Appendix G2

Geotechnical Investigation Parcel B

LIMITED
GEOTECHNICAL INVESTIGATION

COLLINS AEROSPACE
REDEVELOPMENT SITE – PARCEL B
NORTHEAST CORNER OF
H STREET AND MARINA PARKWAY
CHULA VISTA, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

W O H L

MARCH 3, 2021
PROJECT NO. G2560-52-01

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G2560-52-01
March 3, 2021

PW Wohl G Street LLC
c/o Wohl Property Group
1081 Camino Del Rio South, Suite 115
San Diego, California 92108

Attention: Mr. Emil Wohl

Subject: LIMITED GEOTECHNICAL INVESTIGATION
COLLINS AEROSPACE REDEVELOPMENT SITE – PARCEL B
NORTHEAST CORNER OF H STREET AND MARINA PARKWAY
CHULA VISTA, CALIFORNIA

Dear Mr. Wohl:

In accordance with your request and authorization of our Proposal No. LG-20158 dated June 3, 2020, we herein submit the results of our limited geotechnical investigation for the subject project. We performed our limited investigation to evaluate the underlying soil and geologic conditions and potential geologic hazards, and to assist in the design of the proposed site improvements. The accompanying report presents the results of our study and preliminary conclusions and recommendations pertaining to geotechnical aspects of the proposed project.

Should you have questions regarding this 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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TABLE OF CONTENTS

LIMITED GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our limited geotechnical investigation related to the planned improvements to the subject property currently identified as Collins Aerospace – Parcel B in Chula Vista, California (see Vicinity Map).

Vicinity Map

The purpose of this limited geotechnical investigation is to evaluate the surface and subsurface soil conditions and general site geology, and to identify geotechnical constraints that may affect development of the property including faulting, liquefaction and seismic shaking based on the 2019 CBC seismic design criteria.

We reviewed the following plans and reports in preparation of this report:

1. *Limited Geotechnical Investigation,, Collins Aerospace Redevelopment Site – Parcel A, Chula Vista, California*, prepared by Geocon Incorporated, dated October 12, 2020 (Project No. G2559-52-01).

2. *Geotechnical Investigation, OMPPA Project on Goodrich Property, Chula Vista, California*, prepared by Geocon Incorporated, dated September 12, 2005 (Project No. 07050-22-30).

3. *Limited Geotechnical Investigation, B.F. Goodrich Site Development, Chula Vista, California*, prepared by Geocon Incorporated, dated June 24, 1999 (Project No. 06327-22-01).

4. *Soil Investigation, Sauder Furnace Foundation, Building No. 1, Column E11-F11, Chula Vista, California*, prepared by Geocon Incorporated, dated July 14, 1980 (Project No. 02080-02-02).

The scope of this investigation included reviewing readily available published and unpublished geologic literature (see List of References), performing engineering analyses and preparing this report. We also advanced 5 exploratory Cone Penetrometer Tests (CPTs) to a maximum depth of 80 feet. Appendix A presents the CPT soundings and details of the field investigation. Appendix B presents the exploratory boring logs and laboratory testing from investigations previously performed on or adjacent to the property. The locations of the current CPTs and previous borings/CPTs at the property are shown on the Geologic Map, Figure 1. Appendix C presents the results of our current liquefaction analysis along with pertinent results from the Parcel A site.

2. SITE AND PROJECT DESCRIPTION

The Collins Aerospace – Parcel B property consists of the western portion of the existing Collins Aerospace facility (also identified as Rohr Industries, B. F. Goodrich and/or UTC Aerospace property). The Existing Site Map shows the current site conditions.

Existing Site Map

The property is bounded by H Street to the south, Marina Parkway and the future Gaylord Chula Vista Hotel and Convention Center to the west, and the remainder of the Collins Aerospace facility to the east and north. An existing rail line is present along the eastern border of the property. The site is currently occupied by a large industrial warehouse building along with several small ancillary buildings and structures, and an on-grade asphalt concrete and Portland Cement concrete parking lots along with other associated improvements. Additionally, a San Diego Gas & Electric substation is located on the northeast corner of the property. Existing grades are relatively flat with elevations of approximately 8 to 12 feet Mean Sea Level (MSL) on the west and east, respectively.

Based on discussions with you, we understand the proposed development will consist of demolition of the existing warehouse building and ancillary structures and construction of new concrete-tilt-up style warehouse buildings and a hotel building along with other associated improvements. We do not expect the site will require storm water management devices. No other information is known at this time. We will need to prepare an updated geotechnical investigation once the site plans are developed.

3. GEOLOGIC SETTING

Regionally, the site is located in the Peninsular Ranges geomorphic province. The province is bounded by the Transverse Ranges to the north, the San Jacinto Fault Zone on the east, the Pacific Ocean coastline on the west, and the Baja California on the south. The province is characterized by elongated northwest-trending mountain ridges separated by straight-sided sediment-filled valleys. The northwest trend is further reflected in the direction of the dominant geologic structural features of the province that are northwest to west-northwest trending folds and faults, such as the nearby Rose Canyon fault zone.

Locally, the site is within the coastal plain of San Diego County. The coastal plain is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary bedrock units that thicken to the west and range in age from Upper Cretaceous age through the Pleistocene age which have been deposited on Cretaceous to Jurassic age igneous and volcanic bedrock. Geomorphically, the coastal plain is characterized by a series of 21, stair-stepped marine terraces (younger to the west) that have been dissected by west flowing rivers. The coastal plain is a relatively stable block that is dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone.

The site is located on the western portion of the coastal plain. Artificial fill, young alluvial flood-plain deposits (Bay Deposits), and marine sedimentary units consisting of Pleistocene-age Old Paralic Deposits (formerly known as the Bay Point Formation) make up the geologic sequence at the site. The Old Paralic Deposits are shallow marine deposits generally consisting of sand and silty sand units interfingered with layers of silt and clay. Based on published geologic information, we expect this unit to be in excess of 150 to 160 feet deep and extend below the current sea level. The mapped geologic conditions at the site is presented on the Regional Geologic Map.

Regional Geologic Map

4. SOIL AND GEOLOGIC CONDITIONS

Based on our review of published geologic maps, and the current and previous investigations at the site, we expect the site is underlain by two surficial soil types (consisting of undocumented fill and Holocene-age Bay Deposits) and two formational unit (consisting of Old Paralic Deposits and the San Diego Formation). The occurrence, distribution, and description of each unit encountered is shown on the Geologic Map, Figure 1 and on the boring logs in Appendix B. The geologic units are discussed herein in order of increasing age.

4.1 Undocumented Fill (Qudf)

We expect that undocumented fill associated with the existing site improvements is present across the majority of the site to depths of about 5 to 10 feet. In general, the fill consists of loose to medium dense, moist to wet, silty sand and possesses a “very low” to “low” expansion index (expansion index of 50 or less). The fill located below the groundwater elevation possesses a potential for liquefaction. Additionally, we understand that a zone of debris fill is located along the previous shoreline of the bay (along the western edge of the property). These materials are composed of concrete and trash debris mixed with soil that extend to depths of 5 to 10 feet. The upper portion of the undocumented fill is likely unsuitable for the support of proposed structures or structural fill and will require remedial grading. However, we expect the remedial grading operations will be limited to the groundwater elevation and/or saturated soil conditions.

4.2 Bay Deposits (Qb)

The Bay Deposits (bay mud) exist below the undocumented fill or at-grade to a maximum depth of approximately 15 to 20 feet on the western portion of the site and 20 to 30 feet on the eastern portion of the site. The bay deposits generally consist of very loose to medium dense, silty and clayey sand and soft, wet to saturated, sandy silt and clay. Sandy portions of the Bay Deposits are potentially liquefiable when subjected to strong ground motion. Additionally, the soft muds within the Bay Deposits are subject to consolidation settlement. The amount of settlement that could occur is a function of how thick the layer is, how compressible the layer is and the magnitude of the new vertical load (weight of new fill or future building loads). We consider these materials unsuitable for the support of structures or structural fill in their present condition.

4.3 Old Paralic Deposits (Qop)

The Quaternary-age Old Paralic Deposits (formally called the Bay Point Formation) exist below the undocumented fill and/or Bay Deposits across the site. The Old Paralic Deposits consist of medium dense to very dense sand layers interbedded with stiff clay and silt layers. The Old Paralic Deposits are considered suitable for the support of the proposed structures. However, we do not expect the Old Paralic Deposits will be encountered during the construction of the planned improvements.

4.4 San Diego Formation (Tsd)

Based on published geologic information, we expect the San Diego Formation underlies the Old Paralic Deposits. Based on our experience in the area, the top of the San Diego Formation is at about 150 to 160 feet deep (an elevation of -140 to -150 MSL). The San Diego Formation consists of dense to very dense silty, to clayey sandstone and siltstone. We do not expect to encounter the San Diego Formation during the construction of the planned improvements.

5. GROUNDWATER

We previously encountered groundwater at depths ranging from about 8 to 20 feet below the existing ground surface (approximate elevation of 1 to 7 feet above MSL). In addition, we encountered groundwater during our current study within the CPTs at depths ranging from approximately 5 to 8 feet below the existing ground surface (approximate elevation of 2 to 5 feet above MSL). Several groundwater monitoring wells have been installed on and adjacent to the property. Based on review of our existing information in the vicinity of the site, the groundwater depths range from about 3 to 11 feet below grade. The water elevations fluctuate due to tidal influences. The groundwater should be considered brackish due to the close proximity to the San Diego Bay and Pacific Ocean. Groundwater will be a factor in development especially in liquefaction remediation, deep foundation design and construction, grading operations and utility installation. A groundwater elevation of 6 feet above MSL should be incorporated into the design and construction operations. In addition, the soil about 2 to

3 feet above the groundwater elevation may be saturated. Groundwater and seepage is dependent on seasonal precipitation, tidal influence, irrigation, land use, among other factors, and varies as a result. Proper surface drainage will be important to future performance of the project.

6. GEOLOGIC HAZARDS

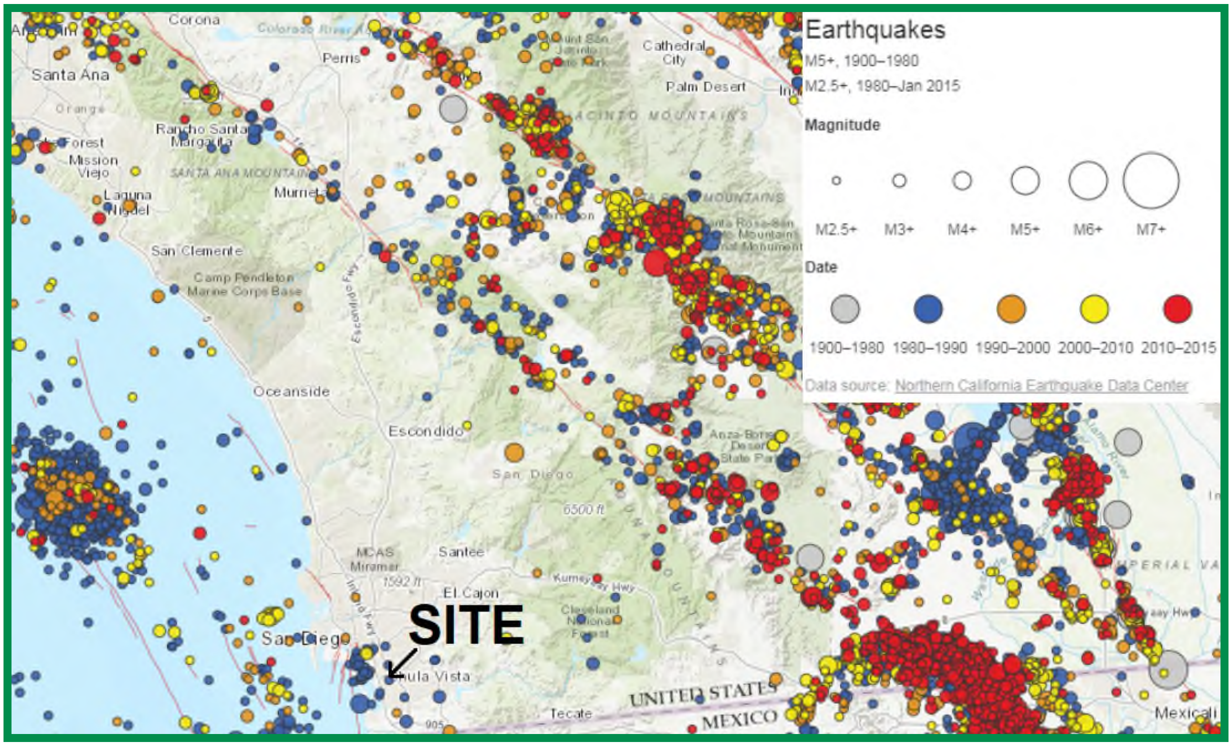
6.1 Faulting and Seismicity

A review of the referenced geologic materials and our knowledge of the general area indicate that the site is not underlain by active, potentially active, or inactive faults. An active fault is defined by the California Geological Survey (CGS) as a fault showing evidence for activity within the last 11,700 years. The site is not located within a State of California Earthquake Fault Zone.

The USGS has developed a program to evaluate the approximate location of faulting in the area of properties. The following figure shows the location of the existing faulting in the San Diego County and Southern California region. The fault traces are shown as solid, dashed and dotted that represent well-constrained, moderately constrained and inferred, respectively. The fault line colors represent faults with ages less than 150 years (red), 15,000 years (orange), 130,000 years (green), 750,000 years (blue) and 1.6 million years (black).

Faults in Southern California

The San Diego County and Southern California region is seismically active. The following figure presents the occurrence of earthquakes with a magnitude greater than 2.5 from the period of 1900 through 2015 according to the Bay Area Earthquake Alliance website.



Earthquakes in Southern California

Considerations important in seismic design include the frequency and duration of motion and the soil conditions underlying the site. Seismic design of structures should be evaluated in accordance with the California Building Code (CBC) guidelines currently adopted by the local agency.

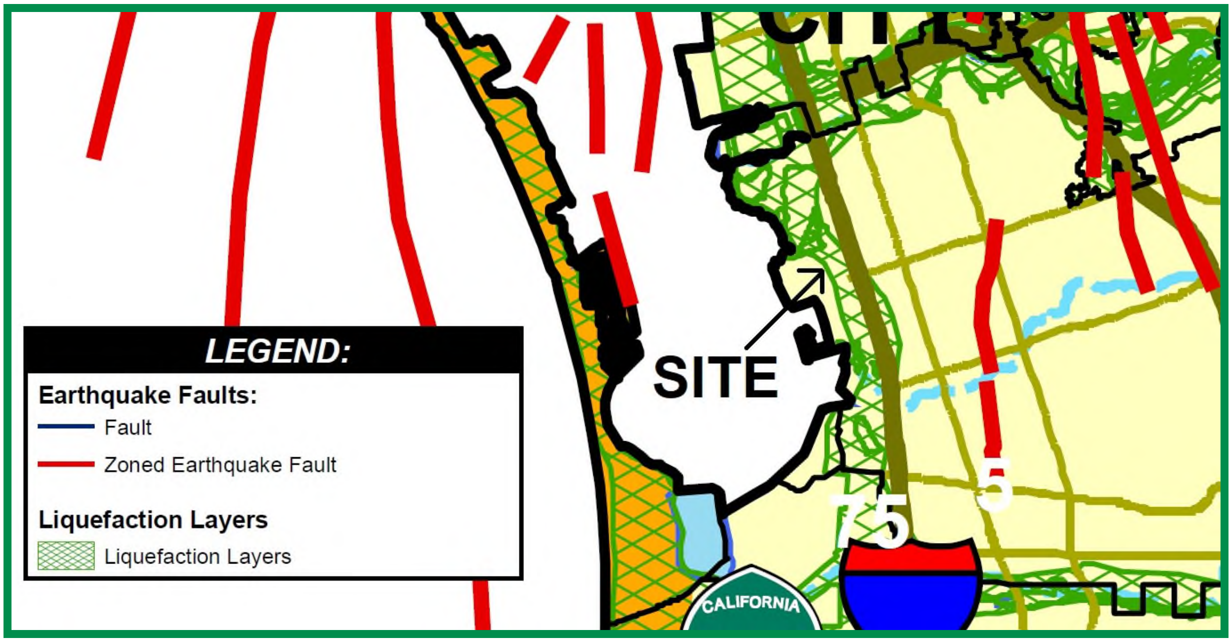
6.2 Ground Rupture

Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects the ground surface. The potential for ground rupture is considered to be very low due to the absence of active faults at the subject site.

6.3 Liquefaction Potential and Seismically Induced Settlement

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 surficial soil (undocumented fill and Bay Deposits) at the site is generally loose/soft and considered to possess a potential for liquefaction below the groundwater elevation. The Multi-Jurisdictional-Hazard Mitigation Plan (2017) maps the site as having zones of liquefiable layers.



Liquefaction Hazard Map

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 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction.

We performed liquefaction analyses with our CPT soundings using the program CLiq (Version 3.0). This program utilizes the 2001 NCEER method of analysis. We used a static groundwater elevation of 6 feet MSL, a modal magnitude of 6.12 earthquake (attributed to the Rose Canyon Fault), and a peak horizontal site acceleration, PGA_M, of 0.636g calculated from ASCE 7-16 Section 11.8.3. This semi-empirical method is based on correlations with the data collected from the CPT soundings and field performance data.

The liquefaction analyses (included in Appendix C) indicate the surficial soils to depths between approximately 5 and 30 feet below the existing grade at the locations the CPTs could be prone to between 0.2 and 1.3 inches during ground motion resulting in an average of about 0.5 to 0.75 inches. We estimate the differential settlement of ⅔ the total settlement ranging from 0.1 to 0.9 inches. Additionally, relatively thin and isolated lenses of soil within the Old Paralic Deposits between 30 and 50 feet are potentially liquefiable.

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. Research presented by Ishihara (1985) indicates that the presence of a non-liquefiable surface layer typically results in the effects of at-depth liquefaction from reaching the surface. 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 Youd and Garris (1995). Based on Youd's modified curves and the thickness of the non-liquefiable soil layer (layer above the assumed groundwater table), the potential for surface manifestation is possible unless ground improvements are performed.

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, fines content of the soil and SPT blow counts. 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. The potential of lateral spreading in the liquefiable soil below the groundwater table is not considered an adverse impact to the proposed development due to relatively flat topography of the site and distance to the San Diego Bay from the site.

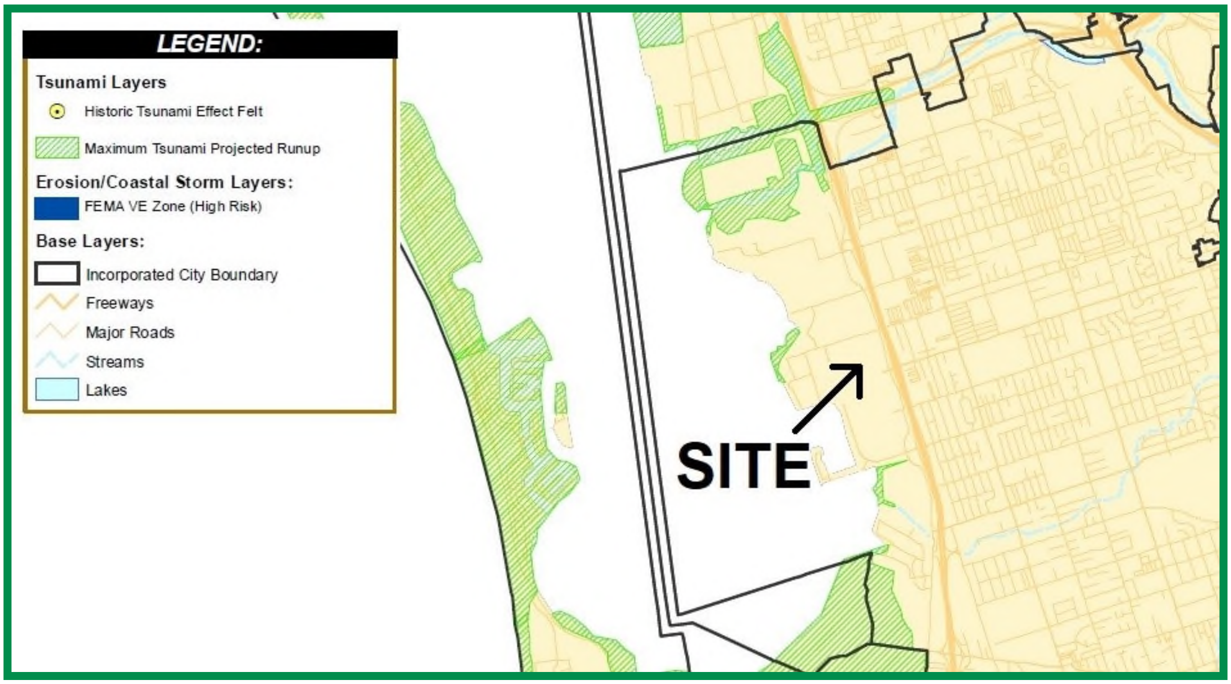
The mitigation of potential hazards due to liquefaction can be accomplished by the densification or removal of the potentially liquefiable soil or the use of foundation systems that still provide acceptable structural support should liquefaction occur. Soil densification can be accomplished by compaction grouting, vibrocompaction, soil mixing, and deep dynamic compaction (among others). We understand the use of vibrocompaction or stone columns may be unacceptable due to the creation of potential vertical pathways for contamination and potential distress to existing structures. Soil densification is generally used to increase the density and provide liquefaction mitigation of sensitive soil to relatively shallow depths over large areas. Deep foundation systems may be used to transmit structural loads to bearing depths below the liquefiable zones and may consist of driven piles or drilled piles. Deep foundations are designed to mitigate damage to the structures supported on the piles; however, they do not generally reduce the potential for damage to underground utilities and peripheral site improvements. The effects of differential settlement between ridged structures and attached settlement-sensitive surface improvements can be mitigated by designing the utilities to accommodate differential movement at the connections.

6.4 Storm Surge, Tsunamis, and Seiches

Storm surges are large ocean waves that sweep across coastal areas when storms make landfall. Storm surges can cause inundation, severe erosion and backwater flooding along the water front. The site is located approximately 800 feet from San Diego Bay, is at an elevation of about 10 feet or greater above Mean Sea Level (MSL) and is protected from ocean waves by the Silver Strand to the west.

Based on historic and predicated wave heights and runout lengths, the proposed site elevation with neighboring topographic features is likely sufficient to mitigate the risk; therefore, the potential of storm surges affecting the site is considered low.

A tsunami is a series of long period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The first-order driving force for locally generated tsunamis offshore southern California is expected to be tectonic deformation from large earthquakes (Legg, *et al.*, 2002). Historically, tsunami wave heights have ranged up to 3.7 feet in the San Diego area. Wave heights and run-up elevations from tsunamis along the San Diego Coast have historically fallen within the normal range of the tides. The Multi-Jurisdictional Hazard Mitigation Plan (2017) maps zones of possible tsunami inundation for coastal areas throughout the county. The site is not included within one of these high-risk hazard areas. Therefore, we consider the risk of a tsunami hazard at the site to be low.



Tsunami Inundation Map

A seiche is a run-up of water within a lake or embayment triggered by fault- or landslide-induced ground displacement. The site is located approximately 800 feet from San Diego Bay, is at an elevation of about 10 feet or greater above Mean Sea Level (MSL) and is protected from ocean waves by the Silver Strand to the west. Based on historic and predicated wave heights and runout lengths, we expect the proposed site elevation is sufficient to mitigate the risk; therefore, we consider the potential for seiches to impact the site low.

6.5 Hazardous Subsurface Materials

We understand contaminated soil and groundwater have been encountered at locations in the vicinity of the property associated with past and current uses as an industrial facility (AECOM, 2017). Where proposed remedial grading, installation of utilities or other improvements extend into areas identified as containing contaminated soil and/or contaminated groundwater, special provisions may be required for the health and safety of workers and to limit movement of the contamination in accordance with the project environmental consultant. Construction techniques to limit movement of contaminates may be required. Additionally, we understand the use of certain ground improvement techniques (i.e. stone columns or wick drains, modifying the use of pipe bedding and certain types of deep foundations) may be restricted due to the existing contaminated soil.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 From a geotechnical engineering standpoint, we opine the subject site is suitable for proposed improvements provided the preliminary recommendations presented herein are implemented in design and construction of the project. We should be contacted to prepare an updated geotechnical investigation to provide recommendations for the planned buildings and improvements once design plans are available.

7.1.2 The site may be subject to geologic hazards, including moderate to strong seismic shaking, liquefaction, seismically induced settlement and consolidation settlement. From a geotechnical engineering standpoint, we opine soil or geologic conditions do not exist at the subject site that is considered adverse to proposed improvements at the site, assuming they are designed to accommodate the potential geologic hazards at the site or be mitigated during the construction operations.

7.1.3 Based on a review of the referenced documents and our experience in the area, we expect the site is underlain by undocumented fill and Bay Deposits overlying Old Paralic Deposits and San Diego Formation. The existing formational units are considered suitable for support of structural loads from the proposed development. However, remedial grading and possible ground modification of the surficial materials situated may need to be performed.

7.1.4 We encountered groundwater at a depth of approximately 5 to 8 feet below the existing ground surface (approximate elevation of 2 to 5 feet above MSL). Groundwater will likely have a significant influence on construction of deep utilities (if constructed), and during remedial grading. Dewatering will likely be required for excavations below the fluctuating groundwater elevation. The project should be designed with a groundwater elevation of 6 feet MSL.

7.1.5 We expect that grading of the site will consist of removal of the upper portions of the surficial materials (undocumented fill and/or bay deposits) within areas that are to receive new fill or structures supported on shallow foundations. These removals will likely be limited to within 2 to 3 feet above groundwater elevations due to saturated soil conditions. Removals within the proposed pavement areas can likely be limited to the upper 1 to 2 feet of existing soil.

7.1.6 We should provide foundation recommendations in future studies. Proposed ancillary structures may be supported on a shallow foundation system bearing in compacted fill, assuming that the estimated seismic and static load settlements can be accommodated by the structure. Alternatively, we expect the settlement-sensitive structures would be supported by a deep foundation system or by a shallow foundation system over ground that has been modified to mitigate the liquefaction potential (i.e. ground improvements).

7.1.7 Excavation of the fill, Bay Deposits and Old Paralic Deposits should generally be possible with moderate to heavy effort using conventional, heavy-duty equipment during grading and trenching operations.

7.1.8 Adequate drainage provisions are imperative to the performance of the development. Site drainage should be maintained to direct surface runoff into controlled drainage devices. Positive site drainage should be maintained away from structures and pavements and tops of slopes and directed to storm drain facilities.

7.2 Soil Characteristics

7.2.1 Based on the soil encountered during previous investigations for the site, we expect the soil is considered to be "non-expansive" and "expansive" (expansion index [EI] of 20 or less and greater than 20, respectively) as defined by 2019 California Building Code (CBC) Section 1803.5.3. Table 7.2.1 presents soil classifications based on the expansion index. We expect a majority of the soil encountered possess a "very low" to "low" expansion potential (EI of 50 or less).

TABLE 7.2.1
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2019 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.2 Previously reported laboratory water-soluble sulfate content test results indicate the on-site materials possess "S0" to "S2" sulfate exposure to concrete structures as defined by 2019 CBC Section 1904 and ACI 318-14 Chapter 19. Table 7.2.2 presents a summary of concrete requirements set forth by 2019 CBC Section 1904 and ACI 318. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

TABLE 7.2.2
REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Exposure Class	Water-Soluble Sulfate (SO_4) Percent by Weight	Cement Type (ASTM C 150)	Maximum Water to Cement Ratio by Weight[1]	Minimum Compressive Strength (psi)
S0	SO_4<0.10	No Type Restriction	n/a	2,500
S1	0.10≤SO_4<0.20	II	0.50	4,000
S2	0.20≤SO_4≤2.00	V	0.45	4,500
S3	SO_4>2.00	V+Pozzolan or Slag	0.45	4,500

[1] Maximum water to cement ratio limits do not apply to lightweight concrete

7.2.3 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements susceptible to corrosion are planned.

7.3 Seismic Design Criteria

7.3.1 Table 7.3.1 summarizes site-specific design criteria obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. We used the computer program *U.S. Seismic Design Maps*, provided by the Structural Engineers Association (SEA) to calculate the seismic design parameters. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2019 CBC and Table 20.3-1 of ASCE 7-16. However, we expect the proposed buildings will possess a period of less than 0.5 second; therefore, the building improvements can be designed based on the soil conditions (ASCE 7-16, Section 20.3.1). The values presented herein are for the risk-targeted maximum considered earthquake (MCE_R). Sites designated as Site Class D, E and F may require additional analyses if requested by the project structural engineer and client.

TABLE 7.3.1
2019 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	E	Section 1613.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.234g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.411g	Figure 1613.2.1(2)
Site Coefficient, F_A	1.200	Table 1613.2.3(1)
Site Coefficient, F_V	2.377*	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.481g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.978g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.987g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.652g*	Section 1613.2.4 (Eqn 16-39)

* Using the code-based values presented in this table, in lieu of a performing a ground motion hazard analysis, requires the exceptions outlined in ASCE 7-16 Section 11.4.8 be followed by the project structural engineer. Per Section 11.4.8 of ASCE/SEI 7-16, a ground motion hazard analysis should be performed for projects for Site Class "E" sites with Ss greater than or equal to 1.0g and for Site Class "D" and "E" sites with S1 greater than 0.2g. Section 11.4.8 also provides exceptions which indicates that the ground motion hazard analysis may be waived provided the exceptions are followed.

7.3.2 Table 7.3.2 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 7.3.2
ASCE 7-16 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.556g	Figure 22-7
Site Coefficient, F_{PGA}	1.144	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.636g	Section 11.8.3 (Eqn 11.8-1)

7.3.3 Conformance to the criteria in Tables 7.3.1 and 7.3.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.4 Site Drainage and Moisture Protection

7.4.1 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 2019 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.

7.4.2 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.

7.4.3 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. We recommend that area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes be used. In addition, where landscaping is planned adjacent to the pavement, we recommend construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material.

7.5 Storm Water Management

7.5.1 The United States Department of Agriculture (USDA), Natural Resources Conservation Services, possesses general information regarding the existing soil conditions for areas within the United States. The USDA website also provides the Hydrologic Soil Group. Table 7.5 presents the descriptions of the hydrologic soil groups. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. In addition, the USDA website also provides an estimated saturated hydraulic conductivity for the existing soil.

TABLE 7.5
HYDROLOGIC SOIL GROUP DEFINITIONS

Soil Group	Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

7.5.2 Based on information from the USDA, the eastern portion of the property is designated as Huerohuero Urban Land Complex (2 to 9 percent slopes) and is classified as Soil Group D with a saturated hydraulic conductivity rate of 0.00 to 0.06 inches per hour, as shown on the USDA Hydrologic Soil Group Map. The western edge of the property is designated as Made Land which does not have a corresponding saturated hydraulic conductivity from USDA.

USDA Hydrologic Soil Group Map

7.5.3 We should provide storm water infiltration recommendations if storm water management devices are planned.

7.6 Updated Geotechnical Investigation

7.6.1 We should be contacted to provide an updated geotechnical investigation for the project once the grading and building foundation are available. We should provide review of the project plans prior to final design submittal to evaluate if additional analyses and/or recommendations are required.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

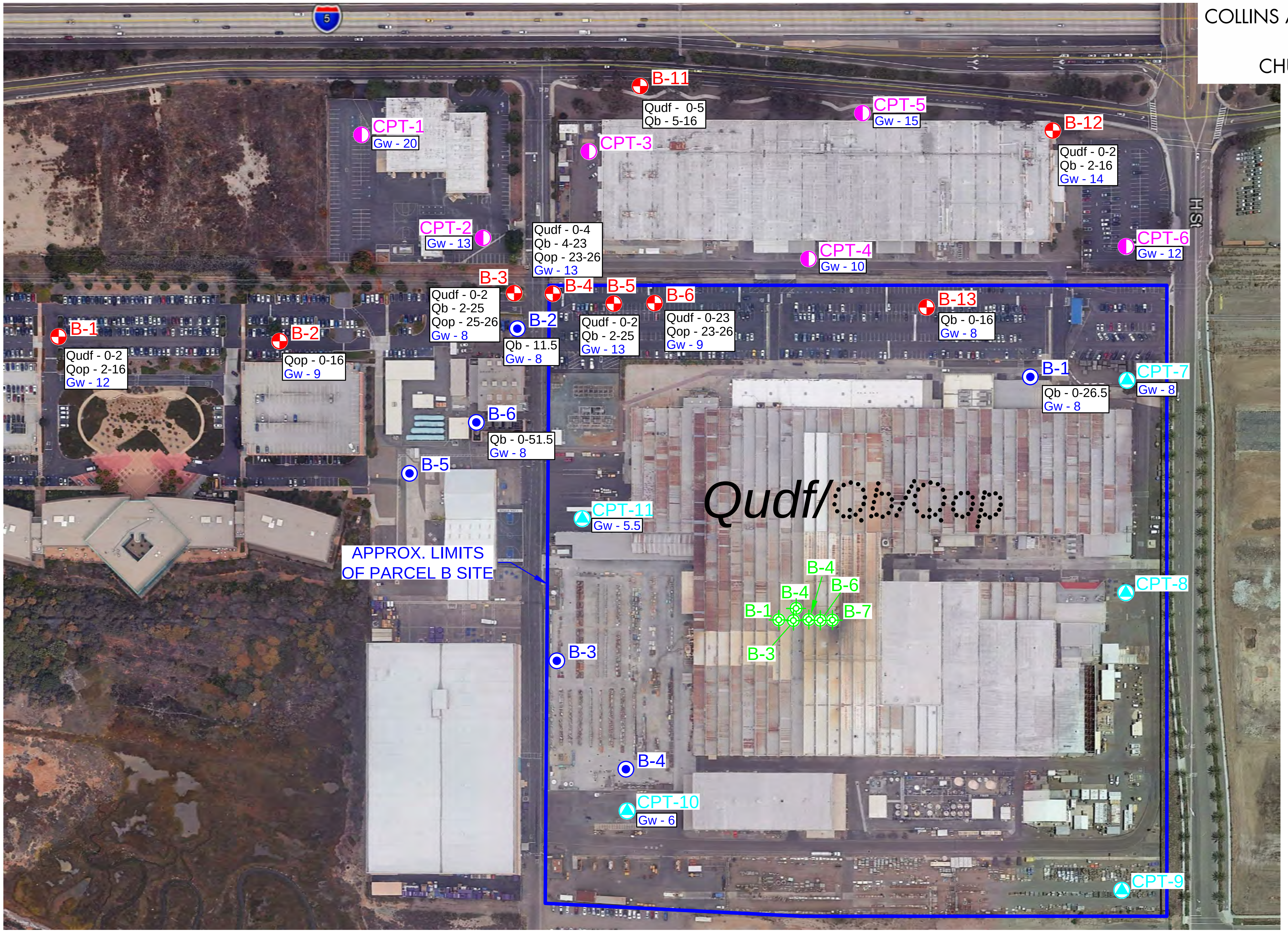
1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development 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.

COLLINS AEROSPACE REDEVELOPMENT
PARCEL B
CHULA VISTA, CALIFORNIA



0' 100' 200' 300' 400'

SCALE 1"=200'(on 11x17)

GEOCON LEGEND

Qudf ........UNDOCUMENTED FILL

Qb ....BAY DEPOSITS
(Dotted Where Buried)

Qop ....OLD PARALIC DEPOSITS
(Dotted Where Buried)

CPT-11 ....APPROX. LOCATION OF CPT
(Current Study)

CPT-6 ....APPROX. LOCATION OF CPT
(Geocon, 2020)

B-11 ....APPROX. LOCATION OF BORING
(Geocon, 2005)

B-6 ....APPROX. LOCATION OF BORING
(Geocon, 1999)

B-7 ....APPROX. LOCATION OF BORING
(Geocon, 1980)

Qudf - 0-4
Qb - 4-23
Qop - 23-26 ....PREVIOUSLY ENCOUNTERED
GEOLOGIC CONDITIONS (In Feet)
Qudf = Undocumented fill
Qb = Bay Deposits
Qop = Old Paralic Deposits

Gw - 15 ....GROUNDWATER DEPTH (In Feet)

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

PROJECT NO. G2560 - 52 - 01

GEOLOGIC MAP

FIGURE 1

DATE 03 - 02 - 2021

Plotted:03/01/2021 9:18AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G2560-52-01 Collins Parcel B\SHEETS\G2560-52-01 GeoMap-BoringLocationMap.dwg

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

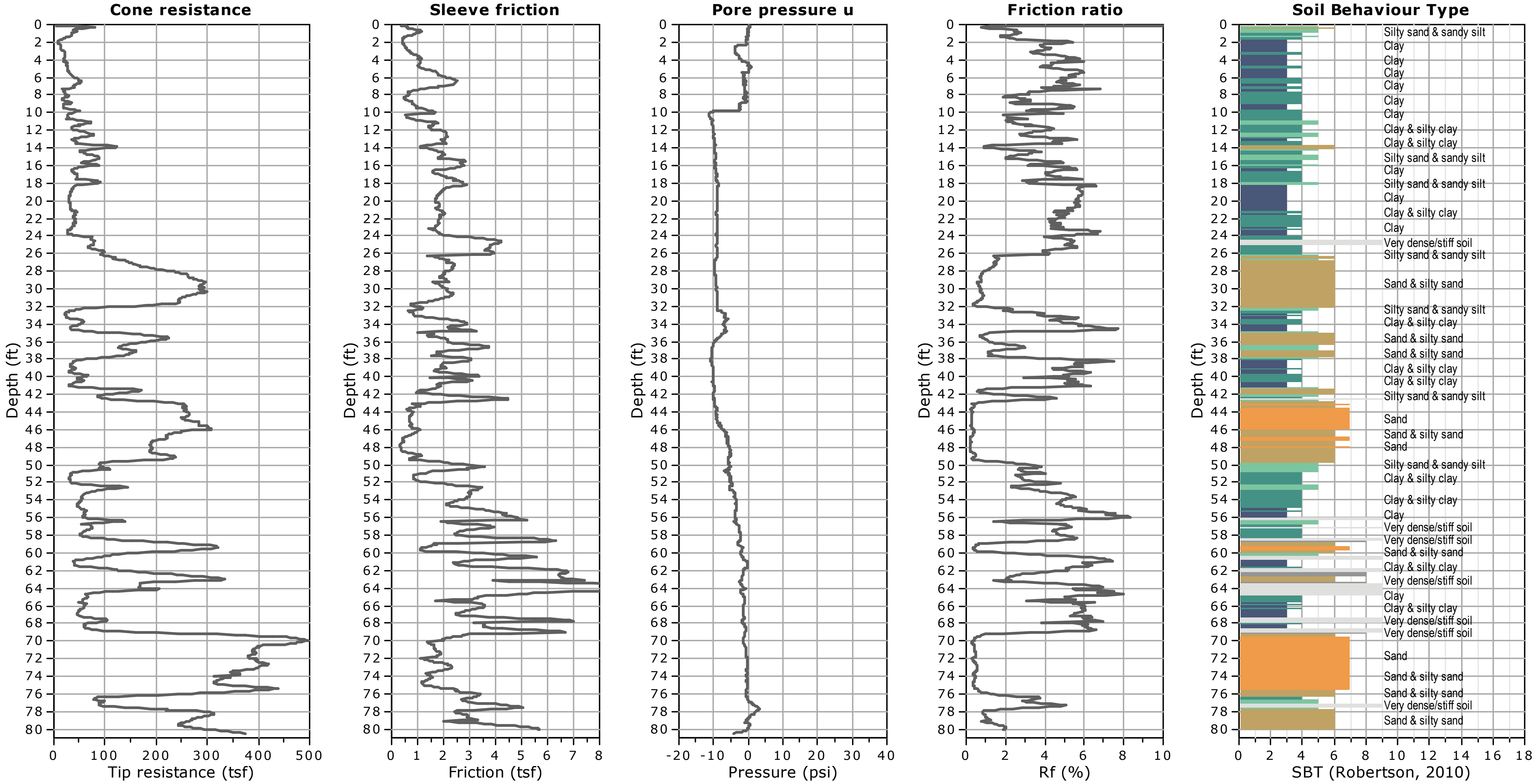
We performed our field investigation on February 11, 2021 that consisted of performing 5 CPTs (CPT-7 through -11). The CPTs extended to a maximum depth of approximately 80 feet, and the locations of the CPTs are shown on the Geologic Map, Figure 1. The CPT soundings are presented herein. We located the CPTs in the field using a measuring tape and existing reference points; therefore, actual locations may deviate slightly.

Kehoe Testing & Engineering performed the CPTs. The soil conditions encountered during the field investigation were automatically logged in a nearly continuous profile of penetration resistance as each CPT sounding was being conducted. The recorded tip stress, sleeve stress, and pore pressure of the soil is used to develop a stratigraphic interpretation of the soil profile.

Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: Geocon / Collins Parcel B
Location: 850 Lagoon Dr, Chula Vista, CA

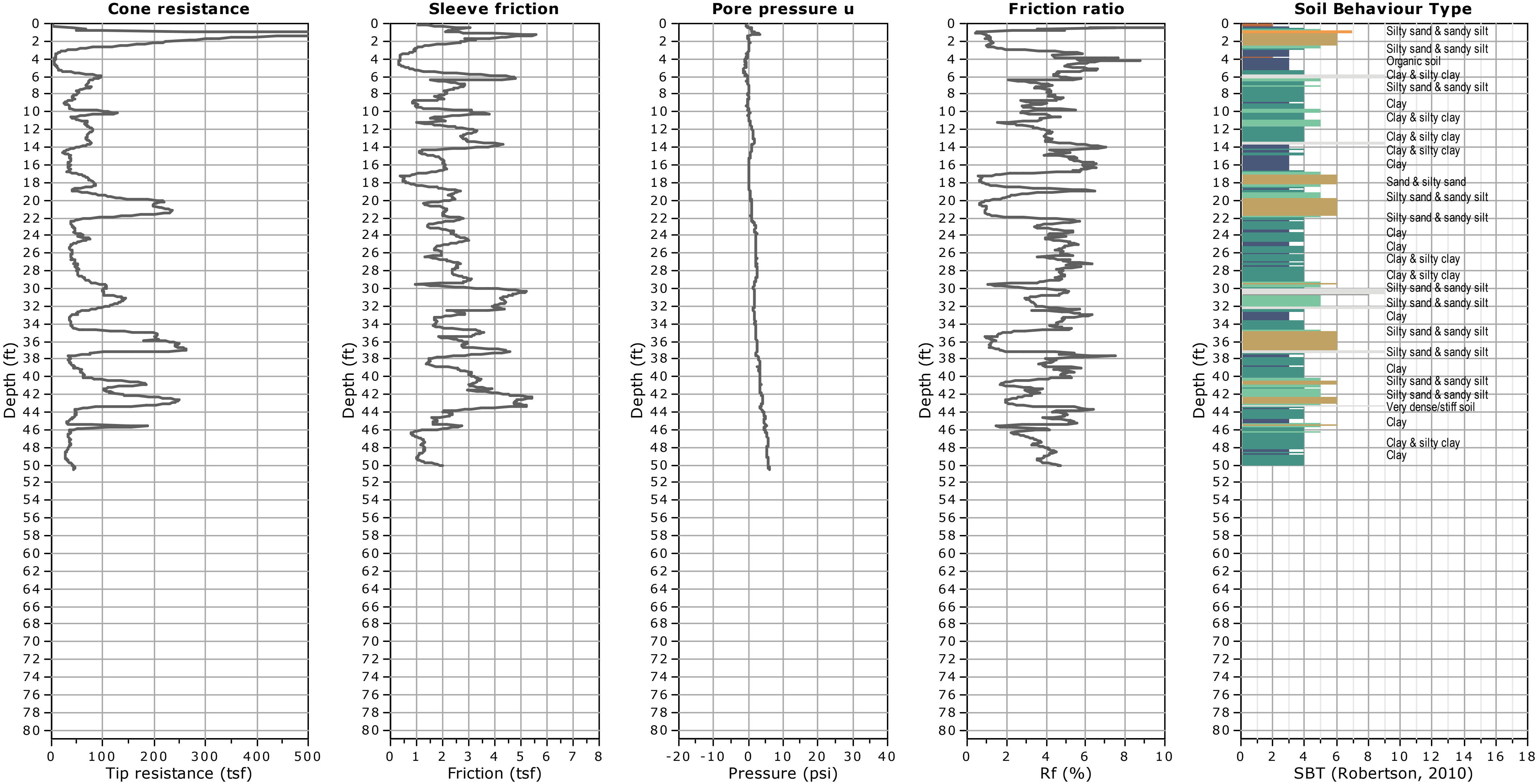
CPT-7
Total depth: 80.46 ft, Date: 2/11/2021



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Geocon / Collins Parcel B**
Location: **850 Lagoon Dr, Chula Vista, CA**

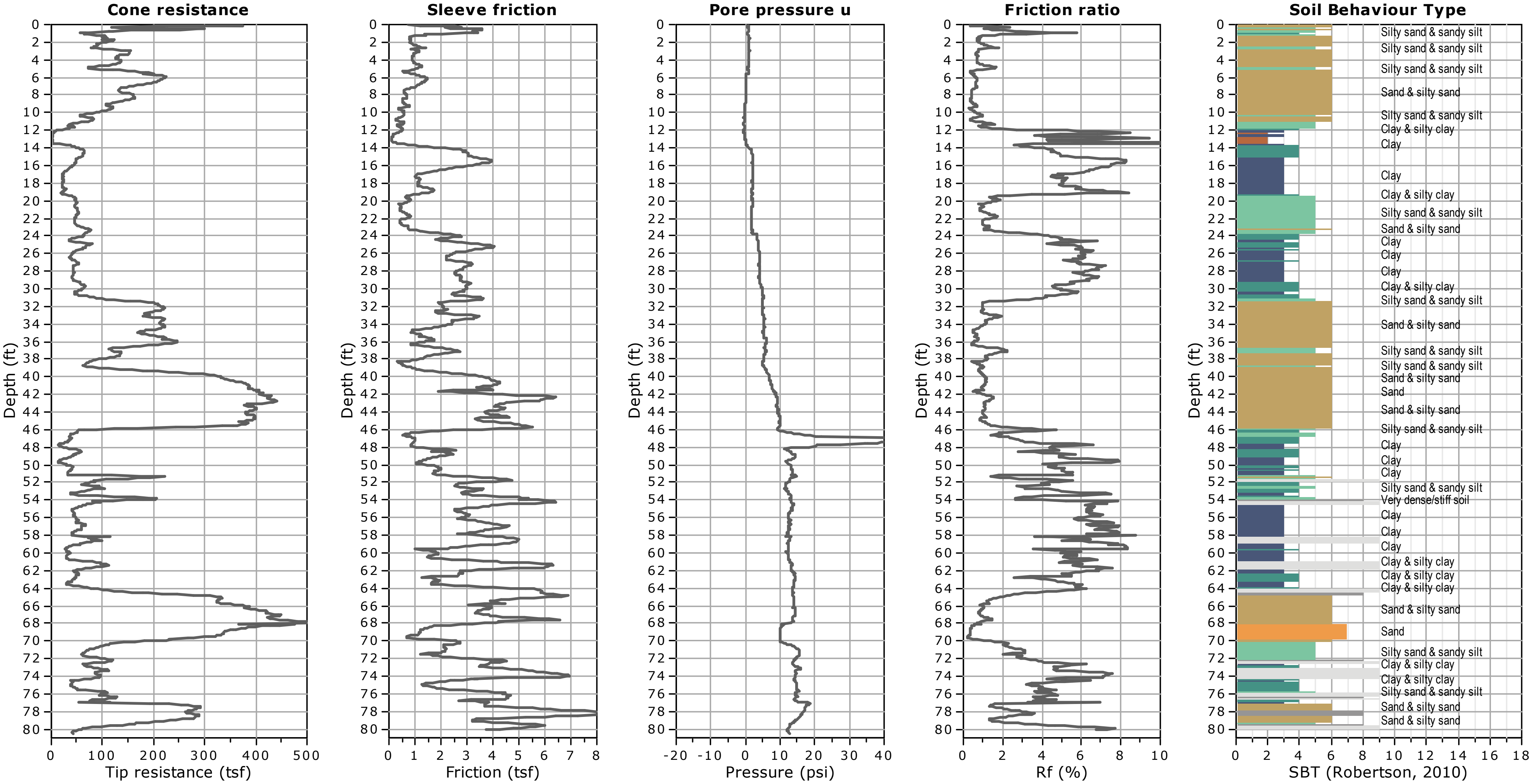
CPT-8
Total depth: 50.53 ft, Date: 2/11/2021



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: Geocon / Collins Parcel B **CPT-9**

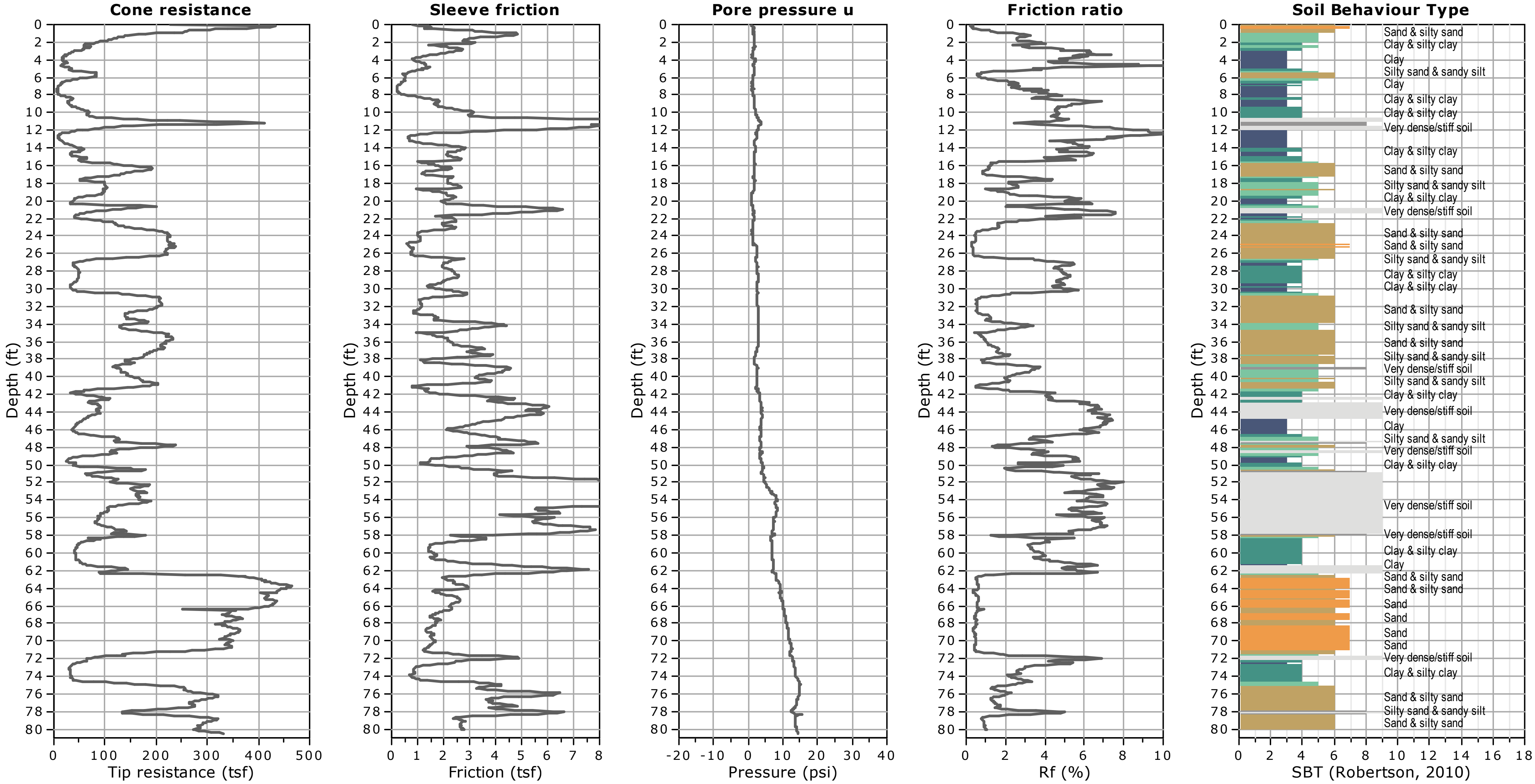
Location: 850 Lagoon Dr, Chula Vista, CA Total depth: 80.46 ft, Date: 2/11/2021



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: Geocon / Collins Parcel B
Location: 850 Lagoon Dr, Chula Vista, CA

CPT-10
Total depth: 80.46 ft, Date: 2/11/2021



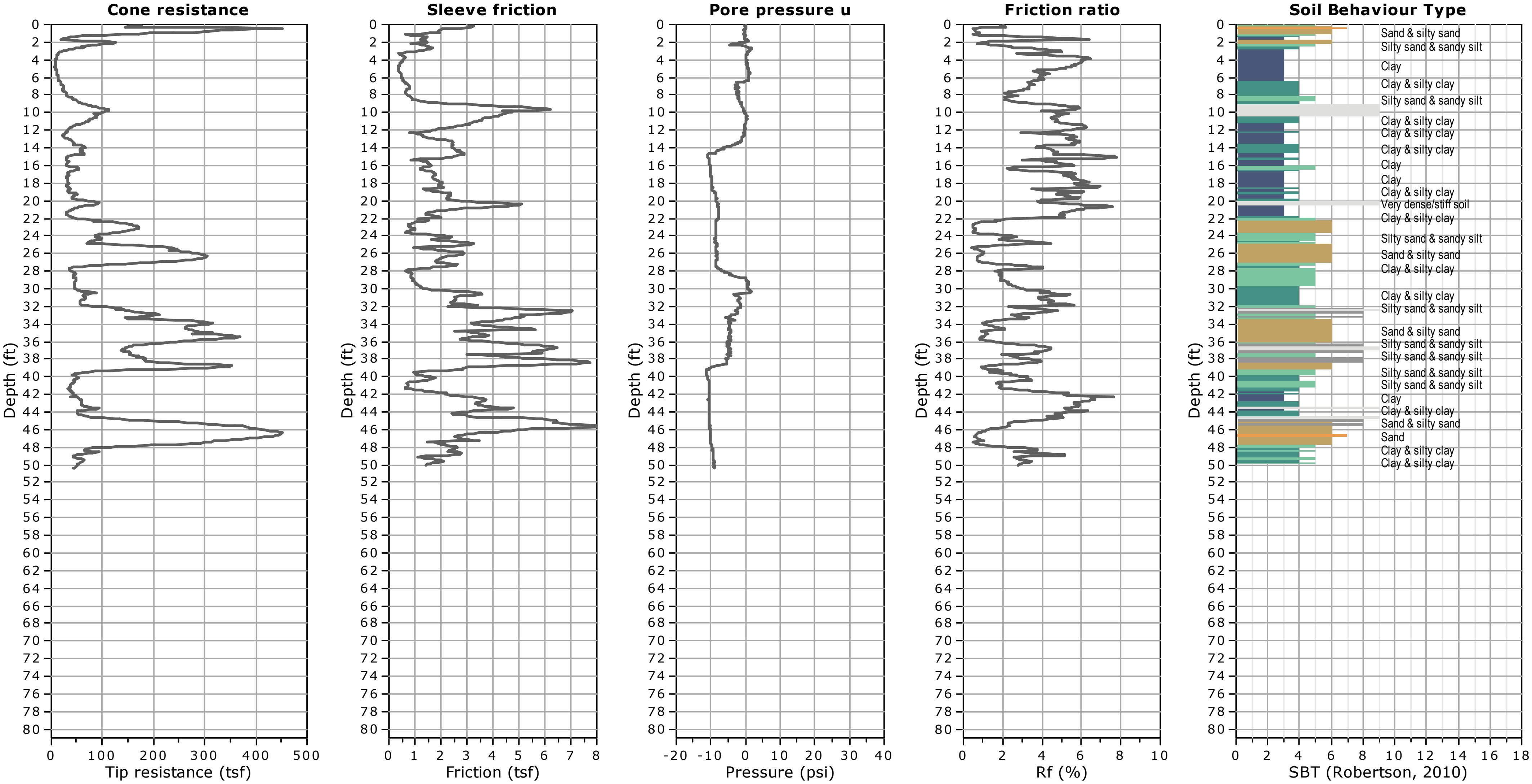
Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: Geocon / Collins Parcel B

Location: 850 Lagoon Dr, Chula Vista, CA

CPT-11

Total depth: 50.41 ft, Date: 2/11/2021



APPENDIX B

APPENDIX B

PREVIOUS BORING LOGS AND LABORATORY TESTING RESULTS

FOR

COLLINS AEROSPACE REDEVELOPMENT SITE – PARCEL B
NORTHEAST CORNER OF H STREET AND MARINA PARKWAY
CHULA VISTA, CALIFORNIA

PROJECT NO. G2560-52-01

PROJECT NO. 07050-22-30

BORING B 1

ELEV. (MSL.) ~16.5' DATE COMPLETED 07-12-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					GRAVEL 4" thick			
	B1-1			SM	**FILL** Loose, moist, moderate brown, Silty, fine SAND			
2	B1-2				**BAY POINT FORMATION** Hard, moist, medium brown, Sandy CLAY	76	124.0	11.7
4								
6	B1-3			CL		50/6"	120.2	13.4
8					Dense, moist, moderate olive brown, Clayey, fine SAND with 1" to 2" thick, stiff to hard clay layers			
10	B1-4			SC		41		
12			▽		-Groundwater depth of 12' at the end of drilling			
14			▼		-Groundwater depth of 14' during drilling			
16	B1-5					39	105.7	20.1
					BORING TERMINATED AT 16 FEET Backfilled with approximately 5.5 cu. ft. of hydrated bentonite chips			

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

07050-22-30.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. 07050-22-30

BORING B 2

ELEV. (MSL.) ~12.3' DATE COMPLETED 07-12-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					4"ASPHALT 4" AGGREGATE BASE			
2	B2-1 B2-2			SC	**BAY POINT FORMATION** Very dense, moist, moderate yellowish brown, Clayey SAND	74	120.4	13.1
4	B2-3			CL	Very hard, moist, moderate brown, CLAY with sand	92/10"	117.7	12.5
8–12	B2-4		▽ ▼	SP	Very dense, wet, pale yellowish brown, poorly graded, fine to medium SAND -Groundwater depth of 9' at the end of drilling -Groundwater depth of 10' during drilling	52		
14–16	B2-5			SW	Very dense, wet to saturated, pale yellowish brown, well graded, fine to coarse SAND	54	112.1	15.1
16					BORING TERMINATED AT 16 FEET Backfilled with approximately 5.5 cu. ft. of hydrated bentonite grout, capped with concrete			

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

07050-22-30.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. 07050-22-30

BORING B 3

ELEV. (MSL.) ~12' DATE COMPLETED 07-11-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0			ASPHALT 4" thick			
	B3-1	SM	**FILL** Loose, moist, medium brown, Silty SAND			
2	B3-2			30	112.1	16.4
		CL	**BAY DEPOSITS** Hard, moist, moderate brown, CLAY with fine sand			
4		SM	Very dense, moist, moderate yellowish brown, Silty, fine SAND			
6	B3-3			92	102.9	20.9
8		SP-SM	Medium dense, wet to saturated, moderate yellowish brown, poorly graded, fine to medium SAND with silt			
10	B3-4			18		
12			-2" clay layer			
14		SP	Dense, saturated, medium yellow brown, poorly graded, fine to medium SAND			
16	B3-5			41	114.6	16.1
20	B3-6			34		
26	B3-7			58	103.7	22.8
		CL	**BAY POINT FORMATION** Hard, moist, moderate olive brown and dark yellowish orange, CLAY with sand			

Groundwater: water table at approx. 8 feet.

BORING TERMINATED AT 26 FEET
Backfilled with approximately 9 cu. ft. of hydrated bentonite grout, capped with concrete

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

07050-22-30.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. 07050-22-30

BORING B 4

ELEV. (MSL.) ~12.3' DATE COMPLETED 07-11-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					ASPHALT 3" thick			
2	B4-1, B4-2			CL	**FILL** Hard, moist, moderate brown, mottled black, Sandy CLAY	98	94.2	13.3
4–6	B4-3			CL	**BAY DEPOSITS** Hard, moist, moderate to dark yellowish brown, CLAY with sand	60		
8–10	B4-4				Medium dense, moist, moderate to dark yellowish brown, Clayey SAND	18		
12–16	B4-5		▼	SC	-Wet to saturated below 13 feet	32	110.4	19.3
18–22	B4-6			SP	Medium dense, saturated, pale yellowish brown, poorly graded, fine to medium SAND -Possible slough	11		
24–26	B4-7			CL	**BAY POINT FORMATION** Hard, moist, moderate olive brown, CLAY	72	102.8	21.5

BORING TERMINATED AT 26 FEET
Backfilled with approximately 9 cu. ft. of hydrated bentonite grout, capped with concrete

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

07050-22-30.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. 07050-22-30

BORING B 5

ELEV. (MSL.) **~11.5'** DATE COMPLETED **07-11-2005**

EQUIPMENT **CME 75**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					ASPHALT 4" thick			
	B5-1			SM	**FILL** Loose, moist, moderate brown, Silty SAND			
2	B5-2			SC	**BAY DEPOSITS** Dense, moist, moderate brown, Clayey SAND	50/6"	106.1	7.6
6	B5-3					42	115.2	14.7
10	B5-4					34		
13			▼					
15	B5-5			SM	Dense, wet to saturated, moderate brown, Silty SAND	41	103.2	23.6
20	B5-6					39		

BORING TERMINATED AT 25 FEET
Backfilled with approximately 8.5 cu. ft. of hydrated bentonite grout, capped with concrete

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

07050-22-30.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.

BORING B 6

ELEV. (MSL.) ~11.5' DATE COMPLETED 07-11-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					ASPHALT 3" thick			
0 – 9	B6-1 (~1)			CL	**BAY DEPOSITS** Very stiff to hard, moist, moderate to dark yellowish brown, CLAY with sand			
	B6-2 (~5.5)					76	115.4	16.4
9 – 13	B6-3 (~10.5)		▼ (~9)	SC	Medium dense, wet, moderate yellowish brown, Clayey SAND with layers (1" to 2") of clay, micaceous	30		
13 – 23	B6-4 (~15.5)			SP	Medium dense, wet, dark yellowish brown, poorly graded, fine SAND, micaceous	25	109.3	17.4
	B6-5 (~20.5)					20		
23 – 26	B6-6 (~25.5)			CL	**BAY POINT FORMATION** Hard, moist, pale yellowish brown, CLAY	40	103.8	21.5

BORING TERMINATED AT 26 FEET

Backfilled with approximately 9 cu. ft. of hydrated bentonite grout, capped with concrete

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

07050-22-30.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. 07050-22-30

BORING B 10

ELEV. (MSL.) ~10.5' DATE COMPLETED 07-27-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B10-1			ASPHALT 2" thick			
			SC	**FILL** Medium dense, damp, light to dark brown, Clayey SAND			
2	B10-2		CL	**BAY DEPOSITS** Stiff, moist, dark yellowish brown, CLAY with sand	15	100.9	23.9
6	B10-3		CL		31	116.2	16.3
8				Medium dense, moist, moderate yellowish brown, Clayey SAND			
10	B10-4	▼	SC		21		
12			SM	Medium dense, wet to saturated, dark yellowish brown, Silty, medium -grained SAND			
15	B10-5					104.9	22.0
16			CL	Stiff, moist, dark reddish brown, Silty CLAY			
18			CL	**BAY POINT FORMATION** Hard, moist, light olive gray, CLAY			
20	B10-6				30		
25	B10-7				50/5"	107.2	21.3
26			SM	Very dense, moist, olive brown and reddish brown mottled, Silty SAND			
30	B10-8				50/6"		

BORING TERMINATED AT 31 FEET
Backfilled with approximately 10.5 cu. ft. of hydrated bentonite chips, capped with concrete

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

07050-22-30.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. 07050-22-30

BORING B 11

ELEV. (MSL.) ____________ DATE COMPLETED 07-27-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B11-1			CL	**FILL** Stiff, dry, brown, Sandy CLAY			
2	B11-2			SM	Loose to medium dense, dry, reddish brown, fine-grained Silty SAND			6.4
4								
6	B11-3			SC	**BAY DEPOSITS** Medium dense, dry to damp, brown with white, Clayey, medium-grained SAND	56	112.0	5.5
8								
10	B11-4					23		
12					-Becomes moist to wet			
14								
16	B11-5				-Medium- to coarse-grained sand	27	114.0	15.4

BORING TERMINATED AT 16 FEET
Backfilled with approximately 5.5 cu. ft. of hydrated bentonite chips

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

07050-22-30.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. 07050-22-30

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 12 ELEV. (MSL.) ______ DATE COMPLETED 07-27-2005 EQUIPMENT CME 75	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	B12-1			SC	**FILL** Loose, dry, light brown, Clayey, fine-grained SAND			
				CL	Stiff, moist, dark brown, Silty CLAY			
2	B12-2			SC	**BAY DEPOSITS** Medium dense, damp, brown, Clayey SAND	18	93.9	5.2
4								
6	B12-3			CL	Very stiff, damp, dark brown, Sandy CLAY	30	107.4	4.5
8								
10	B12-4			CL	Very hard, damp, dark brown, Silty CLAY with sand	50/6"		
12								
14			▼	CL	Very stiff, wet to saturated, dark grayish brown, Sandy, Silty CLAY			
16	B12-5					32	100.9	22.6

BORING TERMINATED AT 16 FEET
Backfilled with approximately 5.5 cu. ft. of hydrated bentonite chips

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

07050-22-30.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. 07050-22-30

BORING B 13

ELEV. (MSL.) ~11.5' DATE COMPLETED 07-12-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					ASPHALT 3" thick			
	B13-1				**BAY DEPOSITS** Hard, moist, moderate brown, Sandy CLAY; trace gravel			
2	B13-2					39	109.6	18.4
4								
6	B13-2			CL		77	111.9	18.0
8			▽		-Groundwater depth of 8' at the end of drilling			
10	B13-3		▼		-Groundwater depth of 10' during drilling -Becomes firm, with 3"-6" interbeds of loose clayey sand	20		
12								
14								
16	B13-4					58		
					BORING TERMINATED AT 16 FEET Backfilled with approximately 5.5 cu. ft. of hydrated bentonite grout, capped with concrete			

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

07050-22-30.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. 06327-22-01

BORING B 1

ELEV. (MSL.) ____________ DATE COMPLETED **6/2/99**

EQUIPMENT **IR A-300**

DEPTH IN FEET	SAMPLE NO.	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0			GW	3" ASPHALT BASE MATERIAL Medium dense, brownish gray, moist, Silty SAND and Sandy angular GRAVEL to 1"			
2	B1-1 B1-2		SM	**ALLUVIUM AND TIDAL FLAT DEPOSIT** Medium dense, reddish brown, moist, Silty, coarse SAND	27	119.0	10.9
4	B1-3				24		
6 – 8	B1-4	▼	CH	Very stiff, light gray to pale brown, moist, plastic CLAY			
10 – 14	B1-5		SM	Dense, medium grayish brown, mottled, wet, Clayey and Silty, micaceous SAND. Grainsize and grading varies widely in thin layers	31		
16	B1-6		MH	Very stiff, grayish to olive brown, wet, Clayey, micaceous SILT, laminate with scattered chalky carbonate nodules	25		
18			MH	Very stiff, grayish to olive brown, wet, Clayey, micaceous SILT, laminate with scattered chalky carbonate nodules			
20 – 24	B1-7		CL	Stiff to very stiff, medium brownish gray and reddish mottled, wet, Silty, plastic CLAY with fine SAND	17		
26	B1-8		MH	Stiff to very stiff, medium brownish gray, wet, Clayey, micaceous, plastic SILT with variable fine SAND	18		
				BORING TERMINATED AT 26.5 FEET			

Figure A-1, Log of Boring B 1

BFGR

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. 06327-22-01

BORING B 2

ELEV. (MSL.) ____________ DATE COMPLETED 6/2/99

EQUIPMENT IR A-300

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					3" ASPHALT			
				GW	12" BASE MATERIAL Medium dense, grayish brown, moist, Silty and Sandy angular gravel to 1"			
2–4	B2-1			CL	**ALLUVIUM AND TIDAL FLAT DEPOSITS** Stiff, medium reddish brown, moist, fine Sandy, plastic CLAY	17		
6–8	B2-3		▼	SM	Dense, medium brown, moist to wet, Silty, micaceous, fine to medium SAND	43		
10	B2-4			SM	Medium dense, medium brown, moist to wet, Silty, micaceous, fine to coarse SAND	16		

BORING TERMINATED AT 11.5 FEET

Figure A-2, Log of Boring B 2

BFGR

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. 06327-22-01

BORING B 3

ELEV. (MSL.) ____________ DATE COMPLETED 6/2/99

EQUIPMENT IR A-300

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					3" ASPHALT			
					3" BASE MATERIAL Medium dense, grayish brown, moist, Silty and Sandy ANGULAR gravel to 1"			
2	B3-1							
	B3-2			CH	**ALLUVIUM AND TIDAL FLAT DEPOSITS** Soft to firm, medium reddish brown, and grayish brown mottled, moist to wet, plastic CLAY, with fine to coarse SAND, common fine roots	6		
4	B3-3					17		
10	B3-4			MH	Very stiff, medium grayish to olive brown, wet, Clayey, micaceous SILT	33		
					BORING TERMINATED AT 11.5 FEET			

Figure A-3, Log of Boring B 3

BFGR

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ... 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. 06327-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 4 ELEV. (MSL.) ______ DATE COMPLETED 6/2/99 EQUIPMENT IR A-300	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					3" ASPHALT			
	B4-1			GW	BASE MATERIAL Medium dense, gray, moist, Silty SAND and GRAVEL, strong hydrocarbon or solvent odor			
2					BORING TERMINATED AT 2 FEET			

Figure A-4, Log of Boring B 4

BFGR

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ☒ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ◪ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... 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. 06327-22-01

BORING B 5

ELEV. (MSL.) ____________ DATE COMPLETED 6/2/99

EQUIPMENT IR A-300

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					8" CONCRETE			
2	B5-1			GW	BASE MATERIAL Medium dense, dark gray, moist, Silty and Sandy angular GRAVEL, strong hydrocarbon or solvent odor			
					BORING TERMINATED AT 2.5 FEET			

Figure A-5, Log of Boring B 5

BFGR

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. 06327-22-01

BORING B 6

ELEV. (MSL.) ____________ DATE COMPLETED **6/2/99**

EQUIPMENT **IR A-300**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					3" ASPHALT			
					12" BASE MATERIAL Medium dense, medium grayish brown, moist, Silty and Sandy angular GRAVEL			
2	B6-1 B6-2			SC	ALLUVIUM AND TIDAL FLAT DEPOSITS Firm to stiff, medium reddish brown, moist, fine to medium Sandy, plastic CLAY	16	114.9	19.1
4								
6	B6-3			ML	Very stiff to hard, medium reddish brown, moist to wet, Clayey and fine Sandy SILT	35		
8								
10	B6-4			ML	Medium dense, pale brown and grayish brown, mottled, wet, Silty, micaceous, fine SAND. Faint hydrocarbon or solution odor	15		
12								
14								
16	B6-5			MH	Stiff to very stiff, pale brown and olive brown, wet, Clayey, micaceous SILT with common chalky carbonate nodules	26		
18								
20	B6-6			SM	Medium dense, pale brown, wet, Silty, micaceous, fine to medium SAND. Spitty dark staining and faint hydrocarbon or solvent odor	17		
22								
24								
	B6-7			SM	Medium dense, pale to medium brown, wet, Silty, micaceous, fine to medium SAND	21		
26				MH	Stiff, medium brown and orange mottled, wet, Clayey, micaceous SILT			
28				CH	Stiff to very stiff, olive brown to olive gray, wet, plastic CLAY			

Figure A-6, Log of Boring B 6

BFGR

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ... 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. 06327-22-01

BORING B 6

ELEV. (MSL.) ____________ DATE COMPLETED 6/2/99

EQUIPMENT IR A-300

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B6-8			SM	Medium dense to dense, medium brown and olive brown, mottled, wet, wet, Silty, micaceous, fine SAND. Much sand slough in hole	41		
32								
34								
36	B6-9			SM	Medium dense, pale brown and gray mottled, wet, Silty, micaceous, fine SAND. Much sand slough in hole	25		
38								
40	B6-10			SM	Medium dense, medium brown, wet, slightly Clayey, micaceous, fine to medium SAND. Much sand slough in hole	16		
42								
44								
46	B6-11				-Little sand in hole at 45 feet	21		
48								
50	B6-12			SM	Medium dense, medium brown, wet, Silty, micaceous, fine to medium SAND. Little slough in hole	20		

BORING TERMINATED AT 51.5 FEET

Figure A-7, Log of Boring B 6

BFGR

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

File No. D-2080-T02
July 14, 1980

DEPTH IN FEET	SAMPLE NUMBER	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f	IN-PLACE MOISTURE CONTENT % dry wt
				BORING NO. 1		
0				16 inch Concrete Slab		
				4 inch Asphalt		
2						
4				FILL Moderately firm, moist, dark brown, Silty, Clayey SAND		
6				BAY POINT FORMATION Moderately firm, moist, reddish-brown to brown, Clayey, Silty SAND-Sandy SILT		
8	1-1		20		104.8	22.5
10	1-2		27	Grading medium stiff to stiff, moist, brown to dark brown, Silty CLAY, with some sand, occasional fine gravel	107.9	21.0
12						
14						
16	1-3		69	Grades to stiff, moist, light brown to brown, Sandy, Clayey SILT	120.2	16.6
18				Grading to medium stiff, moist, greenish-grayish-brown, Sandy, micaceous, Clayey SILT		
20	1-4		23		99.9	27.3
22						
24						
26	1-5		62	Grading to dense, saturated, gray-brown, slightly Silty and Clayey, well graded SAND	125.1	13.2
28						
30						
31	1-6		69	BORING TERMINATED AT 31.0 FEET	112.1	25.7

Figure 7, Log of Test Boring 1

File No. D-2080-T02
July 14, 1980

DEPTH IN FEET	SAMPLE NUMBER	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f	IN-PLACE MOISTURE CONTENT % dry wt
				BORING NO. 2		
0				12 inch Concrete Slab		
				6 inch Sand/Gravel Base		
2				FILL Moderately firm, moist, brown to dark brown, Clayey, Silty SAND-Silty, Sandy CLAY		
6	2-1		19	BAY POINT FORMATION Moderately firm, moist, brown reddish-brown, Clayey, Silty SAND-Sandy SILT	NO RECOVERY	
	2-2		29		100.2	25.2
8				Grading medium stiff to stiff, moist, brown, Silty CLAY, with occasional fine gravel and some sand		
10	2-3		36		110.4	20.1
12				(grading dark brown below 10 feet)		
16	2-4		60	Grading to stiff, moist, light brown to brown, Sandy, Clayey SILT	113.1	18.2
18	2-5		30		103.4	23.9
20	2-6		40	Grading to medium Stiff, light greenish-gray to tan, slightly Sandy, micaceous, Clayey SILT	90.1	32.2
22				Grading to stiff, moist, light brown to brown, Sandy Clayey SILT		
26	2-7		54	Grading to dense, saturated, brown, Silty, Clayey, well graded SAND	121.5	14.7
28						
30						

Figure 8, Log of Test Boring 2

Continued next page

File No. D-2080-T02
July 14, 1980

DEPTH IN FEET	SAMPLE NUMBER	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f	IN-PLACE MOISTURE CONTENT % dry wt
				BORING NO. 2 CONTINUED		
30	2-8		65	--Grading with less SILT and CLAY	107.5	20.8
32				(Clay grading in and out below 32 feet)		
34						
36	2-9		29	Grading to stiff, moist, grayish-brown, with orange and tan streaking, slightly Sandy, Silty CLAY/ Clayey SILT	98.2	26.8
38						
40				(Grading with thin layers of heavy shell fragments below 40 feet)		
42						
44						
46	2-10		51	Grading to dense, saturated, gray-brown, very fine, Sandy SILT-Silty SAND (micaceous)	101.5	22.2
48						
50				Grading to stiff, saturated, gray-brown, Silty, Clayey, fine to medium SAND		
52						
54						
56	2-11		95		118.0	15.9
				BORING TERMINATED AT 56 FEET		

Figure 9, Log of Test Boring 2 Continued

File No. D 2080-T02
July 14, 1980

DEPTH IN FEET	SAMPLE NUMBER	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f	IN-PLACE MOISTURE CONTENT % dry wt
0				BORING NO. 3		
				16 inch Concrete Slab		
2				6 inch Sand/Gravel Base		
4				FILL Moderately firm, brown to dark brown, moist, Clayey, Silty SAND		
6				BAY POINT FORMATION Moderately firm, moist, brown, Clayey, Silty SAND-Sandy SILT		
	3-1		23		105.2	22.2
8				Grading to medium stiff to stiff, moist, brown to dark brown, Sandy Silty CLAY		
10	3-2		31		104.6	23.1
12						
14				Grading to stiff, moist, light brown, Sandy Clayey SILT		
16	3-3		75		116.0	17.8
18				Grading to medium stiff, light greenish-gray/tan, slightly Sandy, micaceous, Clayey SILT		
20	3-4		38		99.6	27.1
22				BORING TERMINATED AT 21.0 FEET		

Figure 10, Log of Test Boring 3

File No. D-2080-T02
July 14, 1980

DEPTH IN FEET	SAMPLE NUMBER	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f	IN-PLACE MOISTURE CONTENT % dry wt
0				BORING NO. 4		
				12 inch Concrete Slab		
2				5 inch Asphalt		
4				FILL Moderately firm, moist, brown to dark brown, Clayey, Silty, SAND/ Sandy CLAY		
6	4-1		17	BAY POINT FORMATION Moderately firm, moist, brown, Clayey, Silty SAND-Sandy SILT	107.0	21.2
8				Grading to stiff, moist, brown to dark brown, Slightly Sandy, Silty CLAY		
10	4-2		31		104.0	23.6
12						
14				Grading to stiff, moist, light brown, Sandy ,Clayey SILT		
16	4-3		75		112.0	19.5
18				Grading to medium stiff, light greenish-gray to brown, slightly Sandy, micaceous, Clayey SILT		
20	4-4		37		98.7	26.3
22				Grading to stiff, moist, light brown to brown, Sandy Clayey SILT-Silty CLAY		
24				Grading to dense, saturated, brown Silty, Clayey, well graded SAND		
26	4-5		80		125.9	14.1
				BORING TERMINATED AT 26.0 FEET		

Figure 11, Log of Test Boring 4

File No. D-2080-T02
July 14, 1980

DEPTH IN FEET	SAMPLE NUMBER	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f	IN-PLACE MOISTURE CONTENT % dry wt
				BORING NO. 5		
0				20 inch Concrete Slab		
2				FILL Moderately firm, moist, dark brown to brown, Clayey, Silty SAND, with occasional gravel		
4–6				BAY POINT FORMATION Moderately firm, moist, brown to reddish-brown, Clayey, Silty SAND - ~~Sandy SILT~~		
8				Grading to stiff, moist, brown to dark brown, Sandy,Sitly CLAY		
10	5-1		32		106.6	22.4
14	5-2		57	Grading to stiff, moist, light brown to brown, Sandy,Clayey SILT	113.7	18.0
18	5-3		23	Grading to medium stiff, moist, light greenish-gray to brown, slightly Sandy, Clayey SILT (micaceous)	97.8	28.6
22				Grading to stiff, moist, light brown to brown, Sandy,Clayey SILT		
24	5-4		25	Medium dense, Silty and Clayey, well graded SAND	NO RECOVERY	
26	5-5a		~~72~~		116.5	17.3
28	5-5b			Grading to dense, saturated, brown to gray, well graded SAND some silt	118.6	14.2
30						

Figure 12, Log of Test Boring 5

Continued next page

DEPTH IN FEET	SAMPLE NUMBER	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE	
					DRY DENSITY p.c.f	MOISTURE CONTENT % dry wt
				BORING NO. 5 CONTINUED		
30	5-6		70		105.3	21.7
32						
34	5-7		55	Grading to stiff, moist, greenish-gray to brown, with tan streaking slightly Sandy, Silty CLAY	101.5	24.9
36						
				BORING TERMINATED AT 35.0 FEET		

Figure 13, Log of Test Boring 5 Continued

File No. D-2080-TO2
July 14, 1980

DEPTH IN FEET	SAMPLE NUMBER	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f	IN-PLACE MOISTURE CONTENT % dry wt
				BORING NO. 6		
0				6 inch Concrete Slab		
2				FILL Loose to moderately firm, moist, brown to dark brown, Silty Clayey SAND, with gravel		
4	6-1		16	BAY POINT FORMATION Moderately firm, moist, brown, Clayey, Silty SAND to Sandy, Silty CLAY	NO RECOVERY	
6	6-2		27		106.6	21.3
8						
10	6-3		34	Grading to medium stiff, moist, dark brown, Sandy, Silty CLAY	105.9	23.0
12						
14						
16	6-4		64		114.2	18.7
18						
20	6-5		33	Grades medium stiff, moist, light gray to greenish-brown, Sandy Silty CLAY-Clayey SILT	91.0	32.0
22				BORING TERMINATED AT 21.0 FEET		

Figure 14, Log of Test Boring 6

File No. D-2080-TO2
July 14, 1980

DEPTH IN FEET	SAMPLE NUMBER	LOG & LOCATION OF SAMPLE	Penetration Resistance Blows/ft	DESCRIPTION	IN-PLACE DRY DENSITY p.c.f	IN-PLACE MOISTURE CONTENT % dry wt
				BORING NO. 7		
0	7-1		48	6 inch Concrete Slab	~~107.1~~	~~11.0~~
				6 inch Sand/fine Gravel Base		
2				FILL Moderately firm, damp to moist, dark brown, slightly Clayey, Silty fine to medium SAND	107.1	11.0
4						
6	7-2		26	BAY POINT FORMATION Moderately firm, moist, brown, Clayey, Silty SAND to Sandy SILT	113.8	17.3
8						
10	7-3		49	Grading to stiff, moist, brown, Silty CLAY, with occasional fine gravel	106.1	22.1
12						
14						
16	7-4		71	(Grading with thin lense of brown-tan, Clayey SILT	114.0	18.2
18						
20	7-5		19	Grades medium stiff, moist, light greenish gray, slightly Sandy, micaceous, Clayey SILT	93.9	35.6
22						
24	7-6a 7-6b		52	Grading to dense, moist, brown, slightly Silty, Clayey SAND-Sandy CLAY	86.7 124.5	35.6 12.8
26				BORING TERMINATED AT 26.0 FEET		

Figure 15, Log of Test Boring 7

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-place dry density and moisture content, shear strength, gradation, permeability, and compaction and consolidation characteristics. Selected soils samples were also tested for R-value, thermal resistivity, pH, resistivity, and water-soluble sulfate content. The results of our laboratory tests are presented in Tables B-I through B-VI and on Figures B-1 through B-3. The in-place dry density and moisture content of the samples tested are presented on the boring logs, Appendix A.

TABLE B-I
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080-03

Sample No.	Sample Top Depth (feet)	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
B3-2	2	102.9	20.9	300	39
B3-7	25	103.7	22.8	320	32
B4-5	15	110.4	19.3	290	37
B5-5	15	103.2	23.6	320	31
B9-5	15	94.0	29.3	720	32

TABLE B-II
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557-02

Sample No.	Sample Top Depth (feet)	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B2-1	1	Dark brown, Clayey SAND, trace gravel (SC)	131.2	9.2
B9-1	1	Dark reddish brown, Sandy CLAY, trace gravel (CL)	127.6	8.6

TABLE B-III
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (pH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST NO. 643

Sample No.	Sample Top Depth (feet)	pH	Resistivity (ohm centimeters)
B1-1	1	7.4	3380
B10-1	0	7.9	390

TABLE B-IV
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Sample Top Depth (feet)	Water Soluble Sulfate (%)
B1-1	1	0.040
B10-1	0	0.290

TABLE B-V
SUMMARY OF LABORATORY R-VALUE TEST RESULTS
CALIFORNIA TEST NO. 301

Sample No.	Sample Top Depth (feet)	Description	R-Value
B13-1	1	Dark reddish brown, Sandy CLAY, trace gravel	Less than 5

TABLE B-VI
SUMMARY OF LABORATORY PERMEABILITY TEST RESULTS
ASTM D 5084-00

Sample No.	Sample Top Depth (feet)	Description	Permeability (cm/sec)
B4-3	5	Dark brown, Sandy, lean CLAY	4.99E-09
B7-3	5	Dark yellowish brown, lean CLAY with sand	6.36E-09
B8-5	25	Olive, fat CLAY	1.35E-08

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-place dry density and moisture content, shear strength characteristics, expansion potential, maximum dry unit weight and optimum moisture content, soluble sulfate content, pH and resistivity, grain size distribution and consolidation characteristics.

The results of our laboratory tests are presented on Tables B-I through B-V and Figures B-1 through B-3. The in-place dry density and moisture content results are indicated on the exploratory boring logs.

TABLE B-I
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS

Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
B1-2	119.0	10.9	600	37
B6-2	114.9	19.1	100	31

TABLE B-II
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS

Sample No.	Moisture Content		Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B1-1	7.9	19.8	117.6	7
B6-1	8.2	18.5	117.8	20

TABLE B-III
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS

Sample No.	Description	Maximum Dry Density(pcf)	Optimum Moisture Content (% dry wt.)
B1-1	Red brown, Silty, coarse SAND	129.0	8.5
B2-1	Brown, Clayey, fine SAND	128.0	10.5

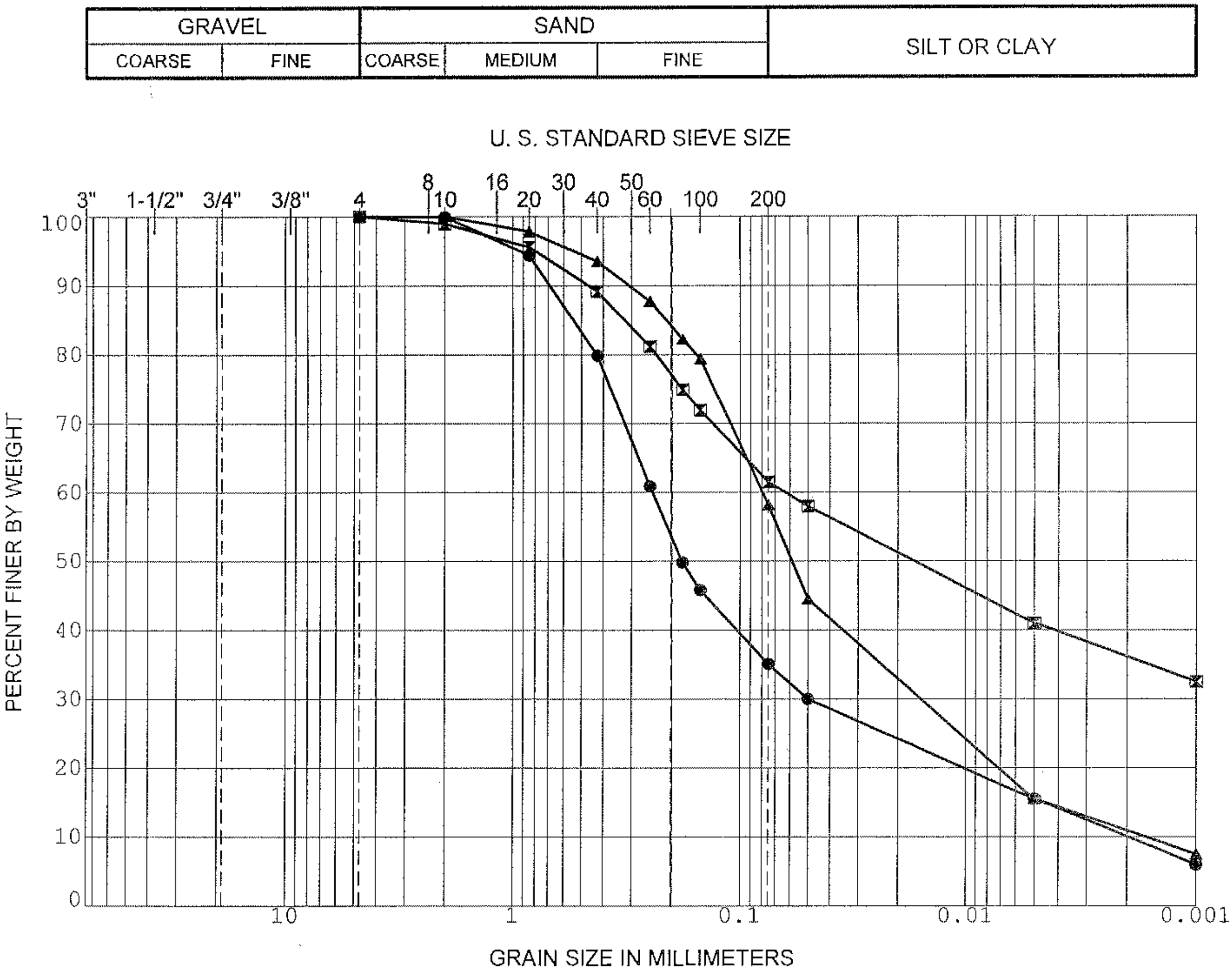
TABLE B-IV
SUMMARY OF LABORATORY WATER SOLUBLE SULFATE TEST RESULTS

Sample No.	Water Soluble Sulfate (%)
B1-1	0.005 (50 ppm)

TABLE B-V
SUMMARY OF LABORATORY pH and RESISTIVITY TEST RESULTS

Sample No.	pH	Minimum Resistivity (ohm-centimeters)
B1-1	8.5	1334

PROJECT NO. 07050-22-30



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B4-4	10.0	SC				
☒	B7-4	10.0	CL				
▲	B8-4	20.0	SC				

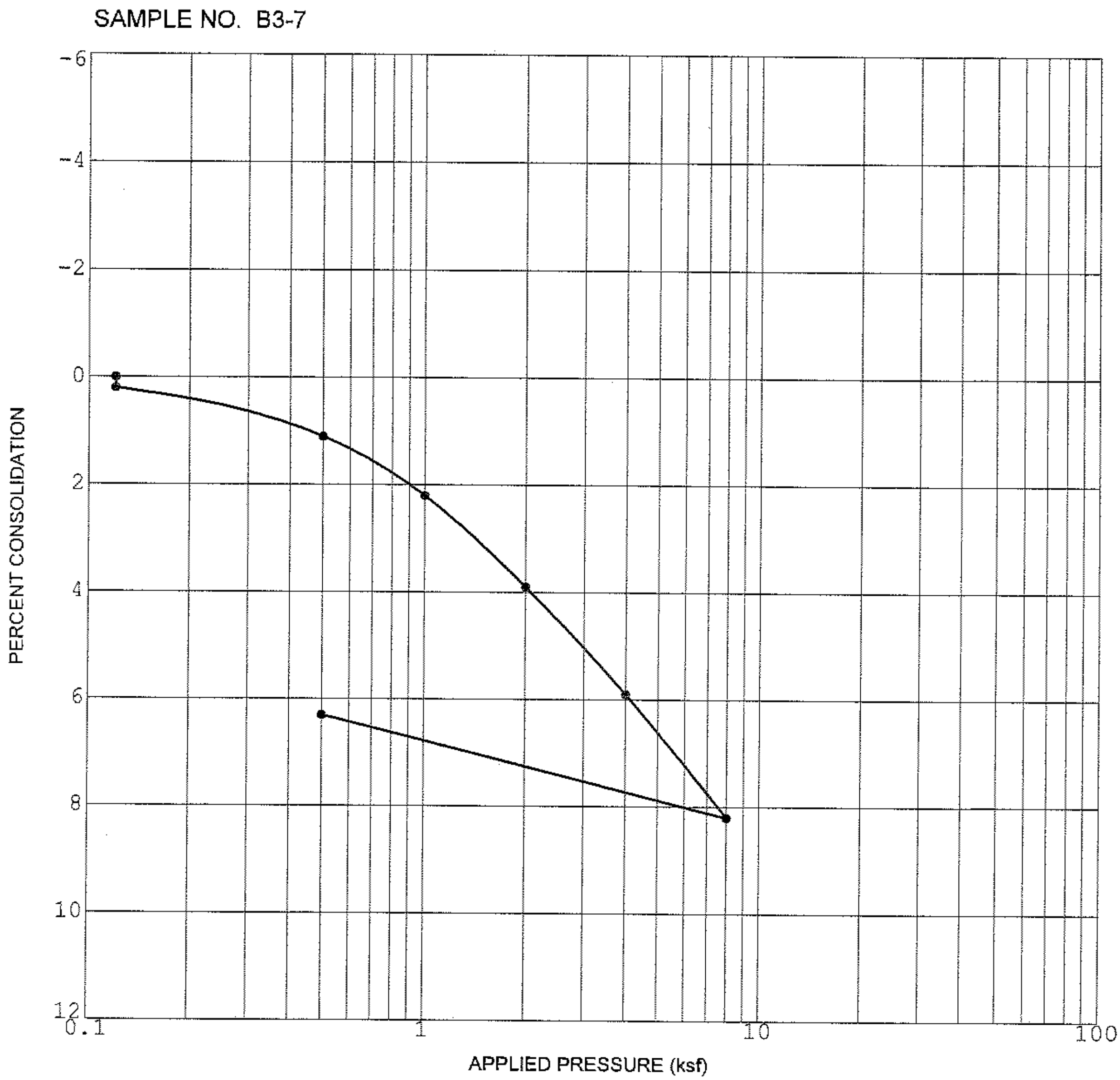
GRADATION CURVE

GOODRICH OMPPA PROJECT

CHULA VISTA, CALIFORNIA

07050-22-30.GPJ

Figure B-1



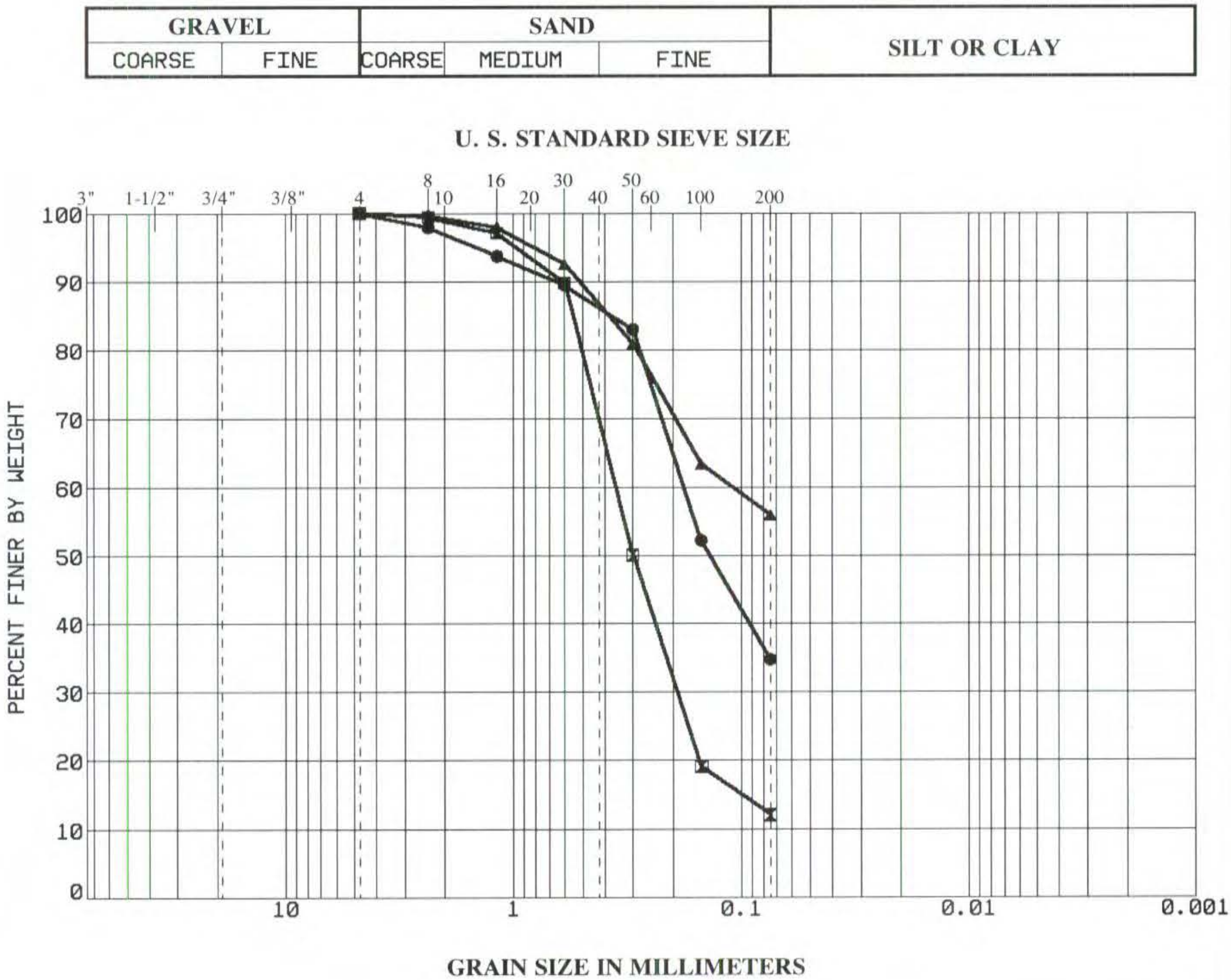
Initial Dry Density (pcf)	103.4
Initial Water Content (%)	22.8

Initial Saturation (%)	99.9
Sample Saturated at (ksf)	.125

CONSOLIDATION CURVE

GOODRICH OMPPA PROJECT

CHULA VISTA, CALIFORNIA



	SAMPLE	Depth (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B6-4	10.0	(ML) Sandy SILT				
⊠	B6-6	20.0	(SM) Silty SAND				
▲	B6-10	40.0	(SM) Silty SAND				

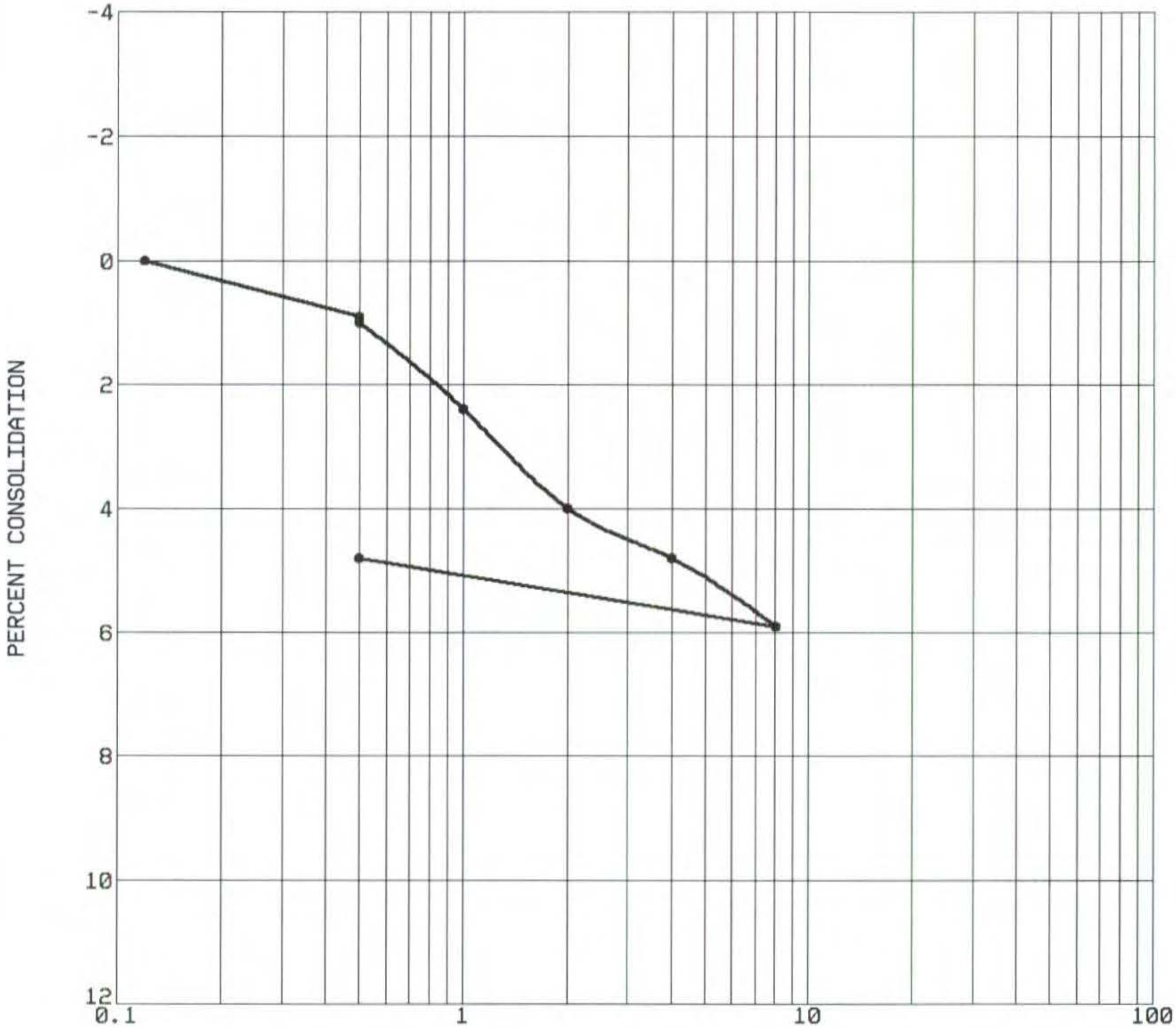
GRADATION CURVE

BF GOODRICH

SAN DIEGO, CALIFORNIA

PROJECT NO. 06327-22-01

SAMPLE NO. B1-2



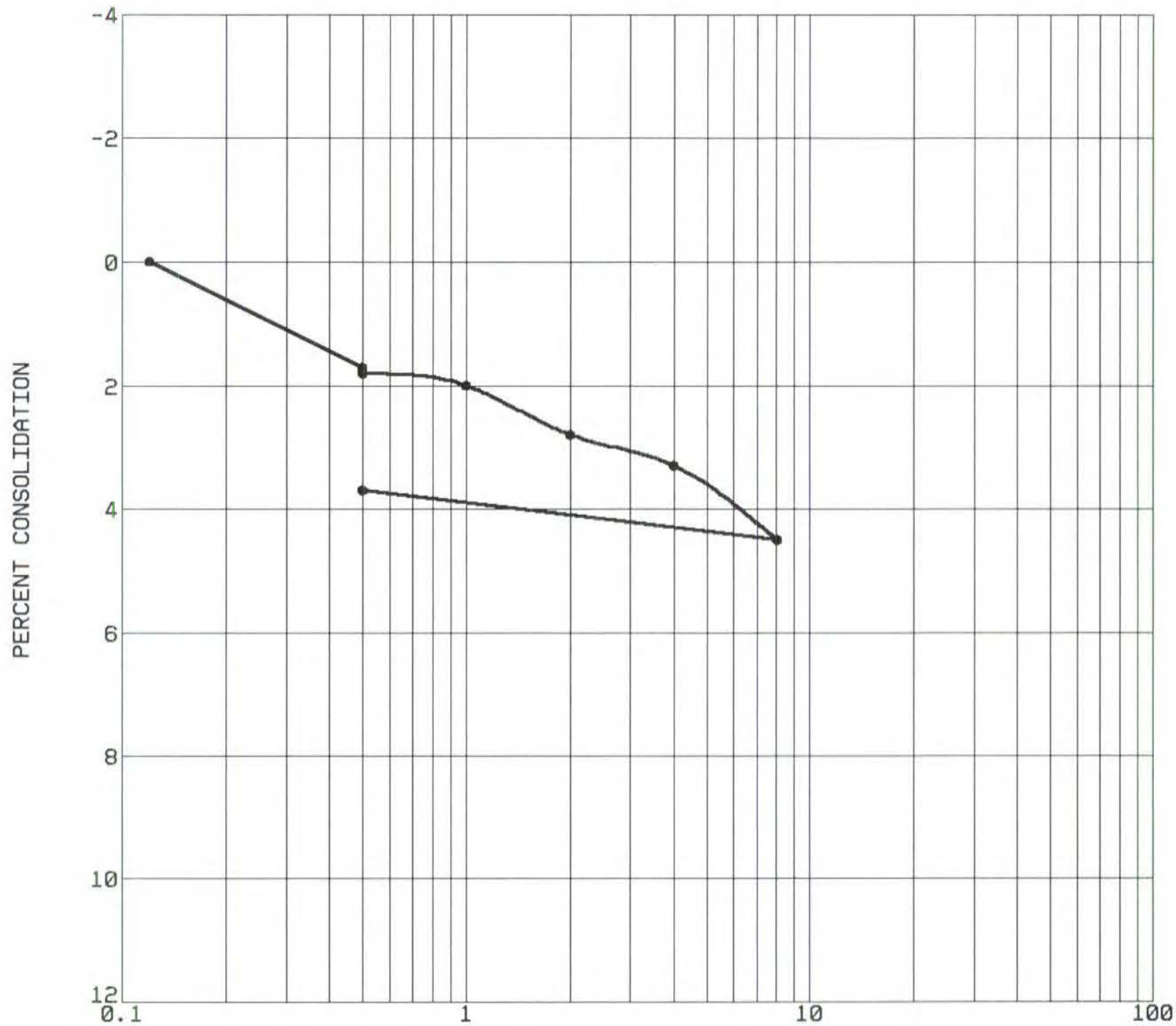
Initial Dry Density (pcf)	115.3	Initial Saturation (%)	71.6
Initial Water Content (%)	11.8	Sample Saturated at (ksf)	0.5

CONSOLIDATION CURVE

BF GOODRICH

SAN DIEGO, CALIFORNIA

SAMPLE NO. B6-2



APPLIED PRESSURE (ksf)

Initial Dry Density (pcf)	125.9	Initial Saturation (%)	100
Initial Water Content (%)	13.1	Sample Saturated at (ksf)	0.5

CONSOLIDATION CURVE

BF GOODRICH

SAN DIEGO, CALIFORNIA

APPENDIX C

APPENDIX C

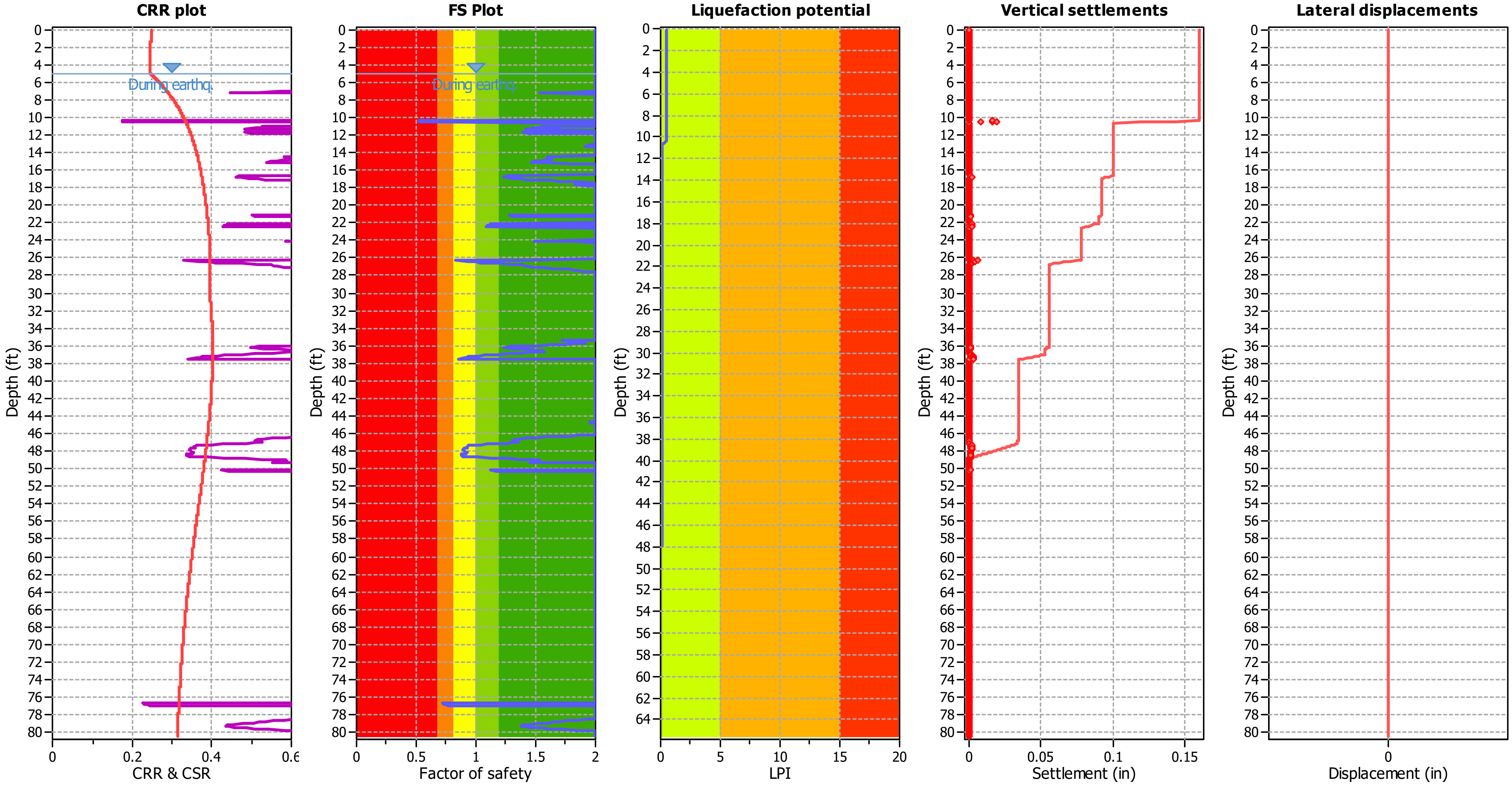
LIQUEFACTION ANALYSIS

FOR

COLLINS AEROSPACE REDEVELOPMENT SITE – PARCEL B
NORTHEAST CORNER OF H STREET AND MARINA PARKWAY
CHULA VISTA, CALIFORNIA

PROJECT NO. G2560-52-01

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 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:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.64	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

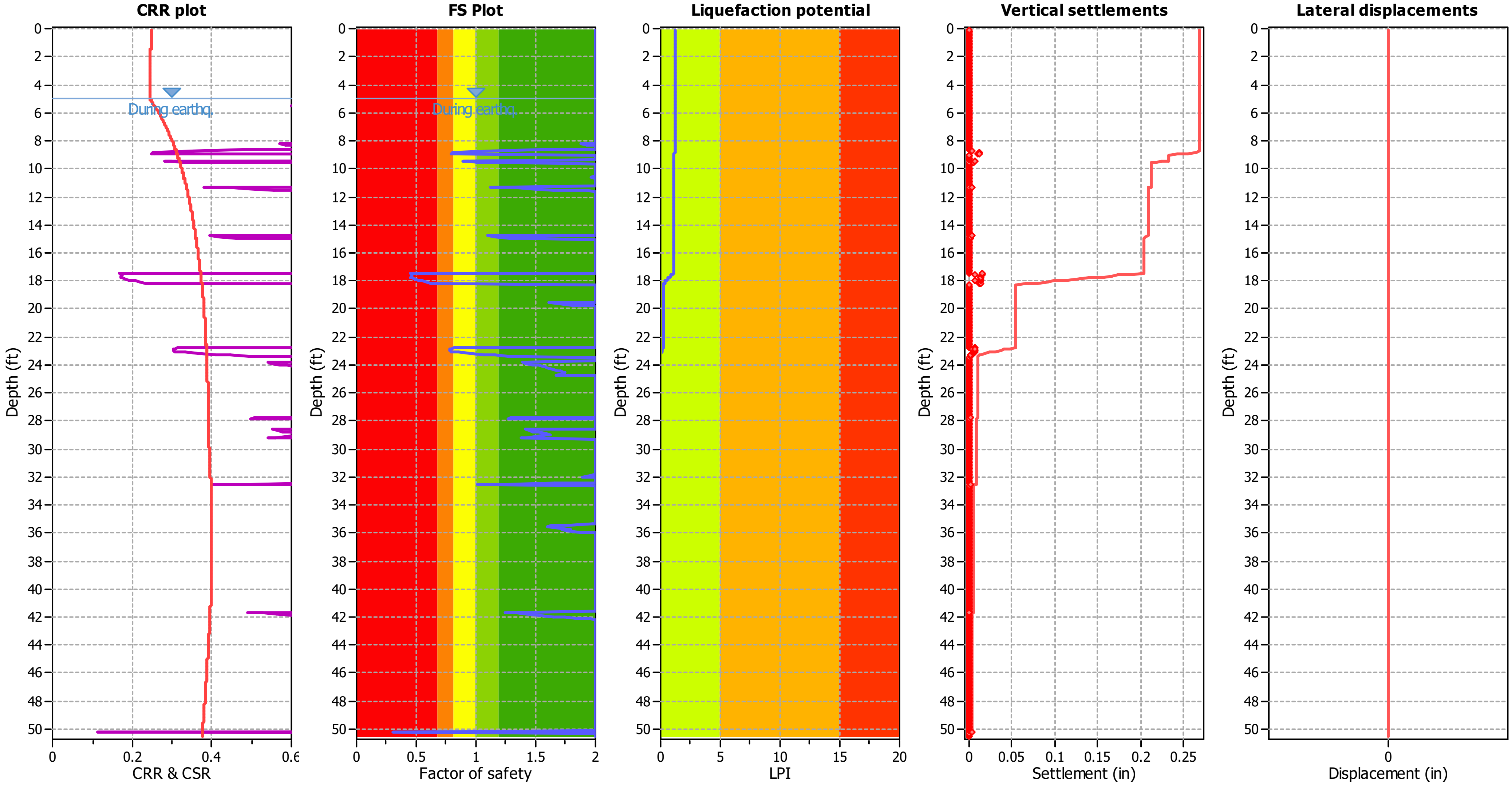
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
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Peak ground acceleration:	0.64	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

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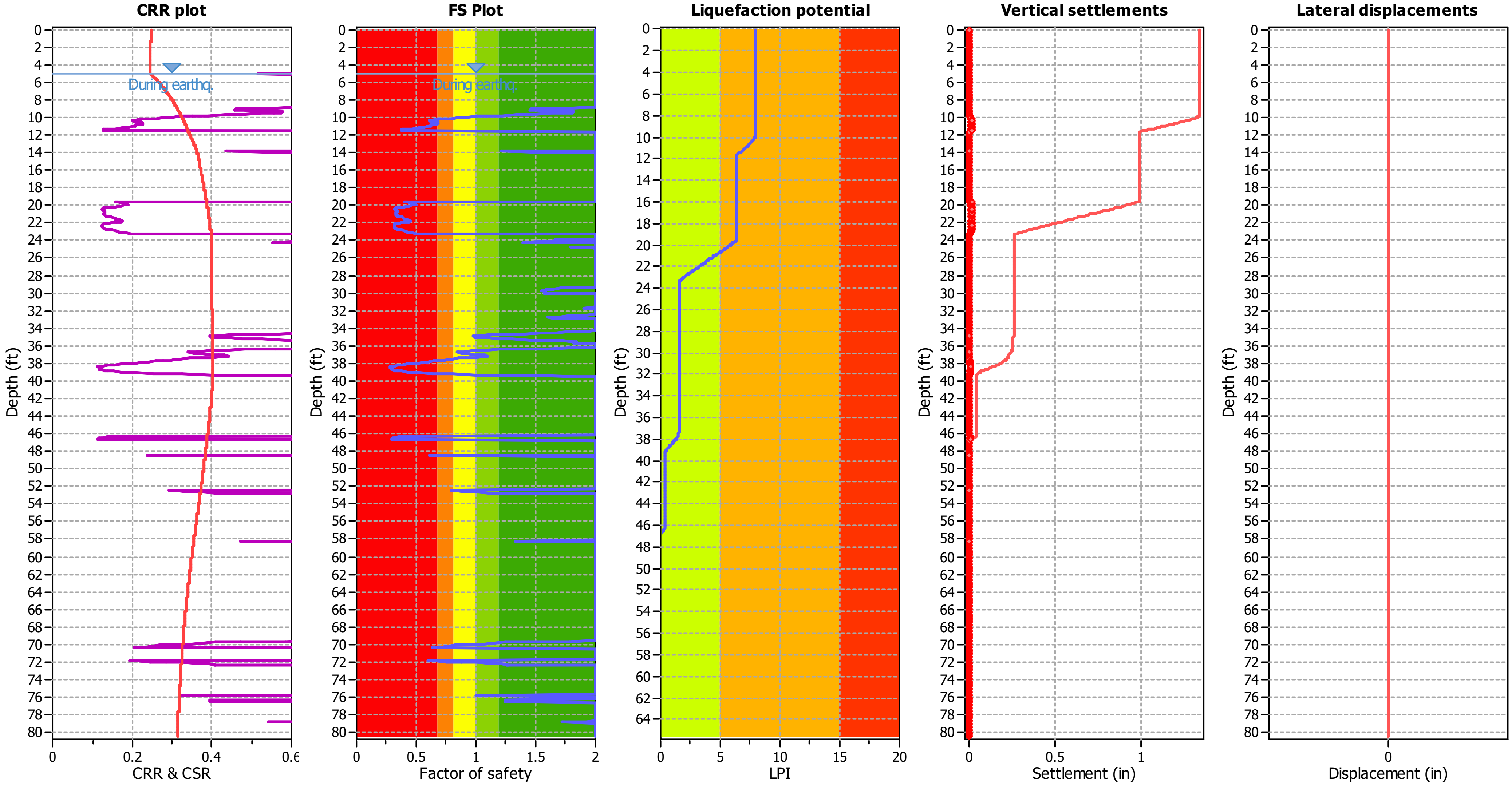
Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
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Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.64	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

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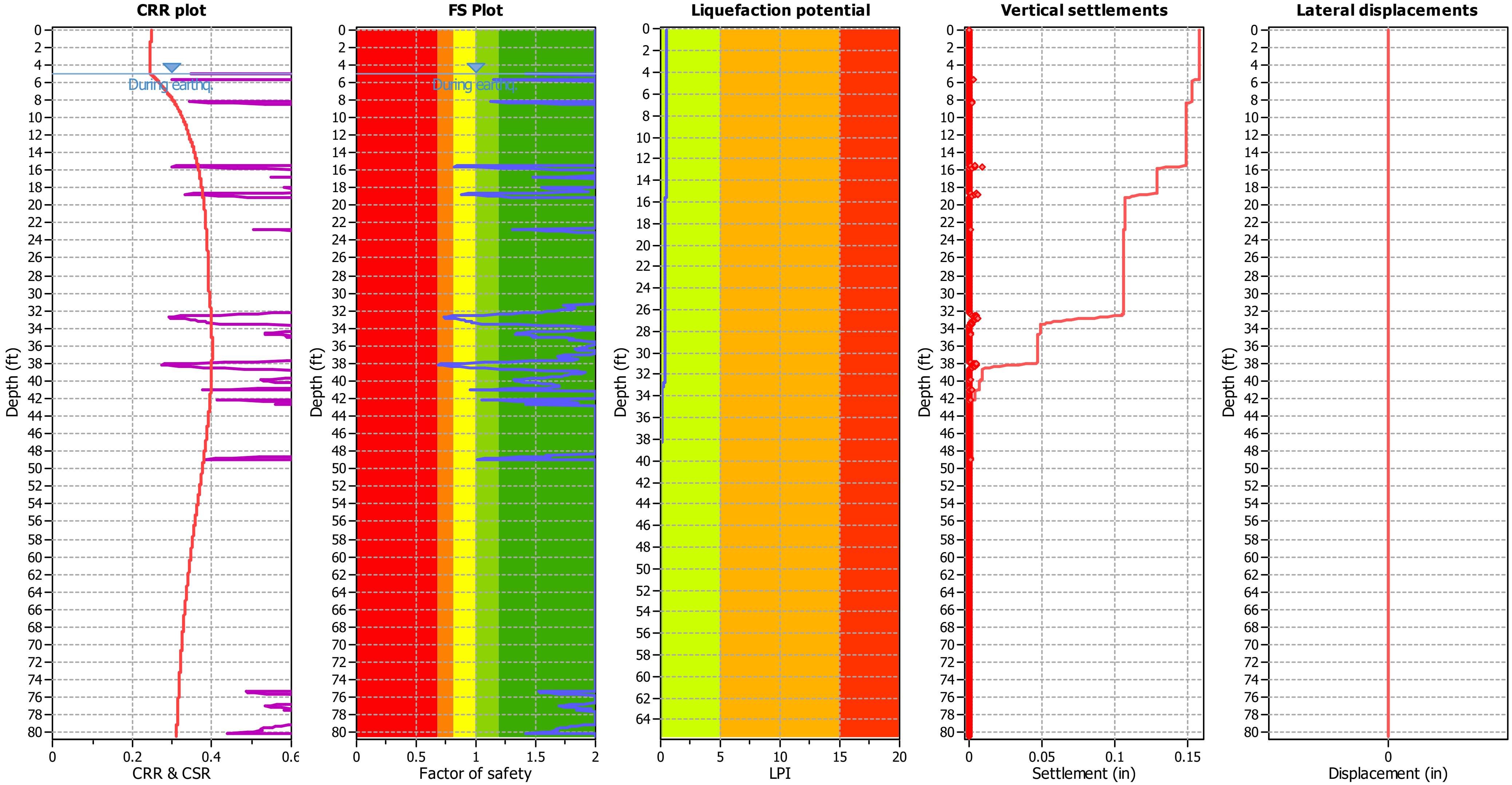

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Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.64	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

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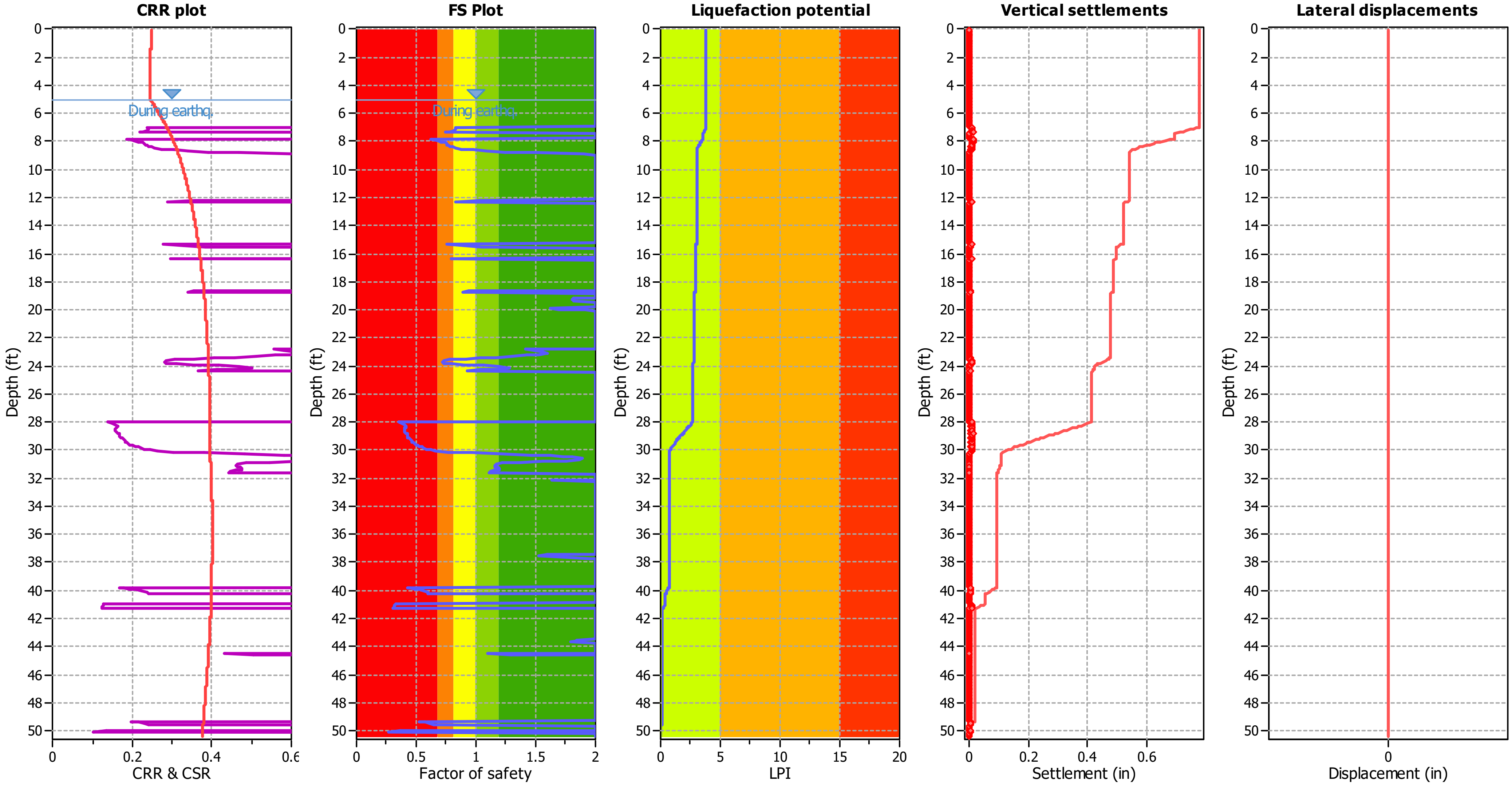
Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 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:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.64	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

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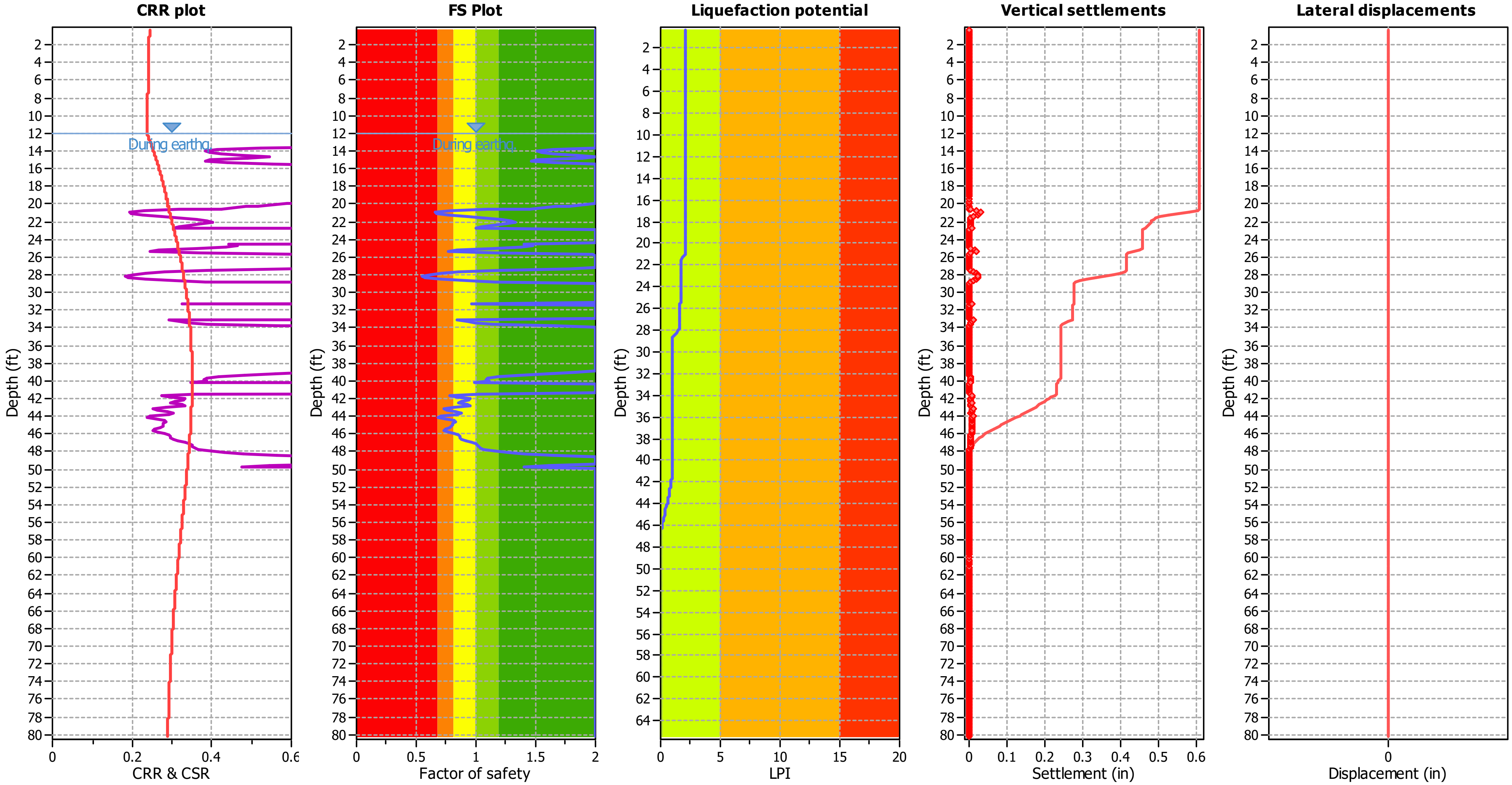
Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

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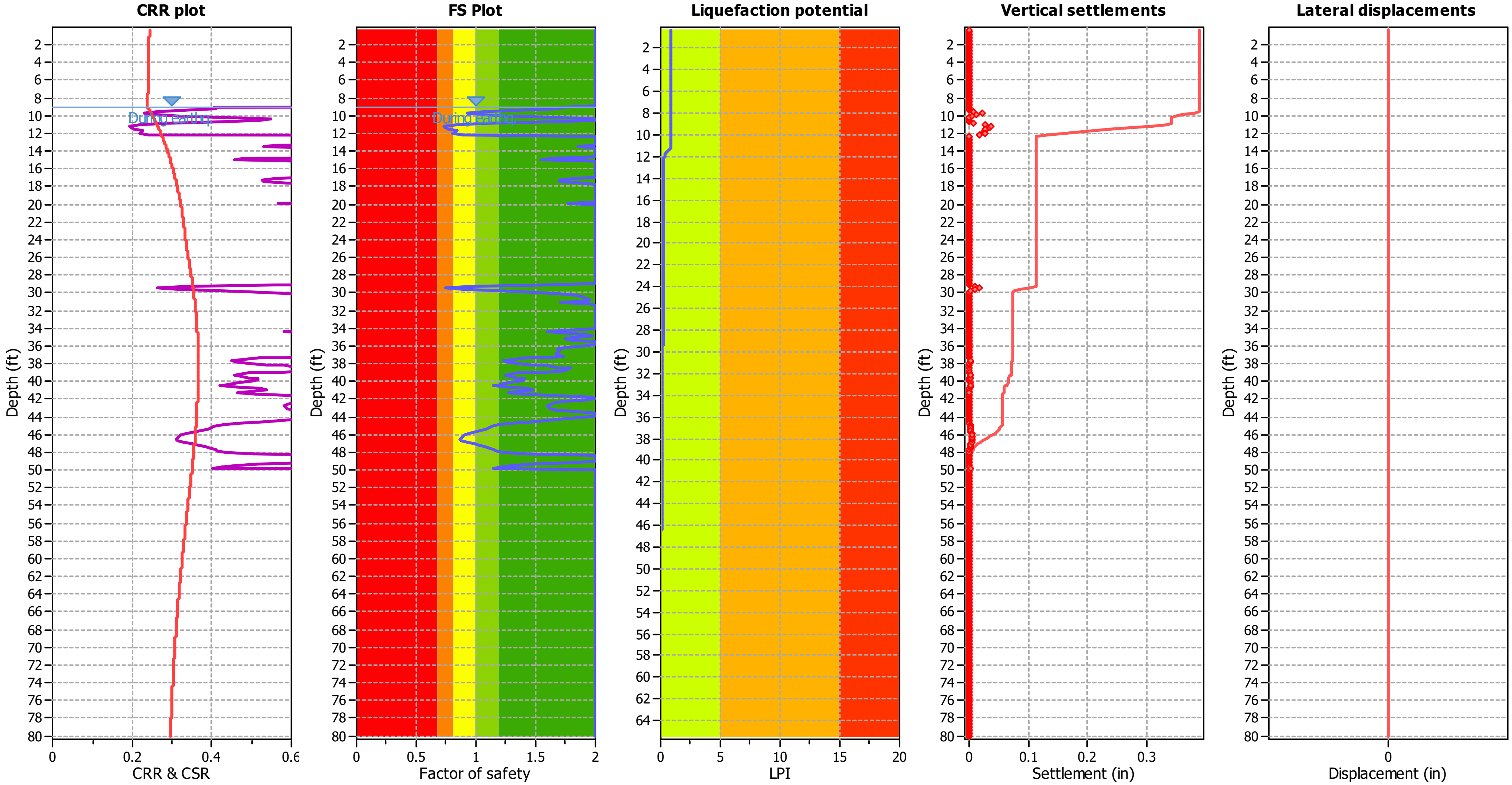
Liquefaction analysis overall plots



Input parameters and analysis data

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Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

F.S. color scheme

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LPI color scheme

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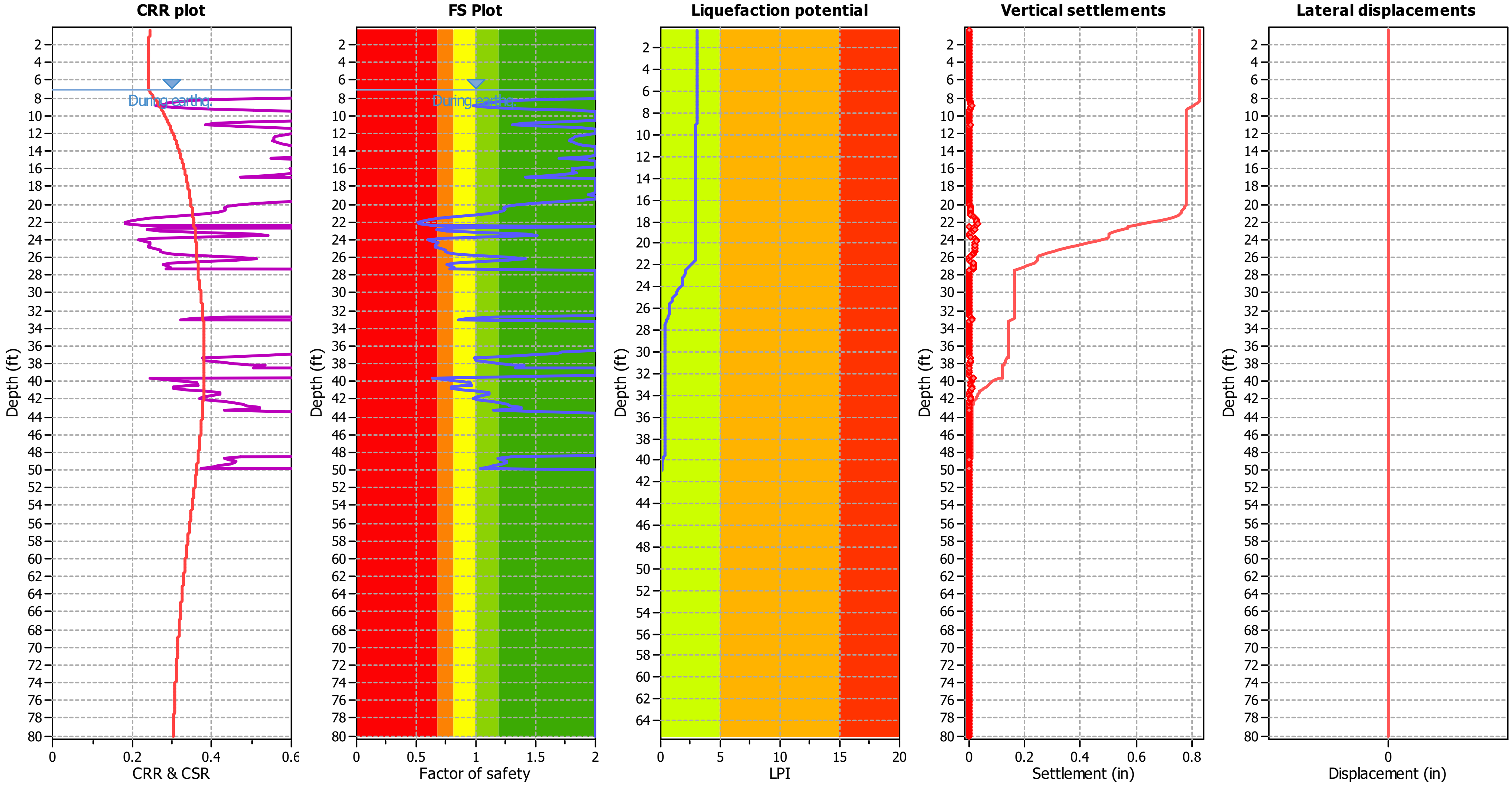
- Low risk

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	7.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	7.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

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