CA**

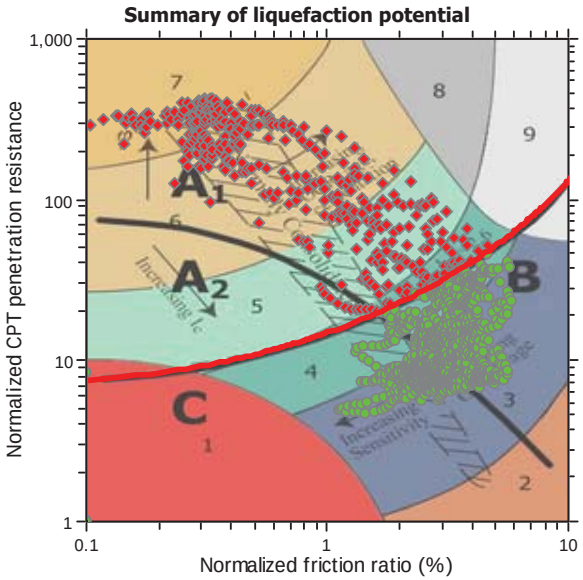
CPT file : 1-CPT3

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

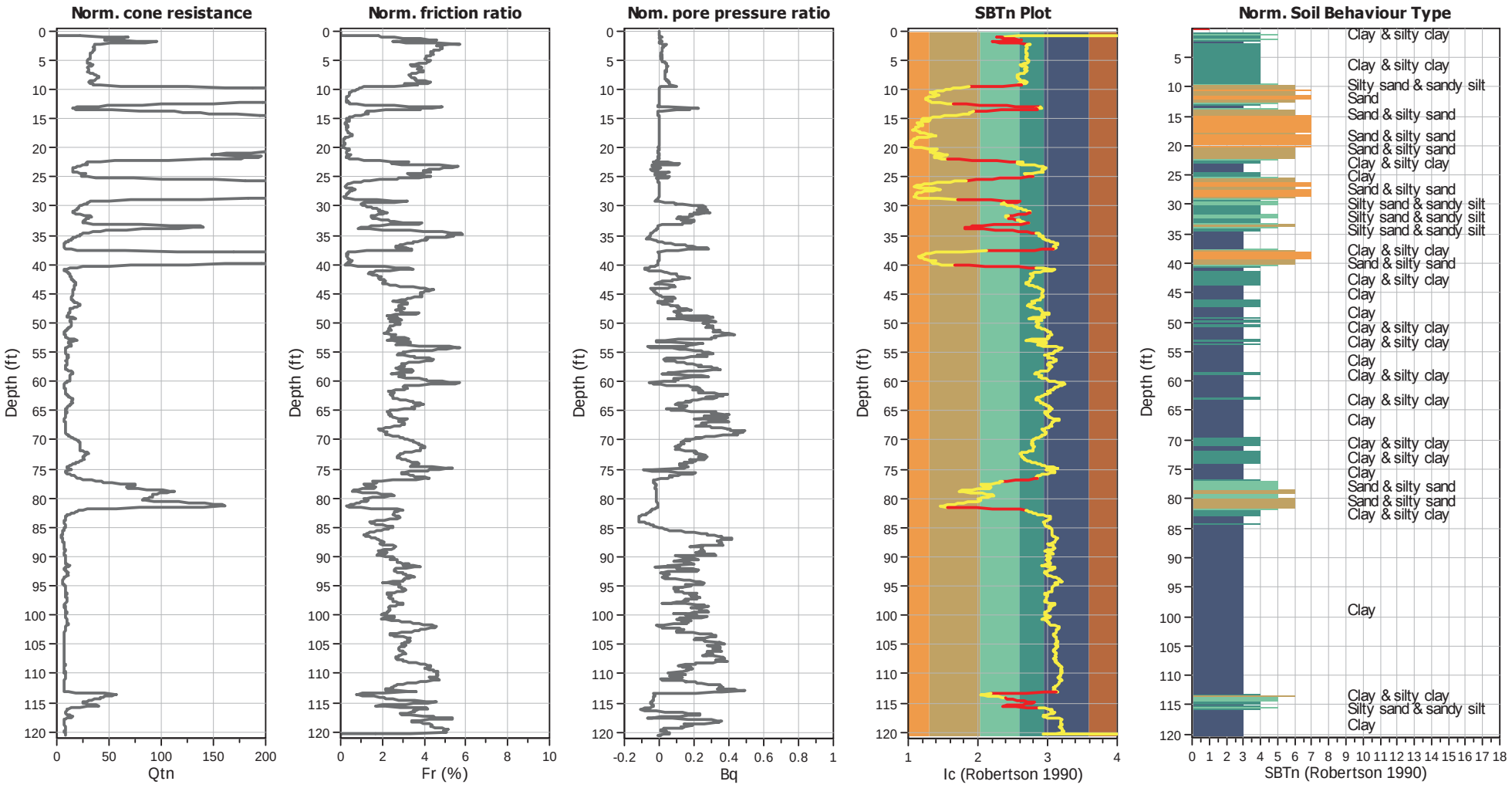






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



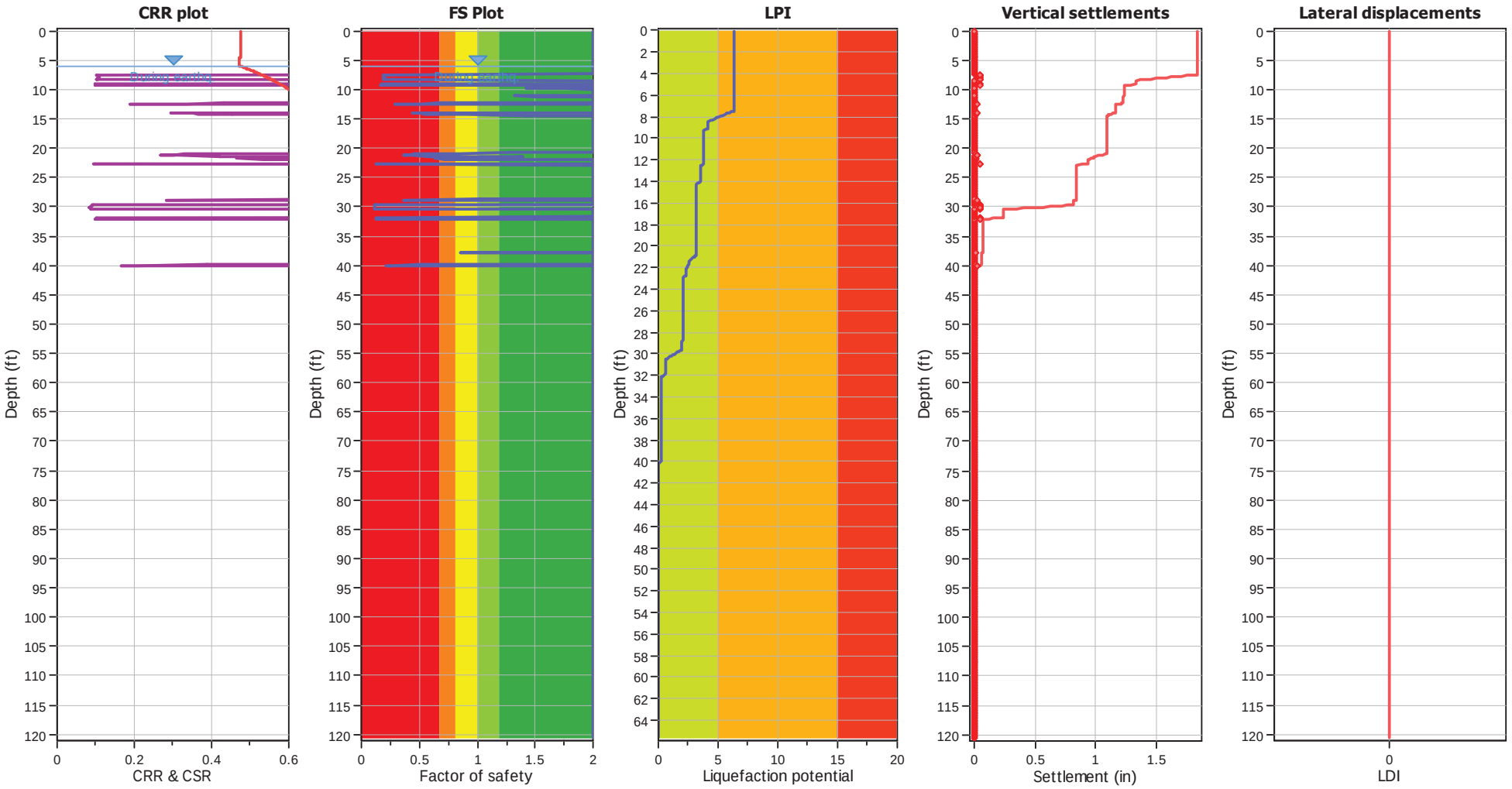
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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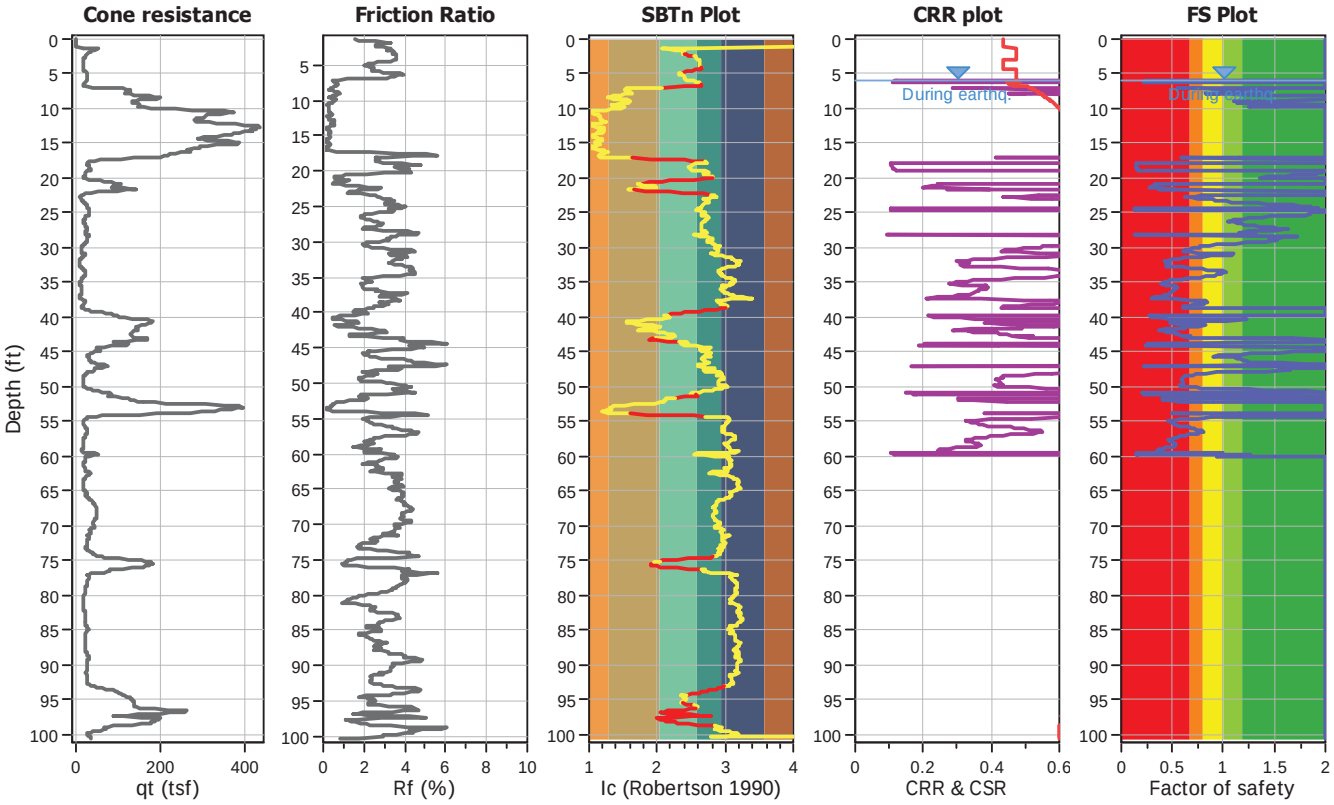
LIQUEFACTION ANALYSIS REPORT

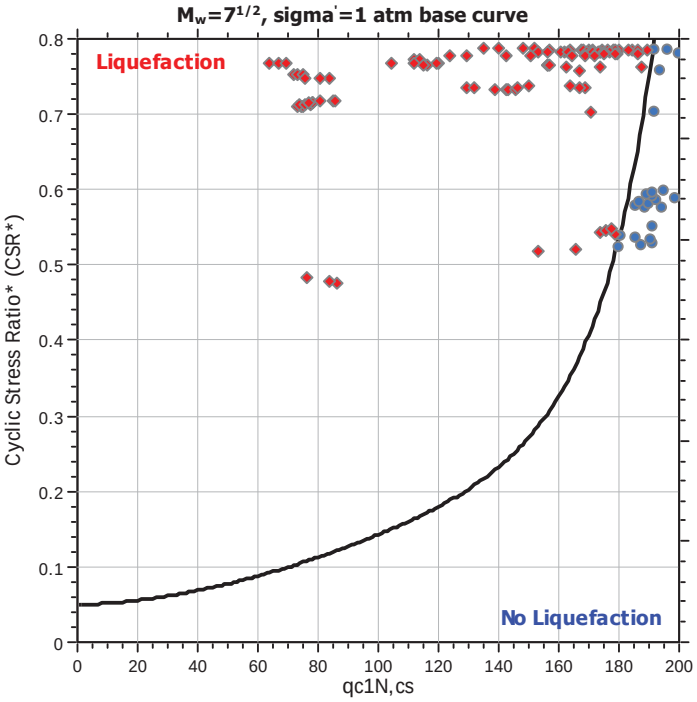
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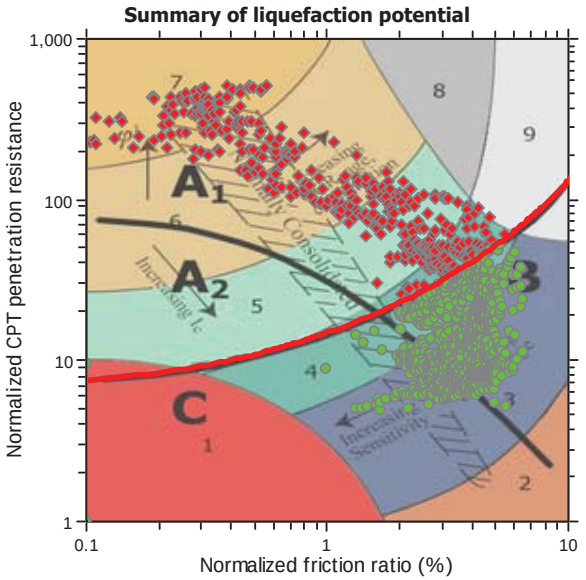
CPT file : 1-SCPT4

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

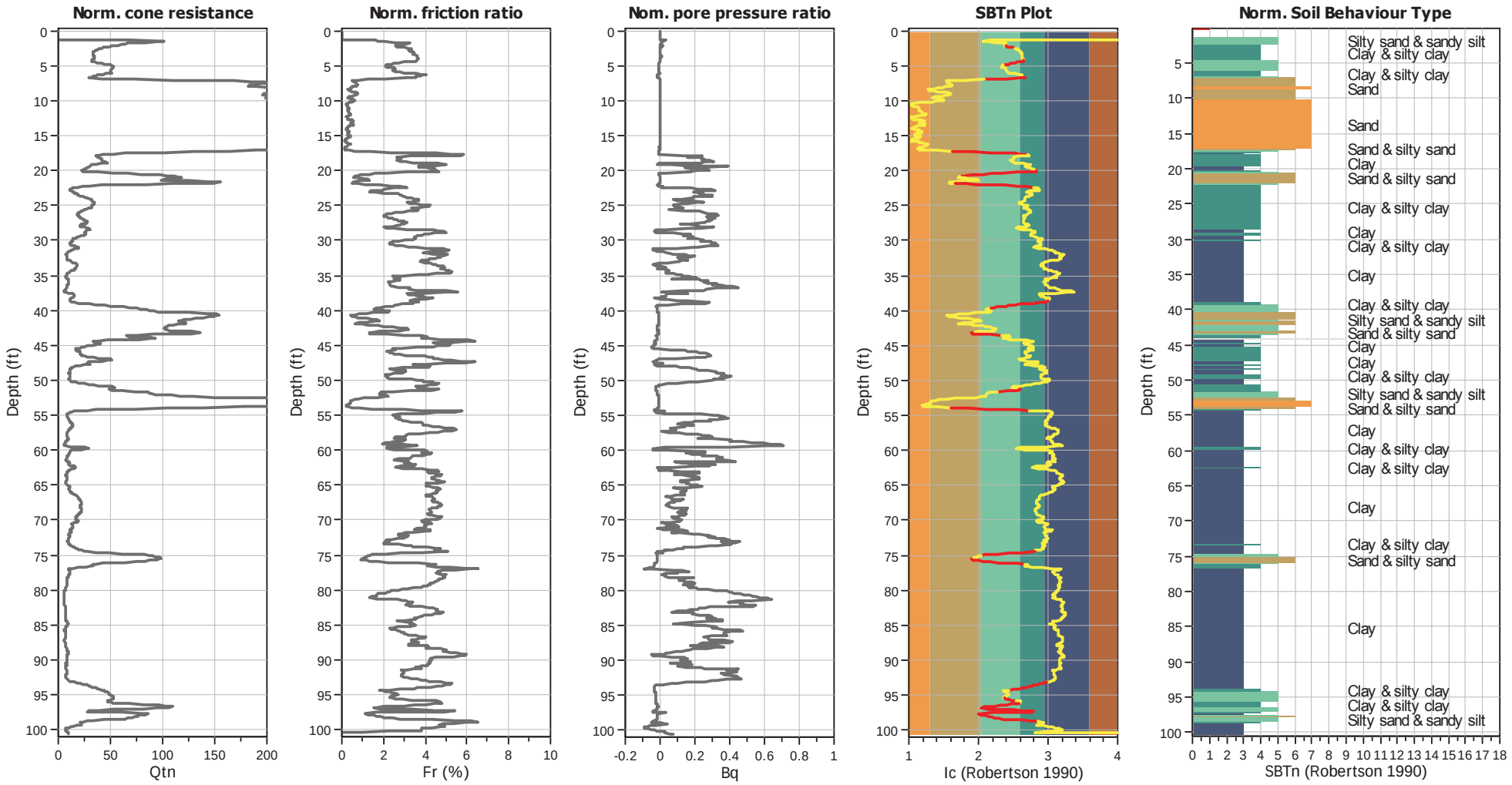






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



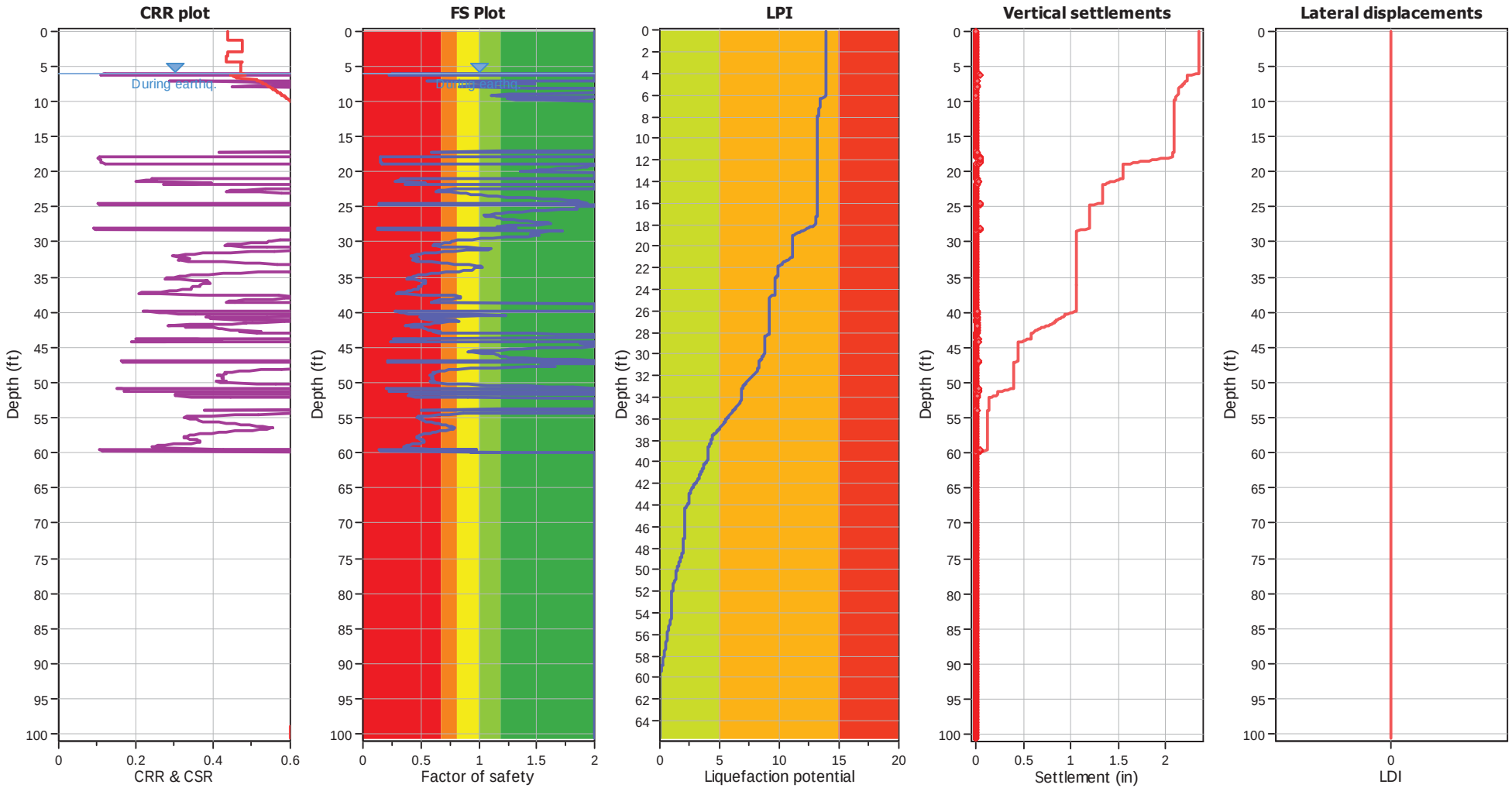
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

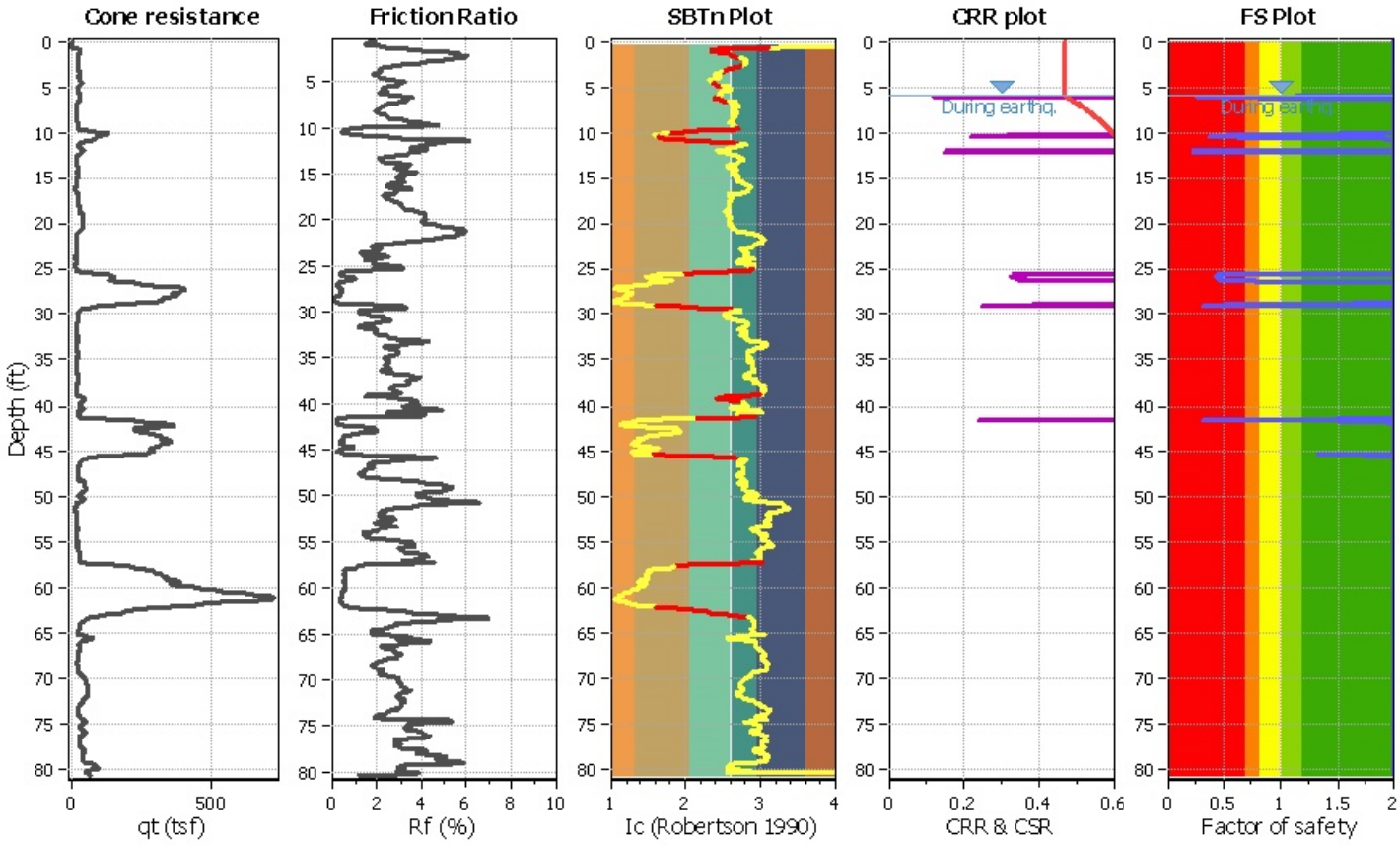
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

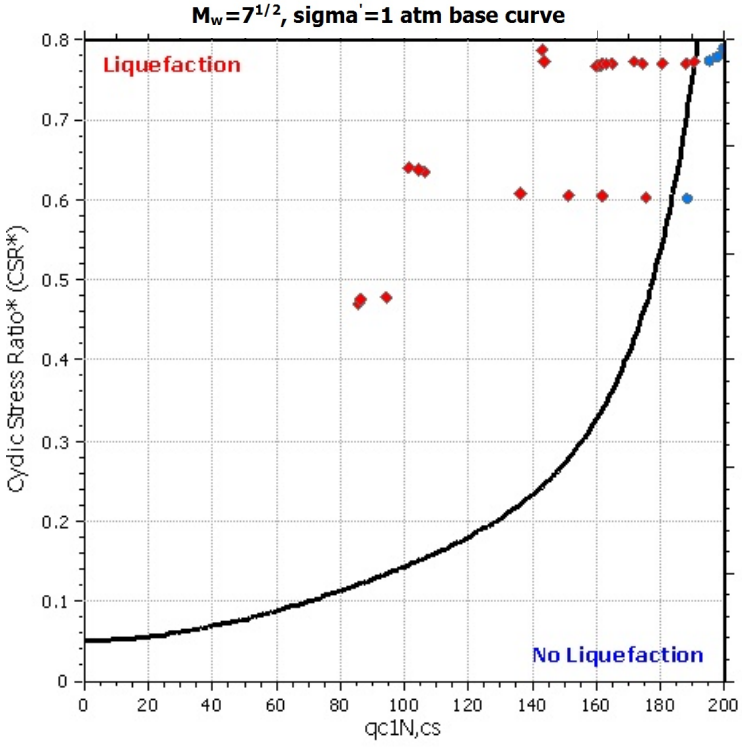
CPT file : 1-CPT5

Input parameters and analysis data

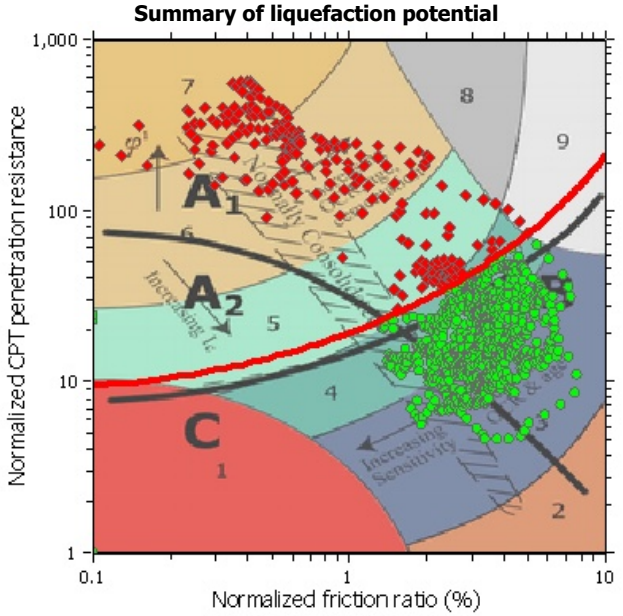
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.50	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

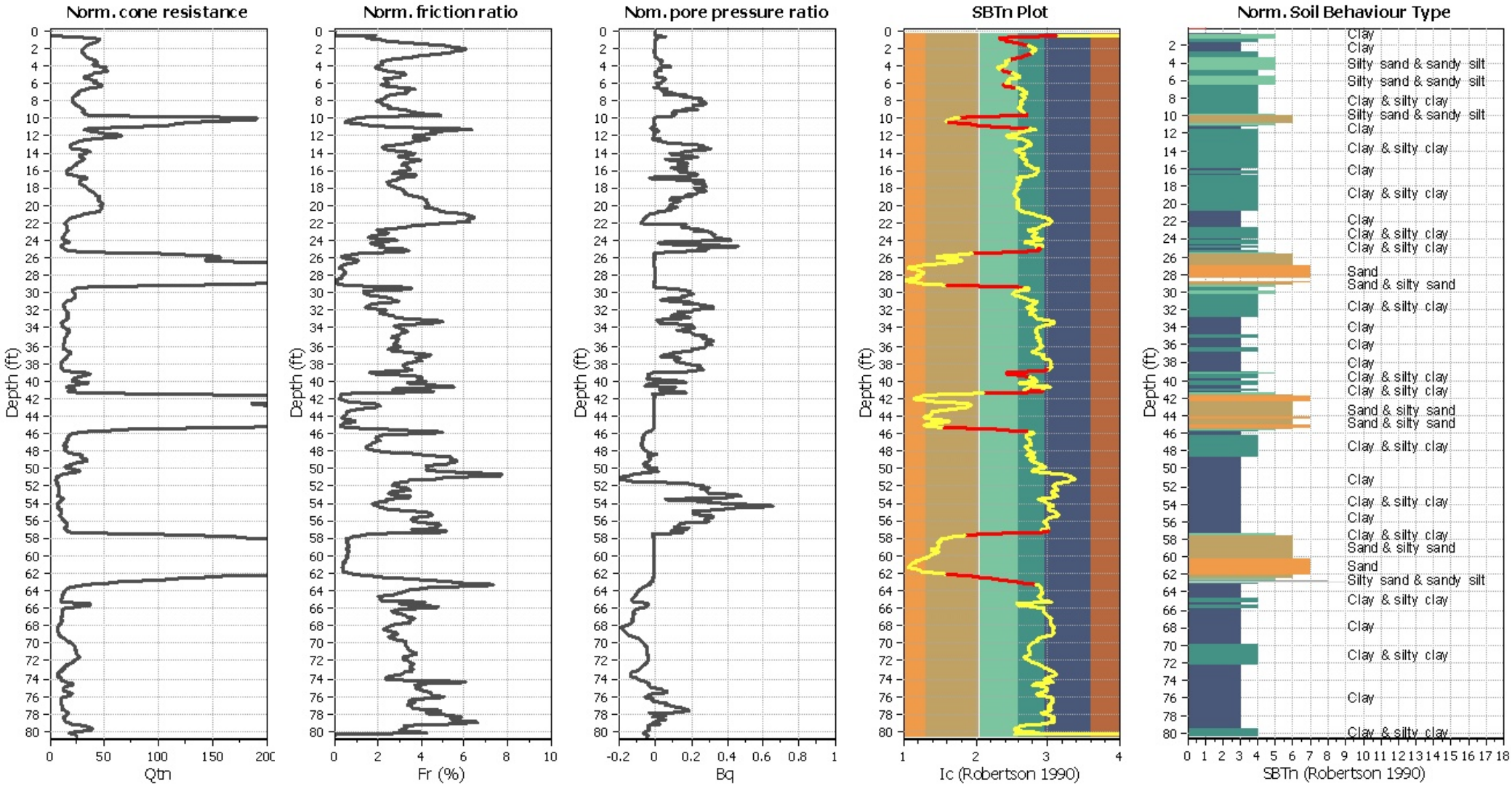


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



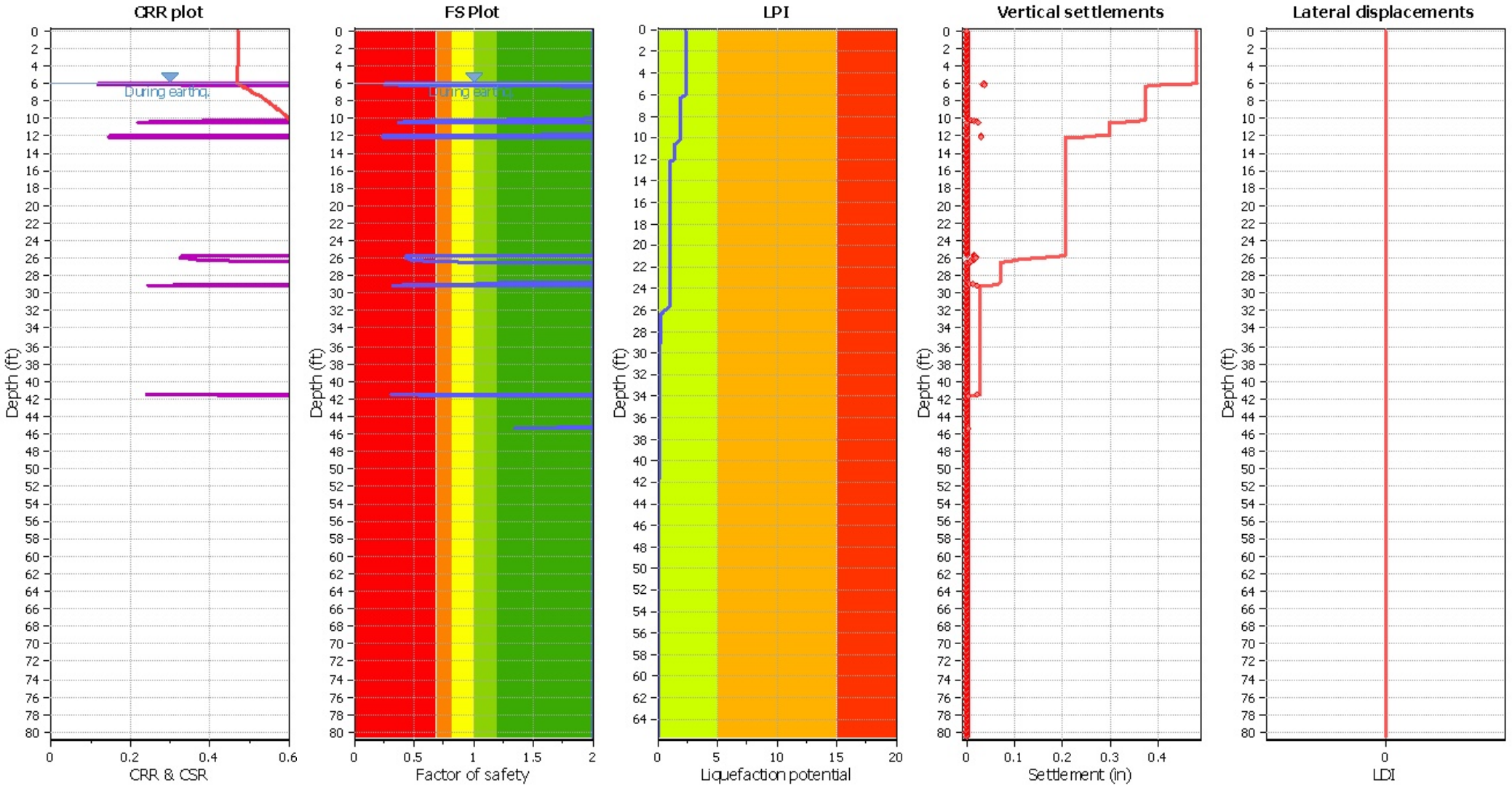
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

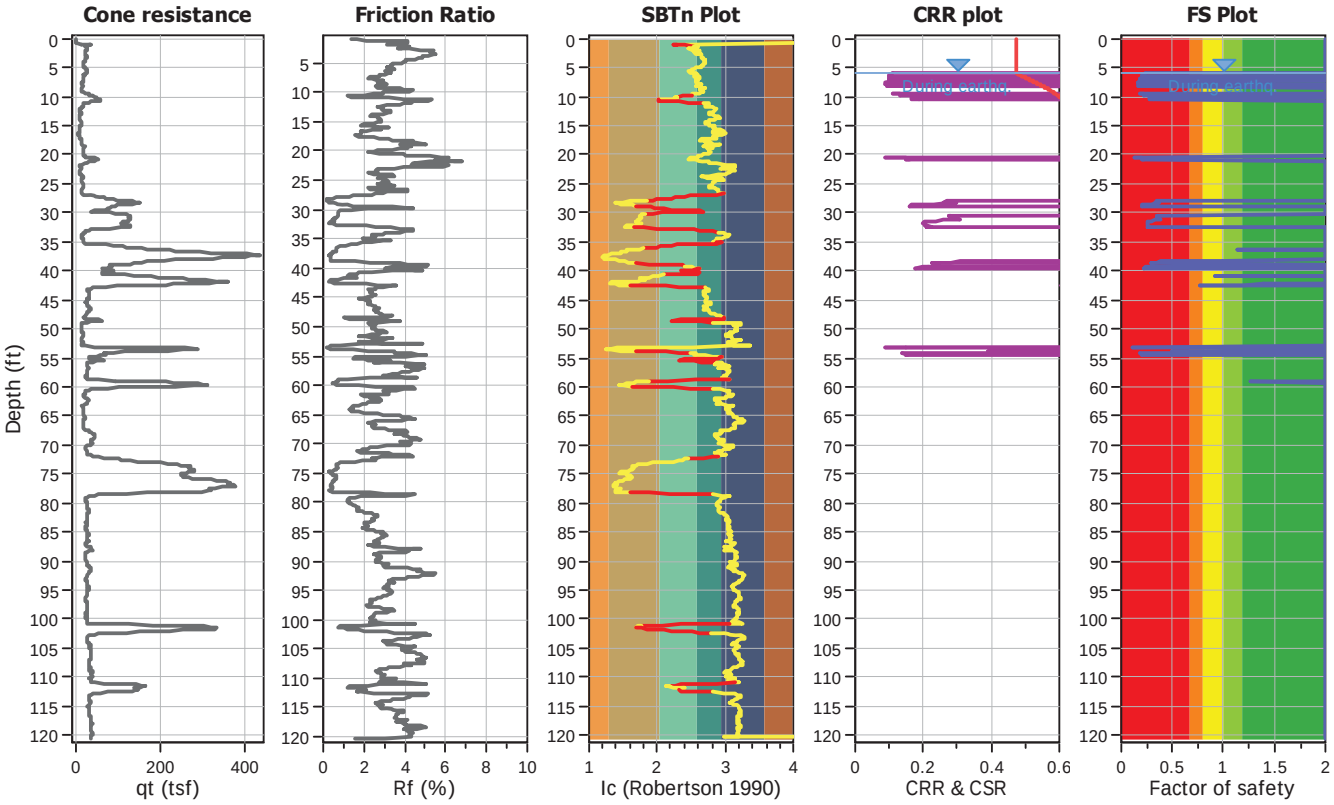
LIQUEFACTION ANALYSIS REPORT

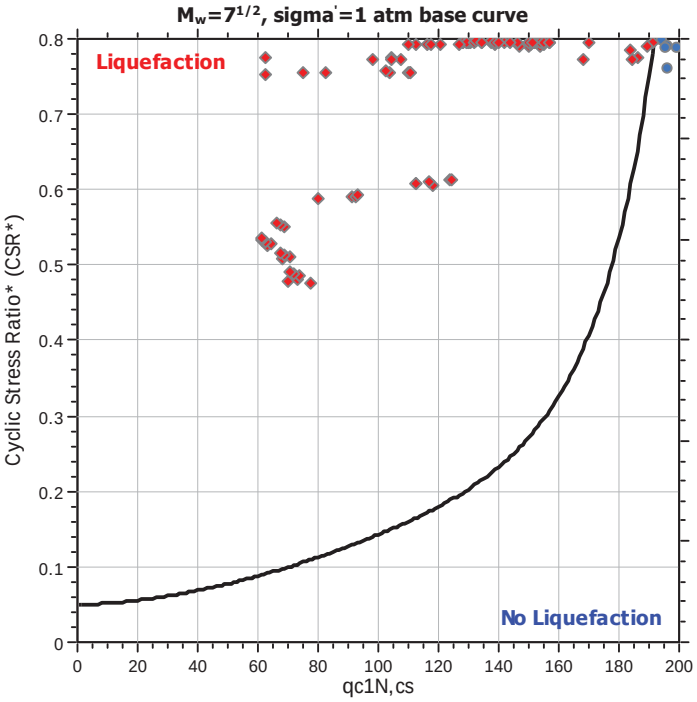
Project title : Google Parcels GEX **Location : Mountain View, CA**

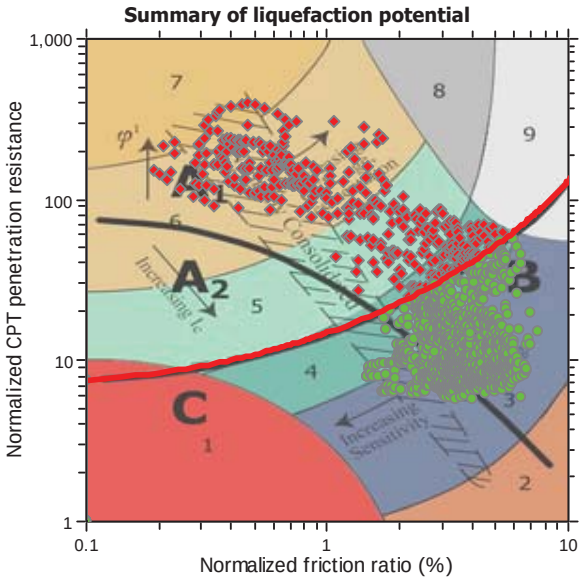
CPT file : 1-CPT6

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method

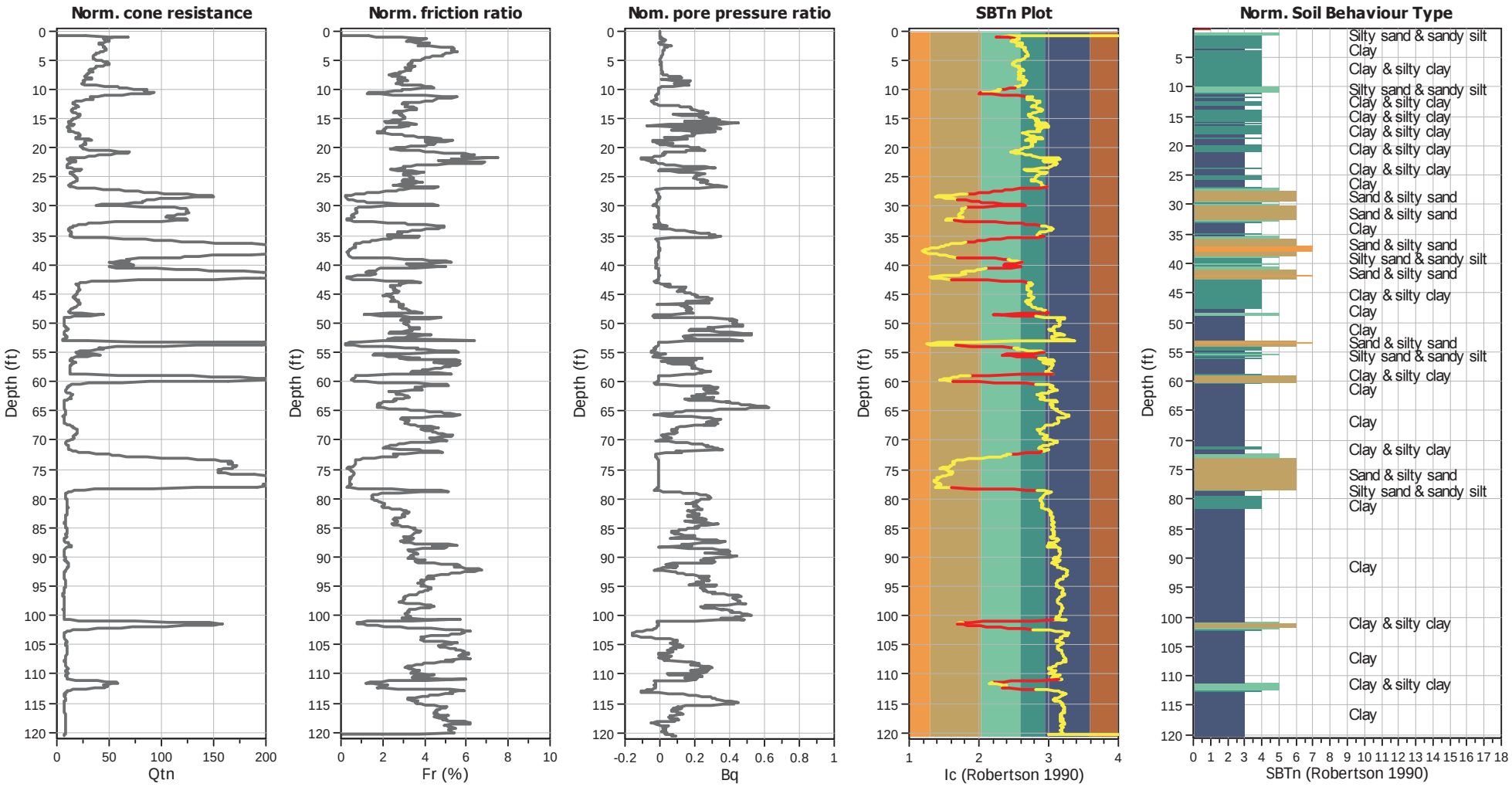






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



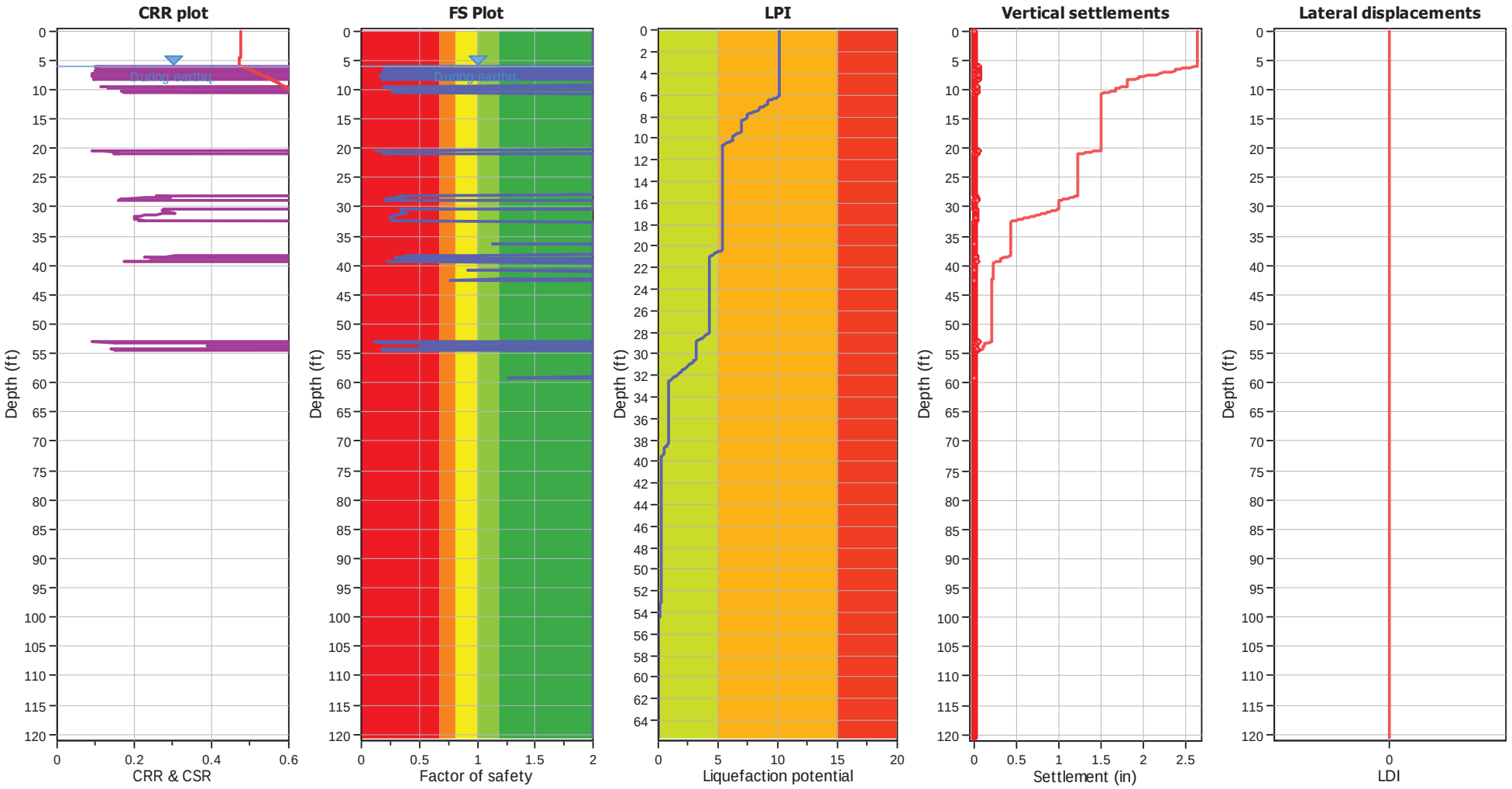
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

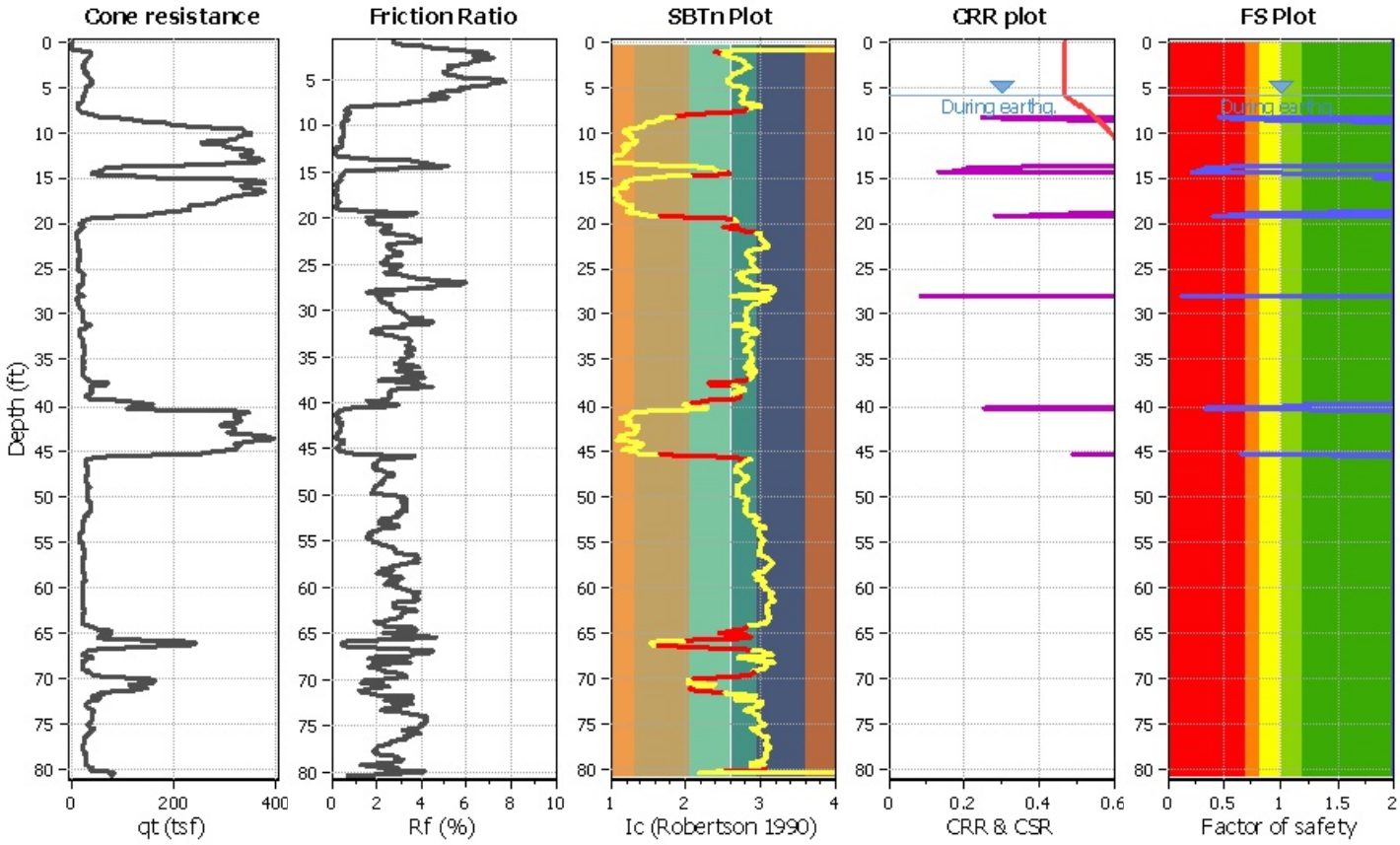
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

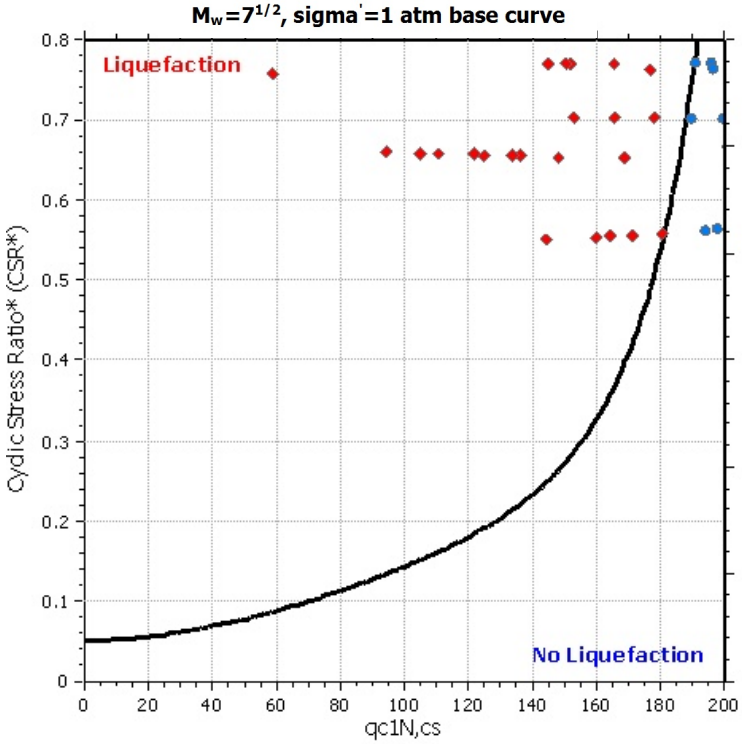
CPT file : 1-CPT7

Input parameters and analysis data

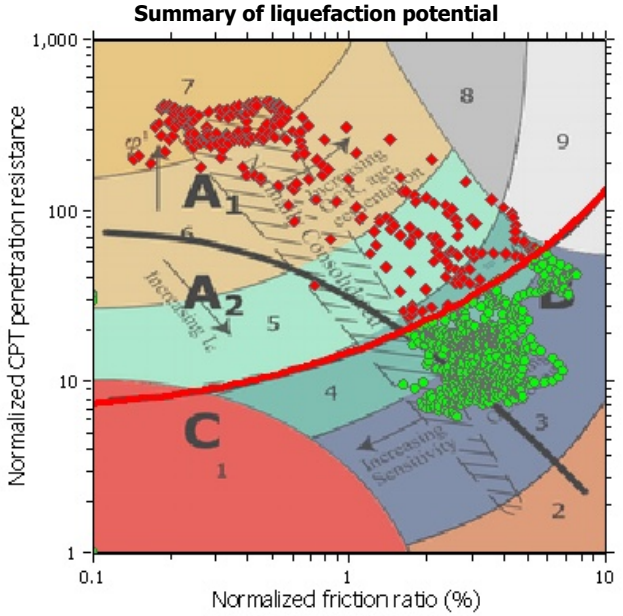
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

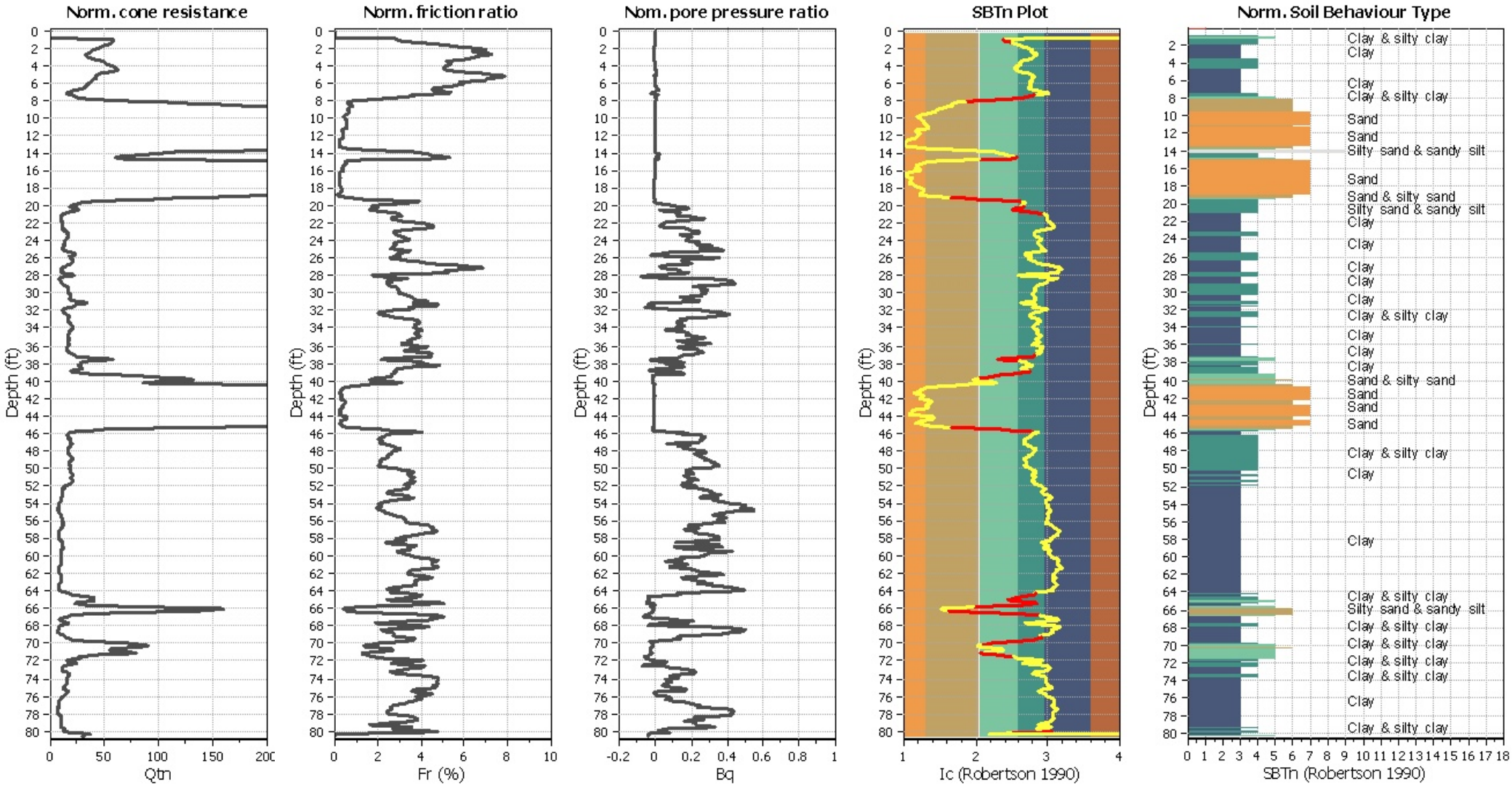


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



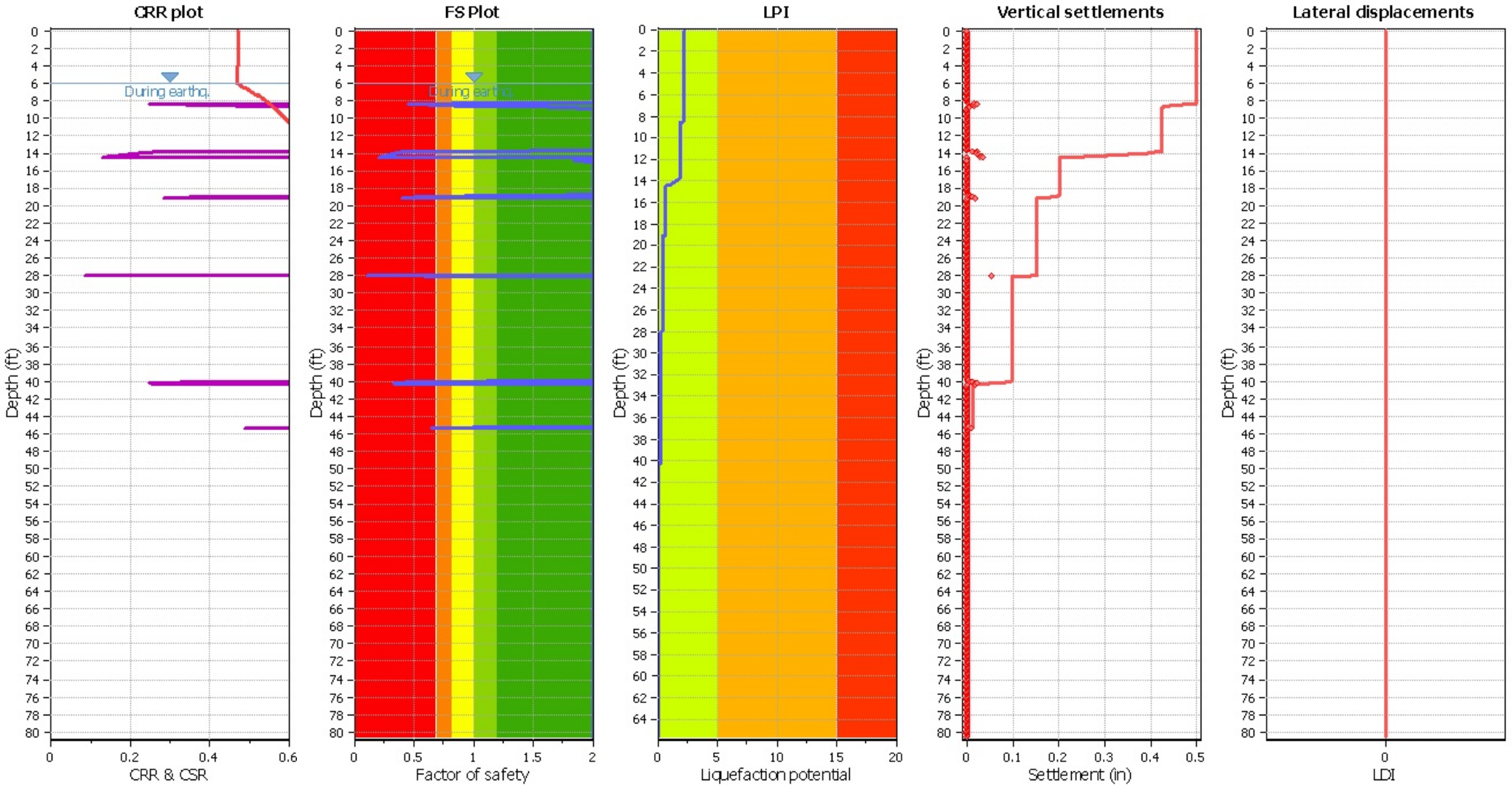
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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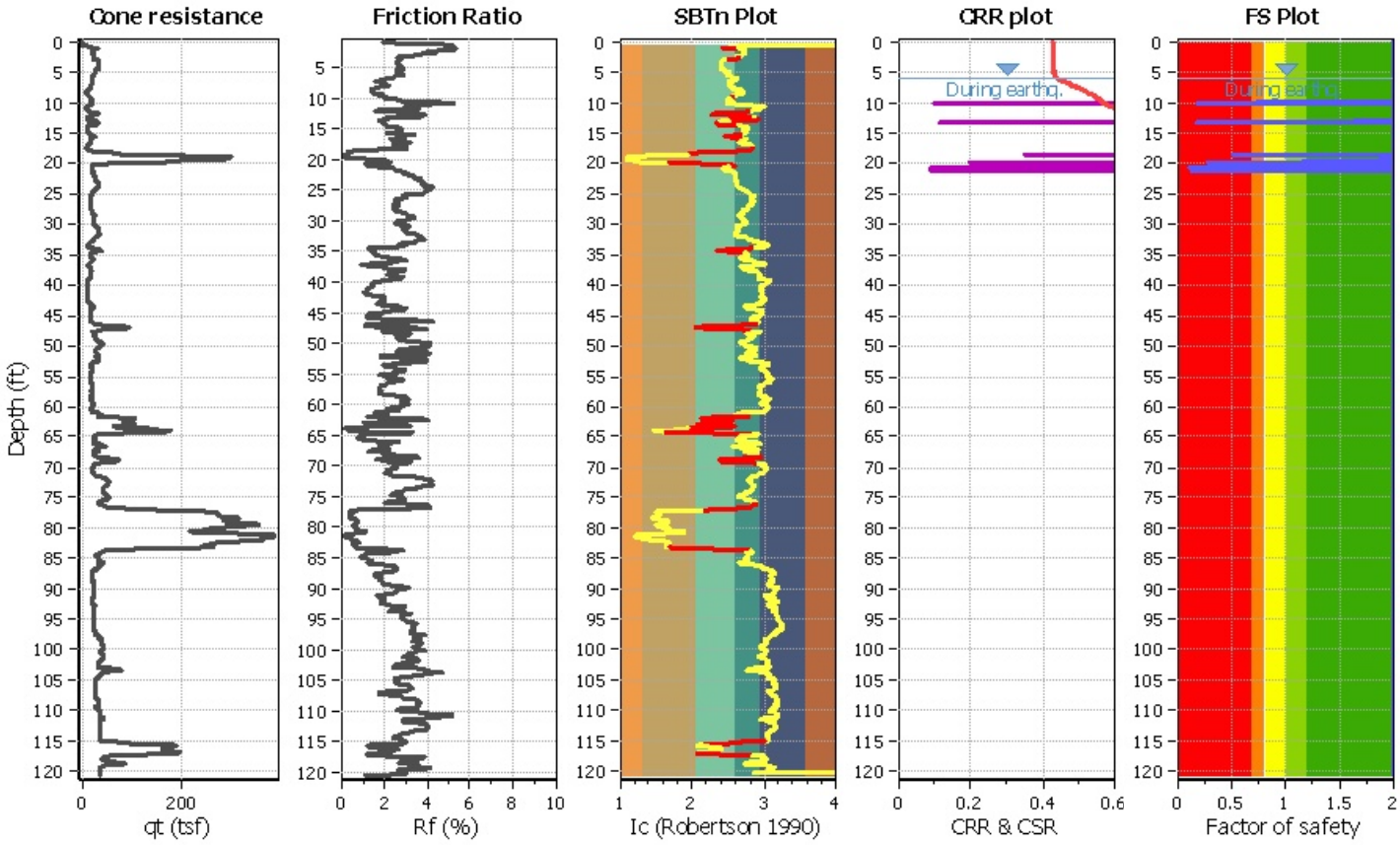
LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

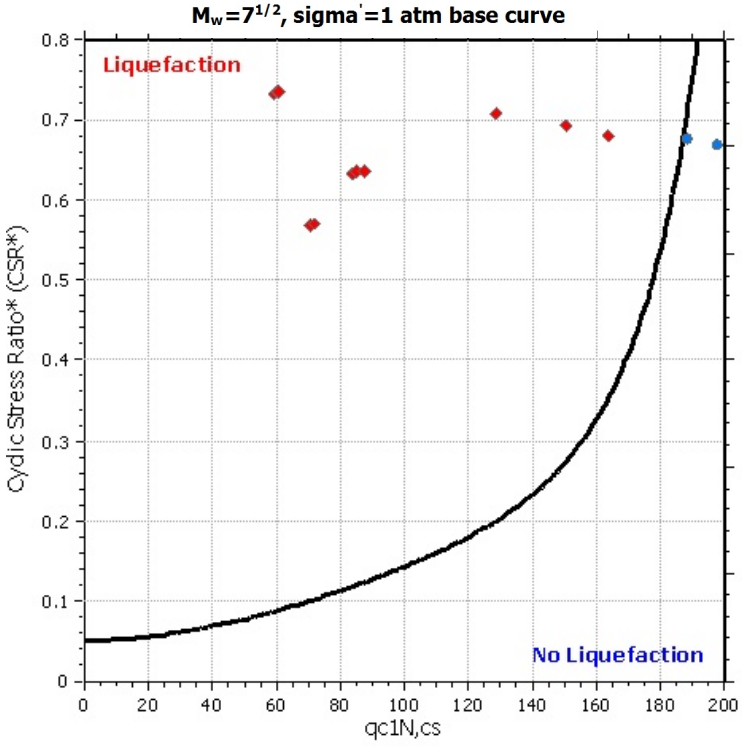
CPT file : 1-CPT8

Input parameters and analysis data

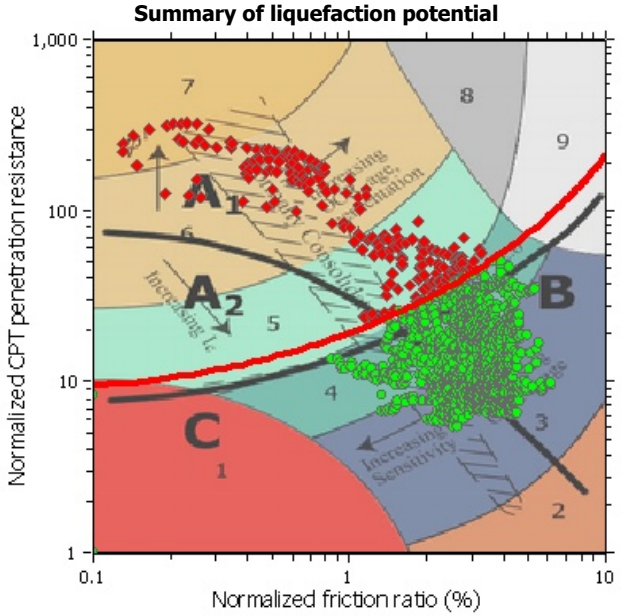
Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.85	Ic cut-off value:	2.50	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

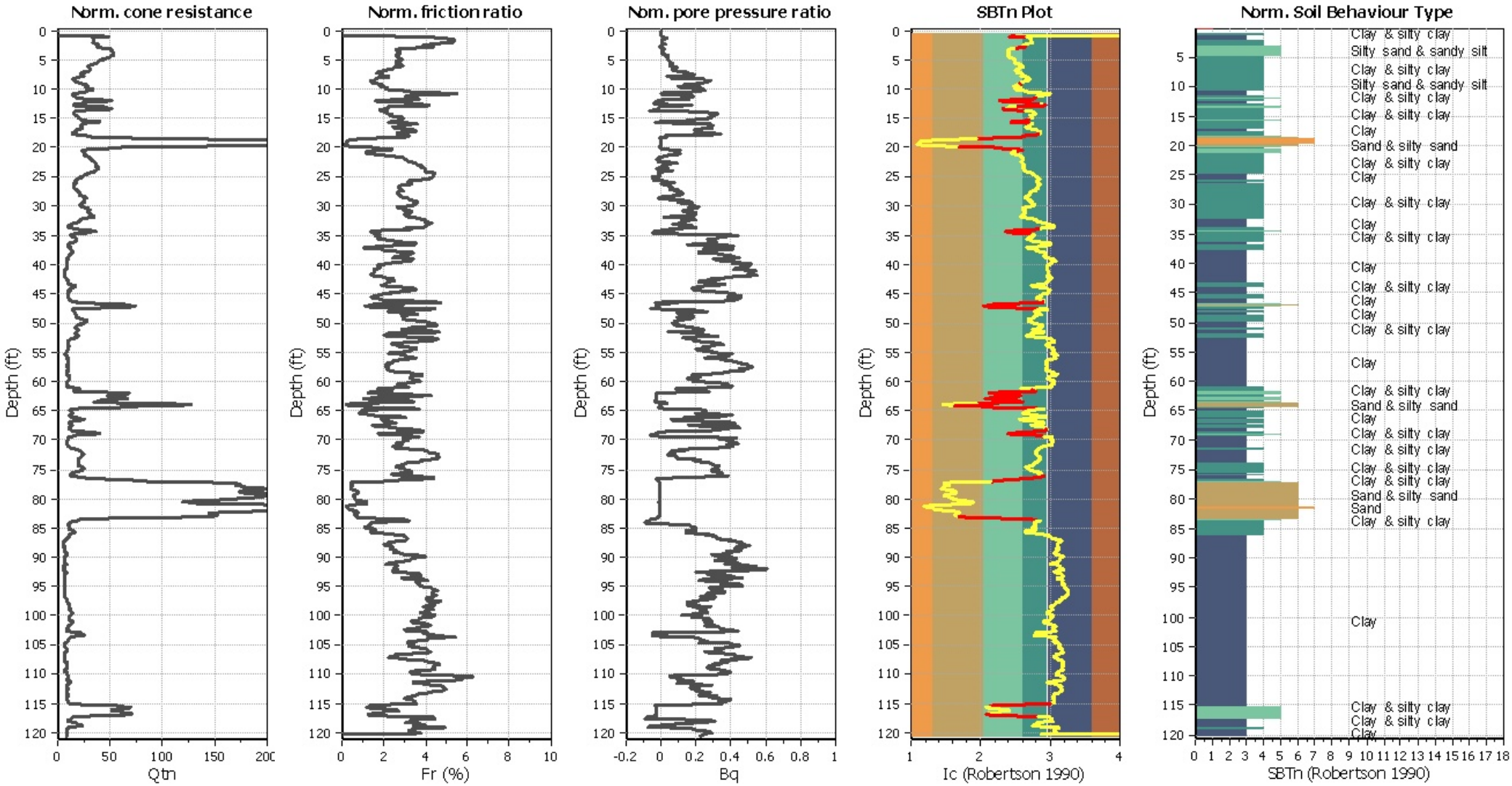


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normaliz



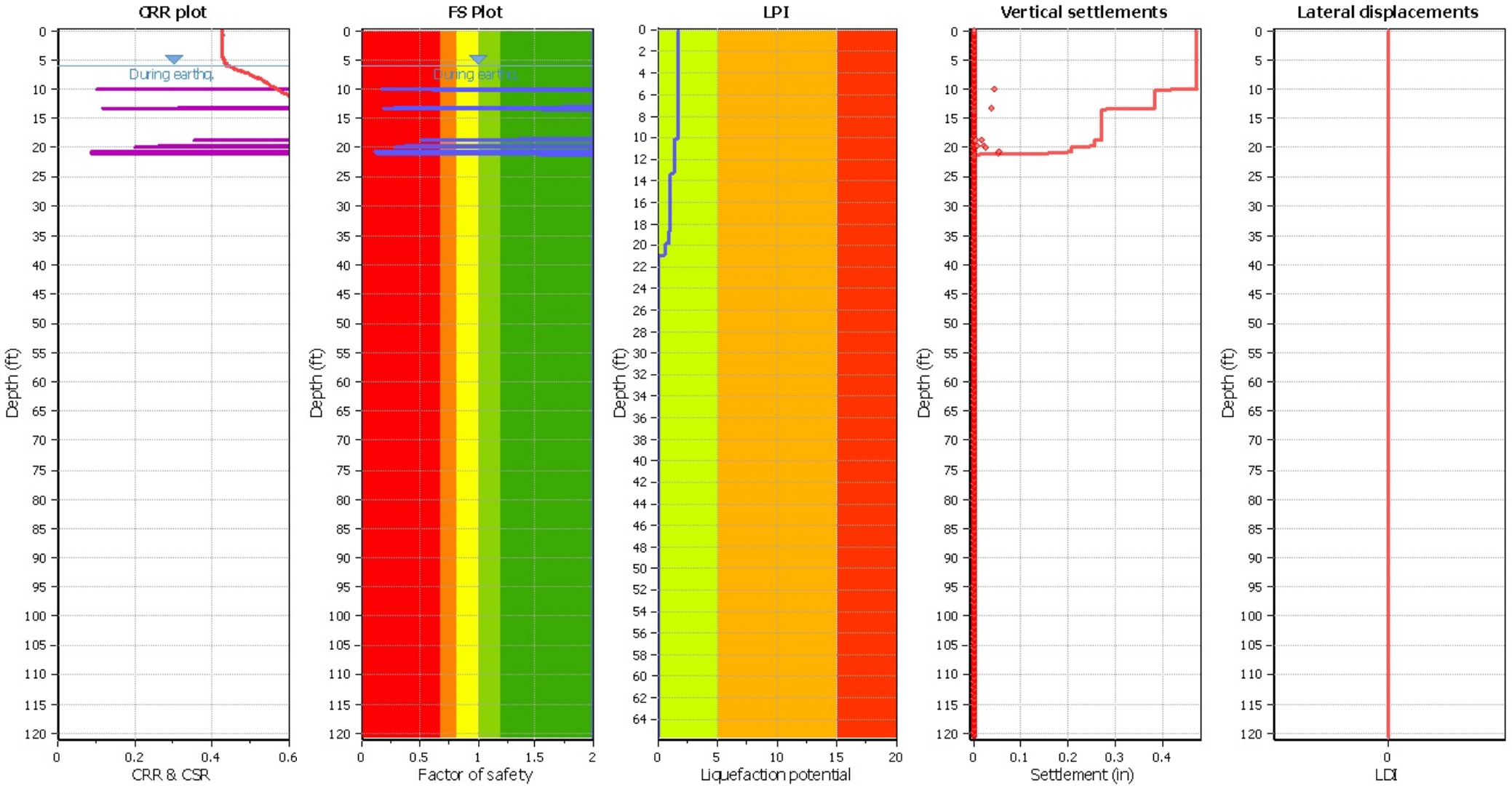
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.50	K_σ applied:	Yes
Earthquake magnitude M_w:	7.85	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

ENGEO
Expect Excellence

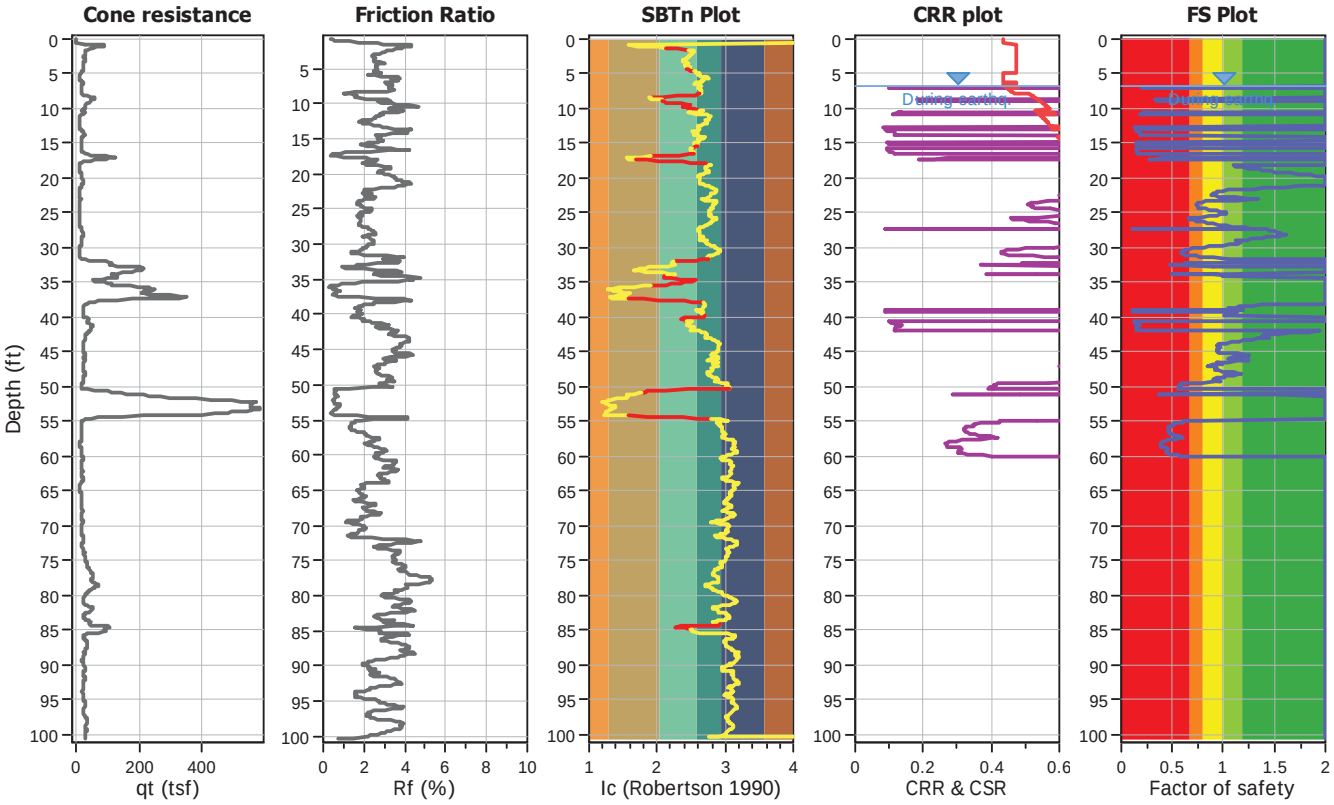
LIQUEFACTION ANALYSIS REPORT

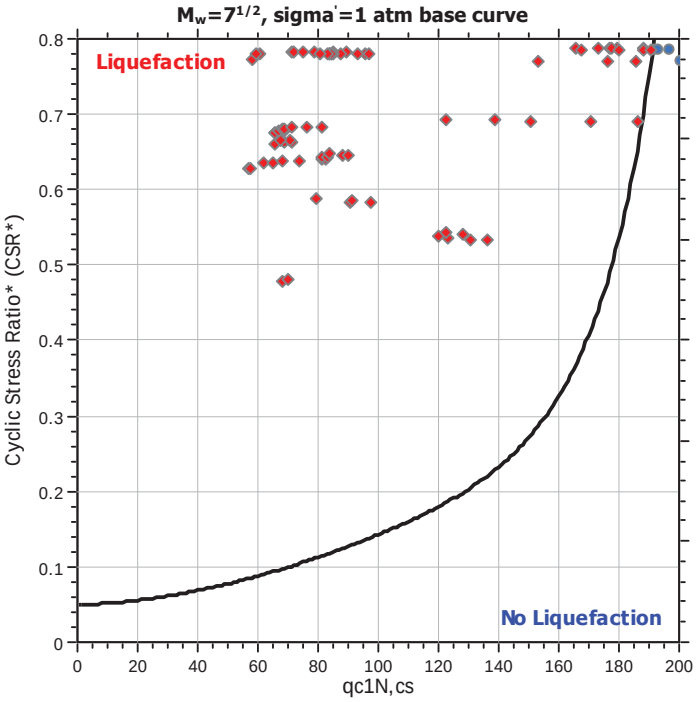
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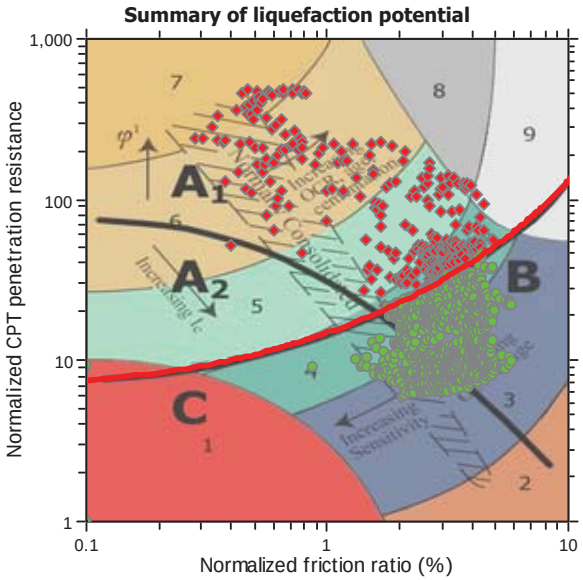
CPT file : 1-CPT9

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.80 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

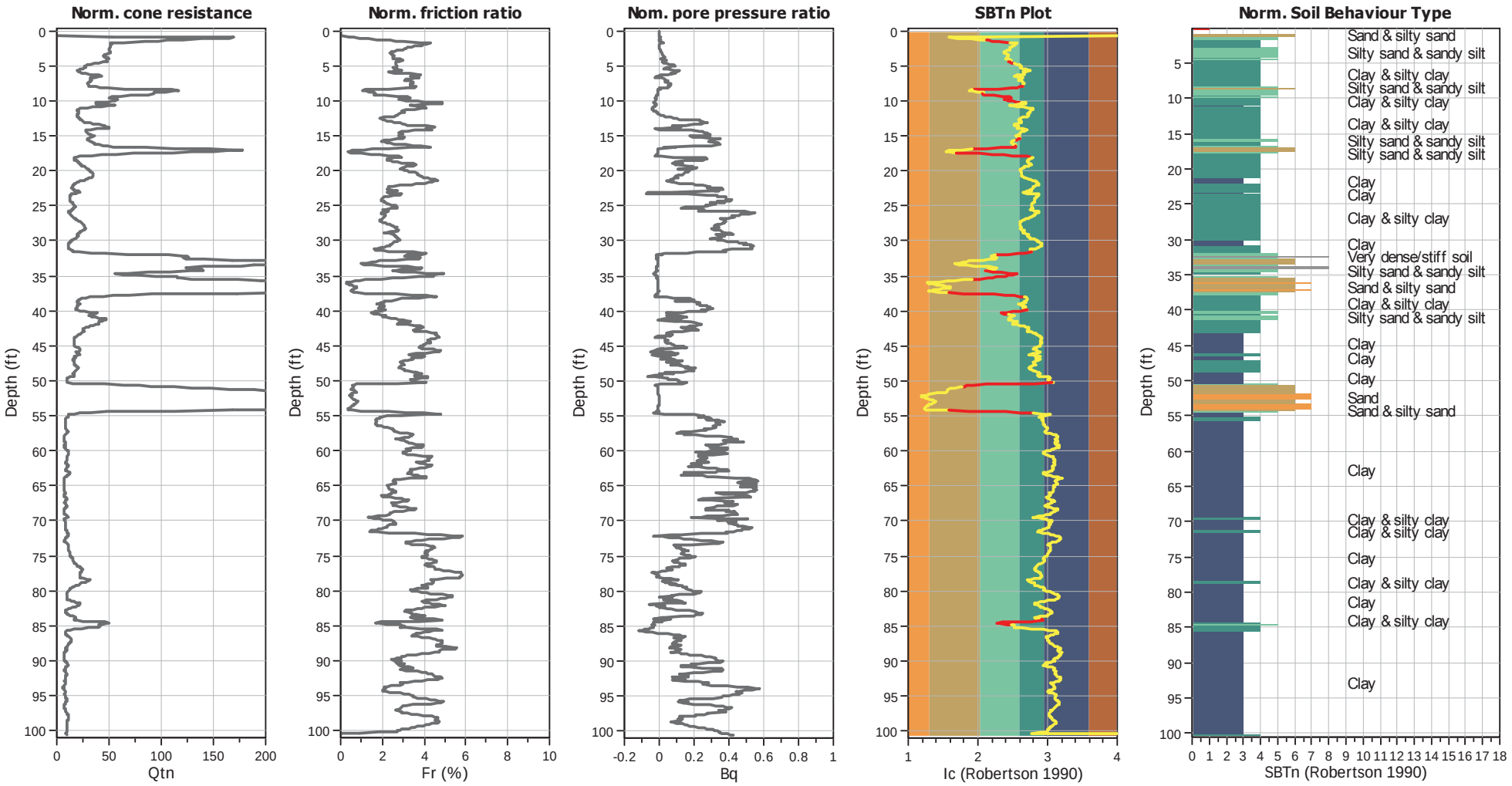






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



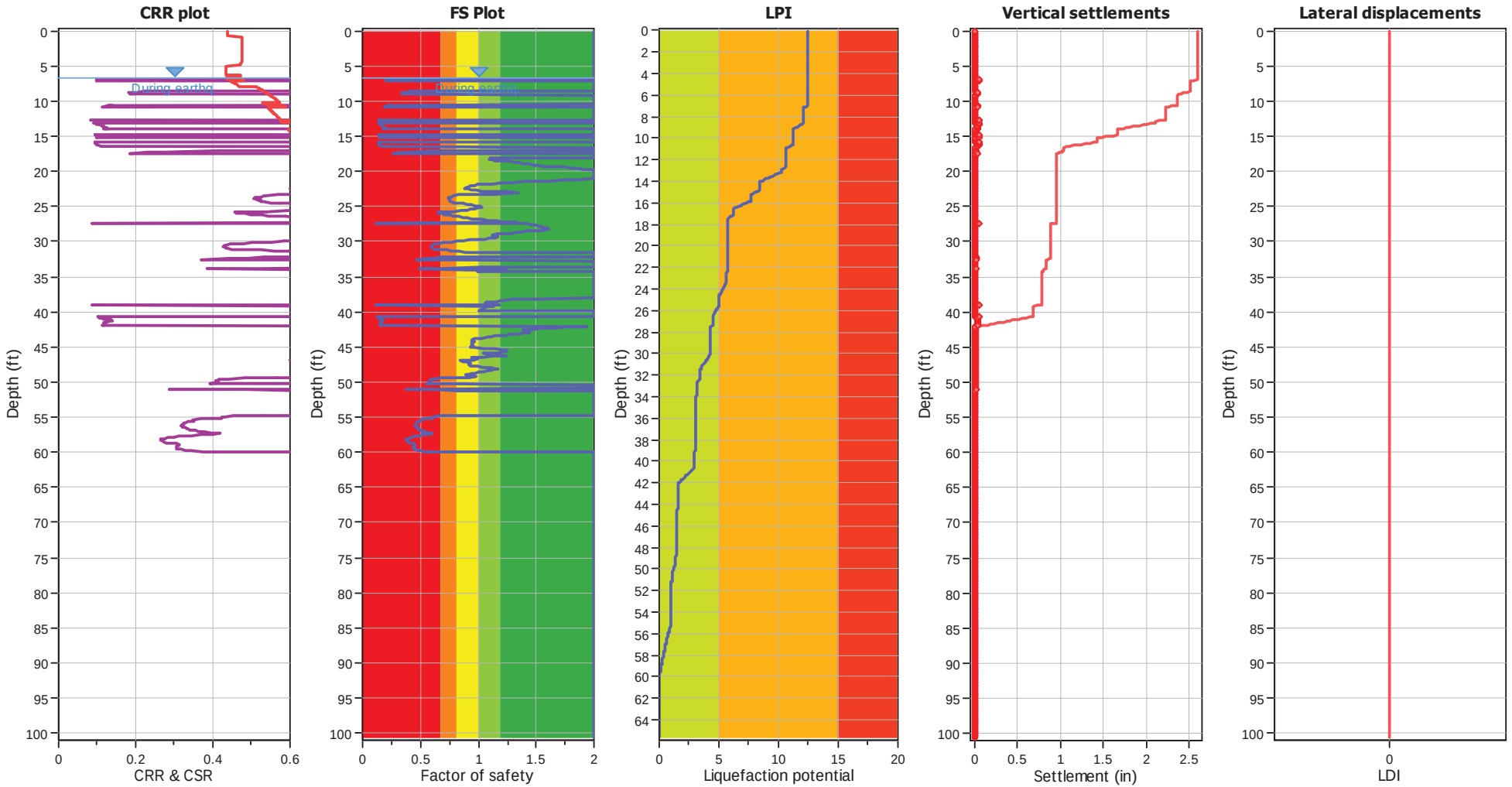
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.80 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.80 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	1.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

ENGEO
Expect Excellence

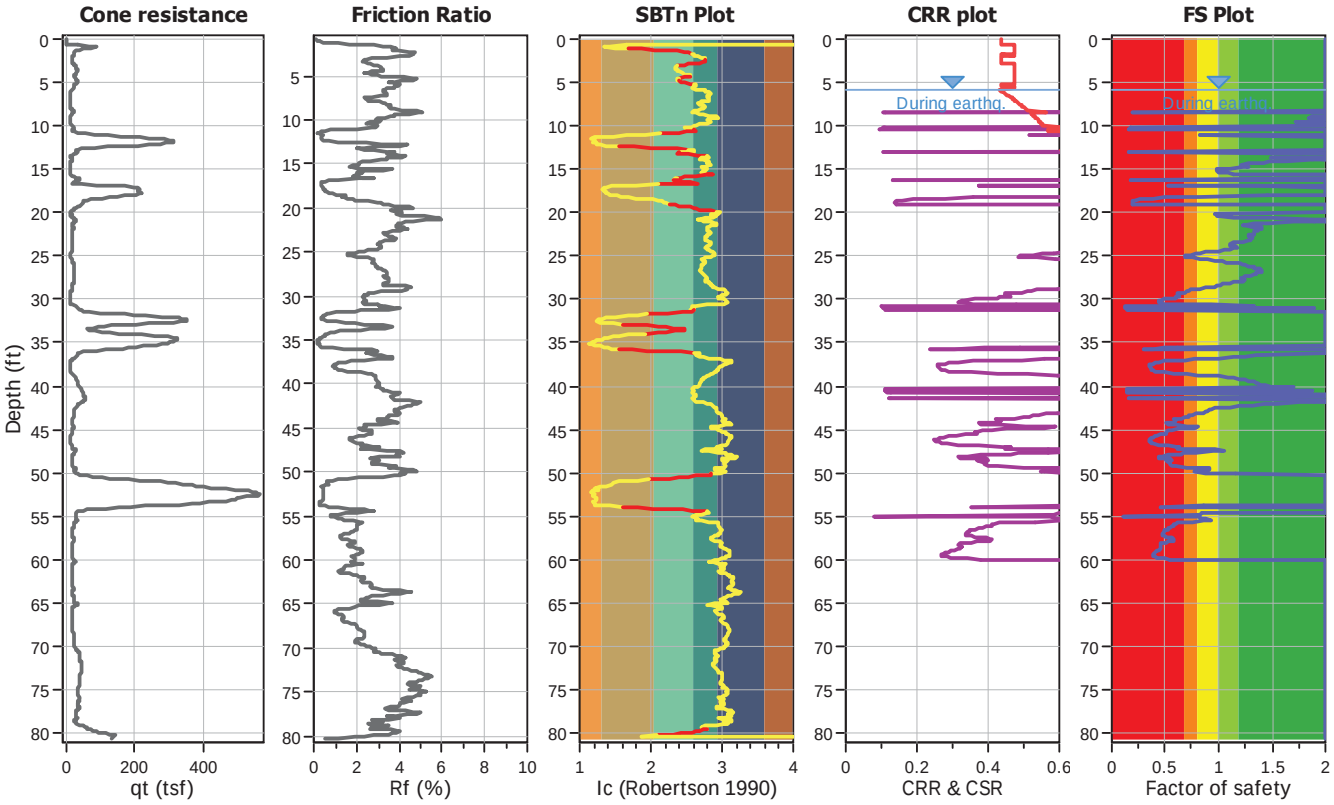
LIQUEFACTION ANALYSIS REPORT

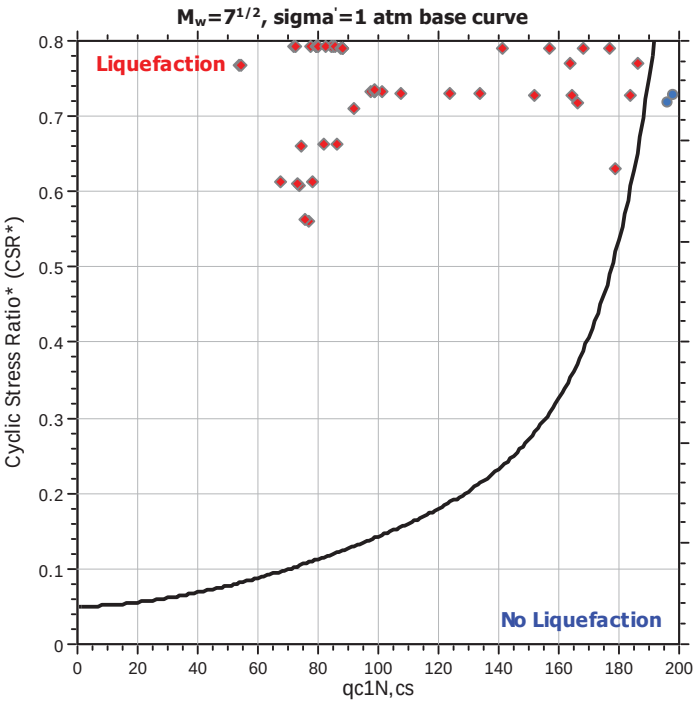
Project title : **Location :**

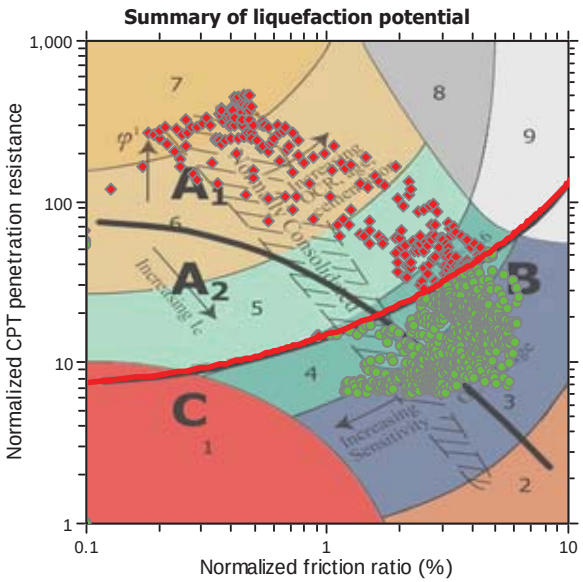
CPT file : 1-SCPT10

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

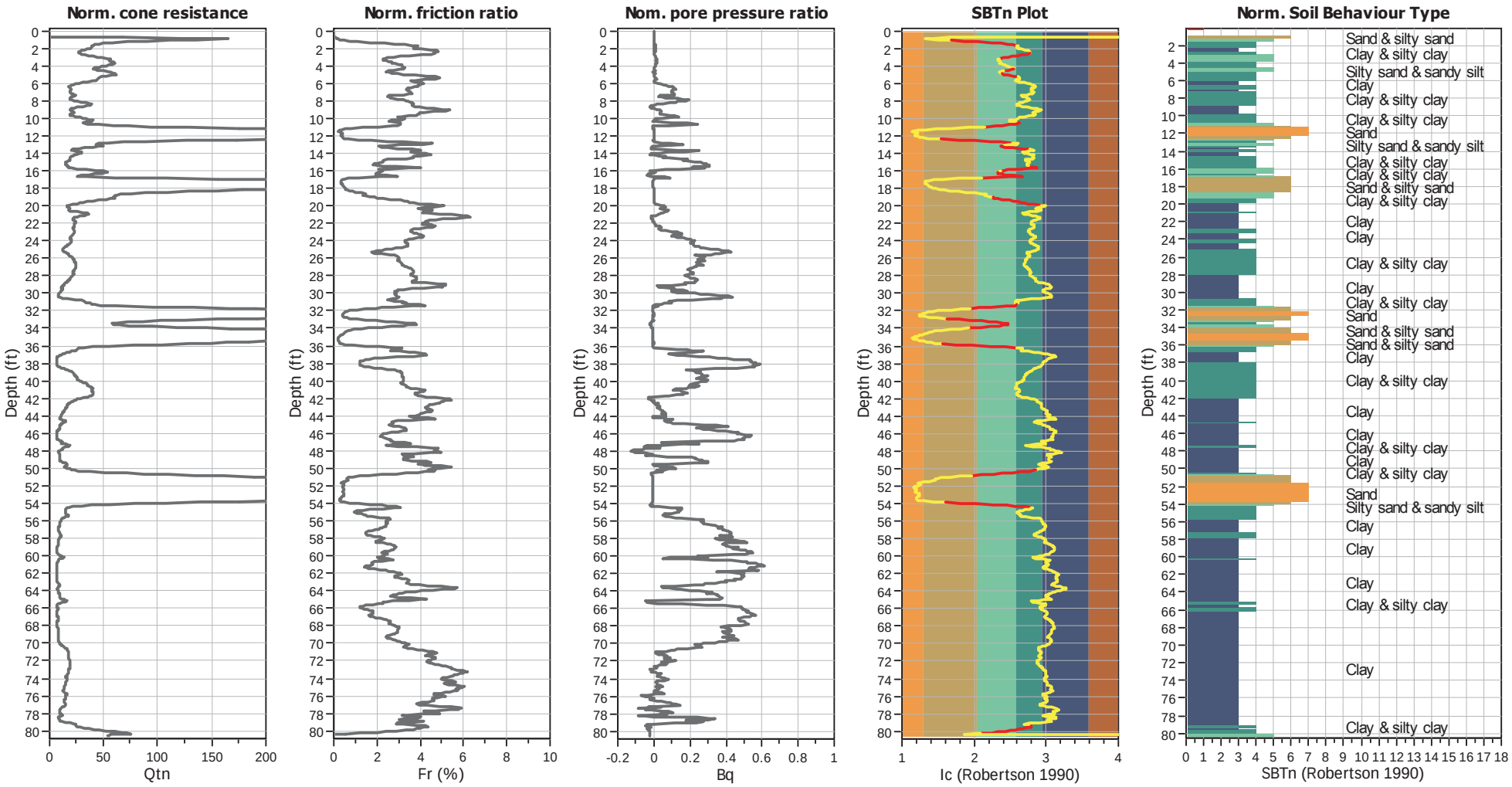






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



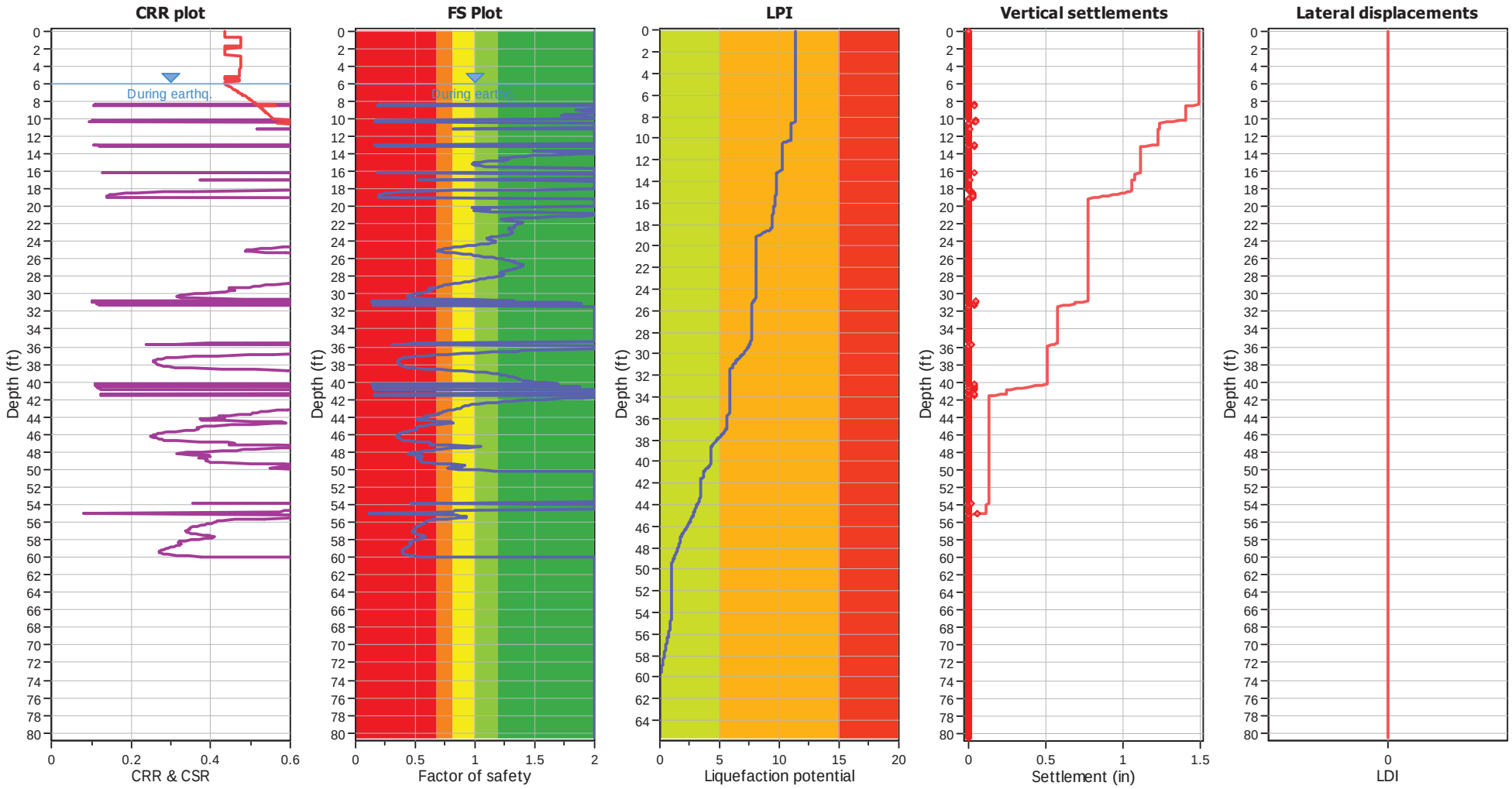
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

ENGEO
Expect Excellence

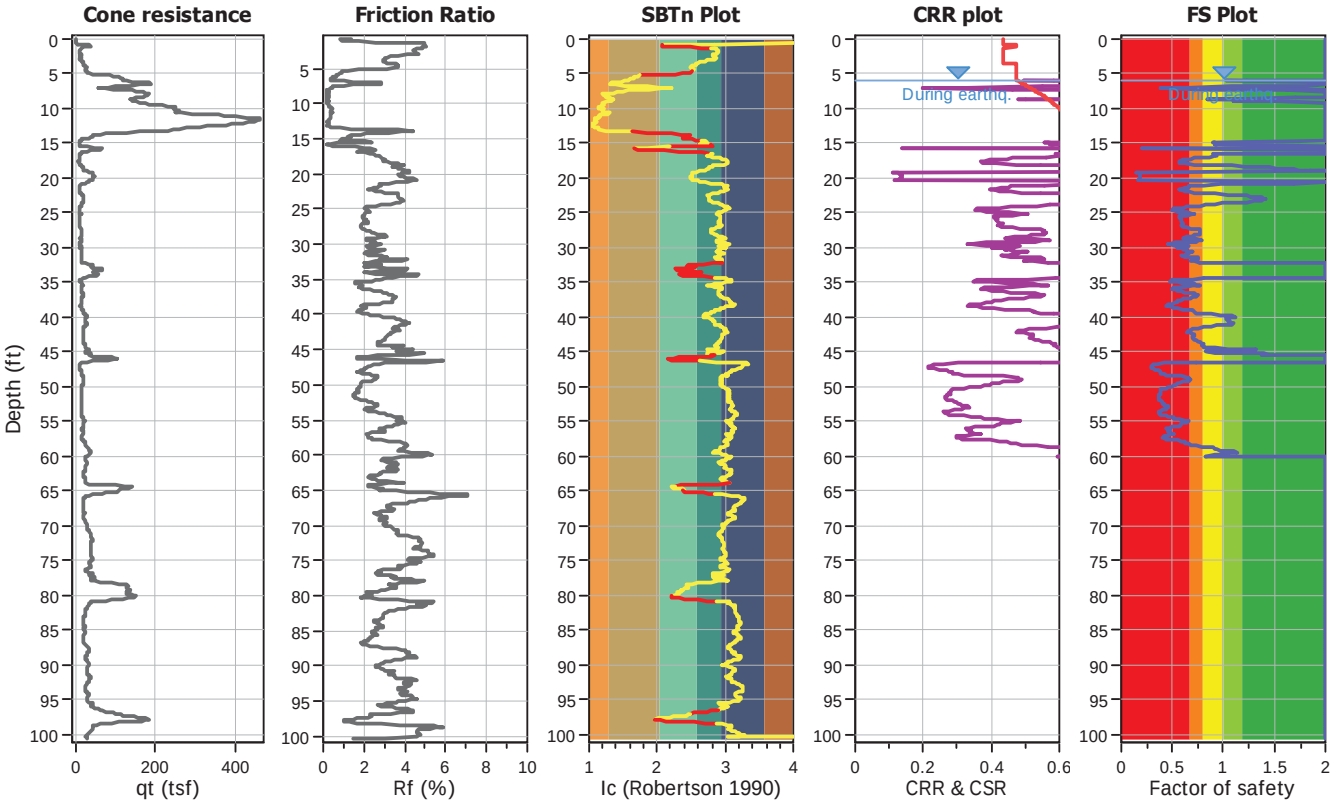
LIQUEFACTION ANALYSIS REPORT

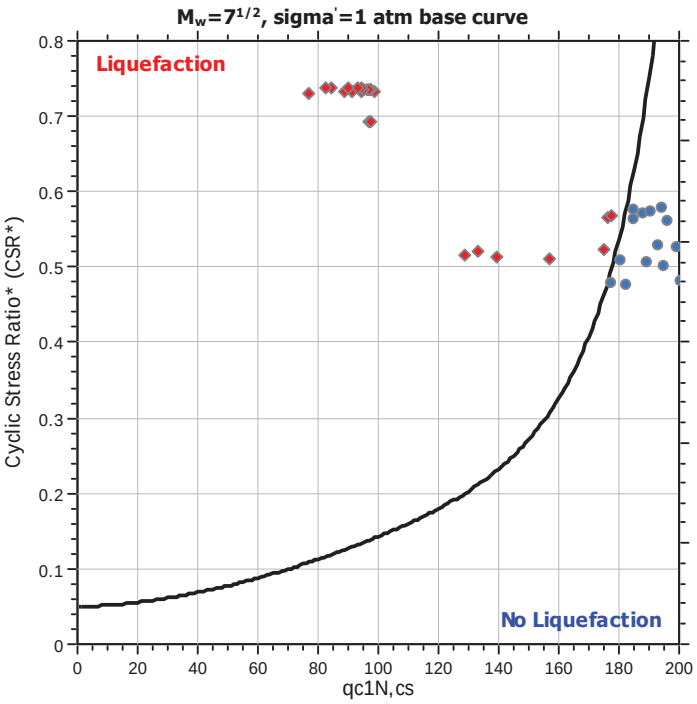
Project title : **Location :**

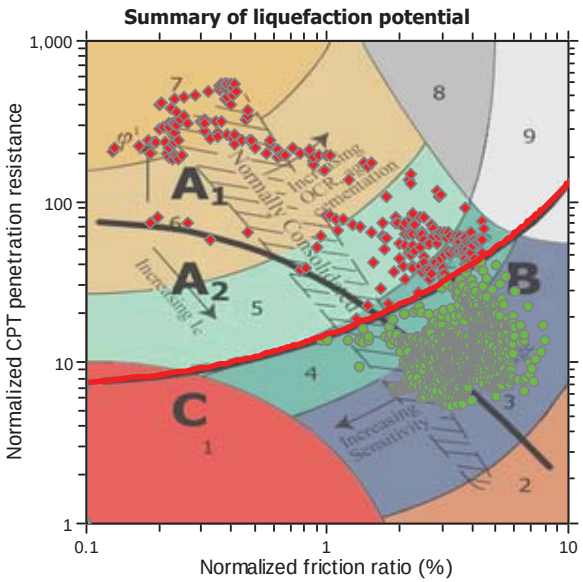
CPT file : 1-CPT11

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method

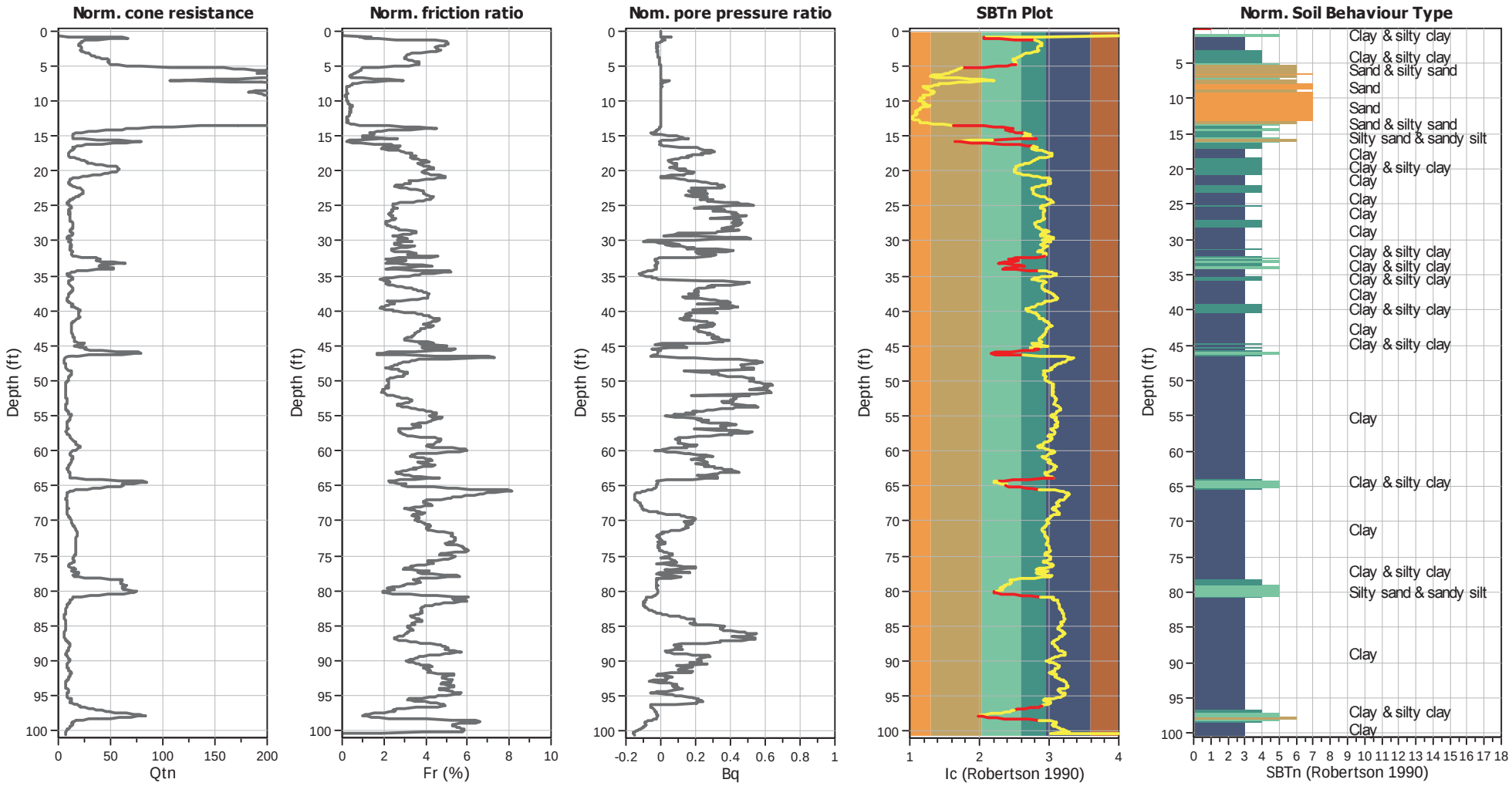






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



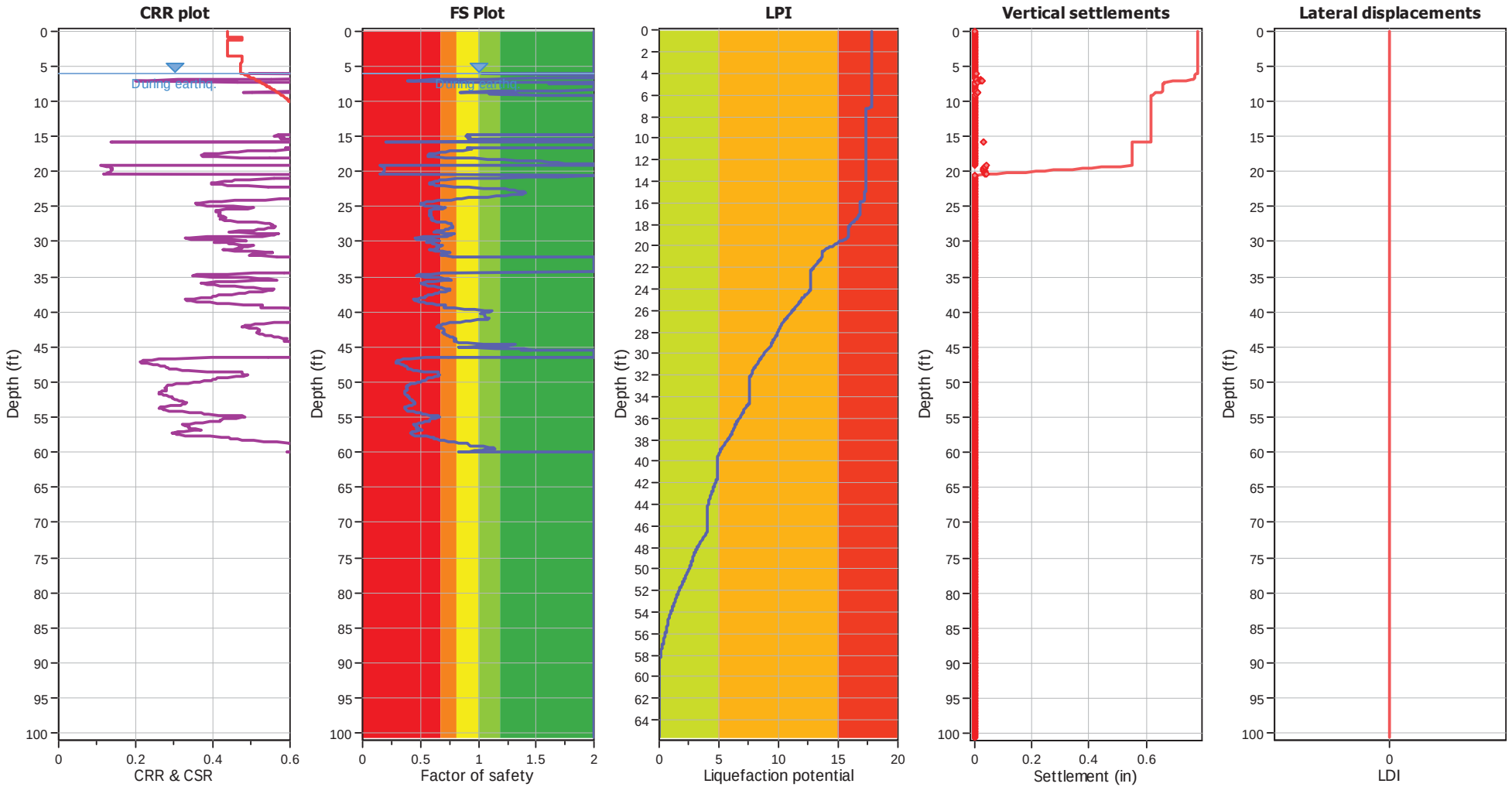
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

ENGEO
Expect Excellence

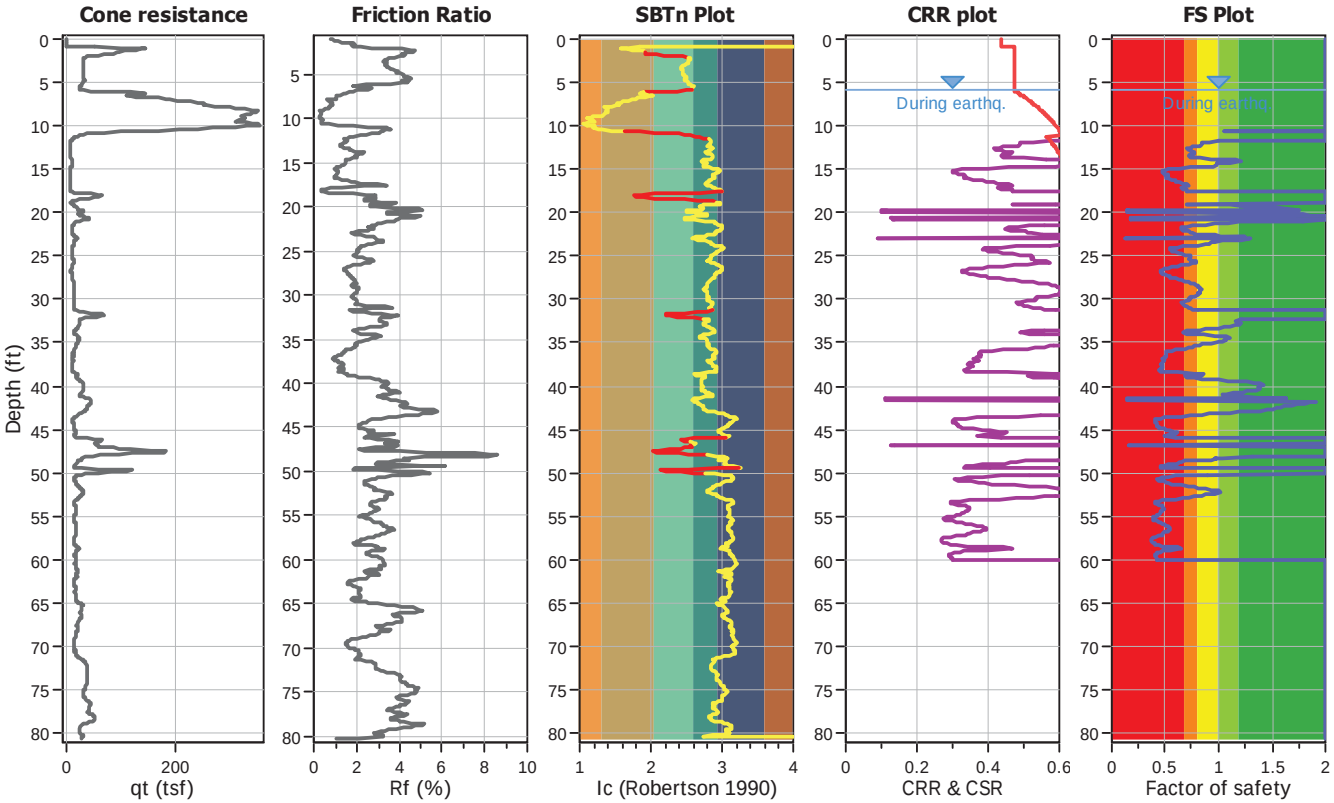
LIQUEFACTION ANALYSIS REPORT

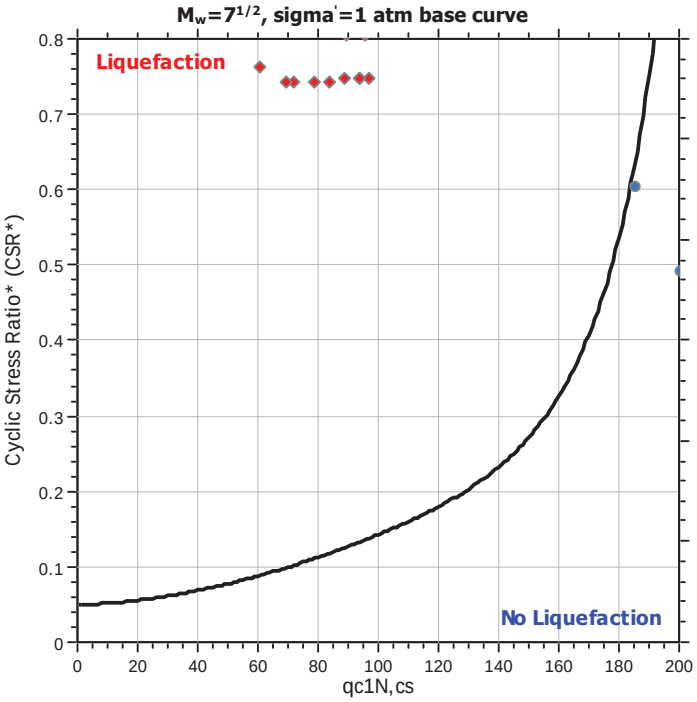
Project title : **Location :**

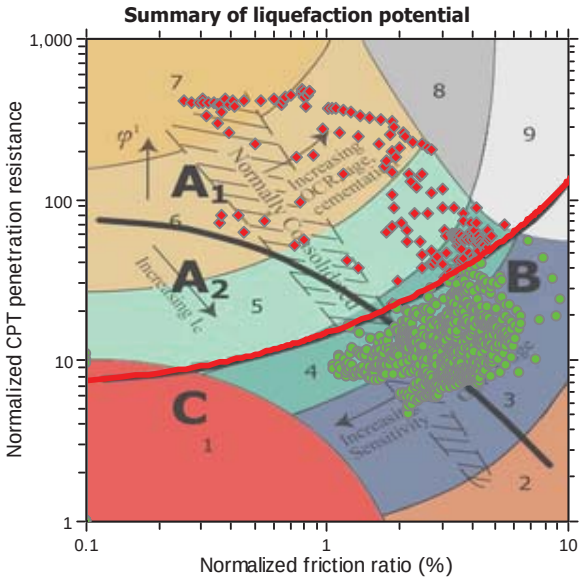
CPT file : 1-CPT12

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

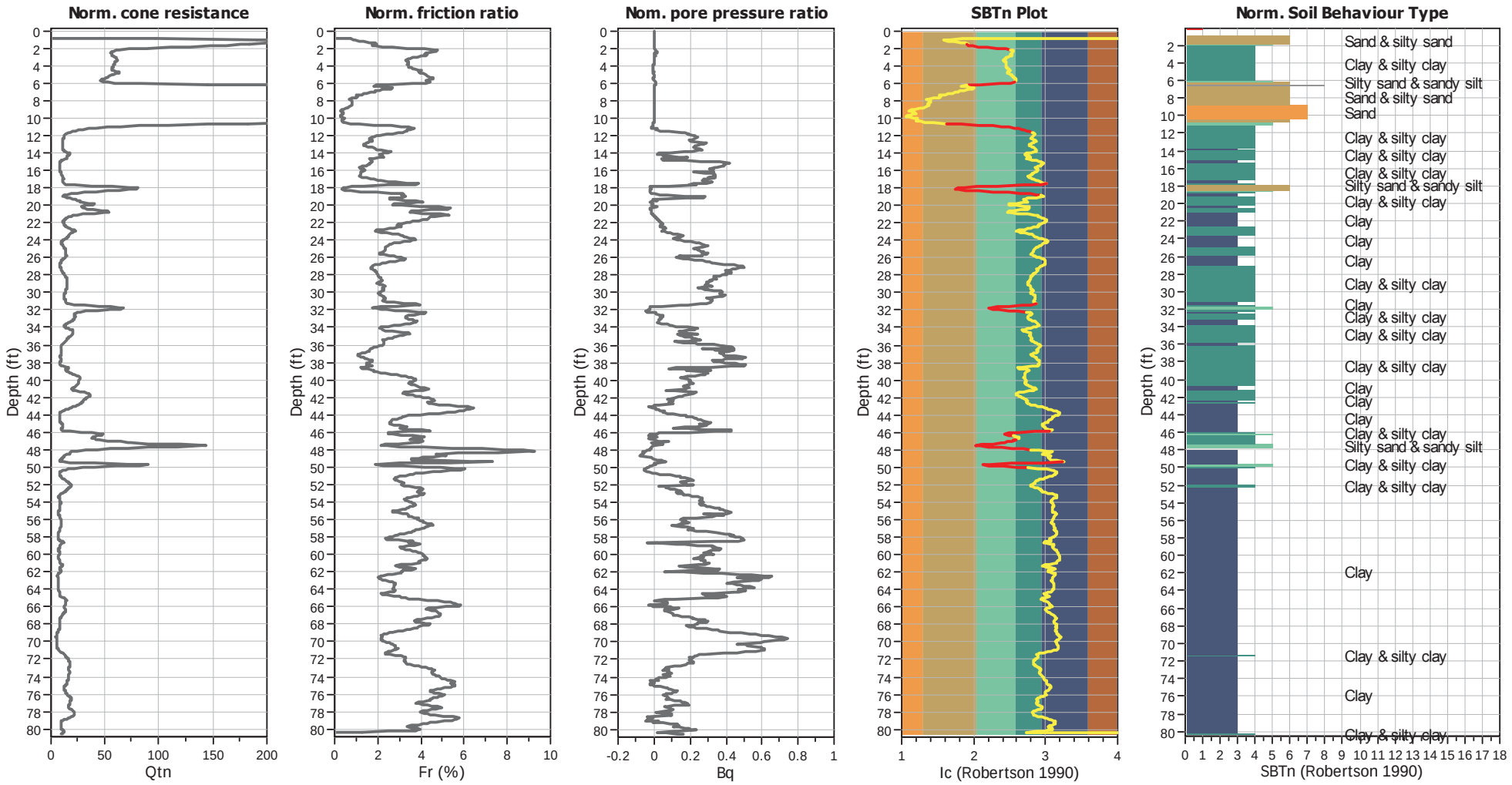






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



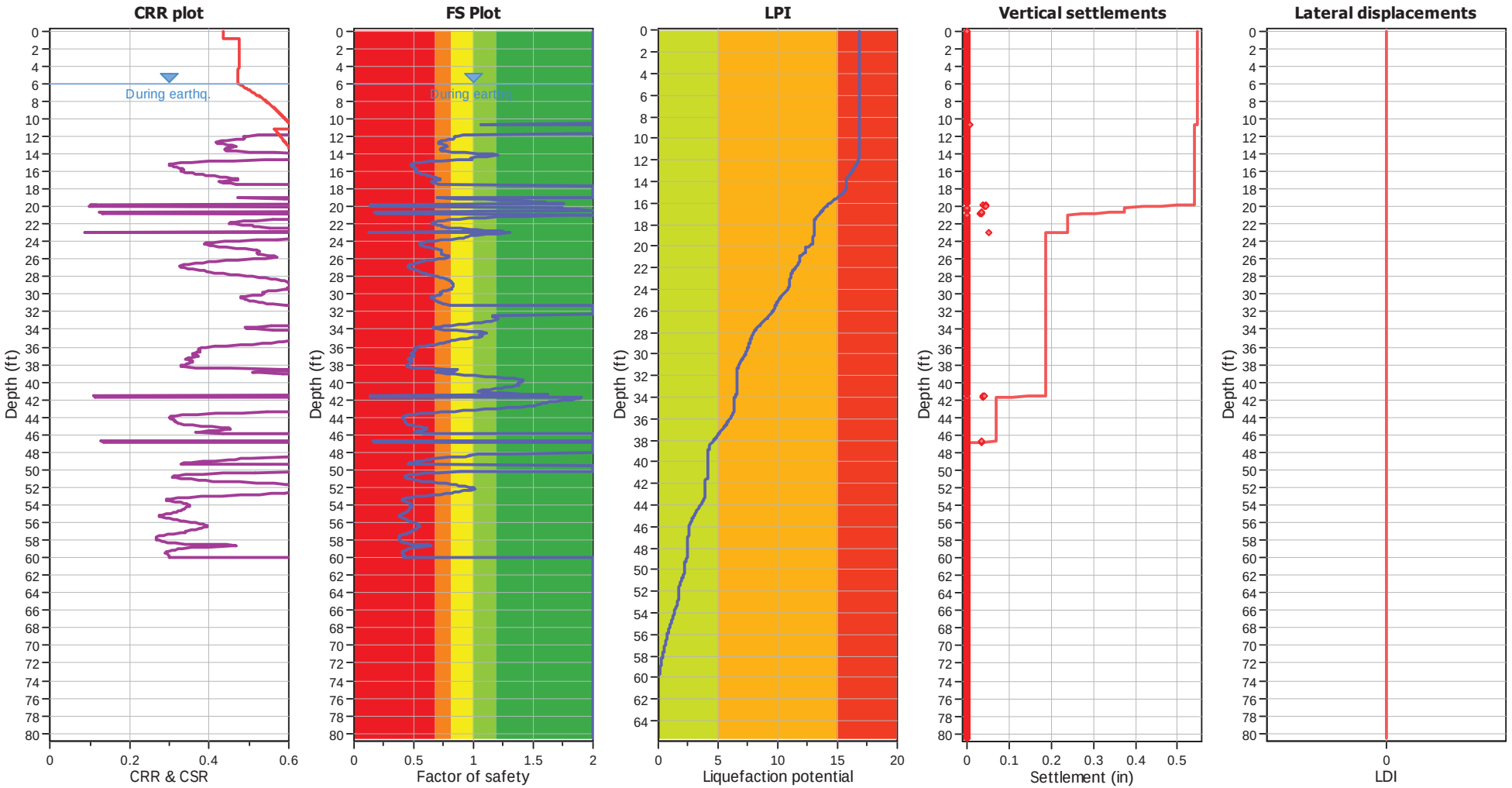
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

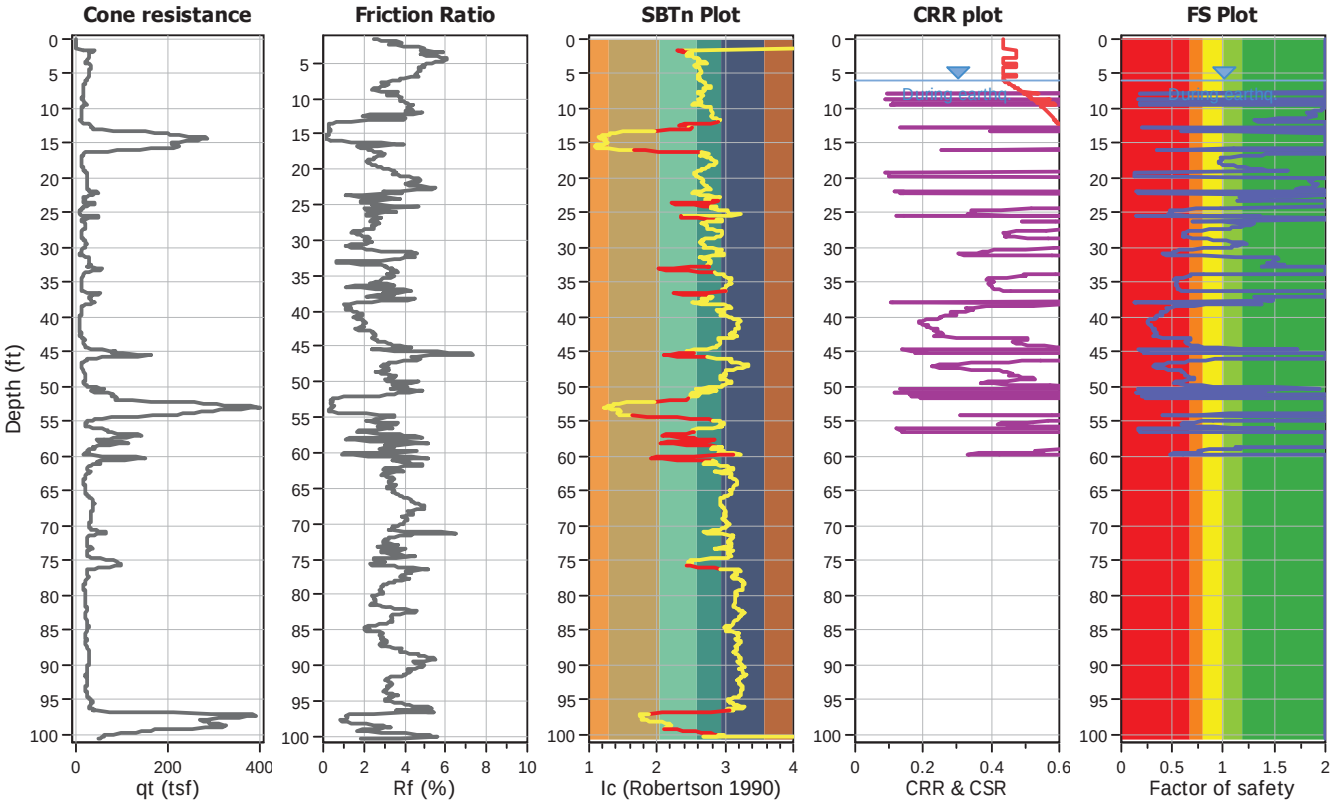
LIQUEFACTION ANALYSIS REPORT

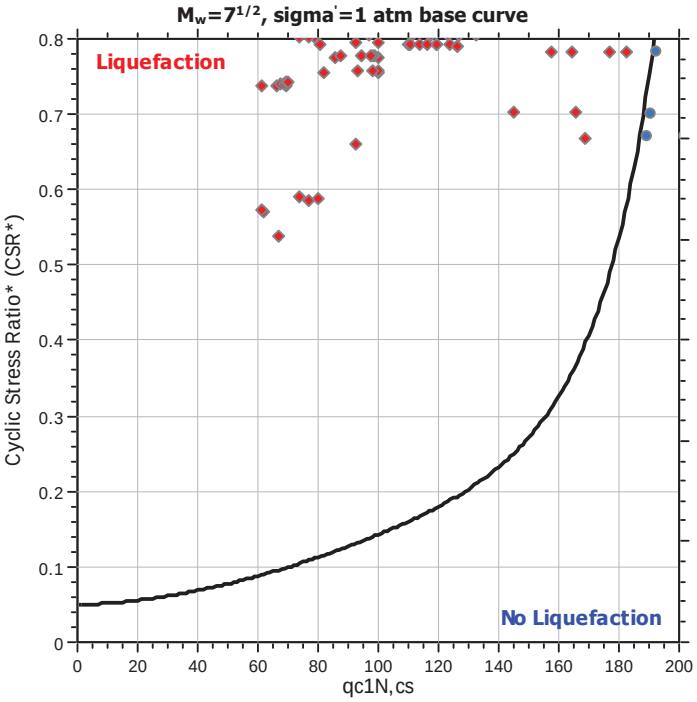
Project title : **Location :**

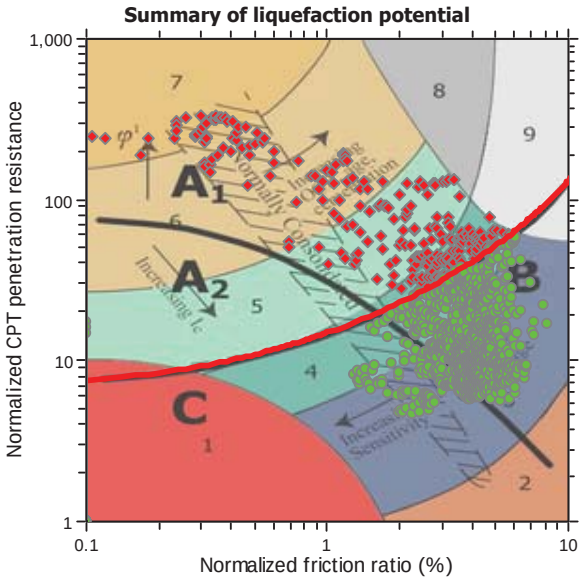
CPT file : 1-CPT13

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

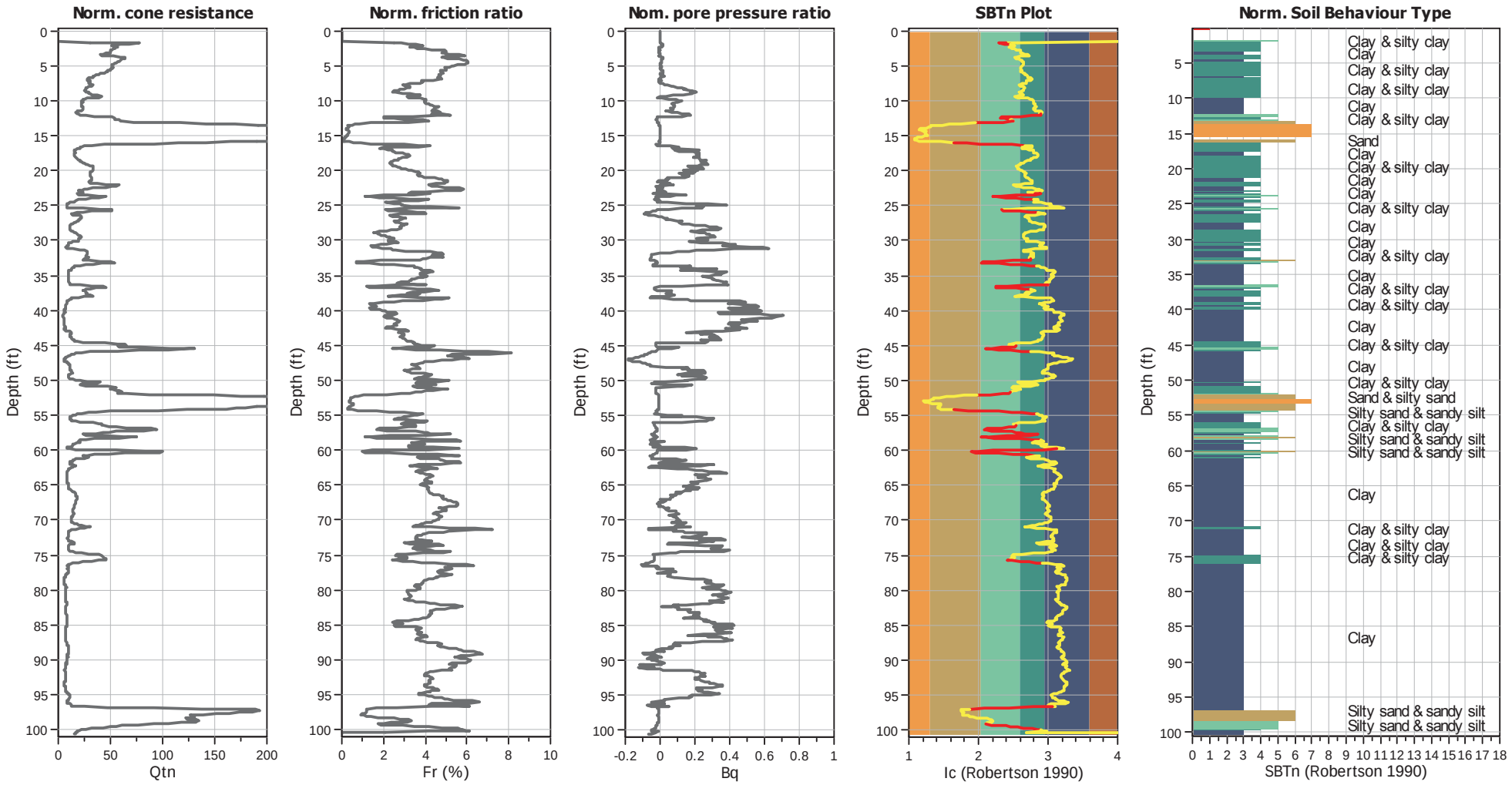






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



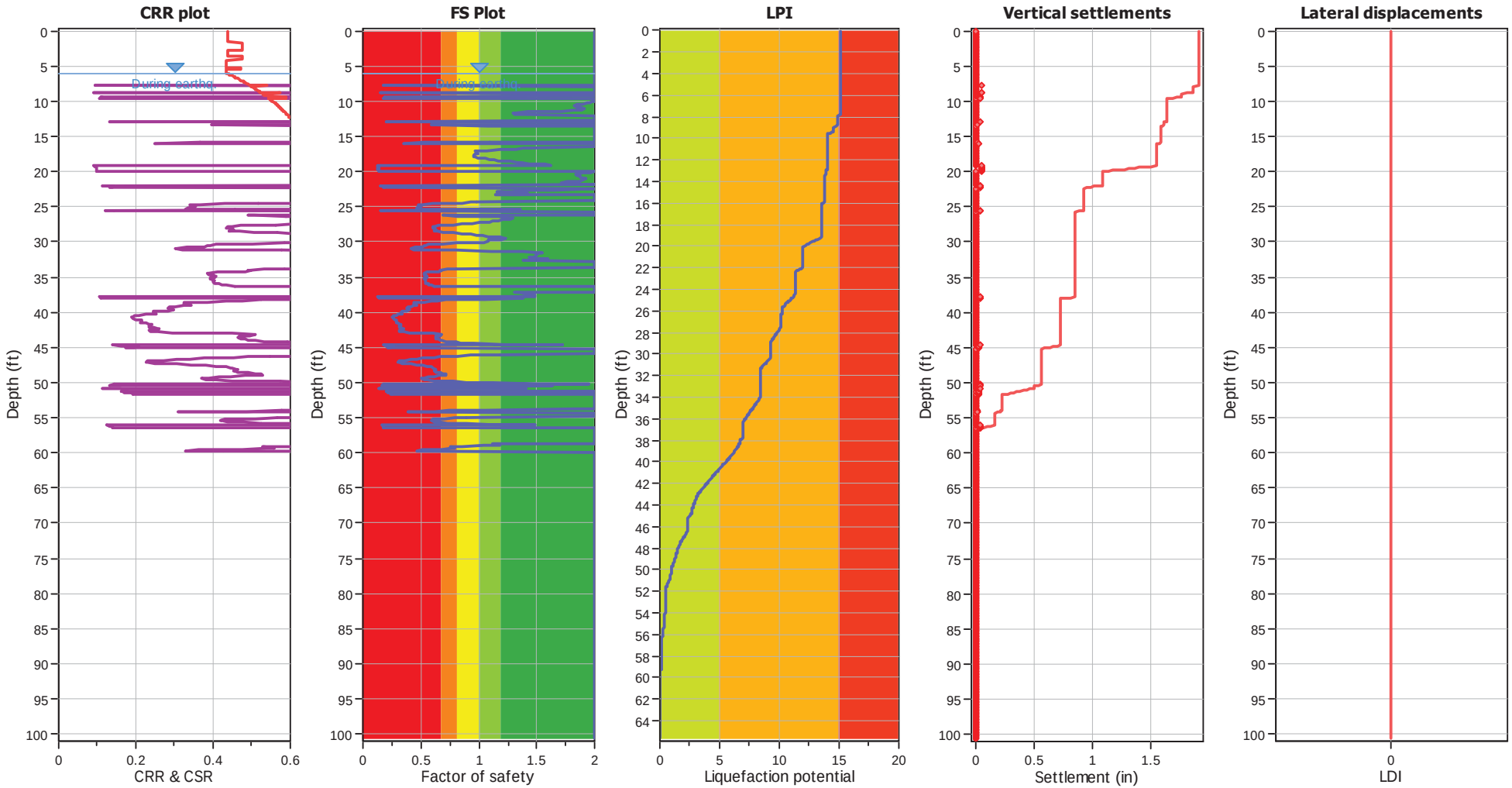
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

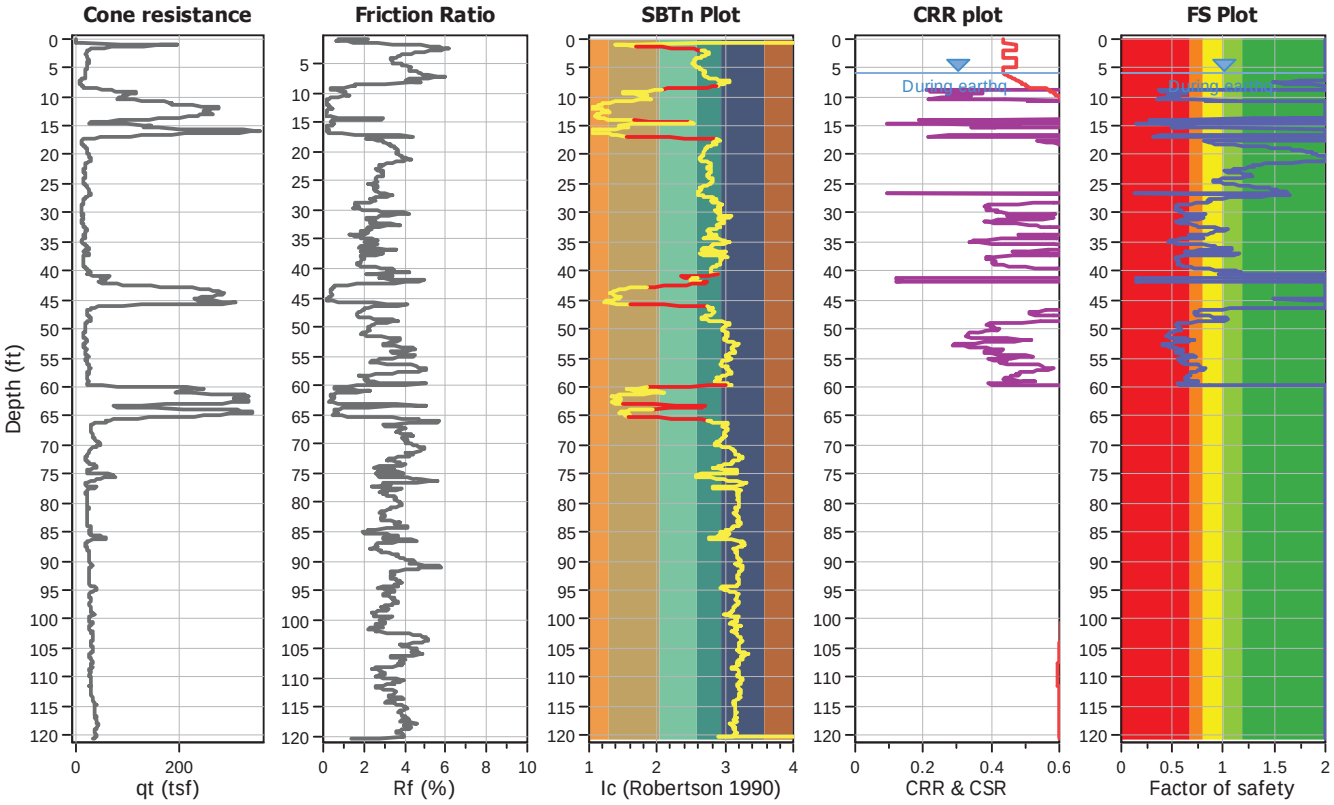
LIQUEFACTION ANALYSIS REPORT

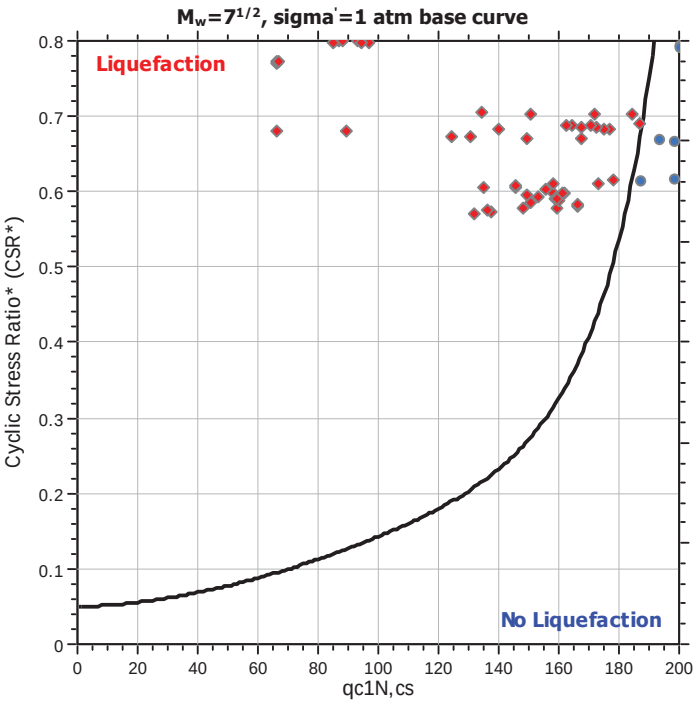
Project title : **Location :**

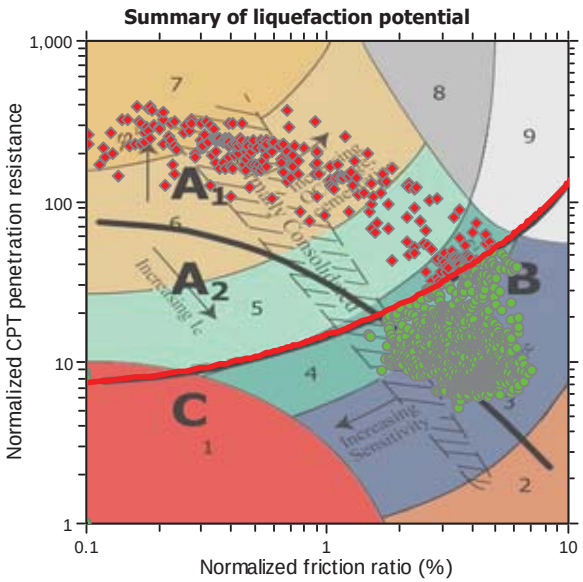
CPT file : 1-CPT14

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

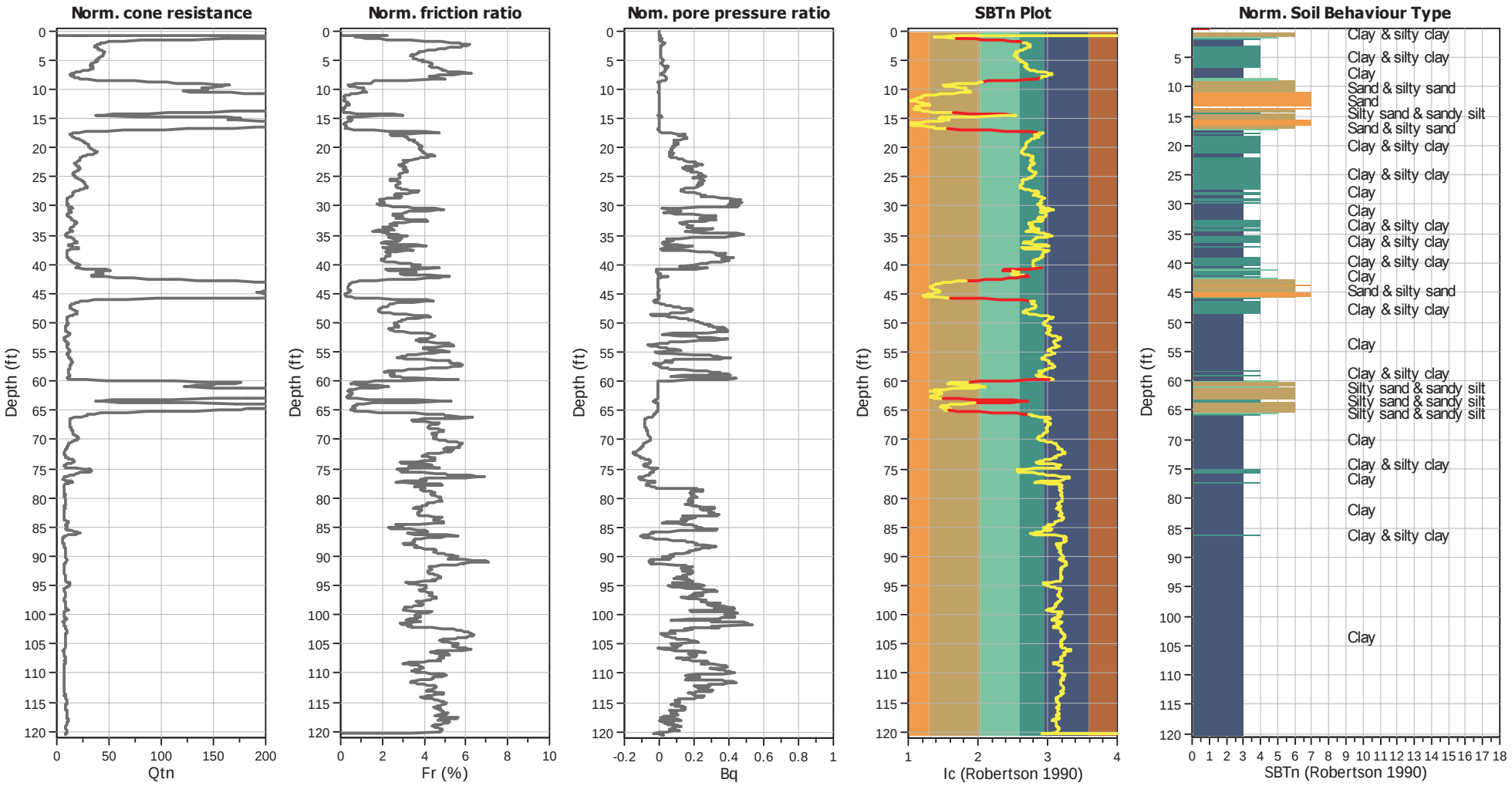






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



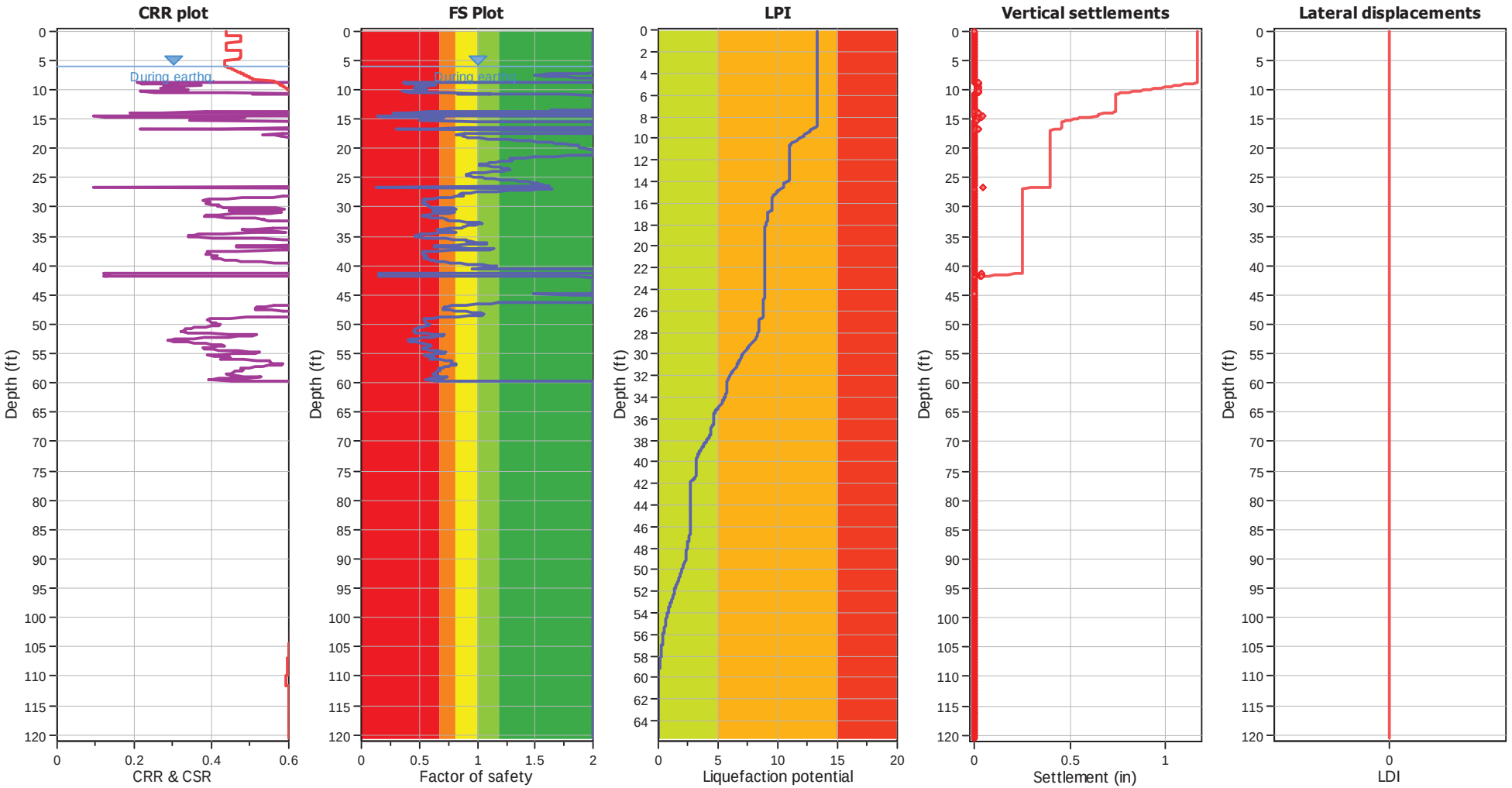
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

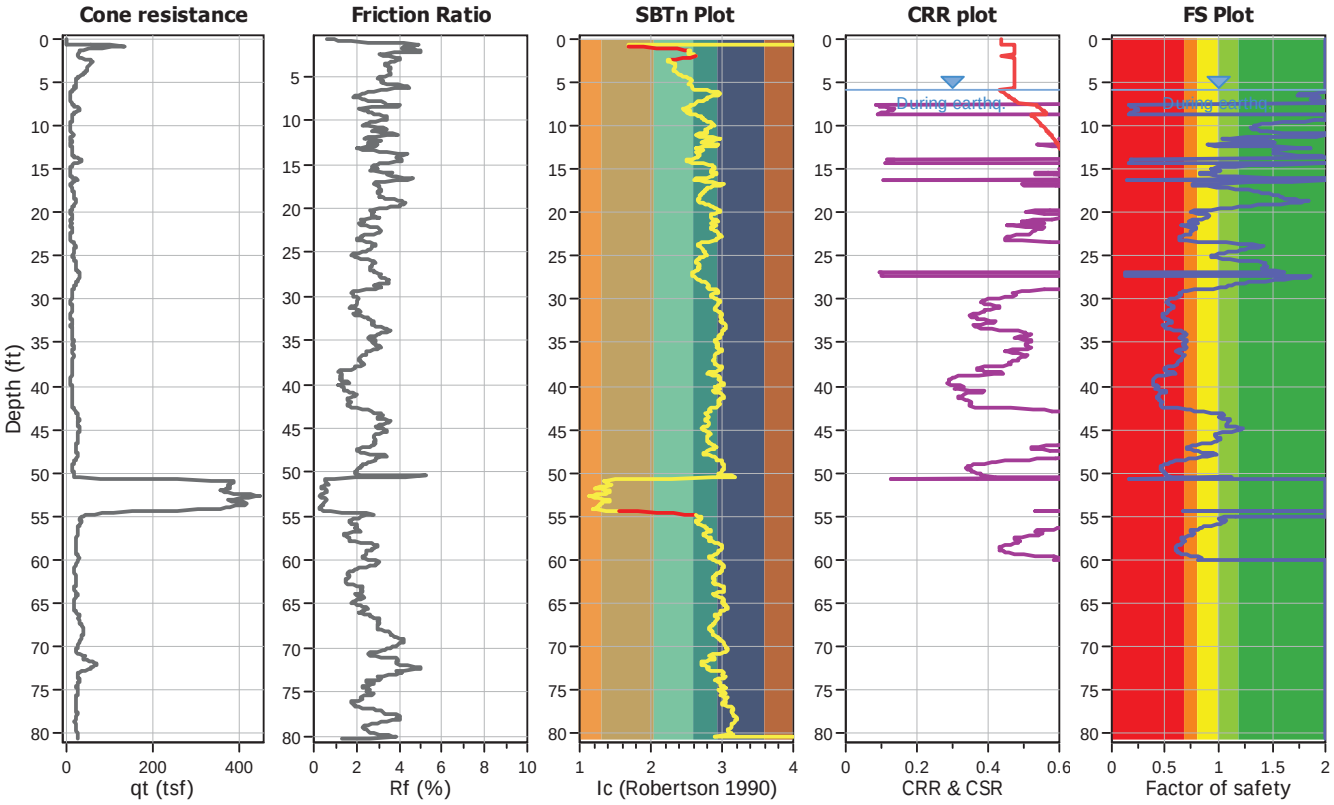
LIQUEFACTION ANALYSIS REPORT

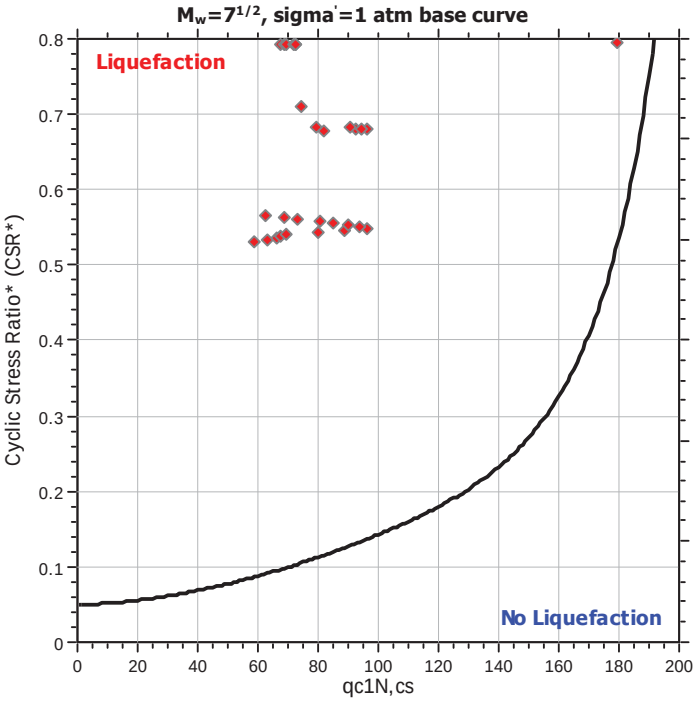
Project title : **Location :**

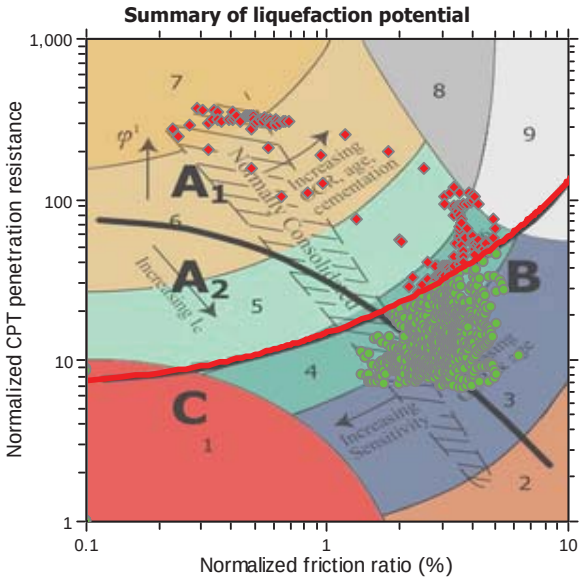
CPT file : 1-CPT15

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

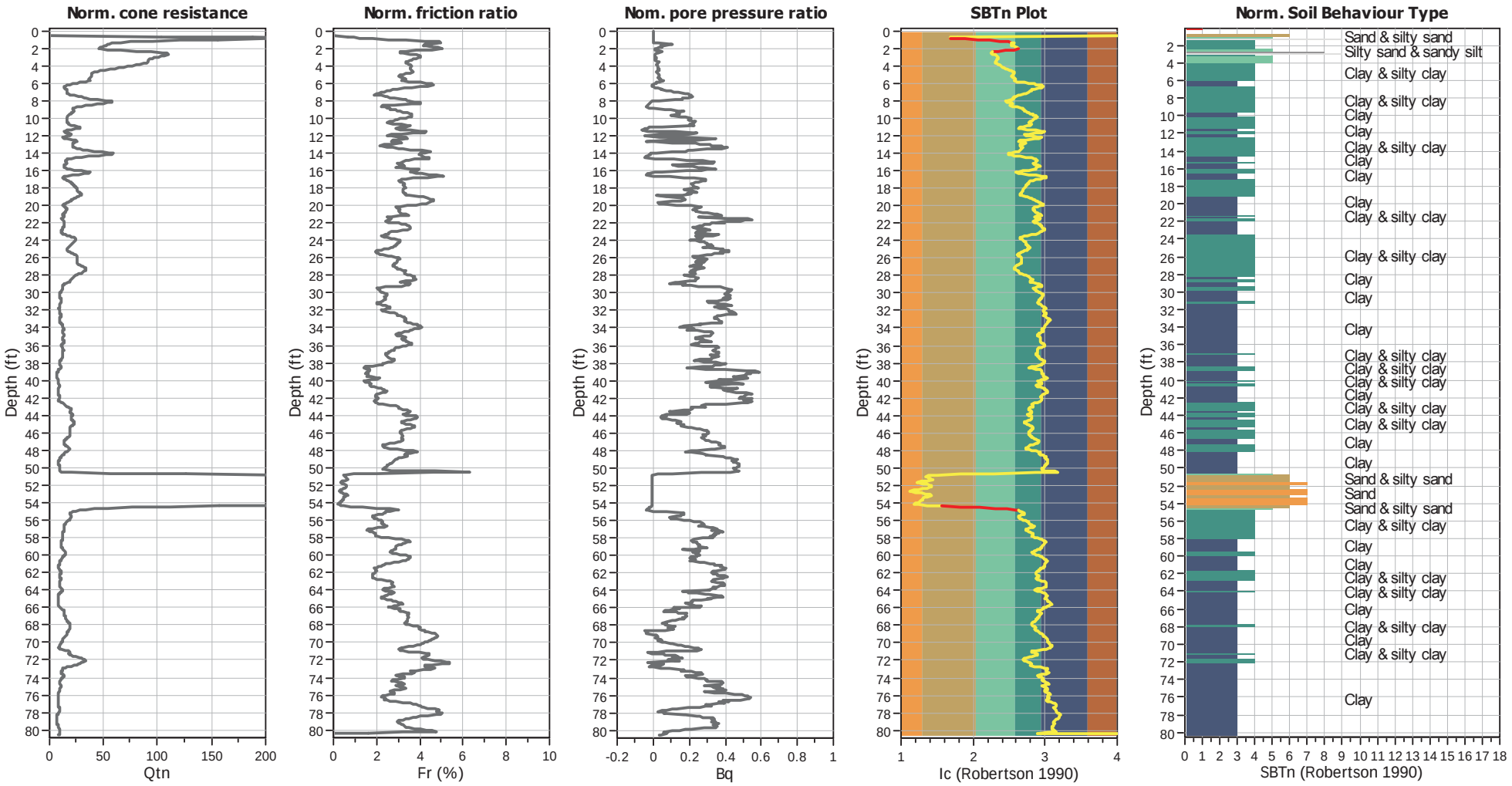






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



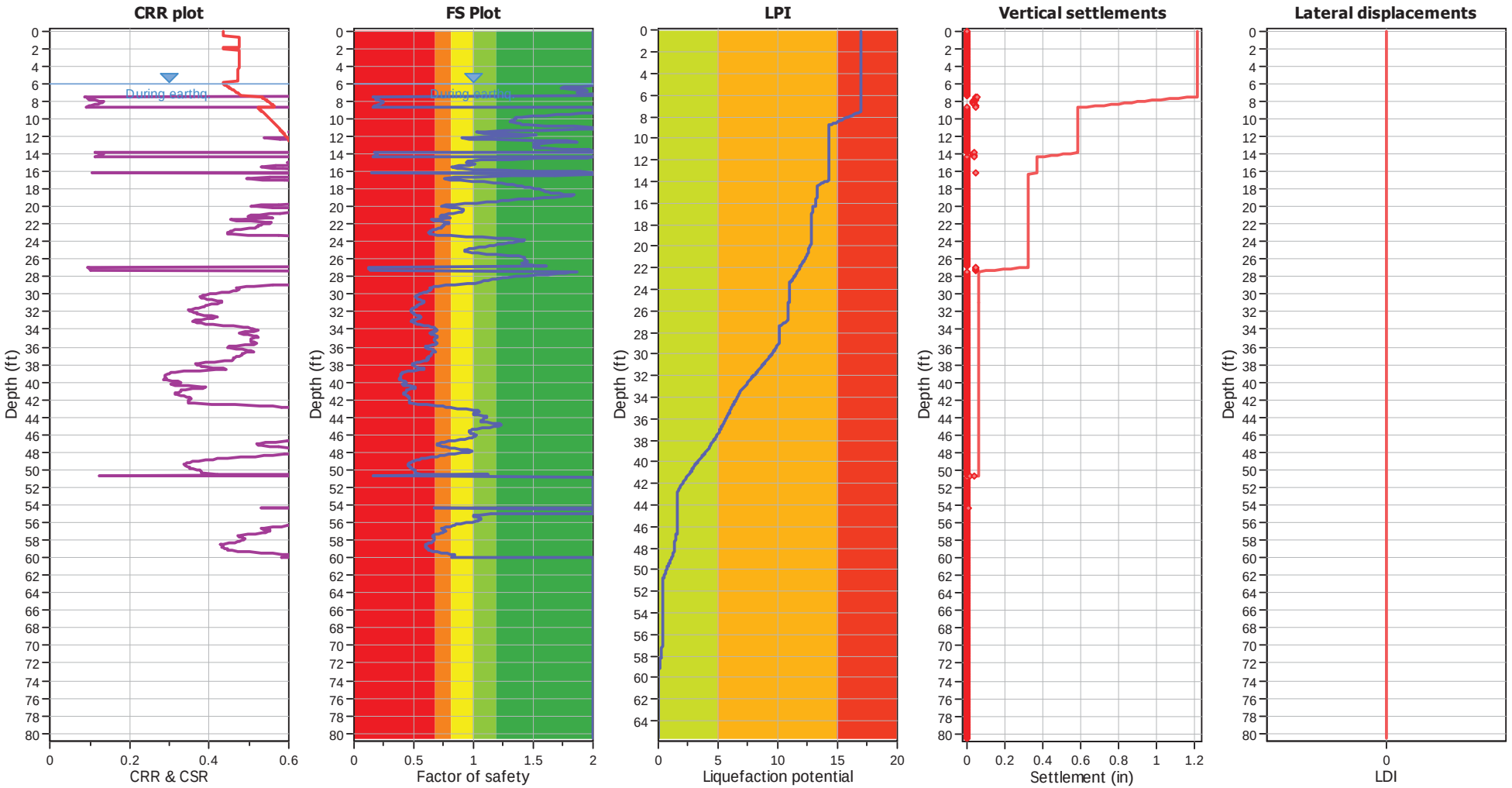
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

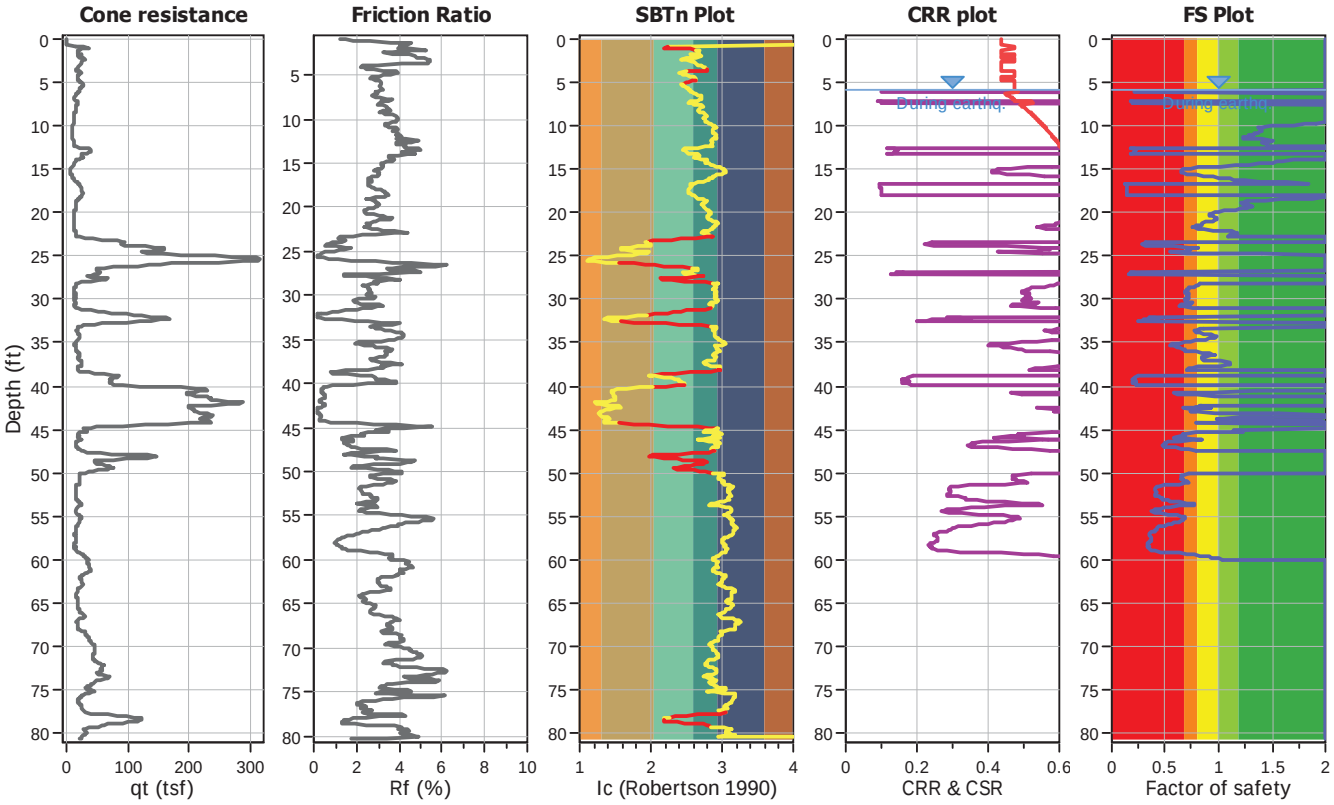
LIQUEFACTION ANALYSIS REPORT

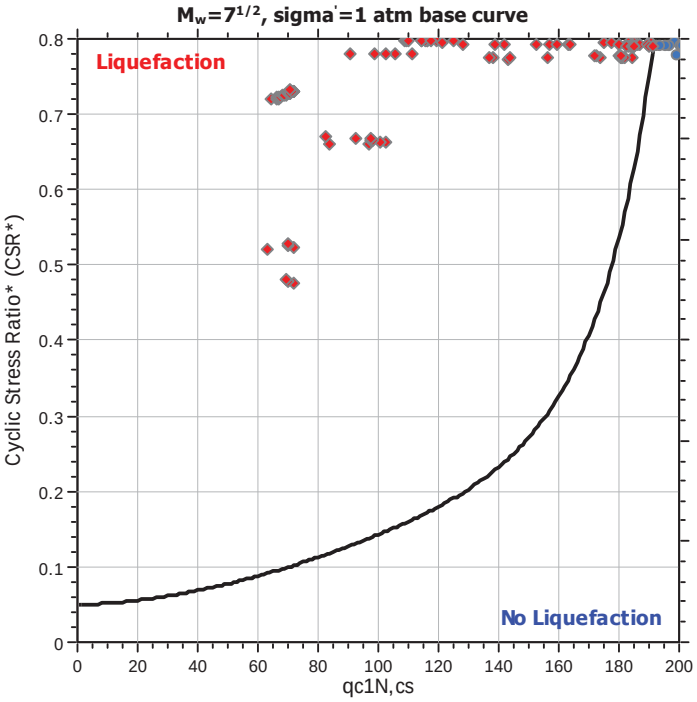
Project title : **Location :**

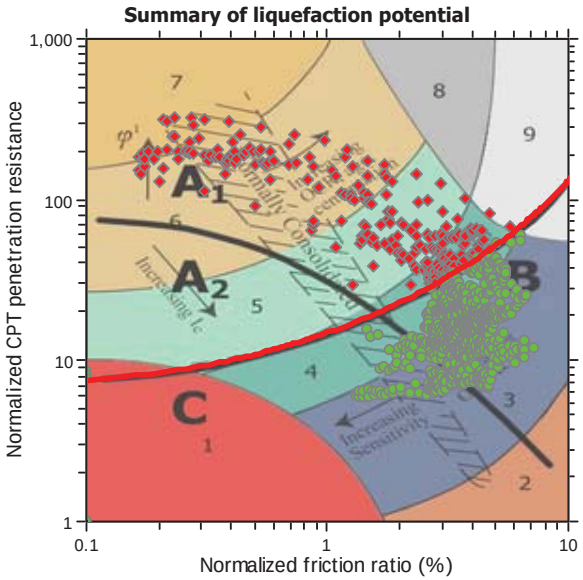
CPT file : 1-CPT16

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

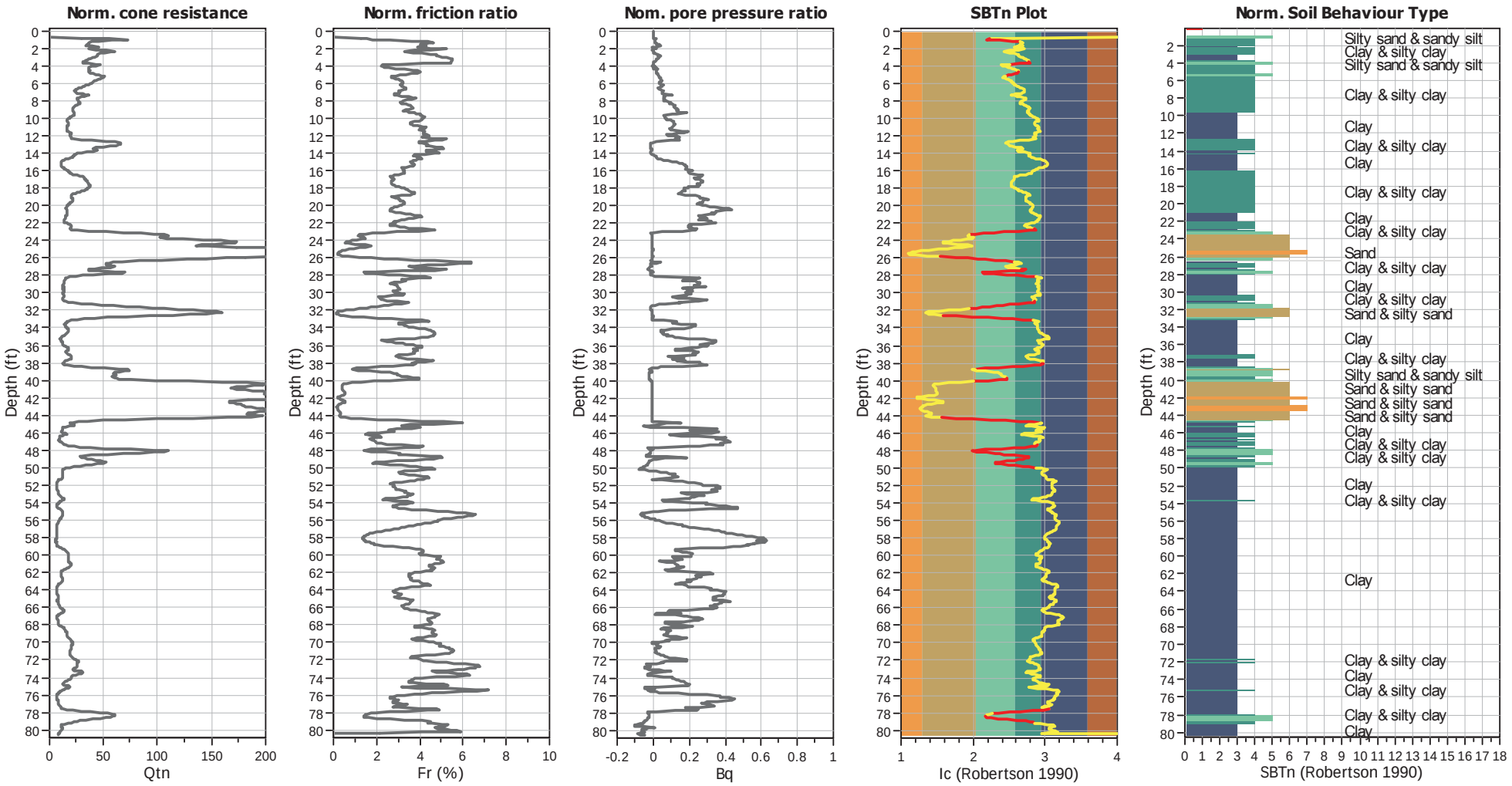






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



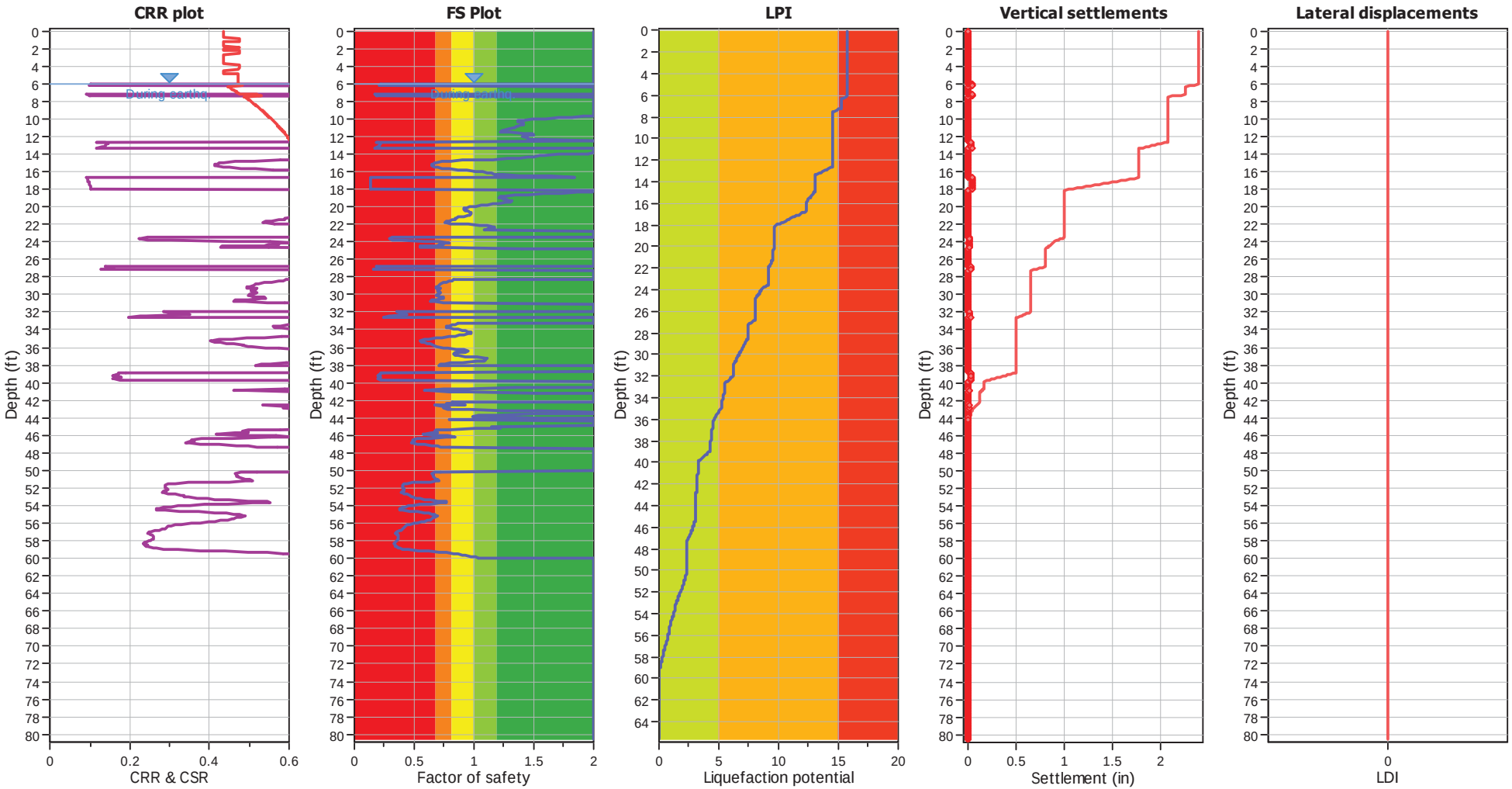
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

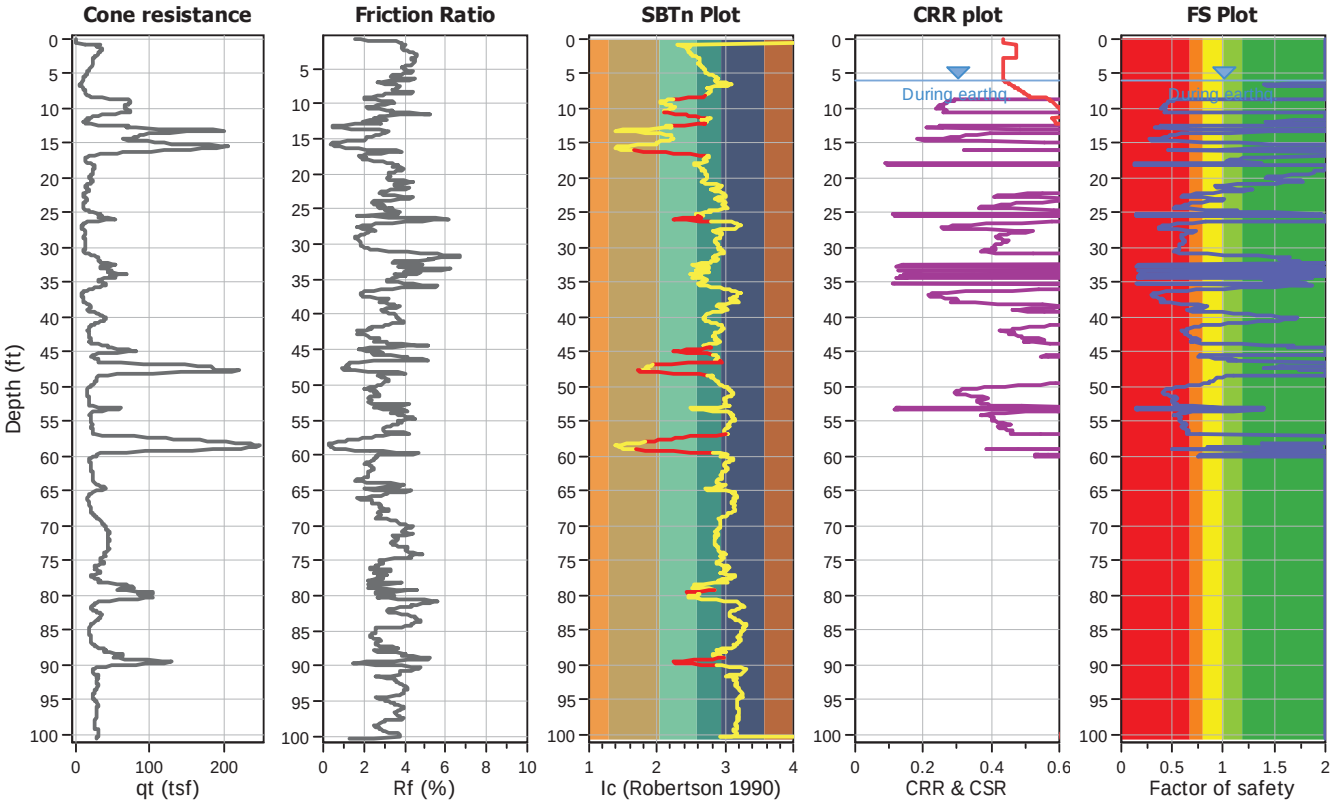
LIQUEFACTION ANALYSIS REPORT

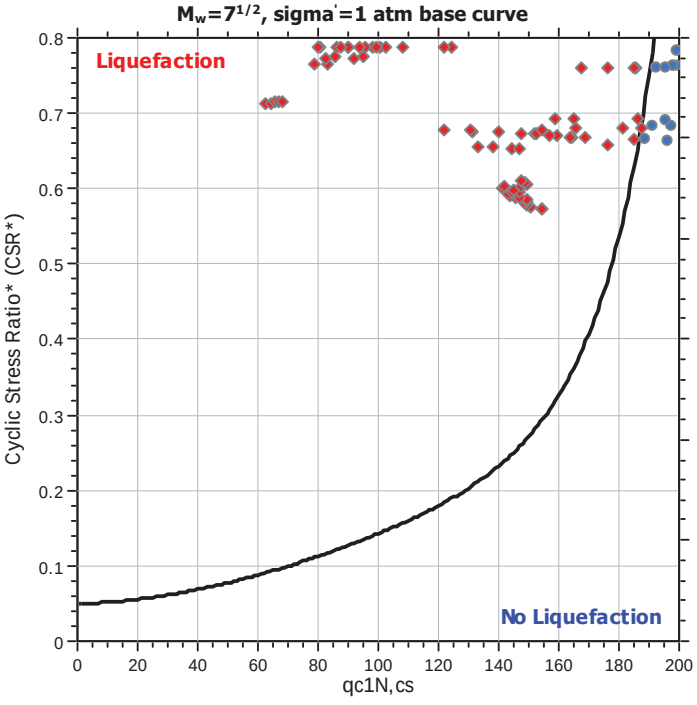
Project title : **Location :**

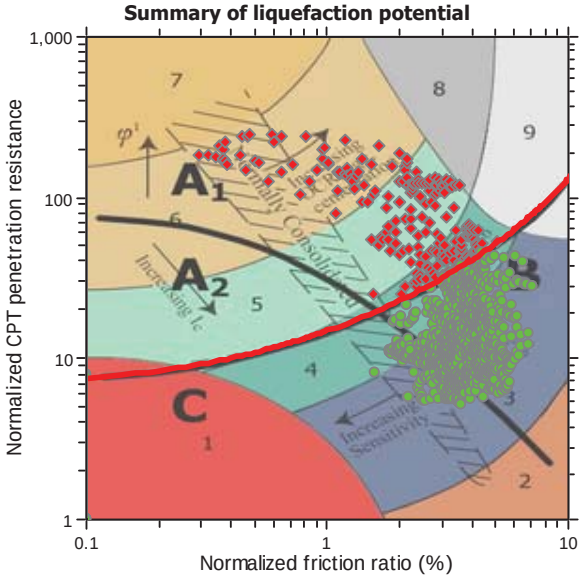
CPT file : 1-CPT17

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

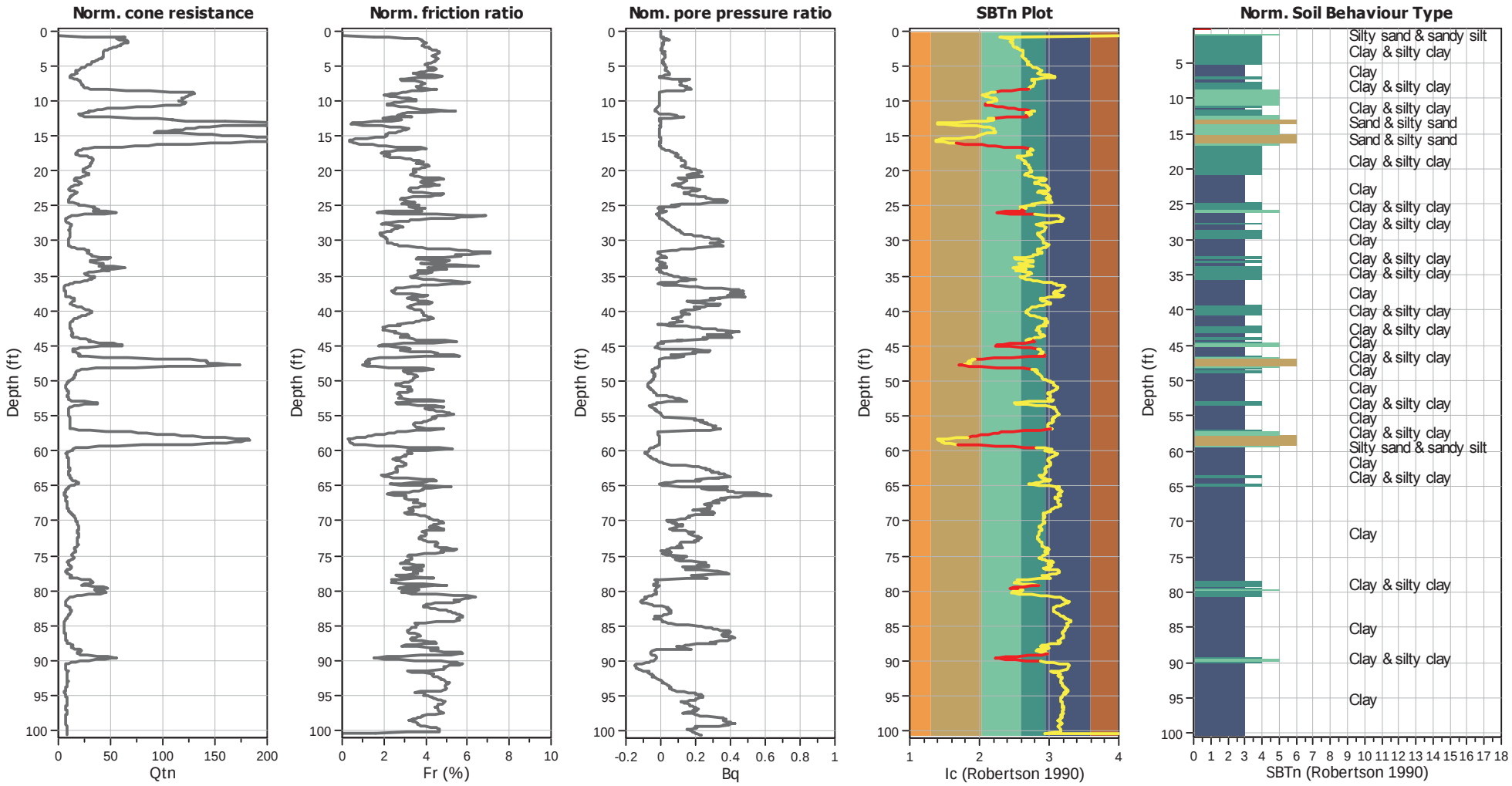






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



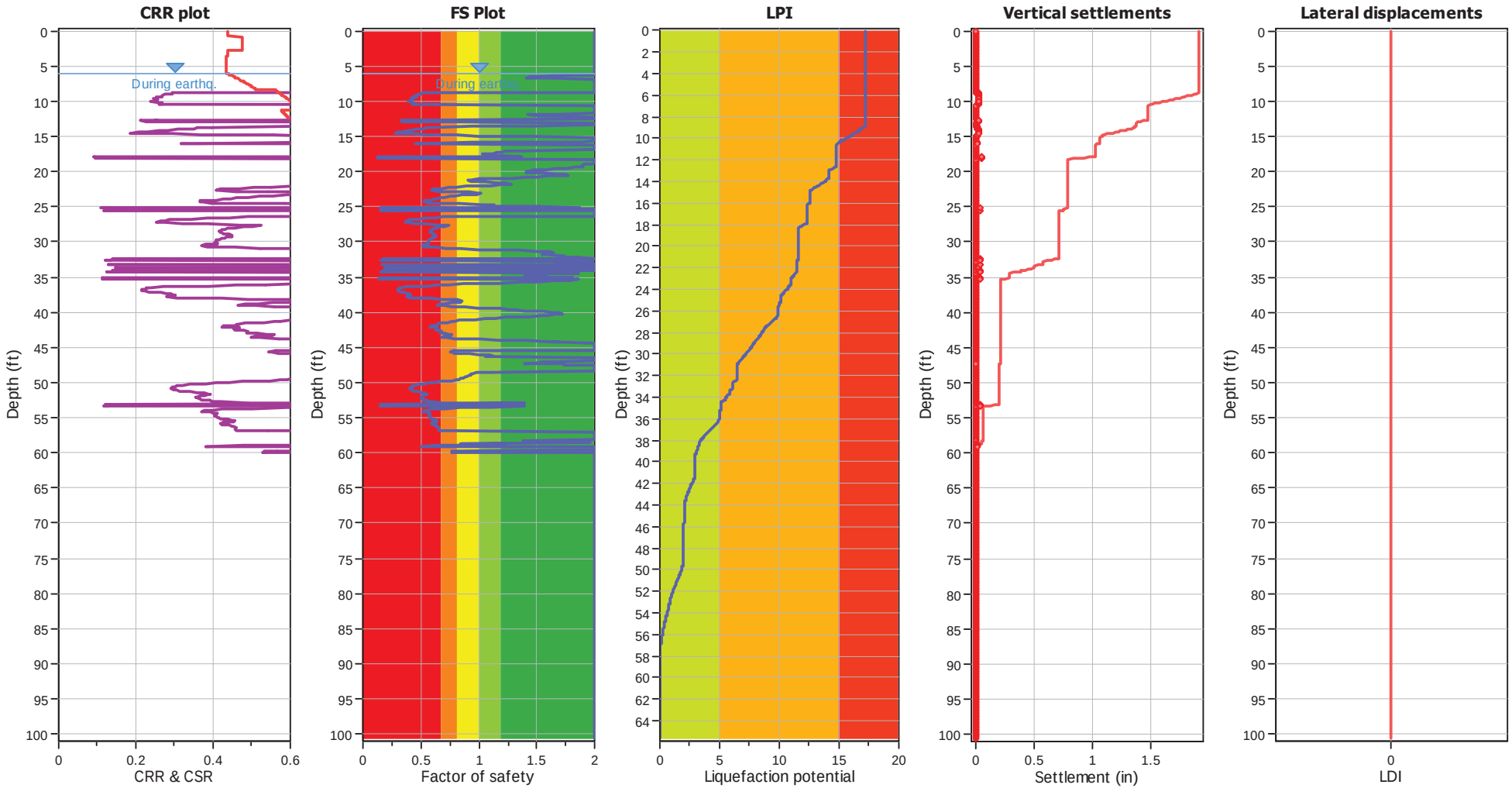
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

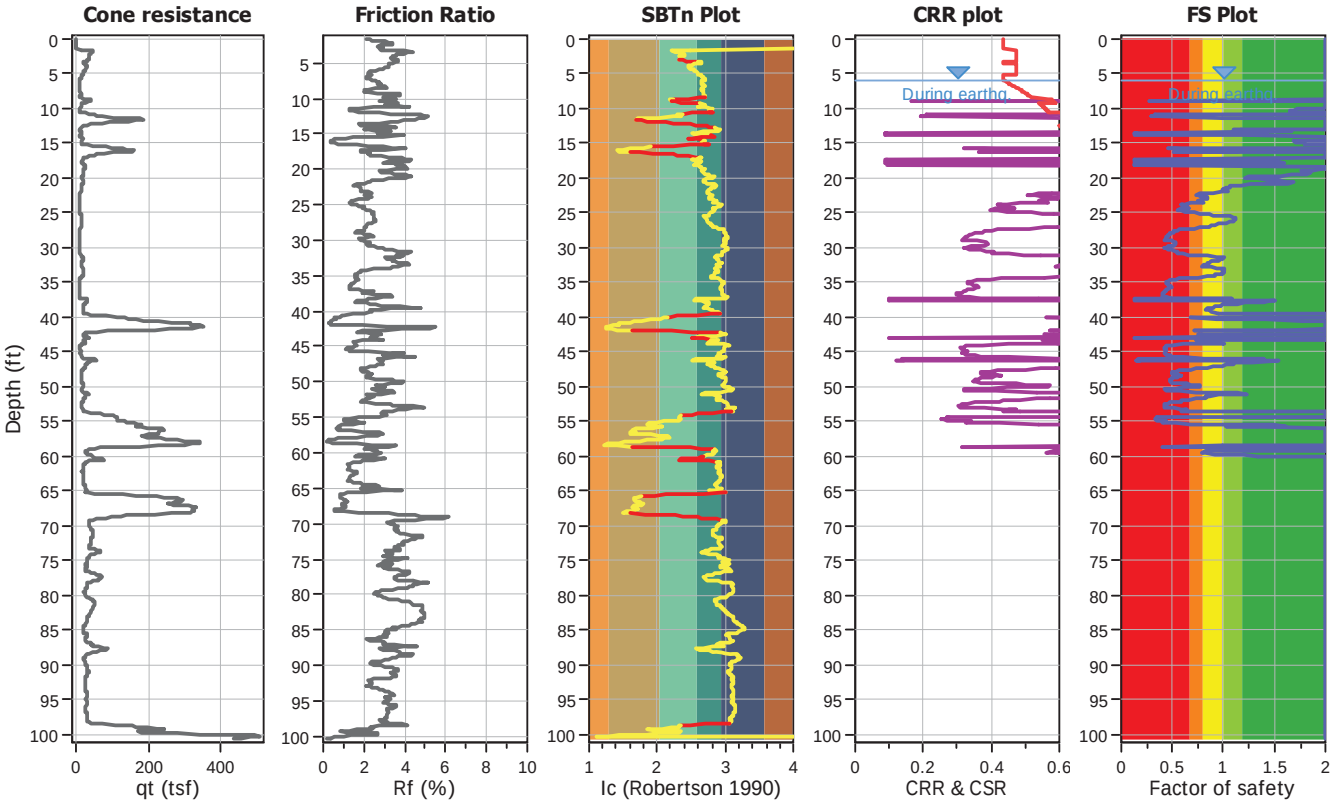
LIQUEFACTION ANALYSIS REPORT

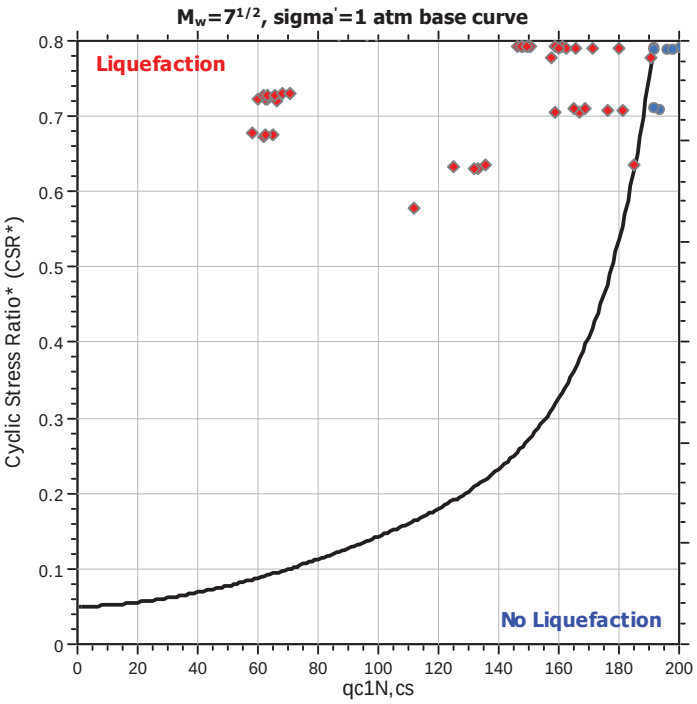
Project title : **Location :**

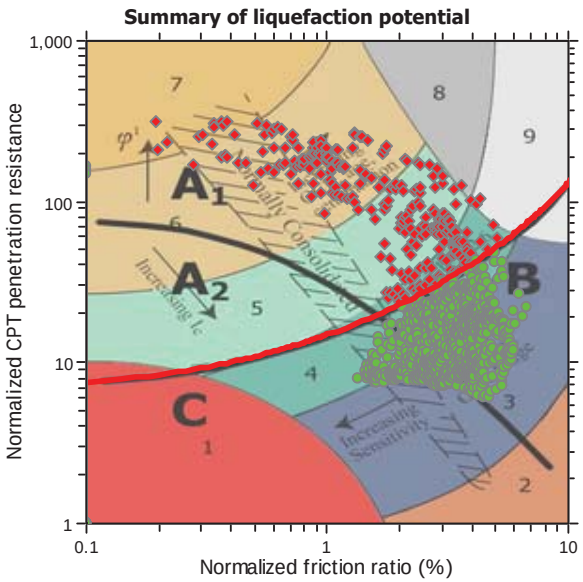
CPT file : 1-CPT18

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	6.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.88	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.66	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

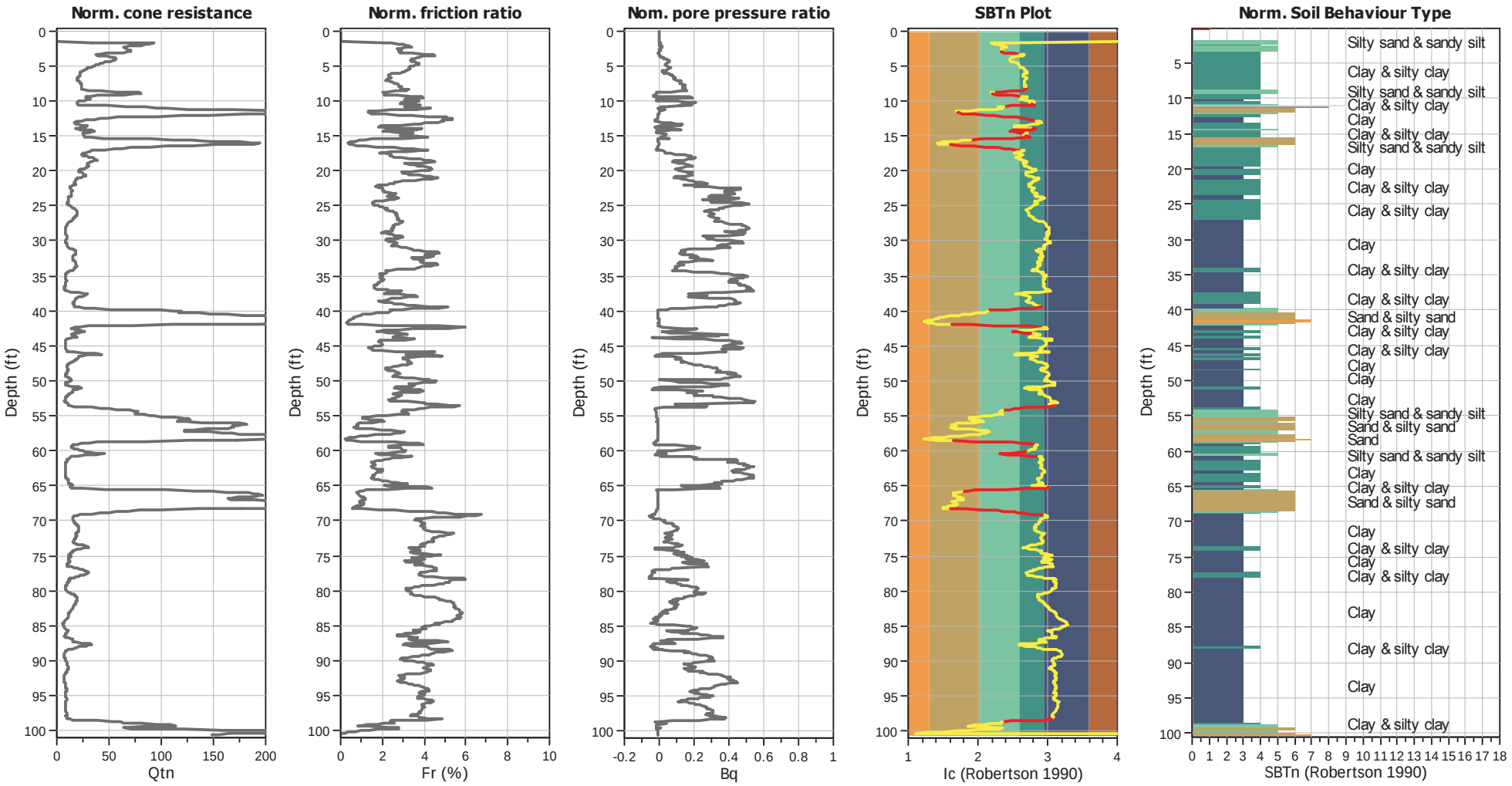






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



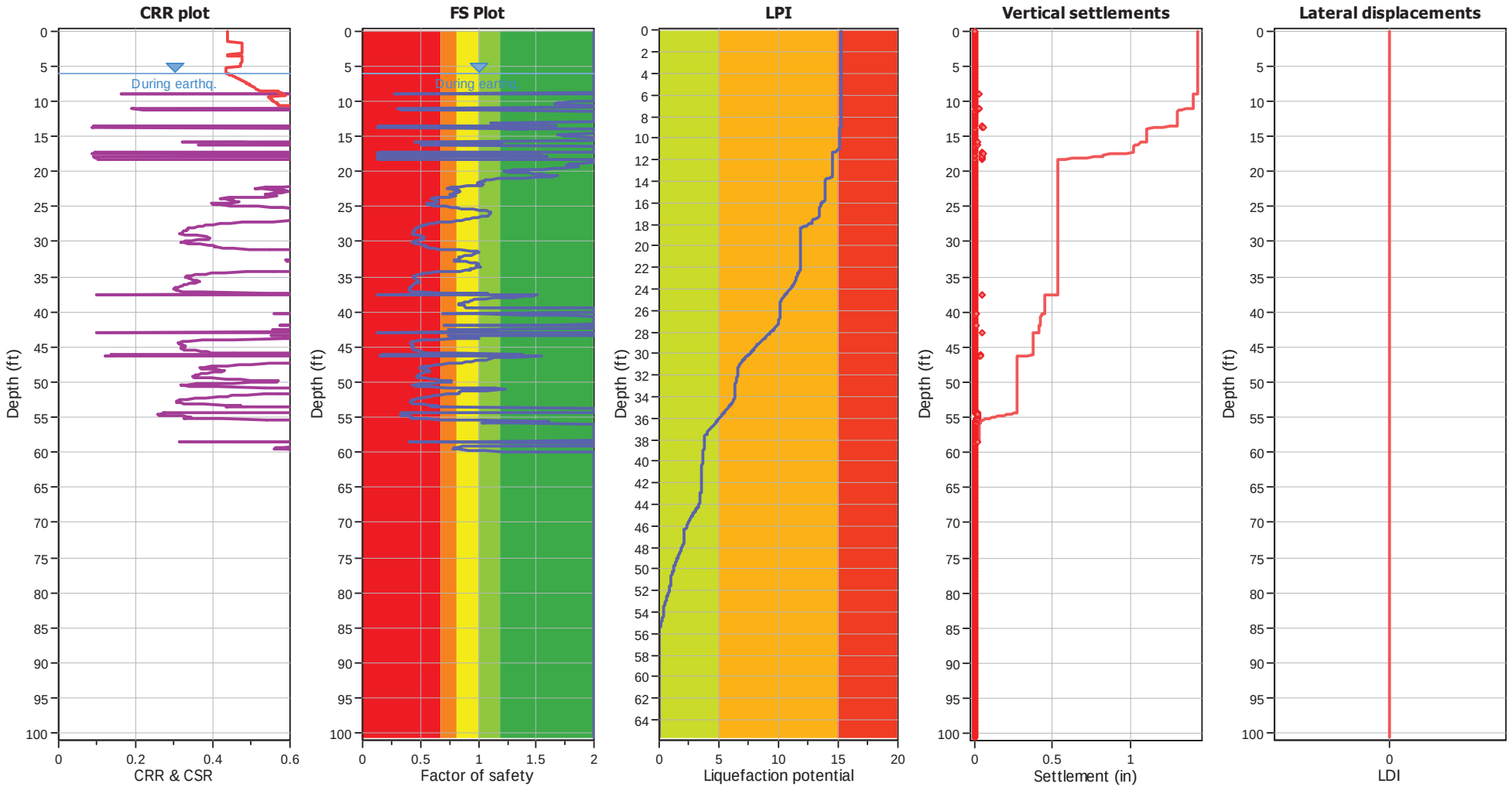
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	6.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.88	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.66	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

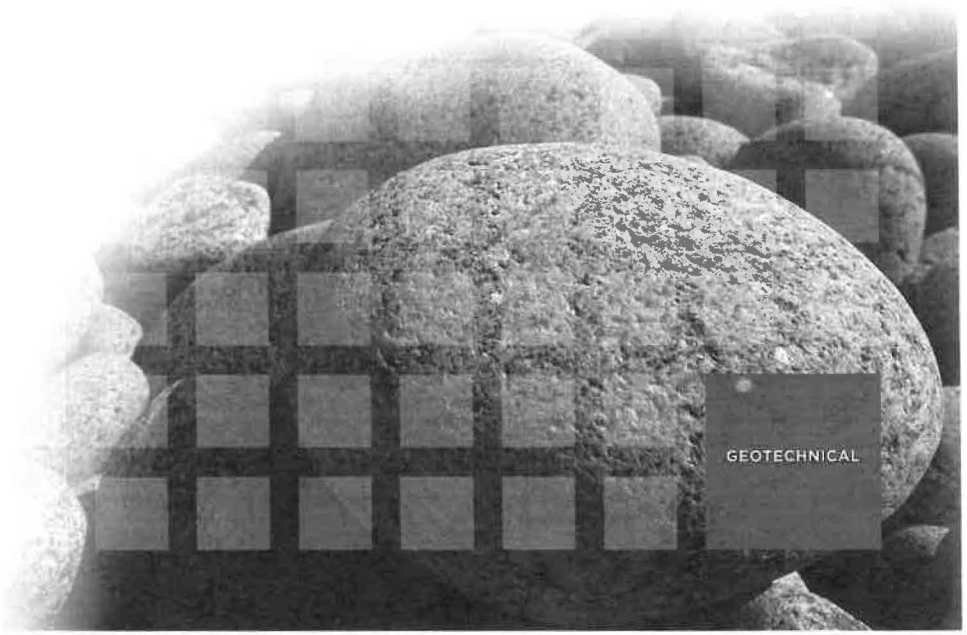
- Very high risk
- High risk
- Low risk



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TYPE OF SERVICES	Geotechnical Investigation
PROJECT NAME	1400 North Shoreline Boulevard Campus
LOCATION	1400 North Shoreline Boulevard Mountain View, California
CLIENT	Kenneth Rodrigues & Partners
PROJECT NUMBER	704-2-1
DATE	March 28, 2014



CORNERSTONE EARTH GROUP

Type of Services	**Geotechnical Investigation**
Project Name	**1400 North Shoreline Boulevard Campus**
Location	**1400 North Shoreline Boulevard Mountain View, California**
Client	**Kenneth Rodrigues & Partners**
Client Address	**445 North Whisman Road, Suite 200 Mountain View, CA**
Project Number	**704-2-1**
Date	**March 28, 2014**

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Type of Services	**Geotechnical Investigation**
Project Name	**1400 North Shoreline Boulevard Campus**
Location	**1400 North Shoreline Boulevard** **Mountain View, California**

SECTION 1: INTRODUCTION

This geotechnical report was prepared for the sole use of Kenneth Rodrigues & Partners for the office campus project located at 1400 North Shoreline Boulevard in Mountain View, California. The location of the site is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- A Site Plan titled, "1400 North Shoreline Boulevard, Conceptual Site Plan," prepared by Rubicon Point Partners and Kenneth Rodrigues & Partners, Inc., undated.

1.1 PROJECT DESCRIPTION

The project will consist of redeveloping the approximately 8-acre site for a new office campus. The campus will include three 8-story office buildings, a 5-level garage, retail/restaurant space, and an employee dining/athletic building. Currently, a partial below-grade (basement) level will be located under the garage and portions of Buildings 1, 2, and 3. The four existing buildings will be demolished prior to new construction.

Structural loads have not been provided at this time; however, structural loads are expected to be typical for similar type structures. We anticipate site grading will include cuts and fills up to about 5 to 15 feet including the basement level.

1.1.1 Project Understanding

As the current project plan is still in the planning stages, we recommend the final design and building layout be forward to us for review and our recommendations as provided in this report be evaluated further. The recommendations provided herein may be revised based on the final project plan and structural loads.

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1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated January 24, 2014 and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, and retaining walls, and preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

Field exploration consisted of five borings drilled on February 8 and 9, 2014 with truck-mounted, hollow-stem auger drilling equipment and seven Cone Penetration Tests (CPTs) advanced on February 14, 2014. The borings were drilled to depths of 49½ to 60 feet; the CPTs were advanced to depths of approximately 50 to 115 feet. Seismic shear wave velocity measurements were collected from CPT-7.

The borings and CPTs were backfilled with cement grout in accordance with Santa Clara Valley Water District guidelines; exploration permits were obtained as required.

The approximate locations of our exploratory borings are shown on the Site Plan, Figure 2. Details regarding our field program are included in Appendix A.

1.4 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program focused on obtaining data for foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, washed sieve analyses, Plasticity Index tests, triaxial compression, and consolidation tests. Details regarding our laboratory program are included in Appendix B.

1.5 ENVIRONMENTAL SERVICES

Environmental services were not requested for this project. If environmental concerns are determined to be present during future evaluations, the project environmental consultant should review our geotechnical recommendations for compatibility with the environmental concerns.

SECTION 2: REGIONAL SETTING

2.1 GEOLOGICAL SETTING

The site is located within the Santa Clara Valley, which is a broad alluvial plane between the Santa Cruz Mountains to the southwest and west, and the Diablo Range to the northeast. The San Andreas Fault system, including the Monte Vista-Shannon Fault, exists within the Santa Cruz Mountains and the Hayward and Calaveras Fault systems exist within the Diablo Range. Alluvial soil thicknesses in the area range from 300 to 400 feet (Rogers & Williams, 1974).

2.2 REGIONAL SEISMICITY

The San Francisco Bay area is one of the most seismically active areas in the Country. While seismologists cannot predict earthquake events, the U.S. Geological Survey's Working Group on California Earthquake Probabilities 2007 estimates there is a 63 percent chance of at least one magnitude 6.7 or greater earthquake occurring in the Bay Area region between 2007 and 2036. As seen with damage in San Francisco and Oakland due to the 1989 Loma Prieta earthquake that was centered about 50 miles south of San Francisco, significant damage can occur at considerable distances. Higher levels of shaking and damage would be expected for earthquakes occurring at closer distances.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 25 kilometers of the site.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
Monte Vista-Shannon	5.0	8.1
San Andreas (1906)	7.8	12.5
Hayward (Southeast Extension)	10.7	17.3
Hayward (Total Length)	12.1	19.4
Calaveras	15.0	24.2

A regional fault map is presented as Figure 3, illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 SURFACE DESCRIPTION

The approximately 8-acre site is located at 1400 North Shoreline Boulevard in Mountain View, California, and is currently occupied by four commercial, retail, and restaurant buildings surrounded by appurtenant parking, drive aisles, and landscaping. The site is bounded by Cinemark Century Theatres to the northwest, North Shoreline Boulevard to the east and US-101 freeway to the south. The site is relatively level but graded to drain to storm drainage facilities.

Surface pavements generally consisted of 2 to 4 inches of asphalt concrete over 3 to 6 inches of aggregate base. Based on visual observations, the existing pavements are in poor to fair conditions with some longitudinal and transverse cracking and related traffic distress.

3.2 SUBSURFACE CONDITIONS

Based on our explorations, the site was generally underlain by near-surface stiff to hard clayey soils to depths of about 3½ to 12½ feet below the existing ground. Boring EB-1, located in the southeast area of the site, encountered up to about 5½ feet of undocumented fill. The raised fill berm was in a landscape area. Fill was not encountered in the remaining borings. Below the surficial soils and fill, the site is underlain by alluvial soils consisting of interbedded medium dense to very dense sands with varying amounts of fines and gravel and medium stiff to very stiff lean clay with varying amounts of sand to 115 feet below the ground surface, the maximum depth explored.

3.2.1 Plasticity/Expansion Potential

We performed six Plasticity Index (PI) tests on representative samples. Test results were used to evaluate expansion potential of surficial soils, and the plasticity of the fines in potentially liquefiable layers. Test for the surficial undocumented fill (EB-1) at a depth of 1½ feet resulted in a PI of 5, indicating a low expansion potential to wetting and drying cycles for the fill material in this area. Based on our engineering judgment, we estimated the native surficial clayey soil to have a high expansion potential. The PI results performed for deeper samples ranged from non-plastic (NP) to 12 for the interbedded silty and clayey sands. Test results are summarized in Appendix B.

3.2.2 In-Situ Moisture Contents

Laboratory testing indicated that the in-situ moisture contents within the upper 15 feet range from 4 to 8 over the estimated laboratory optimum moisture.

3.3 GROUND WATER

Ground water was encountered in our explorations at depths of approximately 6½ to 14 feet below the ground surface. Pore water pressure measurements taken in CPT-3 and CPT-6 estimated depths to ground water at about 6½ to 11¾ feet. Table 2 summarizes depth to ground water encountered at the time of exploration. All measurements were taken at the time of drilling and may not represent the stabilized levels that can be higher than the initial levels encountered.

Available historic high ground water data is estimated at about 4 feet below the ground (California Geologic Survey, Mountain View 7.5-Minute Quadrangle, 2006). We used a design ground water of 4 feet below the existing ground surface for our liquefaction analysis.

Fluctuations in ground water levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

Table 2: Depth to Ground Water

Boring/CPT Number	Date Performed	Depth to Ground Water (feet)	Ground Water Elevation* (feet)	Depth of Boring/CPT (feet)
CPT-3	2/14/2014	6.3	18.7	50.7
CPT-6	2/14/2014	11.8	11.2	74.5
EB-1	2/8/2014	14.0	14	50
EB-2	2/8/2014	8.5	16.5	50
EB-3	2/9/2014	6.5	16.5	49.4
EB-4	2/9/2014	7	17	50
EB-5	2/8/2014	7.5	15.5	60

*Elevation estimated from Google Earth.

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT RUPTURE

As discussed above several significant faults are located within 25 kilometers of the site. The site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone, or a Santa Clara County Fault Hazard Zone. As shown in Figure 3, no known surface expression of fault traces is thought to cross the site; therefore, fault rupture hazard is not a significant geologic hazard at the site.

4.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A peak ground acceleration (PGA) was estimated for analysis using a value equal to $PGA_M = F_{PGA} \times PGA_G$ (Equation 11.8-1) as allowed in the 2013 California Building Code. For our liquefaction analysis we used a PGA of 0.53g.

4.3 LIQUEFACTION POTENTIAL

The site is within a State-designated Liquefaction Hazard Zone (CGS, Mountain View Quadrangle, 2006) as well as a Santa Clara County Liquefaction Hazard Zone (Santa Clara County, 2003). Our field and laboratory programs addressed this issue by sampling potentially liquefiable layers to depths of at least 50 feet, performing visual classification on sampled materials, evaluating CPT correlations, and performing various tests to further classify the soil properties.

4.3.1 Background

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 3 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

4.3.2 Analysis

As discussed in the "Subsurface" section above, several sand layers were encountered below the design ground water depth of 4 feet. Following the procedures in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008) and in accordance with CDMG Special Publication 117A guidelines (CDMG, 2008) for quantitative analysis, these layers were analyzed for liquefaction triggering and potential post-liquefaction settlement. These methods compare the ratio of the estimated cyclic shaking (Cyclic Stress Ratio - CSR) to the soil's estimated resistance to cyclic shaking (Cyclic Resistance Ratio - CRR), providing a factor of safety against liquefaction triggering. Factors of safety less than or equal to 1.3 are considered to be potentially liquefiable and capable of post-liquefaction re-consolidation.

The CSR for each layer quantifies the stresses anticipated to be generated due to a design-level seismic event, is based on the peak horizontal acceleration generated at the ground surface discussed in the "Estimated Ground Shaking" section above, and is corrected for overburden and stress reduction factors as discussed in the procedure developed by Seed and Idriss (1971) and updated in the 2008 Idriss and Boulanger monograph.

The soil's CRR is estimated from the in-situ measurements from CPTs and laboratory testing on samples retrieved from our borings. SPT "N" values obtained from hollow-stem auger borings were not used in our analyses, as the "N" values obtained are unreliable in sands below ground water. The tip pressures are corrected for effective overburden stresses, taking into consideration both the ground water level at the time of exploration and the design ground water level, and stress reduction versus depth factors. The CPT method utilizes the soil behavior type index (I_C) to estimate the plasticity of the layers.

The results of our CPT analyses (CPT-1 through CPT-7) are shown on Figures 4A through 4G of this report. Calculations for these CPTs are attached as Appendix C.

4.3.3 Summary

Our analyses indicate that several layers could potentially experience liquefaction triggering that could result in soil softening and post-liquefaction total settlement ranging from ¼ to 1½ inches based on the Yoshimine (2006) method. As discussed in the CGS Special Publication 117A,

differential movement for level ground sites over deep soil sites will be up to about two-thirds of the total settlement. In our opinion, differential settlements are anticipated to be up to approximately 1 inch between adjacent foundation elements, estimated to be approximately 30 feet.

4.3.4 Ground Rupture Potential

The methods used to estimate liquefaction settlements assume that there is a sufficient cap of non-liquefiable material to prevent ground rupture or sand boils. For ground rupture to occur, the pore water pressure within the liquefiable soil layer will need to be great enough to break through the overlying non-liquefiable layer, which could cause significant ground deformation and settlement. The work of Youd and Garris (1995) indicates the planned basement level will serve as a sufficient non-liquefiable cap to prevent ground rupture; therefore the above total settlement estimates are reasonable.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

There are no open faces within an appropriate distance of the site where lateral spreading could occur; therefore, in our opinion, the potential for lateral spreading to affect the site is low.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose unsaturated sandy soils can settle during strong seismic shaking. As the soils encountered above the ground water level at the site were predominantly stiff to very stiff clays and medium dense to very dense sands, in our opinion, the potential for significant differential seismic settlement affecting the proposed improvements is low.

4.6 TSUNAMI/SEICHE

The terms tsunami or seiche are described as ocean waves or similar waves usually created by undersea fault movement or by a coastal or submerged landslide. Tsunamis may be generated at great distance from shore (far field events) or nearby (near field events). Waves are formed, as the displaced water moves to regain equilibrium, and radiates across the open water, similar to ripples from a rock being thrown into a pond. When the waveform reaches the coastline, it quickly raises the water level, with water velocities as high as 15 to 20 knots. The water mass, as well as vessels, vehicles, or other objects in its path create tremendous forces as they impact coastal structures.

Tsunamis have affected the coastline along the Pacific Northwest during historic times. The Fort Point tide gauge in San Francisco recorded approximately 21 tsunamis between 1854 and 1964. The 1964 Alaska earthquake generated a recorded wave height of 7.4 feet and drowned eleven people in Crescent City, California. For the case of a far-field event, the Bay area would have hours of warning; for a near field event, there may be only a few minutes of warning, if any.

A tsunami or seiche originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Based on the study of tsunami inundation potential for the San Francisco Bay Area (Ritter and Dupre, 1972), areas most likely to be inundated are marshlands, tidal flats, and former bay margin lands that are now artificially filled, but are still at or below sea level, and are generally within 1½ miles of the shoreline. The site is approximately 2½ miles inland from the San Francisco Bay shoreline, and is approximately 21 to 29 feet above mean sea level. Therefore, the potential for inundation due to tsunami or seiche is considered low.

4.7 FLOODING

Based on our internet search of the Federal Emergency Management Agency (FEMA) flood map public database, the site is located within Zone X, described as, "Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood." We recommend the project civil engineer be retained to confirm this information and verify the base flood elevation, if appropriate.

The Association of Bay Area Governments has compiled a database of Dam Failure Inundation Hazard Maps (ABAG, 1995). The generalized hazard maps were prepared by dam owners as required by the State Office of Emergency Services; they are intended for planning purposes only. Based on our review of these maps, the site is not located within a dam failure inundation area.

SECTION 5: CONCLUSIONS

5.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Potential for liquefaction-induced settlements
- Shallow ground water
- Presence of highly expansive soils
- Differential movement at on-grade to on-structure transitions

5.1.1 Potential for Liquefaction-Induced Settlements

As discussed, our liquefaction analysis indicates that there is a potential for liquefaction of localized sand layers during a significant seismic event. Although the potential for liquefied sands to vent to the ground surface through cracks in the surficial soils is low under the buildings, our analysis indicates that liquefaction-induced settlement on the order of ¼ to 1½ inches could occur, resulting in differential settlement on the order of 1-inch between adjacent foundation elements, assumed to be over a distance of about 30 feet. Foundations should be designed to tolerate the anticipated total and differential settlements. Detailed foundation recommendations are presented in the "Foundations" section.

5.1.2 Shallow Ground Water

Ground water was encountered in our borings and CPTs at depths ranging from about 6¼ to 14 feet below current grades. Historic high ground water is mapped at about 4 feet below grade. We recommend using a design ground water of 4 feet below existing site grades; therefore, the proposed below-grade level will have foundations and the garage slab below ground water. The foundation, slab, and below grade walls that extend below the design ground water of 4 feet will have to be designed to resist potential hydrostatic and uplift pressures and should be waterproofed to limit moisture infiltration. In addition, based on our experience, shallow ground water could significantly impact grading and underground construction. These impacts typically consist of potentially wet and unstable pavement subgrade, difficulty achieving compaction, and difficult underground utility installation. Dewatering and shoring of utility trenches may be required in some isolated areas of the site. Detailed recommendations addressing this concern are presented in the "Earthwork" section of this report.

5.1.3 Expansive Soils

As discussed, highly expansive surficial soils were encountered in the surficial soils that blanket the site. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. The parking garage and portions of the 8-story towers will be one-level below grade; however, the at-grade site improvements underlain by expansive soils need to have a layer of non-expansive fill (NEF) to reduce distress. In addition, it is important to limit moisture changes in the surficial soils by using positive drainage away from buildings as well as limiting landscaping watering.

Though the expansive soil will be removed under the new buildings and basement, it will still be in-place under at-grade site improvements including hardscape such as sidewalks. Grading and foundation recommendations addressing this concern are presented in Sections 6 and 7 of this report.

5.1.4 Differential Movement at On-grade to On-Structure Transitions

Pertinent parking areas, driveways, and hardscape will transition from on-grade support to overlying the basements. Where the depth of soil cover overlying the basement roof in the plaza area is thin or where basement walls extend to within inches of finished grade, these

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transition areas typically experience increased differential movement due to a variety of causes, including difficulty in achieving compaction of retaining wall backfill closest to the wall. We recommend consideration be given to where engineered fill is placed behind retaining walls extending to near finished grade, and that subslabs be included beneath flatwork or pavers that can cantilever at least 3 feet beyond the wall. If surface improvements are included that are highly sensitive to differential movement, additional measures may be necessary. We also recommend that retaining wall backfill be compacted to 95 percent where surface improvements are planned (see "Retaining Wall" section).

As currently planned, the partial basement level will be located under only a portion of Buildings 1, 2, and 3. Therefore, additional differential movement can also be expected for transitions from the basement level to the at-grade buildings. Additional comments and recommendations are provided in the following sections of this report.

5.2 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

5.3 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the small-diameter borings performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation, and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least a 48-hour notice when scheduling our field personnel.

SECTION 6: EARTHWORK

6.1 SITE DEMOLITION, CLEARING AND PREPARATION

6.1.1 Site Stripping

The site should be stripped of all surface vegetation, and surface and subsurface improvements within the proposed development area. Demolition of existing improvements is discussed in detail below. A detailed discussion of removal of existing fills is provided later in this report. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight. Based on our site observations, surficial stripping should extend about 3 to 6 inches below existing grade in vegetated areas.

6.1.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the root balls and any roots greater than ½-inch diameter removed completely. Mature trees are estimated to have root balls extending to depths of 2 to 4 feet, depending on the tree size. Significant root zones are anticipated to extend to the diameter of the tree canopy. Grade depressions resulting from root ball removal should be cleaned of loose material and backfilled in accordance with the recommendations in the "Compaction" section of this report.

6.1.3 Demolition of Existing Slabs, Foundations and Pavements

All slabs, foundations, and pavements should be completely removed from within planned building areas. Slabs, foundations, and pavements that extend into planned flatwork, pavement, or landscape areas may be left in place provided there is at least 3 feet of engineered fill overlying the remaining materials, they are shown not to conflict with new utilities, and that asphalt and concrete more than 10 feet square is broken up to provide subsurface drainage. A discussion of recycling existing improvements is provided later in this report.

6.1.4 Abandonment of Existing Utilities

All utilities should be completely removed from within planned building areas. For any utility line to be considered acceptable to remain within building areas, the utility line must be completely backfilled with grout or sand-cement slurry (sand slurry is not acceptable), the ends outside the building area capped with concrete, and the trench fills either removed and replaced as engineered fill with the trench side slopes flattened to at least 1:1, or the trench fills are determined not to be a risk to the structure. The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risks associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not completely filled with grout. In general, the risk is relatively low for single utility lines less than 4 inches in diameter, and increases with increasing pipe diameter.

6.2 REMOVAL OF EXISTING FILLS

During our field exploration, Boring EB-1 encountered fill consisting of silty clayey sand to a depth of approximately 5½ feet below the existing ground surface. A below-grade level is planned for Building 3, which is in the vicinity of EB-1; therefore, the fill will likely be removed beneath the building. In general, any undocumented fills encountered beneath existing

improvements should be over-excavated and re-compacted prior to placing new fills in at-grade development areas. Provided the fills meet the "Material for Fill" requirements below, the fills may be reused when backfilling the excavations. Based on review of the samples collected from our borings, it appears that the fill may be reused. If materials are encountered that do not meet the requirements, such as debris, wood, trash, those materials should screened out of the remaining material and be removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the "Compaction" section below.

Fills extending into planned pavement and flatwork areas may be left in place provided they are determined to be a low risk for future differential settlement and that the upper 12 inches of fill below pavement subgrade is re-worked and compacted as discussed in the "Compaction" section below. In our opinion, the fills encountered at this site are acceptable to be left in place.

6.3 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. On a preliminary basis, the upper 15 feet at the site may be classified as OSHA Site C materials. Recommended soil parameters for temporary shoring are provided in the "Temporary Shoring" section of this report.

Excavations performed during site demolition and fill removal should be sloped at 3:1 (horizontal:vertical) within the upper 5 feet below building subgrade. Excavations extending more than 5 feet below building subgrade and excavations in pavement and flatwork areas should be slope at a 1:1 inclination unless the OSHA soil classification indicates that slope should not exceed 1.5:1.

6.4 BELOW-GRADE EXCAVATIONS

Below-grade excavations may be constructed with temporary slopes in accordance with the "Temporary Cut and Fill Slopes" section above if space allows. Alternatively, temporary shoring may support the planned cuts. We have provided geotechnical parameters for shoring design in the section below. The choice of shoring method should be left to the contractor's judgment based on experience, economic considerations and adjacent improvements such as utilities, pavements, and foundation loads. Temporary shoring should support adjacent improvements without distress and should be the contractor's responsibility. A pre-condition survey including photographs and installation of monitoring points for existing site improvements should be included in the contractor's scope. We should be provided the opportunity to review the geotechnical parameters of the shoring design prior to implementation; the project structural engineer should be consulted regarding support of adjacent structures.

6.4.1 Temporary Shoring

Based on the site conditions encountered during our investigation, the cuts may be supported by soldier beams and tie-backs, braced excavations, or potentially other methods. Where shoring will extend more than about 10 feet, restrained shoring will most likely be required to

limit detrimental lateral deflections and settlement behind the shoring. In addition to soil earth pressures, the shoring system will need to support adjacent loads such as construction vehicles and incidental loading, existing structure foundation loads, and street loading. We recommend that heavy construction loads (cranes, etc.) and material stockpiles be kept at least 15 feet behind the shoring. Where this loading cannot be set back, the shoring will need to be designed to support the loading. The shoring designer should provide for timely and uniform mobilization of soil pressures that will not result in excessive lateral deflections. Minimum suggested geotechnical parameters for shoring design are provided in the table below.

Table 3: Suggested Temporary Shoring Design Parameters

Design Parameter	Design Value
Minimum Lateral Wall Surcharge (upper 5 feet)	120 psf
Restrained Wall – Uniform Earth Pressure	25H*
Passive Pressure – Starting at 2 feet below the bottom of the excavation	400 pcf up to 2,000 psf maximum uniform pressure

* H equals the height of the excavation; passive pressures are assumed to act over twice the soldier pile diameter

The restrained earth pressure may also be distributed as described in Figure 24 of the *FHWA Circular No. 4 – Ground Anchors and Anchored Systems* (with the hinge points at ¼H and ¾H) provided the total pressure is established from the uniform pressure above.

If shotcrete lagging is used for the shoring facing, the permanent retaining wall drainage materials, as discussed in the "Wall Drainage" section of this report, will need to be installed during temporary shoring construction. At a minimum, 2-foot-wide vertical panels should be placed between tiebacks that are spaced at 6-foot centers. For 8-foot centers, 4-foot-wide vertical panels should be provided. A horizontal strip drain connecting the vertical panels should be provided, or pass-through connections should be included for each vertical panel.

We performed our borings with hollow-stem auger drilling and CPT equipment and as such were not able to evaluate the potential for caving soils, which can create difficult conditions during soldier beam, tie-back, or soil nail installation; caving soils can also be problematic during excavation and lagging placement. The contractor is responsible for evaluating excavation difficulties prior to construction. Where relatively clean sands (especially encountered below ground water) or difficult drilling or cobble conditions were encountered during our exploration, pilot holes performed by the contractor may be desired to further evaluate these conditions prior to the finalization of the shoring budget.

In addition to anticipated deflection of the shoring system, other factors such as voids created by soil sloughing, and erosion of granular layers due to perched water conditions can create adverse ground subsidence and deflections. The contractor should attempt to cut the excavation as close to neat lines as possible; where voids are created they should be backfilled as soon as possible with sand, gravel, or grout.

As previously mentioned, we recommend that a monitoring program be developed and implemented to evaluate the effects of the shoring on adjacent improvements. All sensitive improvements should be located and monitored for horizontal and vertical deflections and distress cracking based on a pre-construction survey. For multi-level excavations, the installation of inclinometers at critical areas may be desired for more detailed deflection monitoring. The monitoring frequency should be established and agree to by the project team prior to start of shoring construction.

The above recommendations are for the use of the design team; the contractor in conjunction with input from the shoring designer should perform additional subsurface exploration they deem necessary to design the chosen shoring system. A California-licensed civil or structural engineer must design and be in responsible charge of the temporary shoring design. The contractor is responsible for means and methods of construction, as well as site safety.

6.4.2 Construction Dewatering

Ground water levels are expected to be above the planned excavation bottom; therefore temporary dewatering will be necessary during construction. Design, selection of the equipment and dewatering method, and construction of temporary dewatering should be the responsibility of the contractor. Modifications to the dewatering system are often required in layered alluvial soils and should be anticipated by the contractor. The dewatering plan, including planned dewatering well filter pack materials, should be forwarded to our office for review prior to implementation.

The dewatering design should maintain ground water at least 5 feet below the bottom of the mass excavation, and at least 2 feet below localized excavations such as deepened footings, elevator shafts, and utilities. If the dewatering system was to shut down for an extended period of time, destabilization and/or heave of the excavation bottom requiring over-excavation and stabilization, flooding and softening, and/or shoring failures could occur; therefore, we recommend that a backup power source be considered.

Depending on the ground water quality and previous environmental impacts to the site and surrounding area, settlement and storage tanks, particulate filtration, and environmental testing may be required prior to discharge, either into storm or sanitary, or trucked to an off-site facility.

6.5 SUBGRADE PREPARATION

For at-grade improvements, after site clearing and demolition is complete, and prior to backfilling any excavations resulting from fill removal or demolition, the excavation subgrade and subgrade within areas to receive additional site fills, slabs-on-grade and/or pavements should be scarified to a depth of 6 inches, moisture conditioned, and compacted in accordance with the "Compaction" section below.

The proposed below-grade level should be cut neat to grade and be undisturbed with no rubber tired equipment being used within three feet of the bottom of the excavation. If sandy and wet soils are encountered at the subgrade elevation, we recommend that consideration be given to pouring a two to three inch thick rat slab or the use of a section of clean crushed rock to protect the subgrade. Please refer to the "Subgrade Stabilization Measures" section for additional recommendations if the subgrade is not stable.

6.6 SUBGRADE STABILIZATION MEASURES

Soil subgrade and fill materials, especially soils with high fines contents such as clays and silty soils, can become unstable due to high moisture content, whether from high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

There are several methods to address potential unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below. Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the particular site conditions.

6.6.1 Scarification and Drying

The subgrade may be scarified to a depth of 12 to 18 inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

6.6.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation, whether a geosynthethic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

6.6.3 Chemical Treatment

Where the unstable area exceeds about 5,000 to 10,000 square feet and/or site winterization is desired, chemical treatment with quicklime (CaO), kiln-dust, or cement may be more cost-effective than removal and replacement. Recommended chemical treatment depths will typically range from 12 to 18 inches depending on the magnitude of the instability.

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6.6.4 Below-Grade Excavation Stabilization

As the planned basement excavation will extend below the expected ground water level, we recommend that the contractor plan to excavate an additional 12 to 18 inches below subgrade, place a layer of stabilization fabric (Mirafi 500X, or equivalent) at the bottom, and backfill with clean, crushed rock. The crushed rock should be consolidated in place with light vibratory equipment. Rubber-tire equipment should not be allowed to operate on the exposed subgrade; the crushed rock should be stockpiled and pushed out over the stabilization fabric. Alternative measures including constructing a rat slab may also be feasible.

6.7 MATERIAL FOR FILL

6.7.1 Re-Use of On-site Soils

On-site soils with an organic content less than 3 percent by weight may be reused as general fill. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Minor amounts of oversize material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

6.7.2 Re-Use of On-Site Site Improvements

We anticipate that significant quantities of asphalt concrete (AC) grindings and aggregate base (AB) and Portland Cement Concrete (PCC) will be generated during site demolition. If the AC grindings are mixed with the underlying AB to meet Class 2 AB specifications, they may be reused within the new pavement and flatwork structural sections. AC/AB grindings may not be reused within the habitable building areas including the below grade parking level. Laboratory testing will be required to confirm the grindings meet project specifications.

If the site area allows for on-site pulverization of PCC and provided the PCC is pulverized to meet the "Material for Fill" requirements of this report, it may be used as select fill within the habitable building areas, excluding the capillary break layer; as typically pulverized PCC comes close to or meets Class 2 AB specifications, the recycled PCC may likely be used within the pavement structural sections. PCC grindings also make good winter construction access roads, similar to a cement-treated base (CTB) section.

If desired to reuse the asphalt concrete grindings as part of general site fill, the grindings should be thoroughly mixed with on-site soil resulting in a mixture or less than 40 percent grindings by weight. The resulting mixture should also meet the "Material for Fill" requirements in this report. Due to the potential for slight petroleum odors penetrating into habitable building areas, fill containing asphalt concrete should not be used within 2 feet of the bottom of the capillary break layer or select granular fill layer. At least 2 feet of clean, cohesive soil should cap fill containing asphalt concrete.

6.7.3 Potential Import Sources

Imported and non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less, and not contain recycled asphalt concrete where it will be used within the habitable building areas. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material will be derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant's review. The potential import source should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

6.8 COMPACTION REQUIREMENTS

All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the "Subgrade Stabilization Measures" section of this report. Where the soil's PI is 20 or greater, the expansive soil criteria should be used.

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Table 4: Compaction Requirements

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
General Fill (within upper 5 feet)	On-Site Expansive Soils	87 – 92	>3
	Low Expansion Soils	90	>1
General Fill (below a depth of 5 feet)	On-Site Expansive Soils	95	>3
	Low Expansion Soils	95	>1
Basement Wall Backfill	Without Surface Improvements	90	>1
Basement Wall Backfill	With Surface Improvements	95[4]	>1
Trench Backfill	On-Site Expansive Soils	87 – 92	>3
Trench Backfill	Low Expansion Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Low Expansion Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Non-Expansive Fill	Imported Non-Expansive Fill	90	Optimum
Flatwork Subgrade	On-Site Expansive Soils	87 - 92	>3
Flatwork Subgrade	Low Expansion Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
Pavement Subgrade	On-Site Expansive Soils	87 - 92	>3
Pavement Subgrade	Low Expansion Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	NA

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)
4 – Using light-weight compaction or walls should be braced

6.8.1 Construction Moisture Conditioning

Expansive soils can undergo significant volume change when dried then wetted. The contractor should keep all exposed expansive soil subgrade (and also trench excavation side walls) moist until protected by overlying improvements (or trenches are backfilled). If expansive soils are allowed to dry out significantly, re-moisture conditioning may require several days of re-wetting (flooding is not recommended), or deep scarification, moisture conditioning, and re-compaction.

6.9 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock (¾-inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer's requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the "Material for Fill" section, and are moisture conditioned and compacted in accordance with the requirements in the "Compaction" section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

6.10 SITE DRAINAGE

Ponding should not be allowed adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 2 percent towards suitable discharge facilities; landscape areas should slope at least 3 percent towards suitable discharge facilities. Roof runoff should be directed away from building areas in closed conduits, to approved infiltration facilities, or on to hardscaped surfaces that drain to suitable facilities. Retention, detention or infiltration facilities should be spaced at least 10 feet from buildings, and preferably at least 5 feet from slabs-on-grade or pavements. However, if retention, detention or infiltration facilities are located within these zones, we recommend that these treatment facilities meet the requirements in the Storm Water Treatment Design Considerations section of this report.

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6.11 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS

The Municipal Regional Permit (MRP) requires regulated projects to treat 100 percent of the amount of runoff identified in Provision C.3.d from a regulated project's drainage area with low impact development (LID) treatment measures onsite or at a joint stormwater treatment facility. LID treatment measures are defined as rainwater harvesting and use, infiltration, evapotranspiration, or biotreatment. A biotreatment system may only be used if it is infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site.

Technical infeasibility of infiltration may result from site conditions that restrict the operability of infiltration measures and devices. Various factors affecting the feasibility of infiltration treatment may create an environmental risk, structural stability risk, or physically restrict infiltration. The presence of any of these limiting factors may render infiltration technically infeasible for a proposed project. To aid in determining if infiltration may be feasible at the site, we provide the following site information regarding factors that may aid in determining the feasibility of infiltration facilities at the site.

- The near-surface soils at the site are clayey, categorized as Hydrologic Soil Group D, and are expected to have infiltration rates of less than 0.2 inches per hour. In our opinion, these clayey soils will significantly limit the infiltration of stormwater.
- Ground water was encountered in Borings EB-1 to EB-5 and pore water pressure measurement were taken in CPT-3 and CPT-6 at depths ranging from 6 to 14 feet below current grades. Historic high ground water is mapped at the site at about 4 feet below grade (California Geologic Survey, Mountain View 7.5-Minute Quadrangle, 2006).

6.11.1 Storm Water Treatment Design Considerations

If storm water treatment improvements, such as shallow bio-retention swales, basins or pervious pavements, are required as part of the site improvements to satisfy Storm Water Quality (C.3) requirements, we recommend the following items be considered for design and construction.

6.11.1.1 General Bioswale Design Guidelines

- If possible, avoid placing bioswales or basins within 10 feet of the building perimeter or within 5 feet of exterior flatwork or pavements. If bioswales must be constructed within these setbacks, the side(s) and bottom of the trench excavation should be lined with 10-mil visqueen to reduce water infiltration into the surrounding expansive clay.

- Bioswales constructed within 3 feet of proposed buildings may be within the foundation zone of influence for perimeter wall loads. Therefore, where bioswales will parallel foundations and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the foundation, the foundation will need to be deepened so that the bottom edge of the bioswale filter material is above the foundation plane of influence.

- The bottom of bioswale or detention areas should include a perforated drain placed at a low point, such as a shallow trench or sloped bottom, to reduce water infiltration into the surrounding soils near structural improvements, and to address the low infiltration capacity of the on-site clay soils.

6.11.1.2 Bioswale Infiltration Material

- Gradation specifications for bioswale filter material, if required, should be specified on the grading and improvement plans.
- Compaction requirements for bioswale filter material in non-landscaped areas or in pervious pavement areas, if any, should be indicated on the plans and specifications to satisfy the anticipated use of the infiltration area.
- If required, infiltration (percolation) testing should be performed on representative samples of potential bioswale materials prior to construction to check for general conformance with the specified infiltration rates.
- It should be noted that multiple laboratory tests may be required to evaluate the properties of the bioswale materials, including percolation, landscape suitability and possibly environmental analytical testing depending on the source of the material. We recommend that the landscape architect provide input on the required landscape suitability tests if bioswales are to be planted.
- If bioswales are to be vegetated, the landscape architect should select planting materials that do not reduce or inhibit the water infiltration rate, such as covering the bioswale with grass sod containing a clayey soil base.
- If required by governing agencies, field infiltration testing should be specified on the grading and improvement plans. The appropriate infiltration test method, duration and frequency of testing should be specified in accordance with local requirements.
- Due to the relatively loose consistency and/or high organic content of many bioswale filter materials, long-term settlement of the bioswale medium should be anticipated. To reduce initial volume loss, bioswale filter material should be wetted in 12 inch lifts during placement to pre-consolidate the material. Mechanical compaction should not be allowed, unless specified on the grading and improvement plans, since this could significantly decrease the infiltration rate of the bioswale materials.
- It should be noted that the volume of bioswale filter material may decrease over time depending on the organic content of the material. Additional filter material may need to be added to bioswales after the initial exposure to winter rains and periodically over the life of the bioswale areas, as needed.

6.11.1.3 Bioswale Construction Adjacent to Pavements

If bio-infiltration swales or basins are considered adjacent to proposed parking lots or exterior flatwork, we recommend that mitigative measures be considered in the design and construction of these facilities to reduce potential impacts to flatwork or pavements. Exterior flatwork, concrete curbs, and pavements located directly adjacent to bio-swales may be susceptible to settlement or lateral movement, depending on the configuration of the bioswale and the setback between the improvements and edge of the swale. To reduce the potential for distress to these improvements due to vertical or lateral movement, the following options should be considered by the project civil engineer:

- Improvements should be setback from the vertical edge of a bioswale such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth, or
- Concrete curbs for pavements, or lateral restraint for exterior flatwork, located directly adjacent to a vertical bioswale cut should be designed to resist lateral earth pressures in accordance with the recommendations in the "Retaining Walls" section of this report, or concrete curbs or edge restraint should be adequately keyed into the native soil or engineered to reduce the potential for rotation or lateral movement of the curbs.

6.12 LANDSCAPE CONSIDERATIONS

Since the near-surface soils are moderately to highly expansive, we recommend greatly reducing the amount of surface water infiltrating these soils near exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation,
- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes,
- Regulating the amount of water distributed to lawns or planter areas by using irrigation timers, and
- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 7: FOUNDATIONS

7.1 SUMMARY OF RECOMMENDATIONS

In our opinion, the proposed 5-level garage (with one-level, below grade basement) and the three 8-story office buildings (with a partial, below grade basement) could be supported on

conventional reinforced mat foundations. The mats should be designed for hydrostatic pressure and include waterproofing. As noted above, our understanding and recommendations are based on the limited project information and design assumptions to date. We recommend we be retained to confirm our recommendations provided in this report once the project plans are finalized and foundation loads are available. If it is not feasible to support the split foundation level on a mat foundation, a deep foundation system or ground improvement may need to be considered for the towers.

7.2 SEISMIC DESIGN CRITERIA

We understand that the project structural design will be based on the 2013 California Building Code (CBC), which provides criteria for the seismic design of buildings in Chapter 16. The "Seismic Coefficients" used to design buildings are established based on a series of tables and figures addressing different site factors, including the soil profile in the upper 100 feet below grade and mapped spectral acceleration parameters based on distance to the controlling seismic source/fault system. Based on our borings and review of local geology, the site is underlain by deep alluvial soils with typical SPT "N" values between 15 and 50 blows per foot. Therefore, we have classified the site as Soil Classification D. The mapped spectral acceleration parameters S_S and S_1 were calculated using the USGS computer program *U.S. Seismic Design Maps*, revision date January 24, 2014, based on the site coordinates presented below and the site classification. The table below lists the various factors used to determine the seismic coefficients and other parameters.

Table 5: 2013 CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	D
Site Latitude	37.41376°
Site Longitude	-122.07920°
0.2-second Period Mapped Spectral Acceleration[1], S_S	1.500g
1-second Period Mapped Spectral Acceleration[1], S_1	0.600g
Short-Period Site Coefficient – Fa	1.0
Long-Period Site Coefficient – Fv	1.5
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	1.500g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	0.900g
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.000g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	0.600g

[1]For Site Class B, 5 percent damped.

7.3 REINFORCED CONCRETE MAT FOUNDATION

7.3.1 Mat Allowable Bearing Pressure

The proposed 5-level garage over a full basement and the three 8-story office buildings over a partial basement can be supported on reinforced mat foundations. As noted above, the partial basement level is only located under a portion of the 8-story buildings. Depending on the final project plan, some additional differential movement should be expected between the at-grade portions of the buildings and the portions located over the partial basement.

Structural loads are not yet known, therefore we have assumed areal loading for our analysis based on our understanding of the structures. For our analysis, based on the number of levels and type of construction, we have estimated an average areal pressure of about 900 pounds per square foot (psf) for the garage and 1,100 psf for the office buildings. For design, we recommend maximum allowable localized bearing pressures are limited to 1,500 psf at walls and column locations. This reduced allowable bearing pressure is intended to minimize potential differential movement between the below portion of the buildings to the at-grade portions. When evaluating wind and seismic conditions, allowable bearing pressures may be increased by one-third. These pressures are net values; the weight of the mat may be neglected.

The mat should be reinforced with top and bottom steel, as appropriate, to provide structural continuity and to help span local irregularities. These recommendations may be revised depending on the particular design method selected by the structural engineer. It is essential that we observe the mat foundation pad prior to placement of reinforcing steel.

7.3.2 Mat Foundation Settlement

For the foundation constructed at the basement level, we assumed finished floor is at 12 feet below the ground surface and bottom of mat 15 feet below the ground surface. Based on the assumed areal pressures, we estimate the total settlement for the basement level mat foundation due to static loading will be on the order of 1½ inches across the mat and the total post-construction differential movement should be about ¾ inch from the mat center to its edges from static loading. The at-grade building, Building 2, is estimated to have an additional ½ to ¾ inch for a total of 1½ inch of differential settlement. We recommend the evenly split building (between at-grade and basement level), Building 3, be evaluated further once the foundation plans and structural loads become available.

In addition, all mats should be designed to accommodate an estimated 1-inch of seismic differential movement due to liquefaction. Accounting for both liquefaction-induced and differential settlements, we recommend the mat be designed to tolerate a total differential movement of approximately 1¾ inch for the partial basement level and about 2½ inches for the at-grade Building 2. If the mat is not capable of resisting such differential movement, additional reinforcement or increased mat thickness may be required. Otherwise, a deep foundation system or ground improvement may need to be considered to support the towers.

In addition, gravity flow utilities should be designed to account for any future settlement to avoid grade reversal or leakage from joint separation.

As noted, we should be retained to review the final loading, and verify the settlement estimates above once the project plans are finalized.

7.3.3 Mat Modulus of Soil Subgrade Reaction

We recommend using a variable modulus of subgrade reaction to provide a more accurate soil response and prediction of shears and moments in the mat. This will require at least one iteration between our soil model and the structural SAFE, or similar, analysis for the mat. Preliminary modulus of subgrade reaction values for the initial analysis is provided below.

As discussed above, we estimated an average areal pressure of about 1,100 psf for the 8-story office buildings. Based on this pressure, we calculated a preliminary modulus of soil subgrade reaction for the mat foundation. For preliminary SAFE runs, we recommend that a soil modulus of 5 pci be used toward the center portion of the mat. This value can be increased to 20 pci along the outer 20 feet of the mat edges. As discussed above, this modulus of soil subgrade reaction is intended for use in the first iteration of the structural SAFE analysis for the mat design.

7.3.4 Mat Foundation Lateral Loading

Lateral loads may be resisted by friction between the bottom of mat foundation and the supporting subgrade, and also by passive pressures generated against deepened mat edges. An ultimate frictional resistance of 0.45 applied to the mat dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 450 pcf may be used in design. The structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate values above.

7.3.5 Mat Foundation Construction Considerations

The excavation areas should be cut neat to grade and be undisturbed with no rubber-tire equipment being used within three feet of the bottom of the excavations. If sandy and wet soils are encountered at the subgrade elevation, we recommend that consideration be given to pouring a two to three inch thick rat slab or a section of crushed rock to protect subgrade. Please refer to the "Subgrade Stabilization Measures" Section for additional recommendations if the subgrade is not stable.

7.4 HYDROSTATIC UPLIFT AND WATERPROOFING

Where portions of the structures extend below the design ground water level of 4 feet of the current site grade, including the bottom of the mat, they should be designed to resist potential hydrostatic uplift pressures. Retaining walls extending below design ground water should be waterproofed and designed to resist hydrostatic pressure for the full wall height below design groundwater. Where portions of the walls extend above the design ground water level, a

drainage system may be added as discussed in the "Retaining Wall" section and the walls would not need to be designed for hydrostatic pressures for the full wall height. If drainage is not provided above the design ground water level then the entire wall should be designed to resist hydrostatic pressures for the full wall height.

In addition, the portions of the structures extending below design ground water should be waterproofed to limit moisture infiltration, including mat foundation/thickened slab areas, all construction joints, and any retaining walls. We recommend that a waterproof specialist design the waterproofing system.

SECTION 8: PEDESTRIAN PAVEMENTS

8.1 EXTERIOR FLATWORK

Exterior concrete flatwork subject to pedestrian and/or occasional light pick up loading should be at least 4 inches thick and supported on at least 12 inches of non-expansive fill with the upper 4 inches consisting of Class 2 aggregate base overlying subgrade prepared in accordance with the "Earthwork" recommendations of this report. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the "Vehicular Pavements" section below. To help reduce the potential for uncontrolled shrinkage cracking, adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Flatwork should be isolated from adjacent foundations or retaining walls except where limited sections of structural slabs are included to help span irregularities in retaining wall backfill at the transitions between at-grade and on-structure flatwork.

SECTION 9: VEHICULAR PAVEMENTS

9.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on the clayey nature of the surficial soils and engineering judgment considering the variable surface conditions.

Table 6: Asphalt Concrete Pavement Recommendations, Design R-value = 5

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base* (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	7.5	10.0
4.5	2.5	9.5	12.0
5.0	3.0	10.0	13.0
5.5	3.0	12.0	15.0
6.0	3.5	12.5	16.0
6.5	4.0	14.0	18.0

*Caltrans Class 2 aggregate base; minimum R-value of 78

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will be use the pavements.

Asphalt concrete pavements constructed on expansive subgrade where the adjacent areas will not be irrigated for several months after the pavements are constructed may experience longitudinal cracking parallel to the pavement edge. These cracks typically form within a few feet of the pavement edge and are due to seasonal wetting and drying of the adjacent soil. The cracking may also occur during construction where the adjacent grade is allowed to significantly dry during the summer, pulling moisture out of the pavement subgrade. Any cracks that form should be sealed with bituminous sealant prior to the start of winter rains. One alternative to reduce the potential for this type of cracking is to install a moisture barrier at least 24 inches deep behind the pavement curb.

9.2 PORTLAND CEMENT CONCRETE

The exterior Portland Cement Concrete (PCC) pavement recommendations tabulated below are based on methods presented in the Portland Cement Association (PCA) design manual (PCA, 1984). Recommendations for garage slabs-on-grade were provided in the "Concrete Slabs and Pedestrian Pavements" section above. We have provided a few pavement alternatives as an anticipated Average Daily Truck Traffic (ADTT) was not provided. An allowable ADTT should be chosen that is greater than what is expected for the development.

Table 6: PCC Pavement Recommendations, Design R-value = 5

Allowable ADTT	Minimum PCC Thickness (inches)
0.8	5.0
13	5.5
130	6.0

The PCC thicknesses above are based on a concrete compressive strength of at least 3,500 psi, supporting the PCC on at least 6 inches of Class 2 aggregate base compacted as recommended in the "Earthwork" section, and laterally restraining the PCC with curbs or concrete shoulders. Adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness.

9.3 PAVEMENT CUTOFF

Surface water penetration into the pavement section can significantly reduce the pavement life, due to the native expansive clays. While quantifying the life reduction is difficult, a normal 20-year pavement design could be reduced to less than 10 years; therefore, increased long-term maintenance may be required.

It would be beneficial to include a pavement cut-off, such as deepened curbs, redwood-headers, or "Deep-Root Moisture Barriers" that are keyed at least 4 inches into the pavement subgrade. This will help limit the additional long-term maintenance.

SECTION 10: RETAINING WALLS

10.1 STATIC LATERAL EARTH PRESSURES

The structural design of any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall including building loads. Based on the current site plan, Building 3 will be at-grade and within close proximity of the basement level wall. We recommend the wall be designed to account for the additional building load surcharge: Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls with level backfill be designed for the following pressures:

Table 7: Recommended Lateral Earth Pressures

Wall Condition	Lateral Earth Pressure*	Additional Surcharge Loads
Unrestrained – Cantilever Wall	45 pcf	⅓ of vertical loads at top of wall
Restrained – Braced Wall	45 pcf + 8H** psf	½ of vertical loads at top of wall

* Lateral earth pressures are based on an equivalent fluid pressure for level backfill conditions
** H is the distance in feet between the bottom of footing and top of retained soil

Basement walls should be designed as restrained walls. If adequate drainage cannot be provided behind the wall, an additional equivalent fluid pressure of 40 pcf should be added to the values above for both restrained and unrestrained walls for the portion of the wall that will not have drainage. Damp proofing or waterproofing of the walls may be considered where moisture penetration and/or efflorescence are not desired.

10.2 SEISMIC LATERAL EARTH PRESSURES

The 2010 CBC states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. We reviewed the seismic earth pressures for the proposed basement using procedures generally based on the Mononobe-Okabe method. Because the walls are greater than 10 to 12 feet in height, and peak ground accelerations are greater than 0.40g, we checked the result of the seismic increment when added to the recommended active earth pressure against the recommended fixed wall earth pressures. Because the wall is restrained, or will act as a restrained wall, and will be designed for 45 pcf (equivalent fluid pressure) plus a uniform earth pressure of 8H psf, based on current recommendations for seismic earth pressures (Lew et al., SEAOC 2010), it appears that active earth pressures plus a seismic increment do not exceed the fixed wall earth pressures. Therefore, an additional seismic increment above the design earth pressures is not required as long as the walls are designed for the restrained wall earth pressures recommended above.

10.3 WALL DRAINAGE

10.3.1 At-Grade Site Walls

Adequate drainage should be provided by a subdrain system behind all walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½-inch to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or approved equivalent. The upper 2 feet of wall backfill should consist of compacted on-site soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or equivalent drainage matting can be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. Horizontal strip drains connecting to the vertical drainage matting may be used in lieu of the perforated pipe and crushed rock section. The vertical drainage panel should be connected to the perforated pipe or horizontal drainage strip at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

10.3.2 Below-Grade Walls

Miradrain, AmerDrain or other equivalent drainage matting should be used for wall drainage where below-grade walls are temporarily shored and the shoring will be flush with the back of the permanent walls. The drainage panel should be connected at the base of the wall by a horizontal drainage strip and closed or through-wall system such as the TotalDrain system from AmerDrain.

Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade unless capped by hardscape. The drainage panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil. If the shoring system will be offset behind the back of permanent wall, the drainage systems discussed in the "At-Grade Site Walls" section may also be used.

10.4 BACKFILL

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

As discussed previously, consideration should be given to the transitions from on-grade to on-structure. Providing subslabs or other methods for reducing differential movement of flatwork or pavements across this transition should be included in the project design.

10.5 FOUNDATIONS

At-grade site retaining walls may be supported on continuous spread footings designed in accordance with the recommendations presented below.

Spread footings should bear on natural, undisturbed soil or engineered fill and extend at least 24 inches below the lowest adjacent grade. Footings constructed to the above dimensions and in accordance with the "Earthwork" recommendations of this report should be limited to a maximum allowable bearing pressure of 2,000 psf for dead loads, 3,000 psf for combined dead plus live loads, and 4,000 psf for all loads including wind and seismic. These pressures are based on factors of safety of 3.0, 2.0, and 1.5 applied to the ultimate bearing pressure for dead, dead plus live, and all loads, respectively. These pressures are net values; the weight of the footing may be neglected for the portion of the footing extending below grade (typically, the full footing depth). Top and bottom mats of reinforcing steel should be included in continuous footings to help span irregularities and differential settlement. Lateral loading and resistance should be in accordance with the Lateral Loading section of this report.

SECTION 11: SWIMMING POOLS

11.1 EARTH PRESSURES

The swimming pool should be designed to resist at-rest earth pressures due to adjacent native or engineered backfill materials, hydrostatic pressures, as well as surcharge loads. Pool walls should be designed to resist an equivalent fluid pressure of 85 pcf (at-rest plus hydrostatic pressures) in addition to one-half of any surcharge load applied at the surface. We anticipate that pools less than 5 feet deep will be able to be constructed with vertical cut slopes. Deeper excavations should be temporarily sloped or shored, as required.

11.2 SWIMMING POOL DECKS

Concrete flatwork and/or pavers around swimming pools should be at least 4 inches thick and supported on 18 inches of non-expansive fill overlying subgrade prepared in accordance with the "Earthwork" recommendations of this report. The upper 4 inches of the non-expansive fill should consist of Class 2 aggregate base. In addition, we recommend a subdrain system be installed approximately 24 inches deep along the perimeter of the pool deck where located adjacent to irrigated landscaping areas.

Proper surface drainage should be provided to divert surface water to closed pipe storm drainage facilities. Flexible bituminous caulking or equivalent should be applied between the pool and deck and deck expansion joints to reduce surface water penetration into the native expansive soils.

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11.3 POOL SUB-DRAINAGE

The pool should have pressure relief valves incorporated into the pool bottom to relieve pressure buildup and potential heave during pool draining for maintenance. Consideration should be given to placing at least 4 inches of Caltrans Class 2 Permeable Material below the pool bottom to allow for pressure relief across the pool. Alternatively, ¾-inch clean, crushed rock may be placed provided a layer of filter fabric is placed beneath the crushed rock.

SECTION 12: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Kenneth Rodrigues & Partners specifically to support the design of the 1400 North Shoreline Boulevard Campus project in Mountain View, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and ground water conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

Kenneth Rodrigues & Partners may have provided Cornerstone with plans, reports and other documents prepared by others. Kenneth Rodrigues & Partners understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.
Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone's control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 13: REFERENCES

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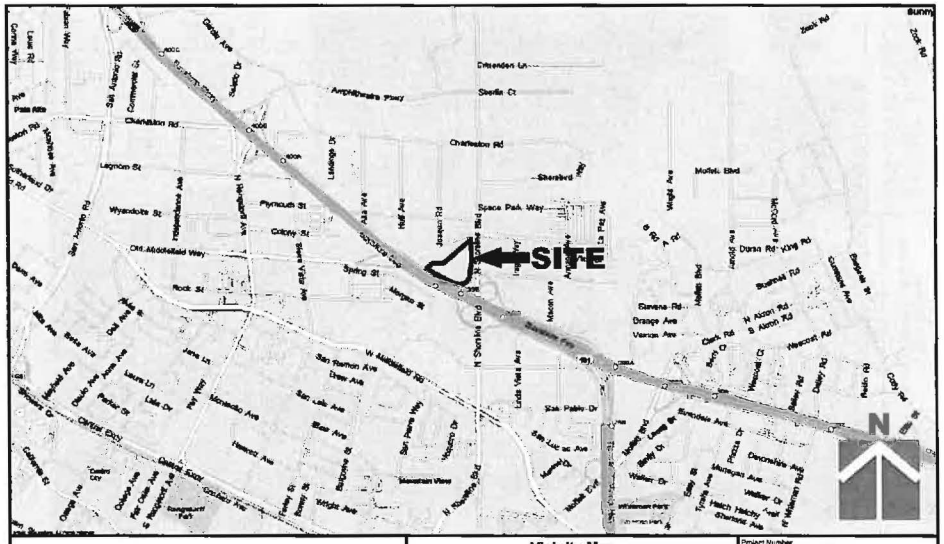
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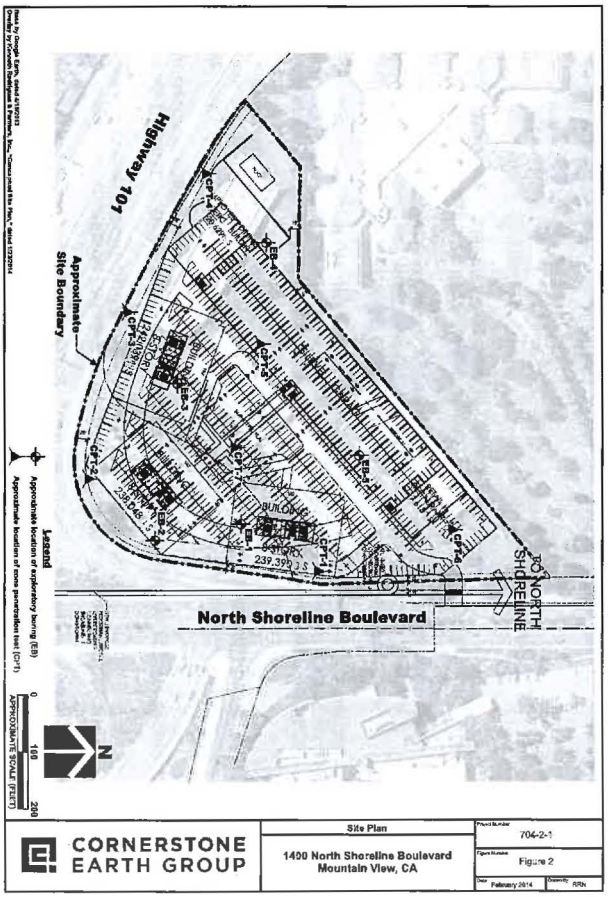
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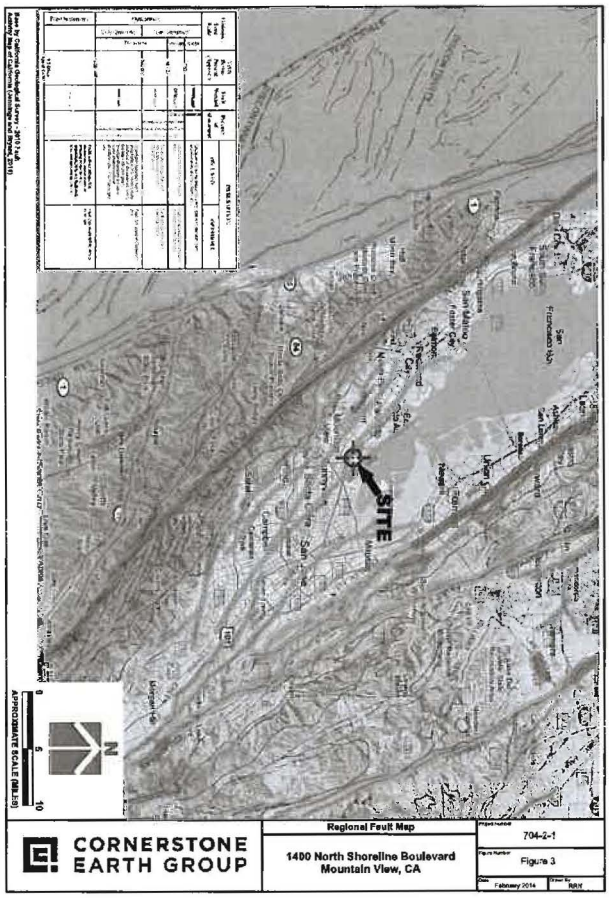
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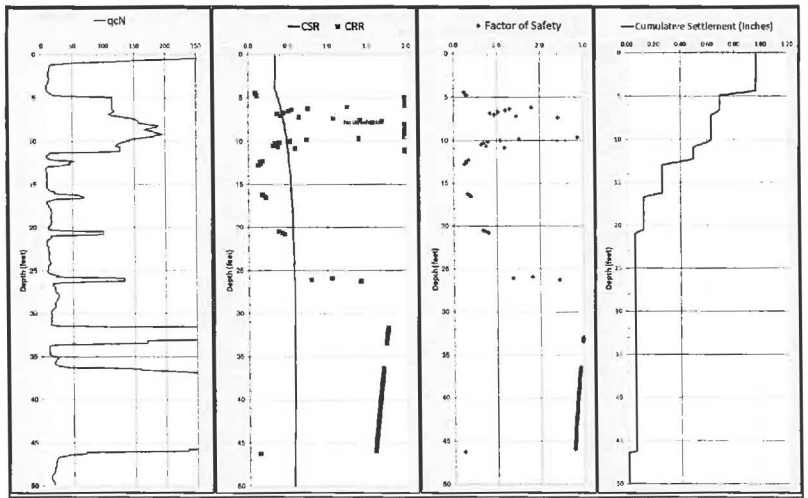
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Highway 101
Approximate Site Boundary
North Shoreline Boulevard
NORTH SHORELINE
Legend
Approximate location of exploratory boring (EB)
Approximate location of cone penetration test (CPT)
APPROXIMATE SCALE (FEET)
0
100
200
N
CORNERSTONE EARTH GROUP
Site Plan
1400 North Shoreline Boulevard
Mountain View, CA
Project Number
704-2-1
Figure Number
Figure 2
Date
February 2014
Drawn By
RRN


SITE
APPROXIMATE SCALE (MILES)
0
5
10
N
CORNERSTONE EARTH GROUP
Regional Fault Map
1400 North Shoreline Boulevard
Mountain View, CA
Project Number
704-2-1
Figure Number
Figure 3
Date
February 2014
Drawn By
RRN



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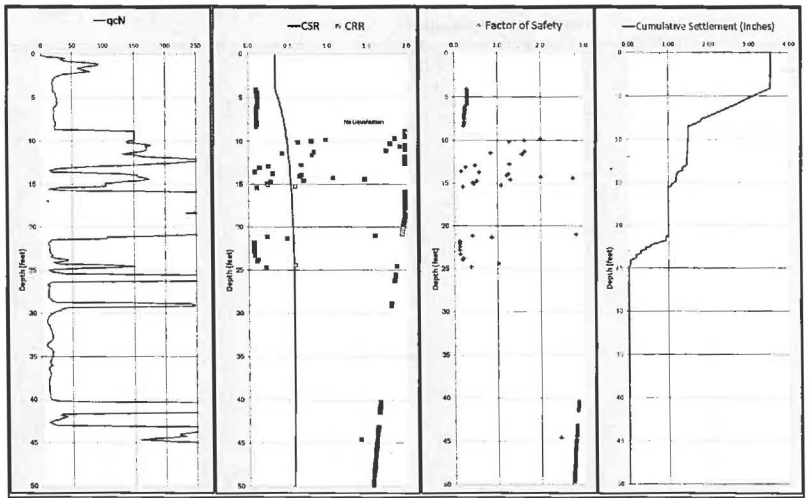
Liquefaction Analysis Summary

1400 N. Shoreline
Mountain View, California

Project Number: 704-2-1

Figure Number: Figure 4A

3/27/2014 | CPT No. 1



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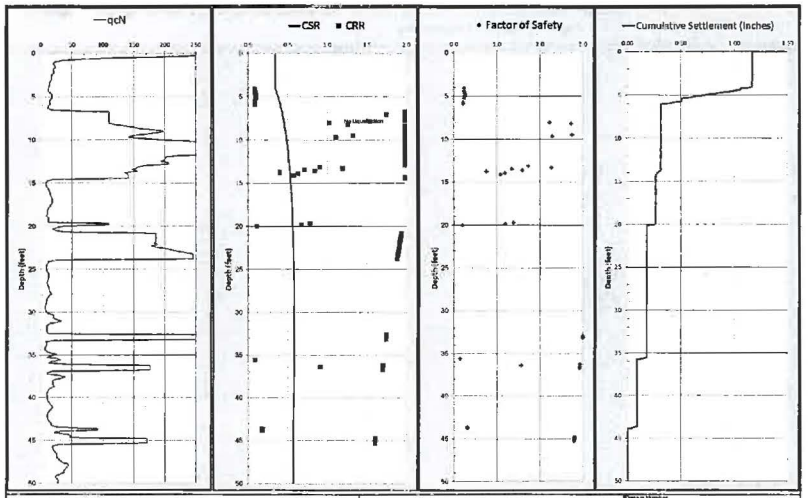
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Mountain View, California

Project Number: 704-2-1

Figure Number: Figure 4B

3/27/2014 | CPT No. 2



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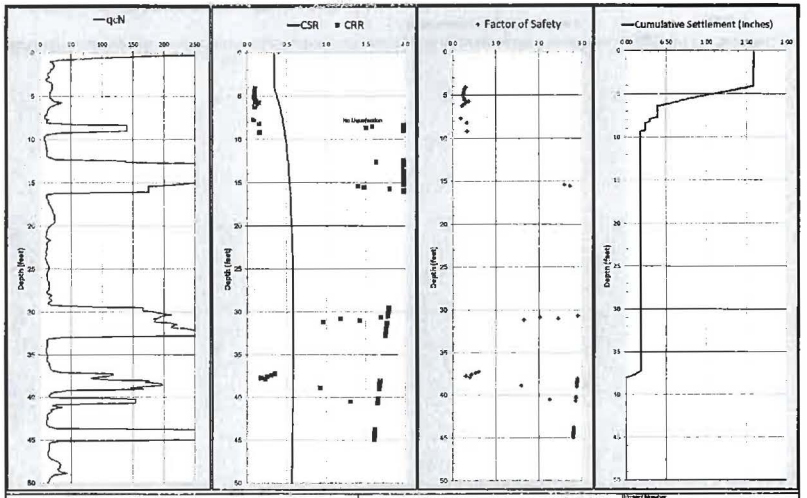
Liquefaction Analysis Summary

1400 N. Shoreline
Mountain View, California

Project Number 704-2-1

Figure Number Figure 4C

3/27/2014 | CPT No. 3



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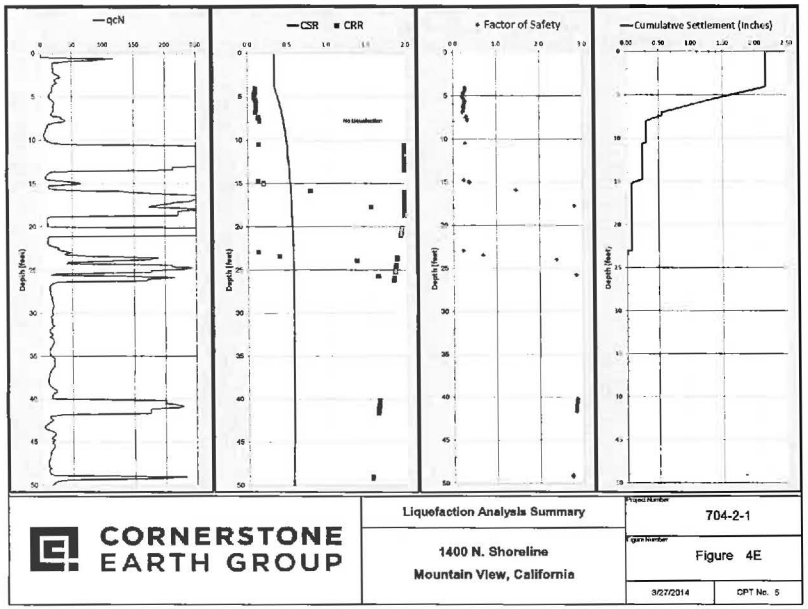
Liquefaction Analysis Summary

1400 N. Shoreline
Mountain View, California

Project Number 704-2-1

Figure Number Figure 4D

3/27/2014 | CPT No. 4



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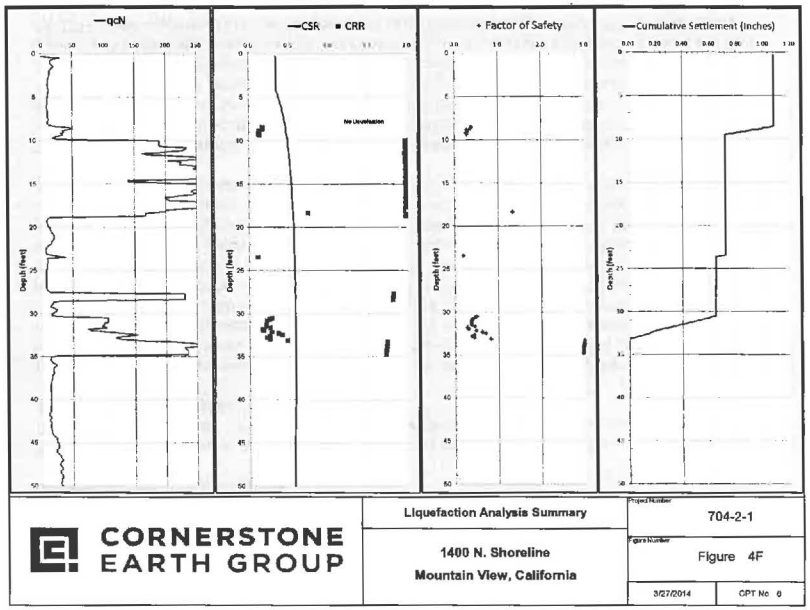
Liquefaction Analysis Summary

1400 N. Shoreline
Mountain View, California

Project Number 704-2-1

Figure Number Figure 4E

3/27/2014 | CPT No. 5



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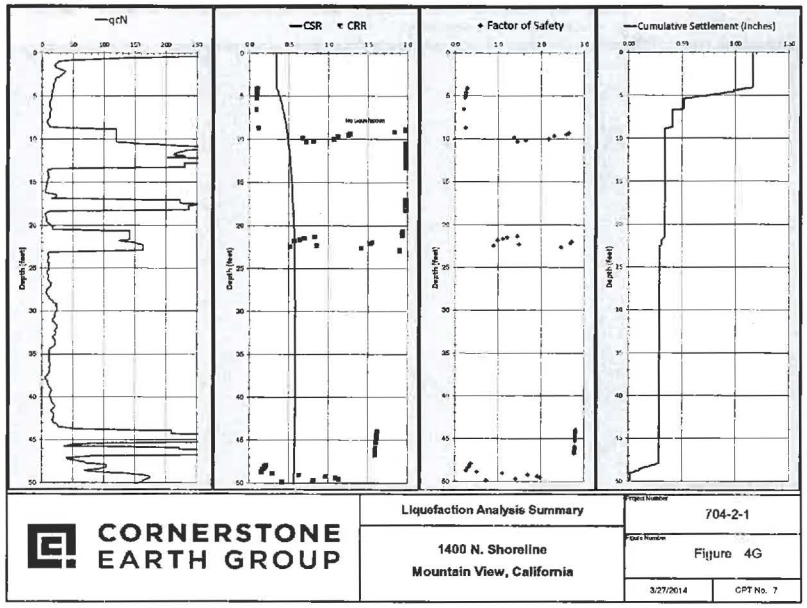
Liquefaction Analysis Summary

1400 N. Shoreline
Mountain View, California

Project Number 704-2-1

Figure Number Figure 4F

3/27/2014 | CPT No. 6



APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck-mounted, hollow-stem auger drilling equipment and 20-ton truck-mounted Cone Penetration Test equipment. Five 8-inch-diameter exploratory borings were drilled on February 8 and 9, 2014 to depths of 49½ to 60 feet. Seven CPT soundings were also performed in accordance with ASTM D 5778-95 (revised, 2002) on February 14, 2014, to depths ranging from 50 to 115 feet. The approximate locations of exploratory borings and CPTs are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil, are included as part of this appendix.

Boring and CPT locations were approximated using existing site boundaries and other site features as references. The locations of the borings and CPTs should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Relatively undisturbed samples were also obtained with 2.875-inch I.D. Shelby Tube sampler which were hydraulically pushed. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

The CPT involved advancing an instrumented cone-tipped probe into the ground while simultaneously recording the resistance at the cone tip (q_c) and along the friction sleeve (f_s) at approximately 5-centimeter intervals. Based on the tip resistance and tip to sleeve ratio (R_f), the CPT classified the soil behavior type and estimated engineering properties of the soil, such as equivalent Standard Penetration Test (SPT) blow count, internal friction angle within sand layers, and undrained shear strength in silts and clays. A pressure transducer behind the tip of the CPT cone measured pore water pressure (u_2). Graphical logs of the CPT data is included as part of this appendix.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring and CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring and CPT locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition,

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any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-10)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI<4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

OTHER MATERIAL SYMBOLS

- Poorly-Graded Sand with Clay
- Clayey Sand
- Sandy Silt
- Artificial/Undocumented Fill
- Poorly-Graded Gravelly Sand
- Topsoil
- Well-Graded Gravel with Clay
- Well-Graded Gravel with Silt
- Sand
- Silt
- Well Graded Gravelly Sand
- Gravelly Silt
- Asphalt
- Boulders and Cobble

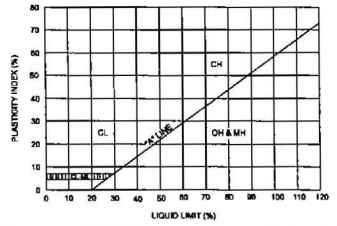
SAMPLER TYPES

- SPT
- Modified California (2.5" I.D.)
- Rock Core
- Shelby Tube
- No Recovery
- Grab Sample

ADDITIONAL TESTS

CA	=	CHEMICAL ANALYSIS (CORROSIVITY)	PI	=	PLASTICITY INDEX
CD	=	CONSOLIDATED DRAINED TRIAXIAL	SW	=	SWELL TEST
CN	=	CONSOLIDATION	TC	=	CYCLIC TRIAXIAL
CU	=	CONSOLIDATED UNDRAINED TRIAXIAL	TV	=	TORVANE SHEAR
DS	=	DIRECT SHEAR	UC	=	UNCONFINED COMPRESSION
PP	=	POCKET PENETROMETER (TSF)	(1.5)	=	(WITH SHEAR STRENGTH IN KSF)
(3.0)	=	(WITH SHEAR STRENGTH IN KSF)			
RV	=	R-VALUE	UU	=	UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	=	SIEVE ANALYSIS: % PASSING #200 SIEVE			
	=	WATER LEVEL			

PLASTICITY CHART



PENETRATION RESISTANCE (RECORDED AS BLOWS / FOOT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5-1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

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LEGEND TO SOIL DESCRIPTIONS

Figure Number A-1

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA

DATE STARTED 2/8/14 DATE COMPLETED 2/8/14
DRILLING CONTRACTOR Exploration Geoservices, Inc.
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
LOGGED BY RSM
NOTES

GROUND ELEVATION BORING DEPTH 50 ft.
LATITUDE LONGITUDE
GROUND WATER LEVELS:
AT TIME OF DRILLING 14 ft.
AT END OF DRILLING 14 ft.

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL)
	0		mulch							
			Silty, Clayey Sand with Gravel (SC-SM) [Fill] very dense, moist, gray and brown, fine to coarse sand, fine to coarse subangular to subrounded gravel Liquid Limit = 21, Plastic Limit = 16	50/6"	MC-1	131	3	5		
	5		**Fat Clay (CH)** hard, moist, dark gray brown, some fine sand, high plasticity	56	MC-2	80	34			>4.5 ○
	10		becomes very stiff	24	MC-3	93	30			○
			Silty Sand (SM) medium dense, moist, brown, fine to medium sand, some fine subangular to subrounded gravel	44	MC-4	115	18		19	
	15		**Poorly Graded Sand with Silt (SP-SM)** dense, wet, gray, fine to coarse sand	42	SPT-5		16			
			Clayey Sand with Gravel (SC) dense, moist, gray and brown, fine to coarse sand, fine to coarse subangular to subrounded gravel							
	20		**Poorly Graded Sand with Clay (SP-SC)** loose, wet, gray, fine to coarse sand	8	NR					
			Poorly Graded Sand with Clay (SP-SC) very dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel	58	SPT-6				6	
	25			62	SPT					

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BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL)
			Poorly Graded Sand with Clay (SP-SC) very dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel							
	30		**Silty, Clayey Sand (SC-SM)** medium dense, moist, brown, fine to coarse sand Liquid Limit = 26, Plastic Limit = 19	20	SPT-8		14	7	18	
			Clayey Sand (SC) very dense, moist, gray and brown, fine to coarse sand, some fine subangular to subrounded gravel	50/6"	SPT					
	35		**Poorly Graded Sand with Silt (SP-SM)** medium dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel							
			Lean Clay (CL) very stiff, moist, brown, some fine sand, moderate plasticity	38	SPT-10		23			○
	40		**Clayey Sand (SC)** medium dense, moist, gray and brown, fine to medium sand, some fine subangular to subrounded gravel	46	MC-11		18		29	
	45		**Poorly Graded Sand with Silt (SP-SM)** dense, wet, gray, fine to coarse sand	41	SPT					
	50		Bottom of Boring at 50.0 feet.							
	55									

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CORNERSTONE EARTH GROUP

BORING NUMBER EB-2

PAGE 1 OF 2

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA
GROUND ELEVATION _____ **BORING DEPTH** 50 ft.
LATITUDE _____ **LONGITUDE** _____
GROUND WATER LEVELS:
AT TIME OF DRILLING 8.5 ft.
AT END OF DRILLING 8.5 ft.

DATE STARTED 2/8/14 **DATE COMPLETED** 2/8/14
DRILLING CONTRACTOR Exploration Geoservices, Inc.
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
LOGGED BY RSM
NOTES _____

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL)
	0		This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.							1.0 2.0 3.0 4.0
			mulch							
			Fat Clay (CH) very stiff, moist, dark gray brown, some fine sand, high plasticity	25	MC-1	83	36			○ 2.0
				34	MC-2B	96	25			○ 3.0
	5		**Lean Clay with Sand (CL)** very stiff, moist, gray and brown mottled, fine sand, moderate plasticity	29	MC-3A	85	24			○ 4.0
			Poorly Graded Sand with Silt (SP-SM) medium dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel	15	SPT-3				5	
	10		NP = non-plastic	9	SPT-4			NP	6	
				15	SPT-5				9	
	15		**Sandy Lean Clay (CL)** stiff, moist, gray and brown mottled, fine sand, low to moderate plasticity	42	MC-6C		12		13	○ 1.0
			Clayey Sand with Gravel (SC) medium dense, moist, gray and brown, fine to coarse sand, fine to coarse subangular to subrounded gravel							
	20		**Poorly Graded Sand with Silt (SP-SM)** very dense, wet, gray, fine to coarse sand, some fine to coarse subangular to subrounded gravel	53	SPT					
			Poorly Graded Sand with Gravel (SP) medium dense, wet, gray, fine to coarse sand, fine to coarse subangular to subrounded gravel	12	SPT-8				2	
	25		**Clayey Sand (SC)** loose, moist, brown, fine to coarse sand Liquid Limit = 27, Plastic Limit = 18	8	SPT-9		19	9	25	

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CORNERSTONE EARTH GROUP

BORING NUMBER EB-2

PAGE 2 OF 2

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL)
			This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.							1.0 2.0 3.0 4.0
			Sandy Lean Clay (CL) very stiff, moist, brown, fine to coarse sand, low plasticity							
	30		**Poorly Graded Sand (SP)** dense, wet, gray, fine to coarse sand, some fine to coarse subangular to subrounded gravel	36	SPT					
			Lean Clay with Sand (CL) stiff, moist, brown with gray mottles, fine sand, moderate plasticity							
	35			28	MC-11B	94	31			○ 2.0
			Sandy Lean Clay (CL) stiff, moist, brown with gray mottles, fine sand, low plasticity							
	40		**Clayey Sand with Gravel (SC)** dense, moist, gray and brown, fine to coarse sand, fine to coarse subangular to subrounded gravel	34	12A MC 12B	123	17 12		18	○ 2.0
			Poorly Graded Sand with Silt (SP-SM) very dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel	50 6"	SPT					
	45									
			Clayey Sand (SC) very dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel	50 6"	SPT					
	50		Bottom of Boring at 50.0 feet.							
	55									

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BORING NUMBER EB-3

CORNERSTONE EARTH GROUP

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA

DATE STARTED 2/9/14 DATE COMPLETED 2/9/14
DRILLING CONTRACTOR Exploration Geoservices, Inc.
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
LOGGED BY RSM
NOTES

GROUND ELEVATION ____ BORING DEPTH 49.4 ft.
LATITUDE ____ LONGITUDE ____
GROUND WATER LEVELS:
AT TIME OF DRILLING 6.5 ft.
AT END OF DRILLING 6.5 ft.

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
	0		4 inches asphalt concrete over 3 inches aggregate base						
			Lean Clay with Sand (CL) very stiff, moist, gray and brown mottled, fine sand, moderate plasticity	27	MC-1B	107	19		
	5		**Poorly Graded Sand Silt and Gravel (SP-SM)** medium dense, wet, gray, fine to coarse sand, fine subangular to subrounded gravel	25	SPT-2		14		
			Silty Sand (SM) loose, wet, gray and brown, fine sand						
	10		**Sandy Lean Clay (CL)** soft, moist, gray and brown mottled, fine sand, low plasticity	4	3A SPT 3B		34 23		
			Silty Sand (SM) loose, wet, gray and brown, fine sand						
			Lean Clay with Sand (CL) stiff, moist, gray, fine to coarse sand, low to moderate plasticity	24	MC-4A	97	25		
	15		**Clayey Sand (SC)** medium dense, moist, gray, fine to coarse sand, some fine subangular to subrounded gravel	25	MC-5B	132	11		
			Lean Clay with Sand (CL) very stiff, moist, gray, fine sand, moderate plasticity	15	SPT-5		23		
	20		**Clayey Sand (SC)** medium dense, moist, gray, fine to coarse sand Liquid Limit = 29, Plastic Limit = 17	27	SPT-7		17	12	19
	25		**Lean Clay with Sand (CL)** very stiff, moist, brown, fine sand, moderate plasticity	15	MC-8B	95	30		

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UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

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BORING NUMBER EB-3

CORNERSTONE EARTH GROUP

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
			Sandy Lean Clay (CL) medium stiff, moist, brown with gray mottles, fine to medium sand, low plasticity		SPT-9	98	27		
	30			30	MC-10B	97	24		
			Poorly Graded Sand with Silt (SP-SM) very dense, wet, gray, fine to coarse sand	60	SPT				
	35								
			Lean Clay with Sand (CL) stiff, moist, gray and brown mottled, fine sand, low plasticity	17	SPT-12A		24		69
	40								
			Poorly Graded Sand with Silt (SP-SM) very dense, wet, gray and brown, fine to coarse sand	90	SPT				
	45								
			Lean Clay with Sand (CL) very stiff, moist, gray, fine sand, moderate plasticity	50/5"	SPT				
	50		Bottom of Boring at 49.4 feet.						
	55								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

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BORING NUMBER EB-4

CORNERSTONE EARTH GROUP

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA
GROUND ELEVATION _____ BORING DEPTH 50 ft.
LATITUDE _____ LONGITUDE _____
GROUND WATER LEVELS:
AT TIME OF DRILLING 7 ft.
AT END OF DRILLING 7 ft.

DATE STARTED 2/9/14 DATE COMPLETED 2/9/14
DRILLING CONTRACTOR Exploration Geoservices, Inc.
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
LOGGED BY RSM
NOTES _____

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
	0		2 inches asphalt concrete over 6 inches aggregate base							
			Fat Clay (CH) very stiff, moist, dark gray brown, some fine sand, high plasticity	40	MC-1	80	36			○ 3.0
	5		**Lean Clay with Sand (CL)** very stiff, moist, light gray with brown mottles, fine sand, moderate plasticity	47	MC-2B	98	25			○ 3.0
				22	MC-3B	95	29			○ 2.0
	10		**Poorly Graded Sand (SP)** dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel	47	SPT					
				35	SPT-5				3	
	15		becomes very dense	68	SPT					
			Lean Clay with Sand (CL) medium stiff, moist, gray, fine sand, moderate plasticity	9	SPT					○ 1.0
	20		**Poorly Graded Sand with Clay (SP-SC)** medium dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel		ST-8				10	
			Lean Clay with Sand (CL) stiff to medium stiff, moist, gray, fine sand, moderate plasticity	17	MC					○ 1.5
	25			19	MC-10B	95	30			▲ 1.0 ○ 1.5

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CORNERSTONE EARTH GROUP

BORING NUMBER EB-4

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
	30		**Poorly Graded Sand with Silt (SP-SM)** dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel	82	SPT					
	35		**Sandy Lean Clay (CL)** stiff, moist, gray, fine to medium sand, low to moderate plasticity	28	SPT-12		25		66	○ 2.0
				26	MC-13B	103	24			▲ 1.0 ○ 1.5
	40									
	45			21	MC-14B	96	26			○ 1.5
	50		Bottom of Boring at 50.0 feet.	30	MC-15B	106	23			▲ 1.0 ○ 1.5
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 2/27/14 12:54 - P:\DRAFTING\GINT FILES\704-2-1 1400 N SHORELINE.GPJ

BORING NUMBER EB-5

CORNERSTONE EARTH GROUP

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA

DATE STARTED 2/8/14 DATE COMPLETED 2/8/14
DRILLING CONTRACTOR Exploration Geoservices, Inc.
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
LOGGED BY RSM
NOTES

GROUND ELEVATION ____ BORING DEPTH 60 ft.
LATITUDE ____ LONGITUDE ____
GROUND WATER LEVELS:
AT TIME OF DRILLING 7.5 ft.
AT END OF DRILLING 7.5 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
	0		2½ inches asphalt concrete over 4½ inches aggregate base							
			Fat Clay (CH) very stiff, moist, dark gray brown, some fine sand, high plasticity	34	MC-1		33			○
	5		**Lean Clay with Sand (CL)** very stiff, moist, ligt gray and brown mottled, fine sand, moderate plasticity	18	MC-2A	88	32			○
			Poorly Graded Sand with Silt (SP-SM) medium dense, wet, gray and brown, fine to coarse sand, some fine subangular to subrounded gravel	46	MC					
	10		NP = non-plastic	18	SPT-4		12	NP	5	
			Sandy Lean Clay (CL) medium stiff, moist, gray, fine to medium sand, trace fine gravel, low to moderate plasticity	9	MC-5A	102	18			○
	15				ST-6	99	26			●
				8	SPT-7		24			○
	20		**Clayey Sand with Gravel (SC)** dense, moist, gray, fine to coarse sand, fine subangular gravel	34	SPT-8A		18		21	
			Poorly Graded Gravel with Silt and Sand (GP-GM) very dense, wet, gray, fine to coarse subangular to subrounded gravel, fine to coarse sand	73	SPT					
	25									

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0612.GDT - 2/27/14 12:54 - P:\DRAFTING\SINT FILES\704-2-1 1400 N SHORELINE.GPJ

CORNERSTONE EARTH GROUP

BORING NUMBER EB-5

PROJECT NAME 1400 North Shoreline Boulevard Campus
PROJECT NUMBER 704-2-1
PROJECT LOCATION Mountain View, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at the location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
	30		**Poorly Graded Gravel with Silt and Sand (GP-GM)** very dense, wet, gray, fine to coarse subangular to subrounded gravel, fine to coarse sand	50 4"	SPT					
			Lean Clay with Sand (CL) very stiff, moist, brown, fine sand, moderate plasticity	44	MC-11B	104	22			○
	35		becomes stiff	24	MC-12B	104	23			○
	40		**Poorly Graded Sand with Silt (SP-SM)** dense to very dense, wet, gray, fine to coarse sand, some fine subangular to subrounded gravel	66	MC					
				50	SPT					
	45		some sandy clay seams	67	SPT-15C		11		11	
	50		**Lean Clay with Sand (CL)** stiff, moist, olive brown, fine sand, moderate plasticity	25	SPT					○
	55									

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0612.GDT - 2/27/14 12:54 - P:\DRAFTING\SINT FILES\704-2-1 1400 N SHORELINE.GPJ

CORNERSTONE EARTH GROUP

BORING NUMBER EB-5

PROJECT NAME 1400 North Shoreline Boulevard Campus

PROJECT NUMBER 704-2-1

PROJECT LOCATION Mountain View, CA

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
			This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.							
			Lean Clay with Sand (CL) stiff, moist, olive brown, fine sand, moderate plasticity							
	60			29	MC-17A	99	26			○
			Bottom of Boring at 60.0 feet.							
	65									
	70									
	75									
	80									
	85									

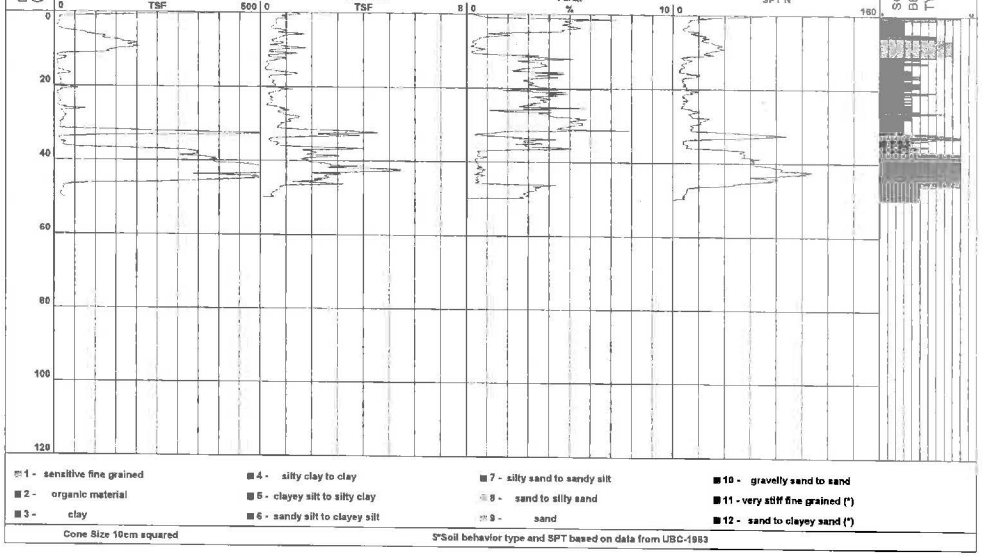
CORNERSTONE EARTH GROUP\2 - CORNERSTONE 2012.GDT - 2/27/14 12:54 - P:\DOAFTING\GINT FILES\704-2-1 1400 N SHORELINE.GPJ

Cornerstone Earth Group

Project	1400 N. Shoreline	Operator	CB	Filename	SDF(008).cpt
Job Number	P4789	Cone Number	DDG1268	GPS	
Hole Number	CPT-01	Date and Time	2/14/2014 6:19:07 PM	Maximum Depth	50.03 ft
EST GW Depth During Test	7.00 ft				

Net Area Ratio .8

CPT DATA



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

Cone Size 10cm squared

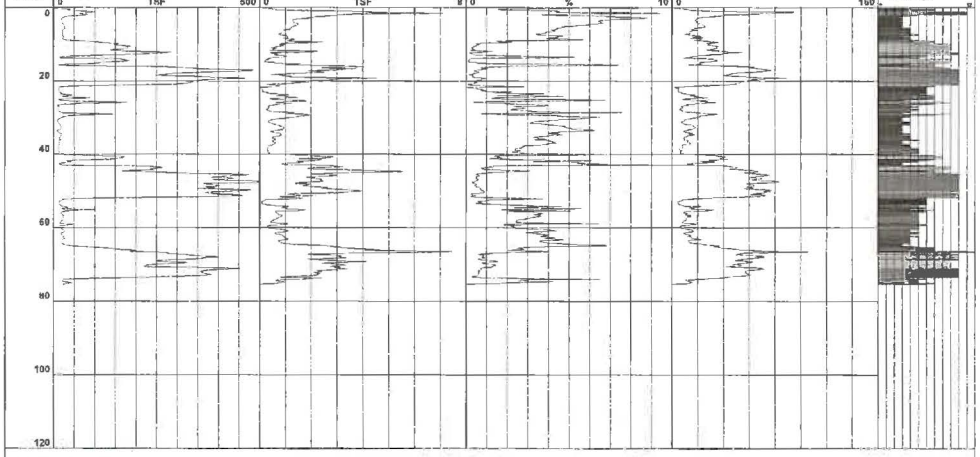
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	1400 N. Shoreline	Operator	CB	Filename	SDF(013).cpt
Job Number	P4289	Cone Number	DSG0806	GPS	
Hole Number	CPT-02	Date and Time	2/14/2014 9:56:21 PM	Maximum Depth	76.46 ft
EST GW Depth During Test		7.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 10cm squared

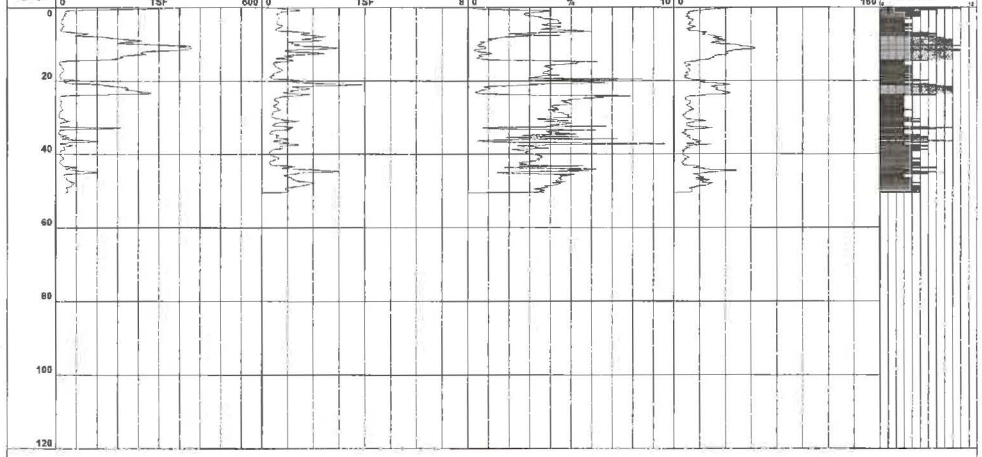
*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	1400 N. Shoreline	Operator	CB	Filename	SDF(005).cpt
Job Number	P4289	Cone Number	DDG1266	GPS	
Hole Number	CPT-03	Date and Time	2/14/2014 6:55:41 PM	Maximum Depth	60.89 ft
EST GW Depth During Test		7.00 ft			

Net Area Ratio .8

CPT DATA



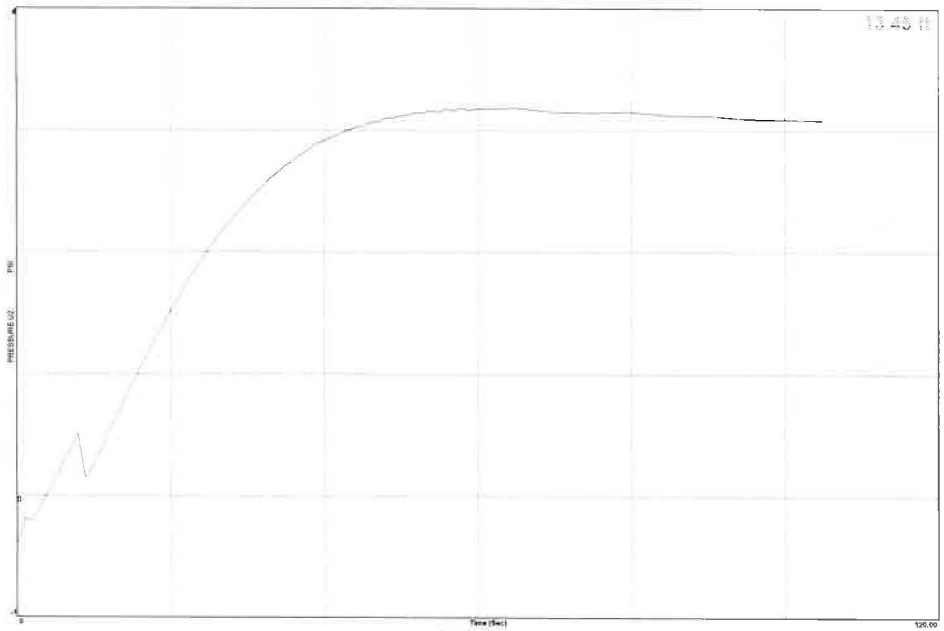
1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

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

Cornerstone Earth Group

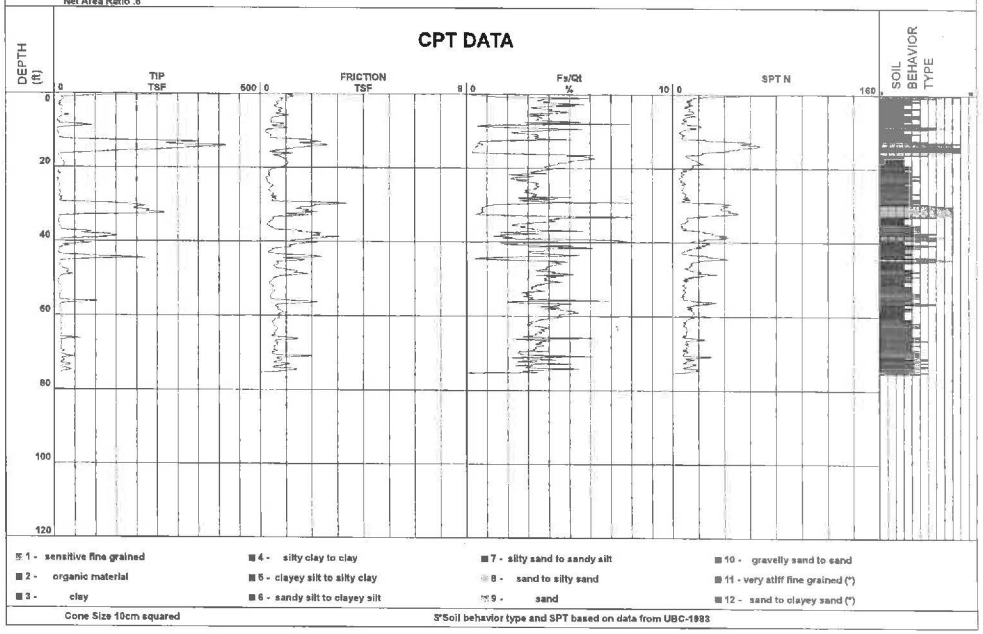
Location	1400 N. Shoreline	Operator	CB	GPS	
Job Number	P4288	Cone Number	DDG1268		
Hole Number	CPT-03	Date and Time	2/14/2014 6:55:41 PM		
Equilized Pressure	3.0	EST GW Depth During Test	6.3		



Cornerstone Earth Group

Project	1400 N. Shoreline	Operator	CB	Filename	SDF(007).cpt
Job Number	P4288	Cone Number	DDG1268	GPS	
Hole Number	CPT-04	Date and Time	2/14/2014 7:36:48 PM	Maximum Depth	75.46 ft
EST GW Depth During Test	7.00 ft				

Net Area Ratio .8



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

Cone Size 10cm squared

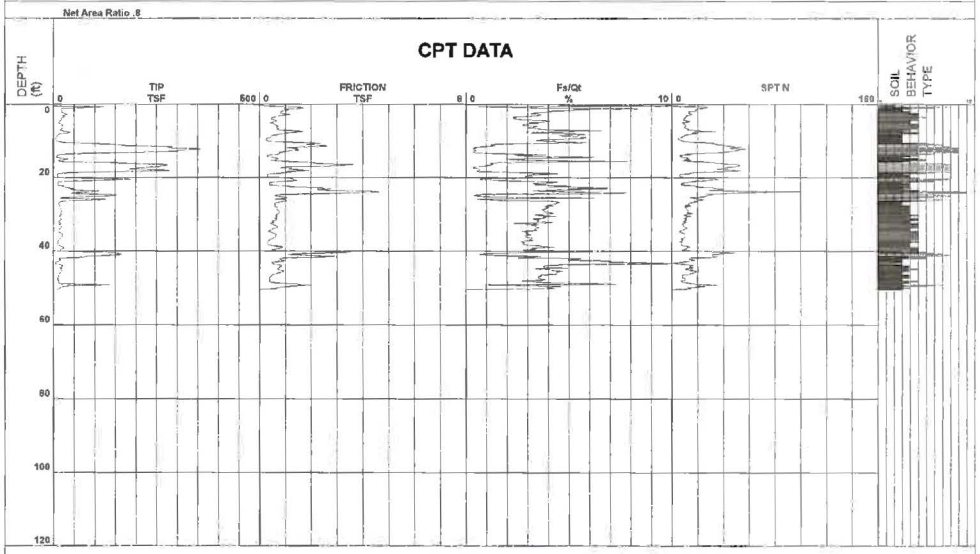
3*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	1400 N. Shoreline	Operator	CB	Filename	SDF(009).cpt
Job Number	P4289	Cone Number	DDG1268	GPS	
Hole Number	CPT-05	Date and Time	2/14/2014 8:34:56 PM	Maximum Depth	50.82 ft
EST GW Depth During Test	7.00 ft				

Net Area Ratio .8

CPT DATA



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

Cone Size 10cm squared

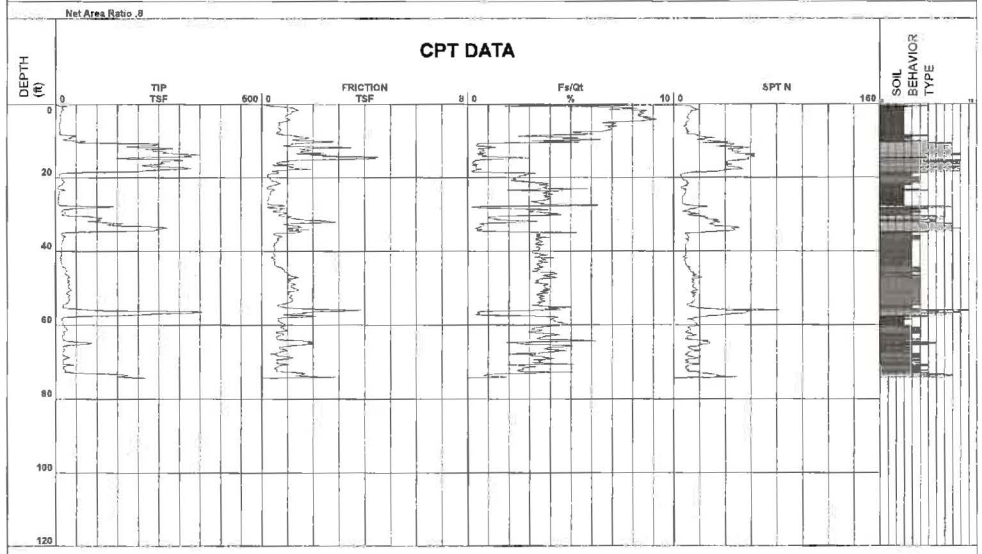
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	1400 N. Shoreline	Operator	CB	Filename	SDF(003).cpt
Job Number	P4289	Cone Number	DDG1268	GPS	
Hole Number	CPT-06	Date and Time	2/14/2014 3:17:21 PM	Maximum Depth	74.47 ft
EST GW Depth During Test	7.00 ft				

Net Area Ratio .8

CPT DATA



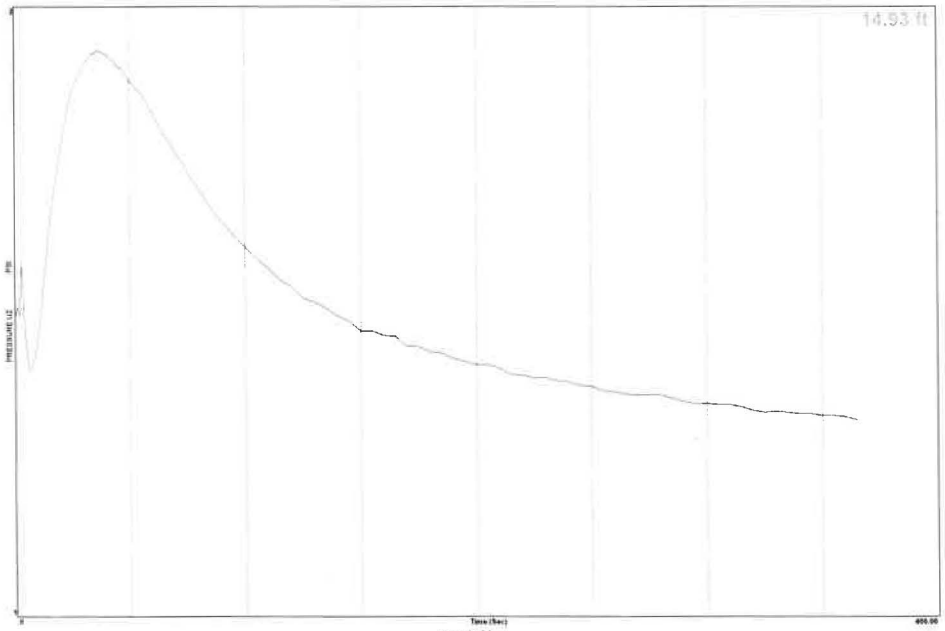
1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	6 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

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

Cornerstone Earth Group

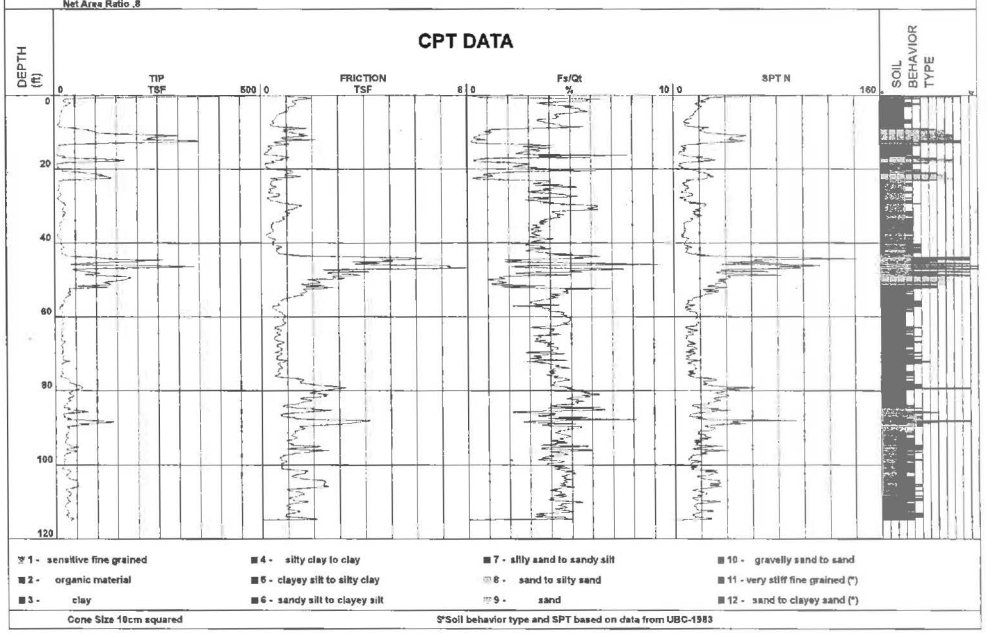
Location	1400 N. Shoreline	Operator	CB	GPS	
Job Number	P4289	Cone Number	DDG1268		
Hole Number	CPT-06	Date and Time	2/14/2014 3:17:21 PM		
Equilized Pressure	1.3	EST GW Depth During Test	11.8		



Cornerstone Earth Group

Project	1400 N. Shoreline	Operator	CB	Filename	SDF(004).cpt
Job Number	P4289	Cone Number	DDG1268	GPS	
Hole Number	CPT-07	Date and Time	2/14/2014 4:35:08 PM	Maximum Depth	114.99 ft
EST GW Depth During Test	7.00 ft				

Net Area Ratio .8



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

Cone Size 10cm squared

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

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on forty-six samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on twenty-seven samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

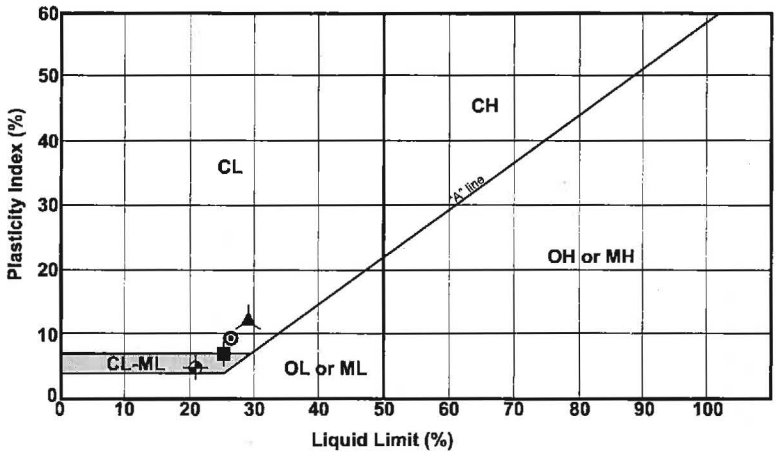
Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on nineteen samples of the subsurface soils to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Plasticity Index: Six Plasticity Index determinations (ASTM D4318) were performed on samples of the subsurface soils to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of these tests are shown on the boring logs at the appropriate sample depths.

Undrained-Unconsolidated Triaxial Shear Strength: The undrained shear strength was determined on six relatively undisturbed sample(s) by unconsolidated-undrained triaxial shear strength testing (ASTM D2850). The results of this test are included as part of this appendix.

Consolidation: Two consolidation tests (ASTM D2435) were performed on relatively undisturbed samples of the subsurface clayey soils to assist in evaluating the compressibility property of this soil. Results of the consolidation test are presented graphically in this appendix.

Plasticity Index (ASTM D4318) Testing Summary



Symbol	Boring No.	Depth (ft)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Passing No. 200 (%)	Group Name (USCS - ASTM D2487)
⊕	EB-1	1.5	3	21	16	5	—	Silty, Clayey Sand (SC-SM) [Fill]
■	EB-1	29.0	14	26	19	7	18	Silty, Clayey Sand (SC-SM)
	EB-2	10.5	determined non-plastic				6	Poorly Graded Sand with Silt (SP-SM)
◎	EB-2	24.5	19	27	18	9	25	Clayey Sand (SC)
▲	EB-3	20.5	17	29	17	12	19	Clayey Sand (SC)
	EB-5	10.0	determined non-plastic				5	Poorly Graded Sand with Silt (SP-SM)

Samples prepared in accordance with ASTM D421

CORNERSTONE EARTH GROUP

Plasticity Index Testing Summary

1400 North Shoreline Boulevard
Mountain View, CA

Project Number: 704-2-1

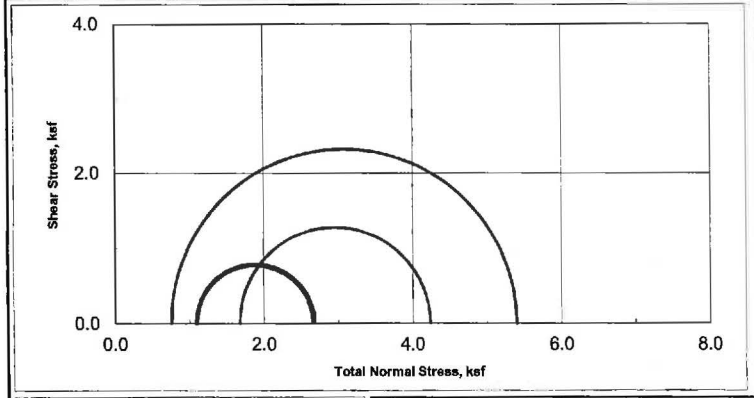
Figure Number: Figure B1

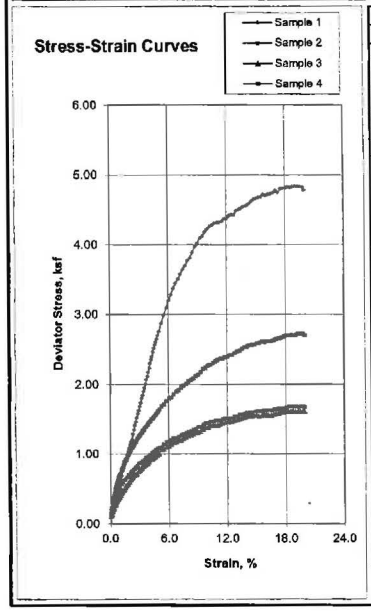
Date: February 2014

Drawn By: FLL

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





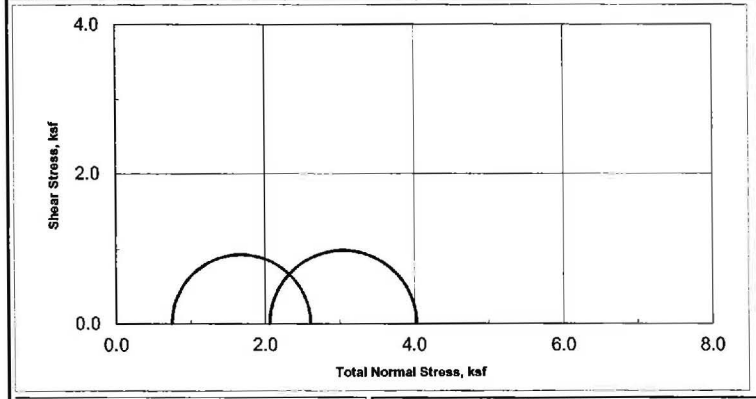
Sample Data	1	2	3	4
Moisture %	11.4	30.1	29.8	24.0
Dry Den,pcf	132.4	94.7	95.3	103.0
Void Ratio	0.320	0.846	0.834	0.698
Saturation %	99.9	99.7	100.0	96.2
Height in	5.02	4.99	5.03	5.00
Diameter in	2.40	2.41	2.42	2.41
Cell psi	5.2	7.5	7.7	11.6
Strain %	15.00	15.00	15.00	15.00
Deviator, ksf	4.648	1.600	1.548	2.565
Rate %/min	1.00	1.00	1.00	1.00
in/min	0.050	0.050	0.050	0.050
Job No.:	640-640a			
Client:	Cornerstone Earth Group			
Project:	1400 North Shoreline - 704-2-1			
Boring:	EB-3	EB-3	EB-4	EB-4
Sample:	5B	8B	10B	13B
Depth ft:	16.0	24.0	25.0	39.5

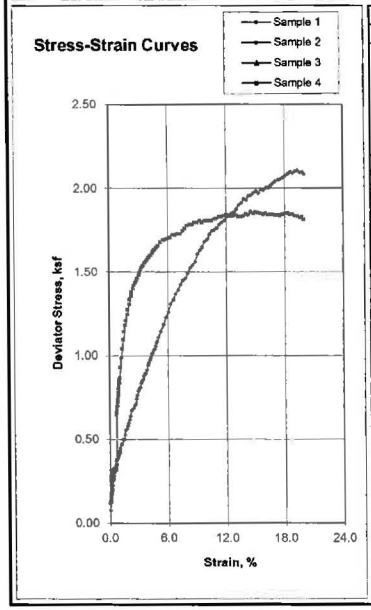
Visual Soil Description	
Sample #	
1	Very Dark Bluish Gray Clayey SAND w/ Gravel (Silty
2	Dark Olive Brown Sandy CLAY
3	Very Dark Bluish Gray Clayey SAND
4	Very Dark Bluish Gray Sandy CLAY
Remarks:	

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data	1	2	3	4
Moisture %	22.9	26.3		
Dry Den,pcf	105.5	99.1		
Void Ratio	0.656	0.763		
Saturation %	97.6	96.6		
Height in	5.00	6.08		
Diameter in	2.41	2.88		
Cell psi	14.3	5.2		
Strain %	15.00	14.58		
Deviator, ksf	1.971	1.859		
Rate %/min	1.00	1.00		
in/min	0.050	0.061		
Job No.:	640-640b			
Client:	Cornerstone Earth Group			
Project:	1400 North Shoreline - 704-2-1			
Boring:	EB-4	EB-5		
Sample:	15B	6		
Depth ft:	49.5	5.5(Tip-7.5		

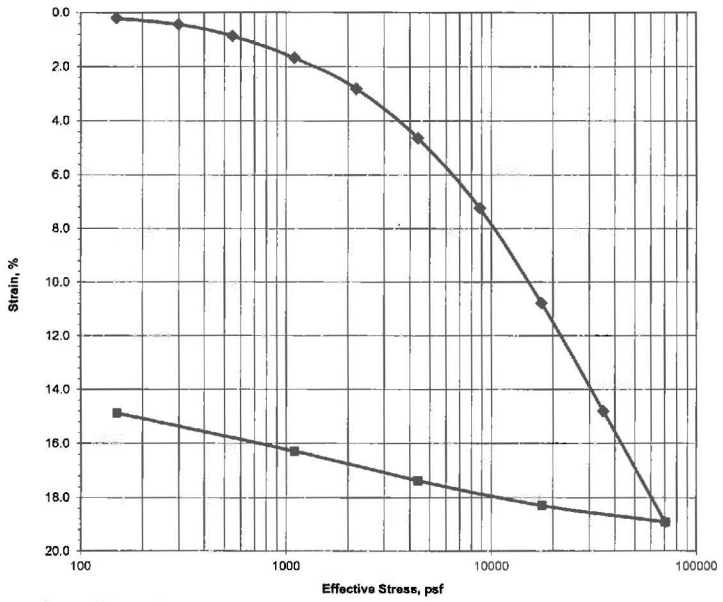
Visual Soil Description	
Sample #	
1	Dark Bluish Gray Clayey SAND
2	Dark Bluish Gray Clayey SAND w/ Gravel
3	
4	
Remarks:	

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Consolidation Test
ASTM D2435

Job No.:	640-640	**Boring:**	EB-3	**Run By:**	MD
Client:	Cornerstone Earth Group	**Sample:**	9	**Reduced:**	PJ
Project:	1400 North Shoreline - 704-2-1	**Depth, ft.:**	25.5(Tip-3")	**Checked:**	PJ/DC
Soil Type:	Olive brown sandy lean clay (CL)			**Date:**	2/25/2014

Strain-Log-P Curve



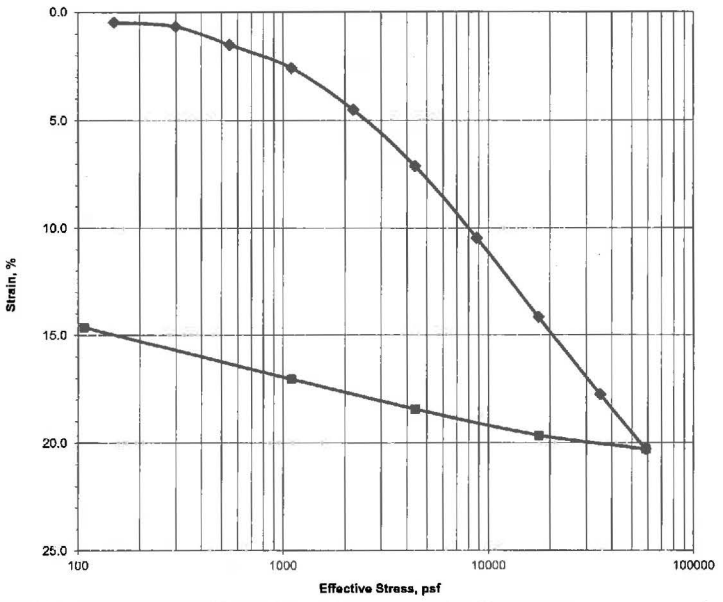
Assumed Gs 2.8	Initial	Final
Moisture %:	26.8	18.4
Dry Density, pcf:	97.7	115.3
Void Ratio:	0.789	0.515
% Saturation:	95.1	100.0

Remarks:

Consolidation Test
ASTM D2435

Job No.:	640-640	**Boring:**	EB-5	**Run By:**	MD
Client:	Cornerstone Earth Group	**Sample:**	6	**Reduced:**	PJ
Project:	1400 North Shoreline - 704-2-1	**Depth, ft.:**	15.5(Tip-6")	**Checked:**	PJ/DC
Soil Type:	Gray sandy lean clay (CL)			**Date:**	2/25/2014

Strain-Log-P Curve



Assumed Gs 2.8	Initial	Final
Moisture %:	23.5	16.1
Dry Density, pcf:	103.1	120.4
Void Ratio:	0.695	0.452
% Saturation:	94.7	100.0

Remarks: Significant patching required due to gravel. This sample appears to have been somewhat disturbed.

CORNERSTONE EARTH GROUP

APPENDIX C: LIQUEFACTION ANALYSES CALCULATIONS

CORNERSTONE EARTH GROUP

CPT No: 1

PGA (A_{max}): 0.53

Total Settlement: 0.97 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Initial σ'_{vo} (psf)	Q	F (%)	I_c	Layer Transition Pt ?	Plag Soil Type	P_{atm} (%)	Corr. near Interface (soft layer)	Thin Layer Factor (K_H)	Interpolated q_{c1N}	C_N	q_{c1N}	q_{c1Ncs}	Stress Reduction Coeff. r_d	CSR	K_σ for Band	CRR from I_c & q_{c1Ncs}	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
0.150	450.470	9.243	20.0	20.0	4456.400	0.271	0.66		Unsaturated	1.0			454.25	1.70	736.20	736.20	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
0.330	383.660	9.820	41.3	41.3	2480.260	0.418	0.85		Unsaturated	1.0			343.83	1.70	553.09	553.09	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
0.490	248.220	1.603	61.3	61.3	1307.692	0.661	1.06		Unsaturated	3.6			222.72	1.70	368.83	368.83	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
0.650	163.170	1.256	82.6	82.6	970.631	0.866	1.18		Unsaturated	4.3			178.13	1.70	294.92	294.92	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
0.820	123.240	0.946	102.5	102.5	824.780	0.992	1.30		Unsaturated	5.5			115.56	1.70	191.43	191.43	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
0.980	95.660	0.880	122.5	122.5	726.826	1.107	1.78		Unsaturated	12.2			87.67	1.70	97.79	122.68	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
1.150	21.670	0.665	143.8	143.8	76.148	4.707	3.47		Unsaturated	20.4			10.91	1.70	33.85	72.98	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
1.310	15.660	0.600	163.6	163.6	75.907	7.301	3.62		Unsaturated	34.7			12.84	1.70	21.84	54.06	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
1.480	14.220	0.600	186.0	186.0	73.823	6.060	3.57		Unsaturated	32.6			13.44	1.70	22.85	60.04	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
1.640	13.470	0.711	206.0	206.0	64.744	6.317	3.68		Unsaturated	32.2			12.73	1.70	21.64	56.56	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
1.800	13.630	0.650	226.0	226.0	60.888	4.847	3.54		Unsaturated	33.7			12.70	1.70	21.74	66.46	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
1.970	13.620	0.601	246.3	246.3	53.237	4.466	3.48		Unsaturated	32.8			11.83	1.70	20.29	60.66	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
2.130	12.660	0.580	266.3	266.3	48.227	4.662	3.52		Unsaturated	34.2			11.43	1.70	19.43	58.74	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
2.300	12.100	0.617	287.5	287.5	46.701	5.158	3.66		Unsaturated	36.2			11.44	1.70	19.44	66.93	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
2.460	12.210	0.650	307.5	307.5	43.954	5.567	3.65		Unsaturated	36.4			11.64	1.70	19.82	68.16	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
2.620	12.380	0.612	327.5	327.5	42.235	4.912	3.60		Unsaturated	35.6			11.79	1.70	19.89	66.55	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
2.790	13.560	0.622	348.6	348.6	44.837	4.718	3.53		Unsaturated	34.6			12.63	1.70	21.47	68.64	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
2.950	12.760	0.612	368.8	368.8	40.479	4.912	3.67		Unsaturated	36.9			12.00	1.70	20.55	67.48	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
3.120	11.720	0.647	390.0	390.0	36.646	5.563	3.72		Unsaturated	37.7			11.09	1.70	18.93	66.54	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
3.280	11.340	0.684	410.0	410.0	33.186	6.067	3.74		Unsaturated	38.5			10.72	1.70	18.22	64.88	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
3.440	9.880	0.625	430.0	430.0	44.909	6.478	2.67		Unsaturated	26.1			9.33	1.70	15.84	51.15	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
3.610	8.630	0.460	451.3	451.3	37.206	5.723	2.74		Unsaturated	26.6			8.18	1.70	13.86	48.06	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
3.770	8.570	0.457	471.3	471.3	34.623	5.617	2.78		Unsaturated	28.2			7.91	1.70	13.45	48.20	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
3.940	8.740	0.430	492.6	492.6	34.462	5.145	2.73		Unsaturated	30.2			8.26	1.70	14.04	49.83	1.00	0.344	1.000	n.a.	n.a.	n.a.	0.00	0.00
4.100	9.270	0.444	512.5	512.5	36.170	4.927	2.71		[redacted]	27.5			8.76	1.46	n.a.	n.a.	1.00	0.348	n.a.	n.a.	n.a.	n.a.	0.00	0.00
4.270	15.660	0.609	533.8	533.8	40.039	4.764	2.69		[redacted]	34.7			10.76	1.44	n.a.	n.a.	1.00	0.356	n.a.	n.a.	n.a.	n.a.	0.00	0.00
4.430	14.300	0.666	553.8	553.8	34.094	4.733	2.71		Mixed	37.4			13.60	1.70	23.12	81.08	1.00	0.361	1.100	0.089	0.098	0.24	0.06	0.10
4.590	15.570	0.654	573.8	573.8	42.142	4.777	2.65		Mixed	36.2			13.17	1.70	22.39	80.01	1.00	0.367	1.100	0.088	0.097	0.27	0.06	0.09
4.760	23.290	1.029	595.0	595.0	52.729	4.462	2.68		Mixed	32.3			21.98	1.70	37.38	132.46	1.00	0.373	1.100	0.112	0.111	0.30	0.04	0.06
4.920	31.540	1.064	615.0	615.0	54.767	3.374	2.48		Sand	39.1	1.15		115.00	1.46	161.56	244.67	1.00	0.379	1.100	2.000	1.979	5.23	0.00	0.00
5.080	44.760	1.413	635.3	635.3	76.687	1.634	2.17		Sand	51.6	1.15		115.00	1.41	162.25	254.32	1.00	0.384	1.100	2.000	1.979	5.16	0.00	0.00
5.250	62.480	0.880	656.3	656.3	105.486	1.109	1.82		Sand	58.2	1.15		115.00	1.43	164.73	217.49	1.00	0.390	1.100	2.000	1.979	5.08	0.00	0.00
5.410	71.740	0.750	676.3	676.3	119.378	1.063	1.67		Sand	64.2	1.15		115.00	1.43	164.81	211.88	1.00	0.395	1.100	2.000	1.979	5.01	0.00	0.00
5.580	77.810	1.405	697.5	697.5	129.205	1.858	2.04		Sand	67.8	1.15		115.00	1.40	160.46	222.68	1.00	0.400	1.100	2.000	1.979	4.95	0.00	0.00
5.740	80.610	1.730	717.5	717.5	130.668	2.179	2.09		Sand	68.4	1.15		115.00	1.38	160.06	223.22	1.00	0.406	1.100	2.000	1.979	4.89	0.00	0.00
5.910	80.100	1.650	738.8	738.8	127.541	1.998	2.04		Sand	67.8	1.15		115.00	1.38	158.27	220.24	1.00	0.409	1.100	2.000	1.979	4.83	0.00	0.00
6.070	95.760	1.192	758.8	758.8	152.139	1.165	1.83		Sand	73.4	1.15		115.00	1.40	160.75	202.26	1.00	0.414	1.100	2.000	1.252	3.63	0.00	0.00
6.230	101.320	0.874	778.8	778.8	157.262	0.868	1.72		Sand	73.8	1.15		115.00	1.41	161.94	190.47	1.00	0.418	1.100	1.784	0.758	1.81	0.00	0.00
6.400	122.160	0.946	800.0	800.0	187.186	0.777	1.63		Sand	80.0			118.48	1.41	169.14	199.26	0.99	0.422	1.100	0.667	0.561	1.39	0.00	0.00
6.560	138.240	0.603	819.7	819.7	190.902	0.440	1.58		Sand	91			118.31	1.41	168.84	178.83	0.99	0.426	1.100	0.617	0.512	1.20	0.01	0.01
6.730	120.470	0.786	840.1	840.1	151.640	0.636	1.69		Sand	83			115.87	1.41	165.73	173.79	0.99	0.431	1.100	0.449	0.443	1.03	0.01	0.01
6.900	118.340	0.825	860.3	860.3	144.481	0.641	1.68		Sand	8.8			115.61	1.41	165.30	180.18	0.99	0.434	1.100	0.372	0.396	0.86	0.01	0.02
7.060	125.840	0.624	879.5	844.2	155.483	0.809	1.62		Sand	8.3			116.39	1.41	163.47	176.86	0.99	0.439	1.100	0.410	0.412	0.94	0.01	0.02
7.220	142.200	0.544	898.8	844.0	210.999	0.383	1.40		Sand	0.7			134.49	1.37	184.40	186.84	0.99	0.443	1.100	0.651	0.644	1.46	0.00	0.00
7.390	149.410	0.440	918.1	843.2	230.766	0.297	1.29		Sand	6.6			147.84	1.35	199.56	199.63	0.99	0.446	1.100	1.000	1.077	2.42	0.00	0.00
7.550	162.640	0.488	938.5	873.8	238.460	0.301	1.30		Sand	6.8			163.63	1.33	264.64	264.71	0.99	0.449	1.100	1.429	1.414	3.15	0.00	0.00
7.710	109.440	0.621	957.7	903.2	242.999	0.314	1.70		Sand	6.6			161.23	1.32	207.95	208.13	0.99	0.452	1.100	1.710	1.592	3.74	0.00	0.00
7.870	156.630	0.612	978.0	991.4	240.499	0.310	1.30		Sand	6.6			156.56	1.32	206.59	206.74	0.99	0.455	1.100	1.667	1.570	3.46	0.00	0.00
8.040	151.670	0.491	997.3	991.2	252.318	0.462	1.38		Sand	6.6			151.65	1.29	221.72	223.08	0.99	0.458	1.100	1.600	1.679	4.32	0.00	0.00
8.200	200.240	0.827	1018.5	990.4	337.605	0.414	1.31		Sand	8.7			160.39	1.27	230.88	230.93	0.99	0.461	1.100	2.000	1.979	4.29	0.00	0.00
8.370	197.840	0.875	1038.9	990.2	281.666	0.446	1.34		Sand	6.8			166.24	1.27	236.91	236.46	0.99	0.464	1.100	2.000	1.979	4.26	0.00	0.00
8.530	194.870	0.839	1059.1	990.4	260.471	0.346	1.30		Sand	6.6			174.46	1.28	223.22	223.39	0.99	0.467	1.100	2.000	1.979	4.24	0.00	0.00
8.690	170.660	0.350	1079.3	938.6	250.364	0.205	1.19		Sand	4.4			167.38	1.29	216.19	216.19	0.99	0.470	1.100	2.000	1.979	4.21	0.00	0.00
8.850	180.230	0.778	1099.7	948.4	267.178	0.429	1.33		Sand	6.6			179.79	1.27	227.72	227.88	0.99	0.473	1.100	2.000	1.979	4.18	0.00	0.00
9.020	196.140	0.864	1119.9	957.7	273.365	0.460	1.36		Sand	6.4			184.44	1.26	231.70	232.07	0.99	0.476	1.100	2.000	1.979	4.16	0.00	0.00
9.190	206.480	1.293	1139.3	977.4	287.634	0.613	1.43		Sand	7.1			190.16	1.24	241.67	244.66	0.99	0.478	1.100	2.000	1.979	4.14	0.00	0.00
9.350	194.660	1.073	1154.5	979.7	269.617	0.564	1.55		Sand	6.8			185.02	1.24	236.19	240.86	0.99	0.481	1.100	2.000	1.979	4.12	0.00	0.00
9.510	186.910	1.700	1173.7	996.9	250.774	0.926	1.69		Sand	6.4			178.98	1.24	221.45	226.19	0.99	0.483	1.100	2.000	1.979	4.10	0.00	0.00
9.680	161.660	1.074	1194.1	998.7	221.056	0.959	1.63		Sand	5.6			163.82	1.28	196.04	204.46	0.99	0.486	1.100	1.411	1.396	2.88	0.00	0.00
9.840	150.270	0.820	1213.3	1004.9	208.272	0.846	1.62		Sand	5.1			142.83	1.29	183.38	190.88	0.99	0.488	1.100	0.750	0.742	1.52	0.00	0.00
10.010	144.830	0.886	1233.7	1014.7	196.417	0.988	1.43		Sand	1.9			136.69	1.30	177.61	178.98	0.99	0.490	1.100	0.526	0.530	1.08	0.01	0.01
10.170	136.440	0.372	1252.9	1023.9	183.180	0.378	1.36		Sand	6.4			128.62	1.31	167.80	168.68	0.99	0.493	1.100	0.368	0.380	0.80	0.01	0.02
10.330	130.120	0.378	1272.1	1033.1	171.192	0.380	1.40		Sand	6.6			122.89	1.32	161.74	163.28	0.99	0.494	1.100	0.348	0.346	0.70	0.02	0.03
10.500	127.160	0.331	1292.5	1042.8	170.339	0.261	1.39		Sand	6.6			120.19	1.32	158.17	159.42	0.99	0.497	1.100	0.322	0.319	0.64	0.02	0.03

CORNERSTONE EARTH GROUP

CPT No 1 | PGA (A_{max}) 0.53 | Total Settlement 0.97 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Initial σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tn} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tn}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'=1atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
10.660	134.170	0.466	1311.7	1062.1	176.966	0.341	1.43		Sand	7.1			126.81	1.30	164.91	167.33	0.99	0.499	1.100	0.362	0.376	0.75	0.01	0.03
10.830	132.150	1.070	1332.1	1061.9	175.429	0.813	1.67		Sand	10.6	126.81		126.81	1.27	161.64	163.61	0.99	0.501	1.100	0.600	0.594	1.10	0.01	0.01
10.990	87.010	1.510	1351.3	1071.1	114.693	1.768	2.03		Sand	17.7	126.81		126.81	1.23	156.30	217.36	0.99	0.503	1.100	2.000	1.979	3.94	0.00	0.00
11.150	32.070	1.107	1370.5	1080.3	41.516	3.628	2.60		Sand	32.3	126.81		126.81	1.21	153.03	236.24	0.99	0.504	1.100	2.000	1.979	3.92	0.00	0.00
11.320	15.590	0.563	1390.9	1090.1	27.326	3.714	2.71		[illegible]	37.4			14.74	1.19	n.a.	n.a.	0.98	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.480	12.580	0.320	1410.1	1099.3	22.140	2.630	2.69		[illegible]	38.5			12.17	1.19	n.a.	n.a.	0.98	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.650	8.580	0.314	1430.5	1109.1	14.182	3.080	2.95		Clay	46.5			8.11	1.19	n.a.	n.a.	0.98	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.810	8.410	0.365	1449.7	1118.4	13.744	4.744	3.01		Clay	48.0			7.95	1.18	n.a.	n.a.	0.98	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.980	10.200	0.400	1470.1	1128.1	16.039	5.193	2.98		Clay	47.1			9.73	1.18	n.a.	n.a.	0.98	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.140	16.990	0.631	1489.3	1137.4	26.668	5.446	2.83		[illegible]	41.8			16.11	1.18	n.a.	n.a.	0.98	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.300	31.340	1.040	1506.6	1146.6	39.273	3.429	2.57		Sand	32.5		1.78	52.73	1.32	69.54	122.04	0.98	0.517	1.078	0.188	0.180	0.35	0.03	0.05
12.470	26.370	0.888	1525.9	1156.4	30.944	3.390	2.55		Mixed	33.1		1.78	44.37	1.34	59.25	108.90	0.98	0.518	1.089	0.158	0.152	0.29	0.03	0.06
12.630	27.990	0.706	1545.1	1165.6	34.680	2.591	2.53		Sand	31.2		1.78	47.09	1.32	62.37	112.69	0.98	0.520	1.070	0.165	0.159	0.31	0.03	0.06
12.800	21.790	0.593	1566.5	1176.4	29.983	2.821	2.60		Mixed	33.8		1.78	36.60	1.35	49.40	96.88	0.98	0.521	1.061	0.136	0.130	0.25	0.05	0.06
12.960	11.650	0.402	1587.7	1184.6	17.316	3.920	2.88		[illegible]	43.5			10.44	1.17	n.a.	n.a.	0.98	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.110	7.490	0.272	1606.5	1193.8	11.202	4.088	3.03		Clay	60.2			7.09	1.18	n.a.	n.a.	0.98	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.290	7.190	0.258	1627.3	1203.8	10.595	4.048	3.06		Clay	61.0			6.80	1.18	n.a.	n.a.	0.98	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.450	7.760	0.298	1646.5	1212.6	11.439	4.129	3.03		Clay	60.0			7.33	1.18	n.a.	n.a.	0.98	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.620	8.210	0.316	1666.9	1222.6	12.062	4.208	3.02		Clay	49.8			7.78	1.18	n.a.	n.a.	0.98	0.529	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.780	8.540	0.326	1686.1	1231.8	12.497	4.236	3.01		Clay	49.0			8.07	1.15	n.a.	n.a.	0.98	0.530	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.940	8.890	0.362	1705.3	1241.0	12.953	4.370	3.00		Clay	48.9			8.40	1.15	n.a.	n.a.	0.98	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.110	9.160	0.341	1725.7	1250.8	13.267	4.111	2.98		Clay	47.8			8.66	1.15	n.a.	n.a.	0.98	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.270	8.980	0.299	1744.9	1260.1	12.869	3.590	2.98		Clay	47.1			8.49	1.15	n.a.	n.a.	0.98	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.440	9.000	0.284	1765.3	1269.8	12.786	3.504	2.96		Clay	46.8			8.51	1.14	n.a.	n.a.	0.98	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.600	9.220	0.276	1784.5	1279.1	13.072	3.319	2.93		Clay	45.8			8.71	1.14	n.a.	n.a.	0.98	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.760	8.870	0.241	1803.7	1288.3	12.370	3.026	2.92		Clay	45.5			8.38	1.14	n.a.	n.a.	0.98	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.930	8.350	0.209	1824.1	1298.1	11.480	2.806	2.93		Clay	46.0			7.89	1.14	n.a.	n.a.	0.98	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.090	8.640	0.189	1843.3	1307.3	11.806	2.450	2.89		Clay	44.1			8.17	1.14	n.a.	n.a.	0.98	0.539	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.260	8.360	0.223	1863.7	1317.1	11.280	2.967	2.95		Clay	40.8			7.90	1.13	n.a.	n.a.	0.98	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.420	9.620	0.217	1882.9	1326.3	13.087	2.405	2.86		Clay	42.8			9.09	1.13	n.a.	n.a.	0.97	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.580	11.080	0.370	1902.1	1335.5	15.169	3.681	2.90		Clay	44.7			10.47	1.13	n.a.	n.a.	0.97	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	14.120	0.666	1922.5	1345.3	19.563	5.050	2.91		Clay	44.8			13.36	1.13	n.a.	n.a.	0.97	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	22.870	0.760	1941.7	1354.5	32.334	3.496	2.64		[illegible]	34.6			21.62	1.12	n.a.	n.a.	0.97	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.080	21.670	1.036	1962.1	1364.3	30.329	5.002	2.76		[illegible]	39.3			20.44	1.12	n.a.	n.a.	0.97	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.240	33.540	1.361	1981.3	1373.6	41.632	4.160	2.61		Mixed	33.9		1.6	57.06	1.22	69.36	122.74	0.97	0.547	1.066	0.189	0.179	0.32	0.03	0.06
16.400	37.900	1.467	2000.5	1382.7	43.078	3.967	2.56		Sand	33.1		1.6	64.31	1.20	77.29	133.18	0.97	0.547	1.059	0.212	0.202	0.37	0.02	0.06
16.570	40.430	1.336	2020.9	1392.5	46.987	3.364	2.52		Sand	30.8		1.6	68.67	1.19	82.17	138.99	0.97	0.548	1.061	0.229	0.219	0.40	0.02	0.04
16.730	24.940	0.989	2040.1	1401.7	34.129	4.133	2.67		[illegible]	35.9			23.57	1.11	n.a.	n.a.	0.97	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.900	13.450	0.533	2060.5	1411.5	17.597	4.292	2.89		[illegible]	44.4			12.71	1.11	n.a.	n.a.	0.97	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.060	8.610	0.400	2079.7	1420.8	10.657	5.283	3.12		Clay	54.0			8.14	1.11	n.a.	n.a.	0.97	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.220	9.360	0.360	2098.9	1430.0	11.623	4.329	3.04		Clay	50.3			8.85	1.11	n.a.	n.a.	0.97	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.390	10.760	0.342	2119.3	1439.8	13.476	3.622	2.93		Clay	45.9			10.17	1.11	n.a.	n.a.	0.97	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.550	11.710	0.370	2138.5	1449.0	14.687	3.473	2.90		Clay	44.6			11.07	1.11	n.a.	n.a.	0.97	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.720	13.800	0.402	2158.9	1458.8	17.440	3.161	2.81		Clay	41.3			13.04	1.10	n.a.	n.a.	0.97	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.880	14.810	0.412	2178.1	1468.0	18.694	3.006	2.78		Clay	39.9			14.00	1.10	n.a.	n.a.	0.97	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.040	15.520	0.457	2197.3	1477.2	19.525	3.168	2.78		Clay	39.8			14.67	1.10	n.a.	n.a.	0.97	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.210	16.350	0.601	2217.7	1487.0	20.409	3.286	2.77		Clay	39.6			15.45	1.10	n.a.	n.a.	0.97	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.370	17.190	0.560	2236.9	1496.2	21.483	3.422	2.77		Clay	39.4			16.25	1.10	n.a.	n.a.	0.97	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.540	16.350	0.636	2257.3	1506.0	20.214	3.631	2.79		Clay	40.5			15.46	1.09	n.a.	n.a.	0.97	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	15.480	0.606	2276.5	1515.2	18.930	3.642	2.82		Clay	41.4			14.63	1.09	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.860	15.710	0.472	2295.7	1524.4	19.106	3.244	2.79		Clay	40.4			14.85	1.09	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	15.980	0.600	2316.1	1534.2	19.298	3.435	2.80		Clay	40.8			15.09	1.09	n.a.	n.a.	0.97	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	16.670	0.610	2335.3	1543.4	19.958	3.308	2.78		Clay	40.0			15.68	1.09	n.a.	n.a.	0.97	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	16.910	0.686	2355.7	1553.2	20.257	3.739	2.81		Clay	41.1			15.98	1.08	n.a.	n.a.	0.96	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	16.630	0.579	2374.9	1562.5	19.639	3.771	2.82		Clay	41.6			15.62	1.08	n.a.	n.a.	0.96	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	15.410	0.681	2395.3	1572.2	18.079	4.169	2.88		Clay	43.7			14.57	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	13.080	0.618	2414.5	1581.5	15.015	4.300	2.95		Clay	46.8			12.36	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	11.510	0.436	2433.7	1590.7	12.942	4.231	2.99		Clay	48.5			10.88	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	10.680	0.738	2454.1	1600.5	11.686	7.684	3.20		Clay	57.7			10.00	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	19.580	0.704	2473.3	1609.7	22.791	3.806	2.79		[illegible]	39.9			18.51	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	58.760	1.035	2493.7	1619.5	62.137	1.790	2.23		Sand	22.8		1.8	99.97	1.10	110.42	169.96	0.96	0.565	1.051	0.407	0.385	0.68	0.01	0.02
20.670	52.840	1.323	2512.9	1628.7	54.673	2.604	2.37		Sand	26.5	56.5	1.8	99.90	1.10	109.06	173.53	0.96	0.566	1.052	0.446	0.422	0.75	0.01	0.02
20.830	31.480	0.640	2532.1	1637.9	32.469	2.781	2.57		Sand	32.8	56.5	1.6	99.90	1.10	109.62	176.36	0.96	0.566	1.052	0.482	0.458	0.81	0.01	0.02
21.000	16.610	0.750	2552.5	1647.7	17.277	6.272	2.96		[illegible]	47.0			14.66	1.07	n.a.	n.a.	0.96	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 1 | PGA (A_{max}) 0.53 | Total Settlement 0.97 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Initial σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tn} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tn}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'=1atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
21.160	17.110	0.710	2571.7	1656.9	19.101	4.488	2.84		Clay	43.6			16.17	1.07	n.a.	n.a.	0.95	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.330	14.410	0.547	2592.1	1666.7	15.730	4.169	2.92		Clay	45.6			13.62	1.06	n.a.	n.a.	0.95	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	9.400	0.463	2611.3	1675.9	9.787	5.660	3.17		Clay	50.2			8.97	1.06	n.a.	n.a.	0.95	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	8.600	0.356	2630.5	1685.1	8.646	4.656	3.17		Clay	50.3			8.13	1.06	n.a.	n.a.	0.95	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	7.840	0.304	2650.9	1694.9	7.687	4.006	3.20		Clay	57.7			7.41	1.06	n.a.	n.a.	0.95	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.980	7.680	0.339	2670.1	1704.1	7.446	5.537	3.25		Clay	59.4			7.26	1.06	n.a.	n.a.	0.95	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	8.480	0.364	2690.5	1713.9	8.492	4.723	3.13		Clay	54.4			8.06	1.06	n.a.	n.a.	0.95	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	12.340	0.373	2709.7	1723.2	12.750	3.392	2.94		Clay	46.3			11.68	1.06	n.a.	n.a.	0.95	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	10.660	0.378	2728.9	1732.4	10.732	4.002	3.06		Clay	50.8			10.06	1.06	n.a.	n.a.	0.95	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	10.700	0.406	2749.3	1742.2	10.704	4.347	3.07		Clay	51.6			10.11	1.05	n.a.	n.a.	0.95	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	11.520	0.468	2768.5	1751.4	11.576	4.617	3.06		Clay	51.1			10.89	1.05	n.a.	n.a.	0.95	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	12.260	0.488	2788.9	1761.2	12.339	4.492	3.03		Clay	49.9			11.60	1.05	n.a.	n.a.	0.95	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	12.410	0.442	2808.1	1770.4	12.433	4.013	2.99		Clay	48.5			11.73	1.05	n.a.	n.a.	0.95	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	11.230	0.408	2827.3	1779.6	11.032	4.196	3.05		Clay	50.6			10.61	1.05	n.a.	n.a.	0.95	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	11.140	0.409	2847.7	1789.4	10.860	4.200	3.06		Clay	51.0			10.53	1.05	n.a.	n.a.	0.95	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.620	11.450	0.439	2866.9	1798.6	11.138	4.382	3.08		Clay	51.1			10.82	1.04	n.a.	n.a.	0.95	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	12.540	0.409	2887.3	1808.4	12.272	4.227	3.01		Clay	49.3			11.85	1.04	n.a.	n.a.	0.95	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	13.630	0.474	2906.5	1817.6	13.399	3.669	2.96		Clay	47.1			12.88	1.04	n.a.	n.a.	0.95	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	14.670	0.464	2925.7	1826.8	14.459	3.436	2.90		Clay	44.7			13.87	1.04	n.a.	n.a.	0.95	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	14.300	0.441	2946.1	1836.6	13.966	3.435	2.91		Clay	45.1			13.52	1.04	n.a.	n.a.	0.95	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	10.870	0.364	2965.3	1845.8	10.171	3.681	3.08		Clay	51.1			10.27	1.04	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	10.590	0.312	2985.7	1855.6	9.806	3.430	3.04		Clay	50.3			10.01	1.04	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	10.510	0.280	3004.9	1864.9	9.660	3.113	3.02		Clay	49.8			9.93	1.03	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.930	10.250	0.256	3024.1	1874.1	9.325	2.913	3.01		Clay	49.3			9.69	1.03	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	9.950	0.282	3044.5	1883.9	8.947	3.343	3.06		Clay	51.4			9.40	1.03	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	10.500	0.600	3063.7	1893.1	9.478	6.691	3.23		Clay	58.8			9.97	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	16.100	0.706	3084.1	1902.9	15.301	4.862	2.88		Clay	47.7			15.22	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	28.430	0.746	3103.3	1912.1	28.114	2.919	2.63		Clay	34.6			26.87	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.750	23.160	0.983	3122.5	1921.3	22.483	4.410	2.82		Clay	41.5			21.89	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	82.420	0.769	3142.9	1931.1	80.203	1.283	2.15		Sand	20.4	73.73	1.8	132.71	1.03	136.77	200.09	0.95	0.578	1.024	1.143	1.053	1.82	0.00	0.00
26.080	78.010	0.879	3162.1	1940.3	75.439	1.150	2.04		Sand	18.0		1.8	132.72	1.03	136.67	193.55	0.95	0.578	1.021	0.862	0.792	1.37	0.00	0.00
26.250	58.370	1.140	3182.6	1950.1	56.602	2.019	2.30		Sand	24.4	73.73	1.8	132.71	1.03	136.24	200.16	0.94	0.578	1.023	1.539	1.417	2.45	0.00	0.00
26.410	31.630	0.931	3201.7	1959.3	30.657	3.060	2.62		Clay	34.1			30.09	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	17.710	0.733	3220.9	1968.6	16.367	4.862	2.94		Clay	46.0			16.74	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	19.360	0.681	3241.3	1974.3	17.084	3.832	2.86		Clay	42.9			18.33	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	21.620	0.786	3260.5	1987.6	20.115	3.932	2.83		Clay	41.7			20.43	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	22.360	0.885	3280.9	1997.3	20.737	4.272	2.84		Clay	42.2			21.12	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	22.540	0.914	3300.1	2006.5	20.822	4.373	2.84		Clay	42.4			21.30	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	22.730	0.895	3320.5	2016.3	20.889	4.257	2.83		Clay	42.0			21.48	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	23.630	0.972	3339.7	2025.6	21.683	4.427	2.83		Clay	42.0			22.35	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	27.470	1.217	3358.9	2034.8	25.350	4.720	2.80		Clay	40.8			25.96	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	28.950	1.398	3379.3	2044.6	26.668	5.128	2.81		Clay	41.1			27.36	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	28.030	1.536	3398.5	2053.8	25.641	5.832	2.86		Clay	43.1			26.49	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	27.760	1.479	3418.9	2063.6	25.248	5.676	2.86		Clay	43.0			26.24	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	25.790	1.502	3438.1	2072.8	23.226	6.240	2.91		Clay	45.1			24.38	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	24.590	1.367	3457.3	2082.0	21.961	6.012	2.91		Clay	45.2			23.24	1.00	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	22.900	1.207	3477.7	2091.8	20.230	5.703	2.93		Clay	46.6			21.64	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	21.510	1.063	3496.9	2101.0	18.811	5.476	2.94		Clay	46.3			20.33	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	22.120	1.114	3517.3	2110.8	19.293	5.471	2.93		Clay	46.0			20.91	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	23.250	1.200	3536.5	2120.0	20.266	5.584	2.92		Clay	45.6			21.96	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	21.440	1.200	3555.7	2129.2	18.460	6.136	2.98		Clay	47.9			20.26	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	18.580	1.036	3576.1	2139.0	15.701	6.157	3.04		Clay	50.2			17.56	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	16.070	0.907	3595.3	2148.2	13.287	6.366	3.10		Clay	53.0			15.19	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	14.620	0.796	3615.7	2158.0	11.874	6.250	3.13		Clay	54.4			13.82	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	15.410	0.806	3634.9	2167.3	12.544	5.923	3.10		Clay	52.9			14.57	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.180	16.300	0.817	3654.1	2176.5	13.299	5.642	3.06		Clay	51.5			15.41	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	16.180	0.797	3674.5	2186.3	13.121	5.564	3.06		Clay	51.5			15.29	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	15.420	0.711	3693.7	2195.5	12.366	5.236	3.07		Clay	51.7			14.57	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	14.830	0.690	3714.1	2205.3	11.765	5.321	3.09		Clay	52.6			14.02	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	15.780	0.694	3733.3	2214.5	12.566	5.019	3.06		Clay	50.9			14.91	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	15.020	0.664	3752.5	2223.7	11.822	4.977	3.07		Clay	51.7			14.20	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	14.510	0.740	3772.9	2233.6	11.304	5.605	3.13		Clay	54.4			13.71	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	14.400	1.140	3792.1	2242.7	11.161	8.130	3.28		Clay	60.4			13.61	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	30.830	1.604	3812.5	2252.5	25.061	5.546	2.85		Clay	42.6			29.14	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 1 | PGA (A_{max}) 0.53 | Total Settlement 0.97 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tn} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tn}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'_{vc}=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
31.660	136.310	2.560	3631.7	2261.7	122.567	1.919	2.04		Sand	17.9	523.79		523.79	0.96	514.57	667.44	0.93	0.582	0.980	2.000	1.763	3.03	0.00	0.00
31.820	204.950	3.542	3650.9	2270.9	185.233	1.744	1.80		Sand	14.7	523.79		523.79	0.96	514.12	632.78	0.93	0.582	0.979	2.000	1.761	3.03	0.00	0.00
31.990	254.640	3.911	3671.3	2280.7	230.246	1.647	1.79		Sand	12.8	523.79		523.79	0.96	513.53	603.04	0.93	0.582	0.978	2.000	1.758	3.02	0.00	0.00
32.150	332.470	4.254	3690.5	2289.9	300.306	1.287	1.68		Sand	10.4	523.79		523.79	0.96	512.09	563.06	0.93	0.582	0.976	2.000	1.756	3.02	0.00	0.00
32.320	421.670	4.572	3710.9	2290.7	380.436	1.089	1.54		Sand	8.6	523.79		523.79	0.96	512.41	533.70	0.93	0.582	0.975	2.000	1.754	3.01	0.00	0.00
32.480	537.660	3.057	3730.1	2308.9	464.910	0.570	1.25		Sand	5.0	523.79		523.79	0.96	511.87	511.65	0.92	0.582	0.974	2.000	1.752	3.01	0.00	0.00
32.640	554.170	2.230	3749.3	2318.2	469.547	0.405	1.13		Sand	3.6			523.79	0.96	511.33	511.33	0.92	0.582	0.973	2.000	1.750	3.01	0.00	0.00
32.810	472.310	2.243	3769.7	2328.0	423.621	0.477	1.23		Sand	4.8			446.42	0.96	436.31	436.36	0.92	0.582	0.971	2.000	1.747	3.00	0.00	0.00
32.970	333.070	3.843	3788.9	2337.2	297.751	1.161	1.63		Sand	9.9			314.81	0.97	308.06	333.84	0.92	0.582	0.970	2.000	1.746	3.00	0.00	0.00
33.140	180.580	3.846	4008.3	2347.0	160.266	2.153	2.00		Sand	17.0			170.00	0.97	165.53	220.36	0.92	0.582	0.969	2.000	1.743	2.99	0.00	0.00
33.300	112.240	3.032	4028.5	2356.2	96.730	2.781	2.22		Sand	22.3	170		170.00	0.97	164.07	240.42	0.92	0.582	0.968	2.000	1.741	2.99	0.00	0.00
33.460	68.250	1.630	4047.7	2365.4	59.204	2.311	2.32		Sand	26.0	170		170.00	0.97	164.66	244.66	0.92	0.582	0.967	2.000	1.739	2.99	0.00	0.00
33.630	27.570	0.969	4066.1	2375.2	21.502	3.574	2.80		[illegible]	40.7			20.06	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	12.000	0.527	4087.3	2384.4	8.361	5.288	3.20		Clay	57.8			11.34	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	11.760	0.417	4107.7	2394.2	8.106	4.208	3.16		Clay	54.8			11.12	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	12.440	0.363	4126.9	2403.4	8.636	3.406	3.08		Clay	52.2			11.76	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.280	11.620	0.337	4146.1	2412.6	8.060	3.462	3.11		Clay	53.4			11.17	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	12.060	0.364	4166.5	2422.4	8.749	3.343	3.07		Clay	51.8			11.96	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	13.100	0.400	4186.7	2431.6	9.063	3.632	3.08		Clay	52.2			12.38	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	12.770	0.446	4206.1	2441.4	8.736	4.174	3.13		Clay	54.3			12.07	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	17.200	0.637	4225.3	2450.6	12.313	4.220	3.01		Clay	40.2			16.26	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	28.400	0.680	4244.5	2459.9	21.365	2.589	2.69		Clay	36.8			26.64	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	25.370	0.742	4264.9	2469.7	18.616	3.101	2.70		Clay	40.4			23.96	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	23.370	0.686	4284.1	2478.9	17.127	3.232	2.83		Clay	41.7			22.09	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	22.540	0.646	4304.5	2488.7	16.385	3.170	2.84		Clay	42.1			21.30	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	20.330	0.610	4323.7	2497.9	14.547	3.300	2.89		Clay	44.4			19.22	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	22.370	0.840	4344.1	2507.7	16.100	4.167	2.92		Clay	46.2			21.14	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	27.550	1.340	4363.3	2516.9	20.159	5.316	2.81		[illegible]	46.1			26.04	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	43.430	2.226	4382.5	2526.1	32.060	5.305	2.76		[illegible]	30.3			41.06	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	67.420	3.159	4402.9	2535.9	56.320	4.850	2.57		Sand	32.5	159		159.00	0.95	150.88	231.68	0.91	0.581	0.946	2.000	1.701	2.93	0.00	0.00
36.580	168.830	4.000	4422.1	2545.1	143.806	2.400	2.07		Sand	18.8			158.57	0.94	150.62	213.01	0.91	0.581	0.945	2.000	1.699	2.97	0.00	0.00
36.750	234.490	3.476	4442.5	2554.9	199.791	1.408	1.82		Sand	13.3			221.64	0.95	210.88	260.71	0.91	0.581	0.943	2.000	1.697	2.92	0.00	0.00
36.910	281.940	2.424	4461.7	2564.1	240.165	0.867	1.59		Sand	9.3			266.49	0.95	253.32	271.62	0.91	0.581	0.942	2.000	1.695	2.92	0.00	0.00
37.070	322.800	1.651	4480.9	2573.3	274.747	0.516	1.39		Sand	6.6			306.10	0.95	289.75	291.57	0.91	0.581	0.941	2.000	1.693	2.91	0.00	0.00
37.240	328.840	1.843	4501.3	2583.1	279.384	0.564	1.41		Sand	6.9			310.61	0.95	294.86	297.57	0.91	0.581	0.940	2.000	1.691	2.91	0.00	0.00
37.400	340.510	1.948	4520.5	2592.3	288.844	0.576	1.41		Sand	6.8			321.64	0.95	305.00	307.03	0.91	0.581	0.939	2.000	1.689	2.91	0.00	0.00
37.570	351.950	2.064	4540.9	2602.1	298.042	0.590	1.40		Sand	6.5			332.06	0.95	314.90	317.63	0.91	0.581	0.938	2.000	1.687	2.91	0.00	0.00
37.730	346.100	2.177	4560.1	2611.3	292.630	0.633	1.43		Sand	7.1			327.13	0.95	309.47	313.36	0.91	0.581	0.937	2.000	1.686	2.90	0.00	0.00
37.890	348.160	2.102	4579.3	2620.5	291.209	0.613	1.42		Sand	7.0			320.24	0.95	308.34	311.73	0.91	0.581	0.936	2.000	1.683	2.90	0.00	0.00
38.060	351.570	1.931	4599.7	2630.4	296.092	0.563	1.39		Sand	6.6			332.30	0.94	313.78	315.59	0.91	0.580	0.935	2.000	1.681	2.90	0.00	0.00
38.220	344.880	1.812	4618.9	2639.6	288.736	0.579	1.38		Sand	6.5			325.78	0.94	307.33	308.93	0.91	0.580	0.934	2.000	1.680	2.89	0.00	0.00
38.390	334.630	1.916	4639.3	2649.4	280.533	0.577	1.42		Sand	6.9			316.10	0.94	297.90	300.86	0.90	0.580	0.933	2.000	1.678	2.89	0.00	0.00
38.550	308.370	2.916	4658.5	2658.6	256.377	0.950	1.60		Sand	9.6			289.57	0.94	272.06	293.07	0.90	0.580	0.932	2.000	1.676	2.89	0.00	0.00
38.710	311.880	3.063	4677.7	2667.8	260.390	0.990	1.61		Sand	9.6			294.58	0.94	277.12	299.64	0.90	0.580	0.930	2.000	1.674	2.89	0.00	0.00
38.880	362.370	2.839	4698.1	2677.6	302.602	0.790	1.49		Sand	7.9			342.50	0.94	321.88	330.60	0.90	0.580	0.929	2.000	1.672	2.88	0.00	0.00
39.040	376.000	2.318	4717.3	2686.8	312.560	0.621	1.41		Sand	6.6			354.44	0.94	332.80	336.61	0.90	0.580	0.928	2.000	1.670	2.88	0.00	0.00
39.210	391.740	1.773	4737.7	2696.6	326.006	0.456	1.30		Sand	5.5			370.26	0.94	347.32	347.58	0.90	0.580	0.927	2.000	1.668	2.88	0.00	0.00
39.370	381.000	1.667	4756.9	2705.8	316.457	0.440	1.30		Sand	5.6			360.11	0.94	337.50	337.77	0.90	0.580	0.926	2.000	1.666	2.88	0.00	0.00
39.530	395.830	1.576	4776.1	2715.0	328.129	0.400	1.26		Sand	5.1			373.94	0.94	350.14	350.22	0.90	0.579	0.925	2.000	1.664	2.87	0.00	0.00
39.700	393.270	1.646	4796.5	2724.8	325.505	0.472	1.31		Sand	5.6			371.71	0.94	347.72	348.07	0.90	0.579	0.924	2.000	1.662	2.87	0.00	0.00
39.860	376.720	1.844	4815.7	2734.0	311.246	0.493	1.34		Sand	6.0			356.07	0.93	332.79	335.40	0.90	0.579	0.923	2.000	1.661	2.87	0.00	0.00
40.030	384.450	1.810	4836.1	2743.8	317.098	0.474	1.32		Sand	5.8			363.57	0.93	339.30	339.74	0.90	0.579	0.922	2.000	1.659	2.86	0.00	0.00
40.190	387.060	1.919	4855.3	2753.0	318.722	0.499	1.33		Sand	5.9			365.64	0.93	341.30	341.02	0.90	0.579	0.921	2.000	1.657	2.86	0.00	0.00
40.350	388.910	1.971	4874.5	2762.3	319.712	0.510	1.34		Sand	6.0			367.60	0.93	342.63	343.36	0.90	0.579	0.920	2.000	1.656	2.86	0.00	0.00
40.520	393.470	2.243	4894.9	2772.1	322.904	0.574	1.37		Sand	6.4			371.00	0.93	346.32	347.60	0.90	0.579	0.919	2.000	1.653	2.86	0.00	0.00
40.680	441.150	2.509	4914.1	2781.3	361.869	0.572	1.36		Sand	6.1			415.07	0.93	387.06	386.93	0.90	0.578	0.918	2.000	1.651	2.86	0.00	0.00
40.850	467.710	2.721	4934.5	2791.1	382.884	0.586	1.35		Sand	5.8			442.07	0.93	410.93	411.66	0.90	0.578	0.917	2.000	1.649	2.86	0.00	0.00
41.010	481.970	2.806	4953.7	2800.3	393.902	0.582	1.31		Sand	5.6			455.56	0.93	423.09	423.46	0.90	0.578	0.916	2.000	1.648	2.85	0.00	0.00
41.170	493.490	2.706	4972.9	2809.5	402.787	0.564	1.30		Sand	5.5			466.44	0.93	432.85	433.18	0.89	0.578	0.915	2.000	1.646	2.85	0.00	0.00
41.340	528.130	4.010	4993.3	2819.3	430.413	0.766	1.38		Sand	6.5			499.16	0.93	462.78	465.10	0.89	0.578	0.914	2.000	1.644	2.85	0.00	0.00
41.500	533.300	2.994	5012.5	2828.5	433.930	0.564	1.28		Sand	5.3			504.06	0.93	466.91	467.09	0.89	0.578	0.913	2.000	1.642	2.84	0.00	0.00
41.670	524.940	2.626	5032.9	2838.3	426.350	0.503	1.25		Sand	5.0			496.16	0.93	459.17	459.23	0.89	0.578	0.912	2.000	1.640	2.84	0.00	0.00
41.830	527.660	2.886	5052.1	2847.5	428.031	0.549	1.27		Sand	5.3			498.92	0.92	461.33	461.40	0.89	0.577	0.911	2.000	1.639	2.84	0.00	0.00
41.990	517.980	4.726	5071.3	2856.7	419.205	0.917	1.46		Sand	7.4			489.58	0.92	452.31	459.60	0.89	0.577	0.910	2.000	1.637	2.84	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 1 | PGA (A_{max}) 0.53 | Total Settlement 0.97 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tn} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tn}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'_{vc}=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
42.160	598.310	5.469	5091.7	2866.5	482.180	0.919	1.42		Sand	7.0			563.62	0.92	520.24	525.26	0.89	0.577	0.909	2.000	1.636	2.83	0.00	0.00
42.320	672.990	5.081	5110.9	2875.7	543.580	0.756	1.32		Sand	5.8			636.10	0.92	586.64	587.39	0.89	0.577	0.908	2.000	1.633	2.83	0.00	0.00
42.490	674.840	5.400	5131.3	2885.5	544.136	0.812	1.35		Sand	6.1			637.84	0.92	587.73	589.10	0.89	0.577	0.907	2.000	1.632	2.83	0.00	0.00
42.650	634.040	5.066	5150.5	2894.7	510.289	0.800	1.36		Sand	6.2			600.28	0.92	551.73	563.36	0.89	0.577	0.906	2.000	1.630	2.83	0.00	0.00
42.810	616.270	4.024	5169.7	2904.0	494.327	0.657	1.30		Sand	5.5			581.54	0.92	534.96	536.25	0.89	0.576	0.905	2.000	1.628	2.82	0.00	0.00
42.980	650.010	3.336	5190.1	2913.7	521.063	0.518	1.20		Sand	4.5			614.94	0.92	565.17	566.15	0.89	0.576	0.904	2.000	1.626	2.82	0.00	0.00
43.140	587.520	3.346	5209.3	2923.0	470.486	0.572	1.26		Sand	5.1			555.41	0.92	510.03	510.14	0.89	0.576	0.903	2.000	1.625	2.82	0.00	0.00
43.310	535.110	2.019	5229.7	2932.8	427.514	0.379	1.16		Sand	4.1			505.78	0.92	464.04	464.04	0.89	0.576	0.902	2.000	1.623	2.82	0.00	0.00
43.470	470.840	3.144	5248.9	2942.0	375.317	0.671	1.36		Sand	6.4			445.03	0.92	407.97	409.87	0.89	0.576	0.901	2.000	1.621	2.82	0.00	0.00
43.640	336.860	3.117	5269.3	2951.8	267.459	0.933	1.56		Sand	8.2			318.35	0.92	291.62	310.60	0.89	0.575	0.900	2.000	1.619	2.81	0.00	0.00
43.800	378.060	2.547	5288.5	2961.0	299.100	0.680	1.45		Sand	7.3			356.31	0.92	326.09	331.15	0.89	0.575	0.899	2.000	1.618	2.81	0.00	0.00
43.960	469.770	2.480	5307.7	2970.2	372.563	0.533	1.31		Sand	5.0			444.02	0.91	406.02	406.37	0.88	0.575	0.898	2.000	1.616	2.81	0.00	0.00
44.130	507.410	2.469	5328.1	2980.0	402.011	0.494	1.26		Sand	5.1			479.59	0.91	438.17	438.26	0.88	0.575	0.897	2.000	1.614	2.81	0.00	0.00
44.290	510.340	2.632	5347.3	2989.2	403.713	0.518	1.27		Sand	5.2			482.30	0.91	440.34	440.48	0.88	0.575	0.896	2.000	1.612	2.81	0.00	0.00
44.460	502.240	2.685	5367.7	2999.0	396.614	0.539	1.29		Sand	5.4			474.71	0.91	432.98	433.22	0.88	0.575	0.895	2.000	1.611	2.80	0.00	0.00
44.620	461.990	2.630	5386.9	3008.2	364.092	0.573	1.33		Sand	5.9			436.56	0.91	397.96	398.69	0.88	0.574	0.894	2.000	1.609	2.80	0.00	0.00
44.780	486.500	2.284	5406.1	3017.4	382.207	0.466	1.26		Sand	5.1			459.97	0.91	417.96	418.03	0.88	0.574	0.894	2.000	1.607	2.80	0.00	0.00
44.950	442.840	2.080	5426.5	3027.2	347.799	0.476	1.29		Sand	5.4			418.58	0.91	380.63	381.05	0.88	0.574	0.893	2.000	1.606	2.80	0.00	0.00
45.110	398.880	2.461	5445.7	3036.4	312.577	0.621	1.41		Sand	6.9			377.01	0.91	342.76	346.52	0.88	0.574	0.892	2.000	1.604	2.80	0.00	0.00
45.280	361.250	2.166	5466.1	3046.2	282.425	0.606	1.43		Sand	7.1			341.45	0.91	310.16	313.86	0.88	0.574	0.891	2.000	1.602	2.79	0.00	0.00
45.440	319.580	1.729	5485.3	3055.4	249.213	0.540	1.44		Sand	7.2			302.06	0.91	274.16	276.01	0.88	0.573	0.890	2.000	1.601	2.79	0.00	0.00
45.600	291.770	1.248	5504.5	3064.7	226.060	0.432	1.40		Sand	6.8			275.75	0.91	249.60	252.00	0.88	0.573	0.889	2.000	1.599	2.79	0.00	0.00
45.770	249.840	2.130	5524.9	3074.5	193.514	0.865	1.65		Sand	10.4			236.87	0.90	212.17	236.64	0.88	0.573	0.888	2.000	1.597	2.79	0.00	0.00
45.930	142.050	2.852	5544.1	3083.7	109.049	1.904	2.07		Sand	16.7	236		236.00	0.91	212.77	291.66	0.88	0.573	0.887	2.000	1.596	2.79	0.00	0.00
46.100	74.330	3.247	5564.5	3093.5	46.257	4.536	2.60		[illegible]	33.7			70.28	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.260	73.810	2.936	5583.7	3102.7	66.278	4.146	2.52		Sand	31.0			69.57	0.83	67.81	106.40	0.88	0.572	0.987	0.164	0.132	0.23	0.03	0.06
46.420	45.350	1.063	5602.9	3111.9	27.340	3.068	2.73		[illegible]	38.0			42.80	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.590	31.060	1.003	5623.3	3121.7	18.008	3.540	2.83		[illegible]	42.0			29.38	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.750	24.970	0.907	5642.5	3130.9	14.148	4.004	2.96		Clay	46.9			23.60	0.90	n.a.	n.a.	0.87	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	23.640	0.804	5662.9	3140.7	13.261	3.805	2.96		Clay	47.2			22.34	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	23.150	0.776	5682.1	3149.9	12.895	3.833	2.97		Clay	47.5			21.88	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.240	22.430	0.756	5701.3	3159.1	12.395	3.856	2.99		Clay	48.1			21.20	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	22.240	0.754	5721.7	3168.9	12.231	3.888	2.99		Clay	48.4			21.02	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	21.910	0.749	5740.9	3178.1	11.982	3.904	3.00		Clay	48.6			20.71	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	22.000	0.722	5761.3	3187.9	11.985	3.776	2.99		Clay	48.3			20.79	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	20.800	0.692	5780.5	3197.1	11.204	3.609	3.01		Clay	48.9			19.66	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.060	20.540	0.699	5799.7	3206.4	11.003	3.460	3.00		Clay	48.9			19.41	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	19.860	0.585	5820.1	3216.1	10.641	3.463	3.01		Clay	49.3			18.77	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.390	19.070	0.642	5839.3	3225.4	10.015	3.367	3.02		Clay	49.7			18.02	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.560	17.840	0.494	5859.7	3235.2	9.216	3.314	3.06		Clay	50.9			16.86	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	15.680	0.457	5878.9	3244.4	7.884	3.506	3.13		Clay	54.5			14.82	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.880	14.280	0.436	5898.1	3253.6	6.965	3.809	3.19		Clay	57.1			13.50	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.050	13.950	0.416	5918.5	3263.4	6.742	3.776	3.19		Clay	57.4			13.19	0.89	n.a.	n.a.	0.87	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.210	14.710	0.420	5937.7	3272.6	7.175	3.574	3.16		Clay	55.7			13.90	0.89	n.a.	n.a.	0.87	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.380	16.430	0.436	5958.1	3282.4	8.196	3.236	3.09		Clay	52.5			15.53	0.89	n.a.	n.a.	0.87	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	18.070	0.471	5977.3	3291.6	9.164	3.125	3.04		Clay	50.3			17.08	0.89	n.a.	n.a.	0.86	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.700	19.160	0.544	5996.5	3300.8	9.793	3.308	3.03		[illegible]	50.1			18.11	0.89	n.a.	n.a.	0.86	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.870			6016.9	3310.0										0.89		n.a.							0.00	

CORNERSTONE EARTH GROUP

CPT No: 2 | PGA (A_{max}): 0.53 | Total Settlement: 3.55 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_c)	Interpreted Q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5}$ & σ'_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
0.160	0.340	0.047	20.0	20.0	33.000	14.091	3.87		Unsaturated	51.7			0.32	1.70	0.66	31.00	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.330	12.440	0.442	41.3	41.3	54.074	3.557	2.36		Unsaturated	26.8			11.76	1.70	19.99	54.14	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	41.640	0.640	61.3	61.3	231.159	1.559	1.79		Unsaturated	12.8			39.36	1.70	66.91	96.13	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	34.400	0.614	82.6	82.6	164.408	1.786	1.93		Unsaturated	16.5			32.51	1.70	55.27	86.73	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	41.960	1.516	102.5	102.5	179.878	3.622	2.15		Unsaturated	20.6			39.66	1.70	67.42	111.38	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	73.660	3.356	122.6	122.5	259.196	4.650	2.13		Unsaturated	20.1			69.64	1.70	118.30	175.83	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.160	96.680	4.360	143.8	143.8	327.886	4.421	2.06		Unsaturated	18.6			93.27	1.70	158.56	223.86	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	96.610	4.257	163.8	163.8	327.971	4.360	2.09		Unsaturated	19.1			91.31	1.70	155.23	220.42	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	77.340	7.112	186.0	186.0	246.928	9.207	2.44		Unsaturated	28.3			73.10	1.70	124.27	193.69	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	63.940	6.033	206.0	206.0	193.652	9.450	2.40		Unsaturated	30.1			60.43	1.70	102.74	168.20	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	70.610	3.768	226.0	226.0	204.051	5.348	2.27		Unsaturated	23.5			66.84	1.70	113.30	174.94	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	84.390	3.103	246.3	246.3	233.475	3.682	2.10		Unsaturated	19.2			79.76	1.70	135.60	195.86	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	65.310	2.962	266.3	266.3	173.888	4.576	2.25		Unsaturated	23.0			61.73	1.70	104.94	163.35	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	39.040	2.640	287.5	287.5	90.736	6.786	2.52		Unsaturated	31.1			36.90	1.70	62.73	113.10	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	32.330	2.226	307.5	307.5	79.778	6.919	2.59		Unsaturated	33.2			30.56	1.70	51.95	99.22	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	25.400	2.131	327.6	327.5	58.264	8.423	2.63		Unsaturated	34.7			24.06	1.70	40.91	84.67	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.780	22.360	1.977	348.6	348.6	74.078	9.009	2.70		Unsaturated	38.9			21.13	1.70	35.93	78.23	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	20.820	1.736	368.8	368.8	66.284	8.420	2.71		Unsaturated	37.2			19.68	1.70	33.46	74.00	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	19.830	1.515	390.0	390.0	60.828	7.715	2.70		Unsaturated	37.0			18.74	1.70	31.86	72.62	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	19.360	1.364	410.0	410.0	67.080	7.126	2.69		Unsaturated	36.7			18.20	1.70	31.09	71.74	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	19.120	1.287	430.0	430.0	64.516	6.806	2.69		Unsaturated	36.0			18.07	1.70	30.72	71.25	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	19.960	1.294	461.3	461.3	65.018	6.568	2.67		Unsaturated	36.1			18.67	1.70	32.07	72.99	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	20.490	1.319	471.3	471.3	64.780	6.512	2.67		Unsaturated	36.0			19.37	1.70	32.92	74.15	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	20.260	1.334	492.5	492.5	62.485	6.603	2.69		Unsaturated	36.7			19.15	1.70	32.56	73.71	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	20.410	1.331	512.5	512.5	61.306	6.606	2.69		Mixed	36.6			19.29	1.70	32.79	74.06	1.00	0.346	1.100	0.105	0.104	0.30	0.04	0.09
4.270	21.350	1.426	533.8	533.8	62.261	6.750	2.70		Mixed	36.9			20.18	1.70	34.31	78.10	1.00	0.356	1.100	0.107	0.106	0.30	0.04	0.08
4.430	23.730	1.475	553.8	553.8	56.857	6.201	2.65		Mixed	35.3			22.43	1.70	38.13	81.03	1.00	0.361	1.100	0.114	0.113	0.31	0.04	0.08
4.590	24.900	1.496	573.8	573.8	58.001	6.076	2.63		Mixed	34.7			23.53	1.70	40.01	83.46	1.00	0.367	1.100	0.117	0.116	0.32	0.04	0.08
4.760	24.920	1.488	595.0	595.0	56.565	6.046	2.64		Mixed	34.6			23.56	1.70	40.04	83.53	1.00	0.373	1.100	0.118	0.116	0.31	0.04	0.07
4.920	25.800	1.401	615.0	615.0	57.426	5.474	2.60		Mixed	33.6			24.47	1.70	41.60	85.41	1.00	0.379	1.100	0.120	0.119	0.31	0.04	0.08
5.090	26.330	1.344	636.3	636.3	57.017	5.165	2.58		Mixed	33.0			24.89	1.70	42.31	86.24	1.00	0.384	1.100	0.121	0.120	0.31	0.04	0.07
5.250	27.350	1.273	656.3	656.3	57.962	4.711	2.56		Mixed	31.9			25.68	1.70	43.06	86.18	1.00	0.390	1.100	0.124	0.123	0.32	0.04	0.07
5.410	26.090	1.227	676.3	676.3	54.090	4.764	2.57		Mixed	32.7			24.66	1.70	41.92	86.66	1.00	0.395	1.100	0.121	0.119	0.30	0.04	0.08
5.580	27.610	1.227	697.5	697.5	56.033	4.501	2.64		Mixed	31.7			26.10	1.70	44.38	88.70	1.00	0.400	1.100	0.125	0.124	0.31	0.04	0.07
5.740	26.820	1.173	717.5	717.5	63.322	4.434	2.66		Mixed	32.1			25.35	1.70	43.09	87.06	1.00	0.405	1.100	0.123	0.121	0.30	0.04	0.08
5.910	26.320	1.171	738.8	738.8	61.236	4.514	2.67		Mixed	32.6			24.88	1.70	42.29	86.14	1.00	0.409	1.100	0.121	0.120	0.29	0.04	0.07
6.070	23.980	0.981	758.8	758.8	45.733	4.108	2.68		Mixed	33.0			22.67	1.70	36.53	81.17	1.00	0.414	1.004	0.114	0.112	0.27	0.04	0.06
6.230	21.750	0.946	778.8	778.8	40.646	4.420	2.64		Mixed	34.6			20.56	1.70	34.95	78.68	1.00	0.418	1.080	0.108	0.106	0.25	0.04	0.08
6.400	21.570	0.926	800.0	800.0	39.531	4.343	2.64		Mixed	36.0			20.39	1.70	34.66	78.32	0.99	0.422	1.086	0.106	0.105	0.25	0.04	0.08
6.560	22.560	0.933	818.7	818.0	40.776	4.215	2.62		Mixed	34.2			21.31	1.69	36.04	78.06	0.99	0.426	1.085	0.110	0.107	0.25	0.04	0.08
6.730	22.060	0.853	840.1	825.7	39.504	3.944	2.61		Mixed	33.9			20.84	1.65	35.13	78.77	0.99	0.431	1.083	0.106	0.106	0.25	0.04	0.08
6.890	22.430	0.874	859.3	835.0	39.869	3.971	2.61		Mixed	33.9			21.20	1.67	35.47	77.23	0.99	0.434	1.083	0.109	0.106	0.24	0.04	0.08
7.060	22.290	0.813	878.5	844.2	39.296	3.721	2.59		Mixed	33.4			21.07	1.67	35.09	76.62	0.99	0.438	1.081	0.108	0.106	0.24	0.04	0.09
7.220	21.840	0.744	898.9	854.0	38.158	3.479	2.58		Mixed	33.0			20.64	1.66	34.28	75.44	0.99	0.442	1.080	0.107	0.103	0.23	0.04	0.08
7.380	21.790	0.813	918.1	863.2	37.767	3.612	2.61		Mixed	34.0			20.60	1.65	33.90	75.27	0.99	0.446	1.079	0.106	0.103	0.23	0.04	0.09
7.550	23.250	0.983	938.5	873.0	40.017	4.229	2.63		Mixed	34.6			21.98	1.63	35.82	77.81	0.99	0.449	1.079	0.110	0.106	0.24	0.04	0.08
7.710	22.350	1.060	957.7	882.2	49.843	4.828	2.60		[illegible]	33.7			21.12	1.26	n.a.	n.a.	0.99	0.452	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.870	24.340	1.068	978.9	891.4	41.289	4.564	2.64		Mixed	34.9			23.01	1.61	36.04	79.36	0.99	0.455	1.075	0.112	0.108	0.24	0.04	0.08
8.040	25.310	1.093	997.3	901.2	42.824	4.403	2.62		Mixed	34.2			23.92	1.59	38.07	80.78	0.99	0.458	1.075	0.114	0.110	0.24	0.04	0.08
8.200	24.780	1.104	1018.6	910.4	41.401	4.640	2.64		Mixed	34.9			23.42	1.59	37.15	79.69	0.99	0.461	1.076	0.112	0.109	0.24	0.04	0.08
8.370	22.610	0.860	1038.9	920.2	37.401	4.025	2.63		Mixed	34.7			21.37	1.59	34.02	75.42	0.99	0.464	1.073	0.107	0.103	0.22	0.04	0.08
8.530	23.150	1.229	1058.1	929.4	48.679	5.432	2.65		[illegible]	36.1			21.86	1.24	n.a.	n.a.	0.99	0.467	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.690	24.190	1.262	1075.3	938.6	50.307	5.843	2.69		[illegible]	36.6			22.86	1.24	n.a.	n.a.	0.99	0.470	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.860	33.490	1.140	1095.7	948.4	46.607	3.462	2.52		Sand	30.9	150.44		150.44	1.24	186.91	277.78	0.99	0.473	1.100	2.000	1.979	4.19	0.00	0.00
9.020	71.740	1.062	1114.9	957.7	100.010	1.519	2.03		Sand	17.7	150.44		150.44	1.23	186.48	263.72	0.99	0.476	1.100	2.000	1.979	4.16	0.00	0.00
9.190	94.060	1.443	1136.3	967.4	130.688	1.544	1.95		Sand	16.0	150.44		150.44	1.24	186.11	246.87	0.99	0.478	1.100	2.000	1.979	4.14	0.00	0.00
9.350	106.460	2.452	1154.8	976.7	160.097	2.274	2.04		Sand	17.9	150.44		150.44	1.23	184.58	253.36	0.99	0.481	1.100	2.000	1.979	4.12	0.00	0.00
9.510	115.640	2.150	1173.7	985.9	156.406	1.912	1.97		Sand	16.3	150.44		150.44	1.23	185.06	247.36	0.99	0.483	1.100	2.000	1.979	4.10	0.00	0.00
9.680	141.600	1.100	1194.1	995.7	194.411	0.779	1.62		Sand	9.8	150.44		150.44	1.27	191.01	209.76	0.99	0.485	1.100	1.871	1.851	3.81	0.00	0.00
9.840	169.170	0.792	1213.3	1004.9	217.479	0.499	1.40		Sand	7.5			150.44	1.26	192.69	196.64	0.99	0.488	1.100	0.989	0.978	2.01	0.00	0.00
10.010	147.280	1.015	1233.7	1014.7	200.157	0.694	1.58		Sand	9.2			139.19	1.28	178.75	191.67	0.99	0.490	1.100	0.806	0.798	1.63	0.00	0.00
10.170	147.080	0.757	1252.9	1023.9	196.896	0.617	1.50		Sand	8.0			139.02	1.29	179.16	186.29	0.99	0.492	1.100	0.636	0.628	1.28	0.00	0.01
10.330	172.240	0.982	1272.1	1033.1	232.127	0.661	1.47		Sand	7.6			162.80	1.26	204.41	209.18	0.99	0.494	1.100	1.810	1.790	3.62	0.00	0.00
10.500	187.710	0.620	1292.6	1042.8	251.840	0.438	1.37		Sand	6.4			177.42	1.24	219.80	220.67	0.99	0.497	1.100	2.000	1.979	3.98	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 2 | PGA (A_{max}): 0.53 | Total Settlement: 3.55 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_c)	Interpreted Q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5}$ & σ'_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
10.660	177.830	0.709	1311.7	1052.1	237.219	0.401	1.37		Sand	8.3			167.89	1.25	209.37	210.34	0.99	0.499	1.100	1.933	1.912	3.84	0.00	0.00
10.820	181.240	0.814	1332.1	1061.9	240.920	0.340	1.32		Sand	5.8			171.30	1.24	212.53	212.86	0.99	0.501	1.100	2.000	1.979	3.95	0.00	0.00
10.990	180.100	0.636	1351.3	1071.1	238.300	0.244	1.25		Sand	5.0			170.23	1.24	210.87	211.00	0.99	0.503	1.100	2.000	1.979	3.94	0.00	0.00
11.150	177.560	0.672	1370.5	1080.3	233.969	0.380	1.36		Sand	6.2			167.83	1.24	207.86	208.66	0.99	0.504	1.100	1.759	1.740	3.45	0.00	0.00
11.320	162.450	0.506	1390.9	1090.1	213.006	0.313	1.38		Sand	6.1			153.64	1.25	192.28	192.84	0.98	0.506	1.100	0.838	0.829	1.64	0.00	0.00
11.480	139.820	0.586	1410.1	1099.3	182.422	0.421	1.47		Sand	7.7			132.16	1.27	168.18	172.63	0.98	0.508	1.100	0.436	0.431	0.85	0.01	0.02
11.650	163.060	0.391	1430.5	1109.1	211.968	0.241	1.29		Sand	5.5			154.14	1.25	192.01	192.15	0.98	0.510	1.100	0.815	0.806	1.58	0.00	0.00
11.810	172.030	2.230	1449.7	1118.4	222.717	1.302	1.74		Sand	11.9			162.60	1.20	195.64	231.26	0.98	0.512	1.100	2.000	1.979	3.87	0.00	0.00
11.980	229.360	2.226	1470.1	1128.1	294.662	0.977	1.57		Sand	9.0			216.84	1.18	264.80	270.66	0.98	0.513	1.100	2.000	1.979	3.86	0.00	0.00
12.140	285.740	1.944	1489.3	1137.4	367.418	0.682	1.39		Sand	6.6			270.08	1.18	318.14	320.08	0.98	0.515	1.100	2.000	1.979	3.84	0.00	0.00
12.300	272.770	0.422	1508.5	1146.6	349.272	0.156	1.01		Sand	2.6			257.82	1.18	303.05	303.06	0.98	0.517	1.100	2.000	1.979	3.83	0.00	0.00
12.470	246.160	0.569	1528.9	1156.4	312.476	0.233	1.14		Sand	3.9			231.72	1.17	271.77	271.77	0.98	0.518	1.100	2.000	1.979	3.82	0.00	0.00
12.630	210.280	0.738	1548.1	1165.6	266.606	0.352	1.30		Sand	5.5			198.75	1.19	236.54	236.71	0.98	0.520	1.100	2.000	1.979	3.81	0.00	0.00
12.800	160.170	0.670	1568.5	1175.4	202.131	0.387	1.40		Sand	6.7			151.39	1.23	186.35	187.17	0.98	0.521	1.100	0.677	0.670	1.29	0.00	0.01
12.960	104.600	0.659	1587.7	1184.6	131.132	0.634	1.70		Sand	11.0			98.87	1.27	125.30	140.81	0.98	0.523	1.100	0.268	0.263	0.48	0.02	0.04
13.120	45.900	1.058	1606.9	1193.8	58.748	2.345	2.34		Sand	25.6			43.38	1.32	57.45	103.42	0.98	0.524	1.063	0.148	0.142	0.27	0.03	0.06
13.290	24.300	1.044	1627.3	1203.6	39.027	4.443	2.66		[illegible]	36.5			22.97	1.18	n.a.	n.a.	0.98	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.450	15.210	0.600	1646.5	1212.8	23.724	5.602	2.87		[illegible]	43.6			14.36	1.18	n.a.	n.a.	0.98	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.620	18.420	0.431	1666.9	1222.6	24.404	2.461	2.63		Mixed	34.7			17.41	1.39	24.16	62.16	0.98	0.529	1.043	0.090	0.085	0.16	0.05	0.10
13.780	132.420	0.426	1686.1	1231.8	182.960	0.325	1.40		Sand	7.4			125.18	1.24	164.61	167.69	0.98	0.530	1.090	0.313	0.307	0.58	0.02	0.04
13.940	164.480	0.330	1705.3	1241.0	201.940	0.202	1.28		Sand	5.3			155.48	1.20	187.00	187.17	0.98	0.531	1.100	0.677	0.670	1.26	0.00	0.01
14.110	164.070	0.273	1725.7	1250.6	200.637	0.167	1.25		Sand	5.0			155.08	1.20	186.23	186.27	0.98	0.532	1.100	0.656	0.649	1.22	0.00	0.01
14.270	177.210	0.349	1744.9	1260.1	215.665	0.198	1.25		Sand	5.0			167.50	1.19	198.55	198.66	0.98	0.534	1.100	1.081	1.070	2.01	0.00	0.00
14.440	184.420	0.207	1765.3	1269.8	223.936	0.113	1.15		Sand	4.0			174.31	1.18	205.49	205.49	0.98	0.535	1.100	1.487	1.471	2.75	0.00	0.00
14.600	167.430	0.732	1784.5	1279.1	202.460	0.130	1.22		Sand	4.7			158.25	1.19	188.31	188.32	0.98	0.536	1.100	0.706	0.698	1.30	0.00	0.00
14.760	133.580	0.174	1803.7	1288.3	160.665	0.131	1.31		Sand	5.8			126.24	1.22	153.72	153.91	0.98	0.537	1.082	0.290	0.283	0.53	0.02	0.04
14.930	109.320	0.583	1824.1	1298.1	130.623	0.519	1.65		Sand	10.2			103.33	1.22	126.64	143.14	0.98	0.538	1.074	0.243	0.235	0.44	0.02	0.04
15.090	110.250	0.618	1843.3	1307.3	131.408	0.566	1.60		Sand	10.5			104.21	1.22	126.60	145.56	0.98	0.539	1.074	0.253	0.244	0.45	0.02	0.04
15.260	75.970	1.509	1863.7	1317.1	89.896	2.130	2.17		Sand	20.9	104		104.00	1.18	122.91	183.36	0.98	0.541	1.100	0.595	0.589	1.09	0.01	0.01
15.420	33.230	1.419	1882.9	1326.3	42.323	4.390	2.82		Mixed	34.3			31.41	1.28	40.35	83.86	0.97	0.542	1.044	0.116	0.111	0.20	0.04	0.07
15.580	13.180	0.975	1902.1	1335.5	18.314	7.975	3.06		[illegible]	51.4			12.46	1.13	n.a.	n.a.	0.97	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	35.070	2.402	1922.5	1345.3	50.706	7.042	2.72		[illegible]	37.7			33.15	1.13	n.a.	n.a.	0.97	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	153.760	3.567	1941.7	1354.5	180.489	2.336	2.00		Sand	17.0	250		250.00	1.12	281.22	360.41	0.97	0.545	1.100	2.000	1.979	3.63	0.00	0.00
16.080	266.600	4.060	1962.1	1364.3	312.544	1.625	1.71		Sand	11.3			251.99	1.12	282.61	323.00	0.97	0.546	1.100	2.000	1.979	3.63	0.00	0.00
16.240	307.080	3.087	1981.3	1373.5	359.089	1.002	1.53		Sand	8.4			290.25	1.12	325.30	336.02	0.97	0.547	1.100	2.000	1.979	3.62	0.00	0.00
16.400	334.520	2.360	2000.5	1382.7	369.063	0.708	1.38		Sand	6.5			316.18	1.12	353.74	355.87	0.97	0.547	1.100	2.000	1.979	3.61	0.00	0.00
16.570	357.220	3.757	2020.9	1392.5	416.029	1.056	1.51		Sand	8.1			337.64	1.12	377.04	386.87	0.97	0.548	1.100	2.000	1.979	3.61	0.00	0.00
16.730	384.310	3.209	2040.1	1401.7	448.197	0.837	1.41		Sand	6.8			363.24	1.11	404.93	406.17	0.97	0.549	1.100	2.000	1.979	3.60	0.00	0.00
16.900	447.850	3.240	2060.5	1411.5	517.060	0.726	1.32		Sand	5.8			423.30	1.11	471.01	471.55	0.97	0.550	1.100	2.000	1.979	3.60	0.00	0.00
17.060	484.280	2.367	2079.7	1420.5	557.411	0.490	1.10		Sand	4.1			457.73	1.11	508.46	508.45	0.97	0.551	1.100	2.000	1.979	3.59	0.00	0.00
17.220	463.860	1.601	2098.9	1430.0	531.918	0.409	1.12		Sand	3.7			438.26	1.11	486.00	486.00	0.97	0.552	1.100	2.000	1.979	3.59	0.00	0.00
17.390	435.330	2.342	2119.3	1439.8	497.807	0.539	1.23		Sand	4.5			411.47	1.11	455.40	455.40	0.97	0.553	1.100	2.000	1.979	3.58	0.00	0.00
17.550	369.840	2.511	2138.5	1449.0	420.960	0.681	1.35		Sand	6.1			349.35	1.11	388.08	387.12	0.97	0.554	1.100	2.000	1.979	3.57	0.00	0.00
17.720	321.400	1.995	2158.9	1458.8	364.630	0.623	1.36		Sand	6.2			303.76	1.10	336.10	336.27	0.97	0.554	1.100	2.000	1.979	3.57	0.00	0.00
17.880	291.020	1.200	2178.1	1468.0	320.888	0.413	1.27		Sand	5.2			275.03	1.10	303.56	303.63	0.97	0.555	1.100	2.000	1.979	3.56	0.00	0.00
18.040	278.780	1.040	2197.3	1477.2	314.100	0.374	1.26		Sand	5.1			263.46	1.10	289.68	289.74	0.97	0.556	1.100	2.000	1.979	3.56	0.00	0.00
18.210	270.890	0.446	2217.7	1487.0	304.179	0.166	1.08		Sand	3.4			256.04	1.10	281.01	281.01	0.97	0.557	1.100	2.000	1.979	3.56	0.00	0.00
18.370	247.990	0.901	2236.9	1496.2	277.490	0.366	1.29		Sand	5.4			234.40	1.10	256.84	257.00	0.97	0.557	1.100	2.000	1.979	3.55	0.00	0.00
18.540	276.280	0.876	2257.3	1506.0	306.270	0.318	1.22		Sand	4.7			261.13	1.09	285.66	285.66	0.97	0.558	1.100	2.000	1.979	3.55	0.00	0.00
18.700	335.740	1.242	2276.5	1515.2	373.734	0.371	1.20		Sand	4.5			317.33	1.09	346.58	346.57	0.97	0.559	1.100	2.000	1.979	3.54	0.00	0.00
18.860	368.290	1.151	2295.7	1524.4	408.830	0.313	1.12		Sand	3.7			348.10	1.09	379.55	379.55	0.97	0.559	1.098	2.000	1.976	3.53	0.00	0.00
19.030	407.360	1.952	2316.1	1534.2	460.922	0.481	1.22		Sand	4.7			385.06	1.09	419.14	419.16	0.97	0.560	1.096	2.000	1.972	3.52	0.00	0.00
19.190	465.010	4.542	2335.3	1543.4	513.331	0.979	1.43		Sand	7.1			439.52	1.09	477.67	482.90	0.97	0.561	1.095	2.000	1.969	3.51	0.00	0.00
19.360	419.100	3.216	2355.7	1553.2	461.051	0.770	1.37		Sand	6.5			396.12	1.08	429.79	431.46	0.96	0.561	1.093	2.000	1.966	3.50	0.00	0.00
19.520	383.910	2.882	2374.9	1562.5	420.972	0.753	1.39		Sand	6.6			362.86	1.08	393.09	395.21	0.96	0.562	1.091	2.000	1.963	3.49	0.00	0.00
19.690	353.500	2.681	2395.3	1572.2	386.303	0.781	1.41		Sand	6.9			334.12	1.08	361.39	364.83	0.96	0.563	1.089	2.000	1.959	3.48	0.00	0.00
19.850	350.340	1.823	2414.5	1581.5	381.710	0.522	1.29		Sand	5.4			331.13	1.08	357.67	357.79	0.96	0.563	1.087	2.000	1.956	3.47	0.00	0.00
20.010	316.820	1.744	2433.7	1590.7	343.833	0.553	1.34		Sand	6.0			299.26	1.08	322.66	323.38	0.96	0.564	1.086	2.000	1.953	3.46	0.00	0.00
20.180	338.360	1.231	2454.1	1600.5	366.395	0.366	1.20		Sand	4.6			319.81	1.08	344.28	344.27	0.96	0.564	1.084	2.000	1.950	3.46	0.00	0.00
20.340	334.100	1.927	2473.3	1609.7	360.715	0.579	1.34		Sand	6.0			315.78	1.07	339.41	340.16	0.96	0.565	1.082	2.000	1.947	3.45	0.00	0.00
20.510	328.170	1.409	2493.7	1619.5	353.206	0.431	1.26		Sand	5.1			310.18	1.07	332.85	332.92	0.96	0.565	1.080	2.000	1.943	3.44	0.00	0.00
20.670	319.700	1.176	2512.9	1628.7	343.169	0.370	1.22		Sand	4.7			302.26	1.07	323.87	323.89	0.96	0.566	1.079	2.000	1.940	3.43	0.00	0.00
20.830	291.740	0.263	2532.1	1637.9	312.067	0.097	1.09		Sand	2.8			275.75	1.07	295.82	296.02	0.96	0.566	1.077	2.000	1.937	3.42	0.00	0.00
21.000	202.680	0.404	2552.5	1647.7	218.725	0.201	1.25		Sand	5.0			191.57	1.06	207.51	207.55	0.96	0.567	1.072	1.667	1.598	2.82	0.00	0.00

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Reg Soil Type	Fines (%)	Q_{tn} near interface (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tn}	C_N	Q_{c1N}	Q_{c1N-cs}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
21.160	112.640	0.814	2571.7	1656.9	118.833	0.732	1.77		Sand	12.3			106.37	1.11	117.60	145.74	0.96	0.567	1.038	0.263	0.230	0.42	0.02	0.04
21.330	44.820	0.806	2592.1	1666.7	46.352	1.805	2.30		Sand	24.4	106		106.00	1.09	115.48	178.82	0.96	0.566	1.060	0.517	0.456	0.80	0.01	0.02
21.490	16.820	0.470	2611.3	1675.9	16.514	3.066	2.79		[illegible]	40.3			16.90	1.06	n.a.	n.a.	0.95	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650			2630.6	1685.1										1.06		n.a.							0.00	
21.820	12.230	0.021	2650.6	1694.9	11.516	0.180	2.46		Sand	29.1			11.56	1.16	13.36	46.54	0.96	0.569	1.015	0.074	0.066	0.12	0.07	0.13
21.980	12.310	0.053	2670.1	1704.1	11.559	0.452	2.57		Sand	32.6			11.64	1.15	13.39	47.35	0.96	0.570	1.015	0.075	0.066	0.12	0.06	0.13
22.150	13.670	0.080	2690.5	1713.9	12.830	0.731	2.60		Sand	33.5			12.83	1.14	14.66	49.27	0.96	0.570	1.016	0.077	0.070	0.12	0.06	0.12
22.310	13.670	0.122	2709.7	1723.2	14.626	0.872	2.60		[illegible]	33.7			13.11	1.06	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	14.100	0.101	2728.9	1732.4	13.304	0.761	2.60		Sand	33.8			13.33	1.14	15.14	49.60	0.96	0.571	1.014	0.077	0.071	0.12	0.06	0.13
22.640	13.680	0.141	2749.3	1742.2	14.127	1.140	2.65		[illegible]	36.3			12.93	1.06	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	14.330	0.117	2768.5	1751.4	13.968	0.807	2.61		Mixed	33.8			13.64	1.13	15.28	50.11	0.96	0.572	1.013	0.078	0.071	0.12	0.06	0.12
22.970	15.100	0.341	2788.9	1761.2	15.632	2.474	2.70		Clay	40.3			14.33	1.05	n.a.	n.a.	0.96	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	16.320	0.329	2808.1	1770.4	16.650	2.106	2.73		Clay	39.3			15.43	1.05	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	19.670	0.274	2827.3	1779.6	19.372	1.507	2.50		Mixed	33.3			18.50	1.11	20.57	67.14	0.95	0.573	1.013	0.086	0.077	0.13	0.05	0.11
23.460	18.000	0.640	2847.7	1789.4	17.296	4.106	2.89		[illegible]	44.4			15.97	1.05	n.a.	n.a.	0.95	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.620	23.850	0.742	2866.9	1798.6	24.929	3.308	2.71		[illegible]	37.3			22.54	1.04	n.a.	n.a.	0.96	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	48.060	1.122	2887.3	1808.4	45.618	2.515	2.43		Sand	28.2			45.53	1.08	47.23	91.32	0.95	0.574	1.016	0.129	0.118	0.21	0.04	0.07
23.950	42.970	0.881	2906.5	1817.6	42.339	1.591	2.33		Sand	25.2			40.81	1.08	44.04	86.61	0.95	0.574	1.014	0.120	0.110	0.19	0.04	0.07
24.110	22.210	1.056	2925.7	1826.8	22.714	5.084	2.80	0	[illegible]	25.0			20.99	1.04	n.a.	n.a.	0.95	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	26.210	0.991	2946.1	1836.6	26.937	4.006	2.74	0	[illegible]	25.0			24.77	1.04	n.a.	n.a.	0.95	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	67.260	1.601	2965.5	1845.8	65.609	2.290	2.21	0	Sand	25.0		1.8	114.43	1.06	120.06	186.63	0.95	0.575	1.031	0.640	0.580	1.03	0.01	0.01
24.610	90.060	1.298	2985.7	1855.6	88.373	1.443	2.06	0	Sand	25.0		1.8	151.50	1.04	157.30	234.50	0.95	0.576	1.036	2.000	1.070	3.25	0.00	0.00
24.770	40.060	0.624	3004.9	1864.9	47.002	1.311	2.23	0	Sand	25.0		1.8	83.60	1.06	87.00	143.27	0.95	0.576	1.019	0.244	0.224	0.39	0.02	0.04
24.930	21.580	0.398	3024.1	1874.1	21.418	1.982	2.62	0	[illegible]	25.0			20.40	1.03	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	13.240	0.783	3044.5	1883.9	12.440	6.080	3.13	0	[illegible]	25.0			12.51	1.03	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	21.470	1.408	3063.7	1893.1	21.064	7.300	2.90	0	[illegible]	25.0			20.29	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	43.760	1.619	3084.1	1902.9	44.302	4.310	2.60	0	[illegible]	26.0			41.36	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	86.600	1.030	3103.3	1912.1	83.769	1.220	2.03	0	Sand	26.0	166.53	1.72	260.87	1.03	297.73	418.50	0.95	0.577	1.030	2.000	1.654	3.21	0.00	0.00
25.750	178.510	0.637	3122.5	1921.3	176.320	0.360	1.46	0	Sand	26.0		1.72	260.86	1.03	297.36	419.01	0.95	0.577	1.029	2.000	1.651	3.21	0.00	0.00
25.920	157.220	0.697	3142.9	1931.1	153.096	0.448	1.55	0	Sand	26.0	166.53	1.72	260.87	1.02	296.96	418.48	0.95	0.578	1.027	2.000	1.648	3.20	0.00	0.00
26.080	72.440	1.271	3162.1	1940.3	69.941	1.794	2.19	0	Sand	26.0	166.53	1.72	260.87	1.02	296.56	417.90	0.95	0.578	1.026	2.000	1.646	3.19	0.00	0.00
26.250	36.000	0.906	3182.5	1950.1	33.678	2.633	2.54	0	Sand	26.0	166.53	1.72	260.87	1.02	296.16	417.47	0.94	0.578	1.024	2.000	1.643	3.19	0.00	0.00
26.410	17.320	0.658	3201.7	1959.3	16.046	4.104	2.92	0	[illegible]	26.0			16.37	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	14.030	0.571	3220.9	1968.5	12.618	4.600	3.03	0	[illegible]	26.0			13.26	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	9.870	0.579	3241.3	1978.3	8.340	4.506	3.17		Clay	26.0			9.33	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	14.400	0.337	3260.5	1987.5	12.660	2.636	2.86		Clay	26.9			13.61	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	12.700	0.398	3280.9	1997.3	11.074	3.218	2.98		Clay	47.8			12.00	1.02	n.a.	n.a.	0.04	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	12.700	0.368	3300.1	2006.5	11.104	3.193	2.96		Clay	47.7			12.09	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	12.130	0.368	3320.5	2016.3	10.366	3.398	3.01		Clay	40.3			11.47	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	12.360	0.313	3339.7	2025.6	10.546	2.934	2.97		Clay	47.6			11.67	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	11.700	0.260	3358.9	2034.8	9.849	2.580	2.97		Clay	41.3			11.06	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.880	11.610	0.280	3378.3	2044.6	9.704	2.621	2.99		Clay	48.4			10.97	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	11.630	0.316	3398.5	2053.8	9.668	3.143	3.01		Clay	40.3			11.18	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	12.690	0.400	3418.0	2063.6	10.642	3.646	3.02		Clay	49.7			11.09	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	16.280	0.571	3438.1	2072.8	14.050	3.919	2.96		Clay	46.5			15.36	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	17.240	1.321	3457.3	2082.0	14.900	8.515	3.15		[illegible]	56.1			16.20	1.00	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	25.050	1.333	3477.7	2091.8	22.285	5.719	2.90		[illegible]	44.6			23.68	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	139.460	1.020	3496.9	2101.0	130.616	0.741	1.74		Sand	11.6		1.6	237.26	1.00	237.69	277.71	0.94	0.581	1.002	2.000	1.603	3.10	0.00	0.00
29.040	145.420	1.730	3517.3	2110.8	136.063	1.204	1.67		Sand	14.2		1.6	247.41	1.00	247.67	309.43	0.94	0.581	1.001	2.000	1.600	3.10	0.00	0.00
29.200	82.310	1.923	3536.5	2120.0	76.064	2.367	2.26		Sand	23.1	137	1.6	246.60	1.00	246.48	348.42	0.94	0.581	0.999	2.000	1.700	3.00	0.00	0.00
29.360	46.320	1.907	3556.7	2129.2	40.690	4.506	2.64		[illegible]	36.1			42.64	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	36.250	1.643	3576.1	2139.0	31.287	4.911	2.75		[illegible]	38.6			33.32	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	33.300	1.401	3595.3	2148.2	29.364	4.692	2.75		Clay	39.0			31.53	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	21.000	1.411	3615.7	2158.0	18.366	7.100	3.03		Clay	49.8			20.47	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	19.060	1.210	3634.9	2167.3	16.403	6.772	3.06		Clay	50.7			18.61	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.180	15.060	0.901	3654.1	2176.5	12.730	6.406	3.12		Clay	53.0			14.53	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	13.000	0.669	3674.5	2186.3	10.294	6.127	3.17		Clay	58.4			12.37	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	11.460	0.561	3693.7	2195.5	8.757	5.727	3.21		Clay	56.1			10.65	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	10.790	0.468	3714.1	2205.3	8.101	5.121	3.21		Clay	57.9			10.20	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	9.630	0.366	3733.3	2214.5	7.011	4.958	3.25		Clay	58.0			9.10	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	9.490	0.343	3752.5	2223.7	6.848	4.502	3.23		Clay	59.2			8.67	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	10.250	0.336	3772.9	2233.5	7.489	4.040	3.17		Clay	58.4			9.60	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	11.310	0.376	3792.1	2242.7	8.395	3.980	3.13		[illegible]	54.4			10.60	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	13.840	0.431	3812.5	2252.5	10.600	3.012	3.02		[illegible]	40.7			13.06	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 2 | PGA (A_{max}) 0.53 | Total Settlement: 3.55 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Reg Soil Type	Fines (%)	Q_{tn} near interface (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tn}	C_N	Q_{c1N}	Q_{c1N-cs}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
31.660	13.910	0.620	3831.7	2261.7	10.666	4.332	3.07		Clay	51.7			13.16	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.820	15.320	0.606	3850.9	2270.9	11.767	4.487	3.04		Clay	50.5			14.48	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	16.400	0.681	3871.3	2280.7	12.684	4.706	3.03		Clay	50.0			15.50	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	16.960	0.767	3890.5	2289.9	13.105	5.044	3.04		Clay	50.4			16.02	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	17.500	0.832	3910.9	2299.7	13.519	5.364	3.04		Clay	50.6			16.54	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	17.960	0.880	3930.1	2308.9	13.566	5.409	3.04		Clay	50.6			16.98	0.98	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	19.040	0.918	3949.3	2318.2	14.723	5.379	3.02		Clay	49.5			18.00	0.98	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	19.110	0.964	3969.7	2328.0	14.713	5.627	3.03		Clay	50.9			18.06	0.98	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.970	18.100	0.927	3988.9	2337.2	13.782	5.766	3.06		Clay	51.2			17.11	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	17.050	0.800	4009.3	2347.0	12.821	5.056	3.09		Clay	52.7			16.12	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	14.070	0.834	4028.5	2356.2	10.233	6.017	3.21		Clay	56.0			13.30	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	11.010	0.698	4047.7	2365.4	7.598	7.750	3.34		Clay	64.4			10.41	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	9.160	0.617	4068.1	2375.2	6.000	7.261	3.40		Clay	67.6			8.66	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	8.960	0.419	4087.3	2384.4	5.818	6.036	3.38		Clay	66.0			9.40	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.950	11.270	0.520	4107.7	2394.2	7.690	5.710	3.26		Clay	60.1			10.66	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	15.310	0.624	4126.9	2403.4	11.023	4.709	3.08		Clay	52.1			14.47	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.280	16.960	0.766	4148.1	2412.6	12.366	5.283	3.07		Clay	51.8			16.00	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	19.470	0.769	4166.6	2422.4	14.356	4.630	2.96		Clay	47.8			18.40	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	18.660	0.851	4185.7	2431.6	13.536	5.173	3.03		Clay	50.2			17.63	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	17.010	0.846	4206.1	2441.4	12.949	5.360	3.08		Clay	51.2			16.93	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	19.270	0.797	4225.3	2450.6	14.002	4.046	2.99		Clay	48.4			18.21	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	17.440	0.662	4244.6	2459.9	12.464	4.321	3.01		Clay	40.3			16.46	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	16.920	0.687	4264.0	2469.7	11.978	3.970	3.00		Clay	48.9			15.99	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	15.660	0.620	4284.1	2478.9	11.060	3.700	3.02		Clay	49.6			14.96	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	14.410	0.600	4304.5	2488.7	9.851	4.161	3.06		Clay	52.3			13.62	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	14.210	0.600	4323.7	2497.9	9.647	4.203	3.09		Clay	52.8			13.43	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	15.300	0.607	4344.1	2507.7	10.470	4.021	3.09		Clay	52.7			14.46	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	18.630	0.620	4363.3	2516.9	13.070	3.772	2.98		Clay	47.1			17.61	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	13.120	0.547	4382.5	2526.1	8.653	5.000	3.18		Clay	60.0			12.40	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	12.270	0.402	4402.9	2535.9	7.941	4.660	3.20		Clay	57.7			11.60	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	12.310	0.533	4422.1	2545.1	7.936	5.276	3.22		Clay	58.6			11.64	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	14.020	0.588	4442.5	2554.9	9.236	4.964	3.16		Clay	55.5			13.26	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	14.400	0.641	4461.7	2564.1	9.492	5.264	3.16		Clay	55.7			13.61	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	14.040	0.601	4480.9	2573.3	9.170	4.730	3.12		Clay	53.6			14.12	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	14.530	0.581	4501.3	2583.1	9.507	4.730	3.13		Clay	54.4			13.73	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	13.490	0.516	4520.5	2592.3	8.664	4.560	3.16		Clay	56.6			12.75	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	12.920	0.440	4540.9	2602.1	8.186	4.166	3.18		Clay	55.4			12.21	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	12.310	0.340	4560.1	2611.3	7.682	3.360	3.12		Clay	54.0			11.64	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	11.800	0.333	4579.3	2620.6	7.258	3.400	3.16		Clay	56.3			11.15	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	11.900	0.334	4599.7	2630.4	7.300	3.476	3.16		Clay	56.1			11.25	0.94	n.a.	n.a.	0.91	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	12.000	0.323	4618.9	2639.6	7.343	3.337	3.13		Clay	54.6			11.34	0.94	n.a.	n.a.	0.91	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	12.380	0.309	4639.3	2649.4	7.596	3.075	3.10		Clay	53.1			11.70	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	12.670	0.307	4658.5	2658.6	7.779	2.972	3.09		Clay	52.4			11.96	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.710	12.240	0.296	4677.7	2667.8	7.423	2.976	3.10		Clay	53.2			11.57	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	12.520	0.296	4698.1	2677.6	7.597	2.933	3.09		Clay	52.6			11.83	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	12.400	0.334	4717.3	2686.8	7.475	3.330	3.13		Clay	54.3			11.72	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	12.780	0.331	4737.7	2696.6	7.729	3.176	3.10		Clay	53.2			12.09	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	13.800	0.311	4756.9	2705.8	8.442	2.726	3.03		Clay	50.2			13.04	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.530	13.670	0.344	4776.1	2715.0	8.311	3.049	3.07		Clay	51.8			12.92	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	13.430	0.370	4796.5	2724.8	8.097	3.361	3.10		Clay	53.0			12.69	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.860	14.750	0.461	4815.7	2734.0	9.029	3.857	3.06		Clay	52.3			13.94	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.030	16.070	1.131	4836.1	2743.8	9.951	8.284	3.27		[illegible]	60.9			15.19	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.190	31.720	1.592	4855.3	2753.0	21.280	5.436	2.90		[illegible]	44.8			26.06	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.360	111.450	1.921	4874.5	2762.3	80.161	1.762	2.11		Sand	19.5	163.33	1.55	253.16	0.93	236.97	324.32	0.90	0.579	0.920	2.000	1.656	2.86	0.00	0.00
40.520	141.410	1.081	4894.9	2772.1	114.754	1.411	1.97		Sand	18.2	163.33	1.56	253.16	0.93	236.75	309.19	0.90	0.579	0.919	2.000	1.653	2.86	0.00	0.00
40.680	172.800	2.083	4914.1	2781.3	140.436	1.093	1.90		Sand	18.1		1.55	253.16	0.93	236.54	306.31	0.90	0.578	0.918	2.000	1.651	2.86	0.00	0.00
40.850	170.210	2.641	4934.5	2791.1	136.048	1.515	1.93		Sand	18.5	163.33	1.55	253.16	0.93	236.33	304.16	0.90	0.578	0.917	2.000	1.649	2.85	0.00	0.00
41.010	156.770	2.780	4953.7	2800.3	126.771	1.802	2.01		Sand	17.2	163.33	1.56	253.16	0.93	236.12	313.69	0.90	0.578	0.916	2.000	1.648	2.85	0.00	0.00
41.170	153.040	1.530	4972.9	2809.5	123.496	1.022	1.86		Sand	13.8	163.33	1.55	253.16	0.93	234.92	291.77	0.90	0.578	0.915	2.000	1.646	2.85	0.00	0.00
41.340	136.600	2.410	4993.3	2819.3	109.810	1.797	2.06		Sand	16.2	163.33	1.56	253.16	0.93	234.70	317.61	0.90	0.578	0.914	2.000	1.644	2.85	0.00	0.00
41.500	78.060	2.350	5012.5	2828.5	50.798	3.225	2.42		Sand	27.9	163.30	1.55	253.16	0.93	234.50	340.08	0.90	0.578	0.913	2.000	1.642	2.84	0.00	0.00
41.670	36.150	2.213	5032.9	2838.3	23.700	6.680	2.92		[illegible]	46.5			34.17	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	31.900	1.594	5052.1	2847.5	20.695	5.410	2.91		[illegible]	44.9			30.24	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	43.620	1.419	5071.3	2856.7	28.763	3.454	2.67		[illegible]	36.0			41.23	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{c1N} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1N}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR M=7.5 σ'_{vc}=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
42.160	34.320	1.717	6001.7	2566.5	22.169	5.405	2.80		Clay	44.0			32.44	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.320	26.860	1.488	6110.9	2576.7	16.903	6.121	3.01		Clay	49.1			26.30	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.490	17.040	0.926	5131.3	2586.5	10.032	6.414	3.19		Clay	67.5			16.11	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.650	12.530	0.850	5150.5	2594.7	6.678	8.731	3.41		Clay	67.8			11.84	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	17.520	0.990	5169.7	2604.0	10.286	6.827	3.19		Clay	57.4			16.56	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	25.370	2.543	5190.1	2613.7	16.833	11.164	3.21		Clay	56.2			23.96	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	122.560	2.687	5200.3	2623.0	86.459	2.223	2.16		Sand	20.7	251.46		261.45	0.92	230.01	321.07	0.89	0.576	0.903	2.000	1.625	2.82	0.00	0.00
43.310	229.210	2.944	5220.7	2632.8	161.972	1.299	1.80		Sand	12.9	251.46		251.46	0.92	230.70	279.74	0.89	0.576	0.902	2.000	1.623	2.82	0.00	0.00
43.470	240.500	3.250	5248.9	2642.0	166.486	1.336	1.76		Sand	12.7	251.46		251.46	0.92	230.61	277.73	0.89	0.576	0.901	2.000	1.621	2.82	0.00	0.00
43.640	266.030	2.777	5260.3	2651.8	210.786	1.035	1.68		Sand	10.9			251.46	0.92	230.31	281.04	0.89	0.576	0.900	2.000	1.619	2.81	0.00	0.00
43.800	261.500	1.826	5266.5	2661.0	206.820	0.732	1.58		Sand	9.3			247.16	0.91	225.09	241.14	0.89	0.576	0.899	2.000	1.618	2.81	0.00	0.00
43.960	235.870	1.675	5307.7	2670.2	180.064	0.804	1.65		Sand	10.2			222.94	0.90	201.44	223.92	0.86	0.576	0.898	2.000	1.616	2.81	0.00	0.00
44.130	236.170	2.154	5328.1	2680.0	186.182	0.926	1.69		Sand	10.9			222.28	0.90	201.13	229.65	0.86	0.575	0.897	2.000	1.614	2.81	0.00	0.00
44.290	245.720	3.570	5347.3	2689.2	183.276	1.562	1.86		Sand	13.9			232.25	0.91	212.02	208.26	0.86	0.575	0.896	2.000	1.612	2.81	0.00	0.00
44.460	201.030	4.140	5367.7	2699.0	157.474	2.092	2.00		Sand	16.0			190.01	0.90	171.91	233.82	0.86	0.575	0.895	2.000	1.611	2.80	0.00	0.00
44.620	197.380	5.244	5386.9	2708.2	130.550	3.164	2.19		Sand	21.6			188.20	0.90	141.44	206.47	0.86	0.574	0.896	1.742	1.406	2.45	0.00	0.00
44.780	210.680	5.628	5406.1	3017.4	164.016	2.057	2.07		Sand	18.6			199.13	0.91	181.14	261.38	0.86	0.574	0.894	2.000	1.607	2.80	0.00	0.00
44.950	258.220	4.121	5426.6	3027.2	201.908	1.613	1.84		Sand	13.7			244.08	0.91	222.06	276.96	0.86	0.574	0.893	2.000	1.606	2.80	0.00	0.00
45.110	266.220	3.356	5446.7	3030.4	225.264	1.176	1.71		Sand	11.7			272.42	0.91	247.66	253.65	0.86	0.574	0.892	2.000	1.604	2.80	0.00	0.00
45.280	333.180	2.689	5466.1	3048.2	260.311	0.814	1.55		Sand	8.7			314.01	0.91	286.05	300.01	0.86	0.574	0.891	2.000	1.602	2.79	0.00	0.00
45.440	421.630	2.007	5485.3	3055.4	320.404	0.479	1.31		Sand	5.7			396.42	0.91	361.82	361.86	0.86	0.573	0.890	2.000	1.601	2.79	0.00	0.00
45.600	473.900	2.618	5504.5	3064.7	370.031	0.565	1.32		Sand	5.8			447.82	0.91	406.22	406.74	0.86	0.573	0.889	2.000	1.599	2.79	0.00	0.00
45.770	456.100	3.022	5524.9	3074.5	362.533	0.664	1.38		Sand	6.5			439.60	0.91	396.34	400.24	0.86	0.573	0.888	2.000	1.597	2.79	0.00	0.00
45.930	419.640	2.727	5544.1	3083.7	326.625	0.664	1.41		Sand	6.8			396.02	0.91	360.38	362.41	0.86	0.573	0.887	2.000	1.596	2.79	0.00	0.00
46.100	406.360	2.177	5564.5	3093.5	314.702	0.541	1.36		Sand	6.2			383.14	0.90	346.01	347.60	0.86	0.572	0.886	2.000	1.594	2.78	0.00	0.00
46.260	360.200	1.806	5583.7	3102.7	294.686	0.478	1.35		Sand	6.1			359.38	0.90	324.84	326.65	0.86	0.572	0.885	2.000	1.592	2.78	0.00	0.00
46.420	402.680	2.149	5602.9	3111.9	311.821	0.537	1.36		Sand	6.3			380.70	0.90	343.96	345.16	0.86	0.572	0.884	2.000	1.591	2.78	0.00	0.00
46.590	431.030	1.993	5623.3	3121.7	333.829	0.464	1.30		Sand	5.6			408.26	0.90	368.46	368.70	0.86	0.572	0.883	2.000	1.589	2.78	0.00	0.00
46.750	438.600	2.231	5642.5	3130.8	336.536	0.512	1.32		Sand	5.8			414.48	0.90	373.78	374.27	0.87	0.572	0.882	2.000	1.587	2.78	0.00	0.00
46.920	386.460	2.425	5662.9	3140.7	296.842	0.634	1.43		Sand	7.1			364.32	0.90	328.27	332.08	0.87	0.571	0.882	2.000	1.586	2.78	0.00	0.00
47.080	404.790	2.337	5682.1	3149.9	311.362	0.581	1.39		Sand	6.6			382.60	0.90	344.48	346.44	0.87	0.571	0.881	2.000	1.584	2.77	0.00	0.00
47.240	476.470	2.384	5701.3	3159.1	365.595	0.504	1.29		Sand	5.6			448.40	0.90	404.31	404.56	0.87	0.571	0.880	2.000	1.583	2.77	0.00	0.00
47.410	515.020	2.473	5721.7	3168.9	395.580	0.483	1.26		Sand	5.1			486.79	0.90	437.90	437.87	0.87	0.571	0.879	2.000	1.581	2.77	0.00	0.00
47.570	522.040	1.943	5740.9	3178.1	400.409	0.374	1.18		Sand	4.3			493.43	0.90	443.22	443.22	0.87	0.571	0.878	2.000	1.579	2.77	0.00	0.00
47.740	490.570	1.300	5761.3	3187.9	375.545	0.286	1.12		Sand	3.8			463.88	0.90	418.16	418.16	0.87	0.570	0.877	2.000	1.578	2.77	0.00	0.00
47.900	441.520	1.858	5780.5	3197.1	337.279	0.423	1.27		Sand	5.2			417.32	0.90	374.26	374.35	0.87	0.570	0.876	2.000	1.576	2.76	0.00	0.00
48.060	364.360	1.386	5799.7	3206.4	277.586	0.383	1.30		Sand	6.0			344.40	0.90	306.64	306.91	0.87	0.570	0.875	2.000	1.575	2.76	0.00	0.00
48.230	374.320	1.968	5820.1	3216.1	284.746	0.530	1.39		Sand	6.5			353.60	0.90	310.60	318.64	0.87	0.570	0.874	2.000	1.573	2.76	0.00	0.00
48.390	392.750	1.857	5839.3	3225.4	298.441	0.479	1.34		Sand	6.0			371.22	0.89	332.16	332.60	0.87	0.569	0.874	2.000	1.571	2.76	0.00	0.00
48.560	403.040	1.680	5859.7	3235.2	305.847	0.420	1.30		Sand	5.5			380.95	0.89	340.68	340.81	0.87	0.569	0.873	2.000	1.570	2.76	0.00	0.00
48.720	391.610	1.916	5878.9	3244.4	298.833	0.493	1.36		Sand	6.1			370.35	0.89	330.84	331.70	0.87	0.569	0.872	2.000	1.568	2.76	0.00	0.00
48.880	364.500	1.957	5898.1	3253.6	275.588	0.544	1.40		Sand	6.6			344.52	0.89	307.85	310.04	0.87	0.569	0.871	2.000	1.567	2.76	0.00	0.00
49.050	391.970	2.639	5918.5	3263.4	298.074	0.678	1.46		Sand	7.4			370.48	0.89	330.47	335.77	0.87	0.568	0.870	2.000	1.565	2.75	0.00	0.00
49.210	391.560	2.602	5937.7	3272.6	295.356	0.667	1.46		Sand	7.3			370.00	0.89	329.86	334.63	0.87	0.568	0.869	2.000	1.564	2.75	0.00	0.00
49.380	351.660	2.397	5958.1	3282.4	264.776	0.687	1.49		Sand	7.9			332.60	0.89	296.21	304.08	0.87	0.568	0.868	2.000	1.562	2.75	0.00	0.00
49.540	382.020	2.872	5977.3	3291.6	287.846	0.756	1.49		Sand	7.9			361.63	0.89	322.02	330.93	0.86	0.568	0.867	2.000	1.560	2.75	0.00	0.00
49.700	476.300	3.313	5996.5	3300.8	358.224	0.700	1.40		Sand	6.6			450.26	0.89	400.41	403.47	0.86	0.567	0.867	2.000	1.559	2.75	0.00	0.00
49.870	479.560	3.690	6016.9	3310.6	360.110	0.773	1.44		Sand	7.2			453.29	0.89	402.80	407.00	0.86	0.567	0.866	2.000	1.557	2.75	0.00	0.00
50.030	446.270	3.652	6036.1	3319.8	333.721	0.844	1.51		Sand	8.1			420.60	0.88	373.71	388.30	0.86	0.567	0.865	2.000	1.556	2.74	0.00	0.00
50.200	403.220	3.000	6056.5	3329.6	301.639	0.900	1.64		Sand	8.6			381.12	0.88	338.15	352.70	0.86	0.567	0.864	2.000	1.554	2.74	0.00	0.00
50.360	374.400	3.387	6075.7	3338.8	279.439	0.907	1.58		Sand	8.9			353.86	0.88	313.78	330.76	0.86	0.566	0.863	2.000	1.553	2.74	0.00	0.00
50.520	366.230	2.979	6094.9	3348.1	274.401	0.818	1.53		Sand	8.5			346.04	0.88	308.36	321.26	0.86	0.566	0.862	2.000	1.551	2.74	0.00	0.00
50.690	394.820	1.424	6115.3	3357.8	293.544	0.364	1.27		Sand	5.2			373.18	0.88	330.37	330.47	0.86	0.566	0.861	2.000	1.550	2.74	0.00	0.00
50.850	435.760	1.080	6134.5	3367.1	324.210	0.250	1.14		Sand	3.9			411.67	0.88	364.37	364.37	0.86	0.566	0.861	2.000	1.548	2.74	0.00	0.00
51.020	380.040	1.223	6154.9	3376.9	282.042	0.324	1.25		Sand	5.1			359.21	0.88	317.53	317.69	0.86	0.565	0.860	2.000	1.547	2.74	0.00	0.00
51.180	451.930	1.440	6174.1	3386.1	335.360	0.321	1.19		Sand	4.4			427.10	0.88	377.33	377.33	0.86	0.565	0.859	2.000	1.545	2.73	0.00	0.00
51.350	460.430	2.199	6194.6	3395.9	340.470	0.482	1.30		Sand	5.6			434.24	0.88	383.30	383.60	0.86	0.565	0.858	2.000	1.544	2.73	0.00	0.00
51.510	421.250	1.128	6213.7	3405.1	311.554	0.269	1.17		Sand	4.2			396.18	0.88	351.19	351.19	0.86	0.565	0.857	2.000	1.542	2.73	0.00	0.00
51.670	329.620	0.796	6232.9	3414.3	242.946	0.244	1.24		Sand	4.9			311.55	0.88	274.61	274.64	0.86	0.564	0.856	2.000	1.541	2.73	0.00	0.00
51.840	176.980	1.557	6253.3	3424.1	129.161	0.896	1.70		Sand	12.8			167.20	0.84	140.32	174.59	0.86	0.564	0.903	0.460	0.374	0.66	0.01	0.00
52.000	68.780	1.670	6272.5	3433.3	48.700	2.567	2.41		Sand	27.7			65.91	0.79	50.56	96.92	0.86	0.564	0.960	0.136	0.118	0.21	0.03	0.00
52.170	36.100	1.367	6292.9	3443.1	18.142	4.140	2.86		Clay	42.9			34.12	0.86	n.a.	n.a.	0.86	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.330	21.980	0.846	6312.1	3452.3	10.904	2.914	2.98		Clay	47.0			20.78	0.86	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.490	21.000	0.741	6331.3	3461.5	10.304	1.351	2.80		Clay	49.9			19.86	0.86	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{c1N} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1N}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR M=7.5 σ'_{vc}=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
52.660	20.170	0.216	6351.7	3471.3	9.701	1.272	2.81		Clay	41.1			19.06	0.86	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.820	15.760	0.144	6370.9	3480.5	7.226	1.148	2.91		Clay	44.9			14.90	0.86	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.990	14.290	0.082	6391.3	3490.3	6.311	0.748	2.88		Clay	44.0			13.43	0.86	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.150	13.870	0.094	6410.5	3499.5	6.006	0.879	2.93		Clay	46.7			13.11	0.86	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.310	13.710	0.114	6429.7	3508.8	5.982	1.064	2.97		Clay	47.5			12.96	0.86	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.480	13.300	0.065	6450.1	3518.5	5.727	0.642	2.90		Clay	44.8			12.57	0.87	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.640	14.300	0.203	6469.3	3527.8	6.271	1.632	3.09		Clay	51.1			13.52	0.87	n.a.	n.a.	0.86	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.810	15.400	0.262	6489.7	3537.6	6.823	2.201	3.07		Clay	51.7			14.64	0.87	n.a.	n.a.	0.86	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.970	18.320	0.585	6508.9	3546.8	8.486	3.783	3.11		Clay	53.5			17.32	0.87	n.a.	n.a.	0.86	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.130	21.010	0.720	6528.1	3556.0	9.981	4.058	3.07		Clay	51.9			19.89	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.300	24.120	1.135	6548.5	3565.8	11.692	5.433	3.10		Clay	52.9			22.80	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.460	33.300	1.061	6567.7	3575.0	16.792	3.536	2.88		Clay	42.9			31.47	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.630	34.000	0.827	6588.1	3584.8	17.630	2.810	2.78		Clay	39.3			32.09	0.87	n.a.	n.a.	0.85	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.790	18.960	1.081	6607.3	3594.0	8.707	6.906	3.26		Clay	60.6			17.91	0.87	n.a.	n.a.	0.84	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.950	22.780	0.991	6626.5	3603.2	10.605	6.000	3.11		Clay	53.3			21.53	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.120	103.260	1.790	6646.9	3613.0	72.302	1.700	2.18		Sand	21.3			97.62	0.79	76.61	124.52	0.84	0.559	0.931	0.180	0.159	0.28	0.03	0.00
55.280	69.090	1.545	6666.1	3622.2	46.781	2.391	2.41		Sand	27.5			64.36	0.76	48.83	93.13	0.84	0.558	0.946	0.132	0.112	0.20	0.03	0.00
55.450	28.760	1.472	6686.5	3632.0	13.996	5.703	3.06		Clay	51.1			27.16	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.610	29.580	0.822	6705.7	3641.2	14.461	2.363	2.81		Clay	40.9			28.06	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.770	20.260	0.824	6724.9	3650.5	9.269	3.667	3.06		Clay	52.0			19.17	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.940	16.250	0.687	6745.3	3660.2	8.676	4.139	3.13		Clay	54.3			15.19	0.87	n.a.	n.a.	0.84	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.100	16.190	0.690	6764.5	3669.5	8.610	4.357	3.14		Clay	55.0			15.14	0.86	n.a.	n.a.	0.84	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.270	19.500	0.741	6784.9	3679.3	8.750	4.603	3.18		Clay	55.4			18.43	0.86	n.a.	n.a.	0.84	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.430	21.270	0.705	6804.1	3688.5	9.650	3.643	3.08		Clay	52.0			20.10	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.600	22.860	0.836	6823.3	3697.7	10.514	4.200	3.07		Clay	51.7			21.60	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.760	25.280	0.892	6843.7	3707.5	11.701	4.061	3.02		Clay	49.5			23.89	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.920	23.150	0.867	6862.9	3716.7	10.611	4.306	3.07		Clay	51.9			21.88	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.090	22.470	0.776	6883.3	3726.6	10.212	4.080	3.07		Clay	51.6			21.24	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.250	23.440	0.776	6902.5	3735.7	10.701	3.677	3.04		Clay	50.3			22.16	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.410	23.600	0.746	6921.7	3744.9	10.760	3.700	3.02		Clay	49.7			22.30	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.580	22.690	0.650	6942.1	3754.7	10.237	3.427	3.02		Clay	49.6			21.46	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.740	22.020	0.656	6961.3	3763.9	9.851	3.536	3.04		Clay	50.6			20.81	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.910	23.150	0.673	6981.7	3773.7	10.410	2.916	2.98		Clay	47.7			21.88	0.90	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.070	21.110	0.524	7000.9	3782.9	9.310	2.678	3.02		Clay	49.6			19.95	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.230	19.100	0.468	7020.1	3792.1	8.222	2.689	3.07		Clay	51.6			18.06	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.400	18.040	0.460	7040.4	3801.9	7.638	3.167	3.11		Clay	53.4			17.06	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.560	17.170	0.421	7059.7	3811.2	7.156	3.086	3.12		Clay	54.1			16.23	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.730	16.840	0.467	7080.1	3820.9	6.469	3.760	3.21		Clay	58.1			15.91	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.890	16.920	1.106	7099.3	3830.2	6.982	6.256	3.30		Clay	66.7			15.99	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.060	48.470	1.087	7119.7	3840.0	23.391	2.421	2.84		Clay	36.1			46.61	0.85	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.220	39.260	0.736	7138.9	3849.2	18.603	2.030	2.87		Clay	38.1			37.78	0.86	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.380	18.610	0.603	7158.1	3858.4	7.730	3.372	3.12		Clay	53.8			17.60	0.86	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.550	14.560	0.317	7178.5	3868.2	6.097	2.800	3.20		Clay	57.4			13.76	0.85	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.710	13.260	0.313	7197.7	3877.4	4.983	3.242	3.27		Clay	60.9			12.53	0.85	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.880	14.020	0.343	7218.1	3887.2	5.357	3.297	3.26		Clay	59.8			13.25	0.85	n.a.	n.a.	0.83	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.040	15.210	0.347	7237.3	3896.4	5.950	2.860	3.16		Clay	56.9			14.38	0.85	n.a.	n.a.	0.83	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.200	18.860	0.485	7256.5	3905.6	7.697	3.225	3.11		Clay	53.4			17.84	0.85	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.370	21.020	0.737	7276.9	3915.4	8.879	4.236	3.13		Clay	54.2			19.87	0.85	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.530	23.230	0.807	7296.1	3924.6	9.979	4.563	3.11		Clay	53.3			21.95	0.85	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.700	25.400	1.032	7316.5	3934.4	11.052	4.748	3.08		Clay	52.2			24.01	0.85	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.860	25.630	1.137	7335.7	3943.6	11.134	6.176	3.10		Clay	53.1			24.22	0.85	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.020	26.790	1.046	7354.9	3952.9	11.684	4.533	3.05		Clay	50.8			25.32	0.85	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.190	25.130	0.900	7378.3	3962.6	10.822	4.040	3.04		Clay	50.6			23.75	0.86	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.350	21.520	0.830	7394.5	3971.9	8.976	3.553	3.08		Clay	52.0			20.34	0.86	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.520	18.660	0.616	7414.9	3981.7	7.511	4.079	3.17		Clay	56.2			17.63	0.86	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.680	18.430	0.646	7434.1	3990.9	7.373	4.366	3.20		Clay	57.6			17.42	0.86	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.840	19.630	0.756	7453.3	4000.1	8.102	4.061	3.18		Clay	56.6			18.64	0.86	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.010	20.800	0.840	7473.7	4009.9	8.656	4.808	3.18		Clay	56.5			19.74	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.170	22.830	0.996	7492.9	4019.1	9.496	4.799	3.13		Clay	54.6			21.68	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.340	24.710	0.902	7513.3	4028.9	10.402	4.305	3.07		Clay	51.9			23.38	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.500	24.110	0.982	7532.5	4038.1	10.076	4.680	3.11		Clay	53.4			22.79	0.84	n.a.	n.a.	0.82	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.660	23.760	1.036	7551.7	4047.3	9.875	5.184	3.14		Clay	54.9			22.48	0.84	n.a.	n.a.	0.82	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.830	25.750	0.991	7572.1	4057.1	10.827	4.611	3.07		Clay	51.9			24.34	0.84	n.a.	n.a.	0.81	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.990	25.810	1.102	7591.3	4066.3	10.826	5.008	3.10		Clay	53.1			24.40	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 2

PGA (A_{max}) 0.53

Total Settlement: 3.55 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	q_{c1} (psf)	Inside q'_{c1} (psf)	Q	F (%)	Ic	Layer "Flexible" Pt > 7	Flag Soil Type	Fines (%)	Qm Inter Interfaces (soft layer)	Thin Layer Factor (K_c)	Interpolated Qm	C_N	q_{c1Ncs}	q_{c1Ncs}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRRm=7.5, σ_{v1}=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
63.100	21.670	1.114	78117	4016.1	8.747	5.856	3.17		Clay	64.1			22.37	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.296	21.500	1.017	7830.9	4096.2	8.660	5.810	3.22		Clay	64.0			22.13	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.492	21.630	0.936	7882.1	4094.5	8.604	4.861	3.18		Clay	64.7			19.98	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.386	20.810	0.746	7572.6	4132.5	8.520	4.364	3.16		Clay	66.0			19.70	0.84	n.a.	n.a.	0.81	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.910	20.600	0.750	7499.7	4113.6	8.190	4.497	3.17		Clay	66.2			19.56	0.84	n.a.	n.a.	0.81	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.960	21.670	0.830	7710.1	4123.5	8.563	4.562	3.18		Clay	66.0			29.39	0.84	n.a.	n.a.	0.81	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.146	21.760	0.858	7729.3	4132.6	8.414	4.636	3.18		Clay	66.0			29.09	0.84	n.a.	n.a.	0.81	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.305	21.680	0.888	7748.8	4141.6	8.588	4.643	3.21		Clay	66.1			28.41	0.84	n.a.	n.a.	0.81	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.470	21.630	1.288	7769.0	4151.6	9.068	5.982	3.15		Clay	66.7			23.27	0.84	n.a.	n.a.	0.81	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.636	22.670	1.542	7788.1	4160.8	11.420	6.486	3.13		Clay	66.5			28.18	0.84	n.a.	n.a.	0.81	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.800	32.560	2.224	7808.5	4170.8	13.786	7.756	3.14		Clay	66.0			39.80	0.84	n.a.	n.a.	0.81	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.960	39.480	2.699	7827.7	4179.8	16.980	7.654	3.07		Clay	61.9			37.24	0.84	n.a.	n.a.	0.81	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.120	57.540	2.758	7849.9	4189.8	20.373	4.806	2.72		Sand	37.6			49.84	0.84	n.a.	n.a.	0.81	0.540	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.288	97.710	5.143	7897.3	4198.8	62.251	3.388	2.42		Sand	28.9			91.41	0.73	68.67	118.63	0.81	0.540	0.937	0.173	0.143	0.269	0.03	0.00
65.468	117.360	5.181	7860.8	4208.0	76.630	3.775	2.30		Sand	24.4			110.35	0.75	82.56	126.72	0.81	0.540	0.903	0.219	0.175	0.333	0.02	0.00
65.628	130.800	3.482	7809.0	4217.8	85.744	2.689	2.22		Sand	22.4			131.96	0.79	100.68	148.52	0.80	0.539	0.863	0.266	0.243	0.46	0.02	0.00
65.788	152.300	4.269	7828.1	4227.8	99.238	2.803	2.24		Sand	22.7			144.01	0.77	111.81	171.52	0.80	0.539	0.825	0.425	0.329	0.61	0.01	0.00
65.940	164.740	4.671	7842.8	4236.2	107.384	2.836	2.21		Sand	22.1			156.21	0.78	122.04	186.56	0.80	0.539	0.846	0.618	0.480	0.87	0.01	0.00
66.110	160.570	4.099	7686.7	4246.0	130.603	2.691	2.06		Sand	18.1			168.83	0.80	151.79	213.02	0.80	0.538	0.791	2.000	1.423	2.64	0.00	0.00
66.310	166.670	4.638	7664.9	4255.3	138.422	2.825	2.17		Sand	20.0			166.90	0.81	150.14	218.45	0.80	0.538	0.780	2.000	1.422	2.64	0.00	0.00
66.440	165.280	7.462	8006.3	4264.8	135.882	4.118	2.30		Sand	24.4			176.13	0.80	146.52	211.77	0.80	0.538	0.790	2.000	1.421	2.64	0.00	0.00
66.600	221.500	7.613	8034.5	4274.3	184.643	3.328	2.17		Sand	21.0			236.22	0.83	172.98	248.00	0.80	0.538	0.788	2.000	1.419	2.64	0.00	0.00
66.770	209.760	6.648	8044.9	4284.1	178.841	2.980	1.98		Sand	18.8			266.00	0.83	211.76	291.04	0.80	0.537	0.768	2.000	1.418	2.64	0.00	0.00
66.950	277.180	3.958	8006.1	4293.3	181.229	1.340	1.61		Sand	13.1			261.80	0.83	217.36	298.36	0.80	0.537	0.768	2.000	1.417	2.64	0.00	0.00
67.090	285.610	2.988	8063.3	4302.6	183.322	1.060	1.74		Sand	11.8			268.23	0.83	219.04	268.06	0.80	0.537	0.767	2.000	1.415	2.64	0.00	0.00
67.250	313.920	1.671	8103.7	4312.2	206.181	0.664	1.63		Sand	8.5			298.71	0.83	246.08	298.80	0.80	0.536	0.756	2.000	1.415	2.64	0.00	0.00
67.420	328.760	2.851	8122.6	4321.6	212.760	0.874	1.91		Sand	8.7			307.80	0.83	252.72	278.47	0.80	0.536	0.756	2.000	1.414	2.64	0.00	0.00
67.580	347.080	3.146	8143.3	4331.3	220.694	0.917	1.83		Sand	8.9			328.56	0.83	271.56	299.23	0.80	0.536	0.756	2.000	1.412	2.64	0.00	0.00
67.730	325.760	3.178	8167.5	4340.6	206.278	0.988	1.98		Sand	9.2			309.15	0.83	250.65	312.89	0.80	0.536	0.764	2.000	1.411	2.64	0.00	0.00
67.910	360.000	3.066	8181.7	4349.7	230.339	0.774	1.83		Sand	8.5			377.13	0.83	311.83	324.89	0.80	0.535	0.764	2.000	1.410	2.64	0.00	0.00
68.090	379.720	3.169	8202.1	4358.9	244.710	0.835	1.68		Sand	8.2			398.12	0.83	329.47	312.82	0.80	0.535	0.763	2.000	1.409	2.63	0.00	0.00
68.240	364.830	3.363	8221.3	4368.7	233.336	0.948	1.83		Sand	8.8			336.10	0.83	280.13	366.88	0.80	0.534	0.783	2.000	1.408	2.63	0.00	0.00
68.410	370.830	2.882	8241.7	4378.6	240.756	0.739	1.64		Sand	6.8			349.22	0.83	290.04	362.13	0.79	0.534	0.782	2.000	1.407	2.63	0.00	0.00
68.570	336.570	1.678	8269.9	4387.7	218.596	0.544	1.49		Sand	7.8			318.12	0.82	262.44	269.69	0.79	0.534	0.781	2.000	1.406	2.63	0.00	0.00
68.730	286.540	2.158	8289.1	4396.9	184.378	0.765	1.83		Sand	10.0			268.73	0.82	220.30	242.74	0.79	0.533	0.781	2.000	1.404	2.63	0.00	0.00
68.900	251.500	2.999	8309.4	4406.7	159.853	1.199	1.78		Sand	12.6			240.26	0.81	198.05	238.87	0.79	0.533	0.780	2.000	1.403	2.63	0.00	0.00
69.060	240.320	3.618	8318.7	4416.2	150.499	1.436	1.87		Sand	14.2			236.08	0.82	192.82	244.66	0.79	0.533	0.779	2.000	1.402	2.63	0.00	0.00
69.230	255.400	4.169	8348.1	4425.7	159.429	1.631	1.98		Sand	14.9			248.89	0.82	204.05	262.84	0.79	0.532	0.779	2.000	1.401	2.63	0.00	0.00
69.390	296.180	3.630	8360.3	4436.0	189.088	1.251	1.78		Sand	12.5			276.80	0.82	229.52	274.61	0.79	0.532	0.778	2.000	1.400	2.63	0.00	0.00
69.560	324.640	2.746	8378.3	4444.2	209.126	0.868	1.63		Sand	9.6			307.83	0.82	262.44	278.19	0.79	0.532	0.777	2.000	1.399	2.62	0.00	0.00
69.720	303.060	2.418	8388.9	4454.0	195.164	0.807	1.63		Sand	10.0			287.83	0.82	235.95	268.60	0.79	0.531	0.777	2.000	1.397	2.62	0.00	0.00
69.880	272.890	2.021	8418.1	4463.3	174.499	1.086	1.78		Sand	12.1			257.66	0.82	211.18	240.82	0.79	0.531	0.776	2.000	1.396	2.62	0.00	0.00
70.050	248.800	3.220	8436.3	4473.0	157.732	1.328	1.95		Sand	13.8			233.32	0.81	188.95	227.89	0.79	0.531	0.776	2.000	1.395	2.62	0.00	0.00
70.210	225.700	3.063	8467.7	4482.2	143.667	1.514	1.92		Sand	16.2			213.38	0.80	170.53	234.17	0.79	0.531	0.775	2.000	1.394	2.62	0.00	0.00
70.370	224.390	3.098	8478.9	4491.4	142.773	1.371	1.89		Sand	14.7			212.91	0.79	169.44	218.48	0.79	0.530	0.774	2.000	1.393	2.62	0.00	0.00
70.540	229.400	3.764	8487.3	4501.2	140.136	1.279	1.87		Sand	14.3			204.40	0.79	164.42	211.69	0.79	0.530	0.774	2.000	1.392	2.62	0.00	0.00
70.720	249.740	3.222	8518.9	4510.5	152.232	1.326	1.89		Sand	14.8			232.27	0.81	187.43	238.60	0.79	0.530	0.773	2.000	1.391	2.62	0.00	0.00
70.870	232.750	2.861	8539.2	4519.4	212.411	0.677	1.63		Sand	10.0			216.49	0.82	267.42	251.83	0.79	0.529	0.772	2.000	1.389	2.62	0.00	0.00
71.030	441.700	3.186	8568.1	4529.4	282.844	0.729	1.49		Sand	7.8			417.87	0.82	341.91	390.28	0.79	0.529	0.772	2.000	1.388	2.62	0.00	0.00
71.180	453.240	3.452	8578.3	4538.8	289.721	0.765	1.49		Sand	8.0			428.38	0.82	350.85	398.86	0.79	0.529	0.771	2.000	1.387	2.62	0.00	0.00
71.350	428.200	3.176	8606.7	4548.4	272.048	0.782	1.51		Sand	8.1			403.82	0.82	329.20	356.88	0.79	0.528	0.770	2.000	1.386	2.62	0.00	0.00
71.520	394.200	2.797	8614.9	4557.7	244.600	0.718	1.52		Sand	8.4			365.14	0.82	298.58	308.29	0.78	0.528	0.770	2.000	1.385	2.62	0.00	0.00
71.680	394.600	3.258	8636.3	4567.4	231.838	0.821	1.59		Sand	9.0			344.79	0.82	281.37	280.87	0.78	0.528	0.769	2.000	1.384	2.62	0.00	0.00
71.850	368.020	2.433	8654.9	4576.7	225.053	0.662	1.54		Sand	8.0			326.43	0.82	274.46	257.18	0.78	0.527	0.769	2.000	1.383	2.62	0.00	0.00
72.010	363.030	2.268	8673.7	4586.7	222.295	0.624	1.51		Sand	8.2			323.13	0.82	279.19	236.45	0.78	0.527	0.768	2.000	1.381	2.62	0.00	0.00
72.180	364.140	2.305	8694.1	4596.1	222.548	0.633	1.49		Sand	7.8			329.45	0.81	279.94	264.52	0.78	0.527	0.767	2.000	1.380	2.62	0.00	0.00
72.340	364.670	2.361	8713.3	4604.9	220.867	0.650	1.52		Sand	8.0			344.68	0.81	280.19	281.87	0.78	0.526	0.767	2.000	1.379	2.62	0.00	0.00
72.510	369.610	2.226	8733.7	4614.7	233.747	0.609	1.49		Sand	7.6			348.56	0.81	294.30	272.28	0.78	0.526	0.766	2.000	1.378	2.62	0.00	0.00
72.670	375.200	2.226	8752.9	4623.9	237.162	0.600	1.48		Sand	7.6			364.63	0.81	298.54	268.72	0.78	0.525	0.766	2.000	1.377	2.62	0.00	0.00
72.830	362.600	2.310	8772.1	4633.3	242.236	0.638	1.46		Sand	7.7			362.87	0.81	294.56	301.93	0.78	0.525	0.765	2.000	1.376	2.62	0.00	0.00
72.990	367.600	2.150	8792.5	4642.5	251.770	0.585	1.45		Sand	7.6			347.48	0.81	282.47	289.92	0.78	0.525	0.764	2.000	1.375	2.62	0.00	0.00
73.150	333.180	1.676	8811.7	4652.1	229.041	0.459	1.51		Sand	6.1			316.06	0.81	258.59	304.58	0.78	0.525	0.764	2.000	1.374	2.62	0.00	0.00
73.330	270.850	0.791	8831.1	4661.9	186.579	0.288	1.43		Sand	3.6			256.82	0.77	197.50	186.48	0.78	0.524	0.764	1.111	0.763	1.53	0.00	0.00
73.490	225.540	0.952	8851.3	4671.1	150.464	0.388	1.55		Sand	5.0			211.39	0.74	159.51	165.65	0.78	0.524	0.763	0.370	0.288	0.56	0.01	0.00

CORNERSTONE EARTH GROUP

CPT No: 2

PGA (A_{max}) 0.53

Total Settlement: 3.55 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	q_{c1} (psf)	Inside q'_{c1} (psf)	Q	F (%)	Ic	Layer "Flexible" Pt > 7	Flag Soil Type	Fines (%)	Qm Inter Interfaces (soft layer)	Thin Layer Factor (K_c)	Interpolated Qm	C_N	q_{c1Ncs}	q_{c1Ncs}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRRm=7.5, σ_{v1}=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
73.660	144.310	2.429	8870.5	4680.5	88.564	1.734	2.11		Sand	19.6			130.49	0.75	99.81	140.81	0.78	0.524	0.873	0.370	0.272	0.41	0.02	0.00
73.820	97.000	1.993	8880.9	4690.3	59.701	3.183	2.67		Sand	31.4			83.56	0.61	n.a.	n.a.	0.78	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.980	85.560	1.772	8910.1	4699.3	52.233	3.581	2.73		Sand	34.0			74.72	0.61	n.a.	n.a.	0.77	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.150	75.690	0.799	8930.5	4709.1	45.197	2.135	2.52		Sand	26.4			66.44	0.61	n.a.	n.a.	0.77	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.310	22.690	0.648	8940.7	4719.4	2.887	5.676	3.13		Clay	64.6			22.32	0.61	n.a.	n.a.	0.77	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.490	24.260	0.826	8970.1	4729.5	6.077	3.971	3.07		Clay	61.8			21.06	0.61	n.a.	n.a.	0.77	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.640	21.400	0.624	8999.3	4739.4	7.178	3.434	3.09		Clay	60.7			20.31	0.61	n.a.	n.a.	0.77	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.800	32.700	0.977	9009.5	4749.6	11.603	3.462	2.97		Clay	57.5			30.94	0.61	n.a.	n.a.	0.77	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.970	45.370	0.602	9029.0	4759.4	17.178	1.662	2.70		Clay	51.6			42.58	0.61	n.a.	n.a.	0.77	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
75.130	36.670	0.641	9048.1	4769.8	13.491	1.995	2.79		Clay	40.3			34.58	0.61	n.a.	n.a.	0.77	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 3 | PGA (A_{max}): 0.53 | Total Settlement: 1.17 (inches)

Depth (ft)	Qc (tsf)	fs (tsf)	σvo (psf)	Insitu σ'vo (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Reg Soil Type	Fines (%)	qc1N near Interfaces (soft layer)	Thin Layer Factor (KH)	Interpolated qc1N	CN	qc1N	qc1N-cs	Stress Reduction Coeff. rd	CSR	Kσ for Sand	CRR M=7.5, σ=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain εv	Settlement (inches)
0.160	319.410	0.564	20.0	20.0	3106.210	0.177	0.47		Unsaturated	0.4			301.90	1.70	513.23	513.23	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.330	246.150	0.837	41.3	41.3	1959.417	0.342	0.79		Unsaturated	1.6			231.71	1.70	393.91	393.91	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	151.650	1.161	61.3	61.3	843.425	0.764	1.23		Unsaturated	4.8			143.53	1.70	243.99	244.01	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	73.030	1.456	82.5	82.5	349.382	1.880	1.76		Unsaturated	12.5			69.03	1.70	117.34	146.76	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	36.470	1.475	102.5	102.5	156.380	4.050	2.23		Unsaturated	22.6			34.47	1.70	58.60	102.36	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	25.010	1.017	122.8	122.8	96.006	4.070	2.36		Unsaturated	25.8			23.64	1.70	40.19	80.66	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	21.940	0.771	143.8	143.8	79.301	3.527	2.36		Unsaturated	26.2			20.74	1.70	35.26	74.52	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	22.530	0.739	163.8	163.8	78.271	3.293	2.36		Unsaturated	25.9			21.29	1.70	36.20	75.61	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	24.930	0.732	185.0	185.0	79.395	2.940	2.31		Unsaturated	24.9			23.50	1.70	40.06	78.65	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	24.950	0.703	205.0	205.0	76.453	2.829	2.31		Unsaturated	24.7			23.56	1.70	40.09	78.96	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	21.720	0.591	225.0	225.0	62.600	2.736	2.35		Unsaturated	26.0			20.53	1.70	34.90	73.90	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	21.100	0.579	246.3	246.3	58.120	2.750	2.38		Unsaturated	26.7			19.94	1.70	33.90	72.90	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	22.800	0.646	266.3	266.3	60.306	2.847	2.38		Unsaturated	26.6			21.55	1.70	36.64	76.56	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	21.940	0.662	287.5	287.5	56.890	3.037	2.42		Unsaturated	27.9			20.74	1.70	35.26	75.30	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	19.320	0.643	307.5	307.5	47.521	3.360	2.50		Unsaturated	30.4			18.26	1.70	31.04	70.52	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	18.690	0.657	327.5	327.5	44.510	3.546	2.54		Unsaturated	31.8			17.67	1.70	30.03	69.47	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	18.640	0.660	348.8	348.8	42.991	3.620	2.56		Unsaturated	32.2			17.62	1.70	29.98	69.40	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	17.830	0.653	368.8	368.8	39.862	3.700	2.59		Unsaturated	33.1			16.86	1.70	28.65	67.94	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	17.460	0.656	390.0	390.0	53.370	3.780	2.60		Unsaturated	33.5			16.52	1.70	28.09	66.59	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	16.120	0.659	410.0	410.0	47.450	4.136	2.67		Unsaturated	32.5			15.24	1.70	26.90	64.14	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	15.140	0.661	430.0	430.0	43.039	4.427	2.62		Unsaturated	34.2			14.31	1.70	24.33	62.32	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	14.560	0.646	451.3	451.3	39.963	4.502	2.65		Unsaturated	35.1			13.76	1.70	23.40	61.20	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	14.270	0.628	471.3	471.3	37.957	4.473	2.66		Unsaturated	35.6			13.49	1.70	22.93	60.64	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	13.820	0.611	492.5	492.5	35.596	4.604	2.68		Unsaturated	36.4			13.06	1.70	22.21	59.75	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	12.890	0.579	512.5	512.5	37.220	4.586	2.72		Mixed	37.7			12.18	1.70	20.71	57.67	1.00	0.348	1.000	0.088	0.086	0.24	0.05	0.11
4.270	12.770	0.582	533.8	533.8	40.850	4.567	2.61		[illegible]	33.9			12.07	1.44	n.a.	n.a.	1.00	0.355	n.a.	n.a.	n.a.	n.a.	0.00	0.00
4.430	14.120	0.603	553.8	553.8	33.442	4.358	2.60		Mixed	36.7			13.36	1.70	22.69	60.44	1.00	0.361	1.100	0.088	0.087	0.24	0.05	0.10
4.590	17.150	0.638	573.8	573.8	39.736	3.746	2.59		Mixed	33.4			16.21	1.70	27.56	66.53	1.00	0.367	1.100	0.095	0.094	0.26	0.05	0.10
4.750	19.180	0.694	595.0	595.0	43.401	3.673	2.56		Mixed	32.2			18.14	1.70	30.83	70.66	1.00	0.373	1.100	0.100	0.099	0.27	0.05	0.09
4.920	19.440	0.781	615.0	615.0	42.047	4.062	2.59		Mixed	33.4			18.37	1.70	31.24	71.46	1.00	0.378	1.100	0.101	0.100	0.26	0.04	0.09
5.080	19.870	0.817	636.3	636.3	42.867	4.100	2.60		Mixed	33.6			18.78	1.70	31.93	72.43	1.00	0.384	1.100	0.103	0.102	0.26	0.04	0.08
5.250	17.360	0.765	658.3	658.3	38.512	4.011	2.68		Mixed	34.4			16.40	1.70	27.88	67.30	1.00	0.390	1.000	0.095	0.095	0.24	0.05	0.09
5.410	15.760	0.693	678.3	678.3	45.610	4.403	2.60		[illegible]	33.7			14.90	1.35	n.a.	n.a.	1.00	0.395	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.580	14.870	0.633	697.5	697.5	41.638	4.359	2.62		[illegible]	34.4			14.05	1.34	n.a.	n.a.	1.00	0.400	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.740	15.580	0.589	717.5	717.5	30.673	3.872	2.66		Mixed	36.6			14.73	1.70	25.03	63.67	1.00	0.405	1.000	0.092	0.090	0.22	0.05	0.10
5.910	15.630	0.550	738.8	738.8	29.033	3.628	2.67		Mixed	36.1			14.68	1.70	24.96	63.41	1.00	0.409	1.064	0.097	0.089	0.22	0.05	0.10
6.070	13.430	0.568	758.8	758.8	34.400	4.272	2.68		[illegible]	36.2			12.69	1.31	n.a.	n.a.	1.00	0.414	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.230	11.750	0.570	778.8	778.8	29.177	5.019	2.76		Clay	39.6			11.11	1.30	n.a.	n.a.	1.00	0.418	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.400	14.020	0.771	800.0	800.0	34.060	5.658	2.77		[illegible]	39.4			13.26	1.29	n.a.	n.a.	0.99	0.422	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.560	21.940	1.329	819.7	816.0	52.773	6.175	2.68		[illegible]	35.8			20.74	1.29	n.a.	n.a.	0.99	0.429	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.730	40.710	1.743	840.1	825.7	60.960	4.320	2.51		Sand	30.6	110		110.00	1.32	146.75	223.60	0.99	0.431	1.100	2.000	1.979	4.60	0.00	0.00
6.890	55.370	1.670	860.3	836.0	87.161	3.237	2.31		Sand	24.7	110		110.00	1.33	146.03	219.31	0.99	0.434	1.100	2.000	1.979	4.56	0.00	0.00
7.050	70.580	1.600	878.5	844.2	115.426	2.022	2.07		Sand	18.5	110		110.00	1.34	147.54	208.75	0.99	0.436	1.100	1.765	1.750	4.00	0.00	0.00
7.220	70.480	1.502	899.9	854.0	104.208	2.145	2.12		Sand	19.9	110		110.00	1.33	146.36	211.21	0.99	0.442	1.100	2.000	1.979	4.48	0.00	0.00
7.380	57.940	1.634	918.1	863.2	86.064	2.843	2.27		Sand	23.7	110		110.00	1.32	144.08	216.69	0.99	0.446	1.100	2.000	1.979	4.46	0.00	0.00
7.550	46.260	2.063	938.5	873.6	67.412	4.647	2.49		Sand	30.1	110		110.00	1.31	143.79	221.02	0.99	0.449	1.100	2.000	1.979	4.41	0.00	0.00
7.710	48.800	2.120	957.7	882.2	70.734	4.369	2.47		Sand	29.5	110		110.00	1.30	143.47	220.12	0.99	0.452	1.100	2.000	1.979	4.38	0.00	0.00
7.870	101.340	2.487	976.9	891.4	146.864	2.486	2.07		Sand	18.8	110		110.00	1.32	145.20	208.36	0.99	0.455	1.100	1.556	1.530	3.36	0.00	0.00
8.040	117.110	2.177	997.3	901.2	169.889	1.887	1.94		Sand	15.7			110.80	1.33	147.00	197.86	0.99	0.458	1.100	1.033	1.022	2.23	0.00	0.00
8.200	126.870	1.967	1016.8	910.4	181.794	1.559	1.86		Sand	14.1			110.73	1.32	157.66	202.36	0.99	0.461	1.100	1.272	1.259	2.73	0.00	0.00
8.370	142.840	2.047	1036.9	920.2	203.556	1.441	1.80		Sand	13.0			134.73	1.29	174.41	216.00	0.99	0.464	1.100	2.000	1.979	4.26	0.00	0.00
8.530	159.960	1.676	1056.1	929.4	226.945	1.063	1.67		Sand	10.8			150.91	1.28	193.06	216.06	0.99	0.467	1.100	2.000	1.979	4.24	0.00	0.00
8.690	168.950	1.583	1075.3	938.6	239.013	0.926	1.61		Sand	9.7			159.70	1.29	203.04	222.30	0.99	0.470	1.100	2.000	1.979	4.21	0.00	0.00
8.860	202.260	2.341	1095.7	948.4	284.774	1.100	1.64		Sand	10.1			191.17	1.24	236.25	260.26	0.99	0.473	1.100	2.000	1.979	4.19	0.00	0.00
9.020	209.300	2.010	1114.9	957.7	293.275	0.963	1.57		Sand	9.0			197.83	1.23	243.65	258.66	0.99	0.475	1.100	2.000	1.979	4.16	0.00	0.00
9.180	194.960	1.901	1136.3	967.4	271.731	0.978	1.59		Sand	9.4			184.27	1.24	228.22	246.69	0.99	0.478	1.100	2.000	1.979	4.14	0.00	0.00
9.350	174.440	1.004	1154.6	976.7	241.864	0.577	1.48		Sand	7.5			164.88	1.27	209.70	214.24	0.99	0.481	1.100	2.000	1.979	4.12	0.00	0.00
9.510	156.040	1.197	1173.7	985.9	215.120	0.770	1.59		Sand	8.3			147.30	1.26	186.92	203.42	0.99	0.483	1.100	1.340	1.326	2.74	0.00	0.00
9.680	150.260	1.221	1194.1	995.7	206.219	0.816	1.62		Sand	9.1			142.02	1.28	182.12	199.71	0.99	0.486	1.100	1.123	1.111	2.29	0.00	0.00
9.840	179.260	1.134	1213.3	1004.9	245.033	0.654	1.49		Sand	7.0			169.43	1.25	212.66	218.62	0.99	0.488	1.100	2.000	1.979	4.06	0.00	0.00
10.010	217.990	1.466	1233.7	1014.7	298.806	0.674	1.46		Sand	7.3			206.04	1.21	250.13	284.20	0.99	0.490	1.100	2.000	1.979	4.04	0.00	0.00
10.170	258.670	1.276	1252.9	1023.9	350.593	0.404	1.30		Sand	6.5			244.65	1.21	296.33	298.56	0.99	0.492	1.100	2.000	1.979	4.02	0.00	0.00
10.330	322.540	1.562	1272.1	1033.1	436.437	0.482	1.23		Sand	4.8			304.86	1.21	368.34	368.36	0.99	0.494	1.100	2.000	1.979	4.00	0.00	0.00
10.500	328.350	1.629	1292.5	1042.9	441.210	0.407	1.23		Sand	4.9			310.36	1.21	374.05	374.06	0.99	0.497	1.100	2.000	1.979	3.98	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 3 | PGA (A_{max}): 0.53 | Total Settlement: 1.17 (inches)

Depth (ft)	Qc (tsf)	fs (tsf)	σvo (psf)	Insitu σ'vo (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Reg Soil Type	Fines (%)	qc1N near Interfaces (soft layer)	Thin Layer Factor (KH)	Interpolated qc1N	CN	qc1N	qc1N-cs	Stress Reduction Coeff. rd	CSR	Kσ for Sand	CRR M=7.5, σ=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain εv	Settlement (inches)
10.660	296.460	2.221	1311.7	1052.1	396.501	0.761	1.40		Sand	6.7			280.21	1.20	336.83	339.39	0.99	0.499	1.100	2.000	1.979	3.97	0.00	0.00
10.830	309.890	2.714	1332.1	1061.9	412.574	0.878	1.44		Sand	7.3			292.90	1.20	351.33	356.39	0.99	0.501	1.100	2.000	1.979	3.95	0.00	0.00
10.990	330.430	2.960	1351.3	1071.1	438.069	0.900	1.44		Sand	7.2			312.32	1.20	373.77	378.63	0.99	0.503	1.100	2.000	1.979	3.94	0.00	0.00
11.150	328.260	2.712	1370.5	1080.3	433.314	0.828	1.41		Sand	6.8			310.26	1.19	370.47	373.64	0.99	0.504	1.100	2.000	1.979	3.92	0.00	0.00
11.320	327.700	2.101	1390.9	1090.1	430.612	0.642	1.32		Sand	5.6			309.74	1.19	368.98	369.50	0.98	0.506	1.100	2.000	1.979	3.91	0.00	0.00
11.480	309.000	1.110	1410.1	1099.3	405.450	0.362	1.16		Sand	4.1			292.01	1.19	348.15	348.15	0.98	0.508	1.100	2.000	1.979	3.90	0.00	0.00
11.650	284.650	0.916	1430.5	1109.1	370.640	0.322	1.16		Sand	4.1			269.23	1.19	319.26	319.26	0.98	0.510	1.100	2.000	1.979	3.88	0.00	0.00
11.810	238.450	0.946	1449.7	1118.4	309.053	0.398	1.28		Sand	5.3			225.39	1.18	266.68	269.79	0.98	0.512	1.100	2.000	1.979	3.87	0.00	0.00
11.980	211.680	1.362	1470.1	1128.1	273.050	0.641	1.49		Sand	7.4			200.08	1.19	238.11	242.64	0.98	0.513	1.100	2.000	1.979	3.86	0.00	0.00
12.140	212.570	1.006	1489.3	1137.4	273.057	0.600	1.38		Sand	6.5			200.92	1.18	236.87	240.36	0.98	0.516	1.100	2.000	1.979	3.84	0.00	0.00
12.300	211.300	2.131	1508.5	1146.6	270.344	1.012	1.61		Sand	9.6			199.72	1.18	234.79	254.18	0.98	0.517	1.100	2.000	1.979	3.83	0.00	0.00
12.470	206.380	2.432	1528.9	1156.4	262.656	1.183	1.67		Sand	10.6			195.04	1.17	228.74	256.39	0.98	0.518	1.100	2.000	1.979	3.82	0.00	0.00
12.630	217.630	2.430	1548.1	1165.6	278.546	1.123	1.63		Sand	10.0			205.68	1.17	241.08	265.00	0.98	0.520	1.100	2.000	1.979	3.81	0.00	0.00
12.800	218.500	1.415	1568.5	1175.4	278.104	0.650	1.46		Sand	7.8			206.52	1.17	242.30	246.65	0.98	0.521	1.100	2.000	1.979	3.79	0.00	0.00
12.960	180.860	1.120	1587.7	1184.6	227.457	0.622	1.51		Sand	8.1			170.95	1.20	205.03	212.34	0.98	0.523	1.100	2.000	1.979	3.78	0.00	0.00
13.120	165.000	0.676	1606.9	1193.8	206.618	0.534	1.49		Sand	7.9			155.95	1.21	188.04	195.09	0.98	0.524	1.100	0.918	0.908	1.73	0.00	0.00
13.290	163.290	1.224	1627.3	1203.6	203.620	0.784	1.60		Sand	9.5			154.34	1.20	185.70	201.21	0.98	0.526	1.100	1.204	1.192	2.27	0.00	0.00
13.450	156.640	0.920	1646.5	1212.8	194.406	0.601	1.54		Sand	8.6			147.98	1.21	179.24	188.98	0.98	0.527	1.100	0.720	0.713	1.36	0.00	0.00
13.620	163.620	0.886	1666.9	1222.6	202.665	0.543	1.50		Sand	8.1			154.64	1.20	186.46	193.24	0.98	0.529	1.100	0.851	0.842	1.59	0.00	0.00
13.780	143.640	0.551	1686.1	1231.8	176.695	0.386	1.48		Sand	7.5			135.77	1.22	166.03	169.91	0.98	0.530	1.100	0.407	0.402	0.76	0.01	0.02
13.940	147.440	1.065	1705.3	1241.0	180.916	0.727	1.62		Sand	9.9			139.36	1.21	167.93	186.40	0.98	0.531	1.100	0.637	0.630	1.19	0.01	0.01
14.110	149.470	0.934	1725.7	1250.8	182.689	0.628	1.58		Sand	9.2			141.28	1.20	170.09	182.91	0.98	0.532	1.100	0.587	0.580	1.09	0.01	0.01
14.270	97.760	1.164	1744.9	1260.1	116.671	1.191	1.90		Sand	14.9	141.26		141.26	1.17	165.72	216.83	0.98	0.534	1.100	2.000	1.979	3.71	0.00	0.00
14.440	45.140	1.244	1765.3	1269.8	53.099	2.812	2.41		Sand	27.5	141.26		141.26	1.15	162.57	244.20	0.98	0.535	1.100	2.000	1.979	3.70	0.00	0.00
14.600	19.750	0.868	1784.5	1279.1	29.487	4.614	2.76		[illegible]	39.2			18.67	1.14	n.a.	n.a.	0.98	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.760	10.970	0.987	1803.7	1288.3	15.630	6.627	3.07		[illegible]	51.8			10.37	1.14	n.a.	n.a.	0.98	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.930	6.840	0.488	1824.1	1298.1	12.369	6.626	3.10		Clay	62.9			6.45	1.14	n.a.	n.a.	0.98	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.090	6.550	0.450	1843.3	1307.3	11.639	6.920	3.12		Clay	53.8			6.19	1.14	n.a.	n.a.	0.98	0.539	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.260	9.330	0.484	1863.7	1317.1	12.753	6.530	3.07		Clay	51.9			8.82	1.13	n.a.	n.a.	0.98	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.420	9.980	0.478	1882.9	1326.3	13.630	6.290	3.04		Clay	50.4			9.43	1.13	n.a.	n.a.	0.97	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.580	12.050	0.610	1902.1	1335.6	16.621	4.863	2.94		Clay	46.1			11.39	1.13	n.a.	n.a.	0.97	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	13.710	0.637	1922.5	1345.3	18.953	4.215	2.87		Clay	43.2			12.96	1.13	n.a.	n.a.	0.97	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	14.320	0.532	1941.7	1354.6	19.711	3.966	2.84		Clay	42.1			13.53	1.12	n.a.	n.a.	0.97	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.080	15.470	0.571	1962.1	1364.3	21.240	3.930	2.81		Clay	41.0			14.62	1.12	n.a.	n.a.	0.97	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.240	16.230	0.636	1981.3	1373.5	22.190	4.174	2.81		Clay	41.1			15.34	1.12	n.a.	n.a.	0.97	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.400	16.820	0.673	2000.5	1382.7	23.020	4.226	2.80		Clay	40.6			15.90	1.12	n.a.	n.a.	0.97	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.570	17.480	0.718	2020.9	1392.5	23.755	4.326	2.80		Clay	40.7			16.59	1.12	n.a.	n.a.	0.97	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.730	18.380	0.748	2040.1	1401.7	24.789	4.305	2.78		Clay	40.1			17.37	1.11	n.a.	n.a.	0.97	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.900	19.400	0.780	2060.5	1411.5	26.028	4.244	2.76		Clay	39.5			18.34	1.11	n.a.	n.a.	0.97	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.060	19.950	0.795	2079.7	1420.8	26.620	4.206	2.76		Clay	39.0			18.86	1.11	n.a.	n.a.	0.97	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.220	19.510	0.754	2098.9	1430.0	25.819	4.087	2.75		Clay	39.0			18.44	1.11	n.a.	n.a.	0.97	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.390	18.450	0.711	2119.3	1439.8	24.157	4.086	2.78		Clay	39.6			17.44	1.11	n.a.	n.a.	0.97	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.550	16.830	0.610	2138.5	1449.0	21.754	3.909	2.80		Clay	40.7			15.91	1.11	n.a.	n.a.	0.97	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.720	15.500	0.550	2158.9	1458.8	19.771	3.860	2.83		Clay	41.8			14.65	1.10	n.a.	n.a.	0.97	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.880	13.710	0.458	2178.1	1468.0	17.196	3.920	2.88		Clay	43.7			12.96	1.10	n.a.	n.a.	0.97	0.555	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.040	11.910	0.459	2197.3	1477.2	14.636	4.337	2.96		Clay	47.0			11.26	1.10	n.a.	n.a.	0.97	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.210	11.040	0.424	2217.7	1487.0	13.361	4.267	2.99		Clay	48.1			10.43	1.10	n.a.	n.a.	0.97	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.370	11.400	0.498	2236.9	1496.2	13.743	4.646	3.01		Clay	49.2			10.78	1.10	n.a.	n.a.	0.97	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.540	12.060	0.433	2257.3	1506.0	14.517	3.964	2.94		Clay	46.1			11.40	1.09	n.a.	n.a.	0.97	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	10.080	0.361	2276.5	1515.2	11.803	3.920	3.01		Clay	49.0			9.53	1.09	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.860	9.520	0.324	2295.7	1524.4	10.984	3.476	3.03		Clay	49.9			9.00	1.09	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	12.960	0.401	2316.1	1534.2	15.386	3.307	2.88		Clay	43.7			12.25	1.09	n.a.	n.a.	0.97	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	13.360	0.390	2335.3	1543.4	15.825	3.198	2.85		Clay	42.7			12.65	1.09	n.a.	n.a.	0.97	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	12.610	0.494	2355.7	1553.2	14.720	4.322	2.98		Clay	46.8			11.92	1.08	n.a.	n.a.	0.96	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	12.840	1.066	2374.9	1562.5	14.916	9.164	3.17		[illegible]	56.1			12.14	1.08	n.a.	n.a.	0.96	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	38.700	1.363	2395.3	1572.2	41.220	3.466	2.58		Sand	32.2	60.94	1.8	100.69	1.11	121.36	191.97	0.96	0.563	1.071	0.809	0.756	1.39	0.00	0.00
19.850	84.470	1.914	2414.6	1581.6	89.100	3.025	2.36		Sand	26.9		1.8	109.88	1.11	121.30	186.11	0.96	0.563	1.067	0.700	0.672	1.19	0.00	0.01
20.010	37.670	1.607	2433.7	1590.7	42.304	4.112	2.60		Mixed	33.8			36.79	1.10	41.60	86.50	0.96	0.564	1.027	0.120	0.111	0.20	0.04	0.06
20.180	25.030	1.229	2454.1	1600.6	30.408	5.037	2.78		[illegible]	39.4			24.22	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	20.510	1.203	2473.3	1609.7	23.047	6.242	2.90		[illegible]	44.8			19.39	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	26.600	1.624	2493.7	1619.5	31.310	7.193	2.87		[illegible]	43.2			25.14	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	37.780	2.210	2512.9	1628.7	44.869	6.062	2.70		[illegible]	37.2			35.71	1.07	n.a.	n.a.	0.96	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	101.640	3.089	2532.1	1637.9	107.832	3.074	2.23		Sand	22.5	165.44	1.12	186.29	1.07	198.26	264.31	0.96	0.666	1.077	2.000	1.937	3.42	0.00	0.00
21.000	115.650	3.910	2552.5	1647.7	122.269	3.421	2.23		Sand	22.8	165.44	1.12	186.29	1.07	197.95	263.97	0.96	0.667	1.075	2.000	1.934	3.41	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3 | PGA (A_{max}) 0.53 | Total Settlement 1.17 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{tN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{tN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
21.100	116.600	3.120	2571.7	1856.9	123.180	2.706	2.15		Sand	26.6	166.44	1.12	186.29	1.07	197.64	276.70	0.96	0.667	1.073	2.000	1.931	3.40	0.00	0.00
21.330	136.100	2.196	2592.1	1866.7	142.595	1.630	1.85		Sand	15.8	166.44	1.12	186.29	1.06	197.34	258.83	0.96	0.668	1.072	2.000	1.928	3.39	0.00	0.00
21.490	152.400	1.196	2611.3	1875.9	160.470	0.791	1.69		Sand	10.9	166.44	1.12	186.29	1.07	198.52	226.00	0.96	0.668	1.070	2.000	1.925	3.39	0.00	0.00
21.660	163.700	1.425	2630.5	1886.1	171.969	0.877	1.70		Sand	11.1	166.44	1.12	186.29	1.07	198.16	227.33	0.96	0.669	1.068	2.000	1.922	3.38	0.00	0.00
21.820	176.040	1.373	2650.9	1894.8	183.466	0.791	1.64		Sand	10.2		1.12	185.30	1.07	198.20	220.36	0.96	0.669	1.067	2.000	1.919	3.37	0.00	0.00
21.980	173.050	1.869	2670.1	1704.1	180.663	1.086	1.75		Sand	11.9		1.12	183.19	1.06	196.08	231.01	0.96	0.670	1.065	2.000	1.916	3.36	0.00	0.00
22.150	177.190	1.869	2690.6	1713.9	184.689	1.058	1.73		Sand	11.7		1.12	187.40	1.06	199.20	233.52	0.96	0.670	1.063	2.000	1.913	3.36	0.00	0.00
22.310	168.760	1.662	2700.7	1723.2	175.360	0.993	1.73		Sand	11.6		1.12	178.67	1.06	190.04	222.69	0.96	0.671	1.062	2.000	1.910	3.36	0.00	0.00
22.470	178.520	1.312	2728.9	1732.4	186.057	0.741	1.62		Sand	8.8		1.12	188.98	1.06	200.81	220.31	0.96	0.671	1.060	2.000	1.907	3.34	0.00	0.00
22.640	194.060	1.130	2740.3	1742.2	201.338	0.585	1.53		Sand	8.4		1.12	206.07	1.06	218.20	227.81	0.96	0.671	1.058	2.000	1.904	3.33	0.00	0.00
22.800	200.340	1.233	2768.5	1751.4	206.069	0.620	1.54		Sand	8.5		1.12	212.06	1.06	223.86	234.44	0.96	0.672	1.057	2.000	1.901	3.32	0.00	0.00
22.970	213.210	1.068	2788.9	1761.2	219.447	0.409	1.45		Sand	7.4		1.12	226.70	1.05	237.60	241.88	0.95	0.672	1.055	2.000	1.898	3.32	0.00	0.00
23.130	225.700	0.831	2808.1	1770.4	231.771	0.371	1.36		Sand	6.2		1.12	238.00	1.05	250.56	251.42	0.95	0.673	1.053	2.000	1.895	3.31	0.00	0.00
23.290	232.170	1.010	2827.3	1779.6	237.620	0.438	1.39		Sand	6.6		1.12	246.75	1.05	257.26	259.00	0.95	0.673	1.052	2.000	1.892	3.30	0.00	0.00
23.460	222.000	1.121	2847.7	1789.4	227.731	0.508	1.45		Sand	7.3	210.44	1.12	246.77	1.05	256.89	261.02	0.95	0.673	1.050	2.000	1.889	3.30	0.00	0.00
23.620	148.370	1.804	2866.9	1798.6	150.638	1.289	1.85		Sand	13.9	210.44	1.12	246.77	1.04	258.54	316.40	0.95	0.674	1.049	2.000	1.887	3.29	0.00	0.00
23.790	70.830	1.581	2887.3	1808.4	70.941	2.276	2.20		Sand	23.3	210.44	1.12	246.77	1.04	258.17	361.82	0.95	0.674	1.047	2.000	1.884	3.28	0.00	0.00
23.950	26.410	1.463	2906.5	1817.6	27.461	5.661	2.84		Clay	42.3			24.96	1.04	n.a.	n.a.	0.95	0.674	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	12.660	1.024	2925.7	1826.6	12.467	8.093	3.22		Clay	56.6			13.16	1.04	n.a.	n.a.	0.95	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	12.100	0.752	2946.1	1836.6	11.872	7.073	3.17		Clay	56.4			11.44	1.04	n.a.	n.a.	0.95	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	10.580	0.699	2965.3	1845.8	9.857	7.688	3.25		Clay	60.0			10.00	1.04	n.a.	n.a.	0.95	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	9.640	0.641	2985.7	1855.6	8.751	7.667	3.30		Clay	62.2			9.11	1.04	n.a.	n.a.	0.95	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	9.370	0.534	3004.9	1864.9	8.438	6.780	3.27		Clay	60.9			8.80	1.03	n.a.	n.a.	0.95	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.930	9.210	0.516	3024.1	1874.1	8.215	6.600	3.27		Clay	61.1			8.71	1.03	n.a.	n.a.	0.95	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	9.540	0.472	3044.5	1883.9	8.512	5.802	3.23		Clay	58.9			9.02	1.03	n.a.	n.a.	0.95	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	10.300	0.521	3063.7	1893.1	9.263	5.937	3.20		Clay	57.6			9.74	1.03	n.a.	n.a.	0.95	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	12.810	0.577	3084.1	1902.9	11.843	5.124	3.08		Clay	52.9			12.11	1.03	n.a.	n.a.	0.95	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	13.640	0.643	3103.3	1912.1	12.640	5.360	3.07		Clay	51.7			12.80	1.03	n.a.	n.a.	0.95	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.750	13.320	0.652	3122.5	1921.3	12.240	5.547	3.09		Clay	52.6			12.60	1.03	n.a.	n.a.	0.95	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	13.680	0.634	3142.9	1931.1	12.541	5.236	3.06		Clay	51.4			12.93	1.02	n.a.	n.a.	0.95	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.080	12.770	0.628	3162.1	1940.3	11.533	5.618	3.11		Clay	53.6			12.07	1.02	n.a.	n.a.	0.95	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.250	12.030	0.605	3182.5	1950.1	10.706	5.767	3.14		Clay	56.1			11.37	1.02	n.a.	n.a.	0.95	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.410	11.090	0.564	3201.7	1959.3	9.686	5.842	3.19		Clay	56.9			10.48	1.02	n.a.	n.a.	0.94	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	10.650	0.494	3220.9	1968.6	9.347	5.342	3.17		Clay	56.1			10.28	1.02	n.a.	n.a.	0.94	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	11.090	0.462	3241.3	1978.3	9.573	4.675	3.14		Clay	54.7			10.48	1.02	n.a.	n.a.	0.94	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	11.670	0.443	3260.6	1987.6	10.304	4.717	3.10		Clay	53.1			11.22	1.02	n.a.	n.a.	0.94	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	13.130	0.639	3280.9	1997.3	11.505	4.087	3.06		Clay	51.4			12.41	1.02	n.a.	n.a.	0.94	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	13.900	0.591	3300.1	2006.5	12.210	4.024	3.05		Clay	50.9			13.14	1.01	n.a.	n.a.	0.94	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	14.500	0.632	3320.6	2016.3	12.736	4.026	3.04		Clay	50.8			13.71	1.01	n.a.	n.a.	0.94	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	14.600	0.619	3339.7	2025.6	12.626	4.765	3.03		Clay	50.0			13.80	1.01	n.a.	n.a.	0.94	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	16.260	0.722	3358.9	2034.8	14.331	4.066	3.00		Clay	48.9			15.37	1.01	n.a.	n.a.	0.94	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.880	18.510	0.721	3378.3	2044.0	16.464	4.284	2.92		Clay	46.3			17.60	1.01	n.a.	n.a.	0.94	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	14.720	0.661	3398.5	2053.8	12.680	4.099	3.06		Clay	50.7			13.91	1.01	n.a.	n.a.	0.94	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	13.100	0.638	3418.9	2063.6	11.040	4.725	3.08		Clay	52.1			12.38	1.01	n.a.	n.a.	0.94	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	11.360	0.476	3438.1	2072.8	9.293	4.929	3.15		Clay	56.3			10.73	1.01	n.a.	n.a.	0.94	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	10.020	0.433	3457.3	2082.0	7.986	5.216	3.22		Clay	58.4			9.47	1.00	n.a.	n.a.	0.94	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	9.010	0.417	3477.7	2091.8	6.962	5.736	3.29		Clay	61.9			8.52	1.00	n.a.	n.a.	0.94	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	8.970	0.420	3496.9	2101.0	6.874	5.620	3.30		Clay	62.3			8.46	1.00	n.a.	n.a.	0.94	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	8.900	0.417	3517.3	2110.8	6.768	5.643	3.30		Clay	62.6			8.41	1.00	n.a.	n.a.	0.94	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	7.920	0.367	3536.5	2120.0	5.803	6.204	3.36		Clay	66.2			7.49	1.00	n.a.	n.a.	0.94	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	7.420	0.368	3555.7	2129.2	5.300	6.526	3.42		Clay	66.4			7.01	1.00	n.a.	n.a.	0.93	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	7.600	0.370	3576.1	2139.0	5.434	6.369	3.40		Clay	67.6			7.18	1.00	n.a.	n.a.	0.93	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	7.870	0.367	3595.3	2148.2	5.653	6.367	3.39		Clay	66.9			7.44	1.00	n.a.	n.a.	0.93	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	8.480	0.415	3615.7	2158.0	6.154	6.223	3.35		Clay	65.0			8.02	0.99	n.a.	n.a.	0.93	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	9.590	0.485	3634.9	2167.3	7.173	6.244	3.30		Clay	62.5			9.06	0.99	n.a.	n.a.	0.93	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.180	14.860	0.579	3654.1	2176.5	11.976	4.443	3.03		Clay	50.2			14.05	0.99	n.a.	n.a.	0.93	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	21.530	0.739	3674.5	2186.3	18.289	3.694	2.84		Clay	42.3			20.03	0.99	n.a.	n.a.	0.93	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	21.780	0.779	3693.7	2195.5	18.167	3.606	2.86		Clay	43.0			20.60	0.99	n.a.	n.a.	0.93	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	21.420	0.809	3714.1	2205.3	17.742	3.645	2.81		Clay	46.2			20.25	0.99	n.a.	n.a.	0.93	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	25.630	1.251	3733.3	2214.5	21.462	5.263	2.80		Clay	44.1			24.22	0.99	n.a.	n.a.	0.93	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	35.310	1.463	3752.5	2223.7	30.070	4.376	2.73		Clay	38.8			33.37	0.99	n.a.	n.a.	0.93	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	28.660	1.076	3772.9	2233.5	24.164	3.084	2.77		Clay	39.8			27.28	0.99	n.a.	n.a.	0.93	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	17.000	0.798	3792.1	2242.7	13.400	5.283	3.04		Clay	50.5			16.07	0.98	n.a.	n.a.	0.93	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	12.300	0.586	3812.5	2252.6	9.229	5.657	3.19		Clay	57.1			11.63	0.98	n.a.	n.a.	0.93	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3 | PGA (A_{max}) 0.53 | Total Settlement 1.17 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{tN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{tN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
31.660	10.210	0.517	3831.7	2261.7	7.334	6.232	3.29		Clay	62.1			9.65	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.820	10.500	0.494	3850.9	2270.9	7.552	5.768	3.26		Clay	60.6			9.92	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	10.590	0.449	3871.3	2280.7	7.580	5.102	3.23		Clay	59.2			10.01	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	10.200	0.408	3890.5	2289.9	7.258	4.693	3.23		Clay	59.1			9.73	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	10.560	0.563	3910.9	2299.7	7.500	6.518	3.30		Clay	62.3			10.01	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	12.900	0.674	3930.1	2308.9	9.560	7.023	3.27		Clay	60.9			12.26	0.98	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	42.840	1.224	3949.3	2318.2	35.302	2.086	2.65		Sand	31.9	149.62	1.78	266.56	0.96	260.34	378.01	0.92	0.582	0.973	2.000	1.760	3.01	0.00	0.00
32.810	156.510	1.134	3969.7	2328.0	141.040	0.724	1.71		Sand	11.2		1.78	266.56	0.96	260.06	297.26	0.92	0.582	0.971	2.000	1.747	3.00	0.00	0.00
32.970	135.360	0.909	3988.9	2337.2	119.633	0.743	1.77		Sand	12.3	149.62	1.78	266.56	0.97	250.78	307.66	0.92	0.582	0.970	2.000	1.745	3.00	0.00	0.00
33.140	93.060	1.132	4009.3	2347.0	84.622	1.863	2.28		Sand	23.9	149.62	1.78	266.56	0.97	259.40	367.13	0.92	0.582	0.969	2.000	1.743	2.00	0.00	0.00
33.300	23.560	0.968	4028.5	2356.2	18.144	4.623	2.91		Clay	44.8			22.11	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	8.720	0.544	4047.7	2365.4	5.662	6.123	3.46		Clay	70.2			8.24	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	10.020	0.361	4068.1	2375.2	6.724	4.772	3.25		Clay	60.2			9.47	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	9.470	0.402	4087.3	2384.4	6.229	5.417	3.31		Clay	63.1			8.95	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	9.200	0.362	4107.7	2394.2	5.970	4.922	3.30		Clay	62.6			8.70	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	7.660	0.301	4126.9	2403.4	4.640	5.300	3.42		Clay	66.2			7.23	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.280	6.360	0.312	4146.1	2412.6	3.546	7.206	3.59		Clay	77.5			6.00	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	8.020	0.317	4166.5	2422.4	4.902	5.336	3.39		Clay	67.1			7.58	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	10.330	0.442	4185.7	2431.6	6.775	6.574	3.33		Clay	64.1			9.76	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	17.660	0.560	4206.1	2441.4	12.744	3.056	2.96		Clay	47.1			16.69	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	26.900	0.606	4226.3	2450.6	20.276	2.800	2.73		Clay	38.2			25.48	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	17.020	0.565	4244.5	2459.9	12.113	3.708	2.99		Clay	46.2			16.00	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	10.490	0.560	4264.9	2469.7	6.706	6.703	3.34		Clay	64.4			9.91	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	28.450	0.556	4284.1	2478.9	21.228	2.114	2.64		Clay	36.0			26.89	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	33.470	0.623	4304.5	2488.7	27.296	1.969	2.64		Sand	31.8			31.64	0.91	28.79	67.81	0.91	0.582	0.967	0.097	0.088	0.16	0.06	0.09
35.760	19.260	0.706	4323.7	2497.9	13.690	4.067	3.00		Clay	48.8			18.20	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	14.600	1.060	4344.1	2507.7	9.912	8.628	3.28		Clay	61.3			13.80	0.95	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	38.810	1.006	4363.3	2516.9	29.106	2.744	2.60		Clay	33.7			36.66	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	74.940	0.661	4382.5	2526.1	62.032	0.909	2.04		Sand	16.0	96.9	1.78	178.04	0.96	167.26	232.04	0.91	0.581	0.947	2.000	1.703	2.93	0.00	0.00
36.420	104.640	0.460	4402.9	2536.9	88.444	0.430	1.75		Sand	12.0		1.78	178.06	0.94	166.79	198.50	0.91	0.581	0.953	1.063	0.912	1.57	0.00	0.00
36.580	89.140	0.692	4422.1	2545.1	72.332	0.826	1.97		Sand	16.5	96.9	1.78	178.04	0.95	166.62	224.75	0.91	0.581	0.945	2.000	1.699	2.92	0.00	0.00
36.750	48.360	1.028	4442.5	2564.9	37.107	2.362	2.46		Sand	29.8	96.9	1.78	178.04	0.95	167.44	252.36	0.91	0.581	0.943	2.000	1.697	2.92	0.00	0.00
36.910	21.240	1.064	4461.7	2564.1	14.827	5.569	3.03		Clay	49.6			20.06	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	10.900	0.869	4480.9	2573.3	6.800	7.647	3.57		Clay	66.1			10.30	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	10.550	1.006	4501.3	2583.1	6.426	12.121	3.62		Clay	73.6			9.97	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	30.320	1.430	4520.5	2592.3	21.848	5.127	2.88		Clay	43.7			28.66	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	41.500	1.426	4540.9	2602.1	30.162	3.636	2.67		Clay	36.0			39.22	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	33.640	0.818	4560.1	2611.3	24.171	2.508	2.65		Clay	36.3			31.96	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	22.960	0.717	4579.3	2620.5	15.706	3.464	2.87		Clay	43.5			21.73	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	19.370	0.662	4599.7	2630.4	12.979	3.880	2.97		Clay	47.8			18.31	0.94	n.a.	n.a.	0.91	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	20.700	0.671	4618.9	2639.6	13.934	3.649	2.93		Clay	46.4			19.57	0.94	n.a.	n.a.	0.91	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	20.900	0.819	4639.3	2649.4	13.998	4.418	2.98		Clay	47.9			19.72	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	21.580	0.759	4658.5	2658.6	14.482	3.840	2.94		Clay	46.1			20.40	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.710	22.970	0.486	4677.7	2667.8	15.467	2.387	2.78		Clay	40.0			21.71	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	16.260	0.364	4698.1	2677.6	10.409	2.758	2.96		Clay	47.1			15.30	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	13.560	0.356	4717.3	2686.8	8.212	3.728	3.09		Clay	52.4			12.66	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	12.300	0.350	4737.7	2696.6	7.369	3.619	3.15		Clay	55.4			11.63	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	11.520	0.328	4756.9	2705.8	6.757	3.568	3.18		Clay	56.7			10.89	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.530	10.430	0.283	4776.1	2715.0	5.924	3.518	3.22		Clay	58.6			9.86	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	10.310	0.287	4796.5	2724.8	5.807	3.622	3.24		Clay	59.4			9.74	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.860	10.580	0.310	4815.7	2734.0	5.976	3.706	3.24		Clay	59.6			10.00	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.030	10.930	0.337	4836.1	2743.8	6.204	3.960	3.24		Clay	59.3			10.33	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.190	11.420	0.369	4855.3	2753.0	6.533	4.006	3.23		Clay	58.8			10.79	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.350	11.900	0.402	4874.8	2762.3	6.851	4.248	3.22		Clay	58.5			11.26	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.520	13.360	0.472	4894.9	2772.1	7.866	4.330	3.17		Clay	56.4			12.62	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.680	15.370	0.536	4914.1	2781.3	9.286	4.140	3.10		Clay	53.2			14.53	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.850	17.030	0.606	4934.5	2791.1	10.435	4.151	3.06		Clay	51.6			16.10	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.010	19.190	0.666	4953.7	2800.3	11.937	4.070	3.01		Clay	49.2			18.14	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.170	19.860	0.666	4972.9	2809.5	12.368	3.631	2.98		Clay	48.1			18.77	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.340	17.720	0.584	4993.3	2819.3	10.700	3.636	3.03		Clay	50.1			16.75	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.500	15.080	0.518	5012.5	2828.5	8.891	4.120	3.12		Clay	53.9			14.26	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.670	13.610	0.462	5032.9	2838.3	7.817	4.167	3.17		Clay	58.1			12.88	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	11.890	0.397	5052.1	2847.5	6.577	4.258	3.23		Clay	59.1			11.24	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	11.100	0.324	5071.3	2856.7	6.050	3.747	3.23		Clay	59.1			10.66	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 3 | PGA (A_{max}) 0.53 | Total Settlement 1.17 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qtn near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1N}	C_N	q_{c1N}	q_{c1N-cs}	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	$CRR_{M=7.5}$ σ'_{vc}=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
42.160	10.230	0.308	6091.7	2866.8	5.361	4.003	3.29		Clay	62.0			9.87	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.320	11.880	0.278	6110.9	2876.7	6.255	3.089	3.17		Clay	58.4			10.92	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.490	11.960	0.201	6131.3	2885.5	6.525	3.094	3.16		Clay	56.7			11.32	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.650	12.310	0.340	6150.6	2894.7	6.720	3.497	3.18		Clay	58.5			11.64	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	15.190	0.362	6169.7	2904.0	8.681	3.034	3.06		Clay	50.9			14.30	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	16.280	0.309	6190.1	2913.7	9.393	2.914	3.01		Clay	49.2			15.39	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	17.030	0.563	6209.3	2923.0	10.281	3.746	3.04		Clay	60.5			16.08	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.310	20.440	1.124	6229.7	2932.8	12.156	6.306	3.13		Clay	64.2			19.32	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	29.600	1.302	6248.9	2942.0	18.338	4.826	2.91		Clay	45.2			27.98	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	53.480	0.993	6269.3	2951.8	40.800	1.962	2.40		Sand	27.2		1.8	60.92	0.87	78.77	132.70	0.89	0.575	0.964	0.210	0.180	0.31	0.02	0.06
43.800	46.060	0.796	6288.5	2961.0	34.370	1.860	2.44		Sand	28.5	60.66	1.8	60.92	0.86	78.70	133.32	0.89	0.575	0.963	0.212	0.182	0.32	0.02	0.06
43.960	25.150	1.130	6307.7	2970.2	15.106	5.015	2.96		Clay	48.2			23.80	0.91	n.a.	n.a.	0.88	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.130	23.780	1.468	6328.1	2980.0	14.152	6.914	3.10		Clay	53.1			22.46	0.91	n.a.	n.a.	0.88	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.290	45.000	2.113	6347.3	2989.2	28.310	4.892	2.78		Clay	40.1			42.53	0.91	n.a.	n.a.	0.88	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.460	50.990	2.000	6367.7	2999.0	32.218	5.507	2.77		Clay	39.7			48.19	0.91	n.a.	n.a.	0.88	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.620	48.610	2.605	6386.9	3008.2	31.192	8.192	2.82		Clay	41.5			48.80	0.91	n.a.	n.a.	0.88	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.780	75.310	2.987	6406.1	3017.4	67.469	4.114	2.61		Sand	30.0	96.2	1.76	171.24	0.90	154.79	236.97	0.88	0.574	0.694	2.000	1.807	2.80	0.00	0.00
44.950	100.300	2.112	6426.5	3027.2	77.116	2.164	2.22		Sand	22.2	96.2	1.74	171.24	0.90	153.60	220.06	0.88	0.574	0.693	2.000	1.806	2.80	0.00	0.00
45.110	101.780	1.466	6445.7	3036.4	78.158	1.468	2.18		Sand	19.5		1.76	171.24	0.90	153.34	218.52	0.88	0.574	0.692	2.000	1.804	2.80	0.00	0.00
45.280	59.120	1.443	6466.1	3046.2	44.419	2.560	2.44		Sand	28.6	96.2	1.76	171.24	0.90	154.24	233.96	0.88	0.574	0.691	2.000	1.802	2.79	0.00	0.00
45.440	31.050	1.200	6485.3	3055.4	19.116	4.100	2.80		Clay	42.8			30.20	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.600	19.850	1.028	6504.5	3064.7	11.158	6.014	3.14		Clay	54.9			18.76	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.770	19.500	0.872	6524.9	3074.5	10.868	5.212	3.11		Clay	53.6			18.43	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.930	20.120	0.981	6544.1	3083.7	11.282	5.656	3.12		Clay	54.0			19.02	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.100	21.900	0.983	6564.5	3093.5	12.360	5.144	3.06		Clay	51.4			20.70	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.260	23.180	1.042	6583.7	3102.7	13.142	5.113	3.04		Clay	50.5			21.91	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.420	25.480	1.160	6602.9	3111.9	14.575	5.114	3.01		Clay	49.0			24.08	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.590	26.670	1.168	6623.3	3121.7	15.221	4.915	2.98		Clay	47.9			25.11	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.750	26.360	1.181	6642.5	3130.9	15.036	5.060	2.99		Clay	48.4			24.91	0.90	n.a.	n.a.	0.87	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	27.360	1.234	6662.9	3140.7	15.613	5.034	2.98		Clay	47.8			25.86	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	28.990	1.330	6682.1	3149.9	16.603	5.087	2.96		Clay	47.1			27.40	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.240	31.220	1.326	6701.3	3159.1	17.960	4.680	2.91		Clay	45.1			29.51	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	33.830	1.506	6721.7	3168.9	19.646	4.882	2.90		Clay	44.4			31.98	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	37.100	1.706	6740.9	3178.1	21.641	5.166	2.88		Clay	43.6			35.07	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	46.380	1.903	6761.3	3187.9	27.290	4.375	2.75		Clay	39.1			43.84	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	46.440	2.047	6780.5	3197.1	27.243	4.699	2.75		Clay	39.9			43.90	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.060	44.940	2.032	6799.7	3206.4	26.223	4.855	2.80		Clay	40.7			42.48	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	42.690	1.888	6820.1	3216.1	24.736	4.748	2.81		Clay	41.2			40.35	0.89	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.390	41.120	1.786	6839.3	3225.4	23.687	4.619	2.82		Clay	41.4			38.87	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.560	38.780	1.690	6859.7	3235.2	22.163	4.436	2.83		Clay	41.8			36.66	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	39.830	1.472	6878.9	3244.4	22.741	3.690	2.79		Clay	40.3			37.65	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.880	33.620	1.300	6898.1	3253.6	18.654	4.258	2.87		Clay	43.4			31.78	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.050	27.690	1.077	6918.5	3263.4	15.157	4.364	2.96		Clay	46.9			26.17	0.89	n.a.	n.a.	0.87	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.210	24.900	0.912	6937.7	3272.6	13.403	4.156	2.98		Clay	47.8			23.53	0.89	n.a.	n.a.	0.87	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.380	26.040	0.911	6958.1	3282.4	14.061	3.950	2.95		Clay	46.8			24.61	0.89	n.a.	n.a.	0.86	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	28.880	0.922	6977.3	3291.6	15.736	3.580	2.88		Clay	43.9			27.31	0.89	n.a.	n.a.	0.86	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.700	29.230	1.010	6996.5	3300.8	15.894	3.861	2.90		Clay	44.8			27.63	0.89	n.a.	n.a.	0.86	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.870	28.210	1.066	7016.9	3310.6	15.225	4.192	2.94		Clay	46.1			26.66	0.89	n.a.	n.a.	0.86	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.030	29.160	1.034	7036.1	3319.8	15.749	3.944	2.91		Clay	45.0			27.56	0.89	n.a.	n.a.	0.86	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.200	29.140	0.966	7056.5	3329.6	15.686	3.777	2.90		Clay	44.5			27.54	0.89	n.a.	n.a.	0.86	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.360	26.220	0.973	7075.7	3338.8	13.888	4.196	2.97		Clay	47.4			24.78	0.89	n.a.	n.a.	0.86	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 4 | PGA (A_{max}) 0.53 | Total Settlement 1.60 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qtn near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1N}	C_Q	q_{c1N}	q_{c1N-cs}	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	$CRR_{M=7.5}$ σ'_{vc}=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
0.160	605.690	0.997	20.0	20.0	4915.461	0.197	0.60		Unsaturated	0.8			477.60	1.70	812.42	812.42	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.330	217.400	1.256	41.3	41.3	1471.008	0.877	1.03		Unsaturated	3.9			205.64	1.70	349.42	349.42	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	128.620	1.136	61.3	61.3	713.610	0.889	1.32		Unsaturated	6.8			121.47	1.70	206.51	206.82	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	82.620	1.314	82.8	82.8	396.246	1.586	1.67		Unsaturated	10.0			78.28	1.70	133.08	152.48	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	34.180	1.109	102.6	102.6	148.479	3.518	2.20		Unsaturated	21.6			32.29	1.70	54.90	86.67	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	17.710	1.071	122.5	122.5	82.530	6.067	2.68		Unsaturated	33.0			16.74	1.70	28.46	67.65	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	21.200	0.786	143.6	143.6	76.618	3.722	2.39		Unsaturated	27.0			20.04	1.70	34.06	73.33	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	23.060	0.871	163.6	163.6	78.072	3.782	2.39		Unsaturated	27.1			21.80	1.70	37.06	77.30	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	24.010	0.860	185.0	185.0	76.464	3.594	2.38		Unsaturated	26.7			22.69	1.70	38.58	78.17	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	23.770	0.825	205.0	205.0	71.870	3.484	2.39		Unsaturated	27.0			22.47	1.70	38.19	78.77	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	22.400	0.812	225.0	225.0	64.601	3.644	2.43		Unsaturated	28.3			21.17	1.70	35.99	76.43	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	17.630	0.715	246.3	246.3	48.506	4.073	2.56		Unsaturated	32.1			16.66	1.70	28.33	67.31	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	18.320	0.661	266.3	266.3	48.460	3.743	2.53		Unsaturated	31.3			17.32	1.70	29.44	68.60	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	14.630	0.637	287.5	287.5	55.371	4.396	2.64		Unsaturated	31.8			13.83	1.70	23.51	69.74	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	13.270	0.640	307.6	307.6	47.629	4.678	2.62		Unsaturated	34.1			12.54	1.70	21.32	68.28	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	12.860	0.736	327.6	327.6	44.266	5.790	2.69		Unsaturated	36.8			12.15	1.70	20.66	67.70	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	16.410	0.667	348.8	348.8	54.211	4.107	2.52		Unsaturated	31.1			15.51	1.70	26.37	64.46	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	11.830	0.627	368.8	368.8	37.399	6.381	2.72		Unsaturated	37.8			11.16	1.70	19.01	65.58	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	10.370	0.531	390.0	390.0	52.179	6.218	2.61		Unsaturated	34.0			9.80	1.70	16.66	62.00	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	13.430	0.556	410.0	410.0	30.430	4.204	2.63		Unsaturated	34.6			12.69	1.70	21.58	58.06	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	18.060	0.607	430.0	430.0	39.812	3.219	2.55		Unsaturated	31.9			18.02	1.70	30.63	70.35	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	20.010	0.666	451.3	451.3	42.131	3.181	2.52		Unsaturated	31.1			18.87	1.70	33.44	73.01	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	20.410	0.723	471.3	471.3	40.408	3.565	2.57		Unsaturated	32.7			19.29	1.70	32.79	73.42	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	20.840	0.668	492.5	492.5	64.206	4.146	2.53		Unsaturated	31.2			19.79	1.70	33.65	74.22	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	20.670	0.666	512.6	512.6	62.061	4.236	2.56		Mixed	31.8			19.54	1.70	33.21	73.79	1.00	0.348	1.100	0.104	0.103	0.30	0.04	0.09
4.270	19.270	0.762	533.8	533.8	47.105	4.112	2.57		Mixed	32.8			18.21	1.70	30.96	70.92	1.00	0.355	1.100	0.101	0.100	0.28	0.04	0.09
4.430	18.400	0.721	553.8	553.8	43.781	3.978	2.58		Mixed	32.9			17.39	1.70	29.57	69.13	1.00	0.361	1.100	0.099	0.097	0.27	0.05	0.09
4.590	16.900	0.747	573.8	573.8	30.140	4.496	2.66		Mixed	35.4			15.97	1.70	27.16	66.26	1.00	0.367	1.100	0.095	0.094	0.26	0.05	0.10
4.760	16.680	0.827	596.0	596.0	37.836	5.046	2.70		Mixed	37.0			15.77	1.70	26.80	66.00	1.00	0.373	1.100	0.095	0.094	0.25	0.05	0.09
4.920	16.500	0.812	616.0	616.0	38.550	4.964	2.70		Mixed	37.2			15.66	1.70	26.60	65.63	1.00	0.379	1.100	0.095	0.094	0.25	0.05	0.10
5.090	16.230	0.721	636.3	636.3	34.876	4.528	2.69		Mixed	36.7			15.34	1.70	26.08	65.00	1.00	0.384	1.097	0.094	0.092	0.24	0.05	0.09
5.250	19.210	0.504	656.3	656.3	40.502	3.147	2.63		Mixed	31.4			18.16	1.70	30.87	70.66	1.00	0.390	1.099	0.100	0.099	0.25	0.05	0.09
5.410	21.230	0.649	676.3	676.3	34.930	3.106	2.58		Sand	32.6			20.07	1.70	34.11	75.21	1.00	0.395	1.100	0.106	0.106	0.27	0.04	0.09
5.580	24.170	0.973	697.5	697.5	48.962	4.060	2.66		Mixed	32.1			22.84	1.70	38.84	81.37	1.00	0.400	1.100	0.115	0.113	0.28	0.04	0.08
5.740	36.810	1.126	717.5	717.5	68.165	3.089	2.41		Sand	27.6			34.79	1.69	58.75	106.34	1.00	0.405	1.100	0.153	0.152	0.37	0.03	0.06
5.910	28.580	1.004	738.8	738.8	48.127	3.569	2.64		Sand	31.5			27.01	1.70	45.92	90.72	1.00	0.409	1.100	0.128	0.127	0.31	0.04	0.07
6.070	22.660	0.776	758.8	758.8	43.156	3.478	2.64		Mixed	31.7			21.41	1.70	36.39	76.02	1.00	0.414	1.092	0.110	0.108	0.26	0.04	0.06
6.230	17.210	0.626	778.8	778.8	32.007	3.717	2.68		Mixed	36.6			16.27	1.70	27.65	66.98	1.00	0.418	1.062	0.098	0.093	0.22	0.06	0.10
6.400	14.950	0.550	800.0	800.0	36.376	3.761	2.62		Clay	34.3			14.13	1.29	n.a.	n.a.	0.99	0.422	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.560	13.410	0.455	820.7	816.0	31.865	3.521	2.64		Clay	36.1			12.67	1.29	n.a.	n.a.	0.99	0.426	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.730	12.270	0.432	840.1	825.7	28.701	3.643	2.69		Clay	36.6			11.60	1.28	n.a.	n.a.	0.99	0.431	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.890	12.710	0.426	860.3	835.0	29.415	3.484	2.67		Clay	36.9			12.01	1.28	n.a.	n.a.	0.99	0.434	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.050	11.760	0.436	878.5	844.2	26.621	3.871	2.73		Clay	36.0			11.12	1.27	n.a.	n.a.	0.98	0.438	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.220	9.240	0.399	899.9	854.0	20.657	4.600	2.88		Clay	42.9			8.73	1.27	n.a.	n.a.	0.98	0.442	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.380	8.030	0.436	918.1	863.2	17.642	5.764	2.98		Clay	47.9			7.59	1.27	n.a.	n.a.	0.98	0.445	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.550	8.330	0.461	938.5	873.0	18.009	5.665	2.98		Clay	47.7			7.87	1.26	n.a.	n.a.	0.98	0.449	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.710	14.690	0.417	957.7	882.2	24.780	2.932	2.68		Mixed	36.2			13.88	1.69	23.46	61.42	0.98	0.452	1.069	0.069	0.066	0.19	0.06	0.10
7.870	11.970	0.479	976.9	891.4	25.760	4.147	2.79		Clay	39.2			11.31	1.26	n.a.	n.a.	0.98	0.455	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.040	11.460	0.606	997.3	901.2	24.370	5.294	2.88		Clay	48.1			10.86	1.25	n.a.	n.a.	0.98	0.458	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.200	25.670	0.913	1016.6	910.4	42.919	3.629	2.58		Mixed	32.2		1.8	38.62	1.50	58.20	107.47	0.98	0.461	1.095	0.156	0.153	0.33	0.05	0.06
8.370	64.350	0.732	1036.9	920.2	91.468	1.147	1.96		Sand	16.6	87.53	1.8	140.06	1.28	177.06	238.30	0.98	0.464	1.100	2.000	1.979	4.26	0.00	0.00
8.530	87.450	0.469	1056.1	929.4	123.663	0.539	1.67		Sand	10.7	87.53	1.8	140.06	1.30	182.29	200.69	0.98	0.467	1.100	1.000	1.583	3.39	0.00	0.00
8.690	92.610	0.525	1075.3	938.6	130.662	0.570	1.67		Sand	10.6		1.8	140.06	1.30	181.92	205.86	0.98	0.470	1.100	1.618	1.602	3.20	0.00	0.00
8.860	61.310	0.660	1095.7	948.4	85.763	1.579	2.09		Sand	19.1	87.53	1.8	140.06	1.25	174.52	244.81	0.98	0.473	1.100	2.000	1.970	4.19	0.00	0.00
9.020	34.680	0.664	1114.9	957.7	47.641	2.795	2.45		Sand	28.6	87.53	1.8	140.06	1.23	172.63	258.47	0.98	0.475	1.100	2.000	1.970	4.16	0.00	0.00
9.190	28.120	1.071	1135.3	967.4	46.040	3.887	2.58		Mixed	32.4		1.8	42.53	1.46	61.57	111.92	0.98	0.478	1.091	0.163	0.160	0.34	0.05	0.06
9.350	17.090	0.790	1154.5	976.7	35.473	4.614	2.80		Clay	38.7			16.02	1.23	n.a.	n.a.	0.98	0.481	n.a.	n.a.	n.a.	n.a.	0.00	0.00
9.510	9.910	0.589	1173.7	985.9	18.913	6.104	2.97		Clay	47.5			9.37	1.22	n.a.	n.a.	0.98	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
9.680	7.910	0.321	1194.1	995.7	14.690	4.383	2.96		Clay	47.1			7.48	1.22	n.a.	n.a.	0.98	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
9.840	7.060	0.254	1213.3	1004.9	12.844	3.628	2.96		Clay	47.8			6.67	1.22	n.a.	n.a.	0.99	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.010	7.040	0.228	1233.7	1014.7	12.660	3.561	2.95		Clay	46.9			6.65	1.21	n.a.	n.a.	0.99	0.490	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.170	9.060	0.225	1252.9	1023.9	16.474	2.680	2.79		Clay	40.4			8.56	1.21	n.a.	n.a.	0.99	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.330	9.890	0.214	1272.1	1033.1	17.916	2.317	2.73		Clay	37.9			9.35	1.21	n.a.	n.a.	0.99	0.494	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.500	9.110	0.236	1292.6	1042.9	16.231	2.790	2.81		Clay	41.0			8.61	1.21	n.a.	n.a.	0.99	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 4 | PGA (A_{max}): 0.53 | Total Settlement: 1.60 (inches)

Depth (ft)	Qc (tsf)	fs (tsf)	σvo (psf)	Insitu σ'vo (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qcn near interfaces (soft layer)	Thin Layer Factor (KH)	Interpolated Qcn	Cn	qc1N	qc1N-cs	Stress Reduction Coeff, rd	CSR	Kσ for Sand	CRR M=7.5 & σvc=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain εv	Settlement (inches)
10.660	10.320	0.287	1311.7	1052.1	16.371	2.900	2.78		Clay	40.0			9.75	1.20	n.a.	n.a.	0.99	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.830	10.600	0.346	1332.1	1061.9	16.634	3.480	2.82		Clay	41.4			9.06	1.20	n.a.	n.a.	0.99	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.990	10.400	0.360	1351.3	1071.1	16.157	3.703	2.84		Clay	42.4			8.83	1.20	n.a.	n.a.	0.99	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.150	11.700	0.410	1370.5	1080.3	20.391	3.719	2.81		Clay	40.0			11.06	1.19	n.a.	n.a.	0.99	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.320	12.470	0.407	1390.9	1090.1	21.602	3.467	2.77		Clay	39.6			11.79	1.19	n.a.	n.a.	0.99	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.480	11.820	0.414	1410.1	1099.3	20.221	3.728	2.81		Clay	41.1			11.17	1.19	n.a.	n.a.	0.98	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.650	11.470	0.389	1430.5	1109.1	19.393	3.620	2.82		Clay	41.3			10.84	1.19	n.a.	n.a.	0.98	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.810	11.670	0.384	1449.7	1118.4	19.306	3.537	2.81		Clay	41.1			10.94	1.18	n.a.	n.a.	0.98	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.980	13.060	0.454	1470.1	1128.1	21.860	3.680	2.78		Clay	40.0			12.34	1.18	n.a.	n.a.	0.98	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.140	18.750	0.779	1489.3	1137.4	31.682	4.326	2.71		Clay	37.3			17.72	1.18	n.a.	n.a.	0.98	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.300	26.160	1.337	1508.5	1146.6	44.316	5.262	2.66		Clay	35.7			24.73	1.18	n.a.	n.a.	0.98	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.470	69.960	1.936	1528.9	1156.4	88.500	2.800	2.26		Sand	23.3	130		138.00	1.18	163.40	240.12	0.98	0.518	1.100	2.000	1.979	3.82	0.00	0.00
12.630	146.060	1.976	1548.1	1165.6	185.022	1.369	1.81		Sand	13.1			138.06	1.21	167.05	207.46	0.98	0.520	1.100	1.840	1.832	3.14	0.00	0.00
12.800	289.670	1.942	1568.5	1175.4	366.815	0.672	1.36		Sand	8.5			273.98	1.17	319.05	321.73	0.98	0.521	1.100	2.000	1.979	3.79	0.00	0.00
12.960	350.380	2.326	1587.7	1184.6	441.587	0.670	1.34		Sand	8.0			331.15	1.17	386.92	386.68	0.98	0.523	1.100	2.000	1.979	3.78	0.00	0.00
13.120	321.880	2.060	1606.9	1193.8	404.929	0.640	1.34		Sand	8.0			304.23	1.16	353.83	354.61	0.98	0.524	1.100	2.000	1.979	3.77	0.00	0.00
13.290	285.250	1.549	1627.3	1203.6	360.464	0.546	1.33		Sand	5.8			269.61	1.16	312.80	313.37	0.98	0.526	1.100	2.000	1.979	3.76	0.00	0.00
13.460	271.430	1.943	1646.6	1212.8	337.841	0.716	1.43		Sand	7.1			256.56	1.16	297.13	300.74	0.98	0.527	1.100	2.000	1.979	3.75	0.00	0.00
13.620	303.670	2.470	1666.0	1222.6	376.437	0.816	1.44		Sand	7.3			286.93	1.16	331.01	336.37	0.98	0.529	1.100	2.000	1.979	3.74	0.00	0.00
13.780	366.460	2.590	1686.1	1231.8	440.522	0.731	1.36		Sand	8.3			336.91	1.15	366.00	369.95	0.98	0.530	1.100	2.000	1.979	3.73	0.00	0.00
13.940	413.270	2.554	1705.3	1241.0	508.997	0.619	1.27		Sand	6.2			390.61	1.15	446.66	449.78	0.98	0.531	1.100	2.000	1.979	3.73	0.00	0.00
14.110	416.000	2.101	1725.7	1250.8	511.582	0.506	1.20		Sand	4.6			394.13	1.18	462.77	462.77	0.98	0.532	1.100	2.000	1.979	3.72	0.00	0.00
14.270	405.640	1.910	1744.9	1260.1	495.774	0.472	1.18		Sand	4.3			383.40	1.15	430.59	430.59	0.98	0.534	1.100	2.000	1.979	3.71	0.00	0.00
14.440	349.320	1.656	1765.3	1269.8	426.130	0.475	1.23		Sand	4.8			330.17	1.14	377.79	377.81	0.98	0.535	1.100	2.000	1.979	3.70	0.00	0.00
14.600	322.310	1.401	1784.6	1279.1	390.746	0.436	1.23		Sand	4.8			304.64	1.14	347.91	347.93	0.98	0.536	1.100	2.000	1.979	3.69	0.00	0.00
14.760	324.100	1.362	1803.7	1288.3	391.504	0.421	1.22		Sand	4.7			306.33	1.14	340.16	340.19	0.98	0.537	1.100	2.000	1.979	3.68	0.00	0.00
14.930	280.400	1.040	1824.1	1298.1	337.086	0.372	1.23		Sand	4.8			265.11	1.14	301.59	301.61	0.98	0.538	1.100	2.000	1.979	3.68	0.00	0.00
15.090	253.190	0.862	1843.3	1307.3	303.384	0.340	1.26		Sand	5.0			239.31	1.14	271.73	271.77	0.98	0.539	1.100	2.000	1.979	3.67	0.00	0.00
15.260	230.320	0.746	1863.7	1317.1	274.813	0.328	1.26		Sand	5.2			217.69	1.14	247.54	247.61	0.98	0.541	1.100	2.000	1.979	3.66	0.00	0.00
15.420	186.480	0.619	1882.9	1326.3	220.313	0.336	1.35		Sand	6.1			175.31	1.16	203.91	204.56	0.97	0.542	1.100	1.418	1.403	2.59	0.00	0.00
15.580	146.970	0.464	1902.1	1335.5	173.723	0.316	1.43		Sand	7.1	175		175.00	1.16	202.97	206.57	0.97	0.543	1.100	1.493	1.477	2.72	0.00	0.00
15.750	117.600	0.358	1922.5	1345.3	138.265	0.307	1.51		Sand	8.1	175		175.00	1.15	202.05	200.26	0.97	0.544	1.100	1.822	1.802	3.32	0.00	0.00
15.910	101.100	0.727	1941.7	1354.5	116.256	0.720	1.77		Sand	12.3	175		175.00	1.13	106.80	237.71	0.97	0.546	1.100	2.000	1.979	3.63	0.00	0.00
16.080	57.060	1.296	1962.1	1364.3	66.034	2.314	2.29		Sand	24.1	175		175.00	1.12	106.48	264.74	0.97	0.546	1.100	2.000	1.979	3.63	0.00	0.00
16.240	24.290	1.077	1981.3	1373.5	33.920	4.022	2.70		Clay	37.2			22.00	1.12	n.a.	n.a.	0.97	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.400	11.620	0.722	2000.8	1382.7	15.360	6.706	3.07		Clay	51.7			10.06	1.12	n.a.	n.a.	0.97	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.570	10.260	0.503	2020.9	1392.5	13.285	5.442	3.06		Clay	51.1			9.70	1.12	n.a.	n.a.	0.97	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.730	11.010	0.607	2040.1	1401.7	14.254	6.073	3.06		Clay	51.4			10.41	1.11	n.a.	n.a.	0.97	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.900	11.980	0.719	2060.5	1411.5	15.529	6.568	3.06		Clay	51.1			11.35	1.11	n.a.	n.a.	0.97	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.060	13.470	0.803	2079.7	1420.8	17.496	6.463	3.01		Clay	49.5			12.73	1.11	n.a.	n.a.	0.97	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.220	13.800	0.851	2098.9	1430.0	17.873	6.521	3.01		Clay	49.2			13.14	1.11	n.a.	n.a.	0.97	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.390	14.550	0.917	2119.3	1439.8	18.740	6.600	3.01		Clay	49.0			13.76	1.11	n.a.	n.a.	0.97	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.550	15.850	0.957	2138.6	1449.0	20.402	6.476	2.97		Clay	47.3			14.06	1.11	n.a.	n.a.	0.97	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.720	17.500	0.982	2158.9	1458.8	22.513	5.970	2.91		Clay	46.0			16.54	1.10	n.a.	n.a.	0.97	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.880	19.040	1.010	2178.1	1468.0	24.457	5.620	2.87		Clay	43.5			18.00	1.10	n.a.	n.a.	0.97	0.555	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.040	19.720	1.013	2197.3	1477.2	25.212	5.430	2.85		Clay	42.5			18.64	1.10	n.a.	n.a.	0.97	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.210	20.520	1.025	2217.7	1487.0	26.108	5.270	2.83		Clay	41.7			19.40	1.10	n.a.	n.a.	0.97	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.370	21.540	1.068	2236.9	1496.2	27.298	5.231	2.81		Clay	41.1			20.30	1.10	n.a.	n.a.	0.97	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.540	22.310	1.076	2257.3	1506.0	28.129	5.079	2.79		Clay	40.4			21.09	1.09	n.a.	n.a.	0.97	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	24.480	1.092	2276.5	1515.2	30.810	4.674	2.74		Clay	38.4			23.14	1.09	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.860	24.550	1.091	2295.7	1524.4	30.703	4.664	2.74		Clay	38.4			23.20	1.09	n.a.	n.a.	0.97	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	24.460	1.058	2316.1	1534.2	30.363	4.540	2.73		Clay	38.5			23.11	1.09	n.a.	n.a.	0.97	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	24.040	1.007	2335.3	1543.4	29.838	4.401	2.73		Clay	38.2			22.72	1.08	n.a.	n.a.	0.97	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	24.920	0.987	2355.7	1553.2	30.571	4.156	2.71		Clay	37.2			23.55	1.08	n.a.	n.a.	0.96	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	25.450	0.982	2374.9	1562.5	31.057	3.958	2.69		Clay	36.6			24.06	1.08	n.a.	n.a.	0.96	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.680	23.130	0.902	2395.3	1572.2	27.889	4.100	2.73		Clay	38.2			21.86	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	19.980	0.784	2414.5	1581.5	23.741	4.177	2.79		Clay	40.3			18.86	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	16.670	0.690	2433.7	1590.7	19.430	4.464	2.87		Clay	43.5			15.70	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	14.180	0.509	2454.1	1600.5	16.186	4.027	2.94		Clay	45.4			13.40	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	13.160	0.519	2473.3	1609.7	14.815	4.340	2.96		Clay	46.0			12.44	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	12.310	0.450	2493.7	1619.5	13.663	4.066	2.97		Clay	47.3			11.64	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	11.060	0.415	2512.9	1628.7	12.076	4.215	3.02		Clay	48.5			10.46	1.07	n.a.	n.a.	0.96	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	10.430	0.363	2532.1	1637.9	11.180	3.861	3.02		Clay	49.6			9.86	1.07	n.a.	n.a.	0.96	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.000	10.500	0.329	2552.5	1647.7	11.190	3.570	3.00		Clay	48.7			9.92	1.07	n.a.	n.a.	0.96	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 4 | PGA (A_{max}): 0.53 | Total Settlement: 1.60 (inches)

Depth (ft)	Qc (tsf)	fs (tsf)	σvo (psf)	Insitu σ'vo (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qcn near interfaces (soft layer)	Thin Layer Factor (KH)	Interpolated Qcn	Cn	qc1N	qc1N-cs	Stress Reduction Coeff, rd	CSR	Kσ for Sand	CRR M=7.5 & σvc=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain εv	Settlement (inches)
21.160	9.040	0.313	2671.7	1658.9	10.440	3.612	3.03		Clay	49.9			9.40	1.07	n.a.	n.a.	0.96	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.330	9.000	0.394	2692.1	1668.7	10.324	4.580	3.09		Clay	52.8			9.55	1.06	n.a.	n.a.	0.96	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	13.010	0.375	2711.3	1676.8	13.088	3.207	2.90		Clay	44.4			12.30	1.06	n.a.	n.a.	0.96	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	16.610	0.346	2730.5	1686.1	18.182	2.282	2.71		Clay	37.5			16.70	1.06	n.a.	n.a.	0.96	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	13.260	0.318	2750.9	1694.9	14.106	2.642	2.84		Clay	42.4			12.65	1.06	n.a.	n.a.	0.96	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.980	11.540	0.332	2770.1	1704.1	11.977	3.267	2.95		Clay	46.8			10.91	1.06	n.a.	n.a.	0.96	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	11.450	0.379	2790.5	1713.9	11.791	3.740	2.99		Clay	44.6			10.82	1.06	n.a.	n.a.	0.96	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	12.050	0.389	2809.7	1723.2	12.413	3.448	2.96		Clay	40.9			11.39	1.06	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	12.170	0.301	2828.9	1732.4	12.476	2.761	2.80		Clay	44.0			11.50	1.05	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	11.460	0.240	2849.3	1742.2	11.576	2.472	2.90		Clay	44.5			10.83	1.05	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	10.690	0.222	2868.5	1751.4	9.842	2.463	2.96		Clay	47.0			9.64	1.05	n.a.	n.a.	0.96	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	9.680	0.250	2888.9	1761.2	9.298	3.083	3.03		Clay	49.9			9.06	1.05	n.a.	n.a.	0.96	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	9.310	0.285	2908.1	1770.4	8.931	3.640	3.09		Clay	52.4			8.80	1.05	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	10.800	0.206	2927.3	1779.6	10.549	2.422	2.96		Clay	47.2			10.21	1.05	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	9.670	0.262	2947.7	1789.4	9.440	3.103	3.03		Clay	49.8			9.33	1.05	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.620	9.020	0.277	2966.9	1798.6	8.436	3.650	3.11		Clay	53.3			8.63	1.04	n.a.	n.a.	0.96	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	9.160	0.300	2987.3	1808.4	8.623	3.892	3.12		Clay	53.9			8.65	1.04	n.a.	n.a.	0.96	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	9.520	0.324	3006.5	1817.6	8.870	4.014	3.11		Clay	53.8			9.00	1.04	n.a.	n.a.	0.96	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	10.150	0.360	3025.7	1826.8	9.511	4.142	3.10		Clay	52.9			9.59	1.04	n.a.	n.a.	0.96	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	11.300	0.369	3046.1	1836.6	10.709	3.621	3.04		Clay	50.3			10.77	1.04	n.a.	n.a.	0.96	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	12.400	0.419	3065.3	1845.8	11.629	3.842	3.00		Clay	48.7			11.72	1.04	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	13.770	0.471	3085.7	1855.6	13.232	3.836	2.99		Clay	47.1			13.02	1.04	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	14.430	0.489	3104.9	1864.9	13.804	3.783	2.94		Clay	46.3			13.64	1.03	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.930	14.260	0.507	3124.1	1874.1	13.605	3.979	2.99		Clay	47.1			13.48	1.03	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	13.880	0.487	3144.5	1883.9	13.120	3.841	2.97		Clay	47.5			13.12	1.03	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	13.040	0.430	3163.7	1893.1	12.158	3.733	2.96		Clay	46.0			12.33	1.03	n.a.	n.a.	0.96	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	12.130	0.415	3184.1	1902.9	11.128	3.916	3.03		Clay	49.8			11.47	1.03	n.a.	n.a.	0.96	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	11.520	0.362	3203.3	1912.1	10.427	3.631	3.04		Clay	50.8			10.89	1.03	n.a.	n.a.	0.96	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.760	11.320	0.358	3222.6	1921.3	10.156	3.663	3.04		Clay	50.5			10.70	1.03	n.a.	n.a.	0.96	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	11.610	0.346	3242.9	1931.1	10.604	3.403	3.01		Clay	49.0			11.10	1.02	n.a.	n.a.	0.95	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.080	11.690	0.339	3262.1	1940.3	10.629	3.286	3.00		Clay	48.8			11.24	1.02	n.a.	n.a.	0.95	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.250	12.120	0.364	3282.6	1950.1	10.706	3.460	3.01		Clay	48.9			11.48	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.410	13.210	0.403	3301.7	1959.3	11.850	3.473	2.97		Clay	47.6			12.49	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	15.430	0.436	3320.9	1968.5	14.040	3.147	2.89		Clay	44.2			14.58	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	14.590	0.460	3341.3	1978.3	13.111	3.619	2.95		Clay	46.0			13.79	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	15.360	0.488	3360.5	1987.5	13.809	3.659	2.93		Clay	46.7			14.61	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	15.840	0.539	3380.9	1997.3	14.219	3.796	2.93		Clay	46.0			14.97	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	15.340	0.525	3400.1	2006.5	13.646	3.859	2.95		Clay	46.7			14.50	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	14.700	0.488	3420.5	2016.3	12.934	3.748	2.96		Clay	47.2			13.60	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	13.360	0.427	3439.7	2025.6	11.543	3.849	3.00		Clay	48.5			12.63	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	11.860	0.461	3458.9	2034.8	9.810	4.019	3.11		Clay	53.7			11.02	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	12.400	0.636	3479.3	2044.6	10.477	5.504	3.16		Clay	55.7			11.72	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	19.540	0.492	3498.5	2053.8	17.374	2.758	2.78		Clay	40.0			18.47	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	16.310	0.456	3518.9	2063.6	14.161	3.136	2.89		Clay	44.0			16.42	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	14.820	0.641	3538.1	2072.8	12.641	4.604	3.04		Clay	50.5			14.01	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	18.370	0.501	3557.3	2082.0	15.986	3.551	2.88		Clay	43.6			17.39	1.00	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	19.260	0.494	3577.7	2091.8	16.771	2.616	2.80		Clay	40.6			18.22	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	16.460	0.443	3596.9	2101.0	13.962	3.235	2.92		Clay	46.5			14.61	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	13.460	0.523	3617.3	2110.8	11.037	4.470	3.06		Clay	51.4			12.72	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	17.600	1.463	3636.5	2120.0	15.209	9.073	3.10		Clay	55.7			16.91	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	52.210	2.356	3655.7	2129.2	47.371	4.670	2.81		Clay	33.5			46.35	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	101.780	3.284	3676.1	2139.0	93.981	3.286	2.29		Sand	24.2	166		166.00	1.00	165.51	244.30	0.93	0.581	0.907	2.000	1.703	3.09	0.00	0.00
29.690	143.220	3.356	3695.3	2148.2	132.603	2.372	2.09		Sand	19.0	166		166.00	1.00	165.28	232.86	0.93	0.581	0.906	2.000	1.791	3.08	0.00	0.00
29.860	175.050	2.808	3715.7	2158.0	162.604	1.870	1.91		Sand	15.1			166.31	0.99	165.31	217.37	0.93	0.581	0.904	2.000	1.788	3.08	0.00	0.00
30.020	196.030	2.093	3734.9	2167.3	181.362	1.076	1.74		Sand	11.9			186.28	0.99	183.93	217.91	0.93	0.581	0.903	2.000	1.786	3.07	0.00	0.00
30.180	207.600	2.184	3754.1	2176.5	191.772	1.061	1.72		Sand	11.8			196.22	0.99	194.59	220.89	0.93	0.581	0.902	2.000	1.784	3.07	0.00	0.00
30.350	224.420	2.067	3774.5	2186.3	206.973	0.924	1.65		Sand	10.4			212.12	0.99	210.14	234.59	0.93	0.582	0.900	2.000	1.781	3.06	0.00	0.00
30.510	206.770	1.610	3793.7	2195.6	189.723	0.836	1.69		Sand	10.9			194.40	0.99	192.32	210.81	0.93	0.582	0.899	2.000	1.779	3.06	0.00	0.00
30.680	204.440	1.544	3814.1	2205.3	187.562	0.762	1.63		Sand	9.9			193.23	0.99	190.72	210.06	0.93	0.582	0.898	1.801	1.689	2.90	0.00	0.00
30.840	193.910	1.541	3833.3	2214.5	177.433	0.802	1.66		Sand	10.5			183.28	0.99	180.59	203.24	0.93	0.582	0.898	1.328	1.180	2.03	0.00	0.00
31.000	197.350	1.618	3852.5	2223.7	180.228	0.826	1.66		Sand	10.5			186.53	0.98	183.59	206.99	0.93	0.582	0.896	1.606	1.429	2.46	0.00	0.00
31.170	193.980	1.381	3872.9	2233.6	176.723	0.719	1.63		Sand	10.0			183.36	0.98	180.10	198.93	0.93	0.582	0.886	1.064	0.961	1.65	0.00	0.00
31.330	221.810	1.717	3892.1	2242.7	201.801	0.781	1.61		Sand	9.7			209.65	0.98	208.04	224.35	0.93	0.582	0.883	2.000	1.766	3.04	0.00	0.00
31.500	233.660	1.812	3912.5	2252.5	212.306	0.825	1.61		Sand	9.7			220.85	0.98	216.96	236.09	0.93	0.582	0.881	2.000	1.765	3.03	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 4 | PGA (A_{max}) 0.53 | Total Settlement 1.60 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qtn near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{tN}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vo=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
31.660	226.610	1.812	3831.7	2261.7	206.421	0.808	1.67		Sand	9.7			214.19	0.96	210.06	229.16	0.93	0.582	0.980	2.000	1.763	3.03	0.00	0.00
31.820	223.640	1.610	3850.9	2270.9	202.194	0.726	1.59		Sand	9.5			211.29	0.96	208.64	222.52	0.93	0.582	0.979	2.000	1.761	3.03	0.00	0.00
31.990	248.880	2.219	3871.3	2280.7	226.730	0.895	1.62		Sand	8.8			238.18	0.96	231.53	252.49	0.93	0.582	0.976	2.000	1.759	3.02	0.00	0.00
32.160	265.250	1.774	3890.5	2289.9	239.232	0.674	1.51		Sand	8.2			260.71	0.96	245.54	254.59	0.93	0.582	0.976	2.000	1.760	3.02	0.00	0.00
32.320	267.300	1.787	3910.9	2299.7	240.571	0.674	1.51		Sand	8.2			262.66	0.96	247.10	256.06	0.93	0.582	0.975	2.000	1.754	3.01	0.00	0.00
32.480	243.000	1.056	3930.1	2308.9	218.006	0.439	1.42		Sand	7.0	252.65		262.06	0.96	240.79	249.60	0.92	0.582	0.974	2.000	1.752	3.01	0.00	0.00
32.640	179.490	1.125	3949.3	2318.2	160.301	0.633	1.63		Sand	8.9	252.65		262.06	0.96	246.64	269.73	0.92	0.582	0.973	2.000	1.750	3.01	0.00	0.00
32.810	87.220	1.906	3969.7	2328.0	76.807	2.230	2.23		Sand	22.5	252.65		252.65	0.96	246.37	346.89	0.92	0.582	0.971	2.000	1.743	3.00	0.00	0.00
32.970	37.320	1.650	3988.9	2337.2	30.729	4.871	2.74		Clay	38.6			36.27	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	14.860	1.202	4009.3	2347.0	10.956	9.347	3.27		Clay	61.0			14.05	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	11.310	0.661	4028.5	2356.2	7.891	8.032	3.26		Clay	60.4			10.59	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	11.760	0.490	4047.7	2365.4	8.232	6.126	3.20		Clay	57.7			11.12	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	11.140	0.612	4068.1	2376.2	7.668	5.675	3.25		Clay	60.0			10.53	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	12.000	0.511	4087.3	2384.4	8.351	5.128	3.20		Clay	57.5			11.34	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	12.360	0.498	4107.7	2394.2	8.609	4.828	3.17		Clay	56.2			11.65	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	11.610	0.450	4126.9	2403.4	7.944	5.029	3.21		Clay	58.0			10.97	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.280	10.270	0.450	4146.1	2412.6	6.795	5.487	3.29		Clay	61.7			9.71	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	10.100	0.420	4166.5	2422.4	6.655	5.200	3.28		Clay	61.4			9.60	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	10.470	0.370	4185.7	2431.6	6.890	4.516	3.23		Clay	59.1			9.90	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	10.780	0.336	4206.1	2441.4	7.116	3.862	3.18		Clay	56.7			10.20	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	11.560	0.328	4225.3	2450.6	7.702	3.460	3.13		Clay	54.5			10.92	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	12.750	0.305	4244.5	2459.9	8.541	2.805	3.04		Clay	50.3			12.06	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	12.750	0.291	4264.9	2469.7	8.596	2.737	3.03		Clay	50.0			12.05	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	11.950	0.269	4284.1	2478.9	7.921	2.740	3.06		Clay	51.3			11.30	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	11.450	0.296	4304.5	2488.7	7.472	3.173	3.12		Clay	53.7			10.82	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	12.090	0.363	4323.7	2497.9	7.940	3.867	3.12		Clay	54.0			11.43	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	14.420	0.364	4344.1	2507.7	9.768	3.134	3.02		Clay	49.4			13.63	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	15.360	0.441	4363.3	2516.9	10.496	3.537	3.01		Clay	49.0			14.56	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	15.730	0.505	4382.5	2526.1	10.719	3.728	3.03		Clay	49.9			14.87	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	16.520	0.548	4402.9	2535.9	11.293	3.828	3.02		Clay	49.4			15.61	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	17.260	0.564	4422.1	2545.1	11.818	3.682	2.99		Clay	48.3			16.30	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	17.760	0.708	4442.5	2554.9	12.164	4.040	3.00		Clay	51.2			16.79	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	22.780	1.297	4461.7	2564.1	16.006	6.321	3.04		Clay	50.3			21.50	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	37.090	1.676	4480.9	2573.3	27.480	4.466	2.78		Clay	39.2			36.55	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	76.060	1.616	4501.3	2583.1	63.166	2.186	2.29		Sand	24.0	80.3	1.36	117.37	0.93	108.97	169.65	0.91	0.581	0.962	0.400	0.361	0.60	0.01	0.02
37.400	91.310	1.489	4520.5	2592.3	78.043	1.672	2.16		Sand	20.4		1.36	117.37	0.93	108.84	164.02	0.91	0.581	0.963	0.365	0.307	0.53	0.02	0.03
37.570	81.480	2.036	4540.9	2602.1	67.513	2.571	2.31		Sand	24.8		1.36	104.74	0.92	96.60	154.20	0.91	0.581	0.966	0.292	0.264	0.44	0.02	0.04
37.730	64.180	2.371	4560.1	2611.3	52.606	3.631	2.61		Sand	30.7		1.36	82.60	0.91	75.23	129.06	0.91	0.581	0.972	0.202	0.177	0.30	0.02	0.05
37.890	77.670	2.185	4579.3	2620.6	64.023	2.809	2.37		Sand	26.3		1.36	99.84	0.92	91.56	140.03	0.91	0.581	0.968	0.267	0.232	0.40	0.02	0.04
38.060	136.290	2.241	4599.7	2630.4	113.560	1.673	2.02		Sand	17.4		1.36	175.10	0.94	164.20	226.33	0.91	0.580	0.935	2.000	1.681	2.90	0.00	0.00
38.220	132.610	2.333	4618.9	2639.6	110.438	1.768	2.05		Sand	18.1		1.36	170.72	0.94	159.70	223.00	0.91	0.580	0.934	2.000	1.680	2.89	0.00	0.00
38.390	151.130	2.000	4639.3	2649.4	126.700	1.344	1.92		Sand	15.3		1.36	194.27	0.94	182.38	238.65	0.90	0.580	0.933	2.000	1.678	2.89	0.00	0.00
38.550	153.600	2.414	4658.5	2658.6	127.601	1.593	1.97		Sand	16.3		1.36	197.82	0.94	185.99	248.48	0.90	0.580	0.932	2.000	1.676	2.89	0.00	0.00
38.710	137.490	3.000	4677.7	2667.8	113.767	2.293	2.12		Sand	19.8		1.36	178.74	0.94	165.43	236.29	0.90	0.580	0.930	2.000	1.674	2.89	0.00	0.00
38.880	113.560	2.481	4698.1	2677.6	93.409	2.230	2.17		Sand	21.0		1.36	146.01	0.93	136.08	199.18	0.90	0.580	0.929	1.000	0.926	1.60	0.00	0.00
39.040	129.860	2.297	4717.3	2686.8	108.677	1.801	2.06		Sand	18.4		1.36	166.97	0.93	155.20	218.22	0.90	0.580	0.928	2.000	1.670	2.88	0.00	0.00
39.210	49.760	2.099	4737.7	2696.6	36.149	4.429	2.86		Clay	38.4			47.03	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	26.620	1.867	4756.9	2706.8	17.844	7.693	3.06		Clay	51.2			25.07	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.530	18.010	1.452	4776.1	2716.0	12.244	8.734	3.22		Clay	58.4			17.07	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	17.100	1.289	4796.5	2724.8	10.791	8.630	3.25		Clay	60.2			16.16	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.860	14.930	1.182	4815.7	2734.0	9.160	9.442	3.33		Clay	64.1			14.11	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.030	18.510	1.473	4836.1	2743.8	11.730	9.158	3.24		Clay	60.7			17.50	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.190	71.760	2.239	4855.3	2753.0	57.478	3.228	2.43		Sand	28.2	86.41	1.78	153.81	0.92	141.86	217.22	0.90	0.579	0.921	2.000	1.657	2.86	0.00	0.00
40.360	68.130	1.872	4874.5	2762.3	54.348	2.860	2.41		Sand	27.8	86.41	1.78	153.81	0.92	141.88	218.51	0.90	0.579	0.920	2.000	1.656	2.86	0.00	0.00
40.520	91.430	1.517	4894.9	2772.1	73.473	1.706	2.16		Sand	20.8		1.78	153.81	0.92	141.04	208.52	0.90	0.579	0.923	1.569	1.353	2.26	0.00	0.00
40.690	61.180	1.451	4914.1	2781.3	48.413	2.436	2.40		Sand	27.3	86.41	1.78	153.81	0.92	141.30	218.83	0.90	0.578	0.918	2.000	1.651	2.86	0.00	0.00
40.850	27.560	1.300	4934.5	2791.1	17.985	5.177	2.94		Clay	46.2			26.07	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.010	21.070	1.102	4953.7	2800.3	13.280	5.925	3.08		Clay	52.1			19.91	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.170	37.720	1.136	4972.9	2809.5	25.082	3.229	2.70		Clay	37.0			35.66	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.340	24.100	1.204	4993.3	2819.3	16.359	6.551	3.01		Clay	49.2			22.88	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.500	17.830	1.101	5012.5	2828.5	10.836	7.184	3.20		Clay	57.8			16.85	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.670	20.080	0.787	5032.9	2838.3	12.378	4.480	3.03		Clay	49.8			18.98	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	15.260	0.626	5052.1	2847.5	8.944	4.907	3.16		Clay	56.8			14.42	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	12.730	0.610	5071.3	2856.7	7.137	6.000	3.24		Clay	59.7			12.03	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 4 | PGA (A_{max}) 0.53 | Total Settlement 1.60 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qtn near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{tN}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vo=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
42.160	11.340	0.453	5091.7	2866.5	6.136	5.151	3.31		Clay	62.7			10.72	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.320	11.730	0.477	5110.9	2875.7	6.361	5.201	3.29		Clay	62.1			11.09	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.490	13.110	0.399	5131.3	2885.5	7.308	3.782	3.17		Clay	56.0			12.39	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.650	11.380	0.301	5150.5	2894.7	6.083	4.098	3.26		Clay	60.1			10.76	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	10.320	0.320	5169.7	2904.0	5.327	4.211	3.31		Clay	62.7			9.76	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	10.720	0.361	5190.1	2913.7	5.577	4.325	3.30		Clay	62.2			10.13	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	10.300	0.407	5209.3	2923.0	5.265	5.292	3.37		Clay	65.7			9.74	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.310	13.300	0.580	5229.7	2932.8	7.287	5.621	3.28		Clay	60.8			12.57	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	16.340	0.807	5248.9	2942.0	9.324	5.609	3.23		Clay	56.9			15.44	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	28.000	1.308	5269.3	2951.8	17.187	5.474	2.97		Clay	47.5			26.47	0.92	n.a.	n.a.	0.89	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.800	67.520	2.040	5288.5	2961.0	51.637	3.145	2.40		Sand	28.0	209.96	1.56	326.42	0.92	297.82	426.52	0.89	0.575	0.899	2.000	1.616	2.81	0.00	0.00
43.960	91.690	2.243	5307.7	2970.2	71.100	2.514	2.29		Sand	24.1	209.96	1.56	326.42	0.91	297.57	417.40	0.88	0.575	0.898	2.000	1.616	2.81	0.00	0.00
44.130	151.640	2.380	5328.1	2980.0	118.654	1.604	1.99		Sand	16.9	209.96	1.56	325.42	0.91	297.32	368.62	0.88	0.575	0.897	2.000	1.614	2.81	0.00	0.00
44.290	197.430	1.312	5347.5	2989.2	154.677	0.674	1.66		Sand	10.4	209.96	1.56	325.42	0.91	297.07	329.59	0.88	0.575	0.896	2.000	1.612	2.81	0.00	0.00
44.460	223.130	0.917	5367.7	2999.0	174.226	0.418	1.49		Sand	7.9		1.56	325.43	0.91	296.82	304.81	0.88	0.575	0.895	2.000	1.611	2.80	0.00	0.00
44.620	157.840	1.146	5386.9	3008.2	122.781	0.740	1.78		Sand	12.2	209.96	1.56	325.42	0.91	296.56	347.80	0.88	0.574	0.894	2.000	1.609	2.80	0.00	0.00
44.780	94.040	1.619	5406.1	3017.4	72.294	1.769	2.18		Sand	21.2	209.96	1.56	325.42	0.91	296.34	407.92	0.88	0.574	0.894	2.000	1.607	2.80	0.00	0.00
44.950	56.400	1.767	5426.5	3027.2	42.425	3.291	2.53		Sand	31.4	209.96	1.56	325.42	0.91	296.08	425.47	0.88	0.574	0.893	2.000	1.606	2.80	0.00	0.00
45.110	30.860	1.307	5445.7	3036.4	16.396	4.080	2.90		Clay	44.5			28.97	0.91	n.a.	n.a.	0.88	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.280	17.980	0.893	5466.1	3046.2	10.010	5.659	3.17		Clay	56.2			16.99	0.91	n.a.	n.a.	0.88	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.440	15.390	0.630	5485.3	3055.4	8.279	5.032	3.19		Clay	57.4			14.55	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.600	15.100	0.675	5504.5	3064.7	8.068	5.448	3.22		Clay	58.6			14.27	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.770	15.330	0.713	5524.0	3074.6	8.175	5.670	3.23		Clay	59.1			14.49	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.930	15.830	0.702	5544.1	3083.7	8.469	5.376	3.20		Clay	57.8			14.96	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.100	15.110	0.664	5564.5	3093.5	7.970	5.385	3.23		Clay	58.8			14.28	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.260	14.160	0.663	5583.7	3102.7	7.328	5.126	3.24		Clay	59.0			13.38	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.420	13.340	0.553	5602.9	3111.9	6.773	5.250	3.26		Clay	61.2			12.61	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.590	13.220	0.519	5623.3	3121.7	6.669	4.963	3.27		Clay	60.8			12.50	0.90	n.a.	n.a.	0.88	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.750	13.610	0.541	5642.5	3130.9	6.892	5.012	3.26		Clay	60.4			12.86	0.90	n.a.	n.a.	0.87	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	14.520	0.572	5662.9	3140.7	7.443	4.896	3.22		Clay	58.8			13.72	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	17.000	0.650	5682.1	3149.9	8.900	4.854	3.15		Clay	55.1			16.07	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.240	20.370	0.802	5701.3	3159.1	11.091	4.577	3.07		Clay	51.7			19.25	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	26.110	0.960	5721.7	3168.9	14.673	4.066	2.94		Clay	46.3			24.66	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	31.300	1.051	5740.9	3178.1	17.891	3.596	2.85		Clay	42.5			29.55	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	34.050	1.261	5761.3	3187.9	19.555	4.040	2.84		Clay	42.4			32.16	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	34.620	1.412	5780.5	3197.1	19.849	4.451	2.87		Clay	43.2			32.72	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.060	33.170	1.461	5799.7	3206.4	18.881	4.793	2.90		Clay	44.7			31.36	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	33.900	1.406	5820.1	3216.1	19.271	4.533	2.88		Clay	43.6			32.04	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.390	30.040	1.306	5839.3	3225.4	16.817	4.816	2.94		Clay	46.3			28.39	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.560	31.340	1.910	5859.7	3235.2	17.563	6.099	2.98		Clay	47.7			29.62	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	36.880	1.893	5878.9	3244.4	20.749	5.009	2.92		Clay	45.5			34.87	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.880	45.480	1.641	5898.1	3253.6	26.132	3.624	2.72		Clay	37.6			42.97	0.89	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.050	24.040	1.194	5918.5	3263.4	12.920	5.066	3.08		Clay	52.0			22.72	0.89	n.a.	n.a.	0.87	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.210	20.700	0.906	5937.7	3272.6	10.830	4.639	3.07		Clay	51.9			19.57	0.89	n.a.	n.a.	0.87	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.380	17.160	0.750	5958.1	3282.4	8.641	5.287	3.19		Clay	57.3			16.22	0.89	n.a.	n.a.	0.87	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	16.230	0.691	5977.3	3291.6	8.046	5.219	3.21		Clay	58.3			15.34	0.89	n.a.	n.a.	0.86	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.700	15.420	0.582	5996.5	3300.8	7.526	4.673	3.21		Clay	58.1			14.57	0.89	n.a.	n.a.	0.86	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.870	13.540	0.522	6016.9	3310.6	6.362	4.560	3.28		Clay	61.6			12.80	0.89	n.a.	n.a.	0.86	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.030	12.900	0.510	6036.1	3319.8	5.953	5.102	3.32		Clay	63.2			12.19	0.89	n.a.	n.a.	0.86	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.200	13.090	0.496	6056.5	3329.6	6.044	4.916	3.30		Clay	62.4			12.37	0.89	n.a.	n.a.	0.86	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.360	12.140	0.474	6075.7	3338.8	5.452	5.203	3.36		Clay	64.0			11.47	0.89	n.a.	n.a.	0.86	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.520	10.590	0.467	6094.9	3348.1	4.506	6.190	3.46		Clay	70.6			10.01	0.88	n.a.	n.a.	0.86	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.690	9.130	0.440	6115.3	3357.8	3.736	7.009	3.56		Clay	75.9			8.62	0.88	n.a.	n.a.	0.86	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.850	9.090	0.384	6134.5	3367.1	3.577	6.362	3.56		Clay	75.5			8.56	0.88	n.a.	n.a.	0.86	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.020	8.990	0.380	6154.9	3376.9	3.502	6.080	3.55		Clay	75.3			8.50	0.88	n.a.	n.a.	0.86	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.180	9.750	0.367	6174.1	3386.1	3.936	5.511	3.48		Clay	71.7			9.22	0.88	n.a.	n.a.	0.86	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.350	9.640	0.367	6194.5	3395.9	3.863	5.606	3.49		Clay	72.3			9.11	0.88	n.a.	n.a.	0.86	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.510	11.510	0.398	6213.7	3405.1	4.936	4.736	3.39		Clay	65.5			10.88	0.88	n.a.	n.a.	0.86	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.670	13.000	0.441	6232.9	3414.3	5.842	4.421	3.28		Clay	61.7			12.37	0.88	n.a.	n.a.	0.86	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.840	14.210	0.408	6253.3	3424.1	6.474	4.422	3.25		Clay	59.9			13.43	0.88	n.a.	n.a.	0.86	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.000	15.570	0.408	6272.5	3433.3	7.201	3.989	3.16		Clay	56.6			14.61	0.88	n.a.	n.a.	0.86	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.170	15.170	0.407	6292.9	3443.1	6.984	4.129	3.20		Clay	57.8			14.34	0.88	n.a.	n.a.	0.86	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.330	14.730	0.474	6312.1	3452.3	6.706	4.092	3.22		Clay	58.4			13.92	0.88	n.a.	n.a.	0.85	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.490	14.360	0.468	6331.3	3461.5	6.458	4.086	3.23		Clay	58.9			13.57	0.88	n.a.	n.a.	0.85	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 4 | PGA (A_{max}) 0.53 | Total Settlement 1.60 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qtn near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'_{vc}=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
52.680	13.640	0.448	6361.7	3471.3	6.167	4.189	3.25		Clay	60.1			13.12	0.88	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.820	13.210	0.465	6379.9	3480.5	5.760	4.641	3.30		Clay	62.2			12.40	0.88	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.990	13.340	0.463	6391.3	3490.3	5.813	4.561	3.29		Clay	62.1			12.61	0.88	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.160	13.980	0.542	6410.5	3499.5	6.158	5.027	3.30		Clay	62.3			13.21	0.88	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.310	16.240	0.501	6428.7	3508.8	7.424	4.306	3.19		Clay	57.3			15.36	0.88	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.480	17.800	0.521	6450.1	3518.5	8.286	3.871	3.11		Clay	53.4			16.82	0.87	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.640	17.030	0.462	6469.3	3527.8	8.331	3.279	3.08		Clay	52.3			16.06	0.87	n.a.	n.a.	0.86	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.810	16.270	0.486	6489.7	3537.6	7.364	3.727	3.18		Clay	56.8			16.38	0.87	n.a.	n.a.	0.86	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.970	16.100	0.460	6508.9	3546.8	7.244	3.662	3.18		Clay	56.8			16.22	0.87	n.a.	n.a.	0.86	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.130	15.530	0.450	6528.1	3556.0	6.869	3.667	3.18		Clay	56.6			14.68	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.300	13.220	0.423	6548.5	3565.8	5.576	4.248	3.29		Clay	62.0			12.60	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.460	13.530	0.407	6567.7	3575.0	5.732	3.967	3.26		Clay	60.7			12.79	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.630	13.450	0.376	6588.1	3584.8	5.660	3.703	3.26		Clay	60.1			12.71	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.790	13.170	0.397	6607.3	3594.0	5.490	4.021	3.28		Clay	61.6			12.46	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.950	12.650	0.400	6626.5	3603.2	5.182	4.362	3.33		Clay	63.7			11.06	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.120	13.230	0.422	6646.9	3613.0	5.484	4.262	3.30		Clay	62.3			12.60	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.280	13.310	0.411	6666.1	3622.2	5.509	4.115	3.29		Clay	61.8			12.88	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.450	13.620	0.418	6686.5	3632.0	5.650	4.066	3.28		Clay	61.2			12.87	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.610	14.140	0.666	6705.7	3641.2	5.925	5.360	3.37		Clay	66.1			13.36	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.770	15.740	1.007	6724.9	3650.5	6.781	6.863	3.41		Clay	68.2			14.88	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.940	38.800	1.177	6745.3	3660.2	19.407	3.314	2.70		Clay	40.4			36.76	0.87	n.a.	n.a.	0.84	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.100	106.080	2.067	6764.5	3669.5	72.993	2.033	2.22		Sand	22.2			99.32	0.78	77.80	120.09	0.84	0.557	0.827	0.196	0.163	0.29	0.02	0.00
56.270	100.000	2.237	6784.9	3679.3	69.312	2.314	2.27		Sand	23.7			94.60	0.78	73.74	123.31	0.84	0.557	0.829	0.187	0.158	0.28	0.03	0.00
56.430	69.520	1.976	6804.1	3688.5	33.971	3.463	2.65		Clay	35.2			57.20	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.590	30.810	1.565	6823.3	3697.7	14.819	5.713	3.03		Clay	50.1			29.12	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.760	19.490	0.896	6843.7	3707.5	8.666	5.660	3.21		Clay	57.9			18.42	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.920	16.250	0.719	6862.9	3716.7	6.903	5.606	3.20		Clay	61.7			15.37	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.090	14.100	0.839	6883.3	3726.5	5.720	8.004	3.37		Clay	65.9			13.33	0.86	n.a.	n.a.	0.84	0.555	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.250	14.160	0.504	6902.6	3736.7	5.744	6.840	3.36		Clay	64.6			13.40	0.86	n.a.	n.a.	0.84	0.555	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.410	16.820	0.687	6921.7	3744.9	7.136	4.306	3.21		Clay	58.2			15.90	0.86	n.a.	n.a.	0.84	0.555	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.580	16.060	0.674	6942.1	3754.7	6.722	5.336	3.28		Clay	61.6			15.21	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.740	15.790	0.719	6961.3	3763.9	6.480	5.867	3.32		Clay	63.4			14.84	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.910	17.760	0.652	6981.7	3773.7	7.567	4.570	3.20		Clay	57.7			10.74	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.070	15.660	0.692	7000.9	3782.9	6.378	5.489	3.31		Clay	62.6			14.71	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.230	14.520	0.682	7020.1	3792.1	5.807	6.102	3.37		Clay	66.0			13.72	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.400	16.510	0.752	7040.5	3801.9	6.307	6.278	3.36		Clay	64.7			14.06	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.560	16.660	0.817	7060.7	3811.2	6.306	6.700	3.37		Clay	65.5			14.70	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.730	16.940	0.844	7080.1	3820.9	6.491	6.807	3.36		Clay	65.3			15.07	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.890	16.500	0.863	7099.3	3830.2	6.782	6.826	3.34		Clay	64.3			15.60	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.060	16.260	0.887	7119.7	3840.0	6.615	6.982	3.36		Clay	65.3			15.37	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.220	17.180	0.875	7136.8	3849.2	7.072	6.427	3.31		Clay	63.1			16.24	0.85	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.380	16.440	0.804	7158.1	3858.4	6.666	6.250	3.33		Clay	63.7			15.54	0.85	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.550	16.140	0.734	7178.8	3868.2	6.489	5.844	3.32		Clay	63.3			15.26	0.85	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.710	15.660	0.706	7197.7	3877.4	6.221	5.868	3.33		Clay	64.1			14.80	0.85	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.880	14.970	0.687	7218.1	3887.2	5.846	6.048	3.36		Clay	65.0			14.18	0.85	n.a.	n.a.	0.83	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.040	15.000	0.703	7237.3	3896.4	5.842	6.170	3.37		Clay	65.9			14.18	0.85	n.a.	n.a.	0.83	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.200	15.900	0.714	7256.5	3905.6	6.279	5.821	3.33		Clay	63.8			15.07	0.85	n.a.	n.a.	0.82	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.370	17.440	0.767	7276.9	3915.4	7.050	5.464	3.27		Clay	61.1			16.45	0.85	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.530	19.140	0.763	7296.1	3924.6	7.886	4.863	3.20		Clay	57.7			18.09	0.85	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.700	18.660	0.734	7316.6	3934.4	7.621	4.806	3.22		Clay	58.4			17.63	0.85	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.860	16.960	0.601	7336.7	3943.6	6.758	4.509	3.24		Clay	60.4			16.06	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.020	15.990	0.587	7354.9	3952.9	6.230	4.767	3.26		Clay	61.5			15.11	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.190	16.170	0.651	7376.3	3962.6	6.300	4.417	3.26		Clay	60.3			15.28	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.350	15.620	0.630	7394.5	3971.9	6.004	4.496	3.28		Clay	61.4			14.76	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.520	15.890	0.487	7414.0	3981.7	6.119	3.993	3.24		Clay	59.7			15.02	0.85	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.680	15.210	0.466	7434.1	3990.9	5.760	4.071	3.27		Clay	60.9			14.38	0.85	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.840	14.860	0.477	7453.3	4000.1	5.567	4.287	3.29		Clay	62.1			14.05	0.85	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.010	15.170	0.482	7473.7	4009.9	5.702	4.215	3.28		Clay	61.5			14.34	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.170	16.580	0.518	7492.9	4019.1	6.386	4.019	3.23		Clay	59.0			15.67	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.340	18.070	0.632	7513.3	4028.8	7.105	3.713	3.17		Clay	56.3			17.08	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.500	16.960	0.616	7532.6	4038.1	6.465	3.620	3.22		Clay	58.5			16.04	0.84	n.a.	n.a.	0.82	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.660	15.680	0.638	7551.7	4047.3	5.882	4.519	3.29		Clay	61.8			14.82	0.84	n.a.	n.a.	0.82	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.830	15.940	0.677	7572.1	4057.1	6.001	4.749	3.29		Clay	62.1			15.07	0.84	n.a.	n.a.	0.81	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.990	16.160	0.630	7591.3	4066.3	6.081	5.093	3.31		Clay	62.7			15.27	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 4 | PGA (A_{max}) 0.53 | Total Settlement 1.60 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qtn near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'_{vc}=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
63.160	16.300	0.640	7611.7	4076.1	6.130	5.190	3.31		Clay	62.8			16.41	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.320	16.730	0.641	7630.9	4085.3	6.322	4.966	3.29		Clay	61.7			15.81	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.490	17.310	0.646	7650.1	4094.5	6.587	4.786	3.26		Clay	60.6			16.36	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.650	17.920	0.643	7670.5	4104.3	6.863	4.590	3.24		Clay	59.3			16.94	0.84	n.a.	n.a.	0.81	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.810	16.700	0.657	7689.7	4113.6	6.279	4.930	3.29		Clay	61.7			15.84	0.84	n.a.	n.a.	0.81	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.980	16.430	0.628	7710.1	4123.3	6.099	4.897	3.30		Clay	62.4			15.53	0.84	n.a.	n.a.	0.81	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.140	16.780	0.580	7729.3	4132.6	6.236	4.504	3.27		Clay	60.8			16.83	0.84	n.a.	n.a.	0.81	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.300	16.370	0.596	7748.5	4141.8	6.010	4.806	3.30		Clay	62.2			15.43	0.84	n.a.	n.a.	0.81	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.470	16.020	0.582	7768.9	4151.6	5.840	4.709	3.30		Clay	62.0			15.14	0.84	n.a.	n.a.	0.81	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.630	15.980	0.536	7788.1	4160.8	5.800	4.431	3.29		Clay	61.8			15.09	0.84	n.a.	n.a.	0.81	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.800	15.750	0.526	7806.5	4170.6	5.681	4.460	3.30		Clay	62.3			14.89	0.84	n.a.	n.a.	0.81	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.960	16.600	0.502	7827.7	4179.8	6.070	4.432	3.27		Clay	61.0			15.69	0.84	n.a.	n.a.	0.81	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.120	17.160	0.563	7846.9	4189.0	6.320	4.256	3.25		Clay	59.8			16.22	0.84	n.a.	n.a.	0.81	0.540	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.290	15.590	0.493	7867.3	4198.8	5.552	4.277	3.29		Clay	62.0			14.74	0.83	n.a.	n.a.	0.81	0.540	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.450	15.600	0.473	7886.5	4208.0	5.540	3.929	3.28		Clay	60.3			14.74	0.83	n.a.	n.a.	0.81	0.540	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.620	14.780	0.566	7906.9	4217.8	5.134	5.406	3.38		Clay	66.5			13.97	0.83	n.a.	n.a.	0.80	0.539	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.780	17.650	1.079	7926.1	4227.0	6.476	7.886	3.40		Clay	67.4			16.66	0.83	n.a.	n.a.	0.80	0.539	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.940	37.190	1.272	7945.3	4236.2	15.682	3.826	2.80		Clay	44.7			35.15	0.83	n.a.	n.a.	0.80	0.539	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.110	66.140	1.480	7965.7	4246.0	41.474	2.382	2.46		Sand	28.6			62.51	0.80	43.20	66.10	0.80	0.538	0.834	0.121	0.102	0.19	0.04	0.00
66.270	42.120	1.200	7984.9	4256.3	17.920	3.362	2.82		Clay	41.6			39.81	0.83	n.a.	n.a.	0.80	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.440	23.790	0.973	8005.3	4265.0	9.279	4.916	3.15		Clay	56.5			22.40	0.83	n.a.	n.a.	0.80	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.600	17.360	0.802	8024.6	4274.3	6.255	5.174	3.30		Clay	62.4			16.43	0.83	n.a.	n.a.	0.80	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.770	15.520	0.580	8044.9	4284.1	5.306	5.047	3.36		Clay	64.8			14.67	0.83	n.a.	n.a.	0.80	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.930	16.080	0.563	8064.1	4293.3	5.612	4.674	3.31		Clay	63.0			15.20	0.83	n.a.	n.a.	0.80	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.090	17.630	0.667	8083.3	4302.5	6.400	4.726	3.27		Clay	60.0			18.65	0.83	n.a.	n.a.	0.80	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.260	19.360	0.806	8103.7	4312.3	7.096	4.640	3.22		Clay	58.7			18.29	0.83	n.a.	n.a.	0.80	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.420	18.860	0.823	8122.9	4321.5	6.782	4.208	3.22		Clay	58.8			17.83	0.83	n.a.	n.a.	0.80	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.590	17.550	0.633	8143.3	4331.3	6.224	4.607	3.28		Clay	61.3			16.60	0.83	n.a.	n.a.	0.80	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.750	18.180	0.678	8162.5	4340.5	6.501	4.804	3.27		Clay	60.8			17.19	0.83	n.a.	n.a.	0.80	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.910	18.200	0.673	8181.7	4349.7	6.487	4.772	3.27		Clay	60.8			17.20	0.83	n.a.	n.a.	0.80	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.080	17.480	0.618	8202.1	4359.5	6.129	4.600	3.28		Clay	61.3			16.60	0.83	n.a.	n.a.	0.80	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.240	16.580	0.558	8221.3	4368.7	5.708	4.402	3.30		Clay	62.2			16.67	0.83	n.a.	n.a.	0.80	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.410	16.410	0.541	8241.7	4378.5	5.613	4.402	3.30		Clay	62.3			16.61	0.83	n.a.	n.a.	0.79	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.570	16.520	0.559	8260.9	4387.7	5.647	4.510	3.30		Clay	62.5			16.61	0.82	n.a.	n.a.	0.79	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.730	16.540	0.558	8280.1	4396.9	5.640	4.499	3.30		Clay	62.5			16.63	0.82	n.a.	n.a.	0.79	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.900	16.930	0.546	8300.5	4406.7	5.800	4.288	3.28		Clay	61.4			16.00	0.82	n.a.	n.a.	0.79	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.060	16.840	0.558	8319.7	4415.9	5.743	4.397	3.29		Clay	61.9			16.92	0.82	n.a.	n.a.	0.79	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.230	17.070	0.614	8340.1	4425.7	5.830	3.981	3.28		Clay	60.8			16.13	0.82	n.a.	n.a.	0.79	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.390	16.840	0.690	8359.3	4435.0	5.700	5.374	3.34		Clay	64.5			15.92	0.82	n.a.	n.a.	0.79	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.560	25.420	0.846	8378.5	4444.2	9.584	3.637	3.02		Clay	49.4			24.03	0.82	n.a.	n.a.	0.79	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.720	23.050	0.586	8398.0	4454.0	8.465	3.103	3.06		Clay	51.5			21.78	0.82	n.a.	n.a.	0.79	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.890	18.830	0.466	8418.1	4463.2	6.652	3.203	3.17		Clay	56.0			17.86	0.82	n.a.	n.a.	0.79	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.050	17.880	0.458	8438.6	4473.0	6.074	3.410	3.21		Clay	58.3			16.62	0.82	n.a.	n.a.	0.79	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.210	16.930	0.461	8457.7	4482.2	5.667	3.660	3.24		Clay	60.0			16.00	0.82	n.a.	n.a.	0.79	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.370	16.900	0.528	8479.9	4491.4	5.676	4.122	3.28		Clay	61.3			16.06	0.82	n.a.	n.a.	0.79	0.530	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.540	20.690	0.670	8497.3	4501.2	7.306	4.112	3.19		Clay	57.0			19.66	0.82	n.a.	n.a.	0.79	0.530	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.700	27.360	1.404	8518.8	4510.4	10.263	6.331	3.18		Clay	56.8			25.88	0.82	n.a.	n.a.	0.79	0.530	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.870	32.550	1.979	8538.6	4520.3	12.613	6.690	3.15		Clay	56.1			30.77	0.82	n.a.	n.a.	0.79	0.529	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.030	49.730	1.860	8558.1	4529.4	20.070	3.411	2.79		Clay	40.2			47.00	0.82	n.a.	n.a.	0.79	0.529	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.190	40.730	0.885	8576.3	4538.6	16.069	2.429	2.78		Clay	39.8			38.60	0.82	n.a.	n.a.	0.78	0.529	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.360	26.300	0.653	8595.7	4548.4	9.676	2.970	3.01		Clay	40.0			24.86	0.82	n.a.	n.a.	0.78	0.528	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.520	18.570	0.636	8614.9	4557.7	6.266	4.475	3.26		Clay	60.6			17.65	0.82	n.a.	n.a.	0.78	0.528	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.680	19.170	0.829	8635.3	4567.4	6.504	5.678	3.31		Clay	62.7			16.12	0.82	n.a.	n.a.	0.78	0.528	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.850	24.960	0.831	8654.5	4576.7	9.012	4.027	3.11		Clay	53.4			23.58	0.82	n.a.	n.a.	0.78	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.010	23.430	0.706	8673.7	4586.0	8.327	4.163	3.14		Clay	55.0			22.16	0.82	n.a.	n.a.	0.78	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.180	26.710	0.646	8694.1	4596.7	9.732	2.682	3.00		Clay	48.6			25.26	0.81	n.a.	n.a.	0.78	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.340	20.100	0.620	8713.3	4604.9	6.677	3.910	3.20		Clay	57.4			19.06	0.81	n.a.	n.a.	0.78	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.510	17.340	0.638	8733.7	4614.7	5.623	4.129	3.28		Clay	61.6			16.30	0.81	n.a.	n.a.	0.78	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.670	16.600	0.584	8752.9	4623.9	5.326	4.739	3.33		Clay	64.1			15.78	0.81	n.a.	n.a.	0.78	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.830	17.370	0.868	8772.1	4633.1	5.606	5.820	3.41		Clay	67.9			16.42	0.81	n.a.	n.a.	0.78	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.000	27.510	1.151	8792.5	4642.9	9.967	4.900	3.13		Clay	54.3			20.00	0.81	n.a.	n.a.	0.78	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.160	39.240	1.128	8811.7	4652.1	14.976	3.232	2.87		Clay	43.5			37.00	0.81	n.a.	n.a.	0.78	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.330	39.000	0.930	8832.1	4661.9	14.876	2.662	2.83		Clay	41.8			36.96	0.81	n.a.	n.a.	0.78	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.490	24.270	0.769	8851.3	4671.1	8.407	3.675	3.12		Clay	53.9			22.94	0.81	n.a.	n.a.	0.78	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 4

PGA (A_{max}) 0.53

Total Settlement 1.60 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	D_w (psf)	Static σ'_{vo} (psf)	Q	F (%)	I	Layer "Plastic" PI > 7	Plug Soil Type	Fines (%)	Corr. near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1n}	C_N	$q_{c1n,cs}$	$q_{penalty}$	Stress Reduction Coeff, r_d	CRR	K_σ for Sand	CRR for $(q_{c1n,cs})_{PI=7}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
73.850	19.530	0.44	5878.5	4960.2	6.007	3.917	3.25		Clay	50.2			17.33	0.61	n.a.	n.a.	0.76	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.900	17.540	0.487	5892.9	4960.5	5.586	3.795	3.29		Clay	52.4			16.52	0.61	n.a.	n.a.	0.76	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.950	16.720	0.501	5910.1	4960.3	5.358	4.799	3.34		Clay	54.8			15.77	0.61	n.a.	n.a.	0.77	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.100	18.680	1.003	6230.5	4799.1	6.037	1.065	3.39		Clay	57.1			17.08	0.61	n.a.	n.a.	0.77	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.310	31.000	1.334	6648.7	4719.4	11.726	4.665	3.07		Clay	51.7			30.19	0.61	n.a.	n.a.	0.77	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.460	36.940	1.442	6870.1	4725.1	13.737	4.439	2.99		Clay	48.2			34.83	0.61	n.a.	n.a.	0.77	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.640	42.500	1.319	6988.5	4737.4	15.670	3.443	2.87		Clay	43.2			40.23	0.61	n.a.	n.a.	0.77	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.800	37.740	1.074	6988.5	4748.6	14.006	3.061	2.88		Clay	43.9			36.87	0.61	n.a.	n.a.	0.77	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.970	29.670	0.783	6929.8	4759.4	9.927	3.662	3.10		Clay	53.0			29.09	0.61	n.a.	n.a.	0.77	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00
75.130	19.750	0.693	6948.1	4768.6	6.582	4.369	3.25		Clay	60.9			18.66	0.61	n.a.	n.a.	0.77	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 5

PGA (A_{max}) 0.53

Total Settlement 2.17 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	D_w (psf)	Static σ'_{vo} (psf)	Q	F (%)	I	Layer "Plastic" PI > 7	Plug Soil Type	Fines (%)	Corr. near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1n}	C_N	$q_{c1n,cs}$	$q_{penalty}$	Stress Reduction Coeff, r_d	CRR	K_σ for Sand	CRR for $(q_{c1n,cs})_{PI=7}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
0.100	0.250	0.024	23.0	20.0	2.000	118.000	4.57		Unsaturated	140.6			0.53	1.70	0.06	29.18	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.200	0.660	0.030	61.3	41.3	31.000	4.554	2.72		Unsaturated	57.6			0.62	1.70	1.06	31.42	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.400	0.670	0.294	61.3	61.3	1.286	650.921	9.76		Unsaturated	208.7			0.07	1.70	0.11	25.88	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.600	122.280	0.791	92.8	82.8	548.910	0.643	1.14		Unsaturated	4.9			116.62	1.70	104.69	199.11	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	87.780	1.427	102.6	102.6	378.749	1.627	1.69		Unsaturated	10.6			82.07	1.70	141.66	185.49	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	41.120	1.008	122.5	122.5	101.291	4.136	3.23		Unsaturated	22.8			39.67	1.70	90.67	112.67	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	29.770	1.726	142.5	142.5	129.535	8.537	2.84		Unsaturated	31.6			19.03	1.70	70.37	73.93	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	19.240	1.027	162.8	162.8	69.702	5.223	2.64		Unsaturated	31.7			19.06	1.70	51.72	71.76	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	19.910	1.101	185.0	185.0	63.345	5.564	2.68		Unsaturated	32.6			19.62	1.70	51.89	72.27	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	19.240	1.063	205.0	205.0	53.114	5.564	2.69		Unsaturated	33.5			18.98	1.70	50.81	71.06	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	21.000	0.999	225.0	225.0	59.717	4.578	2.63		Unsaturated	31.2			19.91	1.70	53.84	74.48	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	21.640	0.978	246.5	246.5	60.447	4.331	2.58		Unsaturated	29.6			20.74	1.70	56.25	76.99	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	20.060	0.923	266.3	266.3	54.466	5.961	2.61		Unsaturated	30.8			19.81	1.70	53.89	74.67	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	22.150	0.851	287.5	287.5	59.478	3.956	2.48		Unsaturated	30.7			20.84	1.70	56.62	76.37	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	29.900	0.949	307.5	307.5	69.315	3.171	2.36		Unsaturated	29.6			28.43	1.70	43.22	56.36	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	31.250	1.034	327.5	327.5	74.797	3.322	2.36		Unsaturated	30.2			29.87	1.70	59.29	84.33	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	33.140	1.213	348.8	348.8	79.750	3.678	2.39		Unsaturated	31.0			31.32	1.70	63.28	90.70	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.960	20.760	0.963	368.8	368.8	60.230	5.443	2.46		Unsaturated	28.6			20.32	1.70	43.36	64.01	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	22.730	0.774	388.0	388.0	49.613	3.433	2.50		Unsaturated	26.2			21.48	1.70	38.83	57.79	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	24.300	0.769	408.0	408.0	51.646	3.163	2.48		Unsaturated	25.8			23.02	1.70	39.13	59.84	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	27.500	0.823	428.0	428.0	58.978	3.269	2.53		Unsaturated	26.3			26.09	1.70	44.01	66.55	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	22.280	0.648	451.3	451.3	46.949	3.478	2.43		Unsaturated	24.1			21.66	1.70	36.90	56.11	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	20.280	0.497	471.5	471.5	40.148	2.330	2.46		Unsaturated	19.8			19.17	1.70	32.59	72.87	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	19.950	0.447	492.5	492.5	37.629	2.265	2.48		Unsaturated	19.7			18.13	1.70	30.77	69.80	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	18.660	0.481	512.8	512.8	34.454	2.639	2.53		Sand	21.2			17.63	1.70	29.91	69.08	1.00	0.344	1.100	0.096	0.092	0.28	0.06	0.09
4.270	18.270	0.503	533.4	533.4	34.163	2.966	2.58		Sand	22.7			18.21	1.70	30.96	70.66	1.00	0.354	1.100	0.101	0.100	0.28	0.04	0.06
4.430	18.620	0.667	553.8	553.8	44.768	3.644	2.54		Mixed	31.5			17.79	1.70	30.24	69.74	1.00	0.361	1.100	0.099	0.095	0.27	0.06	0.09
4.600	18.470	0.884	573.5	573.5	35.129	4.199	2.69		Mixed	34.7			16.82	1.70	29.46	68.25	1.00	0.367	1.100	0.094	0.089	0.26	0.08	0.10
4.760	14.310	0.679	595.0	595.0	32.191	4.151	2.69		Mixed	36.8			13.53	1.70	22.98	60.83	1.00	0.373	1.000	0.069	0.066	0.24	0.06	0.10
4.920	14.020	0.910	615.0	615.0	30.791	5.784	2.87		Mixed	39.1			13.25	1.70	22.53	65.15	1.00	0.379	1.000	0.068	0.065	0.23	0.06	0.11
5.080	13.190	0.407	635.3	635.3	28.193	3.181	2.85		Mixed	36.4			12.49	1.70	21.15	59.26	1.00	0.384	1.000	0.068	0.064	0.22	0.05	0.10
5.250	10.380	0.644	656.5	656.5	22.366	6.813	2.95		Mixed	39.2			9.84	1.70	16.73	52.50	1.00	0.390	1.000	0.051	0.050	0.19	0.05	0.10
5.410	10.240	0.592	676.3	676.3	21.693	5.919	2.99		Sand	33.3			10.19	1.70	17.01	53.66	1.00	0.395	1.007	0.101	0.099	0.25	0.04	0.09
5.580	11.830	0.803	697.5	697.5	36.384	2.806	2.54		Sand	31.7			20.83	1.70	34.64	76.27	1.00	0.400	1.000	0.100	0.100	0.37	0.04	0.08
5.740	23.280	0.880	717.5	717.5	57.295	2.879	2.54		Sand	31.4			33.00	1.70	57.41	79.51	1.00	0.405	1.000	0.112	0.113	0.27	0.04	0.08
5.910	22.610	0.700	738.8	738.8	54.617	3.235	2.59		Sand	29.5			26.80	1.70	46.31	78.89	1.00	0.409	1.003	0.109	0.107	0.26	0.04	0.08
6.070	21.490	0.742	758.8	758.8	49.858	3.658	2.58		Mixed	30.3			25.31	1.70	34.83	76.07	1.00	0.414	1.000	0.107	0.106	0.26	0.04	0.08
6.230	20.370	0.866	778.8	778.8	36.910	3.444	2.58		Mixed	32.9			19.25	1.70	33.73	73.38	1.00	0.418	1.000	0.104	0.101	0.24	0.04	0.08
6.400	21.700	0.844	800.0	800.0	32.624	3.539	2.62		Sand	29.3			20.17	1.70	34.28	78.44	1.00	0.422	1.000	0.109	0.106	0.25	0.04	0.08
6.560	22.370	0.758	819.7	819.7	40.443	3.225	2.64		Mixed	31.7			21.14	1.50	36.62	72.26	0.99	0.426	1.000	0.109	0.106	0.25	0.04	0.08
6.730	20.600	0.751	840.1	840.1	37.458	3.691	2.66		Mixed	33.7			19.76	1.50	33.83	74.62	0.99	0.431	1.002	0.106	0.103	0.24	0.04	0.08
6.900	18.660	0.824	860.3	860.3	33.381	3.730	2.68		Mixed	36.3			17.92	1.70	30.26	70.66	0.99	0.434	1.000	0.100	0.097	0.22	0.05	0.09
7.060	17.500	0.282	878.8	878.8	30.420	1.611	2.76		Mixed	18.2			18.84	1.27	n.a.	n.a.	0.99	0.438	n.a.	n.a.	n.a.	n.a.	0.06	0.00
7.220	18.250	1.206	898.8	898.8	44.864	6.743	2.74		Mixed	36.8			18.20	1.27	n.a.	n.a.	0.99	0.442	n.a.	n.a.	n.a.	n.a.	0.06	0.00
7.380	36.650	1.166	918.1	918.1	63.352	4.582	2.66		Sand	35.6			33.11	1.67	51.84	89.15	0.99	0.446	1.008	0.141	0.139	0.31	0.03	0.07
7.540	24.410	1.006	938.8	938.8	41.730	4.129	2.69		Sand	30.4			22.02	1.50	35.78	81.59	0.99	0.449	1.002	0.130	0.128	0.30	0.03	0.06
7.710	40.580	1.357	957.7	957.7	68.880	3.311	2.43		Sand	28.3			38.56	1.53	58.67	104.46	0.99	0.452	1.000	0.153	0.151	0.34	0.03	0.06
7.870	53.250	1.266	978.0	978.0	87.700	2.332	2.46		Sand	30.0	36.36		50.39	1.52	84.28	108.74	0.99	0.455	1.007	0.154	0.152	0.33	0.03	0.06
8.040	28.880	0.863	997.3	997.3	46.397	4.856	2.62		Clay	34.2			19.98	1.28	n.a.	n.a.	0.99	0.458	n.a.	n.a.	n.a.	n.a.	0.06	0.00
8.200	13.910	0.583	1016.9	1016.4	28.783	5.078	2.83		Clay	42.6			12.66	1.28	n.a.	n.a.	0.99	0.461	n.a.	n.a.	n.a.	n.a.	0.05	0.00
8.370	11.230	0.868	1036.8	1036.7	23.285	6.129	2.95		Clay	44.9			10.61	1.28	n.a.	n.a.	0.99	0.464	n.a.	n.a.	n.a.	n.a.	0.05	0.00
8.530	10.910	0.400	1056.1	1056.4	22.126	4.709	2.96		Clay	42.6			10.22	1.24	n.a.	n.a.	0.99	0.467	n.a.	n.a.	n.a.	n.a.	0.05	0.00
8.690	8.440	0.407	1076.3	1076.0	16.909	5.407	2.84		Clay	46.2			8.02	1.24	n.a.	n.a.	0.99	0.470	n.a.	n.a.	n.a.	n.a.	0.04	0.00
8.860	8.350	0.400	1096.7	1096.4	16.474	5.502	3.01		Clay	46.8			7.95	1.24	n.a.	n.a.	0.99	0.473	n.a.	n.a.	n.a.	n.a.	0.04	0.00
9.020	7.340	0.429	1116.9	1117.2	14.198	5.238	3.06		Clay	51.0			6.94	1.23	n.a.	n.a.	0.99	0.475	n.a.	n.a.	n.a.	n.a.	0.04	0.00
9.180	6.020	0.361	1136.3	1137.4	12.008	6.247	3.11		Clay	53.5			5.91	1.23	n.a.	n.a.	0.99	0.478	n.a.	n.a.	n.a.	n.a.	0.03	0.00
9.350	5.580	0.361	1154.9	1157.7	10.248	6.617	3.17		Clay	56.2			5.57	1.23	n.a.	n.a.	0.99	0.481	n.a.	n.a.	n.a.	n.a.	0.03	0.00
9.510	5.540	0.395	1173.7	1178.0	9.841	6.743	3.17		Clay	56.2			5.58	1.22	n.a.	n.a.	0.99	0.483	n.a.	n.a.	n.a.	n.a.	0.03	0.00
9.680	6.300	0.387	1194.1	1198.7	11.256	4.548	3.09		Clay	51.6			5.88	1.22	n.a.	n.a.	0.99	0.486	n.a.	n.a.	n.a.	n.a.	0.03	0.00
9.840	7.160	0.268	1213.9	1219.0	13.700	3.721	2.94		Clay	46.3			7.08	1.22	n.a.	n.a.	0.99	0.488	n.a.	n.a.	n.a.	n.a.	0.03	0.00
10.010	8.910	0.333	1233.7	1241.7	18.546	4.018	2.91		Clay	44.7			8.42	1.21	n.a.	n.a.	0.99	0.489	n.a.	n.a.	n.a.	n.a.	0.03	0.00
10.170	12.330	0.478	1252.9	1262.9	27.541	4.074	2.79		Clay	40.6			11.64	1.21	n.a.	n.a.	0.99	0.492	n.a.	n.a.	n.a.	n.a.	0.02	0.00
10.330	19.040	1.168	1272.1	1283.1	39.473	6.234	2.77		Clay	30.7			17.62	1.21	n.a.	n.a.	0.99	0.494	n.a.	n.a.	n.a.	n.a.	0.02	0.00
10.500	34.000	1.948	1292.5	1304.8	53.127	5.699	2.64		Mixed	34.8		1.12	30.66	1.42	62.83	106.31	0.99	0.497	1.073	0.143	0.158	0.32	0.03	0.06

CORNERSTONE EARTH GROUP

CPT No. 5 | PGA (A_{max}) 0.53 | Total Settlement 2.17 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qcn near interfaces (soft layer)	Thin Layer Factor (K_c)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-cs}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vo=1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
10.660	70.200	2.363	1311.7	1052.1	63.216	3.441	2.31		Sand	24.7	230.08	1.12	257.67	1.20	309.83	434.62	0.99	0.499	1.100	2.000	1.979	3.97	0.00	0.00
10.830	103.200	2.030	1332.1	1061.0	138.803	1.060	2.02		Sand	17.4	230.08	1.12	257.67	1.20	309.07	406.61	0.99	0.501	1.100	2.000	1.979	3.96	0.00	0.00
10.990	148.320	1.823	1351.3	1071.1	195.141	1.236	1.76		Sand	12.2	230.08	1.12	257.67	1.20	308.37	361.05	0.99	0.503	1.100	2.000	1.979	3.94	0.00	0.00
11.160	165.160	2.258	1370.6	1080.3	217.580	1.373	1.77		Sand	12.3	230.08	1.12	257.67	1.19	307.67	362.21	0.99	0.504	1.100	2.000	1.979	3.92	0.00	0.00
11.320	176.860	2.584	1390.9	1090.1	231.717	1.467	1.77		Sand	12.4	230.08	1.12	257.67	1.19	306.94	361.01	0.98	0.506	1.100	2.000	1.979	3.91	0.00	0.00
11.480	243.400	2.033	1410.1	1099.3	318.246	1.066	1.58		Sand	9.3		1.12	257.66	1.19	306.25	326.60	0.98	0.508	1.100	2.000	1.979	3.90	0.00	0.00
11.650	286.940	1.642	1430.5	1109.1	376.270	0.570	1.32		Sand	5.6		1.12	306.67	1.18	362.70	363.22	0.98	0.510	1.100	2.000	1.979	3.88	0.00	0.00
11.810	280.880	1.074	1449.7	1118.4	363.936	0.386	1.21		Sand	4.6		1.12	307.10	1.18	361.63	361.64	0.98	0.512	1.100	2.000	1.979	3.87	0.00	0.00
11.980	289.560	1.466	1470.1	1128.1	373.873	0.508	1.29		Sand	5.4		1.12	306.63	1.18	361.86	362.06	0.98	0.513	1.100	2.000	1.979	3.86	0.00	0.00
12.140	348.360	1.280	1489.3	1137.4	448.148	0.368	1.13		Sand	3.9		1.12	368.77	1.18	434.40	434.40	0.98	0.515	1.100	2.000	1.979	3.84	0.00	0.00
12.300	366.850	1.540	1508.5	1146.6	466.975	0.423	1.16		Sand	4.3		1.12	377.66	1.18	443.79	443.80	0.98	0.517	1.100	2.000	1.979	3.83	0.00	0.00
12.470	322.790	1.392	1528.9	1156.4	411.731	0.432	1.21		Sand	4.6		1.12	341.71	1.17	400.78	400.77	0.98	0.518	1.100	2.000	1.979	3.82	0.00	0.00
12.630	305.500	1.537	1548.1	1165.8	388.069	0.504	1.28		Sand	6.5		1.12	323.40	1.17	378.60	378.64	0.98	0.520	1.100	2.000	1.979	3.81	0.00	0.00
12.800	299.780	1.031	1568.5	1176.4	370.182	0.346	1.17		Sand	4.2		1.12	317.38	1.17	370.59	370.60	0.98	0.521	1.100	2.000	1.979	3.79	0.00	0.00
12.960	271.910	0.956	1587.7	1184.8	342.486	0.358	1.21		Sand	4.6		1.12	287.84	1.17	336.46	336.46	0.98	0.523	1.100	2.000	1.979	3.78	0.00	0.00
13.120	201.810	0.763	1606.9	1193.5	252.936	0.379	1.33		Sand	5.9		1.12	213.64	1.17	249.16	249.64	0.98	0.524	1.100	2.000	1.979	3.77	0.00	0.00
13.290	116.160	0.910	1627.3	1203.6	147.062	0.806	1.68		Sand	10.6	190	1.12	212.80	1.16	246.96	276.77	0.98	0.526	1.100	2.000	1.979	3.76	0.00	0.00
13.450	64.360	0.709	1646.5	1212.8	66.863	1.491	2.16		Sand	20.6	190	1.12	212.80	1.16	246.40	341.71	0.98	0.527	1.100	2.000	1.979	3.75	0.00	0.00
13.620	21.470	0.700	1666.9	1222.6	33.758	3.393	2.61			34.1			20.29	1.16	n.a.	n.a.	0.98	0.529	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.780	14.140	0.556	1686.1	1231.8	21.589	4.176	2.82			41.5			13.56	1.16	n.a.	n.a.	0.98	0.530	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.940	12.200	0.296	1705.3	1241.0	18.287	2.601	2.76		Clay	38.8			11.83	1.15	n.a.	n.a.	0.98	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.110	9.690	0.262	1725.7	1250.8	14.114	3.313	2.90		Clay	44.6			9.16	1.15	n.a.	n.a.	0.98	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.270	8.120	0.329	1744.9	1260.1	11.504	4.630	3.06		Clay	51.0			7.67	1.15	n.a.	n.a.	0.98	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.440	7.660	0.475	1765.3	1269.8	10.501	7.124	3.21		Clay	58.0			7.14	1.14	n.a.	n.a.	0.98	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.600	13.670	0.563	1784.5	1279.1	18.960	4.326	2.86			42.8			12.92	1.14	n.a.	n.a.	0.98	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.760	23.160	0.729	1803.7	1288.3	29.778	3.274	2.64		Mixed	35.1		1.5	30.40	1.26	50.88	97.74	0.98	0.537	1.062	0.139	0.131	0.24	0.03	0.07
14.930	36.930	0.746	1824.1	1298.1	43.465	2.072	2.39		Sand	27.0		1.5	62.63	1.24	77.74	131.22	0.98	0.538	1.067	0.206	0.196	0.37	0.02	0.05
15.090	27.090	0.800	1843.3	1307.3	31.408	2.521	2.56		Sand	32.0	34.91	1.5	62.64	1.23	77.39	133.01	0.98	0.539	1.067	0.211	0.203	0.38	0.02	0.05
15.260	15.220	0.630	1863.7	1317.1	21.607	4.407	2.83			42.0			14.30	1.13	n.a.	n.a.	0.98	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.420	12.640	0.439	1882.9	1326.3	17.843	3.888	2.86			42.6			12.14	1.13	n.a.	n.a.	0.97	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.580	13.320	1.062	1902.1	1335.5	18.523	8.506	3.06			52.1			12.59	1.13	n.a.	n.a.	0.97	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	20.180	1.424	1922.5	1345.3	41.952	6.040	2.67			35.9			27.58	1.15	n.a.	n.a.	0.97	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	130.070	2.111	1941.7	1354.5	162.512	1.636	1.83		Sand	15.4			122.94	1.16	143.12	191.76	0.97	0.546	1.100	0.803	0.794	1.46	0.00	0.00
16.080	168.730	2.076	1962.1	1364.3	197.458	1.236	1.76		Sand	12.2			159.48	1.14	182.30	218.67	0.97	0.546	1.100	2.000	1.979	3.63	0.00	0.00
16.240	213.630	2.597	1981.3	1373.5	240.341	1.222	1.62		Sand	11.0			201.82	1.12	226.20	257.47	0.97	0.547	1.100	2.000	1.979	3.62	0.00	0.00
16.400	264.030	3.628	2000.6	1382.7	307.144	1.379	1.68		Sand	10.7			249.80	1.12	270.20	313.30	0.97	0.547	1.100	2.000	1.979	3.61	0.00	0.00
16.570	276.800	3.282	2020.9	1392.5	323.774	1.174	1.61		Sand	9.6			263.61	1.12	294.38	317.08	0.97	0.548	1.100	2.000	1.979	3.61	0.00	0.00
16.730	273.400	2.803	2040.1	1401.7	310.414	1.029	1.57		Sand	9.0			258.50	1.11	268.16	306.17	0.97	0.549	1.100	2.000	1.979	3.60	0.00	0.00
16.900	261.060	2.708	2060.5	1411.5	301.836	1.039	1.58		Sand	9.3			247.33	1.11	275.21	285.01	0.97	0.550	1.100	2.000	1.979	3.60	0.00	0.00
17.060	290.620	1.364	2079.7	1420.8	294.806	0.542	1.36		Sand	6.6			242.56	1.11	269.43	270.02	0.97	0.551	1.100	2.000	1.979	3.59	0.00	0.00
17.220	228.720	0.864	2099.9	1430.0	261.767	0.379	1.32		Sand	5.8			216.18	1.12	241.07	241.43	0.97	0.552	1.100	2.000	1.979	3.59	0.00	0.00
17.390	214.860	0.836	2119.3	1439.8	244.962	0.390	1.36		Sand	6.1			203.06	1.12	227.41	228.11	0.97	0.553	1.100	2.000	1.979	3.58	0.00	0.00
17.550	193.200	1.237	2138.6	1449.0	219.451	0.644	1.53		Sand	8.4			182.61	1.12	206.40	214.56	0.97	0.554	1.100	2.000	1.979	3.57	0.00	0.00
17.720	184.670	1.183	2158.8	1458.8	208.992	0.833	1.54		Sand	8.6			174.68	1.13	196.67	206.56	0.97	0.554	1.100	1.572	1.565	2.81	0.00	0.00
17.880	244.480	1.646	2178.1	1468.0	276.196	0.676	1.47		Sand	7.8			231.06	1.10	264.48	290.12	0.97	0.555	1.100	2.000	1.979	3.56	0.00	0.00
18.040	281.240	1.916	2197.3	1477.2	316.906	0.686	1.43		Sand	7.1			265.82	1.10	292.28	296.01	0.97	0.556	1.100	2.000	1.979	3.56	0.00	0.00
18.210	234.740	1.259	2217.7	1487.0	263.420	0.539	1.42		Sand	6.9			221.67	1.10	244.22	246.75	0.97	0.557	1.100	2.000	1.979	3.56	0.00	0.00
18.370	183.930	1.021	2236.9	1496.2	171.784	0.666	1.62		Sand	8.8	221		221.00	1.10	242.16	263.73	0.97	0.557	1.100	2.000	1.979	3.55	0.00	0.00
18.540	68.080	1.280	2257.3	1506.0	75.010	1.912	2.19		Sand	21.5	221		221.00	1.09	241.74	338.21	0.97	0.558	1.100	2.000	1.979	3.55	0.00	0.00
18.700	30.610	1.130	2276.5	1515.2	42.971	2.037	2.40		Sand	30.2	221		221.00	1.09	241.39	361.34	0.97	0.559	1.100	2.000	1.979	3.54	0.00	0.00
18.860	16.130	0.724	2295.7	1524.4	19.650	4.830	2.89			44.3			15.26	1.09	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	9.620	0.431	2316.1	1534.2	11.031	5.002	3.10			53.0			9.09	1.08	n.a.	n.a.	0.97	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	9.580	0.317	2335.3	1543.4	10.914	3.767	3.02		Clay	49.7			9.06	1.08	n.a.	n.a.	0.97	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	9.710	0.297	2356.7	1553.2	10.986	3.476	3.00		Clay	48.7			9.18	1.08	n.a.	n.a.	0.96	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	9.840	0.295	2374.9	1562.5	11.076	3.412	2.98		Clay	48.4			9.30	1.08	n.a.	n.a.	0.96	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	10.590	0.308	2395.3	1572.2	11.948	3.270	2.96		Clay	46.9			10.01	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	10.520	0.350	2414.5	1581.5	11.777	3.762	3.00			46.6			9.94	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	11.640	0.812	2433.7	1590.7	13.106	7.787	3.16			56.8			11.00	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	34.240	1.021	2454.1	1600.5	36.875	3.092	2.57		Sand	32.8	197	1.66	277.22	1.08	298.41	429.43	0.96	0.564	1.084	2.000	1.960	3.46	0.00	0.00
20.340	177.840	1.308	2473.3	1609.7	191.066	0.742	1.61		Sand	9.7		1.66	278.58	1.07	299.42	373.86	0.96	0.565	1.082	2.000	1.947	3.45	0.00	0.00
20.510	188.070	1.311	2493.7	1619.5	201.644	0.702	1.58		Sand	9.2		1.66	296.08	1.07	318.68	330.06	0.96	0.566	1.080	2.000	1.943	3.44	0.00	0.00
20.670	136.810	1.361	2512.9	1628.7	146.822	0.996	1.79		Sand	12.7	177	1.66	293.62	1.07	314.63	374.11	0.96	0.566	1.079	2.000	1.940	3.43	0.00	0.00
20.830	82.540	1.476	2532.1	1637.9	87.313	1.816	2.13		Sand	19.9	177	1.66	293.62	1.07	314.38	426.29	0.96	0.566	1.077	2.000	1.937	3.42	0.00	0.00
21.000	32.430	0.956	2552.5	1647.7	33.369	3.066	2.59		Sand	33.2	177	1.66	293.62	1.07	313.86	450.61	0.96	0.567	1.075	2.000	1.934	3.41	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 5 | PGA (A_{max}) 0.53 | Total Settlement 2.17 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qcn near interfaces (soft layer)	Thin Layer Factor (K_c)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-cs}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vo=1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
21.160	14.310	0.831	2571.7	1656.9	15.721	4.847	2.97		Clay	47.3			13.83	1.07	n.a.	n.a.	0.96	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.330	11.180	0.460	2592.1	1666.7	11.860	4.664	3.06		Clay	50.9			10.57	1.06	n.a.	n.a.	0.96	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	11.760	0.376	2611.3	1675.9	12.470	3.506	2.95		Clay	47.2			11.12	1.06	n.a.	n.a.	0.96	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.660	11.560	0.384	2630.5	1685.1	12.195	3.737	2.98		Clay	48.0			10.95	1.06	n.a.	n.a.	0.96	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	10.790	0.416	2650.9	1694.9	11.168	4.384	3.05		Clay	51.1			10.20	1.06	n.a.	n.a.	0.96	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.990	11.600	0.384	2670.1	1704.1	12.047	3.742	2.99		Clay	48.2			10.96	1.06	n.a.	n.a.	0.96	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	13.330	0.561	2690.5	1713.9	13.085	4.662	3.00		Clay	48.5			12.60	1.06	n.a.	n.a.	0.96	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	21.020	1.066	2709.7	1723.2	22.826	6.422	2.88		Clay	43.7			19.87	1.06	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	30.330	1.227	2728.9	1732.4	33.440	4.236	2.88		Clay	38.4			28.67	1.05	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	28.150	1.654	2749.3	1742.2	30.738	6.178	2.82			41.8			26.61	1.05	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	36.400	2.437	2768.5	1751.4	38.845	7.185	2.80			40.7			33.46	1.05	n.a.	n.a.	0.96	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	51.060	2.524	2788.9	1761.2	53.388	5.083	2.80		Mixed	33.5			48.25	1.10	52.88	100.50	0.96	0.572	1.020	0.143	0.131	0.23	0.03	0.06
23.130	40.810	2.709	2808.1	1770.4	44.517	7.102	2.76			30.2			38.57	1.05	n.a.	n.a.	0.95	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	42.830	2.226	2827.3	1779.6	46.546	5.374	2.86			36.5			40.48	1.05	n.a.	n.a.	0.95	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	59.880	2.446	2847.7	1789.4	59.857	4.190	2.50		Sand	30.4		1.76	100.37	1.09	108.75	171.73	0.96	0.573	1.033	0.428	0.398	0.69	0.01	0.02
23.620	112.140	3.042	2866.9	1798.6	113.498	3.200	2.24		Sand	22.8		1.76	186.67	1.04	199.93	253.06	0.95	0.574	1.040	2.000	1.887	3.29	0.00	0.00
23.790	104.400	4.573	2887.3	1808.4	106.326	4.430	2.36		Sand	26.2		1.76	176.75	1.04	183.18	270.13	0.95	0.574	1.047	2.000	1.884	3.28	0.00	0.00
23.950	74.160	4.044	2906.5	1817.6	74.147	6.367	2.58		Sand	32.0		1.76	124.77	1.05	131.04	205.23	0.95	0.574	1.043	1.468	1.376	2.40	0.00	0.00
24.110	46.580	3.639	2926.7	1826.8	49.304	8.065	2.77			30.8			44.03	1.04	n.a.	n.a.	0.95	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	43.870	3.012	2946.1	1836.8	46.842	7.154	2.76			38.9			41.16	1.04	n.a.	n.a.	0.95	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	63.080	1.780	2965.3	1845.8	62.675	2.181	2.20		Sand	21.6	127	1.66	210.82	1.04	218.50	308.65	0.95	0.575	1.041	2.000	1.873	3.26	0.00	0.00
24.610	134.730	1.207	2985.7	1855.8	134.475	0.906	1.78		Sand	12.8		1.66	211.30	1.04	218.84	263.62	0.95	0.576	1.039	2.000	1.870	3.25	0.00	0.00
24.770	164.830	0.689	3004.9	1864.9	164.373	0.436	1.54		Sand	8.6		1.66	242.93	1.03	251.16	263.48	0.95	0.576	1.038	2.000	1.867	3.24	0.00	0.00
24.930	142.820	0.584	3024.1	1874.1	141.921	0.413	1.56		Sand	8.9		1.66	224.08	1.03	231.66	246.23	0.95	0.576	1.036	2.000	1.864	3.24	0.00	0.00
25.100	114.210	0.745	3044.5	1883.9	112.862	0.661	1.76		Sand	12.1		1.66	179.20	1.04	185.56	221.91	0.95	0.576	1.036	2.000	1.862	3.23	0.00	0.00
25.260	66.320	0.881	3063.7	1893.1	64.742	1.360	2.14		Sand	20.3	107	1.66	177.62	1.03	182.91	256.02	0.95	0.577	1.033	2.000	1.859	3.22	0.00	0.00
25.430	28.230	1.061	3084.1	1902.9	28.050	3.874	2.72			37.8			26.06	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	17.380	1.078	3103.3	1912.1	16.567	6.803	3.08			50.7			16.44	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.760	92.070	0.752	3122.5	1921.5	89.777	0.831	1.90		Sand	14.6		1.76	154.90	1.03	159.73	208.88	0.95	0.577	1.028	1.780	1.646	2.85	0.00	0.00
25.920	127.810	0.589	3142.9	1931.1	124.702	0.467	1.84		Sand	10.1		1.76	214.89	1.03	220.19	242.93	0.95	0.578	1.027	2.000	1.848	3.20	0.00	0.00
26.090	102.380	1.025	3162.1	1940.3	99.473	1.017	1.92		Sand	15.2		1.76	172.21	1.03	176.60	231.31	0.95	0.578	1.026	2.000	1.846	3.19	0.00	0.00
26.250	40.380	1.053	3182.5	1950.1	47.051	2.204	2.38		Sand	26.7	96	1.76	170.88	1.02	174.60	256.39	0.94	0.578	1.024	2.000	1.843	3.19	0.00	0.00
26.410	27.280	1.089	3201.7	1960.3	26.212	4.279	2.76			39.3			26.76	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	21.220	0.913	3220.9	1968.5	19.923	4.667	2.88			43.7			20.06	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	16.800	0.781	3241.3	1978.3	15.346	5.014	2.96		Clay	48.0			15.86	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	14.740	0.651	3260.6	1987.5	13.102	4.864	3.03		Clay	50.1			13.93	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	13.840	0.602	3280.0	1997.3	12.210	4.936	3.06		Clay	51.1			13.06	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	13.960	0.604	3300.1	2006.6	12.270	4.820	3.06		Clay	50.8			13.19	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	14.740	0.618	3320.6	2016.3	12.974	4.721	3.02		Clay	49.7			13.93	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	15.760	0.609	3339.7	2025.6	13.912	4.321	2.96		Clay	47.7			14.90	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	15.370	0.650	3358.9	2034.8	13.457	4.746	3.01		Clay	49.3			14.53	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	15.810	0.598	3379.3	2044.6	13.813	4.734	2.97		Clay	47.8			14.94	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	16.430	0.660	3398.5	2053.8	14.346	4.480	2.96		Clay	47.7			15.53	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	17.930	0.691	3418.9	2063.6	15.721	4.262	2.93		Clay	46.0			16.96	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	17.830	0.704	3438.1	2072.8	15.848	4.372	2.94		Clay	46.3			16.86	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	18.220	0.702	3457.3	2082.0	16.842	4.258	2.93		Clay	46.7			17.22	1.00	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	18.830	0.693	3477.7	2091.8	16.341	4.058	2.90		Clay	44.8			17.80	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	19.260	0.720	3496.9	2101.0	16.670	4.113	2.90		Clay	44.7			18.20	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	19.810	0.753	3517.3	2110.8	17.169	4.149	2.89		Clay	44.3			18.62	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	20.630	0.782	3536.5	2120.0	17.784	4.145	2.88		Clay	43.9			19.50	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	19.740	0.787	3555.7	2129.2	16.872	4.270	2.91		Clay	44.9			18.66	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	18.970	0.773	3576.1	2139.0	16.068	4.497	2.94		Clay	46.2			17.93	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	18.100	0.784	3595.3	2148.2	15.177	4.884	2.97		Clay	47.4			17.11	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	18.460	0.740	3615.7	2158.0	15.433	4.446	2.95		Clay	46.8			17.46	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	18.760	0.676	3634.9	2167.3	15.636	3.984	2.91		Clay	46.2			17.73	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.180	19.790	0.658	3654.1	2176.5	16.507	3.604	2.87		Clay	43.5			18.71	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	16.760	0.664	3674.5	2186.3	13.651	4.460	2.99		Clay	48.3			15.84	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	16.870	0.676	3693.7	2196.5	12.692	4.901	3.04		Clay	50.8			14.81	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	17.010	0.636	3714.1	2205.3	13.743	4.212	2.97		Clay	47.0			16.08	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	18.100	0.671	3733.3	2214.5	14.681	4.136	2.95		Clay	46.5			17.11	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	17.600	0.704	3752.5	2223.7	14.142	4.479	2.98		Clay	47.9			16.64	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	18.210	0.569	3772.9	2233.5	14.617	3.606	2.91		Clay	45.0			17.21	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	18.460	0.686	3792.1	2242.7	14.762	4.023	2.94			46.1			17.44	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	21.000	0.664	3812.5	2252.6	16.953	3.562	2.86			42.9			19.86	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 5

PGA (A_{max}): 0.53

Total Settlement: 2.17 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	D_w (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Reg Soil Type	Fines (%)	Corr over interfaces (soft layer)	Thin Layer Factor (K_σ)	Interpreted qm	C_N	q_{c1N}	q_{c1Ncs}	Stress Reduction (r_d)	CSR	K_σ for Sand	CRR$_{M=7.5,1}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
31.500	16.200	0.651	3831.7	22617	14.463	3.998	2.84		Clay	42.3			17.28	0.66	n.a.	n.a.	0.63	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.620	19.370	0.680	3850.9	22709	16.721	3.666	2.66		Clay	47.8			19.47	0.68	n.a.	n.a.	0.63	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.740	13.880	0.490	3861.3	22817	10.467	4.000	3.08		Clay	51.2			15.18	0.69	n.a.	n.a.	0.63	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.860	12.620	0.523	3880.8	22908	9.230	4.260	3.15		Clay	55.4			11.83	0.68	n.a.	n.a.	0.63	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.980	11.380	0.481	3910.6	23000	11.678	4.309	3.04		Clay	55.3			14.64	0.68	n.a.	n.a.	0.63	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.100	15.840	0.436	3920.1	23091	14.662	2.672	2.42		Clay	41.8			18.84	0.68	n.a.	n.a.	0.63	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	16.810	0.446	3940.3	23138	12.540	3.670	2.92		Clay	48.5			16.00	0.66	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.880	14.480	0.530	3959.7	23358	10.666	4.987	3.06		Clay	51.0			13.91	0.69	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.480	16.440	0.542	3968.8	23372	14.673	3.530	2.87		Clay	46.3			17.43	0.67	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.540	16.320	0.864	4008.9	23479	14.825	5.795	3.01		Clay	46.3			16.45	0.67	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.600	26.280	0.660	4029.6	23545	16.488	3.728	2.60		Clay	44.9			14.15	0.67	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.660	26.320	0.980	4047.7	23584	16.470	3.737	2.66		Clay	44.9			18.21	0.67	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.600	16.780	0.570	4066.1	23782	14.101	3.960	2.95		Clay	46.0			17.75	0.67	n.a.	n.a.	0.62	0.583	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.780	16.210	0.533	4087.3	23844	13.580	3.868	2.95		Clay	46.5			17.21	0.67	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.900	16.370	0.540	4107.7	23906	13.746	3.902	2.99		Clay	46.4			16.99	0.67	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	14.880	0.486	4126.8	24024	10.006	3.722	3.01		Clay	50.1			14.06	0.67	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.260	13.960	0.461	4146.1	24129	9.587	3.664	3.05		Clay	52.3			12.90	0.67	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.460	19.160	0.447	4166.5	24224	9.146	4.051	3.10		Clay	53.2			12.44	0.66	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.640	12.970	0.349	4186.2	24314	8.845	3.107	3.08		Clay	51.3			12.05	0.66	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	13.440	0.361	4206.1	24414	8.304	3.267	3.06		Clay	50.9			12.72	0.66	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	16.200	0.462	4226.3	24492	10.581	3.464	3.01		Clay	49.1			14.37	0.66	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	16.310	0.539	4244.6	24569	13.182	3.776	2.92		Clay	46.8			17.19	0.66	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.220	20.480	0.626	4264.9	24697	14.554	3.948	2.88		Clay	43.7			19.51	0.66	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.400	21.960	0.638	4284.1	24819	15.906	3.957	2.86		Clay	42.8			20.06	0.66	n.a.	n.a.	0.62	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.500	20.900	0.666	4304.5	24887	15.057	3.984	2.89		Clay	44.0			19.16	0.66	n.a.	n.a.	0.61	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.700	21.140	0.636	4323.0	24997	15.199	3.948	2.85		Clay	43.7			19.66	0.66	n.a.	n.a.	0.61	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.900	21.660	0.615	4344.1	25097	15.465	3.878	2.80		Clay	42.9			20.37	0.66	n.a.	n.a.	0.61	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.000	21.400	0.618	4363.3	25159	15.272	3.793	2.80		Clay	43.2			20.23	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.060	20.620	0.618	4382.8	25231	14.638	3.987	2.89		Clay	43.8			19.77	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	18.620	0.569	4402.0	25336	13.199	3.844	2.84		Clay	46.4			17.69	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.480	18.400	0.529	4422.1	25445	11.165	3.882	2.91		Clay	50.1			16.58	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.780	18.260	0.486	4442.1	25544	10.103	3.988	3.04		Clay	50.2			14.37	0.65	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.960	13.960	0.414	4461.7	25641	9.015	3.824	3.08		Clay	52.4			12.91	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.080	12.360	0.400	4480.9	25733	7.569	3.643	3.15		Clay	56.3			11.78	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.140	12.500	0.370	4501.3	25830	7.605	3.520	3.12		Clay	53.8			11.69	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.440	12.670	0.391	4521.8	25932	7.623	3.529	3.10		Clay	53.5			11.84	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.680	11.770	0.322	4540.8	26031	7.301	3.360	3.14		Clay	54.8			11.12	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.700	11.620	0.310	4560.1	26112	6.984	3.547	3.15		Clay	56.8			10.42	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.860	11.660	0.330	4579.3	26206	6.788	3.464	3.17		Clay	56.3			10.47	0.66	n.a.	n.a.	0.61	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.099	11.180	0.304	4597.7	26304	6.591	3.464	3.18		Clay	56.3			10.49	0.66	n.a.	n.a.	0.61	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	11.820	0.340	4618.2	26398	7.214	3.587	3.16		Clay	55.9			11.16	0.66	n.a.	n.a.	0.61	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.380	12.620	0.404	4638.3	26497	7.827	3.864	3.14		Clay	54.6			12.12	0.66	n.a.	n.a.	0.61	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.580	14.720	0.515	4658.6	26598	9.321	4.164	3.15		Clay	53.2			13.97	0.64	n.a.	n.a.	0.60	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.700	16.330	0.550	4677.7	26697	11.066	4.184	3.02		Clay	49.5			17.30	0.64	n.a.	n.a.	0.60	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	21.540	0.911	4696.1	26778	14.364	4.783	2.99		Clay	46.3			20.40	0.64	n.a.	n.a.	0.60	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	25.140	0.954	4717.3	26868	16.655	3.997	2.80		Clay	44.0			23.79	0.64	n.a.	n.a.	0.60	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	25.230	0.900	4737.7	26968	16.603	3.868	2.86		Clay	42.7			23.82	0.64	n.a.	n.a.	0.60	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	26.830	0.988	4756.9	27068	13.491	3.830	2.95		Clay	49.6			19.50	0.64	n.a.	n.a.	0.60	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.630	18.520	0.646	4776.1	27160	11.883	3.967	2.99		Clay	48.1			17.50	0.64	n.a.	n.a.	0.60	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.780	17.140	0.480	4795.6	27248	10.820	3.782	2.98		Clay	48.0			16.20	0.64	n.a.	n.a.	0.60	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.900	16.420	0.846	4816.1	27345	10.250	6.048	3.17		Clay	66.2			15.67	0.65	n.a.	n.a.	0.60	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.020	24.170	1.061	4836.1	27436	15.064	6.018	3.14		Clay	66.0			22.54	0.65	n.a.	n.a.	0.60	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.160	166.660	3.133	4856.3	27530	46.643	3.056	2.29		Sand	24.2	1.00	1.46	291.66	0.93	166.69	223.02	0.60	0.579	0.921	2.000	1.837	2.80	0.00	0.00
40.360	125.740	2.563	4874.6	27622	104.126	2.230	2.21		Sand	22.1	1.00	1.46	291.58	0.93	167.66	299.96	0.60	0.579	0.935	2.000	1.864	2.80	0.00	0.00
40.620	142.130	2.737	4894.9	27721	119.618	1.801	2.04		Sand	19.0		1.46	291.71	0.93	167.84	297.86	0.60	0.578	0.919	2.000	1.853	2.86	0.00	0.00
40.860	154.010	1.939	4914.1	27813	129.196	1.168	1.87		Sand	14.5		1.46	318.01	0.93	203.84	287.32	0.60	0.578	0.918	2.000	1.851	2.86	0.00	0.00
40.980	155.510	1.131	4934.5	27911	130.260	0.676	1.79		Sand	11.1		1.46	328.61	0.93	211.78	283.52	0.60	0.578	0.917	2.000	1.840	2.86	0.00	0.00
41.040	181.000	1.119	4953.7	28003	150.149	0.765	1.76		Sand	11.0		1.46	380.05	0.92	254.19	341.39	0.60	0.578	0.918	2.000	1.840	2.86	0.00	0.00
41.100	128.870	2.080	4972.9	28099	103.009	1.627	2.04		Sand	17.9		1.46	129.62	0.92	162.36	228.46	0.60	0.578	0.915	2.000	1.836	2.86	0.00	0.00
41.340	94.630	2.022	4993.3	28193	67.418	3.041	2.41		Sand	27.7	1.21	1.46	125.49	0.92	162.12	243.74	0.60	0.578	0.914	2.000	1.834	2.86	0.00	0.00
41.400	78.030	2.779	5012.5	28285	55.167	3.780	2.47		Sand	29.5	1.21	1.46	126.48	0.92	162.83	244.86	0.60	0.578	0.913	2.000	1.832	2.84	0.00	0.00
41.880	74.270	1.998	5032.9	28385	53.558	2.666	2.27		Sand	25.3	1.21	1.46	125.48	0.92	161.71	241.88	0.60	0.578	0.912	2.000	1.825	2.84	0.00	0.00
41.520	40.160	1.025	5052.1	28477	28.426	2.723	2.63		Silt	34.7			37.05	0.92	n.a.	n.a.	0.59	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.900	15.530	0.530	5071.3	28567	9.007	6.434	3.23		Silt	58.9			14.68	0.92	n.a.	n.a.	0.59	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 5

PGA (A_{max}): 0.53

Total Settlement: 2.17 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	D_w (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Reg Soil Type	Fines (%)	Corr over interfaces (soft layer)	Thin Layer Factor (K_σ)	Interpreted qm	C_N	q_{c1N}	q_{c1Ncs}	Stress Reduction (r_d)	CSR	K_σ for Sand	CRR$_{M=7.5,1}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
42.180	13.680	0.784	3991.7	28668	7.205	8.982	3.39		Clay	82.2			13.33	0.92	n.a.	n.a.	0.59	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.300	18.030	0.823	3190.9	28757	9.561	9.361	3.38		Clay	85.6			18.21	0.92	n.a.	n.a.	0.59	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.420	18.730	0.647	4121.3	28855	11.704	6.868	3.13		Clay	84.8			17.76	0.92	n.a.	n.a.	0.59	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.660	14.340	1.018	4150.8	28947	8.176	9.668	3.35		Clay	84.8			13.66	0.92	n.a.	n.a.	0.59	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	11.300	0.709	4169.7	29040	6.544	8.067	3.46		Clay	83.6			10.74	0.92	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.960	9.010	0.561	4189.1	29133	5.717	10.363	3.69		Clay	91.8			7.67	0.92	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	5.490	0.409	4208.3	29230	3.913	10.446	4.01		Clay	103.8			5.19	0.92	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.310	4.110	0.405	4228.7	29328	3.556	11.188	4.48		Clay	114.8			3.68	0.92	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	5.000	0.564	4248.2	29420	2.023	18.888	4.83		Clay	154.7			4.29	0.92	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	12.530	0.629	4268.3	29514	8.008	6.083	3.26		Clay	82.8			12.13	0.92	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.800	19.080	0.799	4288.5	29611	10.443	6.183	3.12		Clay	84.1			17.67	0.92	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.950	22.270	0.863	4307.7	29702	13.299	4.347	3.00		Clay	48.8			21.05	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.130	22.040	0.670	4328.1	29800	13.376	4.314	2.88		Clay	44.8			21.04	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.280	20.000	0.782	4347.3	29892	12.034	4.348	3.03		Clay	49.9			18.53	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.400	17.010	0.691	4367.7	29990	10.184	5.280	3.14		Clay	54.7			16.63	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.520	16.460	0.760	4388.2	30088	9.764	6.000	3.23		Clay	58.7			16.09	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.700	21.150	0.712	4408.1	30174	13.184	5.871	2.99		Clay	46.4			19.04	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.880	17.640	0.789	4428.3	30272	9.982	4.782	3.12		Clay	63.8			16.67	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.180	17.830	0.758	4447.7	30365	9.944	4.906	3.13		Clay	64.4			16.84	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.360	19.630	0.830	4468.1	30462	11.291	4.915	3.08		Clay	62.1			18.64	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.480	20.220	0.956	4488.5	30563	11.445	5.471	3.11		Clay	63.5			19.11	0.91	n.a.	n.a.	0.59	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.600	20.990	0.910	4508.8	30664	11.806	5.284	3.10		Clay	63.0			19.86	0.91	n.a.	n.a.	0.58	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.780	18.860	0.857	4524.8	30748	10.630	5.168	3.12		Clay	63.9			17.91	0.91	n.a.	n.a.	0.58	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.900	19.680	0.740	4544.1	30837	9.160	5.206	3.17		Clay	68.1			18.39	0.91	n.a.	n.a.	0.58	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.080	16.120	0.871	4564.3	30935	7.977	5.431	3.23		Clay	68.0			14.29	0.90	n.a.	n.a.	0.58	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.200	13.660	0.852	4583.7	31027	7.026	6.477	3.27		Clay	69.9			13.04	0.90	n.a.	n.a.	0.58	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.420	13.830	0.811	4602.8	31117	7.152	6.200	3.23		Clay	68.8			13.17	0.90	n.a.	n.a.	0.58	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.560	12.910	0.670	4623.3	31217	6.670	4.853	3.26		Clay	60.8			12.55	0.90	n.a.	n.a.	0.58	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.760	13.010	0.445	4642.5	31309	6.809	4.792	3.27		Clay	60.7			12.90	0.90	n.a.	n.a.	0.57	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	12.270	0.461	4662.0	31407	6.324	4.538	3.26		Clay	60.6			12.07	0.90	n.a.	n.a.	0.57	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.060	12.230	0.432	4682.1	31498	6.254	4.505	3.26		Clay	62.4			11.97	0.90	n.a.	n.a.	0.57	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.240	16.730	0.391	4701.3	31591	8.520	4.007	3.36		Clay	56.4			10.19	0.90	n.a.	n.a.	0.57	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	10.310	0.373	4721.7	31689	4.201	5.002	3.78		Clay	67.1			9.71	0.90	n.a.	n.a.	0.57	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	10.230	0.367	4740.9	31781	4.505	5.404	3.45		Clay	68.0			9.48	0.90	n.a.	n.a.	0.57	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	10.800	0.422	4761.3	31879	4.995	5.722	3.78		Clay	69.6			10.13	0.90	n.a.	n.a.	0.57	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.820	11.720	0.428	4780.5	31967	5.324	4.644	3.53		Clay	63.6			11.06	0.90	n.a.	n.a.	0.57	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.060	14.110	0.500	4799.7	32064	6.903	3.459	3.18		Clay	54.6			13.34	0.90	n.a.	n.a.	0.57	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	12.310	0.396	4820.1	32155	6.753	4.281	3.29		Clay	61.4			11.64	0.90	n.a.	n.a.	0.57	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.360	12.140	0.426	4839.3	32254	6.717	4.618	3.39		Clay	62.6			11.47	0.90	n.a.	n.a.	0.57	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.540	12.550	0.523	4858.7	32346	7.111	5.236	3.56		Clay	65.1			11.64	0.90	n.a.	n.a.	0.57	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	15.210	0.668	4878.9	32444	7.564	7.462	3.83		Clay	80.8			14.38	0.90	n.a.	n.a.	0.57	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.900	20.290	1.467	4898.1	32533	10.668	8.673	3.99		Clay	90.0			19.18	0.89	n.a.	n.a.	0.57	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.060	136.060	1.449	4918.3	32634	102.662	1.119	1.94		Sand	19.6		1.0	233.08	0.89	207.55	211.33	0.57	0.568	0.870	2.000	1.696	2.78	0.00	0.00
49.210	111.180	1.088	5037.7	33726	82.243	1.636	2.15		Sand	30.5		1.0	182.15	0.88	167.40	230.63	0.57	0.568	0.900	2.000	1.764	2.78	0.00	0.00
49.340	49.800	1.840	5058.1	33822	28.906	3.729	2.69		Clay	36.7			47.13	0.89	n.a.	n.a.	0.57	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	27.240	1.370	5077.3	33916	14.798	5.214	3.01		Clay	49.0			26.84	0.89	n.a.	n.a.	0.56	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.700	21.640	0.952	5097.5	34008	11.561	5.013	3.09		Clay	53.2			20.78	0.89	n.a.	n.a.	0.56	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.870	19.580	0.791	5118.0	34105	9.960	4.647	3.11		Clay	53.8			18.32	0.89	n.a.	n.a.	0.56	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.020	13.710	0.699	5138.1	34198	7.048	5.272	3.23		Clay	60.2			12.86	0.89	n.a.	n.a.	0.56	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.200	13.240	0.677	5158.5	34294	6.934	5.061	3.23		Clay	60.9			12.51	0.89	n.a.	n.a.	0.56	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 6 | PGA (A_{max}) 0.53 | Total Settlement 1.06 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vc=1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
0.330	0.090	0.236	41.3	41.3	3.364	343.063	4.77		Unsaturated	162.8			0.09	1.70	0.14	29.15	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	32.280	0.581	61.3	61.3	179.100	1.800	1.81		Unsaturated	15.1			30.81	1.70	61.87	80.37	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.650	19.040	0.789	82.5	82.5	96.281	3.948	2.36		Unsaturated	25.8			18.85	1.70	32.04	70.06	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	15.130	1.088	102.5	102.5	118.641	7.200	2.60		Unsaturated	30.4			14.30	1.70	24.31	61.53	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	15.620	1.259	122.5	122.5	109.446	7.969	2.68		Unsaturated	32.2			14.05	1.70	25.42	63.44	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	15.370	1.262	143.8	143.8	94.992	8.251	2.61		Unsaturated	33.8			14.63	1.70	24.70	62.75	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	18.610	1.313	163.8	163.8	106.022	7.086	2.63		Unsaturated	31.2			17.59	1.70	29.90	69.20	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	20.640	1.412	185.0	185.0	109.934	6.872	2.61		Unsaturated	30.7			19.51	1.70	33.16	73.44	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	18.470	1.436	205.0	205.0	88.961	7.812	2.69		Unsaturated	33.7			17.46	1.70	29.68	69.42	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	15.860	1.372	225.0	225.0	71.489	8.714	2.70		Unsaturated	37.0			14.99	1.70	25.48	64.23	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	13.870	1.177	246.3	246.3	58.562	8.683	2.74		Unsaturated	36.6			13.11	1.70	22.29	60.07	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	14.230	1.180	266.3	266.3	58.859	8.387	2.74		Unsaturated	36.7			13.46	1.70	22.88	60.86	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	14.060	1.174	287.5	287.5	96.809	8.438	2.61		Unsaturated	33.9			13.29	1.70	22.59	59.84	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	13.680	1.167	307.5	307.5	67.105	8.627	2.64		Unsaturated	35.1			12.82	1.70	21.79	59.03	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	12.800	1.091	327.5	327.5	77.534	8.662	2.67		Unsaturated	36.0			12.10	1.70	20.80	57.64	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	12.630	1.032	348.8	348.8	70.867	8.360	2.69		Unsaturated	36.5			11.84	1.70	20.13	56.98	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	11.670	0.981	368.8	368.8	62.205	8.537	2.73		Unsaturated	38.0			11.03	1.70	18.75	56.20	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	11.440	0.939	390.0	390.0	57.667	8.352	2.74		Unsaturated	38.5			10.81	1.70	18.38	54.80	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	11.380	0.937	410.0	410.0	54.512	8.387	2.76		Unsaturated	39.1			10.76	1.70	18.29	54.71	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	11.030	0.921	430.0	430.0	50.302	8.617	2.78		Unsaturated	40.1			10.43	1.70	17.72	54.02	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	10.550	0.929	451.3	451.3	45.758	9.009	2.83		Unsaturated	41.8			9.97	1.70	16.95	53.06	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	11.030	0.938	471.3	471.3	46.812	8.687	2.82		Unsaturated	41.3			10.43	1.70	17.72	54.08	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	11.840	1.028	492.8	492.8	47.081	8.869	2.82		Unsaturated	41.3			11.19	1.70	19.02	55.84	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	12.090	1.104	512.5	512.5	46.180	9.329	2.84		[illegible]	42.2			11.43	1.45	n.a.	n.a.	1.00	0.348	n.a.	n.a.	n.a.	n.a.	0.00	0.00
4.270	12.360	1.125	533.8	533.8	45.314	9.300	2.84		Clay	42.3			11.68	1.44	n.a.	n.a.	1.00	0.355	n.a.	n.a.	n.a.	n.a.	0.00	0.00
4.430	12.220	1.064	553.8	553.8	43.136	8.908	2.84		Clay	42.3			11.55	1.42	n.a.	n.a.	1.00	0.361	n.a.	n.a.	n.a.	n.a.	0.00	0.00
4.590	12.020	1.027	573.8	573.8	40.900	8.750	2.86		Clay	42.7			11.36	1.41	n.a.	n.a.	1.00	0.367	n.a.	n.a.	n.a.	n.a.	0.00	0.00
4.760	11.400	0.913	595.0	595.0	37.310	8.222	2.86		Clay	42.8			10.78	1.40	n.a.	n.a.	1.00	0.373	n.a.	n.a.	n.a.	n.a.	0.00	0.00
4.920	10.740	0.777	615.0	615.0	33.927	7.451	2.85		Clay	42.7			10.15	1.39	n.a.	n.a.	1.00	0.379	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.080	10.100	0.683	636.3	636.3	31.031	6.716	2.85		Clay	42.5			9.63	1.37	n.a.	n.a.	1.00	0.384	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.250	9.780	0.700	656.3	656.3	29.808	7.408	2.90		Clay	44.6			9.24	1.36	n.a.	n.a.	1.00	0.390	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.410	9.600	0.684	676.3	676.3	27.392	7.381	2.91		Clay	46.2			9.07	1.35	n.a.	n.a.	1.00	0.395	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.580	9.980	0.698	697.5	697.5	27.616	7.226	2.90		Clay	44.8			9.43	1.34	n.a.	n.a.	1.00	0.400	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.740	9.990	0.699	717.5	717.5	26.847	7.253	2.91		Clay	46.2			9.44	1.33	n.a.	n.a.	1.00	0.406	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.910	9.660	0.639	738.8	738.8	25.152	6.882	2.92		Clay	45.3			9.13	1.32	n.a.	n.a.	1.00	0.409	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.070	8.840	0.637	758.8	758.8	22.301	7.628	2.96		Clay	48.0			8.36	1.31	n.a.	n.a.	1.00	0.414	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.230	9.270	0.626	778.8	778.8	22.807	7.060	2.96		Clay	46.9			8.76	1.30	n.a.	n.a.	1.00	0.418	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.400	9.780	0.660	800.0	800.0	23.376	7.060	2.95		Clay	46.6			9.22	1.29	n.a.	n.a.	0.99	0.422	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.560	10.030	0.694	819.7	818.0	23.580	7.213	2.96		Clay	46.7			9.48	1.29	n.a.	n.a.	0.99	0.426	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.730	10.650	0.737	840.1	826.7	24.177	7.203	2.94		Clay	46.1			10.07	1.28	n.a.	n.a.	0.99	0.431	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.890	10.980	0.769	859.3	835.0	25.223	7.302	2.94		Clay	46.9			10.38	1.28	n.a.	n.a.	0.99	0.434	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.050	11.150	0.769	878.5	844.2	25.376	7.002	2.92		Clay	45.6			10.54	1.27	n.a.	n.a.	0.99	0.438	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.220	10.810	0.724	898.9	854.0	24.264	6.967	2.93		Clay	46.0			10.22	1.27	n.a.	n.a.	0.99	0.442	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.380	10.810	0.705	918.1	863.2	23.983	6.806	2.93		Clay	45.8			10.22	1.27	n.a.	n.a.	0.99	0.446	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.550	12.750	0.664	938.5	873.0	28.136	5.410	2.81		Clay	41.1			12.06	1.26	n.a.	n.a.	0.99	0.449	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.710	11.940	0.607	957.7	882.2	25.983	5.300	2.83		Clay	41.8			11.29	1.26	n.a.	n.a.	0.99	0.452	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.870	10.660	0.674	976.9	891.4	22.600	6.632	2.89		Clay	44.1			10.09	1.26	n.a.	n.a.	0.99	0.456	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.040	10.690	0.696	997.3	901.2	22.617	6.939	2.91		Clay	44.9			10.10	1.25	n.a.	n.a.	0.99	0.458	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.200	12.460	0.756	1016.5	910.4	26.233	6.322	2.86		Clay	43.8			11.77	1.25	n.a.	n.a.	0.99	0.461	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.370	19.540	0.888	1036.9	920.2	41.342	4.687	2.65		[illegible]	36.2			18.47	1.25	n.a.	n.a.	0.99	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.530	48.400	1.371	1056.1	929.4	66.548	2.903	2.37		Sand	26.3	47.86		47.86	1.46	69.58	120.11	0.99	0.467	1.100	0.180	0.178	0.38	0.03	0.05
8.690	50.640	1.245	1075.3	938.6	71.102	2.486	2.29		Sand	24.0			47.86	1.46	69.58	118.21	0.99	0.470	1.100	0.176	0.174	0.37	0.03	0.06
8.860	35.050	1.543	1095.7	948.4	49.590	4.301	2.57		Sand	32.7			33.72	1.50	60.55	97.22	0.99	0.473	1.083	0.136	0.135	0.28	0.03	0.06
9.020	39.570	1.869	1114.9	957.7	54.612	4.766	2.57		Sand	32.5			37.40	1.48	55.19	103.40	0.99	0.475	1.087	0.148	0.146	0.30	0.03	0.06
9.190	33.360	1.765	1135.3	967.4	53.589	5.446	2.62		Mixed	34.2			31.52	1.50	47.14	92.96	0.99	0.478	1.079	0.131	0.127	0.27	0.03	0.07
9.350	30.040	1.705	1154.5	976.7	50.589	4.060	2.59		Sand	33.2			34.91	1.47	51.46	98.53	0.99	0.481	1.081	0.140	0.136	0.28	0.03	0.06
9.510	27.590	1.411	1173.7	985.9	54.618	5.242	2.60		[illegible]	33.8			26.00	1.22	n.a.	n.a.	0.99	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
9.680	18.620	1.208	1194.1	995.7	36.203	6.669	2.80		[illegible]	40.7			17.60	1.22	n.a.	n.a.	0.99	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
9.840	27.590	1.430	1213.3	1004.9	53.846	5.314	2.61		[illegible]	33.9			26.00	1.22	n.a.	n.a.	0.99	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.010	70.600	2.224	1233.7	1014.7	95.918	3.165	2.27		Sand	25.7	100		100.00	1.21	230.66	328.91	0.99	0.490	1.100	2.000	1.979	4.04	0.00	0.00
10.170	71.450	2.561	1252.9	1023.9	96.273	3.063	2.35		Sand	25.7	100		100.00	1.21	230.11	331.56	0.99	0.492	1.100	2.000	1.979	4.02	0.00	0.00
10.330	49.160	2.405	1272.1	1033.1	81.580	5.489	2.68		Sand	32.9	100		100.00	1.21	229.56	337.38	0.99	0.494	1.100	2.000	1.979	4.00	0.00	0.00
10.500	61.130	1.730	1292.5	1042.9	81.431	2.809	2.29		Sand	24.1	100		100.00	1.21	228.99	327.48	0.99	0.497	1.100	2.000	1.979	3.98	0.00	0.00
10.660	201.540	1.417	1311.7	1052.1	269.269	0.705	1.49		Sand	7.9			190.40	1.22	231.87	238.66	0.99	0.499	1.100	2.000	1.979	3.97	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 6 | PGA (A_{max}) 0.53 | Total Settlement 1.06 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vc=1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
10.830	247.900	1.160	1332.1	1061.9	329.565	0.469	1.30		Sand	5.6			234.31	1.20	281.06	281.30	0.99	0.501	1.100	2.000	1.979	3.95	0.00	0.00
10.990	246.420	1.157	1351.3	1071.1	328.404	0.471	1.31		Sand	5.6			232.91	1.20	278.74	279.02	0.99	0.503	1.100	2.000	1.979	3.94	0.00	0.00
11.150	241.460	1.131	1370.5	1080.3	318.495	0.470	1.32		Sand	5.7			228.22	1.19	272.81	272.86	0.99	0.504	1.100	2.000	1.979	3.92	0.00	0.00
11.320	215.640	0.867	1390.9	1090.1	283.047	0.403	1.31		Sand	5.7			203.82	1.20	244.48	244.78	0.98	0.506	1.100	2.000	1.979	3.91	0.00	0.00
11.480	172.530	1.196	1410.1	1099.3	226.315	0.697	1.54		Sand	8.8			163.07	1.23	200.47	210.87	0.98	0.508	1.100	1.992	1.971	3.88	0.00	0.00
11.650	180.440	2.342	1430.5	1109.1	234.632	1.303	1.73		Sand	11.6			170.56	1.20	204.47	239.12	0.98	0.510	1.100	2.000	1.979	3.88	0.00	0.00
11.810	261.000	3.462	1449.7	1118.4	326.387	1.396	1.67		Sand	10.6			237.24	1.18	280.71	313.14	0.98	0.512	1.100	2.000	1.979	3.87	0.00	0.00
11.980	270.210	2.534	1470.1	1128.1	348.825	0.956	1.52		Sand	8.3			255.40	1.18	301.40	312.61	0.98	0.513	1.100	2.000	1.979	3.86	0.00	0.00
12.140	284.100	1.480	1489.3	1137.4	365.420	0.622	1.30		Sand	5.9			268.61	1.18	316.41	316.70	0.98	0.515	1.100	2.000	1.979	3.84	0.00	0.00
12.300	217.060	1.626	1508.5	1146.6	277.727	0.782	1.50		Sand	8.1			205.15	1.18	241.56	240.76	0.98	0.517	1.100	2.000	1.979	3.83	0.00	0.00
12.470	238.910	1.782	1528.9	1156.4	304.486	0.748	1.47		Sand	7.7			225.81	1.17	264.64	270.88	0.98	0.518	1.100	2.000	1.979	3.82	0.00	0.00
12.630	237.100	1.963	1548.1	1165.6	300.062	0.826	1.51		Sand	8.2			224.10	1.17	262.28	271.34	0.98	0.520	1.100	2.000	1.979	3.81	0.00	0.00
12.800	236.040	1.533	1568.5	1175.4	298.221	0.652	1.44		Sand	7.2			223.01	1.17	260.42	264.00	0.98	0.521	1.100	2.000	1.979	3.79	0.00	0.00
12.960	270.620	1.611	1587.7	1184.6	340.550	0.597	1.37		Sand	6.3			255.76	1.17	299.00	299.30	0.98	0.523	1.100	2.000	1.979	3.78	0.00	0.00
13.120	262.800	1.513	1606.9	1193.8	329.799	0.577	1.37		Sand	6.3			248.46	1.16	288.98	290.15	0.98	0.524	1.100	2.000	1.979	3.77	0.00	0.00
13.290	260.060	2.407	1627.3	1203.6	324.920	0.926	1.53		Sand	8.4			245.82	1.16	286.28	298.82	0.98	0.526	1.100	2.000	1.979	3.76	0.00	0.00
13.450	293.060	1.359	1646.5	1212.8	364.846	0.466	1.27		Sand	5.2			276.90	1.16	320.61	320.91	0.98	0.527	1.100	2.000	1.979	3.75	0.00	0.00
13.620	331.220	2.591	1666.9	1222.6	410.819	0.784	1.41		Sand	8.8			313.06	1.16	361.61	364.67	0.98	0.529	1.100	2.000	1.979	3.74	0.00	0.00
13.780	348.260	1.836	1686.1	1231.8	430.378	0.529	1.26		Sand	5.1			329.17	1.15	379.67	379.75	0.98	0.530	1.100	2.000	1.979	3.73	0.00	0.00
13.940	327.990	2.182	1706.3	1241.0	403.746	0.666	1.36		Sand	6.1			310.01	1.15	356.67	357.84	0.98	0.531	1.100	2.000	1.979	3.73	0.00	0.00
14.110	312.870	2.932	1726.7	1250.8	383.583	0.940	1.46		Sand	7.8			295.72	1.15	339.71	348.30	0.98	0.532	1.100	2.000	1.979	3.72	0.00	0.00
14.270	331.240	2.382	1744.9	1260.1	404.045	0.718	1.36		Sand	8.4			313.06	1.15	359.99	360.68	0.98	0.534	1.100	2.000	1.979	3.71	0.00	0.00
14.440	264.720	4.536	1765.3	1269.8	321.900	1.719	1.74		Sand	11.9			250.21	1.14	285.20	333.54	0.98	0.536	1.100	2.000	1.979	3.70	0.00	0.00
14.600	147.510	4.362	1784.5	1270.1	178.243	2.976	2.09		Sand	19.0			139.42	1.16	161.65	226.16	0.98	0.536	1.100	2.000	1.979	3.69	0.00	0.00
14.760	149.450	4.435	1803.7	1288.3	179.943	2.968	2.09		Sand	18.9			141.26	1.16	163.24	230.10	0.98	0.537	1.100	2.000	1.979	3.68	0.00	0.00
14.930	245.260	3.380	1824.1	1298.1	294.550	1.383	1.69		Sand	10.0			231.81	1.14	263.70	299.37	0.98	0.538	1.100	2.000	1.979	3.68	0.00	0.00
15.090	301.660	2.071	1843.3	1307.3	361.904	0.688	1.40		Sand	8.7			285.33	1.14	325.09	329.21	0.98	0.539	1.100	2.000	1.979	3.67	0.00	0.00
15.260	309.610	1.120	1863.7	1317.1	369.806	0.363	1.10		Sand	4.4			292.64	1.13	331.63	331.63	0.98	0.541	1.100	2.000	1.979	3.66	0.00	0.00
15.420	293.750	1.050	1882.9	1326.3	349.572	0.358	1.21		Sand	4.8			277.66	1.13	314.06	314.07	0.97	0.542	1.100	2.000	1.979	3.66	0.00	0.00
15.580	271.660	1.074	1902.1	1335.5	322.050	0.397	1.26		Sand	5.1			256.70	1.13	289.90	289.96	0.97	0.543	1.100	2.000	1.979	3.65	0.00	0.00
15.750	257.080	0.698	1922.5	1345.3	304.313	0.272	1.18		Sand	4.3			243.00	1.13	274.47	274.47	0.97	0.544	1.100	2.000	1.979	3.64	0.00	0.00
15.910	255.020	0.696	1941.7	1354.5	300.122	0.276	1.19		Sand	4.4			241.04	1.12	271.14	271.15	0.97	0.545	1.100	2.000	1.979	3.63	0.00	0.00
16.080	265.530	0.577	1962.1	1364.3	311.402	0.218	1.13		Sand	3.8			250.97	1.12	281.78	281.78	0.97	0.546	1.100	2.000	1.979	3.63	0.00	0.00
16.240	256.100	0.646	1981.3	1373.5	299.357	0.253	1.17		Sand	4.2			242.15	1.12	271.39	271.39	0.97	0.547	1.100	2.000	1.979	3.62	0.00	0.00
16.400	234.540	1.246	2000.5	1382.7	273.003	0.533	1.40		Sand	6.7			221.66	1.12	248.44	250.44	0.97	0.547	1.100	2.000	1.979	3.61	0.00	0.00
16.570	210.950	0.464	2020.9	1392.5	244.604	0.221	1.22		Sand	4.7			199.39	1.13	225.74	225.76	0.97	0.548	1.100	2.000	1.979	3.61	0.00	0.00
16.730	212.160	0.966	2040.1	1401.7	245.103	0.457	1.40		Sand	6.7			200.53	1.13	226.33	228.12	0.97	0.549	1.100	2.000	1.979	3.60	0.00	0.00
16.900	218.760	0.970	2060.5	1411.5	251.990	0.450	1.38		Sand	6.5			206.79	1.12	232.30	233.57	0.97	0.550	1.100	2.000	1.979	3.60	0.00	0.00
17.060	267.900	1.125	2079.7	1420.6	307.869	0.421	1.29		Sand	5.5			253.27	1.11	281.34	281.53	0.97	0.551	1.100	2.000	1.979	3.59	0.00	0.00
17.220	303.960	1.220	2098.9	1430.0	348.150	0.406	1.24		Sand	4.9			287.20	1.11	318.48	318.52	0.97	0.552	1.100	2.000	1.979	3.59	0.00	0.00
17.390	317.860	1.304	2119.3	1439.8	362.993	0.412	1.23		Sand	4.5			300.43	1.11	332.56	332.58	0.97	0.553	1.100	2.000	1.979	3.58	0.00	0.00
17.550	331.360	1.313	2138.5	1449.0	377.246	0.398	1.21		Sand	4.6			313.19	1.11	346.09	346.10	0.97	0.554	1.100	2.000	1.979	3.57	0.00	0.00
17.720	281.670	1.927	2158.9	1458.6	319.412	0.687	1.43		Sand	7.1			266.25	1.10	293.66	297.37	0.97	0.554	1.100	2.000	1.979	3.57	0.00	0.00
17.880	245.040	0.846	2178.1	1468.0	276.830	0.347	1.28		Sand	5.3			231.61	1.10	256.06	256.17	0.97	0.555	1.100	2.000	1.979	3.56	0.00	0.00
18.040	213.470	0.666	2197.3	1477.2	240.241	0.313	1.30		Sand	5.8			201.77	1.11	224.57	224.78	0.97	0.556	1.100	2.000	1.979	3.56	0.00	0.00
18.210	210.000	0.425	2217.7	1487.0	236.202	0.204	1.22		Sand	4.7			199.08	1.11	221.43	221.44	0.97	0.557	1.100	2.000	1.979	3.56	0.00	0.00
18.370	178.000	0.550	2236.9	1496.2	199.887	0.317	1.38		Sand	6.4			168.30	1.13	189.60	190.51	0.97	0.557	1.082	0.708	0.745	1.34	0.00	0.00
18.540	76.600	0.679	2257.3	1506.0	84.856	0.909	1.94		Sand	15.0	100		100.00	1.10	184.53	243.27	0.97	0.558	1.100	2.000	1.979	3.55	0.00	0.00
18.700	31.600	0.666	2276.5	1515.2	34.091	2.180	2.49		Sand	20.9	100		100.00	1.09	183.47	273.86	0.97	0.559	1.100	2.000	1.979	3.54	0.00	0.00
18.860	15.750	0.522	2295.7	1524.4	19.197	3.506	2.81		[illegible]	41.3			14.91	1.09	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	10.610	0.316	2316.1	1534.2	12.321	3.343	2.96		[illegible]	46.0			10.03	1.09	n.a.	n.a.	0.97	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	9.040	0.247	2336.3	1543.4	10.201	3.136	3.00		Clay	48.7			8.54	1.09	n.a.	n.a.	0.97	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	8.420	0.242	2356.7	1553.2	8.325	3.336	3.06		Clay	50.8			7.96	1.08	n.a.	n.a.	0.96	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	9.040	0.228	2374.9	1562.5	10.062	2.906	2.99		Clay	48.2			8.54	1.08	n.a.	n.a.	0.96	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	9.610	0.247	2395.3	1572.2	10.701	2.941	2.97		Clay	47.4			9.08	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	10.870	0.277	2414.5	1581.5	12.220	2.869	2.91		Clay	45.2			10.27	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	12.550	0.296	2433.7	1590.7	14.249	2.632	2.84		Clay	42.2			11.86	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	13.870	0.326	2454.1	1600.5	15.799	2.576	2.80		Clay	40.6			13.11	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	14.900	0.331	2473.3	1609.7	16.970	2.420	2.76		Clay	39.0			14.08	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	15.630	0.370	2493.7	1619.5	17.753	2.470	2.76		Clay	39.0			14.77	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	17.200	0.396	2512.9	1628.7	19.574	2.486	2.71		Clay	37.8			16.26	1.07	n.a.	n.a.	0.96	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	19.850	0.418	2532.1	1637.9	22.602	2.249	2.63		Clay	34.6			18.76	1.07	n.a.	n.a.	0.96	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.000	20.230	0.500	2552.5	1647.7	23.006	3.159	2.72		[illegible]	37.6			19.12	1.07	n.a.	n.a.	0.96	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.160	22.250	0.562	2571.7	1656.9	25.306	2.778	2.65		[illegible]	36.4			21.03	1.07	n.a.	n.a.	0.96	0.567	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 6 | PGA (A_{max}) 0.53 | Total Settlement 1.08 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Play Soil Type	Fines (%)	Qtn near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Qtn	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'v=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
21.330	20.990	0.667	2592.1	1666.7	23.632	3.337	2.73		Clay	38.0			19.84	1.06	n.a.	n.a.	0.96	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	19.400	0.746	2611.3	1675.9	21.666	4.121	2.81		Clay	41.3			18.39	1.06	n.a.	n.a.	0.96	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	17.270	0.677	2630.5	1685.1	18.936	4.243	2.87		Clay	43.3			16.32	1.06	n.a.	n.a.	0.96	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	16.370	0.637	2650.9	1694.9	17.752	4.232	2.89		Clay	44.1			15.47	1.06	n.a.	n.a.	0.96	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.990	15.560	0.539	2670.1	1704.1	16.695	3.790	2.88		Clay	43.6			14.71	1.06	n.a.	n.a.	0.96	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	11.160	0.430	2690.5	1713.9	11.453	4.473	3.06		Clay	50.9			10.55	1.06	n.a.	n.a.	0.96	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	8.990	0.349	2709.7	1723.2	8.862	4.566	3.15		Clay	55.1			8.50	1.06	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	7.360	0.276	2728.9	1732.4	6.945	4.623	3.23		Clay	59.2			6.96	1.06	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	6.410	0.237	2749.3	1742.2	6.781	4.713	3.30		Clay	62.6			6.06	1.06	n.a.	n.a.	0.96	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	6.030	0.217	2768.5	1751.4	5.304	4.577	3.33		Clay	64.0			5.70	1.06	n.a.	n.a.	0.96	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	6.710	0.260	2788.9	1761.2	6.036	5.458	3.33		Clay	63.7			6.34	1.06	n.a.	n.a.	0.96	0.572	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	8.100	0.472	2808.1	1770.4	7.564	7.043	3.32		Clay	63.2			7.66	1.06	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	20.710	0.530	2827.3	1779.6	21.686	2.746	2.70		Clay	37.1			19.57	1.06	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.480	22.500	0.432	2847.7	1789.4	22.497	2.042	2.61		Mixed	34.0		1.5	35.43	1.09	42.01	56.04	0.96	0.573	1.018	0.121	0.111	0.19	0.04	0.07
23.620	8.970	0.410	2866.9	1798.6	8.366	5.446	3.21		Clay	58.1			8.46	1.04	n.a.	n.a.	0.96	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	9.310	0.348	2887.3	1808.4	8.700	4.424	3.14		Clay	56.0			8.80	1.04	n.a.	n.a.	0.96	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	9.470	0.374	2906.5	1817.6	8.821	4.660	3.16		Clay	56.4			8.96	1.04	n.a.	n.a.	0.96	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	9.810	0.352	2926.7	1826.8	9.138	4.217	3.11		Clay	53.7			9.27	1.04	n.a.	n.a.	0.96	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	9.130	0.331	2946.1	1836.6	8.338	4.328	3.16		Clay	56.5			8.63	1.04	n.a.	n.a.	0.96	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	8.710	0.354	2965.3	1845.8	7.831	4.603	3.21		Clay	57.9			8.23	1.04	n.a.	n.a.	0.96	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	8.950	0.348	2985.7	1855.6	8.037	4.606	3.19		Clay	56.9			8.46	1.04	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	8.760	0.325	3004.9	1864.9	7.805	4.471	3.18		Clay	56.9			8.30	1.03	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.930	8.180	0.298	3024.1	1874.1	7.196	4.442	3.22		Clay	58.4			7.73	1.03	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	7.420	0.290	3044.5	1883.9	6.261	4.610	3.29		Clay	61.7			7.01	1.03	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	7.480	0.271	3063.7	1893.1	6.284	4.551	3.27		Clay	60.7			7.07	1.03	n.a.	n.a.	0.96	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	7.250	0.272	3084.1	1902.9	6.009	4.758	3.29		Clay	62.1			6.86	1.03	n.a.	n.a.	0.96	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	7.460	0.278	3103.3	1912.1	6.180	4.806	3.29		Clay	61.9			7.06	1.03	n.a.	n.a.	0.96	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.750	7.460	0.279	3122.8	1921.3	6.172	4.713	3.29		Clay	61.6			7.06	1.03	n.a.	n.a.	0.96	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	7.320	0.281	3142.9	1931.1	5.954	4.861	3.30		Clay	62.5			6.92	1.02	n.a.	n.a.	0.96	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.080	6.970	0.258	3162.1	1940.3	5.555	4.760	3.32		Clay	63.6			6.59	1.02	n.a.	n.a.	0.96	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.250	6.840	0.239	3182.5	1950.1	5.383	4.646	3.32		Clay	63.4			6.47	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.410	7.210	0.227	3201.7	1959.3	5.720	4.042	3.27		Clay	60.9			6.81	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	7.310	0.218	3220.9	1968.5	5.791	3.825	3.25		Clay	60.1			6.91	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	6.920	0.229	3241.3	1978.3	5.357	4.325	3.31		Clay	62.9			6.54	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	6.920	0.228	3260.5	1987.5	5.323	4.308	3.31		Clay	63.0			6.54	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	7.270	0.257	3280.9	1997.3	5.637	4.571	3.31		Clay	62.7			6.87	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	8.710	0.297	3300.1	2006.5	7.037	4.204	3.21		Clay	57.9			8.23	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	10.110	0.619	3320.5	2016.3	8.361	7.322	3.29		Clay	62.0			9.56	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	14.820	0.809	3339.7	2025.6	12.984	6.009	3.13		Clay	54.4			14.01	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	76.390	0.724	3358.9	2034.8	72.011	0.959	2.01		Sand	17.3	133.82	1.72	230.17	1.01	232.66	310.75	0.94	0.580	1.012	2.000	1.620	3.14	0.00	0.00
27.890	141.580	0.520	3379.3	2044.6	134.512	0.378	1.56		Sand	6.9		1.72	230.17	1.01	232.34	245.91	0.94	0.580	1.010	2.000	1.617	3.13	0.00	0.00
28.050	114.630	0.237	3398.6	2053.8	108.249	0.210	1.53		Sand	8.5	133.82	1.72	230.17	1.01	232.06	242.79	0.94	0.580	1.009	2.000	1.615	3.13	0.00	0.00
28.270	76.930	0.470	3418.9	2063.6	71.994	0.633	1.91		Sand	15.9	133.82	1.72	230.17	1.01	231.70	298.78	0.94	0.580	1.008	2.000	1.612	3.12	0.00	0.00
28.380	47.630	0.929	3438.1	2072.8	43.644	2.024	2.38		Sand	26.7	133.82	1.72	230.17	1.01	231.45	334.66	0.94	0.580	1.006	2.000	1.610	3.12	0.00	0.00
28.540	30.740	0.765	3457.3	2082.0	27.869	2.603	2.80		Clay	33.7			28.65	1.00	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	18.400	0.725	3477.7	2091.8	16.930	4.260	2.93		Clay	45.9			17.39	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	18.310	0.662	3496.9	2101.0	15.765	3.936	2.91		Clay	44.9			17.31	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	16.230	0.486	3517.3	2110.8	13.712	3.354	2.91		Clay	45.2			15.34	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	14.600	0.442	3536.5	2120.0	12.294	3.391	2.95		Clay	46.8			13.69	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	19.690	0.709	3555.7	2129.2	16.825	3.960	2.89		Clay	44.1			18.61	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	25.520	0.801	3576.1	2139.0	22.160	3.753	2.76		Clay	40.0			24.12	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	24.920	1.007	3595.3	2148.2	21.627	4.356	2.83		Clay	42.0			23.56	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	20.030	0.913	3616.7	2158.0	17.444	4.840	2.93		Clay	45.9			18.50	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	17.950	0.880	3634.9	2167.3	14.885	4.214	2.95		Clay	46.5			16.97	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.180	15.500	0.699	3654.1	2176.5	12.684	5.114	3.06		Clay	51.1			14.65	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	25.080	0.873	3674.5	2186.3	21.272	2.889	2.72		Clay	37.0			23.71	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	78.500	1.175	3693.7	2195.5	71.128	1.536	2.14		Sand	20.3	100		100.00	0.99	104.49	158.56	0.93	0.582	0.994	0.317	0.283	0.49	0.02	0.04
30.680	86.780	1.109	3714.1	2205.3	80.459	1.276	2.04		Sand	18.1	100		100.00	0.98	104.27	153.32	0.93	0.582	0.993	0.287	0.257	0.44	0.02	0.04
30.840	100.570	0.954	3733.3	2214.5	91.194	0.987	1.93		Sand	15.5	100		100.00	0.98	104.03	144.86	0.93	0.582	0.993	0.250	0.223	0.38	0.02	0.04
31.000	112.450	1.131	3752.8	2223.7	101.931	1.023	1.91		Sand	15.1			100.27	0.98	104.10	143.19	0.93	0.582	0.993	0.244	0.217	0.37	0.02	0.04
31.170	108.260	1.360	3772.9	2233.5	98.022	1.298	2.00		Sand	16.9			100.43	0.98	98.20	142.33	0.93	0.582	0.992	0.240	0.215	0.37	0.02	0.04
31.330	104.860	1.421	3792.1	2242.7	94.521	1.380	2.02		Sand	17.4			99.10	0.98	96.73	142.04	0.93	0.582	0.991	0.239	0.213	0.37	0.02	0.05
31.500	102.210	1.716	3812.5	2252.5	91.668	1.711	2.09		Sand	19.1			98.61	0.97	94.13	142.88	0.93	0.582	0.991	0.242	0.216	0.37	0.02	0.04
31.660	110.650	2.216	3831.7	2261.7	99.407	2.035	2.17		Sand	19.8			104.66	0.97	101.86	154.20	0.93	0.582	0.989	0.292	0.260	0.45	0.02	0.04

CORNERSTONE EARTH GROUP

CPT No 6 | PGA (A_{max}) 0.53 | Total Settlement 1.06 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Play Soil Type	Fines (%)	Qtn near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Qtn	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'v=1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
31.820	77.610	2.692	3850.9	2270.9	69.236	3.429	2.40		Sand	27.1			73.64	0.97	71.23	122.67	0.93	0.582	0.991	0.166	0.165	0.28	0.03	0.06
31.990	83.150	2.813	3871.3	2280.7	73.936	3.484	2.36		Sand	26.7			78.60	0.97	78.04	128.75	0.93	0.582	0.990	0.200	0.178	0.31	0.02	0.06
32.150	112.140	2.883	3890.5	2289.9	100.120	2.618	2.20		Sand	21.8			105.09	0.97	102.75	158.79	0.93	0.582	0.988	0.318	0.282	0.49	0.02	0.04
32.320	137.200	1.767	3910.9	2299.7	122.609	1.306	1.92		Sand	15.3			129.76	0.97	125.61	170.37	0.93	0.582	0.984	0.411	0.364	0.63	0.01	0.02
32.480	163.660	1.225	3930.1	2308.9	146.216	0.758	1.71		Sand	11.2			164.59	0.97	149.76	175.19	0.92	0.582	0.982	0.460	0.412	0.71	0.01	0.02
32.640	146.270	0.865	3949.3	2318.2	129.399	0.597	1.68		Sand	10.9			137.31	0.96	132.42	163.68	0.92	0.582	0.986	0.280	0.256	0.44	0.02	0.04
32.810	125.620	0.960	3969.7	2328.0	111.411	0.782	1.81		Sand	13.0			118.73	0.96	114.17	145.77	0.92	0.582	0.986	0.253	0.225	0.39	0.02	0.04
32.970	131.070	1.146	3988.9	2337.2	116.064	0.887	1.83		Sand	13.4			123.88	0.96	119.08	153.62	0.92	0.582	0.984	0.286	0.255	0.44	0.02	0.04
33.140	167.040	1.372	4009.3	2347.6	148.114	0.831	1.73		Sand	11.9			157.58	0.96	152.16	180.45	0.92	0.582	0.978	0.543	0.476	0.82	0.01	0.02
33.300	226.410	1.490	4028.5	2356.2	200.098	0.667	1.57		Sand	9.0			213.06	0.97	206.19	219.38	0.92	0.582	0.968	2.000	1.741	2.99	0.00	0.00
33.460	256.040	1.580	4047.7	2365.4	227.081	0.617	1.50		Sand	8.1			242.00	0.97	234.66	242.54	0.92	0.582	0.967	2.000	1.739	2.99	0.00	0.00
33.630	267.460	1.270	4068.1	2375.2	236.810	0.478	1.42		Sand	6.9			252.82	0.97	245.02	247.61	0.92	0.582	0.965	2.000	1.737	2.98	0.00	0.00
33.790	273.040	1.032	4087.3	2384.4	241.296	0.381	1.36		Sand	6.1			258.07	0.97	249.96	250.60	0.92	0.582	0.964	2.000	1.734	2.98	0.00	0.00
33.960	243.700	1.071	4107.7	2394.2	214.720	0.443	1.43		Sand	7.1			230.34	0.96	222.02	224.07	0.92	0.582	0.963	2.000	1.732	2.98	0.00	0.00
34.120	244.770	1.838	4126.9	2403.4	216.246	0.757	1.58		Sand	9.2			231.36	0.96	223.22	238.86	0.92	0.582	0.962	2.000	1.730	2.97	0.00	0.00
34.280	246.600	1.222	4146.1	2412.6	216.296	0.496	1.44		Sand	7.4			235.06	0.96	226.25	230.40	0.92	0.582	0.961	2.000	1.728	2.97	0.00	0.00
34.450	238.080	1.052	4166.5	2422.4	208.475	0.446	1.44		Sand	7.3	235.06		235.06	0.96	225.95	229.50	0.92	0.582	0.959	2.000	1.726	2.97	0.00	0.00
34.610	146.520	1.591	4185.7	2431.9	129.967	1.079	1.86		Sand	13.8	235.06		235.06	0.96	225.69	261.67	0.92	0.582	0.958	2.000	1.724	2.96	0.00	0.00
34.780	64.760	1.503	4206.1	2441.4	55.126	2.400	2.36		Sand	26.0	235.06		235.06	0.96	225.36	326.95	0.92	0.582	0.957	2.000	1.722	2.96	0.00	0.00
34.940	26.820	1.362	4225.3	2450.6	10.348	5.746	2.95		Clay	46.5			24.40	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	14.620	0.541	4244.5	2459.9	10.060	4.353	3.09		Clay	62.6			13.72	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	14.420	0.485	4264.9	2469.7	9.951	3.929	3.07		Clay	51.6			13.63	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	14.150	0.496	4284.1	2478.9	9.688	4.150	3.09		Clay	52.6			13.37	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	16.030	0.532	4304.5	2488.7	11.153	3.833	3.02		Clay	49.6			15.15	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	17.390	0.620	4323.7	2497.9	12.195	4.072	3.01		Clay	48.9			16.44	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	23.480	0.764	4344.1	2507.7	16.978	3.662	2.86		Clay	43.2			22.17	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	23.670	0.769	4363.3	2516.9	17.078	3.670	2.86		Clay	43.1			22.37	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	19.470	0.772	4382.5	2526.1	13.660	4.468	2.99		Clay	48.3			18.40	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	18.760	0.647	4402.9	2535.9	13.050	3.908	2.97		Clay	47.5			17.73	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	18.630	0.612	4422.1	2545.1	12.902	3.726	2.96		Clay	47.1			17.61	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	19.000	0.660	4442.5	2554.9	13.135	3.929	2.97		Clay	47.6			17.96	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	19.860	0.663	4461.7	2564.1	13.751	3.703	2.94		Clay	46.2			18.77	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	18.510	0.640	4480.9	2573.3	12.846	3.932	2.98		Clay	48.0			17.50	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	16.960	0.601	4501.3	2583.1	11.369	4.062	3.03		Clay	50.0			16.03	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	16.820	0.604	4520.5	2592.3	11.070	4.208	3.06		Clay	50.7			15.71	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	16.840	0.562	4540.9	2602.1	11.196	3.993	3.03		Clay	50.0			15.92	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	15.930	0.536	4560.1	2611.3	10.454	3.910	3.05		Clay	50.6			15.06	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	15.360	0.519	4579.3	2620.6	9.988	3.976	3.07		Clay	51.7			14.61	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	15.360	0.502	4599.7	2630.4	9.973	3.843	3.06		Clay	51.4			14.51	0.94	n.a.	n.a.	0.91	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	14.500	0.532	4618.9	2639.6	9.237	4.307	3.12		Clay	53.9			13.71	0.94	n.a.	n.a.	0.91	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	13.880	0.464	4639.3	2649.4	8.727	4.184	3.13		Clay	54.3			13.12	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	13.940	0.473	4658.5	2658.6	8.736	4.076	3.12		Clay	54.0			13.18	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.710	14.210	0.480	4677.7	2667.8	8.900	4.096	3.12		Clay	53.8			13.43	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	14.640	0.461	4698.1	2677.6	9.161	3.913	3.09		Clay	52.8			13.84	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	14.460	0.501	4717.3	2686.8	9.006	4.140	3.11		Clay	53.7			13.67	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	14.580	0.511	4737.7	2696.6	9.057	4.187	3.12		Clay	53.8			13.78	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	15.000	0.518	4756.9	2705.8	9.329	4.086	3.10		Clay	53.0			14.18	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.530	14.870	0.516	4776.1	2715.0	9.196	4.124	3.11		Clay	53.3			14.05	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	15.150	0.521	4796.5	2724.6	9.300	4.064	3.10		Clay	53.0			14.32	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.860	14.760	0.466	4815.7	2734.0	9.050	3.767	3.09		Clay	52.6			13.97	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.030	14.270	0.446	4836.1	2743.6	8.630	3.763	3.11		Clay	53.3			13.49	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.190	14.690	0.469	4855.3	2753.0	8.908	3.746	3.09		Clay	52.7			13.88	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.360	15.190	0.470	4874.5	2762.3	9.226	3.669	3.06		Clay	52.0			14.35	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.520	15.130	0.477	4894.9	2772.1	9.150	3.760	3.08		Clay	52.4			14.30	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.690	14.550	0.487	4914.1	2781.3	8.696	4.111	3.13		Clay	54.2			13.76	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.850	13.660	0.487	4934.5	2791.1	8.020	4.348	3.17		Clay	56.1			12.91	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.010	14.010	0.644	4953.7	2800.3	8.237	4.713	3.18		Clay	56.7			13.24	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.170	15.260	0.630	4972.9	2809.5	9.086	4.140	3.11		Clay	53.6			14.41	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.340	14.050	0.493	4993.3	2819.3	8.196	4.267	3.16		Clay	55.8			13.28	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.500	12.880	0.429	5012.8	2828.6	7.321	4.139	3.19		Clay	57.0			12.16	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.670	11.590	0.376	5032.9	2838.3	6.304	4.135	3.24		Clay	59.3			10.95	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	11.010	0.457	5052.1	2847.6	5.969	5.384	3.30		Clay	63.6			10.41	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	14.470	0.512	5071.5	2856.7	8.266	4.289	3.15		Clay	55.3			13.66	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.150	14.760	0.521	5091.7	2865.5	8.522	4.269	3.14		Clay	54.9			13.95	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 6 | PGA (A_{max}) 0.53 | Total Settlement 1.08 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{c1N} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1N}	C_N	q_{c1N}	q_{c1N-cs}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'_{vc}=1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
42.320	12.660	0.475	5110.9	2876.7	7.027	4.701	3.23		Clay	59.2			11.07	0.92	n.a.	n.a.	0.89	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.480	12.630	0.461	5131.3	2886.5	6.976	4.677	3.23		Clay	59.0			11.04	0.92	n.a.	n.a.	0.89	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.650	14.610	0.495	5150.5	2894.7	8.315	4.115	3.14		Clay	54.8			13.81	0.92	n.a.	n.a.	0.89	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	14.770	0.621	5169.7	2904.0	8.392	4.272	3.16		Clay	56.2			13.96	0.92	n.a.	n.a.	0.89	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	14.190	0.642	5190.1	2913.7	7.952	4.662	3.19		Clay	57.2			13.40	0.92	n.a.	n.a.	0.89	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	13.640	0.627	5209.3	2923.0	7.551	4.772	3.21		Clay	58.2			12.88	0.92	n.a.	n.a.	0.89	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.310	14.660	0.567	5229.7	2932.8	8.214	4.212	3.16		Clay	56.4			13.66	0.92	n.a.	n.a.	0.89	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	14.740	0.489	5248.9	2942.0	8.236	4.030	3.14		Clay	54.8			13.03	0.92	n.a.	n.a.	0.89	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	15.660	0.526	5269.3	2951.8	8.830	3.967	3.11		Clay	53.6			14.82	0.92	n.a.	n.a.	0.89	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.800	16.000	0.546	5288.5	2961.0	9.021	4.061	3.11		Clay	53.5			15.12	0.92	n.a.	n.a.	0.89	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.960	16.110	0.561	5307.7	2970.2	9.061	4.166	3.11		Clay	53.7			15.23	0.91	n.a.	n.a.	0.88	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.130	17.780	0.611	5328.1	2980.0	10.146	4.030	3.07		Clay	51.6			16.61	0.91	n.a.	n.a.	0.88	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.290	19.780	0.719	5347.3	2989.2	11.446	4.201	3.04		Clay	50.2			16.70	0.91	n.a.	n.a.	0.88	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.460	23.660	0.797	5367.7	2999.0	13.922	3.610	2.94		Clay	46.3			22.27	0.91	n.a.	n.a.	0.88	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.620	24.110	0.827	5386.9	3008.2	14.239	3.661	2.94		Clay	46.1			22.70	0.91	n.a.	n.a.	0.88	0.674	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.780	24.600	0.760	5406.1	3017.4	14.514	3.607	2.91		Clay	45.1			23.26	0.91	n.a.	n.a.	0.88	0.674	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.950	25.030	0.874	5426.5	3027.2	14.744	3.917	2.93		Clay	45.8			23.60	0.91	n.a.	n.a.	0.88	0.674	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.110	26.720	0.902	5445.7	3036.4	15.806	3.760	2.89		Clay	44.4			25.26	0.91	n.a.	n.a.	0.88	0.674	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.280	26.920	0.920	5466.1	3046.2	15.914	3.819	2.89		Clay	44.6			25.35	0.91	n.a.	n.a.	0.88	0.674	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.440	27.760	0.863	5485.3	3055.4	16.370	3.449	2.86		Clay	43.0			26.24	0.91	n.a.	n.a.	0.88	0.673	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.600	26.750	0.906	5504.5	3064.7	15.661	3.776	2.90		Clay	44.6			25.28	0.91	n.a.	n.a.	0.88	0.673	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.770	24.710	1.015	5524.9	3074.5	14.277	4.622	2.99		Clay	46.1			23.30	0.91	n.a.	n.a.	0.88	0.673	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.930	23.430	0.967	5544.1	3083.7	13.396	4.776	3.02		Clay	48.4			22.15	0.91	n.a.	n.a.	0.88	0.673	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.100	23.660	1.018	5564.5	3093.5	13.492	4.669	3.02		Clay	48.8			22.35	0.90	n.a.	n.a.	0.88	0.672	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.260	26.300	1.048	5583.7	3102.7	15.153	4.460	2.96		Clay	46.0			24.86	0.90	n.a.	n.a.	0.88	0.672	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.420	28.000	1.133	5602.9	3111.9	16.773	4.339	2.91		Clay	45.2			27.32	0.90	n.a.	n.a.	0.88	0.672	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.590	31.570	1.144	5623.3	3121.7	18.426	3.977	2.86		Clay	43.0			29.84	0.90	n.a.	n.a.	0.88	0.672	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.750	31.640	1.109	5642.5	3130.9	18.400	4.067	2.86		Clay	43.2			29.91	0.90	n.a.	n.a.	0.87	0.672	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	33.310	1.334	5662.9	3140.7	19.400	4.377	2.87		Clay	43.3			31.48	0.90	n.a.	n.a.	0.87	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	34.150	1.464	5682.1	3149.9	19.870	4.677	2.88		Clay	43.8			32.28	0.90	n.a.	n.a.	0.87	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.240	31.420	1.315	5701.3	3159.1	18.087	4.601	2.91		Clay	44.8			29.70	0.90	n.a.	n.a.	0.87	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	29.610	1.039	5721.7	3168.9	16.862	3.886	2.88		Clay	43.9			27.99	0.90	n.a.	n.a.	0.87	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	28.890	0.999	5740.9	3178.1	16.374	3.841	2.89		Clay	44.2			27.31	0.90	n.a.	n.a.	0.87	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	31.060	1.066	5761.3	3187.9	17.673	3.790	2.86		Clay	43.9			29.36	0.90	n.a.	n.a.	0.87	0.670	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	32.890	1.126	5780.5	3197.1	18.757	3.753	2.84		Clay	42.1			31.09	0.90	n.a.	n.a.	0.87	0.670	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.060	33.560	1.099	5799.7	3206.4	19.126	3.583	2.82		Clay	41.4			31.72	0.90	n.a.	n.a.	0.87	0.670	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	30.690	1.048	5820.1	3216.1	17.276	3.774	2.87		Clay	43.3			29.01	0.90	n.a.	n.a.	0.87	0.670	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.390	29.300	0.996	5839.3	3225.4	16.358	3.771	2.88		Clay	44.0			27.69	0.89	n.a.	n.a.	0.87	0.669	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.560	31.730	1.019	5859.7	3235.2	17.804	3.630	2.84		Clay	42.2			29.99	0.89	n.a.	n.a.	0.87	0.669	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	33.050	1.169	5878.9	3244.4	18.562	3.860	2.85		Clay	42.6			31.24	0.89	n.a.	n.a.	0.87	0.669	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.880	34.270	1.319	5898.1	3253.6	19.253	4.211	2.86		Clay	43.0			32.39	0.89	n.a.	n.a.	0.87	0.669	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.050	33.490	1.244	5918.5	3263.4	18.711	4.073	2.86		Clay	43.6			31.65	0.89	n.a.	n.a.	0.87	0.668	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.210	32.080	1.166	5937.7	3272.6	17.791	3.972	2.87		Clay	43.4			30.32	0.89	n.a.	n.a.	0.87	0.668	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.380	31.890	1.187	5958.1	3282.4	17.616	4.106	2.88		Clay	43.9			30.14	0.89	n.a.	n.a.	0.87	0.668	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	31.920	1.160	5977.3	3291.6	17.579	4.031	2.88		Clay	43.7			30.17	0.89	n.a.	n.a.	0.86	0.668	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.700	31.010	1.136	5996.5	3300.8	16.973	4.064	2.89		Clay	44.3			29.31	0.89	n.a.	n.a.	0.86	0.667	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.870	32.560	1.204	6016.9	3310.6	17.732	4.102	2.88		Clay	43.8			30.50	0.89	n.a.	n.a.	0.86	0.667	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.030	35.460	1.314	6036.1	3319.8	19.544	4.049	2.84		Clay	42.4			33.52	0.89	n.a.	n.a.	0.86	0.667	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.200	36.060	1.367	6056.5	3329.6	19.841	4.198	2.85		Clay	42.8			34.08	0.89	n.a.	n.a.	0.86	0.667	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.360	36.330	1.438	6075.7	3338.8	19.942	4.310	2.85		Clay	42.8			34.34	0.89	n.a.	n.a.	0.86	0.666	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.520	38.970	1.323	6094.9	3348.1	21.460	3.678	2.80		Clay	40.7			36.83	0.89	n.a.	n.a.	0.86	0.666	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.690	34.300	1.338	6115.3	3357.8	18.644	4.274	2.87		Clay	43.6			32.48	0.89	n.a.	n.a.	0.86	0.666	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.850	31.800	1.107	6134.5	3367.1	17.067	4.165	2.90		Clay	44.5			30.06	0.88	n.a.	n.a.	0.86	0.666	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.020	30.540	1.056	6154.9	3376.9	16.265	3.844	2.89		Clay	44.3			28.87	0.88	n.a.	n.a.	0.86	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.180	28.000	1.012	6174.1	3386.1	14.716	4.062	2.94		Clay	46.2			26.47	0.88	n.a.	n.a.	0.86	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.350	27.480	1.056	6194.5	3395.9	14.360	4.331	2.97		Clay	47.3			25.97	0.88	n.a.	n.a.	0.86	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.510	28.590	1.032	6213.7	3405.1	14.968	4.048	2.93		Clay	46.0			27.02	0.88	n.a.	n.a.	0.86	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.670	31.920	1.063	6232.9	3414.3	16.872	3.600	2.87		Clay	43.3			30.17	0.88	n.a.	n.a.	0.86	0.664	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.840	34.660	1.136	6253.3	3424.1	18.410	3.609	2.83		Clay	41.0			32.76	0.88	n.a.	n.a.	0.86	0.664	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.000	33.770	1.172	6272.5	3433.3	17.846	3.827	2.86		Clay	43.0			31.92	0.88	n.a.	n.a.	0.86	0.664	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.170	31.130	1.137	6292.9	3443.1	16.256	4.063	2.91		Clay	44.9			29.42	0.88	n.a.	n.a.	0.86	0.664	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.330	30.360	1.048	6312.1	3452.3	15.760	3.862	2.90		Clay	44.7			28.70	0.88	n.a.	n.a.	0.86	0.663	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.490	32.600	1.111	6331.3	3461.5	17.007	3.773	2.87		Clay	43.6			30.81	0.88	n.a.	n.a.	0.86	0.663	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.660	33.010	1.121	6351.7	3471.3	17.186	3.787	2.87		Clay	43.3			31.20	0.88	n.a.	n.a.	0.86	0.663	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 6 | PGA (A_{max}) 0.53 | Total Settlement 1.08 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{c1N} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{c1N}	C_N	q_{c1N}	q_{c1N-cs}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'_{vc}=1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
52.820	33.130	1.202	6370.9	3480.5	17.207	4.015	2.88		Clay	44.0			31.31	0.88	n.a.	n.a.	0.85	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.990	34.340	1.186	6391.3	3490.3	17.840	3.804	2.86		Clay	42.9			32.48	0.88	n.a.	n.a.	0.85	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.150	34.220	1.176	6410.5	3499.5	17.725	3.790	2.86		Clay	43.0			32.34	0.88	n.a.	n.a.	0.85	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.310	33.670	1.211	6429.7	3508.8	17.380	3.976	2.88		Clay	43.7			31.82	0.88	n.a.	n.a.	0.85	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.480	32.510	1.191	6450.1	3518.5	16.646	4.066	2.90		Clay	44.8			30.73	0.87	n.a.	n.a.	0.85	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.640	31.530	1.187	6469.3	3527.8	16.042	4.087	2.91		Clay	46.1			29.80	0.87	n.a.	n.a.	0.85	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.810	32.360	1.061	6489.7	3537.6	16.456	3.846	2.87		Clay	43.5			30.58	0.87	n.a.	n.a.	0.85	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.970	28.800	1.001	6508.9	3546.8	14.405	3.917	2.94		Clay	46.1			27.22	0.87	n.a.	n.a.	0.85	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.130	27.480	0.927	6528.1	3556.0	13.620	3.826	2.96		Clay	46.7			25.97	0.87	n.a.	n.a.	0.85	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.300	24.960	0.841	6548.5	3565.8	12.163	3.879	2.99		Clay	48.4			23.59	0.87	n.a.	n.a.	0.85	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.460	21.730	0.721	6567.7	3575.0	10.320	3.906	3.05		Clay	51.0			20.54	0.87	n.a.	n.a.	0.85	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.630	19.930	0.651	6588.1	3584.8	9.281	3.812	3.07		Clay	51.7			18.84	0.87	n.a.	n.a.	0.85	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.790	18.780	0.646	6607.3	3594.0	8.612	4.170	3.13		Clay	54.8			17.75	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.950	19.640	0.700	6626.5	3603.2	9.062	4.286	3.12		Clay	54.0			18.56	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.120	18.140	0.571	6646.9	3613.0	8.202	5.075	3.24		Clay	59.5			17.15	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.280	26.430	0.994	6666.1	3622.2	12.753	4.306	3.00		Clay	48.9			24.98	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.450	32.210	1.329	6686.5	3632.0	15.896	4.606	2.96		Clay	46.6			30.44	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.610	42.280	1.862	6705.7	3641.2	21.361	4.756	2.86		Clay	43.0			39.96	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.770	72.410	2.806	6724.9	3650.5	37.630	3.905	2.62		Clay	34.2			68.44	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.940	85.320	3.861	6745.3	3660.2	44.777	4.700	2.62		Clay	34.4			80.64	0.87	n.a.	n.a.	0.84	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.100	128.610	3.475	6764.5	3669.5	68.446	2.820	2.26		Sand	23.3			118.57	0.80	96.03	182.13	0.84	0.557	0.910	0.251	0.230	0.41	0.02	0.00
56.270	320.820	2.421	6784.9	3679.3	227.386	0.763	1.67		Sand	9.0			303.04	0.86	281.69	277.54	0.84	0.557	0.834	2.000	1.500	2.69	0.00	0.00
56.430	366.340	1.866	6804.1	3688.5	251.961	0.530	1.43		Sand	7.0			336.96	0.86	290.06	293.43	0.84	0.556	0.833	2.000	1.499	2.69	0.00	0.00
56.590	360.310	1.591	6823.3	3697.7	248.033	0.450	1.39		Sand	6.8			331.11	0.86	285.77	287.59	0.84	0.556	0.833	2.000	1.498	2.69	0.00	0.00
56.760	292.570	1.702	6843.7	3707.5	206.468	0.589	1.52		Sand	8.3			276.53	0.86	233.46	247.04	0.84	0.556	0.832	2.000	1.496	2.69	0.00	0.00
56.920	243.740	1.484	6862.9	3716.7	171.361	0.606	1.60		Sand	9.4			230.36	0.84	192.43	207.57	0.84	0.556	0.836	1.659	1.251	2.25	0.00	0.00
57.090	221.810	0.918	6883.3	3726.5	156.316	0.421	1.63		Sand	8.5			209.37	0.82	170.07	179.46	0.84	0.555	0.881	0.527	0.418	0.75	0.01	0.00
57.250	206.880	0.869	6902.5	3735.7	143.064	0.420	1.66		Sand	9.0			194.57	0.81	157.23	167.95	0.84	0.555	0.893	0.368	0.312	0.56	0.01	0.00
57.410	148.700	1.939	6921.7	3744.9	103.253	1.334	1.96		Sand	18.6			140.63	0.80	112.68	150.23	0.84	0.555	0.901	0.321	0.260	0.47	0.02	0.00
57.580	69.510	2.103	6942.1	3754.7	46.868	3.166	2.49		Sand	30.0			65.70	0.75	49.02	94.42	0.83	0.554	0.942	0.134	0.113	0.20	0.03	0.00
57.740	39.010	1.567	6961.3	3763.9	18.870	4.406	2.86		Clay	44.0			36.87	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.910	20.930	0.916	6981.7	3773.7	9.242	5.263	3.17		Clay	58.1			19.76	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.070	16.700	0.706	7000.9	3782.9	6.978	5.342	3.27		Clay	60.0			16.76	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.230	15.500	0.648	7020.1	3792.1	6.324	5.407	3.31		Clay	62.8			14.86	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.400	15.420	0.616	7040.5	3801.9	6.260	5.174	3.30		Clay	62.4			14.57	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.560	15.510	0.622	7059.7	3811.2	6.287	5.194	3.30		Clay	62.4			14.66	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.730	15.720	0.681	7080.1	3820.9	6.375	5.420	3.31		Clay	62.7			14.86	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.890	16.360	0.664	7099.3	3830.2	6.689	5.236	3.28		Clay	61.6			15.46	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.060	16.510	0.710	7119.7	3840.0	6.746	5.482	3.29		Clay	61.6			15.60	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.220	17.000	0.736	7138.9	3849.2	7.025	5.440	3.27		Clay	61.1			16.15	0.86	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.380	17.160	0.761	7158.1	3858.4	7.040	5.751	3.29		Clay	61.7			16.22	0.86	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.550	17.750	0.827	7178.5	3868.2	7.322	5.841	3.28		Clay	61.3			16.78	0.86	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.710	18.500	0.892	7197.7	3877.4	7.686	5.966	3.27		Clay	60.6			17.49	0.86	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.880	18.870	0.912	7218.1	3887.2	7.862	5.977	3.26		Clay	60.4			17.84	0.86	n.a.	n.a.	0.83	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.040	19.610	0.931	7237.3	3896.4	8.208	5.823	3.24		Clay	59.3			18.53	0.86	n.a.	n.a.	0.83	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.200	20.510	0.869	7256.5	3905.6	8.645	5.204	3.18		Clay	57.2			19.39	0.86	n.a.	n.a.	0.82	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.370	20.290	0.797	7276.9	3915.4	8.501	4.791	3.17		Clay	56.3			19.17	0.86	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.530	20.300	0.732	7296.1	3924.6	8.486	4.394	3.15		Clay	55.3			19.19	0.86	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.700	23.120	0.769	7316.5	3934.4	9.893	3.963	3.07		Clay	51.7			21.86	0.85	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.860	25.880	0.837	7335.7	3943.6	11.266	3.766	3.01		Clay	49.7			24.46	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.020	27.480	0.876	7354.9	3952.9	12.043	3.661	2.98		Clay	48.0			25.97	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.190	28.050	0.876	7375.3	3962.6	12.311	3.568	2.97		Clay	47.3			26.54	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.350	27.730	0.996	7394.5	3971.9	12.102	4.153	3.01		Clay	49.3			26.21	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.520	25.870	0.910	7414.9	3981.7	11.132	4.106	3.04		Clay	50.4			24.45	0.85	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.680	23.500	0.764	7434.1	3990.9	9.914	3.901	3.06		Clay	51.4			22.21	0.85	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.840	20.060	0.596	7453.3	4000.1	8.167	3.562	3.11		Clay	53.6			18.96	0.85	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.010	19.140	0.674	7473.7	4009.9	7.683	3.729	3.14		Clay	55.1			18.09	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.170	20.410	0.699	7492.9	4019.1	8.292	4.102	3.16		Clay	56.2			19.29	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.340	21.510	0.804	7513.3	4028.9	8.813	4.526	3.16		Clay	55.1			20.33	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.500	21.070	0.870	7532.5	4038.1	8.570	5.026	3.18		Clay	56.6			19.91	0.84	n.a.	n.a.	0.82	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.660	18.860	0.846	7551.7	4047.3	7.449	5.612	3.26		Clay	60.6			17.82	0.84	n.a.	n.a.	0.82	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.830	16.760	0.716	7572.1	4057.1	6.396	5.520	3.31		Clay	62.8			15.84	0.84	n.a.	n.a.	0.81	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.990	16.180	0.611	7591.3	4066.3	6.091	4.935	3.30		Clay	62.3			15.29	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.160	16.090	0.586	7611.7	4076.1	6.027	4.775	3.29		Clay	62.0			15.21	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 6

PGA (A_{max}): 0.53

Total Settlement: 1.08 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ'_{vo} (psf)	Ic	Q	F (%)	I	Layer Thickness > 7	Flag Soil Type	Fines (%)	Corr. Factor for Interbeds (soft layer)	Thin Layer Factor (K_{LT})	Interpolated q_{cN}	CRR	q_{cN}	$q_{cN,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR for M_w & σ'_{vo}	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
63.320	15.240	0.840	7630.0	2086.3	8083	4.730	3.29		Clay	91.8			15.56	0.84	n.a.	n.a.	0.81	0.644	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.480	10.660	0.584	7650.1	4004.8	5210	4.657	3.28		Clay	61.2			16.04	0.84	n.a.	n.a.	0.81	0.644	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.656	17.530	0.680	7670.6	4104.3	6006	4.979	3.23		Clay	60.3			16.04	0.84	n.a.	n.a.	0.81	0.643	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.840	17.660	0.680	7690.7	4113.6	6.965	4.229	3.22		Clay	64.4			16.87	0.84	n.a.	n.a.	0.81	0.643	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.960	16.430	0.731	7710.1	4123.3	7.009	5.018	3.28		Clay	69.9			17.42	0.84	n.a.	n.a.	0.81	0.643	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.140	21.670	1.374	7729.5	4132.6	9.849	6.649	3.28		Clay	69.4			20.35	0.84	n.a.	n.a.	0.81	0.642	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.300	25.610	1.772	7748.8	4141.8	11.899	7.191	3.17		Clay	66.2			20.85	0.84	n.a.	n.a.	0.81	0.642	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.470	48.270	1.881	7768.0	4151.6	21.283	4.254	2.83		Clay	41.7			46.62	0.84	n.a.	n.a.	0.81	0.642	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.620	70.340	1.668	7788.1	4160.8	44.614	2.606	2.49		Sand	29.8			66.52	0.75	69.58	81.84	0.81	0.641	0.834	0.163	0.136	0.24	0.03	0.00
64.800	84.070	1.733	7808.6	4170.6	57.279	2.602	2.29		Sand	24.1			64.89	0.72	69.84	106.48	0.81	0.641	0.834	0.163	0.136	0.24	0.03	0.00
64.960	86.630	2.034	7827.7	4179.8	58.829	2.464	2.26		Sand	25.1			62.19	0.72	59.04	106.67	0.81	0.641	0.834	0.162	0.135	0.23	0.03	0.00
65.120	71.850	1.916	7846.6	4189.0	48.451	2.804	2.46		Sand	28.2			67.91	0.73	47.58	82.46	0.81	0.640	0.832	0.151	0.126	0.20	0.03	0.00
65.268	54.940	1.859	7867.3	4198.9	37.097	3.391	2.72		Clay	37.2			61.86	0.63	n.a.	n.a.	0.81	0.640	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.450	29.730	1.297	7885.6	4208.0	19.918	5.128	3.07		Clay	61.8			27.83	0.63	n.a.	n.a.	0.81	0.640	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.629	22.930	1.112	7905.8	4217.8	8.872	5.187	3.24		Clay	56.4			26.62	0.63	n.a.	n.a.	0.81	0.639	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.788	15.100	0.897	7925.1	4227.0	5.717	5.290	3.33		Clay	63.7			17.18	0.63	n.a.	n.a.	0.81	0.639	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.948	17.730	0.728	7945.3	4236.2	6.485	4.258	3.20		Clay	60.6			16.78	0.63	n.a.	n.a.	0.81	0.638	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.109	17.510	0.662	7965.7	4245.8	6.372	4.241	3.20		Clay	61.8			16.56	0.63	n.a.	n.a.	0.80	0.638	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.279	16.290	0.593	7984.8	4255.2	5.873	4.881	3.26		Clay	66.8			17.20	0.63	n.a.	n.a.	0.80	0.638	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.440	16.190	0.742	8004.2	4264.9	7.677	4.584	3.20		Clay	67.2			16.85	0.63	n.a.	n.a.	0.80	0.638	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.600	22.820	0.867	8024.5	4274.3	8.983	4.648	3.17		Clay	66.2			21.29	0.63	n.a.	n.a.	0.80	0.638	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.779	22.860	0.879	8044.8	4284.1	9.053	5.253	3.19		Clay	67.1			21.41	0.63	n.a.	n.a.	0.80	0.637	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.939	20.640	0.902	8064.1	4293.3	7.713	5.860	3.27		Clay	69.7			19.46	0.63	n.a.	n.a.	0.80	0.637	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.099	18.860	0.903	8083.3	4302.5	6.884	6.421	3.28		Clay	71.4			17.82	0.63	n.a.	n.a.	0.80	0.637	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.259	17.910	0.701	8103.7	4312.3	6.285	5.178	3.20		Clay	63.3			16.84	0.63	n.a.	n.a.	0.80	0.636	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.420	17.320	0.625	8122.8	4321.5	6.130	4.736	3.20		Clay	61.8			16.37	0.63	n.a.	n.a.	0.80	0.636	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.580	17.880	0.613	8143.2	4331.2	6.273	4.564	3.20		Clay	60.7			16.85	0.63	n.a.	n.a.	0.80	0.636	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.760	18.990	0.743	8162.5	4340.5	6.662	4.501	3.12		Clay	63.9			17.90	0.63	n.a.	n.a.	0.80	0.636	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.910	16.580	0.670	8181.7	4349.7	5.743	4.560	3.26		Clay	67.3			16.87	0.63	n.a.	n.a.	0.80	0.636	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.080	17.840	0.643	8202.1	4359.5	6.049	3.999	3.23		Clay	59.0			16.98	0.63	n.a.	n.a.	0.80	0.636	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.240	20.550	0.920	8221.3	4368.7	7.525	3.774	3.16		Clay	66.5			19.42	0.63	n.a.	n.a.	0.80	0.634	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.410	23.830	0.799	8241.7	4378.5	8.895	4.064	3.11		Clay	63.5			22.51	0.63	n.a.	n.a.	0.79	0.634	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.570	19.790	1.001	8260.8	4387.7	11.240	4.301	3.06		Clay	68.5			22.21	0.62	n.a.	n.a.	0.79	0.634	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.730	33.730	1.220	8280.1	4396.9	13.464	4.126	2.87		Clay	47.2			31.87	0.62	n.a.	n.a.	0.79	0.633	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.880	30.190	1.218	8300.6	4406.7	11.915	4.987	3.06		Clay	61.0			28.53	0.62	n.a.	n.a.	0.79	0.633	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.060	24.480	1.020	83107	4416.0	9.194	5.054	3.16		Clay	65.7			23.12	0.62	n.a.	n.a.	0.79	0.633	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.200	28.570	0.737	8340.1	4425.7	7.321	4.540	3.23		Clay	68.2			30.25	0.62	n.a.	n.a.	0.79	0.632	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.360	18.290	0.642	8360.5	4435.5	6.365	4.124	3.24		Clay	69.4			17.29	0.62	n.a.	n.a.	0.79	0.632	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.550	17.400	0.654	8379.6	4444.8	6.068	4.761	3.26		Clay	67.3			16.48	0.62	n.a.	n.a.	0.79	0.632	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.720	18.020	0.618	8399.9	4454.6	6.206	4.417	3.26		Clay	66.6			17.05	0.62	n.a.	n.a.	0.79	0.631	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.880	18.190	0.631	8418.1	4463.2	6.298	4.443	3.26		Clay	66.6			17.19	0.62	n.a.	n.a.	0.79	0.631	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.060	17.760	0.627	8438.8	4473.0	6.064	4.726	3.26		Clay	67.5			16.79	0.62	n.a.	n.a.	0.79	0.631	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.210	16.480	0.576	8457.7	4482.2	5.360	4.646	3.23		Clay	68.2			17.45	0.62	n.a.	n.a.	0.79	0.631	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.370	18.500	0.711	8478.0	4491.4	6.261	4.095	3.20		Clay	61.7			17.42	0.62	n.a.	n.a.	0.79	0.630	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.540	29.510	1.061	8497.3	4501.2	7.745	5.444	3.31		Clay	60.7			19.47	0.62	n.a.	n.a.	0.79	0.630	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.720	44.110	0.940	8518.5	4510.4	17.703	2.116	2.71		Clay	37.3			41.31	0.62	n.a.	n.a.	0.79	0.630	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.870	30.660	0.723	8536.9	4520.2	11.573	2.736	2.93		Clay	46.4			29.97	0.62	n.a.	n.a.	0.79	0.629	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.030	22.510	0.561	8556.1	4529.4	8.949	3.671	3.12		Clay	63.6			21.28	0.62	n.a.	n.a.	0.79	0.629	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.190	25.240	0.664	8575.3	4538.8	7.354	4.164	3.20		Clay	62.9			18.14	0.62	n.a.	n.a.	0.79	0.629	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.360	19.360	0.606	8595.7	4548.4	6.606	3.946	3.21		Clay	66.1			18.33	0.62	n.a.	n.a.	0.78	0.628	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.520	19.840	0.638	8614.9	4557.7	6.928	3.846	3.17		Clay	66.1			18.77	0.62	n.a.	n.a.	0.78	0.628	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.680	19.800	0.646	8636.3	4567.4	6.962	3.766	3.17		Clay	66.1			18.53	0.62	n.a.	n.a.	0.78	0.628	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.850	20.050	0.609	8654.5	4577.7	7.235	3.443	3.16		Clay	65.2			19.21	0.62	n.a.	n.a.	0.78	0.627	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.010	24.580	0.623	8673.7	4586.9	8.733	3.112	3.06		Clay	61.0			23.01	0.62	n.a.	n.a.	0.78	0.627	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.190	26.580	0.606	8694.1	4596.7	8.014	2.879	3.02		Clay	59.1			23.09	0.61	n.a.	n.a.	0.78	0.627	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.340	24.580	0.576	8712.2	4606.0	8.571	2.992	3.06		Clay	62.0			22.77	0.61	n.a.	n.a.	0.78	0.626	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.510	23.220	0.637	8733.7	4616.7	8.171	3.388	3.16		Clay	63.0			21.08	0.61	n.a.	n.a.	0.78	0.626	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.670	20.900	1.061	8753.9	4626.9	7.109	5.234	3.39		Clay	72.0			19.64	0.61	n.a.	n.a.	0.78	0.626	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.830	40.180	1.431	8772.1	4636.1	16.493	3.868	2.82		Clay	46.4			37.66	0.61	n.a.	n.a.	0.78	0.626	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.000	52.790	1.676	8792.5	4646.0	22.542	3.483	2.78		Clay	39.8			49.50	0.61	n.a.	n.a.	0.78	0.625	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.160	122.100	1.053	8811.7	4655.2	75.034	1.413	2.10		Sand	19.5			115.41	0.71	61.39	127.93	0.78	0.625	0.820	0.190	0.156	0.25	0.02	0.00
73.320	164.200	1.502	8832.1	4664.9	99.038	0.999	1.91		Sand	13.8			161.99	0.75	110.05	150.64	0.78	0.624	0.873	0.274	0.218	0.41	0.02	0.00
73.490	175.580	1.498	8851.3	4674.1	106.782	0.878	1.82		Sand	13.5			166.77	0.75	121.79	149.46	0.78	0.624	0.886	0.319	0.256	0.47	0.02	0.00
73.660	173.700	1.339	8870.5	4683.5	107.872	0.791	1.82		Sand	13.5			164.18	0.75	116.79	153.76	0.78	0.624	0.886	0.290	0.236	0.43	0.02	0.00

CORNERSTONE EARTH GROUP

CPT No: 6

PGA (A_{max}): 0.53

Total Settlement: 1.08 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ'_{vo} (psf)	Ic	Q	F (%)	I	Layer Thickness > 7	Flag Soil Type	Fines (%)	Corr. Factor for Interbeds (soft layer)	Thin Layer Factor (K_{LT})	Interpolated q_{cN}	CRR	q_{cN}	$q_{cN,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR for M_w & σ'_{vo}	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
73.820	163.300	1.804	8890.8	4693.1	94.502	1.299	2.08		Sand	17.0			144.98	0.75	106.54	151.65	0.78	0.624	0.874	0.278	0.218	0.42	0.02	0.00
73.980	162.400	2.911	8910.1	4698.3	93.911	1.960	2.13		Sand	19.9			144.16	0.75	106.79	156.21	0.77	0.623	0.857	0.480	0.369	0.69	0.01	0.00
74.140	176.740	2.194	8928.5	4708.1	106.510	1.564	2.02		Sand	17.4			160.11	0.76	124.28	170.26	0.77	0.623	0.857	0.480	0.369	0.69	0.01	0.00

CORNERSTONE EARTH GROUP

CPT No 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{cn} near interface (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{cn}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'_{vc}=1atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
0.160	606.700	1.008	20.0	20.0	5891.916	0.169	0.54		Unsaturated	0.6			564.07	1.70	958.93	958.93	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.330	361.720	1.120	41.3	41.3	2448.544	0.310	0.72		Unsaturated	1.2			341.60	1.70	581.21	581.21	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.480	214.000	1.410	61.3	61.3	1192.352	0.661	1.11		Unsaturated	3.7			202.50	1.70	344.62	344.62	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	122.260	1.757	82.5	82.5	585.037	1.457	1.56		Unsaturated	8.7			115.66	1.70	196.45	207.11	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	53.720	1.963	102.5	102.5	230.479	3.668	2.10		Unsaturated	19.3			50.78	1.70	86.32	133.23	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	29.180	1.690	122.5	122.5	114.387	6.611	2.48		Unsaturated	28.0			27.58	1.70	46.89	91.41	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	26.080	1.619	143.8	143.8	94.242	5.646	2.49		Unsaturated	29.0			24.63	1.70	41.87	84.84	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	23.760	1.382	163.8	163.8	80.417	5.837	2.63		Unsaturated	31.2			22.46	1.70	38.18	80.27	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	21.960	1.203	185.0	185.0	69.601	5.612	2.57		Unsaturated	32.6			20.76	1.70	35.29	76.74	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	23.340	1.246	205.0	205.0	70.564	5.368	2.54		Unsaturated	31.5			22.06	1.70	37.50	79.44	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	27.540	1.283	225.0	225.0	79.506	4.676	2.46		Unsaturated	29.0			26.03	1.70	44.25	87.69	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	32.770	1.334	246.3	246.3	90.464	4.066	2.38		Unsaturated	26.6			30.97	1.70	52.66	97.72	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	39.670	1.349	266.3	266.3	106.340	3.413	2.27		Unsaturated	23.7			37.50	1.70	63.74	110.24	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	37.680	1.371	287.5	287.5	95.780	3.632	2.32		Unsaturated	24.0			35.61	1.70	60.56	107.50	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	35.250	1.350	307.5	307.5	87.018	3.673	2.37		Unsaturated	26.4			33.32	1.70	56.64	102.88	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	32.770	1.363	327.5	327.5	78.337	4.160	2.42		Unsaturated	27.8			30.97	1.70	52.66	96.42	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	29.040	1.311	348.8	348.8	67.204	4.542	2.49		Unsaturated	30.2			27.45	1.70	46.66	91.31	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	23.800	1.247	368.8	368.8	75.834	6.260	2.51		Unsaturated	30.7			22.50	1.70	38.24	80.22	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	23.380	1.155	390.0	390.0	71.587	4.962	2.51		Unsaturated	30.5			22.10	1.70	37.57	79.28	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	22.270	1.060	410.0	410.0	65.766	4.800	2.52		Unsaturated	30.8			21.05	1.70	35.78	77.60	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	21.680	1.116	430.0	430.0	61.696	5.206	2.56		Unsaturated	32.3			20.49	1.70	34.84	76.08	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	20.390	1.120	451.3	451.3	58.217	5.663	2.61		Unsaturated	34.0			19.27	1.70	32.70	73.61	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	20.300	1.114	471.3	471.3	54.266	5.560	2.62		Unsaturated	34.3			19.19	1.70	32.62	73.47	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	19.880	1.082	492.5	492.5	61.487	6.500	2.63		Unsaturated	34.7			18.79	1.70	31.94	72.63	1.00	0.344	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	19.420	1.091	512.5	512.6	48.873	5.684	2.69		Mixed	36.6			18.30	1.70	31.20	71.77	1.00	0.348	1.100	0.102	0.101	0.29	0.04	0.09
4.270	18.640	1.066	533.8	533.8	45.266	6.037	2.70		Mixed	36.9			17.52	1.70	29.79	70.01	1.00	0.355	1.100	0.100	0.099	0.28	0.06	0.09
4.430	17.640	1.027	553.8	553.8	62.360	5.946	2.69		Mixed	35.7			16.58	1.42	n.a.	n.a.	1.00	0.361	n.a.	n.a.	n.a.	n.a.	0.00	0.00
4.600	17.630	0.943	573.8	573.8	41.341	5.376	2.69		Mixed	36.7			16.66	1.70	28.65	68.46	1.00	0.367	1.100	0.098	0.097	0.26	0.06	0.09
4.760	17.620	0.920	595.0	595.0	39.566	5.342	2.70		Mixed	37.1			16.65	1.70	28.15	67.83	1.00	0.373	1.100	0.097	0.096	0.26	0.06	0.09
4.920	16.860	0.821	615.0	615.0	37.201	4.962	2.70		Mixed	36.0			15.95	1.70	27.12	66.43	1.00	0.379	1.100	0.096	0.094	0.25	0.06	0.10
5.090	16.830	0.746	636.3	636.3	36.194	4.514	2.68		Mixed	36.2			15.91	1.70	27.04	66.24	1.00	0.384	1.098	0.095	0.094	0.24	0.06	0.09
5.250	16.200	0.690	656.3	656.3	34.046	4.340	2.66		Mixed	36.5			15.31	1.70	26.03	64.91	1.00	0.390	1.094	0.093	0.092	0.24	0.06	0.09
5.410	15.590	0.672	676.3	676.3	46.107	4.403	2.69		Clay	33.6			14.74	1.35	n.a.	n.a.	1.00	0.395	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.580	14.640	0.639	697.5	697.5	40.978	4.469	2.64		Clay	34.8			13.84	1.34	n.a.	n.a.	1.00	0.400	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.740	13.860	0.623	717.5	717.5	37.606	4.616	2.67		Clay	36.1			13.09	1.33	n.a.	n.a.	1.00	0.405	n.a.	n.a.	n.a.	n.a.	0.00	0.00
5.910	13.990	0.610	738.8	738.8	36.575	4.461	2.67		Clay	36.0			13.22	1.32	n.a.	n.a.	1.00	0.409	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.070	13.930	0.607	758.8	758.8	35.718	4.479	2.68		Clay	36.3			13.17	1.31	n.a.	n.a.	1.00	0.414	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.230	14.180	0.621	778.8	778.8	35.417	4.601	2.69		Clay	36.4			13.40	1.30	n.a.	n.a.	1.00	0.418	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.400	14.960	0.609	800.0	800.0	36.400	4.111	2.65		Clay	36.2			14.14	1.29	n.a.	n.a.	0.99	0.422	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.560	15.760	0.564	819.7	816.0	29.270	3.609	2.69		Mixed	36.7			14.90	1.70	26.32	63.96	0.99	0.426	1.076	0.092	0.089	0.21	0.06	0.10
6.730	15.010	0.516	840.1	828.7	36.339	3.535	2.61		Clay	34.0			14.19	1.28	n.a.	n.a.	0.99	0.431	n.a.	n.a.	n.a.	n.a.	0.00	0.00
6.890	14.060	0.489	860.3	838.0	32.649	3.565	2.64		Clay	36.0			13.29	1.28	n.a.	n.a.	0.99	0.434	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.060	13.410	0.469	878.5	844.2	30.730	3.617	2.68		Clay	36.7			12.67	1.27	n.a.	n.a.	0.99	0.438	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.220	13.170	0.500	900.9	854.0	29.791	3.928	2.70		Clay	36.0			12.45	1.27	n.a.	n.a.	0.99	0.442	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.380	14.030	0.528	918.1	863.2	31.444	3.686	2.68		Clay	36.2			13.26	1.27	n.a.	n.a.	0.99	0.446	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.550	13.080	0.524	938.5	873.0	28.881	4.157	2.72		Clay	37.8			12.36	1.26	n.a.	n.a.	0.99	0.449	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.710	11.080	0.483	957.7	882.2	24.034	4.370	2.80		Clay	40.6			10.47	1.26	n.a.	n.a.	0.99	0.452	n.a.	n.a.	n.a.	n.a.	0.00	0.00
7.870	9.420	0.497	976.9	891.4	20.039	4.656	2.87		Clay	43.4			8.90	1.26	n.a.	n.a.	0.99	0.455	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.040	8.950	0.403	997.3	901.2	18.756	4.765	2.90		Clay	44.7			8.46	1.25	n.a.	n.a.	0.99	0.458	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.200	9.720	0.442	1016.5	910.4	20.236	4.708	2.88		Clay	43.8			9.19	1.25	n.a.	n.a.	0.99	0.461	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.370	11.460	0.527	1036.9	920.2	23.824	4.605	2.83		Clay	41.8			10.86	1.25	n.a.	n.a.	0.99	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.530	13.340	0.799	1056.1	929.4	27.570	5.920	2.84		Clay	42.4			12.61	1.24	n.a.	n.a.	0.99	0.467	n.a.	n.a.	n.a.	n.a.	0.00	0.00
8.690	29.270	1.377	1075.3	938.6	47.973	4.701	2.61		Mixed	33.9			27.67	1.64	42.53	86.72	0.99	0.470	1.076	0.122	0.118	0.25	0.04	0.06
8.860	51.060	1.661	1095.7	948.4	71.299	3.065	2.41		Sand	27.5	120		120.00	1.26	151.66	229.70	0.99	0.473	1.100	2.000	1.979	4.19	0.00	0.00
9.020	57.280	1.469	1114.9	957.7	79.664	2.626	2.27		Sand	23.6	120		120.00	1.27	151.67	225.47	0.99	0.476	1.100	2.000	1.979	4.16	0.00	0.00
9.190	76.930	1.013	1135.3	967.4	108.346	1.344	1.98		Sand	16.5	120		120.00	1.28	153.79	208.59	0.99	0.478	1.100	1.853	1.833	3.83	0.00	0.00
9.350	82.170	0.906	1154.6	976.7	113.615	1.110	1.90		Sand	14.8	120		120.00	1.29	154.41	202.59	0.99	0.481	1.100	1.286	1.273	2.65	0.00	0.00
9.510	84.400	0.960	1173.7	985.9	116.141	1.146	1.90		Sand	14.9	120		120.00	1.28	153.09	202.24	0.99	0.483	1.100	1.265	1.251	2.59	0.00	0.00
9.680	92.010	1.066	1194.1	995.7	125.957	1.165	1.88		Sand	14.4	120		120.00	1.28	153.96	199.90	0.99	0.486	1.100	1.133	1.121	2.31	0.00	0.00
9.840	100.010	0.825	1213.3	1004.9	136.337	0.830	1.70		Sand	12.1	120		120.00	1.29	155.36	187.29	0.99	0.488	1.100	0.680	0.673	1.38	0.00	0.00
10.010	90.070	1.225	1233.7	1014.7	134.561	1.244	1.86		Sand	14.4	120		120.00	1.28	153.05	198.67	0.99	0.490	1.100	1.061	1.069	2.18	0.00	0.00
10.170	110.210	1.220	1252.9	1023.9	148.689	1.119	1.81		Sand	13.2	120		120.00	1.28	153.58	192.31	0.99	0.492	1.100	0.829	0.811	1.65	0.00	0.00
10.330	127.690	1.457	1272.1	1033.1	171.666	1.146	1.78		Sand	12.5			120.69	1.28	154.40	189.05	0.99	0.494	1.100	0.725	0.717	1.45	0.00	0.00
10.500	180.430	1.720	1292.8	1042.9	215.121	1.077	1.69		Sand	11.0			151.84	1.24	186.65	216.19	0.99	0.497	1.100	2.000	1.979	3.98	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{cn} near interface (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{cn}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'_{vc}=1atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
10.660	207.390	1.585	1311.7	1052.1	277.110	0.787	1.51		Sand	8.2			196.92	1.21	237.26	245.65	0.99	0.499	1.100	2.000	1.979	3.97	0.00	0.00
10.830	254.880	1.488	1332.1	1061.9	339.182	0.586	1.36		Sand	6.3			240.92	1.20	288.98	290.05	0.99	0.501	1.100	2.000	1.979	3.95	0.00	0.00
10.990	298.870	1.887	1351.3	1071.1	396.143	0.633	1.34		Sand	6.0			282.49	1.20	338.07	338.65	0.99	0.503	1.100	2.000	1.978	3.94	0.00	0.00
11.150	281.110	1.608	1370.5	1080.3	370.944	0.584	1.34		Sand	6.0			265.70	1.19	317.26	317.97	0.99	0.504	1.100	2.000	1.979	3.92	0.00	0.00
11.320	245.220	1.153	1390.9	1090.1	321.999	0.472	1.31		Sand	5.7			231.76	1.19	276.10	276.41	0.98	0.506	1.100	2.000	1.979	3.91	0.00	0.00
11.480	238.000	0.797	1410.1	1099.3	311.187	0.336	1.23		Sand	4.8			224.96	1.19	267.37	267.39	0.98	0.508	1.100	2.000	1.979	3.89	0.00	0.00
11.650	228.170	0.861	1430.5	1109.1	296.944	0.378	1.28		Sand	5.3			215.66	1.19	256.73	256.64	0.98	0.510	1.100	2.000	1.979	3.88	0.00	0.00
11.810	225.200	0.906	1449.7	1118.4	291.644	0.403	1.30		Sand	6.5			212.86	1.18	252.15	252.36	0.98	0.512	1.100	2.000	1.979	3.87	0.00	0.00
11.980	245.120	1.861	1470.1	1128.1	316.347	0.757	1.47		Sand	7.8			231.66	1.18	273.50	279.18	0.98	0.513	1.100	2.000	1.979	3.85	0.00	0.00
12.140	214.820	2.143	1489.3	1137.4	275.967	1.001	1.60		Sand	9.4			203.04	1.18	239.16	267.58	0.98	0.515	1.100	2.000	1.979	3.84	0.00	0.00
12.300	328.380	0.994	1508.5	1146.8	420.878	0.303	1.10		Sand	3.6			310.38	1.18	364.84	364.84	0.98	0.517	1.100	2.000	1.979	3.83	0.00	0.00
12.470	349.880	0.924	1528.9	1156.4	446.366	0.265	1.04		Sand	3.1			330.70	1.17	387.86	387.86	0.98	0.518	1.100	2.000	1.979	3.82	0.00	0.00
12.630	320.040	0.710	1548.1	1165.6	408.880	0.222	1.03		Sand	3.0			302.50	1.17	354.03	354.03	0.98	0.520	1.100	2.000	1.979	3.81	0.00	0.00
12.800	244.480	0.524	1568.5	1175.4	308.052	0.216	1.12		Sand	3.8			231.08	1.17	269.86	269.86	0.98	0.521	1.100	2.000	1.979	3.79	0.00	0.00
12.960	147.470	0.729	1587.7	1184.6	185.288	0.497	1.61		Sand	8.2	231.08		231.08	1.17	269.30	278.81	0.98	0.523	1.100	2.000	1.979	3.78	0.00	0.00
13.120	89.180	1.064	1606.9	1193.8	111.200	1.192	1.95		Sand	18.4	231.08		231.08	1.16	268.75	343.91	0.98	0.524	1.100	2.000	1.979	3.77	0.00	0.00
13.290	37.490	1.122	1627.3	1203.6	46.984	3.065	2.49		Sand	29.9	231.08		231.08	1.16	268.17	388.89	0.98	0.526	1.100	2.000	1.979	3.76	0.00	0.00
13.450	19.120	0.639	1646.6	1212.8	30.172	3.492	2.69		Clay	35.6			18.07	1.16	n.a.	n.a.	0.98	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.620	10.660	0.468	1666.9	1222.6	16.065	4.606	2.95		Clay	46.6			10.07	1.16	n.a.	n.a.	0.98	0.529	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.780	10.150	0.294	1686.1	1231.8	15.111	3.160	2.86		Clay	43.2			9.59	1.15	n.a.	n.a.	0.98	0.530	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.940	11.150	0.306	1705.3	1241.0	16.596	2.982	2.81		Clay	41.3			10.54	1.15	n.a.	n.a.	0.98	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.110	10.770	0.362	1725.7	1250.8	15.841	3.053	2.89		Clay	44.1			10.18	1.15	n.a.	n.a.	0.98	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.270	10.350	0.434	1744.9	1260.1	15.043	4.580	2.97		Clay	47.3			9.78	1.15	n.a.	n.a.	0.98	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.440	12.300	0.427	1765.3	1269.8	17.982	3.736	2.86		Clay	42.6			11.63	1.14	n.a.	n.a.	0.98	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.600	10.620	0.374	1784.5	1279.1	15.211	3.542	2.91		Clay	46.2			10.04	1.14	n.a.	n.a.	0.98	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.760	10.380	0.203	1803.7	1288.3	14.714	3.098	2.87		Clay	43.3			9.81	1.14	n.a.	n.a.	0.98	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.930	9.340	0.334	1824.1	1298.1	12.985	3.954	2.96		Clay	47.7			8.83	1.14	n.a.	n.a.	0.98	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.090	9.040	0.320	1843.3	1307.3	12.420	3.930	2.99		Clay	48.3			8.54	1.14	n.a.	n.a.	0.98	0.539	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.250	9.090	0.280	1863.7	1317.1	12.388	3.427	2.95		Clay	46.8			8.59	1.13	n.a.	n.a.	0.98	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.420	8.140	0.231	1882.9	1326.3	10.856	3.206	2.98		Clay	48.1			7.69	1.13	n.a.	n.a.	0.97	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.580	7.440	0.198	1902.1	1335.5	9.718	3.004	3.01		Clay	49.0			7.03	1.13	n.a.	n.a.	0.97	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	7.220	0.173	1922.5	1345.3	9.306	2.767	3.00		Clay	48.5			6.82	1.13	n.a.	n.a.	0.97	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	6.490	0.163	1941.7	1354.5	8.149	2.946	3.07		Clay	51.6			6.13	1.12	n.a.	n.a.	0.97	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.080	6.300	0.219	1962.1	1364.3	7.797	4.117	3.16		Clay	56.0			5.96	1.12	n.a.	n.a.	0.97	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.240	7.270	0.572	1981.3	1373.5	9.143	9.101	3.32		Clay	63.6			6.87	1.12	n.a.	n.a.	0.97	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.400	23.470	0.822	2000.5	1382.7	32.500	3.660	2.66		Clay	36.2			22.15	1.12	n.a.	n.a.	0.97	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.570	26.430	0.928	2020.9	1392.5	36.508	3.650	2.61		Clay	33.0			24.98	1.12	n.a.	n.a.	0.97	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.730	23.930	1.106	2040.1	1401.7	32.686	4.828	2.73		Clay	38.1			22.62	1.11	n.a.	n.a.	0.97	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.900	18.530	1.112	2060.5	1411.5	24.796	6.356	2.90		Clay	44.5			17.51	1.11	n.a.	n.a.	0.97	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.060	59.840	0.956	2079.7	1420.8	67.625	1.624	2.18		Sand	21.1	143	1.56	223.06	1.11	247.60	344.93	0.97	0.551	1.100	2.000	1.979	3.59	0.00	0.00
17.220	113.920	0.770	2098.9	1430.0	128.774	0.682	1.72		Sand	11.4	143	1.56	223.06	1.11	247.36	286.20	0.97	0.552	1.100	2.000	1.979	3.59	0.00	0.00
17.390	151.290	0.676	2119.3	1439.8	172.141	0.454	1.58		Sand	9.2		1.56	223.07	1.11	246.93	263.59	0.97	0.553	1.100	2.000	1.979	3.58	0.00	0.00
17.550	171.460	0.796	2138.5	1449.0	194.604	0.466	1.46		Sand	7.7		1.56	252.80	1.11	279.36	286.13	0.97	0.554	1.100	2.000	1.979	3.57	0.00	0.00
17.720	160.560	0.610	2158.9	1458.8	181.910	0.325	1.41		Sand	8.9		1.56	237.21	1.10	261.67	264.23	0.97	0.554	1.100	2.000	1.979	3.57	0.00	0.00
17.880	111.400	0.428	2178.1	1468.0	125.261	0.366	1.59		Sand	9.4	152	1.56	237.12	1.10	261.13	280.27	0.97	0.555	1.100	2.000	1.979	3.56	0.00	0.00
18.040	63.290	0.640	2197.3	1477.2	70.363	0.956	1.99		Sand	16.6	152	1.56	237.12	1.10	260.70	343.36	0.97	0.556	1.100	2.000	1.979	3.56	0.00	0.00
18.210	28.100	0.656	2217.7	1487.0	28.245	2.346	2.57		Sand	32.6	152	1.56	237.12	1.10	260.26	378.32	0.97	0.557	1.100	2.000	1.979	3.56	0.00	0.00
18.370	13.590	0.328	2236.9	1496.2	16.671	2.620	2.78		Clay	40.1			12.84	1.10	n.a.	n.a.	0.97	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.540	8.210	0.206	2257.3	1506.0	9.404	2.889	3.01		Clay	49.1			7.76	1.09	n.a.	n.a.	0.97	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	8.250	0.186	2276.5	1515.2	6.797	3.065	3.16		Clay	58.9			6.94	1.09	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.860	6.770	0.167	2295.7	1524.4	7.376	3.317	3.13		Clay	64.4			6.40	1.09	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	6.970	0.190	2316.1	1534.2	7.576	3.209	3.12		Clay	63.5			6.59	1.09	n.a.	n.a.	0.97	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	8.130	0.167	2335.3	1543.4	9.027	2.060	3.01		Clay	49.0			7.68	1.09	n.a.	n.a.	0.97	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	8.870	0.194	2355.7	1553.2	9.906	2.526	2.96		Clay	47.0			8.38	1.08	n.a.	n.a.	0.96	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	8.060	0.269	2374.9	1562.5	8.797	3.020	3.11		Clay	53.5			7.62	1.08	n.a.	n.a.	0.96	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.680	9.900	0.303	2395.3	1572.2	11.184	3.440	2.99		Clay	48.4			9.44	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	13.700	0.532	2414.5	1581.5	15.799	4.259	2.93		Clay	46.5			12.95	1.08	n.a.	n.a.	0.96	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	15.450	0.708	2433.7	1590.7	17.896	4.974	2.93		Clay	48.0			14.60	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	19.440	0.656	2454.1	1600.5	22.760	3.486	2.75		Clay	38.0			18.37	1.08	n.a.	n.a.	0.96	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	18.510	0.809	2473.3	1609.7	21.462	5.155	2.88		Clay	43.9			17.50	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	19.220	1.195	2493.7	1619.5	22.196	6.646	2.95		Clay	46.5			18.17	1.07	n.a.	n.a.	0.96	0.566	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	38.600	1.256	2512.9	1628.7	40.232	3.363	2.56		Sand	32.1	113.47	1.25	141.84	1.08	152.89	234.19	0.96	0.566	1.079	2.000	1.940	3.43	0.00	0.00
20.830	64.340	1.276	2532.1	1637.9	67.701	2.023	2.24		Sand	22.8	113.47	1.25	141.84	1.08	153.04	225.76	0.96	0.566	1.077	2.000	1.937	3.42	0.00	0.00
21.000	78.700	1.246	2552.5	1647.7	80.787	1.662	2.12		Sand	19.6	113.47	1.25	141.84	1.08	153.06	219.67	0.96	0.567	1.076	2.000	1.934	3.41	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tn} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tn}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'v=1\,atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
21.160	82.560	1.094	2571.7	1658.9	86.907	1.344	2.04		Sand	17.9	113.47	1.25	141.84	1.08	153.07	213.67	0.96	0.567	1.073	2.000	1.931	3.40	0.00	0.00
21.330	109.610	0.946	2592.1	1666.7	115.352	0.876	1.83		Sand	13.4	113.47	1.25	141.84	1.08	153.75	193.78	0.96	0.568	1.058	0.870	0.828	1.46	0.00	0.00
21.490	116.640	0.947	2611.3	1675.9	122.491	0.821	1.79		Sand	12.7	113.47	1.25	141.84	1.08	153.66	182.30	0.96	0.568	1.054	0.731	0.694	1.22	0.00	0.01
21.650	120.050	0.943	2630.5	1685.1	125.767	0.794	1.77		Sand	12.4		1.25	141.84	1.08	163.51	180.93	0.96	0.569	1.052	0.672	0.636	1.12	0.01	0.01
21.820	106.730	1.322	2650.9	1694.9	110.258	1.308	1.96		Sand	16.6		1.25	124.92	1.08	136.06	185.77	0.96	0.569	1.049	0.603	0.569	1.00	0.01	0.01
21.980	125.160	1.679	2670.1	1704.1	130.418	1.278	1.90		Sand	14.8		1.25	147.87	1.07	158.48	207.16	0.96	0.570	1.062	1.823	1.650	2.72	0.00	0.00
22.150	130.640	1.364	2690.5	1713.0	136.641	1.055	1.83		Sand	13.4		1.25	154.23	1.07	165.00	206.00	0.96	0.570	1.060	1.808	1.534	2.69	0.00	0.00
22.310	136.610	0.780	2709.7	1723.2	143.760	0.589	1.63		Sand	10.0		1.25	163.76	1.07	176.40	194.67	0.96	0.571	1.051	0.902	0.862	1.49	0.00	0.00
22.470	136.920	0.377	2728.9	1732.4	140.567	0.280	1.46		Sand	7.6	131.01	1.25	163.76	1.07	176.86	180.82	0.96	0.571	1.043	0.540	0.516	0.90	0.01	0.02
22.640	101.670	0.629	2749.3	1742.2	104.474	0.626	1.73		Sand	11.6	131.01	1.25	163.76	1.06	174.36	206.51	0.96	0.571	1.055	1.489	1.412	2.47	0.00	0.00
22.800	54.160	0.872	2768.5	1751.4	54.630	1.653	2.25		Sand	23.1	131.01	1.25	163.76	1.05	172.24	261.32	0.96	0.572	1.067	2.000	1.901	3.32	0.00	0.00
22.970	27.380	0.588	2788.9	1761.2	26.922	2.266	2.58		Sand	32.8	131.01	1.25	163.76	1.05	171.60	259.65	0.96	0.572	1.055	2.000	1.898	3.32	0.00	0.00
23.130	13.630	0.561	2808.1	1770.4	14.036	4.435	2.96		Clay	47.9			13.07	1.05	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	10.650	0.438	2827.3	1779.8	10.380	4.741	3.10		Clay	53.1			10.07	1.05	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	10.360	0.412	2847.7	1789.4	10.010	4.606	3.11		Clay	53.3			9.81	1.05	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.620	10.850	0.394	2866.9	1798.6	10.471	4.160	3.06		Clay	51.5			10.26	1.04	n.a.	n.a.	0.96	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	11.300	0.404	2887.3	1808.4	11.000	4.061	3.04		Clay	50.4			10.77	1.04	n.a.	n.a.	0.96	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	11.110	0.358	2906.5	1817.6	10.628	3.705	3.03		Clay	49.8			10.60	1.04	n.a.	n.a.	0.95	0.574	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	9.660	0.374	2925.7	1826.8	8.974	4.583	3.14		Clay	54.9			9.13	1.04	n.a.	n.a.	0.95	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	9.600	0.461	2946.1	1836.6	9.068	5.537	3.19		Clay	57.1			9.28	1.04	n.a.	n.a.	0.95	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	12.950	0.429	2965.3	1845.8	12.426	3.741	2.98		Clay	47.7			12.24	1.04	n.a.	n.a.	0.95	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	11.640	0.444	2985.7	1855.6	10.929	4.419	3.07		Clay	51.8			10.91	1.04	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	11.480	0.600	3004.9	1864.9	10.701	6.075	3.16		Clay	56.7			10.86	1.03	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.930	11.320	0.608	3024.1	1874.1	10.487	6.199	3.17		Clay	56.3			10.76	1.03	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	12.160	0.633	3044.5	1883.9	11.294	6.013	3.09		Clay	52.5			11.40	1.03	n.a.	n.a.	0.95	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	10.260	0.405	3063.7	1893.1	9.221	4.634	3.14		Clay	54.7			9.70	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	9.090	0.336	3084.1	1902.9	7.933	4.471	3.16		Clay	56.6			8.59	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	9.070	0.383	3103.3	1912.1	7.864	5.086	3.22		Clay	58.3			8.57	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.760	10.410	0.406	3122.5	1921.3	9.211	4.610	3.15		Clay	54.9			9.84	1.03	n.a.	n.a.	0.95	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	11.500	0.384	3142.9	1931.1	10.283	3.871	3.06		Clay	50.9			10.87	1.02	n.a.	n.a.	0.95	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.080	10.760	0.317	3162.1	1940.3	9.481	3.490	3.06		Clay	50.9			10.17	1.02	n.a.	n.a.	0.95	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.250	10.150	0.316	3182.5	1950.1	8.778	3.604	3.10		Clay	52.8			9.59	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.410	11.030	0.309	3201.7	1959.3	9.625	4.236	3.10		Clay	52.9			10.43	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	13.330	0.573	3220.9	1968.5	11.907	4.888	3.06		Clay	51.4			12.60	1.02	n.a.	n.a.	0.94	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	16.030	0.703	3241.3	1978.3	14.567	4.677	2.99		Clay	48.4			15.15	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	15.910	0.760	3260.5	1987.6	14.369	5.320	3.02		Clay	49.7			15.04	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	15.270	0.739	3280.9	1997.3	13.646	5.418	3.04		Clay	50.8			14.43	1.02	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	13.280	0.714	3300.1	2006.5	11.672	6.146	3.13		Clay	54.8			12.53	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	10.400	0.536	3320.5	2016.3	8.669	6.156	3.23		Clay	59.1			9.83	1.01	n.a.	n.a.	0.94	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	8.700	0.349	3339.7	2025.5	6.941	4.987	3.26		Clay	60.1			8.22	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	8.260	0.247	3358.9	2034.8	6.488	3.747	3.21		Clay	58.0			7.81	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	7.040	0.281	3379.3	2044.6	5.234	6.250	3.37		Clay	65.7			6.66	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	8.560	0.339	3398.5	2053.8	6.681	4.947	3.27		Clay	60.7			8.09	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	10.050	0.342	3418.9	2063.6	8.084	4.096	3.16		Clay	55.3			9.50	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	12.710	0.366	3438.1	2072.8	10.606	3.261	3.00		Clay	48.6			12.01	1.01	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	13.290	0.463	3457.3	2082.0	11.106	3.918	3.03		Clay	49.9			12.56	1.00	n.a.	n.a.	0.94	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	16.840	0.604	3477.7	2091.8	14.438	4.001	2.94		Clay	46.3			15.92	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	19.400	0.606	3496.9	2101.0	16.800	3.020	2.86		Clay	44.0			18.39	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	19.410	0.820	3517.3	2110.8	16.726	4.644	2.93		Clay	46.0			18.38	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	25.360	0.903	3536.5	2120.0	22.256	3.829	2.79		Clay	40.2			23.97	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	23.760	1.046	3555.7	2129.2	20.648	4.769	2.87		Clay	43.6			22.46	1.00	n.a.	n.a.	0.94	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	25.640	1.180	3576.1	2139.0	22.302	4.948	2.86		Clay	42.9			24.23	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	26.310	1.462	3595.3	2148.2	22.821	6.022	2.90		Clay	44.7			24.87	1.00	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	26.160	1.606	3615.7	2158.0	22.569	6.653	2.94		Clay	46.1			24.73	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	24.430	1.542	3634.9	2167.3	20.867	6.881	2.96		Clay	47.7			23.09	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.180	23.360	1.476	3654.1	2176.6	19.776	6.866	2.99		Clay	48.4			22.07	0.99	n.a.	n.a.	0.93	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	22.630	1.406	3674.5	2186.2	19.021	6.763	3.00		Clay	48.7			21.39	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	21.620	1.297	3693.7	2195.6	18.106	6.495	3.00		Clay	48.6			20.62	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	22.370	1.308	3714.1	2205.3	18.604	6.378	2.99		Clay	48.3			21.14	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	19.640	1.252	3733.3	2214.5	16.052	7.044	3.07		Clay	51.6			18.56	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	17.960	1.094	3752.5	2223.7	14.467	6.803	3.09		Clay	52.6			16.97	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	18.600	1.036	3772.9	2233.6	15.020	6.174	3.06		Clay	50.9			17.64	0.99	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	21.610	1.006	3792.1	2242.7	17.750	5.046	2.94		Clay	46.1			20.61	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	22.900	0.946	3812.5	2252.5	18.840	4.802	2.89		Clay	44.2			21.64	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tn} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tn}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'v=1\,atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
31.660	24.610	1.039	3831.7	2261.7	20.245	4.539	2.86		Clay	43.2			23.45	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.820	26.740	1.133	3850.9	2270.9	21.864	4.587	2.84		Clay	42.3			25.27	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	25.580	1.102	3871.3	2280.7	20.734	4.659	2.86		Clay	43.2			24.18	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	23.560	1.017	3890.5	2289.9	18.869	4.709	2.90		Clay	44.5			22.26	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	21.560	1.012	3910.9	2299.7	17.041	5.186	2.96		Clay	47.0			20.37	0.98	n.a.	n.a.	0.93	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	24.630	1.070	3930.1	2308.9	19.632	4.721	2.89		Clay	44.0			23.28	0.98	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	24.010	1.059	3949.3	2318.2	19.011	4.806	2.90		Clay	44.7			22.69	0.98	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	21.160	0.927	3969.7	2328.0	16.486	4.836	2.96		Clay	46.8			19.99	0.98	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.970	18.960	0.864	3988.9	2337.2	14.518	5.031	3.00		Clay	48.9			17.92	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	18.770	0.849	4009.3	2347.0	14.287	5.064	3.01		Clay	49.2			17.74	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	21.050	0.846	4028.5	2356.2	16.158	4.440	2.93		Clay	45.9			19.90	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	22.400	0.924	4047.7	2365.4	17.229	4.533	2.92		Clay	45.3			21.17	0.97	n.a.	n.a.	0.92	0.583	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	22.960	0.864	4068.1	2375.2	17.637	4.125	2.88		Clay	43.9			21.72	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	22.700	0.862	4087.3	2384.4	17.326	4.171	2.89		Clay	44.3			21.46	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	22.310	0.802	4107.7	2394.2	16.921	3.969	2.89		Clay	44.0			21.09	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	20.370	0.720	4126.9	2403.4	15.234	3.931	2.92		Clay	45.4			19.25	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.280	15.860	0.625	4146.1	2412.6	11.429	4.533	3.06		Clay	51.1			14.99	0.97	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	13.910	0.483	4165.5	2422.4	9.764	4.082	3.08		Clay	52.3			13.16	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	12.810	0.454	4185.7	2431.6	8.815	4.232	3.13		Clay	54.3			12.11	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	12.610	0.472	4206.1	2441.4	8.607	4.494	3.16		Clay	55.4			11.92	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	12.450	0.440	4225.3	2450.6	8.436	4.256	3.14		Clay	55.1			11.77	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	13.050	0.413	4244.5	2459.9	8.885	3.763	3.10		Clay	52.9			12.33	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	12.140	0.416	4264.9	2469.7	8.104	4.098	3.16		Clay	56.3			11.47	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	12.830	0.430	4284.1	2478.9	8.623	4.022	3.12		Clay	54.1			12.13	0.96	n.a.	n.a.	0.92	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	12.750	0.428	4304.5	2488.7	8.517	4.040	3.13		Clay	54.3			12.06	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	12.220	0.436	4323.7	2497.9	8.053	4.330	3.17		Clay	56.0			11.56	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	12.740	0.411	4344.1	2507.7	8.420	3.886	3.12		Clay	54.0			12.04	0.96	n.a.	n.a.	0.91	0.582	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	14.100	0.446	4363.3	2516.9	9.471	3.762	3.07		Clay	51.8			13.33	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	14.610	0.447	4382.5	2526.1	9.832	3.601	3.05		Clay	50.6			13.61	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	14.490	0.467	4402.9	2535.9	9.692	3.901	3.09		Clay	52.1			13.70	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	13.240	0.476	4422.1	2545.1	8.667	4.320	3.14		Clay	54.6			12.51	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	13.600	0.482	4442.5	2554.9	8.900	4.241	3.13		Clay	54.2			12.84	0.96	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	13.750	0.440	4461.7	2564.1	8.985	3.818	3.10		Clay	52.8			13.00	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	12.990	0.429	4480.9	2573.3	8.355	3.992	3.13		Clay	54.5			12.28	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	12.160	0.387	4501.3	2583.1	7.672	3.902	3.16		Clay	56.6			11.49	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	10.660	0.329	4520.5	2592.3	6.473	3.924	3.22		Clay	58.5			10.07	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	8.370	0.276	4540.9	2602.1	4.686	4.510	3.37		Clay	64.9			7.91	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	6.710	0.213	4560.1	2611.3	3.393	4.410	3.50		Clay	72.6			6.34	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	6.420	0.228	4579.3	2620.6	3.152	5.456	3.56		Clay	75.9			6.07	0.95	n.a.	n.a.	0.91	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	8.050	0.278	4599.7	2630.4	4.372	4.836	3.41		Clay	65.9			7.61	0.94	n.a.	n.a.	0.91	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	9.860	0.294	4618.9	2639.6	5.721	3.891	3.28		Clay	60.5			9.32	0.94	n.a.	n.a.	0.91	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	10.260	0.329	4638.3	2649.4	6.009	4.129	3.28		Clay	60.4			9.72	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	10.960	0.369	4658.5	2658.6	6.508	4.161	3.23		Clay	60.1			10.36	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.710	11.420	0.423	4677.7	2667.8	6.806	4.601	3.24		Clay	60.7			10.79	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	12.950	0.542	4698.1	2677.6	7.918	5.113	3.21		Clay	58.3			12.24	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	15.290	0.578	4717.3	2686.8	9.626	4.462	3.11		Clay	53.5			14.46	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	15.660	0.569	4737.7	2696.6	9.873	4.261	3.09		Clay	52.8			14.82	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	15.510	0.539	4756.9	2705.8	9.708	4.063	3.09		Clay	52.4			14.68	0.94	n.a.	n.a.	0.90	0.580	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.540	14.790	0.478	4776.1	2715.0	9.136	3.858	3.09		Clay	52.7			13.98	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	14.410	0.442	4796.5	2724.8	8.817	3.681	3.09		Clay	52.7			13.62	0.94	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.860	13.990	0.520	4815.7	2734.0	8.473	4.536	3.16		Clay	55.5			13.22	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.030	14.340	0.518	4836.1	2743.8	8.690	4.342	3.14		Clay	54.8			13.55	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.190	15.850	0.486	4855.3	2753.0	9.751	3.619	3.06		Clay	51.0			14.98	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.350	15.980	0.452	4874.5	2762.3	9.806	3.334	3.03		Clay	50.0			15.10	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.520	17.320	0.481	4894.9	2772.1	10.730	3.231	2.99		Clay	48.3			16.37	0.93	n.a.	n.a.	0.90	0.579	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.680	17.860	0.617	4914.1	2781.3	11.069	4.006	3.03		Clay	50.2			16.87	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.850	21.240	0.738	4934.5	2791.1	13.452	3.933	2.96		Clay	47.1			20.08	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.010	22.360	0.803	4953.7	2800.3	14.222	4.031	2.95		Clay	46.8			21.15	0.93	n.a.	n.a.	0.90	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.170	22.460	0.834	4972.9	2809.5	14.219	4.177	2.96		Clay	47.0			21.23	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.340	19.830	0.689	4993.3	2819.3	12.298	3.996	2.98		Clay	48.9			18.74	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.500	17.680	0.704	5012.5	2828.5	10.729	4.638	3.08		Clay	52.3			16.71	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.670	16.630	0.656	5032.9	2838.3	9.875	4.551	3.11		Clay	53.4			15.62	0.93	n.a.	n.a.	0.89	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	19.690	0.637	5052.1	2847.5	12.059	3.848	2.97		Clay	47.8			18.60	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	20.800	0.609	5071.3	2856.7	12.787	3.332	2.94		Clay	46.1			19.66	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tN}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'_{vc}=1\,atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
42.160	20.920	0.681	5091.7	2866.5	12.620	3.184	2.97		Clay	46.5			19.77	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.320	20.050	0.636	5110.9	2875.7	12.167	3.635	2.96		Clay	47.7			18.96	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.490	19.400	0.669	5131.3	2885.5	11.710	3.659	3.01		Clay	49.2			18.39	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.650	17.850	0.701	5150.6	2894.7	10.563	4.567	3.09		Clay	62.5			16.87	0.92	n.a.	n.a.	0.89	0.577	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	18.050	0.675	5169.7	2904.0	10.661	4.368	3.07		Clay	61.7			17.08	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	19.760	0.961	5190.1	2913.7	11.776	4.715	3.11		Clay	63.4			18.67	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	24.920	1.254	5209.3	2923.0	15.260	5.019	3.02		Clay	49.5			23.55	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.310	27.560	1.074	5229.7	2932.8	17.026	4.301	2.91		Clay	44.9			26.07	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	27.970	1.631	5248.9	2942.0	17.230	6.436	3.02		Clay	40.5			26.44	0.92	n.a.	n.a.	0.89	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	44.310	2.822	5269.3	2951.6	28.238	6.772	2.88		Clay	43.7			41.66	0.92	n.a.	n.a.	0.89	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.800	72.900	4.292	5288.5	2961.0	47.515	5.973	2.66			36.5			68.90	0.92	n.a.	n.a.	0.89	0.575	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.960	110.080	5.712	5307.7	2970.2	86.702	5.317	2.48		Sand	29.7	140	1.5	210.00	0.91	192.03	286.13	0.88	0.576	0.808	2.000	1.616	2.81	0.00	0.00
44.130	111.910	6.263	5328.1	2980.0	87.010	6.751	2.50		Sand	30.4	140	1.5	210.00	0.91	191.86	285.40	0.88	0.576	0.807	2.000	1.614	2.81	0.00	0.00
44.290	147.700	6.935	5347.3	2989.2	118.330	4.692	2.31		Sand	24.7		1.5	209.40	0.91	191.16	276.73	0.88	0.576	0.806	2.000	1.612	2.81	0.00	0.00
44.460	197.750	6.068	5367.7	2999.0	154.870	2.613	2.08		Sand	18.8		1.5	280.36	0.91	255.72	346.60	0.88	0.576	0.805	2.000	1.611	2.80	0.00	0.00
44.620	261.960	4.678	5386.9	3008.2	206.517	1.803	1.88		Sand	14.4		1.5	371.38	0.91	338.46	419.20	0.88	0.574	0.804	2.000	1.609	2.80	0.00	0.00
44.790	194.400	6.089	5406.1	3017.4	151.800	2.653	2.09		Sand	19.0		1.5	276.74	0.91	251.10	341.78	0.88	0.574	0.804	2.000	1.607	2.80	0.00	0.00
44.950	217.820	5.115	5426.5	3027.2	169.882	2.378	2.02		Sand	17.4		1.5	308.82	0.91	280.08	371.93	0.88	0.574	0.803	2.000	1.606	2.80	0.00	0.00
45.110	193.350	3.484	5446.7	3036.4	150.409	1.833	1.97		Sand	16.5		1.5	274.13	0.91	240.21	325.84	0.88	0.574	0.802	2.000	1.604	2.80	0.00	0.00
45.280	110.650	4.027	5466.1	3046.2	85.012	3.731	2.36		Sand	26.2	180	1.5	270.00	0.91	245.26	362.24	0.88	0.574	0.801	2.000	1.602	2.79	0.00	0.00
45.440	87.510	4.871	5485.3	3055.4	66.480	5.511	2.61			34.0			62.71	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.600	51.200	3.676	5504.8	3064.7	31.678	7.574	2.88			43.7			48.48	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.770	38.760	3.640	5524.9	3074.5	23.430	10.131	3.06			61.3			36.66	0.91	n.a.	n.a.	0.88	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.930	111.120	6.444	5544.1	3083.7	84.632	6.024	2.48		Sand	29.2	222		222.00	0.91	201.00	290.71	0.88	0.573	0.797	2.000	1.590	2.79	0.00	0.00
46.100	236.270	7.165	5564.5	3093.5	181.740	3.096	2.10		Sand	19.2			222.37	0.90	201.17	279.00	0.88	0.572	0.796	2.000	1.594	2.78	0.00	0.00
46.260	295.640	7.347	5583.7	3102.7	226.564	2.509	1.90		Sand	16.2			278.43	0.90	252.59	320.53	0.88	0.572	0.795	2.000	1.592	2.78	0.00	0.00
46.420	330.690	7.236	5602.9	3111.9	252.671	2.148	1.87		Sand	14.3			321.07	0.90	290.00	361.30	0.88	0.572	0.794	2.000	1.591	2.78	0.00	0.00
46.590	301.110	7.299	5623.3	3121.7	232.129	2.447	1.96		Sand	16.9			284.00	0.90	258.86	333.06	0.88	0.572	0.793	2.000	1.589	2.78	0.00	0.00
46.750	204.430	7.969	5642.5	3130.9	158.050	3.986	2.22		Sand	22.3	284		284.00	0.90	256.11	358.94	0.87	0.572	0.792	2.000	1.587	2.78	0.00	0.00
46.920	87.320	5.446	5662.0	3140.7	53.603	7.628	2.73			38.1			82.63	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	43.840	3.310	5682.1	3149.9	25.841	8.132	2.98			47.1			41.15	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.240	43.990	2.377	5701.3	3159.1	25.904	5.786	2.80		Clay	42.8			41.60	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	58.100	2.778	5721.7	3168.9	33.601	5.218	2.74		Clay	38.8			63.02	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	72.420	3.653	5740.9	3178.1	43.768	5.262	2.67			35.9			68.45	0.90	n.a.	n.a.	0.87	0.571	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	76.070	4.316	5761.3	3187.9	46.917	5.807	2.60			30.7			71.90	0.90	n.a.	n.a.	0.87	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	86.200	3.031	5780.5	3197.1	53.201	3.663	2.44		Sand	28.8	104.40		104.40	0.84	88.23	140.09	0.87	0.570	0.936	0.265	0.214	0.38	0.02	0.04
48.060	104.060	2.609	5799.7	3206.4	77.668	2.580	2.27		Sand	23.8	104.40		104.40	0.84	87.66	141.78	0.87	0.570	0.938	0.236	0.201	0.35	0.02	0.06
48.230	110.860	2.672	5820.1	3216.1	82.623	2.369	2.23		Sand	22.5			104.40	0.84	87.66	140.16	0.87	0.570	0.936	0.233	0.187	0.35	0.02	0.04
48.390	97.600	3.265	5839.5	3225.4	72.709	3.459	2.36		Sand	26.8			92.52	0.83	78.03	130.01	0.87	0.569	0.943	0.203	0.172	0.30	0.02	0.06
48.560	73.330	3.708	5859.7	3235.2	43.622	5.267	2.67			36.9			69.31	0.80	n.a.	n.a.	0.87	0.569	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	87.720	3.667	5878.9	3244.4	54.716	4.561	2.51		Sand	30.5			82.91	0.82	68.22	120.25	0.87	0.569	0.947	0.160	0.153	0.27	0.03	0.06
48.880	135.680	2.687	5898.1	3253.6	101.090	2.178	2.14		Sand	20.2			128.15	0.85	108.76	163.79	0.87	0.569	0.922	0.353	0.293	0.51	0.02	0.03
49.050	169.320	2.793	5918.5	3263.4	126.618	1.679	1.99		Sand	16.7			160.04	0.86	138.03	191.11	0.87	0.568	0.897	0.783	0.632	1.11	0.01	0.01
49.210	182.600	2.610	5937.7	3272.6	136.524	1.584	1.94		Sand	15.9			172.59	0.87	149.01	201.41	0.87	0.568	0.884	1.216	0.966	1.70	0.00	0.00
49.380	184.120	2.948	5958.1	3282.4	137.466	1.628	1.95		Sand	16.0			174.03	0.87	150.94	204.01	0.87	0.568	0.879	1.379	1.091	1.92	0.00	0.00
49.540	181.300	3.240	5977.3	3291.6	135.129	1.822	2.00		Sand	16.9			171.36	0.87	148.56	204.71	0.86	0.568	0.877	1.429	1.128	1.99	0.00	0.00
49.700	175.920	3.114	5996.5	3300.8	130.348	1.822	2.01		Sand	17.2			164.39	0.86	141.76	197.32	0.86	0.567	0.887	1.009	0.806	1.42	0.00	0.00
49.870	172.460	1.766	6016.9	3310.6	128.038	1.063	1.84		Sand	13.7			163.00	0.86	138.78	178.25	0.86	0.567	0.907	0.609	0.415	0.73	0.01	0.02
50.030	166.420	1.949	6036.1	3319.8	123.392	1.193	1.89		Sand	14.7			157.30	0.86	133.66	177.16	0.86	0.567	0.907	0.493	0.402	0.71	0.01	0.00
50.200	152.050	2.142	6056.8	3329.6	112.064	1.429	1.97		Sand	16.4			144.57	0.85	122.17	170.36	0.86	0.567	0.913	0.411	0.337	0.60	0.01	0.06
50.360	139.160	2.234	6075.7	3338.8	102.439	1.641	2.05		Sand	18.0			131.55	0.84	110.31	160.69	0.86	0.566	0.920	0.331	0.274	0.48	0.02	0.00
50.520	125.690	2.160	6094.9	3348.1	92.080	1.780	2.11		Sand	19.4			118.71	0.83	98.50	140.17	0.86	0.566	0.927	0.268	0.225	0.39	0.02	0.00
50.690	119.150	2.286	6115.3	3357.8	87.165	1.977	2.16		Sand	20.8			112.62	0.83	93.08	144.36	0.86	0.566	0.930	0.248	0.207	0.37	0.02	0.00
50.850	125.730	2.234	6134.5	3367.1	91.999	1.821	2.11		Sand	19.5			118.84	0.83	98.40	149.37	0.86	0.566	0.926	0.266	0.224	0.40	0.02	0.00
51.020	132.380	1.684	6154.9	3376.8	96.729	1.225	1.98		Sand	16.5			126.10	0.83	103.42	147.56	0.86	0.565	0.927	0.261	0.217	0.38	0.02	0.00
51.180	134.640	1.608	6174.1	3386.1	98.518	1.186	1.96		Sand	16.2			127.84	0.83	106.43	148.95	0.86	0.565	0.926	0.267	0.222	0.39	0.02	0.00
51.350	133.130	1.649	6194.5	3395.8	97.017	1.235	1.99		Sand	16.7			126.83	0.83	103.56	148.75	0.86	0.565	0.925	0.266	0.221	0.39	0.02	0.00
51.510	101.770	2.841	6213.7	3405.1	73.513	2.576	2.29		Sand	24.1			96.19	0.81	78.00	128.36	0.86	0.565	0.936	0.201	0.170	0.30	0.02	0.00
51.670	54.420	2.089	6232.9	3414.3	30.062	4.871	2.70			37.2			51.44	0.86	n.a.	n.a.	0.86	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.840	101.250	1.686	6253.3	3424.1	72.906	1.720	2.17		Sand	20.9			95.70	0.81	77.13	124.40	0.86	0.564	0.938	0.189	0.160	0.28	0.03	0.00
52.000	130.730	2.877	6272.6	3433.3	94.677	2.254	2.17		Sand	21.0			123.56	0.83	102.19	158.75	0.86	0.564	0.918	0.300	0.253	0.48	0.02	0.00
52.170	67.600	2.462	6292.9	3443.1	37.658	3.809	2.81			34.1			64.08	0.88	n.a.	n.a.	0.86	0.564	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.330	34.070	2.375	6312.1	3452.3	17.909	7.064	3.06			51.2			32.20	0.88	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.490	33.640	1.625	6331.3	3461.5	17.723	5.301	2.95			46.7			31.98	0.88	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{tN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted Q_{tN}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\sigma'_{vc}=1\,atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
52.660	36.160	1.668	6351.7	3471.3	18.428	5.200	2.93		Clay	46.0			33.23	0.86	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.820	36.110	1.768	6370.9	3480.5	18.346	5.361	2.94		Clay	40.4			33.19	0.86	n.a.	n.a.	0.86	0.563	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.990	38.580	1.768	6391.3	3490.3	19.616	5.328	2.93		Clay	46.6			34.39	0.86	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.150	39.200	1.768	6410.5	3499.5	20.034	5.043	2.90		Clay	44.6			36.16	0.86	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.310	35.530	1.724	6429.7	3508.8	18.420	5.335	2.94		Clay	46.3			33.56	0.86	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.480	32.470	1.597	6450.1	3518.5	16.623	5.401	2.96		Clay	47.9			30.09	0.87	n.a.	n.a.	0.86	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.640	32.170	1.524	6469.3	3527.8	16.404	5.266	2.96		Clay	47.7			30.41	0.87	n.a.	n.a.	0.86	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.810	37.460	1.529	6489.7	3537.5	19.336	4.470	2.88		Clay	43.6			36.40	0.87	n.a.	n.a.	0.86	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.970	37.400	1.632	6508.9	3546.6	19.268	4.772	2.89		Clay	44.4			35.41	0.87	n.a.	n.a.	0.86	0.561	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.130	36.260	1.504	6528.1	3556.0	18.607	4.677	2.93		Clay	46.4			33.36	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.300	32.670	1.420	6548.5	3565.8	16.600	4.766	2.95		Clay	46.4			31.07	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.460	31.080	1.263	6567.7	3575.0	15.550	4.542	2.96		Clay	46.7			29.36	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.630	29.060	1.221	6588.1	3584.6	14.376	4.740	2.99		Clay	48.3			27.47	0.87	n.a.	n.a.	0.86	0.560	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.790	25.170	1.111	6607.3	3594.0	12.168	5.061	3.07		Clay	51.6			23.79	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.960	23.630	0.982	6626.5	3603.2	11.358	4.768	3.07		Clay	51.6			22.52	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.120	22.640	0.882	6646.9	3613.0	10.637	4.640	3.06		Clay	52.6			21.30	0.87	n.a.	n.a.	0.84	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.280	22.520	0.837	6666.1	3622.2	10.594	4.381	3.07		Clay	51.6			21.29	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.450	22.220	0.798	6686.5	3632.0	10.396	4.228	3.07		Clay	51.7			21.00	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.610	21.670	0.751	6705.7	3641.2	10.061	4.067	3.07		Clay	51.9			20.48	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.770	22.480	0.725	6724.9	3650.5	10.474	3.782	3.04		Clay	50.4			21.26	0.87	n.a.	n.a.	0.84	0.558	n.a.	n.a.	n.a.	n.a.	0.00	0.00
55.940	22.960	0.728	6745.3	3660.2	10.719	3.717	3.03		Clay	49.6			21.73	0.87	n.a.	n.a.	0.84	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.100	23.870	0.726	6764.5	3669.5	11.167	3.541	3.00		Clay	48.7			22.56	0.86	n.a.	n.a.	0.84	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.270	23.080	0.707	6784.9	3679.3	10.702	3.589	3.02		Clay	49.6			21.61	0.86	n.a.	n.a.	0.84	0.557	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.430	21.240	0.688	6804.1	3688.5	9.672	3.866	3.07		Clay	51.6			20.06	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.590	19.440	0.643	6823.3	3697.7	8.659	4.014	3.12		Clay	54.0			18.37	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.760	16.400	0.760	6843.7	3707.5	7.001	5.770	3.29		Clay	61.9			15.50	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.920	14.880	0.613	6862.9	3716.7	6.161	5.365	3.31		Clay	63.1			14.06	0.86	n.a.	n.a.	0.84	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.090	21.060	0.465	6883.3	3726.5	9.400	2.636	2.99		Clay	48.1			19.92	0.86	n.a.	n.a.	0.84	0.555	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.250	12.600	0.463	6902.5	3736.7	4.930	5.031	3.36		Clay	66.3			11.07	0.86	n.a.	n.a.	0.84	0.555	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.410	11.580	0.428	6921.7	3744.9	4.336	5.265	3.43		Clay	69.2			10.96	0.86	n.a.	n.a.	0.84	0.555	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.580	12.000	0.443	6942.1	3754.7	4.561	5.139	3.41		Clay	67.9			11.43	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.740	11.070	0.482	6961.3	3763.9	4.011	5.674	3.44		Clay	69.6			11.31	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.910	13.330	0.536	6981.7	3773.7	5.215	5.468	3.38		Clay	66.3			12.60	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.070	14.640	0.587	7000.9	3782.9	5.886	5.174	3.31		Clay	63.1			14.03	0.86	n.a.	n.a.	0.83	0.554	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.230	16.040	0.633	7020.1	3792.1	6.604	5.062	3.27		Clay	61.2			15.16	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.400	16.240	0.639	7040.5	3801.9	6.691	5.022	3.27		Clay	60.9			15.36	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.560	16.240	0.720	7059.7	3811.2	6.670	5.666	3.30		Clay	62.4			15.36	0.86	n.a.	n.a.	0.83	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.730	16.880	0.775	7080.1	3820.9	6.983	5.806	3.29		Clay	62.0			15.96	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.890	17.460	0.822	7099.3	3830.2	7.204	5.966	3.28		Clay	61.6			16.60	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.060	17.600	0.823	7119.7	3840.0	7.313	5.864	3.28		Clay	61.3			16.64	0.86	n.a.	n.a.	0.83	0.552	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.220	18.240	0.860	7138.9	3849.2	7.623	5.636	3.26		Clay	60.6			17.24	0.86	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.380	18.700	0.864	7158.1	3858.4	7.836	5.646	3.24		Clay	59.7			17.67	0.86	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.550	18.720	0.864	7178.5	3868.2	7.823	5.609	3.26		Clay	60.3			17.60	0.86	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.710	19.500	0.937	7197.7	3877.4	8.099	5.970	3.25		Clay	59.0			18.24	0.85	n.a.	n.a.	0.83	0.551	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.880	18.960	0.870	7218.1	3887.2	7.909	5.663	3.24		Clay	59.6			17.94	0.85	n.a.	n.a.	0.83	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.040	18.240	0.876	7237.3	3896.4	7.506	5.903	3.27		Clay	61.2			17.24	0.86	n.a.	n.a.	0.83	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.200	18.670	0.920	7256.5	3906.2	7.808	6.033	3.28		Clay	60.6			17.84	0.86	n.a.	n.a.	0.82	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.370	18.160	0.920	7276.9	3915.4	7.418	6.332	3.29		Clay	62.1			17.16	0.86	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.530	17.690	0.876	7296.1	3924.6	7.084	6.203	3.31		Clay	62.8			16.50	0.86	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.700	16.860	0.836	7316.5	3934.4	6.668	6.478	3.34		Clay	64.6			15.66	0.86	n.a.	n.a.	0.82	0.549	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.860	16.600	0.832	7335.7	3943.6	6.604	6.391	3.34		Clay	64.2			15.76	0.86	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.020	17.160	0.862	7354.9	3952.9	6.637	6.376	3.32		Clay	63.6			16.25	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.190	17.170	0.855	7375.3	3962.6	6.806	6.342	3.32		Clay	63.6			16.23	0.86	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.350	18.170	0.886	7394.5	3971.9	7.288	6.114	3.29		Clay	61.9			17.17	0.85	n.a.	n.a.	0.82	0.548	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.520	19.620	0.954	7414.9	3981.7	7.993	6.002	3.25		Clay	60.1			18.54	0.86	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.680	20.140	0.936	7434.1	3990.9	8.230	5.708	3.23		Clay	59.0			19.04	0.86	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.840	19.350	0.911	7453.3	4000.1	7.812	5.633	3.26		Clay	60.2			18.29	0.86	n.a.	n.a.	0.82	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.010	17.740	0.886	7473.7	4009.9	6.984	6.339	3.31		Clay	63.1			16.77	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.170	17.780	0.864	7492.9	4019.1	6.983	6.063	3.30		Clay	62.6			16.81	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.340	18.090	0.890	7513.3	4028.9	7.116	5.582	3.27		Clay	61.2			17.10	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.500	17.820	0.779	7532.5	4038.1	6.961	5.481	3.28		Clay	61.3			16.64	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.660	16.940	0.617	7551.7	4047.3	6.506	4.688	3.20		Clay	60.5			16.01	0.84	n.a.	n.a.	0.82	0.546	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.830	16.660	0.617	7572.1	4057.1	6.440	3.069	3.22		Clay	58.7			15.93	0.84	n.a.	n.a.	0.81	0.545	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.990	14.220	0.611	7591.3	4066.3	5.127	4.000	3.36		Clay	66.2			13.44	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	Qc (tsf)	fs (tsf)	σvo (psf)	Insitu σ'vo (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qc1N near interfaces (soft layer)	Thin Layer Factor (Kc)	Interpreted qc1N	CN	qc1N	qc1N-cs	Stress Reduction Coeff. rd	CSR	Kσ for Sand	CRR M=7.5 σ'=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain εv	Settlement (inches)
63.100	15.410	0.537	7611.7	4076.1	5.694	4.626	3.31		Clay	62.7			14.67	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.320	15.640	0.666	7630.9	4086.3	5.667	5.566	3.34		Clay	64.4			14.97	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.430	17.930	0.725	7650.1	4094.6	6.890	5.141	3.29		Clay	60.7			16.96	0.84	n.a.	n.a.	0.81	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.650	18.400	0.760	7670.5	4104.3	7.141	5.322	3.29		Clay	60.5			17.48	0.84	n.a.	n.a.	0.81	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.810	18.020	0.749	7689.7	4113.6	6.862	5.285	3.27		Clay	61.6			17.03	0.84	n.a.	n.a.	0.81	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
63.960	17.200	0.704	7710.1	4123.3	6.502	5.262	3.29		Clay	61.9			16.31	0.84	n.a.	n.a.	0.81	0.543	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.140	15.960	0.636	7729.3	4132.6	5.863	5.263	3.33		Clay	63.7			15.10	0.84	n.a.	n.a.	0.81	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.300	14.830	0.596	7748.5	4141.8	5.290	5.461	3.37		Clay	66.0			14.02	0.84	n.a.	n.a.	0.81	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.470	14.830	0.560	7769.9	4151.6	5.273	5.417	3.37		Clay	66.0			14.02	0.84	n.a.	n.a.	0.81	0.542	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.630	15.110	0.695	7788.1	4160.6	5.361	6.196	3.40		Clay	67.4			14.28	0.84	n.a.	n.a.	0.81	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.800	16.050	0.714	7808.5	4170.6	5.824	5.678	3.36		Clay	65.3			16.17	0.84	n.a.	n.a.	0.81	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
64.960	17.420	0.705	7827.7	4179.8	6.463	5.210	3.29		Clay	62.0			16.47	0.84	n.a.	n.a.	0.81	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.120	18.700	0.594	7846.9	4189.0	7.065	4.022	3.19		Clay	57.3			17.67	0.84	n.a.	n.a.	0.81	0.540	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.290	15.970	0.583	7867.3	4198.8	5.733	4.679	3.31		Clay	62.7			15.09	0.83	n.a.	n.a.	0.81	0.540	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.450	14.810	0.533	7886.5	4208.0	5.212	4.660	3.36		Clay	64.8			14.00	0.83	n.a.	n.a.	0.81	0.540	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.620	14.670	0.516	7906.9	4217.8	5.082	4.612	3.36		Clay	65.2			13.87	0.83	n.a.	n.a.	0.80	0.539	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.780	14.360	0.496	7926.1	4227.0	4.919	4.771	3.36		Clay	66.7			13.57	0.83	n.a.	n.a.	0.80	0.539	n.a.	n.a.	n.a.	n.a.	0.00	0.00
65.940	14.880	0.483	7945.3	4236.2	5.164	4.515	3.33		Clay	64.1			14.07	0.83	n.a.	n.a.	0.80	0.539	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.110	15.320	0.514	7965.7	4246.0	5.340	4.530	3.32		Clay	63.5			14.48	0.83	n.a.	n.a.	0.80	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.270	15.530	0.560	7984.9	4255.3	5.423	4.654	3.33		Clay	64.1			14.68	0.83	n.a.	n.a.	0.80	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.440	16.920	0.634	8005.3	4265.0	6.057	4.941	3.30		Clay	62.4			15.99	0.83	n.a.	n.a.	0.80	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.600	21.960	0.715	8024.5	4274.3	8.399	3.966	3.13		Clay	54.4			20.75	0.83	n.a.	n.a.	0.80	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.770	23.650	0.810	8044.9	4284.1	9.163	4.126	3.11		Clay	53.4			22.36	0.83	n.a.	n.a.	0.80	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
66.930	23.960	0.874	8064.1	4293.3	9.285	4.386	3.12		Clay	53.9			22.65	0.83	n.a.	n.a.	0.80	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.090	20.710	0.826	8083.3	4302.5	7.748	4.966	3.21		Clay	58.3			19.57	0.83	n.a.	n.a.	0.80	0.537	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.260	17.510	0.744	8103.7	4312.3	6.242	5.527	3.32		Clay	63.3			16.55	0.83	n.a.	n.a.	0.80	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.420	16.730	0.640	8122.9	4321.5	5.863	5.122	3.32		Clay	63.4			15.81	0.83	n.a.	n.a.	0.80	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.590	15.490	0.620	8143.3	4331.3	5.273	5.431	3.37		Clay	66.0			14.64	0.83	n.a.	n.a.	0.80	0.536	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.750	15.140	0.504	8162.5	4340.5	5.096	5.370	3.38		Clay	66.5			14.31	0.83	n.a.	n.a.	0.80	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
67.910	15.620	0.500	8181.7	4349.7	5.301	5.199	3.36		Clay	65.4			14.76	0.83	n.a.	n.a.	0.80	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.080	15.910	0.656	8202.1	4359.5	5.418	5.547	3.37		Clay	65.8			15.04	0.83	n.a.	n.a.	0.80	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.240	16.180	0.704	8221.3	4368.7	5.526	5.826	3.37		Clay	66.1			15.29	0.83	n.a.	n.a.	0.80	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.410	16.910	0.739	8241.7	4378.5	5.842	5.781	3.36		Clay	65.0			15.98	0.83	n.a.	n.a.	0.79	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.570	17.460	0.766	8260.9	4387.7	6.071	5.766	3.34		Clay	64.3			16.49	0.82	n.a.	n.a.	0.79	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.730	18.270	0.780	8280.1	4396.9	6.427	5.586	3.31		Clay	62.9			17.27	0.82	n.a.	n.a.	0.79	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
68.900	19.160	0.761	8300.5	4406.7	6.812	5.267	3.27		Clay	61.2			18.11	0.82	n.a.	n.a.	0.79	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.060	18.320	0.739	8319.7	4416.0	6.413	5.216	3.29		Clay	62.1			17.32	0.82	n.a.	n.a.	0.79	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.230	17.390	0.702	8340.1	4425.7	5.974	5.313	3.32		Clay	63.5			16.44	0.82	n.a.	n.a.	0.79	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.390	16.750	0.708	8359.3	4435.0	5.669	5.629	3.36		Clay	65.2			15.83	0.82	n.a.	n.a.	0.79	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.550	18.750	0.614	8378.5	4444.2	6.565	4.218	3.23		Clay	59.1			17.72	0.82	n.a.	n.a.	0.79	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.720	19.230	0.540	8398.9	4454.0	6.749	3.592	3.16		Clay	56.5			18.16	0.82	n.a.	n.a.	0.79	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
69.880	16.530	0.776	8418.1	4463.2	5.521	6.294	3.39		Clay	67.1			15.62	0.82	n.a.	n.a.	0.79	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.050	16.050	0.752	8438.5	4473.0	5.281	6.364	3.41		Clay	68.1			15.15	0.82	n.a.	n.a.	0.79	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.210	19.110	0.760	8457.7	4482.2	6.640	5.042	3.27		Clay	61.1			18.06	0.82	n.a.	n.a.	0.79	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.370	19.560	0.717	8476.9	4491.4	6.836	4.672	3.24		Clay	59.6			18.52	0.82	n.a.	n.a.	0.79	0.530	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.540	19.320	0.680	8497.3	4501.2	6.697	4.331	3.23		Clay	59.1			18.26	0.82	n.a.	n.a.	0.79	0.530	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.700	18.430	0.666	8516.5	4510.4	6.284	4.147	3.24		Clay	59.6			17.42	0.82	n.a.	n.a.	0.79	0.530	n.a.	n.a.	n.a.	n.a.	0.00	0.00
70.870	17.140	0.617	8536.9	4520.2	5.806	4.790	3.31		Clay	63.1			16.20	0.82	n.a.	n.a.	0.79	0.529	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.030	17.300	0.670	8556.1	4529.4	5.760	4.442	3.29		Clay	62.6			16.35	0.82	n.a.	n.a.	0.79	0.529	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.190	17.660	0.633	8575.3	4538.6	5.849	4.767	3.30		Clay	62.6			16.60	0.82	n.a.	n.a.	0.78	0.529	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.360	18.300	0.649	8595.7	4548.4	6.157	3.920	3.24		Clay	59.3			17.30	0.82	n.a.	n.a.	0.78	0.528	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.520	18.140	0.600	8614.9	4557.7	6.070	4.049	3.25		Clay	60.0			17.15	0.82	n.a.	n.a.	0.78	0.528	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.690	17.160	0.768	8635.3	4567.4	5.623	5.877	3.37		Clay	65.9			16.22	0.82	n.a.	n.a.	0.78	0.528	n.a.	n.a.	n.a.	n.a.	0.00	0.00
71.850	20.670	1.000	8654.5	4576.7	7.142	6.116	3.30		Clay	62.3			19.54	0.82	n.a.	n.a.	0.78	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.010	34.260	0.924	8673.7	4585.9	13.048	3.690	2.91		Clay	46.0			32.37	0.82	n.a.	n.a.	0.78	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.180	29.680	0.865	8694.1	4595.7	9.710	3.677	3.07		Clay	51.8			28.22	0.81	n.a.	n.a.	0.78	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.340	20.890	0.786	8713.3	4604.9	7.161	4.767	3.23		Clay	59.1			19.74	0.81	n.a.	n.a.	0.78	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.510	20.270	0.664	8733.7	4614.7	6.892	4.109	3.21		Clay	58.0			19.16	0.81	n.a.	n.a.	0.78	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.670	16.860	0.652	8752.9	4623.9	5.366	5.223	3.36		Clay	66.1			15.93	0.81	n.a.	n.a.	0.78	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
72.830	15.400	0.618	8772.1	4633.1	4.784	5.607	3.42		Clay	68.3			14.56	0.81	n.a.	n.a.	0.78	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.000	16.110	0.673	8792.5	4642.9	5.046	5.742	3.40		Clay	67.6			15.23	0.81	n.a.	n.a.	0.78	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.160	16.700	0.731	8811.7	4652.1	5.324	5.902	3.39		Clay	66.9			15.67	0.81	n.a.	n.a.	0.78	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.330	16.800	0.744	8832.1	4661.9	5.313	6.006	3.40		Clay	67.2			15.88	0.81	n.a.	n.a.	0.78	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.490	17.080	0.715	8851.3	4671.1	5.416	5.672	3.37		Clay	66.1			16.14	0.81	n.a.	n.a.	0.78	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	Qc (tsf)	fs (tsf)	σvo (psf)	Insitu σ'vo (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Qc1N near interfaces (soft layer)	Thin Layer Factor (Kc)	Interpreted qc1N	CN	qc1N	qc1N-cs	Stress Reduction Coeff. rd	CSR	Kσ for Sand	CRR M=7.5 σ'=1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain εv	Settlement (inches)
73.650	17.090	0.757	8870.5	4680.3	5.408	6.221	3.40		Clay	67.4			16.15	0.81	n.a.	n.a.	0.78	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.820	16.590	0.823	8890.9	4690.1	5.179	6.773	3.44		Clay	69.3			15.66	0.81	n.a.	n.a.	0.78	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
73.980	17.320	0.771	8910.1	4699.3	5.476	6.001	3.38		Clay	66.6			16.37	0.81	n.a.	n.a.	0.77	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.150	16.640	0.890	8930.5	4709.1	5.171	6.870	3.39		Clay	68.9			15.73	0.81	n.a.	n.a.	0.77	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.310	16.300	0.873	8949.7	4718.4	5.051	6.061	3.40		Clay	67.3			15.40	0.81	n.a.	n.a.	0.77	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.480	15.810	0.841	8970.1	4728.1	4.790	6.058	3.42		Clay	68.3			14.94	0.81	n.a.	n.a.	0.77	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.640	15.640	0.809	8989.3	4737.4	4.705	6.006	3.44		Clay	69.4			14.78	0.81	n.a.	n.a.	0.77	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.800	15.750	0.816	9008.5	4746.6	4.736	6.479	3.41		Clay	68.1			14.89	0.81	n.a.	n.a.	0.77	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
74.970	15.310	0.846	9028.9	4756.4	4.539	6.062	3.40		Clay	70.0			14.47	0.81	n.a.	n.a.	0.77	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00
75.130	16.890	0.860	9048.1	4765.9	5.190	6.340	3.37		Clay	68.1			15.96	0.81	n.a.	n.a.	0.77	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00
75.300	16.670	0.702	9068.5	4775.4	5.041	5.829	3.41		Clay	67.8			15.66	0.81	n.a.	n.a.	0.77	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00
75.460	16.400	0.676	9087.7	4784.6	4.994	5.068	3.40		Clay	67.6			15.50	0.81	n.a.	n.a.	0.77	0.520	n.a.	n.a.	n.a.	n.a.	0.00	0.00
75.620	16.840	0.677	9106.9	4793.8	5.120	5.508	3.39		Clay	66.7			15.92	0.81	n.a.	n.a.	0.77	0.520	n.a.	n.a.	n.a.	n.a.	0.00	0.00
75.790	16.910	0.654	9127.3	4803.6	4.724	5.325	3.41		Clay	67.8			16.04	0.81	n.a.	n.a.	0.77	0.520	n.a.	n.a.	n.a.	n.a.	0.00	0.00
75.950	13.070	0.626	9146.5	4812.8	3.531	8.104	3.56		Clay	75.3			12.36	0.81	n.a.	n.a.	0.77	0.519	n.a.	n.a.	n.a.	n.a.	0.00	0.00
76.120	11.710	0.516	9166.9	4822.6	2.964	7.266	3.65		Clay	81.2			11.07	0.80	n.a.	n.a.	0.77	0.519	n.a.	n.a.	n.a.	n.a.	0.00	0.00
76.280	15.760	0.688	9186.1	4831.8	4.522	5.890	3.44		Clay	69.6			14.90	0.80	n.a.	n.a.	0.77	0.519	n.a.	n.a.	n.a.	n.a.	0.00	0.00
76.440	21.800	0.909	9205.3	4841.0	7.130	5.267	3.26		Clay	60.4			20.66	0.80	n.a.	n.a.	0.77	0.518	n.a.	n.a.	n.a.	n.a.	0.00	0.00
76.610	26.320	1.247	9225.7	4850.8	8.950	5.746	3.20		Clay	57.8			24.88	0.80	n.a.	n.a.	0.77	0.518	n.a.	n.a.	n.a.	n.a.	0.00	0.00
76.770	30.510	1.430	9244.9	4860.1	10.653	5.526	3.13		Clay	54.5			28.84	0.80	n.a.	n.a.	0.77	0.518	n.a.	n.a.	n.a.	n.a.	0.00	0.00
76.940	32.060	1.604	9265.3	4869.8	11.034	5.063	3.11		Clay	53.5			31.16	0.80	n.a.	n.a.	0.76	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
77.100	33.300	1.643	9284.5	4879.1	11.747	5.734	3.11		Clay	53.6			31.47	0.80	n.a.	n.a.	0.76	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
77.260	33.610	1.626	9303.7	4888.3	11.846	5.613	3.10		Clay	53.1			31.77	0.80	n.a.	n.a.	0.76	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
77.430	34.000	1.632	9324.1	4898.1	11.970	5.223	3.08		Clay	52.1			32.14	0.80	n.a.	n.a.	0.76	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
77.590	34.210	1.487	9343.3	4907.3	12.039	5.036	3.07		Clay	51.6			32.33	0.80	n.a.	n.a.	0.76	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
77.760	35.340	1.470	9363.7	4917.1	12.470	4.704	3.04		Clay	50.5			33.40	0.80	n.a.	n.a.	0.76	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
77.920	37.050	1.547	9382.9	4926.5	13.137	4.780	3.02		Clay	49.7			35.02	0.80	n.a.	n.a.	0.76	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
78.080	41.230	1.720	9402.1	4935.6	14.603	4.710	2.98		Clay	47.8			38.97	0.80	n.a.	n.a.	0.76	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
78.250	45.450	1.897	9422.5	4945.3	16.470	4.656	2.94		Clay	46.2			42.96	0.80	n.a.	n.a.	0.76	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
78.410	50.210	2.039	9441.7	4954.5	18.363	4.478	2.89		Clay	44.3			47.46	0.80	n.a.	n.a.	0.76	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
78.580	55.920	2.284	9462.1	4964.3	20.623	4.461	2.85		Clay	42.8			52.85	0.80	n.a.	n.a.	0.76	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
78.740	60.350	2.609	9481.3	4973.6	22.362	4.614	2.84		Clay	42.1			57.04	0.80	n.a.	n.a.	0.76	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
78.900	63.330	3.039	9500.5	4982.7	23.513	5.017	2.84		Clay	42.4			59.86	0.80	n.a.	n.a.	0.76	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
79.070	64.330	3.046	9520.9	4992.5	23.863	5.112	2.86		Clay	42.5			60.80	0.80	n.a.	n.a.	0.76	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
79.230	65.020	3.256	9540.1	5001.7	24.092	5.404	2.88		Clay	43.0			61.46	0.80	n.a.	n.a.	0.76	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
79.400	63.420	3.016	9560.5	5011.5	23.402	6.147	2.86		Clay	42.8			59.94	0.80	n.a.	n.a.	0.76	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
79.560	57.510	2.821	9579.7	5020.8	21.081	5.351	2.90		Clay	44.8			54.36	0.80	n.a.	n.a.	0.76	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
79.720	52.080	2.694	9598.9	5030.0	18.600	5.606	2.96		Clay	46.8			49.22	0.80	n.a.	n.a.	0.76	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
79.890	46.000	2.631	9619.3	5039.8	16.346	6.146	3.02		Clay	49.8			43.48	0.80	n.a.	n.a.	0.75	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
80.050	40.080	2.290	9638.5	5049.0	13.967	6.520	3.00		Clay	52.8			37.88	0.79	n.a.	n.a.	0.75	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
80.220	39.650	2.181	9658.9	5058.8	13.769	6.206	3.08		Clay	52.2			37.48	0.79	n.a.	n.a.	0.75	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
80.380	35.830	2.002	9678.1	5068.0	12.112	6.524	3.14		Clay	54.7			33.58	0.79	n.a.	n.a.	0.75	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
80.540	31.770	1.850	9697.3	5077.2	10.606	6.904	3.20		Clay	57.4			30.05	0.79	n.a.	n.a.	0.75	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
80.710	33.960	1.800	9717.7	5087.0	11.437	6.517	3.16		Clay	55.5			32.09	0.79	n.a.	n.a.	0.75	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
80.870	36.910	2.311	9736.9	5096.2	12.576	7.213	3.15		Clay	55.4			34.89	0.79	n.a.	n.a.	0.75	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
81.040	40.590	2.576	9757.3	5106.0	13.986	7.215	3.12		Clay	53.8			38.36	0.79	n.a.	n.a.	0.75	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
81.200	43.220	2.366	9776.5	5116.2	14.987	6.178	3.06		Clay	50.9			40.85	0.79	n.a.	n.a.	0.75	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00
81.360	43.620	2.496	9795.7	5124.4	15.113	6.451	3.06		Clay	51.3			41.23	0.79	n.a.	n.a.	0.75	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00
81.530	41.960	2.476	9816.1	5134.2	14.420	6.684	3.09		Clay	52.4			39.66	0.79	n.a.	n.a.	0.75	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00
81.690	39.060	2.147	9835.3	5143.4	13.272	6.291	4.10		Clay	52.9			36.91	0.79	n.a.	n.a.	0.75	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
81.860	36.010	1.702	9854.7	5153.2	12.063	6.767	3.10		Clay	53.2			34.04	0.79	n.a.	n.a.	0.75	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
82.020	31.280	1.563	9874.0	5162.5	10.206	6.606	3.17		Clay	58.0			29.57	0.79	n.a.	n.a.	0.75	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
82.190	31.040	1.473	9895.3	5172.2	10.089	5.640	3.16		Clay	56.6			29.34	0.79	n.a.	n.a.	0.75	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
82.350	33.590	1.661	9914.5	5181.5	11.052	5.802	3.13		Clay	54.6			31.75	0.79	n.a.	n.a.	0.75	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
82.510	36.180	1.922	9933.7	5190.7	12.027	6.150	3.12		Clay	54.1			34.20	0.79	n.a.	n.a.	0.75	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
82.680	36.570	1.936	9954.1	5200.5	12.150	6.120	3.12		Clay	53.6			34.57	0.79	n.a.	n.a.	0.75	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
82.840	31.840	1.791	9973.3	5209.7	10.309	6.668	3.20		Clay	57.4			30.09	0.79	n.a.	n.a.	0.75	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
83.010	30.930	1.501	9993.7	5219.5	9.937	6.172	3.19		Clay	57.0			29.25	0.79	n.a.	n.a.	0.74	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
83.170	27.930	1.400	10012.9	5228.7	8.768	6.502	3.24		Clay	59.7			26.40	0.79	n.a.	n.a.	0.74	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
83.330	27.620	1.464	10032.1	5237.9	8.631	6.478	3.25		Clay	59.9			26.11	0.79	n.a.	n.a.	0.74	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
83.500	26.900	1.404	10052.5	5247.7	8.337	6.420	3.26		Clay	60.5			25.43	0.79	n.a.	n.a.	0.74	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
83.660	24.780	1.238	10071.7	5256.9	7.612	6.266	3.29		Clay	61.7			23.42	0.79	n.a.	n.a.	0.74	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
83.830	23.740	1.027	10092.1	5266.7	7.099	5.402	3.27		Clay	61.0			22.44	0.79	n.a.	n.a.	0.74	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
83.990	21.560	0.856	10111.3	5275.9	6.256	5.300	3.31		Clay	62.0			20.36	0.79	n.a.	n.a.	0.74	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpolated q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vc=1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
84.150	16.920	0.704	10130.5	5285.1	5.621	6.043	3.36		[illegible]	64.7			16.53	0.79	n.a.	n.a.	0.74	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
84.320	16.610	0.846	10150.9	5294.9	5.180	6.140	3.41		Silty	66.0			17.78	0.79	n.a.	n.a.	0.74	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
84.480	19.200	1.223	10170.1	5304.1	5.322	6.664	3.40		Clay	72.2			18.15	0.76	n.a.	n.a.	0.74	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
84.650	34.770	1.334	10190.5	5313.9	11.160	4.404	3.06		Clay	61.4			32.66	0.76	n.a.	n.a.	0.74	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
84.810	36.640	1.663	10209.7	5323.2	11.473	6.463	3.15		Clay	68.4			33.69	0.76	n.a.	n.a.	0.74	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
84.970	29.630	1.916	10228.9	5332.4	9.195	7.622	3.26		Clay	61.4			28.01	0.76	n.a.	n.a.	0.74	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
85.140	33.470	2.202	10249.3	5342.2	10.612	7.767	3.23		Clay	59.0			31.64	0.76	n.a.	n.a.	0.74	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
85.300	45.110	2.700	10268.6	5351.4	14.940	6.777	3.08		Clay	62.1			42.64	0.76	n.a.	n.a.	0.74	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
85.470	60.670	2.416	10288.9	5361.2	20.341	4.431	2.86			42.9			56.40	0.76	n.a.	n.a.	0.74	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
85.630	77.360	1.815	10308.1	5370.4	26.867	2.514	2.61			33.6			73.11	0.76	n.a.	n.a.	0.74	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
85.790	76.020	1.696	10327.3	5379.6	43.781	2.290	2.42		Sand	27.6			74.69	0.61	45.66	59.33	0.74	0.501	0.909	0.120	0.103	0.21	0.04	0.00
85.960	41.340	1.336	10347.7	5388.4	13.421	3.660	2.95			46.5			39.07	0.76	n.a.	n.a.	0.74	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
86.120	24.150	1.009	10366.9	5398.6	7.926	6.372	3.27			60.6			22.83	0.76	n.a.	n.a.	0.74	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
86.290	18.340	0.799	10387.3	5408.4	6.231	6.649	3.39		Clay	66.7			18.28	0.78	n.a.	n.a.	0.73	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
86.450	18.070	0.897	10406.5	5417.6	4.971	6.173	3.36		Clay	66.5			17.66	0.76	n.a.	n.a.	0.73	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
86.610	19.090	0.790	10425.7	5426.6	5.114	6.059	3.30		Clay	62.2			18.04	0.78	n.a.	n.a.	0.73	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
86.780	22.160	0.748	10446.1	5436.6	6.231	4.400	3.26		Clay	60.5			20.96	0.78	n.a.	n.a.	0.73	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
86.940	23.300	0.801	10465.3	5445.8	6.836	4.434	3.24		Clay	59.6			22.02	0.76	n.a.	n.a.	0.73	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
87.110	20.960	0.961	10485.7	5456.5	5.663	6.223	3.36		Clay	66.5			19.56	0.76	n.a.	n.a.	0.73	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
87.270	22.930	1.311	10504.9	5464.9	6.470	7.416	3.38		Clay	66.6			21.67	0.76	n.a.	n.a.	0.73	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
87.430	32.520	1.244	10524.1	5474.1	9.959	4.563	3.11		Clay	53.3			30.74	0.76	n.a.	n.a.	0.73	0.498	n.a.	n.a.	n.a.	n.a.	0.00	0.00
87.600	36.710	1.576	10544.6	5483.9	11.466	6.012	3.08		Clay	52.2			34.70	0.78	n.a.	n.a.	0.73	0.498	n.a.	n.a.	n.a.	n.a.	0.00	0.00
87.760	26.460	2.127	10563.7	5493.1	7.716	10.036	3.41		Clay	57.6			25.03	0.76	n.a.	n.a.	0.73	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
87.930	60.490	2.926	10584.1	5502.9	20.062	5.269	2.91			46.1			57.17	0.78	n.a.	n.a.	0.73	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
88.090	98.170	4.207	10603.3	5512.1	33.696	4.530	2.70			37.1			92.79	0.78	n.a.	n.a.	0.73	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
88.250	116.060	3.979	10622.5	5521.3	64.814	3.662	2.43		Sand	28.1			100.72	0.65	71.22	123.22	0.73	0.497	0.677	0.167	0.147	0.30	0.03	0.00
88.420	140.170	3.769	10642.9	5531.1	78.834	2.767	2.29		Sand	24.2			132.49	0.67	88.05	143.87	0.73	0.496	0.854	0.246	0.188	0.38	0.02	0.00
88.580	130.660	3.673	10662.1	5540.3	73.206	2.931	2.33		Sand	26.2			123.50	0.66	41.70	136.26	0.73	0.496	0.864	0.218	0.169	0.34	0.02	0.00
88.750	89.660	3.391	10682.5	5550.1	30.604	4.060	2.70			36.9			86.06	0.76	n.a.	n.a.	0.73	0.496	n.a.	n.a.	n.a.	n.a.	0.00	0.00
88.910	67.080	3.017	10701.7	5559.3	18.610	5.833	2.96			47.2			63.66	0.76	n.a.	n.a.	0.73	0.496	n.a.	n.a.	n.a.	n.a.	0.00	0.00
89.070	79.620	3.096	10720.9	5568.5	20.743	4.158	2.76		Clay	36.8			75.44	0.77	n.a.	n.a.	0.73	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
89.240	63.640	2.261	10741.3	5578.3	20.591	3.680	2.81		Clay	41.1			60.16	0.77	n.a.	n.a.	0.73	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
89.400	55.070	2.117	10760.5	5587.5	17.756	4.261	2.89		Clay	44.2			52.06	0.77	n.a.	n.a.	0.73	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
89.570	36.260	1.516	10780.9	5597.3	11.041	4.607	3.09		Clay	52.6			34.30	0.77	n.a.	n.a.	0.72	0.494	n.a.	n.a.	n.a.	n.a.	0.00	0.00
89.730	26.650	1.440	10800.1	5606.5	7.580	5.616	3.31		Clay	62.7			25.10	0.77	n.a.	n.a.	0.72	0.494	n.a.	n.a.	n.a.	n.a.	0.00	0.00
89.890	27.240	1.600	10820.5	5616.3	7.774	6.870	3.30		Clay	62.4			25.76	0.77	n.a.	n.a.	0.72	0.494	n.a.	n.a.	n.a.	n.a.	0.00	0.00
90.060	30.820	1.660	10839.7	5625.6	8.030	6.533	3.23		Clay	59.3			29.13	0.77	n.a.	n.a.	0.72	0.494	n.a.	n.a.	n.a.	n.a.	0.00	0.00
90.220	32.840	1.566	10858.9	5634.6	8.728	6.047	3.19		Clay	57.1			31.04	0.77	n.a.	n.a.	0.72	0.493	n.a.	n.a.	n.a.	n.a.	0.00	0.00
90.390	32.040	1.539	10879.3	5644.6	9.426	5.786	3.19		Clay	57.0			30.28	0.77	n.a.	n.a.	0.72	0.493	n.a.	n.a.	n.a.	n.a.	0.00	0.00
90.550	30.560	1.460	10898.5	5653.8	8.663	6.637	3.21		Clay	58.1			28.86	0.77	n.a.	n.a.	0.72	0.493	n.a.	n.a.	n.a.	n.a.	0.00	0.00
90.720	29.490	1.376	10918.9	5663.6	8.480	5.726	3.22		Clay	58.6			27.87	0.77	n.a.	n.a.	0.72	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
90.880	29.110	1.276	10938.1	5672.8	8.336	6.394	3.21		Clay	58.1			27.51	0.77	n.a.	n.a.	0.72	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
91.040	28.330	1.265	10957.3	5682.0	8.043	6.638	3.23		Clay	59.0			26.78	0.77	n.a.	n.a.	0.72	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
91.210	30.160	1.271	10977.7	5691.8	8.669	6.162	3.18		Clay	56.9			28.51	0.77	n.a.	n.a.	0.72	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
91.370	30.240	1.282	10996.9	5701.0	8.680	6.183	3.19		Clay	57.0			28.58	0.77	n.a.	n.a.	0.72	0.491	n.a.	n.a.	n.a.	n.a.	0.00	0.00
91.540	28.920	1.281	11017.3	5710.8	8.190	6.470	3.22		Clay	58.8			27.33	0.77	n.a.	n.a.	0.72	0.491	n.a.	n.a.	n.a.	n.a.	0.00	0.00
91.700	27.920	1.234	11036.5	5720.0	7.833	6.508	3.24		Clay	59.4			26.39	0.77	n.a.	n.a.	0.72	0.491	n.a.	n.a.	n.a.	n.a.	0.00	0.00
91.860	25.320	1.170	11055.7	5729.2	6.909	6.912	3.30		Clay	62.4			23.93	0.77	n.a.	n.a.	0.72	0.491	n.a.	n.a.	n.a.	n.a.	0.00	0.00
92.030	23.670	1.137	11076.1	5739.0	6.319	6.273	3.36		Clay	64.7			22.37	0.77	n.a.	n.a.	0.72	0.490	n.a.	n.a.	n.a.	n.a.	0.00	0.00
92.190	23.920	1.181	11095.3	5748.2	6.392	6.427	3.36		Clay	64.8			22.61	0.77	n.a.	n.a.	0.72	0.490	n.a.	n.a.	n.a.	n.a.	0.00	0.00
92.360	25.960	1.280	11115.7	5758.0	7.086	6.272	3.31		Clay	62.7			24.54	0.77	n.a.	n.a.	0.72	0.490	n.a.	n.a.	n.a.	n.a.	0.00	0.00
92.520	27.300	1.313	11134.9	5767.3	7.509	6.019	3.27		Clay	61.1			25.80	0.77	n.a.	n.a.	0.72	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
92.680	28.940	1.356	11154.1	5776.5	8.089	6.811	3.24		Clay	59.5			27.36	0.77	n.a.	n.a.	0.72	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
92.850	29.450	1.300	11174.5	5786.3	8.248	5.440	3.22		Clay	58.4			27.84	0.77	n.a.	n.a.	0.72	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
93.010	26.880	1.240	11193.7	5795.5	7.345	5.624	3.27		Clay	61.2			25.41	0.77	n.a.	n.a.	0.72	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
93.180	25.590	1.162	11214.1	5805.3	6.884	5.813	3.30		Clay	62.2			24.19	0.77	n.a.	n.a.	0.71	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
93.340	25.050	1.080	11233.3	5814.5	6.684	5.456	3.29		Clay	61.9			23.68	0.77	n.a.	n.a.	0.71	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
93.500	23.410	0.948	11252.5	5823.7	6.107	5.330	3.32		Clay	63.2			22.13	0.77	n.a.	n.a.	0.71	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
93.670	22.330	1.042	11272.9	5833.5	5.723	6.243	3.38		Clay	66.4			21.11	0.77	n.a.	n.a.	0.71	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
93.830	23.690	1.009	11292.1	5842.7	6.177	5.580	3.32		Clay	63.6			22.39	0.76	n.a.	n.a.	0.71	0.487	n.a.	n.a.	n.a.	n.a.	0.00	0.00
94.000	21.640	1.037	11312.5	5852.5	5.462	6.400	3.41		Clay	67.7			20.46	0.76	n.a.	n.a.	0.71	0.487	n.a.	n.a.	n.a.	n.a.	0.00	0.00
94.160	24.410	1.015	11331.7	5861.7	6.395	5.417	3.30		Clay	62.6			23.07	0.76	n.a.	n.a.	0.71	0.487	n.a.	n.a.	n.a.	n.a.	0.00	0.00
94.320	26.650	1.150	11350.9	5870.9	7.145	5.482	3.27		Clay	60.9			25.10	0.76	n.a.	n.a.	0.71	0.487	n.a.	n.a.	n.a.	n.a.	0.00	0.00
94.490	28.360	1.206	11371.3	5880.7	7.722	6.320	3.25			59.2			26.63	0.76	n.a.	n.a.	0.71	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 7 | PGA (A_{max}) 0.53 | Total Settlement 1.16 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vo} (psf)	Insitu σ'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpolated q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}cs}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vc=1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
94.650	31.210	1.063	11390.5	5889.9	8.604	4.282	3.14		[illegible]	54.7			29.50	0.76	n.a.	n.a.	0.71	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
94.820	34.640	1.385	11410.9	5899.7	9.776	4.638	3.13		Clay	54.3			32.66	0.76	n.a.	n.a.	0.71	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
94.980	36.150	2.210	11430.1	5908.9	10.978	6.614	3.18		Clay	56.7			36.06	0.76	n.a.	n.a.	0.71	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
95.140	56.270	2.262	11449.3	5918.2	17.061	4.475	2.82		Clay	46.3			53.10	0.76	n.a.	n.a.	0.71	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
95.310	46.660	1.600	11469.7	5928.0	13.268	4.577	3.01		Clay	49.0			42.50	0.76	n.a.	n.a.	0.71	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
95.470	32.680	1.160	11488.9	5937.2	9.030	4.350	3.13		Clay	54.2			30.77	0.76	n.a.	n.a.	0.71	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
95.640	27.330	0.981	11509.3	5947.0	7.288	4.465	3.21		Clay	56.1			25.63	0.76	n.a.	n.a.	0.71	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
95.800	27.830	1.003	11528.5	5956.2	7.409	4.548	3.21		Clay	55.0			26.30	0.76	n.a.	n.a.	0.71	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00
95.960	26.570	1.554	11547.7	5966.4	6.972	7.473	3.36		Clay	66.4			25.11	0.76	n.a.	n.a.	0.71	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00
96.130	43.500	2.605	11568.1	5976.2	12.624	6.006	3.14		Clay	54.6			41.12	0.76	n.a.	n.a.	0.71	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00
96.290	49.340	2.249	11587.3	5984.4	14.663	5.103	3.01		Clay	49.1			46.64	0.76	n.a.	n.a.	0.71	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00
96.460	48.330	1.806	11607.7	5994.2	14.189	4.458	2.98		Clay	47.6			46.68	0.76	n.a.	n.a.	0.71	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
96.620	37.610	1.669	11626.9	6003.4	10.663	5.248	3.12		Clay	54.0			35.66	0.76	n.a.	n.a.	0.71	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
96.780	30.790	1.421	11646.1	6012.6	8.305	5.693	3.23		Clay	58.6			29.10	0.76	n.a.	n.a.	0.71	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
96.950	26.200	1.232	11665.6	6022.4	6.764	6.047	3.31		Clay	63.0			24.76	0.76	n.a.	n.a.	0.70	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
97.110	23.360	1.090	11685.7	6031.6	5.818	6.219	3.37		Clay	66.0			22.11	0.76	n.a.	n.a.	0.70	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
97.280	22.290	1.074	11706.1	6041.4	5.441	6.632	3.41		Clay	67.9			21.07	0.76	n.a.	n.a.	0.70	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
97.440	22.180	0.962	11725.3	6050.6	5.304	6.220	3.36		Clay	65.1			20.96	0.76	n.a.	n.a.	0.70	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
97.600	19.730	0.806	11744.6	6059.8	4.574	6.811	3.44		Clay	69.5			18.65	0.76	n.a.	n.a.	0.70	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
97.770	19.060	0.770	11764.0	6069.7	4.362	6.675	3.46		Clay	70.6			18.04	0.76	n.a.	n.a.	0.70	0.481	n.a.	n.a.	n.a.	n.a.	0.00	0.00
97.930	20.170	0.711	11784.1	6078.9	4.690	4.882	3.39		Clay	67.0			19.09	0.76	n.a.	n.a.	0.70	0.481	n.a.	n.a.	n.a.	n.a.	0.00	0.00
98.100	19.010	0.677	11804.5	6088.7	4.360	6.103	3.43		Clay	69.1			17.97	0.76	n.a.	n.a.	0.70	0.481	n.a.	n.a.	n.a.	n.a.	0.00	0.00
98.260	18.810	0.745	11823.7	6097.9	4.230	6.776	3.47		Clay	70.9			17.76	0.76	n.a.	n.a.	0.70	0.481	n.a.	n.a.	n.a.	n.a.	0.00	0.00
98.430	21.670	0.721	11844.1	6107.7	5.157	4.576	3.34		Clay	64.3			20.48	0.76	n.a.	n.a.	0.70	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
98.590	21.310	0.729	11863.3	6116.9	5.020	4.738	3.36		Clay	65.2			20.14	0.76	n.a.	n.a.	0.70	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
98.760	20.140	0.827	11882.5	6126.1	4.636	5.826	3.44		Clay	69.3			19.04	0.76	n.a.	n.a.	0.70	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
98.920	20.000	0.921	11902.9	6136.9	4.579	6.552	3.47		Clay	71.1			18.90	0.76	n.a.	n.a.	0.70	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
99.080	20.840	0.963	11922.1	6146.1	4.843	6.404	3.44		Clay	69.5			19.70	0.75	n.a.	n.a.	0.70	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
99.250	21.050	0.941	11942.6	6154.9	4.900	6.242	3.43		Clay	69.2			19.90	0.75	n.a.	n.a.	0.70	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
99.410	20.400	0.951	11961.7	6164.1	4.675	6.004	3.44		Clay	69.3			19.28	0.75	n.a.	n.a.	0.70	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
99.570	19.960	0.771	11980.9	6173.3	4.632	6.514	3.43		Clay	69.0			18.88	0.75	n.a.	n.a.	0.70	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
99.740	19.550	0.733	12001.3	6183.1	4.363	6.412	3.44		Clay	69.4			18.48	0.75	n.a.	n.a.	0.70	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
99.900	18.820	0.719	12020.5	6192.3	4.137	6.609	3.47		Clay	70.9			17.70	0.75	n.a.	n.a.	0.70	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
100.070	18.380	0.718	12040.9	6202.1	3.986	6.606	3.40		Clay	72.1			17.37	0.75	n.a.	n.a.	0.70	0.478	n.a.	n.a.	n.a.	n.a.	0.00	0.00
100.230	17.730	0.756	12060.1	6211.3	3.707	6.464	3.53		Clay	74.0			16.76	0.75	n.a.	n.a.	0.70	0.478	n.a.	n.a.	n.a.	n.a.	0.00	0.00
100.390	17.460	0.791	12079.3	6220.5	3.672	6.923	3.56		Clay	75.1			16.50	0.75	n.a.	n.a.	0.70	0.478	n.a.	n.a.	n.a.	n.a.	0.00	0.00
100.560	17.500	0.717	12099.7	6230.4	3.601	6.068	3.52		Clay	73.6			16.91	0.75	n.a.	n.a.	0.70	0.477	n.a.	n.a.	n.a.	n.a.	0.00	0.00
100.720	18.120	0.774	12118.9	6239.6	3.866	6.416	3.52		Clay	74.0			17.15	0.75	n.a.	n.a.	0.70	0.477	n.a.	n.a.	n.a.	n.a.	0.00	0.00
100.880	15.420	0.732	12130.3	6240.4	2.902	7.826	3.60		Clay	82.0			14.67	0.75	n.a.	n.a.	0.70	0.477	n.a.	n.a.	n.a.	n.a.	0.00	0.00
101.050	19.100	0.700	12158.5	6258.6	4.161	5.806	3.48		Clay	71.5			18.06	0.75	n.a.	n.a.	0.70	0.477	n.a.	n.a.	n.a.	n.a.	0.00	0.00
101.210	23.720	1.014	12177.7	6267.8	5.626	5.753	3.36		Clay	65.6			22.42	0.75	n.a.	n.a.	0.69	0.477	n.a.	n.a.	n.a.	n.a.	0.00	0.00
101.380	32.770	1.441	12198.1	6277.6	8.407	5.404	3.20		Clay	57.6			30.97	0.75	n.a.	n.a.	0.69	0.476	n.a.	n.a.	n.a.	n.a.	0.00	0.00
101.540	34.930	1.763	12217.3	6286.8	9.160	6.061	3.21		Clay	58.1			33.02	0.75	n.a.	n.a.	0.69	0.476	n.a.	n.a.	n.a.	n.a.	0.00	0.00
101.710	36.700	1.748	12237.7	6296.6	9.714	5.717	3.17		Clay	56.4			34.09	0.75	n.a.	n.a.	0.69	0.476	n.a.	n.a.	n.a.	n.a.	0.00	0.00
101.870	38.150	1.644	12256.9	6305.8	9.822	5.477	3.17		Clay	56.2			34.17	0.75	n.a.	n.a.	0.69	0.476	n.a.	n.a.	n.a.	n.a.	0.00	0.00
102.030	33.310	1.682	12276.1	6315.0	8.806	5.159	3.24		Clay	59.3			31.48	0.75	n.a.	n.a.	0.69	0.476	n.a.	n.a.	n.a.	n.a.	0.00	0.00
102.200	34.100	1.684	12296.5	6324.8	8.839	5.052	3.22		Clay	58.4			32.23	0.75	n.a.	n.a.	0.69	0.476	n.a.	n.a.	n.a.	n.a.	0.00	0.00
102.360	31.340	1.687	12315.7	6334.0	7.951	5.302	3.27		Clay	60.9			29.62	0.75	n.a.	n.a.	0.69	0.476	n.a.	n.a.	n.a.	n.a.	0.00	0.00
102.530	28.000	1.416	12336.1	6343.8	7.196	5.205	3.30		Clay	62.3			27.40	0.75	n.a.	n.a.	0.69	0.475	n.a.	n.a.	n.a.	n.a.	0.00	0.00
102.690	27.730	1.278	12355.3	6353.0	6.765	5.918	3.31		Clay	62.7			26.21	0.75	n.a.	n.a.	0.69	0.475	n.a.	n.a.	n.a.	n.a.	0.00	0.00
102.860	26.340	1.206	12374.5	6362.3	6.336	5.006	3.33		Clay	64.1			24.00	0.76	n.a.	n.a.	0.69	0.474	n.a.	n.a.	n.a.	n.a.	0.00	0.00
103.020	26.130	1.133	12394.0	6372.1	6.256	5.686	3.32		Clay	63.6			24.70	0.76	n.a.	n.a.	0.69	0.474	n.a.	n.a.	n.a.	n.a.	0.00	0.00
103.180	26.620	1.104	12414.1	6381.3	6.396	6.548	3.32		Clay	63.6			25.16	0.76	n.a.	n.a.	0.69	0.474	n.a.	n.a.	n.a.	n.a.	0.00	0.00
103.350	29.200	1.314	12434.5	6391.1	7.197	6.719	3.28		Clay	61.3			27.60	0.76	n.a.	n.a.	0.69	0.474	n.a.	n.a.	n.a.	n.a.	0.00	0.00
103.510	31.220	1.431	12453.7	6400.3	7.810	6.727	3.26		Clay	59.6			29.61	0.75	n.a.	n.a.	0.69	0.474	n.a.	n.a.	n.a.	n.a.	0.00	0.00
103.670	33.390	1.474	12472.9	6409.5	8.446	6.446	3.21		Clay	58.0			31.47	0.75	n.a.	n.a.	0.69	0.473	n.a.	n.a.	n.a.	n.a.	0.00	0.00
103.840	35.680	1.662	12493.3	6419.3	9.264	6.667	3.18		Clay	56.6			34.01	0.76	n.a.	n.a.	0.69	0.473	n.a.	n.a.	n.a.	n.a.	0.00	0.00
104.000	40.610	1.900	12512.5	6428.5	10.666	5.722	3.14		Clay	54.0			38.38	0.76	n.a.	n.a.	0.69	0.473	n.a.	n.a.	n.a.	n.a.	0.00	0.00
104.170	52.920	2.343	12532.9	6438.3	14.403	6.022	3.00		Clay	46.9			50.02	0.76	n.a.	n.a.	0.69	0.473	n.a.	n.a.	n.a.	n.a.	0.00	0.00
104.330	53.250	2.423	12552.1	6447.5	14.671	5.167	3.01		Clay	49.1			50.33	0.76	n.a.	n.a.	0.69	0.473	n.a.	n.a.	n.a.	n.a.	0.00	0.00
104.490	52.390	2.408	12571.3	6456.7	14.281	5.224	3.02		Clay	49.5			49.62	0.75	n.a.	n.a.	0.69	0.472	n.a.	n.a.	n.a.	n.a.	0.00	0.00
104.660	53.120	2.460	12591.7	6466.5	14.462	5.253	3.02		Clay	49.4			50.21	0.74	n.a.	n.a.	0.69	0.472	n.a.	n.a.	n.a.	n.a.	0.00	0.00
104.820	54.660	2.420	12610.9	6475.7	14.634	5.006	2.99		Clay	48.4			51.68	0.74	n.a.	n.a.	0.69	0.472	n.a.	n.a.	n.a.	n.a.	0.00	0.00
104.980	53.720	2.408	12631.3	6485.5	14.610	5.079	3.00		Clay	48.0			50.78	0.74	n.a.	n.a.	0.69	0.472	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 7

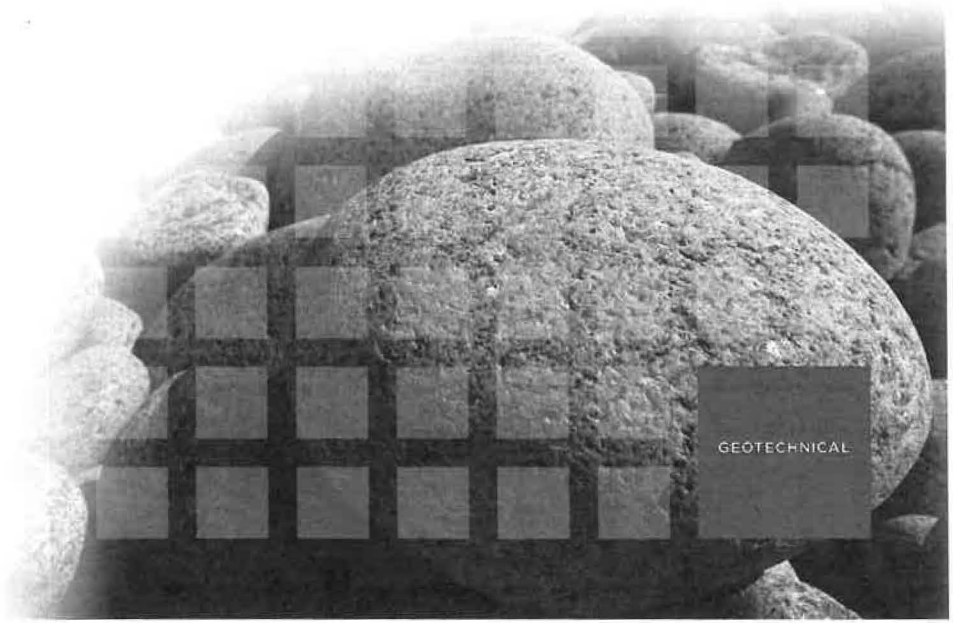
PGA (A_{max}): 0.53

Total Settlement: 1.16 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	q_{c1n} (tsf)	Ic(Ic) I_c (tsf)	Q	F (%)	Ic	Layer "Plastic" Ic > 7	Plag Soil Type	Pass (%)	qpt near interface (soft over)	Thin Layer Factor (K_{Δ})	Interpreted qpt	C_N	q_{c1n}	$q_{c1n,cs}$	Stress Reduction Coeff, r_d	CSR	Kσ for Sand	(CRR/σ'v) &	CNT	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
106.150	56.780	2.373	72966.6	6494.7	16.229	4.199	2.97		Clay	47.8			62.72	0.74	n.a.	n.a.	0.69	0.472	n.a.	n.a.	n.a.	n.a.	0.00	0.00
106.329	63.820	2.410	72970.9	6564.5	14.564	6.091	3.01		Clay	48.0			68.73	0.74	n.a.	n.a.	0.69	0.471	n.a.	n.a.	n.a.	n.a.	0.00	0.00
106.480	62.200	2.304	72965.1	6513.7	14.866	6.180	3.02		Clay	48.5			66.85	0.74	n.a.	n.a.	0.69	0.471	n.a.	n.a.	n.a.	n.a.	0.00	0.00
106.640	66.970	2.340	72709.3	6523.9	15.421	4.862	2.96		Clay	47.1			63.56	0.74	n.a.	n.a.	0.69	0.471	n.a.	n.a.	n.a.	n.a.	0.00	0.00
106.810	66.840	2.668	72729.7	6532.6	16.999	6.212	3.00		Clay	48.7			63.99	0.74	n.a.	n.a.	0.69	0.471	n.a.	n.a.	n.a.	n.a.	0.00	0.00
106.970	69.150	2.536	72744.8	6542.8	13.553	5.721	3.01		Clay	51.8			47.40	0.74	n.a.	n.a.	0.68	0.471	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.140	43.510	1.957	72799.3	6561.8	11.333	5.271	3.10		Clay	53.0			61.12	0.74	n.a.	n.a.	0.68	0.470	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.300	37.860	1.826	72695.5	6501.0	9.951	5.184	3.15		Clay	54.3			56.81	0.74	n.a.	n.a.	0.68	0.470	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.460	39.800	1.178	72807.7	6570.2	6.775	5.283	3.25		Clay	61.3			27.00	0.74	n.a.	n.a.	0.68	0.470	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.630	39.820	0.958	72825.1	6580.0	5.852	5.149	3.23		Clay	64.1			33.85	0.74	n.a.	n.a.	0.68	0.470	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.790	34.800	1.051	72847.3	6592.2	8.673	5.446	3.26		Clay	66.1			23.44	0.74	n.a.	n.a.	0.68	0.470	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.950	27.820	1.032	72857.7	6598.9	6.424	4.995	3.27		Clay	67.2			20.13	0.74	n.a.	n.a.	0.68	0.469	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.120	29.870	1.316	72868.9	6606.2	7.600	5.230	3.29		Clay	68.5			26.04	0.74	n.a.	n.a.	0.68	0.469	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.280	33.020	1.411	72885.1	6617.4	8.174	5.210	3.23		Clay	68.0			31.88	0.74	n.a.	n.a.	0.68	0.469	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.450	36.200	1.477	72905.5	6627.2	8.912	5.176	3.19		Clay	67.1			33.05	0.74	n.a.	n.a.	0.68	0.469	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.610	37.440	1.577	72946.7	6638.4	9.338	5.065	3.16		Clay	66.6			36.40	0.74	n.a.	n.a.	0.68	0.469	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.780	37.340	1.257	72968.1	6648.2	9.364	5.167	3.16		Clay	66.7			36.52	0.74	n.a.	n.a.	0.68	0.469	n.a.	n.a.	n.a.	n.a.	0.00	0.00
107.940	39.080	1.822	72988.3	6658.4	8.891	5.381	3.19		Clay	67.0			34.10	0.74	n.a.	n.a.	0.68	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
108.100	38.940	1.486	73004.5	6668.2	8.834	5.086	3.17		Clay	66.4			33.97	0.74	n.a.	n.a.	0.68	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
108.270	38.130	1.368	73034.8	6674.5	8.525	4.710	3.15		Clay	66.5			34.18	0.74	n.a.	n.a.	0.68	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
108.430	31.710	1.409	73044.1	6683.7	7.537	5.094	3.25		Clay	69.3			28.97	0.74	n.a.	n.a.	0.68	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
108.600	30.620	1.266	73064.5	6693.5	7.297	5.374	3.26		Clay	69.4			29.13	0.74	n.a.	n.a.	0.68	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
108.760	29.560	1.198	73083.7	6702.7	6.810	5.308	3.26		Clay	69.0			28.61	0.74	n.a.	n.a.	0.68	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
108.920	28.110	1.037	73102.9	6711.9	6.424	4.811	3.27		Clay	67.9			28.91	0.74	n.a.	n.a.	0.68	0.467	n.a.	n.a.	n.a.	n.a.	0.00	0.00
109.090	29.330	1.084	73123.3	6721.7	6.716	4.761	3.26		Clay	68.0			27.72	0.74	n.a.	n.a.	0.68	0.467	n.a.	n.a.	n.a.	n.a.	0.00	0.00
109.250	31.270	1.200	73143.5	6730.9	7.360	4.868	3.23		Clay	68.9			29.95	0.74	n.a.	n.a.	0.68	0.467	n.a.	n.a.	n.a.	n.a.	0.00	0.00
109.420	32.060	1.188	73162.9	6740.7	7.744	4.564	3.19		Clay	67.5			30.58	0.74	n.a.	n.a.	0.68	0.467	n.a.	n.a.	n.a.	n.a.	0.00	0.00
109.580	31.280	1.249	73182.1	6749.9	7.316	5.072	3.24		Clay	69.1			29.87	0.74	n.a.	n.a.	0.68	0.467	n.a.	n.a.	n.a.	n.a.	0.00	0.00
109.740	32.660	1.500	73201.5	6759.1	7.770	4.982	3.21		Clay	68.2			31.06	0.74	n.a.	n.a.	0.68	0.467	n.a.	n.a.	n.a.	n.a.	0.00	0.00
109.910	30.720	1.162	73221.7	6768.9	6.969	5.003	3.21		Clay	68.1			29.71	0.74	n.a.	n.a.	0.68	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
110.070	31.950	1.767	73240.9	6778.1	7.477	5.735	3.31		Clay	72.6			30.21	0.74	n.a.	n.a.	0.68	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
110.240	29.930	1.440	73261.3	6787.9	6.800	5.054	3.34		Clay	69.6			27.44	0.74	n.a.	n.a.	0.68	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
110.400	27.340	1.225	73280.5	6797.1	6.002	5.064	3.36		Clay	69.6			24.72	0.74	n.a.	n.a.	0.68	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
110.560	24.990	1.046	73299.7	6806.4	5.342	5.741	3.39		Clay	69.5			23.49	0.73	n.a.	n.a.	0.68	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
110.730	23.570	0.989	73329.1	6815.5	4.991	5.836	3.41		Clay	69.9			22.37	0.73	n.a.	n.a.	0.68	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
110.890	23.220	0.919	73339.3	6825.4	4.860	5.564	3.41		Clay	67.5			21.96	0.73	n.a.	n.a.	0.68	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
111.050	22.440	0.938	73350.7	6835.2	4.911	5.558	3.44		Clay	68.5			21.31	0.73	n.a.	n.a.	0.68	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
111.220	23.040	0.882	73378.9	6844.4	4.953	5.709	3.41		Clay	69.0			22.04	0.73	n.a.	n.a.	0.68	0.465	n.a.	n.a.	n.a.	n.a.	0.00	0.00
111.380	24.350	1.064	73398.1	6853.6	5.146	6.068	3.41		Clay	67.6			23.08	0.73	n.a.	n.a.	0.68	0.465	n.a.	n.a.	n.a.	n.a.	0.00	0.00
111.540	24.500	1.099	73418.5	6863.4	5.272	5.911	3.38		Clay	67.1			23.44	0.73	n.a.	n.a.	0.68	0.465	n.a.	n.a.	n.a.	n.a.	0.00	0.00
111.710	24.530	1.096	73437.7	6872.6	5.212	5.911	3.38		Clay	66.7			23.28	0.73	n.a.	n.a.	0.67	0.465	n.a.	n.a.	n.a.	n.a.	0.00	0.00
111.880	25.020	0.947	73468.1	6881.4	5.318	5.178	3.36		Clay	66.3			23.66	0.73	n.a.	n.a.	0.67	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
112.040	26.230	1.039	73477.3	6891.0	5.664	5.278	3.34		Clay	66.4			24.76	0.73	n.a.	n.a.	0.67	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
112.200	24.040	1.218	73488.6	6900.8	5.420	6.482	3.41		Clay	69.7			27.33	0.73	n.a.	n.a.	0.67	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
112.370	20.760	1.373	73518.9	6910.0	5.066	7.062	3.51		Clay	73.1			25.16	0.73	n.a.	n.a.	0.67	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
112.530	20.130	1.440	73538.1	6919.8	5.740	8.165	3.52		Clay	75.0			25.47	0.73	n.a.	n.a.	0.67	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
112.700	20.060	1.342	73548.5	6929.0	5.696	6.782	3.51		Clay	72.7			25.31	0.73	n.a.	n.a.	0.67	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
112.860	20.300	1.136	73578.7	6938.8	5.777	6.078	3.39		Clay	69.8			25.64	0.73	n.a.	n.a.	0.67	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
113.020	22.030	1.174	73598.9	6948.1	7.404	4.993	3.21		Clay	68.0			30.74	0.73	n.a.	n.a.	0.67	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
113.190	30.950	1.090	73615.3	6957.8	9.848	4.149	3.21		Clay	67.9			39.35	0.73	n.a.	n.a.	0.67	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
113.350	30.590	0.809	73634.5	6967.1	9.738	3.494	3.20		Clay	67.6			39.62	0.73	n.a.	n.a.	0.67	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
113.520	27.460	0.628	73654.9	6976.9	9.012	4.899	3.28		Clay	69.7			29.85	0.73	n.a.	n.a.	0.67	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
113.690	24.800	0.648	73674.1	6986.1	8.280	4.708	3.25		Clay	69.5			27.23	0.73	n.a.	n.a.	0.67	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
113.860	20.620	0.677	73694.5	6995.9	6.798	3.991	3.19		Clay	67.5			25.64	0.73	n.a.	n.a.	0.67	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
114.010	31.269	0.931	73713.7	7005.1	9.957	3.814	3.19		Clay	68.9			29.56	0.73	n.a.	n.a.	0.67	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
114.170	30.910	1.306	73732.9	7014.3	9.868	5.427	3.28		Clay	69.4			29.22	0.73	n.a.	n.a.	0.67	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
114.340	37.670	1.836	73753.3	7024.1	9.708	5.309	3.19		Clay	67.3			36.83	0.73	n.a.	n.a.	0.67	0.462	n.a.	n.a.	n.a.	n.a.	0.00	0.00
114.500	45.180	1.699	73772.5	7033.3	10.223	3.997	3.14		Clay	66.8			43.82	0.73	n.a.	n.a.	0.67	0.462	n.a.	n.a.	n.a.	n.a.	0.00	0.00
114.670	42.010	2.100	73792.9	7043.1	10.227	5.647	3.18		Clay	68.8			40.56	0.73	n.a.	n.a.	0.67	0.462	n.a.	n.a.	n.a.	n.a.	0.00	0.00

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TYPE OF SERVICES	Preliminary Geotechnical Investigation
PROJECT NAME	Shorebird Way Corporate Campus
LOCATION	Shorebird Way Corporate Office Mountain View, California
CLIENT	Google
PROJECT NUMBER	678-4-1
DATE	August 11, 2017



CORNERSTONE EARTH GROUP

Type of Services	**Preliminary Geotechnical Investigation**
Project Name	**Shorebird Way Corporate Campus**
Location	**Shorebird Way Coorporate Office Mountain View, California**
Client	**Google**
Client Address	**1600 Amphitheatre Parkway Mountain View, California**
Project Number	**678-4-1**
Date	**August 11, 2017**

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APPENDIX A: FIELD INVESTIGATION
APPENDIX B: LABORATORY TEST PROGRAM

Type of Services	**Preliminary Geotechnical Investigation**
Project Name	**Shorebird Way Corporate Campus**
Location	**Shorebird Way Coorporate Office Mountain View, California**

SECTION 1: INTRODUCTION

This preliminary geotechnical report was prepared for the sole use of Google for the Shorebird Way Corporate Campus project in Mountain View, California. The location of the site is shown on the Vicinity Map, Figure 1. The purpose of this study was to evaluate the existing subsurface conditions and develop an opinion regarding potential geotechnical concerns that could impact the proposed development. The preliminary geotechnical recommendations contained in this report are for your forward planning, cost estimating, and preliminary project design.

1.1 PROJECT DESCRIPTION

Based on the information provided, we understand the project is still in the early planning stages. Detailed project information including building size, quantity, and layout are not available at this time. However, we understand the overall project will include redeveloping the approximately 77-acre, 16-parcel site for a new corporate office campus. The new campus will include multiple 4- to 12-story structures in a "dense urban mixed-use environment." All structures will be at-grade. At-grade asphalt concrete parking areas, access roads, hardscape, and landscaping will surround the new structures.

Structural loads are not available at this time; however, structural loads are expected to be typical for such structures. Cuts and fills up to about 1 to 3 feet are expected for the building pads and at-grade pavement areas.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated June 5, 2017, and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare preliminary recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, and preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

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1.3 EXPLORATION PROGRAM

Field exploration consisted of four borings drilled on July 5 and 6, 2017 with truck-mounted hollow-stem auger drilling equipment and eleven Cone Penetration Tests (CPTs) advanced on June 27 and 28, 2017. The borings were drilled to depths of 30 to 45 feet; the CPTs were advance to depths of approximately 40 to 100 feet. Practical refusal was encountered in CPT-2, CPT-4, CPT-5, CPT-6, CPT-10, and CPT-11. Seismic shear wave velocity measurements were collected from CPT-6 and CPT-11. Borings EB-1, EB-2, EB-3, and EB-4 were advanced adjacent to CPT-1, CPT-7, CPT-5, and CPT-9, respectively, for direct evaluation of physical samples to correlated soil behavior.

The borings and CPTs were backfilled with cement grout in accordance with local requirements; exploration permits were obtained as required by local jurisdictions.

The approximate locations of our exploratory borings and CPTs are shown on the Site Plan, Figure 2. Details regarding our field program are included in Appendix A.

1.4 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program focused on obtaining data for preliminary foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, washed sieve analyses, Plasticity Index tests, consolidation tests, and triaxial compression tests. Details regarding our laboratory program are included in Appendix B.

1.5 ENVIRONMENTAL SERVICES

Environmental services were not requested for this project. If environmental concerns are determined to be present during future evaluations, the project environmental consultant should review our geotechnical recommendations for compatibility with the environmental concerns.

SECTION 2: REGIONAL SETTING

2.1 GEOLOGICAL SETTING

The site is located within the Santa Clara Valley, which is a broad alluvial plane between the Santa Cruz Mountains to the southwest and west, and the Diablo Range to the northeast. The San Andreas Fault system, including the Monte Vista-Shannon Fault, exists within the Santa Cruz Mountains and the Hayward and Calaveras Fault systems exist within the Diablo Range. The alluvium in the area is mapped to be approximately 400 to 500 feet thick (Rogers & Williams, 1974).

2.2 REGIONAL SEISMICITY

The San Francisco Bay area region is one of the most seismically active areas in the Country. While seismologists cannot predict earthquake events, geologists from the U.S. Geological

Survey have recently updated earlier estimates from their 2015 Uniform California Earthquake Rupture Forecast (Version 3) publication. The estimated probability of one or more magnitude 6.7 earthquakes (the size of the destructive 1994 Northridge earthquake) expected to occur somewhere in the San Francisco Bay Area has been revised (increased) to 72 percent for the period 2014 to 2043 (Aagaard et al., 2016). The faults in the region with the highest estimated probability of generating damaging earthquakes between 2014 and 2043 are the Hayward (33%), Rodgers Creek (33%), Calaveras (26%), and San Andreas Faults (22%). In this 30-year period, the probability of an earthquake of magnitude 6.7 or larger occurring is 22 percent along the San Andreas Fault and 33 percent for the Hayward or Rodgers Creek Faults.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 25 kilometers of the site.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
Monte Vista-Shannon	5.3	8.5
San Andreas	8.0	12.9
Hayward (Southeast Extension)	10.0	16.1
Hayward (Total Length)	11.2	18.0
Calaveras	14.3	23.0

A regional fault map is presented as Figure 3, illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 SURFACE DESCRIPTION

The project site includes 16 parcels in Mountain View, California and is generally bounded by a fitness trail and Charleston Retention Basin to the north, an undeveloped staging area and Stevens Creek Trail and Stevens Creek beyond to the east, trailer homes and Space Park Way to the south, and North Shoreline Boulevard to the west. The site is currently occupied by at-grade, one- and two-story Google commercial buildings and associated at-grade parking lots and landscaping areas consisting of grass, shrubs, and mature trees. Shorebird Way also runs through the southern portion of the site and Charleston Road runs through the northern portion of the site. The site is generally flat but graded to drain to storm drainage facilities.

At our boring locations, surface pavements consisted of 2 to 4 inches of asphalt concrete over 4 to 8 inches of aggregate base. Based on our visual observations, the existing asphalt pavements are in fair condition with some cracking.

3.2 SUBSURFACE CONDITIONS

Below the surface pavement sections, our borings encountered highly expansive, very stiff to hard clay to depths of 3 to 6½ feet beneath the surface. Below the highly expansive clay, our explorations generally encountered medium stiff to hard lean clays with variable amounts of sand and interbedded layers of loose to dense sands with variable amounts of silt, clay, and gravel. Some thicker sand layers were encountered between depths of approximately 8 to 33 feet in explorations CPT-7, CPT-8, CPT-10, and EB-2.

Below the maximum depth of 45 feet explored in our borings, our CPTs generally encountered interbedded layers of clay, silty clay to clay, clayey silt to silty clay, sandy silt to clayey silt, silty sand to sandy silt, sand to silty sand, sand, and sand to clayey sand to a depth of 100 feet below the existing grades, the maximum depth explored.

3.2.1 Plasticity/Expansion Potential

We performed two Plasticity Index (PI) tests on representative samples. Test results were used to evaluate the expansion potential of the surficial soils. The tests resulted in PIs of 39 and 41, indicating high to very high expansion potential to wetting and drying cycles.

3.2.2 In-Situ Moisture Contents

Laboratory testing indicated that the in-situ moisture contents within the upper 5 feet range from few percent over optimum to about 6 to 8 percent over the estimated laboratory optimum moisture.

3.3 GROUND WATER

Ground water was encountered in our borings at depths ranging from about 5½ to 8½ feet below the existing grades. Ground water was inferred at depths ranging from about 4½ to 10¼ feet below existing grades in CPT-1, CPT-3 through CPT-8, CPT-10, and CPT-11 based on pore pressure dissipation tests. All measurements were taken at the time of drilling and may not represent the stabilized levels that can be higher than the initial levels encountered.

Historic high ground water levels are mapped at a depth of less than 5 feet below current grades (CGS, Mountain View 7.5-minute Quadrangle, 2006). In general, fluctuations in ground water levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors. On a preliminary basis, based on our explorations, review of historic depth to ground water maps, and our experience within the site area, we anticipate a high ground water level of 4 feet below existing grades and recommend a design ground water depth of 4 feet beneath the existing site grades be used.

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT RUPTURE

As discussed above several significant faults are located within 25 kilometers of the site. The site is not located within a State-designated Alquist Priolo Earthquake Fault Zone or a Santa Clara County Fault Hazard Zone. As shown in Figure 3, no known surface expression of fault traces is thought to cross the site; therefore, fault rupture hazard is not a significant geologic hazard at the site.

4.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A peak ground acceleration (PGA) was estimated for analysis using a value equal to $F_{PGA} \times$ PGA, as allowed in the 2016 edition of the California Building Code. For our analysis we used a PGA_M of 0.513g.

4.3 LIQUEFACTION POTENTIAL

The site is within a State-designated Liquefaction Hazard Zone (CGS, Mountain View Quadrangle, 2006) as well as a Santa Clara County Liquefaction Hazard Zone (Santa Clara County, 2003). Our field and laboratory programs addressed this issue by sampling potentially liquefiable layers to depths of at least 50 feet, performing visual classification on sampled materials, evaluating CPT correlations, and performing various tests to further classify the soil properties.

4.3.1 Background

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 4 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

4.3.2 Analysis

As discussed in the "Subsurface" section above, several sand layers were encountered below the design ground water depth of 4 feet. Following the liquefaction analysis framework in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008), incorporating updates in *CPT and SPT Based Liquefaction Triggering Procedures* (Boulanger and Idriss, 2014), and in accordance with CDMG Special Publication 117A guidelines (CDMG, 2008) for quantitative analysis, these layers were analyzed for liquefaction triggering and

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potential post-liquefaction settlement. These methods compare the ratio of the estimated cyclic shaking (Cyclic Stress Ratio - CSR) to the soil's estimated resistance to cyclic shaking (Cyclic Resistance Ratio - CRR), providing a factor of safety against liquefaction triggering. Factors of safety less than or equal to 1.3 are considered to be potentially liquefiable and capable of post-liquefaction re-consolidation (i.e. settlement).

The CSR for each layer quantifies the stresses anticipated to be generated due to a design-level seismic event, is based on the peak horizontal acceleration generated at the ground surface discussed in the "Estimated Ground Shaking" section above, and is corrected for overburden and stress reduction factors as discussed in the procedure developed by Seed and Idriss (1971) and updated in the 2008 Idriss and Boulanger monograph.

The soil's CRR is estimated from the in-situ measurements from CPTs and laboratory testing on samples retrieved from our borings. SPT "N" values obtained from hollow-stem auger borings were not used in our analyses, as the "N" values obtained are unreliable in sands below ground water. The tip pressures are corrected for effective overburden stresses, taking into consideration both the ground water level at the time of exploration and the design ground water level, and stress reduction versus depth factors. The CPT method utilizes the soil behavior type index (IC) to estimate the plasticity of the layers. Tests were performed on soil samples collected from our borings adjacent to CPT-1, CPT-5, CPT-7, and CPT-9 as well as visually observed for confirmation of CPT soil behavior types.

In estimating post-liquefaction settlement at the site, we have implemented a depth weighting factor proposed by Cetin (2009). Following evaluation of 49 high-quality, cyclically induced, ground settlement case histories from seven different earthquakes, Cetin proposed the use of a weighting factor based on the depth of layers. The weighting procedure was used to tune the surface observations at liquefaction sites to produce a better model fit with measured data. Aside from the better model fit it produced, the rationale behind the use of a depth weighting factor is based on the following: 1) upward seepage, triggering void ratio redistribution, and resulting in unfavorably higher void ratios for the shallower sublayers of soil layers; 2) reduced induced shear stresses and number of shear stress cycles transmitted to deeper soil layers due to initial liquefaction of surficial layers; and 3) possible arching effects due to nonliquefied soil layers. All these may significantly reduce the contribution of volumetric settlement of deeper soil layers to the overall ground surface settlement (Cetin, 2009).

The results of our CPT analyses (CPT-1 to CPT-11) are presented on Figures 4A to 4K of this report.

4.3.3 Summary

Our analyses indicate that several layers could potentially experience liquefaction triggering that could result in soil softening and post-liquefaction total settlement ranging from less than ¼ inch to 3 inches based on the Yoshimine (2006) method. As discussed in Special Publication 117A, differential movement for level ground sites over deep soil sites will be up to about two-thirds of the total settlement between independent foundation elements. In our opinion, differential

settlements are anticipated to be on the order of less than ¼ inch to 2 inches between independent foundation elements.

It should be noted that most locations show the potential of about 1 inch or less of post-liquefaction total settlement. Larger potential total liquefaction settlements of about 1¾, 3, and 2 inches were estimated at CPT-4, CPT-6, and CPT-8, respectively. We recommend additional explorations be performed in these locations to confirm interpreted soil types and further evaluate the potential for liquefaction settlement during a design-level investigation. We also recommend the potential for liquefaction be further evaluated across the site, specifically within the final proposed building footprints, during a final geotechnical investigation.

4.3.4 Ground Rupture Potential

The methods used to estimate liquefaction settlements assume that there is a sufficient cap of non-liquefiable material to prevent ground rupture or sand boils. For ground rupture to occur, the pore water pressure within the liquefiable soil layer will need to be great enough to break through the overlying non-liquefiable layer, which could cause significant ground deformation and settlement.

The work of Youd and Garris (1995) indicates that the 4-foot and greater thick layer of non-liquefiable cap is not sufficient to prevent ground rupture at exploration locations CPT-4, CPT-6, CPT-8, CPT-9, and CPT-10 and therefore there is a potential for ground rupture to occur that could result in additional ground deformation and settlements in addition to the above liquefaction settlement estimates. We recommend additional exploration be performed during a final geotechnical investigation to further quantify the extent and evaluate the potential for ground rupture to occur at the site.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

Charleston Retention Basin is located directly along the northern side of the site and has an estimated bank height of about 5 to 6 feet, based on site observations and elevations provided by Google Earth®. Additionally, Stevens Creek parallels the eastern side of the site and is located approximately 300 to 350 feet east of the eastern site boundary and is about 6 to 8 feet in depth below site grades based on site observations and elevations provided by Google Earth®. In general, lateral spreading is considered when an open face (Height = D) is within about 40D of a site. Since the project site is within this criteria, we analyzed the site for lateral spreading using analytical methods outlined in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008) and *CPT and SPT Based Liquefaction Triggering Procedures* (Boulanger and Idriss, 2014) by calculating Lateral Displacement Index (LDI) values

at each CPT location. The LDI is calculated by integrating maximum shear strains versus depth, representing a measure of the potential maximum displacement (Zhang et al., 2004).

At CPT-9, our analysis shows a low to moderate potential for lateral spreading to occur. Additionally, at CPT-10 our analysis shows a moderate potential for lateral spreading to occur. We recommend further evaluation and additional exploration be performed during a final geotechnical investigation along the northern and eastern site boundaries to evaluate the potential for lateral spreading affecting the proposed development.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose to medium dense unsaturated sandy soils can settle during strong seismic shaking. We evaluated the potential for seismic compaction of the unsaturated soils above the design ground water level based on the work by Robertson and Shao (2010). Based on our analysis, the potential for significant differential seismic settlement to affect the proposed improvements is low.

4.6 TSUNAMI/SEICHE

The terms tsunami or seiche are described as ocean waves or similar waves usually created by undersea fault movement or by a coastal or submerged landslide. Tsunamis may be generated at great distance from shore (far field events) or nearby (near field events). Waves are formed, as the displaced water moves to regain equilibrium, and radiates across the open water, similar to ripples from a rock being thrown into a pond. When the waveform reaches the coastline, it quickly raises the water level, with water velocities as high as 15 to 20 knots. The water mass, as well as vessels, vehicles, or other objects in its path create tremendous forces as they impact coastal structures.

Tsunamis have affected the coastline along the Pacific Northwest during historic times. The Fort Point tide gauge in San Francisco recorded approximately 21 tsunamis between 1854 and 1964. The 1964 Alaska earthquake generated a recorded wave height of 7.4 feet and drowned eleven people in Crescent City, California. For the case of a far-field event, the Bay area would have hours of warning; for a near field event, there may be only a few minutes of warning, if any.

A tsunami or seiche originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Based on the study of tsunami inundation potential for the San Francisco Bay Area (Ritter and Dupre, 1972), areas most likely to be inundated are marshlands, tidal flats, and former bay margin lands that are now artificially filled, but are still at or below sea level, and are generally within 1½ miles of the shoreline. The site is approximately 1¾ miles inland from the San Francisco Bay shoreline, and is approximately 11 to 17 feet above mean sea level according to Google Earth®. Additionally, the site is mapped by the State of California Tsunami Inundation Map as not being within an inundation area. Therefore, the potential for inundation due to tsunami or seiche is considered low.

4.7 FLOODING

Based on our internet search of the Federal Emergency Management Agency (FEMA) flood map public database, the majority of the site is located within Zone X, described as "Areas of 0.2% annual chance flood; areas of 1% chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood." Portions of the site to the north of Charleston Road are located within Zone AE, described as "Special flood hazard areas subject to inundation by the 1% annual chance flood with a base flood elevation determined to be Elevation 11 feet." We recommend the project civil engineer be retained to confirm this information and verify the base flood elevation, if appropriate.

SECTION 5: CONCLUSIONS

5.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project planning and design. The preliminary recommendations that follow are intended for conceptual planning and preliminary design. A design-level geotechnical investigation should be performed once site development plans are prepared indicated the location of proposed structures. The design-level investigation findings will be used to confirm the preliminary recommendations and develop detailed recommendations for design and construction. Descriptions of each geotechnical concern with brief outlines of our preliminary recommendations follow the listed concerns.

- Potential for liquefaction-induced settlements and associated ground rupture
- Potential for lateral spreading
- Static settlements
- Shallow ground water
- Presence of highly expansive soils
- Re-development considerations

5.1.1 Potential for Liquefaction-Induced Settlements and Associated Ground Rupture

As discussed, our liquefaction analysis indicates that there is a potential for liquefaction of localized sand layers during a significant seismic event. Our analysis indicates liquefaction-induced settlement on the order of less than ¼ inch to 3 inches, resulting in differential settlements ranging from less than ¼ inch to 2 inches between independent foundation elements. In addition, based on the explorations performed, the site has a moderate to high potential for ground rupture to occur as some locations that could result in ground deformation and settlements in addition to the estimated liquefaction settlements. We recommend further exploration and analysis be performed during a final geotechnical investigation to evaluate the potential and extent of potential ground rupture at the site. In areas of higher liquefaction settlement estimates and ground rupture potential, proposed structures in these areas will likely

need to be supported on deep foundation or shallow foundations with ground improvement performed.

5.1.2 Potential for Lateral Spreading

Our preliminary analysis indicates a low to moderate potential for lateral spreading towards the retention basin and Stevens Creek to the north and eastern sides of the site, respectively, at some of our exploration locations. We recommend further exploration and analysis be performed during a final geotechnical investigation to evaluate the potential and extent of lateral spreading to occur along these site boundaries. If the potential for lateral spreading is confirmed during a final investigation, typical techniques to mitigate the potential include ground improvement to construct a shear key or the installation of shear (pin) piles to effectively create a shear key.

5.1.3 Shallow Ground Water

Ground water was encountered in our borings at depths ranging from about 5½ to 8½ feet below the existing grades. We anticipate the historic high ground water level may be on the order of 4 feet below current grades. Our experience with similar sites in the vicinity indicates that shallow ground water could significantly impact grading and underground construction. These impacts typically consist of potentially wet and unstable pavement subgrade, difficulty achieving compaction, and difficult underground utility installation. Dewatering and shoring of utility trenches may be required in some isolated areas of the site.

5.1.4 Presence of Highly Expansive Soils

Highly expansive surficial soils generally blanket the site. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. To reduce the potential for damage to planned at-grade structures, slabs-on-grade should have sufficient reinforcement and be supported on a layer of non-expansive fill; footings should extend below the zone of seasonal moisture fluctuation. In addition, it is important to limit moisture changes in the surficial soils by using positive drainage away from buildings as well as limiting landscaping watering.

5.1.5 Re-Development Considerations

The site is currently developed and occupied by various buildings and surrounding parking lots. Potential issues that are often associated with redeveloping sites include demolition of existing improvements, abandonment of existing utilities, and undocumented fill. Preliminary recommendations addressing these issues are presented in the "Earthwork" section below.

5.2 DESIGN-LEVEL GEOTECHNICAL INVESTIGATION

The preliminary recommendations contained in this study were based on limited site development information and limited information from our field investigation. As site conditions may vary significantly between the small-diameter explorations performed during this

investigation, we also recommend that we be retained to 1) perform a design-level geotechnical investigation once detailed site development plans are available; 2) to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction; and 3) be present to provide geotechnical observation and testing during earthwork and foundation construction.

SECTION 6: EARTHWORK

6.1 ANTICIPATED EARTHWORK MEASURES

On a preliminary basis, we recommend that within any planned at-grade building areas any remnant foundations, slabs, and/or abandoned underground utilities be removed entirely, the ends capped, and the resulting excavations backfilled with engineered fill. All fills should be completely removed from within at-grade building areas and to a lateral distance of at least 5 feet beyond the building footprint or to a lateral distance equal to fill depth below the perimeter footing, whichever is greater.

Shallow ground water is present at depths as shallow as 5½ feet below grade, and we anticipate could be as shallow as 4 feet. Temporary dewatering of deeper footings and utility trenches should be anticipated. As discussed in the "Subsurface" section in this report, the in-situ moisture contents are between a few percent over optimum to about 6 to 8 percent over the estimated laboratory optimum in the upper 5 feet of the soil profile and will be near saturated to saturated near ground water. Contractors should expect needing to dry back soils prior to being re-used as engineered fill. These soils will also be subject to destabilization by rubber-tired and other construction equipment.

Surface water runoff should not be allowed to pond adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 2 percent towards suitable discharge facilities; landscape areas should slope at least 3 percent away from buildings. Bio-treatment basins should be kept at least 10 feet away from buildings and, where possible, at least 3 feet from pavements and flatwork.

SECTION 7: FOUNDATIONS

7.1 SUMMARY OF RECOMMENDATIONS

On a preliminary basis, proposed buildings in areas with low liquefaction total settlements and low ground rupture potential may potentially be supported on reinforced concrete mat foundations. If static settlements are not tolerable for a reinforced concrete mat foundation or in areas of larger liquefaction settlements and/or ground rupture potential, proposed buildings may be supported by shallow spread footings overlying ground improvement or by deep foundations. Preliminary recommendations are discussed in the following sections.

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7.2 SEISMIC DESIGN CRITERIA

The 2016 California Building Code (CBC) provides criteria for the seismic design of buildings in Chapter 16. The "Seismic Coefficients" used to design buildings are established based on a series of tables and figures addressing different site factors, including the soil profile in the upper 100 feet below grade and mapped spectral acceleration parameters based on distance to the controlling seismic source/fault system. Shear wave velocity measurements performed at CPT-6 to a depth of approximately 95 feet and at CPT-11 to a depth of approximately 96 feet resulted in average shear wave velocities of 826 and 784 feet per second, respectively (or 252 and 239 meters per second, respectively). Based on our review of the local geology, we anticipate the average shear wave velocity to remain consistent down to 100 feet with the values mentioned above. Therefore, we have classified the site as Soil Classification D. The mapped spectral acceleration parameters S_S and S_1 were calculated using the USGS computer program *U.S. Seismic Design Maps*, located at http://earthquake.usgs.gov/designmaps/us/application.php, based on the site coordinates presented below and the site classification. The table below lists the various factors used to determine the seismic coefficients and other parameters.

Table 2: CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	D
Site Latitude	37.42012°
Site Longitude	-122.07453°
0.2-second Period Mapped Spectral Acceleration[1], S_S	1.500g
1-second Period Mapped Spectral Acceleration[1], S_1	0.600g
Short-Period Site Coefficient – Fa	1.0
Long-Period Site Coefficient – Fv	1.5
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	1.500g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	0.900g
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.000g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	0.600g
Mapped MCE Geometric Mean Peak Ground Acceleration – PGA_M	0.513g
Site Coefficient Based on PGA and Site Class - F_{PGA}	1.0

[1]For Site Class B, 5 percent damped.

Because the potential for liquefaction and the potential for affects to structures appear high in some locations across the site, based on Section 1613.3.2, Site Class Definitions, of the 2016 California Building Code (CBC) which refers to Section 20 of ASCE 7-10, areas of the site should be classified as Site Class F. Site Coefficients F_a and F_v are determined using Tables

1613.3.3(1) and 1613.3.3(2). Site Class F of those tables refers the determination of Site Coefficients F_a and F_v to Section 11.4.7 of ASCE 7-10. ASCE 7-10 generally indicates that sites classified as Site Class F shall have a site response analysis performed in accordance with Section 21.1 of ASCE 7-10, unless the proposed structure meets the following exception.

> **EXCEPTION:** For structures having fundamental periods of vibration equal to or less than 0.5s, site-response analysis is not required to determine spectral accelerations for liquefiable soils. Rather, a site class is permitted to be determined in accordance with Section 20.3 and the corresponding values of F_a and F_v determined from Tables 11.4-1 and 11.4-2.

We do not know what the fundamental periods will be for the new structures. If the structures meet the requirements for Site Class F, the requirement for a site response analysis may be needed, and additional geotechnical analysis may be required.

7.3 REINFORCED CONCRETE MAT FOUNDATIONS

On a preliminary basis, in our opinion, the structures may be supported on mat foundations bearing on natural soil or engineered fill provided the estimate static settlements are tolerable and the structure is not located in areas of high potential liquefaction settlements or areas of ground rupture potential. Structural loads are not yet available; however, we estimated average areal pressures for four- to ten-story buildings ranging from about 500 to 1250 psf. Based on this assumed loading, on a preliminary basis we estimate static settlements for the above loading would be on the order of 1 to 3 inches. In addition to estimated static settlements, the mats would also need to be designed to accommodate estimated seismic settlements.

The feasibility of mat foundations should be evaluated during the design-level geotechnical investigation.

7.4 SHALLOW FOUNDATIONS OVER GROUND IMPROVEMENT

For buildings with anticipated larger total and differential static settlements and for buildings in locations of higher liquefaction settlements and/or ground rupture potential such that a mat foundation may not be feasible, these structures can potentially be founded on shallow foundations supported on ground improvement. Ground improvement, such as Impact Piers, Stone Columns, Drilled Displacement Columns (DDCs), or other similar methods, should be designed to provide vertical support through the existing soils, as well as partial mitigation of the liquefaction potential. If environmental concerns are present, DDCs may be the only method available to prevent communication of water bearing layers due to the relatively impermeable nature of the grout mixture used for construction. For liquefaction mitigation, ground improvement elements will generally need to extend to about 10 to 20 feet below existing grades on a preliminary basis.

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7.4.1 Bearing Capacity

On a preliminary basis, footings supported on ground improvement should extend at least 24 inches below the lowest adjacent grade. Lowest adjacent grade is defined as the deeper of the following: 1) bottom of the adjacent interior slab-on-grade, or 2) finished exterior grade, excluding landscaping topsoil.

On a preliminary basis, footings supported on ground improvement are likely capable of supporting maximum dead plus live allowable bearing pressures of 4,000 to 6,000 psf.

7.4.2 Settlement

As discussed in the "Ground Improvement" section below, the design of the ground improvement spacing should be such that the total foundation settlements (static and seismic) are reduced to less than 1½ inches. Differential settlements should be limited to less than ¾-inch.

7.4.3 Ground Improvement

Ground improvement, such as Impact Piers, Stone Columns, Geopiers, Soil-Cement Mixing, or other similar methods, should be designed to provide vertical support through the existing soils, as well as partial mitigation of the liquefaction potential. If environmental concerns are present, DDCs should be considered because they use low permeability grout that will prevent communication between water bearing layers. We anticipate that the ground improvement construction will be a design-build process where Cornerstone Earth Group will review preliminary design-build ground improvement designs, including proposed spacing and layout relative to the foundation plans and installation lengths, and anticipated densification improvement of the surrounding soils prepared by prospective contractors, provide comments, and come to a general agreement with the contractor on the intended design approach. The ground improvement columns will likely be uniformly spaced at 4 to 6 feet centers beneath isolated spread foundations.

The feasibility of spread footings with ground improvement should be evaluated during the design-level geotechnical investigation.

7.5 DEEP FOUNDATIONS

As an alternative to shallow foundations, the proposed structures may potentially be supported on deep foundation systems. Several deep foundation alternatives can be considered, such as augercast piles (ACIP piles), driven pipe piles, or pre-cast, pre-stressed concrete piles.

ACIP piles are concrete piles that are cast in place using a hollow-stem auger that drills to the design depth and then sand-cement grout (4,000 to 6,000 psi grout) is pumped through the hollow-stem as the drill stem is extracted. ACIP piles are a low noise and vibration installation compared to driven piles. Displacement augercast piles may also be feasible, which would minimize spoils that are typically generated during drilling. Various types of steel reinforcing,

including rebar cages or H-piles may be installed into the still-wet grout after drilling to satisfy bending moment requirements.

Driven piles, such as steel pipe piles, pre-cast, pre-stressed concrete piles, or similar driven pile alternative, are driven with a pile driving hammer into the ground to the required embedment depths. Driven piles would not create spoils; however, high noise and vibration considerations will need to be evaluated with respect to surrounding properties.

On a preliminary basis, we anticipate a pile depth on the order of 60 to 80 feet for an allowable pile capacity of 100 tons.

The feasibility of deep foundations should be evaluated during the design-level investigation.

SECTION 8: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

8.1 INTERIOR SLABS-ON-GRADE

As the Plasticity Index (PI) of the surficial soils ranges up to 41, slabs-on-grade should be supported on at least 24 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over prepared subgrade. If moisture-sensitive floor coverings are planned, the recommendations in the "Interior Slabs Moisture Protection Considerations" section below may be incorporated in the project design if desired.

8.2 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete slab-on-grade construction where floor coverings are planned are presented for the consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a minimum 10-mil vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer's recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of crushed rock should be placed below the vapor retarder and consolidated in place with vibratory equipment. The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by laboratory sieves will conform to the following gradation:

Sieve Size	Percentage Passing Sieve
1"	100
¾"	90 – 100
No. 4	0 - 10

The capillary break rock may be considered as the upper 4 inches of the non-expansive fill previously recommended.

- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.
- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.
- Polishing the concrete surface with metal trowels is not recommended.
- Where floor coverings are planned, all concrete surfaces should be properly cured.
- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869-98 and F710-98 requirements and evaluated against the floor covering manufacturer's requirements prior to installation.

8.3 EXTERIOR FLATWORK

Exterior concrete flatwork subject to pedestrian traffic only should be at least 4 inches thick and supported on at least 12 inches of non-expansive fill (NEF) overlying prepared subgrade. In addition, the upper 4 inches of the NEF should also meet Class 2 aggregate base requirements. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the "Vehicular Pavements" section below.

SECTION 9: VEHICULAR PAVEMENTS

9.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on experience with similar expansive soil conditions and engineering judgment considering the variable surface conditions.

Table 3: Asphalt Concrete Pavement Recommendations, Design R-value = 5

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base* (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	7.5	10.0
4.5	2.5	9.5	12.0
5.0	3.0	10.0	13.0
5.5	3.0	12.0	15.0
6.0	3.5	13.0	16.5
6.5	4.0	14.0	18.0

*Caltrans Class 2 aggregate base; minimum R-value of 78

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will be use the pavements.

Asphalt concrete pavements constructed on expansive subgrade where the adjacent areas will not be irrigated for several months after the pavements are constructed may experience longitudinal cracking parallel to the pavement edge. These cracks typically form within a few feet of the pavement edge and are due to seasonal wetting and drying of the adjacent soil. The cracking may also occur during construction where the adjacent grade is allowed to significantly dry during the summer, pulling moisture out of the pavement subgrade. Any cracks that form should be sealed with bituminous sealant prior to the start of winter rains. One alternative to reduce the potential for this type of cracking is to install a moisture barrier at least 24 inches deep behind the pavement curb.

9.2 PORTLAND CEMENT CONCRETE

The exterior Portland Cement Concrete (PCC) pavement recommendations tabulated below are based on methods presented in the Portland Cement Association (PCA) design manual (PCA, 1984). We have provided a few pavement alternatives as an anticipated Average Daily Truck Traffic (ADTT) was not provided. An allowable ADTT should be chosen that is greater than what is expected for the development.

Table 4: PCC Pavement Recommendations, Design R-value = 5

Allowable ADTT	Minimum PCC Thickness (inches)
13	5.5
130	6.0

The PCC thicknesses above are based on a concrete compressive strength of at least 3,500 psi, supporting the PCC on at least 6 inches of Class 2 aggregate base, and laterally restraining the PCC with curbs or concrete shoulders. Adequate expansion and control joints should be included. Due to the expansive surficial soils present, we recommend that the construction and expansion joints be dowelled.

SECTION 10: RETAINING WALLS

10.1 STATIC LATERAL EARTH PRESSURES

The structural design of any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall. Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls with level backfill be designed for the following pressures:

Table 5: Recommended Lateral Earth Pressures

Wall Condition	Lateral Earth Pressure*	Additional Surcharge Loads
Unrestrained – Cantilever Wall	45 pcf	½ of vertical loads at top of wall
Restrained – Braced Wall	45 pcf + 8H** psf	½ of vertical loads at top of wall

* Lateral earth pressures are based on an equivalent fluid pressure for level backfill conditions
** H is the distance in feet between the bottom of footing and top of retained soil

If adequate drainage cannot be provided behind the wall, an additional equivalent fluid pressure of 40 pcf should be added to the values above for both restrained and unrestrained walls for the portion of the wall that will not have drainage. Damp proofing or waterproofing of the walls may be considered where moisture penetration and/or efflorescence are not desired.

10.2 SEISMIC LATERAL EARTH PRESSURES

The 2016 CBC states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls greater than 6 feet in height. At this time, we are not aware of any retaining walls 6 feet or greater in height and have not provided seismic earth pressures with this report. If retaining walls greater than 6 feet in height are proposed, seismic earth pressures should be provided during a design-level geotechnical investigation, if

warranted. In our opinion, seismic earth pressures are not warranted for design of minor landscape retaining (i.e. walls 6 feet or less in height).

10.3 WALL DRAINAGE

Adequate drainage should be provided by a subdrain system behind all walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½-inch to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or approved equivalent. The upper 2 feet of wall backfill should consist of compacted on-site soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or equivalent drainage matting can be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. Horizontal strip drains connecting to the vertical drainage matting may be used in lieu of the perforated pipe and crushed rock section. The vertical drainage panel should be connected to the perforated pipe or horizontal drainage strip at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

SECTION 11: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Google specifically to support the design of the Shorebird Way Coporate Campus project in Mountain View, California. The opinions, conclusions, and preliminary recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Preliminary recommendations in this report are based upon the soil and ground water conditions encountered during our limited subsurface exploration. Preparation of a design-level investigation is anticipated to provide additional information and refine the preliminary recommendations presented herein. If variations or unsuitable conditions are encountered during the construction phase, Cornerstone must be contacted to provide supplemental recommendations, as needed.

Google may have provided Cornerstone with plans, reports and other documents prepared by others. Google understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone's control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

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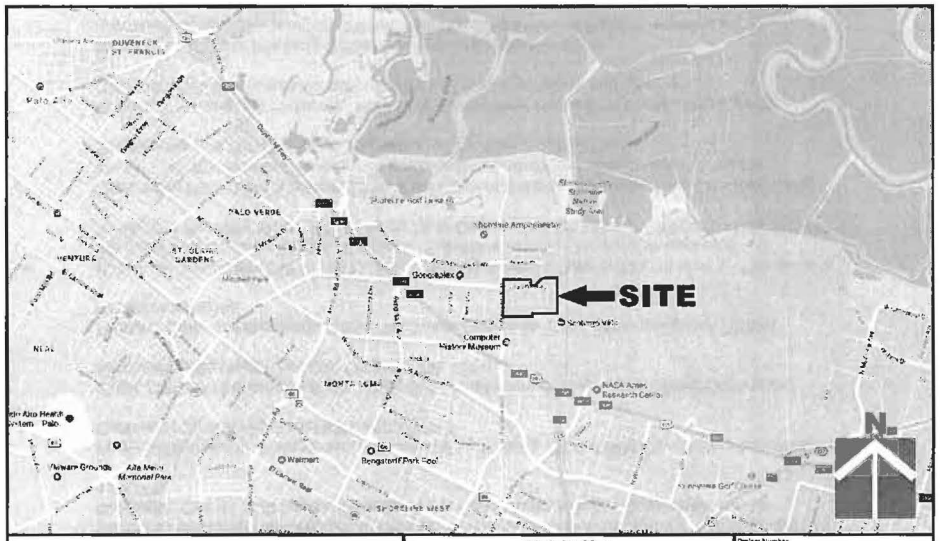
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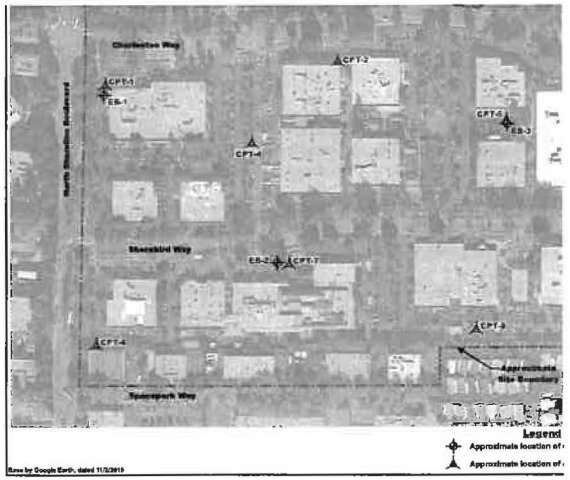


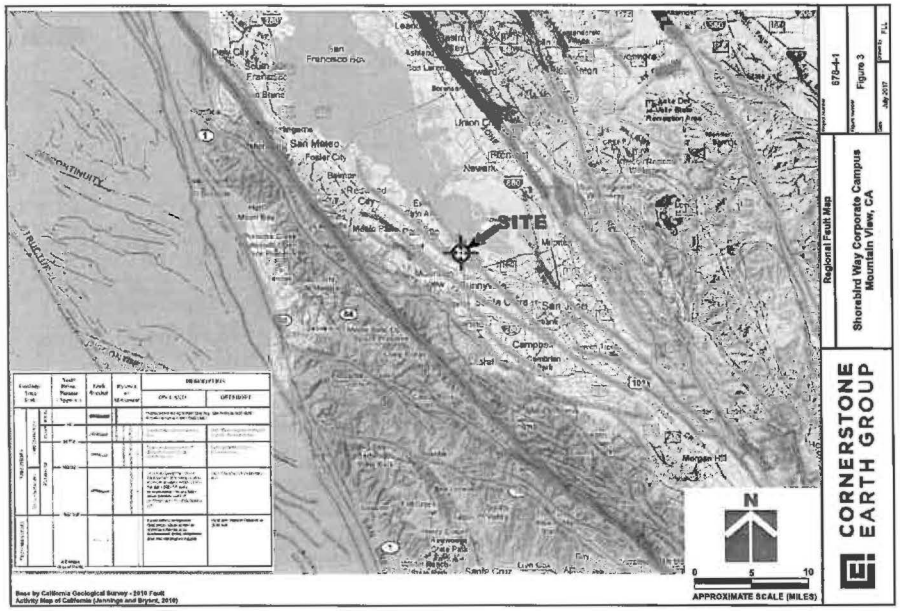
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Vicinity Map

Shorebird Way Corporate Campus
Mountain View, CA

Project Number	678-4-1
Figure Number	Figure 1
Date	July 2017
Drawn By	FLL





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FIGURE 4A

CPT NO. 1

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.513	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	8.7
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.13 (inches)

TOTAL SEISMIC SETTLEMENT 0.1 INCHES

POTENTIAL LATERAL DISPLACEMENT

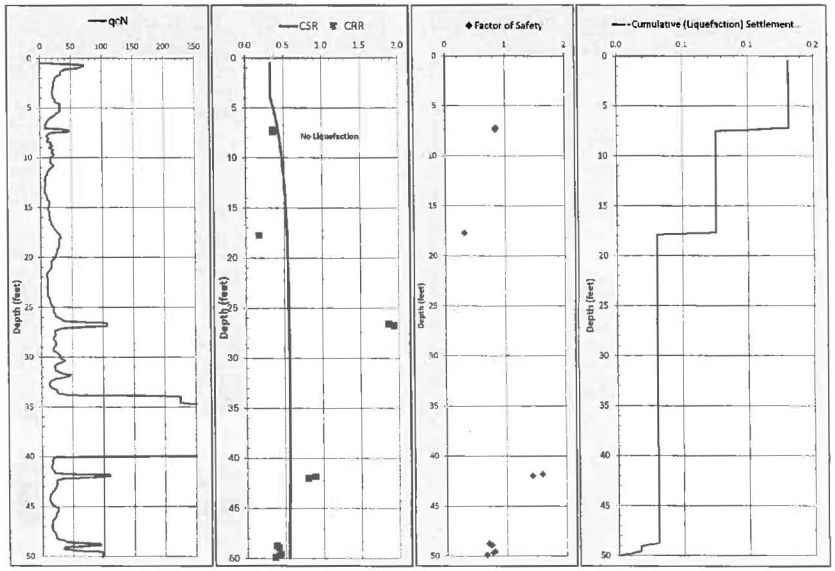
LDI* 0.02 LIH 96.7

LDI* Corrected for Distance 0.00 (4 < LIH < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.0 feet

*Not Valid for LIH Values < 4 and > 40.
*LDI Values Only Summed to 2H Below Grade.



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FIGURE 4B

CPT NO. 2

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controling Fault	San Andreas
Earthquake Magnitude (Mw)	7.9
PGA (Amax)	0.513 (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	5.5
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.62 (Inches)

TOTAL SEISMIC SETTLEMENT 0.6 INCHES

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.42 L/H 75.0

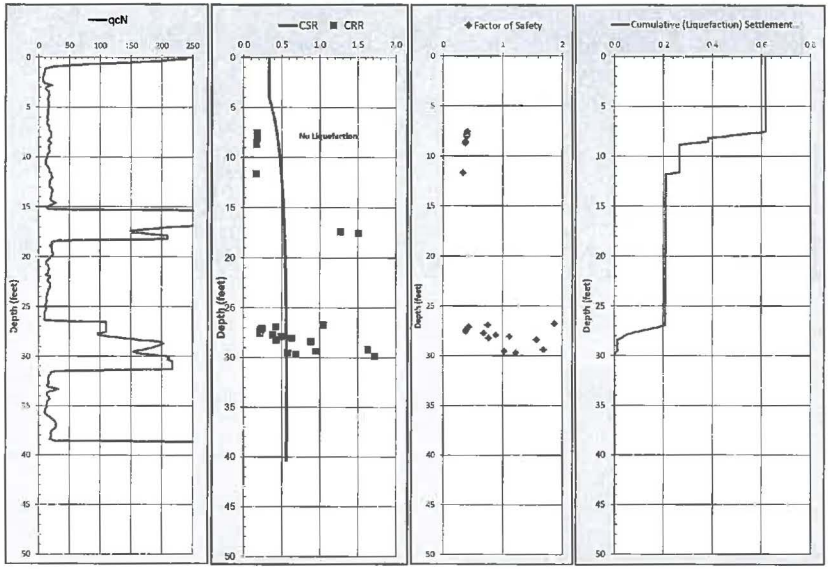
LDI'[Corrected for Distance] 0.08 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.2 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



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FIGURE 4C

CPT NO. 3

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controling Fault	San Andreas
Earthquake Magnitude (Mw)	7.9
PGA (Amax)	0.513 (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	4.6
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.42 (Inches)

TOTAL SEISMIC SETTLEMENT 0.4 INCHES

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.15 L/H 51.4

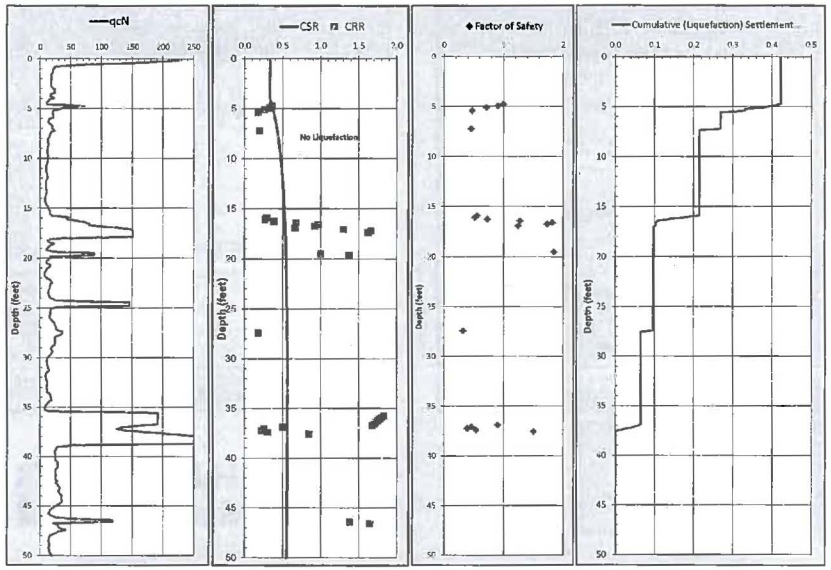
LDI'[Corrected for Distance] 0.04 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.1 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



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FIGURE 4D

CPT NO. 4

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas
Earthquake Magnitude (Mw)	7.9
PGA (Amax)	0.513 (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	5.5
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

1.55 (Inches)

TOTAL SEISMIC SETTLEMENT 1.6 INCHES

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 1.32 L/H 130.0

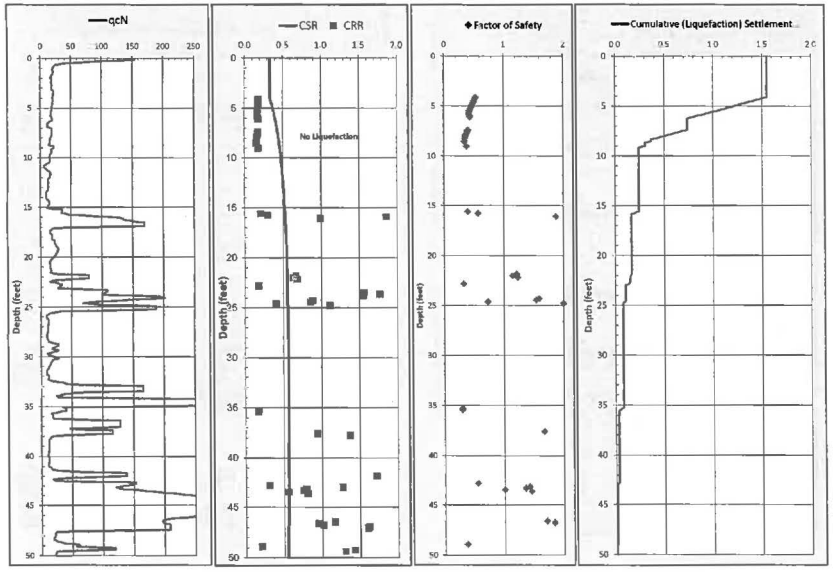
LDI'[1] Corrected for Distance 0.16 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.1 to 0.3 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



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FIGURE 4E

CPT NO. 5

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas
Earthquake Magnitude (Mw)	7.9
PGA (Amax)	0.513 (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	8.4
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.16 (Inches)

TOTAL SEISMIC SETTLEMENT 0.2 INCHES

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.09 L/H 76.7

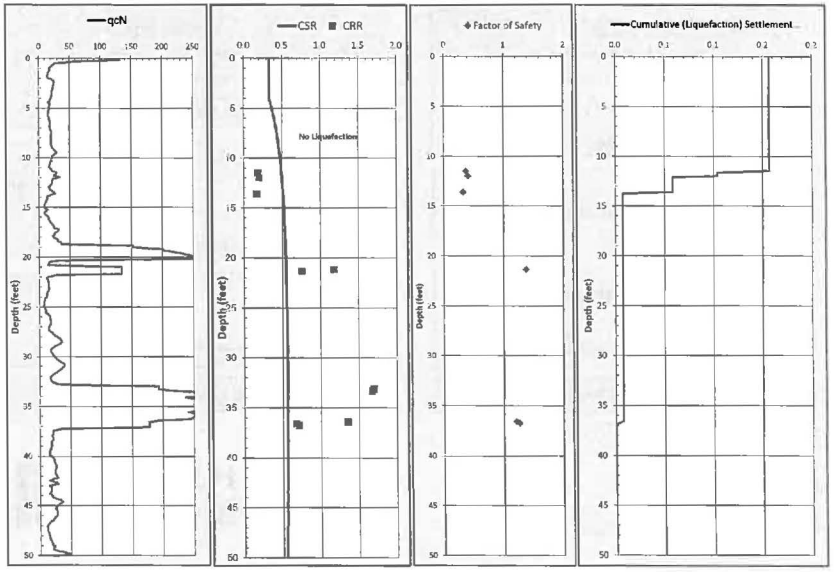
LDI'[1] Corrected for Distance 0.02 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.0 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



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FIGURE 4F

CPT NO. 6

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No.	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas
Earthquake Magnitude (Mw)	7.9
PGA (Amax)	0.513 (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	10.2
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

3.03 (Inches)

TOTAL SEISMIC SETTLEMENT 3.0 INCHES

POTENTIAL LATERAL DISPLACEMENT

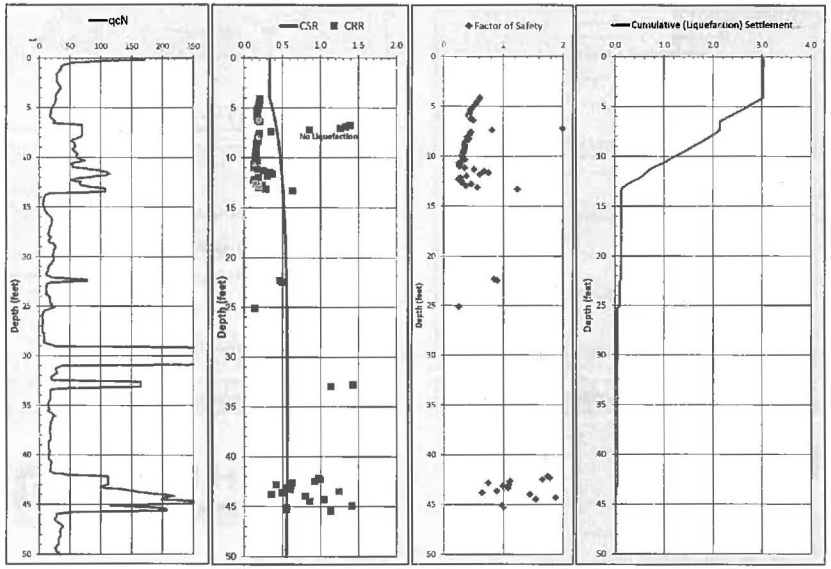
LDI[2] 2.51 L/H 248.3

LDI[1] Corrected for Distance 0.18 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.1 to 0.4 feet

[1]Not Valid for L/H Values < 4 and > 40.
[2]LDI Values Only Summed to 2H Below Grade.



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FIGURE 4G

CPT NO. 7

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No.	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas
Earthquake Magnitude (Mw)	7.9
PGA (Amax)	0.513 (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	6
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.71 (Inches)

TOTAL SEISMIC SETTLEMENT 0.7 INCHES

POTENTIAL LATERAL DISPLACEMENT

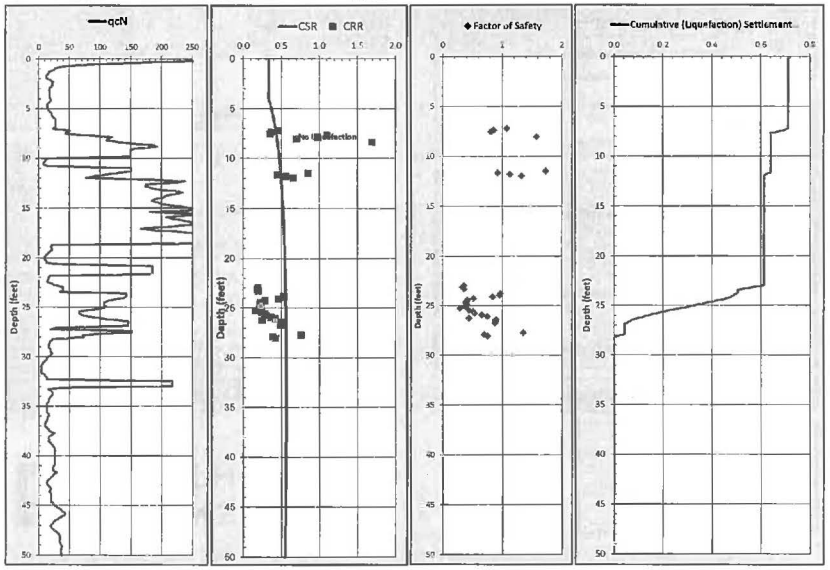
LDI[2] 0.04 L/H 196.7

LDI[1] Corrected for Distance 0.00 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.0 feet

[1]Not Valid for L/H Values < 4 and > 40.
[2]LDI Values Only Summed to 2H Below Grade.



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FIGURE 4H

CPT NO. 8

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No.	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.513	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	4.5
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

1.89 (Inches)

TOTAL SEISMIC SETTLEMENT 1.9 INCHES

POTENTIAL LATERAL DISPLACEMENT

LDI[1] 1.29 L/H 208.3

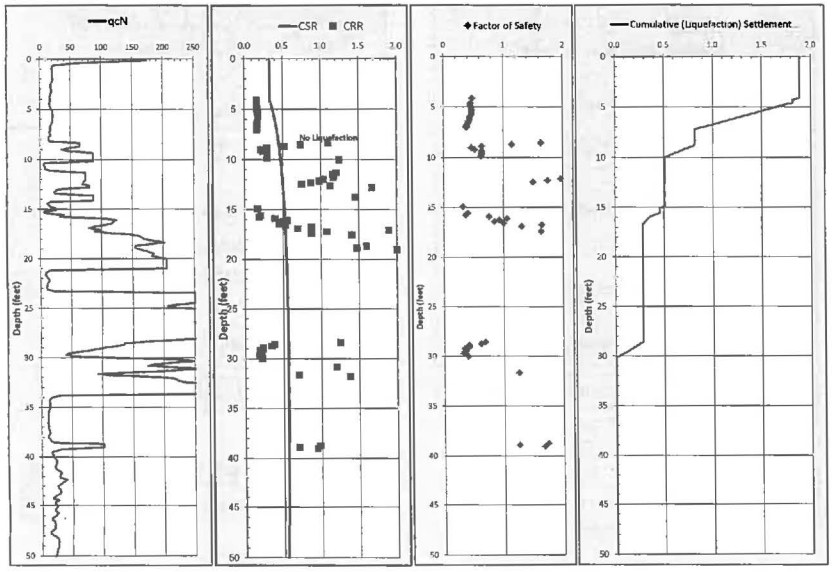
LDI'[2] Corrected for Distance 0.11 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.1 to 0.2 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



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FIGURE 4I

CPT NO. 9

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PROJECT/CPT DATA

Project Title	Shorebird Way Coporate Campus
Project No	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.513	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	5.5
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

1.07 (Inches)

TOTAL SEISMIC SETTLEMENT 1.1 INCHES

POTENTIAL LATERAL DISPLACEMENT

LDI[1] 0.67 L/H 45.0

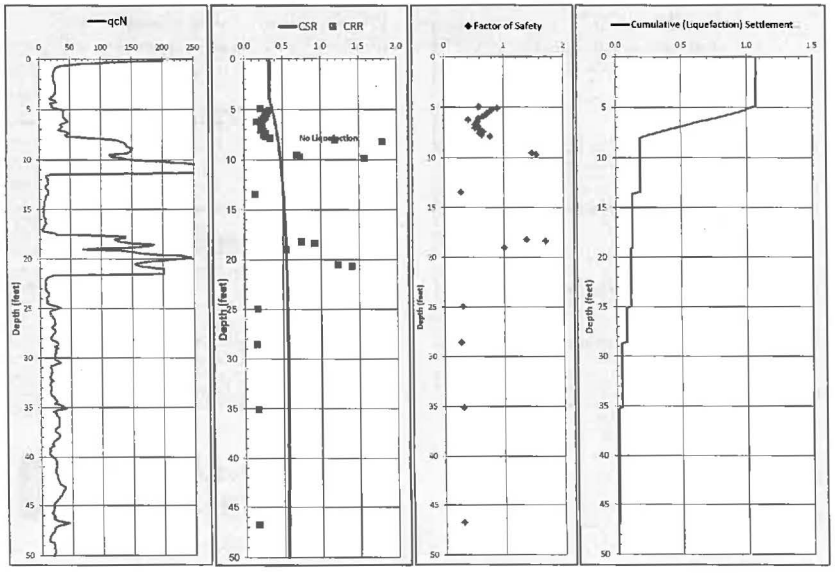
LDI'[2] Corrected for Distance 0.19 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.1 to 0.4 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



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FIGURE 4J

CPT NO. 10

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No.	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.513	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	8.3
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

1.09 (Inches)

TOTAL SEISMIC SETTLEMENT 1.1 INCHES

POTENTIAL LATERAL DISPLACEMENT

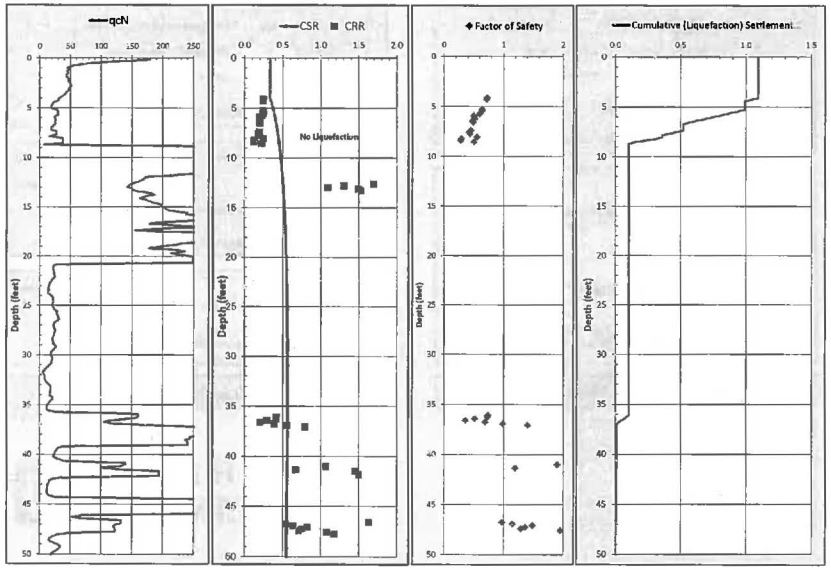
LDI^2 0.89 L/H 22.0

$LDI^1_{Corrected\ for\ Distance}$ 0.45 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.2 to 0.9 feet

[1]Not Valid for L/H Values < 4 and > 40.
[2]LDI Values Only Summed to 2H Below Grade.



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FIGURE 4K

CPT NO. 11

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PROJECT/CPT DATA

Project Title	Shorebird Way Corporate Campus
Project No.	678-4-1
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.513	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	7
Design Water Depth (feet)	4
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 4 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.22 (Inches)

TOTAL SEISMIC SETTLEMENT 0.2 INCHES

POTENTIAL LATERAL DISPLACEMENT

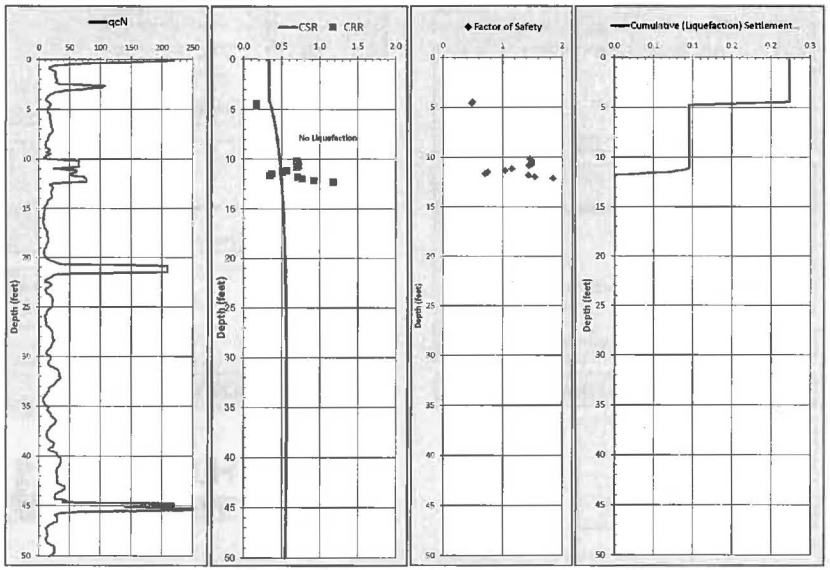
LDI^2 0.18 L/H 51.7

$LDI^1_{Corrected\ for\ Distance}$ 0.04 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.1 feet

[1]Not Valid for L/H Values < 4 and > 40.
[2]LDI Values Only Summed to 2H Below Grade.



APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck-mounted, hollow-stem auger drilling equipment, and 20-ton truck-mounted Cone Penetration Test equipment. Four 8-inch-diameter exploratory borings were drilled on July 5 and July 6, 2017, to depths of 30 to 45 feet. Eleven CPT soundings were also performed in accordance with ASTM D 5778-95 (revised, 2002) on June 27 and June 28, 2017, to depths ranging from approximately 40 to 100 feet. The approximate locations of exploratory borings and CPTs are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil, are included as part of this appendix.

Boring and CPT locations were approximated using existing site boundaries and other site features as references. Boring and CPT elevations were not determined. The locations of the borings and CPTs should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Relatively undisturbed samples were also obtained with 2.875-inch I.D. Shelby Tube sampler which were hydraulically pushed. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

The CPT involved advancing an instrumented cone-tipped probe into the ground while simultaneously recording the resistance at the cone tip (q_c) and along the friction sleeve (f_s) at approximately 5-centimeter intervals. Based on the tip resistance and tip to sleeve ratio (R_f), the CPT classified the soil behavior type and estimated engineering properties of the soil, such as equivalent Standard Penetration Test (SPT) blow count, internal friction angle within sand layers, and undrained shear strength in silts and clays. A pressure transducer behind the tip of the CPT cone measured pore water pressure (u_2). Graphical logs of the CPT data is included as part of this appendix.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring and CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring and CPT locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition,

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any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-98)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>="A" LINE	CL	LEAN CLAY
			PI<4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS	PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR			PT	PEAT

OTHER MATERIAL SYMBOLS

- Poorly-Graded Sand with Clay
- Clayey Sand
- Sandy Silt
- Artificial/Undocumented Fill
- Poorly-Graded Gravelly Sand
- Topsoil
- Well-Graded Gravel with Clay
- Well-Graded Gravel with Silt
- Sand
- Silt
- Well Graded Gravelly Sand
- Gravelly Silt
- Asphalt
- Boulders and Cobble

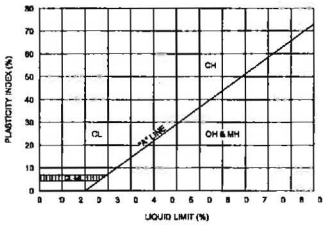
SAMPLER TYPES

- SPT
- Modified California (2.5" I.D.)
- Rock Core
- Shelby Tube
- No Recovery
- Grab Sample

ADDITIONAL TESTS

CA	=	CHEMICAL ANALYSIS (CORROSIVITY)	PI	=	PLASTICITY INDEX
CD	=	CONSOLIDATED DRAINED TRIAXIAL	SW	=	SWELL TEST
CN	=	CONSOLIDATION	TC	=	CYCLIC TRIAXIAL
CU	=	CONSOLIDATED UNDRAINED TRIAXIAL	TV	=	TORVANE SHEAR
DS	=	DIRECT SHEAR	UC	=	UNCONFINED COMPRESSION
PP	=	POCKET PENETROMETER (TSF)	(1.5)	=	(WITH SHEAR STRENGTH IN KSF)
(3.0)	=	(WITH SHEAR STRENGTH IN KSF)			
RV	=	R-VALUE	UU	=	UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	=	SIEVE ANALYSIS: % PASSING #200 SIEVE			
▼	=	WATER LEVEL			

PLASTICITY CHART



PENETRATION RESISTANCE (RECORDED AS BLOWS / FOOT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5 - 1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ.FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

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LEGEND TO SOIL DESCRIPTIONS

Figure Number A-1

CORNERSTONE EARTH GROUP

BORING NUMBER EB-1

PAGE 1 OF 2

PROJECT NAME Shorebird Way Corporate Campus
PROJECT NUMBER 678-4-1
PROJECT LOCATION Mountain View, CA
DATE STARTED 7/6/17 DATE COMPLETED 7/6/17
GROUND ELEVATION _____ BORING DEPTH 45 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE _____ LONGITUDE _____
DRILLING METHOD Mobile B-40, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY RPM
▽ AT TIME OF DRILLING 8.7 ft.
NOTES _____
▼ AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (Uncorrected) Blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
	0		2 inches asphalt concrete over 4 inches aggregate base							
			Fat Clay (CH) hard, moist, dark gray, some fine sand, high plasticity Liquid Limit = 59, Plastic Limit = 18	16	MC-1B	100	22	41		>4.5 ○
			Lean Clay with Sand (CL) hard, moist, gray with light olive brown mottles, fine sand, moderate plasticity	16	MC-2B	98	25			○
	5		**Sandy Lean Clay (CL)** hard, moist, gray with light olive brown mottles, fine sand, some fine subangular gravel, low plasticity	17	MC-3B	107	20			>4.5 ○
			Lean Clay with Sand (CL) stiff, moist, gray with brown mottles, fine sand, moderate plasticity	7	MC-4B	106	23			○
	10				ST-5	111	20			▲
				10	MC-6B	104	23			○
	15			15	MC-7B	104	24			○
	20		**Sandy Lean Clay (CL)** medium stiff, moist, light brown, fine to coarse sand, some fine subangular gravel, low plasticity	8	MC-8B	114	25			○
	25		*Continued Next Page*							

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CORNERSTONE EARTH GROUP

BORING NUMBER EB-1
PAGE 2 OF 2

PROJECT NAME Shorebird Way Corporate Campus
PROJECT NUMBER 678-4-1
PROJECT LOCATION Mountain View, CA

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
	25		**Lean Clay with Sand (CL)** very stiff, moist, gray with brown mottles, fine sand, moderate plasticity	20	MC-9B	108	21			○
	30		**Lean Clay (CL)** medium stiff, moist, brown with gray mottles, fine sand, moderate plasticity		ST-10	102	24			○ ▲
	35		**Silty Sand (SM)** medium dense, moist, brown, fine to coarse sand, some fine subangular to subrounded gravel	48	MC-11B	127	12			
			Poorly Graded Sand (SP) very dense, moist, gray brown, fine to coarse sand, some fine subangular to subrounded gravel	65	SPT					
	40			44	SPT					
			Lean Clay (CL) stiff, moist, brown with gray mottles, some fine sand, moderate plasticity							
	45			19	MC-14B	96	28			○
			Bottom of Boring at 45.0 feet.							
	50									

CORNERSTONE EARTH GROUP

BORING NUMBER EB-2
PAGE 1 OF 2

PROJECT NAME Shorebird Way Corporate Campus
PROJECT NUMBER 678-4-1
PROJECT LOCATION Mountain View, CA
DATE STARTED 7/5/17 **DATE COMPLETED** 7/5/17
GROUND ELEVATION _____ **BORING DEPTH** 45 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc. **LATITUDE** _____ **LONGITUDE** _____
DRILLING METHOD Mobile B-40, 8 inch Hollow-Stem Auger **GROUND WATER LEVELS:**
LOGGED BY RPM ▽ **AT TIME OF DRILLING** 6 ft.
NOTES _____ ▼ **AT END OF DRILLING** 6 ft.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
	0		4 inches asphalt concrete over 8 inches aggregate base							
			Fat Clay (CH) very stiff, moist, dark gray, some fine sand, high plasticity	14	MC-1B	93	28			○
			Lean Clay with Sand (CL) very stiff, moist, gray with light brown mottles, fine sand, moderate plasticity	11	MC-2B	97	26			○
	5		some fine subangular gravel	14	MC-3B	104	21			○
			Silty Sand (SM) loose, wet, brown, fine to medium sand, some fine subangular to subrounded gravel	17	MC-4B	119	13			
	10		**Lean Clay with Sand (CL)** stiff, moist, brown, fine sand, moderate plasticity	14	SPT					○
			Poorly Graded Sand (SP) medium dense to dense, moist, gray brown, fine to coarse sand, some fine subangular to subrounded gravel	12	SPT					
				20	SPT-7		19		3	
	15			43	SPT					
				31	SPT					
	20									
			Poorly Graded Sand with Silt (SP-SM) loose, wet, gray brown, fine to coarse sand	19	MC-10B	114	16		7	
	25		*Continued Next Page*							

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BORING NUMBER EB-2

CORNERSTONE EARTH GROUP

PROJECT NAME Shorebird Way Corporate Campus
PROJECT NUMBER 678-4-1
PROJECT LOCATION Mountain View, CA

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
	25		**Poorly Graded Sand (SP)** medium dense, moist, gray brown, fine to coarse sand, some fine subangular to subrounded gravel	26	SPT					
				22	SPT					
	30		**Lean Clay (CL)** stiff, moist, bluish gray, some fine to medium sand, moderate plasticity	15	SPT					○
				14	MC-14B	106	22			○
	35		**Sandy Lean Clay (CL)** stiff, moist, brown with gray mottles, fine sand, low plasticity		ST-15	104	24			
			Lean Clay with Sand (CL) stiff, moist, brown and gray mottled, some fine to medium sand, moderate plasticity	15	SPT					○
	40									
			Lean Clay (CL) stiff, moist, gray, some fine to medium sand, moderate plasticity	25	MC-17B	104	23			○
	45		Bottom of Boring at 45.0 feet.							
	50									

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BORING NUMBER EB-3

CORNERSTONE EARTH GROUP

PROJECT NAME Shorebird Way Corporate Campus
PROJECT NUMBER 678-4-1
PROJECT LOCATION Mountain View, CA
DATE STARTED 7/6/17 DATE COMPLETED 7/6/17
GROUND ELEVATION _____ BORING DEPTH 36.5 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE _____ LONGITUDE _____
DRILLING METHOD Mobile B-40, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY RPM
AT TIME OF DRILLING 8.4 ft.
NOTES
AT END OF DRILLING Not Encountered

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
	0		2 inches asphalt concrete over 4 inches aggregate base							
			Fat Clay (CH) very stiff, moist, dark gray, some fine sand, high plasticity Liquid Limit = 60, Plastic Limit = 21	21	MC-1B	91	27	39		○
	5			24	MC-2B	89	27			○
				27	MC-3B	88	27			○
			Lean Clay with Sand (CL) very stiff to stiff, moist, gray with light brown mottles, fine to medium sand, moderate plasticity	27	MC-4B	101	24			○
	10			21	MC-5B	101	24			○
			Lean Clay (CL) very stiff, moist, gray with brown mottles, some fine sand, moderate plasticity	16	MC-6B	102	24			○
	15									
			Silty Sand (SM) medium dense, wet, gray brown, fine to coarse sand, some fine subangular to subrounded gravel	14	SPT-7		17			
	20									
				13	MC-8B	90	33			○
	25		*Continued Next Page*							

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CORNERSTONE EARTH GROUP

BORING NUMBER EB-3
PAGE 2 OF 2

PROJECT NAME Shorebird Way Corporate Campus
PROJECT NUMBER 678-4-1
PROJECT LOCATION Mountain View, CA

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
	25		**Lean Clay (CL)** medium stiff, moist, gray, some fine sand, moderate plasticity							
	30		**Lean Clay (CL)** very stiff, moist, brown with gray mottles, some fine sand, moderate plasticity	31	MC-9B	101	24			○
	35		**Poorly Graded Sand (SP)** medium dense, wet, gray brown, fine to coarse sand	22	MC-10B	109	18			
				12	SPT					
			Bottom of Boring at 36.5 feet.							
	40									
	45									
	50									

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CORNERSTONE EARTH GROUP

BORING NUMBER EB-4
PAGE 1 OF 2

PROJECT NAME Shorebird Way Corporate Campus
PROJECT NUMBER 678-4-1
PROJECT LOCATION Mountain View, CA
DATE STARTED 7/5/17 **DATE COMPLETED** 7/5/17
GROUND ELEVATION _____ **BORING DEPTH** 30 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc. **LATITUDE** _____ **LONGITUDE** _____
DRILLING METHOD Mobile B-40, 8 inch Hollow-Stem Auger **GROUND WATER LEVELS:**
LOGGED BY RPM ▽ **AT TIME OF DRILLING** 5.5 ft.
NOTES _____ ▼ **AT END OF DRILLING** Not Encountered

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
	0		2 inches asphalt concrete over 6 inches aggregate base							
			Fat Clay (CH) hard, moist, dark gray, some fine sand, high plasticity	22	MC-1B	100	23			○
			Sandy Lean Clay (CL) very stiff, moist, light gray brown, fine sand, some fine subangular to subrounded gravel, low to moderate plasticity	16	MC-2B	110	20			○
	5		**Silty Sand (SM)** loose, wet, gray brown, fine to coarse sand, some fine subangular to subrounded gravel	7	MC-3B	120	12		21	
				8	SPT					
	10			3	SPT-5		20		31	
			Poorly Graded Sand with Silt (SP-SM) loose, wet, gray brown, fine to coarse sand, some fine subangular to subrounded gravel	15	MC-6B	109	18			
	15		**Sandy Lean Clay (CL)** medium stiff, moist, gray, fine sand, moderate plasticity		ST-7	101	25			◭
			Clayey Sand (SC) medium dense, moist, gray with brown mottles, fine to coarse sand, some fine subrounded gravel	20	MC-8B	128	13			
	20		**Poorly Graded Sand with Silt and Gravel (SP-SM)** dense, moist, gray brown, fine sand, fine to coarse subangular to angular gravel	38	SPT					
			Lean Clay with Sand (CL) soft, moist, brown, fine sand, moderate plasticity							
	25			9	MC-10B	98	28			○
			Continued Next Page							

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BORING NUMBER EB-4

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CORNERSTONE EARTH GROUP

PROJECT NAME Shorebird Way Corporate Campus

PROJECT NUMBER 678-4-1

PROJECT LOCATION Mountain View, CA

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
	25		**Lean Clay (CL)** very stiff, moist, brown with gray mottles, some fine sand, moderate plasticity		ST-11	103	23			○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL 1.0 2.0 3.0 4.0
			Sandy Lean Clay (CL) very stiff, moist, gray, fine sand, some fine subangular to subrounded gravel, low plasticity	22	MC-12B	116	16			
	30		Bottom of Boring at 30.0 feet.							
	35									
	40									
	45									
	50									

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

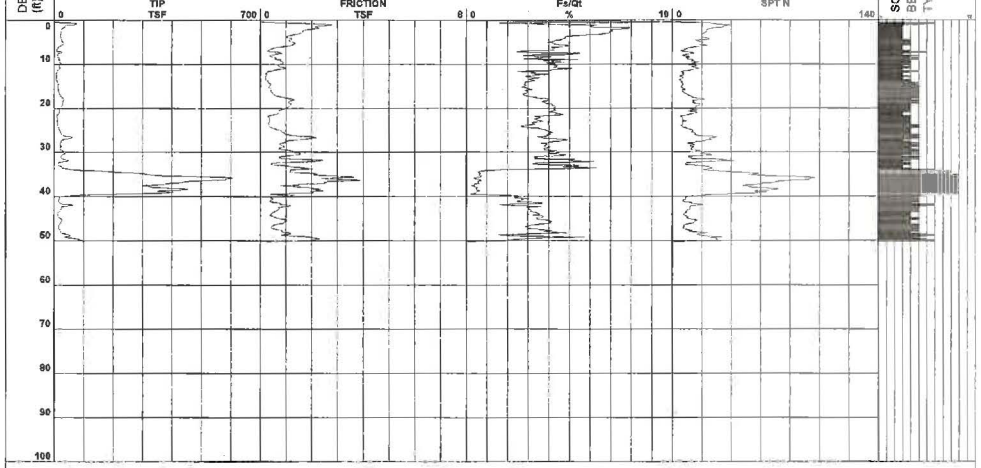
CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 8/9/17 09:34 - P:\DRAFTING\SINT FILES\678-4-1 GOOGLE SHOREBIRD DEVELOPMENT.GPJ

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(050).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-01	Date and Time	6/27/2017 7:37:29 AM	Maximum Depth	60.36 ft
EST GW Depth During Test	9.60 ft				

Net Area Ratio .8

CPT DATA



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

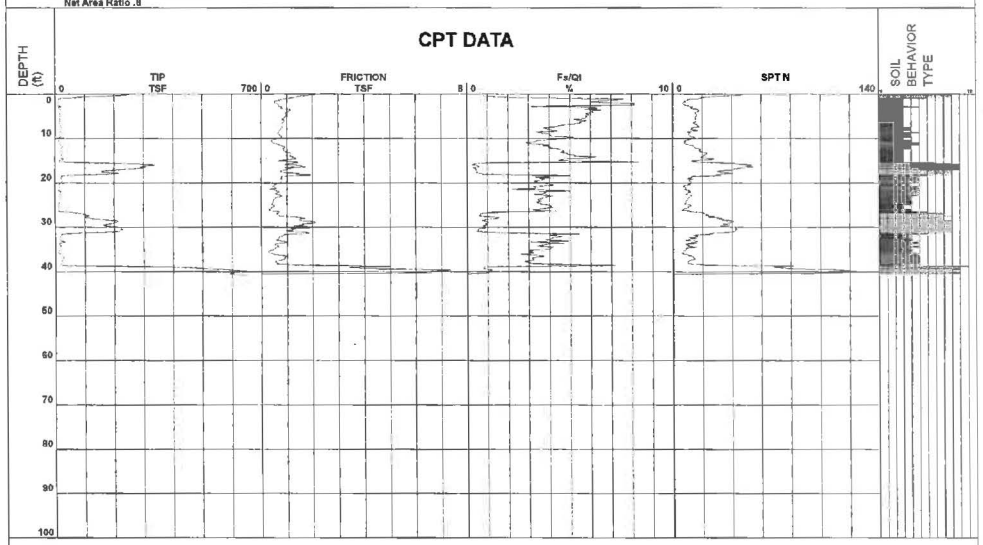
Cone Size 10cm squared

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

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(054).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-02	Date and Time	6/27/2017 1:30:17 PM	Maximum Depth	40.68 ft
EST GW Depth During Test	9.00 ft				

Net Area Ratio .8



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

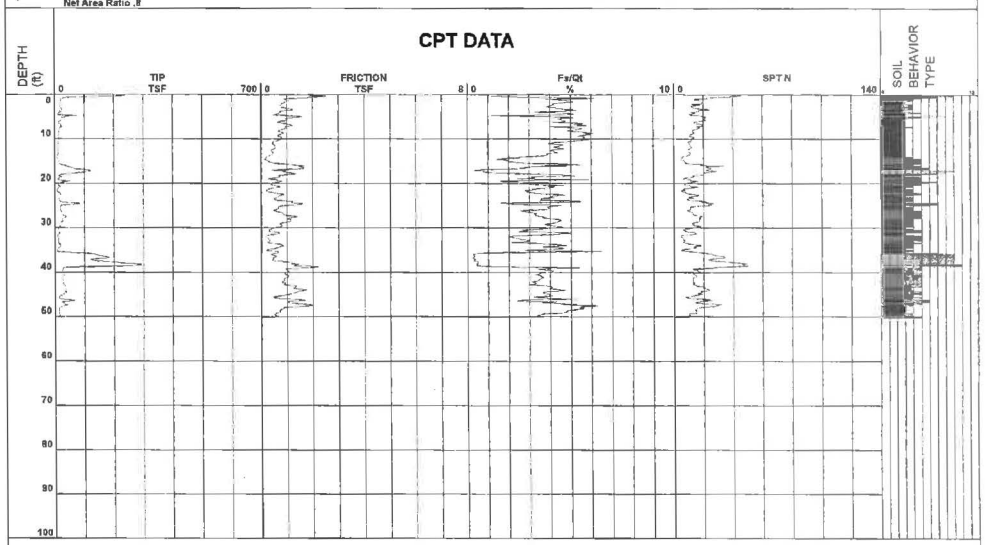
Cone Size 10cm squared

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

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(057).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-03	Date and Time	6/28/2017 9:16:53 AM	Maximum Depth	60.36 ft
EST GW Depth During Test	4.60 ft				

Net Area Ratio .8



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

Cone Size 10cm squared

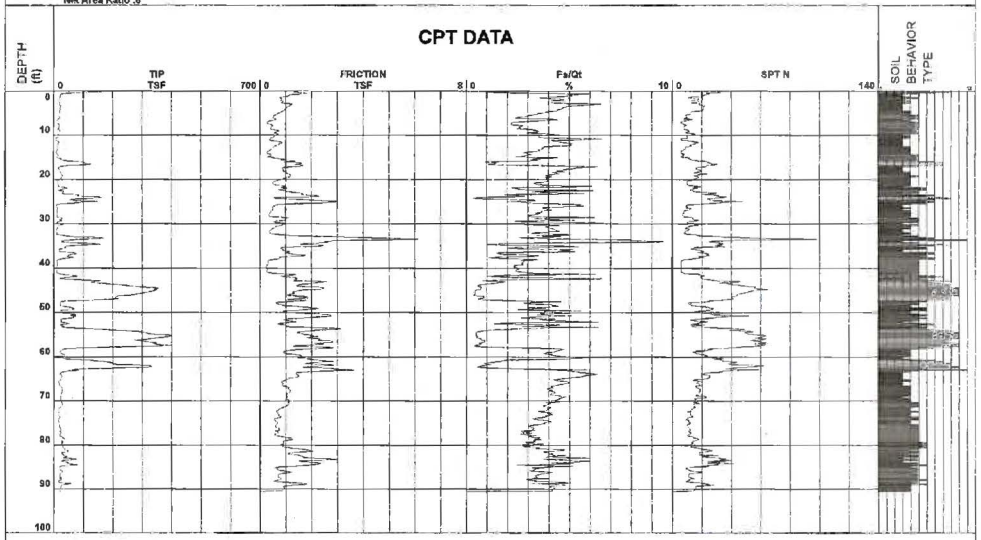
5*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(056).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-04	Date and Time	6/27/2017 2:21:42 PM	Maximum Depth	90.71 ft
EST GW Depth During Test	6.50 ft				

Net Area Ratio ,8

CPT DATA



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

Cone Size 10cm squared

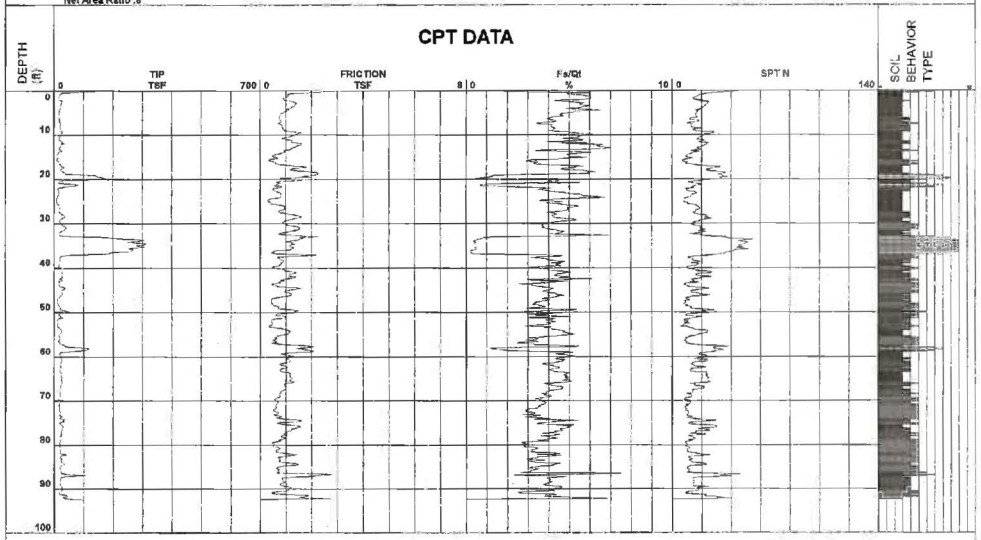
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(051).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-05	Date and Time	6/27/2017 8:42:54 AM	Maximum Depth	92.52 ft
EST GW Depth During Test	9.50 ft				

Net Area Ratio ,8

CPT DATA



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

Cone Size 10cm squared

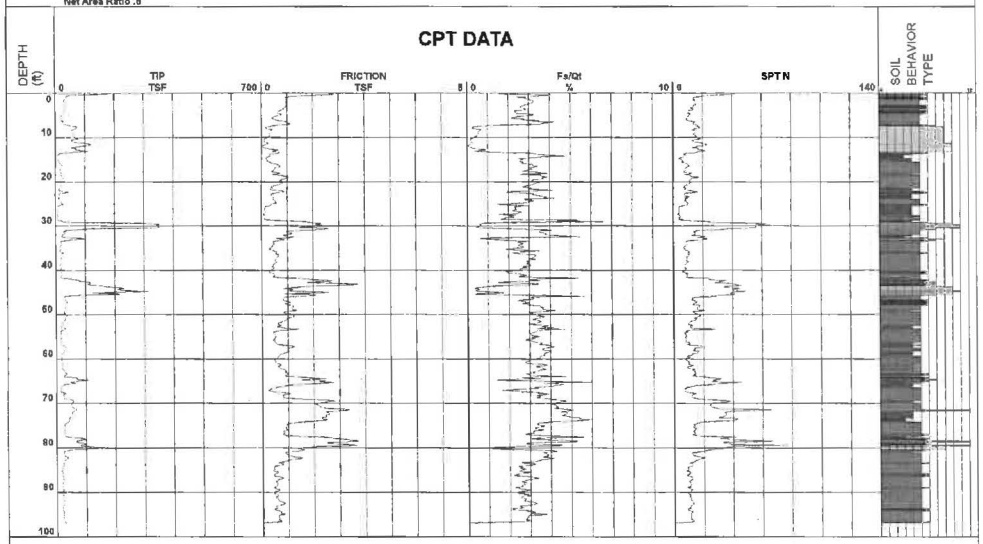
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(056).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-06	Date and Time	6/28/2017 7:27:10 AM	Maximum Depth	96.95 ft
EST GW Depth During Test	10.20 ft				

Net Area Ratio .8

CPT DATA



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

Cone Size 10cm squared

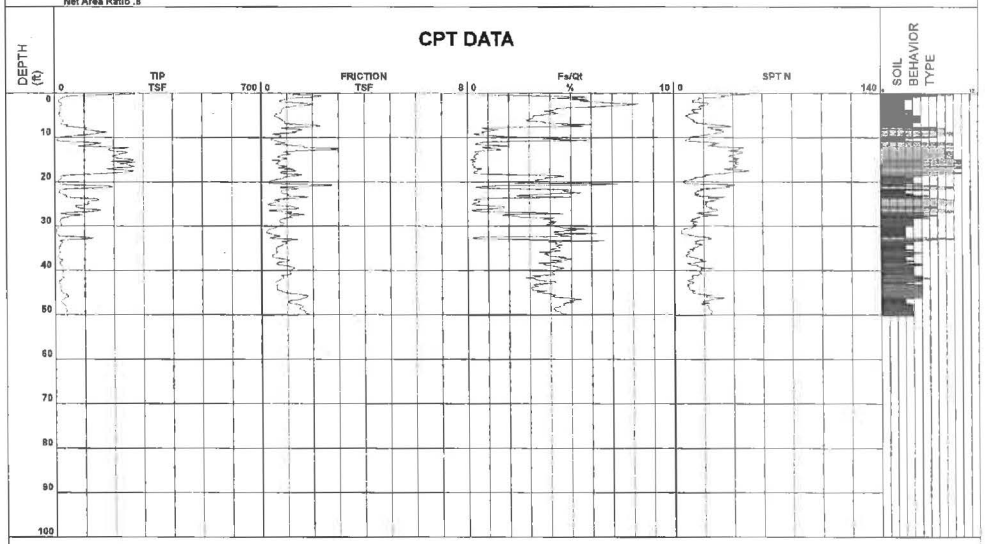
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(061).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-07	Date and Time	6/28/2017 1:01:46 PM	Maximum Depth	50.36 ft
EST GW Depth During Test	5.40 ft				

Net Area Ratio .8

CPT DATA



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

Cone Size 10cm squared

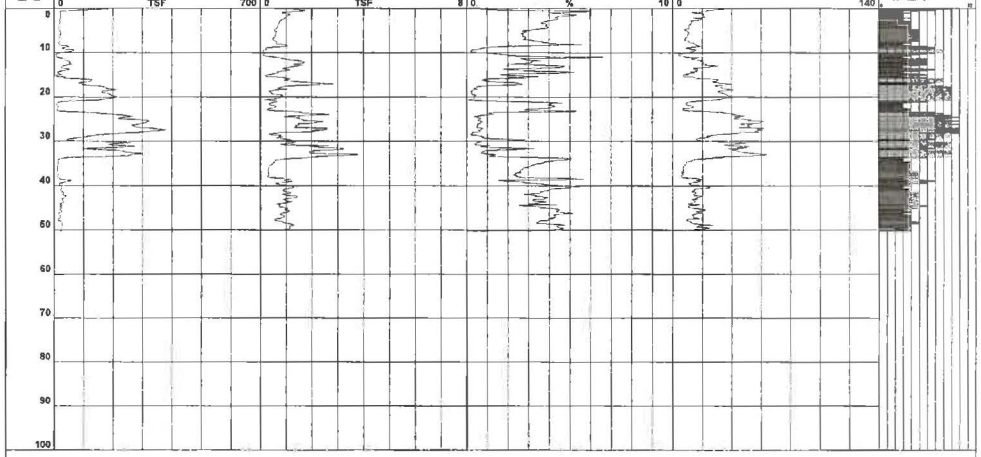
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(060).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-08	Date and Time	6/28/2017 12:05:43 PM	Maximum Depth	50.36 ft
EST GW Depth During Test		4.90 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 10cm squared

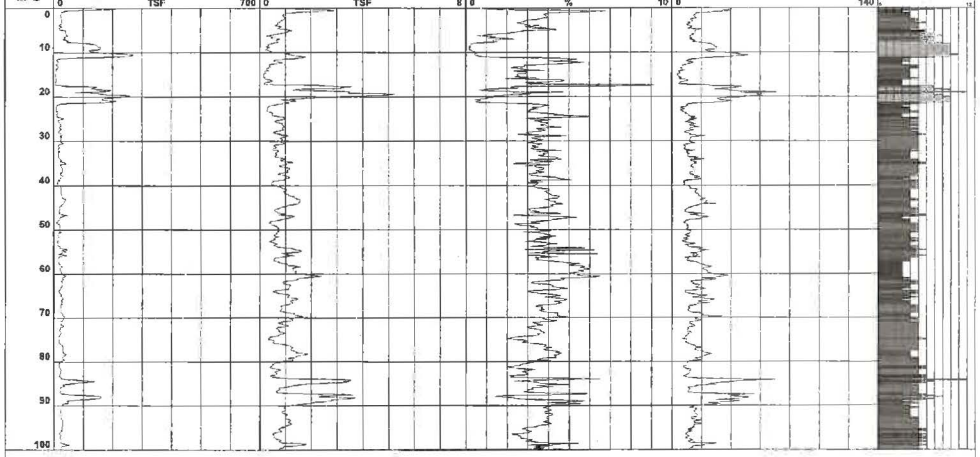
*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(059).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-09	Date and Time	6/28/2017 10:39:21 AM	Maximum Depth	100.39 ft
EST GW Depth During Test		5.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 10cm squared

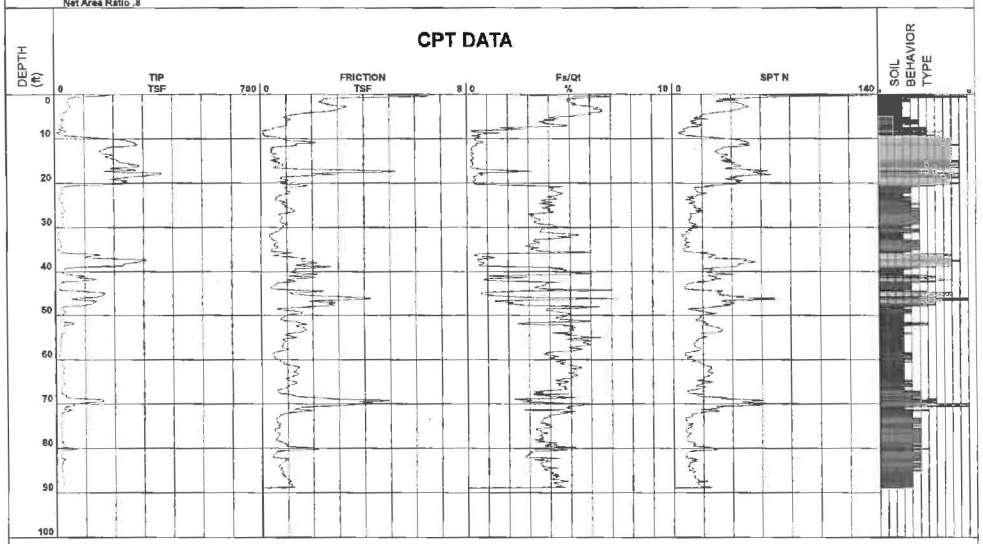
*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(053).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-10	Date and Time	6/27/2017 12:20:53 PM	Maximum Depth	89.07 ft
EST GW Depth During Test	8.30 ft				

Net Area Ratio .8

CPT DATA



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

Cone Size 10cm squared

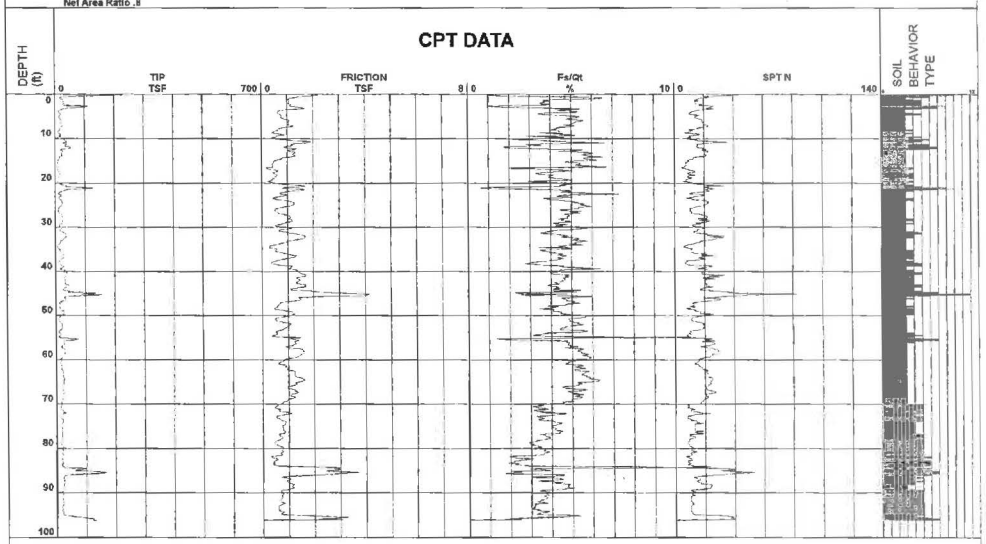
*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Google Shorebird Development	Operator	RB KK	Filename	SDF(052).cpt
Job Number	678-4-1	Cone Number	DDG1333	GPS	
Hole Number	CPT-11	Date and Time	6/27/2017 10:00:44 AM	Maximum Depth	96.29 ft
EST GW Depth During Test	7.00 ft				

Net Area Ratio .8

CPT DATA



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

Cone Size 10cm squared

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

CORNERSTONE EARTH GROUP

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 41 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on 38 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

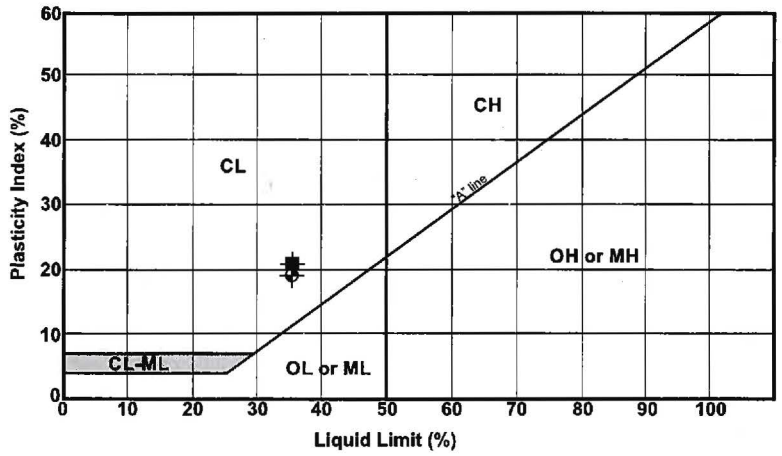
Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on four samples of the subsurface soils to aid in the classification of these soils. The result of these tests are shown on the boring log at the appropriate sample depth.

Plasticity Index: Two Plasticity Index determinations (ASTM D4318) were performed on samples of the subsurface soils to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of these tests are shown on the boring logs at the appropriate sample depths.

Undrained-Unconsolidated Triaxial Shear Strength: The undrained shear strength was determined on three relatively undisturbed samples by unconsolidated-undrained triaxial shear strength testing (ASTM D2850). The results of these tests are included as part of this appendix.

Consolidation: Three consolidation tests (ASTM D2435) were performed on relatively undisturbed samples of the subsurface clayey soils to assist in evaluating the compressibility property of the soil. Results of these consolidation tests are presented graphically in this appendix.

Plasticity Index (ASTM D4318) Testing Summary



Symbol	Boring No.	Depth (ft)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Passing No. 200 (%)	Group Name (USCS - ASTM D2487)
■	EB-1	2.0	22	59	18	41	—	Fat Clay (CH)
◈	EB-2	2.0	27	60	21	39	—	Fat Clay (CH)

CORNERSTONE EARTH GROUP

Plasticity Index Testing Summary

Shorebird Way Corporate Campus
Mountain View, CA

Project Number: 678-4-1

Figure Number: Figure B1

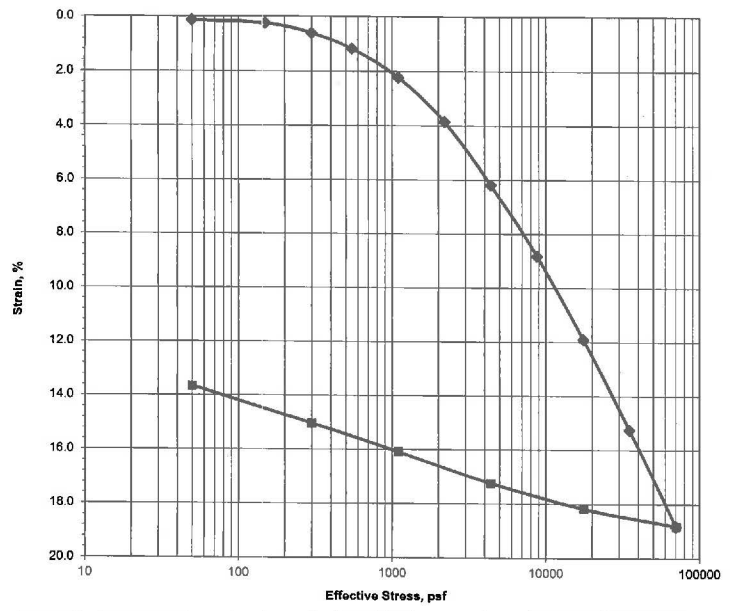
Date: July 2017

Drawn By: ELL

Consolidation Test
ASTM D2435

Job No.:	640-1138	Boring:	EB-1	Run By:	MD
Client:	Cornerstone Earth Group	Sample:	5	Reduced:	PJ
Project:	Google Shorebird - 678-4-1	Depth, ft.:	10(Tip-4")	Checked:	PJ/DC
Soil Type:	Olive Brown Sandy CLAY/ Clayey SAND			Date:	7/31/2017

Strain-Log-P Curve



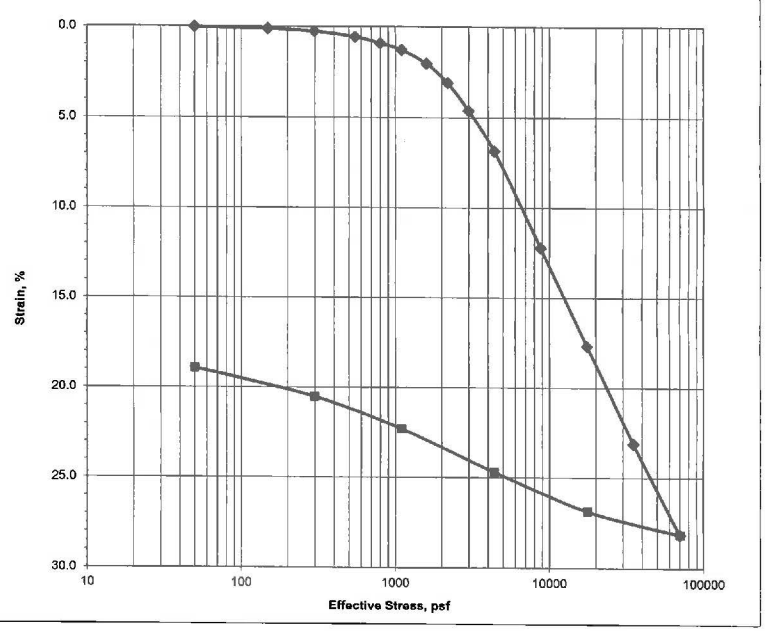
Assumed Gs 2.75	Initial	Final
Moisture %:	24.4	18.1
Dry Density, pcf:	100.6	114.6
Void Ratio:	0.706	0.498
% Saturation:	95.2	100.0

Remarks:

Consolidation Test
ASTM D2435

Job No.:	640-1138	Boring:	EB-4	Run By:	MD
Client:	Cornerstone Earth Group	Sample:	7	Reduced:	PJ
Project:	Google Shorebird - 678-4-1	Depth, ft.:	13.5(Tip-15")	Checked:	PJ/DC
Soil Type:	Greenish Gray CLAY			Date:	8/1/2017

Strain-Log-P Curve



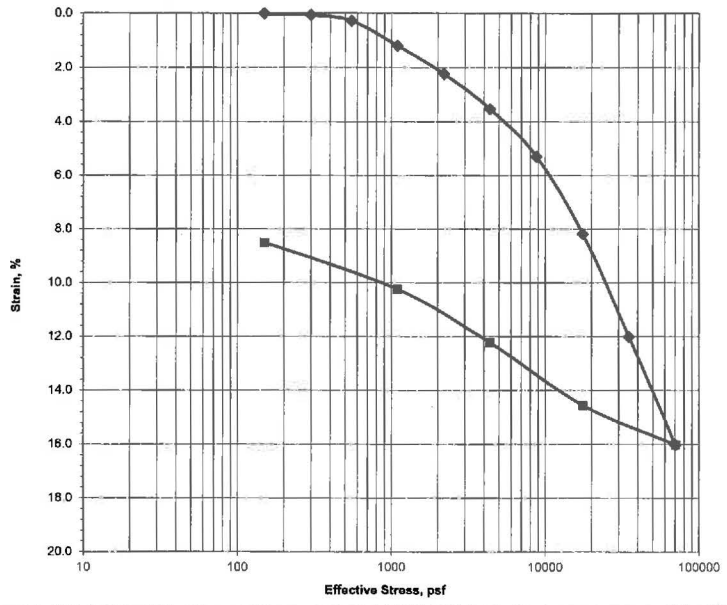
Assumed Gs 2.8	Initial	Final
Moisture %:	38.8	25.9
Dry Density, pcf:	82.2	101.3
Void Ratio:	1.125	0.725
% Saturation:	96.5	100.0

Remarks:

Consolidation Test
ASTM D2435

Job No.:	640-1138	**Boring:**	EB-4	**Run By:**	MD
Client:	Cornerstone Earth Group	**Sample:**	11	**Reduced:**	PJ
Project:	Google Shorebird - 678-4-1	**Depth, ft.:**	25(Tip-4")	**Checked:**	PJ/DC
Soil Type:	Greenish Gray CLAY w/ soil nodules			**Date:**	7/26/2017

Strain-Log-P Curve

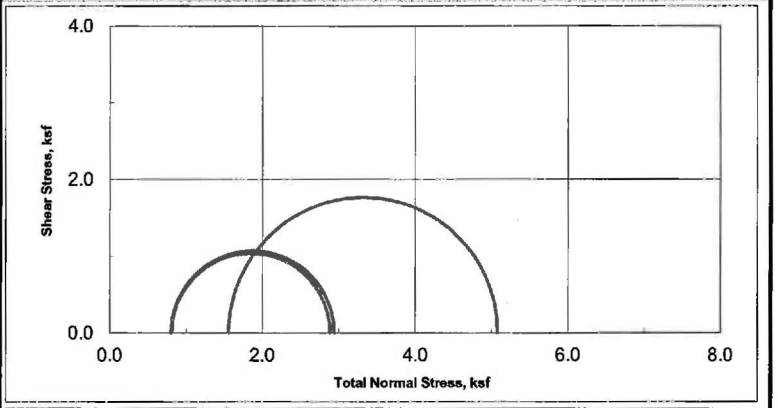


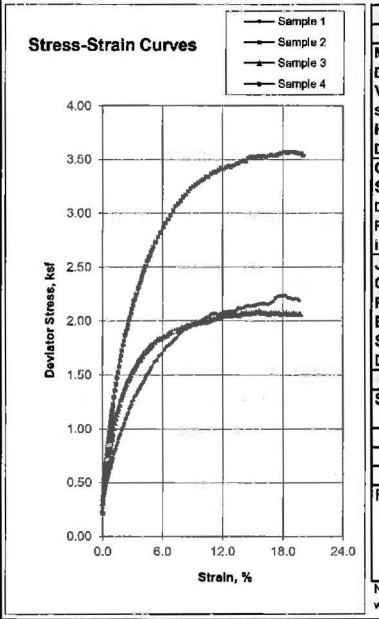
Assumed Gs 2.8	Initial	Final
Moisture %:	22.8	21.0
Dry Density, pcf:	103.1	110.1
Void Ratio:	0.695	0.588
% Saturation:	91.8	100.0

Remarks:

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data	1	2	3	4
Moisture %	19.9	24.0	25.4	
Dry Den,pcf	110.7	101.8	101.0	
Void Ratio	0.550	0.686	0.700	
Saturation %	99.5	96.0	99.7	
Height in	6.08	5.98	6.08	
Diameter in	2.89	2.89	2.89	
Cell psi	5.6	10.8	5.7	
Strain %	15.00	15.00	15.00	
Deviator, ksf	2.135	3.524	2.073	
Rate %/min	0.98	1.00	0.99	
in/min	0.060	0.060	0.060	
Job No.:	**640-1138**			
Client:	**Cornerstone Earth Group**			
Project:	**Google Shorebird - 678-4-1**			
Boring:	EB-1	EB-1	EB-4	
Sample:	5	10	7	
Depth ft:	10	30(Tip-12")	13.5(Tip-11")	

Visual Soil Description	
Sample #	
1	Olive Brown Sandy CLAY
2	Olive Brown Sandy CLAY
3	Gray CLAY
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.