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ENVIRONMENTAL
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PRELIMINARY SOILS ENGINEERING AND ENGINEERING GEOLOGIC INVESTIGATION FOR PROPOSED OCEAN CHARTER SCHOOL 12870 PANAMA STREET LOS ANGELES, CALIFORNIA

GS16-0107 JULY 22, 2016

FOR

OCEAN CHARTER SCHOOL C/O
SCHOOL FACILITY ASSOCIATES
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TABLE OF CONTENTS

TABLE OF CONTENTS *(cont.)*

(2 of 3)

TABLE OF CONTENTS *(cont.)*

Tables

Plates

Appendices

GEOSYSTEMS, INC.

ENVIRONMENTAL
ENGINEERING-GEOLOGY
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1. INTRODUCTION

This report presents the results of our preliminary soils and engineering geologic investigation performed at proposed Ocean Charter School located in 12870 Panama Street, in the City of Los Angeles, California. The report includes a description and an evaluation of the subsurface materials, discusses the soil conditions, and provides soils engineering and engineering geologic recommendations for the proposed development at the subject site.

This report is intended for submittal to the appropriate governmental authorities that control the issuance of necessary permits and provides recommendations for the proposed developments at the subject site.

2. SCOPE OF SERVICE

The scope of our investigation involved the completion of the following:

2.1. Review of available literatures and general geologic data including:

1) California Division of Mines and Geology (1997). Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117, 74 p.

2) Southern California Earthquake Center (1999). Recommended Procedures For Implementation of DMG Special Publication 117 – Guidelines for Analyzing and Mitigating Liquefaction In California, 63 p.

3) California Division of Mines and Geology (1998). Seismic Hazard Zone Report for the Venice Quadrangle, Los Angeles county, Open File Report 98-07.

4) California Division of Mines and Geology (1999). Seismic Hazard Zones Map, Venice Quadrangle.

5) Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County, Appendix A, Ground Water Geology: State of California, Department of Water Resources, Southern District, Bulletin No. 104, Released June 1961, Reprinted May 1990.

6) United States Army Corps of Engineers, 2009, Dam Safety Program, Hansen Dam: http://www.spl.usace.army.mil/Media/Fact-Sheets/Article/477347/dam-safety-program/ (accessed June 2016).

7) California Department of Water Resources, Division of Safety of Dams, 2016, Listing of Dams: http://www.water.ca.gov/damsafety/damlisting/ (accessed June, 2016).

8) Probabilistic Seismic Hazard Assessment for the State of California, California Division of Mines and Geology Open File-Report 96-08 and USGS Open-File Report 96-706, 1996, 33 p., Appendix A and B.

9) State of California, Seismic Hazard Zones, Venice Quadrangle, California Department of Conservation, Division of Mines and Geology, Released March 25, 1999, Scale 1"=2000'.

10) Barlett, S. F., et. al., 1995, Empirical Prediction of Liquefaction-Induced Lateral Spread, Journal of Geotechnical Engineering, V.121, pg. 316-329.

11) CME Automatic Hammer Operations Bulletin, Published by United States, Department of the Interior, Bureau of Reclamation, Earth Sciences and Research Laboratory, November 1999.

12) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards In California; Published by the Southern California Earthquake Center, dated February 2002.

13) Seed, R.B., et al., 2003, Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework, 26th Annual ASCE Los Angeles Geotechnical Spring Seminar, Queen Mary, Long Beach, California, April 30, 2003.

14) Youd, T. L., et. al., 2000, Revised MLR Equations for Predicting Lateral Spread Displacement, Proceedings of the 7th U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures Against Soil Lique-faction, August 15-17, Seattle, Washington, 17 pages.

15) Pile Foundation in Liquefied and Laterally Spreading Ground During Earthquakes: Centrifuge Experiments & Analyses; Department of Civil & Environmental Engineering, College of Engineering, University of Davis, Report No. UCD/CGM-03/01.

16) United States Geological Survey, Earthquake Ground Motion Parameter Calculator for 2007 CBC Seismic Design Parameters. http://earthquake.usgs.gov/research/hazmaps/design/index.php

17) Risk Engineering Inc., Software for Earthquake Ground Motion Estimation, Version 7.62.

18) SCEC Working Group C* (Many Authors), 2001, Active Faults in the Los Angeles Metropolitan Region SCEC: Special Publication Series, No. 001, Southern California Earthquake Center, 47 p.

19) County of Los Angeles, Department of Regional Planning, 1990, Safety Element, Los Angeles County General Plan, County of Los Angeles, California: Leighton and Associates, Inc., 48 p.

20) City of Los Angeles, Department of City Planning, 1996, Safety Element of the Los Angeles City General Plan, Los Angeles, California: City Plan Case No. 95-0371 and Council File No. 86-0662, 61 p.

21) Castle, R. O., 1960, Surficial Geology of the Beverly Hills and Venice Quadrangles, California: U.S. Geological Survey, Open File Report OF-60-26, Scale 1:24,000.

22) Nationwide Environmental Title Research, LLC, (2009), in Partnership with the United States Department of Agriculture and the United State Geological Survey, Historic Aerials: http://www.historicaerials.com (accessed July, 2016).

23) Southern California Earthquake Center, 2013, Significant Earthquakes and Faults, Long Beach Earthquake: http://scedc.caltech.edu/significant/longbeach1933.html (accessed July, 2016).

24) Heaton, T.H., 1982, The 1971 San Fernando Earthquake: A Double Event?; *Bulletin of the Seismological Society of America, Vol. 72, No. 6, pp. 2037-2062.*

25) Hartzell, S., and Iida, M., 1990, Source Complexity of the 1987 Whittier Narrows, California, Earthquake from the Inversion of Strong Motion Records; *Journal of Geophysical Research, Vol. 95, No. B8, pp. 12475-12485.*

26) Wald, D.J., Heaton, T.H., and Hudnut, K.W., 1996, The Slip History of the 1994 Northridge, California, Earthquake Determined from Strong-Motion, Teleseismic, GPS, and Leveling Data; *Bulletin of the Seismological Society of America, Vol. 86, No. 1B, pp. S49-S70.*

2.2 Review of preliminary topographic maps and site development plans provided by the client.

2.3. Mapping of on site and near by earth materials.

2.4. Excavation and detailed logging of three (3) exploratory truck-mounted hollow stem borings in the general area of the proposed buildings to a maximum depth of 70-feet below existing grade.

2.5. Excavation of eight (8) CPT (Cone Penetration Testing) soundings to a maximum depth of 64-feet below existing grade.

2.6. Sampling of representative earth materials.

2.7. Laboratory testing.

2.8. Geotechnical analysis of field and laboratory data.

2.9. Preparation of Geotechnical Map, two (2) Geologic Cross Sections, two (2) Regional Geologic Maps, and various Hazard Maps and graphs.

2.10. Presentation of our procedures, findings and recommendations.

3. PROPOSED DEVELOPMENT

It is proposed to remove all existing structures at the site and construction several new classroom and school facility buildings for a proposed charter school. A two-story building over one-story of subterranean parking is proposed on the western portion of the property. Several two-story classroom buildings with slab on-grade flooring are proposed along portions of the southern property boundary, and two, single-story buildings are proposed in the central and eastern portions of the property. The remaining area are expected to be additional surface parking area, and recreation space. The approximate proposed building location are depicted on the attached Geotechnical Map, Plate 1.

4. SITE CONDITIONS

The site is a trapezoidal parcel located at the south side of Panama Street, west of Culver Boulevard and north of Marina Freeway (Freeway 90) in Marina del Rey area of the City of Los Angeles, California (Thomas guide page 672, grid C7.) The site is a roughly level, and is currently occupied by several commercial buildings with asphalt and concrete paved parking lots. Drainage is by sheet flow to Panama Street.

5. SUBSURFACE EVALUATION

To geotechnically characterize the site and to provide geotechnical recommendations, a subsurface exploration program consisting of 3 hollow-stem auger borings and 8 CPT soundings was implemented.

5.1 Standard Penetration Testing (SPT)

The site was explored on March 2, 2016 by drilling three (3) exploratory truck-mounted hollow stem borings in the general area of the proposed buildings to a maximum depth of 70-feet below existing grade to evaluate the subsurface conditions. The approximate boring locations are shown on Plate 1.

The "Standard Penetration Test" was conducted by driving a 2-inch O.D. split spoon into the soil using blows from a 140 pound hammer dropped 30-inches. The number of blows required to advance the split spoon the final 12-inches of a 18-inch drive is defined as the "Standard Penetration Resistance, " N-value, and is shown on the attached Boring Logs. The N-value can generally be correlated with some significant physical properties of the soil encountered, especially for coarse-grained material. Soil samples were obtained for laboratory testing. The earth materials were logged in detail and are presented in the Log of Borings (Plates B-1 through and B-3.

5.2 Cone Penetrometer Testing (CPT)

The CPT test was conducted by "Gregg Drilling and Testing, Inc." of Long Beach, California. The cone penetrometer testing procedure and cone penetration test data and interpretation are shown on the attached plates (G-1 through G-8), by Gregg Drilling & Testing, Inc.

Soil Behavior type interpretations are based on the following reference: Lunne, Robertson and Powell, 1997 and Robertson, 2015. The test results, include cone resistance, friction resistance, friction ratio, N60, and pore pressure versus depth are shown on the attached plates.

6. SUBSURFACE CONDITIONS

6.1 Soils Condition

A) Artificial Fills:

Artificial fills consisting of brown to dark brown silty clay to sandy silts were encountered at the upper 2- to 5-feet. These materials were likely placed as part of the previous development of the site. The artificial fills are not expected to be left in place below the proposed buildings or direct contact for the pavement and flatwork support.

B) Quaternary Alluvium (Qal):

Quaternary Alluvium (Qal) was encountered below the fills. The alluvium was deposited through fluvial processes. According to Castle (1960) the upper 5- to 10-feet of alluvium are flood plain deposits, which is generally consistent with the presence of clay and silt in the upper elevations of our exploratory borings. The alluvial deposits generally consist of dense gravelly sands below 40 feet and alternating lenses of clay, silt and sands in the upper 40 feet. At a depth of approximately 60-feet the alluvium becomes very dense, as evidenced by the high blow counts observed in Boring B-3. Based on the referenced Bulletin No. 104 (see Reference 5, above), the native earth materials at a depth of approximately 60-feet are classified as Undifferentiated San Pedro Formation and/or Pico Formation. This classification appears to be consistent with the subsurface conditions encountered at the site.

Overall, the alluvial deposits encountered in the borings and CPT sounding consists primarily of variously colored interbedded clays (CH-CL), silts (ML), silty sand (SM), gravelly and pebbly sands (SM/SP) and poorly graded sand (SP) of various thickness. The alluvial deposits are stiff to moderately dense to dense, moist to very moist to wet, and are considered suitable for foundation and slab support, provided our recommendations are followed and integrated into the development plans.

6.2 Groundwater

Groundwater was encountered at a depth of approximately 11-feet below ground surface during our exploration at the subject site. According to Bulletin No. 104 (1961), groundwater observed at the subject site is likely associated with the Ballona Aquifer, which is perched in the more recent alluvial deposits above the lower undifferentiated San Pedro/Pico formation and deeper Silverado Aquifer.

The historically highest groundwater level is approximately 5-feet below the existing grade. However, it must be noted that local fluctuation in groundwater level may occur due to tidal variations, seasonal variations in rainfall, irrigation and water line leak.

7. FAULTING AND SEISMICITY

7.1 Historic Seismicity

Faulting, which has occurred along the Los Angeles basin since ancient times, is thought to have provided the present landscape in Southern California. The faulting was caused by tectonic compression between the North American and Pacific tectonic plates. Today this boundary between the two tectonic plates consists of a complex network of faults. A large number of this network of faults, such as the San Andreas and Newport-Inglewood faults, exhibit right-lateral strike-slip movement on generally vertical fault planes due to the relative plate motion between the North American and Pacific tectonic plates.

An example of an earthquake exhibiting right-lateral strike-slip movement in the Los Angeles area is known as the "Long Beach Earthquake," which occurred on March 10, 1933. According to the County of Los Angeles Safety Element (1990), this earthquake was associated with the Newport-Inglewood fault at a depth 10-km, and ruptured in the subsurface approximately 25-km from its epicentral location. The County of Los Angeles (1990) also shows an Isoseismal Map of the Modified Mercalli Intensities for the earthquake that indicates the subject site experienced an intensity of "VII" on the scale. According to the Southern California Earthquake Center (2013), the earthquake was a Magnitude 6.4, however no surface rupture was recorded as a result of the earthquake. The "Long Beach Earthquake" demonstrated that structures built with unreinforced masonry suffer considerable damage when shaking by a moderate to large earthquake is encountered. The EQFAULT Program shows the subject site is approximately 4-mi (6.4-km) from the Newport-Inglewood fault (see Plates EQ-1 through EQ-3).

A portion of the strike-slipping San Andreas, called the "big bend", changes from a northwesterly trend to a more westerly trend. The big bend consists of the Mojave and San Bernardino segments of the San Andreas fault. The compression on this portion of the San Andreas fault is thought to have resulted in numerous east-west trending thrust faults along the southern margins of the San Gabriel, Santa Susana, and Santa Monica Mountains. Many of these thrust faults break the surface and place basement rock formations over younger sedimentary rock formations. An example of a detrimental event in Los Angeles where a thrust fault ruptured the surface is the San Fernando earthquake of 1971. However, some thrust faults are buried and are thought to exist as segmented strands within zones of intense folding cause by compression. These buried thrust faults or "blind" thrust faults have been responsible for at least two of the most recent earthquakes in the Los Angeles area, the Whittier Narrows earthquake of 1987, and the Northridge earthquake of 1994. Brief descriptions of these earthquakes, and their significance are provided below.

On February 9, 1971, a Magnitude 6.6 (Heaton, 1982) earthquake known as the Sylmar (San Fernando) earthquake created approximately 15 kilometers of surface rupture in the northeast San Fernando Valley (SCEC, 2001). The rupture became known as the San Fernando fault although the epicenter of this particular earthquake appears to have been significantly further north at depth. The sense of motion for this earthquake is a reverse (thrust) fault, the fault plane dips to the north, and it may be a result of flexural slip formed during folding of synclines in this portion of the San Fernando Valley (SCEC, 2001). The San Fernando fault ruptured from a depth of 8 km to the surface (Heaton, 1982). This earthquake showed that precast (tilt up) concrete construction, and "soft-story" multi-story buildings were very susceptible to damage or even collapse in the wake of a moderate to large earthquake. In addition, the earthquake resulted in extensive surface rupture which led to numerous damages, and the Alquist-Priolo Act was established as a direct result of this event. The subject site is approximately 21.1-mi (34-km) to the south of the San Fernando fault (see Plates EQ-1 through EQ-3).

The Whittier Narrows earthquake occurred on October 1, 1987, and had Magnitude 5.9 (Hartzel and Iida, 1990). This fault is a blind thrust, and the plane dips to the north at approximately 30-degrees. The rupture area was approximately 10-km long and 6-km wide (Hartzel and Iida, 1990). This earthquake helped give insight into the stability of structures that had been retrofitted after the San Fernando earthquake. The subject site is approximately 40-mi west of the epicenter of the Whittier Narrows earthquake.

A Magnitude 6.7 earthquake occurred in Northridge on January 17, 1994 (Wald et al., 1996). The Northridge Earthquake was produced from movement on a blind thrust fault with a fault plane orientation striking northwest and dipping an estimated 40-degrees southwest. The dimensions of the rupture were estimated to by 15 km long and 20 km wide. The depth from the surface to the top of the highest rupture area was approximately 5 to 6 km (Wald et al., 1996). According to the City of Los Angeles (1996), this earthquake caused extensive damage to structures throughout the greater Los Angeles area, which appeared to be a direct result of building construction rather than the relationship of the distance of a structure to the fault. The earthquake also resulted in liquefaction of loose alluvial soils which has largely influenced geotechnical investigation in areas of alluvial deposits, such as the subject site. The EQFAULT Program shows the subject site is approximately 11.9-mi (19.1-km) from the Northridge fault (see Plates EQ-1 through EQ-3).

Documents from the Los Angeles City Records Counter were reviewed. From review of building permits, it appears the original structure at the site was built in approximately 1954, with an additional to the structure built in 1962. The structures were built with reinforced brick and concrete. Review of aerial photos (see reference, 22) shows that the original structure and addition have remained on the site from construction to the present, and are generally performing well. In addition, no earthquake damage reports could be found for the subject site. It appears that ground shaking in the greater Los Angeles area due to earthquakes has not negatively impacted the existing structures at the site. In any case, the existing structures at the site are proposed to be removed, and the newly proposed structures will be constructed per the latest modern building codes.

7.2 Ground Motion and Seismic Design

Site Specific Ground Motion Analysis

Site specific ground motion analysis was conducted per Chapter 21 of ASCE 7-10 and 1803A.6 of 2013 CBC utilizing software program as shown in the reference #3. The analysis was conducted based on revised estimated average shear wave velocity, Vs_{30}, of 274 m/s (an average shear velocity for site class D soils), data base from "USGS 2008 California", and averaged spectrum from three attenuations by Abrahamson & Silva, 2008; Boore and Atkinson, 2008; and Campbell and Bozorgnia, 2014. The results of analysis are shown on the attached Plates SP-1 through SP-9. The site specific spectrum is shown on the following Table:

Site Location (latitude, longitude) : (33.9842, 118.4273)	
Spectral Period, T (second)	**Site Specific Spectral Acceleration (g)**
0.2	**S_{DS} = 1.13**
1.0	**S_{D1} = 0.93**

7.3 Groundshaking

Ground shaking resulting from a moderate to major earthquake (Magnitude 6.0 or greater) can be expected during the life span of the proposed structure. Property owners and the general public should be aware that any structure or slope in the southern California region could be subject to significant damage as a result of a moderate or major earthquake. The potential exists throughout southern California for strong ground motion similar to that which struck the Los Angeles region during the January 17, 1994, Northridge Earthquake. Several such destructive earthquakes have struck southern California during the span of recorded history.

Present building codes and construction practices, and the recommendations presented in this report are intended to minimize structural damage to buildings and loss of life as a result of a moderate or a major earthquake. They <u>are not</u> intended to totally prevent damage to structures, graded slopes and natural hillsides due to moderate or major earthquakes. While it may be possible to design structures and graded slopes to withstand strong ground motion, the construction costs associated with such designs are usually prohibitive, and the design restrictions may be severely limiting. Earthquake insurance is often the only economically feasible form of protection for your property against major earthquake damage. Damage to sidewalks, steps, decks, patios and similar exterior improvements can be expected as these are not normally controlled by the building code.

A site specific strong motion study is provided herein for use by a structural engineer to design structures to withstand a major earthquake. Major foundation problems are not anticipated as a result of earthquake induced liquefaction, fault ground rupture or displacement, and differential settlement of natural earth materials, provided the foundation system is constructed as herein recommended, within the limitations presented above.

Structural and cosmetic problems to sidewalks, steps, curbs, decks, and other such appurtenances, may be anticipated as these structures are not normally controlled by the building code.

7.4 Liquefaction Potential

The evaluation of liquefaction potential of the soils at the subject site is based on the following factors: material type, water level, relative density, gradation and intensity and duration of ground shaking.

Soil liquefaction is the sudden decrease of the shearing resistance of a loose state, saturated cohesionless soil under seismic condition. Typically sands and silts are potentially subject to liquefaction under these conditions. According to Seismic Hazard Zones Map (Plate 3), the site is located in an area subject to liquefaction. Liquefaction potential analysis was conducted based on the following conditions:

1) soil type,

2) in-situ standard penetration test and CPT soundings,

3) anticipated highest groundwater level at 5-feet below the grade (Plate 4,)

4) predominant earthquake magnitude of 6.63 (Plate CBC-8), and

5) peak ground acceleration of 0.65 g (Plate CBC-8).

The results indicate that the soil layers at various intervals between depths of 5- to 15-feet and 25- to 40-feet at the site exhibit a factor of safety less than 1.1, which suggests liquefaction may be induced by a major earthquake event should water table rise to the historically highest water level at 5-feet below the existing grade.

7.5 Seismically Induced Unsaturated and Saturated Soils Settlement

We have conducted a quantitative analysis of dry sand settlement analysis based on the following site conditions:

1) soil type.

2) standard penetration test (SPT) data and CPT data.

3) historically highest water level at the site.

Based on the attached analysis on attached plates in Appendix L and the following Table I, the average total and differential seismically induced saturated and un-saturated sand settlement is anticipated to be 1.5-inch and 1.0-inch, respectively.

We recommend that the proposed structures be supported on a mat foundation designed for the combined anticipated differential settlement, both seismically induced differential settlement (1.0-inch) plus static differential settlement (0.25-inch).

TABLE I

Test Location	**Total Seismically Induced Settlement (inches)**	**Differential Settlement (inches)**
CPT-1	1.15	0.76
CPT-2	0.84	0.56
CPT-3	1.12	0.74
CPT-4	2.86	1.89
CPT-5	1.17	0.77
CPT-6	1.89	1.25
CPT-7	1.41	0.93
CPT-8	1.69	1.12
Average	1.50	1.0

The anticipated amount of seismically-induced settlement as a result of an earthquake. The seismically induced settlement analysis at the subject site was analyzed utilizing Tokimatsu and Seed (1987) method, predominant earthquake magnitude, M_w =6.63, and a peak ground acceleration of 0.65g. The project structural engineer should design the foundation system considering the anticipated earthquake-induced saturated sand and un-saturated settlements.

7.6 Lateral Spreading

Based on the attached Plates in Appendix L, the corrected blow counts $(N1)_{60}$ of on-site materials are greater than 15 blows/foot. According to Bartlett, S.F., and Youd, T. L., 1995 and Youd, T. L., et, al., 2000, no significant displacement is likely to $(N1)_{60}$ values greater than 15 blows/foot for a magnitude 8 or less earthquake. Bartlett and Youd's lateral spreading analysis are limited to two (2) specific slope profiles with a surface slope gradient between 0.1% and 6% which is consistent with the range of slope gradient at the subject site.

In addition, a soil layer with a corrected blow count $(N1)_{60}$ value greater than 15 blows/foot indicates a low lateral spreading potential based on the available case histories.

7.7 Ground Rupture

The subject site has been plotted on City of Los Angeles and County of Los Angeles Seismic Safety Element fault maps, and it is not located within any Alquist Priolo Special Studies Zone or in a Fault Rupture Study Area (see Plates FZ-1 and FZ-2). From the reviewed geologic references it appears that the closest fault that is mapped in an Alquist-Priolo Zone is a splay of the Newport-Inlgewood fault located approximately 3.5-miles to the northeast of the subject site (see Plate FZ-2). Based on the referenced geologic map by the State of California, Department of Water Resources (Bulletin No. 104, 1961), the closest mapped fault is located approximately 1-mile to the east of the site (see Plate 6). According to Bulletin No. 104 (1961), this fault appears to trend northwest, and the northeast side is downthrown relative to the southwest side. The fault is zoned as a potentially active fault by the County of Los Angeles (Plate FZ-1), and an area around the fault has been delineated a Fault Rupture Study Area by the City of Los Angeles (Plate FZ-2).

The CPT data is shown on Geologic Cross-Sections A-A' and B-B' to make correlations of packages of alluvium in the subsurface. According to Bulletin No. 104 (1960), the Los Angeles River periodically ran along Ballona Creek in historic time. In addition, the site is near the coast and to the east of Marina del Rey, which at one time was known as Ballona Lagoon. Based on available data and resources, the alluvium below the subject site was most likely deposited in a combination of lagoon, estuary, and fluvial depositional environments. These depositional environments create complex packages of clay, silt, and sand, where thickening, thinning, and pinching out of certain strata in the sequence is common. The mapped packages of alluvium appear fairly continuous, and have the appearance of sediment composition that changes as a result of changing depositional environments. The mapped sedimentary strata due not appear to have been offset as a result of faulting.

Historical aerial photographs and regional topographic maps for the site were reviewed (see reference 22). The reviewed aerial photos from years prior to development of the subject site do not show any obvious signs surface rupture due to faulting, such as offset streams and lineaments.

Based on available data, it is our finding that the proposed development lies a considerable distance from the closest mapped trace of the active Newport-Inglewood fault zone, and no known active faults directly underlie the proposed development. The potential for hazards due to surface fault rupture in the immediate area of the proposed development is considered to be very low.

8. ENGINEERING GEOLOGY

The engineering geologic factors evaluated include geologic planes of weakness, joints and fractures, excavation characteristics, landslides, inundation hazards, and regional subsidence.

8.1 Planes of Weakness

The alluvium underlying the site consists of interbedded sands, silts, clays and gavels which are essentially horizontal in orientation, which is favorable for the stability of proposed excavations at the site.

8.2 Joints and Fractures

The alluvium underlying the site is not considered prone to fracturing. Fractures are not expected to adversely effect the proposed development at the site.

8.3 Excavation Characteristics

The alluvium at the site was observed to be dense, although it is expected that it can be excavated using standard excavation equipment. However, caving conditions may be encountered for pile shaft excavations below the groundwater level. In this case the use of casing or slurry stabilization may be necessary during pile excavation.

8.4 Landslides

Ancient or recent landslides were not observed on the property. In addition, our examination of the property did not reveal the presence of past surficial slope failures.

8.5 Flood Hazards, Tsunamis and Seiches

We have reviewed the Federal Emergency Management Agency (FEMA) Flood Hazard Zone Map (https://msc.fema.gov/webapp/wcs/stores/ servlet/MapSearchResult?storeId=10001&catalogId=10001&langId=-1&panelIDs=06037C1339F$&Type=pbp&nonprinted=&unmapped=) to determine if the site is located within an area designated as Flood Hazard Zone. According to the Flood Insurance Rate Map (FIRM), and the attached FEMA Flood Hazard Zone Map, Plate 5, the site is not located within a flood hazard zone, and is labeled as "Zone X," which is defined as areas of 0.2 percent annual chance flood; areas of one percent annual chance flood with average depths of less than one foot or with drainage areas less than one square mile; and areas protected by levees from one percent annual chance flood.

Tsunamis are long wavelength, seismic, sea waves (long compare to sea depth) generated by the sudden movement of the ocean floor during submarine earthquakes, landslide or volcanic activity. The site has been plotted on the inundation maps provided by the City of Los Angeles Seismic Safety Element (1996), County of Los Angeles Seismic Safety Element (1990), and the California Geological Survey (2009), which are provided herein as Plates IM-1, IM-2, and IM-3, respectively. None of the maps show the subject site with an area designated as subject to susceptible to inundation by tsunami.

Seiches are waves generated in a large, enclosed body of water. The nearest bodies of water to the subject site are Marina del Rey and Bellona Creek, and neither are considered enclosed as they outlet to the Pacific Ocean (see Plate RT-1). The closest portion of Marina del Rey is approximately 4,300-feet to the west of the subject site. The closest portion of Ballona Creek is approximately 1,300-feet to the southwest. Inundation as a result of a seiche is considered unlikely.

The project is not mapped within an area considered susceptible to flood hazard, tsunami, or seiche inundation. Therefore, damage to the proposed development as a result of flooding, tsunamis, and/or seiches is not a design consideration.

8.6 Dam Inundation

The City of Los Angeles (1996) and the County of Los Angeles (1990) map the site in areas of potential inundation by several dams and/or reservoir basins (see Plates IM-1 and IM-2). The Stone Canyon Dam (SCD), Lower Franklin Dam (LFD), Mulholland Dam (MHD), Rowena Dam (RWD), Silver Lake Dam, and Hansen Dam all flow in the Ballona Creek drainage and have flood pattern limits that show the subject site could possibly be inundated by them in the event of a failure.

The Stone Canyon Dam (SCD) is an earthen dam that was built in 1924, and is currently owned by the City of Los Angeles. The crest elevation is 878-feet above sea level, and it has a height of 188-feet. The SCD has a storage capacity of 10,372 acre-feet, and has a drainage area of 1.4 square miles. The subject site is located approximately 9-miles to the south of the SCD.

The Lower Franklin Dam (LFD) is a hydraulic fill dam that was built in 1922, and is currently owned by the City of Los Angeles. The crest elevation is 590.4-feet above sea level, and it has a height of 103-feet. The LFD has a storage capacity of 920 acre-feet, and has a drainage area of 1.12 square miles. The subject site is located approximately 8-miles to the southwest of the LFD.

The Mulholland Dam (MHD), also known as Lake Hollywood Reservoir, is a gravity dam that was built in 1924, and is currently owned by the City of Los Angeles. The crest elevation is 756-feet above sea level, and it has a height of 195-feet. The MHD has a storage capacity of 4.036 acre-feet, and has a drainage area of 1 square mile. The subject site is located approximately 11.5-miles to the southwest of the MHD.

The Rowena Dam (RWD) is an earthen dam that was built in 1911. The RWD has a storage capacity of 118 acre-feet. The subject site is located approximately 13.25-miles to the southwest of the RWD.

The Silver Lake Dam (SLD) is an earthen dam that was built in 1976, and is currently owned by the City of Los Angeles. The crest elevation is 463-feet above sea level, and it has a height of 43-feet. The SLD has a storage capacity of 2020 acre-feet, and has a drainage area of 0.12 square miles. The subject site is located approximately 12.5-miles to the southwest of the SLD.

The Hansen Dam (HSD) is an earthen dam that was built in 1940, and is currently owned by the US Army Corp of Engineers. The subject site is located approximately 19-miles to the southwest of the HSD. Based on our research, the dam received a Dam Safety Action Class IIII rating with probability of failure of moderate to high. Based on the rating, the US Army Corp of Engineers has implemented an interim Risk Reduction Measurement program for dam safety. It should be noted that Hansen Dam is a flood control dam that is rarely at 100% capacity which is immediately released at a controlled flows. Currently a small recreational lake which is part of the City of Los Angeles Parks and Recreation is present which poses no hazard to the proposed development.

The subject site is situated to the north of Ballona Creek, which has been engineered to maintain its current position and outlet to the Pacific Ocean adjacent to Marina del Rey. It also appears from Plate RT-1 that Howard Hughes Airport exists to the south of Ballona Creek at a lower elevation than the subject site, and would likely flood in this area before inundating the site. In addition, the site is far away from all of the above mentioned dams but the drainage of the Los Angeles basin leads there inundations areas into the Pacific Ocean from Ballona Creek.

The age and construction practices of the above mentioned dams, indicate that the potential for failure does exist. According to the County of Los Angeles (1990), the inundation map in the Safety Element (Plate IM-2) shows all probable roots that a flood may follow after leaving the dam, and therefore the map shows a very large and conservative area. Due to the available information and distance from the site to the dams that may pose an inundation threat, it is our professional opinion that the risk of flooding due to dam inundation is low for the subject site.

8.7 Regional Subsidence

According to the County of Los Angeles Seismic Safety Element (1990), regional subsidence may result due to tectonic activity, and the subsidence may be a result of thrust-type faulting due to compression, which causes uplift regional uplift and subsequent subsidence in certain areas. It continues to state that the 1971 San Fernando earthquake was associated with a regional uplift of 2-meters, which may have resulted in approximately 1.6-meters of subsidence in broad areas of Los Angeles. The subject site resides in a tectonic regime that may be capable of producing a thrust-type earthquake, and it should be noted that regional subsidence may be observed at the site in the event of moderate to large compressional earthquake activity.

9. LABORATORY TESTING

Laboratory tests were conducted on representative samples to determine engineering parameters and physical properties of the earth materials. Shear strength, consolidation, sieve analysis, and corrosivity of the materials were determined from these tests.

9.1 Direct Shear

Our shear tests were performed under consolidated drained conditions per ASTM D3080 method. Direct shear tests were conducted on representative samples to determine their shear strength characteristics. The samples were saturated under normal load before testing. Shear loads were applied at a rate of 0.05-inch per minute in accordance with the undrained shear test procedure. Ultimate shear strength values for the samples tested are shown on Plates DS-1 through DS-3.

TABLE 2

Sample Number	Depth (ft)	Soil Type	Dry Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
B-1	10	Qal	102.1	150	23
B-2	7	Qal	106.5	150	31
B-3	5	Qal	111.4	300	31

9.2 Particle Size Distribution

Sieve analyses were performed on the representative materials to verify field classification and aid in evaluation of the shear strength parameters and liquefaction potential of the soils. The test results are attached in the Appendix (Plates SV-1 through SV-13)

9.3 Consolidation

Consolidation tests were performed on in-situ moisture and saturated specimens of the native soil. The consolidometer, like the direct shear machine, is designed to receive the specimens in the field condition. Porous stones placed at the top and bottom of the specimens permits free flow of water into and from the specimens during the test. Successive load increments are applied to the top of the specimens and progressive and final settlements under each load increment are recorded to an accuracy of 0.001-inch. The consolidation curves of the results are shown in the Appendix (Plates C-1 through C-3.)

9.4 Corrosive Soils

Chemical tests for pH, chloride content, sulfate content and minimum resistivity were performed per California Test Method (CTM), on a sample of the surficial materials in the area of the proposed development. Minimum resistivity testing was conducted on a saturated sample of the soil. The laboratory test results based on CTM are presented in Table 3 below:

TABLE 3

Sample Location	Depth (ft)	Soil Type	pH CTM 532	Chloride Content CTM 422 (ppm)	Sulfate Content CTM 417 (ppm)	Minimum Resistivity CTM 532 (ohm-cm)
B-1	0-5	Qal	7.3	30.0	122	8,216

The following corrosion protection and concrete design recommendations are based on California Department of Transportation (Caltrans) Corrosion Guidelines. An engineer specializing in corrosion protection and concrete design should be consulted if additional protection is desirable.

In accordance with Caltrans Corrosion Guidelines, a site is considered to be corrosive if one or more of the following conditions exist: ***1)*** the pH is 5.5 or less, ***2)*** chloride concentration is 500 ppm or greater, ***3)*** sulfate concentration is 2000 ppm or greater, and ***4)*** minimum resistivity is less than 1000 ohm-cm.

The pH and resistivity level of the soils tested are not considered to be corrosive to ferrous metals. Underground steel utilities should be given a high quality protective coating such as 40 mil extruded polyethylene, 20 mil plastic tape over primer per AWWA Standard C209, or hot applied coal tar enamel or tape per AWWA Standard C203. All underground steel should be electrically insulated from above ground steel, dissimilar metals, and cement-mortar or concrete coated steel. Underground steel pipe should be bonded for electrical continuity if rubber gasketed, mechanical, grooved end, or other nonconductive type joints are used. In addition, cathode protection is recommended for underground steel utilities. No special precautions are required for copper, asbestos-cement or plastic utilities placed underground from a corrosion viewpoint. However, any iron valves or fittings should be protected as mentioned above.

The sulfate content of the soil at the site is considered to be low, standard construction practices and concrete mixes may be used for concrete in contact with the on-site soils using Types I, II or III Portland Cement.

10.0 CONCLUSION

Based on the findings of our investigation, the site is considered to be suitable from a soils engineering standpoint for the proposed school and classroom facility development provided the recommendations included herein are followed and integrated into the foundation, building and grading plans.

11. RECOMMENDATIONS

11.1 Site Preparation

Based on our field observations and laboratory test results, artificial fills were encountered at the upper 2 to 5-feet within the proposed development area. These materials are not suitable for foundation and slab support at the current condition and will require mitigation for all proposed on-grade development.

The alluvium below a depth of 5-feet from the existing grade is considered to be suitable for foundation and slab support or for support of new compacted fill. In this case, we recommend that the proposed structures be supported on a new blanket of compacted fill benched into the underlying alluvium or be supported on foundations bearing a minimum of 5-feet below existing grade.

In order to avoid problems due to differential settlement, we recommend that each individual structure be supported entirely within the same material, either new compacted fill or alluvium (bearing a minimum of 5-feet below existing grade). If applicable, the compacted fill blanket should extend a minimum of 5-feet beyond the building line (where space is available) and 3-feet below the base of the proposed foundations. All new fill should be benched into firm alluvium and compacted to at least 90 percent of the maximum dry density, as determined by ASTM Method D1557, at about **2 percent** above optimum moisture content. On-site materials are considered suitable for compaction provided that all deleterious materials are removed prior to compaction. The bottom of the exposed competent soil should be inspected and approved by the soils engineer prior to compaction work. Additional recommendations are provided in the attached grading guidelines.

11.2 Site Clearance

Demolition debris and other unsuitable materials should be stripped and removed from the site. Water lines or other old utility lines or installations to be abandoned should be removed or crushed in place. Old septic tanks and cesspools, if any, should be backfilled in accordance with regulations of the controlling agencies. Holes resulting from removal of buried obstructions which extend below finished site grades should be backfilled with compacted soils.

11.3 Foundation Settlement (Static)

Settlement of the foundation system is expected to occur on initial load application. The maximum settlement is not expected to exceed 1-inch. Differential settlement is not expected to exceed 1/4-inch within a span of 30-feet. The estimates of seismically induced settlement in the event of strong or severe ground shaking resulting from a major earthquake are discussed in the previous section (see Section 7.5, above).

11.4 Foundations

The bearing pressure given is for the total of dead and frequently applied live loads and may be increased by one-third for short duration loading which includes the effects of wind or seismic forces. The foundation system should be designed within a tolerable deflection, determined by structural engineer for the combined differential settlement, both seismically induced differential settlement (1.0-inch) plus static differential settlement (0.25-inch).

11.4.1 Mat Foundation

A mat foundation system is recommended for support of the proposed structures. The mat foundation should be supported entirely on competent native alluvium (a minimum of 5-feet below existing grade) or on certified compacted fill, with a minimum 12-inch embedment. Each individual structure should be supported entirely in the same material, either in approved native alluvium, or in new compacted fill, but not both.

A bearing capacity of 1500 psf and modulus of subgrade reaction of 40 pci should be used for design.

11.4.2 Spread Footings

Conventional continuous and spread footings with grade beams may be used for foundation support provided that the foundations are designed within a tolerable deflection determined by structural engineer. Spread footings should be supported entirely on approved native alluvium or entirely on new certified compacted fill, but not both. Continuous footings may be designed using a bearing pressure of 1500 psf. They should be a minimum of 15-inches in width and 18-inches into the bearing materials.

Independent footings may be designed using a bearing pressure of 2000 psf for approved native alluvium or new compacted fill. The dimensions on independent footings should be a minimum of 2-feet square and founded at least 2-feet into bearing materials.

The bearing capacity can be increased by 10% and 20% with additional foot of width and depth, respectively, to a maximum value of 3000 psf.

Footings should be located below a line measured at a 45 degree angle from the bottom of any utility trench, unless reviewed and approved by the Soils Engineer.

11.4.3 Pile foundation

Friction piles may be used for temporary shoring or for support of proposed structures below the upper 5-feet of unsuitable soil at the site where excavations are limited due to property lines or adjacent structures. Piles should be a minimum of 24-inches in diameter and embedded a minimum of 8-feet into the underlying alluvium. Piles may be assumed fixed at 5-feet below existing grade, or that depth which corresponds to the lowest proposed grade, whichever is deeper. The piles may be designed for a skin friction of 250 psf for that portion of pile in contact with the alluvium, a minimum of 5-feet below existing grade. All piles should be designed within a tolerable amount of deflection, determined by the structural engineer.

11.5 Floor Slabs

Concrete floor slabs should be supported entirely on competent alluvium or new certified compacted fill, and should be reinforced with a minimum of #4 rebar spaced at a minimum distance of 16-inches on center each way. Slabs to be covered with flooring should be protected by an acceptable plastic vapor retarder/barrier (minimum 10 mil thickness). To prevent punctures and aid in the concrete cure, the barrier should be sandwiched within a 3-inch layer of sand.

A minimum 4-inch-thick capillary break consisting of compacted 3/4-inch coarse aggregate (Caltrans Class II permeable or equivalent) should be placed below the vapor retarder/barrier and sand, per the 2010 California Green Building Standards Code (CALGreen).

If moisture vapor transmission is a concern to the facility owner, an expert should be consulted to provide additional recommendations for the design and construction of slabs in moisture sensitive flooring areas.

It is understood that the basement level will be below the historically highest ground-water table. Therefore, a pressure slab to resist maximum probable hydrostatic uplift pressure is recommended for the subterranean garage. The recommendations for pressure slab and under-floor drainage system (relieved slab) are described in Plate RS-1. The actual reinforcement for the slab should be determined by the project structural engineer. Additional 1000 psi concrete strength over the specified concrete strength should be used for foundation or slab under the historically highest water table.

11.6 Expansive Soil

Based on our field exploration, soil classification and in-situ density results, on-site soils in the proposed foundation locations are considered to be medium in expansion potential. Special recommendation for the foundation design as shown in the attached Plate EI-1 is recommended.

11.7 Hydrocollapse

Based on those tests attached, the native alluvium is not considered collapsible with hydro-consolidation less than 0.2 percent. However the existing surficial material at the proposed development area is loose and disturbed at the upper 2- to 5-feet. We recommend that the existing material be removed and re-compacted for slab support. The fill should be compacted to at least 90 percent of relative compaction at 2 percent above optimum moisture content.

11.8 Lateral Design

Resistance to lateral loading may be provided by friction acting at the base of the foundations and by passive earth pressure within native alluvium or certified compacted fill. An allowable coefficient of friction of 0.30 may be used with the dead load forces.

Passive earth pressure may be computed as an equivalent fluid having a density of 300 pcf with a maximum earth pressure of 4500 psf. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third.

11.9 Retaining Walls

Retaining walls are expected to be a maximum of 10-feet in height. Free standing retaining wall should be designed utilizing equivalent fluid pressure of 45 pcf as active pressure (see Plate RW-1). Restrained retaining wall (basement wall) should be designed utilizing a trapezoidal distribution of 42 H psf, where H is the height of retaining wall in feet. The proposed retaining wall should be designed for surcharge condition due to sloping ground, building or vehicular surcharge.

In accordance with Section 1802.2.7 of the 2013 California Building code, an additional active load of 28.3 H^2 pounds should be added to the retaining wall design for restrained walls and an additional active load of 10.6 H^2 pounds should be added to the retaining wall design for freestanding walls. Our earth pressure distribution diagrams are presented on Plate PD-1.

All walls should be effectively waterproofed, provided with an adequate subdrainage system, and backfilled in accordance with the attached retaining wall backfill and subdrain details (Plates RD-1 and RD-2). We recommend you hire a waterproofing expert to determine your waterproofing requirements. Waterproofing details, application methods or effectiveness in preventing moisture intrusion are beyond the scope of our work authorization and not the responsibility of GeoSystems, Inc. The subdrainage system, including outlet locations, should be clearly shown on the building and/or grading plans. The contractor is responsible to insure that all subdrain outlets are constructed per plan.

The water level at the site is expected to be as high as 5-feet below the existing grade. Due to historic fluctuation in groundwater levels, and possible tidal influence due to the close vicinity to the ocean, we recommend that the entire height of the wall be designed with additional hydrostatic pressure.

11.10 Retaining Wall Deflection

All walls should be designed by the structural engineer within a tolerable deflection as determined by the project structural engineer and the owner. Non-restrained (freestanding) retaining walls designed for active pressure will typically deflect approximately one percent of their height over time in response to loading (depending on the stiffness of the wall). This deflection is normal and reduces the pressure on the wall. To accommodate this deflection, structures or slabs should not be tied to freestanding retaining walls. Freestanding walls should be provided with vertical construction joints at corners. Should excessive wall deflection be undesirable, at-rest earth pressure recommendations presented herein, which will reduce wall deflection significantly, may be used for retaining wall design. Our recommendations for at-rest earth pressure distribution for the design of restrained retaining walls are provided on Plate PD-1 herein.

Slabs should not be tied to walls unless designed as a structural slab. The space between the wall and the slab will require periodic caulking to prevent moisture instruction into retaining wall backfill.

11.11 Temporary Excavations

Temporary excavations for removal and re-compaction, and for basement walls are expected to be up to approximately 10-feet in vertical height. The maximum recommended height of temporary vertical excavations in soil is 5-feet. That portion of the excavation above a height of 5-feet, should be trimmed to a 1:1 slope, where space is available, or the excavation may be shored. Area where trimming is not available, the excavations should be temporarily shored utilizing a shoring system consisting of soldier piles. Recommendations for shoring piles are provided below.

All cut-slopes and temporary excavations should be observed during excavation by a representative of this firm. Should the observation reveal any geologic hazard, appropriate treatment will be recommended.

All excavations shall be made in accordance with the regulations of the State of California, Division of Occupational Safety and Health (Cal/OSHA). These recommended temporary excavation slopes do not preclude local raveling and sloughing. Provided our recommendations are followed, the resulting temporary excavations are anticipated to be safe from a geotechnical standpoint for the proposed construction operations, and should not expose workers to hazards due to cave-ins, provided that geologic conditions exposed by the excavations are as anticipated.

All excavations should be stabilized within 30 days of initial excavation. Water should not be allowed to pond on the top of the excavation nor to flow towards it. No vehicular surcharge should be allowed within 5-feet of the top of cut.

Groundwater was encountered at a depth of 11-feet during field exploration. If groundwater is encountered during basement excavation, to provide a dry workable field condition, the seepage can be collected via french drain and pump off site. To bridge the soft saturated subgrade, a 12-inch thick compacted blanket of 3/4-inch gravel is recommended.

It is recommended that a pre-excavation site meeting be attended by the grading contractor, the soils engineer, and an agency representative to discuss methods and sequence of subterranean excavation.

11.12 Shoring/Soldier Piles

Where sufficient space is not present for trimming temporary excavations as recommended above, excavations may be temporarily shored utilizing a shoring system consisting of soldier piles with wood lagging. The piles should be spaced no greater than 8-feet on center exhibiting a minimum embedment 10-feet below the bottom of the excavation. In order to avoid sloughing and/or caving between the proposed piles, we recommend that wood lagging be placed to support the material exposed between the piles. The wood lagging should be extended down to the bottom of the temporary excavations. An active pressure of 35 pcf can be used for temporary shoring design (see Plate RW-2 herein). The shoring can be integrated into permanent wall if the shoring is designed utilizing the active pressure as shown in "retaining wall" section.

11.12.1 Shoring Pile Deflection

The shoring piles should be designed to within a tolerable deflection, typically less than 1-inch, by the project structural engineer. Any movement over 1-inch shall be reported to the structural (shoring) engineer. If there is movement of 2-inches or more, remedial shoring will need to be installed to prevent additional movement prior to further construction.

11.12.2 Shoring Monitoring

It will be the responsibility of the grading contractor to maintain an accurate monitoring system of the performance of the excavation. The intent of this program will be to produce an accurate and on-going record of the horizontal and vertical deflections of the temporary shoring system.

It is anticipated that a surveyor would be retained to construct and maintain the monitoring system. Both vertical and horizontal movements should be measured on a weekly basis and the record of performance should be submitted to both the Soil Engineer and the Structural (Shoring) Engineer. Accuracy should be maintained within one one-hundred of a foot and the record should be produced in a readily understandable form. The surveyor should submit to the Soil Engineer, prior to start of excavation, a plan which would indicate the method selected for monitoring of the excavation.

It is suggested that some attempt be made to secure monuments or survey points for horizontal measurements of the subgrade displaced some 3- or 4-feet back of the shoring elements. It is suggested that several locations be selected at the top of the pile and the performance of such monuments would be included within the monitoring record submitted each week.

Monitoring of the excavation performance should be started prior to the beginning of the initial excavation. The weekly schedule of performance monitoring may be modified as the job progresses. Once the subterranean structure has been constructed, monitoring of the performance will no longer be required.

11.12.3 Typical Sequence of Shoring Pile Installation and Excavation:

1. Drill soldier piles, set steel, and pour concrete;
2. Once cured, excavate for retaining wall;
3. Construct shotcrete retaining wall.

11.13 Slot Cut

As an alternative to temporary shoring, in areas where required removal and re-compaction is adjacent to property lines, excavation may proceed using the "A-B-C" slot cut method.

Slot cutting may be performed utilizing the A-B-C slot cut method. Each slot width should not exceed 8-feet per the calculations presented on Plate SC-1. The maximum anticipated height of each slot is not anticipated to exceed 5-feet. The following construction procedure should be utilized for removal and re-compaction using the slot cut method:

1. Excavate each "A" slot;
2. Backfill each "A" slot with compacted fill;
3. Excavate each "B" slot;
4. Backfill each "B" slot with compacted fill;
5. Excavate each "C" slot;
6. Backfill each "C" slot with compacted fill.

A representative of GeoSystems, Inc., should continuously observe the slot cutting procedure to verify that the geologic conditions being exposed in the cuts are as anticipated. Additional or revised recommendations will be made as field conditions warrant.

All cut-slopes and temporary excavations should be observed during excavation by a representative of this firm. Should the observation reveal any geologic hazard, appropriate treatment will be recommended.

All excavations shall be made in accordance with the regulations of the State of California, Division of Occupational Safety and Health (Cal/OSHA). These recommended temporary excavation slopes do not preclude local raveling and sloughing. Provided our recommendations are followed, the resulting temporary excavations are anticipated to be safe from a geotechnical standpoint for the proposed construction operations, and should not expose workers to hazards due to cave-ins, provided that geologic conditions exposed by the excavations are as anticipated.

All excavations should be stabilized within 30 days of initial excavation. Water should not be allowed to pond on the top of the excavation nor to flow towards it. No vehicular surcharge should be allowed within 5-feet of the top of cut.

Groundwater was encountered at a depth of 11-feet during field exploration. Groundwater is likely will encountered during basement excavation. To provide a dry workable field condition, the seepage can be collected via french drain and pump off site. To bridge the soft saturated subgrade, a 12-inch thick compacted 3/4-inch gravel is recommended.

It is recommended that a pre-excavation site meeting be attended by the grading contractor, the soils engineer, and an agency representative to discuss methods and sequence of subterranean excavation.

11.14 Pavement

We recommend that the upper 2-feet of loose soils and fill materials be removed and re-compacted within the area to receive pavement section.

Prior to placing pavement, the subgrade should be scarified to a depth of 6-inches, moistened or dried out to optimum moisture content, and recompacted to at least 90 percent of the maximum dry density, as determined by ASTM Method D1557-02e1.

Utilizing an estimated traffic index of 4 and "R" value of 30, a flexible pavement section consisting of 3-inches of asphalt concrete over 4-inches of base material should be used for the light weight traffic area. Utilizing an estimated traffic index of 6 and "R" value of 30, a flexible pavement section consisting of 4-inches of asphalt concrete over 6-inches of base material should be used for the service lanes (truck and loading area). The base material may be crushed aggregate.

As an alternative, a rigid pavement section consisting of Portland Cement Concrete (PCC) can be used. The traffic loading is expected to be primarily light vehicles. Recommendations for the rigid concrete pavement design is provided herein in the following Table 4:

TABLE 4

Compressive Strength of Concrete @ 28 days	3500 psi
Modulus of Rupture of Concrete @ 28 days	550 psi
Concrete Thickness	4 inches
90 Percent Compacted Subbase	12 inches
Contraction Joint Spacing	10 ft.
Depth of Joint	1 inch

Concrete slabs should be separated from other structures or fixed objects within or abutting the paved area by isolation joints. This serves to offset the effects of the differential horizontal and vertical movements of the structures which may fracture the concrete slab.

When isolation joints are located where wheel and other loads are applied, the pavement edge at the joint should be thickened by 20 percent or 2-inches, whichever is greater.

A joint filler should be applied to any new isolated joints within the concrete slab. The joint filler should extend through the slab thickness and should be recessed below the pavement surface so that the joint can be sealed with joint sealant material. The types of joint filler materials recommended include bituminous mastic, bituminous impregnated cellulose or cork, sponge rubber, or resin-bound cork. Joint filler materials should be installed in accordance with the recommendations of the manufacturer.

11.15 Patio Slabs and Hardscape

It may be desirable to support new patio slabs and hardscape (patios, steps, walkways, and etc.) on the existing surficial soils. These structures are not normally subject to building code requirements for structural support. In order to reduce the potential for distress due to the potential for settlement, it may be desirable to provide additional subgrade preparation and additional steel and concrete thickness for the proposed patio slabs and hard-scape at the site. At a minimum, we recommend that patio slabs and hardscape be reinforced with a minimum of #4 rebar placed at 16-inches on center each way. The upper 12-inches of existing surficial soils to be used for slab support should be removed and recompacted to 90 percent of the maximum dry density, as determined by ASTM Method D1557-02e1. It should be noted that patio slabs/ hardscape constructed to the preceding specification may be subject to distress over time. Periodic maintenance or replacement may be necessary.

11.16 Drainage Control

Final grading shall provide positive drainage away from the footings and from the lot. Proper drainage shall also be provided away from the building footing and from the lot during construction. Maintaining a proper drainage system will minimize the shrink/swell potential of the subsoils.

All pad and roof drainage should be collected and transferred to the adjacent street in non-erosive drainage devices. Drainage should not be allowed to pond on the pad or against any retaining wall or foundation.

12. CONSTRUCTION AND OBSERVATION

A set of foundation should be submitted to this office for review and approval prior to initiation of construction.

It is recommended that all foundation excavations be approved by this firm prior to placing concrete or steel. Any fill which is placed should be tested for compaction if used for engineering purposes. All cut-slopes and temporary excavations should be observed by a representative of this firm. Should the observation reveal any unforeseen hazard, appropriate treatment will be recommended.

It is advised that the client contact **GEOSYSTEMS, INC.**, at least **1 week** in advance of commencing grading to allow for contractual agreements for geotechnical services during the construction phases of your project

Please advise this office at least **24 hours** prior to any required verification.

Representatives of **GEOSYSTEMS, INC.**, will observe work in progress, perform tests on soil, and observe excavations and trenches. It should be understood that the contractor or others shall supervise and direct the work and they shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during the performance of the work.

Periodic observation by **GEOSYSTEMS, INC.,** is not intended to include verification of dimensions or review of the adequacy of the contractor's safety measures in, on, or near the construction site.

13. REMARKS

The conclusions and recommendations contained herein are based on the findings and observations made at the boring locations. While no great variations in soil conditions are anticipated, if conditions are encountered during construction which appear to differ from those disclosed, **GEOSYSTEMS, INC.,** should be notified, so as to consider the need for modifications.

This report has been compiled for the exclusive use of **OCEAN CHARTER SCHOOL** and their authorized representatives. It shall not be transferred to, or used by, a third party, to another project or applied to any other project on this site, other than as described herein, without consent and/or thorough review by this facility.

Should the project be delayed beyond the period of **one year** after the date of this report, the site should be observe and the report reviewed to consider possible changed conditions.

This report is issued with the understanding that it is the responsibility of the owner, or their representative, to assure that the information and recommendations contained herein are called to the attention of the designers and builders for the project.

The limits of our liability for data contained in this report and our warranty is presented on the following page.

GEOSYSTEMS, INC.

REGISTERED PROFESSIONAL ENGINEER
STEVE SHI-SHEN TSAI
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GEOTECHNICAL
STATE OF CALIFORNIA

Steve S. Tsai, Vice President
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STATE OF CALIFORNIA

Attachments: 288 Plates, see Appendix

CC: 4 to Client

BT:RG:SST:VJC/jsc

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LIMITATIONS

This report is based on the development plans provided to our office. In the event that any significant changes in the design or location of the structure(s); as outlined in this report are planned, the conclusions and recommendations contained in this report may not be considered valid unless the changes are reviewed and the conclusions of this report are modified or approved by the soil engineer.

The subsurface conditions and excavation characteristics described herein have been projected from individual borings or test pits placed on the subject property. The subsurface conditions and excavation characteristics data should in no way be construed to reflect any variations which may occur between these borings or test pits.

It should be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time measurements were made and reported herein. **GEOSYSTEMS, INC.,** assumes no responsibility for variations which may occur across the site.

If conditions encountered during construction appear to differ from those disclosed, this office shall be notified so as to consider the need for modifications. No responsibility for construction compliance with the design concepts, specifications or recommendations is assumed unless on-site construction review is performed during the course of construction which pertains to the specific recommendations contained herein.

This report has been prepared in accordance with generally accepted practice. No warranties, either expressed or implied, are made as to the professional advice provided under the terms of the agreement and included in this report.

GRADING GUIDELINES

Site Clearing

Any existing brush, loose fill and porous soils shall be excavated to competent native materials. Prior to the placement of any fill soils, the exposed surface shall be scarified, cleansed of debris and recompacted to 90 percent of the laboratory standard under the direction of the Soils Engineer in accordance with the following "Placing, Spreading, and Compacting Fill Materials".

Preparation

After the foundation for the fill has been cleared, and scarified, it shall be brought to a proper moisture content and compaction to not less than 90 percent of the maximum dry density in accordance with ASTM D1557.

Materials

On-site materials may be used in the fill if cleansed of debris. Imported fill materials shall be approved by the Soils Engineer and may be obtained from any other approved source. The materials used should be free of excessive organic matter and other deleterious substances and shall not contain rocks or lumps greater than 6 inches in maximum dimension.

Placing, Spreading and Compacting Fill Materials

Fill materials shall be placed in layers which when compacted shall not exceed 6 inches in thickness. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to ensure uniformity of material and moisture of each layer.

Where the moisture content of the fill material is below the optimum value determined by the Soils Engineer, water shall be uniformly added to obtain the approximate optimum moisture content.

Where the moisture content of the fill materials is higher than the optimum value determined by the Soils Engineer, the fill materials shall be aerated by blading disking or mixing with dry materials until the optimum moisture content is obtained.

After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to not less than 90 percent of the maximum dry density in accordance with ASTM D1557 Cohesionless soil having less than 15 percent finer than 0.005 millimeters (such as base material or pea gravel) shall be compacted to a minimum of 95 percent of the maximum dry density.

Compaction shall be by sheepfoot roller, tract rolling or other types of acceptable compaction equipment of such design that they will be able to compact the fill material to the specified density. Rolling shall be accomplished while the fill material is at the specified moisture content, to ensure that the desired density has been obtained. The final surface of the areas to review slabs-on-grade should be rolled to a dense smooth surface.

GRADING GUIDELINES *(Continued)*

Field density tests shall be made by the Soils Engineer at intervals not to exceed 2 feet of fill height. Where sheepfoot rollers are used, the soil may be disturbed to a depth of several inches and density reading shall be taken in the compaction material below the disturbed surface. When these readings indicate the density of any fill or portion thereof is below the required 90 percent density, the particular layer of portion shall be reworked until the required density has been obtained.

The grading specifications should be a part of the project specifications.

The Soils Engineer shall review the grading plan prior to grading.

APPENDIX

BENCHMARK

ID: 17-15756
Datum: NAVD 88
Date: 1998
Elevation; 17.239 Feet

Description: SPIKE NORTH CURB WEST HIGHWAY 90, IN RETURN: 1.7 FT WEST OF BCR EAST OF ALLA ROAD

Topographic Survey

12870 Panama Street
Los Angeles, CA
Survey Date: February, 2016

SURVEYOR'S STATEMENT

This map correctly represents a topographic survey made by me or under my direction in conformance with locally accepted standards and practices at the request of Ocean Charter School in February, 2016.

LEGAL DESCRIPTION

That portion of Lot 3 of Tract No 1100, in the City of Los Angeles, County of Los Angeles, State of California as per map recorded in Book 18 Pages 66 and 67 of Maps, in the office of the County Recorder of said County.

NOTES

1. No attempt has been made as a part of this topographic survey to obtain or show data concerning existence, size, depth, condition, capacity, or location of any utility or municipal/public service facility, except as may be shown hereon. For information regarding these utilities or facilities, contact the appropriate agency.
2. Except as specifically stated or shown on this plat, this topographic survey does not purport to reflect any of the following which may be applicable to the subject real estate: easements, other than possible easements that were visible at the time of making this survey; building setback lines; restrictive covenants; zoning or other land use regulations, and any other land use regulations; and any other facts that an accurate and current title search may disclose.

PREPARED BY:

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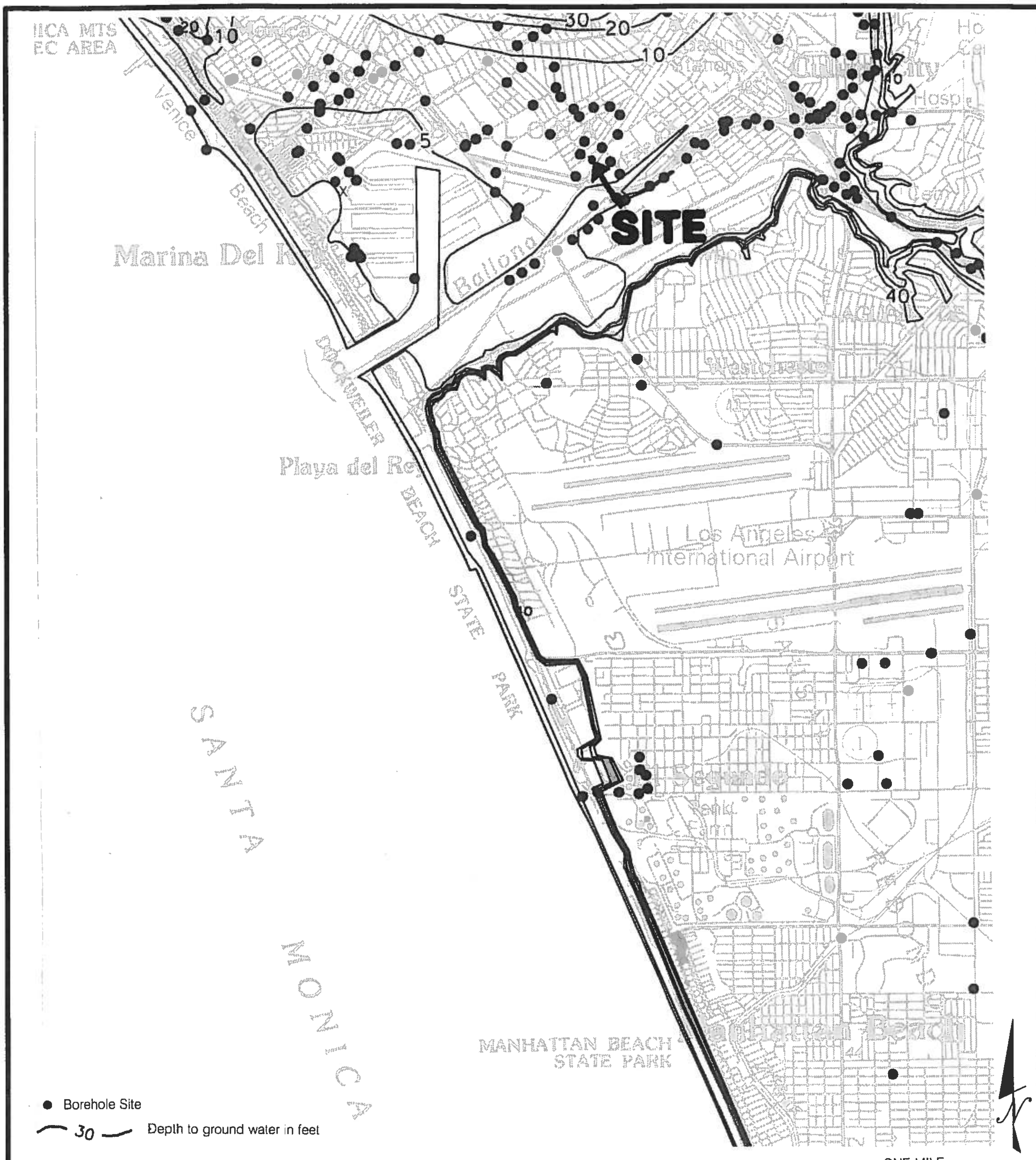
GEOSYSTEMS, Inc.
ENVIRONMENTAL, ENGINEERING-GEOLOGY AND GEOTECHNICAL ENGINEERING

GEOTECHNICAL MAP

12870 Panama Street
Los Angeles, California

GS 16-0107	DATE: June, 2016	PLATE 1



Reference: California Division of Mines and Geology (1998). Seismic Hazard Evaluation of the Venice Quadrangle (Open File Report 98-27) County of Los Angeles, California.

ONE MILE

SCALE

GEOSYSTEMS, Inc.

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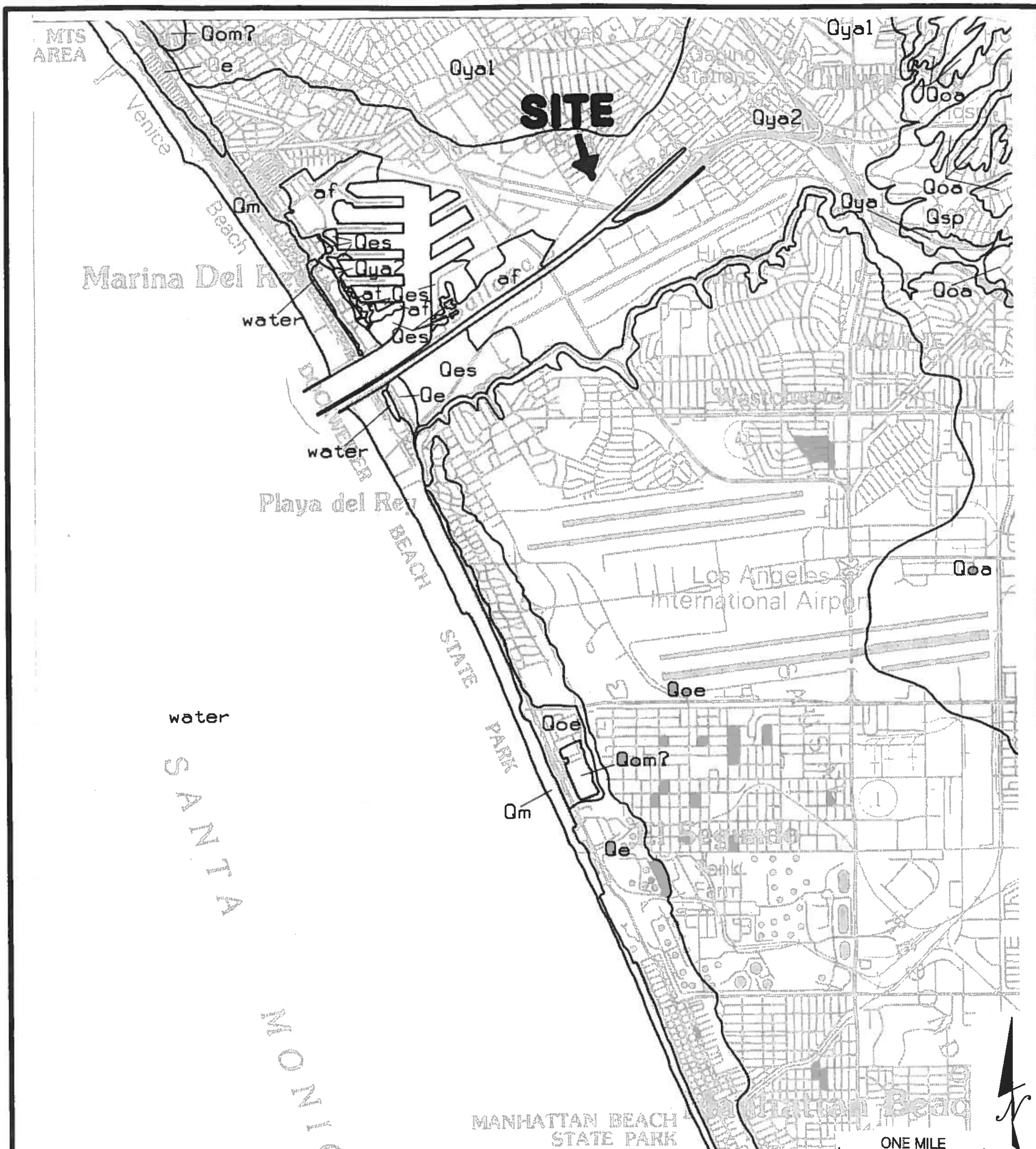
HISTORICALLY HIGHEST GROUND WATER

12870 Panama Street
Los Angeles, California

GS 16-0107	DATE: April, 2016	PLATE 2



Reference: California Division of Mines and Geology (1998). Seismic Hazard Evaluation of the Venice Quadrangle (Open File Report 98–27) County of Los Angeles, California.

GEOSYSTEMS, Inc.
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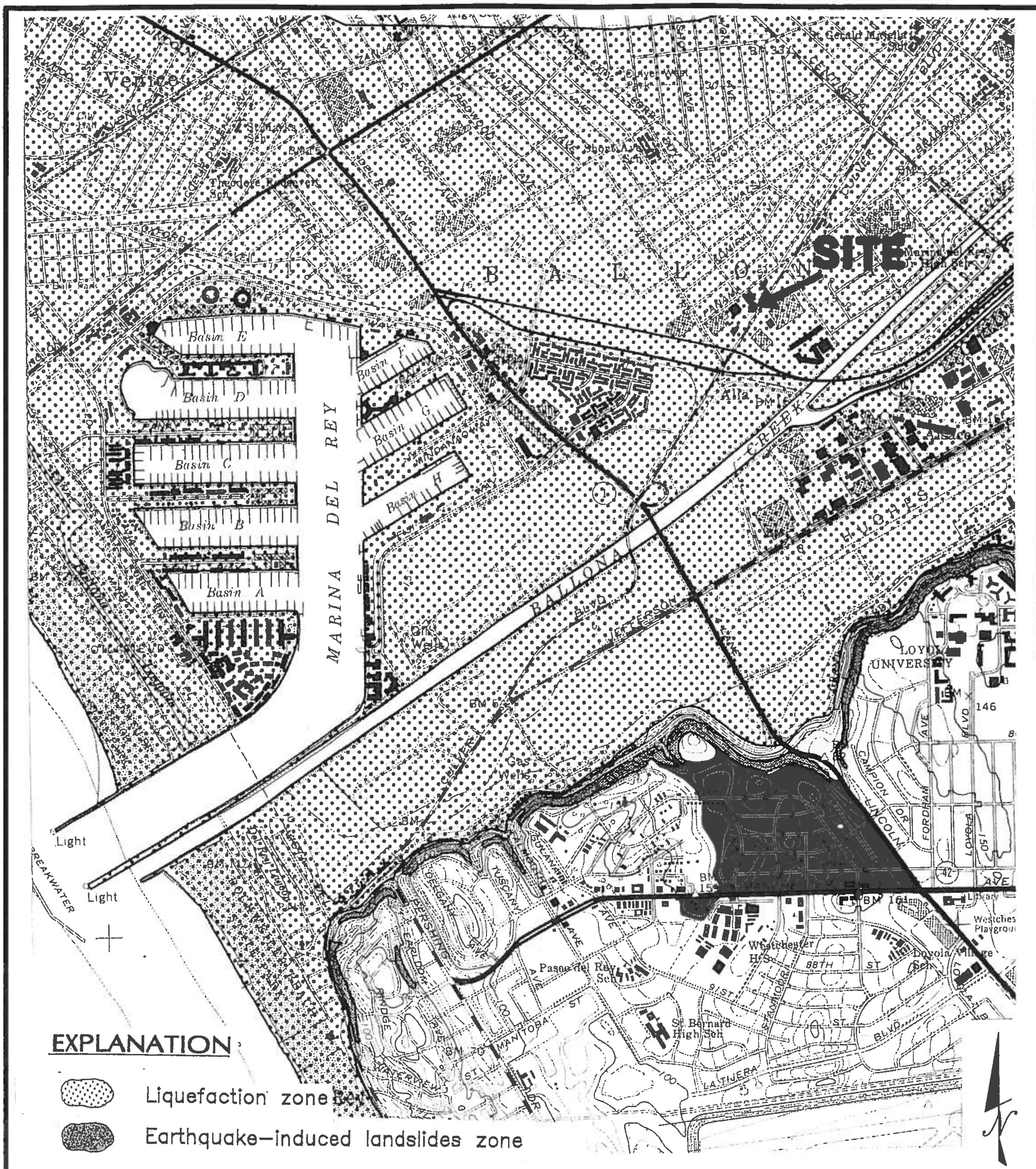
REGIONAL GEOLOGIC MAP

12870 Panama Street
Los Angeles, California

GS 16-0107	DATE: April, 2016	PLATE 3



Reference: California Division of Mines and Geology (1999). Seismic Hazard Zone Map, Venice Quadrangle, County of Los Angeles, California.

Scale: 1"=2000'

GEOSYSTEMS, Inc.
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SEISMIC HAZARD ZONES MAP

12870 Panama Street
Los Angeles, California

GS 16-0107	DATE: April, 2016	PLATE 4

National Flood Hazard Layer Official Map

33°59'19.65"N

118°25'58.03"W

118°25'19.06"W

33°58'48.62"N

Feet

0 345 690 1,380 2,070 2,760

Legend

- Cross-Sections
- Base Flood Elevations

N

Flood Hazard Zones

- 1% Annual Chance Flood
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

LOMRs

- Effective

Map Panels

- Digital Data
- Unmodernized Maps
- Unmapped

The NFHL is a living database, updated daily, and this map represents a snapshot of information at a specific time.

Flood risks are dynamic and can change frequently due to a variety of factors, including weather patterns, erosion, and new development. FEMA flood maps are continually updated through a variety of processes. Users should always verify through the Map Service Center or the Community Map Repository that they have the current effective information.

NFHL maps should not be created for unmapped or unmodernized areas.

U.S. DEPARTMENT OF HOMELAND SECURITY

FEMA

Date: 6/24/2016 Time: 4:24:06 PM

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 11
6000000 FT	5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

GS 16-0107

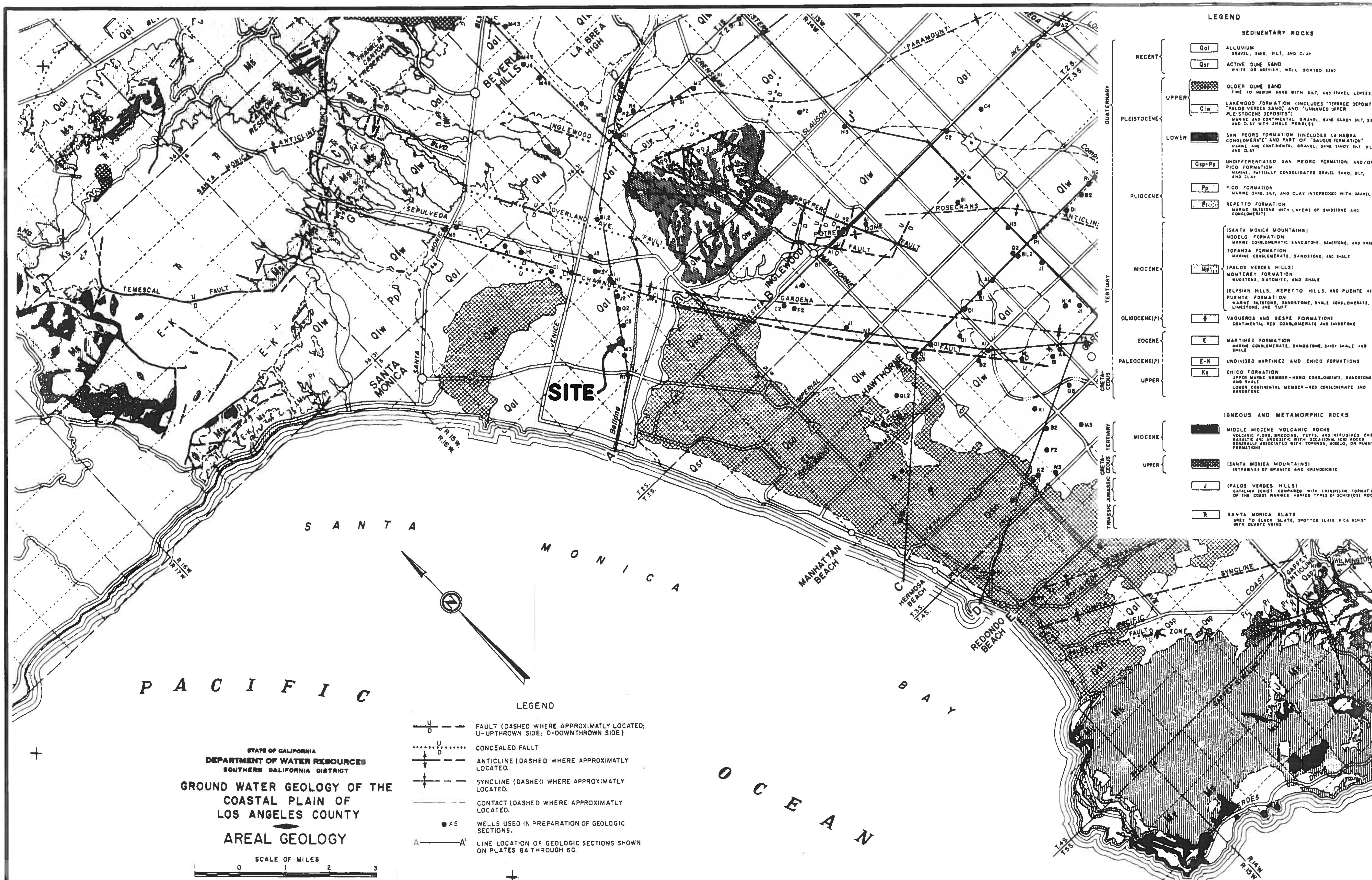
DATE: June, 2016

PLATE 5

FEMA Flood Hazard Zone Map

12870 Panama Street
Los Angeles, California

GEOSYSTEMS, Inc.
ENVIRONMENTAL, ENGINEERING-GEOLOGY AND GEOTECHNICAL ENGINEERING
1545 VICTORY BLVD., 2ND FLR., GLENDALE, CA 91201-9240
PHONE 818-500-9533 FAX 818-500-0134



Reference: State of California, Department of Water Resources, Southern District, 1961 (reprinted 1990), Planned Utilization of the Groundwater Basins of Coastal Plain of Los Angeles County, Appendix A, Groundwater Geology, Bulletin No. 104, 181p.

GS 16-0107

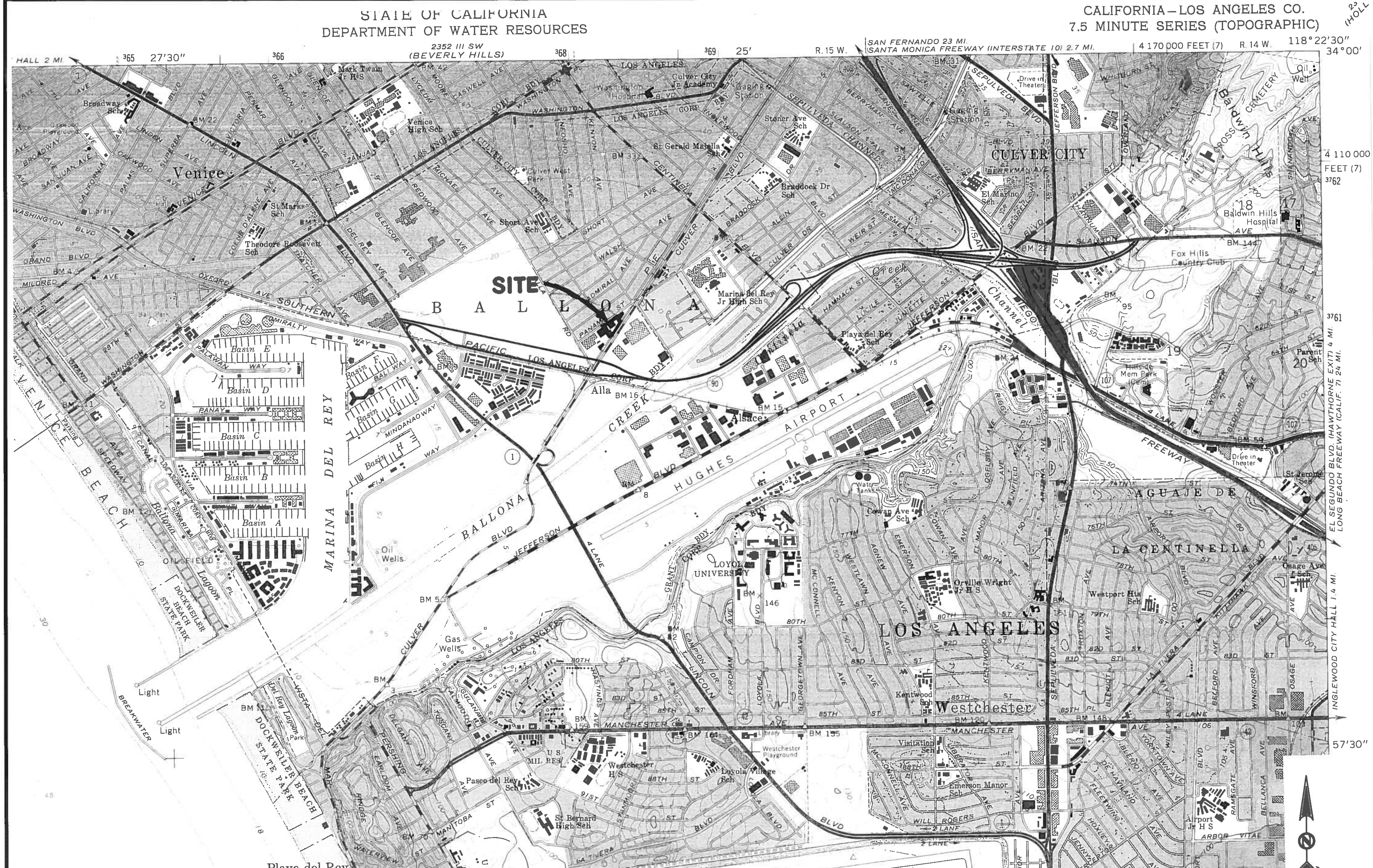
DATE: June, 2016

PLATE 6

REGIONAL GEOLOGIC MAP

12870 Panama Street
Los Angeles, California

GEOSYSTEMS, Inc.
ENVIRONMENTAL, ENGINEERING-GEOLOGY AND GEOTECHNICAL ENGINEERING
1545 VICTORY BLVD., 2ND FLR., GLENDALE, CA 91201-9240
PHONE 818-500-9533 FAX 818-500-0134



Reference: USGS, 1964 (Photo revised 1972) Topographic Map, Venice 7.5-Minute Quadrangle, Los Angeles County, California: State of California Department of Water Resources.

SCALE: 1" = 2000'

GS 16-0107

DATE: June, 2016

PLATE RT-1

REGIONAL TOPOGRAPHIC MAP

12870 Panama Street
Los Angeles, California

GEOSYSTEMS, Inc.
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1545 VICTORY BLVD., 2ND FLR., GLENDALE, CA 91201-9240
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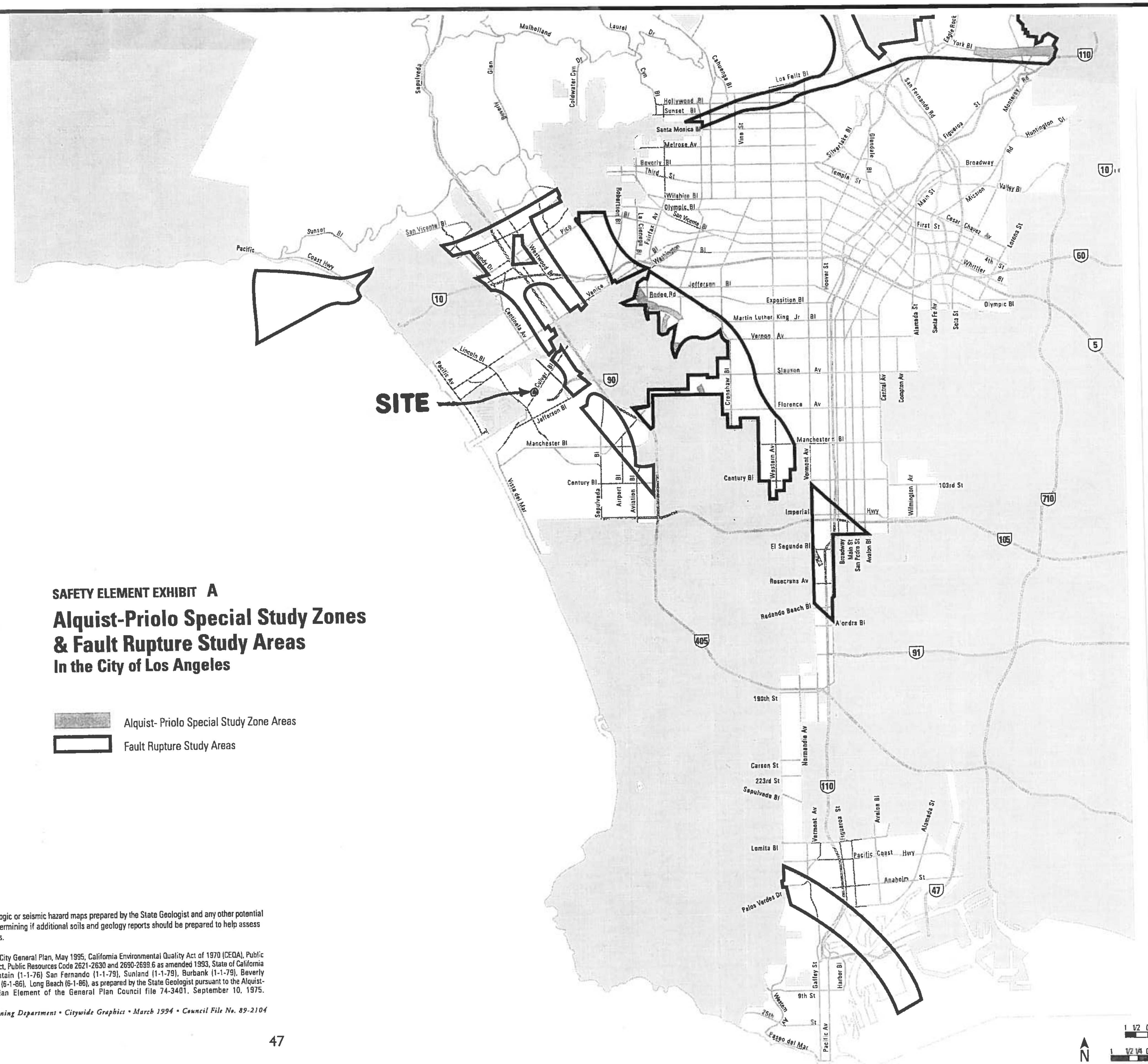

SAFETY ELEMENT EXHIBIT **A**

Alquist-Priolo Special Study Zones & Fault Rupture Study Areas

In the City of Los Angeles

- Alquist- Priolo Special Study Zone Areas
- Fault Rupture Study Areas

NOTES

The Safety Element seismic and landslide exhibits, along with any official geologic or seismic hazard maps prepared by the State Geologist and any other potential hazard areas identified by the City Building Safety Department are used in determining if additional soils and geology reports should be prepared to help assess potential hazards and mitigations, as a part of the development permit process.

Sources: California Environmental Impact Report, Framework Element, Los Angeles City General Plan, May 1995, California Environmental Quality Act of 1970 (CEQA), Public Resources Code 21000 *et. seq.* as amended 1992, Alquist-Priolo Special Study Zone Act, Public Resources Code 2621-2630 and 2690-2699.6 as amended 1993, State of California Special Studies Zone maps for the following USGS quadrangles: Oat Mountain (1-1-76) San Fernando (1-1-79), Sunland (1-1-79), Burbank (1-1-79), Beverly Hills (6-1-86), Hollywood (6-1-86), Los Angeles (1-1-77), Inglewood (6-1-86), Torrance (6-1-86), Long Beach (6-1-86), as prepared by the State Geologist pursuant to the Alquist-Priolo Special Study Zones Act, City of Los Angeles Seismic Safety Plan Element of the General Plan Council file 74-3401, September 10, 1975.

Prepared by the General Plan Framework Section • City of Los Angeles Planning Department • Citywide Graphics • March 1994 • Council File No. 89-2104

GS 16-0107

DATE: June, 2016

PLATE FZ-1

Alquist-Priolo Special Studies Zones & Fault Rupture Study Areas

12870 Panama Street
Los Angeles, California

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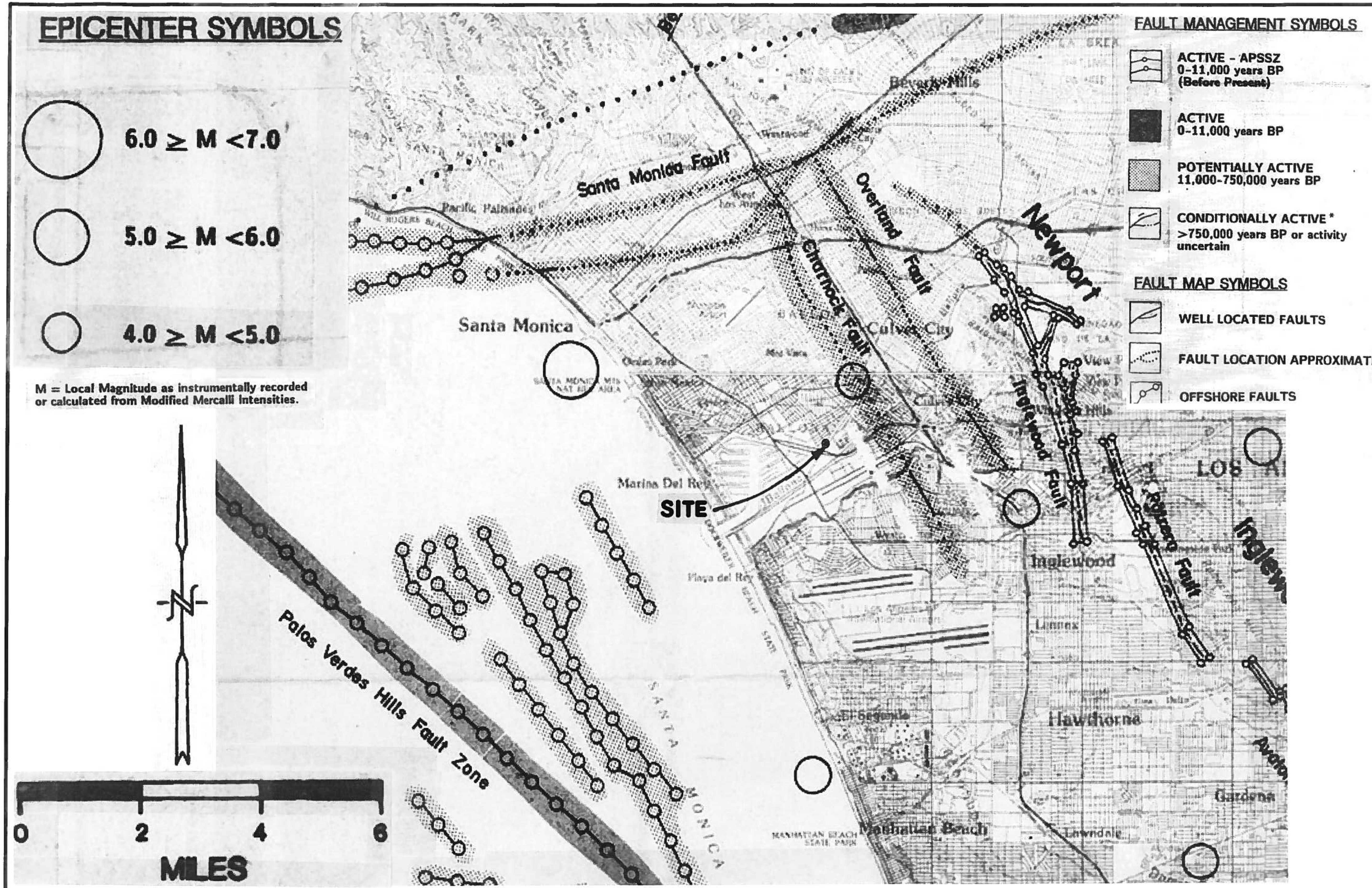
1545 VICTORY BLVD., 2ND FLR., GLENDALE, CA 91201-9240
PHONE 818-500-9533 FAX 818-500-0134



Reference: County of Los Angeles Department of Regional Planning, 1990, Safety Element, Los Angeles County General Plan, Los Angeles County, California: Leighton and Associates, Inc., 48p.

GS 16-0107

DATE: June, 2016

PLATE FZ-2

Alquist-Priolo Special Studies Zones & Fault Rupture Study Areas

12870 Panama Street
Los Angeles, California

GEOSYSTEMS, Inc.
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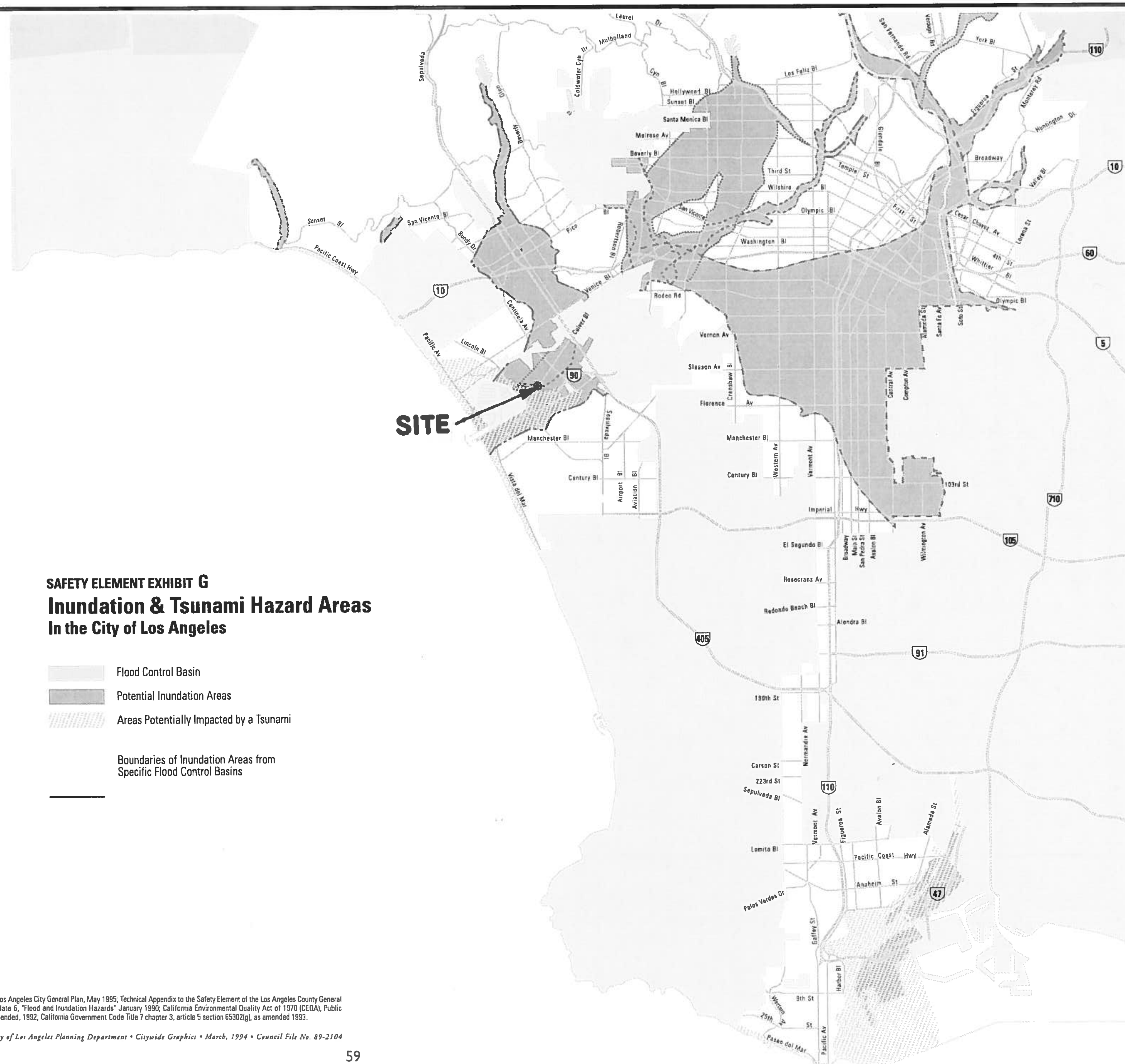


SAFETY ELEMENT EXHIBIT G

Inundation & Tsunami Hazard Areas

In the City of Los Angeles

Flood Control Basin

Potential Inundation Areas

Areas Potentially Impacted by a Tsunami

Boundaries of Inundation Areas from Specific Flood Control Basins

Sources: Environmental Impact Report, Framework Element, Los Angeles City General Plan, May 1995; Technical Appendix to the Safety Element of the Los Angeles County General Plan Hazard Reducation in Los Angeles County, Volume 2, Plate 6, "Flood and Inundation Hazards" January 1990; California Environmental Quality Act of 1970 (CEQA), Public Resources Code Section 21000 *et. seq.* with guidelines as amended, 1992; California Government Code Title 7 chapter 3, article 5 section 65302(g), as amended 1993.

Prepared by the General Plan Framework Section • City of Los Angeles Planning Department • Citywide Graphics • March, 1994 • Council File No. 89-2104

59

GS 16-0107

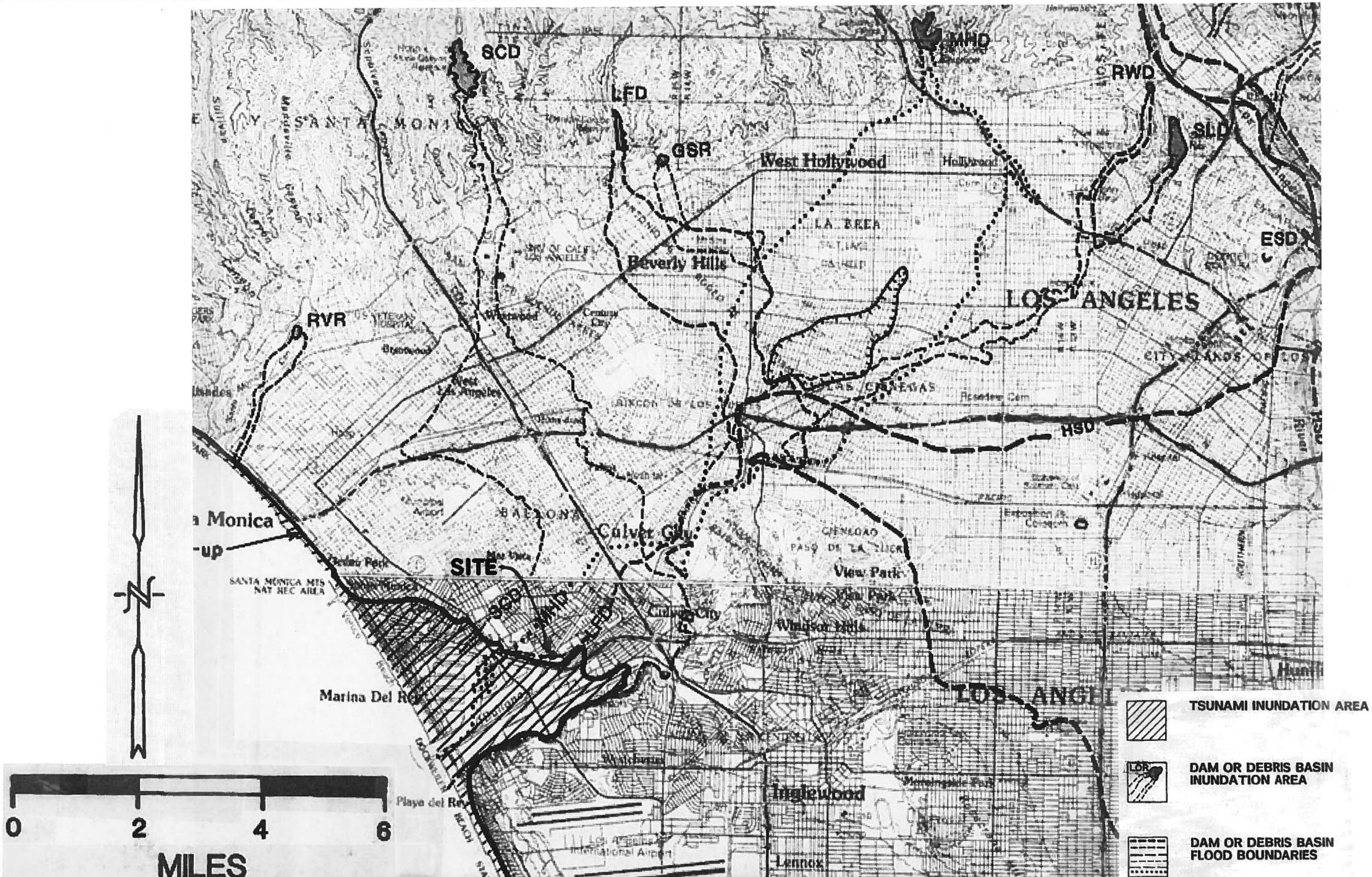
DATE: June, 2016

PLATE IM-1

Inundation & Tsunami Hazard Areas

12870 Panama Street
Los Angeles, California

GEOSYSTEMS, Inc.
ENVIRONMENTAL, ENGINEERING-GEOLOGY AND GEOTECHNICAL ENGINEERING
1545 VICTORY BLVD., 2ND FLR., GLENDALE, CA 91201-9240
PHONE 818-500-9533 FAX 818-500-0134



Reference: County of Los Angeles Department of Regional Planning, 1990, Safety Element, Los Angeles County General Plan, Los Angeles County, California: Leighton and Associates, Inc., 48p.

GS 16-0107

DATE: June, 2016

PLATE IM-2

Inundation Map

12870 Panama Street
Los Angeles, California

GEOSYSTEMS, Inc.
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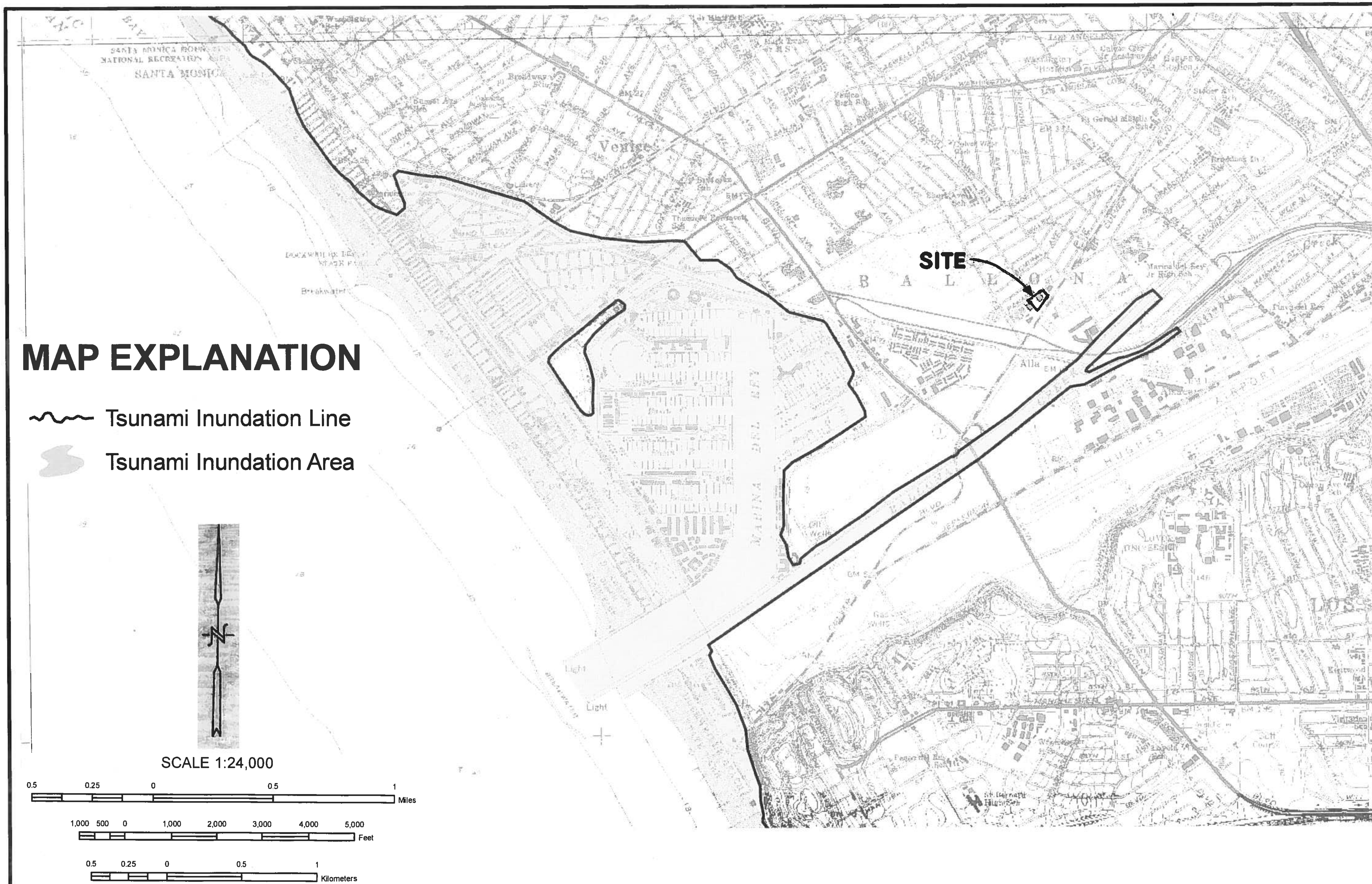
PHONE 818-500-9533 FAX 818-500-0134



Reference: CGS, 2009, Tsunami Inundation Map for Emergency Planning, Venice 7.5 Minute Quadrangle, Los Angeles County, California.

GS 16-0107

DATE: June, 2016

PLATE IM-3

Tsunami Inundation Map

12870 Panama Street
Los Angeles, California

GEOSYSTEMS, Inc.
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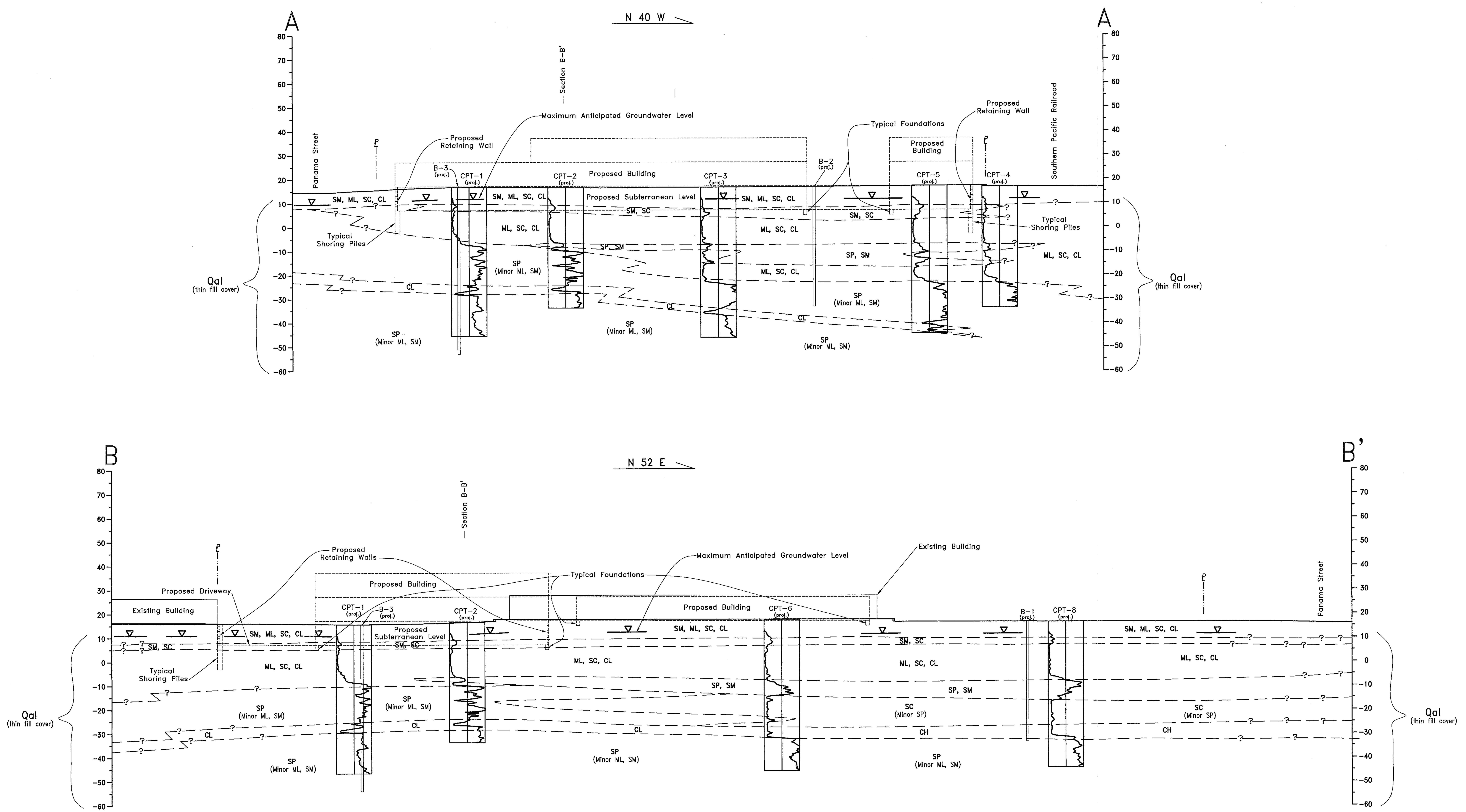
1545 VICTORY BLVD., 2ND FLR., GLENDALE, CA 91201-9240
PHONE 818-500-9533 FAX 818-500-0134



Key

Qal	Quaternary Alluvium
SP	Poorly Graded Sand
SM	Silty Sand
SC	Clayey Sand
ML	Silt (Inorganic/Low Plasticity)
CL	Lean Clay (Inorganic/Low Plasticity)
CH	Fat Clay (Inorganic/High Plasticity)

CPT-1 (proj.) = CPT Data Curve for Equivalent N_{60} (Blows/ft)

SCALE: 1"=20'

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GEOSYSTEMS INC.
ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS

GEOLOGIC CROSS SECTION A-A' & B-B'

12870 Panama Street
Los Angeles, California

GS 16-0107	DATE: June, 2016	PLATE CS-1

APPENDIX A

Boring Logs

R = Ring Sampler (2.41" i.d.)
SPT = Standard Penetration Sample

■ = R Sample location
■ = SPT Sample Location

BORING LOG B-1

Groundwater Encountered at 11.0 ft.
No Caving
Total Depth: 50.0 ft.

Dry Density (pcf)	Moisture (%)	Blowcount (per ft.)	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
						Bulk 0– 10' Clayey silt to silty clay, dark black brown to brown, slightly moist
				5		
101.7	23.3	2/3/4	R	10	SM	@10' Silty sand, gravelly fine to medium grained, slightly moist to moist
		1/1/2	SPT		SC	@12.5' Silty clay, brown with mottled gray and red–brown, wet.
				15		
85.5	31.2	2/2/2	SPT		CL	@17.5' Sandy silty clay, coarse to medium grained, brown, wet.
				20		
94.1	23.8	3/3/4	SPT		CL	@22.5' Sandy silty clay, fine grained, gray to brown with mottled red–brown, very mosit to wet.
				25		
117.7	6.8	15/3/27	SPT		SC	@27.5' Silty clay with fine to medium grained sand, gray and brown with mottled red–brown, wet.
				30		
		4/8/11	SPT		SP	@32.5' Silty sand, medium to coarse grained, brown
				35		
102	17.6	7/8/11	SPT		SC/SP	@37.5' Clay silty sand, medium to coarse grained, brown, wet. Clayey silt, gray with mottled brow. Clay, black, dense, stiff, slightly moist to very moist.
				40		
54	49.3	7/9/13	SPT		CH	@42.5' Silty Clay, dark gray, gray to black with mottled red–brown, very moist to wet, organic odor.
				45		
87.1	30.7	11/18/21	SPT		CH	@47.5' Silty clay, brown to gray–blue with mottled brown. Clayey silty sand, fine to medium grained, gray.
				50		@50' Silty sand, medium to coarse grained, gray, wet.
				55		
				60		

GEOSYSTEMS, Inc.
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1545 VICTORY BLVD., 2ND FLR., GLENDALE, CA 91201-9240
PHONE 818-500-9533 FAX 818-500-0134

Project: 12870 Panama Street
Los Angeles, California, California
Date Drilled: 3/2/16 Elevation: Existing Grade
Rig Type: 8 in. o.d. Hollow Stem
Logged By: FV
GS # 16-0107

This log of subsurface conditions applies only at the specific location and the date indicated. Subsurface conditions may differ at other locations and times.

PLATE B-1

R = Ring Sample (2.4" i.d.) ■ = R Sample location
SPT = Standard Penetration Sample ■ = SPT Sample Location

BORING LOG B-2

Groundwater Encountered at 11.0 ft.
No Caving
Total Depth: 51.0 ft.

Lithologic Description

Dry Density (pcf)	Moisture (%)	Blowcount (per ft.)	Sample Type	U.S.C.S. Class.	Lithologic Description
114.6	12.6	4/6/7	R	SM ML/SM	@2' Sandy silty, coarse grained with some gravel, brown, dry to slightly moist.
106.9	16.2	3/4/7	R	SM/SC	@7' Clayey silt to silty clay with some fine to medium sand and gravel, dark brown to black brown, moist to very moist.
96.4	18	2/2/2	SPT	SM	@11' Clayey silty sand, fine to medium grained, brown to dark brown, moist to very moist.
85	30.9	2/2/3	SPT	SM	@16' Clayey silty sand, fine to medium grained, dark brown with mottled black, very moist to wet.
92	23.7	3/3/4	SPT	ML/SM	@21' Silty clay to clayey silt with fine to medium grained sand, brown, gray-brown with mottled orange brown, wet.
		2/3/7	SPT	SP	@26' Clayey silty sand, fine to medium grained with some gravel. Clay, brown, stiff, wet.
102.5	18.1	2/23/21	SPT	SP	@31' Silty sand, fine to medium grained with some gravel, brown. Clayey silty sand, gray to gray-brown, wet.
		3/3/4	SPT	CL	@36' Silty clay, dark gray, stiff. Sand, medium grained, brown to orange brown, wet.
121	11	9/22/31	SPT	SP	@41' Silty sand, medium to coarse grained, brown, wet.
		8/36/42	SPT	SP	@46' Sand, medium to coarse grained with some gravel, brown to light brown, wet.
107.5	15.5	13/47/ 50-4"	SPT		@51' Silty sand, medium to coarse grained, orange-brown, wet.

Depth (ft): 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60

GEOSYSTEMS, Inc.
ENVIRONMENTAL, ENGINEERING-GEOLOGY AND GEOTECHNICAL ENGINEERING
1545 VICTORY BLVD., 2ND FLR., GLENDALE, CA 91201-9240
PHONE 818-500-9533 FAX 818-500-0134

Project: 12870 Panama Street
Los Angeles, California, California
Date Drilled: 3/1/16 Elevation: Existing Grade
Rig Type: 8 in. o.d. Hollow Stem
Logged By: FV
GS # 16-0107

This log of subsurface conditions applies only at the specific location and the date indicated. Subsurface conditions may differ at other locations and times.

PLATE B-2

R = Ring Sample (2.4" i.d.) ■ = R Sample location
SPT = Standard Penetration Sample ■ = SPT Sample Location

BORING LOG B-3

Groundwater Encountered at 11.0 ft.
No Caving
Total Depth: 70.0 ft.

Dry Density (pcf)	Moisture (%)	Blowcount (per ft.)	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
111.4	18.3	2/3/5	R	5	CL	@5' Silty clay, dark brown to black, mottled gray-dark brown, moist to very moist
84.8	25.4	2/2/2	SPT	10	SC/SM	@10' Silty sand, brown to dark brown, mottled gray brown, fine grained, very moist to wet
78	37.5	1/2/2	SPT	15	CL/SC	@15' Clayey silt to silty clay, dark brown to brown, mottled gray brown, wet
89.5	26.6	2/2/2	SPT	20	CL	@20' Silty clay with fine grained sand, dark brown with mottled black-brown, wet
122.1	7.3	21/50 for 5"	SPT	25	SP	@25' Gravelly sand with silty sand, fine grained, wet
		8/16/23	SPT	30		@30' Sand, gravely to medium grained, gravel up to 1/2", silty binder, wet
111	14	2/4/9	SPT	35		@35' Sand, fine to coarse, light brown to brown, wet
		2/6/8	SPT	40	CL	@40 Sand, fine to coarse grained, some very dense gray clay, very moist
102.4	16.5	2/3/9	SPT	45	SM/SP	@45' Silty sand, fine to medium, grained gravel up to 1/2", brown to black-gray, wet
		3/4/9	SPT	50		@50' Sand, medium to coarse grained, gray, wet
100.8	16.7	3/6/8	SPT	55	SP	@55' Silty sand, medium to coarse grained, gray to dark gray, wet
		30/44/50 for 3"	SPT	60		@60' Silty sand, medium to coarse grained, gray to dark gray, wet

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Project: 12870 Panama Street
Los Angeles, California, California
Date Drilled: 2/29/16 Elevation: Existing Grade ft.
Rig Type: 8 in. o.d. Hollow Stem
Logged By: FV
GS # 16-0107

This log of subsurface conditions applies only at the specific location and the date indicated. Subsurface conditions may differ at other locations and times.

PLATE B-3A

R = Ring Sample (2.4" i.d.) ■ = R Sample location
SPT = Standard Penetration Sample ■ = SPT Sample Location

BORING LOG B-3

Groundwater Encountered at 11.0 ft.
No Caving
Total Depth: 70.0 ft.

Dry Density (pcf)	Moisture (%)	Blowcount (per ft.)	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
					SP	
100.6	16.9	50 for 3"	SPT	65		@65' Silty sand, fine to medium grained, gray to brown-gray, wet
					SM	
104.5	16.7	50 for 5"	SPT	70		@70' Silty sand, fine to medium grained, gray to brown-gray, wet

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Project: 12870 Panama Street
Los Angeles, California, California
Date Drilled: 2/29/16 Elevation: Existing Grade ft.
Rig Type: 8 in. o.d. Hollow Stem
Logged By: FV
GS # 16-0107

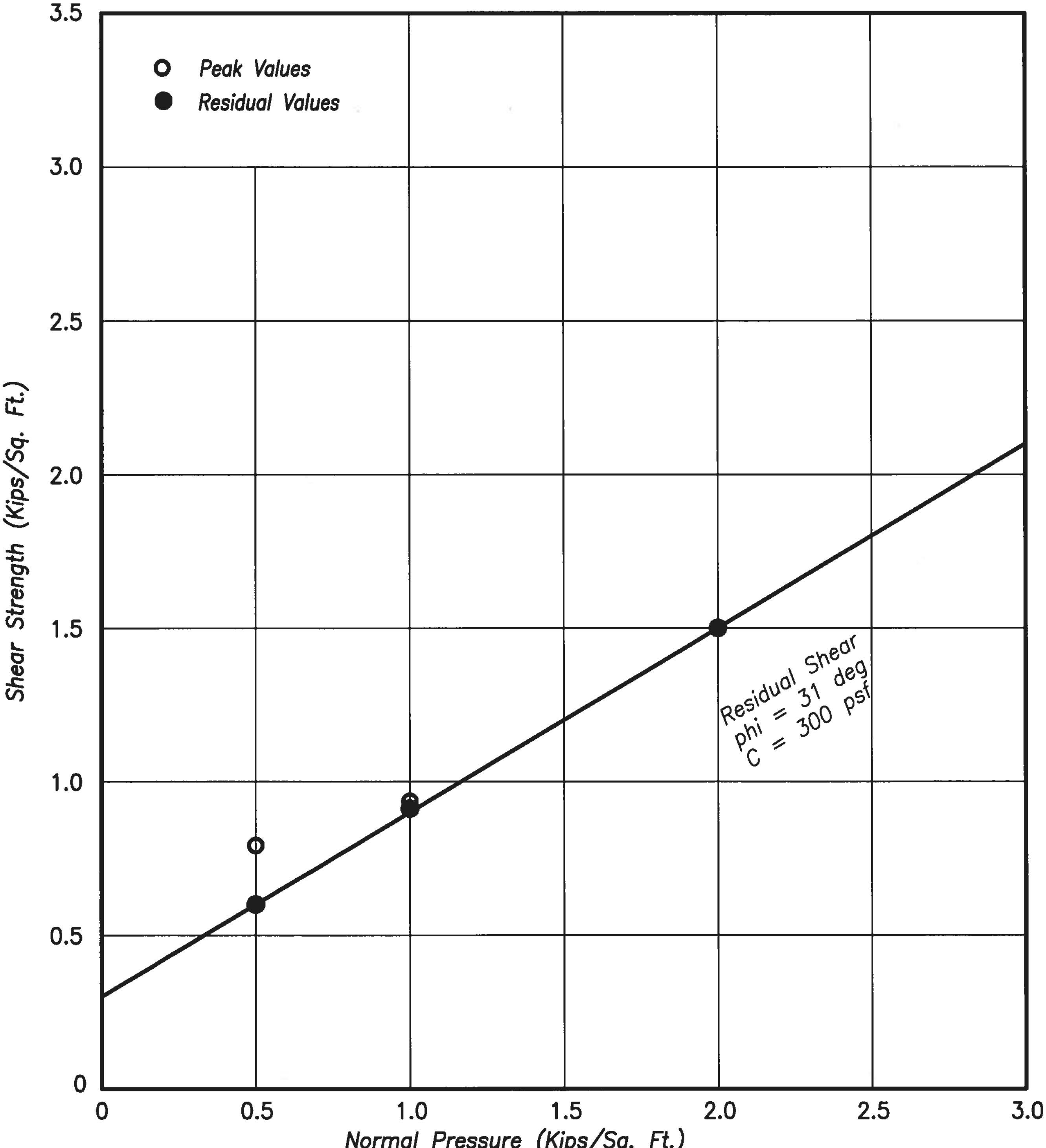
This log of subsurface conditions applies only at the specific location and the date indicated. Subsurface conditions may differ at other locations and times.

PLATE B-3B

APPENDIX B

Laboratory Testing

DIRECT SHEAR TEST DIAGRAM



γd = 111.4 pcf

Wi = 18.3 %

Wf = 20.2 %

Sample Location: B–3 Depth: 5 ft.

Material: CL Saturated, Undisturbed

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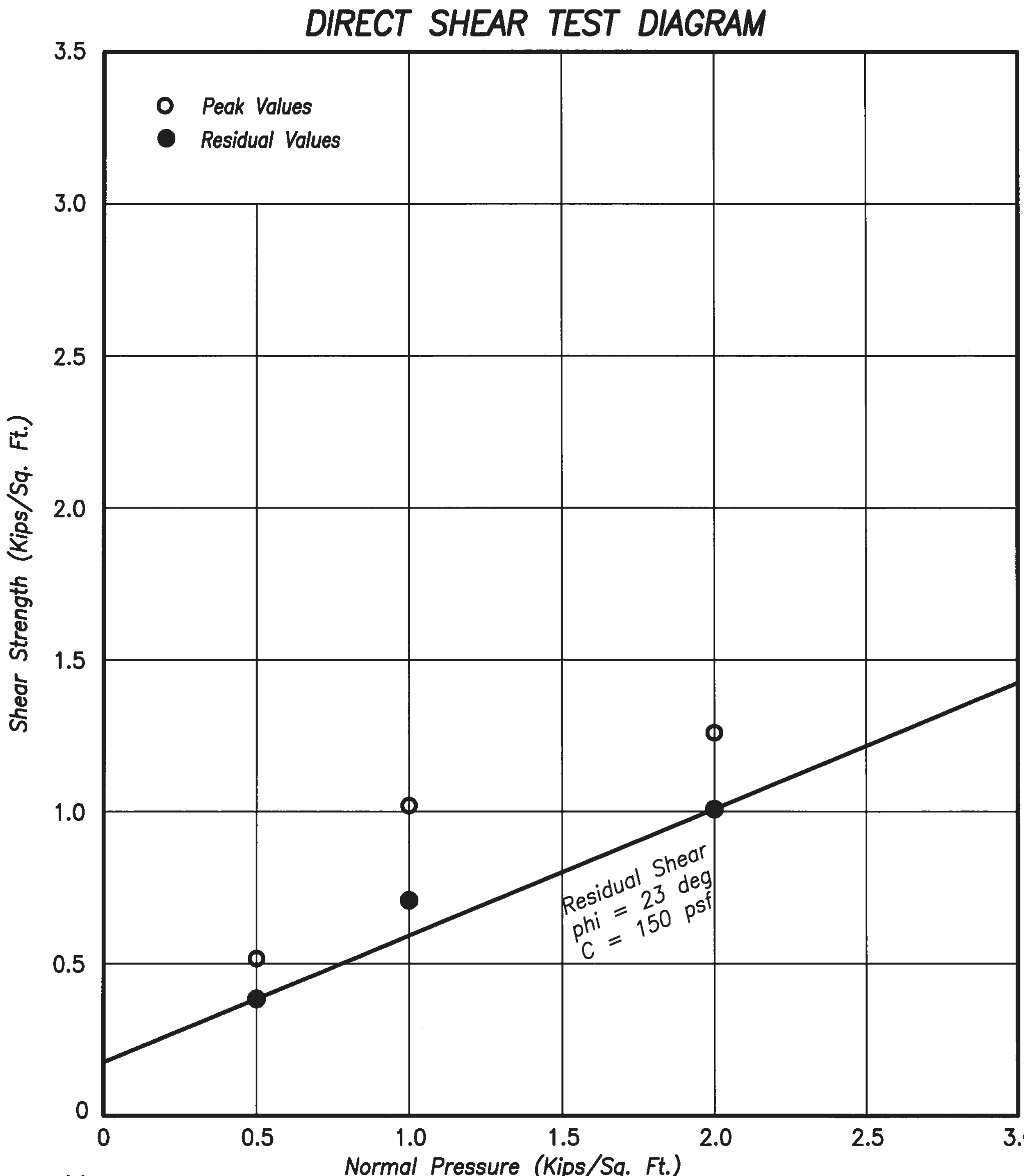
Project: 12870 Panama St.
Los Angeles, California

Date: April, 2016

GS # 16–0107

PLATE DS–1



γ_d = 102.1 pcf

Wi = 18.7 %

Wf = 22.4 %

Sample Location: B-1 Depth: 10 ft.

Material: SM Saturated, Undisturbed

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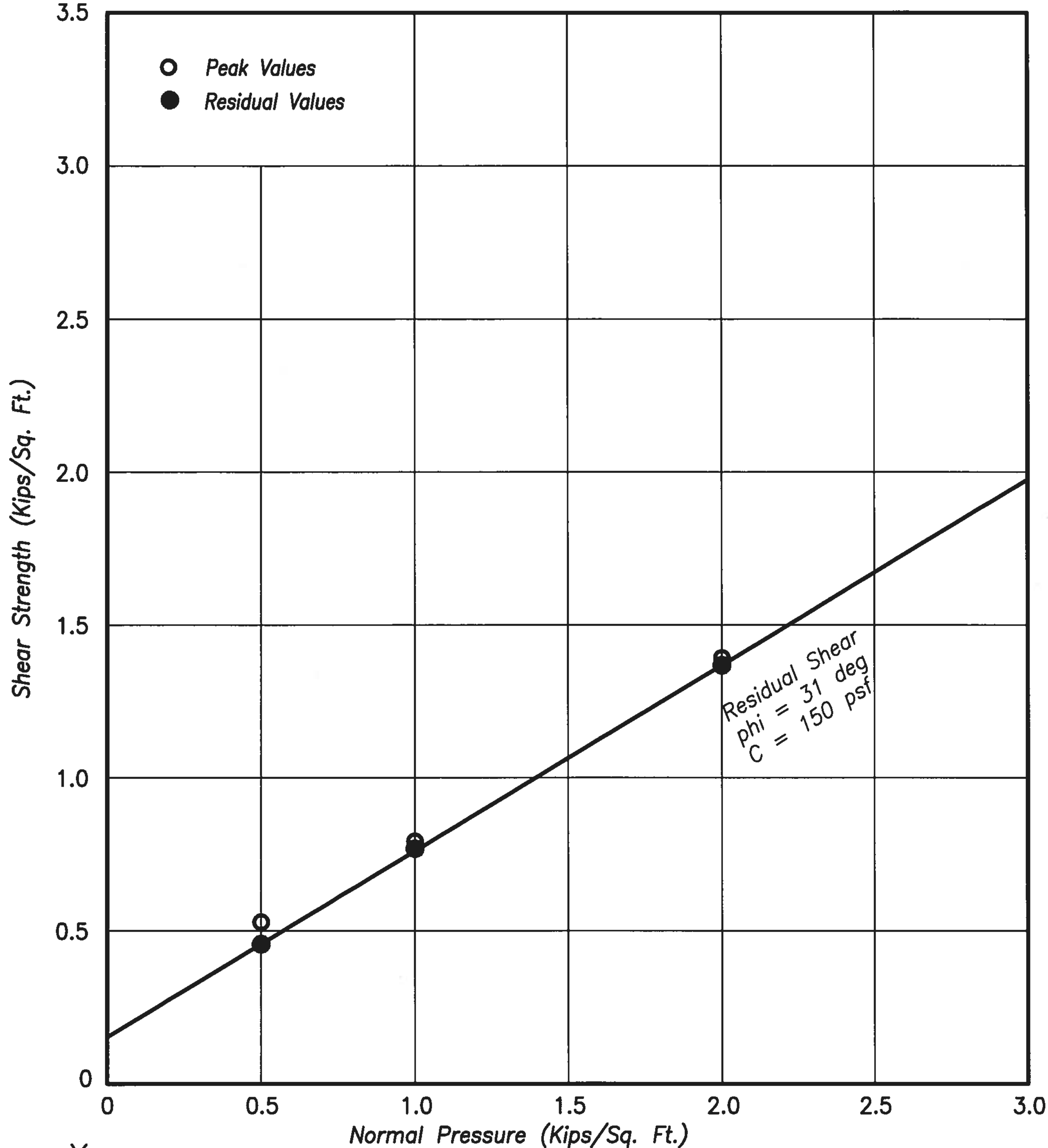
Project: 12870 Panama Street
Los Angeles, California

Date: 6/20/16

GS # 16-0107

PLATE DS-2

DIRECT SHEAR TEST DIAGRAM



γd = 106.5 pcf

Wi = 15.2 %

Wf = 20.2 %

Sample Location: B-2 Depth: 7 ft.

Material: SM Saturated, Undisturbed

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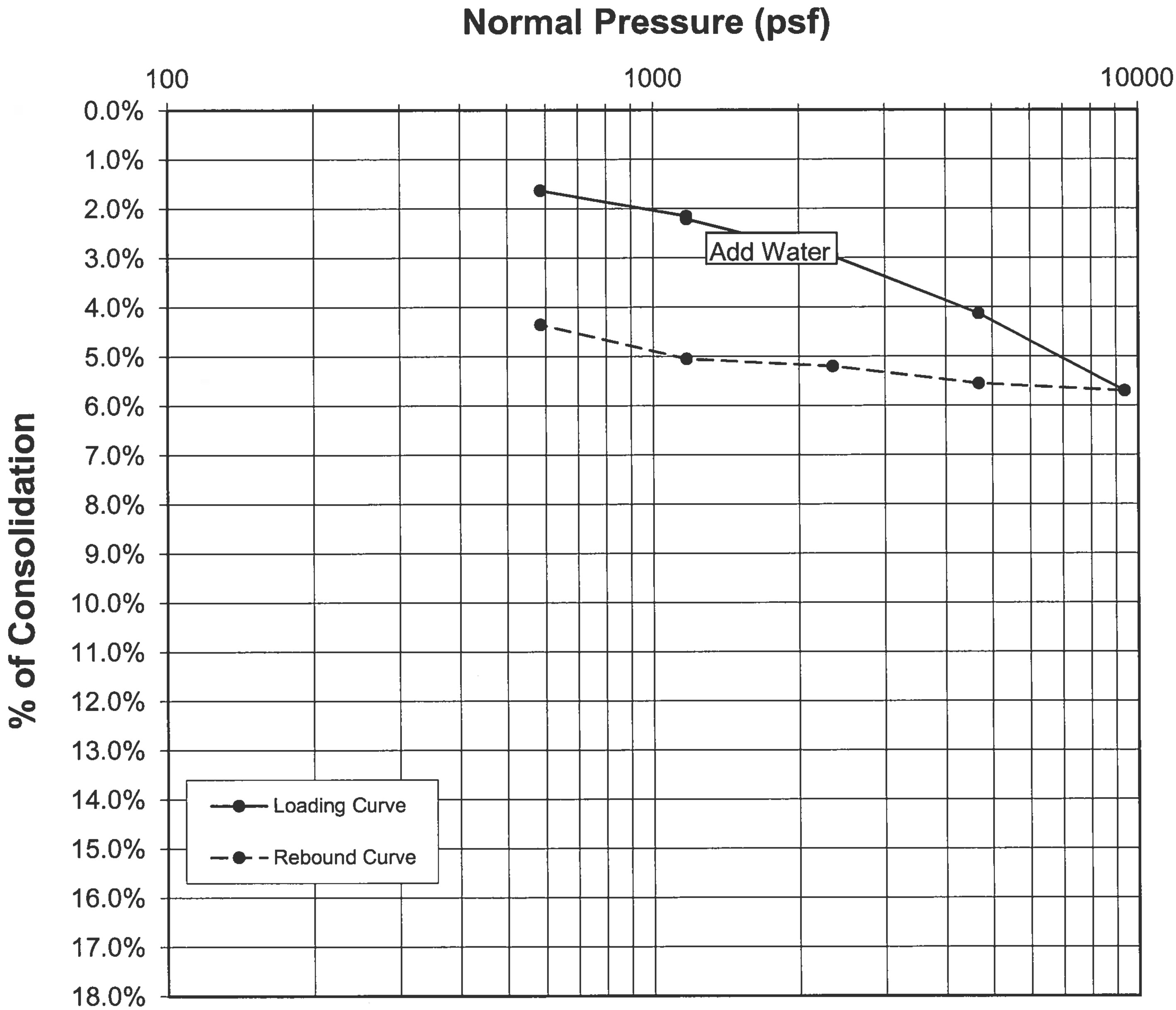
Los Angeles, California

Date: 6/20/16

GS # 16-0107

PLATE DS-3



Sample Location : B-1

Depth : 10 feet

Material : SM

γ_d = 101.7 pcf

ω_i = 23.3%

ω_f = 23.7%

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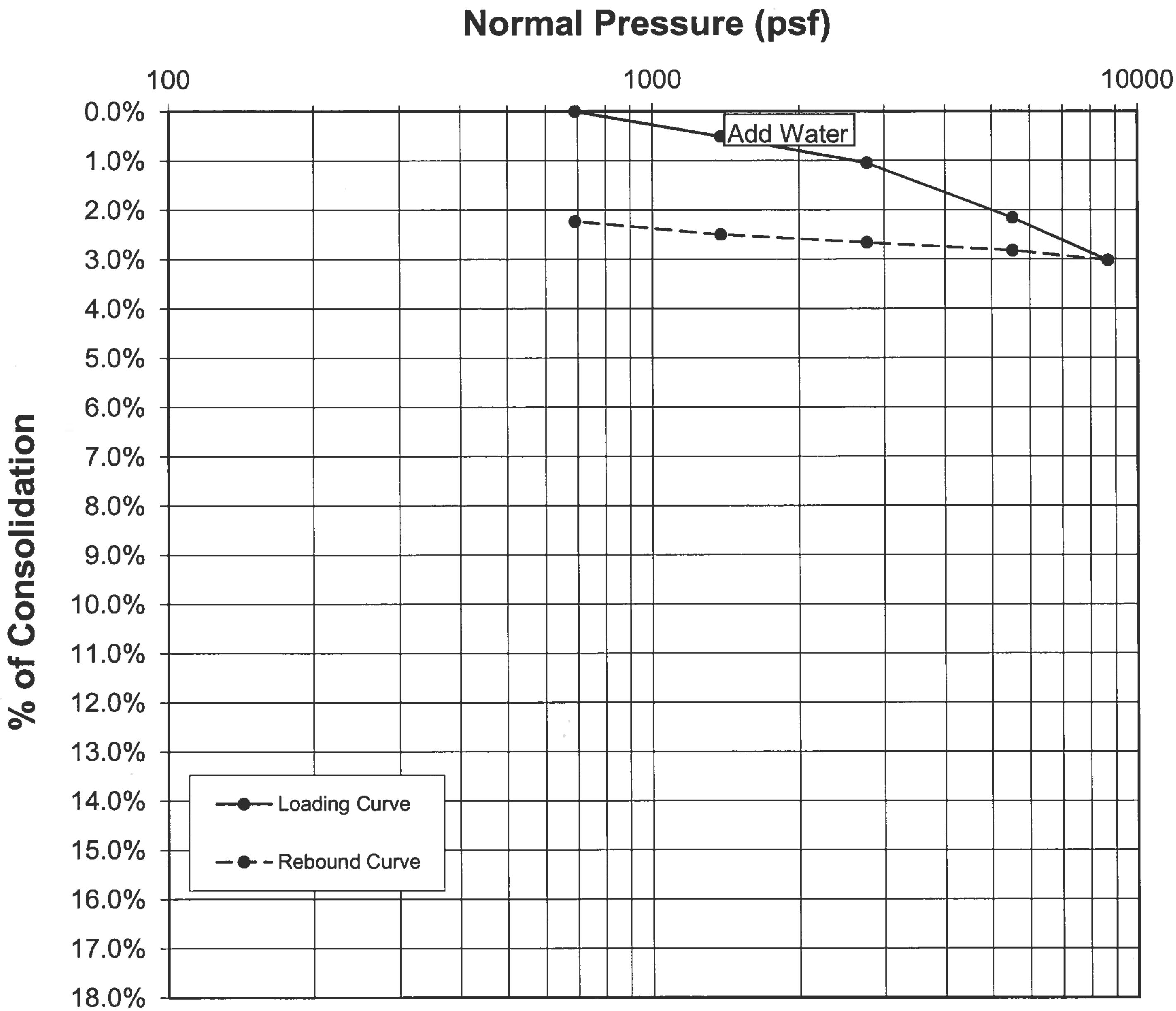
CONSOLIDATION-PRESSURE CURVE

12870 Panama St.

Los Angeles , California

DATE: April, 2016	GS 16-0107	PLATE C-1



Sample Location : B-2

Depth : 2 feet

Material : ML/SM

γ_d = 114.6 pcf

ω_i = 12.6%

ω_f = 14.4%

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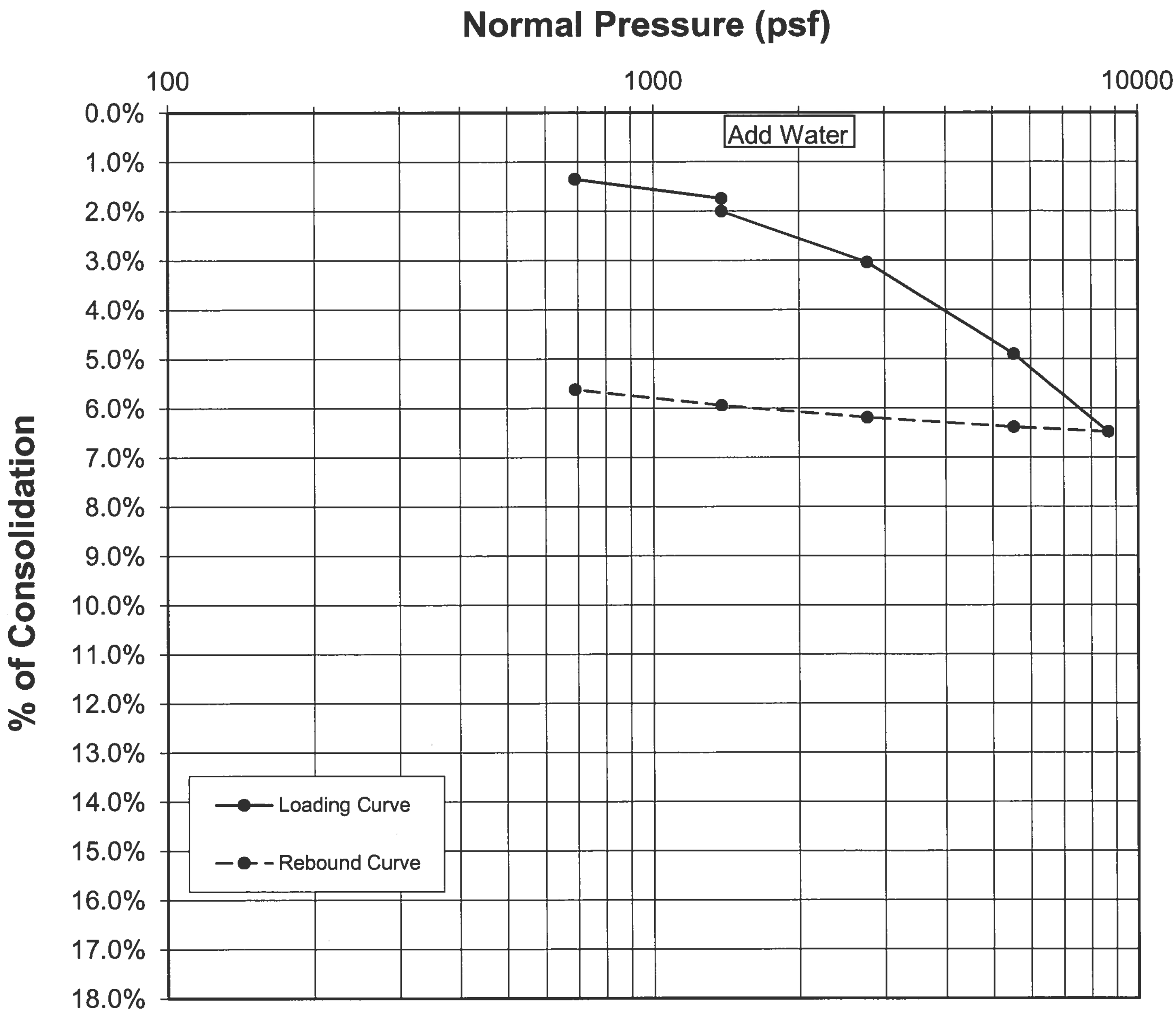
CONSOLIDATION-PRESSURE CURVE

12870 Panama

Los Angeles , California

DATE: April, 2016	GS 16-0107	PLATE C-2



Sample Location : B-2

Depth : 7 feet

Material : SM/SC

γ_d = 106.9 pcf

ω_i = 16.2%

ω_f = 15.9%

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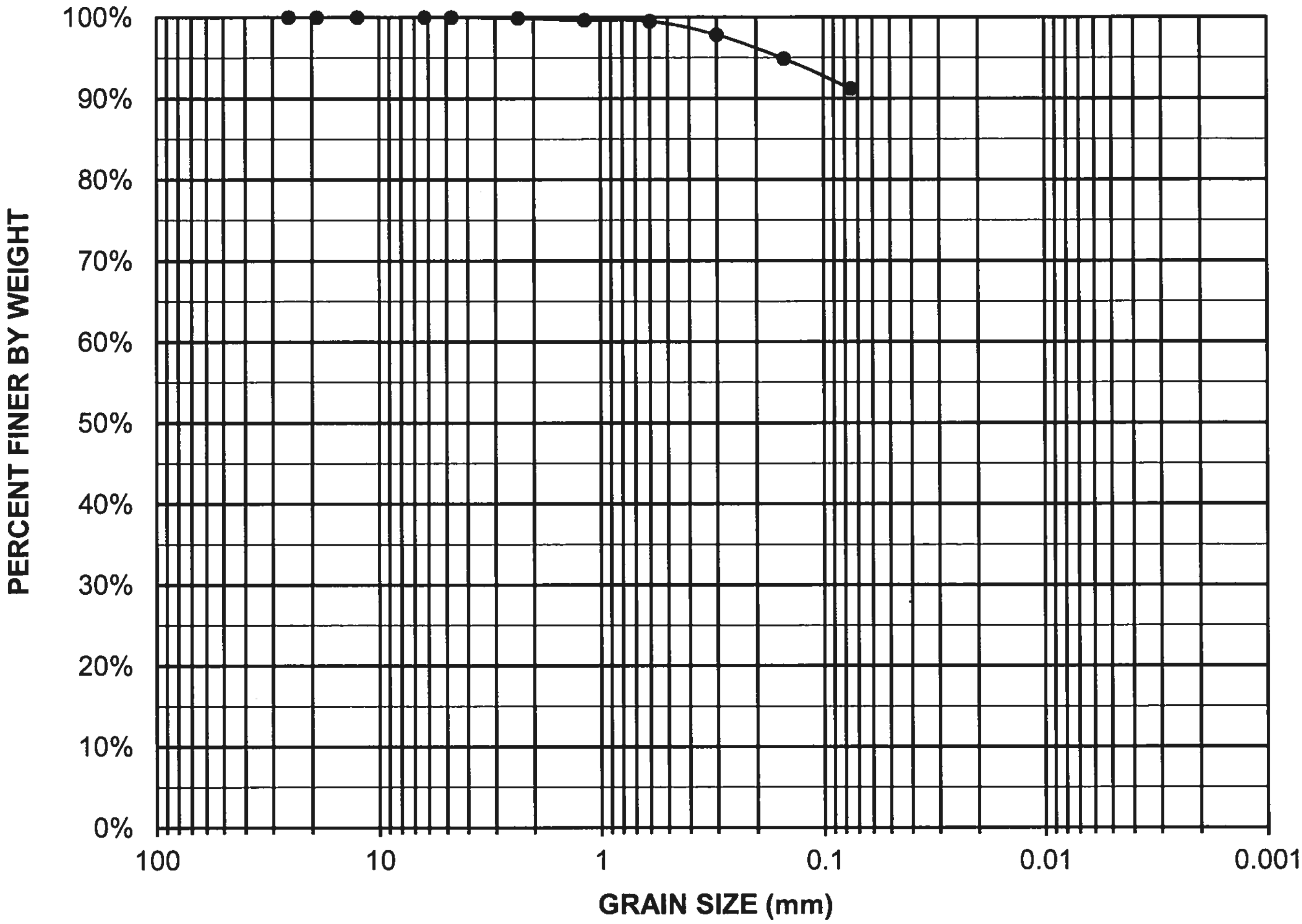
CONSOLIDATION-PRESSURE CURVE

12870 Panama

Los Angeles , California

DATE: April, 2016	GS 16-0107	PLATE C-3

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-1

DEPTH : 12.5 feet

USCS CLASSIFICATION : SC

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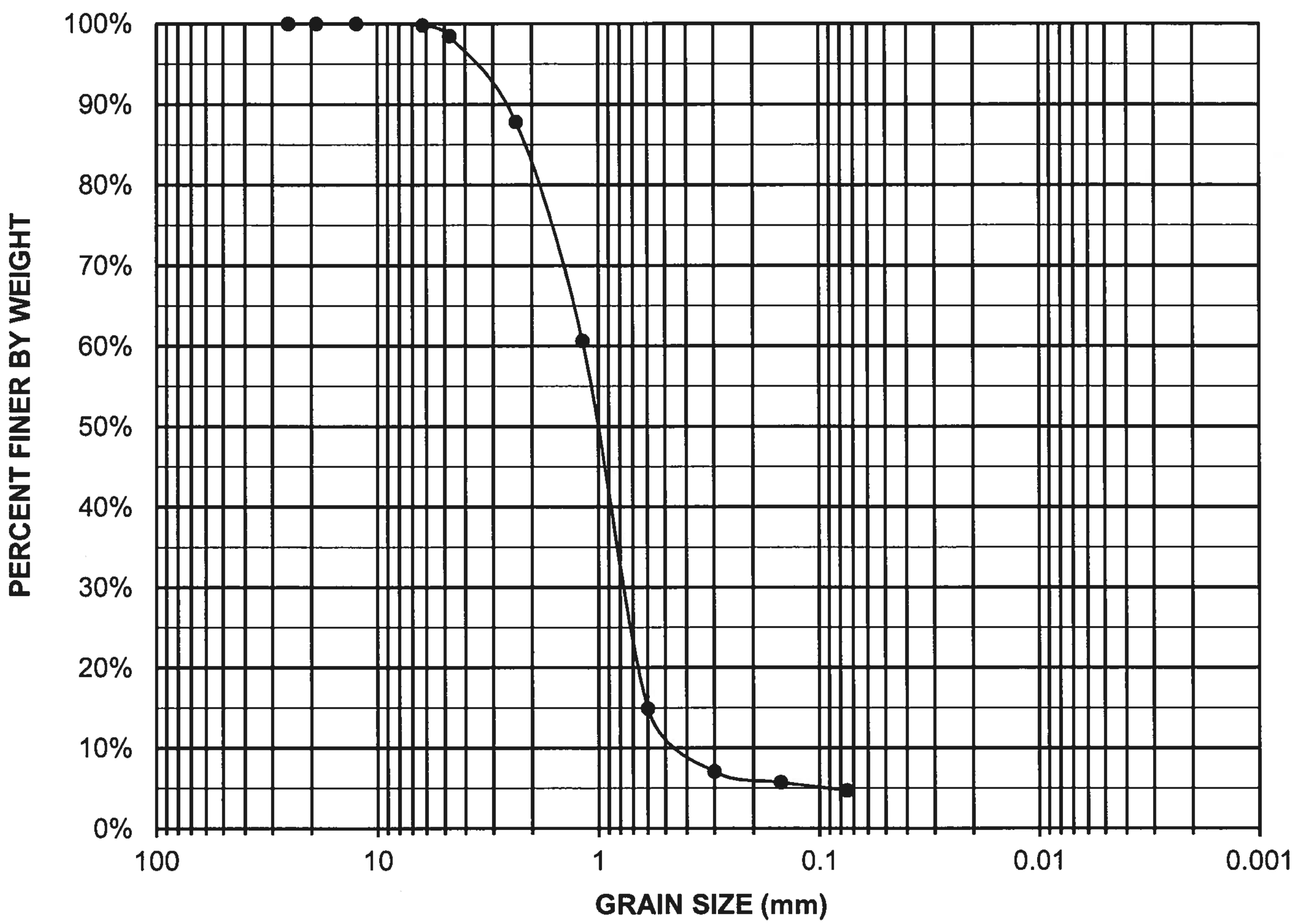
PARTICAL SIZE ANALYSIS

12870 Panama Strett

Los Angeles, California

Date: April, 2016	GS 16-0107	PLATE SV-1

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-1

DEPTH : 32.5 feet

USCS CLASSIFICATION : SP

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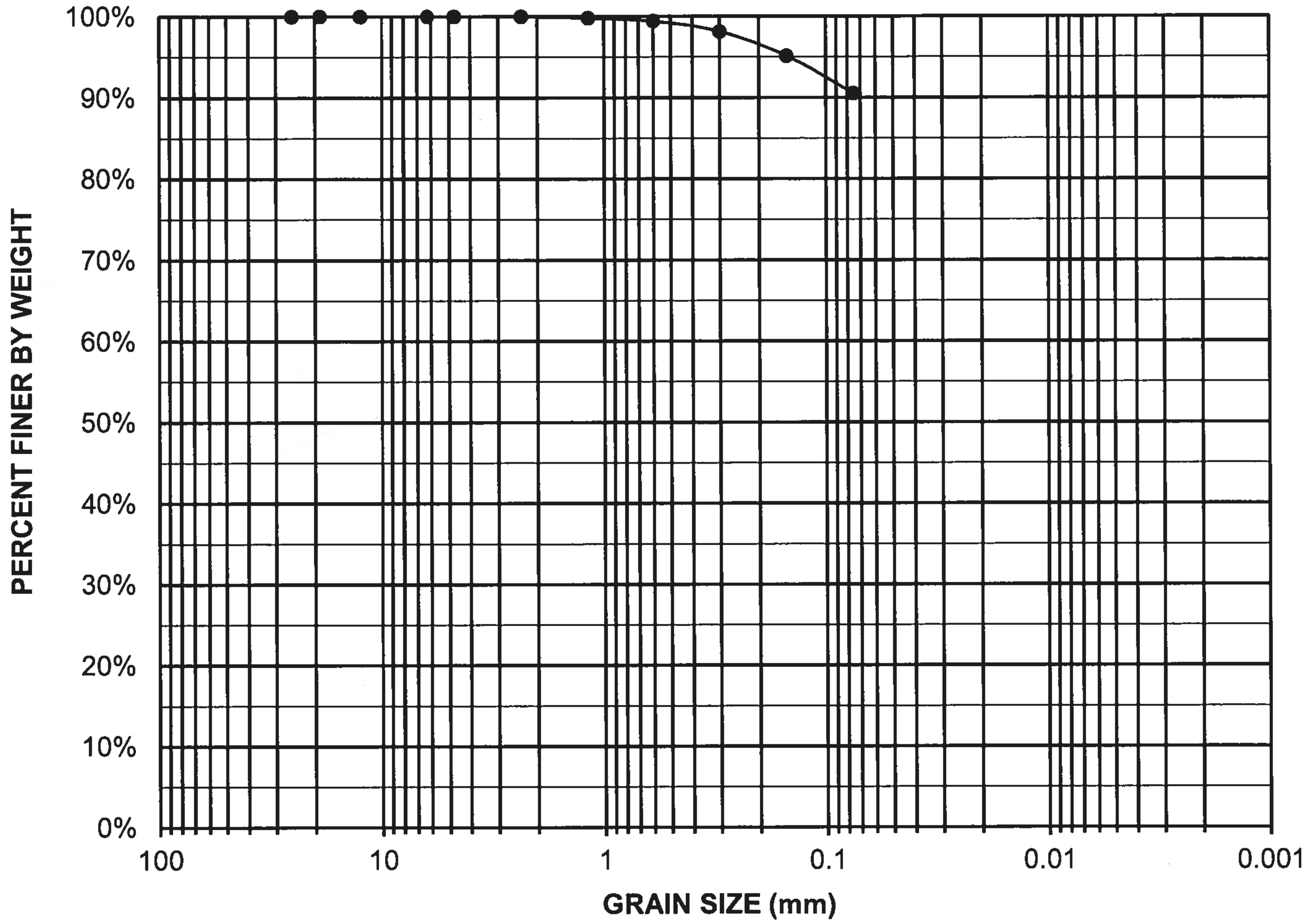
PARTICAL SIZE ANALYSIS

12870 Panama Street

Los Angeles, California

Date: April, 2016	GS 16-0107	PLATE	SV-2

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-2

DEPTH : 16 feet

USCS CLASSIFICATION : SM

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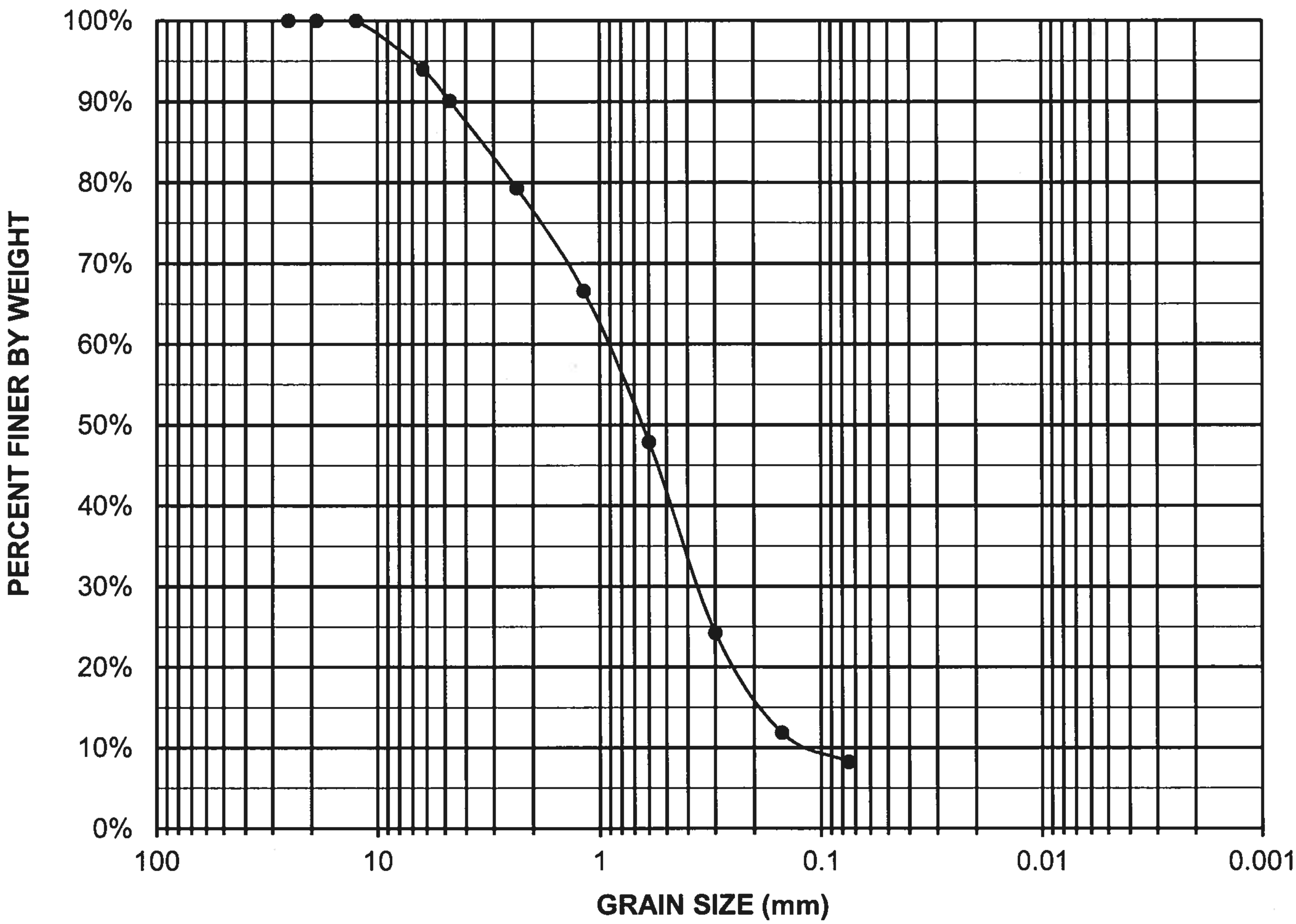
PARTICAL SIZE ANALYSIS

12870 Panama Street

Los Angeles, California

Date: April, 2016	GS 16-0107	PLATE SV-3

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-2

DEPTH : 26 feet

USCS CLASSIFICATION : SP

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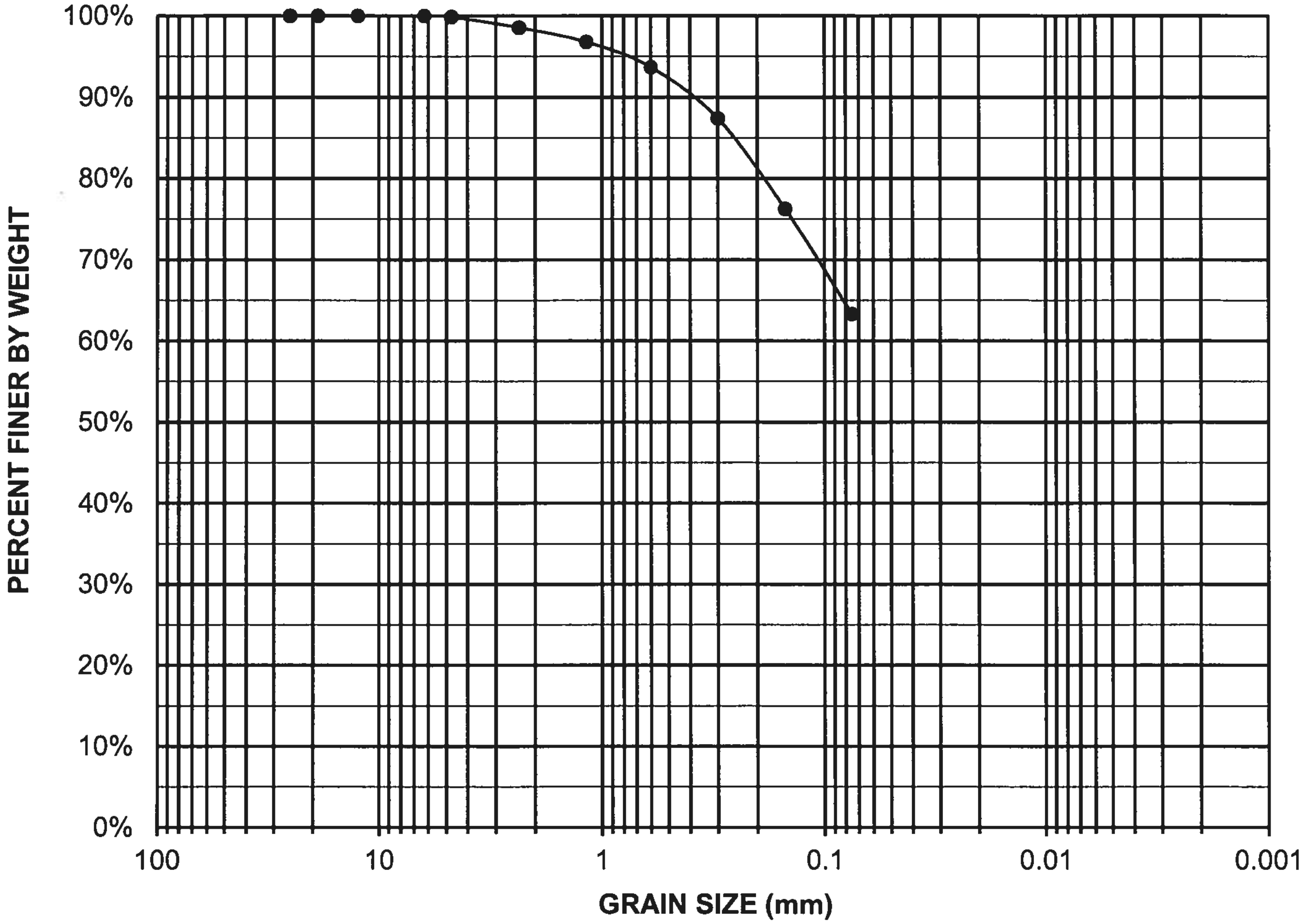
PARTICAL SIZE ANALYSIS

12870 Panama Street

Los Angeles, California

Date: April, 2016	GS 16-0107	PLATE SV-4

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-2

DEPTH : 36 feet

USCS CLASSIFICATION : CL/SC

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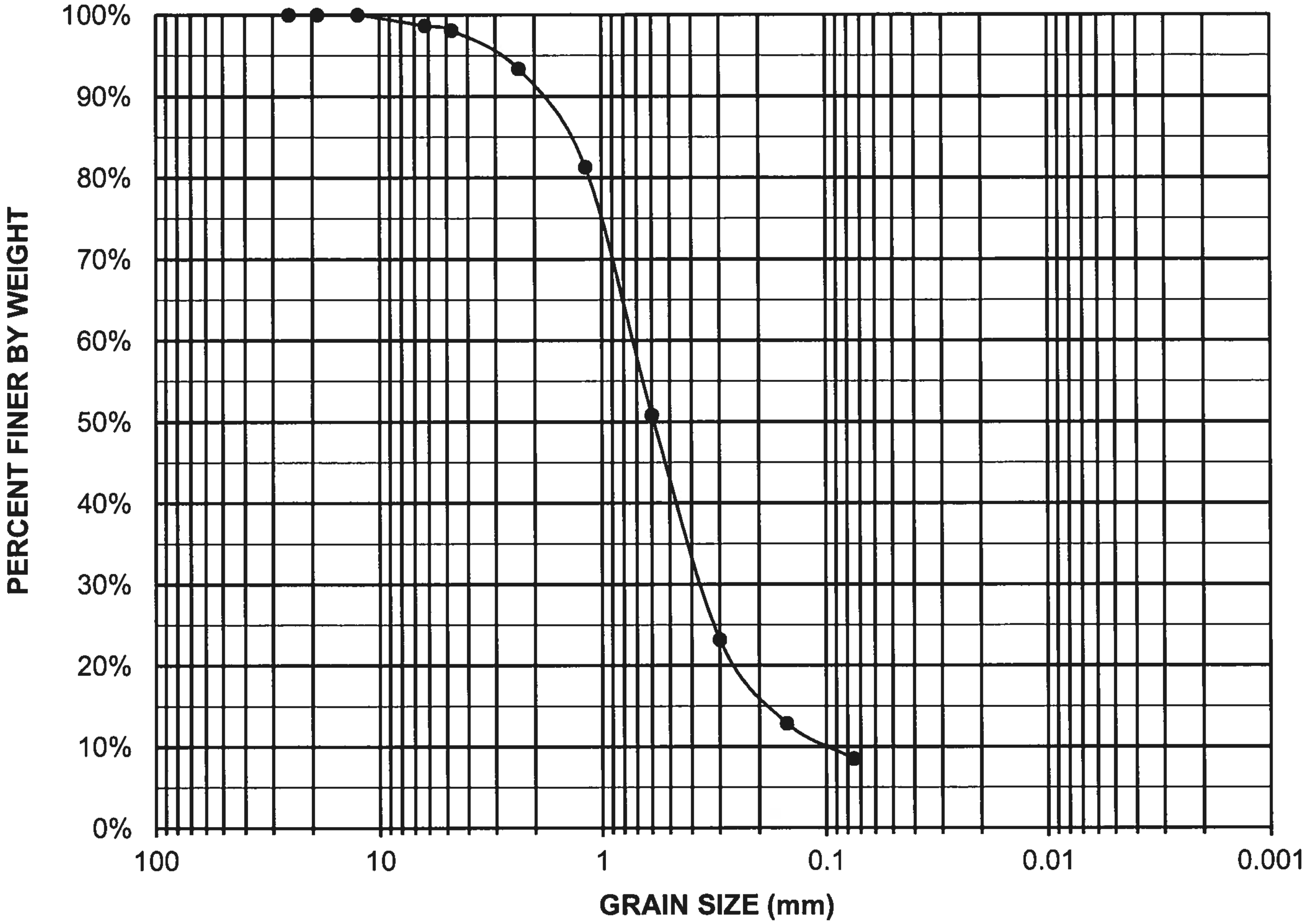
PARTICAL SIZE ANALYSIS

12870 Panama Street

Los Angeles, California

Date: April, 2016	GS 16-0107	PLATE SV-5

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-2

DEPTH : 46 feet

USCS CLASSIFICATION : SP

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PARTICAL SIZE ANALYSIS

12870 Panama Street

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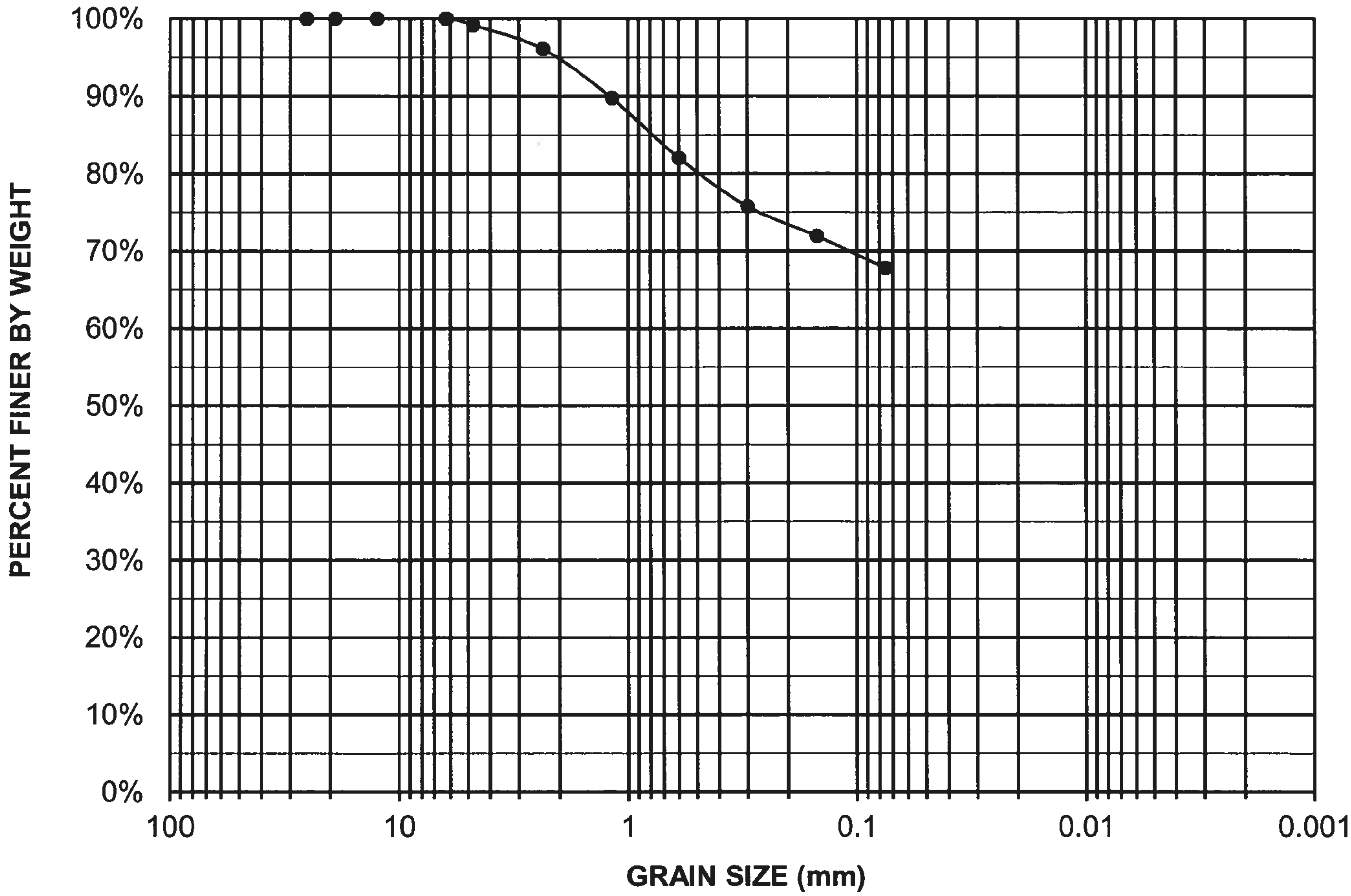
Date: April, 2016	GS 16-0107	PLATE SV-6

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION :	B-3	
DEPTH :	15	feet
USCS CLASSIFICATION :	SC	

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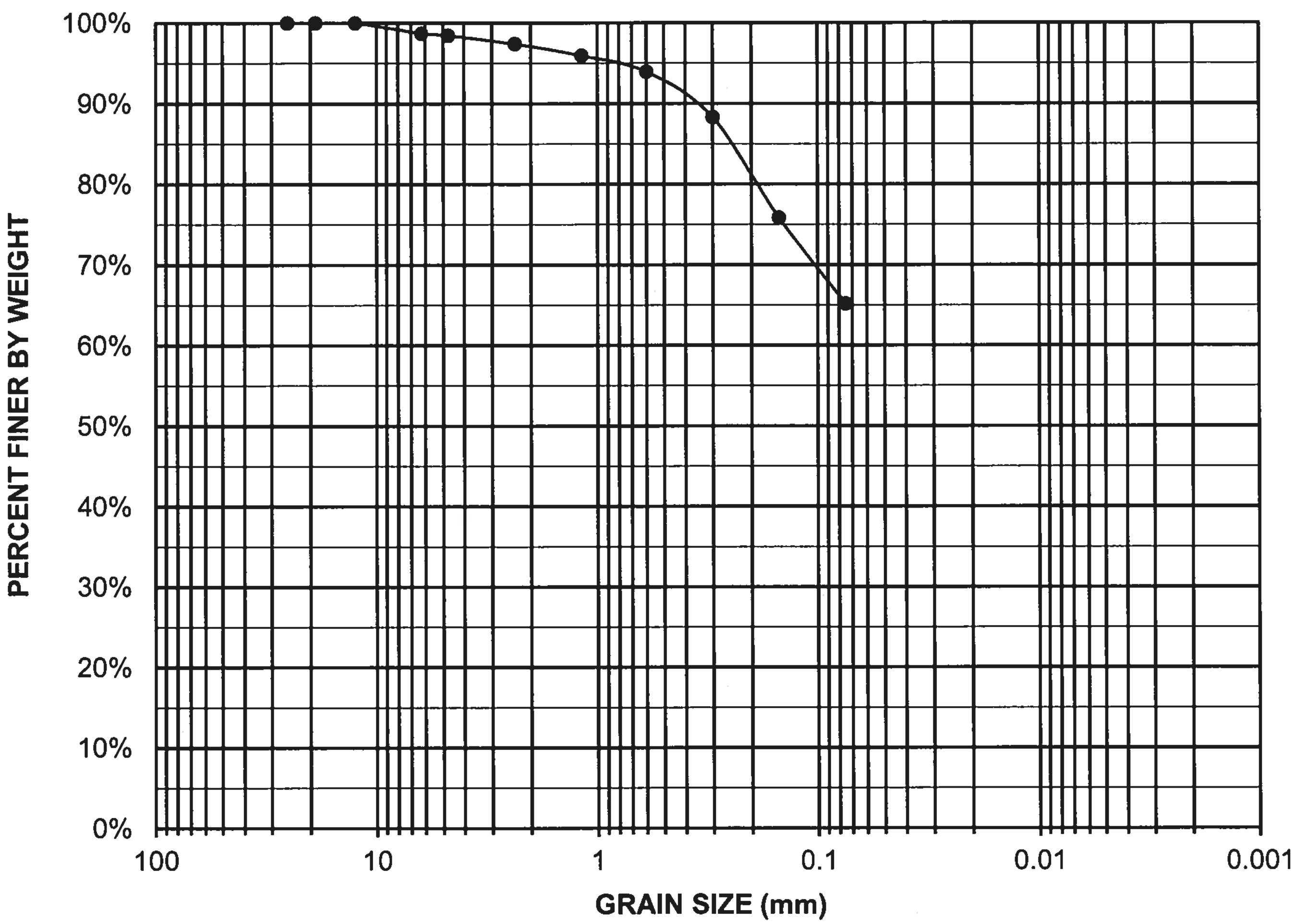
PARTICLE SIZE ANALYSIS

12870 Panama Street

Los Angeles, California

Date:	April, 2016	GS 16-0107	PLATE	SV-7

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-3

DEPTH : 20 feet

USCS CLASSIFICATION : CL

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PARTICAL SIZE ANALYSIS

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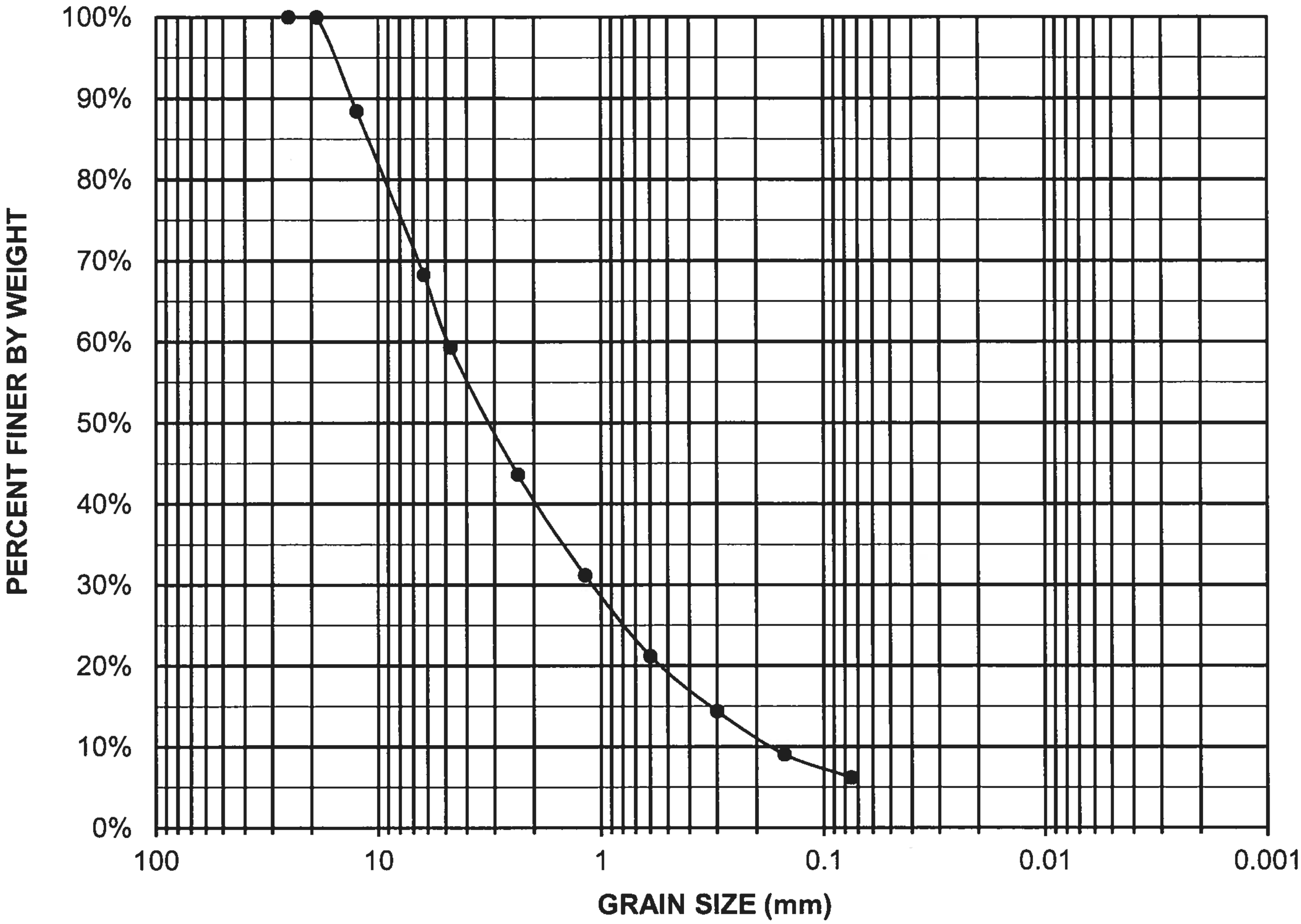
Date: April, 2016	GS 16-0107	PLATE SV-8

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-3

DEPTH : 30 feet

USCS CLASSIFICATION : SP

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PARTICAL SIZE ANALYSIS

12870 Panama Street

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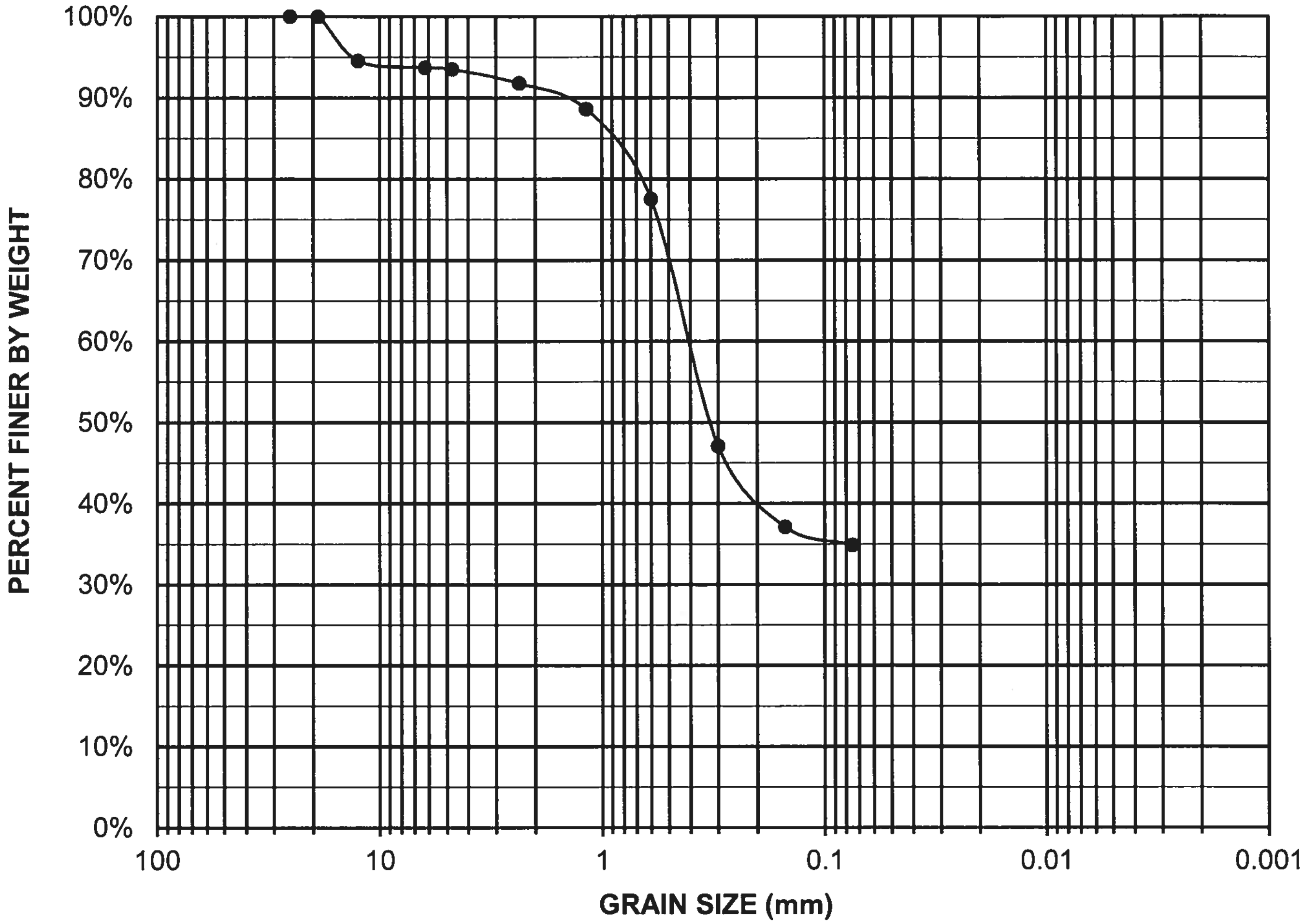
Date: April, 2016	GS 16-0107	PLATE	SV-9

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-3

DEPTH : 40 feet

USCS CLASSIFICATION : SP

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PARTICAL SIZE ANALYSIS

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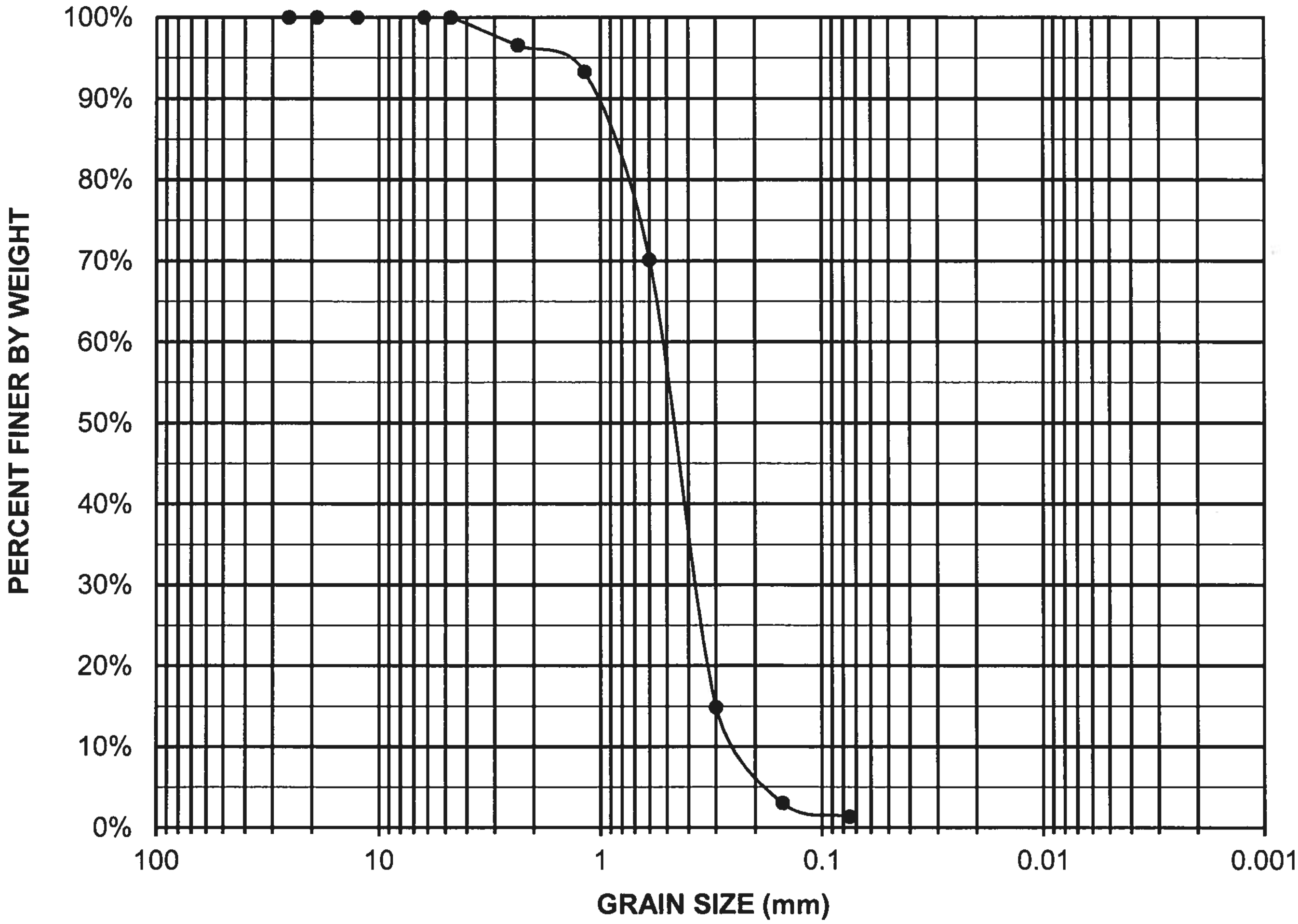
Date: April, 2016	GS 16-0107	PLATE SV-10

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-3

DEPTH : 50 feet

USCS CLASSIFICATION : SP

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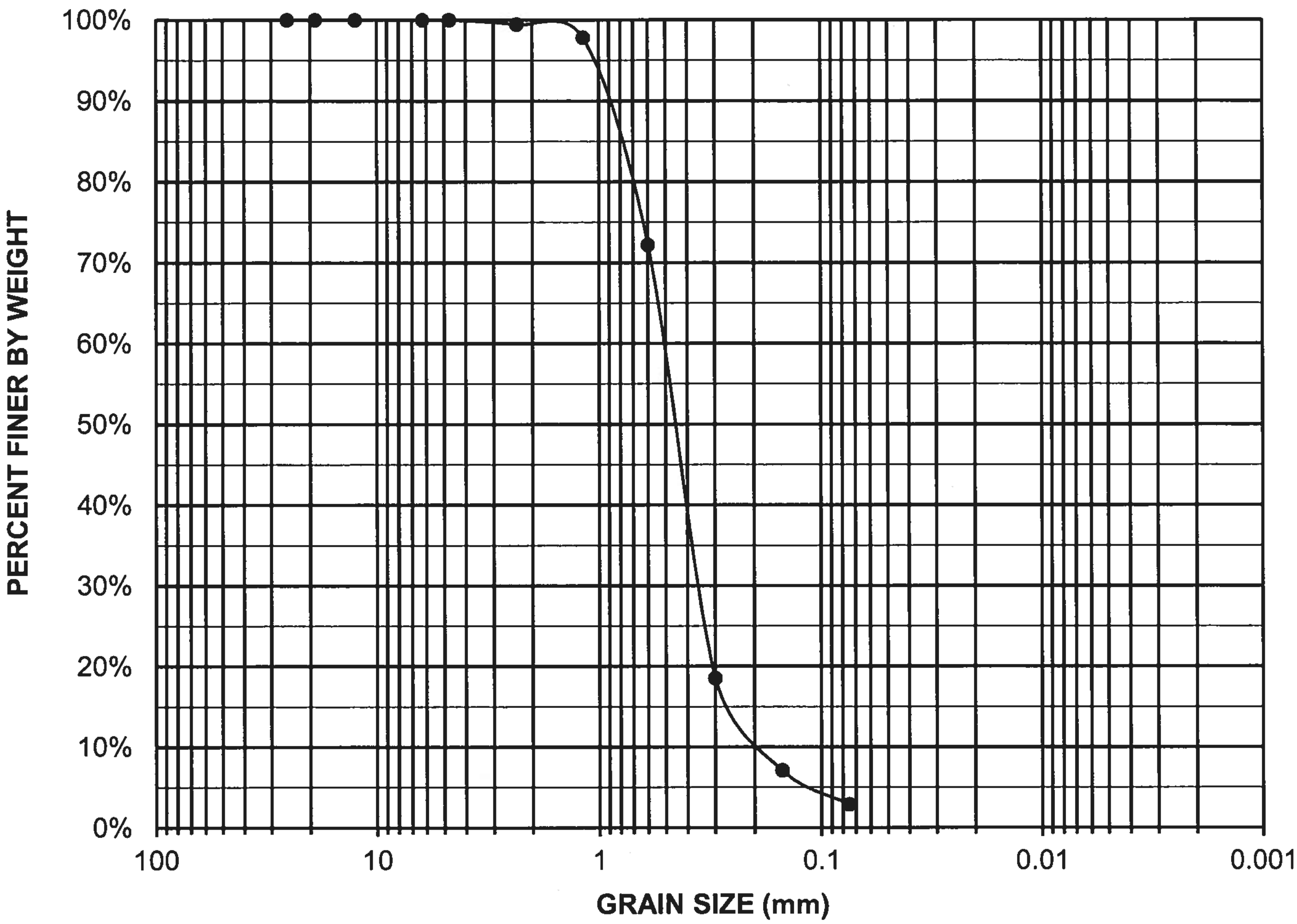
PARTICAL SIZE ANALYSIS

12870 Panama Street

Los Angeles, California

Date: April, 2016	GS 16-0107	PLATE SV-11

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-3

DEPTH : 60 feet

USCS CLASSIFICATION : SP

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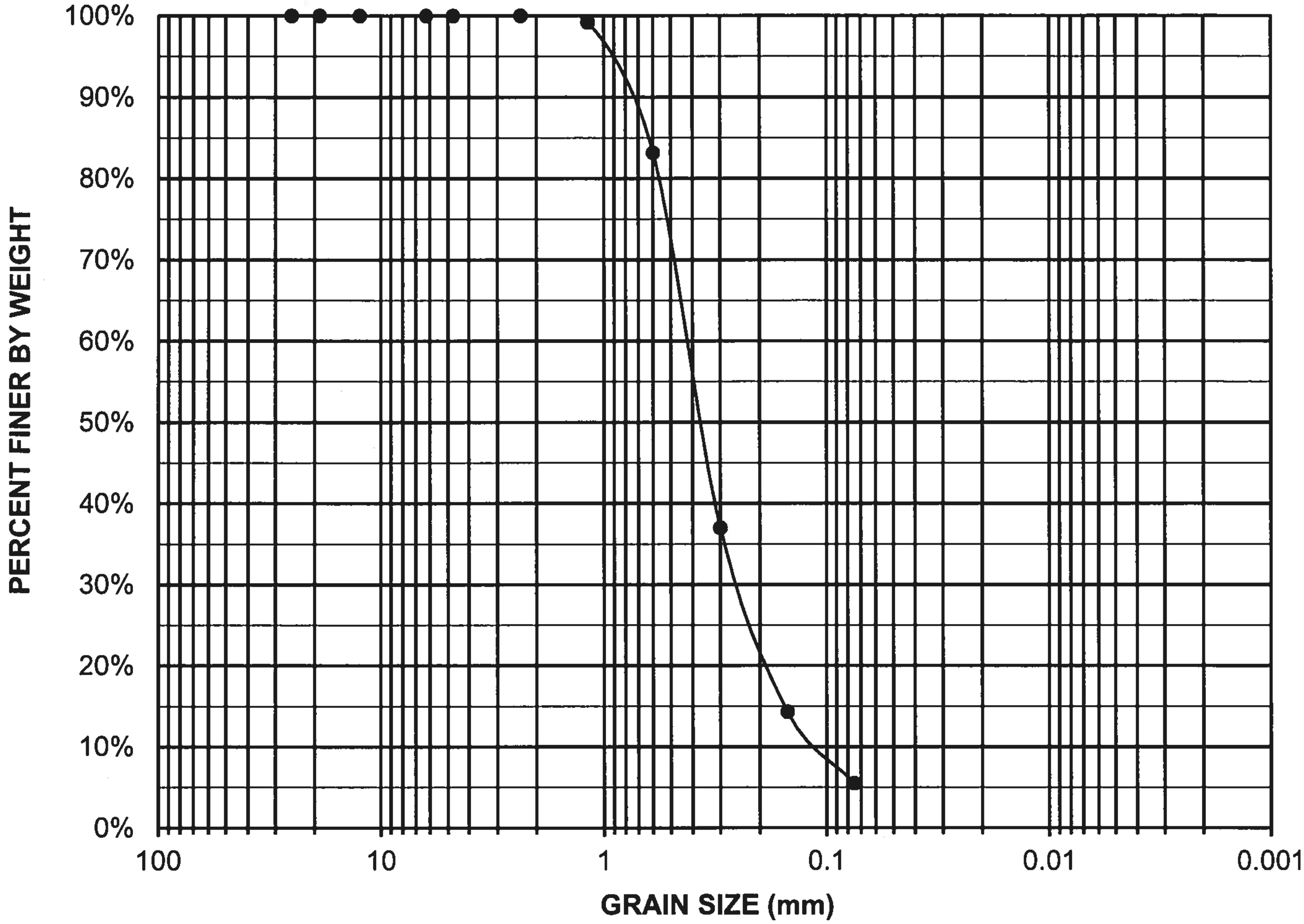
PARTICAL SIZE ANALYSIS

12870 Panama Street

Los Angeles, California

Date: April, 2016	GS 16-0107	PLATE SV-12

PARTICLE SIZE ANALYSIS



SAMPLE LOCATION : B-3

DEPTH : 70 feet

USCS CLASSIFICATION : SP

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PARTICAL SIZE ANALYSIS

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Date: April, 2016	GS 16-0107	PLATE SV-13

APPENDIX C

CPT Logs, Liquefaction and Dynamic Settlement Analysis

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

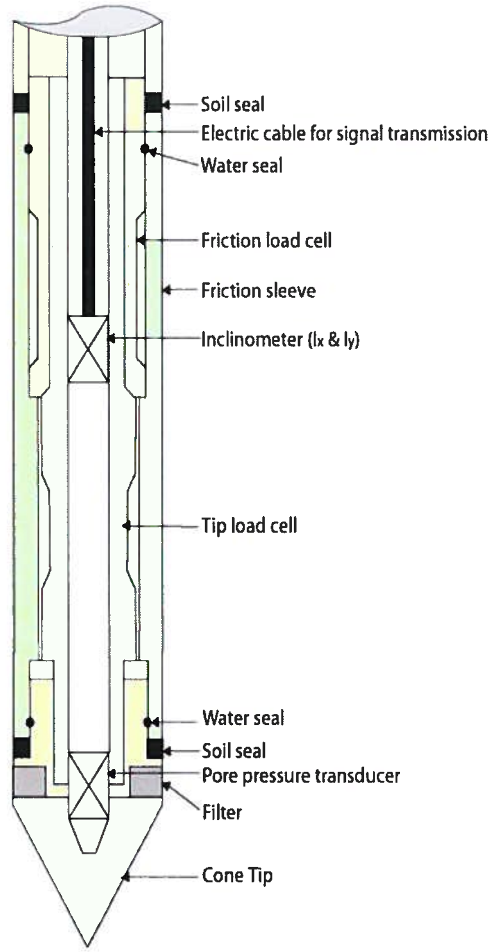


Figure CPT

Gregg 15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

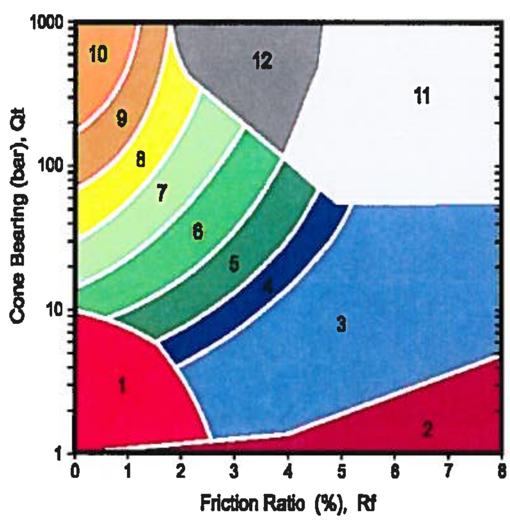
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE		SBT
1		Sensitive, fine grained
2		Organic materials
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		Gravely sand to sand
11		Very stiff fine grained*
12		Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots

Cone Penetration Test (CPT) Interpretation

Gregg uses a proprietary CPT interpretation and plotting software. The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

Input:

1 Units for display (Imperial or metric) (atm. pressure, p_a = 0.96 tsf or 0.1 MPa)
2 Depth interval to average results (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
3 Elevation of ground surface (ft or m)
4 Depth to water table, z_w (ft or m) – input required
5 Net area ratio for cone, a (default to 0.80)
6 Relative Density constant, C_{Dr} (default to 350)
7 Young's modulus number for sands, α (default to 5)
8 Small strain shear modulus number
  a. for sands, S_G (default to 180 for SBT_n 5, 6, 7)
  b. for clays, C_G (default to 50 for SBT_n 1, 2, 3 & 4)
9 Undrained shear strength cone factor for clays, N_{kt} (default to 15)
10 Over Consolidation ratio number, k_{ocr} (default to 0.3)
11 Unit weight of water, (default to γ_w = 62.4 lb/ft^3 or 9.81 kN/m^3)

Column

1 Depth, z, (m) – CPT data is collected in meters
2 Depth (ft)
3 Cone resistance, q_c (tsf or MPa)
4 Sleeve resistance, f_s (tsf or MPa)
5 Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u_2)
6 Other – any additional data
7 Total cone resistance, q_t (tsf or MPa) $q_t = q_c + u\,(1\text{-}a)$

8	Friction Ratio, R_f (%)	$R_f = (f_s/q_t) \times 100\%$
9	Soil Behavior Type (non-normalized), SBT	see note
10	Unit weight, γ (pcf or kN/m^3)	based on SBT, see note
11	Total overburden stress, σ_v (tsf)	$\sigma_{vo} = \sigma\ z$
12	In-situ pore pressure, u_o (tsf)	$u_o = \gamma_w (z - z_w)$
13	Effective overburden stress, σ'_{vo} (tsf)	$\sigma'_{vo} = \sigma_{vo} - u_o$
14	Normalized cone resistance, Q_{t1}	$Q_{t1} = (q_t - \sigma_{vo}) / \sigma'_{vo}$
15	Normalized friction ratio, F_r (%)	$F_r = f_s / (q_t - \sigma_{vo}) \times 100\%$
16	Normalized Pore Pressure ratio, B_q	$B_q = u - u_o / (q_t - \sigma_{vo})$
17	Soil Behavior Type (normalized), SBT_n	see note
18	SBT_n Index, I_c	see note
19	Normalized Cone resistance, Q_{tn} (n varies with I_c)	see note
20	Estimated permeability, k_{SBT} (cm/sec or ft/sec)	see note
21	Equivalent SPT N_{60}, blows/ft	see note
22	Equivalent SPT $(N_1)_{60}$ blows/ft	see note
23	Estimated Relative Density, D_r, (%)	see note
24	Estimated Friction Angle, ϕ', (degrees)	see note
25	Estimated Young's modulus, E_s (tsf)	see note
26	Estimated small strain Shear modulus, Go (tsf)	see note
27	Estimated Undrained shear strength, s_u (tsf)	see note
28	Estimated Undrained strength ratio	s_u/σ_v'
29	Estimated Over Consolidation ratio, OCR	see note

Notes:

1 Soil Behavior Type (non-normalized), SBT (Lunne et al., 1997 and table below)

2 Unit weight, γ either constant at 119 pcf or based on Non-normalized SBT (Lunne et al., 1997 and table below)

3 Soil Behavior Type (Normalized), SBT_n Lunne et al. (1997)

4 SBT_n Index, I_c $I_c = ((3.47 - \log Q_{t1})^2 + (\log F_r + 1.22)^2)^{0.5}$

5 Normalized Cone resistance, Q_{tn} (n varies with Ic)

$Q_{tn} = ((q_t - \sigma_{vo})/pa)\ (pa/(\sigma'_{vo})^n$ and recalculate I_c, then iterate:

When $I_c < 1.64$, n = 0.5 (clean sand)
When $I_c > 3.30$, n = 1.0 (clays)
When $1.64 < I_c < 3.30$, $n = (I_c - 1.64)0.3 + 0.5$
Iterate until the change in n, $\Delta n < 0.01$

6 Estimated permeability, k_{SBT} based on Normalized SBT_n (Lunne et al., 1997 and table below)

7 Equivalent SPT N_{60}, blows/ft Lunne et al. (1997)

$$\frac{(q_t/p_a)}{N_{60}} = 8.5\left(1 - \frac{I_c}{4.6}\right)$$

8 Equivalent SPT $(N_1)_{60}$ blows/ft $(N_1)_{60} = N_{60}\,C_N,$
where $C_N = (pa/\sigma'_{vo})^{0.5}$

9 Relative Density, D_r, (%) $D_r^2 = Q_{tn} / C_{Dr}$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

10 Friction Angle, ϕ', (degrees) $\tan\phi' = \frac{1}{2.68}\left[\log\left(\frac{q_c}{\sigma'_{vo}}\right) + 0.29\right]$

Only SBT_n 5, 6, 7 & 8 *Show'N/A' in zones 1, 2, 3, 4 & 9*

11 Young's modulus, E_s $E_s = \alpha\, q_t$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

12 Small strain shear modulus, Go
a. $G_o = S_G\,(q_t\ \sigma'_{vo}\ pa)^{1/3}$ *For SBT_n 5, 6, 7*
b. $G_o = C_G\, q_t$ *For SBT_n 1, 2, 3& 4*
Show 'N/A' in zones 8 & 9

13 Undrained shear strength, s_u $s_u = (q_t - \sigma_{vo}) / N_{kt}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

14 Over Consolidation ratio, OCR $OCR = k_{ocr}\, Q_{t1}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

The following updated and simplified SBT descriptions have been used in the software:

SBT Zones

1 sensitive fine grained
2 organic soil
3 clay
4 clay & silty clay
5 clay & silty clay
6 sandy silt & clayey silt

SBT_n Zones

1 sensitive fine grained
2 organic soil
3 clay
4 clay & silty clay

7	silty sand & sandy silt	5	silty sand & sandy silt
8	sand & silty sand	6	sand & silty sand
9	sand		
10	sand	7	sand
11	very dense/stiff soil*	8	very dense/stiff soil*
12	very dense/stiff soil*	9	very dense/stiff soil*

*heavily overconsolidated and/or cemented

Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print 'clays & silty clays')

Estimated Permeability (see Lunne et al., 1997)

SBT_n	Permeability (ft/sec)	(m/sec)
1	$3x\ 10^{-8}$	$1x\ 10^{-8}$
2	$3x\ 10^{-7}$	$1x\ 10^{-7}$
3	$1x\ 10^{-9}$	$3x\ 10^{-10}$
4	$3x\ 10^{-8}$	$1x\ 10^{-8}$
5	$3x\ 10^{-6}$	$1x\ 10^{-6}$
6	$3x\ 10^{-4}$	$1x\ 10^{-4}$
7	$3x\ 10^{-2}$	$1x\ 10^{-2}$
8	$3x\ 10^{-6}$	$1x\ 10^{-6}$
9	$1x\ 10^{-8}$	$3x\ 10^{-9}$

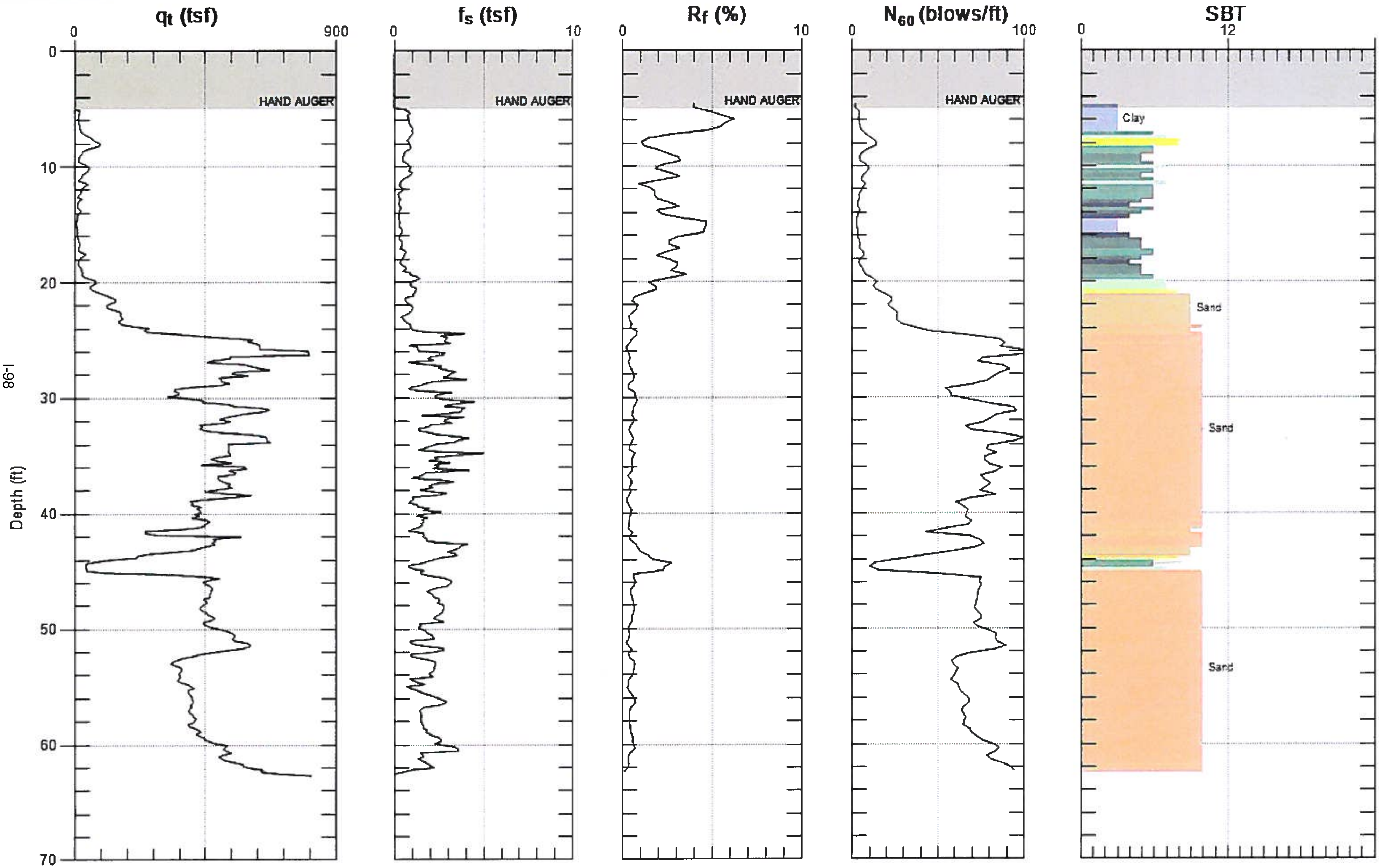
Estimated Unit Weight (see Lunne et al., 1997)

SBT	Approximate Unit Weight (lb/ft^3)	(kN/m^3)
1	111.4	17.5
2	79.6	12.5
3	111.4	17.5
4	114.6	18.0
5	114.6	18.0
6	114.6	18.0
7	117.8	18.5
8	120.9	19.0
9	124.1	19.5
10	127.3	20.0
11	130.5	20.5
12	120.9	19.0

GREGG **GEOSYSTEMS**

Site: 12870 PANAMA ST. **Engineer: R.GLADSON**

Sounding: CPT-1 **Date: 5/26/2016 08:13**

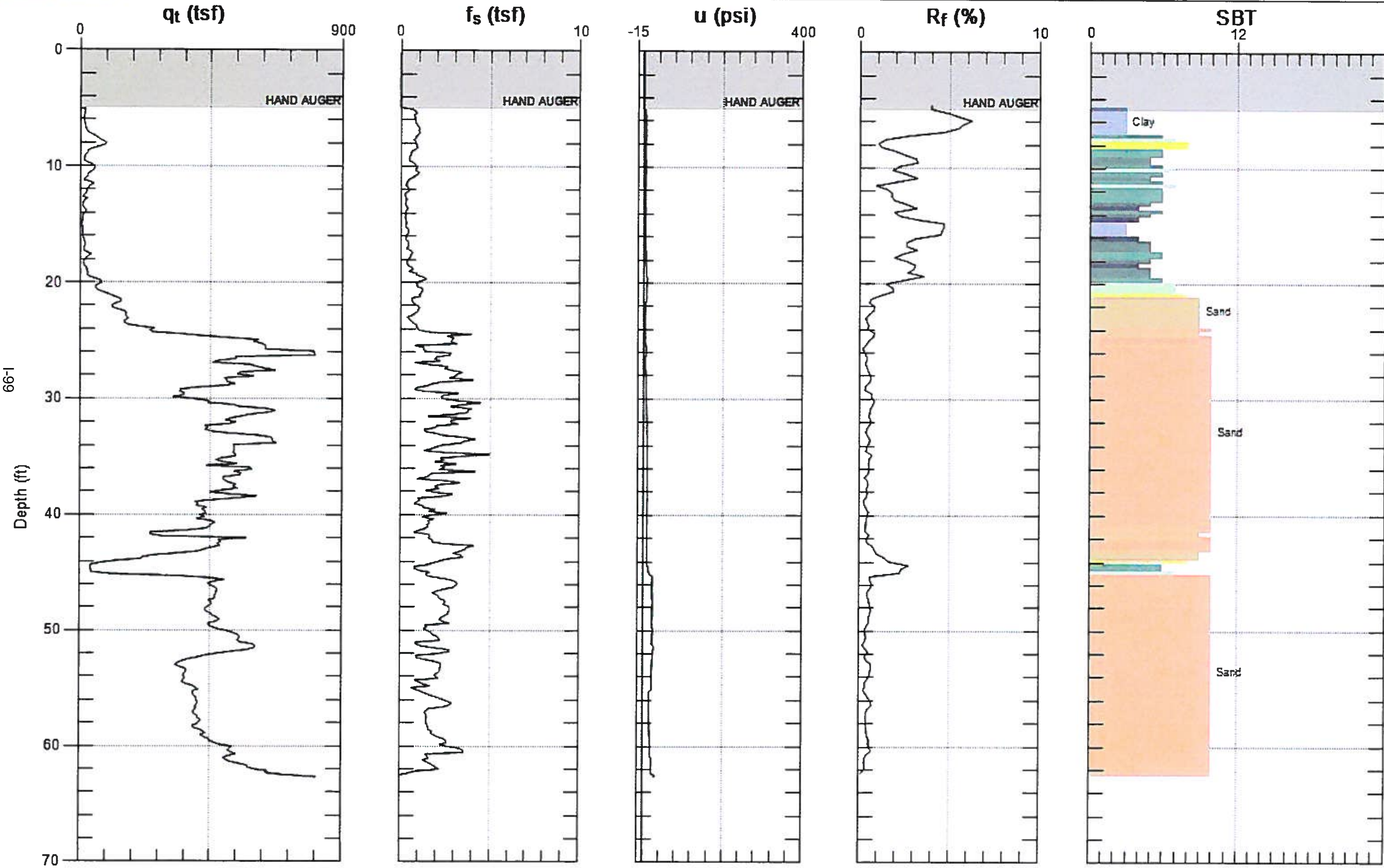


Max. Depth: 62.664 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **GEOSYSTEMS**

Site: 12870 PANAMA ST. **Engineer: R.GLADSON**
Sounding: CPT-1 **Date: 5/26/2016 08:13**



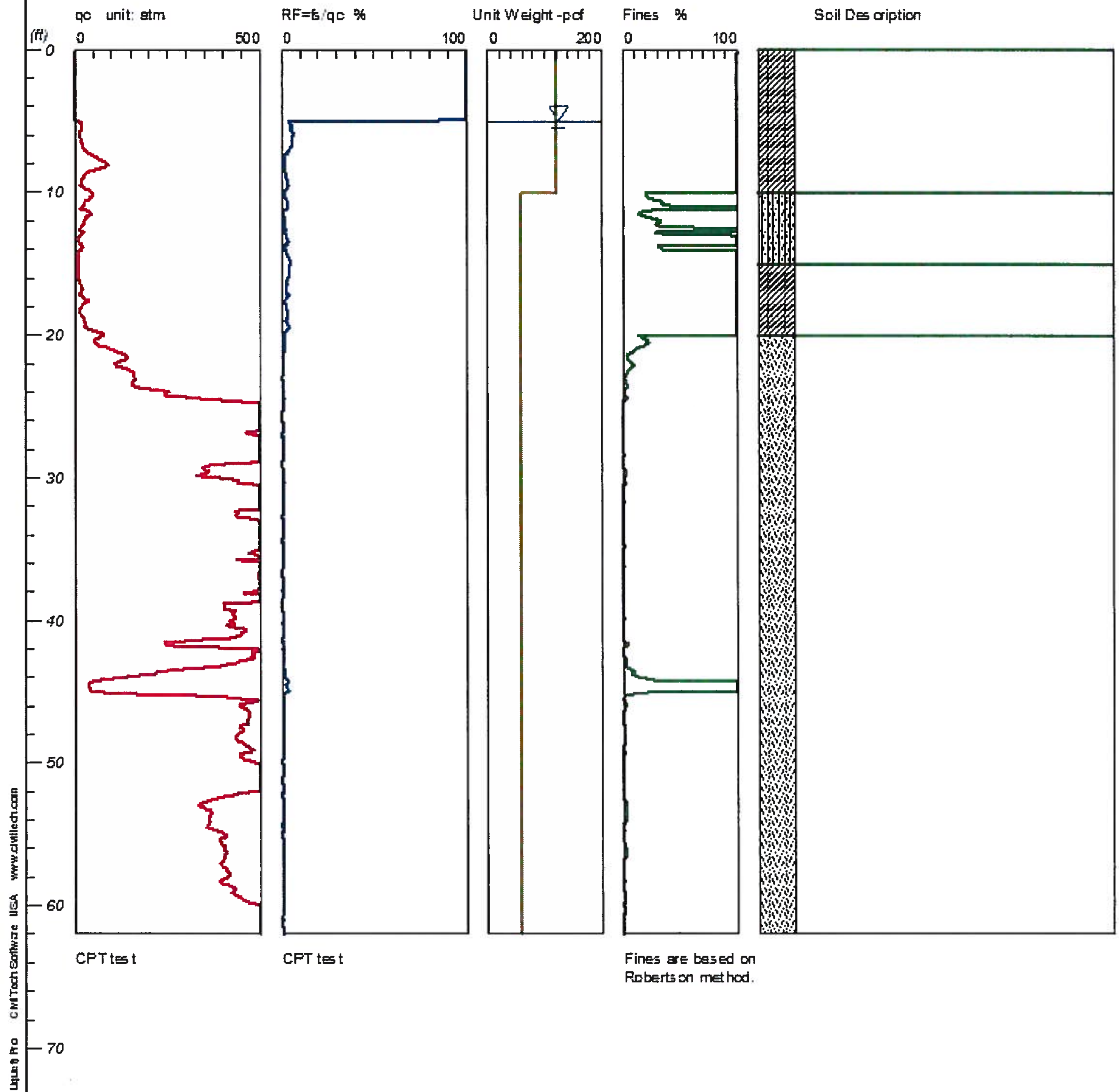
Max. Depth: 62.664 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

LIQUEFACTION ANALYSIS

12870 Panama Street

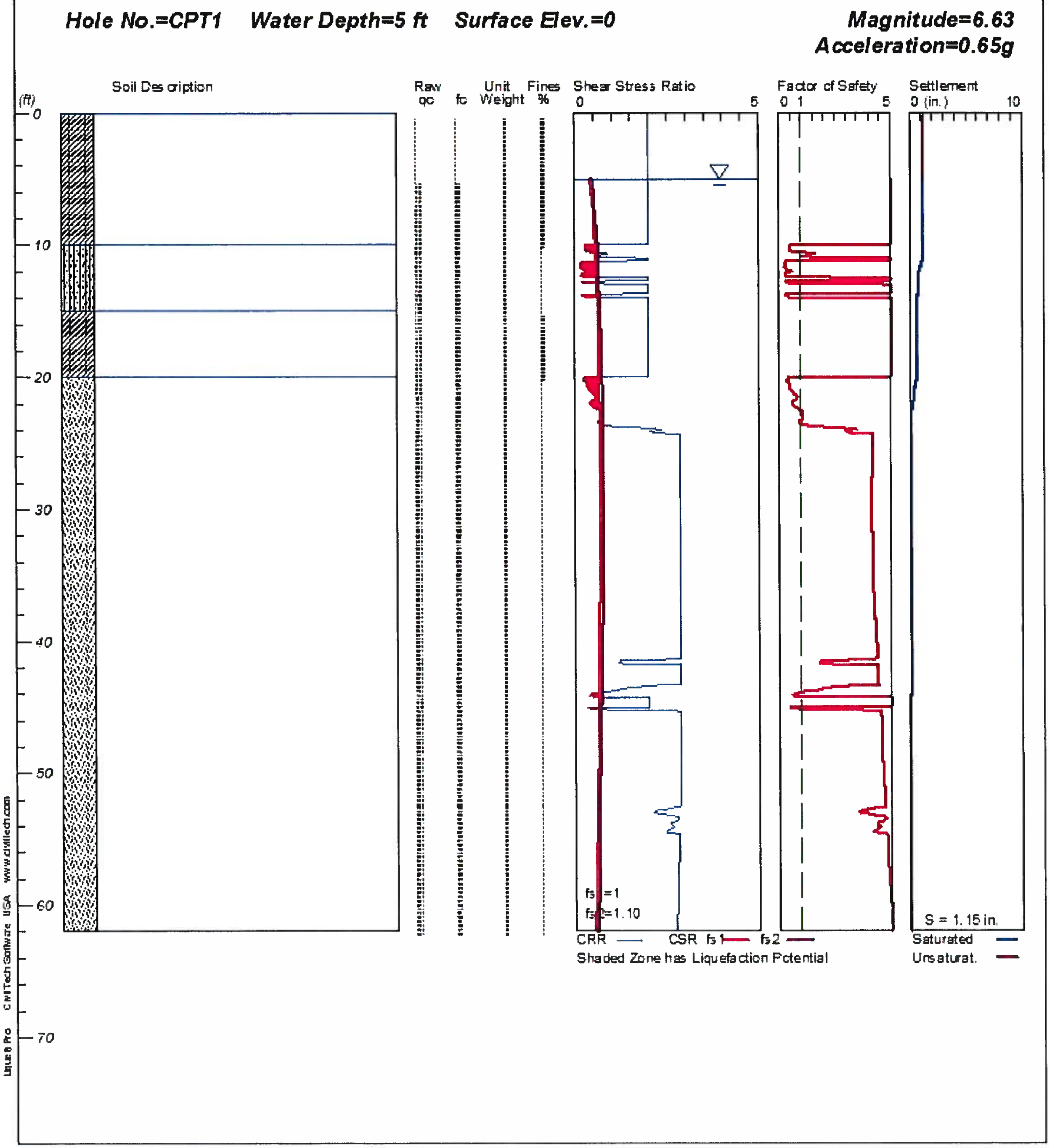
Hole No.=CPT1 *Water Depth=5 ft* *Surface Elev.=0* *Magnitude=6.63*
Acceleration=0.65g



CivilTech Corporation CPT 1 Plate LQ-1

LIQUEFACTION ANALYSIS

12870 Panama Street



CivilTech Corporation | CPT 1 | Plate LQ-1

GREGG DRILLING & TESTING, INC.

CONE PENETRATION TEST DATA

Client:	GEOSYSTEMS	Units:	Imperial
Site:	12870 PANAMA ST.	Data averaging interval:	0.100 meters
Engineer:	R.GLADSON	Assumed depth of water:	11.003 feet
		Net area ratio of cone:	0.80
		Unit weight of water:	62.4 lb/ft3
		Relative density constant, CDR:	350
Sounding:	CPT-1	Young's modulus for sands, a:	4
Date:	5/26/2016	Small strain shear modulus number, SG (sands):	180
Time:	8:13 AM	Small strain shear modulus number, CG (clays):	50
		Nkt for clays:	15
		OCR number, kocr:	0.3

Interpretation based on Lunne, Robertson and Powell, 1997

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
0.100	0.328	0.000	0.000	0.000							0.000				
0.200	0.656	0.000	0.000	0.000							0.000				
0.300	0.984	0.000	0.000	0.000							0.000				
0.400	1.312	0.000	0.000	0.000							0.000				
0.500	1.640	0.000	0.000	0.000							0.000				
0.600	1.969	0.000	0.000	0.000							0.000				
0.700	2.297	0.000	0.000	0.000							0.000				
0.800	2.625	0.000	0.000	0.000							0.000				
0.900	2.953	0.000	0.000	0.000							0.000				
1.000	3.281	0.000	0.000	0.000							0.000				
1.100	3.609	0.000	0.000	0.000							0.000				
1.200	3.937	0.000	0.000	0.000							0.000				
1.300	4.265	0.000	0.000	0.000							0.000				
1.400	4.593	0.000	0.000	0.000							0.000				
1.500	4.921	5.670	0.225	1.299		5.69	3.96	3	111	0.274	0.000	0.274	19.75	4.16	0.02
1.600	5.249	16.228	0.796	4.100		16.29	4.89	3	111	0.292	0.000	0.292	54.70	4.98	0.02
1.700	5.577	14.751	0.812	4.768		14.82	5.48	3	111	0.311	0.000	0.311	46.70	5.60	0.02
1.800	5.906	13.022	0.807	5.008		13.09	6.17	3	111	0.329	0.000	0.329	38.81	6.32	0.03
1.900	6.234	14.853	0.852	4.958		14.92	5.71	3	111	0.347	0.000	0.347	41.98	5.84	0.02
2.000	6.562	17.604	0.963	4.958		17.68	5.45	3	111	0.365	0.000	0.365	47.36	5.57	0.02
2.100	6.890	21.852	1.022	4.945		21.92	4.66	3	111	0.384	0.000	0.384	56.12	4.74	0.02
2.200	7.218	36.249	0.971	4.970		36.32	2.67	6	115	0.403	0.000	0.403	89.22	2.70	0.01
2.300	7.546	58.082	0.813	4.932		58.15	1.40	7	118	0.422	0.000	0.422	136.84	1.41	0.01
2.400	7.874	78.549	0.798	4.882		78.62	1.02	8	121	0.442	0.000	0.442	176.98	1.02	0.00
2.500	8.202	76.374	0.884	4.768		76.44	1.16	8	121	0.462	0.000	0.462	164.62	1.16	0.00
2.600	8.530	41.045	0.787	4.655		41.11	1.92	6	115	0.480	0.000	0.480	84.59	1.94	0.01
2.700	8.858	23.292	0.577	4.705		23.36	2.47	6	115	0.499	0.000	0.499	45.80	2.52	0.01
2.800	9.186	16.154	0.500	4.756		16.22	3.08	5	115	0.518	0.000	0.518	30.32	3.18	0.02
2.900	9.514	17.530	0.563	5.008		17.60	3.20	5	115	0.537	0.000	0.537	31.79	3.30	0.02
3.000	9.843	36.955	0.803	5.121		37.03	2.17	6	115	0.556	0.000	0.556	65.65	2.20	0.01
3.100	10.171	47.505	0.861	5.008		47.58	1.81	7	118	0.575	0.000	0.575	81.76	1.83	0.01
3.200	10.499	35.924	0.915	4.819		35.99	2.54	6	115	0.594	0.000	0.594	59.63	2.58	0.01

GREGG

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
0.100	0.328													
0.200	0.656													
0.300	0.984													
0.400	1.312													
0.500	1.640													
0.600	1.969													
0.700	2.297													
0.800	2.625													
0.900	2.953													
1.000	3.281													
1.100	3.609													
1.200	3.937													
1.300	4.265													
1.400	4.593													
1.500	4.921	3	2.85	16.40	1.00E-9	1.7	3.3				284	0.36	1.32	5.9
1.600	5.249	4	2.58	41.39	3.00E-8	4.1	7.8				814	1.07	3.65	16.4
1.700	5.577	4	2.67	36.92	3.00E-8	3.9	7.2				741	0.97	3.11	14.0
1.800	5.906	3	2.76	32.05	1.00E-9	3.6	6.5				655	0.85	2.59	11.6
1.900	6.234	3	2.71	34.42	1.00E-9	4.0	7.0				746	0.97	2.80	12.6
2.000	6.562	4	2.66	38.55	3.00E-8	4.6	7.9				884	1.15	3.16	14.2
2.100	6.890	4	2.56	44.73	3.00E-8	5.5	9.1				1096	1.44	3.74	16.8
2.200	7.218	5	2.24	65.58	3.00E-6	7.9	12.8	43	40	145	449			
2.300	7.546	6	1.91	93.12	3.00E-4	11.0	17.5	52	42	233	533			
2.400	7.874	6	1.73	117.18	3.00E-4	14.0	21.7	58	43	314	598			
2.500	8.202	6	1.80	113.02	3.00E-4	13.9	21.1	57	43	306	602			
2.600	8.530	5	2.16	64.42	3.00E-6	8.6	12.8	43	40	164	496			
2.700	8.858	5	2.43	37.58	3.00E-6	5.5	8.0	33	36	93	416			
2.800	9.186	4	2.63	26.23	3.00E-8	4.2	6.0				811	1.05	2.02	9.1
2.900	9.514	4	2.63	27.68	3.00E-8	4.5	6.4				880	1.14	2.12	9.5
3.000	9.843	5	2.27	53.78	3.00E-6	8.1	11.2	39	38	148	503			
3.100	10.171	5	2.15	66.17	3.00E-6	9.9	13.5	43	39	190	553			
3.200	10.499	5	2.35	50.54	3.00E-6	8.2	10.9	38	38	144	509			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
3.300	10.827	23.571	0.745	4.655		23.64	3.15	5	115	0.612	0.000	0.612	37.59	3.24	0.01
3.400	11.155	21.824	0.443	4.604		21.89	2.02	6	115	0.631	0.005	0.627	33.93	2.08	0.02
3.500	11.483	37.792	0.336	4.541		37.86	0.89	7	118	0.651	0.015	0.636	58.54	0.90	0.01
3.600	11.811	27.837	0.419	4.428		27.90	1.50	6	115	0.669	0.025	0.644	42.27	1.54	0.01
3.700	12.139	21.870	0.387	4.352		21.93	1.76	6	115	0.688	0.035	0.653	32.55	1.82	0.01
3.800	12.467	14.695	0.257	4.263		14.76	1.74	6	115	0.707	0.046	0.661	21.25	1.83	0.02
3.900	12.795	16.169	0.308	4.440		16.23	1.90	6	115	0.726	0.056	0.670	23.15	1.99	0.02
4.000	13.123	11.163	0.288	4.503		11.23	2.56	5	115	0.745	0.066	0.678	15.45	2.74	0.02
4.100	13.451	10.838	0.341	4.516		10.90	3.13	4	115	0.763	0.076	0.687	14.76	3.36	0.02
4.200	13.780	17.418	0.332	4.503		17.48	1.90	6	115	0.782	0.087	0.696	24.01	1.99	0.01
4.300	14.108	12.529	0.274	4.365		12.59	2.18	5	115	0.801	0.097	0.704	16.75	2.32	0.02
4.400	14.436	8.458	0.275	4.314		8.52	3.22	4	115	0.820	0.107	0.713	10.81	3.57	0.03
4.500	14.764	6.646	0.311	4.289		6.71	4.64	3	111	0.838	0.117	0.721	8.14	5.30	0.03
4.600	15.092	6.655	0.311	4.277		6.72	4.64	3	111	0.856	0.128	0.729	8.04	5.31	0.03
4.700	15.420	8.784	0.402	4.289		8.85	4.54	3	111	0.875	0.138	0.737	10.82	5.04	0.02
4.800	15.748	8.997	0.404	4.276		9.06	4.46	3	111	0.893	0.148	0.745	10.96	4.94	0.02
4.900	16.076	10.280	0.319	4.390		10.34	3.09	4	115	0.912	0.158	0.753	12.52	3.39	0.02
5.000	16.404	14.360	0.373	4.579		14.43	2.59	5	115	0.930	0.169	0.762	17.71	2.76	0.01
5.100	16.732	16.675	0.432	4.705		16.74	2.58	5	115	0.949	0.179	0.770	20.50	2.73	0.01
5.200	17.060	14.081	0.445	4.894		14.15	3.15	5	115	0.968	0.189	0.779	16.92	3.38	0.01
5.300	17.388	25.068	0.609	5.286		25.14	2.42	6	115	0.987	0.199	0.788	30.67	2.52	0.01
5.400	17.717	28.683	0.549	5.260		28.76	1.91	6	115	1.006	0.209	0.796	34.86	1.98	0.01
5.500	18.045	15.996	0.416	5.235		16.07	2.59	5	115	1.024	0.220	0.805	18.70	2.76	0.01
5.600	18.373	12.817	0.394	5.424		12.90	3.06	4	115	1.043	0.230	0.813	14.57	3.32	0.01
5.700	18.701	19.603	0.587	5.853		19.69	2.98	5	115	1.062	0.240	0.822	22.66	3.15	0.01
5.800	19.029	25.244	0.677	6.484		25.34	2.67	5	115	1.081	0.250	0.830	29.21	2.79	0.01
5.900	19.357	28.386	1.006	7.417		28.49	3.53	5	115	1.100	0.261	0.839	32.65	3.67	0.01
6.000	19.685	51.363	1.280	8.351		51.48	2.49	6	115	1.118	0.271	0.848	59.42	2.54	0.01
6.100	20.013	69.636	0.997	8.149		69.75	1.43	7	118	1.138	0.281	0.857	80.10	1.45	0.00
6.200	20.341	57.218	1.039	7.934		57.33	1.81	7	118	1.157	0.291	0.866	64.89	1.85	0.00
6.300	20.669	65.853	1.210	7.858		65.97	1.83	7	118	1.176	0.302	0.875	74.06	1.87	0.00
6.400	20.997	97.259	1.112	7.732		97.37	1.14	8	121	1.196	0.312	0.884	108.75	1.16	0.00
6.500	21.325	128.424	0.796	7.531		128.53	0.62	9	124	1.217	0.322	0.895	142.33	0.63	0.00
6.600	21.654	134.624	0.696	5.588		134.70	0.52	9	124	1.237	0.332	0.905	147.54	0.52	0.00
6.700	21.982	114.771	0.926	4.617		114.84	0.81	9	124	1.257	0.343	0.915	124.16	0.81	0.00
6.800	22.310	130.107	1.006	4.541		130.17	0.77	9	124	1.278	0.353	0.925	139.36	0.78	0.00
6.900	22.638	155.342	0.820	4.478		155.41	0.53	9	124	1.298	0.363	0.935	164.82	0.53	0.00
7.000	22.966	160.258	0.523	4.490		160.32	0.33	9	124	1.318	0.373	0.945	168.23	0.33	0.00
7.100	23.294	156.968	0.604	4.453		157.03	0.38	9	124	1.339	0.383	0.955	162.98	0.39	0.00
7.200	23.622	173.541	0.833	4.440		173.60	0.48	9	124	1.359	0.394	0.965	178.42	0.48	0.00
7.300	23.950	232.924	0.979	4.478		232.99	0.42	10	127	1.380	0.404	0.976	237.29	0.42	0.00
7.400	24.278	278.282	2.226	4.528		278.35	0.80	9	124	1.400	0.414	0.986	280.83	0.80	0.00
7.500	24.606	425.751	3.172	4.629		425.82	0.74	10	127	1.421	0.424	0.997	425.75	0.75	0.00
7.600	24.934	572.514	2.888	3.999		572.57	0.50	10	127	1.442	0.435	1.007	566.89	0.51	0.00
7.700	25.262	618.263	2.264	4.895		618.33	0.37	10	127	1.463	0.445	1.018	605.89	0.37	0.00
7.800	25.591	635.858	1.150	5.777		635.94	0.18	10	127	1.484	0.455	1.029	616.71	0.18	0.00
7.900	25.919	746.827	1.826	5.891		746.91	0.24	10	127	1.505	0.465	1.039	717.13	0.24	0.00
8.000	26.247	714.621	2.533	5.525		714.70	0.35	10	127	1.526	0.476	1.050	679.16	0.36	0.00
8.100	26.575	515.575	2.054	4.491		515.64	0.40	10	127	1.547	0.486	1.061	484.66	0.40	0.00
8.200	26.903	505.119	1.585	4.403		505.18	0.31	10	127	1.567	0.496	1.071	470.06	0.31	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
3.300	10.827	4	2.57	33.29	3.00E-8	5.9	7.8				1182	1.54	2.51	11.3
3.400	11.155	5	2.48	29.78	3.00E-6	5.3	6.8	29	34	88	439			
3.500	11.483	6	2.07	48.45	3.00E-4	7.6	9.9	37	38	151	530			
3.600	11.811	5	2.32	36.50	3.00E-6	6.2	8.0	32	36	112	480			
3.700	12.139	5	2.45	28.77	3.00E-6	5.2	6.6	29	34	88	445			
3.800	12.467	4	2.61	19.25	3.00E-8	3.8	4.8				738	0.94	1.42	6.4
3.900	12.795	4	2.60	21.00	3.00E-8	4.1	5.2				812	1.03	1.54	6.9
4.000	13.123	4	2.82	14.48	3.00E-8	3.2	4.0				561	0.70	1.03	4.6
4.100	13.451	3	2.89	13.98	1.00E-9	3.2	4.0				545	0.68	0.98	4.4
4.200	13.780	4	2.58	21.92	3.00E-8	4.4	5.4				874	1.11	1.60	7.2
4.300	14.108	4	2.75	15.64	3.00E-8	3.5	4.2				630	0.79	1.12	5.0
4.400	14.436	3	3.01	10.44	1.00E-9	2.7	3.3				426	0.51	0.72	3.2
4.500	14.764	3	3.21	8.06	1.00E-9	2.5	3.0				335	0.39	0.54	2.4
4.600	15.092	3	3.22	7.96	1.00E-9	2.5	3.0				336	0.39	0.54	2.4
4.700	15.420	3	3.10	10.58	1.00E-9	3.0	3.6				442	0.53	0.72	3.2
4.800	15.748	3	3.09	10.72	1.00E-9	3.1	3.6				453	0.54	0.73	3.3
4.900	16.076	3	2.95	12.07	1.00E-9	3.2	3.8				517	0.63	0.83	3.8
5.000	16.404	4	2.77	16.81	3.00E-8	4.0	4.7				721	0.90	1.18	5.3
5.100	16.732	4	2.72	19.39	3.00E-8	4.5	5.3				837	1.05	1.37	6.1
5.200	17.060	3	2.84	16.22	1.00E-9	4.1	4.8				708	0.88	1.13	5.1
5.300	17.388	4	2.56	28.71	3.00E-8	6.3	7.3				1257	1.61	2.04	9.2
5.400	17.717	5	2.45	32.41	3.00E-6	6.8	7.9	30	35	115	521			
5.500	18.045	4	2.76	17.87	3.00E-8	4.4	5.1				804	1.00	1.25	5.6
5.600	18.373	3	2.89	14.10	1.00E-9	3.8	4.4				645	0.79	0.97	4.4
5.700	18.701	4	2.73	21.68	3.00E-8	5.3	6.1				984	1.24	1.51	6.8
5.800	19.029	4	2.61	27.76	3.00E-8	6.5	7.3				1267	1.62	1.95	8.8
5.900	19.357	4	2.65	31.19	3.00E-8	7.4	8.4				1425	1.83	2.18	9.8
6.000	19.685	5	2.35	55.75	3.00E-6	11.7	13.0	40	38	206	646			
6.100	20.013	5	2.09	74.15	3.00E-6	14.2	15.8	46	39	279	717			
6.200	20.341	5	2.23	60.81	3.00E-6	12.3	13.6	42	38	229	674			
6.300	20.669	5	2.19	69.48	3.00E-6	14.0	15.4	45	39	264	709			
6.400	20.997	6	1.92	100.95	3.00E-4	18.6	20.3	54	41	389	810			
6.500	21.325	6	1.66	131.02	3.00E-4	22.4	24.3	61	42	514	892			
6.600	21.654	6	1.60	136.42	3.00E-4	23.0	24.9	62	43	539	909			
6.700	21.982	6	1.78	116.16	3.00E-4	20.8	22.4	58	42	459	865			
6.800	22.310	6	1.73	130.77	3.00E-4	23.2	24.8	61	42	521	906			
6.900	22.638	6	1.57	154.94	3.00E-4	26.2	27.9	67	43	622	964			
7.000	22.966	6	1.45	159.00	3.00E-4	26.0	27.5	67	43	641	978			
7.100	23.294	6	1.50	154.86	3.00E-4	25.9	27.2	67	43	628	975			
7.200	23.622	6	1.52	170.42	3.00E-4	28.8	30.1	70	44	694	1011			
7.300	23.950	6	1.38	227.91	3.00E-4	37.0	38.6	81	45	932	1120			
7.400	24.278	6	1.52	271.12	3.00E-4	46.2	47.9	88	46	1113	1192			
7.500	24.606	6	1.38	413.24	3.00E-4	67.6	69.7	109	47	1703	1378			
7.600	24.934	7	1.17	553.16	3.00E-2	85.3	87.5	126	49	2290	1527			
7.700	25.262	7	1.04	594.33	3.00E-2	88.9	90.6	130	49	2473	1572			
7.800	25.591	7	0.83	608.10	3.00E-2	86.3	87.5	132	49	2544	1592			
7.900	25.919	7	0.87	710.78	3.00E-2	102.3	103.2	143	50	2988	1686			
8.000	26.247	7	1.00	676.58	3.00E-2	101.5	101.9	139	49	2859	1667			
8.100	26.575	7	1.14	485.26	3.00E-2	76.1	76.0	118	48	2063	1500			
8.200	26.903	7	1.07	473.00	3.00E-2	73.3	72.8	116	48	2021	1495			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
8.300	27.231	606.031	2.274	4.440		606.09	0.38	10	127	1.588	0.506	1.082	558.68	0.38	0.00
8.400	27.559	617.371	2.933	4.920		617.44	0.47	10	127	1.609	0.517	1.093	563.60	0.48	0.00
8.500	27.887	562.532	3.219	5.538		562.61	0.57	10	127	1.630	0.527	1.103	508.45	0.57	0.00
8.600	28.215	531.887	3.290	6.307		531.98	0.62	10	127	1.651	0.537	1.114	476.07	0.62	0.00
8.700	28.543	513.549	2.698	6.534		513.64	0.53	10	127	1.672	0.547	1.125	455.24	0.53	0.00
8.800	28.871	475.627	1.408	6.673		475.72	0.30	10	127	1.693	0.557	1.135	417.55	0.30	0.00
8.900	29.199	361.897	1.046	6.825		362.00	0.29	10	127	1.714	0.568	1.146	314.40	0.29	0.00
9.000	29.528	352.454	2.332	6.799		352.55	0.66	10	127	1.735	0.578	1.157	303.33	0.66	0.00
9.100	29.856	355.809	2.377	6.900		355.91	0.67	10	127	1.755	0.588	1.167	303.42	0.67	0.00
9.200	30.184	424.246	3.403	7.203		424.35	0.80	10	127	1.776	0.598	1.178	358.76	0.81	0.00
9.300	30.512	504.041	3.561	7.518		504.15	0.71	10	127	1.797	0.609	1.189	422.67	0.71	0.00
9.400	30.840	617.008	3.512	7.909		617.12	0.57	10	127	1.818	0.619	1.199	513.11	0.57	0.00
9.500	31.168	631.563	3.479	8.237		631.68	0.55	10	127	1.839	0.629	1.210	520.61	0.55	0.00
9.600	31.496	550.979	2.799	8.376		551.10	0.51	10	127	1.860	0.639	1.220	450.02	0.51	0.00
9.700	31.824	517.230	3.176	8.666		517.35	0.61	10	127	1.881	0.650	1.231	418.71	0.62	0.00
9.800	32.152	491.307	2.683	9.032		491.44	0.55	10	127	1.902	0.660	1.242	394.23	0.55	0.00
9.900	32.480	433.104	1.766	8.893		433.23	0.41	10	127	1.923	0.670	1.252	344.38	0.41	0.00
10.000	32.808	464.352	1.575	8.981		464.48	0.34	10	127	1.943	0.680	1.263	366.20	0.34	0.00
10.100	33.136	590.630	2.613	9.385		590.76	0.44	10	127	1.964	0.691	1.274	462.27	0.44	0.00
10.200	33.465	657.839	3.735	9.587		657.98	0.57	10	127	1.985	0.701	1.284	510.75	0.57	0.00
10.300	33.793	619.666	3.103	9.537		619.80	0.50	10	127	2.006	0.711	1.295	477.06	0.50	0.00
10.400	34.121	528.550	2.042	9.663		528.69	0.39	10	127	2.027	0.721	1.306	403.37	0.39	0.00
10.500	34.449	528.188	1.852	9.599		528.33	0.35	10	127	2.048	0.732	1.316	399.81	0.35	0.00
10.600	34.777	531.032	3.595	9.650		531.17	0.68	10	127	2.069	0.742	1.327	398.73	0.68	0.00
10.700	35.105	496.335	2.697	9.763		496.48	0.54	10	127	2.090	0.752	1.338	369.61	0.55	0.00
10.800	35.433	499.198	2.504	9.764		499.34	0.50	10	127	2.110	0.762	1.348	368.79	0.50	0.00
10.900	35.761	519.451	2.618	9.574		519.59	0.50	10	127	2.131	0.772	1.359	380.79	0.51	0.00
11.000	36.089	568.509	2.949	9.713		568.65	0.52	10	127	2.152	0.783	1.370	413.64	0.52	0.00
11.100	36.417	544.138	2.522	9.890		544.28	0.46	10	127	2.173	0.793	1.380	392.77	0.47	0.00
11.200	36.745	511.337	1.362	9.990		511.48	0.27	10	127	2.194	0.803	1.391	366.17	0.27	0.00
11.300	37.073	501.484	2.307	9.952		501.63	0.46	10	127	2.215	0.813	1.402	356.34	0.46	0.00
11.400	37.402	524.702	2.483	9.852		524.84	0.47	10	127	2.236	0.824	1.412	370.08	0.48	0.00
11.500	37.730	518.243	1.861	10.091		518.39	0.36	10	127	2.257	0.834	1.423	362.76	0.36	0.00
11.600	38.058	485.052	2.103	10.394		485.20	0.43	10	127	2.278	0.844	1.433	336.90	0.44	0.00
11.700	38.386	556.481	2.124	10.697		556.64	0.38	10	127	2.298	0.854	1.444	383.86	0.38	0.00
11.800	38.714	470.254	1.016	10.798		470.41	0.22	10	127	2.319	0.865	1.455	321.77	0.22	0.00
11.900	39.042	401.232	1.006	10.217		401.38	0.25	10	127	2.340	0.875	1.465	272.31	0.25	0.00
12.000	39.370	418.399	1.509	9.410		418.53	0.36	10	127	2.361	0.885	1.476	281.95	0.36	0.00
12.100	39.698	427.936	2.055	9.322		428.07	0.48	10	127	2.382	0.895	1.487	286.33	0.48	0.00
12.200	40.026	425.417	1.861	9.322		425.55	0.44	10	127	2.403	0.906	1.497	282.60	0.44	0.00
12.300	40.354	427.053	1.564	9.473		427.19	0.37	10	127	2.424	0.916	1.508	281.68	0.37	0.00
12.400	40.682	454.556	1.585	9.738		454.70	0.35	10	127	2.445	0.926	1.519	297.80	0.35	0.00
12.500	41.011	442.027	1.484	9.751		442.17	0.34	10	127	2.466	0.936	1.529	287.52	0.34	0.00
12.600	41.339	345.613	1.073	9.713		345.75	0.31	10	127	2.486	0.946	1.540	222.91	0.31	0.00
12.700	41.667	255.445	1.366	9.663		255.58	0.53	9	124	2.507	0.957	1.550	163.27	0.54	0.00
12.800	41.995	442.287	1.698	9.650		442.43	0.38	10	127	2.528	0.967	1.561	281.86	0.39	0.00
12.900	42.323	477.941	2.014	9.498		478.08	0.42	10	127	2.549	0.977	1.571	302.62	0.42	0.00
13.000	42.651	469.734	3.399	9.448		469.87	0.72	10	127	2.569	0.987	1.582	295.38	0.73	0.00
13.100	42.979	429.841	3.552	9.536		429.98	0.83	10	127	2.590	0.998	1.593	268.35	0.83	0.00
13.200	43.307	336.774	3.244	9.486		336.91	0.96	9	124	2.611	1.008	1.603	208.57	0.97	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
8.300	27.231	7	1.07	564.96	3.00E-2	87.9	86.9	127	49	2424	1594			
8.400	27.559	7	1.15	572.74	3.00E-2	91.5	90.1	128	49	2470	1609			
8.500	27.887	7	1.24	519.20	3.00E-2	85.7	83.9	122	48	2250	1565			
8.600	28.215	7	1.29	488.48	3.00E-2	82.1	80.0	118	48	2128	1541			
8.700	28.543	7	1.24	469.33	3.00E-2	78.3	75.9	116	48	2055	1528			
8.800	28.871	7	1.10	432.51	3.00E-2	69.4	67.0	111	47	1903	1494			
8.900	29.199	7	1.19	327.19	3.00E-2	54.3	52.1	97	46	1448	1368			
9.000	29.528	6	1.44	317.13	3.00E-4	57.0	54.5	95	46	1410	1360			
9.100	29.856	6	1.44	318.68	3.00E-4	57.6	54.8	95	46	1424	1369			
9.200	30.184	6	1.45	378.52	3.00E-4	68.9	65.3	104	47	1697	1456			
9.300	30.512	6	1.36	447.96	3.00E-4	79.6	75.1	113	47	2017	1546			
9.400	30.840	7	1.24	546.24	3.00E-2	93.8	88.2	125	48	2468	1659			
9.500	31.168	7	1.22	556.68	3.00E-2	95.6	89.4	126	48	2527	1677			
9.600	31.496	7	1.24	483.32	3.00E-2	83.8	78.0	118	48	2204	1607			
9.700	31.824	7	1.32	451.64	3.00E-2	80.6	74.7	114	47	2069	1578			
9.800	32.152	7	1.30	427.07	3.00E-2	76.1	70.2	110	47	1966	1556			
9.900	32.480	7	1.25	374.67	3.00E-2	66.1	60.8	103	47	1733	1496			
10.000	32.808	7	1.18	400.10	3.00E-2	69.4	63.5	107	47	1858	1535			
10.100	33.136	7	1.18	507.19	3.00E-2	88.4	80.6	120	48	2363	1668			
10.200	33.465	7	1.24	562.72	3.00E-2	100.1	90.8	127	48	2632	1734			
10.300	33.793	7	1.21	527.77	3.00E-2	93.6	84.6	123	48	2479	1705			
10.400	34.121	7	1.18	448.08	3.00E-2	79.1	71.2	113	47	2115	1621			
10.500	34.449	7	1.16	445.94	3.00E-2	78.5	70.4	113	47	2113	1625			
10.600	34.777	6	1.36	446.53	3.00E-4	84.0	75.0	113	47	2125	1632			
10.700	35.105	7	1.32	415.56	3.00E-2	77.3	68.7	109	47	1986	1600			
10.800	35.433	7	1.29	416.30	3.00E-2	77.2	68.3	109	47	1997	1608			
10.900	35.761	7	1.28	431.54	3.00E-2	80.1	70.7	111	47	2078	1633			
11.000	36.089	7	1.27	470.59	3.00E-2	87.2	76.7	116	47	2275	1688			
11.100	36.417	7	1.25	448.59	3.00E-2	83.0	72.7	113	47	2177	1667			
11.200	36.745	7	1.11	419.82	3.00E-2	75.0	65.4	110	47	2046	1637			
11.300	37.073	7	1.27	410.11	3.00E-2	77.1	67.0	108	47	2007	1631			
11.400	37.402	7	1.27	427.54	3.00E-2	80.6	69.8	111	47	2099	1660			
11.500	37.730	7	1.20	420.65	3.00E-2	77.9	67.2	110	47	2074	1657			
11.600	38.058	7	1.28	392.12	3.00E-2	74.6	64.1	106	46	1941	1625			
11.700	38.386	7	1.20	448.45	3.00E-2	83.6	71.6	113	47	2227	1705			
11.800	38.714	7	1.11	377.29	3.00E-2	68.9	58.8	104	46	1882	1616			
11.900	39.042	7	1.21	320.46	3.00E-2	60.5	51.4	96	46	1606	1537			
12.000	39.370	7	1.28	333.01	3.00E-2	64.5	54.6	98	46	1674	1562			
12.100	39.698	6	1.36	339.40	3.00E-4	67.5	56.9	98	46	1712	1578			
12.200	40.026	7	1.34	336.18	3.00E-2	66.6	56.0	98	46	1702	1578			
12.300	40.354	7	1.29	336.27	3.00E-2	65.9	55.2	98	46	1709	1584			
12.400	40.682	7	1.26	356.77	3.00E-2	69.5	58.0	101	46	1819	1621			
12.500	41.011	7	1.26	345.66	3.00E-2	67.6	56.3	99	46	1769	1610			
12.600	41.339	7	1.33	268.92	3.00E-2	54.1	44.8	88	45	1383	1487			
12.700	41.667	6	1.58	197.61	3.00E-4	43.2	35.7	75	43	1022	1347			
12.800	41.995	7	1.30	342.32	3.00E-2	68.6	56.4	99	46	1770	1621			
12.900	42.323	7	1.30	368.79	3.00E-2	74.1	60.8	103	46	1912	1667			
13.000	42.651	6	1.47	361.18	3.00E-4	76.8	62.8	102	46	1879	1662			
13.100	42.979	6	1.54	329.23	3.00E-4	71.9	58.6	97	45	1720	1617			
13.200	43.307	6	1.67	255.82	3.00E-4	58.7	47.7	85	44	1348	1494			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
13.300	43.635	229.569	3.185	9.372		229.70	1.39	9	124	2.631	1.018	1.613	140.78	1.40	0.00
13.400	43.963	137.766	2.238	9.271		137.90	1.62	8	121	2.651	1.028	1.623	83.36	1.65	0.00
13.500	44.291	51.595	1.399	10.609		51.75	2.70	6	115	2.670	1.039	1.631	30.09	2.85	-0.01
13.600	44.619	39.261	0.914	13.056		39.45	2.32	6	115	2.688	1.049	1.640	22.42	2.49	0.00
13.700	44.948	62.720	1.403	15.212		62.94	2.23	7	118	2.708	1.059	1.649	36.53	2.33	0.00
13.800	45.276	292.522	1.747	21.595		292.83	0.60	10	127	2.729	1.069	1.659	174.83	0.60	0.00
13.900	45.604	464.901	2.724	23.777		465.24	0.59	10	127	2.750	1.080	1.670	276.94	0.59	0.00
14.000	45.932	450.624	3.145	23.387		450.96	0.70	10	127	2.770	1.090	1.681	266.67	0.70	0.00
14.100	46.260	462.540	2.837	23.248		462.87	0.61	10	127	2.791	1.100	1.691	272.02	0.62	0.00
14.200	46.588	470.106	2.114	23.273		470.44	0.45	10	127	2.812	1.110	1.702	274.76	0.45	0.00
14.300	46.916	465.904	2.027	23.488		466.24	0.43	10	127	2.833	1.120	1.713	270.58	0.44	0.00
14.400	47.244	457.233	2.293	23.853		457.58	0.50	10	127	2.854	1.131	1.723	263.87	0.50	0.00
14.500	47.572	449.834	2.480	24.080		450.18	0.55	10	127	2.875	1.141	1.734	257.97	0.55	0.00
14.600	47.900	443.690	2.620	23.790		444.03	0.59	10	127	2.896	1.151	1.745	252.86	0.59	0.00
14.700	48.228	433.336	2.750	23.575		433.68	0.63	10	127	2.917	1.161	1.755	245.42	0.64	0.00
14.800	48.556	448.365	2.647	23.538		448.70	0.59	10	127	2.938	1.172	1.766	252.43	0.59	0.00
14.900	48.885	469.241	2.358	23.411		469.58	0.50	10	127	2.958	1.182	1.777	262.66	0.51	0.00
15.000	49.213	464.678	2.455	23.096		465.01	0.53	10	127	2.979	1.192	1.787	258.53	0.53	0.00
15.100	49.541	446.776	1.898	23.096		447.11	0.42	10	127	3.000	1.202	1.798	247.03	0.43	0.00
15.200	49.869	476.435	1.476	24.042		476.78	0.31	10	127	3.021	1.213	1.808	261.97	0.31	0.00
15.300	50.197	522.881	1.733	23.992		523.23	0.33	10	127	3.042	1.223	1.819	285.95	0.33	0.00
15.400	50.525	546.034	2.043	23.487		546.37	0.37	10	127	3.063	1.233	1.830	296.93	0.38	0.00
15.500	50.853	547.270	1.779	23.286		547.61	0.32	10	127	3.084	1.243	1.840	295.87	0.33	0.00
15.600	51.181	582.925	1.030	24.597		583.28	0.18	10	127	3.105	1.254	1.851	313.43	0.18	0.00
15.700	51.509	592.591	1.980	26.918		592.98	0.33	10	127	3.126	1.264	1.862	316.83	0.34	0.00
15.800	51.837	523.792	2.544	25.594		524.16	0.49	10	127	3.146	1.274	1.872	278.27	0.49	0.00
15.900	52.165	437.798	1.340	24.673		438.15	0.31	10	127	3.167	1.284	1.883	231.00	0.31	0.00
16.000	52.493	378.655	1.393	24.068		379.00	0.37	10	127	3.188	1.295	1.894	198.46	0.37	0.00
16.100	52.822	340.826	2.154	23.513		341.16	0.63	10	127	3.209	1.305	1.904	177.47	0.64	0.00
16.200	53.150	346.728	2.278	23.147		347.06	0.66	10	127	3.230	1.315	1.915	179.55	0.66	0.00
16.300	53.478	365.671	2.222	22.907		366.00	0.61	10	127	3.251	1.325	1.926	188.38	0.61	0.00
16.400	53.806	360.503	2.049	22.642		360.83	0.57	10	127	3.272	1.335	1.936	184.66	0.57	0.00
16.500	54.134	359.471	1.682	22.428		359.79	0.47	10	127	3.293	1.346	1.947	183.11	0.47	0.00
16.600	54.462	358.588	1.109	22.529		358.91	0.31	10	127	3.313	1.356	1.958	181.65	0.31	0.00
16.700	54.790	385.004	1.237	22.655		385.33	0.32	10	127	3.334	1.366	1.968	194.08	0.32	0.00
16.800	55.118	399.373	0.953	19.930		399.66	0.24	10	127	3.355	1.376	1.979	200.27	0.24	0.00
16.900	55.446	391.212	1.486	15.502		391.44	0.38	10	127	3.376	1.387	1.990	195.05	0.38	0.00
17.000	55.774	398.564	2.078	15.490		398.79	0.52	10	127	3.397	1.397	2.000	197.68	0.53	0.00
17.100	56.102	404.550	2.654	15.629		404.78	0.66	10	127	3.418	1.407	2.011	199.60	0.66	0.00
17.200	56.430	402.998	2.727	15.831		403.23	0.68	10	127	3.439	1.417	2.021	197.77	0.68	0.00
17.300	56.759	397.886	1.873	16.045		398.12	0.47	10	127	3.460	1.428	2.032	194.21	0.47	0.00
17.400	57.087	394.187	1.476	16.625		394.43	0.37	10	127	3.481	1.438	2.043	191.38	0.38	0.00
17.500	57.415	403.528	1.509	16.852		403.77	0.37	10	127	3.501	1.448	2.053	194.93	0.38	0.00
17.600	57.743	412.256	1.508	16.940		412.50	0.37	10	127	3.522	1.458	2.064	198.14	0.37	0.00
17.700	58.071	402.970	1.540	17.042		403.22	0.38	10	127	3.543	1.469	2.075	192.64	0.39	0.00
17.800	58.399	398.695	1.603	17.206		398.94	0.40	10	127	3.564	1.479	2.085	189.60	0.41	0.00
17.900	58.727	423.586	1.736	17.458		423.84	0.41	10	127	3.585	1.489	2.096	200.50	0.41	0.00
18.000	59.055	426.393	1.963	17.925		426.65	0.46	10	127	3.606	1.499	2.107	200.81	0.46	0.00
18.100	59.383	441.004	2.425	18.606		441.27	0.55	10	127	3.627	1.509	2.117	206.70	0.55	0.00
18.200	59.711	464.882	2.500	18.694		465.15	0.54	10	127	3.648	1.520	2.128	216.88	0.54	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
13.300	43.635	6	1.90	168.17	3.00E-4	43.5	35.2	69	42	919	1317			
13.400	43.963	5	2.11	97.13	3.00E-6	28.3	22.9	53	40	552	1114			
13.500	44.291	4	2.60	32.97	3.00E-8	13.2	10.6				2587	3.27	2.01	9.0
13.600	44.619	4	2.66	24.39	3.00E-8	10.4	8.3				1972	2.45	1.49	6.7
13.700	44.948	5	2.48	40.77	3.00E-6	15.1	12.1	34	35	252	862			
13.800	45.276	6	1.58	218.94	3.00E-4	49.6	39.6	79	43	1171	1442			
13.900	45.604	6	1.43	347.92	3.00E-4	74.9	59.6	100	46	1861	1686			
14.000	45.932	6	1.49	336.09	3.00E-4	74.2	58.8	98	45	1804	1672			
14.100	46.260	6	1.45	343.92	3.00E-4	75.0	59.3	99	45	1851	1690			
14.200	46.588	6	1.35	348.47	3.00E-4	74.0	58.4	100	46	1882	1703			
14.300	46.916	6	1.35	344.25	3.00E-4	73.3	57.6	99	45	1865	1702			
14.400	47.244	6	1.40	336.75	3.00E-4	73.0	57.2	98	45	1830	1695			
14.500	47.572	6	1.43	330.24	3.00E-4	72.6	56.7	97	45	1801	1689			
14.600	47.900	6	1.46	324.69	3.00E-4	72.2	56.3	96	45	1776	1685			
14.700	48.228	6	1.49	316.09	3.00E-4	71.2	55.3	95	45	1735	1675			
14.800	48.556	6	1.46	326.11	3.00E-4	73.0	56.5	97	45	1795	1697			
14.900	48.885	6	1.40	340.34	3.00E-4	75.0	57.9	99	45	1878	1727			
15.000	49.213	6	1.42	335.99	3.00E-4	74.7	57.5	98	45	1860	1724			
15.100	49.541	6	1.37	322.00	3.00E-4	70.8	54.3	96	45	1788	1705			
15.200	49.869	7	1.27	342.48	3.00E-2	73.2	56.0	99	45	1907	1746			
15.300	50.197	7	1.26	374.94	3.00E-2	80.0	61.0	104	46	2093	1804			
15.400	50.525	7	1.28	390.47	3.00E-2	84.0	63.9	106	46	2185	1834			
15.500	50.853	7	1.24	390.21	3.00E-2	83.3	63.2	106	46	2190	1839			
15.600	51.181	7	1.08	414.56	3.00E-2	84.7	64.1	109	46	2333	1882			
15.700	51.509	7	1.22	420.27	3.00E-2	89.7	67.7	110	46	2372	1896			
15.800	51.837	6	1.37	370.16	3.00E-4	82.9	62.4	103	46	2097	1823			
15.900	52.165	7	1.31	308.17	3.00E-2	68.1	51.1	94	45	1753	1720			
16.000	52.493	6	1.41	265.50	3.00E-4	60.8	45.4	87	44	1516	1642			
16.100	52.822	6	1.59	238.08	3.00E-4	58.0	43.2	82	43	1365	1589			
16.200	53.150	6	1.60	241.55	3.00E-4	59.1	44.0	83	44	1388	1601			
16.300	53.478	6	1.56	254.13	3.00E-4	61.6	45.6	85	44	1464	1632			
16.400	53.806	6	1.55	249.80	3.00E-4	60.5	44.7	84	44	1443	1628			
16.500	54.134	6	1.50	248.38	3.00E-4	59.3	43.8	84	44	1439	1629			
16.600	54.462	6	1.41	247.08	3.00E-4	57.4	42.2	84	44	1436	1631			
16.700	54.790	6	1.39	264.70	3.00E-4	61.3	45.0	87	44	1541	1673			
16.800	55.118	7	1.31	273.88	3.00E-2	62.2	45.5	88	44	1599	1696			
16.900	55.446	6	1.43	267.46	3.00E-4	63.1	46.0	87	44	1566	1688			
17.000	55.774	6	1.50	271.79	3.00E-4	65.8	47.9	88	44	1595	1701			
17.100	56.102	6	1.57	275.16	3.00E-4	68.2	49.5	89	44	1619	1713			
17.200	56.430	6	1.58	273.36	3.00E-4	68.2	49.3	88	44	1613	1713			
17.300	56.759	6	1.48	269.14	3.00E-4	65.3	47.1	88	44	1592	1709			
17.400	57.087	6	1.43	265.92	3.00E-4	63.6	45.8	87	44	1578	1707			
17.500	57.415	6	1.42	271.55	3.00E-4	65.0	46.6	88	44	1615	1723			
17.600	57.743	6	1.41	276.74	3.00E-4	66.1	47.4	89	44	1650	1738			
17.700	58.071	6	1.43	269.75	3.00E-4	65.1	46.5	88	44	1613	1728			
17.800	58.399	6	1.45	266.17	3.00E-4	64.8	46.1	87	44	1596	1725			
17.900	58.727	6	1.44	282.20	3.00E-4	68.5	48.7	90	44	1695	1763			
18.000	59.055	6	1.47	283.35	3.00E-4	69.6	49.3	90	44	1707	1770			
18.100	59.383	6	1.50	292.39	3.00E-4	72.9	51.5	91	44	1765	1793			
18.200	59.711	6	1.48	307.56	3.00E-4	76.2	53.8	94	44	1861	1828			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
18.300	60.039	507.842	2.783	18.921		508.11	0.55	10	127	3.669	1.530	2.139	235.88	0.55	0.00
18.400	60.367	516.663	3.498	19.299		516.94	0.68	10	127	3.689	1.540	2.149	238.81	0.68	0.00
18.500	60.696	523.132	2.216	19.640		523.41	0.42	10	127	3.710	1.550	2.160	240.62	0.43	0.00
18.600	61.024	504.505	1.517	21.116		504.81	0.30	10	127	3.731	1.561	2.171	230.85	0.30	0.00
18.700	61.352	524.043	1.544	21.734		524.36	0.29	10	127	3.752	1.571	2.181	238.68	0.30	0.00
18.800	61.680	567.811	1.899	21.633		568.12	0.33	10	127	3.773	1.581	2.192	257.48	0.34	0.00
18.900	62.008	608.131	1.745	21.620		608.44	0.29	10	127	3.794	1.591	2.202	274.53	0.29	0.00
19.000	62.336	663.351	0.506	24.812		663.71	0.08	10	127	3.815	1.602	2.213	298.17	0.08	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
18.300	60.039	6	1.46	335.34	3.00E-4	82.7	58.2	98	45	2032	1886			
18.400	60.367	6	1.52	340.35	3.00E-4	85.7	60.1	99	45	2068	1900			
18.500	60.696	6	1.38	343.78	3.00E-4	83.1	58.2	99	45	2094	1911			
18.600	61.024	7	1.31	330.64	3.00E-2	78.4	54.8	97	45	2019	1891			
18.700	61.352	7	1.29	342.69	3.00E-2	81.0	56.4	99	45	2097	1918			
18.800	61.680	7	1.30	370.58	3.00E-2	87.9	61.1	103	45	2272	1973			
18.900	62.008	7	1.24	396.08	3.00E-2	92.4	64.1	106	46	2434	2022			
19.000	62.336	7	1.00	431.23	3.00E-2	94.3	65.2	111	46	2655	2085			

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LIQUEFACTION ANALYSIS CALCULATION DETAILS

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Input File Name: G:\GS16\GS16-0107_Panama\Design & Analysis\LIQUEFACTION\16-0107-CPT1.liq
Title: 12870 Panama Street
Subtitle: CPT 1

Input Data:
Surface Elev.=0
Hole No.=CPT1
Depth of Hole=62.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.65 g
Earthquake Magnitude=6.63
No-Liquefiable Soils: CL, OL are Non-Liq. Soil
1. CPT Calulation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) ,   User= 1.1
   Plot two CSR (fs1=1, fs2=User)
10. Average two input data between two Depths: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf %	Gamma pcf	Fines %	D50 mm
0.16	0.00	0.00	100.00	120.00	NoLiq	0.50
0.66	0.00	0.00	100.00	120.00	NoLiq	0.50
1.15	0.00	0.00	100.00	120.00	NoLiq	0.50
1.64	0.00	0.00	100.00	120.00	NoLiq	0.50
2.13	0.00	0.00	100.00	120.00	NoLiq	0.50
2.62	0.00	0.00	100.00	120.00	NoLiq	0.50
3.12	0.00	0.00	100.00	120.00	NoLiq	0.50
3.61	0.00	0.00	100.00	120.00	NoLiq	0.50
4.10	0.00	0.00	100.00	120.00	NoLiq	0.50
4.59	0.00	0.00	100.00	120.00	NoLiq	0.50
5.09	17.00	0.68	3.98	120.00	NoLiq	0.50
5.58	14.61	0.75	5.12	120.00	NoLiq	0.50
6.07	13.77	0.82	5.99	120.00	NoLiq	0.50
6.56	17.87	0.98	5.47	120.00	NoLiq	0.50
7.05	25.82	1.05	4.09	120.00	NoLiq	0.50
7.55	59.28	0.84	1.42	120.00	NoLiq	0.50
8.04	89.39	0.84	0.94	120.00	NoLiq	0.50
8.53	37.75	0.82	2.19	120.00	NoLiq	0.50
9.02	18.65	0.54	2.87	120.00	NoLiq	0.50
9.51	13.85	0.51	3.69	120.00	NoLiq	0.50
10.00	48.62	0.90	1.84	120.00	0.00	0.50
10.49	36.41	1.00	2.74	120.00	0.00	0.50
10.99	18.48	0.55	2.98	120.00	0.00	0.50
11.48	46.37	0.33	0.71	120.00	0.00	0.50
11.97	21.83	0.50	2.30	120.00	0.00	0.50
12.46	13.63	0.23	1.71	120.00	0.00	0.50
12.95	13.55	0.31	2.31	120.00	0.00	0.50
13.45	8.87	0.35	3.98	120.00	0.00	0.50
13.94	16.84	0.29	1.70	120.00	0.00	0.50
14.43	8.39	0.26	3.05	120.00	0.00	0.50
14.92	5.83	0.31	5.37	120.00	0.00	0.50
15.41	9.01	0.43	4.73	120.00	NoLiq	0.50
15.91	8.81	0.36	4.04	120.00	NoLiq	0.50
16.40	13.21	0.39	2.98	120.00	NoLiq	0.50
16.89	14.80	0.41	2.78	120.00	NoLiq	0.50
17.38	23.64	0.67	2.84	120.00	NoLiq	0.50
17.88	19.74	0.48	2.43	120.00	NoLiq	0.50
18.37	11.73	0.38	3.26	120.00	NoLiq	0.50
18.86	23.64	0.67	2.82	120.00	NoLiq	0.50
19.35	24.00	0.89	3.71	120.00	NoLiq	0.50
19.84	70.24	1.17	1.67	120.00	NoLiq	0.50
20.34	53.59	0.94	1.76	120.00	0.00	0.50
20.83	80.44	1.18	1.47	120.00	0.00	0.50
21.32	130.10	0.65	0.50	120.00	0.00	0.50
21.81	122.60	0.77	0.63	120.00	0.00	0.50
22.30	128.00	0.99	0.78	120.00	0.00	0.50
22.80	156.20	0.67	0.43	120.00	0.00	0.50

23.29	153.30	0.60	0.39	120.00	0.00	0.50
23.78	204.10	0.92	0.45	120.00	0.00	0.50
24.27	248.70	1.66	0.67	120.00	0.00	0.50
24.77	510.00	2.97	0.58	120.00	0.00	0.50
25.26	622.50	3.13	0.50	120.00	0.00	0.50
25.75	636.80	1.31	0.21	120.00	0.00	0.50
26.24	805.50	2.74	0.34	120.00	0.00	0.50
26.73	476.30	2.20	0.46	120.00	0.00	0.50
27.23	604.00	2.65	0.44	120.00	0.00	0.50
27.72	551.10	3.45	0.63	120.00	0.00	0.50
28.21	497.80	2.75	0.55	120.00	0.00	0.50
28.70	531.80	1.79	0.34	120.00	0.00	0.50
29.19	345.50	0.82	0.24	120.00	0.00	0.50
29.69	355.40	2.41	0.68	120.00	0.00	0.50
30.18	442.00	3.31	0.75	120.00	0.00	0.50
30.67	545.70	2.84	0.52	120.00	0.00	0.50
31.16	645.60	3.73	0.58	120.00	0.00	0.50
31.66	518.10	3.88	0.75	120.00	0.00	0.50
32.15	510.80	3.21	0.63	120.00	0.00	0.50
32.64	430.30	1.35	0.31	120.00	0.00	0.50
33.13	605.90	2.38	0.39	120.00	0.00	0.50
33.62	660.00	3.56	0.54	120.00	0.00	0.50
34.12	529.50	2.02	0.38	120.00	0.00	0.50
34.61	526.50	2.46	0.47	120.00	0.00	0.50
35.10	486.40	2.26	0.47	120.00	0.00	0.50
35.59	538.40	3.11	0.58	120.00	0.00	0.50
36.08	590.70	2.19	0.37	120.00	0.00	0.50
36.58	547.70	1.63	0.30	120.00	0.00	0.50
37.07	499.70	2.61	0.52	120.00	0.00	0.50
37.56	526.40	1.95	0.37	120.00	0.00	0.50
38.05	450.70	1.94	0.43	120.00	0.00	0.50
38.54	548.30	1.01	0.18	120.00	0.00	0.50
39.04	405.50	0.82	0.20	120.00	0.00	0.50
39.53	420.60	1.94	0.46	120.00	0.00	0.50
40.02	414.60	1.72	0.41	120.00	0.00	0.50
40.51	450.10	1.57	0.35	120.00	0.00	0.50
41.01	446.90	1.55	0.35	120.00	0.00	0.50
41.50	244.00	0.82	0.34	120.00	0.00	0.50
41.99	570.20	1.60	0.28	120.00	0.00	0.50
42.48	473.60	2.41	0.51	120.00	0.00	0.50
42.97	429.20	3.62	0.84	120.00	0.00	0.50
43.47	258.70	3.41	1.32	120.00	0.00	0.50
43.96	126.40	2.23	1.76	120.00	0.00	0.50
44.45	38.89	0.81	2.09	120.00	0.00	0.50
44.94	41.71	1.66	3.97	120.00	0.00	0.50
45.43	438.60	2.22	0.51	120.00	0.00	0.50
45.93	441.40	3.20	0.73	120.00	0.00	0.50
46.42	471.60	2.44	0.52	120.00	0.00	0.50
46.91	465.40	2.07	0.44	120.00	0.00	0.50
47.40	443.20	2.50	0.56	120.00	0.00	0.50
47.90	444.40	2.68	0.60	120.00	0.00	0.50
48.39	436.70	2.72	0.62	120.00	0.00	0.50
48.88	470.70	2.33	0.50	120.00	0.00	0.50
49.37	443.30	2.75	0.62	120.00	0.00	0.50
49.86	472.40	1.35	0.28	120.00	0.00	0.50
50.36	540.60	1.86	0.34	120.00	0.00	0.50
50.85	541.80	2.25	0.42	120.00	0.00	0.50
51.34	602.90	1.23	0.20	120.00	0.00	0.50
51.83	522.90	2.75	0.53	120.00	0.00	0.50
52.32	408.60	0.96	0.23	120.00	0.00	0.50
52.82	337.80	2.26	0.67	120.00	0.00	0.50
53.31	364.40	2.24	0.61	120.00	0.00	0.50
53.80	358.00	1.99	0.55	120.00	0.00	0.50
54.29	357.10	0.90	0.25	120.00	0.00	0.50
54.79	389.60	1.68	0.43	120.00	0.00	0.50
55.28	389.80	1.24	0.32	120.00	0.00	0.50
55.77	400.60	2.10	0.53	120.00	0.00	0.50
56.26	407.70	2.91	0.71	120.00	0.00	0.50
56.75	400.60	1.63	0.41	120.00	0.00	0.50
57.25	397.20	1.50	0.38	120.00	0.00	0.50
57.74	417.50	1.49	0.36	120.00	0.00	0.50
58.23	389.40	1.59	0.41	120.00	0.00	0.50
58.72	424.80	1.83	0.43	120.00	0.00	0.50
59.21	428.60	2.17	0.51	120.00	0.00	0.50
59.71	464.10	2.61	0.56	120.00	0.00	0.50
60.20	517.80	3.35	0.65	120.00	0.00	0.50
60.69	536.70	1.50	0.28	120.00	0.00	0.50
61.18	505.70	1.34	0.27	120.00	0.00	0.50
61.67	576.80	1.90	0.33	120.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:
Calculation segment, dz=0.050 ft
User defined Print Interval, dp=0.50 ft

Peak Ground Acceleration (PGA), a_max = 0.65g

CSR Calculation:

Depth ft	gamma pcf	sigma atm	gamma' pcf	sigma' atm	rd	mZ g	a(z) g	CSR	x fs1	=CSRfs
0.16	120.00	0.009	120.00	0.009	1.00	0.000	0.650	0.42	1.00	0.42
0.66	120.00	0.037	120.00	0.037	1.00	0.000	0.650	0.42	1.00	0.42
1.16	120.00	0.066	120.00	0.066	1.00	0.000	0.650	0.42	1.00	0.42
1.66	120.00	0.094	120.00	0.094	1.00	0.000	0.650	0.42	1.00	0.42
2.16	120.00	0.122	120.00	0.122	0.99	0.000	0.650	0.42	1.00	0.42
2.66	120.00	0.151	120.00	0.151	0.99	0.000	0.650	0.42	1.00	0.42
3.16	120.00	0.179	120.00	0.179	0.99	0.000	0.650	0.42	1.00	0.42
3.66	120.00	0.208	120.00	0.208	0.99	0.000	0.650	0.42	1.00	0.42
4.16	120.00	0.236	120.00	0.236	0.99	0.000	0.650	0.42	1.00	0.42
4.66	120.00	0.264	120.00	0.264	0.99	0.000	0.650	0.42	1.00	0.42
5.16	120.00	0.293	57.60	0.288	0.99	0.000	0.650	0.42	1.00	0.42
5.66	120.00	0.321	57.60	0.302	0.99	0.000	0.650	0.44	1.00	0.44
6.16	120.00	0.349	57.60	0.315	0.99	0.000	0.650	0.46	1.00	0.46
6.66	120.00	0.378	57.60	0.329	0.98	0.000	0.650	0.48	1.00	0.48
7.16	120.00	0.406	57.60	0.343	0.98	0.000	0.650	0.49	1.00	0.49
7.66	120.00	0.434	57.60	0.356	0.98	0.000	0.650	0.51	1.00	0.51
8.16	120.00	0.463	57.60	0.370	0.98	0.000	0.650	0.52	1.00	0.52
8.66	120.00	0.491	57.60	0.383	0.98	0.000	0.650	0.53	1.00	0.53
9.16	120.00	0.519	57.60	0.397	0.98	0.000	0.650	0.54	1.00	0.54
9.66	120.00	0.548	57.60	0.411	0.98	0.000	0.650	0.55	1.00	0.55
10.16	120.00	0.576	57.60	0.424	0.98	0.000	0.650	0.56	1.00	0.56
10.66	120.00	0.604	57.60	0.438	0.98	0.000	0.650	0.57	1.00	0.57
11.16	120.00	0.633	57.60	0.451	0.97	0.000	0.650	0.58	1.00	0.58
11.66	120.00	0.661	57.60	0.465	0.97	0.000	0.650	0.58	1.00	0.58
12.16	120.00	0.690	57.60	0.479	0.97	0.000	0.650	0.59	1.00	0.59
12.66	120.00	0.718	57.60	0.492	0.97	0.000	0.650	0.60	1.00	0.60
13.16	120.00	0.746	57.60	0.506	0.97	0.000	0.650	0.60	1.00	0.60
13.66	120.00	0.775	57.60	0.520	0.97	0.000	0.650	0.61	1.00	0.61
14.16	120.00	0.803	57.60	0.533	0.97	0.000	0.650	0.62	1.00	0.62
14.66	120.00	0.831	57.60	0.547	0.97	0.000	0.650	0.62	1.00	0.62
15.16	120.00	0.860	57.60	0.560	0.96	0.000	0.650	0.63	1.00	0.63
15.66	120.00	0.888	57.60	0.574	0.96	0.000	0.650	0.63	1.00	0.63
16.16	120.00	0.916	57.60	0.588	0.96	0.000	0.650	0.63	1.00	0.63
16.66	120.00	0.945	57.60	0.601	0.96	0.000	0.650	0.64	1.00	0.64
17.16	120.00	0.973	57.60	0.615	0.96	0.000	0.650	0.64	1.00	0.64
17.66	120.00	1.001	57.60	0.628	0.96	0.000	0.650	0.65	1.00	0.65
18.16	120.00	1.030	57.60	0.642	0.96	0.000	0.650	0.65	1.00	0.65
18.66	120.00	1.058	57.60	0.656	0.96	0.000	0.650	0.65	1.00	0.65
19.16	120.00	1.086	57.60	0.669	0.96	0.000	0.650	0.66	1.00	0.66
19.66	120.00	1.115	57.60	0.683	0.95	0.000	0.650	0.66	1.00	0.66
20.16	120.00	1.143	57.60	0.696	0.95	0.000	0.650	0.66	1.00	0.66
20.66	120.00	1.172	57.60	0.710	0.95	0.000	0.650	0.66	1.00	0.66
21.16	120.00	1.200	57.60	0.724	0.95	0.000	0.650	0.67	1.00	0.67
21.66	120.00	1.228	57.60	0.737	0.95	0.000	0.650	0.67	1.00	0.67
22.16	120.00	1.257	57.60	0.751	0.95	0.000	0.650	0.67	1.00	0.67
22.66	120.00	1.285	57.60	0.765	0.95	0.000	0.650	0.67	1.00	0.67
23.16	120.00	1.313	57.60	0.778	0.95	0.000	0.650	0.67	1.00	0.67
23.66	120.00	1.342	57.60	0.792	0.94	0.000	0.650	0.68	1.00	0.68
24.16	120.00	1.370	57.60	0.805	0.94	0.000	0.650	0.68	1.00	0.68
24.66	120.00	1.398	57.60	0.819	0.94	0.000	0.650	0.68	1.00	0.68
25.16	120.00	1.427	57.60	0.833	0.94	0.000	0.650	0.68	1.00	0.68
25.66	120.00	1.455	57.60	0.846	0.94	0.000	0.650	0.68	1.00	0.68
26.16	120.00	1.483	57.60	0.860	0.94	0.000	0.650	0.68	1.00	0.68
26.66	120.00	1.512	57.60	0.873	0.94	0.000	0.650	0.69	1.00	0.69
27.16	120.00	1.540	57.60	0.887	0.94	0.000	0.650	0.69	1.00	0.69
27.66	120.00	1.568	57.60	0.901	0.94	0.000	0.650	0.69	1.00	0.69
28.16	120.00	1.597	57.60	0.914	0.93	0.000	0.650	0.69	1.00	0.69
28.66	120.00	1.625	57.60	0.928	0.93	0.000	0.650	0.69	1.00	0.69
29.16	120.00	1.654	57.60	0.941	0.93	0.000	0.650	0.69	1.00	0.69
29.66	120.00	1.682	57.60	0.955	0.93	0.000	0.650	0.69	1.00	0.69
30.16	120.00	1.710	57.60	0.969	0.93	0.000	0.650	0.69	1.00	0.69
30.66	120.00	1.739	57.60	0.982	0.92	0.000	0.650	0.69	1.00	0.69
31.16	120.00	1.767	57.60	0.996	0.92	0.000	0.650	0.69	1.00	0.69
31.66	120.00	1.795	57.60	1.009	0.92	0.000	0.650	0.69	1.00	0.69
32.16	120.00	1.824	57.60	1.023	0.91	0.000	0.650	0.69	1.00	0.69
32.66	120.00	1.852	57.60	1.037	0.91	0.000	0.650	0.69	1.00	0.69
33.16	120.00	1.880	57.60	1.050	0.90	0.000	0.650	0.68	1.00	0.68
33.66	120.00	1.909	57.60	1.064	0.90	0.000	0.650	0.68	1.00	0.68
34.16	120.00	1.937	57.60	1.078	0.90	0.000	0.650	0.68	1.00	0.68
34.66	120.00	1.965	57.60	1.091	0.89	0.000	0.650	0.68	1.00	0.68
35.16	120.00	1.994	57.60	1.105	0.89	0.000	0.650	0.68	1.00	0.68

35.66	120.00	2.022	57.60	1.118	0.88	0.000	0.650	0.68	1.00	0.68
36.16	120.00	2.050	57.60	1.132	0.88	0.000	0.650	0.67	1.00	0.67
36.66	120.00	2.079	57.60	1.146	0.88	0.000	0.650	0.67	1.00	0.67
37.16	120.00	2.107	57.60	1.159	0.87	0.000	0.650	0.67	1.00	0.67
37.66	120.00	2.136	57.60	1.173	0.87	0.000	0.650	0.67	1.00	0.67
38.16	120.00	2.164	57.60	1.186	0.86	0.000	0.650	0.67	1.00	0.67
38.66	120.00	2.192	57.60	1.200	0.86	0.000	0.650	0.66	1.00	0.66
39.16	120.00	2.221	57.60	1.214	0.86	0.000	0.650	0.66	1.00	0.66
39.66	120.00	2.249	57.60	1.227	0.85	0.000	0.650	0.66	1.00	0.66
40.16	120.00	2.277	57.60	1.241	0.85	0.000	0.650	0.66	1.00	0.66
40.66	120.00	2.306	57.60	1.254	0.84	0.000	0.650	0.65	1.00	0.65
41.16	120.00	2.334	57.60	1.268	0.84	0.000	0.650	0.65	1.00	0.65
41.66	120.00	2.362	57.60	1.282	0.83	0.000	0.650	0.65	1.00	0.65
42.16	120.00	2.391	57.60	1.295	0.83	0.000	0.650	0.65	1.00	0.65
42.66	120.00	2.419	57.60	1.309	0.83	0.000	0.650	0.65	1.00	0.65
43.16	120.00	2.447	57.60	1.322	0.82	0.000	0.650	0.64	1.00	0.64
43.66	120.00	2.476	57.60	1.336	0.82	0.000	0.650	0.64	1.00	0.64
44.16	120.00	2.504	57.60	1.350	0.81	0.000	0.650	0.64	1.00	0.64
44.66	120.00	2.532	57.60	1.363	0.81	0.000	0.650	0.64	1.00	0.64
45.16	120.00	2.561	57.60	1.377	0.81	0.000	0.650	0.63	1.00	0.63
45.66	120.00	2.589	57.60	1.391	0.80	0.000	0.650	0.63	1.00	0.63
46.16	120.00	2.618	57.60	1.404	0.80	0.000	0.650	0.63	1.00	0.63
46.66	120.00	2.646	57.60	1.418	0.79	0.000	0.650	0.63	1.00	0.63
47.16	120.00	2.674	57.60	1.431	0.79	0.000	0.650	0.62	1.00	0.62
47.66	120.00	2.703	57.60	1.445	0.79	0.000	0.650	0.62	1.00	0.62
48.16	120.00	2.731	57.60	1.459	0.78	0.000	0.650	0.62	1.00	0.62
48.66	120.00	2.759	57.60	1.472	0.78	0.000	0.650	0.62	1.00	0.62
49.16	120.00	2.788	57.60	1.486	0.77	0.000	0.650	0.61	1.00	0.61
49.66	120.00	2.816	57.60	1.499	0.77	0.000	0.650	0.61	1.00	0.61
50.16	120.00	2.844	57.60	1.513	0.77	0.000	0.650	0.61	1.00	0.61
50.66	120.00	2.873	57.60	1.527	0.76	0.000	0.650	0.61	1.00	0.61
51.16	120.00	2.901	57.60	1.540	0.76	0.000	0.650	0.60	1.00	0.60
51.66	120.00	2.929	57.60	1.554	0.75	0.000	0.650	0.60	1.00	0.60
52.16	120.00	2.958	57.60	1.567	0.75	0.000	0.650	0.60	1.00	0.60
52.66	120.00	2.986	57.60	1.581	0.75	0.000	0.650	0.59	1.00	0.59
53.16	120.00	3.014	57.60	1.595	0.74	0.000	0.650	0.59	1.00	0.59
53.66	120.00	3.043	57.60	1.608	0.74	0.000	0.650	0.59	1.00	0.59
54.16	120.00	3.071	57.60	1.622	0.73	0.000	0.650	0.59	1.00	0.59
54.66	120.00	3.100	57.60	1.635	0.73	0.000	0.650	0.58	1.00	0.58
55.16	120.00	3.128	57.60	1.649	0.73	0.000	0.650	0.58	1.00	0.58
55.66	120.00	3.156	57.60	1.663	0.72	0.000	0.650	0.58	1.00	0.58
56.16	120.00	3.185	57.60	1.676	0.72	0.000	0.650	0.58	1.00	0.58
56.66	120.00	3.213	57.60	1.690	0.71	0.000	0.650	0.57	1.00	0.57
57.16	120.00	3.241	57.60	1.704	0.71	0.000	0.650	0.57	1.00	0.57
57.66	120.00	3.270	57.60	1.717	0.70	0.000	0.650	0.57	1.00	0.57
58.16	120.00	3.298	57.60	1.731	0.70	0.000	0.650	0.56	1.00	0.56
58.66	120.00	3.326	57.60	1.744	0.70	0.000	0.650	0.56	1.00	0.56
59.16	120.00	3.355	57.60	1.758	0.69	0.000	0.650	0.56	1.00	0.56
59.66	120.00	3.383	57.60	1.772	0.69	0.000	0.650	0.56	1.00	0.56
60.16	120.00	3.411	57.60	1.785	0.68	0.000	0.650	0.55	1.00	0.55
60.66	120.00	3.440	57.60	1.799	0.68	0.000	0.650	0.55	1.00	0.55
61.16	120.00	3.468	57.60	1.812	0.68	0.000	0.650	0.55	1.00	0.55
61.66	120.00	3.496	57.60	1.826	0.67	0.000	0.650	0.54	1.00	0.54

CSR is based on water table at 5.00 during earthquake

CRR Calculation from CPT data, using Modify Robertson's Method:
(Fines content is determined by qc and fric.)

Depth	qc	fric.	n	Q	Rf	Ic	Cq	Fines	Kc	qc1n	qc1f	CRR7.5
ft	atm	atm						%		atm	atm	
0.16			1.00	1.00E-4	0.00	7.97						
0.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
0.66			1.00	1.00E-4	0.00	7.97						
0.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.16			1.00	1.00E-4	0.00	7.97						
1.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.66			1.00	1.00E-4	0.00	7.97						
1.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.16			1.00	1.00E-4	0.00	7.97						
2.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.66			1.00	1.00E-4	0.00	7.97						
2.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.16			1.00	1.00E-4	0.00	7.97						
3.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.66			1.00	1.00E-4	0.00	7.97						
3.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.16			1.00	1.00E-4	0.00	7.97						
4.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.66			1.00	1.00E-4	0.00	7.97						
4.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
5.16			1.00	5.55E1	4.59	2.55						

5.16	16.54	0.75	1.00	5.55E1	4.59	2.55	1.00	NoLiq	1.00	16.54	16.54	2.08
5.66			1.00	4.35E1	5.56	2.69						
5.66	14.29	0.78	1.00	4.35E1	5.56	2.69	1.00	NoLiq	1.00	14.29	14.29	2.08
6.16			1.00	3.99E1	6.00	2.74						
6.16	14.28	0.84	1.00	3.99E1	6.00	2.74	1.00	NoLiq	1.00	14.28	14.28	2.08
6.66			1.00	4.79E1	5.57	2.66						
6.66	18.46	1.01	1.00	4.79E1	5.57	2.66	1.00	NoLiq	1.00	18.46	18.46	2.08
7.16			1.00	7.61E1	3.27	2.35						
7.16	31.31	1.01	1.00	7.61E1	3.27	2.35	1.00	NoLiq	1.00	31.31	31.31	2.08
7.66			1.00	1.47E2	1.19	1.84						
7.66	64.19	0.76	1.00	1.47E2	1.19	1.84	1.00	NoLiq	1.00	64.19	64.19	2.08
8.16			1.00	1.78E2	1.06	1.74						
8.16	83.02	0.87	1.00	1.78E2	1.06	1.74	1.00	NoLiq	1.00	83.02	83.02	2.08
8.66			1.00	5.77E1	2.31	2.33						
8.66	28.82	0.65	1.00	5.77E1	2.31	2.33	1.00	NoLiq	1.00	28.82	28.82	2.08
9.16			1.00	2.88E1	3.30	2.66						
9.16	15.50	0.49	1.00	2.88E1	3.30	2.66	1.00	NoLiq	1.00	15.50	15.50	2.08
9.66			1.00	4.05E1	3.07	2.53						
9.66	22.74	0.68	1.00	4.05E1	3.07	2.53	1.00	NoLiq	1.00	22.74	22.74	2.08
10.16			1.00	8.47E1	1.78	2.13						
10.16			0.50	6.48E1	1.78	2.22						
10.16	49.02	0.86	0.50	6.48E1	1.78	2.22	1.32	19.57	0.39	64.83	106.08	0.19
10.66			1.00	4.43E1	3.56	2.54						
10.66			0.50	3.47E1	3.56	2.62						
10.66			0.70	3.86E1	3.56	2.59						
10.66	26.51	0.92	0.70	3.86E1	3.56	2.59	1.45	34.68	0.79	38.57	185.88	0.68
11.16			1.00	2.27E1	3.00	2.71						
11.16	14.24	0.41	1.00	2.27E1	3.00	2.71	1.00	NoLiq	1.00	14.24	14.24	2.08
11.66			1.00	5.19E1	1.03	2.14						
11.66			0.50	4.14E1	1.03	2.22						
11.66	32.44	0.33	0.50	4.14E1	1.03	2.22	1.28	19.84	0.40	41.44	68.64	0.11
12.16			1.00	3.59E1	1.67	2.40						
12.16			0.50	2.93E1	1.67	2.47						
12.16	23.15	0.37	0.50	2.93E1	1.67	2.47	1.26	29.30	0.65	29.26	83.33	0.13
12.66			1.00	1.94E1	2.33	2.70						
12.66	13.12	0.29	1.00	1.94E1	2.33	2.70	1.00	NoLiq	1.00	13.12	13.12	2.08
13.16			1.00	1.47E1	2.88	2.85						
13.16	10.35	0.28	1.00	1.47E1	2.88	2.85	1.00	NoLiq	1.00	10.35	10.35	2.08
13.66			1.00	2.35E1	2.37	2.64						
13.66	16.48	0.37	1.00	2.35E1	2.37	2.64	1.00	NoLiq	1.00	16.48	16.48	2.08
14.16			1.00	1.45E1	2.72	2.84						
14.16	10.65	0.27	1.00	1.45E1	2.72	2.84	1.00	NoLiq	1.00	10.65	10.65	2.08
14.66			1.00	9.09E0	4.89	3.15						
14.66	7.14	0.31	1.00	9.09E0	4.89	3.15	1.00	NoLiq	1.00	7.14	7.14	2.08
15.16			1.00	8.61E0	5.04	3.18						
15.16	6.96	0.31	1.00	8.61E0	5.04	3.18	1.00	NoLiq	1.00	6.96	6.96	2.08
15.66			1.00	1.14E1	5.21	3.10						
15.66	9.09	0.43	1.00	1.14E1	5.21	3.10	1.00	NoLiq	1.00	9.09	9.09	2.08
16.16			1.00	1.38E1	2.95	2.88						
16.16	11.09	0.30	1.00	1.38E1	2.95	2.88	1.00	NoLiq	1.00	11.09	11.09	2.08
16.66			1.00	2.23E1	2.66	2.68						
16.66	17.61	0.44	1.00	2.23E1	2.66	2.68	1.00	NoLiq	1.00	17.61	17.61	2.08
17.16			1.00	1.68E1	3.80	2.88						
17.16	13.80	0.49	1.00	1.68E1	3.80	2.88	1.00	NoLiq	1.00	13.80	13.80	2.08
17.66			1.00	3.93E1	1.90	2.40						
17.66	31.52	0.58	1.00	3.93E1	1.90	2.40	1.00	NoLiq	1.00	31.52	31.52	2.08
18.16			1.00	1.57E1	2.97	2.83						
18.16	13.43	0.37	1.00	1.57E1	2.97	2.83	1.00	NoLiq	1.00	13.43	13.43	2.08
18.66			1.00	2.30E1	3.26	2.73						
18.66	19.49	0.60	1.00	2.30E1	3.26	2.73	1.00	NoLiq	1.00	19.49	19.49	2.08
19.16			1.00	3.22E1	3.07	2.60						
19.16	27.39	0.81	1.00	3.22E1	3.07	2.60	1.00	NoLiq	1.00	27.39	27.39	2.08
19.66			1.00	5.72E1	2.93	2.40						
19.66	48.60	1.39	1.00	5.72E1	2.93	2.40	1.00	NoLiq	1.00	48.60	48.60	2.08
20.16			1.00	7.44E1	1.48	2.12						
20.16			0.50	6.96E1	1.48	2.14						
20.16	63.95	0.93	0.50	6.96E1	1.48	2.14	1.09	17.03	0.32	69.61	102.56	0.18
20.66			1.00	7.12E1	1.97	2.22						
20.66			0.50	6.72E1	1.97	2.23						
20.66	62.23	1.20	0.50	6.72E1	1.97	2.23	1.08	20.14	0.40	67.20	112.79	0.21
21.16			1.00	1.29E2	0.98	1.82						
21.16			0.50	1.21E2	0.98	1.84						
21.16	113.40	1.09	0.50	1.21E2	0.98	1.84	1.07	8.98	0.11	121.50	135.93	0.31
21.66			1.00	1.55E2	0.49	1.57						
21.66			0.50	1.47E2	0.49	1.59						
21.66	138.45	0.68	0.50	1.47E2	0.49	1.59	1.06	4.21	0.00	147.19	147.19	0.38
22.16			1.00	1.25E2	0.94	1.82						
22.16			0.50	1.20E2	0.94	1.83						
22.16	113.64	1.05	0.50	1.20E2	0.94	1.83	1.06	8.81	0.10	119.90	133.49	0.30
22.66			1.00	1.73E2	0.51	1.54						
22.66			0.50	1.66E2	0.51	1.55						
22.66	158.67	0.80	0.50	1.66E2	0.51	1.55	1.05	3.64	0.00	166.16	166.16	0.51

23.16			1.00	1.73E2	0.33	1.43						
23.16			0.50	1.68E2	0.33	1.45						
23.16	161.72	0.53	0.50	1.68E2	0.33	1.45	1.04	2.10	0.00	168.09	168.09	0.52
23.66			1.00	1.83E2	0.51	1.52						
23.66			0.50	1.79E2	0.51	1.53						
23.66	173.48	0.88	0.50	1.79E2	0.51	1.53	1.03	3.28	0.00	179.01	179.01	0.61
24.16			1.00	2.54E2	0.52	1.42						
24.16			0.50	2.49E2	0.52	1.43						
24.16	242.99	1.26	0.50	2.49E2	0.52	1.43	1.02	1.85	0.00	248.94	248.94	1.51
24.66			1.00	4.67E2	0.61	1.28						
24.66			0.50	4.60E2	0.61	1.29						
24.66	452.69	2.74	0.50	4.60E2	0.61	1.29	1.02	0.28	0.00	460.50	460.50	2.08
25.16			1.00	6.18E2	0.49	1.13						
25.16			0.50	6.13E2	0.49	1.13						
25.16	607.13	2.94	0.50	6.13E2	0.49	1.13	1.01	0.00	0.00	500.00	500.00	2.08
25.66			1.00	6.38E2	0.20	0.85						
25.66			0.50	6.38E2	0.20	0.85						
25.66	635.67	1.30	0.50	6.38E2	0.20	0.85	1.00	0.00	0.00	500.00	500.00	2.08
26.16			1.00	7.97E2	0.35	0.95						
26.16			0.50	8.01E2	0.35	0.95						
26.16	804.05	2.78	0.50	8.01E2	0.35	0.95	1.00	0.00	0.00	500.00	500.00	2.08
26.66			1.00	4.90E2	0.41	1.14						
26.66			0.50	4.97E2	0.41	1.14						
26.66	501.85	2.07	0.50	4.97E2	0.41	1.14	0.99	0.00	0.00	496.71	496.71	2.08
27.16			1.00	5.74E2	0.38	1.07						
27.16			0.50	5.85E2	0.38	1.06						
27.16	595.17	2.26	0.50	5.85E2	0.38	1.06	0.98	0.00	0.00	500.00	500.00	2.08
27.66			1.00	5.64E2	0.55	1.20						
27.66			0.50	5.79E2	0.55	1.19						
27.66	592.98	3.25	0.50	5.79E2	0.55	1.19	0.98	0.00	0.00	500.00	500.00	2.08
28.16			1.00	4.96E2	0.54	1.23						
28.16			0.50	5.13E2	0.54	1.22						
28.16	528.29	2.85	0.50	5.13E2	0.54	1.22	0.97	0.00	0.00	500.00	500.00	2.08
28.66			1.00	4.87E2	0.36	1.11						
28.66			0.50	5.07E2	0.36	1.09						
28.66	525.35	1.91	0.50	5.07E2	0.36	1.09	0.96	0.00	0.00	500.00	500.00	2.08
29.16			1.00	3.25E2	0.24	1.13						
29.16			0.50	3.40E2	0.24	1.11						
29.16	355.19	0.84	0.50	3.40E2	0.24	1.11	0.96	0.00	0.00	340.39	340.39	2.08
29.66			1.00	3.21E2	0.72	1.45						
29.66			0.50	3.39E2	0.72	1.43						
29.66	355.99	2.56	0.50	3.39E2	0.72	1.43	0.95	1.90	0.00	339.04	339.04	2.08
30.16			1.00	3.89E2	0.74	1.40						
30.16			0.50	4.13E2	0.74	1.38						
30.16	435.98	3.20	0.50	4.13E2	0.74	1.38	0.95	1.32	0.00	412.69	412.69	2.08
30.66			1.00	4.80E2	0.53	1.23						
30.66			0.50	5.12E2	0.53	1.21						
30.66	544.51	2.87	0.50	5.12E2	0.53	1.21	0.94	0.00	0.00	500.00	500.00	2.08
31.16			1.00	5.63E2	0.58	1.22						
31.16			0.50	6.04E2	0.58	1.20						
31.16	645.63	3.74	0.50	6.04E2	0.58	1.20	0.94	0.00	0.00	500.00	500.00	2.08
31.66			1.00	4.46E2	0.75	1.37						
31.66			0.50	4.82E2	0.75	1.35						
31.66	518.14	3.88	0.50	4.82E2	0.75	1.35	0.93	0.93	0.00	481.72	481.72	2.08
32.16			1.00	4.31E2	0.62	1.31						
32.16			0.50	4.68E2	0.62	1.29						
32.16	505.81	3.14	0.50	4.68E2	0.62	1.29	0.92	0.32	0.00	467.52	467.52	2.08
32.66			1.00	3.64E2	0.31	1.16						
32.66			0.50	3.98E2	0.31	1.13						
32.66	432.79	1.35	0.50	3.98E2	0.31	1.13	0.92	0.00	0.00	397.72	397.72	2.08
33.16			1.00	5.11E2	0.42	1.14						
33.16			0.50	5.61E2	0.42	1.11						
33.16	614.27	2.57	0.50	5.61E2	0.42	1.11	0.91	0.00	0.00	500.00	500.00	2.08
33.66			1.00	5.46E2	0.53	1.20						
33.66			0.50	6.02E2	0.53	1.17						
33.66	662.71	3.52	0.50	6.02E2	0.53	1.17	0.91	0.00	0.00	500.00	500.00	2.08
34.16			1.00	4.31E2	0.37	1.15						
34.16			0.50	4.78E2	0.37	1.12						
34.16	529.30	1.95	0.50	4.78E2	0.37	1.12	0.90	0.00	0.00	478.24	478.24	2.08
34.66			1.00	4.25E2	0.61	1.31						
34.66			0.50	4.75E2	0.61	1.28						
34.66	528.30	3.24	0.50	4.75E2	0.61	1.28	0.90	0.24	0.00	474.71	474.71	2.08
35.16			1.00	3.81E2	0.49	1.27						
35.16			0.50	4.29E2	0.49	1.24						
35.16	479.60	2.33	0.50	4.29E2	0.49	1.24	0.89	0.00	0.00	428.60	428.60	2.08
35.66			1.00	3.91E2	0.56	1.31						
35.66			0.50	4.41E2	0.56	1.27						
35.66	496.51	2.76	0.50	4.41E2	0.56	1.27	0.89	0.12	0.00	441.32	441.32	2.08
36.16			1.00	4.38E2	0.56	1.27						
36.16			0.50	4.98E2	0.56	1.24						
36.16	562.79	3.12	0.50	4.98E2	0.56	1.24	0.88	0.00	0.00	497.56	497.56	2.08
36.66			1.00	4.01E2	0.30	1.11						

36.66			0.50	4.58E2	0.30	1.07						
36.66	520.94	1.55	0.50	4.58E2	0.30	1.07	0.88	0.00	0.00	458.13	458.13	2.08
37.16			1.00	3.86E2	0.60	1.33						
37.16			0.50	4.43E2	0.60	1.29						
37.16	506.82	3.01	0.50	4.43E2	0.60	1.29	0.87	0.32	0.00	443.39	443.39	2.08
37.66			1.00	4.03E2	0.39	1.19						
37.66			0.50	4.65E2	0.39	1.14						
37.66	534.69	2.09	0.50	4.65E2	0.39	1.14	0.87	0.00	0.00	465.35	465.35	2.08
38.16			1.00	3.68E2	0.52	1.30						
38.16			0.50	4.27E2	0.52	1.26						
38.16	492.71	2.56	0.50	4.27E2	0.52	1.26	0.87	0.00	0.00	426.62	426.62	2.08
38.66			1.00	3.62E2	0.22	1.07						
38.66			0.50	4.22E2	0.22	1.02						
38.66	489.65	1.07	0.50	4.22E2	0.22	1.02	0.86	0.00	0.00	421.82	421.82	2.08
39.16			1.00	2.94E2	0.29	1.21						
39.16			0.50	3.45E2	0.29	1.15						
39.16	401.98	1.15	0.50	3.45E2	0.29	1.15	0.86	0.00	0.00	344.57	344.57	2.08
39.66			1.00	3.10E2	0.39	1.27						
39.66			0.50	3.65E2	0.39	1.22						
39.66	428.14	1.68	0.50	3.65E2	0.39	1.22	0.85	0.00	0.00	365.16	365.16	2.08
40.16			1.00	3.05E2	0.32	1.22						
40.16			0.50	3.61E2	0.32	1.16						
40.16	425.86	1.34	0.50	3.61E2	0.32	1.16	0.85	0.00	0.00	361.43	361.43	2.08
40.66			1.00	3.27E2	0.36	1.23						
40.66			0.50	3.90E2	0.36	1.17						
40.66	461.19	1.65	0.50	3.90E2	0.36	1.17	0.84	0.00	0.00	389.52	389.52	2.08
41.16			1.00	3.02E2	0.32	1.23						
41.16			0.50	3.61E2	0.32	1.17						
41.16	429.50	1.38	0.50	3.61E2	0.32	1.17	0.84	0.00	0.00	361.01	361.01	2.08
41.66			1.00	1.68E2	0.67	1.63						
41.66			0.50	2.03E2	0.67	1.56						
41.66	242.30	1.61	0.50	2.03E2	0.67	1.56	0.84	3.79	0.00	202.69	202.69	0.85
42.16			1.00	3.29E2	0.39	1.25						
42.16			0.50	3.97E2	0.39	1.19						
42.16	476.90	1.83	0.50	3.97E2	0.39	1.19	0.83	0.00	0.00	397.04	397.04	2.08
42.66			1.00	3.28E2	0.85	1.49						
42.66			0.50	3.98E2	0.85	1.44						
42.66	480.20	4.06	0.50	3.98E2	0.85	1.44	0.83	2.04	0.00	397.92	397.92	2.08
43.16			1.00	2.70E2	0.83	1.54						
43.16			0.50	3.29E2	0.83	1.48						
43.16	399.03	3.29	0.50	3.29E2	0.83	1.48	0.82	2.62	0.00	329.12	329.12	2.08
43.66			1.00	1.45E2	1.56	1.93						
43.66			0.50	1.78E2	1.56	1.87						
43.66	217.37	3.34	0.50	1.78E2	1.56	1.87	0.82	9.57	0.12	178.47	203.27	0.86
44.16			1.00	4.33E1	2.74	2.47						
44.16			0.50	5.51E1	2.74	2.40						
44.16	67.39	1.78	0.50	5.51E1	2.74	2.40	0.82	26.22	0.57	55.08	127.04	0.27
44.66			1.00	2.43E1	2.48	2.64						
44.66	39.25	0.91	1.00	2.43E1	2.48	2.64	1.00	NoLiq	1.00	39.25	39.25	2.08
45.16			1.00	1.14E2	0.86	1.82						
45.16			0.50	1.43E2	0.86	1.75						
45.16	176.50	1.49	0.50	1.43E2	0.86	1.75	0.81	7.07	0.06	142.95	151.30	0.40
45.66			1.00	3.12E2	0.61	1.40						
45.66			0.50	3.89E2	0.61	1.34						
45.66	482.59	2.94	0.50	3.89E2	0.61	1.34	0.81	0.80	0.00	389.14	389.14	2.08
46.16			1.00	2.93E2	0.67	1.45						
46.16			0.50	3.67E2	0.67	1.38						
46.16	456.91	3.04	0.50	3.67E2	0.67	1.38	0.80	1.33	0.00	366.81	366.81	2.08
46.66			1.00	2.98E2	0.42	1.30						
46.66			0.50	3.75E2	0.42	1.23						
46.66	469.28	1.96	0.50	3.75E2	0.42	1.23	0.80	0.00	0.00	375.10	375.10	2.08
47.16			1.00	2.92E2	0.47	1.35						
47.16			0.50	3.69E2	0.47	1.27						
47.16	464.20	2.19	0.50	3.69E2	0.47	1.27	0.80	0.13	0.00	369.44	369.44	2.08
47.66			1.00	2.83E2	0.55	1.40						
47.66			0.50	3.59E2	0.55	1.32						
47.66	453.06	2.46	0.50	3.59E2	0.55	1.32	0.79	0.67	0.00	359.03	359.03	2.08
48.16			1.00	2.67E2	0.64	1.47						
48.16			0.50	3.40E2	0.64	1.39						
48.16	431.16	2.76	0.50	3.40E2	0.64	1.39	0.79	1.43	0.00	340.22	340.22	2.08
48.66			1.00	2.79E2	0.57	1.42						
48.66			0.50	3.57E2	0.57	1.34						
48.66	454.80	2.59	0.50	3.57E2	0.57	1.34	0.79	0.83	0.00	357.37	357.37	2.08
49.16			1.00	2.88E2	0.50	1.36						
49.16			0.50	3.70E2	0.50	1.29						
49.16	473.19	2.34	0.50	3.70E2	0.50	1.29	0.78	0.27	0.00	370.26	370.26	2.08
49.66			1.00	2.72E2	0.33	1.27						
49.66			0.50	3.51E2	0.33	1.18						
49.66	451.04	1.48	0.50	3.51E2	0.33	1.18	0.78	0.00	0.00	351.48	351.48	2.08
50.16			1.00	3.12E2	0.33	1.23						
50.16			0.50	4.04E2	0.33	1.14						
50.16	520.65	1.72	0.50	4.04E2	0.33	1.14	0.78	0.00	0.00	404.05	404.05	2.08

50.66			1.00	3.26E2	0.40	1.26						
50.66			0.50	4.24E2	0.40	1.17						
50.66	548.10	2.16	0.50	4.24E2	0.40	1.17	0.77	0.00	0.00	423.62	423.62	2.08
51.16			1.00	3.47E2	0.16	1.02						
51.16			0.50	4.53E2	0.16	0.92						
51.16	588.67	0.94	0.50	4.53E2	0.16	0.92	0.77	0.00	0.00	453.14	453.14	2.08
51.66			1.00	3.37E2	0.47	1.30						
51.66			0.50	4.42E2	0.47	1.22						
51.66	576.96	2.70	0.50	4.42E2	0.47	1.22	0.77	0.00	0.00	442.35	442.35	2.08
52.16			1.00	2.50E2	0.22	1.21						
52.16			0.50	3.30E2	0.22	1.10						
52.16	431.93	0.94	0.50	3.30E2	0.22	1.10	0.76	0.00	0.00	329.84	329.84	2.08
52.66			1.00	2.03E2	0.55	1.51						
52.66			0.50	2.69E2	0.55	1.41						
52.66	353.29	1.92	0.50	2.69E2	0.55	1.41	0.76	1.71	0.00	268.72	268.72	1.88
53.16			1.00	1.98E2	0.66	1.57						
53.16			0.50	2.63E2	0.66	1.48						
53.16	347.49	2.28	0.50	2.63E2	0.66	1.48	0.76	2.53	0.00	263.27	263.27	1.78
53.66			1.00	2.06E2	0.59	1.53						
53.66			0.50	2.75E2	0.59	1.43						
53.66	363.88	2.15	0.50	2.75E2	0.59	1.43	0.75	1.93	0.00	274.62	274.62	2.01
54.16			1.00	2.03E2	0.54	1.50						
54.16			0.50	2.72E2	0.54	1.41						
54.16	361.59	1.92	0.50	2.72E2	0.54	1.41	0.75	1.59	0.00	271.84	271.84	1.95
54.66			1.00	2.06E2	0.38	1.41						
54.66			0.50	2.78E2	0.38	1.30						
54.66	371.17	1.41	0.50	2.78E2	0.38	1.30	0.75	0.43	0.00	277.98	277.98	2.08
55.16			1.00	2.23E2	0.25	1.28						
55.16			0.50	3.01E2	0.25	1.17						
55.16	403.06	1.00	0.50	3.01E2	0.25	1.17	0.75	0.00	0.00	300.71	300.71	2.08
55.66			1.00	2.17E2	0.47	1.44						
55.66			0.50	2.94E2	0.47	1.34						
55.66	395.42	1.86	0.50	2.94E2	0.47	1.34	0.74	0.87	0.00	293.90	293.90	2.08
56.16			1.00	2.21E2	0.69	1.54						
56.16			0.50	3.00E2	0.69	1.45						
56.16	405.37	2.76	0.50	3.00E2	0.69	1.45	0.74	2.15	0.00	300.17	300.17	2.08
56.66			1.00	2.16E2	0.53	1.48						
56.66			0.50	2.95E2	0.53	1.38						
56.66	399.86	2.11	0.50	2.95E2	0.53	1.38	0.74	1.25	0.00	295.00	295.00	2.08
57.16			1.00	2.11E2	0.37	1.39						
57.16			0.50	2.90E2	0.37	1.28						
57.16	394.16	1.46	0.50	2.90E2	0.37	1.28	0.74	0.22	0.00	289.72	289.72	2.08
57.66			1.00	2.20E2	0.37	1.38						
57.66			0.50	3.02E2	0.37	1.26						
57.66	412.57	1.51	0.50	3.02E2	0.37	1.26	0.73	0.05	0.00	302.14	302.14	2.08
58.16			1.00	2.10E2	0.40	1.41						
58.16			0.50	2.90E2	0.40	1.30						
58.16	397.34	1.56	0.50	2.90E2	0.40	1.30	0.73	0.38	0.00	289.93	289.93	2.08
58.66			1.00	2.20E2	0.42	1.41						
58.66			0.50	3.06E2	0.42	1.30						
58.66	420.41	1.75	0.50	3.06E2	0.42	1.30	0.73	0.36	0.00	305.66	305.66	2.08
59.16			1.00	2.21E2	0.50	1.45						
59.16			0.50	3.08E2	0.50	1.34						
59.16	425.18	2.10	0.50	3.08E2	0.50	1.34	0.72	0.87	0.00	308.02	308.02	2.08
59.66			1.00	2.38E2	0.57	1.47						
59.66			0.50	3.32E2	0.57	1.36						
59.66	459.66	2.61	0.50	3.32E2	0.57	1.36	0.72	1.08	0.00	331.82	331.82	2.08
60.16			1.00	2.67E2	0.62	1.45						
60.16			0.50	3.74E2	0.62	1.35						
60.16	519.35	3.20	0.50	3.74E2	0.62	1.35	0.72	0.97	0.00	373.59	373.59	2.08
60.66			1.00	2.73E2	0.36	1.29						
60.66			0.50	3.83E2	0.36	1.18						
60.66	533.79	1.90	0.50	3.83E2	0.36	1.18	0.72	0.00	0.00	382.63	382.63	2.08
61.16			1.00	2.56E2	0.28	1.25						
61.16			0.50	3.60E2	0.28	1.13						
61.16	504.54	1.38	0.50	3.60E2	0.28	1.13	0.71	0.00	0.00	360.40	360.40	2.08
61.66			1.00	2.90E2	0.33	1.25						
61.66			0.50	4.09E2	0.33	1.13						
61.66	574.85	1.89	0.50	4.09E2	0.33	1.13	0.71	0.00	0.00	409.21	409.21	2.08

Fines have been calculated, and correction is made by Modify Robertson Method.
Fines=NoLiq means the soils are not liquefiable.
CRR is based on water table at 10.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 6.63:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.16	0.01	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
0.66	0.02	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.16	0.04	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.66	0.06	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^

2.16	0.08	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
2.66	0.10	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
3.16	0.12	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
3.66	0.13	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
4.16	0.15	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
4.66	0.17	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
5.16	0.19	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
5.66	0.21	2.08	1.00	2.08	1.37	2.00	0.44	5.00	^	
6.16	0.23	2.08	1.00	2.08	1.37	2.00	0.46	5.00	^	
6.66	0.25	2.08	1.00	2.08	1.37	2.00	0.48	5.00	^	
7.16	0.26	2.08	1.00	2.08	1.37	2.00	0.49	5.00	^	
7.66	0.28	2.08	1.00	2.08	1.37	2.00	0.51	5.00	^	
8.16	0.30	2.08	1.00	2.08	1.37	2.00	0.52	5.00	^	
8.66	0.32	2.08	1.00	2.08	1.37	2.00	0.53	5.00	^	
9.16	0.34	2.08	1.00	2.08	1.37	2.00	0.54	5.00	^	
9.66	0.36	2.08	1.00	2.08	1.37	2.00	0.55	5.00	^	
10.16	0.37	0.19	1.00	0.19	1.37	0.26	0.56	0.47	*	
10.66	0.38	0.68	1.00	0.68	1.37	0.93	0.57	1.63		
11.16	0.39	2.08	1.00	2.08	1.37	2.00	0.58	5.00	^	Liq.
11.66	0.40	0.11	1.00	0.11	1.37	0.15	0.58	0.26	*	
12.16	0.41	0.13	1.00	0.13	1.37	0.18	0.59	0.31	*	
12.66	0.42	2.08	1.00	2.08	1.37	2.00	0.60	5.00	^	
13.16	0.42	2.08	1.00	2.08	1.37	2.00	0.60	5.00	^	
13.66	0.43	2.08	1.00	2.08	1.37	2.00	0.61	5.00	^	
14.16	0.44	2.08	1.00	2.08	1.37	2.00	0.62	5.00	^	
14.66	0.45	2.08	1.00	2.08	1.37	2.00	0.62	5.00	^	
15.16	0.46	2.08	1.00	2.08	1.37	2.00	0.63	5.00	^	
15.66	0.47	2.08	1.00	2.08	1.37	2.00	0.63	5.00	^	
16.16	0.48	2.08	1.00	2.08	1.37	2.00	0.63	5.00	^	
16.66	0.49	2.08	1.00	2.08	1.37	2.00	0.64	5.00	^	
17.16	0.50	2.08	1.00	2.08	1.37	2.00	0.64	5.00	^	
17.66	0.50	2.08	1.00	2.08	1.37	2.00	0.65	5.00	^	
18.16	0.51	2.08	1.00	2.08	1.37	2.00	0.65	5.00	^	
18.66	0.52	2.08	1.00	2.08	1.37	2.00	0.65	5.00	^	
19.16	0.53	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
19.66	0.54	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
20.16	0.55	0.18	1.00	0.18	1.37	0.25	0.66	0.37	*	
20.66	0.56	0.21	1.00	0.21	1.37	0.29	0.66	0.44	*	
21.16	0.57	0.31	1.00	0.31	1.37	0.43	0.67	0.65	*	Liq.
21.66	0.58	0.38	1.00	0.38	1.37	0.52	0.67	0.77	*	
22.16	0.58	0.30	1.00	0.30	1.37	0.41	0.67	0.62	*	
22.66	0.59	0.51	1.00	0.51	1.37	0.69	0.67	1.03		
23.16	0.60	0.52	1.00	0.52	1.37	0.72	0.67	1.06		
23.66	0.61	0.61	1.00	0.61	1.37	0.84	0.68	1.24		
24.16	0.62	1.51	1.00	1.51	1.37	2.08	0.68	3.06		
24.66	0.63	2.08	1.00	2.08	1.37	2.85	0.68	4.19		
25.16	0.64	2.08	1.00	2.08	1.37	2.85	0.68	4.18		
25.66	0.65	2.08	1.00	2.08	1.37	2.85	0.68	4.17		
26.16	0.65	2.08	1.00	2.08	1.37	2.85	0.68	4.16		
26.66	0.66	2.08	1.00	2.08	1.37	2.85	0.69	4.16		
27.16	0.67	2.08	1.00	2.08	1.37	2.85	0.69	4.15		
27.66	0.68	2.08	1.00	2.08	1.37	2.85	0.69	4.14		
28.16	0.69	2.08	1.00	2.08	1.37	2.85	0.69	4.13		
28.66	0.70	2.08	1.00	2.08	1.37	2.85	0.69	4.13		
29.16	0.71	2.08	1.00	2.08	1.37	2.85	0.69	4.12		
29.66	0.72	2.08	1.00	2.08	1.37	2.85	0.69	4.12		
30.16	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12		
30.66	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12		
31.16	0.74	2.08	1.00	2.08	1.37	2.85	0.69	4.13		
31.66	0.75	2.08	1.00	2.08	1.37	2.85	0.69	4.14		
32.16	0.76	2.08	1.00	2.08	1.37	2.85	0.69	4.15		
32.66	0.77	2.08	1.00	2.08	1.37	2.85	0.69	4.16		
33.16	0.78	2.08	1.00	2.08	1.37	2.85	0.68	4.17		
33.66	0.79	2.08	1.00	2.08	1.37	2.85	0.68	4.18		
34.16	0.80	2.08	1.00	2.08	1.37	2.85	0.68	4.19		
34.66	0.81	2.08	1.00	2.08	1.37	2.85	0.68	4.20		
35.16	0.81	2.08	1.00	2.08	1.37	2.85	0.68	4.21		
35.66	0.82	2.08	1.00	2.08	1.37	2.85	0.68	4.22		
36.16	0.83	2.08	1.00	2.08	1.37	2.85	0.67	4.23		
36.66	0.84	2.08	1.00	2.08	1.37	2.85	0.67	4.25		
37.16	0.85	2.08	1.00	2.08	1.37	2.85	0.67	4.26		
37.66	0.86	2.08	1.00	2.08	1.37	2.85	0.67	4.27		
38.16	0.87	2.08	1.00	2.08	1.37	2.85	0.67	4.28		
38.66	0.88	2.08	1.00	2.08	1.37	2.85	0.66	4.30		
39.16	0.88	2.08	1.00	2.08	1.37	2.85	0.66	4.31		
39.66	0.89	2.08	1.00	2.08	1.37	2.85	0.66	4.33		
40.16	0.90	2.08	1.00	2.08	1.37	2.85	0.66	4.34		
40.66	0.91	2.08	1.00	2.08	1.37	2.85	0.65	4.35		
41.16	0.92	2.08	1.00	2.08	1.37	2.85	0.65	4.37		
41.66	0.93	0.85	1.00	0.85	1.37	1.17	0.65	1.80		
42.16	0.94	2.08	1.00	2.08	1.37	2.85	0.65	4.40		
42.66	0.95	2.08	1.00	2.08	1.37	2.85	0.65	4.42		

43.16	0.96	2.08	1.00	2.08	1.37	2.85	0.64	4.43	
43.66	0.96	0.86	1.00	0.86	1.37	1.18	0.64	1.84	
44.16	0.97	0.27	1.00	0.27	1.37	0.37	0.64	0.58	*
44.66	0.98	2.08	1.00	2.08	1.37	2.00	0.64	5.00	^
45.16	0.99	0.40	1.00	0.40	1.37	0.55	0.63	0.87	*
45.66	1.00	2.08	1.00	2.08	1.37	2.85	0.63	4.52	
46.16	1.01	2.08	1.00	2.09	1.37	2.86	0.63	4.56	
46.66	1.02	2.08	1.00	2.09	1.37	2.86	0.63	4.57	
47.16	1.03	2.08	1.00	2.08	1.37	2.86	0.62	4.58	
47.66	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.59	
48.16	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.60	
48.66	1.05	2.08	1.00	2.08	1.37	2.84	0.62	4.62	
49.16	1.06	2.08	1.00	2.07	1.37	2.84	0.61	4.63	
49.66	1.07	2.08	1.00	2.07	1.37	2.84	0.61	4.64	
50.16	1.08	2.08	0.99	2.07	1.37	2.83	0.61	4.66	
50.66	1.09	2.08	0.99	2.06	1.37	2.83	0.61	4.67	
51.16	1.10	2.08	0.99	2.06	1.37	2.83	0.60	4.69	
51.66	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.70	
52.16	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.71	
52.66	1.12	1.88	0.99	1.86	1.37	2.55	0.59	4.29	
53.16	1.13	1.78	0.99	1.75	1.37	2.40	0.59	4.05	
53.66	1.14	2.01	0.98	1.97	1.37	2.71	0.59	4.59	
54.16	1.15	1.95	0.98	1.91	1.37	2.62	0.59	4.47	
54.66	1.16	2.08	0.98	2.04	1.37	2.79	0.58	4.79	
55.16	1.17	2.08	0.98	2.04	1.37	2.79	0.58	4.81	
55.66	1.18	2.08	0.98	2.04	1.37	2.79	0.58	4.83	
56.16	1.19	2.08	0.98	2.03	1.37	2.79	0.58	4.84	
56.66	1.19	2.08	0.98	2.03	1.37	2.78	0.57	4.86	
57.16	1.20	2.08	0.97	2.03	1.37	2.78	0.57	4.88	
57.66	1.21	2.08	0.97	2.02	1.37	2.78	0.57	4.89	
58.16	1.22	2.08	0.97	2.02	1.37	2.77	0.56	4.91	
58.66	1.23	2.08	0.97	2.02	1.37	2.77	0.56	4.93	
59.16	1.24	2.08	0.97	2.02	1.37	2.76	0.56	4.95	
59.66	1.25	2.08	0.97	2.01	1.37	2.76	0.56	4.97	
60.16	1.26	2.08	0.97	2.01	1.37	2.76	0.55	4.99	
60.66	1.27	2.08	0.97	2.01	1.37	2.75	0.55	5.00	
61.16	1.27	2.08	0.96	2.01	1.37	2.75	0.55	5.00	
61.66	1.28	2.08	0.96	2.00	1.37	2.75	0.54	5.00	

Liq.

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils or above Water Table.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
0.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
5.16	2.55	3.78	16.54	4.37	NoLiq	0.00	4.37
5.66	2.69	3.54	14.29	4.04	NoLiq	0.00	4.04
6.16	2.74	3.44	14.28	4.15	NoLiq	0.00	4.15
6.66	2.66	3.59	18.46	5.15	NoLiq	0.00	5.15
7.16	2.35	4.15	31.31	7.54	NoLiq	0.00	7.54
7.66	1.84	5.10	64.19	12.58	NoLiq	0.00	12.58
8.16	1.74	5.28	83.02	15.72	NoLiq	0.00	15.72
8.66	2.33	4.20	28.82	6.87	NoLiq	0.00	6.87
9.16	2.66	3.59	15.50	4.32	NoLiq	0.00	4.32
9.66	2.53	3.83	22.74	5.94	NoLiq	0.00	5.94
10.16	2.22	4.40	106.08	24.09	19.57	0.00	24.09
10.66	2.59	3.72	185.88	49.95	34.68	0.00	49.95
11.16	2.71	3.49	14.24	4.08	NoLiq	0.00	4.08
11.66	2.22	4.39	68.64	15.64	19.84	0.00	15.64
12.16	2.47	3.94	83.33	21.16	29.30	0.00	21.16
12.66	2.70	3.51	13.12	3.74	NoLiq	0.00	3.74
13.16	2.85	3.23	10.35	3.20	NoLiq	0.00	3.20
13.66	2.64	3.63	16.48	4.54	NoLiq	0.00	4.54
14.16	2.84	3.25	10.65	3.28	NoLiq	0.00	3.28
14.66	3.15	2.67	7.14	2.67	NoLiq	0.00	2.67
15.16	3.18	2.62	6.96	2.65	NoLiq	0.00	2.65
15.66	3.10	2.78	9.09	3.27	NoLiq	0.00	3.27
16.16	2.88	3.18	11.09	3.48	NoLiq	0.00	3.48

N,60 < 15

16.66	2.68	3.54	17.61	4.98	NoLiq	0.00	4.98
17.16	2.88	3.18	13.80	4.33	NoLiq	0.00	4.33
17.66	2.40	4.06	31.52	7.76	NoLiq	0.00	7.76
18.16	2.83	3.26	13.43	4.12	NoLiq	0.00	4.12
18.66	2.73	3.46	19.49	5.64	NoLiq	0.00	5.64
19.16	2.60	3.69	27.39	7.41	NoLiq	0.00	7.41
19.66	2.40	4.06	48.60	11.98	NoLiq	0.00	11.98
20.16	2.14	4.55	102.56	22.56	17.03	0.00	22.56
20.66	2.23	4.37	112.79	25.79	20.14	0.00	25.79
21.16	1.84	5.10	135.93	26.64	8.98	0.00	26.64
21.66	1.59	5.56	147.19	26.47	4.21	0.00	26.47
22.16	1.83	5.12	133.49	26.10	8.81	0.00	26.10
22.66	1.55	5.63	166.16	29.52	3.64	0.00	29.52
23.16	1.45	5.83	168.09	28.84	2.10	0.00	28.84
23.66	1.53	5.67	179.01	31.57	3.28	0.00	31.57
24.16	1.43	5.86	248.94	42.45	1.85	0.00	42.45
24.66	1.29	6.12	460.50	75.23	0.28	0.00	75.23
25.16	1.13	6.40	500.00	78.09	0.00	0.00	78.09
25.66	0.85	6.93	500.00	72.19	0.00	0.00	72.19
26.16	0.95	6.75	500.00	74.07	0.00	0.00	74.07
26.66	1.14	6.39	496.71	77.70	0.00	0.00	77.70
27.16	1.06	6.53	500.00	76.54	0.00	0.00	76.54
27.66	1.19	6.30	500.00	79.39	0.00	0.00	79.39
28.16	1.22	6.25	500.00	80.04	0.00	0.00	80.04
28.66	1.09	6.48	500.00	77.17	0.00	0.00	77.17
29.16	1.11	6.45	340.39	52.81	0.00	0.00	52.81
29.66	1.43	5.86	339.04	57.88	1.90	0.00	57.88
30.16	1.38	5.94	412.69	69.43	1.32	0.00	69.43
30.66	1.21	6.26	500.00	79.86	0.00	0.00	79.86
31.16	1.20	6.28	500.00	79.61	0.00	0.00	79.61
31.66	1.35	6.01	481.72	80.20	0.93	0.00	80.20
32.16	1.29	6.11	467.52	76.48	0.32	0.00	76.48
32.66	1.13	6.42	397.72	61.98	0.00	0.00	61.98
33.16	1.11	6.45	500.00	77.52	0.00	0.00	77.52
33.66	1.17	6.34	500.00	78.92	0.00	0.00	78.92
34.16	1.12	6.44	478.24	74.28	0.00	0.00	74.28
34.66	1.28	6.13	474.71	77.46	0.24	0.00	77.46
35.16	1.24	6.22	428.60	68.96	0.00	0.00	68.96
35.66	1.27	6.15	441.32	71.75	0.12	0.00	71.75
36.16	1.24	6.21	497.56	80.07	0.00	0.00	80.07
36.66	1.07	6.53	458.13	70.17	0.00	0.00	70.17
37.16	1.29	6.11	443.39	72.53	0.32	0.00	72.53
37.66	1.14	6.39	465.35	72.83	0.00	0.00	72.83
38.16	1.26	6.17	426.62	69.11	0.00	0.00	69.11
38.66	1.02	6.62	421.82	63.68	0.00	0.00	63.68
39.16	1.15	6.37	344.57	54.11	0.00	0.00	54.11
39.66	1.22	6.24	365.16	58.48	0.00	0.00	58.48
40.16	1.16	6.35	361.43	56.89	0.00	0.00	56.89
40.66	1.17	6.33	389.52	61.50	0.00	0.00	61.50
41.16	1.17	6.34	361.01	56.93	0.00	0.00	56.93
41.66	1.56	5.61	202.69	36.14	3.79	0.00	36.14
42.16	1.19	6.31	397.04	62.96	0.00	0.00	62.96
42.66	1.44	5.84	397.92	68.18	2.04	0.00	68.18
43.16	1.48	5.76	329.12	57.17	2.62	0.00	57.17
43.66	1.87	5.05	203.27	40.22	9.57	0.00	40.22
44.16	2.40	4.07	127.04	31.18	26.22	0.00	31.18
44.66	2.64	3.63	39.25	10.82	NoLiq	0.00	10.82
45.16	1.75	5.27	151.30	28.72	7.07	0.00	28.72
45.66	1.34	6.03	389.14	64.54	0.80	0.00	64.54
46.16	1.38	5.94	366.81	61.72	1.33	0.00	61.72
46.66	1.23	6.23	375.10	60.23	0.00	0.00	60.23
47.16	1.27	6.15	369.44	60.08	0.13	0.00	60.08
47.66	1.32	6.05	359.03	59.32	0.67	0.00	59.32
48.16	1.39	5.93	340.22	57.41	1.43	0.00	57.41
48.66	1.34	6.02	357.37	59.33	0.83	0.00	59.33
49.16	1.29	6.12	370.26	60.47	0.27	0.00	60.47
49.66	1.18	6.31	351.48	55.67	0.00	0.00	55.67
50.16	1.14	6.40	404.05	63.15	0.00	0.00	63.15
50.66	1.17	6.33	423.62	66.93	0.00	0.00	66.93
51.16	0.92	6.80	453.14	66.60	0.00	0.00	66.60
51.66	1.22	6.25	442.35	70.72	0.00	0.00	70.72
52.16	1.10	6.46	329.84	51.06	0.00	0.00	51.06
52.66	1.41	5.89	268.72	45.66	1.71	0.00	45.66
53.16	1.48	5.77	263.27	45.64	2.53	0.00	45.64
53.66	1.43	5.85	274.62	46.92	1.93	0.00	46.92
54.16	1.41	5.90	271.84	46.05	1.59	0.00	46.05
54.66	1.30	6.09	277.98	45.62	0.43	0.00	45.62
55.16	1.17	6.34	300.71	47.44	0.00	0.00	47.44
55.66	1.34	6.02	293.90	48.84	0.87	0.00	48.84
56.16	1.45	5.82	300.17	51.56	2.15	0.00	51.56
56.66	1.38	5.96	295.00	49.53	1.25	0.00	49.53
57.16	1.28	6.13	289.72	47.25	0.22	0.00	47.25

57.66	1.26	6.16	302.14	49.01	0.05	0.00	49.01
58.16	1.30	6.10	289.93	47.51	0.38	0.00	47.51
58.66	1.30	6.11	305.66	50.06	0.36	0.00	50.06
59.16	1.34	6.02	308.02	51.19	0.87	0.00	51.19
59.66	1.36	5.98	331.82	55.46	1.08	0.00	55.46
60.16	1.35	6.00	373.59	62.26	0.97	0.00	62.26
60.66	1.18	6.32	382.63	60.51	0.00	0.00	60.51
61.16	1.13	6.42	360.40	56.16	0.00	0.00	56.16
61.66	1.13	6.41	409.21	63.87	0.00	0.00	63.87

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
(N1)60 is converted from qc1, (N1)60s is after fines correction
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Ishihara / Yoshimine

Depth ft	CSRsf	/ MSF*	=CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
61.96	0.54	1.00	0.54	5.00	0.00	66.32	100.00	0.000	0.0E0	0.000	0.000
61.66	0.54	1.00	0.54	5.00	0.00	63.87	100.00	0.000	0.0E0	0.000	0.000
61.16	0.55	1.00	0.55	5.00	0.00	56.16	100.00	0.000	0.0E0	0.000	0.000
60.66	0.55	1.00	0.55	5.00	0.00	60.51	100.00	0.000	0.0E0	0.000	0.000
60.16	0.55	1.00	0.55	4.99	0.97	62.26	100.00	0.000	0.0E0	0.000	0.000
59.66	0.56	1.00	0.56	4.97	1.08	55.46	100.00	0.000	0.0E0	0.000	0.000
59.16	0.56	1.00	0.56	4.95	0.87	51.19	100.00	0.000	0.0E0	0.000	0.000
58.66	0.56	1.00	0.56	4.93	0.36	50.06	100.00	0.000	0.0E0	0.000	0.000
58.16	0.56	1.00	0.56	4.91	0.38	47.51	100.00	0.000	0.0E0	0.000	0.000
57.66	0.57	1.00	0.57	4.89	0.05	49.01	100.00	0.000	0.0E0	0.000	0.000
57.16	0.57	1.00	0.57	4.88	0.22	47.25	100.00	0.000	0.0E0	0.000	0.000
56.66	0.57	1.00	0.57	4.86	1.25	49.53	100.00	0.000	0.0E0	0.000	0.000
56.16	0.58	1.00	0.58	4.84	2.15	51.56	100.00	0.000	0.0E0	0.000	0.000
55.66	0.58	1.00	0.58	4.83	0.87	48.84	100.00	0.000	0.0E0	0.000	0.000
55.16	0.58	1.00	0.58	4.81	0.00	47.44	100.00	0.000	0.0E0	0.000	0.000
54.66	0.58	1.00	0.58	4.79	0.43	45.62	100.00	0.000	0.0E0	0.000	0.000
54.16	0.59	1.00	0.59	4.47	1.59	46.05	100.00	0.000	0.0E0	0.000	0.000
53.66	0.59	1.00	0.59	4.59	1.93	46.92	100.00	0.000	0.0E0	0.000	0.000
53.16	0.59	1.00	0.59	4.05	2.53	45.64	100.00	0.000	0.0E0	0.000	0.000
52.66	0.59	1.00	0.59	4.29	1.71	45.66	100.00	0.000	0.0E0	0.000	0.000
52.16	0.60	1.00	0.60	4.71	0.00	51.06	100.00	0.000	0.0E0	0.000	0.000
51.66	0.60	1.00	0.60	4.70	0.00	70.72	100.00	0.000	0.0E0	0.000	0.000
51.16	0.60	1.00	0.60	4.69	0.00	66.60	100.00	0.000	0.0E0	0.000	0.000
50.66	0.61	1.00	0.61	4.67	0.00	66.93	100.00	0.000	0.0E0	0.000	0.000
50.16	0.61	1.00	0.61	4.66	0.00	63.15	100.00	0.000	0.0E0	0.000	0.000
49.66	0.61	1.00	0.61	4.64	0.00	55.67	100.00	0.000	0.0E0	0.000	0.000
49.16	0.61	1.00	0.61	4.63	0.27	60.47	100.00	0.000	0.0E0	0.000	0.000
48.66	0.62	1.00	0.62	4.62	0.83	59.33	100.00	0.000	0.0E0	0.000	0.000
48.16	0.62	1.00	0.62	4.60	1.43	57.41	100.00	0.000	0.0E0	0.000	0.000
47.66	0.62	1.00	0.62	4.59	0.67	59.32	100.00	0.000	0.0E0	0.000	0.000
47.16	0.62	1.00	0.62	4.58	0.13	60.08	100.00	0.000	0.0E0	0.000	0.000
46.66	0.63	1.00	0.63	4.57	0.00	60.23	100.00	0.000	0.0E0	0.000	0.000
46.16	0.63	1.00	0.63	4.56	1.33	61.72	100.00	0.000	0.0E0	0.000	0.000
45.66	0.63	1.00	0.63	4.52	0.80	64.54	100.00	0.000	0.0E0	0.000	0.000
45.16	0.63	1.00	0.63	0.87	7.07	28.72	87.24	0.759	4.6E-3	0.005	0.005
44.66	0.64	1.00	0.64	5.00	NoLiq	10.82	52.46	0.000	0.0E0	0.030	0.035
44.16	0.64	1.00	0.64	0.58	26.22	31.18	92.79	0.826	5.0E-3	0.005	0.040
43.66	0.64	1.00	0.64	1.84	9.57	40.22	100.00	0.000	0.0E0	0.030	0.069
43.16	0.64	1.00	0.64	4.43	2.62	57.17	100.00	0.000	0.0E0	0.000	0.069
42.66	0.65	1.00	0.65	4.42	2.04	68.18	100.00	0.000	0.0E0	0.000	0.069
42.16	0.65	1.00	0.65	4.40	0.00	62.96	100.00	0.000	0.0E0	0.000	0.069
41.66	0.65	1.00	0.65	1.80	3.79	36.14	100.00	0.000	0.0E0	0.000	0.069
41.16	0.65	1.00	0.65	4.37	0.00	56.93	100.00	0.000	0.0E0	0.000	0.069
40.66	0.65	1.00	0.65	4.35	0.00	61.50	100.00	0.000	0.0E0	0.000	0.069
40.16	0.66	1.00	0.66	4.34	0.00	56.89	100.00	0.000	0.0E0	0.000	0.069
39.66	0.66	1.00	0.66	4.33	0.00	58.48	100.00	0.000	0.0E0	0.000	0.069
39.16	0.66	1.00	0.66	4.31	0.00	54.11	100.00	0.000	0.0E0	0.000	0.069
38.66	0.66	1.00	0.66	4.30	0.00	63.68	100.00	0.000	0.0E0	0.000	0.069
38.16	0.67	1.00	0.67	4.28	0.00	69.11	100.00	0.000	0.0E0	0.000	0.069
37.66	0.67	1.00	0.67	4.27	0.00	72.83	100.00	0.000	0.0E0	0.000	0.069
37.16	0.67	1.00	0.67	4.26	0.32	72.53	100.00	0.000	0.0E0	0.000	0.069
36.66	0.67	1.00	0.67	4.25	0.00	70.17	100.00	0.000	0.0E0	0.000	0.069
36.16	0.67	1.00	0.67	4.23	0.00	80.07	100.00	0.000	0.0E0	0.000	0.069
35.66	0.68	1.00	0.68	4.22	0.12	71.75	100.00	0.000	0.0E0	0.000	0.069
35.16	0.68	1.00	0.68	4.21	0.00	68.96	100.00	0.000	0.0E0	0.000	0.069
34.66	0.68	1.00	0.68	4.20	0.24	77.46	100.00	0.000	0.0E0	0.000	0.069
34.16	0.68	1.00	0.68	4.19	0.00	74.28	100.00	0.000	0.0E0	0.000	0.069
33.66	0.68	1.00	0.68	4.18	0.00	78.92	100.00	0.000	0.0E0	0.000	0.069
33.16	0.68	1.00	0.68	4.17	0.00	77.52	100.00	0.000	0.0E0	0.000	0.069
32.66	0.69	1.00	0.69	4.16	0.00	61.98	100.00	0.000	0.0E0	0.000	0.069
32.16	0.69	1.00	0.69	4.15	0.32	76.48	100.00	0.000	0.0E0	0.000	0.069
31.66	0.69	1.00	0.69	4.14	0.93	80.20	100.00	0.000	0.0E0	0.000	0.069

31.16	0.69	1.00	0.69	4.13	0.00	79.61	100.00	0.000	0.0E0	0.000	0.069
30.66	0.69	1.00	0.69	4.12	0.00	79.86	100.00	0.000	0.0E0	0.000	0.069
30.16	0.69	1.00	0.69	4.12	1.32	69.43	100.00	0.000	0.0E0	0.000	0.069
29.66	0.69	1.00	0.69	4.12	1.90	57.88	100.00	0.000	0.0E0	0.000	0.069
29.16	0.69	1.00	0.69	4.12	0.00	52.81	100.00	0.000	0.0E0	0.000	0.069
28.66	0.69	1.00	0.69	4.13	0.00	77.17	100.00	0.000	0.0E0	0.000	0.069
28.16	0.69	1.00	0.69	4.13	0.00	80.04	100.00	0.000	0.0E0	0.000	0.069
27.66	0.69	1.00	0.69	4.14	0.00	79.39	100.00	0.000	0.0E0	0.000	0.069
27.16	0.69	1.00	0.69	4.15	0.00	76.54	100.00	0.000	0.0E0	0.000	0.069
26.66	0.69	1.00	0.69	4.16	0.00	77.70	100.00	0.000	0.0E0	0.000	0.069
26.16	0.68	1.00	0.68	4.16	0.00	74.07	100.00	0.000	0.0E0	0.000	0.069
25.66	0.68	1.00	0.68	4.17	0.00	72.19	100.00	0.000	0.0E0	0.000	0.069
25.16	0.68	1.00	0.68	4.18	0.00	78.09	100.00	0.000	0.0E0	0.000	0.069
24.66	0.68	1.00	0.68	4.19	0.28	75.23	100.00	0.000	0.0E0	0.000	0.069
24.16	0.68	1.00	0.68	3.06	1.85	42.45	100.00	0.000	0.0E0	0.000	0.069
23.66	0.68	1.00	0.68	1.24	3.28	31.57	93.71	0.152	9.1E-4	0.001	0.070
23.16	0.67	1.00	0.67	1.06	2.10	28.84	87.50	0.427	2.6E-3	0.035	0.105
22.66	0.67	1.00	0.67	1.03	3.64	29.52	88.99	0.434	2.6E-3	0.028	0.133
22.16	0.67	1.00	0.67	0.62	8.81	26.10	81.85	1.529	9.2E-3	0.058	0.191
21.66	0.67	1.00	0.67	0.77	4.21	26.47	82.58	1.129	6.8E-3	0.094	0.285
21.16	0.67	1.00	0.67	0.65	8.98	26.64	82.93	1.406	8.4E-3	0.075	0.360
20.66	0.66	1.00	0.66	0.44	20.14	25.79	81.25	1.692	1.0E-2	0.102	0.462
20.16	0.66	1.00	0.66	0.37	17.03	22.56	75.16	1.964	1.2E-2	0.107	0.568
19.66	0.66	1.00	0.66	5.00	NoLiq	11.98	55.06	0.000	0.0E0	0.036	0.604
19.16	0.66	1.00	0.66	5.00	NoLiq	7.41	43.90	0.000	0.0E0	0.000	0.604
18.66	0.65	1.00	0.65	5.00	NoLiq	5.64	38.75	0.000	0.0E0	0.000	0.604
18.16	0.65	1.00	0.65	5.00	NoLiq	4.12	33.88	0.000	0.0E0	0.000	0.604
17.66	0.65	1.00	0.65	5.00	NoLiq	7.76	44.83	0.000	0.0E0	0.000	0.604
17.16	0.64	1.00	0.64	5.00	NoLiq	4.33	34.60	0.000	0.0E0	0.000	0.604
16.66	0.64	1.00	0.64	5.00	NoLiq	4.98	36.69	0.000	0.0E0	0.000	0.604
16.16	0.63	1.00	0.63	5.00	NoLiq	3.48	31.72	0.000	0.0E0	0.000	0.604
15.66	0.63	1.00	0.63	5.00	NoLiq	3.27	30.97	0.000	0.0E0	0.000	0.604
15.16	0.63	1.00	0.63	5.00	NoLiq	2.65	28.76	0.000	0.0E0	0.000	0.604
14.66	0.62	1.00	0.62	5.00	NoLiq	2.67	28.84	0.000	0.0E0	0.000	0.604
14.16	0.62	1.00	0.62	5.00	NoLiq	3.28	31.00	0.000	0.0E0	0.000	0.604
13.66	0.61	1.00	0.61	5.00	NoLiq	4.54	35.28	0.000	0.0E0	0.059	0.663
13.16	0.60	1.00	0.60	5.00	NoLiq	3.20	30.73	0.000	0.0E0	0.000	0.663
12.66	0.60	1.00	0.60	5.00	NoLiq	3.74	32.59	0.000	0.0E0	0.053	0.716
12.16	0.59	1.00	0.59	0.31	29.30	21.16	72.62	2.078	1.2E-2	0.075	0.791
11.66	0.58	1.00	0.58	0.26	19.84	15.64	62.51	2.651	1.6E-2	0.114	0.906
11.16	0.58	1.00	0.58	5.00	NoLiq	4.08	33.75	0.000	0.0E0	0.135	1.040
10.66	0.57	1.00	0.57	1.63	34.68	49.95	100.00	0.000	0.0E0	0.000	1.040
10.16	0.56	1.00	0.56	0.47	19.57	24.09	78.00	1.836	1.1E-2	0.074	1.114
9.66	0.55	1.00	0.55	5.00	NoLiq	5.94	39.64	0.000	0.0E0	0.032	1.147
9.16	0.54	1.00	0.54	5.00	NoLiq	4.32	34.55	0.000	0.0E0	0.000	1.147
8.66	0.53	1.00	0.53	5.00	NoLiq	6.87	42.37	0.000	0.0E0	0.000	1.147
8.16	0.52	1.00	0.52	5.00	NoLiq	15.72	62.66	0.000	0.0E0	0.000	1.147
7.66	0.51	1.00	0.51	5.00	NoLiq	12.58	56.36	0.000	0.0E0	0.000	1.147
7.16	0.49	1.00	0.49	5.00	NoLiq	7.54	44.24	0.000	0.0E0	0.000	1.147
6.66	0.48	1.00	0.48	5.00	NoLiq	5.15	37.22	0.000	0.0E0	0.000	1.147
6.16	0.46	1.00	0.46	5.00	NoLiq	4.15	33.98	0.000	0.0E0	0.000	1.147
5.66	0.44	1.00	0.44	5.00	NoLiq	4.04	33.62	0.000	0.0E0	0.000	1.147
5.16	0.42	1.00	0.42	5.00	NoLiq	4.37	34.73	0.000	0.0E0	0.000	1.147
5.01	0.42	1.00	0.42	5.00	NoLiq	2.62	28.63	0.000	0.0E0	0.000	1.147

Settlement of Saturated Sands=1.147 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth ft	sigma' atm	sigC' atm	(N1)60s	CSRsf	Gmax atm	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsp in.	S in.
4.96	0.28	0.18	1.36	0.42	211.62	5.6E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.66	0.26	0.17	0.10	0.42	86.09	1.3E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.16	0.24	0.15	0.10	0.42	81.34	1.2E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.66	0.21	0.13	0.10	0.42	76.30	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.16	0.18	0.12	0.10	0.42	70.90	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.66	0.15	0.10	0.10	0.42	65.05	9.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.16	0.12	0.08	0.10	0.42	58.62	8.8E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.66	0.09	0.06	0.10	0.42	51.39	7.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.16	0.07	0.04	0.10	0.42	42.95	6.5E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.66	0.04	0.02	0.10	0.42	32.40	4.9E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.16	0.01	0.01	0.10	0.42	15.95	2.4E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000

Settlement of Unsaturated Sands

Settlement of Unsaturated Sands=0.000 in.

(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=1.147 in.
Differential Settlement=0.573 to 0.757 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)
1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=1, based on Item 2 of Page C.
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.
SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.
2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.
3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake

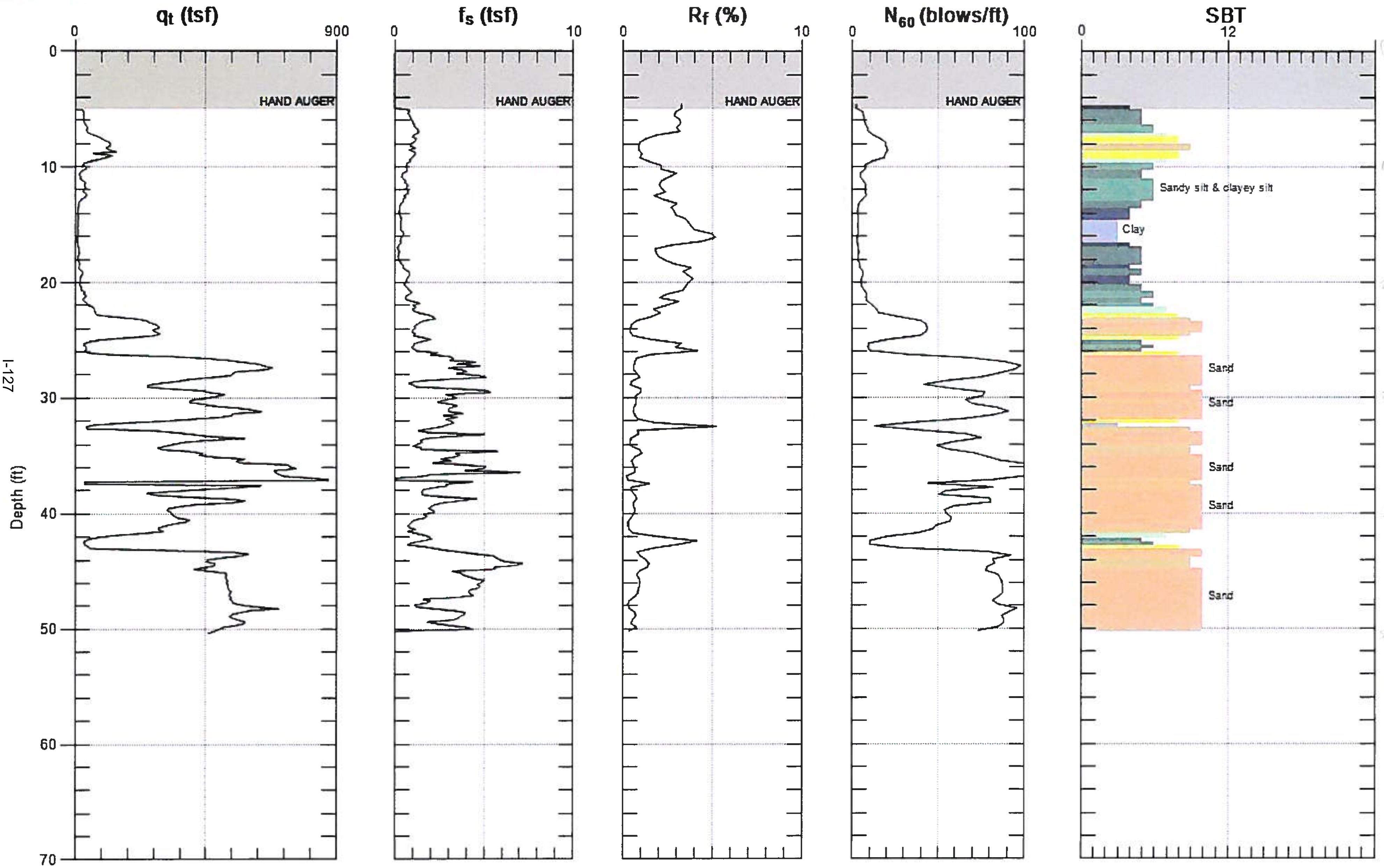
Engineering Research Center,
Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

GREGG **GEOSYSTEMS**

Site: 12870 PANAMA ST. **Engineer: R.GLADSON**

Sounding: CPT-2 **Date: 5/26/2016 09:51**



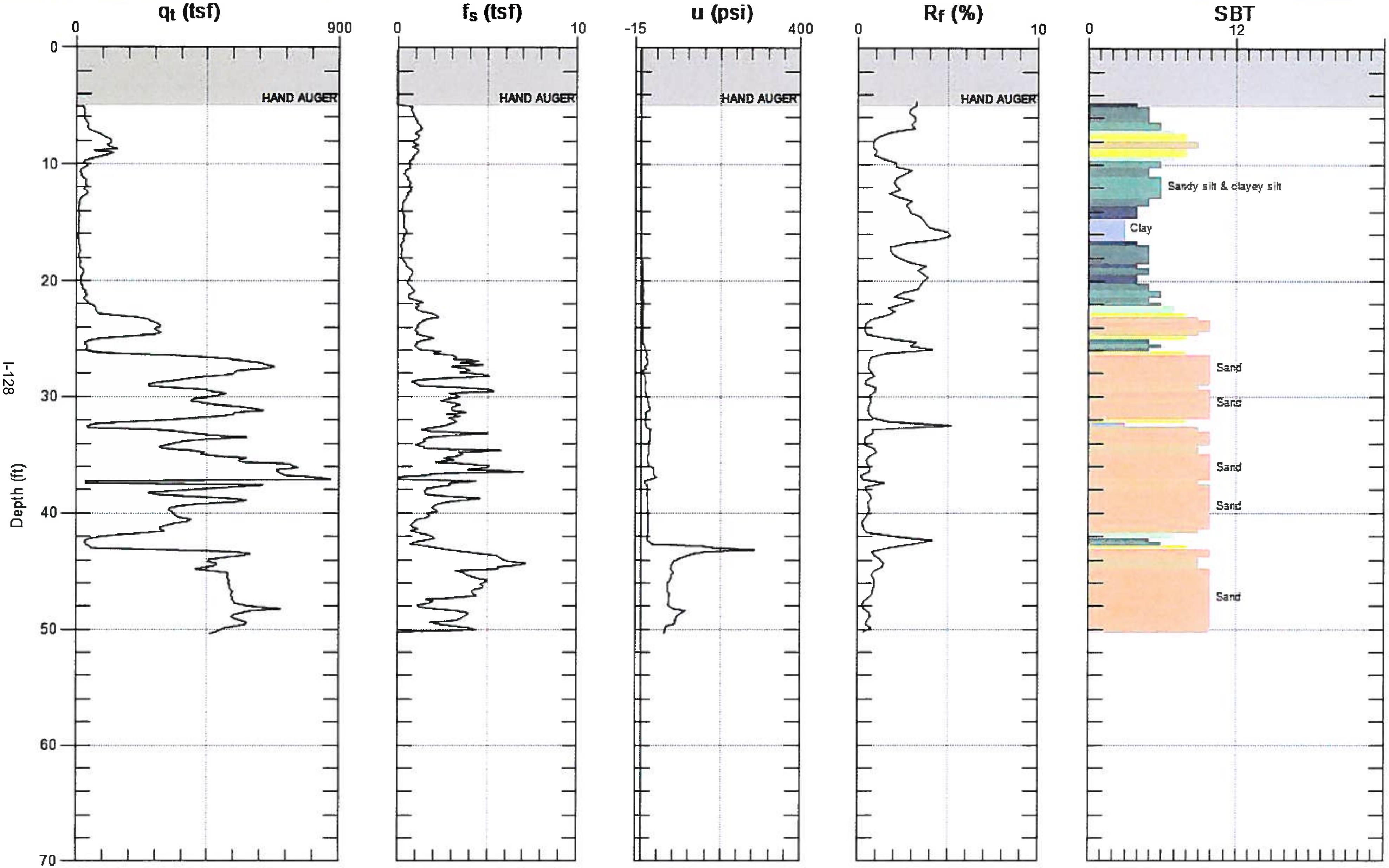
Max. Depth: 50.361 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **GEOSYSTEMS**

Site: 12870 PANAMA ST.
Sounding: CPT-2

Engineer: R.GLADSON
Date: 5/26/2016 09:51



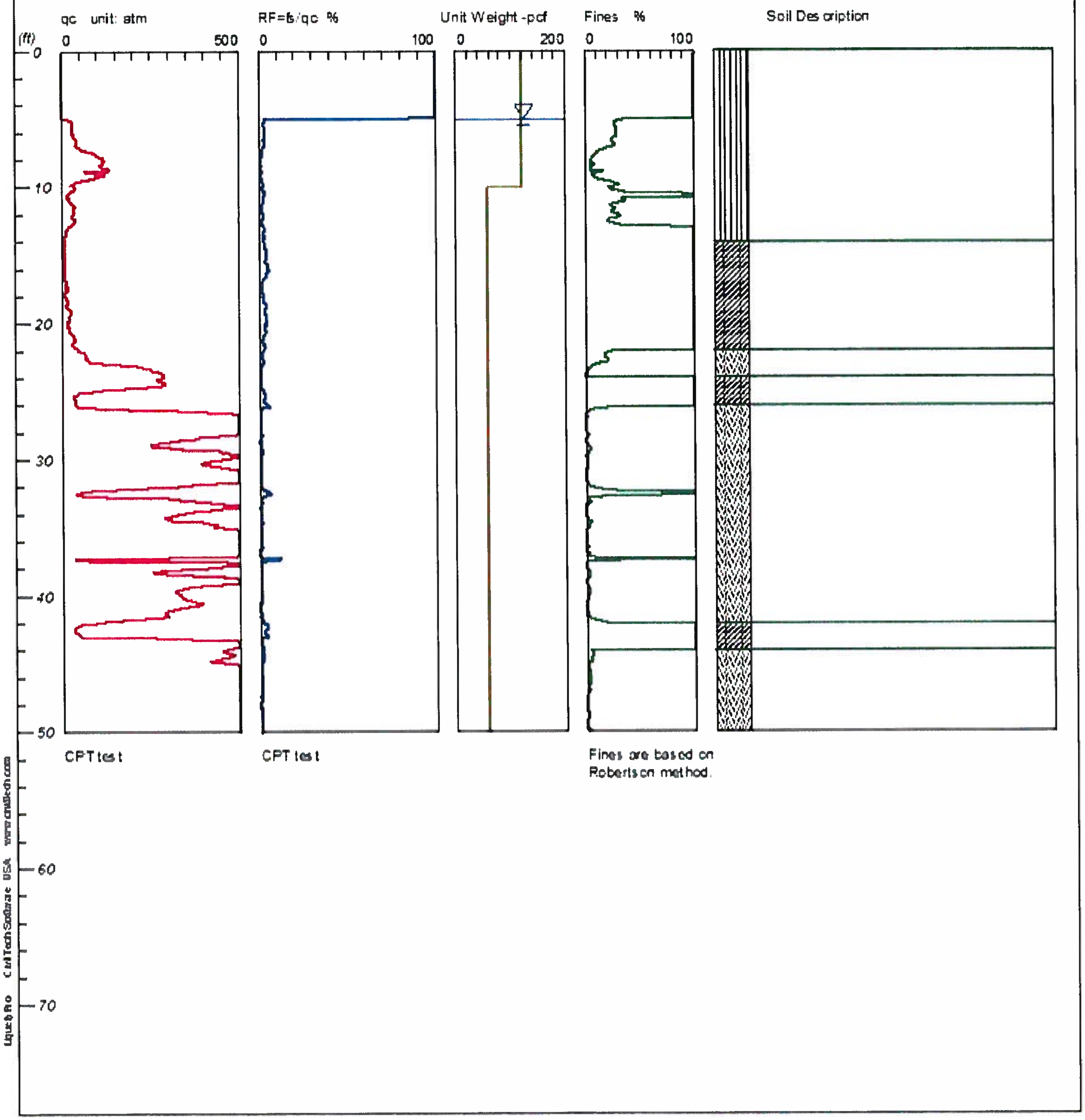
Max. Depth: 50.361 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT2 ***Water Depth=5 ft*** ***Surface Elev.=0*** ***Magnitude=6.63***
Acceleration=0.65g



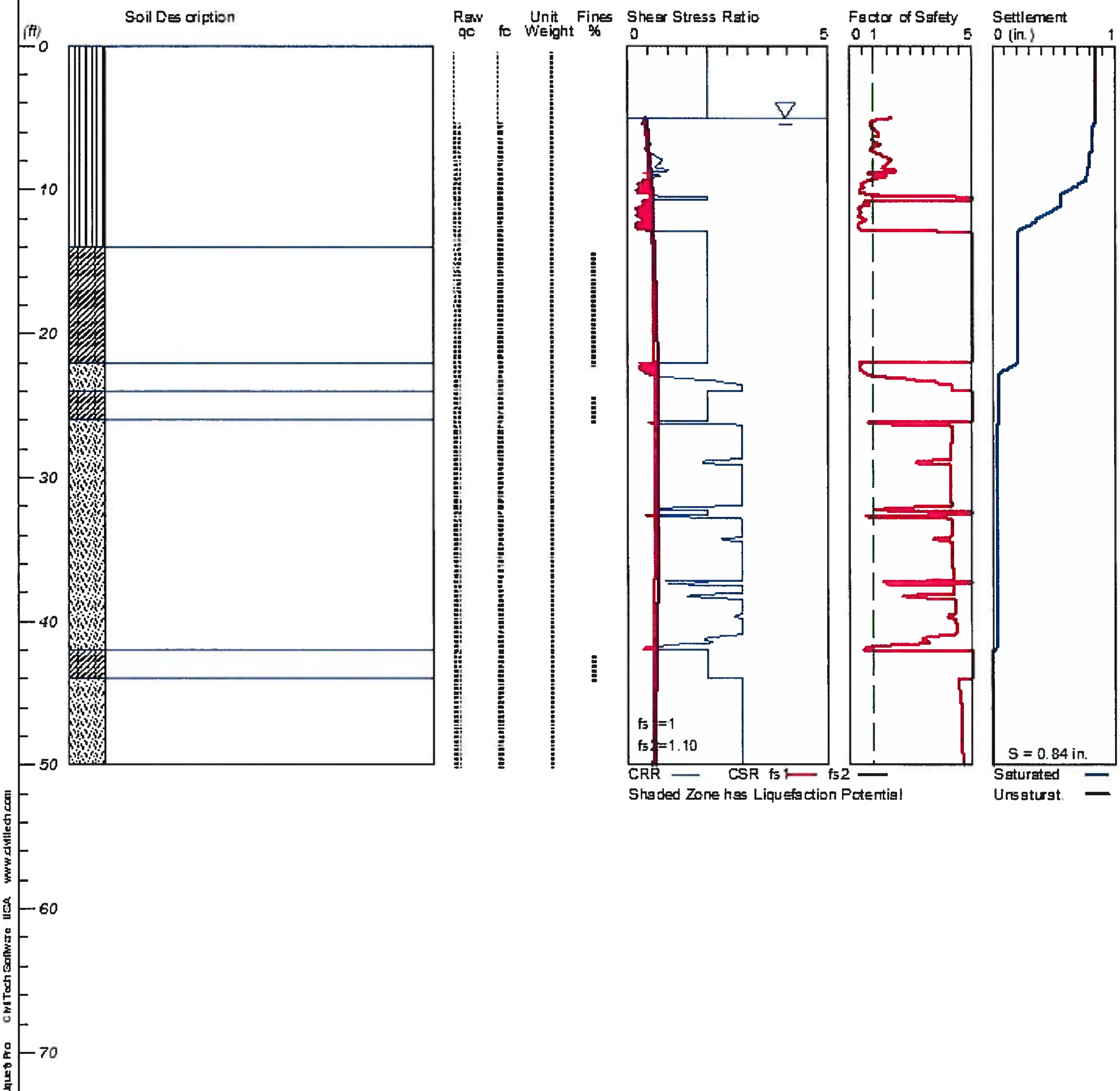
CivilTech Corporation CPT 2 Plate LQ-1

LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT2 Water Depth=5 ft Surface Elev.=0

Magnitude=6.63
Acceleration=0.65g



CivilTech Corporation CPT 2 Plate LQ-1

GREGG DRILLING & TESTING, INC.

CONE PENETRATION TEST DATA

Client:	GEOSYSTEMS	
Site:	12870 PANAMA ST.	
Engineer:	R.GLADSON	
Sounding:	CPT-2	
Date:	5/26/2016	
Time:	9:51 AM	

Units:	Imperial	
Data averaging interval:	0.100	meters
Assumed depth of water:	11.003	feet
Net area ratio of cone:	0.80	
Unit weight of water:	62.4	lb/ft3
Relative density constant, CDR:	350	
Young's modulus for sands, a:	4	
Small strain shear modulus number, SG (sands):	180	
Small strain shear modulus number, CG (clays):	50	
Nkt for clays:	15	
OCR number, kocr:	0.3	

Interpretation based on Lunne, Robertson and Powell, 1997

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
0.100	0.328	0.000	0.000	0.000							0.000				
0.200	0.656	0.000	0.000	0.000							0.000				
0.300	0.984	0.000	0.000	0.000							0.000				
0.400	1.312	0.000	0.000	0.000							0.000				
0.500	1.640	0.000	0.000	0.000							0.000				
0.600	1.969	0.000	0.000	0.000							0.000				
0.700	2.297	0.000	0.000	0.000							0.000				
0.800	2.625	0.000	0.000	0.000							0.000				
0.900	2.953	0.000	0.000	0.000							0.000				
1.000	3.281	0.000	0.000	0.000							0.000				
1.100	3.609	0.000	0.000	0.000							0.000				
1.200	3.937	0.000	0.000	0.000							0.000				
1.300	4.265	0.000	0.000	0.000							0.000				
1.400	4.593	0.000	0.000	0.000							0.000				
1.500	4.921	8.588	0.277	-0.126		8.59	3.23	4	115	0.282	0.000	0.282	29.45	3.34	0.00
1.600	5.249	27.596	0.798	-0.202		27.59	2.89	5	115	0.301	0.000	0.301	90.75	2.93	0.00
1.700	5.577	29.297	0.835	0.139		29.30	2.85	5	115	0.320	0.000	0.320	90.69	2.88	0.00
1.800	5.906	29.910	0.939	0.416		29.92	3.14	5	115	0.338	0.000	0.338	87.42	3.18	0.00
1.900	6.234	33.033	1.048	0.391		33.04	3.17	5	115	0.357	0.000	0.357	91.51	3.21	0.00
2.000	6.562	39.670	1.174	0.303		39.67	2.96	6	115	0.376	0.000	0.376	104.53	2.99	0.00
2.100	6.890	41.696	1.312	0.240		41.70	3.15	6	115	0.395	0.000	0.395	104.64	3.18	0.00
2.200	7.218	61.605	1.132	0.278		61.61	1.84	7	118	0.414	0.000	0.414	147.80	1.85	0.00
2.300	7.546	90.865	1.118	0.214		90.87	1.23	8	121	0.434	0.000	0.434	208.42	1.24	0.00
2.400	7.874	113.312	1.025	0.177		113.31	0.90	8	121	0.454	0.000	0.454	248.74	0.91	0.00
2.500	8.202	115.338	0.978	-0.164		115.34	0.85	9	124	0.474	0.000	0.474	242.27	0.85	0.00
2.600	8.530	120.589	1.032	-0.177		120.59	0.86	9	124	0.494	0.000	0.494	242.87	0.86	0.00
2.700	8.858	109.882	1.119	0.063		109.88	1.02	8	121	0.514	0.000	0.514	212.65	1.02	0.00
2.800	9.186	105.588	0.974	-0.076		105.59	0.92	8	121	0.534	0.000	0.534	196.67	0.93	0.00
2.900	9.514	57.116	0.815	-0.315		57.11	1.43	7	118	0.553	0.000	0.553	102.19	1.44	0.00
3.000	9.843	32.531	0.681	-0.341		32.53	2.09	6	115	0.572	0.000	0.572	55.84	2.13	0.00
3.100	10.171	33.145	0.695	-0.353		33.14	2.10	6	115	0.591	0.000	0.591	55.07	2.14	0.00
3.200	10.499	18.357	0.543	-0.404		18.35	2.96	5	115	0.610	0.000	0.610	29.09	3.06	0.00

GREGG

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
0.100	0.328													
0.200	0.656													
0.300	0.984													
0.400	1.312													
0.500	1.640													
0.600	1.969													
0.700	2.297													
0.800	2.625													
0.900	2.953													
1.000	3.281													
1.100	3.609													
1.200	3.937													
1.300	4.265													
1.400	4.593													
1.500	4.921	4	2.65	22.73	3.00E-8	2.3	4.4				429	0.55	1.96	8.8
1.600	5.249	5	2.26	61.25	3.00E-6	6.0	11.3	42	40	110	371			
1.700	5.577	5	2.26	62.27	3.00E-6	6.4	11.7	42	40	117	387			
1.800	5.906	5	2.30	62.00	3.00E-6	6.7	11.8	42	40	120	397			
1.900	6.234	5	2.29	65.76	3.00E-6	7.3	12.6	43	40	132	418			
2.000	6.562	5	2.23	74.87	3.00E-6	8.6	14.4	46	41	159	451			
2.100	6.890	5	2.25	76.58	3.00E-6	9.1	14.9	47	41	167	467			
2.200	7.218	6	1.98	101.61	3.00E-4	12.0	19.2	54	43	246	540			
2.300	7.546	6	1.75	137.29	3.00E-4	16.3	25.4	63	44	363	624			
2.400	7.874	6	1.59	162.88	3.00E-4	19.3	29.4	68	45	453	682			
2.500	8.202	6	1.58	162.17	3.00E-4	19.5	29.2	68	45	461	696			
2.600	8.530	6	1.58	166.03	3.00E-4	20.4	29.9	69	45	482	717			
2.700	8.858	6	1.68	149.50	3.00E-4	19.2	27.6	65	44	440	704			
2.800	9.186	6	1.67	140.63	3.00E-4	18.4	26.0	63	44	422	703			
2.900	9.514	6	2.01	79.40	3.00E-4	11.3	15.6	48	41	228	580			
3.000	9.843	5	2.32	46.52	3.00E-6	7.3	9.9	36	37	130	486			
3.100	10.171	5	2.32	46.36	3.00E-6	7.4	10.0	36	37	133	494			
3.200	10.499	4	2.63	26.03	3.00E-8	4.8	6.3				918	1.18	1.94	8.7

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
3.300	10.827	17.437	0.440	-0.316		17.43	2.52	5	115	0.629	0.000	0.629	26.73	2.62	0.00
3.400	11.155	26.778	0.569	-0.227		26.77	2.12	6	115	0.647	0.005	0.643	40.65	2.18	0.00
3.500	11.483	33.916	0.677	-0.176		33.91	2.00	6	115	0.666	0.015	0.651	51.05	2.04	0.00
3.600	11.811	33.461	0.709	-0.164		33.46	2.12	6	115	0.685	0.025	0.660	49.67	2.16	0.00
3.700	12.139	31.677	0.743	-0.101		31.68	2.34	6	115	0.704	0.035	0.668	46.34	2.40	0.00
3.800	12.467	36.668	0.635	0.101		36.67	1.73	6	115	0.723	0.046	0.677	53.10	1.77	0.00
3.900	12.795	24.287	0.538	0.012		24.29	2.21	6	115	0.741	0.056	0.686	34.35	2.28	0.00
4.000	13.123	13.366	0.398	-0.038		13.37	2.98	5	115	0.760	0.066	0.694	18.16	3.16	-0.01
4.100	13.451	11.079	0.296	0.063		11.08	2.67	5	115	0.779	0.076	0.703	14.66	2.88	-0.01
4.200	13.780	9.667	0.275	0.215		9.67	2.84	4	115	0.798	0.087	0.711	12.47	3.10	-0.01
4.300	14.108	10.187	0.297	0.391		10.19	2.91	4	115	0.817	0.097	0.720	13.03	3.17	-0.01
4.400	14.436	10.633	0.367	0.567		10.64	3.45	4	115	0.835	0.107	0.728	13.46	3.74	-0.01
4.500	14.764	10.206	0.371	0.706		10.22	3.63	3	111	0.854	0.117	0.736	12.71	3.96	-0.01
4.600	15.092	9.583	0.362	0.782		9.59	3.77	3	111	0.872	0.128	0.744	11.72	4.15	-0.01
4.700	15.420	9.890	0.393	0.820		9.90	3.97	3	111	0.890	0.138	0.752	11.98	4.36	-0.01
4.800	15.748	9.862	0.485	0.807		9.87	4.91	3	111	0.909	0.148	0.760	11.79	5.41	-0.01
4.900	16.076	8.003	0.411	0.732		8.01	5.13	3	111	0.927	0.158	0.769	9.22	5.80	-0.01
5.000	16.404	7.854	0.345	0.681		7.86	4.39	3	111	0.945	0.169	0.777	8.91	4.99	-0.02
5.100	16.732	9.797	0.263	0.795		9.81	2.68	4	115	0.964	0.179	0.785	11.27	2.97	-0.01
5.200	17.060	12.316	0.218	0.857		12.33	1.77	5	115	0.983	0.189	0.794	14.29	1.92	-0.01
5.300	17.388	13.664	0.249	0.857		13.68	1.82	5	115	1.001	0.199	0.802	15.80	1.97	-0.01
5.400	17.717	10.977	0.215	0.958		10.99	1.95	5	115	1.020	0.209	0.811	12.30	2.15	-0.01
5.500	18.045	11.256	0.262	1.374		11.28	2.32	5	115	1.039	0.220	0.819	12.49	2.56	-0.01
5.600	18.373	14.472	0.414	1.930		14.50	2.86	5	115	1.058	0.230	0.828	16.24	3.08	-0.01
5.700	18.701	14.128	0.534	2.208		14.16	3.77	4	115	1.077	0.240	0.836	15.64	4.08	-0.01
5.800	19.029	22.205	0.744	3.406		22.25	3.34	5	115	1.095	0.250	0.845	25.04	3.51	0.00
5.900	19.357	22.744	0.821	4.036		22.80	3.60	5	115	1.114	0.261	0.854	25.41	3.78	0.00
6.000	19.685	18.301	0.712	4.150		18.36	3.88	4	115	1.133	0.271	0.862	19.98	4.13	0.00
6.100	20.013	16.675	0.604	4.276		16.74	3.61	4	115	1.152	0.281	0.871	17.90	3.87	0.00
6.200	20.341	19.008	0.661	4.617		19.07	3.47	5	115	1.171	0.291	0.879	20.36	3.69	0.00
6.300	20.669	25.626	0.853	4.894		25.70	3.32	5	115	1.189	0.302	0.888	27.60	3.48	0.00
6.400	20.997	34.037	0.832	4.856		34.11	2.44	6	115	1.208	0.312	0.896	36.70	2.53	0.00
6.500	21.325	32.559	0.660	4.579		32.63	2.02	6	115	1.227	0.322	0.905	34.70	2.10	0.00
6.600	21.654	33.349	1.030	4.907		33.42	3.08	5	115	1.246	0.332	0.914	35.22	3.20	0.00
6.700	21.982	50.070	1.217	5.134		50.14	2.43	6	115	1.265	0.343	0.922	53.01	2.49	0.00
6.800	22.310	65.788	1.107	4.831		65.86	1.68	7	118	1.284	0.353	0.931	69.35	1.71	0.00
6.900	22.638	71.188	1.466	4.314		71.25	2.06	7	118	1.303	0.363	0.940	74.39	2.10	0.00
7.000	22.966	139.281	2.116	4.137		139.34	1.52	8	121	1.323	0.373	0.950	145.30	1.53	0.00
7.100	23.294	236.977	1.771	4.036		237.04	0.75	9	124	1.343	0.383	0.960	245.52	0.75	0.00
7.200	23.622	272.985	1.258	3.898		273.04	0.46	10	127	1.364	0.394	0.971	279.90	0.46	0.00
7.300	23.950	280.318	1.105	3.835		280.37	0.39	10	127	1.385	0.404	0.981	284.31	0.40	0.00
7.400	24.278	278.199	1.052	3.948		278.26	0.38	10	127	1.406	0.414	0.992	279.10	0.38	0.00
7.500	24.606	245.835	1.281	3.910		245.89	0.52	9	124	1.426	0.424	1.002	243.96	0.52	0.00
7.600	24.934	107.158	1.707	3.620		107.21	1.59	8	121	1.446	0.435	1.012	104.55	1.61	0.00
7.700	25.262	38.322	1.237	4.402		38.39	3.22	5	115	1.465	0.445	1.020	36.19	3.35	0.00
7.800	25.591	36.008	1.054	7.215		36.11	2.92	6	115	1.484	0.455	1.029	33.66	3.04	0.00
7.900	25.919	38.071	1.584	10.507		38.22	4.14	5	115	1.503	0.465	1.037	35.40	4.31	0.01
8.000	26.247	168.708	2.499	13.774		168.91	1.48	8	121	1.523	0.476	1.047	159.88	1.49	0.00
8.100	26.575	435.455	3.154	13.699		435.65	0.72	10	127	1.543	0.486	1.058	410.47	0.73	0.00
8.200	26.903	577.050	3.716	15.074		577.27	0.64	10	127	1.564	0.496	1.068	538.93	0.65	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
3.300	10.827	4	2.62	24.01	3.00E-8	4.5	5.8				872	1.12	1.78	8.0
3.400	11.155	5	2.43	35.64	3.00E-6	6.3	8.1	32	35	107	474			
3.500	11.483	5	2.33	44.30	3.00E-6	7.7	9.8	36	37	136	515			
3.600	11.811	5	2.36	43.43	3.00E-6	7.6	9.7	35	37	134	515			
3.700	12.139	5	2.41	40.96	3.00E-6	7.4	9.3	34	36	127	507			
3.800	12.467	5	2.28	46.27	3.00E-6	8.1	10.1	36	37	147	535			
3.900	12.795	5	2.50	30.91	3.00E-6	5.9	7.3	30	34	97	468			
4.000	13.123	4	2.80	17.04	3.00E-8	3.8	4.7				668	0.84	1.21	5.4
4.100	13.451	4	2.85	13.86	3.00E-8	3.2	4.0				554	0.69	0.98	4.4
4.200	13.780	3	2.93	11.92	1.00E-9	3.0	3.6				483	0.59	0.83	3.7
4.300	14.108	3	2.92	12.45	1.00E-9	3.1	3.8				510	0.63	0.87	3.9
4.400	14.436	3	2.95	12.93	1.00E-9	3.3	4.0				532	0.65	0.90	4.0
4.500	14.764	3	2.98	12.28	1.00E-9	3.2	3.9				511	0.62	0.85	3.8
4.600	15.092	3	3.02	11.37	1.00E-9	3.1	3.7				480	0.58	0.78	3.5
4.700	15.420	3	3.03	11.64	1.00E-9	3.2	3.8				495	0.60	0.80	3.6
4.800	15.748	3	3.09	11.54	1.00E-9	3.3	3.9				494	0.60	0.79	3.5
4.900	16.076	3	3.20	9.12	1.00E-9	2.9	3.4				401	0.47	0.61	2.8
5.000	16.404	3	3.17	8.79	1.00E-9	2.8	3.3				393	0.46	0.59	2.7
5.100	16.732	3	2.95	10.91	1.00E-9	3.0	3.5				490	0.59	0.75	3.4
5.200	17.060	4	2.76	13.64	3.00E-8	3.4	4.0				616	0.76	0.95	4.3
5.300	17.388	4	2.73	15.06	3.00E-8	3.7	4.3				684	0.84	1.05	4.7
5.400	17.717	4	2.84	11.85	3.00E-8	3.2	3.6				550	0.66	0.82	3.7
5.500	18.045	4	2.88	12.09	3.00E-8	3.3	3.8				564	0.68	0.83	3.7
5.600	18.373	4	2.83	15.68	3.00E-8	4.2	4.7				725	0.90	1.08	4.9
5.700	18.701	3	2.92	15.22	1.00E-9	4.3	4.8				708	0.87	1.04	4.7
5.800	19.029	4	2.72	24.07	3.00E-8	6.0	6.8				1113	1.41	1.67	7.5
5.900	19.357	4	2.74	24.49	3.00E-8	6.2	7.0				1140	1.45	1.69	7.6
6.000	19.685	3	2.84	19.42	1.00E-9	5.3	5.9				918	1.15	1.33	6.0
6.100	20.013	3	2.86	17.44	1.00E-9	4.9	5.4				837	1.04	1.19	5.4
6.200	20.341	4	2.80	19.80	3.00E-8	5.4	5.9				954	1.19	1.36	6.1
6.300	20.669	4	2.69	26.72	3.00E-8	6.9	7.5				1285	1.63	1.84	8.3
6.400	20.997	4	2.50	35.26	3.00E-8	8.3	9.0				1705	2.19	2.45	11.0
6.500	21.325	5	2.47	33.36	3.00E-6	7.8	8.5	31	35	131	567			
6.600	21.654	4	2.58	34.12	3.00E-8	8.5	9.1				1671	2.14	2.35	10.6
6.700	21.982	5	2.38	51.02	3.00E-6	11.5	12.4	38	37	201	658			
6.800	22.310	5	2.18	66.42	3.00E-6	13.9	14.8	44	39	263	723			
6.900	22.638	5	2.22	71.58	3.00E-6	15.3	16.2	45	39	285	745			
7.000	22.966	6	1.92	138.92	3.00E-4	26.6	28.1	63	43	557	935			
7.100	23.294	6	1.54	233.86	3.00E-4	39.6	41.6	82	45	948	1120			
7.200	23.622	6	1.35	268.08	3.00E-4	43.0	44.9	88	46	1092	1178			
7.300	23.950	7	1.30	273.80	3.00E-2	43.5	45.2	88	46	1121	1193			
7.400	24.278	7	1.30	270.24	3.00E-2	43.1	44.5	88	46	1113	1194			
7.500	24.606	6	1.43	237.41	3.00E-4	39.7	40.8	82	45	984	1150			
7.600	24.934	6	2.04	102.77	3.00E-4	21.4	21.9	54	41	429	875			
7.700	25.262	4	2.59	35.91	3.00E-8	9.7	9.9				1919	2.46	2.41	10.9
7.800	25.591	4	2.58	33.45	3.00E-8	9.1	9.3				1806	2.31	2.24	10.1
7.900	25.919	4	2.67	35.26	3.00E-8	10.1	10.2				1911	2.45	2.36	10.6
8.000	26.247	6	1.88	159.16	3.00E-4	31.8	31.9	67	43	676	1030			
8.100	26.575	6	1.38	410.37	3.00E-4	69.2	69.2	108	47	1743	1417			
8.200	26.903	7	1.27	541.50	3.00E-2	88.6	88.1	124	48	2309	1561			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
8.300	27.231	652.235	3.774	12.828		652.42	0.58	10	127	1.585	0.506	1.079	603.24	0.58	0.00
8.400	27.559	625.717	3.612	8.640		625.84	0.58	10	127	1.606	0.517	1.090	572.93	0.58	0.00
8.500	27.887	542.800	4.058	4.856		542.87	0.75	10	127	1.627	0.527	1.100	491.95	0.75	0.00
8.600	28.215	463.433	4.210	8.376		463.55	0.91	10	127	1.648	0.537	1.111	415.82	0.91	0.00
8.700	28.543	344.981	1.613	10.671		345.13	0.47	10	127	1.669	0.547	1.121	306.26	0.47	0.00
8.800	28.871	264.322	1.034	10.633		264.48	0.39	10	127	1.690	0.557	1.132	232.11	0.39	0.00
8.900	29.199	338.680	3.275	9.877		338.82	0.97	9	124	1.710	0.568	1.142	295.13	0.97	0.00
9.000	29.528	471.593	4.471	11.012		471.75	0.95	10	127	1.731	0.578	1.153	407.68	0.95	0.00
9.100	29.856	482.477	3.201	12.967		482.66	0.66	10	127	1.752	0.588	1.164	413.31	0.67	0.00
9.200	30.184	413.120	2.867	15.667		413.35	0.69	10	127	1.773	0.598	1.174	350.51	0.70	0.00
9.300	30.512	436.887	3.018	17.647		437.14	0.69	10	127	1.794	0.609	1.185	367.42	0.69	0.00
9.400	30.840	547.214	3.190	19.867		547.50	0.58	10	127	1.814	0.619	1.196	456.45	0.58	0.00
9.500	31.168	596.857	3.305	17.962		597.12	0.55	10	127	1.835	0.629	1.206	493.53	0.56	0.00
9.600	31.496	524.842	3.357	11.820		525.01	0.64	10	127	1.856	0.639	1.217	429.94	0.64	0.00
9.700	31.824	397.347	3.179	11.744		397.52	0.80	10	127	1.877	0.650	1.227	322.32	0.80	0.00
9.800	32.152	176.636	3.132	11.050		176.80	1.77	8	121	1.897	0.660	1.237	141.38	1.79	0.00
9.900	32.480	48.695	2.532	12.677		48.88	5.18	3	111	1.915	0.670	1.245	37.72	5.39	0.01
10.000	32.808	219.810	1.758	20.397		220.10	0.80	9	124	1.936	0.680	1.255	173.81	0.81	0.00
10.100	33.136	404.040	3.321	22.049		404.36	0.82	10	127	1.956	0.691	1.266	317.88	0.83	0.00
10.200	33.465	496.363	2.100	22.163		496.68	0.42	10	127	1.977	0.701	1.277	387.54	0.42	0.00
10.300	33.793	386.528	1.445	20.649		386.83	0.37	10	127	1.998	0.711	1.287	298.97	0.38	0.00
10.400	34.121	311.502	1.288	19.223		311.78	0.41	10	127	2.019	0.721	1.298	238.68	0.42	0.00
10.500	34.449	326.457	2.922	18.732		326.73	0.89	9	124	2.039	0.732	1.308	248.24	0.90	0.00
10.600	34.777	419.301	4.279	19.324		419.58	1.02	9	124	2.060	0.742	1.318	316.76	1.02	0.00
10.700	35.105	495.731	3.199	16.890		495.97	0.64	10	127	2.081	0.752	1.329	371.70	0.65	0.00
10.800	35.433	567.226	2.635	16.108		567.46	0.46	10	127	2.102	0.762	1.339	422.10	0.47	0.00
10.900	35.761	677.414	3.672	17.924		677.67	0.54	10	127	2.122	0.772	1.350	500.40	0.54	0.00
11.000	36.089	727.066	4.672	26.691		727.45	0.64	10	127	2.143	0.783	1.361	533.05	0.64	0.00
11.100	36.417	691.217	4.336	31.018		691.66	0.63	10	127	2.164	0.793	1.371	502.80	0.63	0.00
11.200	36.745	745.349	1.225	34.171		745.84	0.16	10	127	2.185	0.803	1.382	538.11	0.16	0.00
11.300	37.073	574.355	1.477	24.269		574.70	0.26	10	127	2.206	0.813	1.393	411.09	0.26	0.00
11.400	37.402	235.722	3.413	11.441		235.89	1.45	9	124	2.226	0.824	1.403	166.57	1.46	0.00
11.500	37.730	540.978	2.265	15.565		541.20	0.42	10	127	2.247	0.834	1.413	381.32	0.42	0.00
11.600	38.058	339.869	1.572	15.629		340.09	0.46	10	127	2.268	0.844	1.424	237.23	0.47	0.00
11.700	38.386	301.547	1.972	15.213		301.77	0.65	10	127	2.289	0.854	1.435	208.74	0.66	0.00
11.800	38.714	494.941	3.690	15.982		495.17	0.75	10	127	2.310	0.865	1.445	341.00	0.75	0.00
11.900	39.042	511.895	2.899	16.663		512.13	0.57	10	127	2.331	0.875	1.456	350.14	0.57	0.00
12.000	39.370	363.756	2.085	16.600		364.00	0.57	10	127	2.352	0.885	1.467	246.58	0.58	0.00
12.100	39.698	322.395	2.098	16.814		322.64	0.65	10	127	2.373	0.895	1.477	216.79	0.65	0.00
12.200	40.026	334.060	1.892	17.344		334.31	0.57	10	127	2.393	0.906	1.488	223.07	0.57	0.00
12.300	40.354	362.344	1.544	17.596		362.60	0.43	10	127	2.414	0.916	1.499	240.35	0.43	0.00
12.400	40.682	371.796	1.001	17.773		372.05	0.27	10	127	2.435	0.926	1.509	244.90	0.27	0.00
12.500	41.011	313.035	0.840	17.672		313.29	0.27	10	127	2.456	0.936	1.520	204.51	0.27	0.00
12.600	41.339	292.847	0.936	17.470		293.10	0.32	10	127	2.477	0.946	1.531	189.88	0.32	0.00
12.700	41.667	226.316	1.206	17.256		226.56	0.53	9	124	2.497	0.957	1.541	145.43	0.54	0.00
12.800	41.995	90.716	1.897	16.348		90.95	2.09	7	118	2.517	0.967	1.550	57.06	2.15	0.00
12.900	42.323	36.528	1.519	18.593		36.80	4.13	5	115	2.535	0.977	1.558	21.99	4.43	0.01
13.000	42.651	36.370	1.129	68.140		37.35	3.02	6	115	2.554	0.987	1.567	22.21	3.25	0.11
13.100	42.979	134.345	2.254	208.193		137.34	1.64	8	121	2.574	0.998	1.576	85.49	1.67	0.10
13.200	43.307	480.079	3.733	194.582		482.88	0.77	10	127	2.595	1.008	1.587	302.61	0.78	0.03

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
8.300	27.231	7	1.20	609.14	3.00E-2	98.1	97.2	132	49	2610	1632			
8.400	27.559	7	1.21	581.38	3.00E-2	94.5	93.1	129	49	2503	1614			
8.500	27.887	7	1.34	501.64	3.00E-2	85.2	83.6	120	48	2171	1545			
8.600	28.215	6	1.45	426.05	3.00E-4	75.4	73.5	110	47	1854	1470			
8.700	28.543	7	1.33	315.30	3.00E-2	53.9	52.4	95	46	1381	1337			
8.800	28.871	6	1.37	240.10	3.00E-4	41.9	40.5	83	45	1058	1227			
8.900	29.199	6	1.57	306.64	3.00E-4	57.1	55.0	94	46	1355	1337			
9.000	29.528	6	1.47	425.55	3.00E-4	77.2	73.9	110	47	1887	1497			
9.100	29.856	6	1.35	433.42	3.00E-4	75.9	72.4	111	47	1931	1513			
9.200	30.184	6	1.41	369.24	3.00E-4	66.2	62.9	103	47	1653	1441			
9.300	30.512	6	1.39	388.81	3.00E-4	69.7	65.9	105	47	1749	1473			
9.400	30.840	7	1.28	485.18	3.00E-2	84.2	79.2	118	48	2190	1593			
9.500	31.168	7	1.24	526.93	3.00E-2	90.8	85.1	123	48	2388	1644			
9.600	31.496	7	1.32	461.06	3.00E-2	82.0	76.4	115	48	2100	1580			
9.700	31.824	6	1.48	347.16	3.00E-4	65.1	60.5	100	46	1590	1444			
9.800	32.152	6	1.98	150.47	3.00E-4	34.5	31.9	66	42	707	1105			
9.900	32.480	3	2.72	38.81	1.00E-9	13.2	12.2				2444	3.13	2.51	11.3
10.000	32.808	6	1.67	189.04	3.00E-4	38.3	35.2	73	43	880	1195			
10.100	33.136	6	1.49	347.70	3.00E-4	66.5	60.8	100	46	1617	1467			
10.200	33.465	7	1.22	425.66	3.00E-2	75.2	68.4	110	47	1987	1576			
10.300	33.793	7	1.27	329.75	3.00E-2	59.4	53.9	97	46	1547	1454			
10.400	34.121	6	1.38	264.33	3.00E-4	49.4	44.6	87	45	1247	1357			
10.500	34.449	6	1.59	276.00	3.00E-4	55.5	49.9	89	45	1307	1382			
10.600	34.777	6	1.57	353.54	3.00E-4	70.7	63.3	101	46	1678	1506			
10.700	35.105	6	1.37	416.54	3.00E-4	78.5	70.0	109	47	1984	1596			
10.800	35.433	7	1.23	474.91	3.00E-2	86.0	76.4	116	47	2270	1674			
10.900	35.761	7	1.23	565.23	3.00E-2	102.7	90.9	127	48	2711	1781			
11.000	36.089	7	1.27	604.48	3.00E-2	111.6	98.5	131	48	2910	1828			
11.100	36.417	7	1.28	572.40	3.00E-2	106.4	93.4	128	48	2767	1802			
11.200	36.745	7	0.86	614.98	3.00E-2	101.9	89.2	133	48	2983	1853			
11.300	37.073	7	1.06	471.62	3.00E-2	83.1	72.4	116	47	2299	1703			
11.400	37.402	6	1.86	188.19	3.00E-4	44.1	38.3	73	43	944	1269			
11.500	37.730	7	1.23	440.71	3.00E-2	82.0	70.9	112	47	2165	1677			
11.600	38.058	6	1.41	275.21	3.00E-4	54.5	47.0	89	45	1360	1440			
11.700	38.386	6	1.55	243.06	3.00E-4	50.6	43.4	83	44	1207	1388			
11.800	38.714	6	1.44	398.54	3.00E-4	80.1	68.6	107	47	1981	1641			
11.900	39.042	7	1.34	410.73	3.00E-2	80.4	68.6	108	47	2049	1663			
12.000	39.370	6	1.46	290.30	3.00E-4	59.2	50.3	91	45	1456	1488			
12.100	39.698	6	1.54	256.16	3.00E-4	53.8	45.5	86	44	1291	1433			
12.200	40.026	6	1.49	264.53	3.00E-4	54.9	46.3	87	45	1337	1453			
12.300	40.354	6	1.38	286.03	3.00E-4	57.6	48.4	90	45	1450	1497			
12.400	40.682	7	1.26	292.49	3.00E-2	57.0	47.7	91	45	1488	1513			
12.500	41.011	7	1.33	245.11	3.00E-2	49.0	40.9	84	44	1253	1432			
12.600	41.339	6	1.40	228.37	3.00E-4	46.8	38.9	81	44	1172	1404			
12.700	41.667	6	1.62	175.49	3.00E-4	38.8	32.2	71	43	906	1291			
12.800	41.995	5	2.31	63.95	3.00E-6	20.3	16.8	43	38	364	955			
12.900	42.323	3	2.83	23.24	1.00E-9	10.6	8.7				1840	2.28	1.47	6.6
13.000	42.651	4	2.74	23.74	3.00E-8	10.0	8.2				1868	2.32	1.48	6.7
13.100	42.979	5	2.11	98.65	3.00E-6	27.6	22.6	53	40	549	1101			
13.200	43.307	6	1.49	370.62	3.00E-4	78.9	64.4	103	46	1932	1679			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
13.300	43.635	554.892	5.280	118.394		556.60	0.95	10	127	2.616	1.018	1.598	346.72	0.95	0.01
13.400	43.963	470.162	5.913	92.574		471.49	1.25	9	124	2.636	1.028	1.608	291.60	1.26	0.01
13.500	44.291	470.171	6.686	79.897		471.32	1.42	9	124	2.657	1.039	1.618	289.65	1.43	0.01
13.600	44.619	446.079	5.979	76.289		447.18	1.34	9	124	2.677	1.049	1.628	273.01	1.35	0.01
13.700	44.948	461.973	4.198	78.837		463.11	0.91	10	127	2.698	1.059	1.639	280.94	0.91	0.01
13.800	45.276	518.011	3.896	78.408		519.14	0.75	10	127	2.719	1.069	1.649	313.09	0.75	0.01
13.900	45.604	519.628	4.546	75.028		520.71	0.87	10	127	2.740	1.080	1.660	312.01	0.88	0.01
14.000	45.932	522.305	4.841	69.869		523.31	0.93	10	127	2.761	1.090	1.671	311.57	0.93	0.01
14.100	46.260	524.322	4.704	67.081		525.29	0.90	10	127	2.781	1.100	1.681	310.76	0.90	0.01
14.200	46.588	530.150	4.357	67.548		531.12	0.82	10	127	2.802	1.110	1.692	312.24	0.82	0.01
14.300	46.916	531.832	4.266	70.335		532.84	0.80	10	127	2.823	1.120	1.703	311.28	0.80	0.01
14.400	47.244	532.371	3.182	70.877		533.39	0.60	10	127	2.844	1.131	1.713	309.65	0.60	0.01
14.500	47.572	538.701	1.801	69.755		539.71	0.33	10	127	2.865	1.141	1.724	311.39	0.34	0.01
14.600	47.900	578.835	1.393	70.890		579.86	0.24	10	127	2.886	1.151	1.735	332.61	0.24	0.01
14.700	48.228	639.148	2.231	90.000		640.44	0.35	10	127	2.907	1.161	1.745	365.29	0.35	0.01
14.800	48.556	568.406	3.711	103.207		569.89	0.65	10	127	2.928	1.172	1.756	322.88	0.65	0.01
14.900	48.885	536.749	3.719	91.237		538.06	0.69	10	127	2.949	1.182	1.767	302.91	0.69	0.01
15.000	49.213	561.519	2.893	86.885		562.77	0.51	10	127	2.969	1.192	1.777	314.98	0.52	0.01
15.100	49.541	570.442	2.439	78.080		571.57	0.43	10	127	2.990	1.202	1.788	318.01	0.43	0.01
15.200	49.869	517.407	3.824	62.401		518.31	0.74	10	127	3.011	1.213	1.799	286.51	0.74	0.01
15.300	50.197	476.872	1.464	59.740		477.73	0.31	10	127	3.032	1.223	1.809	262.38	0.31	0.01

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
13.300	43.635	6	1.52	426.06	3.00E-4	92.1	74.9	110	47	2226	1764			
13.400	43.963	6	1.66	358.57	3.00E-4	81.8	66.3	101	46	1886	1672			
13.500	44.291	6	1.70	355.26	3.00E-4	83.0	67.2	101	46	1885	1676			
13.600	44.619	6	1.70	336.07	3.00E-4	78.7	63.4	98	46	1789	1650			
13.700	44.948	6	1.56	349.64	3.00E-4	77.7	62.5	100	46	1852	1673			
13.800	45.276	6	1.47	390.90	3.00E-4	84.6	67.7	106	46	2077	1742			
13.900	45.604	6	1.52	390.82	3.00E-4	86.2	68.9	106	46	2083	1747			
14.000	45.932	6	1.54	391.51	3.00E-4	87.2	69.4	106	46	2093	1754			
14.100	46.260	6	1.53	391.73	3.00E-4	87.3	69.2	106	46	2101	1760			
14.200	46.588	6	1.50	394.84	3.00E-4	87.4	69.1	106	46	2124	1770			
14.300	46.916	6	1.49	394.88	3.00E-4	87.5	69.0	106	46	2131	1776			
14.400	47.244	6	1.40	394.04	3.00E-4	85.0	66.8	106	46	2134	1780			
14.500	47.572	7	1.23	397.48	3.00E-2	81.7	64.0	107	46	2159	1791			
14.600	47.900	7	1.12	425.88	3.00E-2	85.2	66.5	110	46	2319	1838			
14.700	48.228	7	1.19	469.14	3.00E-2	95.8	74.6	116	47	2562	1904			
14.800	48.556	6	1.41	415.95	3.00E-4	91.2	70.8	109	46	2280	1835			
14.900	48.885	6	1.45	391.39	3.00E-4	87.2	67.5	106	46	2152	1803			
15.000	49.213	6	1.35	408.22	3.00E-4	88.3	68.1	108	46	2251	1834			
15.100	49.541	7	1.29	413.38	3.00E-2	88.1	67.8	109	46	2286	1848			
15.200	49.869	6	1.49	373.53	3.00E-4	85.0	65.2	103	46	2073	1792			
15.300	50.197	7	1.27	343.09	3.00E-2	73.2	56.0	99	45	1911	1747			

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LIQUEFACTION ANALYSIS CALCULATION DETAILS
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Input File Name: G:\GS16\GS16-0107_Panama\Design & Analysis\LIQUEFACTION\16-0107-CPT2.liq
Title: 12870 Panama Street
Subtitle: CPT 2

Input Data:
Surface Elev.=0
Hole No.=CPT2
Depth of Hole=50.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.65 g
Earthquake Magnitude=6.63
No-Liquefiable Soils: CL, OL are Non-Liq. Soil
1. CPT Calulation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.1
Plot two CSR (fs1=1, fs2=User)
10. Average two input data between two Depths: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf %	Gamma pcf	Fines %	D50 mm
0.16	0.00	0.00	100.00	120.00	0.00	0.50
0.66	0.00	0.00	100.00	120.00	0.00	0.50
1.15	0.00	0.00	100.00	120.00	0.00	0.50
1.64	0.00	0.00	100.00	120.00	0.00	0.50
2.13	0.00	0.00	100.00	120.00	0.00	0.50
2.62	0.00	0.00	100.00	120.00	0.00	0.50
3.12	0.00	0.00	100.00	120.00	0.00	0.50
3.61	0.00	0.00	100.00	120.00	0.00	0.50
4.10	0.00	0.00	100.00	120.00	0.00	0.50
4.59	0.00	0.00	100.00	120.00	0.00	0.50
5.09	25.76	0.83	3.23	120.00	0.00	0.50
5.58	29.11	0.85	2.91	120.00	0.00	0.50
6.07	30.17	1.00	3.31	120.00	0.00	0.50
6.56	41.51	1.16	2.79	120.00	0.00	0.50
7.05	45.20	1.32	2.91	120.00	0.00	0.50
7.55	91.23	1.20	1.32	120.00	0.00	0.50
8.04	120.70	0.87	0.72	120.00	0.00	0.50
8.53	115.40	0.84	0.73	120.00	0.00	0.50
9.02	126.70	1.08	0.85	120.00	0.00	0.50
9.51	55.32	0.87	1.57	120.00	0.00	0.50
10.00	39.17	0.67	1.70	120.00	0.00	0.50
10.49	16.48	0.49	2.96	120.00	0.00	0.50
10.99	17.87	0.50	2.81	120.00	0.00	0.50
11.48	33.68	0.71	2.11	120.00	0.00	0.50
11.97	30.95	0.75	2.41	120.00	0.00	0.50
12.46	39.73	0.55	1.37	120.00	0.00	0.50
12.95	16.45	0.50	3.06	120.00	0.00	0.50
13.45	11.46	0.28	2.43	120.00	0.00	0.50
13.94	9.23	0.25	2.69	120.00	0.00	0.50
14.43	10.76	0.38	3.57	120.00	NoLiq	0.50
14.92	10.42	0.37	3.57	120.00	NoLiq	0.50
15.41	10.48	0.36	3.47	120.00	NoLiq	0.50
15.91	9.79	0.48	4.94	120.00	NoLiq	0.50
16.40	7.50	0.34	4.48	120.00	NoLiq	0.50
16.89	11.54	0.19	1.66	120.00	NoLiq	0.50
17.38	15.30	0.26	1.73	120.00	NoLiq	0.50
17.88	9.73	0.22	2.31	120.00	NoLiq	0.50
18.37	16.22	0.39	2.42	120.00	NoLiq	0.50
18.86	15.69	0.61	3.90	120.00	NoLiq	0.50
19.35	23.00	0.84	3.66	120.00	NoLiq	0.50
19.84	17.53	0.67	3.80	120.00	NoLiq	0.50
20.34	20.43	0.65	3.19	120.00	NoLiq	0.50
20.83	33.60	0.96	2.87	120.00	NoLiq	0.50
21.32	32.65	0.63	1.91	120.00	NoLiq	0.50
21.81	41.10	1.40	3.40	120.00	NoLiq	0.50
22.30	66.33	1.02	1.54	120.00	0.00	0.50
22.80	76.04	1.91	2.51	120.00	0.00	0.50

23.29	246.50	1.64	0.66	120.00	0.00	0.50
23.78	286.70	1.13	0.39	120.00	0.00	0.50
24.27	276.80	0.99	0.36	120.00	NoLiq	0.50
24.77	178.90	1.61	0.90	120.00	NoLiq	0.50
25.26	32.23	1.13	3.49	120.00	NoLiq	0.50
25.75	37.11	1.10	2.97	120.00	NoLiq	0.50
26.24	131.50	2.02	1.54	120.00	0.00	0.50
26.73	526.20	3.11	0.59	120.00	0.00	0.50
27.23	648.10	4.77	0.74	120.00	0.00	0.50
27.72	551.80	4.01	0.73	120.00	0.00	0.50
28.21	464.90	5.09	1.10	120.00	0.00	0.50
28.70	292.90	0.81	0.28	120.00	0.00	0.50
29.19	327.40	3.39	1.04	120.00	0.00	0.50
29.69	513.60	2.88	0.56	120.00	0.00	0.50
30.18	397.70	2.74	0.69	120.00	0.00	0.50
30.67	475.70	3.48	0.73	120.00	0.00	0.50
31.16	639.70	3.07	0.48	120.00	0.00	0.50
31.66	493.90	3.49	0.71	120.00	0.00	0.50
32.15	163.90	3.30	2.01	120.00	0.00	0.50
32.64	41.63	2.01	4.84	120.00	0.00	0.50
33.13	406.80	5.00	1.23	120.00	0.00	0.50
33.62	447.00	1.47	0.33	120.00	0.00	0.50
34.12	310.60	1.06	0.34	120.00	0.00	0.50
34.61	394.20	5.76	1.46	120.00	0.00	0.50
35.10	478.40	3.33	0.70	120.00	0.00	0.50
35.59	563.10	2.14	0.38	120.00	0.00	0.50
36.08	758.00	4.98	0.66	120.00	0.00	0.50
36.58	701.00	2.07	0.30	120.00	0.00	0.50
37.07	870.50	0.02	0.00	120.00	0.00	0.50
37.56	637.50	2.94	0.46	120.00	0.00	0.50
38.05	332.90	1.53	0.46	120.00	0.00	0.50
38.54	382.30	2.79	0.73	120.00	0.00	0.50
39.04	540.40	2.74	0.51	120.00	0.00	0.50
39.53	321.80	1.93	0.60	120.00	0.00	0.50
40.02	332.40	1.63	0.49	120.00	0.00	0.50
40.51	393.40	1.14	0.29	120.00	0.00	0.50
41.01	311.90	0.78	0.25	120.00	0.00	0.50
41.50	302.10	0.79	0.26	120.00	0.00	0.50
41.99	82.78	1.96	2.37	120.00	0.00	0.50
42.48	30.44	0.96	3.17	120.00	NoLiq	0.50
42.97	50.27	2.23	4.45	120.00	NoLiq	0.50
43.47	593.00	4.63	0.78	120.00	NoLiq	0.50
43.96	454.30	5.88	1.29	120.00	NoLiq	0.50
44.45	478.90	6.75	1.41	120.00	0.00	0.50
44.94	459.20	3.26	0.71	120.00	0.00	0.50
45.43	517.10	4.16	0.80	120.00	0.00	0.50
45.93	520.80	4.86	0.93	120.00	0.00	0.50
46.42	525.60	4.70	0.89	120.00	0.00	0.50
46.91	531.30	4.24	0.80	120.00	0.00	0.50
47.40	532.80	1.62	0.30	120.00	0.00	0.50
47.90	572.30	1.14	0.20	120.00	0.00	0.50
48.39	598.00	3.28	0.55	120.00	0.00	0.50
48.88	530.20	3.70	0.70	120.00	0.00	0.50
49.37	583.00	1.85	0.32	120.00	0.00	0.50
49.86	508.50	3.99	0.78	120.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Calculation segment, dz=0.050 ft
User defined Print Interval, dp=0.50 ft

Peak Ground Acceleration (PGA), a_max = 0.65g

CSR Calculation:

Depth ft	gamma pcf	sigma atm	gamma' pcf	sigma' atm	rd	mZ g	a(z) g	CSR	x fs1	=CSRfs
0.16	120.00	0.009	120.00	0.009	1.00	0.000	0.650	0.42	1.00	0.42
0.66	120.00	0.037	120.00	0.037	1.00	0.000	0.650	0.42	1.00	0.42
1.16	120.00	0.066	120.00	0.066	1.00	0.000	0.650	0.42	1.00	0.42
1.66	120.00	0.094	120.00	0.094	1.00	0.000	0.650	0.42	1.00	0.42
2.16	120.00	0.122	120.00	0.122	0.99	0.000	0.650	0.42	1.00	0.42
2.66	120.00	0.151	120.00	0.151	0.99	0.000	0.650	0.42	1.00	0.42
3.16	120.00	0.179	120.00	0.179	0.99	0.000	0.650	0.42	1.00	0.42
3.66	120.00	0.208	120.00	0.208	0.99	0.000	0.650	0.42	1.00	0.42
4.16	120.00	0.236	120.00	0.236	0.99	0.000	0.650	0.42	1.00	0.42
4.66	120.00	0.264	120.00	0.264	0.99	0.000	0.650	0.42	1.00	0.42
5.16	120.00	0.293	57.60	0.288	0.99	0.000	0.650	0.42	1.00	0.42
5.66	120.00	0.321	57.60	0.302	0.99	0.000	0.650	0.44	1.00	0.44
6.16	120.00	0.349	57.60	0.315	0.99	0.000	0.650	0.46	1.00	0.46

6.66	120.00	0.378	57.60	0.329	0.98	0.000	0.650	0.48	1.00	0.48
7.16	120.00	0.406	57.60	0.343	0.98	0.000	0.650	0.49	1.00	0.49
7.66	120.00	0.434	57.60	0.356	0.98	0.000	0.650	0.51	1.00	0.51
8.16	120.00	0.463	57.60	0.370	0.98	0.000	0.650	0.52	1.00	0.52
8.66	120.00	0.491	57.60	0.383	0.98	0.000	0.650	0.53	1.00	0.53
9.16	120.00	0.519	57.60	0.397	0.98	0.000	0.650	0.54	1.00	0.54
9.66	120.00	0.548	57.60	0.411	0.98	0.000	0.650	0.55	1.00	0.55
10.16	120.00	0.576	57.60	0.424	0.98	0.000	0.650	0.56	1.00	0.56
10.66	120.00	0.604	57.60	0.438	0.98	0.000	0.650	0.57	1.00	0.57
11.16	120.00	0.633	57.60	0.451	0.97	0.000	0.650	0.58	1.00	0.58
11.66	120.00	0.661	57.60	0.465	0.97	0.000	0.650	0.58	1.00	0.58
12.16	120.00	0.690	57.60	0.479	0.97	0.000	0.650	0.59	1.00	0.59
12.66	120.00	0.718	57.60	0.492	0.97	0.000	0.650	0.60	1.00	0.60
13.16	120.00	0.746	57.60	0.506	0.97	0.000	0.650	0.60	1.00	0.60
13.66	120.00	0.775	57.60	0.520	0.97	0.000	0.650	0.61	1.00	0.61
14.16	120.00	0.803	57.60	0.533	0.97	0.000	0.650	0.62	1.00	0.62
14.66	120.00	0.831	57.60	0.547	0.97	0.000	0.650	0.62	1.00	0.62
15.16	120.00	0.860	57.60	0.560	0.96	0.000	0.650	0.63	1.00	0.63
15.66	120.00	0.888	57.60	0.574	0.96	0.000	0.650	0.63	1.00	0.63
16.16	120.00	0.916	57.60	0.588	0.96	0.000	0.650	0.63	1.00	0.63
16.66	120.00	0.945	57.60	0.601	0.96	0.000	0.650	0.64	1.00	0.64
17.16	120.00	0.973	57.60	0.615	0.96	0.000	0.650	0.64	1.00	0.64
17.66	120.00	1.001	57.60	0.628	0.96	0.000	0.650	0.65	1.00	0.65
18.16	120.00	1.030	57.60	0.642	0.96	0.000	0.650	0.65	1.00	0.65
18.66	120.00	1.058	57.60	0.656	0.96	0.000	0.650	0.65	1.00	0.65
19.16	120.00	1.086	57.60	0.669	0.96	0.000	0.650	0.66	1.00	0.66
19.66	120.00	1.115	57.60	0.683	0.95	0.000	0.650	0.66	1.00	0.66
20.16	120.00	1.143	57.60	0.696	0.95	0.000	0.650	0.66	1.00	0.66
20.66	120.00	1.172	57.60	0.710	0.95	0.000	0.650	0.66	1.00	0.66
21.16	120.00	1.200	57.60	0.724	0.95	0.000	0.650	0.67	1.00	0.67
21.66	120.00	1.228	57.60	0.737	0.95	0.000	0.650	0.67	1.00	0.67
22.16	120.00	1.257	57.60	0.751	0.95	0.000	0.650	0.67	1.00	0.67
22.66	120.00	1.285	57.60	0.765	0.95	0.000	0.650	0.67	1.00	0.67
23.16	120.00	1.313	57.60	0.778	0.95	0.000	0.650	0.67	1.00	0.67
23.66	120.00	1.342	57.60	0.792	0.94	0.000	0.650	0.68	1.00	0.68
24.16	120.00	1.370	57.60	0.805	0.94	0.000	0.650	0.68	1.00	0.68
24.66	120.00	1.398	57.60	0.819	0.94	0.000	0.650	0.68	1.00	0.68
25.16	120.00	1.427	57.60	0.833	0.94	0.000	0.650	0.68	1.00	0.68
25.66	120.00	1.455	57.60	0.846	0.94	0.000	0.650	0.68	1.00	0.68
26.16	120.00	1.483	57.60	0.860	0.94	0.000	0.650	0.68	1.00	0.68
26.66	120.00	1.512	57.60	0.873	0.94	0.000	0.650	0.69	1.00	0.69
27.16	120.00	1.540	57.60	0.887	0.94	0.000	0.650	0.69	1.00	0.69
27.66	120.00	1.568	57.60	0.901	0.94	0.000	0.650	0.69	1.00	0.69
28.16	120.00	1.597	57.60	0.914	0.93	0.000	0.650	0.69	1.00	0.69
28.66	120.00	1.625	57.60	0.928	0.93	0.000	0.650	0.69	1.00	0.69
29.16	120.00	1.654	57.60	0.941	0.93	0.000	0.650	0.69	1.00	0.69
29.66	120.00	1.682	57.60	0.955	0.93	0.000	0.650	0.69	1.00	0.69
30.16	120.00	1.710	57.60	0.969	0.93	0.000	0.650	0.69	1.00	0.69
30.66	120.00	1.739	57.60	0.982	0.92	0.000	0.650	0.69	1.00	0.69
31.16	120.00	1.767	57.60	0.996	0.92	0.000	0.650	0.69	1.00	0.69
31.66	120.00	1.795	57.60	1.009	0.92	0.000	0.650	0.69	1.00	0.69
32.16	120.00	1.824	57.60	1.023	0.91	0.000	0.650	0.69	1.00	0.69
32.66	120.00	1.852	57.60	1.037	0.91	0.000	0.650	0.69	1.00	0.69
33.16	120.00	1.880	57.60	1.050	0.90	0.000	0.650	0.68	1.00	0.68
33.66	120.00	1.909	57.60	1.064	0.90	0.000	0.650	0.68	1.00	0.68
34.16	120.00	1.937	57.60	1.078	0.90	0.000	0.650	0.68	1.00	0.68
34.66	120.00	1.965	57.60	1.091	0.89	0.000	0.650	0.68	1.00	0.68
35.16	120.00	1.994	57.60	1.105	0.89	0.000	0.650	0.68	1.00	0.68
35.66	120.00	2.022	57.60	1.118	0.88	0.000	0.650	0.68	1.00	0.68
36.16	120.00	2.050	57.60	1.132	0.88	0.000	0.650	0.67	1.00	0.67
36.66	120.00	2.079	57.60	1.146	0.88	0.000	0.650	0.67	1.00	0.67
37.16	120.00	2.107	57.60	1.159	0.87	0.000	0.650	0.67	1.00	0.67
37.66	120.00	2.136	57.60	1.173	0.87	0.000	0.650	0.67	1.00	0.67
38.16	120.00	2.164	57.60	1.186	0.86	0.000	0.650	0.67	1.00	0.67
38.66	120.00	2.192	57.60	1.200	0.86	0.000	0.650	0.66	1.00	0.66
39.16	120.00	2.221	57.60	1.214	0.86	0.000	0.650	0.66	1.00	0.66
39.66	120.00	2.249	57.60	1.227	0.85	0.000	0.650	0.66	1.00	0.66
40.16	120.00	2.277	57.60	1.241	0.85	0.000	0.650	0.66	1.00	0.66
40.66	120.00	2.306	57.60	1.254	0.84	0.000	0.650	0.65	1.00	0.65
41.16	120.00	2.334	57.60	1.268	0.84	0.000	0.650	0.65	1.00	0.65
41.66	120.00	2.362	57.60	1.282	0.83	0.000	0.650	0.65	1.00	0.65
42.16	120.00	2.391	57.60	1.295	0.83	0.000	0.650	0.65	1.00	0.65
42.66	120.00	2.419	57.60	1.309	0.83	0.000	0.650	0.65	1.00	0.65
43.16	120.00	2.447	57.60	1.322	0.82	0.000	0.650	0.64	1.00	0.64
43.66	120.00	2.476	57.60	1.336	0.82	0.000	0.650	0.64	1.00	0.64
44.16	120.00	2.504	57.60	1.350	0.81	0.000	0.650	0.64	1.00	0.64
44.66	120.00	2.532	57.60	1.363	0.81	0.000	0.650	0.64	1.00	0.64
45.16	120.00	2.561	57.60	1.377	0.81	0.000	0.650	0.63	1.00	0.63
45.66	120.00	2.589	57.60	1.391	0.80	0.000	0.650	0.63	1.00	0.63
46.16	120.00	2.618	57.60	1.404	0.80	0.000	0.650	0.63	1.00	0.63
46.66	120.00	2.646	57.60	1.418	0.79	0.000	0.650	0.63	1.00	0.63
47.16	120.00	2.674	57.60	1.431	0.79	0.000	0.650	0.62	1.00	0.62

47.66	120.00	2.703	57.60	1.445	0.79	0.000	0.650	0.62	1.00	0.62
48.16	120.00	2.731	57.60	1.459	0.78	0.000	0.650	0.62	1.00	0.62
48.66	120.00	2.759	57.60	1.472	0.78	0.000	0.650	0.62	1.00	0.62
49.16	120.00	2.788	57.60	1.486	0.77	0.000	0.650	0.61	1.00	0.61
49.66	120.00	2.816	57.60	1.499	0.77	0.000	0.650	0.61	1.00	0.61

CSR is based on water table at 5.00 during earthquake

CRR Calculation from CPT data, using Modify Robertson's Method:
(Fines content is determined by qc and fric.)

Depth ft	qc atm	fric. atm	n	Q	Rf	Ic	Cq	Fines %	Kc	qc1n atm	qc1f atm	CRR7.5
0.16			1.00	1.00E-4	0.00	7.97						
0.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
0.66			1.00	1.00E-4	0.00	7.97						
0.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.16			1.00	1.00E-4	0.00	7.97						
1.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.66			1.00	1.00E-4	0.00	7.97						
1.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.16			1.00	1.00E-4	0.00	7.97						
2.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.66			1.00	1.00E-4	0.00	7.97						
2.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.16			1.00	1.00E-4	0.00	7.97						
3.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.66			1.00	1.00E-4	0.00	7.97						
3.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.16			1.00	1.00E-4	0.00	7.97						
4.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.66			1.00	1.00E-4	0.00	7.97						
4.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
5.16			1.00	9.07E1	3.07	2.28						
5.16			0.50	4.96E1	3.07	2.46						
5.16	26.84	0.81	0.50	4.96E1	3.07	2.46	1.85	29.01	0.64	49.63	138.22	0.33
5.66			1.00	9.09E1	2.97	2.27						
5.66			0.50	5.21E1	2.97	2.44						
5.66	29.50	0.87	0.50	5.21E1	2.97	2.44	1.77	27.96	0.61	52.08	134.57	0.31
6.16			1.00	8.83E1	3.35	2.32						
6.16			0.50	5.28E1	3.35	2.47						
6.16	31.20	1.03	0.50	5.28E1	3.35	2.47	1.69	29.34	0.65	52.79	150.83	0.40
6.66			1.00	1.07E2	3.04	2.23						
6.66			0.50	6.66E1	3.04	2.37						
6.66	40.95	1.23	0.50	6.66E1	3.04	2.37	1.63	25.14	0.54	66.64	144.16	0.36
7.16			1.00	1.34E2	2.14	2.05						
7.16			0.50	8.60E1	2.14	2.18						
7.16	54.80	1.16	0.50	8.60E1	2.14	2.18	1.57	18.40	0.36	86.01	133.94	0.30
7.66			1.00	2.26E2	1.19	1.71						
7.66			0.50	1.49E2	1.19	1.83						
7.66	98.50	1.17	0.50	1.49E2	1.19	1.83	1.52	8.84	0.10	149.46	166.52	0.51
8.16			1.00	2.57E2	0.76	1.53						
8.16			0.50	1.75E2	0.76	1.65						
8.16	119.29	0.91	0.50	1.75E2	0.76	1.65	1.47	5.20	0.01	175.36	176.29	0.59
8.66			1.00	2.73E2	0.79	1.52						
8.66			0.50	1.92E2	0.79	1.63						
8.66	134.74	1.06	0.50	1.92E2	0.79	1.63	1.43	4.84	0.00	192.28	192.28	0.74
9.16			1.00	2.10E2	0.91	1.64						
9.16			0.50	1.52E2	0.91	1.75						
9.16	109.62	0.99	0.50	1.52E2	0.91	1.75	1.39	7.00	0.05	152.09	160.65	0.47
9.66			1.00	6.29E1	2.11	2.28						
9.66			0.50	4.73E1	2.11	2.37						
9.66	34.98	0.73	0.50	4.73E1	2.11	2.37	1.35	25.14	0.54	47.27	102.23	0.18
10.16			1.00	6.31E1	1.93	2.25						
10.16			0.50	4.85E1	1.93	2.33						
10.16	36.68	0.70	0.50	4.85E1	1.93	2.33	1.32	23.80	0.50	48.51	97.39	0.17
10.66			1.00	2.44E1	2.95	2.68						
10.66	14.86	0.42	1.00	2.44E1	2.95	2.68	1.00	NoLiq	1.00	14.86	14.86	2.08
11.16			1.00	4.51E1	2.26	2.40						
11.16			0.50	3.57E1	2.26	2.48						
11.16	27.66	0.61	0.50	3.57E1	2.26	2.48	1.29	29.81	0.66	35.74	105.87	0.19
11.66			1.00	5.32E1	2.21	2.34						
11.66			0.50	4.24E1	2.21	2.42						
11.66	33.22	0.72	0.50	4.24E1	2.21	2.42	1.28	27.11	0.59	42.45	103.58	0.18
12.16			1.00	4.50E1	2.62	2.45						
12.16			0.50	3.65E1	2.62	2.51						
12.16	28.90	0.74	0.50	3.65E1	2.62	2.51	1.26	31.36	0.70	36.52	123.23	0.25
12.66			1.00	4.80E1	1.94	2.34						
12.66			0.50	3.93E1	1.94	2.41						
12.66	31.43	0.59	0.50	3.93E1	1.94	2.41	1.25	26.66	0.58	39.29	93.19	0.16
13.16			1.00	1.70E1	3.28	2.83						
13.16	11.84	0.36	1.00	1.70E1	3.28	2.83	1.00	NoLiq	1.00	11.84	11.84	2.08

13.66			1.00	1.37E1	3.21	2.90						
13.66	9.93	0.29	1.00	1.37E1	3.21	2.90	1.00	NoLiq	1.00	9.93	9.93	2.08
14.16			1.00	1.44E1	3.25	2.89						
14.16	10.59	0.32	1.00	1.44E1	3.25	2.89	1.00	NoLiq	1.00	10.59	10.59	2.08
14.66			1.00	1.34E1	4.01	2.97						
14.66	10.11	0.37	1.00	1.34E1	4.01	2.97	1.00	NoLiq	1.00	10.11	10.11	2.08
15.16			1.00	1.17E1	4.29	3.03						
15.16	9.17	0.36	1.00	1.17E1	4.29	3.03	1.00	NoLiq	1.00	9.17	9.17	2.08
15.66			1.00	1.25E1	5.38	3.07						
15.66	9.90	0.49	1.00	1.25E1	5.38	3.07	1.00	NoLiq	1.00	9.90	9.90	2.08
16.16			1.00	8.43E0	6.02	3.24						
16.16	7.12	0.37	1.00	8.43E0	6.02	3.24	1.00	NoLiq	1.00	7.12	7.12	2.08
16.66			1.00	1.07E1	3.61	3.02						
16.66	8.93	0.29	1.00	1.07E1	3.61	3.02	1.00	NoLiq	1.00	8.93	8.93	2.08
17.16			1.00	1.52E1	2.07	2.76						
17.16	12.56	0.24	1.00	1.52E1	2.07	2.76	1.00	NoLiq	1.00	12.56	12.56	2.08
17.66			1.00	1.27E1	2.09	2.82						
17.66	10.88	0.21	1.00	1.27E1	2.09	2.82	1.00	NoLiq	1.00	10.88	10.88	2.08
18.16			1.00	1.50E1	2.65	2.82						
18.16	12.85	0.31	1.00	1.50E1	2.65	2.82	1.00	NoLiq	1.00	12.85	12.85	2.08
18.66			1.00	1.52E1	4.02	2.93						
18.66	13.25	0.49	1.00	1.52E1	4.02	2.93	1.00	NoLiq	1.00	13.25	13.25	2.08
19.16			1.00	3.03E1	3.38	2.65						
19.16	25.85	0.84	1.00	3.03E1	3.38	2.65	1.00	NoLiq	1.00	25.85	25.85	2.08
19.66			1.00	2.07E1	4.11	2.83						
19.66	18.32	0.71	1.00	2.07E1	4.11	2.83	1.00	NoLiq	1.00	18.32	18.32	2.08
20.16			1.00	1.76E1	3.81	2.86						
20.16	16.03	0.57	1.00	1.76E1	3.81	2.86	1.00	NoLiq	1.00	16.03	16.03	2.08
20.66			1.00	2.51E1	3.85	2.75						
20.66	22.69	0.83	1.00	2.51E1	3.85	2.75	1.00	NoLiq	1.00	22.69	22.69	2.08
21.16			1.00	4.28E1	1.82	2.36						
21.16	38.50	0.68	1.00	4.28E1	1.82	2.36	1.00	NoLiq	1.00	38.50	38.50	2.08
21.66			1.00	3.59E1	3.28	2.58						
21.66	32.96	1.04	1.00	3.59E1	3.28	2.58	1.00	NoLiq	1.00	32.96	32.96	2.08
22.16			1.00	6.93E1	1.89	2.21						
22.16			0.50	6.70E1	1.89	2.22						
22.16	63.55	1.18	0.50	6.70E1	1.89	2.22	1.06	19.79	0.39	67.05	110.79	0.21
22.66			1.00	7.62E1	2.13	2.22						
22.66			0.50	7.41E1	2.13	2.23						
22.66	70.78	1.48	0.50	7.41E1	2.13	2.23	1.05	19.91	0.40	74.11	123.13	0.25
23.16			1.00	2.34E2	0.98	1.64						
23.16			0.50	2.26E2	0.98	1.65						
23.16	217.58	2.12	0.50	2.26E2	0.98	1.65	1.04	5.16	0.00	226.16	227.15	1.17
23.66			1.00	2.96E2	0.44	1.32						
23.66			0.50	2.88E2	0.44	1.33						
23.66	279.05	1.22	0.50	2.88E2	0.44	1.33	1.03	0.70	0.00	287.94	287.94	2.08
24.16			1.00	2.82E2	0.38	1.29						
24.16	270.33	1.02	1.00	2.82E2	0.38	1.29	1.00	NoLiq	1.00	270.33	270.33	2.08
24.66			1.00	2.43E2	0.54	1.44						
24.66	236.66	1.28	1.00	2.43E2	0.54	1.44	1.00	NoLiq	1.00	236.66	236.66	2.08
25.16			1.00	4.29E1	3.20	2.52						
25.16	43.51	1.35	1.00	4.29E1	3.20	2.52	1.00	NoLiq	1.00	43.51	43.51	2.08
25.66			1.00	3.73E1	2.78	2.52						
25.66	38.49	1.03	1.00	3.73E1	2.78	2.52	1.00	NoLiq	1.00	38.49	38.49	2.08
26.16			1.00	8.47E1	2.59	2.25						
26.16			0.50	8.65E1	2.59	2.24						
26.16	86.77	2.21	0.50	8.65E1	2.59	2.24	1.00	20.38	0.41	86.46	146.70	0.37
26.66			1.00	4.80E2	0.65	1.30						
26.66			0.50	4.87E2	0.65	1.30						
26.66	491.75	3.18	0.50	4.87E2	0.65	1.30	0.99	0.36	0.00	486.71	486.71	2.08
27.16			1.00	6.18E2	0.66	1.24						
27.16			0.50	6.30E2	0.66	1.24						
27.16	641.00	4.25	0.50	6.30E2	0.66	1.24	0.98	0.00	0.00	500.00	500.00	2.08
27.66			1.00	5.57E2	0.67	1.27						
27.66			0.50	5.72E2	0.67	1.27						
27.66	585.69	3.93	0.50	5.72E2	0.67	1.27	0.98	0.08	0.00	500.00	500.00	2.08
28.16			1.00	4.57E2	1.02	1.47						
28.16			0.50	4.73E2	1.02	1.46						
28.16	486.93	4.96	0.50	4.73E2	1.02	1.46	0.97	2.35	0.00	472.58	472.58	2.08
28.66			1.00	2.85E2	0.29	1.23						
28.66			0.50	2.97E2	0.29	1.21						
28.66	307.71	0.90	0.50	2.97E2	0.29	1.21	0.96	0.00	0.00	296.74	296.74	2.08
29.16			1.00	2.86E2	0.96	1.57						
29.16			0.50	3.00E2	0.96	1.56						
29.16	312.70	2.99	0.50	3.00E2	0.96	1.56	0.96	3.72	0.00	299.67	299.67	2.08
29.66			1.00	4.56E2	0.66	1.32						
29.66			0.50	4.80E2	0.66	1.30						
29.66	504.43	3.32	0.50	4.80E2	0.66	1.30	0.95	0.45	0.00	480.41	480.41	2.08
30.16			1.00	3.60E2	0.70	1.40						
30.16			0.50	3.82E2	0.70	1.39						
30.16	403.63	2.82	0.50	3.82E2	0.70	1.39	0.95	1.37	0.00	382.07	382.07	2.08
30.66			1.00	4.18E2	0.73	1.38						

30.66			0.50	4.45E2	0.73	1.36						
30.66	473.49	3.46	0.50	4.45E2	0.73	1.36	0.94	1.06	0.00	445.48	445.48	2.08
31.16			1.00	5.58E2	0.48	1.16						
31.16			0.50	5.98E2	0.48	1.14						
31.16	639.66	3.07	0.50	5.98E2	0.48	1.14	0.94	0.00	0.00	500.00	500.00	2.08
31.66			1.00	4.25E2	0.71	1.36						
31.66			0.50	4.59E2	0.71	1.34						
31.66	493.95	3.49	0.50	4.59E2	0.71	1.34	0.93	0.84	0.00	459.24	459.24	2.08
32.16			1.00	1.33E2	2.10	2.05						
32.16			0.50	1.46E2	2.10	2.02						
32.16	157.89	3.28	0.50	1.46E2	2.10	2.02	0.92	13.52	0.23	145.93	188.91	0.71
32.66			1.00	5.77E1	2.83	2.39						
32.66			0.50	6.45E1	2.83	2.36						
32.66	70.16	1.93	0.50	6.45E1	2.83	2.36	0.92	24.65	0.52	64.48	135.63	0.31
33.16			1.00	3.46E2	1.13	1.58						
33.16			0.50	3.80E2	1.13	1.55						
33.16	416.08	4.66	0.50	3.80E2	1.13	1.55	0.91	3.60	0.00	380.19	380.19	2.08
33.66			1.00	3.53E2	0.35	1.20						
33.66			0.50	3.91E2	0.35	1.16						
33.66	429.80	1.49	0.50	3.91E2	0.35	1.16	0.91	0.00	0.00	390.51	390.51	2.08
34.16			1.00	2.47E2	0.38	1.35						
34.16			0.50	2.75E2	0.38	1.31						
34.16	304.19	1.16	0.50	2.75E2	0.38	1.31	0.90	0.49	0.00	274.84	274.84	2.01
34.66			1.00	3.28E2	1.24	1.62						
34.66			0.50	3.66E2	1.24	1.60						
34.66	407.79	5.03	0.50	3.66E2	1.24	1.60	0.90	4.29	0.00	366.42	366.42	2.08
35.16			1.00	4.12E2	0.59	1.31						
35.16			0.50	4.62E2	0.59	1.28						
35.16	517.46	3.06	0.50	4.62E2	0.59	1.28	0.89	0.19	0.00	462.43	462.43	2.08
35.66			1.00	4.97E2	0.45	1.16						
35.66			0.50	5.61E2	0.45	1.13						
35.66	631.61	2.81	0.50	5.61E2	0.45	1.13	0.89	0.00	0.00	500.00	500.00	2.08
36.16			1.00	5.64E2	0.62	1.24						
36.16			0.50	6.40E2	0.62	1.21						
36.16	723.39	4.49	0.50	6.40E2	0.62	1.21	0.88	0.00	0.00	500.00	500.00	2.08
36.66			1.00	5.47E2	0.26	0.97						
36.66			0.50	6.23E2	0.26	0.93						
36.66	708.97	1.83	0.50	6.23E2	0.26	0.93	0.88	0.00	0.00	500.00	500.00	2.08
37.16			1.00	3.06E2	0.62	1.41						
37.16			0.50	3.51E2	0.62	1.37						
37.16	401.78	2.47	0.50	3.51E2	0.62	1.37	0.87	1.17	0.00	351.49	351.49	2.08
37.66			1.00	4.38E2	0.43	1.19						
37.66			0.50	5.06E2	0.43	1.15						
37.66	580.91	2.49	0.50	5.06E2	0.43	1.15	0.87	0.00	0.00	500.00	500.00	2.08
38.16			1.00	2.07E2	0.56	1.51						
38.16			0.50	2.41E2	0.56	1.46						
38.16	278.11	1.54	0.50	2.41E2	0.56	1.46	0.87	2.22	0.00	240.81	240.81	1.38
38.66			1.00	3.54E2	0.85	1.47						
38.66			0.50	4.13E2	0.85	1.43						
38.66	479.04	4.06	0.50	4.13E2	0.85	1.43	0.86	1.93	0.00	412.69	412.69	2.08
39.16			1.00	3.25E2	0.54	1.35						
39.16			0.50	3.81E2	0.54	1.30						
39.16	444.72	2.39	0.50	3.81E2	0.54	1.30	0.86	0.43	0.00	381.20	381.20	2.08
39.66			1.00	2.29E2	0.66	1.52						
39.66			0.50	2.71E2	0.66	1.47						
39.66	317.50	2.09	0.50	2.71E2	0.66	1.47	0.85	2.43	0.00	270.80	270.80	1.93
40.16			1.00	2.43E2	0.53	1.44						
40.16			0.50	2.88E2	0.53	1.38						
40.16	339.38	1.78	0.50	2.88E2	0.53	1.38	0.85	1.30	0.00	288.04	288.04	2.08
40.66			1.00	2.72E2	0.26	1.21						
40.66			0.50	3.25E2	0.26	1.15						
40.66	384.24	1.00	0.50	3.25E2	0.26	1.15	0.84	0.00	0.00	324.53	324.53	2.08
41.16			1.00	2.03E2	0.30	1.35						
41.16			0.50	2.44E2	0.30	1.29						
41.16	289.73	0.85	0.50	2.44E2	0.30	1.29	0.84	0.26	0.00	243.53	243.53	1.42
41.66			1.00	1.62E2	0.51	1.56						
41.66			0.50	1.96E2	0.51	1.50						
41.66	234.25	1.17	0.50	1.96E2	0.51	1.50	0.84	2.80	0.00	195.95	195.95	0.78
42.16			1.00	3.02E1	4.68	2.74						
42.16	45.94	2.04	1.00	3.02E1	4.68	2.74	1.00	NoLiq	1.00	45.94	45.94	2.08
42.66			1.00	2.27E1	2.48	2.66						
42.66	35.42	0.82	1.00	2.27E1	2.48	2.66	1.00	NoLiq	1.00	35.42	35.42	2.08
43.16			1.00	2.28E2	0.89	1.61						
43.16	337.03	2.97	1.00	2.28E2	0.89	1.61	1.00	NoLiq	1.00	337.03	337.03	2.08
43.66			1.00	3.73E2	1.01	1.52						
43.66	555.11	5.56	1.00	3.73E2	1.01	1.52	1.00	NoLiq	1.00	555.11	555.11	2.08
44.16			1.00	3.04E2	1.41	1.69						
44.16			0.50	3.74E2	1.41	1.64						
44.16	457.87	6.40	0.50	3.74E2	1.41	1.64	0.82	4.96	0.00	374.21	374.21	2.08
44.66			1.00	2.88E2	1.28	1.67						
44.66			0.50	3.57E2	1.28	1.61						
44.66	438.26	5.58	0.50	3.57E2	1.28	1.61	0.81	4.60	0.00	356.56	356.56	2.08

45.16			1.00	3.38E2	0.73	1.43						
45.16			0.50	4.20E2	0.73	1.37						
45.16	518.17	3.74	0.50	4.20E2	0.73	1.37	0.81	1.21	0.00	419.69	419.69	2.08
45.66			1.00	3.37E2	0.90	1.51						
45.66			0.50	4.20E2	0.90	1.45						
45.66	520.28	4.66	0.50	4.20E2	0.90	1.45	0.81	2.13	0.00	419.53	419.53	2.08
46.16			1.00	3.36E2	0.90	1.51						
46.16			0.50	4.20E2	0.90	1.45						
46.16	523.51	4.70	0.50	4.20E2	0.90	1.45	0.80	2.13	0.00	420.28	420.28	2.08
46.66			1.00	3.38E2	0.79	1.46						
46.66			0.50	4.25E2	0.79	1.40						
46.66	532.08	4.19	0.50	4.25E2	0.79	1.40	0.80	1.52	0.00	425.30	425.30	2.08
47.16			1.00	3.35E2	0.75	1.45						
47.16			0.50	4.24E2	0.75	1.38						
47.16	532.13	3.96	0.50	4.24E2	0.75	1.38	0.80	1.30	0.00	423.50	423.50	2.08
47.66			1.00	3.39E2	0.35	1.21						
47.66			0.50	4.29E2	0.35	1.13						
47.66	541.80	1.88	0.50	4.29E2	0.35	1.13	0.79	0.00	0.00	429.35	429.35	2.08
48.16			1.00	4.15E2	0.27	1.07						
48.16			0.50	5.28E2	0.27	0.99						
48.16	669.15	1.82	0.50	5.28E2	0.27	0.99	0.79	0.00	0.00	500.00	500.00	2.08
48.66			1.00	3.38E2	0.72	1.43						
48.66			0.50	4.32E2	0.72	1.36						
48.66	549.69	3.92	0.50	4.32E2	0.72	1.36	0.79	1.07	0.00	431.93	431.93	2.08
49.16			1.00	3.38E2	0.61	1.38						
49.16			0.50	4.34E2	0.61	1.30						
49.16	555.25	3.36	0.50	4.34E2	0.61	1.30	0.78	0.45	0.00	434.48	434.48	2.08
49.66			1.00	3.36E2	0.53	1.33						
49.66			0.50	4.34E2	0.53	1.26						
49.66	556.89	2.93	0.50	4.34E2	0.53	1.26	0.78	0.00	0.00	433.95	433.95	2.08

Fines have been calculated, and correction is made by Modify Robertson Method.
Fines=NoLiq means the soils are not liquefiable.
CRR is based on water table at 10.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 6.63:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.16	0.01	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
0.66	0.02	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.16	0.04	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.66	0.06	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.16	0.08	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.66	0.10	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.16	0.12	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.66	0.13	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.16	0.15	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.66	0.17	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
5.16	0.19	0.33	1.00	0.33	1.37	0.45	0.42	1.05
5.66	0.21	0.31	1.00	0.31	1.37	0.42	0.44	0.95 *
6.16	0.23	0.40	1.00	0.40	1.37	0.55	0.46	1.19
6.66	0.25	0.36	1.00	0.36	1.37	0.49	0.48	1.03
7.16	0.26	0.30	1.00	0.30	1.37	0.42	0.49	0.84 *
7.66	0.28	0.51	1.00	0.51	1.37	0.70	0.51	1.38
8.16	0.30	0.59	1.00	0.59	1.37	0.81	0.52	1.56
8.66	0.32	0.74	1.00	0.74	1.37	1.02	0.53	1.92
9.16	0.34	0.47	1.00	0.47	1.37	0.64	0.54	1.18
9.66	0.36	0.18	1.00	0.18	1.37	0.25	0.55	0.45 *
10.16	0.37	0.17	1.00	0.17	1.37	0.23	0.56	0.41 *
10.66	0.38	2.08	1.00	2.08	1.37	2.00	0.57	5.00 ^
11.16	0.39	0.19	1.00	0.19	1.37	0.26	0.58	0.45 *
11.66	0.40	0.18	1.00	0.18	1.37	0.25	0.58	0.43 *
12.16	0.41	0.25	1.00	0.25	1.37	0.35	0.59	0.59 *
12.66	0.42	0.16	1.00	0.16	1.37	0.21	0.60	0.36 *
13.16	0.42	2.08	1.00	2.08	1.37	2.00	0.60	5.00 ^
13.66	0.43	2.08	1.00	2.08	1.37	2.00	0.61	5.00 ^
14.16	0.44	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^
14.66	0.45	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^
15.16	0.46	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
15.66	0.47	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
16.16	0.48	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
16.66	0.49	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
17.16	0.50	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
17.66	0.50	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
18.16	0.51	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
18.66	0.52	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
19.16	0.53	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
19.66	0.54	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
20.16	0.55	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
20.66	0.56	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
21.16	0.57	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^

Liq.

Liq.

21.66	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^	
22.16	0.58	0.21	1.00	0.21	1.37	0.28	0.67	0.42 *	Liq.
22.66	0.59	0.25	1.00	0.25	1.37	0.35	0.67	0.52 *	
23.16	0.60	1.17	1.00	1.17	1.37	1.60	0.67	2.38	
23.66	0.61	2.08	1.00	2.08	1.37	2.85	0.68	4.21	
24.16	0.62	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
24.66	0.63	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
25.16	0.64	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
25.66	0.65	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
26.16	0.65	0.37	1.00	0.37	1.37	0.51	0.68	0.75 *	Liq.
26.66	0.66	2.08	1.00	2.08	1.37	2.85	0.69	4.16	
27.16	0.67	2.08	1.00	2.08	1.37	2.85	0.69	4.15	
27.66	0.68	2.08	1.00	2.08	1.37	2.85	0.69	4.14	
28.16	0.69	2.08	1.00	2.08	1.37	2.85	0.69	4.13	
28.66	0.70	2.08	1.00	2.08	1.37	2.85	0.69	4.13	
29.16	0.71	2.08	1.00	2.08	1.37	2.85	0.69	4.12	
29.66	0.72	2.08	1.00	2.08	1.37	2.85	0.69	4.12	
30.16	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12	
30.66	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12	
31.16	0.74	2.08	1.00	2.08	1.37	2.85	0.69	4.13	
31.66	0.75	2.08	1.00	2.08	1.37	2.85	0.69	4.14	
32.16	0.76	0.71	1.00	0.71	1.37	0.97	0.69	1.41	
32.66	0.77	0.31	1.00	0.31	1.37	0.43	0.69	0.62 *	Liq.
33.16	0.78	2.08	1.00	2.08	1.37	2.85	0.68	4.17	
33.66	0.79	2.08	1.00	2.08	1.37	2.85	0.68	4.18	
34.16	0.80	2.01	1.00	2.01	1.37	2.76	0.68	4.05	
34.66	0.81	2.08	1.00	2.08	1.37	2.85	0.68	4.20	
35.16	0.81	2.08	1.00	2.08	1.37	2.85	0.68	4.21	
35.66	0.82	2.08	1.00	2.08	1.37	2.85	0.68	4.22	
36.16	0.83	2.08	1.00	2.08	1.37	2.85	0.67	4.23	
36.66	0.84	2.08	1.00	2.08	1.37	2.85	0.67	4.25	
37.16	0.85	2.08	1.00	2.08	1.37	2.85	0.67	4.26	
37.66	0.86	2.08	1.00	2.08	1.37	2.85	0.67	4.27	
38.16	0.87	1.38	1.00	1.38	1.37	1.89	0.67	2.84	
38.66	0.88	2.08	1.00	2.08	1.37	2.85	0.66	4.30	
39.16	0.88	2.08	1.00	2.08	1.37	2.85	0.66	4.31	
39.66	0.89	1.93	1.00	1.93	1.37	2.64	0.66	4.01	
40.16	0.90	2.08	1.00	2.08	1.37	2.85	0.66	4.34	
40.66	0.91	2.08	1.00	2.08	1.37	2.85	0.65	4.35	
41.16	0.92	1.42	1.00	1.42	1.37	1.95	0.65	2.99	
41.66	0.93	0.78	1.00	0.78	1.37	1.07	0.65	1.64	
42.16	0.94	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^	
42.66	0.95	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^	
43.16	0.96	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^	
43.66	0.96	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^	
44.16	0.97	2.08	1.00	2.08	1.37	2.85	0.64	4.46	
44.66	0.98	2.08	1.00	2.08	1.37	2.85	0.64	4.48	
45.16	0.99	2.08	1.00	2.08	1.37	2.85	0.63	4.50	
45.66	1.00	2.08	1.00	2.08	1.37	2.85	0.63	4.52	
46.16	1.01	2.08	1.00	2.09	1.37	2.86	0.63	4.56	
46.66	1.02	2.08	1.00	2.09	1.37	2.86	0.63	4.57	
47.16	1.03	2.08	1.00	2.08	1.37	2.86	0.62	4.58	
47.66	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.59	
48.16	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.60	
48.66	1.05	2.08	1.00	2.08	1.37	2.84	0.62	4.62	
49.16	1.06	2.08	1.00	2.07	1.37	2.84	0.61	4.63	
49.66	1.07	2.08	1.00	2.07	1.37	2.84	0.61	4.64	

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils or above Water Table.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
0.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
5.16	2.46	3.95	138.22	34.99	29.01	0.00	34.99
5.66	2.44	4.00	134.57	33.67	27.96	0.00	33.67
6.16	2.47	3.94	150.83	38.32	29.34	0.00	38.32
6.66	2.37	4.12	144.16	34.96	25.14	0.00	34.96

7.16	2.18	4.47	133.94	29.98	18.40	0.00	29.98
7.66	1.83	5.11	166.52	32.57	8.84	0.00	32.57
8.16	1.65	5.45	176.29	32.33	5.20	0.00	32.33
8.66	1.63	5.49	192.28	35.02	4.84	0.00	35.02
9.16	1.75	5.27	160.65	30.46	7.00	0.00	30.46
9.66	2.37	4.12	102.23	24.79	25.14	0.00	24.79
10.16	2.33	4.19	97.39	23.26	23.80	0.00	23.26
10.66	2.68	3.54	14.86	4.19	NoLiq	0.00	4.19
11.16	2.48	3.92	105.87	27.03	29.81	0.00	27.03
11.66	2.42	4.03	103.58	25.68	27.11	0.00	25.68
12.16	2.51	3.85	123.23	31.99	31.36	0.00	31.99
12.66	2.41	4.05	93.19	22.99	26.66	0.00	22.99
13.16	2.83	3.26	11.84	3.63	NoLiq	0.00	3.63
13.66	2.90	3.14	9.93	3.17	NoLiq	0.00	3.17
14.16	2.89	3.16	10.59	3.35	NoLiq	0.00	3.35
14.66	2.97	3.01	10.11	3.36	NoLiq	0.00	3.36
15.16	3.03	2.90	9.17	3.16	NoLiq	0.00	3.16
15.66	3.07	2.82	9.90	3.51	NoLiq	0.00	3.51
16.16	3.24	2.52	7.12	2.82	NoLiq	0.00	2.82
16.66	3.02	2.92	8.93	3.06	NoLiq	0.00	3.06
17.16	2.76	3.41	12.56	3.69	NoLiq	0.00	3.69
17.66	2.82	3.28	10.88	3.31	NoLiq	0.00	3.31
18.16	2.82	3.29	12.85	3.91	NoLiq	0.00	3.91
18.66	2.93	3.09	13.25	4.29	NoLiq	0.00	4.29
19.16	2.65	3.61	25.85	7.17	NoLiq	0.00	7.17
19.66	2.83	3.27	18.32	5.60	NoLiq	0.00	5.60
20.16	2.86	3.21	16.03	4.99	NoLiq	0.00	4.99
20.66	2.75	3.42	22.69	6.63	NoLiq	0.00	6.63
21.16	2.36	4.14	38.50	9.30	NoLiq	0.00	9.30
21.66	2.58	3.72	32.96	8.85	NoLiq	0.00	8.85
22.16	2.22	4.39	110.79	25.23	19.79	0.00	25.23
22.66	2.23	4.38	123.13	28.08	19.91	0.00	28.08
23.16	1.65	5.46	227.15	41.63	5.16	0.00	41.63
23.66	1.33	6.05	287.94	47.63	0.70	0.00	47.63
24.16	1.29	6.11	270.33	44.25	NoLiq	0.00	44.25
24.66	1.44	5.83	236.66	40.58	NoLiq	0.00	40.58
25.16	2.52	3.84	43.51	11.32	NoLiq	0.00	11.32
25.66	2.52	3.83	38.49	10.04	NoLiq	0.00	10.04
26.16	2.24	4.36	146.70	33.65	20.38	0.00	33.65
26.66	1.30	6.11	486.71	79.71	0.36	0.00	79.71
27.16	1.24	6.21	500.00	80.52	0.00	0.00	80.52
27.66	1.27	6.16	500.00	81.19	0.08	0.00	81.19
28.16	1.46	5.79	472.58	81.57	2.35	0.00	81.57
28.66	1.21	6.26	296.74	47.39	0.00	0.00	47.39
29.16	1.56	5.62	299.67	53.34	3.72	0.00	53.34
29.66	1.30	6.09	480.41	78.89	0.45	0.00	78.89
30.16	1.39	5.94	382.07	64.36	1.37	0.00	64.36
30.66	1.36	5.99	445.48	74.42	1.06	0.00	74.42
31.16	1.14	6.40	500.00	78.16	0.00	0.00	78.16
31.66	1.34	6.02	459.24	76.26	0.84	0.00	76.26
32.16	2.02	4.77	188.91	39.64	13.52	0.00	39.64
32.66	2.36	4.15	135.63	32.71	24.65	0.00	32.71
33.16	1.55	5.63	380.19	67.50	3.60	0.00	67.50
33.66	1.16	6.35	390.51	61.47	0.00	0.00	61.47
34.16	1.31	6.08	274.84	45.19	0.49	0.00	45.19
34.66	1.60	5.55	366.42	66.00	4.29	0.00	66.00
35.16	1.28	6.14	462.43	75.35	0.19	0.00	75.35
35.66	1.13	6.41	500.00	77.97	0.00	0.00	77.97
36.16	1.21	6.26	500.00	79.87	0.00	0.00	79.87
36.66	0.93	6.79	500.00	73.64	0.00	0.00	73.64
37.16	1.37	5.97	351.49	58.89	1.17	0.00	58.89
37.66	1.15	6.38	500.00	78.35	0.00	0.00	78.35
38.16	1.46	5.81	240.81	41.44	2.22	0.00	41.44
38.66	1.43	5.85	412.69	70.52	1.93	0.00	70.52
39.16	1.30	6.09	381.20	62.57	0.43	0.00	62.57
39.66	1.47	5.78	270.80	46.83	2.43	0.00	46.83
40.16	1.38	5.95	288.04	48.43	1.30	0.00	48.43
40.66	1.15	6.37	324.53	50.92	0.00	0.00	50.92
41.16	1.29	6.12	243.53	39.77	0.26	0.00	39.77
41.66	1.50	5.73	195.95	34.18	2.80	0.00	34.18
42.16	2.74	3.43	45.94	13.40	NoLiq	0.00	13.40
42.66	2.66	3.58	35.42	9.88	NoLiq	0.00	9.88
43.16	1.61	5.52	337.03	61.07	NoLiq	0.00	61.07
43.66	1.52	5.70	555.11	97.46	NoLiq	0.00	97.46
44.16	1.64	5.48	374.21	68.32	4.96	0.00	68.32
44.66	1.61	5.52	356.56	64.63	4.60	0.00	64.63
45.16	1.37	5.96	419.69	70.39	1.21	0.00	70.39
45.66	1.45	5.82	419.53	72.04	2.13	0.00	72.04
46.16	1.45	5.82	420.28	72.16	2.13	0.00	72.16
46.66	1.40	5.91	425.30	71.91	1.52	0.00	71.91
47.16	1.38	5.95	423.50	71.21	1.30	0.00	71.21
47.66	1.13	6.41	429.35	67.00	0.00	0.00	67.00

$N_{1}60 < 15$

48.16	0.99	6.66	500.00	75.04	0.00	0.00	75.04
48.66	1.36	5.98	431.93	72.18	1.07	0.00	72.18
49.16	1.30	6.09	434.48	71.33	0.45	0.00	71.33
49.66	1.26	6.18	433.95	70.27	0.00	0.00	70.27

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
(N1)60 is converted from qc1, (N1)60s is after fines correction
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Ishihara / Yoshimine

Depth ft	CSRsf	/ MSF*	=CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
49.96	0.61	1.00	0.61	4.65	1.74	67.22	100.00	0.000	0.0E0	0.000	0.000
49.66	0.61	1.00	0.61	4.64	0.00	70.27	100.00	0.000	0.0E0	0.000	0.000
49.16	0.61	1.00	0.61	4.63	0.45	71.33	100.00	0.000	0.0E0	0.000	0.000
48.66	0.62	1.00	0.62	4.62	1.07	72.18	100.00	0.000	0.0E0	0.000	0.000
48.16	0.62	1.00	0.62	4.60	0.00	75.04	100.00	0.000	0.0E0	0.000	0.000
47.66	0.62	1.00	0.62	4.59	0.00	67.00	100.00	0.000	0.0E0	0.000	0.000
47.16	0.62	1.00	0.62	4.58	1.30	71.21	100.00	0.000	0.0E0	0.000	0.000
46.66	0.63	1.00	0.63	4.57	1.52	71.91	100.00	0.000	0.0E0	0.000	0.000
46.16	0.63	1.00	0.63	4.56	2.13	72.16	100.00	0.000	0.0E0	0.000	0.000
45.66	0.63	1.00	0.63	4.52	2.13	72.04	100.00	0.000	0.0E0	0.000	0.000
45.16	0.63	1.00	0.63	4.50	1.21	70.39	100.00	0.000	0.0E0	0.000	0.000
44.66	0.64	1.00	0.64	4.48	4.60	64.63	100.00	0.000	0.0E0	0.000	0.000
44.16	0.64	1.00	0.64	4.46	4.96	68.32	100.00	0.000	0.0E0	0.000	0.000
43.66	0.64	1.00	0.64	5.00	NoLiq	97.46	100.00	0.000	0.0E0	0.000	0.000
43.16	0.64	1.00	0.64	5.00	NoLiq	61.07	100.00	0.000	0.0E0	0.000	0.000
42.66	0.65	1.00	0.65	5.00	NoLiq	9.88	50.25	0.000	0.0E0	0.000	0.000
42.16	0.65	1.00	0.65	5.00	NoLiq	13.40	58.08	0.000	0.0E0	0.000	0.000
41.66	0.65	1.00	0.65	1.64	2.80	34.18	100.00	0.000	0.0E0	0.035	0.035
41.16	0.65	1.00	0.65	2.99	0.26	39.77	100.00	0.000	0.0E0	0.000	0.035
40.66	0.65	1.00	0.65	4.35	0.00	50.92	100.00	0.000	0.0E0	0.000	0.035
40.16	0.66	1.00	0.66	4.34	1.30	48.43	100.00	0.000	0.0E0	0.000	0.035
39.66	0.66	1.00	0.66	4.01	2.43	46.83	100.00	0.000	0.0E0	0.000	0.035
39.16	0.66	1.00	0.66	4.31	0.43	62.57	100.00	0.000	0.0E0	0.000	0.035
38.66	0.66	1.00	0.66	4.30	1.93	70.52	100.00	0.000	0.0E0	0.000	0.035
38.16	0.67	1.00	0.67	2.84	2.22	41.44	100.00	0.000	0.0E0	0.000	0.035
37.66	0.67	1.00	0.67	4.27	0.00	78.35	100.00	0.000	0.0E0	0.000	0.035
37.16	0.67	1.00	0.67	4.26	1.17	58.89	100.00	0.000	0.0E0	0.000	0.035
36.66	0.67	1.00	0.67	4.25	0.00	73.64	100.00	0.000	0.0E0	0.000	0.035
36.16	0.67	1.00	0.67	4.23	0.00	79.87	100.00	0.000	0.0E0	0.000	0.035
35.66	0.68	1.00	0.68	4.22	0.00	77.97	100.00	0.000	0.0E0	0.000	0.035
35.16	0.68	1.00	0.68	4.21	0.19	75.35	100.00	0.000	0.0E0	0.000	0.035
34.66	0.68	1.00	0.68	4.20	4.29	66.00	100.00	0.000	0.0E0	0.000	0.035
34.16	0.68	1.00	0.68	4.05	0.49	45.19	100.00	0.000	0.0E0	0.000	0.035
33.66	0.68	1.00	0.68	4.18	0.00	61.47	100.00	0.000	0.0E0	0.000	0.035
33.16	0.68	1.00	0.68	4.17	3.60	67.50	100.00	0.000	0.0E0	0.000	0.035
32.66	0.69	1.00	0.69	0.62	24.65	32.71	96.53	0.373	2.2E-3	0.007	0.042
32.16	0.69	1.00	0.69	1.41	13.52	39.64	100.00	0.000	0.0E0	0.000	0.042
31.66	0.69	1.00	0.69	4.14	0.84	76.26	100.00	0.000	0.0E0	0.000	0.042
31.16	0.69	1.00	0.69	4.13	0.00	78.16	100.00	0.000	0.0E0	0.000	0.042
30.66	0.69	1.00	0.69	4.12	1.06	74.42	100.00	0.000	0.0E0	0.000	0.042
30.16	0.69	1.00	0.69	4.12	1.37	64.36	100.00	0.000	0.0E0	0.000	0.042
29.66	0.69	1.00	0.69	4.12	0.45	78.89	100.00	0.000	0.0E0	0.000	0.042
29.16	0.69	1.00	0.69	4.12	3.72	53.34	100.00	0.000	0.0E0	0.000	0.042
28.66	0.69	1.00	0.69	4.13	0.00	47.39	100.00	0.000	0.0E0	0.000	0.042
28.16	0.69	1.00	0.69	4.13	2.35	81.57	100.00	0.000	0.0E0	0.000	0.042
27.66	0.69	1.00	0.69	4.14	0.08	81.19	100.00	0.000	0.0E0	0.000	0.042
27.16	0.69	1.00	0.69	4.15	0.00	80.52	100.00	0.000	0.0E0	0.000	0.042
26.66	0.69	1.00	0.69	4.16	0.36	79.71	100.00	0.000	0.0E0	0.000	0.042
26.16	0.68	1.00	0.68	0.75	20.38	33.65	98.95	0.090	5.4E-4	0.003	0.045
25.66	0.68	1.00	0.68	5.00	NoLiq	10.04	50.63	0.000	0.0E0	0.000	0.045
25.16	0.68	1.00	0.68	5.00	NoLiq	11.32	53.60	0.000	0.0E0	0.000	0.045
24.66	0.68	1.00	0.68	5.00	NoLiq	40.58	100.00	0.000	0.0E0	0.000	0.045
24.16	0.68	1.00	0.68	5.00	NoLiq	44.25	100.00	0.000	0.0E0	0.000	0.045
23.66	0.68	1.00	0.68	4.21	0.70	47.63	100.00	0.000	0.0E0	0.000	0.045
23.16	0.67	1.00	0.67	2.38	5.16	41.63	100.00	0.000	0.0E0	0.000	0.045
22.66	0.67	1.00	0.67	0.52	19.91	28.08	85.88	1.458	8.7E-3	0.027	0.072
22.16	0.67	1.00	0.67	0.42	19.79	25.23	80.15	1.739	1.0E-2	0.108	0.180
21.66	0.67	1.00	0.67	5.00	NoLiq	8.85	47.70	0.000	0.0E0	0.030	0.210
21.16	0.67	1.00	0.67	5.00	NoLiq	9.30	48.84	0.000	0.0E0	0.000	0.210
20.66	0.66	1.00	0.66	5.00	NoLiq	6.63	41.68	0.000	0.0E0	0.000	0.210
20.16	0.66	1.00	0.66	5.00	NoLiq	4.99	36.72	0.000	0.0E0	0.000	0.210
19.66	0.66	1.00	0.66	5.00	NoLiq	5.60	38.62	0.000	0.0E0	0.000	0.210
19.16	0.66	1.00	0.66	5.00	NoLiq	7.17	43.21	0.000	0.0E0	0.000	0.210
18.66	0.65	1.00	0.65	5.00	NoLiq	4.29	34.45	0.000	0.0E0	0.000	0.210
18.16	0.65	1.00	0.65	5.00	NoLiq	3.91	33.19	0.000	0.0E0	0.000	0.210
17.66	0.65	1.00	0.65	5.00	NoLiq	3.31	31.12	0.000	0.0E0	0.000	0.210
17.16	0.64	1.00	0.64	5.00	NoLiq	3.69	32.42	0.000	0.0E0	0.000	0.210

16.66	0.64	1.00	0.64	5.00	NoLiq	3.06	30.23	0.000	0.0E0	0.000	0.210
16.16	0.63	1.00	0.63	5.00	NoLiq	2.82	29.38	0.000	0.0E0	0.000	0.210
15.66	0.63	1.00	0.63	5.00	NoLiq	3.51	31.80	0.000	0.0E0	0.000	0.210
15.16	0.63	1.00	0.63	5.00	NoLiq	3.16	30.60	0.000	0.0E0	0.000	0.210
14.66	0.62	1.00	0.62	5.00	NoLiq	3.36	31.28	0.000	0.0E0	0.000	0.210
14.16	0.62	1.00	0.62	5.00	NoLiq	3.35	31.25	0.000	0.0E0	0.000	0.210
13.66	0.61	1.00	0.61	5.00	NoLiq	3.17	30.60	0.000	0.0E0	0.000	0.210
13.16	0.60	1.00	0.60	5.00	NoLiq	3.63	32.23	0.000	0.0E0	0.000	0.210
12.66	0.60	1.00	0.60	0.36	26.66	22.99	75.95	1.928	1.2E-2	0.035	0.245
12.16	0.59	1.00	0.59	0.59	31.36	31.99	94.73	0.597	3.6E-3	0.110	0.355
11.66	0.58	1.00	0.58	0.43	27.11	25.68	81.03	1.702	1.0E-2	0.085	0.440
11.16	0.58	1.00	0.58	0.45	29.81	27.03	83.71	1.584	9.5E-3	0.110	0.550
10.66	0.57	1.00	0.57	5.00	NoLiq	4.19	34.14	0.000	0.0E0	0.013	0.563
10.16	0.56	1.00	0.56	0.41	23.80	23.26	76.45	1.906	1.1E-2	0.030	0.593
9.66	0.55	1.00	0.55	0.45	25.14	24.79	79.32	1.777	1.1E-2	0.100	0.693
9.16	0.54	1.00	0.54	1.18	7.00	30.46	91.10	0.250	1.5E-3	0.075	0.768
8.66	0.53	1.00	0.53	1.92	4.84	35.02	100.00	0.000	0.0E0	0.018	0.786
8.16	0.52	1.00	0.52	1.56	5.20	32.33	95.59	0.060	3.6E-4	0.005	0.791
7.66	0.51	1.00	0.51	1.38	8.84	32.57	96.17	0.073	4.4E-4	0.002	0.794
7.16	0.49	1.00	0.49	0.84	18.40	29.98	90.01	0.707	4.2E-3	0.028	0.821
6.66	0.48	1.00	0.48	1.03	25.14	34.96	100.00	0.000	0.0E0	0.002	0.824
6.16	0.46	1.00	0.46	1.19	29.34	38.32	100.00	0.000	0.0E0	0.003	0.826
5.66	0.44	1.00	0.44	0.95	27.96	33.67	99.02	0.053	3.2E-4	0.000	0.827
5.16	0.42	1.00	0.42	1.05	29.01	34.99	100.00	0.000	0.0E0	0.018	0.845
5.01	0.42	1.00	0.42	1.73	35.66	45.78	100.00	0.000	0.0E0	0.000	0.845

Settlement of Saturated Sands=0.845 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth ft	sigma' atm	sigC' atm	(N1)60s	CSRsf	Gmax atm	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsp in.	S in.
4.96	0.28	0.18	1.82	0.42	233.22	5.0E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.66	0.26	0.17	0.10	0.42	86.09	1.3E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.16	0.24	0.15	0.10	0.42	81.34	1.2E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.66	0.21	0.13	0.10	0.42	76.30	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.16	0.18	0.12	0.10	0.42	70.90	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.66	0.15	0.10	0.10	0.42	65.05	9.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.16	0.12	0.08	0.10	0.42	58.62	8.8E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.66	0.09	0.06	0.10	0.42	51.39	7.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.16	0.07	0.04	0.10	0.42	42.95	6.5E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.66	0.04	0.02	0.10	0.42	32.40	4.9E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.16	0.01	0.01	0.10	0.42	15.95	2.4E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000

Settlement of Unsaturated Sands

Settlement of Unsaturated Sands=0.000 in.
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=0.845 in.
Differential Settlement=0.422 to 0.557 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)
1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ

CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=1, based on Item 2 of Page C.
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

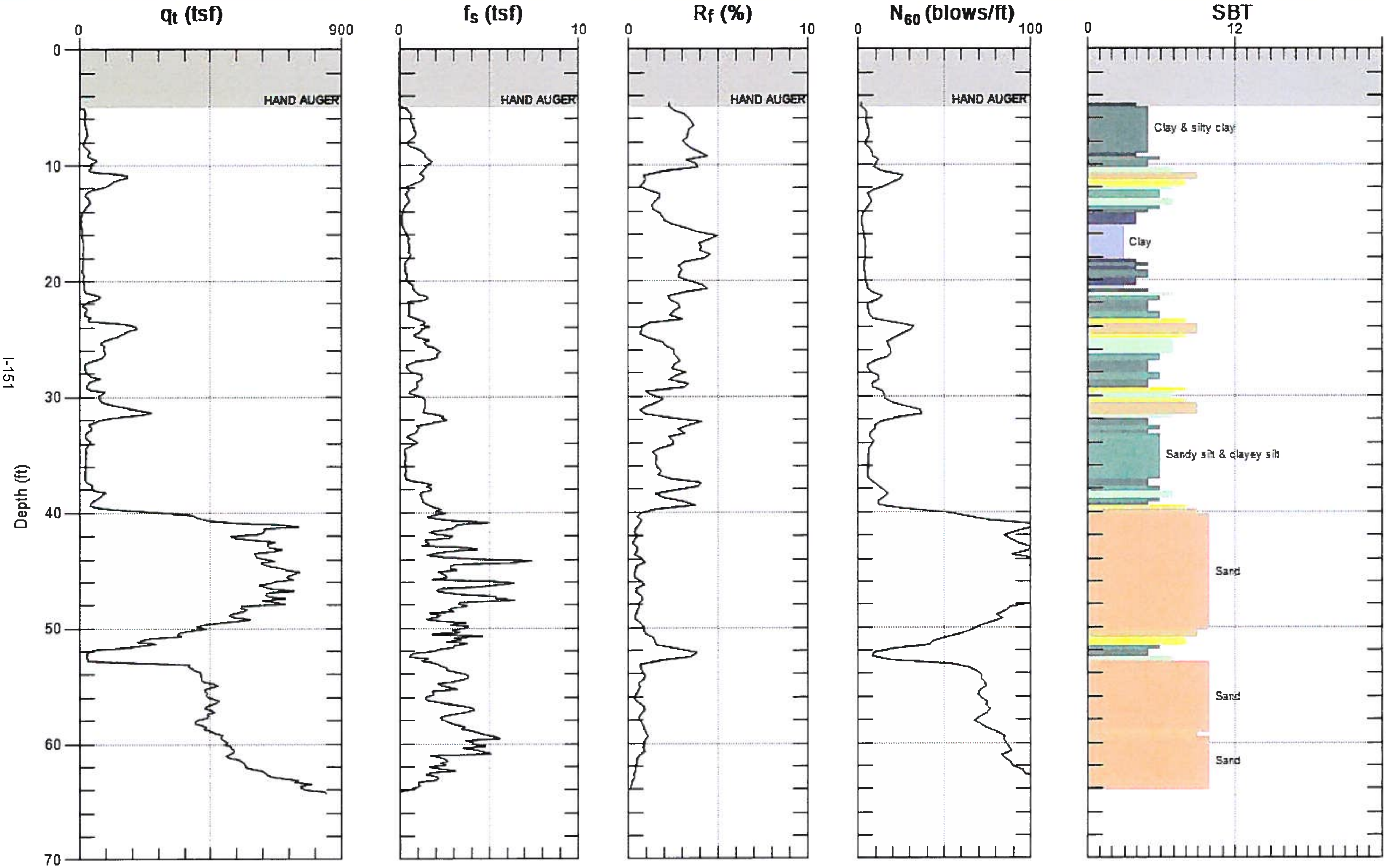
1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.
SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.
2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.
3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center, Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

GREGG GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-3

Engineer: R.GLADSON
Date: 5/26/2016 11:03



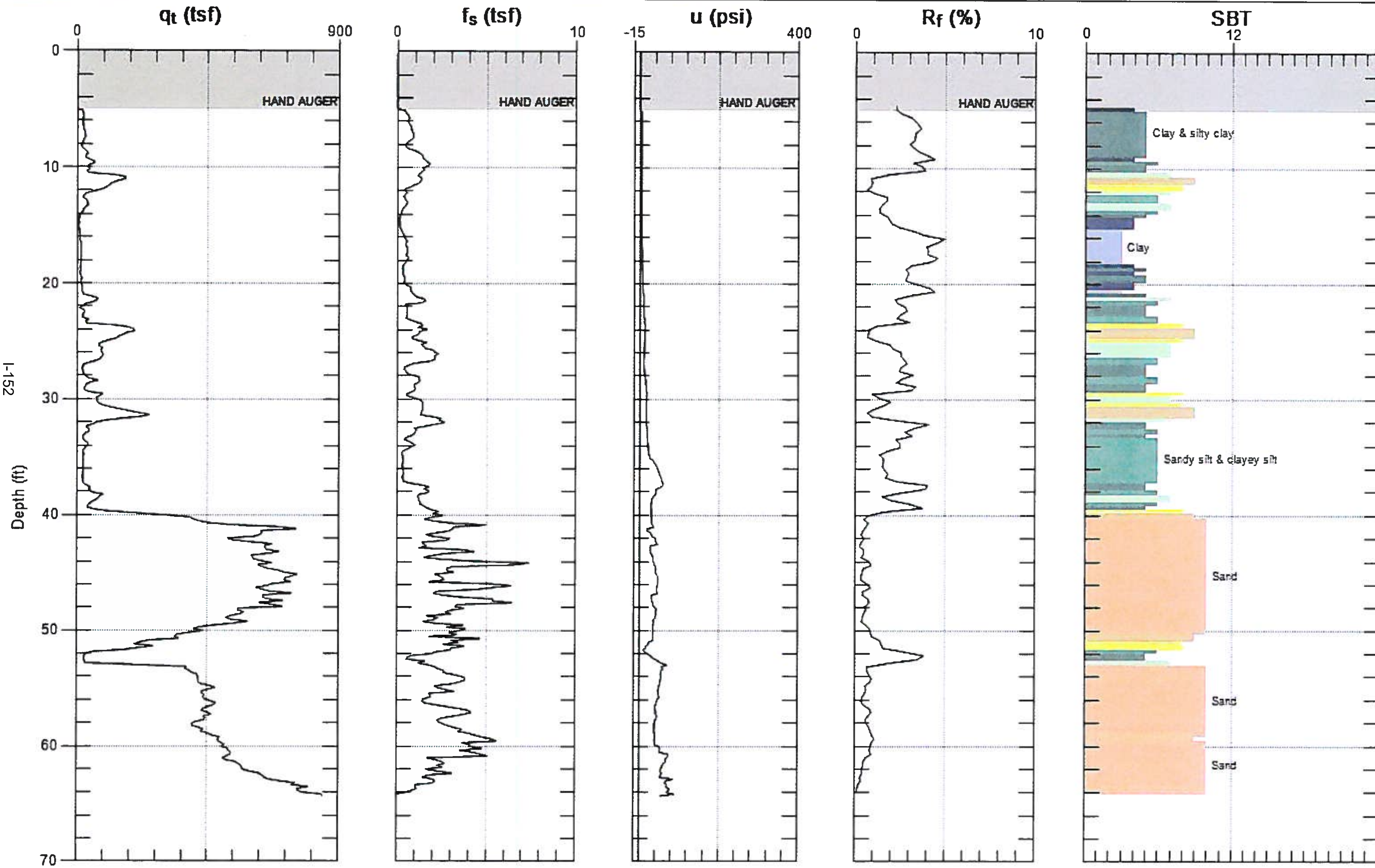
Max. Depth: 64.304 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **GEOSYSTEMS**

Site: 12870 PANAMA ST. **Engineer: R.GLADSON**

Sounding: CPT-3 **Date: 5/26/2016 11:03**



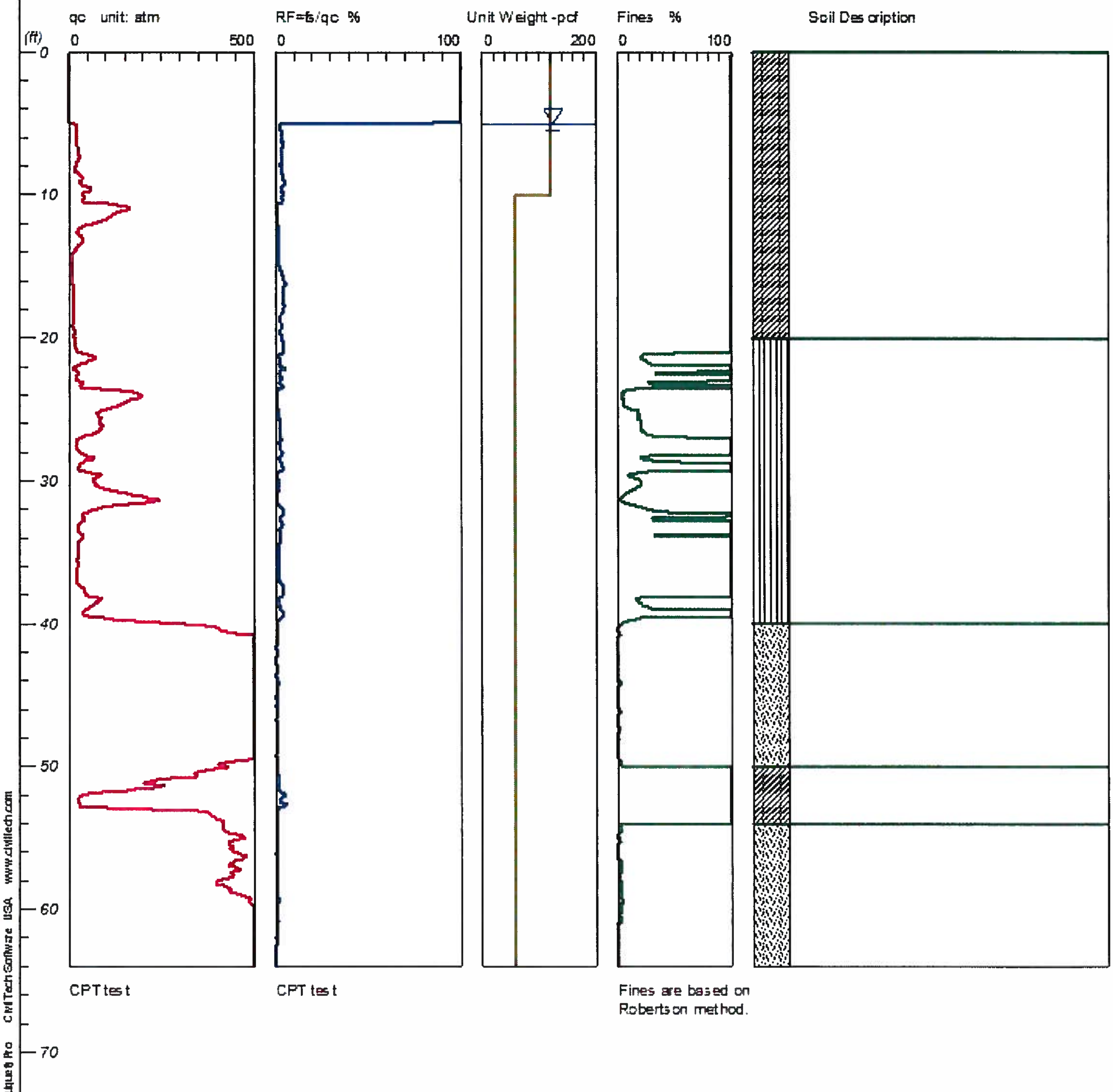
Max. Depth: 64.304 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT3 ***Water Depth=5 ft*** ***Surface Elev.=0*** ***Magnitude=6.63***
Acceleration=0.65g

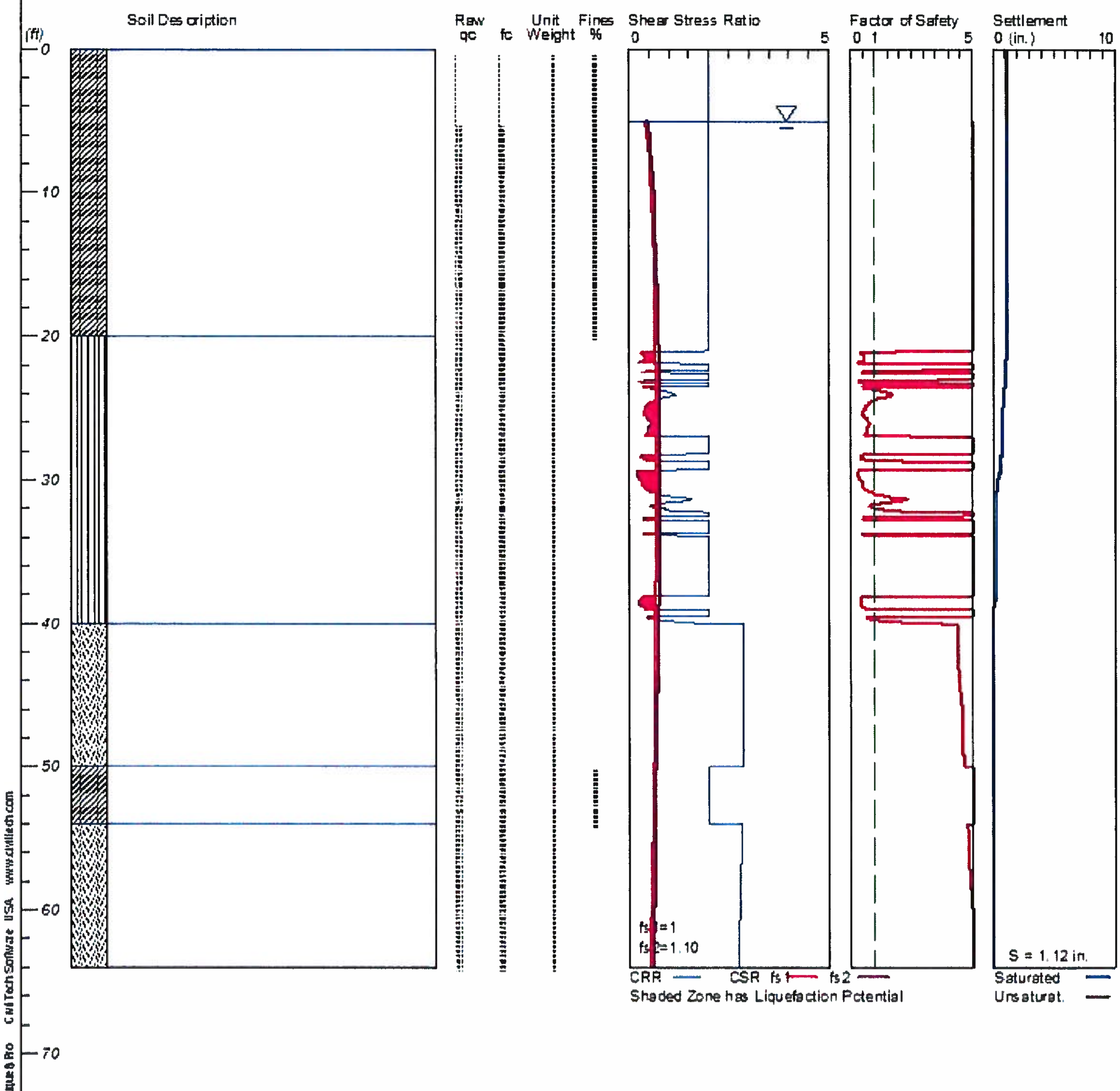


LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT3   Water Depth=5 ft   Surface Elev.=0

Magnitude=6.63
Acceleration=0.65g



GREGG DRILLING & TESTING, INC.

CONE PENETRATION TEST DATA

Client:	GEOSYSTEMS	Units:	Imperial
Site:	12870 PANAMA ST.	Data averaging interval:	0.100 meters
Engineer:	R.GLADSON	Assumed depth of water:	11.003 feet
		Net area ratio of cone:	0.80
		Unit weight of water:	62.4 lb/ft3
		Relative density constant, CDR:	350
Sounding:	CPT-3	Young's modulus for sands, a:	4
Date:	5/26/2016	Small strain shear modulus number, SG (sands):	180
Time:	11:03 AM	Small strain shear modulus number, CG (clays):	50
		Nkt for clays:	15
		OCR number, kocr:	0.3

Interpretation based on Lunne, Robertson and Powell, 1997

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
0.100	0.328	0.000	0.000	0.000							0.000				
0.200	0.656	0.000	0.000	0.000							0.000				
0.300	0.984	0.000	0.000	0.000							0.000				
0.400	1.312	0.000	0.000	0.000							0.000				
0.500	1.640	0.000	0.000	0.000							0.000				
0.600	1.969	0.000	0.000	0.000							0.000				
0.700	2.297	0.000	0.000	0.000							0.000				
0.800	2.625	0.000	0.000	0.000							0.000				
0.900	2.953	0.000	0.000	0.000							0.000				
1.000	3.281	0.000	0.000	0.000							0.000				
1.100	3.609	0.000	0.000	0.000							0.000				
1.200	3.937	0.000	0.000	0.000							0.000				
1.300	4.265	0.000	0.000	0.000							0.000				
1.400	4.593	0.000	0.000	0.000							0.000				
1.500	4.921	6.144	0.139	0.832		6.16	2.26	4	115	0.282	0.000	0.282	20.83	2.37	0.01
1.600	5.249	19.212	0.488	3.090		19.26	2.53	5	115	0.301	0.000	0.301	63.03	2.57	0.01
1.700	5.577	20.346	0.627	3.860		20.40	3.07	5	115	0.320	0.000	0.320	62.85	3.12	0.01
1.800	5.906	19.147	0.633	3.986		19.20	3.30	5	115	0.338	0.000	0.338	55.76	3.36	0.02
1.900	6.234	19.259	0.675	4.074		19.32	3.49	5	115	0.357	0.000	0.357	53.09	3.56	0.02
2.000	6.562	21.173	0.767	4.100		21.23	3.61	5	115	0.376	0.000	0.376	55.48	3.68	0.01
2.100	6.890	24.817	0.832	4.150		24.88	3.34	5	115	0.395	0.000	0.395	62.02	3.40	0.01
2.200	7.218	27.252	0.897	4.162		27.31	3.28	5	115	0.414	0.000	0.414	65.04	3.33	0.01
2.300	7.546	24.361	0.797	4.137		24.42	3.26	5	115	0.432	0.000	0.432	55.49	3.32	0.01
2.400	7.874	18.385	0.553	4.125		18.44	3.00	5	115	0.451	0.000	0.451	39.88	3.08	0.02
2.500	8.202	16.275	0.524	4.175		16.34	3.21	5	115	0.470	0.000	0.470	33.76	3.30	0.02
2.600	8.530	26.443	0.921	4.289		26.51	3.48	5	115	0.489	0.000	0.489	53.23	3.54	0.01
2.700	8.858	33.080	1.311	4.389		33.14	3.96	5	115	0.508	0.000	0.508	64.30	4.02	0.01
2.800	9.186	33.675	1.473	4.415		33.74	4.36	4	115	0.526	0.000	0.526	63.10	4.43	0.01
2.900	9.514	52.375	1.683	4.478		52.44	3.21	6	115	0.545	0.000	0.545	95.20	3.24	0.01
3.000	9.843	44.419	1.654	4.389		44.48	3.72	5	115	0.564	0.000	0.564	77.88	3.77	0.01
3.100	10.171	37.439	1.437	4.376		37.50	3.83	5	115	0.583	0.000	0.583	63.36	3.89	0.01
3.200	10.499	67.033	1.260	4.427		67.10	1.88	7	118	0.602	0.000	0.602	110.45	1.89	0.00

GREGG

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
0.100	0.328													
0.200	0.656													
0.300	0.984													
0.400	1.312													
0.500	1.640													
0.600	1.969													
0.700	2.297													
0.800	2.625													
0.900	2.953													
1.000	3.281													
1.100	3.609													
1.200	3.937													
1.300	4.265													
1.400	4.593													
1.500	4.921	4	2.68	16.23	3.00E-8	1.6	3.2				308	0.39	1.39	6.2
1.600	5.249	5	2.33	43.67	3.00E-6	4.3	8.1	35	38	77	329			
1.700	5.577	5	2.39	45.29	3.00E-6	4.7	8.6	36	38	82	343			
1.800	5.906	4	2.45	41.65	3.00E-8	4.6	8.1				960	1.26	3.72	16.7
1.900	6.234	4	2.49	40.64	3.00E-8	4.7	8.0				966	1.26	3.54	15.9
2.000	6.562	4	2.48	42.96	3.00E-8	5.1	8.6				1062	1.39	3.70	16.6
2.100	6.890	4	2.43	47.78	3.00E-8	5.8	9.6				1244	1.63	4.13	18.6
2.200	7.218	5	2.40	50.44	3.00E-6	6.3	10.2	38	38	109	412			
2.300	7.546	4	2.45	44.11	3.00E-8	5.8	9.1				1221	1.60	3.70	16.6
2.400	7.874	4	2.53	32.72	3.00E-8	4.5	7.0				922	1.20	2.66	12.0
2.500	8.202	4	2.61	28.47	3.00E-8	4.2	6.3				817	1.06	2.25	10.1
2.600	8.530	4	2.48	44.00	3.00E-8	6.4	9.4				1325	1.73	3.55	16.0
2.700	8.858	4	2.47	53.45	3.00E-8	7.9	11.5				1657	2.18	4.29	19.3
2.800	9.186	4	2.50	53.34	3.00E-8	8.2	11.7				1687	2.21	4.21	18.9
2.900	9.514	5	2.28	77.68	3.00E-6	11.6	16.1	47	40	210	561			
3.000	9.843	4	2.39	65.52	3.00E-8	10.3	14.1				2224	2.93	5.19	23.4
3.100	10.171	4	2.46	54.47	3.00E-8	9.0	12.1				1875	2.46	4.22	19.0
3.200	10.499	5	2.07	89.58	3.00E-6	13.5	18.0	51	41	268	629			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
3.300	10.827	152.275	1.274	4.478		152.34	0.84	9	124	0.622	0.000	0.622	243.77	0.84	0.00
3.400	11.155	140.954	1.270	4.339		141.02	0.90	9	124	0.643	0.005	0.638	220.02	0.90	0.00
3.500	11.483	111.294	0.924	4.200		111.35	0.83	8	121	0.663	0.015	0.648	170.92	0.83	0.00
3.600	11.811	86.942	0.531	4.112		87.00	0.61	8	121	0.682	0.025	0.657	131.34	0.62	0.00
3.700	12.139	46.232	0.481	3.860		46.29	1.04	7	118	0.702	0.035	0.666	68.42	1.05	0.01
3.800	12.467	23.432	0.405	3.771		23.49	1.72	6	115	0.721	0.046	0.675	33.73	1.78	0.01
3.900	12.795	27.977	0.479	3.885		28.03	1.71	6	115	0.739	0.056	0.683	39.94	1.75	0.01
4.000	13.123	35.468	0.519	3.898		35.52	1.46	7	118	0.759	0.066	0.693	50.20	1.49	0.01
4.100	13.451	28.469	0.367	3.835		28.52	1.29	7	118	0.778	0.076	0.702	39.55	1.32	0.01
4.200	13.780	18.487	0.248	3.809		18.54	1.34	6	115	0.797	0.087	0.710	24.99	1.40	0.01
4.300	14.108	10.094	0.175	3.809		10.15	1.73	5	115	0.816	0.097	0.719	12.99	1.88	0.02
4.400	14.436	6.664	0.126	3.860		6.72	1.87	4	115	0.834	0.107	0.727	8.09	2.14	0.03
4.500	14.764	6.395	0.129	3.935		6.45	2.00	4	115	0.853	0.117	0.736	7.61	2.30	0.03
4.600	15.092	6.265	0.153	4.024		6.32	2.41	4	115	0.872	0.128	0.744	7.32	2.80	0.03
4.700	15.420	7.445	0.240	4.099		7.50	3.20	3	111	0.890	0.138	0.752	8.79	3.63	0.02
4.800	15.748	9.164	0.348	4.276		9.23	3.77	3	111	0.909	0.148	0.760	10.94	4.18	0.02
4.900	16.076	9.202	0.456	4.402		9.27	4.92	3	111	0.927	0.158	0.769	10.85	5.46	0.02
5.000	16.404	11.414	0.514	4.516		11.48	4.47	3	111	0.945	0.169	0.777	13.57	4.88	0.01
5.100	16.732	13.143	0.519	4.705		13.21	3.93	3	111	0.963	0.179	0.785	15.61	4.24	0.01
5.200	17.060	13.942	0.563	4.944		14.01	4.02	3	111	0.982	0.189	0.793	16.44	4.32	0.01
5.300	17.388	13.273	0.530	5.046		13.35	3.97	3	111	1.000	0.199	0.801	15.42	4.29	0.01
5.400	17.717	12.603	0.575	5.096		12.68	4.53	3	111	1.018	0.209	0.809	14.42	4.93	0.01
5.500	18.045	12.325	0.521	5.171		12.40	4.20	3	111	1.036	0.220	0.817	13.91	4.59	0.01
5.600	18.373	11.916	0.370	5.247		11.99	3.09	4	115	1.055	0.230	0.825	13.25	3.39	0.01
5.700	18.701	11.711	0.328	5.562		11.79	2.78	5	115	1.074	0.240	0.834	12.85	3.06	0.01
5.800	19.029	11.060	0.328	6.117		11.15	2.94	4	115	1.093	0.250	0.842	11.94	3.26	0.02
5.900	19.357	13.310	0.379	6.345		13.40	2.83	5	115	1.112	0.261	0.851	14.44	3.09	0.02
6.000	19.685	14.537	0.404	6.471		14.63	2.76	5	115	1.130	0.271	0.860	15.71	3.00	0.01
6.100	20.013	14.128	0.478	6.711		14.22	3.36	4	115	1.149	0.281	0.868	15.06	3.66	0.02
6.200	20.341	16.954	0.699	7.164		17.06	4.10	4	115	1.168	0.291	0.877	18.12	4.40	0.01
6.300	20.669	17.846	0.783	7.745		17.96	4.36	3	111	1.186	0.302	0.885	18.96	4.67	0.02
6.400	20.997	31.341	0.956	8.842		31.47	3.04	5	115	1.205	0.312	0.893	33.88	3.16	0.01
6.500	21.325	63.250	1.391	9.612		63.39	2.19	7	118	1.224	0.322	0.902	68.89	2.24	0.01
6.600	21.654	49.225	1.138	9.183		49.36	2.31	6	115	1.243	0.332	0.911	52.82	2.37	0.01
6.700	21.982	18.841	0.517	9.019		18.97	2.73	5	115	1.262	0.343	0.919	19.26	2.92	0.02
6.800	22.310	19.500	0.558	9.611		19.64	2.84	5	115	1.281	0.353	0.928	19.78	3.04	0.02
6.900	22.638	22.159	0.555	10.393		22.31	2.49	5	115	1.300	0.363	0.937	22.43	2.64	0.02
7.000	22.966	25.867	0.593	11.302		26.03	2.28	6	115	1.318	0.373	0.945	26.15	2.40	0.02
7.100	23.294	34.158	1.021	11.857		34.33	2.97	6	115	1.337	0.383	0.954	34.59	3.09	0.01
7.200	23.622	111.313	1.314	12.576		111.49	1.18	8	121	1.357	0.394	0.963	114.33	1.19	0.00
7.300	23.950	188.691	1.371	12.576		188.87	0.73	9	124	1.377	0.404	0.973	192.61	0.73	0.00
7.400	24.278	175.548	1.209	12.361		175.73	0.69	9	124	1.398	0.414	0.984	177.24	0.69	0.00
7.500	24.606	144.346	0.943	12.210		144.52	0.65	9	124	1.418	0.424	0.994	144.01	0.66	0.00
7.600	24.934	109.194	1.239	11.983		109.37	1.13	8	121	1.438	0.435	1.003	107.57	1.15	0.00
7.700	25.262	79.376	1.495	11.844		79.55	1.88	7	118	1.457	0.445	1.012	77.13	1.91	0.01
7.800	25.591	81.997	1.672	11.403		82.16	2.04	7	118	1.477	0.455	1.021	78.99	2.07	0.00
7.900	25.919	85.232	2.122	11.087		85.39	2.49	7	118	1.496	0.465	1.031	81.41	2.53	0.00
8.000	26.247	86.812	2.170	10.961		86.97	2.50	7	118	1.515	0.476	1.040	82.20	2.54	0.00
8.100	26.575	74.338	2.002	10.835		74.49	2.69	6	115	1.534	0.486	1.048	69.61	2.74	0.00
8.200	26.903	40.292	1.143	10.634		40.45	2.83	6	115	1.553	0.496	1.057	36.80	2.94	0.01

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
3.300	10.827	6	1.58	186.96	3.00E-4	25.8	33.6	73	45	609	836			
3.400	11.155	6	1.63	170.85	3.00E-4	24.3	31.3	70	45	564	822			
3.500	11.483	6	1.68	134.58	3.00E-4	19.5	24.9	62	43	445	763			
3.600	11.811	6	1.69	104.21	3.00E-4	15.3	19.4	55	42	348	707			
3.700	12.139	6	2.05	57.50	3.00E-4	9.3	11.7	41	38	185	575			
3.800	12.467	5	2.44	29.99	3.00E-6	5.5	6.9	29	34	94	461			
3.900	12.795	5	2.37	35.34	3.00E-6	6.4	8.0	32	35	112	491			
4.000	13.123	5	2.25	43.90	3.00E-6	7.7	9.6	35	37	142	533			
4.100	13.451	5	2.30	34.95	3.00E-6	6.3	7.8	32	35	114	498			
4.200	13.780	5	2.48	22.64	3.00E-6	4.5	5.4	25	32	74	433			
4.300	14.108	4	2.79	12.23	3.00E-8	2.9	3.5				507	0.62	0.87	3.9
4.400	14.436	3	2.99	7.81	1.00E-9	2.1	2.6				336	0.39	0.54	2.4
4.500	14.764	3	3.03	7.39	1.00E-9	2.1	2.5				323	0.37	0.51	2.3
4.600	15.092	3	3.09	7.16	1.00E-9	2.1	2.5				316	0.36	0.49	2.2
4.700	15.420	3	3.09	8.60	1.00E-9	2.5	3.0				375	0.44	0.59	2.6
4.800	15.748	3	3.05	10.66	1.00E-9	3.0	3.6				461	0.55	0.73	3.3
4.900	16.076	3	3.12	10.66	1.00E-9	3.2	3.7				463	0.56	0.72	3.3
5.000	16.404	3	3.02	13.21	1.00E-9	3.7	4.3				574	0.70	0.90	4.1
5.100	16.732	3	2.93	15.09	1.00E-9	4.0	4.7				661	0.82	1.04	4.7
5.200	17.060	3	2.92	15.90	1.00E-9	4.2	4.9				701	0.87	1.10	4.9
5.300	17.388	3	2.94	14.95	1.00E-9	4.1	4.7				667	0.82	1.03	4.6
5.400	17.717	3	3.00	14.06	1.00E-9	4.0	4.6				634	0.78	0.96	4.3
5.500	18.045	3	2.99	13.58	1.00E-9	3.9	4.5				620	0.76	0.93	4.2
5.600	18.373	3	2.93	12.88	1.00E-9	3.6	4.1				600	0.73	0.88	4.0
5.700	18.701	3	2.91	12.50	1.00E-9	3.6	4.0				590	0.71	0.86	3.9
5.800	19.029	3	2.95	11.65	1.00E-9	3.4	3.9				557	0.67	0.80	3.6
5.900	19.357	3	2.87	14.04	1.00E-9	3.9	4.4				670	0.82	0.96	4.3
6.000	19.685	4	2.84	15.25	3.00E-8	4.2	4.7				731	0.90	1.05	4.7
6.100	20.013	3	2.90	14.71	1.00E-9	4.3	4.7				711	0.87	1.00	4.5
6.200	20.341	3	2.89	17.71	1.00E-9	5.1	5.6				853	1.06	1.21	5.4
6.300	20.669	3	2.89	18.54	1.00E-9	5.3	5.9				898	1.12	1.26	5.7
6.400	20.997	4	2.59	32.67	3.00E-8	8.0	8.7				1573	2.02	2.26	10.2
6.500	21.325	5	2.26	65.55	3.00E-6	13.8	15.0	43	39	254	707			
6.600	21.654	5	2.37	50.63	3.00E-6	11.3	12.1	38	37	197	652			
6.700	21.982	4	2.76	18.82	3.00E-8	5.2	5.6				949	1.18	1.28	5.8
6.800	22.310	4	2.76	19.36	3.00E-8	5.4	5.8				982	1.22	1.32	5.9
6.900	22.638	4	2.68	21.92	3.00E-8	5.9	6.3				1115	1.40	1.50	6.7
7.000	22.966	4	2.60	25.53	3.00E-8	6.6	7.0				1301	1.65	1.74	7.8
7.100	23.294	4	2.58	33.82	3.00E-8	8.6	9.1				1716	2.20	2.31	10.4
7.200	23.622	6	1.92	109.94	3.00E-4	21.2	22.2	56	41	446	872			
7.300	23.950	6	1.61	184.74	3.00E-4	32.2	33.6	73	44	755	1043			
7.400	24.278	6	1.62	170.88	3.00E-4	30.1	31.2	70	43	703	1022			
7.500	24.606	6	1.67	139.65	3.00E-4	25.2	26.0	63	42	578	961			
7.600	24.934	6	1.93	105.23	3.00E-4	20.9	21.4	55	41	437	878			
7.700	25.262	5	2.18	75.99	3.00E-6	16.8	17.2	47	39	318	792			
7.800	25.591	5	2.20	78.07	3.00E-6	17.5	17.8	47	39	329	803			
7.900	25.919	5	2.25	80.73	3.00E-6	18.6	18.8	48	39	342	816			
8.000	26.247	5	2.25	81.74	3.00E-6	18.9	19.1	48	40	348	823			
8.100	26.575	5	2.32	69.41	3.00E-6	16.7	16.8	45	39	298	784			
8.200	26.903	4	2.54	36.79	3.00E-8	10.0	10.0				2022	2.59	2.45	11.0

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
8.300	27.231	19.881	0.505	10.747		20.04	2.52	5	115	1.572	0.506	1.065	17.33	2.73	0.01
8.400	27.559	19.677	0.480	11.239		19.84	2.42	5	115	1.590	0.517	1.074	16.99	2.63	0.02
8.500	27.887	26.062	0.829	12.349		26.24	3.16	5	115	1.609	0.527	1.082	22.76	3.36	0.01
8.600	28.215	47.923	1.239	14.102		48.13	2.57	6	115	1.628	0.537	1.091	42.62	2.66	0.01
8.700	28.543	50.944	1.149	14.682		51.16	2.25	6	115	1.647	0.547	1.100	45.03	2.32	0.01
8.800	28.871	29.511	0.989	15.616		29.74	3.32	5	115	1.666	0.557	1.108	25.33	3.52	0.02
8.900	29.199	30.198	0.935	16.726		30.44	3.07	5	115	1.684	0.568	1.117	25.75	3.25	0.02
9.000	29.528	68.762	0.647	17.193		69.01	0.94	8	121	1.704	0.578	1.126	59.76	0.96	0.01
9.100	29.856	71.420	0.916	16.701		71.66	1.28	7	118	1.724	0.588	1.135	61.60	1.31	0.01
9.200	30.184	70.872	1.371	16.284		71.11	1.93	7	118	1.743	0.598	1.144	60.61	1.98	0.01
9.300	30.512	92.733	1.430	16.032		92.96	1.54	8	121	1.763	0.609	1.154	79.03	1.57	0.01
9.400	30.840	145.378	1.424	15.881		145.61	0.98	9	124	1.783	0.619	1.164	123.54	0.99	0.00
9.500	31.168	211.435	1.351	15.981		211.67	0.64	9	124	1.803	0.629	1.174	178.71	0.64	0.00
9.600	31.496	207.466	1.912	16.007		207.70	0.92	9	124	1.824	0.639	1.184	173.82	0.93	0.00
9.700	31.824	106.898	2.487	15.805		107.13	2.32	7	118	1.843	0.650	1.194	88.21	2.36	0.00
9.800	32.152	52.236	2.124	16.524		52.47	4.05	5	115	1.862	0.660	1.202	42.10	4.20	0.01
9.900	32.480	37.578	1.230	17.672		37.83	3.25	5	115	1.881	0.670	1.211	29.70	3.42	0.02
10.000	32.808	36.909	1.022	18.215		37.17	2.75	6	115	1.900	0.680	1.219	28.93	2.90	0.02
10.100	33.136	23.980	0.757	18.315		24.24	3.12	5	115	1.918	0.691	1.228	18.18	3.39	0.03
10.200	33.465	23.943	0.544	19.072		24.22	2.24	6	115	1.937	0.701	1.236	18.02	2.44	0.03
10.300	33.793	33.953	0.840	20.081		34.24	2.45	6	115	1.956	0.711	1.245	25.94	2.60	0.02
10.400	34.121	30.988	0.773	20.674		31.29	2.47	6	115	1.975	0.721	1.253	23.38	2.64	0.03
10.500	34.449	22.920	0.409	21.683		23.23	1.76	6	115	1.994	0.732	1.262	16.83	1.92	0.04
10.600	34.777	22.446	0.304	23.424		22.78	1.33	6	115	2.012	0.742	1.271	16.35	1.46	0.05
10.700	35.105	21.610	0.339	28.103		22.01	1.54	6	115	2.031	0.752	1.279	15.62	1.69	0.06
10.800	35.433	21.434	0.338	36.025		21.95	1.54	6	115	2.050	0.762	1.288	15.46	1.70	0.09
10.900	35.761	21.210	0.323	41.878		21.81	1.48	6	115	2.069	0.772	1.296	15.23	1.64	0.11
11.000	36.089	20.922	0.348	46.167		21.59	1.61	6	115	2.088	0.783	1.305	14.94	1.78	0.13
11.100	36.417	19.444	0.362	49.434		20.16	1.79	6	115	2.106	0.793	1.313	13.74	2.00	0.15
11.200	36.745	19.361	0.334	53.243		20.13	1.66	6	115	2.125	0.803	1.322	13.62	1.86	0.17
11.300	37.073	20.048	0.475	56.422		20.86	2.28	6	115	2.144	0.813	1.330	14.07	2.54	0.17
11.400	37.402	31.295	1.289	56.825		32.11	4.01	5	115	2.163	0.824	1.339	22.37	4.30	0.11
11.500	37.730	43.090	1.695	45.839		43.75	3.87	5	115	2.181	0.834	1.348	30.85	4.08	0.06
11.600	38.058	60.955	1.591	40.516		61.54	2.59	6	115	2.200	0.844	1.356	43.75	2.68	0.03
11.700	38.386	80.315	1.208	35.395		80.83	1.49	7	118	2.220	0.854	1.365	57.58	1.54	0.02
11.800	38.714	63.362	1.244	30.740		63.80	1.95	7	118	2.239	0.865	1.374	44.80	2.02	0.02
11.900	39.042	44.280	1.365	29.378		44.70	3.05	6	115	2.258	0.875	1.383	30.69	3.22	0.03
12.000	39.370	45.683	1.703	29.302		46.10	3.69	5	115	2.277	0.885	1.391	31.50	3.88	0.03
12.100	39.698	134.066	2.099	29.655		134.49	1.56	8	121	2.296	0.895	1.401	94.35	1.59	0.01
12.200	40.026	305.813	2.184	29.592		306.24	0.71	9	124	2.317	0.906	1.411	215.37	0.72	0.00
12.300	40.354	402.022	1.875	30.033		402.45	0.47	10	127	2.338	0.916	1.422	281.41	0.47	0.00
12.400	40.682	467.410	3.339	30.829		467.85	0.71	10	127	2.358	0.926	1.432	324.96	0.72	0.00
12.500	41.011	657.291	3.750	29.264		657.71	0.57	10	127	2.379	0.936	1.443	454.10	0.57	0.00
12.600	41.339	672.915	2.787	22.642		673.24	0.41	10	127	2.400	0.946	1.454	461.44	0.42	0.00
12.700	41.667	624.983	2.005	30.437		625.42	0.32	10	127	2.421	0.957	1.464	425.42	0.32	0.00
12.800	41.995	555.487	2.587	37.905		556.03	0.47	10	127	2.442	0.967	1.475	375.29	0.47	0.00
12.900	42.323	603.048	1.911	42.521		603.66	0.32	10	127	2.463	0.977	1.486	404.65	0.32	0.00
13.000	42.651	653.322	1.476	33.553		653.81	0.23	10	127	2.484	0.987	1.496	435.26	0.23	0.00
13.100	42.979	662.952	3.074	27.283		663.34	0.46	10	127	2.505	0.998	1.507	438.50	0.47	0.00
13.200	43.307	651.473	3.030	29.693		651.90	0.46	10	127	2.526	1.008	1.518	427.87	0.47	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
8.300	27.231	4	2.78	17.35	3.00E-8	5.6	5.6				1002	1.23	1.16	5.2
8.400	27.559	4	2.78	17.03	3.00E-8	5.5	5.5				992	1.22	1.13	5.1
8.500	27.887	4	2.74	22.84	3.00E-8	7.2	7.1				1312	1.64	1.52	6.8
8.600	28.215	5	2.47	42.95	3.00E-6	11.5	11.3	35	36	193	687			
8.700	28.543	5	2.41	45.49	3.00E-6	11.9	11.7	36	36	205	703			
8.800	28.871	4	2.72	25.54	3.00E-8	8.0	7.8				1487	1.87	1.69	7.6
8.900	29.199	4	2.69	26.01	3.00E-8	8.1	7.9				1522	1.92	1.72	7.7
9.000	29.528	6	2.08	61.15	3.00E-4	13.9	13.5	42	38	276	783			
9.100	29.856	5	2.15	63.13	3.00E-6	14.9	14.4	42	38	287	795			
9.200	30.184	5	2.27	62.11	3.00E-6	15.5	14.9	42	38	284	795			
9.300	30.512	5	2.12	81.52	3.00E-6	19.1	18.3	48	39	372	872			
9.400	30.840	6	1.84	128.85	3.00E-4	26.9	25.7	61	42	582	1015			
9.500	31.168	6	1.59	188.27	3.00E-4	36.0	34.2	73	44	847	1153			
9.600	31.496	6	1.71	183.46	3.00E-4	36.7	34.7	72	43	831	1149			
9.700	31.824	5	2.21	91.79	3.00E-6	22.8	21.5	51	40	429	924			
9.800	32.152	4	2.61	43.24	3.00E-8	13.4	12.6				2624	3.37	2.81	12.6
9.900	32.480	4	2.66	30.48	3.00E-8	9.9	9.3				1892	2.40	1.98	8.9
10.000	32.808	4	2.62	29.79	3.00E-8	9.5	8.9				1859	2.35	1.93	8.7
10.100	33.136	4	2.82	18.58	3.00E-8	6.9	6.4				1212	1.49	1.21	5.5
10.200	33.465	4	2.74	18.51	3.00E-8	6.6	6.1				1211	1.49	1.20	5.4
10.300	33.793	4	2.63	26.81	3.00E-8	8.8	8.1				1712	2.15	1.73	7.8
10.400	34.121	4	2.67	24.16	3.00E-8	8.2	7.5				1564	1.95	1.56	7.0
10.500	34.449	4	2.70	17.38	3.00E-8	6.2	5.7				1162	1.42	1.12	5.0
10.600	34.777	4	2.65	16.95	3.00E-8	5.9	5.4				1139	1.38	1.09	4.9
10.700	35.105	4	2.70	16.17	3.00E-8	5.8	5.3				1101	1.33	1.04	4.7
10.800	35.433	4	2.70	16.02	3.00E-8	5.8	5.2				1098	1.33	1.03	4.6
10.900	35.761	4	2.70	15.81	3.00E-8	5.7	5.2				1091	1.32	1.02	4.6
11.000	36.089	4	2.73	15.50	3.00E-8	5.7	5.1				1079	1.30	1.00	4.5
11.100	36.417	4	2.78	14.22	3.00E-8	5.5	4.9				1008	1.20	0.92	4.1
11.200	36.745	4	2.77	14.12	3.00E-8	5.4	4.8				1006	1.20	0.91	4.1
11.300	37.073	4	2.83	14.53	3.00E-8	5.8	5.2				1043	1.25	0.94	4.2
11.400	37.402	3	2.82	23.16	1.00E-9	9.0	8.0				1606	2.00	1.49	6.7
11.500	37.730	4	2.70	32.24	3.00E-8	11.6	10.3				2188	2.77	2.06	9.3
11.600	38.058	5	2.46	46.59	3.00E-6	14.6	12.9	36	36	246	802			
11.700	38.386	5	2.21	62.59	3.00E-6	17.2	15.2	42	38	323	880			
11.800	38.714	5	2.37	48.20	3.00E-6	14.6	12.8	37	36	255	815			
11.900	39.042	4	2.63	32.41	3.00E-8	11.5	10.1				2235	2.83	2.05	9.2
12.000	39.370	4	2.68	33.17	3.00E-8	12.1	10.6				2305	2.92	2.10	9.4
12.100	39.698	5	2.06	104.78	3.00E-6	27.0	23.5	55	40	538	1052			
12.200	40.026	6	1.57	248.72	3.00E-4	51.5	44.6	84	44	1225	1387			
12.300	40.354	6	1.35	326.21	3.00E-4	63.4	54.7	97	46	1610	1523			
12.400	40.682	6	1.44	378.10	3.00E-4	75.7	65.0	104	46	1871	1605			
12.500	41.011	7	1.27	530.33	3.00E-2	101.0	86.5	123	48	2631	1803			
12.600	41.339	7	1.16	540.89	3.00E-2	100.1	85.4	124	48	2693	1821			
12.700	41.667	7	1.11	500.48	3.00E-2	91.6	77.9	120	47	2502	1781			
12.800	41.995	7	1.26	443.11	3.00E-2	85.1	72.1	113	47	2224	1717			
12.900	42.323	7	1.13	479.49	3.00E-2	88.8	74.9	117	47	2415	1769			
13.000	42.651	7	1.01	517.62	3.00E-2	93.1	78.3	122	48	2615	1821			
13.100	42.979	7	1.21	523.32	3.00E-2	100.1	83.9	122	48	2653	1834			
13.200	43.307	7	1.22	512.44	3.00E-2	98.6	82.4	121	47	2608	1828			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
13.300	43.635	603.243	1.999	33.553		603.73	0.33	10	127	2.546	1.018	1.528	393.36	0.33	0.00
13.400	43.963	636.490	4.633	35.243		637.00	0.73	10	127	2.567	1.028	1.539	412.24	0.73	0.00
13.500	44.291	641.528	5.648	38.296		642.08	0.88	10	127	2.588	1.039	1.550	412.67	0.88	0.00
13.600	44.619	660.368	2.910	40.869		660.96	0.44	10	127	2.609	1.049	1.560	421.94	0.44	0.00
13.700	44.948	718.859	2.724	41.146		719.45	0.38	10	127	2.630	1.059	1.571	456.30	0.38	0.00
13.800	45.276	735.283	2.388	45.296		735.94	0.32	10	127	2.651	1.069	1.582	463.64	0.33	0.00
13.900	45.604	719.770	2.360	46.987		720.45	0.33	10	127	2.672	1.080	1.592	450.80	0.33	0.00
14.000	45.932	685.686	4.471	45.927		686.35	0.65	10	127	2.693	1.090	1.603	426.52	0.65	0.00
14.100	46.260	635.365	5.348	43.934		636.00	0.84	10	127	2.714	1.100	1.614	392.48	0.84	0.00
14.200	46.588	677.377	2.879	44.300		678.01	0.42	10	127	2.734	1.110	1.624	415.77	0.43	0.00
14.300	46.916	671.345	2.746	35.773		671.86	0.41	10	127	2.755	1.120	1.635	409.28	0.41	0.00
14.400	47.244	664.653	4.764	31.169		665.10	0.72	10	127	2.776	1.131	1.645	402.51	0.72	0.00
14.500	47.572	668.436	5.062	33.225		668.91	0.76	10	127	2.797	1.141	1.656	402.21	0.76	0.00
14.600	47.900	643.572	3.483	37.488		644.11	0.54	10	127	2.818	1.151	1.667	384.75	0.54	0.00
14.700	48.228	560.022	3.185	41.840		560.62	0.57	10	127	2.839	1.161	1.677	332.53	0.57	0.00
14.800	48.556	553.823	2.494	41.260		554.42	0.45	10	127	2.860	1.172	1.688	326.74	0.45	0.00
14.900	48.885	523.625	2.036	38.598		524.18	0.39	10	127	2.881	1.182	1.699	306.88	0.39	0.00
15.000	49.213	551.016	1.947	35.331		551.52	0.35	10	127	2.902	1.192	1.709	320.95	0.35	0.00
15.100	49.541	479.177	2.908	35.028		479.68	0.61	10	127	2.922	1.202	1.720	277.18	0.61	0.00
15.200	49.869	419.431	3.380	34.663		419.93	0.80	10	127	2.943	1.213	1.731	240.94	0.81	0.00
15.300	50.197	387.365	3.261	34.637		387.86	0.84	10	127	2.964	1.223	1.741	221.04	0.85	0.00
15.400	50.525	343.578	3.279	33.717		344.06	0.95	9	124	2.985	1.233	1.751	194.74	0.96	0.00
15.500	50.853	272.362	3.720	30.349		272.80	1.36	9	124	3.005	1.243	1.762	153.16	1.38	0.00
15.600	51.181	226.409	3.292	21.204		226.71	1.45	8	121	3.025	1.254	1.771	126.29	1.47	0.00
15.700	51.509	210.803	3.284	14.266		211.01	1.56	8	121	3.045	1.264	1.781	116.78	1.58	0.00
15.800	51.837	86.543	2.391	15.250		86.76	2.76	6	115	3.063	1.274	1.789	46.78	2.86	0.00
15.900	52.165	29.204	1.125	27.826		29.60	3.80	5	115	3.082	1.284	1.798	14.75	4.24	0.03
16.000	52.493	26.573	0.937	41.386		27.17	3.45	5	115	3.101	1.295	1.806	13.32	3.89	0.07
16.100	52.822	83.931	1.557	58.377		84.77	1.84	7	118	3.120	1.305	1.816	44.97	1.91	0.04
16.200	53.150	314.736	2.103	62.073		315.63	0.67	10	127	3.141	1.315	1.826	171.11	0.67	0.01
16.300	53.478	385.255	2.545	56.951		386.07	0.66	10	127	3.162	1.325	1.837	208.46	0.66	0.01
16.400	53.806	408.557	3.146	54.668		409.34	0.77	10	127	3.183	1.335	1.847	219.84	0.77	0.01
16.500	54.134	416.922	3.764	54.404		417.71	0.90	10	127	3.204	1.346	1.858	223.07	0.91	0.01
16.600	54.462	421.328	3.441	52.877		422.09	0.82	10	127	3.225	1.356	1.869	224.14	0.82	0.01
16.700	54.790	453.794	2.499	50.405		454.52	0.55	10	127	3.246	1.366	1.879	240.11	0.55	0.01
16.800	55.118	451.516	2.768	48.563		452.22	0.61	10	127	3.266	1.376	1.890	237.53	0.62	0.00
16.900	55.446	433.280	2.319	48.488		433.98	0.53	10	127	3.287	1.387	1.901	226.59	0.54	0.00
17.000	55.774	437.425	1.765	49.081		438.13	0.40	10	127	3.308	1.397	1.911	227.49	0.41	0.00
17.100	56.102	458.831	1.525	44.994		459.48	0.33	10	127	3.329	1.407	1.922	237.33	0.33	0.00
17.200	56.430	466.908	2.226	41.739		467.51	0.48	10	127	3.350	1.417	1.933	240.16	0.48	0.00
17.300	56.759	438.894	3.503	40.982		439.48	0.80	10	127	3.371	1.428	1.943	224.41	0.80	0.00
17.400	57.087	448.040	3.999	41.853		448.64	0.89	10	127	3.392	1.438	1.954	227.87	0.90	0.00
17.500	57.415	446.683	3.155	43.594		447.31	0.71	10	127	3.413	1.448	1.965	225.94	0.71	0.00
17.600	57.743	429.023	2.406	41.260		429.62	0.56	10	127	3.434	1.458	1.975	215.76	0.56	0.00
17.700	58.071	401.214	2.620	38.952		401.77	0.65	10	127	3.454	1.469	1.986	200.57	0.66	0.00
17.800	58.399	418.279	3.264	38.359		418.83	0.78	10	127	3.475	1.479	1.997	208.03	0.79	0.00
17.900	58.727	438.086	3.727	38.497		438.64	0.85	10	127	3.496	1.489	2.007	216.79	0.86	0.00
18.000	59.055	469.204	4.423	39.834		469.78	0.94	10	127	3.517	1.499	2.018	231.06	0.95	0.00
18.100	59.383	488.100	5.249	39.519		488.67	1.07	9	124	3.537	1.509	2.028	239.22	1.08	0.00
18.200	59.711	497.637	4.469	39.721		498.21	0.90	10	127	3.558	1.520	2.039	242.63	0.90	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
13.300	43.635	7	1.15	472.75	3.00E-2	89.4	74.4	116	47	2415	1786			
13.400	43.963	6	1.38	497.17	3.00E-4	101.1	83.8	119	47	2548	1822			
13.500	44.291	6	1.45	499.41	3.00E-4	104.0	86.0	119	47	2568	1831			
13.600	44.619	7	1.21	512.38	3.00E-2	99.6	82.0	121	47	2644	1853			
13.700	44.948	7	1.14	555.99	3.00E-2	106.2	87.2	126	48	2878	1911			
13.800	45.276	7	1.09	566.84	3.00E-2	107.1	87.6	127	48	2944	1929			
13.900	45.604	7	1.10	553.00	3.00E-2	105.2	85.7	126	48	2882	1920			
14.000	45.932	7	1.33	524.96	3.00E-2	107.4	87.2	122	47	2745	1893			
14.100	46.260	6	1.44	484.67	3.00E-4	102.9	83.4	118	47	2544	1850			
14.200	46.588	7	1.20	515.11	3.00E-2	102.0	82.3	121	47	2712	1894			
14.300	46.916	7	1.20	508.74	3.00E-2	100.9	81.2	121	47	2687	1892			
14.400	47.244	6	1.38	501.95	3.00E-4	105.6	84.7	120	47	2660	1890			
14.500	47.572	6	1.40	503.20	3.00E-4	106.8	85.4	120	47	2676	1898			
14.600	47.900	7	1.30	482.90	3.00E-2	99.8	79.5	117	47	2576	1878			
14.700	48.228	6	1.36	418.68	3.00E-4	88.4	70.2	109	46	2242	1797			
14.800	48.556	7	1.30	412.70	3.00E-2	85.7	67.9	109	46	2218	1794			
14.900	48.885	7	1.27	388.83	3.00E-2	80.5	63.6	105	46	2097	1765			
15.000	49.213	7	1.23	407.94	3.00E-2	83.7	65.9	108	46	2206	1799			
15.100	49.541	6	1.44	353.40	3.00E-4	77.5	60.8	100	46	1919	1720			
15.200	49.869	6	1.57	308.14	3.00E-4	70.7	55.3	94	45	1680	1649			
15.300	50.197	6	1.61	283.56	3.00E-4	66.2	51.6	90	45	1551	1609			
15.400	50.525	6	1.69	248.83	3.00E-4	60.3	46.9	84	44	1376	1549			
15.500	50.853	6	1.87	190.77	3.00E-4	51.0	39.6	74	43	1091	1437			
15.600	51.181	6	1.95	155.78	3.00E-4	43.7	33.8	67	42	907	1353			
15.700	51.509	6	1.99	143.34	3.00E-4	41.4	31.9	64	41	844	1324			
15.800	51.837	5	2.46	53.46	3.00E-6	20.7	15.9	39	36	347	986			
15.900	52.165	3	2.95	15.61	1.00E-9	9.1	6.9				1480	1.77	0.98	4.4
16.000	52.493	3	2.96	14.08	1.00E-9	8.3	6.4				1358	1.60	0.89	4.0
16.100	52.822	5	2.36	52.46	3.00E-6	19.1	14.6	39	36	339	983			
16.200	53.150	6	1.62	224.80	3.00E-4	54.0	41.1	80	43	1263	1526			
16.300	53.478	6	1.55	274.66	3.00E-4	64.7	49.1	89	44	1544	1636			
16.400	53.806	6	1.58	290.50	3.00E-4	69.2	52.4	91	45	1637	1671			
16.500	54.134	6	1.63	295.61	3.00E-4	71.7	54.1	92	45	1671	1686			
16.600	54.462	6	1.59	297.87	3.00E-4	71.7	53.9	92	45	1688	1695			
16.700	54.790	6	1.45	320.01	3.00E-4	73.8	55.4	96	45	1818	1740			
16.800	55.118	6	1.49	317.46	3.00E-4	74.2	55.5	95	45	1809	1741			
16.900	55.446	6	1.47	303.70	3.00E-4	70.7	52.7	93	45	1736	1720			
17.000	55.774	6	1.39	305.76	3.00E-4	69.6	51.8	93	45	1753	1729			
17.100	56.102	7	1.32	319.86	3.00E-2	71.6	53.1	96	45	1838	1760			
17.200	56.430	6	1.41	324.58	3.00E-4	74.9	55.5	96	45	1870	1773			
17.300	56.759	6	1.59	304.13	3.00E-4	74.5	55.0	93	45	1758	1740			
17.400	57.087	6	1.62	309.66	3.00E-4	76.8	56.5	94	45	1795	1755			
17.500	57.415	6	1.55	307.88	3.00E-4	74.8	54.9	94	45	1789	1757			
17.600	57.743	6	1.49	294.79	3.00E-4	70.7	51.7	92	44	1718	1737			
17.700	58.071	6	1.56	274.78	3.00E-4	67.6	49.3	89	44	1607	1701			
17.800	58.399	6	1.60	285.77	3.00E-4	71.4	52.0	90	44	1675	1728			
17.900	58.727	6	1.62	298.59	3.00E-4	75.1	54.5	92	44	1755	1758			
18.000	59.055	6	1.63	319.09	3.00E-4	80.8	58.5	95	45	1879	1802			
18.100	59.383	6	1.66	329.73	3.00E-4	85.0	61.4	97	45	1955	1829			
18.200	59.711	6	1.60	336.79	3.00E-4	84.8	61.1	98	45	1993	1844			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
18.300	60.039	508.074	4.338	48.198		508.77	0.85	10	127	3.579	1.530	2.049	246.52	0.86	0.00
18.400	60.367	523.253	4.204	52.095		524.00	0.80	10	127	3.600	1.540	2.060	252.63	0.81	0.00
18.500	60.696	524.814	4.675	66.437		525.77	0.89	10	127	3.621	1.550	2.071	252.17	0.90	0.01
18.600	61.024	510.147	3.020	70.247		511.16	0.59	10	127	3.642	1.561	2.081	243.85	0.59	0.01
18.700	61.352	536.972	2.491	65.996		537.92	0.46	10	127	3.663	1.571	2.092	255.39	0.47	0.01
18.800	61.680	562.467	2.521	59.866		563.33	0.45	10	127	3.684	1.581	2.103	266.17	0.45	0.00
18.900	62.008	576.390	2.178	55.577		577.19	0.38	10	127	3.705	1.591	2.113	271.38	0.38	0.00
19.000	62.336	617.640	2.399	55.312		618.44	0.39	10	127	3.725	1.602	2.124	289.43	0.39	0.00
19.100	62.664	645.422	1.795	64.167		646.35	0.28	10	127	3.746	1.612	2.135	301.05	0.28	0.00
19.200	62.992	701.729	2.090	72.429		702.77	0.30	10	127	3.767	1.622	2.145	325.85	0.30	0.01
19.300	63.320	760.546	1.400	68.456		761.53	0.18	10	127	3.788	1.632	2.156	351.49	0.18	0.00
19.400	63.648	771.086	1.040	73.325		772.14	0.13	10	127	3.809	1.643	2.166	354.65	0.14	0.00
19.500	63.976	790.902	0.499	78.433		792.03	0.06	10	127	3.830	1.653	2.177	362.04	0.06	0.01

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
18.300	60.039	6	1.58	343.07	3.00E-4	86.0	61.8	99	45	2035	1860			
18.400	60.367	6	1.55	352.49	3.00E-4	87.8	62.9	100	45	2096	1882			
18.500	60.696	6	1.59	352.76	3.00E-4	89.1	63.7	100	45	2103	1887			
18.600	61.024	6	1.47	342.00	3.00E-4	83.4	59.4	99	45	2045	1872			
18.700	61.352	6	1.39	359.10	3.00E-4	85.4	60.8	101	45	2152	1908			
18.800	61.680	6	1.36	375.21	3.00E-4	88.8	63.0	104	45	2253	1941			
18.900	62.008	7	1.31	383.52	3.00E-2	89.6	63.4	105	45	2309	1960			
19.000	62.336	7	1.29	410.06	3.00E-2	95.6	67.5	108	46	2474	2009			
19.100	62.664	7	1.19	427.59	3.00E-2	96.9	68.2	111	46	2585	2042			
19.200	62.992	7	1.18	463.97	3.00E-2	105.0	73.8	115	46	2811	2103			
19.300	63.320	7	1.04	501.71	3.00E-2	109.4	76.6	120	47	3046	2164			
19.400	63.648	7	0.98	507.47	3.00E-2	109.1	76.2	120	47	3089	2177			
19.500	63.976	7	0.91	519.32	3.00E-2	109.7	76.5	122	47	3168	2199			

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LIQUEFACTION ANALYSIS CALCULATION DETAILS
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Input File Name: G:\GS16\GS16-0107_Panama\Design & Analysis\LIQUEFACTION\16-0107-CPT3.liq
Title: 12870 Panama Street
Subtitle: CPT 3

Input Data:
Surface Elev.=0
Hole No.=CPT3
Depth of Hole=64.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.65 g
Earthquake Magnitude=6.63
No-Liquefiable Soils: CL, OL are Non-Liq. Soil
1. CPT Calulation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.1
Plot two CSR (fs1=1, fs2=User)
10. Average two input data between two Depths: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf %	Gamma pcf	Fines %	D50 mm
0.16	0.00	0.00	100.00	120.00	NoLiq	0.50
0.66	0.00	0.00	100.00	120.00	NoLiq	0.50
1.15	0.00	0.00	100.00	120.00	NoLiq	0.50
1.64	0.00	0.00	100.00	120.00	NoLiq	0.50
2.13	0.00	0.00	100.00	120.00	NoLiq	0.50
2.62	0.00	0.00	100.00	120.00	NoLiq	0.50
3.12	0.00	0.00	100.00	120.00	NoLiq	0.50
3.61	0.00	0.00	100.00	120.00	NoLiq	0.50
4.10	0.00	0.00	100.00	120.00	NoLiq	0.50
4.59	0.00	0.00	100.00	120.00	NoLiq	0.50
5.09	18.43	0.42	2.26	120.00	NoLiq	0.50
5.58	20.74	0.63	3.06	120.00	NoLiq	0.50
6.07	18.82	0.61	3.22	120.00	NoLiq	0.50
6.56	21.02	0.77	3.66	120.00	NoLiq	0.50
7.05	26.57	0.88	3.32	120.00	NoLiq	0.50
7.55	23.92	0.81	3.37	120.00	NoLiq	0.50
8.04	15.28	0.46	3.02	120.00	NoLiq	0.50
8.53	26.37	0.95	3.61	120.00	NoLiq	0.50
9.02	28.91	1.43	4.95	120.00	NoLiq	0.50
9.51	57.13	1.68	2.93	120.00	NoLiq	0.50
10.01	35.10	1.42	4.06	120.00	NoLiq	0.50
10.50	38.42	1.26	3.28	120.00	NoLiq	0.50
10.99	163.70	1.36	0.83	120.00	NoLiq	0.50
11.48	110.90	0.89	0.80	120.00	NoLiq	0.50
11.98	67.78	0.45	0.67	120.00	NoLiq	0.50
12.47	22.02	0.37	1.68	120.00	NoLiq	0.50
12.96	34.63	0.56	1.61	120.00	NoLiq	0.50
13.45	27.82	0.34	1.24	120.00	NoLiq	0.50
13.94	14.16	0.22	1.58	120.00	NoLiq	0.50
14.44	6.44	0.12	1.85	120.00	NoLiq	0.50
14.93	6.36	0.13	2.03	120.00	NoLiq	0.50
15.42	7.42	0.24	3.28	120.00	NoLiq	0.50
15.91	9.73	0.41	4.19	120.00	NoLiq	0.50
16.40	12.07	0.55	4.52	120.00	NoLiq	0.50
16.90	13.46	0.56	4.19	120.00	NoLiq	0.50
17.39	13.24	0.53	4.03	120.00	NoLiq	0.50
17.88	12.71	0.59	4.61	120.00	NoLiq	0.50
18.37	11.90	0.34	2.89	120.00	NoLiq	0.50
18.86	12.18	0.34	2.80	120.00	NoLiq	0.50
19.36	12.91	0.40	3.12	120.00	NoLiq	0.50
19.85	12.49	0.39	3.12	120.00	NoLiq	0.50
20.34	17.70	0.77	4.34	120.00	0.00	0.50
20.83	19.29	0.82	4.28	120.00	0.00	0.50
21.33	70.79	1.51	2.14	120.00	0.00	0.50
21.82	28.24	0.47	1.65	120.00	0.00	0.50
22.31	22.11	0.57	2.57	120.00	0.00	0.50
22.80	19.04	0.56	2.96	120.00	0.00	0.50

23.29	29.44	1.01	3.45	120.00	0.00	0.50
23.79	174.80	1.18	0.68	120.00	0.00	0.50
24.28	171.20	1.25	0.73	120.00	0.00	0.50
24.77	133.30	0.86	0.65	120.00	0.00	0.50
25.26	75.23	1.36	1.81	120.00	0.00	0.50
25.75	83.59	1.98	2.37	120.00	0.00	0.50
26.25	88.78	2.10	2.37	120.00	0.00	0.50
26.74	61.62	1.78	2.89	120.00	0.00	0.50
27.23	19.54	0.44	2.23	120.00	0.00	0.50
27.72	20.77	0.55	2.66	120.00	0.00	0.50
28.22	40.73	1.23	3.03	120.00	0.00	0.50
28.71	33.71	0.99	2.93	120.00	0.00	0.50
29.20	25.79	0.98	3.79	120.00	0.00	0.50
29.69	79.07	0.57	0.73	120.00	0.00	0.50
30.18	69.76	1.41	2.03	120.00	0.00	0.50
30.68	113.60	1.44	1.27	120.00	0.00	0.50
31.17	210.30	1.34	0.64	120.00	0.00	0.50
31.66	155.00	2.45	1.58	120.00	0.00	0.50
32.15	54.62	2.11	3.86	120.00	0.00	0.50
32.64	42.71	1.10	2.56	120.00	0.00	0.50
33.14	22.61	0.81	3.57	120.00	0.00	0.50
33.63	27.80	0.68	2.44	120.00	0.00	0.50
34.12	30.89	0.74	2.41	120.00	0.00	0.50
34.61	22.30	0.28	1.27	120.00	0.00	0.50
35.10	20.96	0.34	1.64	120.00	0.00	0.50
35.60	20.69	0.32	1.54	120.00	0.00	0.50
36.09	21.27	0.34	1.61	120.00	0.00	0.50
36.58	18.93	0.33	1.76	120.00	0.00	0.50
37.07	19.12	0.39	2.03	120.00	0.00	0.50
37.57	43.05	1.77	4.12	120.00	0.00	0.50
38.06	50.24	1.75	3.48	120.00	0.00	0.50
38.55	73.02	1.22	1.66	120.00	0.00	0.50
39.04	43.94	1.32	2.99	120.00	0.00	0.50
39.53	63.60	1.93	3.03	120.00	0.00	0.50
40.03	312.10	2.56	0.82	120.00	0.00	0.50
40.52	418.90	2.10	0.50	120.00	0.00	0.50
41.01	689.00	3.19	0.46	120.00	0.00	0.50
41.50	634.30	2.30	0.36	120.00	0.00	0.50
41.99	518.60	2.94	0.57	120.00	0.00	0.50
42.49	669.50	1.51	0.23	120.00	0.00	0.50
42.98	650.50	3.64	0.56	120.00	0.00	0.50
43.47	599.40	2.07	0.35	120.00	0.00	0.50
43.96	633.70	4.14	0.65	120.00	0.00	0.50
44.46	634.60	3.08	0.49	120.00	0.00	0.50
44.95	709.50	3.18	0.45	120.00	0.00	0.50
45.44	715.00	2.58	0.36	120.00	0.00	0.50
45.93	671.10	5.18	0.77	120.00	0.00	0.50
46.42	636.60	4.32	0.68	120.00	0.00	0.50
46.92	639.40	2.58	0.40	120.00	0.00	0.50
47.41	706.30	5.38	0.76	120.00	0.00	0.50
47.90	704.40	3.29	0.47	120.00	0.00	0.50
48.39	573.00	2.74	0.48	120.00	0.00	0.50
48.88	512.70	2.29	0.45	120.00	0.00	0.50
49.38	538.10	2.21	0.41	120.00	0.00	0.50
49.87	402.20	3.85	0.96	120.00	0.00	0.50
50.36	344.60	3.35	0.97	120.00	NoLiq	0.50
50.85	248.40	3.07	1.24	120.00	NoLiq	0.50
51.35	260.90	3.78	1.45	120.00	NoLiq	0.50
51.84	61.28	2.24	3.66	120.00	NoLiq	0.50
52.33	26.65	0.62	2.33	120.00	NoLiq	0.50
52.82	29.36	1.26	4.28	120.00	NoLiq	0.50
53.31	373.50	2.34	0.63	120.00	NoLiq	0.50
53.81	413.80	3.16	0.76	120.00	NoLiq	0.50
54.30	418.10	3.81	0.91	120.00	0.00	0.50
54.79	458.40	2.14	0.47	120.00	0.00	0.50
55.28	429.20	3.20	0.75	120.00	0.00	0.50
55.77	433.50	1.87	0.43	120.00	0.00	0.50
56.27	477.60	1.60	0.34	120.00	0.00	0.50
56.76	434.90	3.57	0.82	120.00	0.00	0.50
57.25	461.70	3.76	0.81	120.00	0.00	0.50
57.74	436.90	2.30	0.53	120.00	0.00	0.50
58.23	398.20	2.88	0.72	120.00	0.00	0.50
58.73	427.60	3.46	0.81	120.00	0.00	0.50
59.22	492.10	4.82	0.98	120.00	0.00	0.50
59.71	498.20	3.70	0.74	120.00	0.00	0.50
60.20	518.90	4.78	0.92	120.00	0.00	0.50
60.70	528.10	4.67	0.88	120.00	0.00	0.50
61.19	511.30	2.23	0.44	120.00	0.00	0.50
61.68	564.50	2.32	0.41	120.00	0.00	0.50
62.17	591.60	2.28	0.39	120.00	0.00	0.50
62.66	643.80	1.51	0.23	120.00	0.00	0.50
63.16	748.60	2.02	0.27	120.00	0.00	0.50

63.65	759.00	1.14	0.15	120.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:
Calculation segment, dz=0.050 ft
User defined Print Interval, dp=0.50 ft

Peak Ground Acceleration (PGA), a_max = 0.65g

CSR Calculation:

Depth ft	gamma pcf	sigma atm	gamma' pcf	sigma' atm	rd	mZ g	a(z) g	CSR	x fs1	=CSRfs
0.16	120.00	0.009	120.00	0.009	1.00	0.000	0.650	0.42	1.00	0.42
0.66	120.00	0.037	120.00	0.037	1.00	0.000	0.650	0.42	1.00	0.42
1.16	120.00	0.066	120.00	0.066	1.00	0.000	0.650	0.42	1.00	0.42
1.66	120.00	0.094	120.00	0.094	1.00	0.000	0.650	0.42	1.00	0.42
2.16	120.00	0.122	120.00	0.122	0.99	0.000	0.650	0.42	1.00	0.42
2.66	120.00	0.151	120.00	0.151	0.99	0.000	0.650	0.42	1.00	0.42
3.16	120.00	0.179	120.00	0.179	0.99	0.000	0.650	0.42	1.00	0.42
3.66	120.00	0.208	120.00	0.208	0.99	0.000	0.650	0.42	1.00	0.42
4.16	120.00	0.236	120.00	0.236	0.99	0.000	0.650	0.42	1.00	0.42
4.66	120.00	0.264	120.00	0.264	0.99	0.000	0.650	0.42	1.00	0.42
5.16	120.00	0.293	57.60	0.288	0.99	0.000	0.650	0.42	1.00	0.42
5.66	120.00	0.321	57.60	0.302	0.99	0.000	0.650	0.44	1.00	0.44
6.16	120.00	0.349	57.60	0.315	0.99	0.000	0.650	0.46	1.00	0.46
6.66	120.00	0.378	57.60	0.329	0.98	0.000	0.650	0.48	1.00	0.48
7.16	120.00	0.406	57.60	0.343	0.98	0.000	0.650	0.49	1.00	0.49
7.66	120.00	0.434	57.60	0.356	0.98	0.000	0.650	0.51	1.00	0.51
8.16	120.00	0.463	57.60	0.370	0.98	0.000	0.650	0.52	1.00	0.52
8.66	120.00	0.491	57.60	0.383	0.98	0.000	0.650	0.53	1.00	0.53
9.16	120.00	0.519	57.60	0.397	0.98	0.000	0.650	0.54	1.00	0.54
9.66	120.00	0.548	57.60	0.411	0.98	0.000	0.650	0.55	1.00	0.55
10.16	120.00	0.576	57.60	0.424	0.98	0.000	0.650	0.56	1.00	0.56
10.66	120.00	0.604	57.60	0.438	0.98	0.000	0.650	0.57	1.00	0.57
11.16	120.00	0.633	57.60	0.451	0.97	0.000	0.650	0.58	1.00	0.58
11.66	120.00	0.661	57.60	0.465	0.97	0.000	0.650	0.58	1.00	0.58
12.16	120.00	0.690	57.60	0.479	0.97	0.000	0.650	0.59	1.00	0.59
12.66	120.00	0.718	57.60	0.492	0.97	0.000	0.650	0.60	1.00	0.60
13.16	120.00	0.746	57.60	0.506	0.97	0.000	0.650	0.60	1.00	0.60
13.66	120.00	0.775	57.60	0.520	0.97	0.000	0.650	0.61	1.00	0.61
14.16	120.00	0.803	57.60	0.533	0.97	0.000	0.650	0.62	1.00	0.62
14.66	120.00	0.831	57.60	0.547	0.97	0.000	0.650	0.62	1.00	0.62
15.16	120.00	0.860	57.60	0.560	0.96	0.000	0.650	0.63	1.00	0.63
15.66	120.00	0.888	57.60	0.574	0.96	0.000	0.650	0.63	1.00	0.63
16.16	120.00	0.916	57.60	0.588	0.96	0.000	0.650	0.63	1.00	0.63
16.66	120.00	0.945	57.60	0.601	0.96	0.000	0.650	0.64	1.00	0.64
17.16	120.00	0.973	57.60	0.615	0.96	0.000	0.650	0.64	1.00	0.64
17.66	120.00	1.001	57.60	0.628	0.96	0.000	0.650	0.65	1.00	0.65
18.16	120.00	1.030	57.60	0.642	0.96	0.000	0.650	0.65	1.00	0.65
18.66	120.00	1.058	57.60	0.656	0.96	0.000	0.650	0.65	1.00	0.65
19.16	120.00	1.086	57.60	0.669	0.96	0.000	0.650	0.66	1.00	0.66
19.66	120.00	1.115	57.60	0.683	0.95	0.000	0.650	0.66	1.00	0.66
20.16	120.00	1.143	57.60	0.696	0.95	0.000	0.650	0.66	1.00	0.66
20.66	120.00	1.172	57.60	0.710	0.95	0.000	0.650	0.66	1.00	0.66
21.16	120.00	1.200	57.60	0.724	0.95	0.000	0.650	0.67	1.00	0.67
21.66	120.00	1.228	57.60	0.737	0.95	0.000	0.650	0.67	1.00	0.67
22.16	120.00	1.257	57.60	0.751	0.95	0.000	0.650	0.67	1.00	0.67
22.66	120.00	1.285	57.60	0.765	0.95	0.000	0.650	0.67	1.00	0.67
23.16	120.00	1.313	57.60	0.778	0.95	0.000	0.650	0.67	1.00	0.67
23.66	120.00	1.342	57.60	0.792	0.94	0.000	0.650	0.68	1.00	0.68
24.16	120.00	1.370	57.60	0.805	0.94	0.000	0.650	0.68	1.00	0.68
24.66	120.00	1.398	57.60	0.819	0.94	0.000	0.650	0.68	1.00	0.68
25.16	120.00	1.427	57.60	0.833	0.94	0.000	0.650	0.68	1.00	0.68
25.66	120.00	1.455	57.60	0.846	0.94	0.000	0.650	0.68	1.00	0.68
26.16	120.00	1.483	57.60	0.860	0.94	0.000	0.650	0.68	1.00	0.68
26.66	120.00	1.512	57.60	0.873	0.94	0.000	0.650	0.69	1.00	0.69
27.16	120.00	1.540	57.60	0.887	0.94	0.000	0.650	0.69	1.00	0.69
27.66	120.00	1.568	57.60	0.901	0.94	0.000	0.650	0.69	1.00	0.69
28.16	120.00	1.597	57.60	0.914	0.93	0.000	0.650	0.69	1.00	0.69
28.66	120.00	1.625	57.60	0.928	0.93	0.000	0.650	0.69	1.00	0.69
29.16	120.00	1.654	57.60	0.941	0.93	0.000	0.650	0.69	1.00	0.69
29.66	120.00	1.682	57.60	0.955	0.93	0.000	0.650	0.69	1.00	0.69
30.16	120.00	1.710	57.60	0.969	0.93	0.000	0.650	0.69	1.00	0.69
30.66	120.00	1.739	57.60	0.982	0.92	0.000	0.650	0.69	1.00	0.69
31.16	120.00	1.767	57.60	0.996	0.92	0.000	0.650	0.69	1.00	0.69
31.66	120.00	1.795	57.60	1.009	0.92	0.000	0.650	0.69	1.00	0.69
32.16	120.00	1.824	57.60	1.023	0.91	0.000	0.650	0.69	1.00	0.69
32.66	120.00	1.852	57.60	1.037	0.91	0.000	0.650	0.69	1.00	0.69
33.16	120.00	1.880	57.60	1.050	0.90	0.000	0.650	0.68	1.00	0.68

33.66	120.00	1.909	57.60	1.064	0.90	0.000	0.650	0.68	1.00	0.68
34.16	120.00	1.937	57.60	1.078	0.90	0.000	0.650	0.68	1.00	0.68
34.66	120.00	1.965	57.60	1.091	0.89	0.000	0.650	0.68	1.00	0.68
35.16	120.00	1.994	57.60	1.105	0.89	0.000	0.650	0.68	1.00	0.68
35.66	120.00	2.022	57.60	1.118	0.88	0.000	0.650	0.68	1.00	0.68
36.16	120.00	2.050	57.60	1.132	0.88	0.000	0.650	0.67	1.00	0.67
36.66	120.00	2.079	57.60	1.146	0.88	0.000	0.650	0.67	1.00	0.67
37.16	120.00	2.107	57.60	1.159	0.87	0.000	0.650	0.67	1.00	0.67
37.66	120.00	2.136	57.60	1.173	0.87	0.000	0.650	0.67	1.00	0.67
38.16	120.00	2.164	57.60	1.186	0.86	0.000	0.650	0.67	1.00	0.67
38.66	120.00	2.192	57.60	1.200	0.86	0.000	0.650	0.66	1.00	0.66
39.16	120.00	2.221	57.60	1.214	0.86	0.000	0.650	0.66	1.00	0.66
39.66	120.00	2.249	57.60	1.227	0.85	0.000	0.650	0.66	1.00	0.66
40.16	120.00	2.277	57.60	1.241	0.85	0.000	0.650	0.66	1.00	0.66
40.66	120.00	2.306	57.60	1.254	0.84	0.000	0.650	0.65	1.00	0.65
41.16	120.00	2.334	57.60	1.268	0.84	0.000	0.650	0.65	1.00	0.65
41.66	120.00	2.362	57.60	1.282	0.83	0.000	0.650	0.65	1.00	0.65
42.16	120.00	2.391	57.60	1.295	0.83	0.000	0.650	0.65	1.00	0.65
42.66	120.00	2.419	57.60	1.309	0.83	0.000	0.650	0.65	1.00	0.65
43.16	120.00	2.447	57.60	1.322	0.82	0.000	0.650	0.64	1.00	0.64
43.66	120.00	2.476	57.60	1.336	0.82	0.000	0.650	0.64	1.00	0.64
44.16	120.00	2.504	57.60	1.350	0.81	0.000	0.650	0.64	1.00	0.64
44.66	120.00	2.532	57.60	1.363	0.81	0.000	0.650	0.64	1.00	0.64
45.16	120.00	2.561	57.60	1.377	0.81	0.000	0.650	0.63	1.00	0.63
45.66	120.00	2.589	57.60	1.391	0.80	0.000	0.650	0.63	1.00	0.63
46.16	120.00	2.618	57.60	1.404	0.80	0.000	0.650	0.63	1.00	0.63
46.66	120.00	2.646	57.60	1.418	0.79	0.000	0.650	0.63	1.00	0.63
47.16	120.00	2.674	57.60	1.431	0.79	0.000	0.650	0.62	1.00	0.62
47.66	120.00	2.703	57.60	1.445	0.79	0.000	0.650	0.62	1.00	0.62
48.16	120.00	2.731	57.60	1.459	0.78	0.000	0.650	0.62	1.00	0.62
48.66	120.00	2.759	57.60	1.472	0.78	0.000	0.650	0.62	1.00	0.62
49.16	120.00	2.788	57.60	1.486	0.77	0.000	0.650	0.61	1.00	0.61
49.66	120.00	2.816	57.60	1.499	0.77	0.000	0.650	0.61	1.00	0.61
50.16	120.00	2.844	57.60	1.513	0.77	0.000	0.650	0.61	1.00	0.61
50.66	120.00	2.873	57.60	1.527	0.76	0.000	0.650	0.61	1.00	0.61
51.16	120.00	2.901	57.60	1.540	0.76	0.000	0.650	0.60	1.00	0.60
51.66	120.00	2.929	57.60	1.554	0.75	0.000	0.650	0.60	1.00	0.60
52.16	120.00	2.958	57.60	1.567	0.75	0.000	0.650	0.60	1.00	0.60
52.66	120.00	2.986	57.60	1.581	0.75	0.000	0.650	0.59	1.00	0.59
53.16	120.00	3.014	57.60	1.595	0.74	0.000	0.650	0.59	1.00	0.59
53.66	120.00	3.043	57.60	1.608	0.74	0.000	0.650	0.59	1.00	0.59
54.16	120.00	3.071	57.60	1.622	0.73	0.000	0.650	0.59	1.00	0.59
54.66	120.00	3.100	57.60	1.635	0.73	0.000	0.650	0.58	1.00	0.58
55.16	120.00	3.128	57.60	1.649	0.73	0.000	0.650	0.58	1.00	0.58
55.66	120.00	3.156	57.60	1.663	0.72	0.000	0.650	0.58	1.00	0.58
56.16	120.00	3.185	57.60	1.676	0.72	0.000	0.650	0.58	1.00	0.58
56.66	120.00	3.213	57.60	1.690	0.71	0.000	0.650	0.57	1.00	0.57
57.16	120.00	3.241	57.60	1.704	0.71	0.000	0.650	0.57	1.00	0.57
57.66	120.00	3.270	57.60	1.717	0.70	0.000	0.650	0.57	1.00	0.57
58.16	120.00	3.298	57.60	1.731	0.70	0.000	0.650	0.56	1.00	0.56
58.66	120.00	3.326	57.60	1.744	0.70	0.000	0.650	0.56	1.00	0.56
59.16	120.00	3.355	57.60	1.758	0.69	0.000	0.650	0.56	1.00	0.56
59.66	120.00	3.383	57.60	1.772	0.69	0.000	0.650	0.56	1.00	0.56
60.16	120.00	3.411	57.60	1.785	0.68	0.000	0.650	0.55	1.00	0.55
60.66	120.00	3.440	57.60	1.799	0.68	0.000	0.650	0.55	1.00	0.55
61.16	120.00	3.468	57.60	1.812	0.68	0.000	0.650	0.55	1.00	0.55
61.66	120.00	3.496	57.60	1.826	0.67	0.000	0.650	0.54	1.00	0.54
62.16	120.00	3.525	57.60	1.840	0.67	0.000	0.650	0.54	1.00	0.54
62.66	120.00	3.553	57.60	1.853	0.66	0.000	0.650	0.54	1.00	0.54
63.16	120.00	3.582	57.60	1.867	0.66	0.000	0.650	0.53	1.00	0.53
63.66	120.00	3.610	57.60	1.880	0.66	0.000	0.650	0.53	1.00	0.53

CSR is based on water table at 5.00 during earthquake

CRR Calculation from CPT data, using Modify Robertson's Method:
(Fines content is determined by qc and fric.)

Depth ft	qc atm	fric. atm	n	Q	Rf	Ic	Cq	Fines %	Kc	qc1n atm	qc1f atm	CRR7.5
0.16			1.00	1.00E-4	0.00	7.97						
0.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
0.66			1.00	1.00E-4	0.00	7.97						
0.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.16			1.00	1.00E-4	0.00	7.97						
1.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.66			1.00	1.00E-4	0.00	7.97						
1.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.16			1.00	1.00E-4	0.00	7.97						
2.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.66			1.00	1.00E-4	0.00	7.97						
2.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.16			1.00	1.00E-4	0.00	7.97						

3.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.66			1.00	1.00E-4	0.00	7.97						
3.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.16			1.00	1.00E-4	0.00	7.97						
4.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.66			1.00	1.00E-4	0.00	7.97						
4.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
5.16			1.00	6.25E1	2.43	2.32						
5.16	18.59	0.44	1.00	6.25E1	2.43	2.32	1.00	NoLiq	1.00	18.59	18.59	2.08
5.66			1.00	6.23E1	3.29	2.41						
5.66	20.31	0.66	1.00	6.23E1	3.29	2.41	1.00	NoLiq	1.00	20.31	20.31	2.08
6.16			1.00	5.35E1	3.47	2.48						
6.16	19.04	0.65	1.00	5.35E1	3.47	2.48	1.00	NoLiq	1.00	19.04	19.04	2.08
6.66			1.00	5.74E1	3.62	2.47						
6.66	22.04	0.78	1.00	5.74E1	3.62	2.47	1.00	NoLiq	1.00	22.04	22.04	2.08
7.16			1.00	6.49E1	3.38	2.41						
7.16	26.75	0.89	1.00	6.49E1	3.38	2.41	1.00	NoLiq	1.00	26.75	26.75	2.08
7.66			1.00	4.92E1	3.34	2.49						
7.66	21.79	0.71	1.00	4.92E1	3.34	2.49	1.00	NoLiq	1.00	21.79	21.79	2.08
8.16			1.00	3.03E1	3.41	2.65						
8.16	14.50	0.48	1.00	3.03E1	3.41	2.65	1.00	NoLiq	1.00	14.50	14.50	2.08
8.66			1.00	6.47E1	3.59	2.43						
8.66	32.29	1.14	1.00	6.47E1	3.59	2.43	1.00	NoLiq	1.00	32.29	32.29	2.08
9.16			1.00	5.61E1	4.93	2.57						
9.16	29.64	1.44	1.00	5.61E1	4.93	2.57	1.00	NoLiq	1.00	29.64	29.64	2.08
9.66			1.00	1.04E2	3.16	2.25						
9.66	57.62	1.80	1.00	1.04E2	3.16	2.25	1.00	NoLiq	1.00	57.62	57.62	2.08
10.16			1.00	7.42E1	3.55	2.39						
10.16	42.99	1.51	1.00	7.42E1	3.55	2.39	1.00	NoLiq	1.00	42.99	42.99	2.08
10.66			1.00	2.19E2	0.89	1.63						
10.66	128.90	1.14	1.00	2.19E2	0.89	1.63	1.00	NoLiq	1.00	128.90	128.90	2.08
11.16			1.00	2.29E2	0.93	1.63						
11.16	137.53	1.28	1.00	2.29E2	0.93	1.63	1.00	NoLiq	1.00	137.53	137.53	2.08
11.66			1.00	1.65E2	0.69	1.64						
11.66	101.66	0.70	1.00	1.65E2	0.69	1.64	1.00	NoLiq	1.00	101.66	101.66	2.08
12.16			1.00	6.41E1	1.35	2.14						
12.16	40.81	0.54	1.00	6.41E1	1.35	2.14	1.00	NoLiq	1.00	40.81	40.81	2.08
12.66			1.00	3.27E1	2.02	2.48						
12.66	21.62	0.42	1.00	3.27E1	2.02	2.48	1.00	NoLiq	1.00	21.62	21.62	2.08
13.16			1.00	5.39E1	1.47	2.22						
13.16	35.97	0.52	1.00	5.39E1	1.47	2.22	1.00	NoLiq	1.00	35.97	35.97	2.08
13.66			1.00	3.07E1	1.34	2.40						
13.66	21.25	0.27	1.00	3.07E1	1.34	2.40	1.00	NoLiq	1.00	21.25	21.25	2.08
14.16			1.00	1.11E1	2.10	2.87						
14.16	8.34	0.16	1.00	1.11E1	2.10	2.87	1.00	NoLiq	1.00	8.34	8.34	2.08
14.66			1.00	7.98E0	2.32	3.02						
14.66	6.37	0.13	1.00	7.98E0	2.32	3.02	1.00	NoLiq	1.00	6.37	6.37	2.08
15.16			1.00	7.46E0	3.04	3.11						
15.16	6.14	0.16	1.00	7.46E0	3.04	3.11	1.00	NoLiq	1.00	6.14	6.14	2.08
15.66			1.00	1.10E1	3.97	3.03						
15.66	8.84	0.32	1.00	1.10E1	3.97	3.03	1.00	NoLiq	1.00	8.84	8.84	2.08
16.16			1.00	1.09E1	5.98	3.15						
16.16	8.94	0.48	1.00	1.09E1	5.98	3.15	1.00	NoLiq	1.00	8.94	8.94	2.08
16.66			1.00	1.61E1	4.16	2.92						
16.66	12.97	0.50	1.00	1.61E1	4.16	2.92	1.00	NoLiq	1.00	12.97	12.97	2.08
17.16			1.00	1.73E1	4.25	2.90						
17.16	14.13	0.56	1.00	1.73E1	4.25	2.90	1.00	NoLiq	1.00	14.13	14.13	2.08
17.66			1.00	1.49E1	5.09	3.00						
17.66	12.54	0.59	1.00	1.49E1	5.09	3.00	1.00	NoLiq	1.00	12.54	12.54	2.08
18.16			1.00	1.40E1	4.26	2.97						
18.16	12.06	0.47	1.00	1.40E1	4.26	2.97	1.00	NoLiq	1.00	12.06	12.06	2.08
18.66			1.00	1.27E1	3.14	2.92						
18.66	11.27	0.32	1.00	1.27E1	3.14	2.92	1.00	NoLiq	1.00	11.27	11.27	2.08
19.16			1.00	1.15E1	3.45	2.98						
19.16	10.47	0.32	1.00	1.15E1	3.45	2.98	1.00	NoLiq	1.00	10.47	10.47	2.08
19.66			1.00	1.66E1	2.99	2.82						
19.66	14.90	0.41	1.00	1.66E1	2.99	2.82	1.00	NoLiq	1.00	14.90	14.90	2.08
20.16			1.00	1.75E1	3.89	2.87						
20.16	15.90	0.57	1.00	1.75E1	3.89	2.87	1.00	NoLiq	1.00	15.90	15.90	2.08
20.66			1.00	1.88E1	4.86	2.91						
20.66	17.26	0.78	1.00	1.88E1	4.86	2.91	1.00	NoLiq	1.00	17.26	17.26	2.08
21.16			1.00	5.75E1	2.15	2.31						
21.16			0.50	5.50E1	2.15	2.32						
21.16	51.32	1.08	0.50	5.50E1	2.15	2.32	1.07	23.43	0.49	54.99	108.28	0.20
21.66			1.00	5.56E1	2.67	2.39						
21.66			0.50	5.36E1	2.67	2.40						
21.66	50.42	1.32	0.50	5.36E1	2.67	2.40	1.06	26.27	0.57	53.60	124.05	0.26
22.16			1.00	1.00E1	6.13	3.18						
22.16	10.27	0.55	1.00	1.00E1	6.13	3.18	1.00	NoLiq	1.00	10.27	10.27	2.08
22.66			1.00	2.09E1	2.89	2.73						
22.66	20.34	0.55	1.00	2.09E1	2.89	2.73	1.00	NoLiq	1.00	20.34	20.34	2.08
23.16			1.00	3.93E1	2.11	2.43						

23.16			0.50	3.92E1	2.11	2.43						
23.16	37.69	0.77	0.50	3.92E1	2.11	2.43	1.04	27.69	0.61	39.18	99.41	0.17
23.66			1.00	1.45E2	1.01	1.79						
23.66			0.50	1.42E2	1.01	1.80						
23.66	137.23	1.37	0.50	1.42E2	1.01	1.80	1.03	8.09	0.08	141.61	154.34	0.42
24.16			1.00	1.98E2	0.67	1.57						
24.16			0.50	1.95E2	0.67	1.58						
24.16	190.27	1.26	0.50	1.95E2	0.67	1.58	1.02	3.97	0.00	194.93	194.93	0.77
24.66			1.00	1.43E2	0.62	1.66						
24.66			0.50	1.42E2	0.62	1.66						
24.66	139.63	0.85	0.50	1.42E2	0.62	1.66	1.02	5.40	0.01	142.04	143.58	0.36
25.16			1.00	8.28E1	1.91	2.16						
25.16			0.50	8.34E1	1.91	2.16						
25.16	82.61	1.55	0.50	8.34E1	1.91	2.16	1.01	17.55	0.34	83.45	125.51	0.26
25.66			1.00	8.43E1	2.09	2.18						
25.66			0.50	8.55E1	2.09	2.18						
25.66	85.24	1.75	0.50	8.55E1	2.09	2.18	1.00	18.21	0.35	85.51	132.14	0.29
26.16			1.00	8.65E1	2.53	2.23						
26.16			0.50	8.83E1	2.53	2.23						
26.16	88.62	2.20	0.50	8.83E1	2.53	2.23	1.00	19.89	0.40	88.30	146.57	0.37
26.66			1.00	6.65E1	2.85	2.35						
26.66			0.50	6.87E1	2.85	2.34						
26.66	69.44	1.94	0.50	6.87E1	2.85	2.34	0.99	24.00	0.51	68.73	139.50	0.33
27.16			1.00	1.84E1	2.84	2.77						
27.16	20.61	0.54	1.00	1.84E1	2.84	2.77	1.00	NoLiq	1.00	20.61	20.61	2.08
27.66			1.00	1.81E1	2.78	2.77						
27.66	20.53	0.53	1.00	1.81E1	2.78	2.77	1.00	NoLiq	1.00	20.53	20.53	2.08
28.16			1.00	3.40E1	3.41	2.61						
28.16	37.67	1.23	1.00	3.40E1	3.41	2.61	1.00	NoLiq	1.00	37.67	37.67	2.08
28.66			1.00	3.38E1	2.89	2.57						
28.66			0.50	3.66E1	2.89	2.54						
28.66	37.98	1.05	0.50	3.66E1	2.89	2.54	0.96	32.55	0.74	36.63	138.54	0.33
29.16			1.00	2.20E1	4.13	2.81						
29.16	25.65	0.99	1.00	2.20E1	4.13	2.81	1.00	NoLiq	1.00	25.65	25.65	2.08
29.66			1.00	7.17E1	0.73	1.94						
29.66			0.50	7.68E1	0.73	1.92						
29.66	80.68	0.57	0.50	7.68E1	0.73	1.92	0.95	10.83	0.16	76.84	91.00	0.15
30.16			1.00	6.07E1	2.06	2.28						
30.16			0.50	6.58E1	2.06	2.25						
30.16	69.47	1.40	0.50	6.58E1	2.06	2.25	0.95	20.87	0.42	65.76	114.09	0.22
30.66			1.00	9.64E1	1.32	2.00						
30.66			0.50	1.04E2	1.32	1.98						
30.66	110.70	1.44	0.50	1.04E2	1.32	1.98	0.94	12.31	0.20	104.15	129.43	0.28
31.16			1.00	1.81E2	0.65	1.59						
31.16			0.50	1.95E2	0.65	1.57						
31.16	208.29	1.34	0.50	1.95E2	0.65	1.57	0.94	3.85	0.00	194.80	194.80	0.77
31.66			1.00	1.32E2	1.60	1.96						
31.66			0.50	1.44E2	1.60	1.94						
31.66	155.08	2.45	0.50	1.44E2	1.60	1.94	0.93	11.26	0.17	144.18	173.09	0.56
32.16			1.00	4.41E1	4.03	2.58						
32.16			0.50	4.94E1	4.03	2.55						
32.16	53.47	2.08	0.50	4.94E1	4.03	2.55	0.92	32.82	0.74	49.42	192.15	0.74
32.66			1.00	3.43E1	2.68	2.54						
32.66			0.50	3.90E1	2.68	2.50						
32.66	42.42	1.09	0.50	3.90E1	2.68	2.50	0.92	30.65	0.68	38.98	123.68	0.26
33.16			1.00	1.72E1	3.75	2.87						
33.16	22.48	0.77	1.00	1.72E1	3.75	2.87	1.00	NoLiq	1.00	22.48	22.48	2.08
33.66			1.00	2.28E1	2.57	2.67						
33.66	29.49	0.71	1.00	2.28E1	2.57	2.67	1.00	NoLiq	1.00	29.49	29.49	2.08
34.16			1.00	2.24E1	2.56	2.67						
34.16	29.39	0.70	1.00	2.24E1	2.56	2.67	1.00	NoLiq	1.00	29.39	29.39	2.08
34.66			1.00	1.67E1	1.41	2.63						
34.66	22.66	0.29	1.00	1.67E1	1.41	2.63	1.00	NoLiq	1.00	22.66	22.66	2.08
35.16			1.00	1.55E1	1.79	2.71						
35.16	21.45	0.35	1.00	1.55E1	1.79	2.71	1.00	NoLiq	1.00	21.45	21.45	2.08
35.66			1.00	1.49E1	1.69	2.71						
35.66	20.94	0.32	1.00	1.49E1	1.69	2.71	1.00	NoLiq	1.00	20.94	20.94	2.08
36.16			1.00	1.46E1	1.90	2.75						
36.16	20.67	0.35	1.00	1.46E1	1.90	2.75	1.00	NoLiq	1.00	20.67	20.67	2.08
36.66			1.00	1.33E1	1.91	2.79						
36.66	19.22	0.33	1.00	1.33E1	1.91	2.79	1.00	NoLiq	1.00	19.22	19.22	2.08
37.16			1.00	1.39E1	2.99	2.88						
37.16	20.33	0.55	1.00	1.39E1	2.99	2.88	1.00	NoLiq	1.00	20.33	20.33	2.08
37.66			1.00	3.09E1	4.01	2.69						
37.66	42.95	1.64	1.00	3.09E1	4.01	2.69	1.00	NoLiq	1.00	42.95	42.95	2.08
38.16			1.00	5.43E1	1.98	2.30						
38.16			0.50	6.46E1	1.98	2.25						
38.16	74.57	1.43	0.50	6.46E1	1.98	2.25	0.87	20.67	0.42	64.57	111.02	0.21
38.66			1.00	4.86E1	1.87	2.33						
38.66			0.50	5.82E1	1.87	2.27						
38.66	67.61	1.22	0.50	5.82E1	1.87	2.27	0.86	21.27	0.43	58.25	102.98	0.18
39.16			1.00	2.70E1	3.91	2.73						

39.16	39.03	1.44	1.00	2.70E1	3.91	2.73	1.00	NoLiq	1.00	39.03	39.03	2.08
39.66			1.00	7.67E1	2.11	2.21						
39.66			0.50	9.19E1	2.11	2.16						
39.66	107.69	2.23	0.50	9.19E1	2.11	2.16	0.85	17.63	0.34	91.85	138.56	0.33
40.16			1.00	2.67E2	0.56	1.42						
40.16			0.50	3.17E2	0.56	1.37						
40.16	373.62	2.06	0.50	3.17E2	0.56	1.37	0.85	1.13	0.00	317.10	317.10	2.08
40.66			1.00	3.17E2	0.65	1.41						
40.66			0.50	3.78E2	0.65	1.36						
40.66	447.10	2.87	0.50	3.78E2	0.65	1.36	0.84	1.09	0.00	377.61	377.61	2.08
41.16			1.00	5.26E2	0.42	1.13						
41.16			0.50	6.28E2	0.42	1.08						
41.16	746.71	3.14	0.50	6.28E2	0.42	1.08	0.84	0.00	0.00	500.00	500.00	2.08
41.66			1.00	4.39E2	0.27	1.05						
41.66			0.50	5.27E2	0.27	0.99						
41.66	629.70	1.70	0.50	5.27E2	0.27	0.99	0.84	0.00	0.00	500.00	500.00	2.08
42.16			1.00	3.70E2	0.52	1.30						
42.16			0.50	4.47E2	0.52	1.24						
42.16	536.56	2.78	0.50	4.47E2	0.52	1.24	0.83	0.00	0.00	446.72	446.72	2.08
42.66			1.00	4.41E2	0.25	1.04						
42.66			0.50	5.34E2	0.25	0.97						
42.66	644.75	1.63	0.50	5.34E2	0.25	0.97	0.83	0.00	0.00	500.00	500.00	2.08
43.16			1.00	4.67E2	0.60	1.28						
43.16			0.50	5.68E2	0.60	1.23						
43.16	689.10	4.13	0.50	5.68E2	0.60	1.23	0.82	0.00	0.00	500.00	500.00	2.08
43.66			1.00	4.05E2	0.27	1.09						
43.66			0.50	4.95E2	0.27	1.02						
43.66	603.29	1.65	0.50	4.95E2	0.27	1.02	0.82	0.00	0.00	495.31	495.31	2.08
44.16			1.00	4.39E2	1.10	1.51						
44.16			0.50	5.39E2	1.10	1.46						
44.16	659.51	7.21	0.50	5.39E2	1.10	1.46	0.82	2.30	0.00	500.00	500.00	2.08
44.66			1.00	4.37E2	0.43	1.19						
44.66			0.50	5.40E2	0.43	1.13						
44.66	663.33	2.82	0.50	5.40E2	0.43	1.13	0.81	0.00	0.00	500.00	500.00	2.08
45.16			1.00	4.90E2	0.30	1.05						
45.16			0.50	6.07E2	0.30	0.98						
45.16	749.08	2.24	0.50	6.07E2	0.30	0.98	0.81	0.00	0.00	500.00	500.00	2.08
45.66			1.00	4.66E2	0.33	1.09						
45.66			0.50	5.80E2	0.33	1.02						
45.66	718.81	2.37	0.50	5.80E2	0.33	1.02	0.81	0.00	0.00	500.00	500.00	2.08
46.16			1.00	4.10E2	0.94	1.47						
46.16			0.50	5.13E2	0.94	1.42						
46.16	639.34	5.99	0.50	5.13E2	0.94	1.42	0.80	1.71	0.00	500.00	500.00	2.08
46.66			1.00	4.41E2	0.31	1.09						
46.66			0.50	5.54E2	0.31	1.02						
46.66	692.72	2.17	0.50	5.54E2	0.31	1.02	0.80	0.00	0.00	500.00	500.00	2.08
47.16			1.00	4.06E2	0.69	1.37						
47.16			0.50	5.12E2	0.69	1.31						
47.16	643.72	4.45	0.50	5.12E2	0.69	1.31	0.80	0.46	0.00	500.00	500.00	2.08
47.66			1.00	4.07E2	0.74	1.39						
47.66			0.50	5.16E2	0.74	1.33						
47.66	650.64	4.82	0.50	5.16E2	0.74	1.33	0.79	0.71	0.00	500.00	500.00	2.08
48.16			1.00	3.43E2	0.61	1.37						
48.16			0.50	4.37E2	0.61	1.30						
48.16	553.25	3.35	0.50	4.37E2	0.61	1.30	0.79	0.43	0.00	436.57	436.57	2.08
48.66			1.00	3.32E2	0.41	1.26						
48.66			0.50	4.24E2	0.41	1.19						
48.66	540.23	2.21	0.50	4.24E2	0.41	1.19	0.79	0.00	0.00	424.49	424.49	2.08
49.16			1.00	3.46E2	0.30	1.17						
49.16			0.50	4.44E2	0.30	1.08						
49.16	567.49	1.71	0.50	4.44E2	0.30	1.08	0.78	0.00	0.00	444.05	444.05	2.08
49.66			1.00	2.63E2	0.70	1.50						
49.66			0.50	3.40E2	0.70	1.42						
49.66	436.14	3.04	0.50	3.40E2	0.70	1.42	0.78	1.77	0.00	339.86	339.86	2.08
50.16			1.00	2.37E2	0.78	1.56						
50.16	395.61	3.08	1.00	2.37E2	0.78	1.56	1.00	NoLiq	1.00	395.61	395.61	2.08
50.66			1.00	2.06E2	1.20	1.74						
50.66	347.10	4.14	1.00	2.06E2	1.20	1.74	1.00	NoLiq	1.00	347.10	347.10	2.08
51.16			1.00	1.18E2	1.38	1.95						
51.16	201.57	2.75	1.00	1.18E2	1.38	1.95	1.00	NoLiq	1.00	201.57	201.57	2.08
51.66			1.00	9.59E1	1.84	2.10						
51.66	166.15	3.01	1.00	9.59E1	1.84	2.10	1.00	NoLiq	1.00	166.15	166.15	2.08
52.16			1.00	1.37E1	3.80	2.95						
52.16	26.44	0.89	1.00	1.37E1	3.80	2.95	1.00	NoLiq	1.00	26.44	26.44	2.08
52.66			1.00	1.42E1	6.49	3.08						
52.66	27.56	1.59	1.00	1.42E1	6.49	3.08	1.00	NoLiq	1.00	27.56	27.56	2.08
53.16			1.00	2.14E2	0.58	1.51						
53.16	375.57	2.17	1.00	2.14E2	0.58	1.51	1.00	NoLiq	1.00	375.57	375.57	2.08
53.66			1.00	2.25E2	0.68	1.54						
53.66	397.51	2.70	1.00	2.25E2	0.68	1.54	1.00	NoLiq	1.00	397.51	397.51	2.08
54.16			1.00	2.34E2	0.93	1.62						
54.16			0.50	3.13E2	0.93	1.54						

54.16	416.53	3.84	0.50	3.13E2	0.93	1.54	0.75	3.37	0.00	313.14	313.14	2.08
54.66			1.00	2.42E2	0.66	1.50						
54.66			0.50	3.25E2	0.66	1.41						
54.66	433.92	2.85	0.50	3.25E2	0.66	1.41	0.75	1.70	0.00	324.97	324.97	2.08
55.16			1.00	2.46E2	0.65	1.49						
55.16			0.50	3.32E2	0.65	1.40						
55.16	445.47	2.86	0.50	3.32E2	0.65	1.40	0.75	1.54	0.00	332.36	332.36	2.08
55.66			1.00	2.40E2	0.44	1.39						
55.66			0.50	3.25E2	0.44	1.29						
55.66	437.51	1.89	0.50	3.25E2	0.44	1.29	0.74	0.27	0.00	325.18	325.18	2.08
56.16			1.00	2.54E2	0.33	1.29						
56.16			0.50	3.45E2	0.33	1.19						
56.16	465.83	1.51	0.50	3.45E2	0.33	1.19	0.74	0.00	0.00	344.94	344.94	2.08
56.66			1.00	2.40E2	0.72	1.53						
56.66			0.50	3.28E2	0.72	1.44						
56.66	444.60	3.17	0.50	3.28E2	0.72	1.44	0.74	2.00	0.00	328.00	328.00	2.08
57.16			1.00	2.45E2	0.88	1.59						
57.16			0.50	3.35E2	0.88	1.50						
57.16	456.21	4.00	0.50	3.35E2	0.88	1.50	0.74	2.84	0.00	335.32	335.32	2.08
57.66			1.00	2.34E2	0.56	1.46						
57.66			0.50	3.22E2	0.56	1.36						
57.66	439.12	2.43	0.50	3.22E2	0.56	1.36	0.73	1.09	0.00	321.58	321.58	2.08
58.16			1.00	2.10E2	0.70	1.57						
58.16			0.50	2.90E2	0.70	1.47						
58.16	397.45	2.76	0.50	2.90E2	0.70	1.47	0.73	2.38	0.00	290.01	290.01	2.08
58.66			1.00	2.26E2	0.83	1.59						
58.66			0.50	3.13E2	0.83	1.50						
58.66	430.92	3.55	0.50	3.13E2	0.83	1.50	0.73	2.82	0.00	313.30	313.30	2.08
59.16			1.00	2.51E2	0.97	1.61						
59.16			0.50	3.49E2	0.97	1.52						
59.16	481.61	4.66	0.50	3.49E2	0.97	1.52	0.72	3.18	0.00	348.90	348.90	2.08
59.66			1.00	2.56E2	0.88	1.57						
59.66			0.50	3.57E2	0.88	1.48						
59.66	494.69	4.30	0.50	3.57E2	0.88	1.48	0.72	2.57	0.00	357.10	357.10	2.08
60.16			1.00	2.64E2	0.90	1.58						
60.16			0.50	3.69E2	0.90	1.48						
60.16	513.54	4.61	0.50	3.69E2	0.90	1.48	0.72	2.59	0.00	369.41	369.41	2.08
60.66			1.00	2.70E2	0.87	1.56						
60.66			0.50	3.79E2	0.87	1.46						
60.66	528.46	4.58	0.50	3.79E2	0.87	1.46	0.72	2.33	0.00	378.80	378.80	2.08
61.16			1.00	2.58E2	0.42	1.35						
61.16			0.50	3.64E2	0.42	1.24						
61.16	509.68	2.14	0.50	3.64E2	0.42	1.24	0.71	0.00	0.00	364.07	364.07	2.08
61.66			1.00	2.84E2	0.42	1.32						
61.66			0.50	4.01E2	0.42	1.21						
61.66	563.22	2.36	0.50	4.01E2	0.42	1.21	0.71	0.00	0.00	400.93	400.93	2.08
62.16			1.00	2.95E2	0.38	1.28						
62.16			0.50	4.19E2	0.38	1.17						
62.16	590.11	2.24	0.50	4.19E2	0.38	1.17	0.71	0.00	0.00	418.63	418.63	2.08
62.66			1.00	3.20E2	0.24	1.13						
62.66			0.50	4.55E2	0.24	1.01						
62.66	643.77	1.51	0.50	4.55E2	0.24	1.01	0.71	0.00	0.00	455.14	455.14	2.08
63.16			1.00	3.70E2	0.27	1.11						
63.16			0.50	5.27E2	0.27	0.99						
63.16	748.41	2.02	0.50	5.27E2	0.27	0.99	0.70	0.00	0.00	500.00	500.00	2.08
63.66			1.00	3.73E2	0.15	0.98						
63.66			0.50	5.33E2	0.15	0.84						
63.66	759.05	1.13	0.50	5.33E2	0.15	0.84	0.70	0.00	0.00	500.00	500.00	2.08

Fines have been calculated, and correction is made by Modify Robertson Method.
Fines=NoLiq means the soils are not liquefiable.
CRR is based on water table at 10.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 6.63:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.16	0.01	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
0.66	0.02	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.16	0.04	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.66	0.06	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.16	0.08	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.66	0.10	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.16	0.12	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.66	0.13	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.16	0.15	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.66	0.17	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
5.16	0.19	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
5.66	0.21	2.08	1.00	2.08	1.37	2.00	0.44	5.00 ^
6.16	0.23	2.08	1.00	2.08	1.37	2.00	0.46	5.00 ^
6.66	0.25	2.08	1.00	2.08	1.37	2.00	0.48	5.00 ^
7.16	0.26	2.08	1.00	2.08	1.37	2.00	0.49	5.00 ^

7.66	0.28	2.08	1.00	2.08	1.37	2.00	0.51	5.00	^	
8.16	0.30	2.08	1.00	2.08	1.37	2.00	0.52	5.00	^	
8.66	0.32	2.08	1.00	2.08	1.37	2.00	0.53	5.00	^	
9.16	0.34	2.08	1.00	2.08	1.37	2.00	0.54	5.00	^	
9.66	0.36	2.08	1.00	2.08	1.37	2.00	0.55	5.00	^	
10.16	0.37	2.08	1.00	2.08	1.37	2.00	0.56	5.00	^	
10.66	0.38	2.08	1.00	2.08	1.37	2.00	0.57	5.00	^	
11.16	0.39	2.08	1.00	2.08	1.37	2.00	0.58	5.00	^	
11.66	0.40	2.08	1.00	2.08	1.37	2.00	0.58	5.00	^	
12.16	0.41	2.08	1.00	2.08	1.37	2.00	0.59	5.00	^	
12.66	0.42	2.08	1.00	2.08	1.37	2.00	0.60	5.00	^	
13.16	0.42	2.08	1.00	2.08	1.37	2.00	0.60	5.00	^	
13.66	0.43	2.08	1.00	2.08	1.37	2.00	0.61	5.00	^	
14.16	0.44	2.08	1.00	2.08	1.37	2.00	0.62	5.00	^	
14.66	0.45	2.08	1.00	2.08	1.37	2.00	0.62	5.00	^	
15.16	0.46	2.08	1.00	2.08	1.37	2.00	0.63	5.00	^	
15.66	0.47	2.08	1.00	2.08	1.37	2.00	0.63	5.00	^	
16.16	0.48	2.08	1.00	2.08	1.37	2.00	0.63	5.00	^	
16.66	0.49	2.08	1.00	2.08	1.37	2.00	0.64	5.00	^	
17.16	0.50	2.08	1.00	2.08	1.37	2.00	0.64	5.00	^	
17.66	0.50	2.08	1.00	2.08	1.37	2.00	0.65	5.00	^	
18.16	0.51	2.08	1.00	2.08	1.37	2.00	0.65	5.00	^	
18.66	0.52	2.08	1.00	2.08	1.37	2.00	0.65	5.00	^	
19.16	0.53	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
19.66	0.54	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
20.16	0.55	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
20.66	0.56	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
21.16	0.57	0.20	1.00	0.20	1.37	0.27	0.67	0.41	*	
21.66	0.58	0.26	1.00	0.26	1.37	0.35	0.67	0.53	*	
22.16	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
22.66	0.59	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
23.16	0.60	0.17	1.00	0.17	1.37	0.23	0.67	0.35	*	
23.66	0.61	0.42	1.00	0.42	1.37	0.58	0.68	0.85	*	Liq.
24.16	0.62	0.77	1.00	0.77	1.37	1.05	0.68	1.55		
24.66	0.63	0.36	1.00	0.36	1.37	0.49	0.68	0.72	*	
25.16	0.64	0.26	1.00	0.26	1.37	0.36	0.68	0.53	*	
25.66	0.65	0.29	1.00	0.29	1.37	0.40	0.68	0.59	*	
26.16	0.65	0.37	1.00	0.37	1.37	0.51	0.68	0.75	*	
26.66	0.66	0.33	1.00	0.33	1.37	0.46	0.69	0.66	*	
27.16	0.67	2.08	1.00	2.08	1.37	2.00	0.69	5.00	^	
27.66	0.68	2.08	1.00	2.08	1.37	2.00	0.69	5.00	^	
28.16	0.69	2.08	1.00	2.08	1.37	2.00	0.69	5.00	^	
28.66	0.70	0.33	1.00	0.33	1.37	0.45	0.69	0.65	*	
29.16	0.71	2.08	1.00	2.08	1.37	2.00	0.69	5.00	^	
29.66	0.72	0.15	1.00	0.15	1.37	0.21	0.69	0.30	*	
30.16	0.73	0.22	1.00	0.22	1.37	0.30	0.69	0.43	*	
30.66	0.73	0.28	1.00	0.28	1.37	0.39	0.69	0.56	*	
31.16	0.74	0.77	1.00	0.77	1.37	1.05	0.69	1.52		
31.66	0.75	0.56	1.00	0.56	1.37	0.77	0.69	1.12		
32.16	0.76	0.74	1.00	0.74	1.37	1.01	0.69	1.48		
32.66	0.77	0.26	1.00	0.26	1.37	0.35	0.69	0.51	*	
33.16	0.78	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
33.66	0.79	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
34.16	0.80	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
34.66	0.81	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
35.16	0.81	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
35.66	0.82	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
36.16	0.83	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
36.66	0.84	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
37.16	0.85	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
37.66	0.86	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
38.16	0.87	0.21	1.00	0.21	1.37	0.28	0.67	0.43	*	
38.66	0.88	0.18	1.00	0.18	1.37	0.25	0.66	0.38	*	
39.16	0.88	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	Liq.
39.66	0.89	0.33	1.00	0.33	1.37	0.45	0.66	0.68	*	
40.16	0.90	2.08	1.00	2.08	1.37	2.85	0.66	4.34		
40.66	0.91	2.08	1.00	2.08	1.37	2.85	0.65	4.35		
41.16	0.92	2.08	1.00	2.08	1.37	2.85	0.65	4.37		
41.66	0.93	2.08	1.00	2.08	1.37	2.85	0.65	4.38		
42.16	0.94	2.08	1.00	2.08	1.37	2.85	0.65	4.40		
42.66	0.95	2.08	1.00	2.08	1.37	2.85	0.65	4.42		
43.16	0.96	2.08	1.00	2.08	1.37	2.85	0.64	4.43		
43.66	0.96	2.08	1.00	2.08	1.37	2.85	0.64	4.45		
44.16	0.97	2.08	1.00	2.08	1.37	2.85	0.64	4.46		
44.66	0.98	2.08	1.00	2.08	1.37	2.85	0.64	4.48		
45.16	0.99	2.08	1.00	2.08	1.37	2.85	0.63	4.50		
45.66	1.00	2.08	1.00	2.08	1.37	2.85	0.63	4.52		
46.16	1.01	2.08	1.00	2.09	1.37	2.86	0.63	4.56		
46.66	1.02	2.08	1.00	2.09	1.37	2.86	0.63	4.57		
47.16	1.03	2.08	1.00	2.08	1.37	2.86	0.62	4.58		
47.66	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.59		
48.16	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.60		

48.66	1.05	2.08	1.00	2.08	1.37	2.84	0.62	4.62	
49.16	1.06	2.08	1.00	2.07	1.37	2.84	0.61	4.63	
49.66	1.07	2.08	1.00	2.07	1.37	2.84	0.61	4.64	
50.16	1.08	2.08	0.99	2.07	1.37	2.00	0.61	5.00	^
50.66	1.09	2.08	0.99	2.06	1.37	2.00	0.61	5.00	^
51.16	1.10	2.08	0.99	2.06	1.37	2.00	0.60	5.00	^
51.66	1.11	2.08	0.99	2.06	1.37	2.00	0.60	5.00	^
52.16	1.11	2.08	0.99	2.06	1.37	2.00	0.60	5.00	^
52.66	1.12	2.08	0.99	2.05	1.37	2.00	0.59	5.00	^
53.16	1.13	2.08	0.99	2.05	1.37	2.00	0.59	5.00	^
53.66	1.14	2.08	0.98	2.05	1.37	2.00	0.59	5.00	^
54.16	1.15	2.08	0.98	2.04	1.37	2.80	0.59	4.78	
54.66	1.16	2.08	0.98	2.04	1.37	2.80	0.58	4.79	
55.16	1.17	2.08	0.98	2.04	1.37	2.79	0.58	4.81	
55.66	1.18	2.08	0.98	2.04	1.37	2.79	0.58	4.83	
56.16	1.19	2.08	0.98	2.03	1.37	2.79	0.58	4.84	
56.66	1.19	2.08	0.98	2.03	1.37	2.78	0.57	4.86	
57.16	1.20	2.08	0.97	2.03	1.37	2.78	0.57	4.88	
57.66	1.21	2.08	0.97	2.02	1.37	2.78	0.57	4.89	
58.16	1.22	2.08	0.97	2.02	1.37	2.77	0.56	4.91	
58.66	1.23	2.08	0.97	2.02	1.37	2.77	0.56	4.93	
59.16	1.24	2.08	0.97	2.02	1.37	2.76	0.56	4.95	
59.66	1.25	2.08	0.97	2.01	1.37	2.76	0.56	4.97	
60.16	1.26	2.08	0.97	2.01	1.37	2.76	0.55	4.99	
60.66	1.27	2.08	0.97	2.01	1.37	2.75	0.55	5.00	
61.16	1.27	2.08	0.96	2.01	1.37	2.75	0.55	5.00	
61.66	1.28	2.08	0.96	2.00	1.37	2.75	0.54	5.00	
62.16	1.29	2.08	0.96	2.00	1.37	2.74	0.54	5.00	
62.66	1.30	2.08	0.96	2.00	1.37	2.74	0.54	5.00	
63.16	1.31	2.08	0.96	2.00	1.37	2.73	0.53	5.00	
63.66	1.32	2.08	0.96	1.99	1.37	2.73	0.53	5.00	

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils or above Water Table.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
0.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
5.16	2.32	4.21	18.59	4.41	NoLiq	0.00	4.41
5.66	2.41	4.04	20.31	5.03	NoLiq	0.00	5.03
6.16	2.48	3.92	19.04	4.85	NoLiq	0.00	4.85
6.66	2.47	3.94	22.04	5.60	NoLiq	0.00	5.60
7.16	2.41	4.05	26.75	6.61	NoLiq	0.00	6.61
7.66	2.49	3.90	21.79	5.59	NoLiq	0.00	5.59
8.16	2.65	3.60	14.50	4.02	NoLiq	0.00	4.02
8.66	2.43	4.01	32.29	8.05	NoLiq	0.00	8.05
9.16	2.57	3.75	29.64	7.92	NoLiq	0.00	7.92
9.66	2.25	4.34	57.62	13.28	NoLiq	0.00	13.28
10.16	2.39	4.09	42.99	10.51	NoLiq	0.00	10.51
10.66	1.63	5.50	128.90	23.46	NoLiq	0.00	23.46
11.16	1.63	5.49	137.53	25.05	NoLiq	0.00	25.05
11.66	1.64	5.47	101.66	18.59	NoLiq	0.00	18.59
12.16	2.14	4.54	40.81	8.99	NoLiq	0.00	8.99
12.66	2.48	3.92	21.62	5.52	NoLiq	0.00	5.52
13.16	2.22	4.39	35.97	8.19	NoLiq	0.00	8.19
13.66	2.40	4.07	21.25	5.22	NoLiq	0.00	5.22
14.16	2.87	3.19	8.34	2.62	NoLiq	0.00	2.62
14.66	3.02	2.92	6.37	2.18	NoLiq	0.00	2.18
15.16	3.11	2.76	6.14	2.22	NoLiq	0.00	2.22
15.66	3.03	2.89	8.84	3.06	NoLiq	0.00	3.06
16.16	3.15	2.69	8.94	3.33	NoLiq	0.00	3.33
16.66	2.92	3.11	12.97	4.17	NoLiq	0.00	4.17
17.16	2.90	3.14	14.13	4.49	NoLiq	0.00	4.49
17.66	3.00	2.96	12.54	4.24	NoLiq	0.00	4.24
18.16	2.97	3.01	12.06	4.00	NoLiq	0.00	4.00
18.66	2.92	3.10	11.27	3.64	NoLiq	0.00	3.64
19.16	2.98	2.99	10.47	3.50	NoLiq	0.00	3.50
19.66	2.82	3.29	14.90	4.52	NoLiq	0.00	4.52

20.16	2.87	3.20	15.90	4.97	NoLiq	0.00	4.97
20.66	2.91	3.13	17.26	5.52	NoLiq	0.00	5.52
21.16	2.32	4.21	108.28	25.75	23.43	0.00	25.75
21.66	2.40	4.07	124.05	30.47	26.27	0.00	30.47
22.16	3.18	2.62	10.27	3.92	NoLiq	0.00	3.92
22.66	2.73	3.46	20.34	5.88	NoLiq	0.00	5.88
23.16	2.43	4.01	99.41	24.80	27.69	0.00	24.80
23.66	1.80	5.18	154.34	29.81	8.09	0.00	29.81
24.16	1.58	5.59	194.93	34.88	3.97	0.00	34.88
24.66	1.66	5.43	143.58	26.44	5.40	0.00	26.44
25.16	2.16	4.52	125.51	27.79	17.55	0.00	27.79
25.66	2.18	4.48	132.14	29.51	18.21	0.00	29.51
26.16	2.23	4.39	146.57	33.42	19.89	0.00	33.42
26.66	2.34	4.18	139.50	33.39	24.00	0.00	33.39
27.16	2.77	3.39	20.61	6.08	NoLiq	0.00	6.08
27.66	2.77	3.38	20.53	6.07	NoLiq	0.00	6.07
28.16	2.61	3.67	37.67	10.26	NoLiq	0.00	10.26
28.66	2.54	3.80	138.54	36.41	32.55	0.00	36.41
29.16	2.81	3.31	25.65	7.75	NoLiq	0.00	7.75
29.66	1.92	4.96	91.00	18.36	10.83	0.00	18.36
30.16	2.25	4.33	114.09	26.32	20.87	0.00	26.32
30.66	1.98	4.85	129.43	26.70	12.31	0.00	26.70
31.16	1.57	5.60	194.80	34.77	3.85	0.00	34.77
31.66	1.94	4.92	173.09	35.15	11.26	0.00	35.15
32.16	2.55	3.79	192.15	50.65	32.82	0.00	50.65
32.66	2.50	3.88	123.68	31.86	30.65	0.00	31.86
33.16	2.87	3.21	22.48	7.01	NoLiq	0.00	7.01
33.66	2.67	3.57	29.49	8.26	NoLiq	0.00	8.26
34.16	2.67	3.56	29.39	8.25	NoLiq	0.00	8.25
34.66	2.63	3.64	22.66	6.23	NoLiq	0.00	6.23
35.16	2.71	3.49	21.45	6.15	NoLiq	0.00	6.15
35.66	2.71	3.49	20.94	6.01	NoLiq	0.00	6.01
36.16	2.75	3.42	20.67	6.05	NoLiq	0.00	6.05
36.66	2.79	3.35	19.22	5.73	NoLiq	0.00	5.73
37.16	2.88	3.18	20.33	6.39	NoLiq	0.00	6.39
37.66	2.69	3.53	42.95	12.18	NoLiq	0.00	12.18
38.16	2.25	4.34	111.02	25.55	20.67	0.00	25.55
38.66	2.27	4.31	102.98	23.87	21.27	0.00	23.87
39.16	2.73	3.46	39.03	11.28	NoLiq	0.00	11.28
39.66	2.16	4.51	138.56	30.71	17.63	0.00	30.71
40.16	1.37	5.97	317.10	53.08	1.13	0.00	53.08
40.66	1.36	5.98	377.61	63.14	1.09	0.00	63.14
41.16	1.08	6.50	500.00	76.87	0.00	0.00	76.87
41.66	0.99	6.66	500.00	75.04	0.00	0.00	75.04
42.16	1.24	6.20	446.72	72.04	0.00	0.00	72.04
42.66	0.97	6.71	500.00	74.55	0.00	0.00	74.55
43.16	1.23	6.23	500.00	80.27	0.00	0.00	80.27
43.66	1.02	6.62	495.31	74.82	0.00	0.00	74.82
44.16	1.46	5.80	500.00	86.20	2.30	0.00	86.20
44.66	1.13	6.42	500.00	77.89	0.00	0.00	77.89
45.16	0.98	6.69	500.00	74.72	0.00	0.00	74.72
45.66	1.02	6.61	500.00	75.65	0.00	0.00	75.65
46.16	1.42	5.89	500.00	84.96	1.71	0.00	84.96
46.66	1.02	6.61	500.00	75.60	0.00	0.00	75.60
47.16	1.31	6.09	500.00	82.14	0.46	0.00	82.14
47.66	1.33	6.04	500.00	82.72	0.71	0.00	82.72
48.16	1.30	6.09	436.57	71.65	0.43	0.00	71.65
48.66	1.19	6.31	424.49	67.28	0.00	0.00	67.28
49.16	1.08	6.50	444.05	68.29	0.00	0.00	68.29
49.66	1.42	5.88	339.86	57.84	1.77	0.00	57.84
50.16	1.56	5.61	395.61	70.50	NoLiq	0.00	70.50
50.66	1.74	5.28	347.10	65.69	NoLiq	0.00	65.69
51.16	1.95	4.89	201.57	41.19	NoLiq	0.00	41.19
51.66	2.10	4.62	166.15	36.00	NoLiq	0.00	36.00
52.16	2.95	3.05	26.44	8.66	NoLiq	0.00	8.66
52.66	3.08	2.80	27.56	9.83	NoLiq	0.00	9.83
53.16	1.51	5.72	375.57	65.70	NoLiq	0.00	65.70
53.66	1.54	5.66	397.51	70.25	NoLiq	0.00	70.25
54.16	1.54	5.66	313.14	55.32	3.37	0.00	55.32
54.66	1.41	5.89	324.97	55.21	1.70	0.00	55.21
55.16	1.40	5.91	332.36	56.23	1.54	0.00	56.23
55.66	1.29	6.12	325.18	53.12	0.27	0.00	53.12
56.16	1.19	6.31	344.94	54.67	0.00	0.00	54.67
56.66	1.44	5.84	328.00	56.13	2.00	0.00	56.13
57.16	1.50	5.73	335.32	58.55	2.84	0.00	58.55
57.66	1.36	5.98	321.58	53.77	1.09	0.00	53.77
58.16	1.47	5.79	290.01	50.09	2.38	0.00	50.09
58.66	1.50	5.73	313.30	54.67	2.82	0.00	54.67
59.16	1.52	5.68	348.90	61.37	3.18	0.00	61.37
59.66	1.48	5.76	357.10	61.95	2.57	0.00	61.95
60.16	1.48	5.76	369.41	64.13	2.59	0.00	64.13
60.66	1.46	5.80	378.80	65.36	2.33	0.00	65.36

61.16	1.24	6.21	364.07	58.67	0.00	0.00	58.67
61.66	1.21	6.26	400.93	64.02	0.00	0.00	64.02
62.16	1.17	6.34	418.63	66.00	0.00	0.00	66.00
62.66	1.01	6.64	455.14	68.52	0.00	0.00	68.52
63.16	0.99	6.66	500.00	75.03	0.00	0.00	75.03
63.66	0.84	6.95	500.00	71.98	0.00	0.00	71.98

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
(N1)60 is converted from qc1, (N1)60s is after fines correction
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Ishihara / Yoshimine

Depth ft	CSRsf	/ MSF*	=CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
63.96	0.53	1.00	0.53	5.00	0.00	70.25	100.00	0.000	0.0E0	0.000	0.000
63.66	0.53	1.00	0.53	5.00	0.00	71.98	100.00	0.000	0.0E0	0.000	0.000
63.16	0.53	1.00	0.53	5.00	0.00	75.03	100.00	0.000	0.0E0	0.000	0.000
62.66	0.54	1.00	0.54	5.00	0.00	68.52	100.00	0.000	0.0E0	0.000	0.000
62.16	0.54	1.00	0.54	5.00	0.00	66.00	100.00	0.000	0.0E0	0.000	0.000
61.66	0.54	1.00	0.54	5.00	0.00	64.02	100.00	0.000	0.0E0	0.000	0.000
61.16	0.55	1.00	0.55	5.00	0.00	58.67	100.00	0.000	0.0E0	0.000	0.000
60.66	0.55	1.00	0.55	5.00	2.33	65.36	100.00	0.000	0.0E0	0.000	0.000
60.16	0.55	1.00	0.55	4.99	2.59	64.13	100.00	0.000	0.0E0	0.000	0.000
59.66	0.56	1.00	0.56	4.97	2.57	61.95	100.00	0.000	0.0E0	0.000	0.000
59.16	0.56	1.00	0.56	4.95	3.18	61.37	100.00	0.000	0.0E0	0.000	0.000
58.66	0.56	1.00	0.56	4.93	2.82	54.67	100.00	0.000	0.0E0	0.000	0.000
58.16	0.56	1.00	0.56	4.91	2.38	50.09	100.00	0.000	0.0E0	0.000	0.000
57.66	0.57	1.00	0.57	4.89	1.09	53.77	100.00	0.000	0.0E0	0.000	0.000
57.16	0.57	1.00	0.57	4.88	2.84	58.55	100.00	0.000	0.0E0	0.000	0.000
56.66	0.57	1.00	0.57	4.86	2.00	56.13	100.00	0.000	0.0E0	0.000	0.000
56.16	0.58	1.00	0.58	4.84	0.00	54.67	100.00	0.000	0.0E0	0.000	0.000
55.66	0.58	1.00	0.58	4.83	0.27	53.12	100.00	0.000	0.0E0	0.000	0.000
55.16	0.58	1.00	0.58	4.81	1.54	56.23	100.00	0.000	0.0E0	0.000	0.000
54.66	0.58	1.00	0.58	4.79	1.70	55.21	100.00	0.000	0.0E0	0.000	0.000
54.16	0.59	1.00	0.59	4.78	3.37	55.32	100.00	0.000	0.0E0	0.000	0.000
53.66	0.59	1.00	0.59	5.00	NoLiq	70.25	100.00	0.000	0.0E0	0.000	0.000
53.16	0.59	1.00	0.59	5.00	NoLiq	65.70	100.00	0.000	0.0E0	0.000	0.000
52.66	0.59	1.00	0.59	5.00	NoLiq	9.83	50.12	0.000	0.0E0	0.000	0.000
52.16	0.60	1.00	0.60	5.00	NoLiq	8.66	47.20	0.000	0.0E0	0.000	0.000
51.66	0.60	1.00	0.60	5.00	NoLiq	36.00	100.00	0.000	0.0E0	0.000	0.000
51.16	0.60	1.00	0.60	5.00	NoLiq	41.19	100.00	0.000	0.0E0	0.000	0.000
50.66	0.61	1.00	0.61	5.00	NoLiq	65.69	100.00	0.000	0.0E0	0.000	0.000
50.16	0.61	1.00	0.61	5.00	NoLiq	70.50	100.00	0.000	0.0E0	0.000	0.000
49.66	0.61	1.00	0.61	4.64	1.77	57.84	100.00	0.000	0.0E0	0.000	0.000
49.16	0.61	1.00	0.61	4.63	0.00	68.29	100.00	0.000	0.0E0	0.000	0.000
48.66	0.62	1.00	0.62	4.62	0.00	67.28	100.00	0.000	0.0E0	0.000	0.000
48.16	0.62	1.00	0.62	4.60	0.43	71.65	100.00	0.000	0.0E0	0.000	0.000
47.66	0.62	1.00	0.62	4.59	0.71	82.72	100.00	0.000	0.0E0	0.000	0.000
47.16	0.62	1.00	0.62	4.58	0.46	82.14	100.00	0.000	0.0E0	0.000	0.000
46.66	0.63	1.00	0.63	4.57	0.00	75.60	100.00	0.000	0.0E0	0.000	0.000
46.16	0.63	1.00	0.63	4.56	1.71	84.96	100.00	0.000	0.0E0	0.000	0.000
45.66	0.63	1.00	0.63	4.52	0.00	75.65	100.00	0.000	0.0E0	0.000	0.000
45.16	0.63	1.00	0.63	4.50	0.00	74.72	100.00	0.000	0.0E0	0.000	0.000
44.66	0.64	1.00	0.64	4.48	0.00	77.89	100.00	0.000	0.0E0	0.000	0.000
44.16	0.64	1.00	0.64	4.46	2.30	86.20	100.00	0.000	0.0E0	0.000	0.000
43.66	0.64	1.00	0.64	4.45	0.00	74.82	100.00	0.000	0.0E0	0.000	0.000
43.16	0.64	1.00	0.64	4.43	0.00	80.27	100.00	0.000	0.0E0	0.000	0.000
42.66	0.65	1.00	0.65	4.42	0.00	74.55	100.00	0.000	0.0E0	0.000	0.000
42.16	0.65	1.00	0.65	4.40	0.00	72.04	100.00	0.000	0.0E0	0.000	0.000
41.66	0.65	1.00	0.65	4.38	0.00	75.04	100.00	0.000	0.0E0	0.000	0.000
41.16	0.65	1.00	0.65	4.37	0.00	76.87	100.00	0.000	0.0E0	0.000	0.000
40.66	0.65	1.00	0.65	4.35	1.09	63.14	100.00	0.000	0.0E0	0.000	0.000
40.16	0.66	1.00	0.66	4.34	1.13	53.08	100.00	0.000	0.0E0	0.000	0.000
39.66	0.66	1.00	0.66	0.68	17.63	30.71	91.69	0.817	4.9E-3	0.010	0.010
39.16	0.66	1.00	0.66	5.00	NoLiq	11.28	53.50	0.000	0.0E0	0.008	0.018
38.66	0.66	1.00	0.66	0.38	21.27	23.87	77.59	1.854	1.1E-2	0.057	0.076
38.16	0.67	1.00	0.67	0.43	20.67	25.55	80.78	1.712	1.0E-2	0.114	0.190
37.66	0.67	1.00	0.67	5.00	NoLiq	12.18	55.50	0.000	0.0E0	0.007	0.197
37.16	0.67	1.00	0.67	5.00	NoLiq	6.39	40.99	0.000	0.0E0	0.000	0.197
36.66	0.67	1.00	0.67	5.00	NoLiq	5.73	39.04	0.000	0.0E0	0.000	0.197
36.16	0.67	1.00	0.67	5.00	NoLiq	6.05	39.99	0.000	0.0E0	0.000	0.197
35.66	0.68	1.00	0.68	5.00	NoLiq	6.01	39.86	0.000	0.0E0	0.000	0.197
35.16	0.68	1.00	0.68	5.00	NoLiq	6.15	40.29	0.000	0.0E0	0.000	0.197
34.66	0.68	1.00	0.68	5.00	NoLiq	6.23	40.52	0.000	0.0E0	0.000	0.197
34.16	0.68	1.00	0.68	5.00	NoLiq	8.25	46.16	0.000	0.0E0	0.000	0.197
33.66	0.68	1.00	0.68	5.00	NoLiq	8.26	46.18	0.000	0.0E0	0.011	0.208
33.16	0.68	1.00	0.68	5.00	NoLiq	7.01	42.78	0.000	0.0E0	0.000	0.208
32.66	0.69	1.00	0.69	0.51	30.65	31.86	94.43	0.710	4.3E-3	0.015	0.223
32.16	0.69	1.00	0.69	1.48	32.82	50.65	100.00	0.000	0.0E0	0.002	0.226

31.66	0.69	1.00	0.69	1.12	11.26	35.15	100.00	0.000	0.0E0	0.002	0.228
31.16	0.69	1.00	0.69	1.52	3.85	34.77	100.00	0.000	0.0E0	0.000	0.228
30.66	0.69	1.00	0.69	0.56	12.31	26.70	83.04	1.544	9.3E-3	0.045	0.273
30.16	0.69	1.00	0.69	0.43	20.87	26.32	82.29	1.647	9.9E-3	0.100	0.372
29.66	0.69	1.00	0.69	0.30	10.83	18.36	67.58	2.343	1.4E-2	0.121	0.494
29.16	0.69	1.00	0.69	5.00	NoLiq	7.75	44.82	0.000	0.0E0	0.083	0.577
28.66	0.69	1.00	0.69	0.65	32.55	36.41	100.00	0.000	0.0E0	0.000	0.577
28.16	0.69	1.00	0.69	5.00	NoLiq	10.26	51.16	0.000	0.0E0	0.069	0.646
27.66	0.69	1.00	0.69	5.00	NoLiq	6.07	40.03	0.000	0.0E0	0.000	0.646
27.16	0.69	1.00	0.69	5.00	NoLiq	6.08	40.09	0.000	0.0E0	0.000	0.646
26.66	0.69	1.00	0.69	0.66	24.00	33.39	98.29	0.173	1.0E-3	0.008	0.654
26.16	0.68	1.00	0.68	0.75	19.89	33.42	98.35	0.143	8.6E-4	0.014	0.668
25.66	0.68	1.00	0.68	0.59	18.21	29.51	88.95	1.185	7.1E-3	0.025	0.692
25.16	0.68	1.00	0.68	0.53	17.55	27.79	85.28	1.467	8.8E-3	0.093	0.785
24.66	0.68	1.00	0.68	0.72	5.40	26.44	82.52	1.269	7.6E-3	0.088	0.873
24.16	0.68	1.00	0.68	1.55	3.97	34.88	100.00	0.000	0.0E0	0.028	0.900
23.66	0.68	1.00	0.68	0.85	8.09	29.81	89.64	0.706	4.2E-3	0.008	0.909
23.16	0.67	1.00	0.67	0.35	27.69	24.80	79.34	1.776	1.1E-2	0.040	0.948
22.66	0.67	1.00	0.67	5.00	NoLiq	5.88	39.48	0.000	0.0E0	0.021	0.970
22.16	0.67	1.00	0.67	5.00	NoLiq	3.92	33.21	0.000	0.0E0	0.008	0.978
21.66	0.67	1.00	0.67	0.53	26.27	30.47	91.12	1.105	6.6E-3	0.047	1.025
21.16	0.67	1.00	0.67	0.41	23.43	25.75	81.17	1.696	1.0E-2	0.083	1.108
20.66	0.66	1.00	0.66	5.00	NoLiq	5.52	38.39	0.000	0.0E0	0.009	1.116
20.16	0.66	1.00	0.66	5.00	NoLiq	4.97	36.68	0.000	0.0E0	0.000	1.116
19.66	0.66	1.00	0.66	5.00	NoLiq	4.52	35.23	0.000	0.0E0	0.000	1.116
19.16	0.66	1.00	0.66	5.00	NoLiq	3.50	31.79	0.000	0.0E0	0.000	1.116
18.66	0.65	1.00	0.65	5.00	NoLiq	3.64	32.25	0.000	0.0E0	0.000	1.116
18.16	0.65	1.00	0.65	5.00	NoLiq	4.00	33.51	0.000	0.0E0	0.000	1.116
17.66	0.65	1.00	0.65	5.00	NoLiq	4.24	34.28	0.000	0.0E0	0.000	1.116
17.16	0.64	1.00	0.64	5.00	NoLiq	4.49	35.13	0.000	0.0E0	0.000	1.116
16.66	0.64	1.00	0.64	5.00	NoLiq	4.17	34.06	0.000	0.0E0	0.000	1.116
16.16	0.63	1.00	0.63	5.00	NoLiq	3.33	31.18	0.000	0.0E0	0.000	1.116
15.66	0.63	1.00	0.63	5.00	NoLiq	3.06	30.21	0.000	0.0E0	0.000	1.116
15.16	0.63	1.00	0.63	5.00	NoLiq	2.22	27.17	0.000	0.0E0	0.000	1.116
14.66	0.62	1.00	0.62	5.00	NoLiq	2.18	27.00	0.000	0.0E0	0.000	1.116
14.16	0.62	1.00	0.62	5.00	NoLiq	2.62	28.63	0.000	0.0E0	0.000	1.116
13.66	0.61	1.00	0.61	5.00	NoLiq	5.22	37.46	0.000	0.0E0	0.000	1.116
13.16	0.60	1.00	0.60	5.00	NoLiq	8.19	45.99	0.000	0.0E0	0.000	1.116
12.66	0.60	1.00	0.60	5.00	NoLiq	5.52	38.38	0.000	0.0E0	0.000	1.116
12.16	0.59	1.00	0.59	5.00	NoLiq	8.99	48.05	0.000	0.0E0	0.000	1.116
11.66	0.58	1.00	0.58	5.00	NoLiq	18.59	67.99	0.000	0.0E0	0.000	1.116
11.16	0.58	1.00	0.58	5.00	NoLiq	25.05	79.81	0.000	0.0E0	0.000	1.116
10.66	0.57	1.00	0.57	5.00	NoLiq	23.46	76.81	0.000	0.0E0	0.000	1.116
10.16	0.56	1.00	0.56	5.00	NoLiq	10.51	51.74	0.000	0.0E0	0.000	1.116
9.66	0.55	1.00	0.55	5.00	NoLiq	13.28	57.82	0.000	0.0E0	0.000	1.116
9.16	0.54	1.00	0.54	5.00	NoLiq	7.92	45.26	0.000	0.0E0	0.000	1.116
8.66	0.53	1.00	0.53	5.00	NoLiq	8.05	45.62	0.000	0.0E0	0.000	1.116
8.16	0.52	1.00	0.52	5.00	NoLiq	4.02	33.57	0.000	0.0E0	0.000	1.116
7.66	0.51	1.00	0.51	5.00	NoLiq	5.59	38.60	0.000	0.0E0	0.000	1.116
7.16	0.49	1.00	0.49	5.00	NoLiq	6.61	41.63	0.000	0.0E0	0.000	1.116
6.66	0.48	1.00	0.48	5.00	NoLiq	5.60	38.61	0.000	0.0E0	0.000	1.116
6.16	0.46	1.00	0.46	5.00	NoLiq	4.85	36.29	0.000	0.0E0	0.000	1.116
5.66	0.44	1.00	0.44	5.00	NoLiq	5.03	36.84	0.000	0.0E0	0.000	1.116
5.16	0.42	1.00	0.42	5.00	NoLiq	4.41	34.86	0.000	0.0E0	0.000	1.116
5.01	0.42	1.00	0.42	5.00	NoLiq	2.53	28.31	0.000	0.0E0	0.000	1.116

Settlement of Saturated Sands=1.116 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth ft	sigma' atm	sigC' atm	(N1)60s	CSRsf	Gmax atm	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsp in.	S in.
4.96	0.28	0.18	1.31	0.42	209.38	5.6E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.66	0.26	0.17	0.10	0.42	86.09	1.3E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.16	0.24	0.15	0.10	0.42	81.34	1.2E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.66	0.21	0.13	0.10	0.42	76.30	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.16	0.18	0.12	0.10	0.42	70.90	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.66	0.15	0.10	0.10	0.42	65.05	9.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.16	0.12	0.08	0.10	0.42	58.62	8.8E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.66	0.09	0.06	0.10	0.42	51.39	7.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.16	0.07	0.04	0.10	0.42	42.95	6.5E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.66	0.04	0.02	0.10	0.42	32.40	4.9E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.16	0.01	0.01	0.10	0.42	15.95	2.4E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000

Settlement of Unsaturated Sands

Settlement of Unsaturated Sands=0.000 in.
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=1.116 in.
Differential Settlement=0.558 to 0.737 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)
1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=1, based on Item 2 of Page C.
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

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1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.
SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.
2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

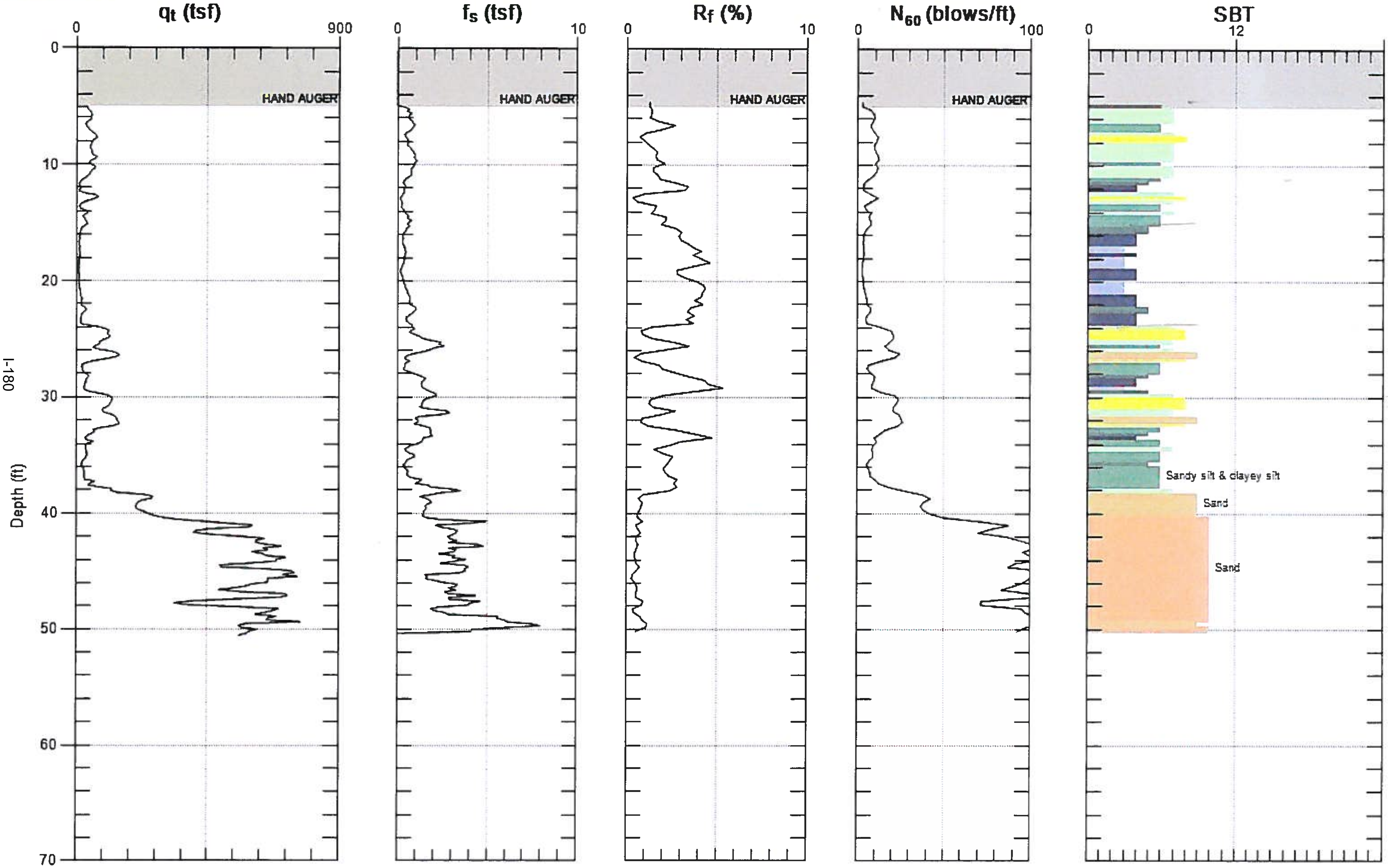
3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center,
Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

GREGG **GEOSYSTEMS**

Site: 12870 PANAMA ST.
Sounding: CPT-4

Engineer: R.GLADSON
Date: 5/26/2016 12:41



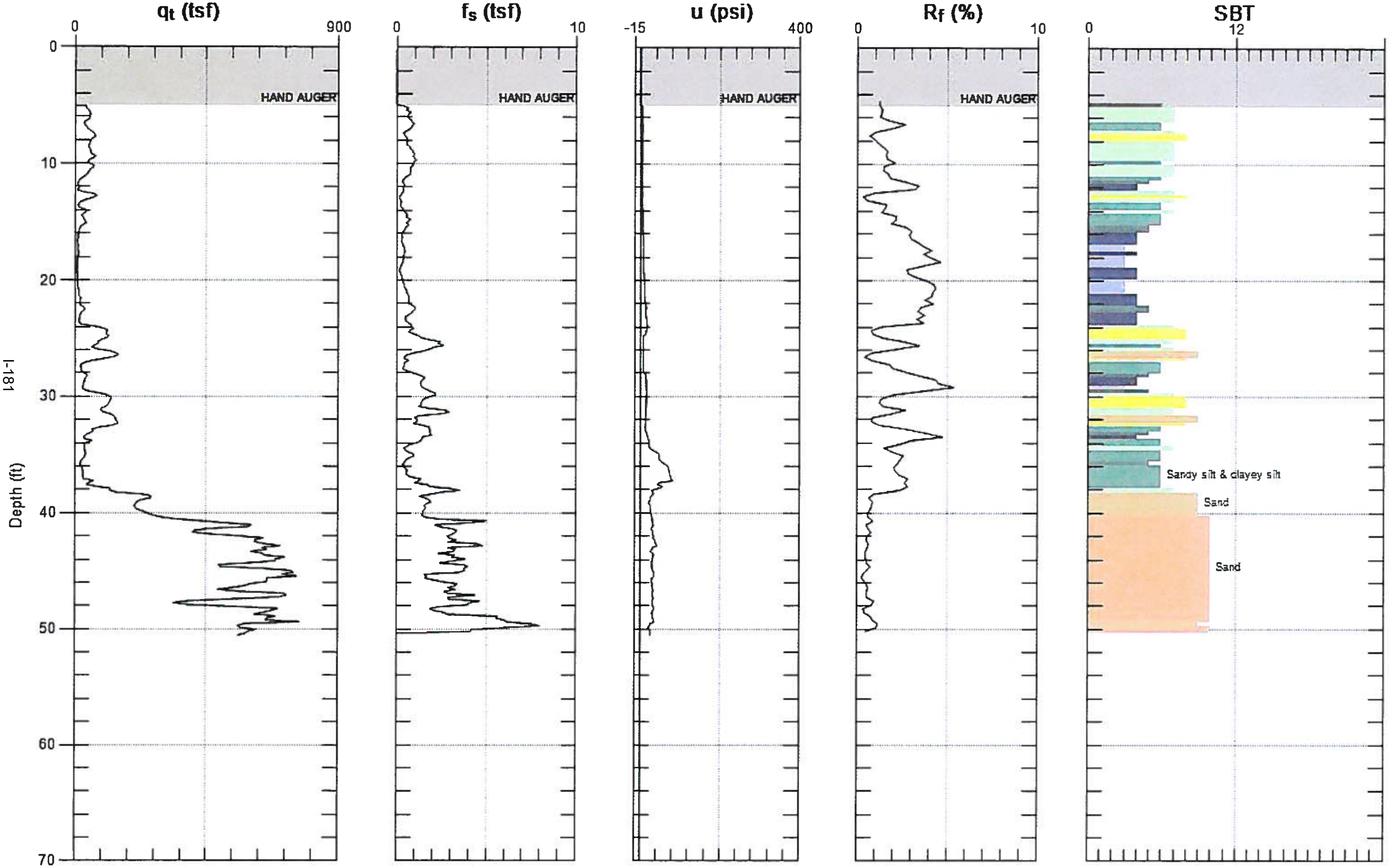
Max. Depth: 50.525 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-4

Engineer: R.GLADSON
Date: 5/26/2016 12:41



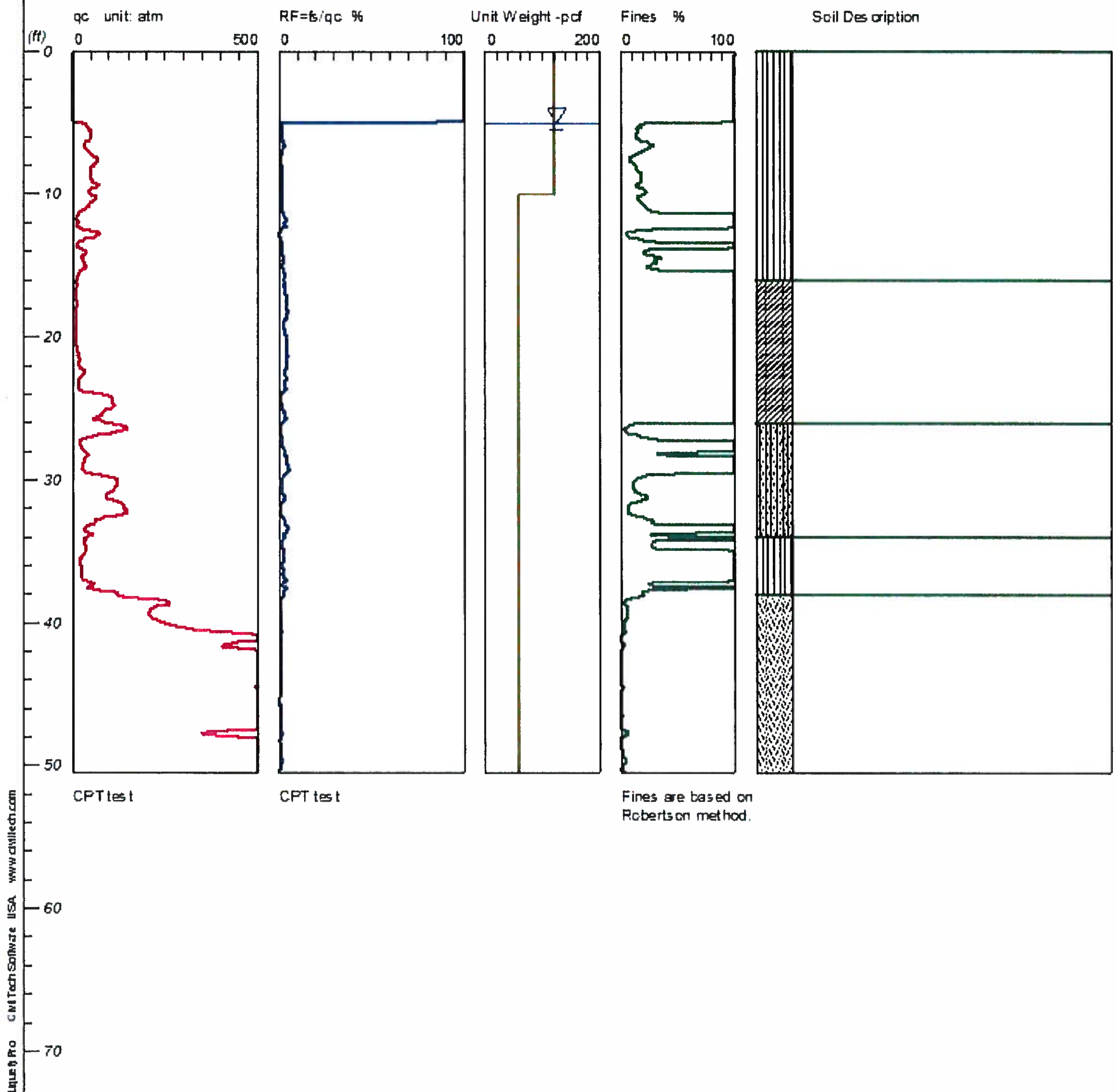
Max. Depth: 50.525 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT4 *Water Depth=5 ft* *Surface Elev.=0* *Magnitude=6.63* *Acceleration=0.65g*

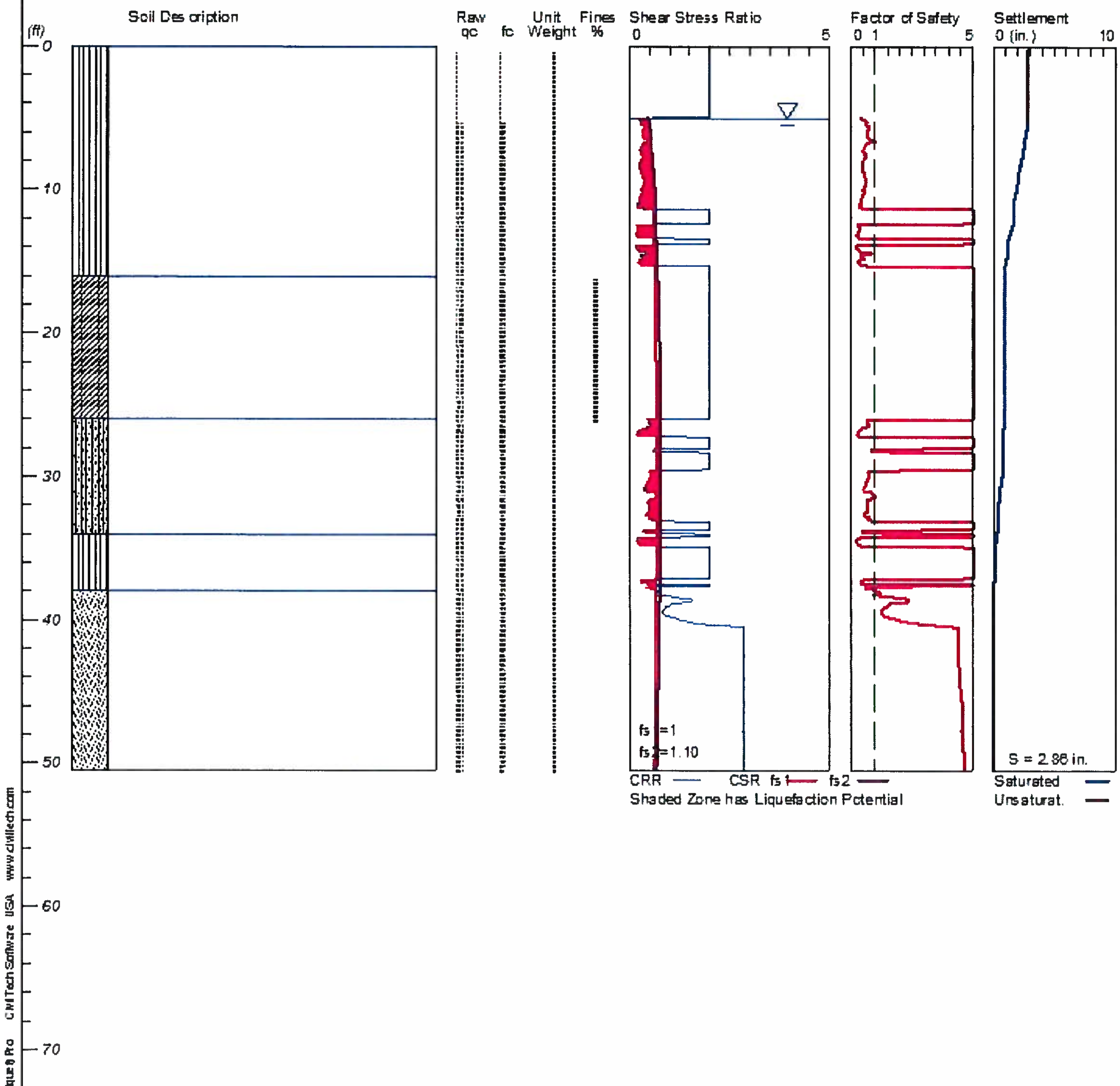


LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT4 Water Depth=5 ft Surface Elev.=0

Magnitude=6.63
Acceleration=0.65g



GREGG DRILLING & TESTING, INC.

CONE PENETRATION TEST DATA

Client:	GEOSYSTEMS	Units:	Imperial
Site:	12870 PANAMA ST.	Data averaging interval:	0.100 meters
Engineer:	R.GLADSON	Assumed depth of water:	11.003 feet
		Net area ratio of cone:	0.80
		Unit weight of water:	62.4 lb/ft3
		Relative density constant, CDR:	350
Sounding:	CPT-4	Young's modulus for sands, a:	4
Date:	5/26/2016	Small strain shear modulus number, SG (sands):	180
Time:	12:41 PM	Small strain shear modulus number, CG (clays):	50
		Nkt for clays:	15
		OCR number, kocr:	0.3

Interpretation based on Lunne, Robertson and Powell, 1997

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
0.100	0.328	0.000	0.000	0.000							0.000				
0.200	0.656	0.000	0.000	0.000							0.000				
0.300	0.984	0.000	0.000	0.000							0.000				
0.400	1.312	0.000	0.000	0.000							0.000				
0.500	1.640	0.000	0.000	0.000							0.000				
0.600	1.969	0.000	0.000	0.000							0.000				
0.700	2.297	0.000	0.000	0.000							0.000				
0.800	2.625	0.000	0.000	0.000							0.000				
0.900	2.953	0.000	0.000	0.000							0.000				
1.000	3.281	0.000	0.000	0.000							0.000				
1.100	3.609	0.000	0.000	0.000							0.000				
1.200	3.937	0.000	0.000	0.000							0.000				
1.300	4.265	0.000	0.000	0.000							0.000				
1.400	4.593	0.000	0.000	0.000							0.000				
1.500	4.921	12.139	0.148	1.463		12.16	1.22	6	115	0.282	0.000	0.282	42.13	1.25	0.01
1.600	5.249	39.948	0.541	4.137		40.01	1.35	7	118	0.301	0.000	0.301	131.80	1.36	0.01
1.700	5.577	49.113	0.656	4.226		49.17	1.33	7	118	0.321	0.000	0.321	152.38	1.34	0.01
1.800	5.906	51.604	0.645	4.402		51.67	1.25	7	118	0.340	0.000	0.340	151.00	1.26	0.01
1.900	6.234	43.331	0.756	4.478		43.40	1.74	7	118	0.359	0.000	0.359	119.80	1.76	0.01
2.000	6.562	33.433	0.881	4.806		33.50	2.63	6	115	0.378	0.000	0.378	87.62	2.66	0.01
2.100	6.890	39.855	0.787	5.008		39.93	1.97	6	115	0.397	0.000	0.397	99.62	1.99	0.01
2.200	7.218	53.407	0.539	4.920		53.48	1.01	7	118	0.416	0.000	0.416	127.51	1.02	0.01
2.300	7.546	66.512	0.449	4.743		66.58	0.67	8	121	0.436	0.000	0.436	151.71	0.68	0.01
2.400	7.874	60.341	0.570	4.642		60.41	0.94	8	121	0.456	0.000	0.456	131.52	0.95	0.01
2.500	8.202	50.777	0.586	4.490		50.84	1.15	7	118	0.475	0.000	0.475	106.00	1.16	0.01
2.600	8.530	47.877	0.682	4.314		47.94	1.42	7	118	0.494	0.000	0.494	95.95	1.44	0.01
2.700	8.858	51.418	0.847	4.252		51.48	1.65	7	118	0.514	0.000	0.514	99.20	1.66	0.01
2.800	9.186	59.421	0.932	4.188		59.48	1.57	7	118	0.533	0.000	0.533	110.58	1.58	0.01
2.900	9.514	60.489	0.991	3.999		60.55	1.64	7	118	0.552	0.000	0.552	108.60	1.65	0.00
3.000	9.843	47.551	0.977	3.948		47.61	2.05	6	115	0.571	0.000	0.571	82.34	2.08	0.01
3.100	10.171	58.352	0.850	3.999		58.41	1.45	7	118	0.591	0.000	0.591	97.91	1.47	0.00
3.200	10.499	53.770	0.772	3.860		53.83	1.43	7	118	0.610	0.000	0.610	87.26	1.45	0.01

GREGG

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
0.100	0.328													
0.200	0.656													
0.300	0.984													
0.400	1.312													
0.500	1.640													
0.600	1.969													
0.700	2.297													
0.800	2.625													
0.900	2.953													
1.000	3.281													
1.100	3.609													
1.200	3.937													
1.300	4.265													
1.400	4.593													
1.500	4.921	5	2.27	27.88	3.00E-6	2.7	5.2	28	36	49	277			
1.600	5.249	6	1.91	77.93	3.00E-4	7.6	14.2	47	42	160	421			
1.700	5.577	6	1.86	90.88	3.00E-4	9.2	16.7	51	43	197	460			
1.800	5.906	6	1.85	91.81	3.00E-4	9.6	16.9	51	43	207	477			
1.900	6.234	6	2.02	78.97	3.00E-4	8.6	14.7	47	42	174	458			
2.000	6.562	5	2.24	63.13	3.00E-6	7.3	12.1	42	40	134	428			
2.100	6.890	5	2.12	70.16	3.00E-6	8.2	13.4	45	41	160	461			
2.200	7.218	6	1.83	84.44	3.00E-4	9.9	15.8	49	42	214	516			
2.300	7.546	6	1.66	97.99	3.00E-4	11.6	18.0	53	43	266	564			
2.400	7.874	6	1.81	90.02	3.00E-4	11.0	16.8	51	42	242	554			
2.500	8.202	6	1.93	76.23	3.00E-4	9.7	14.5	47	41	203	530			
2.600	8.530	6	2.03	71.66	3.00E-4	9.5	13.9	45	40	192	527			
2.700	8.858	5	2.06	75.72	3.00E-6	10.4	14.9	47	41	206	546			
2.800	9.186	6	2.01	84.73	3.00E-4	11.7	16.5	49	41	238	581			
2.900	9.514	6	2.03	84.68	3.00E-4	12.0	16.7	49	41	242	591			
3.000	9.843	5	2.19	66.94	3.00E-6	10.1	13.7	44	40	190	552			
3.100	10.171	6	2.03	78.28	3.00E-4	11.6	15.5	47	40	234	597			
3.200	10.499	5	2.06	71.02	3.00E-6	10.8	14.3	45	40	215	587			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
3.300	10.827	42.532	0.726	3.746		42.59	1.70	7	118	0.629	0.000	0.629	66.69	1.73	0.01
3.400	11.155	27.307	0.496	3.545		27.36	1.81	6	115	0.648	0.005	0.643	41.53	1.86	0.01
3.500	11.483	13.161	0.355	3.457		13.21	2.69	5	115	0.667	0.015	0.652	19.25	2.83	0.02
3.600	11.811	11.786	0.399	3.860		11.84	3.37	4	115	0.686	0.025	0.660	16.89	3.57	0.02
3.700	12.139	11.693	0.374	4.314		11.75	3.18	4	115	0.704	0.035	0.669	16.52	3.38	0.02
3.800	12.467	34.409	0.325	4.503		34.47	0.94	7	118	0.724	0.046	0.678	49.78	0.96	0.01
3.900	12.795	66.020	0.197	4.516		66.08	0.30	8	121	0.744	0.056	0.688	95.03	0.30	0.00
4.000	13.123	38.582	0.213	4.327		38.64	0.55	7	118	0.763	0.066	0.697	54.37	0.56	0.01
4.100	13.451	14.304	0.230	4.251		14.37	1.60	6	115	0.782	0.076	0.705	19.26	1.69	0.02
4.200	13.780	19.621	0.295	4.806		19.69	1.50	6	115	0.800	0.087	0.714	26.46	1.56	0.01
4.300	14.108	33.898	0.452	5.247		33.97	1.33	7	118	0.820	0.097	0.723	45.86	1.36	0.01
4.400	14.436	26.425	0.566	5.121		26.50	2.14	6	115	0.839	0.107	0.731	35.08	2.21	0.01
4.500	14.764	30.942	0.659	5.247		31.02	2.12	6	115	0.857	0.117	0.740	40.76	2.18	0.01
4.600	15.092	33.386	0.631	5.172		33.46	1.88	6	115	0.876	0.128	0.749	43.53	1.94	0.01
4.700	15.420	21.080	0.567	4.920		21.15	2.68	5	115	0.895	0.138	0.757	26.75	2.80	0.01
4.800	15.748	13.561	0.409	5.210		13.64	3.00	5	115	0.914	0.148	0.766	16.62	3.21	0.02
4.900	16.076	10.949	0.316	5.853		11.03	2.86	4	115	0.933	0.158	0.774	13.05	3.13	0.03
5.000	16.404	10.179	0.306	6.244		10.27	2.98	4	115	0.951	0.169	0.783	11.90	3.29	0.03
5.100	16.732	9.127	0.311	6.421		9.22	3.37	4	115	0.970	0.179	0.791	10.42	3.77	0.03
5.200	17.060	10.568	0.392	6.560		10.66	3.67	3	111	0.988	0.189	0.799	12.10	4.05	0.03
5.300	17.388	10.791	0.446	6.698		10.89	4.10	3	111	1.007	0.199	0.807	12.24	4.51	0.03
5.400	17.717	11.516	0.427	6.887		11.62	3.67	4	115	1.025	0.209	0.816	12.98	4.03	0.03
5.500	18.045	9.471	0.392	7.051		9.57	4.10	3	111	1.044	0.220	0.824	10.35	4.60	0.03
5.600	18.373	7.519	0.349	7.240		7.62	4.58	3	111	1.062	0.230	0.832	7.89	5.32	0.04
5.700	18.701	7.092	0.262	7.304		7.20	3.64	3	111	1.080	0.240	0.840	7.28	4.28	0.05
5.800	19.029	6.813	0.190	7.505		6.92	2.75	4	115	1.099	0.250	0.849	6.86	3.27	0.05
5.900	19.357	7.594	0.215	8.149		7.71	2.78	4	115	1.118	0.261	0.857	7.69	3.26	0.05
6.000	19.685	8.886	0.288	8.805		9.01	3.20	4	115	1.137	0.271	0.866	9.10	3.66	0.05
6.100	20.013	8.663	0.338	9.259		8.80	3.84	3	111	1.155	0.281	0.874	8.74	4.42	0.05
6.200	20.341	9.360	0.402	9.675		9.50	4.23	3	111	1.173	0.291	0.882	9.44	4.82	0.05
6.300	20.669	10.977	0.480	9.940		11.12	4.32	3	111	1.192	0.302	0.890	11.16	4.83	0.04
6.400	20.997	13.654	0.574	10.142		13.80	4.16	3	111	1.210	0.312	0.898	14.02	4.56	0.03
6.500	21.325	15.931	0.662	10.508		16.08	4.12	4	115	1.229	0.322	0.907	16.39	4.46	0.03
6.600	21.654	18.246	0.688	10.886		18.40	3.74	4	115	1.247	0.332	0.915	18.75	4.01	0.03
6.700	21.982	17.539	0.742	12.236		17.72	4.19	4	115	1.266	0.343	0.924	17.81	4.51	0.03
6.800	22.310	27.531	0.975	13.977		27.73	3.51	5	115	1.285	0.353	0.932	28.37	3.69	0.02
6.900	22.638	27.466	0.923	13.346		27.66	3.34	5	115	1.304	0.363	0.941	28.01	3.50	0.02
7.000	22.966	17.799	0.667	13.674		18.00	3.70	4	115	1.323	0.373	0.949	17.56	4.00	0.04
7.100	23.294	15.475	0.515	14.923		15.69	3.28	4	115	1.341	0.383	0.958	14.98	3.59	0.05
7.200	23.622	17.753	0.660	16.058		17.98	3.67	4	115	1.360	0.394	0.966	17.20	3.97	0.05
7.300	23.950	63.687	0.861	17.004		63.93	1.35	7	118	1.379	0.404	0.976	64.12	1.38	0.01
7.400	24.278	105.578	0.800	14.922		105.79	0.76	8	121	1.399	0.414	0.985	105.97	0.77	0.01
7.500	24.606	109.984	0.974	11.491		110.15	0.88	8	121	1.419	0.424	0.995	109.30	0.90	0.00
7.600	24.934	105.206	1.474	6.824		105.30	1.40	8	121	1.439	0.435	1.004	103.42	1.42	0.00
7.700	25.262	83.884	2.176	6.925		83.98	2.59	7	118	1.458	0.445	1.013	81.43	2.64	0.00
7.800	25.591	68.130	2.330	7.240		68.23	3.41	6	115	1.477	0.455	1.022	65.32	3.49	0.00
7.900	25.919	84.990	1.800	7.468		85.10	2.12	7	118	1.496	0.465	1.031	81.08	2.15	0.00
8.000	26.247	135.200	1.023	7.468		135.31	0.76	9	124	1.517	0.476	1.041	128.50	0.76	0.00
8.100	26.575	126.454	0.503	7.316		126.56	0.40	9	124	1.537	0.486	1.051	118.92	0.40	0.00
8.200	26.903	64.867	0.536	7.039		64.97	0.82	8	121	1.557	0.496	1.061	59.77	0.84	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
3.300	10.827	5	2.20	56.10	3.00E-6	9.1	11.7	40	38	170	549			
3.400	11.155	5	2.38	36.14	3.00E-6	6.3	8.1	32	36	109	477			
3.500	11.483	4	2.75	17.75	3.00E-8	3.6	4.6				661	0.84	1.28	5.8
3.600	11.811	3	2.86	15.86	1.00E-9	3.5	4.4				592	0.74	1.13	5.1
3.700	12.139	3	2.85	15.52	1.00E-9	3.4	4.3				588	0.74	1.10	5.0
3.800	12.467	5	2.14	42.61	3.00E-6	7.2	8.9	35	37	138	524			
3.900	12.795	6	1.65	76.68	3.00E-4	11.4	14.2	47	40	264	655			
4.000	13.123	6	1.99	46.08	3.00E-4	7.6	9.3	36	37	155	550			
4.100	13.451	4	2.62	17.72	3.00E-8	3.7	4.5				718	0.91	1.28	5.8
4.200	13.780	5	2.49	24.02	3.00E-6	4.8	5.8	26	33	79	443			
4.300	14.108	5	2.26	40.69	3.00E-6	7.4	9.0	34	36	136	533			
4.400	14.436	5	2.48	32.01	3.00E-6	6.4	7.7	30	35	106	493			
4.500	14.764	5	2.43	37.09	3.00E-6	7.3	8.7	33	35	124	521			
4.600	15.092	5	2.37	39.50	3.00E-6	7.7	9.1	34	36	134	537			
4.700	15.420	4	2.64	25.01	3.00E-8	5.5	6.5				1058	1.35	1.78	8.0
4.800	15.748	4	2.84	15.87	3.00E-8	3.9	4.6				682	0.85	1.11	5.0
4.900	16.076	3	2.91	12.57	1.00E-9	3.3	3.9				552	0.67	0.87	3.9
5.000	16.404	3	2.96	11.53	1.00E-9	3.2	3.7				513	0.62	0.79	3.6
5.100	16.732	3	3.04	10.18	1.00E-9	3.0	3.5				461	0.55	0.69	3.1
5.200	17.060	3	3.01	11.80	1.00E-9	3.4	3.9				533	0.64	0.81	3.6
5.300	17.388	3	3.03	11.97	1.00E-9	3.5	4.0				544	0.66	0.82	3.7
5.400	17.717	3	2.98	12.65	1.00E-9	3.6	4.1				581	0.71	0.87	3.9
5.500	18.045	3	3.09	10.19	1.00E-9	3.2	3.6				479	0.57	0.69	3.1
5.600	18.373	3	3.23	7.84	1.00E-9	2.8	3.2				381	0.44	0.53	2.4
5.700	18.701	3	3.20	7.23	1.00E-9	2.6	2.9				360	0.41	0.49	2.2
5.800	19.029	3	3.15	6.79	1.00E-9	2.4	2.7				346	0.39	0.46	2.1
5.900	19.357	3	3.11	7.60	1.00E-9	2.6	2.9				386	0.44	0.51	2.3
6.000	19.685	3	3.08	8.97	1.00E-9	3.0	3.3				451	0.53	0.61	2.7
6.100	20.013	3	3.14	8.66	1.00E-9	3.0	3.3				440	0.51	0.58	2.6
6.200	20.341	3	3.14	9.35	1.00E-9	3.3	3.6				475	0.56	0.63	2.8
6.300	20.669	3	3.08	11.03	1.00E-9	3.7	4.0				556	0.66	0.74	3.3
6.400	20.997	3	2.99	13.80	1.00E-9	4.3	4.7				690	0.84	0.93	4.2
6.500	21.325	3	2.93	16.10	1.00E-9	4.9	5.3				804	0.99	1.09	4.9
6.600	21.654	3	2.86	18.38	1.00E-9	5.3	5.8				920	1.14	1.25	5.6
6.700	21.982	3	2.90	17.52	1.00E-9	5.3	5.7				886	1.10	1.19	5.3
6.800	22.310	4	2.69	27.72	3.00E-8	7.4	7.9				1387	1.76	1.89	8.5
6.900	22.638	4	2.68	27.40	3.00E-8	7.3	7.8				1383	1.76	1.87	8.4
7.000	22.966	3	2.88	17.32	1.00E-9	5.3	5.6				900	1.11	1.17	5.3
7.100	23.294	3	2.90	14.80	1.00E-9	4.7	4.9				785	0.96	1.00	4.5
7.200	23.622	3	2.88	17.00	1.00E-9	5.3	5.5				899	1.11	1.15	5.2
7.300	23.950	5	2.15	62.34	3.00E-6	13.3	13.8	42	38	256	727			
7.400	24.278	6	1.82	102.64	3.00E-4	19.4	20.1	54	41	423	863			
7.500	24.606	6	1.85	106.39	3.00E-4	20.5	21.1	55	41	441	878			
7.600	24.934	6	2.00	101.32	3.00E-4	20.7	21.2	54	41	421	867			
7.700	25.262	5	2.26	80.34	3.00E-6	18.4	18.8	48	39	336	807			
7.800	25.591	4	2.42	64.72	3.00E-8	16.0	16.2				3412	4.45	4.35	19.6
7.900	25.919	5	2.20	80.39	3.00E-6	18.1	18.4	48	39	340	815			
8.000	26.247	6	1.75	127.54	3.00E-4	24.3	24.5	60	42	541	954			
8.100	26.575	6	1.62	118.54	3.00E-4	21.7	21.8	58	41	506	936			
8.200	26.903	6	2.05	59.83	3.00E-4	13.0	13.0	41	38	260	752			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
8.300	27.231	24.937	0.443	6.849		25.04	1.77	6	115	1.576	0.506	1.069	21.94	1.89	0.00
8.400	27.559	20.978	0.411	7.114		21.08	1.95	6	115	1.595	0.517	1.078	18.07	2.11	0.00
8.500	27.887	28.060	0.751	9.082		28.19	2.66	6	115	1.613	0.527	1.087	24.46	2.82	0.00
8.600	28.215	38.712	1.336	12.879		38.90	3.43	5	115	1.632	0.537	1.095	34.03	3.59	0.01
8.700	28.543	33.981	1.474	14.140		34.18	4.31	4	115	1.651	0.547	1.104	29.48	4.53	0.01
8.800	28.871	29.892	1.355	14.708		30.10	4.50	4	115	1.670	0.557	1.112	25.56	4.77	0.02
8.900	29.199	27.670	1.480	14.834		27.88	5.31	3	111	1.688	0.568	1.120	23.38	5.65	0.02
9.000	29.528	52.236	1.879	15.187		52.45	3.58	5	115	1.707	0.578	1.129	44.95	3.70	0.01
9.100	29.856	105.002	2.049	15.099		105.22	1.95	7	118	1.726	0.588	1.138	90.94	1.98	0.00
9.200	30.184	121.769	1.600	14.746		121.98	1.31	8	121	1.746	0.598	1.148	104.77	1.33	0.00
9.300	30.512	116.406	1.406	14.481		116.61	1.21	8	121	1.766	0.609	1.157	99.25	1.22	0.00
9.400	30.840	102.483	1.474	14.191		102.69	1.44	8	121	1.786	0.619	1.167	86.48	1.46	0.00
9.500	31.168	92.556	2.469	13.762		92.75	2.66	7	118	1.805	0.629	1.176	77.35	2.71	0.00
9.600	31.496	117.252	2.192	13.687		117.45	1.87	7	118	1.824	0.639	1.185	97.58	1.90	0.00
9.700	31.824	136.278	1.138	13.094		136.47	0.83	9	124	1.845	0.650	1.195	112.65	0.85	0.00
9.800	32.152	143.212	1.090	12.640		143.39	0.76	9	124	1.865	0.660	1.205	117.43	0.77	0.00
9.900	32.480	118.256	1.427	12.122		118.43	1.20	8	121	1.885	0.670	1.215	95.94	1.22	0.00
10.000	32.808	68.715	1.846	12.576		68.90	2.68	6	115	1.904	0.680	1.223	54.76	2.76	0.00
10.100	33.136	50.619	1.891	15.364		50.84	3.72	5	115	1.923	0.691	1.232	39.71	3.87	0.01
10.200	33.465	34.111	1.616	18.227		34.37	4.70	4	115	1.941	0.701	1.241	26.14	4.98	0.02
10.300	33.793	43.769	1.315	21.015		44.07	2.98	6	115	1.960	0.711	1.249	33.71	3.12	0.02
10.400	34.121	35.487	0.841	22.138		35.81	2.35	6	115	1.979	0.721	1.258	26.90	2.49	0.03
10.500	34.449	34.130	0.515	25.670		34.50	1.49	7	118	1.998	0.732	1.267	25.66	1.58	0.03
10.600	34.777	35.580	0.697	38.674		36.14	1.93	6	115	2.017	0.742	1.275	26.76	2.04	0.06
10.700	35.105	34.018	0.876	46.722		34.69	2.53	6	115	2.036	0.752	1.284	25.44	2.68	0.08
10.800	35.433	24.677	0.602	48.930		25.38	2.37	6	115	2.055	0.762	1.292	18.05	2.58	0.12
10.900	35.761	18.422	0.428	59.576		19.28	2.22	5	115	2.073	0.772	1.301	13.23	2.49	0.20
11.000	36.089	22.679	0.478	69.465		23.68	2.02	6	115	2.092	0.783	1.310	16.48	2.22	0.20
11.100	36.417	26.685	0.582	71.937		27.72	2.10	6	115	2.111	0.793	1.318	19.43	2.27	0.17
11.200	36.745	26.824	0.643	74.208		27.89	2.31	6	115	2.130	0.803	1.327	19.42	2.50	0.18
11.300	37.073	39.391	1.128	78.156		40.52	2.78	6	115	2.149	0.813	1.335	28.74	2.94	0.13
11.400	37.402	50.544	1.340	57.078		51.37	2.61	6	115	2.167	0.824	1.344	36.61	2.72	0.07
11.500	37.730	78.559	2.198	47.782		79.25	2.77	6	115	2.186	0.834	1.352	56.98	2.85	0.03
11.600	38.058	127.337	2.987	34.575		127.83	2.34	7	118	2.206	0.844	1.361	92.28	2.38	0.01
11.700	38.386	210.691	1.890	30.513		211.13	0.90	9	124	2.226	0.854	1.372	152.32	0.90	0.01
11.800	38.714	248.065	1.592	25.480		248.43	0.64	9	124	2.246	0.865	1.382	178.18	0.65	0.00
11.900	39.042	215.459	1.813	22.453		215.78	0.84	9	124	2.267	0.875	1.392	153.41	0.85	0.00
12.000	39.370	205.867	1.628	23.840		206.21	0.79	9	124	2.287	0.885	1.402	145.46	0.80	0.00
12.100	39.698	218.341	1.556	25.531		218.71	0.71	9	124	2.307	0.895	1.412	153.26	0.72	0.00
12.200	40.026	249.171	1.458	26.641		249.55	0.58	9	124	2.328	0.906	1.422	173.84	0.59	0.00
12.300	40.354	301.947	1.810	29.076		302.37	0.60	10	127	2.349	0.916	1.433	209.39	0.60	0.00
12.400	40.682	429.980	3.745	30.337		430.42	0.87	10	127	2.369	0.926	1.443	296.54	0.87	0.00
12.500	41.011	569.410	2.834	31.674		569.87	0.50	10	127	2.390	0.936	1.454	390.26	0.50	0.00
12.600	41.339	486.641	2.964	29.454		487.06	0.61	10	127	2.411	0.946	1.465	330.88	0.61	0.00
12.700	41.667	426.328	3.251	30.955		426.77	0.76	10	127	2.432	0.957	1.475	287.61	0.77	0.00
12.800	41.995	558.786	2.965	32.393		559.25	0.53	10	127	2.453	0.967	1.486	374.68	0.53	0.00
12.900	42.323	624.248	3.064	35.231		624.76	0.49	10	127	2.474	0.977	1.497	415.77	0.49	0.00
13.000	42.651	654.289	4.067	39.368		654.86	0.62	10	127	2.495	0.987	1.507	432.79	0.62	0.00
13.100	42.979	665.340	3.654	34.020		665.83	0.55	10	127	2.516	0.998	1.518	436.97	0.55	0.00
13.200	43.307	632.558	2.932	29.176		632.98	0.46	10	127	2.537	1.008	1.529	412.42	0.47	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
8.300	27.231	4	2.60	21.99	3.00E-8	6.4	6.4				1252	1.56	1.46	6.6
8.400	27.559	4	2.70	18.14	3.00E-8	5.6	5.6				1054	1.30	1.20	5.4
8.500	27.887	4	2.67	24.58	3.00E-8	7.4	7.3				1410	1.77	1.63	7.3
8.600	28.215	4	2.63	34.27	3.00E-8	10.0	9.9				1945	2.48	2.27	10.2
8.700	28.543	4	2.74	29.69	3.00E-8	9.4	9.2				1709	2.17	1.97	8.8
8.800	28.871	3	2.80	25.76	1.00E-9	8.5	8.3				1505	1.90	1.70	7.7
8.900	29.199	3	2.88	23.55	1.00E-9	8.2	8.0				1394	1.75	1.56	7.0
9.000	29.528	4	2.55	45.62	3.00E-8	13.0	12.6				2623	3.38	3.00	13.5
9.100	29.856	5	2.14	93.29	3.00E-6	21.8	21.1	52	40	421	904			
9.200	30.184	6	1.98	108.22	3.00E-4	23.7	22.8	56	41	488	952			
9.300	30.512	6	1.97	102.88	3.00E-4	22.6	21.6	54	41	466	941			
9.400	30.840	5	2.07	89.68	3.00E-6	20.7	19.7	51	40	411	904			
9.500	31.168	5	2.29	79.88	3.00E-6	20.5	19.4	48	39	371	876			
9.600	31.496	5	2.11	101.64	3.00E-6	24.0	22.7	54	40	470	951			
9.700	31.824	6	1.82	118.91	3.00E-4	25.1	23.6	58	41	546	1002			
9.800	32.152	6	1.78	124.62	3.00E-4	26.0	24.4	60	41	574	1022			
9.900	32.480	6	1.98	101.35	3.00E-4	23.1	21.6	54	40	474	961			
10.000	32.808	5	2.40	56.97	3.00E-6	16.0	14.8	40	37	276	804			
10.100	33.136	4	2.60	41.01	3.00E-8	13.0	12.0				2542	3.26	2.65	11.9
10.200	33.465	3	2.81	26.77	1.00E-9	9.7	9.0				1719	2.16	1.74	7.8
10.300	33.793	4	2.59	34.94	3.00E-8	11.1	10.3				2204	2.81	2.25	10.1
10.400	34.121	4	2.60	27.90	3.00E-8	9.1	8.3				1790	2.26	1.79	8.1
10.500	34.449	5	2.50	26.80	3.00E-6	8.3	7.6	28	33	138	646			
10.600	34.777	4	2.55	27.91	3.00E-8	8.9	8.1				1807	2.27	1.78	8.0
10.700	35.105	4	2.64	26.44	3.00E-8	8.9	8.1				1735	2.18	1.70	7.6
10.800	35.433	4	2.75	18.66	3.00E-8	6.8	6.2				1269	1.56	1.20	5.4
10.900	35.761	4	2.85	13.61	3.00E-8	5.4	4.9				964	1.15	0.88	4.0
11.000	36.089	4	2.74	17.09	3.00E-8	6.2	5.6				1184	1.44	1.10	4.9
11.100	36.417	4	2.69	20.23	3.00E-8	7.2	6.4				1386	1.71	1.30	5.8
11.200	36.745	4	2.72	20.21	3.00E-8	7.3	6.5				1395	1.72	1.29	5.8
11.300	37.073	4	2.63	30.13	3.00E-8	10.2	9.1				2026	2.56	1.92	8.6
11.400	37.402	4	2.52	38.72	3.00E-8	12.5	11.1				2568	3.28	2.44	11.0
11.500	37.730	5	2.40	60.93	3.00E-6	18.2	16.1	42	37	317	871			
11.600	38.058	5	2.19	100.38	3.00E-6	27.1	23.9	54	40	511	1024			
11.700	38.386	6	1.74	172.02	3.00E-4	37.7	33.1	70	43	845	1213			
11.800	38.714	6	1.60	203.61	3.00E-4	42.2	37.0	76	44	994	1284			
11.900	39.042	6	1.72	174.75	3.00E-4	38.3	33.4	71	43	863	1228			
12.000	39.370	6	1.72	166.27	3.00E-4	36.6	31.8	69	43	825	1213			
12.100	39.698	6	1.68	176.49	3.00E-4	38.2	33.1	71	43	875	1240			
12.200	40.026	6	1.58	201.54	3.00E-4	42.2	36.4	76	43	998	1299			
12.300	40.354	6	1.52	243.66	3.00E-4	50.2	43.1	83	44	1209	1388			
12.400	40.682	6	1.53	346.36	3.00E-4	71.7	61.4	99	46	1722	1565			
12.500	41.011	7	1.27	457.49	3.00E-2	87.5	74.6	114	47	2279	1723			
12.600	41.339	6	1.38	389.30	3.00E-4	77.4	65.8	105	46	1948	1639			
12.700	41.667	6	1.50	339.62	3.00E-4	70.3	59.5	99	46	1707	1572			
12.800	41.995	7	1.30	444.04	3.00E-2	86.7	73.2	113	47	2237	1724			
12.900	42.323	7	1.25	494.49	3.00E-2	95.2	80.1	119	47	2499	1794			
13.000	42.651	7	1.31	516.56	3.00E-2	101.8	85.3	121	48	2619	1826			
13.100	42.979	7	1.27	523.38	3.00E-2	102.2	85.3	122	48	2663	1841			
13.200	43.307	7	1.23	495.71	3.00E-2	96.1	79.9	119	47	2532	1814			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
13.300	43.635	667.524	2.901	32.582		667.99	0.43	10	127	2.557	1.018	1.539	432.30	0.44	0.00
13.400	43.963	695.064	3.350	30.917		695.51	0.48	10	127	2.578	1.028	1.550	447.07	0.48	0.00
13.500	44.291	590.249	3.112	29.580		590.67	0.53	10	127	2.599	1.039	1.561	376.83	0.53	0.00
13.600	44.619	545.132	3.817	29.731		545.56	0.70	10	127	2.620	1.049	1.571	345.55	0.70	0.00
13.700	44.948	708.505	3.680	31.976		708.97	0.52	10	127	2.641	1.059	1.582	446.50	0.52	0.00
13.800	45.276	736.575	2.252	34.247		737.07	0.31	10	127	2.662	1.069	1.593	461.15	0.31	0.00
13.900	45.604	689.692	1.800	31.270		690.14	0.26	10	127	2.683	1.080	1.603	428.81	0.26	0.00
14.000	45.932	637.438	2.697	29.391		637.86	0.42	10	127	2.704	1.090	1.614	393.57	0.42	0.00
14.100	46.260	575.739	3.188	30.362		576.18	0.55	10	127	2.725	1.100	1.624	353.00	0.56	0.00
14.200	46.588	529.173	2.958	31.800		529.63	0.56	10	127	2.745	1.110	1.635	322.23	0.56	0.00
14.300	46.916	663.054	3.326	31.384		663.51	0.50	10	127	2.766	1.120	1.646	401.47	0.50	0.00
14.400	47.244	651.026	3.413	32.140		651.49	0.52	10	127	2.787	1.131	1.656	391.62	0.53	0.00
14.500	47.572	422.517	3.864	31.359		422.97	0.91	10	127	2.808	1.141	1.667	252.03	0.92	0.00
14.600	47.900	426.913	3.472	31.749		427.37	0.81	10	127	2.829	1.151	1.678	253.04	0.82	0.00
14.700	48.228	641.081	2.133	33.465		641.56	0.33	10	127	2.850	1.161	1.688	378.30	0.33	0.00
14.800	48.556	644.381	2.549	30.879		644.83	0.40	10	127	2.871	1.172	1.699	377.83	0.40	0.00
14.900	48.885	651.305	4.685	30.917		651.75	0.72	10	127	2.892	1.182	1.710	379.52	0.72	0.00
15.000	49.213	691.179	5.919	33.553		691.66	0.86	10	127	2.912	1.192	1.720	400.36	0.86	0.00
15.100	49.541	634.398	7.195	27.877		634.80	1.13	9	124	2.933	1.202	1.730	365.14	1.14	0.00
15.200	49.869	579.978	6.093	22.251		580.30	1.05	10	127	2.954	1.213	1.741	331.59	1.06	0.00
15.300	50.197	598.000	2.784	24.900		598.36	0.47	10	127	2.975	1.223	1.752	339.88	0.47	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
13.300	43.635	7	1.20	521.41	3.00E-2	100.3	83.2	122	48	2672	1851			
13.400	43.963	7	1.22	541.09	3.00E-2	105.2	86.9	124	48	2782	1881			
13.500	44.291	7	1.30	457.64	3.00E-2	91.5	75.3	114	47	2363	1785			
13.600	44.619	6	1.42	421.08	3.00E-4	87.6	71.9	110	47	2182	1742			
13.700	44.948	7	1.25	545.95	3.00E-2	108.0	88.3	125	48	2836	1906			
13.800	45.276	7	1.07	565.75	3.00E-2	106.8	87.0	127	48	2948	1935			
13.900	45.604	7	1.05	527.83	3.00E-2	99.5	80.8	123	47	2761	1897			
14.000	45.932	7	1.22	486.06	3.00E-2	96.4	78.1	118	47	2551	1852			
14.100	46.260	7	1.33	437.40	3.00E-2	90.2	72.8	112	47	2305	1794			
14.200	46.588	6	1.37	400.57	3.00E-4	83.7	67.3	107	46	2119	1748			
14.300	46.916	7	1.27	500.70	3.00E-2	101.7	81.5	120	47	2654	1889			
14.400	47.244	7	1.29	490.00	3.00E-2	100.5	80.3	118	47	2606	1881			
14.500	47.572	6	1.59	316.35	3.00E-4	71.9	57.3	95	45	1692	1633			
14.600	47.900	6	1.56	318.64	3.00E-4	71.7	57.0	95	45	1709	1642			
14.700	48.228	7	1.16	477.87	3.00E-2	95.4	75.5	117	47	2566	1884			
14.800	48.556	7	1.21	478.78	3.00E-2	97.3	76.8	117	47	2579	1891			
14.900	48.885	6	1.40	482.42	3.00E-4	104.1	81.9	117	47	2607	1902			
15.000	49.213	6	1.44	510.49	3.00E-4	112.0	87.8	121	47	2767	1944			
15.100	49.541	6	1.57	466.96	3.00E-4	106.9	83.6	116	47	2539	1893			
15.200	49.869	6	1.56	425.36	3.00E-4	97.7	76.2	110	46	2321	1841			
15.300	50.197	7	1.29	437.32	3.00E-2	92.5	71.9	112	46	2393	1863			

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Subtitle: CPT 4

Input Data:
Surface Elev.=0
Hole No.=CPT4
Depth of Hole=50.50 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.65 g
Earthquake Magnitude=6.63
No-Liquefiable Soils: CL, OL are Non-Liq. Soil
1. CPT Calulation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.1
Plot two CSR (fs1=1, fs2=User)
10. Average two input data between two Depths: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf %	Gamma pcf	Fines %	D50 mm
0.16	0.00	0.00	100.00	120.00	0.00	0.50
0.66	0.00	0.00	100.00	120.00	0.00	0.50
1.15	0.00	0.00	100.00	120.00	0.00	0.50
1.64	0.00	0.00	100.00	120.00	0.00	0.50
2.13	0.00	0.00	100.00	120.00	0.00	0.50
2.62	0.00	0.00	100.00	120.00	0.00	0.50
3.12	0.00	0.00	100.00	120.00	0.00	0.50
3.61	0.00	0.00	100.00	120.00	0.00	0.50
4.10	0.00	0.00	100.00	120.00	0.00	0.50
4.59	0.00	0.00	100.00	120.00	0.00	0.50
5.09	36.41	0.44	1.22	120.00	0.00	0.50
5.58	49.21	0.77	1.56	120.00	0.00	0.50
6.07	51.30	0.64	1.24	120.00	0.00	0.50
6.56	30.61	0.95	3.12	120.00	0.00	0.50
7.05	44.44	0.70	1.57	120.00	0.00	0.50
7.55	68.37	0.44	0.65	120.00	0.00	0.50
8.04	53.17	0.63	1.18	120.00	0.00	0.50
8.53	46.28	0.70	1.52	120.00	0.00	0.50
9.02	52.33	0.92	1.75	120.00	0.00	0.50
9.51	62.37	0.99	1.59	120.00	0.00	0.50
10.00	49.68	0.92	1.86	120.00	0.00	0.50
10.49	52.47	0.78	1.49	120.00	0.00	0.50
10.99	36.69	0.64	1.74	120.00	0.00	0.50
11.48	12.35	0.32	2.58	120.00	0.00	0.50
11.97	14.89	0.38	2.55	120.00	0.00	0.50
12.46	28.05	0.34	1.20	120.00	0.00	0.50
12.95	58.64	0.15	0.25	120.00	0.00	0.50
13.45	12.29	0.23	1.87	120.00	0.00	0.50
13.94	33.09	0.37	1.10	120.00	0.00	0.50
14.43	21.74	0.60	2.74	120.00	0.00	0.50
14.92	34.10	0.66	1.94	120.00	0.00	0.50
15.41	19.04	0.54	2.84	120.00	0.00	0.50
15.91	11.43	0.33	2.86	120.00	0.00	0.50
16.40	11.54	0.31	2.67	120.00	NoLiq	0.50
16.89	10.28	0.35	3.42	120.00	NoLiq	0.50
17.38	10.59	0.45	4.23	120.00	NoLiq	0.50
17.88	11.07	0.39	3.53	120.00	NoLiq	0.50
18.37	7.95	0.36	4.48	120.00	NoLiq	0.50
18.86	7.31	0.21	2.89	120.00	NoLiq	0.50
19.35	7.64	0.22	2.81	120.00	NoLiq	0.50
19.84	8.70	0.32	3.63	120.00	NoLiq	0.50
20.34	9.48	0.41	4.35	120.00	NoLiq	0.50
20.83	12.49	0.54	4.33	120.00	NoLiq	0.50
21.32	13.55	0.69	5.09	120.00	NoLiq	0.50
21.81	16.84	0.67	3.98	120.00	NoLiq	0.50
22.30	29.25	1.01	3.47	120.00	NoLiq	0.50
22.80	20.66	0.82	3.99	120.00	NoLiq	0.50

23.29	15.30	0.52	3.39	120.00	NoLiq	0.50
23.78	23.36	0.82	3.52	120.00	NoLiq	0.50
24.27	111.30	0.77	0.69	120.00	NoLiq	0.50
24.77	115.10	1.25	1.08	120.00	NoLiq	0.50
25.26	79.60	2.40	3.02	120.00	NoLiq	0.50
25.75	57.77	2.08	3.60	120.00	NoLiq	0.50
26.24	139.50	0.96	0.69	120.00	0.00	0.50
26.73	98.59	0.45	0.46	120.00	0.00	0.50
27.23	20.35	0.41	2.02	120.00	0.00	0.50
27.72	22.47	0.45	1.99	120.00	0.00	0.50
28.21	43.41	1.36	3.13	120.00	0.00	0.50
28.70	32.06	1.37	4.26	120.00	0.00	0.50
29.19	26.68	1.43	5.36	120.00	0.00	0.50
29.69	83.59	2.13	2.55	120.00	0.00	0.50
30.18	122.90	1.51	1.23	120.00	0.00	0.50
30.67	112.50	1.39	1.24	120.00	0.00	0.50
31.16	88.69	2.71	3.06	120.00	0.00	0.50
31.66	132.50	1.24	0.93	120.00	0.00	0.50
32.15	144.10	1.13	0.78	120.00	0.00	0.50
32.64	83.48	1.82	2.18	120.00	0.00	0.50
33.13	52.00	1.86	3.58	120.00	0.00	0.50
33.62	33.71	1.41	4.19	120.00	0.00	0.50
34.12	32.62	0.75	2.31	120.00	0.00	0.50
34.61	34.99	0.50	1.43	120.00	0.00	0.50
35.10	34.60	0.95	2.75	120.00	0.00	0.50
35.59	19.18	0.50	2.60	120.00	0.00	0.50
36.08	23.56	0.45	1.89	120.00	0.00	0.50
36.58	27.32	0.56	2.05	120.00	0.00	0.50
37.07	29.27	1.37	4.67	120.00	0.00	0.50
37.56	40.32	1.73	4.30	120.00	0.00	0.50
38.05	119.00	3.52	2.96	120.00	0.00	0.50
38.54	260.20	1.30	0.50	120.00	0.00	0.50
39.04	213.10	1.92	0.90	120.00	0.00	0.50
39.53	206.30	1.64	0.80	120.00	0.00	0.50
40.02	247.20	1.49	0.60	120.00	0.00	0.50
40.51	345.10	2.40	0.69	120.00	0.00	0.50
41.01	602.30	2.17	0.36	120.00	0.00	0.50
41.50	409.30	3.36	0.82	120.00	0.00	0.50
41.99	567.70	2.85	0.50	120.00	0.00	0.50
42.48	615.40	2.91	0.47	120.00	0.00	0.50
42.97	640.80	2.90	0.45	120.00	0.00	0.50
43.47	639.10	2.35	0.37	120.00	0.00	0.50
43.96	686.20	3.81	0.56	120.00	0.00	0.50
44.45	491.40	3.75	0.76	120.00	0.00	0.50
44.94	734.10	3.82	0.52	120.00	0.00	0.50
45.43	756.30	1.68	0.22	120.00	0.00	0.50
45.93	655.30	2.61	0.40	120.00	0.00	0.50
46.42	545.40	2.90	0.53	120.00	0.00	0.50
46.91	713.50	2.90	0.41	120.00	0.00	0.50
47.40	536.10	2.93	0.55	120.00	0.00	0.50
47.90	385.70	3.99	1.03	120.00	0.00	0.50
48.39	674.60	2.10	0.31	120.00	0.00	0.50
48.88	684.40	5.61	0.82	120.00	0.00	0.50
49.37	766.10	6.19	0.81	120.00	0.00	0.50
49.86	564.00	6.13	1.09	120.00	0.00	0.50
50.36	583.70	0.02	0.00	120.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:
Calculation segment, dz=0.050 ft
User defined Print Interval, dp=0.50 ft

Peak Ground Acceleration (PGA), a_max = 0.65g

CSR Calculation:

Depth ft	gamma pcf	sigma atm	gamma' pcf	sigma' atm	rd	mZ g	a(z) g	CSR	x fs1	=CSRfs
0.16	120.00	0.009	120.00	0.009	1.00	0.000	0.650	0.42	1.00	0.42
0.66	120.00	0.037	120.00	0.037	1.00	0.000	0.650	0.42	1.00	0.42
1.16	120.00	0.066	120.00	0.066	1.00	0.000	0.650	0.42	1.00	0.42
1.66	120.00	0.094	120.00	0.094	1.00	0.000	0.650	0.42	1.00	0.42
2.16	120.00	0.122	120.00	0.122	0.99	0.000	0.650	0.42	1.00	0.42
2.66	120.00	0.151	120.00	0.151	0.99	0.000	0.650	0.42	1.00	0.42
3.16	120.00	0.179	120.00	0.179	0.99	0.000	0.650	0.42	1.00	0.42
3.66	120.00	0.208	120.00	0.208	0.99	0.000	0.650	0.42	1.00	0.42
4.16	120.00	0.236	120.00	0.236	0.99	0.000	0.650	0.42	1.00	0.42
4.66	120.00	0.264	120.00	0.264	0.99	0.000	0.650	0.42	1.00	0.42
5.16	120.00	0.293	57.60	0.288	0.99	0.000	0.650	0.42	1.00	0.42
5.66	120.00	0.321	57.60	0.302	0.99	0.000	0.650	0.44	1.00	0.44

6.16	120.00	0.349	57.60	0.315	0.99	0.000	0.650	0.46	1.00	0.46
6.66	120.00	0.378	57.60	0.329	0.98	0.000	0.650	0.48	1.00	0.48
7.16	120.00	0.406	57.60	0.343	0.98	0.000	0.650	0.49	1.00	0.49
7.66	120.00	0.434	57.60	0.356	0.98	0.000	0.650	0.51	1.00	0.51
8.16	120.00	0.463	57.60	0.370	0.98	0.000	0.650	0.52	1.00	0.52
8.66	120.00	0.491	57.60	0.383	0.98	0.000	0.650	0.53	1.00	0.53
9.16	120.00	0.519	57.60	0.397	0.98	0.000	0.650	0.54	1.00	0.54
9.66	120.00	0.548	57.60	0.411	0.98	0.000	0.650	0.55	1.00	0.55
10.16	120.00	0.576	57.60	0.424	0.98	0.000	0.650	0.56	1.00	0.56
10.66	120.00	0.604	57.60	0.438	0.98	0.000	0.650	0.57	1.00	0.57
11.16	120.00	0.633	57.60	0.451	0.97	0.000	0.650	0.58	1.00	0.58
11.66	120.00	0.661	57.60	0.465	0.97	0.000	0.650	0.58	1.00	0.58
12.16	120.00	0.690	57.60	0.479	0.97	0.000	0.650	0.59	1.00	0.59
12.66	120.00	0.718	57.60	0.492	0.97	0.000	0.650	0.60	1.00	0.60
13.16	120.00	0.746	57.60	0.506	0.97	0.000	0.650	0.60	1.00	0.60
13.66	120.00	0.775	57.60	0.520	0.97	0.000	0.650	0.61	1.00	0.61
14.16	120.00	0.803	57.60	0.533	0.97	0.000	0.650	0.62	1.00	0.62
14.66	120.00	0.831	57.60	0.547	0.97	0.000	0.650	0.62	1.00	0.62
15.16	120.00	0.860	57.60	0.560	0.96	0.000	0.650	0.63	1.00	0.63
15.66	120.00	0.888	57.60	0.574	0.96	0.000	0.650	0.63	1.00	0.63
16.16	120.00	0.916	57.60	0.588	0.96	0.000	0.650	0.63	1.00	0.63
16.66	120.00	0.945	57.60	0.601	0.96	0.000	0.650	0.64	1.00	0.64
17.16	120.00	0.973	57.60	0.615	0.96	0.000	0.650	0.64	1.00	0.64
17.66	120.00	1.001	57.60	0.628	0.96	0.000	0.650	0.65	1.00	0.65
18.16	120.00	1.030	57.60	0.642	0.96	0.000	0.650	0.65	1.00	0.65
18.66	120.00	1.058	57.60	0.656	0.96	0.000	0.650	0.65	1.00	0.65
19.16	120.00	1.086	57.60	0.669	0.96	0.000	0.650	0.66	1.00	0.66
19.66	120.00	1.115	57.60	0.683	0.95	0.000	0.650	0.66	1.00	0.66
20.16	120.00	1.143	57.60	0.696	0.95	0.000	0.650	0.66	1.00	0.66
20.66	120.00	1.172	57.60	0.710	0.95	0.000	0.650	0.66	1.00	0.66
21.16	120.00	1.200	57.60	0.724	0.95	0.000	0.650	0.67	1.00	0.67
21.66	120.00	1.228	57.60	0.737	0.95	0.000	0.650	0.67	1.00	0.67
22.16	120.00	1.257	57.60	0.751	0.95	0.000	0.650	0.67	1.00	0.67
22.66	120.00	1.285	57.60	0.765	0.95	0.000	0.650	0.67	1.00	0.67
23.16	120.00	1.313	57.60	0.778	0.95	0.000	0.650	0.67	1.00	0.67
23.66	120.00	1.342	57.60	0.792	0.94	0.000	0.650	0.68	1.00	0.68
24.16	120.00	1.370	57.60	0.805	0.94	0.000	0.650	0.68	1.00	0.68
24.66	120.00	1.398	57.60	0.819	0.94	0.000	0.650	0.68	1.00	0.68
25.16	120.00	1.427	57.60	0.833	0.94	0.000	0.650	0.68	1.00	0.68
25.66	120.00	1.455	57.60	0.846	0.94	0.000	0.650	0.68	1.00	0.68
26.16	120.00	1.483	57.60	0.860	0.94	0.000	0.650	0.68	1.00	0.68
26.66	120.00	1.512	57.60	0.873	0.94	0.000	0.650	0.69	1.00	0.69
27.16	120.00	1.540	57.60	0.887	0.94	0.000	0.650	0.69	1.00	0.69
27.66	120.00	1.568	57.60	0.901	0.94	0.000	0.650	0.69	1.00	0.69
28.16	120.00	1.597	57.60	0.914	0.93	0.000	0.650	0.69	1.00	0.69
28.66	120.00	1.625	57.60	0.928	0.93	0.000	0.650	0.69	1.00	0.69
29.16	120.00	1.654	57.60	0.941	0.93	0.000	0.650	0.69	1.00	0.69
29.66	120.00	1.682	57.60	0.955	0.93	0.000	0.650	0.69	1.00	0.69
30.16	120.00	1.710	57.60	0.969	0.93	0.000	0.650	0.69	1.00	0.69
30.66	120.00	1.739	57.60	0.982	0.92	0.000	0.650	0.69	1.00	0.69
31.16	120.00	1.767	57.60	0.996	0.92	0.000	0.650	0.69	1.00	0.69
31.66	120.00	1.795	57.60	1.009	0.92	0.000	0.650	0.69	1.00	0.69
32.16	120.00	1.824	57.60	1.023	0.91	0.000	0.650	0.69	1.00	0.69
32.66	120.00	1.852	57.60	1.037	0.91	0.000	0.650	0.69	1.00	0.69
33.16	120.00	1.880	57.60	1.050	0.90	0.000	0.650	0.68	1.00	0.68
33.66	120.00	1.909	57.60	1.064	0.90	0.000	0.650	0.68	1.00	0.68
34.16	120.00	1.937	57.60	1.078	0.90	0.000	0.650	0.68	1.00	0.68
34.66	120.00	1.965	57.60	1.091	0.89	0.000	0.650	0.68	1.00	0.68
35.16	120.00	1.994	57.60	1.105	0.89	0.000	0.650	0.68	1.00	0.68
35.66	120.00	2.022	57.60	1.118	0.88	0.000	0.650	0.68	1.00	0.68
36.16	120.00	2.050	57.60	1.132	0.88	0.000	0.650	0.67	1.00	0.67
36.66	120.00	2.079	57.60	1.146	0.88	0.000	0.650	0.67	1.00	0.67
37.16	120.00	2.107	57.60	1.159	0.87	0.000	0.650	0.67	1.00	0.67
37.66	120.00	2.136	57.60	1.173	0.87	0.000	0.650	0.67	1.00	0.67
38.16	120.00	2.164	57.60	1.186	0.86	0.000	0.650	0.67	1.00	0.67
38.66	120.00	2.192	57.60	1.200	0.86	0.000	0.650	0.66	1.00	0.66
39.16	120.00	2.221	57.60	1.214	0.86	0.000	0.650	0.66	1.00	0.66
39.66	120.00	2.249	57.60	1.227	0.85	0.000	0.650	0.66	1.00	0.66
40.16	120.00	2.277	57.60	1.241	0.85	0.000	0.650	0.66	1.00	0.66
40.66	120.00	2.306	57.60	1.254	0.84	0.000	0.650	0.65	1.00	0.65
41.16	120.00	2.334	57.60	1.268	0.84	0.000	0.650	0.65	1.00	0.65
41.66	120.00	2.362	57.60	1.282	0.83	0.000	0.650	0.65	1.00	0.65
42.16	120.00	2.391	57.60	1.295	0.83	0.000	0.650	0.65	1.00	0.65
42.66	120.00	2.419	57.60	1.309	0.83	0.000	0.650	0.65	1.00	0.65
43.16	120.00	2.447	57.60	1.322	0.82	0.000	0.650	0.64	1.00	0.64
43.66	120.00	2.476	57.60	1.336	0.82	0.000	0.650	0.64	1.00	0.64
44.16	120.00	2.504	57.60	1.350	0.81	0.000	0.650	0.64	1.00	0.64
44.66	120.00	2.532	57.60	1.363	0.81	0.000	0.650	0.64	1.00	0.64
45.16	120.00	2.561	57.60	1.377	0.81	0.000	0.650	0.63	1.00	0.63
45.66	120.00	2.589	57.60	1.391	0.80	0.000	0.650	0.63	1.00	0.63
46.16	120.00	2.618	57.60	1.404	0.80	0.000	0.650	0.63	1.00	0.63
46.66	120.00	2.646	57.60	1.418	0.79	0.000	0.650	0.63	1.00	0.63

47.16	120.00	2.674	57.60	1.431	0.79	0.000	0.650	0.62	1.00	0.62
47.66	120.00	2.703	57.60	1.445	0.79	0.000	0.650	0.62	1.00	0.62
48.16	120.00	2.731	57.60	1.459	0.78	0.000	0.650	0.62	1.00	0.62
48.66	120.00	2.759	57.60	1.472	0.78	0.000	0.650	0.62	1.00	0.62
49.16	120.00	2.788	57.60	1.486	0.77	0.000	0.650	0.61	1.00	0.61
49.66	120.00	2.816	57.60	1.499	0.77	0.000	0.650	0.61	1.00	0.61
50.16	120.00	2.844	57.60	1.513	0.77	0.000	0.650	0.61	1.00	0.61

CSR is based on water table at 5.00 during earthquake

CRR Calculation from CPT data, using Modify Robertson's Method:
(Fines content is determined by qc and fric.)

Depth ft	qc atm	fric. atm	n	Q	Rf	Ic	Cq	Fines %	Kc	qc1n atm	qc1f atm	CRR7.5
0.16			1.00	1.00E-4	0.00	7.97						
0.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
0.66			1.00	1.00E-4	0.00	7.97						
0.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.16			1.00	1.00E-4	0.00	7.97						
1.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.66			1.00	1.00E-4	0.00	7.97						
1.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.16			1.00	1.00E-4	0.00	7.97						
2.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.66			1.00	1.00E-4	0.00	7.97						
2.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.16			1.00	1.00E-4	0.00	7.97						
3.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.66			1.00	1.00E-4	0.00	7.97						
3.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.16			1.00	1.00E-4	0.00	7.97						
4.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.66			1.00	1.00E-4	0.00	7.97						
4.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
5.16			1.00	1.26E2	1.46	1.95						
5.16			0.50	6.88E1	1.46	2.14						
5.16	37.21	0.54	0.50	6.88E1	1.46	2.14	1.85	17.03	0.32	68.80	101.34	0.18
5.66			1.00	1.58E2	1.41	1.87						
5.66			0.50	9.01E1	1.41	2.04						
5.66	51.06	0.72	0.50	9.01E1	1.41	2.04	1.77	14.15	0.24	90.12	119.24	0.24
6.16			1.00	1.34E2	1.55	1.95						
6.16			0.50	8.00E1	1.55	2.11						
6.16	47.31	0.73	0.50	8.00E1	1.55	2.11	1.69	16.03	0.29	80.05	113.46	0.22
6.66			1.00	8.72E1	2.72	2.25						
6.66			0.50	5.42E1	2.72	2.40						
6.66	33.32	0.89	0.50	5.42E1	2.72	2.40	1.63	26.32	0.57	54.22	125.84	0.27
7.16			1.00	1.22E2	1.18	1.89						
7.16			0.50	7.85E1	1.18	2.04						
7.16	50.01	0.59	0.50	7.85E1	1.18	2.04	1.57	14.00	0.24	78.48	103.29	0.18
7.66			1.00	1.56E2	0.72	1.67						
7.66			0.50	1.04E2	0.72	1.81						
7.66	68.37	0.49	0.50	1.04E2	0.72	1.81	1.52	8.36	0.09	103.74	113.96	0.22
8.16			1.00	1.10E2	1.13	1.91						
8.16			0.50	7.56E1	1.13	2.04						
8.16	51.43	0.57	0.50	7.56E1	1.13	2.04	1.47	13.98	0.24	75.61	99.45	0.17
8.66			1.00	9.77E1	1.57	2.05						
8.66			0.50	6.91E1	1.57	2.16						
8.66	48.45	0.75	0.50	6.91E1	1.57	2.16	1.43	17.68	0.34	69.14	104.53	0.19
9.16			1.00	1.06E2	1.74	2.05						
9.16			0.50	7.73E1	1.74	2.15						
9.16	55.71	0.96	0.50	7.73E1	1.74	2.15	1.39	17.47	0.33	77.30	115.91	0.22
9.66			1.00	9.20E1	2.11	2.16						
9.66			0.50	6.88E1	2.11	2.25						
9.66	50.93	1.06	0.50	6.88E1	2.11	2.25	1.35	20.59	0.42	68.81	117.86	0.23
10.16			1.00	1.10E2	1.37	1.97						
10.16			0.50	8.39E1	1.37	2.06						
10.16	63.44	0.86	0.50	8.39E1	1.37	2.06	1.32	14.55	0.25	83.91	112.61	0.21
10.66			1.00	8.06E1	1.62	2.12						
10.66			0.50	6.24E1	1.62	2.20						
10.66	47.76	0.76	0.50	6.24E1	1.62	2.20	1.31	19.06	0.38	62.43	99.93	0.17
11.16			1.00	4.42E1	1.74	2.34						
11.16			0.50	3.50E1	1.74	2.42						
11.16	27.10	0.46	0.50	3.50E1	1.74	2.42	1.29	27.14	0.59	35.01	85.62	0.14
11.66			1.00	1.49E1	4.10	2.94						
11.66	9.78	0.37	1.00	1.49E1	4.10	2.94	1.00	NoLiq	1.00	9.78	9.78	2.08
12.16			1.00	1.57E1	3.71	2.89						
12.16	10.52	0.37	1.00	1.57E1	3.71	2.89	1.00	NoLiq	1.00	10.52	10.52	2.08
12.66			1.00	1.04E2	0.37	1.65						
12.66			0.50	8.41E1	0.37	1.73						
12.66	67.23	0.24	0.50	8.41E1	0.37	1.73	1.25	6.76	0.05	84.06	88.21	0.14
13.16			1.00	4.92E1	0.75	2.09						

13.16			0.50	4.07E1	0.75	2.16						
13.16	32.88	0.24	0.50	4.07E1	0.75	2.16	1.24	17.65	0.34	40.68	61.44	0.10
13.66			1.00	1.69E1	2.12	2.72						
13.66	12.07	0.24	1.00	1.69E1	2.12	2.72	1.00	NoLiq	1.00	12.07	12.07	2.08
14.16			1.00	5.12E1	1.37	2.22						
14.16			0.50	4.32E1	1.37	2.28						
14.16	35.66	0.48	0.50	4.32E1	1.37	2.28	1.21	21.81	0.45	43.23	78.42	0.12
14.66			1.00	4.07E1	2.26	2.44						
14.66			0.50	3.49E1	2.26	2.49						
14.66	29.10	0.64	0.50	3.49E1	2.26	2.49	1.20	30.14	0.67	34.93	106.24	0.19
15.16			1.00	4.63E1	1.86	2.34						
15.16			0.50	4.00E1	1.86	2.39						
15.16	33.65	0.61	0.50	4.00E1	1.86	2.39	1.19	25.94	0.56	40.00	90.74	0.15
15.66			1.00	1.90E1	3.27	2.79						
15.66	14.62	0.45	1.00	1.90E1	3.27	2.79	1.00	NoLiq	1.00	14.62	14.62	2.08
16.16			1.00	1.33E1	3.18	2.91						
16.16	10.68	0.31	1.00	1.33E1	3.18	2.91	1.00	NoLiq	1.00	10.68	10.68	2.08
16.66			1.00	1.02E1	3.82	3.05						
16.66	8.54	0.29	1.00	1.02E1	3.82	3.05	1.00	NoLiq	1.00	8.54	8.54	2.08
17.16			1.00	1.27E1	4.30	3.01						
17.16	10.63	0.42	1.00	1.27E1	4.30	3.01	1.00	NoLiq	1.00	10.63	10.63	2.08
17.66			1.00	1.40E1	4.03	2.95						
17.66	11.87	0.44	1.00	1.40E1	4.03	2.95	1.00	NoLiq	1.00	11.87	11.87	2.08
18.16			1.00	9.06E0	5.44	3.18						
18.16	8.18	0.39	1.00	9.06E0	5.44	3.18	1.00	NoLiq	1.00	8.18	8.18	2.08
18.66			1.00	7.43E0	4.66	3.21						
18.66	7.02	0.28	1.00	7.43E0	4.66	3.21	1.00	NoLiq	1.00	7.02	7.02	2.08
19.16			1.00	6.74E0	3.20	3.15						
19.16	6.59	0.18	1.00	6.74E0	3.20	3.15	1.00	NoLiq	1.00	6.59	6.59	2.08
19.66			1.00	9.87E0	3.53	3.04						
19.66	9.31	0.29	1.00	9.87E0	3.53	3.04	1.00	NoLiq	1.00	9.31	9.31	2.08
20.16			1.00	9.15E0	4.71	3.14						
20.16	8.86	0.36	1.00	9.15E0	4.71	3.14	1.00	NoLiq	1.00	8.86	8.86	2.08
20.66			1.00	1.11E1	4.94	3.09						
20.66	10.73	0.47	1.00	1.11E1	4.94	3.09	1.00	NoLiq	1.00	10.73	10.73	2.08
21.16			1.00	1.52E1	4.58	2.96						
21.16	14.47	0.61	1.00	1.52E1	4.58	2.96	1.00	NoLiq	1.00	14.47	14.47	2.08
21.66			1.00	1.90E1	4.18	2.86						
21.66	18.04	0.70	1.00	1.90E1	4.18	2.86	1.00	NoLiq	1.00	18.04	18.04	2.08
22.16			1.00	2.16E1	4.58	2.85						
22.16	20.68	0.89	1.00	2.16E1	4.58	2.85	1.00	NoLiq	1.00	20.68	20.68	2.08
22.66			1.00	2.77E1	3.52	2.69						
22.66	26.58	0.89	1.00	2.77E1	3.52	2.69	1.00	NoLiq	1.00	26.58	26.58	2.08
23.16			1.00	1.57E1	3.52	2.88						
23.16	15.86	0.51	1.00	1.57E1	3.52	2.88	1.00	NoLiq	1.00	15.86	15.86	2.08
23.66			1.00	1.66E1	4.40	2.92						
23.66	16.94	0.69	1.00	1.66E1	4.40	2.92	1.00	NoLiq	1.00	16.94	16.94	2.08
24.16			1.00	1.05E2	0.88	1.86						
24.16	101.54	0.88	1.00	1.05E2	0.88	1.86	1.00	NoLiq	1.00	101.54	101.54	2.08
24.66			1.00	1.12E2	0.99	1.87						
24.66	109.53	1.07	1.00	1.12E2	0.99	1.87	1.00	NoLiq	1.00	109.53	109.53	2.08
25.16			1.00	8.72E1	2.40	2.21						
25.16	86.84	2.05	1.00	8.72E1	2.40	2.21	1.00	NoLiq	1.00	86.84	86.84	2.08
25.66			1.00	6.16E1	3.87	2.47						
25.66	62.67	2.37	1.00	6.16E1	3.87	2.47	1.00	NoLiq	1.00	62.67	62.67	2.08
26.16			1.00	1.26E2	0.97	1.82						
26.16			0.50	1.28E2	0.97	1.82						
26.16	128.89	1.23	0.50	1.28E2	0.97	1.82	1.00	8.52	0.09	128.42	141.73	0.34
26.66			1.00	1.10E2	0.40	1.65						
26.66			0.50	1.13E2	0.40	1.64						
26.66	113.71	0.45	0.50	1.13E2	0.40	1.64	0.99	5.05	0.00	112.55	112.70	0.21
27.16			1.00	2.41E1	1.77	2.55						
27.16			0.50	2.60E1	1.77	2.53						
27.16	26.42	0.44	0.50	2.60E1	1.77	2.53	0.98	31.82	0.72	25.98	91.48	0.15
27.66			1.00	1.95E1	2.01	2.66						
27.66	21.98	0.41	1.00	1.95E1	2.01	2.66	1.00	NoLiq	1.00	21.98	21.98	2.08
28.16			1.00	3.72E1	3.21	2.57						
28.16			0.50	3.99E1	3.21	2.54						
28.16	41.09	1.27	0.50	3.99E1	3.21	2.54	0.97	32.70	0.74	39.88	153.23	0.41
28.66			1.00	2.86E1	4.53	2.75						
28.66	32.34	1.39	1.00	2.86E1	4.53	2.75	1.00	NoLiq	1.00	32.34	32.34	2.08
29.16			1.00	2.32E1	5.60	2.88						
29.16	26.91	1.42	1.00	2.32E1	5.60	2.88	1.00	NoLiq	1.00	26.91	26.91	2.08
29.66			1.00	6.80E1	2.78	2.33						
29.66			0.50	7.30E1	2.78	2.31						
29.66	76.69	2.08	0.50	7.30E1	2.78	2.31	0.95	22.99	0.48	73.04	140.51	0.34
30.16			1.00	1.09E2	1.28	1.95						
30.16			0.50	1.16E2	1.28	1.93						
30.16	122.81	1.55	0.50	1.16E2	1.28	1.93	0.95	11.18	0.16	116.24	139.21	0.33
30.66			1.00	9.83E1	1.25	1.98						
30.66			0.50	1.06E2	1.25	1.96						
30.66	112.75	1.39	0.50	1.06E2	1.25	1.96	0.94	11.76	0.18	106.08	129.46	0.28

31.16			1.00	7.60E1	3.12	2.34						
31.16			0.50	8.29E1	3.12	2.31						
31.16	88.69	2.71	0.50	8.29E1	3.12	2.31	0.94	22.96	0.48	82.95	159.34	0.46
31.66			1.00	1.13E2	0.95	1.85						
31.66			0.50	1.23E2	0.95	1.83						
31.66	132.49	1.24	0.50	1.23E2	0.95	1.83	0.93	8.69	0.10	123.18	136.65	0.32
32.16			1.00	1.22E2	0.79	1.78						
32.16			0.50	1.33E2	0.79	1.75						
32.16	144.23	1.12	0.50	1.33E2	0.79	1.75	0.92	7.04	0.05	133.32	140.99	0.34
32.66			1.00	6.65E1	2.32	2.29						
32.66			0.50	7.41E1	2.32	2.25						
32.66	80.58	1.83	0.50	7.41E1	2.32	2.25	0.92	20.81	0.42	74.05	128.16	0.28
33.16			1.00	3.97E1	3.95	2.61						
33.16	49.42	1.88	1.00	3.97E1	3.95	2.61	1.00	NoLiq	1.00	49.42	49.42	2.08
33.66			1.00	3.09E1	3.74	2.67						
33.66	39.39	1.40	1.00	3.09E1	3.74	2.67	1.00	NoLiq	1.00	39.39	39.39	2.08
34.16			1.00	2.54E1	2.30	2.60						
34.16	33.02	0.72	1.00	2.54E1	2.30	2.60	1.00	NoLiq	1.00	33.02	33.02	2.08
34.66			1.00	2.68E1	1.66	2.50						
34.66			0.50	3.15E1	1.66	2.44						
34.66	35.11	0.55	0.50	3.15E1	1.66	2.44	0.90	28.14	0.62	31.55	82.55	0.13
35.16			1.00	2.50E1	2.80	2.66						
35.16	33.29	0.88	1.00	2.50E1	2.80	2.66	1.00	NoLiq	1.00	33.29	33.29	2.08
35.66			1.00	1.31E1	2.72	2.88						
35.66	18.62	0.45	1.00	1.31E1	2.72	2.88	1.00	NoLiq	1.00	18.62	18.62	2.08
36.16			1.00	1.78E1	2.25	2.72						
36.16	24.80	0.51	1.00	1.78E1	2.25	2.72	1.00	NoLiq	1.00	24.80	24.80	2.08
36.66			1.00	1.92E1	2.35	2.71						
36.66	26.85	0.58	1.00	1.92E1	2.35	2.71	1.00	NoLiq	1.00	26.85	26.85	2.08
37.16			1.00	3.49E1	2.86	2.55						
37.16			0.50	4.17E1	2.86	2.50						
37.16	47.69	1.30	0.50	4.17E1	2.86	2.50	0.87	30.50	0.68	41.72	130.78	0.29
37.66			1.00	4.50E1	3.06	2.49						
37.66			0.50	5.36E1	3.06	2.44						
37.66	61.53	1.82	0.50	5.36E1	3.06	2.44	0.87	27.98	0.61	53.55	138.56	0.33
38.16			1.00	9.87E1	2.15	2.14						
38.16			0.50	1.16E2	2.15	2.09						
38.16	133.78	2.83	0.50	1.16E2	2.15	2.09	0.87	15.65	0.28	115.83	161.85	0.47
38.66			1.00	1.91E2	0.60	1.55						
38.66			0.50	2.23E2	0.60	1.50						
38.66	259.00	1.54	0.50	2.23E2	0.60	1.50	0.86	2.85	0.00	223.13	223.13	1.11
39.16			1.00	1.52E2	0.84	1.72						
39.16			0.50	1.79E2	0.84	1.67						
39.16	209.14	1.74	0.50	1.79E2	0.84	1.67	0.86	5.59	0.02	179.26	182.12	0.64
39.66			1.00	1.54E2	0.75	1.69						
39.66			0.50	1.82E2	0.75	1.63						
39.66	213.27	1.58	0.50	1.82E2	0.75	1.63	0.85	4.88	0.00	181.90	181.90	0.64
40.16			1.00	1.88E2	0.55	1.53						
40.16			0.50	2.23E2	0.55	1.48						
40.16	262.98	1.43	0.50	2.23E2	0.55	1.48	0.85	2.50	0.00	223.19	223.19	1.11
40.66			1.00	2.99E2	1.10	1.61						
40.66			0.50	3.56E2	1.10	1.56						
40.66	421.87	4.63	0.50	3.56E2	1.10	1.56	0.84	3.75	0.00	356.31	356.31	2.08
41.16			1.00	4.18E2	0.41	1.19						
41.16			0.50	4.99E2	0.41	1.13						
41.16	593.98	2.42	0.50	4.99E2	0.41	1.13	0.84	0.00	0.00	499.25	499.25	2.08
41.66			1.00	2.80E2	0.82	1.53						
41.66			0.50	3.37E2	0.82	1.48						
41.66	403.01	3.30	0.50	3.37E2	0.82	1.48	0.84	2.49	0.00	337.12	337.12	2.08
42.16			1.00	4.42E2	0.47	1.21						
42.16			0.50	5.33E2	0.47	1.16						
42.16	640.39	2.97	0.50	5.33E2	0.47	1.16	0.83	0.00	0.00	500.00	500.00	2.08
42.66			1.00	4.45E2	0.70	1.34						
42.66			0.50	5.39E2	0.70	1.30						
42.66	650.13	4.52	0.50	5.39E2	0.70	1.30	0.83	0.36	0.00	500.00	500.00	2.08
43.16			1.00	4.39E2	0.50	1.24						
43.16			0.50	5.35E2	0.50	1.18						
43.16	648.37	3.26	0.50	5.35E2	0.50	1.18	0.82	0.00	0.00	500.00	500.00	2.08
43.66			1.00	4.43E2	0.49	1.23						
43.66			0.50	5.42E2	0.49	1.17						
43.66	660.33	3.22	0.50	5.42E2	0.49	1.17	0.82	0.00	0.00	500.00	500.00	2.08
44.16			1.00	4.41E2	0.45	1.20						
44.16			0.50	5.42E2	0.45	1.14						
44.16	662.93	2.98	0.50	5.42E2	0.45	1.14	0.82	0.00	0.00	500.00	500.00	2.08
44.66			1.00	3.57E2	0.72	1.42						
44.66			0.50	4.40E2	0.72	1.36						
44.66	541.20	3.90	0.50	4.40E2	0.72	1.36	0.81	1.04	0.00	440.31	440.31	2.08
45.16			1.00	4.80E2	0.40	1.14						
45.16			0.50	5.94E2	0.40	1.07						
45.16	733.78	2.90	0.50	5.94E2	0.40	1.07	0.81	0.00	0.00	500.00	500.00	2.08
45.66			1.00	4.25E2	0.28	1.07						
45.66			0.50	5.29E2	0.28	1.00						

45.66	656.38	1.80	0.50	5.29E2	0.28	1.00	0.81	0.00	0.00	500.00	500.00	2.08
46.16			1.00	3.80E2	0.57	1.32						
46.16			0.50	4.75E2	0.57	1.26						
46.16	592.20	3.34	0.50	4.75E2	0.57	1.26	0.80	0.00	0.00	475.43	475.43	2.08
46.66			1.00	3.30E2	0.58	1.37						
46.66			0.50	4.15E2	0.58	1.30						
46.66	518.96	3.01	0.50	4.15E2	0.58	1.30	0.80	0.43	0.00	414.81	414.81	2.08
47.16			1.00	4.47E2	0.52	1.24						
47.16			0.50	5.64E2	0.52	1.18						
47.16	708.48	3.66	0.50	5.64E2	0.52	1.18	0.80	0.00	0.00	500.00	500.00	2.08
47.66			1.00	2.26E2	1.19	1.71						
47.66			0.50	2.87E2	1.19	1.65						
47.66	362.33	4.29	0.50	2.87E2	1.19	1.65	0.79	5.12	0.00	287.13	288.08	2.08
48.16			1.00	3.97E2	0.33	1.14						
48.16			0.50	5.06E2	0.33	1.06						
48.16	640.69	2.09	0.50	5.06E2	0.33	1.06	0.79	0.00	0.00	500.00	500.00	2.08
48.66			1.00	3.84E2	0.45	1.24						
48.66			0.50	4.91E2	0.45	1.17						
48.66	624.64	2.80	0.50	4.91E2	0.45	1.17	0.79	0.00	0.00	490.82	490.82	2.08
49.16			1.00	3.98E2	0.90	1.46						
49.16			0.50	5.11E2	0.90	1.40						
49.16	652.67	5.87	0.50	5.11E2	0.90	1.40	0.78	1.54	0.00	500.00	500.00	2.08
49.66			1.00	3.40E2	1.40	1.66						
49.66			0.50	4.38E2	1.40	1.60						
49.66	562.64	7.81	0.50	4.38E2	1.40	1.60	0.78	4.30	0.00	438.44	438.44	2.08
50.16			1.00	3.57E2	0.70	1.40						
50.16			0.50	4.63E2	0.70	1.33						
50.16	596.35	4.13	0.50	4.63E2	0.70	1.33	0.78	0.75	0.00	462.80	462.80	2.08

Fines have been calculated, and correction is made by Modify Robertson Method.
Fines=NoLiq means the soils are not liquefiable.
CRR is based on water table at 10.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 6.63:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.16	0.01	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
0.66	0.02	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.16	0.04	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.66	0.06	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.16	0.08	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.66	0.10	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.16	0.12	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.66	0.13	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.16	0.15	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.66	0.17	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
5.16	0.19	0.18	1.00	0.18	1.37	0.24	0.42	0.57 *
5.66	0.21	0.24	1.00	0.24	1.37	0.33	0.44	0.73 *
6.16	0.23	0.22	1.00	0.22	1.37	0.30	0.46	0.64 *
6.66	0.25	0.27	1.00	0.27	1.37	0.36	0.48	0.76 *
7.16	0.26	0.18	1.00	0.18	1.37	0.25	0.49	0.51 *
7.66	0.28	0.22	1.00	0.22	1.37	0.30	0.51	0.59 *
8.16	0.30	0.17	1.00	0.17	1.37	0.24	0.52	0.45 *
8.66	0.32	0.19	1.00	0.19	1.37	0.26	0.53	0.48 *
9.16	0.34	0.22	1.00	0.22	1.37	0.31	0.54	0.57 *
9.66	0.36	0.23	1.00	0.23	1.37	0.32	0.55	0.58 *
10.16	0.37	0.21	1.00	0.21	1.37	0.29	0.56	0.52 *
10.66	0.38	0.17	1.00	0.17	1.37	0.24	0.57	0.42 *
11.16	0.39	0.14	1.00	0.14	1.37	0.19	0.58	0.33 *
11.66	0.40	2.08	1.00	2.08	1.37	2.00	0.58	5.00 ^
12.16	0.41	2.08	1.00	2.08	1.37	2.00	0.59	5.00 ^
12.66	0.42	0.14	1.00	0.14	1.37	0.20	0.60	0.33 *
13.16	0.42	0.10	1.00	0.10	1.37	0.14	0.60	0.23 *
13.66	0.43	2.08	1.00	2.08	1.37	2.00	0.61	5.00 ^
14.16	0.44	0.12	1.00	0.12	1.37	0.17	0.62	0.28 *
14.66	0.45	0.19	1.00	0.19	1.37	0.26	0.62	0.42 *
15.16	0.46	0.15	1.00	0.15	1.37	0.20	0.63	0.33 *
15.66	0.47	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
16.16	0.48	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
16.66	0.49	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
17.16	0.50	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
17.66	0.50	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
18.16	0.51	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
18.66	0.52	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
19.16	0.53	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
19.66	0.54	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
20.16	0.55	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
20.66	0.56	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
21.16	0.57	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
21.66	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
22.16	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^

Liq.

22.66	0.59	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
23.16	0.60	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
23.66	0.61	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
24.16	0.62	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
24.66	0.63	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
25.16	0.64	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
25.66	0.65	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
26.16	0.65	0.34	1.00	0.34	1.37	0.47	0.68	0.69 *
26.66	0.66	0.21	1.00	0.21	1.37	0.29	0.69	0.43 *
27.16	0.67	0.15	1.00	0.15	1.37	0.21	0.69	0.30 *
27.66	0.68	2.08	1.00	2.08	1.37	2.00	0.69	5.00 ^
28.16	0.69	0.41	1.00	0.41	1.37	0.57	0.69	0.82 *
28.66	0.70	2.08	1.00	2.08	1.37	2.00	0.69	5.00 ^
29.16	0.71	2.08	1.00	2.08	1.37	2.00	0.69	5.00 ^
29.66	0.72	0.34	1.00	0.34	1.37	0.46	0.69	0.67 *
30.16	0.73	0.33	1.00	0.33	1.37	0.45	0.69	0.65 *
30.66	0.73	0.28	1.00	0.28	1.37	0.39	0.69	0.56 *
31.16	0.74	0.46	1.00	0.46	1.37	0.63	0.69	0.91 *
31.66	0.75	0.32	1.00	0.32	1.37	0.43	0.69	0.63 *
32.16	0.76	0.34	1.00	0.34	1.37	0.47	0.69	0.68 *
32.66	0.77	0.28	1.00	0.28	1.37	0.38	0.69	0.55 *
33.16	0.78	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
33.66	0.79	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
34.16	0.80	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
34.66	0.81	0.13	1.00	0.13	1.37	0.18	0.68	0.27 *
35.16	0.81	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
35.66	0.82	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
36.16	0.83	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
36.66	0.84	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
37.16	0.85	0.29	1.00	0.29	1.37	0.39	0.67	0.59 *
37.66	0.86	0.33	1.00	0.33	1.37	0.45	0.67	0.67 *
38.16	0.87	0.47	1.00	0.47	1.37	0.65	0.67	0.98 *
38.66	0.88	1.11	1.00	1.11	1.37	1.53	0.66	2.30
39.16	0.88	0.64	1.00	0.64	1.37	0.88	0.66	1.33
39.66	0.89	0.64	1.00	0.64	1.37	0.88	0.66	1.33
40.16	0.90	1.11	1.00	1.11	1.37	1.53	0.66	2.32
40.66	0.91	2.08	1.00	2.08	1.37	2.85	0.65	4.35
41.16	0.92	2.08	1.00	2.08	1.37	2.85	0.65	4.37
41.66	0.93	2.08	1.00	2.08	1.37	2.85	0.65	4.38
42.16	0.94	2.08	1.00	2.08	1.37	2.85	0.65	4.40
42.66	0.95	2.08	1.00	2.08	1.37	2.85	0.65	4.42
43.16	0.96	2.08	1.00	2.08	1.37	2.85	0.64	4.43
43.66	0.96	2.08	1.00	2.08	1.37	2.85	0.64	4.45
44.16	0.97	2.08	1.00	2.08	1.37	2.85	0.64	4.46
44.66	0.98	2.08	1.00	2.08	1.37	2.85	0.64	4.48
45.16	0.99	2.08	1.00	2.08	1.37	2.85	0.63	4.50
45.66	1.00	2.08	1.00	2.08	1.37	2.85	0.63	4.52
46.16	1.01	2.08	1.00	2.09	1.37	2.86	0.63	4.56
46.66	1.02	2.08	1.00	2.09	1.37	2.86	0.63	4.57
47.16	1.03	2.08	1.00	2.08	1.37	2.86	0.62	4.58
47.66	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.59
48.16	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.60
48.66	1.05	2.08	1.00	2.08	1.37	2.84	0.62	4.62
49.16	1.06	2.08	1.00	2.07	1.37	2.84	0.61	4.63
49.66	1.07	2.08	1.00	2.07	1.37	2.84	0.61	4.64
50.16	1.08	2.08	0.99	2.07	1.37	2.83	0.61	4.66

Liq.

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils or above Water Table.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
0.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
5.16	2.14	4.55	101.34	22.29	17.03	0.00	22.29
5.66	2.04	4.72	119.24	25.24	14.15	0.00	25.24
6.16	2.11	4.61	113.46	24.63	16.03	0.00	24.63
6.66	2.40	4.07	125.84	30.92	26.32	0.00	30.92
7.16	2.04	4.73	103.29	21.82	14.00	0.00	21.82

7.66	1.81	5.15	113.96	22.11	8.36	0.00	22.11
8.16	2.04	4.74	99.45	21.00	13.98	0.00	21.00
8.66	2.16	4.51	104.53	23.18	17.68	0.00	23.18
9.16	2.15	4.52	115.91	25.64	17.47	0.00	25.64
9.66	2.25	4.35	117.86	27.10	20.59	0.00	27.10
10.16	2.06	4.70	112.61	23.97	14.55	0.00	23.97
10.66	2.20	4.43	99.93	22.55	19.06	0.00	22.55
11.16	2.42	4.03	85.62	21.23	27.14	0.00	21.23
11.66	2.94	3.07	9.78	3.19	NoLiq	0.00	3.19
12.16	2.89	3.15	10.52	3.34	NoLiq	0.00	3.34
12.66	1.73	5.30	88.21	16.65	6.76	0.00	16.65
13.16	2.16	4.51	61.44	13.62	17.65	0.00	13.62
13.66	2.72	3.47	12.07	3.48	NoLiq	0.00	3.48
14.16	2.28	4.29	78.42	18.30	21.81	0.00	18.30
14.66	2.49	3.90	106.24	27.22	30.14	0.00	27.22
15.16	2.39	4.09	90.74	22.20	25.94	0.00	22.20
15.66	2.79	3.34	14.62	4.38	NoLiq	0.00	4.38
16.16	2.91	3.12	10.68	3.42	NoLiq	0.00	3.42
16.66	3.05	2.86	8.54	2.99	NoLiq	0.00	2.99
17.16	3.01	2.94	10.63	3.61	NoLiq	0.00	3.61
17.66	2.95	3.04	11.87	3.90	NoLiq	0.00	3.90
18.16	3.18	2.62	8.18	3.13	NoLiq	0.00	3.13
18.66	3.21	2.56	7.02	2.74	NoLiq	0.00	2.74
19.16	3.15	2.67	6.59	2.47	NoLiq	0.00	2.47
19.66	3.04	2.88	9.31	3.23	NoLiq	0.00	3.23
20.16	3.14	2.69	8.86	3.29	NoLiq	0.00	3.29
20.66	3.09	2.80	10.73	3.84	NoLiq	0.00	3.84
21.16	2.96	3.03	14.47	4.78	NoLiq	0.00	4.78
21.66	2.86	3.21	18.04	5.62	NoLiq	0.00	5.62
22.16	2.85	3.24	20.68	6.38	NoLiq	0.00	6.38
22.66	2.69	3.53	26.58	7.53	NoLiq	0.00	7.53
23.16	2.88	3.18	15.86	4.99	NoLiq	0.00	4.99
23.66	2.92	3.10	16.94	5.46	NoLiq	0.00	5.46
24.16	1.86	5.07	101.54	20.04	NoLiq	0.00	20.04
24.66	1.87	5.04	109.53	21.72	NoLiq	0.00	21.72
25.16	2.21	4.41	86.84	19.70	NoLiq	0.00	19.70
25.66	2.47	3.94	62.67	15.91	NoLiq	0.00	15.91
26.16	1.82	5.14	141.73	27.57	8.52	0.00	27.57
26.66	1.64	5.47	112.70	20.61	5.05	0.00	20.61
27.16	2.53	3.83	91.48	23.86	31.82	0.00	23.86
27.66	2.66	3.58	21.98	6.13	NoLiq	0.00	6.13
28.16	2.54	3.80	153.23	40.34	32.70	0.00	40.34
28.66	2.75	3.41	32.34	9.47	NoLiq	0.00	9.47
29.16	2.88	3.18	26.91	8.48	NoLiq	0.00	8.48
29.66	2.31	4.23	140.51	33.24	22.99	0.00	33.24
30.16	1.93	4.93	139.21	28.24	11.18	0.00	28.24
30.66	1.96	4.89	129.46	26.49	11.76	0.00	26.49
31.16	2.31	4.23	159.34	37.68	22.96	0.00	37.68
31.66	1.83	5.13	136.65	26.66	8.69	0.00	26.66
32.16	1.75	5.27	140.99	26.75	7.04	0.00	26.75
32.66	2.25	4.34	128.16	29.55	20.81	0.00	29.55
33.16	2.61	3.68	49.42	13.42	NoLiq	0.00	13.42
33.66	2.67	3.57	39.39	11.05	NoLiq	0.00	11.05
34.16	2.60	3.69	33.02	8.94	NoLiq	0.00	8.94
34.66	2.44	3.99	82.55	20.70	28.14	0.00	20.70
35.16	2.66	3.59	33.29	9.29	NoLiq	0.00	9.29
35.66	2.88	3.19	18.62	5.84	NoLiq	0.00	5.84
36.16	2.72	3.47	24.80	7.14	NoLiq	0.00	7.14
36.66	2.71	3.50	26.85	7.67	NoLiq	0.00	7.67
37.16	2.50	3.89	130.78	33.64	30.50	0.00	33.64
37.66	2.44	4.00	138.56	34.68	27.98	0.00	34.68
38.16	2.09	4.63	161.85	34.96	15.65	0.00	34.96
38.66	1.50	5.73	223.13	38.97	2.85	0.00	38.97
39.16	1.67	5.41	182.12	33.65	5.59	0.00	33.65
39.66	1.63	5.49	181.90	33.15	4.88	0.00	33.15
40.16	1.48	5.77	223.19	38.66	2.50	0.00	38.66
40.66	1.56	5.61	356.31	63.46	3.75	0.00	63.46
41.16	1.13	6.40	499.25	77.95	0.00	0.00	77.95
41.66	1.48	5.77	337.12	58.39	2.49	0.00	58.39
42.16	1.16	6.36	500.00	78.62	0.00	0.00	78.62
42.66	1.30	6.11	500.00	81.88	0.36	0.00	81.88
43.16	1.18	6.31	500.00	79.21	0.00	0.00	79.21
43.66	1.17	6.34	500.00	78.89	0.00	0.00	78.89
44.16	1.14	6.39	500.00	78.26	0.00	0.00	78.26
44.66	1.36	5.99	440.31	73.53	1.04	0.00	73.53
45.16	1.07	6.52	500.00	76.74	0.00	0.00	76.74
45.66	1.00	6.66	500.00	75.08	0.00	0.00	75.08
46.16	1.26	6.18	475.43	76.92	0.00	0.00	76.92
46.66	1.30	6.09	414.81	68.08	0.43	0.00	68.08
47.16	1.18	6.32	500.00	79.10	0.00	0.00	79.10
47.66	1.65	5.46	288.08	52.76	5.12	0.00	52.76
48.16	1.06	6.54	500.00	76.49	0.00	0.00	76.49

N,60 < 15

48.66	1.17	6.34	490.82	77.45	0.00	0.00	77.45
49.16	1.40	5.91	500.00	84.59	1.54	0.00	84.59
49.66	1.60	5.55	438.44	79.00	4.30	0.00	79.00
50.16	1.33	6.04	462.80	76.66	0.75	0.00	76.66

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
(N1)60 is converted from qc1, (N1)60s is after fines correction
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Ishihara / Yoshimine

Depth ft	CSRsf	/ MSF*	=CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
50.46	0.61	1.00	0.61	4.67	2.65	78.54	100.00	0.000	0.0E0	0.000	0.000
50.16	0.61	1.00	0.61	4.66	0.75	76.66	100.00	0.000	0.0E0	0.000	0.000
49.66	0.61	1.00	0.61	4.64	4.30	79.00	100.00	0.000	0.0E0	0.000	0.000
49.16	0.61	1.00	0.61	4.63	1.54	84.59	100.00	0.000	0.0E0	0.000	0.000
48.66	0.62	1.00	0.62	4.62	0.00	77.45	100.00	0.000	0.0E0	0.000	0.000
48.16	0.62	1.00	0.62	4.60	0.00	76.49	100.00	0.000	0.0E0	0.000	0.000
47.66	0.62	1.00	0.62	4.59	5.12	52.76	100.00	0.000	0.0E0	0.000	0.000
47.16	0.62	1.00	0.62	4.58	0.00	79.10	100.00	0.000	0.0E0	0.000	0.000
46.66	0.63	1.00	0.63	4.57	0.43	68.08	100.00	0.000	0.0E0	0.000	0.000
46.16	0.63	1.00	0.63	4.56	0.00	76.92	100.00	0.000	0.0E0	0.000	0.000
45.66	0.63	1.00	0.63	4.52	0.00	75.08	100.00	0.000	0.0E0	0.000	0.000
45.16	0.63	1.00	0.63	4.50	0.00	76.74	100.00	0.000	0.0E0	0.000	0.000
44.66	0.64	1.00	0.64	4.48	1.04	73.53	100.00	0.000	0.0E0	0.000	0.000
44.16	0.64	1.00	0.64	4.46	0.00	78.26	100.00	0.000	0.0E0	0.000	0.000
43.66	0.64	1.00	0.64	4.45	0.00	78.89	100.00	0.000	0.0E0	0.000	0.000
43.16	0.64	1.00	0.64	4.43	0.00	79.21	100.00	0.000	0.0E0	0.000	0.000
42.66	0.65	1.00	0.65	4.42	0.36	81.88	100.00	0.000	0.0E0	0.000	0.000
42.16	0.65	1.00	0.65	4.40	0.00	78.62	100.00	0.000	0.0E0	0.000	0.000
41.66	0.65	1.00	0.65	4.38	2.49	58.39	100.00	0.000	0.0E0	0.000	0.000
41.16	0.65	1.00	0.65	4.37	0.00	77.95	100.00	0.000	0.0E0	0.000	0.000
40.66	0.65	1.00	0.65	4.35	3.75	63.46	100.00	0.000	0.0E0	0.000	0.000
40.16	0.66	1.00	0.66	2.32	2.50	38.66	100.00	0.000	0.0E0	0.000	0.000
39.66	0.66	1.00	0.66	1.33	4.88	33.15	97.67	0.047	2.8E-4	0.000	0.000
39.16	0.66	1.00	0.66	1.33	5.59	33.65	98.96	0.021	1.3E-4	0.005	0.005
38.66	0.66	1.00	0.66	2.30	2.85	38.97	100.00	0.000	0.0E0	0.000	0.005
38.16	0.67	1.00	0.67	0.98	15.65	34.96	100.00	0.000	0.0E0	0.001	0.006
37.66	0.67	1.00	0.67	0.67	27.98	34.68	100.00	0.000	0.0E0	0.010	0.016
37.16	0.67	1.00	0.67	0.59	30.50	33.64	98.93	0.121	7.3E-4	0.052	0.068
36.66	0.67	1.00	0.67	5.00	NoLiq	7.67	44.59	0.000	0.0E0	0.000	0.068
36.16	0.67	1.00	0.67	5.00	NoLiq	7.14	43.14	0.000	0.0E0	0.000	0.068
35.66	0.68	1.00	0.68	5.00	NoLiq	5.84	39.37	0.000	0.0E0	0.000	0.068
35.16	0.68	1.00	0.68	5.00	NoLiq	9.29	48.79	0.000	0.0E0	0.000	0.068
34.66	0.68	1.00	0.68	0.27	28.14	20.70	71.79	2.115	1.3E-2	0.053	0.121
34.16	0.68	1.00	0.68	5.00	NoLiq	8.94	47.94	0.000	0.0E0	0.114	0.235
33.66	0.68	1.00	0.68	5.00	NoLiq	11.05	52.99	0.000	0.0E0	0.023	0.258
33.16	0.68	1.00	0.68	5.00	NoLiq	13.42	58.12	0.000	0.0E0	0.000	0.258
32.66	0.69	1.00	0.69	0.55	20.81	29.55	89.05	1.249	7.5E-3	0.015	0.273
32.16	0.69	1.00	0.69	0.68	7.04	26.75	83.14	1.323	7.9E-3	0.084	0.357
31.66	0.69	1.00	0.69	0.63	8.69	26.66	82.97	1.434	8.6E-3	0.087	0.444
31.16	0.69	1.00	0.69	0.91	22.96	37.68	100.00	0.000	0.0E0	0.013	0.457
30.66	0.69	1.00	0.69	0.56	11.76	26.49	82.62	1.565	9.4E-3	0.079	0.536
30.16	0.69	1.00	0.69	0.65	11.18	28.24	86.21	1.219	7.3E-3	0.085	0.621
29.66	0.69	1.00	0.69	0.67	22.99	33.24	97.89	0.211	1.3E-3	0.040	0.661
29.16	0.69	1.00	0.69	5.00	NoLiq	8.48	46.74	0.000	0.0E0	0.000	0.661
28.66	0.69	1.00	0.69	5.00	NoLiq	9.47	49.26	0.000	0.0E0	0.000	0.661
28.16	0.69	1.00	0.69	0.82	32.70	40.34	100.00	0.000	0.0E0	0.000	0.661
27.66	0.69	1.00	0.69	5.00	NoLiq	6.13	40.23	0.000	0.0E0	0.000	0.661
27.16	0.69	1.00	0.69	0.30	31.82	23.86	77.57	1.856	1.1E-2	0.011	0.672
26.66	0.69	1.00	0.69	0.43	5.05	20.61	71.64	2.122	1.3E-2	0.137	0.809
26.16	0.68	1.00	0.68	0.69	8.52	27.57	84.82	1.218	7.3E-3	0.087	0.897
25.66	0.68	1.00	0.68	5.00	NoLiq	15.91	63.03	0.000	0.0E0	0.022	0.918
25.16	0.68	1.00	0.68	5.00	NoLiq	19.70	70.00	0.000	0.0E0	0.000	0.918
24.66	0.68	1.00	0.68	5.00	NoLiq	21.72	73.63	0.000	0.0E0	0.000	0.918
24.16	0.68	1.00	0.68	5.00	NoLiq	20.04	70.62	0.000	0.0E0	0.000	0.918
23.66	0.68	1.00	0.68	5.00	NoLiq	5.46	38.20	0.000	0.0E0	0.000	0.918
23.16	0.67	1.00	0.67	5.00	NoLiq	4.99	36.72	0.000	0.0E0	0.000	0.918
22.66	0.67	1.00	0.67	5.00	NoLiq	7.53	44.21	0.000	0.0E0	0.000	0.918
22.16	0.67	1.00	0.67	5.00	NoLiq	6.38	40.95	0.000	0.0E0	0.000	0.918
21.66	0.67	1.00	0.67	5.00	NoLiq	5.62	38.68	0.000	0.0E0	0.000	0.918
21.16	0.67	1.00	0.67	5.00	NoLiq	4.78	36.05	0.000	0.0E0	0.000	0.918
20.66	0.66	1.00	0.66	5.00	NoLiq	3.84	32.94	0.000	0.0E0	0.000	0.918
20.16	0.66	1.00	0.66	5.00	NoLiq	3.29	31.05	0.000	0.0E0	0.000	0.918
19.66	0.66	1.00	0.66	5.00	NoLiq	3.23	30.85	0.000	0.0E0	0.000	0.918
19.16	0.66	1.00	0.66	5.00	NoLiq	2.47	28.08	0.000	0.0E0	0.000	0.918
18.66	0.65	1.00	0.65	5.00	NoLiq	2.74	29.07	0.000	0.0E0	0.000	0.918
18.16	0.65	1.00	0.65	5.00	NoLiq	3.13	30.47	0.000	0.0E0	0.000	0.918
17.66	0.65	1.00	0.65	5.00	NoLiq	3.90	33.17	0.000	0.0E0	0.000	0.918

17.16	0.64	1.00	0.64	5.00	NoLiq	3.61	32.16	0.000	0.0E0	0.000	0.918
16.66	0.64	1.00	0.64	5.00	NoLiq	2.99	29.97	0.000	0.0E0	0.000	0.918
16.16	0.63	1.00	0.63	5.00	NoLiq	3.42	31.51	0.000	0.0E0	0.000	0.918
15.66	0.63	1.00	0.63	5.00	NoLiq	4.38	34.76	0.000	0.0E0	0.000	0.918
15.16	0.63	1.00	0.63	0.33	25.94	22.20	74.52	1.993	1.2E-2	0.025	0.943
14.66	0.62	1.00	0.62	0.42	30.14	27.22	84.10	1.570	9.4E-3	0.104	1.047
14.16	0.62	1.00	0.62	0.28	21.81	18.30	67.46	2.350	1.4E-2	0.078	1.125
13.66	0.61	1.00	0.61	5.00	NoLiq	3.48	31.71	0.000	0.0E0	0.100	1.225
13.16	0.60	1.00	0.60	0.23	17.65	13.62	58.53	2.909	1.7E-2	0.073	1.298
12.66	0.60	1.00	0.60	0.33	6.76	16.65	64.43	2.535	1.5E-2	0.162	1.460
12.16	0.59	1.00	0.59	5.00	NoLiq	3.34	31.21	0.000	0.0E0	0.076	1.536
11.66	0.58	1.00	0.58	5.00	NoLiq	3.19	30.68	0.000	0.0E0	0.000	1.536
11.16	0.58	1.00	0.58	0.33	27.14	21.23	72.76	2.072	1.2E-2	0.033	1.569
10.66	0.57	1.00	0.57	0.42	19.06	22.55	75.15	1.964	1.2E-2	0.119	1.688
10.16	0.56	1.00	0.56	0.52	14.55	23.97	77.77	1.834	1.1E-2	0.116	1.804
9.66	0.55	1.00	0.55	0.58	20.59	27.10	83.86	1.479	8.9E-3	0.099	1.903
9.16	0.54	1.00	0.54	0.57	17.47	25.64	80.95	1.641	9.8E-3	0.097	2.000
8.66	0.53	1.00	0.53	0.48	17.68	23.18	76.31	1.912	1.1E-2	0.107	2.107
8.16	0.52	1.00	0.52	0.45	13.98	21.00	72.34	2.091	1.3E-2	0.123	2.230
7.66	0.51	1.00	0.51	0.59	8.36	22.11	74.35	1.969	1.2E-2	0.120	2.350
7.16	0.49	1.00	0.49	0.51	14.00	21.82	73.82	2.022	1.2E-2	0.124	2.474
6.66	0.48	1.00	0.48	0.76	26.32	30.92	92.18	0.656	3.9E-3	0.090	2.564
6.16	0.46	1.00	0.46	0.64	16.03	24.63	79.02	1.627	9.8E-3	0.057	2.621
5.66	0.44	1.00	0.44	0.73	14.15	25.24	80.18	1.329	8.0E-3	0.097	2.717
5.16	0.42	1.00	0.42	0.57	17.03	22.29	74.67	1.959	1.2E-2	0.102	2.819
5.01	0.42	1.00	0.42	0.37	22.89	16.78	64.66	2.521	1.5E-2	0.041	2.860

Settlement of Saturated Sands=2.860 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth ft	sigma' atm	sigC' atm	(N1)60s	CSRsf	Gmax atm	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsp in.	S in.
4.96	0.28	0.18	18.91	0.42	508.95	2.3E-4	0.0535	0.0566	0.82	0.0462	5.55E-4	0.001	0.001
4.66	0.26	0.17	0.10	0.42	86.09	1.3E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001
4.16	0.24	0.15	0.10	0.42	81.34	1.2E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001
3.66	0.21	0.13	0.10	0.42	76.30	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001
3.16	0.18	0.12	0.10	0.42	70.90	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001
2.66	0.15	0.10	0.10	0.42	65.05	9.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001
2.16	0.12	0.08	0.10	0.42	58.62	8.8E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001
1.66	0.09	0.06	0.10	0.42	51.39	7.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001
1.16	0.07	0.04	0.10	0.42	42.95	6.5E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001
0.66	0.04	0.02	0.10	0.42	32.40	4.9E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001
0.16	0.01	0.01	0.10	0.42	15.95	2.4E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.001

Settlement of Unsaturated Sands=0.001 in.
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=2.861 in.
Differential Settlement=1.430 to 1.888 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)
1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ

CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=1, based on Item 2 of Page C.
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

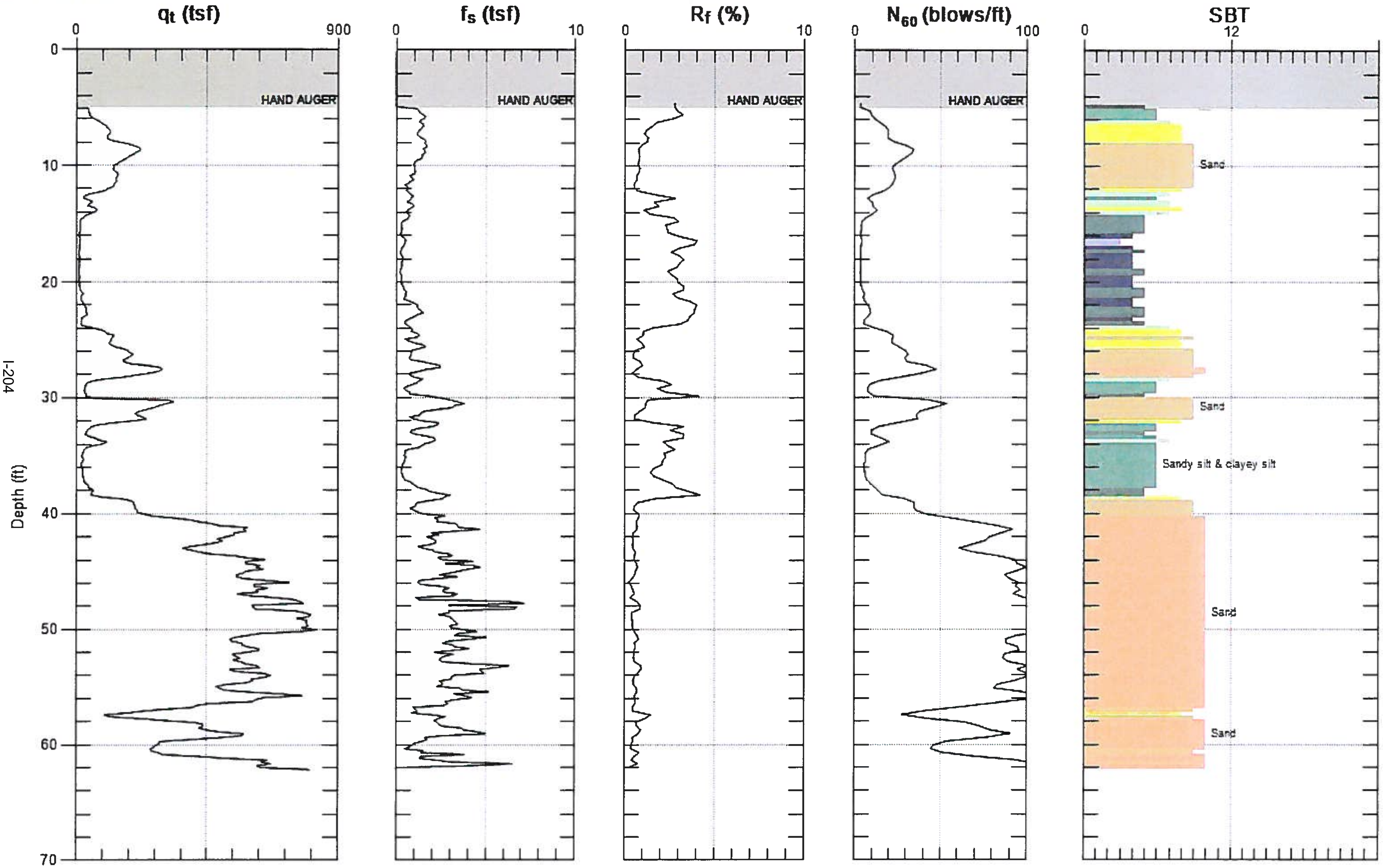
3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center, Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-5

Engineer: R.GLADSON
Date: 5/26/2016 01:47



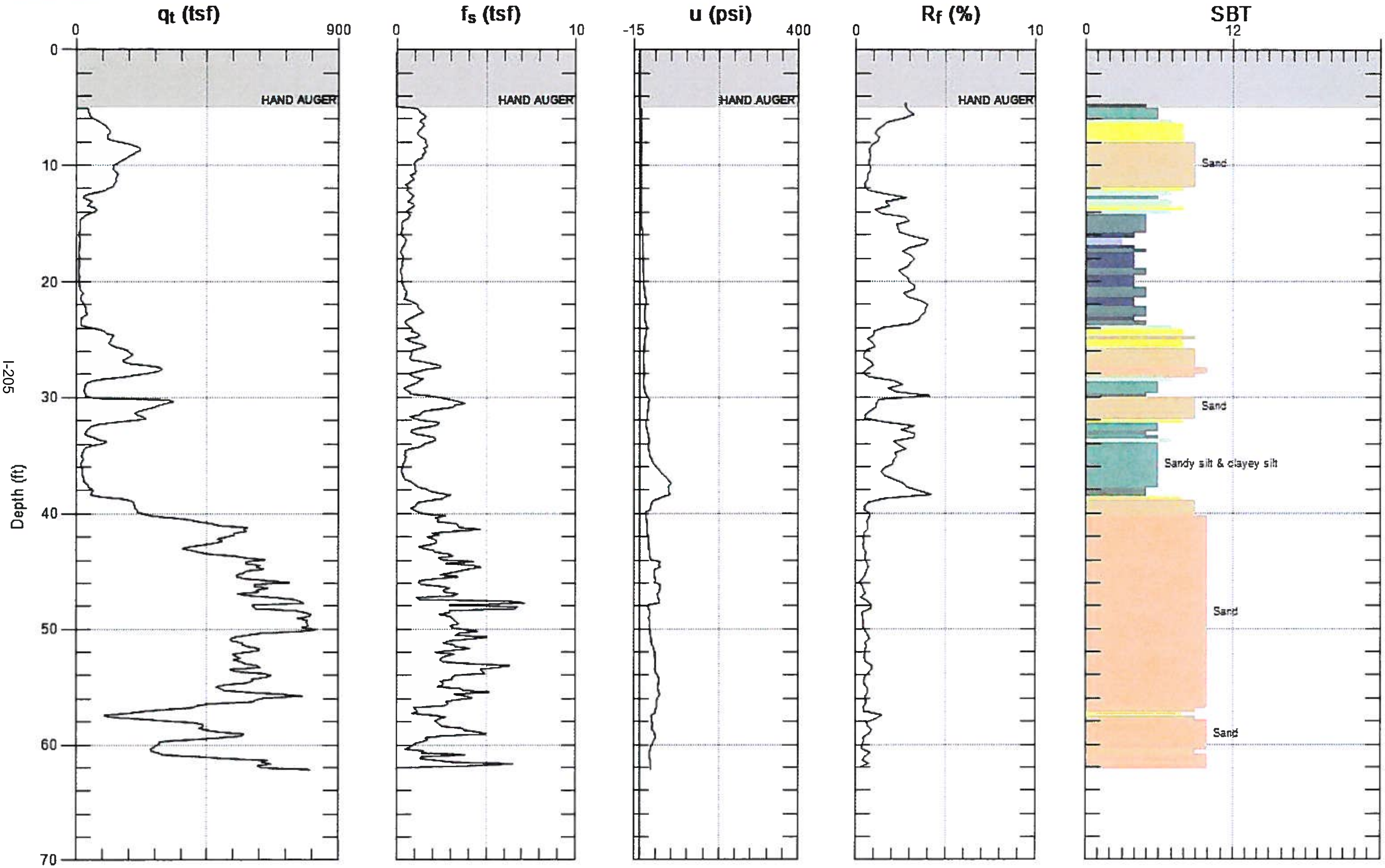
Max. Depth: 62.172 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-5

Engineer: R.GLADSON
Date: 5/26/2016 01:47



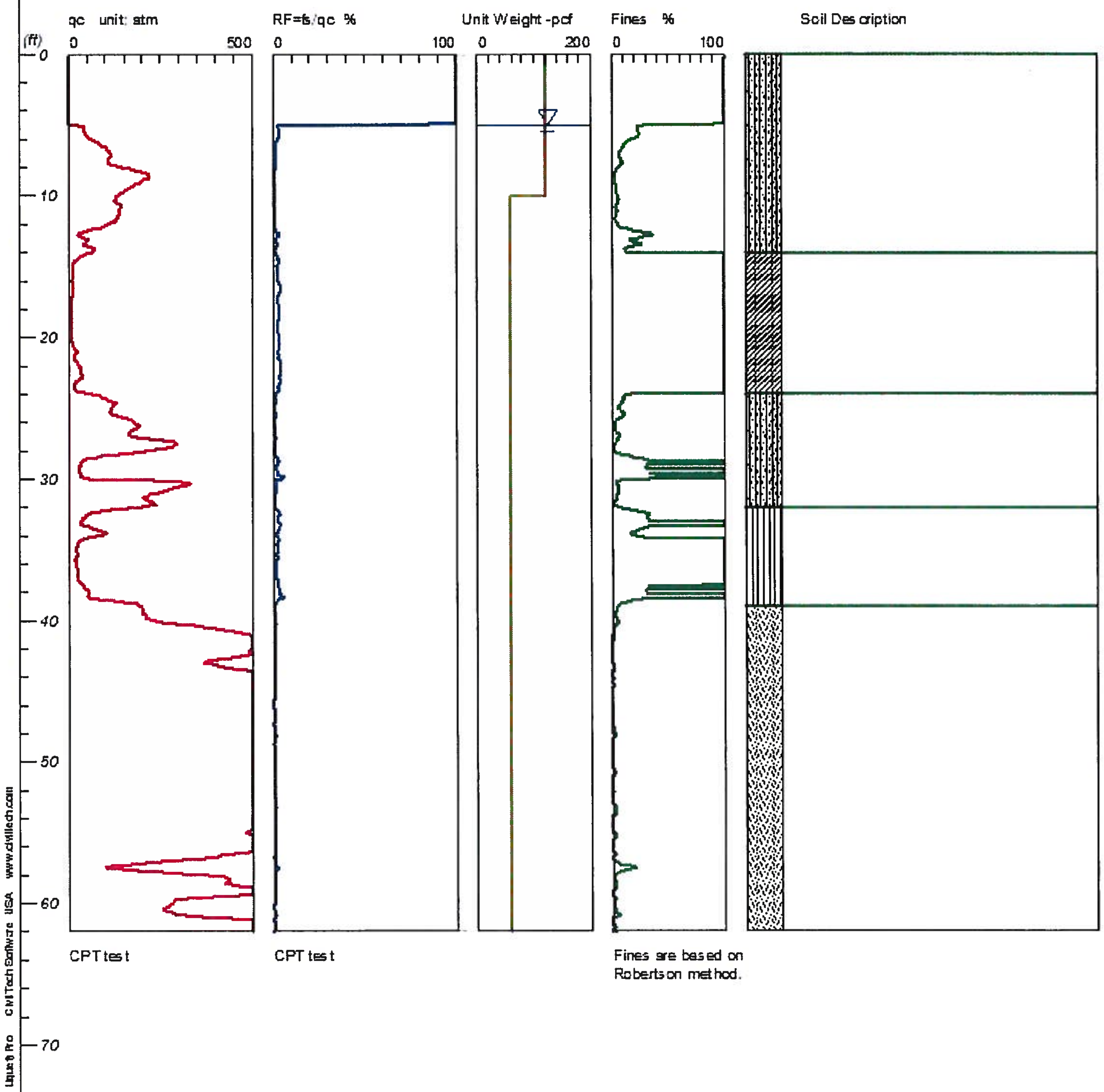
Max. Depth: 62.172 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT5 *Water Depth=5 ft* *Surface Elev.=0* *Magnitude=6.63*
Acceleration=0.65g

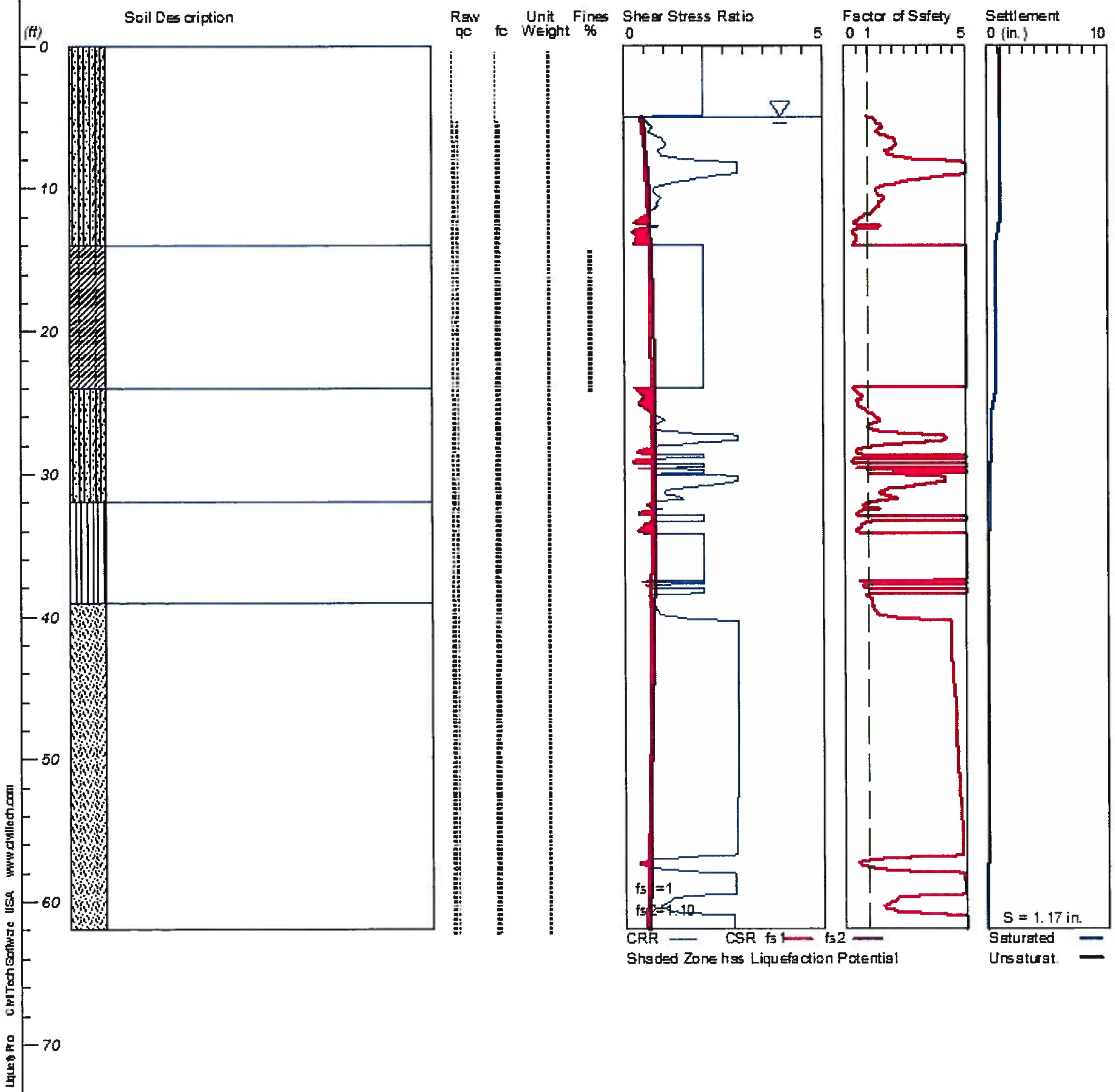


LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT5 Water Depth=5 ft Surface Elev.=0

Magnitude=6.63
Acceleration=0.65g



GREGG DRILLING & TESTING, INC.

CONE PENETRATION TEST DATA

Client:	GEOSYSTEMS
Site:	12870 PANAMA ST.
Engineer:	R.GLADSON
Sounding:	CPT-5
Date:	5/26/2016
Time:	1:47 PM

Units:	Imperial	
Data averaging interval:	0.100	meters
Assumed depth of water:	11.003	feet
Net area ratio of cone:	0.80	
Unit weight of water:	62.4	lb/ft3
Relative density constant, CDR:	350	
Young's modulus for sands, a:	4	
Small strain shear modulus number, SG (sands):	180	
Small strain shear modulus number, CG (clays):	50	
Nkt for clays:	15	
OCR number, kocr:	0.3	

Interpretation based on Lunne, Robertson and Powell, 1997

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
0.100	0.328	0.000	0.000	0.000							0.000				
0.200	0.656	0.000	0.000	0.000							0.000				
0.300	0.984	0.000	0.000	0.000							0.000				
0.400	1.312	0.000	0.000	0.000							0.000				
0.500	1.640	0.000	0.000	0.000							0.000				
0.600	1.969	0.000	0.000	0.000							0.000				
0.700	2.297	0.000	0.000	0.000							0.000				
0.800	2.625	0.000	0.000	0.000							0.000				
0.900	2.953	0.000	0.000	0.000							0.000				
1.000	3.281	0.000	0.000	0.000							0.000				
1.100	3.609	0.000	0.000	0.000							0.000				
1.200	3.937	0.000	0.000	0.000							0.000				
1.300	4.265	0.000	0.000	0.000							0.000				
1.400	4.593	0.000	0.000	0.000							0.000				
1.500	4.921	13.617	0.377	0.870		13.63	2.76	5	115	0.282	0.000	0.282	47.34	2.82	0.00
1.600	5.249	41.966	1.223	2.737		42.01	2.91	6	115	0.301	0.000	0.301	138.67	2.93	0.00
1.700	5.577	45.563	1.458	2.876		45.60	3.20	6	115	0.320	0.000	0.320	141.71	3.22	0.00
1.800	5.906	56.549	1.511	2.977		56.59	2.67	6	115	0.338	0.000	0.338	166.26	2.69	0.00
1.900	6.234	79.116	1.384	3.028		79.16	1.75	7	118	0.358	0.000	0.358	220.32	1.76	0.00
2.000	6.562	98.588	1.468	3.078		98.63	1.49	8	121	0.378	0.000	0.378	260.27	1.49	0.00
2.100	6.890	111.675	1.320	3.179		111.72	1.18	8	121	0.397	0.000	0.397	280.17	1.19	0.00
2.200	7.218	113.107	1.198	3.154		113.15	1.06	8	121	0.417	0.000	0.417	270.23	1.06	0.00
2.300	7.546	107.846	1.378	3.217		107.89	1.28	8	121	0.437	0.000	0.437	245.88	1.28	0.00
2.400	7.874	131.529	1.593	3.469		131.58	1.21	8	121	0.457	0.000	0.457	287.00	1.21	0.00
2.500	8.202	184.323	1.648	3.544		184.37	0.89	9	124	0.477	0.000	0.477	385.34	0.90	0.00
2.600	8.530	215.134	1.587	3.570		215.19	0.74	9	124	0.498	0.000	0.498	431.45	0.74	0.00
2.700	8.858	206.388	1.550	3.658		206.44	0.75	9	124	0.518	0.000	0.518	397.57	0.75	0.00
2.800	9.186	183.300	1.445	3.646		183.35	0.79	9	124	0.538	0.000	0.538	339.60	0.79	0.00
2.900	9.514	161.551	1.214	3.620		161.60	0.75	9	124	0.559	0.000	0.559	288.25	0.75	0.00
3.000	9.843	139.132	1.009	3.544		139.18	0.72	9	124	0.579	0.000	0.579	239.36	0.73	0.00
3.100	10.171	126.863	1.013	3.532		126.91	0.80	9	124	0.599	0.000	0.599	210.73	0.80	0.00
3.200	10.499	133.769	1.037	3.582		133.82	0.77	9	124	0.620	0.000	0.620	214.92	0.78	0.00

GREGG

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
0.100	0.328													
0.200	0.656													
0.300	0.984													
0.400	1.312													
0.500	1.640													
0.600	1.969													
0.700	2.297													
0.800	2.625													
0.900	2.953													
1.000	3.281													
1.100	3.609													
1.200	3.937													
1.300	4.265													
1.400	4.593													
1.500	4.921	5	2.45	33.72	3.00E-6	3.2	6.3	31	36	55	287			
1.600	5.249	5	2.15	89.53	3.00E-6	8.8	16.4	51	42	168	427			
1.700	5.577	8	2.17	94.32	3.00E-6	9.6	17.5	52	42	182				
1.800	5.906	5	2.07	108.87	3.00E-6	11.4	20.2	56	43	226	491			
1.900	6.234	6	1.85	137.06	3.00E-4	14.7	25.3	63	45	317	559			
2.000	6.562	6	1.75	160.75	3.00E-4	17.7	29.6	68	45	395	612			
2.100	6.890	6	1.65	172.15	3.00E-4	19.4	31.6	70	46	447	649			
2.200	7.218	6	1.62	169.68	3.00E-4	19.4	30.9	70	45	453	663			
2.300	7.546	6	1.71	161.04	3.00E-4	19.1	29.7	68	45	432	663			
2.400	7.874	6	1.65	189.11	3.00E-4	22.8	34.7	74	46	526	719			
2.500	8.202	6	1.47	258.79	3.00E-4	30.1	44.8	86	47	737	816			
2.600	8.530	6	1.37	295.87	3.00E-4	34.1	49.7	92	48	861	871			
2.700	8.858	6	1.40	278.16	3.00E-4	33.0	47.2	89	47	826	871			
2.800	9.186	6	1.46	242.23	3.00E-4	29.9	41.9	83	46	733	848			
2.900	9.514	6	1.49	209.46	3.00E-4	26.6	36.6	77	46	646	823			
3.000	9.843	6	1.54	177.07	3.00E-4	23.2	31.4	71	45	557	792			
3.100	10.171	6	1.61	158.61	3.00E-4	21.7	28.8	67	44	508	777			
3.200	10.499	6	1.59	164.48	3.00E-4	22.7	29.7	69	44	535	800			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
3.300	10.827	140.452	0.889	3.595		140.50	0.63	9	124	0.640	0.000	0.640	218.49	0.64	0.00
3.400	11.155	137.310	0.877	3.633		137.36	0.64	9	124	0.661	0.005	0.656	208.46	0.64	0.00
3.500	11.483	132.682	0.652	3.671		132.73	0.49	9	124	0.681	0.015	0.666	198.31	0.49	0.00
3.600	11.811	120.413	0.586	3.583		120.46	0.49	9	124	0.701	0.025	0.676	177.16	0.49	0.00
3.700	12.139	94.276	0.636	3.217		94.32	0.67	8	121	0.721	0.035	0.686	136.52	0.68	0.00
3.800	12.467	49.680	0.820	2.876		49.72	1.65	7	118	0.740	0.046	0.695	70.51	1.67	0.00
3.900	12.795	30.849	0.858	3.103		30.89	2.78	6	115	0.759	0.056	0.703	42.85	2.85	0.01
4.000	13.123	46.827	0.763	3.620		46.88	1.63	7	118	0.779	0.066	0.712	64.72	1.66	0.00
4.100	13.451	49.076	0.908	3.822		49.13	1.85	7	118	0.798	0.076	0.721	67.00	1.88	0.00
4.200	13.780	66.002	0.703	4.037		66.06	1.06	8	121	0.818	0.087	0.731	89.25	1.08	0.00
4.300	14.108	48.500	0.671	3.847		48.56	1.38	7	118	0.837	0.097	0.740	64.47	1.41	0.00
4.400	14.436	24.938	0.680	3.759		24.99	2.72	5	115	0.856	0.107	0.749	32.24	2.82	0.01
4.500	14.764	14.323	0.424	3.898		14.38	2.95	5	115	0.875	0.117	0.757	17.83	3.14	0.01
4.600	15.092	13.264	0.301	4.112		13.32	2.26	5	115	0.893	0.128	0.766	16.23	2.42	0.01
4.700	15.420	13.347	0.313	5.146		13.42	2.33	5	115	0.912	0.138	0.774	16.15	2.50	0.02
4.800	15.748	11.470	0.277	6.244		11.56	2.40	5	115	0.931	0.148	0.783	13.58	2.61	0.03
4.900	16.076	11.456	0.355	6.774		11.55	3.07	4	115	0.950	0.158	0.791	13.40	3.34	0.03
5.000	16.404	12.464	0.503	7.215		12.57	4.00	3	111	0.968	0.169	0.800	14.51	4.34	0.03
5.100	16.732	11.702	0.454	7.644		11.81	3.85	3	111	0.986	0.179	0.808	13.41	4.20	0.03
5.200	17.060	11.144	0.337	7.783		11.26	2.99	4	115	1.005	0.189	0.816	12.56	3.29	0.04
5.300	17.388	9.992	0.260	7.846		10.10	2.58	5	115	1.024	0.199	0.825	11.01	2.87	0.04
5.400	17.717	10.224	0.313	8.111		10.34	3.02	4	115	1.043	0.209	0.833	11.16	3.36	0.04
5.500	18.045	10.912	0.358	8.338		11.03	3.25	4	115	1.062	0.220	0.842	11.84	3.59	0.04
5.600	18.373	10.624	0.324	8.515		10.75	3.02	4	115	1.080	0.230	0.850	11.37	3.36	0.04
5.700	18.701	10.364	0.301	8.464		10.49	2.87	4	115	1.099	0.240	0.859	10.93	3.20	0.04
5.800	19.029	9.602	0.231	8.641		9.73	2.38	5	115	1.118	0.250	0.867	9.92	2.69	0.04
5.900	19.357	10.289	0.269	9.120		10.42	2.58	5	115	1.137	0.261	0.876	10.60	2.89	0.04
6.000	19.685	10.503	0.306	9.612		10.64	2.88	4	115	1.155	0.271	0.885	10.72	3.23	0.04
6.100	20.013	10.317	0.307	10.167		10.46	2.93	4	115	1.174	0.281	0.893	10.40	3.30	0.05
6.200	20.341	11.488	0.378	10.823		11.64	3.25	4	115	1.193	0.291	0.902	11.59	3.62	0.05
6.300	20.669	14.862	0.484	11.781		15.03	3.22	5	115	1.212	0.302	0.910	15.18	3.50	0.04
6.400	20.997	20.290	0.544	13.131		20.48	2.66	5	115	1.231	0.312	0.919	20.95	2.83	0.03
6.500	21.325	16.851	0.491	14.342		17.06	2.88	5	115	1.249	0.322	0.927	17.05	3.11	0.04
6.600	21.654	19.659	0.711	15.868		19.89	3.58	4	115	1.268	0.332	0.936	19.89	3.82	0.04
6.700	21.982	27.661	1.110	14.910		27.88	3.98	4	115	1.287	0.343	0.945	28.15	4.17	0.03
6.800	22.310	32.560	1.268	13.762		32.76	3.87	5	115	1.306	0.353	0.953	33.00	4.03	0.02
6.900	22.638	35.116	1.355	13.270		35.31	3.84	5	115	1.325	0.363	0.962	35.34	3.99	0.02
7.000	22.966	27.921	1.011	12.967		28.11	3.60	5	115	1.343	0.373	0.970	27.59	3.78	0.02
7.100	23.294	17.892	0.632	13.522		18.09	3.49	4	115	1.362	0.383	0.979	17.09	3.78	0.04
7.200	23.622	18.041	0.559	15.427		18.26	3.06	5	115	1.381	0.394	0.987	17.10	3.31	0.04
7.300	23.950	51.009	0.788	17.571		51.26	1.54	7	118	1.400	0.404	0.996	50.04	1.58	0.02
7.400	24.278	94.992	0.964	16.549		95.23	1.01	8	121	1.420	0.414	1.006	93.25	1.03	0.01
7.500	24.606	119.325	1.199	15.111		119.54	1.00	8	121	1.440	0.424	1.016	116.29	1.02	0.01
7.600	24.934	120.524	0.798	13.585		120.72	0.66	9	124	1.460	0.435	1.026	116.26	0.67	0.00
7.700	25.262	116.816	1.072	12.299		116.99	0.92	8	121	1.480	0.445	1.035	111.57	0.93	0.00
7.800	25.591	137.357	1.454	11.668		137.53	1.06	8	121	1.500	0.455	1.045	130.17	1.07	0.00
7.900	25.919	172.444	0.992	11.340		172.61	0.57	9	124	1.520	0.465	1.055	162.15	0.58	0.00
8.000	26.247	187.343	0.825	10.785		187.50	0.44	9	124	1.541	0.476	1.065	174.57	0.44	0.00
8.100	26.575	173.968	0.790	10.457		174.12	0.45	9	124	1.561	0.486	1.075	160.47	0.46	0.00
8.200	26.903	170.520	1.419	10.470		170.67	0.83	9	124	1.582	0.496	1.085	155.77	0.84	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
3.300	10.827	6	1.52	169.94	3.00E-4	23.4	30.0	70	44	562	822			
3.400	11.155	6	1.54	164.11	3.00E-4	23.0	29.2	68	44	549	822			
3.500	11.483	6	1.49	157.32	3.00E-4	21.8	27.5	67	44	531	817			
3.600	11.811	6	1.52	141.61	3.00E-4	20.0	25.0	64	43	482	795			
3.700	12.139	6	1.70	110.75	3.00E-4	16.6	20.7	56	42	377	736			
3.800	12.467	5	2.17	61.09	3.00E-6	10.5	12.9	42	39	199	597			
3.900	12.795	4	2.49	38.75	3.00E-8	7.5	9.2				1545	2.01	2.86	12.9
4.000	13.123	5	2.20	56.72	3.00E-6	10.0	12.1	40	38	188	591			
4.100	13.451	5	2.22	59.14	3.00E-6	10.6	12.8	41	38	197	603			
4.200	13.780	6	1.97	76.94	3.00E-4	12.8	15.4	47	40	264	668			
4.300	14.108	5	2.15	56.96	3.00E-6	10.1	12.1	40	38	194	605			
4.400	14.436	4	2.58	29.88	3.00E-8	6.3	7.5				1250	1.61	2.15	9.7
4.500	14.764	4	2.81	16.96	3.00E-8	4.1	4.8				719	0.90	1.19	5.4
4.600	15.092	4	2.77	15.41	3.00E-8	3.7	4.4				666	0.83	1.08	4.9
4.700	15.420	4	2.78	15.38	3.00E-8	3.8	4.4				671	0.83	1.08	4.8
4.800	15.748	4	2.85	13.03	3.00E-8	3.4	3.9				578	0.71	0.91	4.1
4.900	16.076	3	2.92	12.96	1.00E-9	3.5	4.0				578	0.71	0.89	4.0
5.000	16.404	3	2.96	14.10	1.00E-9	3.9	4.5				628	0.77	0.97	4.4
5.100	16.732	3	2.98	13.06	1.00E-9	3.7	4.2				591	0.72	0.89	4.0
5.200	17.060	3	2.94	12.21	1.00E-9	3.4	3.9				563	0.68	0.84	3.8
5.300	17.388	3	2.95	10.72	1.00E-9	3.1	3.5				505	0.61	0.73	3.3
5.400	17.717	3	2.99	10.91	1.00E-9	3.2	3.7				517	0.62	0.74	3.3
5.500	18.045	3	2.98	11.58	1.00E-9	3.5	3.9				552	0.66	0.79	3.6
5.600	18.373	3	2.98	11.13	1.00E-9	3.4	3.7				537	0.64	0.76	3.4
5.700	18.701	3	2.98	10.71	1.00E-9	3.3	3.6				524	0.63	0.73	3.3
5.800	19.029	3	2.97	9.73	1.00E-9	3.0	3.3				486	0.57	0.66	3.0
5.900	19.357	3	2.97	10.40	1.00E-9	3.2	3.5				521	0.62	0.71	3.2
6.000	19.685	3	2.99	10.54	1.00E-9	3.3	3.6				532	0.63	0.71	3.2
6.100	20.013	3	3.01	10.24	1.00E-9	3.3	3.6				523	0.62	0.69	3.1
6.200	20.341	3	2.99	11.42	1.00E-9	3.7	4.0				582	0.70	0.77	3.5
6.300	20.669	3	2.89	14.90	1.00E-9	4.4	4.8				752	0.92	1.01	4.6
6.400	20.997	4	2.72	20.44	3.00E-8	5.5	5.9				1024	1.28	1.40	6.3
6.500	21.325	4	2.82	16.72	3.00E-8	4.8	5.2				853	1.05	1.14	5.1
6.600	21.654	3	2.82	19.54	1.00E-9	5.7	6.0				994	1.24	1.33	6.0
6.700	21.982	4	2.73	27.61	3.00E-8	7.6	8.0				1394	1.77	1.88	8.4
6.800	22.310	4	2.67	32.35	3.00E-8	8.6	9.1				1638	2.10	2.20	9.9
6.900	22.638	4	2.65	34.68	3.00E-8	9.2	9.6				1765	2.27	2.36	10.6
7.000	22.966	4	2.71	27.16	3.00E-8	7.6	7.9				1405	1.78	1.84	8.3
7.100	23.294	3	2.87	16.91	1.00E-9	5.3	5.5				904	1.11	1.14	5.1
7.200	23.622	4	2.83	16.93	3.00E-8	5.2	5.4				913	1.13	1.14	5.1
7.300	23.950	5	2.27	49.11	3.00E-6	11.2	11.5	37	37	205	681			
7.400	24.278	6	1.94	91.34	3.00E-4	18.3	18.7	51	40	381	839			
7.500	24.606	6	1.86	114.24	3.00E-4	22.3	22.8	57	41	478	908			
7.600	24.934	6	1.75	114.59	3.00E-4	21.6	22.0	57	41	483	914			
7.700	25.262	6	1.85	110.52	3.00E-4	21.7	22.0	56	41	468	908			
7.800	25.591	6	1.84	129.46	3.00E-4	25.5	25.6	61	42	550	961			
7.900	25.919	6	1.60	161.92	3.00E-4	29.4	29.4	68	43	690	1040			
8.000	26.247	6	1.50	175.16	3.00E-4	30.9	30.8	71	43	750	1072			
8.100	26.575	6	1.54	161.77	3.00E-4	29.1	28.9	68	43	696	1049			
8.200	26.903	6	1.71	157.69	3.00E-4	30.2	29.8	67	43	683	1046			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
8.300	27.231	240.295	2.285	10.797		240.45	0.95	9	124	1.602	0.506	1.096	218.01	0.96	0.00
8.400	27.559	287.772	1.803	10.987		287.93	0.63	10	127	1.623	0.517	1.106	258.81	0.63	0.00
8.500	27.887	242.609	0.953	11.113		242.77	0.39	10	127	1.644	0.527	1.117	215.89	0.40	0.00
8.600	28.215	150.853	1.084	10.911		151.01	0.72	9	124	1.664	0.537	1.127	132.51	0.73	0.00
8.700	28.543	61.754	1.291	10.444		61.90	2.09	7	118	1.683	0.547	1.136	53.01	2.14	0.00
8.800	28.871	33.795	0.877	10.671		33.95	2.58	6	115	1.702	0.557	1.145	28.17	2.72	0.01
8.900	29.199	29.129	0.528	11.756		29.30	1.80	6	115	1.721	0.568	1.153	23.91	1.91	0.01
9.000	29.528	30.264	0.693	13.888		30.46	2.27	6	115	1.740	0.578	1.162	24.72	2.41	0.01
9.100	29.856	41.166	1.689	18.265		41.43	4.08	5	115	1.759	0.588	1.170	33.90	4.26	0.02
9.200	30.184	234.151	2.957	23.146		234.48	1.26	9	124	1.779	0.598	1.180	197.13	1.27	0.00
9.300	30.512	306.213	3.485	22.819		306.54	1.14	9	124	1.799	0.609	1.191	255.96	1.14	0.00
9.400	30.840	261.469	2.907	21.784		261.78	1.11	9	124	1.820	0.619	1.201	216.50	1.12	0.00
9.500	31.168	218.155	1.762	20.283		218.45	0.81	9	124	1.840	0.629	1.211	178.89	0.81	0.00
9.600	31.496	213.787	1.154	19.249		214.06	0.54	9	124	1.860	0.639	1.221	173.80	0.54	0.00
9.700	31.824	218.341	1.081	17.962		218.60	0.49	9	124	1.881	0.650	1.231	176.04	0.50	0.00
9.800	32.152	127.774	2.047	15.995		128.00	1.60	8	121	1.901	0.660	1.241	101.64	1.62	0.00
9.900	32.480	57.339	1.867	16.549		57.58	3.24	6	115	1.919	0.670	1.249	44.55	3.35	0.01
10.000	32.808	38.629	0.979	18.404		38.89	2.52	6	115	1.938	0.680	1.258	29.38	2.65	0.02
10.100	33.136	35.580	1.171	20.939		35.88	3.26	5	115	1.957	0.691	1.266	26.79	3.45	0.02
10.200	33.465	61.317	1.983	23.159		61.65	3.22	6	115	1.976	0.701	1.275	46.81	3.32	0.02
10.300	33.793	90.762	1.931	23.575		91.10	2.12	7	118	1.995	0.711	1.284	69.40	2.17	0.01
10.400	34.121	59.867	1.431	22.781		60.19	2.38	6	115	2.014	0.721	1.293	45.01	2.46	0.02
10.500	34.449	28.841	0.809	22.907		29.17	2.77	6	115	2.033	0.732	1.301	20.86	2.98	0.03
10.600	34.777	21.889	0.484	24.597		22.24	2.18	6	115	2.051	0.742	1.310	15.42	2.40	0.05
10.700	35.105	21.369	0.489	27.246		21.76	2.25	6	115	2.070	0.752	1.318	14.94	2.48	0.06
10.800	35.433	21.917	0.466	31.232		22.37	2.08	6	115	2.089	0.762	1.327	15.28	2.30	0.07
10.900	35.761	18.032	0.380	36.605		18.56	2.05	6	115	2.108	0.772	1.335	12.32	2.31	0.11
11.000	36.089	19.900	0.326	44.679		20.54	1.59	6	115	2.127	0.783	1.344	13.70	1.77	0.13
11.100	36.417	21.573	0.315	52.903		22.33	1.41	6	115	2.145	0.793	1.353	14.93	1.56	0.15
11.200	36.745	22.818	0.377	62.212		23.71	1.59	6	115	2.164	0.803	1.361	15.83	1.75	0.17
11.300	37.073	25.811	0.565	71.407		26.84	2.11	6	115	2.183	0.813	1.370	18.00	2.29	0.18
11.400	37.402	34.344	0.931	76.592		35.45	2.63	6	115	2.202	0.824	1.378	24.12	2.80	0.14
11.500	37.730	45.916	1.328	73.627		46.98	2.83	6	115	2.221	0.834	1.387	32.27	2.97	0.10
11.600	38.058	54.197	1.940	74.056		55.26	3.51	5	115	2.239	0.844	1.395	38.00	3.66	0.08
11.700	38.386	62.971	2.672	70.133		63.98	4.18	5	115	2.258	0.854	1.404	43.97	4.33	0.07
11.800	38.714	143.668	2.359	47.668		144.35	1.63	8	121	2.278	0.865	1.413	100.51	1.66	0.02
11.900	39.042	194.733	1.366	31.636		195.19	0.70	9	124	2.298	0.875	1.424	135.49	0.71	0.01
12.000	39.370	200.876	0.986	28.381		201.29	0.49	9	124	2.319	0.885	1.434	138.77	0.50	0.01
12.100	39.698	207.290	1.006	22.819		207.62	0.48	9	124	2.339	0.895	1.444	142.17	0.49	0.00
12.200	40.026	234.765	1.834	15.314		234.99	0.78	9	124	2.360	0.906	1.454	159.99	0.79	0.00
12.300	40.354	326.819	2.412	16.512		327.06	0.74	10	127	2.380	0.916	1.465	221.67	0.74	0.00
12.400	40.682	425.389	2.638	17.962		425.65	0.62	10	127	2.401	0.926	1.475	286.89	0.62	0.00
12.500	41.011	513.623	3.401	18.707		513.89	0.66	10	127	2.422	0.936	1.486	344.20	0.66	0.00
12.600	41.339	580.712	3.818	19.022		580.99	0.66	10	127	2.443	0.946	1.497	386.57	0.66	0.00
12.700	41.667	555.078	2.560	19.526		555.36	0.46	10	127	2.464	0.957	1.507	366.82	0.46	0.00
12.800	41.995	514.209	2.055	21.116		514.51	0.40	10	127	2.485	0.967	1.518	337.33	0.40	0.00
12.900	42.323	489.532	2.166	22.415		489.85	0.44	10	127	2.506	0.977	1.529	318.83	0.44	0.00
13.000	42.651	437.993	1.794	23.185		438.33	0.41	10	127	2.527	0.987	1.539	283.13	0.41	0.00
13.100	42.979	384.846	1.606	23.651		385.19	0.42	10	127	2.548	0.998	1.550	246.89	0.42	0.00
13.200	43.307	425.650	2.379	24.547		426.00	0.56	10	127	2.568	1.008	1.561	271.35	0.56	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
8.300	27.231	6	1.65	221.81	3.00E-4	41.7	40.9	80	44	962	1176			
8.400	27.559	6	1.47	264.63	3.00E-4	47.0	46.0	87	45	1152	1253			
8.500	27.887	6	1.40	221.81	3.00E-4	38.8	37.7	80	44	971	1187			
8.600	28.215	6	1.73	136.53	3.00E-4	26.9	26.0	62	42	604	1016			
8.700	28.543	5	2.34	54.12	3.00E-6	13.9	13.5	39	37	248	757			
8.800	28.871	4	2.61	28.64	3.00E-8	8.7	8.4				1697	2.15	1.88	8.5
8.900	29.199	4	2.57	24.37	3.00E-8	7.4	7.0				1465	1.84	1.59	7.2
9.000	29.528	4	2.62	25.20	3.00E-8	7.8	7.5				1523	1.91	1.65	7.4
9.100	29.856	4	2.68	34.55	3.00E-8	11.0	10.4				2071	2.64	2.26	10.2
9.200	30.184	6	1.77	207.33	3.00E-4	42.3	40.1	77	44	938	1195			
9.300	30.512	6	1.66	271.30	3.00E-4	53.3	50.2	88	45	1226	1311			
9.400	30.840	6	1.70	230.09	3.00E-4	46.1	43.3	81	44	1047	1247			
9.500	31.168	6	1.66	191.20	3.00E-4	38.0	35.5	74	44	874	1177			
9.600	31.496	6	1.56	186.70	3.00E-4	35.9	33.5	73	43	856	1173			
9.700	31.824	6	1.53	189.88	3.00E-4	36.4	33.7	74	43	874	1184			
9.800	32.152	5	2.05	107.95	3.00E-6	25.6	23.6	56	41	512	993			
9.900	32.480	4	2.52	46.33	3.00E-8	14.1	13.0				2879	3.71	2.97	13.4
10.000	32.808	4	2.59	30.49	3.00E-8	9.8	9.0				1945	2.46	1.96	8.8
10.100	33.136	4	2.69	27.69	3.00E-8	9.6	8.7				1794	2.26	1.79	8.0
10.200	33.465	4	2.50	48.95	3.00E-8	15.0	13.6				3083	3.98	3.12	14.0
10.300	33.793	5	2.25	73.78	3.00E-6	19.8	18.0	46	39	364	897			
10.400	34.121	5	2.43	47.45	3.00E-6	14.1	12.8	37	36	241	783			
10.500	34.449	4	2.74	21.61	3.00E-8	7.9	7.1				1459	1.81	1.39	6.3
10.600	34.777	4	2.79	15.94	3.00E-8	6.2	5.6				1112	1.35	1.03	4.6
10.700	35.105	4	2.81	15.44	3.00E-8	6.1	5.5				1088	1.31	1.00	4.5
10.800	35.433	4	2.78	15.84	3.00E-8	6.2	5.5				1118	1.35	1.02	4.6
10.900	35.761	4	2.86	12.71	3.00E-8	5.3	4.7				928	1.10	0.82	3.7
11.000	36.089	4	2.76	14.25	3.00E-8	5.5	4.9				1027	1.23	0.91	4.1
11.100	36.417	4	2.70	15.61	3.00E-8	5.8	5.1				1117	1.35	1.00	4.5
11.200	36.745	4	2.70	16.57	3.00E-8	6.1	5.4				1186	1.44	1.06	4.7
11.300	37.073	4	2.72	18.84	3.00E-8	7.0	6.2				1342	1.64	1.20	5.4
11.400	37.402	4	2.67	25.37	3.00E-8	9.1	8.0				1772	2.22	1.61	7.2
11.500	37.730	4	2.59	34.20	3.00E-8	11.7	10.2				2349	2.98	2.15	9.7
11.600	38.058	4	2.60	40.30	3.00E-8	13.9	12.1				2763	3.53	2.53	11.4
11.700	38.386	4	2.60	46.66	3.00E-8	16.1	14.0				3199	4.11	2.93	13.2
11.800	38.714	5	2.06	112.05	3.00E-6	28.9	25.0	57	41	577	1080			
11.900	39.042	6	1.71	156.14	3.00E-4	34.5	29.7	67	42	781	1197			
12.000	39.370	6	1.61	161.54	3.00E-4	34.4	29.5	68	42	805	1212			
12.100	39.698	6	1.60	166.08	3.00E-4	35.4	30.3	69	42	830	1228			
12.200	40.026	6	1.69	186.69	3.00E-4	41.2	35.2	73	43	940	1282			
12.300	40.354	6	1.57	260.81	3.00E-4	55.1	46.8	86	45	1308	1435			
12.400	40.682	6	1.43	338.76	3.00E-4	68.7	58.2	98	46	1703	1571			
12.500	41.011	6	1.40	407.90	3.00E-4	82.1	69.3	108	47	2056	1677			
12.600	41.339	6	1.36	459.75	3.00E-4	91.8	77.2	115	47	2324	1751			
12.700	41.667	7	1.27	437.81	3.00E-2	85.2	71.4	112	47	2221	1729			
12.800	41.995	7	1.25	404.03	3.00E-2	78.5	65.6	107	46	2058	1689			
12.900	42.323	7	1.30	383.21	3.00E-2	75.8	63.1	105	46	1959	1666			
13.000	42.651	7	1.32	341.49	3.00E-2	68.2	56.6	99	46	1753	1609			
13.100	42.979	6	1.37	298.80	3.00E-4	60.9	50.3	92	45	1541	1544			
13.200	43.307	6	1.42	329.53	3.00E-4	68.4	56.4	97	45	1704	1601			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
13.300	43.635	528.765	2.808	25.833		529.14	0.53	10	127	2.589	1.018	1.571	335.13	0.53	0.00
13.400	43.963	603.336	3.055	35.193		603.84	0.51	10	127	2.610	1.028	1.582	380.09	0.51	0.00
13.500	44.291	597.954	3.771	49.712		598.67	0.63	10	127	2.631	1.039	1.592	374.29	0.63	0.00
13.600	44.619	629.965	4.330	46.672		630.64	0.69	10	127	2.652	1.049	1.603	391.73	0.69	0.00
13.700	44.948	599.943	3.553	37.842		600.49	0.59	10	127	2.673	1.059	1.614	370.45	0.59	0.00
13.800	45.276	558.609	2.972	37.362		559.15	0.53	10	127	2.694	1.069	1.624	342.56	0.53	0.00
13.900	45.604	594.459	2.318	39.090		595.02	0.39	10	127	2.715	1.080	1.635	362.26	0.39	0.00
14.000	45.932	665.638	1.307	43.077		666.26	0.20	10	127	2.735	1.090	1.646	403.19	0.20	0.00
14.100	46.260	626.266	2.256	51.339		627.00	0.36	10	127	2.756	1.100	1.656	376.88	0.36	0.00
14.200	46.588	632.893	2.742	50.620		633.62	0.43	10	127	2.777	1.110	1.667	378.43	0.43	0.00
14.300	46.916	592.256	3.095	46.634		592.93	0.52	10	127	2.798	1.120	1.678	351.76	0.52	0.00
14.400	47.244	675.695	1.877	46.571		676.37	0.28	10	127	2.819	1.131	1.688	398.95	0.28	0.00
14.500	47.572	763.938	4.881	49.043		764.64	0.64	10	127	2.840	1.141	1.699	448.40	0.64	0.00
14.600	47.900	664.281	5.607	31.017		664.73	0.84	10	127	2.861	1.151	1.710	387.15	0.85	0.00
14.700	48.228	659.197	5.436	22.629		659.52	0.82	10	127	2.882	1.161	1.720	381.71	0.83	0.00
14.800	48.556	780.631	2.777	25.190		780.99	0.36	10	127	2.903	1.172	1.731	449.53	0.36	0.00
14.900	48.885	787.509	2.834	24.181		787.86	0.36	10	127	2.923	1.182	1.742	450.71	0.36	0.00
15.000	49.213	779.730	3.228	24.080		780.08	0.41	10	127	2.944	1.192	1.752	443.52	0.42	0.00
15.100	49.541	792.045	3.271	25.177		792.41	0.41	10	127	2.965	1.202	1.763	447.83	0.41	0.00
15.200	49.869	798.208	3.295	25.291		798.57	0.41	10	127	2.986	1.213	1.773	448.60	0.41	0.00
15.300	50.197	740.674	3.927	26.540		741.06	0.53	10	127	3.007	1.223	1.784	413.67	0.53	0.00
15.400	50.525	587.191	3.936	27.700		587.59	0.67	10	127	3.028	1.233	1.795	325.70	0.67	0.00
15.500	50.853	536.191	4.028	29.239		536.61	0.75	10	127	3.049	1.243	1.805	295.53	0.75	0.00
15.600	51.181	558.061	2.924	30.172		558.50	0.52	10	127	3.070	1.254	1.816	305.84	0.53	0.00
15.700	51.509	596.039	3.510	33.679		596.52	0.59	10	127	3.091	1.264	1.827	324.86	0.59	0.00
15.800	51.837	611.227	3.127	36.971		611.76	0.51	10	127	3.111	1.274	1.837	331.26	0.51	0.00
15.900	52.165	554.911	2.708	38.763		555.47	0.49	10	127	3.132	1.284	1.848	298.88	0.49	0.00
16.000	52.493	550.068	2.565	39.217		550.63	0.47	10	127	3.153	1.295	1.859	294.55	0.47	0.00
16.100	52.822	562.597	3.044	39.570		563.17	0.54	10	127	3.174	1.305	1.869	299.57	0.54	0.00
16.200	53.150	609.898	5.350	39.759		610.47	0.88	10	127	3.195	1.315	1.880	323.02	0.88	0.00
16.300	53.478	568.155	5.041	39.595		568.73	0.89	10	127	3.216	1.325	1.891	299.11	0.89	0.00
16.400	53.806	617.594	4.325	42.559		618.21	0.70	10	127	3.237	1.335	1.901	323.45	0.70	0.00
16.500	54.134	639.799	3.164	47.580		640.48	0.49	10	127	3.258	1.346	1.912	333.29	0.50	0.00
16.600	54.462	596.262	2.716	48.551		596.96	0.46	10	127	3.279	1.356	1.923	308.80	0.46	0.00
16.700	54.790	524.154	2.496	47.466		524.84	0.48	10	127	3.299	1.366	1.933	269.78	0.48	0.00
16.800	55.118	494.895	3.199	47.189		495.57	0.65	10	127	3.320	1.376	1.944	253.23	0.65	0.00
16.900	55.446	601.756	4.042	48.955		602.46	0.67	10	127	3.341	1.387	1.955	306.53	0.67	0.00
17.000	55.774	706.349	3.781	48.803		707.05	0.53	10	127	3.362	1.397	1.965	358.08	0.54	0.00
17.100	56.102	620.763	3.422	44.464		621.40	0.55	10	127	3.383	1.407	1.976	312.79	0.55	0.00
17.200	56.430	492.329	2.782	43.253		492.95	0.56	10	127	3.404	1.417	1.986	246.44	0.57	0.00
17.300	56.759	372.921	1.585	42.446		373.53	0.42	10	127	3.425	1.428	1.997	185.32	0.43	0.00
17.400	57.087	235.034	1.060	39.910		235.61	0.45	9	124	3.445	1.438	2.007	115.66	0.46	0.01
17.500	57.415	130.664	1.880	33.174		131.14	1.43	8	121	3.465	1.448	2.017	63.31	1.47	0.01
17.600	57.743	217.151	2.420	30.576		217.59	1.11	9	124	3.485	1.458	2.027	105.63	1.13	0.00
17.700	58.071	381.714	2.284	32.103		382.18	0.60	10	127	3.506	1.469	2.038	185.84	0.60	0.00
17.800	58.399	430.985	2.889	32.367		431.45	0.67	10	127	3.527	1.479	2.048	208.92	0.68	0.00
17.900	58.727	454.928	4.009	33.969		455.42	0.88	10	127	3.548	1.489	2.059	219.47	0.89	0.00
18.000	59.055	545.067	4.041	38.460		545.62	0.74	10	127	3.569	1.499	2.070	261.91	0.75	0.00
18.100	59.383	481.901	1.971	39.116		482.46	0.41	10	127	3.590	1.509	2.080	230.20	0.41	0.00
18.200	59.711	320.964	1.424	35.230		321.47	0.44	10	127	3.611	1.520	2.091	152.02	0.45	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
13.300	43.635	7	1.34	408.38	3.00E-2	82.9	68.0	108	46	2117	1725			
13.400	43.963	7	1.28	464.73	3.00E-2	93.1	76.1	115	47	2415	1806			
13.500	44.291	6	1.36	459.18	3.00E-4	94.4	76.9	115	47	2395	1805			
13.600	44.619	6	1.37	482.18	3.00E-4	99.9	81.2	117	47	2523	1841			
13.700	44.948	6	1.34	457.49	3.00E-4	94.2	76.3	114	47	2402	1815			
13.800	45.276	7	1.33	424.44	3.00E-2	87.4	70.5	110	47	2237	1776			
13.900	45.604	7	1.22	450.32	3.00E-2	90.0	72.4	113	47	2380	1817			
14.000	45.932	7	1.01	502.83	3.00E-2	94.7	76.0	120	47	2665	1891			
14.100	46.260	7	1.18	471.54	3.00E-2	93.8	75.0	116	47	2508	1857			
14.200	46.588	7	1.24	475.00	3.00E-2	96.3	76.7	116	47	2534	1868			
14.300	46.916	7	1.32	442.93	3.00E-2	92.3	73.3	112	47	2372	1831			
14.400	47.244	7	1.09	503.94	3.00E-2	98.6	78.0	120	47	2705	1917			
14.500	47.572	7	1.31	568.19	3.00E-2	118.9	93.8	127	48	3059	2001			
14.600	47.900	6	1.45	492.11	3.00E-4	107.8	84.8	119	47	2659	1914			
14.700	48.228	6	1.44	486.71	3.00E-4	106.8	83.8	118	47	2638	1913			
14.800	48.556	7	1.12	574.95	3.00E-2	114.9	89.8	128	48	3124	2028			
14.900	48.885	7	1.13	578.23	3.00E-2	116.0	90.4	129	48	3151	2038			
15.000	49.213	7	1.17	570.74	3.00E-2	116.4	90.5	128	48	3120	2036			
15.100	49.541	7	1.17	578.03	3.00E-2	118.1	91.5	129	48	3170	2050			
15.200	49.869	7	1.17	580.78	3.00E-2	119.0	92.0	129	48	3194	2060			
15.300	50.197	7	1.27	537.17	3.00E-2	113.9	87.7	124	47	2964	2013			
15.400	50.525	6	1.42	424.19	3.00E-4	94.4	72.5	110	46	2350	1867			
15.500	50.853	6	1.48	386.04	3.00E-4	88.0	67.4	105	46	2146	1815			
15.600	51.181	6	1.36	400.68	3.00E-4	88.2	67.3	107	46	2234	1843			
15.700	51.509	6	1.38	426.85	3.00E-4	94.7	72.0	110	46	2386	1887			
15.800	51.837	7	1.33	436.52	3.00E-2	95.6	72.5	112	46	2447	1907			
15.900	52.165	6	1.35	394.99	3.00E-4	87.3	66.0	106	46	2222	1850			
16.000	52.493	7	1.34	390.39	3.00E-2	86.3	65.1	106	46	2203	1848			
16.100	52.822	6	1.38	398.18	3.00E-4	89.3	67.2	107	46	2253	1866			
16.200	53.150	6	1.51	430.57	3.00E-4	101.0	75.7	111	46	2442	1920			
16.300	53.478	6	1.54	399.83	3.00E-4	94.8	70.9	107	46	2275	1879			
16.400	53.806	6	1.44	433.58	3.00E-4	99.8	74.5	111	46	2473	1936			
16.500	54.134	7	1.32	448.02	3.00E-2	99.7	74.2	113	46	2562	1962			
16.600	54.462	7	1.32	416.25	3.00E-2	92.9	68.9	109	46	2388	1920			
16.700	54.790	6	1.37	364.65	3.00E-4	83.1	61.5	102	45	2099	1843			
16.800	55.118	6	1.48	343.24	3.00E-4	81.2	59.9	99	45	1982	1812			
16.900	55.446	6	1.44	416.61	3.00E-4	97.3	71.6	109	46	2410	1937			
17.000	55.774	7	1.32	488.00	3.00E-2	110.1	80.8	118	47	2828	2047			
17.100	56.102	6	1.37	427.43	3.00E-4	98.3	71.9	111	46	2486	1964			
17.200	56.430	6	1.45	337.67	3.00E-4	80.0	58.4	98	45	1972	1821			
17.300	56.759	6	1.47	254.60	3.00E-4	61.0	44.4	85	44	1494	1664			
17.400	57.087	6	1.66	158.72	3.00E-4	40.9	29.7	67	41	942	1429			
17.500	57.415	5	2.17	78.87	3.00E-6	27.5	19.9	47	38	525	1177			
17.600	57.743	6	1.93	138.24	3.00E-4	41.5	30.0	63	41	870	1396			
17.700	58.071	6	1.56	257.89	3.00E-4	64.3	46.3	86	44	1529	1688			
17.800	58.399	6	1.56	290.68	3.00E-4	72.4	52.1	91	44	1726	1760			
17.900	58.727	6	1.62	306.15	3.00E-4	78.2	56.1	94	45	1822	1795			
18.000	59.055	6	1.52	366.30	3.00E-4	90.4	64.6	102	45	2182	1910			
18.100	59.383	6	1.39	322.78	3.00E-4	76.7	54.7	96	45	1930	1836			
18.200	59.711	6	1.56	213.70	3.00E-4	53.9	38.4	78	43	1286	1607			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
18.300	60.039	276.823	0.907	30.904		277.27	0.33	10	127	3.631	1.530	2.102	130.21	0.33	0.00
18.400	60.367	261.133	0.925	27.587		261.53	0.35	10	127	3.652	1.540	2.112	122.09	0.36	0.00
18.500	60.696	280.717	2.251	25.568		281.09	0.80	9	124	3.673	1.550	2.122	130.71	0.81	0.00
18.600	61.024	414.301	2.183	25.682		414.67	0.53	10	127	3.694	1.561	2.133	192.68	0.53	0.00
18.700	61.352	604.842	2.219	27.183		605.23	0.37	10	127	3.714	1.571	2.144	280.61	0.37	0.00
18.800	61.680	642.150	4.576	27.965		642.55	0.71	10	127	3.735	1.581	2.154	296.54	0.72	0.00
18.900	62.008	686.913	1.391	28.356		687.32	0.20	10	127	3.756	1.591	2.165	315.75	0.20	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
18.300	60.039	6	1.54	183.50	3.00E-4	46.3	32.9	72	42	1109	1532			
18.400	60.367	6	1.59	172.50	3.00E-4	44.3	31.4	70	42	1046	1505			
18.500	60.696	6	1.76	180.44	3.00E-4	50.6	35.7	72	42	1124	1544			
18.600	61.024	6	1.52	273.57	3.00E-4	68.7	48.4	88	44	1659	1761			
18.700	61.352	7	1.29	399.41	3.00E-2	93.5	65.7	107	46	2421	2000			
18.800	61.680	6	1.47	423.12	3.00E-4	104.8	73.5	110	46	2570	2044			
18.900	62.008	7	1.11	451.65	3.00E-2	100.5	70.3	114	46	2749	2094			

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LIQUEFACTION ANALYSIS CALCULATION DETAILS
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Input File Name: G:\GS16\GS16-0107_Panama\Design & Analysis\LIQUEFACTION\16-0107-CPT5.liq
Title: 12870 Panama Street
Subtitle: CPT 5

Input Data:
Surface Elev.=0
Hole No.=CPT5
Depth of Hole=62.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.65 g
Earthquake Magnitude=6.63
No-Liquefiable Soils: CL, OL are Non-Liq. Soil
1. CPT Calulation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.1
Plot two CSR (fs1=1, fs2=User)
10. Average two input data between two Depths: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf %	Gamma pcf	Fines %	D50 mm
0.16	0.00	0.00	100.00	120.00	0.00	0.50
0.66	0.00	0.00	100.00	120.00	0.00	0.50
1.15	0.00	0.00	100.00	120.00	0.00	0.50
1.64	0.00	0.00	100.00	120.00	0.00	0.50
2.13	0.00	0.00	100.00	120.00	0.00	0.50
2.62	0.00	0.00	100.00	120.00	0.00	0.50
3.12	0.00	0.00	100.00	120.00	0.00	0.50
3.61	0.00	0.00	100.00	120.00	0.00	0.50
4.10	0.00	0.00	100.00	120.00	0.00	0.50
4.59	0.00	0.00	100.00	120.00	0.00	0.50
5.09	40.85	1.13	2.77	120.00	0.00	0.50
5.58	45.86	1.47	3.19	120.00	0.00	0.50
6.07	67.36	1.36	2.02	120.00	0.00	0.50
6.56	101.10	1.52	1.51	120.00	0.00	0.50
7.05	116.30	1.23	1.06	120.00	0.00	0.50
7.55	108.10	1.36	1.25	120.00	0.00	0.50
8.04	158.90	1.58	0.99	120.00	0.00	0.50
8.53	219.00	1.50	0.69	120.00	0.00	0.50
9.02	195.00	1.46	0.75	120.00	0.00	0.50
9.51	161.00	1.16	0.72	120.00	0.00	0.50
10.00	126.70	1.00	0.79	120.00	0.00	0.50
10.49	132.60	1.07	0.81	120.00	0.00	0.50
10.99	137.50	0.86	0.62	120.00	0.00	0.50
11.48	131.70	0.68	0.51	120.00	0.00	0.50
11.97	107.80	0.63	0.58	120.00	0.00	0.50
12.46	44.92	0.80	1.79	120.00	0.00	0.50
12.95	40.09	0.77	1.93	120.00	0.00	0.50
13.45	39.40	0.99	2.51	120.00	0.00	0.50
13.94	64.71	0.59	0.91	120.00	0.00	0.50
14.43	25.87	0.68	2.62	120.00	NoLiq	0.50
14.92	13.49	0.28	2.10	120.00	NoLiq	0.50
15.41	14.22	0.33	2.30	120.00	NoLiq	0.50
15.91	10.81	0.26	2.37	120.00	NoLiq	0.50
16.40	12.63	0.53	4.19	120.00	NoLiq	0.50
16.89	11.60	0.40	3.48	120.00	NoLiq	0.50
17.38	10.15	0.23	2.31	120.00	NoLiq	0.50
17.88	11.12	0.37	3.34	120.00	NoLiq	0.50
18.37	10.45	0.31	2.99	120.00	NoLiq	0.50
18.86	9.73	0.26	2.70	120.00	NoLiq	0.50
19.35	10.23	0.28	2.75	120.00	NoLiq	0.50
19.84	9.84	0.30	3.06	120.00	NoLiq	0.50
20.34	11.29	0.38	3.34	120.00	NoLiq	0.50
20.83	18.23	0.57	3.14	120.00	NoLiq	0.50
21.32	16.34	0.51	3.10	120.00	NoLiq	0.50
21.81	24.06	0.96	4.01	120.00	NoLiq	0.50
22.30	33.23	1.25	3.76	120.00	NoLiq	0.50
22.80	38.03	1.20	3.15	120.00	NoLiq	0.50

23.29	17.51	0.61	3.47	120.00	NoLiq	0.50
23.78	20.16	0.66	3.28	120.00	NoLiq	0.50
24.27	97.98	0.83	0.85	120.00	0.00	0.50
24.77	124.70	1.15	0.92	120.00	0.00	0.50
25.26	111.80	1.02	0.92	120.00	0.00	0.50
25.75	158.60	1.25	0.79	120.00	0.00	0.50
26.24	194.20	0.84	0.43	120.00	0.00	0.50
26.73	161.20	0.83	0.51	120.00	0.00	0.50
27.23	245.90	2.44	0.99	120.00	0.00	0.50
27.72	281.20	1.29	0.46	120.00	0.00	0.50
28.21	160.10	1.01	0.63	120.00	0.00	0.50
28.70	37.75	1.15	3.04	120.00	0.00	0.50
29.19	28.52	0.44	1.53	120.00	0.00	0.50
29.69	33.76	0.78	2.32	120.00	0.00	0.50
30.18	312.70	2.99	0.96	120.00	0.00	0.50
30.67	282.00	3.23	1.15	120.00	0.00	0.50
31.16	214.40	1.56	0.73	120.00	0.00	0.50
31.66	229.20	0.78	0.34	120.00	0.00	0.50
32.15	121.00	2.36	1.95	120.00	0.00	0.50
32.64	44.89	1.26	2.81	120.00	0.00	0.50
33.13	30.86	1.05	3.41	120.00	0.00	0.50
33.62	77.71	2.18	2.80	120.00	0.00	0.50
34.12	55.21	1.44	2.61	120.00	0.00	0.50
34.61	24.37	0.48	1.96	120.00	0.00	0.50
35.10	19.77	0.54	2.71	120.00	0.00	0.50
35.59	18.34	0.44	2.39	120.00	0.00	0.50
36.08	19.79	0.32	1.63	120.00	0.00	0.50
36.58	21.33	0.34	1.61	120.00	0.00	0.50
37.07	25.96	0.51	1.97	120.00	0.00	0.50
37.56	41.15	1.08	2.63	120.00	0.00	0.50
38.05	55.74	1.85	3.32	120.00	0.00	0.50
38.54	86.74	2.70	3.12	120.00	0.00	0.50
39.04	197.80	1.19	0.60	120.00	0.00	0.50
39.53	202.10	0.80	0.40	120.00	0.00	0.50
40.02	234.40	1.57	0.67	120.00	0.00	0.50
40.51	391.00	2.35	0.60	120.00	0.00	0.50
41.01	489.30	3.43	0.70	120.00	0.00	0.50
41.50	582.40	3.32	0.57	120.00	0.00	0.50
41.99	514.50	1.73	0.34	120.00	0.00	0.50
42.48	480.70	2.22	0.46	120.00	0.00	0.50
42.97	365.80	1.50	0.41	120.00	0.00	0.50
43.47	459.00	2.94	0.64	120.00	0.00	0.50
43.96	646.90	2.52	0.39	120.00	0.00	0.50
44.45	630.00	4.26	0.68	120.00	0.00	0.50
44.94	584.20	3.56	0.61	120.00	0.00	0.50
45.43	550.80	3.41	0.62	120.00	0.00	0.50
45.93	729.90	1.25	0.17	120.00	0.00	0.50
46.42	656.10	2.94	0.45	120.00	0.00	0.50
46.91	553.50	3.41	0.62	120.00	0.00	0.50
47.40	746.10	1.28	0.17	120.00	0.00	0.50
47.90	605.00	2.96	0.49	120.00	0.00	0.50
48.39	753.20	2.96	0.39	120.00	0.00	0.50
48.88	798.70	2.98	0.37	120.00	0.00	0.50
49.37	788.10	3.35	0.43	120.00	0.00	0.50
49.86	775.70	3.10	0.40	120.00	0.00	0.50
50.36	629.20	3.48	0.55	120.00	0.00	0.50
50.85	527.70	4.09	0.77	120.00	0.00	0.50
51.34	570.70	3.19	0.56	120.00	0.00	0.50
51.83	625.70	3.14	0.50	120.00	0.00	0.50
52.32	547.40	2.74	0.50	120.00	0.00	0.50
52.82	567.30	2.58	0.45	120.00	0.00	0.50
53.31	629.50	5.65	0.90	120.00	0.00	0.50
53.80	639.60	4.92	0.77	120.00	0.00	0.50
54.29	602.40	3.11	0.52	120.00	0.00	0.50
54.79	509.40	2.59	0.51	120.00	0.00	0.50
55.28	509.00	3.72	0.73	120.00	0.00	0.50
55.77	774.00	3.87	0.50	120.00	0.00	0.50
56.26	604.60	2.77	0.46	120.00	0.00	0.50
56.75	400.80	0.99	0.25	120.00	0.00	0.50
57.25	174.40	0.89	0.51	120.00	0.00	0.50
57.74	228.90	2.38	1.04	120.00	0.00	0.50
58.23	434.00	2.41	0.56	120.00	0.00	0.50
58.72	448.90	3.76	0.84	120.00	0.00	0.50
59.21	567.90	2.56	0.45	120.00	0.00	0.50
59.71	286.80	1.47	0.51	120.00	0.00	0.50
60.20	268.10	0.75	0.28	120.00	0.00	0.50
60.69	284.30	1.42	0.50	120.00	0.00	0.50
61.18	521.00	1.33	0.26	120.00	0.00	0.50
61.67	668.00	6.50	0.97	120.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:
Calculation segment, dz=0.050 ft
User defined Print Interval, dp=0.50 ft

Peak Ground Acceleration (PGA), a_max = 0.65g

CSR Calculation:

Depth ft	gamma pcf	sigma atm	gamma' pcf	sigma' atm	rd	mZ g	a(z) g	CSR	x fs1	=CSRfs
0.16	120.00	0.009	120.00	0.009	1.00	0.000	0.650	0.42	1.00	0.42
0.66	120.00	0.037	120.00	0.037	1.00	0.000	0.650	0.42	1.00	0.42
1.16	120.00	0.066	120.00	0.066	1.00	0.000	0.650	0.42	1.00	0.42
1.66	120.00	0.094	120.00	0.094	1.00	0.000	0.650	0.42	1.00	0.42
2.16	120.00	0.122	120.00	0.122	0.99	0.000	0.650	0.42	1.00	0.42
2.66	120.00	0.151	120.00	0.151	0.99	0.000	0.650	0.42	1.00	0.42
3.16	120.00	0.179	120.00	0.179	0.99	0.000	0.650	0.42	1.00	0.42
3.66	120.00	0.208	120.00	0.208	0.99	0.000	0.650	0.42	1.00	0.42
4.16	120.00	0.236	120.00	0.236	0.99	0.000	0.650	0.42	1.00	0.42
4.66	120.00	0.264	120.00	0.264	0.99	0.000	0.650	0.42	1.00	0.42
5.16	120.00	0.293	57.60	0.288	0.99	0.000	0.650	0.42	1.00	0.42
5.66	120.00	0.321	57.60	0.302	0.99	0.000	0.650	0.44	1.00	0.44
6.16	120.00	0.349	57.60	0.315	0.99	0.000	0.650	0.46	1.00	0.46
6.66	120.00	0.378	57.60	0.329	0.98	0.000	0.650	0.48	1.00	0.48
7.16	120.00	0.406	57.60	0.343	0.98	0.000	0.650	0.49	1.00	0.49
7.66	120.00	0.434	57.60	0.356	0.98	0.000	0.650	0.51	1.00	0.51
8.16	120.00	0.463	57.60	0.370	0.98	0.000	0.650	0.52	1.00	0.52
8.66	120.00	0.491	57.60	0.383	0.98	0.000	0.650	0.53	1.00	0.53
9.16	120.00	0.519	57.60	0.397	0.98	0.000	0.650	0.54	1.00	0.54
9.66	120.00	0.548	57.60	0.411	0.98	0.000	0.650	0.55	1.00	0.55
10.16	120.00	0.576	57.60	0.424	0.98	0.000	0.650	0.56	1.00	0.56
10.66	120.00	0.604	57.60	0.438	0.98	0.000	0.650	0.57	1.00	0.57
11.16	120.00	0.633	57.60	0.451	0.97	0.000	0.650	0.58	1.00	0.58
11.66	120.00	0.661	57.60	0.465	0.97	0.000	0.650	0.58	1.00	0.58
12.16	120.00	0.690	57.60	0.479	0.97	0.000	0.650	0.59	1.00	0.59
12.66	120.00	0.718	57.60	0.492	0.97	0.000	0.650	0.60	1.00	0.60
13.16	120.00	0.746	57.60	0.506	0.97	0.000	0.650	0.60	1.00	0.60
13.66	120.00	0.775	57.60	0.520	0.97	0.000	0.650	0.61	1.00	0.61
14.16	120.00	0.803	57.60	0.533	0.97	0.000	0.650	0.62	1.00	0.62
14.66	120.00	0.831	57.60	0.547	0.97	0.000	0.650	0.62	1.00	0.62
15.16	120.00	0.860	57.60	0.560	0.96	0.000	0.650	0.63	1.00	0.63
15.66	120.00	0.888	57.60	0.574	0.96	0.000	0.650	0.63	1.00	0.63
16.16	120.00	0.916	57.60	0.588	0.96	0.000	0.650	0.63	1.00	0.63
16.66	120.00	0.945	57.60	0.601	0.96	0.000	0.650	0.64	1.00	0.64
17.16	120.00	0.973	57.60	0.615	0.96	0.000	0.650	0.64	1.00	0.64
17.66	120.00	1.001	57.60	0.628	0.96	0.000	0.650	0.65	1.00	0.65
18.16	120.00	1.030	57.60	0.642	0.96	0.000	0.650	0.65	1.00	0.65
18.66	120.00	1.058	57.60	0.656	0.96	0.000	0.650	0.65	1.00	0.65
19.16	120.00	1.086	57.60	0.669	0.96	0.000	0.650	0.66	1.00	0.66
19.66	120.00	1.115	57.60	0.683	0.95	0.000	0.650	0.66	1.00	0.66
20.16	120.00	1.143	57.60	0.696	0.95	0.000	0.650	0.66	1.00	0.66
20.66	120.00	1.172	57.60	0.710	0.95	0.000	0.650	0.66	1.00	0.66
21.16	120.00	1.200	57.60	0.724	0.95	0.000	0.650	0.67	1.00	0.67
21.66	120.00	1.228	57.60	0.737	0.95	0.000	0.650	0.67	1.00	0.67
22.16	120.00	1.257	57.60	0.751	0.95	0.000	0.650	0.67	1.00	0.67
22.66	120.00	1.285	57.60	0.765	0.95	0.000	0.650	0.67	1.00	0.67
23.16	120.00	1.313	57.60	0.778	0.95	0.000	0.650	0.67	1.00	0.67
23.66	120.00	1.342	57.60	0.792	0.94	0.000	0.650	0.68	1.00	0.68
24.16	120.00	1.370	57.60	0.805	0.94	0.000	0.650	0.68	1.00	0.68
24.66	120.00	1.398	57.60	0.819	0.94	0.000	0.650	0.68	1.00	0.68
25.16	120.00	1.427	57.60	0.833	0.94	0.000	0.650	0.68	1.00	0.68
25.66	120.00	1.455	57.60	0.846	0.94	0.000	0.650	0.68	1.00	0.68
26.16	120.00	1.483	57.60	0.860	0.94	0.000	0.650	0.68	1.00	0.68
26.66	120.00	1.512	57.60	0.873	0.94	0.000	0.650	0.69	1.00	0.69
27.16	120.00	1.540	57.60	0.887	0.94	0.000	0.650	0.69	1.00	0.69
27.66	120.00	1.568	57.60	0.901	0.94	0.000	0.650	0.69	1.00	0.69
28.16	120.00	1.597	57.60	0.914	0.93	0.000	0.650	0.69	1.00	0.69
28.66	120.00	1.625	57.60	0.928	0.93	0.000	0.650	0.69	1.00	0.69
29.16	120.00	1.654	57.60	0.941	0.93	0.000	0.650	0.69	1.00	0.69
29.66	120.00	1.682	57.60	0.955	0.93	0.000	0.650	0.69	1.00	0.69
30.16	120.00	1.710	57.60	0.969	0.93	0.000	0.650	0.69	1.00	0.69
30.66	120.00	1.739	57.60	0.982	0.92	0.000	0.650	0.69	1.00	0.69
31.16	120.00	1.767	57.60	0.996	0.92	0.000	0.650	0.69	1.00	0.69
31.66	120.00	1.795	57.60	1.009	0.92	0.000	0.650	0.69	1.00	0.69
32.16	120.00	1.824	57.60	1.023	0.91	0.000	0.650	0.69	1.00	0.69
32.66	120.00	1.852	57.60	1.037	0.91	0.000	0.650	0.69	1.00	0.69
33.16	120.00	1.880	57.60	1.050	0.90	0.000	0.650	0.68	1.00	0.68
33.66	120.00	1.909	57.60	1.064	0.90	0.000	0.650	0.68	1.00	0.68
34.16	120.00	1.937	57.60	1.078	0.90	0.000	0.650	0.68	1.00	0.68
34.66	120.00	1.965	57.60	1.091	0.89	0.000	0.650	0.68	1.00	0.68
35.16	120.00	1.994	57.60	1.105	0.89	0.000	0.650	0.68	1.00	0.68

35.66	120.00	2.022	57.60	1.118	0.88	0.000	0.650	0.68	1.00	0.68
36.16	120.00	2.050	57.60	1.132	0.88	0.000	0.650	0.67	1.00	0.67
36.66	120.00	2.079	57.60	1.146	0.88	0.000	0.650	0.67	1.00	0.67
37.16	120.00	2.107	57.60	1.159	0.87	0.000	0.650	0.67	1.00	0.67
37.66	120.00	2.136	57.60	1.173	0.87	0.000	0.650	0.67	1.00	0.67
38.16	120.00	2.164	57.60	1.186	0.86	0.000	0.650	0.67	1.00	0.67
38.66	120.00	2.192	57.60	1.200	0.86	0.000	0.650	0.66	1.00	0.66
39.16	120.00	2.221	57.60	1.214	0.86	0.000	0.650	0.66	1.00	0.66
39.66	120.00	2.249	57.60	1.227	0.85	0.000	0.650	0.66	1.00	0.66
40.16	120.00	2.277	57.60	1.241	0.85	0.000	0.650	0.66	1.00	0.66
40.66	120.00	2.306	57.60	1.254	0.84	0.000	0.650	0.65	1.00	0.65
41.16	120.00	2.334	57.60	1.268	0.84	0.000	0.650	0.65	1.00	0.65
41.66	120.00	2.362	57.60	1.282	0.83	0.000	0.650	0.65	1.00	0.65
42.16	120.00	2.391	57.60	1.295	0.83	0.000	0.650	0.65	1.00	0.65
42.66	120.00	2.419	57.60	1.309	0.83	0.000	0.650	0.65	1.00	0.65
43.16	120.00	2.447	57.60	1.322	0.82	0.000	0.650	0.64	1.00	0.64
43.66	120.00	2.476	57.60	1.336	0.82	0.000	0.650	0.64	1.00	0.64
44.16	120.00	2.504	57.60	1.350	0.81	0.000	0.650	0.64	1.00	0.64
44.66	120.00	2.532	57.60	1.363	0.81	0.000	0.650	0.64	1.00	0.64
45.16	120.00	2.561	57.60	1.377	0.81	0.000	0.650	0.63	1.00	0.63
45.66	120.00	2.589	57.60	1.391	0.80	0.000	0.650	0.63	1.00	0.63
46.16	120.00	2.618	57.60	1.404	0.80	0.000	0.650	0.63	1.00	0.63
46.66	120.00	2.646	57.60	1.418	0.79	0.000	0.650	0.63	1.00	0.63
47.16	120.00	2.674	57.60	1.431	0.79	0.000	0.650	0.62	1.00	0.62
47.66	120.00	2.703	57.60	1.445	0.79	0.000	0.650	0.62	1.00	0.62
48.16	120.00	2.731	57.60	1.459	0.78	0.000	0.650	0.62	1.00	0.62
48.66	120.00	2.759	57.60	1.472	0.78	0.000	0.650	0.62	1.00	0.62
49.16	120.00	2.788	57.60	1.486	0.77	0.000	0.650	0.61	1.00	0.61
49.66	120.00	2.816	57.60	1.499	0.77	0.000	0.650	0.61	1.00	0.61
50.16	120.00	2.844	57.60	1.513	0.77	0.000	0.650	0.61	1.00	0.61
50.66	120.00	2.873	57.60	1.527	0.76	0.000	0.650	0.61	1.00	0.61
51.16	120.00	2.901	57.60	1.540	0.76	0.000	0.650	0.60	1.00	0.60
51.66	120.00	2.929	57.60	1.554	0.75	0.000	0.650	0.60	1.00	0.60
52.16	120.00	2.958	57.60	1.567	0.75	0.000	0.650	0.60	1.00	0.60
52.66	120.00	2.986	57.60	1.581	0.75	0.000	0.650	0.59	1.00	0.59
53.16	120.00	3.014	57.60	1.595	0.74	0.000	0.650	0.59	1.00	0.59
53.66	120.00	3.043	57.60	1.608	0.74	0.000	0.650	0.59	1.00	0.59
54.16	120.00	3.071	57.60	1.622	0.73	0.000	0.650	0.59	1.00	0.59
54.66	120.00	3.100	57.60	1.635	0.73	0.000	0.650	0.58	1.00	0.58
55.16	120.00	3.128	57.60	1.649	0.73	0.000	0.650	0.58	1.00	0.58
55.66	120.00	3.156	57.60	1.663	0.72	0.000	0.650	0.58	1.00	0.58
56.16	120.00	3.185	57.60	1.676	0.72	0.000	0.650	0.58	1.00	0.58
56.66	120.00	3.213	57.60	1.690	0.71	0.000	0.650	0.57	1.00	0.57
57.16	120.00	3.241	57.60	1.704	0.71	0.000	0.650	0.57	1.00	0.57
57.66	120.00	3.270	57.60	1.717	0.70	0.000	0.650	0.57	1.00	0.57
58.16	120.00	3.298	57.60	1.731	0.70	0.000	0.650	0.56	1.00	0.56
58.66	120.00	3.326	57.60	1.744	0.70	0.000	0.650	0.56	1.00	0.56
59.16	120.00	3.355	57.60	1.758	0.69	0.000	0.650	0.56	1.00	0.56
59.66	120.00	3.383	57.60	1.772	0.69	0.000	0.650	0.56	1.00	0.56
60.16	120.00	3.411	57.60	1.785	0.68	0.000	0.650	0.55	1.00	0.55
60.66	120.00	3.440	57.60	1.799	0.68	0.000	0.650	0.55	1.00	0.55
61.16	120.00	3.468	57.60	1.812	0.68	0.000	0.650	0.55	1.00	0.55
61.66	120.00	3.496	57.60	1.826	0.67	0.000	0.650	0.54	1.00	0.54

CSR is based on water table at 5.00 during earthquake

CRR Calculation from CPT data, using Modify Robertson's Method:
(Fines content is determined by qc and fric.)

Depth ft	qc atm	fric. atm	n	Q	Rf	Ic	Cq	Fines %	Kc	qc1n atm	qc1f atm	CRR7.5
0.16			1.00	1.00E-4	0.00	7.97						
0.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
0.66			1.00	1.00E-4	0.00	7.97						
0.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.16			1.00	1.00E-4	0.00	7.97						
1.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.66			1.00	1.00E-4	0.00	7.97						
1.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.16			1.00	1.00E-4	0.00	7.97						
2.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.66			1.00	1.00E-4	0.00	7.97						
2.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.16			1.00	1.00E-4	0.00	7.97						
3.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.66			1.00	1.00E-4	0.00	7.97						
3.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.16			1.00	1.00E-4	0.00	7.97						
4.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.66			1.00	1.00E-4	0.00	7.97						
4.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
5.16			1.00	1.41E2	2.87	2.14						

5.16			0.50	7.66E1	2.87	2.31						
5.16	41.44	1.18	0.50	7.66E1	2.87	2.31	1.85	22.85	0.48	76.60	146.37	0.37
5.66			1.00	1.45E2	3.30	2.18						
5.66			0.50	8.28E1	3.30	2.33						
5.66	46.89	1.54	0.50	8.28E1	3.30	2.33	1.77	23.69	0.50	82.77	165.19	0.50
6.16			1.00	2.14E2	1.79	1.86						
6.16			0.50	1.27E2	1.79	2.01						
6.16	74.93	1.33	0.50	1.27E2	1.79	2.01	1.69	13.20	0.22	126.78	162.34	0.48
6.66			1.00	2.74E2	1.40	1.71						
6.66			0.50	1.69E2	1.40	1.85						
6.66	103.82	1.45	0.50	1.69E2	1.40	1.85	1.63	9.16	0.11	168.93	190.02	0.72
7.16			1.00	2.84E2	1.02	1.60						
7.16			0.50	1.82E2	1.02	1.73						
7.16	115.71	1.18	0.50	1.82E2	1.02	1.73	1.57	6.60	0.04	181.60	189.71	0.71
7.66			1.00	2.47E2	1.40	1.74						
7.66			0.50	1.64E2	1.40	1.86						
7.66	107.89	1.50	0.50	1.64E2	1.40	1.86	1.52	9.34	0.12	163.70	185.18	0.67
8.16			1.00	3.87E2	0.92	1.48						
8.16			0.50	2.64E2	0.92	1.58						
8.16	179.66	1.66	0.50	2.64E2	0.92	1.58	1.47	4.08	0.00	264.11	264.11	1.79
8.66			1.00	4.45E2	0.71	1.35						
8.66			0.50	3.13E2	0.71	1.45						
8.66	219.16	1.56	0.50	3.13E2	0.71	1.45	1.43	2.16	0.00	312.74	312.74	2.08
9.16			1.00	3.53E2	0.79	1.45						
9.16			0.50	2.55E2	0.79	1.54						
9.16	183.64	1.45	0.50	2.55E2	0.79	1.54	1.39	3.47	0.00	254.80	254.80	1.62
9.66			1.00	2.75E2	0.71	1.48						
9.66			0.50	2.05E2	0.71	1.58						
9.66	151.38	1.06	0.50	2.05E2	0.71	1.58	1.35	3.98	0.00	204.54	204.54	0.88
10.16			1.00	2.22E2	0.80	1.59						
10.16			0.50	1.69E2	0.80	1.67						
10.16	127.55	1.02	0.50	1.69E2	0.80	1.67	1.32	5.66	0.02	168.69	171.69	0.55
10.66			1.00	2.42E2	0.72	1.53						
10.66			0.50	1.86E2	0.72	1.61						
10.66	142.40	1.02	0.50	1.86E2	0.72	1.61	1.31	4.57	0.00	186.13	186.13	0.68
11.16			1.00	2.27E2	0.71	1.55						
11.16			0.50	1.76E2	0.71	1.63						
11.16	136.41	0.97	0.50	1.76E2	0.71	1.63	1.29	4.82	0.00	176.26	176.26	0.59
11.66			1.00	2.08E2	0.40	1.41						
11.66			0.50	1.63E2	0.40	1.50						
11.66	127.85	0.51	0.50	1.63E2	0.40	1.50	1.28	2.85	0.00	163.35	163.35	0.49
12.16			1.00	1.51E2	0.63	1.65						
12.16			0.50	1.20E2	0.63	1.72						
12.16	95.17	0.60	0.50	1.20E2	0.63	1.72	1.26	6.59	0.04	120.27	125.59	0.26
12.66			1.00	4.20E1	3.47	2.55						
12.66			0.50	3.45E1	3.47	2.61						
12.66			0.70	3.77E1	3.47	2.59						
12.66	27.61	0.93	0.70	3.77E1	3.47	2.59	1.37	34.64	0.79	37.74	181.00	0.63
13.16			1.00	7.93E1	1.33	2.07						
13.16			0.50	6.50E1	1.33	2.13						
13.16	52.54	0.69	0.50	6.50E1	1.33	2.13	1.24	16.82	0.32	65.00	94.99	0.16
13.66			1.00	9.63E1	1.23	1.98						
13.66			0.50	7.96E1	1.23	2.04						
13.66	65.03	0.79	0.50	7.96E1	1.23	2.04	1.22	14.16	0.24	79.62	105.38	0.19
14.16			1.00	6.14E1	1.66	2.21						
14.16	42.62	0.70	1.00	6.14E1	1.66	2.21	1.00	NoLiq	1.00	42.62	42.62	2.08
14.66			1.00	2.04E1	3.62	2.80						
14.66	14.99	0.51	1.00	2.04E1	3.62	2.80	1.00	NoLiq	1.00	14.99	14.99	2.08
15.16			1.00	1.73E1	2.53	2.76						
15.16	13.10	0.31	1.00	1.73E1	2.53	2.76	1.00	NoLiq	1.00	13.10	13.10	2.08
15.66			1.00	1.51E1	2.64	2.82						
15.66	11.79	0.29	1.00	1.51E1	2.64	2.82	1.00	NoLiq	1.00	11.79	11.79	2.08
16.16			1.00	1.48E1	3.75	2.92						
16.16	11.82	0.41	1.00	1.48E1	3.75	2.92	1.00	NoLiq	1.00	11.82	11.82	2.08
16.66			1.00	1.43E1	4.43	2.97						
16.66	11.67	0.48	1.00	1.43E1	4.43	2.97	1.00	NoLiq	1.00	11.67	11.67	2.08
17.16			1.00	1.29E1	3.05	2.91						
17.16	10.82	0.30	1.00	1.29E1	3.05	2.91	1.00	NoLiq	1.00	10.82	10.82	2.08
17.66			1.00	1.15E1	3.29	2.97						
17.66	9.96	0.29	1.00	1.15E1	3.29	2.97	1.00	NoLiq	1.00	9.96	9.96	2.08
18.16			1.00	1.23E1	3.52	2.96						
18.16	10.76	0.34	1.00	1.23E1	3.52	2.96	1.00	NoLiq	1.00	10.76	10.76	2.08
18.66			1.00	1.20E1	3.28	2.96						
18.66	10.68	0.32	1.00	1.20E1	3.28	2.96	1.00	NoLiq	1.00	10.68	10.68	2.08
19.16			1.00	1.04E1	2.54	2.94						
19.16	9.59	0.22	1.00	1.04E1	2.54	2.94	1.00	NoLiq	1.00	9.59	9.59	2.08
19.66			1.00	1.15E1	3.22	2.96						
19.66	10.70	0.31	1.00	1.15E1	3.22	2.96	1.00	NoLiq	1.00	10.70	10.70	2.08
20.16			1.00	1.14E1	3.32	2.98						
20.16	10.76	0.32	1.00	1.14E1	3.32	2.98	1.00	NoLiq	1.00	10.76	10.76	2.08
20.66			1.00	1.49E1	3.48	2.89						
20.66	13.97	0.44	1.00	1.49E1	3.48	2.89	1.00	NoLiq	1.00	13.97	13.97	2.08

21.16			1.00	1.95E1	3.14	2.77						
21.16	18.20	0.53	1.00	1.95E1	3.14	2.77	1.00	NoLiq	1.00	18.20	18.20	2.08
21.66			1.00	2.03E1	4.16	2.84						
21.66	19.22	0.75	1.00	2.03E1	4.16	2.84	1.00	NoLiq	1.00	19.22	19.22	2.08
22.16			1.00	3.43E1	3.85	2.65						
22.16	32.07	1.19	1.00	3.43E1	3.85	2.65	1.00	NoLiq	1.00	32.07	32.07	2.08
22.66			1.00	3.73E1	4.23	2.65						
22.66	35.34	1.44	1.00	3.73E1	4.23	2.65	1.00	NoLiq	1.00	35.34	35.34	2.08
23.16			1.00	1.86E1	4.39	2.88						
23.16	18.55	0.76	1.00	1.86E1	4.39	2.88	1.00	NoLiq	1.00	18.55	18.55	2.08
23.66			1.00	1.72E1	3.47	2.84						
23.66	17.54	0.56	1.00	1.72E1	3.47	2.84	1.00	NoLiq	1.00	17.54	17.54	2.08
24.16			1.00	9.01E1	1.03	1.95						
24.16			0.50	8.93E1	1.03	1.96						
24.16	87.20	0.88	0.50	8.93E1	1.03	1.96	1.02	11.77	0.18	89.33	109.05	0.20
24.66			1.00	1.30E2	0.99	1.82						
24.66			0.50	1.29E2	0.99	1.82						
24.66	127.16	1.24	0.50	1.29E2	0.99	1.82	1.02	8.59	0.10	129.35	143.06	0.35
25.16			1.00	1.16E2	0.74	1.78						
25.16			0.50	1.17E2	0.74	1.78						
25.16	115.57	0.84	0.50	1.17E2	0.74	1.78	1.01	7.61	0.07	116.74	125.50	0.26
25.66			1.00	1.44E2	1.03	1.80						
25.66			0.50	1.45E2	1.03	1.80						
25.66	144.24	1.47	0.50	1.45E2	1.03	1.80	1.00	8.08	0.08	144.70	157.67	0.44
26.16			1.00	1.85E2	0.45	1.48						
26.16			0.50	1.88E2	0.45	1.48						
26.16	188.19	0.83	0.50	1.88E2	0.45	1.48	1.00	2.55	0.00	187.52	187.52	0.69
26.66			1.00	1.62E2	0.47	1.55						
26.66			0.50	1.66E2	0.47	1.54						
26.66	167.29	0.79	0.50	1.66E2	0.47	1.54	0.99	3.40	0.00	165.58	165.58	0.50
27.16			1.00	2.13E2	1.02	1.68						
27.16			0.50	2.18E2	1.02	1.67						
27.16	221.52	2.24	0.50	2.18E2	1.02	1.67	0.98	5.57	0.02	217.80	221.18	1.09
27.66			1.00	2.71E2	0.50	1.39						
27.66			0.50	2.79E2	0.50	1.38						
27.66	285.69	1.42	0.50	2.79E2	0.50	1.38	0.98	1.24	0.00	279.07	279.07	2.08
28.16			1.00	1.61E2	0.55	1.59						
28.16			0.50	1.68E2	0.55	1.57						
28.16	172.73	0.94	0.50	1.68E2	0.55	1.57	0.97	3.91	0.00	167.64	167.64	0.52
28.66			1.00	3.77E1	2.90	2.53						
28.66			0.50	4.07E1	2.90	2.51						
28.66	42.21	1.18	0.50	4.07E1	2.90	2.51	0.96	31.05	0.70	40.71	133.67	0.30
29.16			1.00	2.51E1	1.71	2.53						
29.16			0.50	2.78E1	1.71	2.49						
29.16	29.03	0.47	0.50	2.78E1	1.71	2.49	0.96	30.34	0.68	27.82	86.05	0.14
29.66			1.00	2.84E1	2.48	2.58						
29.66			0.50	3.14E1	2.48	2.55						
29.66	32.98	0.78	0.50	3.14E1	2.48	2.55	0.95	32.94	0.75	31.41	123.64	0.26
30.16			1.00	2.51E2	1.04	1.64						
30.16			0.50	2.67E2	1.04	1.62						
30.16	282.33	2.93	0.50	2.67E2	1.04	1.62	0.95	4.68	0.00	267.24	267.24	1.86
30.66			1.00	2.49E2	1.16	1.67						
30.66			0.50	2.67E2	1.16	1.66						
30.66	283.37	3.27	0.50	2.67E2	1.16	1.66	0.94	5.31	0.01	266.61	268.82	1.89
31.16			1.00	1.86E2	0.74	1.62						
31.16			0.50	2.01E2	0.74	1.60						
31.16	214.43	1.56	0.50	2.01E2	0.74	1.60	0.94	4.28	0.00	200.54	200.54	0.83
31.66			1.00	1.97E2	0.34	1.40						
31.66			0.50	2.13E2	0.34	1.37						
31.66	229.18	0.78	0.50	2.13E2	0.34	1.37	0.93	1.15	0.00	213.07	213.07	0.98
32.16			1.00	9.94E1	2.02	2.12						
32.16			0.50	1.09E2	2.02	2.09						
32.16	118.21	2.36	0.50	1.09E2	2.02	2.09	0.92	15.58	0.28	109.26	152.30	0.41
32.66			1.00	3.55E1	2.89	2.55						
32.66			0.50	4.04E1	2.89	2.51						
32.66	43.91	1.21	0.50	4.04E1	2.89	2.51	0.92	31.12	0.70	40.35	133.40	0.30
33.16			1.00	2.58E1	3.75	2.73						
33.16	32.79	1.16	1.00	2.58E1	3.75	2.73	1.00	NoLiq	1.00	32.79	32.79	2.08
33.66			1.00	6.78E1	2.60	2.32						
33.66			0.50	7.63E1	2.60	2.28						
33.66	84.02	2.14	0.50	7.63E1	2.60	2.28	0.91	21.75	0.45	76.34	138.14	0.33
34.16			1.00	3.93E1	2.90	2.52						
34.16			0.50	4.52E1	2.90	2.47						
34.16	50.07	1.39	0.50	4.52E1	2.90	2.47	0.90	29.54	0.66	45.24	131.19	0.29
34.66			1.00	1.76E1	2.26	2.72						
34.66	23.78	0.49	1.00	1.76E1	2.26	2.72	1.00	NoLiq	1.00	23.78	23.78	2.08
35.16			1.00	1.59E1	2.59	2.80						
35.16	21.91	0.52	1.00	1.59E1	2.59	2.80	1.00	NoLiq	1.00	21.91	21.91	2.08
35.66			1.00	1.26E1	2.51	2.87						
35.66	18.01	0.40	1.00	1.26E1	2.51	2.87	1.00	NoLiq	1.00	18.01	18.01	2.08
36.16			1.00	1.46E1	1.68	2.72						
36.16	20.68	0.31	1.00	1.46E1	1.68	2.72	1.00	NoLiq	1.00	20.68	20.68	2.08

36.66			1.00	1.53E1	1.82	2.72						
36.66	21.88	0.36	1.00	1.53E1	1.82	2.72	1.00	NoLiq	1.00	21.88	21.88	2.08
37.16			1.00	1.86E1	2.71	2.75						
37.16	26.43	0.66	1.00	1.86E1	2.71	2.75	1.00	NoLiq	1.00	26.43	26.43	2.08
37.66			1.00	2.97E1	2.98	2.62						
37.66	41.36	1.17	1.00	2.97E1	2.98	2.62	1.00	NoLiq	1.00	41.36	41.36	2.08
38.16			1.00	3.82E1	4.18	2.64						
38.16	53.17	2.13	1.00	3.82E1	4.18	2.64	1.00	NoLiq	1.00	53.17	53.17	2.08
38.66			1.00	9.91E1	1.96	2.11						
38.66			0.50	1.17E2	1.96	2.06						
38.66	135.79	2.61	0.50	1.17E2	1.96	2.06	0.86	14.66	0.26	116.98	157.66	0.44
39.16			1.00	1.44E2	0.57	1.64						
39.16			0.50	1.70E2	0.57	1.58						
39.16	198.40	1.13	0.50	1.70E2	0.57	1.58	0.86	4.03	0.00	170.06	170.06	0.54
39.66			1.00	1.50E2	0.47	1.57						
39.66			0.50	1.78E2	0.47	1.51						
39.66	208.26	0.96	0.50	1.78E2	0.47	1.51	0.85	2.98	0.00	177.63	177.63	0.60
40.16			1.00	1.82E2	0.99	1.72						
40.16			0.50	2.17E2	0.99	1.66						
40.16	255.27	2.51	0.50	2.17E2	0.99	1.66	0.85	5.45	0.01	216.65	219.29	1.06
40.66			1.00	2.95E2	0.55	1.39						
40.66			0.50	3.51E2	0.55	1.33						
40.66	416.09	2.29	0.50	3.51E2	0.55	1.33	0.84	0.77	0.00	351.43	351.43	2.08
41.16			1.00	4.08E2	0.60	1.32						
41.16			0.50	4.87E2	0.60	1.27						
41.16	579.57	3.49	0.50	4.87E2	0.60	1.27	0.84	0.11	0.00	487.14	487.14	2.08
41.66			1.00	3.77E2	0.37	1.19						
41.66			0.50	4.52E2	0.37	1.13						
41.66	540.79	1.99	0.50	4.52E2	0.37	1.13	0.84	0.00	0.00	452.38	452.38	2.08
42.16			1.00	3.36E2	0.43	1.27						
42.16			0.50	4.05E2	0.43	1.21						
42.16	486.89	2.07	0.50	4.05E2	0.43	1.21	0.83	0.00	0.00	405.36	405.36	2.08
42.66			1.00	2.99E2	0.43	1.31						
42.66			0.50	3.63E2	0.43	1.25						
42.66	437.62	1.86	0.50	3.63E2	0.43	1.25	0.83	0.00	0.00	362.63	362.63	2.08
43.16			1.00	2.70E2	0.52	1.40						
43.16			0.50	3.29E2	0.52	1.34						
43.16	399.17	2.07	0.50	3.29E2	0.52	1.34	0.82	0.79	0.00	329.24	329.24	2.08
43.66			1.00	3.70E2	0.54	1.31						
43.66			0.50	4.53E2	0.54	1.26						
43.66	551.70	2.99	0.50	4.53E2	0.54	1.26	0.82	0.00	0.00	452.95	452.95	2.08
44.16			1.00	3.86E2	0.68	1.37						
44.16			0.50	4.75E2	0.68	1.32						
44.16	581.08	3.94	0.50	4.75E2	0.68	1.32	0.82	0.60	0.00	474.90	474.90	2.08
44.66			1.00	4.12E2	0.72	1.38						
44.66			0.50	5.08E2	0.72	1.32						
44.66	624.87	4.49	0.50	5.08E2	0.72	1.32	0.81	0.63	0.00	500.00	500.00	2.08
45.16			1.00	3.70E2	0.51	1.29						
45.16			0.50	4.59E2	0.51	1.23						
45.16	566.69	2.86	0.50	4.59E2	0.51	1.23	0.81	0.00	0.00	458.99	458.99	2.08
45.66			1.00	3.93E2	0.31	1.13						
45.66			0.50	4.89E2	0.31	1.06						
45.66	606.33	1.89	0.50	4.89E2	0.31	1.06	0.81	0.00	0.00	488.92	488.92	2.08
46.16			1.00	3.92E2	0.30	1.12						
46.16			0.50	4.91E2	0.30	1.05						
46.16	611.33	1.84	0.50	4.91E2	0.30	1.05	0.80	0.00	0.00	490.79	490.79	2.08
46.66			1.00	3.95E2	0.43	1.22						
46.66			0.50	4.96E2	0.43	1.15						
46.66	620.98	2.64	0.50	4.96E2	0.43	1.15	0.80	0.00	0.00	496.36	496.36	2.08
47.16			1.00	4.04E2	0.34	1.15						
47.16			0.50	5.10E2	0.34	1.07						
47.16	640.22	2.18	0.50	5.10E2	0.34	1.07	0.80	0.00	0.00	500.00	500.00	2.08
47.66			1.00	4.84E2	0.87	1.40						
47.66			0.50	6.13E2	0.87	1.35						
47.66	773.58	6.73	0.50	6.13E2	0.87	1.35	0.79	0.91	0.00	500.00	500.00	2.08
48.16			1.00	3.80E2	1.09	1.54						
48.16			0.50	4.84E2	1.09	1.48						
48.16	613.07	6.66	0.50	4.84E2	1.09	1.48	0.79	2.60	0.00	483.77	483.77	2.08
48.66			1.00	4.91E2	0.33	1.07						
48.66			0.50	6.27E2	0.33	1.00						
48.66	797.47	2.60	0.50	6.27E2	0.33	1.00	0.79	0.00	0.00	500.00	500.00	2.08
49.16			1.00	4.77E2	0.41	1.15						
49.16			0.50	6.12E2	0.41	1.08						
49.16	782.49	3.19	0.50	6.12E2	0.41	1.08	0.78	0.00	0.00	500.00	500.00	2.08
49.66			1.00	4.81E2	0.39	1.13						
49.66			0.50	6.20E2	0.39	1.06						
49.66	795.11	3.12	0.50	6.20E2	0.39	1.06	0.78	0.00	0.00	500.00	500.00	2.08
50.16			1.00	4.68E2	0.56	1.26						
50.16			0.50	6.05E2	0.56	1.19						
50.16	780.22	4.37	0.50	6.05E2	0.56	1.19	0.78	0.00	0.00	500.00	500.00	2.08
50.66			1.00	3.27E2	0.88	1.51						
50.66			0.50	4.26E2	0.88	1.44						

50.66	550.94	4.81	0.50	4.26E2	0.88	1.44	0.77	1.96	0.00	425.81	425.81	2.08
51.16			1.00	3.33E2	0.47	1.30						
51.16			0.50	4.34E2	0.47	1.22						
51.16	564.37	2.66	0.50	4.34E2	0.47	1.22	0.77	0.00	0.00	434.44	434.44	2.08
51.66			1.00	3.66E2	0.64	1.37						
51.66			0.50	4.79E2	0.64	1.30						
51.66	625.17	4.01	0.50	4.79E2	0.64	1.30	0.77	0.38	0.00	479.31	479.31	2.08
52.16			1.00	3.11E2	0.60	1.40						
52.16			0.50	4.10E2	0.60	1.32						
52.16	536.94	3.20	0.50	4.10E2	0.60	1.32	0.76	0.57	0.00	410.02	410.02	2.08
52.66			1.00	3.11E2	0.46	1.31						
52.66			0.50	4.12E2	0.46	1.23						
52.66	541.33	2.45	0.50	4.12E2	0.46	1.23	0.76	0.00	0.00	411.75	411.75	2.08
53.16			1.00	3.54E2	1.01	1.53						
53.16			0.50	4.70E2	1.01	1.46						
53.16	620.56	6.22	0.50	4.70E2	1.01	1.46	0.76	2.29	0.00	470.16	470.16	2.08
53.66			1.00	3.16E2	0.87	1.51						
53.66			0.50	4.20E2	0.87	1.43						
53.66	557.13	4.80	0.50	4.20E2	0.87	1.43	0.75	1.95	0.00	420.46	420.46	2.08
54.16			1.00	3.60E2	0.49	1.29						
54.16			0.50	4.82E2	0.49	1.20						
54.16	640.83	3.12	0.50	4.82E2	0.49	1.20	0.75	0.00	0.00	481.77	481.77	2.08
54.66			1.00	3.15E2	0.46	1.31						
54.66			0.50	4.23E2	0.46	1.22						
54.66	564.92	2.59	0.50	4.23E2	0.46	1.22	0.75	0.00	0.00	423.08	423.08	2.08
55.16			1.00	2.76E2	0.73	1.49						
55.16			0.50	3.72E2	0.73	1.41						
55.16	498.65	3.61	0.50	3.72E2	0.73	1.41	0.75	1.61	0.00	372.03	372.03	2.08
55.66			1.00	3.99E2	0.48	1.25						
55.66			0.50	5.39E2	0.48	1.16						
55.66	724.87	3.45	0.50	5.39E2	0.48	1.16	0.74	0.00	0.00	500.00	500.00	2.08
56.16			1.00	3.34E2	0.51	1.32						
56.16			0.50	4.53E2	0.51	1.23						
56.16	611.51	3.09	0.50	4.53E2	0.51	1.23	0.74	0.00	0.00	452.82	452.82	2.08
56.66			1.00	2.20E2	0.48	1.44						
56.66			0.50	3.01E2	0.48	1.34						
56.66	408.22	1.95	0.50	3.01E2	0.48	1.34	0.74	0.83	0.00	301.16	301.16	2.08
57.16			1.00	1.07E2	0.53	1.72						
57.16			0.50	1.49E2	0.53	1.61						
57.16	202.21	1.06	0.50	1.49E2	0.53	1.61	0.74	4.45	0.00	148.63	148.63	0.39
57.66			1.00	9.31E1	1.47	2.04						
57.66			0.50	1.30E2	1.47	1.94						
57.66	176.85	2.55	0.50	1.30E2	1.47	1.94	0.73	11.40	0.17	129.51	156.21	0.43
58.16			1.00	2.23E2	0.56	1.48						
58.16			0.50	3.08E2	0.56	1.38						
58.16	422.40	2.36	0.50	3.08E2	0.56	1.38	0.73	1.29	0.00	308.21	308.21	2.08
58.66			1.00	2.30E2	0.86	1.60						
58.66			0.50	3.19E2	0.86	1.50						
58.66	438.90	3.73	0.50	3.19E2	0.86	1.50	0.73	2.89	0.00	319.10	319.10	2.08
59.16			1.00	2.97E2	0.59	1.40						
59.16			0.50	4.13E2	0.59	1.31						
59.16	569.80	3.32	0.50	4.13E2	0.59	1.31	0.72	0.47	0.00	412.79	412.79	2.08
59.66			1.00	1.64E2	0.49	1.55						
59.66			0.50	2.29E2	0.49	1.44						
59.66	317.53	1.55	0.50	2.29E2	0.49	1.44	0.72	1.99	0.00	229.22	229.22	1.20
60.16			1.00	1.38E2	0.29	1.50						
60.16			0.50	1.94E2	0.29	1.37						
60.16	270.04	0.79	0.50	1.94E2	0.29	1.37	0.72	1.15	0.00	194.24	194.24	0.76
60.66			1.00	1.42E2	0.52	1.62						
60.66			0.50	2.00E2	0.52	1.50						
60.66	279.46	1.44	0.50	2.00E2	0.52	1.50	0.72	2.80	0.00	200.32	200.32	0.83
61.16			1.00	2.58E2	0.27	1.24						
61.16			0.50	3.63E2	0.27	1.11						
61.16	508.35	1.34	0.50	3.63E2	0.27	1.11	0.71	0.00	0.00	363.13	363.13	2.08
61.66			1.00	3.36E2	0.95	1.52						
61.66			0.50	4.74E2	0.95	1.44						
61.66	665.93	6.28	0.50	4.74E2	0.95	1.44	0.71	1.97	0.00	474.04	474.04	2.08

Fines have been calculated, and correction is made by Modify Robertson Method.
Fines=NoLiq means the soils are not liquefiable.
CRR is based on water table at 10.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 6.63:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.16	0.01	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
0.66	0.02	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.16	0.04	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.66	0.06	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.16	0.08	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.66	0.10	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^

3.16	0.12	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
3.66	0.13	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
4.16	0.15	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
4.66	0.17	2.08	1.00	2.08	1.37	2.00	0.42	5.00	^	
5.16	0.19	0.37	1.00	0.37	1.37	0.51	0.42	1.20		
5.66	0.21	0.50	1.00	0.50	1.37	0.68	0.44	1.54		
6.16	0.23	0.48	1.00	0.48	1.37	0.66	0.46	1.42		
6.66	0.25	0.72	1.00	0.72	1.37	0.98	0.48	2.06		
7.16	0.26	0.71	1.00	0.71	1.37	0.98	0.49	1.99		
7.66	0.28	0.67	1.00	0.67	1.37	0.92	0.51	1.82		
8.16	0.30	1.79	1.00	1.79	1.37	2.46	0.52	4.74		
8.66	0.32	2.08	1.00	2.08	1.37	2.85	0.53	5.00		
9.16	0.34	1.62	1.00	1.62	1.37	2.22	0.54	4.10		
9.66	0.36	0.88	1.00	0.88	1.37	1.20	0.55	2.18		
10.16	0.37	0.55	1.00	0.55	1.37	0.75	0.56	1.35		
10.66	0.38	0.68	1.00	0.68	1.37	0.93	0.57	1.64		
11.16	0.39	0.59	1.00	0.59	1.37	0.81	0.58	1.40		
11.66	0.40	0.49	1.00	0.49	1.37	0.67	0.58	1.14		
12.16	0.41	0.26	1.00	0.26	1.37	0.36	0.59	0.61	*	
12.66	0.42	0.63	1.00	0.63	1.37	0.87	0.60	1.45		
13.16	0.42	0.16	1.00	0.16	1.37	0.22	0.60	0.36	*	Liq.
13.66	0.43	0.19	1.00	0.19	1.37	0.26	0.61	0.42	*	
14.16	0.44	2.08	1.00	2.08	1.37	2.00	0.62	5.00	^	
14.66	0.45	2.08	1.00	2.08	1.37	2.00	0.62	5.00	^	
15.16	0.46	2.08	1.00	2.08	1.37	2.00	0.63	5.00	^	
15.66	0.47	2.08	1.00	2.08	1.37	2.00	0.63	5.00	^	
16.16	0.48	2.08	1.00	2.08	1.37	2.00	0.63	5.00	^	
16.66	0.49	2.08	1.00	2.08	1.37	2.00	0.64	5.00	^	
17.16	0.50	2.08	1.00	2.08	1.37	2.00	0.64	5.00	^	
17.66	0.50	2.08	1.00	2.08	1.37	2.00	0.65	5.00	^	
18.16	0.51	2.08	1.00	2.08	1.37	2.00	0.65	5.00	^	
18.66	0.52	2.08	1.00	2.08	1.37	2.00	0.65	5.00	^	
19.16	0.53	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
19.66	0.54	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
20.16	0.55	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
20.66	0.56	2.08	1.00	2.08	1.37	2.00	0.66	5.00	^	
21.16	0.57	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
21.66	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
22.16	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
22.66	0.59	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
23.16	0.60	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
23.66	0.61	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
24.16	0.62	0.20	1.00	0.20	1.37	0.27	0.68	0.41	*	
24.66	0.63	0.35	1.00	0.35	1.37	0.48	0.68	0.71	*	
25.16	0.64	0.26	1.00	0.26	1.37	0.36	0.68	0.53	*	
25.66	0.65	0.44	1.00	0.44	1.37	0.61	0.68	0.89	*	
26.16	0.65	0.69	1.00	0.69	1.37	0.95	0.68	1.39		
26.66	0.66	0.50	1.00	0.50	1.37	0.69	0.69	1.00		
27.16	0.67	1.09	1.00	1.09	1.37	1.49	0.69	2.17		
27.66	0.68	2.08	1.00	2.08	1.37	2.85	0.69	4.14		
28.16	0.69	0.52	1.00	0.52	1.37	0.71	0.69	1.03		
28.66	0.70	0.30	1.00	0.30	1.37	0.41	0.69	0.60	*	
29.16	0.71	0.14	1.00	0.14	1.37	0.19	0.69	0.28	*	Liq.
29.66	0.72	0.26	1.00	0.26	1.37	0.35	0.69	0.51	*	
30.16	0.73	1.86	1.00	1.86	1.37	2.54	0.69	3.67		
30.66	0.73	1.89	1.00	1.89	1.37	2.59	0.69	3.74		
31.16	0.74	0.83	1.00	0.83	1.37	1.14	0.69	1.65		
31.66	0.75	0.98	1.00	0.98	1.37	1.34	0.69	1.95		
32.16	0.76	0.41	1.00	0.41	1.37	0.56	0.69	0.81	*	
32.66	0.77	0.30	1.00	0.30	1.37	0.41	0.69	0.60	*	
33.16	0.78	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
33.66	0.79	0.33	1.00	0.33	1.37	0.45	0.68	0.65	*	
34.16	0.80	0.29	1.00	0.29	1.37	0.40	0.68	0.58	*	
34.66	0.81	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
35.16	0.81	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
35.66	0.82	2.08	1.00	2.08	1.37	2.00	0.68	5.00	^	
36.16	0.83	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
36.66	0.84	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
37.16	0.85	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
37.66	0.86	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
38.16	0.87	2.08	1.00	2.08	1.37	2.00	0.67	5.00	^	
38.66	0.88	0.44	1.00	0.44	1.37	0.61	0.66	0.92	*	
39.16	0.88	0.54	1.00	0.54	1.37	0.74	0.66	1.11		
39.66	0.89	0.60	1.00	0.60	1.37	0.82	0.66	1.25		
40.16	0.90	1.06	1.00	1.06	1.37	1.45	0.66	2.21		
40.66	0.91	2.08	1.00	2.08	1.37	2.85	0.65	4.35		
41.16	0.92	2.08	1.00	2.08	1.37	2.85	0.65	4.37		
41.66	0.93	2.08	1.00	2.08	1.37	2.85	0.65	4.38		
42.16	0.94	2.08	1.00	2.08	1.37	2.85	0.65	4.40		
42.66	0.95	2.08	1.00	2.08	1.37	2.85	0.65	4.42		
43.16	0.96	2.08	1.00	2.08	1.37	2.85	0.64	4.43		
43.66	0.96	2.08	1.00	2.08	1.37	2.85	0.64	4.45		

44.16	0.97	2.08	1.00	2.08	1.37	2.85	0.64	4.46
44.66	0.98	2.08	1.00	2.08	1.37	2.85	0.64	4.48
45.16	0.99	2.08	1.00	2.08	1.37	2.85	0.63	4.50
45.66	1.00	2.08	1.00	2.08	1.37	2.85	0.63	4.52
46.16	1.01	2.08	1.00	2.09	1.37	2.86	0.63	4.56
46.66	1.02	2.08	1.00	2.09	1.37	2.86	0.63	4.57
47.16	1.03	2.08	1.00	2.08	1.37	2.86	0.62	4.58
47.66	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.59
48.16	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.60
48.66	1.05	2.08	1.00	2.08	1.37	2.84	0.62	4.62
49.16	1.06	2.08	1.00	2.07	1.37	2.84	0.61	4.63
49.66	1.07	2.08	1.00	2.07	1.37	2.84	0.61	4.64
50.16	1.08	2.08	0.99	2.07	1.37	2.83	0.61	4.66
50.66	1.09	2.08	0.99	2.06	1.37	2.83	0.61	4.67
51.16	1.10	2.08	0.99	2.06	1.37	2.83	0.60	4.69
51.66	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.70
52.16	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.71
52.66	1.12	2.08	0.99	2.05	1.37	2.81	0.59	4.73
53.16	1.13	2.08	0.99	2.05	1.37	2.81	0.59	4.74
53.66	1.14	2.08	0.98	2.05	1.37	2.81	0.59	4.76
54.16	1.15	2.08	0.98	2.04	1.37	2.80	0.59	4.78
54.66	1.16	2.08	0.98	2.04	1.37	2.80	0.58	4.79
55.16	1.17	2.08	0.98	2.04	1.37	2.79	0.58	4.81
55.66	1.18	2.08	0.98	2.04	1.37	2.79	0.58	4.83
56.16	1.19	2.08	0.98	2.03	1.37	2.79	0.58	4.84
56.66	1.19	2.08	0.98	2.03	1.37	2.78	0.57	4.86
57.16	1.20	0.39	0.97	0.38	1.37	0.51	0.57	0.90 *
57.66	1.21	0.43	0.97	0.42	1.37	0.58	0.57	1.02
58.16	1.22	2.08	0.97	2.02	1.37	2.77	0.56	4.91
58.66	1.23	2.08	0.97	2.02	1.37	2.77	0.56	4.93
59.16	1.24	2.08	0.97	2.02	1.37	2.76	0.56	4.95
59.66	1.25	1.20	0.97	1.16	1.37	1.59	0.56	2.87
60.16	1.26	0.76	0.97	0.74	1.37	1.01	0.55	1.83
60.66	1.27	0.83	0.97	0.80	1.37	1.10	0.55	1.99
61.16	1.27	2.08	0.96	2.01	1.37	2.75	0.55	5.00
61.66	1.28	2.08	0.96	2.00	1.37	2.75	0.54	5.00

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils or above Water Table.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
0.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
5.16	2.31	4.23	146.37	34.57	22.85	0.00	34.57
5.66	2.33	4.19	165.19	39.40	23.69	0.00	39.40
6.16	2.01	4.79	162.34	33.91	13.20	0.00	33.91
6.66	1.85	5.09	190.02	37.35	9.16	0.00	37.35
7.16	1.73	5.31	189.71	35.71	6.60	0.00	35.71
7.66	1.86	5.07	185.18	36.51	9.34	0.00	36.51
8.16	1.58	5.58	264.11	47.37	4.08	0.00	47.37
8.66	1.45	5.82	312.74	53.73	2.16	0.00	53.73
9.16	1.54	5.65	254.80	45.11	3.47	0.00	45.11
9.66	1.58	5.59	204.54	36.61	3.98	0.00	36.61
10.16	1.67	5.40	171.69	31.77	5.66	0.00	31.77
10.66	1.61	5.52	186.13	33.72	4.57	0.00	33.72
11.16	1.63	5.49	176.26	32.09	4.82	0.00	32.09
11.66	1.50	5.73	163.35	28.53	2.85	0.00	28.53
12.16	1.72	5.31	125.59	23.64	6.59	0.00	23.64
12.66	2.59	3.72	181.00	48.62	34.64	0.00	48.62
13.16	2.13	4.56	94.99	20.84	16.82	0.00	20.84
13.66	2.04	4.72	105.38	22.31	14.16	0.00	22.31
14.16	2.21	4.41	42.62	9.67	NoLiq	0.00	9.67
14.66	2.80	3.33	14.99	4.50	NoLiq	0.00	4.50
15.16	2.76	3.40	13.10	3.85	NoLiq	0.00	3.85
15.66	2.82	3.29	11.79	3.58	NoLiq	0.00	3.58
16.16	2.92	3.11	11.82	3.80	NoLiq	0.00	3.80
16.66	2.97	3.01	11.67	3.88	NoLiq	0.00	3.88
17.16	2.91	3.12	10.82	3.47	NoLiq	0.00	3.47

17.66	2.97	3.01	9.96	3.30	NoLiq	0.00	3.30
18.16	2.96	3.02	10.76	3.56	NoLiq	0.00	3.56
18.66	2.96	3.04	10.68	3.51	NoLiq	0.00	3.51
19.16	2.94	3.06	9.59	3.13	NoLiq	0.00	3.13
19.66	2.96	3.02	10.70	3.54	NoLiq	0.00	3.54
20.16	2.98	3.00	10.76	3.59	NoLiq	0.00	3.59
20.66	2.89	3.15	13.97	4.43	NoLiq	0.00	4.43
21.16	2.77	3.37	18.20	5.39	NoLiq	0.00	5.39
21.66	2.84	3.25	19.22	5.91	NoLiq	0.00	5.91
22.16	2.65	3.61	32.07	8.88	NoLiq	0.00	8.88
22.66	2.65	3.61	35.34	9.80	NoLiq	0.00	9.80
23.16	2.88	3.17	18.55	5.84	NoLiq	0.00	5.84
23.66	2.84	3.25	17.54	5.40	NoLiq	0.00	5.40
24.16	1.96	4.89	109.05	22.31	11.77	0.00	22.31
24.66	1.82	5.13	143.06	27.86	8.59	0.00	27.86
25.16	1.78	5.22	125.50	24.05	7.61	0.00	24.05
25.66	1.80	5.18	157.67	30.45	8.08	0.00	30.45
26.16	1.48	5.77	187.52	32.52	2.55	0.00	32.52
26.66	1.54	5.66	165.58	29.27	3.40	0.00	29.27
27.16	1.67	5.41	221.18	40.86	5.57	0.00	40.86
27.66	1.38	5.96	279.07	46.85	1.24	0.00	46.85
28.16	1.57	5.60	167.64	29.96	3.91	0.00	29.96
28.66	2.51	3.87	133.67	34.58	31.05	0.00	34.58
29.16	2.49	3.89	86.05	22.10	30.34	0.00	22.10
29.66	2.55	3.79	123.64	32.63	32.94	0.00	32.63
30.16	1.62	5.51	267.24	48.52	4.68	0.00	48.52
30.66	1.66	5.44	268.82	49.41	5.31	0.00	49.41
31.16	1.60	5.55	200.54	36.12	4.28	0.00	36.12
31.66	1.37	5.97	213.07	35.68	1.15	0.00	35.68
32.16	2.09	4.63	152.30	32.87	15.58	0.00	32.87
32.66	2.51	3.86	133.40	34.54	31.12	0.00	34.54
33.16	2.73	3.45	32.79	9.49	NoLiq	0.00	9.49
33.66	2.28	4.29	138.14	32.21	21.75	0.00	32.21
34.16	2.47	3.93	131.19	33.40	29.54	0.00	33.40
34.66	2.72	3.46	23.78	6.86	NoLiq	0.00	6.86
35.16	2.80	3.33	21.91	6.57	NoLiq	0.00	6.57
35.66	2.87	3.20	18.01	5.63	NoLiq	0.00	5.63
36.16	2.72	3.47	20.68	5.96	NoLiq	0.00	5.96
36.66	2.72	3.47	21.88	6.31	NoLiq	0.00	6.31
37.16	2.75	3.41	26.43	7.74	NoLiq	0.00	7.74
37.66	2.62	3.66	41.36	11.30	NoLiq	0.00	11.30
38.16	2.64	3.63	53.17	14.66	NoLiq	0.00	14.66
38.66	2.06	4.69	157.66	33.61	14.66	0.00	33.61
39.16	1.58	5.58	170.06	30.47	4.03	0.00	30.47
39.66	1.51	5.71	177.63	31.11	2.98	0.00	31.11
40.16	1.66	5.43	219.29	40.42	5.45	0.00	40.42
40.66	1.33	6.03	351.43	58.24	0.77	0.00	58.24
41.16	1.27	6.15	487.14	79.18	0.11	0.00	79.18
41.66	1.13	6.41	452.38	70.62	0.00	0.00	70.62
42.16	1.21	6.26	405.36	64.72	0.00	0.00	64.72
42.66	1.25	6.20	362.63	58.53	0.00	0.00	58.53
43.16	1.34	6.03	329.24	54.59	0.79	0.00	54.59
43.66	1.26	6.18	452.95	73.28	0.00	0.00	73.28
44.16	1.32	6.06	474.90	78.32	0.60	0.00	78.32
44.66	1.32	6.06	500.00	82.54	0.63	0.00	82.54
45.16	1.23	6.23	458.99	73.68	0.00	0.00	73.68
45.66	1.06	6.54	488.92	74.73	0.00	0.00	74.73
46.16	1.05	6.56	490.79	74.78	0.00	0.00	74.78
46.66	1.15	6.37	496.36	77.86	0.00	0.00	77.86
47.16	1.07	6.52	500.00	76.70	0.00	0.00	76.70
47.66	1.35	6.01	500.00	83.18	0.91	0.00	83.18
48.16	1.48	5.76	483.77	83.99	2.60	0.00	83.99
48.66	1.00	6.66	500.00	75.10	0.00	0.00	75.10
49.16	1.08	6.51	500.00	76.79	0.00	0.00	76.79
49.66	1.06	6.54	500.00	76.44	0.00	0.00	76.44
50.16	1.19	6.30	500.00	79.33	0.00	0.00	79.33
50.66	1.44	5.85	425.81	72.82	1.96	0.00	72.82
51.16	1.22	6.24	434.44	69.61	0.00	0.00	69.61
51.66	1.30	6.10	479.31	78.53	0.38	0.00	78.53
52.16	1.32	6.07	410.02	67.56	0.57	0.00	67.56
52.66	1.23	6.23	411.75	66.05	0.00	0.00	66.05
53.16	1.46	5.80	470.16	81.04	2.29	0.00	81.04
53.66	1.43	5.85	420.46	71.87	1.95	0.00	71.87
54.16	1.20	6.28	481.77	76.74	0.00	0.00	76.74
54.66	1.22	6.24	423.08	67.76	0.00	0.00	67.76
55.16	1.41	5.90	372.03	63.06	1.61	0.00	63.06
55.66	1.16	6.35	500.00	78.74	0.00	0.00	78.74
56.16	1.23	6.22	452.82	72.78	0.00	0.00	72.78
56.66	1.34	6.02	301.16	49.99	0.83	0.00	49.99
57.16	1.61	5.53	148.63	26.86	4.45	0.00	26.86
57.66	1.94	4.91	156.21	31.79	11.40	0.00	31.79
58.16	1.38	5.95	308.21	51.80	1.29	0.00	51.80

58.66	1.50	5.72	319.10	55.78	2.89	0.00	55.78
59.16	1.31	6.09	412.79	67.83	0.47	0.00	67.83
59.66	1.44	5.84	229.22	39.22	1.99	0.00	39.22
60.16	1.37	5.97	194.24	32.53	1.15	0.00	32.53
60.66	1.50	5.73	200.32	34.94	2.80	0.00	34.94
61.16	1.11	6.44	363.13	56.38	0.00	0.00	56.38
61.66	1.44	5.85	474.04	81.08	1.97	0.00	81.08

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
(N1)60 is converted from qc1, (N1)60s is after fines correction
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Ishihara / Yoshimine

Depth ft	CSRsf	/ MSF*	=CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
61.96	0.54	1.00	0.54	5.00	0.00	66.36	100.00	0.000	0.0E0	0.000	0.000
61.66	0.54	1.00	0.54	5.00	1.97	81.08	100.00	0.000	0.0E0	0.000	0.000
61.16	0.55	1.00	0.55	5.00	0.00	56.38	100.00	0.000	0.0E0	0.000	0.000
60.66	0.55	1.00	0.55	1.99	2.80	34.94	100.00	0.000	0.0E0	0.000	0.000
60.16	0.55	1.00	0.55	1.83	1.15	32.53	96.07	0.021	1.3E-4	0.003	0.003
59.66	0.56	1.00	0.56	2.87	1.99	39.22	100.00	0.000	0.0E0	0.000	0.003
59.16	0.56	1.00	0.56	4.95	0.47	67.83	100.00	0.000	0.0E0	0.000	0.003
58.66	0.56	1.00	0.56	4.93	2.89	55.78	100.00	0.000	0.0E0	0.000	0.003
58.16	0.56	1.00	0.56	4.91	1.29	51.80	100.00	0.000	0.0E0	0.000	0.003
57.66	0.57	1.00	0.57	1.02	11.40	31.79	94.25	0.245	1.5E-3	0.002	0.005
57.16	0.57	1.00	0.57	0.90	4.45	26.86	83.37	0.802	4.8E-3	0.071	0.076
56.66	0.57	1.00	0.57	4.86	0.83	49.99	100.00	0.000	0.0E0	0.004	0.079
56.16	0.58	1.00	0.58	4.84	0.00	72.78	100.00	0.000	0.0E0	0.000	0.079
55.66	0.58	1.00	0.58	4.83	0.00	78.74	100.00	0.000	0.0E0	0.000	0.079
55.16	0.58	1.00	0.58	4.81	1.61	63.06	100.00	0.000	0.0E0	0.000	0.079
54.66	0.58	1.00	0.58	4.79	0.00	67.76	100.00	0.000	0.0E0	0.000	0.079
54.16	0.59	1.00	0.59	4.78	0.00	76.74	100.00	0.000	0.0E0	0.000	0.079
53.66	0.59	1.00	0.59	4.76	1.95	71.87	100.00	0.000	0.0E0	0.000	0.079
53.16	0.59	1.00	0.59	4.74	2.29	81.04	100.00	0.000	0.0E0	0.000	0.079
52.66	0.59	1.00	0.59	4.73	0.00	66.05	100.00	0.000	0.0E0	0.000	0.079
52.16	0.60	1.00	0.60	4.71	0.57	67.56	100.00	0.000	0.0E0	0.000	0.079
51.66	0.60	1.00	0.60	4.70	0.38	78.53	100.00	0.000	0.0E0	0.000	0.079
51.16	0.60	1.00	0.60	4.69	0.00	69.61	100.00	0.000	0.0E0	0.000	0.079
50.66	0.61	1.00	0.61	4.67	1.96	72.82	100.00	0.000	0.0E0	0.000	0.079
50.16	0.61	1.00	0.61	4.66	0.00	79.33	100.00	0.000	0.0E0	0.000	0.079
49.66	0.61	1.00	0.61	4.64	0.00	76.44	100.00	0.000	0.0E0	0.000	0.079
49.16	0.61	1.00	0.61	4.63	0.00	76.79	100.00	0.000	0.0E0	0.000	0.079
48.66	0.62	1.00	0.62	4.62	0.00	75.10	100.00	0.000	0.0E0	0.000	0.079
48.16	0.62	1.00	0.62	4.60	2.60	83.99	100.00	0.000	0.0E0	0.000	0.079
47.66	0.62	1.00	0.62	4.59	0.91	83.18	100.00	0.000	0.0E0	0.000	0.079
47.16	0.62	1.00	0.62	4.58	0.00	76.70	100.00	0.000	0.0E0	0.000	0.079
46.66	0.63	1.00	0.63	4.57	0.00	77.86	100.00	0.000	0.0E0	0.000	0.079
46.16	0.63	1.00	0.63	4.56	0.00	74.78	100.00	0.000	0.0E0	0.000	0.079
45.66	0.63	1.00	0.63	4.52	0.00	74.73	100.00	0.000	0.0E0	0.000	0.079
45.16	0.63	1.00	0.63	4.50	0.00	73.68	100.00	0.000	0.0E0	0.000	0.079
44.66	0.64	1.00	0.64	4.48	0.63	82.54	100.00	0.000	0.0E0	0.000	0.079
44.16	0.64	1.00	0.64	4.46	0.60	78.32	100.00	0.000	0.0E0	0.000	0.079
43.66	0.64	1.00	0.64	4.45	0.00	73.28	100.00	0.000	0.0E0	0.000	0.079
43.16	0.64	1.00	0.64	4.43	0.79	54.59	100.00	0.000	0.0E0	0.000	0.079
42.66	0.65	1.00	0.65	4.42	0.00	58.53	100.00	0.000	0.0E0	0.000	0.079
42.16	0.65	1.00	0.65	4.40	0.00	64.72	100.00	0.000	0.0E0	0.000	0.079
41.66	0.65	1.00	0.65	4.38	0.00	70.62	100.00	0.000	0.0E0	0.000	0.079
41.16	0.65	1.00	0.65	4.37	0.11	79.18	100.00	0.000	0.0E0	0.000	0.079
40.66	0.65	1.00	0.65	4.35	0.77	58.24	100.00	0.000	0.0E0	0.000	0.079
40.16	0.66	1.00	0.66	2.21	5.45	40.42	100.00	0.000	0.0E0	0.000	0.079
39.66	0.66	1.00	0.66	1.25	2.98	31.11	92.62	0.176	1.1E-3	0.005	0.084
39.16	0.66	1.00	0.66	1.11	4.03	30.47	91.12	0.295	1.8E-3	0.016	0.100
38.66	0.66	1.00	0.66	0.92	14.66	33.61	98.85	0.069	4.1E-4	0.010	0.110
38.16	0.67	1.00	0.67	5.00	NoLiq	14.66	60.61	0.000	0.0E0	0.000	0.111
37.66	0.67	1.00	0.67	5.00	NoLiq	11.30	53.56	0.000	0.0E0	0.000	0.111
37.16	0.67	1.00	0.67	5.00	NoLiq	7.74	44.78	0.000	0.0E0	0.000	0.111
36.66	0.67	1.00	0.67	5.00	NoLiq	6.31	40.75	0.000	0.0E0	0.000	0.111
36.16	0.67	1.00	0.67	5.00	NoLiq	5.96	39.72	0.000	0.0E0	0.000	0.111
35.66	0.68	1.00	0.68	5.00	NoLiq	5.63	38.73	0.000	0.0E0	0.000	0.111
35.16	0.68	1.00	0.68	5.00	NoLiq	6.57	41.52	0.000	0.0E0	0.000	0.111
34.66	0.68	1.00	0.68	5.00	NoLiq	6.86	42.35	0.000	0.0E0	0.000	0.111
34.16	0.68	1.00	0.68	0.58	29.54	33.40	98.29	0.195	1.2E-3	0.001	0.112
33.66	0.68	1.00	0.68	0.65	21.75	32.21	95.28	0.484	2.9E-3	0.073	0.185
33.16	0.68	1.00	0.68	5.00	NoLiq	9.49	49.30	0.000	0.0E0	0.000	0.185
32.66	0.69	1.00	0.69	0.60	31.12	34.54	100.00	0.000	0.0E0	0.020	0.205
32.16	0.69	1.00	0.69	0.81	15.58	32.87	96.94	0.229	1.4E-3	0.004	0.209
31.66	0.69	1.00	0.69	1.95	1.15	35.68	100.00	0.000	0.0E0	0.005	0.214
31.16	0.69	1.00	0.69	1.65	4.28	36.12	100.00	0.000	0.0E0	0.000	0.214
30.66	0.69	1.00	0.69	3.74	5.31	49.41	100.00	0.000	0.0E0	0.000	0.214

30.16	0.69	1.00	0.69	3.67	4.68	48.52	100.00	0.000	0.0E0	0.000	0.214
29.66	0.69	1.00	0.69	0.51	32.94	32.63	96.32	0.472	2.8E-3	0.003	0.217
29.16	0.69	1.00	0.69	0.28	30.34	22.10	74.32	2.001	1.2E-2	0.045	0.262
28.66	0.69	1.00	0.69	0.60	31.05	34.58	100.00	0.000	0.0E0	0.035	0.297
28.16	0.69	1.00	0.69	1.03	3.91	29.96	89.97	0.419	2.5E-3	0.080	0.377
27.66	0.69	1.00	0.69	4.14	1.24	46.85	100.00	0.000	0.0E0	0.001	0.378
27.16	0.69	1.00	0.69	2.17	5.57	40.86	100.00	0.000	0.0E0	0.000	0.378
26.66	0.69	1.00	0.69	1.00	3.40	29.27	88.43	0.479	2.9E-3	0.018	0.396
26.16	0.68	1.00	0.68	1.39	2.55	32.52	96.06	0.074	4.5E-4	0.009	0.405
25.66	0.68	1.00	0.68	0.89	8.08	30.45	91.09	0.575	3.5E-3	0.018	0.423
25.16	0.68	1.00	0.68	0.53	7.61	24.05	77.92	1.821	1.1E-2	0.075	0.498
24.66	0.68	1.00	0.68	0.71	8.59	27.86	85.43	1.148	6.9E-3	0.100	0.598
24.16	0.68	1.00	0.68	0.41	11.77	22.31	74.72	1.984	1.2E-2	0.100	0.698
23.66	0.68	1.00	0.68	5.00	NoLiq	5.40	38.03	0.000	0.0E0	0.037	0.735
23.16	0.67	1.00	0.67	5.00	NoLiq	5.84	39.37	0.000	0.0E0	0.000	0.735
22.66	0.67	1.00	0.67	5.00	NoLiq	9.80	50.05	0.000	0.0E0	0.000	0.735
22.16	0.67	1.00	0.67	5.00	NoLiq	8.88	47.78	0.000	0.0E0	0.000	0.735
21.66	0.67	1.00	0.67	5.00	NoLiq	5.91	39.55	0.000	0.0E0	0.000	0.735
21.16	0.67	1.00	0.67	5.00	NoLiq	5.39	38.00	0.000	0.0E0	0.000	0.735
20.66	0.66	1.00	0.66	5.00	NoLiq	4.43	34.92	0.000	0.0E0	0.000	0.735
20.16	0.66	1.00	0.66	5.00	NoLiq	3.59	32.08	0.000	0.0E0	0.000	0.735
19.66	0.66	1.00	0.66	5.00	NoLiq	3.54	31.91	0.000	0.0E0	0.000	0.735
19.16	0.66	1.00	0.66	5.00	NoLiq	3.13	30.48	0.000	0.0E0	0.000	0.735
18.66	0.65	1.00	0.65	5.00	NoLiq	3.51	31.83	0.000	0.0E0	0.000	0.735
18.16	0.65	1.00	0.65	5.00	NoLiq	3.56	31.98	0.000	0.0E0	0.000	0.735
17.66	0.65	1.00	0.65	5.00	NoLiq	3.30	31.09	0.000	0.0E0	0.000	0.735
17.16	0.64	1.00	0.64	5.00	NoLiq	3.47	31.66	0.000	0.0E0	0.000	0.735
16.66	0.64	1.00	0.64	5.00	NoLiq	3.88	33.09	0.000	0.0E0	0.000	0.735
16.16	0.63	1.00	0.63	5.00	NoLiq	3.80	32.80	0.000	0.0E0	0.000	0.735
15.66	0.63	1.00	0.63	5.00	NoLiq	3.58	32.06	0.000	0.0E0	0.000	0.735
15.16	0.63	1.00	0.63	5.00	NoLiq	3.85	32.99	0.000	0.0E0	0.000	0.735
14.66	0.62	1.00	0.62	5.00	NoLiq	4.50	35.16	0.000	0.0E0	0.000	0.735
14.16	0.62	1.00	0.62	5.00	NoLiq	9.67	49.74	0.000	0.0E0	0.000	0.735
13.66	0.61	1.00	0.61	0.42	14.16	22.31	74.71	1.984	1.2E-2	0.087	0.822
13.16	0.60	1.00	0.60	0.36	16.82	20.84	72.04	2.104	1.3E-2	0.108	0.930
12.66	0.60	1.00	0.60	1.45	34.64	48.62	100.00	0.000	0.0E0	0.063	0.993
12.16	0.59	1.00	0.59	0.61	6.59	23.64	77.15	1.794	1.1E-2	0.099	1.092
11.66	0.58	1.00	0.58	1.14	2.85	28.53	86.82	0.349	2.1E-3	0.053	1.145
11.16	0.58	1.00	0.58	1.40	4.82	32.09	94.98	0.093	5.6E-4	0.011	1.156
10.66	0.57	1.00	0.57	1.64	4.57	33.72	99.15	0.010	5.7E-5	0.003	1.159
10.16	0.56	1.00	0.56	1.35	5.66	31.77	94.19	0.116	6.9E-4	0.006	1.165
9.66	0.55	1.00	0.55	2.18	3.98	36.61	100.00	0.000	0.0E0	0.003	1.168
9.16	0.54	1.00	0.54	4.10	3.47	45.11	100.00	0.000	0.0E0	0.000	1.168
8.66	0.53	1.00	0.53	5.00	2.16	53.73	100.00	0.000	0.0E0	0.000	1.168
8.16	0.52	1.00	0.52	4.74	4.08	47.37	100.00	0.000	0.0E0	0.000	1.168
7.66	0.51	1.00	0.51	1.82	9.34	36.51	100.00	0.000	0.0E0	0.000	1.168
7.16	0.49	1.00	0.49	1.99	6.60	35.71	100.00	0.000	0.0E0	0.000	1.168
6.66	0.48	1.00	0.48	2.06	9.16	37.35	100.00	0.000	0.0E0	0.000	1.168
6.16	0.46	1.00	0.46	1.42	13.20	33.91	99.66	0.006	3.7E-5	0.000	1.168
5.66	0.44	1.00	0.44	1.54	23.69	39.40	100.00	0.000	0.0E0	0.000	1.168
5.16	0.42	1.00	0.42	1.20	22.85	34.57	100.00	0.000	0.0E0	0.000	1.168
5.01	0.42	1.00	0.42	0.90	30.30	32.89	96.98	0.189	1.1E-3	0.002	1.170

Settlement of Saturated Sands=1.170 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth ft	sigma' atm	sigC' atm	(N1)60s	CSRsf	Gmax atm	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsp in.	S in.
4.96	0.28	0.18	33.33	0.42	614.67	1.9E-4	0.0371	0.0178	0.82	0.0145	1.74E-4	0.000	0.000
4.66	0.26	0.17	0.10	0.42	86.09	1.3E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.16	0.24	0.15	0.10	0.42	81.34	1.2E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.66	0.21	0.13	0.10	0.42	76.30	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.16	0.18	0.12	0.10	0.42	70.90	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.66	0.15	0.10	0.10	0.42	65.05	9.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.16	0.12	0.08	0.10	0.42	58.62	8.8E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.66	0.09	0.06	0.10	0.42	51.39	7.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.16	0.07	0.04	0.10	0.42	42.95	6.5E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.66	0.04	0.02	0.10	0.42	32.40	4.9E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.16	0.01	0.01	0.10	0.42	15.95	2.4E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000

Settlement of Unsaturated Sands=0.000 in.
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft

S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=1.170 in.
Differential Settlement=0.585 to 0.772 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)	
1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)	
SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=1, based on Item 2 of Page C.
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

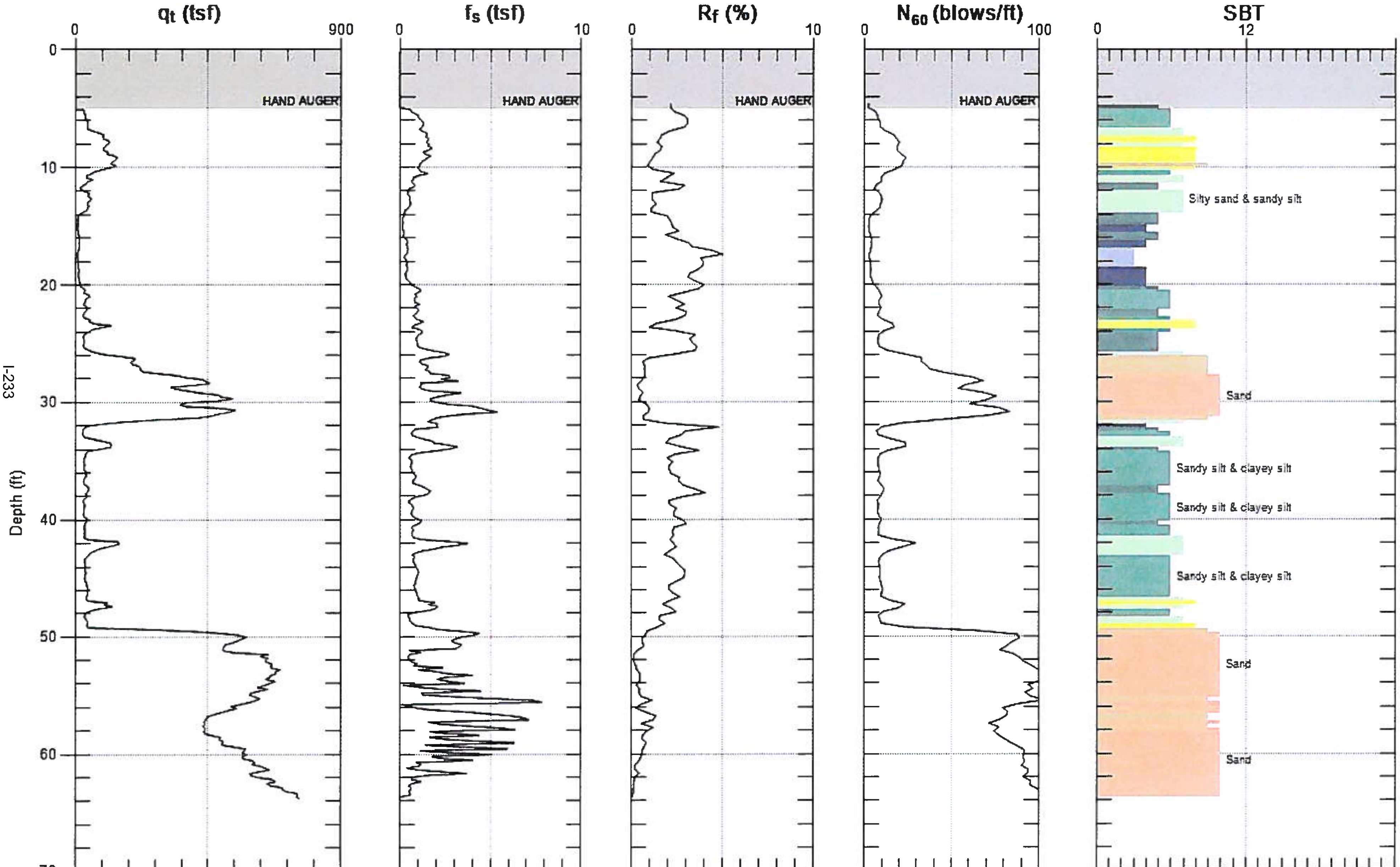
3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center, Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

GREGG GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-6

Engineer: R.GLADSON
Date: 5/26/2016 03:02



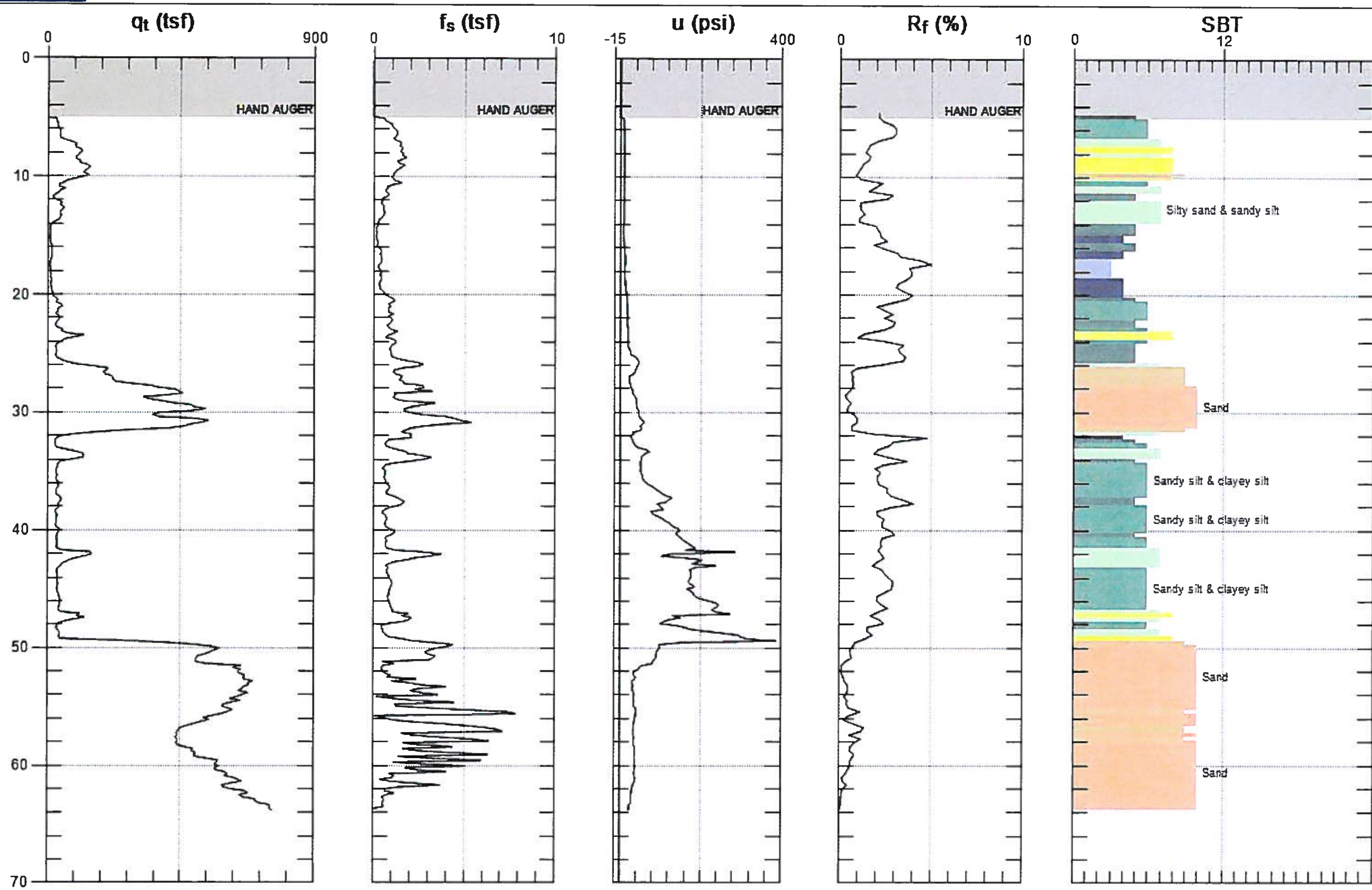
Max. Depth: 63.812 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-6

Engineer: R.GLADSON
Date: 5/26/2016 03:02



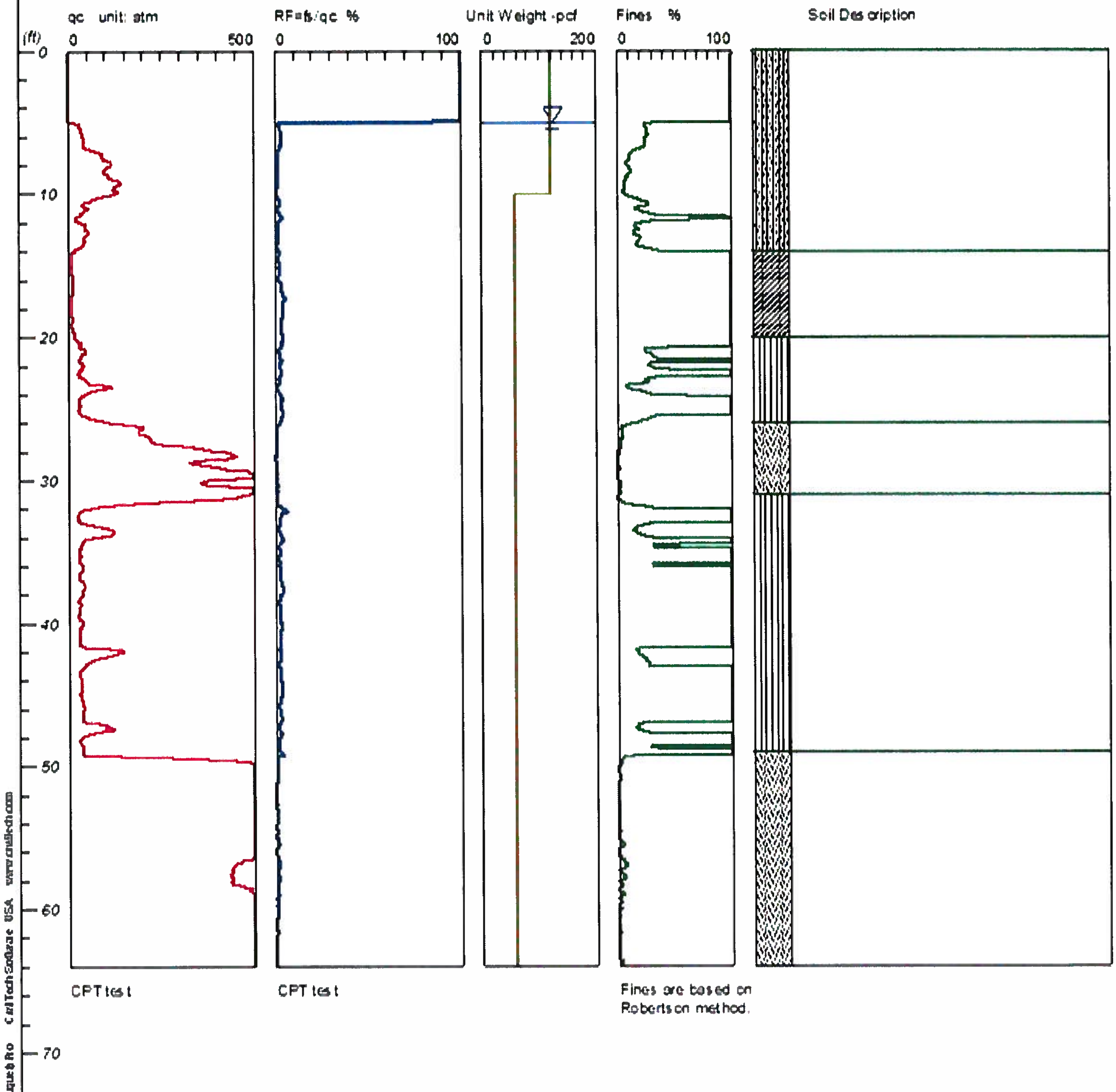
Max. Depth: 63.812 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

LIQUEFACTION ANALYSIS

12870 Panama Street

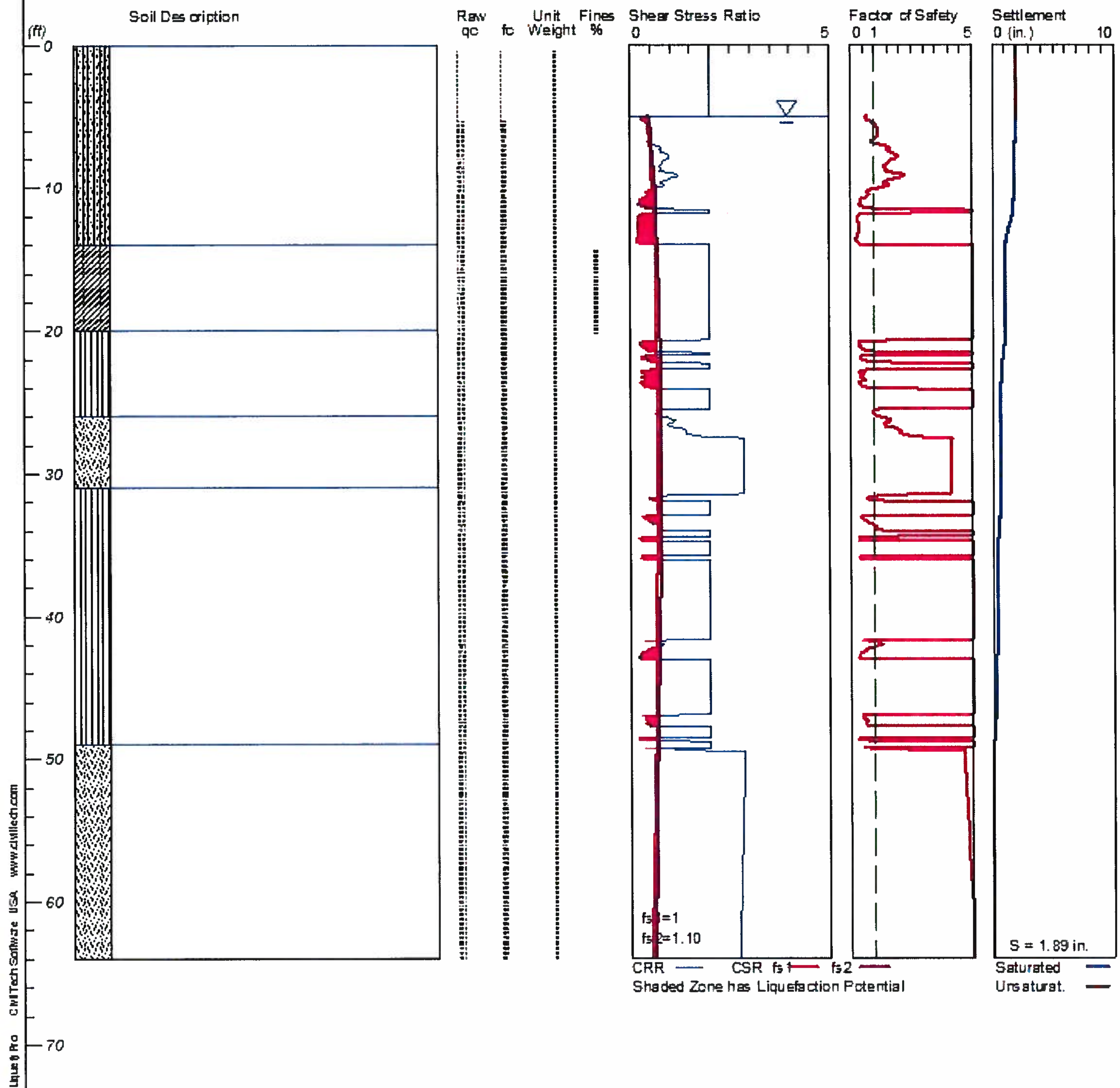
Hole No.=CPT6 ***Water Depth=5 ft*** ***Surface Elev.=0*** ***Magnitude=6.63***
Acceleration=0.65g



LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT6 *Water Depth=5 ft* *Surface Elev.=0* *Magnitude=6.63*
Acceleration=0.65g



CivilTech Corporation CPT 6 Plate LQ-1

GREGG DRILLING & TESTING, INC.

CONE PENETRATION TEST DATA

Client:	GEOSYSTEMS	Units:	Imperial
Site:	12870 PANAMA ST.	Data averaging interval:	0.100 meters
Engineer:	R.GLADSON	Assumed depth of water:	11.003 feet
		Net area ratio of cone:	0.80
		Unit weight of water:	62.4 lb/ft3
		Relative density constant, CDR:	350
Sounding:	CPT-6	Young's modulus for sands, a:	4
Date:	5/26/2016	Small strain shear modulus number, SG (sands):	180
Time:	3:02 PM	Small strain shear modulus number, CG (clays):	50
		Nkt for clays:	15
		OCR number, kocr:	0.3

Interpretation based on Lunne, Robertson and Powell, 1997

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
0.100	0.328	0.000	0.000	0.000							0.000				
0.200	0.656	0.000	0.000	0.000							0.000				
0.300	0.984	0.000	0.000	0.000							0.000				
0.400	1.312	0.000	0.000	0.000							0.000				
0.500	1.640	0.000	0.000	0.000							0.000				
0.600	1.969	0.000	0.000	0.000							0.000				
0.700	2.297	0.000	0.000	0.000							0.000				
0.800	2.625	0.000	0.000	0.000							0.000				
0.900	2.953	0.000	0.000	0.000							0.000				
1.000	3.281	0.000	0.000	0.000							0.000				
1.100	3.609	0.000	0.000	0.000							0.000				
1.200	3.937	0.000	0.000	0.000							0.000				
1.300	4.265	0.000	0.000	0.000							0.000				
1.400	4.593	0.000	0.000	0.000							0.000				
1.500	4.921	9.183	0.195	2.599		9.22	2.12	5	115	0.282	0.000	0.282	31.70	2.19	0.02
1.600	5.249	29.269	0.687	7.922		29.38	2.34	6	115	0.301	0.000	0.301	96.70	2.36	0.02
1.700	5.577	32.940	0.946	8.136		33.06	2.86	6	115	0.320	0.000	0.320	102.45	2.89	0.02
1.800	5.906	36.714	1.122	8.338		36.83	3.05	6	115	0.338	0.000	0.338	107.87	3.07	0.02
1.900	6.234	41.510	1.270	8.552		41.63	3.05	6	115	0.357	0.000	0.357	115.57	3.08	0.01
2.000	6.562	41.854	1.206	8.779		41.98	2.87	6	115	0.376	0.000	0.376	110.67	2.90	0.02
2.100	6.890	59.858	1.253	8.842		59.98	2.09	7	118	0.395	0.000	0.395	150.76	2.10	0.01
2.200	7.218	89.108	1.458	8.779		89.23	1.63	7	118	0.415	0.000	0.415	214.24	1.64	0.01
2.300	7.546	99.964	1.518	8.741		100.09	1.52	8	121	0.434	0.000	0.434	229.40	1.52	0.01
2.400	7.874	111.592	1.539	8.767		111.72	1.38	8	121	0.454	0.000	0.454	244.93	1.38	0.01
2.500	8.202	101.210	1.651	8.805		101.34	1.63	7	118	0.474	0.000	0.474	212.98	1.64	0.01
2.600	8.530	100.317	1.551	8.994		100.45	1.54	8	121	0.493	0.000	0.493	202.57	1.55	0.01
2.700	8.858	116.397	1.461	8.905		116.53	1.25	8	121	0.513	0.000	0.513	226.03	1.26	0.01
2.800	9.186	136.325	1.536	8.716		136.45	1.13	8	121	0.533	0.000	0.533	254.96	1.13	0.00
2.900	9.514	127.383	1.248	8.905		127.51	0.98	8	121	0.553	0.000	0.553	229.61	0.98	0.01
3.000	9.843	125.617	1.070	9.006		125.75	0.85	9	124	0.573	0.000	0.573	218.34	0.85	0.01
3.100	10.171	93.411	1.070	8.880		93.54	1.14	8	121	0.593	0.000	0.593	156.70	1.15	0.01
3.200	10.499	54.002	1.242	8.653		54.13	2.29	6	115	0.612	0.000	0.612	87.45	2.32	0.01

GREGG

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
0.100	0.328													
0.200	0.656													
0.300	0.984													
0.400	1.312													
0.500	1.640													
0.600	1.969													
0.700	2.297													
0.800	2.625													
0.900	2.953													
1.000	3.281													
1.100	3.609													
1.200	3.937													
1.300	4.265													
1.400	4.593													
1.500	4.921	5	2.51	23.13	3.00E-6	2.2	4.4	26	34	37	252			
1.600	5.249	5	2.18	63.15	3.00E-6	6.2	11.6	42	40	118	379			
1.700	5.577	5	2.23	69.50	3.00E-6	7.1	12.9	45	41	132	402			
1.800	5.906	5	2.23	74.69	3.00E-6	7.9	14.0	46	41	147	425			
1.900	6.234	5	2.21	80.93	3.00E-6	8.9	15.3	48	41	167	451			
2.000	6.562	5	2.21	78.62	3.00E-6	8.9	15.0	47	41	168	460			
2.100	6.890	5	2.01	102.85	3.00E-6	11.8	19.4	54	43	240	527			
2.200	7.218	6	1.83	141.56	3.00E-4	16.5	26.3	64	44	357	611			
2.300	7.546	6	1.79	152.94	3.00E-4	18.2	28.4	66	45	400	645			
2.400	7.874	6	1.74	164.53	3.00E-4	19.9	30.4	69	45	447	679			
2.500	8.202	6	1.83	149.28	3.00E-4	18.7	28.0	65	44	405	667			
2.600	8.530	6	1.83	144.44	3.00E-4	18.5	27.1	64	44	402	674			
2.700	8.858	6	1.73	160.48	3.00E-4	20.7	29.8	68	45	466	717			
2.800	9.186	6	1.66	181.67	3.00E-4	23.7	33.4	72	45	546	766			
2.900	9.514	6	1.64	166.09	3.00E-4	22.0	30.5	69	45	510	758			
3.000	9.843	6	1.61	160.71	3.00E-4	21.5	29.2	68	44	503	763			
3.100	10.171	6	1.81	120.79	3.00E-4	17.1	22.9	59	43	374	700			
3.200	10.499	5	2.20	72.94	3.00E-6	11.5	15.1	46	40	217	589			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
3.300	10.827	44.549	0.861	8.716		44.67	1.93	7	118	0.631	0.000	0.631	69.77	1.95	0.01
3.400	11.155	45.507	0.714	8.780		45.63	1.56	7	118	0.651	0.005	0.646	69.65	1.59	0.01
3.500	11.483	26.880	0.775	8.679		27.01	2.87	5	115	0.669	0.015	0.654	40.24	2.94	0.02
3.600	11.811	22.187	0.568	8.704		22.31	2.55	5	115	0.688	0.025	0.663	32.62	2.63	0.03
3.700	12.139	39.818	0.452	8.691		39.94	1.13	7	118	0.707	0.035	0.672	58.38	1.15	0.02
3.800	12.467	47.319	0.516	8.540		47.44	1.09	7	118	0.727	0.046	0.681	68.59	1.10	0.01
3.900	12.795	49.448	0.562	8.515		49.57	1.13	7	118	0.746	0.056	0.690	70.74	1.15	0.01
4.000	13.123	43.332	0.577	8.401		43.45	1.33	7	118	0.765	0.066	0.699	61.04	1.35	0.01
4.100	13.451	41.519	0.442	8.338		41.64	1.06	7	118	0.785	0.076	0.708	57.67	1.08	0.01
4.200	13.780	26.834	0.285	8.098		26.95	1.06	7	118	0.804	0.087	0.717	36.44	1.09	0.02
4.300	14.108	11.321	0.220	7.657		11.43	1.93	5	115	0.823	0.097	0.726	14.61	2.08	0.04
4.400	14.436	8.170	0.170	6.736		8.27	2.06	5	115	0.842	0.107	0.735	10.11	2.29	0.05
4.500	14.764	8.077	0.179	7.455		8.18	2.18	5	115	0.860	0.117	0.743	9.86	2.44	0.06
4.600	15.092	7.305	0.166	7.884		7.42	2.23	4	115	0.879	0.128	0.752	8.70	2.53	0.07
4.700	15.420	8.086	0.209	8.212		8.20	2.55	4	115	0.898	0.138	0.760	9.61	2.86	0.06
4.800	15.748	11.423	0.217	8.868		11.55	1.88	5	115	0.917	0.148	0.769	13.83	2.04	0.05
4.900	16.076	13.422	0.328	9.688		13.56	2.42	5	115	0.936	0.158	0.777	16.24	2.60	0.04
5.000	16.404	12.910	0.407	10.558		13.06	3.11	4	115	0.954	0.169	0.786	15.41	3.36	0.05
5.100	16.732	12.706	0.424	11.390		12.87	3.29	4	115	0.973	0.179	0.795	14.97	3.56	0.05
5.200	17.060	9.982	0.447	11.529		10.15	4.40	3	111	0.992	0.189	0.803	11.41	4.88	0.07
5.300	17.388	7.064	0.358	11.302		7.23	4.95	3	111	1.010	0.199	0.811	7.67	5.76	0.10
5.400	17.717	7.863	0.303	10.079		8.01	3.78	3	111	1.028	0.209	0.819	8.53	4.34	0.07
5.500	18.045	9.880	0.391	9.637		10.02	3.91	3	111	1.046	0.220	0.827	10.85	4.36	0.05
5.600	18.373	10.261	0.403	9.864		10.40	3.88	3	111	1.065	0.230	0.835	11.19	4.32	0.05
5.700	18.701	11.302	0.414	10.797		11.46	3.61	4	115	1.083	0.240	0.843	12.30	3.99	0.05
5.800	19.029	10.754	0.346	11.693		10.92	3.17	4	115	1.102	0.250	0.852	11.53	3.52	0.06
5.900	19.357	11.330	0.355	12.626		11.51	3.08	4	115	1.121	0.261	0.860	12.08	3.42	0.06
6.000	19.685	14.165	0.495	13.862		14.36	3.45	4	115	1.140	0.271	0.869	15.22	3.74	0.05
6.100	20.013	17.567	0.701	15.200		17.79	3.94	4	115	1.159	0.281	0.878	18.95	4.22	0.05
6.200	20.341	27.763	1.028	16.461		28.00	3.67	5	115	1.177	0.291	0.886	30.27	3.83	0.03
6.300	20.669	35.171	1.007	16.991		35.42	2.84	6	115	1.196	0.302	0.895	38.25	2.94	0.03
6.400	20.997	42.765	0.866	17.256		43.01	2.01	6	115	1.215	0.312	0.903	46.28	2.07	0.02
6.500	21.325	33.907	0.833	17.243		34.16	2.44	6	115	1.234	0.322	0.912	36.11	2.53	0.03
6.600	21.654	32.076	0.930	17.672		32.33	2.88	6	115	1.253	0.332	0.920	33.77	2.99	0.03
6.700	21.982	38.731	0.942	17.559		38.98	2.42	6	115	1.271	0.343	0.929	40.60	2.50	0.02
6.800	22.310	32.206	0.970	17.105		32.45	2.99	5	115	1.290	0.353	0.937	33.24	3.11	0.03
6.900	22.638	28.414	0.832	17.533		28.67	2.90	5	115	1.309	0.363	0.946	28.92	3.04	0.03
7.000	22.966	42.997	1.038	18.290		43.26	2.40	6	115	1.328	0.373	0.955	43.93	2.48	0.02
7.100	23.294	77.620	1.059	18.606		77.89	1.36	8	121	1.348	0.383	0.964	79.39	1.38	0.01
7.200	23.622	87.751	0.855	18.706		88.02	0.97	8	121	1.367	0.394	0.974	88.99	0.99	0.01
7.300	23.950	47.180	1.175	18.416		47.45	2.48	6	115	1.386	0.404	0.982	46.89	2.55	0.02
7.400	24.278	30.440	1.063	19.337		30.72	3.46	5	115	1.405	0.414	0.991	29.58	3.63	0.03
7.500	24.606	28.888	0.930	22.125		29.21	3.18	5	115	1.424	0.424	0.999	27.80	3.35	0.04
7.600	24.934	28.888	0.964	25.493		29.25	3.30	5	115	1.443	0.435	1.008	27.59	3.47	0.05
7.700	25.262	30.338	1.098	35.105		30.84	3.56	5	115	1.461	0.445	1.017	28.90	3.74	0.07
7.800	25.591	51.706	1.813	43.960		52.34	3.46	5	115	1.480	0.455	1.025	49.61	3.57	0.05
7.900	25.919	107.734	2.511	43.758		108.36	2.32	7	118	1.500	0.465	1.034	103.33	2.35	0.03
8.000	26.247	185.029	1.716	39.469		185.60	0.92	9	124	1.520	0.476	1.044	176.26	0.93	0.01
8.100	26.575	192.753	1.163	35.054		193.26	0.60	9	124	1.540	0.486	1.054	181.82	0.61	0.01
8.200	26.903	208.758	1.438	25.846		209.13	0.69	9	124	1.561	0.496	1.065	194.98	0.69	0.01

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
3.300	10.827	5	2.22	58.96	3.00E-6	9.6	12.4	41	39	179	558			
3.400	11.155	5	2.16	58.77	3.00E-6	9.5	12.2	41	39	183	567			
3.500	11.483	4	2.52	35.91	3.00E-8	6.6	8.4				1350	1.76	2.68	12.1
3.600	11.811	4	2.55	29.34	3.00E-8	5.5	7.0				1116	1.44	2.17	9.8
3.700	12.139	5	2.13	49.75	3.00E-6	8.3	10.4	38	38	160	549			
3.800	12.467	6	2.07	58.21	3.00E-4	9.5	11.9	41	39	190	584			
3.900	12.795	5	2.07	60.34	3.00E-6	10.0	12.4	42	39	198	595			
4.000	13.123	5	2.16	52.93	3.00E-6	9.1	11.2	39	38	174	572			
4.100	13.451	5	2.12	49.99	3.00E-6	8.6	10.5	38	38	167	567			
4.200	13.780	5	2.29	32.35	3.00E-6	5.9	7.2	30	35	108	492			
4.300	14.108	4	2.77	13.75	3.00E-8	3.2	3.8				572	0.71	0.97	4.4
4.400	14.436	3	2.93	9.70	1.00E-9	2.5	3.0				413	0.50	0.67	3.0
4.500	14.764	3	2.95	9.49	1.00E-9	2.5	3.0				409	0.49	0.66	3.0
4.600	15.092	3	3.01	8.44	1.00E-9	2.3	2.8				371	0.44	0.58	2.6
4.700	15.420	3	3.00	9.32	1.00E-9	2.6	3.0				410	0.49	0.64	2.9
4.800	15.748	4	2.79	13.16	3.00E-8	3.2	3.8				578	0.71	0.92	4.1
4.900	16.076	4	2.79	15.48	3.00E-8	3.8	4.4				678	0.84	1.08	4.9
5.000	16.404	3	2.87	14.82	1.00E-9	3.8	4.4				653	0.81	1.03	4.6
5.100	16.732	3	2.90	14.46	1.00E-9	3.8	4.4				643	0.79	1.00	4.5
5.200	17.060	3	3.08	11.19	1.00E-9	3.4	3.8				507	0.61	0.76	3.4
5.300	17.388	3	3.26	7.64	1.00E-9	2.7	3.1				361	0.41	0.51	2.3
5.400	17.717	3	3.15	8.42	1.00E-9	2.8	3.1				400	0.47	0.57	2.6
5.500	18.045	3	3.06	10.66	1.00E-9	3.3	3.7				501	0.60	0.72	3.3
5.600	18.373	3	3.05	10.99	1.00E-9	3.4	3.8				520	0.62	0.75	3.4
5.700	18.701	3	3.00	12.05	1.00E-9	3.6	4.0				573	0.69	0.82	3.7
5.800	19.029	3	2.99	11.29	1.00E-9	3.4	3.8				546	0.65	0.77	3.5
5.900	19.357	3	2.96	11.82	1.00E-9	3.5	3.9				576	0.69	0.81	3.6
6.000	19.685	3	2.91	14.86	1.00E-9	4.3	4.7				718	0.88	1.01	4.6
6.100	20.013	3	2.87	18.48	1.00E-9	5.2	5.7				889	1.11	1.26	5.7
6.200	20.341	4	2.68	29.29	3.00E-8	7.4	8.1				1400	1.79	2.02	9.1
6.300	20.669	4	2.53	36.79	3.00E-8	8.7	9.5				1771	2.28	2.55	11.5
6.400	20.997	5	2.37	44.27	3.00E-6	9.8	10.6	36	36	172	621			
6.500	21.325	4	2.51	34.84	3.00E-8	8.3	8.9				1708	2.19	2.41	10.8
6.600	21.654	4	2.58	32.75	3.00E-8	8.1	8.7				1617	2.07	2.25	10.1
6.700	21.982	5	2.47	39.29	3.00E-6	9.3	9.9	34	35	156	607			
6.800	22.310	4	2.59	32.39	3.00E-8	8.2	8.7				1623	2.08	2.22	10.0
6.900	22.638	4	2.63	28.27	3.00E-8	7.4	7.8				1433	1.82	1.93	8.7
7.000	22.966	5	2.44	42.77	3.00E-6	10.2	10.7	35	36	173	634			
7.100	23.294	5	2.08	76.71	3.00E-6	15.7	16.5	47	39	312	774			
7.200	23.622	6	1.95	86.02	3.00E-4	16.9	17.6	50	40	352	809			
7.300	23.950	5	2.43	45.98	3.00E-6	11.1	11.5	36	36	190	660			
7.400	24.278	4	2.68	29.22	3.00E-8	8.1	8.4				1536	1.95	1.97	8.9
7.500	24.606	4	2.67	27.50	3.00E-8	7.7	7.9				1460	1.85	1.85	8.3
7.600	24.934	4	2.69	27.34	3.00E-8	7.7	7.9				1463	1.85	1.84	8.3
7.700	25.262	4	2.69	28.69	3.00E-8	8.1	8.3				1542	1.96	1.93	8.7
7.800	25.591	4	2.51	49.24	3.00E-8	12.6	12.8				2617	3.39	3.31	14.9
7.900	25.919	5	2.16	102.52	3.00E-6	22.6	22.8	54	41	433	884			
8.000	26.247	6	1.71	175.16	3.00E-4	32.7	32.9	71	43	742	1061			
8.100	26.575	6	1.57	181.50	3.00E-4	32.6	32.6	72	44	773	1079			
8.200	26.903	6	1.59	195.57	3.00E-4	35.4	35.3	75	44	837	1112			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
8.300	27.231	223.016	1.525	22.743		223.34	0.68	9	124	1.581	0.506	1.075	206.35	0.69	0.01
8.400	27.559	286.555	2.008	24.156		286.90	0.70	9	124	1.601	0.517	1.085	262.99	0.70	0.00
8.500	27.887	383.294	2.595	27.498		383.69	0.68	10	127	1.622	0.527	1.095	348.76	0.68	0.00
8.600	28.215	441.887	2.230	30.412		442.32	0.50	10	127	1.643	0.537	1.106	398.40	0.51	0.00
8.700	28.543	392.151	1.150	34.096		392.64	0.29	10	127	1.664	0.547	1.117	350.09	0.29	0.00
8.800	28.871	350.572	1.330	38.788		351.13	0.38	10	127	1.685	0.557	1.127	309.95	0.38	0.01
8.900	29.199	429.428	2.596	39.772		430.00	0.60	10	127	1.706	0.568	1.138	376.33	0.61	0.01
9.000	29.528	502.209	2.190	41.185		502.80	0.44	10	127	1.727	0.578	1.149	436.20	0.44	0.00
9.100	29.856	463.832	1.822	44.452		464.47	0.39	10	127	1.748	0.588	1.159	399.11	0.39	0.01
9.200	30.184	367.809	2.918	46.104		368.47	0.79	10	127	1.768	0.598	1.170	313.41	0.80	0.01
9.300	30.512	470.506	4.425	51.528		471.25	0.94	10	127	1.789	0.609	1.181	397.62	0.94	0.01
9.400	30.840	511.830	4.651	56.057		512.64	0.91	10	127	1.810	0.619	1.191	428.79	0.91	0.01
9.500	31.168	449.499	2.853	51.780		450.24	0.63	10	127	1.831	0.629	1.202	373.06	0.64	0.01
9.600	31.496	279.175	1.804	44.679		279.82	0.64	9	124	1.851	0.639	1.212	229.32	0.65	0.01
9.700	31.824	101.628	1.890	29.870		102.06	1.85	7	118	1.871	0.650	1.221	82.04	1.89	0.01
9.800	32.152	34.455	1.654	27.574		34.85	4.74	4	115	1.890	0.660	1.230	26.80	5.02	0.04
9.900	32.480	24.975	0.748	31.900		25.43	2.94	5	115	1.908	0.670	1.238	19.00	3.18	0.07
10.000	32.808	27.577	0.756	39.141		28.14	2.69	6	115	1.927	0.680	1.247	21.02	2.88	0.08
10.100	33.136	63.641	1.341	60.736		64.52	2.08	7	118	1.947	0.691	1.256	49.82	2.14	0.06
10.200	33.465	111.629	2.100	63.272		112.54	1.87	7	118	1.966	0.701	1.265	87.41	1.90	0.03
10.300	33.793	107.623	2.868	53.306		108.39	2.65	7	118	1.985	0.711	1.274	83.51	2.70	0.03
10.400	34.121	54.495	2.023	51.225		55.23	3.66	5	115	2.004	0.721	1.283	41.50	3.80	0.06
10.500	34.449	34.335	0.831	50.708		35.06	2.37	6	115	2.023	0.732	1.291	25.59	2.51	0.09
10.600	34.777	30.124	0.597	50.922		30.86	1.94	6	115	2.042	0.742	1.300	22.17	2.07	0.10
10.700	35.105	29.148	0.663	52.020		29.90	2.22	6	115	2.060	0.752	1.308	21.28	2.38	0.11
10.800	35.433	29.799	0.623	54.808		30.59	2.04	6	115	2.079	0.762	1.317	21.65	2.19	0.11
10.900	35.761	31.407	0.662	59.740		32.27	2.05	6	115	2.098	0.772	1.325	22.76	2.19	0.12
11.000	36.089	35.534	0.782	71.370		36.56	2.14	6	115	2.117	0.783	1.334	25.82	2.27	0.13
11.100	36.417	31.760	0.857	86.469		33.01	2.60	6	115	2.136	0.793	1.343	22.99	2.78	0.18
11.200	36.745	27.912	0.756	99.726		29.35	2.57	6	115	2.154	0.803	1.351	20.13	2.78	0.23
11.300	37.073	35.924	1.056	117.246		37.61	2.81	6	115	2.173	0.813	1.360	26.06	2.98	0.22
11.400	37.402	42.411	1.520	121.333		44.16	3.44	5	115	2.192	0.824	1.368	30.67	3.62	0.19
11.500	37.730	37.271	1.555	101.833		38.74	4.01	5	115	2.211	0.834	1.377	26.53	4.26	0.18
11.600	38.058	33.879	0.987	102.362		35.35	2.79	6	115	2.230	0.844	1.385	23.91	2.98	0.20
11.700	38.386	27.243	0.582	87.969		28.51	2.04	6	115	2.248	0.854	1.394	18.84	2.21	0.21
11.800	38.714	29.920	0.646	89.042		31.20	2.07	6	115	2.267	0.865	1.403	20.63	2.23	0.19
11.900	39.042	28.786	0.733	106.991		30.33	2.42	6	115	2.286	0.875	1.411	19.87	2.61	0.24
12.000	39.370	27.215	0.668	121.119		28.96	2.31	6	115	2.305	0.885	1.420	18.78	2.51	0.29
12.100	39.698	30.579	0.753	134.856		32.52	2.31	6	115	2.324	0.895	1.428	21.14	2.49	0.29
12.200	40.026	36.621	1.075	144.303		38.70	2.78	6	115	2.342	0.906	1.437	25.30	2.96	0.26
12.300	40.354	30.998	0.985	142.701		33.05	2.98	5	115	2.361	0.916	1.445	21.24	3.21	0.30
12.400	40.682	29.334	0.730	152.856		31.54	2.31	6	115	2.380	0.926	1.454	20.05	2.50	0.35
12.500	41.011	29.827	0.722	166.416		32.22	2.24	6	115	2.399	0.936	1.462	20.39	2.42	0.37
12.600	41.339	29.315	0.727	180.682		31.92	2.28	6	115	2.417	0.946	1.471	20.05	2.47	0.41
12.700	41.667	70.825	1.554	212.065		73.88	2.10	7	118	2.437	0.957	1.480	48.27	2.18	0.20
12.800	41.995	138.342	3.196	171.108		140.81	2.27	7	118	2.456	0.967	1.489	92.90	2.31	0.08
12.900	42.323	98.914	2.448	157.636		101.18	2.42	7	118	2.475	0.977	1.498	65.88	2.48	0.11
13.000	42.651	60.620	1.319	191.542		63.38	2.08	7	118	2.495	0.987	1.507	40.39	2.17	0.21
13.100	42.979	42.263	0.814	200.082		45.14	1.80	7	118	2.514	0.998	1.516	28.11	1.91	0.31
13.200	43.307	32.178	0.792	178.096		34.74	2.28	6	115	2.533	1.008	1.525	21.12	2.46	0.37

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
8.300	27.231	6	1.57	207.96	3.00E-4	37.6	37.3	77	44	893	1140			
8.400	27.559	6	1.50	266.29	3.00E-4	47.2	46.7	87	45	1148	1243			
8.500	27.887	6	1.40	354.87	3.00E-4	61.3	60.3	101	47	1535	1374			
8.600	28.215	7	1.27	407.34	3.00E-2	67.9	66.4	108	47	1769	1445			
8.700	28.543	7	1.15	359.67	3.00E-2	58.2	56.6	101	47	1571	1393			
8.800	28.871	7	1.26	319.94	3.00E-2	53.8	52.1	96	46	1405	1347			
8.900	29.199	7	1.34	390.29	3.00E-2	67.4	65.0	106	47	1720	1445			
9.000	29.528	7	1.20	454.50	3.00E-2	75.5	72.4	114	48	2011	1528			
9.100	29.856	7	1.19	417.78	3.00E-2	69.6	66.5	109	47	1858	1492			
9.200	30.184	6	1.48	329.57	3.00E-4	60.4	57.4	97	46	1474	1386			
9.300	30.512	6	1.48	420.02	3.00E-4	77.1	73.0	110	47	1885	1509			
9.400	30.840	6	1.45	454.98	3.00E-4	83.0	78.2	114	47	2051	1556			
9.500	31.168	6	1.36	397.62	3.00E-4	71.0	66.6	107	47	1801	1495			
9.600	31.496	6	1.52	245.45	3.00E-4	46.3	43.3	84	45	1119	1279			
9.700	31.824	5	2.16	86.19	3.00E-6	21.3	19.8	50	40	408	916			
9.800	32.152	3	2.80	27.42	1.00E-9	9.8	9.1				1743	2.20	1.79	8.0
9.900	32.480	4	2.79	19.47	3.00E-8	7.0	6.5				1272	1.57	1.27	5.7
10.000	32.808	4	2.73	21.63	3.00E-8	7.5	6.9				1407	1.75	1.40	6.3
10.100	33.136	5	2.36	52.32	3.00E-6	14.5	13.3	39	37	258	794			
10.200	33.465	5	2.14	93.04	3.00E-6	23.2	21.2	52	40	450	958			
10.300	33.793	5	2.26	88.51	3.00E-6	23.6	21.5	50	40	434	948			
10.400	34.121	4	2.58	43.27	3.00E-8	13.8	12.5				2762	3.55	2.77	12.4
10.500	34.449	4	2.62	26.66	3.00E-8	8.9	8.0				1753	2.20	1.71	7.7
10.600	34.777	4	2.62	23.13	3.00E-8	7.8	7.0				1543	1.92	1.48	6.7
10.700	35.105	4	2.67	22.15	3.00E-8	7.7	7.0				1495	1.86	1.42	6.4
10.800	35.433	4	2.64	22.61	3.00E-8	7.8	7.0				1529	1.90	1.44	6.5
10.900	35.761	4	2.63	23.83	3.00E-8	8.1	7.3				1613	2.01	1.52	6.8
11.000	36.089	4	2.59	27.13	3.00E-8	9.1	8.1				1828	2.30	1.72	7.7
11.100	36.417	4	2.69	24.04	3.00E-8	8.5	7.5				1650	2.06	1.53	6.9
11.200	36.745	4	2.73	20.99	3.00E-8	7.6	6.8				1467	1.81	1.34	6.0
11.300	37.073	4	2.66	27.36	3.00E-8	9.5	8.4				1881	2.36	1.74	7.8
11.400	37.402	4	2.66	32.23	3.00E-8	11.2	9.9				2208	2.80	2.04	9.2
11.500	37.730	4	2.76	27.70	3.00E-8	10.3	9.1				1937	2.44	1.77	8.0
11.600	38.058	4	2.69	25.13	3.00E-8	9.1	7.9				1768	2.21	1.59	7.2
11.700	38.386	4	2.70	19.82	3.00E-8	7.3	6.4				1425	1.75	1.26	5.7
11.800	38.714	4	2.67	21.78	3.00E-8	7.9	6.9				1560	1.93	1.38	6.2
11.900	39.042	4	2.72	20.90	3.00E-8	7.8	6.8				1516	1.87	1.32	6.0
12.000	39.370	4	2.73	19.76	3.00E-8	7.4	6.4				1448	1.78	1.25	5.6
12.100	39.698	4	2.69	22.36	3.00E-8	8.2	7.0				1626	2.01	1.41	6.3
12.200	40.026	4	2.67	26.83	3.00E-8	9.7	8.3				1935	2.42	1.69	7.6
12.300	40.354	4	2.75	22.37	3.00E-8	8.6	7.3				1653	2.05	1.42	6.4
12.400	40.682	4	2.71	21.24	3.00E-8	7.9	6.8				1577	1.94	1.34	6.0
12.500	41.011	4	2.69	21.65	3.00E-8	8.0	6.8				1611	1.99	1.36	6.1
12.600	41.339	4	2.70	21.29	3.00E-8	7.9	6.7				1596	1.97	1.34	6.0
12.700	41.667	5	2.37	53.04	3.00E-6	16.2	13.7	39	36	296	877			
12.800	41.995	5	2.18	104.25	3.00E-6	29.3	24.7	55	40	563	1090			
12.900	42.323	5	2.31	73.11	3.00E-6	22.1	18.6	46	38	405	978			
13.000	42.651	5	2.43	44.34	3.00E-6	14.3	12.0	36	35	254	838			
13.100	42.979	5	2.52	30.61	3.00E-6	10.4	8.7	30	33	181	750			
13.200	43.307	4	2.68	22.62	3.00E-8	8.6	7.2				1737	2.15	1.41	6.3

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
13.300	43.635	30.180	0.802	176.015		32.71	2.45	6	115	2.552	1.018	1.534	19.67	2.66	0.39
13.400	43.963	31.240	0.893	174.665		33.75	2.65	6	115	2.570	1.028	1.542	20.22	2.86	0.37
13.500	44.291	32.253	1.004	171.751		34.73	2.89	6	115	2.589	1.039	1.551	20.72	3.12	0.35
13.600	44.619	32.494	1.014	179.080		35.07	2.89	6	115	2.608	1.049	1.559	20.82	3.12	0.36
13.700	44.948	30.542	0.941	175.561		33.07	2.85	6	115	2.627	1.059	1.568	19.42	3.09	0.38
13.800	45.276	33.665	0.886	180.253		36.26	2.44	6	115	2.646	1.069	1.576	21.32	2.64	0.35
13.900	45.604	37.764	0.833	190.155		40.50	2.06	6	115	2.664	1.080	1.585	23.87	2.20	0.33
14.000	45.932	39.948	0.874	216.531		43.07	2.03	6	115	2.683	1.090	1.593	25.34	2.16	0.36
14.100	46.260	38.359	0.940	240.749		41.83	2.25	6	115	2.702	1.100	1.602	24.42	2.40	0.41
14.200	46.588	35.524	1.019	235.502		38.92	2.62	6	115	2.721	1.110	1.611	22.47	2.81	0.44
14.300	46.916	61.001	1.357	246.539		64.55	2.10	7	118	2.740	1.120	1.620	38.16	2.20	0.27
14.400	47.244	108.357	1.875	184.605		111.02	1.69	8	121	2.760	1.131	1.629	66.44	1.73	0.11
14.500	47.572	86.403	1.917	127.098		88.23	2.17	7	118	2.779	1.141	1.638	52.16	2.24	0.09
14.600	47.900	40.683	1.021	115.859		42.35	2.41	6	115	2.798	1.151	1.647	24.02	2.58	0.18
14.700	48.228	30.068	0.497	157.372		32.33	1.54	6	115	2.817	1.161	1.655	17.83	1.68	0.34
14.800	48.556	34.762	0.567	212.103		37.82	1.50	7	118	2.836	1.172	1.665	21.01	1.62	0.40
14.900	48.885	37.169	0.744	282.312		41.23	1.80	7	118	2.856	1.182	1.674	22.93	1.94	0.50
15.000	49.213	106.888	1.536	335.417		111.72	1.37	8	121	2.875	1.192	1.683	64.66	1.41	0.21
15.100	49.541	377.187	3.259	212.469		380.25	0.86	9	124	2.896	1.202	1.693	222.84	0.86	0.04
15.200	49.869	539.537	3.989	98.124		540.95	0.74	10	127	2.917	1.213	1.704	315.74	0.74	0.01
15.300	50.197	562.318	3.135	94.554		563.68	0.56	10	127	2.938	1.223	1.715	327.02	0.56	0.01
15.400	50.525	528.384	3.108	90.656		529.69	0.59	10	127	2.958	1.233	1.725	305.29	0.59	0.01
15.500	50.853	502.851	3.264	88.197		504.12	0.65	10	127	2.979	1.243	1.736	288.68	0.65	0.01
15.600	51.181	511.848	1.610	82.091		513.03	0.31	10	127	3.000	1.254	1.747	292.01	0.32	0.01
15.700	51.509	604.377	0.748	61.152		605.26	0.12	10	127	3.021	1.264	1.757	342.71	0.12	0.01
15.800	51.837	640.338	0.518	43.379		640.96	0.08	10	127	3.042	1.274	1.768	360.83	0.08	0.00
15.900	52.165	651.649	0.732	34.815		652.15	0.11	10	127	3.063	1.284	1.779	364.95	0.11	0.00
16.000	52.493	663.259	1.379	36.934		663.79	0.21	10	127	3.084	1.295	1.789	369.27	0.21	0.00
16.100	52.822	677.507	1.819	32.784		677.98	0.27	10	127	3.105	1.305	1.800	374.95	0.27	0.00
16.200	53.150	672.321	2.871	31.913		672.78	0.43	10	127	3.126	1.315	1.811	369.87	0.43	0.00
16.300	53.478	654.967	2.863	32.052		655.43	0.44	10	127	3.146	1.325	1.821	358.16	0.44	0.00
16.400	53.806	659.215	2.787	34.272		659.71	0.42	10	127	3.167	1.335	1.832	358.41	0.42	0.00
16.500	54.134	638.442	1.650	35.004		638.95	0.26	10	127	3.188	1.346	1.842	345.05	0.26	0.00
16.600	54.462	629.463	2.640	35.079		629.97	0.42	10	127	3.209	1.356	1.853	338.22	0.42	0.00
16.700	54.790	602.118	2.333	35.041		602.62	0.39	10	127	3.230	1.366	1.864	321.60	0.39	0.00
16.800	55.118	607.565	3.105	38.094		608.11	0.51	10	127	3.251	1.376	1.874	322.69	0.51	0.00
16.900	55.446	606.403	6.723	39.418		606.97	1.11	9	124	3.271	1.387	1.885	320.34	1.11	0.00
17.000	55.774	557.188	2.858	38.599		557.74	0.51	10	127	3.292	1.397	1.895	292.55	0.52	0.00
17.100	56.102	530.419	1.252	36.744		530.95	0.24	10	127	3.313	1.407	1.906	276.85	0.24	0.00
17.200	56.430	495.090	3.643	35.243		495.60	0.74	10	127	3.334	1.417	1.917	256.85	0.74	0.00
17.300	56.759	456.415	6.025	33.944		456.90	1.32	9	124	3.354	1.428	1.927	235.41	1.33	0.00
17.400	57.087	440.521	5.185	33.389		441.00	1.18	9	124	3.375	1.438	1.937	225.96	1.18	0.00
17.500	57.415	436.505	2.422	34.373		437.00	0.55	10	127	3.395	1.448	1.947	222.66	0.56	0.00
17.600	57.743	436.301	5.023	35.319		436.81	1.15	9	124	3.416	1.458	1.958	221.40	1.16	0.00
17.700	58.071	438.048	3.526	34.159		438.54	0.80	10	127	3.437	1.469	1.968	221.07	0.81	0.00
17.800	58.399	464.882	2.854	36.505		465.41	0.61	10	127	3.458	1.479	1.979	233.45	0.62	0.00
17.900	58.727	492.999	2.773	37.413		493.54	0.56	10	127	3.478	1.489	1.989	246.32	0.57	0.00
18.000	59.055	498.724	3.979	37.628		499.27	0.80	10	127	3.499	1.499	2.000	247.87	0.80	0.00
18.100	59.383	536.953	3.585	37.539		537.49	0.67	10	127	3.520	1.509	2.011	265.55	0.67	0.00
18.200	59.711	571.158	3.244	37.754		571.70	0.57	10	127	3.541	1.520	2.021	281.07	0.57	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
13.300	43.635	4	2.73	20.98	3.00E-8	8.2	6.8				1636	2.01	1.31	5.9
13.400	43.963	4	2.74	21.56	3.00E-8	8.6	7.1				1688	2.08	1.35	6.1
13.500	44.291	4	2.75	22.08	3.00E-8	8.9	7.4				1736	2.14	1.38	6.2
13.600	44.619	4	2.75	22.21	3.00E-8	9.0	7.4				1754	2.16	1.39	6.2
13.700	44.948	4	2.77	20.68	3.00E-8	8.5	7.0				1654	2.03	1.29	5.8
13.800	45.276	4	2.70	22.94	3.00E-8	9.1	7.4				1813	2.24	1.42	6.4
13.900	45.604	4	2.61	25.97	3.00E-8	9.7	7.9				2025	2.52	1.59	7.2
14.000	45.932	4	2.59	27.69	3.00E-8	10.1	8.3				2153	2.69	1.69	7.6
14.100	46.260	4	2.63	26.58	3.00E-8	9.9	8.1				2091	2.61	1.63	7.3
14.200	46.588	4	2.70	24.27	3.00E-8	9.5	7.7				1946	2.41	1.50	6.7
14.300	46.916	5	2.45	42.57	3.00E-6	14.5	11.7	35	35	258	864			
14.400	47.244	5	2.20	76.68	3.00E-6	23.1	18.6	47	38	444	1037			
14.500	47.572	5	2.35	59.10	3.00E-6	19.7	15.8	41	37	353	963			
14.600	47.900	4	2.65	26.20	3.00E-8	10.7	8.6				2118	2.64	1.60	7.2
14.700	48.228	4	2.65	19.48	3.00E-8	7.9	6.3				1617	1.97	1.19	5.3
14.800	48.556	4	2.58	23.20	3.00E-8	8.8	7.0				1891	2.33	1.40	6.3
14.900	48.885	4	2.59	25.30	3.00E-8	9.5	7.5				2062	2.56	1.53	6.9
15.000	49.213	5	2.15	75.95	3.00E-6	22.3	17.7	47	38	447	1051			
15.100	49.541	6	1.61	281.90	3.00E-4	64.5	51.0	90	45	1521	1584			
15.200	49.869	6	1.46	400.69	3.00E-4	87.9	69.2	107	46	2164	1785			
15.300	50.197	6	1.36	416.30	3.00E-4	88.8	69.7	109	46	2255	1814			
15.400	50.525	6	1.40	389.84	3.00E-4	84.4	66.1	106	46	2119	1780			
15.500	50.853	6	1.45	369.76	3.00E-4	81.5	63.6	103	46	2016	1754			
15.600	51.181	7	1.24	375.17	3.00E-2	77.8	60.6	104	46	2052	1768			
15.700	51.509	7	0.99	441.65	3.00E-2	85.5	66.4	112	47	2421	1872			
15.800	51.837	7	0.92	466.41	3.00E-2	89.0	68.9	115	47	2564	1912			
15.900	52.165	7	0.95	473.15	3.00E-2	91.3	70.4	116	47	2609	1927			
16.000	52.493	7	1.05	480.19	3.00E-2	95.6	73.5	117	47	2655	1942			
16.100	52.822	7	1.11	489.03	3.00E-2	99.2	76.1	118	47	2712	1960			
16.200	53.150	7	1.24	483.82	3.00E-2	102.4	78.3	118	47	2691	1959			
16.300	53.478	7	1.26	469.89	3.00E-2	100.2	76.4	116	47	2622	1946			
16.400	53.806	7	1.25	471.58	3.00E-2	100.6	76.4	116	47	2639	1954			
16.500	54.134	7	1.13	455.33	3.00E-2	94.0	71.3	114	47	2556	1937			
16.600	54.462	7	1.26	447.59	3.00E-2	96.5	72.9	113	46	2520	1931			
16.700	54.790	7	1.26	426.83	3.00E-2	92.2	69.4	110	46	2410	1907			
16.800	55.118	7	1.34	429.50	3.00E-2	95.3	71.6	111	46	2432	1916			
16.900	55.446	6	1.59	427.52	3.00E-4	103.1	77.3	111	46	2428	1918			
17.000	55.774	6	1.37	391.54	3.00E-4	88.2	65.9	106	46	2231	1868			
17.100	56.102	7	1.19	371.56	3.00E-2	79.5	59.2	103	46	2124	1841			
17.200	56.430	6	1.52	345.68	3.00E-4	82.2	61.1	99	45	1982	1803			
17.300	56.759	6	1.74	312.27	3.00E-4	81.5	60.4	94	45	1828	1758			
17.400	57.087	6	1.71	301.93	3.00E-4	77.9	57.6	93	45	1764	1740			
17.500	57.415	6	1.48	302.07	3.00E-4	71.6	52.8	93	45	1748	1738			
17.600	57.743	6	1.71	297.43	3.00E-4	77.1	56.7	92	45	1747	1741			
17.700	58.071	6	1.59	301.51	3.00E-4	74.5	54.6	93	45	1754	1746			
17.800	58.399	6	1.50	319.25	3.00E-4	76.6	56.0	96	45	1862	1785			
17.900	58.727	6	1.45	337.77	3.00E-4	80.1	58.4	98	45	1974	1823			
18.000	59.055	6	1.56	340.79	3.00E-4	83.8	61.0	99	45	1997	1833			
18.100	59.383	6	1.48	366.08	3.00E-4	88.0	63.8	102	45	2150	1882			
18.200	59.711	6	1.41	388.49	3.00E-4	91.7	66.3	105	46	2287	1925			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
18.300	60.039	570.702	3.169	37.981		571.25	0.55	10	127	3.562	1.530	2.032	279.36	0.56	0.00
18.400	60.367	577.617	2.724	37.211		578.15	0.47	10	127	3.583	1.540	2.043	281.28	0.47	0.00
18.500	60.696	601.458	2.051	36.189		601.98	0.34	10	127	3.604	1.550	2.053	291.41	0.34	0.00
18.600	61.024	622.957	0.897	37.678		623.50	0.14	10	127	3.625	1.561	2.064	300.32	0.14	0.00
18.700	61.352	639.882	1.239	36.921		640.41	0.19	10	127	3.646	1.571	2.075	306.92	0.19	0.00
18.800	61.680	602.667	2.467	33.036		603.14	0.41	10	127	3.666	1.581	2.085	287.47	0.41	0.00
18.900	62.008	627.808	0.933	30.791		628.25	0.15	10	127	3.687	1.591	2.096	297.98	0.15	0.00
19.000	62.336	664.272	0.861	28.886		664.69	0.13	10	127	3.708	1.602	2.107	313.76	0.13	0.00
19.100	62.664	669.718	0.624	28.281		670.13	0.09	10	127	3.729	1.612	2.117	314.74	0.09	0.00
19.200	62.992	705.047	0.596	28.381		705.46	0.08	10	127	3.750	1.622	2.128	329.76	0.08	0.00
19.300	63.320	737.619	0.571	25.127		737.98	0.08	10	127	3.771	1.632	2.139	343.32	0.08	0.00
19.400	63.648	753.912	0.211	23.373		754.25	0.03	10	127	3.792	1.643	2.149	349.18	0.03	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
18.300	60.039	6	1.41	387.15	3.00E-4	91.4	66.0	105	46	2285	1928			
18.400	60.367	6	1.36	390.82	3.00E-4	91.1	65.6	106	46	2313	1939			
18.500	60.696	7	1.26	405.95	3.00E-2	92.0	66.1	108	46	2408	1968			
18.600	61.024	7	1.06	419.45	3.00E-2	90.1	64.5	109	46	2494	1995			
18.700	61.352	7	1.11	429.78	3.00E-2	93.7	66.9	111	46	2562	2016			
18.800	61.680	7	1.31	403.57	3.00E-2	93.7	66.8	107	46	2413	1980			
18.900	62.008	7	1.07	419.39	3.00E-2	91.0	64.7	109	46	2513	2010			
19.000	62.336	7	1.03	442.72	3.00E-2	95.2	67.4	112	46	2659	2052			
19.100	62.664	7	0.99	445.23	3.00E-2	94.9	67.1	113	46	2681	2061			
19.200	62.992	7	0.96	467.64	3.00E-2	99.2	69.9	116	46	2822	2100			
19.300	63.320	7	0.94	488.08	3.00E-2	103.1	72.5	118	47	2952	2136			
19.400	63.648	7	0.98	497.65	3.00E-2	106.6	74.8	119	47	3017	2155			

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LIQUEFACTION ANALYSIS CALCULATION DETAILS
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Input File Name: G:\GS16\GS16-0107_Panama\Design & Analysis\LIQUEFACTION\16-0107-CPT6.liq
Title: 12870 Panama Street
Subtitle: CPT 6

Input Data:
Surface Elev.=0
Hole No.=CPT6
Depth of Hole=64.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.65 g
Earthquake Magnitude=6.63
No-Liquefiable Soils: CL, OL are Non-Liq. Soil
1. CPT Calulation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.1
Plot two CSR (fs1=1, fs2=User)
10. Average two input data between two Depths: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf %	Gamma pcf	Fines %	D50 mm
0.16	0.00	0.00	100.00	120.00	0.00	0.50
0.66	0.00	0.00	100.00	120.00	0.00	0.50
1.15	0.00	0.00	100.00	120.00	0.00	0.50
1.64	0.00	0.00	100.00	120.00	0.00	0.50
2.13	0.00	0.00	100.00	120.00	0.00	0.50
2.62	0.00	0.00	100.00	120.00	0.00	0.50
3.12	0.00	0.00	100.00	120.00	0.00	0.50
3.61	0.00	0.00	100.00	120.00	0.00	0.50
4.10	0.00	0.00	100.00	120.00	0.00	0.50
4.59	0.00	0.00	100.00	120.00	0.00	0.50
5.09	27.54	0.59	2.13	120.00	0.00	0.50
5.58	33.37	1.00	2.98	120.00	0.00	0.50
6.07	40.48	1.23	3.04	120.00	0.00	0.50
6.56	40.87	1.23	3.01	120.00	0.00	0.50
7.05	79.41	1.46	1.83	120.00	0.00	0.50
7.55	95.61	1.59	1.66	120.00	0.00	0.50
8.04	107.10	1.60	1.50	120.00	0.00	0.50
8.53	96.28	1.56	1.62	120.00	0.00	0.50
9.02	131.50	1.69	1.29	120.00	0.00	0.50
9.51	126.30	1.23	0.98	120.00	0.00	0.50
10.00	121.20	0.98	0.81	120.00	0.00	0.50
10.49	55.54	1.53	2.75	120.00	0.00	0.50
10.99	57.77	0.75	1.30	120.00	0.00	0.50
11.48	26.43	0.84	3.19	120.00	0.00	0.50
11.97	29.78	0.47	1.56	120.00	0.00	0.50
12.46	43.97	0.55	1.26	120.00	0.00	0.50
12.95	42.77	0.58	1.36	120.00	0.00	0.50
13.45	41.63	0.46	1.10	120.00	0.00	0.50
13.94	15.69	0.25	1.60	120.00	0.00	0.50
14.43	8.39	0.17	1.98	120.00	NoLiq	0.50
14.92	7.67	0.17	2.28	120.00	NoLiq	0.50
15.41	8.34	0.21	2.47	120.00	NoLiq	0.50
15.91	13.66	0.20	1.50	120.00	NoLiq	0.50
16.40	12.15	0.41	3.36	120.00	NoLiq	0.50
16.89	11.93	0.45	3.78	120.00	NoLiq	0.50
17.38	6.66	0.37	5.48	120.00	NoLiq	0.50
17.88	8.92	0.37	4.15	120.00	NoLiq	0.50
18.37	10.51	0.38	3.64	120.00	NoLiq	0.50
18.86	11.46	0.40	3.45	120.00	NoLiq	0.50
19.35	11.32	0.35	3.11	120.00	NoLiq	0.50
19.84	16.08	0.60	3.74	120.00	NoLiq	0.50
20.34	30.53	1.06	3.49	120.00	0.00	0.50
20.83	43.80	0.84	1.92	120.00	0.00	0.50
21.32	33.87	0.84	2.48	120.00	0.00	0.50
21.81	36.91	0.85	2.29	120.00	0.00	0.50
22.30	31.56	0.97	3.08	120.00	0.00	0.50
22.80	32.98	0.85	2.59	120.00	0.00	0.50

23.29	64.71	1.07	1.65	120.00	0.00	0.50
23.78	56.46	1.07	1.89	120.00	0.00	0.50
24.27	28.33	1.03	3.63	120.00	0.00	0.50
24.77	30.70	0.94	3.05	120.00	0.00	0.50
25.26	28.49	1.01	3.56	120.00	0.00	0.50
25.75	69.04	2.39	3.46	120.00	0.00	0.50
26.24	202.10	1.56	0.77	120.00	0.00	0.50
26.73	192.70	1.22	0.63	120.00	0.00	0.50
27.23	220.10	1.41	0.64	120.00	0.00	0.50
27.72	346.90	2.69	0.77	120.00	0.00	0.50
28.21	442.00	3.22	0.73	120.00	0.00	0.50
28.70	323.50	1.10	0.34	120.00	0.00	0.50
29.19	418.90	3.37	0.80	120.00	0.00	0.50
29.69	531.40	1.71	0.32	120.00	0.00	0.50
30.18	354.60	2.70	0.76	120.00	0.00	0.50
30.67	539.00	4.80	0.89	120.00	0.00	0.50
31.16	461.00	2.72	0.59	120.00	0.00	0.50
31.66	165.50	1.56	0.94	120.00	0.00	0.50
32.15	31.92	2.07	6.48	120.00	0.00	0.50
32.64	24.20	0.65	2.71	120.00	0.00	0.50
33.13	62.51	1.31	2.10	120.00	0.00	0.50
33.62	121.20	2.63	2.17	120.00	0.00	0.50
34.12	44.19	2.06	4.66	120.00	0.00	0.50
34.61	32.62	0.60	1.83	120.00	0.00	0.50
35.10	28.05	0.66	2.35	120.00	0.00	0.50
35.59	28.02	0.61	2.18	120.00	0.00	0.50
36.08	35.02	0.78	2.23	120.00	0.00	0.50
36.58	28.05	0.80	2.85	120.00	0.00	0.50
37.07	37.00	1.08	2.92	120.00	0.00	0.50
37.56	41.29	1.68	4.07	120.00	0.00	0.50
38.05	37.33	0.89	2.39	120.00	0.00	0.50
38.54	28.72	0.53	1.83	120.00	0.00	0.50
39.04	28.10	0.78	2.77	120.00	0.00	0.50
39.53	26.09	0.65	2.49	120.00	0.00	0.50
40.02	38.81	1.17	3.02	120.00	0.00	0.50
40.51	28.91	0.76	2.62	120.00	0.00	0.50
41.01	29.83	0.70	2.36	120.00	0.00	0.50
41.50	29.27	0.79	2.71	120.00	0.00	0.50
41.99	148.00	3.73	2.52	120.00	0.00	0.50
42.48	72.83	1.87	2.56	120.00	0.00	0.50
42.97	42.60	0.72	1.69	120.00	0.00	0.50
43.47	29.83	0.76	2.53	120.00	0.00	0.50
43.96	31.37	0.87	2.78	120.00	0.00	0.50
44.45	33.68	1.05	3.13	120.00	0.00	0.50
44.94	29.86	0.93	3.11	120.00	0.00	0.50
45.43	36.36	0.87	2.40	120.00	0.00	0.50
45.93	40.65	0.88	2.16	120.00	0.00	0.50
46.42	37.08	0.96	2.60	120.00	0.00	0.50
46.91	42.69	1.08	2.52	120.00	0.00	0.50
47.40	122.60	2.09	1.71	120.00	0.00	0.50
47.90	37.64	0.93	2.48	120.00	0.00	0.50
48.39	29.97	0.53	1.77	120.00	0.00	0.50
48.88	36.52	0.74	2.01	120.00	0.00	0.50
49.37	246.00	2.09	0.85	120.00	0.00	0.50
49.86	551.30	4.12	0.75	120.00	0.00	0.50
50.36	547.90	2.87	0.52	120.00	0.00	0.50
50.85	502.10	3.30	0.66	120.00	0.00	0.50
51.34	535.10	1.16	0.22	120.00	0.00	0.50
51.83	650.70	0.51	0.08	120.00	0.00	0.50
52.32	665.30	0.96	0.14	120.00	0.00	0.50
52.82	692.60	1.06	0.15	120.00	0.00	0.50
53.31	661.40	3.99	0.60	120.00	0.00	0.50
53.80	675.30	2.67	0.40	120.00	0.00	0.50
54.29	617.80	1.16	0.19	120.00	0.00	0.50
54.79	595.30	1.23	0.21	120.00	0.00	0.50
55.28	624.20	4.97	0.80	120.00	0.00	0.50
55.77	556.50	0.13	0.02	120.00	0.00	0.50
56.26	517.40	2.10	0.41	120.00	0.00	0.50
56.75	453.50	6.17	1.36	120.00	0.00	0.50
57.25	436.60	1.61	0.37	120.00	0.00	0.50
57.74	437.80	5.23	1.20	120.00	0.00	0.50
58.23	439.90	2.51	0.57	120.00	0.00	0.50
58.72	486.20	2.45	0.50	120.00	0.00	0.50
59.21	498.00	1.44	0.29	120.00	0.00	0.50
59.71	571.70	1.16	0.20	120.00	0.00	0.50
60.20	566.90	1.82	0.32	120.00	0.00	0.50
60.69	606.70	0.94	0.15	120.00	0.00	0.50
61.18	643.20	0.44	0.07	120.00	0.00	0.50
61.67	591.00	3.69	0.62	120.00	0.00	0.50
62.17	666.80	0.69	0.10	120.00	0.00	0.50
62.66	659.90	0.53	0.08	120.00	0.00	0.50
63.15	712.30	0.54	0.08	120.00	0.00	0.50

63.64	750.70	0.02	0.00	120.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:
Calculation segment, dz=0.050 ft
User defined Print Interval, dp=0.50 ft

Peak Ground Acceleration (PGA), a_max = 0.65g

CSR Calculation:

Depth ft	gamma pcf	sigma atm	gamma' pcf	sigma' atm	rd	mZ g	a(z) g	CSR	x fs1	=CSRfs
0.16	120.00	0.009	120.00	0.009	1.00	0.000	0.650	0.42	1.00	0.42
0.66	120.00	0.037	120.00	0.037	1.00	0.000	0.650	0.42	1.00	0.42
1.16	120.00	0.066	120.00	0.066	1.00	0.000	0.650	0.42	1.00	0.42
1.66	120.00	0.094	120.00	0.094	1.00	0.000	0.650	0.42	1.00	0.42
2.16	120.00	0.122	120.00	0.122	0.99	0.000	0.650	0.42	1.00	0.42
2.66	120.00	0.151	120.00	0.151	0.99	0.000	0.650	0.42	1.00	0.42
3.16	120.00	0.179	120.00	0.179	0.99	0.000	0.650	0.42	1.00	0.42
3.66	120.00	0.208	120.00	0.208	0.99	0.000	0.650	0.42	1.00	0.42
4.16	120.00	0.236	120.00	0.236	0.99	0.000	0.650	0.42	1.00	0.42
4.66	120.00	0.264	120.00	0.264	0.99	0.000	0.650	0.42	1.00	0.42
5.16	120.00	0.293	57.60	0.288	0.99	0.000	0.650	0.42	1.00	0.42
5.66	120.00	0.321	57.60	0.302	0.99	0.000	0.650	0.44	1.00	0.44
6.16	120.00	0.349	57.60	0.315	0.99	0.000	0.650	0.46	1.00	0.46
6.66	120.00	0.378	57.60	0.329	0.98	0.000	0.650	0.48	1.00	0.48
7.16	120.00	0.406	57.60	0.343	0.98	0.000	0.650	0.49	1.00	0.49
7.66	120.00	0.434	57.60	0.356	0.98	0.000	0.650	0.51	1.00	0.51
8.16	120.00	0.463	57.60	0.370	0.98	0.000	0.650	0.52	1.00	0.52
8.66	120.00	0.491	57.60	0.383	0.98	0.000	0.650	0.53	1.00	0.53
9.16	120.00	0.519	57.60	0.397	0.98	0.000	0.650	0.54	1.00	0.54
9.66	120.00	0.548	57.60	0.411	0.98	0.000	0.650	0.55	1.00	0.55
10.16	120.00	0.576	57.60	0.424	0.98	0.000	0.650	0.56	1.00	0.56
10.66	120.00	0.604	57.60	0.438	0.98	0.000	0.650	0.57	1.00	0.57
11.16	120.00	0.633	57.60	0.451	0.97	0.000	0.650	0.58	1.00	0.58
11.66	120.00	0.661	57.60	0.465	0.97	0.000	0.650	0.58	1.00	0.58
12.16	120.00	0.690	57.60	0.479	0.97	0.000	0.650	0.59	1.00	0.59
12.66	120.00	0.718	57.60	0.492	0.97	0.000	0.650	0.60	1.00	0.60
13.16	120.00	0.746	57.60	0.506	0.97	0.000	0.650	0.60	1.00	0.60
13.66	120.00	0.775	57.60	0.520	0.97	0.000	0.650	0.61	1.00	0.61
14.16	120.00	0.803	57.60	0.533	0.97	0.000	0.650	0.62	1.00	0.62
14.66	120.00	0.831	57.60	0.547	0.97	0.000	0.650	0.62	1.00	0.62
15.16	120.00	0.860	57.60	0.560	0.96	0.000	0.650	0.63	1.00	0.63
15.66	120.00	0.888	57.60	0.574	0.96	0.000	0.650	0.63	1.00	0.63
16.16	120.00	0.916	57.60	0.588	0.96	0.000	0.650	0.63	1.00	0.63
16.66	120.00	0.945	57.60	0.601	0.96	0.000	0.650	0.64	1.00	0.64
17.16	120.00	0.973	57.60	0.615	0.96	0.000	0.650	0.64	1.00	0.64
17.66	120.00	1.001	57.60	0.628	0.96	0.000	0.650	0.65	1.00	0.65
18.16	120.00	1.030	57.60	0.642	0.96	0.000	0.650	0.65	1.00	0.65
18.66	120.00	1.058	57.60	0.656	0.96	0.000	0.650	0.65	1.00	0.65
19.16	120.00	1.086	57.60	0.669	0.96	0.000	0.650	0.66	1.00	0.66
19.66	120.00	1.115	57.60	0.683	0.95	0.000	0.650	0.66	1.00	0.66
20.16	120.00	1.143	57.60	0.696	0.95	0.000	0.650	0.66	1.00	0.66
20.66	120.00	1.172	57.60	0.710	0.95	0.000	0.650	0.66	1.00	0.66
21.16	120.00	1.200	57.60	0.724	0.95	0.000	0.650	0.67	1.00	0.67
21.66	120.00	1.228	57.60	0.737	0.95	0.000	0.650	0.67	1.00	0.67
22.16	120.00	1.257	57.60	0.751	0.95	0.000	0.650	0.67	1.00	0.67
22.66	120.00	1.285	57.60	0.765	0.95	0.000	0.650	0.67	1.00	0.67
23.16	120.00	1.313	57.60	0.778	0.95	0.000	0.650	0.67	1.00	0.67
23.66	120.00	1.342	57.60	0.792	0.94	0.000	0.650	0.68	1.00	0.68
24.16	120.00	1.370	57.60	0.805	0.94	0.000	0.650	0.68	1.00	0.68
24.66	120.00	1.398	57.60	0.819	0.94	0.000	0.650	0.68	1.00	0.68
25.16	120.00	1.427	57.60	0.833	0.94	0.000	0.650	0.68	1.00	0.68
25.66	120.00	1.455	57.60	0.846	0.94	0.000	0.650	0.68	1.00	0.68
26.16	120.00	1.483	57.60	0.860	0.94	0.000	0.650	0.68	1.00	0.68
26.66	120.00	1.512	57.60	0.873	0.94	0.000	0.650	0.69	1.00	0.69
27.16	120.00	1.540	57.60	0.887	0.94	0.000	0.650	0.69	1.00	0.69
27.66	120.00	1.568	57.60	0.901	0.94	0.000	0.650	0.69	1.00	0.69
28.16	120.00	1.597	57.60	0.914	0.93	0.000	0.650	0.69	1.00	0.69
28.66	120.00	1.625	57.60	0.928	0.93	0.000	0.650	0.69	1.00	0.69
29.16	120.00	1.654	57.60	0.941	0.93	0.000	0.650	0.69	1.00	0.69
29.66	120.00	1.682	57.60	0.955	0.93	0.000	0.650	0.69	1.00	0.69
30.16	120.00	1.710	57.60	0.969	0.93	0.000	0.650	0.69	1.00	0.69
30.66	120.00	1.739	57.60	0.982	0.92	0.000	0.650	0.69	1.00	0.69
31.16	120.00	1.767	57.60	0.996	0.92	0.000	0.650	0.69	1.00	0.69
31.66	120.00	1.795	57.60	1.009	0.92	0.000	0.650	0.69	1.00	0.69
32.16	120.00	1.824	57.60	1.023	0.91	0.000	0.650	0.69	1.00	0.69
32.66	120.00	1.852	57.60	1.037	0.91	0.000	0.650	0.69	1.00	0.69
33.16	120.00	1.880	57.60	1.050	0.90	0.000	0.650	0.68	1.00	0.68

33.66	120.00	1.909	57.60	1.064	0.90	0.000	0.650	0.68	1.00	0.68
34.16	120.00	1.937	57.60	1.078	0.90	0.000	0.650	0.68	1.00	0.68
34.66	120.00	1.965	57.60	1.091	0.89	0.000	0.650	0.68	1.00	0.68
35.16	120.00	1.994	57.60	1.105	0.89	0.000	0.650	0.68	1.00	0.68
35.66	120.00	2.022	57.60	1.118	0.88	0.000	0.650	0.68	1.00	0.68
36.16	120.00	2.050	57.60	1.132	0.88	0.000	0.650	0.67	1.00	0.67
36.66	120.00	2.079	57.60	1.146	0.88	0.000	0.650	0.67	1.00	0.67
37.16	120.00	2.107	57.60	1.159	0.87	0.000	0.650	0.67	1.00	0.67
37.66	120.00	2.136	57.60	1.173	0.87	0.000	0.650	0.67	1.00	0.67
38.16	120.00	2.164	57.60	1.186	0.86	0.000	0.650	0.67	1.00	0.67
38.66	120.00	2.192	57.60	1.200	0.86	0.000	0.650	0.66	1.00	0.66
39.16	120.00	2.221	57.60	1.214	0.86	0.000	0.650	0.66	1.00	0.66
39.66	120.00	2.249	57.60	1.227	0.85	0.000	0.650	0.66	1.00	0.66
40.16	120.00	2.277	57.60	1.241	0.85	0.000	0.650	0.66	1.00	0.66
40.66	120.00	2.306	57.60	1.254	0.84	0.000	0.650	0.65	1.00	0.65
41.16	120.00	2.334	57.60	1.268	0.84	0.000	0.650	0.65	1.00	0.65
41.66	120.00	2.362	57.60	1.282	0.83	0.000	0.650	0.65	1.00	0.65
42.16	120.00	2.391	57.60	1.295	0.83	0.000	0.650	0.65	1.00	0.65
42.66	120.00	2.419	57.60	1.309	0.83	0.000	0.650	0.65	1.00	0.65
43.16	120.00	2.447	57.60	1.322	0.82	0.000	0.650	0.64	1.00	0.64
43.66	120.00	2.476	57.60	1.336	0.82	0.000	0.650	0.64	1.00	0.64
44.16	120.00	2.504	57.60	1.350	0.81	0.000	0.650	0.64	1.00	0.64
44.66	120.00	2.532	57.60	1.363	0.81	0.000	0.650	0.64	1.00	0.64
45.16	120.00	2.561	57.60	1.377	0.81	0.000	0.650	0.63	1.00	0.63
45.66	120.00	2.589	57.60	1.391	0.80	0.000	0.650	0.63	1.00	0.63
46.16	120.00	2.618	57.60	1.404	0.80	0.000	0.650	0.63	1.00	0.63
46.66	120.00	2.646	57.60	1.418	0.79	0.000	0.650	0.63	1.00	0.63
47.16	120.00	2.674	57.60	1.431	0.79	0.000	0.650	0.62	1.00	0.62
47.66	120.00	2.703	57.60	1.445	0.79	0.000	0.650	0.62	1.00	0.62
48.16	120.00	2.731	57.60	1.459	0.78	0.000	0.650	0.62	1.00	0.62
48.66	120.00	2.759	57.60	1.472	0.78	0.000	0.650	0.62	1.00	0.62
49.16	120.00	2.788	57.60	1.486	0.77	0.000	0.650	0.61	1.00	0.61
49.66	120.00	2.816	57.60	1.499	0.77	0.000	0.650	0.61	1.00	0.61
50.16	120.00	2.844	57.60	1.513	0.77	0.000	0.650	0.61	1.00	0.61
50.66	120.00	2.873	57.60	1.527	0.76	0.000	0.650	0.61	1.00	0.61
51.16	120.00	2.901	57.60	1.540	0.76	0.000	0.650	0.60	1.00	0.60
51.66	120.00	2.929	57.60	1.554	0.75	0.000	0.650	0.60	1.00	0.60
52.16	120.00	2.958	57.60	1.567	0.75	0.000	0.650	0.60	1.00	0.60
52.66	120.00	2.986	57.60	1.581	0.75	0.000	0.650	0.59	1.00	0.59
53.16	120.00	3.014	57.60	1.595	0.74	0.000	0.650	0.59	1.00	0.59
53.66	120.00	3.043	57.60	1.608	0.74	0.000	0.650	0.59	1.00	0.59
54.16	120.00	3.071	57.60	1.622	0.73	0.000	0.650	0.59	1.00	0.59
54.66	120.00	3.100	57.60	1.635	0.73	0.000	0.650	0.58	1.00	0.58
55.16	120.00	3.128	57.60	1.649	0.73	0.000	0.650	0.58	1.00	0.58
55.66	120.00	3.156	57.60	1.663	0.72	0.000	0.650	0.58	1.00	0.58
56.16	120.00	3.185	57.60	1.676	0.72	0.000	0.650	0.58	1.00	0.58
56.66	120.00	3.213	57.60	1.690	0.71	0.000	0.650	0.57	1.00	0.57
57.16	120.00	3.241	57.60	1.704	0.71	0.000	0.650	0.57	1.00	0.57
57.66	120.00	3.270	57.60	1.717	0.70	0.000	0.650	0.57	1.00	0.57
58.16	120.00	3.298	57.60	1.731	0.70	0.000	0.650	0.56	1.00	0.56
58.66	120.00	3.326	57.60	1.744	0.70	0.000	0.650	0.56	1.00	0.56
59.16	120.00	3.355	57.60	1.758	0.69	0.000	0.650	0.56	1.00	0.56
59.66	120.00	3.383	57.60	1.772	0.69	0.000	0.650	0.56	1.00	0.56
60.16	120.00	3.411	57.60	1.785	0.68	0.000	0.650	0.55	1.00	0.55
60.66	120.00	3.440	57.60	1.799	0.68	0.000	0.650	0.55	1.00	0.55
61.16	120.00	3.468	57.60	1.812	0.68	0.000	0.650	0.55	1.00	0.55
61.66	120.00	3.496	57.60	1.826	0.67	0.000	0.650	0.54	1.00	0.54
62.16	120.00	3.525	57.60	1.840	0.67	0.000	0.650	0.54	1.00	0.54
62.66	120.00	3.553	57.60	1.853	0.66	0.000	0.650	0.54	1.00	0.54
63.16	120.00	3.582	57.60	1.867	0.66	0.000	0.650	0.53	1.00	0.53
63.66	120.00	3.610	57.60	1.880	0.66	0.000	0.650	0.53	1.00	0.53

CSR is based on water table at 5.00 during earthquake

CRR Calculation from CPT data, using Modify Robertson's Method:
(Fines content is determined by qc and fric.)

Depth ft	qc atm	fric. atm	n	Q	Rf	Ic	Cq	Fines %	Kc	qc1n atm	qc1f atm	CRR7.5
0.16			1.00	1.00E-4	0.00	7.97						
0.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
0.66			1.00	1.00E-4	0.00	7.97						
0.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.16			1.00	1.00E-4	0.00	7.97						
1.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.66			1.00	1.00E-4	0.00	7.97						
1.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.16			1.00	1.00E-4	0.00	7.97						
2.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.66			1.00	1.00E-4	0.00	7.97						
2.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.16			1.00	1.00E-4	0.00	7.97						

3.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.66			1.00	1.00E-4	0.00	7.97						
3.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.16			1.00	1.00E-4	0.00	7.97						
4.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.66			1.00	1.00E-4	0.00	7.97						
4.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
5.16			1.00	9.54E1	2.19	2.16						
5.16			0.50	5.22E1	2.19	2.35						
5.16	28.22	0.61	0.50	5.22E1	2.19	2.35	1.85	24.30	0.52	52.16	107.61	0.20
5.66			1.00	1.04E2	3.00	2.23						
5.66			0.50	5.97E1	3.00	2.40						
5.66	33.80	1.00	0.50	5.97E1	3.00	2.40	1.77	26.33	0.57	59.65	138.60	0.33
6.16			1.00	1.18E2	3.08	2.21						
6.16			0.50	7.03E1	3.08	2.36						
6.16	41.53	1.27	0.50	7.03E1	3.08	2.36	1.69	24.68	0.53	70.28	148.11	0.38
6.66			1.00	1.11E2	2.77	2.19						
6.66			0.50	6.86E1	2.77	2.33						
6.66	42.17	1.16	0.50	6.86E1	2.77	2.33	1.63	23.67	0.50	68.62	136.83	0.32
7.16			1.00	2.20E2	1.66	1.83						
7.16			0.50	1.41E2	1.66	1.95						
7.16	89.67	1.48	0.50	1.41E2	1.66	1.95	1.57	11.73	0.18	140.73	171.57	0.55
7.66			1.00	2.45E2	1.46	1.76						
7.66			0.50	1.62E2	1.46	1.87						
7.66	106.75	1.55	0.50	1.62E2	1.46	1.87	1.52	9.74	0.13	161.98	185.43	0.67
8.16			1.00	2.22E2	1.54	1.80						
8.16			0.50	1.52E2	1.54	1.91						
8.16	103.38	1.58	0.50	1.52E2	1.54	1.91	1.47	10.57	0.15	151.98	178.54	0.61
8.66			1.00	2.18E2	1.28	1.74						
8.66			0.50	1.53E2	1.28	1.85						
8.66	107.39	1.37	0.50	1.53E2	1.28	1.85	1.43	9.14	0.11	153.25	172.30	0.56
9.16			1.00	2.69E2	1.12	1.64						
9.16			0.50	1.94E2	1.12	1.73						
9.16	140.08	1.56	0.50	1.94E2	1.12	1.73	1.39	6.75	0.05	194.37	203.88	0.87
9.66			1.00	2.19E2	0.95	1.65						
9.66			0.50	1.63E2	0.95	1.74						
9.66	120.69	1.14	0.50	1.63E2	0.95	1.74	1.35	6.82	0.05	163.07	171.41	0.55
10.16			1.00	1.62E2	1.16	1.80						
10.16			0.50	1.23E2	1.16	1.89						
10.16	93.12	1.07	0.50	1.23E2	1.16	1.89	1.32	10.04	0.13	123.16	142.29	0.35
10.66			1.00	6.54E1	2.74	2.34						
10.66			0.50	5.08E1	2.74	2.42						
10.66	38.87	1.05	0.50	5.08E1	2.74	2.42	1.31	27.25	0.59	50.81	125.15	0.26
11.16			1.00	6.88E1	1.60	2.17						
11.16			0.50	5.40E1	1.60	2.25						
11.16	41.83	0.66	0.50	5.40E1	1.60	2.25	1.29	20.56	0.42	54.05	92.47	0.15
11.66			1.00	2.80E1	4.15	2.73						
11.66	17.82	0.71	1.00	2.80E1	4.15	2.73	1.00	NoLiq	1.00	17.82	17.82	2.08
12.16			1.00	7.12E1	1.01	2.03						
12.16			0.50	5.72E1	1.01	2.11						
12.16	45.26	0.45	0.50	5.72E1	1.01	2.11	1.26	16.00	0.29	57.20	80.99	0.13
12.66			1.00	8.24E1	1.06	1.99						
12.66			0.50	6.68E1	1.06	2.06						
12.66	53.42	0.56	0.50	6.68E1	1.06	2.06	1.25	14.71	0.26	66.79	90.17	0.15
13.16			1.00	6.48E1	1.40	2.15						
13.16			0.50	5.33E1	1.40	2.22						
13.16	43.09	0.59	0.50	5.33E1	1.40	2.22	1.24	19.50	0.39	53.31	86.99	0.14
13.66			1.00	5.07E1	0.92	2.12						
13.66			0.50	4.24E1	0.92	2.19						
13.66	34.60	0.31	0.50	4.24E1	0.92	2.19	1.22	18.66	0.36	42.37	66.69	0.11
14.16			1.00	1.28E1	2.47	2.86						
14.16	9.54	0.22	1.00	1.28E1	2.47	2.86	1.00	NoLiq	1.00	9.54	9.54	2.08
14.66			1.00	1.08E1	2.41	2.92						
14.66	8.30	0.18	1.00	1.08E1	2.41	2.92	1.00	NoLiq	1.00	8.30	8.30	2.08
15.16			1.00	8.85E0	2.55	3.00						
15.16	7.13	0.16	1.00	8.85E0	2.55	3.00	1.00	NoLiq	1.00	7.13	7.13	2.08
15.66			1.00	1.30E1	2.37	2.84						
15.66	10.30	0.22	1.00	1.30E1	2.37	2.84	1.00	NoLiq	1.00	10.30	10.30	2.08
16.16			1.00	1.68E1	3.16	2.83						
16.16	13.30	0.39	1.00	1.68E1	3.16	2.83	1.00	NoLiq	1.00	13.30	13.30	2.08
16.66			1.00	1.62E1	3.42	2.86						
16.66	13.06	0.41	1.00	1.62E1	3.42	2.86	1.00	NoLiq	1.00	13.06	13.06	2.08
17.16			1.00	1.01E1	5.80	3.17						
17.16	8.64	0.44	1.00	1.01E1	5.80	3.17	1.00	NoLiq	1.00	8.64	8.64	2.08
17.66			1.00	8.34E0	4.19	3.14						
17.66	7.47	0.27	1.00	8.34E0	4.19	3.14	1.00	NoLiq	1.00	7.47	7.47	2.08
18.16			1.00	1.17E1	4.32	3.03						
18.16	10.29	0.40	1.00	1.17E1	4.32	3.03	1.00	NoLiq	1.00	10.29	10.29	2.08
18.66			1.00	1.34E1	3.90	2.96						
18.66	11.84	0.42	1.00	1.34E1	3.90	2.96	1.00	NoLiq	1.00	11.84	11.84	2.08
19.16			1.00	1.14E1	3.47	2.99						
19.16	10.41	0.32	1.00	1.14E1	3.47	2.99	1.00	NoLiq	1.00	10.41	10.41	2.08

19.66			1.00	1.54E1	3.77	2.90						
19.66	13.92	0.48	1.00	1.54E1	3.77	2.90	1.00	NoLiq	1.00	13.92	13.92	2.08
20.16			1.00	2.16E1	4.54	2.84						
20.16	19.36	0.83	1.00	2.16E1	4.54	2.84	1.00	NoLiq	1.00	19.36	19.36	2.08
20.66			1.00	3.18E1	3.64	2.65						
20.66	28.47	1.00	1.00	3.18E1	3.64	2.65	1.00	NoLiq	1.00	28.47	28.47	2.08
21.16			1.00	4.00E1	2.33	2.45						
21.16			0.50	3.87E1	2.33	2.46						
21.16	36.08	0.81	0.50	3.87E1	2.33	2.46	1.07	29.06	0.64	38.66	108.09	0.20
21.66			1.00	3.04E1	4.03	2.70						
21.66	28.12	1.08	1.00	3.04E1	4.03	2.70	1.00	NoLiq	1.00	28.12	28.12	2.08
22.16			1.00	3.94E1	2.94	2.52						
22.16			0.50	3.86E1	2.94	2.53						
22.16	36.61	1.04	0.50	3.86E1	2.94	2.53	1.06	31.98	0.72	38.63	138.14	0.33
22.66			1.00	2.71E1	3.12	2.66						
22.66	26.02	0.77	1.00	2.71E1	3.12	2.66	1.00	NoLiq	1.00	26.02	26.02	2.08
23.16			1.00	5.43E1	2.47	2.37						
23.16			0.50	5.36E1	2.47	2.37						
23.16	51.61	1.24	0.50	5.36E1	2.47	2.37	1.04	25.30	0.54	53.65	117.12	0.23
23.66			1.00	8.25E1	1.00	1.98						
23.66			0.50	8.13E1	1.00	1.98						
23.66	78.81	0.78	0.50	8.13E1	1.00	1.98	1.03	12.44	0.20	81.32	101.49	0.18
24.16			1.00	3.38E1	3.57	2.63						
24.16	33.57	1.15	1.00	3.38E1	3.57	2.63	1.00	NoLiq	1.00	33.57	33.57	2.08
24.66			1.00	2.91E1	3.24	2.65						
24.66	29.54	0.91	1.00	2.91E1	3.24	2.65	1.00	NoLiq	1.00	29.54	29.54	2.08
25.16			1.00	2.65E1	3.85	2.73						
25.16	27.39	1.00	1.00	2.65E1	3.85	2.73	1.00	NoLiq	1.00	27.39	27.39	2.08
25.66			1.00	5.73E1	3.57	2.46						
25.66			0.50	5.86E1	3.57	2.46						
25.66	58.42	2.03	0.50	5.86E1	3.57	2.46	1.00	28.83	0.64	58.61	161.09	0.47
26.16			1.00	1.75E2	1.13	1.77						
26.16			0.50	1.77E2	1.13	1.76						
26.16	178.12	2.00	0.50	1.77E2	1.13	1.76	1.00	7.37	0.06	177.48	189.47	0.71
26.66			1.00	1.85E2	0.62	1.57						
26.66			0.50	1.88E2	0.62	1.57						
26.66	190.11	1.17	0.50	1.88E2	0.62	1.57	0.99	3.84	0.00	188.17	188.17	0.70
27.16			1.00	2.11E2	0.67	1.55						
27.16			0.50	2.16E2	0.67	1.54						
27.16	219.89	1.45	0.50	2.16E2	0.67	1.54	0.98	3.45	0.00	216.20	216.20	1.02
27.66			1.00	3.08E2	0.72	1.46						
27.66			0.50	3.17E2	0.72	1.45						
27.66	324.44	2.33	0.50	3.17E2	0.72	1.45	0.98	2.16	0.00	316.92	316.92	2.08
28.16			1.00	4.11E2	0.67	1.35						
28.16			0.50	4.25E2	0.67	1.34						
28.16	438.18	2.94	0.50	4.25E2	0.67	1.34	0.97	0.87	0.00	425.26	425.26	2.08
28.66			1.00	3.17E2	0.33	1.22						
28.66			0.50	3.30E2	0.33	1.20						
28.66	342.47	1.12	0.50	3.30E2	0.33	1.20	0.96	0.00	0.00	330.27	330.27	2.08
29.16			1.00	3.77E2	0.74	1.41						
29.16			0.50	3.95E2	0.74	1.40						
29.16	412.68	3.05	0.50	3.95E2	0.74	1.40	0.96	1.49	0.00	395.48	395.48	2.08
29.66			1.00	4.74E2	0.34	1.09						
29.66			0.50	4.99E2	0.34	1.08						
29.66	524.36	1.78	0.50	4.99E2	0.34	1.08	0.95	0.00	0.00	499.39	499.39	2.08
30.16			1.00	3.18E2	0.74	1.46						
30.16			0.50	3.38E2	0.74	1.44						
30.16	357.04	2.63	0.50	3.38E2	0.74	1.44	0.95	2.01	0.00	337.97	337.97	2.08
30.66			1.00	4.73E2	0.89	1.42						
30.66			0.50	5.05E2	0.89	1.40						
30.66	536.45	4.78	0.50	5.05E2	0.89	1.40	0.94	1.53	0.00	500.00	500.00	2.08
31.16			1.00	4.02E2	0.59	1.32						
31.16			0.50	4.31E2	0.59	1.30						
31.16	461.02	2.72	0.50	4.31E2	0.59	1.30	0.94	0.38	0.00	431.16	431.16	2.08
31.66			1.00	1.42E2	0.95	1.78						
31.66			0.50	1.54E2	0.95	1.76						
31.66	165.61	1.56	0.50	1.54E2	0.95	1.76	0.93	7.21	0.06	153.97	163.64	0.49
32.16			1.00	2.54E1	6.71	2.91						
32.16	31.56	2.00	1.00	2.54E1	6.71	2.91	1.00	NoLiq	1.00	31.56	31.56	2.08
32.66			1.00	1.90E1	2.92	2.76						
32.66	24.39	0.66	1.00	1.90E1	2.92	2.76	1.00	NoLiq	1.00	24.39	24.39	2.08
33.16			1.00	5.55E1	2.10	2.31						
33.16			0.50	6.24E1	2.10	2.28						
33.16	68.31	1.39	0.50	6.24E1	2.10	2.28	0.91	21.66	0.44	62.42	112.42	0.21
33.66			1.00	9.80E1	2.32	2.17						
33.66			0.50	1.10E2	2.32	2.14						
33.66	120.62	2.76	0.50	1.10E2	2.32	2.14	0.91	16.90	0.32	109.59	160.65	0.47
34.16			1.00	3.29E1	4.58	2.71						
34.16	42.24	1.85	1.00	3.29E1	4.58	2.71	1.00	NoLiq	1.00	42.24	42.24	2.08
34.66			1.00	2.39E1	1.93	2.58						
34.66			0.50	2.84E1	1.93	2.52						
34.66	31.61	0.57	0.50	2.84E1	1.93	2.52	0.90	31.46	0.71	28.40	96.76	0.16

35.16			1.00	2.17E1	2.42	2.67						
35.16	29.15	0.66	1.00	2.17E1	2.42	2.67	1.00	NoLiq	1.00	29.15	29.15	2.08
35.66			1.00	2.14E1	2.39	2.67						
35.66	29.14	0.65	1.00	2.14E1	2.39	2.67	1.00	NoLiq	1.00	29.14	29.14	2.08
36.16			1.00	2.62E1	2.49	2.61						
36.16	35.54	0.83	1.00	2.62E1	2.49	2.61	1.00	NoLiq	1.00	35.54	35.54	2.08
36.66			1.00	1.98E1	2.97	2.75						
36.66	27.72	0.76	1.00	1.98E1	2.97	2.75	1.00	NoLiq	1.00	27.72	27.72	2.08
37.16			1.00	2.90E1	3.24	2.65						
37.16	40.06	1.23	1.00	2.90E1	3.24	2.65	1.00	NoLiq	1.00	40.06	40.06	2.08
37.66			1.00	2.66E1	4.64	2.78						
37.66	37.26	1.63	1.00	2.66E1	4.64	2.78	1.00	NoLiq	1.00	37.26	37.26	2.08
38.16			1.00	2.21E1	2.57	2.68						
38.16	31.70	0.76	1.00	2.21E1	2.57	2.68	1.00	NoLiq	1.00	31.70	31.70	2.08
38.66			1.00	2.10E1	2.23	2.66						
38.66	30.47	0.63	1.00	2.10E1	2.23	2.66	1.00	NoLiq	1.00	30.47	30.47	2.08
39.16			1.00	1.92E1	2.71	2.74						
39.16	28.33	0.71	1.00	1.92E1	2.71	2.74	1.00	NoLiq	1.00	28.33	28.33	2.08
39.66			1.00	1.85E1	2.83	2.76						
39.66	27.74	0.72	1.00	1.85E1	2.83	2.76	1.00	NoLiq	1.00	27.74	27.74	2.08
40.16			1.00	2.32E1	3.67	2.76						
40.16	34.48	1.18	1.00	2.32E1	3.67	2.76	1.00	NoLiq	1.00	34.48	34.48	2.08
40.66			1.00	1.92E1	2.52	2.72						
40.66	29.28	0.68	1.00	1.92E1	2.52	2.72	1.00	NoLiq	1.00	29.28	29.28	2.08
41.16			1.00	1.95E1	2.54	2.72						
41.16	29.89	0.70	1.00	1.95E1	2.54	2.72	1.00	NoLiq	1.00	29.89	29.89	2.08
41.66			1.00	2.91E1	2.81	2.61						
41.66	43.94	1.17	1.00	2.91E1	2.81	2.61	1.00	NoLiq	1.00	43.94	43.94	2.08
42.16			1.00	8.56E1	2.52	2.23						
42.16			0.50	1.05E2	2.52	2.18						
42.16	125.91	3.11	0.50	1.05E2	2.52	2.18	0.83	18.17	0.35	104.83	161.68	0.47
42.66			1.00	4.00E1	2.04	2.42						
42.66			0.50	5.03E1	2.04	2.34						
42.66	60.64	1.19	0.50	5.03E1	2.04	2.34	0.83	24.00	0.51	50.25	101.98	0.18
43.16			1.00	2.27E1	2.49	2.66						
43.16	35.82	0.83	1.00	2.27E1	2.49	2.66	1.00	NoLiq	1.00	35.82	35.82	2.08
43.66			1.00	1.88E1	2.88	2.76						
43.66	30.35	0.80	1.00	1.88E1	2.88	2.76	1.00	NoLiq	1.00	30.35	30.35	2.08
44.16			1.00	1.96E1	3.29	2.79						
44.16	31.79	0.96	1.00	1.96E1	3.29	2.79	1.00	NoLiq	1.00	31.79	31.79	2.08
44.66			1.00	1.97E1	3.36	2.79						
44.66	32.27	1.00	1.00	1.97E1	3.36	2.79	1.00	NoLiq	1.00	32.27	32.27	2.08
45.16			1.00	1.91E1	3.09	2.78						
45.16	31.73	0.90	1.00	1.91E1	3.09	2.78	1.00	NoLiq	1.00	31.73	31.73	2.08
45.66			1.00	2.31E1	2.28	2.63						
45.66	38.13	0.81	1.00	2.31E1	2.28	2.63	1.00	NoLiq	1.00	38.13	38.13	2.08
46.16			1.00	2.35E1	2.54	2.65						
46.16	39.05	0.93	1.00	2.35E1	2.54	2.65	1.00	NoLiq	1.00	39.05	39.05	2.08
46.66			1.00	2.05E1	3.25	2.77						
46.66	34.74	1.04	1.00	2.05E1	3.25	2.77	1.00	NoLiq	1.00	34.74	34.74	2.08
47.16			1.00	6.24E1	1.79	2.23						
47.16			0.50	8.05E1	1.79	2.15						
47.16	101.19	1.77	0.50	8.05E1	1.79	2.15	0.80	17.32	0.33	80.54	120.02	0.24
47.66			1.00	4.00E1	2.84	2.51						
47.66			0.50	5.27E1	2.84	2.42						
47.66	66.47	1.81	0.50	5.27E1	2.84	2.42	0.79	27.22	0.59	52.67	129.50	0.28
48.16			1.00	1.69E1	1.78	2.68						
48.16	29.84	0.48	1.00	1.69E1	1.78	2.68	1.00	NoLiq	1.00	29.84	29.84	2.08
48.66			1.00	2.17E1	1.70	2.58						
48.66			0.50	2.98E1	1.70	2.47						
48.66	37.89	0.60	0.50	2.98E1	1.70	2.47	0.79	29.26	0.65	29.77	84.51	0.14
49.16			1.00	2.17E1	4.01	2.81						
49.16	38.15	1.42	1.00	2.17E1	4.01	2.81	1.00	NoLiq	1.00	38.15	38.15	2.08
49.66			1.00	2.81E2	0.89	1.55						
49.66			0.50	3.63E2	0.89	1.48						
49.66	465.97	4.12	0.50	3.63E2	0.89	1.48	0.78	2.57	0.00	363.11	363.11	2.08
50.16			1.00	3.38E2	0.56	1.35						
50.16			0.50	4.38E2	0.56	1.27						
50.16	564.59	3.15	0.50	4.38E2	0.56	1.27	0.78	0.15	0.00	438.15	438.15	2.08
50.66			1.00	3.03E2	0.66	1.44						
50.66			0.50	3.94E2	0.66	1.36						
50.66	509.88	3.36	0.50	3.94E2	0.66	1.36	0.77	1.05	0.00	394.08	394.08	2.08
51.16			1.00	2.95E2	0.18	1.10						
51.16			0.50	3.85E2	0.18	1.00						
51.16	500.73	0.88	0.50	3.85E2	0.18	1.00	0.77	0.00	0.00	385.45	385.45	2.08
51.66			1.00	3.68E2	0.08	0.91						
51.66			0.50	4.82E2	0.08	0.80						
51.66	628.65	0.51	0.50	4.82E2	0.08	0.80	0.77	0.00	0.00	481.97	481.97	2.08
52.16			1.00	3.75E2	0.11	0.93						
52.16			0.50	4.94E2	0.11	0.82						
52.16	646.59	0.69	0.50	4.94E2	0.11	0.82	0.76	0.00	0.00	493.76	493.76	2.08
52.66			1.00	3.83E2	0.35	1.17						

52.66			0.50	5.05E2	0.35	1.08						
52.66	664.18	2.31	0.50	5.05E2	0.35	1.08	0.76	0.00	0.00	500.00	500.00	2.08
53.16			1.00	3.86E2	0.41	1.21						
53.16			0.50	5.12E2	0.41	1.13						
53.16	676.19	2.76	0.50	5.12E2	0.41	1.13	0.76	0.00	0.00	500.00	500.00	2.08
53.66			1.00	3.68E2	0.34	1.17						
53.66			0.50	4.90E2	0.34	1.08						
53.66	649.13	2.18	0.50	4.90E2	0.34	1.08	0.75	0.00	0.00	489.90	489.90	2.08
54.16			1.00	3.58E2	0.06	0.92						
54.16			0.50	4.79E2	0.06	0.79						
54.16	636.48	0.39	0.50	4.79E2	0.06	0.79	0.75	0.00	0.00	478.50	478.50	2.08
54.66			1.00	3.43E2	0.61	1.37						
54.66			0.50	4.60E2	0.61	1.29						
54.66	614.65	3.71	0.50	4.60E2	0.61	1.29	0.75	0.28	0.00	460.32	460.32	2.08
55.16			1.00	3.39E2	0.59	1.37						
55.16			0.50	4.57E2	0.59	1.28						
55.16	612.64	3.60	0.50	4.57E2	0.59	1.28	0.75	0.21	0.00	457.08	457.08	2.08
55.66			1.00	3.17E2	0.95	1.54						
55.66			0.50	4.29E2	0.95	1.46						
55.66	577.58	5.45	0.50	4.29E2	0.95	1.46	0.74	2.30	0.00	429.29	429.29	2.08
56.16			1.00	2.92E2	0.27	1.20						
56.16			0.50	3.96E2	0.27	1.09						
56.16	535.31	1.43	0.50	3.96E2	0.27	1.09	0.74	0.00	0.00	396.39	396.39	2.08
56.66			1.00	2.50E2	1.20	1.69						
56.66			0.50	3.42E2	1.20	1.60						
56.66	463.41	5.54	0.50	3.42E2	1.20	1.60	0.74	4.40	0.00	341.87	341.87	2.08
57.16			1.00	2.35E2	1.04	1.66						
57.16			0.50	3.22E2	1.04	1.57						
57.16	438.52	4.54	0.50	3.22E2	1.04	1.57	0.74	3.84	0.00	322.32	322.32	2.08
57.66			1.00	2.32E2	1.02	1.65						
57.66			0.50	3.19E2	1.02	1.56						
57.66	435.24	4.40	0.50	3.19E2	1.02	1.56	0.73	3.77	0.00	318.74	318.74	2.08
58.16			1.00	2.31E2	0.50	1.44						
58.16			0.50	3.20E2	0.50	1.33						
58.16	437.96	2.16	0.50	3.20E2	0.50	1.33	0.73	0.73	0.00	319.57	319.57	2.08
58.66			1.00	2.57E2	0.44	1.37						
58.66			0.50	3.55E2	0.44	1.26						
58.66	488.62	2.16	0.50	3.55E2	0.44	1.26	0.73	0.05	0.00	355.25	355.25	2.08
59.16			1.00	2.60E2	0.60	1.45						
59.16			0.50	3.61E2	0.60	1.35						
59.16	498.00	2.98	0.50	3.61E2	0.60	1.35	0.72	0.99	0.00	360.77	360.77	2.08
59.66			1.00	2.97E2	0.45	1.33						
59.66			0.50	4.14E2	0.45	1.22						
59.66	572.98	2.58	0.50	4.14E2	0.45	1.22	0.72	0.00	0.00	413.62	413.62	2.08
60.16			1.00	2.93E2	0.46	1.33						
60.16			0.50	4.10E2	0.46	1.23						
60.16	569.89	2.59	0.50	4.10E2	0.46	1.23	0.72	0.00	0.00	409.94	409.94	2.08
60.66			1.00	3.09E2	0.25	1.16						
60.66			0.50	4.34E2	0.25	1.04						
60.66	605.13	1.53	0.50	4.34E2	0.25	1.04	0.72	0.00	0.00	433.76	433.76	2.08
61.16			1.00	3.25E2	0.08	0.97						
61.16			0.50	4.58E2	0.08	0.82						
61.16	641.03	0.52	0.50	4.58E2	0.08	0.82	0.71	0.00	0.00	457.90	457.90	2.08
61.66			1.00	2.99E2	0.61	1.41						
61.66			0.50	4.22E2	0.61	1.31						
61.66	592.95	3.59	0.50	4.22E2	0.61	1.31	0.71	0.54	0.00	422.09	422.09	2.08
62.16			1.00	3.32E2	0.10	0.98						
62.16			0.50	4.71E2	0.10	0.83						
62.16	663.85	0.69	0.50	4.71E2	0.10	0.83	0.71	0.00	0.00	470.94	470.94	2.08
62.66			1.00	3.28E2	0.08	0.96						
62.66			0.50	4.67E2	0.08	0.81						
62.66	659.86	0.53	0.50	4.67E2	0.08	0.81	0.71	0.00	0.00	466.51	466.51	2.08
63.16			1.00	3.53E2	0.08	0.93						
63.16			0.50	5.03E2	0.08	0.77						
63.16	714.31	0.54	0.50	5.03E2	0.08	0.77	0.70	0.00	0.00	500.00	500.00	2.08
63.66			1.00	3.69E2	0.00	1.63						
63.66			0.50	5.28E2	0.00	1.55						
63.66	751.68	0.02	0.50	5.28E2	0.00	1.55	0.70	3.51	0.00	500.00	500.00	2.08

Fines have been calculated, and correction is made by Modify Robertson Method.
Fines=NoLiq means the soils are not liquefiable.
CRR is based on water table at 10.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 6.63:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.16	0.01	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
0.66	0.02	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.16	0.04	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.66	0.06	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.16	0.08	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^

2.66	0.10	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^	
3.16	0.12	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^	
3.66	0.13	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^	
4.16	0.15	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^	
4.66	0.17	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^	
5.16	0.19	0.20	1.00	0.20	1.37	0.27	0.42	0.63 *	
5.66	0.21	0.33	1.00	0.33	1.37	0.45	0.44	1.01	
6.16	0.23	0.38	1.00	0.38	1.37	0.52	0.46	1.14	
6.66	0.25	0.32	1.00	0.32	1.37	0.44	0.48	0.91 *	
7.16	0.26	0.55	1.00	0.55	1.37	0.75	0.49	1.53	
7.66	0.28	0.67	1.00	0.67	1.37	0.92	0.51	1.82	
8.16	0.30	0.61	1.00	0.61	1.37	0.84	0.52	1.61	
8.66	0.32	0.56	1.00	0.56	1.37	0.76	0.53	1.44	
9.16	0.34	0.87	1.00	0.87	1.37	1.19	0.54	2.20	
9.66	0.36	0.55	1.00	0.55	1.37	0.75	0.55	1.36	
10.16	0.37	0.35	1.00	0.35	1.37	0.48	0.56	0.85 *	
10.66	0.38	0.26	1.00	0.26	1.37	0.36	0.57	0.63 *	
11.16	0.39	0.15	1.00	0.15	1.37	0.21	0.58	0.36 *	
11.66	0.40	2.08	1.00	2.08	1.37	2.00	0.58	5.00 ^	
12.16	0.41	0.13	1.00	0.13	1.37	0.18	0.59	0.30 *	Liq.
12.66	0.42	0.15	1.00	0.15	1.37	0.20	0.60	0.34 *	
13.16	0.42	0.14	1.00	0.14	1.37	0.19	0.60	0.32 *	
13.66	0.43	0.11	1.00	0.11	1.37	0.15	0.61	0.24 *	
14.16	0.44	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^	
14.66	0.45	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^	
15.16	0.46	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^	
15.66	0.47	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^	
16.16	0.48	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^	
16.66	0.49	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^	
17.16	0.50	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^	
17.66	0.50	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^	
18.16	0.51	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^	
18.66	0.52	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^	
19.16	0.53	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^	
19.66	0.54	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^	
20.16	0.55	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^	
20.66	0.56	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^	
21.16	0.57	0.20	1.00	0.20	1.37	0.27	0.67	0.41 *	
21.66	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^	
22.16	0.58	0.33	1.00	0.33	1.37	0.45	0.67	0.66 *	
22.66	0.59	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^	Liq.
23.16	0.60	0.23	1.00	0.23	1.37	0.31	0.67	0.47 *	
23.66	0.61	0.18	1.00	0.18	1.37	0.24	0.68	0.36 *	
24.16	0.62	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
24.66	0.63	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
25.16	0.64	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
25.66	0.65	0.47	1.00	0.47	1.37	0.64	0.68	0.94 *	
26.16	0.65	0.71	1.00	0.71	1.37	0.98	0.68	1.43	
26.66	0.66	0.70	1.00	0.70	1.37	0.96	0.69	1.40	
27.16	0.67	1.02	1.00	1.02	1.37	1.40	0.69	2.03	
27.66	0.68	2.08	1.00	2.08	1.37	2.85	0.69	4.14	
28.16	0.69	2.08	1.00	2.08	1.37	2.85	0.69	4.13	
28.66	0.70	2.08	1.00	2.08	1.37	2.85	0.69	4.13	
29.16	0.71	2.08	1.00	2.08	1.37	2.85	0.69	4.12	
29.66	0.72	2.08	1.00	2.08	1.37	2.85	0.69	4.12	
30.16	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12	
30.66	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12	
31.16	0.74	2.08	1.00	2.08	1.37	2.85	0.69	4.13	
31.66	0.75	0.49	1.00	0.49	1.37	0.67	0.69	0.97 *	
32.16	0.76	2.08	1.00	2.08	1.37	2.00	0.69	5.00 ^	
32.66	0.77	2.08	1.00	2.08	1.37	2.00	0.69	5.00 ^	
33.16	0.78	0.21	1.00	0.21	1.37	0.29	0.68	0.43 *	Liq.
33.66	0.79	0.47	1.00	0.47	1.37	0.64	0.68	0.94 *	
34.16	0.80	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
34.66	0.81	0.16	1.00	0.16	1.37	0.23	0.68	0.33 *	
35.16	0.81	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
35.66	0.82	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^	
36.16	0.83	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^	
36.66	0.84	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^	
37.16	0.85	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^	
37.66	0.86	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^	
38.16	0.87	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^	
38.66	0.88	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^	
39.16	0.88	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^	
39.66	0.89	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^	
40.16	0.90	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^	
40.66	0.91	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^	
41.16	0.92	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^	
41.66	0.93	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^	
42.16	0.94	0.47	1.00	0.47	1.37	0.65	0.65	1.00	
42.66	0.95	0.18	1.00	0.18	1.37	0.24	0.65	0.38 *	
43.16	0.96	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^	

43.66	0.96	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
44.16	0.97	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
44.66	0.98	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
45.16	0.99	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
45.66	1.00	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
46.16	1.01	2.08	1.00	2.09	1.37	2.00	0.63	5.00 ^
46.66	1.02	2.08	1.00	2.09	1.37	2.00	0.63	5.00 ^
47.16	1.03	0.24	1.00	0.24	1.37	0.33	0.62	0.53 *
47.66	1.04	0.28	1.00	0.28	1.37	0.39	0.62	0.62 *
48.16	1.04	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^
48.66	1.05	0.14	1.00	0.14	1.37	0.19	0.62	0.30 *
49.16	1.06	2.08	1.00	2.07	1.37	2.00	0.61	5.00 ^
49.66	1.07	2.08	1.00	2.07	1.37	2.84	0.61	4.64
50.16	1.08	2.08	0.99	2.07	1.37	2.83	0.61	4.66
50.66	1.09	2.08	0.99	2.06	1.37	2.83	0.61	4.67
51.16	1.10	2.08	0.99	2.06	1.37	2.83	0.60	4.69
51.66	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.70
52.16	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.71
52.66	1.12	2.08	0.99	2.05	1.37	2.81	0.59	4.73
53.16	1.13	2.08	0.99	2.05	1.37	2.81	0.59	4.74
53.66	1.14	2.08	0.98	2.05	1.37	2.81	0.59	4.76
54.16	1.15	2.08	0.98	2.04	1.37	2.80	0.59	4.78
54.66	1.16	2.08	0.98	2.04	1.37	2.80	0.58	4.79
55.16	1.17	2.08	0.98	2.04	1.37	2.79	0.58	4.81
55.66	1.18	2.08	0.98	2.04	1.37	2.79	0.58	4.83
56.16	1.19	2.08	0.98	2.03	1.37	2.79	0.58	4.84
56.66	1.19	2.08	0.98	2.03	1.37	2.78	0.57	4.86
57.16	1.20	2.08	0.97	2.03	1.37	2.78	0.57	4.88
57.66	1.21	2.08	0.97	2.02	1.37	2.78	0.57	4.89
58.16	1.22	2.08	0.97	2.02	1.37	2.77	0.56	4.91
58.66	1.23	2.08	0.97	2.02	1.37	2.77	0.56	4.93
59.16	1.24	2.08	0.97	2.02	1.37	2.76	0.56	4.95
59.66	1.25	2.08	0.97	2.01	1.37	2.76	0.56	4.97
60.16	1.26	2.08	0.97	2.01	1.37	2.76	0.55	4.99
60.66	1.27	2.08	0.97	2.01	1.37	2.75	0.55	5.00
61.16	1.27	2.08	0.96	2.01	1.37	2.75	0.55	5.00
61.66	1.28	2.08	0.96	2.00	1.37	2.75	0.54	5.00
62.16	1.29	2.08	0.96	2.00	1.37	2.74	0.54	5.00
62.66	1.30	2.08	0.96	2.00	1.37	2.74	0.54	5.00
63.16	1.31	2.08	0.96	2.00	1.37	2.73	0.53	5.00
63.66	1.32	2.08	0.96	1.99	1.37	2.73	0.53	5.00

Liq.

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils or above Water Table.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
0.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
5.16	2.35	4.16	107.61	25.85	24.30	0.00	25.85
5.66	2.40	4.07	138.60	34.07	26.33	0.00	34.07
6.16	2.36	4.15	148.11	35.73	24.68	0.00	35.73
6.66	2.33	4.19	136.83	32.63	23.67	0.00	32.63
7.16	1.95	4.89	171.57	35.09	11.73	0.00	35.09
7.66	1.87	5.04	185.43	36.79	9.74	0.00	36.79
8.16	1.91	4.98	178.54	35.88	10.57	0.00	35.88
8.66	1.85	5.09	172.30	33.86	9.14	0.00	33.86
9.16	1.73	5.30	203.88	38.48	6.75	0.00	38.48
9.66	1.74	5.29	171.41	32.40	6.82	0.00	32.40
10.16	1.89	5.02	142.29	28.36	10.04	0.00	28.36
10.66	2.42	4.03	125.15	31.07	27.25	0.00	31.07
11.16	2.25	4.35	92.47	21.26	20.56	0.00	21.26
11.66	2.73	3.45	17.82	5.17	NoLiq	0.00	5.17
12.16	2.11	4.61	80.99	17.58	16.00	0.00	17.58
12.66	2.06	4.69	90.17	19.23	14.71	0.00	19.23
13.16	2.22	4.41	86.99	19.74	19.50	0.00	19.74
13.66	2.19	4.45	66.69	14.98	18.66	0.00	14.98
14.16	2.86	3.22	9.54	2.96	NoLiq	0.00	2.96
14.66	2.92	3.11	8.30	2.67	NoLiq	0.00	2.67

15.16	3.00	2.95	7.13	2.41	NoLiq	0.00	2.41
15.66	2.84	3.25	10.30	3.17	NoLiq	0.00	3.17
16.16	2.83	3.28	13.30	4.06	NoLiq	0.00	4.06
16.66	2.86	3.21	13.06	4.07	NoLiq	0.00	4.07
17.16	3.17	2.65	8.64	3.26	NoLiq	0.00	3.26
17.66	3.14	2.69	7.47	2.78	NoLiq	0.00	2.78
18.16	3.03	2.89	10.29	3.56	NoLiq	0.00	3.56
18.66	2.96	3.03	11.84	3.91	NoLiq	0.00	3.91
19.16	2.99	2.98	10.41	3.49	NoLiq	0.00	3.49
19.66	2.90	3.13	13.92	4.44	NoLiq	0.00	4.44
20.16	2.84	3.25	19.36	5.96	NoLiq	0.00	5.96
20.66	2.65	3.60	28.47	7.92	NoLiq	0.00	7.92
21.16	2.46	3.95	108.09	27.37	29.06	0.00	27.37
21.66	2.70	3.51	28.12	8.00	NoLiq	0.00	8.00
22.16	2.53	3.83	138.14	36.09	31.98	0.00	36.09
22.66	2.66	3.58	26.02	7.27	NoLiq	0.00	7.27
23.16	2.37	4.12	117.12	28.45	25.30	0.00	28.45
23.66	1.98	4.84	101.49	20.97	12.44	0.00	20.97
24.16	2.63	3.64	33.57	9.22	NoLiq	0.00	9.22
24.66	2.65	3.60	29.54	8.20	NoLiq	0.00	8.20
25.16	2.73	3.46	27.39	7.92	NoLiq	0.00	7.92
25.66	2.46	3.96	161.09	40.69	28.83	0.00	40.69
26.16	1.76	5.24	189.47	36.16	7.37	0.00	36.16
26.66	1.57	5.60	188.17	33.58	3.84	0.00	33.58
27.16	1.54	5.65	216.20	38.26	3.45	0.00	38.26
27.66	1.45	5.82	316.92	54.45	2.16	0.00	54.45
28.16	1.34	6.02	425.26	70.68	0.87	0.00	70.68
28.66	1.20	6.28	330.27	52.62	0.00	0.00	52.62
29.16	1.40	5.92	395.48	66.82	1.49	0.00	66.82
29.66	1.08	6.51	499.39	76.74	0.00	0.00	76.74
30.16	1.44	5.84	337.97	57.86	2.01	0.00	57.86
30.66	1.40	5.91	500.00	84.56	1.53	0.00	84.56
31.16	1.30	6.10	431.16	70.64	0.38	0.00	70.64
31.66	1.76	5.25	163.64	31.14	7.21	0.00	31.14
32.16	2.91	3.13	31.56	10.09	NoLiq	0.00	10.09
32.66	2.76	3.39	24.39	7.19	NoLiq	0.00	7.19
33.16	2.28	4.29	112.42	26.18	21.66	0.00	26.18
33.66	2.14	4.55	160.65	35.28	16.90	0.00	35.28
34.16	2.71	3.49	42.24	12.10	NoLiq	0.00	12.10
34.66	2.52	3.85	96.76	25.14	31.46	0.00	25.14
35.16	2.67	3.57	29.15	8.17	NoLiq	0.00	8.17
35.66	2.67	3.57	29.14	8.17	NoLiq	0.00	8.17
36.16	2.61	3.67	35.54	9.67	NoLiq	0.00	9.67
36.66	2.75	3.41	27.72	8.13	NoLiq	0.00	8.13
37.16	2.65	3.60	40.06	11.12	NoLiq	0.00	11.12
37.66	2.78	3.36	37.26	11.09	NoLiq	0.00	11.09
38.16	2.68	3.55	31.70	8.92	NoLiq	0.00	8.92
38.66	2.66	3.58	30.47	8.50	NoLiq	0.00	8.50
39.16	2.74	3.43	28.33	8.25	NoLiq	0.00	8.25
39.66	2.76	3.39	27.74	8.18	NoLiq	0.00	8.18
40.16	2.76	3.40	34.48	10.14	NoLiq	0.00	10.14
40.66	2.72	3.47	29.28	8.44	NoLiq	0.00	8.44
41.16	2.72	3.48	29.89	8.60	NoLiq	0.00	8.60
41.66	2.61	3.68	43.94	11.95	NoLiq	0.00	11.95
42.16	2.18	4.48	161.68	36.08	18.17	0.00	36.08
42.66	2.34	4.18	101.98	24.41	24.00	0.00	24.41
43.16	2.66	3.58	35.82	10.00	NoLiq	0.00	10.00
43.66	2.76	3.39	30.35	8.95	NoLiq	0.00	8.95
44.16	2.79	3.35	31.79	9.48	NoLiq	0.00	9.48
44.66	2.79	3.34	32.27	9.65	NoLiq	0.00	9.65
45.16	2.78	3.37	31.73	9.42	NoLiq	0.00	9.42
45.66	2.63	3.64	38.13	10.48	NoLiq	0.00	10.48
46.16	2.65	3.59	39.05	10.86	NoLiq	0.00	10.86
46.66	2.77	3.39	34.74	10.26	NoLiq	0.00	10.26
47.16	2.15	4.53	120.02	26.50	17.32	0.00	26.50
47.66	2.42	4.03	129.50	32.14	27.22	0.00	32.14
48.16	2.68	3.55	29.84	8.42	NoLiq	0.00	8.42
48.66	2.47	3.94	84.51	21.45	29.26	0.00	21.45
49.16	2.81	3.31	38.15	11.51	NoLiq	0.00	11.51
49.66	1.48	5.76	363.11	63.01	2.57	0.00	63.01
50.16	1.27	6.14	438.15	71.31	0.15	0.00	71.31
50.66	1.36	5.99	394.08	65.82	1.05	0.00	65.82
51.16	1.00	6.65	385.45	57.95	0.00	0.00	57.95
51.66	0.80	7.03	481.97	68.60	0.00	0.00	68.60
52.16	0.82	6.99	493.76	70.61	0.00	0.00	70.61
52.66	1.08	6.50	500.00	76.90	0.00	0.00	76.90
53.16	1.13	6.42	500.00	77.93	0.00	0.00	77.93
53.66	1.08	6.50	489.90	75.33	0.00	0.00	75.33
54.16	0.79	7.04	478.50	67.97	0.00	0.00	67.97
54.66	1.29	6.12	460.32	75.20	0.28	0.00	75.20
55.16	1.28	6.13	457.08	74.51	0.21	0.00	74.51
55.66	1.46	5.80	429.29	74.01	2.30	0.00	74.01

56.16	1.09	6.49	396.39	61.08	0.00	0.00	61.08
56.66	1.60	5.54	341.87	61.72	4.40	0.00	61.72
57.16	1.57	5.60	322.32	57.52	3.84	0.00	57.52
57.66	1.56	5.61	318.74	56.79	3.77	0.00	56.79
58.16	1.33	6.04	319.57	52.90	0.73	0.00	52.90
58.66	1.26	6.16	355.25	57.64	0.05	0.00	57.64
59.16	1.35	6.00	360.77	60.15	0.99	0.00	60.15
59.66	1.22	6.24	413.62	66.30	0.00	0.00	66.30
60.16	1.23	6.23	409.94	65.81	0.00	0.00	65.81
60.66	1.04	6.58	433.76	65.96	0.00	0.00	65.96
61.16	0.82	6.99	457.90	65.55	0.00	0.00	65.55
61.66	1.31	6.07	422.09	69.49	0.54	0.00	69.49
62.16	0.83	6.96	470.94	67.65	0.00	0.00	67.65
62.66	0.81	7.00	466.51	66.63	0.00	0.00	66.63
63.16	0.77	7.07	500.00	70.74	0.00	0.00	70.74
63.66	1.55	5.64	500.00	88.59	3.51	0.00	88.59

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
(N1)60 is converted from qc1, (N1)60s is after fines correction
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Ishihara / Yoshimine

Depth ft	CSRsf	/ MSF*	=CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
63.96	0.53	1.00	0.53	5.00	3.54	88.65	100.00	0.000	0.0E0	0.000	0.000
63.66	0.53	1.00	0.53	5.00	3.51	88.59	100.00	0.000	0.0E0	0.000	0.000
63.16	0.53	1.00	0.53	5.00	0.00	70.74	100.00	0.000	0.0E0	0.000	0.000
62.66	0.54	1.00	0.54	5.00	0.00	66.63	100.00	0.000	0.0E0	0.000	0.000
62.16	0.54	1.00	0.54	5.00	0.00	67.65	100.00	0.000	0.0E0	0.000	0.000
61.66	0.54	1.00	0.54	5.00	0.54	69.49	100.00	0.000	0.0E0	0.000	0.000
61.16	0.55	1.00	0.55	5.00	0.00	65.55	100.00	0.000	0.0E0	0.000	0.000
60.66	0.55	1.00	0.55	5.00	0.00	65.96	100.00	0.000	0.0E0	0.000	0.000
60.16	0.55	1.00	0.55	4.99	0.00	65.81	100.00	0.000	0.0E0	0.000	0.000
59.66	0.56	1.00	0.56	4.97	0.00	66.30	100.00	0.000	0.0E0	0.000	0.000
59.16	0.56	1.00	0.56	4.95	0.99	60.15	100.00	0.000	0.0E0	0.000	0.000
58.66	0.56	1.00	0.56	4.93	0.05	57.64	100.00	0.000	0.0E0	0.000	0.000
58.16	0.56	1.00	0.56	4.91	0.73	52.90	100.00	0.000	0.0E0	0.000	0.000
57.66	0.57	1.00	0.57	4.89	3.77	56.79	100.00	0.000	0.0E0	0.000	0.000
57.16	0.57	1.00	0.57	4.88	3.84	57.52	100.00	0.000	0.0E0	0.000	0.000
56.66	0.57	1.00	0.57	4.86	4.40	61.72	100.00	0.000	0.0E0	0.000	0.000
56.16	0.58	1.00	0.58	4.84	0.00	61.08	100.00	0.000	0.0E0	0.000	0.000
55.66	0.58	1.00	0.58	4.83	2.30	74.01	100.00	0.000	0.0E0	0.000	0.000
55.16	0.58	1.00	0.58	4.81	0.21	74.51	100.00	0.000	0.0E0	0.000	0.000
54.66	0.58	1.00	0.58	4.79	0.28	75.20	100.00	0.000	0.0E0	0.000	0.000
54.16	0.59	1.00	0.59	4.78	0.00	67.97	100.00	0.000	0.0E0	0.000	0.000
53.66	0.59	1.00	0.59	4.76	0.00	75.33	100.00	0.000	0.0E0	0.000	0.000
53.16	0.59	1.00	0.59	4.74	0.00	77.93	100.00	0.000	0.0E0	0.000	0.000
52.66	0.59	1.00	0.59	4.73	0.00	76.90	100.00	0.000	0.0E0	0.000	0.000
52.16	0.60	1.00	0.60	4.71	0.00	70.61	100.00	0.000	0.0E0	0.000	0.000
51.66	0.60	1.00	0.60	4.70	0.00	68.60	100.00	0.000	0.0E0	0.000	0.000
51.16	0.60	1.00	0.60	4.69	0.00	57.95	100.00	0.000	0.0E0	0.000	0.000
50.66	0.61	1.00	0.61	4.67	1.05	65.82	100.00	0.000	0.0E0	0.000	0.000
50.16	0.61	1.00	0.61	4.66	0.15	71.31	100.00	0.000	0.0E0	0.000	0.000
49.66	0.61	1.00	0.61	4.64	2.57	63.01	100.00	0.000	0.0E0	0.000	0.000
49.16	0.61	1.00	0.61	5.00	NoLiq	11.51	54.04	0.000	0.0E0	0.014	0.014
48.66	0.62	1.00	0.62	0.30	29.26	21.45	73.15	2.054	1.2E-2	0.037	0.050
48.16	0.62	1.00	0.62	5.00	NoLiq	8.42	46.58	0.000	0.0E0	0.012	0.062
47.66	0.62	1.00	0.62	0.62	27.22	32.14	95.11	0.526	3.2E-3	0.003	0.066
47.16	0.62	1.00	0.62	0.53	17.32	26.50	82.64	1.595	9.6E-3	0.083	0.148
46.66	0.63	1.00	0.63	5.00	NoLiq	10.26	51.15	0.000	0.0E0	0.038	0.186
46.16	0.63	1.00	0.63	5.00	NoLiq	10.86	52.56	0.000	0.0E0	0.000	0.186
45.66	0.63	1.00	0.63	5.00	NoLiq	10.48	51.68	0.000	0.0E0	0.000	0.186
45.16	0.63	1.00	0.63	5.00	NoLiq	9.42	49.13	0.000	0.0E0	0.000	0.186
44.66	0.64	1.00	0.64	5.00	NoLiq	9.65	49.69	0.000	0.0E0	0.000	0.186
44.16	0.64	1.00	0.64	5.00	NoLiq	9.48	49.29	0.000	0.0E0	0.000	0.186
43.66	0.64	1.00	0.64	5.00	NoLiq	8.95	47.95	0.000	0.0E0	0.000	0.186
43.16	0.64	1.00	0.64	5.00	NoLiq	10.00	50.54	0.000	0.0E0	0.000	0.186
42.66	0.65	1.00	0.65	0.38	24.00	24.41	78.60	1.809	1.1E-2	0.102	0.288
42.16	0.65	1.00	0.65	1.00	18.17	36.08	100.00	0.000	0.0E0	0.046	0.334
41.66	0.65	1.00	0.65	5.00	NoLiq	11.95	54.99	0.000	0.0E0	0.018	0.352
41.16	0.65	1.00	0.65	5.00	NoLiq	8.60	47.06	0.000	0.0E0	0.000	0.352
40.66	0.65	1.00	0.65	5.00	NoLiq	8.44	46.63	0.000	0.0E0	0.000	0.352
40.16	0.66	1.00	0.66	5.00	NoLiq	10.14	50.87	0.000	0.0E0	0.000	0.352
39.66	0.66	1.00	0.66	5.00	NoLiq	8.18	45.97	0.000	0.0E0	0.000	0.352
39.16	0.66	1.00	0.66	5.00	NoLiq	8.25	46.14	0.000	0.0E0	0.000	0.352
38.66	0.66	1.00	0.66	5.00	NoLiq	8.50	46.80	0.000	0.0E0	0.000	0.352
38.16	0.67	1.00	0.67	5.00	NoLiq	8.92	47.89	0.000	0.0E0	0.000	0.352
37.66	0.67	1.00	0.67	5.00	NoLiq	11.09	53.09	0.000	0.0E0	0.000	0.352
37.16	0.67	1.00	0.67	5.00	NoLiq	11.12	53.14	0.000	0.0E0	0.000	0.352

36.66	0.67	1.00	0.67	5.00	NoLiq	8.13	45.82	0.000	0.0E0	0.000	0.352
36.16	0.67	1.00	0.67	5.00	NoLiq	9.67	49.75	0.000	0.0E0	0.000	0.352
35.66	0.68	1.00	0.68	5.00	NoLiq	8.17	45.94	0.000	0.0E0	0.046	0.398
35.16	0.68	1.00	0.68	5.00	NoLiq	8.17	45.94	0.000	0.0E0	0.000	0.398
34.66	0.68	1.00	0.68	0.33	31.46	25.14	79.99	1.747	1.0E-2	0.021	0.419
34.16	0.68	1.00	0.68	5.00	NoLiq	12.10	55.33	0.000	0.0E0	0.040	0.459
33.66	0.68	1.00	0.68	0.94	16.90	35.28	100.00	0.000	0.0E0	0.000	0.459
33.16	0.68	1.00	0.68	0.43	21.66	26.18	82.02	1.659	1.0E-2	0.063	0.523
32.66	0.69	1.00	0.69	5.00	NoLiq	7.19	43.28	0.000	0.0E0	0.022	0.545
32.16	0.69	1.00	0.69	5.00	NoLiq	10.09	50.76	0.000	0.0E0	0.000	0.545
31.66	0.69	1.00	0.69	0.97	7.21	31.14	92.69	0.369	2.2E-3	0.021	0.566
31.16	0.69	1.00	0.69	4.13	0.38	70.64	100.00	0.000	0.0E0	0.000	0.566
30.66	0.69	1.00	0.69	4.12	1.53	84.56	100.00	0.000	0.0E0	0.000	0.566
30.16	0.69	1.00	0.69	4.12	2.01	57.86	100.00	0.000	0.0E0	0.000	0.566
29.66	0.69	1.00	0.69	4.12	0.00	76.74	100.00	0.000	0.0E0	0.000	0.566
29.16	0.69	1.00	0.69	4.12	1.49	66.82	100.00	0.000	0.0E0	0.000	0.566
28.66	0.69	1.00	0.69	4.13	0.00	52.62	100.00	0.000	0.0E0	0.000	0.566
28.16	0.69	1.00	0.69	4.13	0.87	70.68	100.00	0.000	0.0E0	0.000	0.566
27.66	0.69	1.00	0.69	4.14	2.16	54.45	100.00	0.000	0.0E0	0.000	0.566
27.16	0.69	1.00	0.69	2.03	3.45	38.26	100.00	0.000	0.0E0	0.000	0.566
26.66	0.69	1.00	0.69	1.40	3.84	33.58	98.78	0.023	1.4E-4	0.000	0.566
26.16	0.68	1.00	0.68	1.43	7.37	36.16	100.00	0.000	0.0E0	0.001	0.567
25.66	0.68	1.00	0.68	0.94	28.83	40.69	100.00	0.000	0.0E0	0.000	0.567
25.16	0.68	1.00	0.68	5.00	NoLiq	7.92	45.28	0.000	0.0E0	0.000	0.567
24.66	0.68	1.00	0.68	5.00	NoLiq	8.20	46.00	0.000	0.0E0	0.000	0.567
24.16	0.68	1.00	0.68	5.00	NoLiq	9.22	48.62	0.000	0.0E0	0.000	0.567
23.66	0.68	1.00	0.68	0.36	12.44	20.97	72.29	2.093	1.3E-2	0.074	0.641
23.16	0.67	1.00	0.67	0.47	25.30	28.45	86.67	1.452	8.7E-3	0.110	0.752
22.66	0.67	1.00	0.67	5.00	NoLiq	7.27	43.48	0.000	0.0E0	0.056	0.808
22.16	0.67	1.00	0.67	0.66	31.98	36.09	100.00	0.000	0.0E0	0.000	0.808
21.66	0.67	1.00	0.67	5.00	NoLiq	8.00	45.49	0.000	0.0E0	0.057	0.865
21.16	0.67	1.00	0.67	0.41	29.06	27.37	84.41	1.558	9.4E-3	0.036	0.901
20.66	0.66	1.00	0.66	5.00	NoLiq	7.92	45.26	0.000	0.0E0	0.084	0.985
20.16	0.66	1.00	0.66	5.00	NoLiq	5.96	39.73	0.000	0.0E0	0.000	0.985
19.66	0.66	1.00	0.66	5.00	NoLiq	4.44	34.96	0.000	0.0E0	0.000	0.985
19.16	0.66	1.00	0.66	5.00	NoLiq	3.49	31.75	0.000	0.0E0	0.000	0.985
18.66	0.65	1.00	0.65	5.00	NoLiq	3.91	33.18	0.000	0.0E0	0.000	0.985
18.16	0.65	1.00	0.65	5.00	NoLiq	3.56	31.98	0.000	0.0E0	0.000	0.985
17.66	0.65	1.00	0.65	5.00	NoLiq	2.78	29.22	0.000	0.0E0	0.000	0.985
17.16	0.64	1.00	0.64	5.00	NoLiq	3.26	30.94	0.000	0.0E0	0.000	0.985
16.66	0.64	1.00	0.64	5.00	NoLiq	4.07	33.71	0.000	0.0E0	0.000	0.985
16.16	0.63	1.00	0.63	5.00	NoLiq	4.06	33.69	0.000	0.0E0	0.000	0.985
15.66	0.63	1.00	0.63	5.00	NoLiq	3.17	30.64	0.000	0.0E0	0.000	0.985
15.16	0.63	1.00	0.63	5.00	NoLiq	2.41	27.87	0.000	0.0E0	0.000	0.985
14.66	0.62	1.00	0.62	5.00	NoLiq	2.67	28.82	0.000	0.0E0	0.000	0.985
14.16	0.62	1.00	0.62	5.00	NoLiq	2.96	29.89	0.000	0.0E0	0.000	0.985
13.66	0.61	1.00	0.61	0.24	18.66	14.98	61.23	2.729	1.6E-2	0.100	1.085
13.16	0.60	1.00	0.60	0.32	19.50	19.74	70.07	2.193	1.3E-2	0.145	1.230
12.66	0.60	1.00	0.60	0.34	14.71	19.23	69.16	2.247	1.3E-2	0.134	1.363
12.16	0.59	1.00	0.59	0.30	16.00	17.58	66.14	2.431	1.5E-2	0.141	1.505
11.66	0.58	1.00	0.58	5.00	NoLiq	5.17	37.28	0.000	0.0E0	0.074	1.579
11.16	0.58	1.00	0.58	0.36	20.56	21.26	72.80	2.070	1.2E-2	0.060	1.639
10.66	0.57	1.00	0.57	0.63	27.25	31.07	92.53	0.792	4.8E-3	0.104	1.743
10.16	0.56	1.00	0.56	0.85	10.04	28.36	86.48	0.815	4.9E-3	0.050	1.793
9.66	0.55	1.00	0.55	1.36	6.82	32.40	95.75	0.083	5.0E-4	0.010	1.803
9.16	0.54	1.00	0.54	2.20	6.75	38.48	100.00	0.000	0.0E0	0.000	1.803
8.66	0.53	1.00	0.53	1.44	9.14	33.86	99.53	0.008	5.0E-5	0.000	1.804
8.16	0.52	1.00	0.52	1.61	10.57	35.88	100.00	0.000	0.0E0	0.000	1.804
7.66	0.51	1.00	0.51	1.82	9.74	36.79	100.00	0.000	0.0E0	0.000	1.804
7.16	0.49	1.00	0.49	1.53	11.73	35.09	100.00	0.000	0.0E0	0.000	1.804
6.66	0.48	1.00	0.48	0.91	23.67	32.63	96.33	0.224	1.3E-3	0.018	1.822
6.16	0.46	1.00	0.46	1.14	24.68	35.73	100.00	0.000	0.0E0	0.000	1.822
5.66	0.44	1.00	0.44	1.01	26.33	34.07	100.00	0.000	0.0E0	0.000	1.822
5.16	0.42	1.00	0.42	0.63	24.30	25.85	81.36	1.515	9.1E-3	0.045	1.868
5.01	0.42	1.00	0.42	0.69	33.05	29.51	88.95	1.023	6.1E-3	0.026	1.893

Settlement of Saturated Sands=1.893 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth	sigma'	sigC'	(N1)60s	CSRsf	Gmax	g*Ge/Gm	g_eff	ec7.5	Cec	ec	dsz	dsp	S
ft	atm	atm			atm			%		%	in.	in.	in.
4.96	0.28	0.18	1.81	0.42	232.83	5.0E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.66	0.26	0.17	0.10	0.42	86.09	1.3E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.16	0.24	0.15	0.10	0.42	81.34	1.2E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.66	0.21	0.13	0.10	0.42	76.30	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000

3.16	0.18	0.12	0.10	0.42	70.90	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.66	0.15	0.10	0.10	0.42	65.05	9.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.16	0.12	0.08	0.10	0.42	58.62	8.8E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.66	0.09	0.06	0.10	0.42	51.39	7.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.16	0.07	0.04	0.10	0.42	42.95	6.5E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.66	0.04	0.02	0.10	0.42	32.40	4.9E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.16	0.01	0.01	0.10	0.42	15.95	2.4E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000

Settlement of Unsaturated Sands

Settlement of Unsaturated Sands=0.000 in.
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=1.893 in.
Differential Settlement=0.947 to 1.250 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)
1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=1, based on Item 2 of Page C.
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

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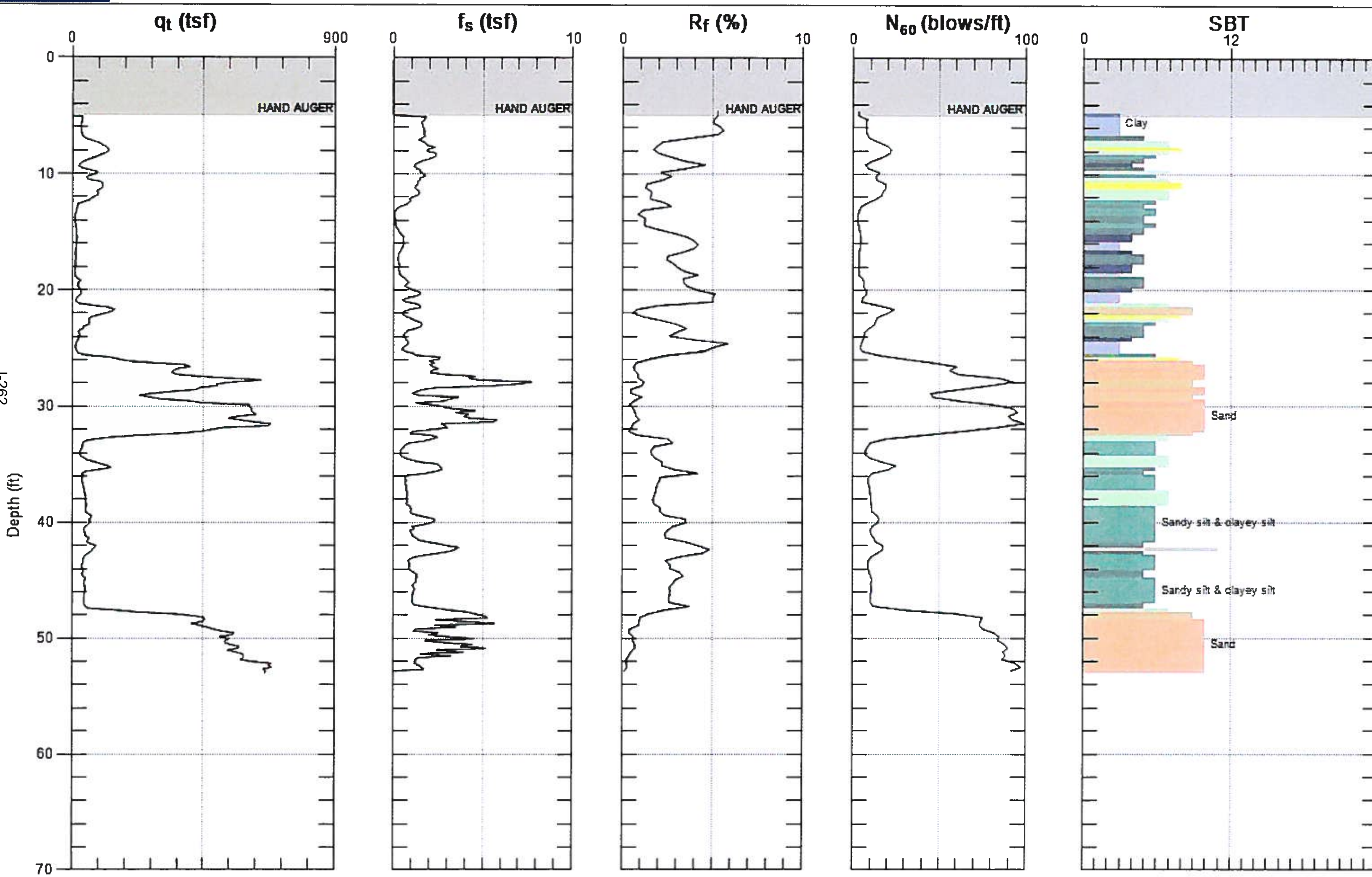
1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.
SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for
Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.
2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth
International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.
3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center,
Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

GREGG GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-7

Engineer: R.GLADSON
Date: 5/26/2016 05:01



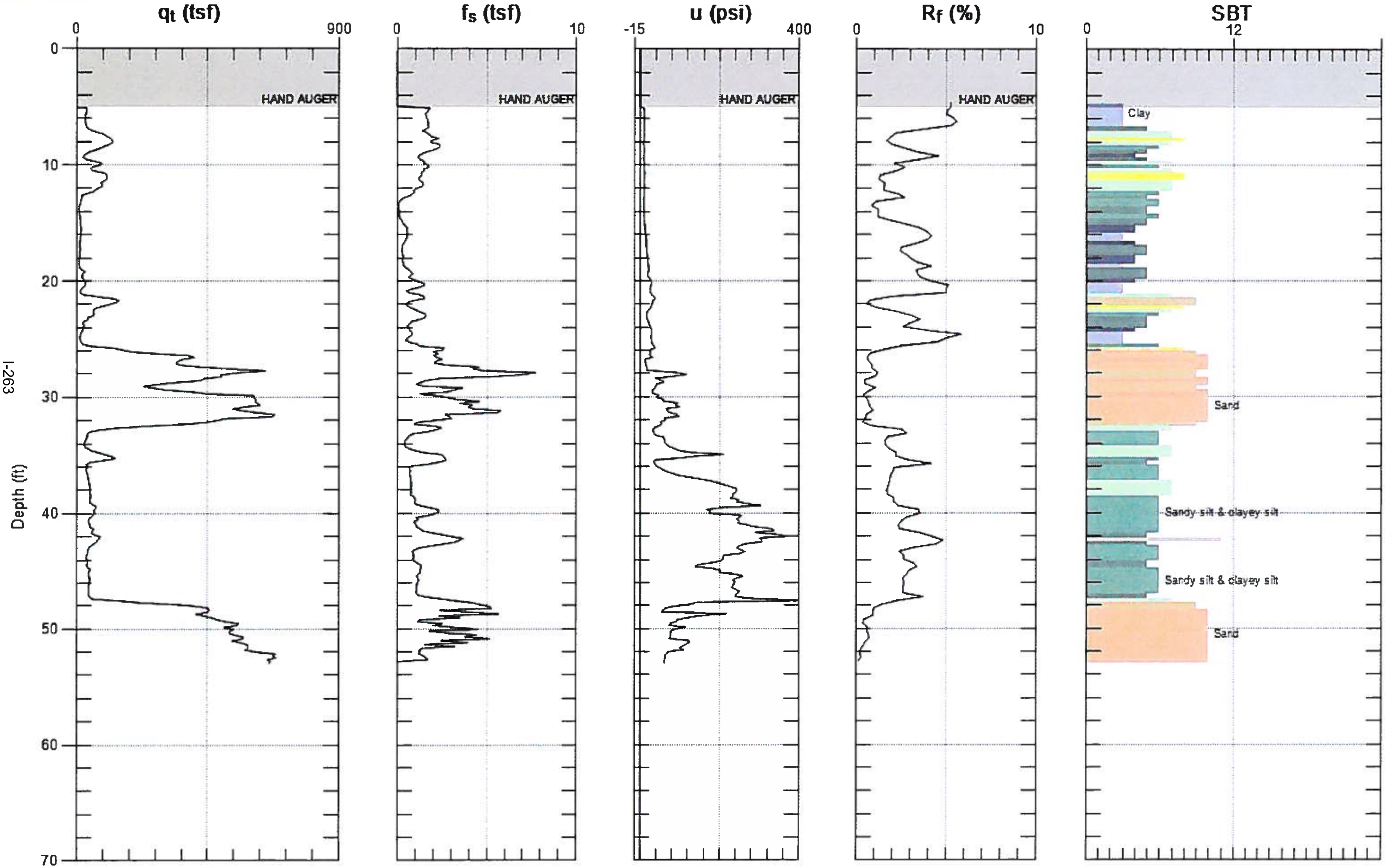
Max. Depth: 52.986 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-7

Engineer: R.GLADSON
Date: 5/26/2016 05:01



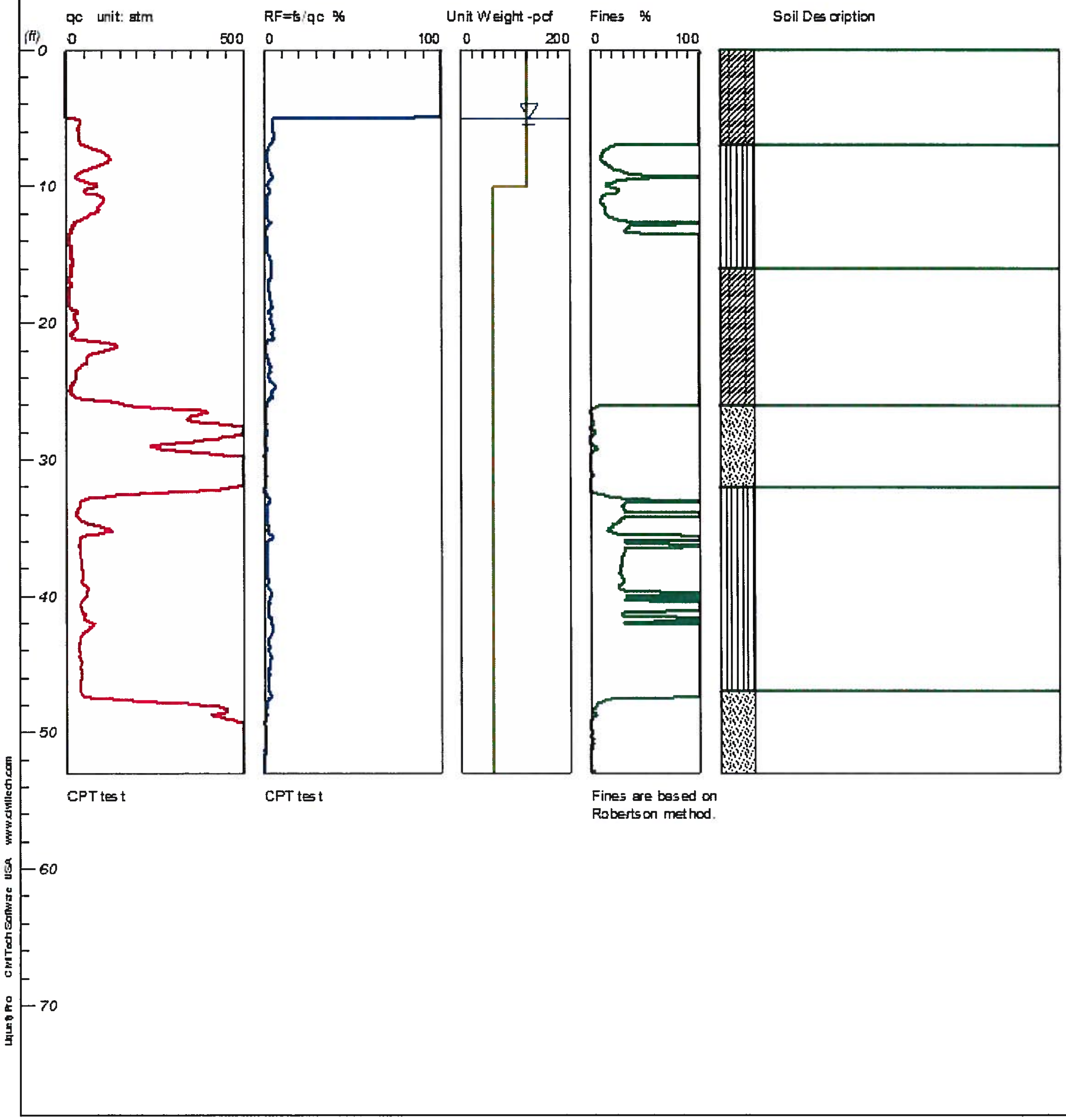
Max. Depth: 52.986 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

LIQUEFACTION ANALYSIS

12870 Panama Street

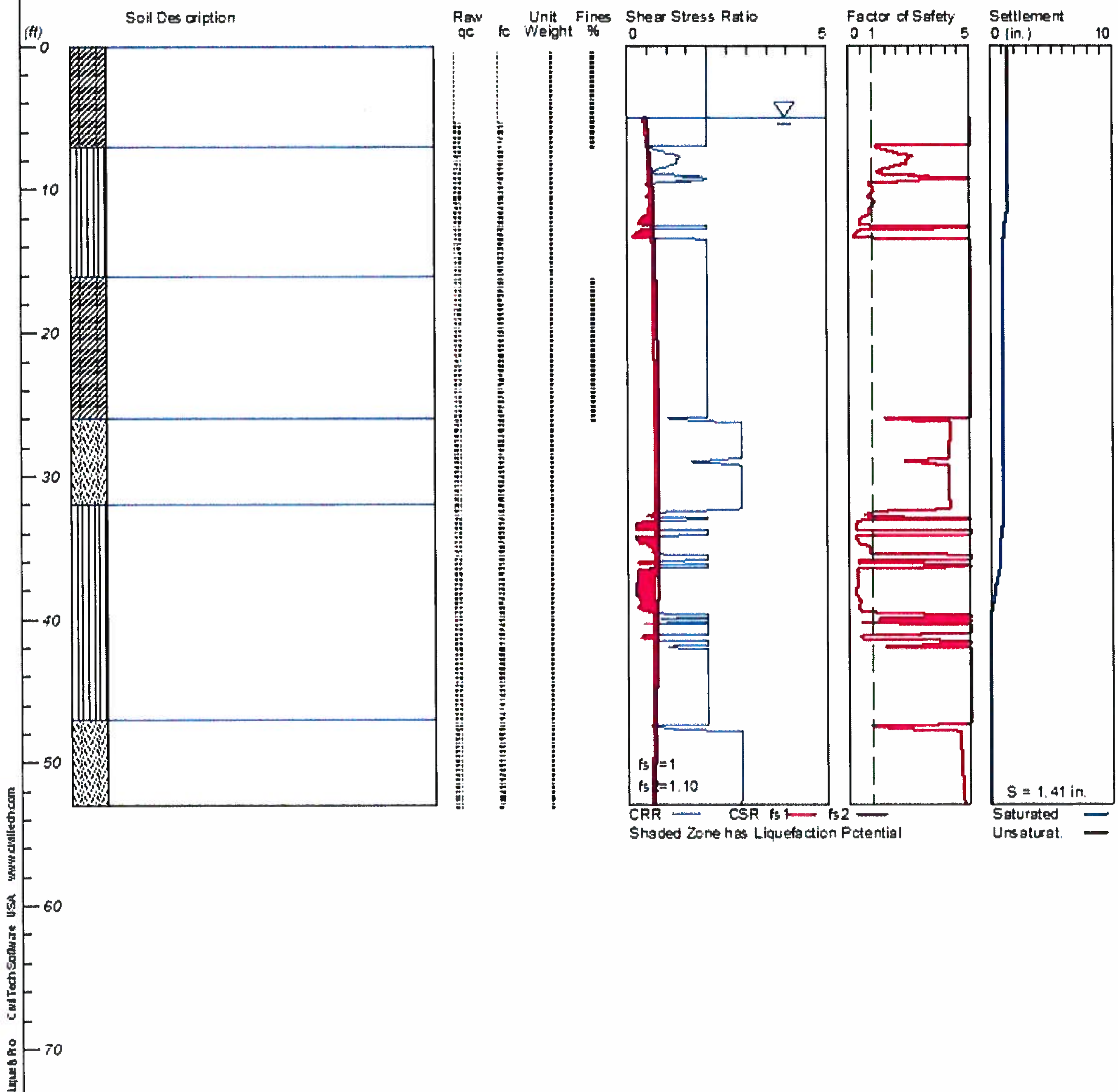
Hole No.=CPT7 *Water Depth=5 ft* *Surface Elev.=0* *Magnitude=6.63*
Acceleration=0.65g



LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT7 *Water Depth=5 ft* *Surface Elev.=0* *Magnitude=6.63* *Acceleration=0.65g*



GREGG DRILLING & TESTING, INC.

CONE PENETRATION TEST DATA

Client:	GEOSYSTEMS	Units:	Imperial
Site:	12870 PANAMA ST.	Data averaging interval:	0.100 meters
Engineer:	R.GLADSON	Assumed depth of water:	11.003 feet
		Net area ratio of cone:	0.80
		Unit weight of water:	62.4 lb/ft3
		Relative density constant, CDR:	350
Sounding:	CPT-7	Young's modulus for sands, a:	4
Date:	5/26/2016	Small strain shear modulus number, SG (sands):	180
Time:	5:01 PM	Small strain shear modulus number, CG (clays):	50
		Nkt for clays:	15
		OCR number, kocr:	0.3

Interpretation based on Lunne, Robertson and Powell, 1997

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
0.100	0.328	0.000	0.000	0.000							0.000				
0.200	0.656	0.000	0.000	0.000							0.000				
0.300	0.984	0.000	0.000	0.000							0.000				
0.400	1.312	0.000	0.000	0.000							0.000				
0.500	1.640	0.000	0.000	0.000							0.000				
0.600	1.969	0.000	0.000	0.000							0.000				
0.700	2.297	0.000	0.000	0.000							0.000				
0.800	2.625	0.000	0.000	0.000							0.000				
0.900	2.953	0.000	0.000	0.000							0.000				
1.000	3.281	0.000	0.000	0.000							0.000				
1.100	3.609	0.000	0.000	0.000							0.000				
1.200	3.937	0.000	0.000	0.000							0.000				
1.300	4.265	0.000	0.000	0.000							0.000				
1.400	4.593	0.000	0.000	0.000							0.000				
1.500	4.921	11.507	0.605	3.116		11.55	5.24	3	111	0.274	0.000	0.274	41.14	5.36	0.02
1.600	5.249	34.344	1.744	9.398		34.48	5.06	3	111	0.292	0.000	0.292	116.92	5.10	0.02
1.700	5.577	32.197	1.615	9.372		32.33	5.00	3	111	0.311	0.000	0.311	103.07	5.04	0.02
1.800	5.906	30.533	1.646	9.587		30.67	5.37	3	111	0.329	0.000	0.329	92.24	5.42	0.02
1.900	6.234	30.747	1.716	9.701		30.89	5.56	3	111	0.347	0.000	0.347	87.95	5.62	0.02
2.000	6.562	32.820	1.734	9.763		32.96	5.26	3	111	0.365	0.000	0.365	89.18	5.32	0.02
2.100	6.890	42.923	1.599	10.028		43.07	3.71	5	115	0.384	0.000	0.384	111.07	3.75	0.02
2.200	7.218	74.172	1.632	9.890		74.31	2.20	7	118	0.404	0.000	0.404	183.12	2.21	0.01
2.300	7.546	104.705	2.003	10.016		104.85	1.91	7	118	0.423	0.000	0.423	246.91	1.92	0.01
2.400	7.874	120.561	2.032	9.095		120.69	1.68	8	121	0.443	0.000	0.443	271.58	1.69	0.01
2.500	8.202	112.205	2.199	8.237		112.32	1.96	7	118	0.462	0.000	0.462	242.08	1.97	0.01
2.600	8.530	83.355	2.228	9.927		83.50	2.67	6	115	0.481	0.000	0.481	172.63	2.68	0.01
2.700	8.858	49.438	1.676	9.725		49.58	3.38	5	115	0.500	0.000	0.500	98.22	3.41	0.01
2.800	9.186	27.615	1.263	9.032		27.74	4.55	4	115	0.518	0.000	0.518	52.51	4.64	0.02
2.900	9.514	38.313	1.325	8.817		38.44	3.45	5	115	0.537	0.000	0.537	70.55	3.50	0.02
3.000	9.843	75.250	1.576	10.116		75.40	2.09	7	118	0.557	0.000	0.557	134.46	2.11	0.01
3.100	10.171	61.986	1.659	10.079		62.13	2.67	6	115	0.575	0.000	0.575	106.98	2.69	0.01
3.200	10.499	65.295	1.442	10.596		65.45	2.20	7	118	0.595	0.000	0.595	109.05	2.22	0.01

GREGG

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
0.100	0.328													
0.200	0.656													
0.300	0.984													
0.400	1.312													
0.500	1.640													
0.600	1.969													
0.700	2.297													
0.800	2.625													
0.900	2.953													
1.000	3.281													
1.100	3.609													
1.200	3.937													
1.300	4.265													
1.400	4.593													
1.500	4.921	4	2.69	32.06	3.00E-8	3.1	6.1				578	0.75	2.74	12.3
1.600	5.249	9	2.38	81.89	1.00E-8	7.9	15.1					2.28	7.79	35.1
1.700	5.577	9	2.41	74.19	1.00E-8	7.5	13.9					2.13	6.87	30.9
1.800	5.906	9	2.47	68.72	1.00E-8	7.3	13.1					2.02	6.15	27.7
1.900	6.234	9	2.49	66.98	1.00E-8	7.5	13.0					2.04	5.86	26.4
2.000	6.562	9	2.47	68.27	1.00E-8	7.9	13.4					2.17	5.95	26.8
2.100	6.890	8	2.29	81.56	3.00E-6	9.5	15.8	48	41	172				
2.200	7.218	6	1.98	124.63	3.00E-4	14.5	23.4	60	44	297	570			
2.300	7.546	6	1.85	165.35	3.00E-4	19.5	30.8	69	45	419	649			
2.400	7.874	6	1.78	182.25	3.00E-4	21.9	33.8	72	45	483	691			
2.500	8.202	6	1.86	169.09	3.00E-4	21.0	31.7	70	45	449	684			
2.600	8.530	5	2.06	128.50	3.00E-6	16.8	24.9	61	43	334	628			
2.700	8.858	5	2.29	78.18	3.00E-6	11.0	15.9	47	40	198	535			
2.800	9.186	4	2.57	44.88	3.00E-8	7.0	10.0				1387	1.82	3.50	15.8
2.900	9.514	5	2.40	58.62	3.00E-6	8.9	12.5	41	39	154	503			
3.000	9.843	5	2.04	105.43	3.00E-6	15.1	20.8	55	42	302	637			
3.100	10.171	5	2.19	87.24	3.00E-6	13.2	17.8	50	41	249	604			
3.200	10.499	5	2.12	88.87	3.00E-6	13.5	18.0	50	41	262	622			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
3.300	10.827	100.224	1.322	10.987		100.38	1.32	8	121	0.615	0.000	0.615	162.34	1.33	0.01
3.400	11.155	101.200	1.254	10.709		101.35	1.24	8	121	0.634	0.005	0.630	159.96	1.24	0.01
3.500	11.483	89.564	1.398	10.583		89.72	1.56	7	118	0.654	0.015	0.639	139.44	1.57	0.01
3.600	11.811	83.280	1.288	10.772		83.44	1.54	7	118	0.673	0.025	0.648	127.76	1.56	0.01
3.700	12.139	65.118	0.985	10.507		65.27	1.51	7	118	0.692	0.035	0.657	98.31	1.52	0.01
3.800	12.467	37.374	0.853	10.079		37.52	2.27	6	115	0.711	0.046	0.665	55.31	2.32	0.02
3.900	12.795	17.818	0.478	9.183		17.95	2.66	5	115	0.730	0.056	0.674	25.55	2.77	0.04
4.000	13.123	14.370	0.163	8.805		14.50	1.12	6	115	0.749	0.066	0.683	20.14	1.19	0.04
4.100	13.451	10.624	0.088	8.905		10.75	0.82	6	115	0.768	0.076	0.691	14.45	0.88	0.06
4.200	13.780	8.570	0.104	9.082		8.70	1.20	5	115	0.786	0.087	0.700	11.31	1.32	0.07
4.300	14.108	9.583	0.117	9.259		9.72	1.20	5	115	0.805	0.097	0.708	12.58	1.31	0.06
4.400	14.436	11.367	0.138	9.524		11.50	1.20	6	115	0.824	0.107	0.717	14.90	1.29	0.05
4.500	14.764	12.734	0.247	10.116		12.88	1.92	5	115	0.843	0.117	0.725	16.59	2.05	0.05
4.600	15.092	13.561	0.380	10.924		13.72	2.77	5	115	0.862	0.128	0.734	17.52	2.95	0.05
4.700	15.420	14.964	0.532	11.781		15.13	3.52	4	115	0.880	0.138	0.743	19.20	3.73	0.05
4.800	15.748	14.351	0.570	12.387		14.53	3.92	4	115	0.899	0.148	0.751	18.15	4.18	0.05
4.900	16.076	13.403	0.564	13.800		13.60	4.15	3	111	0.917	0.158	0.759	16.71	4.45	0.07
5.000	16.404	12.185	0.487	14.721		12.40	3.93	3	111	0.936	0.169	0.767	14.94	4.25	0.08
5.100	16.732	10.893	0.365	14.834		11.11	3.28	4	115	0.954	0.179	0.776	13.09	3.59	0.09
5.200	17.060	11.181	0.284	15.314		11.40	2.49	5	115	0.973	0.189	0.784	13.30	2.72	0.09
5.300	17.388	11.079	0.275	16.449		11.32	2.43	5	115	0.992	0.199	0.793	13.02	2.66	0.10
5.400	17.717	10.977	0.312	17.319		11.23	2.78	5	115	1.011	0.209	0.801	12.75	3.06	0.10
5.500	18.045	10.280	0.320	18.089		10.54	3.03	4	115	1.030	0.220	0.810	11.74	3.36	0.11
5.600	18.373	9.332	0.326	19.375		9.61	3.39	4	115	1.048	0.230	0.819	10.46	3.80	0.14
5.700	18.701	9.982	0.425	20.460		10.28	4.14	3	111	1.067	0.240	0.827	11.14	4.61	0.13
5.800	19.029	19.389	0.657	20.826		19.69	3.34	5	115	1.086	0.250	0.835	22.28	3.53	0.07
5.900	19.357	23.070	0.786	19.363		23.35	3.37	5	115	1.104	0.261	0.844	26.37	3.54	0.05
6.000	19.685	20.848	0.753	21.709		21.16	3.56	5	115	1.123	0.271	0.852	23.51	3.76	0.06
6.100	20.013	27.475	1.152	26.868		27.86	4.13	4	115	1.142	0.281	0.861	31.04	4.31	0.06
6.200	20.341	27.429	1.417	26.918		27.82	5.09	3	111	1.160	0.291	0.869	30.68	5.32	0.06
6.300	20.669	17.335	0.881	25.102		17.70	4.98	3	111	1.178	0.302	0.877	18.84	5.33	0.09
6.400	20.997	16.154	0.825	26.414		16.53	4.99	3	111	1.197	0.312	0.885	17.33	5.38	0.10
6.500	21.325	72.490	1.418	33.251		72.97	1.94	7	118	1.216	0.322	0.894	80.26	1.98	0.03
6.600	21.654	133.946	1.018	33.427		134.43	0.76	9	124	1.236	0.332	0.904	147.32	0.76	0.02
6.700	21.982	112.949	0.574	29.302		113.37	0.51	9	124	1.257	0.343	0.914	122.63	0.51	0.02
6.800	22.310	71.216	0.813	24.925		71.57	1.14	8	121	1.277	0.353	0.924	76.09	1.16	0.02
6.900	22.638	58.371	1.287	18.341		58.64	2.20	7	118	1.296	0.363	0.933	61.46	2.25	0.02
7.000	22.966	51.632	1.564	16.398		51.87	3.02	6	115	1.315	0.373	0.941	53.69	3.09	0.02
7.100	23.294	33.981	1.198	18.000		34.24	3.50	5	115	1.334	0.383	0.950	34.64	3.64	0.03
7.200	23.622	23.887	0.718	21.583		24.20	2.97	5	115	1.352	0.394	0.959	23.83	3.14	0.05
7.300	23.950	23.562	0.621	25.228		23.93	2.60	5	115	1.371	0.404	0.967	23.32	2.75	0.06
7.400	24.278	18.896	0.750	28.028		19.30	3.89	4	115	1.390	0.414	0.976	18.36	4.19	0.09
7.500	24.606	13.273	0.793	27.738		13.67	5.80	3	111	1.408	0.424	0.984	12.47	6.46	0.13
7.600	24.934	11.442	0.589	27.511		11.84	4.98	3	111	1.426	0.435	0.992	10.50	5.66	0.15
7.700	25.262	16.758	0.774	28.962		17.18	4.51	3	111	1.445	0.445	1.000	15.73	4.92	0.10
7.800	25.591	65.174	1.657	33.780		65.66	2.52	6	115	1.464	0.455	1.008	63.66	2.58	0.03
7.900	25.919	157.359	2.388	29.088		157.78	1.51	8	121	1.483	0.465	1.018	153.53	1.53	0.01
8.000	26.247	280.922	2.120	24.181		281.27	0.75	9	124	1.504	0.476	1.028	272.11	0.76	0.00
8.100	26.575	382.113	2.257	22.175		382.43	0.59	10	127	1.525	0.486	1.039	366.68	0.59	0.00
8.200	26.903	349.387	2.249	13.195		349.58	0.64	10	127	1.546	0.496	1.049	331.63	0.65	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
3.300	10.827	6	1.84	127.84	3.00E-4	18.6	24.4	60	43	402	725			
3.400	11.155	6	1.83	127.01	3.00E-4	18.7	24.2	60	43	405	733			
3.500	11.483	6	1.94	113.36	3.00E-4	17.2	22.2	57	42	359	707			
3.600	11.811	6	1.96	104.83	3.00E-4	16.2	20.6	55	42	334	694			
3.700	12.139	6	2.04	81.99	3.00E-4	13.0	16.5	48	40	261	642			
3.800	12.467	5	2.34	48.38	3.00E-6	8.5	10.7	37	37	150	536			
3.900	12.795	4	2.65	23.38	3.00E-8	4.7	5.9				898	1.15	1.70	7.7
4.000	13.123	5	2.52	18.17	3.00E-6	3.5	4.4	23	31	58	394			
4.100	13.451	5	2.59	13.18	3.00E-6	2.7	3.3	19	29	43	358			
4.200	13.780	4	2.76	10.57	3.00E-8	2.4	2.9				435	0.53	0.75	3.4
4.300	14.108	4	2.72	11.73	3.00E-8	2.6	3.2				486	0.59	0.84	3.8
4.400	14.436	4	2.65	13.81	3.00E-8	3.0	3.6				575	0.71	0.99	4.5
4.500	14.764	4	2.72	15.53	3.00E-8	3.5	4.2				644	0.80	1.11	5.0
4.600	15.092	4	2.80	16.56	3.00E-8	3.8	4.6				686	0.86	1.17	5.3
4.700	15.420	3	2.83	18.24	1.00E-9	4.3	5.2				757	0.95	1.28	5.8
4.800	15.748	3	2.88	17.36	1.00E-9	4.3	5.1				726	0.91	1.21	5.4
4.900	16.076	3	2.92	16.08	1.00E-9	4.1	4.8				680	0.85	1.11	5.0
5.000	16.404	3	2.95	14.43	1.00E-9	3.8	4.4				620	0.76	1.00	4.5
5.100	16.732	3	2.95	12.66	1.00E-9	3.4	3.9				555	0.68	0.87	3.9
5.200	17.060	4	2.87	12.79	3.00E-8	3.3	3.8				570	0.70	0.89	4.0
5.300	17.388	4	2.87	12.54	3.00E-8	3.3	3.8				566	0.69	0.87	3.9
5.400	17.717	3	2.92	12.34	1.00E-9	3.3	3.8				561	0.68	0.85	3.8
5.500	18.045	3	2.97	11.43	1.00E-9	3.2	3.7				527	0.63	0.78	3.5
5.600	18.373	3	3.04	10.25	1.00E-9	3.1	3.5				481	0.57	0.70	3.1
5.700	18.701	3	3.07	10.95	1.00E-9	3.3	3.8				514	0.61	0.74	3.3
5.800	19.029	4	2.76	21.43	3.00E-8	5.4	6.1				984	1.24	1.49	6.7
5.900	19.357	4	2.71	25.31	3.00E-8	6.2	7.0				1167	1.48	1.76	7.9
6.000	19.685	4	2.76	22.69	3.00E-8	5.8	6.5				1058	1.34	1.57	7.1
6.100	20.013	4	2.71	29.92	3.00E-8	7.4	8.2				1393	1.78	2.07	9.3
6.200	20.341	3	2.78	29.74	1.00E-9	7.7	8.5				1391	1.78	2.05	9.2
6.300	20.669	3	2.93	18.45	1.00E-9	5.3	5.8				885	1.10	1.26	5.7
6.400	20.997	3	2.96	17.02	1.00E-9	5.0	5.5				827	1.02	1.16	5.2
6.500	21.325	5	2.18	75.81	3.00E-6	15.3	16.7	47	39	292	738			
6.600	21.654	6	1.71	136.60	3.00E-4	23.7	25.6	62	43	538	909			
6.700	21.982	6	1.66	114.11	3.00E-4	19.7	21.2	57	42	453	862			
6.800	22.310	6	2.04	72.28	3.00E-4	14.2	15.2	45	39	286	742			
6.900	22.638	5	2.30	59.17	3.00E-6	13.0	13.8	41	38	235	696			
7.000	22.966	4	2.44	52.09	3.00E-8	12.2	13.0				2593	3.37	3.58	16.1
7.100	23.294	4	2.63	33.88	3.00E-8	8.8	9.3				1712	2.19	2.31	10.4
7.200	23.622	4	2.71	23.41	3.00E-8	6.5	6.8				1210	1.52	1.59	7.1
7.300	23.950	4	2.68	22.93	3.00E-8	6.3	6.6				1196	1.50	1.55	7.0
7.400	24.278	3	2.87	18.16	1.00E-9	5.6	5.8				965	1.19	1.22	5.5
7.500	24.606	3	3.12	12.42	1.00E-9	4.6	4.8				684	0.82	0.83	3.7
7.600	24.934	3	3.14	10.46	1.00E-9	4.0	4.2				592	0.69	0.70	3.1
7.700	25.262	3	2.97	15.64	1.00E-9	5.3	5.4				859	1.05	1.05	4.7
7.800	25.591	5	2.33	62.77	3.00E-6	14.7	15.1	42	38	263	742			
7.900	25.919	6	1.90	151.05	3.00E-4	29.8	30.4	66	43	631	997			
8.000	26.247	6	1.51	268.23	3.00E-4	46.5	47.2	88	45	1125	1213			
8.100	26.575	7	1.34	363.32	3.00E-2	60.0	60.6	102	47	1530	1348			
8.200	26.903	6	1.40	330.27	3.00E-4	55.9	56.1	97	46	1398	1313			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
8.300	27.231	374.139	3.140	14.418		374.35	0.84	10	127	1.566	0.506	1.060	351.65	0.84	0.00
8.400	27.559	534.481	4.534	16.600		534.72	0.85	10	127	1.587	0.517	1.071	497.91	0.85	0.00
8.500	27.887	563.304	6.508	73.867		564.37	1.15	9	124	1.608	0.527	1.081	520.65	1.16	0.01
8.600	28.215	475.106	4.970	78.875		476.24	1.04	9	124	1.628	0.537	1.091	435.03	1.05	0.01
8.700	28.543	401.874	1.781	49.876		402.59	0.44	10	127	1.649	0.547	1.102	363.95	0.44	0.01
8.800	28.871	283.804	1.293	47.012		284.48	0.45	10	127	1.670	0.557	1.112	254.26	0.46	0.01
8.900	29.199	266.804	2.749	36.051		267.32	1.03	9	124	1.690	0.568	1.122	236.66	1.04	0.01
9.000	29.528	382.885	2.423	31.207		383.33	0.63	10	127	1.711	0.578	1.133	336.80	0.63	0.00
9.100	29.856	552.485	2.070	39.684		553.06	0.37	10	127	1.732	0.588	1.144	482.04	0.38	0.00
9.200	30.184	610.019	3.542	51.742		610.76	0.58	10	127	1.753	0.598	1.154	527.57	0.58	0.01
9.300	30.512	618.561	4.083	79.695		619.71	0.66	10	127	1.774	0.609	1.165	530.41	0.66	0.01
9.400	30.840	576.307	4.132	84.148		577.52	0.72	10	127	1.795	0.619	1.176	489.70	0.72	0.01
9.500	31.168	576.595	5.195	68.708		577.58	0.90	10	127	1.815	0.629	1.186	485.34	0.90	0.01
9.600	31.496	655.442	3.714	86.519		656.69	0.57	10	127	1.836	0.639	1.197	547.09	0.57	0.01
9.700	31.824	551.723	2.676	73.186		552.78	0.48	10	127	1.857	0.650	1.208	456.20	0.49	0.01
9.800	32.152	425.668	1.404	55.804		426.47	0.33	10	127	1.878	0.660	1.218	348.52	0.33	0.01
9.900	32.480	239.217	1.836	45.259		239.87	0.77	9	124	1.898	0.670	1.228	193.72	0.77	0.01
10.000	32.808	83.178	2.091	33.364		83.66	2.50	7	118	1.918	0.680	1.237	66.05	2.56	0.02
10.100	33.136	39.010	1.090	35.547		39.52	2.76	6	115	1.937	0.691	1.246	30.16	2.90	0.05
10.200	33.465	33.972	0.598	52.701		34.73	1.72	6	115	1.955	0.701	1.255	26.12	1.82	0.09
10.300	33.793	28.172	0.456	61.127		29.05	1.57	6	115	1.974	0.711	1.263	21.44	1.69	0.14
10.400	34.121	27.122	0.448	68.128		28.10	1.60	6	115	1.993	0.721	1.272	20.53	1.72	0.16
10.500	34.449	40.599	0.747	85.927		41.84	1.79	7	118	2.012	0.732	1.281	31.09	1.88	0.14
10.600	34.777	74.692	1.662	143.736		76.76	2.17	7	118	2.032	0.742	1.290	57.94	2.22	0.13
10.700	35.105	115.635	2.571	148.618		117.78	2.18	7	118	2.051	0.752	1.299	89.09	2.22	0.09
10.800	35.433	89.154	2.574	56.347		89.97	2.86	6	115	2.070	0.762	1.308	67.22	2.93	0.04
10.900	35.761	39.158	1.644	37.211		39.69	4.14	5	115	2.089	0.772	1.316	28.57	4.37	0.05
11.000	36.089	34.818	0.741	47.996		35.51	2.09	6	115	2.107	0.783	1.325	25.22	2.22	0.08
11.100	36.417	34.288	0.712	67.308		35.26	2.02	6	115	2.126	0.793	1.333	24.85	2.15	0.12
11.200	36.745	36.565	0.721	98.401		37.98	1.90	6	115	2.145	0.803	1.342	26.71	2.01	0.18
11.300	37.073	38.814	0.760	148.819		40.96	1.85	6	115	2.164	0.813	1.350	28.73	1.96	0.26
11.400	37.402	40.822	0.788	193.586		43.61	1.81	7	118	2.183	0.824	1.359	30.47	1.90	0.32
11.500	37.730	42.058	0.784	226.218		45.32	1.73	7	118	2.202	0.834	1.368	31.50	1.82	0.36
11.600	38.058	43.220	0.782	241.267		46.69	1.67	7	118	2.222	0.844	1.378	32.28	1.76	0.37
11.700	38.386	44.382	0.822	235.805		47.78	1.72	7	118	2.241	0.854	1.387	32.84	1.80	0.35
11.800	38.714	44.001	0.978	237.168		47.42	2.06	6	115	2.260	0.865	1.395	32.36	2.17	0.36
11.900	39.042	45.200	1.011	254.058		48.86	2.07	6	115	2.279	0.875	1.404	33.18	2.17	0.37
12.000	39.370	58.147	1.433	259.620		61.89	2.32	6	115	2.297	0.885	1.412	42.19	2.40	0.30
12.100	39.698	60.071	2.177	183.987		62.72	3.47	6	115	2.316	0.895	1.421	42.51	3.60	0.20
12.200	40.026	55.777	2.041	202.403		58.69	3.48	6	115	2.335	0.906	1.429	39.43	3.62	0.24
12.300	40.354	44.075	1.327	249.706		47.67	2.78	6	115	2.354	0.916	1.438	31.51	2.93	0.38
12.400	40.682	38.685	1.055	246.426		42.23	2.50	6	115	2.373	0.926	1.447	27.55	2.65	0.42
12.500	41.011	41.845	1.063	267.731		45.70	2.33	6	115	2.391	0.936	1.455	29.76	2.45	0.42
12.600	41.339	49.448	1.282	318.287		54.03	2.37	6	115	2.410	0.946	1.464	35.27	2.48	0.43
12.700	41.667	51.613	1.942	322.677		56.26	3.45	6	115	2.429	0.957	1.472	36.56	3.61	0.41
12.800	41.995	68.725	3.065	337.221		73.58	4.17	5	115	2.448	0.967	1.481	48.04	4.31	0.33
12.900	42.323	67.033	3.431	304.450		71.42	4.80	11	131	2.469	0.977	1.492	46.21	4.98	0.30
13.000	42.651	52.710	2.514	273.760		56.65	4.44	5	115	2.488	0.987	1.501	36.10	4.64	0.35
13.100	42.979	39.261	1.335	248.507		42.84	3.12	6	115	2.507	0.998	1.509	26.73	3.31	0.42
13.200	43.307	34.809	0.916	255.445		38.49	2.38	6	115	2.526	1.008	1.518	23.69	2.55	0.48

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
8.300	27.231	6	1.47	351.98	3.00E-4	61.2	61.1	100	47	1497	1348			
8.400	27.559	6	1.39	500.87	3.00E-4	85.0	84.5	120	48	2139	1523			
8.500	27.887	6	1.49	526.23	3.00E-4	92.6	91.6	123	48	2257	1556			
8.600	28.215	6	1.49	441.74	3.00E-4	78.2	77.0	112	48	1905	1475			
8.700	28.543	7	1.26	371.36	3.00E-2	61.5	60.2	103	47	1610	1399			
8.800	28.871	6	1.38	260.69	3.00E-4	45.1	44.0	86	45	1138	1250			
8.900	29.199	6	1.65	243.70	3.00E-4	46.3	44.9	83	45	1069	1228			
9.000	29.528	6	1.39	348.53	3.00E-4	61.0	59.0	100	46	1533	1389			
9.100	29.856	7	1.12	501.17	3.00E-2	81.2	78.1	120	48	2212	1575			
9.200	30.184	7	1.24	551.05	3.00E-2	92.8	88.8	125	48	2443	1633			
9.300	30.512	7	1.28	556.56	3.00E-2	95.3	90.8	126	48	2479	1645			
9.400	30.840	7	1.33	516.19	3.00E-2	90.1	85.5	121	48	2310	1612			
9.500	31.168	6	1.41	513.91	3.00E-4	92.5	87.4	121	48	2310	1617			
9.600	31.496	7	1.22	581.89	3.00E-2	99.1	93.2	129	48	2627	1693			
9.700	31.824	7	1.22	487.37	3.00E-2	83.4	78.1	118	48	2211	1603			
9.800	32.152	7	1.19	373.97	3.00E-2	63.8	59.4	103	47	1706	1475			
9.900	32.480	6	1.62	208.73	3.00E-4	41.1	38.1	77	44	959	1221			
10.000	32.808	5	2.32	69.19	3.00E-6	18.6	17.2	44	38	335	861			
10.100	33.136	4	2.61	31.22	3.00E-8	10.0	9.2				1976	2.51	2.01	9.0
10.200	33.465	5	2.53	27.18	3.00E-6	8.4	7.7	28	33	139	645			
10.300	33.793	4	2.58	22.28	3.00E-8	7.1	6.5				1453	1.81	1.43	6.4
10.400	34.121	4	2.60	21.34	3.00E-8	6.9	6.3				1405	1.74	1.37	6.2
10.500	34.449	5	2.48	32.61	3.00E-6	9.8	8.9	31	34	167	692			
10.600	34.777	5	2.32	61.44	3.00E-6	16.7	15.2	42	37	307	849			
10.700	35.105	5	2.18	95.47	3.00E-6	24.5	22.1	52	40	471	981			
10.800	35.433	5	2.35	71.41	3.00E-6	20.3	18.3	45	38	360	899			
10.900	35.761	4	2.74	29.65	3.00E-8	10.8	9.7				1985	2.51	1.90	8.6
11.000	36.089	4	2.59	26.46	3.00E-8	8.9	7.9				1775	2.23	1.68	7.6
11.100	36.417	4	2.59	26.11	3.00E-8	8.7	7.8				1763	2.21	1.66	7.5
11.200	36.745	4	2.55	28.19	3.00E-8	9.1	8.1				1899	2.39	1.78	8.0
11.300	37.073	5	2.52	30.44	3.00E-6	9.5	8.4	29	33	164	699			
11.400	37.402	5	2.49	32.41	3.00E-6	9.9	8.7	30	33	174	715			
11.500	37.730	5	2.47	33.62	3.00E-6	10.1	8.9	31	34	181	726			
11.600	38.058	5	2.45	34.55	3.00E-6	10.3	9.0	31	34	187	735			
11.700	38.386	5	2.45	35.21	3.00E-6	10.6	9.2	32	34	191	742			
11.800	38.714	5	2.50	34.60	3.00E-6	10.7	9.3	31	34	190	742			
11.900	39.042	5	2.49	35.55	3.00E-6	11.0	9.5	32	34	195	751			
12.000	39.370	5	2.44	45.47	3.00E-6	13.8	11.9	36	35	248	814			
12.100	39.698	4	2.56	45.42	3.00E-8	15.1	13.0				3136	4.03	2.83	12.8
12.200	40.026	4	2.58	42.08	3.00E-8	14.2	12.2				2935	3.76	2.63	11.8
12.300	40.354	4	2.59	33.65	3.00E-8	11.2	9.6				2384	3.02	2.10	9.5
12.400	40.682	4	2.61	29.41	3.00E-8	9.9	8.5				2112	2.66	1.84	8.3
12.500	41.011	4	2.56	31.95	3.00E-8	10.5	9.0				2285	2.89	1.98	8.9
12.600	41.339	4	2.51	38.11	3.00E-8	12.1	10.3				2702	3.44	2.35	10.6
12.700	41.667	4	2.61	39.19	3.00E-8	13.2	11.2				2813	3.59	2.44	11.0
12.800	41.995	4	2.58	51.71	3.00E-8	17.4	14.7				3679	4.74	3.20	14.4
12.900	42.323	4	2.63	49.53	3.00E-8	17.4	14.7				3571	4.60	3.08	13.9
13.000	42.651	4	2.69	38.52	3.00E-8	14.1	11.8				2833	3.61	2.41	10.8
13.100	42.979	4	2.68	28.56	3.00E-8	10.5	8.8				2142	2.69	1.78	8.0
13.200	43.307	4	2.65	25.43	3.00E-8	9.1	7.6				1924	2.40	1.58	7.1

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
13.300	43.635	32.132	0.924	224.162		35.36	2.61	6	115	2.544	1.018	1.526	21.50	2.82	0.46
13.400	43.963	32.708	0.934	206.364		35.68	2.62	6	115	2.563	1.028	1.535	21.58	2.82	0.42
13.500	44.291	34.009	1.152	176.002		36.54	3.15	5	115	2.582	1.039	1.543	22.00	3.39	0.34
13.600	44.619	37.421	1.327	156.754		39.68	3.35	5	115	2.601	1.049	1.552	23.89	3.58	0.28
13.700	44.948	41.510	1.295	194.974		44.32	2.92	6	115	2.620	1.059	1.560	26.72	3.10	0.31
13.800	45.276	39.093	1.183	232.021		42.43	2.79	6	115	2.638	1.069	1.569	25.36	2.97	0.39
13.900	45.604	41.073	1.156	245.253		44.60	2.59	6	115	2.657	1.080	1.578	26.59	2.76	0.40
14.000	45.932	40.869	1.158	236.183		44.27	2.62	6	115	2.676	1.090	1.586	26.22	2.78	0.38
14.100	46.260	39.168	1.112	233.446		42.53	2.61	6	115	2.695	1.100	1.595	24.98	2.79	0.39
14.200	46.588	38.759	1.086	240.144		42.22	2.57	6	115	2.714	1.110	1.603	24.64	2.75	0.41
14.300	46.916	39.093	1.112	245.341		42.63	2.61	6	115	2.732	1.120	1.612	24.75	2.79	0.41
14.400	47.244	44.336	1.768	255.621		48.02	3.68	5	115	2.751	1.131	1.620	27.93	3.91	0.38
14.500	47.572	138.705	3.289	274.416		142.66	2.31	7	118	2.770	1.141	1.629	85.85	2.35	0.13
14.600	47.900	329.868	4.662	117.474		331.56	1.41	9	124	2.791	1.151	1.640	200.51	1.42	0.02
14.700	48.228	441.339	4.274	69.604		442.34	0.97	9	124	2.811	1.161	1.650	266.42	0.97	0.01
14.800	48.556	436.245	4.018	110.158		437.83	0.92	10	127	2.832	1.172	1.660	261.98	0.92	0.02
14.900	48.885	435.065	3.828	162.594		437.41	0.88	10	127	2.853	1.182	1.671	260.05	0.88	0.02
15.000	49.213	485.238	1.975	103.220		486.72	0.41	10	127	2.874	1.192	1.682	287.72	0.41	0.01
15.100	49.541	537.297	1.903	81.020		538.46	0.35	10	127	2.895	1.202	1.692	316.46	0.36	0.01
15.200	49.869	530.159	3.181	91.767		531.48	0.60	10	127	2.916	1.213	1.703	310.37	0.60	0.01
15.300	50.197	527.956	3.046	81.461		529.13	0.58	10	127	2.937	1.223	1.714	307.06	0.58	0.01
15.400	50.525	544.092	3.680	76.970		545.20	0.67	10	127	2.957	1.233	1.724	314.47	0.68	0.01
15.500	50.853	556.230	3.809	91.060		557.54	0.68	10	127	2.978	1.243	1.735	319.64	0.69	0.01
15.600	51.181	558.545	2.653	120.766		560.28	0.47	10	127	2.999	1.254	1.746	319.25	0.48	0.01
15.700	51.509	584.886	2.067	107.433		586.43	0.35	10	127	3.020	1.264	1.756	332.19	0.35	0.01
15.800	51.837	592.163	1.311	92.965		593.50	0.22	10	127	3.041	1.274	1.767	334.18	0.22	0.01
15.900	52.165	654.967	1.321	67.258		655.94	0.20	10	127	3.062	1.284	1.778	367.29	0.20	0.01
16.000	52.493	669.356	1.604	62.931		670.26	0.24	10	127	3.083	1.295	1.788	373.10	0.24	0.00
16.100	52.822	658.416	0.594	61.152		659.30	0.09	10	127	3.104	1.305	1.799	364.79	0.09	0.00

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
13.300	43.635	4	2.71	22.95	3.00E-8	8.7	7.2				1768	2.19	1.43	6.5
13.400	43.963	4	2.71	23.06	3.00E-8	8.9	7.4				1784	2.21	1.44	6.5
13.500	44.291	4	2.76	23.42	3.00E-8	9.4	7.8				1827	2.26	1.47	6.6
13.600	44.619	4	2.74	25.49	3.00E-8	10.3	8.5				1984	2.47	1.59	7.2
13.700	44.948	4	2.67	28.79	3.00E-8	11.0	9.0				2216	2.78	1.78	8.0
13.800	45.276	4	2.67	27.34	3.00E-8	10.4	8.5				2122	2.65	1.69	7.6
13.900	45.604	4	2.63	28.82	3.00E-8	10.7	8.8				2230	2.80	1.77	8.0
14.000	45.932	4	2.64	28.43	3.00E-8	10.7	8.7				2213	2.77	1.75	7.9
14.100	46.260	4	2.66	27.05	3.00E-8	10.3	8.4				2126	2.66	1.67	7.5
14.200	46.588	4	2.66	26.71	3.00E-8	10.2	8.3				2111	2.63	1.64	7.4
14.300	46.916	4	2.66	26.85	3.00E-8	10.3	8.4				2131	2.66	1.65	7.4
14.400	47.244	4	2.72	30.12	3.00E-8	12.0	9.7				2401	3.02	1.86	8.4
14.500	47.572	5	2.21	98.93	3.00E-6	29.7	23.9	53	40	571	1128			
14.600	47.900	6	1.80	244.37	3.00E-4	60.3	48.4	84	44	1326	1497			
14.700	48.228	6	1.60	332.67	3.00E-4	75.2	60.2	97	45	1769	1651			
14.800	48.556	6	1.58	328.19	3.00E-4	74.0	59.1	97	45	1751	1649			
14.900	48.885	6	1.57	326.80	3.00E-4	73.5	58.5	97	45	1750	1652			
15.000	49.213	7	1.31	362.72	3.00E-2	75.4	59.8	102	46	1947	1716			
15.100	49.541	7	1.24	400.23	3.00E-2	81.8	64.6	107	46	2154	1778			
15.200	49.869	6	1.40	393.76	3.00E-4	84.7	66.8	106	46	2126	1774			
15.300	50.197	6	1.39	390.77	3.00E-4	84.1	66.1	106	46	2117	1775			
15.400	50.525	6	1.43	401.44	3.00E-4	87.9	68.8	107	46	2181	1797			
15.500	50.853	6	1.43	409.30	3.00E-4	89.8	70.1	108	46	2230	1814			
15.600	51.181	7	1.32	410.05	3.00E-2	87.1	67.8	108	46	2241	1821			
15.700	51.509	7	1.22	427.98	3.00E-2	88.5	68.7	111	46	2346	1852			
15.800	51.837	7	1.10	431.84	3.00E-2	86.6	67.0	111	46	2374	1863			
15.900	52.165	7	1.05	476.05	3.00E-2	94.3	72.7	117	47	2624	1931			
16.000	52.493	7	1.08	485.03	3.00E-2	97.3	74.8	118	47	2681	1948			
16.100	52.822	7	0.92	475.63	3.00E-2	91.6	70.3	117	47	2637	1942			

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LIQUEFACTION ANALYSIS CALCULATION DETAILS

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Input File Name: G:\GS16\GS16-0107_Panama\Design & Analysis\LIQUEFACTION\16-0107-CPT7.liq
Title: 12870 Panama Street
Subtitle: CPT 7

Input Data:
Surface Elev.=0
Hole No.=CPT7
Depth of Hole=53.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.65 g
Earthquake Magnitude=6.63
No-Liquefiable Soils: CL, OL are Non-Liq. Soil
1. CPT Calulation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=1, fs2=User)
10. Average two input data between two Depths: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf %	Gamma pcf	Fines %	D50 mm
0.16	0.00	0.00	100.00	120.00	NoLiq	0.50
0.66	0.00	0.00	100.00	120.00	NoLiq	0.50
1.15	0.00	0.00	100.00	120.00	NoLiq	0.50
1.64	0.00	0.00	100.00	120.00	NoLiq	0.50
2.13	0.00	0.00	100.00	120.00	NoLiq	0.50
2.62	0.00	0.00	100.00	120.00	NoLiq	0.50
3.12	0.00	0.00	100.00	120.00	NoLiq	0.50
3.61	0.00	0.00	100.00	120.00	NoLiq	0.50
4.10	0.00	0.00	100.00	120.00	NoLiq	0.50
4.59	0.00	0.00	100.00	120.00	NoLiq	0.50
5.09	34.52	1.82	5.26	120.00	NoLiq	0.50
5.58	32.17	1.56	4.84	120.00	NoLiq	0.50
6.07	30.56	1.70	5.56	120.00	NoLiq	0.50
6.56	32.31	1.70	5.26	120.00	NoLiq	0.50
7.05	53.23	1.43	2.68	120.00	0.00	0.50
7.55	103.70	1.91	1.84	120.00	0.00	0.50
8.04	123.80	1.89	1.52	120.00	0.00	0.50
8.53	84.96	2.31	2.71	120.00	0.00	0.50
9.02	33.93	1.40	4.12	120.00	0.00	0.50
9.51	33.07	1.30	3.93	120.00	0.00	0.50
10.00	82.42	1.72	2.08	120.00	0.00	0.50
10.49	54.54	1.48	2.72	120.00	0.00	0.50
10.99	104.40	1.26	1.20	120.00	0.00	0.50
11.48	84.23	1.45	1.72	120.00	0.00	0.50
11.97	74.50	1.07	1.44	120.00	0.00	0.50
12.46	35.63	0.85	2.40	120.00	0.00	0.50
12.95	16.00	0.25	1.58	120.00	0.00	0.50
13.45	10.31	0.09	0.85	120.00	0.00	0.50
13.94	8.56	0.12	1.43	120.00	0.00	0.50
14.43	11.51	0.12	1.03	120.00	0.00	0.50
14.92	13.69	0.30	2.20	120.00	0.00	0.50
15.41	15.53	0.58	3.73	120.00	0.00	0.50
15.91	13.21	0.58	4.43	120.00	0.00	0.50
16.40	12.10	0.49	4.03	120.00	NoLiq	0.50
16.89	10.76	0.29	2.71	120.00	NoLiq	0.50
17.38	10.93	0.27	2.47	120.00	NoLiq	0.50
17.88	11.23	0.34	3.04	120.00	NoLiq	0.50
18.37	8.95	0.34	3.85	120.00	NoLiq	0.50
18.86	10.73	0.52	4.89	120.00	NoLiq	0.50
19.35	20.30	0.86	4.25	120.00	NoLiq	0.50
19.84	23.92	0.88	3.66	120.00	NoLiq	0.50
20.34	29.13	1.50	5.15	120.00	NoLiq	0.50
20.83	12.74	0.54	4.25	120.00	NoLiq	0.50
21.32	71.99	1.50	2.08	120.00	NoLiq	0.50
21.81	135.10	0.62	0.46	120.00	NoLiq	0.50
22.30	67.59	0.79	1.17	120.00	NoLiq	0.50
22.80	59.47	1.55	2.61	120.00	NoLiq	0.50

23.29	38.28	1.24	3.24	120.00	NoLiq	0.50
23.78	26.37	0.60	2.29	120.00	NoLiq	0.50
24.27	19.49	0.73	3.74	120.00	NoLiq	0.50
24.77	11.20	0.70	6.25	120.00	NoLiq	0.50
25.26	16.28	0.69	4.24	120.00	NoLiq	0.50
25.75	127.40	2.60	2.04	120.00	NoLiq	0.50
26.24	270.20	2.28	0.84	120.00	0.00	0.50
26.73	361.80	2.49	0.69	120.00	0.00	0.50
27.23	355.20	2.75	0.77	120.00	0.00	0.50
27.72	645.90	4.80	0.74	120.00	0.00	0.50
28.21	494.40	5.48	1.11	120.00	0.00	0.50
28.70	344.20	1.33	0.39	120.00	0.00	0.50
29.19	264.30	3.64	1.38	120.00	0.00	0.50
29.69	446.40	1.30	0.29	120.00	0.00	0.50
30.18	613.50	3.29	0.54	120.00	0.00	0.50
30.67	627.00	4.19	0.67	120.00	0.00	0.50
31.16	572.70	5.76	1.01	120.00	0.00	0.50
31.66	668.80	2.88	0.43	120.00	0.00	0.50
32.15	439.30	1.12	0.26	120.00	0.00	0.50
32.64	130.30	2.45	1.88	120.00	0.00	0.50
33.13	36.30	0.91	2.51	120.00	0.00	0.50
33.62	31.20	0.50	1.62	120.00	0.00	0.50
34.12	26.12	0.41	1.57	120.00	0.00	0.50
34.61	50.69	1.04	2.04	120.00	0.00	0.50
35.10	120.20	2.59	2.16	120.00	0.00	0.50
35.59	47.04	2.34	4.97	120.00	0.00	0.50
36.08	35.10	0.69	1.97	120.00	0.00	0.50
36.58	35.55	0.69	1.94	120.00	0.00	0.50
37.07	38.64	0.76	1.96	120.00	0.00	0.50
37.56	41.60	0.79	1.90	120.00	0.00	0.50
38.05	43.41	0.77	1.78	120.00	0.00	0.50
38.54	44.89	0.92	2.05	120.00	0.00	0.50
39.04	42.91	0.97	2.26	120.00	0.00	0.50
39.53	63.43	1.90	2.99	120.00	0.00	0.50
40.02	57.49	2.09	3.64	120.00	0.00	0.50
40.51	37.83	1.20	3.18	120.00	0.00	0.50
41.01	41.49	1.08	2.59	120.00	0.00	0.50
41.50	49.80	1.42	2.85	120.00	0.00	0.50
41.99	76.06	3.03	3.99	120.00	0.00	0.50
42.48	61.84	3.17	5.13	120.00	0.00	0.50
42.97	38.78	1.20	3.10	120.00	0.00	0.50
43.47	33.82	0.92	2.72	120.00	0.00	0.50
43.96	32.98	0.90	2.73	120.00	0.00	0.50
44.45	32.84	1.32	4.02	120.00	0.00	0.50
44.94	41.77	1.28	3.05	120.00	0.00	0.50
45.43	40.23	1.10	2.73	120.00	0.00	0.50
45.93	40.68	1.15	2.83	120.00	0.00	0.50
46.42	38.56	1.10	2.86	120.00	0.00	0.50
46.91	39.12	1.09	2.78	120.00	0.00	0.50
47.40	51.36	2.45	4.77	120.00	0.00	0.50
47.90	350.30	4.60	1.31	120.00	0.00	0.50
48.39	453.30	2.40	0.53	120.00	0.00	0.50
48.88	435.80	2.36	0.54	120.00	0.00	0.50
49.37	510.70	1.17	0.23	120.00	0.00	0.50
49.86	504.90	3.04	0.60	120.00	0.00	0.50
50.36	522.50	2.84	0.54	120.00	0.00	0.50
50.85	567.00	5.16	0.91	120.00	0.00	0.50
51.34	582.50	1.57	0.27	120.00	0.00	0.50
51.83	577.10	1.26	0.22	120.00	0.00	0.50
52.32	672.30	1.47	0.22	120.00	0.00	0.50
52.82	662.20	0.02	0.00	120.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:
Calculation segment, dz=0.050 ft
User defined Print Interval, dp=0.50 ft

Peak Ground Acceleration (PGA), a_max = 0.65g

CSR Calculation:

Depth ft	gamma pcf	sigma atm	gamma' pcf	sigma' atm	rd	mZ g	a(z) g	CSR	x fs1	=CSRfs
0.16	120.00	0.009	120.00	0.009	1.00	0.000	0.650	0.42	1.00	0.42
0.66	120.00	0.037	120.00	0.037	1.00	0.000	0.650	0.42	1.00	0.42
1.16	120.00	0.066	120.00	0.066	1.00	0.000	0.650	0.42	1.00	0.42
1.66	120.00	0.094	120.00	0.094	1.00	0.000	0.650	0.42	1.00	0.42
2.16	120.00	0.122	120.00	0.122	0.99	0.000	0.650	0.42	1.00	0.42
2.66	120.00	0.151	120.00	0.151	0.99	0.000	0.650	0.42	1.00	0.42
3.16	120.00	0.179	120.00	0.179	0.99	0.000	0.650	0.42	1.00	0.42

3.66	120.00	0.208	120.00	0.208	0.99	0.000	0.650	0.42	1.00	0.42
4.16	120.00	0.236	120.00	0.236	0.99	0.000	0.650	0.42	1.00	0.42
4.66	120.00	0.264	120.00	0.264	0.99	0.000	0.650	0.42	1.00	0.42
5.16	120.00	0.293	57.60	0.288	0.99	0.000	0.650	0.42	1.00	0.42
5.66	120.00	0.321	57.60	0.302	0.99	0.000	0.650	0.44	1.00	0.44
6.16	120.00	0.349	57.60	0.315	0.99	0.000	0.650	0.46	1.00	0.46
6.66	120.00	0.378	57.60	0.329	0.98	0.000	0.650	0.48	1.00	0.48
7.16	120.00	0.406	57.60	0.343	0.98	0.000	0.650	0.49	1.00	0.49
7.66	120.00	0.434	57.60	0.356	0.98	0.000	0.650	0.51	1.00	0.51
8.16	120.00	0.463	57.60	0.370	0.98	0.000	0.650	0.52	1.00	0.52
8.66	120.00	0.491	57.60	0.383	0.98	0.000	0.650	0.53	1.00	0.53
9.16	120.00	0.519	57.60	0.397	0.98	0.000	0.650	0.54	1.00	0.54
9.66	120.00	0.548	57.60	0.411	0.98	0.000	0.650	0.55	1.00	0.55
10.16	120.00	0.576	57.60	0.424	0.98	0.000	0.650	0.56	1.00	0.56
10.66	120.00	0.604	57.60	0.438	0.98	0.000	0.650	0.57	1.00	0.57
11.16	120.00	0.633	57.60	0.451	0.97	0.000	0.650	0.58	1.00	0.58
11.66	120.00	0.661	57.60	0.465	0.97	0.000	0.650	0.58	1.00	0.58
12.16	120.00	0.690	57.60	0.479	0.97	0.000	0.650	0.59	1.00	0.59
12.66	120.00	0.718	57.60	0.492	0.97	0.000	0.650	0.60	1.00	0.60
13.16	120.00	0.746	57.60	0.506	0.97	0.000	0.650	0.60	1.00	0.60
13.66	120.00	0.775	57.60	0.520	0.97	0.000	0.650	0.61	1.00	0.61
14.16	120.00	0.803	57.60	0.533	0.97	0.000	0.650	0.62	1.00	0.62
14.66	120.00	0.831	57.60	0.547	0.97	0.000	0.650	0.62	1.00	0.62
15.16	120.00	0.860	57.60	0.560	0.96	0.000	0.650	0.63	1.00	0.63
15.66	120.00	0.888	57.60	0.574	0.96	0.000	0.650	0.63	1.00	0.63
16.16	120.00	0.916	57.60	0.588	0.96	0.000	0.650	0.63	1.00	0.63
16.66	120.00	0.945	57.60	0.601	0.96	0.000	0.650	0.64	1.00	0.64
17.16	120.00	0.973	57.60	0.615	0.96	0.000	0.650	0.64	1.00	0.64
17.66	120.00	1.001	57.60	0.628	0.96	0.000	0.650	0.65	1.00	0.65
18.16	120.00	1.030	57.60	0.642	0.96	0.000	0.650	0.65	1.00	0.65
18.66	120.00	1.058	57.60	0.656	0.96	0.000	0.650	0.65	1.00	0.65
19.16	120.00	1.086	57.60	0.669	0.96	0.000	0.650	0.66	1.00	0.66
19.66	120.00	1.115	57.60	0.683	0.95	0.000	0.650	0.66	1.00	0.66
20.16	120.00	1.143	57.60	0.696	0.95	0.000	0.650	0.66	1.00	0.66
20.66	120.00	1.172	57.60	0.710	0.95	0.000	0.650	0.66	1.00	0.66
21.16	120.00	1.200	57.60	0.724	0.95	0.000	0.650	0.67	1.00	0.67
21.66	120.00	1.228	57.60	0.737	0.95	0.000	0.650	0.67	1.00	0.67
22.16	120.00	1.257	57.60	0.751	0.95	0.000	0.650	0.67	1.00	0.67
22.66	120.00	1.285	57.60	0.765	0.95	0.000	0.650	0.67	1.00	0.67
23.16	120.00	1.313	57.60	0.778	0.95	0.000	0.650	0.67	1.00	0.67
23.66	120.00	1.342	57.60	0.792	0.94	0.000	0.650	0.68	1.00	0.68
24.16	120.00	1.370	57.60	0.805	0.94	0.000	0.650	0.68	1.00	0.68
24.66	120.00	1.398	57.60	0.819	0.94	0.000	0.650	0.68	1.00	0.68
25.16	120.00	1.427	57.60	0.833	0.94	0.000	0.650	0.68	1.00	0.68
25.66	120.00	1.455	57.60	0.846	0.94	0.000	0.650	0.68	1.00	0.68
26.16	120.00	1.483	57.60	0.860	0.94	0.000	0.650	0.68	1.00	0.68
26.66	120.00	1.512	57.60	0.873	0.94	0.000	0.650	0.69	1.00	0.69
27.16	120.00	1.540	57.60	0.887	0.94	0.000	0.650	0.69	1.00	0.69
27.66	120.00	1.568	57.60	0.901	0.94	0.000	0.650	0.69	1.00	0.69
28.16	120.00	1.597	57.60	0.914	0.93	0.000	0.650	0.69	1.00	0.69
28.66	120.00	1.625	57.60	0.928	0.93	0.000	0.650	0.69	1.00	0.69
29.16	120.00	1.654	57.60	0.941	0.93	0.000	0.650	0.69	1.00	0.69
29.66	120.00	1.682	57.60	0.955	0.93	0.000	0.650	0.69	1.00	0.69
30.16	120.00	1.710	57.60	0.969	0.93	0.000	0.650	0.69	1.00	0.69
30.66	120.00	1.739	57.60	0.982	0.92	0.000	0.650	0.69	1.00	0.69
31.16	120.00	1.767	57.60	0.996	0.92	0.000	0.650	0.69	1.00	0.69
31.66	120.00	1.795	57.60	1.009	0.92	0.000	0.650	0.69	1.00	0.69
32.16	120.00	1.824	57.60	1.023	0.91	0.000	0.650	0.69	1.00	0.69
32.66	120.00	1.852	57.60	1.037	0.91	0.000	0.650	0.69	1.00	0.69
33.16	120.00	1.880	57.60	1.050	0.90	0.000	0.650	0.68	1.00	0.68
33.66	120.00	1.909	57.60	1.064	0.90	0.000	0.650	0.68	1.00	0.68
34.16	120.00	1.937	57.60	1.078	0.90	0.000	0.650	0.68	1.00	0.68
34.66	120.00	1.965	57.60	1.091	0.89	0.000	0.650	0.68	1.00	0.68
35.16	120.00	1.994	57.60	1.105	0.89	0.000	0.650	0.68	1.00	0.68
35.66	120.00	2.022	57.60	1.118	0.88	0.000	0.650	0.68	1.00	0.68
36.16	120.00	2.050	57.60	1.132	0.88	0.000	0.650	0.67	1.00	0.67
36.66	120.00	2.079	57.60	1.146	0.88	0.000	0.650	0.67	1.00	0.67
37.16	120.00	2.107	57.60	1.159	0.87	0.000	0.650	0.67	1.00	0.67
37.66	120.00	2.136	57.60	1.173	0.87	0.000	0.650	0.67	1.00	0.67
38.16	120.00	2.164	57.60	1.186	0.86	0.000	0.650	0.67	1.00	0.67
38.66	120.00	2.192	57.60	1.200	0.86	0.000	0.650	0.66	1.00	0.66
39.16	120.00	2.221	57.60	1.214	0.86	0.000	0.650	0.66	1.00	0.66
39.66	120.00	2.249	57.60	1.227	0.85	0.000	0.650	0.66	1.00	0.66
40.16	120.00	2.277	57.60	1.241	0.85	0.000	0.650	0.66	1.00	0.66
40.66	120.00	2.306	57.60	1.254	0.84	0.000	0.650	0.65	1.00	0.65
41.16	120.00	2.334	57.60	1.268	0.84	0.000	0.650	0.65	1.00	0.65
41.66	120.00	2.362	57.60	1.282	0.83	0.000	0.650	0.65	1.00	0.65
42.16	120.00	2.391	57.60	1.295	0.83	0.000	0.650	0.65	1.00	0.65
42.66	120.00	2.419	57.60	1.309	0.83	0.000	0.650	0.65	1.00	0.65
43.16	120.00	2.447	57.60	1.322	0.82	0.000	0.650	0.64	1.00	0.64
43.66	120.00	2.476	57.60	1.336	0.82	0.000	0.650	0.64	1.00	0.64
44.16	120.00	2.504	57.60	1.350	0.81	0.000	0.650	0.64	1.00	0.64

44.66	120.00	2.532	57.60	1.363	0.81	0.000	0.650	0.64	1.00	0.64
45.16	120.00	2.561	57.60	1.377	0.81	0.000	0.650	0.63	1.00	0.63
45.66	120.00	2.589	57.60	1.391	0.80	0.000	0.650	0.63	1.00	0.63
46.16	120.00	2.618	57.60	1.404	0.80	0.000	0.650	0.63	1.00	0.63
46.66	120.00	2.646	57.60	1.418	0.79	0.000	0.650	0.63	1.00	0.63
47.16	120.00	2.674	57.60	1.431	0.79	0.000	0.650	0.62	1.00	0.62
47.66	120.00	2.703	57.60	1.445	0.79	0.000	0.650	0.62	1.00	0.62
48.16	120.00	2.731	57.60	1.459	0.78	0.000	0.650	0.62	1.00	0.62
48.66	120.00	2.759	57.60	1.472	0.78	0.000	0.650	0.62	1.00	0.62
49.16	120.00	2.788	57.60	1.486	0.77	0.000	0.650	0.61	1.00	0.61
49.66	120.00	2.816	57.60	1.499	0.77	0.000	0.650	0.61	1.00	0.61
50.16	120.00	2.844	57.60	1.513	0.77	0.000	0.650	0.61	1.00	0.61
50.66	120.00	2.873	57.60	1.527	0.76	0.000	0.650	0.61	1.00	0.61
51.16	120.00	2.901	57.60	1.540	0.76	0.000	0.650	0.60	1.00	0.60
51.66	120.00	2.929	57.60	1.554	0.75	0.000	0.650	0.60	1.00	0.60
52.16	120.00	2.958	57.60	1.567	0.75	0.000	0.650	0.60	1.00	0.60
52.66	120.00	2.986	57.60	1.581	0.75	0.000	0.650	0.59	1.00	0.59

CSR is based on water table at 5.00 during earthquake

CRR Calculation from CPT data, using Modify Robertson's Method:
(Fines content is determined by qc and fric.)

Depth ft	qc atm	fric. atm	n	Q	Rf	Ic	Cq	Fines %	Kc	qc1n atm	qc1f atm	CRR7.5
0.16			1.00	1.00E-4	0.00	7.97						
0.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
0.66			1.00	1.00E-4	0.00	7.97						
0.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.16			1.00	1.00E-4	0.00	7.97						
1.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.66			1.00	1.00E-4	0.00	7.97						
1.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.16			1.00	1.00E-4	0.00	7.97						
2.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.66			1.00	1.00E-4	0.00	7.97						
2.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.16			1.00	1.00E-4	0.00	7.97						
3.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.66			1.00	1.00E-4	0.00	7.97						
3.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.16			1.00	1.00E-4	0.00	7.97						
4.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.66			1.00	1.00E-4	0.00	7.97						
4.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
5.16			1.00	1.16E2	5.24	2.39						
5.16	34.33	1.78	1.00	1.16E2	5.24	2.39	1.00	NoLiq	1.00	34.33	34.33	2.08
5.66			1.00	9.58E1	5.16	2.44						
5.66	31.07	1.59	1.00	9.58E1	5.16	2.44	1.00	NoLiq	1.00	31.07	31.07	2.08
6.16			1.00	8.70E1	5.61	2.49						
6.16	30.73	1.70	1.00	8.70E1	5.61	2.49	1.00	NoLiq	1.00	30.73	30.73	2.08
6.66			1.00	8.94E1	5.14	2.46						
6.66	34.13	1.74	1.00	8.94E1	5.14	2.46	1.00	NoLiq	1.00	34.13	34.13	2.08
7.16			1.00	1.64E2	2.37	2.03						
7.16			0.50	1.05E2	2.37	2.15						
7.16	67.08	1.58	0.50	1.05E2	2.37	2.15	1.57	17.49	0.33	105.27	157.92	0.45
7.66			1.00	2.57E2	1.95	1.85						
7.66			0.50	1.70E2	1.95	1.95						
7.66	111.98	2.18	0.50	1.70E2	1.95	1.95	1.52	11.74	0.18	169.90	207.19	0.91
8.16			1.00	2.52E2	1.90	1.84						
8.16			0.50	1.72E2	1.90	1.94						
8.16	117.18	2.22	0.50	1.72E2	1.90	1.94	1.47	11.43	0.17	172.26	207.95	0.92
8.66			1.00	1.44E2	2.94	2.14						
8.66			0.50	1.01E2	2.94	2.23						
8.66	70.97	2.07	0.50	1.01E2	2.94	2.23	1.43	20.17	0.41	101.27	170.23	0.54
9.16			1.00	5.15E1	4.63	2.58						
9.16			0.50	3.79E1	4.63	2.67						
9.16			0.70	4.32E1	4.63	2.63						
9.16	27.29	1.24	0.70	4.32E1	4.63	2.63	1.58	36.90	0.80	43.17	215.83	1.02
9.66			1.00	1.02E2	2.65	2.20						
9.66			0.50	7.59E1	2.65	2.29						
9.66	56.16	1.48	0.50	7.59E1	2.65	2.29	1.35	22.04	0.45	75.88	139.19	0.33
10.16			1.00	9.88E1	3.10	2.26						
10.16			0.50	7.55E1	3.10	2.34						
10.16	57.06	1.75	0.50	7.55E1	3.10	2.34	1.32	23.94	0.51	75.47	152.69	0.41
10.66			1.00	1.58E2	1.44	1.88						
10.66			0.50	1.22E2	1.44	1.95						
10.66	93.30	1.34	0.50	1.22E2	1.44	1.95	1.31	11.73	0.18	121.95	148.68	0.39
11.16			1.00	1.71E2	1.18	1.79						
11.16			0.50	1.33E2	1.18	1.86						
11.16	103.09	1.20	0.50	1.33E2	1.18	1.86	1.29	9.55	0.12	133.21	151.62	0.40
11.66			1.00	1.44E2	1.63	1.94						

11.66			0.50	1.13E2	1.63	2.01					
11.66	88.65	1.43	0.50	1.13E2	1.63	2.01	1.28	13.31	0.22	113.27	145.57	0.37
12.16			1.00	9.85E1	1.49	2.03					
12.16			0.50	7.88E1	1.49	2.10					
12.16	62.37	0.92	0.50	7.88E1	1.49	2.10	1.26	15.85	0.29	78.82	110.96	0.21
12.66			1.00	2.85E1	3.72	2.70					
12.66	18.94	0.68	1.00	2.85E1	3.72	2.70	1.00	NoLiq	1.00	18.94	18.94	2.08
13.16			1.00	2.01E1	1.02	2.49					
13.16			0.50	1.72E1	1.02	2.55					
13.16	13.88	0.13	0.50	1.72E1	1.02	2.55	1.24	33.02	0.75	17.18	68.24	0.11
13.66			1.00	1.17E1	1.19	2.73					
13.66	8.61	0.09	1.00	1.17E1	1.19	2.73	1.00	NoLiq	1.00	8.61	8.61	2.08
14.16			1.00	1.32E1	1.27	2.70					
14.16	9.81	0.11	1.00	1.32E1	1.27	2.70	1.00	NoLiq	1.00	9.81	9.81	2.08
14.66			1.00	1.63E1	1.89	2.71					
14.66	12.13	0.21	1.00	1.63E1	1.89	2.71	1.00	NoLiq	1.00	12.13	12.13	2.08
15.16			1.00	1.78E1	3.30	2.82					
15.16	13.42	0.41	1.00	1.78E1	3.30	2.82	1.00	NoLiq	1.00	13.42	13.42	2.08
15.66			1.00	1.94E1	4.01	2.84					
15.66	14.91	0.56	1.00	1.94E1	4.01	2.84	1.00	NoLiq	1.00	14.91	14.91	2.08
16.16			1.00	1.71E1	4.41	2.91					
16.16	13.47	0.55	1.00	1.71E1	4.41	2.91	1.00	NoLiq	1.00	13.47	13.47	2.08
16.66			1.00	1.33E1	3.97	2.97					
16.66	10.90	0.40	1.00	1.33E1	3.97	2.97	1.00	NoLiq	1.00	10.90	10.90	2.08
17.16			1.00	1.37E1	2.67	2.85					
17.16	11.43	0.28	1.00	1.37E1	2.67	2.85	1.00	NoLiq	1.00	11.43	11.43	2.08
17.66			1.00	1.27E1	3.08	2.92					
17.66	10.88	0.30	1.00	1.27E1	3.08	2.92	1.00	NoLiq	1.00	10.88	10.88	2.08
18.16			1.00	1.10E1	3.40	3.00					
18.16	9.70	0.29	1.00	1.10E1	3.40	3.00	1.00	NoLiq	1.00	9.70	9.70	2.08
18.66			1.00	1.07E1	4.49	3.07					
18.66	9.69	0.39	1.00	1.07E1	4.49	3.07	1.00	NoLiq	1.00	9.69	9.69	2.08
19.16			1.00	3.21E1	2.86	2.58					
19.16	27.33	0.75	1.00	3.21E1	2.86	2.58	1.00	NoLiq	1.00	27.33	27.33	2.08
19.66			1.00	2.16E1	3.69	2.78					
19.66	19.08	0.66	1.00	2.16E1	3.69	2.78	1.00	NoLiq	1.00	19.08	19.08	2.08
20.16			1.00	3.44E1	5.00	2.72					
20.16	30.15	1.45	1.00	3.44E1	5.00	2.72	1.00	NoLiq	1.00	30.15	30.15	2.08
20.66			1.00	1.77E1	5.43	2.96					
20.66	16.39	0.83	1.00	1.77E1	5.43	2.96	1.00	NoLiq	1.00	16.39	16.39	2.08
21.16			1.00	2.47E1	5.81	2.87					
21.16	22.69	1.25	1.00	2.47E1	5.81	2.87	1.00	NoLiq	1.00	22.69	22.69	2.08
21.66			1.00	1.61E2	0.64	1.63					
21.66	143.35	0.91	1.00	1.61E2	0.64	1.63	1.00	NoLiq	1.00	143.35	143.35	2.08
22.16			1.00	9.47E1	0.74	1.85					
22.16	86.30	0.63	1.00	9.47E1	0.74	1.85	1.00	NoLiq	1.00	86.30	86.30	2.08
22.66			1.00	6.30E1	2.30	2.30					
22.66	58.71	1.32	1.00	6.30E1	2.30	2.30	1.00	NoLiq	1.00	58.71	58.71	2.08
23.16			1.00	4.07E1	3.91	2.60					
23.16	38.94	1.47	1.00	4.07E1	3.91	2.60	1.00	NoLiq	1.00	38.94	38.94	2.08
23.66			1.00	2.22E1	3.39	2.75					
23.66	22.17	0.71	1.00	2.22E1	3.39	2.75	1.00	NoLiq	1.00	22.17	22.17	2.08
24.16			1.00	2.05E1	3.52	2.79					
24.16	20.93	0.69	1.00	2.05E1	3.52	2.79	1.00	NoLiq	1.00	20.93	20.93	2.08
24.66			1.00	1.13E1	7.13	3.18					
24.66	12.36	0.78	1.00	1.13E1	7.13	3.18	1.00	NoLiq	1.00	12.36	12.36	2.08
25.16			1.00	1.28E1	4.65	3.02					
25.16	14.00	0.58	1.00	1.28E1	4.65	3.02	1.00	NoLiq	1.00	14.00	14.00	2.08
25.66			1.00	8.09E1	2.29	2.22					
25.66	81.86	1.84	1.00	8.09E1	2.29	2.22	1.00	NoLiq	1.00	81.86	81.86	2.08
26.16			1.00	2.27E2	0.94	1.63					
26.16			0.50	2.29E2	0.94	1.63					
26.16	229.69	2.15	0.50	2.29E2	0.94	1.63	1.00	4.88	0.00	228.87	228.87	1.19
26.66			1.00	3.70E2	0.63	1.36					
26.66			0.50	3.75E2	0.63	1.36					
26.66	379.11	2.37	0.50	3.75E2	0.63	1.36	0.99	1.01	0.00	375.23	375.23	2.08
27.16			1.00	3.36E2	0.72	1.43					
27.16			0.50	3.43E2	0.72	1.42					
27.16	348.89	2.49	0.50	3.43E2	0.72	1.42	0.98	1.83	0.00	343.03	343.03	2.08
27.66			1.00	5.76E2	0.76	1.31					
27.66			0.50	5.91E2	0.76	1.31					
27.66	604.94	4.61	0.50	5.91E2	0.76	1.31	0.98	0.46	0.00	500.00	500.00	2.08
28.16			1.00	4.64E2	1.21	1.53					
28.16			0.50	4.79E2	1.21	1.52					
28.16	494.06	5.97	0.50	4.79E2	1.21	1.52	0.97	3.18	0.00	479.50	479.50	2.08
28.66			1.00	3.37E2	0.39	1.24					
28.66			0.50	3.51E2	0.39	1.23					
28.66	364.18	1.40	0.50	3.51E2	0.39	1.23	0.96	0.00	0.00	351.20	351.20	2.08
29.16			1.00	2.35E2	1.26	1.72					
29.16			0.50	2.47E2	1.26	1.70					
29.16	257.99	3.23	0.50	2.47E2	1.26	1.70	0.96	6.19	0.03	247.23	255.35	1.63
29.66			1.00	3.95E2	0.36	1.17					

29.66			0.50	4.17E2	0.36	1.15						
29.66	437.63	1.57	0.50	4.17E2	0.36	1.15	0.95	0.00	0.00	416.80	416.80	2.08
30.16			1.00	5.47E2	0.53	1.19						
30.16			0.50	5.80E2	0.53	1.18						
30.16	612.56	3.23	0.50	5.80E2	0.53	1.18	0.95	0.00	0.00	500.00	500.00	2.08
30.66			1.00	5.53E2	0.66	1.27						
30.66			0.50	5.89E2	0.66	1.25						
30.66	626.41	4.15	0.50	5.89E2	0.66	1.25	0.94	0.00	0.00	500.00	500.00	2.08
31.16			1.00	4.99E2	1.01	1.45						
31.16			0.50	5.36E2	1.01	1.43						
31.16	572.66	5.76	0.50	5.36E2	1.01	1.43	0.94	1.90	0.00	500.00	500.00	2.08
31.66			1.00	5.77E2	0.43	1.11						
31.66			0.50	6.22E2	0.43	1.09						
31.66	668.81	2.88	0.50	6.22E2	0.43	1.09	0.93	0.00	0.00	500.00	500.00	2.08
32.16			1.00	3.70E2	0.26	1.10						
32.16			0.50	4.02E2	0.26	1.07						
32.16	434.51	1.11	0.50	4.02E2	0.26	1.07	0.92	0.00	0.00	401.62	401.62	2.08
32.66			1.00	1.03E2	1.98	2.10						
32.66			0.50	1.13E2	1.98	2.08						
32.66	123.41	2.41	0.50	1.13E2	1.98	2.08	0.92	15.07	0.27	113.41	155.12	0.43
33.16			1.00	2.87E1	2.54	2.59						
33.16			0.50	3.31E1	2.54	2.54						
33.16	36.26	0.87	0.50	3.31E1	2.54	2.54	0.91	32.39	0.73	33.13	123.30	0.25
33.66			1.00	2.35E1	1.70	2.55						
33.66			0.50	2.76E1	1.70	2.49						
33.66	30.42	0.48	0.50	2.76E1	1.70	2.49	0.91	30.39	0.68	27.64	85.82	0.14
34.16			1.00	2.05E1	1.71	2.60						
34.16	27.03	0.43	1.00	2.05E1	1.71	2.60	1.00	NoLiq	1.00	27.03	27.03	2.08
34.66			1.00	4.60E1	2.07	2.37						
34.66			0.50	5.30E1	2.07	2.32						
34.66	58.99	1.18	0.50	5.30E1	2.07	2.32	0.90	23.45	0.49	53.00	104.46	0.19
35.16			1.00	9.75E1	2.14	2.14						
35.16			0.50	1.11E2	2.14	2.11						
35.16	124.08	2.62	0.50	1.11E2	2.14	2.11	0.89	16.01	0.29	110.89	157.05	0.44
35.66			1.00	3.15E1	5.29	2.77						
35.66	41.88	2.11	1.00	3.15E1	5.29	2.77	1.00	NoLiq	1.00	41.88	41.88	2.08
36.16			1.00	2.52E1	2.18	2.59						
36.16			0.50	3.03E1	2.18	2.53						
36.16	34.29	0.70	0.50	3.03E1	2.18	2.53	0.88	31.86	0.72	30.31	107.16	0.19
36.66			1.00	2.61E1	2.10	2.57						
36.66			0.50	3.15E1	2.10	2.50						
36.66	35.85	0.71	0.50	3.15E1	2.10	2.50	0.88	30.83	0.69	31.53	101.61	0.18
37.16			1.00	2.85E1	2.07	2.53						
37.16			0.50	3.44E1	2.07	2.47						
37.16	39.30	0.77	0.50	3.44E1	2.07	2.47	0.87	29.33	0.65	34.38	98.11	0.17
37.66			1.00	3.01E1	1.98	2.50						
37.66			0.50	3.65E1	1.98	2.44						
37.66	41.89	0.79	0.50	3.65E1	1.98	2.44	0.87	27.98	0.61	36.46	94.37	0.16
38.16			1.00	3.11E1	1.90	2.48						
38.16			0.50	3.78E1	1.90	2.41						
38.16	43.63	0.79	0.50	3.78E1	1.90	2.41	0.87	27.01	0.59	37.78	91.63	0.15
38.66			1.00	3.13E1	2.29	2.53						
38.66			0.50	3.82E1	2.29	2.46						
38.66	44.34	0.97	0.50	3.82E1	2.29	2.46	0.86	29.03	0.64	38.20	106.56	0.19
39.16			1.00	3.36E1	2.23	2.50						
39.16			0.50	4.11E1	2.23	2.43						
39.16	47.97	1.02	0.50	4.11E1	2.23	2.43	0.86	27.64	0.60	41.12	103.94	0.18
39.66			1.00	4.12E1	3.94	2.60						
39.66			0.50	5.02E1	3.94	2.54						
39.66	58.91	2.23	0.50	5.02E1	3.94	2.54	0.85	32.28	0.73	50.24	184.88	0.67
40.16			1.00	3.59E1	3.57	2.61						
40.16	52.08	1.78	1.00	3.59E1	3.57	2.61	1.00	NoLiq	1.00	52.08	52.08	2.08
40.66			1.00	2.54E1	2.80	2.65						
40.66	37.88	1.00	1.00	2.54E1	2.80	2.65	1.00	NoLiq	1.00	37.88	37.88	2.08
41.16			1.00	2.91E1	2.70	2.60						
41.16			0.50	3.66E1	2.70	2.52						
41.16	43.58	1.11	0.50	3.66E1	2.70	2.52	0.84	31.69	0.71	36.63	127.41	0.27
41.66			1.00	3.17E1	4.22	2.70						
41.66	47.62	1.91	1.00	3.17E1	4.22	2.70	1.00	NoLiq	1.00	47.62	47.62	2.08
42.16			1.00	4.85E1	5.22	2.63						
42.16	72.34	3.65	1.00	4.85E1	5.22	2.63	1.00	NoLiq	1.00	72.34	72.34	2.08
42.66			1.00	3.42E1	5.01	2.73						
42.66	52.17	2.49	1.00	3.42E1	5.01	2.73	1.00	NoLiq	1.00	52.17	52.17	2.08
43.16			1.00	2.24E1	2.89	2.71						
43.16	35.41	0.95	1.00	2.24E1	2.89	2.71	1.00	NoLiq	1.00	35.41	35.41	2.08
43.66			1.00	1.98E1	3.15	2.77						
43.66	31.88	0.93	1.00	1.98E1	3.15	2.77	1.00	NoLiq	1.00	31.88	31.88	2.08
44.16			1.00	2.15E1	3.16	2.74						
44.16	34.69	1.02	1.00	2.15E1	3.16	2.74	1.00	NoLiq	1.00	34.69	34.69	2.08
44.66			1.00	2.36E1	3.75	2.76						
44.66	38.16	1.34	1.00	2.36E1	3.75	2.76	1.00	NoLiq	1.00	38.16	38.16	2.08
45.16			1.00	2.38E1	3.44	2.73						

45.16	38.83	1.25	1.00	2.38E1	3.44	2.73	1.00	NoLiq	1.00	38.83	38.83	2.08
45.66			1.00	2.53E1	3.04	2.68						
45.66	41.43	1.18	1.00	2.53E1	3.04	2.68	1.00	NoLiq	1.00	41.43	41.43	2.08
46.16			1.00	2.38E1	3.02	2.70						
46.16	39.56	1.12	1.00	2.38E1	3.02	2.70	1.00	NoLiq	1.00	39.56	39.56	2.08
46.66			1.00	2.31E1	2.98	2.70						
46.66	38.84	1.08	1.00	2.31E1	2.98	2.70	1.00	NoLiq	1.00	38.84	38.84	2.08
47.16			1.00	2.42E1	3.74	2.75						
47.16	40.81	1.43	1.00	2.42E1	3.74	2.75	1.00	NoLiq	1.00	40.81	40.81	2.08
47.66			1.00	1.16E2	2.05	2.08						
47.66			0.50	1.48E2	2.05	2.01						
47.66	186.82	3.77	0.50	1.48E2	2.05	2.01	0.79	13.18	0.22	148.04	189.40	0.71
48.16			1.00	2.72E2	1.20	1.66						
48.16			0.50	3.47E2	1.20	1.60						
48.16	439.22	5.22	0.50	3.47E2	1.20	1.60	0.79	4.31	0.00	346.59	346.59	2.08
48.66			1.00	2.59E2	1.21	1.68						
48.66			0.50	3.31E2	1.21	1.61						
48.66	421.77	5.07	0.50	3.31E2	1.21	1.61	0.79	4.56	0.00	331.41	331.41	2.08
49.16			1.00	2.90E2	0.41	1.31						
49.16			0.50	3.73E2	0.41	1.22						
49.16	476.71	1.93	0.50	3.73E2	0.41	1.22	0.78	0.00	0.00	373.02	373.02	2.08
49.66			1.00	3.32E2	0.39	1.25						
49.66			0.50	4.28E2	0.39	1.17						
49.66	549.29	2.14	0.50	4.28E2	0.39	1.17	0.78	0.00	0.00	428.03	428.03	2.08
50.16			1.00	3.15E2	0.44	1.30						
50.16			0.50	4.09E2	0.44	1.22						
50.16	526.39	2.32	0.50	4.09E2	0.44	1.22	0.78	0.00	0.00	408.50	408.50	2.08
50.66			1.00	3.36E2	0.69	1.42						
50.66			0.50	4.37E2	0.69	1.34						
50.66	565.07	3.87	0.50	4.37E2	0.69	1.34	0.77	0.88	0.00	436.73	436.73	2.08
51.16			1.00	3.28E2	0.68	1.42						
51.16			0.50	4.29E2	0.68	1.34						
51.16	556.82	3.75	0.50	4.29E2	0.68	1.34	0.77	0.87	0.00	428.62	428.62	2.08
51.66			1.00	3.43E2	0.26	1.13						
51.66			0.50	4.49E2	0.26	1.04						
51.66	585.91	1.52	0.50	4.49E2	0.26	1.04	0.77	0.00	0.00	449.21	449.21	2.08
52.16			1.00	3.94E2	0.18	1.00						
52.16			0.50	5.18E2	0.18	0.90						
52.16	678.89	1.24	0.50	5.18E2	0.18	0.90	0.76	0.00	0.00	500.00	500.00	2.08
52.66			1.00	3.77E2	0.25	1.09						
52.66			0.50	4.97E2	0.25	0.99						
52.66	653.89	1.64	0.50	4.97E2	0.25	0.99	0.76	0.00	0.00	497.36	497.36	2.08

Fines have been calculated, and correction is made by Modify Robertson Method.
Fines=NoLiq means the soils are not liquefiable.
CRR is based on water table at 10.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 6.63:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.16	0.01	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
0.66	0.02	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.16	0.04	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.66	0.06	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.16	0.08	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.66	0.10	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.16	0.12	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.66	0.13	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.16	0.15	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.66	0.17	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
5.16	0.19	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
5.66	0.21	2.08	1.00	2.08	1.37	2.00	0.44	5.00 ^
6.16	0.23	2.08	1.00	2.08	1.37	2.00	0.46	5.00 ^
6.66	0.25	2.08	1.00	2.08	1.37	2.00	0.48	5.00 ^
7.16	0.26	0.45	1.00	0.45	1.37	0.61	0.49	1.24
7.66	0.28	0.91	1.00	0.91	1.37	1.24	0.51	2.46
8.16	0.30	0.92	1.00	0.92	1.37	1.26	0.52	2.42
8.66	0.32	0.54	1.00	0.54	1.37	0.74	0.53	1.39
9.16	0.34	1.02	1.00	1.02	1.37	1.39	0.54	2.57
9.66	0.36	0.33	1.00	0.33	1.37	0.45	0.55	0.82 *
10.16	0.37	0.41	1.00	0.41	1.37	0.56	0.56	1.01
10.66	0.38	0.39	1.00	0.39	1.37	0.53	0.57	0.93 *
11.16	0.39	0.40	1.00	0.40	1.37	0.55	0.58	0.96 *
11.66	0.40	0.37	1.00	0.37	1.37	0.50	0.58	0.86 *
12.16	0.41	0.21	1.00	0.21	1.37	0.28	0.59	0.48 *
12.66	0.42	2.08	1.00	2.08	1.37	2.00	0.60	5.00 ^
13.16	0.42	0.11	1.00	0.11	1.37	0.15	0.60	0.25 *
13.66	0.43	2.08	1.00	2.08	1.37	2.00	0.61	5.00 ^
14.16	0.44	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^
14.66	0.45	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^
15.16	0.46	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^

Liq.

15.66	0.47	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
16.16	0.48	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
16.66	0.49	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
17.16	0.50	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
17.66	0.50	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
18.16	0.51	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
18.66	0.52	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
19.16	0.53	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
19.66	0.54	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
20.16	0.55	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
20.66	0.56	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
21.16	0.57	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
21.66	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
22.16	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
22.66	0.59	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
23.16	0.60	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
23.66	0.61	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
24.16	0.62	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
24.66	0.63	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
25.16	0.64	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
25.66	0.65	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
26.16	0.65	1.19	1.00	1.19	1.37	1.64	0.68	2.39
26.66	0.66	2.08	1.00	2.08	1.37	2.85	0.69	4.16
27.16	0.67	2.08	1.00	2.08	1.37	2.85	0.69	4.15
27.66	0.68	2.08	1.00	2.08	1.37	2.85	0.69	4.14
28.16	0.69	2.08	1.00	2.08	1.37	2.85	0.69	4.13
28.66	0.70	2.08	1.00	2.08	1.37	2.85	0.69	4.13
29.16	0.71	1.63	1.00	1.63	1.37	2.23	0.69	3.23
29.66	0.72	2.08	1.00	2.08	1.37	2.85	0.69	4.12
30.16	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12
30.66	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12
31.16	0.74	2.08	1.00	2.08	1.37	2.85	0.69	4.13
31.66	0.75	2.08	1.00	2.08	1.37	2.85	0.69	4.14
32.16	0.76	2.08	1.00	2.08	1.37	2.85	0.69	4.15
32.66	0.77	0.43	1.00	0.43	1.37	0.59	0.69	0.85 *
33.16	0.78	0.25	1.00	0.25	1.37	0.35	0.68	0.51 *
33.66	0.79	0.14	1.00	0.14	1.37	0.19	0.68	0.28 *
34.16	0.80	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
34.66	0.81	0.19	1.00	0.19	1.37	0.25	0.68	0.38 *
35.16	0.81	0.44	1.00	0.44	1.37	0.60	0.68	0.89 *
35.66	0.82	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
36.16	0.83	0.19	1.00	0.19	1.37	0.27	0.67	0.40 *
36.66	0.84	0.18	1.00	0.18	1.37	0.24	0.67	0.36 *
37.16	0.85	0.17	1.00	0.17	1.37	0.23	0.67	0.34 *
37.66	0.86	0.16	1.00	0.16	1.37	0.22	0.67	0.32 *
38.16	0.87	0.15	1.00	0.15	1.37	0.21	0.67	0.31 *
38.66	0.88	0.19	1.00	0.19	1.37	0.26	0.66	0.40 *
39.16	0.88	0.18	1.00	0.18	1.37	0.25	0.66	0.38 *
39.66	0.89	0.67	1.00	0.67	1.37	0.92	0.66	1.39
40.16	0.90	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
40.66	0.91	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
41.16	0.92	0.27	1.00	0.27	1.37	0.37	0.65	0.57 *
41.66	0.93	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
42.16	0.94	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
42.66	0.95	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
43.16	0.96	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
43.66	0.96	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
44.16	0.97	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
44.66	0.98	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
45.16	0.99	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
45.66	1.00	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
46.16	1.01	2.08	1.00	2.09	1.37	2.00	0.63	5.00 ^
46.66	1.02	2.08	1.00	2.09	1.37	2.00	0.63	5.00 ^
47.16	1.03	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^
47.66	1.04	0.71	1.00	0.71	1.37	0.98	0.62	1.57
48.16	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.60
48.66	1.05	2.08	1.00	2.08	1.37	2.84	0.62	4.62
49.16	1.06	2.08	1.00	2.07	1.37	2.84	0.61	4.63
49.66	1.07	2.08	1.00	2.07	1.37	2.84	0.61	4.64
50.16	1.08	2.08	0.99	2.07	1.37	2.83	0.61	4.66
50.66	1.09	2.08	0.99	2.06	1.37	2.83	0.61	4.67
51.16	1.10	2.08	0.99	2.06	1.37	2.83	0.60	4.69
51.66	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.70
52.16	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.71
52.66	1.12	2.08	0.99	2.05	1.37	2.81	0.59	4.73

Liq.

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils or above Water Table.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:

Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
0.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
5.16	2.39	4.08	34.33	8.42	NoLiq	0.00	8.42
5.66	2.44	3.99	31.07	7.78	NoLiq	0.00	7.78
6.16	2.49	3.89	30.73	7.90	NoLiq	0.00	7.90
6.66	2.46	3.96	34.13	8.62	NoLiq	0.00	8.62
7.16	2.15	4.52	157.92	34.94	17.49	0.00	34.94
7.66	1.95	4.89	207.19	42.38	11.74	0.00	42.38
8.16	1.94	4.91	207.95	42.34	11.43	0.00	42.34
8.66	2.23	4.37	170.23	38.94	20.17	0.00	38.94
9.16	2.63	3.64	215.83	59.32	36.90	0.00	59.32
9.66	2.29	4.27	139.19	32.56	22.04	0.00	32.56
10.16	2.34	4.18	152.69	36.52	23.94	0.00	36.52
10.66	1.95	4.89	148.68	30.41	11.73	0.00	30.41
11.16	1.86	5.06	151.62	29.99	9.55	0.00	29.99
11.66	2.01	4.78	145.57	30.45	13.31	0.00	30.45
12.16	2.10	4.62	110.96	24.03	15.85	0.00	24.03
12.66	2.70	3.52	18.94	5.38	NoLiq	0.00	5.38
13.16	2.55	3.79	68.24	18.02	33.02	0.00	18.02
13.66	2.73	3.46	8.61	2.49	NoLiq	0.00	2.49
14.16	2.70	3.52	9.81	2.79	NoLiq	0.00	2.79
14.66	2.71	3.49	12.13	3.47	NoLiq	0.00	3.47
15.16	2.82	3.29	13.42	4.08	NoLiq	0.00	4.08
15.66	2.84	3.25	14.91	4.59	NoLiq	0.00	4.59
16.16	2.91	3.12	13.47	4.32	NoLiq	0.00	4.32
16.66	2.97	3.01	10.90	3.62	NoLiq	0.00	3.62
17.16	2.85	3.22	11.43	3.54	NoLiq	0.00	3.54
17.66	2.92	3.11	10.88	3.50	NoLiq	0.00	3.50
18.16	3.00	2.97	9.70	3.27	NoLiq	0.00	3.27
18.66	3.07	2.82	9.69	3.44	NoLiq	0.00	3.44
19.16	2.58	3.73	27.33	7.33	NoLiq	0.00	7.33
19.66	2.78	3.36	19.08	5.69	NoLiq	0.00	5.69
20.16	2.72	3.47	30.15	8.70	NoLiq	0.00	8.70
20.66	2.96	3.03	16.39	5.40	NoLiq	0.00	5.40
21.16	2.87	3.19	22.69	7.11	NoLiq	0.00	7.11
21.66	1.63	5.49	143.35	26.10	NoLiq	0.00	26.10
22.16	1.85	5.09	86.30	16.97	NoLiq	0.00	16.97
22.66	2.30	4.25	58.71	13.82	NoLiq	0.00	13.82
23.16	2.60	3.70	38.94	10.52	NoLiq	0.00	10.52
23.66	2.75	3.41	22.17	6.49	NoLiq	0.00	6.49
24.16	2.79	3.35	20.93	6.25	NoLiq	0.00	6.25
24.66	3.18	2.62	12.36	4.72	NoLiq	0.00	4.72
25.16	3.02	2.91	14.00	4.80	NoLiq	0.00	4.80
25.66	2.22	4.40	81.86	18.62	NoLiq	0.00	18.62
26.16	1.63	5.49	228.87	41.72	4.88	0.00	41.72
26.66	1.36	5.99	375.23	62.60	1.01	0.00	62.60
27.16	1.42	5.87	343.03	58.46	1.83	0.00	58.46
27.66	1.31	6.09	500.00	82.13	0.46	0.00	82.13
28.16	1.52	5.68	479.50	84.35	3.18	0.00	84.35
28.66	1.23	6.23	351.20	56.36	0.00	0.00	56.36
29.16	1.70	5.35	255.35	47.71	6.19	0.00	47.71
29.66	1.15	6.37	416.80	65.40	0.00	0.00	65.40
30.16	1.18	6.32	500.00	79.08	0.00	0.00	79.08
30.66	1.25	6.18	500.00	80.89	0.00	0.00	80.89
31.16	1.43	5.86	500.00	85.38	1.90	0.00	85.38
31.66	1.09	6.49	500.00	77.09	0.00	0.00	77.09
32.16	1.07	6.52	401.62	61.60	0.00	0.00	61.60
32.66	2.08	4.67	155.12	33.25	15.07	0.00	33.25
33.16	2.54	3.81	123.30	32.35	32.39	0.00	32.35
33.66	2.49	3.89	85.82	22.05	30.39	0.00	22.05
34.16	2.60	3.69	27.03	7.32	NoLiq	0.00	7.32
34.66	2.32	4.20	104.46	24.85	23.45	0.00	24.85
35.16	2.11	4.61	157.05	34.09	16.01	0.00	34.09
35.66	2.77	3.38	41.88	12.38	NoLiq	0.00	12.38
36.16	2.53	3.83	107.16	27.96	31.86	0.00	27.96
36.66	2.50	3.87	101.61	26.23	30.83	0.00	26.23
37.16	2.47	3.94	98.11	24.92	29.33	0.00	24.92
37.66	2.44	4.00	94.37	23.62	27.98	0.00	23.62
38.16	2.41	4.04	91.63	22.69	27.01	0.00	22.69
38.66	2.46	3.95	106.56	26.98	29.03	0.00	26.98

39.16	2.43	4.01	103.94	25.92	27.64	0.00	25.92
39.66	2.54	3.82	184.88	48.45	32.28	0.00	48.45
40.16	2.61	3.68	52.08	14.16	NoLiq	0.00	14.16
40.66	2.65	3.59	37.88	10.54	NoLiq	0.00	10.54
41.16	2.52	3.84	127.41	33.19	31.69	0.00	33.19
41.66	2.70	3.51	47.62	13.55	NoLiq	0.00	13.55
42.16	2.63	3.63	72.34	19.91	NoLiq	0.00	19.91
42.66	2.73	3.46	52.17	15.07	NoLiq	0.00	15.07
43.16	2.71	3.50	35.41	10.11	NoLiq	0.00	10.11
43.66	2.77	3.38	31.88	9.43	NoLiq	0.00	9.43
44.16	2.74	3.43	34.69	10.11	NoLiq	0.00	10.11
44.66	2.76	3.40	38.16	11.22	NoLiq	0.00	11.22
45.16	2.73	3.45	38.83	11.26	NoLiq	0.00	11.26
45.66	2.68	3.55	41.43	11.67	NoLiq	0.00	11.67
46.16	2.70	3.52	39.56	11.25	NoLiq	0.00	11.25
46.66	2.70	3.51	38.84	11.08	NoLiq	0.00	11.08
47.16	2.75	3.42	40.81	11.95	NoLiq	0.00	11.95
47.66	2.01	4.79	189.40	39.55	13.18	0.00	39.55
48.16	1.60	5.55	346.59	62.46	4.31	0.00	62.46
48.66	1.61	5.52	331.41	60.02	4.56	0.00	60.02
49.16	1.22	6.24	373.02	59.78	0.00	0.00	59.78
49.66	1.17	6.34	428.03	67.50	0.00	0.00	67.50
50.16	1.22	6.24	408.50	65.41	0.00	0.00	65.41
50.66	1.34	6.02	436.73	72.60	0.88	0.00	72.60
51.16	1.34	6.02	428.62	71.24	0.87	0.00	71.24
51.66	1.04	6.58	449.21	68.22	0.00	0.00	68.22
52.16	0.90	6.84	500.00	73.05	0.00	0.00	73.05
52.66	0.99	6.67	497.36	74.62	0.00	0.00	74.62

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
(N1)60 is converted from qc1, (N1)60s is after fines correction
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Ishihara / Yoshimine

Depth ft	CSRsf	/ MSF*	=CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
52.96	0.59	1.00	0.59	4.74	2.95	87.51	100.00	0.000	0.0E0	0.000	0.000
52.66	0.59	1.00	0.59	4.73	0.00	74.62	100.00	0.000	0.0E0	0.000	0.000
52.16	0.60	1.00	0.60	4.71	0.00	73.05	100.00	0.000	0.0E0	0.000	0.000
51.66	0.60	1.00	0.60	4.70	0.00	68.22	100.00	0.000	0.0E0	0.000	0.000
51.16	0.60	1.00	0.60	4.69	0.87	71.24	100.00	0.000	0.0E0	0.000	0.000
50.66	0.61	1.00	0.61	4.67	0.88	72.60	100.00	0.000	0.0E0	0.000	0.000
50.16	0.61	1.00	0.61	4.66	0.00	65.41	100.00	0.000	0.0E0	0.000	0.000
49.66	0.61	1.00	0.61	4.64	0.00	67.50	100.00	0.000	0.0E0	0.000	0.000
49.16	0.61	1.00	0.61	4.63	0.00	59.78	100.00	0.000	0.0E0	0.000	0.000
48.66	0.62	1.00	0.62	4.62	4.56	60.02	100.00	0.000	0.0E0	0.000	0.000
48.16	0.62	1.00	0.62	4.60	4.31	62.46	100.00	0.000	0.0E0	0.000	0.000
47.66	0.62	1.00	0.62	1.57	13.18	39.55	100.00	0.000	0.0E0	0.000	0.000
47.16	0.62	1.00	0.62	5.00	NoLiq	11.95	54.99	0.000	0.0E0	0.000	0.000
46.66	0.63	1.00	0.63	5.00	NoLiq	11.08	53.06	0.000	0.0E0	0.000	0.000
46.16	0.63	1.00	0.63	5.00	NoLiq	11.25	53.44	0.000	0.0E0	0.000	0.000
45.66	0.63	1.00	0.63	5.00	NoLiq	11.67	54.37	0.000	0.0E0	0.000	0.000
45.16	0.63	1.00	0.63	5.00	NoLiq	11.26	53.46	0.000	0.0E0	0.000	0.000
44.66	0.64	1.00	0.64	5.00	NoLiq	11.22	53.38	0.000	0.0E0	0.000	0.000
44.16	0.64	1.00	0.64	5.00	NoLiq	10.11	50.81	0.000	0.0E0	0.000	0.000
43.66	0.64	1.00	0.64	5.00	NoLiq	9.43	49.15	0.000	0.0E0	0.000	0.000
43.16	0.64	1.00	0.64	5.00	NoLiq	10.11	50.81	0.000	0.0E0	0.000	0.000
42.66	0.65	1.00	0.65	5.00	NoLiq	15.07	61.42	0.000	0.0E0	0.000	0.000
42.16	0.65	1.00	0.65	5.00	NoLiq	19.91	70.38	0.000	0.0E0	0.000	0.000
41.66	0.65	1.00	0.65	5.00	NoLiq	13.55	58.39	0.000	0.0E0	0.000	0.000
41.16	0.65	1.00	0.65	0.57	31.69	33.19	97.75	0.262	1.6E-3	0.037	0.037
40.66	0.65	1.00	0.65	5.00	NoLiq	10.54	51.81	0.000	0.0E0	0.000	0.037
40.16	0.66	1.00	0.66	5.00	NoLiq	14.16	59.62	0.000	0.0E0	0.003	0.041
39.66	0.66	1.00	0.66	1.39	32.28	48.45	100.00	0.000	0.0E0	0.000	0.041
39.16	0.66	1.00	0.66	0.38	27.64	25.92	81.50	1.683	1.0E-2	0.063	0.104
38.66	0.66	1.00	0.66	0.40	29.03	26.98	83.60	1.593	9.6E-3	0.087	0.191
38.16	0.67	1.00	0.67	0.31	27.01	22.69	75.41	1.953	1.2E-2	0.114	0.305
37.66	0.67	1.00	0.67	0.32	27.98	23.62	77.12	1.876	1.1E-2	0.116	0.421
37.16	0.67	1.00	0.67	0.34	29.33	24.92	79.56	1.766	1.1E-2	0.109	0.530
36.66	0.67	1.00	0.67	0.36	30.83	26.23	82.10	1.657	9.9E-3	0.102	0.632
36.16	0.67	1.00	0.67	0.40	31.86	27.96	85.63	1.508	9.0E-3	0.047	0.679
35.66	0.68	1.00	0.68	5.00	NoLiq	12.38	55.92	0.000	0.0E0	0.036	0.715
35.16	0.68	1.00	0.68	0.89	16.01	34.09	100.00	0.000	0.0E0	0.000	0.715
34.66	0.68	1.00	0.68	0.38	23.45	24.85	79.43	1.772	1.1E-2	0.050	0.765
34.16	0.68	1.00	0.68	5.00	NoLiq	7.32	43.64	0.000	0.0E0	0.104	0.869
33.66	0.68	1.00	0.68	0.28	30.39	22.05	74.23	2.005	1.2E-2	0.048	0.917
33.16	0.68	1.00	0.68	0.51	32.39	32.35	95.64	0.558	3.3E-3	0.102	1.019
32.66	0.69	1.00	0.69	0.85	15.07	33.25	97.91	0.145	8.7E-4	0.005	1.024
32.16	0.69	1.00	0.69	4.15	0.00	61.60	100.00	0.000	0.0E0	0.000	1.024

31.66	0.69	1.00	0.69	4.14	0.00	77.09	100.00	0.000	0.0E0	0.000	1.024
31.16	0.69	1.00	0.69	4.13	1.90	85.38	100.00	0.000	0.0E0	0.000	1.024
30.66	0.69	1.00	0.69	4.12	0.00	80.89	100.00	0.000	0.0E0	0.000	1.024
30.16	0.69	1.00	0.69	4.12	0.00	79.08	100.00	0.000	0.0E0	0.000	1.024
29.66	0.69	1.00	0.69	4.12	0.00	65.40	100.00	0.000	0.0E0	0.000	1.024
29.16	0.69	1.00	0.69	3.23	6.19	47.71	100.00	0.000	0.0E0	0.000	1.024
28.66	0.69	1.00	0.69	4.13	0.00	56.36	100.00	0.000	0.0E0	0.000	1.024
28.16	0.69	1.00	0.69	4.13	3.18	84.35	100.00	0.000	0.0E0	0.000	1.024
27.66	0.69	1.00	0.69	4.14	0.46	82.13	100.00	0.000	0.0E0	0.000	1.024
27.16	0.69	1.00	0.69	4.15	1.83	58.46	100.00	0.000	0.0E0	0.000	1.024
26.66	0.69	1.00	0.69	4.16	1.01	62.60	100.00	0.000	0.0E0	0.000	1.024
26.16	0.68	1.00	0.68	2.39	4.88	41.72	100.00	0.000	0.0E0	0.000	1.024
25.66	0.68	1.00	0.68	5.00	NoLiq	18.62	68.05	0.000	0.0E0	0.000	1.024
25.16	0.68	1.00	0.68	5.00	NoLiq	4.80	36.13	0.000	0.0E0	0.000	1.024
24.66	0.68	1.00	0.68	5.00	NoLiq	4.72	35.86	0.000	0.0E0	0.000	1.024
24.16	0.68	1.00	0.68	5.00	NoLiq	6.25	40.59	0.000	0.0E0	0.000	1.024
23.66	0.68	1.00	0.68	5.00	NoLiq	6.49	41.29	0.000	0.0E0	0.000	1.024
23.16	0.67	1.00	0.67	5.00	NoLiq	10.52	51.78	0.000	0.0E0	0.000	1.024
22.66	0.67	1.00	0.67	5.00	NoLiq	13.82	58.93	0.000	0.0E0	0.000	1.024
22.16	0.67	1.00	0.67	5.00	NoLiq	16.97	65.02	0.000	0.0E0	0.000	1.024
21.66	0.67	1.00	0.67	5.00	NoLiq	26.10	81.85	0.000	0.0E0	0.000	1.024
21.16	0.67	1.00	0.67	5.00	NoLiq	7.11	43.05	0.000	0.0E0	0.000	1.024
20.66	0.66	1.00	0.66	5.00	NoLiq	5.40	38.02	0.000	0.0E0	0.000	1.024
20.16	0.66	1.00	0.66	5.00	NoLiq	8.70	47.31	0.000	0.0E0	0.000	1.024
19.66	0.66	1.00	0.66	5.00	NoLiq	5.69	38.90	0.000	0.0E0	0.000	1.024
19.16	0.66	1.00	0.66	5.00	NoLiq	7.33	43.66	0.000	0.0E0	0.000	1.024
18.66	0.65	1.00	0.65	5.00	NoLiq	3.44	31.56	0.000	0.0E0	0.000	1.024
18.16	0.65	1.00	0.65	5.00	NoLiq	3.27	30.98	0.000	0.0E0	0.000	1.024
17.66	0.65	1.00	0.65	5.00	NoLiq	3.50	31.78	0.000	0.0E0	0.000	1.024
17.16	0.64	1.00	0.64	5.00	NoLiq	3.54	31.93	0.000	0.0E0	0.000	1.024
16.66	0.64	1.00	0.64	5.00	NoLiq	3.62	32.18	0.000	0.0E0	0.000	1.024
16.16	0.63	1.00	0.63	5.00	NoLiq	4.32	34.56	0.000	0.0E0	0.000	1.024
15.66	0.63	1.00	0.63	5.00	NoLiq	4.59	35.45	0.000	0.0E0	0.000	1.024
15.16	0.63	1.00	0.63	5.00	NoLiq	4.08	33.76	0.000	0.0E0	0.000	1.024
14.66	0.62	1.00	0.62	5.00	NoLiq	3.47	31.67	0.000	0.0E0	0.000	1.024
14.16	0.62	1.00	0.62	5.00	NoLiq	2.79	29.26	0.000	0.0E0	0.000	1.024
13.66	0.61	1.00	0.61	5.00	NoLiq	2.49	28.16	0.000	0.0E0	0.000	1.024
13.16	0.60	1.00	0.60	0.25	33.02	18.02	66.96	2.381	1.4E-2	0.093	1.117
12.66	0.60	1.00	0.60	5.00	NoLiq	5.38	37.96	0.000	0.0E0	0.056	1.173
12.16	0.59	1.00	0.59	0.48	15.85	24.03	77.89	1.841	1.1E-2	0.076	1.249
11.66	0.58	1.00	0.58	0.86	13.31	30.45	91.09	0.612	3.7E-3	0.071	1.320
11.16	0.58	1.00	0.58	0.96	9.55	29.99	90.04	0.521	3.1E-3	0.037	1.357
10.66	0.57	1.00	0.57	0.93	11.73	30.41	90.99	0.523	3.1E-3	0.023	1.380
10.16	0.56	1.00	0.56	1.01	23.94	36.52	100.00	0.000	0.0E0	0.013	1.393
9.66	0.55	1.00	0.55	0.82	22.04	32.56	96.16	0.283	1.7E-3	0.013	1.406
9.16	0.54	1.00	0.54	2.57	36.90	59.32	100.00	0.000	0.0E0	0.000	1.406
8.66	0.53	1.00	0.53	1.39	20.17	38.94	100.00	0.000	0.0E0	0.000	1.406
8.16	0.52	1.00	0.52	2.42	11.43	42.34	100.00	0.000	0.0E0	0.000	1.406
7.66	0.51	1.00	0.51	2.46	11.74	42.38	100.00	0.000	0.0E0	0.000	1.406
7.16	0.49	1.00	0.49	1.24	17.49	34.94	100.00	0.000	0.0E0	0.000	1.406
6.66	0.48	1.00	0.48	5.00	NoLiq	8.62	47.10	0.000	0.0E0	0.000	1.406
6.16	0.46	1.00	0.46	5.00	NoLiq	7.90	45.20	0.000	0.0E0	0.000	1.406
5.66	0.44	1.00	0.44	5.00	NoLiq	7.78	44.90	0.000	0.0E0	0.000	1.406
5.16	0.42	1.00	0.42	5.00	NoLiq	8.42	46.60	0.000	0.0E0	0.000	1.406
5.01	0.42	1.00	0.42	5.00	NoLiq	4.96	36.64	0.000	0.0E0	0.000	1.406

Settlement of Saturated Sands=1.406 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth	sigma'	sigC'	(N1)60s	CSRsf	Gmax	g*Ge/Gm	g_eff	ec7.5	Cec	ec	dsz	dsp	S
ft	atm	atm			atm			%		%	in.	in.	in.
4.96	0.28	0.18	2.48	0.42	258.90	4.5E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.66	0.26	0.17	0.10	0.42	86.09	1.3E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.16	0.24	0.15	0.10	0.42	81.34	1.2E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.66	0.21	0.13	0.10	0.42	76.30	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.16	0.18	0.12	0.10	0.42	70.90	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.66	0.15	0.10	0.10	0.42	65.05	9.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.16	0.12	0.08	0.10	0.42	58.62	8.8E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.66	0.09	0.06	0.10	0.42	51.39	7.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.16	0.07	0.04	0.10	0.42	42.95	6.5E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.66	0.04	0.02	0.10	0.42	32.40	4.9E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.16	0.01	0.01	0.10	0.42	15.95	2.4E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000

Settlement of Unsaturated Sands

Settlement of Unsaturated Sands=0.000 in.
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=1.406 in.
Differential Settlement=0.703 to 0.928 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)
1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=1, based on Item 2 of Page C.
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.
SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.
2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

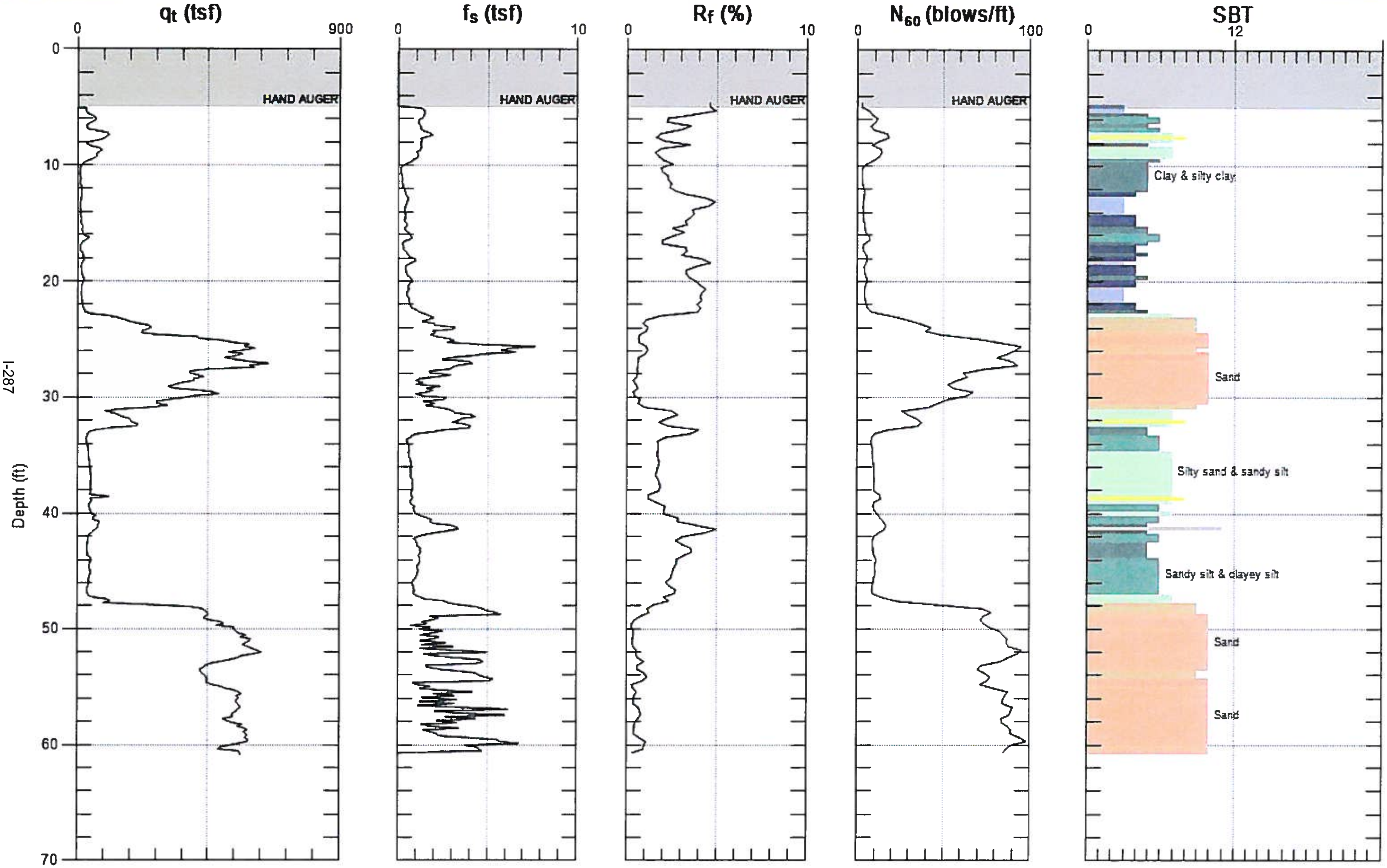
3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center,
Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

GREGG GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-8

Engineer: R.GLADSON
Date: 5/26/2016 05:46



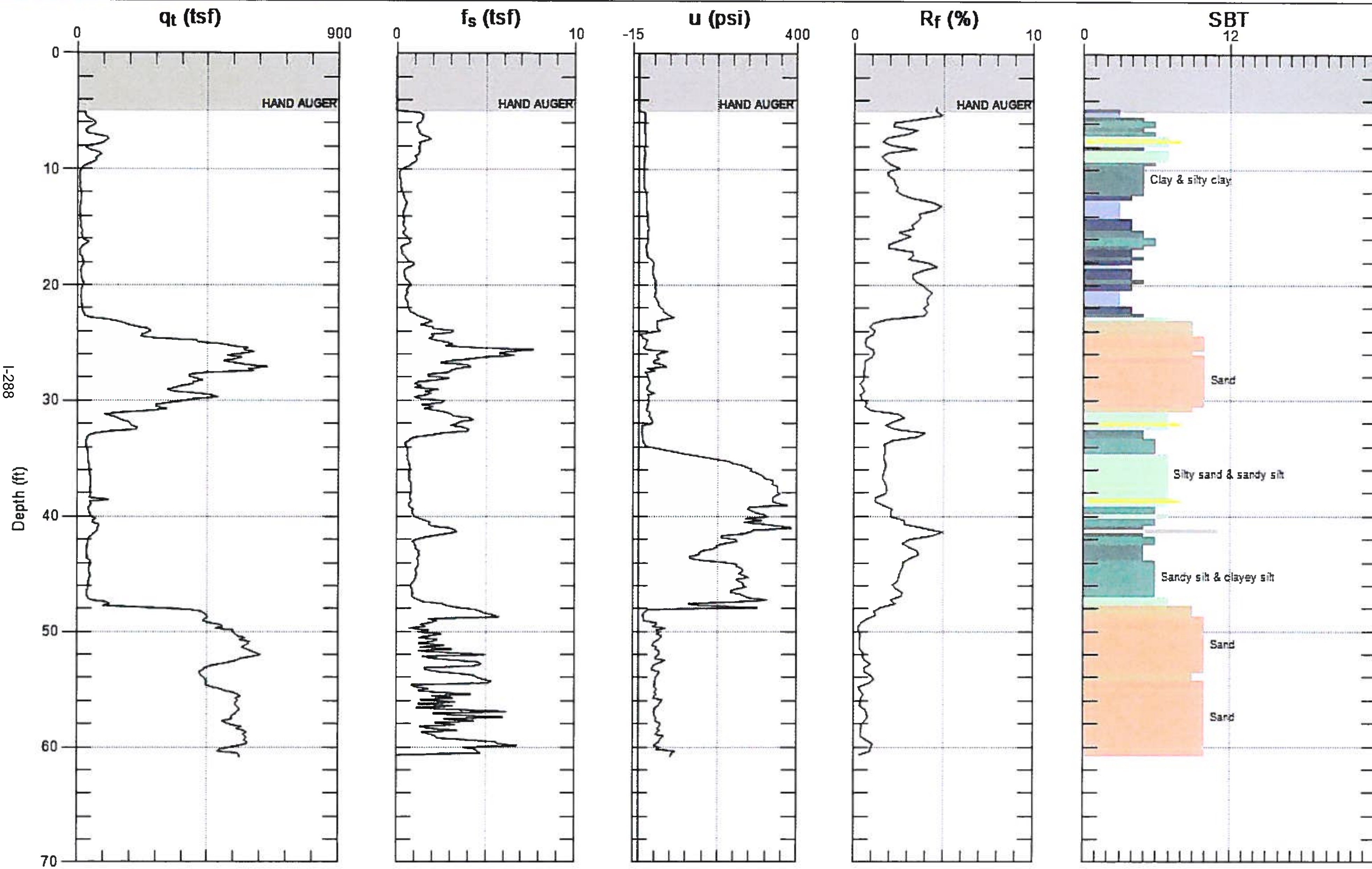
Max. Depth: 60.860 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG GEOSYSTEMS

Site: 12870 PANAMA ST.
Sounding: CPT-8

Engineer: R.GLADSON
Date: 5/26/2016 05:46



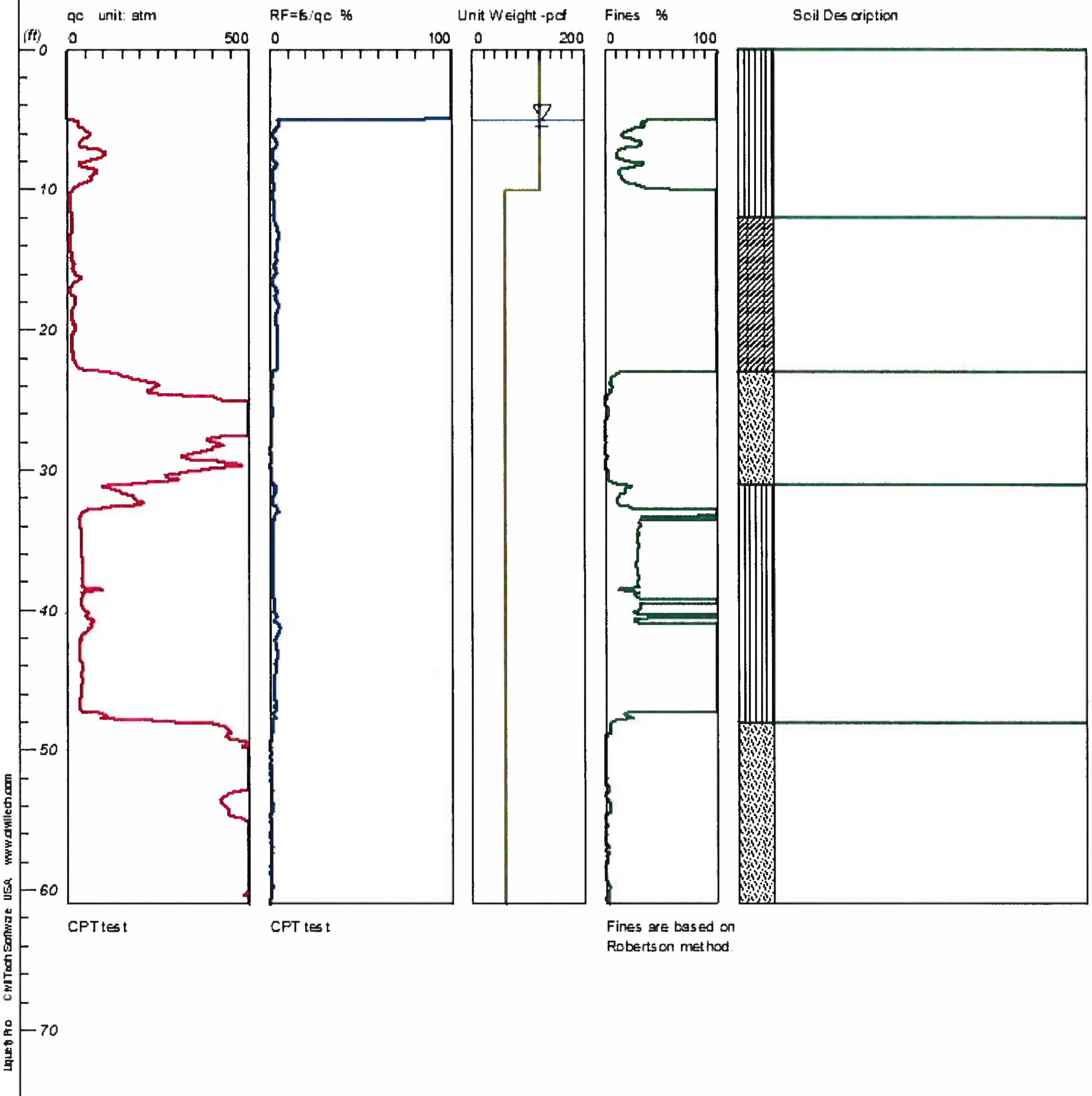
Max. Depth: 60.860 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

LIQUEFACTION ANALYSIS

12870 Panama Street

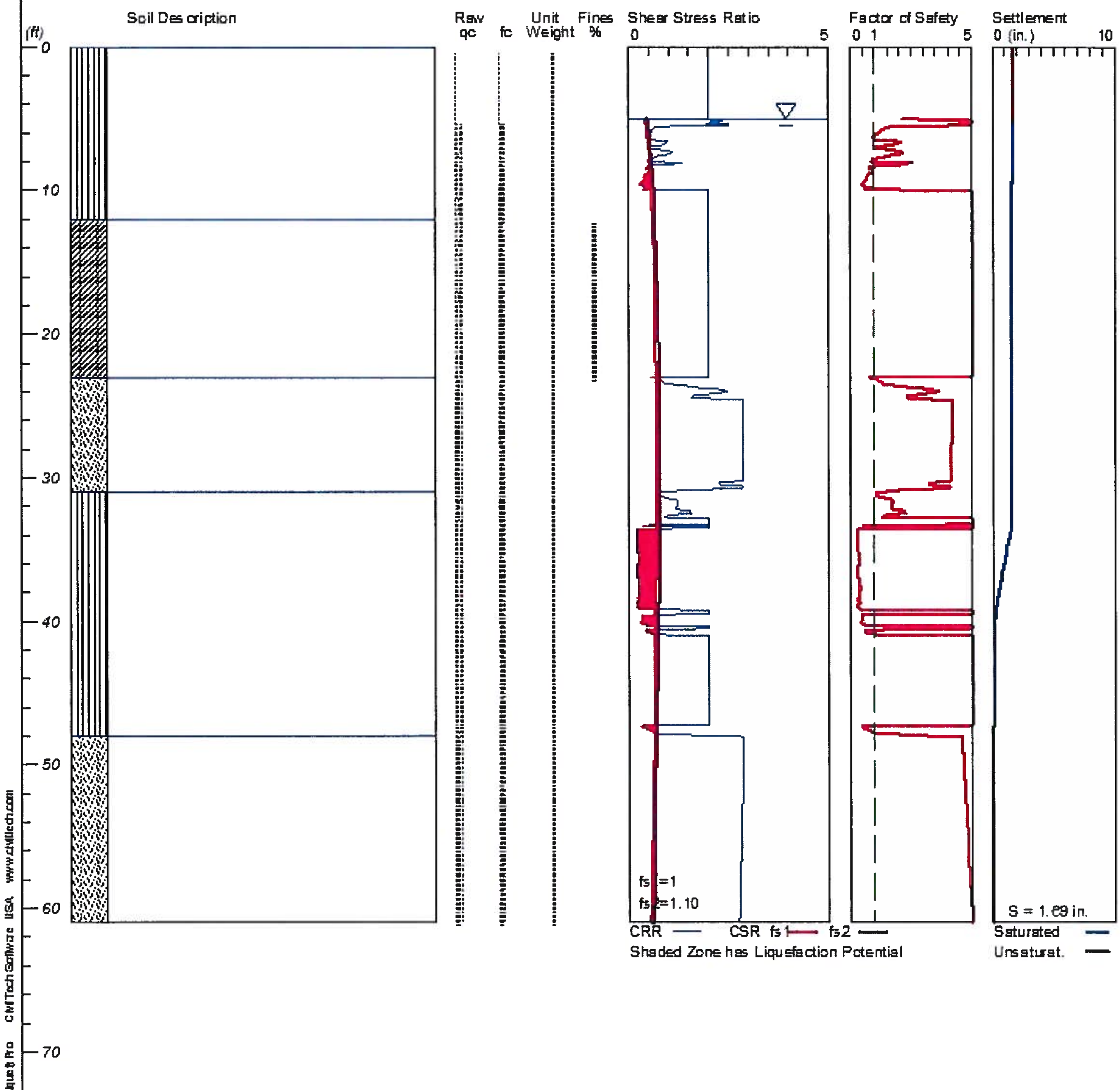
Hole No.=CPT8 *Water Depth=5 ft* *Surface Elev.=0* *Magnitude=6.63* *Acceleration=0.65g*



LIQUEFACTION ANALYSIS

12870 Panama Street

Hole No.=CPT8 ***Water Depth=5 ft*** ***Surface Elev.=0*** ***Magnitude=6.63***
Acceleration=0.65g



GREGG DRILLING & TESTING, INC.

CONE PENETRATION TEST DATA

Client:	GEOSYSTEMS	Units:	Imperial
Site:	12870 PANAMA ST.	Data averaging interval:	0.100 meters
Engineer:	R.GLADSON	Assumed depth of water:	11.003 feet
		Net area ratio of cone:	0.80
Sounding:	CPT-8	Unit weight of water:	62.4 lb/ft3
Date:	5/26/2016	Relative density constant, CDR:	350
Time:	5:46 PM	Young's modulus for sands, a:	4
		Small strain shear modulus number, SG (sands):	180
		Small strain shear modulus number, CG (clays):	50
		Nkt for clays:	15
		OCR number, kocr:	0.3

Interpretation based on Lunne, Robertson and Powell, 1997

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
0.100	0.328	0.000	0.000	0.000							0.000				
0.200	0.656	0.000	0.000	0.000							0.000				
0.300	0.984	0.000	0.000	0.000							0.000				
0.400	1.312	0.000	0.000	0.000							0.000				
0.500	1.640	0.000	0.000	0.000							0.000				
0.600	1.969	0.000	0.000	0.000							0.000				
0.700	2.297	0.000	0.000	0.000							0.000				
0.800	2.625	0.000	0.000	0.000							0.000				
0.900	2.953	0.000	0.000	0.000							0.000				
1.000	3.281	0.000	0.000	0.000							0.000				
1.100	3.609	0.000	0.000	0.000							0.000				
1.200	3.937	0.000	0.000	0.000							0.000				
1.300	4.265	0.000	0.000	0.000							0.000				
1.400	4.593	0.000	0.000	0.000							0.000				
1.500	4.921	9.378	0.432	4.957		9.45	4.57	3	111	0.274	0.000	0.274	33.47	4.70	0.04
1.600	5.249	28.553	1.404	14.935		28.77	4.88	3	111	0.292	0.000	0.292	97.39	4.93	0.04
1.700	5.577	39.242	1.446	14.998		39.46	3.67	5	115	0.311	0.000	0.311	125.80	3.69	0.03
1.800	5.906	58.054	1.301	14.960		58.27	2.23	6	115	0.330	0.000	0.330	175.58	2.25	0.02
1.900	6.234	51.873	1.139	14.443		52.08	2.19	6	115	0.349	0.000	0.349	148.32	2.20	0.02
2.000	6.562	34.279	1.208	14.291		34.48	3.50	5	115	0.368	0.000	0.368	92.81	3.54	0.03
2.100	6.890	44.168	1.314	14.922		44.38	2.96	6	115	0.386	0.000	0.386	113.87	2.99	0.02
2.200	7.218	91.859	1.695	16.234		92.09	1.84	7	118	0.406	0.000	0.406	226.00	1.85	0.01
2.300	7.546	97.901	1.564	16.398		98.14	1.59	8	121	0.426	0.000	0.426	229.62	1.60	0.01
2.400	7.874	62.088	1.279	15.023		62.30	2.05	7	118	0.445	0.000	0.445	139.05	2.07	0.02
2.500	8.202	36.463	1.266	13.699		36.66	3.45	5	115	0.464	0.000	0.464	78.07	3.50	0.03
2.600	8.530	67.507	1.253	14.733		67.72	1.85	7	118	0.483	0.000	0.483	139.21	1.86	0.02
2.700	8.858	73.075	1.113	14.304		73.28	1.52	7	118	0.502	0.000	0.502	144.89	1.53	0.01
2.800	9.186	62.841	1.082	13.976		63.04	1.72	7	118	0.522	0.000	0.522	119.86	1.73	0.02
2.900	9.514	43.350	0.867	13.320		43.54	1.99	6	115	0.540	0.000	0.540	79.57	2.02	0.02
3.000	9.843	19.733	0.495	12.538		19.91	2.49	5	115	0.559	0.000	0.559	34.61	2.56	0.05
3.100	10.171	10.856	0.206	12.197		11.03	1.86	5	115	0.578	0.000	0.578	18.09	1.97	0.08
3.200	10.499	8.718	0.168	12.122		8.89	1.89	5	115	0.597	0.000	0.597	13.90	2.03	0.11

GREGG

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
0.100	0.328													
0.200	0.656													
0.300	0.984													
0.400	1.312													
0.500	1.640													
0.600	1.969													
0.700	2.297													
0.800	2.625													
0.900	2.953													
1.000	3.281													
1.100	3.609													
1.200	3.937													
1.300	4.265													
1.400	4.593													
1.500	4.921	4	2.71	26.33	3.00E-8	2.5	5.0				472	0.61	2.23	10.0
1.600	5.249	9	2.42	69.16	1.00E-8	6.7	12.7					1.90	6.49	29.2
1.700	5.577	8	2.25	85.42	3.00E-6	8.5	15.8	49	42	158				
1.800	5.906	6	1.99	110.92	3.00E-4	11.4	20.4	56	43	233	491			
1.900	6.234	5	2.03	97.03	3.00E-6	10.3	18.0	53	43	208	482			
2.000	6.562	5	2.32	67.90	3.00E-6	7.7	13.1	44	40	138	428			
2.100	6.890	5	2.21	81.68	3.00E-6	9.4	15.6	48	41	178	473			
2.200	7.218	6	1.86	149.04	3.00E-4	17.1	27.7	65	45	368	613			
2.300	7.546	6	1.81	152.33	3.00E-4	17.9	28.2	66	45	393	636			
2.400	7.874	5	2.03	99.76	3.00E-6	12.4	19.1	53	42	249	555			
2.500	8.202	5	2.37	61.86	3.00E-6	8.3	12.6	42	39	147	472			
2.600	8.530	6	1.99	102.25	3.00E-4	13.3	19.6	54	42	271	587			
2.700	8.858	6	1.92	106.27	3.00E-4	13.9	20.2	55	42	293	610			
2.800	9.186	6	2.02	91.13	3.00E-4	12.4	17.7	51	41	252	588			
2.900	9.514	5	2.19	63.51	3.00E-6	9.2	12.9	43	39	174	526			
3.000	9.843	4	2.53	29.81	3.00E-8	4.9	6.7				996	1.29	2.31	10.4
3.100	10.171	4	2.68	16.15	3.00E-8	2.9	3.9				552	0.70	1.21	5.4
3.200	10.499	4	2.78	12.71	3.00E-8	2.5	3.3				445	0.55	0.93	4.2

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
3.300	10.827	8.802	0.198	12.160		8.98	2.21	5	115	0.616	0.000	0.616	13.58	2.37	0.10
3.400	11.155	9.871	0.226	12.412		10.05	2.25	5	115	0.634	0.005	0.630	14.95	2.40	0.09
3.500	11.483	9.824	0.242	13.283		10.02	2.42	5	115	0.653	0.015	0.638	14.67	2.59	0.10
3.600	11.811	12.241	0.292	15.906		12.47	2.34	5	115	0.672	0.025	0.647	18.24	2.48	0.09
3.700	12.139	13.756	0.371	18.239		14.02	2.65	5	115	0.691	0.035	0.655	20.34	2.79	0.10
3.800	12.467	13.013	0.430	19.110		13.29	3.24	4	115	0.710	0.046	0.664	18.95	3.42	0.11
3.900	12.795	11.767	0.518	19.703		12.05	4.30	3	111	0.728	0.056	0.672	16.85	4.57	0.12
4.000	13.123	10.317	0.513	19.501		10.60	4.84	3	111	0.746	0.066	0.680	14.49	5.20	0.14
4.100	13.451	9.267	0.431	19.665		9.55	4.52	3	111	0.764	0.076	0.688	12.77	4.91	0.15
4.200	13.780	10.020	0.372	20.800		10.32	3.60	3	111	0.783	0.087	0.696	13.70	3.90	0.15
4.300	14.108	10.234	0.389	21.267		10.54	3.69	3	111	0.801	0.097	0.704	13.83	3.99	0.15
4.400	14.436	11.256	0.403	21.166		11.56	3.49	4	115	0.820	0.107	0.713	15.07	3.75	0.13
4.500	14.764	11.702	0.385	22.490		12.03	3.20	4	115	0.839	0.117	0.721	15.51	3.44	0.13
4.600	15.092	13.812	0.467	24.004		14.16	3.30	4	115	0.857	0.128	0.730	18.23	3.51	0.12
4.700	15.420	16.015	0.407	22.730		16.34	2.49	5	115	0.876	0.138	0.738	20.95	2.63	0.10
4.800	15.748	16.219	0.518	22.553		16.54	3.13	5	115	0.895	0.148	0.747	20.95	3.31	0.09
4.900	16.076	27.280	0.703	22.692		27.61	2.55	6	115	0.914	0.158	0.755	35.33	2.63	0.06
5.000	16.404	29.873	0.586	20.220		30.16	1.94	6	115	0.933	0.169	0.764	38.26	2.00	0.04
5.100	16.732	14.258	0.279	18.303		14.52	1.92	5	115	0.951	0.179	0.773	17.56	2.06	0.08
5.200	17.060	8.914	0.297	19.690		9.20	3.23	4	115	0.970	0.189	0.781	10.53	3.61	0.15
5.300	17.388	11.785	0.396	20.838		12.09	3.28	4	115	0.989	0.199	0.790	14.05	3.57	0.12
5.400	17.717	18.375	0.566	28.407		18.78	3.01	5	115	1.008	0.209	0.798	22.27	3.18	0.10
5.500	18.045	19.844	0.841	35.962		20.36	4.13	4	115	1.027	0.220	0.807	23.96	4.35	0.12
5.600	18.373	16.321	0.774	35.962		16.84	4.60	3	111	1.045	0.230	0.815	19.38	4.90	0.15
5.700	18.701	11.972	0.473	35.117		12.48	3.79	4	115	1.064	0.240	0.823	13.86	4.15	0.20
5.800	19.029	12.873	0.434	35.571		13.39	3.24	4	115	1.082	0.250	0.832	14.79	3.53	0.19
5.900	19.357	14.704	0.499	38.763		15.26	3.27	4	115	1.101	0.261	0.841	16.85	3.52	0.18
6.000	19.685	18.589	0.663	41.702		19.19	3.45	5	115	1.120	0.271	0.849	21.28	3.67	0.15
6.100	20.013	18.645	0.734	41.664		19.24	3.82	4	115	1.139	0.281	0.858	21.11	4.06	0.15
6.200	20.341	14.397	0.607	42.017		15.00	4.05	4	115	1.158	0.291	0.866	15.98	4.39	0.20
6.300	20.669	12.873	0.584	41.613		13.47	4.34	3	111	1.176	0.302	0.874	14.06	4.75	0.22
6.400	20.997	11.999	0.517	40.844		12.59	4.11	3	111	1.194	0.312	0.882	12.91	4.54	0.23
6.500	21.325	13.115	0.556	45.953		13.78	4.04	3	111	1.212	0.322	0.890	14.11	4.43	0.24
6.600	21.654	14.667	0.633	49.573		15.38	4.11	3	111	1.231	0.332	0.898	15.75	4.47	0.23
6.700	21.982	16.544	0.670	56.523		17.36	3.86	4	115	1.249	0.343	0.907	17.76	4.16	0.23
6.800	22.310	19.881	0.844	64.571		20.81	4.06	4	115	1.268	0.353	0.915	21.35	4.32	0.22
6.900	22.638	30.375	1.221	77.954		31.50	3.88	5	115	1.287	0.363	0.924	32.69	4.04	0.17
7.000	22.966	94.703	1.730	66.576		95.66	1.81	7	118	1.306	0.373	0.933	101.12	1.83	0.05
7.100	23.294	158.000	1.664	46.457		158.67	1.05	9	124	1.327	0.383	0.943	166.81	1.06	0.02
7.200	23.622	209.771	1.805	46.760		210.44	0.86	9	124	1.347	0.394	0.953	219.32	0.86	0.01
7.300	23.950	244.747	2.761	42.118		245.35	1.13	9	124	1.367	0.404	0.964	253.22	1.13	0.01
7.400	24.278	227.738	2.352	12.248		227.91	1.03	9	124	1.388	0.414	0.974	232.66	1.04	0.00
7.500	24.606	299.455	2.018	13.913		299.66	0.67	10	127	1.409	0.424	0.984	303.00	0.68	0.00
7.600	24.934	440.855	2.682	20.195		441.15	0.61	10	127	1.430	0.435	0.995	441.95	0.61	0.00
7.700	25.262	538.654	3.440	15.679		538.88	0.64	10	127	1.450	0.445	1.006	534.44	0.64	0.00
7.800	25.591	588.315	6.122	35.218		588.82	1.04	10	127	1.471	0.455	1.016	577.96	1.04	0.00
7.900	25.919	562.801	6.200	56.763		563.62	1.10	9	124	1.492	0.465	1.026	547.68	1.10	0.01
8.000	26.247	540.717	5.174	47.807		541.41	0.96	10	127	1.513	0.476	1.037	520.62	0.96	0.01
8.100	26.575	528.644	3.201	42.938		529.26	0.60	10	127	1.534	0.486	1.048	503.72	0.61	0.00
8.200	26.903	590.909	3.517	55.438		591.71	0.59	10	127	1.554	0.496	1.058	557.63	0.60	0.01

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
3.300	10.827	4	2.83	12.57	3.00E-8	2.5	3.3				449	0.56	0.91	4.1
3.400	11.155	4	2.80	13.81	3.00E-8	2.8	3.6				502	0.63	1.00	4.5
3.500	11.483	4	2.82	13.63	3.00E-8	2.8	3.6				501	0.62	0.98	4.4
3.600	11.811	4	2.74	16.77	3.00E-8	3.4	4.3				624	0.79	1.22	5.5
3.700	12.139	4	2.73	18.72	3.00E-8	3.8	4.8				701	0.89	1.36	6.1
3.800	12.467	4	2.81	17.67	3.00E-8	3.7	4.7				664	0.84	1.26	5.7
3.900	12.795	3	2.93	16.00	1.00E-9	3.6	4.5				603	0.75	1.12	5.1
4.000	13.123	3	3.01	13.94	1.00E-9	3.3	4.1				530	0.66	0.97	4.3
4.100	13.451	3	3.04	12.34	1.00E-9	3.0	3.8				477	0.59	0.85	3.8
4.200	13.780	3	2.95	13.11	1.00E-9	3.1	3.8				516	0.64	0.91	4.1
4.300	14.108	3	2.96	13.25	1.00E-9	3.2	3.9				527	0.65	0.92	4.1
4.400	14.436	3	2.91	14.38	1.00E-9	3.4	4.2				578	0.72	1.00	4.5
4.500	14.764	3	2.88	14.77	1.00E-9	3.5	4.2				601	0.75	1.03	4.7
4.600	15.092	4	2.83	17.28	3.00E-8	4.0	4.8				708	0.89	1.22	5.5
4.700	15.420	4	2.70	19.63	3.00E-8	4.3	5.2				817	1.03	1.40	6.3
4.800	15.748	4	2.76	19.80	3.00E-8	4.5	5.4				827	1.04	1.40	6.3
4.900	16.076	4	2.53	32.66	3.00E-8	6.7	8.0				1380	1.78	2.36	10.6
5.000	16.404	5	2.42	35.10	3.00E-6	7.0	8.3	32	35	121	522			
5.100	16.732	4	2.70	16.59	3.00E-8	3.8	4.5				726	0.90	1.17	5.3
5.200	17.060	3	3.02	10.27	1.00E-9	2.9	3.4				460	0.55	0.70	3.2
5.300	17.388	3	2.92	13.58	1.00E-9	3.6	4.2				604	0.74	0.94	4.2
5.400	17.717	4	2.73	21.22	3.00E-8	5.0	5.8				939	1.19	1.48	6.7
5.500	18.045	3	2.80	22.99	1.00E-9	5.6	6.4				1018	1.29	1.60	7.2
5.600	18.373	3	2.90	18.78	1.00E-9	4.9	5.6				842	1.05	1.29	5.8
5.700	18.701	3	2.97	13.51	1.00E-9	3.7	4.2				624	0.76	0.92	4.2
5.800	19.029	3	2.90	14.36	1.00E-9	3.9	4.4				669	0.82	0.99	4.4
5.900	19.357	3	2.86	16.33	1.00E-9	4.3	4.8				763	0.94	1.12	5.1
6.000	19.685	4	2.79	20.56	3.00E-8	5.2	5.9				959	1.20	1.42	6.4
6.100	20.013	3	2.82	20.47	1.00E-9	5.4	5.9				962	1.21	1.41	6.3
6.200	20.341	3	2.93	15.63	1.00E-9	4.4	4.9				750	0.92	1.07	4.8
6.300	20.669	3	3.00	13.82	1.00E-9	4.1	4.5				674	0.82	0.94	4.2
6.400	20.997	3	3.01	12.71	1.00E-9	3.9	4.2				629	0.76	0.86	3.9
6.500	21.325	3	2.98	13.87	1.00E-9	4.1	4.5				689	0.84	0.94	4.2
6.600	21.654	3	2.94	15.47	1.00E-9	4.5	4.9				769	0.94	1.05	4.7
6.700	21.982	3	2.88	17.42	1.00E-9	4.9	5.3				868	1.07	1.18	5.3
6.800	22.310	3	2.83	20.91	1.00E-9	5.8	6.2				1041	1.30	1.42	6.4
6.900	22.638	4	2.68	31.87	3.00E-8	8.1	8.6				1575	2.01	2.18	9.8
7.000	22.966	5	2.08	96.56	3.00E-6	19.3	20.5	53	41	383	820			
7.100	23.294	6	1.76	158.16	3.00E-4	28.5	30.2	67	43	635	974			
7.200	23.622	6	1.62	208.18	3.00E-4	36.0	37.9	77	44	842	1074			
7.300	23.950	6	1.66	241.79	3.00E-4	42.6	44.6	83	45	981	1134			
7.400	24.278	6	1.66	223.27	3.00E-4	39.6	41.3	80	45	912	1110			
7.500	24.606	6	1.44	292.25	3.00E-4	48.5	50.3	91	46	1199	1221			
7.600	24.934	7	1.30	428.56	3.00E-2	68.3	70.5	111	48	1765	1394			
7.700	25.262	7	1.27	521.01	3.00E-2	82.6	84.8	122	48	2156	1495			
7.800	25.591	6	1.43	566.42	3.00E-4	94.8	96.7	127	49	2355	1546			
7.900	25.919	6	1.46	539.41	3.00E-4	91.6	93.1	124	48	2254	1528			
8.000	26.247	6	1.42	515.41	3.00E-4	86.9	87.8	121	48	2166	1513			
8.100	26.575	7	1.26	501.23	3.00E-2	81.0	81.4	120	48	2117	1507			
8.200	26.903	7	1.23	557.69	3.00E-2	89.7	89.7	126	49	2367	1569			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
8.300	27.231	614.554	3.503	44.325		615.19	0.57	10	127	1.575	0.506	1.069	574.03	0.57	0.00
8.400	27.559	478.350	2.555	26.300		478.73	0.53	10	127	1.596	0.517	1.080	441.95	0.54	0.00
8.500	27.887	393.471	2.158	22.768		393.80	0.55	10	127	1.617	0.527	1.090	359.71	0.55	0.00
8.600	28.215	412.674	2.120	25.795		413.05	0.51	10	127	1.638	0.537	1.101	373.69	0.52	0.00
8.700	28.543	384.669	1.200	26.376		385.05	0.31	10	127	1.659	0.547	1.112	344.91	0.31	0.00
8.800	28.871	335.240	1.578	21.898		335.56	0.47	10	127	1.680	0.557	1.122	297.51	0.47	0.00
8.900	29.199	350.586	1.956	28.419		350.99	0.56	10	127	1.701	0.568	1.133	308.33	0.56	0.00
9.000	29.528	452.260	1.514	29.188		452.68	0.33	10	127	1.721	0.578	1.144	394.36	0.34	0.00
9.100	29.856	415.778	1.679	25.190		416.14	0.40	10	127	1.742	0.588	1.154	359.05	0.41	0.00
9.200	30.184	315.145	2.204	24.458		315.50	0.70	10	127	1.763	0.598	1.165	269.34	0.70	0.00
9.300	30.512	283.283	1.679	22.200		283.60	0.59	10	127	1.784	0.609	1.175	239.75	0.60	0.00
9.400	30.840	237.014	2.185	22.554		237.34	0.92	9	124	1.805	0.619	1.186	198.66	0.93	0.00
9.500	31.168	122.383	2.996	27.031		122.77	2.44	7	118	1.824	0.629	1.195	101.24	2.48	0.01
9.600	31.496	137.719	3.848	29.327		138.14	2.79	7	118	1.843	0.639	1.204	113.23	2.82	0.01
9.700	31.824	169.897	3.742	33.427		170.38	2.20	7	118	1.862	0.650	1.213	138.94	2.22	0.01
9.800	32.152	192.260	3.376	16.638		192.50	1.75	8	121	1.882	0.660	1.222	155.93	1.77	0.00
9.900	32.480	173.429	3.899	8.350		173.55	2.25	7	118	1.902	0.670	1.232	139.38	2.27	0.00
10.000	32.808	71.941	2.838	8.401		72.06	3.94	5	115	1.920	0.680	1.240	56.56	4.05	0.00
10.100	33.136	36.965	1.311	9.321		37.10	3.53	5	115	1.939	0.691	1.249	28.16	3.73	0.00
10.200	33.465	31.918	0.670	10.999		32.08	2.09	6	115	1.958	0.701	1.257	23.96	2.22	0.00
10.300	33.793	31.035	0.522	15.477		31.26	1.67	6	115	1.977	0.711	1.266	23.13	1.78	0.01
10.400	34.121	33.554	0.585	43.682		34.18	1.71	6	115	1.996	0.721	1.274	25.26	1.82	0.08
10.500	34.449	35.561	0.631	91.918		36.88	1.71	6	115	2.014	0.732	1.283	27.18	1.81	0.17
10.600	34.777	35.348	0.622	143.685		37.42	1.66	7	118	2.034	0.742	1.292	27.39	1.76	0.27
10.700	35.105	35.543	0.641	199.502		38.42	1.67	7	118	2.053	0.752	1.301	27.95	1.76	0.37
10.800	35.433	37.076	0.709	241.607		40.56	1.75	7	118	2.072	0.762	1.310	29.37	1.84	0.43
10.900	35.761	38.517	0.742	272.070		42.43	1.75	7	118	2.092	0.772	1.319	30.58	1.84	0.47
11.000	36.089	39.400	0.727	288.909		43.56	1.67	7	118	2.111	0.783	1.328	31.20	1.75	0.48
11.100	36.417	40.339	0.721	307.906		44.77	1.61	7	118	2.130	0.793	1.337	31.88	1.69	0.50
11.200	36.745	41.184	0.726	325.263		45.87	1.58	7	118	2.150	0.803	1.346	32.47	1.66	0.52
11.300	37.073	41.296	0.791	339.352		46.18	1.71	7	118	2.169	0.813	1.356	32.47	1.80	0.54
11.400	37.402	40.525	0.813	346.567		45.52	1.79	7	118	2.188	0.824	1.365	31.75	1.88	0.56
11.500	37.730	40.144	0.824	351.298		45.20	1.82	7	118	2.208	0.834	1.374	31.30	1.92	0.57
11.600	38.058	40.385	0.791	351.449		45.45	1.74	7	118	2.227	0.844	1.383	31.25	1.83	0.57
11.700	38.386	60.768	0.782	341.661		65.69	1.19	7	118	2.246	0.854	1.392	45.58	1.23	0.37
11.800	38.714	62.246	0.779	342.998		67.19	1.16	8	121	2.266	0.865	1.401	46.32	1.20	0.37
11.900	39.042	40.199	0.728	335.707		45.03	1.62	7	118	2.285	0.875	1.411	30.31	1.70	0.54
12.000	39.370	36.575	0.853	281.240		40.62	2.10	6	115	2.304	0.885	1.419	27.00	2.23	0.51
12.100	39.698	39.911	0.903	300.577		44.24	2.04	6	115	2.323	0.895	1.428	29.36	2.16	0.49
12.200	40.026	49.578	1.107	304.929		53.97	2.05	7	118	2.342	0.906	1.437	35.93	2.14	0.41
12.300	40.354	53.482	1.610	283.221		57.56	2.80	6	115	2.361	0.916	1.445	38.19	2.92	0.35
12.400	40.682	62.999	1.894	312.762		67.50	2.81	6	115	2.380	0.926	1.454	44.79	2.91	0.33
12.500	41.011	66.476	2.752	344.423		71.44	3.85	5	115	2.399	0.936	1.462	47.21	3.99	0.35
12.600	41.339	59.718	3.130	279.020		63.74	4.91	11	131	2.420	0.946	1.474	41.61	5.11	0.31
12.700	41.667	45.599	2.106	228.325		48.89	4.31	5	115	2.439	0.957	1.482	31.34	4.53	0.33
12.800	41.995	35.059	1.178	235.287		38.45	3.06	6	115	2.458	0.967	1.491	24.14	3.27	0.44
12.900	42.323	33.479	0.990	222.623		36.68	2.70	6	115	2.476	0.977	1.499	22.82	2.89	0.44
13.000	42.651	32.559	1.083	194.393		35.36	3.06	5	115	2.495	0.987	1.508	21.79	3.30	0.40
13.100	42.979	31.909	1.207	167.286		34.32	3.52	5	115	2.514	0.998	1.516	20.97	3.80	0.35
13.200	43.307	32.792	1.252	145.564		34.89	3.59	5	115	2.533	1.008	1.525	21.22	3.87	0.29

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
8.300	27.231	7	1.21	576.97	3.00E-2	92.7	92.2	128	49	2461	1595			
8.400	27.559	7	1.26	446.42	3.00E-2	73.2	72.5	113	48	1915	1472			
8.500	27.887	7	1.33	365.14	3.00E-2	61.5	60.6	102	47	1575	1384			
8.600	28.215	7	1.29	381.18	3.00E-2	63.8	62.6	104	47	1652	1410			
8.700	28.543	7	1.18	353.52	3.00E-2	57.4	56.0	101	47	1540	1382			
8.800	28.871	7	1.34	306.40	3.00E-2	52.6	51.1	94	46	1342	1325			
8.900	29.199	6	1.38	319.04	3.00E-4	55.7	53.8	95	46	1404	1349			
9.000	29.528	7	1.15	409.97	3.00E-2	67.0	64.5	108	47	1811	1473			
9.100	29.856	7	1.23	374.99	3.00E-2	63.2	60.5	104	47	1665	1436			
9.200	30.184	6	1.49	282.60	3.00E-4	51.8	49.4	90	45	1262	1314			
9.300	30.512	6	1.48	252.70	3.00E-4	46.4	44.0	85	45	1134	1272			
9.400	30.840	6	1.67	210.09	3.00E-4	41.3	39.1	77	44	949	1202			
9.500	31.168	5	2.18	105.48	3.00E-6	25.9	24.3	55	41	491	967			
9.600	31.496	5	2.19	118.23	3.00E-6	29.2	27.4	58	41	553	1009			
9.700	31.824	5	2.05	146.26	3.00E-6	34.1	31.9	65	42	682	1084			
9.800	32.152	6	1.95	165.40	3.00E-4	37.1	34.5	69	43	770	1132			
9.900	32.480	5	2.06	147.52	3.00E-6	34.9	32.4	65	42	694	1097			
10.000	32.808	4	2.51	58.76	3.00E-8	17.6	16.2				3603	4.68	3.77	17.0
10.100	33.136	4	2.70	29.02	3.00E-8	10.0	9.2				1855	2.34	1.88	8.4
10.200	33.465	4	2.61	24.83	3.00E-8	8.2	7.5				1604	2.01	1.60	7.2
10.300	33.793	4	2.57	24.07	3.00E-8	7.8	7.1				1563	1.95	1.54	6.9
10.400	34.121	5	2.54	26.36	3.00E-6	8.3	7.6	27	33	137	645			
10.500	34.449	5	2.52	28.45	3.00E-6	8.7	7.9	29	33	148	663			
10.600	34.777	5	2.51	28.73	3.00E-6	8.6	7.8	29	33	150	668			
10.700	35.105	5	2.50	29.38	3.00E-6	8.7	7.8	29	33	154	676			
10.800	35.433	5	2.49	30.95	3.00E-6	9.0	8.1	30	33	162	690			
10.900	35.761	5	2.48	32.30	3.00E-6	9.3	8.3	30	33	170	702			
11.000	36.089	5	2.46	33.06	3.00E-6	9.4	8.4	31	33	174	709			
11.100	36.417	5	2.44	33.88	3.00E-6	9.6	8.5	31	33	179	718			
11.200	36.745	5	2.43	34.59	3.00E-6	9.7	8.6	31	34	183	725			
11.300	37.073	5	2.45	34.60	3.00E-6	9.8	8.7	31	33	185	728			
11.400	37.402	5	2.47	33.84	3.00E-6	9.7	8.6	31	33	182	726			
11.500	37.730	5	2.48	33.39	3.00E-6	9.7	8.5	31	33	181	726			
11.600	38.058	5	2.47	33.43	3.00E-6	9.7	8.5	31	33	182	729			
11.700	38.386	5	2.24	49.78	3.00E-6	13.1	11.5	38	36	263	826			
11.800	38.714	5	2.22	50.75	3.00E-6	13.4	11.6	38	36	269	834			
11.900	39.042	5	2.46	32.60	3.00E-6	9.6	8.3	31	33	180	732			
12.000	39.370	4	2.57	28.81	3.00E-8	9.2	8.0				2031	2.55	1.80	8.1
12.100	39.698	4	2.53	31.47	3.00E-8	9.9	8.5				2212	2.79	1.96	8.8
12.200	40.026	5	2.46	38.82	3.00E-6	11.9	10.2	33	34	216	782			
12.300	40.354	4	2.53	41.07	3.00E-8	13.2	11.3				2878	3.68	2.55	11.5
12.400	40.682	4	2.48	48.47	3.00E-8	15.2	13.0				3375	4.34	2.99	13.4
12.500	41.011	4	2.56	50.77	3.00E-8	16.6	14.2				3572	4.60	3.15	14.2
12.600	41.339	4	2.67	44.32	3.00E-8	15.8	13.4				3187	4.09	2.77	12.5
12.700	41.667	4	2.72	33.24	3.00E-8	12.4	10.5				2444	3.10	2.09	9.4
12.800	41.995	4	2.71	25.66	3.00E-8	9.5	8.0				1922	2.40	1.61	7.2
12.900	42.323	4	2.70	24.31	3.00E-8	9.0	7.6				1834	2.28	1.52	6.8
13.000	42.651	4	2.75	23.12	3.00E-8	9.0	7.5				1768	2.19	1.45	6.5
13.100	42.979	4	2.80	22.15	3.00E-8	9.1	7.6				1716	2.12	1.40	6.3
13.200	43.307	3	2.80	22.42	1.00E-9	9.3	7.8				1744	2.16	1.41	6.4

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
13.300	43.635	36.714	1.206	140.065		38.73	3.11	5	115	2.552	1.018	1.534	23.59	3.33	0.25
13.400	43.963	42.188	1.236	207.701		45.18	2.74	6	115	2.570	1.028	1.542	27.63	2.90	0.33
13.500	44.291	39.948	1.195	251.610		43.57	2.74	6	115	2.589	1.039	1.551	26.43	2.92	0.42
13.600	44.619	38.517	1.109	261.512		42.28	2.62	6	115	2.608	1.049	1.559	25.44	2.80	0.45
13.700	44.948	40.524	1.124	260.881		44.28	2.54	6	115	2.627	1.059	1.568	26.57	2.70	0.43
13.800	45.276	40.023	1.085	264.161		43.83	2.48	6	115	2.646	1.069	1.576	26.12	2.63	0.44
13.900	45.604	36.639	0.973	255.306		40.32	2.41	6	115	2.664	1.080	1.585	23.76	2.58	0.46
14.000	45.932	35.710	0.851	266.948		39.55	2.15	6	115	2.683	1.090	1.593	23.14	2.31	0.49
14.100	46.260	33.460	0.869	252.379		37.09	2.34	6	115	2.702	1.100	1.602	21.47	2.53	0.50
14.200	46.588	30.849	0.919	242.591		34.34	2.68	6	115	2.721	1.110	1.611	19.63	2.91	0.52
14.300	46.916	32.290	0.946	268.929		36.16	2.62	6	115	2.740	1.120	1.619	20.64	2.83	0.55
14.400	47.244	58.370	1.271	286.475		62.50	2.03	7	118	2.759	1.131	1.628	36.69	2.13	0.33
14.500	47.572	98.310	2.316	180.076		100.90	2.30	7	118	2.778	1.141	1.637	59.93	2.36	0.12
14.600	47.900	239.105	3.545	161.521		241.43	1.47	9	124	2.799	1.151	1.647	144.85	1.49	0.04
14.700	48.228	417.247	4.691	18.290		417.51	1.12	9	124	2.819	1.161	1.658	250.18	1.13	0.00
14.800	48.556	444.341	5.382	11.983		444.51	1.21	9	124	2.839	1.172	1.668	264.84	1.22	0.00
14.900	48.885	441.060	3.285	13.207		441.25	0.74	10	127	2.860	1.182	1.678	261.20	0.75	0.00
15.000	49.213	459.017	1.862	34.726		459.52	0.41	10	127	2.881	1.192	1.689	270.36	0.41	0.00
15.100	49.541	489.662	1.266	49.737		490.38	0.26	10	127	2.902	1.202	1.700	286.81	0.26	0.00
15.200	49.869	516.514	1.283	55.980		517.32	0.25	10	127	2.923	1.213	1.710	300.76	0.25	0.01
15.300	50.197	543.664	1.892	53.382		544.43	0.35	10	127	2.944	1.223	1.721	314.64	0.35	0.00
15.400	50.525	561.946	1.839	55.274		562.74	0.33	10	127	2.965	1.233	1.732	323.27	0.33	0.00
15.500	50.853	580.591	1.864	43.429		581.22	0.32	10	127	2.986	1.243	1.742	331.89	0.32	0.00
15.600	51.181	578.844	1.775	39.784		579.42	0.31	10	127	3.006	1.254	1.753	328.83	0.31	0.00
15.700	51.509	583.621	1.917	47.163		584.30	0.33	10	127	3.027	1.264	1.764	329.60	0.33	0.00
15.800	51.837	614.182	3.045	51.855		614.93	0.50	10	127	3.048	1.274	1.774	344.88	0.50	0.00
15.900	52.165	597.787	2.844	46.154		598.45	0.48	10	127	3.069	1.284	1.785	333.57	0.48	0.00
16.000	52.493	545.848	3.331	55.602		546.65	0.61	10	127	3.090	1.295	1.796	302.73	0.61	0.00
16.100	52.822	490.405	4.576	46.091		491.07	0.93	10	127	3.111	1.305	1.806	270.16	0.94	0.00
16.200	53.150	443.514	2.541	35.142		444.02	0.57	10	127	3.132	1.315	1.817	242.67	0.58	0.00
16.300	53.478	425.668	2.489	45.725		426.33	0.58	10	127	3.153	1.325	1.827	231.56	0.59	0.00
16.400	53.806	428.568	4.128	47.618		429.25	0.96	9	124	3.173	1.335	1.838	231.87	0.97	0.00
16.500	54.134	441.060	4.896	43.278		441.68	1.11	9	124	3.193	1.346	1.848	237.32	1.12	0.00
16.600	54.462	444.434	3.765	41.613		445.03	0.85	10	127	3.214	1.356	1.858	237.75	0.85	0.00
16.700	54.790	466.537	1.246	42.534		467.15	0.27	10	127	3.235	1.366	1.869	248.21	0.27	0.00
16.800	55.118	512.815	1.793	43.606		513.44	0.35	10	127	3.256	1.376	1.880	271.43	0.35	0.00
16.900	55.446	550.960	2.846	42.433		551.57	0.52	10	127	3.277	1.387	1.890	290.06	0.52	0.00
17.000	55.774	553.749	2.199	46.482		554.42	0.40	10	127	3.298	1.397	1.901	289.92	0.40	0.00
17.100	56.102	548.172	1.990	56.636		548.99	0.36	10	127	3.319	1.407	1.912	285.45	0.36	0.00
17.200	56.430	549.975	1.860	48.286		550.67	0.34	10	127	3.340	1.417	1.922	284.73	0.34	0.00
17.300	56.759	555.356	3.548	40.856		555.94	0.64	10	127	3.360	1.428	1.933	285.88	0.64	0.00
17.400	57.087	543.422	3.914	40.049		544.00	0.72	10	127	3.381	1.438	1.944	278.16	0.72	0.00
17.500	57.415	532.649	4.054	42.963		533.27	0.76	10	127	3.402	1.448	1.954	271.14	0.77	0.00
17.600	57.743	514.962	3.085	46.962		515.64	0.60	10	127	3.423	1.458	1.965	260.69	0.60	0.00
17.700	58.071	536.693	2.271	53.722		537.47	0.42	10	127	3.444	1.469	1.975	270.32	0.43	0.00
17.800	58.399	562.207	2.235	51.603		562.95	0.40	10	127	3.465	1.479	1.986	281.69	0.40	0.00
17.900	58.727	575.498	2.267	48.576		576.20	0.39	10	127	3.486	1.489	1.997	286.82	0.40	0.00
18.000	59.055	577.682	2.147	54.732		578.47	0.37	10	127	3.507	1.499	2.007	286.42	0.37	0.00
18.100	59.383	580.341	3.924	54.858		581.13	0.68	10	127	3.528	1.509	2.018	286.21	0.68	0.00
18.200	59.711	574.457	6.005	45.763		575.12	1.04	10	127	3.548	1.520	2.029	281.73	1.05	0.00

I-297

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
13.300	43.635	4	2.73	25.16	3.00E-8	10.0	8.3				1937	2.41	1.57	7.1
13.400	43.963	4	2.64	29.81	3.00E-8	11.0	9.1				2259	2.84	1.84	8.3
13.500	44.291	4	2.65	28.49	3.00E-8	10.5	8.7				2179	2.73	1.76	7.9
13.600	44.619	4	2.65	27.45	3.00E-8	10.1	8.3				2114	2.64	1.70	7.6
13.700	44.948	4	2.63	28.78	3.00E-8	10.5	8.6				2214	2.78	1.77	8.0
13.800	45.276	4	2.63	28.33	3.00E-8	10.4	8.5				2191	2.75	1.74	7.8
13.900	45.604	4	2.66	25.71	3.00E-8	9.6	7.9				2016	2.51	1.58	7.1
14.000	45.932	4	2.63	25.13	3.00E-8	9.3	7.6				1978	2.46	1.54	6.9
14.100	46.260	4	2.68	23.20	3.00E-8	8.9	7.3				1855	2.29	1.43	6.4
14.200	46.588	4	2.75	21.06	3.00E-8	8.5	6.9				1717	2.11	1.31	5.9
14.300	46.916	4	2.73	22.23	3.00E-8	8.8	7.1				1808	2.23	1.38	6.2
14.400	47.244	5	2.46	40.96	3.00E-6	13.9	11.2	34	35	250	856			
14.500	47.572	5	2.32	68.16	3.00E-6	22.1	17.8	44	38	404	1006			
14.600	47.900	6	1.91	174.36	3.00E-4	45.5	36.4	71	42	966	1349			
14.700	48.228	6	1.66	312.10	3.00E-4	72.7	58.1	94	45	1670	1622			
14.800	48.556	6	1.67	330.96	3.00E-4	77.7	61.9	97	45	1778	1660			
14.900	48.885	6	1.52	328.97	3.00E-4	73.2	58.1	97	45	1765	1659			
15.000	49.213	7	1.33	341.58	3.00E-2	71.8	56.8	99	45	1838	1686			
15.100	49.541	7	1.19	363.50	3.00E-2	73.5	58.0	102	46	1962	1726			
15.200	49.869	7	1.17	382.38	3.00E-2	77.0	60.5	105	46	2069	1761			
15.300	50.197	7	1.24	401.27	3.00E-2	82.7	64.8	107	46	2178	1795			
15.400	50.525	7	1.21	413.55	3.00E-2	84.8	66.3	109	46	2251	1818			
15.500	50.853	7	1.20	425.88	3.00E-2	87.2	68.0	110	46	2325	1842			
15.600	51.181	7	1.19	423.24	3.00E-2	86.8	67.4	110	46	2318	1844			
15.700	51.509	7	1.20	425.52	3.00E-2	87.9	68.1	110	46	2337	1853			
15.800	51.837	7	1.31	446.58	3.00E-2	95.4	73.7	113	47	2460	1888			
15.900	52.165	7	1.31	433.24	3.00E-2	92.8	71.5	111	46	2394	1875			
16.000	52.493	6	1.41	394.36	3.00E-4	87.6	67.2	106	46	2187	1823			
16.100	52.822	6	1.58	352.97	3.00E-4	83.1	63.6	100	45	1964	1762			
16.200	53.150	6	1.46	317.99	3.00E-4	72.3	55.2	95	45	1776	1707			
16.300	53.478	6	1.48	304.32	3.00E-4	69.9	53.2	93	45	1705	1688			
16.400	53.806	6	1.64	305.57	3.00E-4	73.9	56.1	93	45	1717	1695			
16.500	54.134	6	1.68	311.77	3.00E-4	77.1	58.4	94	45	1767	1714			
16.600	54.462	6	1.59	315.08	3.00E-4	75.5	56.9	95	45	1780	1722			
16.700	54.790	7	1.26	329.89	3.00E-2	71.4	53.7	97	45	1869	1753			
16.800	55.118	7	1.29	361.77	3.00E-2	79.2	59.4	102	45	2054	1813			
16.900	55.446	6	1.37	387.69	3.00E-4	87.4	65.4	105	46	2206	1860			
17.000	55.774	7	1.30	388.60	3.00E-2	85.8	64.0	105	46	2218	1867			
17.100	56.102	7	1.28	383.68	3.00E-2	84.5	62.8	105	46	2196	1864			
17.200	56.430	7	1.26	383.78	3.00E-2	84.3	62.5	105	46	2203	1869			
17.300	56.759	6	1.44	386.39	3.00E-4	90.0	66.6	105	46	2224	1879			
17.400	57.087	6	1.49	376.99	3.00E-4	89.3	65.9	104	46	2176	1869			
17.500	57.415	6	1.51	368.48	3.00E-4	88.3	65.0	103	45	2133	1860			
17.600	57.743	6	1.45	355.24	3.00E-4	83.7	61.4	101	45	2063	1842			
17.700	58.071	7	1.34	369.37	3.00E-2	84.2	61.6	103	45	2150	1871			
17.800	58.399	7	1.31	385.94	3.00E-2	87.4	63.8	105	46	2252	1904			
17.900	58.727	7	1.30	394.01	3.00E-2	89.2	65.0	106	46	2305	1922			
18.000	59.055	7	1.29	394.51	3.00E-2	89.2	64.7	106	46	2314	1928			
18.100	59.383	6	1.46	395.27	3.00E-4	94.6	68.5	106	46	2325	1934			
18.200	59.711	6	1.61	390.11	3.00E-4	98.2	70.9	106	46	2300	1931			

Col 1i	Col 2i	Col 3i	Col 4i	Col 5i	Col 6i	Col 7i	Col 8i	Col 9i	Col 10i	Col 11i	Col 12i	Col 13i	Col 14i	Col 15i	Col 16i
Depth	Depth	qc	fs	u	Other	qt	Rf	SBT	Unit Weight, γ	Total Overburden Stress, σv	Insitu pore pressure, uo	Effective overburden stress, σ'v	Normalized cone resistance, Qtl	Normalized Friction raio, Fr	Normalized pore pressure ratio, Bq
(m)	(ft)	(tsf)	(tsf)	(psi)		(tsf)	(%)		(pcf)	(tsf)	(tsf)	(tsf)			
18.300	60.039	522.602	4.988	46.986		523.28	0.95	10	127	3.569	1.530	2.039	254.84	0.96	0.00
18.400	60.367	509.181	4.576	74.800		510.26	0.90	10	127	3.590	1.540	2.050	247.15	0.90	0.01
18.500	60.696	556.639	1.585	82.949		557.83	0.28	10	127	3.611	1.550	2.061	268.95	0.29	0.01

Col 1i	Col 2i	Col 17i	Col 18i	Col 19i	Col 20i	Col 21i	Col 22i	Col 23i	Col 24i	Col 25i	Col 26i	Col 27i	Col 28i	Col 29i
Depth	Depth	Soil Behavior Type (normalized) SBTn	SBTn Index, Ic	Normalized Cone resistance, Qtn	Estimated permeability, kSBT	SPT N60	SPT (N1)60	Relative Density, Dr	Friction Angle, φ'	Young's modulus, Es	Small strain shear modulus, Go	Undrained shear strength, su	Undrained strength ratio, su/σ'v	Over consolidation ratio, OCR
(m)	(ft)				(ft/sec)	(blows/ft)	(blows/ft)	(%)	(degrees)	(tsf)	(tsf)	(tsf)		
18.300	60.039	6	1.61	353.79	3.00E-4	89.3	64.3	101	45	2093	1874			
18.400	60.367	6	1.59	344.02	3.00E-4	86.6	62.3	99	45	2041	1862			
18.500	60.696	7	1.24	375.33	3.00E-2	84.8	60.7	104	45	2231	1921			

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LIQUEFACTION ANALYSIS CALCULATION DETAILS
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Input File Name: G:\GS16\GS16-0107_Panama\Design & Analysis\LIQUEFACTION\16-0107-CPT8.liq
Title: 12870 Panama Street
Subtitle: CPT 8

Input Data:
Surface Elev.=0
Hole No.=CPT8
Depth of Hole=61.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.65 g
Earthquake Magnitude=6.63
No-Liquefiable Soils: CL, OL are Non-Liq. Soil
1. CPT Calulation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.1
Plot two CSR (fs1=1, fs2=User)
10. Average two input data between two Depths: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf %	Gamma pcf	Fines %	D50 mm
0.16	0.00	0.00	100.00	120.00	0.00	0.50
0.66	0.00	0.00	100.00	120.00	0.00	0.50
1.15	0.00	0.00	100.00	120.00	0.00	0.50
1.64	0.00	0.00	100.00	120.00	0.00	0.50
2.13	0.00	0.00	100.00	120.00	0.00	0.50
2.62	0.00	0.00	100.00	120.00	0.00	0.50
3.12	0.00	0.00	100.00	120.00	0.00	0.50
3.61	0.00	0.00	100.00	120.00	0.00	0.50
4.10	0.00	0.00	100.00	120.00	0.00	0.50
4.59	0.00	0.00	100.00	120.00	0.00	0.50
5.09	28.13	1.29	4.60	120.00	0.00	0.50
5.58	37.36	1.46	3.90	120.00	0.00	0.50
6.07	62.90	1.15	1.83	120.00	0.00	0.50
6.56	31.03	1.24	4.01	120.00	0.00	0.50
7.05	67.28	1.42	2.12	120.00	0.00	0.50
7.55	97.09	1.53	1.57	120.00	0.00	0.50
8.04	30.72	1.26	4.10	120.00	0.00	0.50
8.53	73.33	1.26	1.72	120.00	0.00	0.50
9.02	63.77	1.09	1.71	120.00	0.00	0.50
9.51	43.72	0.84	1.92	120.00	0.00	0.50
10.00	12.99	0.28	2.12	120.00	0.00	0.50
10.49	8.70	0.17	1.93	120.00	0.00	0.50
10.99	9.84	0.22	2.25	120.00	0.00	0.50
11.48	9.17	0.25	2.71	120.00	0.00	0.50
11.97	13.35	0.34	2.58	120.00	0.00	0.50
12.46	13.30	0.41	3.09	120.00	NoLiq	0.50
12.95	11.51	0.55	4.75	120.00	NoLiq	0.50
13.45	9.03	0.43	4.78	120.00	NoLiq	0.50
13.94	10.17	0.37	3.63	120.00	NoLiq	0.50
14.43	11.32	0.40	3.52	120.00	NoLiq	0.50
14.92	10.90	0.43	3.90	120.00	NoLiq	0.50
15.41	16.20	0.35	2.15	120.00	NoLiq	0.50
15.91	18.12	0.64	3.56	120.00	NoLiq	0.50
16.40	29.97	0.64	2.15	120.00	NoLiq	0.50
16.89	9.40	0.27	2.91	120.00	NoLiq	0.50
17.38	9.54	0.40	4.21	120.00	NoLiq	0.50
17.88	19.29	0.64	3.33	120.00	NoLiq	0.50
18.37	16.08	0.79	4.93	120.00	NoLiq	0.50
18.86	11.87	0.41	3.49	120.00	NoLiq	0.50
19.35	14.27	0.49	3.41	120.00	NoLiq	0.50
19.84	20.46	0.75	3.66	120.00	NoLiq	0.50
20.34	13.88	0.59	4.27	120.00	NoLiq	0.50
20.83	11.96	0.56	4.67	120.00	NoLiq	0.50
21.32	13.38	0.55	4.07	120.00	NoLiq	0.50
21.81	15.44	0.64	4.17	120.00	NoLiq	0.50
22.30	18.84	0.77	4.09	120.00	NoLiq	0.50
22.80	43.19	1.49	3.44	120.00	NoLiq	0.50

23.29	159.30	1.68	1.05	120.00	0.00	0.50
23.78	243.00	2.07	0.85	120.00	0.00	0.50
24.27	222.50	1.94	0.87	120.00	0.00	0.50
24.77	408.80	2.15	0.52	120.00	0.00	0.50
25.26	531.20	2.75	0.52	120.00	0.00	0.50
25.75	605.90	6.30	1.04	120.00	0.00	0.50
26.24	564.30	4.85	0.86	120.00	0.00	0.50
26.73	540.20	2.50	0.46	120.00	0.00	0.50
27.23	588.60	3.36	0.57	120.00	0.00	0.50
27.72	385.60	1.76	0.46	120.00	0.00	0.50
28.21	431.00	2.21	0.51	120.00	0.00	0.50
28.70	358.70	1.36	0.38	120.00	0.00	0.50
29.19	328.60	1.61	0.49	120.00	0.00	0.50
29.69	483.00	1.01	0.21	120.00	0.00	0.50
30.18	309.80	2.51	0.81	120.00	0.00	0.50
30.67	306.80	1.57	0.51	120.00	0.00	0.50
31.16	96.36	3.06	3.18	120.00	0.00	0.50
31.66	151.10	4.28	2.83	120.00	0.00	0.50
32.15	187.90	3.05	1.62	120.00	0.00	0.50
32.64	112.30	3.95	3.52	120.00	0.00	0.50
33.13	35.30	1.14	3.24	120.00	0.00	0.50
33.62	30.64	0.50	1.64	120.00	0.00	0.50
34.12	34.26	0.61	1.77	120.00	0.00	0.50
34.61	35.46	0.65	1.84	120.00	0.00	0.50
35.10	35.32	0.62	1.74	120.00	0.00	0.50
35.59	38.14	0.73	1.90	120.00	0.00	0.50
36.08	39.26	0.72	1.84	120.00	0.00	0.50
36.58	40.82	0.73	1.80	120.00	0.00	0.50
37.07	40.90	0.82	2.01	120.00	0.00	0.50
37.56	40.09	0.81	2.03	120.00	0.00	0.50
38.05	40.73	0.79	1.95	120.00	0.00	0.50
38.54	103.20	0.80	0.78	120.00	0.00	0.50
39.04	40.12	0.71	1.77	120.00	0.00	0.50
39.53	38.50	0.86	2.24	120.00	0.00	0.50
40.02	46.76	1.06	2.26	120.00	0.00	0.50
40.51	49.99	1.89	3.78	120.00	0.00	0.50
41.01	64.13	2.98	4.65	120.00	0.00	0.50
41.50	52.58	2.74	5.21	120.00	0.00	0.50
41.99	33.51	1.13	3.36	120.00	0.00	0.50
42.48	33.15	1.07	3.22	120.00	0.00	0.50
42.97	31.95	1.28	4.00	120.00	0.00	0.50
43.47	33.68	1.24	3.67	120.00	0.00	0.50
43.96	42.21	1.23	2.90	120.00	0.00	0.50
44.45	38.34	1.14	2.96	120.00	0.00	0.50
44.94	40.73	1.14	2.80	120.00	0.00	0.50
45.43	38.48	1.04	2.70	120.00	0.00	0.50
45.93	36.44	0.82	2.26	120.00	0.00	0.50
46.42	31.39	0.90	2.86	120.00	0.00	0.50
46.91	31.95	0.87	2.73	120.00	0.00	0.50
47.40	96.42	1.52	1.58	120.00	0.00	0.50
47.90	243.10	3.39	1.39	120.00	0.00	0.50
48.39	438.70	4.95	1.13	120.00	0.00	0.50
48.88	439.20	1.84	0.42	120.00	0.00	0.50
49.37	491.30	1.39	0.28	120.00	0.00	0.50
49.86	536.00	1.81	0.34	120.00	0.00	0.50
50.36	549.70	1.91	0.35	120.00	0.00	0.50
50.85	592.70	2.02	0.34	120.00	0.00	0.50
51.34	568.00	1.38	0.24	120.00	0.00	0.50
51.83	613.80	2.94	0.48	120.00	0.00	0.50
52.32	562.20	2.11	0.37	120.00	0.00	0.50
52.82	489.70	4.76	0.97	120.00	0.00	0.50
53.31	434.00	1.66	0.38	120.00	0.00	0.50
53.80	427.90	4.39	1.03	120.00	0.00	0.50
54.29	446.10	5.31	1.19	120.00	0.00	0.50
54.79	462.10	1.06	0.23	120.00	0.00	0.50
55.28	538.00	2.32	0.43	120.00	0.00	0.50
55.77	546.10	3.16	0.58	120.00	0.00	0.50
56.26	544.30	1.26	0.23	120.00	0.00	0.50
56.75	559.30	3.35	0.60	120.00	0.00	0.50
57.25	534.70	3.50	0.65	120.00	0.00	0.50
57.74	499.40	4.34	0.87	120.00	0.00	0.50
58.23	564.60	1.34	0.24	120.00	0.00	0.50
58.72	582.10	1.47	0.25	120.00	0.00	0.50
59.21	581.80	2.31	0.40	120.00	0.00	0.50
59.71	583.00	5.71	0.98	120.00	0.00	0.50
60.20	490.60	4.46	0.91	120.00	0.00	0.50
60.69	557.70	0.02	0.00	120.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Calculation segment, dz=0.050 ft
User defined Print Interval, dp=0.50 ft

Peak Ground Acceleration (PGA), a_max = 0.65g

CSR Calculation:

Depth ft	gamma pcf	sigma atm	gamma' pcf	sigma' atm	rd	mZ g	a(z) g	CSR	x fs1	=CSRfs
0.16	120.00	0.009	120.00	0.009	1.00	0.000	0.650	0.42	1.00	0.42
0.66	120.00	0.037	120.00	0.037	1.00	0.000	0.650	0.42	1.00	0.42
1.16	120.00	0.066	120.00	0.066	1.00	0.000	0.650	0.42	1.00	0.42
1.66	120.00	0.094	120.00	0.094	1.00	0.000	0.650	0.42	1.00	0.42
2.16	120.00	0.122	120.00	0.122	0.99	0.000	0.650	0.42	1.00	0.42
2.66	120.00	0.151	120.00	0.151	0.99	0.000	0.650	0.42	1.00	0.42
3.16	120.00	0.179	120.00	0.179	0.99	0.000	0.650	0.42	1.00	0.42
3.66	120.00	0.208	120.00	0.208	0.99	0.000	0.650	0.42	1.00	0.42
4.16	120.00	0.236	120.00	0.236	0.99	0.000	0.650	0.42	1.00	0.42
4.66	120.00	0.264	120.00	0.264	0.99	0.000	0.650	0.42	1.00	0.42
5.16	120.00	0.293	57.60	0.288	0.99	0.000	0.650	0.42	1.00	0.42
5.66	120.00	0.321	57.60	0.302	0.99	0.000	0.650	0.44	1.00	0.44
6.16	120.00	0.349	57.60	0.315	0.99	0.000	0.650	0.46	1.00	0.46
6.66	120.00	0.378	57.60	0.329	0.98	0.000	0.650	0.48	1.00	0.48
7.16	120.00	0.406	57.60	0.343	0.98	0.000	0.650	0.49	1.00	0.49
7.66	120.00	0.434	57.60	0.356	0.98	0.000	0.650	0.51	1.00	0.51
8.16	120.00	0.463	57.60	0.370	0.98	0.000	0.650	0.52	1.00	0.52
8.66	120.00	0.491	57.60	0.383	0.98	0.000	0.650	0.53	1.00	0.53
9.16	120.00	0.519	57.60	0.397	0.98	0.000	0.650	0.54	1.00	0.54
9.66	120.00	0.548	57.60	0.411	0.98	0.000	0.650	0.55	1.00	0.55
10.16	120.00	0.576	57.60	0.424	0.98	0.000	0.650	0.56	1.00	0.56
10.66	120.00	0.604	57.60	0.438	0.98	0.000	0.650	0.57	1.00	0.57
11.16	120.00	0.633	57.60	0.451	0.97	0.000	0.650	0.58	1.00	0.58
11.66	120.00	0.661	57.60	0.465	0.97	0.000	0.650	0.58	1.00	0.58
12.16	120.00	0.690	57.60	0.479	0.97	0.000	0.650	0.59	1.00	0.59
12.66	120.00	0.718	57.60	0.492	0.97	0.000	0.650	0.60	1.00	0.60
13.16	120.00	0.746	57.60	0.506	0.97	0.000	0.650	0.60	1.00	0.60
13.66	120.00	0.775	57.60	0.520	0.97	0.000	0.650	0.61	1.00	0.61
14.16	120.00	0.803	57.60	0.533	0.97	0.000	0.650	0.62	1.00	0.62
14.66	120.00	0.831	57.60	0.547	0.97	0.000	0.650	0.62	1.00	0.62
15.16	120.00	0.860	57.60	0.560	0.96	0.000	0.650	0.63	1.00	0.63
15.66	120.00	0.888	57.60	0.574	0.96	0.000	0.650	0.63	1.00	0.63
16.16	120.00	0.916	57.60	0.588	0.96	0.000	0.650	0.63	1.00	0.63
16.66	120.00	0.945	57.60	0.601	0.96	0.000	0.650	0.64	1.00	0.64
17.16	120.00	0.973	57.60	0.615	0.96	0.000	0.650	0.64	1.00	0.64
17.66	120.00	1.001	57.60	0.628	0.96	0.000	0.650	0.65	1.00	0.65
18.16	120.00	1.030	57.60	0.642	0.96	0.000	0.650	0.65	1.00	0.65
18.66	120.00	1.058	57.60	0.656	0.96	0.000	0.650	0.65	1.00	0.65
19.16	120.00	1.086	57.60	0.669	0.96	0.000	0.650	0.66	1.00	0.66
19.66	120.00	1.115	57.60	0.683	0.95	0.000	0.650	0.66	1.00	0.66
20.16	120.00	1.143	57.60	0.696	0.95	0.000	0.650	0.66	1.00	0.66
20.66	120.00	1.172	57.60	0.710	0.95	0.000	0.650	0.66	1.00	0.66
21.16	120.00	1.200	57.60	0.724	0.95	0.000	0.650	0.67	1.00	0.67
21.66	120.00	1.228	57.60	0.737	0.95	0.000	0.650	0.67	1.00	0.67
22.16	120.00	1.257	57.60	0.751	0.95	0.000	0.650	0.67	1.00	0.67
22.66	120.00	1.285	57.60	0.765	0.95	0.000	0.650	0.67	1.00	0.67
23.16	120.00	1.313	57.60	0.778	0.95	0.000	0.650	0.67	1.00	0.67
23.66	120.00	1.342	57.60	0.792	0.94	0.000	0.650	0.68	1.00	0.68
24.16	120.00	1.370	57.60	0.805	0.94	0.000	0.650	0.68	1.00	0.68
24.66	120.00	1.398	57.60	0.819	0.94	0.000	0.650	0.68	1.00	0.68
25.16	120.00	1.427	57.60	0.833	0.94	0.000	0.650	0.68	1.00	0.68
25.66	120.00	1.455	57.60	0.846	0.94	0.000	0.650	0.68	1.00	0.68
26.16	120.00	1.483	57.60	0.860	0.94	0.000	0.650	0.68	1.00	0.68
26.66	120.00	1.512	57.60	0.873	0.94	0.000	0.650	0.69	1.00	0.69
27.16	120.00	1.540	57.60	0.887	0.94	0.000	0.650	0.69	1.00	0.69
27.66	120.00	1.568	57.60	0.901	0.94	0.000	0.650	0.69	1.00	0.69
28.16	120.00	1.597	57.60	0.914	0.93	0.000	0.650	0.69	1.00	0.69
28.66	120.00	1.625	57.60	0.928	0.93	0.000	0.650	0.69	1.00	0.69
29.16	120.00	1.654	57.60	0.941	0.93	0.000	0.650	0.69	1.00	0.69
29.66	120.00	1.682	57.60	0.955	0.93	0.000	0.650	0.69	1.00	0.69
30.16	120.00	1.710	57.60	0.969	0.93	0.000	0.650	0.69	1.00	0.69
30.66	120.00	1.739	57.60	0.982	0.92	0.000	0.650	0.69	1.00	0.69
31.16	120.00	1.767	57.60	0.996	0.92	0.000	0.650	0.69	1.00	0.69
31.66	120.00	1.795	57.60	1.009	0.92	0.000	0.650	0.69	1.00	0.69
32.16	120.00	1.824	57.60	1.023	0.91	0.000	0.650	0.69	1.00	0.69
32.66	120.00	1.852	57.60	1.037	0.91	0.000	0.650	0.69	1.00	0.69
33.16	120.00	1.880	57.60	1.050	0.90	0.000	0.650	0.68	1.00	0.68
33.66	120.00	1.909	57.60	1.064	0.90	0.000	0.650	0.68	1.00	0.68
34.16	120.00	1.937	57.60	1.078	0.90	0.000	0.650	0.68	1.00	0.68
34.66	120.00	1.965	57.60	1.091	0.89	0.000	0.650	0.68	1.00	0.68
35.16	120.00	1.994	57.60	1.105	0.89	0.000	0.650	0.68	1.00	0.68
35.66	120.00	2.022	57.60	1.118	0.88	0.000	0.650	0.68	1.00	0.68
36.16	120.00	2.050	57.60	1.132	0.88	0.000	0.650	0.67	1.00	0.67

36.66	120.00	2.079	57.60	1.146	0.88	0.000	0.650	0.67	1.00	0.67
37.16	120.00	2.107	57.60	1.159	0.87	0.000	0.650	0.67	1.00	0.67
37.66	120.00	2.136	57.60	1.173	0.87	0.000	0.650	0.67	1.00	0.67
38.16	120.00	2.164	57.60	1.186	0.86	0.000	0.650	0.67	1.00	0.67
38.66	120.00	2.192	57.60	1.200	0.86	0.000	0.650	0.66	1.00	0.66
39.16	120.00	2.221	57.60	1.214	0.86	0.000	0.650	0.66	1.00	0.66
39.66	120.00	2.249	57.60	1.227	0.85	0.000	0.650	0.66	1.00	0.66
40.16	120.00	2.277	57.60	1.241	0.85	0.000	0.650	0.66	1.00	0.66
40.66	120.00	2.306	57.60	1.254	0.84	0.000	0.650	0.65	1.00	0.65
41.16	120.00	2.334	57.60	1.268	0.84	0.000	0.650	0.65	1.00	0.65
41.66	120.00	2.362	57.60	1.282	0.83	0.000	0.650	0.65	1.00	0.65
42.16	120.00	2.391	57.60	1.295	0.83	0.000	0.650	0.65	1.00	0.65
42.66	120.00	2.419	57.60	1.309	0.83	0.000	0.650	0.65	1.00	0.65
43.16	120.00	2.447	57.60	1.322	0.82	0.000	0.650	0.64	1.00	0.64
43.66	120.00	2.476	57.60	1.336	0.82	0.000	0.650	0.64	1.00	0.64
44.16	120.00	2.504	57.60	1.350	0.81	0.000	0.650	0.64	1.00	0.64
44.66	120.00	2.532	57.60	1.363	0.81	0.000	0.650	0.64	1.00	0.64
45.16	120.00	2.561	57.60	1.377	0.81	0.000	0.650	0.63	1.00	0.63
45.66	120.00	2.589	57.60	1.391	0.80	0.000	0.650	0.63	1.00	0.63
46.16	120.00	2.618	57.60	1.404	0.80	0.000	0.650	0.63	1.00	0.63
46.66	120.00	2.646	57.60	1.418	0.79	0.000	0.650	0.63	1.00	0.63
47.16	120.00	2.674	57.60	1.431	0.79	0.000	0.650	0.62	1.00	0.62
47.66	120.00	2.703	57.60	1.445	0.79	0.000	0.650	0.62	1.00	0.62
48.16	120.00	2.731	57.60	1.459	0.78	0.000	0.650	0.62	1.00	0.62
48.66	120.00	2.759	57.60	1.472	0.78	0.000	0.650	0.62	1.00	0.62
49.16	120.00	2.788	57.60	1.486	0.77	0.000	0.650	0.61	1.00	0.61
49.66	120.00	2.816	57.60	1.499	0.77	0.000	0.650	0.61	1.00	0.61
50.16	120.00	2.844	57.60	1.513	0.77	0.000	0.650	0.61	1.00	0.61
50.66	120.00	2.873	57.60	1.527	0.76	0.000	0.650	0.61	1.00	0.61
51.16	120.00	2.901	57.60	1.540	0.76	0.000	0.650	0.60	1.00	0.60
51.66	120.00	2.929	57.60	1.554	0.75	0.000	0.650	0.60	1.00	0.60
52.16	120.00	2.958	57.60	1.567	0.75	0.000	0.650	0.60	1.00	0.60
52.66	120.00	2.986	57.60	1.581	0.75	0.000	0.650	0.59	1.00	0.59
53.16	120.00	3.014	57.60	1.595	0.74	0.000	0.650	0.59	1.00	0.59
53.66	120.00	3.043	57.60	1.608	0.74	0.000	0.650	0.59	1.00	0.59
54.16	120.00	3.071	57.60	1.622	0.73	0.000	0.650	0.59	1.00	0.59
54.66	120.00	3.100	57.60	1.635	0.73	0.000	0.650	0.58	1.00	0.58
55.16	120.00	3.128	57.60	1.649	0.73	0.000	0.650	0.58	1.00	0.58
55.66	120.00	3.156	57.60	1.663	0.72	0.000	0.650	0.58	1.00	0.58
56.16	120.00	3.185	57.60	1.676	0.72	0.000	0.650	0.58	1.00	0.58
56.66	120.00	3.213	57.60	1.690	0.71	0.000	0.650	0.57	1.00	0.57
57.16	120.00	3.241	57.60	1.704	0.71	0.000	0.650	0.57	1.00	0.57
57.66	120.00	3.270	57.60	1.717	0.70	0.000	0.650	0.57	1.00	0.57
58.16	120.00	3.298	57.60	1.731	0.70	0.000	0.650	0.56	1.00	0.56
58.66	120.00	3.326	57.60	1.744	0.70	0.000	0.650	0.56	1.00	0.56
59.16	120.00	3.355	57.60	1.758	0.69	0.000	0.650	0.56	1.00	0.56
59.66	120.00	3.383	57.60	1.772	0.69	0.000	0.650	0.56	1.00	0.56
60.16	120.00	3.411	57.60	1.785	0.68	0.000	0.650	0.55	1.00	0.55
60.66	120.00	3.440	57.60	1.799	0.68	0.000	0.650	0.55	1.00	0.55

CSR is based on water table at 5.00 during earthquake

CRR Calculation from CPT data, using Modify Robertson's Method:
(Fines content is determined by qc and fric.)

Depth ft	qc atm	fric. atm	n	Q	Rf	Ic	Cq	Fines %	Kc	qc1n atm	qc1f atm	CRR7.5
0.16			1.00	1.00E-4	0.00	7.97						
0.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
0.66			1.00	1.00E-4	0.00	7.97						
0.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.16			1.00	1.00E-4	0.00	7.97						
1.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
1.66			1.00	1.00E-4	0.00	7.97						
1.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.16			1.00	1.00E-4	0.00	7.97						
2.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
2.66			1.00	1.00E-4	0.00	7.97						
2.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.16			1.00	1.00E-4	0.00	7.97						
3.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
3.66			1.00	1.00E-4	0.00	7.97						
3.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.16			1.00	1.00E-4	0.00	7.97						
4.16	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
4.66			1.00	1.00E-4	0.00	7.97						
4.66	0.00	0.00	1.00	1.00E-4	0.00	7.97	1.00	NoLiq	1.00	0.00	0.00	2.08
5.16			1.00	9.51E1	4.93	2.43						
5.16			0.50	5.20E1	4.93	2.60						
5.16	28.12	1.37	0.50	5.20E1	4.93	2.60	1.85	35.13	0.80	51.98	259.89	1.71
5.66			1.00	1.37E2	3.28	2.19						
5.66			0.50	7.81E1	3.28	2.35						

5.66	44.23	1.44	0.50	7.81E1	3.28	2.35	1.77	24.26	0.51	78.08	160.78	0.47
6.16			1.00	1.63E2	2.00	1.97						
6.16			0.50	9.72E1	2.00	2.12						
6.16	57.44	1.14	0.50	9.72E1	2.00	2.12	1.69	16.54	0.31	97.19	140.46	0.34
6.66			1.00	8.30E1	3.98	2.39						
6.66			0.50	5.16E1	3.98	2.53						
6.66	31.71	1.25	0.50	5.16E1	3.98	2.53	1.63	32.04	0.72	51.59	185.60	0.67
7.16			1.00	2.20E2	1.84	1.86						
7.16			0.50	1.41E2	1.84	1.99						
7.16	89.87	1.64	0.50	1.41E2	1.84	1.99	1.57	12.60	0.20	141.04	176.93	0.60
7.66			1.00	2.11E2	1.46	1.80						
7.66			0.50	1.40E2	1.46	1.92						
7.66	92.30	1.34	0.50	1.40E2	1.46	1.92	1.52	10.78	0.15	140.05	165.59	0.50
8.16			1.00	6.72E1	4.03	2.46						
8.16			0.50	4.64E1	4.03	2.57						
8.16	31.55	1.25	0.50	4.64E1	4.03	2.57	1.47	33.73	0.77	46.39	199.22	0.82
8.66			1.00	1.63E2	1.53	1.88						
8.66			0.50	1.15E2	1.53	1.99						
8.66	80.49	1.22	0.50	1.15E2	1.53	1.99	1.43	12.66	0.20	114.86	144.39	0.36
9.16			1.00	1.26E2	1.70	2.00						
9.16			0.50	9.12E1	1.70	2.09						
9.16	65.71	1.11	0.50	9.12E1	1.70	2.09	1.39	15.65	0.28	91.18	127.41	0.27
9.66			1.00	5.27E1	2.55	2.39						
9.66			0.50	3.98E1	2.55	2.48						
9.66	29.42	0.74	0.50	3.98E1	2.55	2.48	1.35	29.74	0.66	39.75	117.14	0.23
10.16			1.00	1.72E1	1.82	2.68						
10.16	10.39	0.18	1.00	1.72E1	1.82	2.68	1.00	NoLiq	1.00	10.39	10.39	2.08
10.66			1.00	1.28E1	2.25	2.84						
10.66	8.11	0.17	1.00	1.28E1	2.25	2.84	1.00	NoLiq	1.00	8.11	8.11	2.08
11.16			1.00	1.65E1	2.55	2.78						
11.16	10.53	0.25	1.00	1.65E1	2.55	2.78	1.00	NoLiq	1.00	10.53	10.53	2.08
11.66			1.00	1.73E1	2.59	2.76						
11.66	11.27	0.27	1.00	1.73E1	2.59	2.76	1.00	NoLiq	1.00	11.27	11.27	2.08
12.16			1.00	2.14E1	2.75	2.71						
12.16	14.09	0.37	1.00	2.14E1	2.75	2.71	1.00	NoLiq	1.00	14.09	14.09	2.08
12.66			1.00	1.76E1	4.30	2.90						
12.66	11.95	0.48	1.00	1.76E1	4.30	2.90	1.00	NoLiq	1.00	11.95	11.95	2.08
13.16			1.00	1.42E1	5.44	3.03						
13.16	10.04	0.51	1.00	1.42E1	5.44	3.03	1.00	NoLiq	1.00	10.04	10.04	2.08
13.66			1.00	1.36E1	4.17	2.97						
13.66	9.85	0.38	1.00	1.36E1	4.17	2.97	1.00	NoLiq	1.00	9.85	9.85	2.08
14.16			1.00	1.41E1	4.11	2.96						
14.16	10.37	0.39	1.00	1.41E1	4.11	2.96	1.00	NoLiq	1.00	10.37	10.37	2.08
14.66			1.00	1.63E1	3.26	2.85						
14.66	12.18	0.37	1.00	1.63E1	3.26	2.85	1.00	NoLiq	1.00	12.18	12.18	2.08
15.16			1.00	1.98E1	3.48	2.80						
15.16	14.90	0.49	1.00	1.98E1	3.48	2.80	1.00	NoLiq	1.00	14.90	14.90	2.08
15.66			1.00	1.99E1	3.16	2.77						
15.66	15.27	0.46	1.00	1.99E1	3.16	2.77	1.00	NoLiq	1.00	15.27	15.27	2.08
16.16			1.00	4.27E1	2.34	2.43						
16.16	32.31	0.73	1.00	4.27E1	2.34	2.43	1.00	NoLiq	1.00	32.31	32.31	2.08
16.66			1.00	2.03E1	1.80	2.62						
16.66	16.11	0.27	1.00	2.03E1	1.80	2.62	1.00	NoLiq	1.00	16.11	16.11	2.08
17.16			1.00	1.00E1	3.98	3.07						
17.16	8.60	0.30	1.00	1.00E1	3.98	3.07	1.00	NoLiq	1.00	8.60	8.60	2.08
17.66			1.00	2.20E1	3.15	2.73						
17.66	18.09	0.54	1.00	2.20E1	3.15	2.73	1.00	NoLiq	1.00	18.09	18.09	2.08
18.16			1.00	2.41E1	5.00	2.84						
18.16	20.04	0.95	1.00	2.41E1	5.00	2.84	1.00	NoLiq	1.00	20.04	20.04	2.08
18.66			1.00	1.31E1	4.46	3.01						
18.66	11.54	0.47	1.00	1.31E1	4.46	3.01	1.00	NoLiq	1.00	11.54	11.54	2.08
19.16			1.00	1.53E1	3.59	2.89						
19.16	13.59	0.45	1.00	1.53E1	3.59	2.89	1.00	NoLiq	1.00	13.59	13.59	2.08
19.66			1.00	2.13E1	3.77	2.79						
19.66	18.80	0.67	1.00	2.13E1	3.77	2.79	1.00	NoLiq	1.00	18.80	18.80	2.08
20.16			1.00	1.80E1	4.35	2.89						
20.16	16.34	0.66	1.00	1.80E1	4.35	2.89	1.00	NoLiq	1.00	16.34	16.34	2.08
20.66			1.00	1.44E1	5.01	3.01						
20.66	13.49	0.62	1.00	1.44E1	5.01	3.01	1.00	NoLiq	1.00	13.49	13.49	2.08
21.16			1.00	1.27E1	4.51	3.02						
21.16	12.26	0.50	1.00	1.27E1	4.51	3.02	1.00	NoLiq	1.00	12.26	12.26	2.08
21.66			1.00	1.54E1	4.62	2.96						
21.66	14.90	0.63	1.00	1.54E1	4.62	2.96	1.00	NoLiq	1.00	14.90	14.90	2.08
22.16			1.00	1.85E1	4.40	2.89						
22.16	17.87	0.73	1.00	1.85E1	4.40	2.89	1.00	NoLiq	1.00	17.87	17.87	2.08
22.66			1.00	2.94E1	4.49	2.74						
22.66	28.10	1.20	1.00	2.94E1	4.49	2.74	1.00	NoLiq	1.00	28.10	28.10	2.08
23.16			1.00	1.52E2	1.35	1.87						
23.16			0.50	1.47E2	1.35	1.88						
23.16	141.86	1.90	0.50	1.47E2	1.35	1.88	1.04	9.81	0.13	147.45	169.19	0.53
23.66			1.00	2.29E2	0.93	1.63						
23.66			0.50	2.24E2	0.93	1.63						

23.66	216.81	2.01	0.50	2.24E2	0.93	1.63	1.03	4.95	0.00	223.72	223.72	1.12
24.16			1.00	2.45E2	1.16	1.68						
24.16			0.50	2.41E2	1.16	1.68						
24.16	235.02	2.70	0.50	2.41E2	1.16	1.68	1.02	5.80	0.02	240.78	246.00	1.46
24.66			1.00	3.28E2	0.61	1.39						
24.66			0.50	3.24E2	0.61	1.39						
24.66	318.66	1.95	0.50	3.24E2	0.61	1.39	1.02	1.42	0.00	324.15	324.15	2.08
25.16			1.00	5.21E2	0.58	1.24						
25.16			0.50	5.17E2	0.58	1.24						
25.16	511.77	2.97	0.50	5.17E2	0.58	1.24	1.01	0.00	0.00	500.00	500.00	2.08
25.66			1.00	5.89E2	1.20	1.48						
25.66			0.50	5.89E2	1.20	1.48						
25.66	587.03	7.04	0.50	5.89E2	1.20	1.48	1.00	2.51	0.00	500.00	500.00	2.08
26.16			1.00	5.35E2	1.06	1.45						
26.16			0.50	5.38E2	1.06	1.45						
26.16	540.12	5.70	0.50	5.38E2	1.06	1.45	1.00	2.13	0.00	500.00	500.00	2.08
26.66			1.00	5.12E2	0.52	1.21						
26.66			0.50	5.19E2	0.52	1.20						
26.66	524.29	2.71	0.50	5.19E2	0.52	1.20	0.99	0.00	0.00	500.00	500.00	2.08
27.16			1.00	5.92E2	0.60	1.22						
27.16			0.50	6.04E2	0.60	1.21						
27.16	614.13	3.68	0.50	6.04E2	0.60	1.21	0.98	0.00	0.00	500.00	500.00	2.08
27.66			1.00	3.86E2	0.53	1.29						
27.66			0.50	3.97E2	0.53	1.29						
27.66	406.58	2.16	0.50	3.97E2	0.53	1.29	0.98	0.27	0.00	397.15	397.15	2.08
28.16			1.00	3.98E2	0.58	1.31						
28.16			0.50	4.12E2	0.58	1.30						
28.16	424.11	2.43	0.50	4.12E2	0.58	1.30	0.97	0.42	0.00	411.61	411.61	2.08
28.66			1.00	3.41E2	0.35	1.21						
28.66			0.50	3.55E2	0.35	1.19						
28.66	368.39	1.27	0.50	3.55E2	0.35	1.19	0.96	0.00	0.00	355.26	355.26	2.08
29.16			1.00	2.97E2	0.54	1.38						
29.16			0.50	3.12E2	0.54	1.36						
29.16	325.30	1.75	0.50	3.12E2	0.54	1.36	0.96	1.09	0.00	311.74	311.74	2.08
29.66			1.00	4.33E2	0.23	1.02						
29.66			0.50	4.56E2	0.23	1.00						
29.66	479.24	1.12	0.50	4.56E2	0.23	1.00	0.95	0.00	0.00	456.42	456.42	2.08
30.16			1.00	2.82E2	0.80	1.52						
30.16			0.50	2.99E2	0.80	1.50						
30.16	316.33	2.53	0.50	2.99E2	0.80	1.50	0.95	2.85	0.00	299.43	299.43	2.08
30.66			1.00	2.68E2	0.53	1.41						
30.66			0.50	2.87E2	0.53	1.38						
30.66	304.60	1.60	0.50	2.87E2	0.53	1.38	0.94	1.33	0.00	286.58	286.58	2.08
31.16			1.00	8.28E1	3.23	2.32						
31.16			0.50	9.02E1	3.23	2.30						
31.16	96.42	3.06	0.50	9.02E1	3.23	2.30	0.94	22.50	0.47	90.18	169.26	0.53
31.66			1.00	1.29E2	2.87	2.16						
31.66			0.50	1.40E2	2.87	2.14						
31.66	151.09	4.28	0.50	1.40E2	2.87	2.14	0.93	16.92	0.32	140.47	206.08	0.89
32.16			1.00	1.60E2	1.65	1.92						
32.16			0.50	1.75E2	1.65	1.89						
32.16	189.06	3.09	0.50	1.75E2	1.65	1.89	0.92	10.17	0.14	174.75	202.72	0.85
32.66			1.00	8.81E1	3.62	2.34						
32.66			0.50	9.76E1	3.62	2.31						
32.66	106.16	3.78	0.50	9.76E1	3.62	2.31	0.92	23.07	0.48	97.56	188.53	0.70
33.16			1.00	2.78E1	3.24	2.66						
33.16	35.21	1.08	1.00	2.78E1	3.24	2.66	1.00	NoLiq	1.00	35.21	35.21	2.08
33.66			1.00	2.39E1	1.75	2.55						
33.66			0.50	2.80E1	1.75	2.50						
33.66	30.82	0.51	0.50	2.80E1	1.75	2.50	0.91	30.55	0.68	28.00	88.12	0.14
34.16			1.00	2.66E1	1.86	2.53						
34.16			0.50	3.12E1	1.86	2.47						
34.16	34.53	0.61	0.50	3.12E1	1.86	2.47	0.90	29.58	0.66	31.20	90.74	0.15
34.66			1.00	2.71E1	1.89	2.53						
34.66			0.50	3.19E1	1.89	2.47						
34.66	35.51	0.63	0.50	3.19E1	1.89	2.47	0.90	29.40	0.65	31.91	91.55	0.15
35.16			1.00	2.69E1	1.91	2.53						
35.16			0.50	3.19E1	1.91	2.47						
35.16	35.71	0.64	0.50	3.19E1	1.91	2.47	0.89	29.51	0.65	31.91	92.34	0.15
35.66			1.00	2.87E1	2.03	2.53						
35.66			0.50	3.40E1	2.03	2.47						
35.66	38.29	0.74	0.50	3.40E1	2.03	2.47	0.89	29.29	0.65	34.03	96.81	0.16
36.16			1.00	2.94E1	1.91	2.50						
36.16			0.50	3.50E1	1.91	2.44						
36.16	39.63	0.72	0.50	3.50E1	1.91	2.44	0.88	28.16	0.62	35.03	91.79	0.15
36.66			1.00	3.00E1	1.86	2.49						
36.66			0.50	3.60E1	1.86	2.43						
36.66	40.90	0.72	0.50	3.60E1	1.86	2.43	0.88	27.46	0.60	35.97	89.88	0.15
37.16			1.00	2.98E1	2.10	2.52						
37.16			0.50	3.59E1	2.10	2.46						
37.16	41.09	0.82	0.50	3.59E1	2.10	2.46	0.87	28.85	0.64	35.95	99.00	0.17
37.66			1.00	2.87E1	2.20	2.55						

37.66			0.50	3.48E1	2.20	2.48					
37.66	40.04	0.83	0.50	3.48E1	2.20	2.48	0.87	29.86	0.66	34.85	103.63	0.18
38.16			1.00	2.86E1	2.04	2.53					
38.16			0.50	3.49E1	2.04	2.46					
38.16	40.32	0.78	0.50	3.49E1	2.04	2.46	0.87	28.94	0.64	34.91	96.75	0.16
38.66			1.00	4.16E1	1.45	2.31					
38.66			0.50	5.02E1	1.45	2.25					
38.66	58.21	0.81	0.50	5.02E1	1.45	2.25	0.86	20.56	0.42	50.15	85.81	0.14
39.16			1.00	2.58E1	2.13	2.58					
39.16			0.50	3.20E1	2.13	2.50					
39.16	37.28	0.75	0.50	3.20E1	2.13	2.50	0.86	30.79	0.69	31.96	102.61	0.18
39.66			1.00	2.71E1	2.41	2.59					
39.66			0.50	3.37E1	2.41	2.52					
39.66	39.56	0.90	0.50	3.37E1	2.41	2.52	0.85	31.44	0.71	33.74	114.78	0.22
40.16			1.00	4.02E1	2.28	2.44					
40.16			0.50	4.93E1	2.28	2.38					
40.16	58.10	1.27	0.50	4.93E1	2.28	2.38	0.85	25.48	0.55	49.31	108.82	0.20
40.66			1.00	4.64E1	2.79	2.45					
40.66			0.50	5.69E1	2.79	2.39					
40.66	67.35	1.81	0.50	5.69E1	2.79	2.39	0.84	26.02	0.56	56.88	129.65	0.28
41.16			1.00	4.49E1	5.14	2.65					
41.16	65.88	3.27	1.00	4.49E1	5.14	2.65	1.00	NoLiq	1.00	65.88	65.88	2.08
41.66			1.00	3.07E1	4.69	2.74					
41.66	46.29	2.06	1.00	3.07E1	4.69	2.74	1.00	NoLiq	1.00	46.29	46.29	2.08
42.16			1.00	2.17E1	2.86	2.71					
42.16	33.72	0.90	1.00	2.17E1	2.86	2.71	1.00	NoLiq	1.00	33.72	33.72	2.08
42.66			1.00	2.05E1	3.61	2.80					
42.66	32.26	1.08	1.00	2.05E1	3.61	2.80	1.00	NoLiq	1.00	32.26	32.26	2.08
43.16			1.00	1.99E1	4.24	2.85					
43.16	31.71	1.24	1.00	1.99E1	4.24	2.85	1.00	NoLiq	1.00	31.71	31.71	2.08
43.66			1.00	2.20E1	3.58	2.77					
43.66	35.07	1.17	1.00	2.20E1	3.58	2.77	1.00	NoLiq	1.00	35.07	35.07	2.08
44.16			1.00	2.57E1	3.23	2.69					
44.16	40.94	1.24	1.00	2.57E1	3.23	2.69	1.00	NoLiq	1.00	40.94	40.94	2.08
44.66			1.00	2.38E1	3.03	2.70					
44.66	38.51	1.09	1.00	2.38E1	3.03	2.70	1.00	NoLiq	1.00	38.51	38.51	2.08
45.16			1.00	2.54E1	2.88	2.66					
45.16	41.26	1.11	1.00	2.54E1	2.88	2.66	1.00	NoLiq	1.00	41.26	41.26	2.08
45.66			1.00	2.16E1	2.88	2.72					
45.66	35.79	0.95	1.00	2.16E1	2.88	2.72	1.00	NoLiq	1.00	35.79	35.79	2.08
46.16			1.00	2.06E1	2.67	2.71					
46.16	34.58	0.85	1.00	2.06E1	2.67	2.71	1.00	NoLiq	1.00	34.58	34.58	2.08
46.66			1.00	1.78E1	3.33	2.82					
46.66	30.57	0.93	1.00	1.78E1	3.33	2.82	1.00	NoLiq	1.00	30.57	30.57	2.08
47.16			1.00	2.32E1	3.12	2.71					
47.16	39.31	1.14	1.00	2.32E1	3.12	2.71	1.00	NoLiq	1.00	39.31	39.31	2.08
47.66			1.00	5.97E1	2.87	2.38					
47.66			0.50	7.75E1	2.87	2.30					
47.66	97.85	2.73	0.50	7.75E1	2.87	2.30	0.79	22.71	0.47	77.54	147.06	0.38
48.16			1.00	2.54E2	1.13	1.66					
48.16			0.50	3.25E2	1.13	1.59					
48.16	411.33	4.61	0.50	3.25E2	1.13	1.59	0.79	4.25	0.00	324.57	324.57	2.08
48.66			1.00	2.75E2	1.27	1.68					
48.66			0.50	3.52E2	1.27	1.61					
48.66	447.91	5.64	0.50	3.52E2	1.27	1.61	0.79	4.58	0.00	351.95	351.95	2.08
49.16			1.00	2.72E2	0.46	1.36					
49.16			0.50	3.49E2	0.46	1.28					
49.16	446.38	2.02	0.50	3.49E2	0.46	1.28	0.78	0.17	0.00	349.28	349.28	2.08
49.66			1.00	2.92E2	0.21	1.14					
49.66			0.50	3.76E2	0.21	1.04					
49.66	482.99	0.99	0.50	3.76E2	0.21	1.04	0.78	0.00	0.00	376.37	376.37	2.08
50.16			1.00	3.25E2	0.42	1.28					
50.16			0.50	4.22E2	0.42	1.19					
50.16	543.24	2.27	0.50	4.22E2	0.42	1.19	0.78	0.00	0.00	421.58	421.58	2.08
50.66			1.00	3.34E2	0.39	1.24					
50.66			0.50	4.34E2	0.39	1.16					
50.66	561.38	2.16	0.50	4.34E2	0.39	1.16	0.77	0.00	0.00	433.88	433.88	2.08
51.16			1.00	3.42E2	0.43	1.27					
51.16			0.50	4.46E2	0.43	1.19					
51.16	579.87	2.49	0.50	4.46E2	0.43	1.19	0.77	0.00	0.00	446.37	446.37	2.08
51.66			1.00	3.50E2	0.23	1.10					
51.66			0.50	4.59E2	0.23	1.00					
51.66	598.14	1.38	0.50	4.59E2	0.23	1.00	0.77	0.00	0.00	458.58	458.58	2.08
52.16			1.00	3.49E2	0.25	1.12					
52.16			0.50	4.59E2	0.25	1.02					
52.16	601.59	1.51	0.50	4.59E2	0.25	1.02	0.76	0.00	0.00	459.39	459.39	2.08
52.66			1.00	3.01E2	0.89	1.53					
52.66			0.50	3.97E2	0.89	1.46					
52.66	522.46	4.61	0.50	3.97E2	0.89	1.46	0.76	2.25	0.00	397.40	397.40	2.08
53.16			1.00	2.50E2	0.37	1.33					
53.16			0.50	3.32E2	0.37	1.23					
53.16	438.78	1.61	0.50	3.32E2	0.37	1.23	0.76	0.00	0.00	332.44	332.44	2.08

53.66			1.00	2.39E2	0.85	1.59						
53.66			0.50	3.19E2	0.85	1.50						
53.66	422.54	3.58	0.50	3.19E2	0.85	1.50	0.75	2.88	0.00	318.89	318.89	2.08
54.16			1.00	2.48E2	1.13	1.67						
54.16			0.50	3.32E2	1.13	1.59						
54.16	441.94	4.94	0.50	3.32E2	1.13	1.59	0.75	4.14	0.00	332.25	332.25	2.08
54.66			1.00	2.50E2	0.21	1.20						
54.66			0.50	3.36E2	0.21	1.09						
54.66	449.05	0.93	0.50	3.36E2	0.21	1.09	0.75	0.00	0.00	336.30	336.30	2.08
55.16			1.00	2.86E2	0.31	1.24						
55.16			0.50	3.86E2	0.31	1.13						
55.16	516.80	1.58	0.50	3.86E2	0.31	1.13	0.75	0.00	0.00	385.57	385.57	2.08
55.66			1.00	3.06E2	0.43	1.30						
55.66			0.50	4.14E2	0.43	1.21						
55.66	556.81	2.38	0.50	4.14E2	0.43	1.21	0.74	0.00	0.00	413.86	413.86	2.08
56.16			1.00	2.98E2	0.47	1.34						
56.16			0.50	4.04E2	0.47	1.24						
56.16	545.81	2.55	0.50	4.04E2	0.47	1.24	0.74	0.00	0.00	404.16	404.16	2.08
56.66			1.00	3.02E2	0.38	1.27						
56.66			0.50	4.12E2	0.38	1.17						
56.66	557.83	2.11	0.50	4.12E2	0.38	1.17	0.74	0.00	0.00	411.53	411.53	2.08
57.16			1.00	2.90E2	0.51	1.37						
57.16			0.50	3.97E2	0.51	1.27						
57.16	540.45	2.76	0.50	3.97E2	0.51	1.27	0.74	0.15	0.00	397.25	397.25	2.08
57.66			1.00	2.75E2	0.70	1.48						
57.66			0.50	3.77E2	0.70	1.39						
57.66	515.14	3.57	0.50	3.77E2	0.70	1.39	0.73	1.39	0.00	377.26	377.26	2.08
58.16			1.00	2.91E2	0.40	1.30						
58.16			0.50	4.02E2	0.40	1.19						
58.16	550.48	2.19	0.50	4.02E2	0.40	1.19	0.73	0.00	0.00	401.67	401.67	2.08
58.66			1.00	3.04E2	0.38	1.27						
58.66			0.50	4.21E2	0.38	1.17						
58.66	578.50	2.20	0.50	4.21E2	0.38	1.17	0.73	0.00	0.00	420.60	420.60	2.08
59.16			1.00	3.03E2	0.39	1.28						
59.16			0.50	4.21E2	0.39	1.17						
59.16	581.07	2.28	0.50	4.21E2	0.39	1.17	0.72	0.00	0.00	420.96	420.96	2.08
59.66			1.00	3.02E2	0.98	1.56						
59.66			0.50	4.21E2	0.98	1.48						
59.66	583.51	5.67	0.50	4.21E2	0.98	1.48	0.72	2.50	0.00	421.22	421.22	2.08
60.16			1.00	2.56E2	0.87	1.57						
60.16			0.50	3.58E2	0.87	1.48						
60.16	498.01	4.29	0.50	3.58E2	0.87	1.48	0.72	2.51	0.00	358.23	358.23	2.08
60.66			1.00	2.84E2	0.17	1.11						
60.66			0.50	3.99E2	0.17	0.97						
60.66	556.78	0.92	0.50	3.99E2	0.17	0.97	0.72	0.00	0.00	399.11	399.11	2.08

Fines have been calculated, and correction is made by Modify Robertson Method.
Fines=NoLiq means the soils are not liquefiable.
CRR is based on water table at 10.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 6.63:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.16	0.01	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
0.66	0.02	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.16	0.04	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
1.66	0.06	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.16	0.08	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
2.66	0.10	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.16	0.12	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
3.66	0.13	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.16	0.15	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
4.66	0.17	2.08	1.00	2.08	1.37	2.00	0.42	5.00 ^
5.16	0.19	1.71	1.00	1.71	1.37	2.35	0.42	5.00
5.66	0.21	0.47	1.00	0.47	1.37	0.64	0.44	1.44
6.16	0.23	0.34	1.00	0.34	1.37	0.46	0.46	1.00
6.66	0.25	0.67	1.00	0.67	1.37	0.92	0.48	1.94
7.16	0.26	0.60	1.00	0.60	1.37	0.82	0.49	1.66
7.66	0.28	0.50	1.00	0.50	1.37	0.69	0.51	1.36
8.16	0.30	0.82	1.00	0.82	1.37	1.12	0.52	2.15
8.66	0.32	0.36	1.00	0.36	1.37	0.49	0.53	0.93 *
9.16	0.34	0.27	1.00	0.27	1.37	0.37	0.54	0.69 *
9.66	0.36	0.23	1.00	0.23	1.37	0.31	0.55	0.57 *
10.16	0.37	2.08	1.00	2.08	1.37	2.00	0.56	5.00 ^
10.66	0.38	2.08	1.00	2.08	1.37	2.00	0.57	5.00 ^
11.16	0.39	2.08	1.00	2.08	1.37	2.00	0.58	5.00 ^
11.66	0.40	2.08	1.00	2.08	1.37	2.00	0.58	5.00 ^
12.16	0.41	2.08	1.00	2.08	1.37	2.00	0.59	5.00 ^
12.66	0.42	2.08	1.00	2.08	1.37	2.00	0.60	5.00 ^
13.16	0.42	2.08	1.00	2.08	1.37	2.00	0.60	5.00 ^
13.66	0.43	2.08	1.00	2.08	1.37	2.00	0.61	5.00 ^

Liq.

14.16	0.44	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^
14.66	0.45	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^
15.16	0.46	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
15.66	0.47	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
16.16	0.48	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
16.66	0.49	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
17.16	0.50	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
17.66	0.50	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
18.16	0.51	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
18.66	0.52	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
19.16	0.53	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
19.66	0.54	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
20.16	0.55	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
20.66	0.56	2.08	1.00	2.08	1.37	2.00	0.66	5.00 ^
21.16	0.57	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
21.66	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
22.16	0.58	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
22.66	0.59	2.08	1.00	2.08	1.37	2.00	0.67	5.00 ^
23.16	0.60	0.53	1.00	0.53	1.37	0.73	0.67	1.08
23.66	0.61	1.12	1.00	1.12	1.37	1.54	0.68	2.27
24.16	0.62	1.46	1.00	1.46	1.37	2.01	0.68	2.96
24.66	0.63	2.08	1.00	2.08	1.37	2.85	0.68	4.19
25.16	0.64	2.08	1.00	2.08	1.37	2.85	0.68	4.18
25.66	0.65	2.08	1.00	2.08	1.37	2.85	0.68	4.17
26.16	0.65	2.08	1.00	2.08	1.37	2.85	0.68	4.16
26.66	0.66	2.08	1.00	2.08	1.37	2.85	0.69	4.16
27.16	0.67	2.08	1.00	2.08	1.37	2.85	0.69	4.15
27.66	0.68	2.08	1.00	2.08	1.37	2.85	0.69	4.14
28.16	0.69	2.08	1.00	2.08	1.37	2.85	0.69	4.13
28.66	0.70	2.08	1.00	2.08	1.37	2.85	0.69	4.13
29.16	0.71	2.08	1.00	2.08	1.37	2.85	0.69	4.12
29.66	0.72	2.08	1.00	2.08	1.37	2.85	0.69	4.12
30.16	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12
30.66	0.73	2.08	1.00	2.08	1.37	2.85	0.69	4.12
31.16	0.74	0.53	1.00	0.53	1.37	0.73	0.69	1.05
31.66	0.75	0.89	1.00	0.89	1.37	1.23	0.69	1.78
32.16	0.76	0.85	1.00	0.85	1.37	1.17	0.69	1.71
32.66	0.77	0.70	1.00	0.70	1.37	0.96	0.69	1.41
33.16	0.78	2.08	1.00	2.08	1.37	2.00	0.68	5.00 ^
33.66	0.79	0.14	1.00	0.14	1.37	0.20	0.68	0.29 *
34.16	0.80	0.15	1.00	0.15	1.37	0.20	0.68	0.30 *
34.66	0.81	0.15	1.00	0.15	1.37	0.21	0.68	0.31 *
35.16	0.81	0.15	1.00	0.15	1.37	0.21	0.68	0.31 *
35.66	0.82	0.16	1.00	0.16	1.37	0.23	0.68	0.33 *
36.16	0.83	0.15	1.00	0.15	1.37	0.21	0.67	0.31 *
36.66	0.84	0.15	1.00	0.15	1.37	0.20	0.67	0.30 *
37.16	0.85	0.17	1.00	0.17	1.37	0.23	0.67	0.35 *
37.66	0.86	0.18	1.00	0.18	1.37	0.25	0.67	0.38 *
38.16	0.87	0.16	1.00	0.16	1.37	0.23	0.67	0.34 *
38.66	0.88	0.14	1.00	0.14	1.37	0.19	0.66	0.29 *
39.16	0.88	0.18	1.00	0.18	1.37	0.25	0.66	0.37 *
39.66	0.89	0.22	1.00	0.22	1.37	0.30	0.66	0.46 *
40.16	0.90	0.20	1.00	0.20	1.37	0.27	0.66	0.42 *
40.66	0.91	0.28	1.00	0.28	1.37	0.39	0.65	0.59 *
41.16	0.92	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
41.66	0.93	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
42.16	0.94	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
42.66	0.95	2.08	1.00	2.08	1.37	2.00	0.65	5.00 ^
43.16	0.96	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
43.66	0.96	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
44.16	0.97	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
44.66	0.98	2.08	1.00	2.08	1.37	2.00	0.64	5.00 ^
45.16	0.99	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
45.66	1.00	2.08	1.00	2.08	1.37	2.00	0.63	5.00 ^
46.16	1.01	2.08	1.00	2.09	1.37	2.00	0.63	5.00 ^
46.66	1.02	2.08	1.00	2.09	1.37	2.00	0.63	5.00 ^
47.16	1.03	2.08	1.00	2.08	1.37	2.00	0.62	5.00 ^
47.66	1.04	0.38	1.00	0.38	1.37	0.52	0.62	0.83 *
48.16	1.04	2.08	1.00	2.08	1.37	2.85	0.62	4.60
48.66	1.05	2.08	1.00	2.08	1.37	2.84	0.62	4.62
49.16	1.06	2.08	1.00	2.07	1.37	2.84	0.61	4.63
49.66	1.07	2.08	1.00	2.07	1.37	2.84	0.61	4.64
50.16	1.08	2.08	0.99	2.07	1.37	2.83	0.61	4.66
50.66	1.09	2.08	0.99	2.06	1.37	2.83	0.61	4.67
51.16	1.10	2.08	0.99	2.06	1.37	2.83	0.60	4.69
51.66	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.70
52.16	1.11	2.08	0.99	2.06	1.37	2.82	0.60	4.71
52.66	1.12	2.08	0.99	2.05	1.37	2.81	0.59	4.73
53.16	1.13	2.08	0.99	2.05	1.37	2.81	0.59	4.74
53.66	1.14	2.08	0.98	2.05	1.37	2.81	0.59	4.76
54.16	1.15	2.08	0.98	2.04	1.37	2.80	0.59	4.78
54.66	1.16	2.08	0.98	2.04	1.37	2.80	0.58	4.79

Liq.

55.16	1.17	2.08	0.98	2.04	1.37	2.79	0.58	4.81
55.66	1.18	2.08	0.98	2.04	1.37	2.79	0.58	4.83
56.16	1.19	2.08	0.98	2.03	1.37	2.79	0.58	4.84
56.66	1.19	2.08	0.98	2.03	1.37	2.78	0.57	4.86
57.16	1.20	2.08	0.97	2.03	1.37	2.78	0.57	4.88
57.66	1.21	2.08	0.97	2.02	1.37	2.78	0.57	4.89
58.16	1.22	2.08	0.97	2.02	1.37	2.77	0.56	4.91
58.66	1.23	2.08	0.97	2.02	1.37	2.77	0.56	4.93
59.16	1.24	2.08	0.97	2.02	1.37	2.76	0.56	4.95
59.66	1.25	2.08	0.97	2.01	1.37	2.76	0.56	4.97
60.16	1.26	2.08	0.97	2.01	1.37	2.76	0.55	4.99
60.66	1.27	2.08	0.97	2.01	1.37	2.75	0.55	5.00

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils or above Water Table.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
0.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
1.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
2.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
3.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.16	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
4.66	7.97	1.02	0.00	0.10	NoLiq	0.00	0.10
5.16	2.60	3.70	259.89	70.16	35.13	0.00	70.16
5.66	2.35	4.16	160.78	38.60	24.26	0.00	38.60
6.16	2.12	4.58	140.46	30.70	16.54	0.00	30.70
6.66	2.53	3.83	185.60	48.52	32.04	0.00	48.52
7.16	1.99	4.83	176.93	36.64	12.60	0.00	36.64
7.66	1.92	4.96	165.59	33.38	10.78	0.00	33.38
8.16	2.57	3.76	199.22	53.01	33.73	0.00	53.01
8.66	1.99	4.82	144.39	29.93	12.66	0.00	29.93
9.16	2.09	4.63	127.41	27.52	15.65	0.00	27.52
9.66	2.48	3.92	117.14	29.88	29.74	0.00	29.88
10.16	2.68	3.55	10.39	2.93	NoLiq	0.00	2.93
10.66	2.84	3.26	8.11	2.49	NoLiq	0.00	2.49
11.16	2.78	3.37	10.53	3.13	NoLiq	0.00	3.13
11.66	2.76	3.39	11.27	3.32	NoLiq	0.00	3.32
12.16	2.71	3.50	14.09	4.03	NoLiq	0.00	4.03
12.66	2.90	3.15	11.95	3.80	NoLiq	0.00	3.80
13.16	3.03	2.90	10.04	3.47	NoLiq	0.00	3.47
13.66	2.97	3.00	9.85	3.28	NoLiq	0.00	3.28
14.16	2.96	3.03	10.37	3.42	NoLiq	0.00	3.42
14.66	2.85	3.24	12.18	3.76	NoLiq	0.00	3.76
15.16	2.80	3.33	14.90	4.47	NoLiq	0.00	4.47
15.66	2.77	3.38	15.27	4.51	NoLiq	0.00	4.51
16.16	2.43	4.01	32.31	8.06	NoLiq	0.00	8.06
16.66	2.62	3.66	16.11	4.40	NoLiq	0.00	4.40
17.16	3.07	2.83	8.60	3.04	NoLiq	0.00	3.04
17.66	2.73	3.45	18.09	5.25	NoLiq	0.00	5.25
18.16	2.84	3.26	20.04	6.15	NoLiq	0.00	6.15
18.66	3.01	2.94	11.54	3.92	NoLiq	0.00	3.92
19.16	2.89	3.15	13.59	4.31	NoLiq	0.00	4.31
19.66	2.79	3.34	18.80	5.64	NoLiq	0.00	5.64
20.16	2.89	3.16	16.34	5.17	NoLiq	0.00	5.17
20.66	3.01	2.95	13.49	4.58	NoLiq	0.00	4.58
21.16	3.02	2.92	12.26	4.20	NoLiq	0.00	4.20
21.66	2.96	3.03	14.90	4.91	NoLiq	0.00	4.91
22.16	2.89	3.17	17.87	5.64	NoLiq	0.00	5.64
22.66	2.74	3.44	28.10	8.18	NoLiq	0.00	8.18
23.16	1.88	5.03	169.19	33.61	9.81	0.00	33.61
23.66	1.63	5.48	223.72	40.83	4.95	0.00	40.83
24.16	1.68	5.39	246.00	45.63	5.80	0.00	45.63
24.66	1.39	5.93	324.15	54.68	1.42	0.00	54.68
25.16	1.24	6.21	500.00	80.57	0.00	0.00	80.57
25.66	1.48	5.77	500.00	86.63	2.51	0.00	86.63
26.16	1.45	5.82	500.00	85.84	2.13	0.00	85.84
26.66	1.20	6.28	500.00	79.63	0.00	0.00	79.63
27.16	1.21	6.26	500.00	79.89	0.00	0.00	79.89
27.66	1.29	6.12	397.15	64.86	0.27	0.00	64.86
28.16	1.30	6.10	411.61	67.52	0.42	0.00	67.52
28.66	1.19	6.30	355.26	56.43	0.00	0.00	56.43
29.16	1.36	5.98	311.74	52.13	1.09	0.00	52.13

29.66	1.00	6.65	456.42	68.65	0.00	0.00	68.65
30.16	1.50	5.73	299.43	52.28	2.85	0.00	52.28
30.66	1.38	5.94	286.58	48.22	1.33	0.00	48.22
31.16	2.30	4.25	169.26	39.81	22.50	0.00	39.81
31.66	2.14	4.55	206.08	45.27	16.92	0.00	45.27
32.16	1.89	5.01	202.72	40.49	10.17	0.00	40.49
32.66	2.31	4.22	188.53	44.65	23.07	0.00	44.65
33.16	2.66	3.58	35.21	9.84	NoLiq	0.00	9.84
33.66	2.50	3.89	88.12	22.68	30.55	0.00	22.68
34.16	2.47	3.93	90.74	23.11	29.58	0.00	23.11
34.66	2.47	3.93	91.55	23.27	29.40	0.00	23.27
35.16	2.47	3.93	92.34	23.50	29.51	0.00	23.50
35.66	2.47	3.94	96.81	24.58	29.29	0.00	24.58
36.16	2.44	3.99	91.79	23.02	28.16	0.00	23.02
36.66	2.43	4.02	89.88	22.37	27.46	0.00	22.37
37.16	2.46	3.96	99.00	25.02	28.85	0.00	25.02
37.66	2.48	3.91	103.63	26.47	29.86	0.00	26.47
38.16	2.46	3.95	96.75	24.47	28.94	0.00	24.47
38.66	2.25	4.35	85.81	19.73	20.56	0.00	19.73
39.16	2.50	3.88	102.61	26.47	30.79	0.00	26.47
39.66	2.52	3.85	114.78	29.82	31.44	0.00	29.82
40.16	2.38	4.11	108.82	26.49	25.48	0.00	26.49
40.66	2.39	4.08	129.65	31.75	26.02	0.00	31.75
41.16	2.65	3.60	65.88	18.30	NoLiq	0.00	18.30
41.66	2.74	3.44	46.29	13.47	NoLiq	0.00	13.47
42.16	2.71	3.49	33.72	9.67	NoLiq	0.00	9.67
42.66	2.80	3.33	32.26	9.68	NoLiq	0.00	9.68
43.16	2.85	3.23	31.71	9.81	NoLiq	0.00	9.81
43.66	2.77	3.38	35.07	10.37	NoLiq	0.00	10.37
44.16	2.69	3.53	40.94	11.60	NoLiq	0.00	11.60
44.66	2.70	3.52	38.51	10.95	NoLiq	0.00	10.95
45.16	2.66	3.58	41.26	11.52	NoLiq	0.00	11.52
45.66	2.72	3.48	35.79	10.28	NoLiq	0.00	10.28
46.16	2.71	3.49	34.58	9.92	NoLiq	0.00	9.92
46.66	2.82	3.29	30.57	9.30	NoLiq	0.00	9.30
47.16	2.71	3.48	39.31	11.28	NoLiq	0.00	11.28
47.66	2.30	4.24	147.06	34.68	22.71	0.00	34.68
48.16	1.59	5.56	324.57	58.41	4.25	0.00	58.41
48.66	1.61	5.52	351.95	63.77	4.58	0.00	63.77
49.16	1.28	6.14	349.28	56.88	0.17	0.00	56.88
49.66	1.04	6.57	376.37	57.26	0.00	0.00	57.26
50.16	1.19	6.29	421.58	66.98	0.00	0.00	66.98
50.66	1.16	6.36	433.88	68.26	0.00	0.00	68.26
51.16	1.19	6.31	446.37	70.75	0.00	0.00	70.75
51.66	1.00	6.65	458.58	68.91	0.00	0.00	68.91
52.16	1.02	6.62	459.39	69.43	0.00	0.00	69.43
52.66	1.46	5.81	397.40	68.43	2.25	0.00	68.43
53.16	1.23	6.22	332.44	53.42	0.00	0.00	53.42
53.66	1.50	5.72	318.89	55.72	2.88	0.00	55.72
54.16	1.59	5.57	332.25	59.66	4.14	0.00	59.66
54.66	1.09	6.49	336.30	51.79	0.00	0.00	51.79
55.16	1.13	6.41	385.57	60.17	0.00	0.00	60.17
55.66	1.21	6.27	413.86	66.01	0.00	0.00	66.01
56.16	1.24	6.21	404.16	65.12	0.00	0.00	65.12
56.66	1.17	6.34	411.53	64.95	0.00	0.00	64.95
57.16	1.27	6.15	397.25	64.64	0.15	0.00	64.64
57.66	1.39	5.93	377.26	63.57	1.39	0.00	63.57
58.16	1.19	6.29	401.67	63.82	0.00	0.00	63.82
58.66	1.17	6.34	420.60	66.29	0.00	0.00	66.29
59.16	1.17	6.33	420.96	66.51	0.00	0.00	66.51
59.66	1.48	5.77	421.22	72.97	2.50	0.00	72.97
60.16	1.48	5.77	358.23	62.07	2.51	0.00	62.07
60.66	0.97	6.70	399.11	59.57	0.00	0.00	59.57

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
(N1)60 is converted from qc1, (N1)60s is after fines correction
Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:
Settlement Analysis Method: Ishihara / Yoshimine

Depth ft	CSRsf	/ MSF*	=CSRm	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsp in.	S in.
60.96	0.55	1.00	0.55	5.00	2.84	69.82	100.00	0.000	0.0E0	0.000	0.000
60.66	0.55	1.00	0.55	5.00	0.00	59.57	100.00	0.000	0.0E0	0.000	0.000
60.16	0.55	1.00	0.55	4.99	2.51	62.07	100.00	0.000	0.0E0	0.000	0.000
59.66	0.56	1.00	0.56	4.97	2.50	72.97	100.00	0.000	0.0E0	0.000	0.000
59.16	0.56	1.00	0.56	4.95	0.00	66.51	100.00	0.000	0.0E0	0.000	0.000
58.66	0.56	1.00	0.56	4.93	0.00	66.29	100.00	0.000	0.0E0	0.000	0.000
58.16	0.56	1.00	0.56	4.91	0.00	63.82	100.00	0.000	0.0E0	0.000	0.000
57.66	0.57	1.00	0.57	4.89	1.39	63.57	100.00	0.000	0.0E0	0.000	0.000

57.16	0.57	1.00	0.57	4.88	0.15	64.64	100.00	0.000	0.0E0	0.000	0.000
56.66	0.57	1.00	0.57	4.86	0.00	64.95	100.00	0.000	0.0E0	0.000	0.000
56.16	0.58	1.00	0.58	4.84	0.00	65.12	100.00	0.000	0.0E0	0.000	0.000
55.66	0.58	1.00	0.58	4.83	0.00	66.01	100.00	0.000	0.0E0	0.000	0.000
55.16	0.58	1.00	0.58	4.81	0.00	60.17	100.00	0.000	0.0E0	0.000	0.000
54.66	0.58	1.00	0.58	4.79	0.00	51.79	100.00	0.000	0.0E0	0.000	0.000
54.16	0.59	1.00	0.59	4.78	4.14	59.66	100.00	0.000	0.0E0	0.000	0.000
53.66	0.59	1.00	0.59	4.76	2.88	55.72	100.00	0.000	0.0E0	0.000	0.000
53.16	0.59	1.00	0.59	4.74	0.00	53.42	100.00	0.000	0.0E0	0.000	0.000
52.66	0.59	1.00	0.59	4.73	2.25	68.43	100.00	0.000	0.0E0	0.000	0.000
52.16	0.60	1.00	0.60	4.71	0.00	69.43	100.00	0.000	0.0E0	0.000	0.000
51.66	0.60	1.00	0.60	4.70	0.00	68.91	100.00	0.000	0.0E0	0.000	0.000
51.16	0.60	1.00	0.60	4.69	0.00	70.75	100.00	0.000	0.0E0	0.000	0.000
50.66	0.61	1.00	0.61	4.67	0.00	68.26	100.00	0.000	0.0E0	0.000	0.000
50.16	0.61	1.00	0.61	4.66	0.00	66.98	100.00	0.000	0.0E0	0.000	0.000
49.66	0.61	1.00	0.61	4.64	0.00	57.26	100.00	0.000	0.0E0	0.000	0.000
49.16	0.61	1.00	0.61	4.63	0.17	56.88	100.00	0.000	0.0E0	0.000	0.000
48.66	0.62	1.00	0.62	4.62	4.58	63.77	100.00	0.000	0.0E0	0.000	0.000
48.16	0.62	1.00	0.62	4.60	4.25	58.41	100.00	0.000	0.0E0	0.000	0.000
47.66	0.62	1.00	0.62	0.83	22.71	34.68	100.00	0.000	0.0E0	0.000	0.000
47.16	0.62	1.00	0.62	5.00	NoLiq	11.28	53.52	0.000	0.0E0	0.056	0.056
46.66	0.63	1.00	0.63	5.00	NoLiq	9.30	48.83	0.000	0.0E0	0.000	0.056
46.16	0.63	1.00	0.63	5.00	NoLiq	9.92	50.34	0.000	0.0E0	0.000	0.056
45.66	0.63	1.00	0.63	5.00	NoLiq	10.28	51.21	0.000	0.0E0	0.000	0.056
45.16	0.63	1.00	0.63	5.00	NoLiq	11.52	54.05	0.000	0.0E0	0.000	0.056
44.66	0.64	1.00	0.64	5.00	NoLiq	10.95	52.77	0.000	0.0E0	0.000	0.056
44.16	0.64	1.00	0.64	5.00	NoLiq	11.60	54.22	0.000	0.0E0	0.000	0.056
43.66	0.64	1.00	0.64	5.00	NoLiq	10.37	51.42	0.000	0.0E0	0.000	0.056
43.16	0.64	1.00	0.64	5.00	NoLiq	9.81	50.08	0.000	0.0E0	0.000	0.056
42.66	0.65	1.00	0.65	5.00	NoLiq	9.68	49.76	0.000	0.0E0	0.000	0.056
42.16	0.65	1.00	0.65	5.00	NoLiq	9.67	49.75	0.000	0.0E0	0.000	0.056
41.66	0.65	1.00	0.65	5.00	NoLiq	13.47	58.21	0.000	0.0E0	0.000	0.056
41.16	0.65	1.00	0.65	5.00	NoLiq	18.30	67.47	0.000	0.0E0	0.000	0.056
40.66	0.65	1.00	0.65	0.59	26.02	31.75	94.16	0.658	3.9E-3	0.013	0.069
40.16	0.66	1.00	0.66	0.42	25.48	26.49	82.63	1.634	9.8E-3	0.025	0.094
39.66	0.66	1.00	0.66	0.46	31.44	29.82	89.65	1.322	7.9E-3	0.086	0.181
39.16	0.66	1.00	0.66	0.37	30.79	26.47	82.59	1.636	9.8E-3	0.026	0.206
38.66	0.66	1.00	0.66	0.29	20.56	19.73	70.04	2.194	1.3E-2	0.117	0.323
38.16	0.67	1.00	0.67	0.34	28.94	24.47	78.71	1.804	1.1E-2	0.119	0.443
37.66	0.67	1.00	0.67	0.38	29.86	26.47	82.59	1.636	9.8E-3	0.102	0.545
37.16	0.67	1.00	0.67	0.35	28.85	25.02	79.75	1.757	1.1E-2	0.104	0.649
36.66	0.67	1.00	0.67	0.30	27.46	22.37	74.82	1.979	1.2E-2	0.115	0.764
36.16	0.67	1.00	0.67	0.31	28.16	23.02	76.01	1.926	1.2E-2	0.117	0.881
35.66	0.68	1.00	0.68	0.33	29.29	24.58	78.91	1.795	1.1E-2	0.109	0.991
35.16	0.68	1.00	0.68	0.31	29.51	23.50	76.89	1.886	1.1E-2	0.108	1.099
34.66	0.68	1.00	0.68	0.31	29.40	23.27	76.47	1.905	1.1E-2	0.117	1.216
34.16	0.68	1.00	0.68	0.30	29.58	23.11	76.17	1.918	1.2E-2	0.115	1.331
33.66	0.68	1.00	0.68	0.29	30.55	22.68	75.38	1.954	1.2E-2	0.114	1.445
33.16	0.68	1.00	0.68	5.00	NoLiq	9.84	50.16	0.000	0.0E0	0.027	1.472
32.66	0.69	1.00	0.69	1.41	23.07	44.65	100.00	0.000	0.0E0	0.000	1.472
32.16	0.69	1.00	0.69	1.71	10.17	40.49	100.00	0.000	0.0E0	0.000	1.472
31.66	0.69	1.00	0.69	1.78	16.92	45.27	100.00	0.000	0.0E0	0.000	1.472
31.16	0.69	1.00	0.69	1.05	22.50	39.81	100.00	0.000	0.0E0	0.000	1.472
30.66	0.69	1.00	0.69	4.12	1.33	48.22	100.00	0.000	0.0E0	0.000	1.472
30.16	0.69	1.00	0.69	4.12	2.85	52.28	100.00	0.000	0.0E0	0.000	1.472
29.66	0.69	1.00	0.69	4.12	0.00	68.65	100.00	0.000	0.0E0	0.000	1.472
29.16	0.69	1.00	0.69	4.12	1.09	52.13	100.00	0.000	0.0E0	0.000	1.472
28.66	0.69	1.00	0.69	4.13	0.00	56.43	100.00	0.000	0.0E0	0.000	1.472
28.16	0.69	1.00	0.69	4.13	0.42	67.52	100.00	0.000	0.0E0	0.000	1.472
27.66	0.69	1.00	0.69	4.14	0.27	64.86	100.00	0.000	0.0E0	0.000	1.472
27.16	0.69	1.00	0.69	4.15	0.00	79.89	100.00	0.000	0.0E0	0.000	1.472
26.66	0.69	1.00	0.69	4.16	0.00	79.63	100.00	0.000	0.0E0	0.000	1.472
26.16	0.68	1.00	0.68	4.16	2.13	85.84	100.00	0.000	0.0E0	0.000	1.472
25.66	0.68	1.00	0.68	4.17	2.51	86.63	100.00	0.000	0.0E0	0.000	1.472
25.16	0.68	1.00	0.68	4.18	0.00	80.57	100.00	0.000	0.0E0	0.000	1.472
24.66	0.68	1.00	0.68	4.19	1.42	54.68	100.00	0.000	0.0E0	0.000	1.472
24.16	0.68	1.00	0.68	2.96	5.80	45.63	100.00	0.000	0.0E0	0.000	1.472
23.66	0.68	1.00	0.68	2.27	4.95	40.83	100.00	0.000	0.0E0	0.000	1.472
23.16	0.67	1.00	0.67	1.08	9.81	33.61	98.85	0.042	2.5E-4	0.001	1.473
22.66	0.67	1.00	0.67	5.00	NoLiq	8.18	45.95	0.000	0.0E0	0.005	1.478
22.16	0.67	1.00	0.67	5.00	NoLiq	5.64	38.75	0.000	0.0E0	0.000	1.478
21.66	0.67	1.00	0.67	5.00	NoLiq	4.91	36.48	0.000	0.0E0	0.000	1.478
21.16	0.67	1.00	0.67	5.00	NoLiq	4.20	34.15	0.000	0.0E0	0.000	1.478
20.66	0.66	1.00	0.66	5.00	NoLiq	4.58	35.41	0.000	0.0E0	0.000	1.478
20.16	0.66	1.00	0.66	5.00	NoLiq	5.17	37.31	0.000	0.0E0	0.000	1.478
19.66	0.66	1.00	0.66	5.00	NoLiq	5.64	38.74	0.000	0.0E0	0.000	1.478
19.16	0.66	1.00	0.66	5.00	NoLiq	4.31	34.52	0.000	0.0E0	0.000	1.478
18.66	0.65	1.00	0.65	5.00	NoLiq	3.92	33.22	0.000	0.0E0	0.000	1.478
18.16	0.65	1.00	0.65	5.00	NoLiq	6.15	40.28	0.000	0.0E0	0.000	1.478
17.66	0.65	1.00	0.65	5.00	NoLiq	5.25	37.54	0.000	0.0E0	0.000	1.478
17.16	0.64	1.00	0.64	5.00	NoLiq	3.04	30.15	0.000	0.0E0	0.000	1.478
16.66	0.64	1.00	0.64	5.00	NoLiq	4.40	34.82	0.000	0.0E0	0.000	1.478

16.16	0.63	1.00	0.63	5.00	NoLiq	8.06	45.65	0.000	0.0E0	0.000	1.478
15.66	0.63	1.00	0.63	5.00	NoLiq	4.51	35.19	0.000	0.0E0	0.000	1.478
15.16	0.63	1.00	0.63	5.00	NoLiq	4.47	35.06	0.000	0.0E0	0.000	1.478
14.66	0.62	1.00	0.62	5.00	NoLiq	3.76	32.66	0.000	0.0E0	0.000	1.478
14.16	0.62	1.00	0.62	5.00	NoLiq	3.42	31.50	0.000	0.0E0	0.000	1.478
13.66	0.61	1.00	0.61	5.00	NoLiq	3.28	31.00	0.000	0.0E0	0.000	1.478
13.16	0.60	1.00	0.60	5.00	NoLiq	3.47	31.66	0.000	0.0E0	0.000	1.478
12.66	0.60	1.00	0.60	5.00	NoLiq	3.80	32.80	0.000	0.0E0	0.000	1.478
12.16	0.59	1.00	0.59	5.00	NoLiq	4.03	33.59	0.000	0.0E0	0.000	1.478
11.66	0.58	1.00	0.58	5.00	NoLiq	3.32	31.17	0.000	0.0E0	0.000	1.478
11.16	0.58	1.00	0.58	5.00	NoLiq	3.13	30.47	0.000	0.0E0	0.000	1.478
10.66	0.57	1.00	0.57	5.00	NoLiq	2.49	28.17	0.000	0.0E0	0.000	1.478
10.16	0.56	1.00	0.56	5.00	NoLiq	2.93	29.77	0.000	0.0E0	0.000	1.478
9.66	0.55	1.00	0.55	0.57	29.74	29.88	89.80	1.175	7.1E-3	0.009	1.487
9.16	0.54	1.00	0.54	0.69	15.65	27.52	84.72	1.224	7.3E-3	0.093	1.580
8.66	0.53	1.00	0.53	0.93	12.66	29.93	89.90	0.581	3.5E-3	0.061	1.641
8.16	0.52	1.00	0.52	2.15	33.73	53.01	100.00	0.000	0.0E0	0.021	1.662
7.66	0.51	1.00	0.51	1.36	10.78	33.38	98.26	0.034	2.0E-4	0.011	1.673
7.16	0.49	1.00	0.49	1.66	12.60	36.64	100.00	0.000	0.0E0	0.000	1.673
6.66	0.48	1.00	0.48	1.94	32.04	48.52	100.00	0.000	0.0E0	0.001	1.674
6.16	0.46	1.00	0.46	1.00	16.54	30.70	91.65	0.372	2.2E-3	0.012	1.687
5.66	0.44	1.00	0.44	1.44	24.26	38.60	100.00	0.000	0.0E0	0.005	1.692
5.16	0.42	1.00	0.42	5.00	35.13	70.16	100.00	0.000	0.0E0	0.000	1.692
5.01	0.42	1.00	0.42	2.17	39.58	52.01	100.00	0.000	0.0E0	0.000	1.692

Settlement of Saturated Sands=1.692 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth ft	sigma' atm	sigC' atm	(N1)60s	CSRsf	Gmax atm	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsp in.	S in.
4.96	0.28	0.18	2.06	0.42	243.23	4.8E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.66	0.26	0.17	0.10	0.42	86.09	1.3E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
4.16	0.24	0.15	0.10	0.42	81.34	1.2E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.66	0.21	0.13	0.10	0.42	76.30	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
3.16	0.18	0.12	0.10	0.42	70.90	1.1E-3	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.66	0.15	0.10	0.10	0.42	65.05	9.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
2.16	0.12	0.08	0.10	0.42	58.62	8.8E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.66	0.09	0.06	0.10	0.42	51.39	7.7E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
1.16	0.07	0.04	0.10	0.42	42.95	6.5E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.66	0.04	0.02	0.10	0.42	32.40	4.9E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000
0.16	0.01	0.01	0.10	0.42	15.95	2.4E-4	1.0000	4.6774	0.82	3.8158	0.00E0	0.000	0.000

Settlement of Unsaturated Sands

Settlement of Unsaturated Sands=0.000 in.
(N1)60s is converted from qc1 and after fines correction
dsz is per each segment, dz=0.05 ft
dsp is per each print interval, dp=0.50 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=1.692 in.
Differential Settlement=0.846 to 1.117 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)
1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig

CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=1, based on Item 2 of Page C.
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center, Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

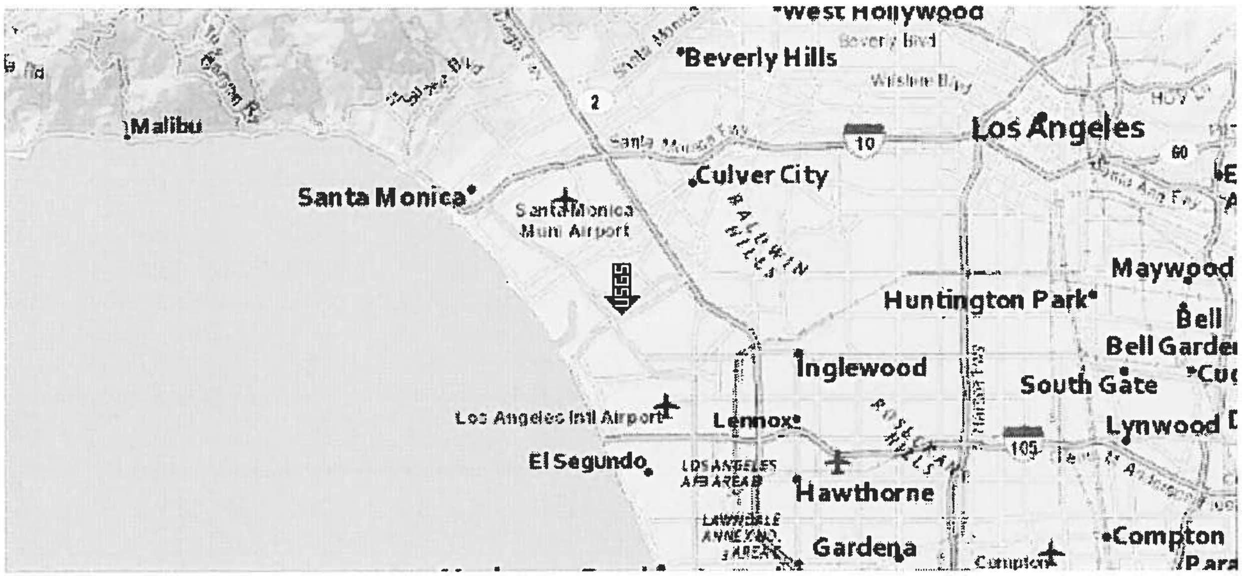
APPENDIX D

CBC Seismic Design / Site Specific Response Spectra

USGS Design Maps Summary Report

User–Specified Input

Report Title	12870 Panama Street Tue March 22, 2016 15:41:21 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	33.98417°N, 118.42733°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

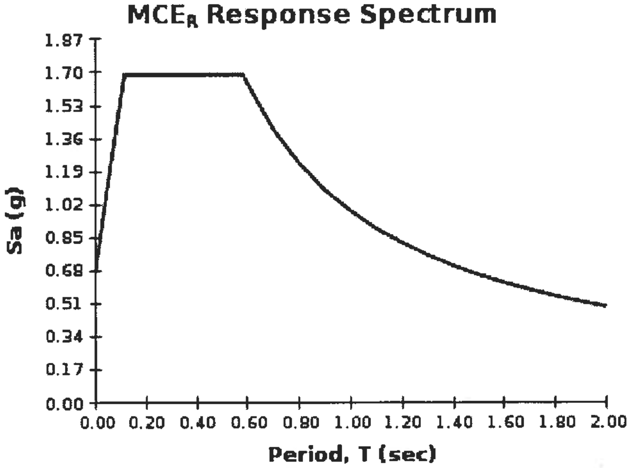


USGS–Provided Output

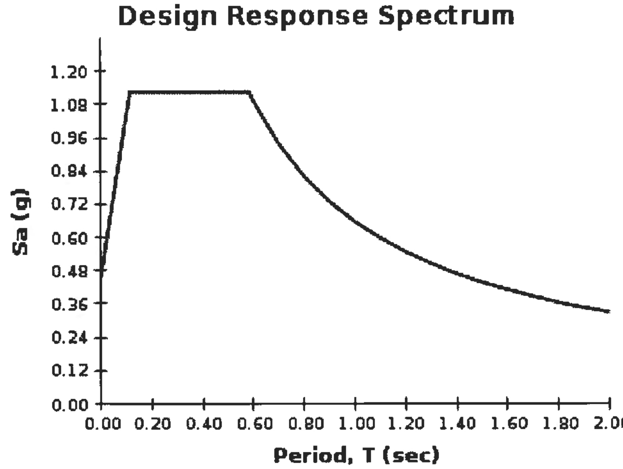
$S_S =$	1.688 g	$S_{MS} =$	1.688 g	$S_{DS} =$	1.125 g
$S_1 =$	0.657 g	$S_{M1} =$	0.986 g	$S_{D1} =$	0.657 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

MCE_R Response Spectrum



Design Response Spectrum



For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

CBC-1

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.98417°N, 118.42733°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1] $S_S = 1.688$ g

From Figure 22-2 [2] $S_1 = 0.657$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

abc-2

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE $_R$ Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	$\boxed{1.0}$
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = D and S_S = 1.688 g, F_a = 1.000

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE $_R$ Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	$\boxed{1.5}$
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.657 g, F_v = 1.500

CBC-3

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 1.688 = 1.688$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.657 = 0.986$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

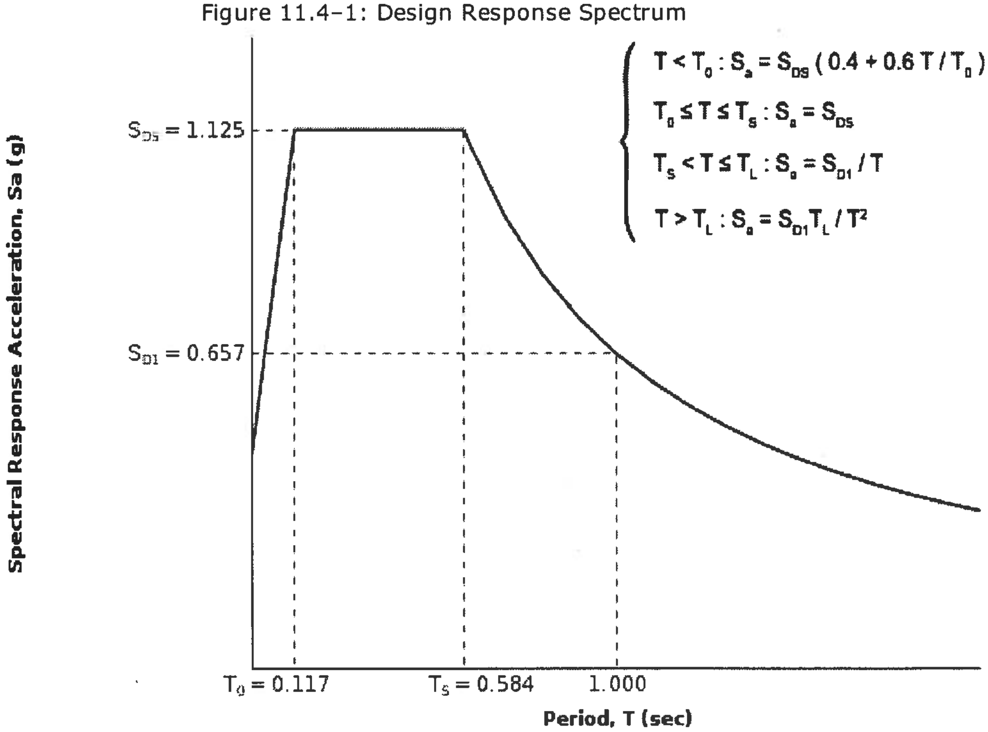
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 1.688 = 1.125$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 0.986 = 0.657$ g

Section 11.4.5 — Design Response Spectrum

From Figure 22-12 [3] T_L = 8 seconds

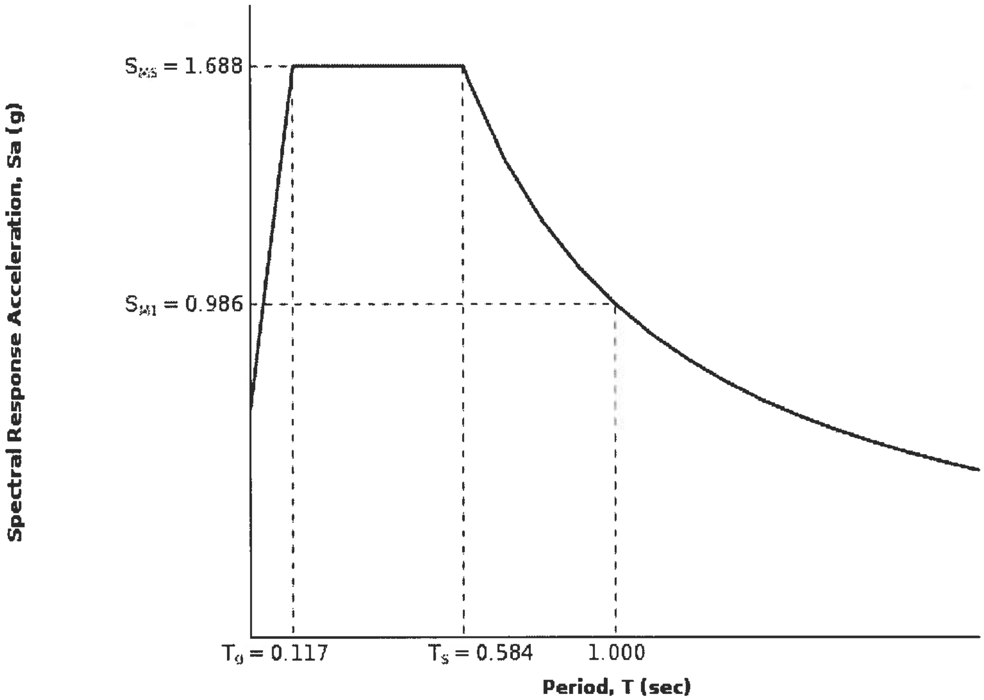
Figure 11.4-1: Design Response Spectrum



CBC-4

Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



CBC-5

Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.651

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.651 = 0.651$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	$\boxed{1.0}$
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.651 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.995

From Figure 22-18 [6] C_{R1} = 0.998

OBC-6

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	**RISK CATEGORY**		
	I or II	**III**	**IV**
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.125 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	**RISK CATEGORY**		
	I or II	**III**	**IV**
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.657 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

CBC-7

PSH Deaggregation on NEHRP DE soil

12870_Panama_St 118.427° W, 33.984 N.

SA period 0.20 sec. Accel.>=0.8524 g

Ann. Exceedance Rate .214E-02. Mean Return Time 475 yrs

Mean (R,M,ε_0) 25.0 km,6.63, 1.25

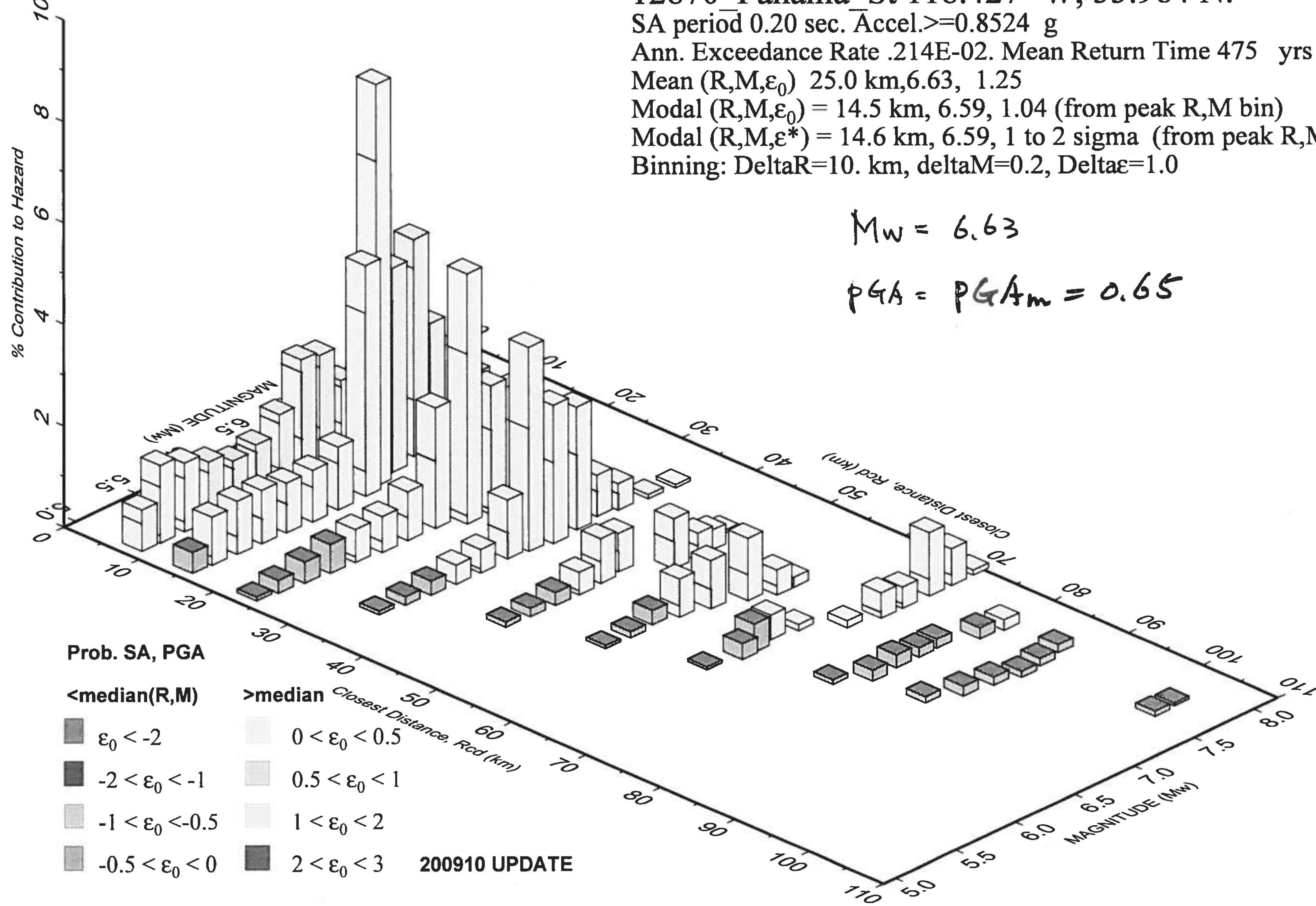
Modal (R,M,ε_0) = 14.5 km, 6.59, 1.04 (from peak R,M bin)

Modal (R,M,ε^*) = 14.6 km, 6.59, 1 to 2 sigma (from peak R,M,ε bin)

Binning: DeltaR=10. km, deltaM=0.2, Deltaε=1.0

Mw = 6.63

PGA = PGAm = 0.65



GMT 2016 Mar 22 15:45:07 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on soil with average vs= 180. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

CBC-8

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*                     *
*   E Q F A U L T     *
*                     *
*   Version 3.00      *
*                     *
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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 16-0107

DATE: 03-23-2016

JOB NAME: 12870 Panama Street

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: CGSFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 33.9817
SITE LONGITUDE: 118.4273

SEARCH RADIUS: 100 mi

ATTENUATION RELATION: 1) Boore et al. (1997) Horiz. - NEHRP B (1070)
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: cd_2drp
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: CGSFLTE.DAT

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
NEWPORT-INGLEWOOD (L.A.Basin)	4.0(6.4)	7.1	0.273	IX
SANTA MONICA	4.6(7.4)	6.6	0.238	IX
MALIBU COAST	6.9(11.1)	6.7	0.200	VIII
PALOS VERDES	7.1(11.4)	7.3	0.222	IX
HOLLYWOOD	7.1(11.5)	6.4	0.167	VIII
PUENTE HILLS BLIND THRUST	9.1(14.7)	7.1	0.206	VIII
UPPER ELYSIAN PARK BLIND THRUST	11.7(18.9)	6.4	0.119	VII
NORTHRIDGE (E. Oak Ridge)	11.9(19.1)	7.0	0.162	VIII
RAYMOND	15.2(24.4)	6.5	0.104	VII
ANACAPA-DUME	15.3(24.6)	7.5	0.176	VIII
VERDUGO	16.5(26.5)	6.9	0.121	VII
SIERRA MADRE	20.9(33.6)	7.2	0.119	VII
SIERRA MADRE (San Fernando)	21.1(34.0)	6.7	0.090	VII
SANTA SUSANA	23.1(37.1)	6.7	0.085	VII
WHITTIER	23.4(37.7)	6.8	0.072	VII
SAN GABRIEL	24.7(39.8)	7.2	0.086	VII
SIMI-SANTA ROSA	27.0(43.4)	7.0	0.088	VII
HOLSER	27.9(44.9)	6.5	0.066	VI
CLAMSHELL-SAWPIT	27.9(44.9)	6.5	0.066	VI
OAK RIDGE (Onshore)	30.4(48.9)	7.0	0.080	VII
SAN JOSE	30.8(49.6)	6.4	0.058	VI
SAN JOAQUIN HILLS	34.5(55.6)	6.6	0.059	VI
CHINO-CENTRAL AVE. (Elsinore)	35.5(57.2)	6.7	0.061	VI
SAN CAYETANO	36.8(59.2)	7.0	0.069	VI
NEWPORT-INGLEWOOD (Offshore)	39.9(64.2)	7.1	0.056	VI
CUCAMONGA	40.8(65.6)	6.9	0.061	VI
SAN ANDREAS - 1857 Rupture M-2a	43.2(69.6)	7.8	0.077	VII
SAN ANDREAS - Mojave M-1c-3	43.2(69.6)	7.4	0.062	VI
SAN ANDREAS - Whole M-1a	43.2(69.6)	8.0	0.085	VII
SAN ANDREAS - Cho-Moj M-1b-1	43.2(69.6)	7.8	0.077	VII
OAK RIDGE(Blind Thrust Offshore)	45.7(73.5)	7.1	0.062	VI
ELSINORE (GLEN IVY)	46.1(74.2)	6.8	0.043	VI
VENTURA - PITAS POINT	48.0(77.2)	6.9	0.054	VI
CHANNEL IS. THRUST (Eastern)	48.0(77.3)	7.5	0.073	VII
SANTA YNEZ (East)	48.7(78.3)	7.1	0.048	VI
SAN ANDREAS - Carrizo M-1c-2	49.8(80.1)	7.4	0.056	VI
OAK RIDGE MID-CHANNEL STRUCTURE	52.1(83.8)	6.6	0.043	VI
M.RIDGE-ARROYO PARIDA-SANTA ANA	54.1(87.1)	7.2	0.057	VI
SAN JACINTO-SAN BERNARDINO	55.7(89.7)	6.7	0.035	V
RED MOUNTAIN	56.9(91.5)	7.0	0.049	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
CORONADO BANK	57.0(91.7)	7.6	0.056	VI
SAN ANDREAS - SB-Coach. M-1b-2	57.4(92.3)	7.7	0.058	VI
SAN ANDREAS - San Bernardino M-1	57.4(92.3)	7.5	0.053	VI
SAN ANDREAS - SB-Coach. M-2b	57.4(92.3)	7.7	0.058	VI
CLEGHORN	59.7(96.1)	6.5	0.030	V
SANTA CRUZ ISLAND	62.3(100.3)	7.0	0.046	VI
GARLOCK (West)	63.8(102.7)	7.3	0.044	VI
PLEITO THRUST	64.3(103.5)	7.0	0.045	VI
ELSINORE (TEMECULA)	66.1(106.4)	6.8	0.033	V
BIG PINE	66.2(106.6)	6.9	0.034	V
SAN JACINTO-SAN JACINTO VALLEY	68.5(110.2)	6.9	0.033	V
NORTH FRONTAL FAULT ZONE (West)	70.3(113.1)	7.2	0.047	VI
NORTH CHANNEL SLOPE	76.4(123.0)	7.4	0.049	VI
SANTA YNEZ (West)	77.4(124.6)	7.1	0.034	V
WHITE WOLF	78.6(126.5)	7.3	0.045	VI
ROSE CANYON	82.6(133.0)	7.2	0.034	V
HELENDALE - S. LOCKHARDT	84.1(135.4)	7.3	0.035	V
SANTA ROSA ISLAND	84.8(136.5)	7.1	0.038	V
SAN JACINTO-ANZA	88.1(141.8)	7.2	0.032	V
ELSINORE (JULIAN)	91.2(146.7)	7.1	0.030	V
LENWOOD-LOCKHART-OLD WOMAN SPRGS	92.3(148.6)	7.5	0.036	V
GARLOCK (East)	92.9(149.5)	7.5	0.036	V
NORTH FRONTAL FAULT ZONE (East)	94.1(151.4)	6.7	0.029	V
PINTO MOUNTAIN	97.9(157.6)	7.2	0.030	V

-END OF SEARCH- 64 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

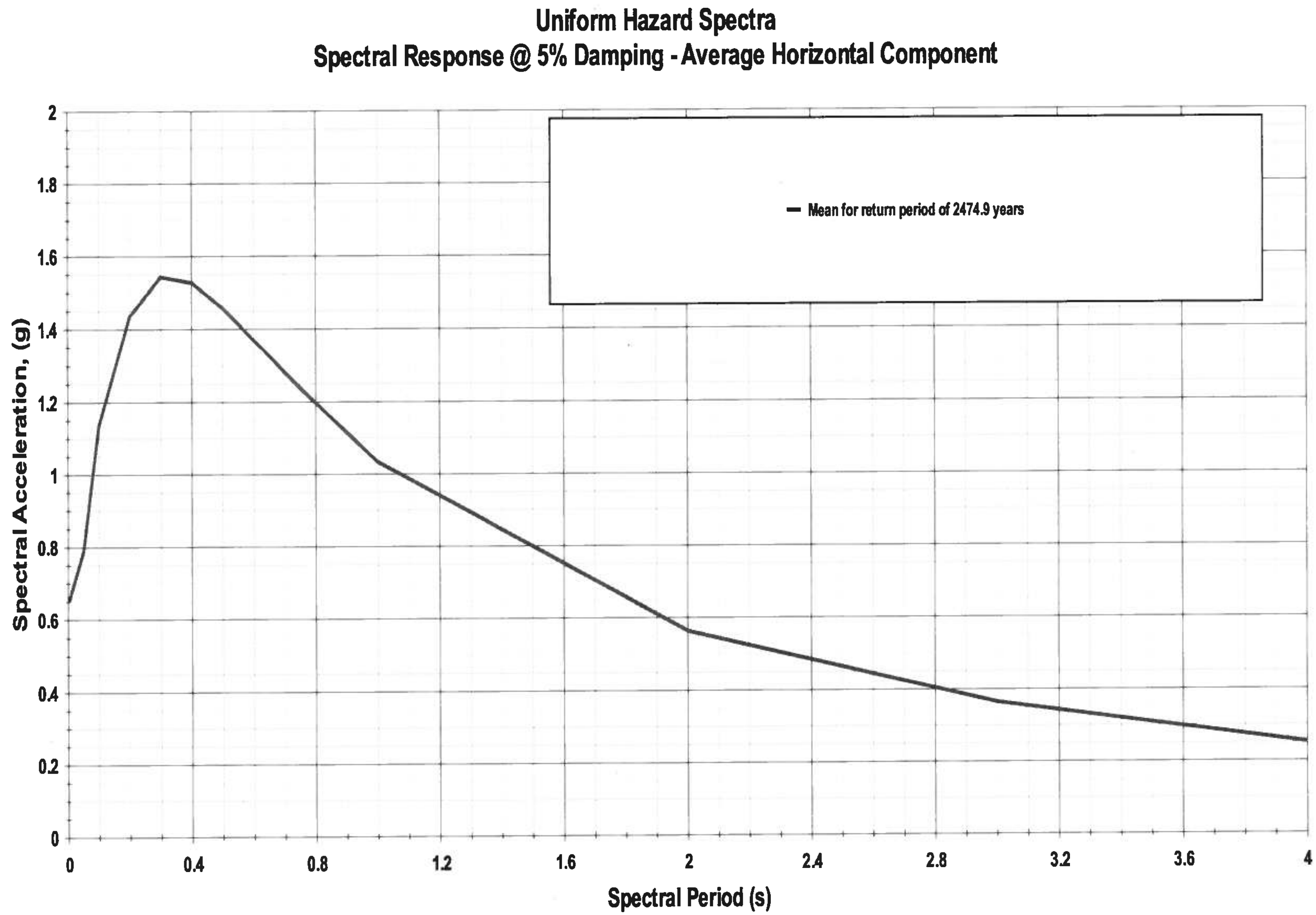
THE NEWPORT-INGLEWOOD (L.A.Basin) FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 4.0 MILES (6.4 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.2731 g

Probabilistic Spectra results for EZ-FRISK 7.65 Build 004

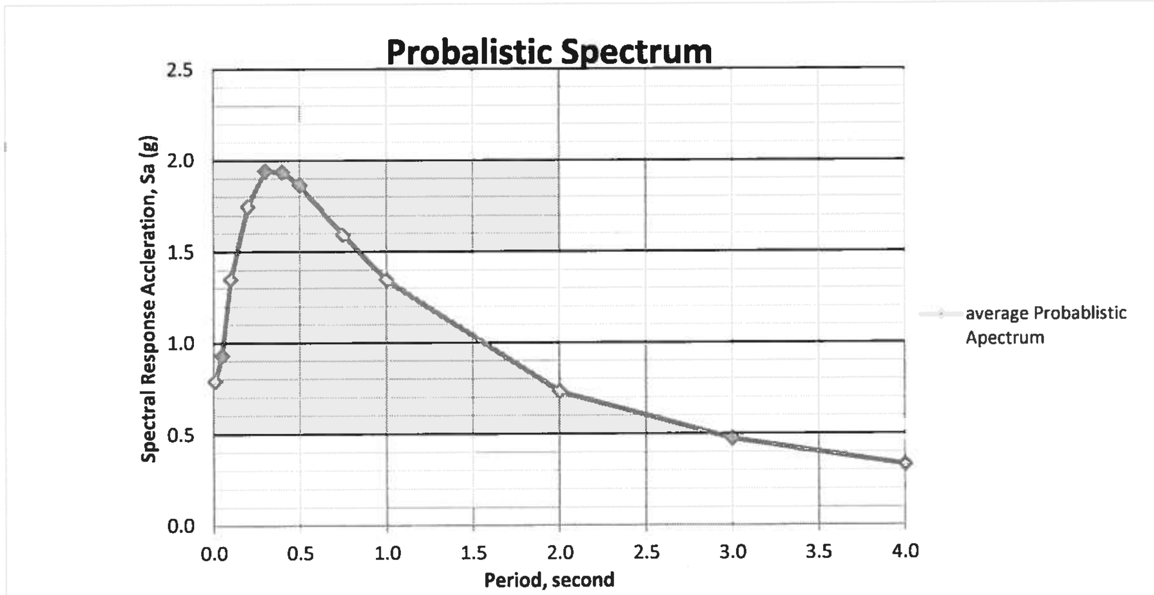
ANNUAL FREQUENCY OF EXCEEDANCE: 4.041e-004
RETURN PERIOD: 2474.9
PROBABILITY OF EXCEEDENCE: 2.0% IN 50.0 YEARS
Column 1: Spectral Period
Column 2: Acceleration (g) for: Mean
Column 3: Acceleration (g) for: Boore-Atkinson (2008) NGA USGS 2008
Column 4: Acceleration (g) for: Abrahamson-Silva (2008) NGA
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2

1	2	3	4	5
PGA	6.577e-001	7.096e-001	6.589e-001	5.964e-001
0.05	7.885e-001	8.624e-001	7.474e-001	7.534e-001
0.1	1.136e+000	1.234e+000	1.050e+000	1.115e+000
0.2	1.435e+000	1.582e+000	1.417e+000	1.286e+000
0.3	1.543e+000	1.632e+000	1.524e+000	1.468e+000
0.4	1.526e+000	1.521e+000	1.491e+000	1.566e+000
0.5	1.458e+000	1.423e+000	1.392e+000	1.554e+000
0.75	1.238e+000	1.183e+000	1.167e+000	1.359e+000
1	1.034e+000	9.199e-001	9.975e-001	1.164e+000
2	5.638e-001	4.941e-001	5.553e-001	6.409e-001
3	3.656e-001	3.189e-001	3.580e-001	4.191e-001
4	2.517e-001	2.233e-001	2.567e-001	2.745e-001


Uniform Hazard Spectra
Spectral Response @ 5% Damping - Average Horizontal Component
Mean for return period of 2474.9 years
Spectral Acceleration, (g)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.4
0.8
1.2
1.6
2
2.4
2.8
3.2
3.6
4
Spectral Period (s)

12870 Panama Street	Latitude	33.984174	Longitude	-118.427328	Site Class:	D

CR_S 0.995 CR1 0.998



Probablistic Spectrum, Boore & Atkinson, 2008		Probablistic Spectrum, Abrahamson & Silva, 2008		Probablistic Spectrum, Campbell-Bozorgnia, 2014		Average Probablistic Spectrum		Cr adjausted Probablistic Spectrum			Rotated Maximum Component		Adjusted Average Probablistic Spectrum	
Period	Sa	Period	Sa	Period	Sa	Period	Sa	Period	Crs/Cr1	Sa	Period		Period	Sa
(sec)	(g)	(sec)	(g)	(sec)	(g)	(sec)	(g)	(sec)		(g)	(sec)		(sec)	(g)
0.01	0.71	0.01	0.66	0.01	0.60	0.01	0.65	0.01	0.995	0.65	0.01	1.21	0.01	0.79
0.05	0.86	0.05	0.75	0.05	0.75	0.05	0.79	0.05	0.987	0.78	0.05	1.20	0.05	0.93
0.10	1.23	0.10	1.05	0.10	1.12	0.10	1.13	0.10	0.987	1.12	0.10	1.21	0.10	1.35
0.20	1.58	0.20	1.42	0.20	1.29	0.20	1.43	0.20	0.987	1.41	0.20	1.24	0.20	1.75
0.30	1.63	0.30	1.52	0.30	1.47	0.30	1.54	0.30	0.999	1.54	0.3	1.26	0.30	1.94
0.40	1.52	0.40	1.49	0.40	1.57	0.40	1.53	0.40	0.999	1.52	0.40	1.27	0.40	1.94
0.50	1.42	0.50	1.39	0.50	1.55	0.50	1.46	0.50	0.999	1.455	0.5	1.28	0.50	1.86
0.75	1.18	0.75	1.17	0.75	1.36	0.75	1.24	0.75	0.999	1.24	0.75	1.29	0.75	1.59
1.00	0.92	1.00	1.00	1.00	1.16	1.00	1.03	1.00	0.999	1.03	1.00	1.31	1.00	1.34
2.00	0.49	2.00	0.56	2.00	0.64	2.00	0.56	2.00	0.999	0.56	2.00	1.30	2.00	0.73
3.00	0.32	3.00	0.36	3.00	0.42	3.00	0.37	3.00	0.999	0.36	3.00	1.30	3.00	0.47
4.00	0.22	4.00	0.26	4.00	0.27	4.00	0.25	4.00	0.999	0.25	4.00	1.32	4.00	0.33

SP-3

Deterministic Spectra Results using EZ-FRISK 7.65 Build 004

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations
Amplitude Units: Acceleration (g)

Fractile: 0.84

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	7.654e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.05	9.069e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.1	1.219e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.2	1.574e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.3	1.777e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.4	1.826e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.5	1.755e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.75	1.491e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
1	1.198e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
2	6.400e-001	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood
3	4.444e-001	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood
4	3.167e-001	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood

Largest Amplitudes of Ground Motions Considering Sources Calculated with Boore-Atkinson (2008) NGA USGS 2008
Amplitude Units: Acceleration (g)

Fractile: 0.84

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	9.290e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.05	1.181e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.1	1.649e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.2	2.163e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.3	2.359e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.4	2.333e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.5	2.212e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.75	1.857e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
1	1.374e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
2	7.030e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
3	4.215e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
4	2.937e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded

Largest Amplitudes of Ground Motions Considering Sources Calculated with Abrahamson-Silva (2008) NGA
Amplitude Units: Acceleration (g)

Fractile: 0.84

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	7.888e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.05	8.145e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.1	1.040e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.2	1.477e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.3	1.695e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.4	1.730e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded

SP-4

0.5	1.632e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.75	1.340e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
1	1.096e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
2	6.318e-001	7.40 Mw	6.13	USGS 2008 California	Santa Monica
3	4.118e-001	7.40 Mw	6.13	USGS 2008 California	Santa Monica
4	2.987e-001	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood

Largest Amplitudes of Ground Motions Considering Sources Calculated with Campbell-Bozorgnia (2014) NGA West 2

Amplitude Units: Acceleration (g)

Fractile: 0.84

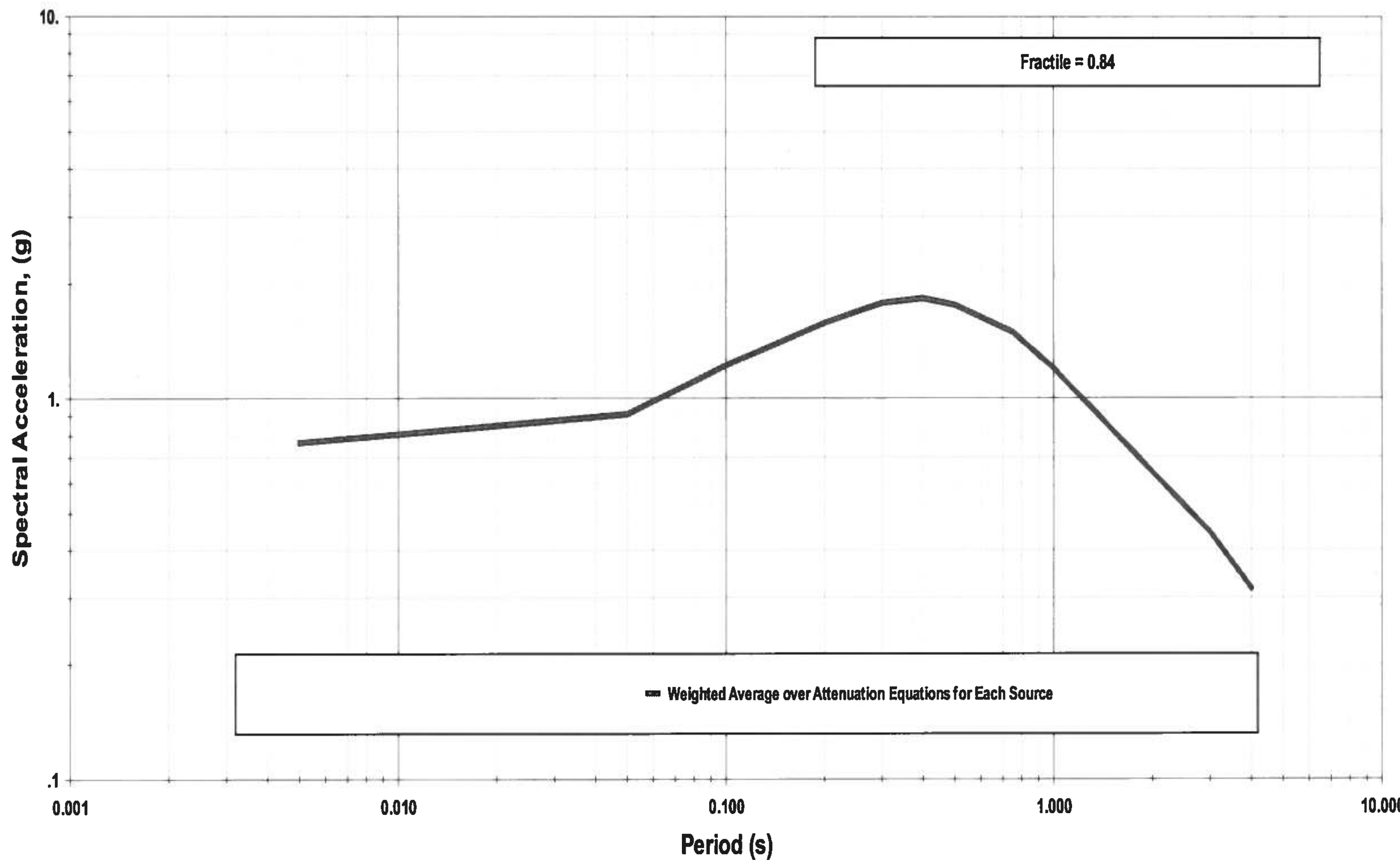
Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	5.784e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.05	7.247e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.1	9.672e-001	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.2	1.085e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.3	1.275e+000	7.00 Mw	5.00	USGS 2008 California	California Gridded
0.4	1.420e+000	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood
0.5	1.449e+000	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood
0.75	1.295e+000	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood
1	1.176e+000	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood
2	7.548e-001	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood
3	5.321e-001	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood
4	3.670e-001	7.50 Mw	5.88	USGS 2008 California	Newport-Inglewood

Largest Amplitudes of Ground Motions for Each Source

Source: So Sierra Nevada
Region: USGS 2008 California
Closest Distance: 150.31 km
Amplitude Units: Acceleration (g)
Magnitude: 7.50 Mw
Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Boore-Atkinson (2008) NGA USGS 2008

1	2	3
PGA	5.291e-002	5.291e-002
0.05	5.895e-002	5.895e-002
0.1	7.508e-002	7.508e-002
0.2	1.048e-001	1.048e-001
0.3	1.210e-001	1.210e-001
0.4	1.256e-001	1.256e-001
0.5	1.282e-001	1.282e-001
0.75	1.086e-001	1.086e-001
1	9.044e-002	9.044e-002
2	5.306e-002	5.306e-002
3	3.456e-002	3.456e-002
4	2.587e-002	2.587e-002

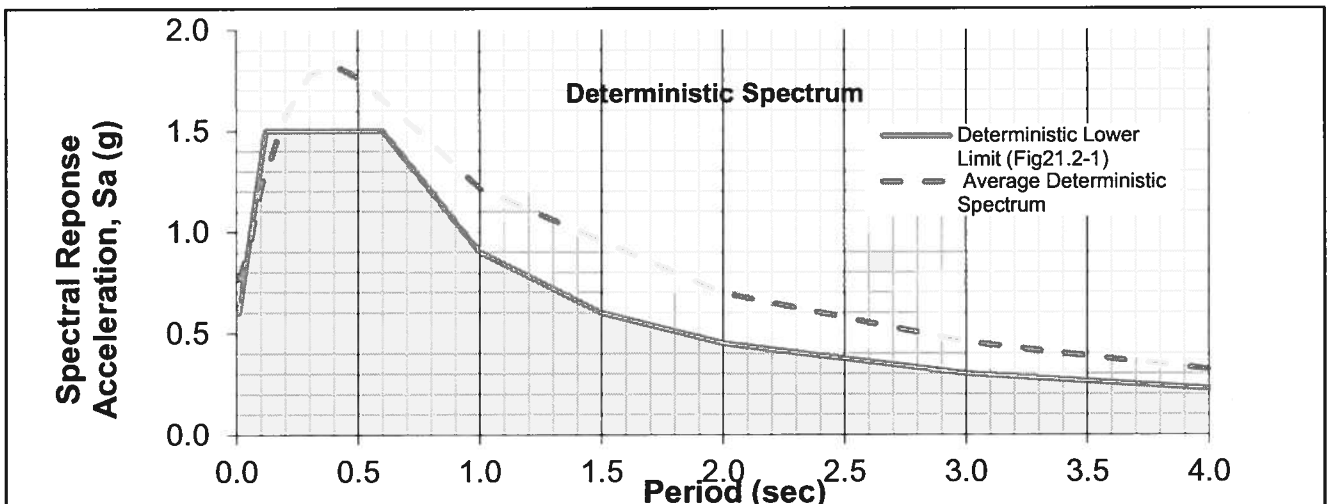
Deterministic Spectra
Spectral Response @ 5% Damping - Average Horizontal Component



12870 Panama Street — Latitude 33.984174 — Longitude -118.427328 — Site Class: D

84th percentile Deterministic Spectrum, Boore & Atkinson, 2008		84th percentile Deterministic Spectrum, Abrahamson & Silva, 2008		84th percentile Deterministic Spectrum, Campbell & Bozorgnia, 2014		Average 84th percentile Deterministic Spectrum		Deterministic Lower Limit, Fig 21.2-1	
Period (sec)	Sa (g)	Period (sec)	Sa (g)	Period (sec)	Sa (g)	Period (sec)	Sa (g)	Period (sec)	Sa (g)
0.01	0.93	0.01	0.79	0.01	0.58	0.01	0.77	0.01	0.60
0.05	1.18	0.05	0.8	0.05	0.72	0.05	0.91	0.12	1.50
0.10	1.65	0.1	1	0.10	0.97	0.10	1.22	0.60	1.50
0.20	2.16	0.2	1.5	0.20	1.09	0.20	1.58	1.00	0.90
0.30	2.36	0.30	1.70	0.30	1.28	0.30	1.78	1.50	0.60
0.40	2.33	0.40	1.73	0.40	1.42	0.40	1.83	2.00	0.45
0.50	2.21	0.50	1.63	0.50	1.45	0.50	1.76	3.00	0.30
0.75	1.86	0.75	1.34	0.75	1.30	0.75	1.50	4.00	0.23
1.00	1.37	1.00	1.10	1.00	1.18	1.00	1.22	5.00	0.18
2.00	0.70	2.00	0.63	2.00	0.75	2.00	0.70	7.50	0.12
3.00	0.42	3.00	0.41	3.00	0.53	3.00	0.46	10.00	0.09
4.00	0.29	4.00	0.30	4.00	0.37	4.00	0.32		

To	0.117	Ss	1.688	S_{D1}	0.657
Ts	0.584	S_1	0.657	S_{DS}/2.5	0.450
T_L	8	Fa	1.000	PGA_M	0.651
		Fv	1.500	CR_S	0.995
		S_{MS}	1.688	CR1	0.998
		S_{M1}	0.986		
		S_{DS}	1.125		



SP-7

Site Specific Spectrum, ASCE 7-10, Chapter 21

Project: 12870 Panama				Latitude	33.984174			Longitude	-118.427328				Site Class: D		
General Design Response Spectrum		MCE_R Response Spectrum		84th Percentile Deterministic MCE		Adjusted Probablistic Spectrum		Site Specific MCEr Response Spectrum		2/3 of Site Specific MCEr Response Spectrum		80% of Design Response Spectrum		Design Response Spectrum,	
Period (sec)	Sa (g)	Period (sec)	Sa (g)	Period (sec)	Sa (g)	Period (sec)	Sa (g)	Period (sec)	Sa (g)	Period (sec)	Sa (g)	Period (sec)	Sa (g)	Period (sec)	Sa (g)
0.01	0.51	0.01	0.76	0.01	0.77	0.01	0.79	0.01	0.77	0.01	0.51	0.01	0.41	0.01	0.51
0.05	0.74	0.05	1.11	0.05	0.91	0.05	0.93	0.05	0.91	0.05	0.60	0.05	0.59	0.05	0.60
0.10	1.03	0.10	1.54	0.10	1.22	0.10	1.35	0.10	1.22	0.10	0.81	0.10	0.82	0.10	0.82
0.20	1.13	0.20	1.69	0.20	1.58	0.20	1.75	0.20	1.58	0.20	1.05	0.20	0.90	0.20	1.05
0.30	1.13	0.30	1.69	0.30	1.78	0.30	1.94	0.30	1.78	0.30	1.18	0.30	0.90	0.30	1.18
0.40	1.13	0.40	1.69	0.40	1.83	0.40	1.94	0.40	1.83	0.40	1.22	0.40	0.90	0.40	1.22
0.50	1.13	0.50	1.69	0.50	1.76	0.50	1.86	0.50	1.76	0.50	1.18	0.50	0.90	0.50	1.18
0.75	0.88	0.75	1.45	0.75	1.50	0.75	1.59	0.75	1.50	0.75	1.00	0.75	0.70	0.75	1.00
1.00	0.66	1.00	1.09	1.00	1.22	1.00	1.34	1.00	1.22	1.00	0.81	1.00	0.53	1.00	0.81
2.00	0.33	2.00	0.55	2.00	0.70	2.00	0.73	2.00	0.70	2.00	0.46	2.00	0.26	2.00	0.46
3.00	0.22	3.00	0.33	3.00	0.46	3.00	0.47	3.00	0.46	3.00	0.30	3.00	0.18	3.00	0.30
4.00	0.16	4.00	0.25	4.00	0.32	4.00	0.33	4.00	0.32	4.00	0.21	4.00	0.13	4.00	0.21

Site Specific Parameters

S_{MS}	1.69	
S_{M1}	1.39	
S_{DS}	1.13	
S_{D1}	0.93	
PGA	0.65	

To	0.117	Ss	1.688	S_{D1}	0.657
Ts	0.584	S_1	0.657	$S_{DS}/2.5$	0.450
T_L	8	Fa	1.000	PGA_M	0.651
		Fv	1.500	CR_S	0.995
		S_{MS}	1.688	CR1	0.998
		S_{M1}	0.986		
		S_{DS}	1.125		

Minimum Allowable PGA (80% of PGA_M)	0.52
Minimum Allowable S_{DS} (90% of Sa at any period)	1.06
Minimum Allowable S_{D1} (200% of Sa at 2 seconds)	0.93

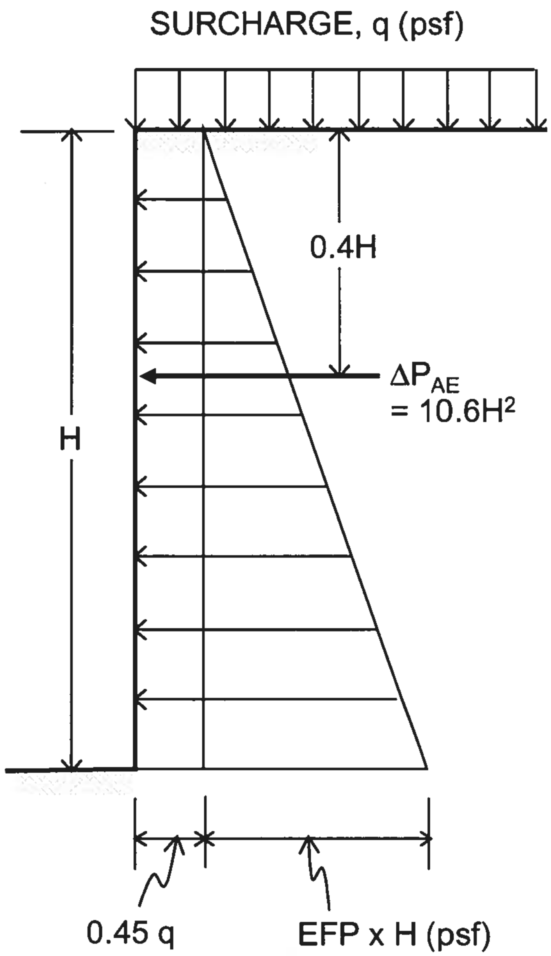
SP-8

APPENDIX E

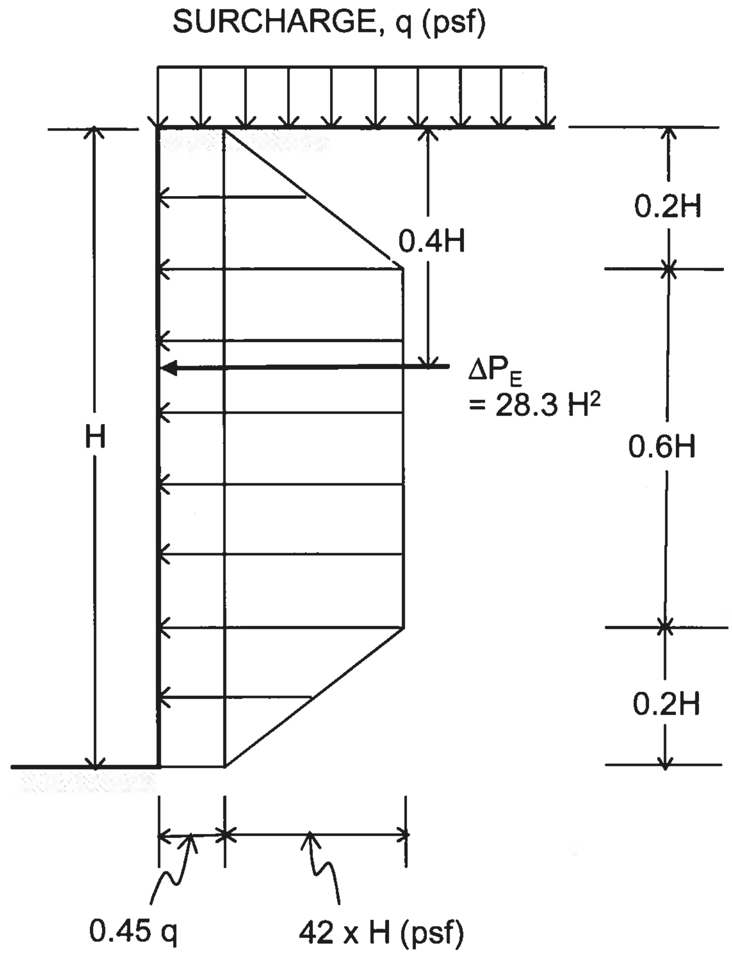
Earth Pressure Analyses

EARTH PRESSURE DISTRIBUTION OF RETAINING WALL

Free Standing (Yielding) Wall



Restrained (Non-Yielding) Wall



Seismic Earth Pressure Calculations

γ =	**125.0**	**pcf**
S_{DS} =	**1.130**	**g**
PGA = $S_{DS}/2.5$ =	***0.45***	**g**
k_h = PGA/2=	***0.23***	**(k_h >= 0.15)**
$\Delta P_{AE} = 3/8\ k_h\ \gamma H^2$ =	***10.6***	**H^2 (lb)**
$\Delta P_E = k_h\ \gamma H^2$ =	***28.3***	**H^2 (lb)**

Reference: 1. FEMA 369 commentary Part 2 (2000)
2. NEHRP Workshop (2006)

GEOSYSTEMS, Inc.
ENVIRONMENTAL, ENGINEERING-GEOLOGY AND GEOTECHNICAL ENGINEERING
1545 VICTORY BLVD., 2ND FLR., GLENDALE, CA 91201-9240
PHONE 818-500-9533 FAX 818-500-0134

EARTH PRESSURE DISTRIBUTION
STATIC & SEISMIC LOADS

12870 Panama Street

Los Angeles, California

DATE: June, 2016	**GS 16-107**	**PLATE PD-1**

Active Pressure Analysis: Search for Maximum Value (Vector Method)

Height of wall, H = 10.0 feet
Angle of back slope, β = 0.0 degrees
Surcharge, q = 0.0 psf

Soil parameters

Unit weight γ (pcf)	Cohesion C (psf)	Friction angle ϕ (deg)	Factor of Safety, F.S.	Design Cohesion C_d (psf)	Design Friction angle ϕ_d (deg)
125.0	150.0	23.0	1.50	100.0	15.8

Failure plane angle (deg)	Tension crack (ft)	Failure plane length (ft)	Weight of soil wedge (lb/ft)	Active Force (lb/ft)	EFP (pcf)
40	3.0	10.9	6778.1	1897.3	37.9
41	3.0	10.7	6542.7	1944.0	38.9
42	3.0	10.5	6316.6	1986.2	39.7
43	3.0	10.3	6099.1	2024.0	40.5
44	3.0	10.1	5889.6	2057.7	41.2
45	3.0	9.9	5687.5	2087.3	41.7
46	3.0	9.7	5492.4	2113.2	42.3
47	3.0	9.6	5303.7	2135.3	42.7
48	3.0	9.4	5121.0	2153.7	43.1
49	3.0	9.3	4944.1	2168.7	43.4
50	3.0	9.1	4772.4	2180.2	43.6
51	3.0	9.0	4605.6	2188.2	43.8
52	3.0	8.9	4443.6	2192.9	43.9
53	3.0	8.8	4285.8	2194.3	43.9
54	3.0	8.7	4132.2	2192.2	43.8
55	3.0	8.5	3982.4	2186.9	43.7
56	3.0	8.4	3836.3	2178.1	43.6
57	3.0	8.3	3693.5	2166.0	43.3
58	3.0	8.3	3553.9	2150.3	43.0
59	3.0	8.2	3417.4	2131.1	42.6
60	3.0	8.1	3283.7	2108.3	42.2
61	3.0	8.0	3152.6	2081.7	41.6
62	3.0	7.9	3024.1	2051.3	41.0
63	3.0	7.9	2897.9	2016.8	40.3
64	3.0	7.8	2774.0	1978.2	39.6
65	3.0	7.7	2652.1	1935.1	38.7
66	3.0	7.7	2532.2	1887.4	37.7
67	3.0	7.6	2414.2	1834.9	36.7
68	3.0	7.5	2297.9	1777.1	35.5
69	3.0	7.5	2183.2	1713.9	34.3
70	3.0	7.4	2070.1	1644.8	32.9

Use EFP = 45 pcf

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ACTIVE PRESSURE ANALYSIS

12870 Panama Street
Los Angeles, California

DATE: Mar., 2016	GS 16-0107	PLATE RW-1

Active Pressure Analysis: Search for Maximum Value (Vector Method)

Height of wall, H =	10.0	feet
Angle of back slope, β =	0.0	degrees
Surcharge, q =	0.0	psf

Soil parameters

Unit weight γ (pcf)	Cohesion C (psf)	Friction angle ϕ (deg)	Factor of Safety, F.S.	Design Cohesion C_d (psf)	Design Friction angle ϕ_d (deg)
125.0	150.0	23.0	1.25	120.0	18.8

Failure plane angle (deg)	Tension crack (ft)	Failure plane length (ft)	Weight of soil wedge (lb/ft)	Active Force (lb/ft)	EFP (pcf)
40	3.0	10.9	6778.1	1307.4	26.1
41	3.0	10.7	6542.7	1366.0	27.3
42	3.0	10.5	6316.6	1419.3	28.4
43	3.0	10.3	6099.1	1467.5	29.4
44	3.0	10.1	5889.6	1511.0	30.2
45	3.0	9.9	5687.5	1549.8	31.0
46	3.0	9.7	5492.4	1584.3	31.7
47	3.0	9.6	5303.7	1614.5	32.3
48	3.0	9.4	5121.0	1640.5	32.8
49	3.0	9.3	4944.1	1662.6	33.3
50	3.0	9.1	4772.4	1680.8	33.6
51	3.0	9.0	4605.6	1695.1	33.9
52	3.0	8.9	4443.6	1705.7	34.1
53	3.0	8.8	4285.8	1712.6	34.3
54	3.0	8.7	4132.2	1715.9	34.3
55	3.0	8.5	3982.4	1715.4	34.3
56	3.0	8.4	3836.3	1711.3	34.2
57	3.0	8.3	3693.5	1703.5	34.1
58	3.0	8.3	3553.9	1692.0	33.8
59	3.0	8.2	3417.4	1676.7	33.5
60	3.0	8.1	3283.7	1657.6	33.2
61	3.0	8.0	3152.6	1634.6	32.7
62	3.0	7.9	3024.1	1607.5	32.1
63	3.0	7.9	2897.9	1576.3	31.5
64	3.0	7.8	2774.0	1540.8	30.8
65	3.0	7.7	2652.1	1500.8	30.0
66	3.0	7.7	2532.2	1456.2	29.1
67	3.0	7.6	2414.2	1406.8	28.1
68	3.0	7.5	2297.9	1352.2	27.0
69	3.0	7.5	2183.2	1292.2	25.8
70	3.0	7.4	2070.1	1226.6	24.5

Use EFP = 35 pcf

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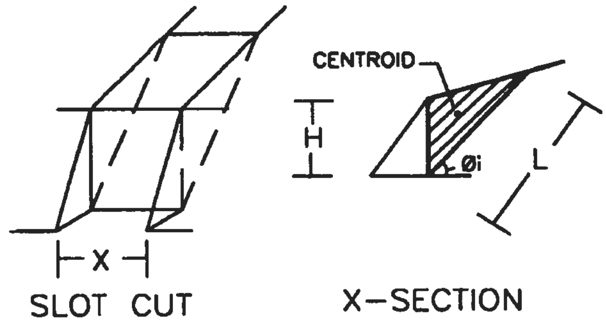
ACTIVE PRESSURE ANALYSIS

12870 Panama Street

Los Angeles, California

DATE: Mar., 2016	GS 16-0107	PLATE RW-2

SLOT CUT ANALYSIS



Height of Slot cut, H =	5 ft
Width of Slot cut, X =	8 ft
Surcharge, q =	0.5 kips/ ft
Unit weight of soil, γ =	125 pcf
Friction angle of soil, ϕ =	23 degrees
Cohesion of soil, C =	150 psf
Angle of Influence, ϕ_i =	*56.5* degrees
Length of Failure surface, L =	*6.0* ft
Depth of Centroid from surface, d =	*1.7* ft

1) FORCES ALONG BEDDING FOR UNIT WIDTH (Base of Wedge)

Area of Failure, A =	*8.3* ft^2
Weight, W =	*1.0* kips/ ft
W+q =	*1.5* kips/ ft
Tangent Force, F_T =	*1.3* kips/ ft
Normal Force, F_N =	*0.8* kips/ ft
$R = F_N \tan\phi + L \times C$ =	*1.3* kips/ ft

2) RESISTING FORCES ALONG SIDES OF WEDGE

Area in X-section, A_s =	*8.3* ft^2
Average Intergranular stress, τ =	*203.9* psf
$R_s = 2\,\tau\,A_s$ =	*3.4* kips

3) FACTOR OF SAFETY

$F.S. = (R\,X + R_s) / (F_T\,X)$ = *1.3* > 1.25 O.K.

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SLOT CUT ANALYSIS

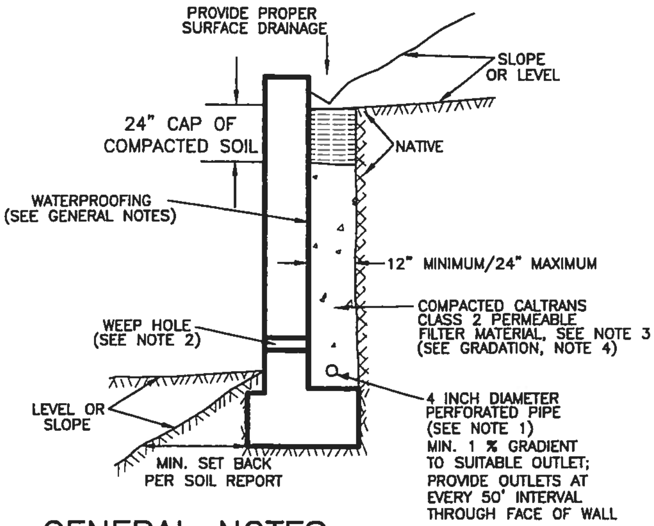
12870 Panama Street

Los Angeles, California

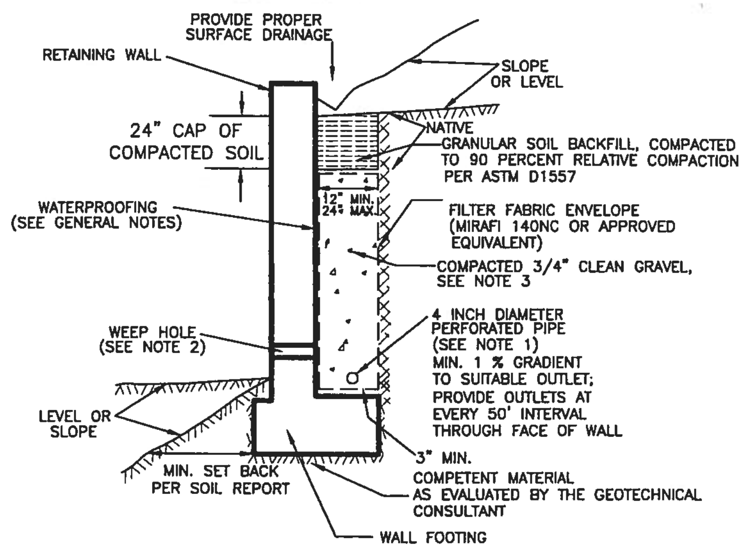
DATE: June, 2016	GS 16-0107	PLATE SC-1

CONFINED BACKFILL AND SUBDRAIN OPTIONS FOR RETAINING WALLS
(Space between back of wall and face of excavation is less than 24-inches)

OPTION 1: PIPE SURROUNDED WITH CLASS 2 PERMEABLE MATERIAL



OPTION 2: GRAVEL WRAPPED IN FILTER FABRIC



GENERAL NOTES:

*Retaining wall plans should be reviewed and approved by the geotechnical engineer.

*These details apply only to retaining walls not surcharged by adjacent structures or adverse geology. See text of report for specific backfill recommendations if these conditions exist.

*Walls over 12 feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements may be necessary (see text of report).

*Waterproofing should be provided where moisture intrusion through the wall is undesirable.

*Waterproofing of the walls is not under purview of the geotechnical engineer or geologist.

*All drains should have a gradient of 1 percent minimum.

*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding) and must remain clear at all times.

*Other subdrain/backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

*Additional or revised backfilling and compaction procedures may be required by the local governing agency.

NOTES:

1) The following plastic subdrain pipes are acceptable. All pipe should be SDR35:
   a. Acrylonitrile Butadiene Styrene (ABS): ASTM D2661, D2680 and D2751;
   b. Polyvinyl Chloride (PVC): ASTM D2665, D2729, D3033 and D3034;
   c. Polyethylene (PE): ASTM D2239, D3035 and F810.

   Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered).
2) Weepholes should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12-inches above finished grade. If exposure is not permitted, such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk discharging through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
3) All gravel or Class 2 Filter Material should be compacted at every 2-feet of vertical elevation rise using vibratory compaction equipment. All placement and compaction of backfill should be observed and verified by our field representative.
4) Gradation: Caltrans Class 2 Filter Permeable Material Gradation Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

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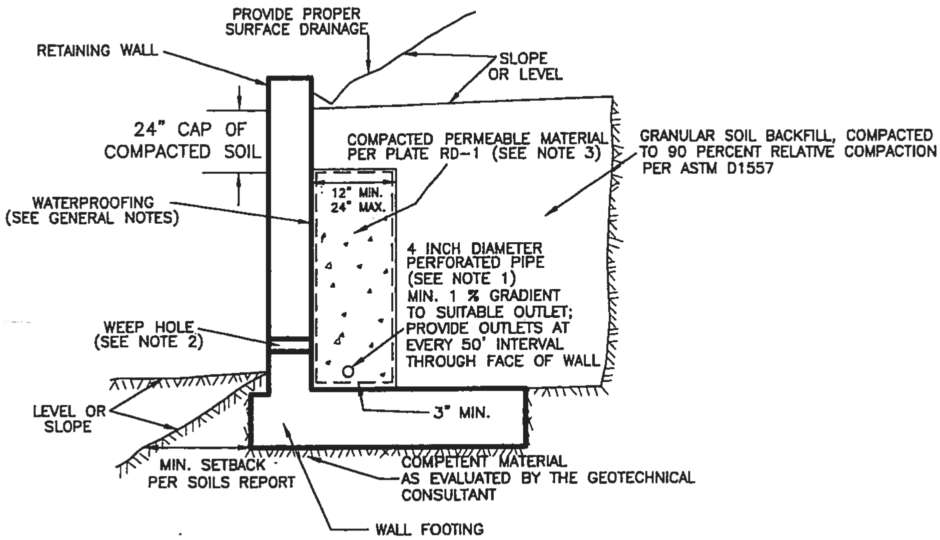
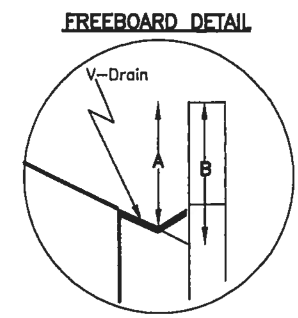
RETAINING WALL BACKFILL AND SUBDRAIN DETAIL FOR WALLS 15 FEET OR LESS IN HEIGHT WITH CONFINED BACKFILL CONDITIONS

PLATE RD-1

UNCONFINED BACKFILL AND SUBDRAIN OPTIONS FOR RETAINING WALLS

(Space between back of wall and face of excavation is greater than 24-inches)





* wall design (and height of freeboard) must take into account minimum 2% gradient of v-drain.
* height of freeboard equal to distance "A" (plus thickness of v-drain), not "B".

GENERAL NOTES:

*Retaining wall plans should be reviewed and approved by the geotechnical engineer.

*These details apply only to retaining walls not surcharged by adjacent structures or adverse geology. See text of report for specific backfill recommendations if these conditions exist.

*Walls over 12 feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements may be necessary (see text of report).

*Waterproofing should be provided where moisture intrusion through the wall is undesirable.

*Waterproofing of the walls is not under purview of the geotechnical engineer or geologist.

*All drains should have a gradient of 1 percent minimum.

*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding) and must remain clear at all times.

*Other subdrain/backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

*Additional or revised backfilling and compaction procedures may be required by the local governing agency.

NOTES:

1) The following plastic subdrain pipes are acceptable. All pipe should be SDR35:
   a. Acrylonitrile Butadiene Styrene (ABS): ASTM D2661, D2680 and D2751;
   b. Polyvinyl Chloride (PVC): ASTM D2665, D2729, D3033 and D3034;
   c. Polyethylene (PE): ASTM D2239, D3035 and F810.

   Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered).
2) Weepholes should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12-inches above finished grade. If exposure is not permitted, such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk discharging through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
3) All gravel or Class 2 Filter Material should be compacted at every 2-feet of vertical elevation rise using vibratory compaction equipment. All placement and compaction of backfill should be observed and verified by our field representative.

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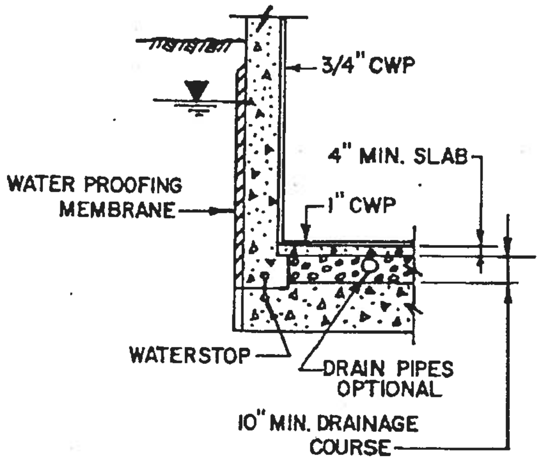
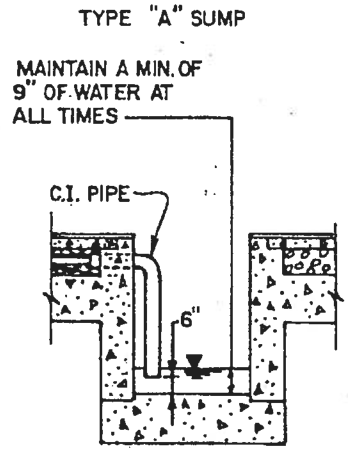
FREEBOARD DETAIL AND RETAINING WALL BACKFILL AND SUBDRAIN DETAIL FOR WALLS WITH BACKFILL WIDTH GREATER THAN 2' (UNCONFINED BACKFILL CONDITIONS)

PLATE RD-2

Ⓐ PRESSURE SLAB



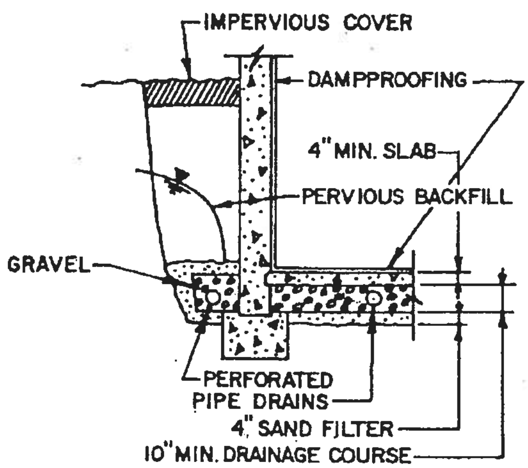


GENERAL REQUIREMENTS:

1. SEE CHAPTER 6 DM-7.1 FOR REQUIREMENTS FOR FILTER IN DRAINAGE SYSTEM.
2. SEE TABLE 5 FOR REQUIREMENTS FOR CEMENT PLASTER WATERPROOFING (CWP), AND DAMPPROOFING.

MATERIAL FOR UNDER-FLOOR DRAINAGE COURSE SHALL CONSIST OF SOUND, CLEAN GRAVEL OR CRUSHED ROCK, 3/4 IN. TO 2 IN. IN SIZE.

Ⓑ RELIEVED SLAB



USE TYPE "A" OR "C" SUMP

FOR PRESSURE RELIEVED SLAB, PROVIDE PERIPHERAL DRAIN AT BASE OF FOUNDATION WALL. REPLACE CWP ON FOUNDATION WALL WITH DAMPPROOFING.

FIGURE 15
Typical Foundation Drainage and Waterproofing

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TYPICAL FOUNDATION DRAINAGE & WATERPROOFING

12870 Panama Street
Los Angeles, California

GS 16-0107	DATE: June, 2016	PLATE RS-1

MINIMUM RECOMMENDATIONS FOR INTERIOR FLOOR SLAB & FOUNDATION DESIGN*

Expansion Index	**Very Low** 0-20	**Low** 21-50	**Medium** 51-90	**High** 91-130
Plastic Index	**0-10**	**10-15**	**15-25**	**25-35**
Footing Width 1 story 2 story	 12" 12"	 12" 15"	 12" 15"	 12" 15"
Exterior Footing Depth 1 story 2 story	 12" 18"	 15" 18"	 21" 24"	 27" 30"
Interior Footing Depth 1 story 2 story	 12" 18"	 12" 18"	 15" 21"	 18" 24"
Footing Reinforcement	4-#4 rebar 2 top 2 bottom	4-#4 rebar 2 top 2 bottom	4-#4 rebar 2 top 2 bottom	4-#4 rebar 2 top 2 bottom
Slab Thickness (3)	4" nominal	4" nominal	4" nominal	4" actual
Slab Reinforcement	#4 rebar on 16" centers each way	#4 rebar on 16" centers each way	#4 rebar on 16" centers each way	#4 rebar on 16" centers each way
Moisture Barrier (2)	10 mil visqueen sandwiched within 3" of sand	10 mil visqueen sandwiched within 3" of sand	10 mil visqueen sandwiched within 3" of sand	10 mil visqueen sandwiched within 3" of sand
Garage Floor Slab Reinforcement	#4 rebar on 16" centers each way	#4 rebar on 16" centers each way	#4 rebar on 16" centers each way	#4 rebar on 16" centers each way
Grade Beam at Garage Entrance	not required	not required	same as adjacent exterior footing	same as adjacent exterior footing
Subgrade	4" thick coarse aggregate (4)	4" thick coarse aggregate (4)	4" thick coarse aggregate (4)	6" thick coarse aggregate (4)
Pre-saturation	optional	110% of opt. m/c to depth of 6" below subgrade (no testing req.'d)	120% of opt. m/c to depth of 6" below subgrade (testing req.'d)	130% of opt. m/c to depth of 6" below subgrade (testing req.'d)

* All recommendations presented in the text of this report which are in addition to or more restrictive than the minimum recommendations presented on this Plate should be incorporated into the construction plans.

Notes:
(1) The surrounding areas should be graded so as to ensure drainage away from the building.
(2) The 10 mil visqueen should be properly lapped, sealed, and protected within 3" of sand.
(3) Any quatering of slab should be accomplished by the use of pre-molded expansion joint material, not by saw cutting.
(4) 3/4" coarse aggregate (Caltrans Class II permeable material or equivalent) compacted to the equivalent of 95 percent relative compaction to act as a capillary break.

PLATE EI-1