GEOTECHNICAL ENGINEERING STUDY
ALUM ROCK AVENUE THREE-TO-SEVEN-STORY MIXED-USE BUILDING
2350 ALUM ROCK AVENUE
SAN JOSE, CALIFORNIA

August 30, 2018

Prepared for

Ms. Michelle Muniz
Affirmed Housing
13520 Evening Creek Drive N., Suite 160
San Diego, CA 92128

Prepared by

Earth Systems Pacific
48511 Warm Springs Blvd., Suite 210
Fremont, CA 94539

Earth Systems
48511 Warm Springs Boulevard, Suite 210 | Fremont, CA 94539 | Ph: 510.353.3833 | www.earthsystems.com

August 30, 2018 File No.: 302265-001

Ms. Michelle Muniz
Affirmed Housing
13520 Evening Creek Drive N. Suite 160
San Diego, CA 92128

PROJECT: ALUM ROCK AVENUE THREE-TO-SEVEN-STORY MIXED-USE BUILDING
2350 ALUM ROCK AVENUE
SAN JOSE, CALIFORNIA

SUBJECT: Geotechnical Engineering Study

REF.: Proposal for Geotechnical Engineering Study, Three-to-Seven-Story Mixed-Use Building, 2650 Alum Rock Avenue, San Jose, California, by Earth Systems Pacific, June 11, 2018.

Dear Ms. Muniz:

In accordance with your authorization of the above referenced proposal, this geotechnical engineering study has been prepared by Earth Systems Pacific (Earth Systems) for use in the development of plans and specifications for the proposed mixed-use building in San Jose, California. The conclusions and recommendations presented herein are based on our understanding of the currently proposed development, a review of the subsurface conditions revealed by the soil borings and Cone Penetrometer Tests (CPTs) advanced as a part of this investigation, and our engineering analysis.

We appreciate the opportunity to assist you on this project. Should you have any questions regarding the contents of this report, please contact the undersigned.

Sincerely,

Earth Systems Pacific

Kira Ortiz, PE 88089
Project Engineer

Girmay Weldegiorgis, GE 3099
Principal Engineer

Doc. No.: 1808-064.SER/kt

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

FIGURES

APPENDIX A

APPENDIX B

APPENDIX C

1.0 INTRODUCTION

This report presents the results of the geotechnical engineering study performed by Earth Systems Pacific (Earth System), for the proposed mixed-use building to be constructed off Alum Rock Avenue in San Jose, California. The attached Site Location Map Figure 1, shows the general location of the site and the attached Site Plan, Figure 2, shows the location of the borings and Cone Penetration Tests (CPTs) advanced at the site as part of this investigation.

Site Setting

The subject property is a 0.63-acre, rectangular-shaped lot, located at 2350 Alum Rock Avenue in San Jose, California (APN 484-41-166). The middle portion of the site has a latitude of 37.3586°N and a longitude of 121.8423°W (See Figure 1).

Site Description

The site is located on the south side of Alum Rock Avenue, at the southwest corner of the intersection of Foss Avenue and Alum Rock Avenue in San Jose, California. The project site is currently occupied a one-story commercial building. The site is flat, and a majority of the site is paved with asphaltic concrete parking stalls and drive aisles, with the exception of some landscaping that border the site as shown on the attached Site Plan (Figure 2).

Project Description

Based on a review of the site plan prepared by Architectural Technologies, it is our understanding that the planned construction will consist a 93,108 to 107,984 square-foot, three- to seven-story mixed-use development. The ground floor will feature a parking garage, a lobby, utility rooms, and a 3,800 square-foot commercial space at northwestern corner of the first floor. The upper floors will feature housing units ranging from 350 square-foot studios to 1100 square-foot 3 bedrooms. Related site improvements will include associated utilities, hardscape/landscape, pavement, and other site elements. No basement is anticipated.

Scope of Services

The scope of work for the geotechnical engineering study included general site reconnaissance, subsurface exploration, engineering evaluation and analysis of the data collected by Earth Systems, and preparation of this report. The analysis and engineering recommendations presented in the following sections of this report are based on our understanding of the proposed development at the subject site and our experience with projects of a similar nature.

The report and recommendations are intended to comply with the considerations of Section 1803 of the California Building Code (CBC), 2016 Edition, and common geotechnical engineering practice in this area at this time under similar conditions.

Preliminary geotechnical recommendations for site preparation and grading, foundations, slabs-on-grade, exterior flatwork, utility trench backfill, site drainage management, and geotechnical observation and testing are presented to guide the development of project plans and specifications. It is our intent that this update report be used by the client to form the geotechnical basis of the design of the project as described herein, and in the preparation of plans and specifications.

Detailed evaluation of the site geology and potential geologic hazards, and analyses of the soil for infiltration rates, mold or other microbial content, asbestos, radioisotopes, hydrocarbons, or other chemical properties are beyond the scope of this report. This report also does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, excavatability, shoring, temporary slope angles, and construction means and methods. Ancillary features such as temporary access roads, fences, light poles, and non-structural fills are not within our scope and are also not addressed.

To verify that pertinent issues have been addressed and to aid in conformance with the intent of this report, it is requested that final grading and foundation plans be submitted to this office for review. In the event that there are any changes in the nature, design, or locations of improvements, or if any assumptions used in the preparation of this update report prove to be incorrect, the conclusions and recommendations contained herein should not be considered valid unless the changes are reviewed and the conclusions of this update report are verified or modified in writing by the geotechnical engineer. The criteria presented in this update report are considered preliminary until such time as they are verified or modified in writing by the geotechnical engineer in the field during construction.

2.0 GEOLOGIC SETTING

Regional Geology

A review of the geologic literature indicates that the site is underlain by Holocene alluvial fan deposits, fine-grained facies (Qhff) (Knudsen, and others 2000).

Seismic Setting

The entire San Francisco Bay Area, is considered to be an active seismic region due to the presence of several active faults. Three northwest-trending major earthquake faults that are responsible for the majority of the movement on San Andreas fault system extend through the Bay Area. They include the San Andreas fault, the Hayward fault and the Calaveras fault, which

are respectively located approximately 14.7 miles to the southwest, 1.6 miles to the east and 4.4 miles to the northeast. The Monta-Vista Shannon fault is located approximately 9.7 miles southwest of the site. Using information from recent earthquakes, improved mapping of active faults, and a new model for estimating earthquake probabilities, the 2014 Working Group on California Earthquake Probabilities updated the 30 years earthquake forecast for California. They concluded that there is a 72 percent probability (or likelihood) of at least one earthquake of magnitude 6.7 greater striking somewhere in the San Francisco Bay region before 2043. A summary of the significant faults in the near vicinity of the site and their respective potential moment magnitudes are listed below.

Major Active Faults

Fault	Distance from Site (miles)	Probability of $M_w \geq 6.7$ within 30 Years[1]
Hayward	1.6 (E)	32%
Calaveras	4.4 (NE)	26%
Monta-Vista Shannon	9.7 (SW)	1%
San Andreas	14.7 (SW)	33%

[1] Working Group on California Earthquake Probabilities, 2014

3.0 FIELD INVESTIGATION

Subsurface Exploration

Our subsurface exploration program consisted of drilling three exploratory borings and advancing six Cone Penetrometer Tests (CPTs) at the site on July 27, 2018 at the approximate locations shown on the Site Plan, Figure 2.

Exploratory Borings

The borings were drilled using a truck-mounted drilling rig equipped with 8-inch diameter hollow stem augers and sampled to depths ranging from 20 to 45 feet below the ground surface (bgs). The drilling process consisted of augering to the desired depth and upon reaching that depth, the plug blocking the auger was retrieved and a standard sampler connected to steel rods was lowered into the hole through the augers that formed temporary casing for the hole. The samplers were driven with a 140-pound, drop hammer falling about 30 inches per drop using a rope and cathead. The samplers were driven up to 18 inches and the hammer blows required to drive the samplers were recorded every six inches and are presented on the boring logs.

Our staff engineer supervised the drilling program, logged the soil conditions encountered in the borehole and collected representative samples for laboratory testing. Subsurface conditions revealed by our borings were described by our staff engineer. The borings were backfilled with lean cement grout. The boring logs show soil description including: color, major and minor components, USCS classification, changes in soil conditions with depth, moisture content, consistency/density, plasticity, sampler type, and sampling depths and laboratory test results. Copies of the boring logs advanced for this investigation are presented in Appendix A.

Cone Penetrometer Tests

The CPT soundings were performed with Middle Earth Geo Testing, Inc. (MEGT) 25-ton truck mounted CPT rig. The soundings were conducted in accordance with ASTM specifications and pushed to a maximum depth of 60 feet below the ground surface. A copy of the CPT soundings is included in Appendix A.

A CPT involves pushing a standardized size instrument of a conical shape into the ground at a specified constant rate. The cone used for this project had a tip area of 10 cm^2 and a friction sleeve area of 150 cm^2. The cone was pushed into ground at a constant rate of 20-mm per second using the 25-ton truck as reaction weight. The cone was fitted with load cells, which recorded the total force acting on the cone (Q_c), sleeve friction (F_s), and pore pressure (u) readings at 5 cm depth intervals. The data collected from the CPT was used to interpret site stratigraphy, soil consistency, and strength using published relationships. Generally, cohesive soils (clays) have high friction ratios (sleeve friction divided by cone bearing – R_f), low cone bearing, and generate large excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing, and generate little in the way of excess pore water pressures.

Subsurface Profile

A review of the logs of borings drilled at the site by Earth Systems, indicates the near surface soils consist of stiff to very stiff, moist, lean clay with variable proportions of sand extending to approximately 18 to 21 feet below the ground surface (bgs); boring B3 encountered this lean clay material to the bottom of the boring at 20 feet bgs. However, B2 encountered approximately 6½ feet of fill consisting of stiff, lean clay and sandy lean clay immediately beneath the pavement. Underlying the fill material was lean clay material similar to that encountered in borings B1 and B3. Below the upper clayey soil, boring B1 and B2 encountered loose to medium dense, wet, clayey sand to a depth of 28 feet bgs in boring B1 and to the bottom of the boring in B2. Below the upper clayey soil, boring B3 encountered alternating layers of loose, very moist, sand, and

stiff, very moist silty clay to a depth of 20 feet bgs. Boring B1 then encountered alternating layers of medium stiff lean clay with dense clayey sand to the maximum depths explored of 45 feet bgs.

A review of the CPT data pushed at the site show the surface soils are predominantly clayey in the upper 20 feet with the exception of a few small sandy layers. Underlying the upper clayey soils, the CPTs encountered alternating layers of clayey silt to clayey silt soil with clay to maximum depths explored of 80 feet bgs. However, CPT3 and CPT4 encountered a gravelly sand to sandy layer from approximately 45-55 feet and 45-50 feet in CPT 3 and CPT 4, respectively.

Groundwater was encountered at approximately 14 to 20 feet below the ground surface. The historic high depth to groundwater level according to the CGS Seismic Hazards Zones Report for the San Jose East Quadrangle maps is reported to be between 10 and 20 feet below the ground surface. It should be noted, however, that fluctuations in the level of subsurface water can occur due to variations in rainfall, temperature, and recharge from the nearby San Francisco Bay, and groundwater levels should not be considered constant.

Laboratory Testing

Selected liner samples were tested for moisture content and dry density (ASTM D 2216-10 and D 2937-17). Two sample was tested to determine their Atterberg Limits (ASTM D 4318-17). Three sample were tested for grain size distribution (ASTM D 422-63/07; D 1140-17). One sample was tested for Unconfined Compressive Strength (ASTM D 2166/D2166M-16). Two samples of the near surface soil were sent to Cerco Analytical for corrosion potential testing. Copies of the laboratory test results are included in Appendix B.

4.0 DATA ANALYSIS

Subsurface Soil Classification

Based on the data acquired during our subsurface investigation (See Appendix A), the site is assigned to Site Class D (“stiff soil”) as defined by Table 20.3-1 of the ASCE 7-10.

Seismic Design Parameters

The following seismic design parameters represent the general procedure as outlined in Section 1613 of the CBC and in ASCE 7. The values determined below are based on the 2009 National Earthquake Hazard Reduction Program (NEHRP) maps and were obtained using the United States Geological Survey’s Design Maps Web Application.

Summary of Seismic Parameters - CBC 2016
(Site Coordinates 37.3586°N, 121.8423°W)

Parameter	Design Value
Site Class	D
Mapped Short Term Spectral Response Parameter, (S_s)	1.50g
Mapped 1-second Spectral Response Parameter, (S_1)	0.60g
Site Coefficient, (F_a)	1.0
Site Coefficient, (F_v)	1.5
Site Modified Short Term Response Parameter, (S_{Ms})	1.50g
Site Modified 1-second Response Parameter, (S_{M1})	0.90g
Design Short Term Response Parameter, (S_{Ds})	1.00g
Design 1-second Response Parameter, (S_{D1})	0.60g

Liquefaction

Soil liquefaction is a phenomenon where saturated granular soils undergo a substantial loss of strength due to increased pore water pressure resulting from cyclic stress applications induced by earthquakes or other vibrations. In this process, the soil acquires mobility sufficient to permit both vertical and horizontal movements, which may result in significant deformations. Soils most susceptible to liquefaction are loose, uniformly graded, fine-grained sands. In addition, recent literature indicates that fine grained soils may also be susceptible to liquefaction or cyclic strain softening. Examples of highly susceptible fine-grained soil include "non-plastic silts and clayey silts of low plasticity (PI<12) at high water content to liquid limit ratios (w_c/LL>0.85)." Examples of soils moderately susceptible to liquefaction include "clayey silts and silty clays of moderate plasticity (12<PI<18) at natural water content and Liquid Limits ratios (w_c/LL) greater than 0.80" (Bray and Sancio, 2006). It is generally acknowledged that liquefaction will not affect surface improvements if these deposits are located at a depth greater than 50 feet below the ground surface. In the deeper deposits, the greater overburden pressure is sufficient to prevent liquefaction effects from occurring.

Analysis Parameters

The liquefaction analysis was carried out using an assumed historic high groundwater table of 10 feet below ground surface based on Plate 1.2 from the Seismic Hazard Zone Report (SHZR) for the San Jose East 7.5-Minute Quadrangle (2000). In accordance with USGS Interactive Deaggregations Web Application, the predominant earthquake is the Hayward fault with a magnitude of 6.9. The liquefaction analysis was performed with the aid of computer program Cliq Version V.2.2.0.37 by Geologismiki utilizing the peak ground acceleration of 0.52g (PGAm)

based on the United States Geological Survey's Design Maps Web Application and the methodology suggested by Idriss and Boulanger, 2014.

Analysis Results

The loose, coarser grained deposits found at the site were assumed to be potentially liquefiable and the results of our CPT liquefaction analysis are presented below. The calculated liquefaction settlement ranges from approximately a negligible amount of liquefaction to 1½-inch. The liquefaction analysis results are included in Appendix C.

Discussion

In general, there is a high potential of the granular deposits to liquefy during a seismic event. Should liquefaction occur, liquefaction related settlements on the order of approximately 1¾-inch. Because liquefaction ranges from a negligible amount to approximately 1½-inches, the estimated differential settlement is approximately 1½-inches across a distance of 50 feet.

The boundary curve for discriminating between occurrence and non-occurrence of surface effects of liquefaction, after Ishihara 1985 (Youd and Garris, 1995), is presented at the end of Appendix C in Figure C1. The point representative of B1 and B2, as well as CPT-1 through CPT-6 all plot below the curve, indicating a low likelihood of surface manifestation potential.

Static Settlement

The consolidation test results on the fine grained soils indicate overconsolidated conditions. Due to the presence of sandy layers at the site, static settlements are expected to be relatively immediate and most of the consolidation will occur during construction. Anticipated static settlements of the onsite native soils are on the order of 1-inches with a differential settlement of ½-inch.

5.0 CONCLUSIONS

General

The subject site is suitable for the proposed development from a geotechnical engineering standpoint, provided the recommendations included in this report are incorporated into the design and implemented during site grading and foundation construction. The primary geotechnical concerns are the presence of moderately expansive surface soils at the site. To reduce the shrinkage and swelling potential, special provisions in the site preparation and under-slab measures will be necessary.

Site Preparation and Grading

Grading plans were not available during the preparation of this report; however, it is anticipated

that cuts and fills required to achieve the final pad grade will be on the order of 1- to 2-feet or less. The near surface clayey soils encountered at the site could become unstable with the addition of excessive amounts of water should the grading occur during wet weather conditions. Unstable soils hinder compactive effort and are inappropriate for placement of additional fill. Alternatives to correct instability include aeration to dry the soils, lime treatment, and the use of gravel or geotextiles as stabilizing measures. Recommendations for stabilization should be provided by the geotechnical engineer as needed during construction. Grading operations are discussed in detail in the *Recommendations* section of this report.

Soil Expansion Potential

A plasticity index test performed on a sample of the upper soils from the site resulted in a liquid limit (LL) of 41 and a plasticity index of (PI) of 21. These values indicate that the sample tested has a moderate expansion potential. Soils with moderate shrinkage-swelling potential undergo pronounced volume changes with moisture content fluctuations and when constrained they could exert significant uplift forces on the overlying structures. Thus, during construction, the on-site soils should not be allowed to dry-out and crack. Proper moister conditioning is important to mitigate soil expansion and contraction.

Foundations

Due to the firm nature of the onsite soils, the proposed loads of the building may be adequately supported on a reinforced concrete mat foundation. Foundation recommendations are discussed in detail in the *Recommendations* section of this report.

Corrosion

Two sample of the near surface soils were collected for corrosion analysis. The sample was sent to Cerco Analytical and tested in accordance with ASTM Test Methods. They conclude that the soil is classified as **corrosive** to buried metallic utility pipes. The sulfate concentration of the samples were 68 to 77 mg/kg and Type II or V cement can be used for the foundations and slab-on-grade concrete constructed near surface. Earth Systems does not practice corrosion engineering and we recommend that a qualified corrosion engineer be consulted regarding mitigation of the corrosion effects of the site soils on metals. The results of the test along with a brief corrosivity analysis by CERCO are included at the end of this report, in Appendix B.

Groundwater

Groundwater was encountered in boring B-1 and B-2 during the subsurface exploration at approximately 21 and 19 feet below the surface (bgs), respectively. Additionally, groundwater was encountered in CPT-1 through CPT-6 at 20feet bgs with the exception of CPT-4, where groundwater was encountered at approximately 14 feet bgs. According to the Seismic Hazard

Zone Report for the San Jose East Quadrangle, the historic high groundwater in the area of the site is between 10 and 20 feet bgs. It is not anticipated that groundwater will adversely affect construction at the site.

Seismicity

The San Francisco Bay area is recognized by geologists and seismologists as one of the most seismically active regions in the United States. The significant earthquakes in this area are generally associated with crustal movement along well-defined, active fault zones which regionally trend in a northwesterly direction. Although research on earthquake prediction has greatly increased in recent years, seismologists cannot predict when and where an earthquake will occur. Nevertheless, based on current technology, it is reasonable to assume that the proposed development will be subjected to at least one moderate to severe earthquake during its lifetime. During such an earthquake, the danger from fault offset on the site is low, but strong shaking of the site is likely to occur and, therefore, the project should be designed in accordance with the seismic design provisions of the latest California Building Code. The California Building Code seismic design parameters are not intended to prevent structural damage during an earthquake, but to reduce damage and minimize loss of life.

6.0 RECOMMENDATIONS

Site Preparation and Grading

General Site Preparation

1. Site clearing, placement of fill, and grading operations at the site should be conducted in accordance with the recommendations provided in this report. Compaction recommendations for site grading can be found later in this section.

2. The site should be prepared for grading by removing structures scheduled for demolition, existing flatwork, existing trees and their root systems, vegetation, debris, and other potentially deleterious materials from areas to receive improvements. Existing utility lines that will not be serving the proposed project should be either removed or abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

3. Due to potential ground disturbance from potential demolition activities, a program of over-excavation and backfilling may be required. Loose, disturbed soil within the existing building areas should be cleaned out (excavated) to competent, undisturbed soil. Over-excavation of the upper 1 to 2 feet of existing ground may be needed. The exposed ground should be reviewed by the geotechnical engineer to determine the need for additional excavation work.

4. Undocumented fills (if any) should be removed and recompacted in areas to receive engineered fill, new building foundations, flatwork or other development features.

5. Ruts or depressions resulting from the removal of the previous building foundations, slabs, utilities, fill soils, tree root systems, and abandoned and/or buried structures, buried debris, and remnants of the former use of the site that are discovered during site grading should be removed and properly cleaned out down to undisturbed native soil. The bottoms of the resulting depressions should be scarified and cross-scarified at least 8 inches in depth, moisture conditioned and recompacted. The depressions should then be backfilled with approved, compacted, moisture conditioned structural fill, as recommended in other sections of this report.

6. Site clearing, and backfilling operations should be conducted under the field observation of the geotechnical engineer.

7. The geotechnical engineer should be notified at least 48 hours prior to commencement of grading operations.

Compaction Recommendations

1. In general, the underlying native soil should be scarified at least 8 inches, moisture conditioned and recompacted to the recommended relative compaction presented below, unless noted otherwise. This scarification operation should be performed at locations designated for proposed structural fill, concrete slabs-on-grade, exterior flatwork, foundations, and pavement areas.

2. Recompacted native soils and fill soils should be compacted to a minimum relative compaction of 90 percent of maximum dry density at a moisture content at least 3 percentage points above optimum.

3. In areas to be paved, the upper 8 inches of subgrade soil should be compacted to a minimum 92 percent of maximum dry density at a moisture content at least 3 percentage points over optimum. The aggregate base courses should be compacted to a minimum 95 percent of maximum dry density at a moisture content that is slightly over optimum. The subgrade and base should be firm and unyielding when proof-rolled with heavy, rubber-tired equipment prior to paving. The pavement subgrade soils should be frequently moistened as necessary prior to placement of the aggregate base and concrete slab to maintain the soil moisture content above optimum.

Fill Recommendations

1. The on-site native and fill soils that are free of debris, excessive amounts of organics and other deleterious material, may be used as structural fill, but should not be placed within the upper 18 inches of the subgrade beneath building floor slab and exterior flatwork.

2. To reduce the effects of soil expansion and contraction on the reinforced concrete mat foundation, the slabs should be constructed over a minimum of 18 inches of Class 2 aggregate base conforming with Section 26-1.02B of the Caltrans Standard Specifications. Prior to placement of the aggregate base, the subgrade soil should be moistened as necessary to maintain the soil moisture content at or above optimum, and no desiccations cracks should be present. Non-expansive imported material should also be used in areas to receive exterior concrete flatwork (refer to the Exterior Flatwork section of this report).

3. If fill is to be imported for general use at the site (other than non-expansive imported material), the soil should meet the following criteria:

    a. Be coarse grained and have a plasticity index of less than 15 and/or an expansion index less than 15;
    b. Be free of organics, debris or other deleterious material;
    c. Have a maximum rock size of 3 inches; and
    d. Contain sufficient clay binder to allow for stable foundation and utility trench excavations.

4. A representative sample of the proposed imported soils should be submitted at least three days before being transported to the site for evaluation by the geotechnical engineer. During importation to the site the material should be further reviewed on an intermittent basis.

Foundations

1. The proposed development may be supported by a reinforced concrete mat foundation bearing on the stiff native or engineered fill material. The mat slab should be designed using a maximum localized allowable bearing pressure of 1,500 psf for dead plus live load. This value may be increased by one-third when transient loads such as wind or seismicity are included. The mat slab should be sufficiently thick to uniformly spread the concentrated loads imposed by any building columns. The mat should be designed using a modulus of subgrade reaction value of 30 psi per inch.

2. The mat slab should be designed for an edge cantilever of 8 feet and have an interior span of 10 feet unsupported.

3. Resistance to lateral loads should be calculated based on a passive equivalent fluid pressure of 250 pcf and a friction factor of 0.30. Passive and frictional resistance can be combined in the calculations without reductions. These values may be used in combination without reduction of either value. These values are based on the assumption that backfill adjacent to foundations is properly compacted.

4. The mat slab should be underlain by at least 4 inches of clean crushed rock. The subgrade soil beneath the slab should be prepared as recommended by the geotechnical engineer.

5. In areas where moisture transmitted from the subgrade would be undesirable, a vapor retarder should be utilized beneath the slab-on-grade. The vapor retarder should comply with ASTM Standard Specification E 1745-17 and the latest recommendations of ACI Committee 302. The vapor retarder should be installed in accordance with ASTM Standard Practice E 1643-18a. Care should be taken to properly lap and seal the vapor retarder, particularly around utilities, and to protect it from damage during construction. A layer of sand above the vapor retarder is optional.

6. If sand, gravel or other permeable material is to be placed over the vapor retarder, the material over the vapor retarder should be only lightly moistened and not saturated prior to casting the slab. Excess water above the vapor retarder would increase the potential for moisture damage to floor coverings. Recent studies, including those by ACI Committee 302, have concluded that excess water above the vapor retarder would increase the potential for moisture damage to floor coverings and could increase the potential for mold growth or other microbial contamination. These studies also concluded that it is preferable to eliminate the sand layer and place the slab in direct contact with the vapor retarder, particularly during wet weather construction. However, placing the concrete directly on the vapor retarder would require special attention to using the proper vapor retarder, concrete mix design, and finishing and curing techniques.

7. When concrete slabs are in direct contact with vapor retarders, the concrete water to cement (w/c) ratio must be correctly specified to control bleed water and plastic shrinkage and cracking. The concrete w/c ratio for this type of application is typically in the range of 0.45 to 0.50. The concrete should be properly cured to reduce slab curling and plastic shrinkage cracking. Concrete materials, placement, and curing methods should be specified by the architect/engineer.

Exterior Flatwork

1. Exterior flatwork that will not experience vehicular traffic should have a minimum thickness of 4 full inches. The exterior slabs should be placed on soil subgrade moisture conditioned to a minimum of 2 percent above optimum moisture content and overlain by a 4-inch thick layer of Class 2 aggregate baserock. Both the soil subgrade and aggregate baserock layers should be compacted to a minimum of 90 percent relative compaction. Exterior flatwork should be reinforced as directed by the architect/engineer. If adverse conditions are encountered during grading, a thicker layer of low-expansive material may be recommended by the geotechnical engineer.

2. Assuming that movement (i.e., 1/4-inch or more) of exterior flatwork beyond the structure is acceptable, the flatwork should be designed to be independent of the building foundations. The flatwork should not be doweled to foundations, and a separator should be placed between the two.

3. To reduce shrinkage cracks in concrete, the concrete aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the concrete should be properly placed and finished, contraction joints should be installed, and the concrete should be properly cured. Concrete materials, placement and curing specifications should be at the direction of the designer; ACI 302.1R-04 and ACI 302.2R-04 are suggested as resources for the designer in preparing such specifications.

Utility Trench Backfills

1. A select, noncorrosive, granular, easily compacted material should be used as bedding and shading immediately around utility pipes. The site soils may be used for trench backfill above the select material.

2. Trench backfill in the upper 8 inches of subgrade beneath pavement areas should be compacted to a minimum of 92 percent of maximum dry density at a moisture content at least 3 percentage points above optimum moisture content and the aggregate base courses should be compacted to a minimum 95 percent of maximum dry density at a moisture content slightly over optimum. Trench backfill in other areas should be compacted to a minimum of 90 percent of maximum dry density at a moisture content at least 3 percentage points above optimum moisture content. Jetting of utility trench backfill should not be allowed.

3. Where utility trenches extend under perimeter foundations, the trenches should be backfilled entirely with approved fill soil compacted to a minimum of 90 percent of maximum dry density at a moisture content at least 3 percentage points above optimum moisture content. The zone of approved fill soil should extend a minimum distance of 2 feet on both sides of the foundation. If utility pipes pass through sleeves cast into the perimeter foundations, the annulus between the pipes and sleeves should be completely sealed.

4. Parallel trenches excavated in the area under foundations defined by a plane radiating at a 45-degree angle downward from the bottom edge of the footing should be avoided, if possible. Trench backfill within this zone, if necessary, should consist of Controlled Low Strength Material (CLSM), also known as Controlled Density Fill (Flowable Fill).

Site Drainage and Finish Improvements

1. Unpaved ground surfaces should be finish graded to direct surface runoff away from site improvements at a minimum 5 percent grade for a minimum distance of 10 feet. If this is not practical due to the terrain or other site features, swales with improved surfaces should be provided to divert drainage away from improvements. The landscaping should be planned and installed to maintain proper surface drainage conditions.

2. Runoff from driveways, roof gutters, downspouts, planter drains and other improvements should discharge in a non-erosive manner away from foundations, pavements, and other improvements. The downspouts may discharge onto splash blocks that direct the flow away from the foundation.

3. Stabilization of surface soils, particularly those disturbed during construction, by vegetation or other means during and following construction is essential to protect the site from erosion damage. Care should be taken to establish and maintain vegetation.

4. Raised planter beds adjacent to foundations should be provided with sealed sides and bottoms so that irrigation water is not allowed to penetrate the subsurface beneath foundations. Outlets should be provided in the planters to direct accumulated irrigation water away from foundations.

5. Open areas adjacent to exterior flatwork should be irrigated or otherwise maintained so that constant moisture conditions are created throughout the year. Irrigation systems should be controlled to the minimum levels that will sustain the vegetation without saturating the soil.

6. Bio-retention swales constructed within 10 feet or less from the building foundation should be lined with a 20-mil pond liner.

Geotechnical Observation and Testing

1. It must be recognized that the recommendations contained in this report are based on a limited number of borings and rely on continuity of the subsurface conditions encountered.

2. It is assumed that the geotechnical engineer will be retained to provide consultation during the design phase, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

3. Unless otherwise stated, the terms "compacted" and "recompacted" refer to soils placed in level lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent of maximum dry density. The standard tests used to define maximum dry density and field density should be ASTM D 1557-12 and ASTM D 6938-17, respectively, or other methods acceptable to the geotechnical engineer and jurisdiction.

4. “Moisture conditioning” refers to adjusting the soil moisture to at least 2 percentage points above optimum moisture content prior to application of compactive effort. If the soils are overly moist so that they become unstable, or if the recommended compaction cannot be readily achieved, drying the soil to optimum moisture content or just above may be necessary. Placement of gravel layers or geotextiles may also be necessary to help stabilize unstable soils. The geotechnical engineer should be contacted for recommendations for mitigating unstable soils.

5. At a minimum, the following should be provided by the geotechnical engineer:

    - Review of final grading and foundation plans,
    - Professional observation during site preparation, grading, and foundation excavation,
    - Oversight of soil compaction testing during grading,
    - Oversight of soil special inspection during grading.

6. Special inspection of grading should be provided as per Section 1705.6 and 1705.8 and Table 1705.6 and 1705.8 of the CBC; the soils special inspector should be under the direction of the geotechnical engineer. In our opinion, the following operations should be subject to *continuous* soils special inspection:

- Scarification and recompaction,
- Fill placement and compaction,
- Over-excavation to the recommended depth.

7. In our opinion, the following operations may be subject to *periodic* soils special inspection; subject to approval by the Building Official:

   - Site preparation,
   - Compaction of utility trench backfill,
   - Removal of existing development features,
   - Compaction of subgrade and aggregate base,
   - Observation of foundation excavations,
   - Building pad moisture conditioning.

8. It will be necessary to develop a program of quality control prior to beginning grading. It is the responsibility of the owner, contractor, or project manager to determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

9. The locations and frequencies of compaction tests should be as per the recommendations of the geotechnical engineer at the time of construction. The recommended test locations and frequencies may be subject to modification by the geotechnical engineer based upon soil and moisture conditions encountered, the size and type of equipment used by the contractor, the general trend of the compaction test results, and other factors.

10. A preconstruction conference among a representative of the owner, the geotechnical engineer, soils special inspector, the architect/engineer, and contractors is recommended to discuss planned construction procedures and quality control requirements. Earth Systems should be notified at least 48 hours prior to beginning grading operations.

7.0 CLOSURE

This report is valid for conditions as they exist at this time for the type of project described herein. Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project at this time under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the Scope of Services section. Application beyond the stated intent is strictly at the user's risk.

If changes with respect to the project type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions stated in this report are not correct, Earth Systems should be notified for modifications to this report. Any items not specifically addressed in this report should comply with the California Building Code and the requirements of the governing jurisdiction.

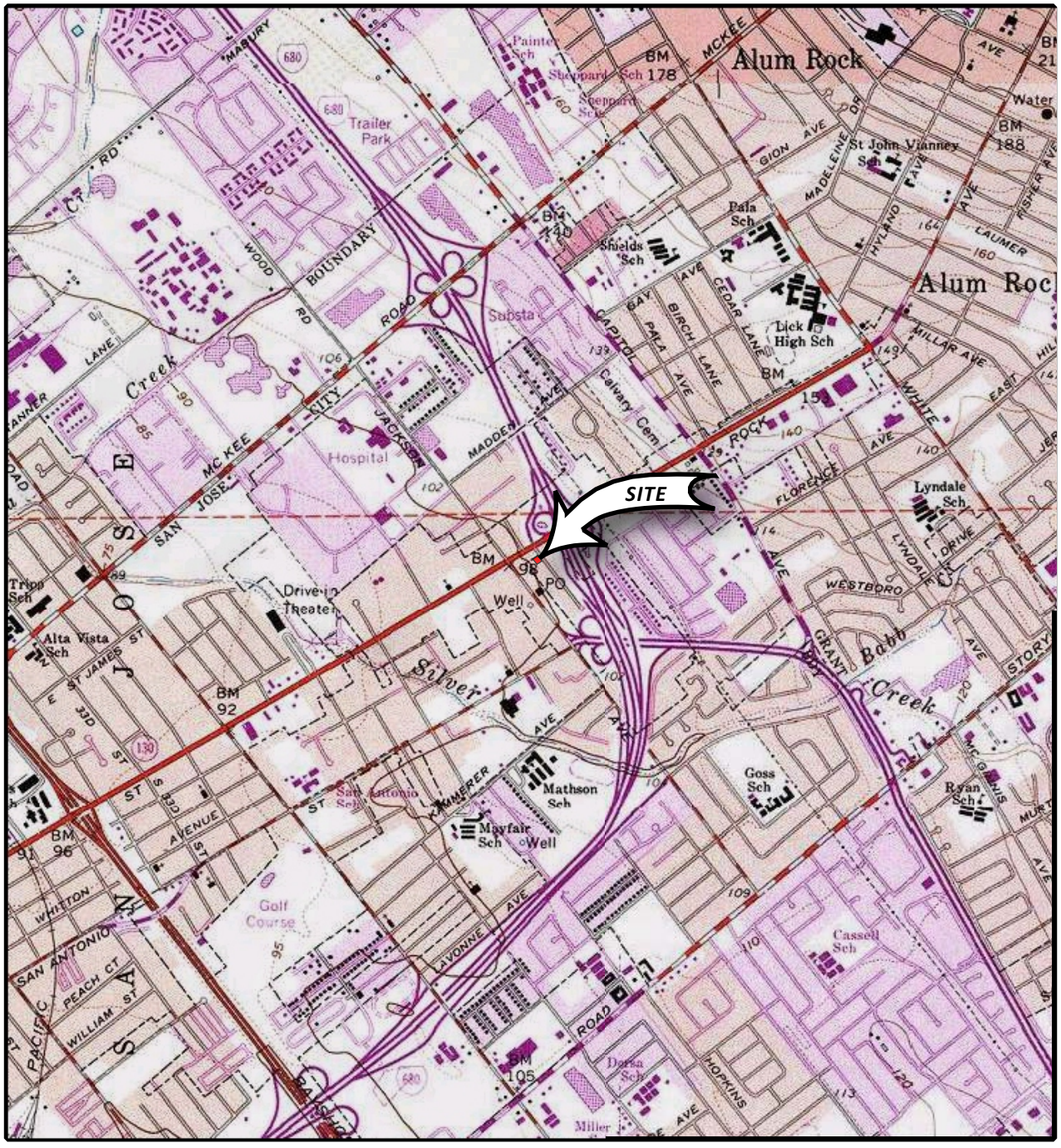
The preliminary recommendations of this report are based upon the geotechnical conditions encountered during the investigation and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by this firm based on conditions exposed at the time of construction.

If Earth Systems is not retained to provide construction observation and testing services, it will not be responsible for the interpretation of the information by others or any consequences arising there from. This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems. This report should be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems, the client, and his authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems.

FIGURES

Figure 1

TN MN 13.1



Approximate Scale 1:24,000

1 0 1 Mile

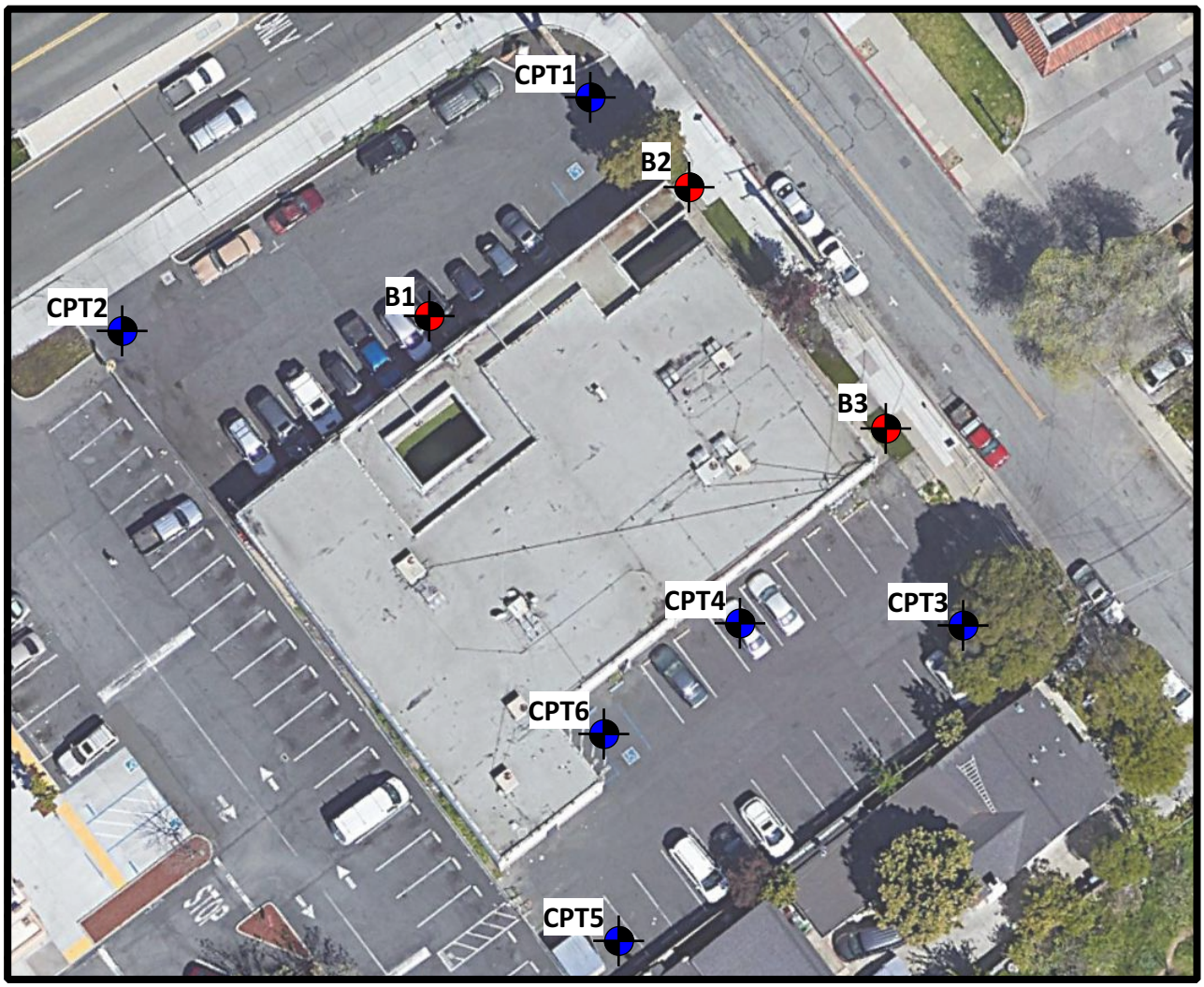
1 0 1 Kilometer

Base: USGS 7.5 Minute Series, Newark Quadrangle (2015)

Earth Systems Pacific	Three-to-Seven-Story Mixed-Use Building 2350 Alum Rock Avenue San Jose, California	Site Location Map 302265-001

Figure 2

TN MN 13.1



0 50 100 150

Approximate Scale in Feet

Approximate Boring Location

Approximate Cone Penetrometer Location

Earth Systems Pacific	Three-to-Seven-Story Mixed-Use Building 2350 Alum Rock Avenue San Jose, California	Boring Location Map 302265-001

APPENDIX A

Boring Logs
Cone Penetrometer Tests

Earth Systems Pacific

Boring No. 1

LOGGED BY: X. Mejia
DRILL RIG: B-40
AUGER TYPE: 8" Hollow Stem Auger

JOB NO.: 302265-001
DATE: 07/27/2018

Alum Rock Ave Three-to Seven-Story Mixed Use Building
2350 Alum Rock Ave; APN:484-41-166
San Jose,Ca.

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0			3" AC/4" AB gray brown							
1	CL		LEAN CLAY; stiff, very dark brown, very moist							
2			.						5	
3			LL = 41, PI = 21	2.5-3.0	1-1	■	112	18.6	5 5	3.0
4			-yellow brown to gray brown, mottled with gray, trace fine-grained subrounded gravel	4.0-4.5	1-2	■	121.5	16.1	8 8 13	2.5
5										
6										
7										
8										
9			- wet						4 3	
10			- dark gray-brown and orange mottle	9.5-10.0	1-3	■			7	0.5
11										
12										
13										
14			- more gray with orange brown mottle						5 5	
15				14.5-15.0	1-4	■			6	
16										
17										
18			- increase in sand content, very moist							
19									7 7	
20				19.5-20.0	1-5	■	112	19.5	8	
21	SC		Clayey SAND, loose, wet, brown, med-coarse sand							
22										
23									9 10	
24			Fines = 48%	24.0-24.5	1-6	■			12	
25										
26										

LEGEND: ■ 2.5" Mod Cal Sample ▭ 2.0" Cal Sample ● SPT ○ Bulk Sample ▽ Groundwater

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 1
PAGE 2 OF 2

LOGGED BY: X. Mejia
DRILL RIG: B-40
AUGER TYPE: 8" Hollow Stem Auger

JOB NO.: 302265-001
DATE: 07/27/2018

Alum Rock Ave Three-to Seven-Story Mixed Use Building
2350 Alum Rock Ave; APN:484-41-166
San Jose,Ca.

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
27										
28	CL		LEAN CLAY, medium stiff, yellow brown, wet/very moist							
29									5	
30				29.5-30.0	1-7	■	115	25.6	12 17	0.75
31										
32										
33										
34									8	
35				34.5-35.0	1-8	■	118	21.3	12 19	
36										
37	SC		CLAYEY SAND with GRAVEL, dense, gray brown, wet							
38										
39				38.5-39.0	1-9	■			50 / 6"	
40										
41										
42										
43									18	
44			Fines = 15%	44.5-45.0	1-10	●			28 50 / 5"	
45										
46			Bottom of Boring at 45.0' Groundwater encountered at 21'.							
47										
48										
49										
50										
51										
52										
53										
54										

LEGEND: ■ 2.5" Mod Cal Sample ▭ 2.0" Cal Sample ● SPT ○ Bulk Sample ▼ Groundwater

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 2

LOGGED BY: X. Mejia
DRILL RIG: B-40
AUGER TYPE: 8" Hollow Stem Auger

PAGE 1 OF 1
JOB NO.: 302265-001
DATE: 07/27/2018

Alum Rock Ave Three-to Seven-Story Mixed Use Building
2350 Alum Rock Ave; APN:484-41-166
San Jose,Ca.

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0			3" AC/8" AB gray brown							
1-6	CL/SC		FILL; LEAN CLAY and SANDY LEAN CLAY with gravel, stiff dark brown with yellow brown , moist	3.0-3.5	2-1	■	127	15.8	5 9 6	
7-18	CL		LEAN CLAY, stiff, olive brown, with orange brown and gray throughout, very moist	6.5-7.0	2-2	■	112	20.6	6 6 9	2.0
				11.0-11.5	2-3	■	119	16.9	8 9 12	3.25
				14.5-15.0	2-4	■	122	15.8	5 6 7	
19-25	SC		Clayey SAND medium dense, wet, gray brown Fines = 44%	19.5-20.0	2-5	■			5 8 11	
				24.5-25.0	2-6	■			7 17 20	
26			Bottom of Boring at 25.0' Groundwater encountered at 19'.							

LEGEND: ■ 2.5" Mod Cal Sample ▭ 2.0" Cal Sample ● SPT ○ Bulk Sample ▼ Groundwater

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 3

LOGGED BY: X. Mejia
DRILL RIG: B-40
AUGER TYPE: 8" Hollow Stem Auger

PAGE 1 OF 1
JOB NO.: 302265-001
DATE: 07/27/2018

Alum Rock Ave Three-to Seven-Story Mixed Use Building
2350 Alum Rock Ave; APN:484-41-166
San Jose,Ca.

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0			2" AC/8" AB gray brown							
1	CL		LEAN CLAY, very stiff, dark brown, moist							
2									9	
3				3.0-3.5	3-1	■	106	22.1	16 19	4.5
4			-stiff, yellow brown							
5										
6									6 7	
7				6.5-7.0	3-2	■	118	19.0	11	2.5
8										
9										
10									4 5	
11				11.0-11.5	3-3	■	108	25.2	2	1.25
12										
13										
14										
15									4 6	
16				16.0-16.5	3-4	■			7	0.75
17										
18									5	
19				19.5-20.0	3-5	■			7 9	
20			Bottom of Boring at 20.0' Groundwater not encountered.							
21										
22										
23										
24										
25										
26										

LEGEND: ■ 2.5" Mod Cal Sample ▭ 2.0" Cal Sample ● SPT ○ Bulk Sample ▼ Groundwater

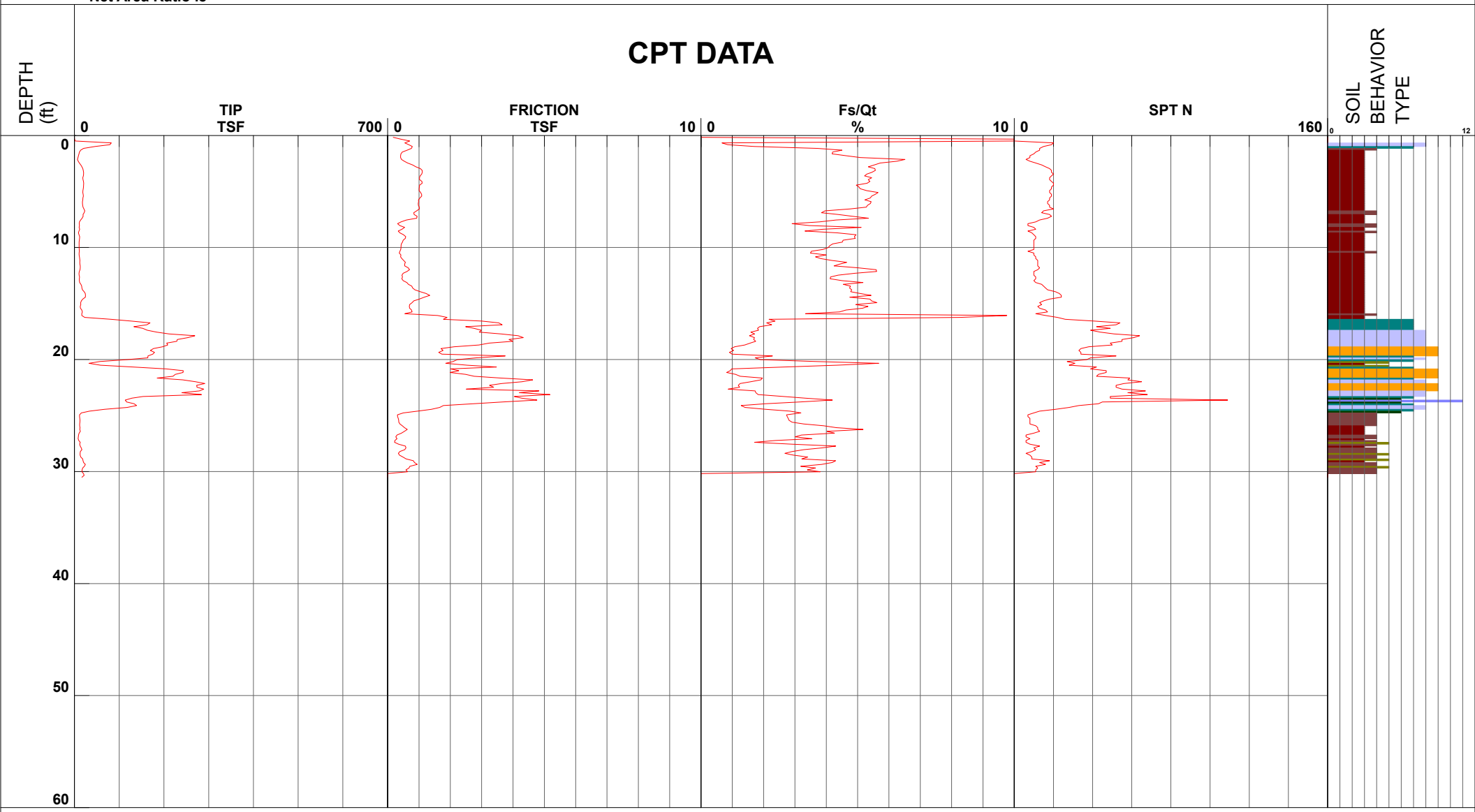
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems

PrcAlum Rock Avenue Three-to-Seven-Story Mixed-Us		Operatorg	RB-JM	Filename	SDF(032).cpt
Job Number	302265-001	Cone Number	DDG1418	GPS	
Hole Number	CPT-01	Date and Time	7/27/2018 7:26:25 AM	Maximum Depth	30.51 ft
EST GW Depth During Test		20.00 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 15cm squared

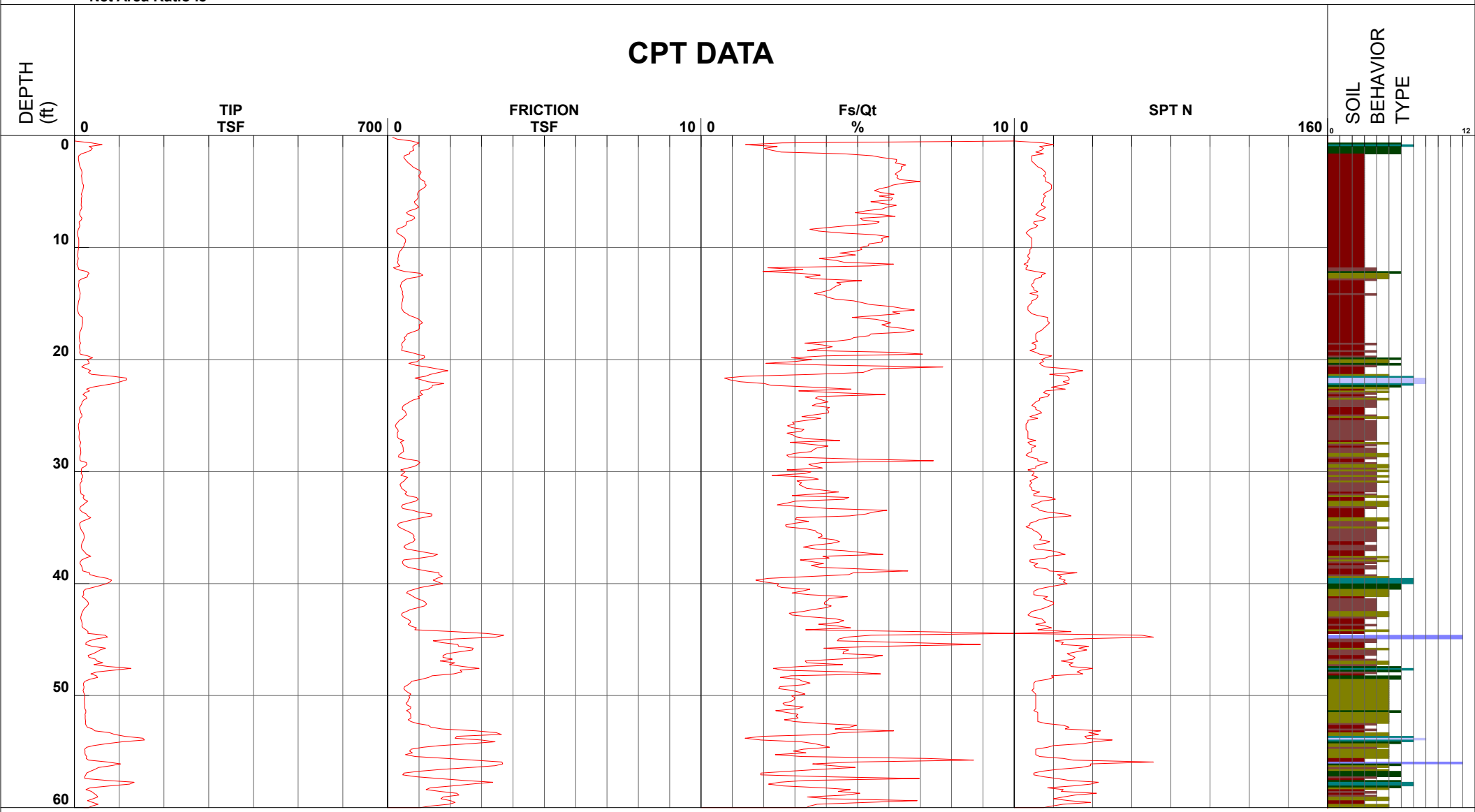
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Prc	Alum Rock Avenue Three-to-Seven-Story Mixed-Us	Operator	RB-JM	Filename	SDF(033).cpt
Job Number	302265-001	Cone Number	DDG1418	GPS	
Hole Number	CPT-02	Date and Time	7/27/2018 8:00:16 AM	Maximum Depth	60.53 ft
EST GW Depth During Test		20.00 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 15cm squared

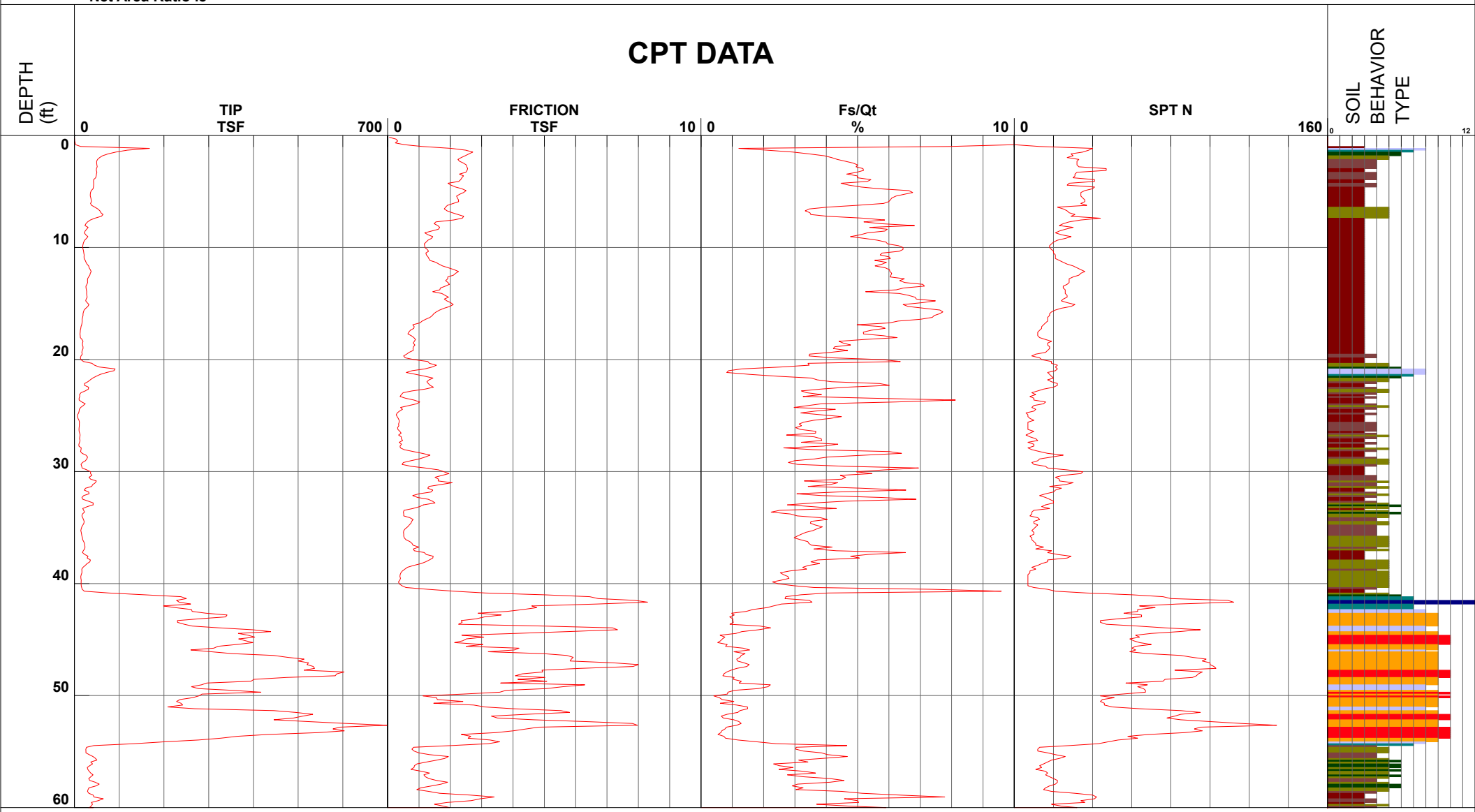
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

PrcAlum Rock Avenue Three-to-Seven-Story Mixed-Us		Operatorg	RB-JM	Filename	SDF(034).cpt
Job Number	302265-001	Cone Number	DDG1418	GPS	
Hole Number	CPT-03	Date and Time	7/27/2018 8:52:22 AM	Maximum Depth	60.53 ft
EST GW Depth During Test		20.00 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 15cm squared

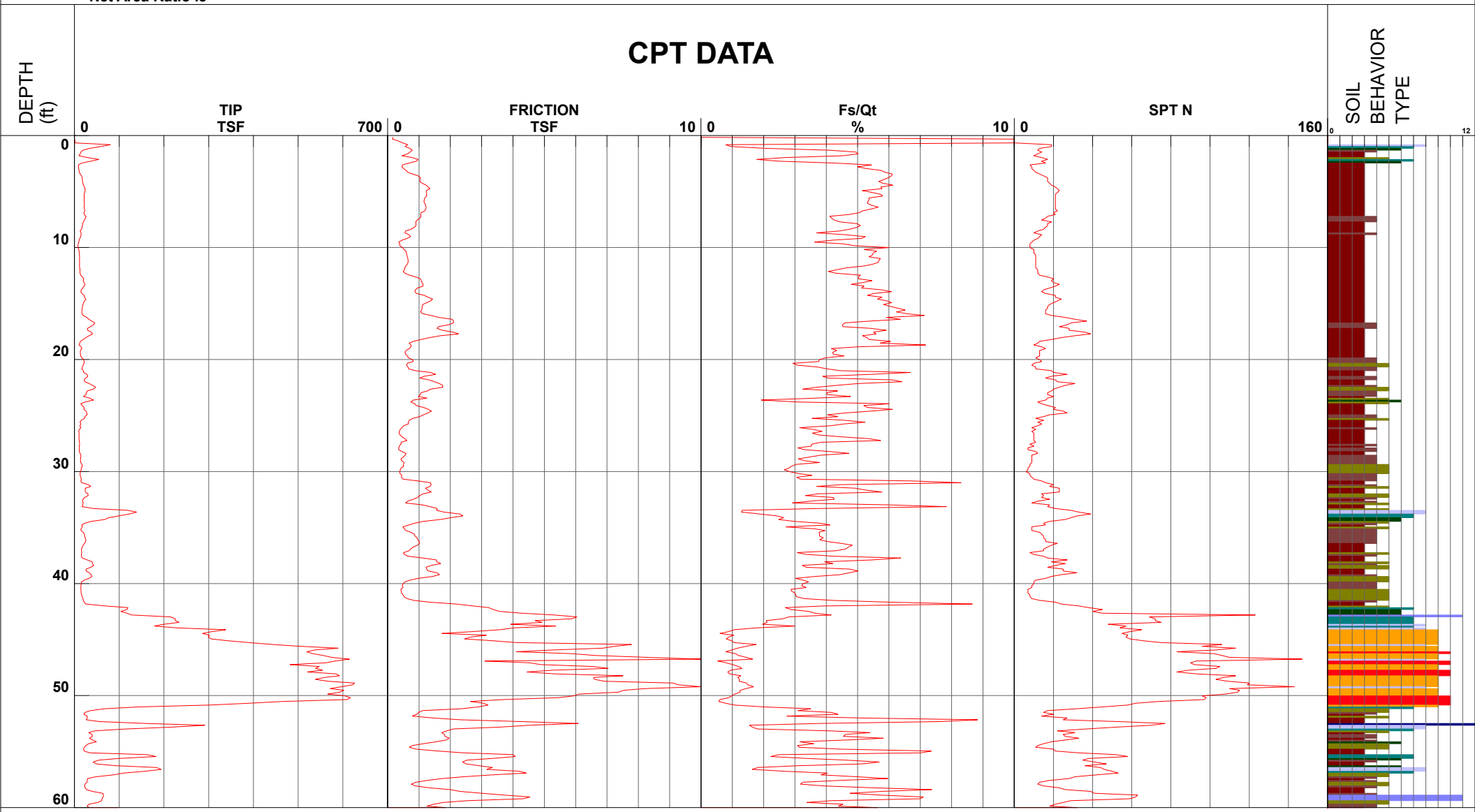
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

PrcAlum Rock Avenue Three-to-Seven-Story Mixed-Us		Operatorg	RB-JM	Filename	SDF(035).cpt
Job Number	302265-001	Cone Number	DDG1418	GPS	
Hole Number	CPT-04	Date and Time	7/27/2018 9:42:21 AM	Maximum Depth	60.53 ft
EST GW Depth During Test		14.00 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 15cm squared

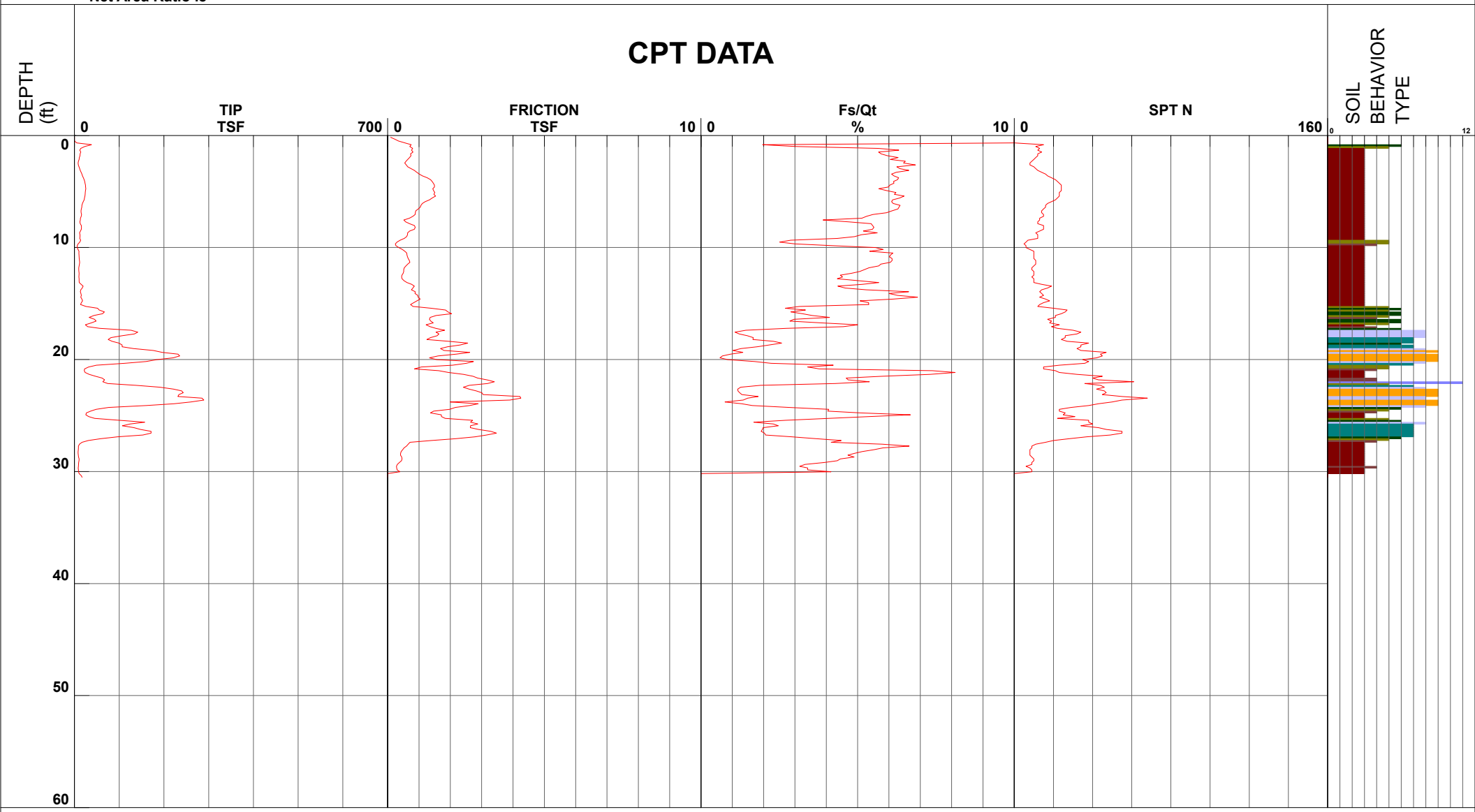
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

PrcAlum Rock Avenue Three-to-Seven-Story Mixed-Us		Operatorg	RB-JM	Filename	SDF(036).cpt
Job Number	302265-001	Cone Number	DDG1418	GPS	
Hole Number	CPT-05	Date and Time	7/27/2018 10:38:29 AM	Maximum Depth	30.51 ft
EST GW Depth During Test		20.00 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 15cm squared

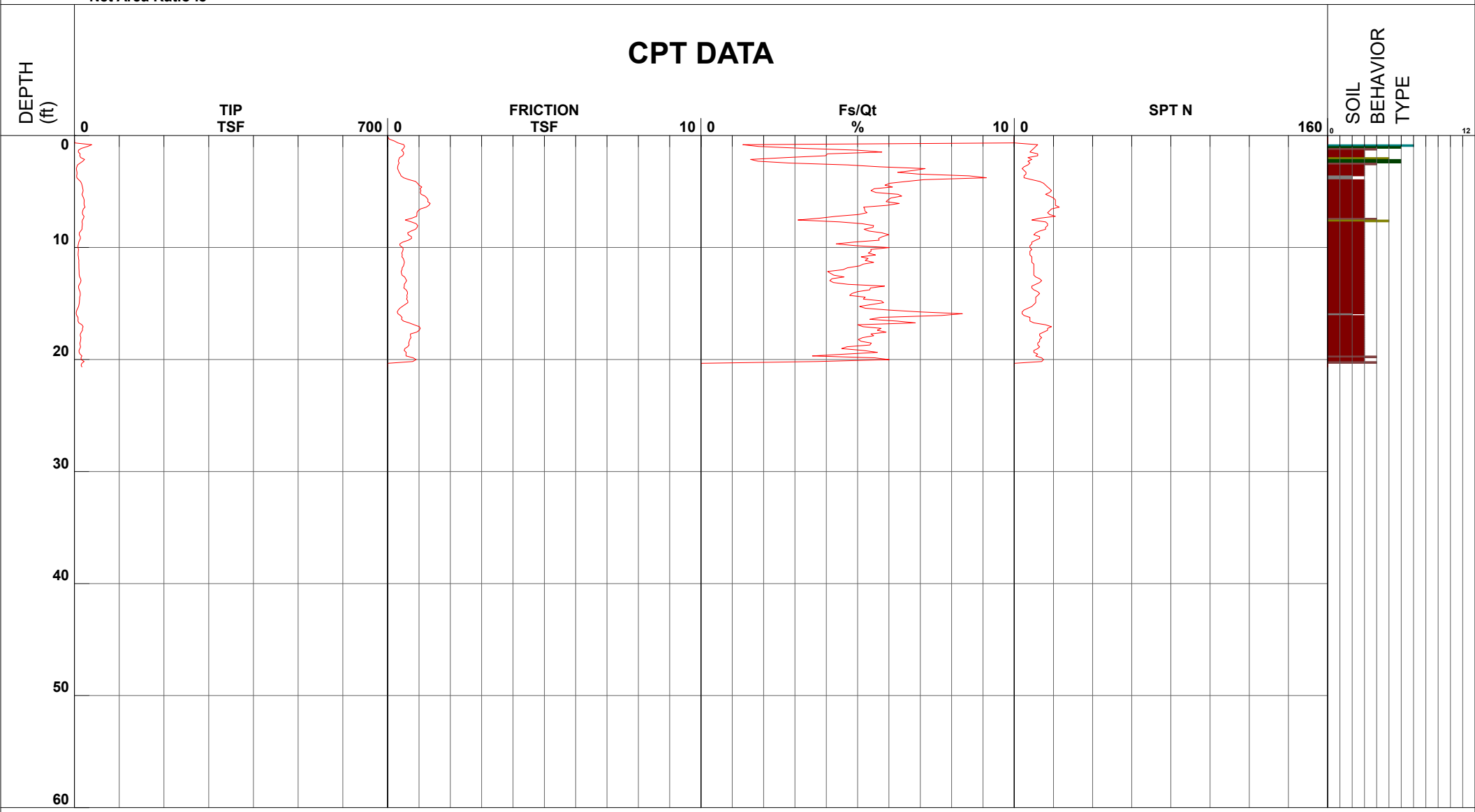
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Prc	Alum Rock Avenue Three-to-Seven-Story Mixed-Us	Operator	RB-JM	Filename	SDF(037).cpt
Job Number	302265-001	Cone Number	DDG1418	GPS	
Hole Number	CPT-06	Date and Time	7/27/2018 11:11:16 AM	Maximum Depth	20.67 ft
EST GW Depth During Test		20.67 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 15cm squared

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

APPENDIX B

Laboratory Test Results

Earth Systems Pacific

Alum Rock 3 to 7 Story Building 302265-001

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

August 15, 2018

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1-1	2.5 - 3.0	18.6	133.3	112.3
1-4	14.5 - 15.0	16.1	141.1	121.5
1-5	19.5 - 20.0	19.5	133.3	111.6
1-7	29.5 - 30.0	25.6	144.7	115.2
1-8	34.5 - 35.0	21.3	142.8	117.6
2-1	3.0 - 3.5	11.1	141.2	127.1
2-2	6.5 - 7.0	20.6	135.4	112.2
2-3	11.0 - 11.5	16.9	139.1	119.0
2-4	14.5 - 15.0	15.8	141.0	121.7
3-1	2.5 - 3.0	22.1	129.7	106.3
3-2	6.0 - 6.5	19.0	140.1	117.7
3-3	11.0 - 11.5	25.2	134.9	107.7

Earth Systems Pacific

Alum Rock 3 to 7 Story Building 302265-001

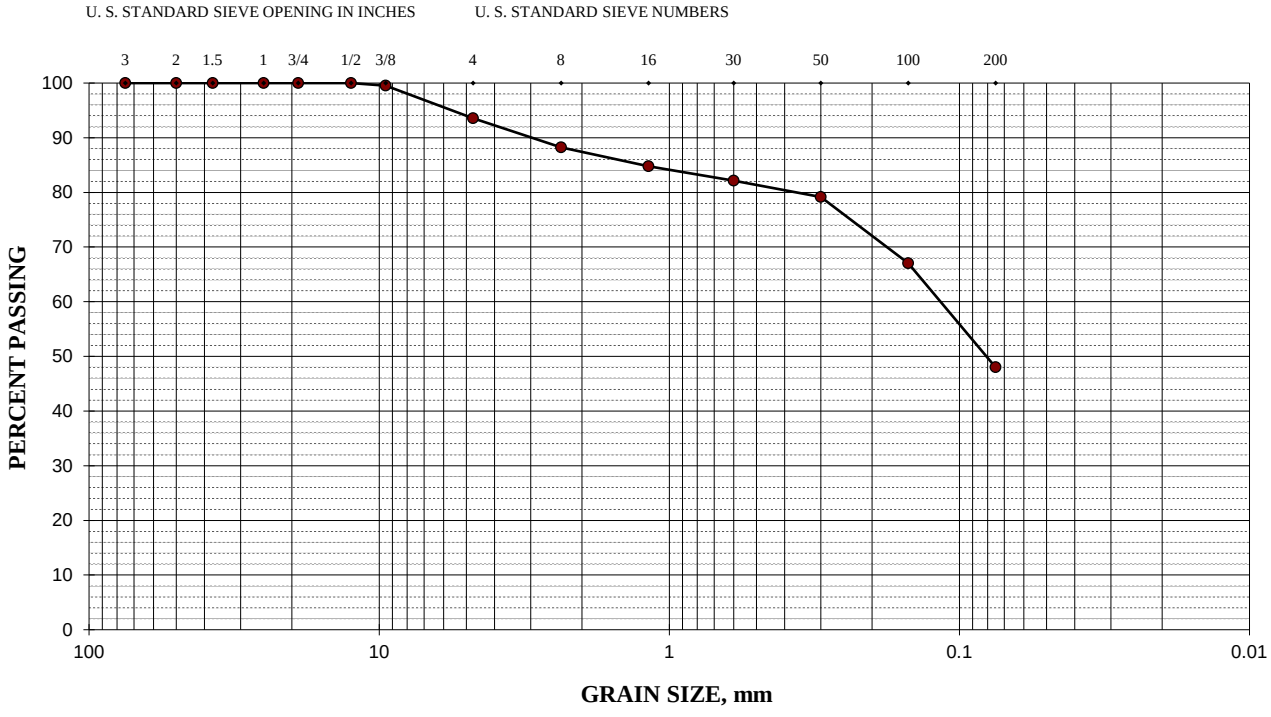
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #B1-6 @ 24.0 - 24.0' August 15, 2018

Olive Brown Lean Clay with Sand (CL)

Sieve size	% Retained	% Passing
3" (75-mm)	0	100
2" (50-mm)	0	100
1.5" (37.5-mm)	0	100
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	6	94
#8 (2.36-mm)	12	88
#16 (1.18-mm)	15	85
#30 (600-µm)	18	82
#50 (300-µm)	21	79
#100 (150-µm)	33	67
#200 (75-µm)	52	48



Earth Systems Pacific

Alum Rock 3 to 7 Story Building 302265-001

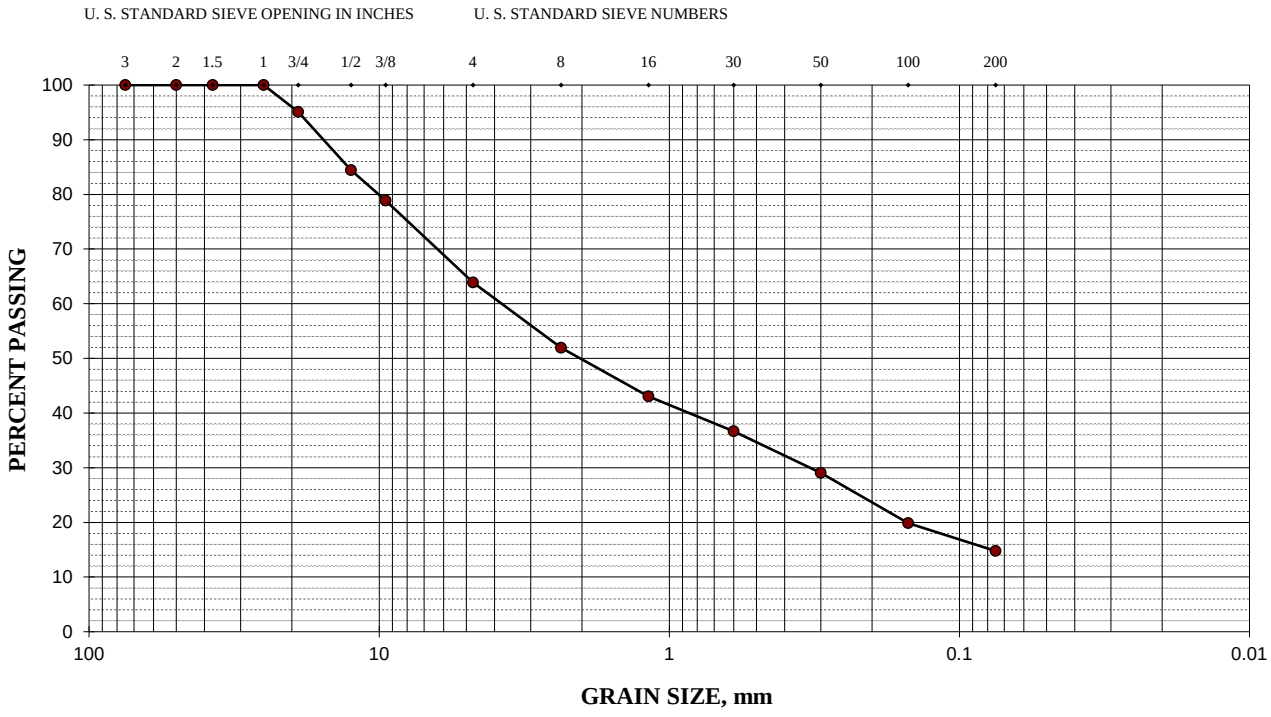
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-14

Boring #B1-10 @ 44.5 - 44.5' August 15, 2018

Dark Yellowish Brown Well Graded Sand with Gravel (SW)

Sieve size	% Retained	% Passing
3" (75-mm)	0	100
2" (50-mm)	0	100
1.5" (37.5-mm)	0	100
1" (25-mm)	0	100
3/4" (19-mm)	5	95
1/2" (12.5-mm)	16	84
3/8" (9.5-mm)	21	79
#4 (4.75-mm)	36	64
#8 (2.36-mm)	48	52
#16 (1.18-mm)	57	43
#30 (600-µm)	63	37
#50 (300-µm)	71	29
#100 (150-µm)	80	20
#200 (75-µm)	85	15



Earth Systems Pacific

Alum Rock 3 to 7 Story Building 302265-001

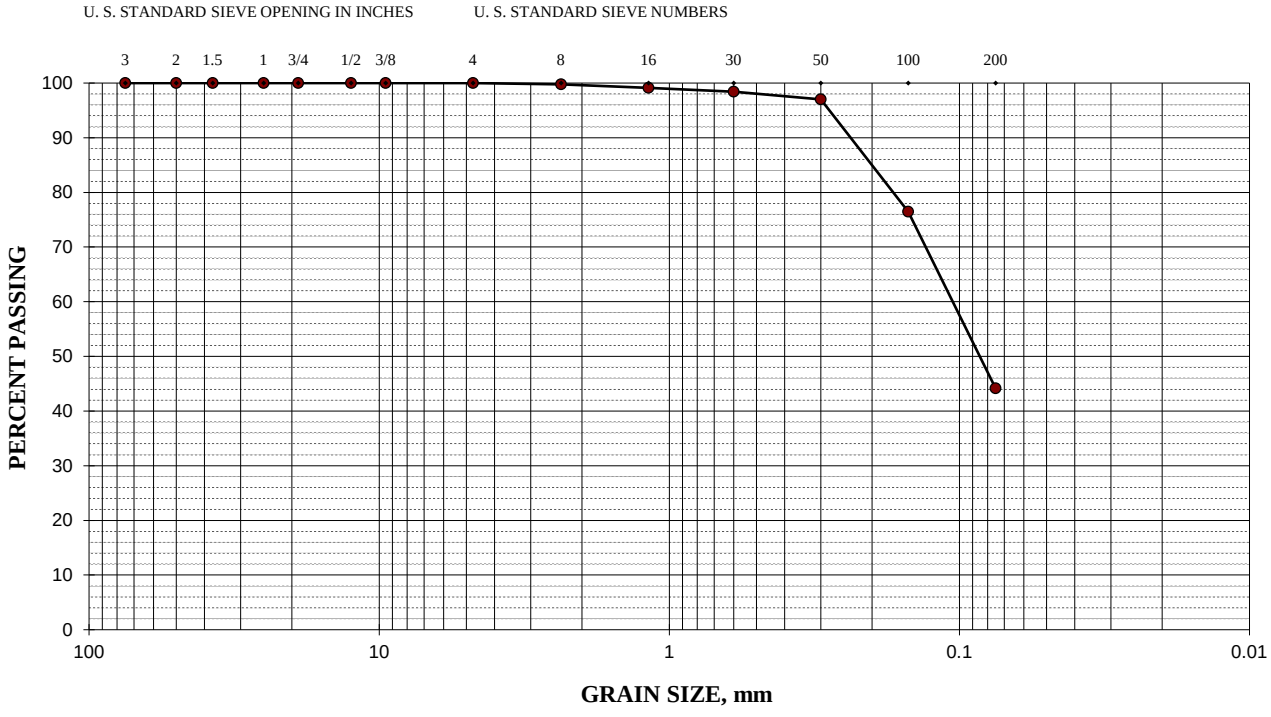
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-14

Boring #B2-5 @ 19.5 - 19.5' August 15, 2018

Dark Olive Brown Poorly Graded Sand with Clay (SP-SC)

Sieve size	% Retained	% Passing
3" (75-mm)	0	100
2" (50-mm)	0	100
1.5" (37.5-mm)	0	100
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	1	99
#30 (600-µm)	2	98
#50 (300-µm)	3	97
#100 (150-µm)	24	76
#200 (75-µm)	56	44



Earth Systems Pacific

Alum Rock 3 to 7 Story Building 302265-001

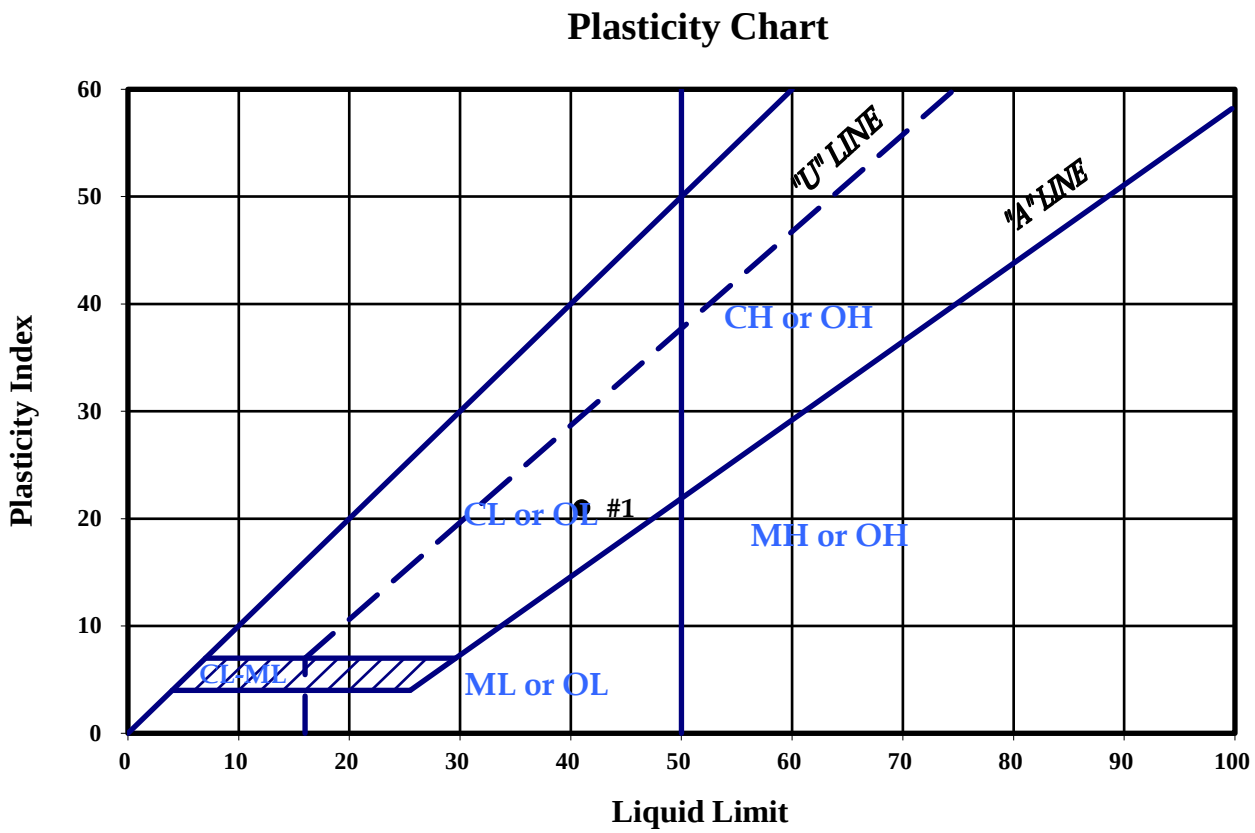
PLASTICITY INDEX

ASTM D 4318-17

Very Dark Grey Lean Clay (CL)

August 15, 2018

Test No.:	1	2	3	4	5
Boring No.:	B1-1				
Sample Depth:	2.5 - 2.5'				
Liquid Limit:	41				
Plastic Limit:	20				
Plasticity Index:	21				



Earth Systems Pacific

Alum Rock 3 to 7 Story Building 302265-001

UNCONFINED COMPRESSION ON COHESIVE SOIL

ASTM D 2166-16

August 15, 2018

Boring #41640 @ 4.0 - 4.5'
Very Dark Lean Clay (CL)
Ring Sample
COMPRESSIVE STRENGTH: 27 psi (3,820 psf)

Dry Density: 102.3 pcf
Moisture Content: 21.1%
Degree Saturation: 90.8%
Specific Gravity: 2.65 (assumed)
H/D Ratio: 2.31

TIME (MINUTES)	DEFORM, in (X 1000)	AXIAL STRAIN	AREA (SQ. IN.)	APPLIED LOAD (LBS)	STRENGTH (PSI)	STRENGTH (PSF)
0.5	**20**	0.0036	4.58	16.8	4	528
1.0	**40**	0.0072	4.59	35.7	8	1,119
1.5	**60**	0.0108	4.61	52.5	11	1,639
2.0	**80**	0.0144	4.63	69.3	15	2,156
2.5	**100**	0.0180	4.65	86.1	19	2,669
3.0	**120**	0.0216	4.66	98.7	21	3,048
3.5	**140**	0.0252	4.68	107.1	23	3,296
4.0	**160**	0.0288	4.70	113.4	24	3,477
4.5	**180**	0.0324	4.71	119.7	25	3,656
5.0	**200**	0.0360	4.73	123.9	26	3,770
5.5	**220**	0.0396	4.75	126	27	3,820
6.0	**240**	0.0432	4.77	126	26	3,806
6.5	**260**	0.0468	4.79	123.9	26	3,728
7.0	**280**	0.0504	4.80	113.4	24	3,399
7.5	**300**	0.0540	4.82	98.7	20	2,948
8.0	**320**	0.0576	4.84	86.1	18	2,562
8.5						
9.0						
9.5						
10.0						
10.5						
11.0						
11.5						
12.0						
12.5						
13.0						
13.5						
14.0						
14.5						

Earth Systems Pacific

Alum Rock 3 to 7 Story Building 302265-001

CONSOLIDATION TEST

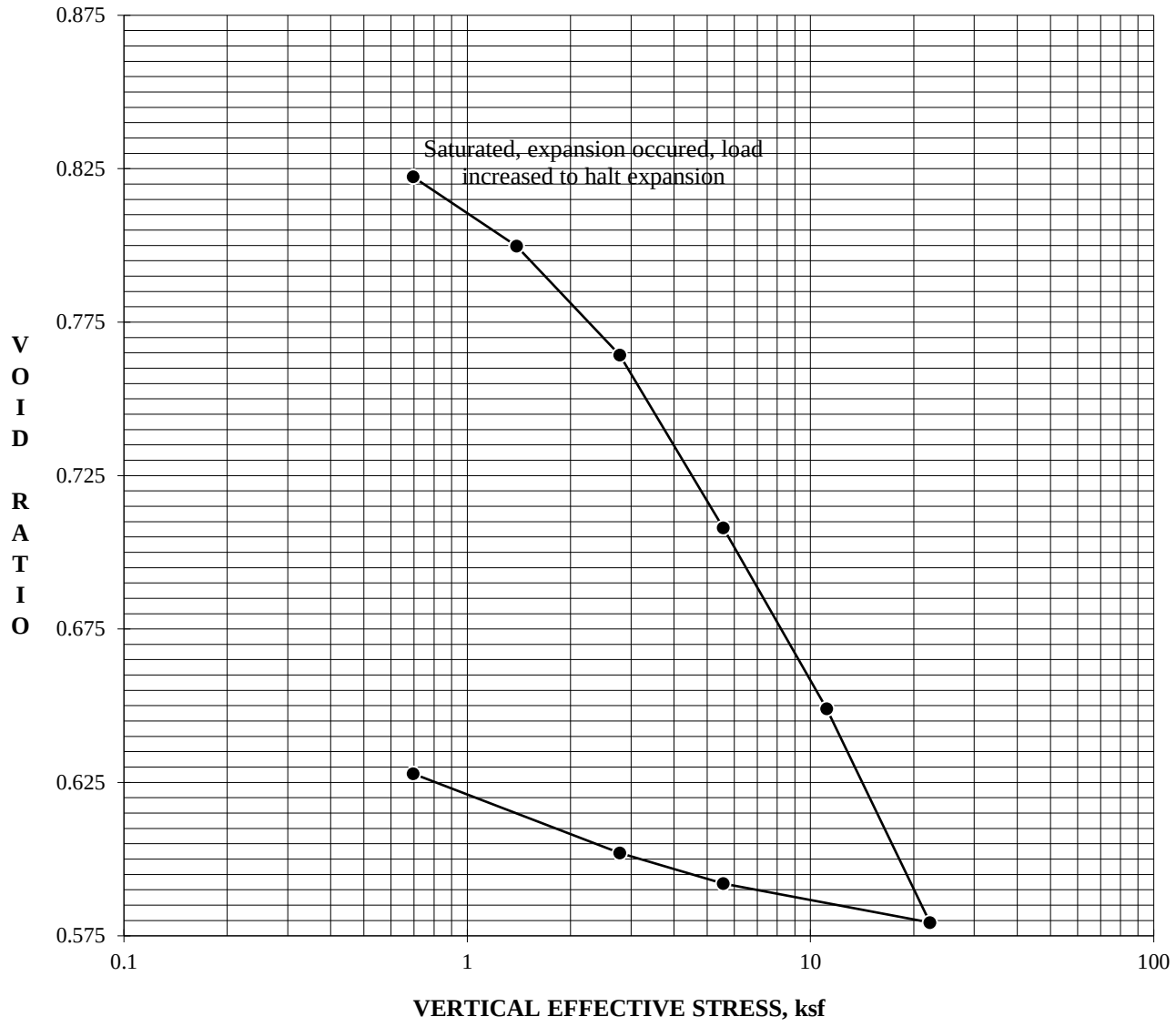
ASTM D 2435/D2435M-11

August 16, 2018

Boring #1 @ 9.5 - 10.0'
Sandy Lean Clay (CL)
Ring Sample

DRY DENSITY: 88.4 pcf
MOISTURE CONTENT: 29.9%
SPECIFIC GRAVITY: 2.70 (assumed)
INITIAL VOID RATIO: 0.822

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



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

16 August, 2018

Job No. 1808021
Cust. No. 12899

Mr. Ajay Singh
Earth Systems Pacific, Inc.
48511 Warm Springs Blvd., Suite 210
Fremont, CA 94539

Subject: Project No.: 302265-001
Project Name: 2350 Alum Rock Avenue
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Singh:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on August 06, 2018. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, this sample is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentration reflects none detected with a reporting limit of 15 mg/kg.

The sulfate ion concentration is 77 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location.

The pH of the soil is 7.92, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential is 260-mV, which 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.

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

JDH/jdl
Enclosure

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

Client: Earth Systems Pacific, Inc.
Client's Project No.: 302265-001
Client's Project Name: 2350 Alum Rock Avenue
Date Sampled: 3-Aug-18
Date Received: 6-Aug-18
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 16-Aug-2018

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)*
1808021-001	C-1 (1'-2')	260	7.92	-	1,300	-	N.D.	77

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	10-Aug-2018	10-Aug-2018	-	16-Aug-2018	-	10-Aug-2018	10-Aug-2018

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**

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

21 August, 2018

Job No. 1808034
Cust. No. 12899

Mr. Girmay Weldegiorgis
Earth Systems Pacific, Inc.
48511 Warm Springs Blvd., Suite 210
Fremont, CA 94539

Subject: Project No.: 302265-001
Project Name: 2350 Alum Rock Avenue
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Weldegiorgis:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on August 07, 2018. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, this sample is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentration reflects none detected with a reporting limit of 15 mg/kg.

The sulfate ion concentration was 68 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location.

The pH of the soil is 8.09, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential is 150-mV, which is indicative of potentially "moderately 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

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

Client: Earth Systems Pacific, Inc.
Client's Project No.: 302265-001
Client's Project Name: 2350 Alum Rock Avenue, San Jose
Date Sampled: 3-Aug-18
Date Received: 7-Aug-18
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 21-Aug-2018

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)*
1808034-001	C1 @ 0.5-4'	150	8.09	-	1,200	-	N.D.	68

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	20-Aug-2018	17-Aug-2018	-	21-Aug-2018	-	17-Aug-2018	17-Aug-2018

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

APPENDIX C

Liquefaction Analysis

Figure C1 – Surface Manifestation

Earth Systems Pacific
48511 Warm Springs Blvd., Suite 210
Fremont, CA 94539
https://www.earthsystems.com/

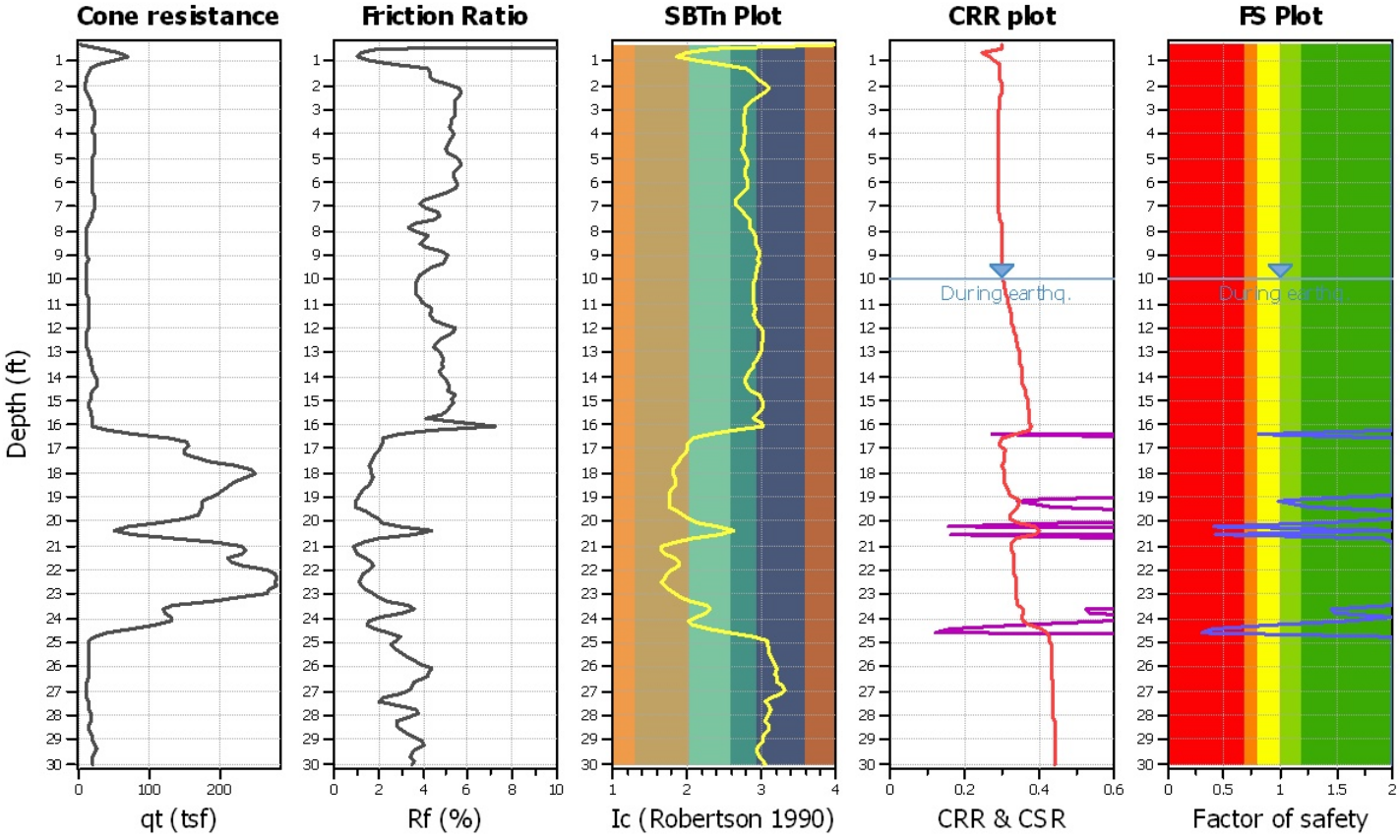
LIQUEFACTION ANALYSIS REPORT

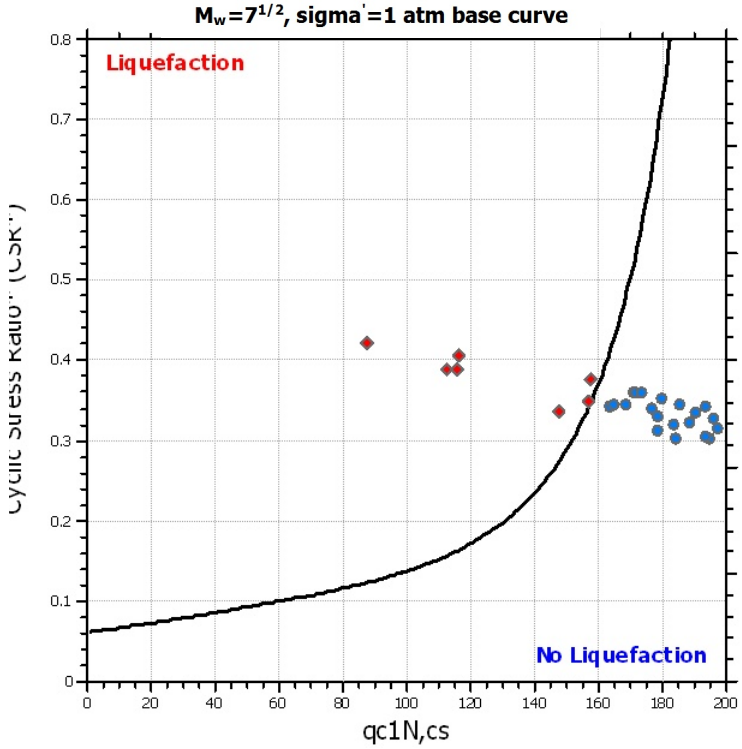
Project title : Alum Rock Avenue Mixed-Use Building **Location : 2350 Alum Rock Avenue, San Jose**

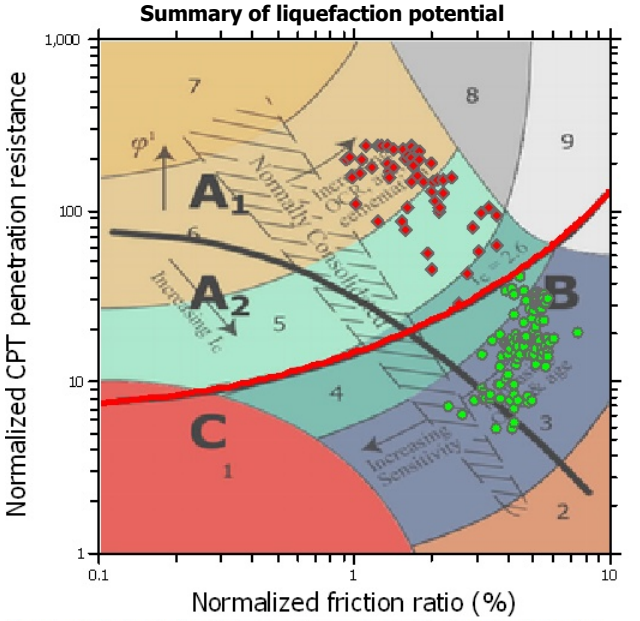
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	20.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	10.00 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:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.52	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

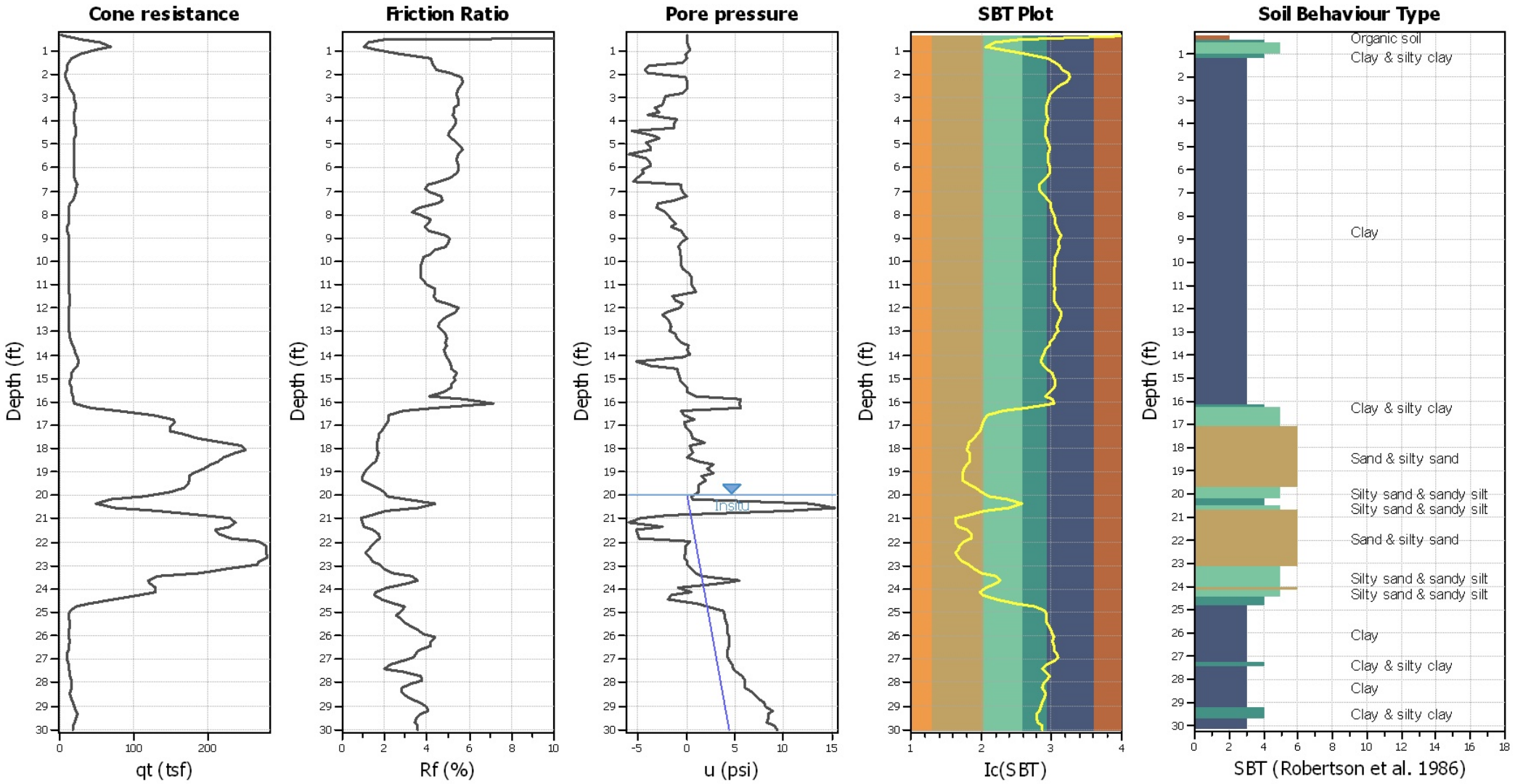






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



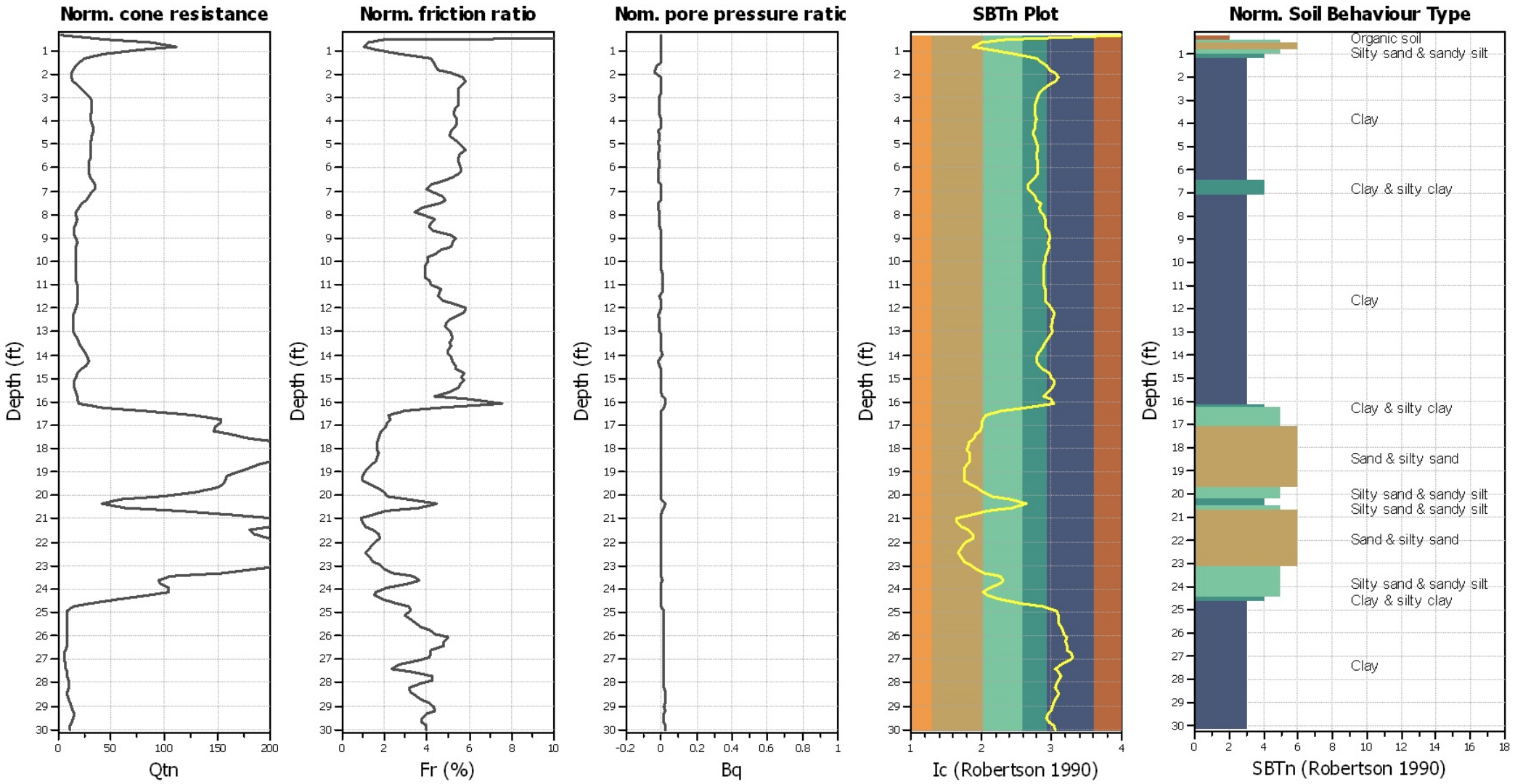
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT 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

CPT basic interpretation plots (normaliz



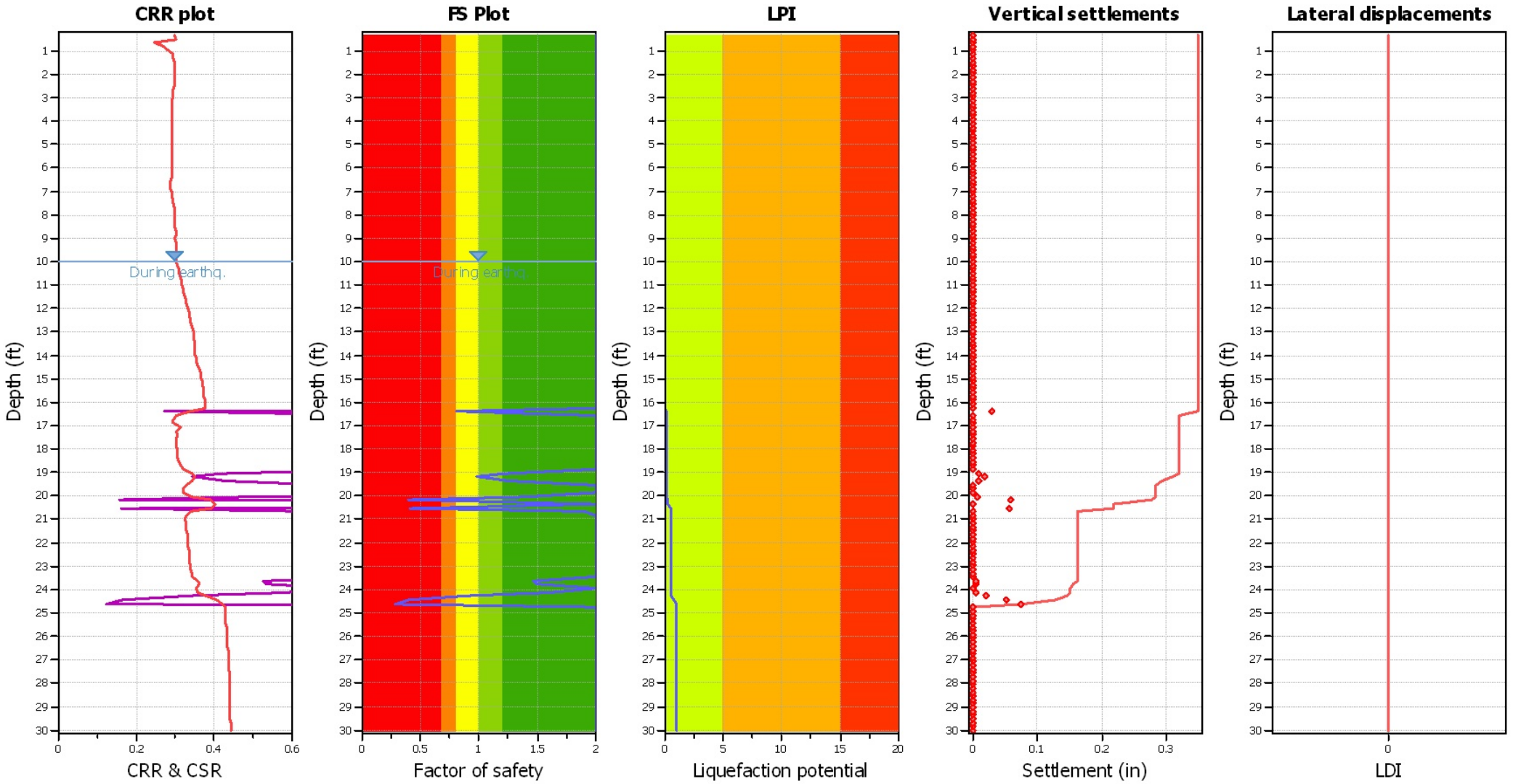
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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

Earth Systems Pacific
48511 Warm Springs Blvd., Suite 210
Fremont, CA 94539
https://www.earthsystems.com/

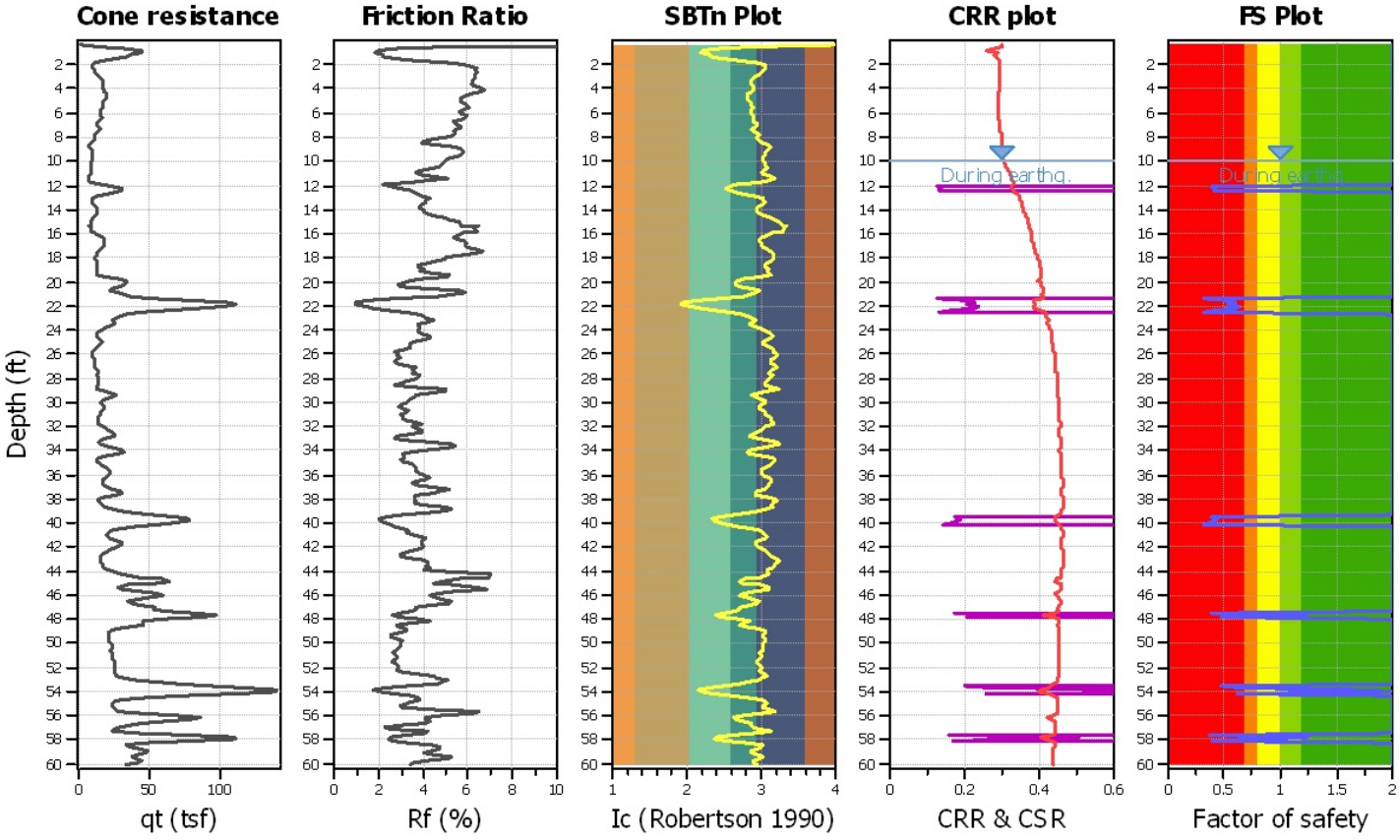
LIQUEFACTION ANALYSIS REPORT

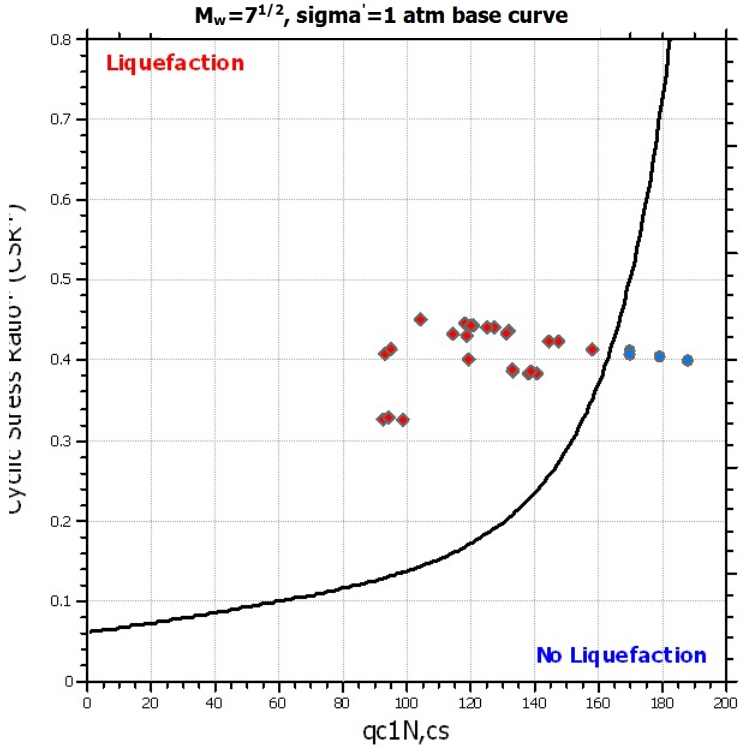
Project title : Alum Rock Avenue Mixed-Use Building **Location : 2350 Alum Rock Avenue, San Jose**

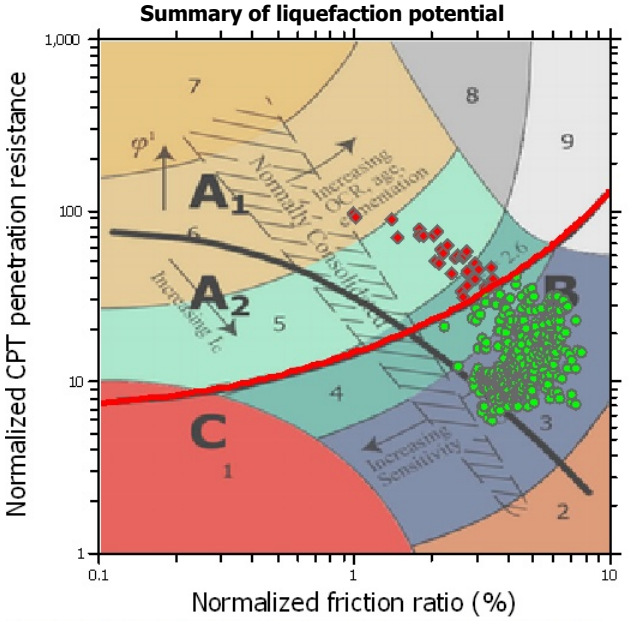
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	20.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	10.00 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:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.52	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

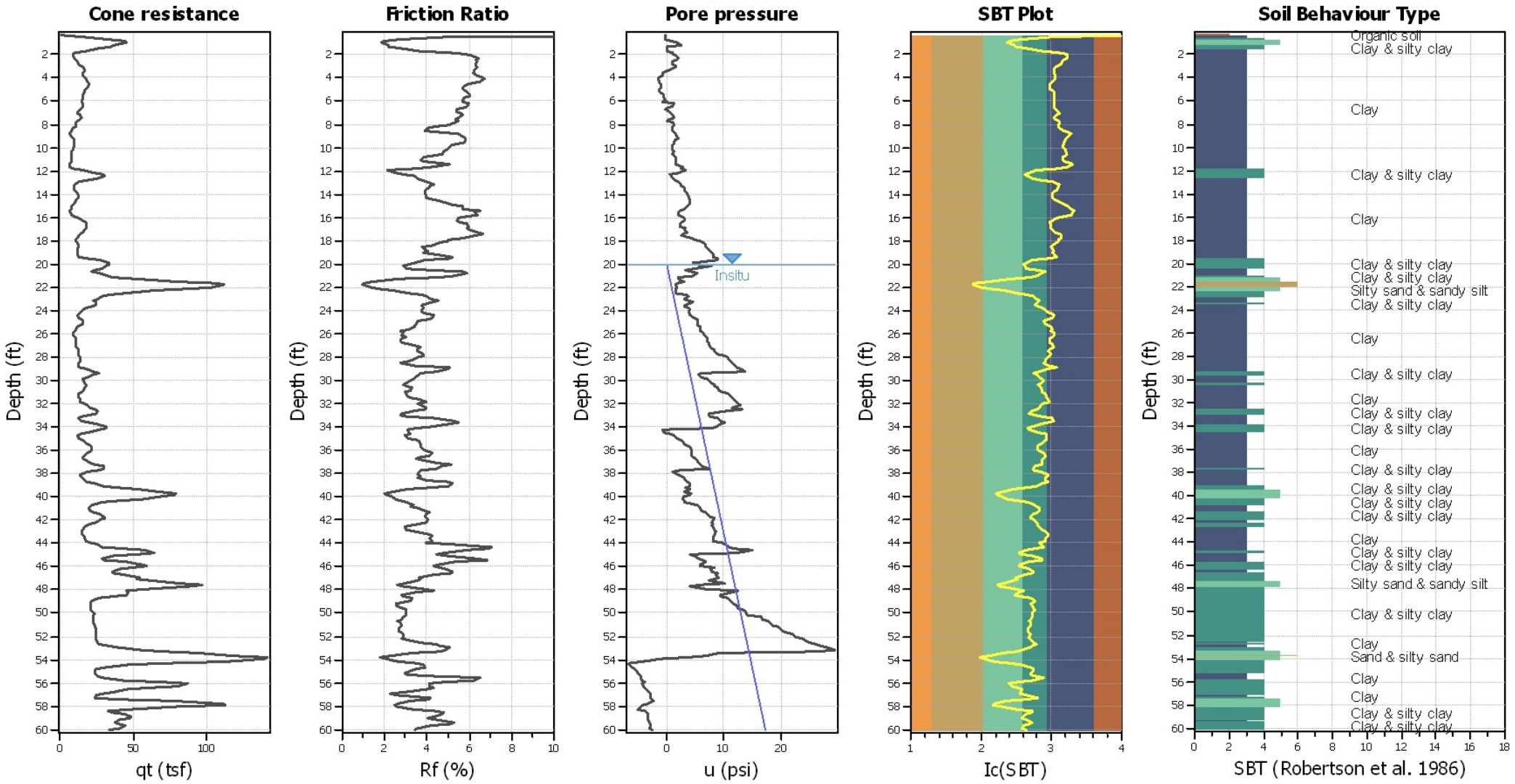






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



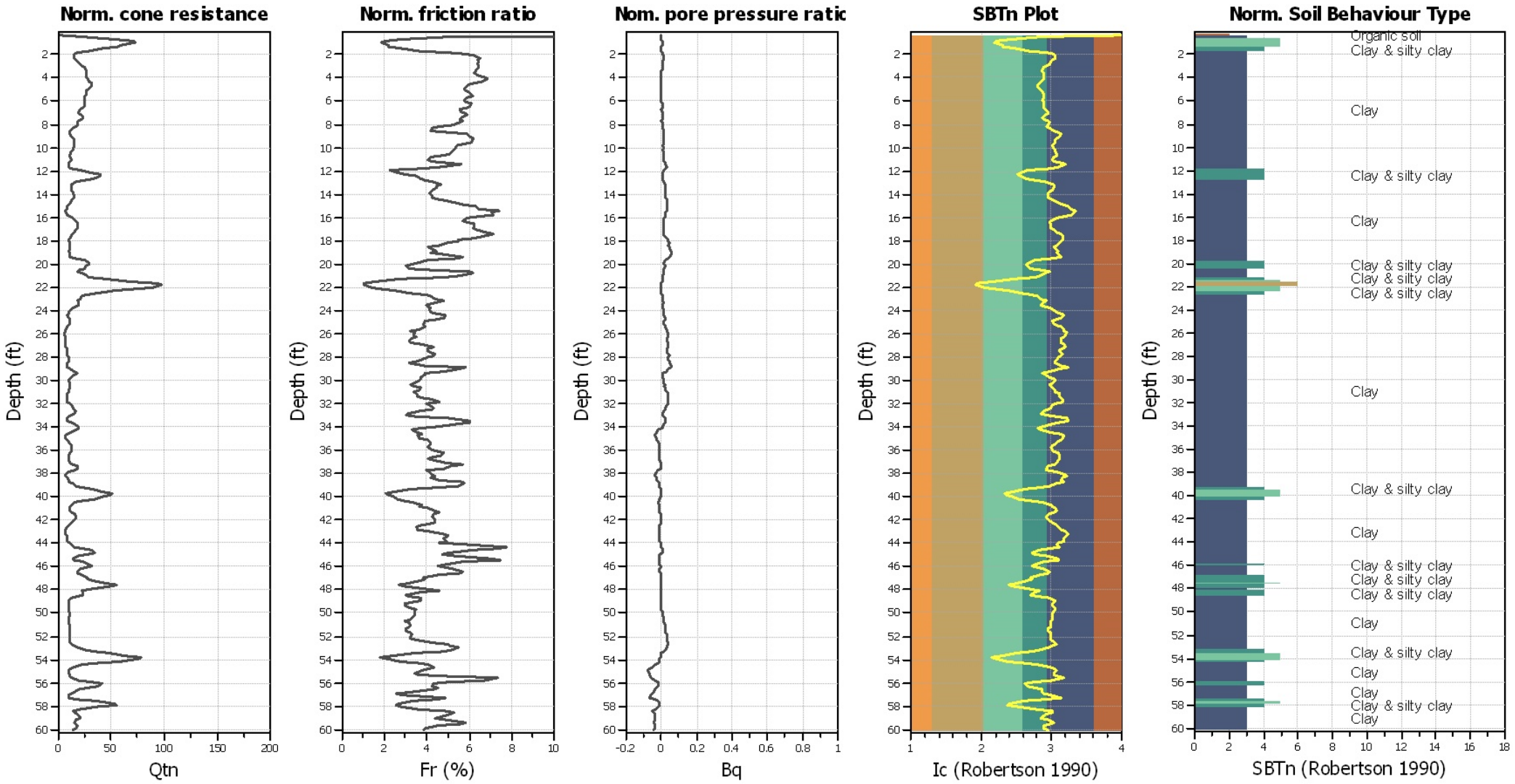
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT 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

CPT basic interpretation plots (normaliz



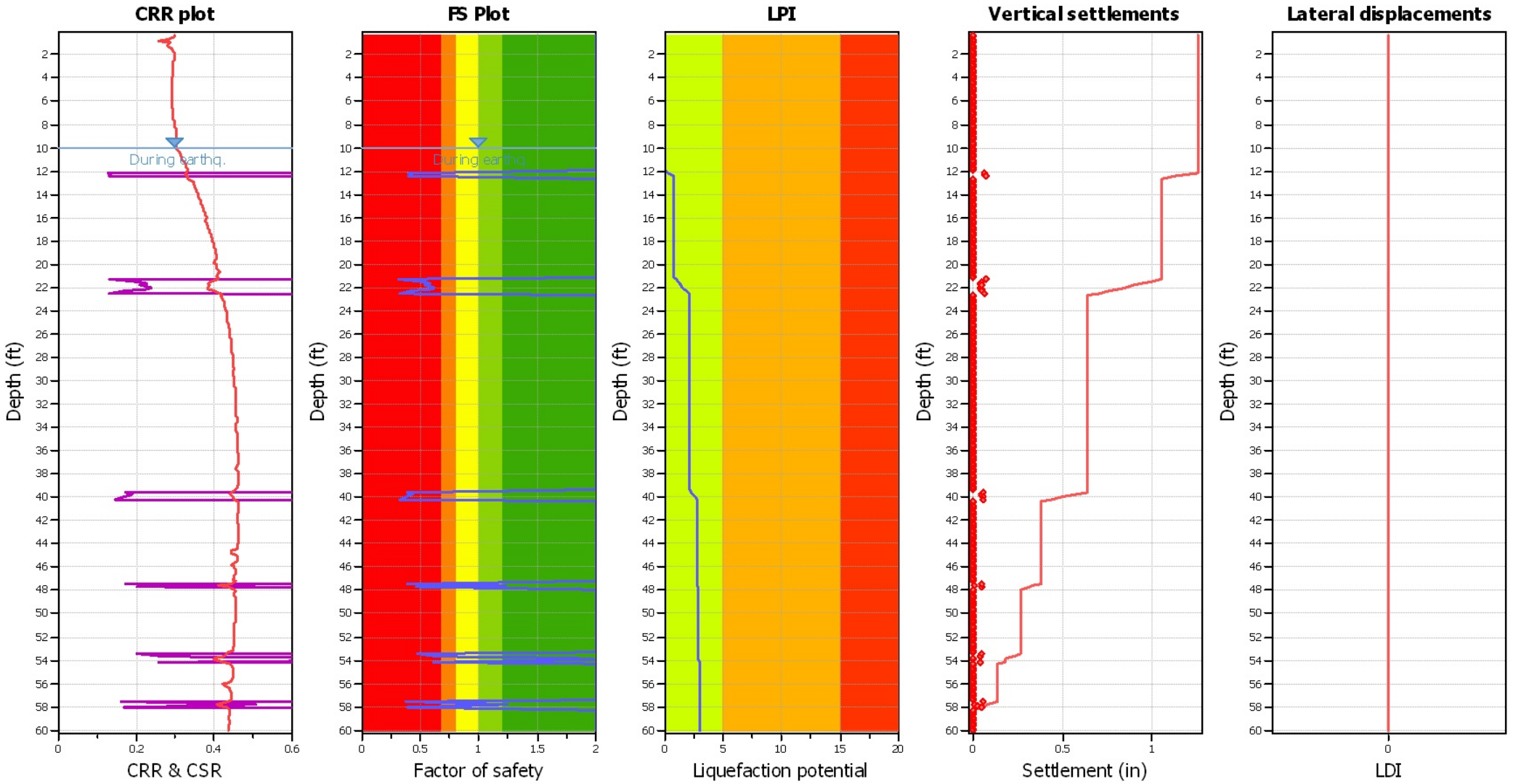
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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

Earth Systems Pacific
48511 Warm Springs Blvd., Suite 210
Fremont, CA 94539
https://www.earthsystems.com/

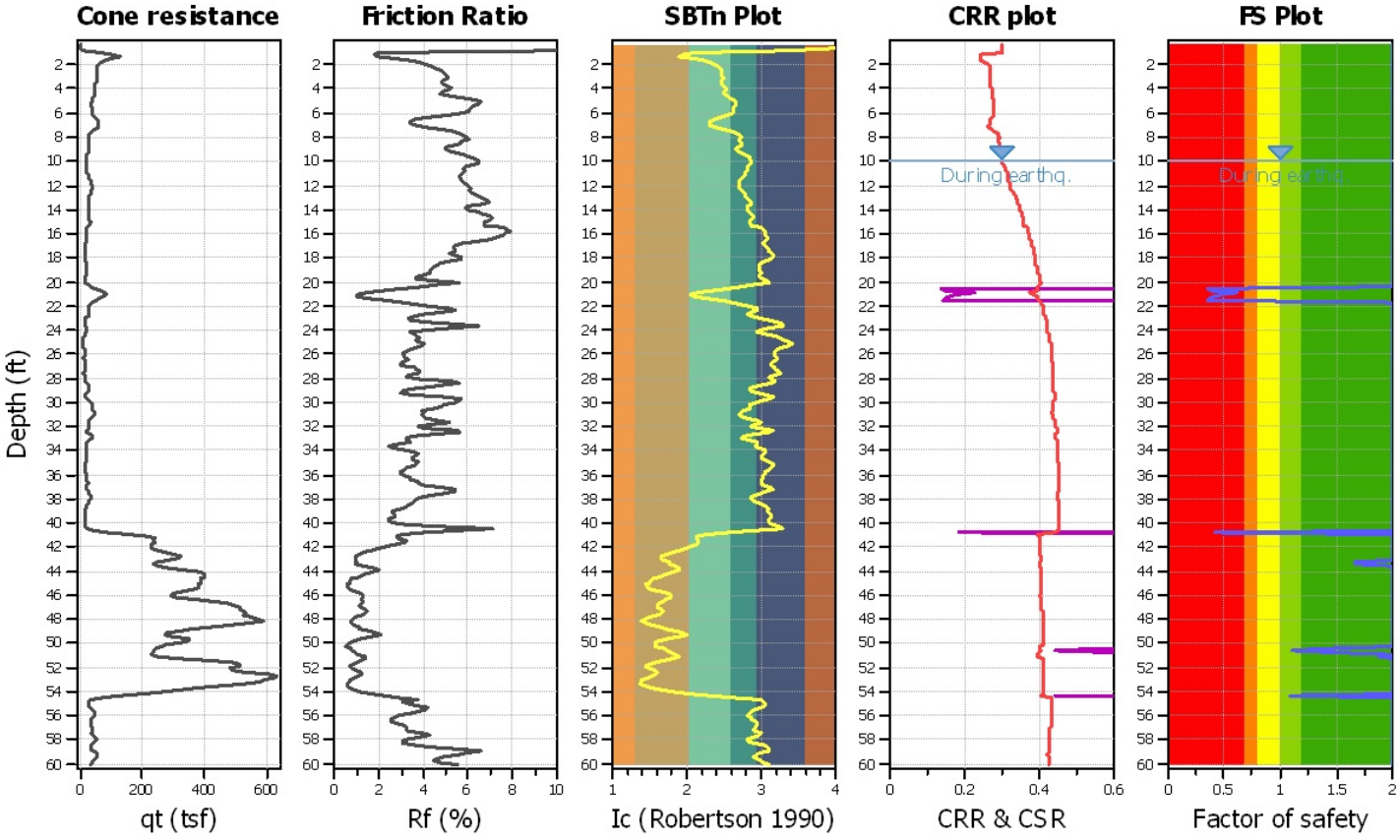
LIQUEFACTION ANALYSIS REPORT

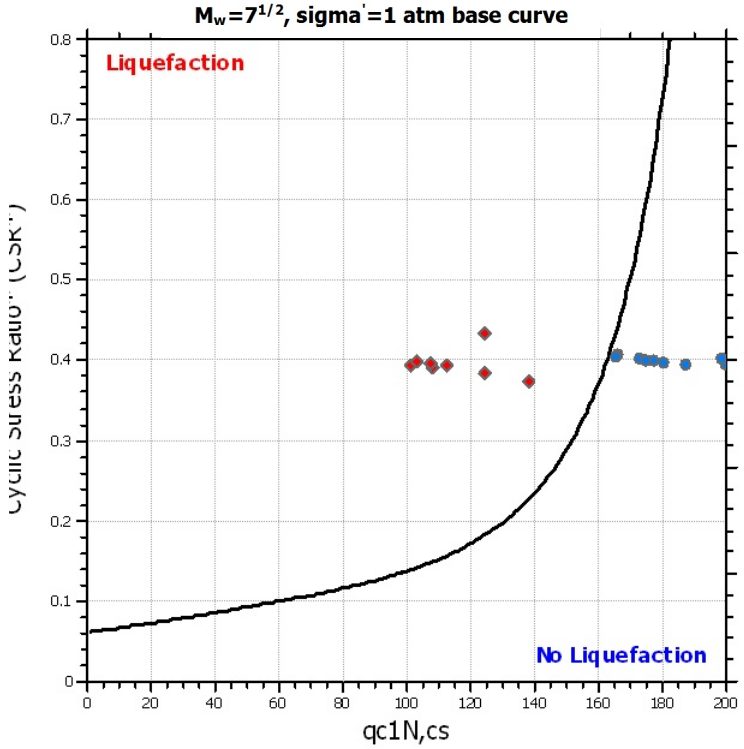
Project title : Alum Rock Avenue Mixed-Use Building **Location : 2350 Alum Rock Avenue, San Jose**

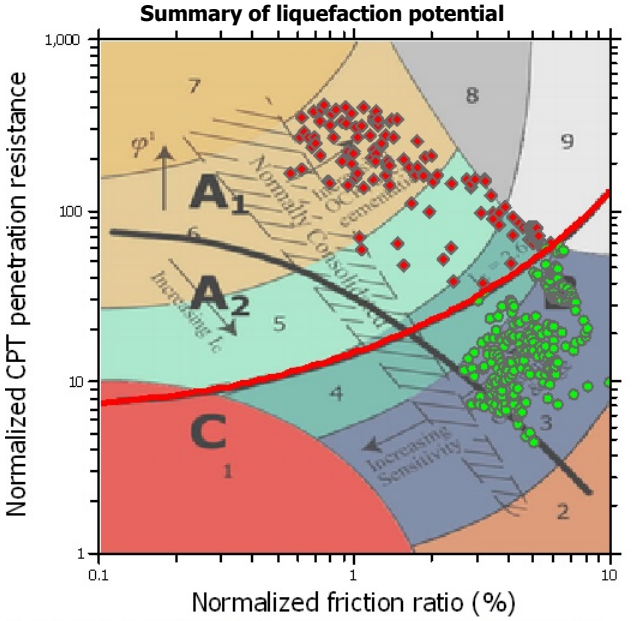
CPT file : CPT-03

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	20.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	10.00 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:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.52	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

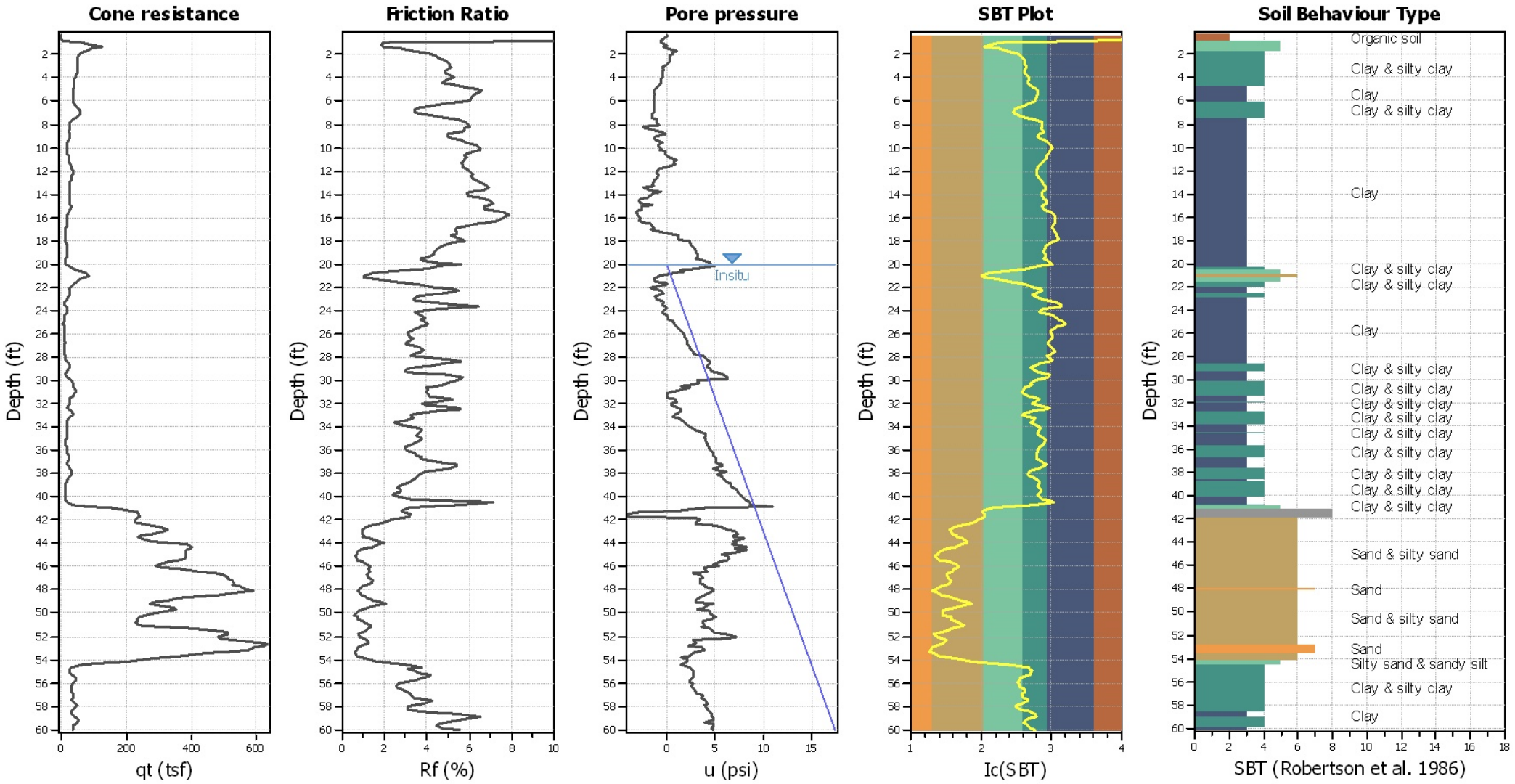






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



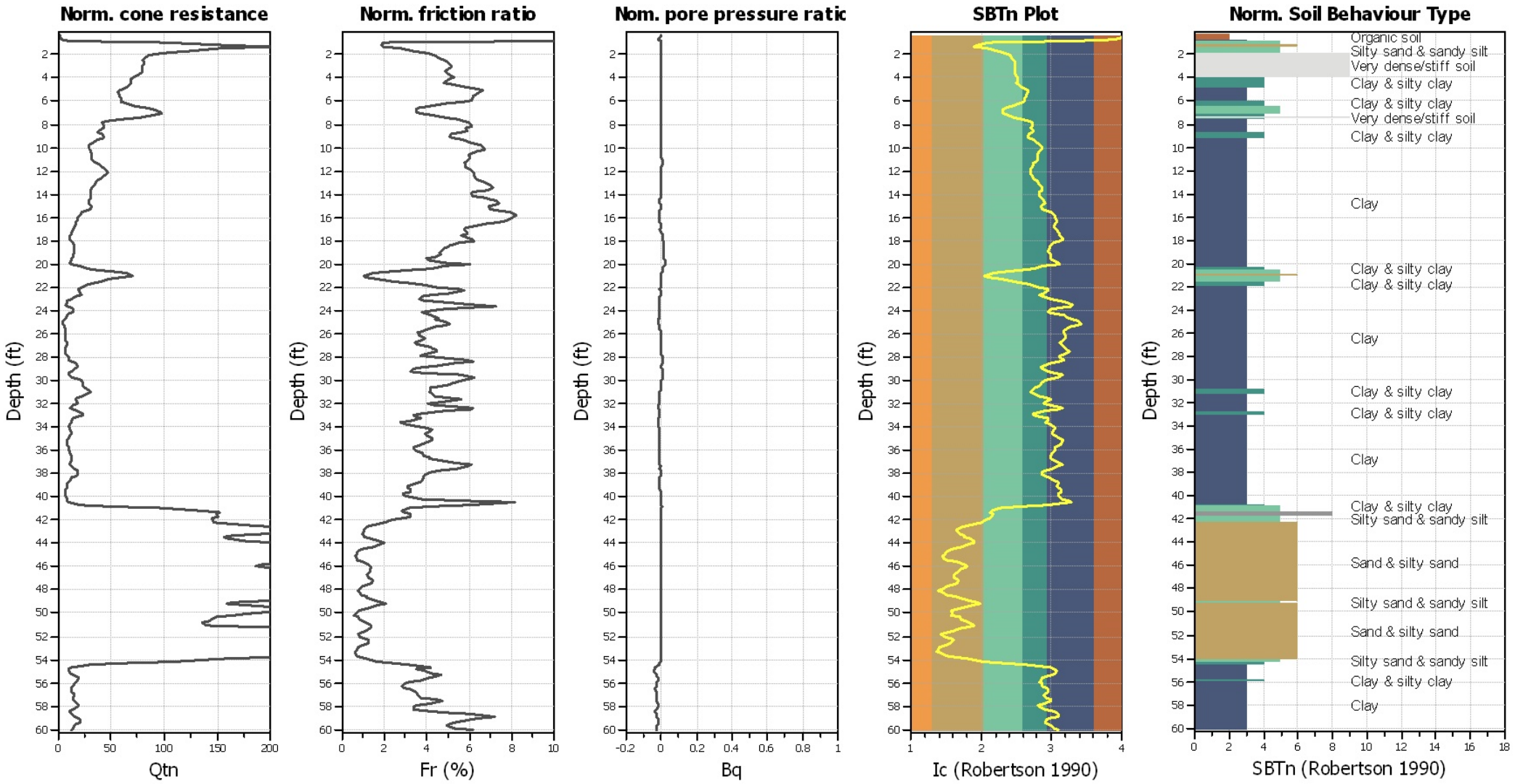
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT 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

CPT basic interpretation plots (normaliz



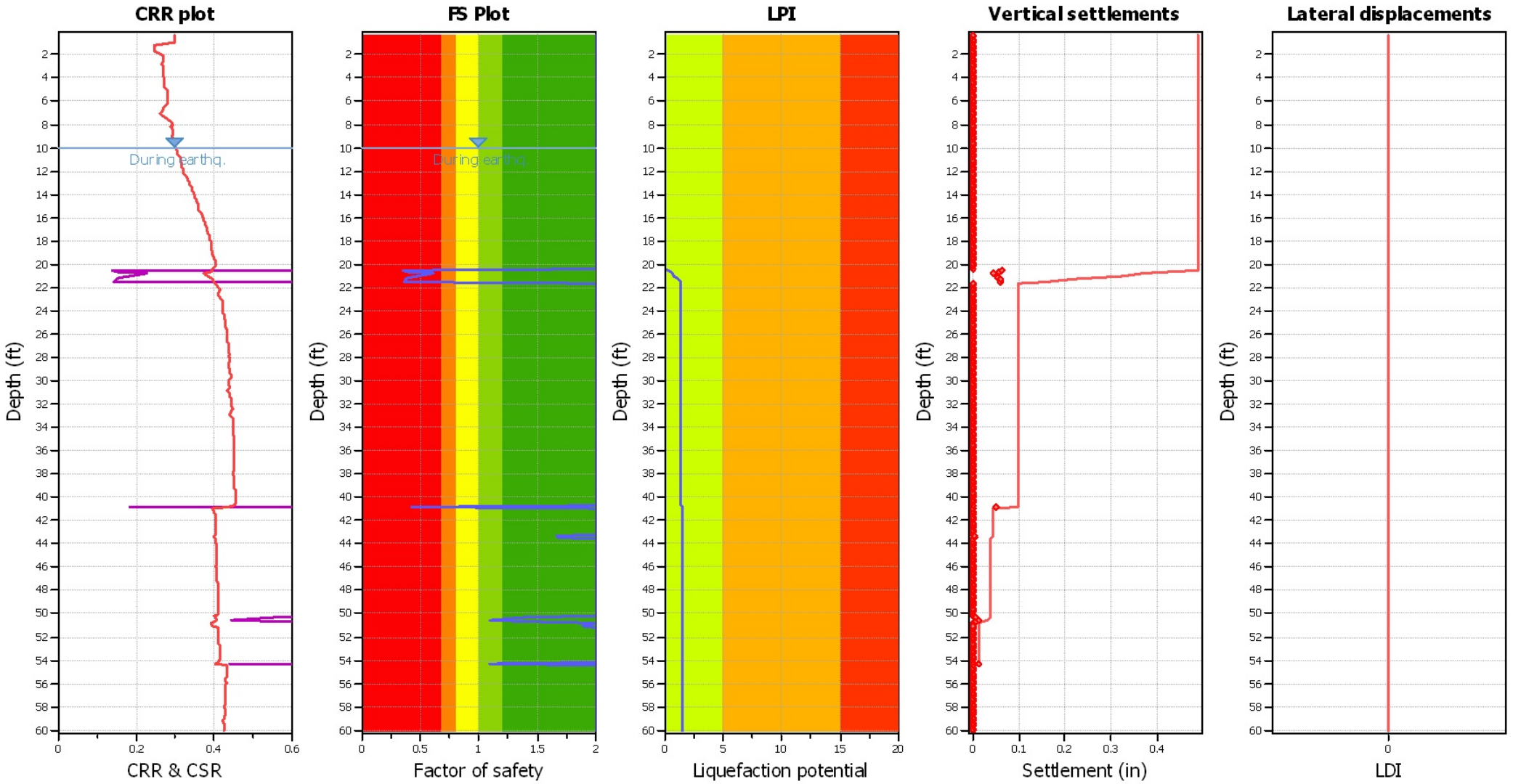
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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

Earth Systems Pacific
48511 Warm Springs Blvd., Suite 210
Fremont, CA 94539
https://www.earthsystems.com/

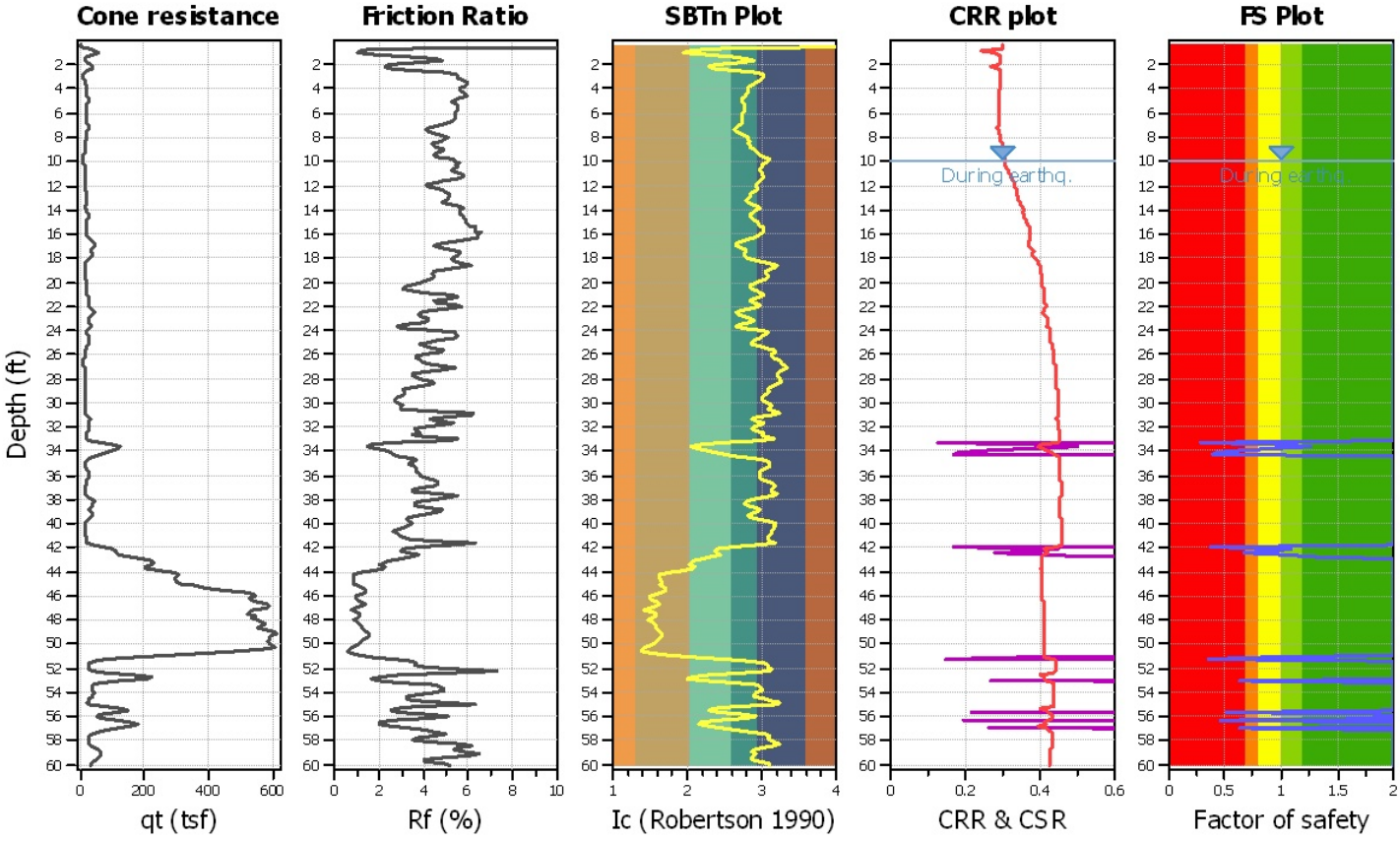
LIQUEFACTION ANALYSIS REPORT

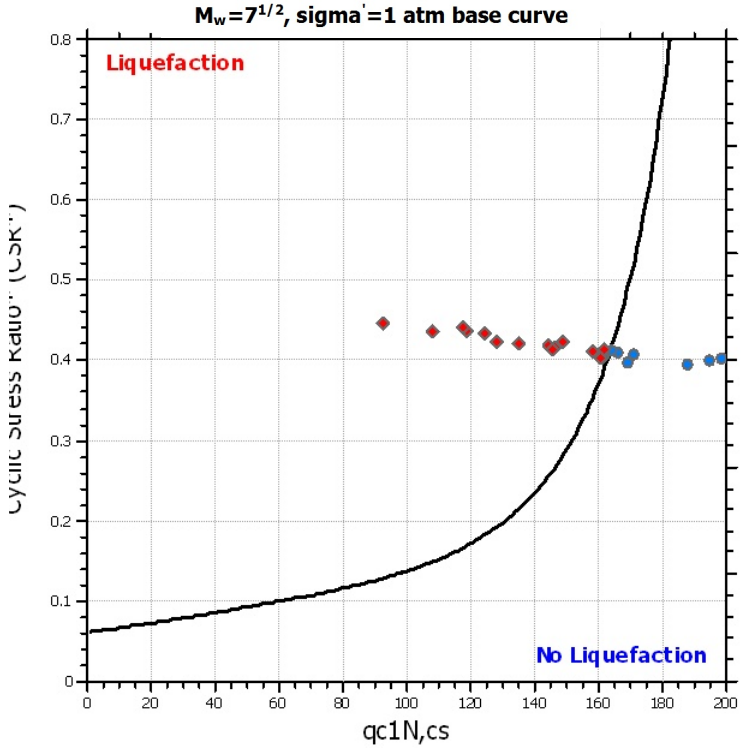
Project title : Alum Rock Avenue Mixed-Use Building **Location : 2350 Alum Rock Avenue, San Jose**

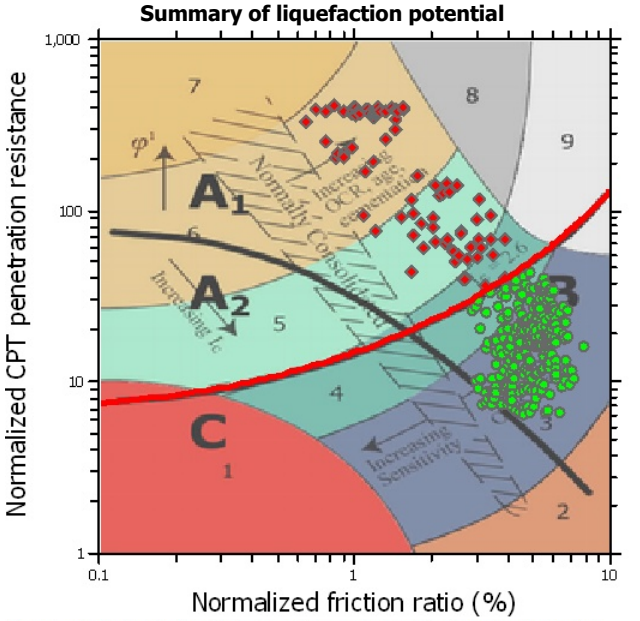
CPT file : CPT-04

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	20.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	10.00 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:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.52	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

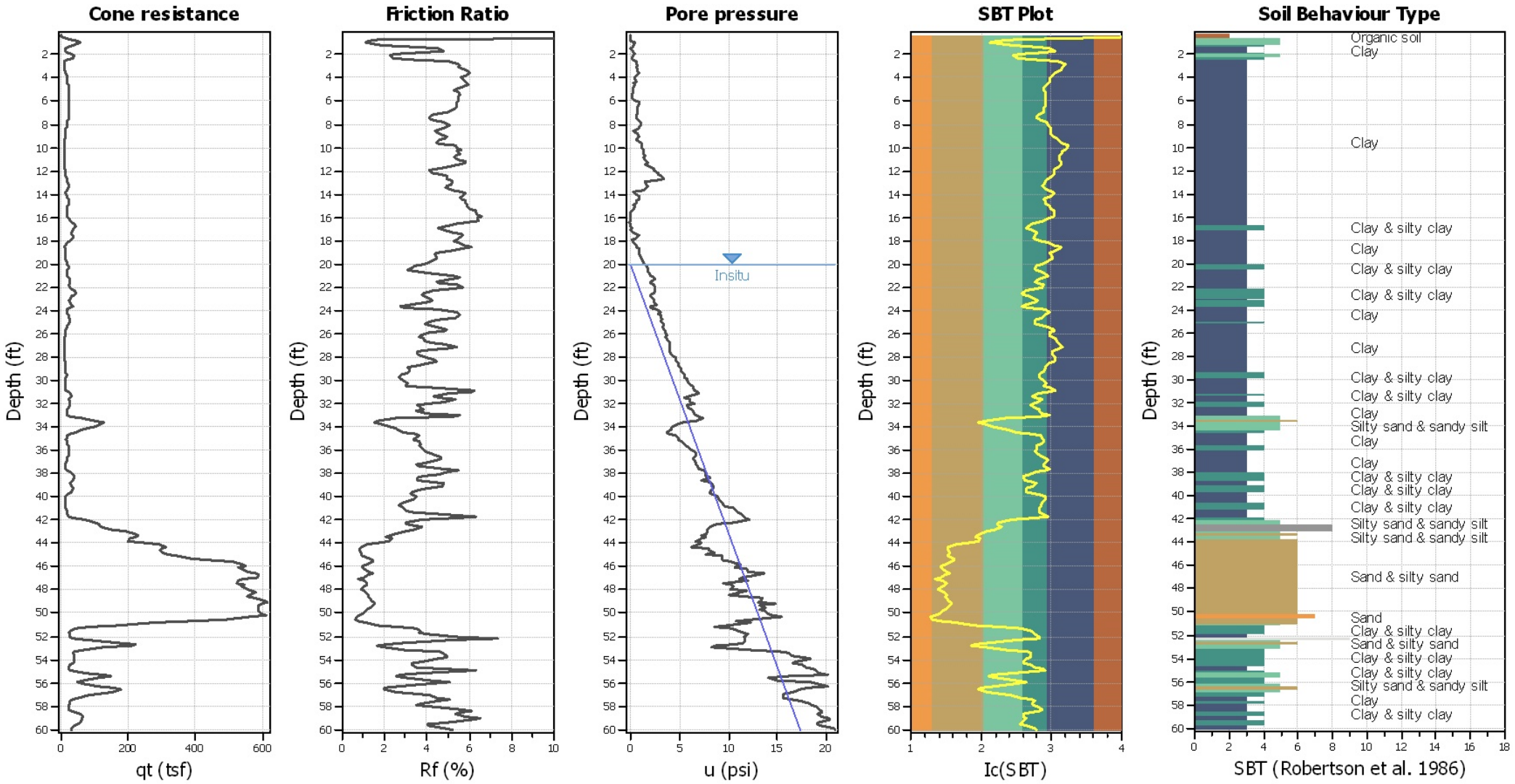






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



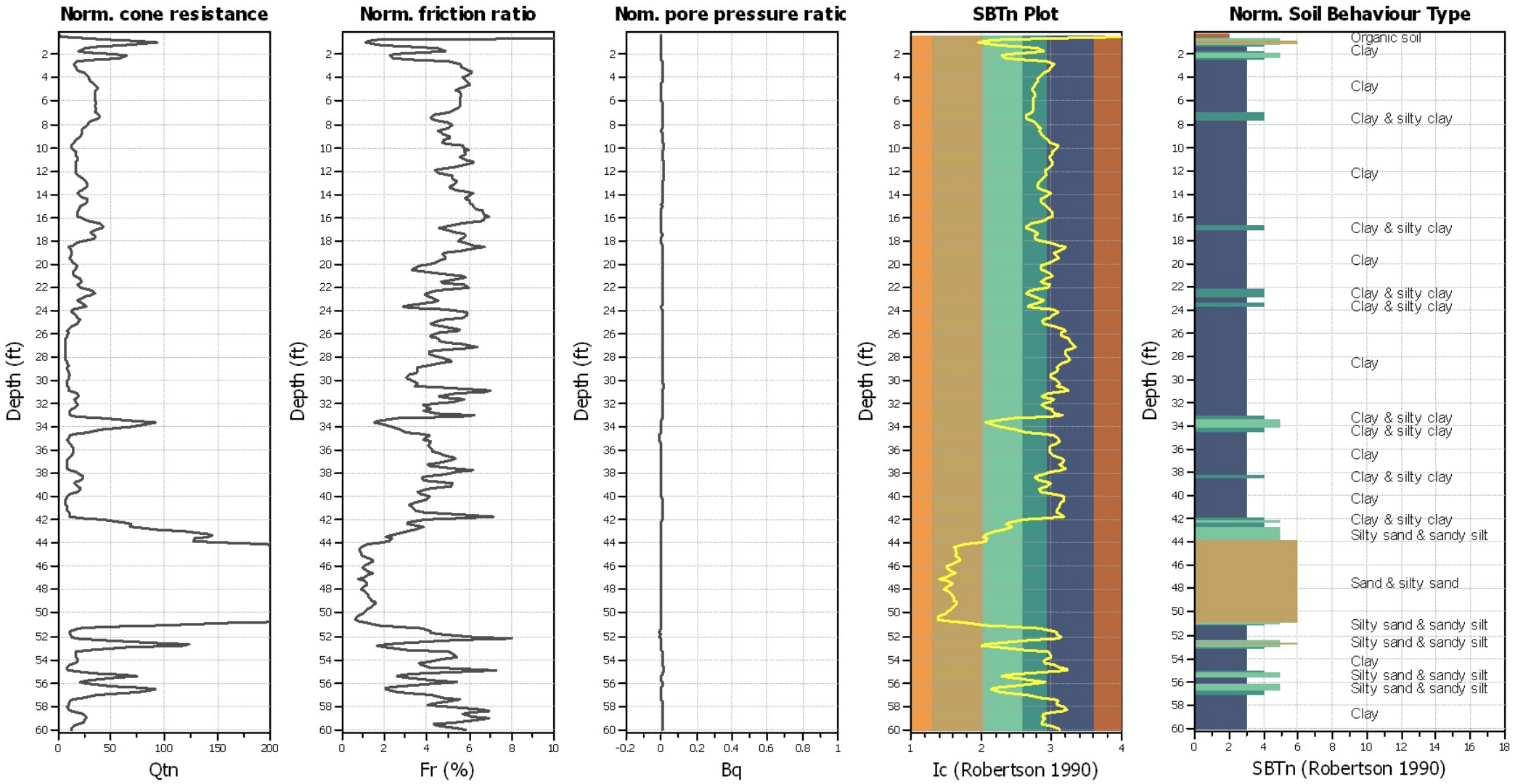
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT 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

CPT basic interpretation plots (normaliz



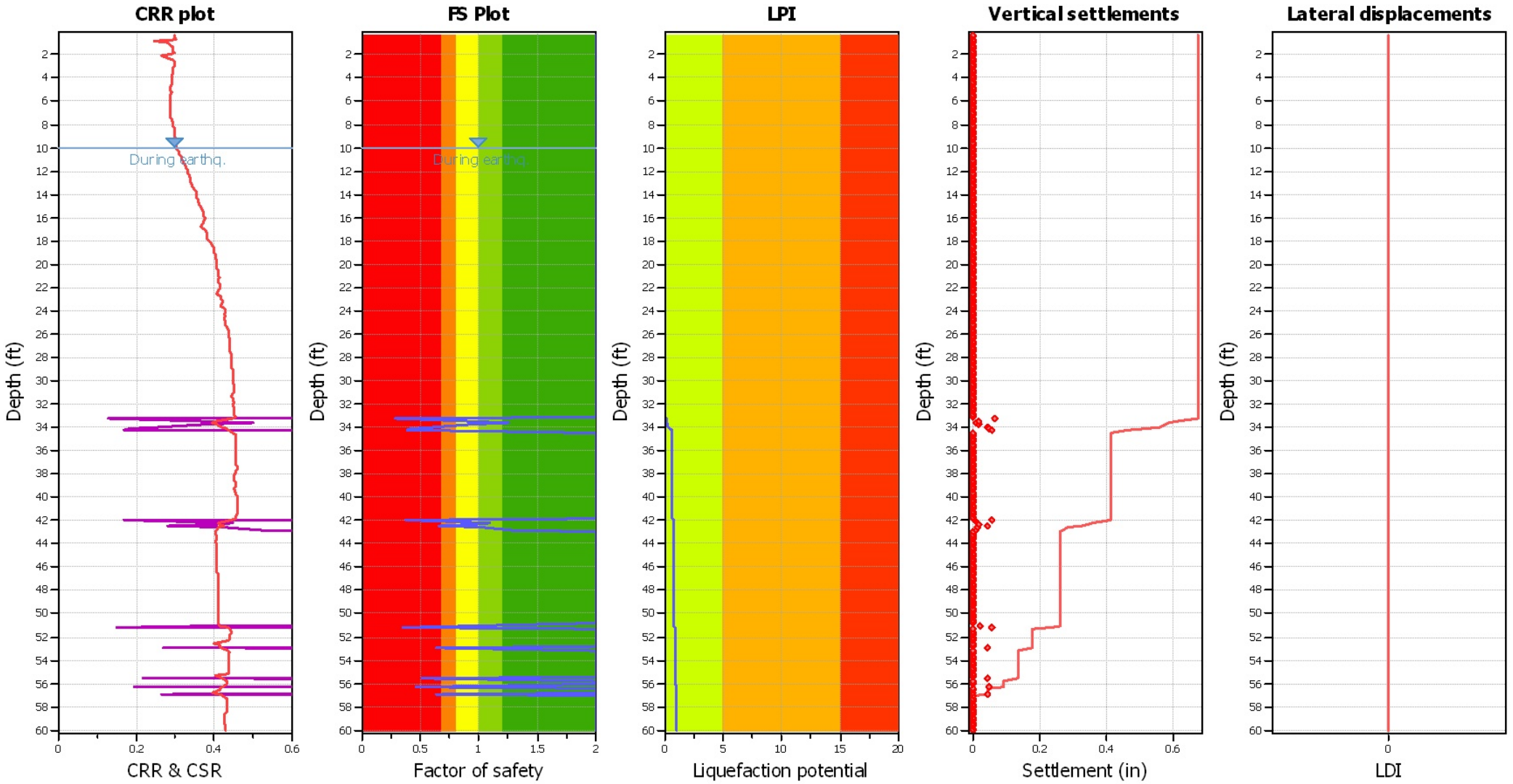
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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

Earth Systems Pacific
48511 Warm Springs Blvd., Suite 210
Fremont, CA 94539
https://www.earthsystems.com/

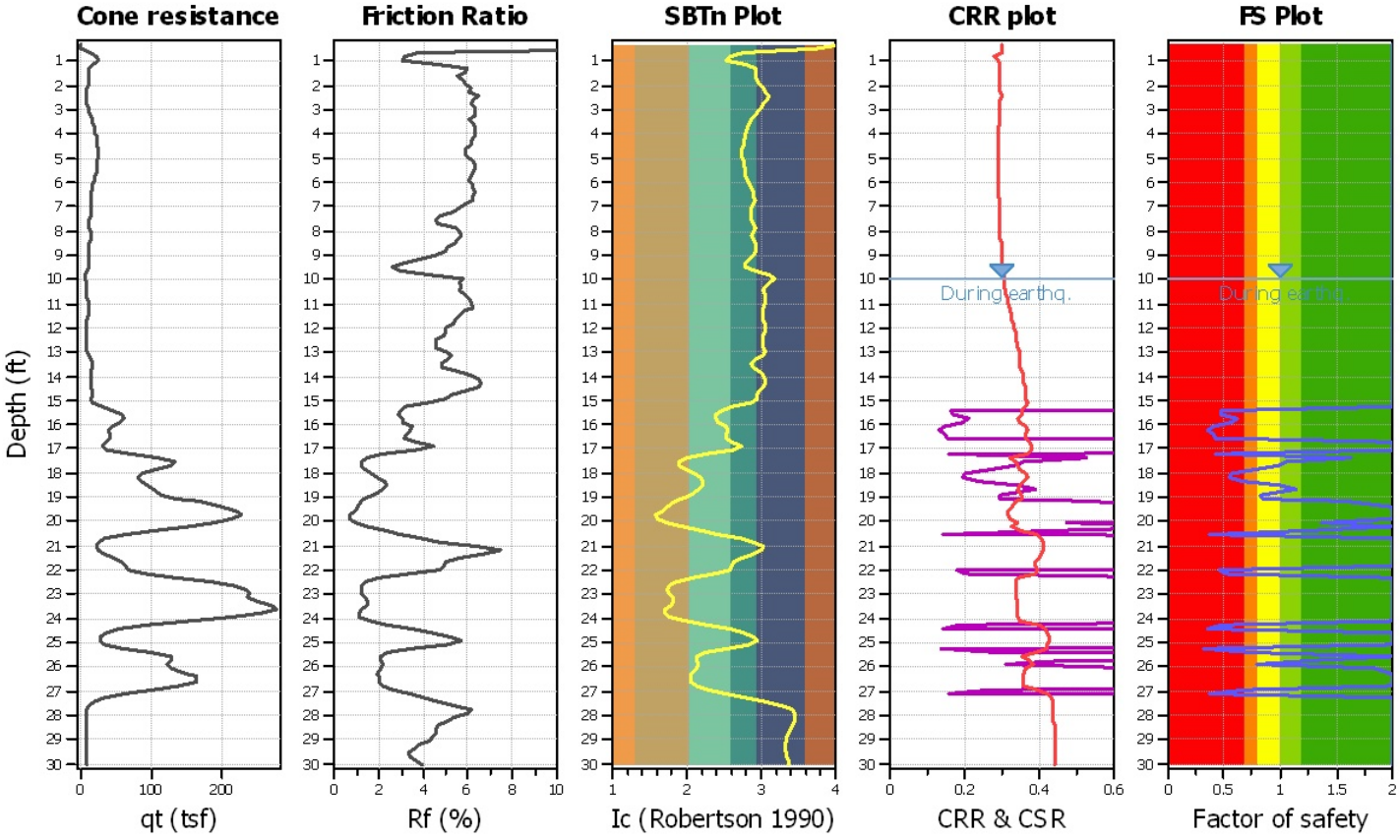
LIQUEFACTION ANALYSIS REPORT

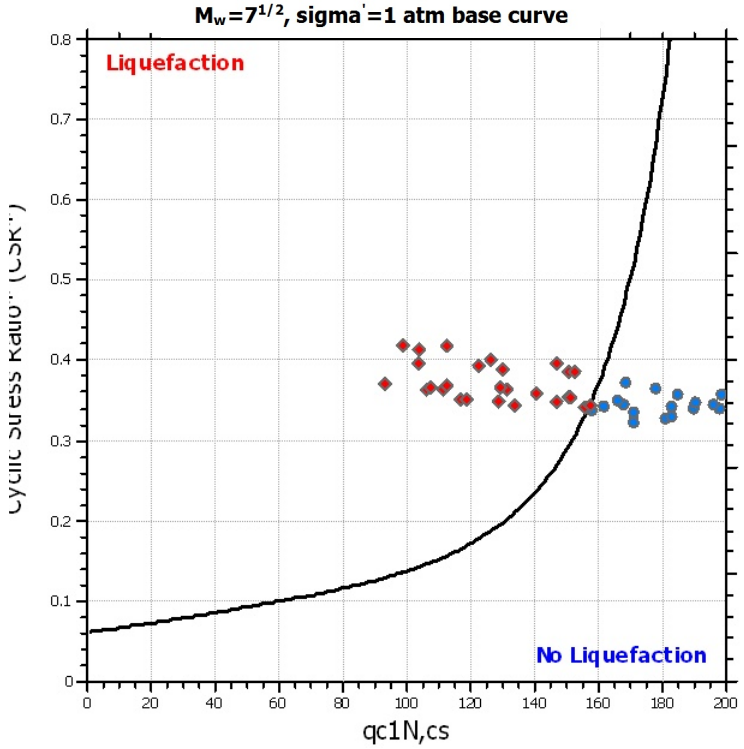
Project title : Alum Rock Avenue Mixed-Use Building **Location : 2350 Alum Rock Avenue, San Jose**

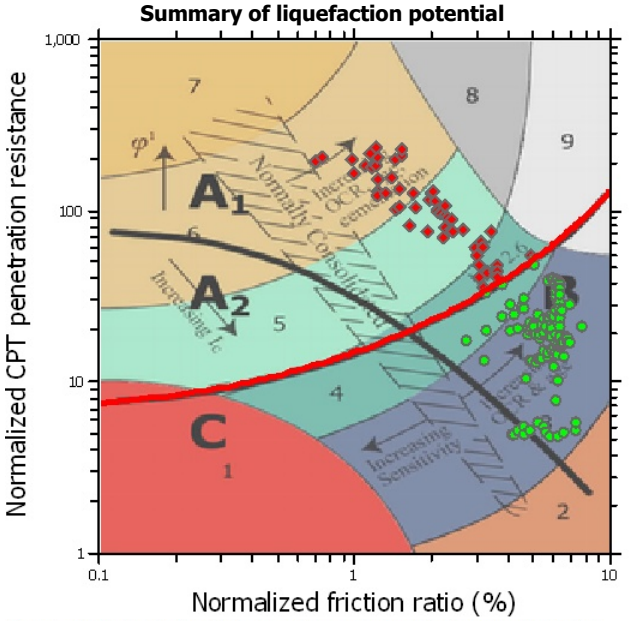
CPT file : CPT-05

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	20.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	10.00 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:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.52	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

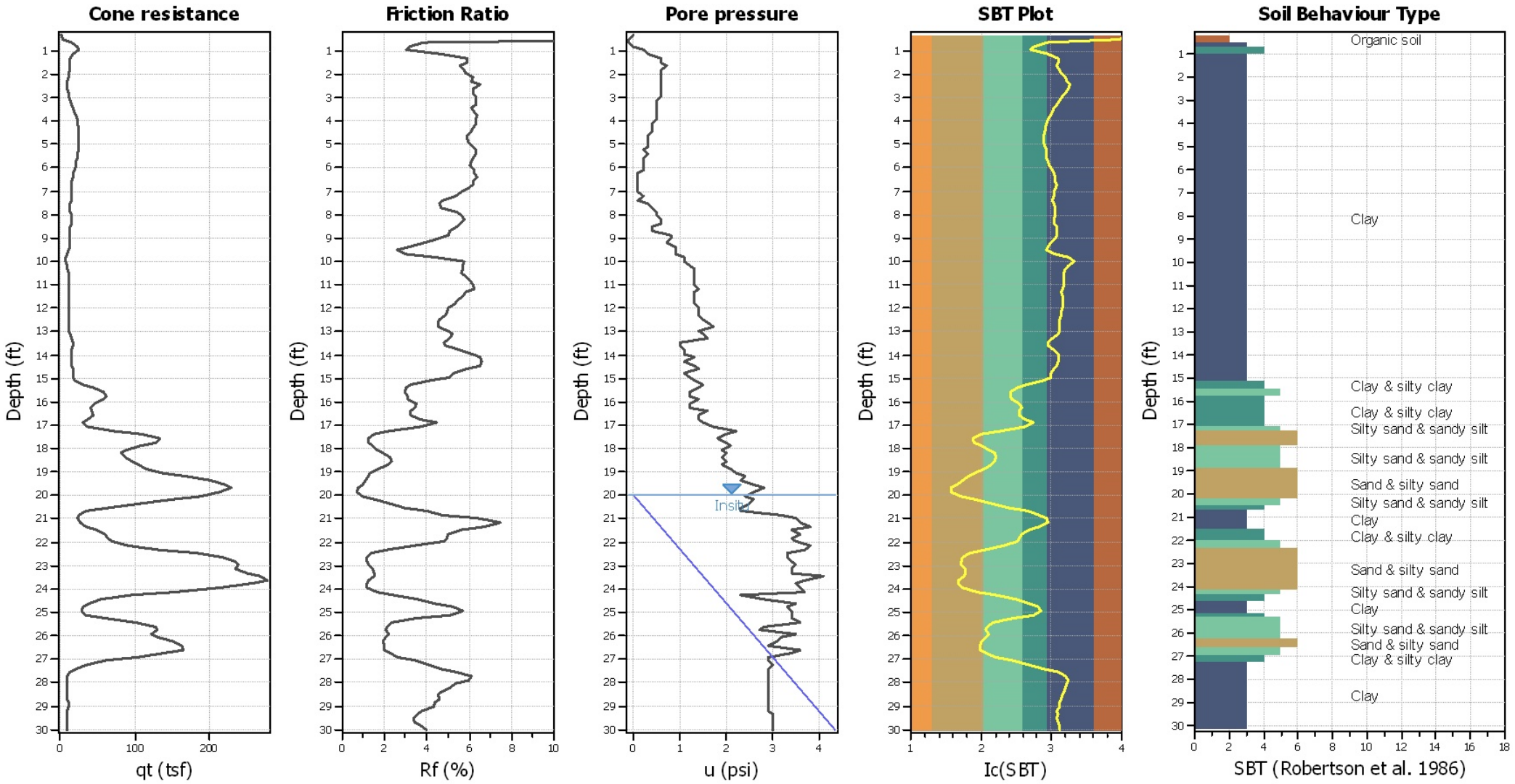






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



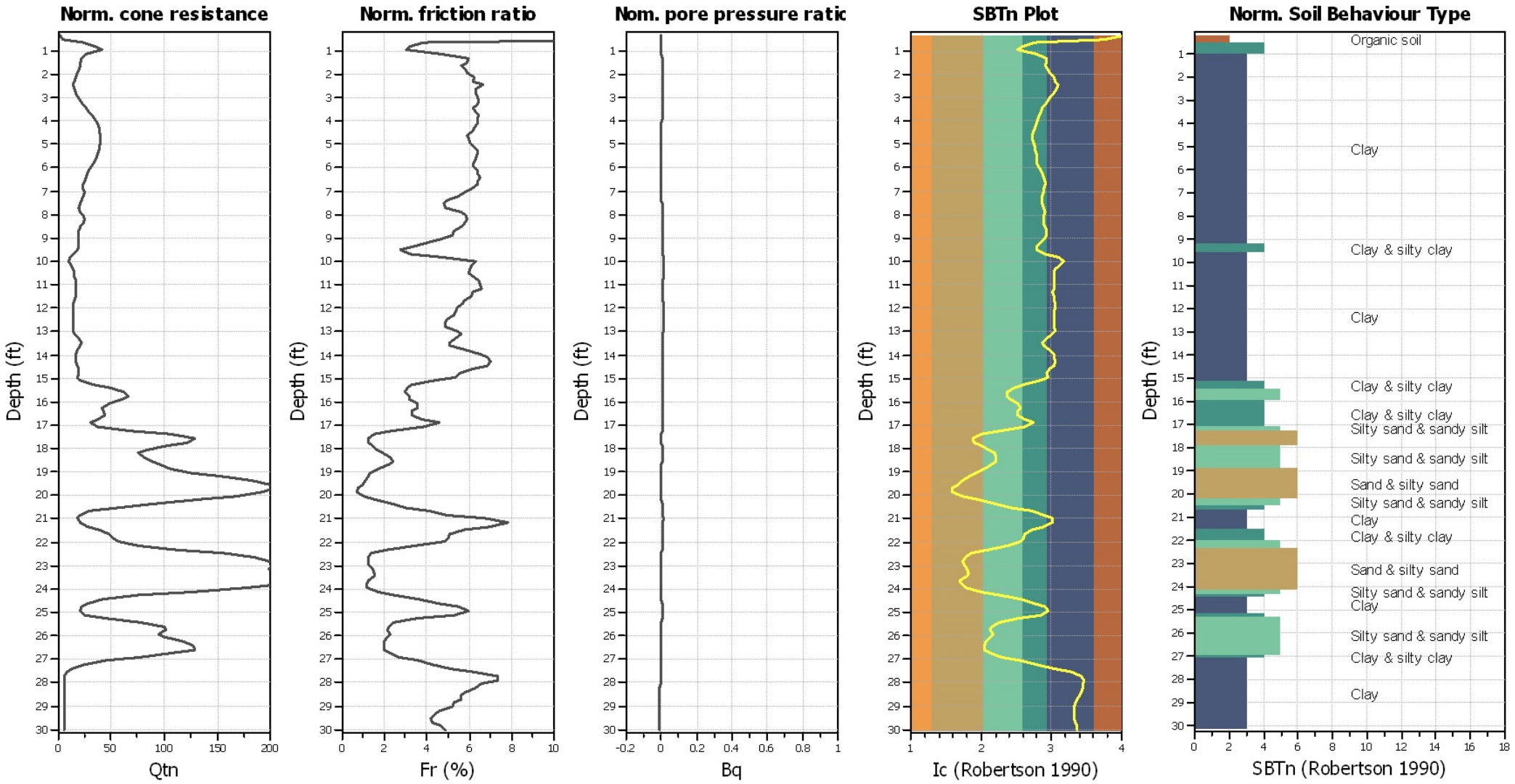
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT 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

CPT basic interpretation plots (normaliz



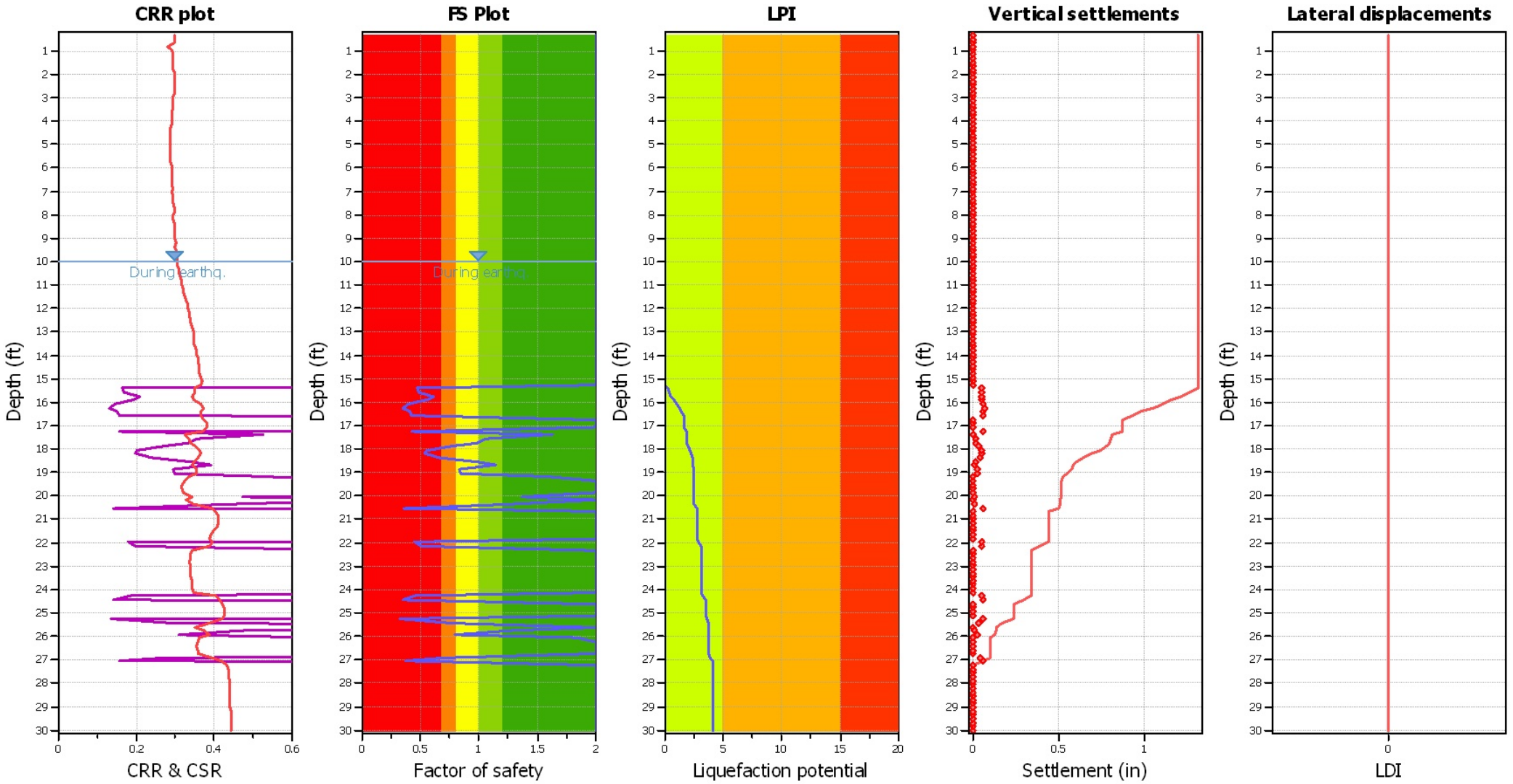
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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

Earth Systems Pacific
48511 Warm Springs Blvd., Suite 210
Fremont, CA 94539
https://www.earthsystems.com/

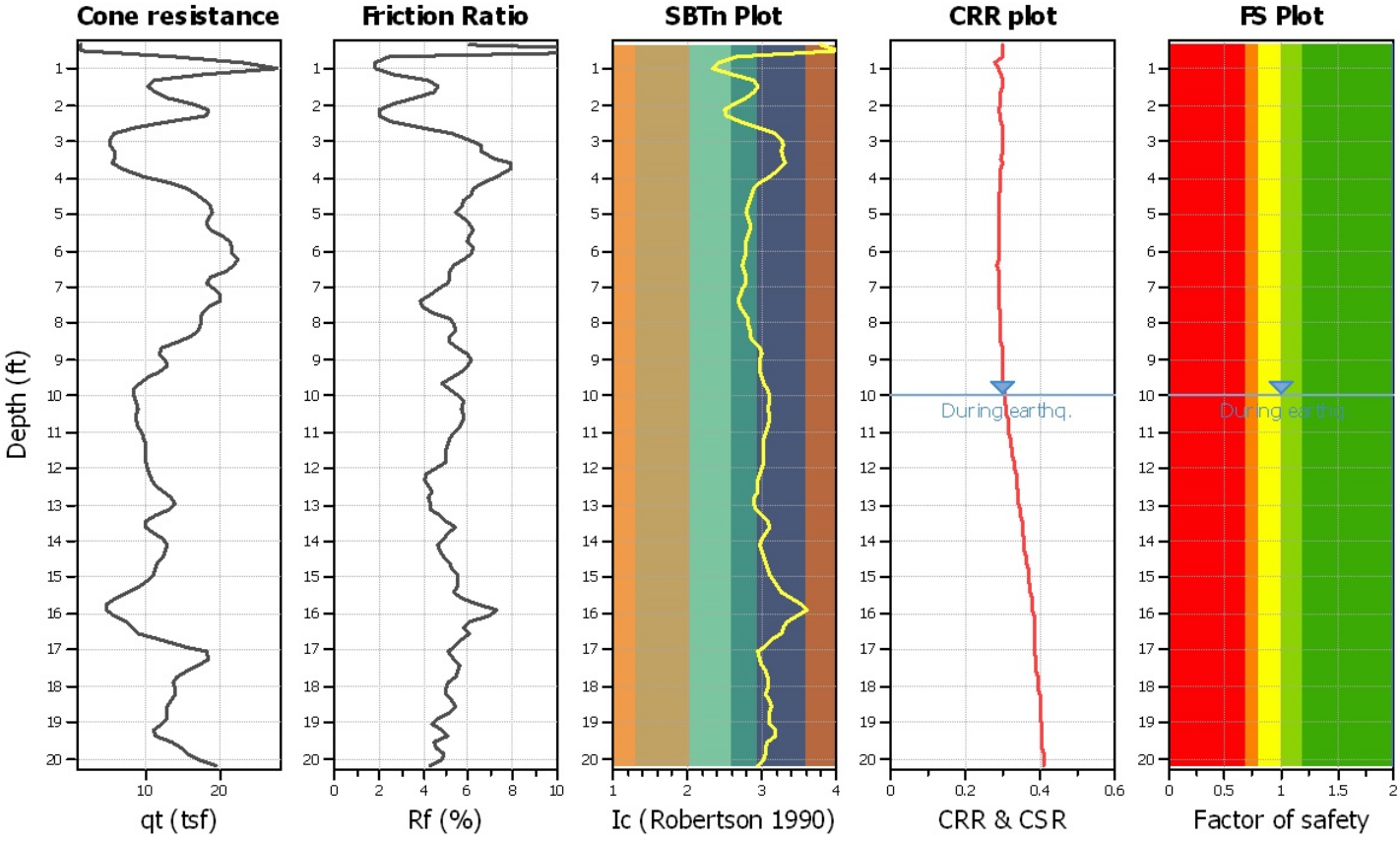
LIQUEFACTION ANALYSIS REPORT

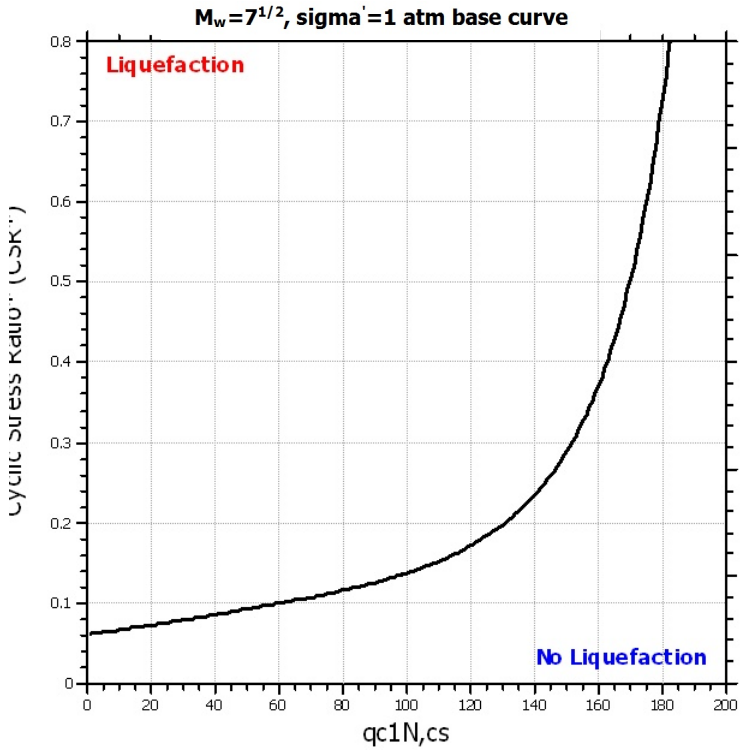
Project title : Alum Rock Avenue Mixed-Use Building **Location : 2350 Alum Rock Avenue, San Jose**

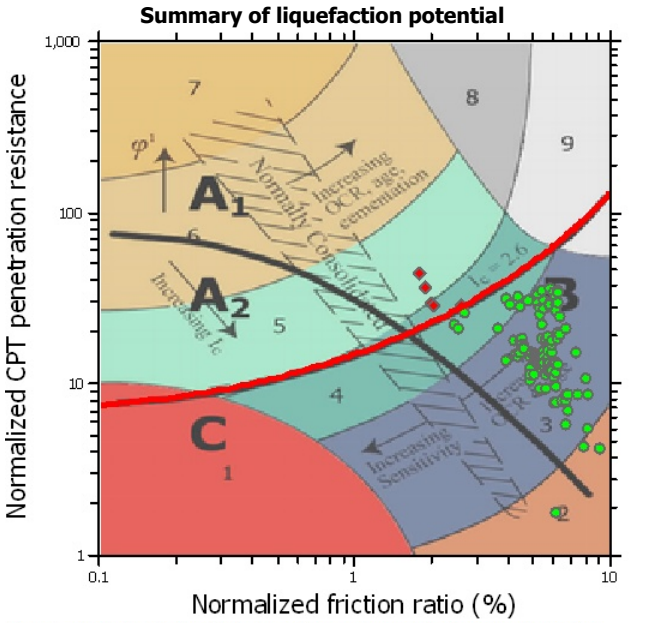
CPT file : CPT-06

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	20.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	10.00 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:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.52	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

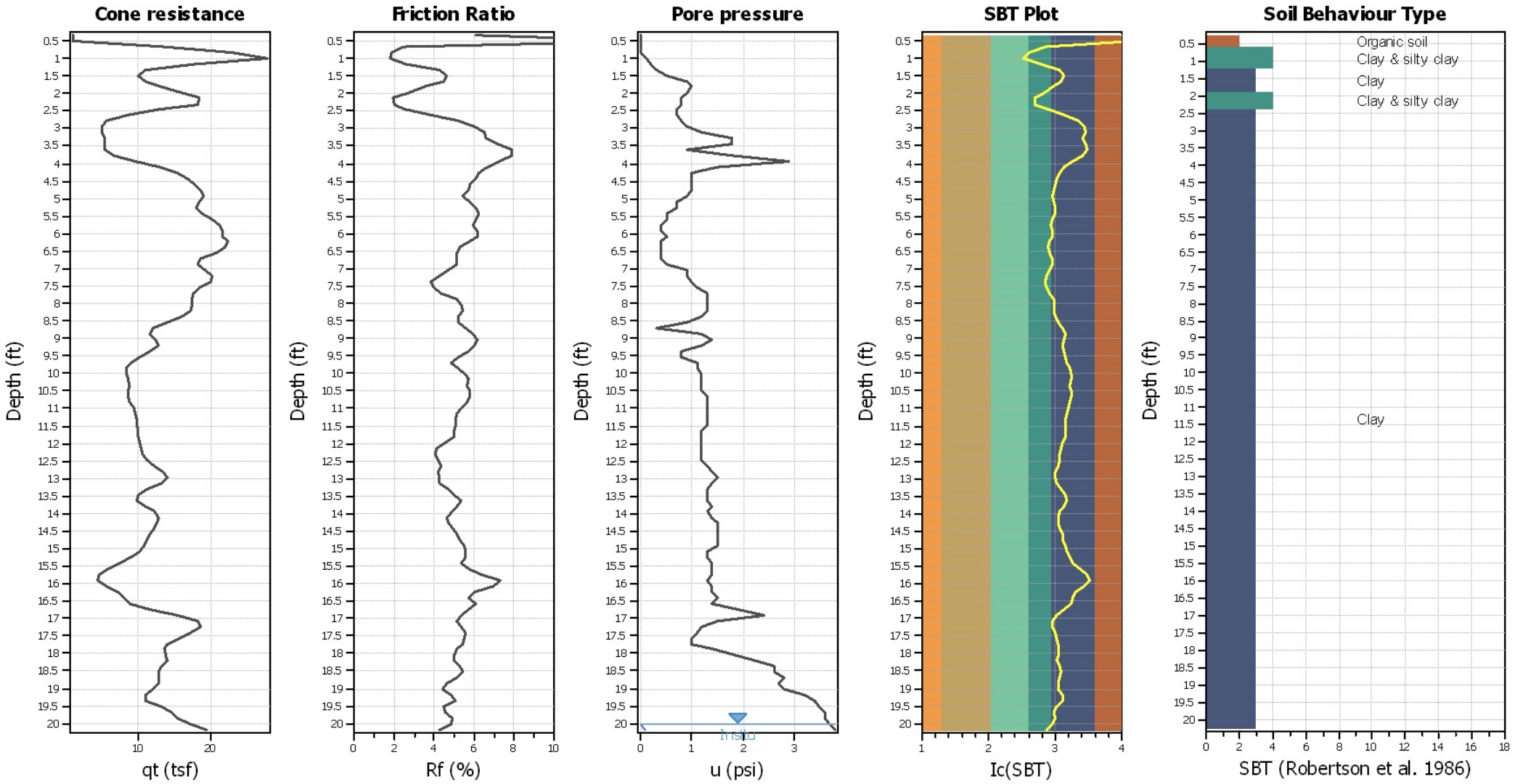






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



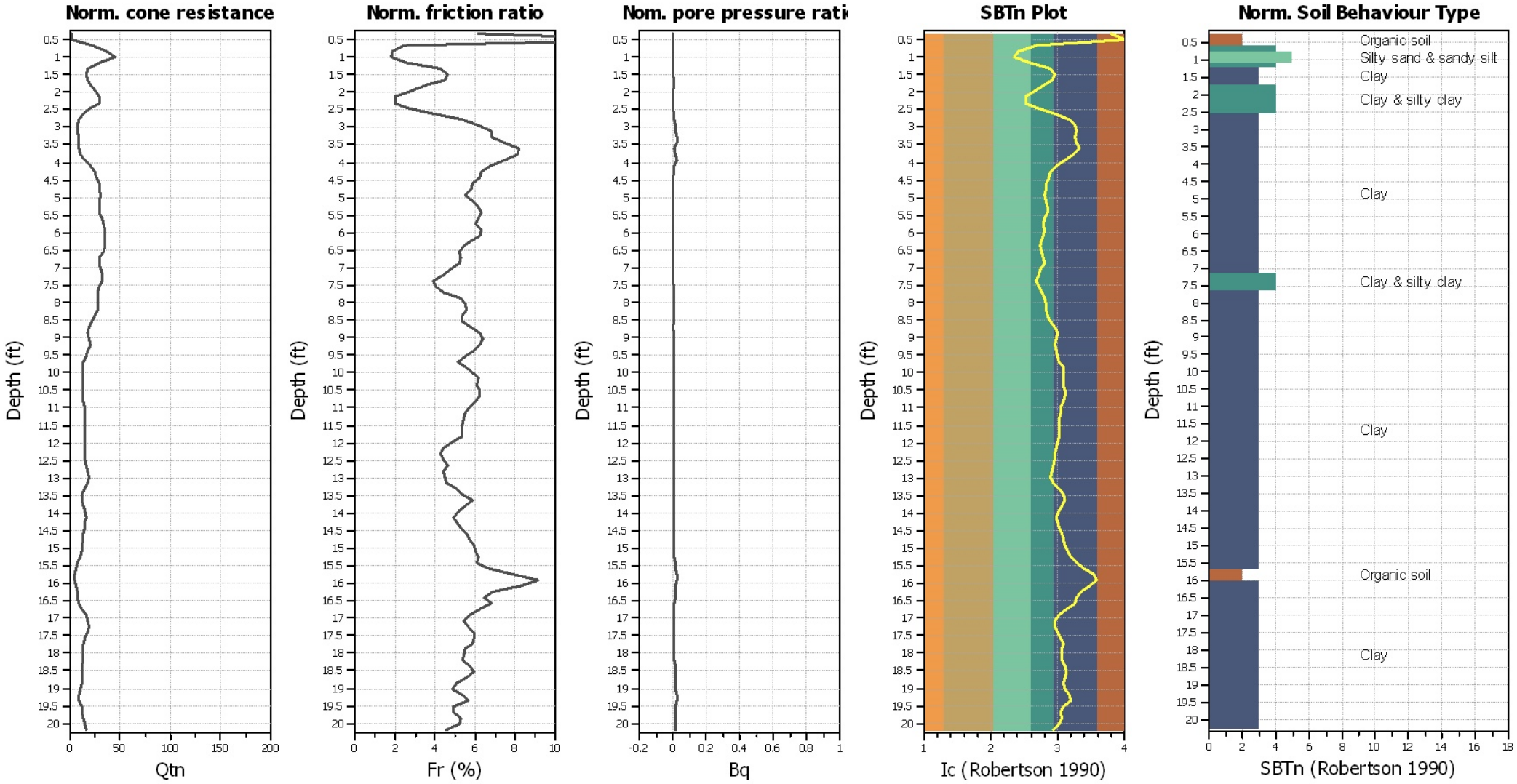
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT 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

CPT basic interpretation plots (normaliz



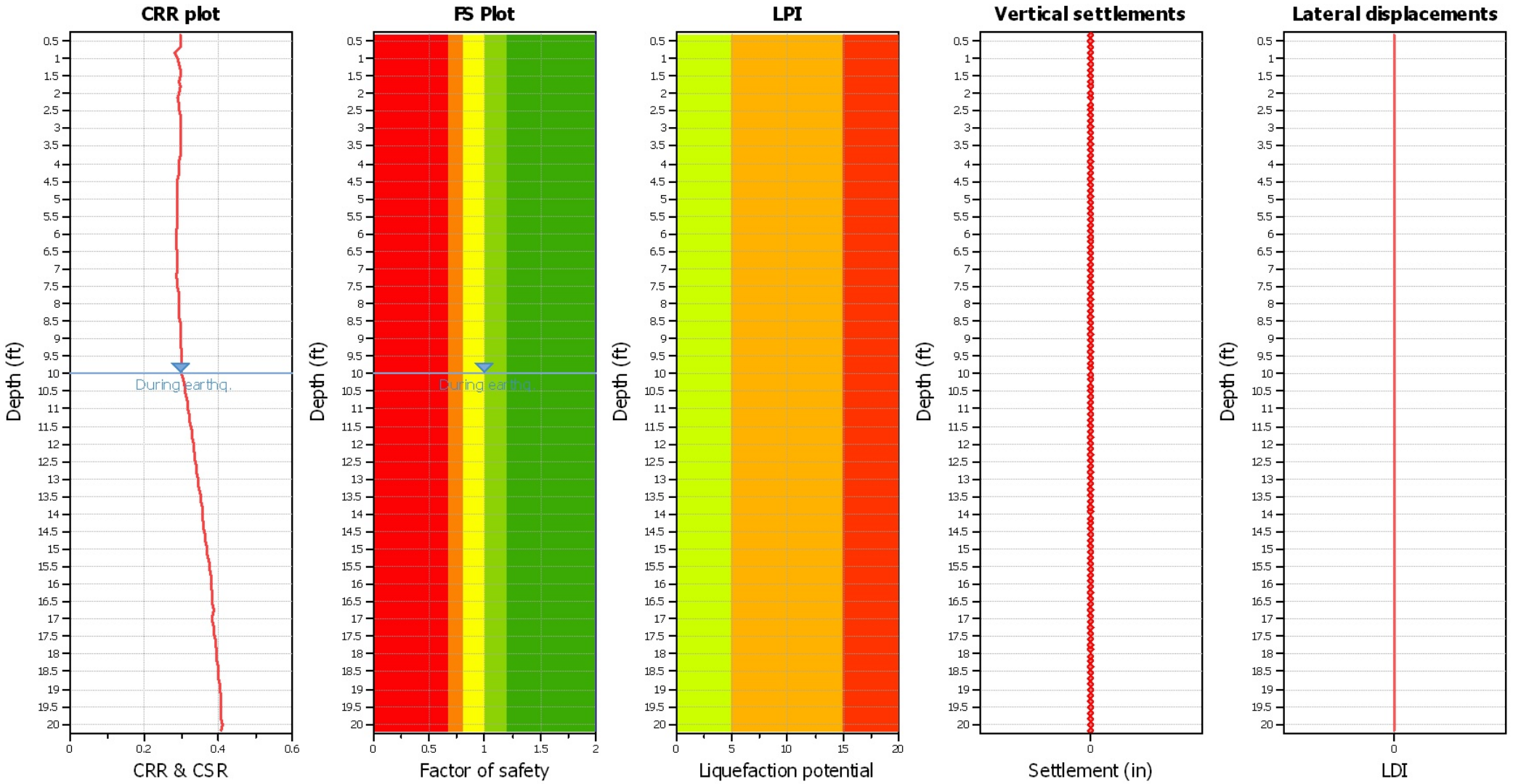
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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:	B&I (2014)	Depth to GWT (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	20.00 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

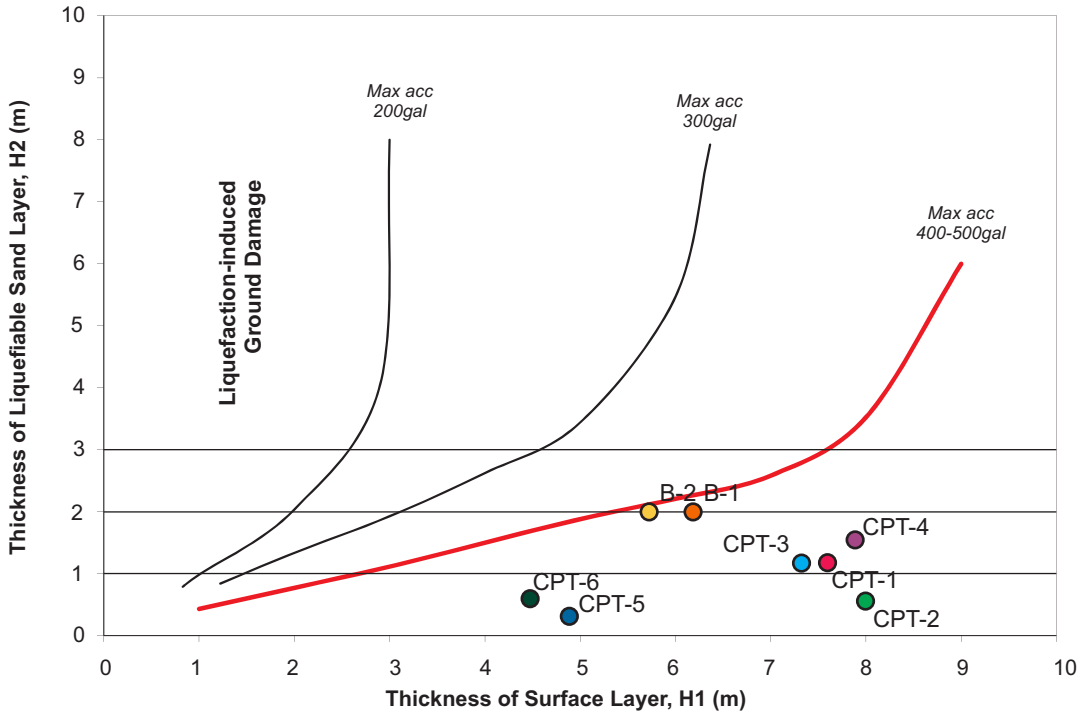


Figure A. Boundary Curve for Discriminating Between Occurrence and Nonoccurrence of Surface Effects of Liquefaction. Base: Youd & Garris, 1995

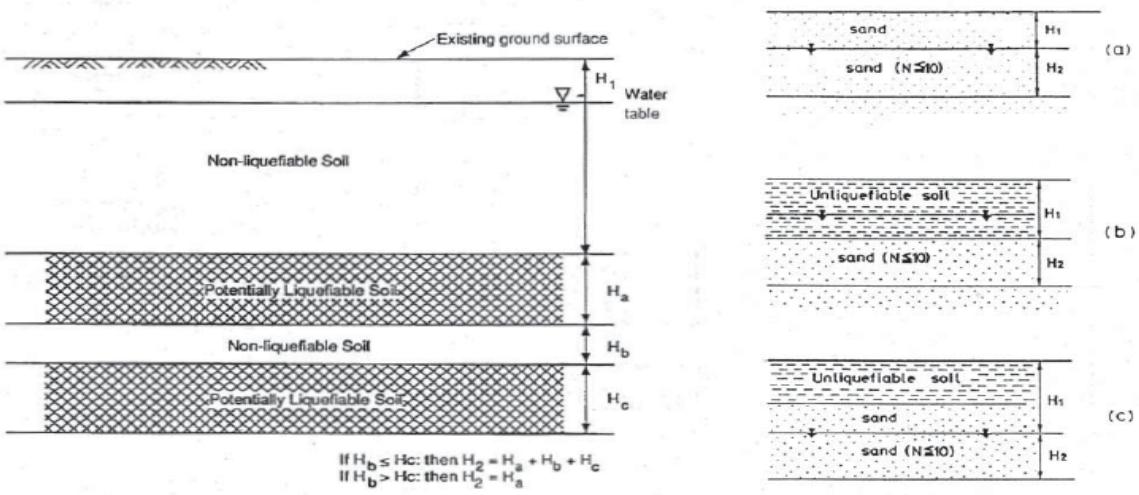


Figure B. Schematic Diagram for Determination of H1 and H2 Used in Figure B (After Ishihara, 1985)
Base: Martin and Lew, 1999