APPENDIX G

Preliminary Geotechnical Investigation

PRELIMINARY
GEOTECHNICAL INVESTIGATION

NORTH RIVER FARMS
OCEANSIDE, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

INTEGRAL COMMUNITIES
ENCINITAS, CALIFORNIA

NOVEMBER 22, 2017
PROJECT NO. G1753-32-02

Project No. G1753-32-02
November 22, 2017

Integral Communities
2235 Encinitas Boulevard, Suite 216
Encinitas, California 92024

Attention: Ms. Ninia Hammond

Subject: PRELIMINARY GEOTECHNICAL INVESTIGATION
NORTH RIVER FARMS
OCEANSIDE, CALIFORNIA

Dear Ms. Hammond:

In accordance with your request and authorization of our Proposal No. LG-17392, dated October 16, 2017, we have prepared this preliminary geotechnical investigation for the proposed North River Farms development in Oceanside, California. The accompanying report presents the findings of our previous studies and our conclusions and recommendations pertaining to the geotechnical aspects of project development.

Based on a review of the Vesting Tentative Map, the proposed project includes grading to support a residential development, including four sheet-graded pads north of North River Road and 137 single family residences. Additional sheet graded pads and open space areas are proposed south of North River Road. Based on the results of our studies, it is our opinion that the site can be developed as planned, provided the recommendations of this report are followed.

If there are any questions regarding this update report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

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PRELIMINARY GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of a preliminary geotechnical investigation for the proposed development of North River Farms located in Oceanside, California (see *Vicinity Map,* Figure 1). The purpose of this report was to summarize the soil and geologic conditions encountered during two previous studies within the site and provide preliminary geotechnical recommendations pertaining to development of the property as presently proposed.

The scope of our study included a review of the following plan and reports associated with the site.

1. *Preliminary Geotechnical Feasibility Study, North River Farms, Oceanside, California*, prepared by Geocon Incorporated, dated October 14, 2014 (Project No. G1753-32-01).

2. *Addendum to Preliminary Geotechnical Feasibility Study, North River Farms, Oceanside, California*, prepared by Geocon Incorporated, dated December 18, 2014 (Project No. G1753-32-01).

3. *Vesting Tentative Map, North River Farms, City of Oceanside, California*, prepared by Hunsaker & Associates, San Diego, Inc., dated November 10, 2017.

Details of the field investigation and logs of the exploratory trenches, hollow-stem auger borings, and Cone Penetration Tests (CPT's) are located in Appendix A. The approximate locations of the exploratory trenches, borings, and CPT's are presented on the Geologic Map, Figure 2. Laboratory tests were performed on selected soil samples obtained from the borings to evaluate their physical engineering properties. The laboratory test results are presented in Appendix B. The results of a liquefaction analysis are presented in Appendix C.

The descriptions of the soil and geologic conditions and proposed development described herein are based on review of the above referenced reports and plan.

2. SITE AND PROJECT DESCRIPTION

The site consists of approximately 225 acres of land in east Oceanside, California (see Vicinity Map, Figure 1). The irregular-shaped property consists of agricultural land and is bound on the southeast and southwest by the San Luis Rey River, on the northeast and east by Wilshire Road and on the north and northwest by agricultural land and partially developed land. The east-west trending North River Road bisects the property.

Most of the site consists of farmland, with two clusters of residential structures, one at the northern end of the property that has been turned into an office with storage sheds. The other residential

structures are located south of North River Road and appear to be abandoned. Some packing sheds are located immediately west of Wilshire Road where it bends north.

The majority of the site does not appear to have been significantly improved except for an area in the vicinity of CPT soundings 3, 4 and 5 that is discussed in *Soil and Geologic Conditions*, and grading associated with North River Road. Most of the grading appears to have been cuts and fills of less than 5 feet, presumably associated with leveling of the growing fields. Minor grading has also likely occurred in the vicinity of the residential structures. Several piles of granitic boulders were observed at sporadic locations near property margins within the site, with one prominent boulder outcrop located westerly-adjacent to the packing sheds.

The site is characterized as gently sloping, north to south, with a high point at the northern end becoming nearly flat along the southern portion of the property that abuts the San Luis Rey River. Site elevations range from about 240 feet above mean sea level (MSL) at the north to about 90 feet MSL adjacent to the river. Within the western third of the site, a drainage transects the property north to south, then trending west, eventually emptying into the San Luis Rey river channel.

Based on review of the Vesting Tentative Map, the proposed project includes grading of the property to support a residential development, including four sheet-graded pads north of North River Road and 137 single family residences. Additional sheet graded pads are also proposed south of North River Road and several lots are designated as open space. Water quality basins and associated roadways and underground improvements are also shown. It is understood that the development footprint has been modified based on the results of the preliminary liquefaction analyses presented in the referenced reports.

3. PREVIOUS FIELD INVESTIGATION

A previous geotechnical investigation was reviewed as part of this study. The report is entitled *Geotechnical Investigations, Proposed Northeast Valley School Site, Oceanside, California*, prepared by Construction Testing & Engineering Incorporated, March 27, 2002 (CTE Job No. 10-4941), and was part of an Environmental Impact Report from 2003 when the northern portion of the site and adjacent properties were being considered as a location for a high school. Four borings were advanced near drainages or depressions for the study to depths of between 8½ and 31½ feet. Ten test pits were also excavated to depths of between 10 and 14 feet. The locations of the borings and test pits are depicted on the Geologic Map, Figure 2. Boring and trench logs and laboratory test results from the report are included in Appendix D. Specifics within the referenced report are discussed in the *Soil and Geologic Conditions* section of this report.

4. SOIL AND GEOLOGIC CONDITIONS

Four surficial soil types and two geologic formations were encountered during the field investigation. The surficial deposits consist of undocumented fill, colluvium, alluvium, and older alluvium. The formational units include the Eocene-age Santiago Formation and Cretaceous-age Tonalite (Granitic Rock). Each of the surficial soil types and geologic units encountered is described below in order of increasing age. The approximate extent of the deposits, excluding topsoil and undocumented fill, is shown on the Geologic Map, Figure 2.

4.1 Undocumented Fill (Qudf)

Undocumented fill soils were encountered across the site and generally ranged in thickness from 2 and 10 feet and primarily consisted of loose to medium dense, silty sands with varying amounts of cobbles and boulders, debris, trash, etc. These materials will require removal and compaction in areas planned to receive structural fill and/or settlement-sensitive improvements. The trash and debris should be separated from the soil and exported.

4.2 Alluvium (Qal)

Alluvial soils were encountered in the exploratory borings and trenches, with the thickest deposits south of North River Road. The alluvium primarily consists of damp to saturated, loose to medium dense, silty/clayey, fine-grained sand and sand. These deposits are considered compressible if subjected to additional fill and/or structure loading. In addition, portions of the alluvium are considered susceptible to liquefaction. The alluvium is approximately 67 feet thick (Boring B-13) at the southern property boundary, however, its thickness beneath the footprint of the development is generally 1 to 30 feet. The alluvium should be removed and compacted to mitigate the compression-related settlement, and potential for liquefaction. If groundwater conditions preclude complete removal, surcharge loading and settlement monitoring procedures may be necessary.

4.3 Colluvium (Qcol)

Colluvial soils were encountered underlying the undocumented fill or were exposed at the surface. This material primarily consists of damp, medium dense, silty/clay, fine to medium grained sand to stiff, silty/sandy clay. The colluvial deposits are considered compressible and should be removed and compacted. The colluvial soils generally ranged between 4 to 9 feet thick.

4.4 Older Alluvium (Qoa)

Older alluvium was encountered underlying the undocumented fill or was exposed at the ground surface. The older alluvium primarily consists of damp, dense, silty, fine to coarse grained sand. The older alluvial deposits are considered suitable for the support of additional fill and/or structure loading.

4.5 Santiago Formation (Tsa)

The Eocene-age Santiago Formation was deposited on an irregular erosional surface formed on the Tonalite. This formation consists of relatively flat-lying claystone, siltstone, and sandstone units. With the exception of the sandier portions, materials derived from this unit typically possess a medium to high expansion potential with a moderate to low shear strength. This formation can also possess a high to moderate potential to transmit seepage along impervious layers. The Santiago Formation is considered suitable in its present condition.

4.6 Granitic Rock (Kgt)

Cretaceous-age Tonalite (granitic rock) of the Southern California Batholith was encountered beneath the surficial soils or at the ground surface. The rock materials exhibited a variable weathering pattern ranging from completely weathered, decomposed granite to outcrops of fresh, extremely strong, hard rock that may require blasting to excavate. Granitic units generally exhibit adequate bearing and slope stability characteristics and cut slopes excavated at an inclination of 2:1 (horizontal:vertical) should be stable to the proposed heights if free of adversely oriented joints or fractures.

The soils derived from excavations within the decomposed granitic rock are anticipated to consist of low-expansive, silty, medium- to coarse-grained sands and should provide suitable foundation support in either a natural or properly compacted condition. It should be anticipated that excavations within the granitic rock will generate boulders and oversize materials (rocks greater than 12 inches in length) that will require special handling and placement as recommended hereinafter. The granite was able to be excavated to a depth of at least 14 feet within two of the excavations during the previous investigation. The extent and rippability characteristics of the granitic rock in areas of proposed excavation should be the subject of future studies as plans progress.

5. GROUNDWATER

Groundwater was encountered during the field explorations at depths ranging between 8 and 23 feet below the existing ground surface. Within the proposed development footprint, groundwater was generally observed at approximately 19 to 23 feet below the ground surface. Groundwater was not encountered in the test pits. During the geologic reconnaissance, no water was observed within the drainage that transects the western third of the property.

Groundwater may impact grading in that it may limit remedial excavations within alluvial areas which will affect the liquefaction and settlement estimates. Dewatering or other means of groundwater mitigation should be considered to facilitate remedial grading and prevent the need to perform surcharging and settlement monitoring. Other than the drainage that transects the western third of the site, groundwater is not expected to be a factor in development of the site north of North

River Road. Groundwater is expected to be a factor during remedial grading of alluvium south the North River Road.

6. GEOLOGIC HAZARDS

6.1 Faulting and Seismicity

Based on our reconnaissance and a review of published geologic maps and reports, the site is not located on any known "active," "potentially active" or "inactive" fault traces as defined by the California Geological Survey (CGS).

The Newport-Inglewood and Rose Canyon Faults, located approximately 11 and 12 miles west of the site, respectively, are the closest known active faults. The CGS considers a fault seismically active when evidence suggests seismic activity within roughly the last 11,000 years. The CGS has included portions of the Rose Canyon Fault zone within an Alquist-Priolo Earthquake Fault Zone.

According to the computer program *EZ-FRISK* (Version 7.65), 10 known active faults are located within a search radius of 50 miles from the property. The nearest known active faults are the Newport-Inglewood and Rose Canyon Faults, located approximately 11 and 12 miles west of the site, respectively, and are the dominant sources of potential ground motion. Earthquakes that might occur on the Newport-Inglewood or Rose Canyon Fault Zones or other faults within the southern California and northern Baja California area are potential generators of significant ground motion at the site. The estimated deterministic maximum earthquake magnitude and peak ground acceleration for the Newport Inglewood Fault are 7.5 and 0.26g, respectively. Table 6.1.1 lists the estimated maximum earthquake magnitude and peak ground acceleration for the most dominant faults in relationship to the site location. We calculated peak ground acceleration (PGA) using Boore-Atkinson (2008) NGA USGS2008, Campbell-Bozorgnia (2008) NGA USGS, and Chiou-Youngs (2008) NGA acceleration-attenuation relationships.

TABLE 6.1.1
DETERMINISTIC SPECTRA SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Peak Ground Acceleration		
			Boore-Atkinson 2008 (g)	Campbell-Bozorgnia 2008 (g)	Chiou-Youngs 2008 (g)
Newport-Inglewood	11	7.5	0.26	0.20	0.26
Rose Canyon	12	6.9	0.21	0.17	0.18
Elsinore	17	7.85	0.24	0.17	0.22
Coronado Bank	28	7.4	0.16	0.10	0.12
Palos Verdes Connected	28	7.7	0.17	0.13	0.14
San Joaquin Hills	33	7.1	0.13	0.11	0.10
Palos Verdes	37	7.3	0.13	0.08	0.09
San Jacinto	39	7.88	0.15	0.10	0.12
Earthquake Valley	41	6.8	0.09	0.06	0.05

We used the computer program *EZ-FRISK* to perform a probabilistic seismic hazard analysis. The computer program *EZ-FRISK* operates under the assumption that the occurrence rate of earthquakes on each mappable Quaternary fault is proportional to the faults slip rate. The program accounts for fault rupture length as a function of earthquake magnitude, and site acceleration estimates are made using the earthquake magnitude and distance from the site to the rupture zone. The program also accounts for uncertainty in each of following: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from considered earthquake sources, the program calculates the total average annual expected number of occurrences of site acceleration greater than a specified value. We utilized acceleration-attenuation relationships suggested by Boore-Atkinson (2008) NGA USGS, Campbell-Bozorgnia (2008) NGA USGS, and Chiou-Youngs (2008) in the analysis. Table 6.1.2 presents the site-specific probabilistic seismic hazard parameters including acceleration-attenuation relationships and the probability of exceedence.

TABLE 6.1.2
PROBABILISTIC SEISMIC HAZARD PARAMETERS

Probability of Exceedence	Peak Ground Acceleration		
	Boore-Atkinson, 2007 (g)	Campbell-Bozorgnia, 2008 (g)	Chiou-Youngs, 2008 (g)
2% in a 50 Year Period	0.51	0.40	0.47
5% in a 50 Year Period	0.40	0.31	0.36
10% in a 50 Year Period	0.32	0.25	0.27

While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including the frequency and duration of motion and the soil conditions underlying the site. Seismic design of the structures should be evaluated in accordance with the California Building Code (CBC) guidelines currently adopted by the City of Oceanside.

The site could be subjected to moderate to severe ground shaking in the event of a major earthquake on any of the referenced faults or other faults in Southern California. With respect to seismic shaking, the site is considered comparable to the surrounding developed area.

6.2 Liquefaction

Liquefaction typically occurs when a site is located in a zone with seismic activity, onsite soils are cohesionless or silt/clay with low plasticity, groundwater is encountered within 50 feet of the surface, and soil densities are less than about 70 percent of the maximum dry densities. If the four previous criteria are met, a seismic event could result in a rapid pore water pressure increase from the earthquake-generated ground accelerations.

The site is not located within a state-designated liquefaction hazard zone. However, based on an initial screening of the boring logs and CPT's, the subsurface conditions along the southwest property margin had relatively shallow groundwater depths within deposits of relatively loose sand. The current standard of practice, as outlined in the *Recommended Procedures for Implementation of DMG Special Publication 117A, Guidelines for Analyzing and Mitigating Liquefaction in California* requires liquefaction analysis to a depth of at least 50 feet below the lowest portion of proposed structures.

We performed liquefaction analyses utilizing the computer program CLiq (2006) in conjunction with the information obtained from the CPT soundings (CPT's-1 through 14) and corresponding hollow-stem auger borings. In accordance with SP117A guidelines, we used the methodology of NCEER to perform the liquefaction evaluations. We used a computed site acceleration of 0.44g (based on ASCE 7-10) and a modal magnitude of 7.76 as evaluated from the 2008 NSHMP PSHA Interactive Deaggregation on the United States Geological Survey website.

Our analyses of the proposed as-graded soil conditions indicates that liquefaction could occur within the soil below the groundwater table for the levels of ground shaking assumed for soils encountered in Borings B-5 (CPT-10) and B-9 (CPT-1). The other analyses (CPT-2 through CPT-9, and CPT-11 through CPT-14) did not reveal a liquefaction potential. Adverse impacts associated with liquefaction include ground rupture and/or sand boils, lateral spread, and settlement of the liquefiable layers. Based on review of the original plans and referenced plans, the proposed development has generally been shifted north and west of the primary liquefaction hazard areas associated with the San Luis Rey

River. Remedial grading will remove the majority, if not all of the soils subject to a liquefaction potential within the development footprint and proposed fill placement (including remedial grading) will provide an overburden sufficient to eliminate the potential for surface manifestation.

Sand boils occur where liquefiable soil is extruded upward through the soil deposit to the ground surface. Providing an increase in overburden pressure and a compacted fill mat can mitigate surface manifestation of these features. Research presented by Ishihara (1985) indicates that the presence of a non-liquefiable surface layer typically prevents the effects of at-depth liquefaction from reaching the surface if it is thick enough, generally 3 m or greater. Modifications to Ishihara's chart have been made to include higher ground accelerations (Ishihara's 1985 chart was based on a 0.25g ground acceleration) by EERC (2003). Based on the modified curves and the thickness of the non-liquefiable soil layers (layers above the assumed groundwater table), the risk for surface manifestation does exist in the in-situ condition. However, proposed remedial grading and additional fill placement will eliminate the potential for surface manifestation.

Lateral spreading occurs when liquefiable soil is in the immediate vicinity of a free face such as a slope. Factors controlling lateral displacement include earthquake magnitude, distance from the earthquake epicenter, thickness of liquefiable soil layer, grain size characteristics, and fines content of the soil. Bartlett and Youd (1995) have concluded that lateral spreading is restricted to sediments with corrected SPT blow counts of 15 or less for earthquake magnitudes less than or equal to 8.0. Based on review of the referenced plans, the potential for lateral spreading in the potentially liquefiable soil below the groundwater table and below the compacted fill is considered negligible.

Seismically-induced settlement could occur within the liquefied soil layer and/or layers after seismic shaking stops due to rearrangement of the sand particles. We estimated seismically-induced settlement due to liquefaction using procedures suggested by SP 117A (2008). The CLiq analyses indicated total settlements ranging between 0 and approximately 3.5 inches. Proposed remedial grading will reduce these settlement estimates to acceptable levels. It should be noted that the analysis which indicated 3.5 inches of settlement was located at CPT-1. The proposed development has been shifted away from the river valley where this CPT sounding was located. The other liquefaction analysis that revealed liquefaction induced settlement was CPT-10, which showed approximately 0.75 inches, which is acceptable. Differential settlement is expected to be approximately one-half of the estimated total settlement over a distance of approximately 50 feet.

The results of the liquefaction analyses are presented in Appendix C.

6.3 Landslides

No evidence of landslide deposits was encountered at the site during the site reconnaissance.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 No soil or geologic conditions exist at the site that would preclude the development of the property as planned, provided the recommendations of this report are followed.

7.1.2 This preliminary geotechnical investigation should be updated as project plans progress to 40-scale grading plans. Additional field exploration and laboratory testing is recommended to evaluate specific geotechnical issues, such as slope stability and rock rippability. In addition, a storm water infiltration feasibility evaluation, in accordance with current City of Oceanside Storm Water Standards Manual, should be performed. This evaluation should include in-situ permeability testing at each of the proposed water quality basin locations. Due to expected site conditions, we expect a "Partial Infiltration" to "No Infiltration" condition depending on soil conditions and proximity to settlement sensitive structures and improvements.

7.1.3 The surficial soils and alluvial materials should be completely removed and compacted. The lowest portions of alluvial soils may require dewatering or other means to manage groundwater perched on the bedrock and allow for complete removals. In the event that groundwater prevents complete removals, a surcharge embankment and settlement monitoring procedure will be necessary where the saturated deposits are left in-place.

7.1.4 Remedial grading along the project boundary will be impacted by property line constraints. In several instances, proposed slope and building pad areas abut the property line where our subsurface information indicates remedial grading depths of up to 15 to 20 feet below the ground surface (e.g. Lots 39 through 42). Groundwater is also present in these areas. Permission to grade offsite may be necessary to facilitate remedial grading in these areas along the project boundary.

7.1.5 It is not uncommon for groundwater or seepage conditions to develop where none previously existed, particularly after landscape irrigation is initiated. The occurrence of induced groundwater seepage from landscaping can be greatly reduced by implementing and monitoring a landscape program that limits irrigation to that sufficient to support the vegetative cover without over watering. Shallow subdrains may be required in the future if seeps occur after rainy periods or after landscaping is installed.

7.2 Seismic Design Criteria

7.2.1 We used the computer program *U.S. Seismic Design Maps*, provided by the USGS. Table 7.2.1 summarizes site-specific design criteria obtained from the 2016 California

Building Code (CBC; Based on the 2015 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The short spectral response uses a period of 0.2 seconds. The values presented in Table 7.2.1 are for the risk-targeted maximum considered earthquake (MCE_R). Based on soil conditions and planned grading, the building should be designed using a Site Class D. We evaluated the Site Class based on the discussion in Section 1613.3.2 of the 2016 CBC and Table 20.3-1 of ASCE 7-10.

TABLE 7.2.1
2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2016 CBC Reference
Site Class	D	Section 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.057g	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.414g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.077	Table 1613.3.3(1)
Site Coefficient, F_V	1.586	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.139g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	0.657g	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.759g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.438g	Section 1613.3.4 (Eqn 16-40)

7.2.2 Table 7.2.2 presents additional seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-10 for the mapped maximum considered geometric mean (MCE_G).

TABLE 7.2.2
2016 CBC SITE ACCELERATION PARAMETERS

Parameter	Value, Site Class D	ASCE 7-10 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.393g	Figure 22-7
Site Coefficient, F_{PGA}	1.107	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.435g	Section 11.8.3 (Eqn 11.8-1)

7.2.3 Conformance to the criteria for seismic design does not constitute any guarantee or assurance that significant structural damage or ground failure will not occur in the event of a maximum level earthquake. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive.

7.3 Grading

7.3.1 All grading should be performed in accordance with the *Recommended Grading Specifications* contained in Appendix E. Where the recommendations of Appendix E conflict with this report, the recommendations of this report should take precedence.

7.3.2 Prior to commencing grading, a preconstruction conference should be held at the site with the owner or developer, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling and the fine grading plans can be discussed at that time.

7.3.3 Site preparation should begin with the removal of all deleterious material and vegetation, if present. The depth of removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during stripping should be exported from the site.

7.3.4 The surficial soils should be removed and properly compacted prior to placing additional fill and/or structural loads. As previously discussed, groundwater may impact project remedial grading. Where the water table is not encountered, remedial grading should extend to formational materials. Prior to placing fill, the exposed removal bottom should be compacted to at least 90 percent of the applicable maximum dry density at or slightly above optimum moisture content. Aeration, and/or mixing with drier soils may be needed. The actual extent of unsuitable soil removals will be determined in the field during grading by the geotechnical engineer and/or engineering geologist.

7.3.5 To reduce the potential for differential settlement and facilitate ease of excavating shallow footings and utility trenches, it is recommended that the cut portion of cut-fill transitions, if present after remedial grading, or shallow fills (less than 3 feet) over granitic rock be undercut a minimum of three feet below proposed finish grade and replaced with properly compacted “very low” to “low” expansive soil fill. Undercutting of granitic rock on cut lots and roadway areas should also be considered to facilitate construction of foundations and underground utilities.

7.3.6 The site should then be brought to final subgrade elevations with structural fill compacted in layers. In general, the on-site soils are suitable for re-use as fill if free from vegetation, debris and other deleterious material. Layers of fill should be no thicker than will allow for

adequate bonding and compaction. All fill and scarified ground surfaces should be compacted to at least 90 percent of maximum dry density at or above optimum moisture content, as determined in accordance with ASTM Test Procedure D 1557. Fill materials below optimum moisture content may be considered unacceptable by the project geotechnical engineer.

7.3.7 It is the responsibility of the contractor to ensure that all excavations and trenches are properly shored and maintained in accordance with applicable OSHA rules and regulations in order to maintain safety and maintain the stability of adjacent existing improvements.

7.3.8 Import fill (if necessary) should consist of granular materials with a "very low" to "low" expansion potential (EI of 50 or less) free of deleterious material or stones larger than 3 inches and should be compacted as recommended above. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to determine its suitability as fill material.

7.4 Foundation and Concrete Slab-On-Grade Recommendations

7.4.1 The following foundation recommendations are for proposed one- to three-story residential structures. The foundation recommendations have been separated into three categories based on either the maximum and differential fill thickness or Expansion Index. The foundation category criteria are presented in Table 7.4.1.

TABLE 7.4.1
FOUNDATION CATEGORY CRITERIA

Foundation Category	Maximum Fill Thickness, T (feet)	Differential Fill Thickness, D (feet)	Expansion Index (EI)
I	T<20	--	EI≤50
II	20≤T<50	10≤D<20	50<EI≤90
III	T≥50	D≥20	90<EI≤130

7.4.2 We will provide the final foundation category for the building after finish pad grades have been achieved and laboratory testing of the subgrade soil has been completed. However, Category III foundations are recommended for any lots underlain by saturated alluvium.

7.4.3 Table 7.4.2 presents minimum foundation and interior concrete slab design criteria for conventional foundation systems.

TABLE 7.4.2
CONVENTIONAL FOUNDATION RECOMMENDATIONS BY CATEGORY

Foundation Category	Minimum Footing Embedment Depth (inches)	Continuous Footing Reinforcement	Interior Slab Reinforcement
I	12	Two No. 4 bars, one top and one bottom	6 x 6 - 10/10 welded wire mesh at slab mid-point
II	18	Four No. 4 bars, two top and two bottom	No. 3 bars at 24 inches on center, both directions
III	24	Four No. 5 bars, two top and two bottom	No. 3 bars at 18 inches on center, both directions

7.4.4 The embedment depths presented in Table 7.4.2 should be measured from the lowest adjacent pad grade for both interior and exterior footings. The conventional foundations should have a minimum width of 12 inches and 24 inches for continuous and isolated footings, respectively. A typical wall/column footing detail is presented on Figure 3.

7.4.5 The concrete slabs-on-grade should be a minimum of 4 inches thick for Foundation Categories I and II and 5 inches thick for Foundation Category III. The concrete slabs-on-grade should be underlain by 4 inches and 3 inches of clean sand for 4-inch-thick and 5-inch-thick slabs, respectively. Slabs expected to receive moisture sensitive floor coverings or used to store moisture sensitive materials should be underlain by a vapor inhibitor covered with at least 2 inches of clean sand or crushed rock. If crushed rock will be used, the thickness of the vapor inhibitor should be at least 10 mil to prevent possible puncturing.

7.4.6 As a substitute, the layer of clean sand (or crushed rock) beneath the vapor inhibitor recommended in the previous section can be omitted if a vapor inhibitor that meets or exceeds the requirements of ASTM E 1745-97 (Class A), and that exhibits permeance not greater than 0.012 perm (measured in accordance with ASTM E 96-95) is used. This vapor inhibitor may be placed directly on properly compacted fill or formational materials. The vapor inhibitor should be installed in general conformance with ASTM E 1643-98 and the manufacturer's recommendations. Two inches of clean sand should then be placed on top of the vapor inhibitor to reduce the potential for differential curing, slab curl, and cracking. Floor coverings should be installed in accordance with the manufacturer's recommendations.

7.4.7 As an alternative to the conventional foundation recommendations, consideration should be given to the use of post-tensioned concrete slab and foundation systems for the support of the proposed structures. The post-tensioned systems should be designed by a structural engineer experienced in post-tensioned slab design and design criteria of the Post-

Tensioning Institute (PTI) DC 10.5-12 *Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive Soils* or *WRI/CRSI Design of Slab-on-Ground Foundations*, as required by the 2016 California Building Code (CBC Section 1808.6.2). Although this procedure was developed for expansive soil conditions, it can also be used to reduce the potential for foundation distress due to differential fill settlement. The post-tensioned design should incorporate the geotechnical parameters presented in Table 7.4.3 for the particular Foundation Category designated. The parameters presented in Table 7.4.3 are based on the guidelines presented in the PTI DC 10.5 design manual.

TABLE 7.4.3
POST-TENSIONED FOUNDATION SYSTEM DESIGN PARAMETERS

Post-Tensioning Institute (PTI), Third Edition Design Parameters	Foundation Category		
	I	II	III
Thornthwaite Index	-20	-20	-20
Equilibrium Suction	3.9	3.9	3.9
Edge Lift Moisture Variation Distance, e_M (feet)	5.3	5.1	4.9
Edge Lift, y_M (inches)	0.61	1.10	1.58
Center Lift Moisture Variation Distance, e_M (feet)	9.0	9.0	9.0
Center Lift, y_M (inches)	0.30	0.47	0.66

7.4.8 Foundation systems for the lots that possess a foundation Category I and a "very low" expansion potential (expansion index of 20 or less) can be designed using the method described in Section 1808 of the 2016 CBC. If post-tensioned foundations are planned, an alternative, commonly accepted design method (other than PTI DC 10.5) can be used. However, the post-tensioned foundation system should be designed with a total and differential deflection of 1 inch. Geocon Incorporated should be contacted to review the plans and provide additional information, if necessary.

7.4.9 If an alternate design method is contemplated, Geocon Incorporated should be contacted to evaluate if additional expansion index testing should be performed to identify the lots that possess a "very low" expansion potential (expansion index of 20 or less).

7.4.10 The foundations for the post-tensioned slabs should be embedded in accordance with the recommendations of the structural engineer. If a post-tensioned mat foundation system is planned, the slab should possess a thickened edge with a minimum width of 12 inches and extend below the clean sand or crushed rock layer.

7.4.11 If the structural engineer proposes a post-tensioned foundation design method other than PTI DC 10.5:

- The deflection criteria presented in Table 7.4.3 are still applicable.
- Interior stiffener beams should be used for Foundation Categories II and III.
- The width of the perimeter foundations should be at least 12 inches.
- The perimeter footing embedment depths should be at least 12 inches, 18 inches and 24 inches for foundation categories I, II, and III, respectively. The embedment depths should be measured from the lowest adjacent pad grade.

7.4.12 Our experience indicates post-tensioned slabs may be susceptible to excessive edge lift, regardless of the underlying soil conditions. Placing reinforcing steel at the bottom of the perimeter footings and the interior stiffener beams may mitigate this potential. The structural engineer should design the foundation system to reduce the potential of edge lift occurring for the proposed structures.

7.4.13 During the construction of the post-tension foundation system, the concrete should be placed monolithically. Under no circumstances should cold joints be allowed to form between the footings/grade beams and the slab during the construction of the post-tension foundation system unless designed by the structural engineer.

7.4.14 Category I, II, or III foundations may be designed for an allowable soil bearing pressure of 2,000 pounds per square foot (psf) (dead plus live load). This bearing pressure may be increased by one-third for transient loads due to wind or seismic forces.

7.4.15 Isolated footings, if present, should have the minimum embedment depth and width recommended for conventional foundations for a particular Foundation Category. The use of isolated footings, which are located beyond the perimeter of the building and support structural elements connected to the building, are not recommended for Category III. Where this condition cannot be avoided, the isolated footings should be connected to the building foundation system with grade beams.

7.4.16 For Foundation Category III, consideration should be given to using interior stiffening beams and connecting isolated footings and/or increasing the slab thickness. In addition, consideration should be given to connecting patio slabs, which exceed 5 feet in width, to the building foundation to reduce the potential for future separation to occur.

7.4.17 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisture conditioned, as

necessary, to maintain a moist condition as would be expected in any such concrete placement.

7.4.18 Where buildings or other improvements are planned near the top of a slope 3:1 (horizontal:vertical) or steeper, special foundation and/or design considerations are recommended due to the tendency for lateral soil movement to occur.

- For fill slopes less than 20 feet high, building footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

- When located next to a descending 3:1 (horizontal:vertical) fill slope or steeper, the foundations should be extended to a depth where the minimum horizontal distance is equal to H/3 (where H equals the vertical distance from the top of the fill slope to the base of the fill soil) with a minimum of 7 feet but need not exceed 40 feet. The horizontal distance is measured from the outer, deepest edge of the footing to the face of the slope. A post-tensioned slab and foundation system or mat foundation system can be used to reduce the potential for distress in the structures associated with strain softening and lateral fill extension. Specific design parameters or recommendations for either of these alternatives can be provided once the building location and fill slope geometry have been determined.

- If swimming pools are planned, Geocon Incorporated should be contacted for a review of specific site conditions.

- Swimming pools located within 7 feet of the top of cut or fill slopes are not recommended. Where such a condition cannot be avoided, the portion of the swimming pool wall within 7 feet of the slope face be designed assuming that the adjacent soil provides no lateral support. This recommendation applies to fill slopes up to 30 feet in height, and cut slopes regardless of height. For swimming pools located near the top of fill slopes greater than 30 feet in height, additional recommendations may be required and Geocon Incorporated should be contacted for a review of specific site conditions.

- Although other improvements, which are relatively rigid or brittle, such as concrete flatwork or masonry walls, may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures, which would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.

7.4.19 The recommendations of this report are intended to reduce the potential for cracking of slabs and foundations due to expansive soil (if present), differential settlement of fill soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil

characteristics. Their occurrence may be reduced by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.4.20 Concrete slabs should be provided with adequate crack-control joints, construction joints and/or expansion joints to reduce unsightly shrinkage cracking. The design of joints should consider criteria of the American Concrete Institute (ACI) when establishing crack-control spacing. Additional steel reinforcing, concrete admixtures and/or closer crack control joint spacing should be considered where concrete-exposed finished floors are planned.

7.4.21 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

7.5 Retaining Walls and Lateral Loads Recommendations

7.5.1 Retaining walls not restrained at the top and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid with a density of 35 pounds per cubic foot (pcf). Where the backfill will be inclined at 2:1 (horizontal:vertical), an active soil pressure of 50 pcf is recommended. These soil pressures assume that the backfill materials within an area bounded by the wall and a 1:1 plane extending upward from the base of the wall possess an Expansion Index $\leq$50. Geocon Incorporated should be consulted for additional recommendations if backfill materials have an EI >50.

7.5.2 Retaining walls shall be designed to ensure stability against overturning sliding, excessive foundation pressure and water uplift. Where a keyway is extended below the wall base with the intent to engage passive pressure and enhance sliding stability, it is not necessary to consider active pressure on the keyway.

7.5.3 Where walls are restrained from movement at the top, an additional uniform pressure of 8H psf (where H equals the height of the retaining wall portion of the wall in feet) should be added to the active soil pressure where the wall possesses a height of 8 feet or less and 12H where the wall is greater than 8 feet. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to two feet of fill soil should be added (total unit weight of soil should be taken as 125 pcf).

7.5.4 Soil contemplated for use as retaining wall backfill, including import materials, should be identified in the field prior to backfill. At that time Geocon Incorporated should obtain samples for laboratory testing to evaluate its suitability. Modified lateral earth pressures may be necessary if the backfill soil does not meet the required expansion index or shear

strength. City or regional standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. In this regard, on-site soil to be used as backfill may or may not meet the values for standard wall designs. Geocon Incorporated should be consulted to assess the suitability of the on-site soil for use as wall backfill if standard wall designs will be used.

7.5.5 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The wall designer should provide appropriate lateral deflection quantities for planned retaining walls structures, if applicable. These lateral values should be considered when planning types of improvements above retaining wall structures.

7.5.6 Retaining walls should be provided with a drainage system adequate to prevent the buildup of hydrostatic forces and should be waterproofed as required by the project architect. The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The above recommendations assume a properly compacted granular (EI $\leq$50) free-draining backfill material with no hydrostatic forces or imposed surcharge load. A typical retaining wall drainage detail is presented on Figure 4. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

7.5.7 In general, wall foundations having a minimum depth and width of one foot may be designed for an allowable soil bearing pressure of 2,000 psf, provided the soil within three feet below the base of the wall has an Expansion Index $\leq$ 90. The recommended allowable soil bearing pressure may be increased by 300 psf and 500 psf for each additional foot of foundation width and depth, respectively, up to a maximum allowable soil bearing pressure of 4,000 psf.

7.5.8 The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, Geocon Incorporated should be consulted where such a condition is anticipated. As a minimum, wall footings should be deepened such that the bottom outside edge of the footing is at least seven feet from the face of slope when located adjacent and/or at the top of descending slopes.

7.5.9 The structural engineer should determine the Seismic Design Category for the project in accordance with Section 1613.3.5 of the 2016 CBC or Section 11.6 of ASCE 7-10. For structures assigned to Seismic Design Category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 1803.5.12 of the 2016 CBC. The seismic load is dependent on the retained

height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall. A seismic load of 21H should be used for design. We used the peak ground acceleration adjusted for Site Class effects, PGA_M, of 0.44g calculated from ASCE 7-10 Section 11.8.3 and applied a pseudo-static coefficient of 0.33.

7.5.10 For resistance to lateral loads, a passive earth pressure equivalent to a fluid density of 300 pcf is recommended for footings or shear keys poured neat against properly compacted granular fill soils or undisturbed formational materials. The passive pressure assumes a horizontal surface extending away from the base of the wall at least five feet or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material not protected by floor slabs or pavement should not be included in the design for lateral resistance.

7.5.11 An ultimate friction coefficient of 0.35 may be used for resistance to sliding between soil and concrete. This friction coefficient may be combined with the passive earth pressure when determining resistance to lateral loads.

7.5.12 The recommendations presented above are generally applicable to the design of rigid concrete or masonry retaining walls having a maximum height of 12 feet. In the event that walls higher than 12 feet are planned, Geocon Incorporated should be consulted for additional recommendations.

7.6 Site Drainage and Moisture Protection

7.6.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2016 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

7.6.2 In the case of basement walls or building walls retaining landscaping areas, a water-proofing system should be used on the wall and joints, and a Miradrain drainage panel (or similar) should be placed over the waterproofing. The project architect or civil engineer should provide detailed specifications on the plans for all waterproofing and drainage.

7.6.3 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil

movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

7.7 Grading and Foundation Plan Review

7.7.1 Geocon Incorporated should review the grading and foundation plans for the project prior to final design submittal to determine if additional analysis and/or recommendations are required.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

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VICINITY MAP

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NORTH RIVER FARMS
OCEANSIDE, CALIFORNIA

DATE 11 - 22 - 2017	PROJECT NO. G1753 - 32 - 02	FIG. 1

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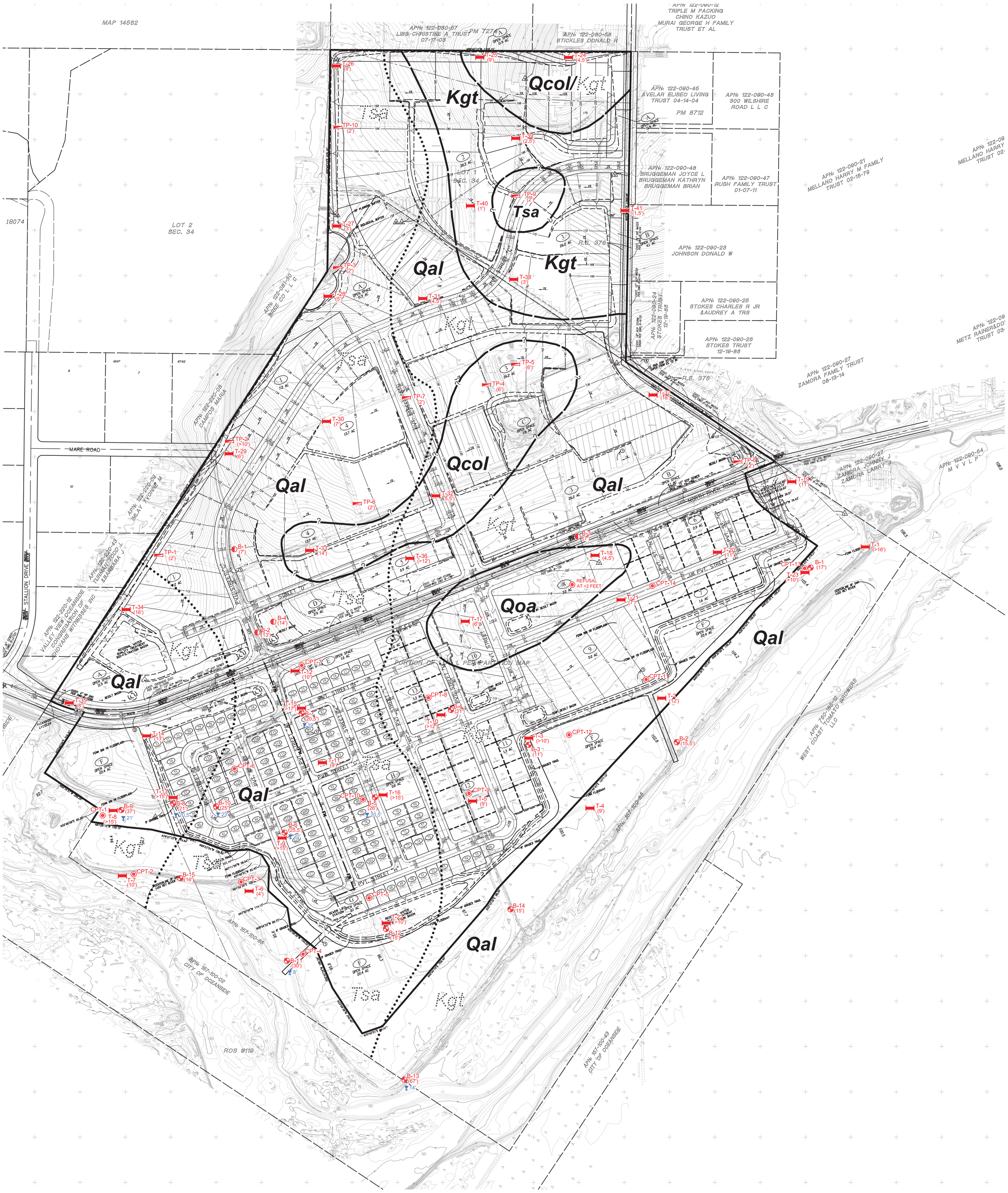

GEOCON LEGEND

- **Qal** .....ALLUVIUM
- **Qoa** .....OLDER ALLUVIUM
- **Qcol** .....COLLUVIUM
- **Kgt** .....GRANITIC ROCK (Tonalite; Dotted Where Buried)
- **Tsa** .....SANTIAGO FORMATION (Dotted Where Buried)
- B-15 .....APPROX. LOCATION OF HOLLOW STEM BORING PERFORMED BY GEOCON INC (Nov 2014)
- T-41 .....APPROX. LOCATION OF EXPLORATORY TRENCH PERFORMED BY GEOCON INC (Nov 2014)
- CPT-14 .....APPROX. LOCATION OF CONE PENETROMETER TEST PERFORMED BY GEOCON INC (Aug 2014)
- B-4 .....APPROX. LOCATION OF HOLLOW STEM BORING PERFORMED BY CTE (Sept 2001)
- TP-9 .....APPROX. LOCATION OF EXPLORATORY TRENCH PERFORMED BY CTE (Sept 2001)
- (67') .....APPROX. THICKNESS OF SURFICIAL SOILS (In Feet)
- 23' .....APPROX. DEPTH GROUNDWATER ENCOUNTERED (In Feet)
- .....APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried; Queried Where Uncertain)

GEOLOGIC MAP

NORTH RIVER FARMS
OCEANSIDE, CALIFORNIA

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SCALE 1" = 200'	DATE 11 - 22 - 2017
PROJECT NO. G1753 - 32 - 02	FIGURE 2
SHEET 1 OF 1	

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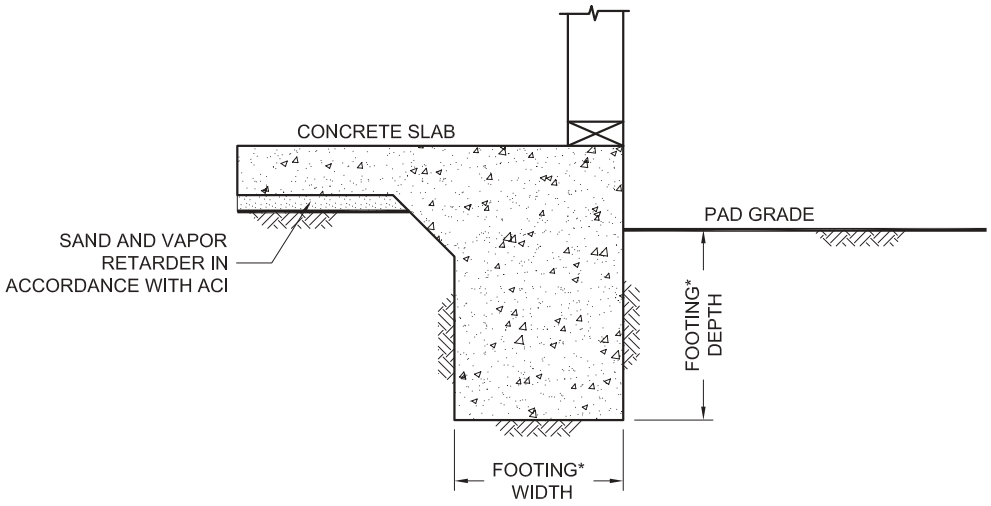

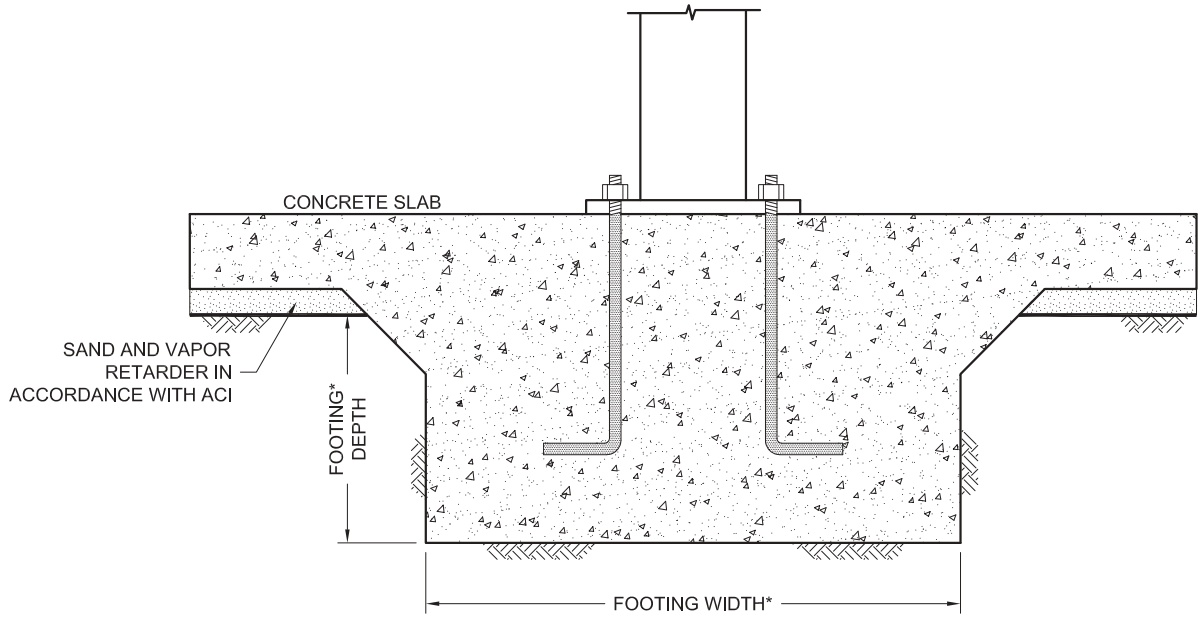

*....SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION

NO SCALE

WALL / COLUMN FOOTING DIMENSION DETAIL

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NORTH RIVER FARMS
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DATE 11 - 22 - 2017	PROJECT NO. G1753 - 32 - 02	FIG. 3

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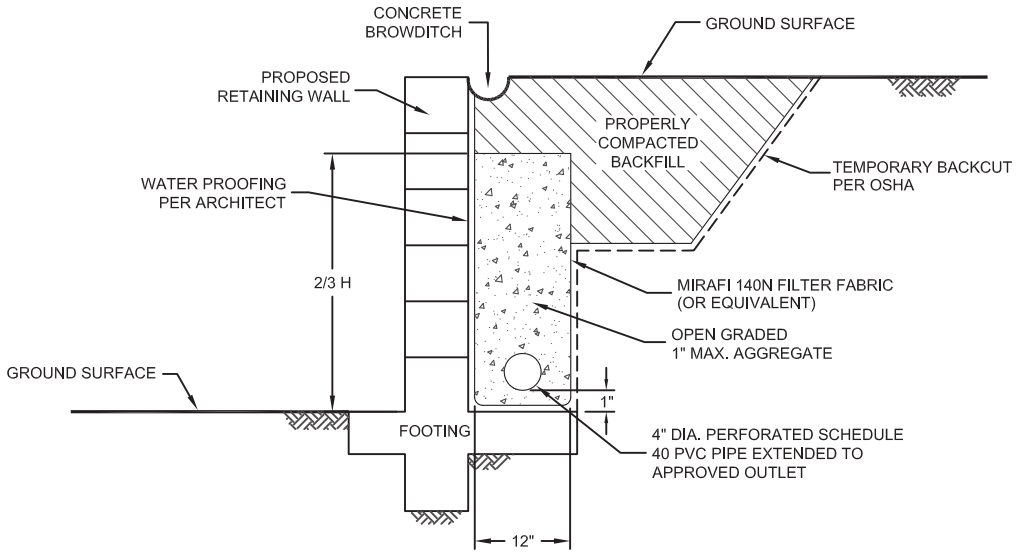

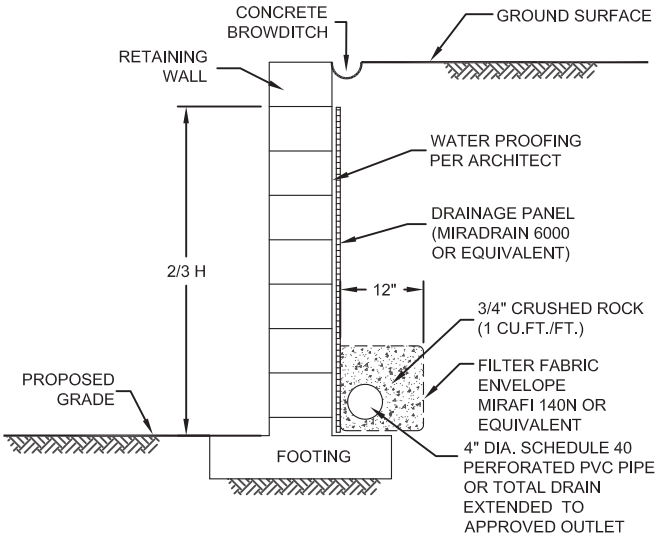

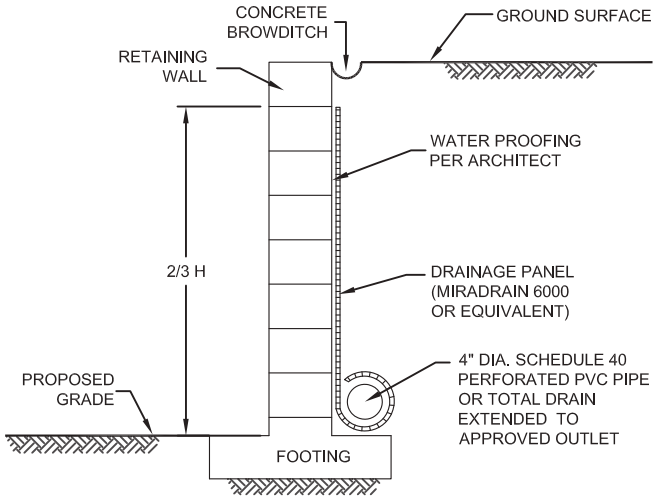

NOTE :

DRAIN SHOULD BE UNIFORMLY SLOPED TO GRAVITY OUTLET OR TO A SUMP WHERE WATER CAN BE REMOVED BY PUMPING

NO SCALE

TYPICAL RETAINING WALL DRAIN DETAIL

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NORTH RIVER FARMS
OCEANSIDE, CALIFORNIA

DATE 11 - 22 - 2017	PROJECT NO. G1753 - 32 - 02	FIG. 4

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APPENDIX A

APPENDIX A

FIELD INVESTIGATION

The initial field investigation was conducted on August 15 and 27, 2014, and consisted of advancing fourteen cone penetrometer test (CPT) soundings, using a CPT hydraulic push drill rig by Middle Earth GeoTesting, Inc. The CPT's insert an instrumented probe into the ground and measure tip resistance, sleeve friction and total down pressure. Correlations from these values can be used to evaluate soil type, density, liquefaction potential and total expected settlements due to liquefaction.

The CPT's were advanced to depths ranging from 6 to 46 feet below the existing ground surface. A fifteenth location was attempted three times within a radius of approximately 10 feet, but met refusal at a depth of less than 2 feet. This location is noted on Figure 2. Logs of the CPT soundings are presented in Appendix A. In the case of CPT's 4, 13, and 14, two or three attempts were made to attain the depths shown on the logs. Only the deepest of those attempts is presented in Appendix A.

We performed a supplemental field investigation on November 21 through 26, 2014, which consisted of the excavation of 15 small diameter borings and 41 exploratory trenches. As drilling and trenching proceeded, we logged and sampled the soil and geologic conditions encountered. We visually examined, classified and logged the soil conditions encountered in the excavations in general accordance with the Unified Soil Classification System (USCS). Logs of the exploratory borings and trenches are presented on Figures A-1 through A-56. The logs depict the general soil and geologic conditions encountered and the depth at which samples were obtained.

The borings were excavated using a CME 55 drill rig equipped with 8-inch, hollow-stem augers to a maximum depth of 68½ feet. We obtained samples during our boring excavations using a California split-spoon sampler or a Standard Penetration Test (SPT) sampler. Both samplers are composed of steel and are driven to obtain the soil samples. The California sampler has an inside diameter of 2.5 inches and an outside diameter of 2.875 inches. Up to 18 rings are placed inside the sampler that is 2.4 inches in diameter and 1 inch in height. The SPT sampler has an inside diameter of 1.5 inches and an outside diameter of 2 inches. Ring samples at appropriate intervals were retained in moisture-tight containers and transported to the laboratory for testing. Bulk samples were also retained from the borings for laboratory testing. The type of sample is noted on the exploratory boring logs.

The samplers were driven 12 and 18 inches using the California and SPT samplers, respectively, into the bottom of the excavations with the use of an automatic hammer and the use of A rods. The sampler is connected to the A rods and driven into the bottom of the excavation using a 140-pound hammer with a 30-inch drop. Blow counts are recorded for every 6 inches the sampler is driven. The penetration resistances shown on the boring logs are shown in terms of blows per foot. The values indicated on the boring logs are the sum of the last 12 inches of the sampler if driven 18 inches. If the sampler was not

driven for 18 inches, an approximate value is calculated in term of blows per foot or the final 6-inch interval is reported. These values are not to be taken as N-values, adjustments have not been applied.

The backhoe trenches were advanced to depths of 2½ to 16½ feet using a John Deere 410 G rubber tire backhoe equipped with a 24-inch-wide bucket.

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 1** ELEV. (MSL.)_____ DATE COMPLETED **11-24-2014** EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Medium dense, damp, brown to reddish brown, Silty, fine to medium SAND with clay			
2								
4								
	B1-1					25		
6				SP	**ALLUVIUM** Loose, damp, gray, fine to medium SAND; little to no cohesion	5		
8								
10	B1-2					22		
12					-Gravel present below 12 feet			
14					-Blow counts likely not accurate due to gravel			
	B1-3					57		
16					-Becomes wet at contact	35		
		+ +			**GRANITIC ROCK** Highly weathered, light brown and brown, weak GRANITIC ROCK			
					BORING TERMINATED AT 17.5 FEET Groundwater not encountered			

Figure A-1,
Log of Boring B 1, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

BORING B 2

ELEV. (MSL.) _____ DATE COMPLETED **11-24-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP	**ALLUVIUM** Loose, damp, gray, fine to medium SAND; little to no cohesion			
2								
4								
6	B2-1				-Becomes medium dense below 6 feet	14 17		
8								
10	B2-2					38		
12								
14					-Gravel present at 13 feet			
16	B2-3	+ +			**GRANITIC ROCK** Highly to moderately weathered, orange and black, moderately weak GRANITIC ROCK BORING TERMINATED AT 16 FEET Groundwater not encountered	57/9"		

Figure A-2,
Log of Boring B 2, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

BORING B 3

ELEV. (MSL.) _____ DATE COMPLETED **11-24-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM** Medium dense, damp, reddish brown, Silty, fine to medium SAND			
2								
4					-Some gravel at 3 feet			
6	B3-1			SP	Medium dense, damp to moist, reddish brown, fine to coarse SAND with gravel and little to no cohesion; blow counts not accurate due to gravel	60		
8								
10					-Contact observed in sample	78/9"		
					GRANITIC ROCK Moderately weathered, dark gray and brown, medium weak GRANITIC ROCK			
					BORING TERMINATED AT 11.5 FEET Groundwater not encountered			

Figure A-3,
Log of Boring B 3, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 4** ELEV. (MSL.)_____ DATE COMPLETED **11-24-2014** EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**ALLUVIUM** Medium dense, moist, reddish brown, Silty/Clayey, fine to medium SAND			
2								
4								
6	B4-1					34		
				SP	-Contact estimated from cuttings Medium dense, damp, brown to light brown, fine to coarse SAND with some gravel; little to no cohesion			
8								
10	B4-2				-Sample disturbed due to gravel; blow counts not accurate	51		
12								
14								
16						28		
18								
20								
						85/11"		
		+ +			-Contact observed in sample **GRANITIC ROCK** Moderately weathered, light brown, moderately weak to moderately strong GRANITIC ROCK			
					BORING TERMINATED AT 21.5 FEET Groundwater not encountered			

Figure A-4,
Log of Boring B 4, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

BORING B 5

ELEV. (MSL.) _____ DATE COMPLETED **11-24-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)
0		SM/SC	**UNDOCUMENTED FILL** Medium dense, damp, brown, Silty/Clayey, fine to medium SAND	
2			-Used information from trench T-16 for contact	
4		SM/SC	**ALLUVIUM** Medium dense, damp, reddish brown, Silty/Clayey, fine to coarse SAND with gravel	
6	B5-1		-Blow counts likely not accurate due to gravel	69
8		SP	-Contact estimated from cuttings Medium dense, damp, light gray to light brown, fine to medium SAND with little to no cohesion	
10	B5-2			33
12				19
14			-Gravel present below 14 feet	
16			-Becomes fine to coarse below 15 feet; blow counts likely not accurate due to gravel	52
18				
20			-Static groundwater at 20.5 feet	19
22				23
24				
26		CL	-Contact observed in sample	52
			SANTIAGO FORMATION Very stiff, pale green with orange mottling, Silty CLAY/CLAYSTONE; weathered	
			BORING TERMINATED AT 26.5 FEET Groundwater encountered at 20.5 feet	

DRY DENSITY (P.C.F.)

MOISTURE CONTENT (%)

G1753-32-02.GPJ

Figure A-5,
Log of Boring B 5, Page 1 of 1

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

BORING B 6

ELEV. (MSL.) _____ DATE COMPLETED **11-24-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SM/SC	**UNDOCUMENTED FILL** Loose, damp, dark brown, Silty/Clayey, fine to medium SAND			
2		SM	-Contact determined from trench T-9 **ALLUVIUM** Dense, damp, reddish brown, Silty, fine to coarse SAND with gravel			
4						
6			-Sample bounced at 5 feet			
8	B6-1		-Blow counts not accurate due to gravels	55		
10	B6-2	SP	Medium dense, damp, brown, fine to coarse SAND with gravel; little to no cohesion	37		
12				21		
14						
16	B6-3			40		
18						
20	B6-4		-Static groundwater at 20 feet; blow counts likely not accurate due to gravels	78/11"		
22				48		
24						
26		CL	-Contact observed in sample **SANTIAGO FORMATION** Very stiff, moist, pale green with, Silty CLAY/CLAYSTONE; weathered	29		
			BORING TERMINATED AT 26.5 FEET Groundwater encountered at 20 feet			

Figure A-6,
Log of Boring B 6, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

BORING B 7

ELEV. (MSL.) _____ DATE COMPLETED **11-24-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL** Loose to medium dense, moist, gray to brown, Silty, fine SAND			
2								
4								
					-Contact determined by trench T-15			
6				CL	**ALLUVIUM** Firm, wet, black, Silty CLAY; no recovery on sample at 5 feet	8		
8				SC	Medium dense, moist to wet, mottled reddish brown and gray, Clayey, fine to coarse SAND			
10	B7-1					30		
12						18		
14								
16	B7-2			SM	Medium dense, moist, reddish brown, Silty, fine to coarse SAND with gravel; blow counts likely not accurate due to gravel	50		
18			▼		-Static groundwater at 19 feet			
20	B7-3				-Contact observed in sample	40		
				CL	**SANTIAGO FORMATION** Very stiff, pale green, Silty CLAY/CLAYSTONE; weathered			
					BORING TERMINATED AT 21 FEET Groundwater encountered at 19 feet			

Figure A-7,
Log of Boring B 7, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

BORING B 8

ELEV. (MSL.) _____ DATE COMPLETED **11-24-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM** Medium dense, damp, brown, Silty, fine to medium SAND			
2								
4								
6	B8-1				-Becomes reddish brown below 5 feet	34		
8				SP	Medium dense, damp, reddish, fine to coarse SAND with little to no cohesion			
10	B8-2				-Becomes light gray with gravels below 10.5 feet -Blow counts of SPT sample likely not accurate due to gravels	35 52		
12								
14								
16	B8-3				-Blow counts not accurate due to gravels	71		
18								
20			▼			47		
		+ +			-Static groundwater at 20.5 feet **GRANITIC ROCK** Highly weathered, orange brown, moderately weak GRANITIC ROCK BORING TERMINATED AT 21.5 FEET Groundwater encountered at 20.5 feet			

Figure A-8,
Log of Boring B 8, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

BORING B 9

ELEV. (MSL.) _____ DATE COMPLETED **11-25-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. MYERS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2				SM	**UNDOCUMENTED FILL** Loose, damp, gray, Silty, fine SAND			
4								
6	B9-1					14		
8				SM	**ALLUVIUM** Loose, damp, gray, Silty, fine to medium SAND; little to no cohesion			
10	B9-2					15	96.7	16.0
12								
14				ML	Firm, moist, gray, fine Sandy SILT			
16	B9-3				-Becomes very moist	9	93.1	29.1
18								
20			▼		-No recovery -Static groundwater at 21 feet	9		
22								
24				CL	Firm, wet, gray, Lean CLAY with trace fine sand			
26	B9-4					8	93.6	30.0
28								

Figure A-9,
Log of Boring B 9, Page 1 of 2

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

BORING B 9

ELEV. (MSL.) _____ DATE COMPLETED **11-25-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. MYERS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B9-5			CL	-Becomes fine, Sandy CLAY at 30 feet	8		
32				SM	Loose, wet, gray, Silty SAND with some clay and gravel			
34					-No recovery; blow counts not accurate due to gravels	73		
36								
38	B9-6				**GRANITIC ROCK** Highly weathered, moderately weak GRANITIC ROCK	73		
					BORING TERMINATED AT 39 FEET Groundwater encountered at 21 feet			

Figure A-9,
Log of Boring B 9, Page 2 of 2

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

BORING B 10

ELEV. (MSL.) _____ DATE COMPLETED **11-25-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. MYERS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL** Loose, damp, reddish brown, Silty, fine to medium SAND			
2								
4								
6	B10-1				-Becomes dark brown to black at 5 feet	11		
8					-Contact estimated			
				ML	**ALLUVIUM** Very moist, gray, Clayey SILT with some fine sand			
10	B10-2					5		
12								
14								
16	B10-3			CL	Firm, very moist, gray, Sandy CLAY	10		
18								
20	B10-4			SC	Medium dense, very moist, gray, Clayey, fine to coarse SAND; gravel in shoe; blow counts likely not accurate	35		
22			▼		-Groundwater encountered at 23 feet			
24								
26	B10-5			ML	**SANTIAGO FORMATION** Very stiff, moist, yellowish brown, Sandy SILTSTONE	33		
					BORING TERMINATED AT 26 FEET Groundwater encountered at 23 feet			

Figure A-10,
Log of Boring B 10, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

BORING B 11

ELEV. (MSL.) _____ DATE COMPLETED **11-25-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. MYERS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2				SP	**ALLUVIUM** Loose to medium dense, damp, gray, poorly graded fine to medium SAND with low cohesion			
4								
6	B11-1				-Becomes medium dense at 5 feet	18		1.8
8			▼		-Groundwater encountered at 8 feet			
10					-No recovery	19		
12								
14				SP-SM	Medium dense, wet, gray, poorly graded, fine to medium SAND with trace silt			
16	B11-2					11		
18								
20	B11-3			SW-SM	Medium dense, wet, gray, well graded, fine to coarse SAND, with some gravel, trace silt	23		
22								
24								
26					-No recovery; blow counts not accurate due to gravels	66		
28								

Figure A-11,
Log of Boring B 11, Page 1 of 2

G1753-32-02.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 11** ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. MYERS**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30	B11-4			ML	**SANTIAGO FORMATION** Very stiff, moist, light brown SILTSTONE	23		
					BORING TERMINATED AT 31.5 FEET Groundwater encountered at 8 feet			

Figure A-11,
Log of Boring B 11, Page 2 of 2

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

BORING B 12

ELEV. (MSL.) _____ DATE COMPLETED **11-25-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. MYERS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
				SP	**ALLUVIUM** Loose, damp, gray, fine to medium SAND; low cohesion			
2								
4								
6								
8								
10	B12-1					10		
12								
14								
	B12-2			ML	**SANTIAGO FORMATION** Very stiff, damp, yellowish brown, SILTSTONE	16		
16					BORING TERMINATED AT 16.5 FEET Groundwater not encountered			

Figure A-12,
Log of Boring B 12, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

BORING B 13

ELEV. (MSL.) _____ DATE COMPLETED **11-25 & 11-26-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. MYERS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL** Loose, damp, olive brown, Silty, fine to medium SAND with some debris (irrigation tubing, wood, steel cable)			
2								
4								
6					-Contact estimated			
8				SP	**ALLUVIUM** Medium dense, damp, gray, poorly graded, fine to medium SAND; little to no cohesion			
10	B13-1					18		
12								
14			▼		-Groundwater encountered at 14 feet			
16	B13-2					15		
18								
20	B13-3			SP-SM	Medium dense, wet, gray, poorly graded, fine to medium SAND with trace silt	17		
22								
24								
26	B13-4					21		
28								

Figure A-13,
Log of Boring B 13, Page 1 of 3

G1753-32-02.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

BORING B 13

ELEV. (MSL.) _____ DATE COMPLETED **11-25 & 11-26-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. MYERS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30					-No recovery	14		
32								
34								
36	B13-5					28		
38								
40								
42								
44								
46	B13-6			SM	Loose, wet, gray, Silty, fine to medium SAND	5		
48								
50	B13-7				-Becomes medium dense at 50 feet	11		
52								
54								
56								
58								

Figure A-13,
Log of Boring B 13, Page 2 of 3

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL | ... STANDARD PENETRATION TEST | ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE | ... CHUNK SAMPLE | ... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 13** ELEV. (MSL.)_____ DATE COMPLETED **11-25 & 11-26-2014** EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. MYERS**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
60				SP	Medium dense, gray, fine to medium SAND; no recovery on sample	11		
62								
64								
66								
					-Contact based on drill rig efficiency			
68					**GRANITIC ROCK** Highly weathered, dark gray, weak GRANITIC ROCK	50/3"		
					BORING TERMINATED AT 68.5 FEET Groundwater encountered at 14 feet			

Figure A-13,
Log of Boring B 13, Page 3 of 3

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1753-32-02

BORING B 14

ELEV. (MSL.) _____ DATE COMPLETED **11-26-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP	**ALLUVIUM** Loose to medium dense, damp, light gray to brown, fine to medium SAND			
2								
4								
6	B14-1				-Becomes medium dense at 5 feet	19		
8								
10	B14-2				-Becomes loose at 10 feet	14		
12					-Becomes medium dense below 11 feet	20		
14								
					-No recovery on cal sample; becomes wet at contact	50/6"		
16					**GRANITIC ROCK** Highly weathered, orange, brown, and dark gray, weak GRANITIC ROCK	98/10"		
					BORING TERMINATED AT 16.5 FEET Groundwater not encountered			

Figure A-14,
Log of Boring B 14, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

BORING B 15

ELEV. (MSL.) _____ DATE COMPLETED **11-26-2014**

EQUIPMENT **8" HOLLOW STEM AUGER** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL** Loose to medium dense, damp to moist, brown to gray, Silty, fine to medium SAND			
2					-Contact based on information from trench T-7			
4				SM	**ALLUVIUM** Medium dense, damp to moist, Silty, fine to coarse SAND with some clay and gravel			
6								
8					-Gravels present below 7 feet			
10	B15-1					30		
12					-Abundant gravel below 12 feet			
14								
16	B15-2					46		
					-Contact observed in shoe			
				CL	**SANTIAGO FORMATION** Very stiff, moist, pale green, Silty CLAY/CLAYSTONE; weathered			
					BORING TERMINATED AT 16.5 FEET Groundwater not encountered			

Figure A-15,
Log of Boring B 15, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 1 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SP	**UNDOCUMENTED FILL** Loose, damp, light brown, Silty, fine to medium SAND with 10%-15% trash (plastic, T-tape), cobble and boulder size rock fragments up to 24-inches and asphalt chunks; low cohesion			
2					-Moderate caving from 2-10 feet in low cohesive sands			
4								
6								
8					-Heavy concentration of plastic and T-tape from 5-10 feet			
10				SP	**ALLUVIUM** Medium dense, damp, light brown, fine to medium SAND with little to no cohesion			
12	T1-1							
14								
16					TRENCH TERMINATED AT 16 FEET Groundwater not encountered			

Figure A-16,
Log of Trench T 1, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 2 ELEV. (MSL.) _____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SP	**UNDOCUMENTED FILL** Loose to medium dense, damp, light brown, Silty, fine to medium SAND with 5%-10% trash (T-tape); low to moderate cohesion			
2								
4								
6				SM	**ALLUVIUM** Medium dense, moist to wet, reddish brown, Silty, fine to coarse SAND with clay and trace gravel			
8					-Becomes damp to moist with depth			
10								
12					-Gravel present above contact			
					GRANITIC ROCK Highly weathered, dark red to dark gray, weak GRANITIC ROCK			
					TRENCH TERMINATED AT 13 FEET Groundwater not encountered			

Figure A-17,
Log of Trench T 2, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 3 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Medium dense, moist, brown to reddish brown, Silty, fine to medium SAND with clay and minor amounts of trash (T-tape)			
2				SM/SC	**ALLUVIUM** Medium dense, damp to moist, reddish brown, Silty/Clayey, fine to medium SAND			
4								
6				SP	Medium dense, damp to moist, reddish brown, fine to coarse SAND with 10%-20% gravel; moderate caving from 5-10 feet; little to no cohesion -Becomes light brown, fine to medium with little gravel below 7 feet			
8								
10					TRENCH TERMINATED AT 10 FEET DUE TO CAVING Groundwater not encountered			

Figure A-18,
Log of Trench T 3, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 4 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SP	**ALLUVIUM** Medium dense, damp, gray brown, fine to medium SAND with little to no cohesion and moderate caving from 2-8 feet			
2								
4								
6								
8								
10					**GRANITIC ROCK** Highly weathered, brown, weak GRANITIC ROCK			
					TRENCH TERMINATED AT 11 FEET Groundwater not encountered			

Figure A-19,
Log of Trench T 4, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 5 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**UNDOCUMENTED FILL** Medium dense, damp to moist, brown and dark brown, Silty/Clayey SAND; 3-4" thick asphalt layer at contact			
2				SM/SC	**ALLUVIUM** Medium dense, moist, reddish brown, Silty/Clayey, fine to medium SAND with trace gravel and cobble size rock fragments up to 4-inches			
4								
					-Becomes silty, fine to coarse sand below 5 feet			
6								
8								
10					**GRANITIC ROCK** Highly to moderately weathered, light brown and brown, weak to moderately weak GRANITIC ROCK			
					TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-20,
Log of Trench T 5, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 6 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SP	**ALLUVIUM** Medium dense, damp, gray, fine to medium SAND; little to no cohesion			
2								
4				CL	**SANTIAGO FORMATION** Very stiff, damp to moist, pale green, Silty CLAY/CLAYSTONE; weathered			
6	T6-1							
8					TRENCH TERMINATED AT 8 FEET Groundwater not encountered			

Figure A-21,
Log of Trench T 6, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 7 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Loose to medium dense, damp to moist, gray, Silty, fine to medium SAND			
2								
				SM	**ALLUVIUM** Medium dense, damp to moist, Silty, fine to coarse SAND with some clay and trace gravel			
4								
6								
8					-10%-20% gravel and cobble size rock fragments up to 6-inches present below 8 feet			
10					**GRANITIC ROCK** Highly weathered, dark gray, weak GRANITIC ROCK			
12					TRENCH TERMINATED AT 12 FEET Groundwater not encountered			

Figure A-22,
Log of Trench T 7, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 8 ELEV. (MSL.) _____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Loose, damp, brown, gray, Silty, fine to medium SAND			
2								
					-6-inch diameter broken pipe piece present at 3 feet			
4								
6								
				SP	**ALLUVIUM** Loose, damp, gray, fine to medium SAND; low cohesion			
8								
10								
12					-Moderate caving below 12 feet			
14								
					TRENCH TERMINATED AT 15 FEET DUE TO CAVING Groundwater not encountered			

Figure A-23,
Log of Trench T 8, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 9 ELEV. (MSL.) _____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**UNDOCUMENTED FILL** Loose, damp, dark brown, Silty/Clayey, fine to medium SAND			
2				SM	**ALLUVIUM** Medium dense, damp, reddish brown, Silty, fine to coarse SAND with 10% gravel and cobble size rock fragments up to 6-inches			
4								
6								
8				SP	Medium dense, brown, fine to coarse SAND with little to no cohesion; moderate caving below			
10								
12								
14								
					TRENCH TERMINATED AT 15 FEET Groundwater not encountered			

Figure A-24,
Log of Trench T 9, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

TRENCH T 10

ELEV. (MSL.) _____ DATE COMPLETED **11-21-2014**

EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**ALLUVIUM** Stiff, moist, reddish brown, fine to coarse, Sandy CLAY with some gravel			
2	T10-1							
4								
6				SP	Medium dense, damp brown, fine to coarse SAND with some gravel; low cohesion and moderate caving from 6-12 feet			
8								
10					-Becomes moist below 10 feet			
12					TRENCH TERMINATED AT 12 FEET DUE TO CAVING Groundwater not encountered			

Figure A-25,
Log of Trench T 10, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 11 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**ALLUVIUM** Medium dense, damp, brown, Silty/Clayey, fine to medium SAND			
2								
4				SM	Medium dense to dense, damp, reddish brown, Silty, fine to coarse SAND with 10% gravel and cobble size rock fragments up to 6-inches			
6								
8								
10					**GRANITIC ROCK** Moderately weathered, light brown and brown, moderately weak GRANITIC ROCK TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-26,
Log of Trench T 11, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 12 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**ALLUVIUM** Loose, medium dense, damp, brown, Silty, fine to medium SAND			
2				CL	Very stiff, moist, reddish brown, fine to coarse, Sandy CLAY			
4				SM	Medium dense, damp, reddish brown, Silty, fine to coarse SAND with 10% gravel			
6								
8					-Increase in gravel content below 9 feet			
10				CL	**SANTIAGO FORMATION** Very stiff, moist, pale green, Silty CLAY/CLAYSTONE; weathered			
12					TRENCH TERMINATED AT 12 FEET Groundwater not encountered			

Figure A-27,
Log of Trench T 12, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 13 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Loose, damp, brown, Silty, fine to medium SAND; some trash (T-tape)			
2				SM	**ALLUVIUM** Medium dense, damp, brown, Silty, fine to medium SAND			
4					-Becomes gray brown and more silty below 4 feet			
6								
8				SP	Medium dense, damp, light gray, fine to coarse SAND with little to no cohesion; moderate caving from 8-15 feet			
10								
12								
14								
					TRENCH TERMINATED AT 15 FEET Groundwater not encountered			

Figure A-28,
Log of Trench T 13, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 14 ELEV. (MSL.) _____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Loose, damp, brown, Silty, fine to medium SAND with some clay			
2				SM/SC	**ALLUVIUM** Medium dense, damp to moist, brown to reddish brown, Silty/Clayey, fine to medium SAND			
4								
6				SM	Medium dense, damp, brown-gray, Silty, fine SAND			
8								
10					-Becomes gray below 9 feet			
12								
14					**GRANITIC ROCK** Highly to moderately weathered, dark gray, weak to moderately weak GRANITIC ROCK TRENCH TERMINATED AT 14 FEET Groundwater not encountered			

Figure A-29,
Log of Trench T 14, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 15 ELEV. (MSL.) _____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Loose to medium dense, moist, gray-brown, very Silty, fine SAND			
2								
4								
6				CL	**ALLUVIUM** Firm, wet, black, Silty CLAY			
8				SC	Medium dense, moist, mottled reddish brown and gray, Clayey, fine to coarse SAND			
10								
12								
14					-10%-15% gravel and cobble size rock fragments up to 8-inches present below 14 feet			
16					-Becomes wet at 16.5 feet			
					TRENCH TERMINATED AT 17 FEET Groundwater not encountered			

Figure A-30,
Log of Trench T 15, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 16 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**UNDOCUMENTED FILL** Medium dense, damp, brown, Silty/Clayey, fine to medium SAND			
2								
4				SM/SC	**ALLUVIUM** Medium dense, damp, reddish brown, Silty/Clayey, fine to coarse SAND with 5% to 10% gravel and cobble size rock fragments up to 6-inches			
6								
8				SP	Medium dense, damp, light brown to gray, fine to medium SAND with little to no cohesion -Moderate caving below 9 feet			
10								
12					-Some cobble size rock fragments up to 6-inches present below 13 feet			
14								
					TRENCH TERMINATED AT 15 FEET Groundwater not encountered			

Figure A-31,
Log of Trench T 16, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 17 ELEV. (MSL.) _____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Medium dense, damp, brown, Silty, fine to medium SAND			
2				SM	**OLDER ALLUVIUM** Dense, damp, reddish brown, Silty, fine to coarse SAND			
4	T17-1							
6					**GRANITIC ROCK** Moderately weathered, gray, moderately weak GRANITIC ROCK			
					TRENCH TERMINATED AT 7 FEET Groundwater not encountered			

Figure A-32,
Log of Trench T 17, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 18 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Medium dense, damp, brown, Silty, fine to medium SAND with some debris (brick, concrete)			
2				SM	**OLDER ALLUVIUM** Dense, damp, reddish brown, Silty, fine to medium SAND			
4	T18-1						120.0	8.3
					GRANITIC ROCK Fresh, gray, extremely strong GRANITIC ROCK			
					REFUSAL AT 4.5 FEET Groundwater not encountered			

Figure A-33,
Log of Trench T 18, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

TRENCH T 19

ELEV. (MSL.) _____ DATE COMPLETED **11-21-2014**

EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL** Medium dense, damp to moist, dark brown, Silty, fine to medium SAND			
2								
4				SM	**ALLUVIUM** Medium dense, damp, brown, Silty, fine to medium SAND with some clay			
6				SP	Medium dense, damp, light brown, fine to medium SAND with little to no cohesion and moderate caving from 6 to 11 feet			
8								
10								
12					**GRANITIC ROCK** Highly weathered, green-gray, weak GRANITIC ROCK			
					TRENCH TERMINATED AT 12 FEET Groundwater not encountered			

Figure A-34,
Log of Trench T 19, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 20 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**UNDOCUMENTED FILL** Medium dense, damp to moist, dark brown, Silty/Clayey, fine to medium SAND			
2				SM	**ALLUVIUM** Medium dense, damp, reddish brown, Silty, fine to medium SAND			
4								
6								
8								
10					-5% to 10% gravel and cobble size rock fragments up to 6-inches present below 9 feet			
12					**GRANITIC ROCK** Highly weathered, dark gray, moderately weak GRANITIC ROCK			
					TRENCH TERMINATED AT 12 FEET Groundwater not encountered			

Figure A-35,
Log of Trench T 20, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 21 ELEV. (MSL.) _____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**UNDOCUMENTED FILL** Medium dense, damp to moist, dark brown, Silty/Clayey, fine to medium SAND			
2								
					ALLUVIUM Medium dense, moist, brown, Silty, fine SAND			
4								
6								
					GRANITIC ROCK Highly weathered, gray, weak GRANITIC ROCK			
8					TRENCH TERMINATED AT 8 FEET Groundwater not encountered			

Figure A-36,
Log of Trench T 21, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 22** ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SP	**ALLUVIUM** Medium dense, damp, gray, fine to medium SAND with little to no cohesion and moderate to severe caving			
2								
4								
6								
8								
10					TRENCH TERMINATED AT 10 FEET DUE TO CAVING Groundwater not encountered			

Figure A-37,
Log of Trench T 22, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 23 ELEV. (MSL.)_____ DATE COMPLETED **11-21-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL** Medium dense, damp, brown to reddish brown, Silty, fine to medium SAND with some clay			
2								
4				SP	**ALLUVIUM** Loose, damp, gray, fine to medium SAND with little to no cohesion and moderate caving from 3-10 feet			
6								
8								
10					TRENCH TERMINATED AT 10 FEET DUE TO CAVING Groundwater not encountered			

Figure A-38,
Log of Trench T 23, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 24 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COLLUVIUM** Medium dense, damp, brown to reddish brown, Silty, fine to medium SAND			
2								
4		+ +			**GRANITIC ROCK** Moderately weathered, green-gray, moderately weak to moderately strong GRANITIC ROCK			
					TRENCH TERMINATED AT 5 FEET Groundwater not encountered			

Figure A-39,
Log of Trench T 24, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 25 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COLLUVIUM** Medium dense, damp, brown to reddish brown, Silty, fine to medium SAND			
2								
4								
					-Becomes mottled gray-brown and orange with some clay below 5 feet			
6								
8								
		+ +			**GRANITIC ROCK** Highly weathered, green-gray, weak GRANITIC ROCK			
10					TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-40,
Log of Trench T 25, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 26 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**ALLUVIUM** Loose, moist, dark brown, Silty/Clayey, fine to coarse SAND			
2	T26-1				-Becomes medium dense below 3 feet			
4					-Becomes brown below 5 feet			
6								
8								
				CL	**SANTIAGO FORMATION** Very stiff, pale green, Silty CLAY/CLAYSTONE; weathered			
10					TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-41,
Log of Trench T 26, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 27 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**ALLUVIUM** Stiff, damp to moist, very dark brown, Sandy CLAY; abundant roots			
2				SM	**SANTIAGO FORMATION** Dense, damp, pale green, Silty, fine to medium SANDSTONE			
4					TRENCH TERMINATED AT 4 FEET Groundwater not encountered			

Figure A-42,
Log of Trench T 27, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 28 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**ALLUVIUM** Stiff, very moist, dark brown, Sandy CLAY			
2					-Becomes black and gray and more plastic with organic odor			
4	T28-1							
				ML	**SANTIAGO FORMATION** Very stiff, moist, pale green, fine, Sandy/Clayey SILTSTONE			
6					TRENCH TERMINATED AT 6 FEET Groundwater not encountered			

Figure A-43,
Log of Trench T 28, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 29 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**ALLUVIUM** Stiff, very moist, very dark brown, Silty CLAY with sand			
2								
4								
6				CL	**SANTIAGO FORMATION** Very stiff, moist, pale green, Silty CLAY/CLAYSTONE; weathered			
					TRENCH TERMINATED AT 7 FEET Groundwater not encountered			

Figure A-44,
Log of Trench T 29, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 30 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**COLLUVIUM** Stiff, moist, dark brown to reddish brown, Silty/Sandy CLAY			
2								
4					-Becomes mottled reddish brown and brown below 4 feet			
				SM	Medium dense, damp, reddish brown, Silty, fine to medium SAND			
6								
				CL	**SANTIAGO FORMATION** Very stiff, moist, pale green, Silty CLAY/CLAYSTONE; weathered			
8					TRENCH TERMINATED AT 8 FEET Groundwater not encountered			

Figure A-45,
Log of Trench T 30, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 31 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**COLLUVIUM** Stiff, moist, dark brown, Silty CLAY with some sand			
2								
4					**GRANITIC ROCK** Highly weathered, orange-brown, weak GRANITIC ROCK			
					TRENCH TERMINATED AT 5.5 FEET Groundwater not encountered			

Figure A-46,
Log of Trench T 31, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 32 ELEV. (MSL.) _____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SC/SM	**UNDOCUMENTED FILL** Loose, damp, brown, Clayey/Silty, fine to coarse SAND			
2				SC	**COLLUVIUM** Medium dense, moist, dark brown, Clayey, fine to coarse SAND			
4								
6					**GRANITIC ROCK** Highly weathered, gray and orange, weak GRANITIC ROCK			
					TRENCH TERMINATED AT 6.5 FEET Groundwater not encountered			

Figure A-47,
Log of Trench T 32, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 33 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**UNDOCUMENTED FILL** Loose, moist, brown and reddish brown, Silty/Clayey, fine to coarse SAND with some trash (rope, plastic)			
2								
4				SM	**COLLUVIUM** Medium dense, damp to moist, Silty, fine to coarse SAND with some clay			
6								
8								
10					-Becomes clayier with depth			
12								
14				SM	**SANTIAGO FORMATION** Dense, damp, pale green, Silty, fine to medium SANDSTONE			
					TRENCH TERMINATED AT 15 FEET Groundwater not encountered			

Figure A-48,
Log of Trench T 33, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

TRENCH T 34

ELEV. (MSL.) _____ DATE COMPLETED **11-25-2014**

EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL** Medium dense, damp, brown, Silty, fine to medium SAND			
2				SM	**ALLUVIUM** Dense, damp, brown, Silty, fine to medium SAND with pinholes			
4								
6	T34-1						115.6	3.1
8								
10				SP	Medium dense, damp to moist, reddish brown, fine to coarse SAND with trace gravel and low cohesion			
12								
14								
16		+ +			**GRANITIC ROCK** Highly weathered, gray-green, weak GRANITIC ROCK			
					TRENCH TERMINATED AT 16.5 FEET Groundwater not encountered			

Figure A-49,
Log of Trench T 34, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 35 ELEV. (MSL.) _____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COLLUVIUM** Medium dense, dry to damp, brown, Silty fine to medium SAND			
2								
4								
6								
8					-Refusal on fresh granitic rock at 8 feet REFUSAL AT 8 FEET Groundwater not encountered			

Figure A-50,
Log of Trench T 35, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 36 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**ALLUVIUM** Medium dense, damp to moist, dark brown, Silty/Clayey, fine to medium SAND			
2								
4				CL	Stiff, moist, gray-brown, fine to medium, Sandy CLAY			
				SP	Medium dense, damp, light brown, fine to coarse SAND with low cohesion; moderate caving from 7-12 feet			
6								
8								
10					-Becomes moist with trace gravel			
12					TRENCH TERMINATED AT 12 FEET DUE TO CAVING Groundwater not encountered			

Figure A-51,
Log of Trench T 36, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 37 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**ALLUVIUM** Medium dense, damp to moist, dark brown, Silty/Clayey, fine to coarse SAND with caliche stringers down to 3 feet			
2								
4								
6								
8					-Becomes less clayey with depth			
10								
12				SP	Medium dense, damp to moist, brown to gray, fine to medium SAND; low cohesion			
14								
16		+ +			**GRANITIC ROCK** Highly weathered, gray-green, weak GRANITIC ROCK TRENCH TERMINATED AT 16.5 FEET Groundwater not encountered			

Figure A-52,
Log of Trench T 37, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 38 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**TOPSOIL** Very stiff, moist, brown, fine to medium, Sandy/Silty CLAY			
2								
					GRANITIC ROCK Highly weathered, green-gray, weak GRANITIC ROCK			
4					TRENCH TERMINATED AT 4 FEET Groundwater not encountered			

Figure A-53,
Log of Trench T 38, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 39 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**TOPSOIL** Medium dense, damp, reddish brown, Silty/Clayey, fine to coarse SAND			
2					**GRANITIC ROCK** Highly weathered, orange brown, weak GRANITIC ROCK			
					TRENCH TERMINATED AT 3.5 FEET Groundwater not encountered			

Figure A-54,
Log of Trench T 39, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 40** ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**TOPSOIL** Medium dense, damp, brown, Silty, fine to coarse SAND			
2					**GRANITIC ROCK** Highly weathered, orange-brown, weak GRANITIC ROCK			
					TRENCH TERMINATED AT 3 FEET Groundwater not encountered			

Figure A-55,
Log of Trench T 40, Page 1 of 1

G1753-32-02.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1753-32-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 41 ELEV. (MSL.)_____ DATE COMPLETED **11-25-2014** EQUIPMENT **410G RUBBER TIRE BACKHOE** BY: **T. REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**TOPSOIL** Medium dense, damp, brown to reddish brown, Silty fine to medium SAND			
2					**GRANITIC ROCK** Highly weathered, gray-green, weak GRANITIC ROCK			
					TRENCH TERMINATED AT 2.5 FEET Groundwater not encountered			

Figure A-56,
Log of Trench T 41, Page 1 of 1

G1753-32-02.GPJ

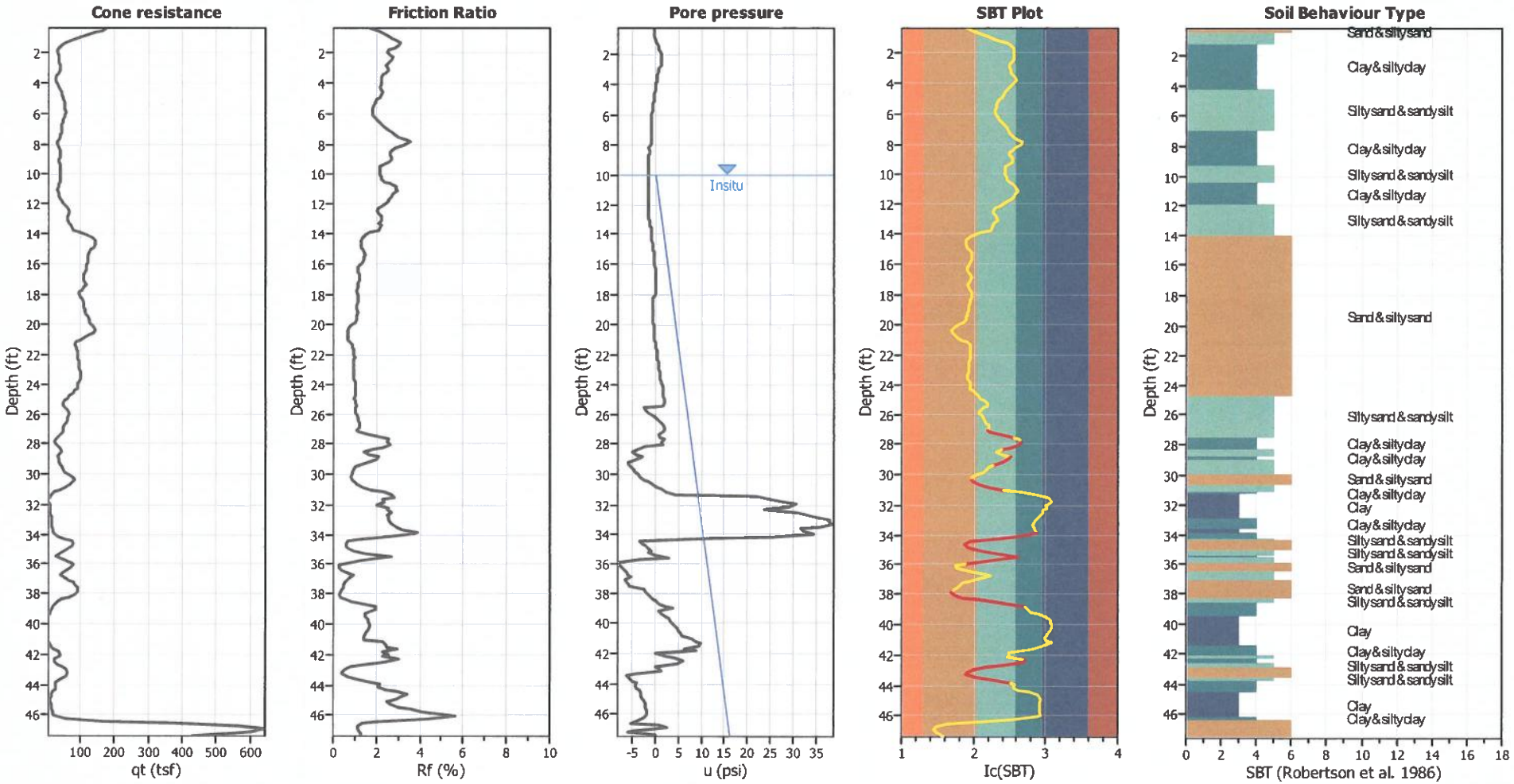
SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

CPT basic interpretation plots



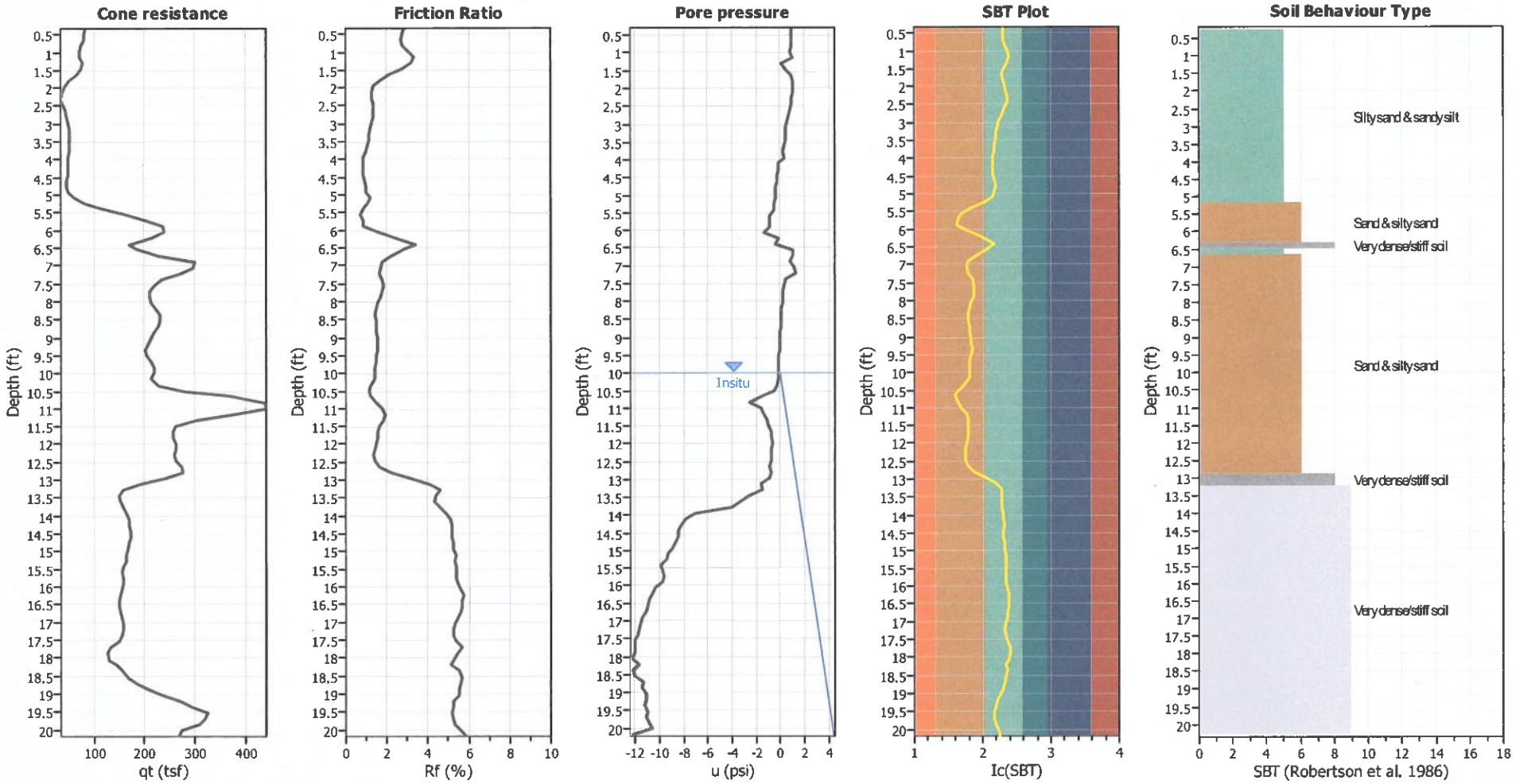
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



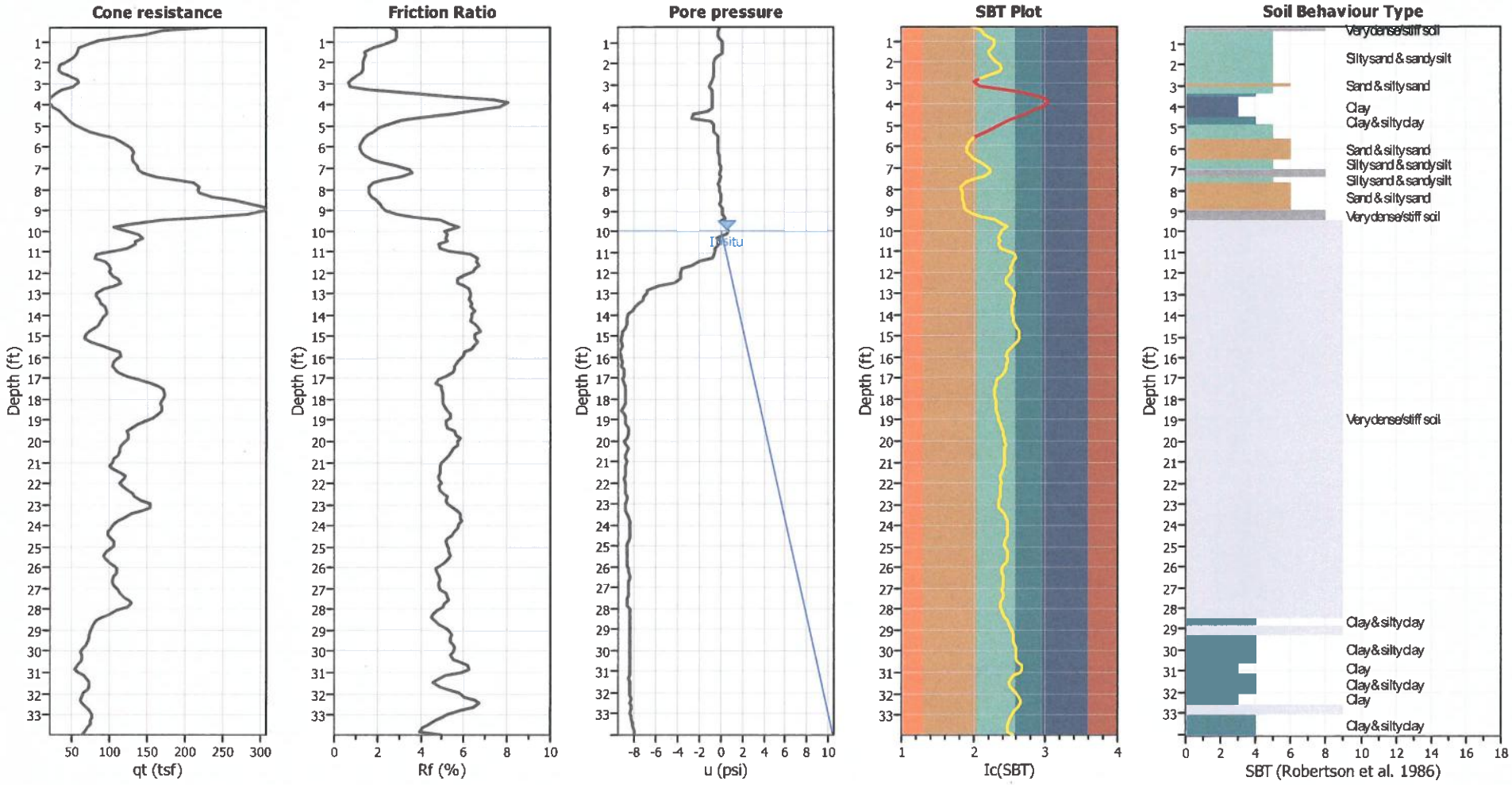
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



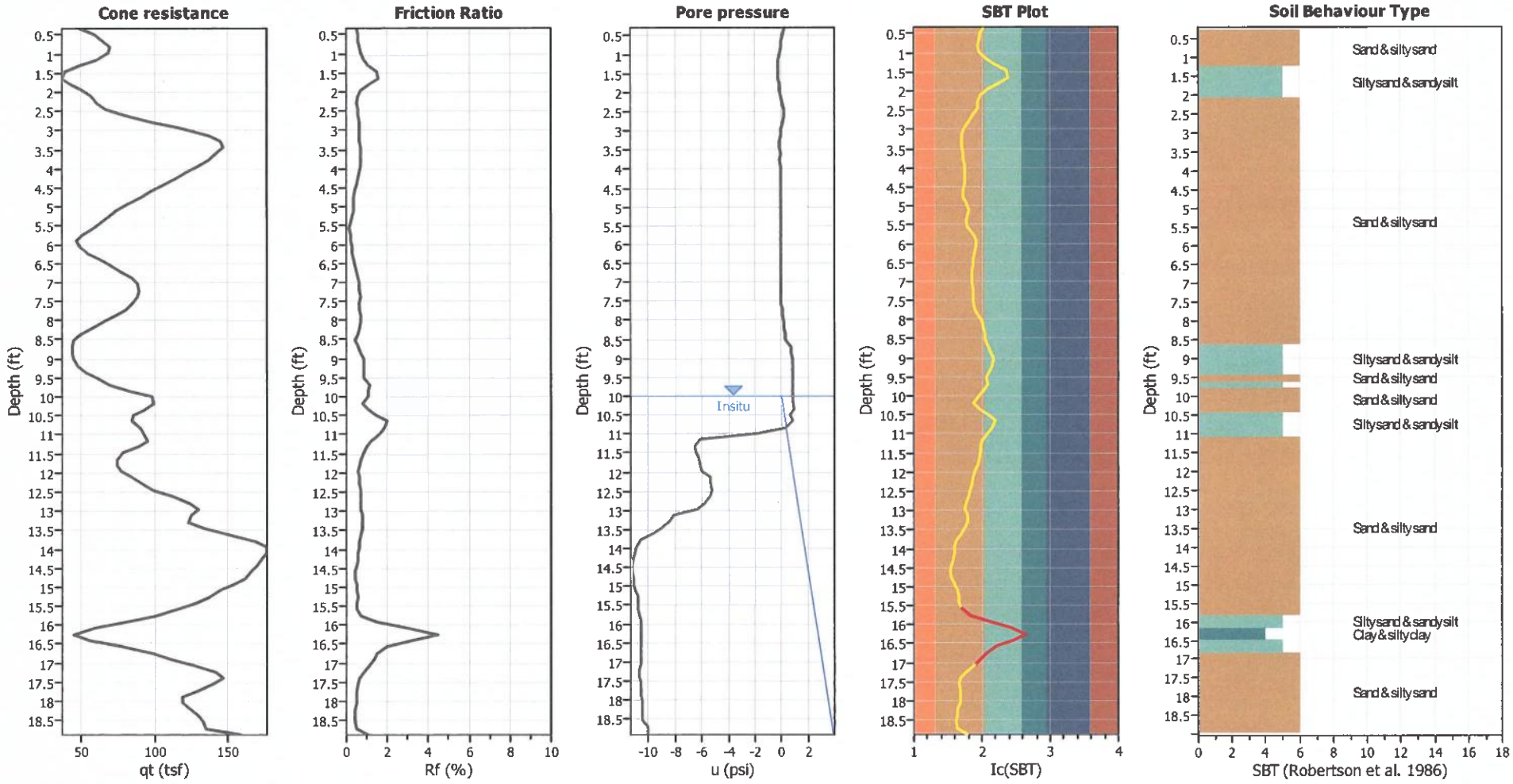
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



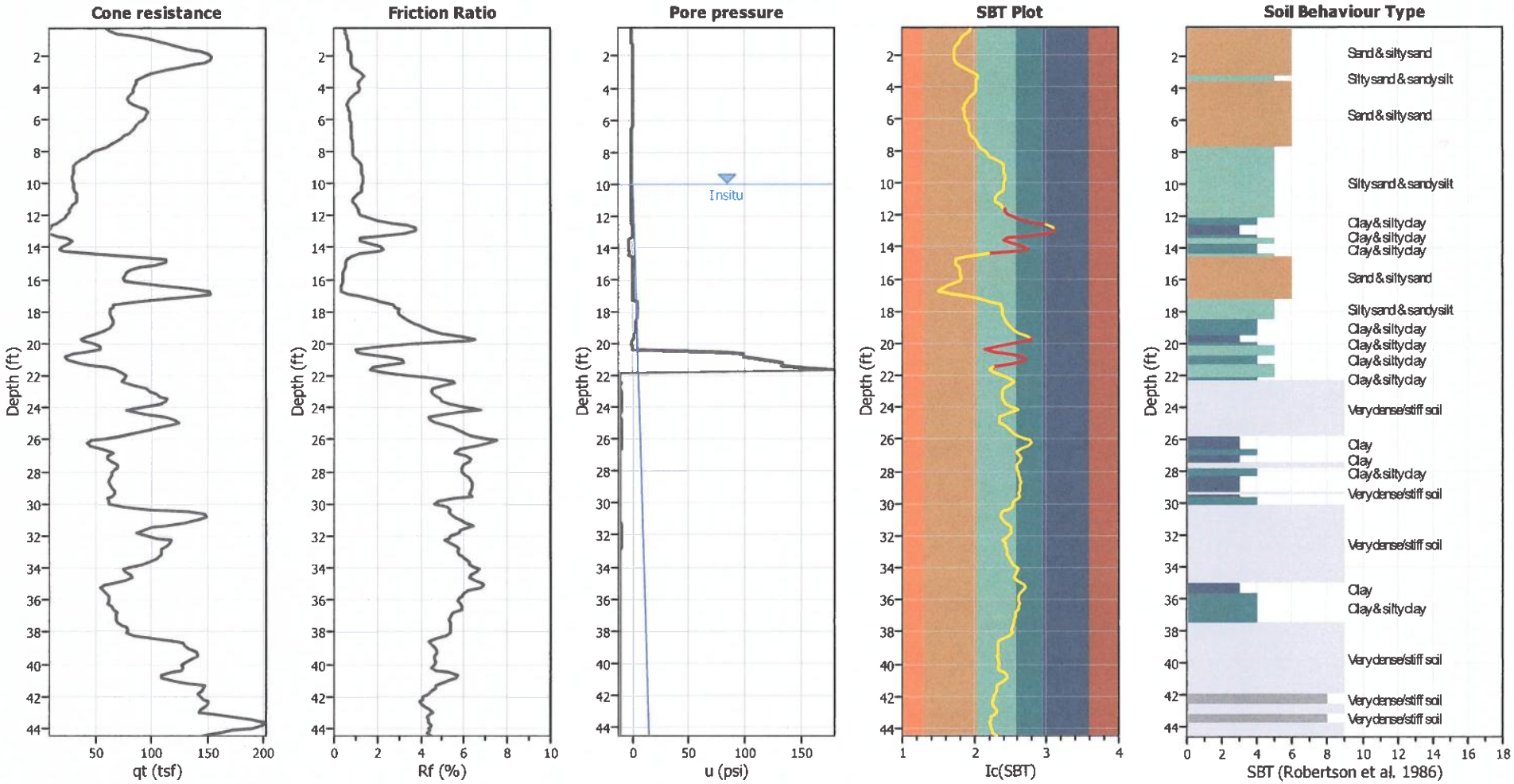
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



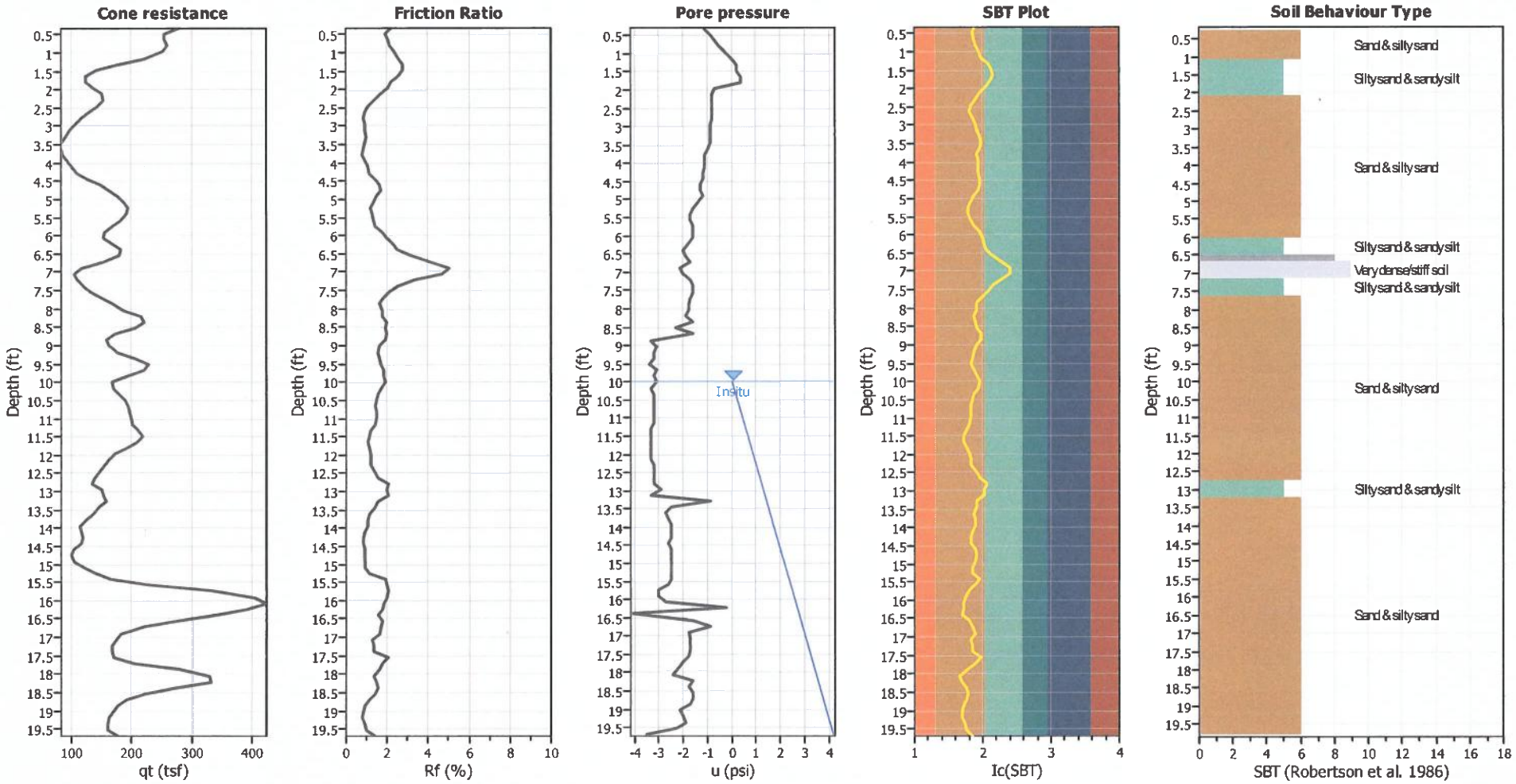
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



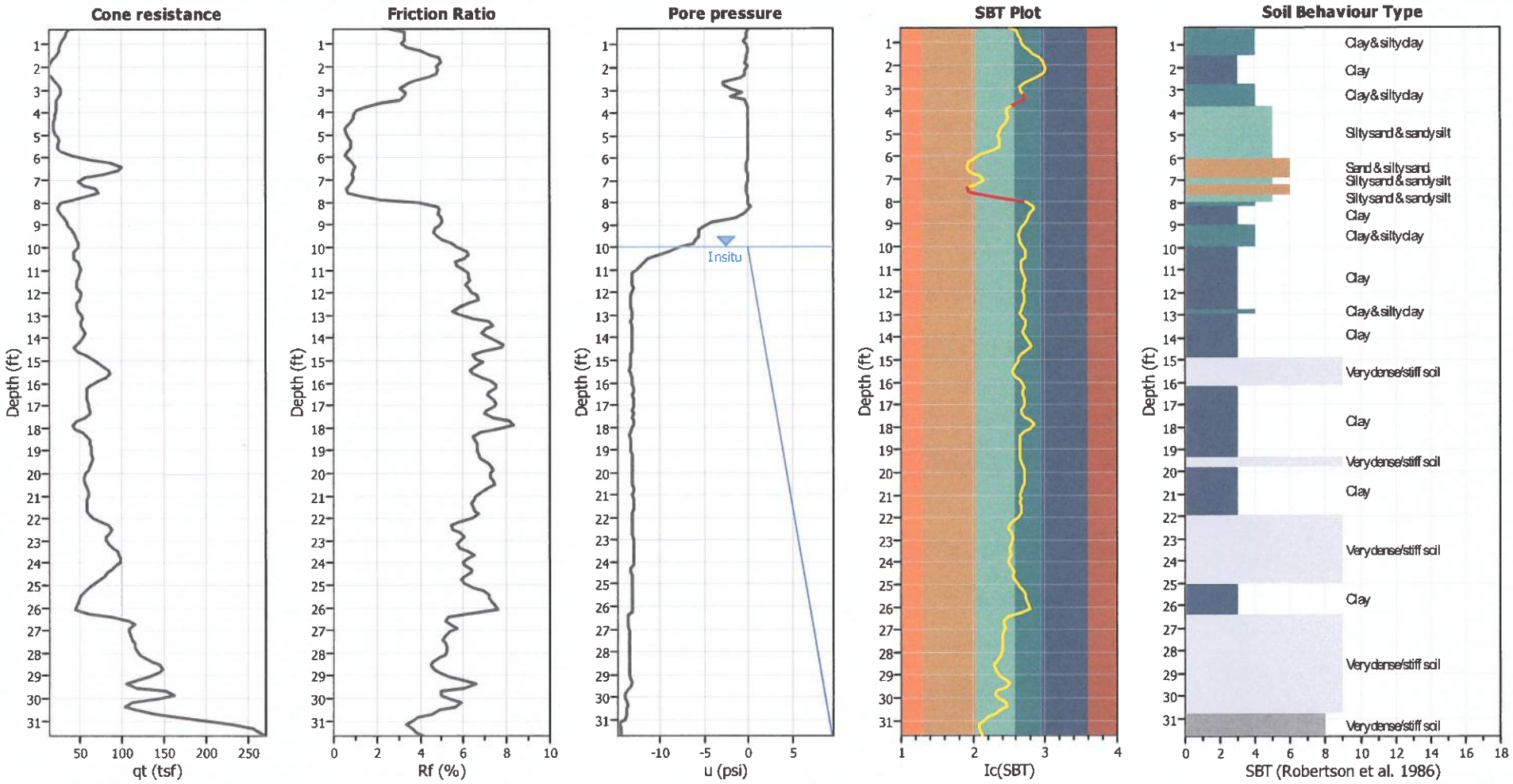
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



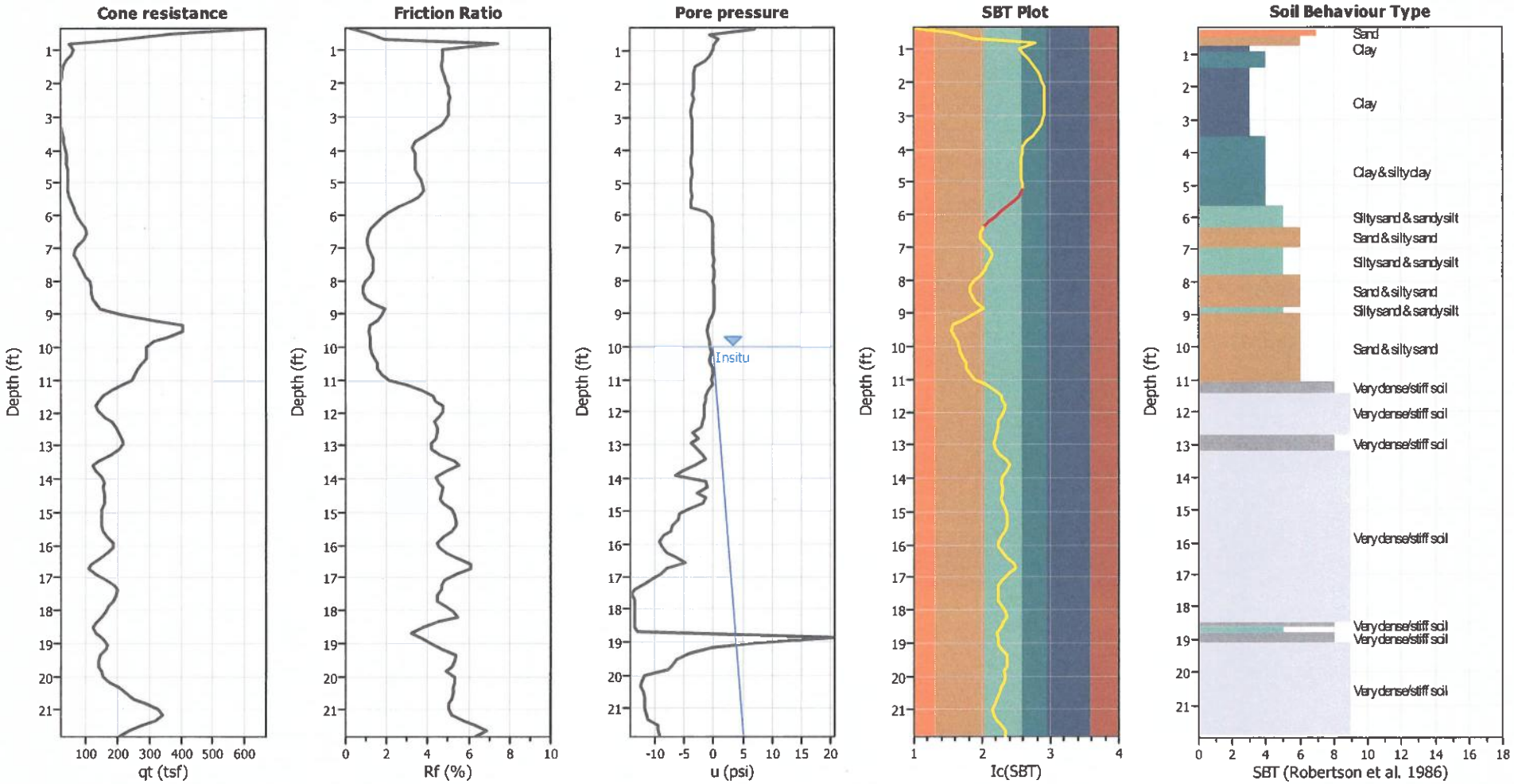
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



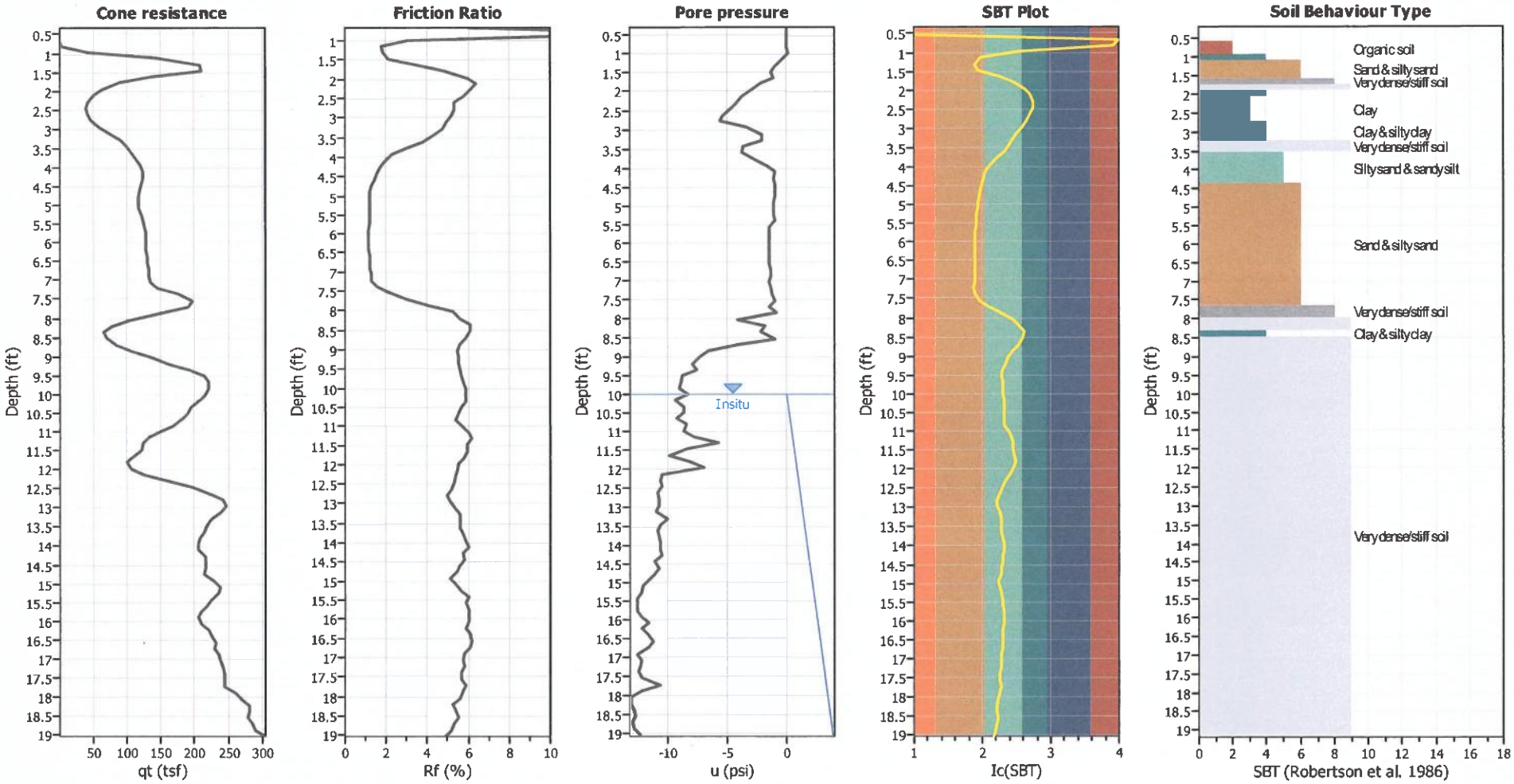
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



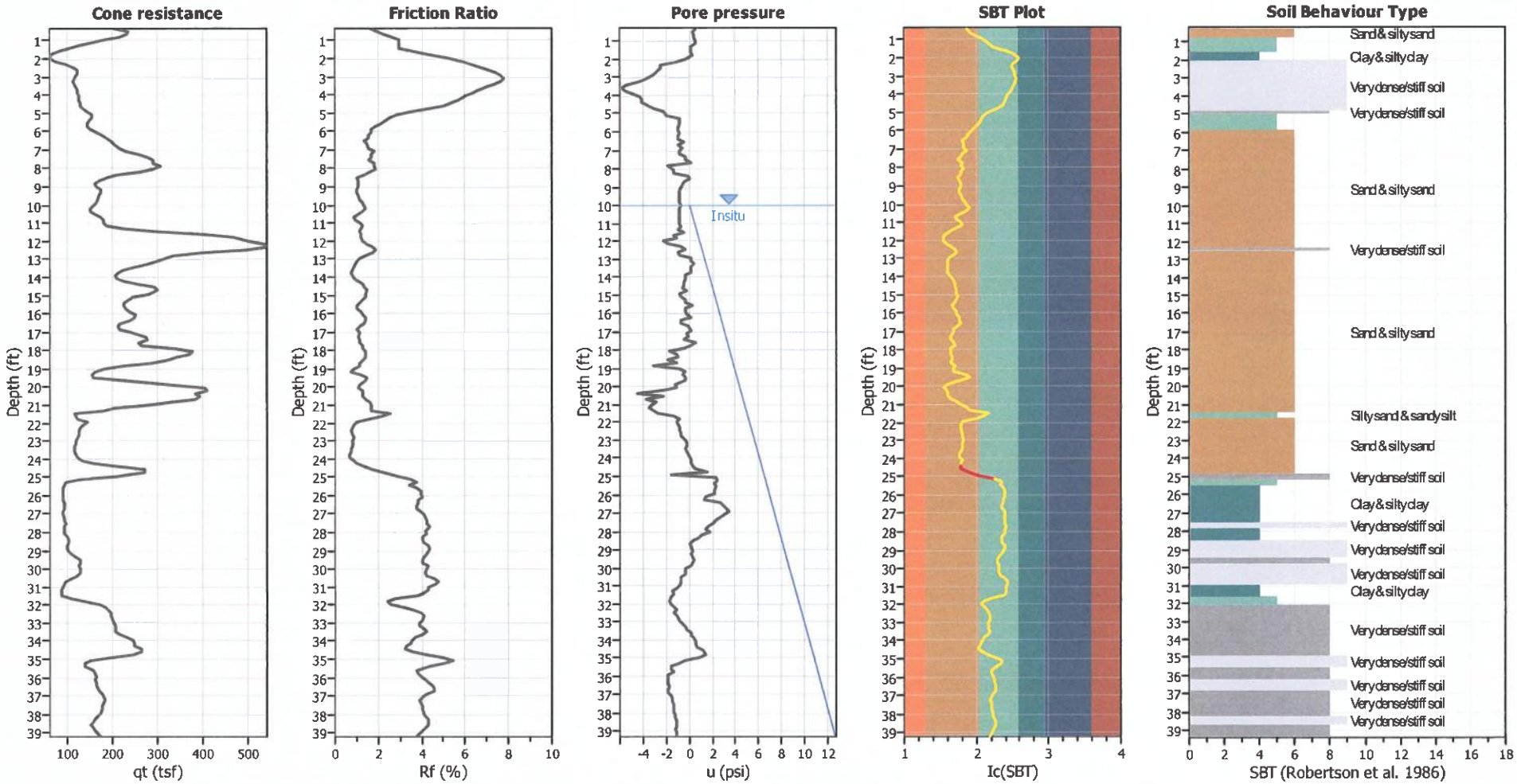
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



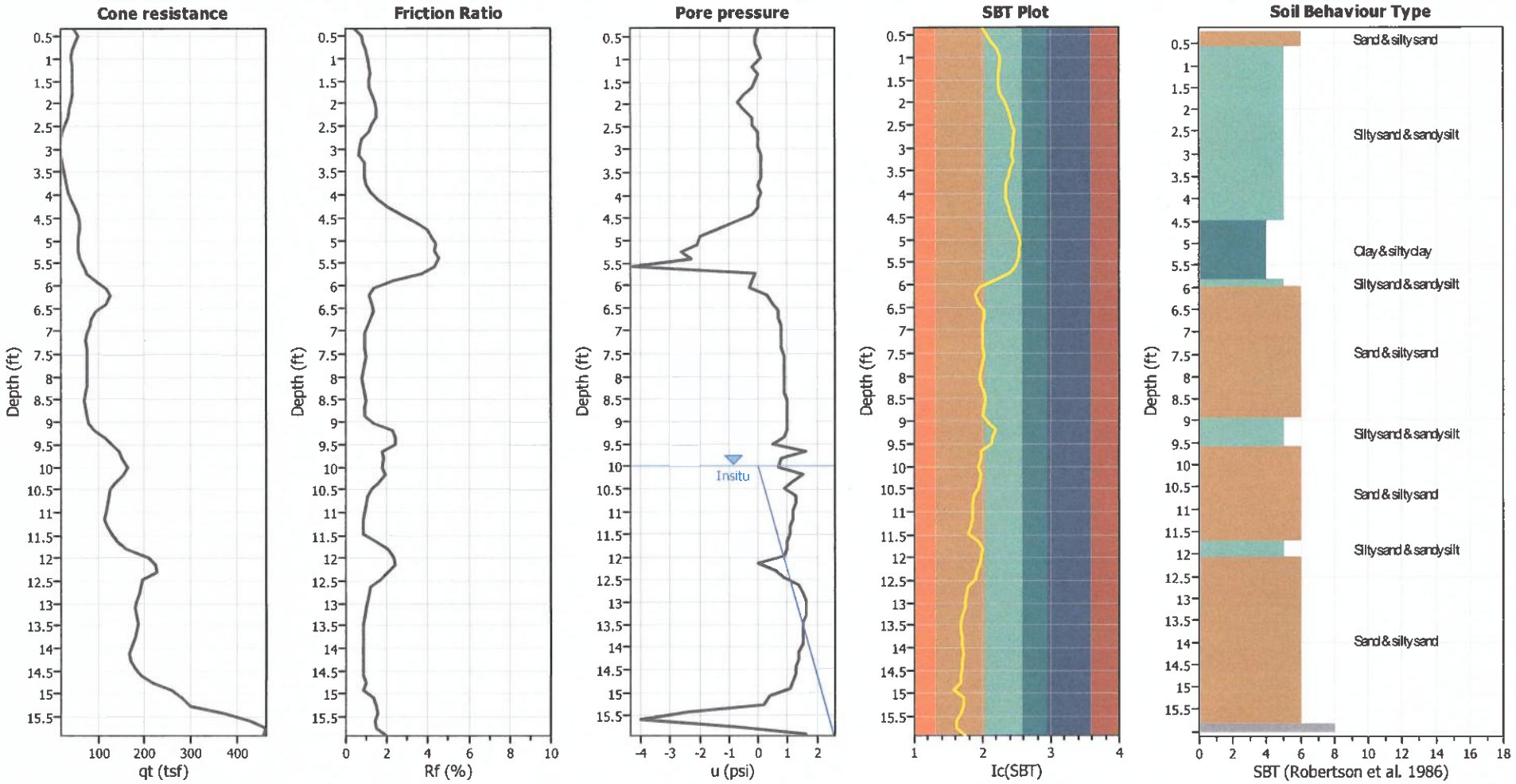
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



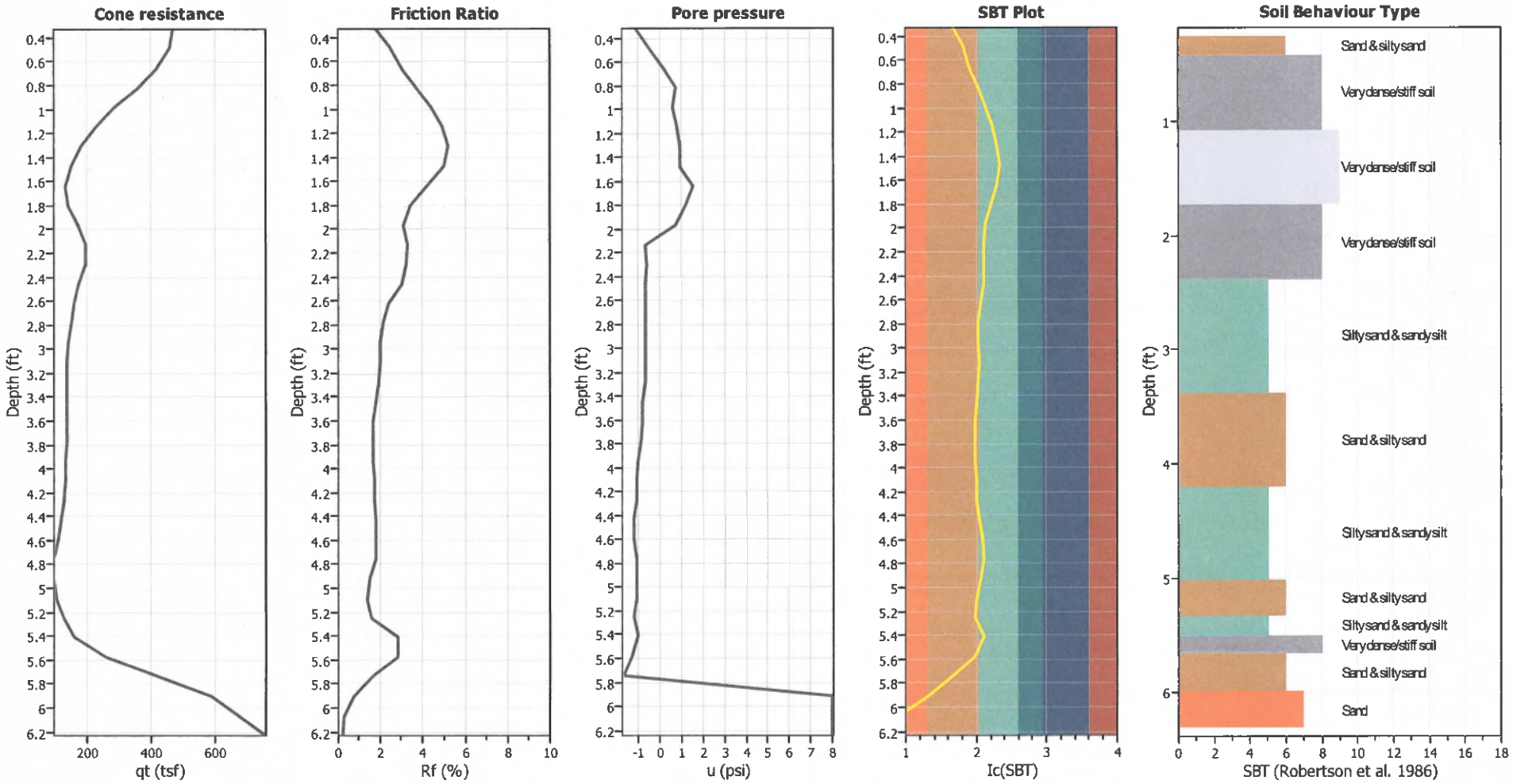
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



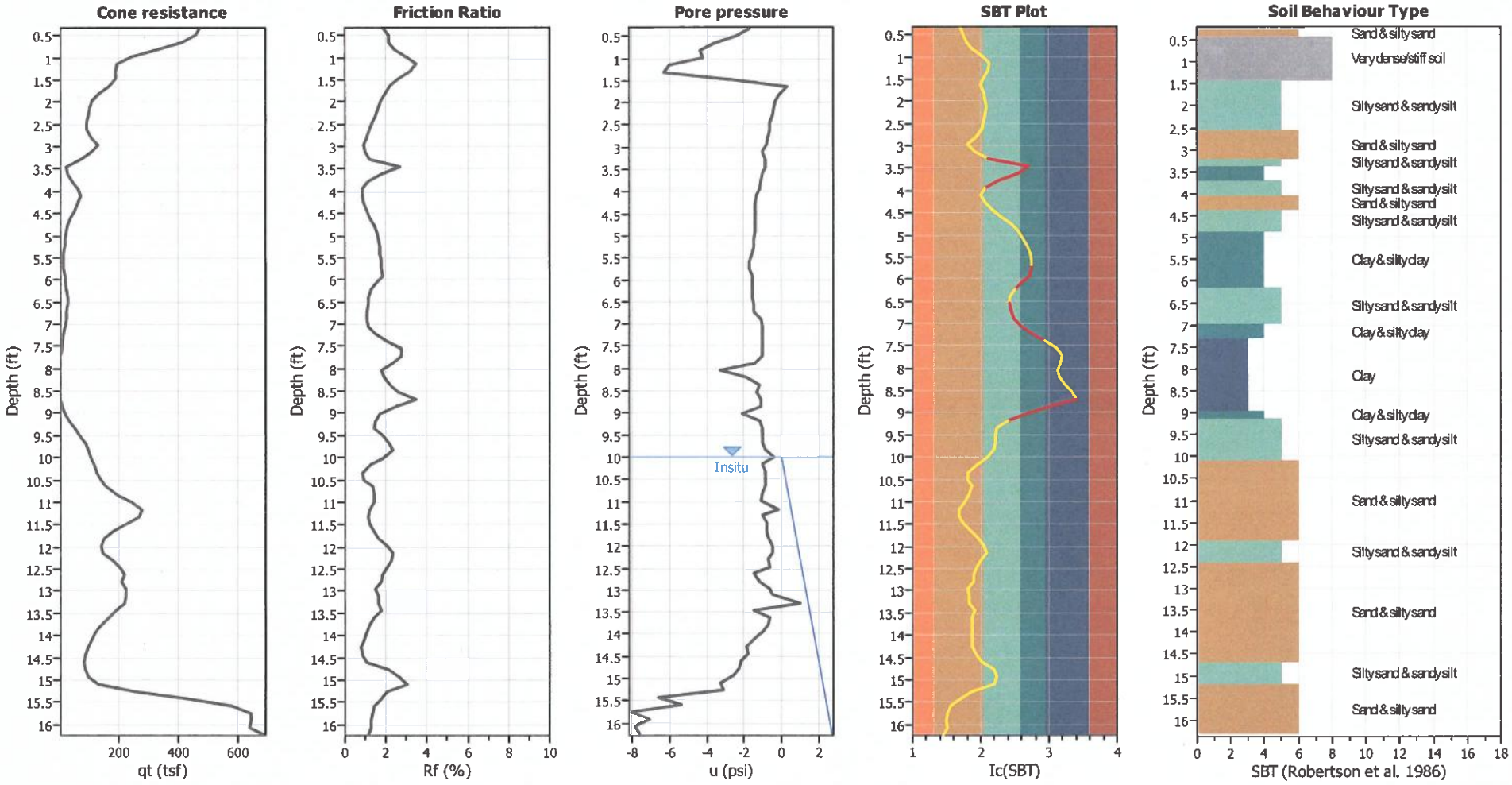
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



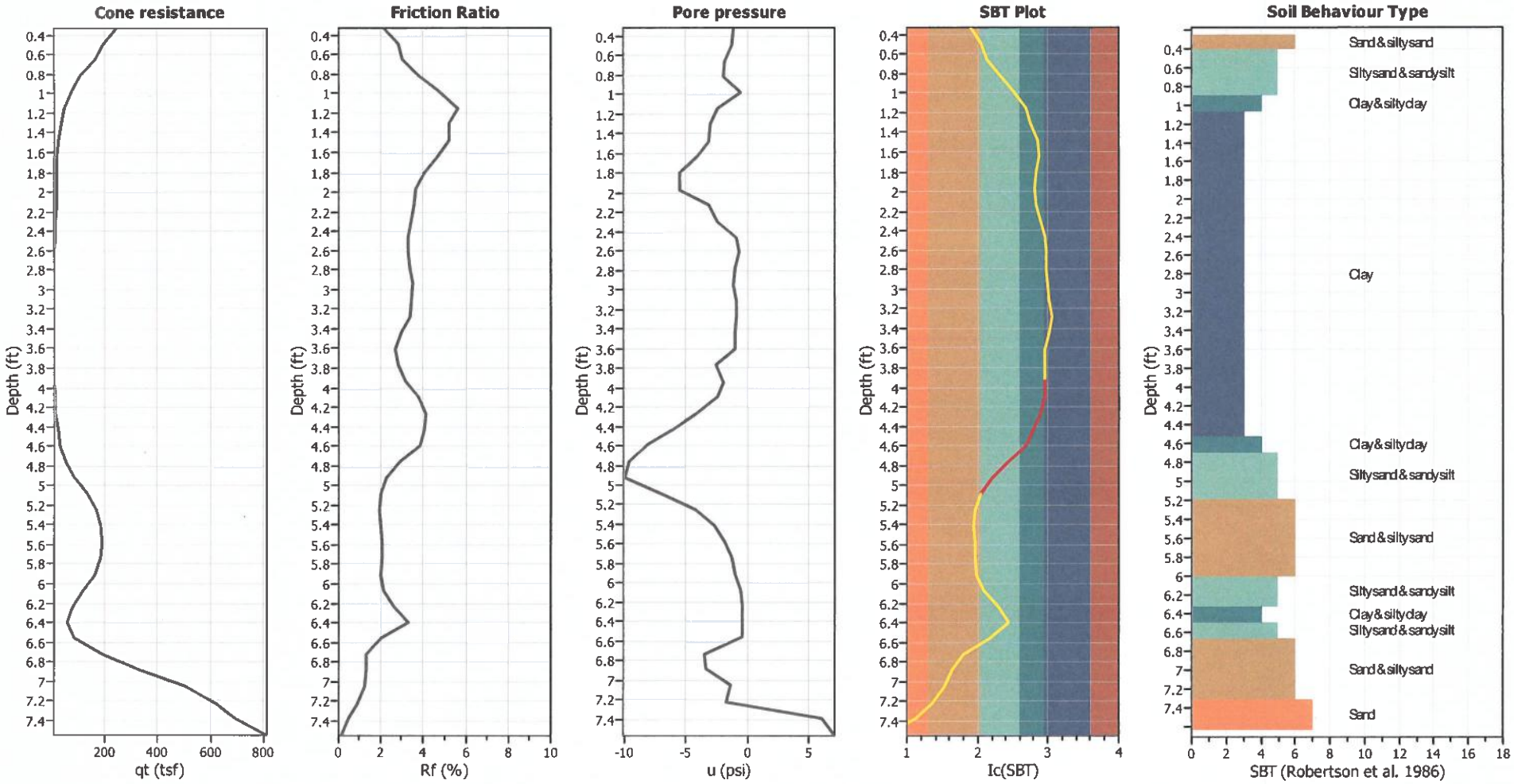
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

APPENDIX B

APPENDIX B

LABORATORY TESTING

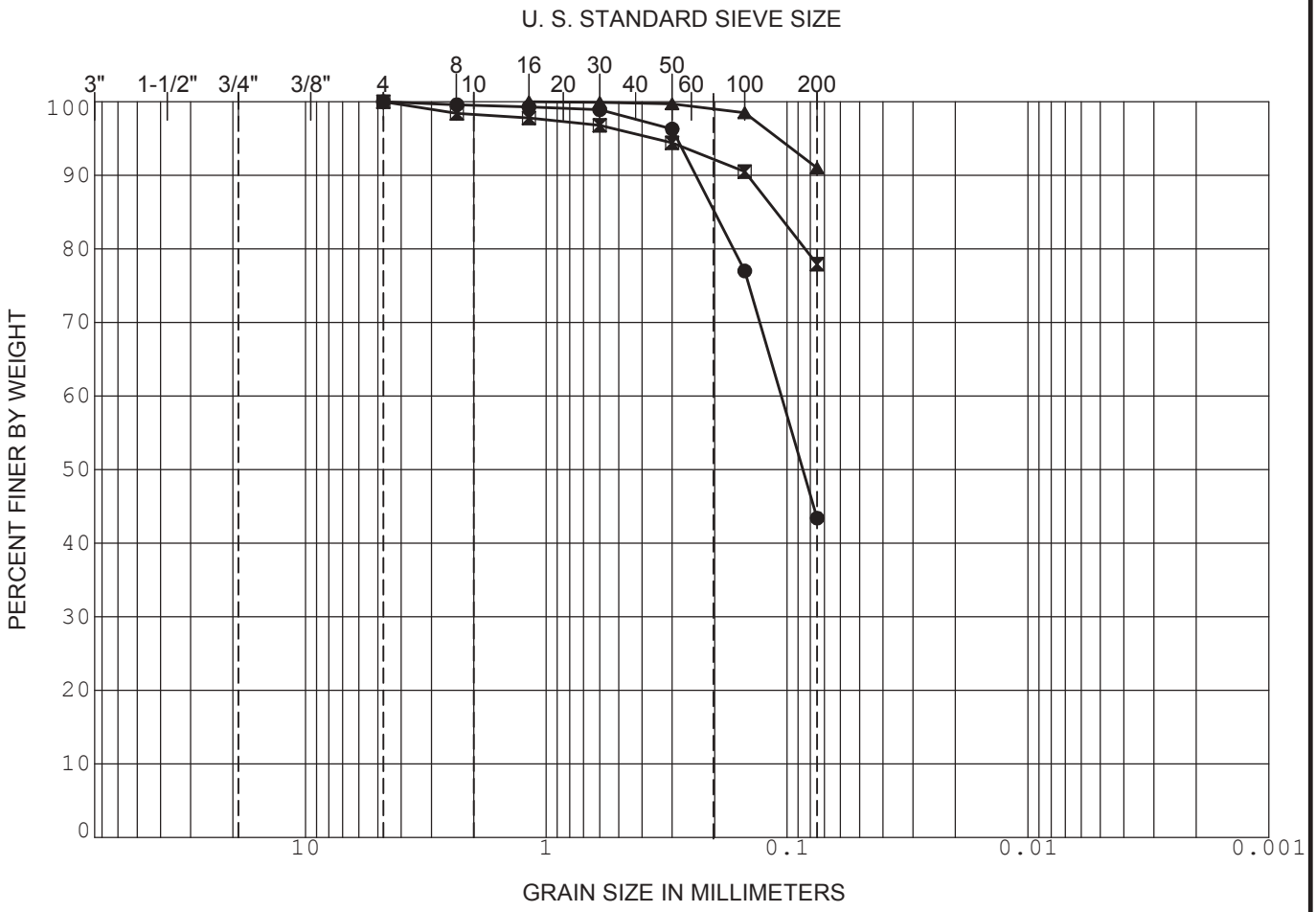
Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were tested for their in-situ dry density and moisture content, plasticity index, and gradation. The results of our laboratory tests are summarized on Table B-1 and Figures B-1 through B-5. The dry density and moisture content test results are presented on the boring logs.

TABLE B-I
SUMMARY OF LABORATORY PLASTICITY INDEX TEST RESULTS
ASTM D 4318-10

Sample No.	Description	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Unified Soil Classification (Group Symbol)
B9-4	Lean Clay	45	24	21	CL
B9-5	Sandy, Lean Clay	35	21	14	CL

PROJECT NO. G1753-32-02

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B9-2	10.0	(SM) Silty SAND				
⊠	B9-3	15.0	(ML) Sandy SILT				
▲	B9-4	25.0	(CL) Lean CLAY		45	24	21

GRADATION CURVE

NORTH RIVER FARMS

OCEANSIDE, CALIFORNIA

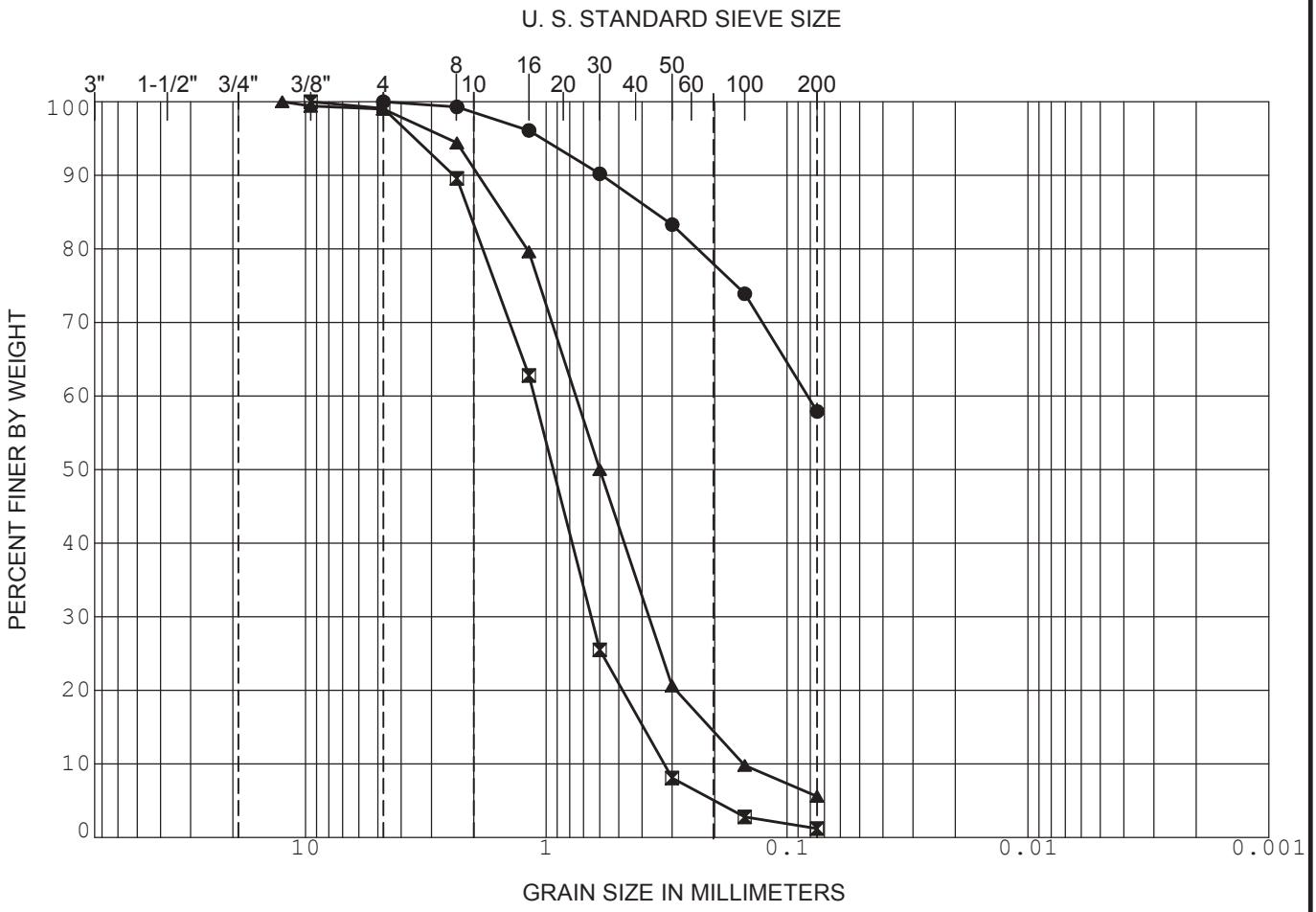
G1753-32-02.GPJ

Figure B-1

GEOCON

PROJECT NO. G1753-32-02

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B9-5	30.0	(CL) Sandy, lean CLAY		35	21	14
⊠	B11-1	5.0	(SP) Poorly graded SAND				
▲	B11-2	15.0	(SP-SM) Poorly graded SAND with trace silt				

GRADATION CURVE

NORTH RIVER FARMS

OCEANSIDE, CALIFORNIA

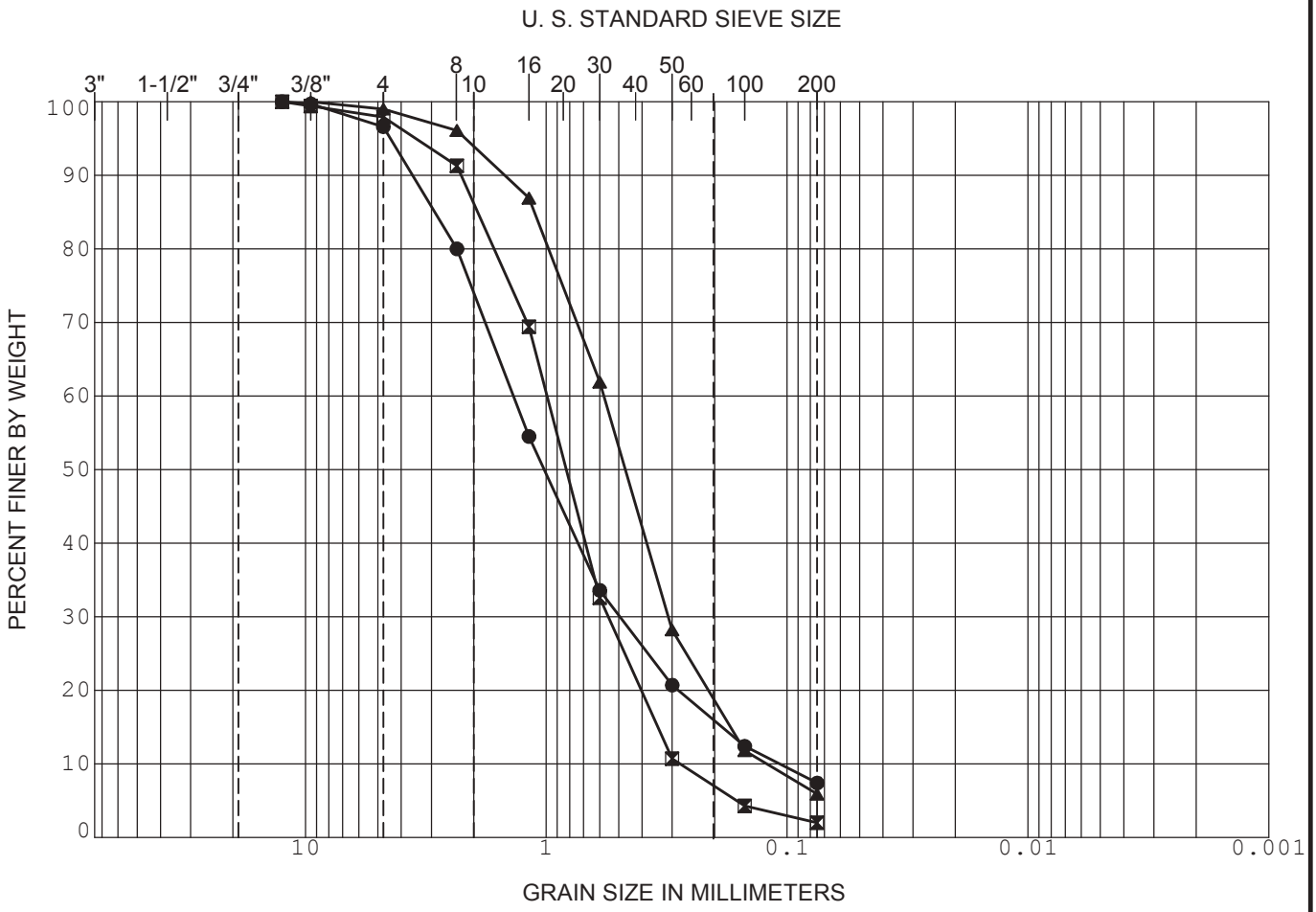
G1753-32-02.GPJ

Figure B-2

GEOCON

PROJECT NO. G1753-32-02

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B11-3	20.0	(SW-SM) Well-graded SAND with trace silt				
⊠	B13-2	15.0	(SP) Poorly graded SAND				
▲	B13-3	20.0	(SP-SM) Poorly graded SAND with silt				

GRADATION CURVE

NORTH RIVER FARMS

OCEANSIDE, CALIFORNIA

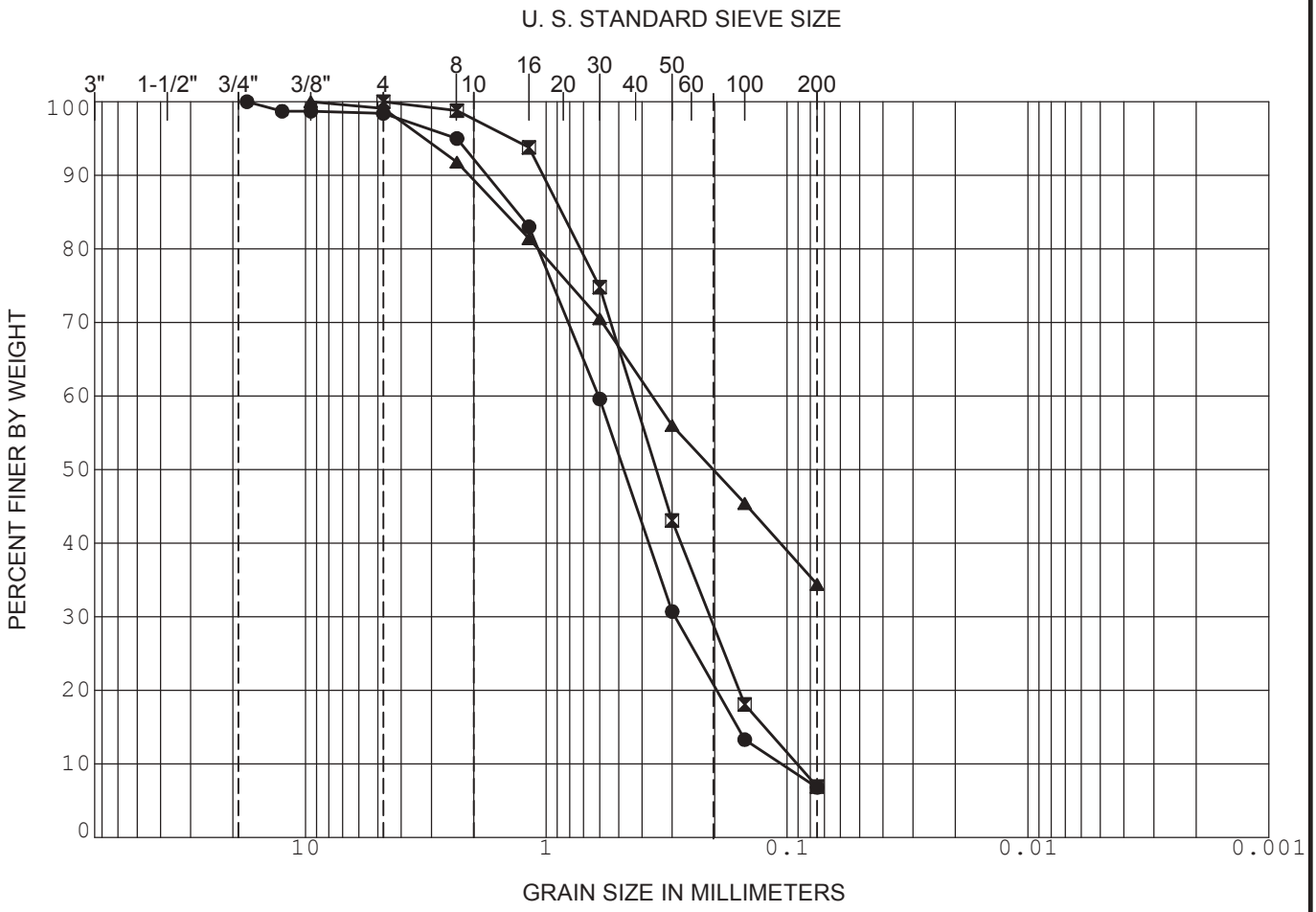
G1753-32-02.GPJ

Figure B-3

GEOCON

PROJECT NO. G1753-32-02

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B13-4	25.0	(SP-SM) Poorly graded SAND with silt				
⊠	B13-5	35.0	(SP-SM) Poorly graded SAND with silt				
▲	B13-6	45.0	(SM) Silty SAND				

GRADATION CURVE

NORTH RIVER FARMS

OCEANSIDE, CALIFORNIA

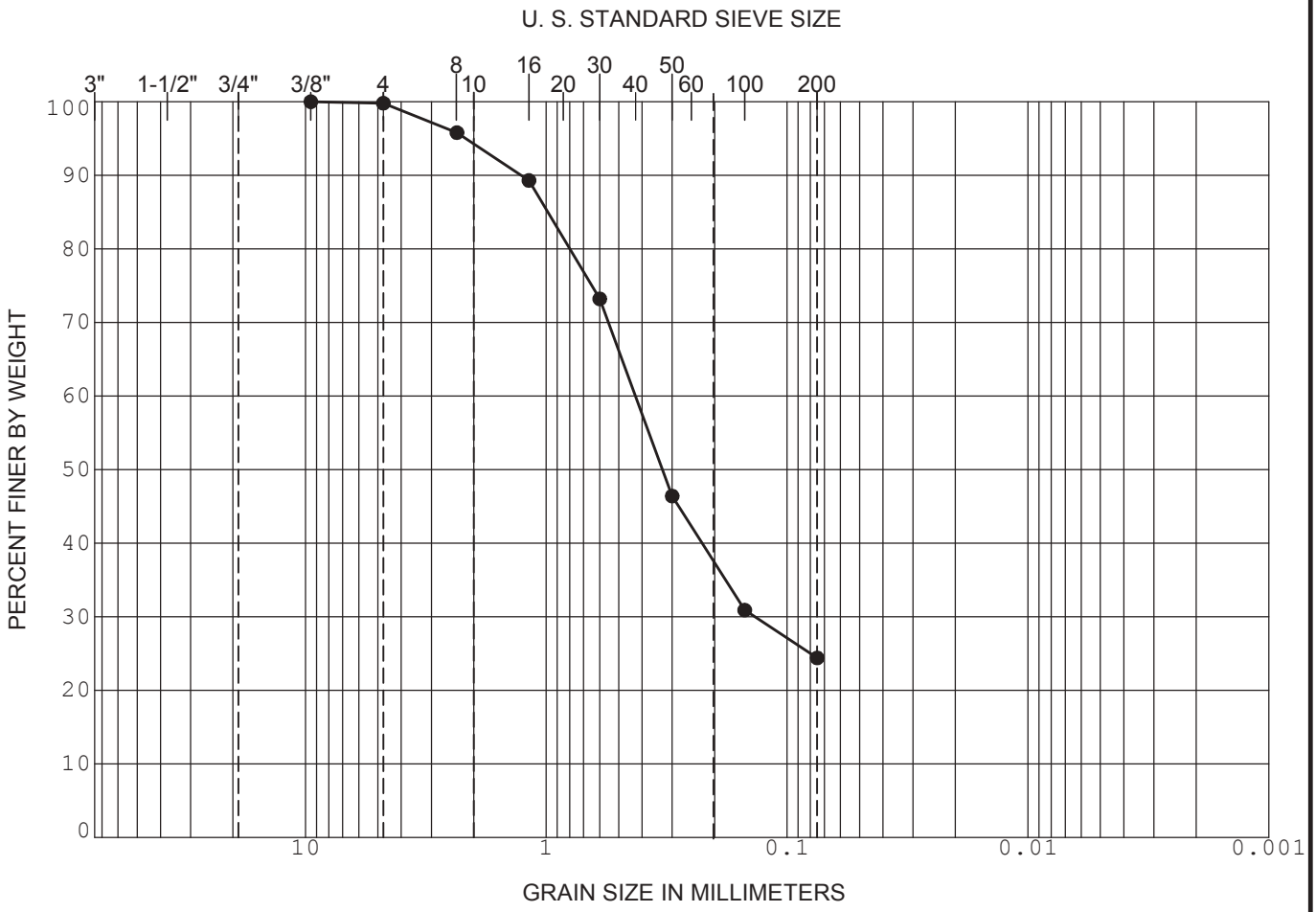
G1753-32-02.GPJ

Figure B-4

GEOCON

PROJECT NO. G1753-32-02

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B13-7	50.0	(SM) Silty SAND				
⊠							
▲							

GRADATION CURVE

NORTH RIVER FARMS

OCEANSIDE, CALIFORNIA

G1753-32-02.GPJ

Figure B-5

GEOCON

APPENDIX C

APPENDIX C

LIQUEFACTION ANALYSES

FOR

NORTH RIVER FARMS
OCEANSIDE, CALIFORNIA

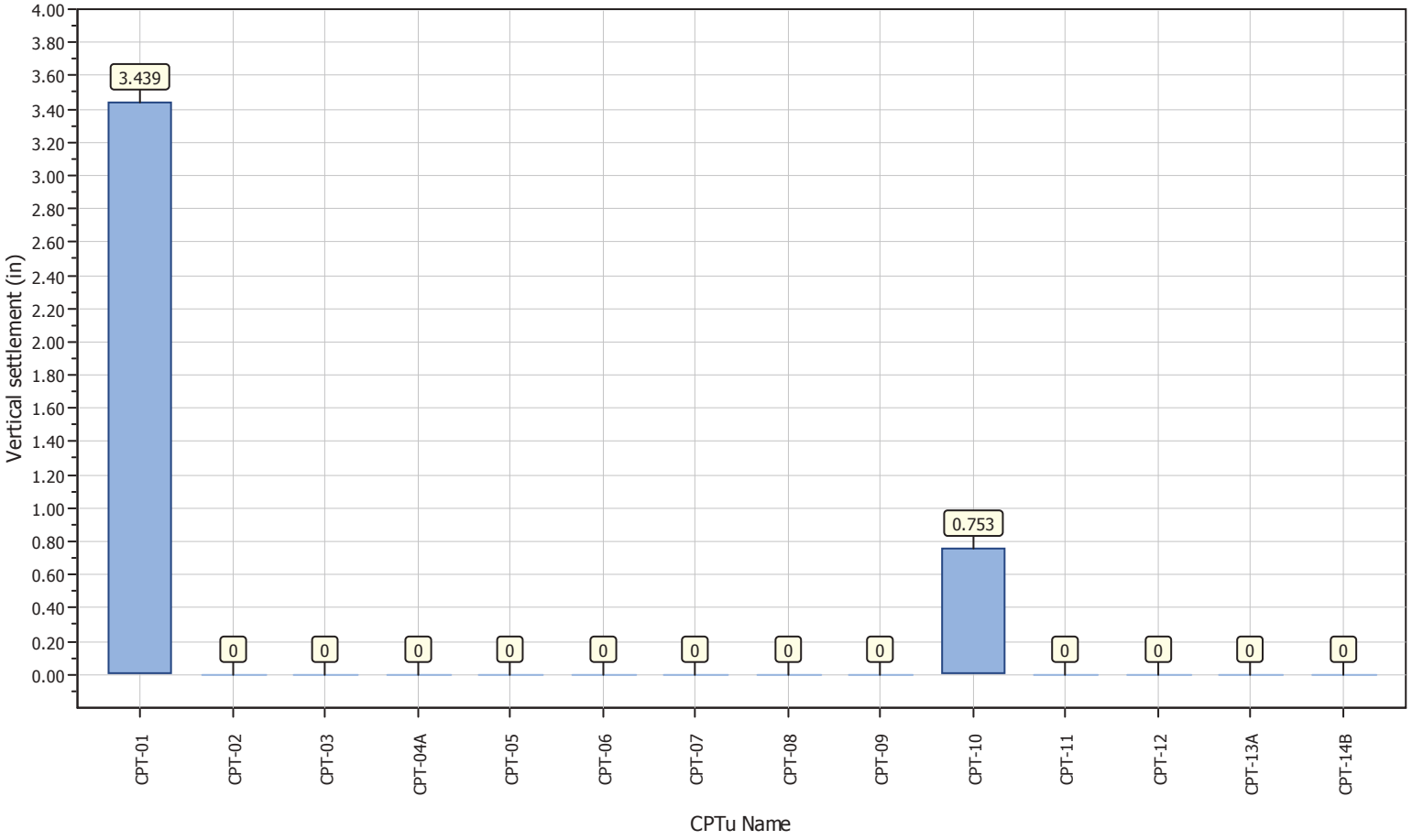
PROJECT NO. G1753-32-02

Geocon Incorporated
6960 Flanders Drive
San Diego, California 92121-2974
www.geoconinc.com

Project title : North River Farms

Location : Geocon Project No. G1753-32-02

Overall vertical settlements report



Geocon Incorporated
6960 Flanders Drive
San Diego, California 92121-2974
www.geoconinc.com

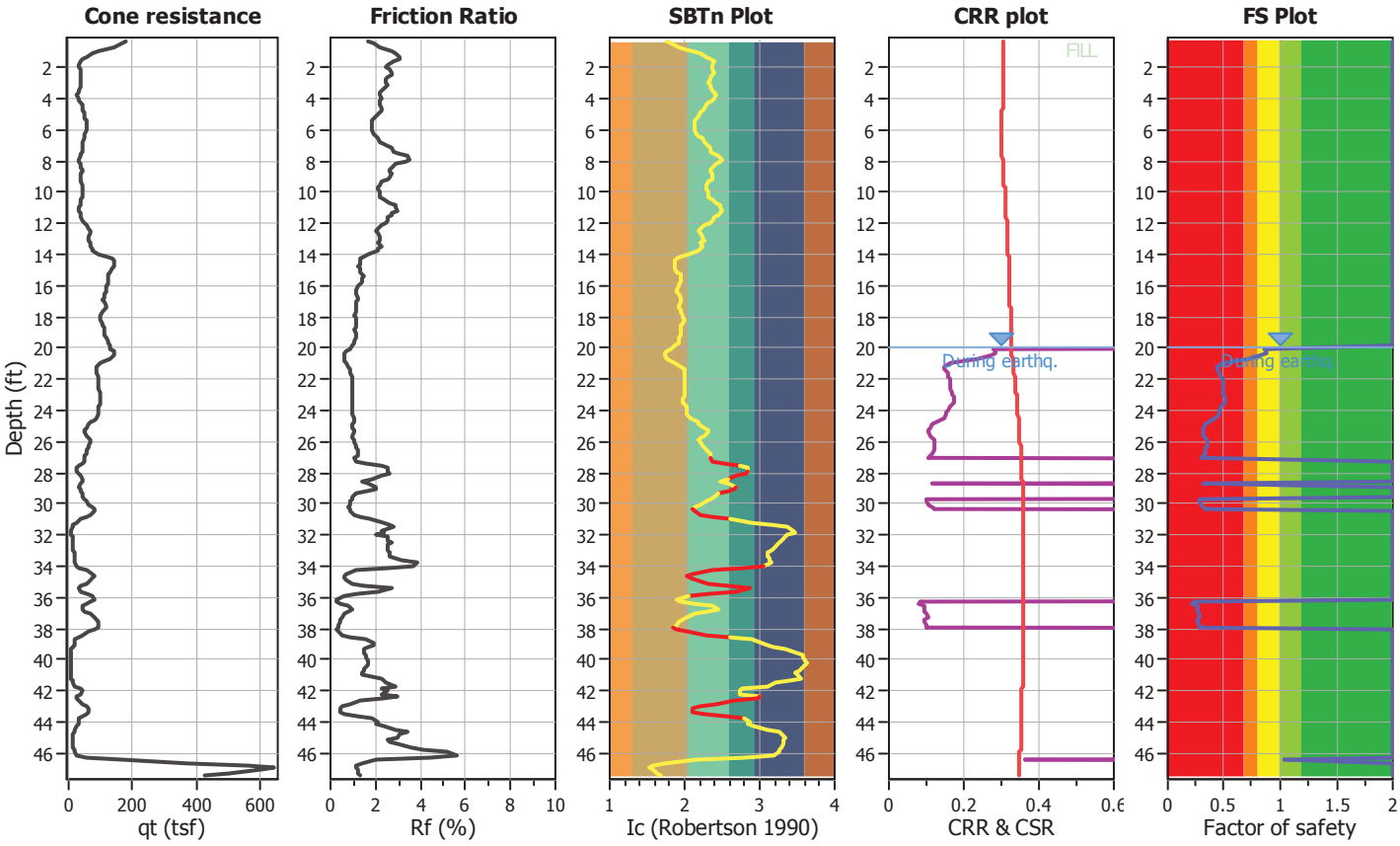
LIQUEFACTION ANALYSIS REPORT

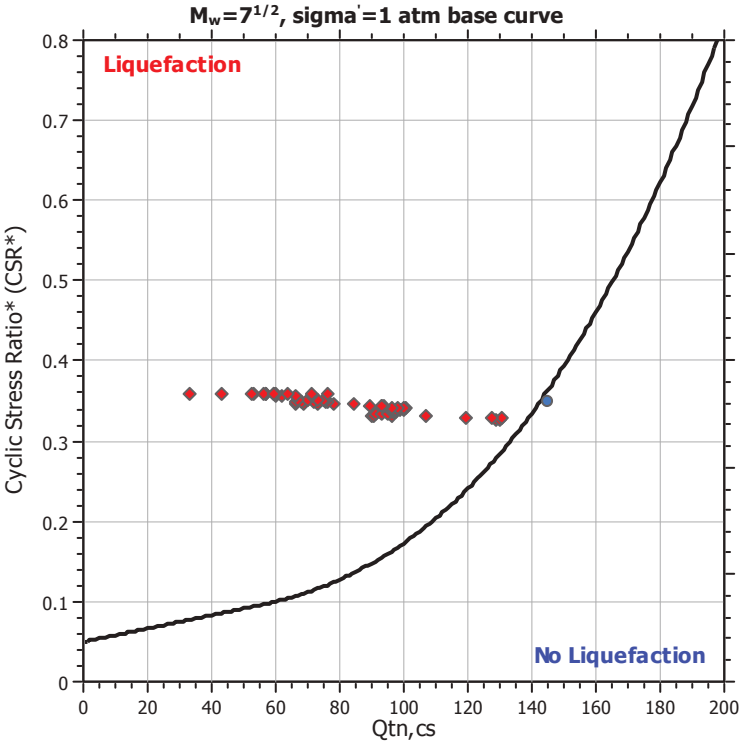
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

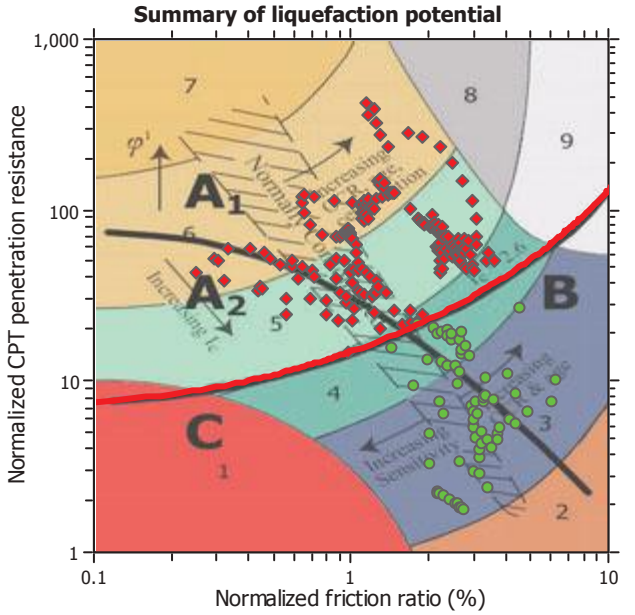
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

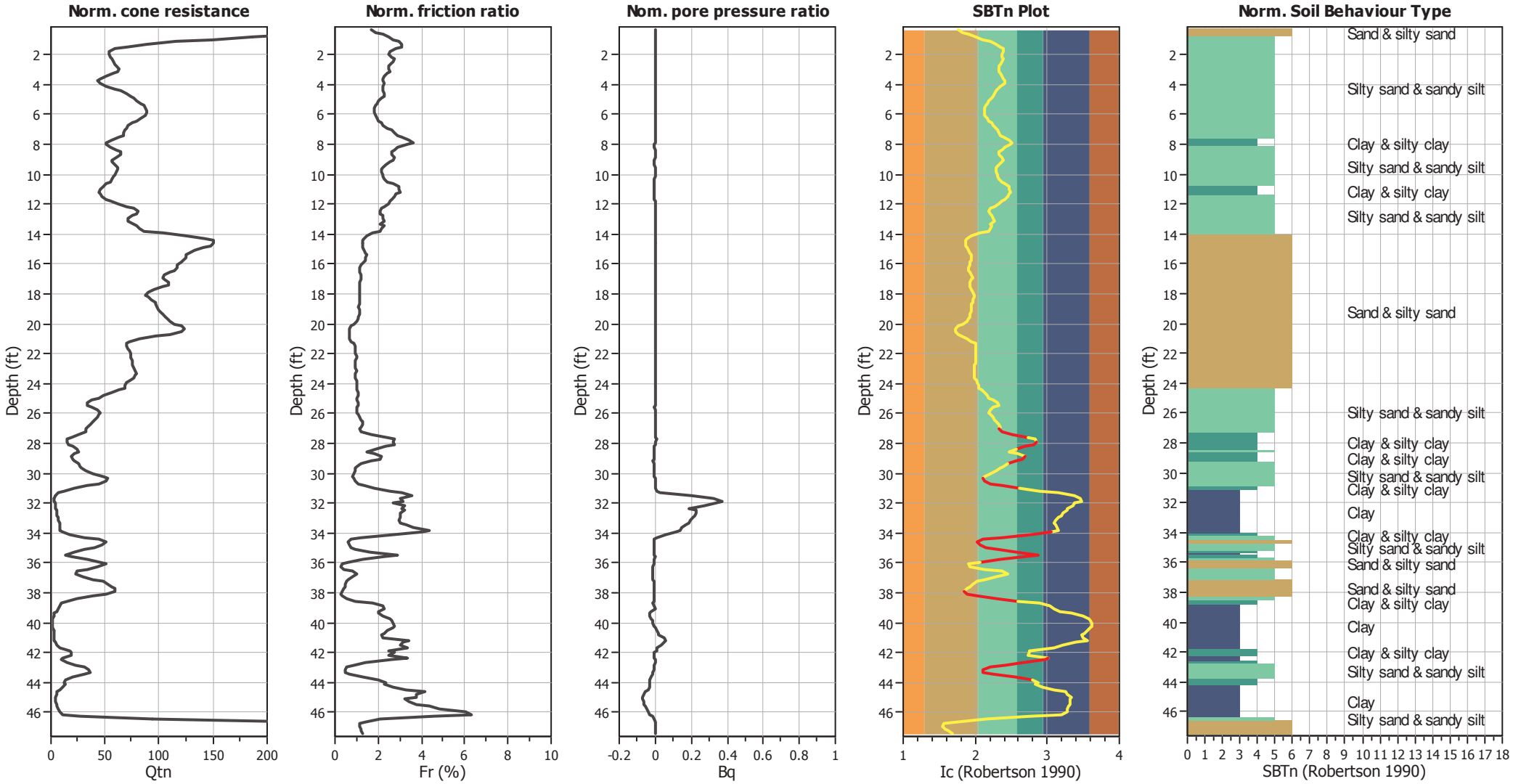






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



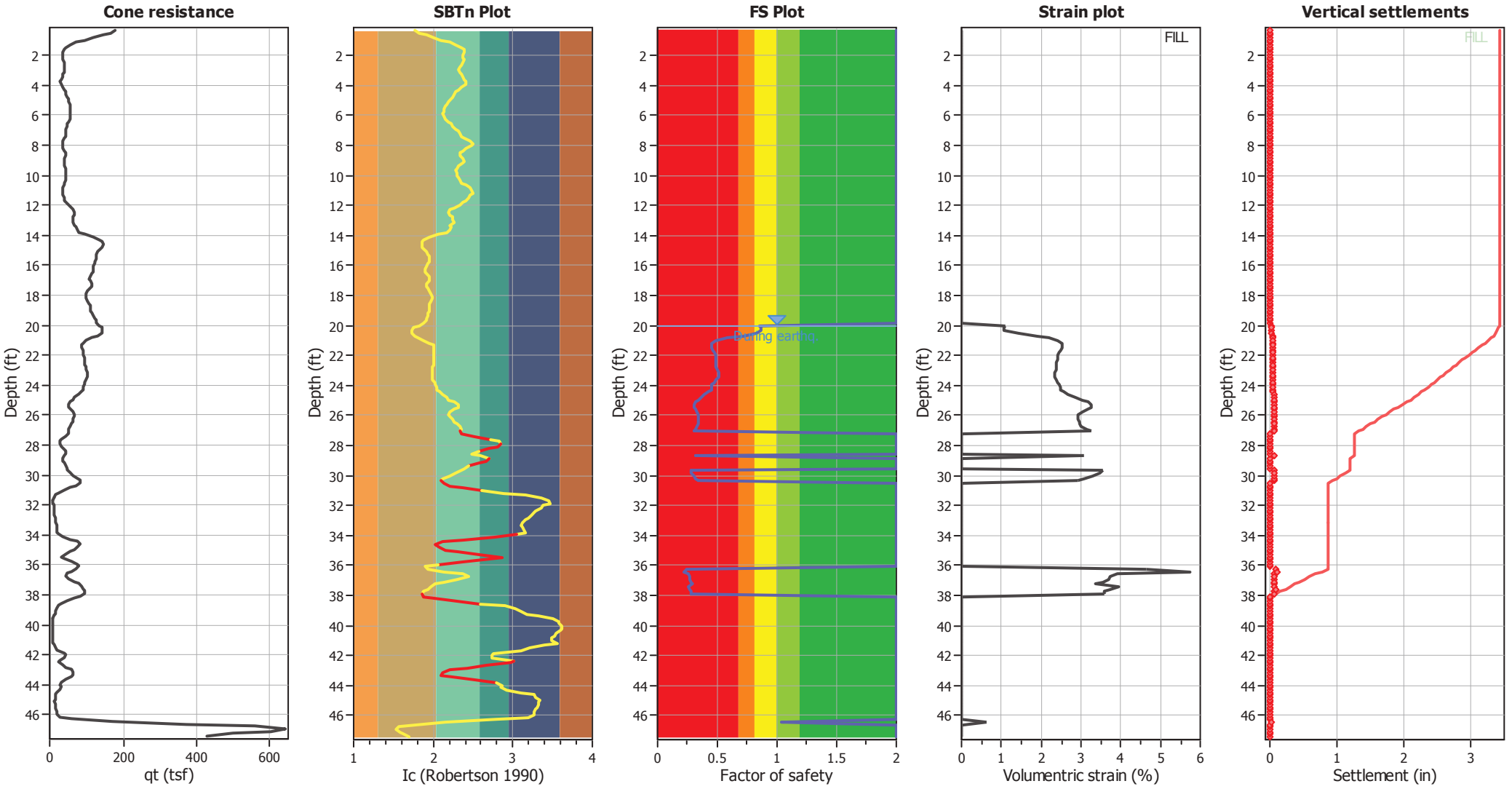
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Geocon Incorporated
6960 Flanders Drive
San Diego, California 92121-2974
www.geoconinc.com

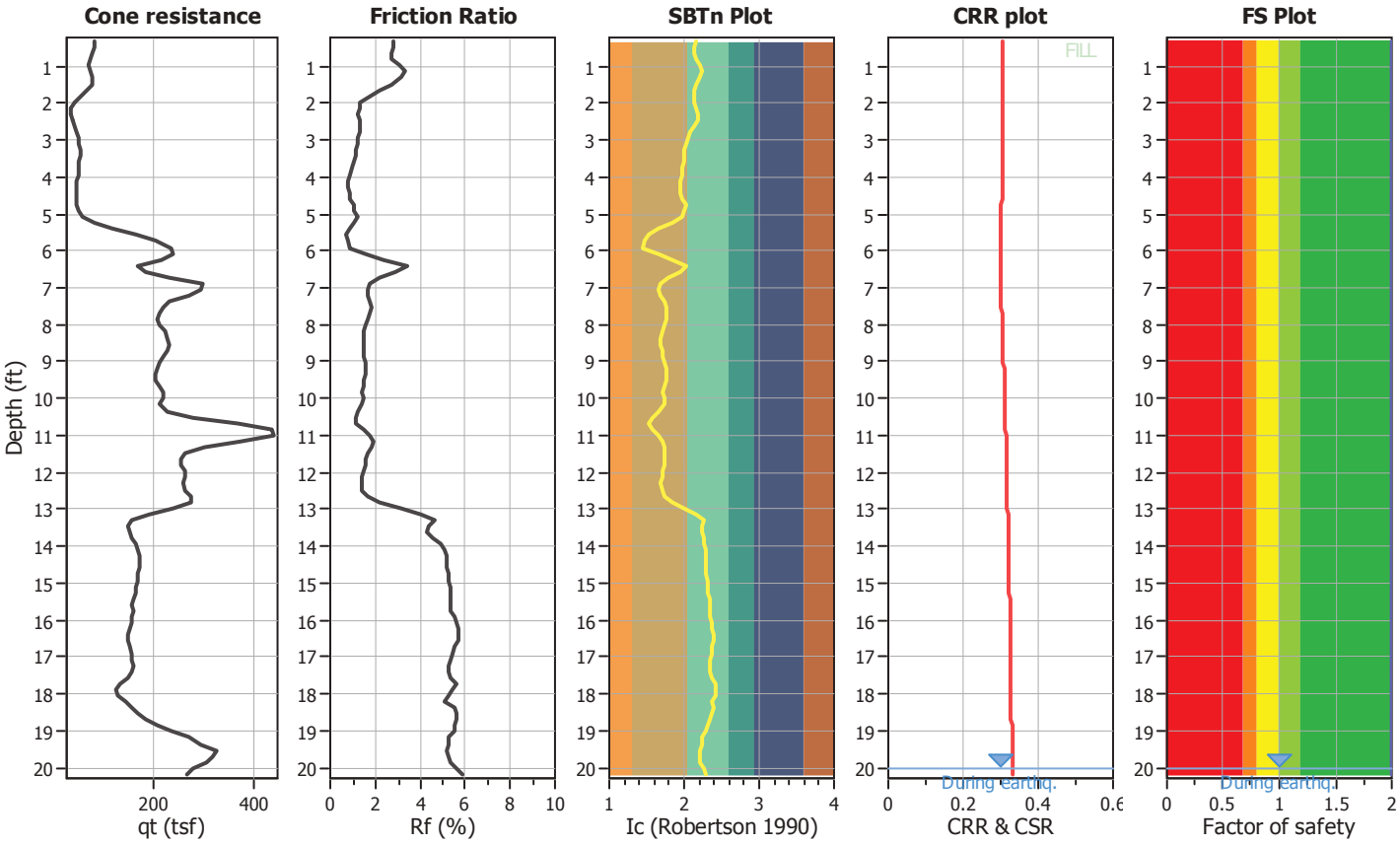
LIQUEFACTION ANALYSIS REPORT

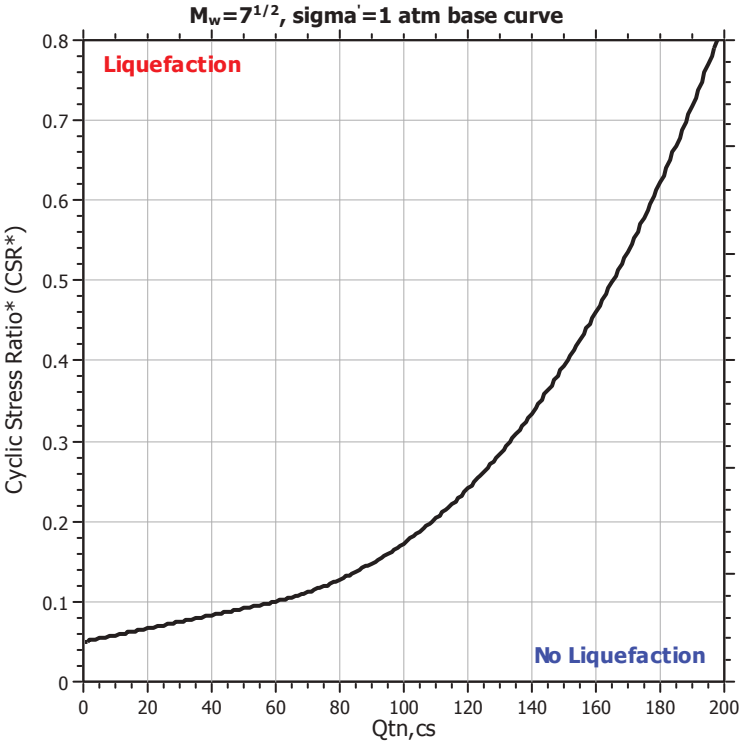
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

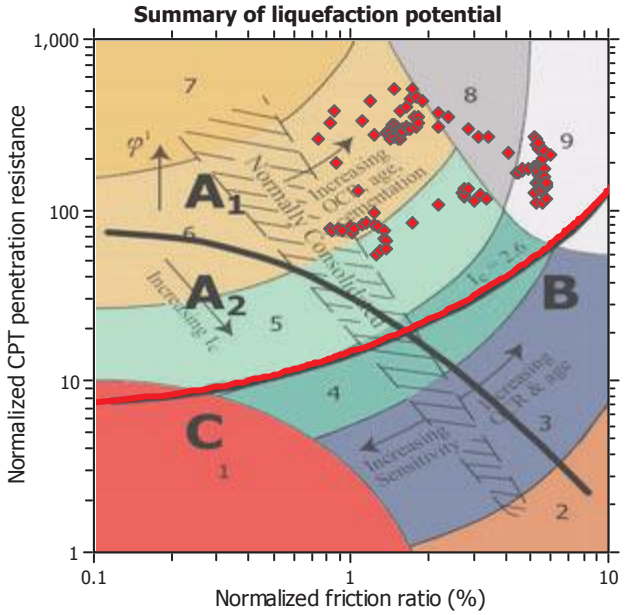
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

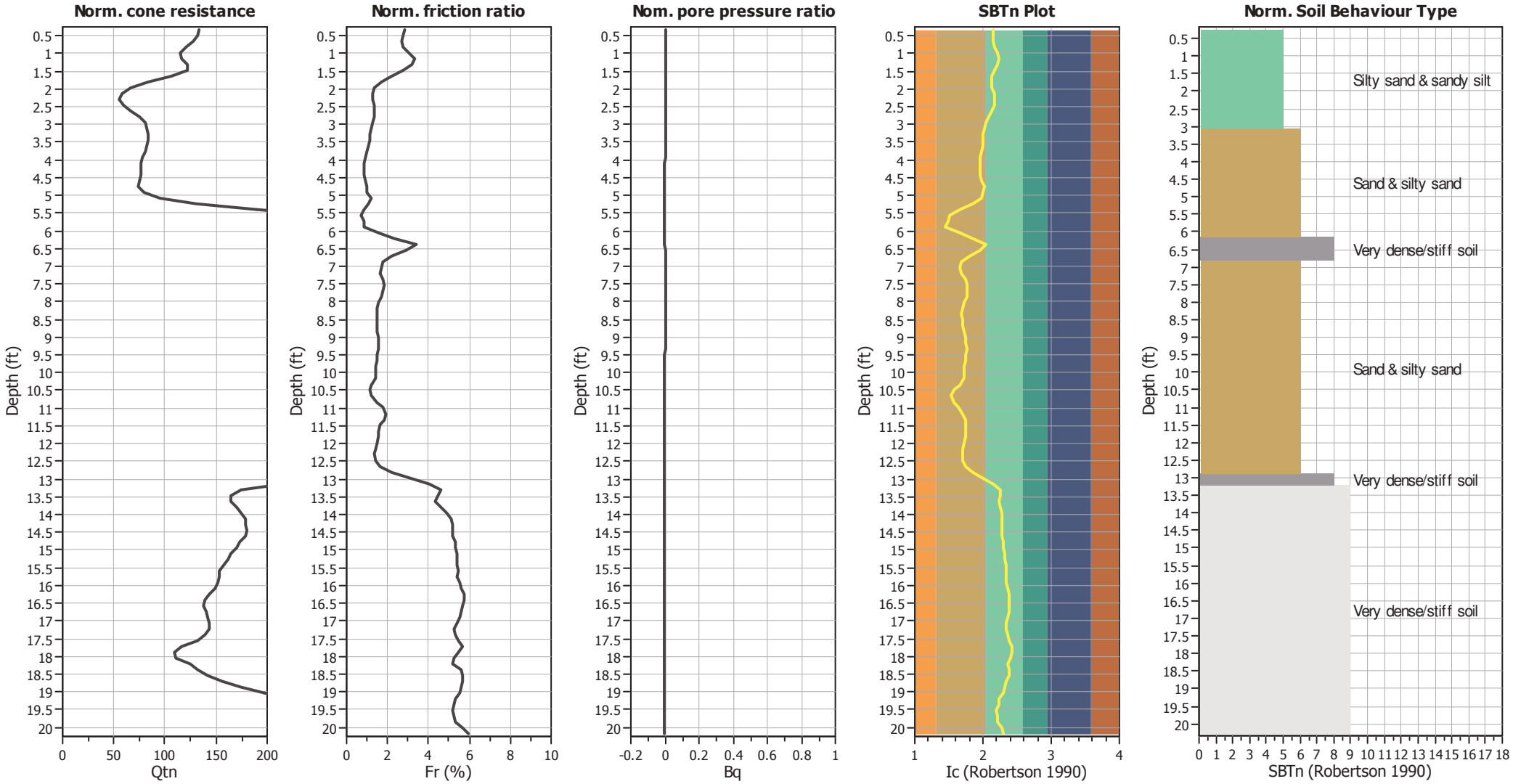






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



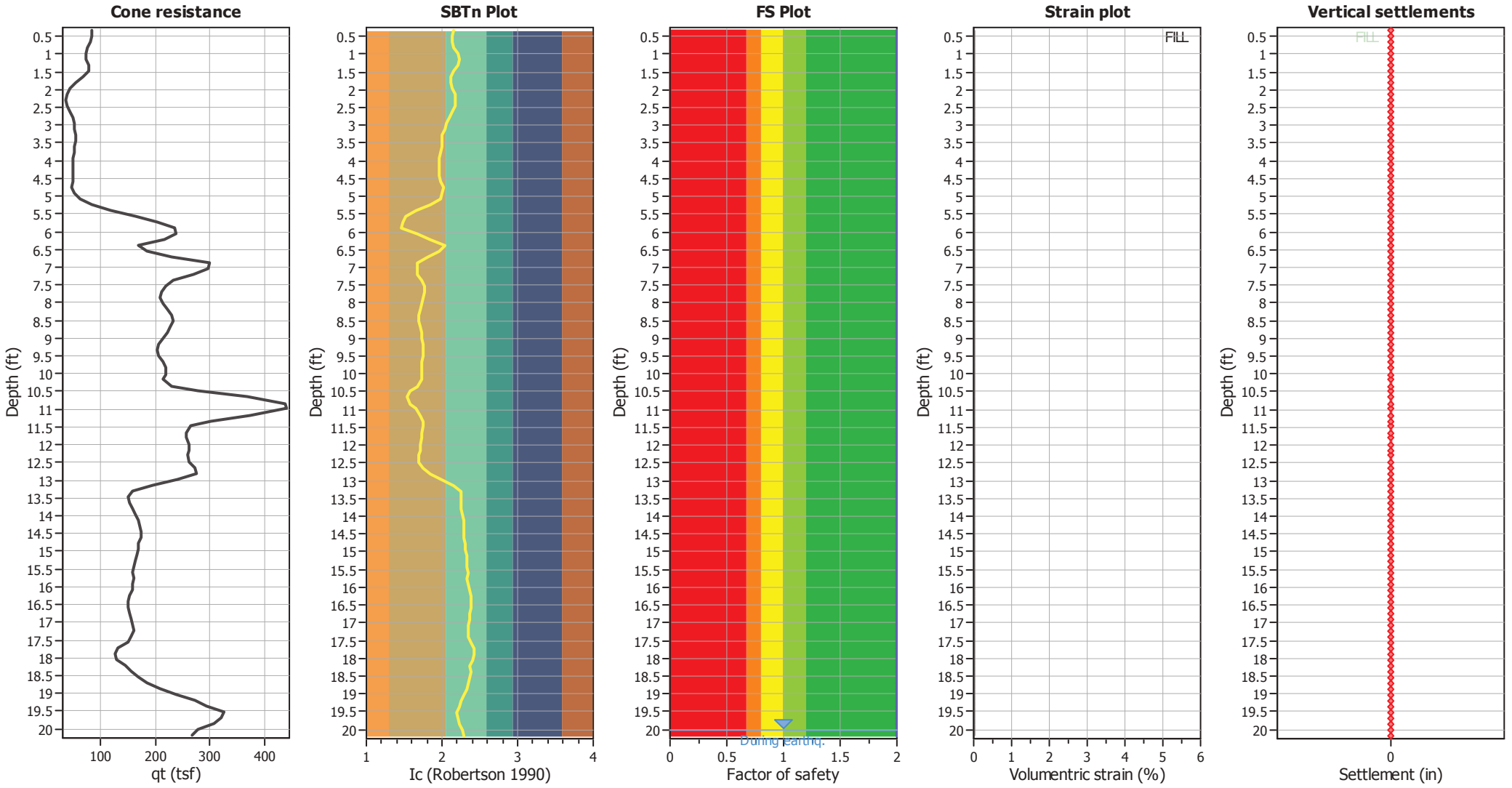
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

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6960 Flanders Drive
San Diego, California 92121-2974
www.geoconinc.com

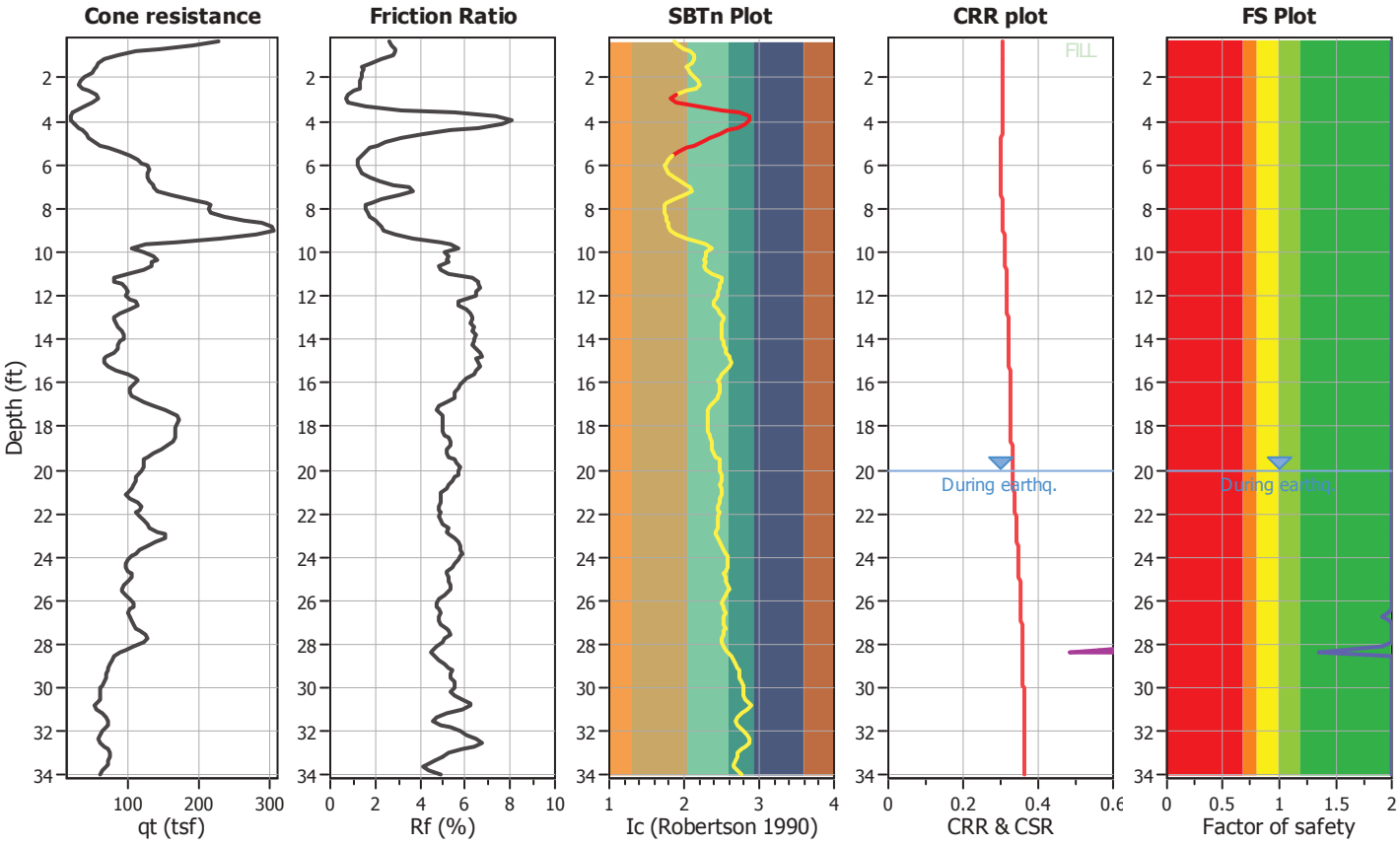
LIQUEFACTION ANALYSIS REPORT

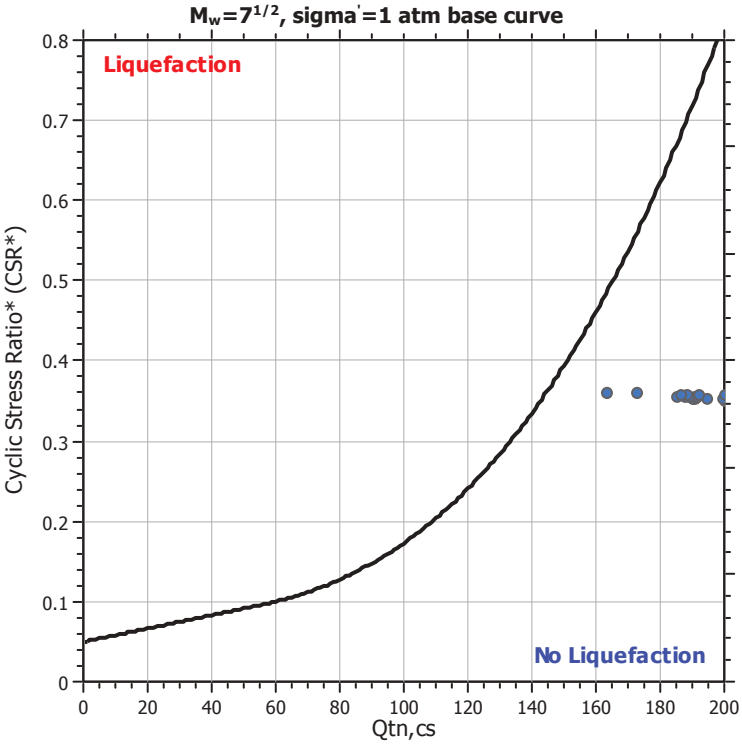
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

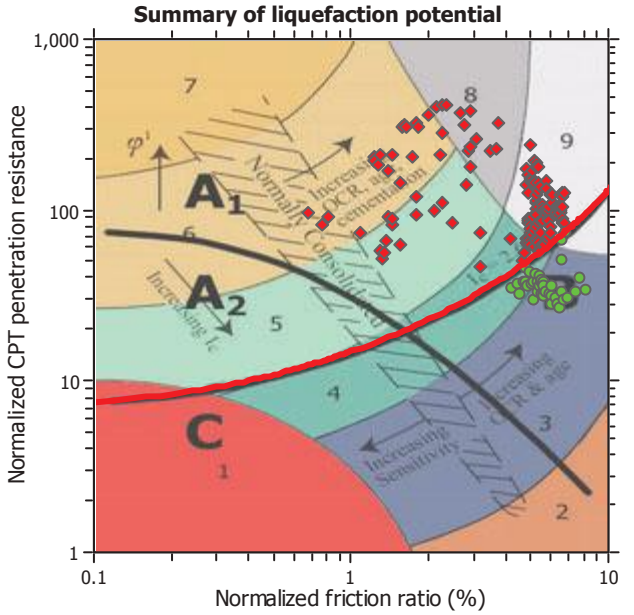
CPT file : CPT-03

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

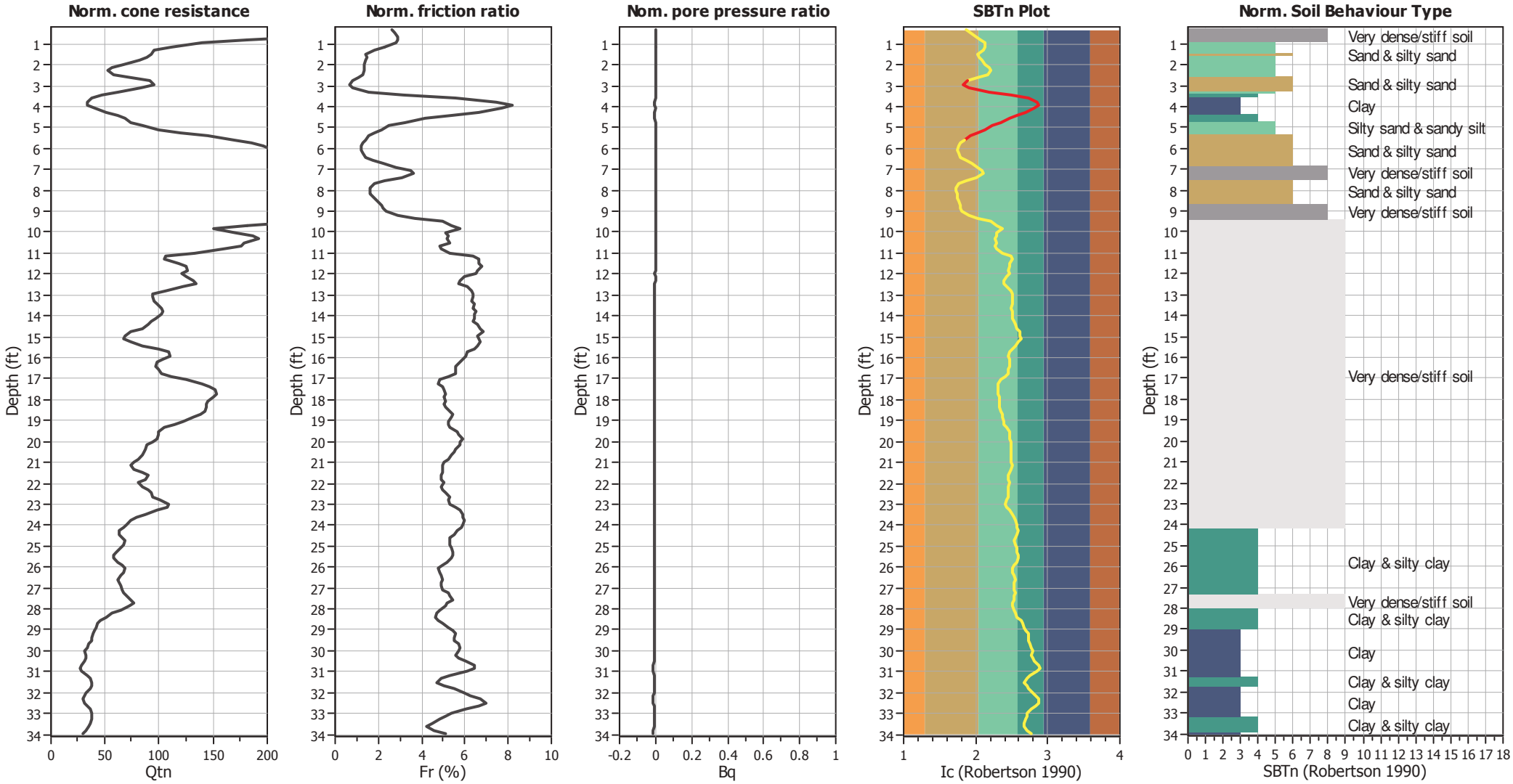






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



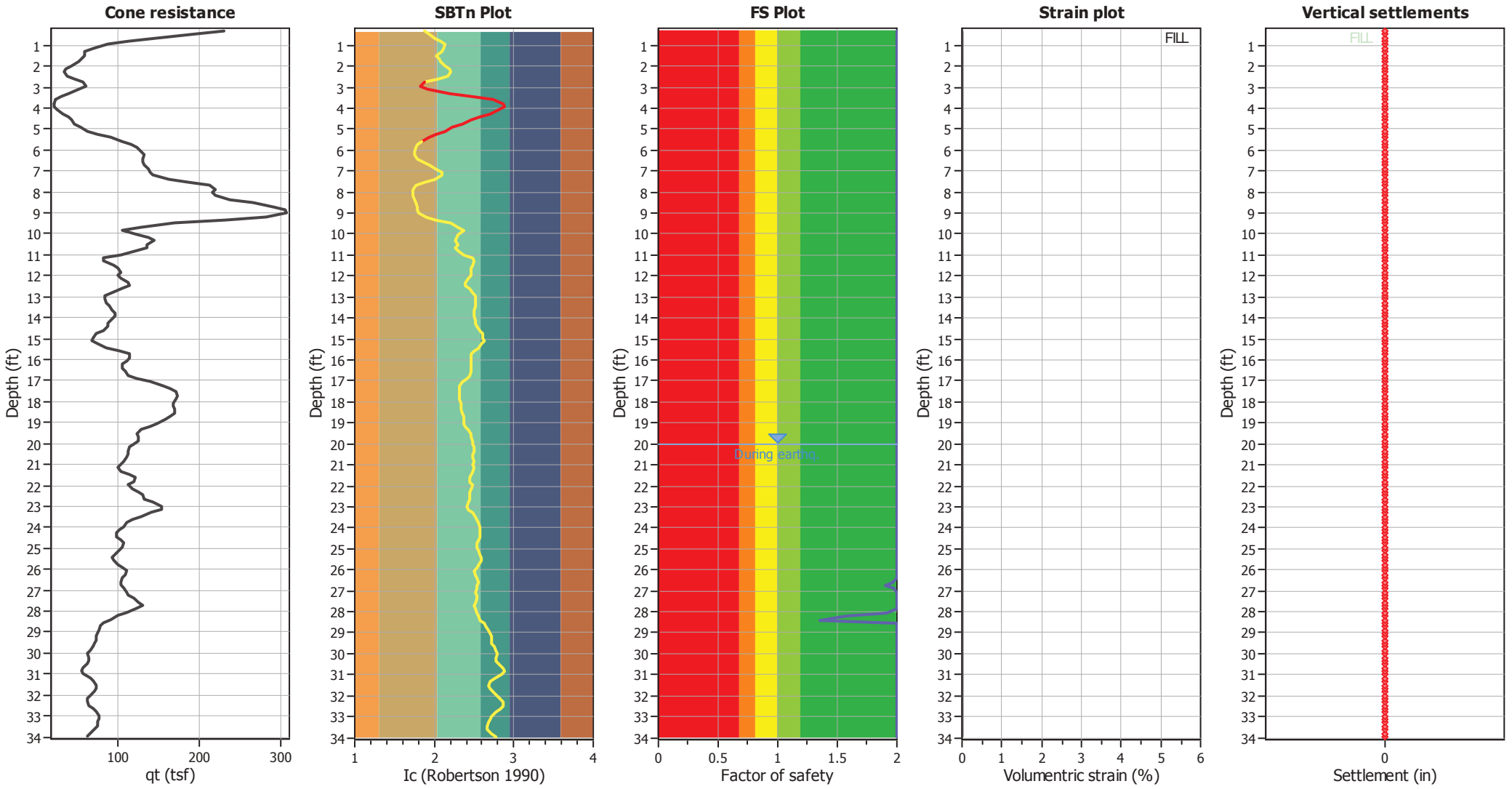
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Geocon Incorporated
6960 Flanders Drive
San Diego, California 92121-2974
www.geoconinc.com

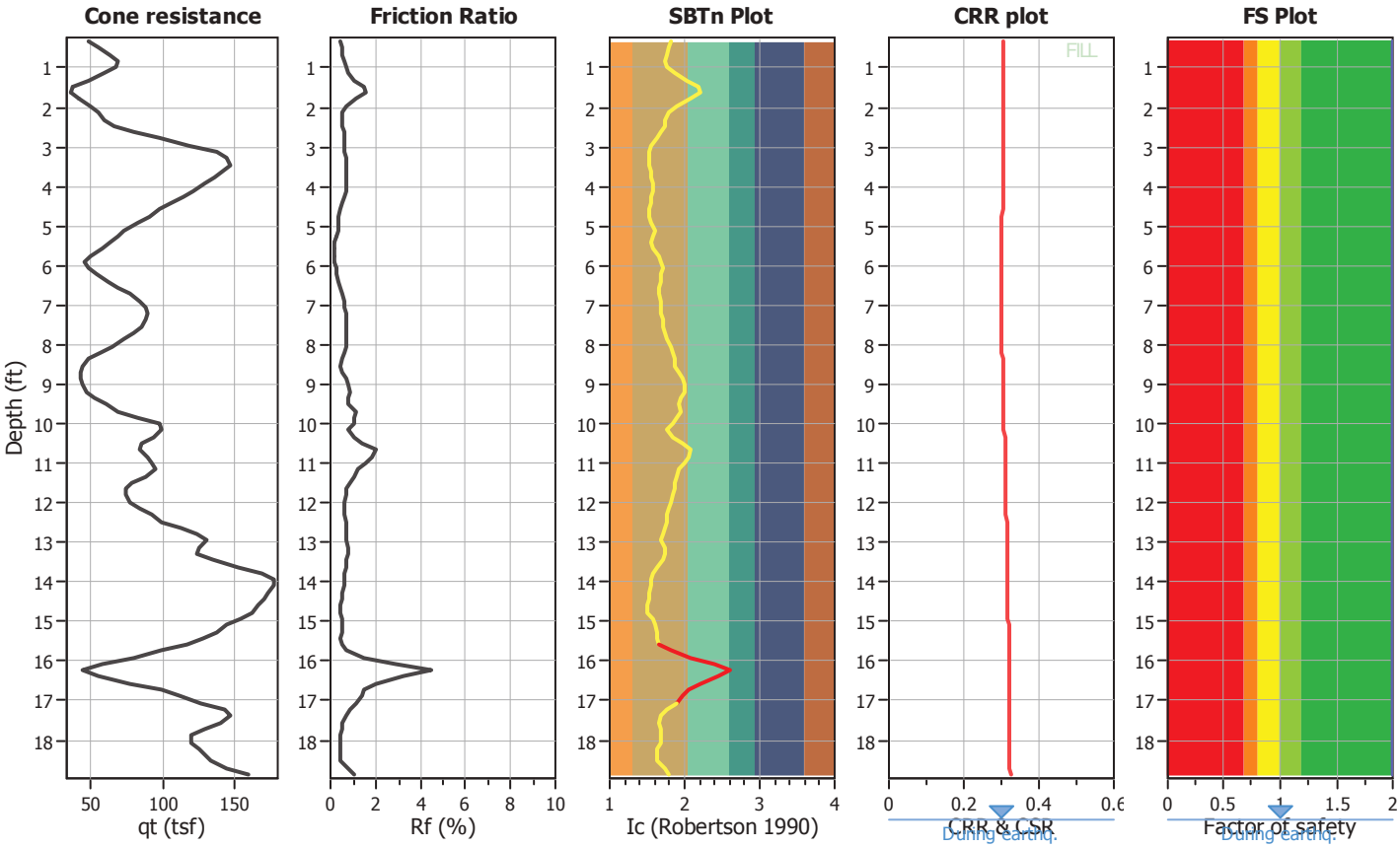
LIQUEFACTION ANALYSIS REPORT

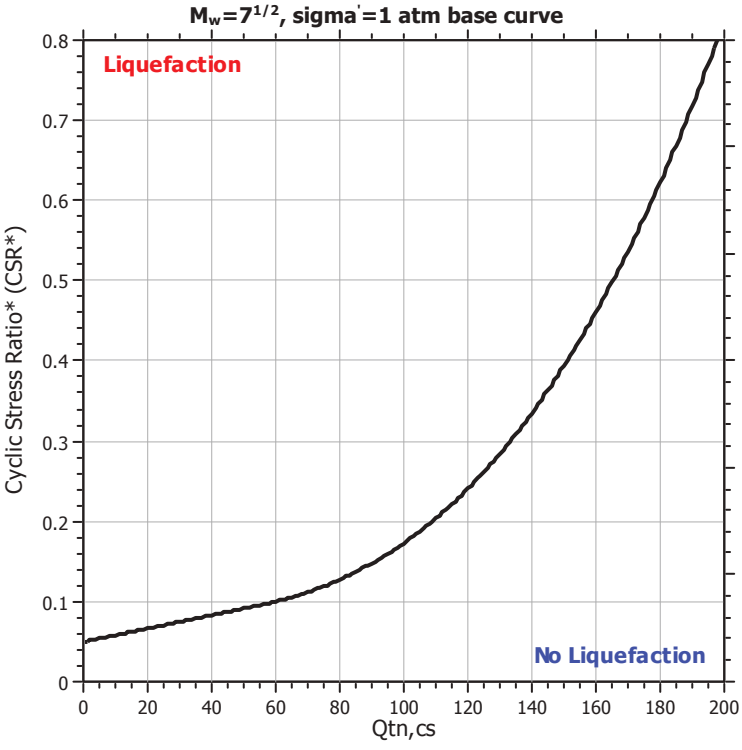
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

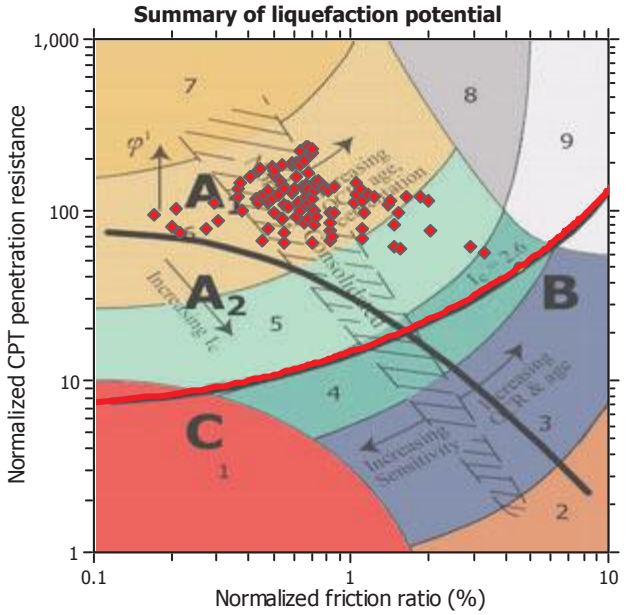
CPT file : CPT-04A

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

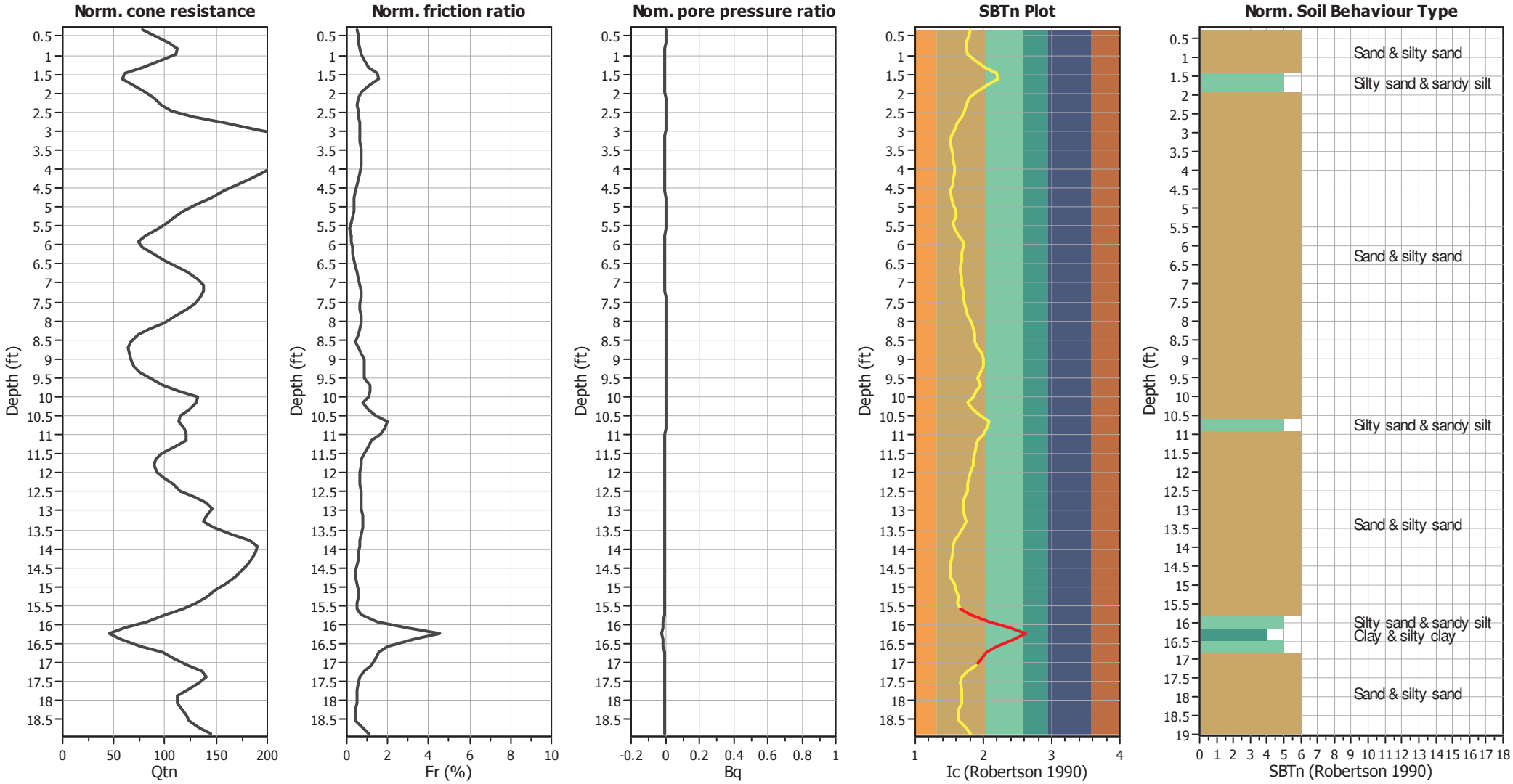






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



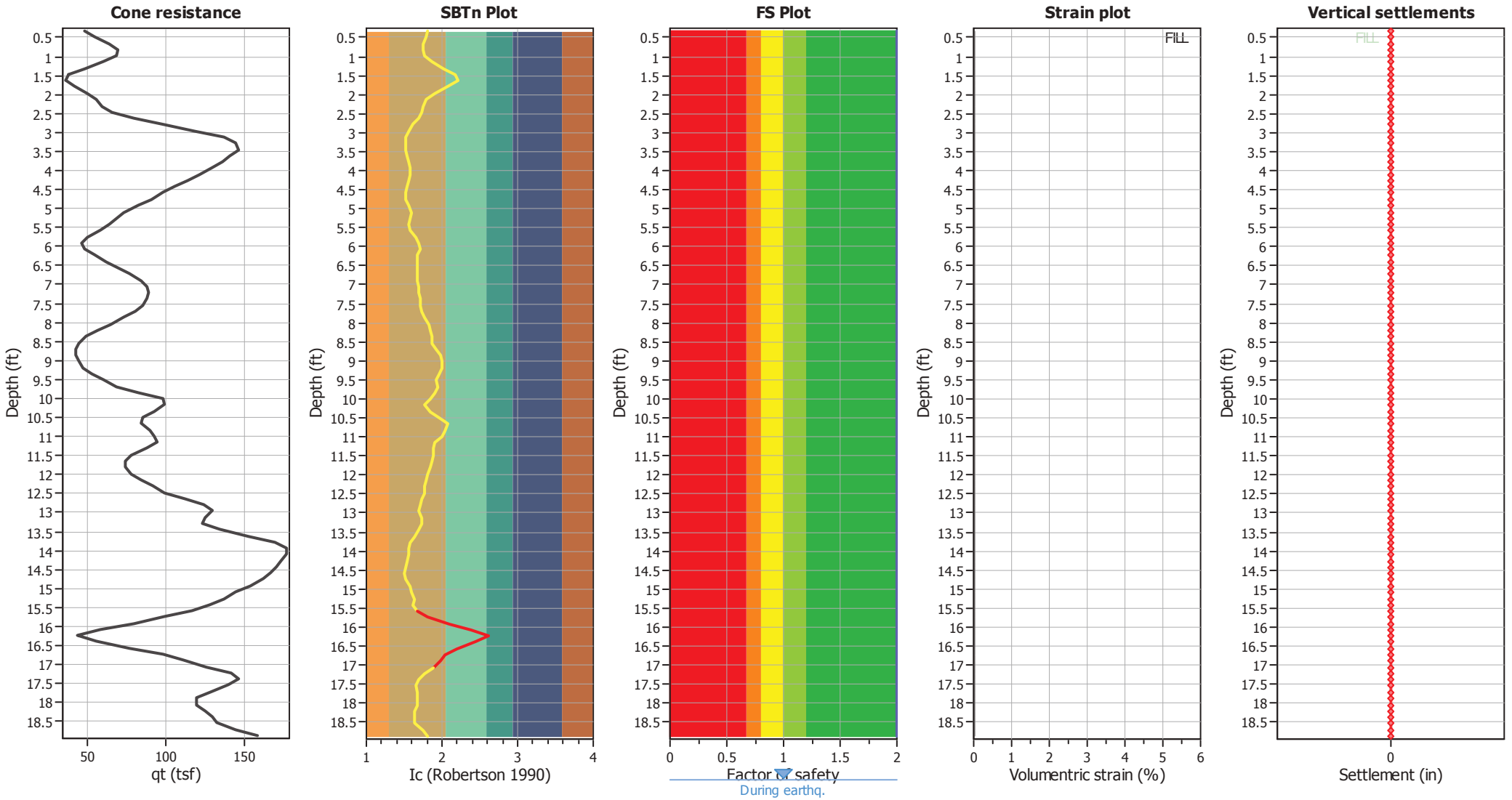
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

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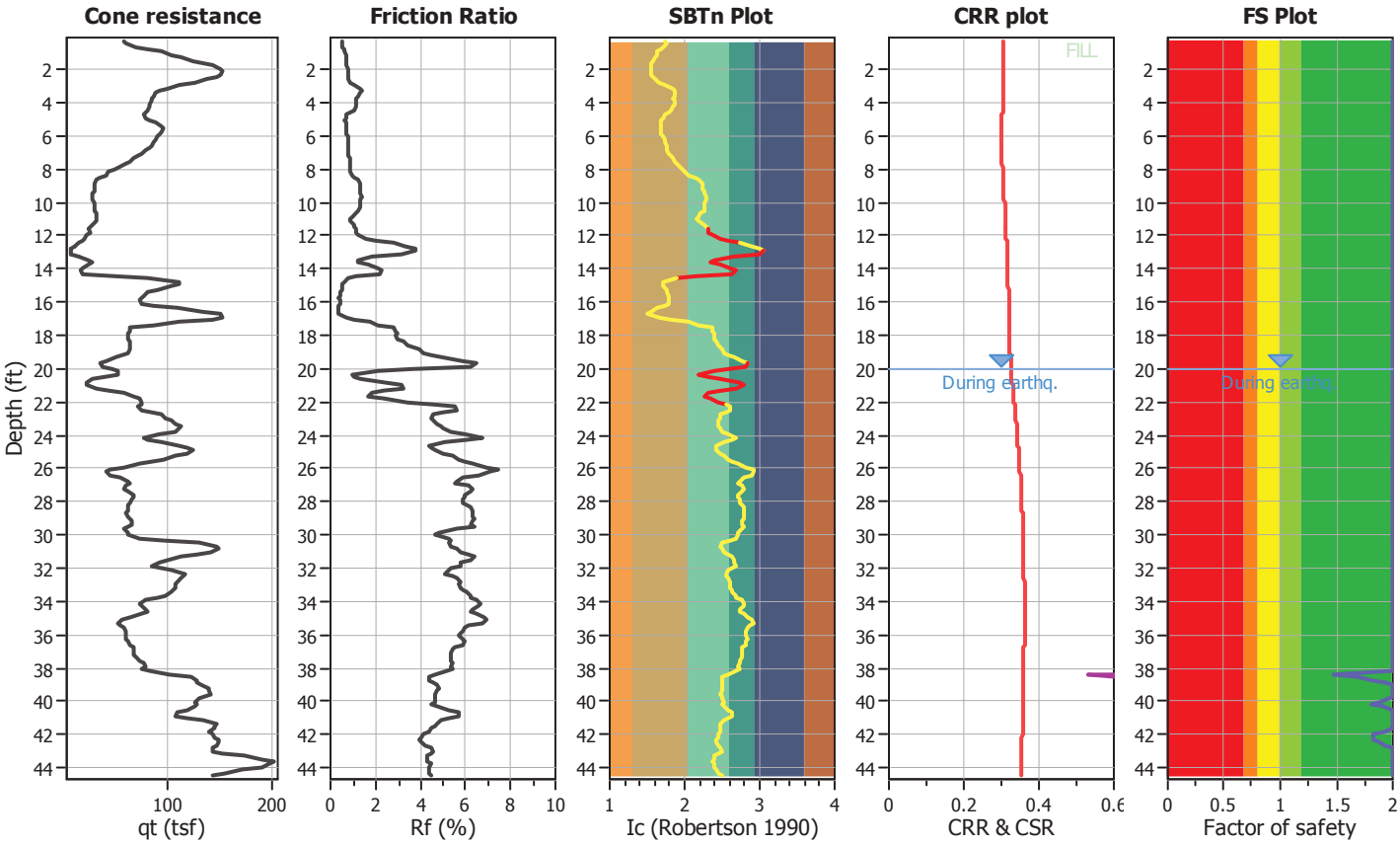
LIQUEFACTION ANALYSIS REPORT

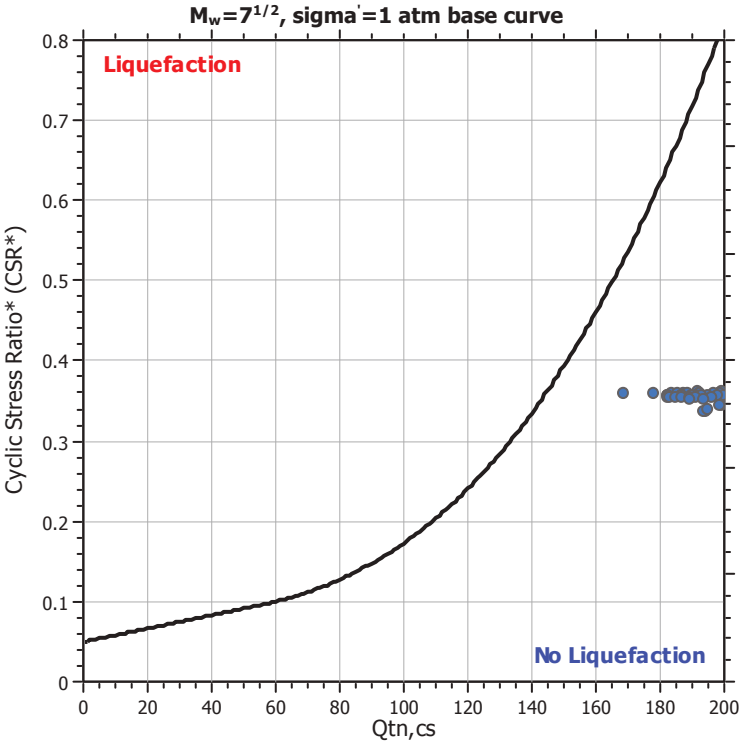
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

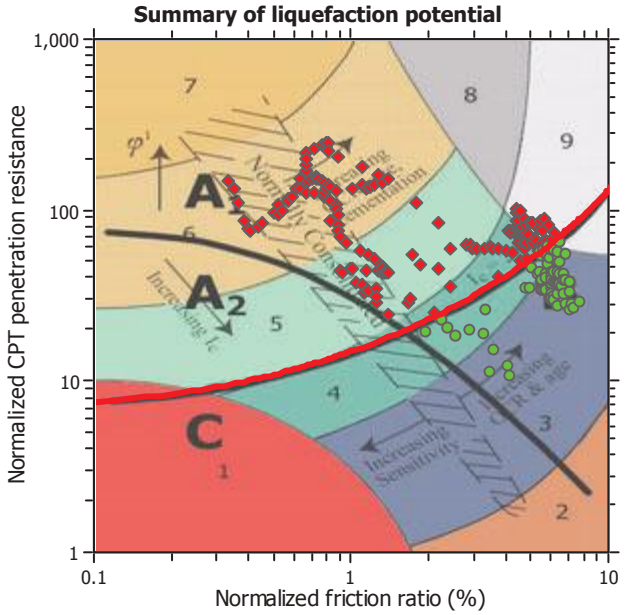
CPT file : CPT-05

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

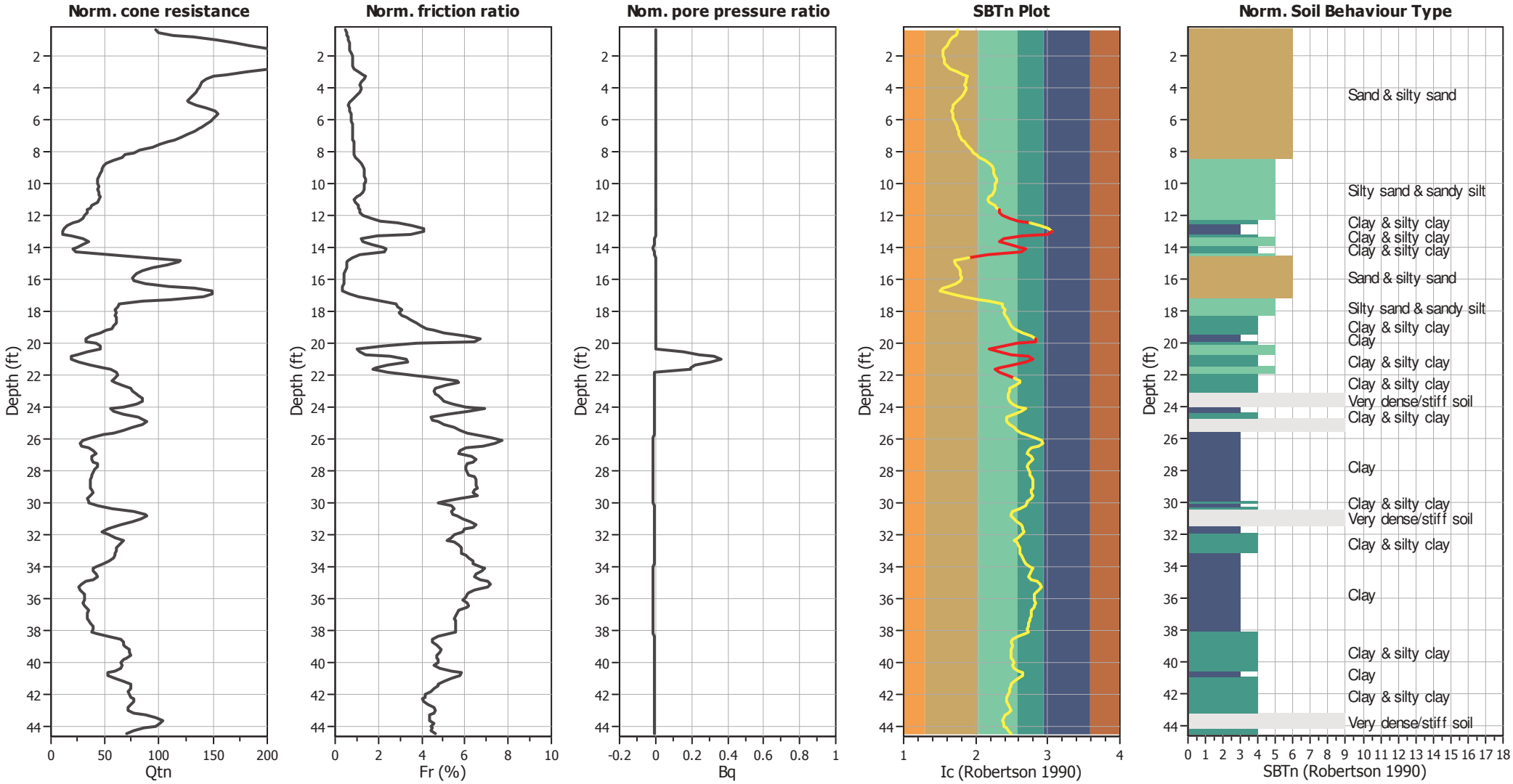






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



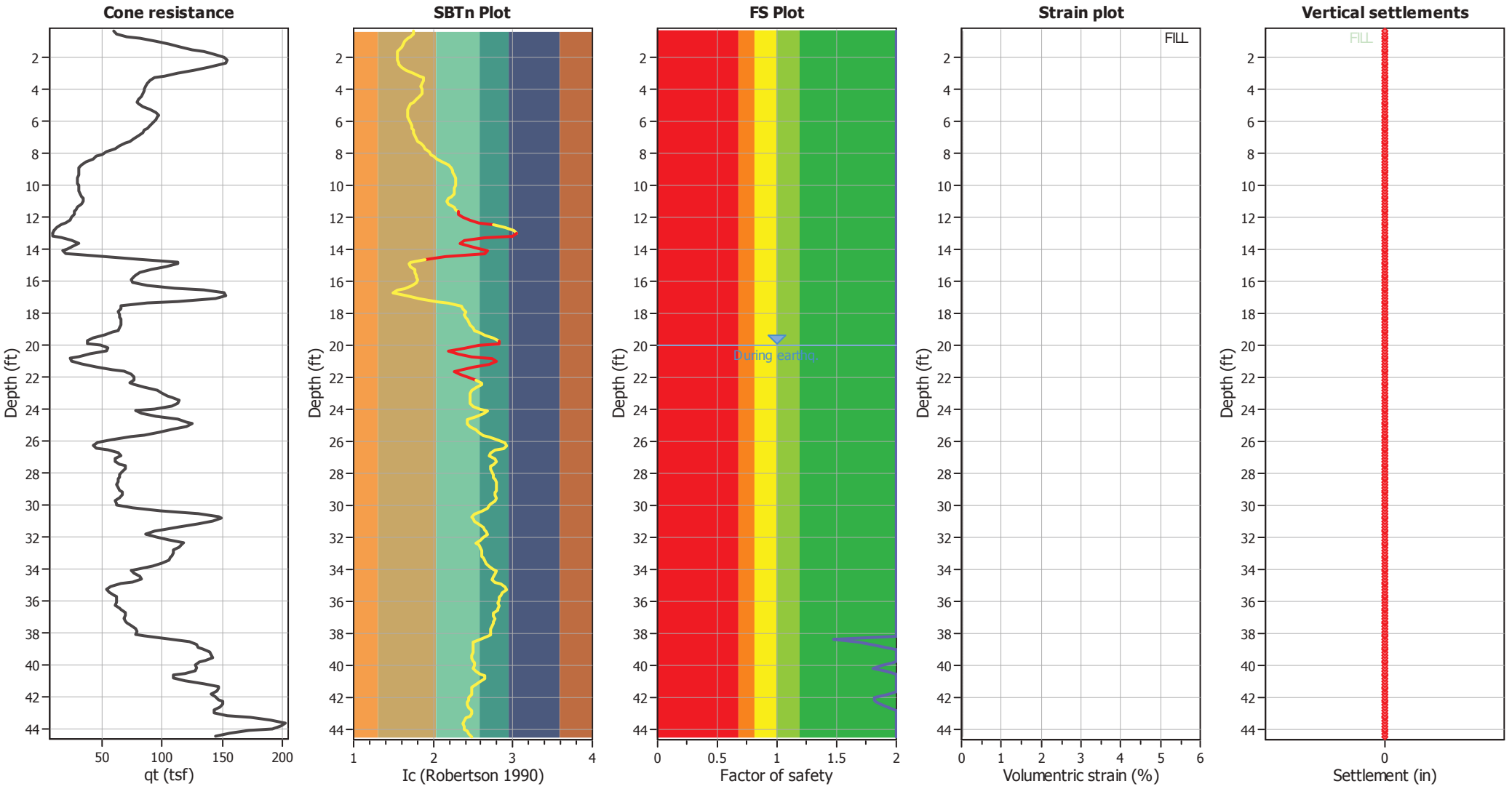
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

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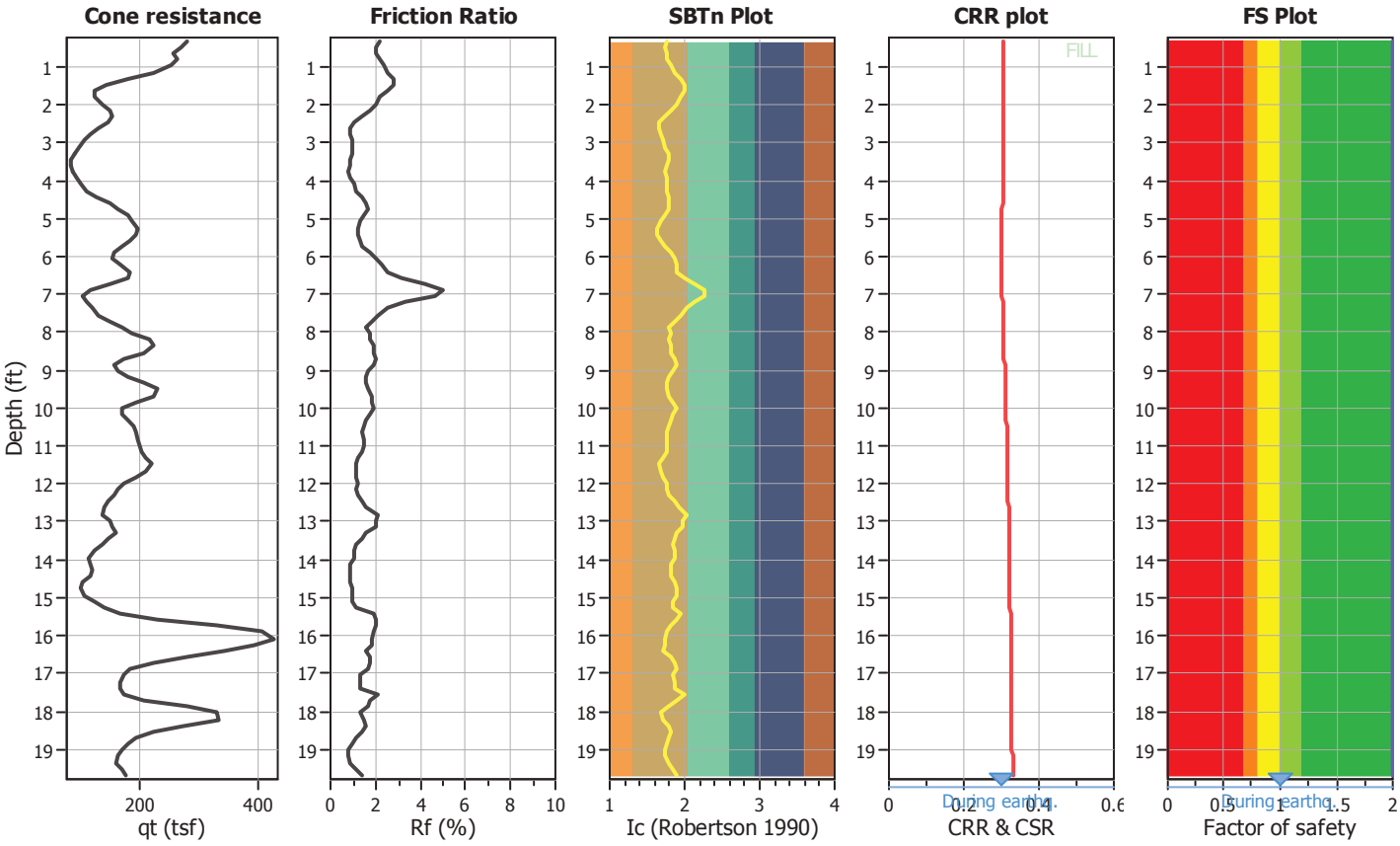
LIQUEFACTION ANALYSIS REPORT

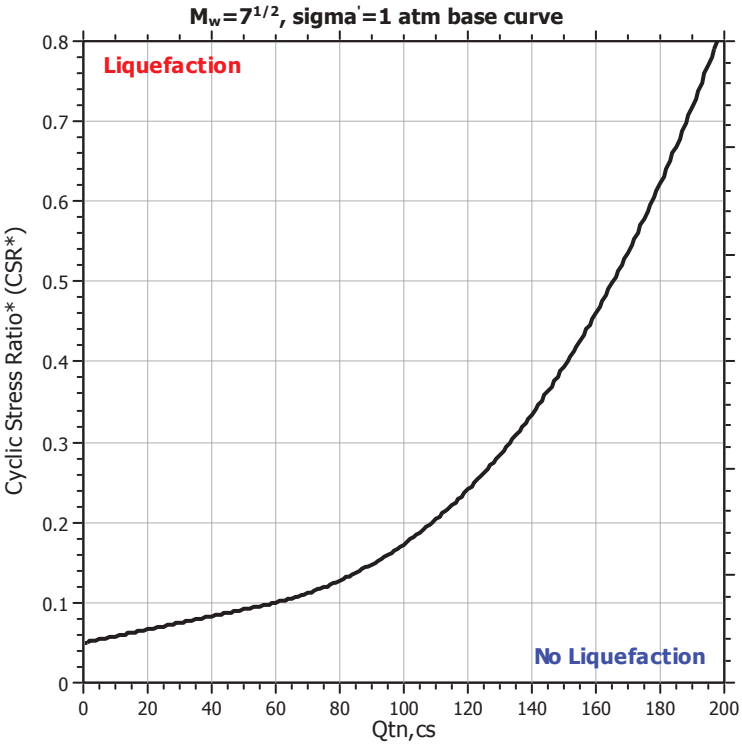
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

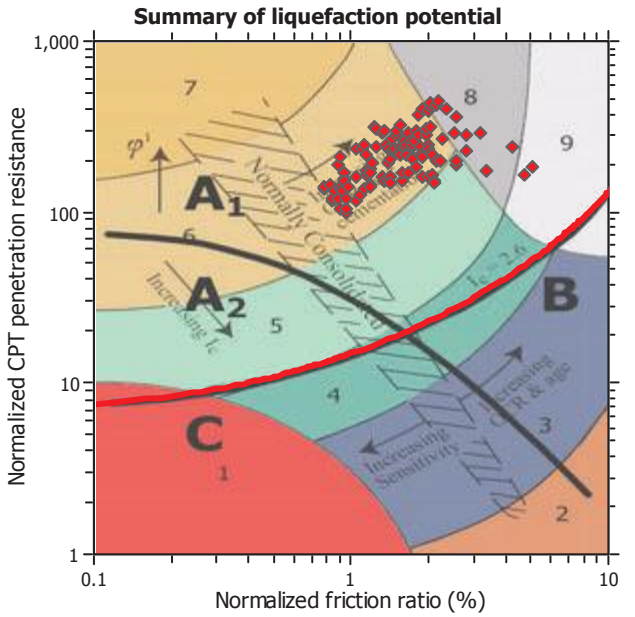
CPT file : CPT-06

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

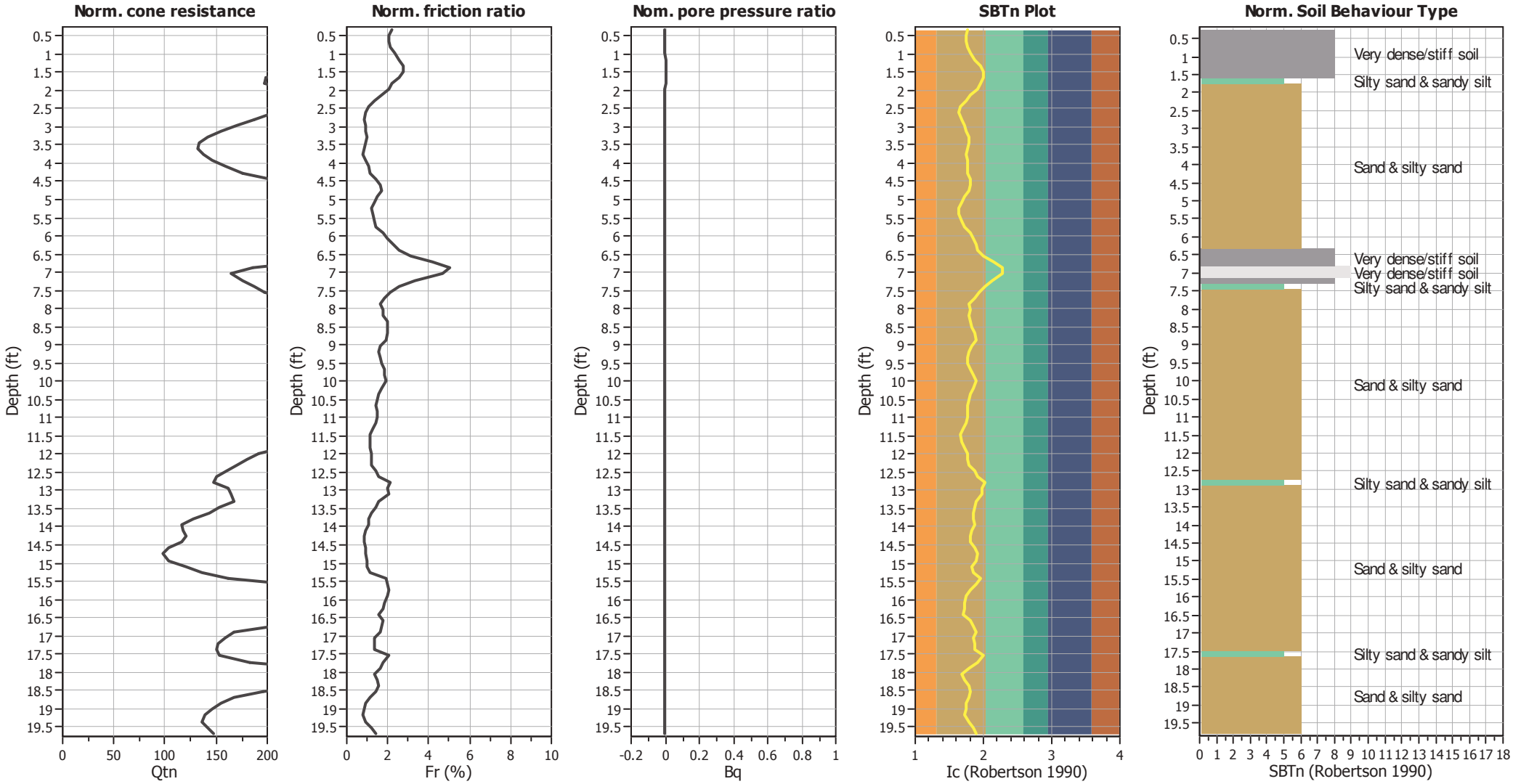






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



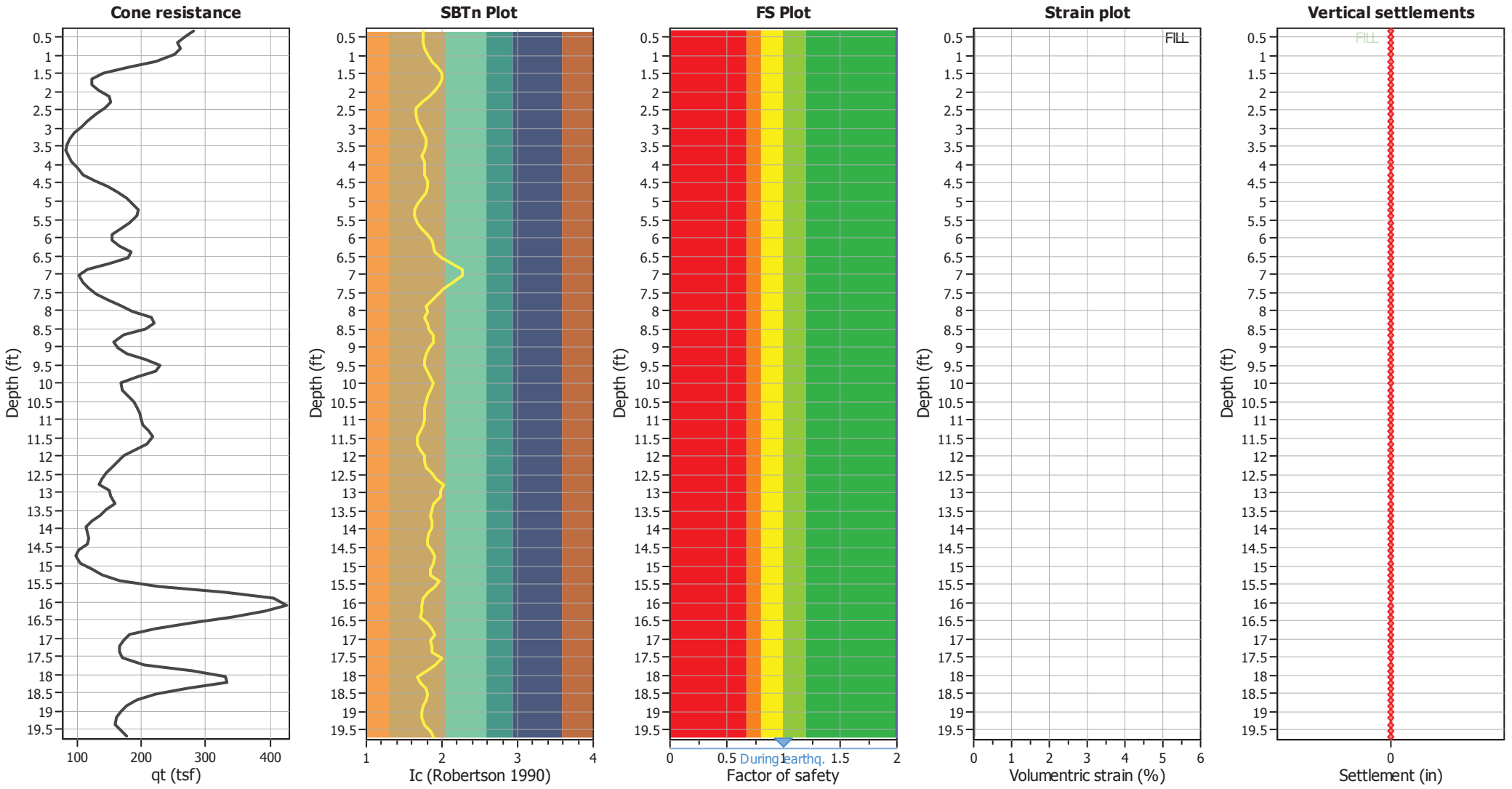
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

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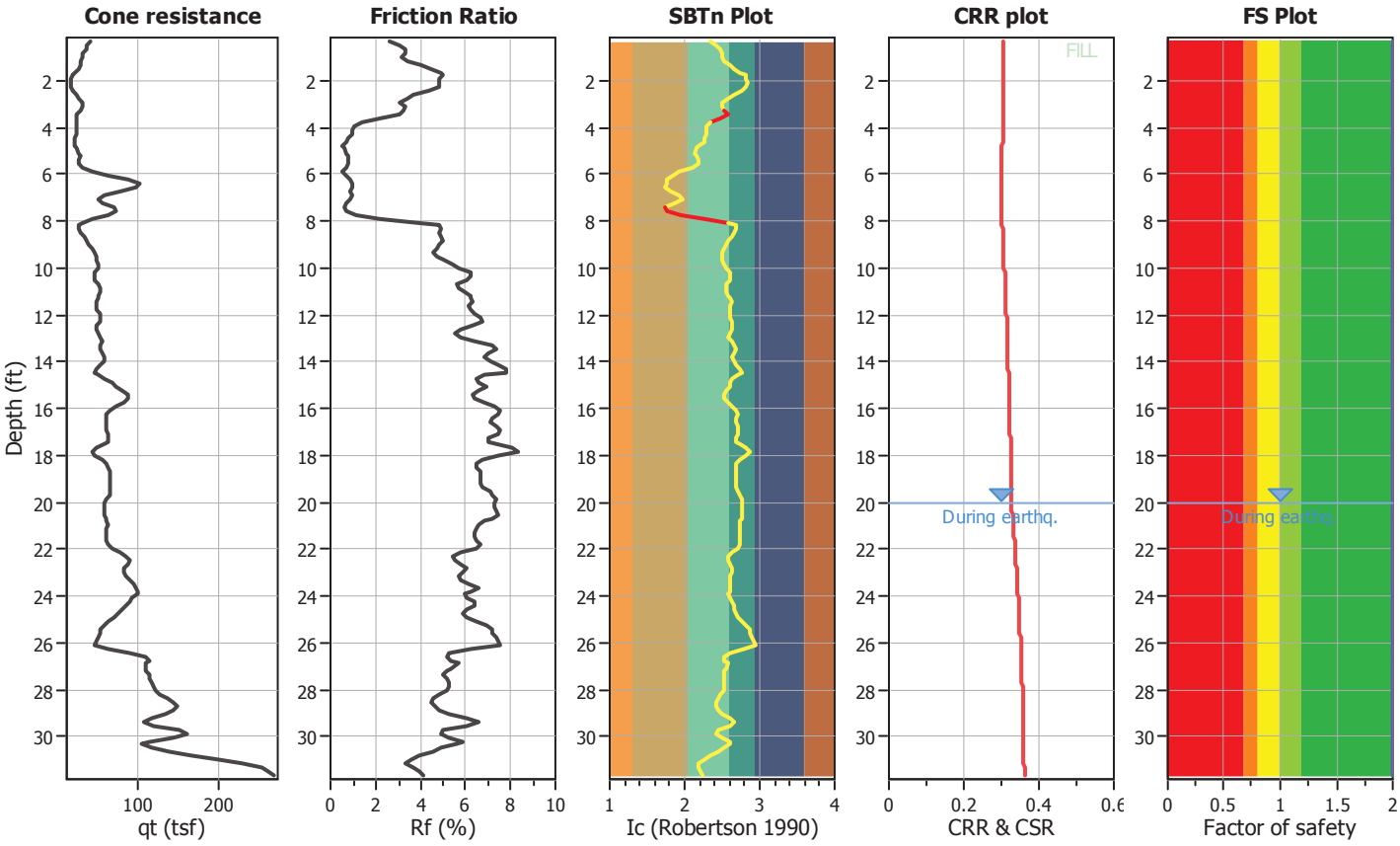
LIQUEFACTION ANALYSIS REPORT

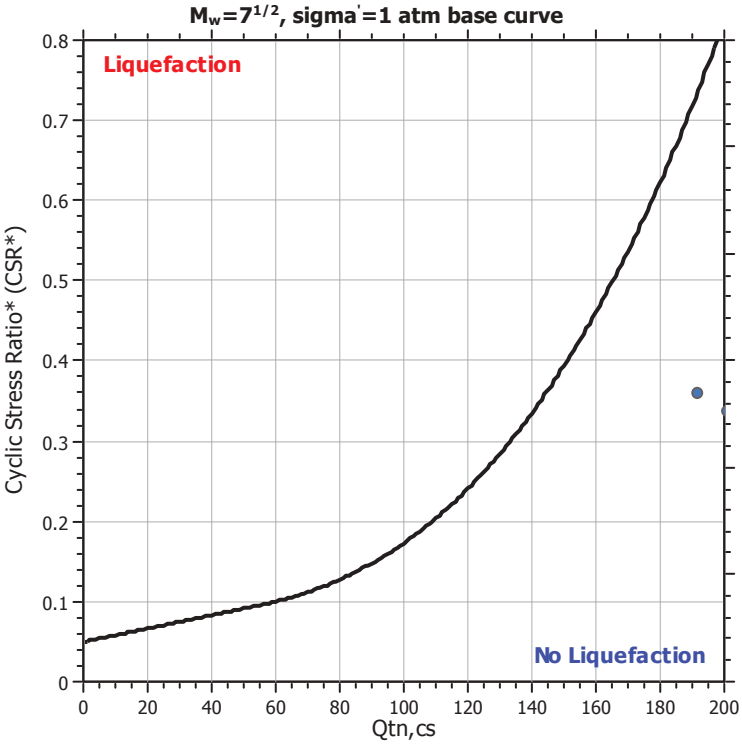
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

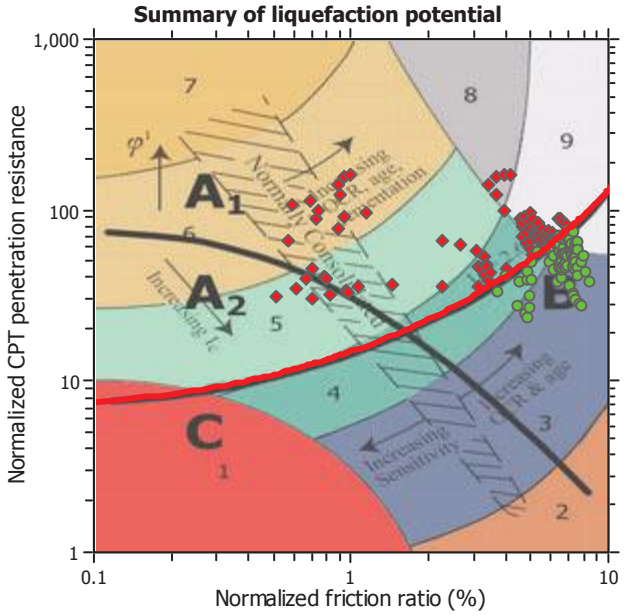
CPT file : CPT-07

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

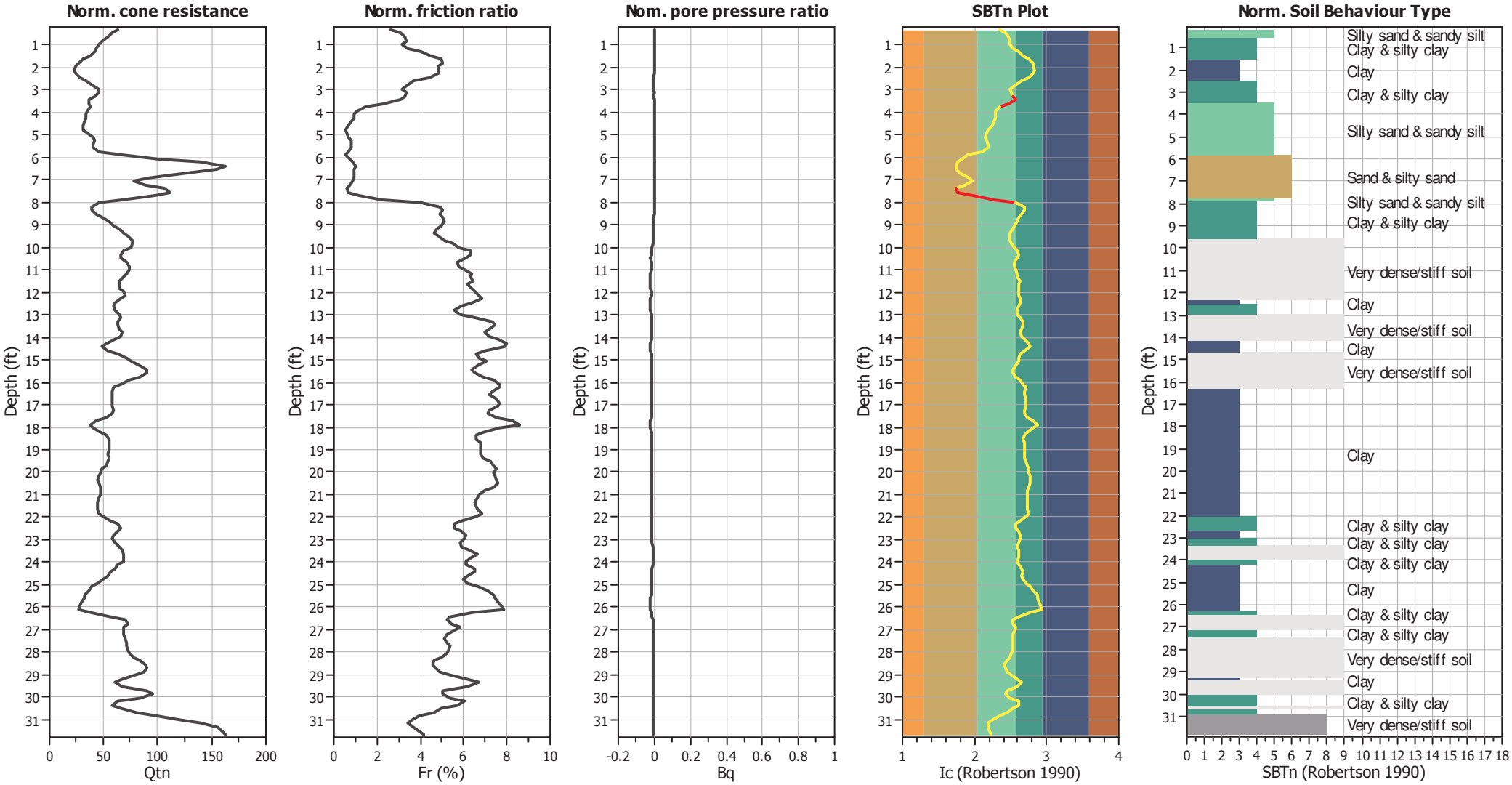






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



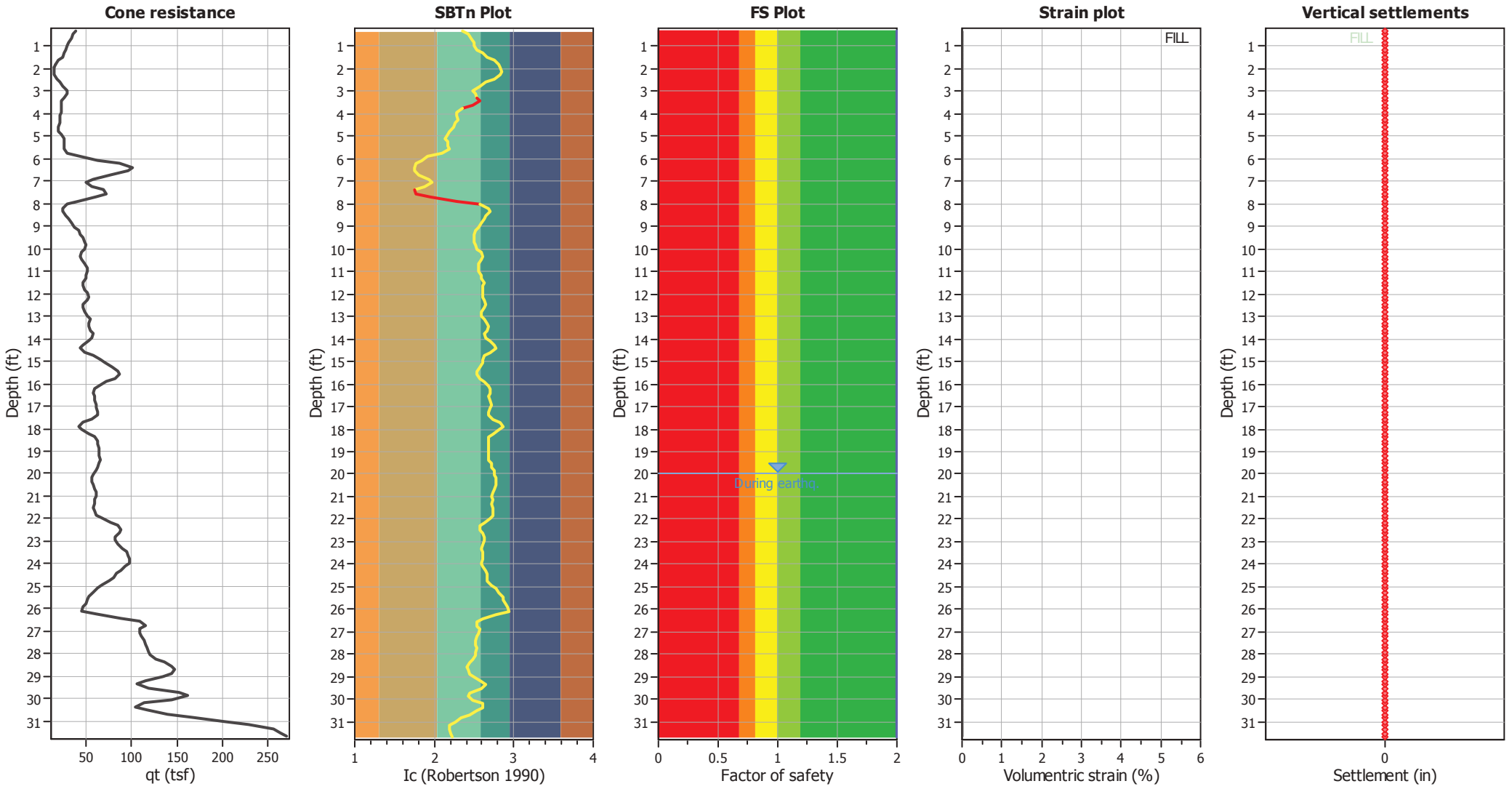
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
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Volumentric strain:	Post-liquefaction volumentric strain

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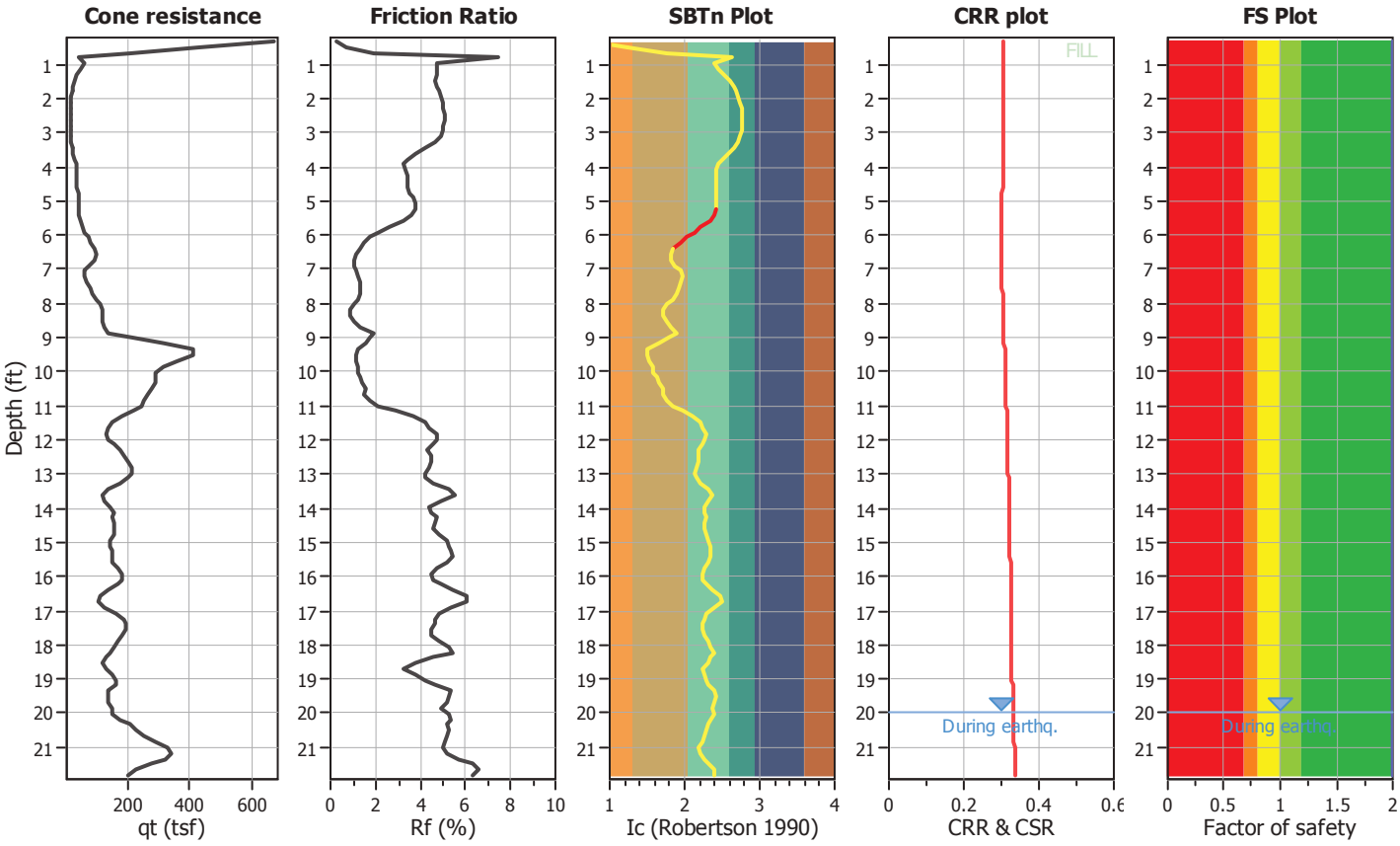
LIQUEFACTION ANALYSIS REPORT

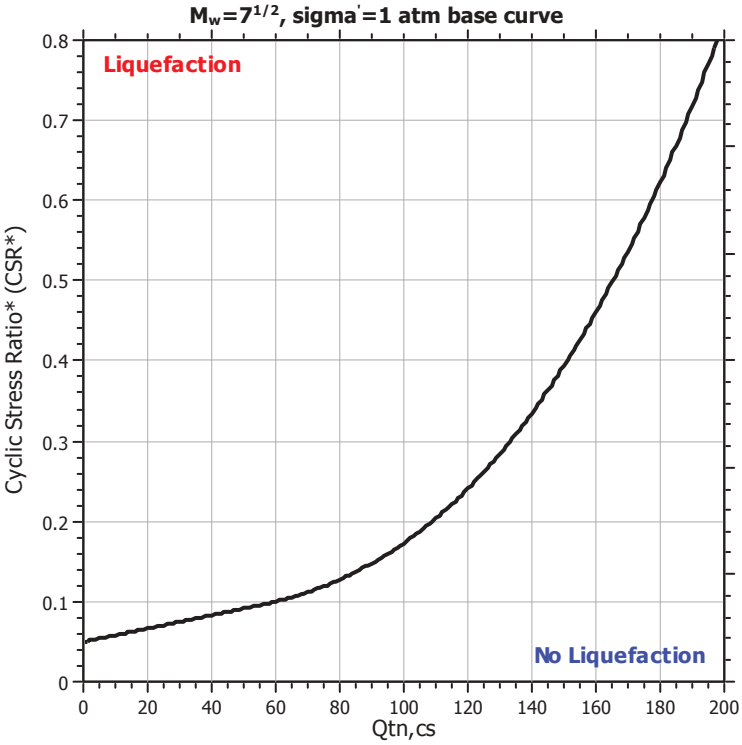
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

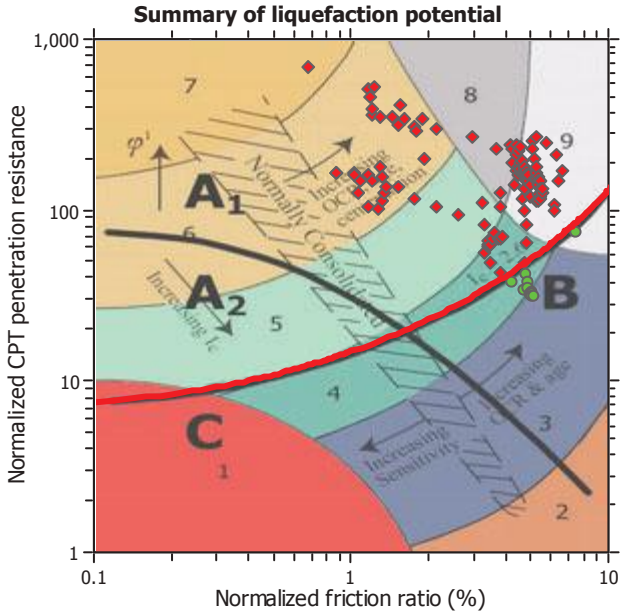
CPT file : CPT-08

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

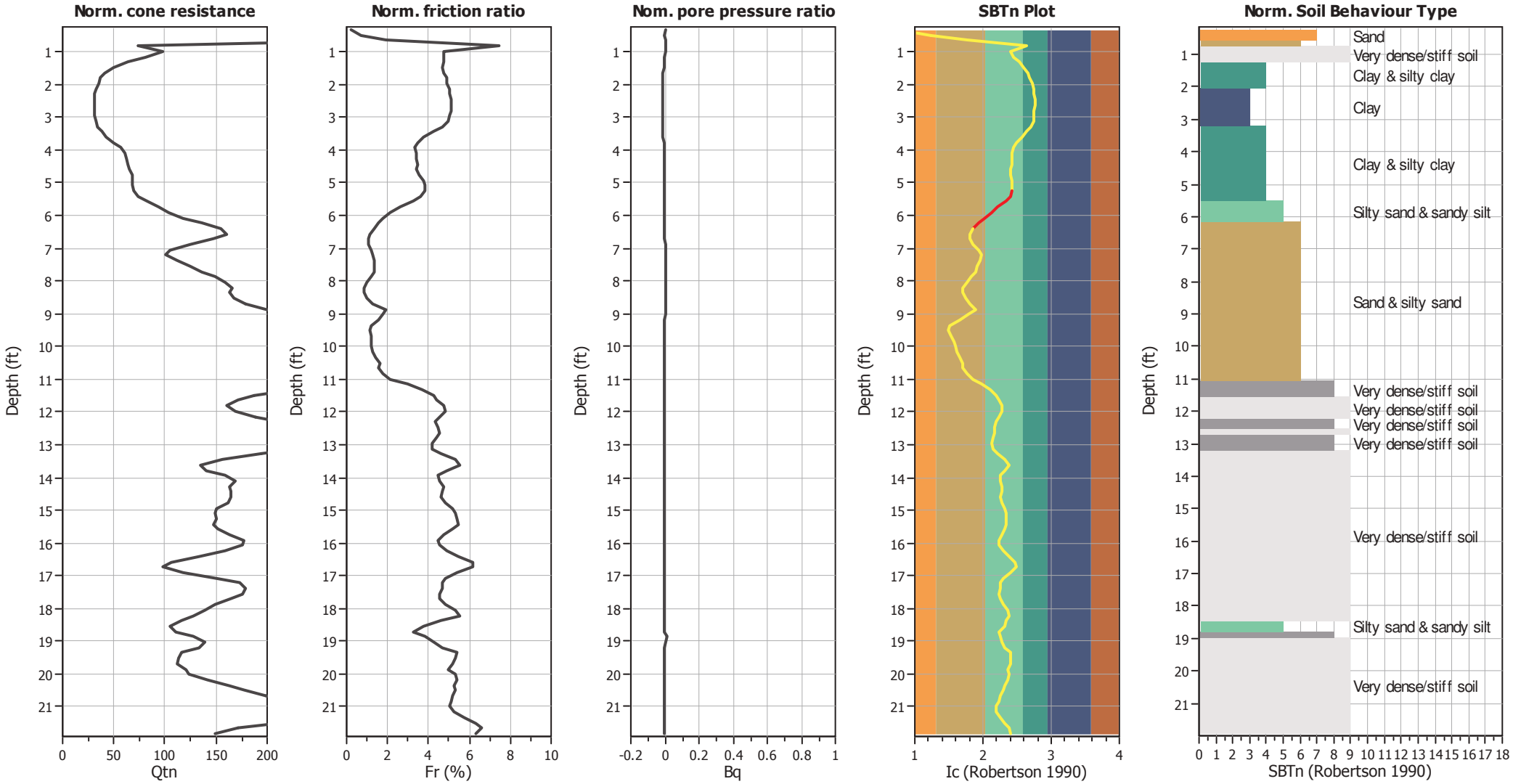






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



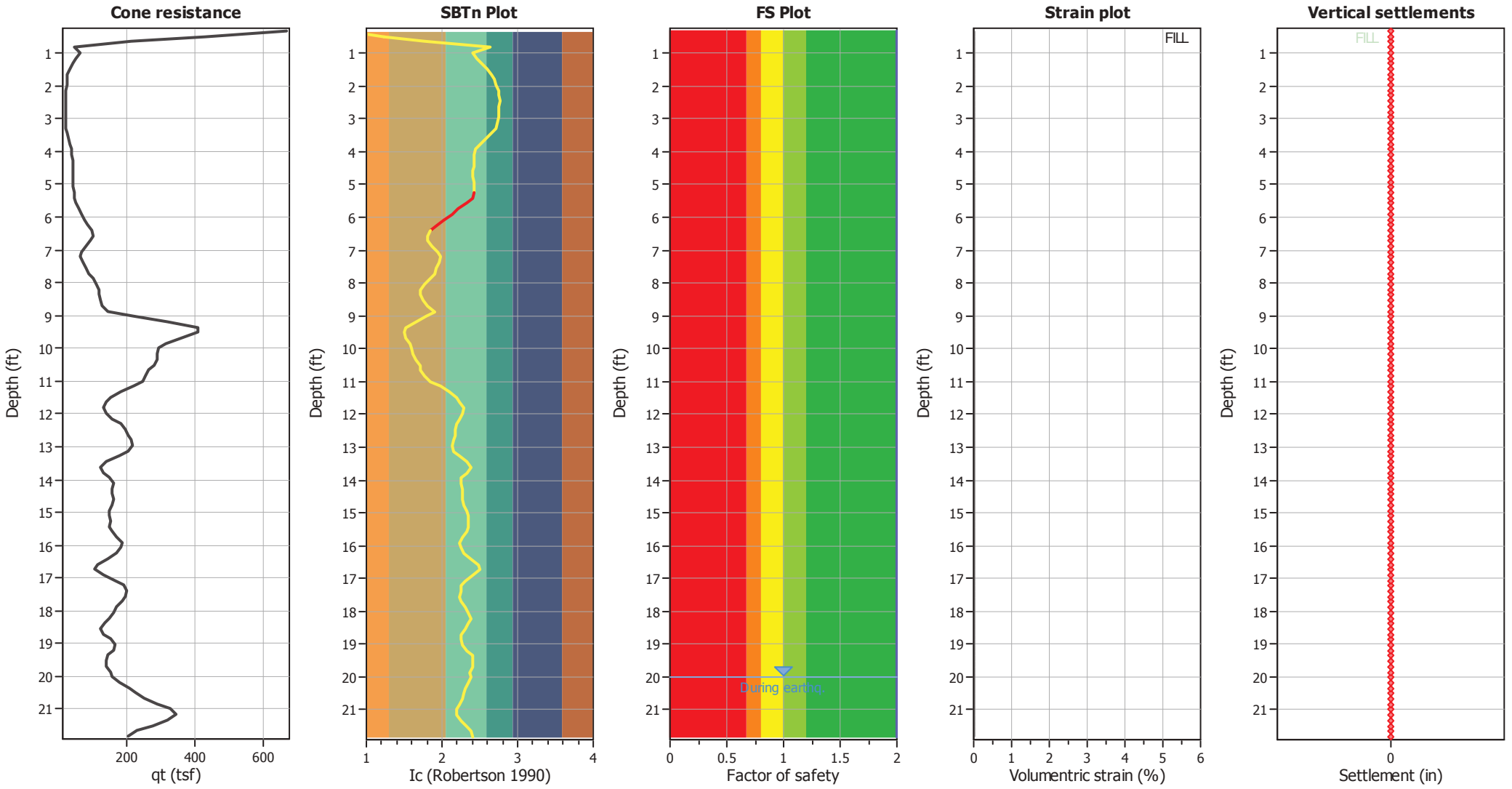
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

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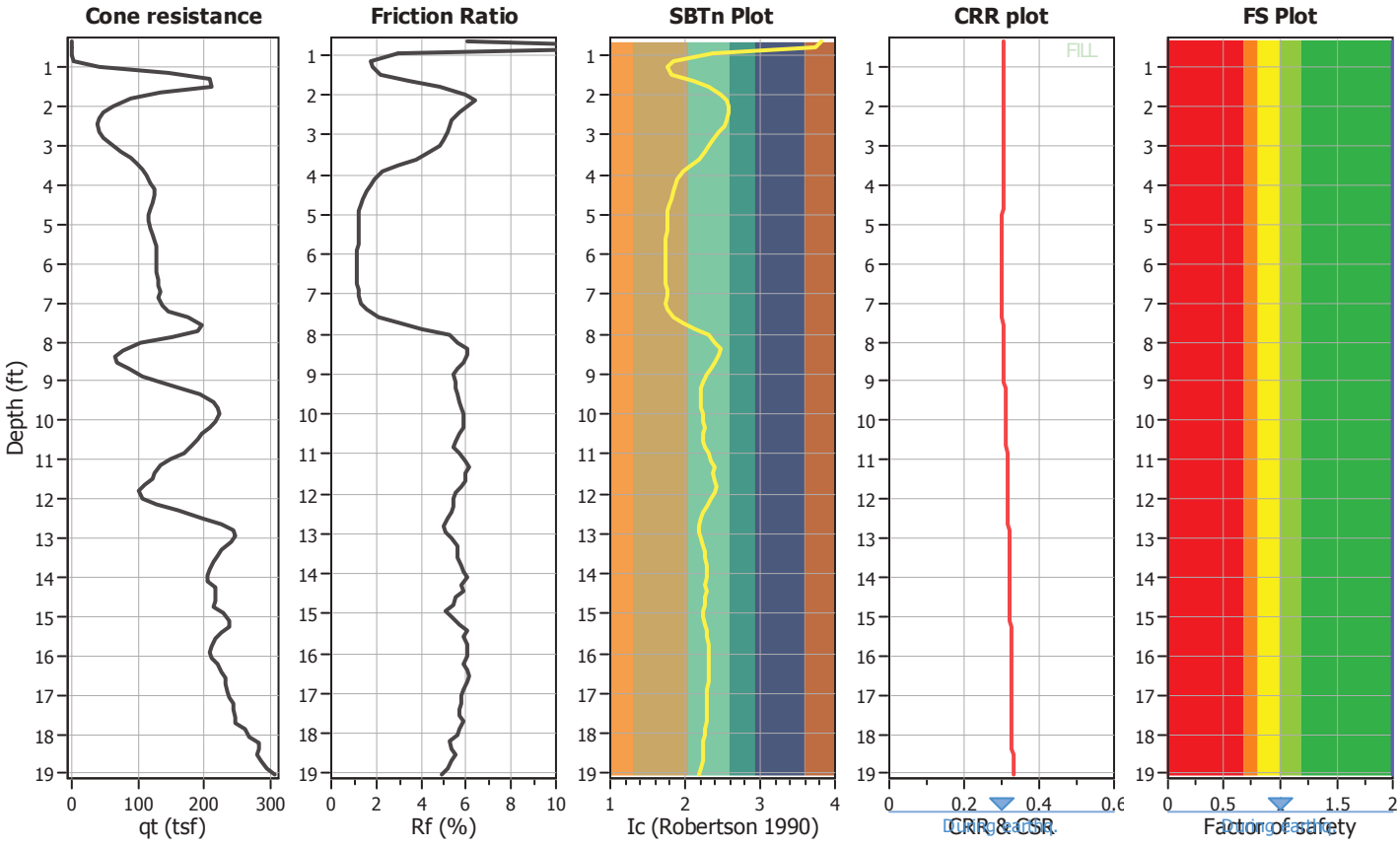
LIQUEFACTION ANALYSIS REPORT

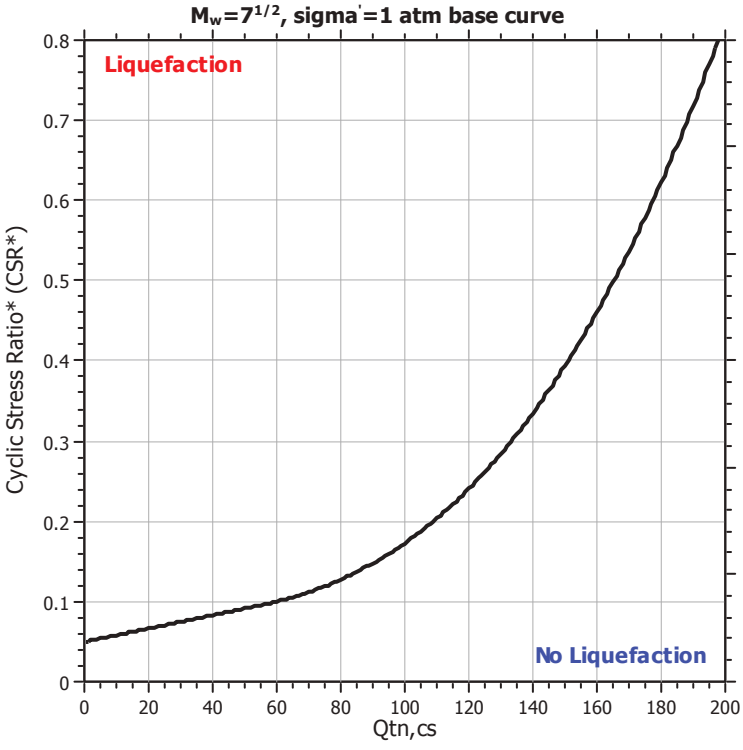
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

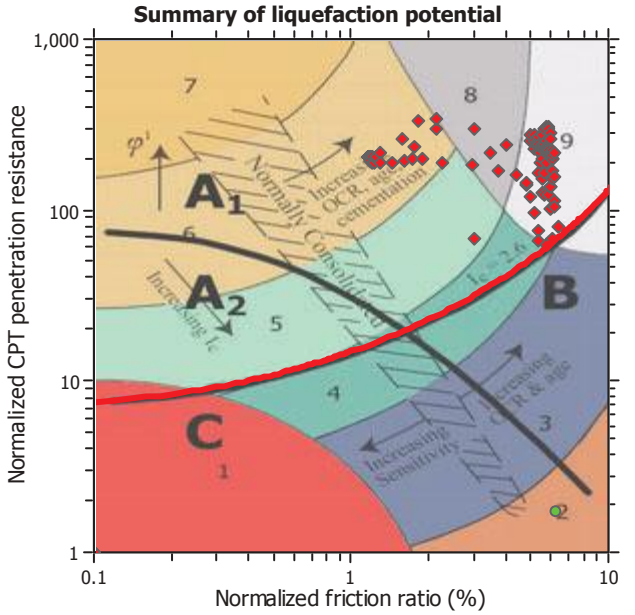
CPT file : CPT-09

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

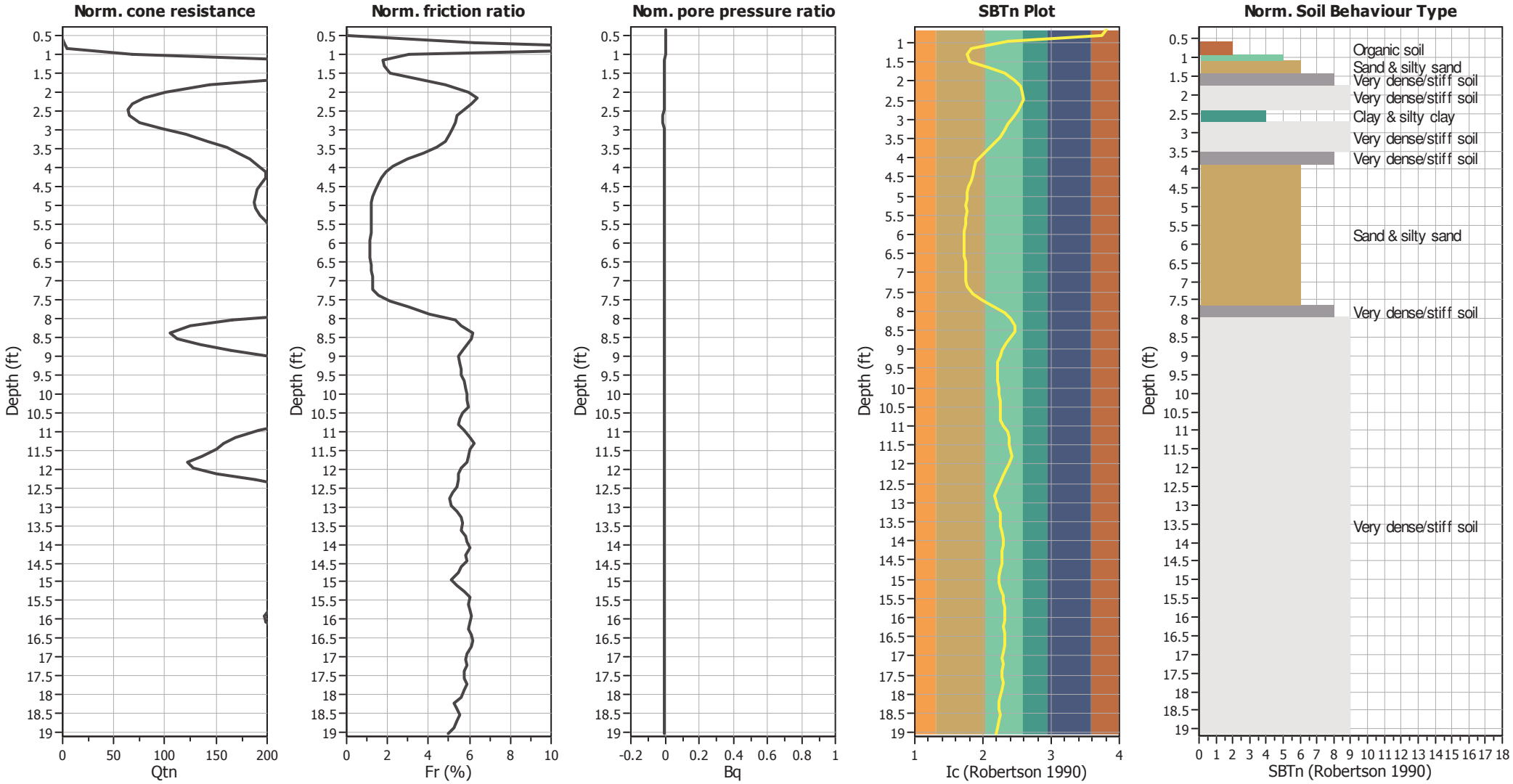






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



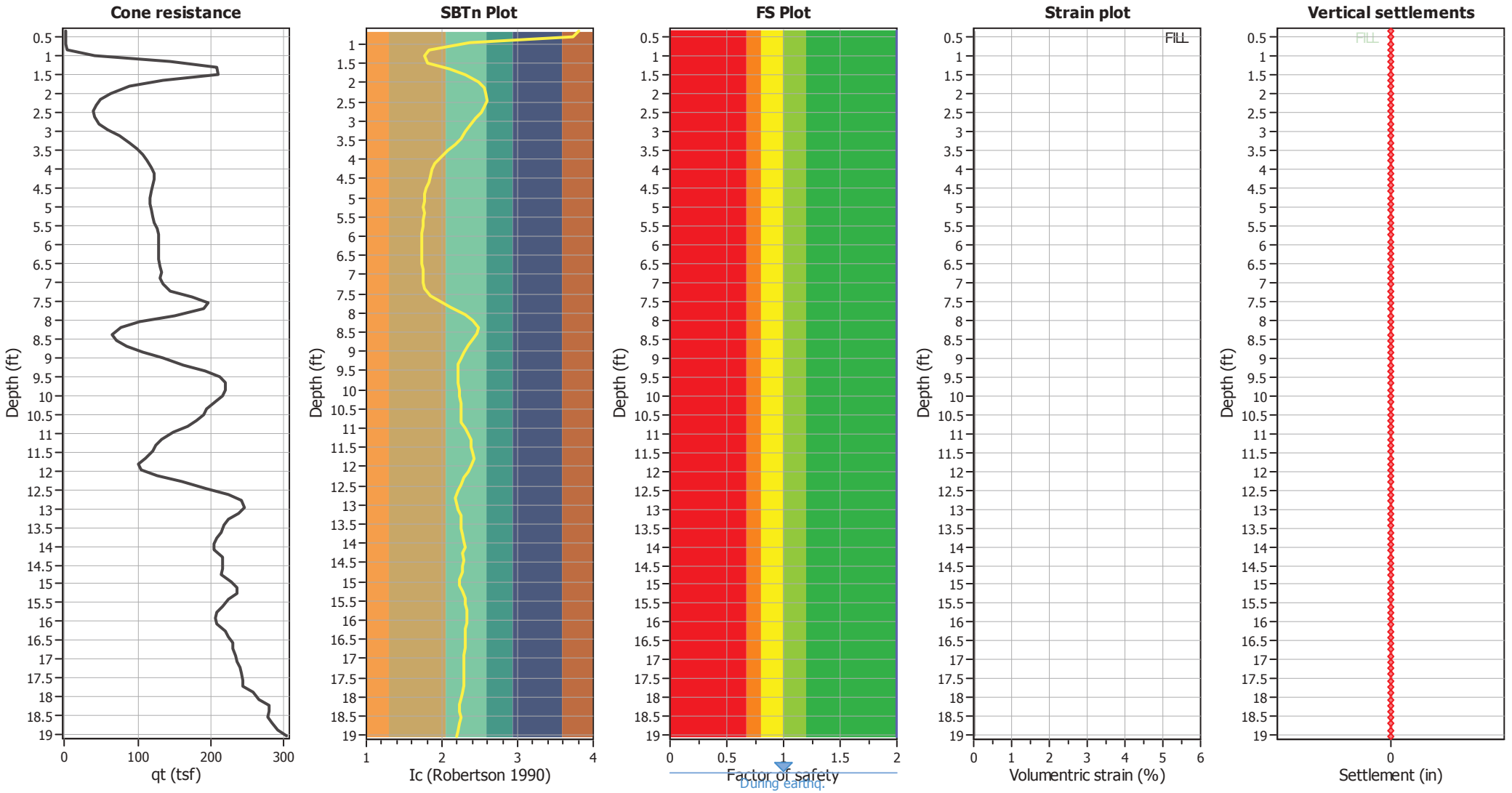
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
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Volumentric strain:	Post-liquefaction volumentric strain

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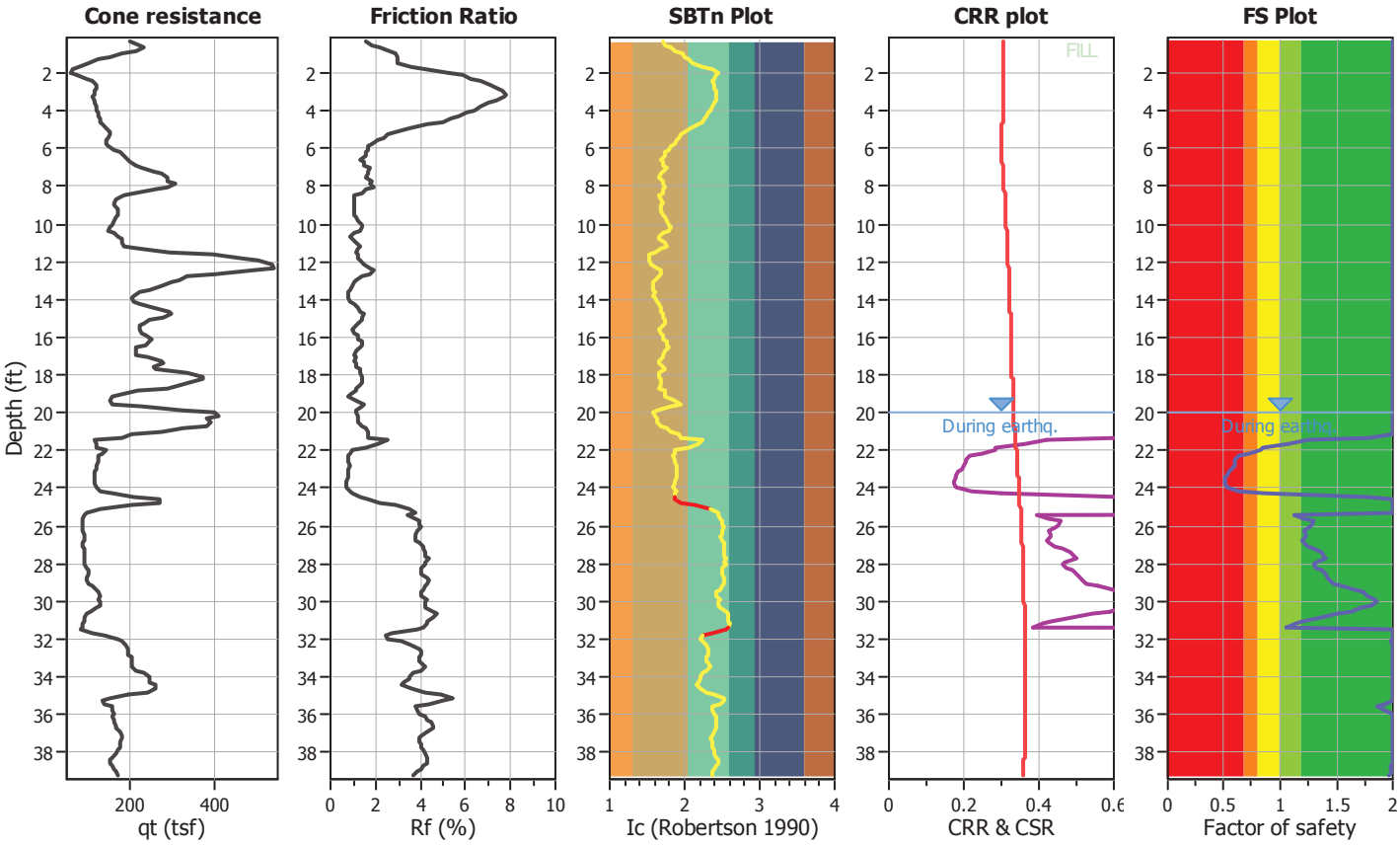
LIQUEFACTION ANALYSIS REPORT

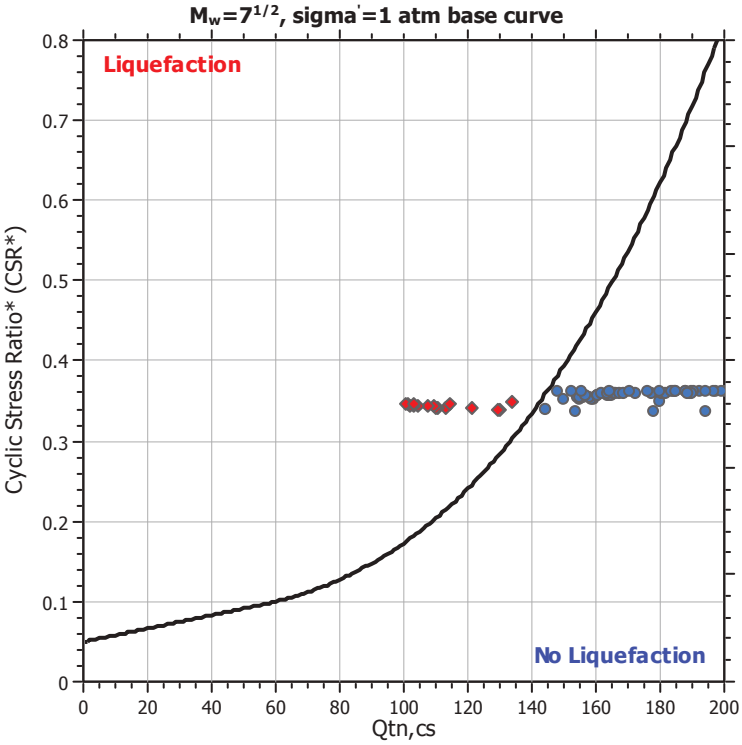
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

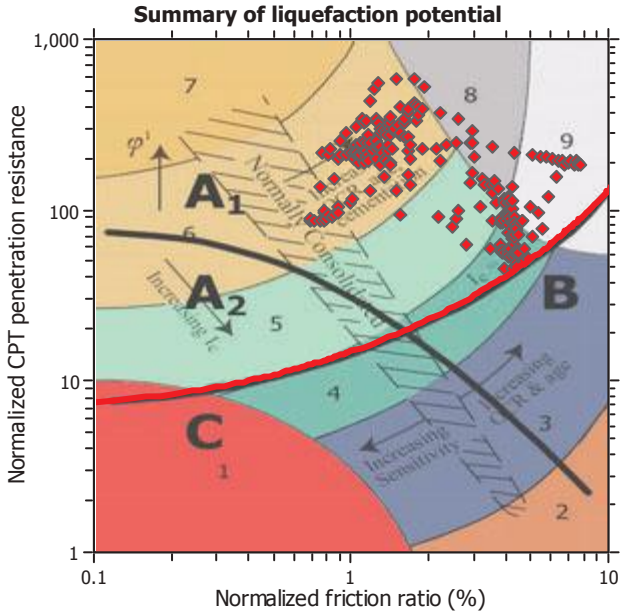
CPT file : CPT-10

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

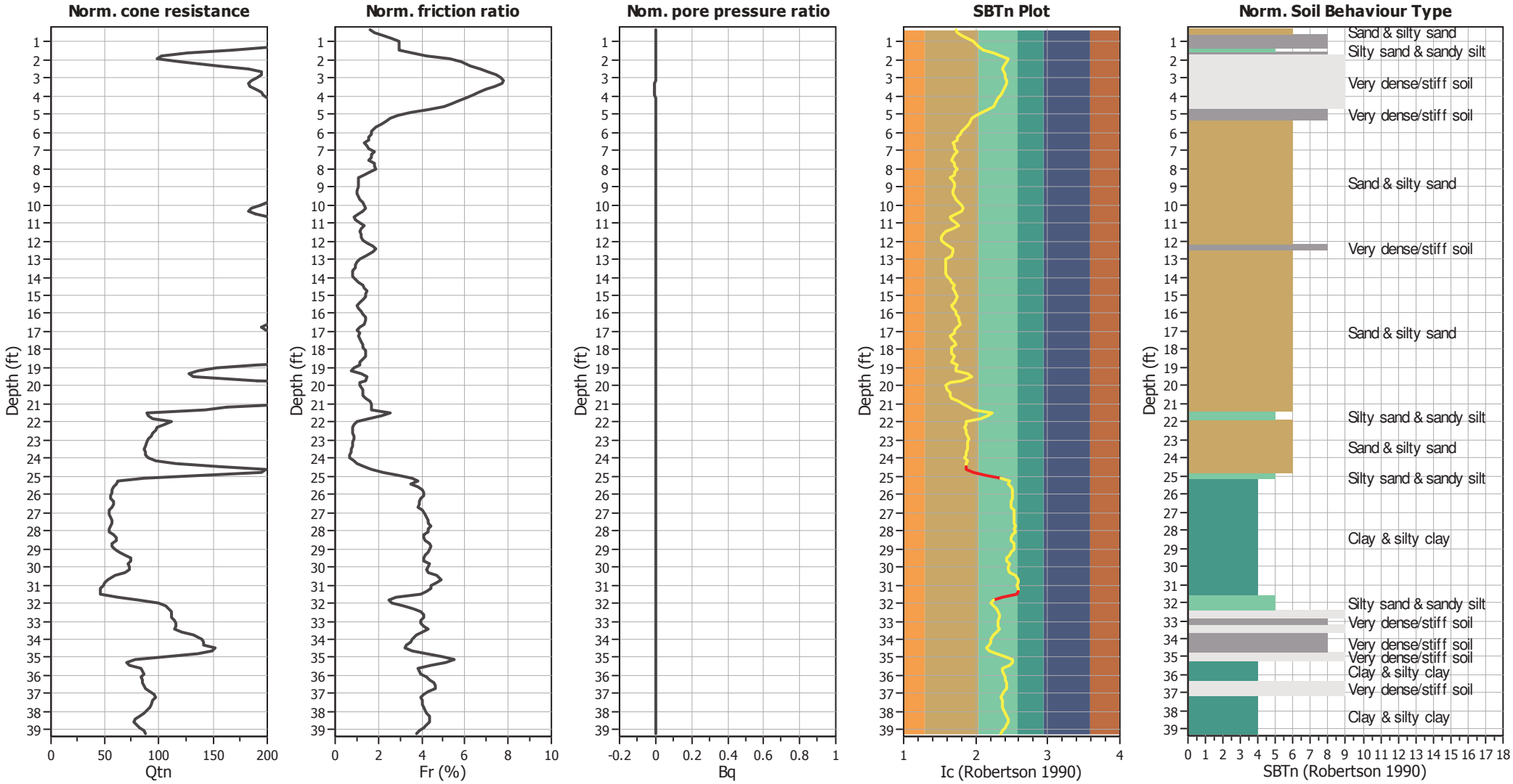






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



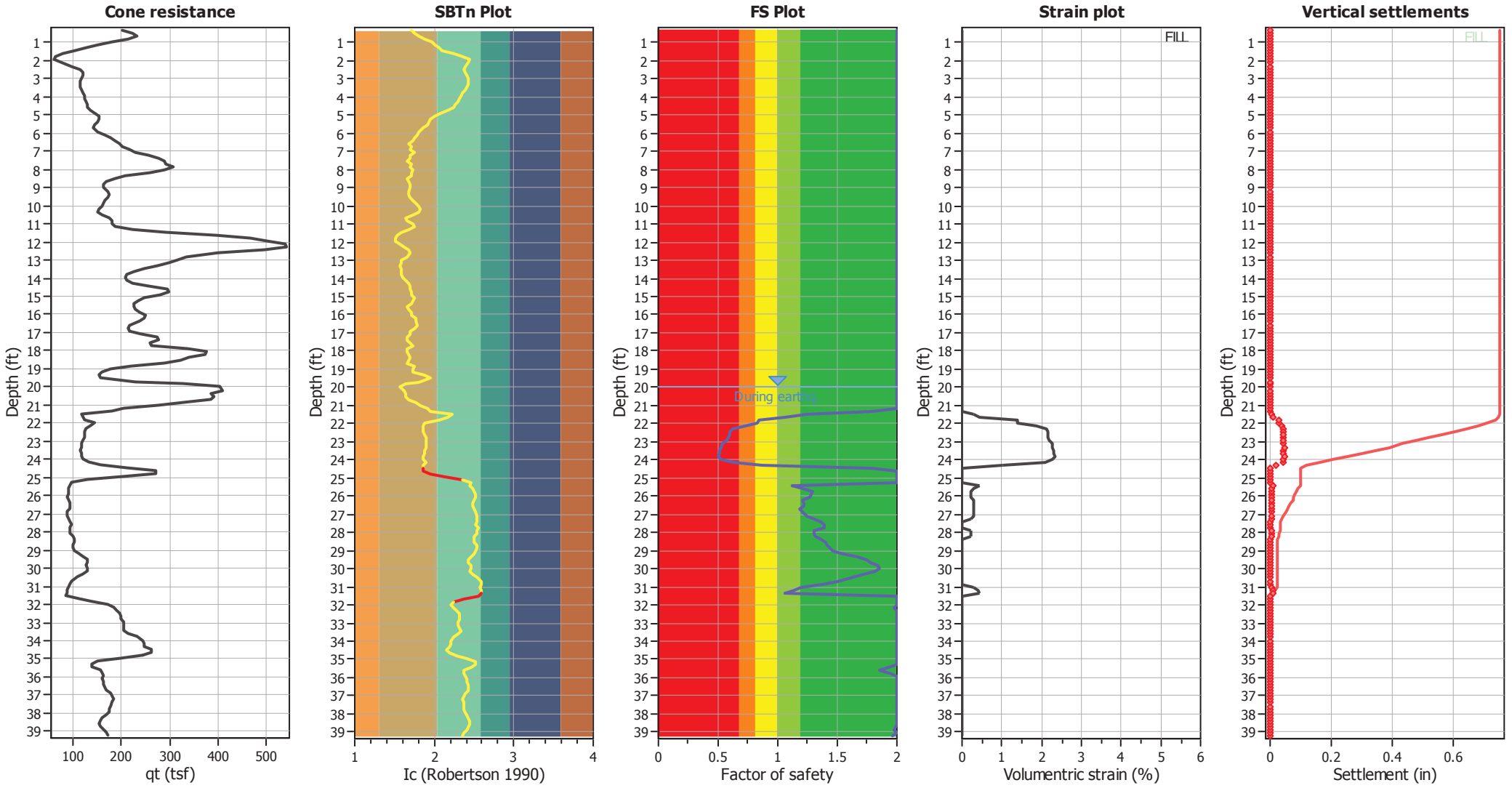
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

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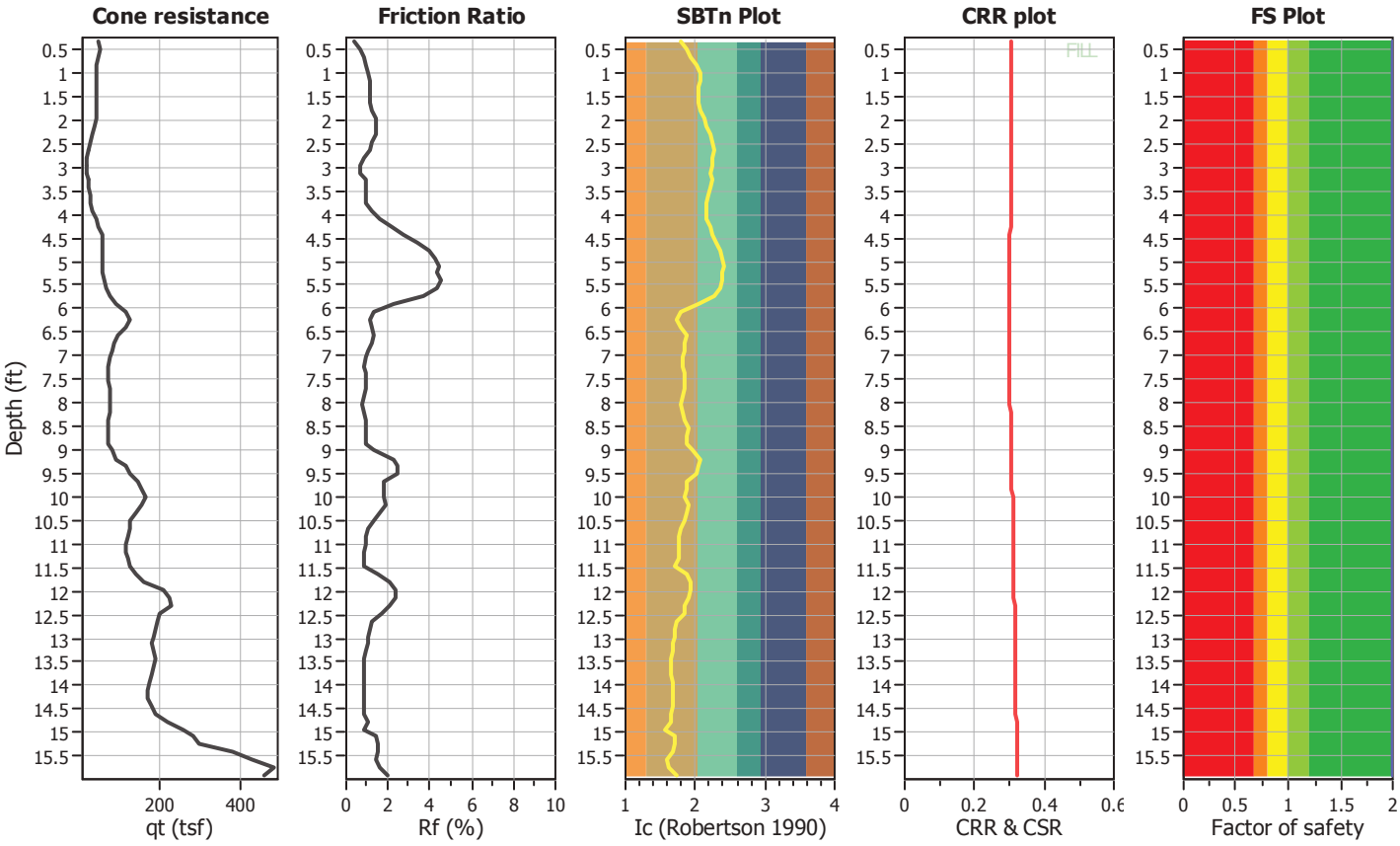
LIQUEFACTION ANALYSIS REPORT

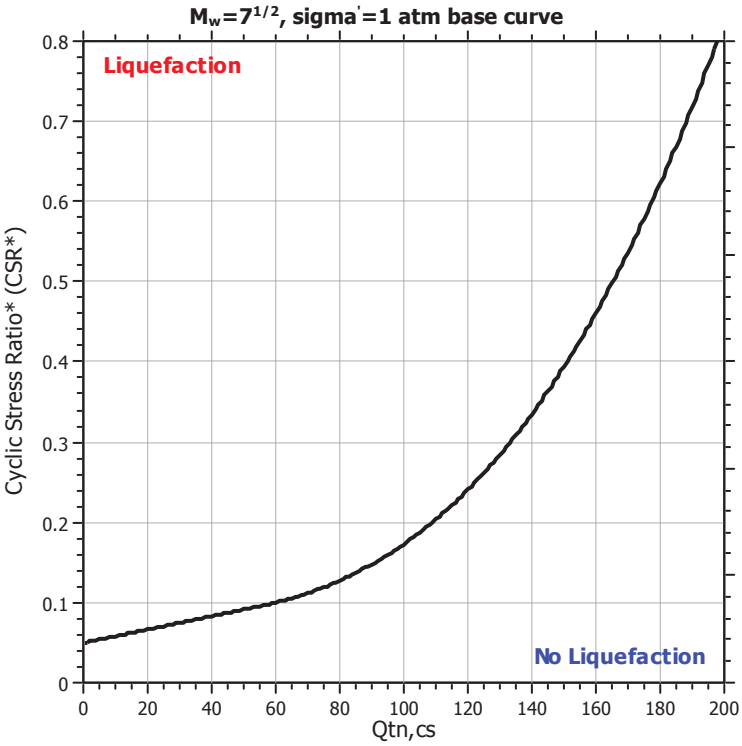
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

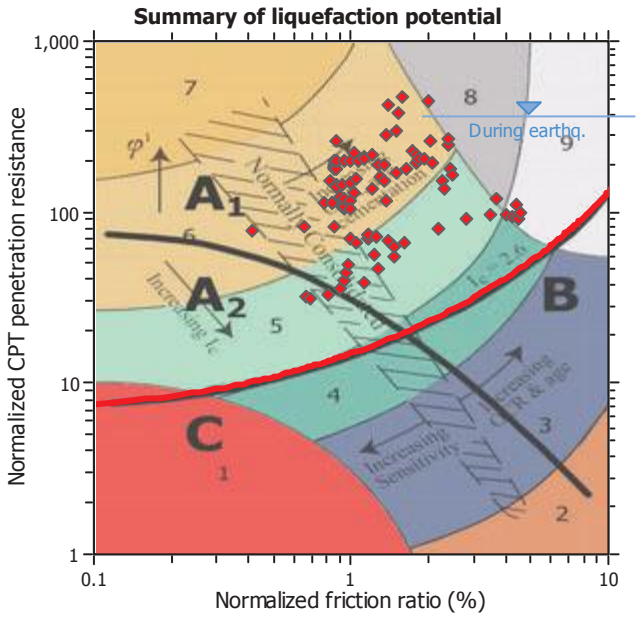
CPT file : CPT-11

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

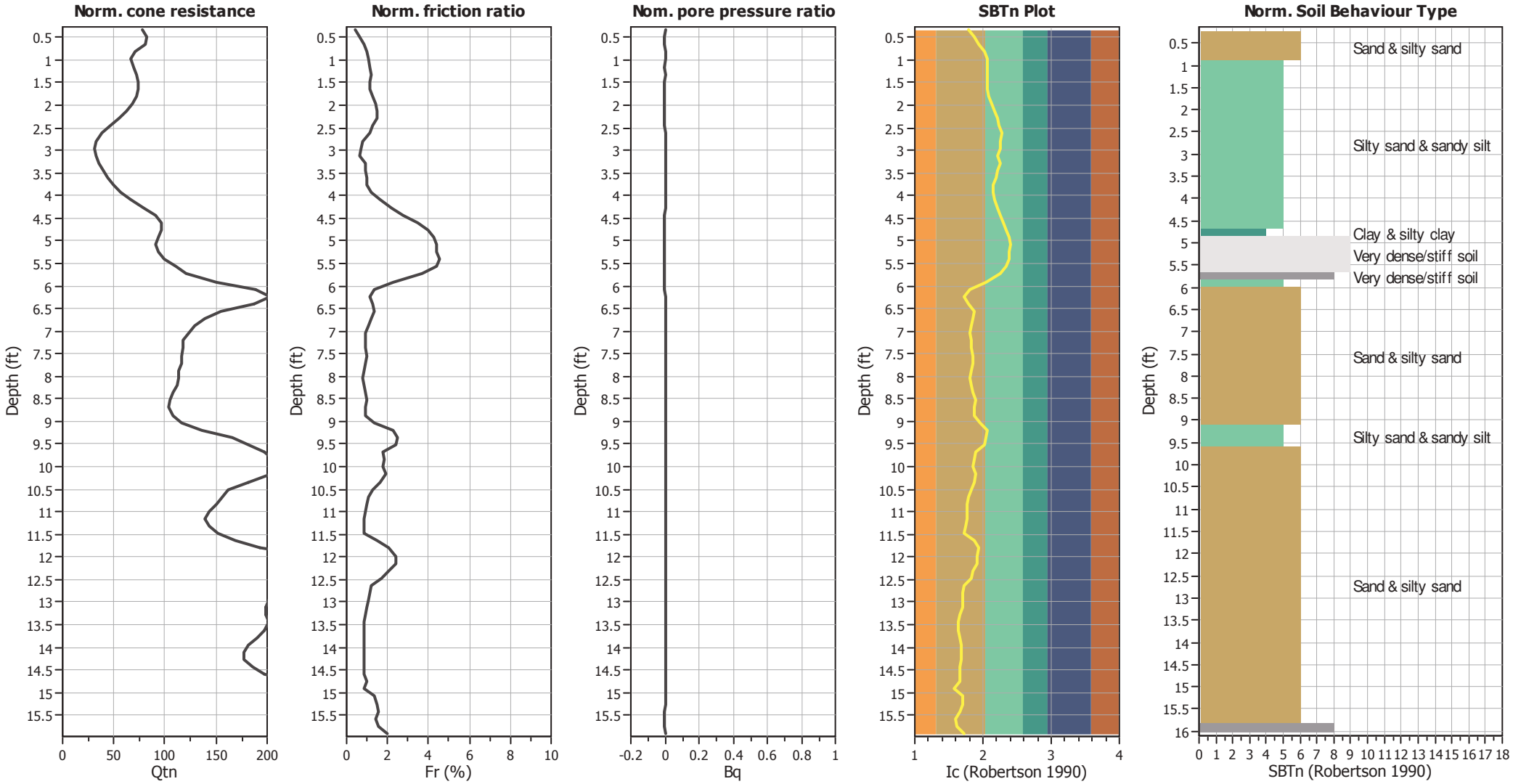






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



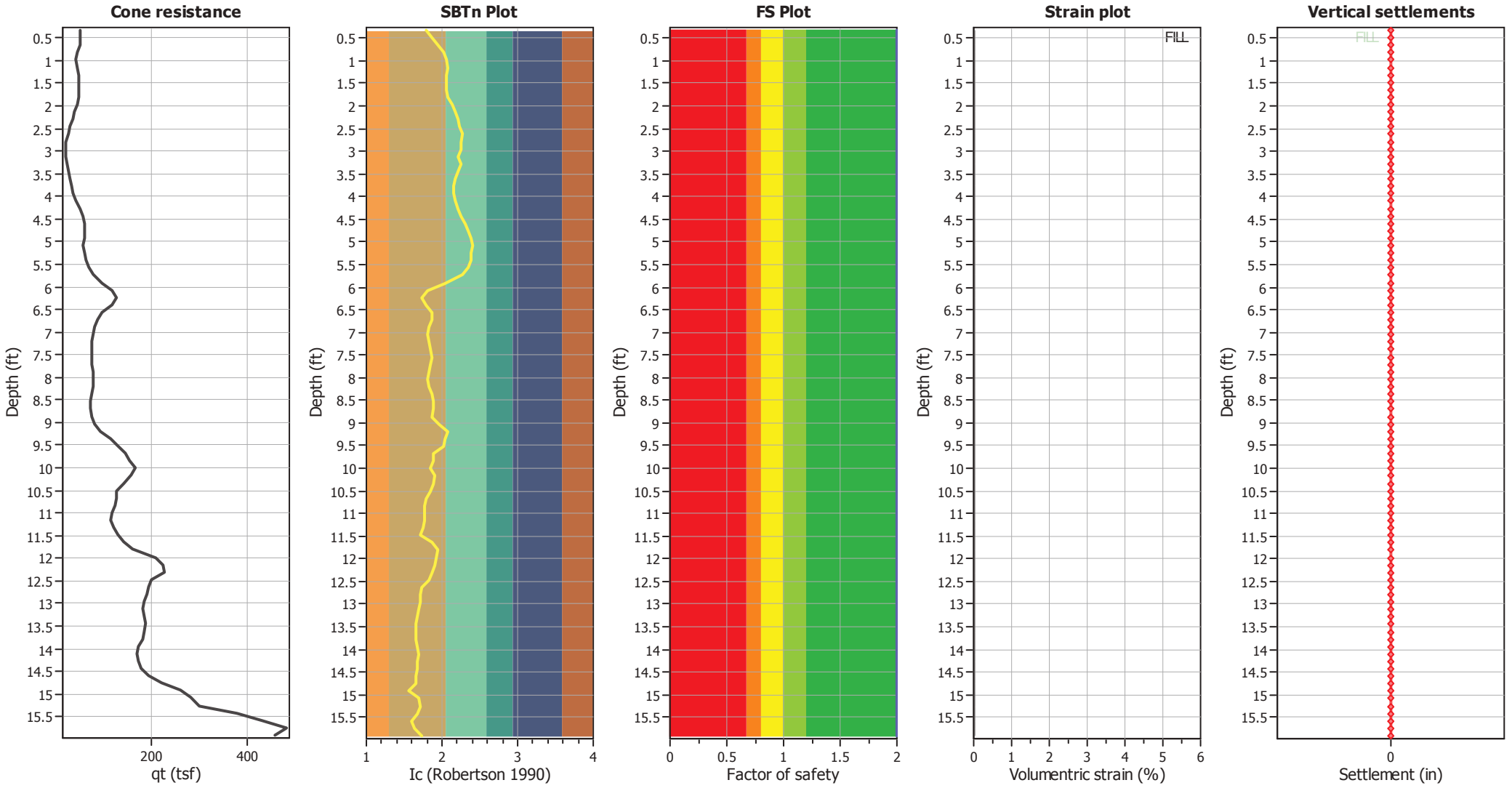
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
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Volumentric strain:	Post-liquefaction volumentric strain

During earthq.

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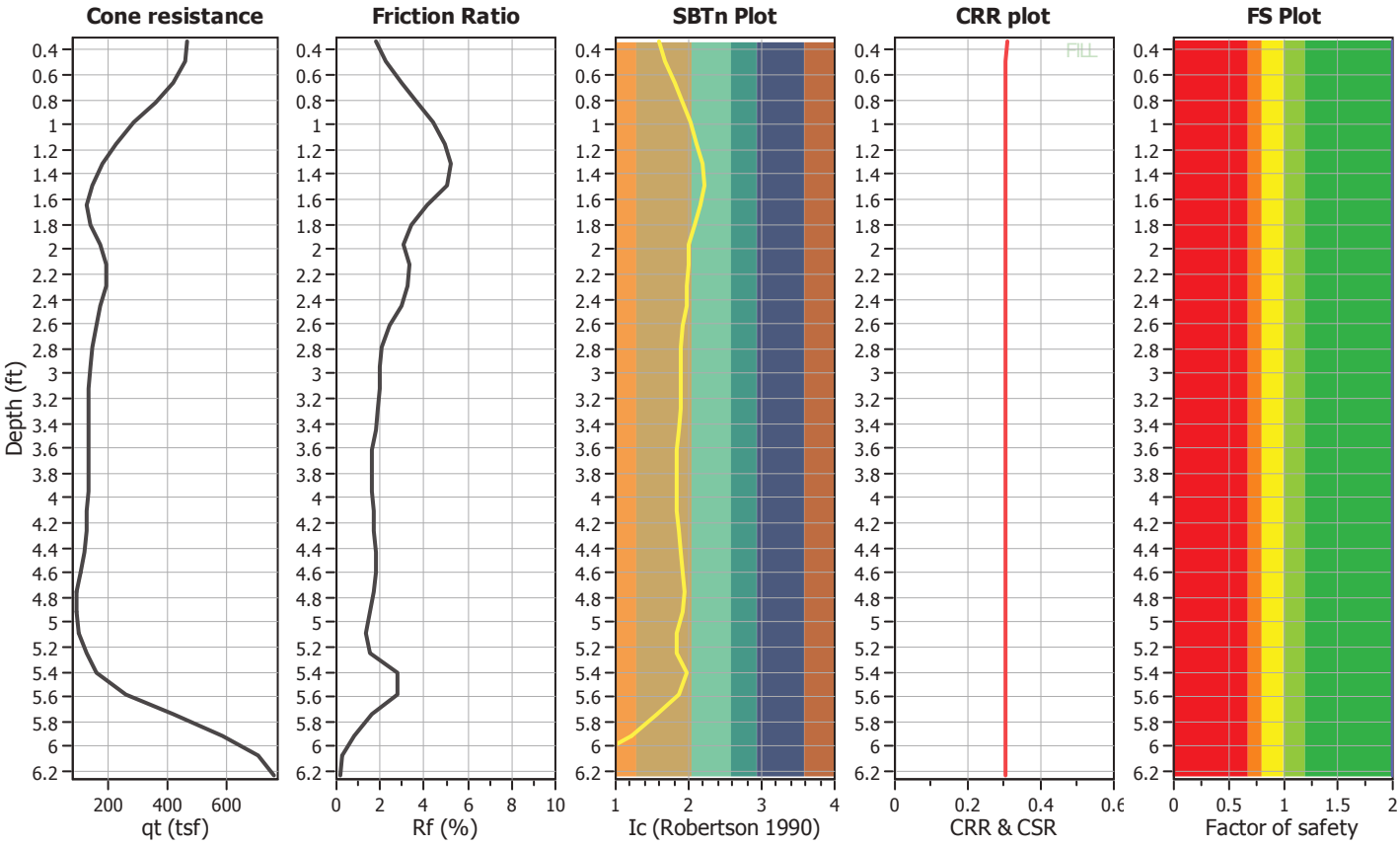
LIQUEFACTION ANALYSIS REPORT

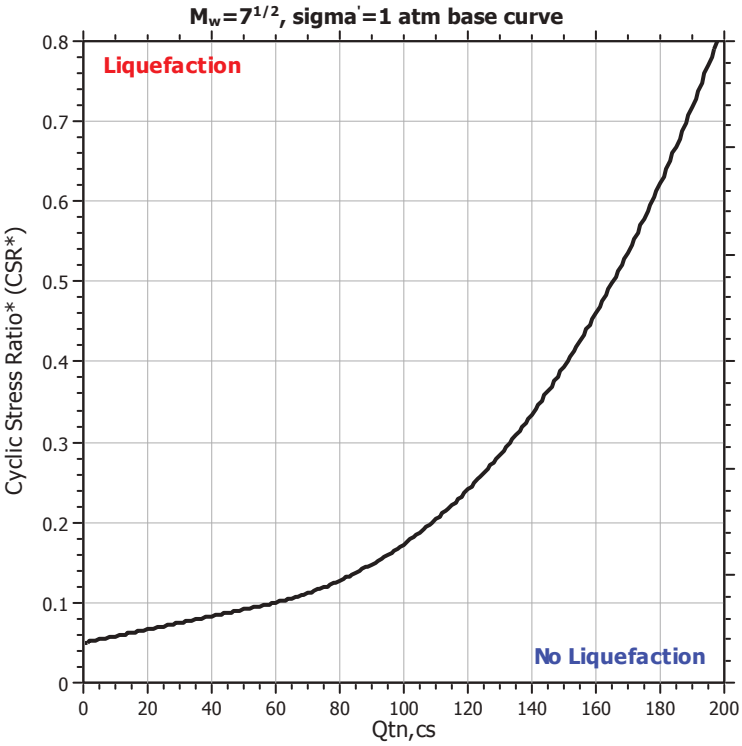
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

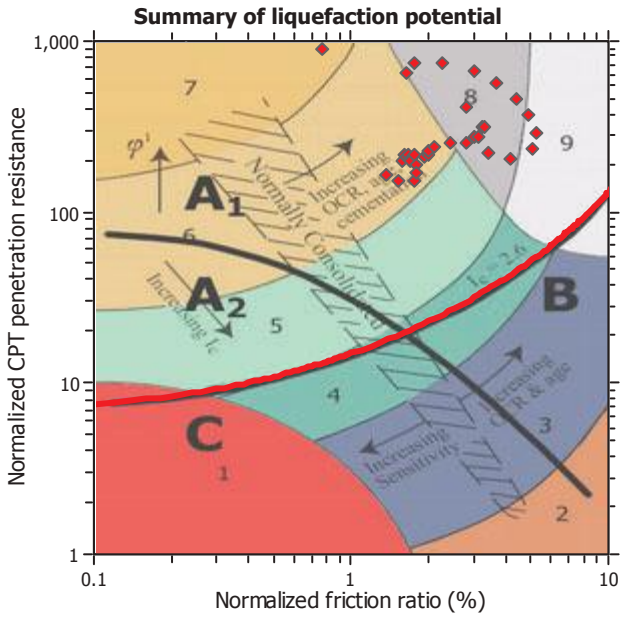
CPT file : CPT-12

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth applied:	No
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

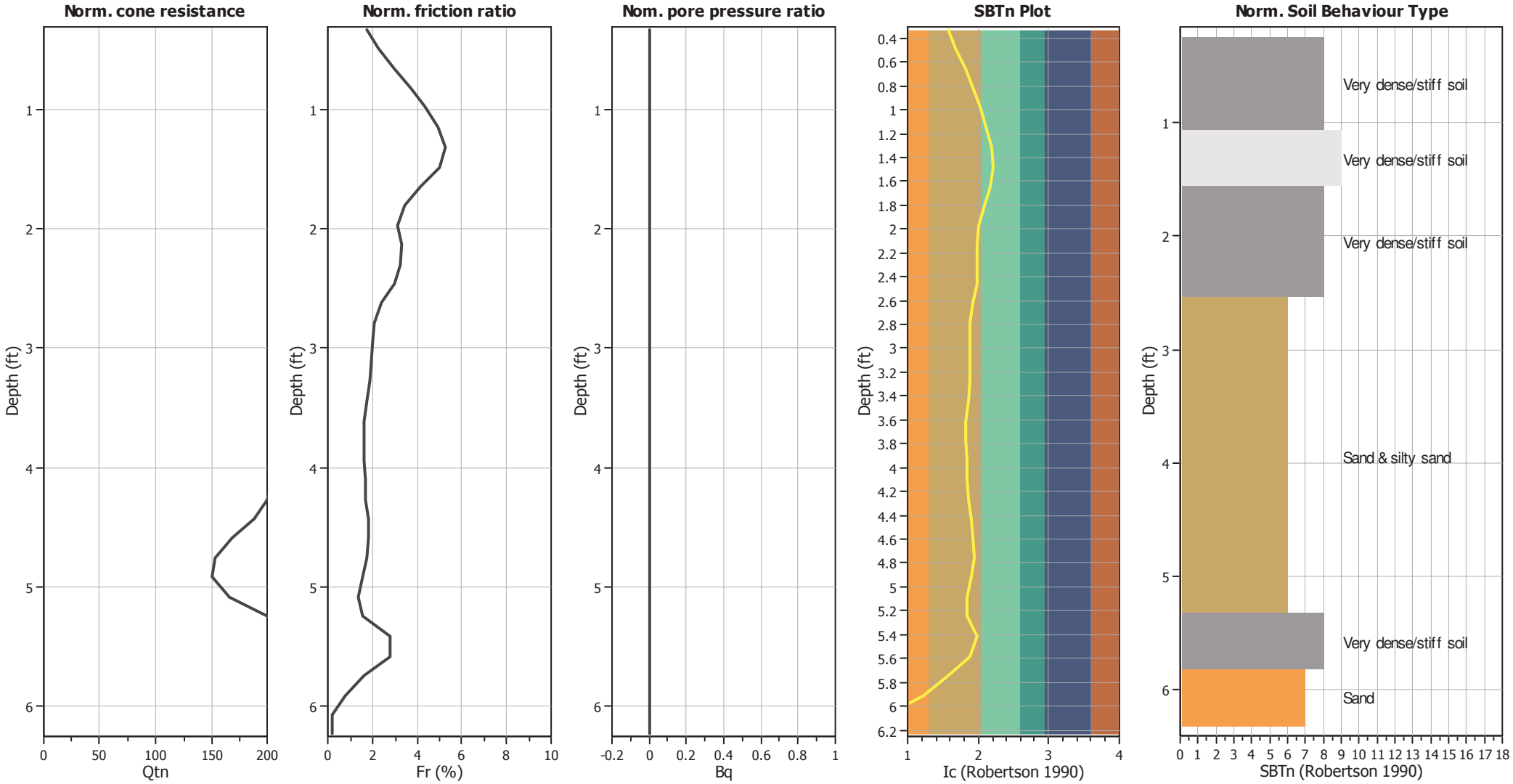






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	30.00 ft	Fill weight:	125.00 lb/ft^3
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.76	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	Yes	Limit depth applied:	No
Depth to water table (insitu):	30.00 ft	Fill height:	10.00 ft	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
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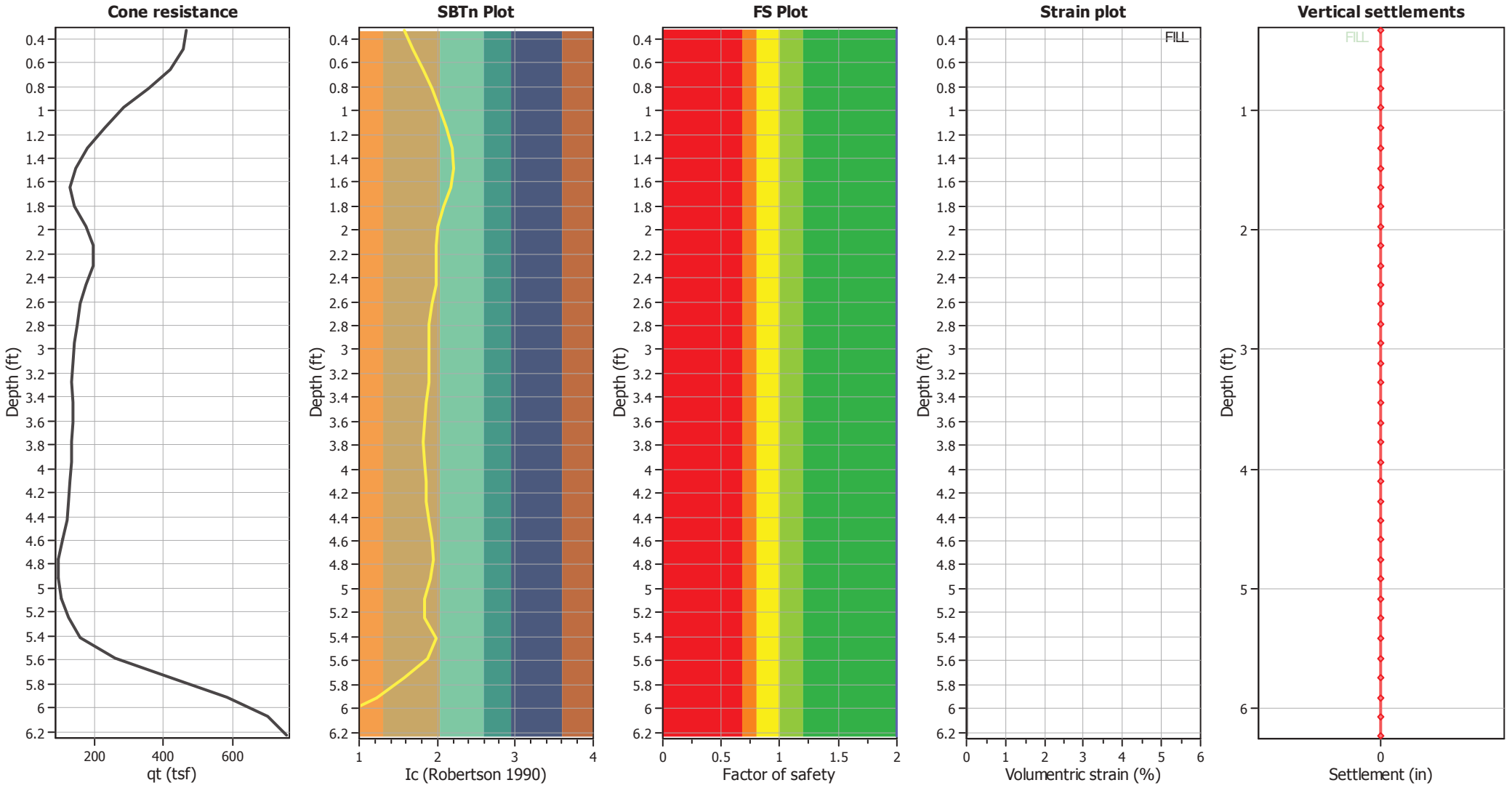
9. Very stiff fine grained

Estimation of post-earthquake settlements



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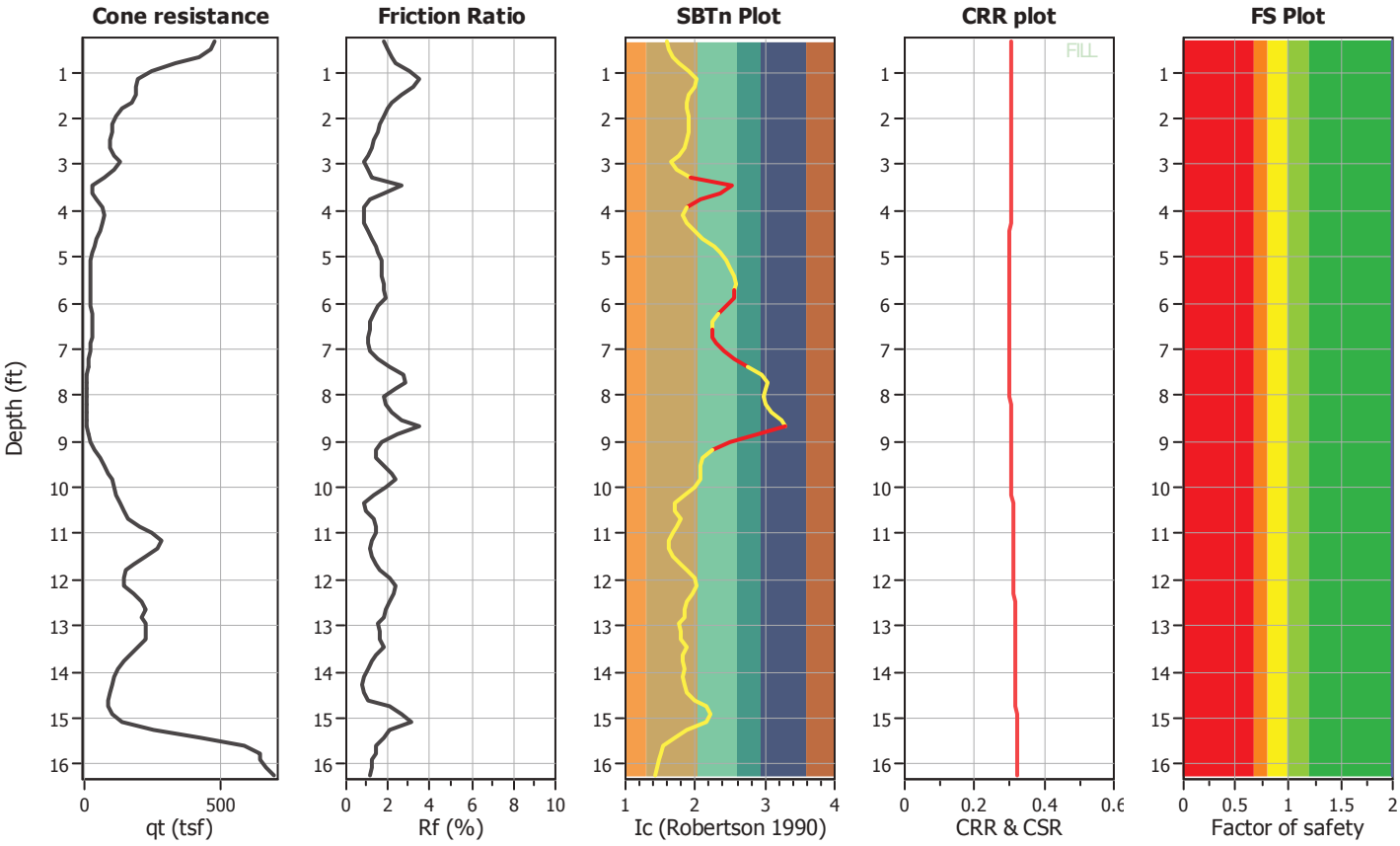
LIQUEFACTION ANALYSIS REPORT

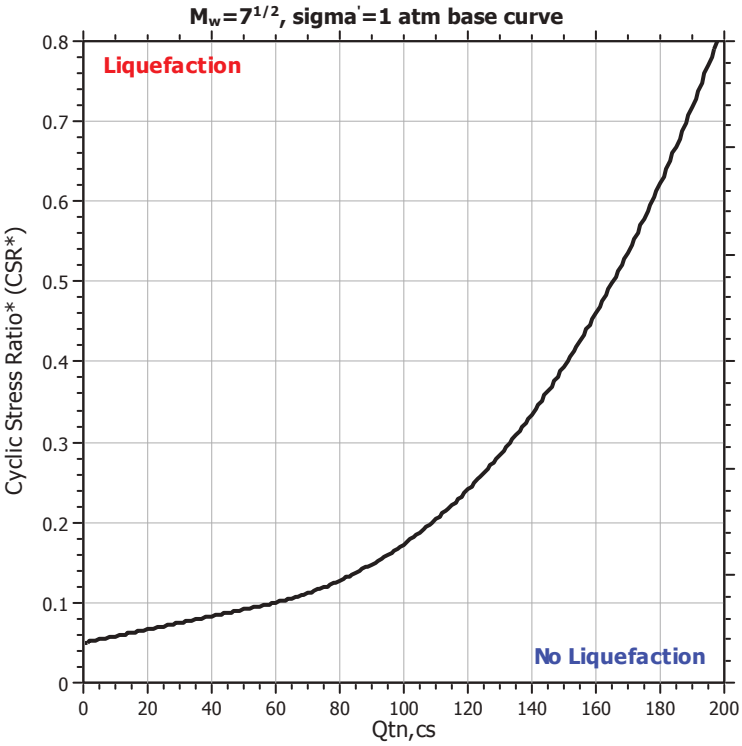
Project title : North River Farms **Location : Geocon Project No. G1753-32-02**

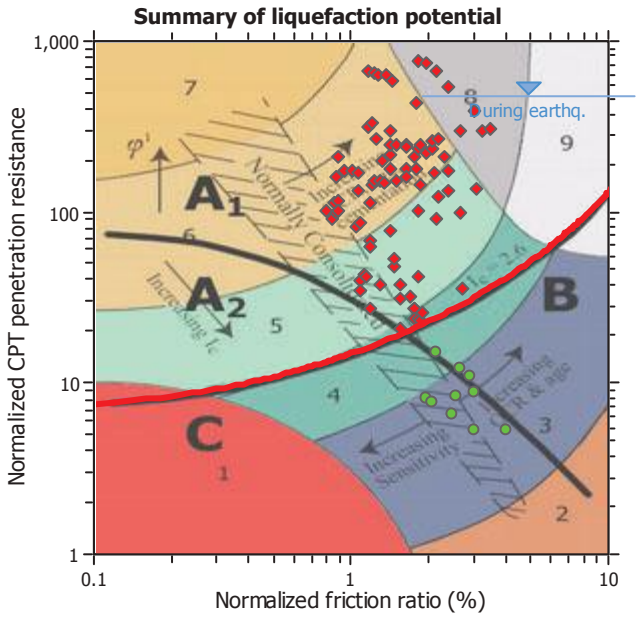
CPT file : CPT-13A

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	30.00 ft	Fill height:	10.00 ft	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	125.00 lb/ft^3	Limit depth:	N/A
Earthquake magnitude M_w:	7.76	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
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