Normandie Crossing Specific Plan Project

Initial Study

May 2023

Lead Agency:

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1.0 INTRODUCTION

1.1 Statutory Authority and Requirements

This Initial Study has been conducted in accordance with the California Environmental Quality Act (CEQA) (California Public Resources Code [PRC] §21000 et seq.) and the State CEQA Guidelines (California Code of Regulations [CCR], Title 14, §15000 et seq.). Pursuant to State CEQA Guidelines §15063, this Initial Study has been conducted to determine if the proposed Normandie Crossing Specific Plan Project ("Project") would have a significant effect on the environment. The approximately 5.25-acre Project site consists of four parcels on the west side of South Normandie Avenue between 169th Street and 170th Street at 16829, 16835, and 16907 South Normandie Avenue in the City of Gardena ("City" or "Gardena"). The Project proposes to remove all existing onsite structures and, in their place, construct up to 403 multi-family dwelling units (DU), including 328 apartment units in one building and 75 townhome-style units in nine buildings. The seven-story apartment building would be developed on an approximately 2.14-acre portion of the site at a density of approximately 153 DU per net-acre (DU/net AC). The apartment building would provide 399 vehicle parking spaces in levels one and two, and 173 bicycle parking spaces. The three-story townhomes would be developed on an approximately 3.1-acre portion of the site in nine buildings at a density of approximately 24 DU/net AC. The townhomes would provide 160 vehicle parking spaces (150 resident spaces in two-car garages and 10 guest spaces). The combined density of the two areas is 77 DU/net AC. The requested entitlements include a General Plan Amendment, Zone Change/Zone Code Text Amendment, Specific Plan, Tract Map, Site Plan Review, and Development Agreement.

State CEQA Guidelines §15063(b) states that if the Lead Agency determines that there is substantial evidence that any aspect of a project, either individually or cumulatively, may cause a significant effect on the environment, the Lead Agency shall prepare an Environmental Impact Report (EIR), use a previously prepared EIR, or determine, which of a project's effects were adequately examined by an earlier EIR or Negative Declaration (ND). Conversely, the Lead Agency shall prepare a ND if there is no substantial evidence that the project or any of its aspects may cause a significant effect on the environment.

Pursuant to State CEQA Guidelines §15063(c), the purposes of an Initial Study are to:

- Provide the Lead Agency with information to use as the basis for deciding whether to prepare an EIR or a ND;
- Enable an applicant or Lead Agency to modify a project, mitigating adverse impacts before an EIR is prepared, thereby enabling the project to qualify for a ND;
- Assist in the preparation of an EIR, if one is required;
- Facilitate environmental assessment early in the design of a project;
- Provide documentation of the factual basis for the finding in a ND that a project will not have a significant effect on the environment;
- Eliminate unnecessary EIRs; and

- Determine whether a previously prepared EIR could be used with the project.

This Initial Study is intended to be used as a decision-making tool for the Lead Agency and responsible agencies in considering and acting on the proposed Project. Responsible agencies would comply with CEQA by considering this environmental analysis for discretionary actions associated with Project implementation, if any.

State CEQA Guidelines §15063(g) specifies that as soon as a Lead Agency has determined that an Initial Study will be required for a project, the Lead Agency shall consult informally with all Responsible Agencies and all Trustee Agencies responsible for resources affected by the project to obtain their recommendations as to whether an EIR, Mitigated Negative Declaration (MND), or ND should be prepared.

1.2 Summary of Findings

Pursuant to State CEQA Guidelines §15367, the City of Gardena, as the Lead Agency, has the authority for environmental review and adoption of the environmental documentation, in accordance with CEQA. This Initial Study evaluates the environmental issues outlined in **Section 3.2: Environmental Factors Potentially Affected**. It provides decision-makers and the public with information concerning the Project's potential environmental effects.

Based on the Environmental Checklist Form and supporting environmental analysis, the Project would have no impact or a less than significant impact concerning the following environmental issue areas: Aesthetics; Agricultural and Forestry; Biological Resources; Mineral Resources; and Wildfire. All other areas, as listed below, would have a potentially significant impact:

- Air Quality
- Cultural Resources
- Energy
- Geology and Soils (Paleontological Resources)
- Greenhouse Gas Emissions
- Hazardous Materials and Waste
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Mandatory Findings of Significance

As set forth in State CEQA Guidelines §15081, the decision to prepare an EIR will be made either during preliminary review under State CEQA Guidelines §15060 or at the conclusion of an Initial Study after applying the standards described in State CEQA Guidelines §15064. On the basis of this initial evaluation, the Lead Agency has found that the proposed Project may have a significant effect on the environment and an EIR will be prepared.

1.3 Initial Study Public Review Process

In accordance with State CEQA Guidelines §15375, the City distributed a Notice of Preparation (NOP) to notify the responsible agencies, trustee agencies, the Office of Planning and Research (OPR), and involved federal agencies that the City (i.e., Lead Agency) plans to prepare an EIR for the Project. The NOP's purpose is to solicit guidance from those agencies as to the scope and content of the environmental information to be included in the EIR.

Within 30 days after receiving the NOP, each responsible and trustee agency and OPR are required to provide the Lead Agency with specific detail about the scope and content of the environmental information related to the responsible or trustee agency's area of statutory responsibility that must be included in the Draft EIR. During the 30-day public review period, the NOP/Initial Study were made available for review on the City of Gardena Website, at https://www.cityofgardena.org/community-development/planning-projects/, and by request at the Community Development Department- please contact Amanda Acuna, Senior Planner, at 310.217.9524 or via email at AAcuna@cityofgardena.org. Written responses to the NOP/comments on this Initial Study may be sent to:

Amanda Acuna,
Senior Planner
City of Gardena, Community Development Department
1700 West 162nd Street
Gardena, CA 90247-3732
Email: AAcuna@cityofgardena.org

Please include in the subject matter line "Normandie Crossing NOP/IS Comment." Additionally, please note that email is the preferred method of communication.

1.4 Incorporation by Reference

All or portions of another document, which is a matter of public record or is generally available to the public, may be incorporated by reference. Where all or part of another document is incorporated by reference, the incorporated language shall be considered to be set forth in full as part of the document's text.

The references outlined below, which were utilized during preparation of this Initial Study, are available for review on the City of Gardena Website, at https://www.cityofgardena.org/community-development/planning-projects/, and by request at the Community Development Department – please see above contact information.

Gardena General Plan 2006. The City adopted the comprehensive Gardena General Plan 2006 (GGP) in 2006. The GGP constitutes the City's overall plans, goals, and objectives for land use within the City's jurisdiction. The GGP is based upon the following core visions for the City: City of Opportunity; Safe and attractive place to live, work and play; Community that values ethnic and cultural diversity; Strong and diverse economic base. It evaluates the existing conditions and provides long-term goals and policies necessary to guide growth and development in the direction that the community desires. Through its Goals, Objectives, Policies, and Programs, the GGP serves as a decision-making tool to guide future growth and development decisions.

The GGP consists of the following elements and plans:

- Community Development Element
  - Land Use Plan (updated in June 2012, March 2013 and February 2023)
  - Economic Development Plan
  - Community Design Plan
  - Circulation Plan (updated in July 2020)
- Community Resources Element
  - Open Space Plan
  - Conservation Plan
- Community Safety Element
  - Public Safety Plan (updated February 2022)
  - Noise Plan
- Housing Element (updated in February 2023; see below)
- Environmental Justice Element (adopted in February 2022)
- Implementation
  - Implementation Program (updated in February 2022)

The GGP was used throughout this Initial Study as a source of baseline data.

<u>City of Gardena General Plan 2006 Final Environmental Impact Report (GRC Associates, Inc., April 2006) (SCH #2005021125)</u>. The GGP Final Environmental Impact Report (GGP FEIR) analyzed the potential environmental impacts that would result from the GGP implementation. At the time of the GGP FEIR's writing, the City was 98.5 percent developed and approximately 45 acres of vacant land existed. GGP FEIR Tables 2 and 3 present the forecast capacity at the City's buildout as 22,329 DU, a population of 63,799 persons, and approximately 18.9 million SF of non-residential land uses. Buildout was estimated to occur over 20 years. The GGP FEIR concluded significant and unavoidable impacts concerning Transportation (GGP FEIR page 138). The City is currently updating its Land Use Plan to examine the environmental impacts of changing the land use designation and zoning of the inventory sites identified in the Housing Element, as well as additional non-inventory sites that are being redesignated and rezoned to create a more coherent zoning pattern. The GGP FEIR was used throughout this Initial Study as a source of baseline data.

<u>Revised 2021-2029 Housing Element 6th Cycle (HEU).</u> The City of Gardena 2021-2029 Housing Element (HE) was adopted in January 2022, and then readopted on February 15, 2023, with additional revisions. The HE analyzes the City's housing needs for all income levels and develops

strategies to provide for those housing needs. It is a key part of the City's General Plan. This HE is an eight-year program extending from 2021 through 2029. The HE identifies strategies and programs that focus on the following: 1) conserving and improving existing affordable housing; 2) providing adequate sites for residential development; 3) assisting in the provision of affordable housing; 4) removing governmental and other constraints on housing development; and 5) affirmatively furthering fair housing. The HE identifies 122 candidate sites (468 parcels consolidated) that are considered viable for housing development and will receive a housing overlay designation. HE Appendix C: Sites Inventory provides detailed parcel data for sites receiving the overlay designation. The northern portion of Project site (i.e., APNs 6106-030-011, 6106-030-015, and 6106-030-017), where the Project proposes an apartment building, is identified as candidate housing site #91. The HEU was used throughout this Initial Study as a source of baseline data for the northern portion of Project site. It is noted, preparation of an EIR for the update of the City's Land Use Plan, Zoning Code, and Zoning Map is currently underway (Land Use/Zoning Project). The EIR for the Land Use/Zoning Project includes the change of land use and zoning to the Inventory Sites identified in the Housing Element as well as additional Non-Inventory Sites that are being considered for changes to provide a more coherent zoning scheme. A Notice of Preparation for the EIR was issued on April 13, 2023 and the actions are anticipated to be complete in 2024

Gardena Municipal Code. The Gardena Municipal Code (GMC) regulates municipal affairs within the City's jurisdiction including, without limitation, zoning regulations (codified in GMC Title 18). GMC Title 18 is the primary tool for implementing the GGP's Goals, Objectives, and Policies. The GMC is referenced throughout this Initial Study to establish the Project's regulatory requirements according to the City's regulatory framework.

1.5 Report Organization

This document is organized into the following sections:

Section 1.0: Introduction provides a Project introduction and overview, cites the CEQA Statute and Guidelines provisions to which the proposed Project is subject, and summarizes the Initial Study's conclusions.

Section 2.0: Project Description details the Project's location, environmental setting, background and history, characteristics, discretionary actions, construction program, phasing, agreements, and required permits and approvals. This Section also identifies the Initial Study's intended uses, including a list of anticipated permits and other approvals.

Section 3.0: Environmental Checklist Form provides the Project background and an overview of potential impacts that may or may not result from Project implementation.

Section 4.0: Evaluation of Environmental Impacts provides an analysis of environmental impacts identified in the environmental checklist.

Section 5.0: References identifies resources used to prepare the Initial Study.

2.0 PROJECT DESCRIPTION

2.1 Project Location

The Normandie Crossing Specific Plan Project site is in the County of Los Angeles, approximately 8.8 miles southwest of downtown Los Angeles, in the southeast portion of the City of Gardena ("City"), at 16829, 16835, and 16907 South Normandie Avenue. Gardena is in Los Angeles County's South Bay region and is bordered by the City of Hawthorne and unincorporated County lands to the north, the cities of Los Angeles and Torrance to the south, the City of Los Angeles to the east; and unincorporated County lands and the cities of Hawthorne and Torrance to the west; see **Exhibit 2-1: Regional Vicinity Map**.

The approximately 5.25-acre Project site is comprised of four parcels (APN: 6106-030-011, 6106-030-015, 6106-030-016, 6106-030-017) generally bound by West 169th and West 170th Streets on the north and south, and South Normandie Avenue and Brighton Way on the east and west; see **Exhibit 2-2: Local Vicinity Map**.

2.2 Environmental Setting

Gardena is an approximate 6.0-square mile, fully urbanized city with various residential densities and other suburban land uses. While much of the City land is developed with single-family residential uses, the City's southeast portion where the Project site is located is characterized by both industrial and residential land uses. Major arterials such as Normandie Avenue, Western Avenue, Redondo Beach Boulevard, and Rosecrans Avenue are characterized by both industrial and commercial uses, with residential uses behind them.

Regional access to the Project site is provided via four major freeways: I-105 to the north; I-405 to the south and east; and I-110 and SR-91 (becomes West Artesia Boulevard) to the east. From I-105, access to the Project site is provided via South Western Avenue, from I-405, access is provided via South Normandie Avenue, from I-110, access is provided via Artesia Boulevard at the City's northern portion, which intersects with Normandie Avenue, and from SR-91, access is provided via Artesia Boulevard in the City's southern portion, which intersects with Normandie Avenue. The existing conditions and Circulation Plan classifications[1] for nearby roadways are summarized below:

- **Normandie Avenue,** which is oriented north-south on the Project site's eastern boundary, contains five divided vehicle lanes, pedestrian sidewalks on both sides of the ROW, and public and private railroad tracks along the road's western boundary. The railroad tracks cross onto the roadway's eastern side along the Project's frontage. Normandie Avenue is classified as a Major Collector (four lanes, undivided with parking and Class II bike lane).

[1] City of Gardena. (2006). Gardena General Plan 2006. Figure CI-1: Roadway Network and Figure CI-2: Roadway Cross Sections. Gardena, CA: City of Gardena. Retrieved from: https://cityofgardena.org/wp-content/uploads/2016/04/Circulation-Plan-2020-Update.pdf, accessed April, 2023.

- **Brighton Way,** which is oriented north-south and forms the Project site's western boundary, is an alleyway. Brighton Way is classified as a Local Street (two lanes undivided with parking).
- **West 169th and West 170th Streets**, are oriented east-west and form the Project site's northern and southern boundaries, respectively. West 169th and West 170th Streets are two-lane, undivided with parking. These roadways are classified as Local Streets (two lanes undivided with parking).

Transit and pedestrian facilities exist near the Project site. The City of Gardena's Transit Service (GTrans) provides access to GTrans Line 1X via two bus stops on either side of the 166th Street and Brighton Avenue intersection. Bus stop N1X25 is located approximately 640 feet north of the Project site, while bus stop S1X45 is located approximately 760 to the north. GTrans Line 4 runs alongside the Project site via Normandie Avenue, however this service line has recently been discontinued. The Harbor Gateway Transit Center, which is a Los Angeles County Metro Rail, is located at 731 West 182nd Street, approximately 0.9 mile southeast of the Project site. Pedestrian access to the Project site is provided by sidewalks, which are present on West 169th Street, West 170th Street, and Normandie Avenue surrounding the Project site, except along the south side of 169th Street, between Brighton Way and Brighton Avenue.

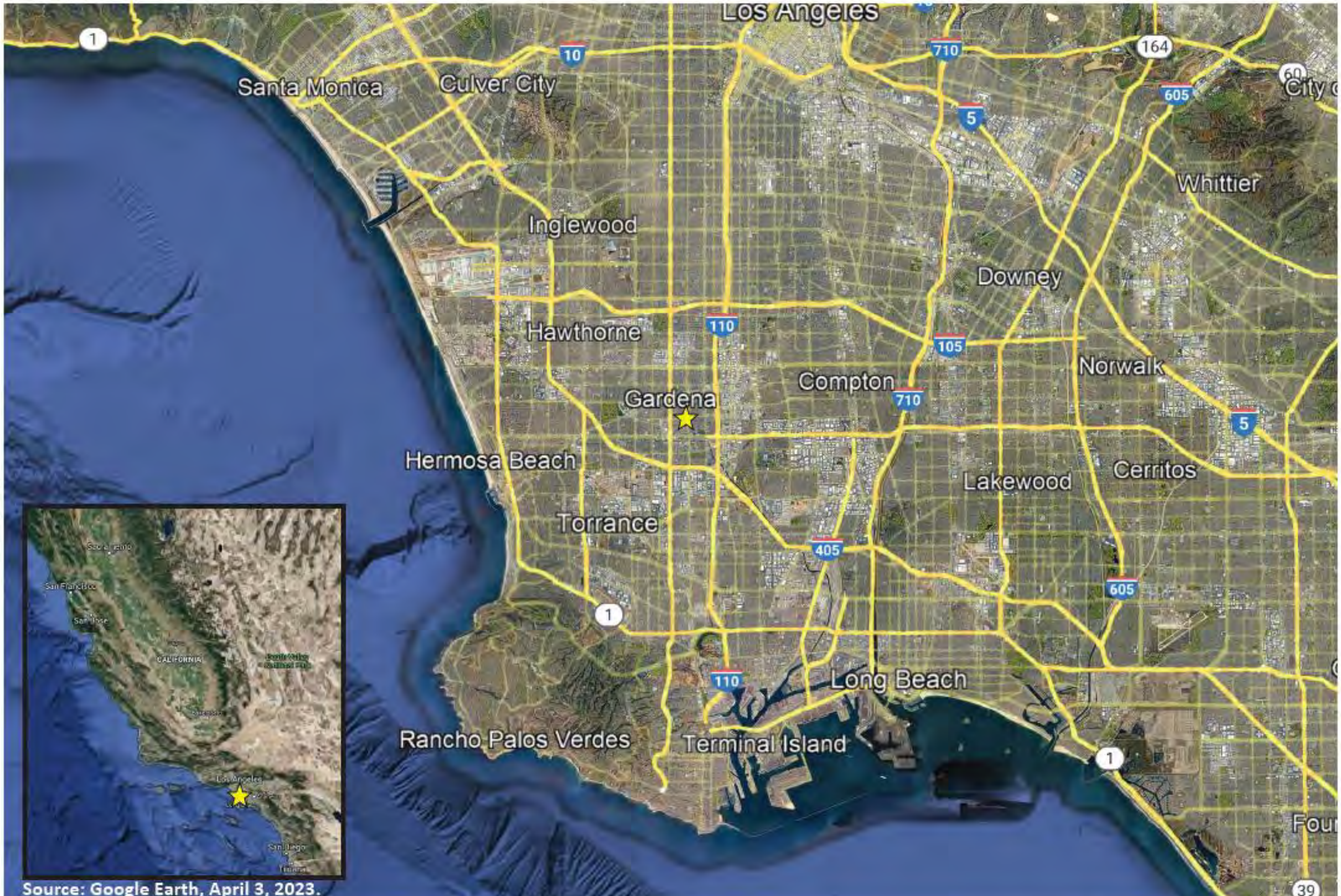


EXHIBIT 2-1: REGIONAL VICINITY MAP
Normandie Crossing Specific Plan Project

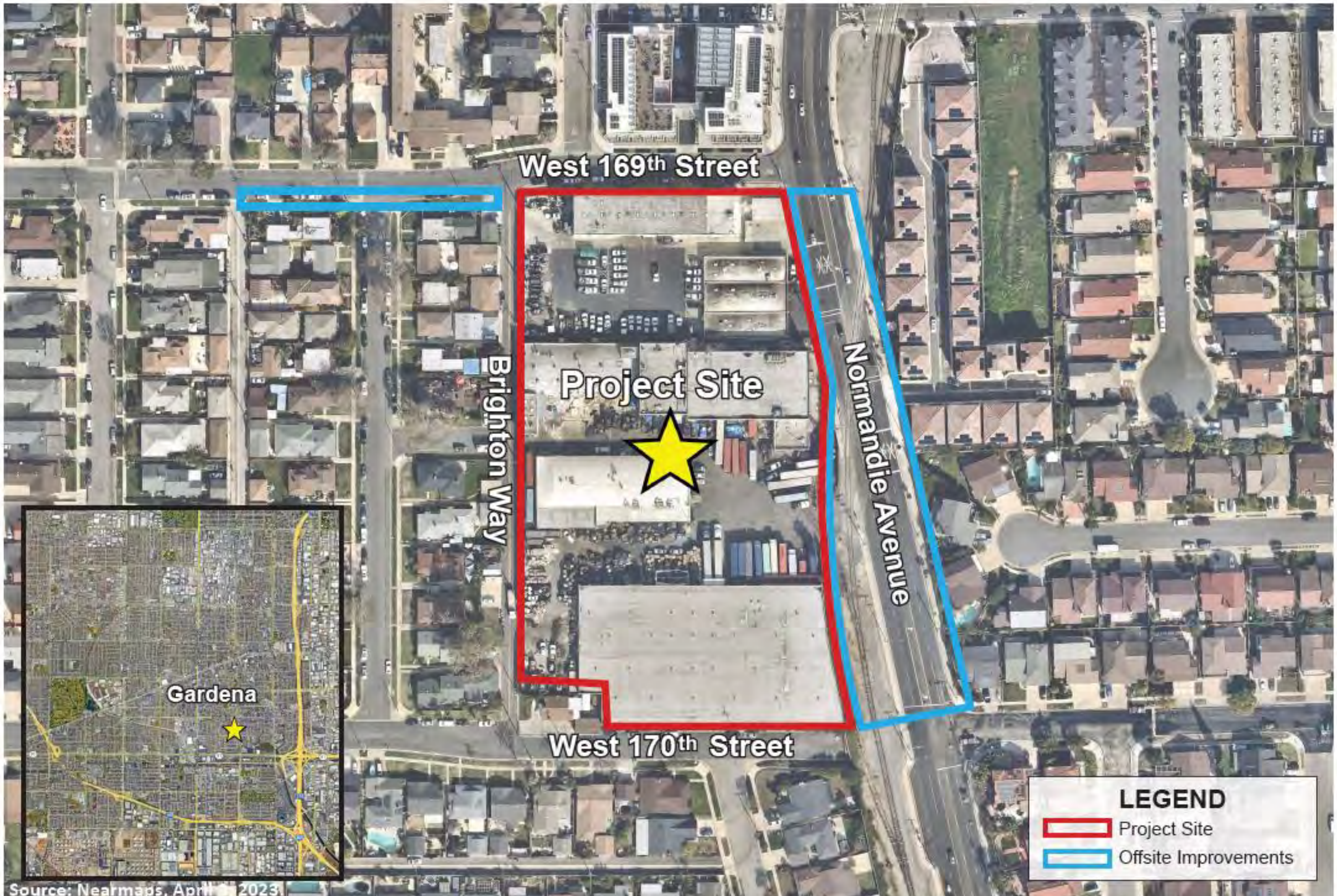


EXHIBIT 2-2: LOCAL VICINITY MAP
Normandie Crossing Specific Plan Project

2.2.1 Onsite Land Uses

The Project site is relatively level, sloping from the northeast corner to the southwest corner, with an elevation difference of approximately 7.0 feet across the site. As depicted in **Exhibit 2-2**, the Project site is fully developed with five industrial buildings, asphalt surface parking lots, hardscapes, and landscaping. **Table 2-1: Existing Onsite Land Uses** summarizes the existing onsite land uses by APN and address, and indicates approximately 115,424 square feet (SF) of industrial floor area is present on the Project site. However, 9,324 SF of industrial floor area on Parcel 4 is not being used due to its dilapidated condition and is therefore are not occupiable. Additionally, the Project site includes a railroad spur from the adjacent Union Pacific Railroad (UPRR) northern track. The spur is associated with former industrial operations but is no longer in use.

Table 2-1: Existing Onsite Land Uses

Parcel ID[1]	Assessor's Parcel Number[2]	Size (Acres)[2]	Address[2]	Existing General Plan Land Use[3]	Existing Zoning[4]	Building (Square Feet)[2]	Year Built[2]
1	6106-030-011	0.55	16829 South Normandie Avenue	Industrial, High Density 30 Overlay	Industrial Zone (M-1), Housing Overlay 4 (HO-4)[5]	10,880	1963
2	6106-030-015	0.47	16835 South Normandie Avenue	Industrial, High Density 30 Overlay	Industrial Zone (M-1), Housing Overlay 4 (HO-4)[5]	9,600	1957
3	6106-030-016	0.30	No Address	Industrial, High Density 30 Overlay	Industrial Zone (M-1), Housing Overlay 4 (HO-4)[5]	-	-
4	6106-030-017	3.93	16907 South Normandie Avenue	Industrial	General Industrial Zone (M-2)[6]	94,944[7]	1952
	Total	***5.25***				***115,424***[7]	

Notes:
1. Identification number (ID) correlates with labels on **Exhibit 2-2: Local Vicinity Map**.
2. ParcelQuest. (January 2021). Assessor Data. Retrieved from: https://pqweb.parcelquest.com/#home.
3. City of Gardena. (2006, Updated February 2013). *Gardena General Plan 2006. Figure LU-2: 2013 General Plan Land Use Policy Map*. Gardena, CA: City of Gardena. Retrieved from: https://cityofgardena.org/wp-content/uploads/2023/03/Land-use-Plan-2023-Update-FINAL.pdf. Accessed April, 2023.
4. City of Gardena. (2020). Zoning. Available at https://cityofgardena.org/wp-content/uploads/2020/11/Gardena_Zonning_2020.pdf. Accessed April, 2023.
5. See GMC §18.36.060: Property Development Standards and Ordinance 1847.
6. See GMC §18.38.010: General Industrial Zone (M-2).
7. This total includes 9,324 square feet of building that is unoccupied and dilapidated.

2.2.2 Existing General Plan and Zoning

The Gardena General Plan (GGP) designates the Project site as Industrial,[2] which provides for a wide range of industries, technology-related uses and supporting facilities, and business parks.[3] Additionally, the GGP assigns aa High Density 30 Overlay to Parcels 1, 2, and 3; see **Table 2-1**. The Zoning Map classifies the northern approximately 1.4 acres of the Project site (APNs 6106-030-011, 6106-030-015, and 6106-030-016) as Industrial Zone (M-1) and the southern approximately 3.9 acres (APN 6106-030-017) as General Industrial Zone (M-2); see **Table 2-1**.[4] Commercial, manufacturing, and industrial uses are permitted in the M-1 and M-2 zones.[5] Additionally, Parcels 1, 2, and 3 (see **Table 2-1**) are zoned Housing Overlay 4 (HO-4), which allows a density of 21-30 DU/net AC. Surrounding Land Uses and Zoning

The Project site is generally surrounded by single- and multi-family residential uses. There are two immediately adjacent parcels that are outside the Specific Plan area, but are where entitlement actions are proposed; see **Section 2.4: Project Characteristics.** The parcel immediately adjacent to the Project site's southwest corner, at 16964 West 179th Street, is occupied by a single-family residential (SFR) DU. The parcel immediately adjacent and east of the Project site is occupied by Union Pacific Railroad (UPRR) tracks. Both of these parcels are currently designated Industrial and zoned M-2. The surrounding land uses and zoning are depicted on **Exhibit 2-3: Zoning Map** and summarized in Error! Reference source not found.**.**

[2] City of Gardena. (2006, Updated February 2013). *Gardena General Plan 2006*. Figure LU-2: 2013 General Plan Land Use Policy Map. Gardena, CA: City of Gardena. Retrieved from: https://cityofgardena.org/wp-content/uploads/2023/03/Land-use-Plan-2023-Update-FINAL.pdf, accessed April, 2023.

[3] City of Gardena. (2006, Updated February 2013). *Gardena General Plan 2006*. page LU-19. Gardena, CA: City of Gardena. Retrieved from: https://cityofgardena.org/wp-content/uploads/2023/03/Land-use-Plan-2023-Update-FINAL.pdf, accessed April, 2023.

[4] City of Gardena. (2020). *City of Gardena Zoning 2020*. Retrieved from: https://cityofgardena.org/wp-content/uploads/2020/11/Gardena_Zonning_2020.pdf. accessed April, 2023.

[5] Gardena Municipal Code §18.36.020: Uses Permitted and §18.38.010: General Industrial Zone (M-2).

Source: Gardena GIS Online, General Plan and Zoning - PUBLIC

EXHIBIT 2-3: ZONING MAP
Normandie Crossing Specific Plan Project

NOT TO SCALE

Table 2-2: Surrounding Land Uses and Zoning		
Direction	**Existing On-the-Ground Land Uses**	**Zoning[1]**
North	North: West 169th Street, with a 63-unit single-room occupancy development across the street. Northwest: Single-family residential uses.	North: Industrial Zone (M-1)[2] Northwest: Low-Density Multi-Family Residential Zone (R-2)[3]
South	South: West 170th Street, with single-family residential uses across the street. Southwest: One single-family residential dwelling unit is immediately adjacent, at 16964 West 179th Street.	South: Single-Family Residential Zone (R-1)[4] Southwest: General Industrial Zone (M-2)[5]
East	East: South Normandie Avenue and an existing UPRR track (north/south orientation) are immediately adjacent and to the east. Northeast/Southeast: multi- and single-family uses across the street, respectively.	East: General Industrial Zone (M-2)[5] Northeast: Normandie Estates Specific Plan[6] Southeast: Single-Family Residential Zone (R-1)[4]
West	Brighton Way is to the west, with duplex residential uses across the street.	Low-Density Multiple Family Residential Zone (R-2)[3]

Notes:
1. City of Gardena. (2020). Zoning. Available at https://cityofgardena.org/wp-content/uploads/2020/11/Gardena_Zonning_2020.pdf.
2. GMC Chapter 18.36: Industrial Zone (M-1). See GMC §18.36.040: Performance Standards, for property development standards.
3. GMC Chapter 18.14: Low-Density Multi-Family Residential Zone (R-2). See GMC §18.14.050: Property Development Standards, for property development standards.
4. GMC Chapter 18.12: Single-Family Residential Zone (R-1). See GMC §18.12.050: Property Development Standards, for property development standards.
5. GMC Chapter 18.38: General Industrial Zone (M-2). M-1 Zone performance standards apply; see GMC §18.36.040.
6. Normandie Estates Specific Plan single-family detached residential.
7. GMC §18.14.050: Property Development Standards.

2.3 Project Characteristics

2.3.1 Project Overview

The Applicant seeks approval of the Normandie Crossing Specific Plan (NCSP)(SP #1-21) Project. The Project proposes to establish a maximum allowable development within the approximately 5.25-acre NCSP area of up to 403 DU. Because the City does not have any zone which would accommodate the proposed development, the Applicant is proposing the NCSP, which would establish the site-specific zoning regulations and development standards for this area. The NCSP includes the statutorily required elements, including a land use plan, a circulation plan, a description of existing and proposed utilities and infrastructure, design guidelines, development standards, and administrative provisions. In addition to requiring a Specific Plan, the Project requires various other approvals, including a Development Agreement; see **Section 2.5: Agreements, Permits, and Approvals** below. The approvals are collectively referred to as the "Project."

For analysis purposes, it is assumed all existing approximately 115,424 SF of industrial uses would be removed and replaced with the proposed residential development. However, because 9,324 SF of the existing industrial uses are in a dilapidated condition and therefore are not occupiable, this analysis will evaluate the loss of 106,100 SF of industrial uses.

The Project proposes offsite sidewalk and railroad improvements, as depicted on **Exhibit 2-2** Sidewalk improvements are proposed along the south side of 169th Street, just west of the Project site**,** between Brighton Way and Brighton Avenue. Track and other railroad improvements are proposed on Normandie Avenue along the site's eastern boundary, pursuant to UPPR standards.

Additionally, the Project proposes to redesignate and rezone two parcels that are adjacent to the site and outside the proposed Specific Plan area: the residential parcel at 16964 West 179th Street; and the UPRR parcel immediately adjacent and east of the Project site.

The proposed Project components are further described below.

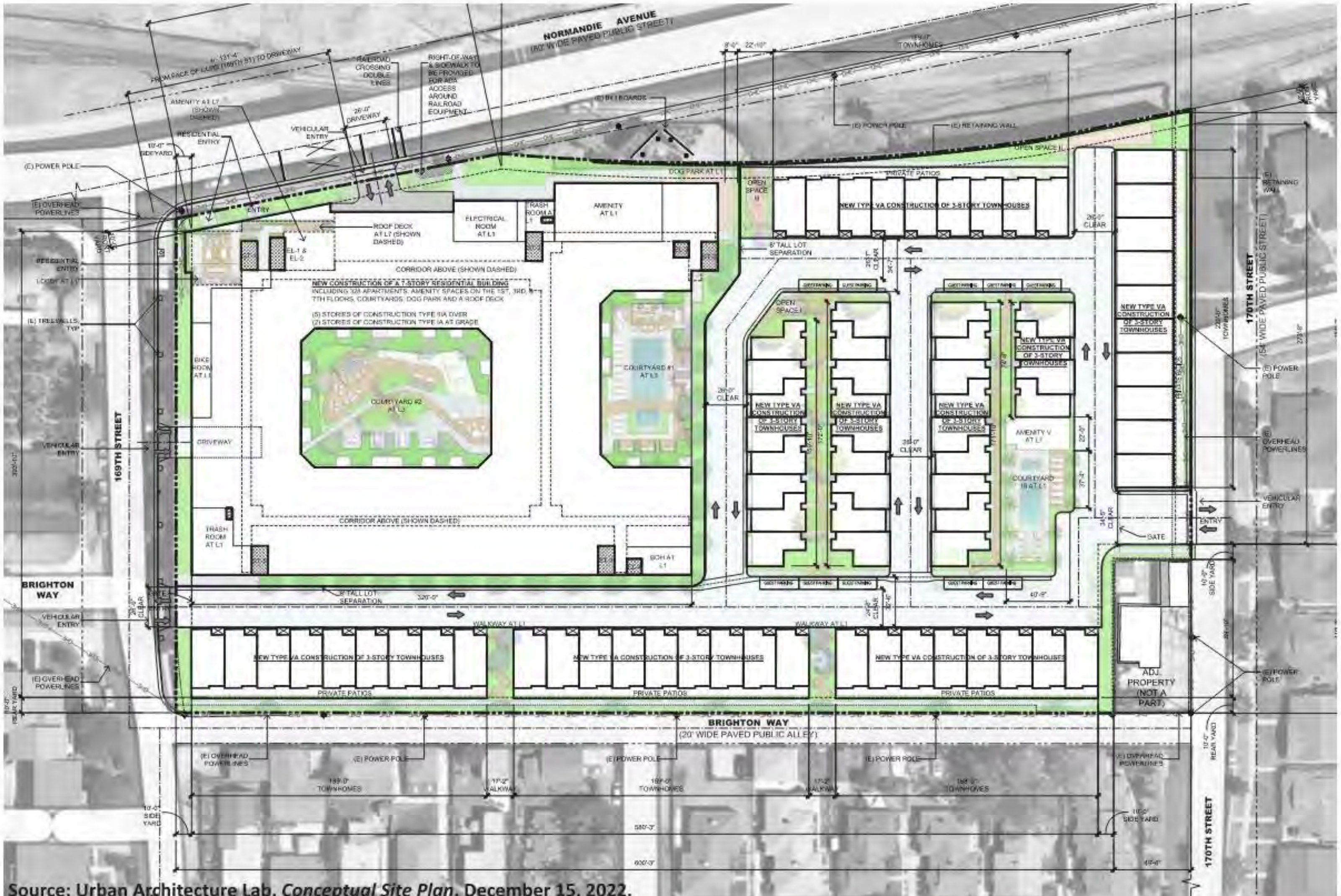
Land Use Plan

The Project proposes a 403-DU multi-family residential development with two types of residential uses: an apartment building with 328 DU at the Project site's northern portion; and 75 townhome-style units within nine buildings at the Project site's southern portion and along the western site boundary; see **Exhibit 2-4: Conceptual Site Plan**. Overall, the Project site would be developed at a density of approximately 77 DU per acre (DU/AC). **Table 2-3: Land Use Summary – Proposed Project**, summarizes the proposed development according to land use type.

Table 2-3: Land Use Summary – Proposed Project

Description	Industrial (Square Feet)[1]	Residential[1]	
		(Square Feet)	(Dwelling Units)
Industrial (to be removed)	-115,424	-	-
Industrial (to be removed, but excluded from Project impact offsets)	9,324		
Apartment Building	-	308,308	328
Townhome-Style Residential	-	120,673	75
Project Total	***-106,100***	***+428,981***	***+403***

Notes:
1. See **Table 2-1: Existing Onsite Land Uses.**
2. Urban Architecture Lab (2022). *16911 Normandie Apartments and Townhomes Entitlement Set, Sheet No. G0.01: Project Information.*



Source: Urban Architecture Lab, *Conceptual Site Plan*, December 15, 2022.

EXHIBIT 2-4: CONCEPTUAL SITE PLAN
Normandie Crossing Specific Plan Project

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Kimley»Horn

Apartments

The Project proposes an approximately 308,308-SF apartment building with 328 DU at a density of approximately 153 DU per acre (DU/AC). The building would be seven stories at a maximum height of approximately 87.5 feet. Table 2-4: Land Use Summary – Proposed Apartment Building [1]summarizes the apartment building's proposed floor areas. The various proposed apartment product types are 68 studio, 194 one-bedroom, and 66 two-bedroom. The Project proposes approximately 61,743 total SF of open space, including approximately 31,400 SF of private open space and approximately 31,434 SF of public open space. Each unit would be provided a minimum of 50 SF of private open space for Subarea A and 200 SF of private open space for Subarea B (i.e., balconies and roof decks). The Specific Plan separates the proposed open space and amenities by Subarea A (Apartment Building Area) and Subarea B (Townhome Area). The following amenities are proposed per Subarea:

- **Open Space Subarea A:** Roof deck with BBQs and seating areas; swimming pool with BBQ, seating areas, and fire pits; a dog park; fitness room; club houses; and a courtyard with seating area, fire table, and game tables.
- **Open Space Subarea B:** Swimming pool with BBQ and seating areas; dog park; club house; and paseos with seating areas.

Table 2-4: Land Use Summary – Proposed Apartment Building [1]

Level	Description	Floor Area[2] (Square Feet)	Dwelling Units
L1	Lobby	2,800	
	Amenity I: Fitness Room	2,682	
L2 - L7	Apartments	241,109	328 (68 Studio, 194 1-Bedroom, 66 2-Bedroom)
	Balconies (Covered)	6,991	
L3	Amenity II: Courtyard	1,446	
	Amenity III: Pool Court	1,500	
L4	Amenity IV: BBQ Covered Dining Area	795	
Other	Other[3]	50,985	
Total		***308,308***	

Notes:
1. Urban Architecture. (2022). *16911 Normandie Apartments & Townhomes Entitlement Set*.
2. "Floor Area," as defined in GMC Chapter 18:04: Definitions.
3. Other = Circulation, stairs, elevator shafts, trash vestibules, and trash rooms.

Onsite vehicle parking (approximately 399 spaces) and bicycle parking (173 spaces) are proposed on the building's first two levels, as follows:

- Level 1:
  - Bicycle Parking, 173 Spaces: 16 short-term and 157 long-term.

  - Vehicle Parking, 195 Spaces: 135 Standard, 20 electric vehicle charging (one of which is a van electric vehicle charging), 8 accessible, and 32 tandem stalls.
- Level 2:
  - Vehicle Parking, 204 Spaces: 150 Standard, 20 electric vehicle charging, and 34 tandem stalls.

The vehicle parking spaces would be unbundled from the rental of the apartment units to encourage alternate modes of transportation.

Townhomes

The Project proposes 75 townhome-style units in nine buildings (totaling approximately 120,673 SF), at a density of approximately 24 DU/AC. The townhome buildings would be three-story at a maximum height of approximately 40 feet. **Table 2-5: Land Use Summary – Proposed Townhomes** summarizes the townhome proposed floor areas. The various proposed townhome product types are 30 two-bedroom, 35 three-bedroom, and 10 four-bedroom. Additionally, the townhomes would include private and public open spaces as described for Open Space Subarea B above.

Table 2-5: Land Use Summary – Proposed Townhomes

Level	Description	Floor Area[1] (Square Feet)	Dwelling Units
L1-L3	Townhouses	115,982	30 two-bedroom 35 three-bedroom 10 four-bedroom
	Balconies (Covered)	3,916	
L1	Amenity V	775	
	Subtotal	**120,673**	

Source: Urban Architecture. (2022). *16911 Normandie Apartments & Townhomes Entitlement Set*.

Note:
1. "Floor Area," as defined in GMC Chapter 18:04: Definitions.

Approximately 160 vehicle parking spaces (150 spaces in attached garages and 10 guest spaces) are proposed.

2.3.2 Utilities and Infrastructure

The utilities and infrastructure proposed in the NCSP area include a domestic, fire and irrigation water line connection, sewer line connection, onsite stormwater drainage and management design, electrical power line connection, natural gas line connection, and solid waste collection areas. The NCSP's public facilities and utilities are addressed in NCSP Chapter 4, Section V: Public Facilities and Utilities Plan. The NCSP includes the distribution, location, extent of major components of public and private utilities and infrastructure, and other essential facilities within the NCSP area that are needed to support the proposed development.

2.3.3 Development Regulations and Requirements

The NCSP specifies the standards which development in the NCSP area would be subject to. Specific regulations and requirements for development in the NCSP area can be found in NCSP Chapter 5, Section I: Development Standards. These regulations (which are intended to replace the existing zoning regulations) address various aspects of development, as follows:

- Permitted and Prohibited Uses: A project in the NCSP area would only be occupied by land uses identified in the NCSP and would be subject to the applicable City approval process.
- Development Standards (e.g., density and development capacity, maximum building height, floor area/floor area ratio, dwelling unit size, and setbacks).
- Design Standards (e.g., siding materials, colors, landscaping, lighting, and sustainability). Land uses within the NCSP area would be required to comply with the design standards, which are intended to ensure quality development within the NCSP area.
- Recreation and Open Space Standards
- Parking and Loading
- Nonconformities
- Maintenance Standards
- Standards for Accessory Structures, Additions, Walls, Fences, and Other Changes
- Sign Program

2.3.4 Implementation

The program of implementation necessary to carry out the land use plan, utilities/infrastructure, and development standards described above is addressed through the NCSP's administration of plan, which address the framework, review authority, substantial conformance, and NCSP modifications. The NCSP's proposed implementation is addressed in NCSP Chapter 7: Implementation.

2.4 Offsite Improvements and Entitlements

The Project proposes offsite sidewalk and railroad improvements, and land use and zoning entitlements, as described below.

2.4.1 Sidewalk Improvements

The Project proposes to construct approximately 266 linear feet of offsite sidewalk improvements along the south side of 169th Street, just west of the Project site, between Brighton Way and Brighton Avenue. The sidewalk improvements would be constructed pursuant to GMC §17.08.170: Improvements and designed to be consistent with the GGP Circulation Element requirements for a Local Street.

2.4.2 Normandie Avenue Railroad Improvements

The Project proposes to remove approximately 830 linear feet of railroad spur currently located along the Project's eastern boundary. The Project would include track infrastructure improvements designed pursuant to current UPRR standards, including a new median both north and south of the track alignment, and new warning devices and tactile warning strips on the Normandie Avenue east and west sidewalks. Finally, railroad crossing pavement markings immediately north and south of the track alignment would be refreshed. Additionally, the Project proposes to remove the spur track, which enters the Project site.

2.4.3 Residential Parcel at 16964 West 179th Street

Concerning the SFR parcel immediately adjacent to the Project site's southwest corner (not a part of the Specific Plan area) at 16964 West 179th Street, the Project proposes to redesignate the parcel from Industrial to Low-Density Residential, and rezone from General Industrial Zone (M-2) to Low-Density Multi-Family Residential Zone (R-2) consistent with the existing residential land use.

2.4.4 Union Pacific Railroad Parcel

Concerning the parcel immediately adjacent and east of the Project site that is currently occupied by UPRR tracks, the Project proposes to redesignate the property from Industrial to Public/Institutional, and rezone from General Industrial Zone (M-2) to Official (O) consistent with the existing railroad land use.

2.5 Project Construction Activities and Phasing

Project construction is conservatively analyzed to occur in a single phase. Phased occupancy of the proposed Project would be permitted, provided all occupiable areas are deemed safe for fire and life safety purposes. For purposes of the environmental analysis, opening year is assumed to be 2027.

Project construction is anticipated to begin June 2024 and be completed by September 2027. Project construction is anticipated to occur in the following sequence:

- Demolition (2 months);
- Site preparation (1 month);
- Grading (2 months);
- Building Construction (24 months); and
- Architectural Coating and Paving (10 months).

Grading for the proposed improvements would require approximately 10,000 cubic yards of cut and fill and approximately 10,000 cubic yards of export. The Project site would be graded to mimic the existing grading and drainage patterns. The overall site grading and drainage pattern would be southeasterly towards Normandie Avenue.

2.6 Agreements, Permits, and Approvals

The City, as Lead Agency for the Project, has discretionary authority over the Project. To implement the Project, the Applicant would need to obtain, at a minimum, the following discretionary permits/approvals:

- General Plan/General Plan Map Amendment (GPA #3-21):
    - Concerning the NCSP area, a General Plan amendment to: (i) change the land use designation on the General Plan Land Use Map from "General Commercial" to "Specific Plan" and (ii) amend the Land Use Plan text and Land Use Plan Table LU-3 to allow the mix of uses and densities specified in the NCSP;
    - Concerning the residential parcel at 16964 West 179th Street, a General Plan amendment to change the land use designation on the General Plan Land Use Map from Industrial to Low-Density Residential; and
    - Concerning the Union Pacific Railroad parcel immediately adjacent and east of the Project site, a General Plan amendment to change the land use designation on the General Plan Land Use Map from Industrial to Public/Institutional.
- Zone Change and Zone Map Amendment (ZC #4-21):
    - Concerning the NCSP area, a zoning map amendment to change the zones on the Zoning Map from Industrial (M-1) Zone and General Industrial (M-2) Zone to Normandie Crossing Specific Plan Zone;
    - Concerning the residential parcel at 16964 West 179th Street, a zoning map amendment to change the zone on the Zoning Map from General Industrial (M-2) Zone to Low-Density Multi-Family Residential (R-2) Zone; and
    - Concerning the Union Pacific Railroad parcel immediately adjacent and east of the Project site, a zoning map amendment to change the zone on the Zoning Map from General Industrial (M-2) Zone to Official (O).
- Zoning Text Amendment (ZTA #6-21): A GMC zoning text amendment to add Normandie Crossing Specific Plan;
- Normandie Crossing Specific Plan (NCSP) (SP #1-21);
- Site Plan Review (SPR #11-21): Review of the development's physical design;
- Vesting Tentative Tract Map (TTM #4-21): A vesting TTM to create one parcel for the Townhomes and one parcel for the Apartment Building;
- Development Agreement (DA #2-21): The development agreement would guarantee that the Specific Plan's terms would not be amended for a set period of years without the Developer's consent and would guarantee the City five (5) percent affordable housing for a period of 55 years and sidewalk improvements along 169th Street, outside the Project boundaries; and
- Environmental Assessment (EA #20-21).

3.0 ENVIRONMENTAL CHECKLIST FORM

3.1 Background

1.	**Project Title:** Normandie Crossing Specific Plan Project
2.	**Lead Agency Name and Address:** City of Gardena Community Development Department 1700 West 162nd Street Gardena, California 90247
3.	**Contact Person and Phone Number:** Greg Tsujiuchi, Community Development Planner Tel: 310.217.9530 Email: gtsujiuchi@cityofgardena.org
4.	**Project Location:** County of Los Angeles, City of Gardena, at 16829, 16835, and 16907 South Normandie Avenue
5.	**Project Sponsor's Name and Address:** Coastline Real Estate Advisors, Inc. 134 Lomita Street El Segundo, California 90245
6.	**General Plan Designation:** Industrial, High Density 30 Overlay
7.	**Zoning:** Industrial Zone (M-1) and General Industrial Zone (M-2), Housing Overlay 4 (HO-4)
8.	**Description of Project:** See **Section 2.4: Project Characteristics**
9.	**Surrounding Land Uses and Setting:** See **Section 2.2.3: Surrounding Land Uses and Zoning**
10.	**Other public agencies whose approval is required (e.g., permits).** To be determined, as part of EIR completion.
11.	**Have California Native American tribes traditionally and culturally affiliated with the Project area requested consultation pursuant to Public Resources Code §21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?** Consultation with one California Native American tribe (Kizh Nation) was initiated on March 9, 2022; see also **Section 4.18: Tribal Cultural Resources**.

3.2 Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by the proposed Project, involving at least one impact that is a "Potentially Significant Impact," as indicated by the analysis in the following section.

	Aesthetics		Agricultural and Forestry Resources	X	Air Quality
	Biological Resources	X	Cultural Resources	X	Energy
X	Geology and Soils (Paleontological Resources)	X	Greenhouse Gas Emissions	X	Hazards and Hazardous Materials
X	Hydrology and Water Quality	X	Land Use and Planning		Mineral Resources
X	Noise	X	Population and Housing	X	Public Services
X	Recreation	X	Transportation	X	Tribal Cultural Resources
X	Utilities and Service Systems		Wildfire	X	Mandatory Findings of Significance

3.3 Lead Agency Determination

On the basis of this initial evaluation:

I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	
I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	
I find that the proposed Project MAY have a significant effect on the environment and an ENVIRONMENTAL IMPACT REPORT is required.	X
I find that the proposed Project MAY have a potentially significant or a potentially significant unless mitigated impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	
I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.	

CITY OF GARDENA

May 08, 2023

Greg Tsujiuchi
Community Development Director

Date

4.0 EVALUATION OF ENVIRONMENTAL IMPACTS

The following environmental analysis is patterned after State CEQA Guidelines Appendix G. An explanation is provided for all responses except "No Impact" responses, which are supported by the cited information sources. The responses consider the whole action involved with the proposed Project: on and offsite, Project- and cumulative-level, direct and indirect, and short-term construction and long-term operational. The explanation of each issue also identifies the significance criteria or threshold, if any, used to evaluate each question, and the mitigation identified, if any, to avoid or reduce the impact to less than significant. To each question, there are four possible responses:

- **No Impact.** The Project would not have any measurable environmental impact.
- **Less Than Significant Impact.** The Project would have the potential to impact the environment, although this impact would be below-established thresholds that are considered to be significant.
- **Less Than Significant With Mitigation Incorporated.** The Project would have the potential to generate impacts, which may be considered as a significant effect on the environment, although mitigation measures or changes to the Project's physical or operational characteristics could reduce these impacts to a less than significant level.
- **Potentially Significant Impact.** The Project could have impacts, which may be considered significant, and therefore additional analysis is required to identify mitigation. A determination that there is a potential for significant effects indicates the need to analyze the Project's impacts and identify mitigation more fully.

4.1 Aesthetics

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Except as provided in Public Resources Code §21099, would the project:				
a) Have a substantial adverse effect on a scenic vista?				X
b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a State Scenic Highway?				X
c) If in a non-urbanized area, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?				X
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	

IMPACT ANALYSIS

4.1a Would the project have a substantial adverse effect on a scenic vista?

No Impact. Under CEQA, a scenic vista is defined as a viewpoint that provides expansive views of a highly-valued landscape for the public's benefit. No such conditions exist on or near the Project site. Additionally, the GGP does not specifically address scenic vistas. Therefore, the Project would not have an adverse effect on a scenic vista. This issue will not be further analyzed in the EIR.

4.1b Would the project substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a State Scenic Highway?

No Impact. The area surrounding the Project site is predominately developed, with no natural landforms or scenic features present. There are no State- or County-designated scenic highways in the Project site vicinity.[6] Therefore, the Project would not damage scenic resources within a State scenic highway. This issue will not be further analyzed in the EIR.

6 California Department of Transportation. (2019). *California State Scenic Highway System Map.* Retrieved from https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa.

4.1c If in a non-urbanized area, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

No Impact. The Project site is surrounded by development in an urbanized area of the City. The Project site is fully developed with approximately 106,100 SF of industrial land uses comprised of five buildings, circa 1952, 1957, and 1963. The Project site is generally bounded by single- and multi-family residential uses. The Project proposes to remove all existing onsite improvements, and construct 75 three-story townhomes and a seven-story 328-unit apartment building. The maximum proposed building height for the apartment building would be seven stories or 87.5 feet (to top of stair shaft). The maximum allowable building height is 90 feet as measured from the finished floor (i.e., the level of the finished floor on the ground level) to the highest point on the roof, including non-habitable projections (including, without limitation, architectural features, elevator shafts mechanical equipment, stairwells, canopies, or shade structures). The maximum of the townhome units would be 40 feet as measured from finished floor.

The onsite and surrounding zoning and the GMC regulations pertaining to each zone are detailed in **Table 2-1: Onsite Land Uses and Zoning** and **Table 2-2: Surrounding Land Uses and Zoning**. The regulations specified in **Tables 2-1 and 2-2** do not include standards governing scenic quality. Additionally, the GMC does not include other regulations governing scenic quality. The Project proposes a Zone Change from Industrial (M-1), General Industrial (M-2), and Housing Overlay 4 (HO-4) to Normandie Crossing Specific Plan to allow the proposed development. Therefore, the Project should not conflict with applicable zoning or other regulations governing scenic quality. Notwithstanding, this issue will be further analyzed in the EIR to provide additional information.

4.1d Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. The proposed Project would generate lighting from two primary sources: lighting from building interiors that would pass through windows and lighting from exterior sources (e.g., street lighting, parking lot lighting, building illumination, security lighting, and landscape lighting). Future development within the NCSP area would be subject to the light and glare regulations specified in GMC §18.42.150: Security and Lighting Plan, which the City requires to ensure that safety and security issues are addressed in the development's design, and that an average of one footcandle is provided for all public/common areas. NCSP Section 5.2: Design Standards requires that open spaces and pedestrian areas be illuminated. The Project's outdoor lighting would be subject to compliance with GMC §18.42.150. A Photometric Plan would be required prior to Building Permit issuance to verify compliance with GMC §18.42.150.

Concerning the Project's potential to adversely affect the surrounding area, and as part of the Project's Site Plan Review process, the City's Community Development Department would review the Photometric Plan for placement, height, and direction of illumination for the proposed lighting standards; see GMC §18.44.030: Factors for Approval. Further, the City would also review new lighting for conformance with the California Green Building Standards (CALGreen) (2022 Standards) (CCR Title 24 Part 11) in effect at the time that building plans are submitted, such that only the minimum amount of lighting is used, and no light spillage occurs. Additionally, NCSP Section 5.2: Design Standards requires that light fixtures be designed and located in a manner that does not allow spillover onto adjacent properties. Consistent with City requirements, required landscaping may also help buffer and minimize light effects on adjacent land uses. Buildings with large facades constructed of reflective surfaces (e.g., brightly colored building façades, metal surfaces, and reflective glass) could increase existing levels of daytime glare. The Project's proposed design does not include such surfaces or components. Therefore, the Project would result in a less than significant impact concerning a new source of light or glare, and no mitigation is required. This issue will not be further analyzed in the EIR.

4.2 Agricultural and Forestry Resources

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code §12220(g)), timberland (as defined by Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code §51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				X

IMPACT ANALYSIS

4.2a Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

4.2b Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

4.2c Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code §12220(g)), timberland (as defined by Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code §51104(g))?

4.2d Would the project result in the loss of forest land or conversion of forest land to non-forest use?

4.2e Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

No Impact. No Prime Farmland, Unique Farmland, or Farmland of Statewide or Local Importance is mapped in the City.[7] Further, the Project site is not the subject of a Williamson Act Contract.[8] The Project site is zoned M-1, M-2, and HO-6.[9] No agricultural, forest land, or timberland zoning exists in the City. Therefore, the Project would result in no impact concerning mapped farmlands, Williamson Act contracts, or agricultural, forest, or timber land zoning.

The Project site is fully developed with approximately 106,100 SF of industrial land uses. No farmland, forest land, or timberland exist in the City. Therefore, the Project would not result in the conversion or loss of Farmland, forest land or timberland. These issues will not be further analyzed in the EIR.

[7] California Department of Conservation. (2016). *California Important Farmland Finder.* Retrieved from https://maps.conservation.ca.gov/dlrp/ciff/.

[8] California Department of Conservation. (2016). *Williamson Act/Land Conservation Act.* Retrieved from http://www.conservation.ca.gov/dlrp/lca.

[9] City of Gardena. (2020). *Zoning Map*. Gardena, CA: City of Gardena Planning Division. Retrieved from https://cityofgardena.org/wp-content/uploads/2020/11/Gardena_Zonning_2020.pdf.

4.3 Air Quality

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	X			
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?	X			
c) Expose sensitive receptors to substantial pollutant concentrations?	X			
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	X			

The Project site is within the South Coast Air Basin (SCAB), which is under the South Coast Air Quality Management District's (South Coast AQMD) jurisdiction. The South Coast AQMD significance criteria may be relied upon to make the above determinations. According to the South Coast AQMD, an air quality impact is considered significant if a proposed project would violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. The South Coast AQMD has established thresholds of significance for air quality during a project's construction and operations.

The proposed Project would also be subject to ambient air quality standards. These are addressed through an analysis of localized CO impacts.

In addition to the CO hotspot analysis, the South Coast AQMD developed Local Significance Thresholds ("LSTs") for emissions of NO_2, CO, PM_{10}, and $PM_{2.5}$ generated at new development sites. LST analysis for construction is applicable for all projects that disturb 5.0 acres or less on a single day.

IMPACT ANALYSIS

4.3a Would the project conflict with or obstruct implementation of the applicable air quality plan?

4.3b Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?

4.3c Would the project expose sensitive receptors to substantial pollutant concentrations?

4.3d Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Potentially Significant Impact. The South Coast AQMD is required, pursuant to the Federal Clean Air Act (FCAA), to reduce criteria pollutant emissions for which SCAB is in non-attainment. The Project proposes to construct multi-family residential uses (up to 403 DUs), generating construction traffic for material and construction worker trips. Project construction activities would generate short-term criteria air pollutant emissions. During operations, the residential uses would generate vehicle trips and there would be intermittent deliveries. The Project's operational emissions would be associated with area, energy, and mobile sources. Project construction and operations could result in the release of air contaminants and other adverse impacts, including odors. Therefore, the EIR will further evaluate these potential impacts.

4.4 Biological Resources

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

IMPACT ANALYSIS

4.4a Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

4.4b Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

4.4c Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. The Project site is fully developed with approximately 106,100 SF of industrial land uses. No natural habitats are present on-site, with only landscaping (i.e., ornamental vegetation) present. The Project site is bounded by single- and multi-family residential uses on all sides. No natural habitats are present within these adjacent areas, with only landscaping (i.e., ornamental vegetation) present. Based on review of the existing and adjacent site conditions, no candidate, sensitive, or special-status plant or wildlife species, riparian habitat or other sensitive natural community, or wetlands are present on or adjacent to the Project site. Therefore, the Project would not have an adverse effect on any candidate, sensitive, or special-status plant or wildlife species, riparian habitat or other sensitive natural community, or wetlands. These issues will not be further analyzed in the EIR.

4.4d Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant Impact. Corridors are linear linkages between two or more habitat patches, which provide for wildlife movement and dispersal. The Project site is fully developed and contains no natural habitats, with only minimal landscaping. The Project site is also bounded by single- and multi- family residential uses on all sides. No natural habitats are present on these adjacent areas, and only landscaping (i.e., ornamental vegetation) is present.

The Dominguez Channel is located 0.4 mile south of the Project site. There are no established wildlife movement corridors that traverse this segment of the Dominguez Channel.[10] Because this drainage is concrete-lined, its habitat values in this urban area are low. The Channel does not necessarily include habitat capable of supporting all requirements of a species, but it could be used for wildlife movement. However, because Project construction activities would occur entirely within Project site boundaries and would be restricted to daytime hours, in accordance with the GMC, the Project's potential impacts concerning interference with an established

[10] Environmental Sciences Associates, *LA County Flood Control District Enhanced Watershed Management Programs Draft Program Environmental Impact Report*, January 2015.

wildlife movement would be less than significant. This issue will not be further analyzed in the EIR.

As previously noted, the Project site is fully developed and contains only ornamental vegetation, no natural habitats, with only landscaping. The on-site vegetation and trees could provide suitable nesting habitat for birds. The Project would clear and grade the Project site including the vegetation with the potential to support nesting migratory birds. The Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (CFGC) are intended to protect migratory birds. Under MBTA provisions, it is unlawful "by any means or manner to pursue, hunt, take, capture (or) kill" any migratory birds except as permitted by regulations issued by the USFWS. The term "take" is defined by USFWS regulation to mean to "pursue, hunt, shoot, wound, kill, trap, capture or collect" any migratory bird or any part, nest or egg of any migratory bird covered by the conventions, or to attempt those activities. In addition, the CFGC extends protection to non-migratory birds identified as resident game birds (CFGC §3500) and any birds in the orders Falconiformes or Strigiformes (birds-of-prey) (CFGC §3503). To address potential impacts to migratory birds from construction activities during the nesting season, the Project would be subject to compliance with GMC §18.42.210E: Migratory Bird Protection,[11] which includes provisions concerning construction activities both within and outside the nesting season to avoid effects to migratory birds. Therefore, following compliance with the relevant regulatory framework (MBTA, CFGC, and GMC §18.42.210E), the Project's potential impacts to nesting migratory birds would be mitigated to a less than significant level. This issue will not be further analyzed in the EIR.

4.4e Would the project conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. GMC §13.60.080: Permit, requires a Trimming Permit, Tree Removal Permit, and/or a Tree Planting Permit for cutting, trimming, pruning, planting, removing, injuring or interfering with any tree, shrub, or plant upon any Street or Public Place in the City. The Project would be developed on private property and no tree trimming or tree removal within any of the City's streets or public places would occur as a result of Project construction. Therefore, the Project would not conflict with GMC §13.60.080. This issue will not be further analyzed in the EIR.

4.4f Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The Project site is not located within the boundaries of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, the Project would not result in conflicts with such plans. No impact would occur in this regard. This issue will not be further analyzed in the EIR.

11 City of Gardena, California, Municipal Code Ordinance No. 1848. Retrieved from https://cityofgardena.org/wp-content/uploads/2023/03/ORD-NO-1848-Establishment-of-Housing-Overlays-and-Devlopment-Standards.pdf.

4.5 Cultural Resources

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	X			
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	X			
c) Disturb any human remains, including those interred outside of dedicated cemeteries?			X	

IMPACT ANALYSIS

4.5a Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

Potentially Significant Impact. The three existing onsite buildings were constructed circa 1952, 1957, and 1962.[12] The existing buildings are all over 50 years old. Therefore, the Project could cause an adverse change in the significance of a historical resource. The EIR will further evaluate these potential impacts.

4.5b Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Potentially Significant Impact. The California Historical Resources Information System (CHRIS) records search and archival research conducted for the Project determined no previously recorded resource has been identified within the Project site.[13] Additionally, past development has previously disturbed the Project site. However, the records search and archival research identified seven previously recorded resources within a 0.5-mile radius of the Project site (i.e., five historic in nature and two prehistoric sites).[14] As such, the potential exists for accidental discovery of archaeological resources during the Project's ground-disturbing activities. Therefore, the Project could cause an adverse change in the significance of an archaeological resource. The EIR will further evaluate this potential impact.

12 ParcelQuest. 2021. *Assessor Data*. Retrieved from: https://pqweb.parcelquest.com/#home.

13 16911 Normandie Associates, LLC. (November 2022). *Archaeological Resources Assessment for the Proposed Development at 16911 South Normandie Avenue, City of Gardena, Los Angeles County, California*. page i. Pasadena, CA: SWCA Environmental Consultants.

14 Ibid.

4.5c Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Less Than Significant Impact. Past development has previously disturbed the Project site. Also, no dedicated cemeteries are on or near the Project site. Given the extent of onsite ground disturbances from previous development and the area's urbanized nature, there is low potential for the Project's ground-disturbing activities to encounter human remains. Notwithstanding, the potential exists for accidental discovery of human remains during ground-disturbing activities. If human remains are found, those remains would require proper treatment in accordance with applicable laws, including State of California Health and Safety Code (HSC) §§7050.5-7055 and PRC §5097.98 and §5097.99. HSC §§7050.5-7055 describe the general provisions for treatment of human remains. Specifically, HSC §7050.5 prescribes the requirements for the treatment of any human remains that are accidentally discovered during excavation of a site. HSC §7050.5 also requires that all activities cease immediately, and a qualified archaeologist and Native American monitor be contacted immediately. As required by State law, the procedures set forth in PRC §5087.98 would be implemented, including evaluation by the County Coroner and notification of the NAHC. The NAHC would designate the "Most Likely Descendent" of the unearthed human remains. If human remains are found during excavation, excavation would be halted near the find and any area that is reasonably suspected to overlay adjacent remains shall remain undisturbed until the County Coroner has investigated, and appropriate recommendations have been made for treatment and disposition of the remains. Following compliance with the established regulatory framework (i.e., HSC §§7050.5-7055 and PRC §5097.98 and §5097.99), the Project's potential impacts concerning disturbances to human remains would be less than significant, and no mitigation is required. This issue will not be further analyzed in the EIR.

4.6 Energy

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	X			
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	X			

Building energy efficiency standards for new residential and non-residential buildings were adopted by the California Energy Resources Conservation and Development Commission (now the California Energy Commission (CEC)) in June 1977 and are updated every three years (CCR Title 24, Part 6). CCR Title 24, Part 6 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. On July 1, 2022, the CEC adopted the 2022 California Green Building Standards (CALGreen) (2022 Standards), which went into effect on January 1, 2023.

CALGreen is a statewide mandatory construction code that was developed and adopted by the California Building Standards Commission and the California Department of Housing and Community Development. CALGreen standards require new residential and commercial buildings to comply with mandatory measures under five topical areas: planning and design; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; and environmental quality. CALGreen also provides voluntary measures (CALGreen Tier 1 and Tier 2) that local governments may adopt which encourage or require additional measures in the five topical areas. Gardena has not adopted the voluntary measures.

IMPACT ANALYSIS

4.6a Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

4.6b Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Potentially Significant Impact. Southern California Edison (SCE) provides electric power service to the Project area. Southern California Gas Company (SoCalGas) provides natural gas service to the Project area. During Project construction, transportation fuel use would depend on the type and number of trips, vehicle miles traveled (VMT), fuel efficiency of vehicles, and travel mode.

During Project operations, residential energy consumption of fuel would be associated with resident and guest vehicle trips, delivery truck trips, and maintenance and repair crew trips.

The Project's energy demand is expected to be served by existing utility facilities. The Project's construction-related and operational electric power, gas, and fuel demand, as well as consistency with State and local plans for renewable energy and energy efficiency, will be evaluated in the EIR.

4.7 Geology and Soils

This section is based on the Preliminary Geotechnical Investigation,[15] which evaluates select conditions at the Project site and provides recommendations for Project design and construction; see **Appendix 4.7-1: Preliminary Geotechnical Investigation**.

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?			X	
iv) Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?			X	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X

15 Hamilton & Associates. (2022). *Preliminary Geotechnical Investigation*; see **Appendix 4.7-1.**

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	X			

IMPACT ANALYSIS

4.7ai Would the project directly or indirectly cause potential substantial adverse effects, including the risks of loss, or death involving the rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

No Impact. The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act requires the State Geologist to establish regulatory zones, known as "Alquist-Priolo (AP) Earthquake Fault Zones," around the surface traces of active faults and to issue appropriate maps. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back from the fault (typically 50 feet). The Project site is not located within an Alquist-Priolo Earthquake Fault Zone.[16] Additionally, the potential for surface fault rupture at the Project site during the design life of onsite structures is considered low.[17] The Project would not expose people or structures to adverse effects involving rupture of a known earthquake fault. Therefore, no impact would occur in this regard. This issue will not be further analyzed in the EIR.

4.7aii Would the project directly or indirectly cause potential substantial adverse effects, including the risks of loss, or death involving strong seismic ground shaking?

Less Than Significant Impact. The City is located between several active fault zones including the Newport-Inglewood-Rose Canyon Fault Zone, Palos Verdes Fault, and Compton Blind Thrust Fault.[18] The zoned fault nearest the Project site is the Newport-Inglewood Fault Zone, located approximately 0.6 miles to the west. The Project site is in an area of high regional seismicity. Ground shaking originating from earthquakes along active faults in the region is expected to induce lower horizontal accelerations due to smaller anticipated earthquakes and/or greater distances to other faults. The region has experienced shaking from several earthquakes recorded back to 1812. The nearest large historic earthquake is the 1994 Northridge Earthquake, with an

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[16] California Department of Conservation. (2015). Earthquake Zones of Required Investigation Inglewood Quadrangle. Retrieved from http://gmw.consrv.ca.gov/SHP/EZRIM/Maps/INGLEWOOD_EZRIM.pdf.

[17] Hamilton & Associates. (2022). *Preliminary Geotechnical Investigation*. page 8.

[18] California Department of Conservation. (2015). CGS Information Warehouse: Regulatory Maps. Retrieved from http://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps.

epicenter approximately 33.6 miles northwest of the Project site.[19] Historic earthquakes with magnitudes of greater than or equal to 6.0 and have been epicentered within approximately 30 miles of the Project site.

The faults described above could cause moderate to intense ground shaking during the Project's lifetime. Additionally, the Project site has experienced earthquake-induced ground shaking in the past and can be expected to experience further shaking in the future. Therefore, Project implementation could expose people and structures to potential adverse effects involving strong seismic ground shaking. The intensity of ground shaking on the Project site would depend upon the earthquake's magnitude, distance to the epicenter, and geology of the area between the Project site and epicenter. Regulatory controls to address potential seismic hazards would be imposed on the Project through the permitting process. Pursuant to GMC Chapter 15.04: General Building Provisions, the City has adopted the 2022 California Building Standards Code (CBSC), subject to certain amendments and changes, including those that address seismic resistance. CBSC design standards correspond to the level of seismic risk in a given location and are intended primarily to protect public safety and secondly to minimize property damage. The Project would be subject to compliance with all applicable regulations in the most recently published CBSC (as amended by GMC Chapter 15.04), which specifies design requirements to mitigate the effects of potential earthquake hazards. Moreover, the Gardena Building Services Division will review construction plans to verify compliance with standard engineering practices, the GMC/CBSC, and the Preliminary Geotechnical Investigation's[20] recommendations for Project design and construction, including concerning seismic design parameters. Following compliance with standard engineering practices, the established regulatory framework (i.e., GMC and CBSC), and the Preliminary Geotechnical Investigation's recommendations, the Project's potential impacts concerning exposure of people or structures to potential adverse effects involving strong seismic ground shaking would be less than significant. This issue will not be further analyzed in the EIR.

4.7aiii Would the project directly or indirectly cause potential substantial adverse effects, including the risks of loss, or death involving seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Liquefaction is a phenomenon where earthquake-induced ground vibrations increase the pore pressure in saturated, granular soils until it is equal to the confining, overburden pressure. When this occurs, the soil can completely lose its shear strength and enter a liquefied state. For liquefaction to occur, three criteria must be met: underlying loose, coarse-grained (sandy) soils, a groundwater depth of approximately 25 feet, and a potential for seismic shaking from nearby large-magnitude earthquakes. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

The State's Seismic Hazards Maps[21] do not classify the Project site as part of the potentially "Liquefiable" area. This determination is based on groundwater depth records, soil type, and

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[19] Southern California Earthquake Data Center. (2019). Significant Earthquakes and Faults. Retrieved from https://scedc.caltech.edu/significant/index.html.

[20] Hamilton & Associates. (2022). *Preliminary Geotechnical Investigation*; **Appendix 4.7-1**

[21] California Department of Conservation. Seismic Hazard Zones, Map Data Viewer. Retrieved from Maps and Data (ca.gov).

distance to a fault capable of producing a substantial earthquake. Additionally, onsite soils consist predominantly of very stiff fine-grained soils (clays and silts), with one layer of borderline stiff to very stiff fine-grained soil, and occasional layers or lenses of dense sands. Deeper soils are mostly very stiff fine-grained soils with dense to very dense sand layers or lenses. Liquefaction potential of these soil types is characteristically nil to low.[22] Analysis was also performed to evaluate potential seismically induced settlement of onsite earth materials during a seismic event, considering historic high groundwater depth of approximately 15 feet below existing grade. Results of the liquefaction analysis further support that liquefaction potential at the site is considered nil to low;[23] see Appendix B of **Appendix 4.7-1**. Therefore, the Project's potential impacts concerning exposure of people or structures to potential adverse effects involving liquefaction would be less than significant. Further, as discussed in Response 4.7aii, the Gardena Building Services Division will review construction plans to verify compliance with standard engineering practices, the GMC/CBSC, and the Preliminary Geotechnical Investigation's recommendations for Project design and construction. This issue will not be further analyzed in the EIR.

4.7aiv Would the project directly or indirectly cause potential substantial adverse effects, including the risks of loss, or death involving landslides?

No Impact. Landslides are mass movements of the ground that include rock falls, relatively shallow slumping and sliding of soil, and deeper rotational or transitional movement of soil or rock. According to the California Geological Survey's Earthquake Zones of Required Investigation Inglewood Quadrangle Map, the Project site does not lie in a landslide hazard zone.[24] Since the site is relatively flat and not within a landslide hazard zone, no potential for earthquake-induced land sliding would occur. Therefore, the Project would not directly or indirectly cause potential adverse effects involving landslides. No impact would occur in this regard. This issue will not be further analyzed in the EIR.

4.7b Would the project result in substantial soil erosion or the loss of topsoil?

Less Than Significant Impact. The Project site is relatively flat, and its geology is composed of fill materials and native alluvial soils. Grading and earthwork activities during construction would expose soils to potential short-term erosion by wind and water. During construction, the Project would be subject to compliance with the GMC §8.70.110.B.1: Development Construction, erosion and siltation control measures and the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, and all subsequent amendments) (Construction General Permit); see also Response 4.9a. GMC §8.70.110.B.1 specifies that no Grading Permit shall be issued to construction projects that disturb 1.0 or more acres of soil without obtaining a *General Construction Activity Stormwater Permit* (GCASWP) from the State Water Resources Control Board. Following compliance with the established regulatory framework (i.e., the GMC and

22 Hamilton & Associates. (2022). *Preliminary Geotechnical Investigation;* **Appendix 4.7-1**.

23 Ibid.

24 Ibid.

Construction General Permit), the Project's potential impacts concerning soil erosion and loss of topsoil would be less than significant. This issue will not be further analyzed in the EIR.

4.7c Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

4.7d Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Less Than Significant Impact. The Project site would not be subject to seismically-induced liquefaction or lateral spreading (see Response 4.7aiii) or landslides (see Response 4.7aiv). The Gardena Building Services Division would review construction plans to verify compliance with standard engineering practices, the GMC/CBSC, and the Preliminary Geotechnical Investigation's recommendations, including those concerning expansive soils. Following compliance with standard engineering practices, the established regulatory framework (i.e., GMC and CBSC), and the Preliminary Geotechnical Investigation's recommendations, the Project would not create substantial direct or indirect risks to life or property concerning expansive soils. Therefore, impacts would be less than significant in this regard. These issues will not be further analyzed in the EIR.

4.7e Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impact. Sewers would be available for disposal of Project-generated wastewater; see Responses 4.19aii and 4.19aiii. The Project would not utilize septic tanks or alternative wastewater disposal systems. Therefore, no impact would occur in this regard. This issue will not be further analyzed in the EIR.

4.7f Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Potentially Significant Impact. Paleontological resources are the fossilized remains of organisms from prehistoric environments found in geologic strata. These resources are valued for the information they yield about the earth's history and its past ecological settings. The potential for fossil occurrence depends on the rock type exposed at the surface in a given area. Previous construction-related excavation on the Project site has disturbed sediments beyond depths at which buried prehistoric cultural resources are likely. Notwithstanding, the potential exists for accidental discovery of paleontological resources during ground-disturbing activities. The EIR will further evaluate these potential impacts.

4.8 Greenhouse Gas Emissions

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	X			
b) Conflict with applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	X			

Gardena and the South Bay Cities Council of Governments have prepared an Energy Efficiency Climate Action Plan (EECAP) (2015) to guide the City toward a more sustainable future. The EECAP's goal is to reduce the City's greenhouse gas (GHG) emissions. The City's EECAP serves as a guide for action by setting GHG emission reduction goals and establishing strategies and policy to achieve desired outcomes over the next 20 years. The EECAP outlines various municipal measures that encourage reductions in the following categories: land use and transportation, energy efficiency, solid waste, urban greening, and energy generation and storage. The City's EECAP maintains the reduction targets established in the EECAP. CARB has also adopted the 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan). The EIR will analyze the Project's consistency with both the EECAP and the Scoping Plan to determine consistency with GHG reduction plans and policies.

IMPACT ANALYSIS

4.8a Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Potentially Significant Impact. The Project would generate GHG emissions directly from construction-related activities. Construction GHG emissions are typically summed and amortized over the Project's lifetime (assumed to be 30 years), then added to the operational emissions.[25] The EIR will further evaluate the Project's amortized GHG emissions.

Operational long-term emissions would occur over the Project's life. The Project's operational GHG emissions would result from direct emissions such as Project-generated vehicular traffic, onsite combustion of natural gas, and operation of any landscaping equipment. Operational GHG emissions would also result from indirect sources, such as offsite generation of electrical power, the energy required to convey water to the Project site and wastewater from the Project site, the emissions associated with solid waste generated from the Project site, and any fugitive

[25] The Project lifetime is based on South Coast AQMD's standard 30-year assumption (South Coast Air Quality Management District, Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #13, August 26, 2009).

refrigerants from air conditioning or refrigerators. The EIR will further evaluate the Project's operational GHG emissions.

4.8b Would the project conflict with applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Potentially Significant Impact. The EIR will further evaluate the proposed Project's consistency with EECAP goals, the California Air Resources Board (CARB) Scoping Plan, measures, and emission reduction targets and potential to conflict with any applicable plan, policy, or regulation of an agency adopted to reduce GHG emissions, including Title 24, AB 32, and SB 32.

4.9 Hazards and Hazardous Materials

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	X			
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			X	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would it create a significant hazard to the public or the environment?	X			
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				X
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?				X

IMPACT ANALYSIS

4.9a Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less Than Significant Impact. Project construction would involve the routine transport, storage, use and/or disposal of limited quantities of hazardous materials, such as fuels, solvents, degreasers and paints. Examples of such activities include fueling and servicing construction equipment, and applying paints and other coatings.

The Project proposes a residential development, which is not anticipated to involve the routine transport, use, or disposal of large quantities of hazardous materials that could create a significant hazard to the public or environment. The maintenance materials would be stored, handled, and disposed of in accordance with applicable regulations and the City's programs to control and safely dispose of hazardous materials and wastes. Specifically, the City's Hazardous Materials Release Response Plans and Inventory Program requires the owner or operator of any business that handles or stores hazardous materials equal to or above the reportable quantities to submit a Hazardous Materials Inventory and Contingency Plan. Compliance with these regulations would ensure that all hazardous wastes would be properly handled, recycled, treated, stored, and disposed.

Therefore, following compliance with standard City practices and federal and State regulations, the Project would result in a less than significant impact concerning its potential to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. This issue will not be further analyzed in the EIR.

4.9b Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Potentially Significant Impact. Project construction would include demolition of all structures and complete over-excavation and re-compaction of soils, which could be contaminated. A Phase I Environmental Site Assessment (ESA) and Phase II Subsurface Investigation Report were completed for the Project site. The property was previously occupied by light-industrial tenants since 1957 such as manufacturing entities, auto body, and painting entities that used paints and potentially solvents. Therefore, Recognized Environmental Conditions (RECs) in connection with the Project site could be present. Additionally, the Project site's subsurface could be impacted with concentrations of Volatile Organic Compounds (VOC) in soil gas that could pose a human health concern for redevelopment with residential uses.

The EIR will further evaluate the Project's potential to create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

4.9c Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less Than Significant Impact. The school nearest the Project site, Peary Middle School, is at 1415 West Gardena Boulevard, City of Gardena, which is approximately 0.27 mile north of the Project site. Therefore, the Project site is more than 0.25 mile from this existing school. Notwithstanding, the routine transport, use, and disposal of hazardous materials during Project construction would be subject to federal, state, and local regulations for transport, handling, storage, and disposal of hazardous substances. Compliance with the regulatory framework would ensure Project construction activities would not create a significant hazard to nearby schools.

Additionally, the Project does not propose any uses which could generate hazardous emissions or involve the handling of hazardous materials, substances, or waste in significant quantities that could impact surrounding schools. The types of hazardous materials that would be routinely handled during Project operations would be limited to household cleaners, paints, solvents, and fertilizers and pesticides for site landscaping. The routine transport, use, and disposal of hazardous materials during operations would be subject to federal, state, and local regulations for transport, handling, storage, and disposal of hazardous substances. Compliance with the regulatory framework would ensure Project operations would not create a significant hazard to nearby schools.

This issue will not be further analyzed in the EIR.

4.9d Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Potentially Significant Impact. Government Code §65962.5 refers to the Hazardous Waste and Substances Site List, commonly known as the Cortese List, maintained by the DTSC. The Cortese list contains hazardous waste and substance sites including public drinking water wells with detectable levels of contamination, sites with known underground storage tanks (USTs) having a reportable release, solid waste disposal facilities from which there is a known migration, hazardous substance sites selected for remedial action, historic Cortese sites, and sites with known toxic material identified through the abandoned site assessment program. The Project site is listed on several environmental databases, as determined by the regulatory agency database search conducted as part of the Phase I ESA.[26] Therefore, the EIR will further evaluate the Project's potential to create a significant hazard to the public or the environment in this regard.

4.9e For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No Impact. The Project site is not located within an airport land use plan or within two miles of a public airport or public use airport. The airport located nearest the Project site is Hawthorne Municipal Airport/Jack Northrop Field ("Airport"), approximately 3.4 miles to the northwest. This Airport is an FAA-designated general aviation reliever airport owned by the City of Hawthorne. Therefore, the Project would not result in a safety hazard or excessive noise for people residing or working in the Project area. No impact would occur in this regard. This issue will not be further analyzed in the EIR.

[26] Partner Engineering and Science, Inc. (2021). Phase I Environmental Site Assessment Report; see **Appendix 4.9-1**.

4.9f Would the project impair implementation of or physically interfere with an emergency response plan or emergency evacuation plan?

Less Than Significant Impact. The Project Site is located in an urbanized area where adequate circulation and access are provided to facilitate emergency response. The Gardena Public Safety Plan [27] outlines emergency response actions in the event of a large-scale disaster, such as a hazardous materials emergency. Further, Project construction would not require the complete closure of any public or private streets during construction. Temporary construction activities would not impede use of the streets for emergencies or access for emergency response vehicles. The Project would be subject to compliance with the following Public Safety Plan Policies:

- **PS 1.7: Development Review**. Ensure that law enforcement, crime prevention, and fire safety concerns are considered in the review of planning and development proposals in the City.
- **PS 2.2: Building and Fire Codes**. Require that all buildings and facilities within Gardena comply with local, state, and federal regulatory standards such as the California Building and Fire Codes as well as other applicable fire safety standards
- **PS 2.7: New Development**. Require adequate fire protection services, fire protection plans, and emergency vehicle access for new development. Locate, design, and construct new development to minimize the risk of structural loss from fires.
- **PS 3.1: California Building Code**. Require compliance with seismic safety standards in the California Building Code, as adopted and amended.

Therefore, following compliance with City policies, as specified above, the Project's potential impacts concerning impairing implementation of or physically interfering with an emergency response plan or related policies would be less than significant. This issue will not be further analyzed in the EIR.

4.9g Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

No Impact. The Project site is in a fully urbanized area and it is not adjacent to any wildland. Therefore, the Project would not expose people or structures to a risk involving wildland fires. No impact would occur in this regard. This issue will not be further analyzed in the EIR.

[27] City of Gardena. (2022). Public Safety Plan. Retrieved from https://cityofgardena.org/wp-content/uploads/2022/04/Gardena_Public-Safety-Element_FINAL-FOR-ADOPTION.pdf.

4.10 Hydrology and Water Quality

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	X			
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the projects may impede sustainable groundwater management of the basin?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
(i) Result in substantial erosion or siltation on or off site.	X			
(ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;	X			
(iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	X			
iv) Impede or redirect flood flows?	X			
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?				X
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?			X	

IMPACT ANALYSIS

4.10a Would the project violate water quality or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Potentially Significant Impact. The Project's construction-related activities would include excavation, grading, and trenching, which would displace soils and temporarily increase the potential for soils to be subject to wind and water erosion. Also, the Project's operational activities would generate various materials (i.e., vehicle fluids, landscaping materials and wastes, general trash debris and litter, and pet waste (bacteria/ fecal coliforms), which could contribute to pollutants, other than sediment, to stormwater runoff. As such, the Project's construction-related and operational activities could violate water quality standards or otherwise substantially degrade surface or groundwater quality. Therefore, the EIR will further evaluate these potential impacts.

4.10b Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less Than Significant Impact. The Project site is in Golden State Water Company's (GSWC's) service area, and specifically, within the Southwest System service area, which serves Gardena, seven other cities, and portions of unincorporated Los Angeles County. The Southwest System's water supply sources are imported water, groundwater wells, and recycled water. The Southwest System is supplied by two active wells in the Central Subbasin of the Coastal Plain of Los Angeles Groundwater Basin (Central Basin) and 12 active wells in the West Coast Subbasin of the Coastal Plain of Los Angeles Groundwater Basin (West Coast Basin). There are no groundwater supply wells located on the Project site. Basin recharge occurs through the percolation of precipitation and artificial recharge activities at spreading grounds, among other sources. GSWC's 2020 Urban Water Management Plan - Southwest (UWMP) Tables 5-2, 5-3, and 5-4 identify that water supplies would meet the service area's water demands for normal, single-dry, and multiple dry-year conditions through 2045.[28] See Response 4.10e concerning sustainable groundwater management and 4.19b concerning water supply availability to serve the Project. The Project site is fully developed with industrial buildings, asphalt surface parking lots, hardscapes, and landscaping. The Project proposes various exterior open spaces, thus, would increase the onsite pervious surfaces. Finally, the Project would include low impact development (LID) best management practices (BMPs) to increase infiltration of stormwater runoff. Therefore, the Project would not substantially deplete groundwater supplies and would not interfere with groundwater recharge. Project impacts would be less than significant. This issue will not be further analyzed in the EIR.

[28] Golden State Water Company. (2021). 2020 Urban Water Management Plan – Southwest Service Area. Retrieved from https://wuedata.water.ca.gov/getfile?filename=/public%2Fuwmp_attachments%2F7646146476%2FGSWC-Southwest%202020%20UWMP%20Final.pdf.

4.10c Would the project substantially alter the existing drainage pattern of the site or area, including through the alterations of the course of stream or river or through the addition of impervious surfaces, in a manner which would:

(i) Result in substantial erosion or siltation on or off site?

(ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site?

(iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

(iv) Impede or redirect flood flows?

Potentially Significant Impact. As part of the EIR, a Preliminary Hydrology Study will be prepared to determine the volume of stormwater runoff generated from the Project site in the existing and proposed conditions. The Hydrology Study will also determine the drainage (e.g., detention basins) and water quality facilities that would be required for peak storm events. Therefore, the EIR will further study the Project's potential to alter the site's existing drainage pattern or add impervious surfaces, such that it would substantially increase the rate or amount of surface runoff in a manner which would result in flooding, create/contribute runoff, which would exceed the capacity of existing drainage system, or impede/redirect flood flows. Refer to Response 4.10a concerning potential impacts involving erosion.

4.10d In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

No Impact. Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) indicates the Project Site is within Zone X, which depicts areas determined to be outside of the 0.2-1.0% (500-year) annual chance floodplain.[29]

Tsunamis are sea waves that are generated in response to large-magnitude earthquakes. When these waves reach shorelines, they sometimes produce coastal flooding. Seiches are the oscillation of large bodies of standing water, such as lakes, which can occur in response to ground shaking. The Project site is approximately eight miles east of the Pacific Ocean and there are no nearby bodies of standing water. Therefore, the Project site is not within a tsunami or seiche zone.

The Project proposes a residential development that would involve the use of materials associated with routine property maintenance, such as janitorial supplies for cleaning purposes and/or herbicides and pesticides for landscaping. The Project is not within a flood hazard, tsunami, or seiche zone. Therefore, no risk of release of pollutants due to Project inundation by these hazards would occur. This issue will not be further analyzed in the EIR.

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[29] Federal Emergency Management Agency. (April 2019). *FEMA Flood Map Service Center.* Retrieved from https://msc.fema.gov/portal/search?AddressQuery=1515%20W%20178th%20St%2C%20Gardena%2C%20CA%2090248#searchresultsanchor.

4.10e Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less Than Significant Impact. The Southwest System is supplied by two active, GSWC-owned wells in the Central Basin, and 12 active, GSWC-owned wells in the West Coast Basin. GSWC monitors well capacity, status, and water quality. The Central Basin's groundwater storage capacity is approximately 13.8 million AF. The West Coast Basin's groundwater storage capacity (i.e., the Silverado aquifer) is approximately 6.5 million AF.

In 2014, the California Sustainable Groundwater Management Act (SGMA) was passed, which provides authority for agencies to develop and implement groundwater sustainability plans (GSP) or alternative plans that demonstrate water basins are being managed sustainably.[30] Under the SGMA, the Central and West Coast Basins are exempt from the requirement to form a Groundwater Sustainability Agency, since they are adjudicated basins.[31]

The Central Basin adjudication limit (total of the allowed pumping allocations (APA) of each party) for groundwater extraction across the entire basin is 217,467 AFY. GSWC maintains an APA of 16,439 AFY. GSWC's APA is shared between all their systems that extract groundwater from the Central Basin. The West Coast Basin adjudication limit for groundwater extraction across the entire basin is 64,468 AFY. GSWC maintains legal rights to 7,502 AFY. Groundwater levels are managed within a safe basin operating range to protect the Basin's long-term sustainability and to protect against land subsidence.

SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, sustainability is anticipated to be reached by 2040. For the remaining high and medium priority basins, 2042 is the deadline. The latest basin prioritization project, SGMA 2019 Basin Prioritization, was completed in December 2019. SGMA 2019 Basin Prioritization identified 94 basins/sub-basins as medium or high priority. The Project site is located in a low priority basin.[32] Additionally, the Southwest System's water use in 2020 (most recent UWMP) was 84 GPCD, well below the SB X7-7 2020 target of 121 GPCD. Further, the City would continue to comply with Senate Bill X7-7 (Water Conservation Act of 2009) requirements concerning water use efficiency. Therefore, the Project would not conflict with or obstruct implementation of a sustainable groundwater management plan. Impacts would be less than significant in this regard. This issue will not be further analyzed in the EIR.

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30 State Water Resources Control Board. Sustainable Groundwater Management Act (SGMA). (April 2019). Retrieved from https://www.waterboards.ca.gov/water_issues/programs/gmp/sgma.html.

31 State Water Resources Control Board. Sustainable Groundwater Management Act (SGMA). (April 2019). Retrieved from https://www.waterboards.ca.gov/water_issues/programs/gmp/sgma.html.

32 California Department of Water Resources. (2020). *Basin Prioritization Dashboard*. Retrieved from: https://gis.water.ca.gov/app/bp-dashboard/final/.

4.11 Land Use and Planning

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Physically divide an established community?				X
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	X			

IMPACT ANALYSIS

4.11a Would the project physically divide an established community?

No Impact. Examples of projects that could physically divide an established community include a new freeway or highway that traverse an established neighborhood. The Project proposes residential infill development. The Project replaces the existing industrial use and does not propose any new roadways or other physical barriers. Given its nature and scope, the Project would not physically divide an established community. No impact would occur in this regard. This issue will not be further analyzed in the EIR.

4.11b Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Potentially Significant Impact. GGP Figure LU-2, *Land Use Policy Map*, depicts the City's land use designations and indicates the Project site is designated Industrial.[33] The Industrial designation provides for a wide range of clean and environmentally friendly industries, technology-related uses and supporting facilities, and business parks.[34] Additionally, the GGP assigns to most of the Project site (APNs: 6106-030-011, 6106-030-015, and 6106-030-016) a Regional Housing Needs Assessment (RHNA) Housing Overlay 4 (HO-4).

The Project proposes the NCSP, which involves a multi-family residential development with 403 DU. Additionally, three of the parcels (APNs: 6106-030-011, 6106-030-015, and 6106-030-016) have a High Density 30 Overlay which allows up to 30 DU/AC. The Project would conflict with the existing Industrial designation, as well as the density permitted by the Housing Overlay, thus, would require a GGP amendment (i.e., from Industrial to Specific Plan). The EIR will further evaluate the Project's potential to conflict with the GGP.

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33 City of Gardena. (2006, Updated April 2021). *Gardena General Plan 2006*. Figure LU-2: 2021 General Plan Land Use Policy Map. Gardena, CA: City of Gardena.

34 City of Gardena. (2006, Updated February 2013). *Gardena General Plan 2006*. page 14. Gardena, CA: City of Gardena.

The City of Gardena Zoning Map depicts the City's zones and indicates the Project site is zoned M-1 and M-2 Zone.[35] The M-1 and M-2 Zones are intended for general industrial use. Additionally, the M-1 zoned property (APNs: 6106-030-011, 6106-030-015, and 6106-030-016) is zoned with Housing Overlay 4 (HO-4) as well, which allows a density of 21-30 DU/AC. The Project proposes the NCSP, which involves a multi-family residential development with 403 DU. The Project would conflict with the existing M-1 and M-2 Zones and the density permitted by the HO-4 Overlay, thus, would require a zone change (i.e., from M-1 and M-2 to Specific Plan). The EIR will further evaluate the Project's potential to conflict with the GMC.

[35] City of Gardena. (2020). *City of Gardena Zoning 2020*. Retrieved from: https://cityofgardena.org/wp-content/uploads/2020/11/Gardena_Zonning_2020.pdf, accessed April, 2023.

4.12 Mineral Resources

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				X

IMPACT ANALYSIS

4.12a Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

4.12b Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

No Impact. The Surface Mining and Reclamation Act of 1975 (SMARA) requires classification of land into mineral resource zones (MRZs) according to the area's known or inferred mineral potential.[36] The Project site is located in Mineral Resource Zone-1 (MRZ-1). Areas designated MRZ-1 are noted to have adequate information that no significant[37] mineral deposits are present or it is judged that little likelihood exists for their presence.[38] Further, the GGP does not identify the Project site as a locally-important mineral resource recovery site. Therefore, the proposed Project would have no impact concerning mineral resources. These issues will not be further analyzed in the EIR.

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[36] California Department of Conservation. (2018). *California Statutes and Regulations for the California Geological Survey.* Sacramento, CA: California Geological Survey.

[37] Note that use of the term "significant" in this context is used in the MRZ definitions of zones to describe economic value of mineral resources and does not refer to a level of impact under CEQA.

[38] California Department of Conservation. (2015). *CGS Information Warehouse: Regulatory Maps. Special Report 143, Plate 4-1.* Retrieved from http://maps.conservation.ca.gov/cgs/informationwarehouse/.

4.13 Noise

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	X			
b) Generate of excessive ground borne vibration or groundborne noise levels?	X			
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X

The GGP establishes goals, policies, and programs to protect residents from excessive noise. Additionally, GMC §8.36.040 and §8.36.050 state the City's exterior and interior noise standards in terms of Leq(15) and Lmax. GMC §8.36.080(G) addresses noise associated with construction, repair, remodeling, grading, or demolition.

IMPACT ANALYSIS

4.13a Would the project result in generation a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Potentially Significant Impact. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earthmovers, material handlers, and portable generators, can reach high levels. Construction activities are anticipated to include site preparation, grading, building construction, paving, and architectural coating. Nearby noise-sensitive receptors could be exposed to elevated exterior noise levels during Project construction that exceed adopted standards. Construction activities could also cause increased noise along access routes to and from the Project site due to movement of equipment, materials, and workers. The EIR will further evaluate the potential for the Project's construction activities to result in a temporary increase in ambient noise levels in the Project's vicinity in excess of City standards.

The Project proposes to replace the existing industrial use with a residential development of up to 403 DUs. Since the existing buildings are currently operating a food plant and other industrial uses, there is existing operational noise. The Project would introduce operational mobile and stationary noise sources typical of residential developments. The stationary noise associated with the current industrial uses would be replaced with stationary noise typical of a multi-family residential use. The Project would also generate traffic volumes along nearby roadways, which could result in noise level increases along area roadways. The EIR will further evaluate the potential for Project operations to result in a temporary or permanent increase in ambient noise levels in the Project's vicinity in excess of City standards.

4.13b Would the project generate excessive groundborne vibration or groundborne noise levels?

Potentially Significant Impact. Increases in groundborne vibration levels attributable to the Project would be primarily associated with short-term construction-related activities. Project construction could result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. The Project proposes a residential development that would remove the existing industrial uses, removing the groundborne vibration associated with existing truck operations. The EIR will further evaluate the Project's potential to generate excessive groundborne vibration or groundborne noise levels.

4.13c Would the project be located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the project area to excessive noise levels?

No Impact. The Project site is not located within the vicinity of a private airstrip or an airport land use plan, or within two miles of a public airport or public use airport. The airport located nearest the Project site is Hawthorne Municipal Airport/Jack Northrop Field ("Airport"), approximately 3.4 miles to the northwest. This Airport is an FAA-designated general aviation reliever airport owned by the City of Hawthorne. Therefore, the Project would not expose people residing or working in the Project area to excessive airstrip- or airport-related noise levels. No impact would occur in this regard. This issue will not be further analyzed in the EIR. Refer also to Response 4.9e.

4.14 Population and Housing

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	X			
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				X

IMPACT ANALYSIS

4.14a Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Potentially Significant Impact. The City's current population as of January 1, 2022 is approximately 60,903 persons.[39] The City's housing stock totaled 22,486 DU with approximately 2.74 persons per household. The Project would remove all existing onsite improvements and, in their place, construct up to 403 DUs (i.e., 75 townhome units and 328 apartment units). Because the Project proposes residential uses, it would induce unplanned population growth in the City directly by proposing new homes. The EIR will further evaluate whether the Project's forecast population growth is substantial.

4.14b Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact. The Project would remove the existing onsite industrial uses and, in their place, construct residential uses. The Project would not displace existing housing or people or require construction of replacement housing elsewhere. Therefore, no impact would occur in this regard. This issue will not be further analyzed in the EIR.

[39] California Department of Finance. (2021). *E-5 Population and Housing Estimates for Cities, Counties, and the State, January 2021-2022, with 2020 Benchmark*. Retrieved from https://dof.ca.gov/forecasting/demographics/estimates/e-5-population-and-housing-estimates-for-cities-counties-and-the-state-2020-2022/.

4.15 Public Services

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physical altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?	X			
b) Police protection?	X			
c) Schools?	X			
d) Parks?	X			
e) Other public facilities?	X			

IMPACT ANALYSIS

4.15a Fire Protection?

Potentially Significant Impact. The City contracts with the County of Los Angeles Fire Department (LACFD) to provide fire protection and emergency medical services to the City. LACFD operates two fire stations within Gardena: Fire Station 158, located at 1650 West 162nd Street; and Fire Station 159, located at 2030 West 135th Street. The fire station nearest the Project site is Fire Station 158, approximately 0.45 mile to the northwest. The Project's forecast population growth would incrementally increase the demand for fire protection and emergency medical services to the Project site. The EIR will further evaluate the Project's potential to result in substantial adverse physical impacts associated with the provision of new or physically altered governmental fire protection facilities.

4.15b Police Protection?

Potentially Significant Impact. Police protection services to the Project would be provided by the City of Gardena Police Department (GPD). The GPD operates out of its headquarters at 1718 West 162nd Street, Gardena, approximately 0.5-mile northwest of the Project site. The Project's forecast population growth would incrementally increase the demand for police protection services to the Project site. The EIR will further evaluate the Project's potential to result in substantial adverse physical impacts associated with the provision of new or physically altered governmental police protection facilities.

4.15c Schools?

Potentially Significant Impact. The Project site is within Los Angeles Unified School District (LAUSD) boundaries. The Project's forecast population growth would generate an increase in student population. The EIR will further evaluate the Project's potential to result in substantial adverse physical impacts associated with the provision of new or physically altered governmental school facilities.

4.15d Parks?

Potentially Significant Impact. There are six parks with community buildings and one parkette in the City.[40] The Project's forecast population growth would incrementally increase the demand for parks. The EIR will further evaluate the Project's potential to result in substantial adverse physical impacts associated with the provision of new or physically altered governmental park facilities. See also Response 4.16 below.

4.15e Other public facilities?

Potentially Significant Impact. Los Angeles County Library operates 84 community-based library outlets, including four bookmobiles in 51 of 88 cities and unincorporated areas.[41] Los Angeles County Library is responsible for maintenance and library improvements to meet future library service's demands. The Project's forecast population growth would incrementally increase the demand for library services. The EIR will further evaluate the Project's potential to result in substantial adverse physical impacts associated with the provision of new or physically altered library facilities.

[40] City of Gardena. *Gardena Facilities*. Retrieved from Gardena Facilities – City of Gardena.

[41] LA County Library. (2018). Public Libraries. https://www.lacounty.gov/things-to-do/libraries-museums/public-libraries/.

4.16 Recreation

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	X			
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	X			

IMPACT ANALYSIS

4.16a Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Potentially Significant Impact. The City's recreational facilities include six parks with community buildings, two gymnasiums, one parkette, one large two-story community center, and one municipal swimming pool.[42] The Project's forecast population growth could incrementally increase the use of existing recreational facilities. The EIR will further evaluate whether this incremental increase would be such that substantial physical deterioration of existing recreational facilities would occur or be accelerated.

4.16b Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Potentially Significant Impact. The Project proposes various recreational facilities including a fitness room, club house, and pool. Additionally, the Project's forecast population growth could require the construction or expansion of recreational facilities to meet future Project demands. The EIR will further evaluate the Project's potential to result in adverse physical environmental effects from construction or expansion of recreational facilities.

42 City of Gardena. *Gardena Facilities*. Retrieved from Gardena Facilities – City of Gardena.

4.17 Transportation

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycles, and pedestrian facilities?	X			
b) Conflict or be inconsistent with CEQA Guidelines §15064.3, subdivision (b)?	X			
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (for example, farm equipment)?	X			
d) Result in inadequate emergency access?	X			

IMPACT ANALYSIS

4.17a Would the project conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

Potentially Significant Impact. The Project would increase pedestrian, bicyclist, and vehicle traffic in the Project area. The EIR will further evaluate whether this increase would conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

4.17b Would the project conflict or be inconsistent with CEQA Guidelines §15064.3, subdivision (b)?

Potentially Significant Impact. The Project would increase vehicle traffic in the Project area. Therefore, the EIR will further evaluate the Project's vehicle miles traveled (VMT) for consistency with State CEQA Guidelines §15064.3, subdivision (b).

4.17c Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (for example, farm equipment)?

Potentially Significant Impact. The Project would replace existing industrial uses with multi-family residential uses and construct new transportation features (i.e., access driveways and curves, sidewalks, and railroad improvements), which may increase transportation hazards. The EIR will further evaluate the Project's potential to increase hazards due to a design feature or incompatible use.

4.17d Would the project result in inadequate emergency access?

Potentially Significant Impact. The Project would modify existing site access. The EIR will further evaluate if this would result in inadequate emergency access.

4.18 Tribal Cultural Resources

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code §21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is	X			
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code §5020.1(k); or	X			
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code §5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code §5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	X			
Source: Kimley-Horn & Associates				

IMPACT ANALYSIS

4.18ai Cause a substantial adverse change in the significance of a tribal cultural resource, listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code §5020.1(k); or

4.18aii Cause a substantial adverse change in the significance of a tribal cultural resource- a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code §5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code §5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Potentially Significant Impact. Past development has previously disturbed the Project site. Given the extent of onsite ground disturbances from previous development and the area's urbanized nature, there is low potential for the Project's ground-disturbing activities to encounter tribal cultural resources. Notwithstanding, the potential exists for accidental discovery of tribal cultural resources during ground-disturbing activities. The EIR will further evaluate these potential impacts.

4.19 Utilities and Service Systems

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Require or result in the relocation or construction of new or expanded facilities concerning the following, the construction or relocation of which could cause significant environmental effects? i) Water, ii) Wastewater, iii) Wastewater Treatment (see Response 4.19.c below), iv) Stormwater Drainage, v) Electric Power, Natural Gas, and Telecommunications.	X			
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	X			
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project projected demand in addition to the provider's existing commitments?	X			
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	X			
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	X			
Source: Kimley-Horn & Associates				

IMPACT ANALYSIS

4.19a Require or result in the relocation or construction of new or expanded facilities concerning the following, the construction or relocation of which could cause significant environmental effects?

(i) Water,

(ii) Wastewater,

(iii) Wastewater Treatment,

(iv) Stormwater Drainage,

(v) Electric Power, Natural Gas, and Telecommunications.

4.19b Would the project have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?

4.19c Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project projected demand in addition to the provider's existing commitments?

4.19d Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

4.19e Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Potentially Significant Impact. The Project would increase utility demands and generations within the Project site, potentially resulting in the need to relocate or construct new utility facilities. The Project would also increase demands for water supplies wastewater treatment solid waste generation. The EIR will further evaluate these potential impacts.

4.20 Wildfire

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?				X
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?				X
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				X
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				X
Source: Kimley-Horn & Associates				

IMPACT ANALYSIS

4.20a Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

4.20b Would the project, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

4.20c Would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

4.20d Would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No Impact. The Project site is in a local responsibility area and classified as Non-Very High Fire Hazard Severity Zone (Non-VHFHSZ).[43] Because the Project is not located in or near a State responsibility area or lands classified as VHFHZ, the Project would result in no impact concerning wildfire. This issue will not be further analyzed in the EIR.

[43] CalFire. (September 2011). *Los Angeles County FHSZ Map.* Retrieved from https://osfm.fire.ca.gov/media/7280/losangelescounty.pdf.

4.21 Mandatory Findings of Significance

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Does the Project:				
a) Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	X			
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects.)	X			
c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	X			

IMPACT ANALYSIS

4.21a Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Potentially Significant Impact. As discussed throughout this Initial Study, the Project has the potential to degrade the environment's quality/result in significant environmental impacts that may not be able to be reduced to less than significant, despite compliance with the established regulatory framework (i.e., local, state, and federal regulations), Project and conditions of approvals. Therefore, the EIR will further evaluate these potential impacts.

As concluded in **Section 4.4: Biological Resources**, the Project would not have the potential to reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal. These issues will not be further analyzed in the EIR.

As concluded in **Section 4.5: Cultural Resources**, the three existing onsite buildings are all over 50 years old. Additionally, the potential exists for accidental discovery of archaeological resources during ground-disturbing activities. Therefore, the Project could eliminate important examples of the major periods of California history or prehistory. Therefore, the EIR will further evaluate these potential impacts.

4.21b Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects.)

4.21c Does the project have environmental effects which will cause substantial adverse effects on human beings, directly or indirectly?

Potentially Significant Impact. The Project would replace the existing onsite industrial uses with residential uses, which could result in cumulatively considerable impacts and/or adverse effects on human beings. The EIR will further evaluate these potential impacts.

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Appendix 4.7-1:
Preliminary Geotechnical Investigation

HAMILTON
& Associates

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Updated April 18, 2023
Project No. 21-2971

16911 Normandie Associates, LLC
134 Lomita St.,
El Segundo, CA 90245

Attention: Mr. Fred Shaffer, President

Subject: Preliminary Geotechnical Investigation, Proposed 5.5-Acre Apartment and Townhome Development, 16831 & 16911 South Normandie Avenue, Gardena, California.

Dear Mr. Shaffer:

Per your request, presented herewith is Hamilton & Associates, Inc. (H&A) Preliminary Geotechnical Investigation Report for the subject project. H&A's work was conducted in accordance with the proposal dated July 21, 2021 and your subsequent authorization. The purpose of this study was to evaluate select conditions at the site and provide recommendations for the design and construction of the proposed project. This evaluation has concluded that the proposed project is feasible from a geotechnical viewpoint provided that the recommendations and design guidelines presented in this report are incorporated in the project plans and design and implemented during construction. The results of the field exploration and laboratory tests are also presented. We thank you for the opportunity to provide professional services on this important project and we look forward to assisting you during construction. If you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,
HAMILTON & ASSOCIATES, INC.

REGISTERED PROFESSIONAL ENGINEER
DAVID THOMAS HAMILTON
GE 2721
Exp. 6/30/2023
GEOTECHNICAL
STATE OF CALIFORNIA

Brendan Miller
Senior Staff Engineer

David T. Hamilton, PE, GE
President/Geotechnical Engineer

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INTRODUCTION

This report presents the results of H&A's geotechnical investigation for the Project (described below in Project Concept) conducted at 16831 & 16911 South Normandie Avenue, Gardena, California, approximately 33.8773°N, 118.2996°W (Site). Figure 1, "Site Location Map" presents the Site's location.

Site exploration was conducted to identify and evaluate select surface and subsurface conditions. Geotechnical recommendations for design and construction of the Project were developed based on the review of select published and unpublished documents in conjunction with the findings of this field investigation and laboratory analysis. This report summarizes the data collected and presents geotechnical findings, conclusions, and recommendations.

PROJECT DESCRIPTION

The Project concept was provided during conversations and in emails with Mr. Fred Shaffer of Saiko Investment Corp. and Mr. Richard Solares of Urban Architecture Lab, Project Architect. It is H&A's understanding that the Project will consist of a 328-unit 7-story podium construction residential building that consists of 2 levels of on/above grade parking with 5 levels of wood frame units above. Furthermore, 75 3-story townhomes are planned. Site Plan by Urban Architecture Lab, dated September 26, 2022, is presented on Plate A-1.

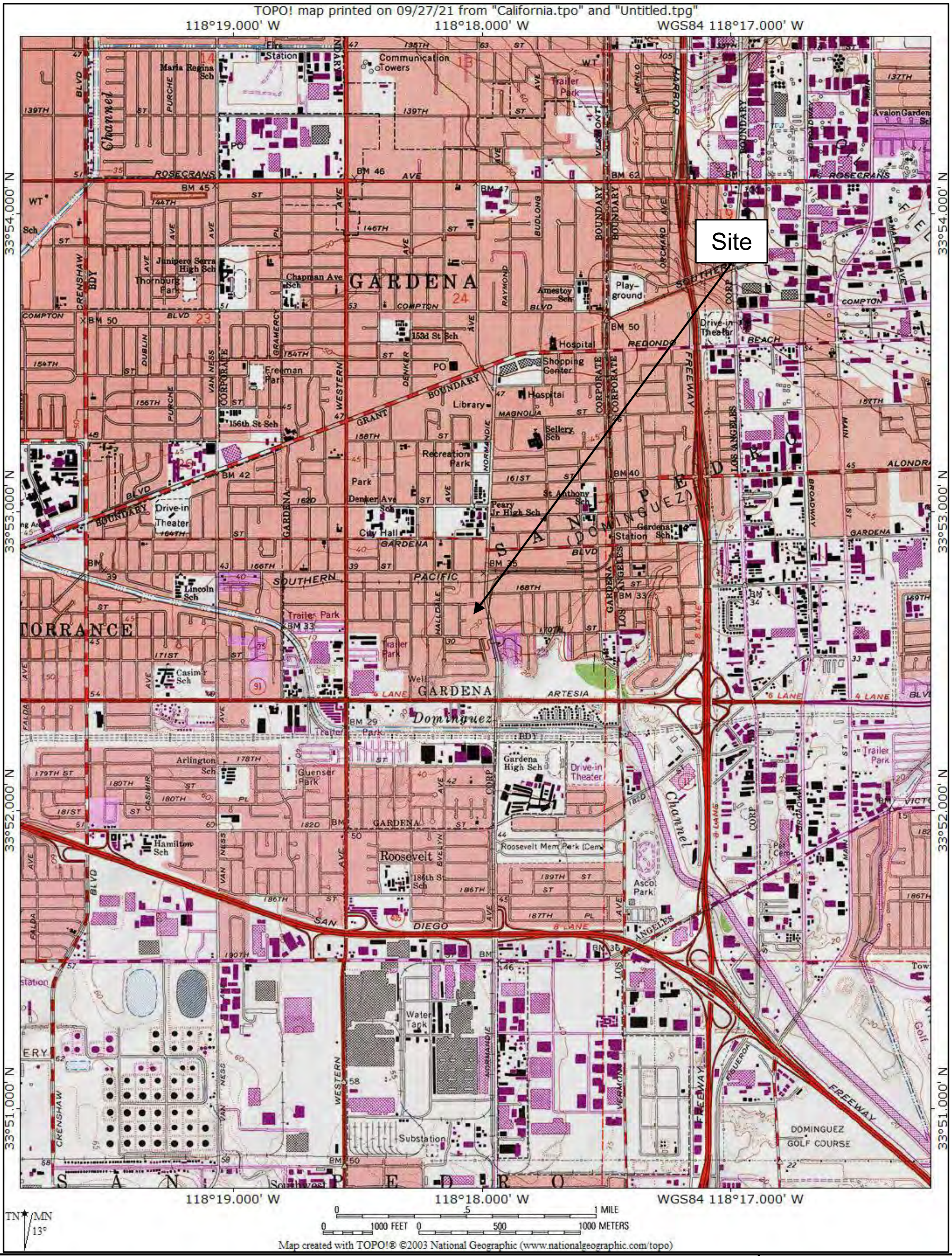
Existing Site Conditions

In general, the Site and surrounding area are relatively level. The lots are occupied by commercial/industrial buildings that are reportedly constructed between 1952 through 1987, according to the office of the Los Angeles County Assessor. The Site is bound to the north by West 169th Street, to the west by Brighton Way, to the east by South Normandie Avenue, and to the south by West 170th Street. Primarily the area contains residential lots surrounding the Site with some commercial/industrial lots to the north.

Structural Loading

The project structural engineering firm was not contracted at the time of issuing this report, therefore building loads have been assumed and shall be confirmed when available. It is assumed that the 7-story podium residential structure will be supported by shallow conventional foundations with maximum column load on the order of 350 kips and maximum continuous footing loads on the order of 5 kips per linear foot. It is assumed that the 3-story townhomes will be supported by shallow conventional foundations with maximum column loads on the order of 75 kips and maximum continuous footing loads on the order of 4 kips per linear foot.

SITE LOCATION MAP



PROJECT: 16911 Normandie Associates, LLC	PROJECT NO: 21-2971	DATE: October 2021
ADDRESS: 16831 & 16911 S. Normandie Avenue, Gardena, California		FIGURE: 1

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REVIEW OF AVAILABLE REPORTS

H&A submitted a public record request to the City of Gardena for soil, geology, and or/grading documents for the Site. At the time of issuing this report the City has not provided any documents to H&A for review. A list of reviewed documents found on file with the building department and within this firm's records are provided in the "References" section of this report.

A report for a proposed residential development similar to the proposed project for the Site was provided to H&A for review. The report was prepared by Geotechnologies in June of 2021 for 16911 Normandie Avenue. Data from the Geotechnologies report is provided in Appendix C for reference.

HISTORICAL TOPOGRAPHIC MAPS AND AERIAL IMAGES

H&A reviewed historical United States Geological Survey (USGS) topographic maps, Redondo Sheet 1896, Compton and Torrance Quadrangle 1924, Inglewood 1950, Torrance 1951, and Inglewood and Torrance 1964. Portions of these topographic maps are presented on Plates H-1 through H-4 "Historical Topography".

The 1896 topographic map (Plate H-1) depicts the Site as undeveloped. East and south of the Site, the present-day roads of Normandie Avenue and West 170th Street are depicted. South of 170th Street, drainage from the area flows into a slough. The slough is depicted with both marsh and standing water. Of note, the Redondo rail line is north south until diverting to the west to bypass the slough.

The 1924 topographic maps (Plate H-2) depict development of the area. A single structure is on the northern portion of the Site. The Redondo rail line is no longer present. A new rail line, east of the Site extends south across the area previously identified as slough. A fill was placed to accommodate the extension of Normandie Avenue, and the rail line. Standing water within the slough is no longer identified, with only marsh depicted east of the rail line. The area west of the rail line had been drained. By draining and drying the marsh area, better topographic control of the area was achieved, showing a drainage channel/gully at the southeastern portion of the Site.

The 1950/1951 topographic maps (Plate H-3) suggest further development of the area. A new structure is in the southwest corner of the Site, while the structure to the north identified on the 1924 map is no longer present. Development of roads to the west of the Site are similar to present day conditions. The marsh to the south has been further removed, portions of which were occupied by a speedway track and drive-in theater. Furthermore, the Dominguez Channel was constructed in the general path of the old drainage channel to the marsh.

The 1964 topographic maps (Plate H-4) depict the Site and surrounding area as developed, although individual buildings are no longer identified. Up to 14 feet of fill was placed along the southeastern portion of the parcel, filling in the natural drainage/gully, creating a broadly level, southeastern sloped ground surface. Development of the area around the Site is similar to present day conditions.

Historical aerial imagery from 1927 through 1983 was reviewed and is presented on Plates H-5 through H-17.

Plate H-5 “Historical Aerial Image 1927” depicts the Site in general conformance with Plate H-2 “Historical Topographic Map 1924”. Of significance is the that the slough has been drained, and the property to the south of the Site utilized for agriculture. The moisture from the old slough is shown within the image as the dark portions of the agricultural field. The Site, by contrast has been graded, with trees and residences along the northern and southern property lines.

Plate H-6 “Historical Aerial Image 1938” has the graded portion of the Site being utilized for agriculture. South of the Site, 170th street is well defined, and a fill embankment was placed to support and protect it. Agriculture continues within the old marsh area. The areas previously seen as dark and heavy with moisture appear more so in this image.

The 1941 image (Plate H-7) depicts the marsh to the south filled with water up to present day 170th Street, with the fill embankment protecting it. On Site, the residence and farming operations appear to have expanded with new structures. Residential development is shown encroaching from the west and north.

Plate H-8 “Historical Aerial Image 1947” records the standing water from 1941 within the slough being gone, and development rapidly encroaching from the west. Little appears to have changed on Site, save what appears to be a foot trail cross cutting the center of the Site, and the home at the north of property gone. Agriculture on Site appears to have ceased.

The 1951 historical aerial image (Plate H-8) depicts the majority of the Site being covered with vegetation, and the southern portion of the Site being irrigated. South of the Site, farming operations have generally ceased, and the marsh area may have been used as a stormwater catch basin, with an outflow channeled and extending under the rail line and Normandie Avenue.

The 1952 (Plate H-10) image depicts a building constructed near the center of the lot and is similar to a present day building on the Site. This structure concurs with information provided by the LA County Assessor information. Development along the southern property line appears to have been unchanged for years. Along the south side of 170^{th}, the fill embankment is still in place and marsh area appears dried, yet well defined.

More development in the center of the Site is documented on the 1956 historical image (Plate H-11), while the northern and southern property lines appear little changed. 170^{th} Street, west of the Site was widened. The fill embankment persists along the southern side of 170^{th}, and the marsh area appears to be further drained and dried, and partially graded to control the accumulation of water.

Plate H-12 “Historical Image 1960” records the additional development of industrial style buildings on Site. Grading of the southern property line, along 170th appears to be on going. Of most significance is the full residential development of the old slough and marsh area. Drainage for the area has been channeled.

Shown the 1962 historical areal image recorded continued clearing and grading of the southern portion of the property. This is in general accordance with the 1964 historical topographic map (Plate H-4) which indicates that portion of the Site had been filled.

The historical image from 1965 (Plate H-14) depicts further grading along the southern property line, with continued development and paving of the northern and center portions of the Site.

A new, large industrial style building is shown at the southeastern corner of the property on the 1971 historical image (Plate H-15). Buildings and pavement cover all but a strip of land along the northern property line. Little change has occurred on the adjacent properties.

1976 (Plate H-16) depicts little change on Site or otherwise.

The 1983 historical image (Plate H-17) records a new building along the northern property line, with little other changes. The Site’s development in 1983 is similar to today’s configuration.

FIELD EXPLORATION AND LABORATORY TESTING

The field exploration for this report included advancing exploratory excavations and, logging and sampling of Site earth materials. Exploratory locations are presented on Plate A-2, “Geotechnical Exploration Map”.

Logs and descriptions were based on visual and tactile field observations. Exploratory excavations were backfilled with the excavated materials. No locations were surveyed.

Samples of earth materials were secured and transported to H&A's certified geotechnical laboratory for further observation and testing.

This exploration did not include any evaluation or assessment of hazardous or toxic materials, which may or may not exist on or beneath the site.

FIELD EXPLORATION

Hollow Stem Auger Borings

On August 19th and 20th, 2021, three (3) 8-inch diameter hollow stem auger borings were excavated utilizing a truck mounted drill rig. The borings were advanced to depths ranging from 31.5 feet to 61.5 feet below ground surface (bgs). Relatively undisturbed Modified California Ring and bulk samples were retrieved from the exploratory borings for subsequent laboratory testing and analysis. Logs of subsurface observations are presented in Appendix A as Plates B-1 through B-3.

Cone Penetration Test (CPT)

On August 19, 2021, Hamilton & Associates contracted for six (6) CPTs, utilizing a truck mounted push CPT rig. The CPTs were advanced to approximately 60 feet to 100 feet bgs.

LABORATORY TESTING

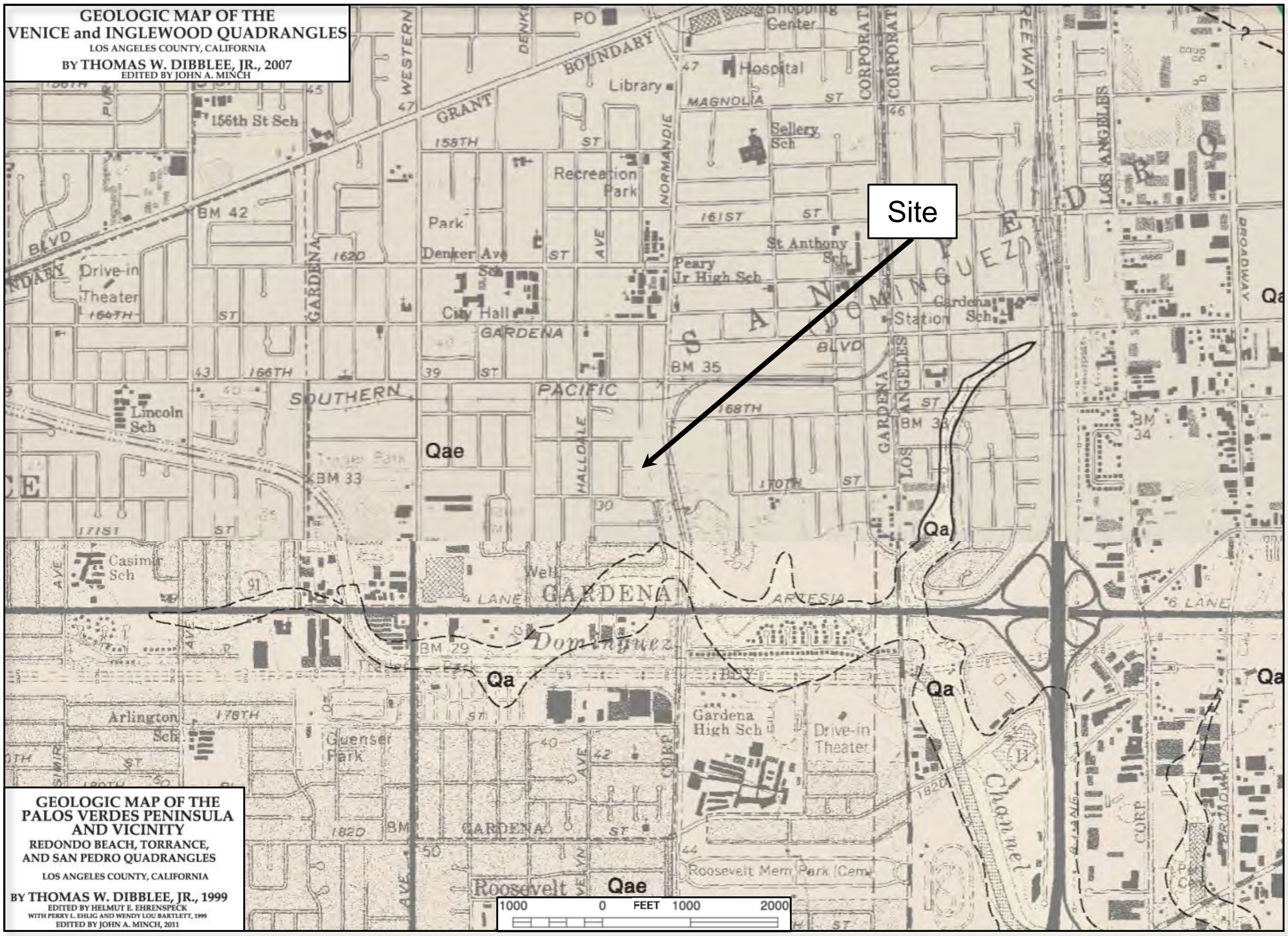
Select field samples were further inspected in Hamilton & Associates', Inc. geotechnical laboratory for subsequent confirmatory soil classification and engineering property testing. This testing included in-situ moisture content (ASTM D2216), dry unit weight (ASTM D2937), maximum density (ASTM D1557), consolidation (ASTM D2435), direct shear (ASTM D3080), Atterberg limits (ASTM D4318), Expansion Index (ASTM D 4829), sieve grain size fines analysis (ASTM D1140), as well as corrosion testing per guidelines of California 417 (Sulfate), California 422 (Chloride), and California 643 (pH and Resistivity) test procedures on a representative sample of the on-Site soils

SITE AND SUBSURFACE CONDITONS

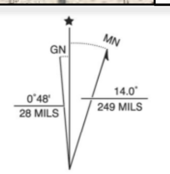
GEOLOGIC SETTING

The Site is located within the City of Gardena located within Los Angeles County. According to Figure 2, Regional Geology Map (Dibblee, 2007), the Site's vicinity is

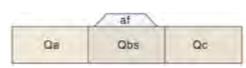
REGIONAL GEOLOGY MAP



INGLEWOOD QUADRANGLE
CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



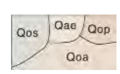
UTM GRID AND 1981 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



SURFICIAL SEDIMENTS

Alluvial sediments, unconsolidated, undissected

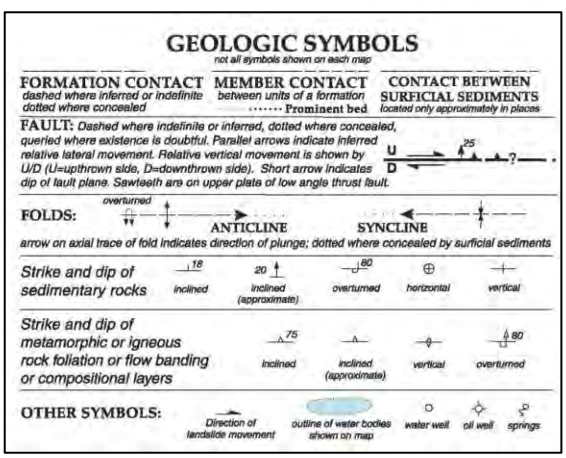
af: Artificial cut and fill
Qs: Beach sand
Qc: Clay and sand of predeveloped marshlands
Qa: Alluvial gravel, sand and clay, derived mostly from Santa Monica mountains; includes gravel and sand of minor stream channels



OLDER SURFICAL SEDIMENTS

Unconsolidated to weakly consolidated alluvial sediments, dissected where elevated; age late Pleistocene

Qos: Old sand dune deposits
Qae: Alluvial gravel, sand, and clay, slightly elevated and dissected
Qop: Paleosol in Baldwin Hills (Fox Hills paleosol of Weber et al., 1982) gray to rusty brown, sandy, locally pebbly, moderately indurated "hardpan" on **Qoa**
Qoa: Older alluvium of gray to light brown pebble-gravel, sand and silt-clay, elevated and dissected; in Baldwin Hills designated as Baldwin Hills sandy gravel by Weber et al., 1982, where it is much dissected and eroded



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underlain by Older Dissected Surficial Sediments, Qae, described as alluvial gravel, sand and clay, slightly elevated and dissected.

The Site is located within a seismically active region of Southern California within the zone of influence of several active and potentially active faults. Review of selected maps published by the California Geologic Survey (CGS) and the United States Geologic Survey (USGS) include Figure 3 “Regional Fault Map” and Figure 4 “Seismic Hazards Map”. Review of the USGS Interactive Quaternary Faults database and the USGS Unified Hazard Tool, indicate that the faults of most influence to the Site are the:

- Newport, Inglewood, Rose Canyon Fault, located approximately 0.6 miles west of the Site and capable of producing a M7.3 earthquake.
- Palos Verdes Fault, located approximately 6.3 miles south of the Site and capable of producing an M7.2 earthquake,
- Compton Blind Thrust Fault, which is not expressed at the ground surface, capable of producing a M7.2 earthquake,

At this time, the Newport, Inglewood, Rose Canyon faults have been determined to have moved within the last 11,000 years, and therefore is considered to be active and is “zoned” under the Alquist Priolo Fault Zones Act of 1972 and the Seismic Hazards Mapping Act of 1990.

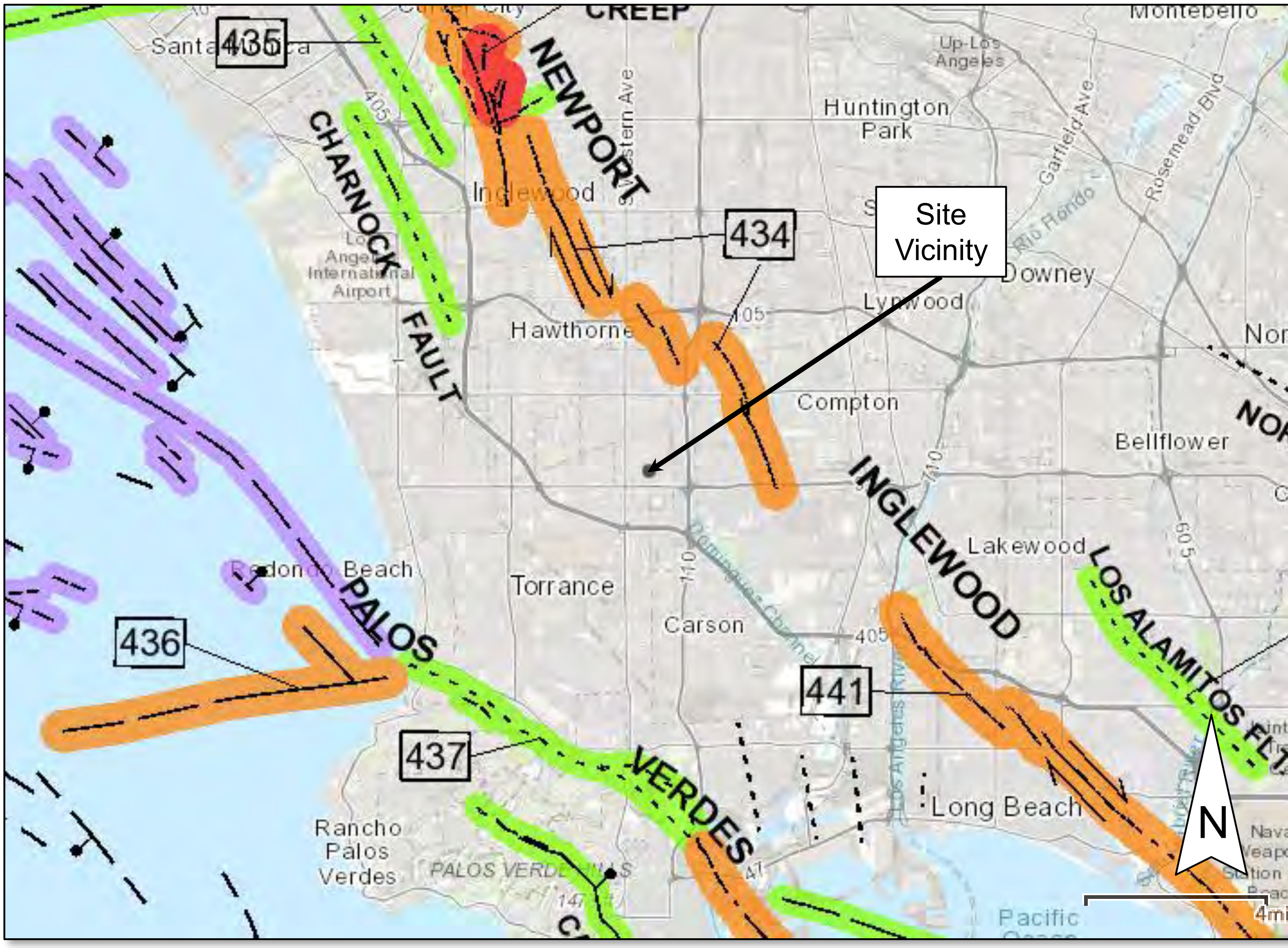
On January 17, 1994 the M6.7 Northridge earthquake occurred at a focal depth of 17.5 km (10.9 miles), on a south-dipping blind thrust fault with no direct surface rupture. The M5.9 Whittier Narrows earthquake occurred October 1, 1987 on a previously unknown, north-dipping blind thrust fault in the eastern Los Angeles region, with no recorded surface rupture (Woods, 1995). On February 9, 1971 the M6.5 San Fernando Earthquake occurred along previously mapped faults, producing 12 miles of ground rupture. And, on March 10, 1933, the historic Long Beach M6.2 earthquake occurred (Ziony, 1985). All of these earthquakes caused considerable damage near their epicenters and in surrounding cities.

Review of select geologic maps of the area published by the CGS and the USGS depict no landslide on or near the Site as shown on Figure 2 and Figure 5, “Landslide Inventory Map”.

GEOLOGIC MATERIALS

Site earth materials identified during this investigation included artificial fill and alluvium. Historical topographic maps and aerial images (as previously described) revealed a small

REGIONAL FAULT MAP



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION: ON LAND	DESCRIPTION: OFFSHORE
Quaternary	Late Quaternary	Historic	200			Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	11,700			Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	700,000			Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		1,600,000			Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			4.5 billion			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.

From: "Fault Activity Map of California," compiled by Charles W. Jennings and William A. Bryant, California Geological Survey, Map No. 6, California Geologic Data Map Series, 2010

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ADDRESS: 16831 & 16911 S. Normandie Avenue, Gardena, California		FIGURE: 3

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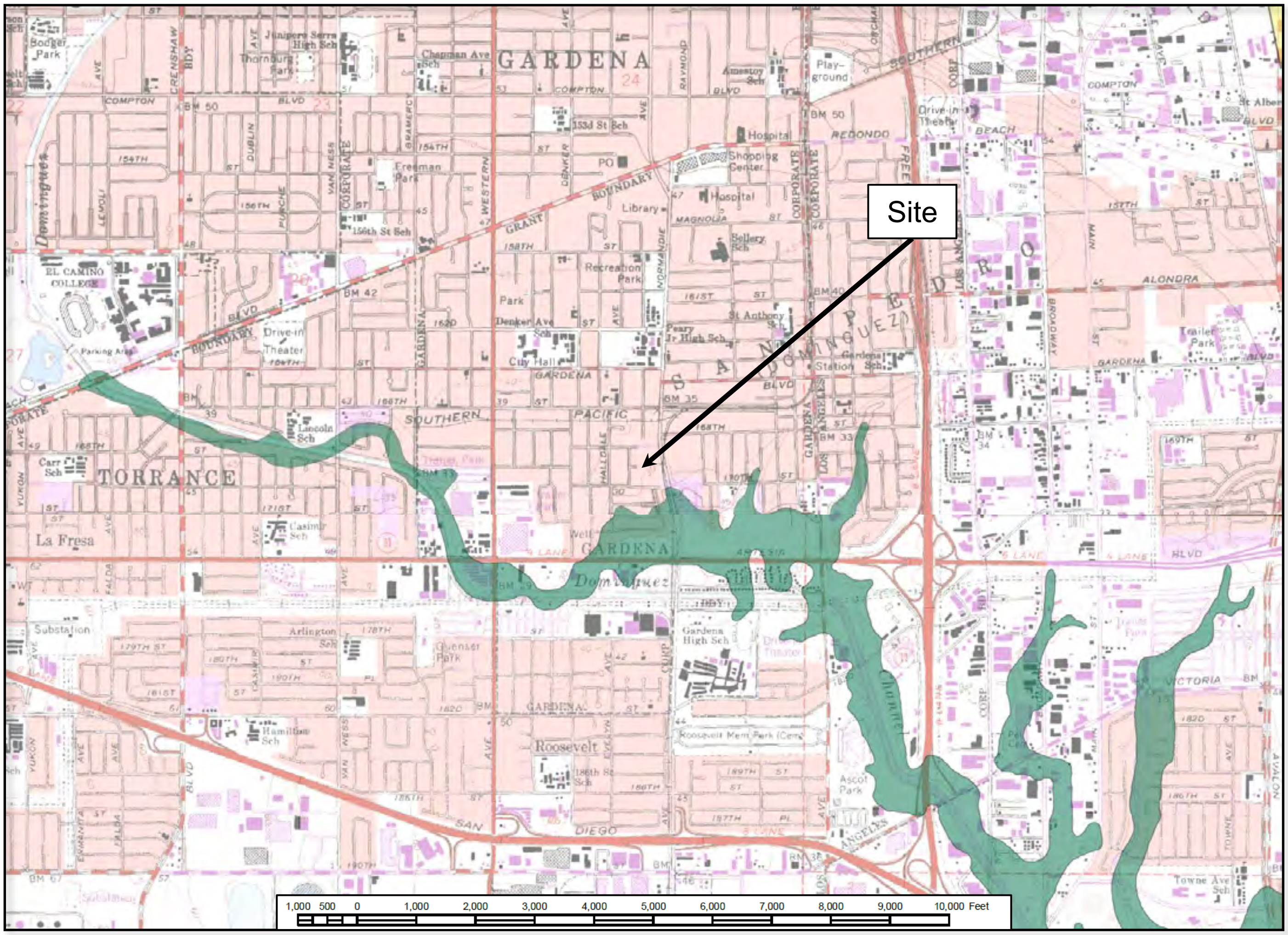
SEISMIC HAZARD ZONES MAP



Contour Interval 5 Feet

INGLEWOOD QUADRANGLE

EARTHQUAKE FAULT ZONES

Delineated in compliance with
Chapter 7.5 Division 2 of the California Public Resources Code
(Alquist-Priolo Earthquake Fault Zoning Act)

REVISED OFFICIAL MAP

Released: July 1, 1986

STATE GEOLOGIST

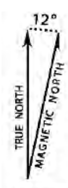
SEISMIC HAZARD ZONES

Delineated in compliance with
Chapter 7.8 Division 2 of the California Public Resources Code
(Seismic Hazards Mapping Act)

OFFICIAL MAP

Released: March 25, 1999

STATE GEOLOGIST



Approximate Declination, 2016

TORRANCE QUADRANGLE

EARTHQUAKE FAULT ZONES

Delineated in compliance with
Chapter 7.5 Division 2 of the California Public Resources Code
(Alquist-Priolo Earthquake Fault Zoning Act)

OFFICIAL MAP

Released: July 1, 1986

STATE GEOLOGIST

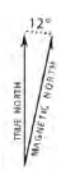
SEISMIC HAZARD ZONES

Delineated in compliance with
Chapter 7.8 Division 2 of the California Public Resources Code
(Seismic Hazards Mapping Act)

OFFICIAL MAP

Released: March 25, 1999

STATE GEOLOGIST



Approximate Declination, 2016

SEISMIC HAZARD ZONES

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

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONES

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

1906 C ?

Active Fault Traces
Faults considered to have been active during Holocene time and to have potential for surface rupture: Solid Line in Black or Red where Accurately Located; Long Dash in Black or Solid Line in Purple where Approximately Located; Short Dash in Black or Solid Line in Orange where Inferred; Dotted Line in Black or Solid Line in Rose where Concealed; Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

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LANDSLIDE INVENTORY MAP

Landslide Types

Deposits:

- Debris Flow
- Debris Slide, Soil Slide, or Soil Topple
- Earth Flow
- Rock Fall, Rock Topple, or Soil Fall
- Rock Slide
- Rock Spread
- Debris Fan
- Uncertain
- Type Undifferentiated

Sources:

- Scarp or Main Scarp
- Internal Scarp
- Debris Flow or Slide Scarp
- Debris Flow Track
- Gully or Rock Fall Chute
- Track or Rock Fall Source
- Inner Gorge
- Small Debris Flow Scarp or Track
- Small Slide Source, Type Undifferentiated
- Source Scarp

Landslide Activity

1000 0
FEET

- Active/Historic
- Dormant Young
- Dormant Mature
- Dormant Old/Relict
- Dormant Age Not Specified

Produced from Landslide Inventory

Retrieved from- https://maps.conservation.ca.gov/cgs/lsi/app/

Date retrieved: September 24, 2021

Information provided by: County of Los Angeles, Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA | California Geological Survey, USGS, Cooper-Clark Associates | California Geological Survey

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gully/depression on the southern portion of the Site, under the current industrial building. This area may contain deeper, deleterious natural soil and/or undocumented fill.

Subsurface field observations are presented on the Boring Logs found in Appendix A.

<u>Fill (Af)</u>
Artificial fill was encountered in all borings in minor amounts under the asphalt and concrete. The artificial fill was field identified as sandy silt and sandy clay, shades of brown in color, moist, and firm. Construction debris was encounter to a depth of 5 feet in boring 3.

<u>Alluvium</u>
Alluvium was encountered in all borings to final depths explored. It was field identified as layers of clayey silt, sandy clay, clayey sand, sandy silt, and silty sand. The material was generally shades of brown, reddish brown, and grey. Moisture of the material increased with depth. The material was field classified as firm to very stiff and medium dense to dense.

<u>GROUNDWATER AND CAVING</u>
Groundwater was encountered during field exploration at an approximate depth of 22 feet bgs. Figure 6 “Historic High Groundwater” indicates the Site’s historic high groundwater is approximately 15 feet bgs.

Seasonal and long-term fluctuations in the groundwater conditions may occur as a result of variations in irrigation, rainfall, surface run-off and other factors.

The use of hollow-stem augers and mud rotary drilling techniques precluded observation of potential caving conditions which may have otherwise occurred in an uncased hole, however low to moderate caving and/or soil sloughing may be experienced in Site excavations.

<u>SEISMOLOGICAL AND GEOLOGIC HAZARDS</u>

<u>Ground Shaking Analysis</u>
Neither the location nor magnitude of earthquakes can accurately be predicted at the time of this report. In the past, the Site has been periodically subject to moderate to intense earthquake-induced ground shaking from nearby faults. Considerable damage could occur at the Site and structural improvements during a strong seismic event.
There are a number of faults in the area, as presented, that were, at the time of this report, considered ‘active’ and that could produce moderate to strong ground shaking at the Site.

HISTORIC HIGH GROUNDWATER (SHZR #027)

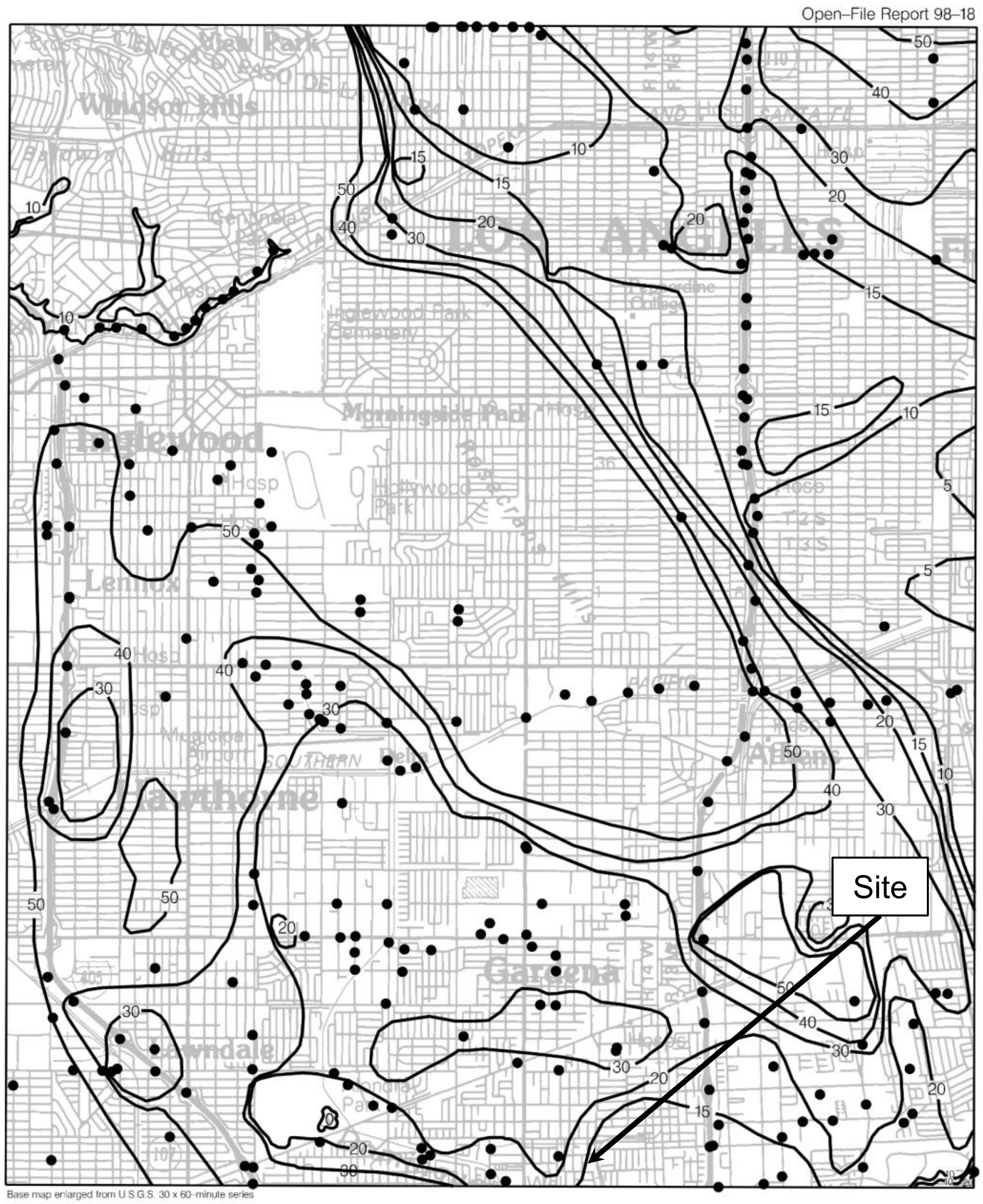

Plate 1.2 Historically Highest Ground Water Contours and Borehole Log Data Locations, Inglewood Quadrangle.

● Borehole Site — 30 — Depth to ground water in feet

ONE MILE
SCALE

From: "Seismic Hazard Zone Report for the Inglewood 7.5 Minute Quadrangle, Los Angeles County, California"
1998

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The possibility of ground acceleration or shaking at the Site could be considered as approximately similar to the Southern California region as a whole.

Based on the USGS Degradation Application (2014 V4.2.0), the peak ground acceleration for Site Class "D" earth materials was reported to be 0.46g, with a 10% probability of being exceeded in 50 years, and 0.80g for a 2% probabilistic of exceedance in 50 years.

Surface Fault Rupture

The Site does not lie within a designated Alquist-Priolo Earthquake Fault Zone, Figure 4. Therefore, the potential for surface fault rupture at the Site during the design life of onsite structures is considered low.

Seismic Settlements (Liquefaction)

The term "liquefaction" describes a phenomenon in which a saturated cohesionless soil loses strength and acquires a degree of mobility as a result of strong ground shaking during an earthquake. The factors known to influence liquefaction potential include soil type and depth, grain size, relative density, groundwater level, degree of saturation, and both the intensity and duration of ground shaking. Hazard data published by the State of California is shown on Figure 4 and indicates that the subject site is not within an area identified as having a potential for soil liquefaction.

As described in the Site Characterization section of this report, Site soils consisted predominantly of very stiff fine-grained soils (clays and silts), with one layer of borderline stiff to very stiff fine-grained soil, and occasional layers or lenses of dense sands. Deeper soils are mostly very stiff fine-grained soils with dense to very dense sand layers or lenses. Liquefaction potential of these soil types is characteristically nil to low.

Analysis was performed to evaluate potential seismically induced settlement of earth materials on site during a seismic event, considering historic high groundwater depth of approximately 15 feet below existing grade. Sensitivity Liquefaction Analysis Results are provided in the table below. Results further support that liquefaction potential at the site is considered nil to low.

Sensitivity Analysis Results									
Scenario	Liq. Factor of Safety	Earthquake Magnitude (M)	Ground Acceleration (g)	Settlement (in)					
				CPT-1	CPT-2	CPT-3	CPT-4	CPT-5	CPT-6
10% in 50 Years	1.1	6.61	0.46	0.02	0.14	0.09	0.03	0.39	0.58
2/3 PGAm	1.1	6.61	0.57	0.10	0.21	0.16	0.13	0.43	0.66
Full PGAm	1	6.74	0.85	0.34	0.42	0.38	0.45	0.53	0.76

Per Southern California Earthquake Center (1991), corresponding differential settlement for the liquefiable soils could be on the order of two-thirds (2/3) of the total liquefaction-induced settlement or more based on variability of subsurface soil layers. Liquefaction Analysis printout and details are provided in Appendix B

Significant damage to the structure due to soil liquefaction is not expected. It is this firm's opinion that the proposed development may be supported on shallow conventional foundations.

Seismically Induced Landslides

A landslide is a movement of the ground and is categorized based on the type of material that has failed and the movement type that occurs. A landslide is broadly categorized by its' failure mode, its' movement, and the earth materials involved. Predicting where landslides may occur utilizes this information as well as other factors such as slope steepness, slope height, slope orientation, relative density of the earth materials, groundwater level, degree of saturation, as well as location, intensity, and duration of ground shaking.

As shown on Figure 4 the Site does not lie within an Earthquake-Induced Landslide Zone as identified by the CGS.

Figure 5 shows the Site is not located in any known or inferred landslides.

Hydro-Consolidation

Hydro-consolidation settlement potential is considered to be low, as evidenced by subsurface soil properties, and laboratory engineering and index test results.

Expansive Soils

Laboratory testing on a sample of near surface soils indicated a 'Very Low' soil expansion potential (EI<5) as defined in the latest edition of ASTM D4829. It is H&A's opinion that a 'Medium' soil expansion should be used in project design. The degree of soil expansion should be confirmed by additional tests during or after rough grading operations.

ENGINEERING SITE CHARACTERIZATION

SOIL PROFILE CHARACTERIZATION

Approximate locations of exploratory borings and Cone Penetration Test (CPT) soundings performed by H&A and previous consultants is shown on Plate A-2. Depth of exploratory borings and CPT soundings ranged from approximately 26 feet to 95 feet below the ground surface (bgs). H&A's Boring B-2 extended to approximately 61.5 feet bgs and H&A's CPT sounding SCPT-4 extended to a depth of 95 feet bgs. Refusal to hollow stem auger drilling and sampling equipment was not encountered in any of the three (3) H&A soil borings. H&A CPT tip refusal was encountered at the maximum depth explored in SCPT-4.

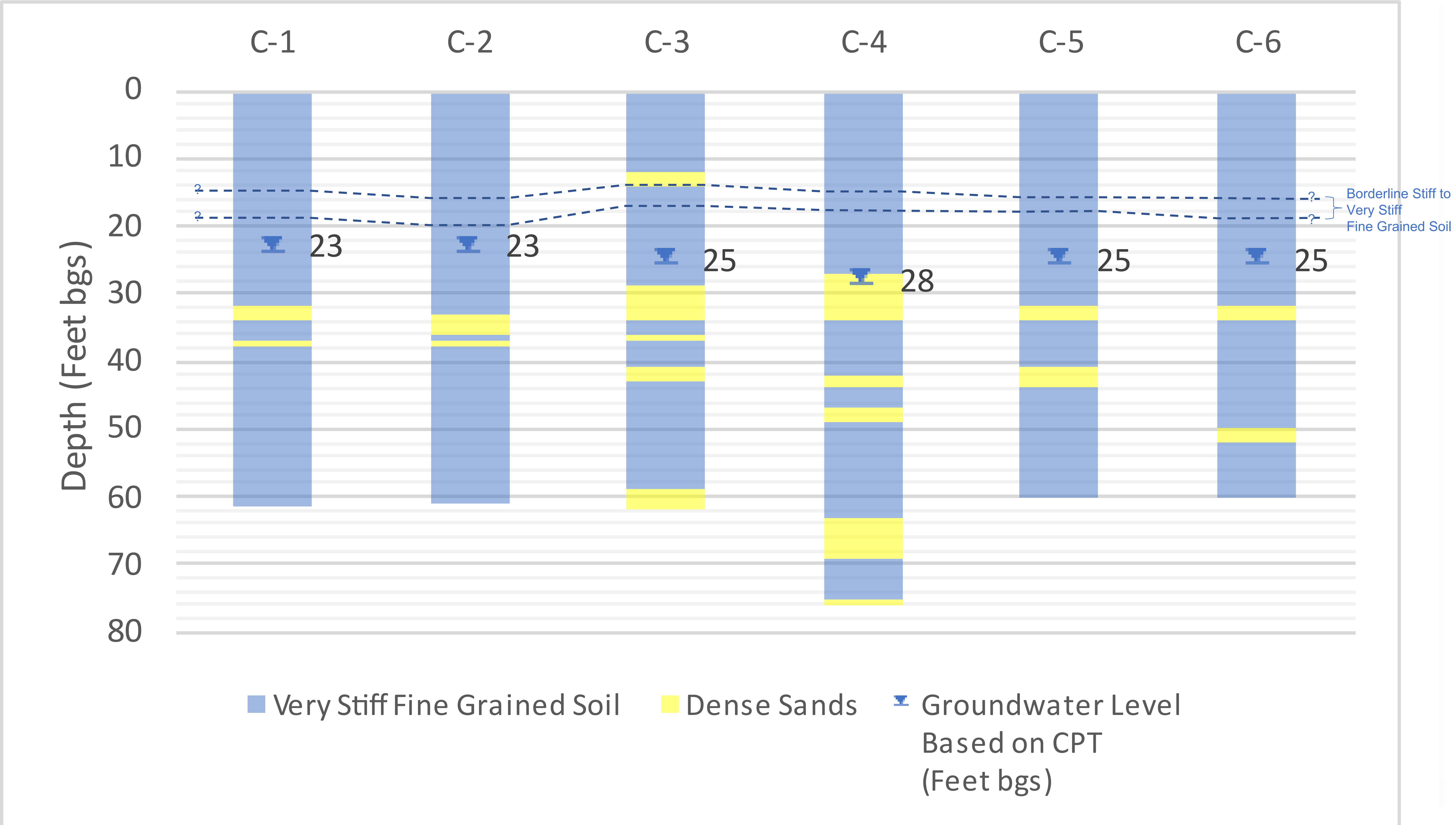
As described in Site and Subsurface Conditions of this report, the Site is located in a relatively level alluvial plain of latest Pleistocene to Holocene sediments. The alluvium generally consisted of mostly fine-grained (silt and clay) sediments (FGS) interbedded with occasional layers or lenses of mostly dense sand, a few (1 to 9) feet in thickness to depths of 60 feet. Below 60 feet of depth, sand layers were very dense in consistency. The CPT soundings indicated a general trend of predominantly silty clay to clayey silt materials (CL-ML, ML) with significant amounts of sand. Subsurface Soils Stratigraphy based on CPT Soundings are presented on Figure 7. The soils encountered at the Site can be described as consisting of Generalized Strata, which are summarized below.

Generalized Stratum (w/ Around Typical Depth Range bgs)	**Description** Soil Classification and Thickness
Stratum I (Ground Surface to 14-15 feet)	Mostly very stiff FGS (clays and Silts) Stratum I thickness is somewhat variable and approximately 15±1 feet, depending on location.
Stratum II (14-16 to 17-21 feet)	Borderline stiff to very stiff FGS. Stratum II varies from 4±1 feet thick.
Stratum III (17-21 to 27-36 feet)	Very stiff FGS (Silts/Clays) Stratum III is approximately 37±3 feet thick.
Stratum IV (27-36 to 38-46 feet)	Mostly very stiff FGS interbedded with layers or lenses of dense sand.
Stratum V (34-46 to 60+ feet)	Very stiff FGS with occasional layers of dense sand. Below 60 feet of depth sand layers or lenses become very dense.

CLASSIFICATION AND INDEX PROPERTIES

Profiles of soil penetration resistance, classification and index property test data collected from exploratory borings and generalized subsurface soil stratigraphy are presented on Figure 8. A Generalized Stratigraphic column of subsurface conditions is included in Column 1 of Figure 8. Field-measured CPT tip resistance (q_c) and Standard Penetration Test (SPT) blow count data from exploratory borings are shown on the second and third columns, respectively, of Figure 8. SPT-equivalent values were corrected for the effect of

SUBSURFACE SOIL STRATIGRAPHY BASED ON CPT SOUNDINGS



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SOIL PROPERTY CHARACTERIZATION PROFILES VERSUS DEPTH

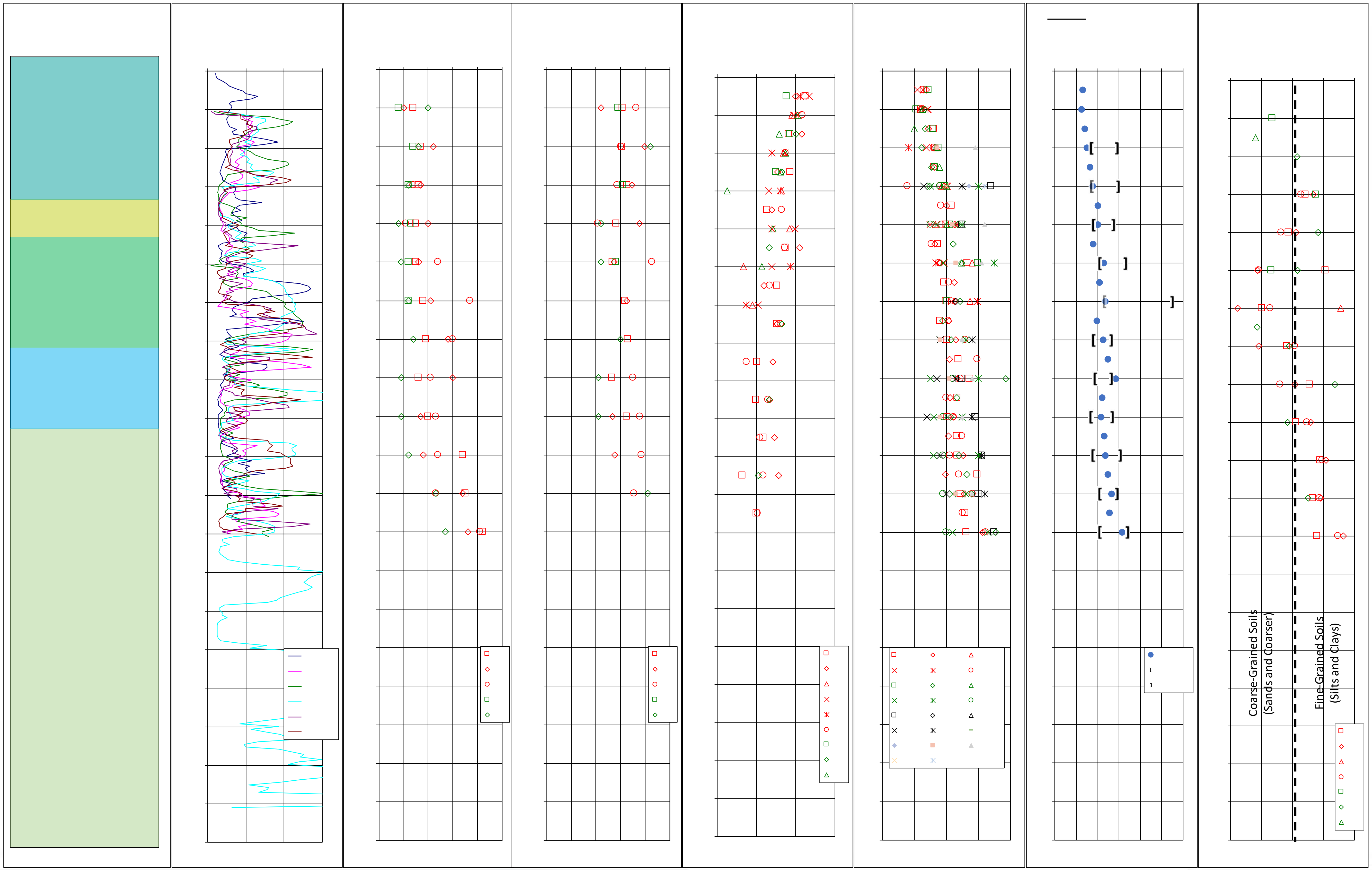

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Figure No: 8

Date: October 2021

overburden pressure and SPT procedures and designated as $N_1(60)_{cs}$. Field measured SPT values are presented on the boring logs in Appendix A.

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Based on the results of H&A's field exploration and laboratory testing, combined with engineering analysis, experience and judgment, it is this firm's opinion that the project may be developed as planned, provided the Site grading and foundation criteria discussed herein are incorporated into the project plans and specifications and implemented during construction.

The major geotechnical considerations that affect the design and construction of the planned construction included the following:

- Soil disturbance as a result of site excavation and preparation operations.
- Presence of undocumented fill.
- Presence of groundwater within approximately 22 feet below ground surface.
- Grading for an approved compacted fill blanket at least 3 feet below footing bottoms for foundation support.
- Based on historic topography and aerial photos, potential presence of deeper soft soils or fill in southern to southeast portion of the Site that will require deeper removal.
- To provide increased rigidity of heavy structures with higher expected settlements, consideration shall be given to tying isolated foundations with gradebeams in two directions where possible.
- Compaction requirement of 90% for relatively light loaded structures and 95% for relatively high loaded structures.

It is this firm's opinion that the proposed 7-story podium residential building, and 3-story townhomes may be supported by conventional foundations embedded into approved compacted fill. Should the structural engineer desire a more robust foundation system to accommodate static and potential liquefaction induced settlements, alternative recommendations are provided for design of reinforced concrete mat foundations. The following recommendations are provided. Foundation design details such as concrete strength, reinforcements, etc. should be established by the Project Structural Engineer.

SITE PREPARATION AND GRADING

Existing Construction Debris, Disturbed Soils

Prior to grading operations, it will be necessary to remove designated existing construction, including any remaining buried obstructions, which may be in the areas of proposed construction. Concrete flatwork should also be removed from areas of proposed construction. Concrete fragments from Site demolition operations should be disposed of off-Site. Any undocumented fill or disturbed soils in areas of proposed foundations and slab on grade construction should be excavated to full depth. Historic topography and photos show that potential undocumented fill or disturbed soils may exist at deeper depth in the southerly property.

Remedial Grading

To provide support for the proposed structures, it is recommended that subgrade soil be over-excavated uniformly to a minimum depth of not less than 3 feet below the proposed foundation bottom, existing, or finished subgrade (whichever is lower) and replaced with properly compacted fill to create an approved compacted fill blanket. To provide support for the proposed pavement, it is recommended that subgrade soil be over-excavated uniformly to a minimum depth of not less than 1 feet below existing or finished slab subgrade (whichever is lower) and replaced with properly compacted fill. For relatively lightly loaded structures (i.e.. 3-story townhomes), soils should be recompacted to a minimum of 90 percent relative compaction above optimum moisture content for clayey soils and near optimum moisture content for granular soils. For relatively high loaded structures (i.e.. 7-story residential building), soils should be recompacted to a minimum of 95 percent relative compaction. A six-inch scarification and recompaction of in-place soils may be taken equivalent to six-inches of approved compacted fill, when computing total excavation requirements.

The depth of over excavation should be reviewed by the Geotechnical Consultant during construction. Any subsurface obstruction, buried structural elements, and unsuitable material encountered during grading, should be immediately brought to the attention of the Geotechnical Consultant for proper exposure, removal and processing, as recommended. Exposed excavation bottoms should be observed by the Geotechnical consultant or his representative.

Temporary Excavations

Excavations of site soils 4 feet or deeper should be temporarily shored or sloped in accordance with Cal OSHA requirements. A temporary shield/shoring system will be required for those excavations where temporary cuts are not feasible. For the purpose of Cal OSHA soil classification and shoring design, site soils should be considered as Type B.

A. Temporary Slopes:

In areas where excavations deeper than 4 feet are not adjacent to existing structures or public right-of-ways, sloping procedures may be utilized for temporary excavations. It is recommended that temporary slopes in native soils be graded no steeper than 1:1 (H:V) for excavations up to 15 feet in depth. The above temporary slope criteria is based on level soil conditions behind temporary slopes with no surcharge loading (structures, traffic) within a lateral distance behind the top of slope equivalent to the slope height. It is recommended that excavated soils be placed a minimum lateral distance from top of slope equal to the height of slope. A minimum setback distance equivalent to the slope height should be maintained between the top of slope and heavy excavating/grading equipment.

Should running sand conditions be experienced during excavation operations, flattening of cut slope faces, or other special procedures, may be required to achieve stable, temporary slopes. Soil conditions should be reviewed by the Geotechnical Consultant as excavation progresses to verify acceptability of temporary slopes. Final temporary cut slope design will be dependent upon the soil conditions encountered, construction procedures and schedule.

B. Shoring:

Temporary shoring will be required for those excavations where temporary slope cuts as specified above are not feasible.

Temporary cantilever shoring, if used, should be designed to resist active earth pressures of 35 pounds per cubic foot equivalent fluid pressure for level conditions behind shoring. The design of shoring should also include surcharge loading effects of existing structures and anticipated traffic, including delivery and construction equipment, when loading is within a distance from the shoring equal to the depth of excavation.

In addition to the above, a minimum uniform lateral pressure of 100 pounds per square foot in the upper ten feet of shoring should be incorporated in the design when normal traffic is permitted within ten feet of the shoring.

C. Soldier Piles and Lagging Design:

For the design of soldier piles spaced at a minimum of two pile diameters, and a maximum of 8 feet on center, we recommend an allowable passive pressure of 460 psf per foot of depth, below the base of the excavation for the deepened pit, against the projected width of the soldier piles be used for design. These pressures should be limited to a maximum value of 4,600 psf. To develop the full lateral value, provisions should be taken to yield firm contact between the soldier pile and the soil.

The shoring system may consist of steel soldier piles and lagging installed in drilled holes and backfilled with structural concrete for that portion of the soldier pile that is below the excavation level; and lean mix concrete above the excavation level. We recommend that continuous lagging between soldier piles be used for this excavation. Timber lagging should be treated if lagging is to remain in place after construction of the subterranean walls. Lagging may be designed using a maximum uniform earth pressure of 500 psf.

It is difficult to accurately predict the amount of deflection of a shored excavation. It should be realized that some deflection will occur. To further reduce deflection a greater lateral earth pressure may be used in the shoring design.

New Fills

The upper one foot of Site soils should be excavated and recompacted to a minimum of 90 percent relative compaction near optimum moisture content prior to placement of any new fills, where required, to achieve finish grade elevations. Exposed excavation bottoms should be scarified a minimum 6-inches and recompacted to at least 90 percent relative compaction at near optimum moisture content. Excavation bottoms should be firm and unyielding prior to backfilling.

Backfilling and Compaction Requirements

On-Site and import materials approved for use should be placed in horizontal lifts not exceeding 8-inches in loose thickness, moisture conditioned to above optimum moisture content for clayey soils and near optimum moisture content for granular soil, and compacted to a minimum of 90 percent of the maximum dry density as determined by the latest edition of ASTM Test Method D1557. Existing Site soils, unless indicated otherwise, are considered suitable for re-use during Site grading and backfilling, provided they are free of debris, particles greater than 4 inches in maximum dimension, organic matter or other deleterious materials, and are to a suitable moisture condition to permit achieving the required compaction.

Imported Soils

Any imported soil required to complete grading operations should consist of predominantly granular material which exhibits an Expansion Index (“EI”) of less than 20 when tested in accordance ASTM Expansion Test Procedures and should be free of debris and particles greater than 4 inches in maximum dimension, organic matter or other deleterious materials, and should be approved by the Geotechnical Consultant or his representative. Potential import material should be identified, sampled and provided to the Geotechnical Consultant at least 72 hours prior to importation to the Site. Final acceptance of any imported soil will be based upon review and testing of the soil actually delivered to the Site.

Observation and Testing During Construction

All pile, grading, compaction, and backfill operations should be performed under the observation of and testing by the Geotechnical Consultant's designated representative. The consultant should be notified at least two days in advance of the start of construction. A joint meeting between the contractor and geotechnical consultant is required prior to the start of construction to discuss specific procedures and scheduling.

A. Grading Observation and Testing:

Prior to placing any fill the exposed excavation bottoms should be observed by the Project Geotechnical Consultant or their representative. If it is determined during grading that site soils require overexcavation to greater depths for obtaining proper support for the proposed structure, this additional work should be performed in accordance with the recommendations of the Geotechnical Consultant. Any subsurface obstruction, buried structural elements, and unsuitable material (such as undocumented fill, natural topsoil, etc…) encountered during grading, should be immediately brought to the attention of the Geotechnical Consultant for proper exposure, removal and processing, as recommended. Field moisture and density tests should be taken during grading in accordance with this report and local ordinances. All foundation excavations should be observed by the Geotechnical Consultant's representative to verify minimum embedment depths and competency of bearing soils. Such observations should be made prior to placement of any reinforcing steel or concrete.

B. CIDH Pile Observation and Testing:

General guidelines for pile installation are summarized below:

- Pile excavation will require equipment suitable to penetrate fill and natural soil typical to the area.
- Pile excavations should be drilled with suitable equipment and should not be out-of-plumb by more than 0.5 percent of the pier length. The center-to-center distance of constructed piers at the base of pile cap should not vary by more than three inches from the design spacing, or as directed by the Structural Consultant, whichever is more restrictive.
- Casing and slurry should be used during drilling of any piles in the event caving conditions are experienced, such as below the groundwater table. If casing is used, concrete placement and casing removal should be done in stages such that the casing bottom is always as a minimum 3 feet below the top of concrete.
- All pile excavations shall be cleaned of loose soils and cuttings.
- A representative of this office should be present during all pile-drilling operations to verify pile embedment depths and acceptability of strata.

- The placement of reinforcement and concrete should conform to ACI and other applicable code requirements.
- Pile installation specifications should be reviewed by the Geotechnical Consultant.

FOUNDATION DESIGN

It is this firm's opinion that the proposed 7-story podium residential building, and 3-story townhomes may be supported by conventional foundations embedded into approved compacted fill. Should the structural engineer desire a more robust foundation system to accommodate static and potential liquefaction induced settlements, alternative recommendations are provided for design of reinforced concrete mat foundations. The following recommendations are provided. Foundation design details such as concrete strength, reinforcements, etc. should be established by the Project Structural Engineer.

Foundation Capacity

A. Conventional Foundation Capacity

A dead plus live load allowable bearing pressure of 3,150 and 3,600 pounds per square foot may be used in the design of both continuous and spread footings, respectively, when embedded a minimum of 24 inches into approved compacted fill. The bearing capacity increase for each additional foot of width is 100 pounds per square foot. The bearing capacity increase for each additional foot of depth is 580 pounds per square foot. The maximum recommended bearing capacity is 5,000 pounds per square foot. The above bearing pressures may be increased by one-third when considering short term loading from wind or seismic forces.

B. Mat Foundations

Mat foundations should be supported on approved compacted fill. We recommend a minimum slab embedment of 24 inches below the lowest adjacent grade.

For design of the mat foundation, the geotechnical input information is the subgrade reaction modulus, which is a spring constant that can be applied to represent the soil response to applied stress. We recommend a unit vertical subgrade reaction modulus (k_1) equal to 140 pounds per cubic inch (pci). This unit value is applicable for a one-foot square plate and should be reduced by a shape factor to account for larger square and rectangular loaded areas. The unit modulus value should be adjusted using the following equations:

$$k_{square} = k_1 \left(\frac{B+1}{2B} \right)^2$$

$$k_{rectangular} = k_{square} \left(\frac{1 + 0.5\frac{B}{L}}{1.5} \right)$$

where the dimensions B and L are the minimum slab width and length, respectively, in feet.

Lateral Resistance

Conventional and Mat Foundations

Resistance to lateral loads can be assumed to be provided by pressure acting on structural components in contact with approved compacted fill. Lateral resistance on the sides of footings may be computed using a passive pressure of 300 pounds per square foot per foot embedment into alluvium, subject to a maximum of 3,000 pounds per square foot. Friction between the base of the footings, and/or floor slabs, and the underlying material may be assumed as 0.34. Friction and lateral pressure may be combined, provided either is limited to two-thirds of the allowable.

Settlements/Displacements

Settlement analysis for foundations designed and constructed in accordance with the above criteria and supporting maximum assumed column loads of 75 kips and 350 kips are anticipated to be on the order of 0.7- and 1.7-inches, respectively. Total settlements for foundations designed and constructed in accordance with the above criteria and supporting maximum assumed continuous footing loads of 3 klf and 5 klf are anticipated to be on the order of 0.5- and 0.6-inches, respectively. A differential settlement on the order of 0.75 inch is anticipated between similarly loaded pad footings and for continuous wall footings over a distance of approximately 30 feet. Some of the estimated settlement will take place rapidly with the first application of load. This office should be contacted for further evaluation and recommendations, at the time of structural foundation design.

SEISMIC DESIGN PARAMETERS

The Site-specific seismic design parameters were determined as a part of this study in accordance with the 2022 California Building Code, which is based on the 2021 International Building Code (IBC). Additionally, seismic design parameters were determined using the Structural Engineers Association (SEA) website which uses the USGS Seismic Design Web Services for the hazard loads. The 2022 CBC seismic design parameters that apply to the Site are as follows:

2022 CBC Seismic Parameters

CBC Seismic Parameter	Value or Classification
Site Classification (per Table ASCE/SEI 7-10 Table 20.3-1)	D
Mapped Spectral Response at 0.2 Sec Acceleration, S_s	1.778
Mapped Spectral Response at 1.0 Sec Acceleration, S_1	0.632
Maximum Considered Earthquake Spectral Acceleration, S_{MS}	1.778
Maximum Considered Earthquake Spectral Acceleration, S_{M1}	*null
5-Percent Damped Design Spectral Acceleration, S_{DS}	1.186
5-Percent Damped Design Spectral Acceleration, S_{D1}	*null

*See ASCE 7-16 Section 11.4.8

The Structural Consultant should review the above parameters and the 2022 CBC to evaluate the seismic design. Final selection of design coefficients should be made by the structural consultant based on the local laws and ordinances, expected structure response, and the desired level of conservatism.

RETAINING WALLS

Retaining walls planned should be adequately designed to resist the lateral soil pressures and the anticipated construction loadings and service conditions. The earth pressure acting on retaining walls depends primarily on the allowable wall movement, type of backfill materials, backfill slopes, wall inclination, surcharges, and any hydrostatic pressure. The following equivalent fluid pressures are recommended for vertical walls with no hydrostatic pressure and no surcharge loading:

Soil Type	Backfill Slope Behind Walls	EARTH PRESSURE Equivalent Fluid Pressure (pcf)	
		Active (Cantilever)	At-Rest (Rigid)
Site Soil Medium Expansive	Level	60	100

These values are applicable for granular expansive Site soils placed between the wall sides and an imaginary plane rising at 45 degrees from below the edges (heel) of wall bottoms. The surcharge effect of anticipated loads on the wall backfill (e.g., traffic, construction equipment, footings) should be included in the wall design. Depending on whether the wall is free to deflect or restrained, 33 or 50 percent, respectively, of a maximum surcharge load located within a distance equal to the retained height of the wall should be used in design.

If it is determined that retaining walls require an additional seismic design pressure in accordance with the CBC, the following is provided for lateral earth pressures of site retaining walls. A resultant lateral force acting on proposed retaining walls as a result of seismic forces may be computed as 25 pcf-equivalent fluid pressure. This seismic resultant force may be applied to the retaining wall at a point located at (2/3)*H, measured from the bottom of the wall.

Positive drainage measures should be incorporated in design. Retaining wall subdrains should be located below the basement slab elevation and consist of a minimum four-inch diameter perforated ABS-SDR-35 or PVC SCH-40, or equivalent, connected to similar non-perforated outlet pipe. The perforated portion of the pipe should be embedded in at least three cubic feet per lineal foot of 3/4 inch crushed rock or equivalent material which has been wrapped in fabric, consisting of Mirafi 140N or equivalent, and approved by the Geotechnical Consultant. The filter fabric should overlap at least 12 inches at the ends of the fabric. Other subdrainage alternatives may be considered but should first be reviewed and approved by the Geotechnical Consultant prior to implementation.

SLAB-ON-GRADE

Concrete slabs should be supported on properly compacted soils in accordance with the site preparation and grading section of this report. Slab subgrade soils should not be allowed to dry out and should be maintained at the placement moisture condition until concreting. From a geotechnical standpoint, as a minimum, slabs should be 5-inches thick and reinforced with #4 reinforcing bars spaced at 16-inches on center each way.

Expansive structural slab and slab-on-grade subgrade should be pre-saturated just prior to construction.

Any interior slab to receive a moisture-sensitive floor covering should include a moisture membrane system. The vapor barrier shall consist of Stego Wrap Vapor Barrier 15 mil extruded poloylefin plastic, or equivalent. No recycled content or woven materials are permitted. Permeance as tested before and after mandatory conditioning (ASTM E 1745 section 7.1 and sub-paragraphs 7.1.1 – 7.1.5): less than 0.01 perms [grains/(ft2 · hr · inhg)] and comply with the ASTM E 1745-11 class a requirements. Install vapor barrier according to ASTM E 1643-11 and the manufactures recommendations, unless directed otherwise by the project structural engineer.

Slabs should be properly designed and reinforced for the construction and service loading conditions. The structural details, such as slab thickness, concrete strength, amount and type of reinforcements, joint spacing, etc., should be established by the Project Structural Engineer.

PORTLAND CEMENT PAVEMENT

The following concrete pavement sections are based on a load safety factor of 1.2, and a modulus of subgrade reaction (k value) of 100 pounds per cubic inch for 6-Inches of base over site soils compacted as a subgrade material, and the design procedures presented in the Portland Cement Association bulletin "Thickness Design for Concrete Highway and Street Pavements" (EB109.01P), 1984. The modulus of subgrade reaction was obtained from the PCC bulletin for interrelationships between ASTM soil classification and bearing values. A design service life of 20 years was assumed for the design of the Portland cement concrete pavement section.

Portland Cement Concrete (PCC) Pavement Design Summary

Concrete Flexural Strength (psi) (1)	Pavement Thickness (Inches) (2),(3)
650	6.0
600	6.5

(1) Represents 90-day flexural strength
(2) Load Safety Factor = 1.2
(3) Assumes no PCC shoulder or curb

The Structural Consultant should establish the design details of the concrete pavement section, including reinforcements, concrete strength, and joint and load transfer requirements.

The PCC pavements shall be underlain by 4-inches of Import Crushed Aggregate Base (CAB) Material with the upper one-foot of exposed subgrade soils compacted to a minimum 95 percent relative compaction near optimum moisture contents. Furthermore, the upper 12-inches of subgrade compacted fill soils should be compacted to a minimum 90 percent relative compaction above optimum moisture contents and exhibit a firm, unyielding surface in addition to the recommended compaction. Final compaction and testing of pavement subgrade should be performed just prior to placement of aggregate base and/or concreting. Other pertinent subgrade preparation measures stipulated in the "Thickness Design for Concrete Highway and Street Pavements" (EB109.01P), 1984, or required by the jurisdictional municipal authorities should be followed accordingly.

ASPHALT PAVEMENT

The finish grade at the subject site is anticipated to be underlain by compacted fill consisting of site soils. For preliminary pavement design purposes, an R-Value of 20 has been assumed considering the site soils as subgrade soils. Five (5) traffic indices (TI) of 4.5, 5.5, 7, 9 and 10 together with the assumed minimum R-Value, have been assumed and utilized for the development of preliminary recommendations for the pavement sections. Analyses performed in accordance with the current edition of the Caltrans

Highway Design Manual, and assuming compliance with site preparation recommendations, it is recommended that the following AC pavement structural sections be used.

Asphalt Pavement Design Summary

Traffic Index (TI)	Pavement Section Alternatives		Remark
	AC(1) (inches)	AB(2) (inches)	
4.5	3.0	6.0	For auto parking stalls
5.5	3.0	9.0	For auto circulation aisles/entry and exits
7.0	4.0	12.0	Drive Aisles w/ Medium Truck Loading
9.0	5.5	16.0	Drive Aisles w/ Heavy Truck Loading
10.0	6.0	18.0	Drive Aisles w/ Heavy Truck Loading

(1) Asphalt Concrete (AC);
(2) Aggregate Base (CAB or CMB), Green book section 200-2.2 and 200-2.4, respectively, compacted to at least 95% relative compaction;
(3) Subgrade: The upper 12-inches of subgrade soils in pavement areas should be compacted to at least 90% relative compaction of the Modified Proctor (ASTM D1557), including deeper removal and recompaction of any encountered undocumented fill, as necessary.

Please be aware that the above preliminary pavement section recommendations have been established based purely on procedures stipulated in the Caltrans Manual. Local government authority should be consulted for minimum pavement section requirements and, if more stringent than that recommended by the Hamilton and Associates, be complied with.

It is recommended that R-Value testing be performed on representative soil samples after rough grading operations on the upper 2 feet to confirm/modify applicability of the above pavement sections.

The asphalt concrete pavement should be compacted to 95% of the unit weight as tested in accordance with the Hveem procedure. The asphalt concrete material shall conform to

Type III, Class C2 or C3, of the Greenbook. All subgrade and aggregate base materials should be proof-rolled by heavy rubber tire equipment to verify that the subgrade and base grade are in a non-yielding condition.

If the paved areas are to be used during construction, or if the type and frequency of traffic is greater than assumed in the design, the pavement section should be re-evaluated for the anticipated traffic.

SOIL CORROSIVITY

Limited soil constituent tests were performed on a select sample of Site soils to give a general idea as to the corrosive nature of on-Site soils to proposed concrete foundations, rebar, and any underground metal conduit. A corrosion engineer/specialist should be consulted for any advanced analysis or recommendations relating to corrosion at the Site. Constituent test results are presented in Appendix A.

Concrete Corrosion

Disintegration of concrete may be attributed to the chemical reaction of soil sulfates and hydrated lime and calcium aluminate within the cement. The severity of the reaction resulting in expansion and disruption of the cement is primarily a function of the soluble sulfates and the water-cement ratio of the concrete. A soluble sulfate content of 0.0232% by weight has been recorded from corrosivity testing conducted on on-Site soils, as indicated in the test results provided in Appendix A. In accordance with Table 19.3.1.1 of ACI 318-19, Building Code Requirements for Structural Concrete, soils exhibiting soluble sulfate content less than 0.1% by weight are classified as ‘S0’. ‘S0’ sulfate class has no type restriction on concrete and a minimum requirement of f_c’ of 2500 psi.

Metal Corrosion

In the evaluation of soil corrosivity to metal, the hydrogen ion concentrate (pH) and the electrical resistivity of the Site and backfill soils are the principal variables in determining the service life of ferrous metal conduit. The pH of soil and water is a measure of acidity or alkalinity, while the resistivity is a measure of the soil’s resistance to the flow of electrical current.

Currently available design charts indicate that corrosion rates decrease with increasing resistivity and increasing alkalinity. It can also be noted that for alkaline soils, the corrosion rate is more influenced by resistivity than by pH.

The resistivity value of 2000 ohm-cm, as well as a pH-value of 7.00 classifies the on-Site soils tested to be ‘Corrosive’ to buried ferrous metals. Based on California Test 643, the year to perforation for 18-gauge steel in contact with soils of similar resistivity and pH-value is approximately 21 years. In lieu of additional testing, alternative piping materials, i.e. coatings, plastic piping, may be used instead of metal if longer service life is desired or required. Where more detailed corrosion evaluation is required, we recommend that a qualified corrosion consultant be engaged to provide further evaluation and recommendations.

A soluble chloride content of 14.8 ppm was recorded and is considered low to the threshold values of 500 ppm per Caltrans Corrosion Guidelines 2018. Therefore, no special measure in terms of rebar protection against chloride corrosion is recommended herein as a result of the low soluble chloride content tested.

SITE DRAINAGE

In accordance with the CBC, the ground immediately adjacent to buildings should be sloped away from the building at a slope of 5% for the first 10 feet. If physical obstructions or lot lines prohibit 10 feet of horizontal distance, the 5% slope should be provided to an alternate method of diverting water from the foundation system, such as swales (sloped at 2%). Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2% away from the building.

UTILITY TRENCHES

All trenches should be backfilled with approved fill material, compacted to relative compaction of not less than 90 percent of maximum density. Care should be taken during backfilling to prevent utility line damage. The on-Site soils may be used for backfilling utility trenches from one foot above the top of pipe to the surface, provided the material is free of organic matter and deleterious substances. Any soft and/or loose materials or fill encountered at a pipe invert should be removed and replaced with properly compacted fill or adequate bedding material. Imported soils for pipe bedding should consist of non-expansive granular soils. The walls of temporary construction trenches may not be stable when excavated nearly vertical due to the potential for caving. Shoring of excavation walls or flattening of slopes will be required for temporary excavations deeper than 4 feet. All work associated with trenches, excavations and shoring must conform to the State of California Safety Code.

PLAN REVIEW, OBSERVATIONS AND TESTING

As foundation and earthwork plans are completed, Hamilton & Associates should be retained to provide plan review for intent of our recommendations. The review will enable us to modify our recommendations should the final design conditions not be as we understand them. During construction, we should provide field observation and testing to check that Site preparation, grading, and foundation installation conform to the intent of our recommendations and to the project plans and specifications. As needed, during construction, we should be retained to consult on geotechnical questions, construction problems, and unanticipated conditions. This would allow us to develop supplemental recommendations as appropriate for the actual subsurface conditions encountered and the specific construction techniques. Furthermore, we would prepare a construction observation and testing report for the building department.

CLOSURE

This report has been prepared for the exclusive use of Saiko Investment Corp. and their design team for the proposed project at the subject site. The report has not been prepared for use by other parties and may not contain sufficient information for purposes of other parties.

The Owner or their representatives are responsible for ensuring the information and recommendations contained in this report are brought to the attention of the project engineers and architects, incorporated into the project plans, and implemented by project contractors. This report should be named on project grading plans as a part of the project specifications.

We request and recommend notification should any of the following occur:

1. Final plans for site development indicate utilization of areas not originally proposed for construction.
2. Structural loading conditions vary from those utilized for evaluation and preparation of this report.
3. The site is not developed within 12 months following the date of this report.
4. Change of ownership of property occurs.

If changes or delays do occur, this office should be notified and provided with finalized plans of site development for our review to enable us to provide the necessary recommendations for additional work and/or updating of the report. Any charges for such review and necessary recommendations would be at the prevailing rate at the time of performing review work.

The findings contained in this report are based upon our evaluation and interpretation of the information obtained from the subsurface exploration performed and the results of laboratory testing and engineering analysis. As part of the engineering analysis it had been assumed, and is expected, that the geotechnical conditions which exist across the area of study are similar to those encountered in the subsurface exploration. However, no warranty is expressed or implied as to the conditions at locations or depths other than those excavated. Should any conditions encountered during construction differ from those described herein, this office should be contacted immediately for recommendations prior to continuation of work.

Our findings and recommendations were obtained in accordance with generally accepted current professional principles and local practice in geotechnical engineering and reflect our best professional judgment. We make no other warranty, either express or implied.

These recommendations are, however, dependent on the above assumption of uniformity and upon proper quality control of construction. Geotechnical observations and testing should be provided on a continuous basis during temporary and foundation construction at the site to confirm design assumptions and to verify conformance with the intent of our recommendations. If parties other than Hamilton & Associates, Inc., are engaged to provide geotechnical services during construction they must be informed that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the recommendations in this report or providing alternative recommendations.

This concludes our scope of services as described during our proposal dated July 21, 2021, however, this report is subject to review by the controlling authorities for the project. Any further geotechnical services that may be required of our office to respond to questions/comments of the controlling authorities after their review of the report will be performed on a time and expense basis as per our current fee schedule. We would not proceed with any response to report review comments/questions without authorization from your office.

We appreciate your business and hope that we can assist you during construction related services.

REFERENCES

Hamilton and Associates, Inc., Geotechnical Investigation Report, Proposed 3-Story Mixed-Use Building with One Level Subterranean Parking, 16819 Normandie Avenue, Gardena, California, Project No. 16-2163, dated November 18, 2016.

Hamilton and Associates, Inc., Geotechnical Percolation Report, Proposed Infiltration System, 16819 Normandie Avenue, Gardena, California, Project No. 16-2163-1, dated March 19, 2018.

Hamilton and Associates, Inc., Geotechnical Report Update, Proposed 3-Story Mixed-Use Building with At-Grade Parking Structure, 16819 Normandie Avenue, Gardena, California, Project No. 16-2163-2, dated February 13, 2020.

Hamilton and Associates, Inc., Geotechnical Report Addendum, Proposed 3-Story Mixed-Use Building with At-Grade Parking Structure, 16819 Normandie Avenue, Gardena, California, Project No. 16-2163-3, dated November 25, 2020.

Geotechnologies, Inc. Preliminary Geotechnical Engineering Investigation, Proposed Residential Development, 16911 South Normandie Avenue, Gardena, California, File Number 22079, dated June 4, 2021.

APPENDIX A

Plate A-1	Site Plan
Plate A-2	Geotechnical Exploration Map
Plates B-1 through B-3	Log of Borings
Plates C-1 through C-8	Consolidation Test Results
Plates D-1 through D-4	Direct Shear Test Results
Plates E-1 through E-9	Atterberg Limits Test Results
Plates G-1 through G-12	Grain Size Analysis Test Results
Plates H-1 through H-4	Historical Topographic Map
Plates H-5 through H-17	Historic Aerial Image

LABORATORY TESTS

After samples were visually classified in the field and laboratory, a laboratory testing program was performed to evaluate various geotechnical properties. The results are presented in the following sections.

MOISTURE CONTENT AND DENSITY TESTS

The undisturbed soil retained within the rings of the Modified California barrel sampler was tested in the laboratory to determine in-place dry density and moisture content. Test results are presented in the Logs of Boring and Test Pit(see attached "B" Plates).

CONSOLIDATION AND DIRECT SHEAR TESTS

Consolidation (ASTM D2435) and direct shear (ASTM D3080) tests were performed on selected relatively undisturbed samples to determine the settlement characteristics and shear strength parameters of various soil samples, respectively. The results of these tests are shown graphically on the appended "C" and "D" Plates.

ATTERBERG LIMITS

Atterberg Limits (ASTM D-4318) tests were performed on selected samples to determine the liquid limit, plastic limit, and the plasticity index of soils. The results of these tests are shown on the appended "E" Plates.

NO. 200 SIEVE (ASTM D1140)

No. 200 Sieves (ASTM D1140) were performed on selected samples to determine the fines content. Results are presented in the appended "G" Plates.

MAXIMUM DENSITY TEST

The following maximum density test was conducted in accordance with the latest edition of ASTM D1557-09, Method A, using 5 equal layers, 25 blows each layer, 10-pound hammer, 18-inch drop in a 1/30 cubic foot mold. The results are as follows:

Test Pit No.	Depth, Feet	Maximum Dry Density, pcf	Optimum Moisture Content, %	Material Classification
B-3	2-5	125.5	10.0	Silty Sand

EXPANSION TEST

An expansion test was performed on a soil sample to determine the swell characteristics. The expansion test was conducted in accordance with ASTM D4829, Expansion Index Test. The expansion sample was remolded to approximately 90 percent relative compaction at near optimum moisture content, subjected to 144 pounds per square foot surcharge load and saturated.

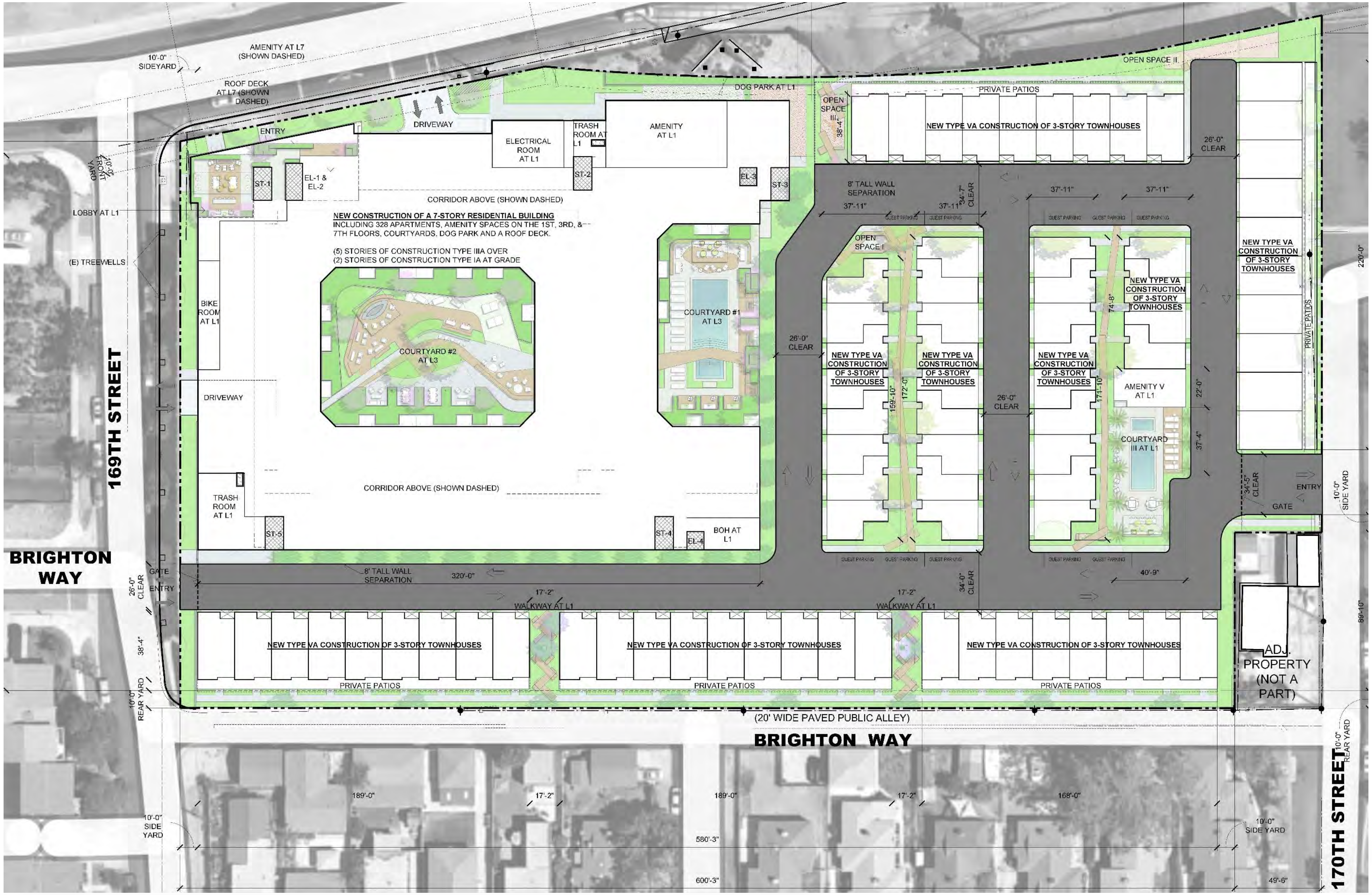
Location	Molded Dry Density, pcf	Molded Moist. Content, %	Degree of Saturation	Expansion Index	Expansion Classification
B-3 (2-5’)	107.0	10.8	50.8	0	Very Low

CORROSIVITY TESTING

Laboratory testing was performed per guidelines of California 417 (Sulfate), California 422 (Chloride), and California 532 (pH and Resistivity test procedures on a representative sample of the on-Site soils. This test was intended to provide data for a preliminary assessment relative to the potential for concrete deterioration due to soil sulfate and metal deterioration due to pH, resistivity of the soil and chloride content. The test results are shown below:

SAMPLE	SULFATE CONTENT (% weight, dry soil)	CHLORIDE (ppm)	pH	RESISTIVITY (ohms)
B-3 (2-5’)	0.0232	14.8	7.0	2000

SITE PLAN



Site Plan by
Urban Architecture Lab
Project: Normandie Apartments
Sheet Title: First Floor Plan
Sheet No. A0.11
Original Scale: 1/32" = 1'
Dated: September 26, 2022

N

0 60' 120'
Scale in Feet

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971
Hamilton & Associates	Plate No: A-1 / Date: January 2023

GEOTECHNICAL EXPLORATION MAP

Explanation

B-3	H&A Boring
G-7	Geotechnologies Boring
CPT-6	H&A Cone Penetration Test (CPT)
GCPT-6	Geotechnologies Cone Penetration Test (CPT)

N

0 60' 120'

Scale in Feet

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California

Project No: 21-2971

Hamilton & Associates

Plate No: A-2

Date: January 2023

FIELD LOG OF BORING NO: B-1

Sheet 1 of 1

HAMILTON & Associates

PROJECT:	**16911 Normandie Associates, LLC**
PROJECT NO:	**21-2971**
LOCATION:	**16911 South Normandie Avenue**

DATE(S) DRILLED:	**August 20, 2021**	LOGGED BY:	**KD**
DRILLED BY:	**Hamilton Drilling Corp.**	TOTAL DEPTH:	**31.5 Feet**
RIG MAKE/MODEL:	**CME 45 C**	HAMMER TYPE:	**Auto Hammer**
DRILLING METHOD:	**Hollow Stem Auger**	HAMMER DROP/ WT:	**140 lbs./30"**
HOLE DIAMETER:	**8-Inch**	SURFACE ELEVATION:	**Unknown**

COMMENTS: **Groundwater encountered at 22 Feet**

DEPTH (FT)	ELEVATION	USCS	GEOTECHNICAL DESCRIPTION
0	0		**Asphalt:** Asphalt over Concrete
		CL	**Sandy Clay:** dark brown to red brown, moist, firm, fine grain sand, some rock fragments
5	5	SM	**SIlty Sand:** some Silt, light brown to tan, moist, loose, fine grain sand.
		CL-ML	**Silty Clay to Clayey Silt:** with lenses of Silty Sand, light brown to brown to reddish brown, moist, stiff to hard, fine to medium grain sand.
10	10		
15	15		
20	20		
25	25		
30	30		

BLOWCOUNT (Blows/Ft)	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	OTHER TESTS
13 Rings	115.3	14.4	Consol, DS
8 SPT	-	10.6	-200 Wash
26 Rings	117.1	15.9	Consol
14 SPT	-	17.5	
42 Rings	110.0	16.4	
12 SPT	-	19.7	Atterberg, -200 Wash
13 SPT	-	21.2	
12 SPT	-	29.9	Atterberg, -200 Wash
12 SPT	-	20.3	

FIELD LOG OF BORING NO: B-2

HAMILTON & Associates

PROJECT:	**16911 Normandie Associates, LLC**
PROJECT NO:	**21-2971**
LOCATION:	**16911 South Normandie Avenue**

DATE(S) DRILLED:	**August 20, 2021**	LOGGED BY:	**KD**
DRILLED BY:	**Hamilton Drilling Corp.**	TOTAL DEPTH:	**61.5 Feet**
RIG MAKE/MODEL:	**CME 45 C**	HAMMER TYPE:	**Auto Hammer**
DRILLING METHOD:	**Hollow Stem/Mud Rotary**	HAMMER DROP/ WT:	**140 lbs./30"**
HOLE DIAMETER:	**8-Inch**	SURFACE ELEVATION:	**Unknown**

COMMENTS: **Groundwater encountered at 22.5' / Mud Rotary started at 30' BGS**

DEPTH (FT)	ELEVATION	SAMPLE INT. BULK	SAMPLE INT. DRIVE	BLOWCOUNT (Blows/Ft)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	OTHER TESTS
0	0						**Asphalt:** Asphalt over Concrete			
						ML	**Sandy Silt:** with trace Clay, light brown to brown, rock fragments.			
5	5			20 SPT		CL	**Sandy Clay:** with some Silt, tan to brown to orange, moist, very stiff, fine grain sand, rock fragments.	-	13.2	
				33 Rings				120.1	13.5	Consol, DS
10	10			16 SPT		ML	**Sandy Silt:** trace Clay, tan to orange, moist, firm to very stiff, fine grain sand.	-	12.3	Atterberg, -200 Wash
				28 Rings				112.8	15.4	Consol
15	15			12 SPT				-	14.8	
20	20			8 SPT		CL	**Sandy Clay:** trace Silt, light brown, very moist to wet, firm to stiff, fine grain sand. ▽	-	23.5	Atterberg, -200 Wash
				16 Rings				106.4	22.1	Consol
25	25			9 SPT		ML	**Sandy Silt:** trace Clay, with interbedded layers of Silty Sand, tan to orange, moist, firm to very stiff, fine grain sand.	-	24.8	Atterberg, -200 Wash
30	30			12 SPT				-	24.3	

FIELD LOG OF BORING NO: B-2

Sheet 2 of 2

PROJECT: **16911 Normandie Associates, LLC**

PROJECT NO: **21-2971**

LOCATION: **16911 South Normandie Avenue**

HAMILTON & Associates

DATE(S) DRILLED:	**August 20, 2021**	LOGGED BY:	**KD**
DRILLED BY:	**Hamilton Drilling Corp.**	TOTAL DEPTH:	**61.5 Feet**
RIG MAKE/MODEL:	**CME 45 C**	HAMMER TYPE:	**Auto Hammer**
DRILLING METHOD:	**Hollow Stem/Mud Rotary**	HAMMER DROP/ WT:	**140 lbs./30"**
HOLE DIAMETER:	**8-Inch**	SURFACE ELEVATION:	**Unknown**

COMMENTS: **Groundwater encountered at 22.5' / Mud Rotary started at 30' BGS**

DEPTH (FT)	ELEVATION	SAMPLE INT. BULK	SAMPLE INT. DRIVE	BLOWCOUNT (Blows/Ft)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	OTHER TESTS
				46 Rings				112.8	18.8	Atterberg, Consol, -200 Wash
35	35			14 SPT				-	21.5	Atterberg, -200 Wash
40	40			9 SPT		CL-ML	**Clayey Silt:** with Sand, light brown to grey brown, wet, stiff to very stiff, fine grain sand.	-	38.5	Atterberg, -200 Wash
				27 Rings				106.3	23.2	
45	45			9 SPT		SC	**Clayey Sand:** with Silt, light brown to grey, wet, medium dense.	-	21.3	Atterberg, -200 Wash
50	50			12 SPT				-	23.9	
				26 Rings				100.7	26.4	
55	55			23 SPT		ML	**Sandy Silt:** trace Clay, light brown to grey brown, wet, stiff to very stiff, fine grain sand.	-	27.8	Atterberg, -200 Wash
60	60			27 SPT				-	35.5	

FIELD LOG OF BORING NO: B-3

Sheet 1 of 1

HAMILTON & Associates

PROJECT: **16911 Normandie Associates, LLC**

PROJECT NO: **21-2971**

LOCATION: **16911 South Normandie Avenue**

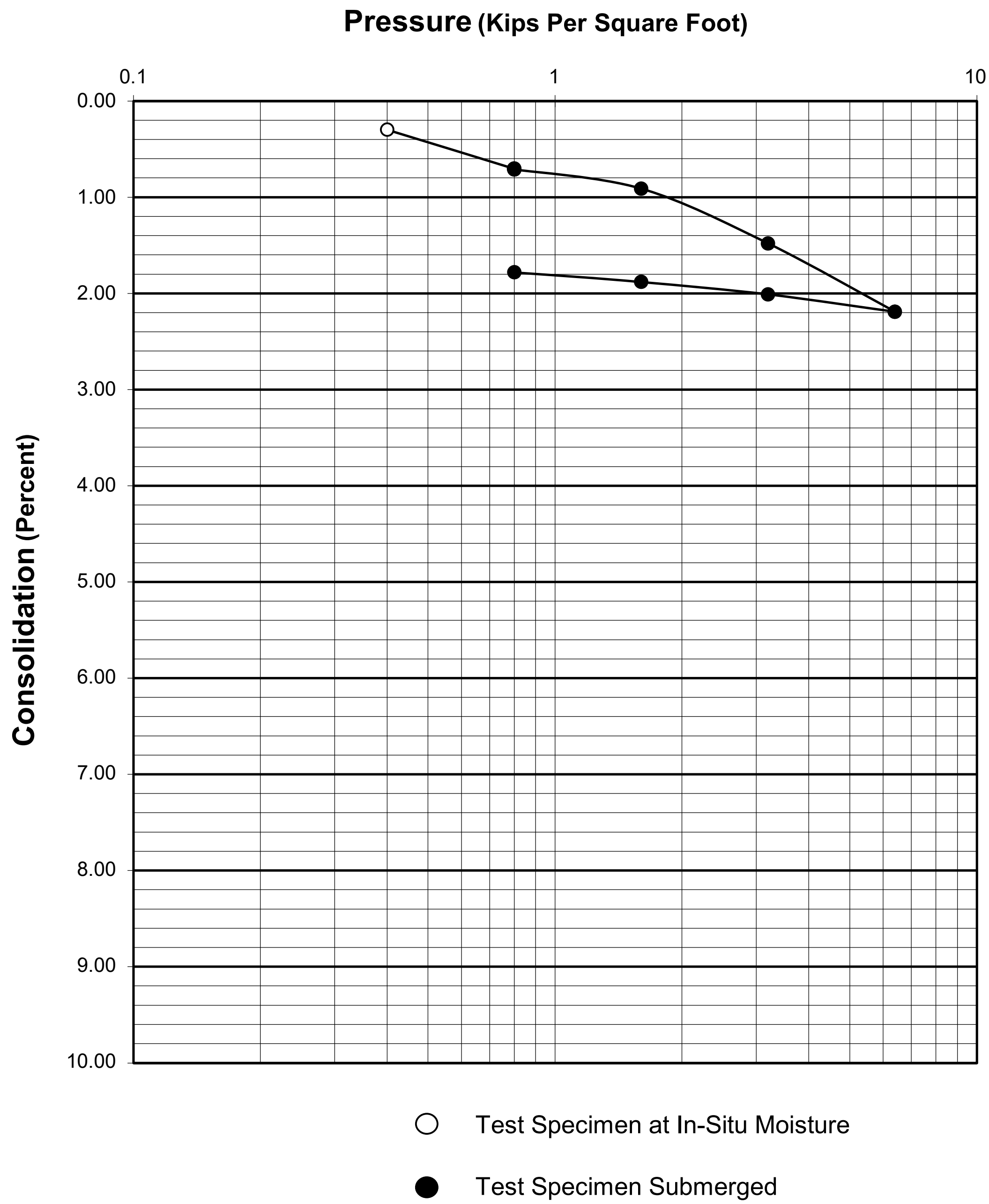
DATE(S) DRILLED:	**August 20, 2021**	LOGGED BY:	**KD**
DRILLED BY:	**Hamilton Drilling Corp.**	TOTAL DEPTH:	**26 Feet**
RIG MAKE/MODEL:	**CME 45 C**	HAMMER TYPE:	**Auto Hammer**
DRILLING METHOD:	**Hollow Stem Auger**	HAMMER DROP/ WT:	**140 lbs./30"**
HOLE DIAMETER:	**8-Inch**	SURFACE ELEVATION:	**Unknown**

COMMENTS: **Groundwater encountered at 22'**

DEPTH (FT)	ELEVATION	SAMPLE INT. BULK	SAMPLE INT. DRIVE	BLOWCOUNT (Blows/Ft)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	OTHER TESTS
0	0						**Asphalt:** Asphalt over Concrete			
							Fill: Construction Debris, rock fragments.			Corrosion, EI, Max
5	5			16 Rings		SC	**Clayey Sand:** light brown to tan, moist, medium dense.	121.0	12.6	Consol, DS
				16 Rings				111.5	10.0	-200 Wash
10	10			32 Rings		CL	**Sandy Clay:** light brown to dark brown, moist, very stiff, fine grain sand.	114.9	16.7	DS
				27 Rings				112.4	17.8	Consol
15	15			27 Rings				85.0	20.2	
20	20			19 Rings				108.3	20.1	
25	25			17				102.6	24.7	

CONSOLIDATION TEST RESULTS

B-1 at 2.5 Feet

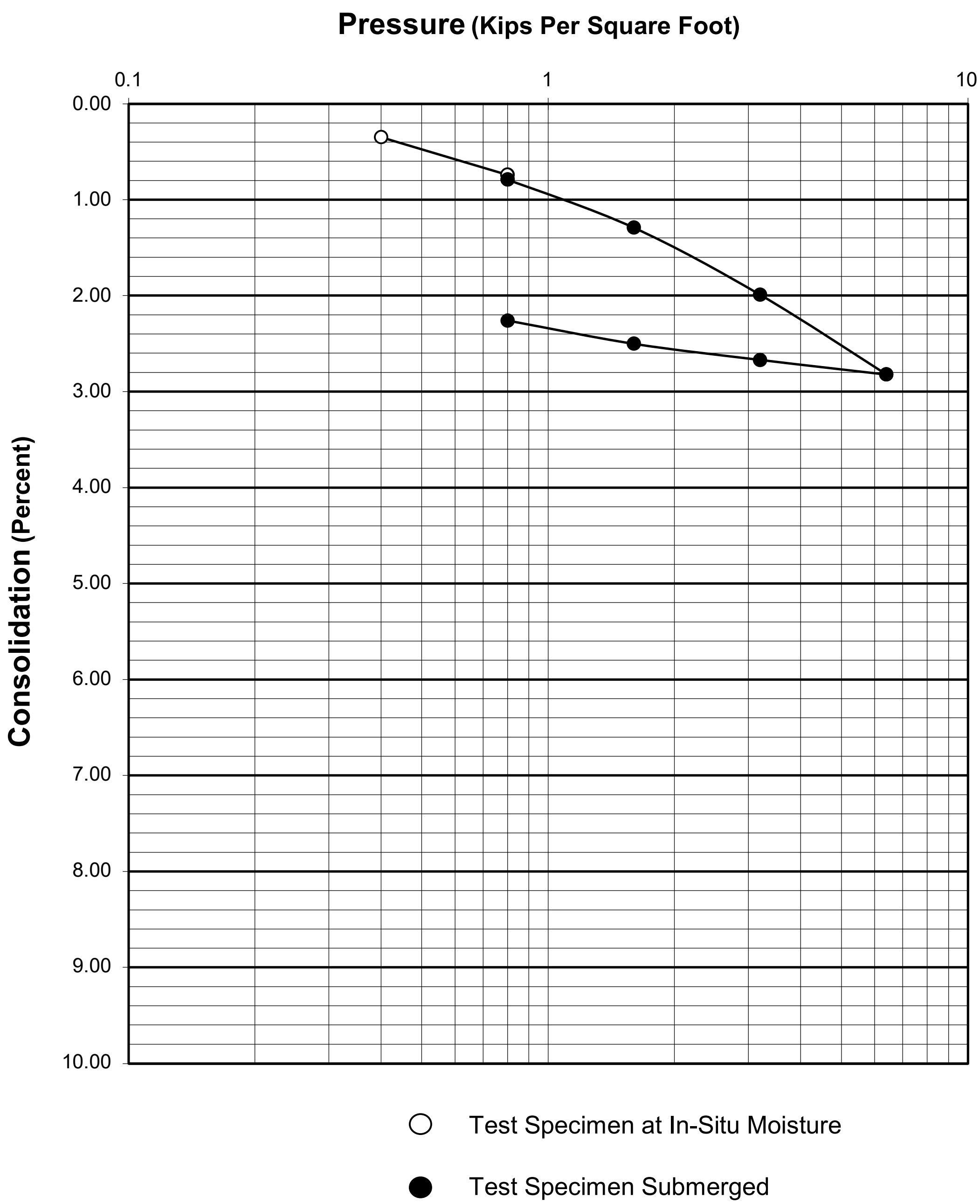


Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No. 21-2971
	Plate C-1

HAMILTON & ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS

B-3 at 5 Feet

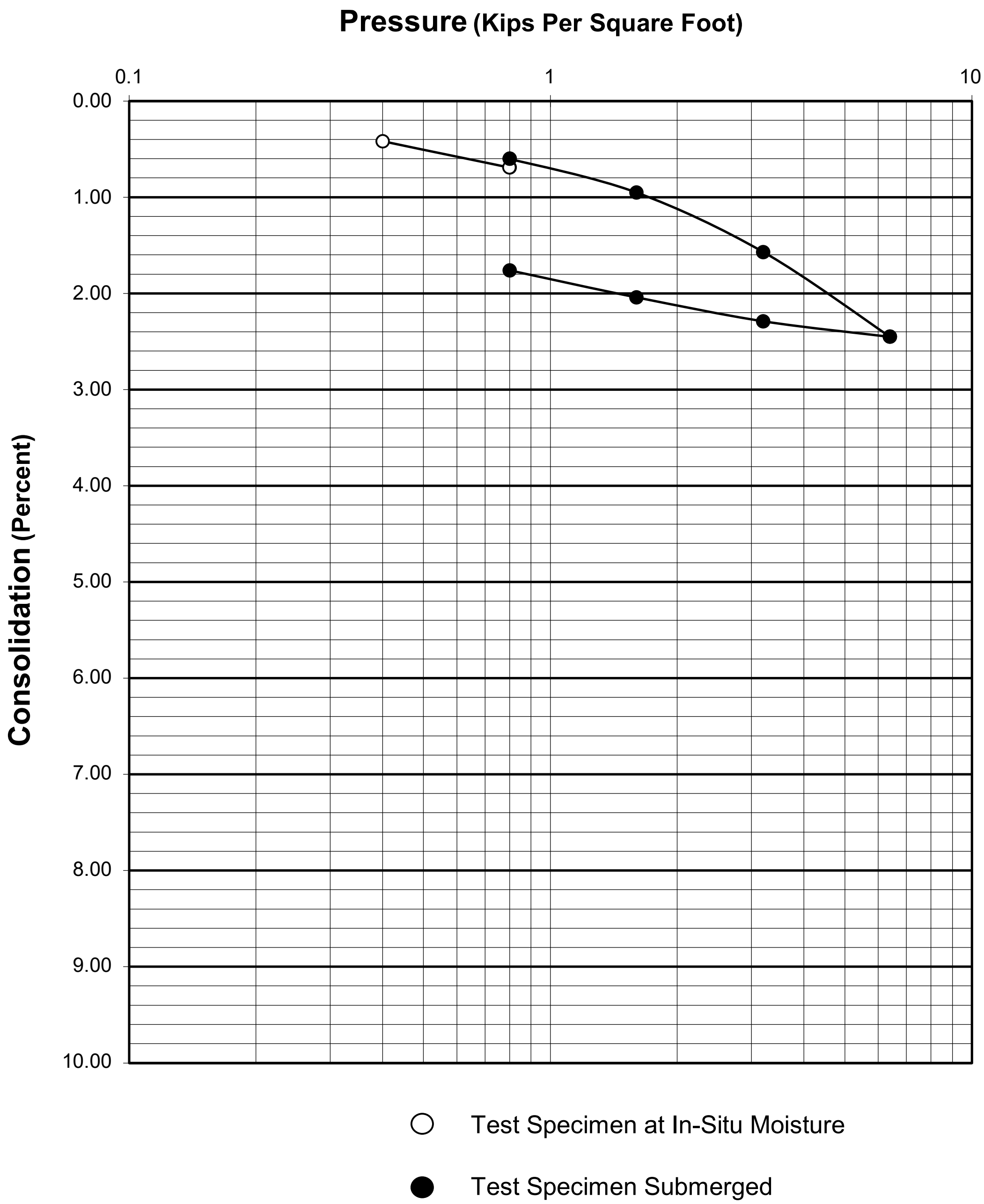


Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No.	21-2971
	Plate	C-2

HAMILTON & ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS

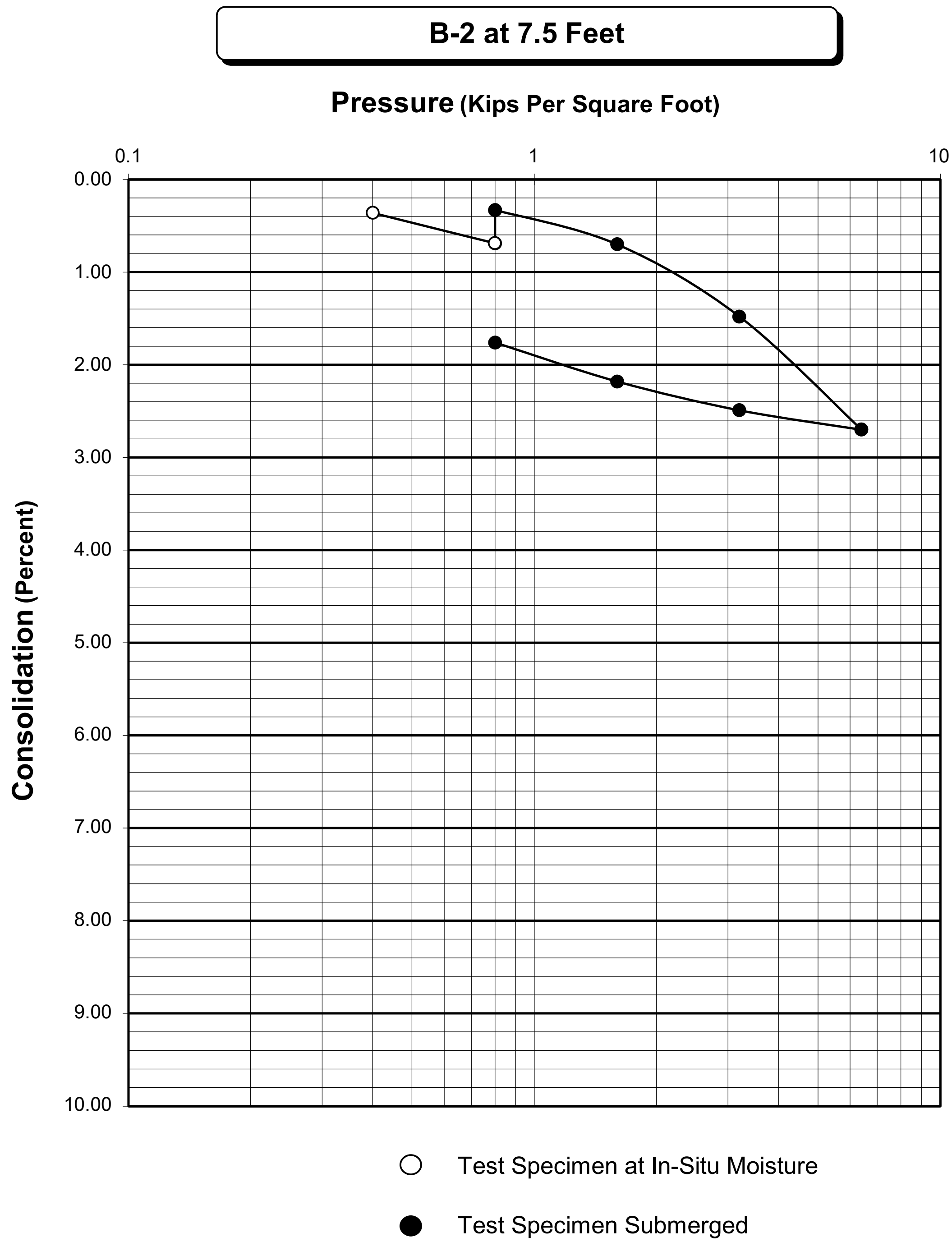
B-1 at 7.5 Feet



Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No. 21-2971
	Plate C-3

HAMILTON & ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS

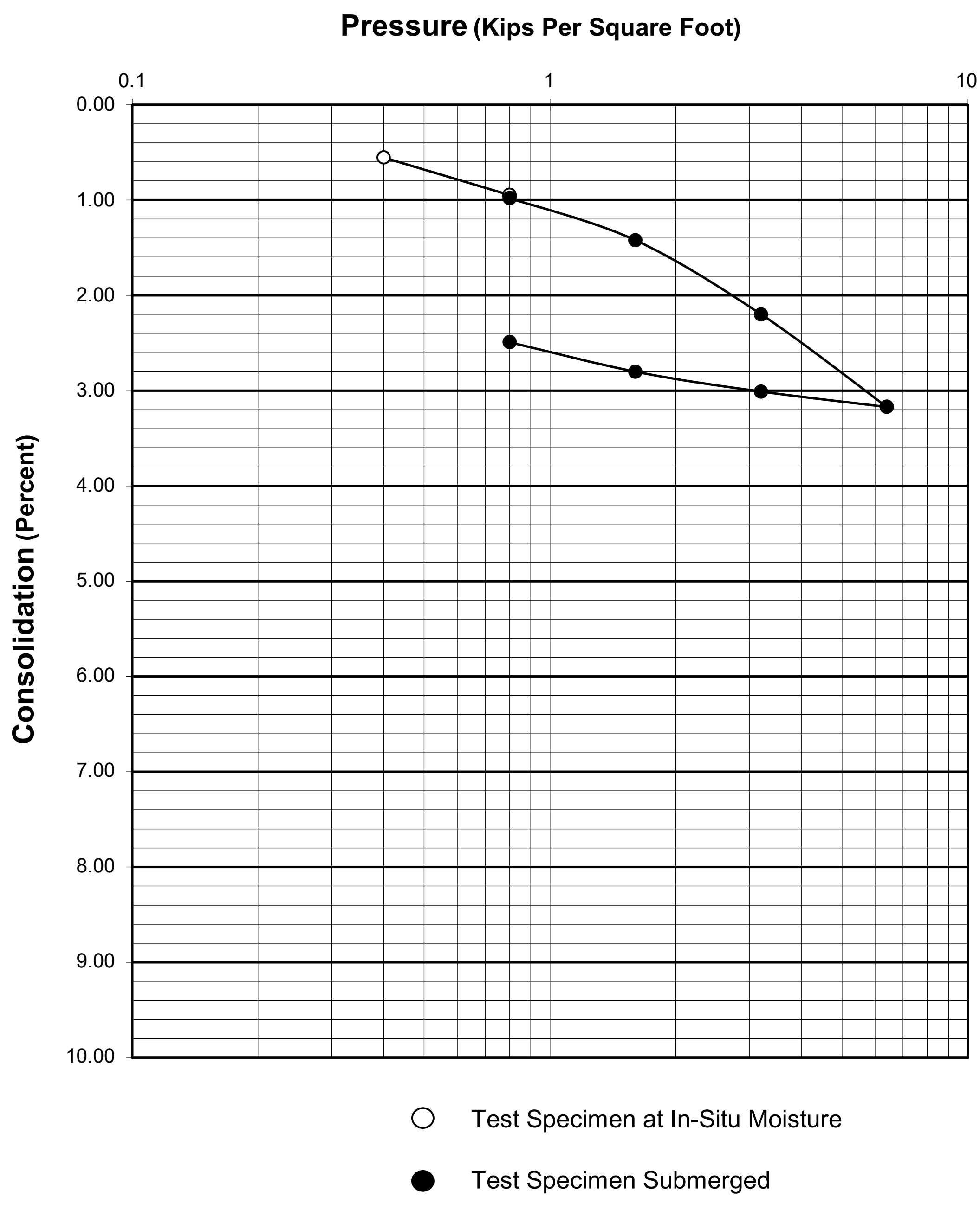


Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No.	21-2971
	Plate	C-4

HAMILTON & ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS

B-2 at 12.5 Feet

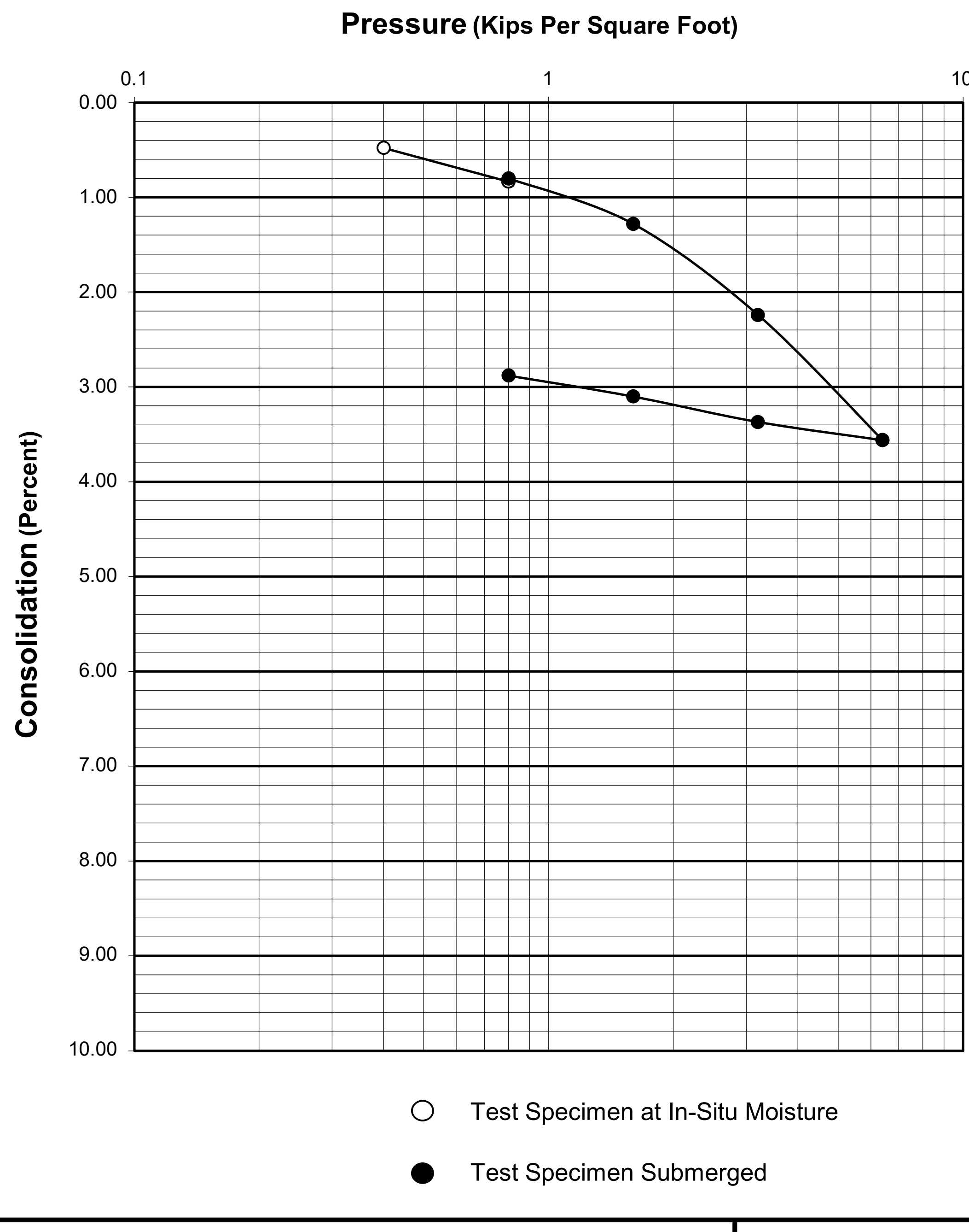


Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No. 21-2971 Plate C-5

HAMILTON & ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS

B-3 at 12.5 Feet

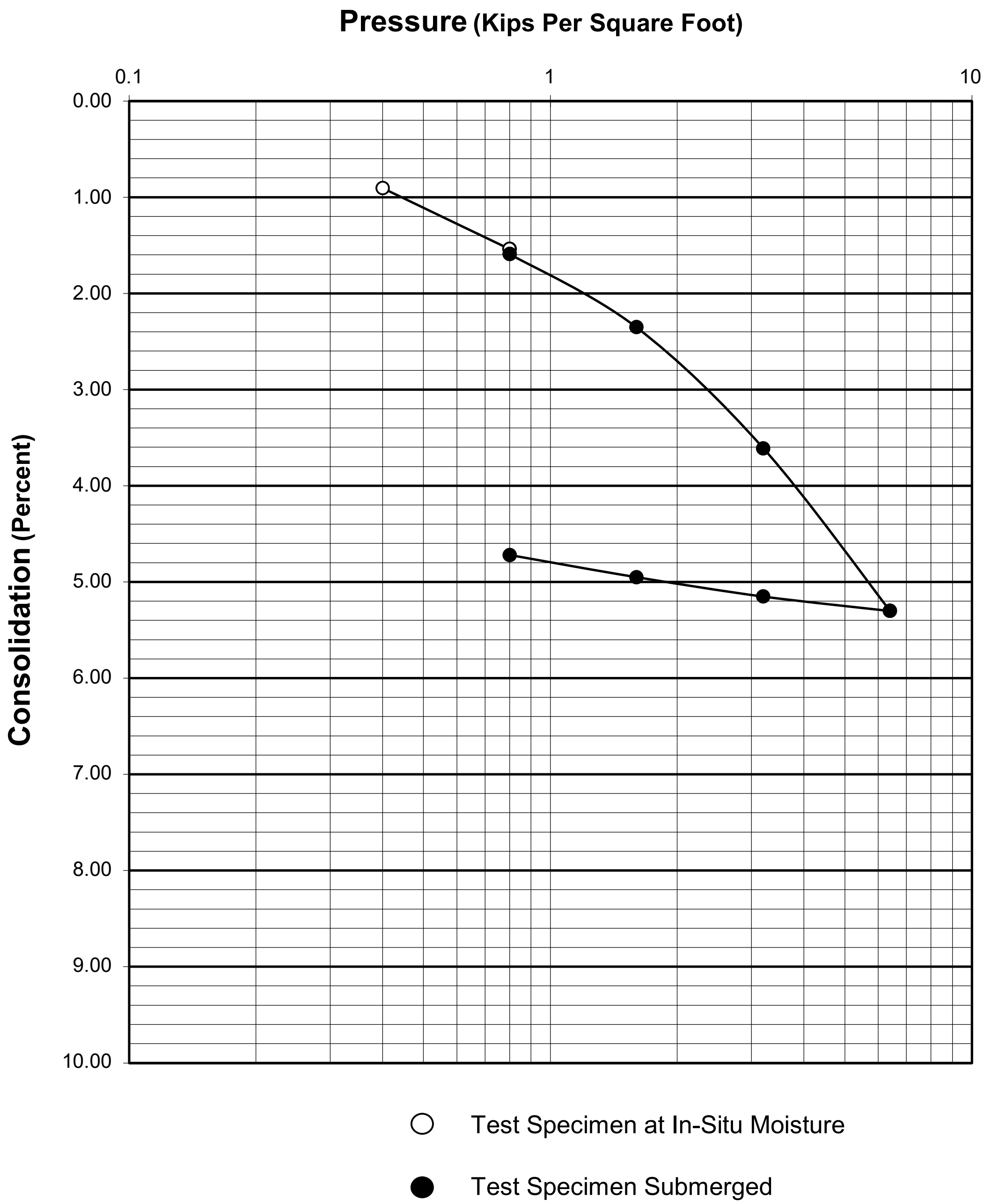


Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No.	21-2971
	Plate	C-6

HAMILTON & ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS

B-2 at 22.5 Feet

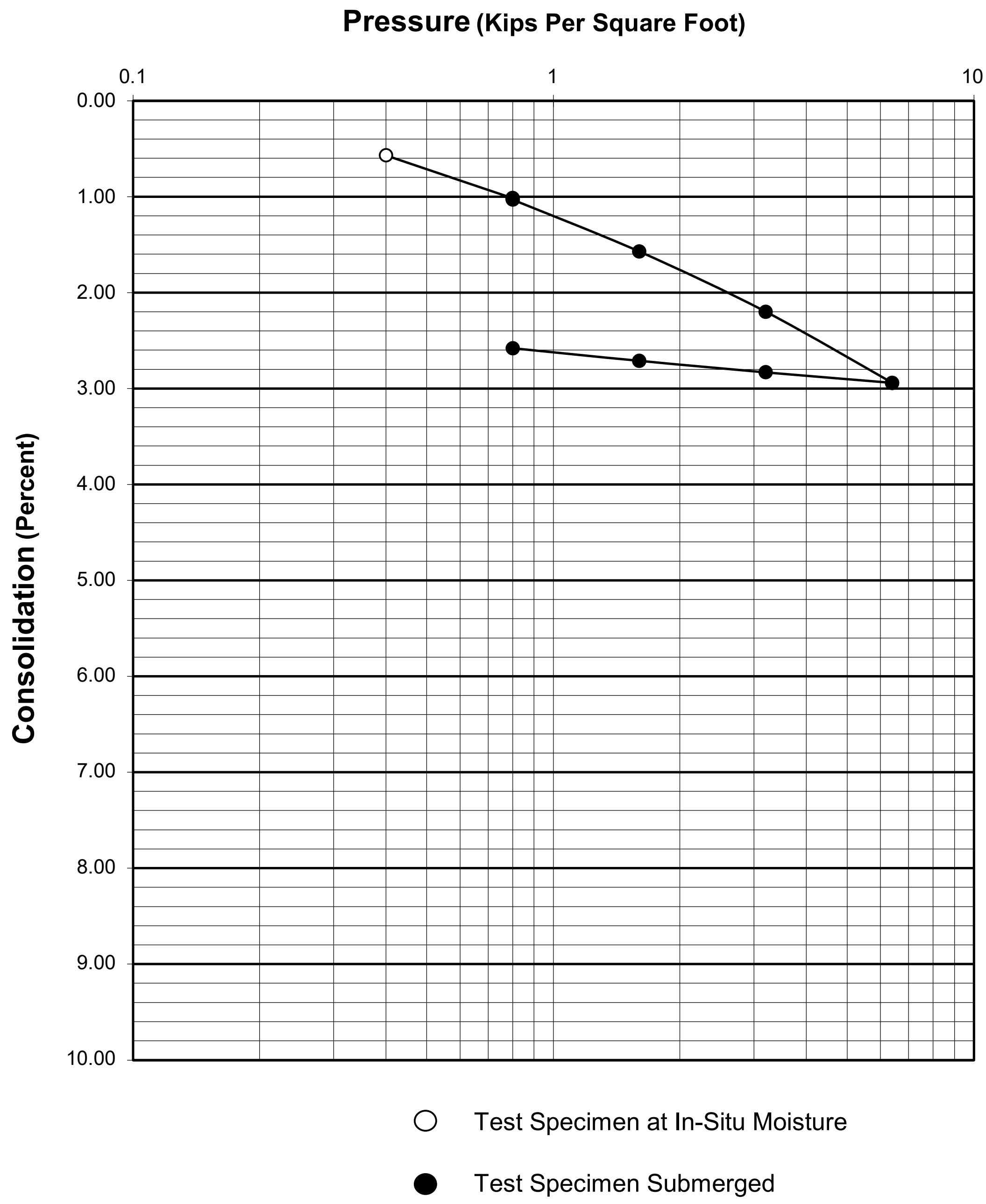


Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No. 21-2971 Plate C-7

HAMILTON & ASSOCIATES, INC.

CONSOLIDATION TEST RESULTS

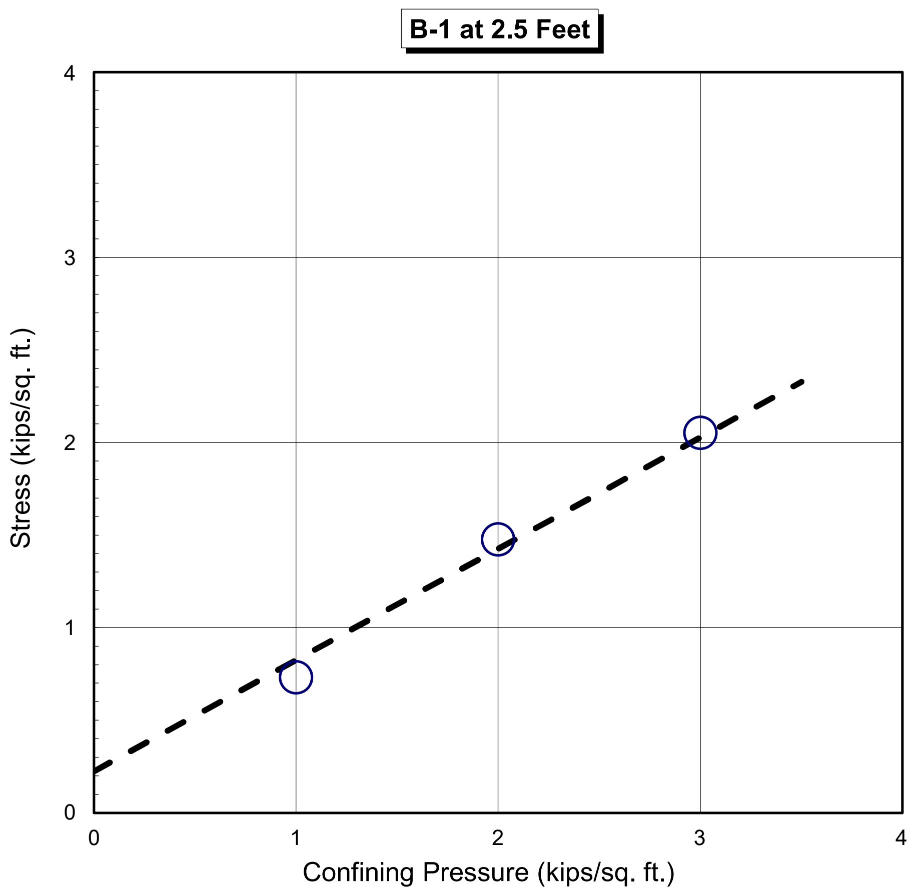
B-2 at 32.5 Feet

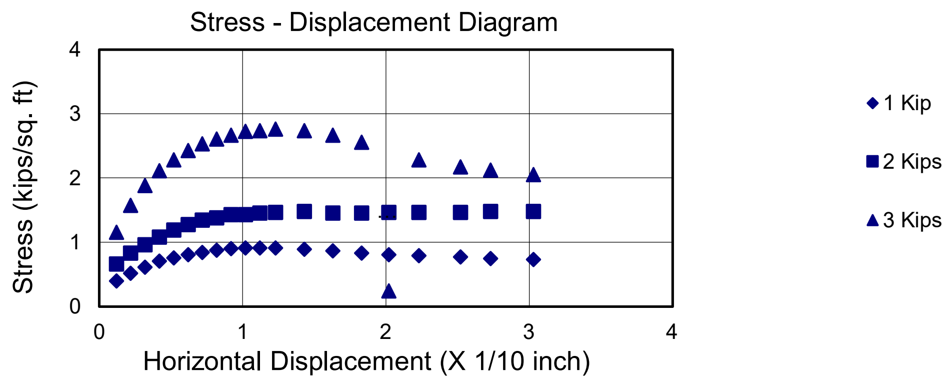


Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No. 21-2971
	Plate C-8

HAMILTON & ASSOCIATES, INC.

SHEAR TEST RESULTS





Sandy Clay samples were submerged for at least 24 hours.

The samples had a density of 115.3 lbs./cu.ft. and a moisture content of 14.4 %

Cohesion = 225 psf

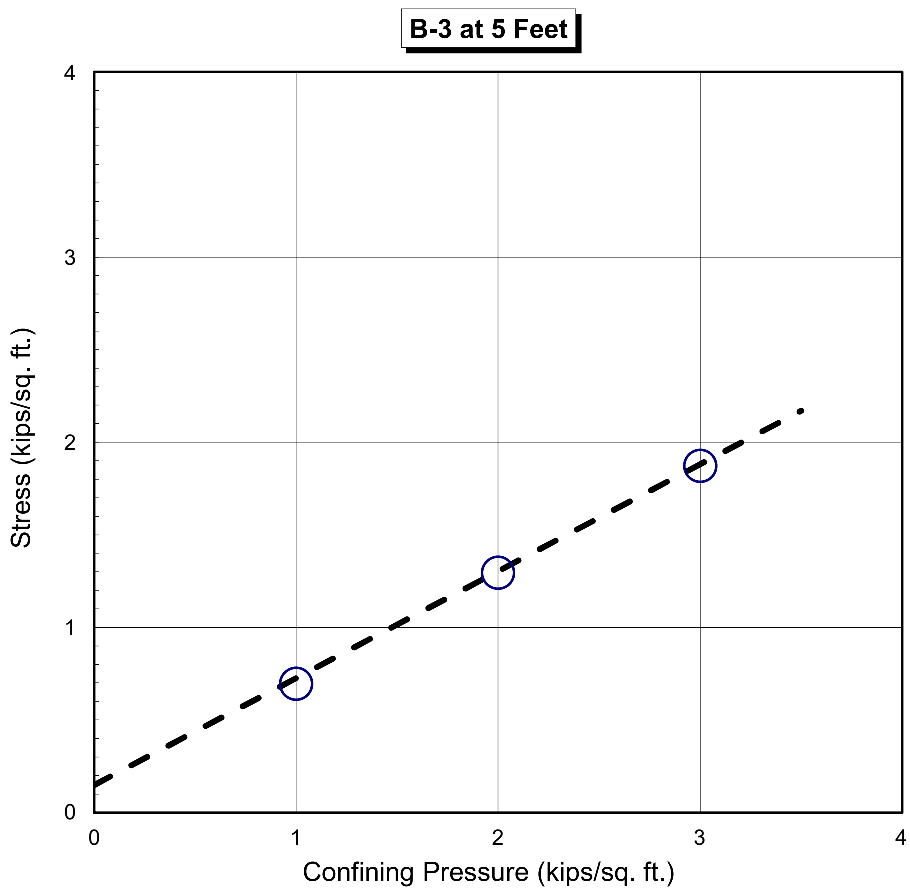
Friction Angle = 31 degrees

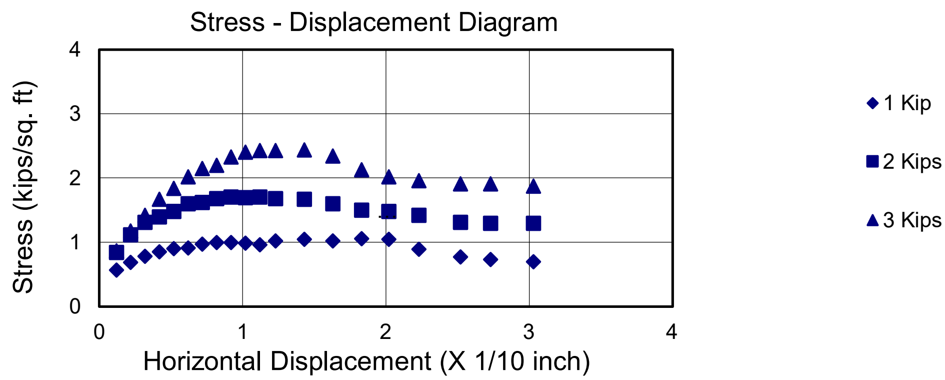
Based on Ultimate Strength

Geotechnical Engineering Investigation 16911 South Normanadie Avene Gardena, California	Project No.	21-2971
	Plate	D-1

HAMILTON & ASSOCIATES

SHEAR TEST RESULTS





Clayey Sand samples were submerged for at least 24 hours.

The samples had a density of 121 lbs./cu.ft. and a moisture content of 12.6 %

Cohesion = 150 psf

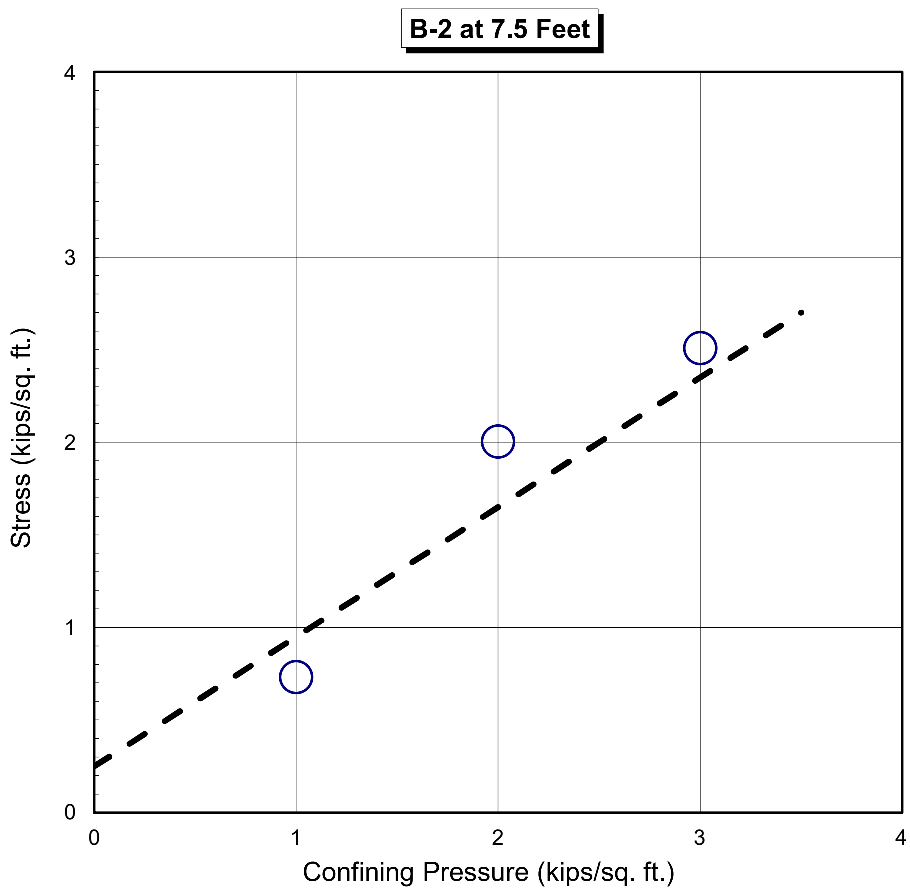
Friction Angle = 30 degrees

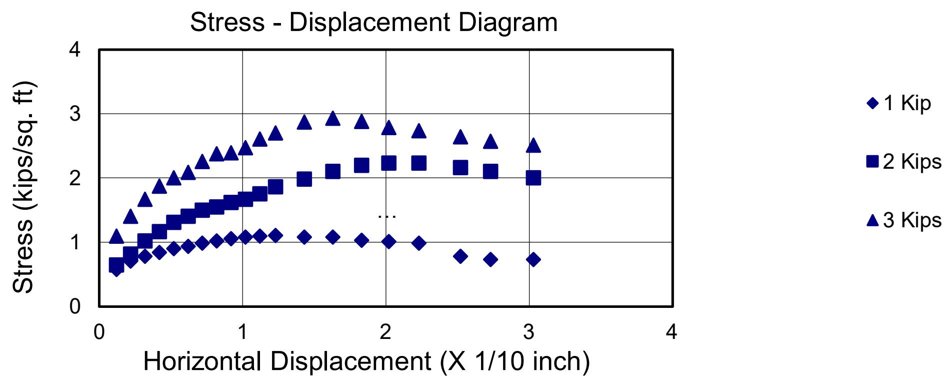
Based on Ultimate Strength

Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No. 21-2971 Plate D-2

HAMILTON & ASSOCIATES

SHEAR TEST RESULTS





Sandy Clay samples were submerged for at least 24 hours.

The samples had a density of 120.1 lbs./cu.ft. and a moisture content of 13.5 %

Cohesion = 250 psf

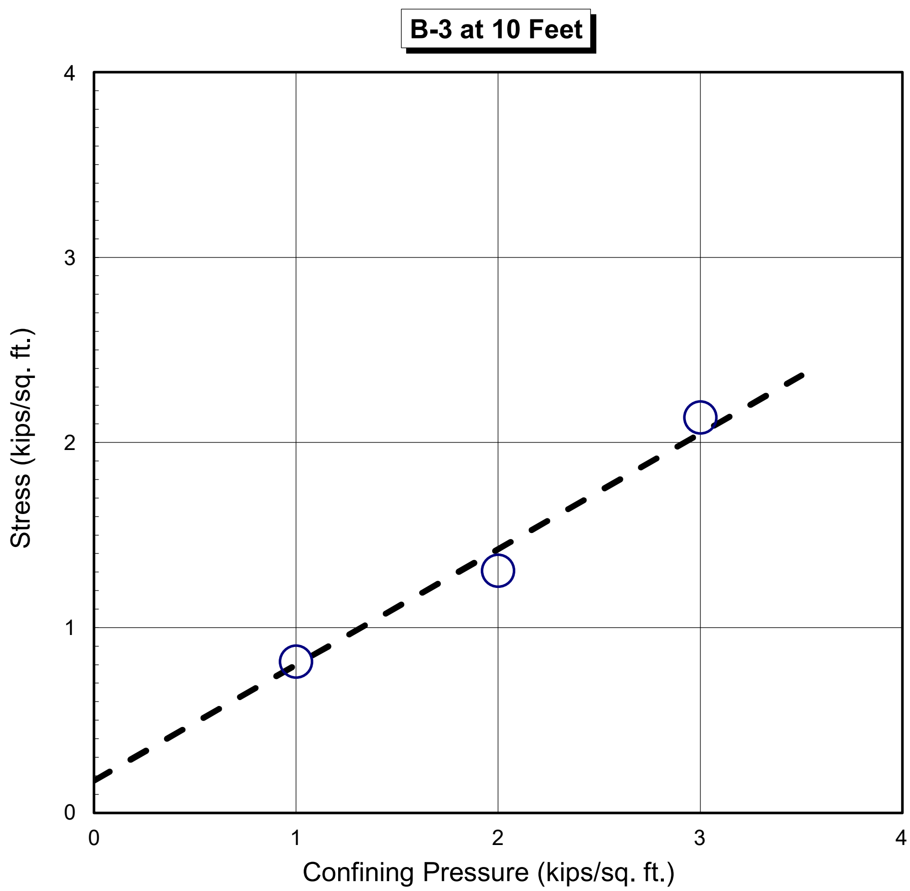
Friction Angle = 35 degrees

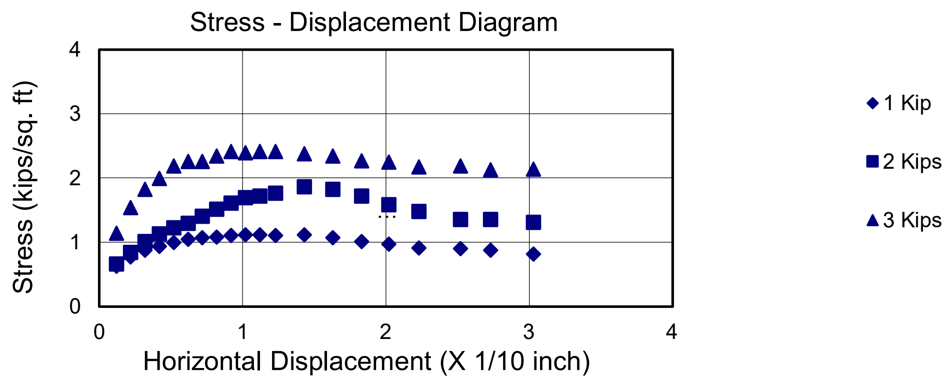
Based on Ultimate Strength

Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No. 21-2971
	Plate D-3

HAMILTON & ASSOCIATES

SHEAR TEST RESULTS





Clayey Sand samples were submerged for at least 24 hours.

The samples had a density of 114.9 lbs./cu.ft. and a moisture content of 16.7 %

Cohesion = 175 psf

Friction Angle = 32 degrees

Based on Ultimate Strength

Geotechnical Engineering Investigation 16911 South Normandie Avenue Gardena, California	Project No. 21-2971
	Plate D-4

HAMILTON & ASSOCIATES

ATTERBERG LIMITS
ASTM D4318

HAMILTON & Associates

Project Name: 16911 Normandie Associates, LLC
Project No. : 21-2971
Boring No. : B-2
Sample No. : N/A
Tested By: BB
Checked By:
Depth (ft.): 10'
Date: 9/13/2021

Visual Sample Description: Sandy Lean Clay

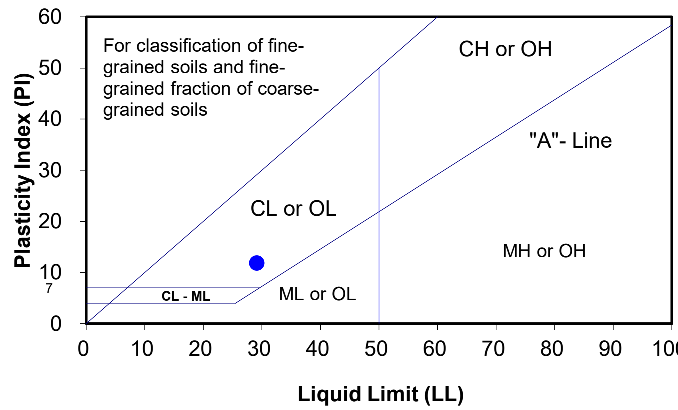
	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]:			33	28	23	
Tare No.:	B-2	A-8	A-3	A-4	A-5	
Wt. of Tare (gm):	15.60	15.60	15.60	15.60	15.60	
Wet Wt. of Soil + Tare (gm):	20.80	20.60	47.70	49.10	47.60	
Dry Wt. of Soil + Tare (gm):	20.00	19.90	40.80	41.60	40.20	
Moisture Content (%) [Wn]:	18.18	16.28	27.38	28.85	30.08	

Liquid Limit	**29**
Plastic Limit	**17**
Plasticity Index	**12**
USCS Classification	**CL**

PI at "A" - Line = 0.73(LL-20) = 6.652774

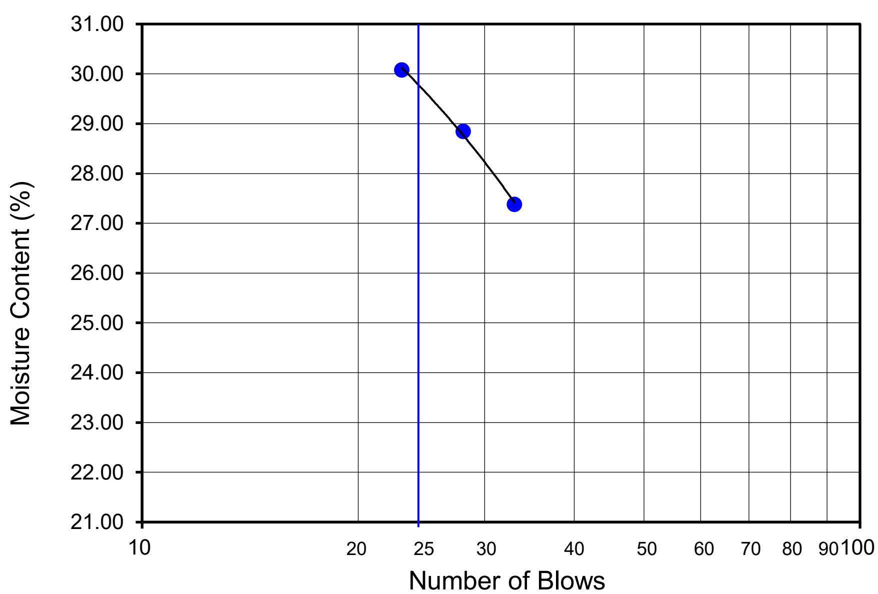
One - Point Liquid Limit Calculation

LL = $W_n(N/25)^{0.121}$



PROCEDURES USED

☐	Wet Preparation Multipoint - Wet
X	Dry Preparation Multipoint - Dry
X	Procedure A Multipoint Test
☐	Procedure B One-point Test



ATTERBERG LIMITS
ASTM D4318

HAMILTON & Associates

Project Name: Saiko Investments
Project No. : 21-2971
Boring No. : B-1
Sample No. : N/A

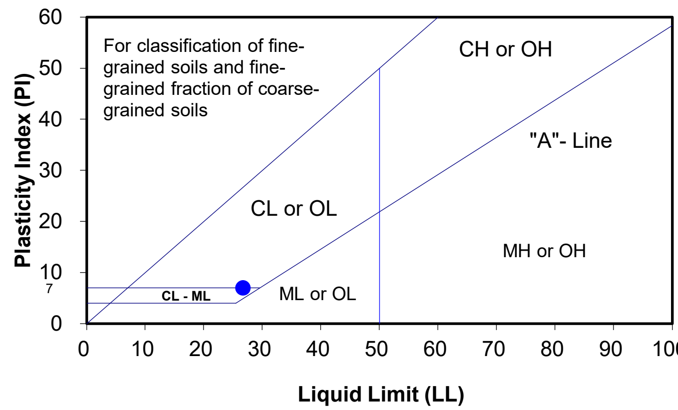
Tested By: BB
Checked By:
Depth (ft.): 15'
Date: 9/14/2021

Visual Sample Description: Silty Clay to Clayey Silt

	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]:			34	27	21	
Tare No.:	B-2	A-9	P-2	P-9	P-5	
Wt. of Tare (gm):	15.60	15.50	15.10	15.60	15.70	
Wet Wt. of Soil + Tare (gm):	21.10	20.90	46.10	47.00	50.80	
Dry Wt. of Soil + Tare (gm):	20.20	20.00	40.30	40.20	42.90	
Moisture Content (%) [Wn]:	19.57	20.00	23.02	27.64	29.04	

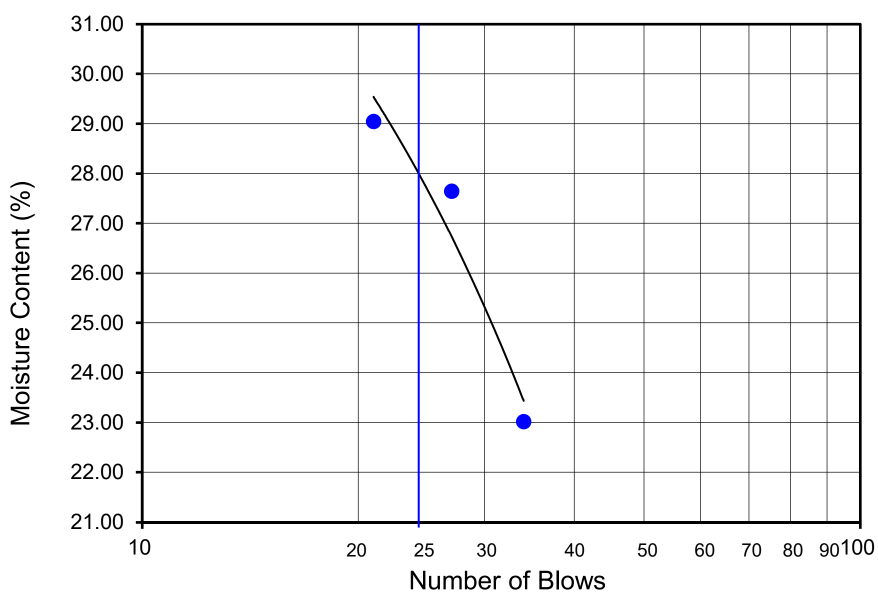
Liquid Limit	**27**
Plastic Limit	**20**
Plasticity Index	**7**
USCS Classification	**CL-ML**

PI at "A" - Line = 0.73(LL-20) = 4.921907
One - Point Liquid Limit Calculation
LL =Wn(N/25)$^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [X] Dry Preparation
  Multipoint - Dry
- [X] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test



ATTERBERG LIMITS
ASTM D4318

Project Name: Saiko Investments
Project No. : 21-2971
Boring No. : B-3
Sample No. : N/A

Tested By: BB
Checked By:
Depth (ft.): 15'
Date: 9/7/2021

Visual Sample Description: Silty Clay

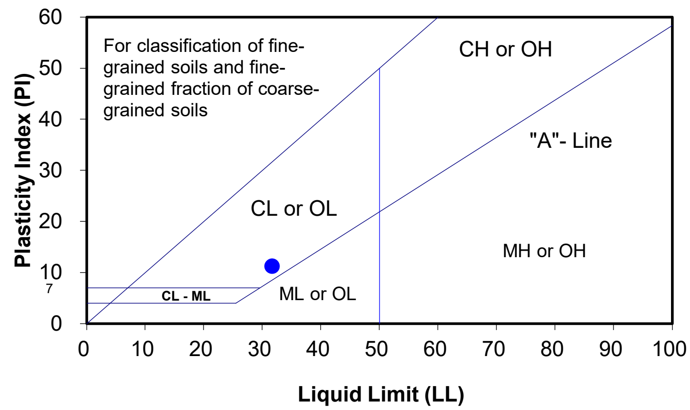
	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]:			34	22	19	
Tare No.:	P-7	P-8	J-1	J-2	J-3	
Wt. of Tare (gm):	15.70	15.70	15.70	15.60	14.90	
Wet Wt. of Soil + Tare (gm):	21.00	21.00	49.30	47.40	49.30	
Dry Wt. of Soil + Tare (gm):	20.10	20.10	41.40	39.70	40.80	
Moisture Content (%) [Wn]:	20.45	20.45	30.74	31.95	32.82	

Liquid Limit	32
Plastic Limit	20
Plasticity Index	11
USCS Classification	CL

PI at "A" - Line = 0.73(LL-20) = 8.543666

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

[ ]	Wet Preparation Multipoint - Wet
X	Dry Preparation Multipoint - Dry
X	Procedure A Multipoint Test
[ ]	Procedure B One-point Test

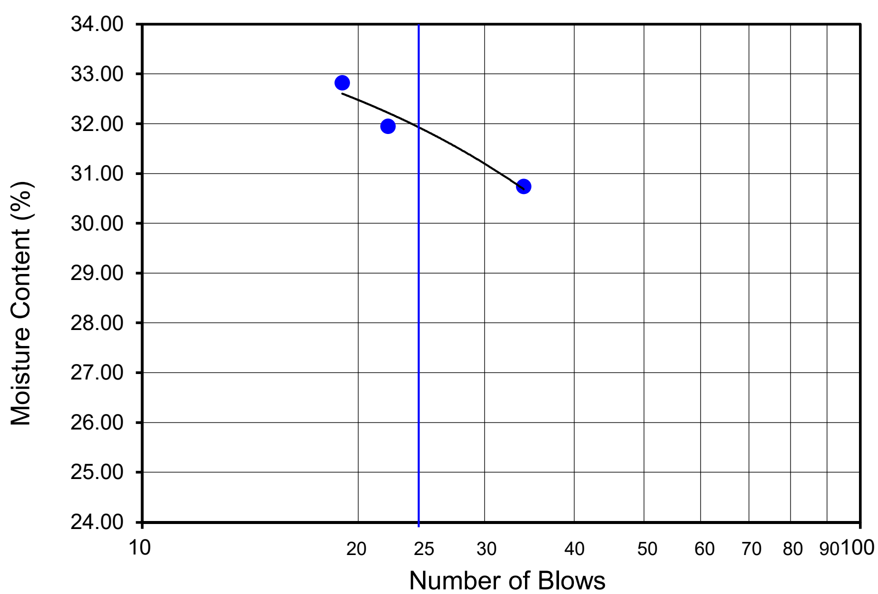


Plate E-3

ATTERBERG LIMITS
ASTM D4318

Project Name: Saiko Investments
Project No. : 21-2971
Boring No. : B-2
Sample No. : N/A

Tested By: BB
Checked By:
Depth (ft.): 20'
Date: 9/13/2021

Visual Sample Description: Clay

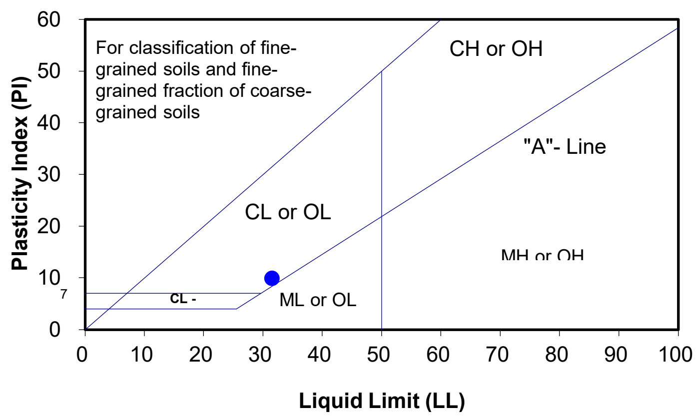
	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]:			26	23	18	
Tare No.:	A-7	A-6	B-3	A-6	B-1	
Wt. of Tare (gm):	15.60	15.60	15.50	15.50	15.60	
Wet Wt. of Soil + Tare (gm):	20.90	21.00	49.10	48.10	47.60	
Dry Wt. of Soil + Tare (gm):	20.00	20.00	41.10	40.20	39.70	
Moisture Content (%) [Wn]:	20.45	22.73	31.25	31.98	32.78	

Liquid Limit	**32**
Plastic Limit	**22**
Plasticity Index	**10**
USCS Classification	**CL**

PI at "A" - Line = 0.73(LL-20) = 8.410587

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



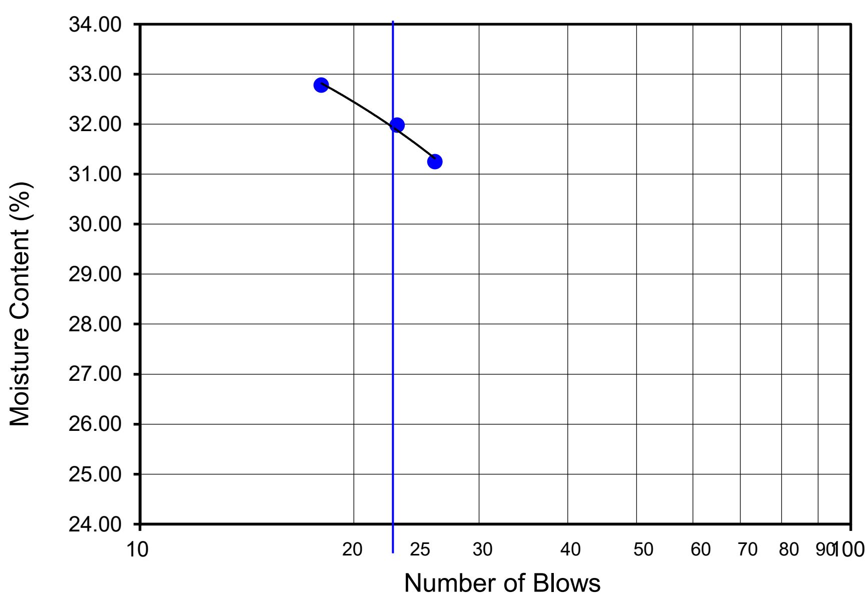
PROCEDURES USED

☐ Wet Preparation
Multipoint - Wet

☒ Dry Preparation
Multipoint - Dry

☒ Procedure A
Multipoint Test

☐ Procedure B
One-point Test



HAMILTON & Associates

ATTERBERG LIMITS
ASTM D4318

Project Name:	Saiko Investments	**Tested By:**	BB
Project No. :	21-2971	**Checked By:**	
Boring No. :	B-2	**Depth (ft.):**	25'
Sample No. :	N/A	**Date:**	9/14/2021

Visual Sample Description: Sandy Silt

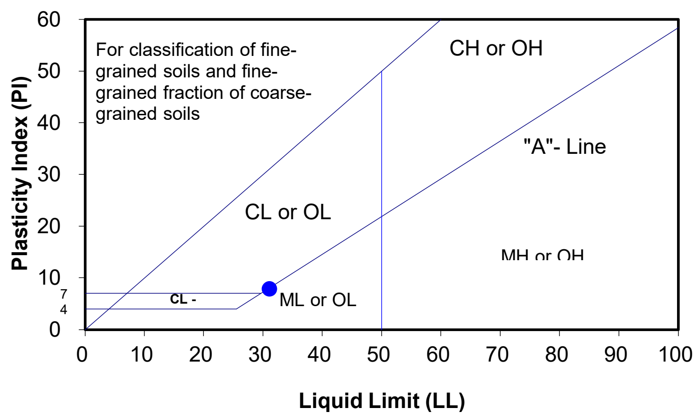
	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]:			34	25	20	
Tare No.:	A-4	A-5	P-7	J-2	P-6	
Wt. of Tare (gm):	15.60	15.60	15.70	15.70	15.60	
Wet Wt. of Soil + Tare (gm):	21.00	20.80	49.40	47.90	49.00	
Dry Wt. of Soil + Tare (gm):	20.00	19.80	41.70	40.20	40.90	
Moisture Content (%) [Wn]:	22.73	23.81	29.62	31.43	32.02	

Liquid Limit	**31**
Plastic Limit	**23**
Plasticity Index	**8**
USCS Classification	**ML**

PI at "A" - Line = 0.73(LL-20) = 8.11018

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation — Multipoint - Wet
- [X] Dry Preparation — Multipoint - Dry
- [X] Procedure A — Multipoint Test
- [ ] Procedure B — One-point Test

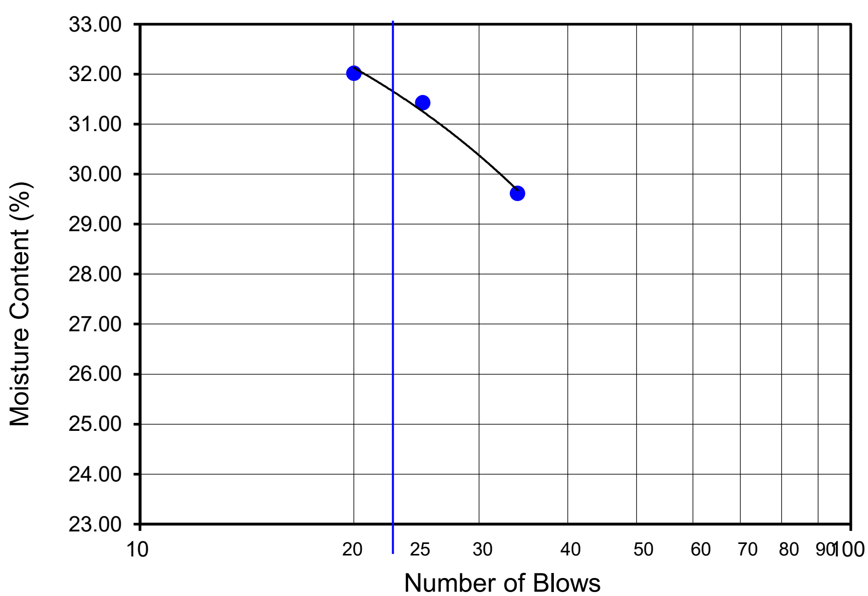


Plate E-5

ATTERBERG LIMITS
ASTM D4318

HAMILTON & Associates

Project Name: Saiko Imvestments
Project No. : 21-2971
Boring No. : B-2
Sample No. : N/A

Tested By: BB
Checked By:
Depth (ft.): 35'
Date: 9/10/2021

Visual Sample Description: Sandy Silty Clay

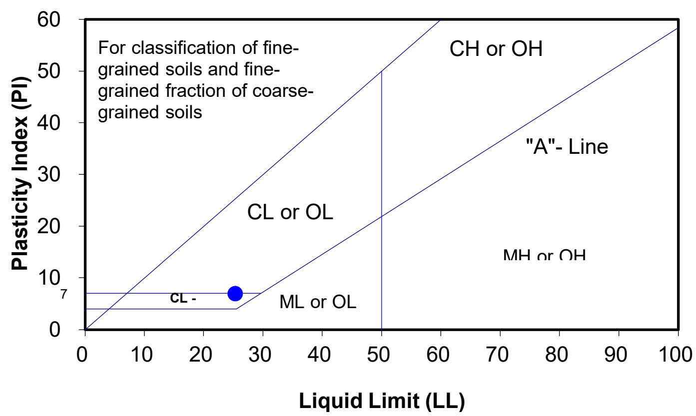
	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]:			29	20	17	
Tare No.:	A-1	A-2	P-1	P-8	J-3	
Wt. of Tare (gm):	15.50	15.60	15.60	15.70	15.00	
Wet Wt. of Soil + Tare (gm):	20.80	20.60	47.80	48.30	46.20	
Dry Wt. of Soil + Tare (gm):	20.00	19.80	41.30	41.60	39.70	
Moisture Content (%) [Wn]:	17.78	19.05	25.29	25.87	26.32	

Liquid Limit	**25**
Plastic Limit	**18**
Plasticity Index	**7**
USCS Classification	**CL-ML**

PI at "A" - Line = 0.73(LL-20) = 3.904459

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation Multipoint - Wet
- [X] Dry Preparation Multipoint - Dry
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test

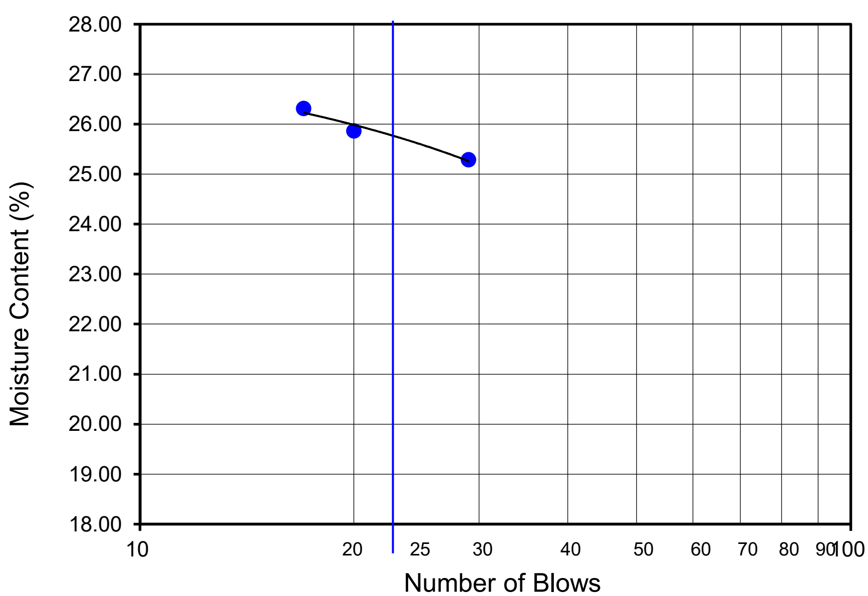


Plate E-6

ATTERBERG LIMITS
ASTM D4318

Project Name: Saiko Investments
Project No. : 21-2971
Boring No. : B-2
Sample No. : N/A

Tested By: BB
Checked By:
Depth (ft.): 40'
Date: 9/21/2021

Visual Sample Description: Silty Clay with Sand

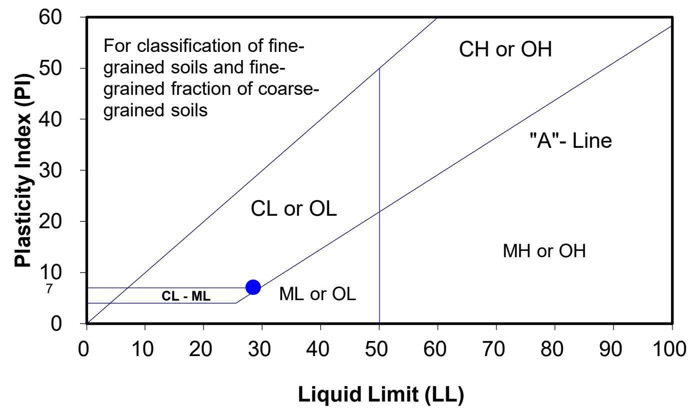
	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]:			26	20	17	
Tare No.:	P-2	P-6	P-9	A-4	A-2	
Wt. of Tare (gm):	15.20	15.60	15.60	15.70	15.60	
Wet Wt. of Soil + Tare (gm):	20.90	20.70	47.70	46.80	46.90	
Dry Wt. of Soil + Tare (gm):	19.90	19.80	40.60	39.80	39.70	
Moisture Content (%) [Wn]:	21.28	21.43	28.40	29.05	29.88	

Liquid Limit	**28**
Plastic Limit	**21**
Plasticity Index	**7**
USCS Classification	**CL-ML**

PI at "A" - Line = 0.73(LL-20) = 6.161296

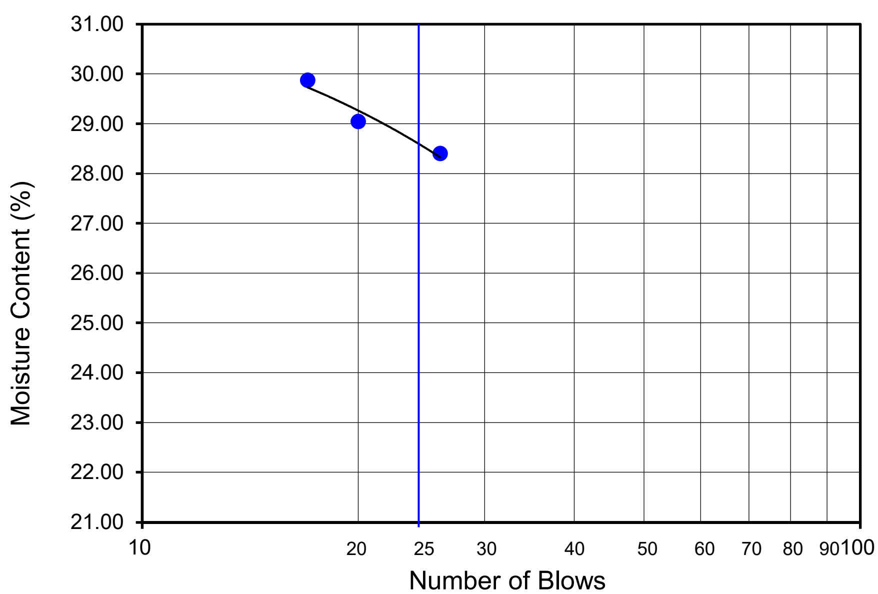
One - Point Liquid Limit Calculation

LL =Wn(N/25)$^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation Multipoint - Wet
- [X] Dry Preparation Multipoint - Dry
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



HAMILTON & Associates

ATTERBERG LIMITS
ASTM D4318

Project Name:	Saiko Investments	**Tested By:**	BB
Project No. :	21-2971	**Checked By:**	
Boring No. :	B-2	**Depth (ft.):**	45'
Sample No. :	N/A	**Date:**	9/7/2021

Visual Sample Description: Silty Clay to Clayey Silt

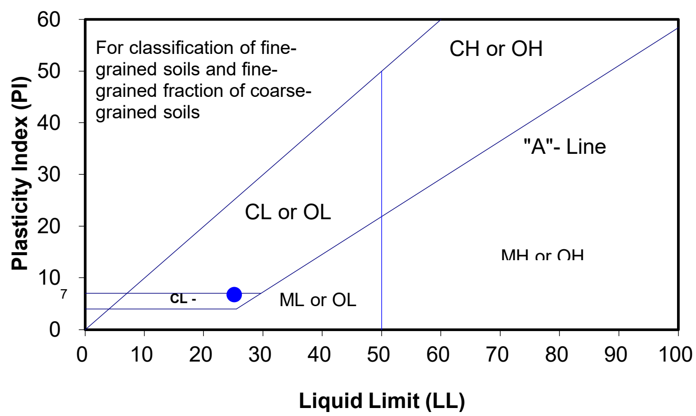
	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]:			29	24	18	
Tare No.:	P-6	P-9	P-1	P-2	P-5	
Wt. of Tare (gm):	15.50	15.60	15.60	15.20	15.60	
Wet Wt. of Soil + Tare (gm):	20.70	20.70	46.90	48.80	50.90	
Dry Wt. of Soil + Tare (gm):	19.90	19.90	40.70	42.00	43.60	
Moisture Content (%) [Wn]:	18.18	18.60	24.70	25.37	26.07	

Liquid Limit	**25**
Plastic Limit	**18**
Plasticity Index	**7**
USCS Classification	**CL-ML**

PI at "A" - Line = 0.73(LL-20) = 3.760075

One - Point Liquid Limit Calculation

LL =Wn(N/25) $^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation Multipoint - Wet
- [X] Dry Preparation Multipoint - Dry
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test

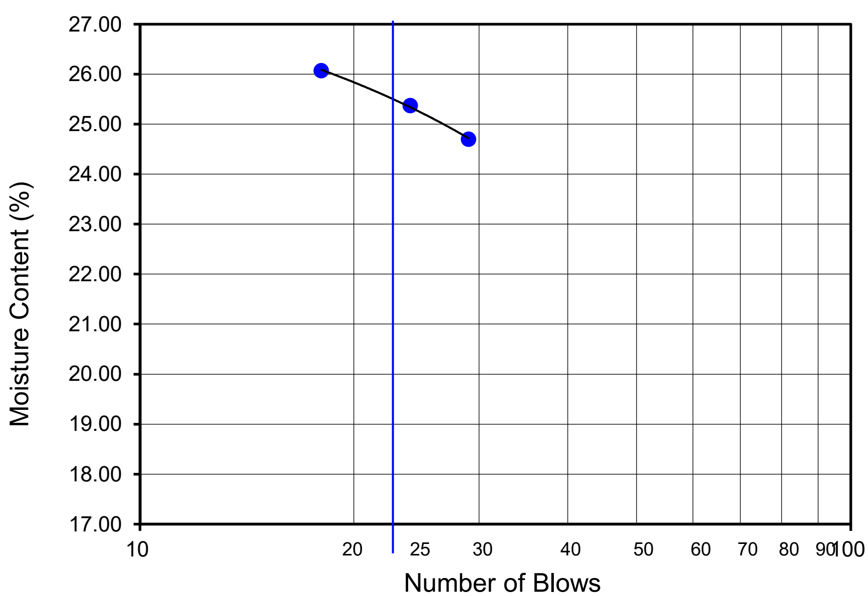


Plate E-8

ATTERBERG LIMITS
ASTM D4318

HAMILTON & Associates

Project Name: Saiko Investments
Project No. : 21-2971
Boring No. : B-2
Sample No. : N/A

Tested By: BB
Checked By:
Depth (ft.): 55'
Date: 9/21/2021

Visual Sample Description: Sandy Silt

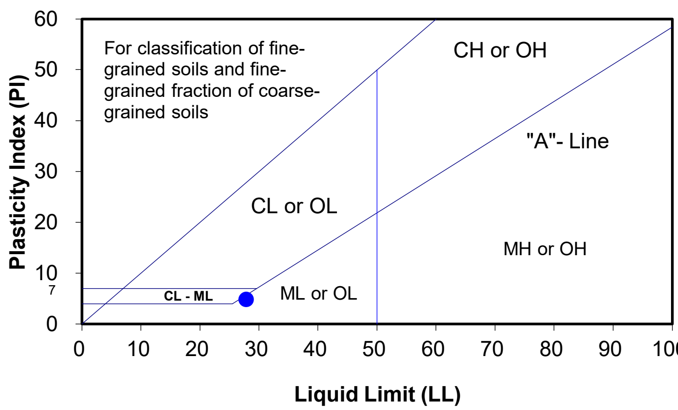
	PLASTIC LIMIT		LIQUID LIMIT			
	1	2	1	2	3	4
Number of Blows [N]:			26	20	15	
Tare No.:	P-5	J-3	A-9	B-2	A-1	
Wt. of Tare (gm):	15.70	14.90	15.50	15.60	15.50	
Wet Wt. of Soil + Tare (gm):	20.90	20.40	46.00	45.80	46.40	
Dry Wt. of Soil + Tare (gm):	19.90	19.40	39.30	39.10	39.40	
Moisture Content (%) [Wn]:	23.81	22.22	28.15	28.51	29.29	

Liquid Limit	**28**
Plastic Limit	**23**
Plasticity Index	**5**
USCS Classification	**ML**

PI at "A" - Line = 0.73(LL-20) = 5.735245

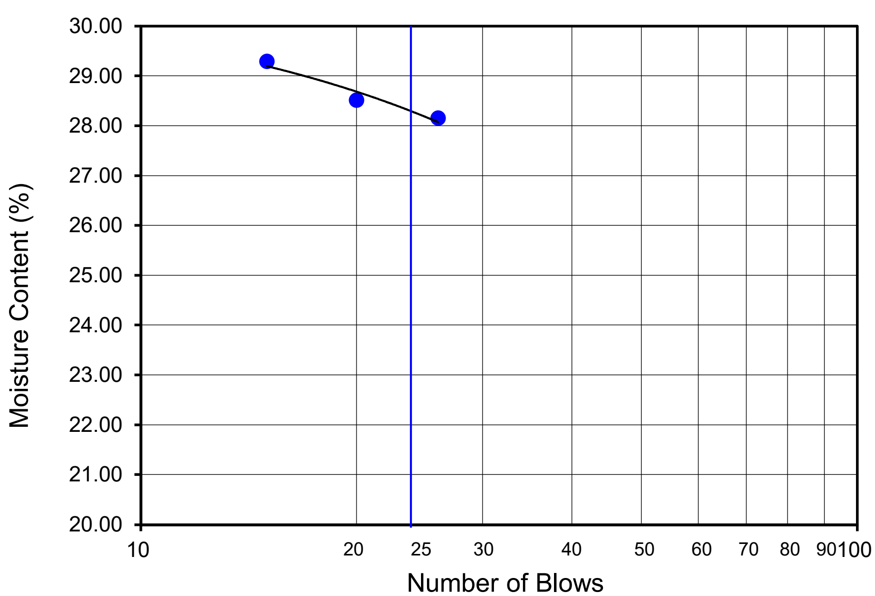
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation Multipoint - Wet
- [X] Dry Preparation Multipoint - Dry
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



HAMILTON
& Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	16911 Normandie Associates, LLC	Tested By:	BB
Project No.:	21-2971	Checked By:	
Boring No.:	B-1	Depth (ft.):	5'
Sample No.:	N/A	Date:	9/14/2021

Soil Description: **Silty Sand**

Moisture Determination

Tare No.	51.0
Tare Weight (g)	3.9
Wet Weight of Soil plus Tare (g)	113.6
Oven Dried Weight of Soil plus Tare (g)	103.1
Moisture Content (%)	10.6

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	69.7	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
33.7	% Fines

Plate G-1

HAMILTON & Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	Saiko Investments	Tested By:	BB
Project No.:	21-2971	Checked By:	
Boring No.:	B-3	Depth (ft.):	7.5'
Sample No.:	N/A	Date:	9/21/2021

Soil Description: **Silty Sand**

Moisture Determination

Tare No.	H-87
Tare Weight (g)	3.8
Wet Weight of Soil plus Tare (g)	105.7
Oven Dried Weight of Soil plus Tare (g)	96.4
Moisture Content (%)	10.0

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	77.8	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
20.1	% Fines

HAMILTON & Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	Saiko Investments	Tested By:	BB
Project No.:	21-2971	Checked By:	
Boring No.:	B-2	Depth (ft.):	10'
Sample No.:	N/A	Date:	9/15/2021

Soil Description: **Sandy Clay**

Moisture Determination

Tare No.	83.0
Tare Weight (g)	3.8
Wet Weight of Soil plus Tare (g)	102.2
Oven Dried Weight of Soil plus Tare (g)	91.4
Moisture Content (%)	12.3

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	44.3	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
53.8	% Fines

HAMILTON & Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	**Saiko Investments**	**Tested By:**	**BB**
Project No.:	**21-2971**	**Checked By:**	
Boring No.:	**B-1**	**Depth (ft.):**	**15'**
Sample No.:	**N/A**	**Date:**	**9/15/2021**

Soil Description: **Sandy Silt to Sandy Clay**

Moisture Determination

Tare No.	L-240
Tare Weight (g)	3.8
Wet Weight of Soil plus Tare (g)	105.8
Oven Dried Weight of Soil plus Tare (g)	89.0
Moisture Content (%)	19.7

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	30.0	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
69.2	% Fines

HAMILTON & Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	Saiko Investments	Tested By:	BB
Project No.:	21-2971	Checked By:	
Boring No.:	B-2	Depth (ft.):	20'
Sample No.:	N/A	Date:	9/15/2021

Soil Description: **Sandy Clay**

Moisture Determination

Tare No.	AM-13
Tare Weight (g)	3.7
Wet Weight of Soil plus Tare (g)	96.6
Oven Dried Weight of Soil plus Tare (g)	78.9
Moisture Content (%)	23.5

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	25.7	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
70.7	% Fines

HAMILTON
& Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	**Saiko Investments**	**Tested By:**	**BB**
Project No.:	**21-2971**	**Checked By:**	
Boring No.:	**B-1**	**Depth (ft.):**	**25'**
Sample No.:	**N/A**	**Date:**	**9/14/2021**

Soil Description: **Silty Sand**

Moisture Determination

Tare No.	Z-40
Tare Weight (g)	3.2
Wet Weight of Soil plus Tare (g)	113.6
Oven Dried Weight of Soil plus Tare (g)	88.2
Moisture Content (%)	29.9

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	60.2	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
32.9	% Fines

HAMILTON
& Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	Saiko Investments	Tested By:	BB
Project No.:	21-2971	Checked By:	
Boring No.:	B-2	Depth (ft.):	25'
Sample No.:	N/A	Date:	9/21/2021

Soil Description: **Sandy Silt**

Moisture Determination

Tare No.	SO-62
Tare Weight (g)	3.7
Wet Weight of Soil plus Tare (g)	103.5
Oven Dried Weight of Soil plus Tare (g)	83.7
Moisture Content (%)	24.8

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	40.5	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
54.0	% Fines

HAMILTON & Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	**Saiko Investments**	**Tested By:**	**BB**
Project No.:	**21-2971**	**Checked By:**	
Boring No.:	**B-2**	**Depth (ft.):**	**32.5'**
Sample No.:	**N/A**	**Date:**	**9/14/2021**

Soil Description: **Silty Sand**

Moisture Determination

Tare No.	AM-6
Tare Weight (g)	3.6
Wet Weight of Soil plus Tare (g)	149.0
Oven Dried Weight of Soil plus Tare (g)	126.0
Moisture Content (%)	18.8

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	99.8	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
21.4	% Fines

HAMILTON & Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	**Saiko Investments**	**Tested By:**	**BB**
Project No.:	**21-2971**	**Checked By:**	
Boring No.:	**B-2**	**Depth (ft.):**	**35'**
Sample No.:	**N/A**	**Date:**	**9/21/2021**

Soil Description: **Silty Sand**

Moisture Determination

Tare No.	L-148
Tare Weight (g)	3.7
Wet Weight of Soil plus Tare (g)	116.0
Oven Dried Weight of Soil plus Tare (g)	96.1
Moisture Content (%)	21.5

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	52.5	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
47.2	% Fines

HAMILTON & Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	**Saiko Investments**	**Tested By:**	**BB**
Project No.:	**21-2971**	**Checked By:**	
Boring No.:	**B-2**	**Depth (ft.):**	**40'**
Sample No.:	**N/A**	**Date:**	**9/14/2021**

Soil Description: **Silty Clay to Clayey Silt with Sand**

Moisture Determination

Tare No.	Z-85
Tare Weight (g)	3.1
Wet Weight of Soil plus Tare (g)	90.5
Oven Dried Weight of Soil plus Tare (g)	66.2
Moisture Content (%)	38.5

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	13.0	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
84.3	% Fines

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& Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	**Saiko Investments**	**Tested By:**	**BB**
Project No.:	**21-2971**	**Checked By:**	
Boring No.:	**B-2**	**Depth (ft.):**	**45'**
Sample No.:	**N/A**	**Date:**	**9/21/2021**

Soil Description: **Silty Sand**

Moisture Determination

Tare No.	Z-27
Tare Weight (g)	3.2
Wet Weight of Soil plus Tare (g)	90.2
Oven Dried Weight of Soil plus Tare (g)	74.9
Moisture Content (%)	21.3

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	41.7	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
46.3	% Fines

HAMILTON & Associates

No. 200 Wash and Grain Analysis
ASTM D 1140

Project Name:	**Saiko Investments**	**Tested By:**	**BB**
Project No.:	**21-2971**	**Checked By:**	
Boring No.:	**B-2**	**Depth (ft.):**	**55'**
Sample No.:	**N/A**	**Date:**	**9/14/2021**

Soil Description: **Sandy Silt**

Moisture Determination

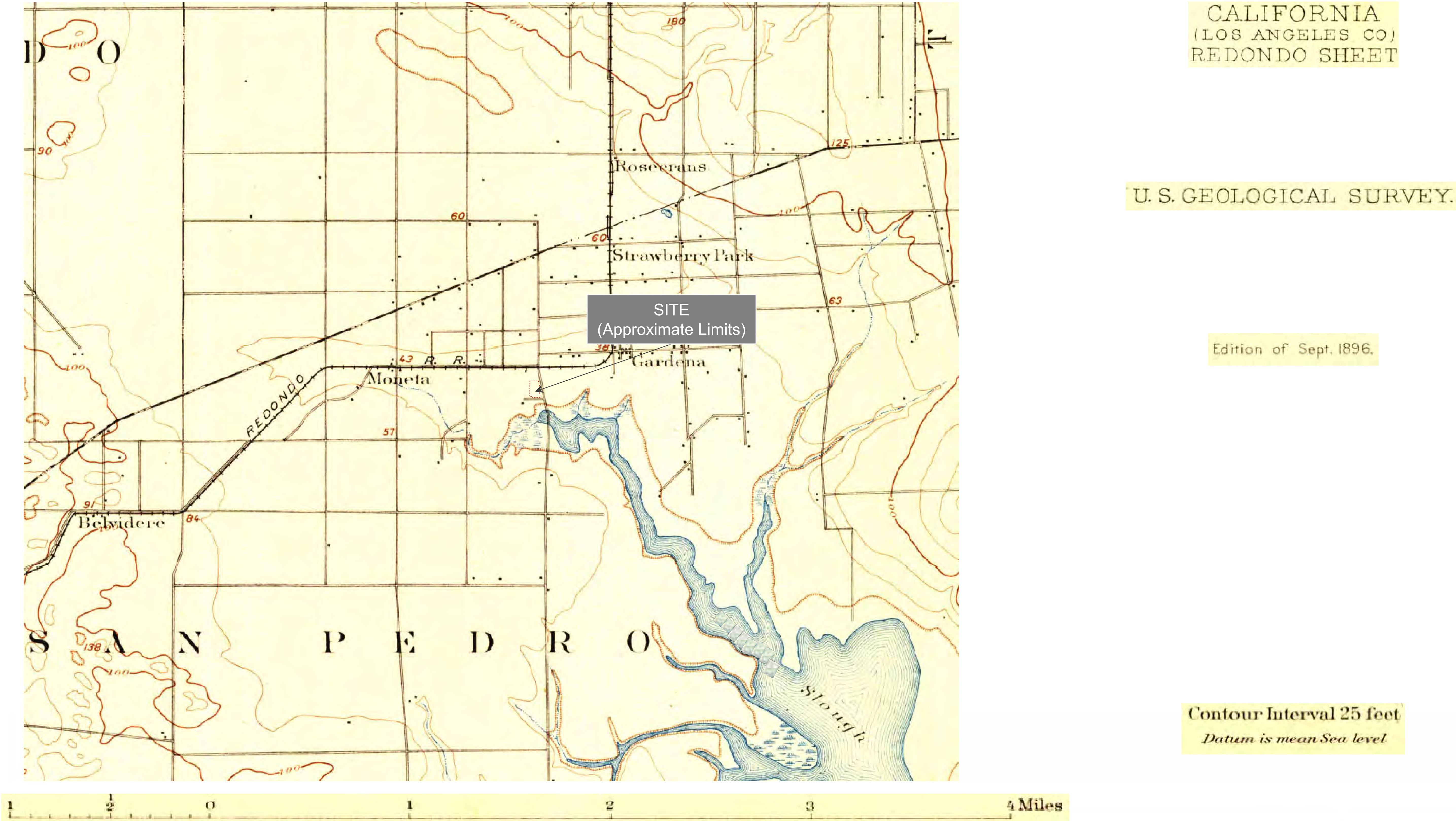
Tare No.	OWL
Tare Weight (g)	3.7
Wet Weight of Soil plus Tare (g)	116.2
Oven Dried Weight of Soil plus Tare (g)	91.7
Moisture Content (%)	27.8

Grain Analysis

Post #200 Wash Mass of Oven Dried Soil for Grain Analysis plus Tare (g)	36.7	
Mass of Soil Retained on Seive (g)	3"	
	1 1/2"	
	1"	
	3/4"	
	3/8"	
	#4	
	#10	
	#20	
	#40	
	#60	
	#100	
	#140	
	#200	
	Pass #200	

0.0	% Gravel
0.0	% Sand
62.5	% Fines

HISTORICAL TOPOGRAPHIC MAP 1896



Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California

Project No: 21-2971

Hamilton & Associates

Plate No: H-1

Date: October 2021

HISTORICAL TOPOGRAPHIC MAP 1924

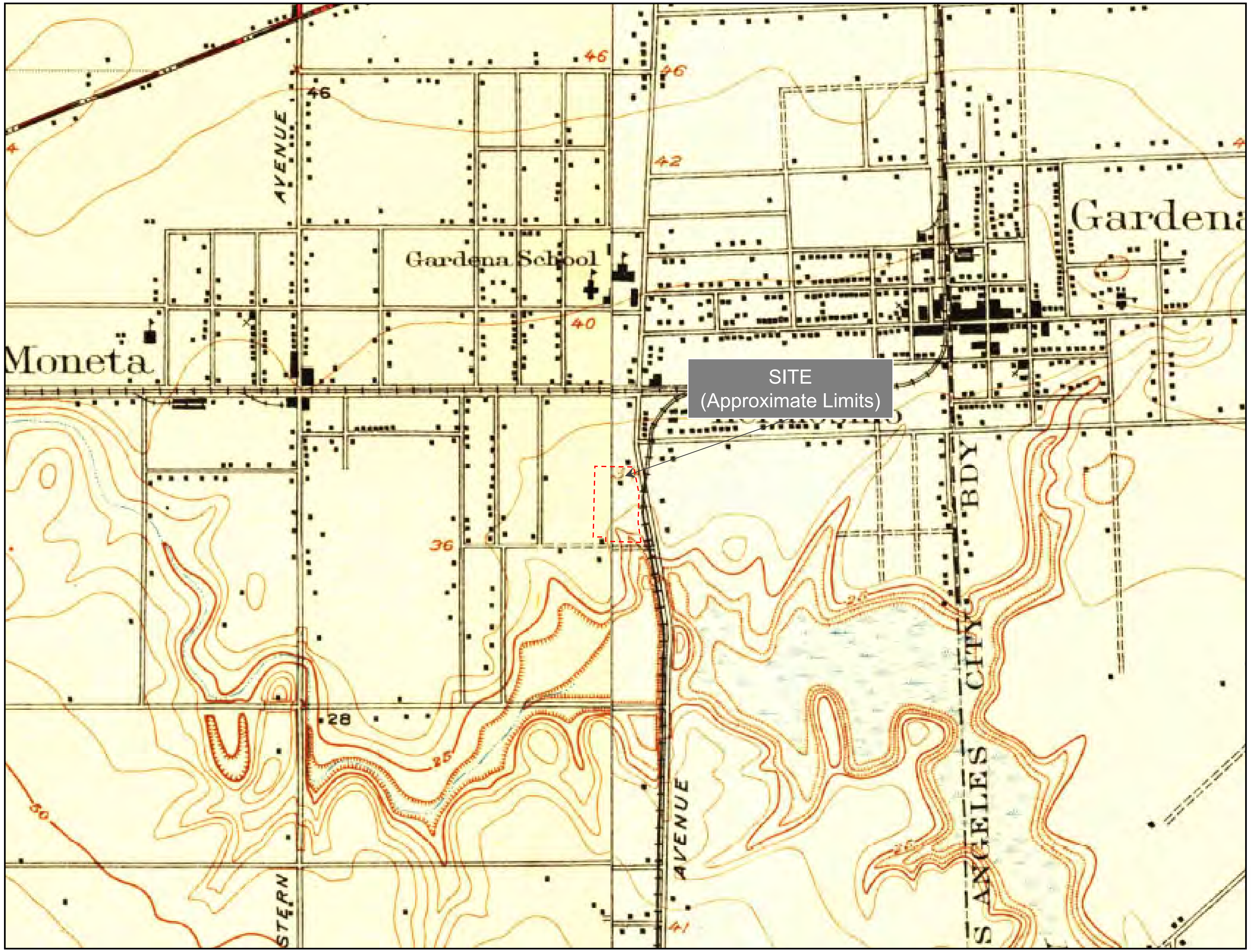
CALIFORNIA
(LOS ANGELES COUNTY)
TORRANCE QUADRANGLE

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

TORRANCE, CALIF.
Edition of 1924.

APPROXIMATE MEAN DECLINATION, 1923

Contour interval 5 feet.
Datum is mean sea level.



CALIFORNIA
(LOS ANGELES COUNTY)
COMPTON QUADRANGLE

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

COMPTON, CALIF.
Edition of 1924

APPROXIMATE MEAN DECLINATION, 1923

Contour interval 5 feet.
Datum is mean sea level.

5000 4000 3000 2000 1000 0 5000 Feet

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971
Hamilton & Associates	Plate No: H-2 / Date: October 2021

HISTORICAL TOPOGRAPHIC MAP 1950/1951

Lower Map

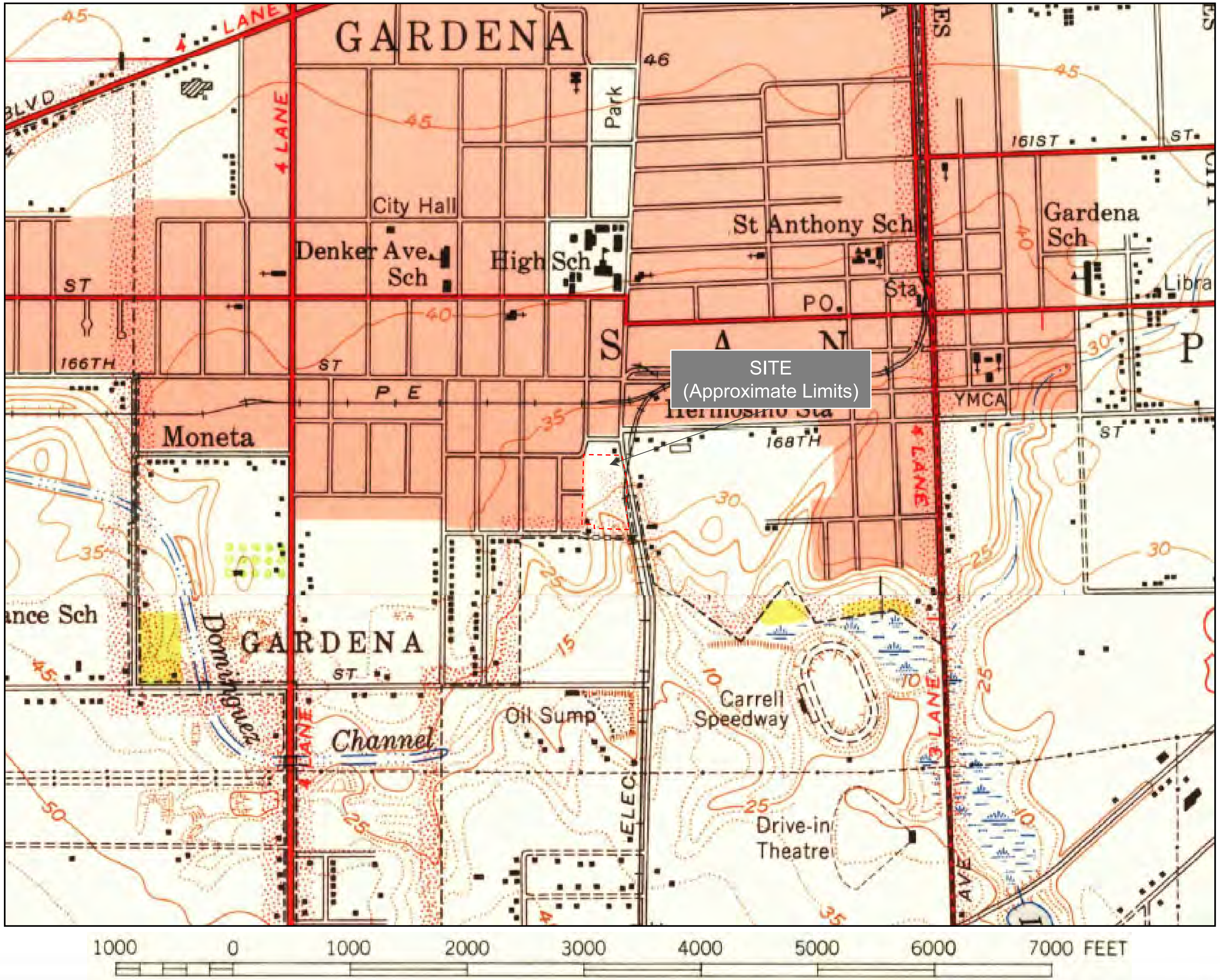
TORRANCE QUADRANGLE
CALIFORNIA-LOS ANGELES CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TORRANCE, CALIF.
N3345—W11815/7.5
1951

15½°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1951

CONTOUR INTERVAL 25 FEET
DOTTED LINES REPRESENT 5 FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



Upper Map

INGLEWOOD QUADRANGLE
CALIFORNIA-LOS ANGELES CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

INGLEWOOD, CALIF.
N3352.5—W11815/7.5
1950

15½°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1950

CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971
Hamilton & Associates	Plate No: H-3 / Date: October 2021

HISTORICAL TOPOGRAPHIC MAP 1964

Lower Map

TORRANCE QUADRANGLE
CALIFORNIA–LOS ANGELES CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

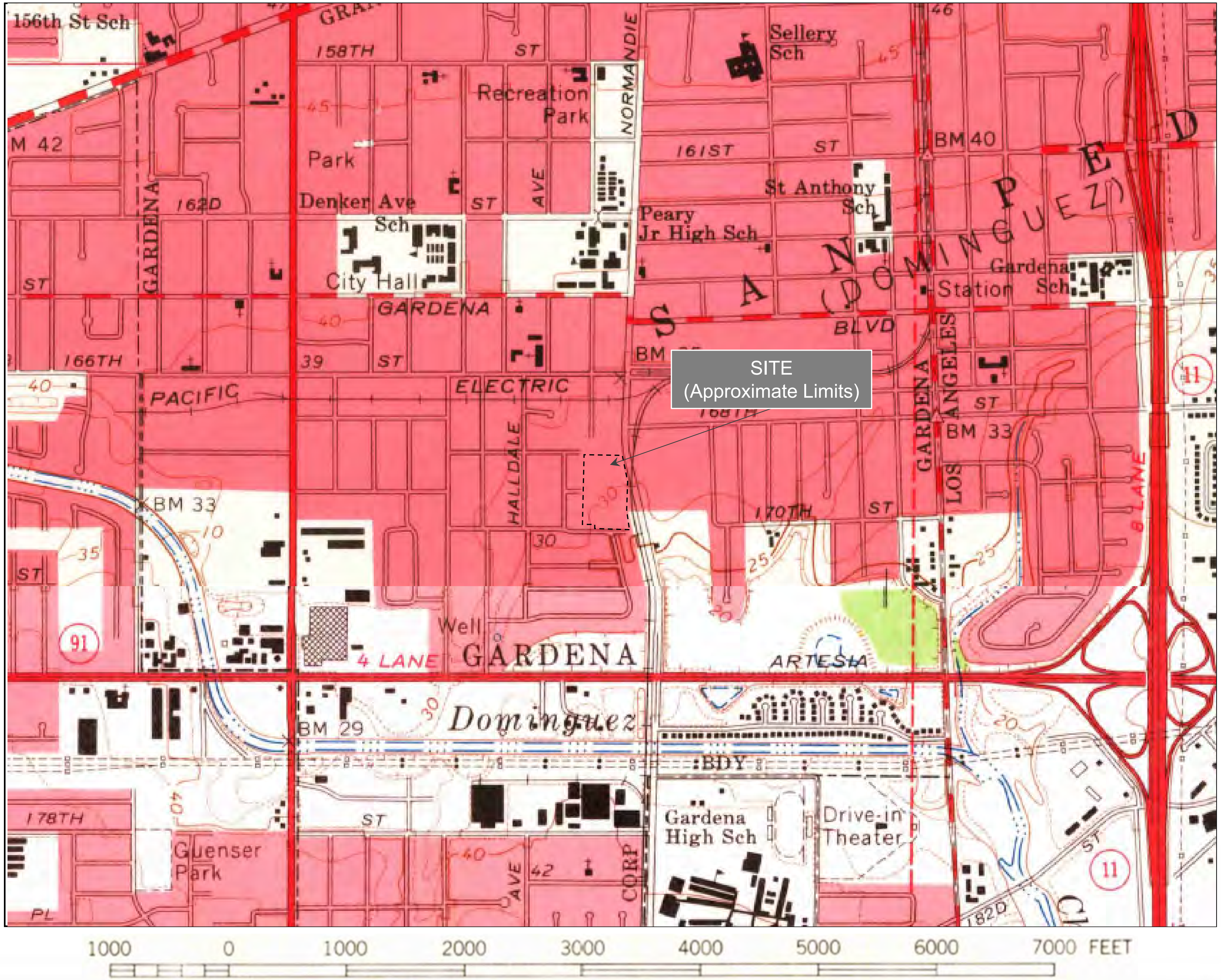
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TORRANCE, CALIF.
N3345—11815/7.5

1964

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



Upper Map

INGLEWOOD QUADRANGLE
CALIFORNIA–LOS ANGELES CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

INGLEWOOD, CALIF
N3352.5—W11815/7.5

1964

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971	
Hamilton & Associates	Plate No: H-4	Date: October 2021

HISTORICAL AERIAL IMAGE 1927

Imagery Report: Flight C-113

Partially Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles, Orange, San Bernardino
Filed by (catalog):	C-113
Filed by (collection):	C-113
Imagery Location:	Map Room--Utility Shelves Off-site storage--UCLA
Index type:	mosaic, SmartIndex
Index scale:	1:135,000
Size:	frames 7 x 9 inches
Height:	7
Width:	9

Begin date:	1927-08-01
End date:	1927-08-31
Scale:	1:18,000
Overlap:	60%
Sidelap:	20%
Directional orientation:	North-South
Altitude:	14,250
Lens focal length:	9.5 inches (241.3mm)
Film type:	Nitrate, Copy
Spectral range:	400-700nm

Note: Los Angeles County south of Santa Monica Mountains and Interstate 210 and Orange County west of SR 133; vicinity of Chino Hills. Overlap within flightlines in not consistent. Copy negatives acquired from Teledyne, Inc., 1986; nitrate negatives and prints acquired from Whittier College, January 2013. Nitrate negatives scanned, 2015.	
Physical Details:	black and white; paper prints; negative transparencies; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	Standard Oil Company
Acquired from:	Teledyne Inc.; Whittier College
Est. frame count:	743

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California

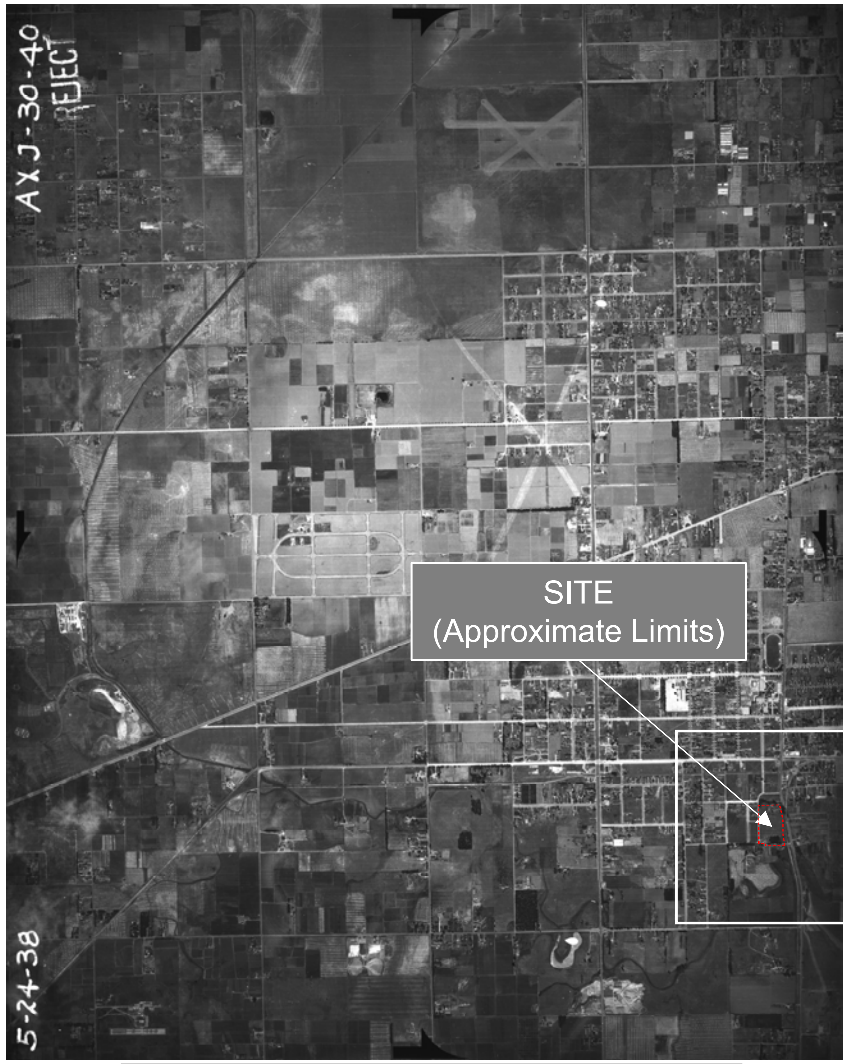
Project No: 21-2971

Hamilton & Associates

Plate No: H-5

Date: October 2021

HISTORICAL AERIAL IMAGE 1938

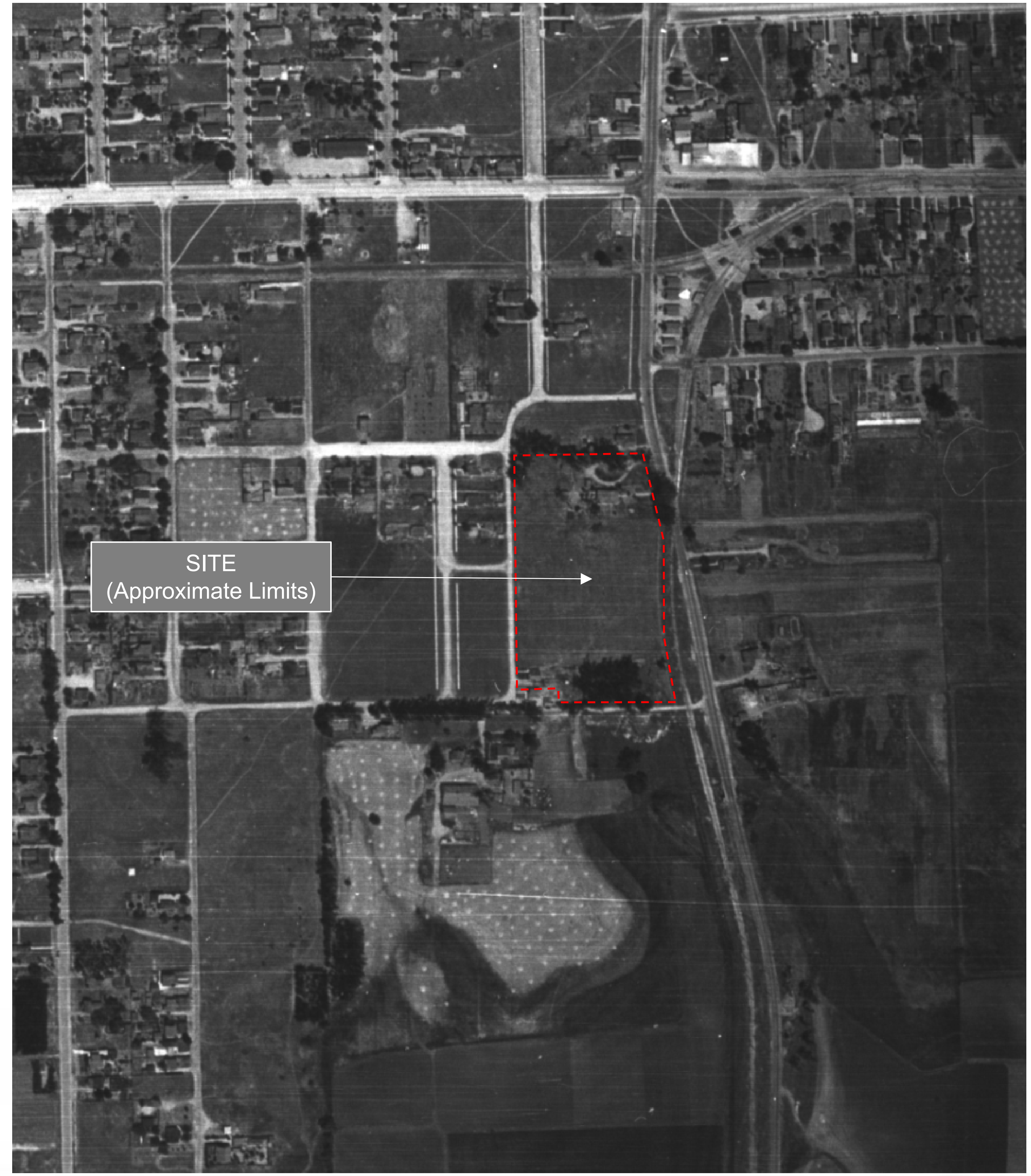


Imagery Report: Flight AXJ-1938
Digital
View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles
Filed by (catalog):	AXJ-1938
Filed by (collection):	AXJ-1938
Imagery Location:	Map Room--Utility Shelves Room 2552
Index type:	line
Index scale:	1:100,000
Size:	frames 7.25 X 9.25 inches

Begin date:	1938-05-22
End date:	1938-07-28
Scale:	1:20,000
Overlap:	60%
Sidelap:	20%
Directional orientation:	East-West
Altitude:	13,750
Lens focal length:	8.25 inches
Spectral range:	400-700 nm.
Generation held:	2nd generation

Note: Diapositives purchased from King Visual Technology; paper prints acquired from Whittier College, January 2013. Some analog frames in this flight are filed under AXK-1938 or AXL-1938.	
Physical Details:	black and white; paper prints; positive transparencies; cut frame; vertical view;
Copyright:	Reproduction rights held by the Regents of the University of California.
Flown by:	Laval Company Inc.
Contractor/requestor:	USDA, Agricultural Adjustment Administration
Acquired from:	National Archives & Records Administration; Whittier College
Est. frame count:	1245



Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971
Hamilton & Associates	Plate No: H-6 / Date: October 2021

HISTORICAL AERIAL IMAGE 1941

Imagery Report: Flight C-6972

Partially Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles
Filed by (catalog):	C-6972
Filed by (collection):	C-6972
Imagery Location:	Map Room--Utility Shelves Room 2552 Off-site storage--UCLA
Index type:	line, SmartIndex
Index scale:	1:50,000
Size:	frames 9 X 9 inches
Height:	9
Width:	9

Begin date:	1941-03-06
End date:	1941-03-06
Scale:	1:12,000
Overlap:	60%
Sidelap:	40%
Altitude:	12,000
Lens focal length:	12 inches
Film type:	Nitrate
Spectral range:	400-700 nm
Generation held:	1st and 2nd generation

Note: Vicinity of Carson and Avalon Village: Wilmington oil facility. Imagery acquired 1986 and January 2013.	
Physical Details:	black and white; paper prints; positive transparencies; negative transparencies; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	Dominguez Estate Company
Acquired from:	Teledyne, Inc.; Whittier College
Est. frame count:	57

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California

Project No: 21-2971

Hamilton & Associates

Plate No: H-7

Date: October 2021

HISTORICAL AERIAL IMAGE 1947

Imagery Report: Flight C-11351

Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles, Orange
Filed by (catalog):	C-11351
Filed by (collection):	C-11351
Imagery Location:	Map Room--Utility Shelves Room 2552
Index type:	mosaic, SmartIndex
Index scale:	1:100,000
Size:	frames 9 x 9 inches
Height:	9
Width:	9

Begin date:	1947-05-01
End date:	1947-07-01
Scale:	1:24,000
Overlap:	60%
Sidelap:	10%
Directional orientation:	East-West
Altitude:	16,500
Lens focal length:	8.25 inches (209.55mm)
Camera:	Fairchild
Film type:	Copy
Spectral range:	400-700nm
Generation held:	1st and 2nd generation

Note: Los Angeles County, south of Santa Monica Mountains; Orange County, west of Highway 55. Imagery acquired 1986 and January 2013. MIL has additional frames not shown on index.

Physical Details:	black and white; paper prints; negative transparencies; film roll; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	State of California, Department of Public Works, Division of Water Resources
Acquired from:	Teledyne, Inc.; Whittier College
Est. frame count:	602

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California

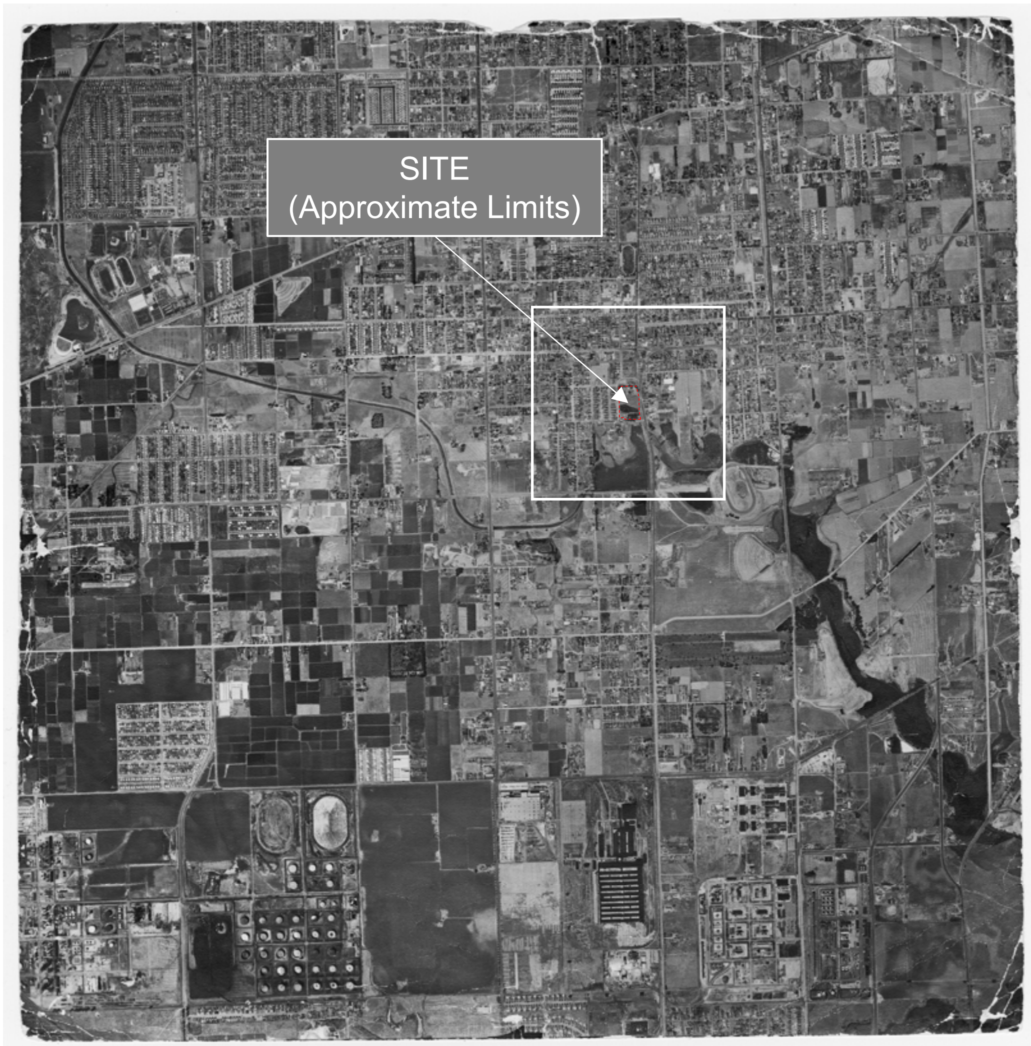
Project No: 21-2971

Hamilton & Associates

Plate No: H-8

Date: October 2021

HISTORICAL AERIAL IMAGE 1951



Imagery Report: Flight C-16580

View Index

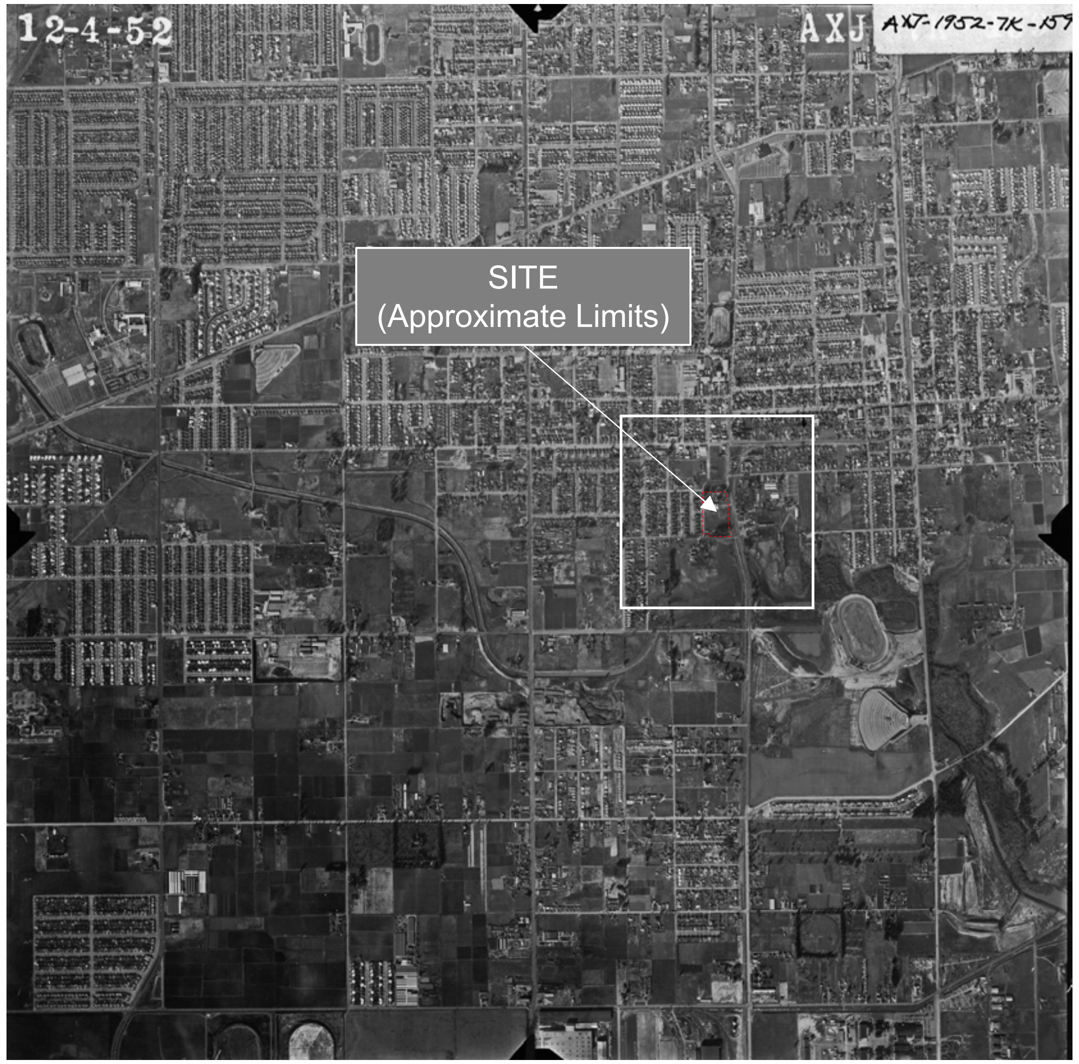
Country:	United States
State(s):	California
Counties:	California: Los Angeles
Filed by (catalog):	C-16580
Filed by (collection):	C-16580
Imagery Location:	Map Room--Utility Shelves
Index type:	mosaic, SmartIndex
Size:	9 x 9 inches

Begin date:	1951-05-28
End date:	1951-05-28
Scale:	1:24,000
Overlap:	60
Lens focal length:	8.25 inches
Film type:	Copy

Note: West Los Angeles to El Segundo and Gardena areas. Imagery acquired January 2013.	
Physical Details:	black and white; paper prints; vertical view;
Copyright:	Copyright © UC Regents
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	O'Melveny & Myers
Acquired from:	Whittier College
Est. frame count:	38

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971
Hamilton & Associates	Plate No: H-9 / Date: October 2021

HISTORICAL AERIAL IMAGE 1952



Imagery Report: Flight AXJ-1952

Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles
Filed by (catalog):	AXJ-1952
Filed by (collection):	AXJ-1952
Imagery Location:	Map Room--Utility Shelves
Index type:	mosaic
Index scale:	1:63,360
Size:	frames 9 X 9 inches

Begin date:	1952-11-03
End date:	1954-10-28
Scale:	1:20,000
Overlap:	60%
Sidelap:	20%
Directional orientation:	North-South
Platform id:	Aircraft
Lens focal length:	8.25 inches (209.55mm)
Camera:	mapping camera
Film type:	Panchromatic
Generation held:	2nd generation

Note: Flight covers entire county, including Santa Catalina Island and San Clemente Island.	
Physical Details:	black and white; paper prints; vertical view;
Copyright:	Reproduction rights held by the Regents of the University of California.
Flown by:	Pacific Air Industries
Contractor/requestor:	USDA - Production and Marketing Administration
Acquired from:	USDA (gift to MIL).
Est. frame count:	2388

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California

Project No: 21-2971

Hamilton & Associates

Plate No: H-10

Date: October 2021

HISTORICAL AERIAL IMAGE 1956

Imagery Report: Flight C-22555

Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles, Orange, Ventura
Filed by (catalog):	C-22555
Filed by (collection):	C-22555
Imagery Location:	Map Room--Utility Shelves Room 2552
Index type:	mosaic, SmartIndex
Index scale:	1:140,000
Size:	frames 9 x 9 inches
Height:	9
Width:	9

Begin date:	1956-07-01
End date:	1956-09-30
Scale:	1:14,400
Scale:	1:12,000
Overlap:	60%
Sidelap:	20%
Directional orientation:	East-West
Altitude:	14,400
Lens focal length:	12 inches (304.8mm)
Film type:	Camera, Copy
Generation held:	1st and 2nd generation

Note: Photographs and negatives are 1:14,400. Flight also exists as a 3-volume bound atlas of orthophoto quarter (scale: ~1:12,000) quadrangles (stored offsite). Imagery acquired from Whittier College, January 2013.	
Physical Details:	black and white; paper prints; negative transparencies; film roll; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Acquired from:	Teledyne, Inc.; Whittier College
Est. frame count:	1193

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California		Project No: 21-2971
Hamilton & Associates	Plate No: H-11	Date: October 2021

HISTORICAL AERIAL IMAGE 1960

Imagery Report: Flight C-23870

Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura
Filed by (catalog):	C-23870
Filed by (collection):	C-23870
Imagery Location:	Map Room--Utility Shelves Room 2552 Refrigerators
Index type:	mosaic
Index scale:	1:72,000
Size:	frames 9 x 9 inches
Height:	9
Width:	9

Begin date:	1960-05-01
End date:	1960-07-31
Scale:	1:14,400
Overlap:	60%
Sidelap:	20%
Directional orientation:	East-West
Altitude:	7,200
Lens focal length:	6 inches (152.4mm)
Film type:	Camera, Copy
Spectral range:	400-700nm
Generation held:	1st and 2nd generation

Note: Paper prints stored at Annex2. Roll C-23870-16, 17 has "vinegar syndrome". Imagery acquired from Whittier College, January 2013.

Physical Details:	black and white; paper prints; negative transparencies; film roll; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Acquired from:	Teledyne, Inc; Whittier College
Est. frame count:	2790

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Project No: 21-2971

Hamilton & Associates

Plate No: H-12

Date: October 2021

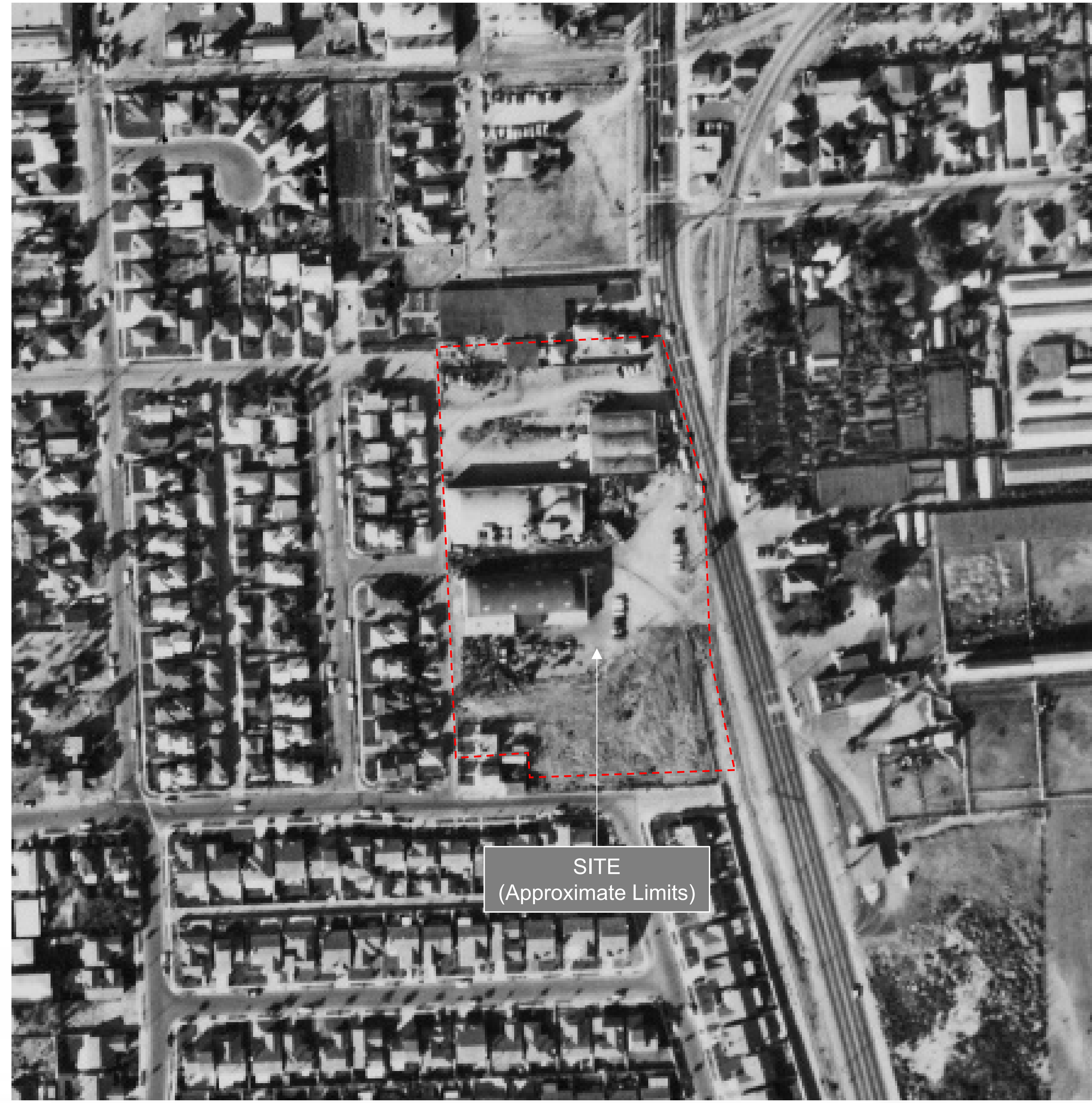
HISTORICAL AERIAL IMAGE 1962

Imagery Report: Flight C-24400
Digital
View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles
Filed by (catalog):	C-24400
Filed by (collection):	C-24400
Imagery Location:	Map Room--Utility Shelves
Index type:	mosaic, SmartIndex
Index scale:	1:48,000
Size:	frames 9 x 9 inches
Height:	9
Width:	9

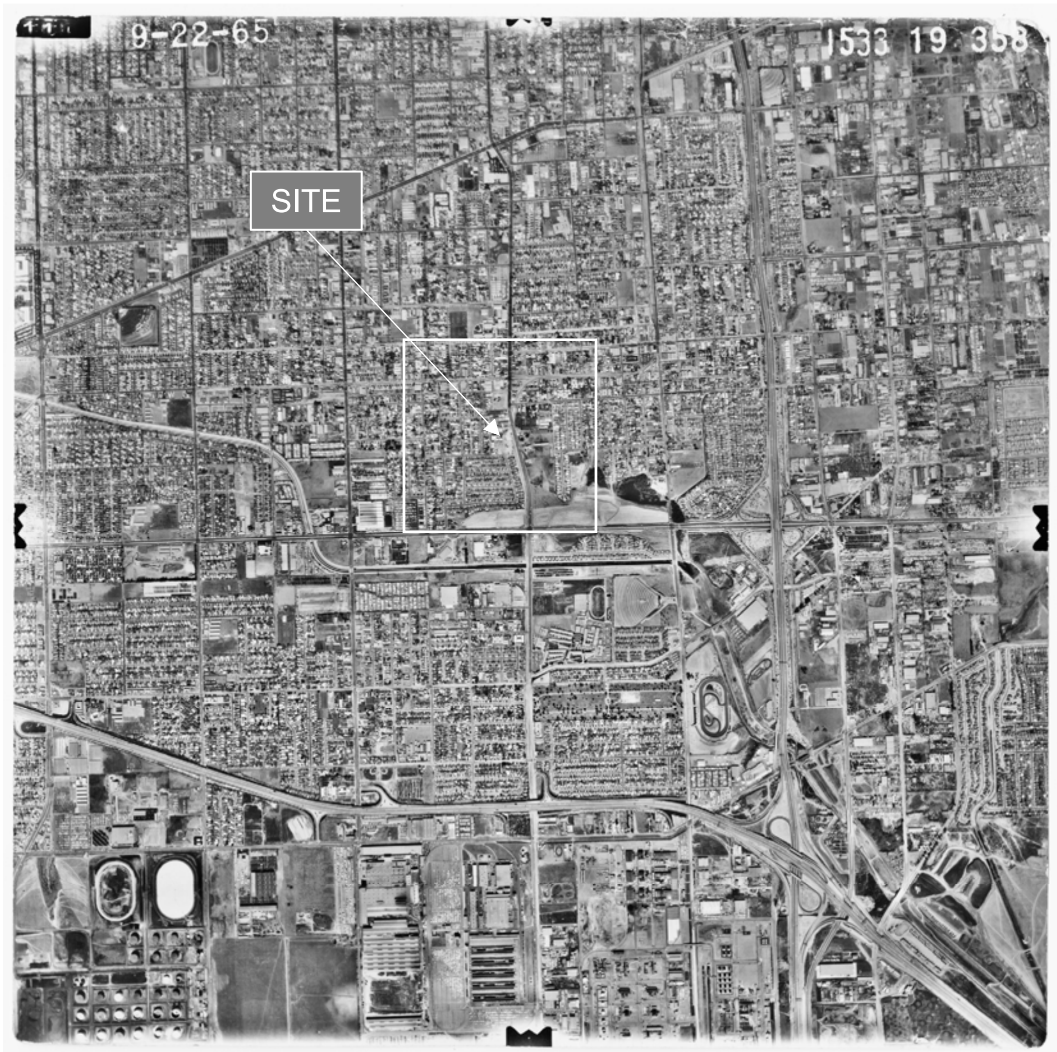
Begin date:	1962-10-01
End date:	1962-11-30
Scale:	1:12,000
Overlap:	40%
Sidelap:	20%
Film type:	Copy
Spectral range:	400-700nm
Generation held:	2nd generation

Note: Imagery acquired from Whittier College, January 2013.	
Physical Details:	black and white; paper prints; negative transparencies; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	Los Angeles Department of Water and Power
Acquired from:	Teledyne, Inc.; Whittier College
Est. frame count:	358



Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971	
Hamilton & Associates	Plate No: H-13	Date: October 2021

HISTORICAL AERIAL IMAGE 1965



Imagery Report: Flight C-25019

Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles
Filed by (catalog):	C-25019
Filed by (collection):	C-25019
Imagery Location:	Map Room--Utility Shelves Room 2552
Index type:	smartindex
Index scale:	1:100,000
Size:	frames 9 x 9 inches
Height:	9
Width:	9

Begin date:	1965-09-22
End date:	1965-11-28
Scale:	1:24,000
Overlap:	60%
Sidelap:	20%
Directional orientation:	East-West
Spectral range:	400-700nm
Generation held:	1st and 2nd generation

Note: Southwest region of the county. Imagery acquired 1986.	
Physical Details:	black and white; paper prints; negative transparencies; film roll; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Acquired from:	Teledyne Inc.
Est. frame count:	489

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California

Project No: 21-2971

Hamilton & Associates

Plate No: H-14

Date: October 2021

HISTORICAL AERIAL IMAGE 1971

Imagery Report: Flight TG-2755

Digital

View Index

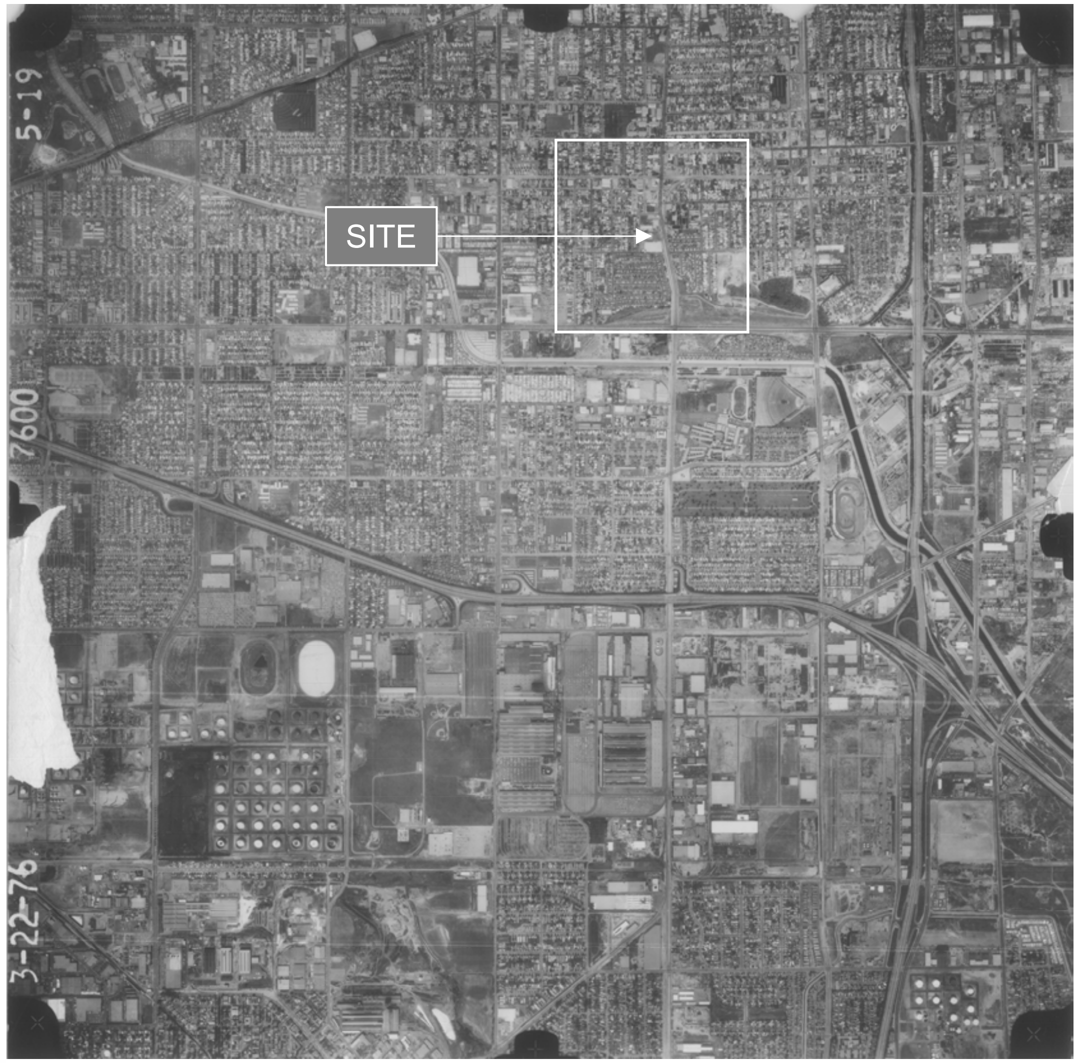
Country:	United States
State(s):	California
Counties:	California: Los Angeles
Filed by (catalog):	TG-2755
Filed by (collection):	TG-2755
Imagery Location:	Map Room--Utility Shelves Off-site storage--Iron Mountain
Index type:	line
Index scale:	1:62,500
Size:	frames 9 x 9 inches
Height:	9
Width:	9

Begin date:	1971-03-01
End date:	1971-04-30
Scale:	1:10,440
Overlap:	60%
Sidelap:	20%
Directional orientation:	Various
Altitude:	5,220
Lens focal length:	6 inches
Generation held:	1st and 2nd generations

Note: Index states flight is color infrared; negatives and prints held in MIL's collection are black and white.	
Physical Details:	black and white; paper prints; negative transparencies; film roll; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Teledyne Geotronics
Contractor/requestor:	Remote Sensing Community Analysis Bureau, City of Los Angeles
Acquired from:	Teledyne, Inc.
Est. frame count:	1199

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971
Hamilton & Associates	Plate No: H-15 / Date: October 2021

HISTORICAL AERIAL IMAGE 1976



Imagery Report: Flight TG-7600
Digital
View Index

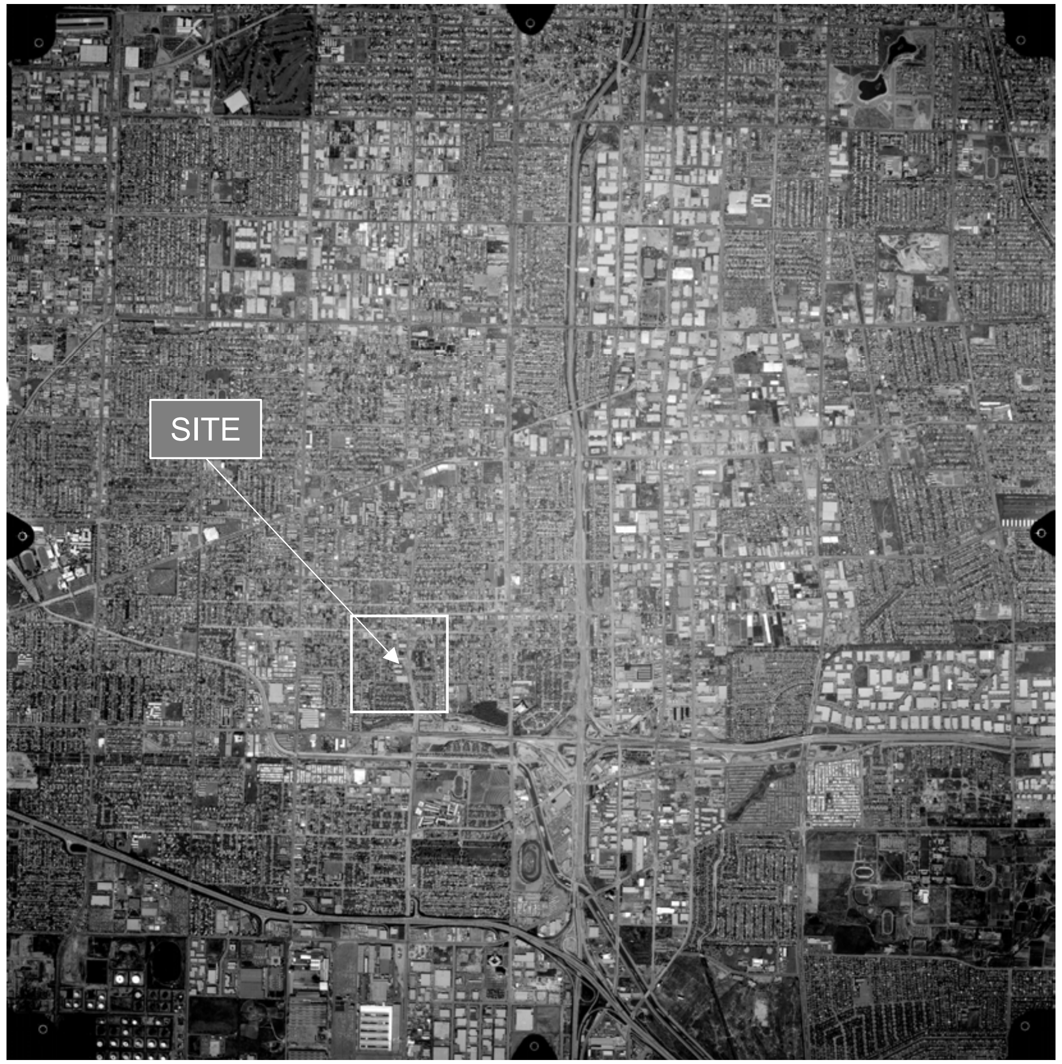
Country:	United States
State(s):	California
Counties:	California: Los Angeles, Orange, San Bernardino, Ventura
Filed by (catalog):	TG-7600
Filed by (collection):	TG-7600
Imagery Location:	Map Room--Utility Shelves Off-site storage--Iron Mountain Room 2552
Index type:	mosaic
Index scale:	1:96,000
Size:	frames 9 X 9 inches

Begin date:	1976-02-01
End date:	1976-04-30
Scale:	1:24,000
Overlap:	60%
Sidelap:	20%
Directional orientation:	East-West
Altitude:	12,000
Lens focal length:	6 inches (152.4mm)
Generation held:	1st and 2nd generations

Note: South Los Angeles County; LA Basin, San Fernando Valley, and Santa Clarita Valley to Castaic Lake. Coverage extends into Orange, San Bernardino, and Ventura counties.	
Physical Details:	black and white; paper prints; negative transparencies; film roll; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Teledyne Geotronics
Acquired from:	Teledyne, Inc.
Est. frame count:	780

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971	
Hamilton & Associates	Plate No: H-16	Date: October 2021

HISTORICAL AERIAL IMAGE 1983



Imagery Report: Flight AMI-LA-83

Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles
Filed by (catalog):	AMI-LA-83
Filed by (collection):	AMI-LA-83
Imagery Location:	Room 2552
Index type:	line, SmartIndex
Index scale:	1:245,000
Size:	frames 9 x 9 inches
Height:	9
Width:	9

Begin date:	1983-04-14
End date:	1983-06-18
Scale:	1:36,000
Overlap:	50%
Sidelap:	20%
Altitude:	18,000
Lens focal length:	6 inches (151.62mm), UAg 1027
Generation held:	1st generation

Note: Los Angeles Basin and San Fernando Valley.	
Physical Details:	black and white; negative transparencies; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Contractor/requestor:	Aerial Map Industries
Acquired from:	Landiscor Aerial Information
Est. frame count:	131

Project: 16911 Normandie Associates, LLC – 16831 & 16911 S. Normandie Avenue, Gardena, California	Project No: 21-2971	
Hamilton & Associates	Plate No: H-17	Date: October 2021

APPENDIX B

LIQUEFACTION ANALYSIS

GeoLogismiki
Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

Project title : 21-2971 16911 Normandie Associates, LLC

Location :

Overall vertical settlements report

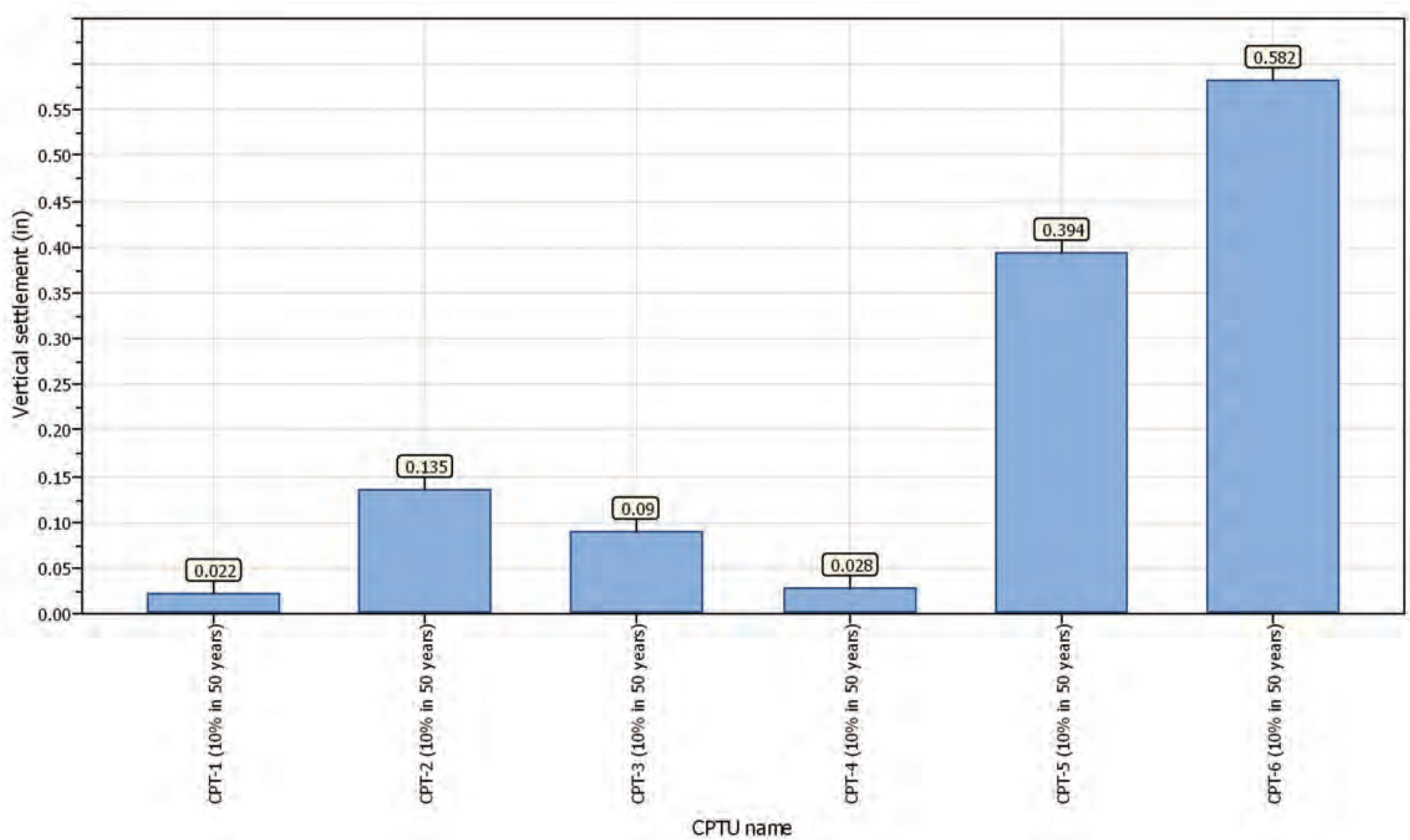


TABLE OF CONTENTS

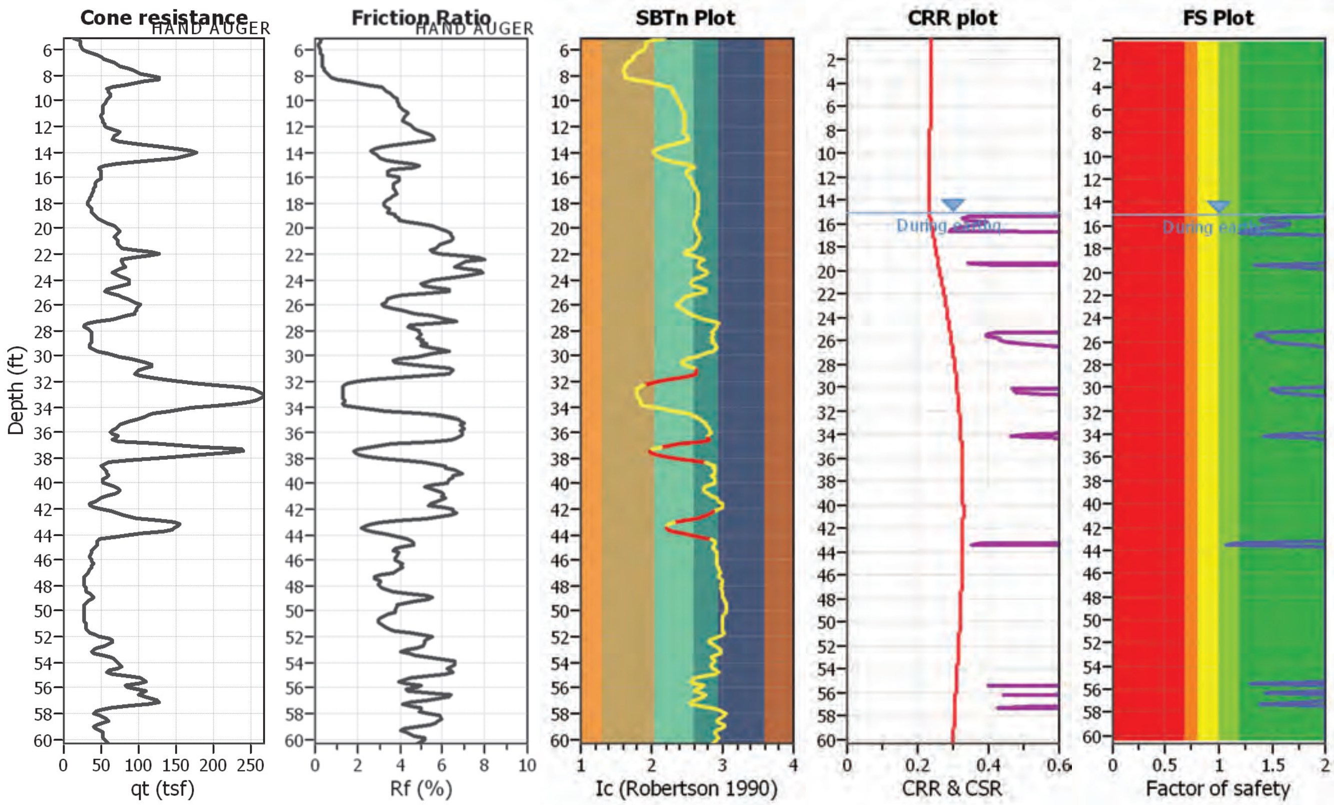
LIQUEFACTION ANALYSIS REPORT

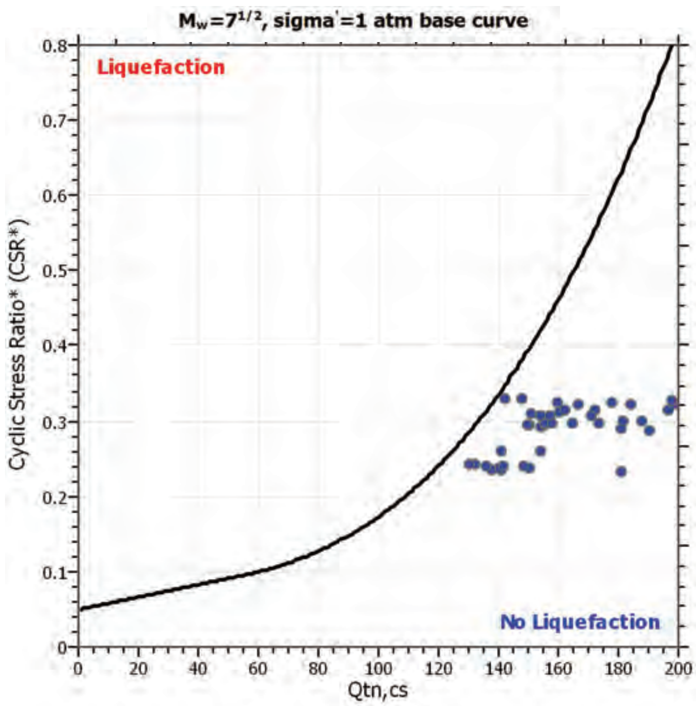
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

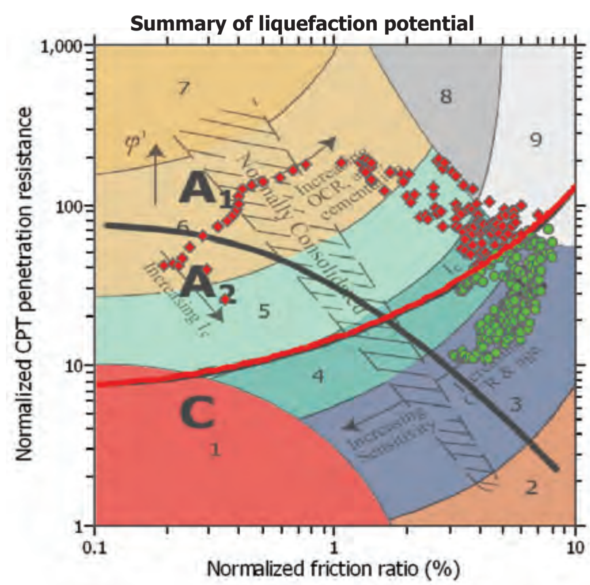
CPT file : CPT-1 (10% in 50 years)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.46	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

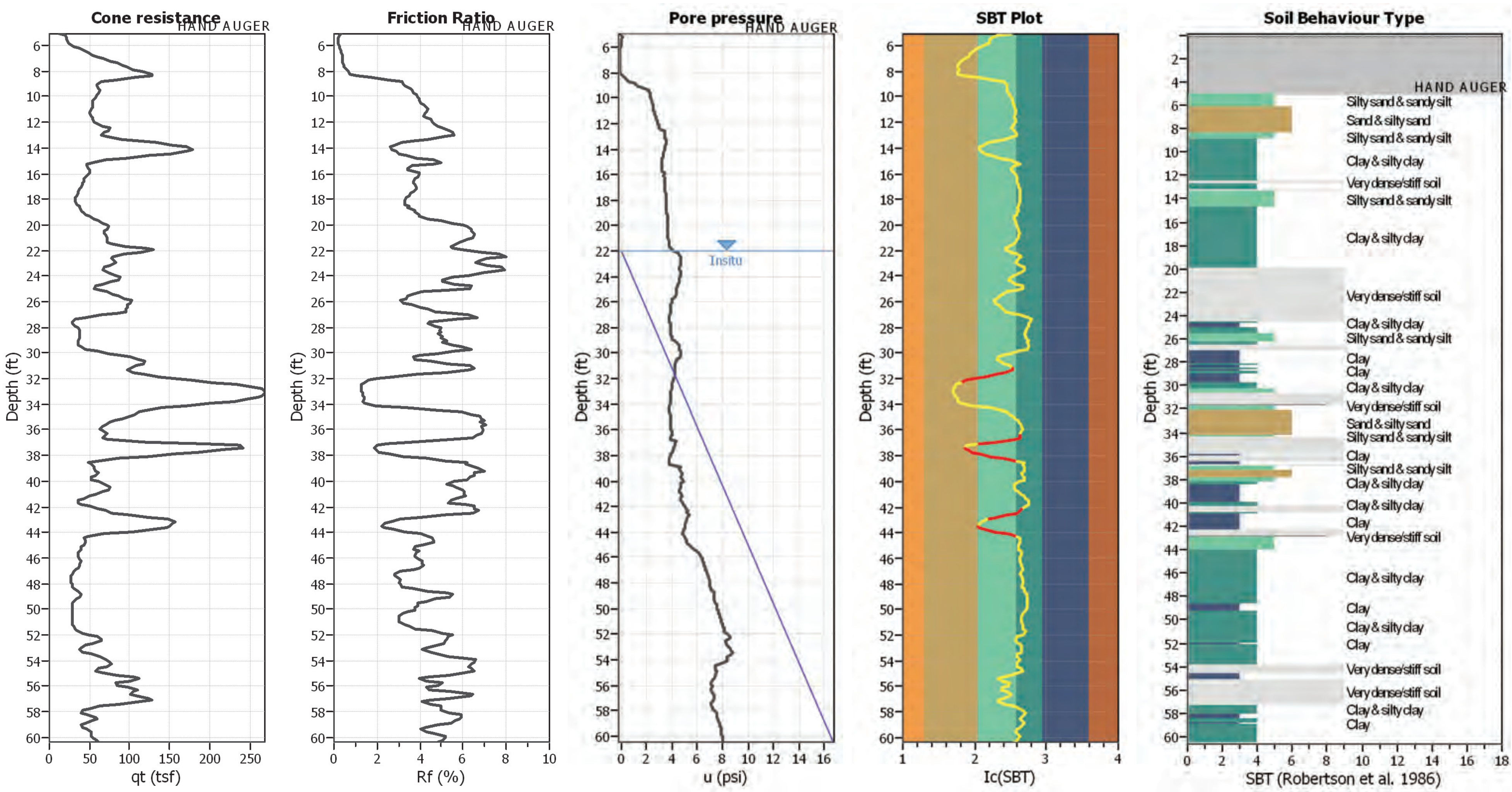






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



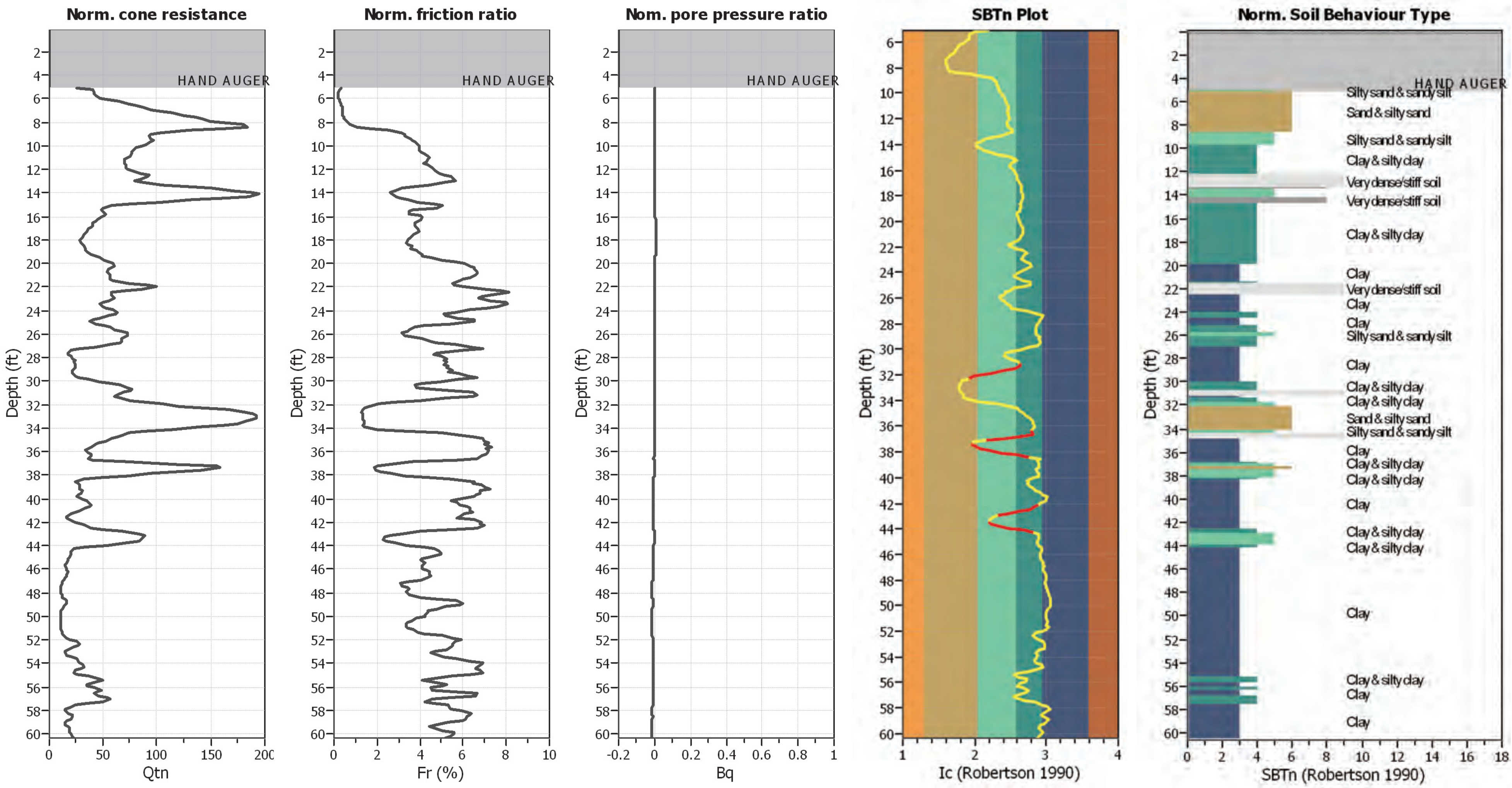
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



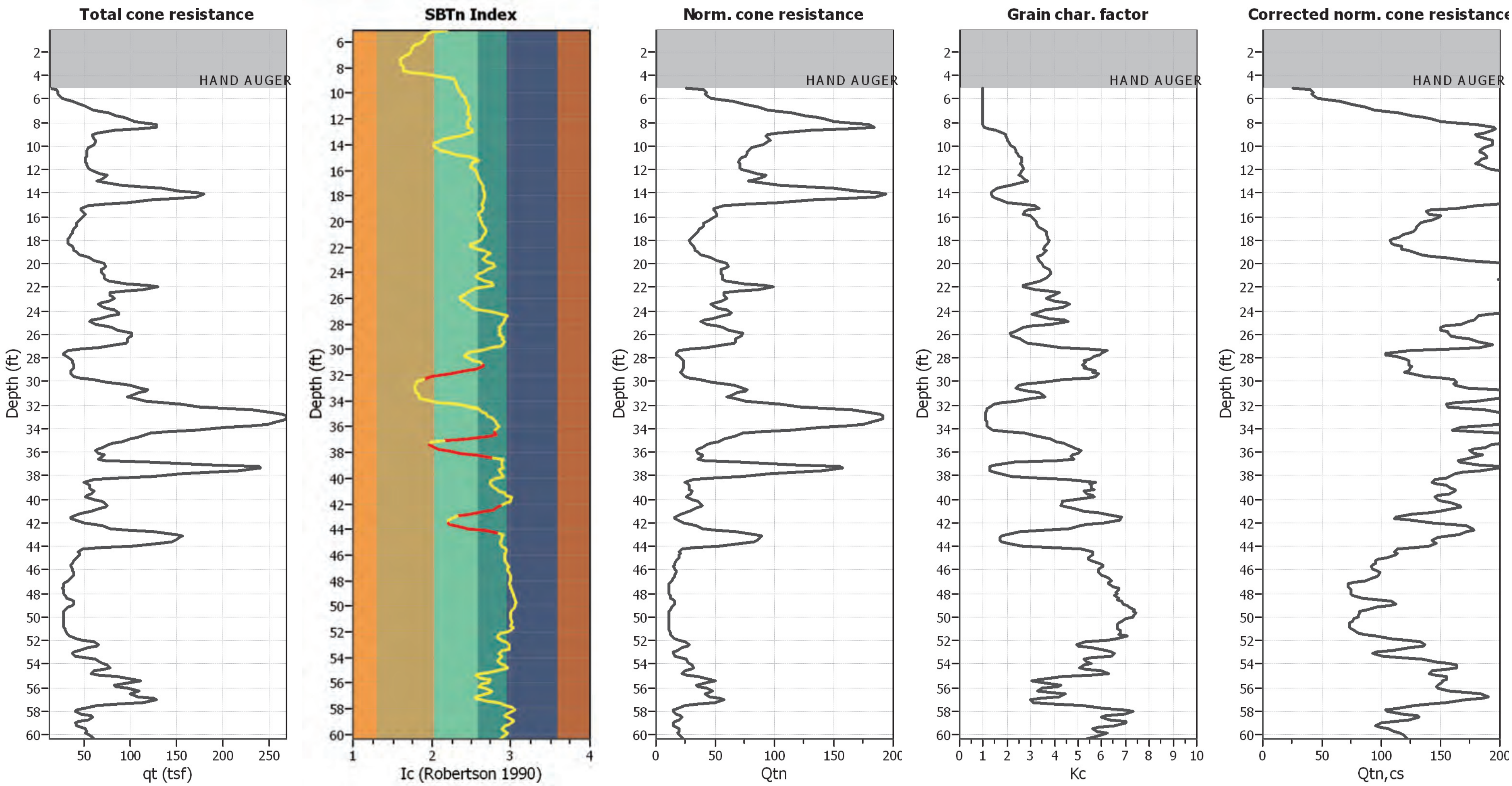
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

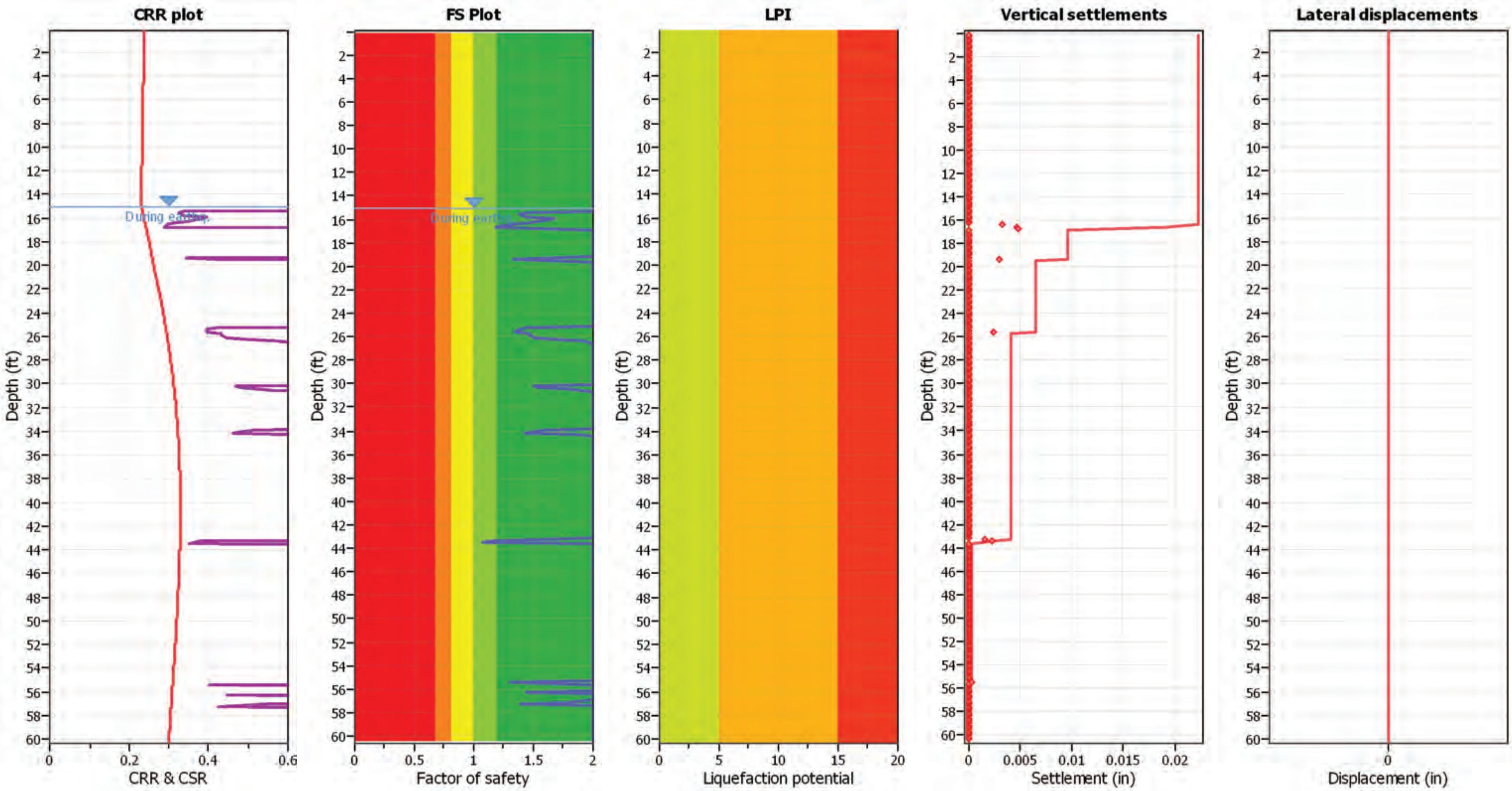
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

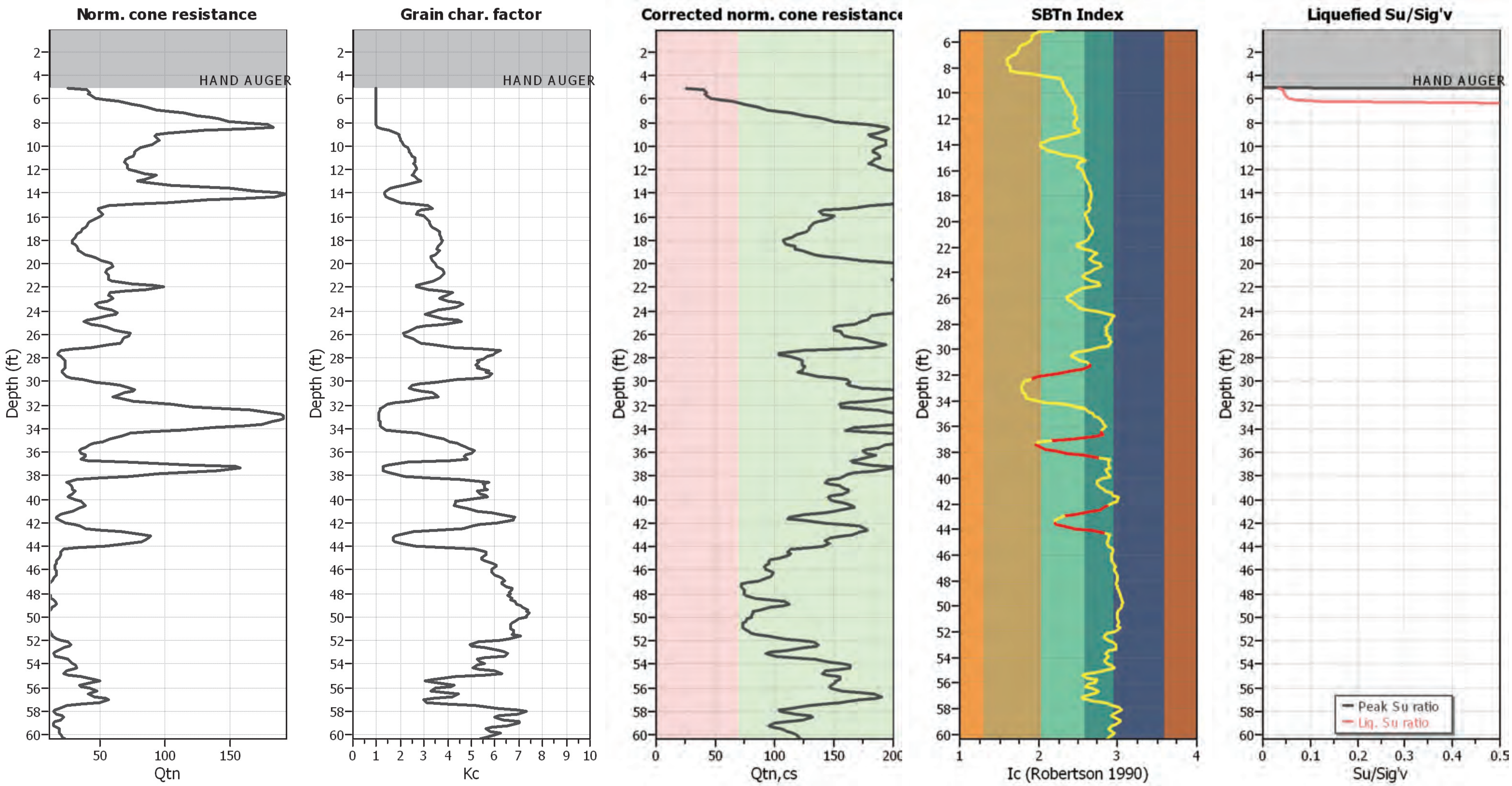
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

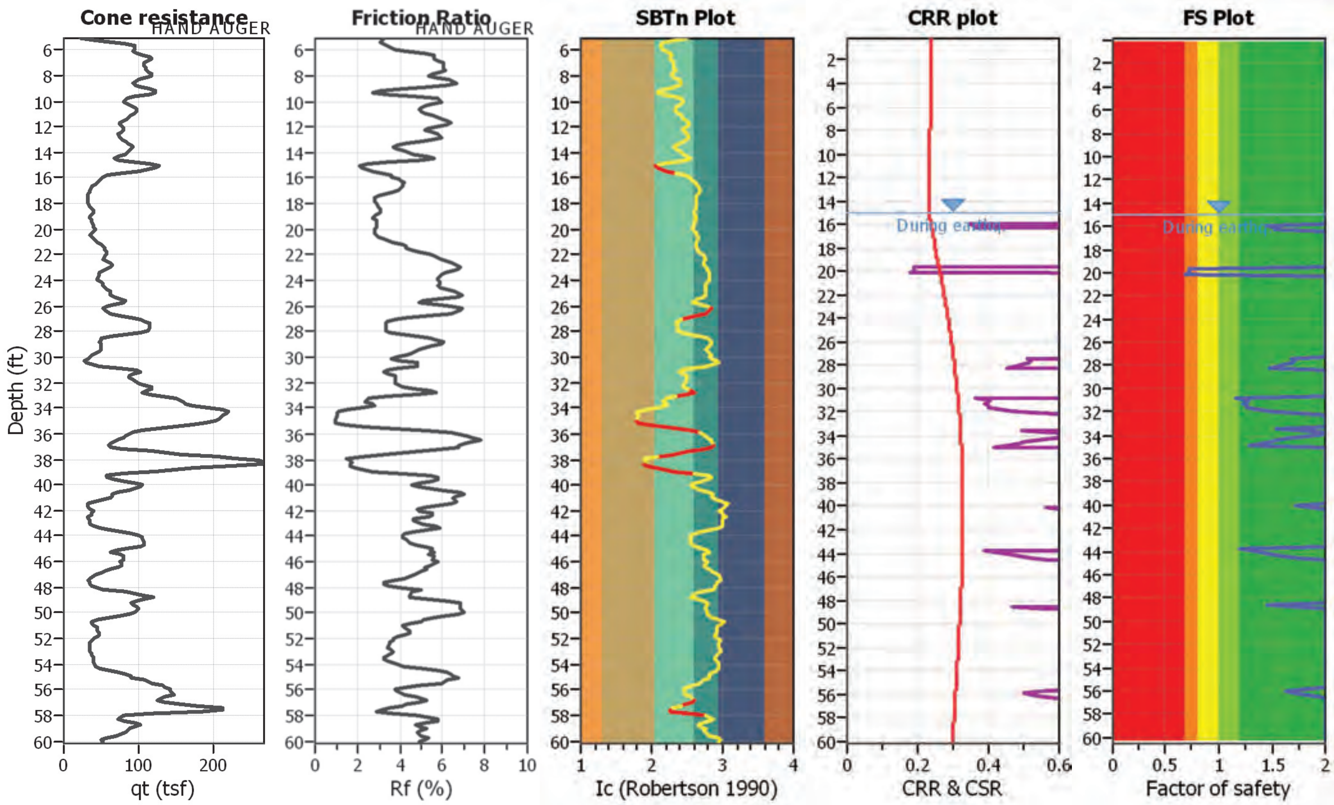
LIQUEFACTION ANALYSIS REPORT

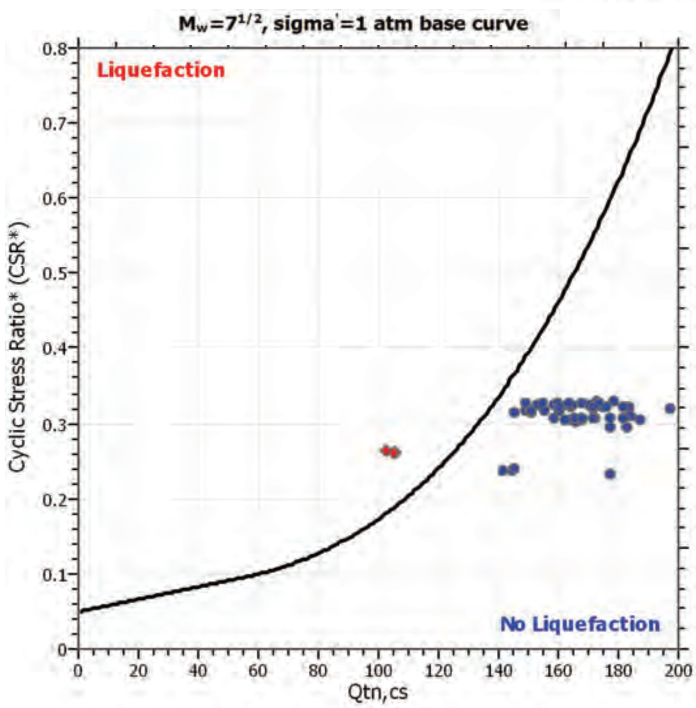
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

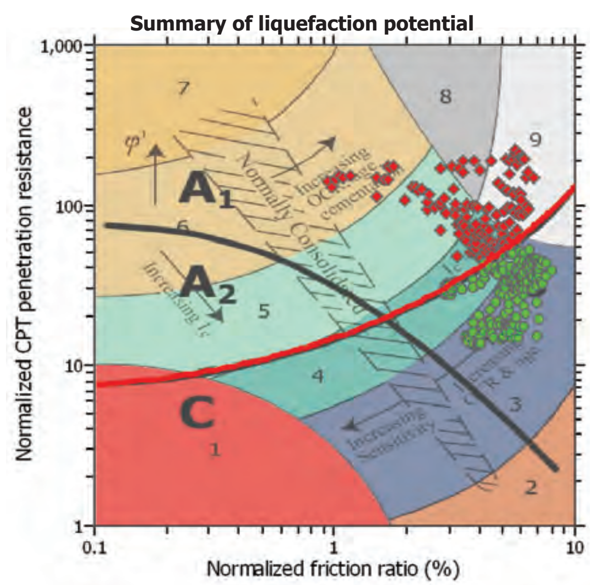
CPT file : CPT-2 (10% in 50 years)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.46	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

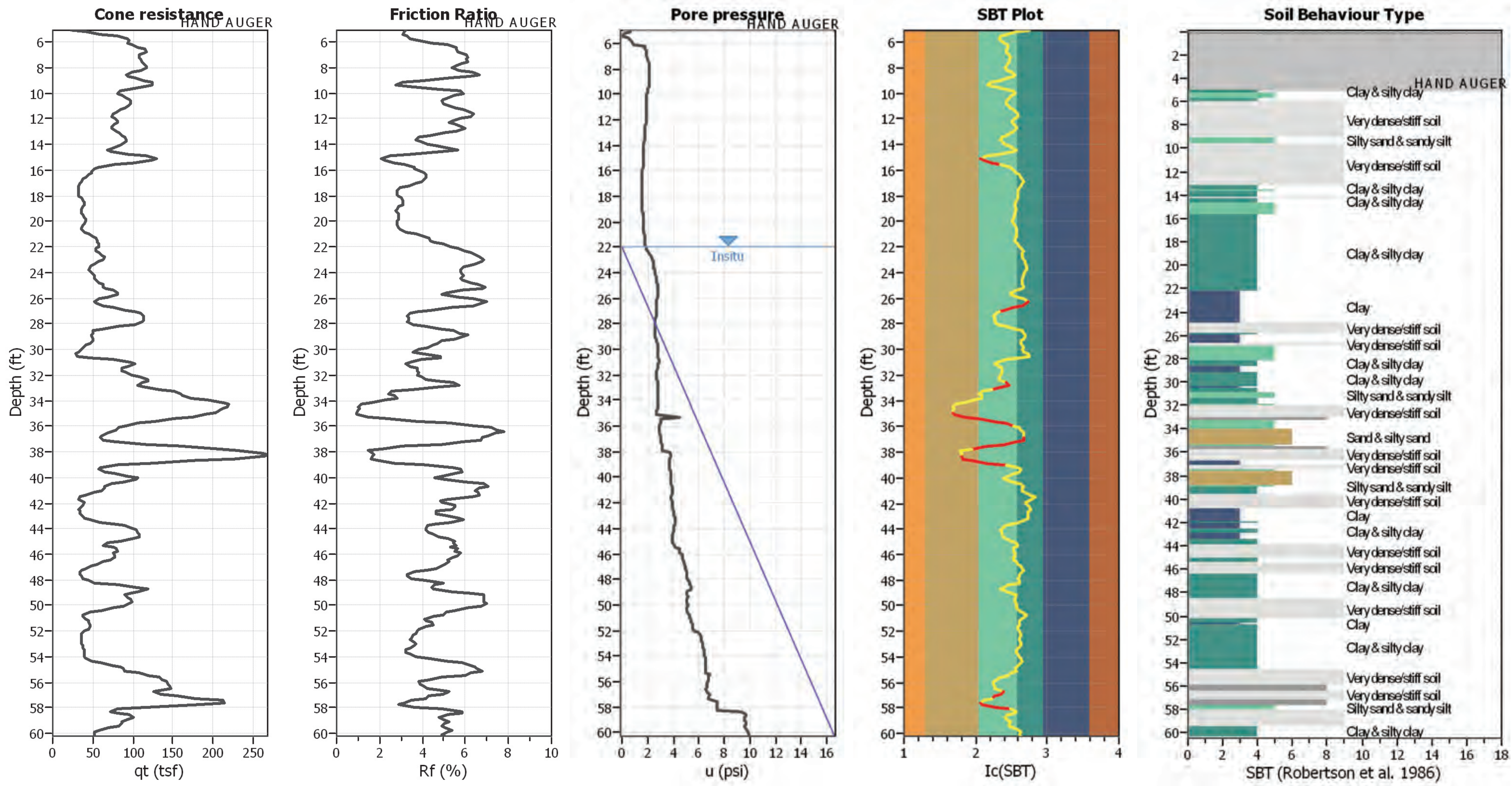






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



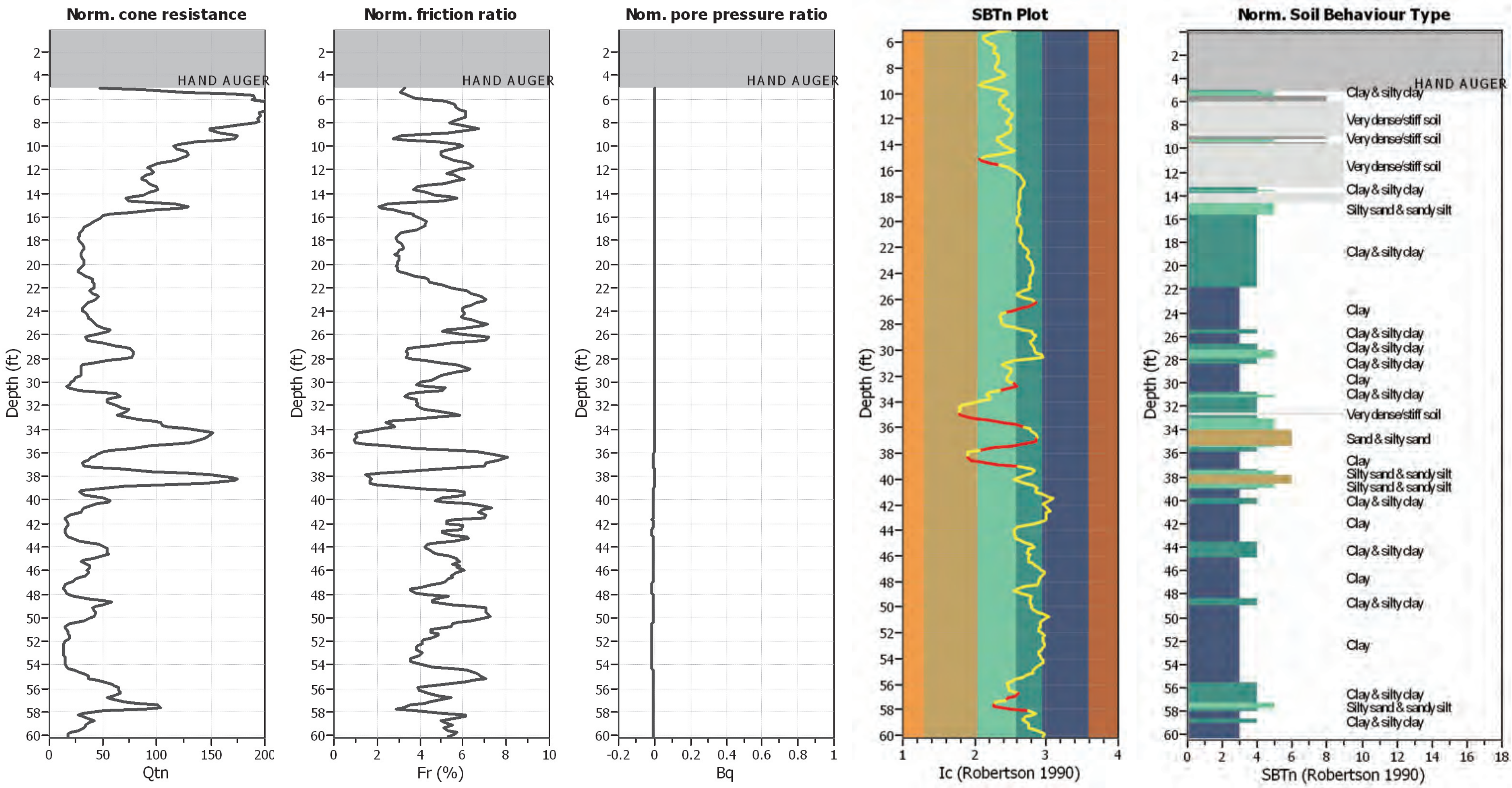
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



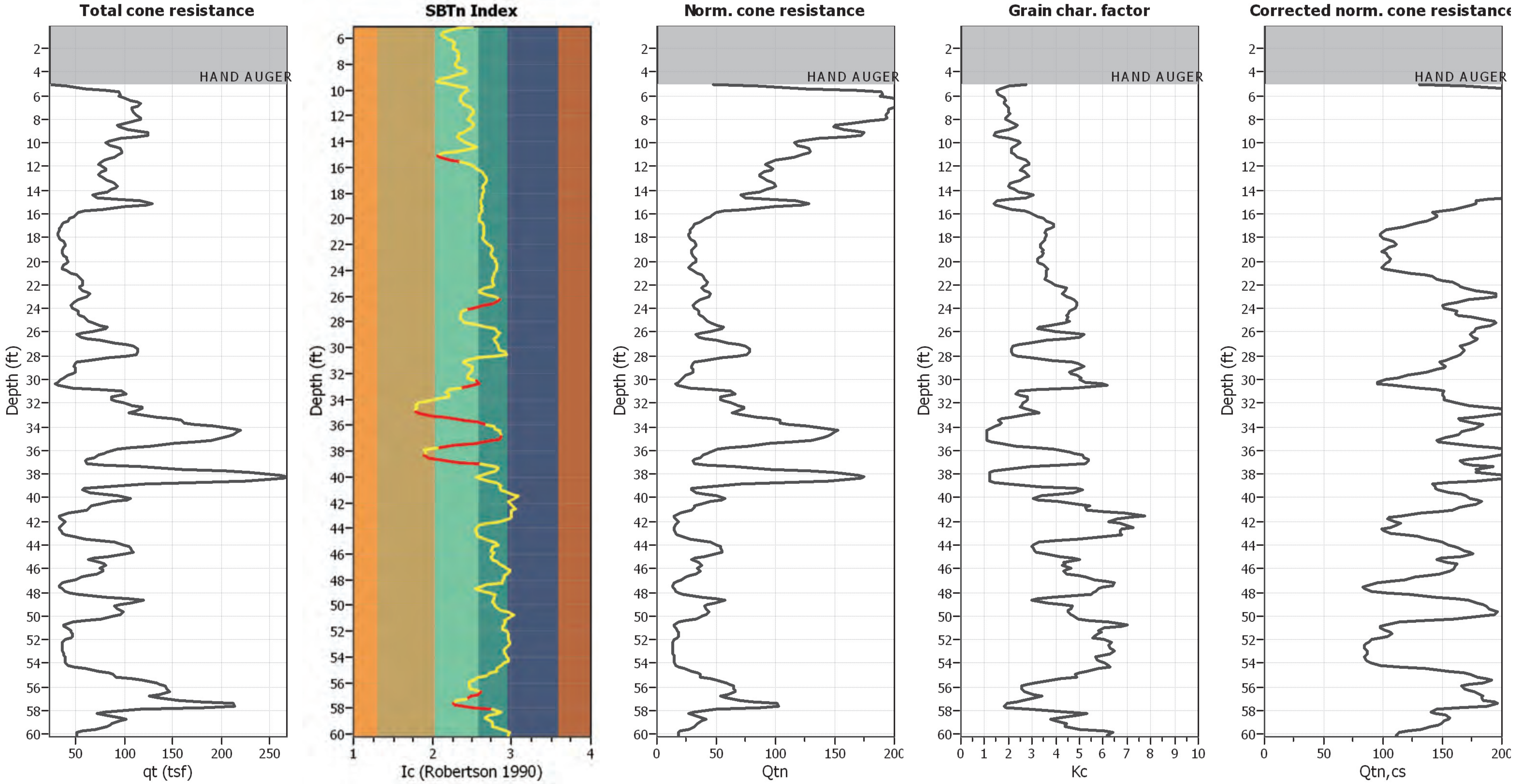
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

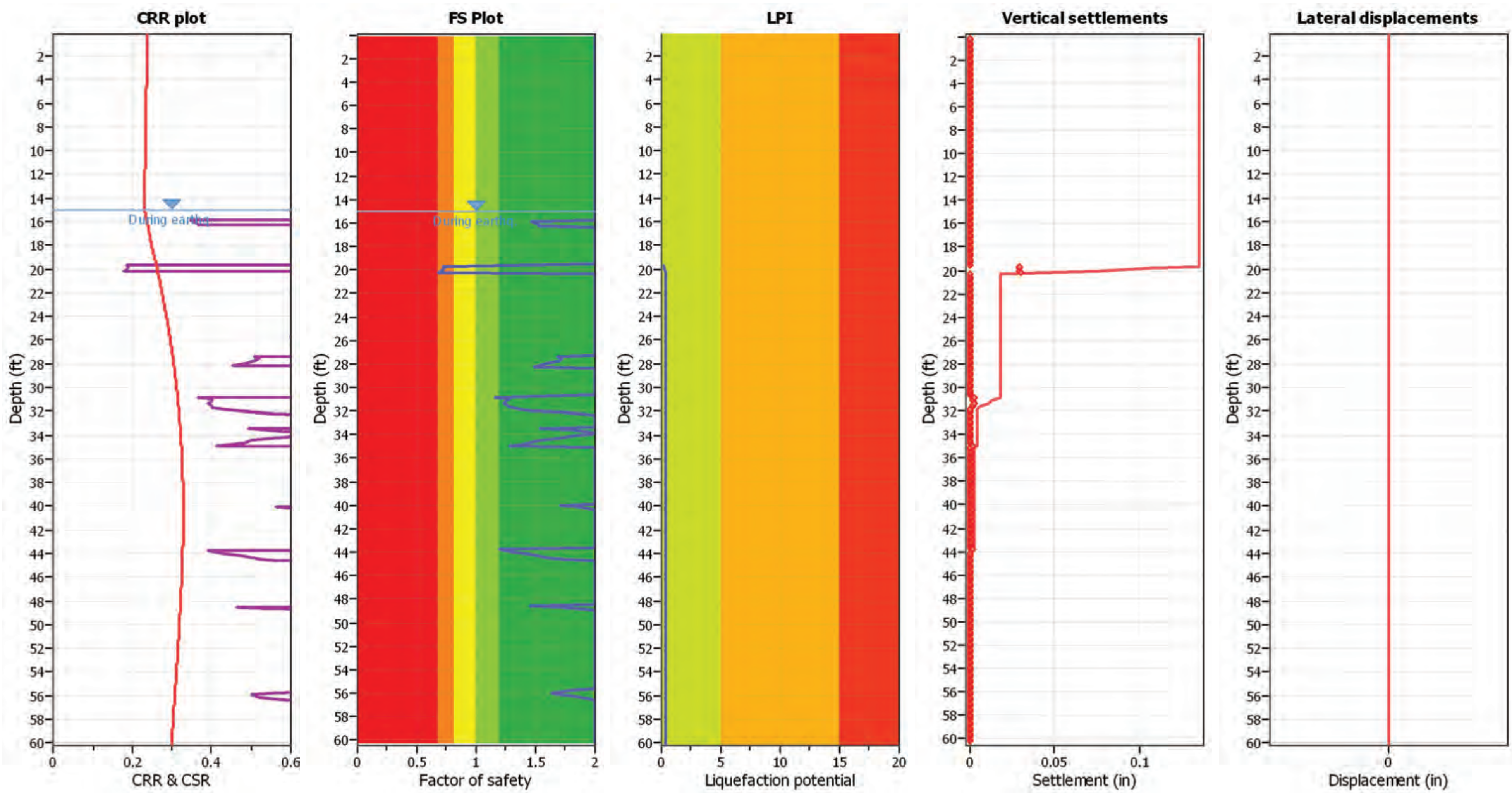
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

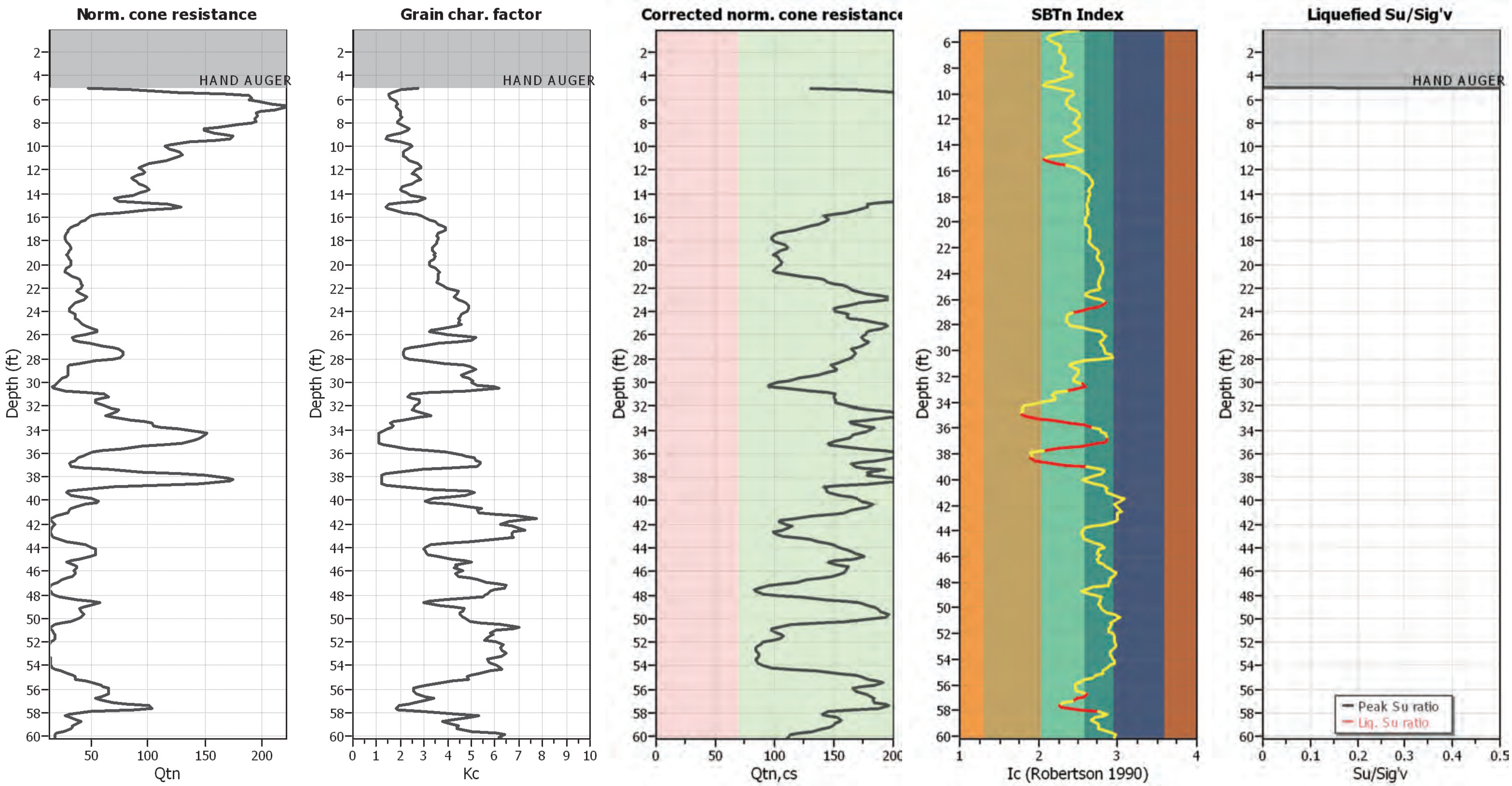
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

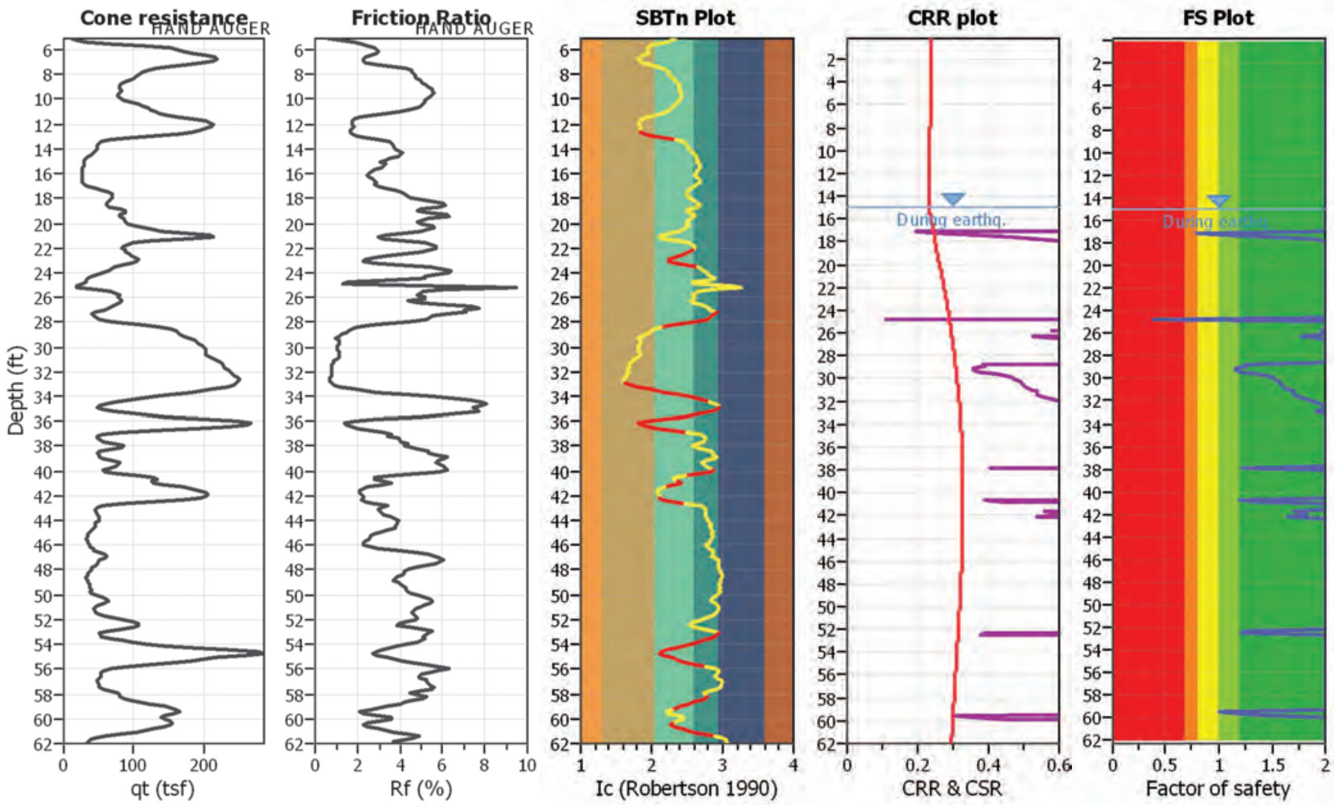
LIQUEFACTION ANALYSIS REPORT

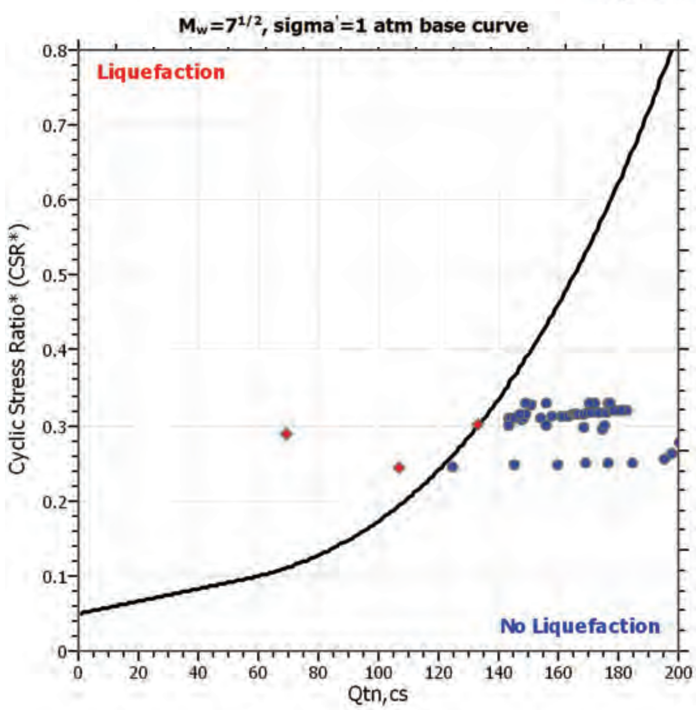
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

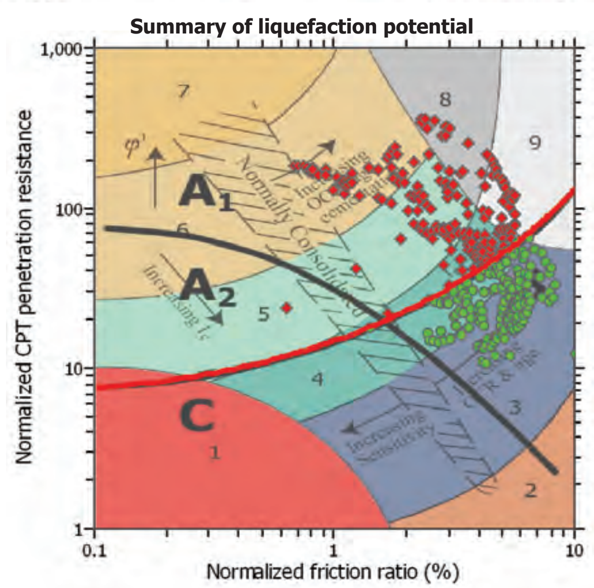
CPT file : CPT-3 (10% in 50 years)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.46	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

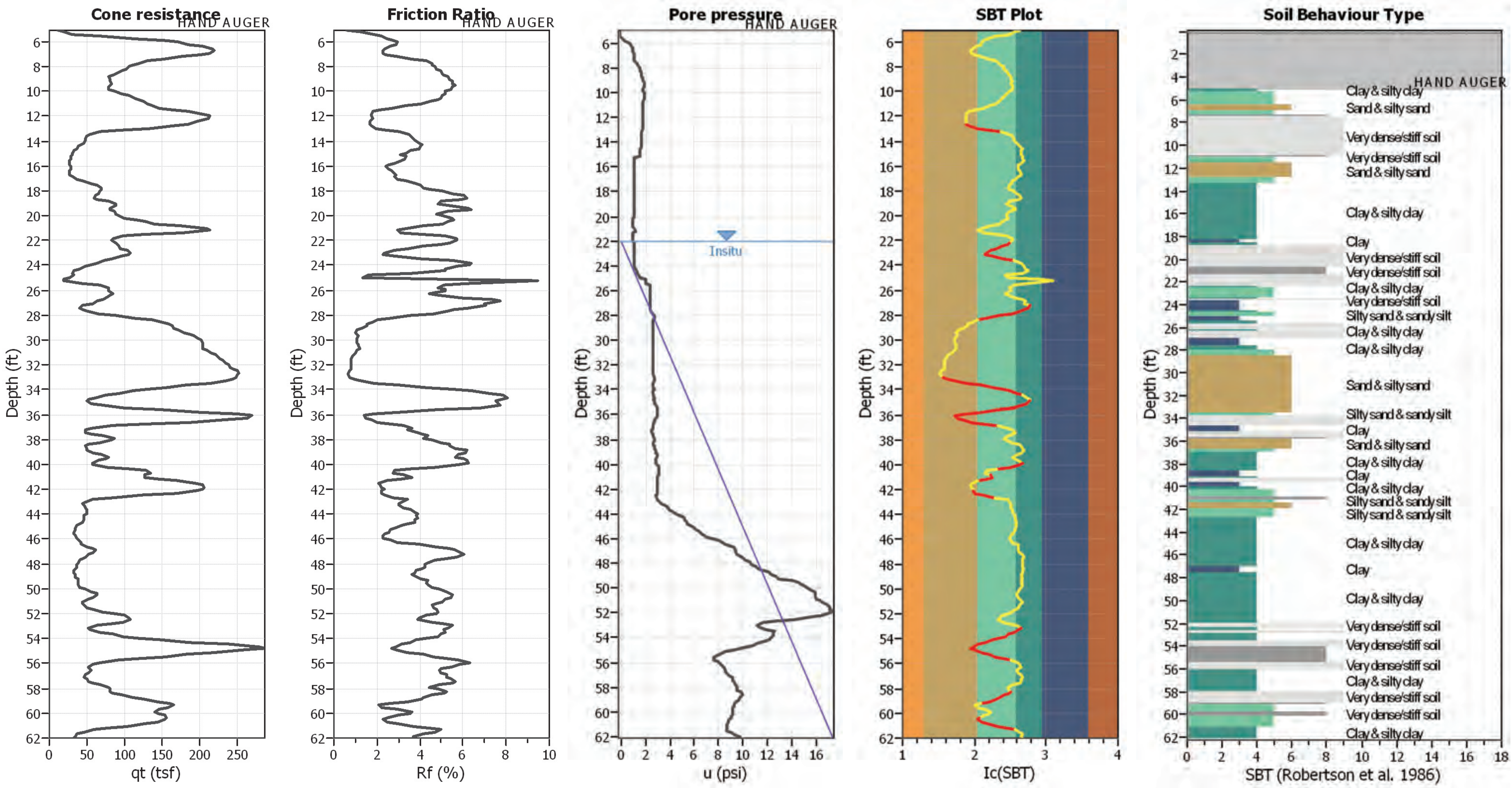






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



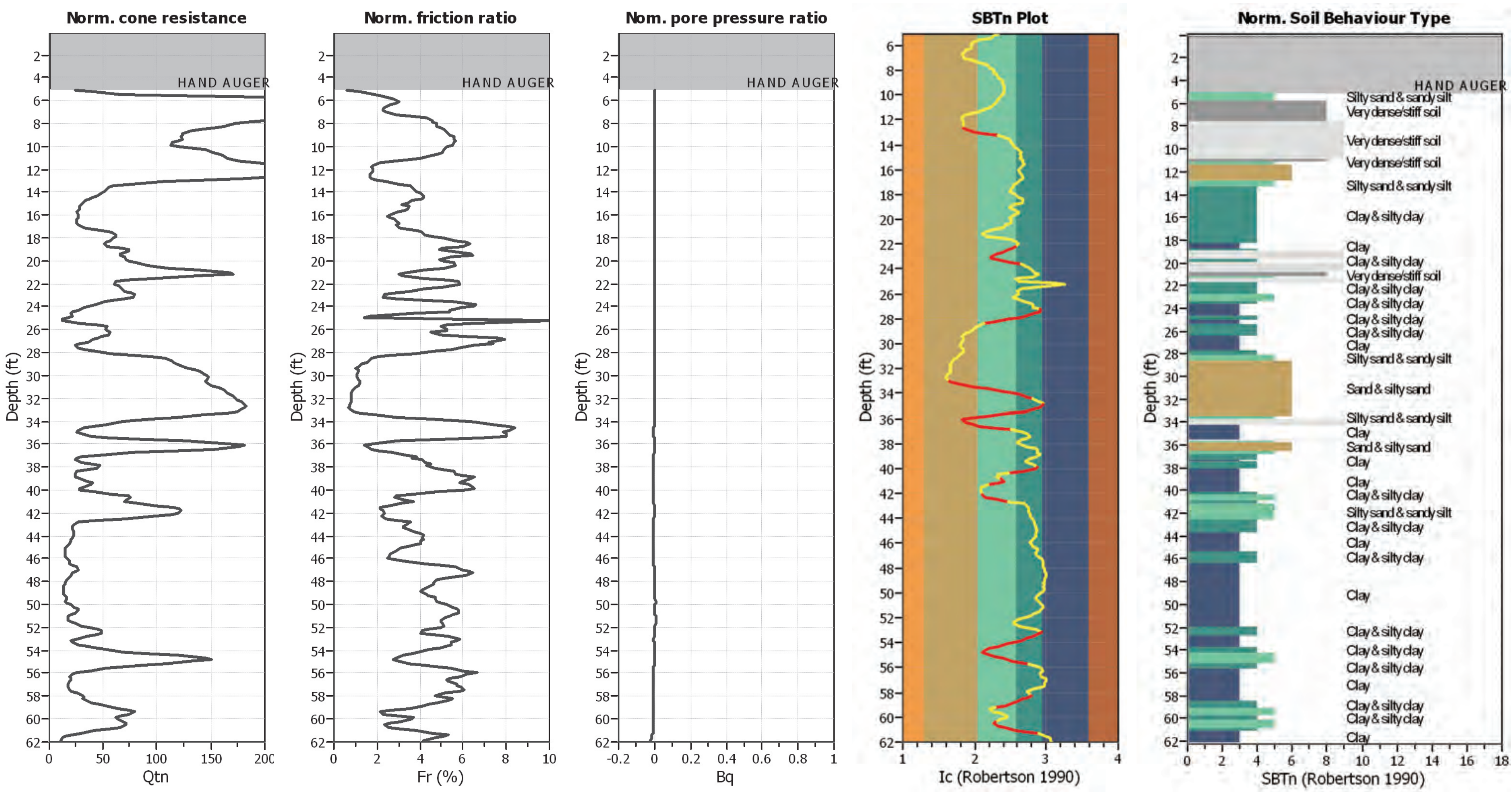
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



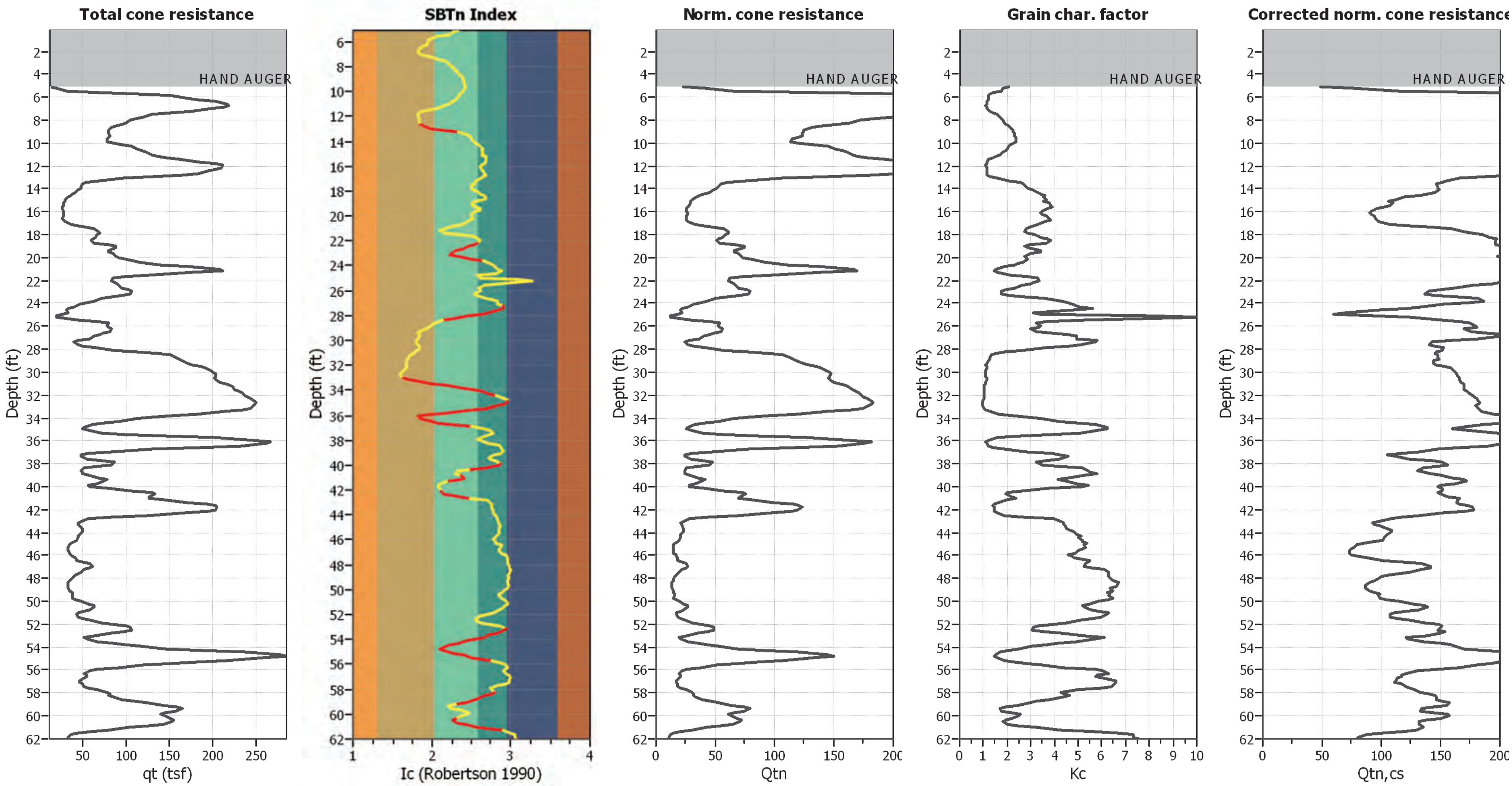
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

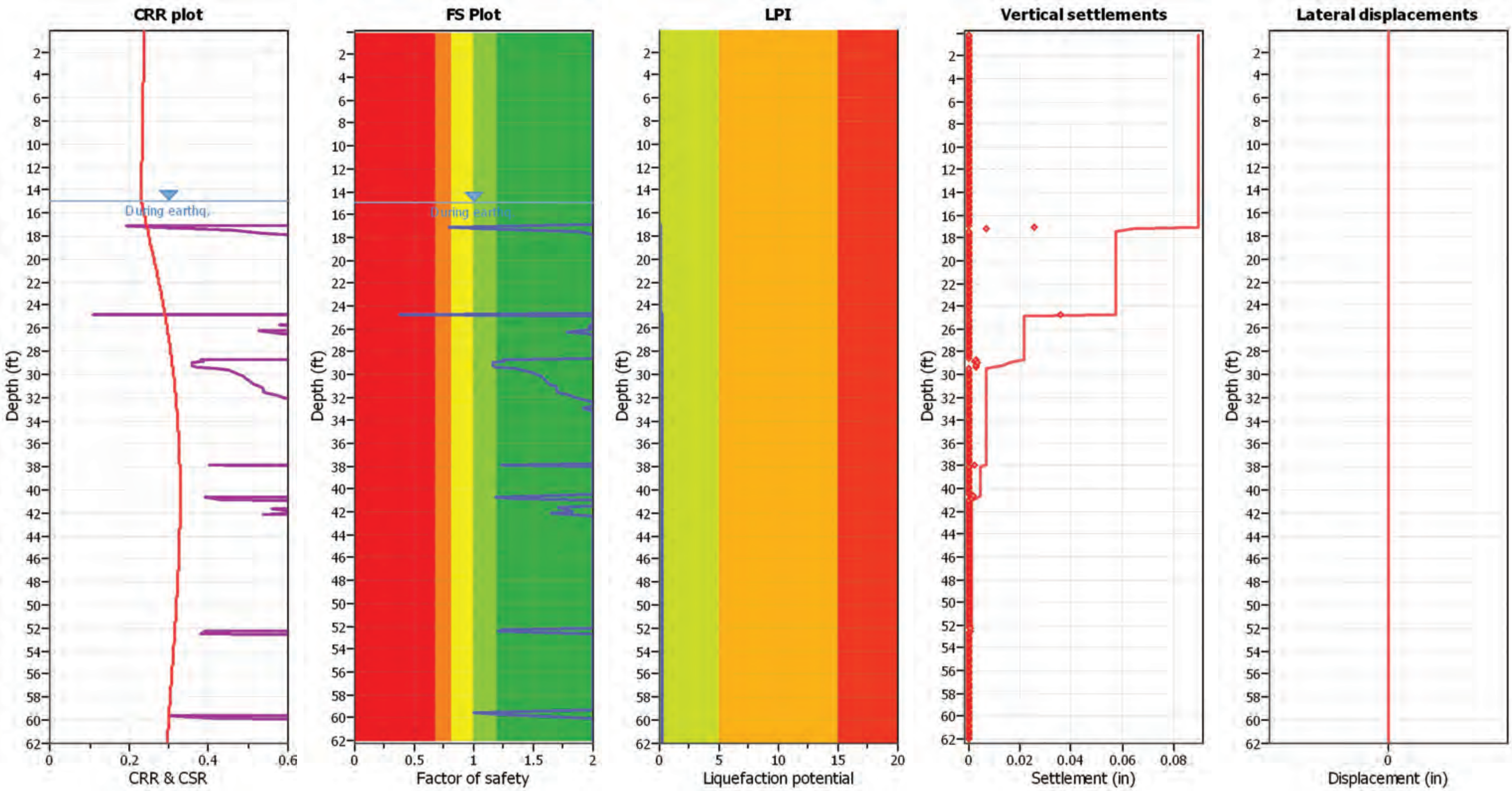
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

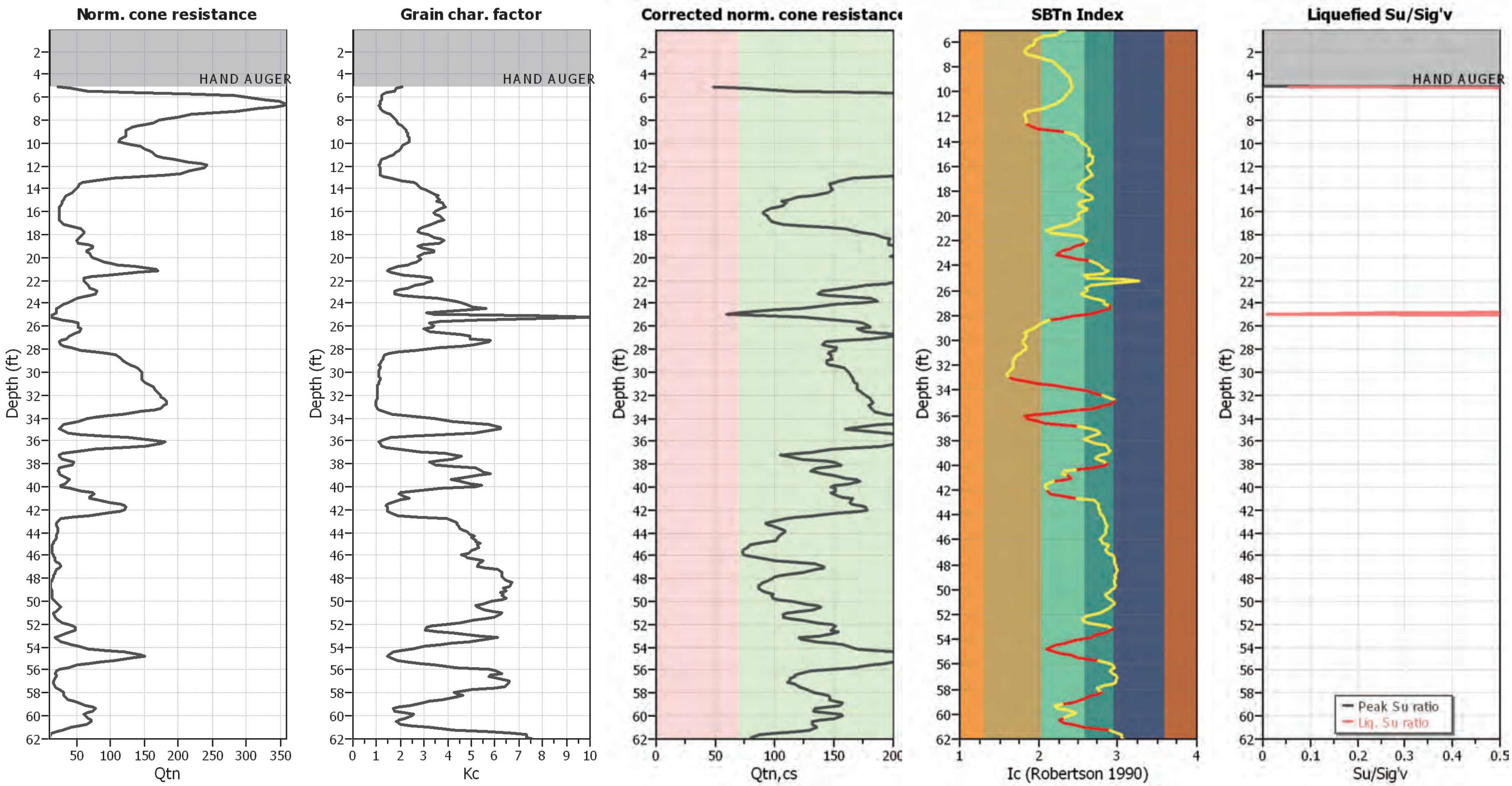
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

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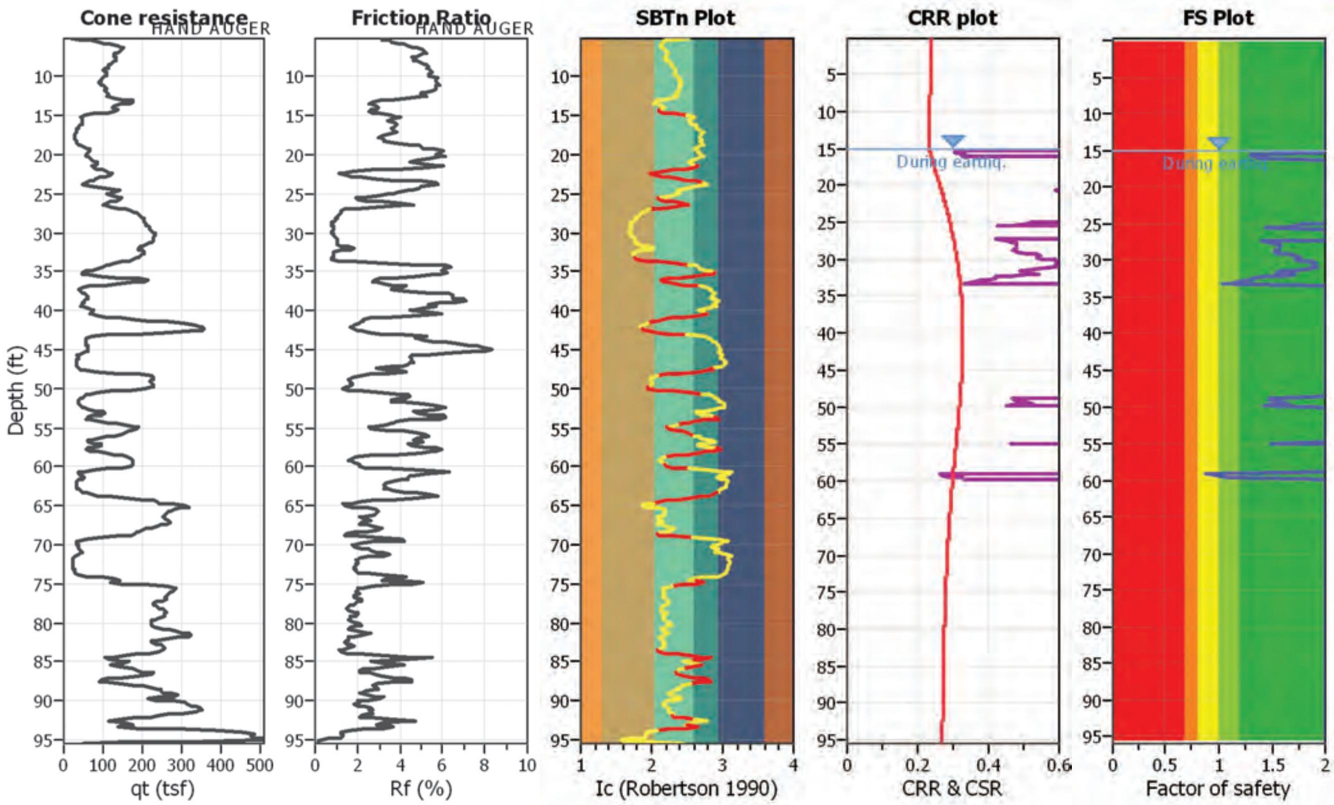
LIQUEFACTION ANALYSIS REPORT

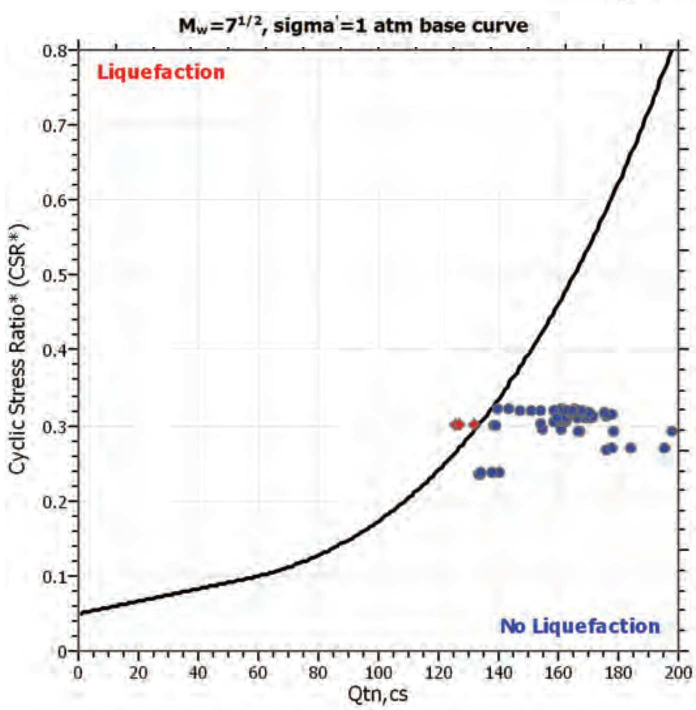
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

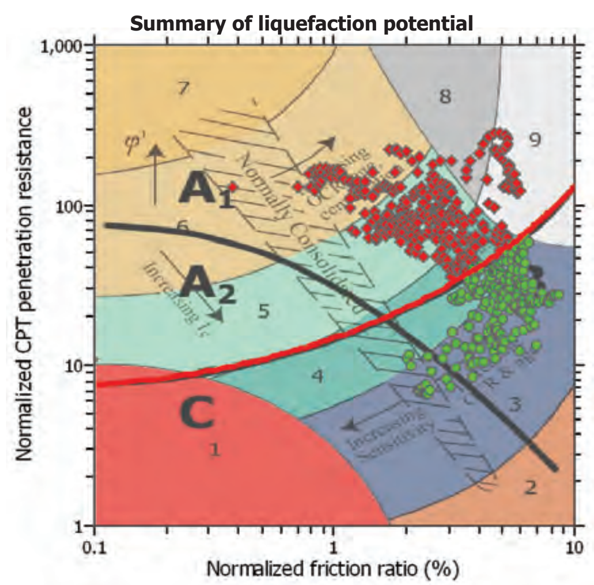
CPT file : CPT-4 (10% in 50 years)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.46	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

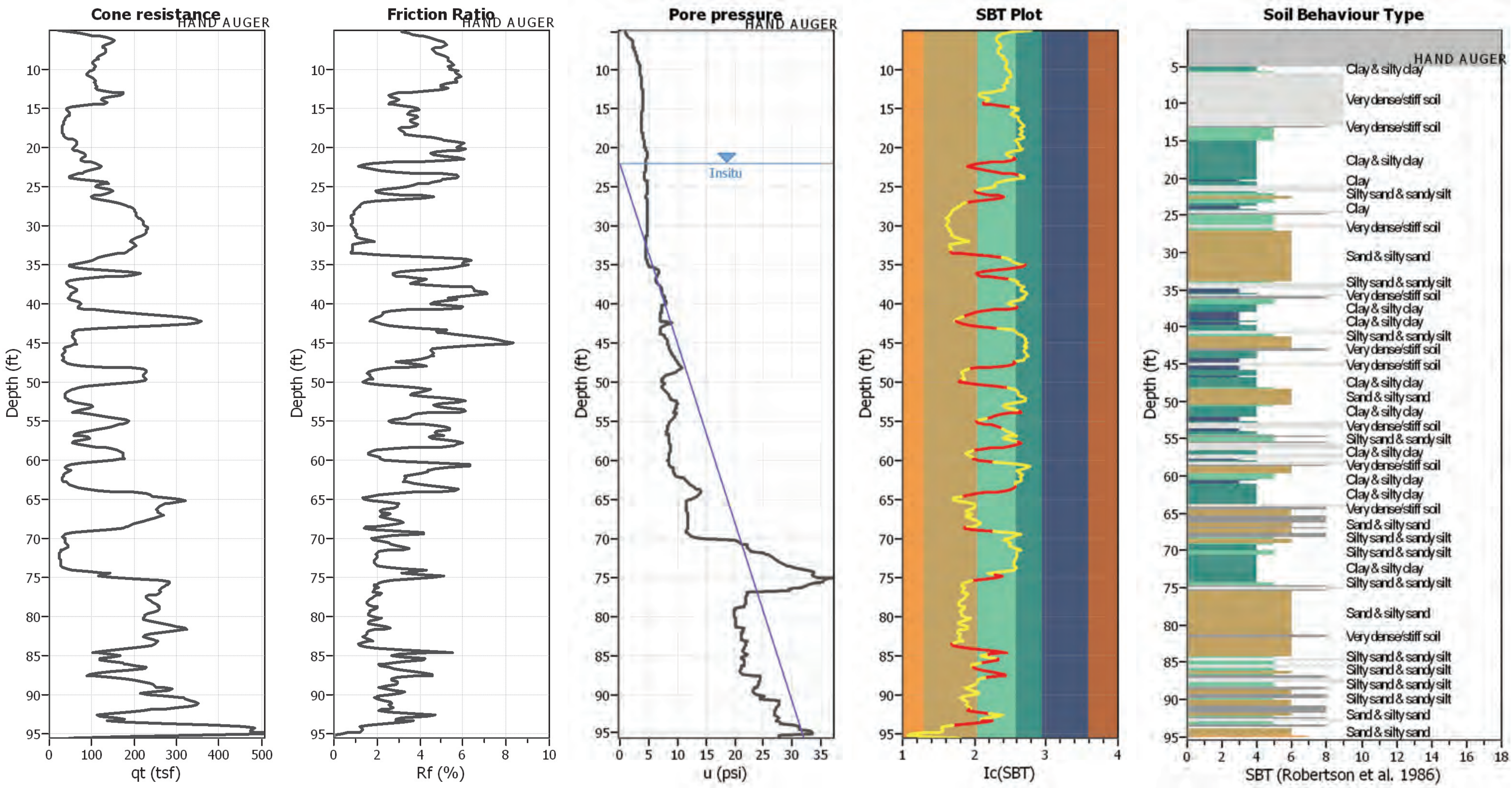






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



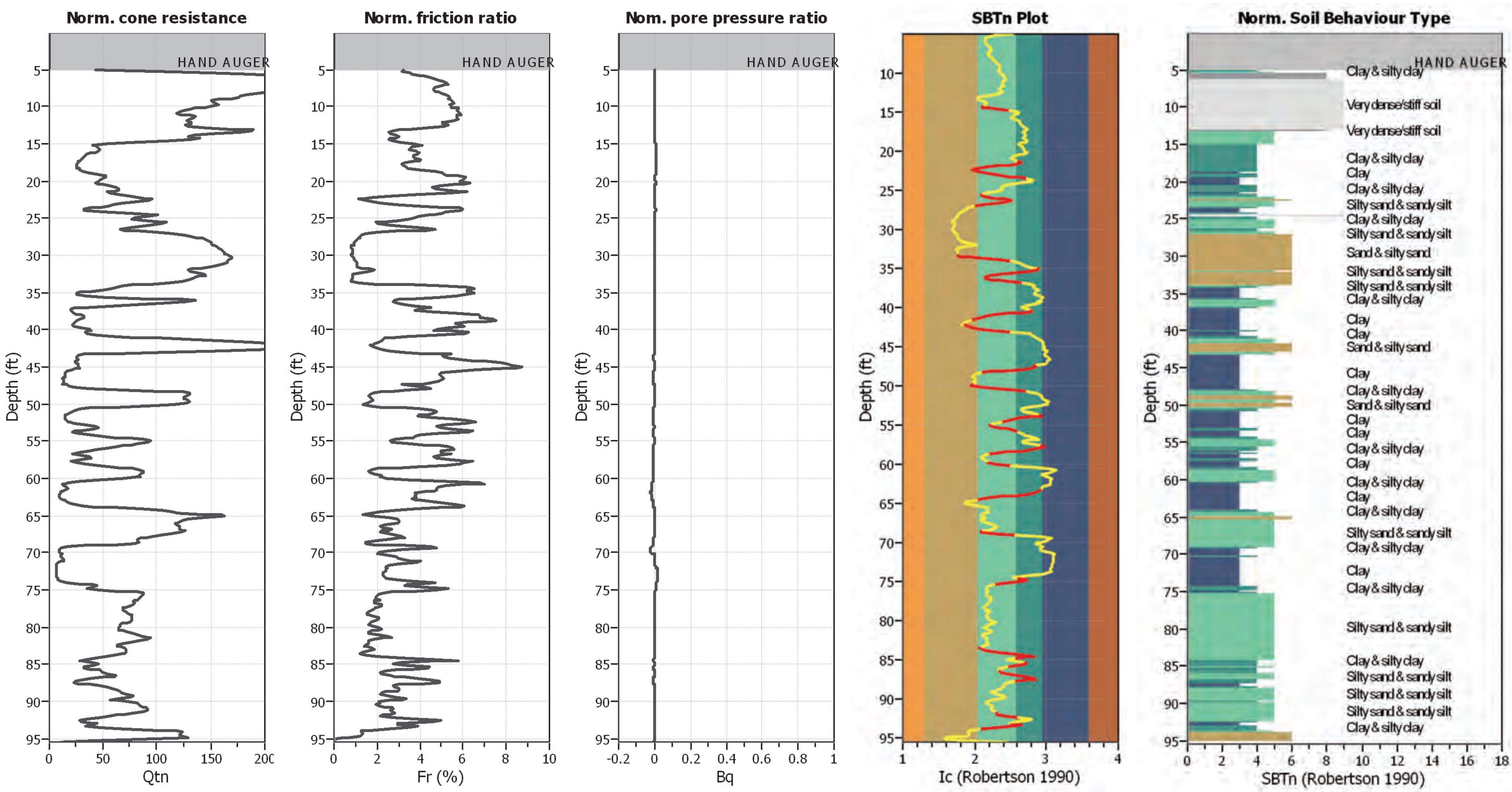
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



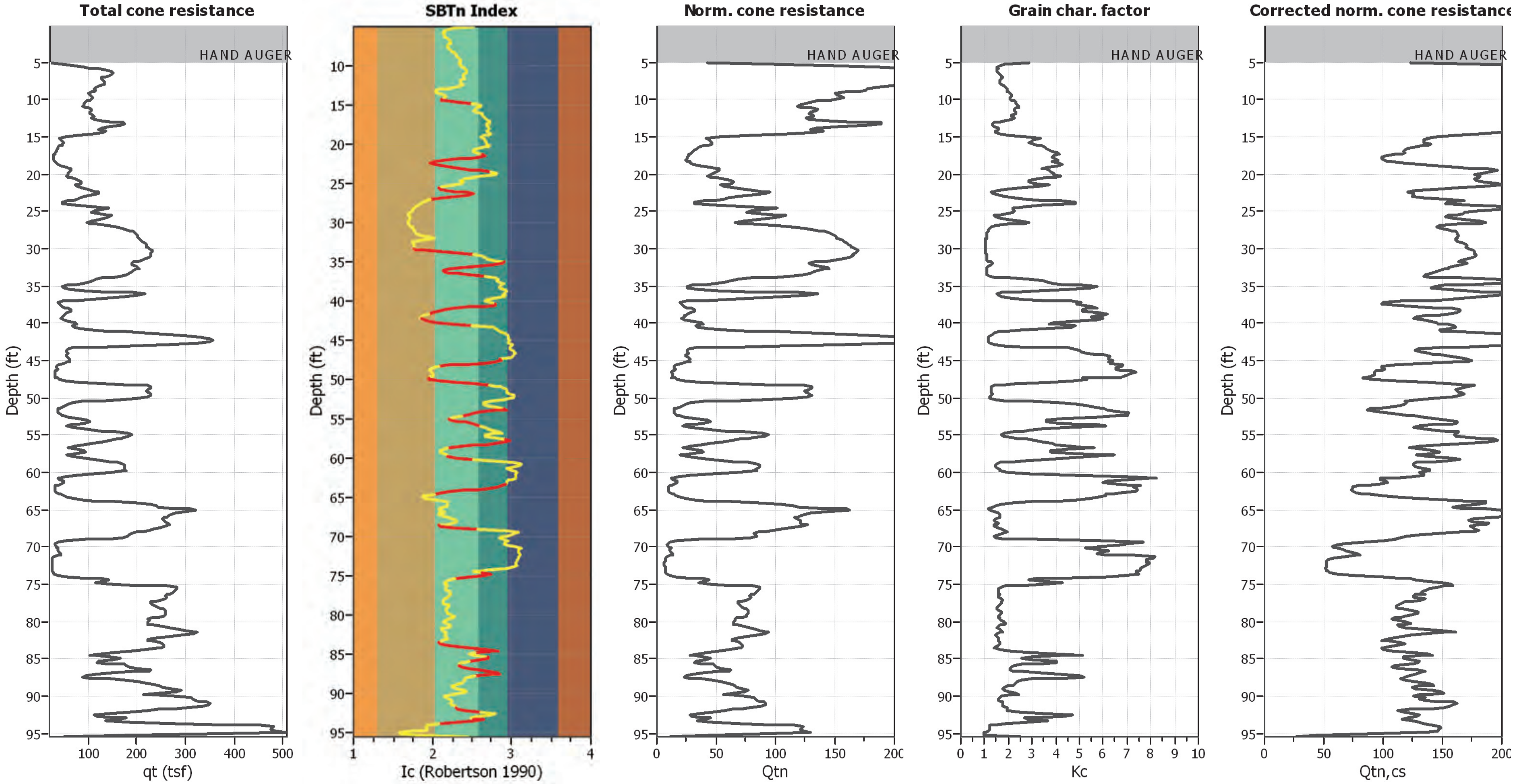
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

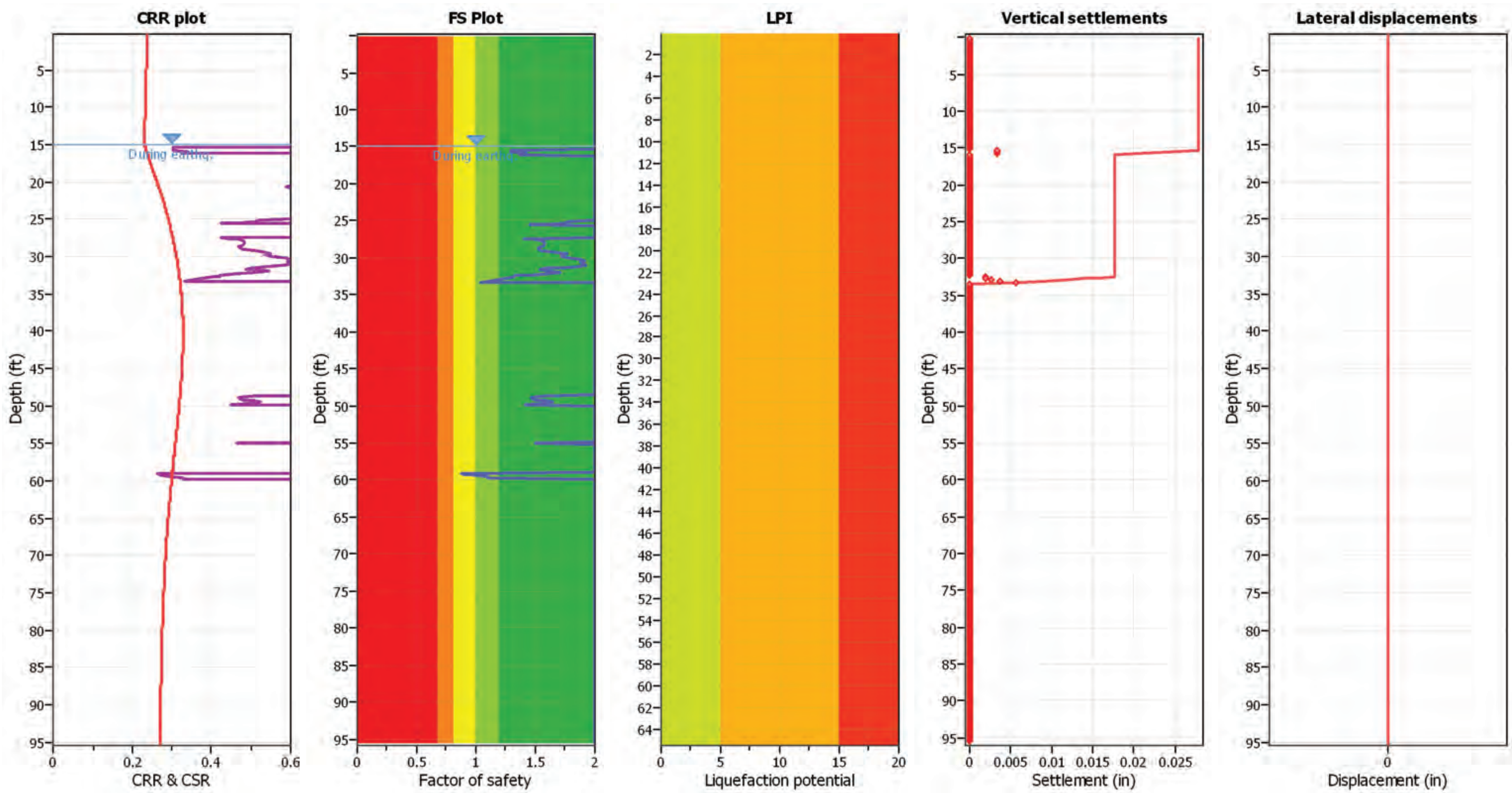
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

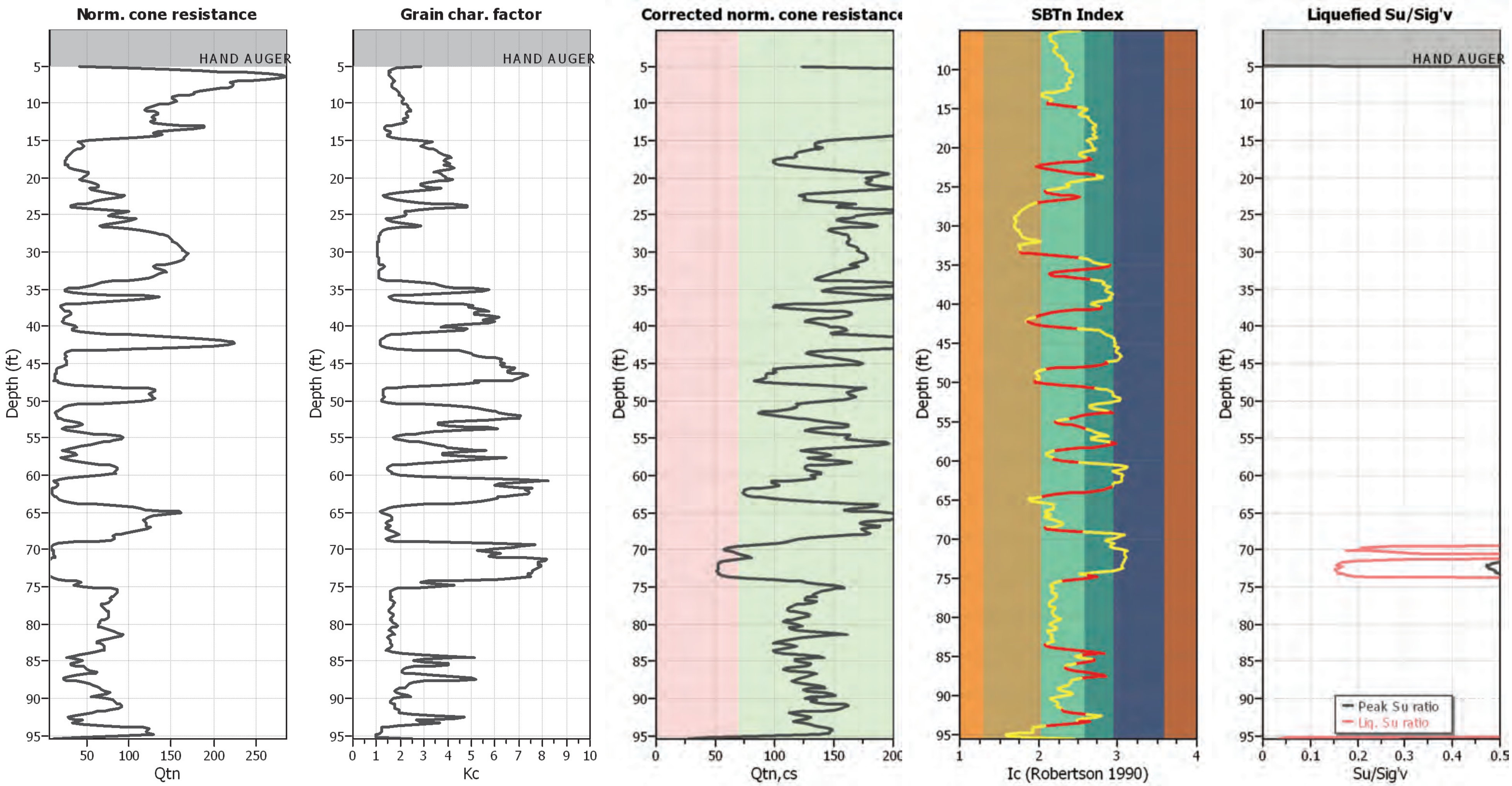
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

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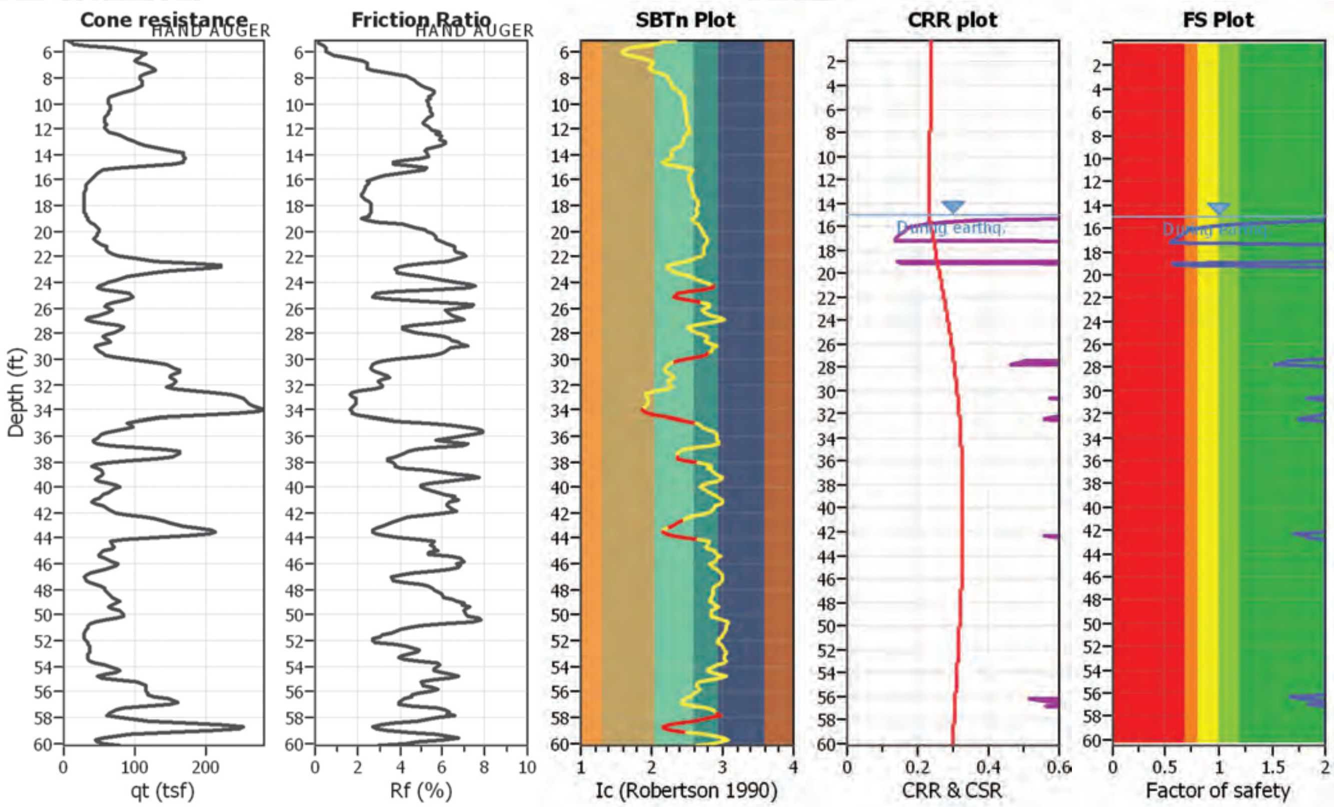
LIQUEFACTION ANALYSIS REPORT

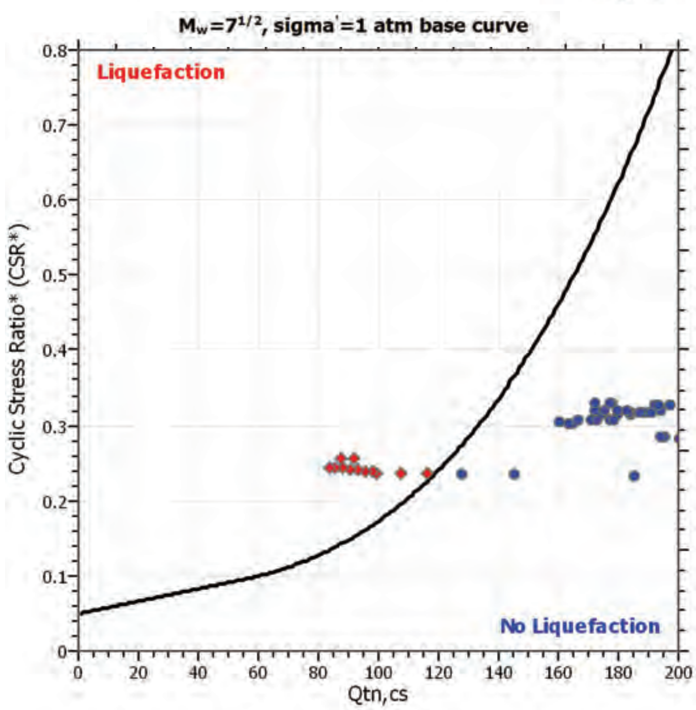
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

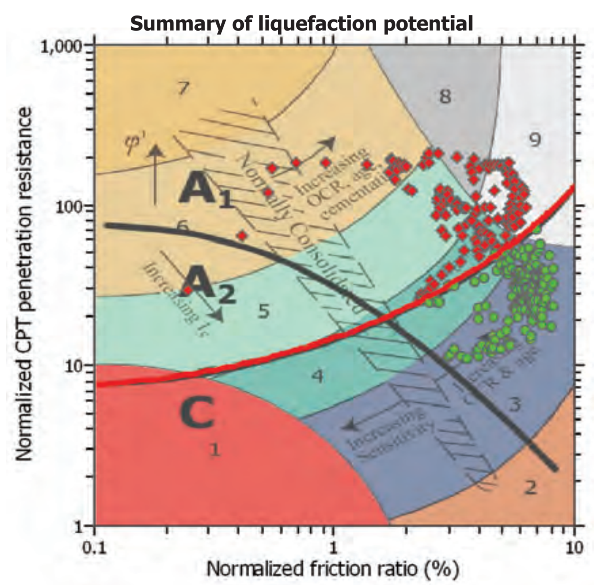
CPT file : CPT-5 (10% in 50 years)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.46	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

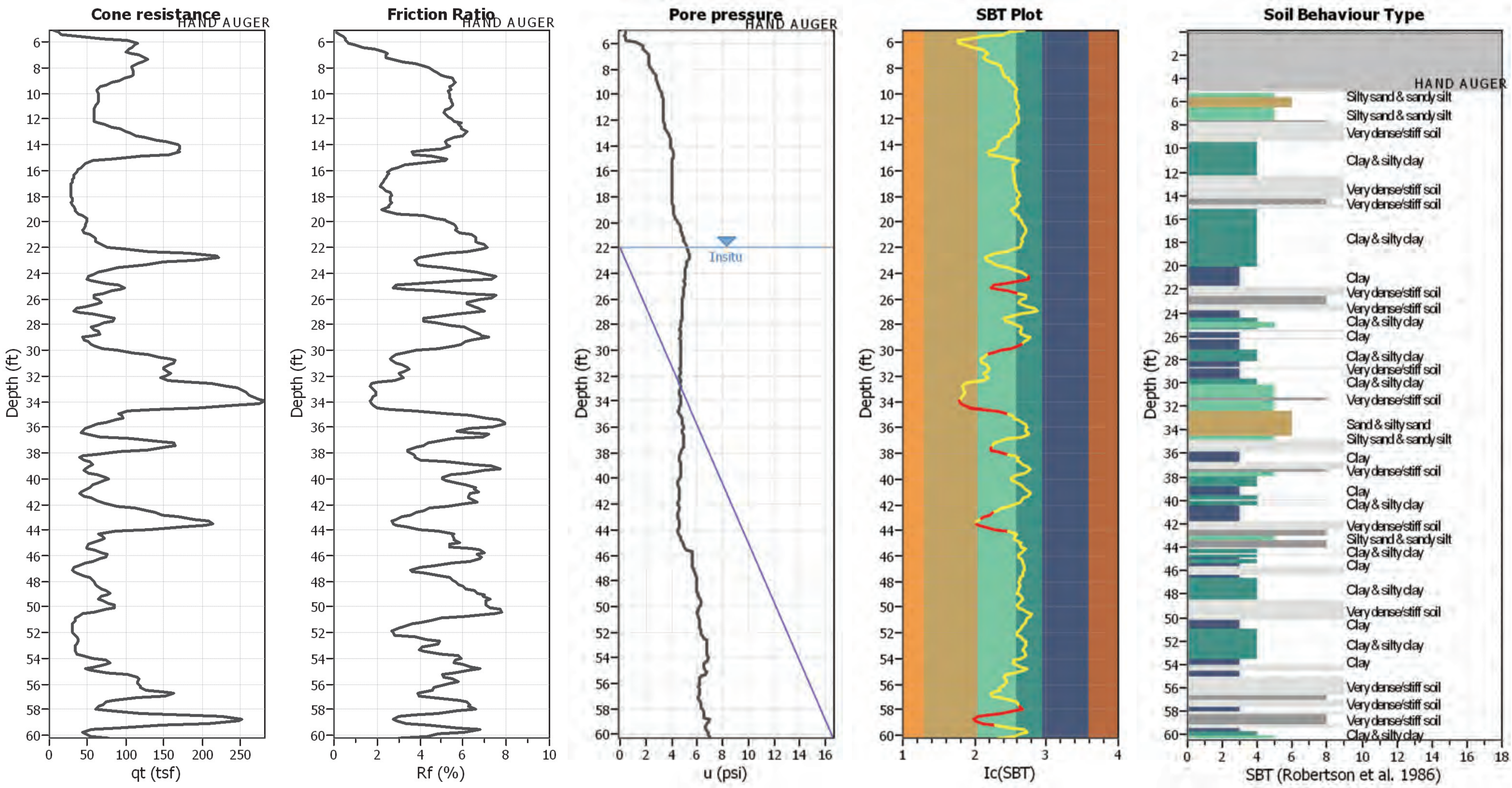






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



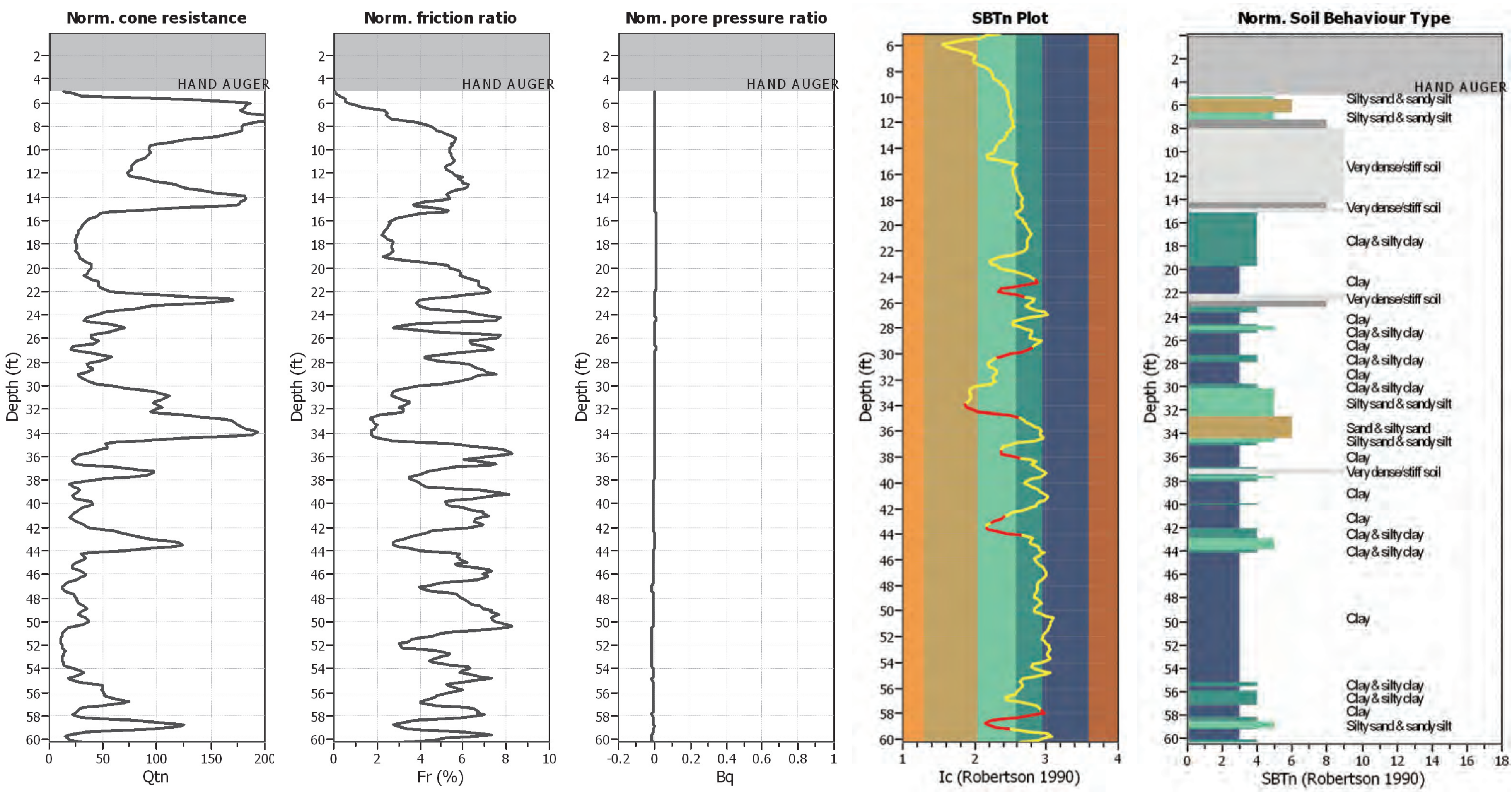
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



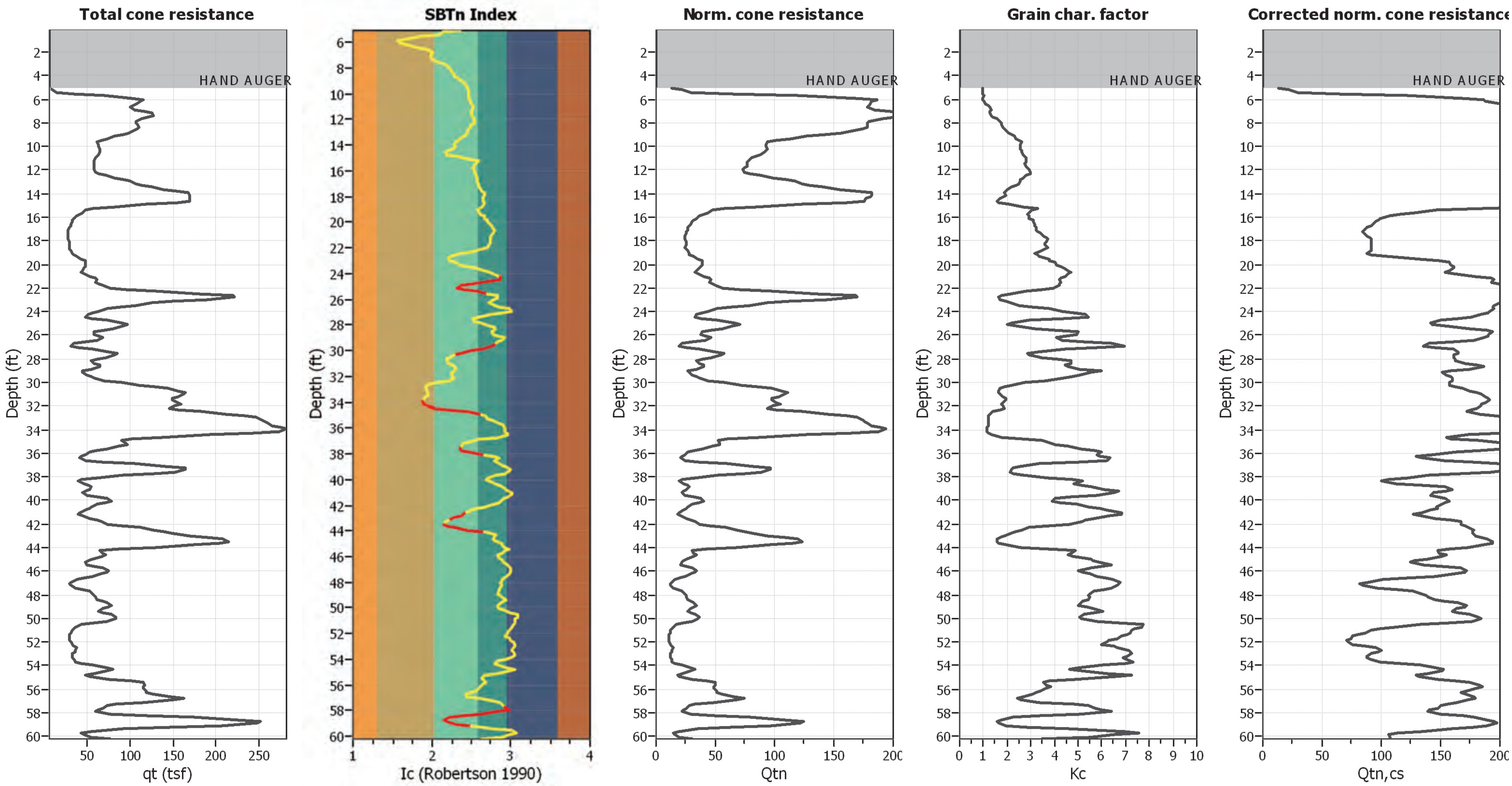
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

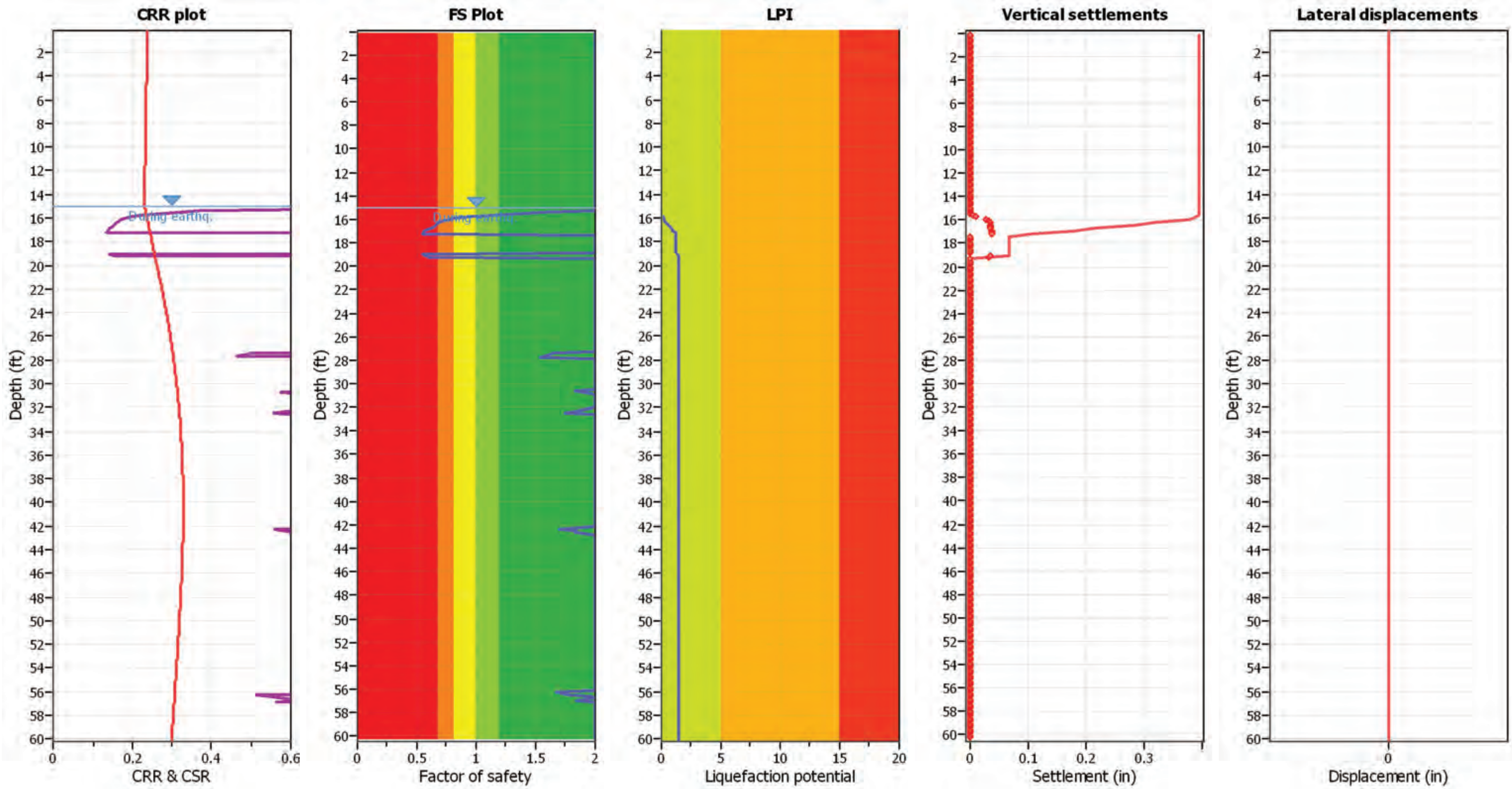
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

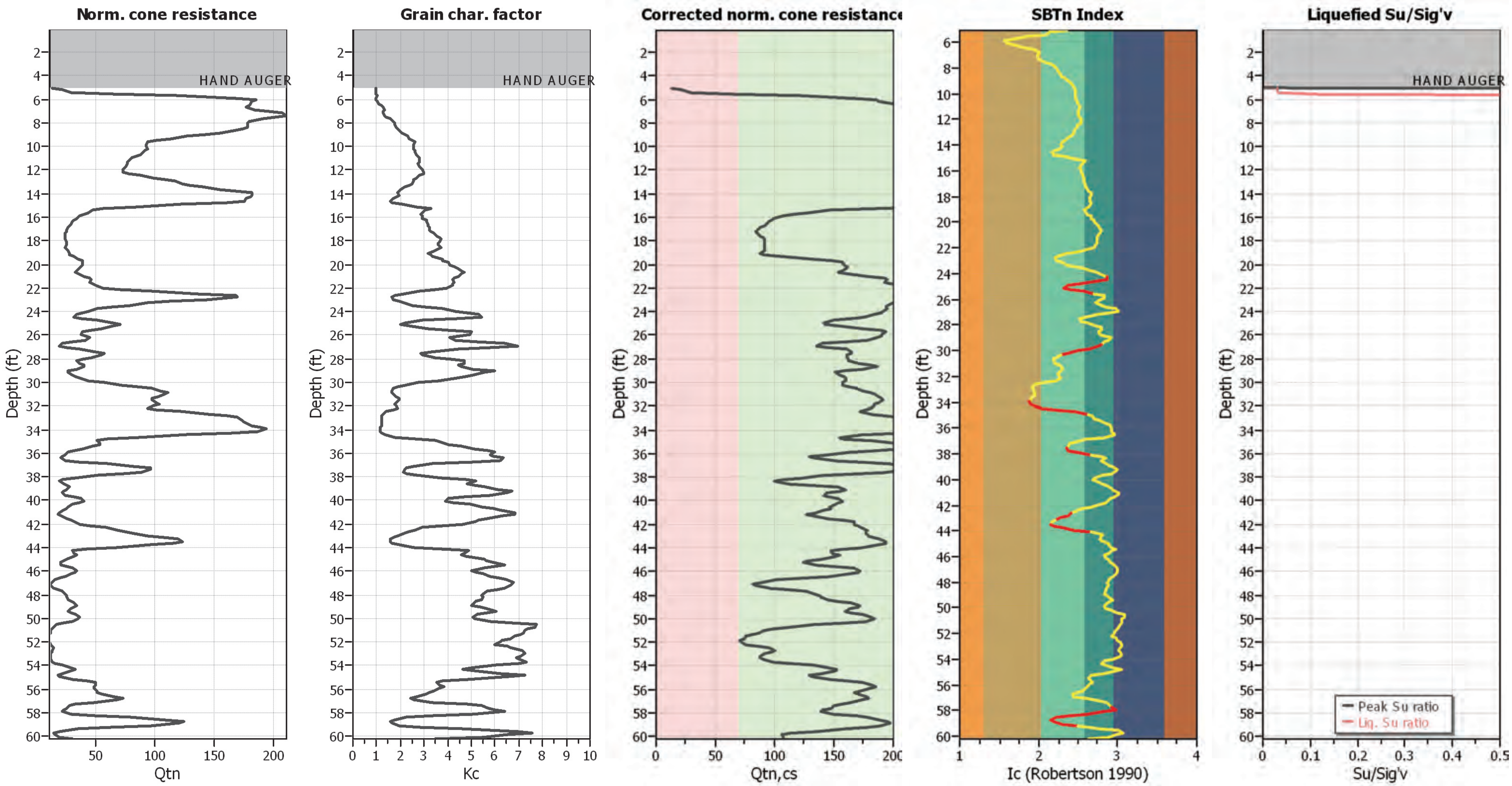
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

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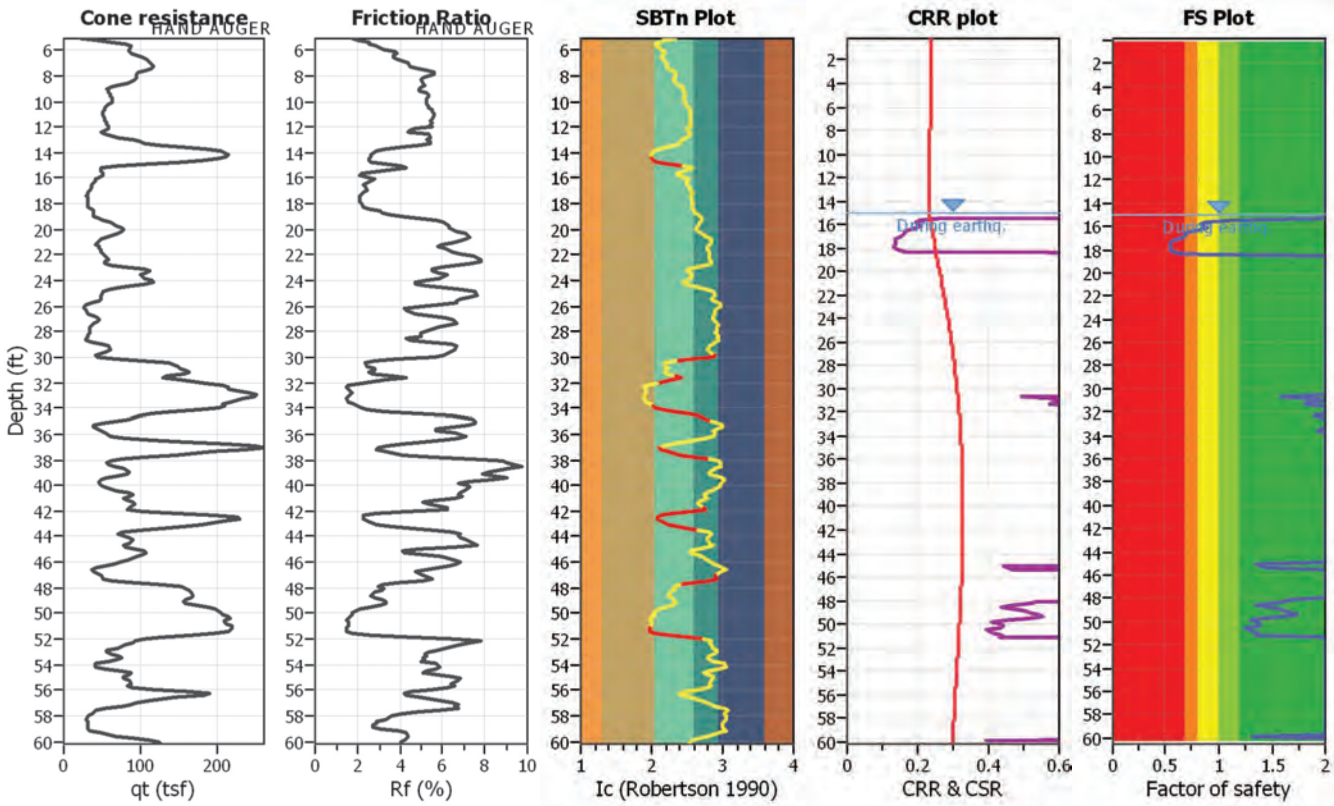
LIQUEFACTION ANALYSIS REPORT

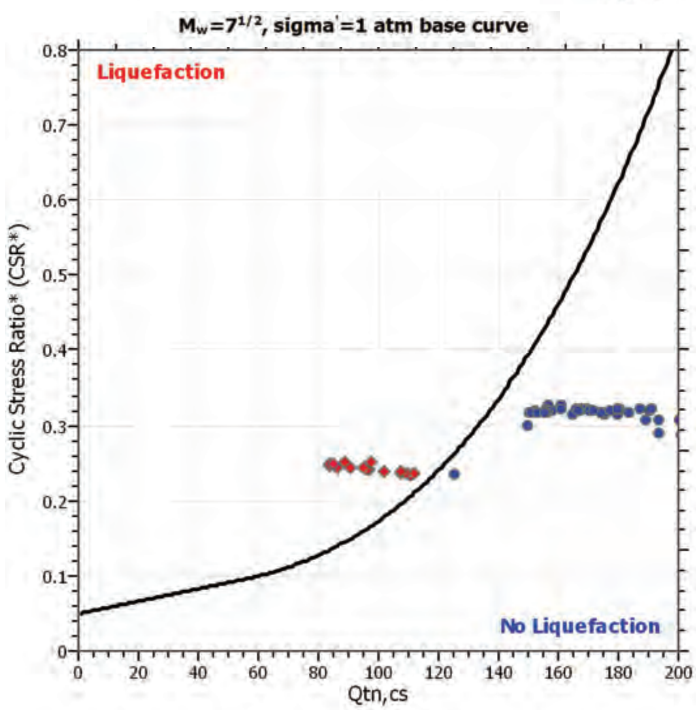
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

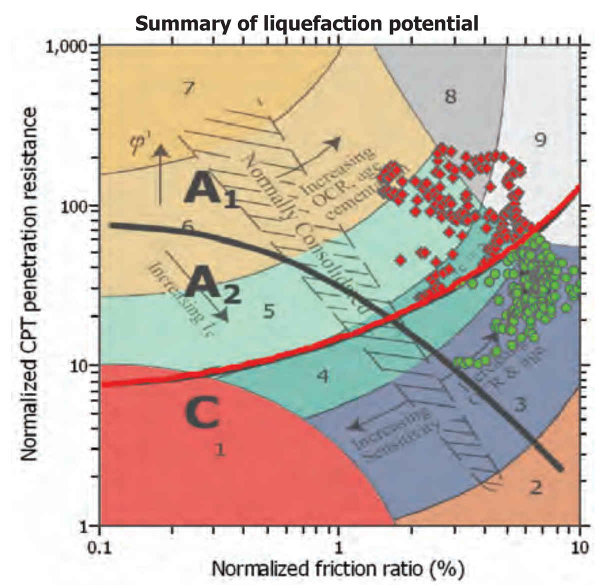
CPT file : CPT-6 (10% in 50 years)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.46	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

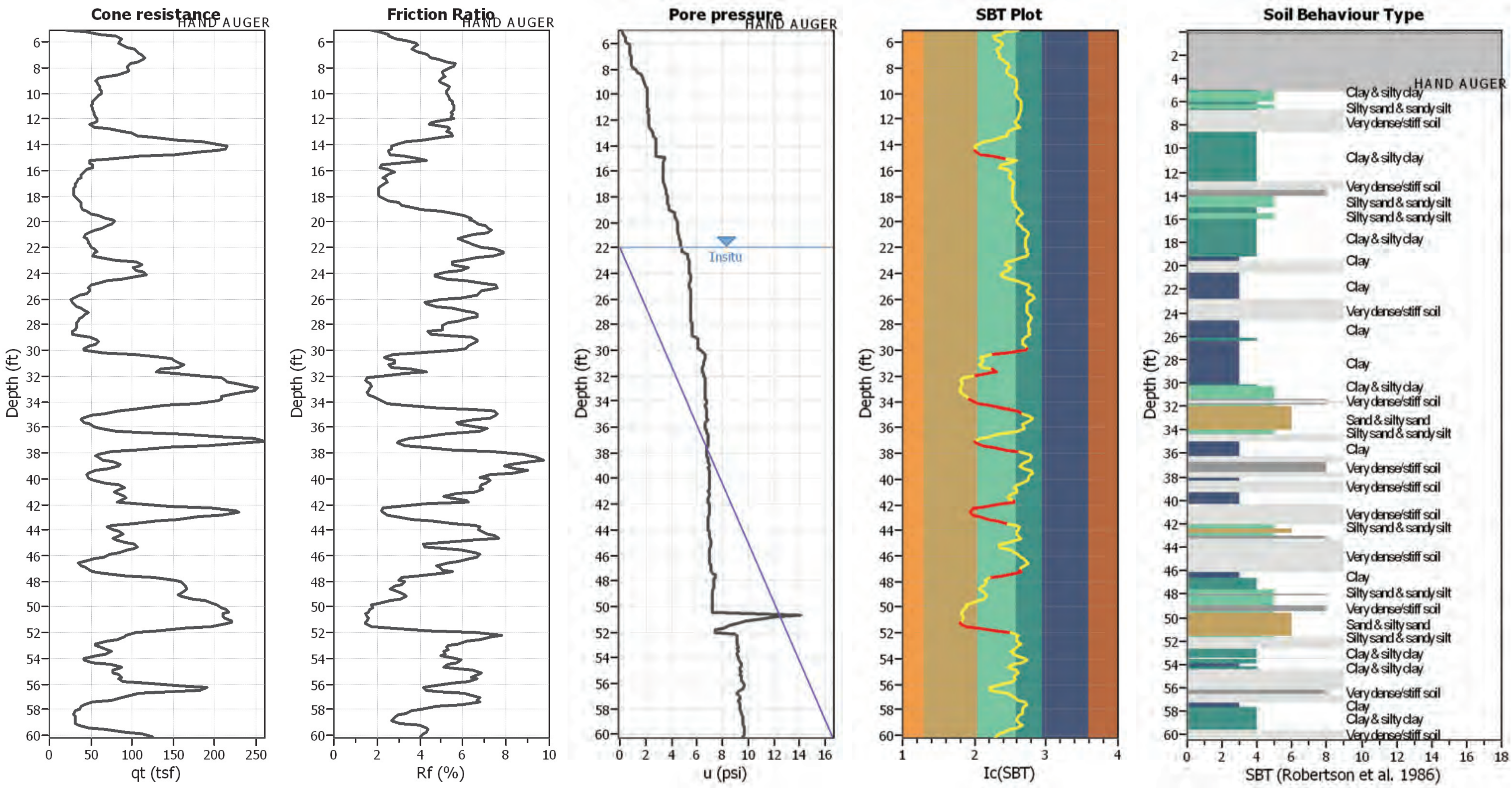






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



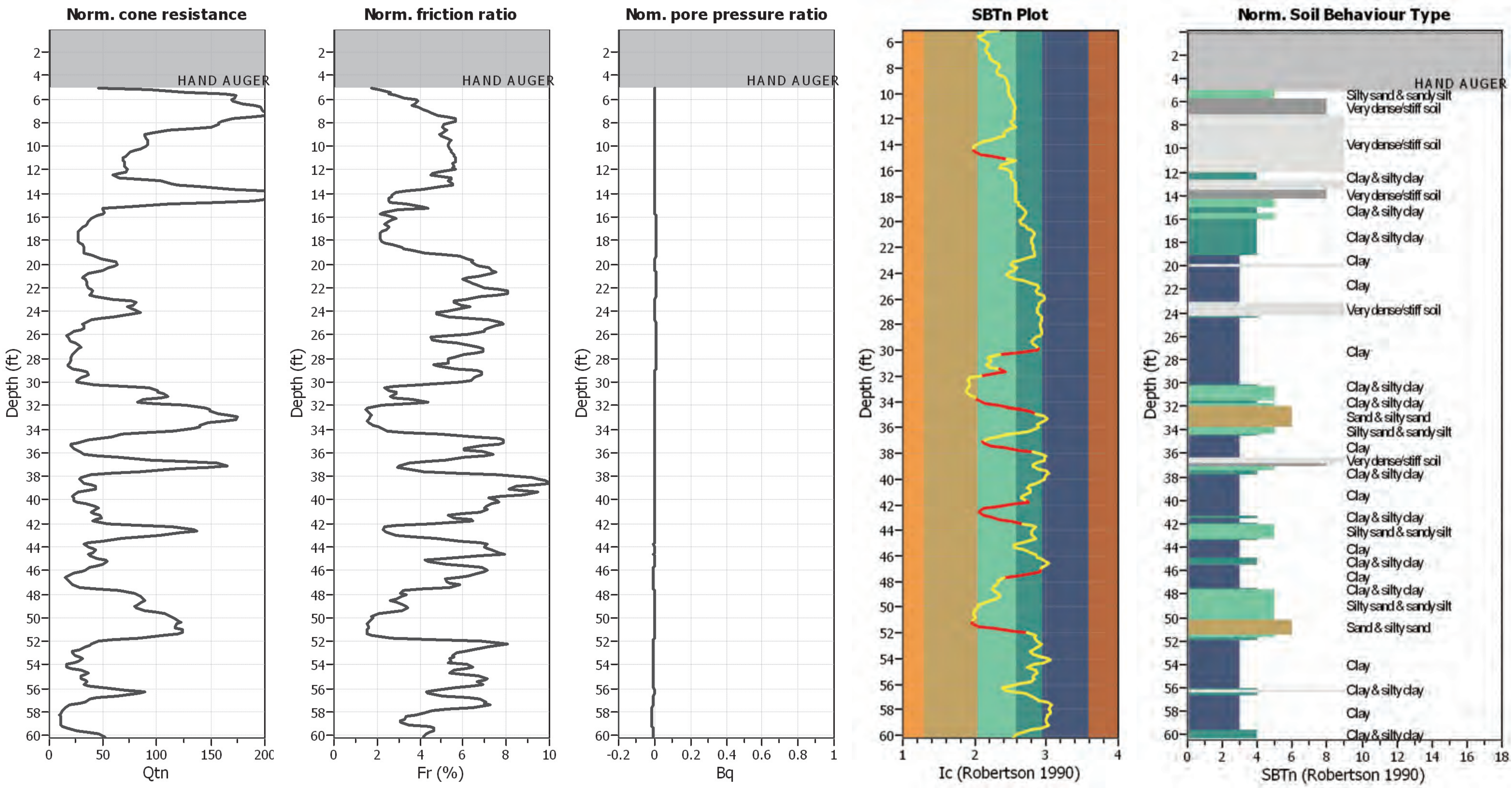
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



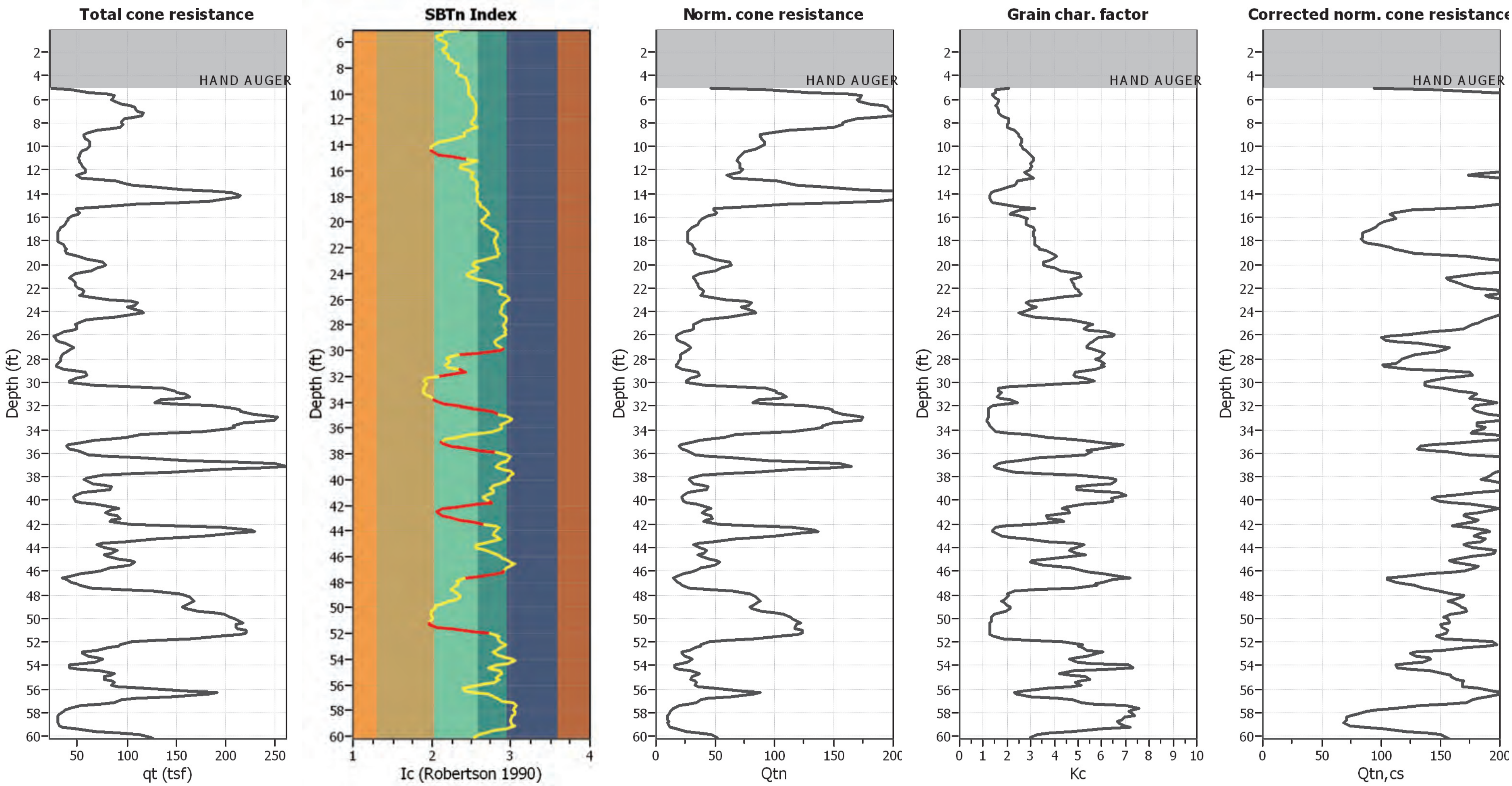
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

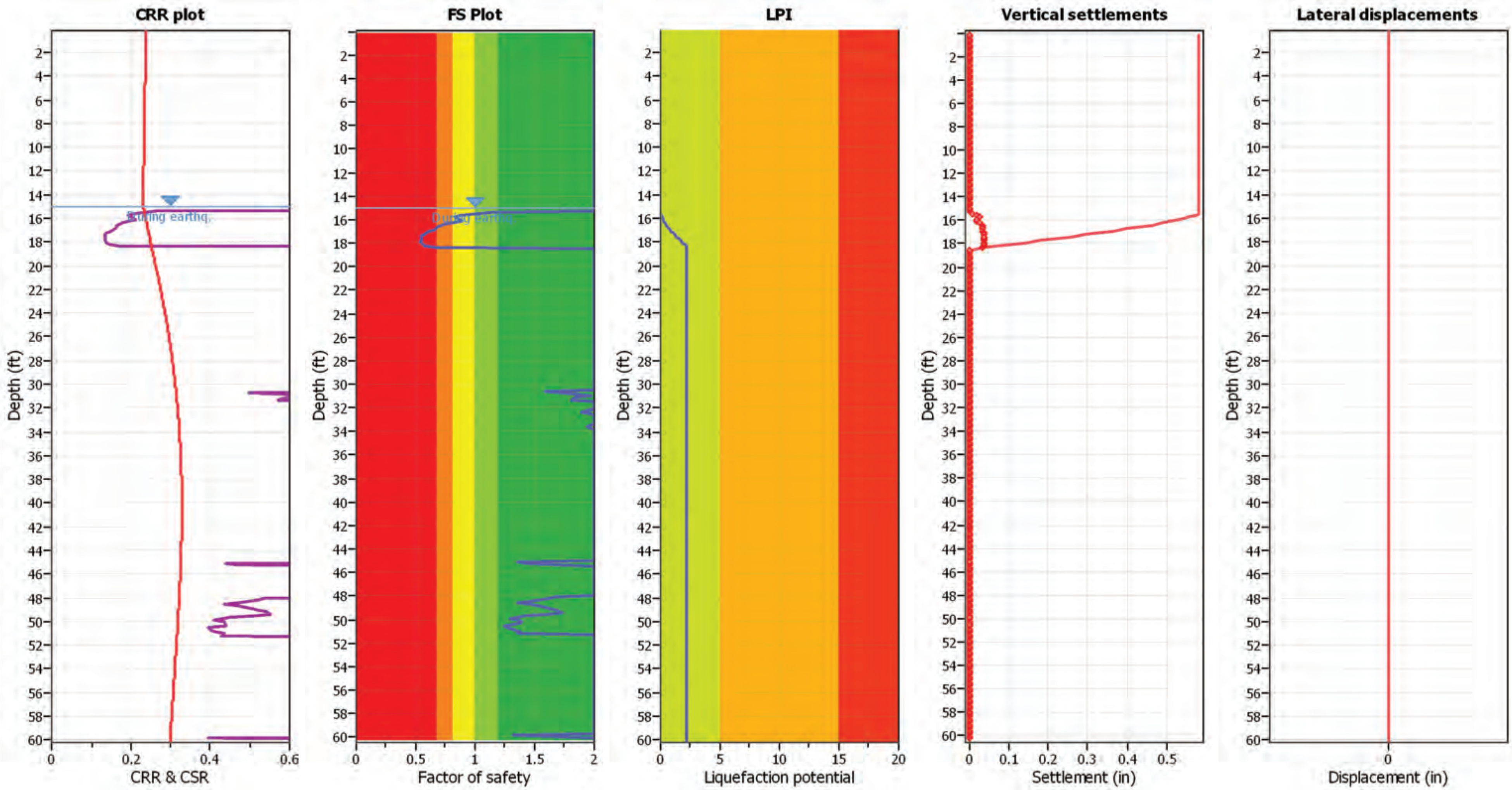
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

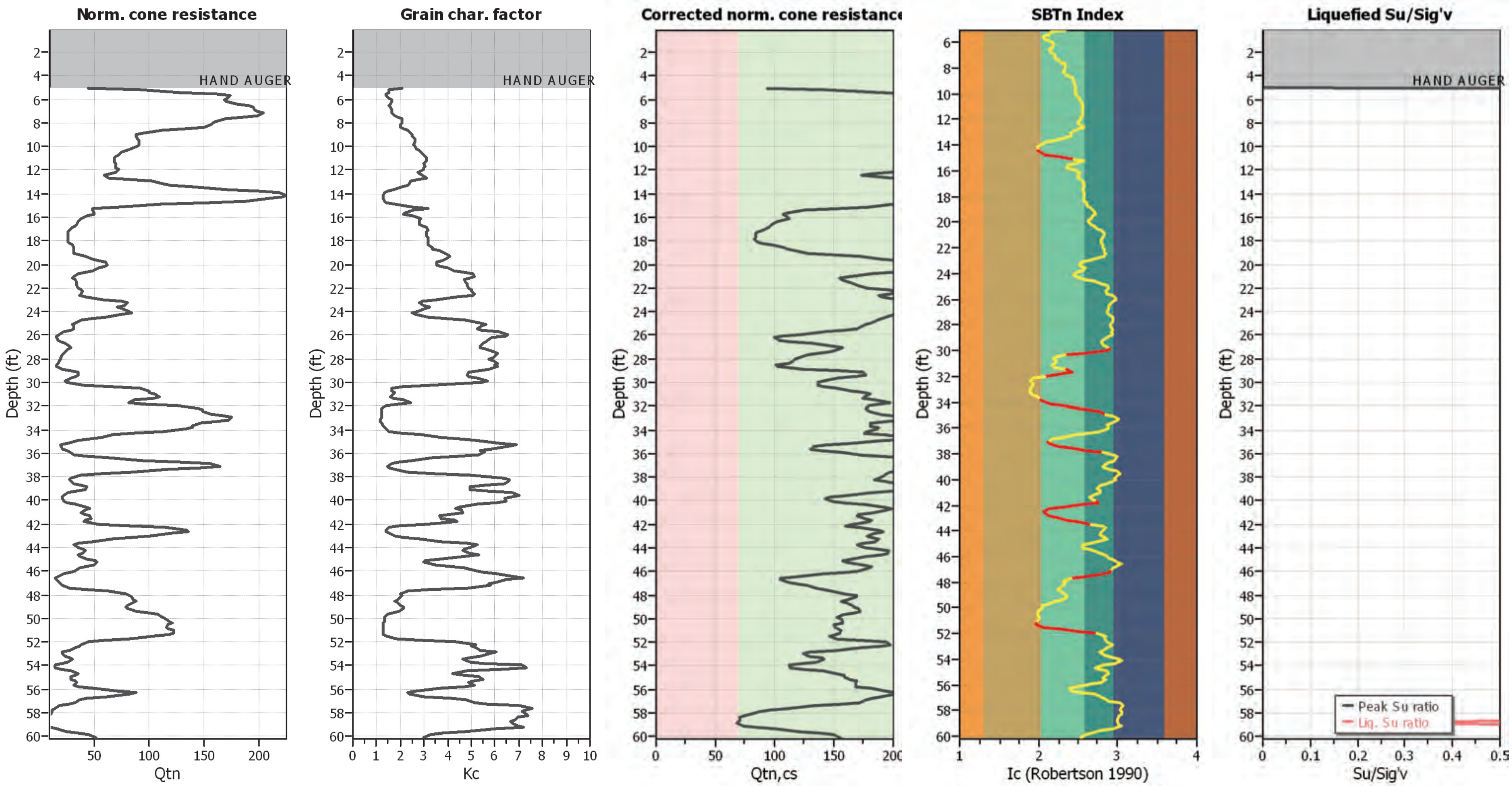
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



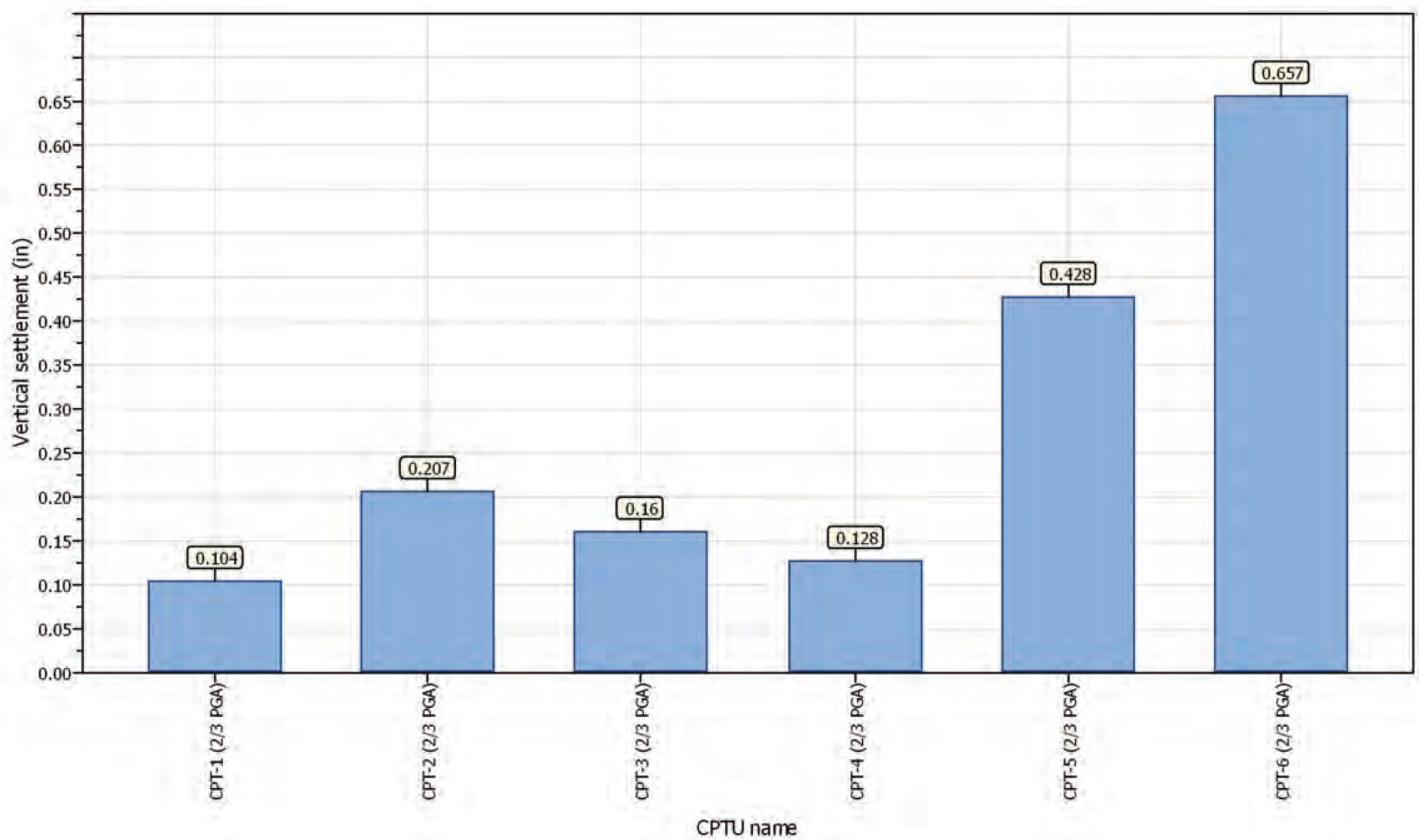
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.46	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Project title : 21-2971 16911 Normandie Associates, LLC

Location :

Overall vertical settlements report



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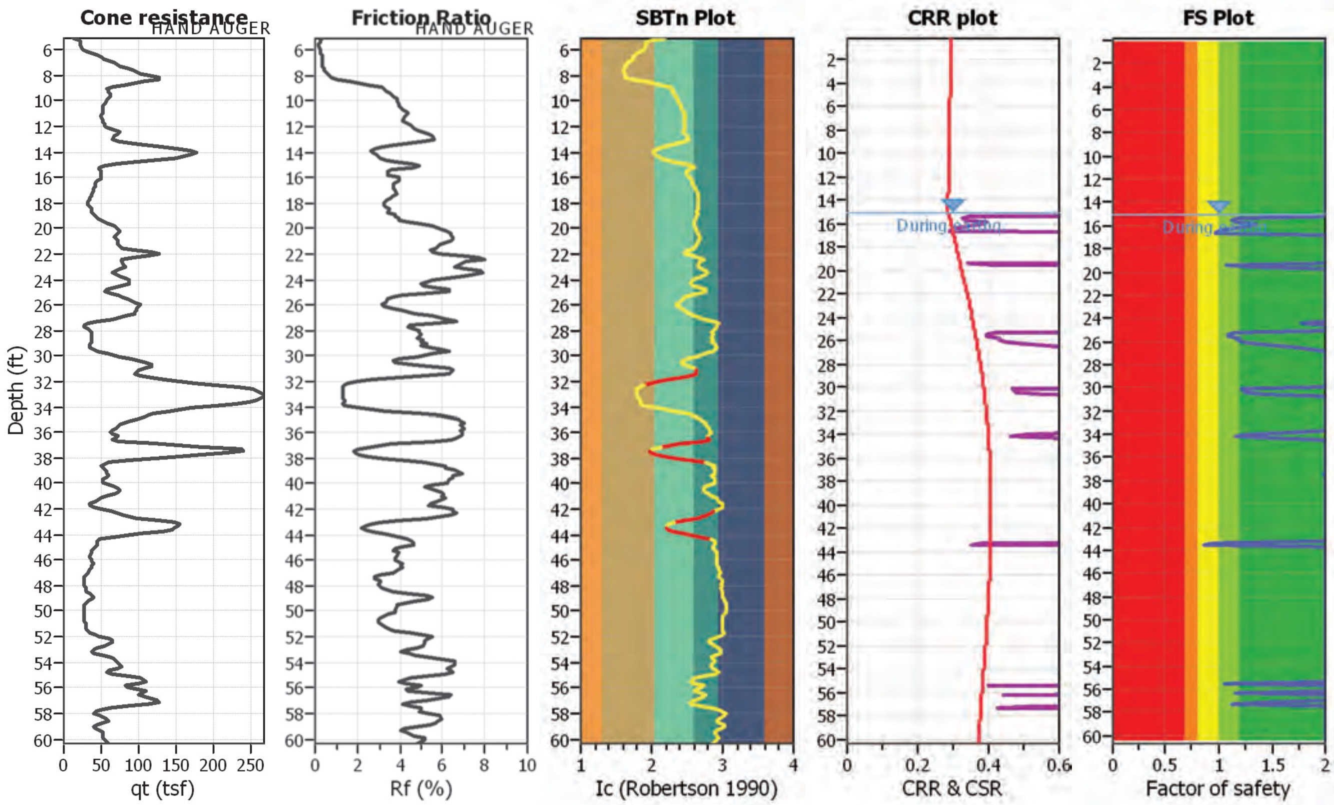
LIQUEFACTION ANALYSIS REPORT

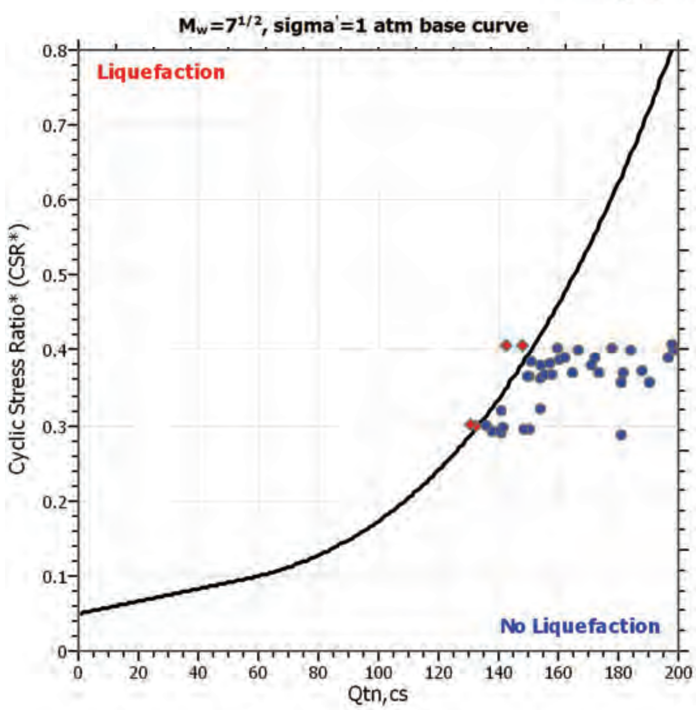
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

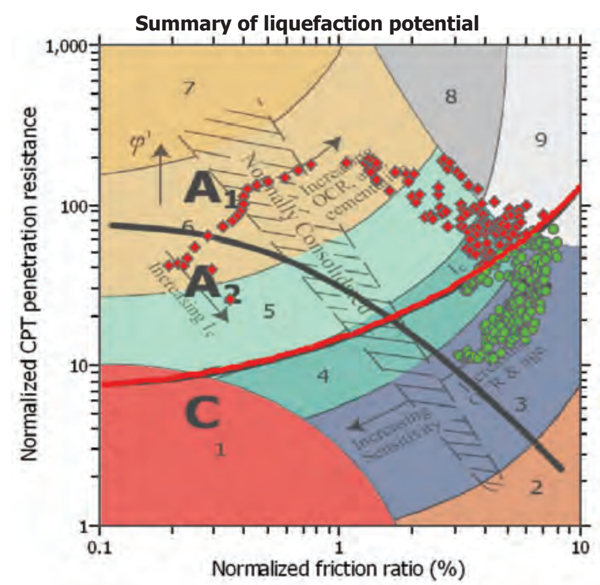
CPT file : CPT-1 (2/3 PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

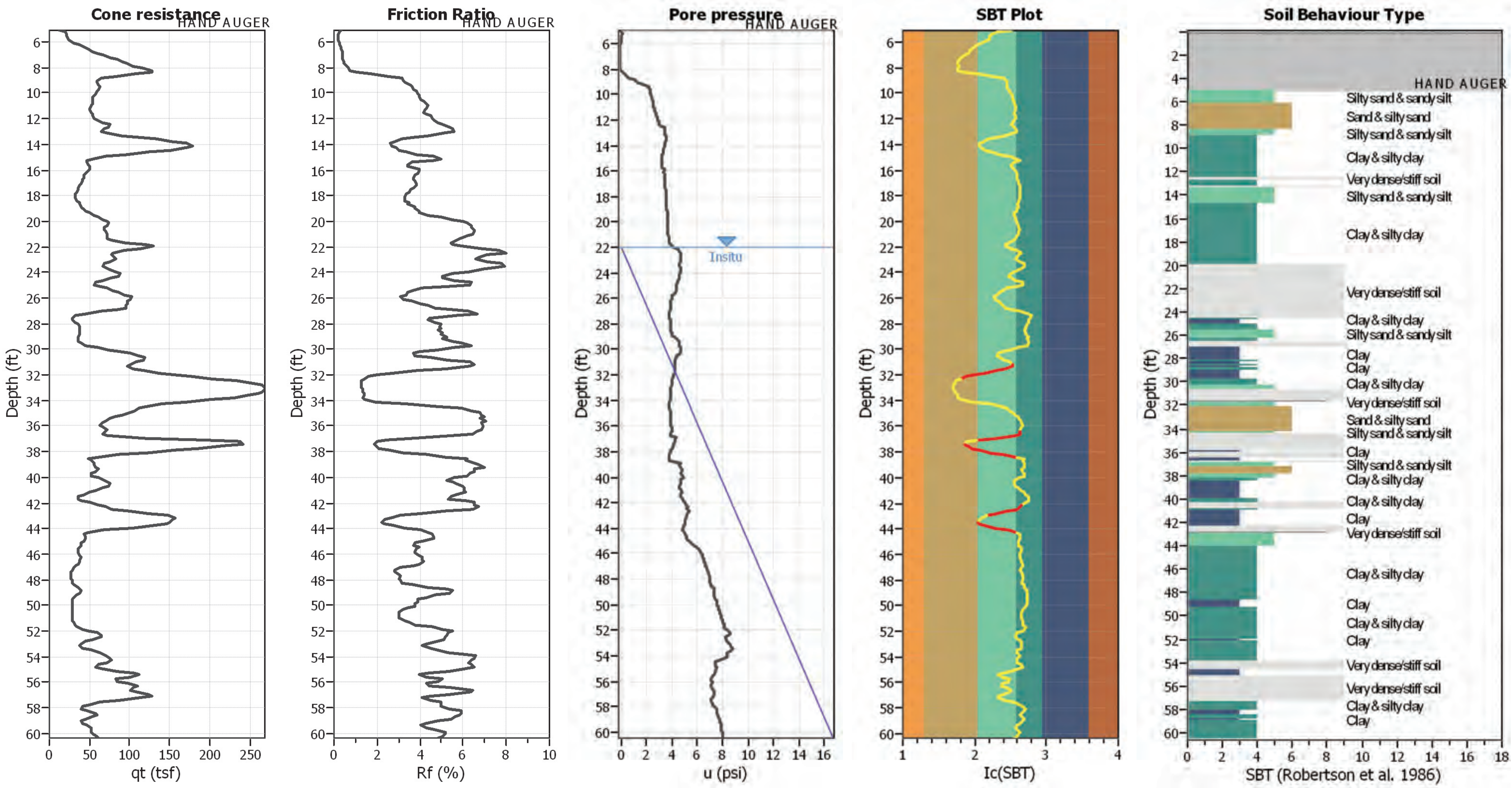






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



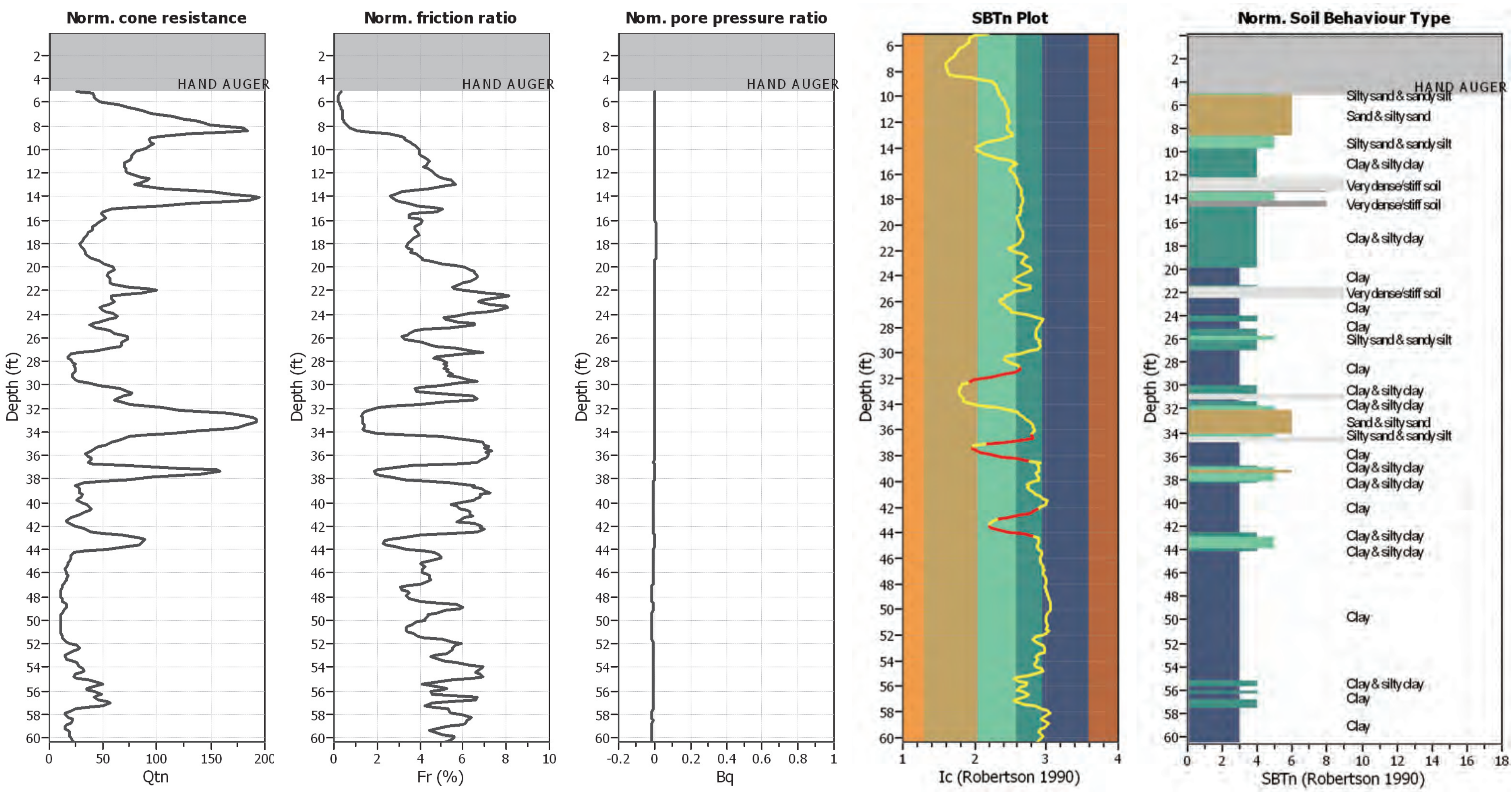
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



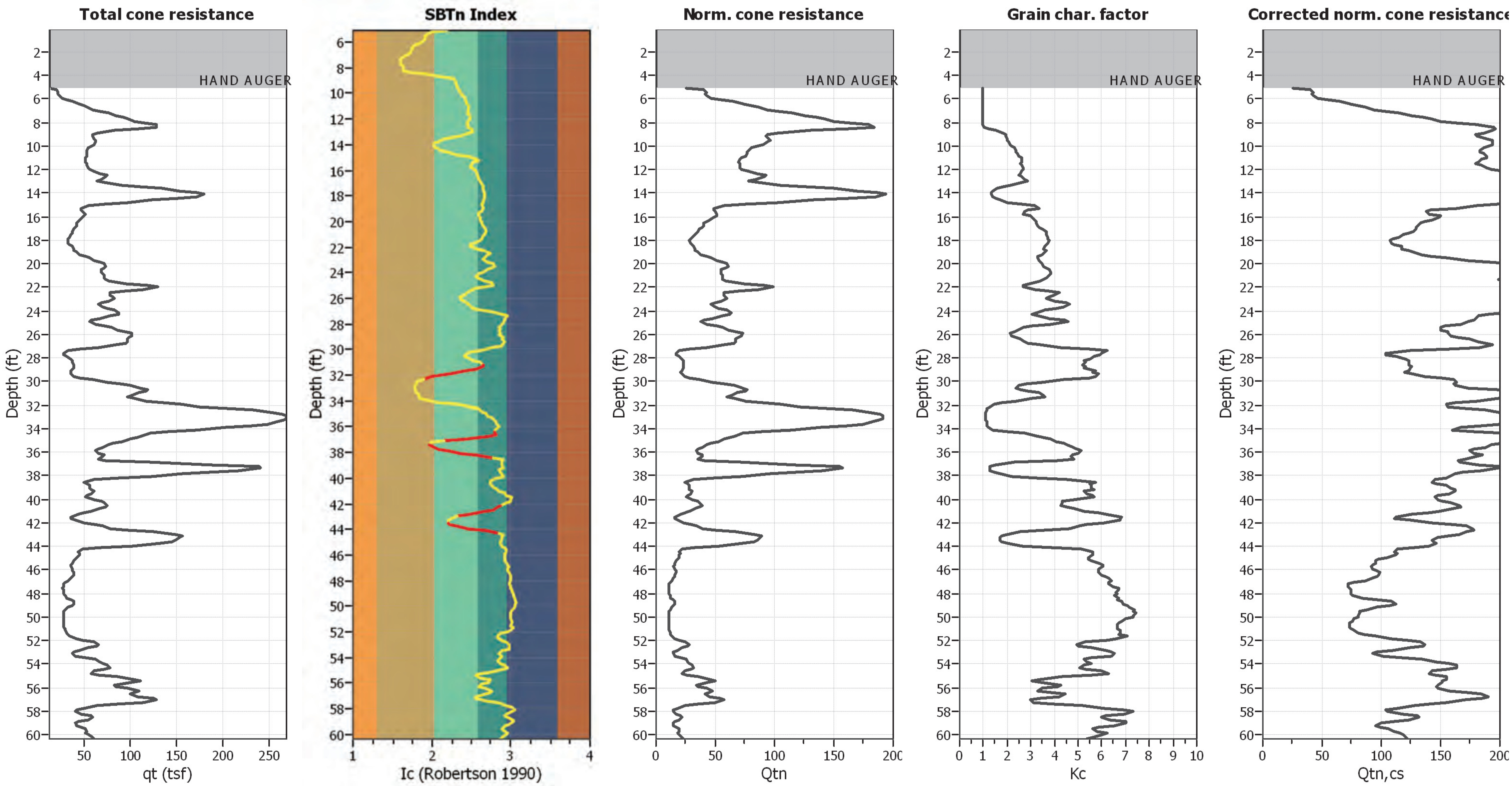
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

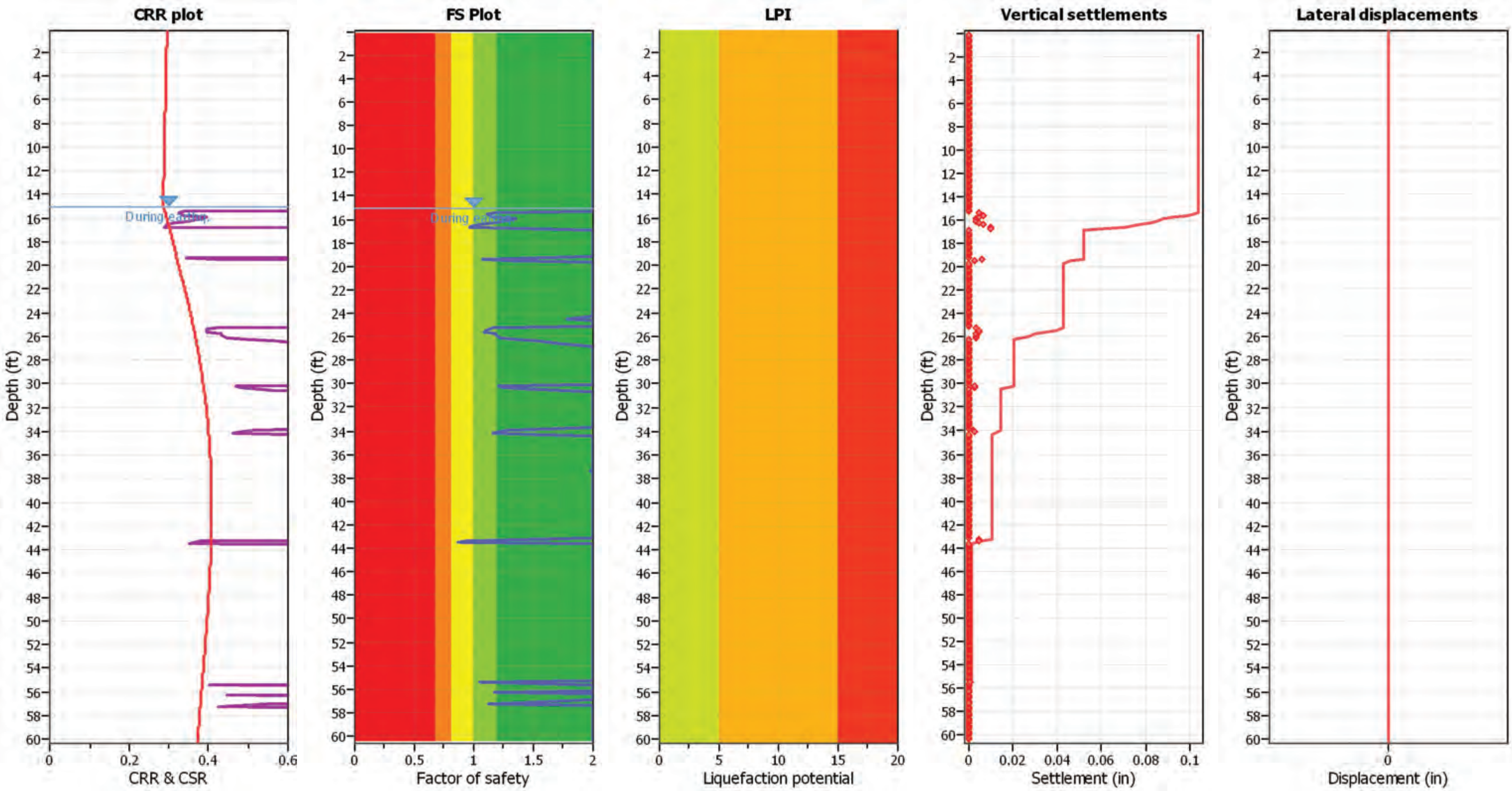
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

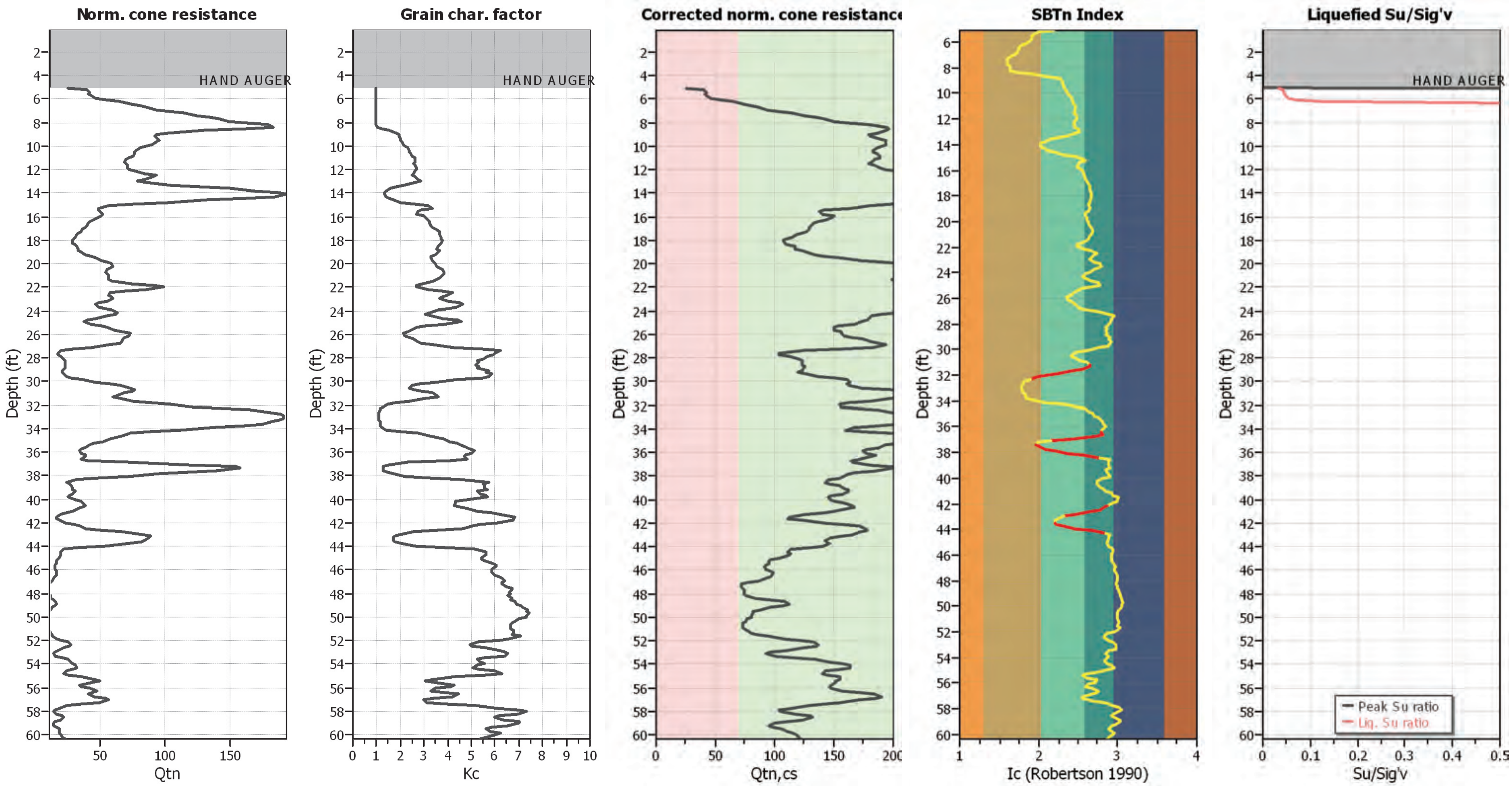
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

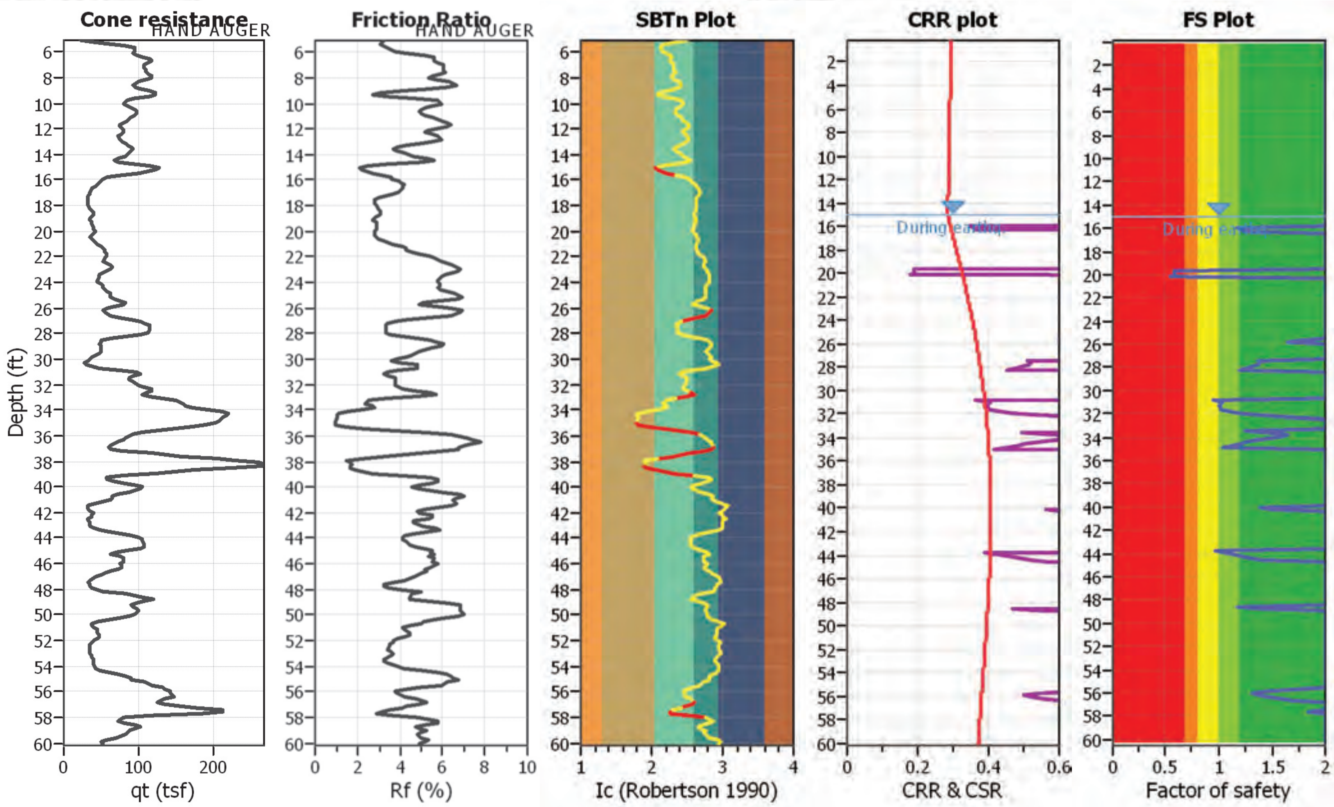
LIQUEFACTION ANALYSIS REPORT

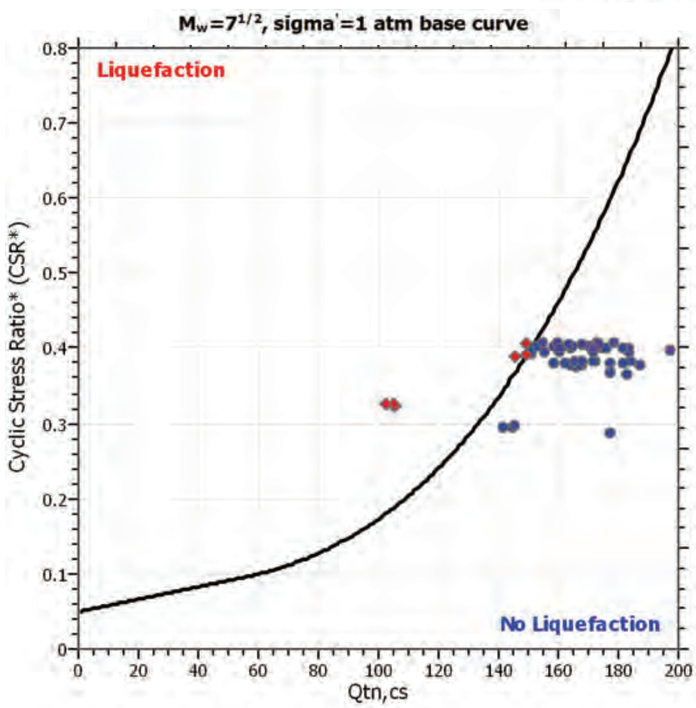
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

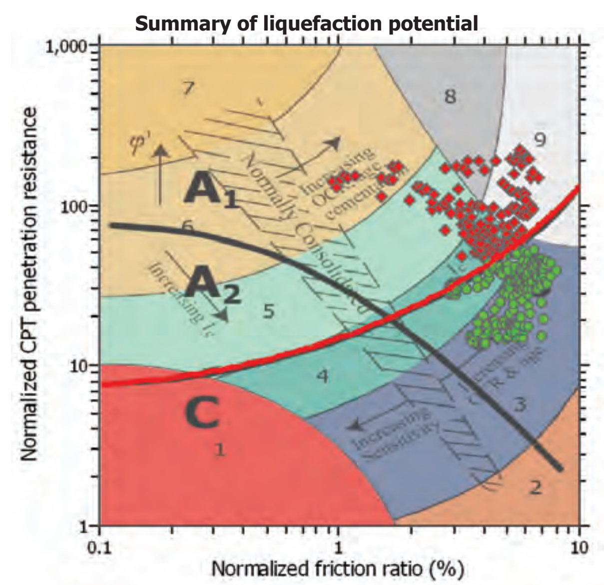
CPT file : CPT-2 (2/3 PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

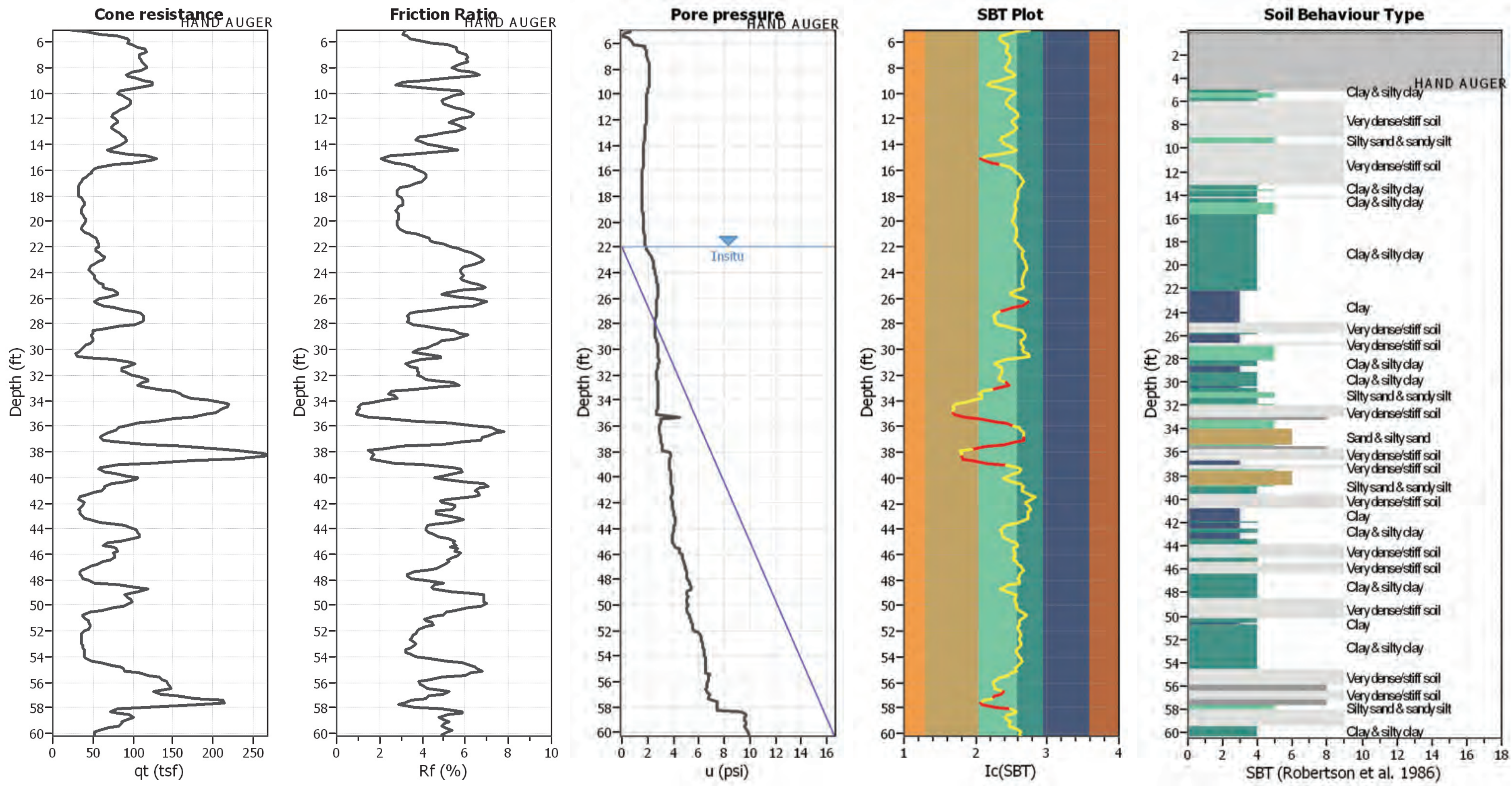






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



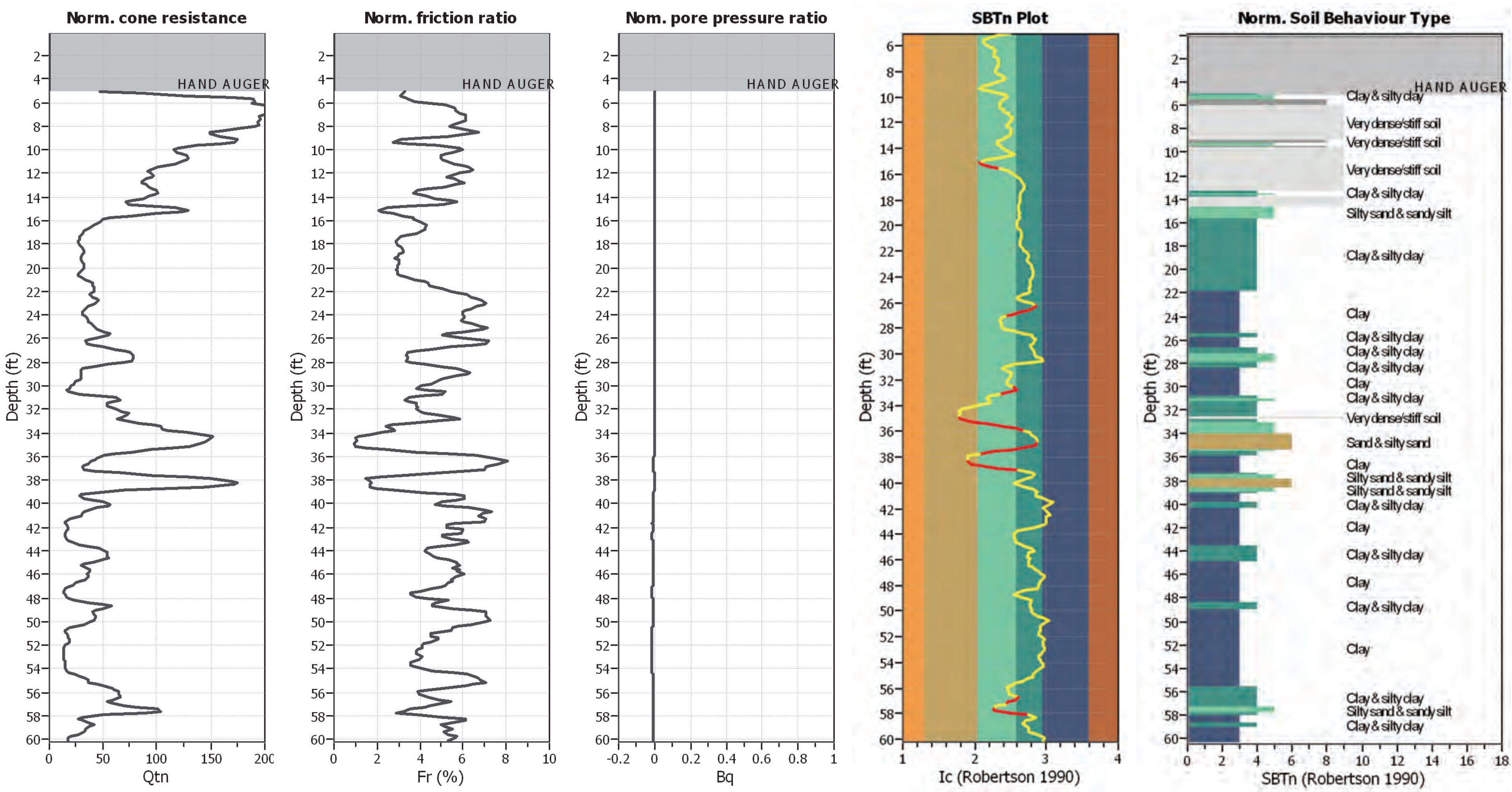
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
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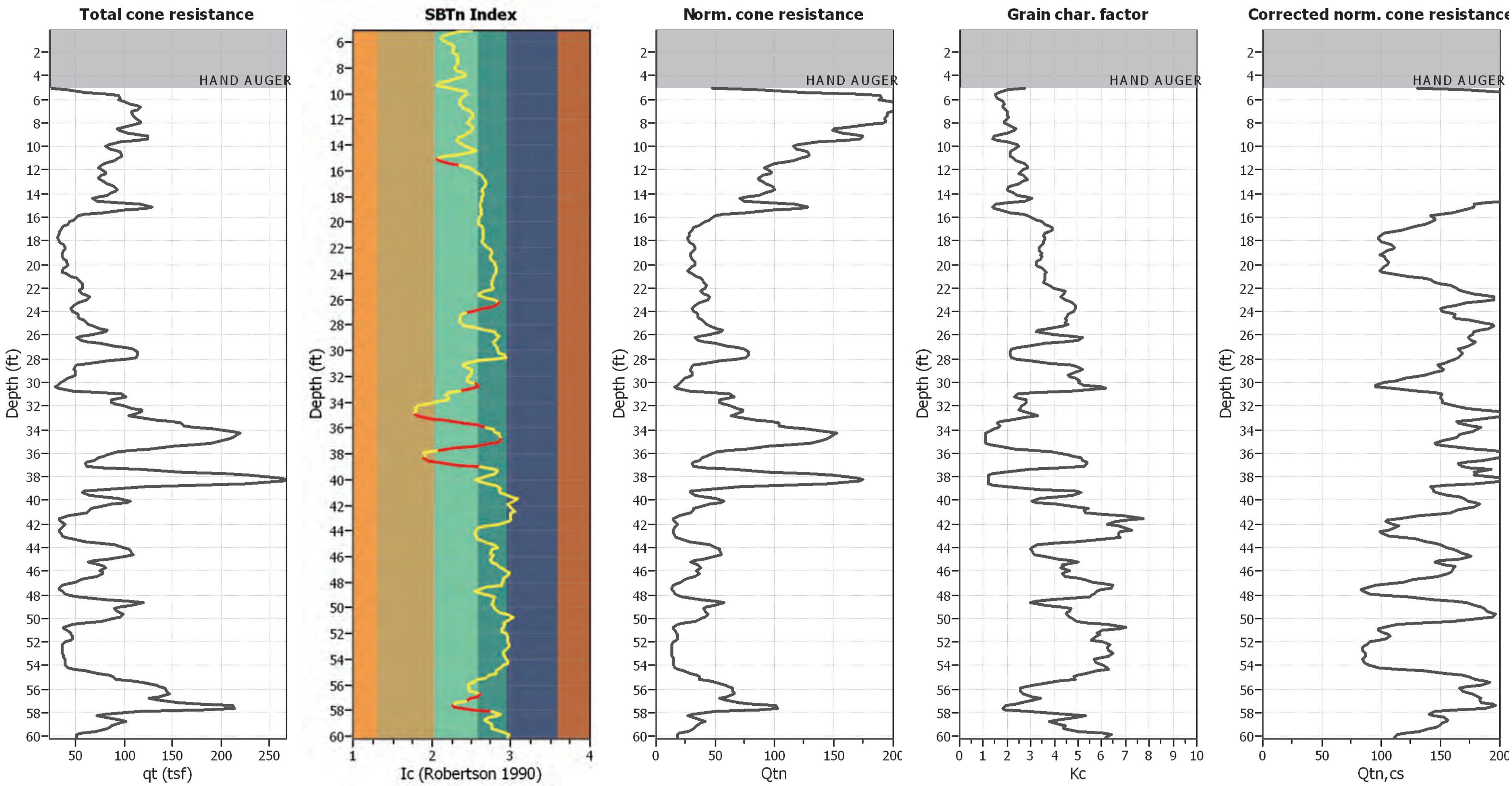
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

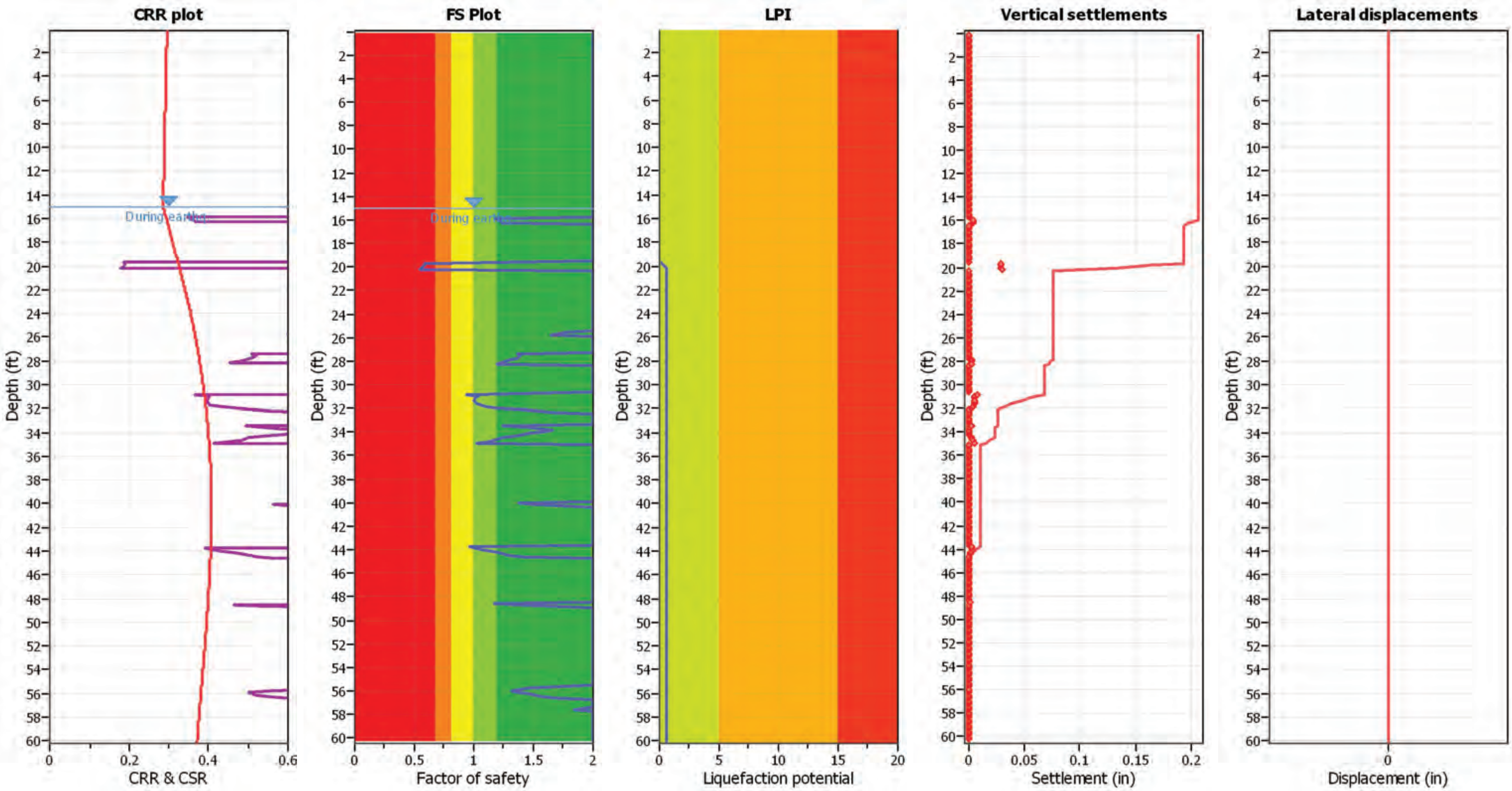
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

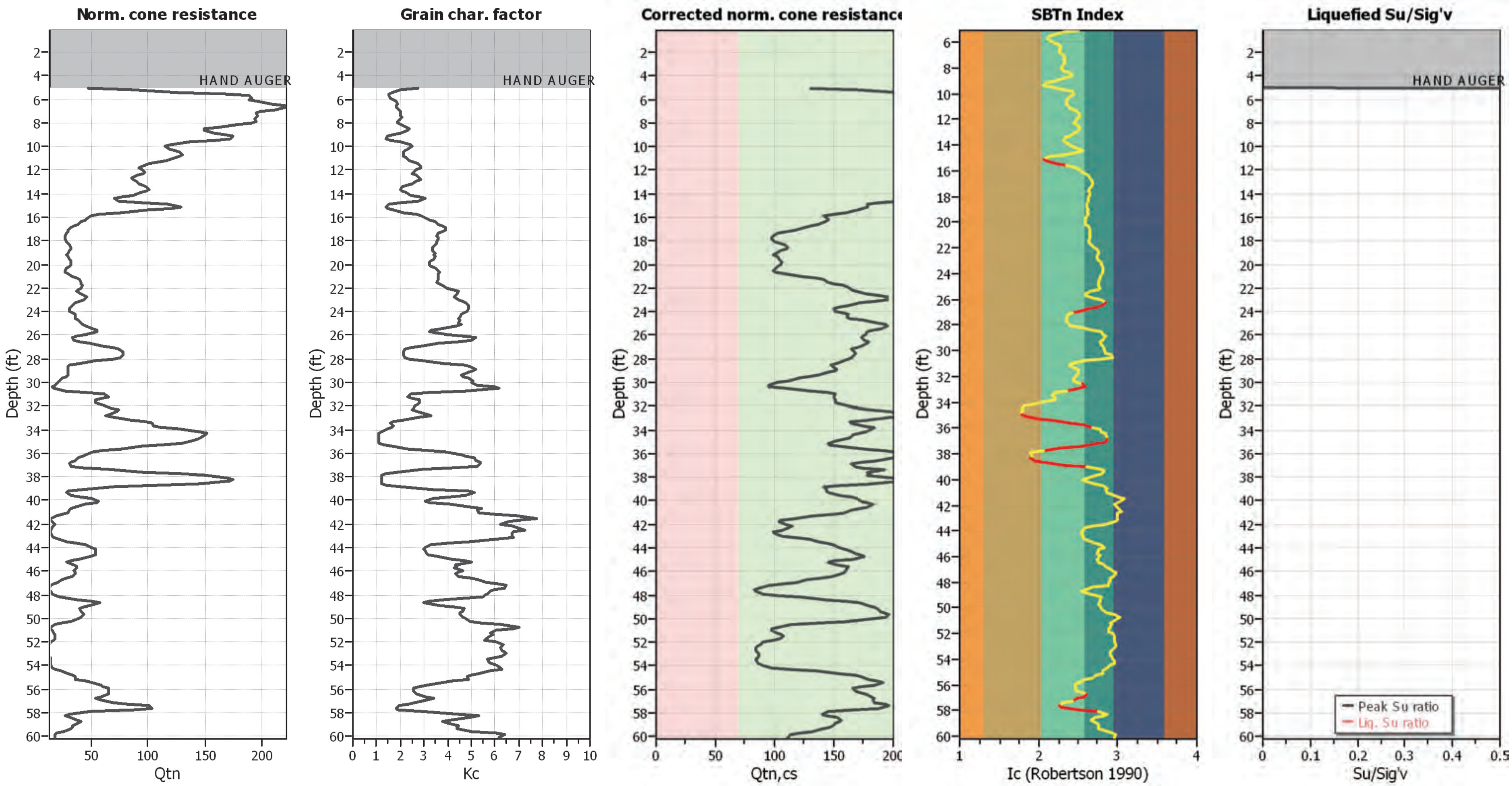
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

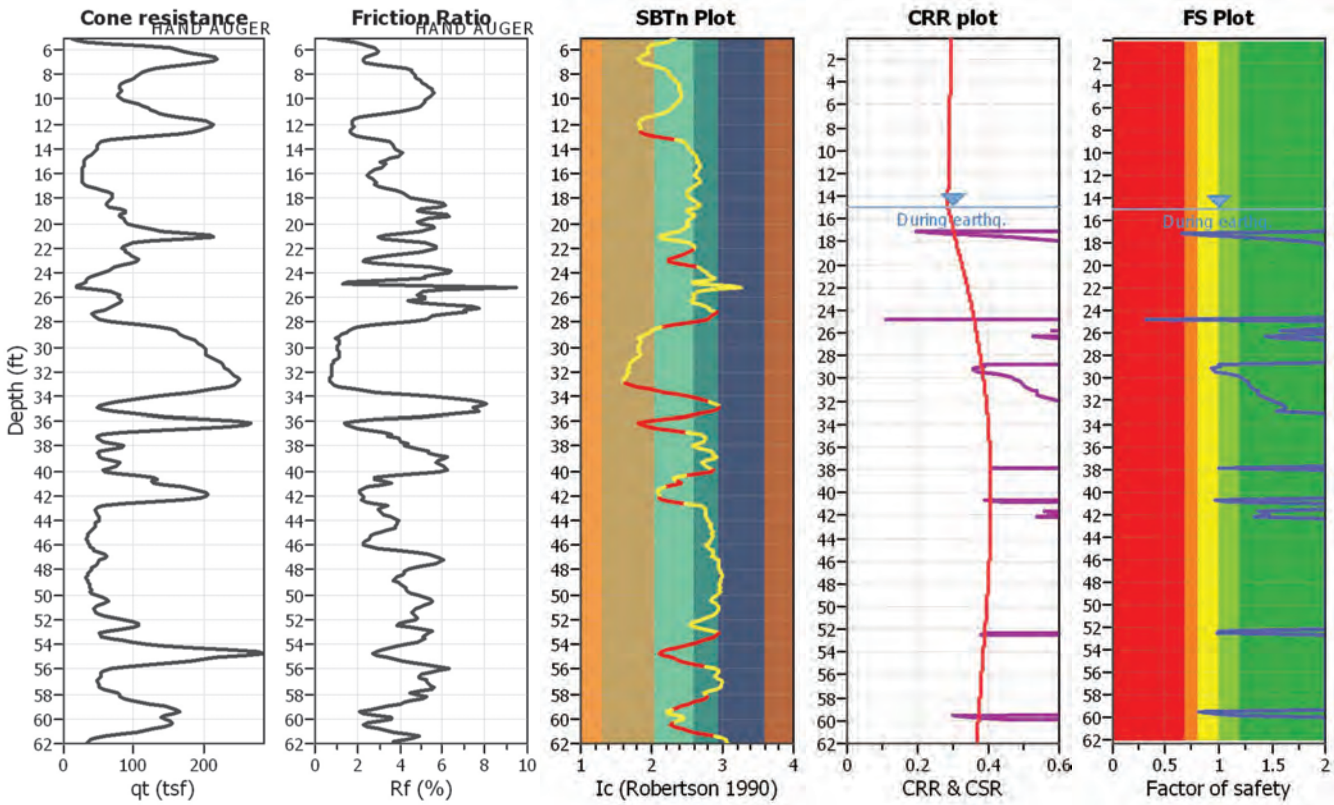
LIQUEFACTION ANALYSIS REPORT

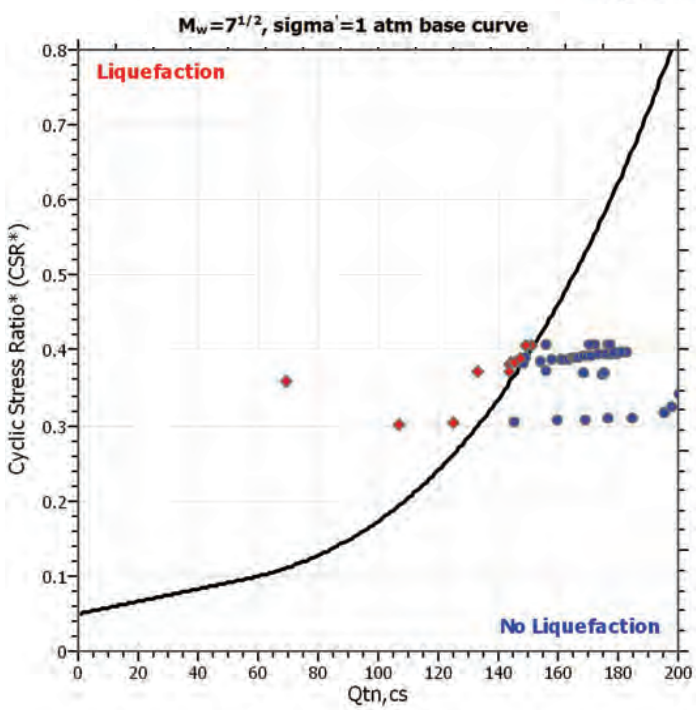
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

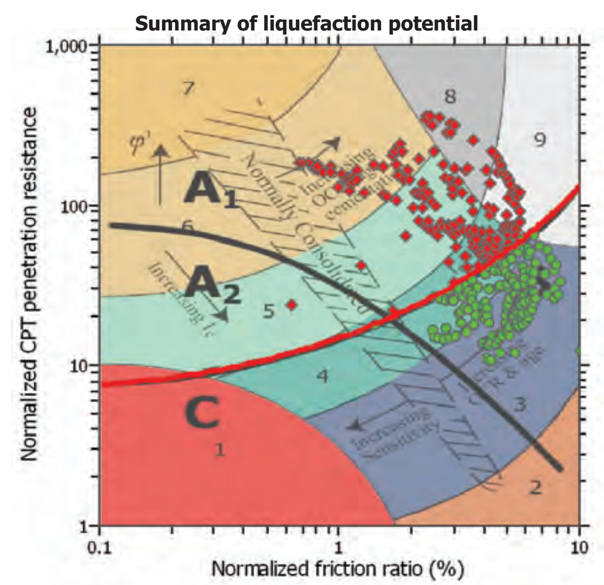
CPT file : CPT-3 (2/3 PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

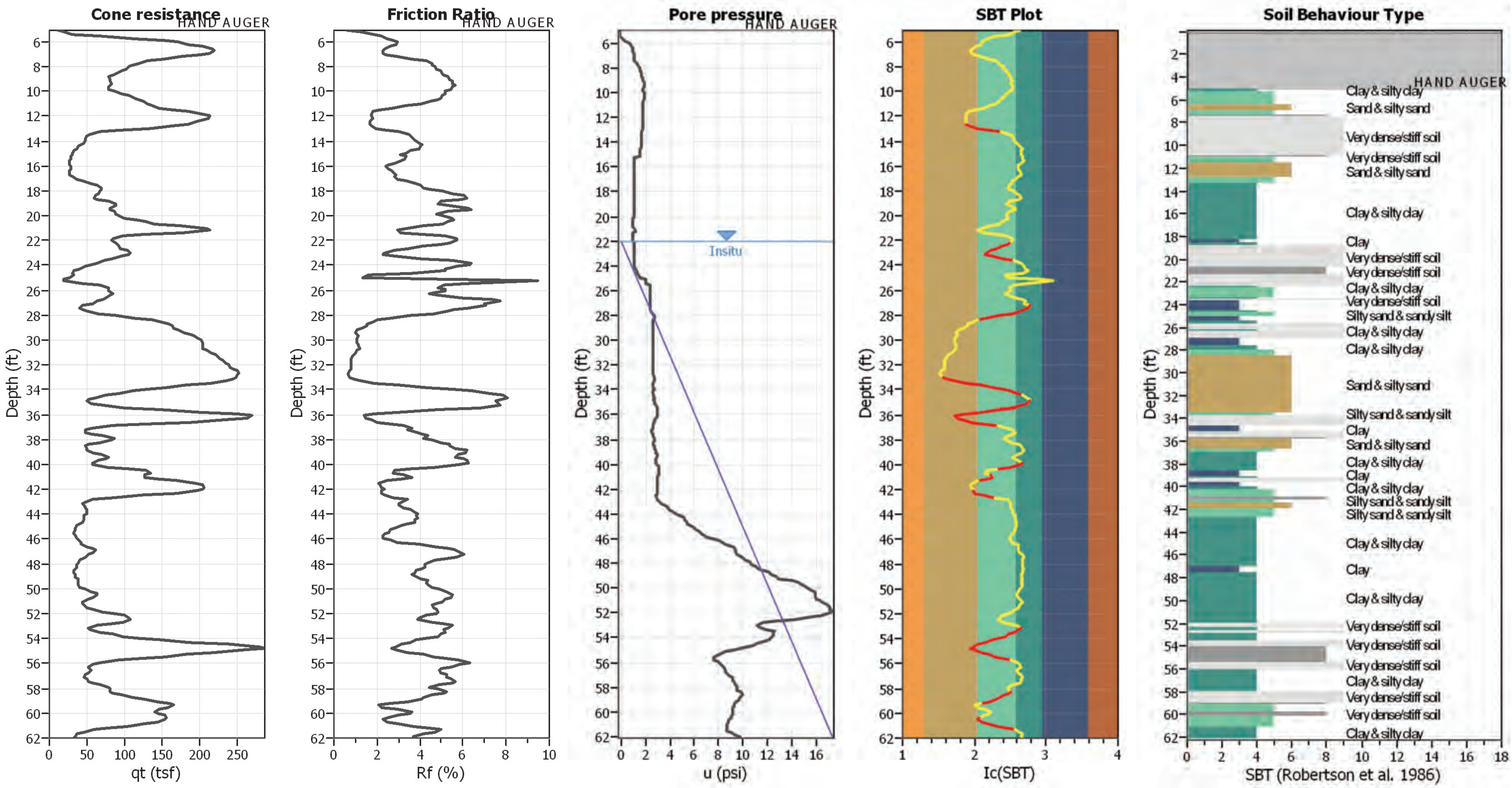






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



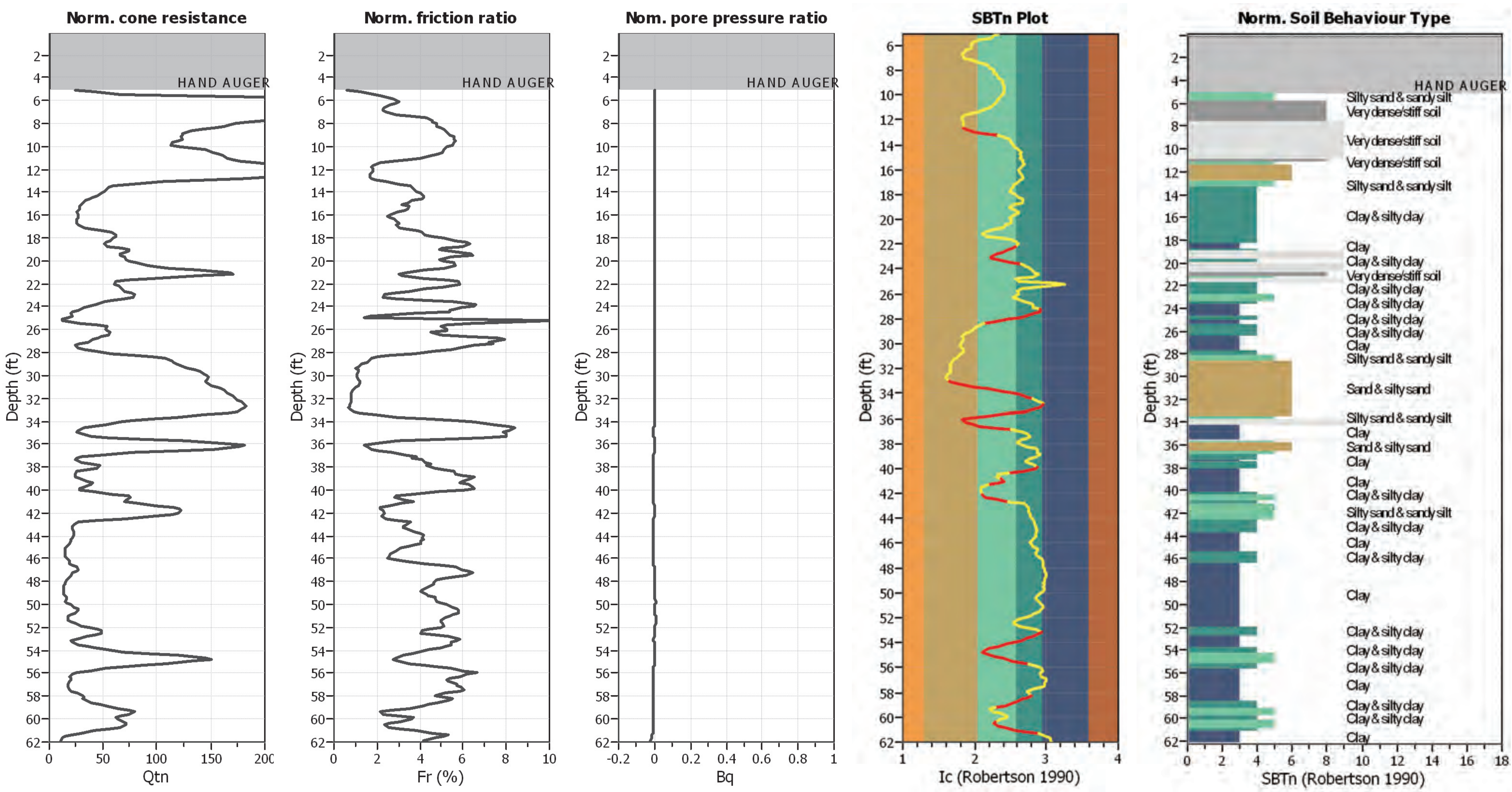
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



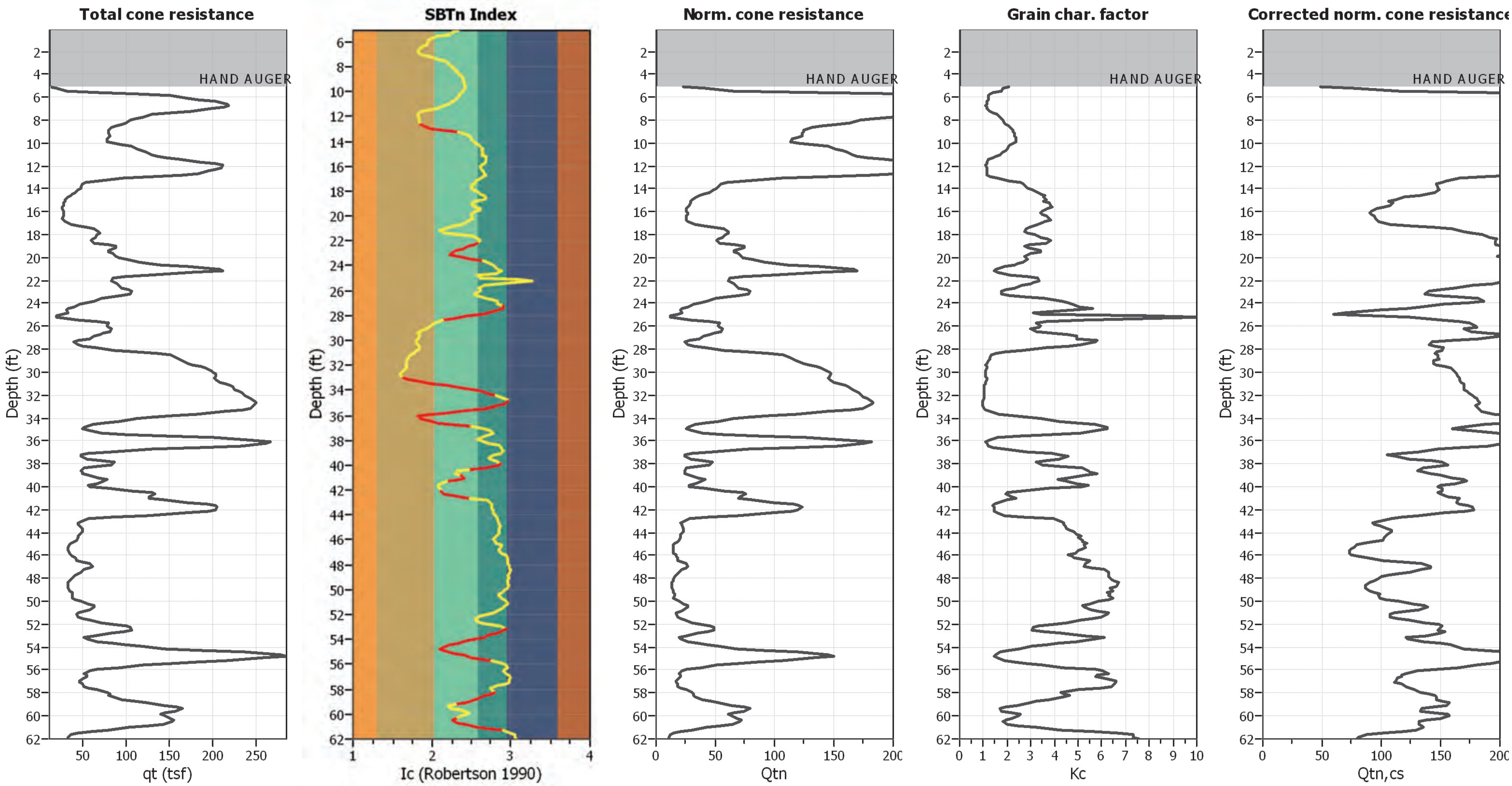
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

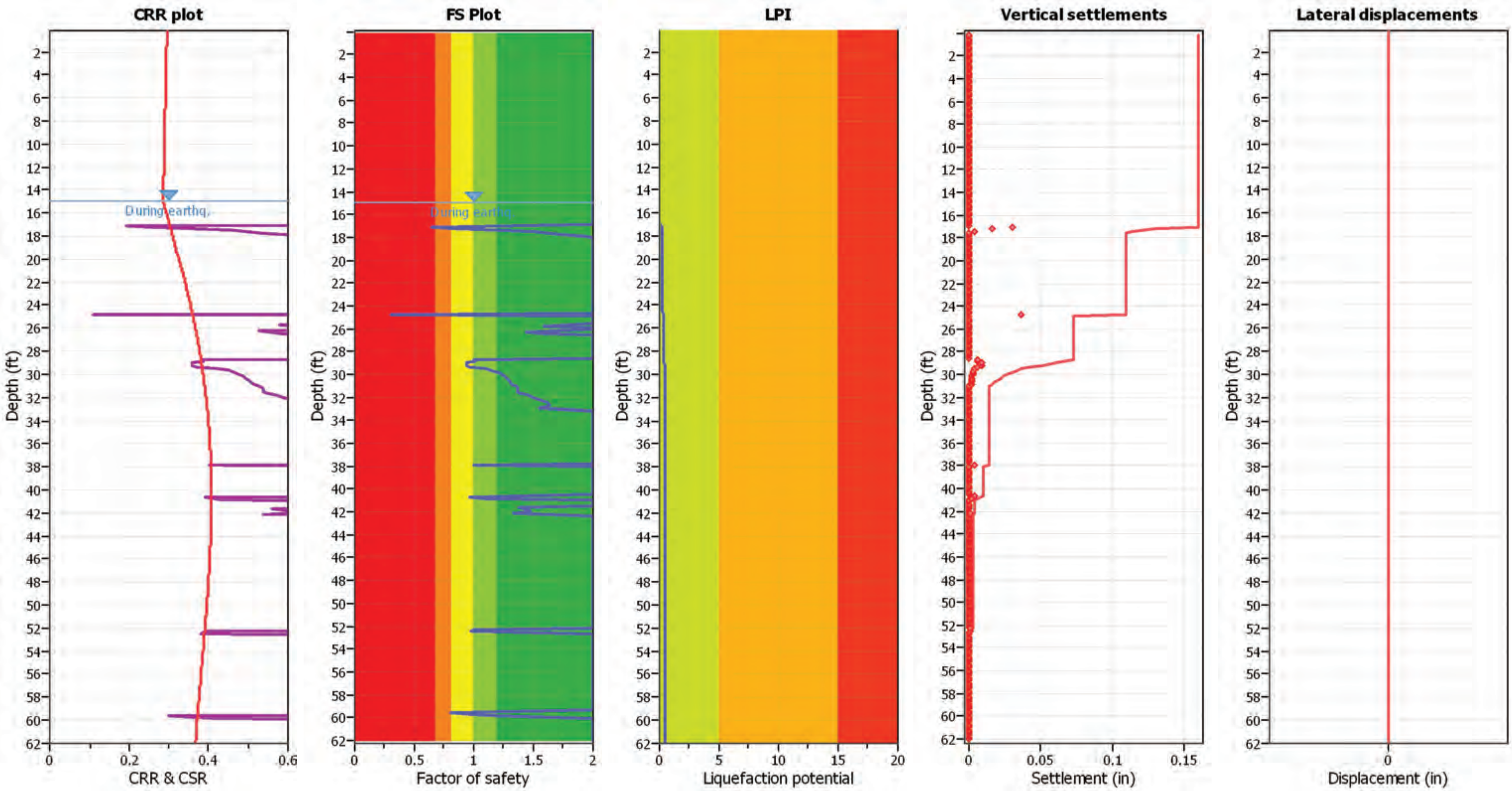
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

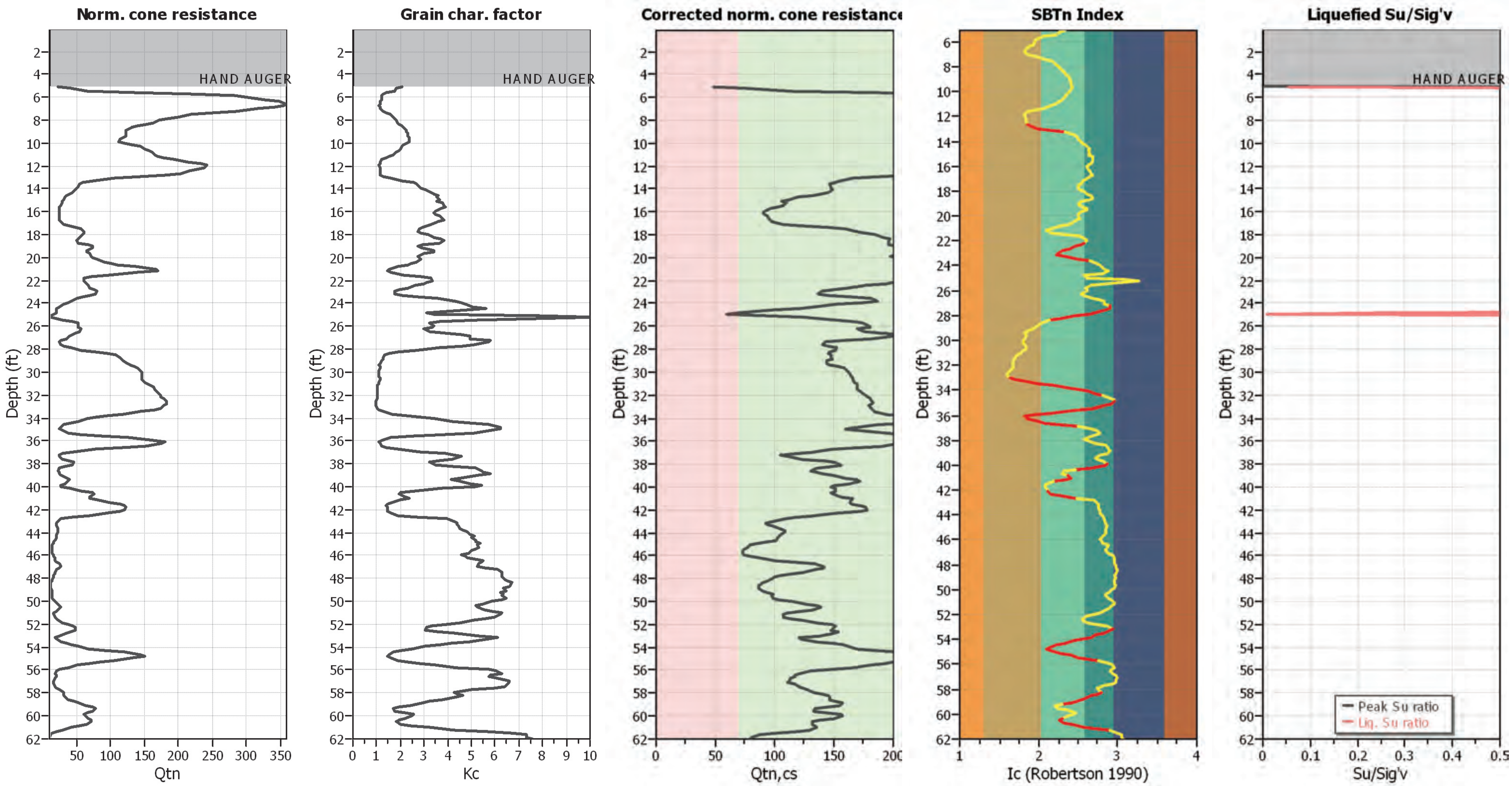
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

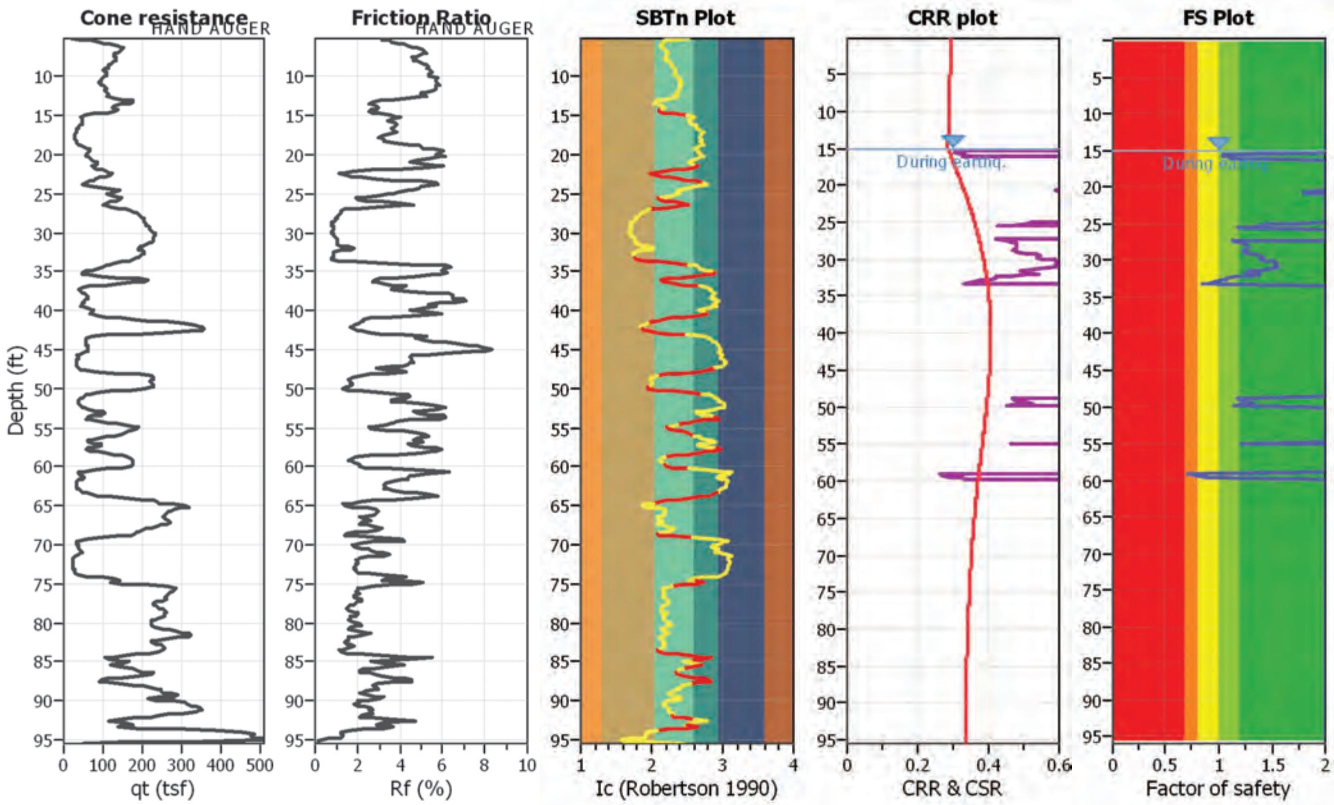
LIQUEFACTION ANALYSIS REPORT

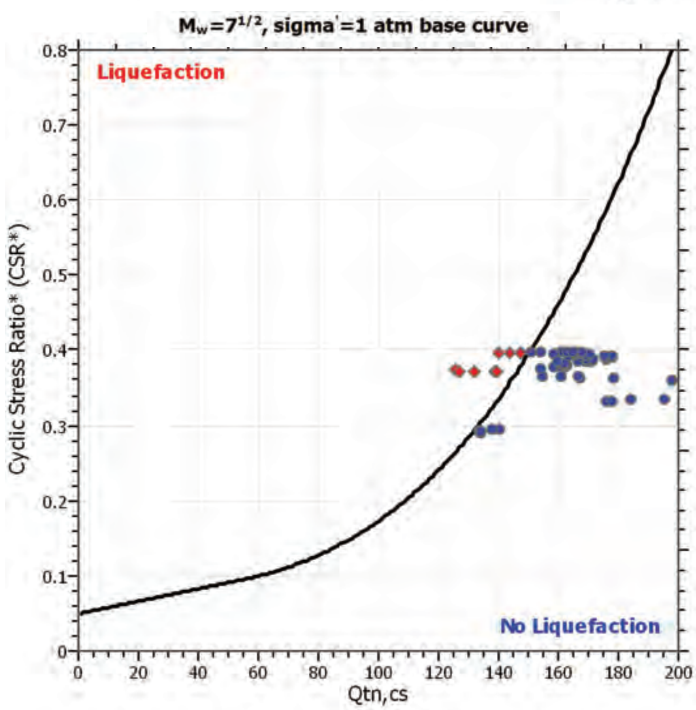
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

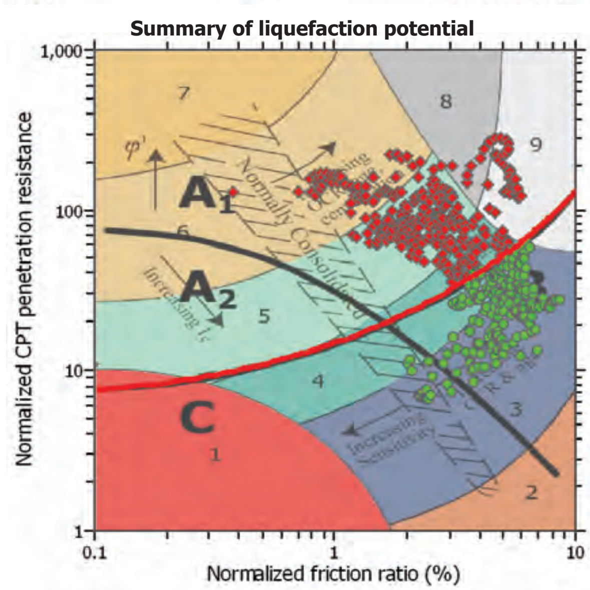
CPT file : CPT-4 (2/3 PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

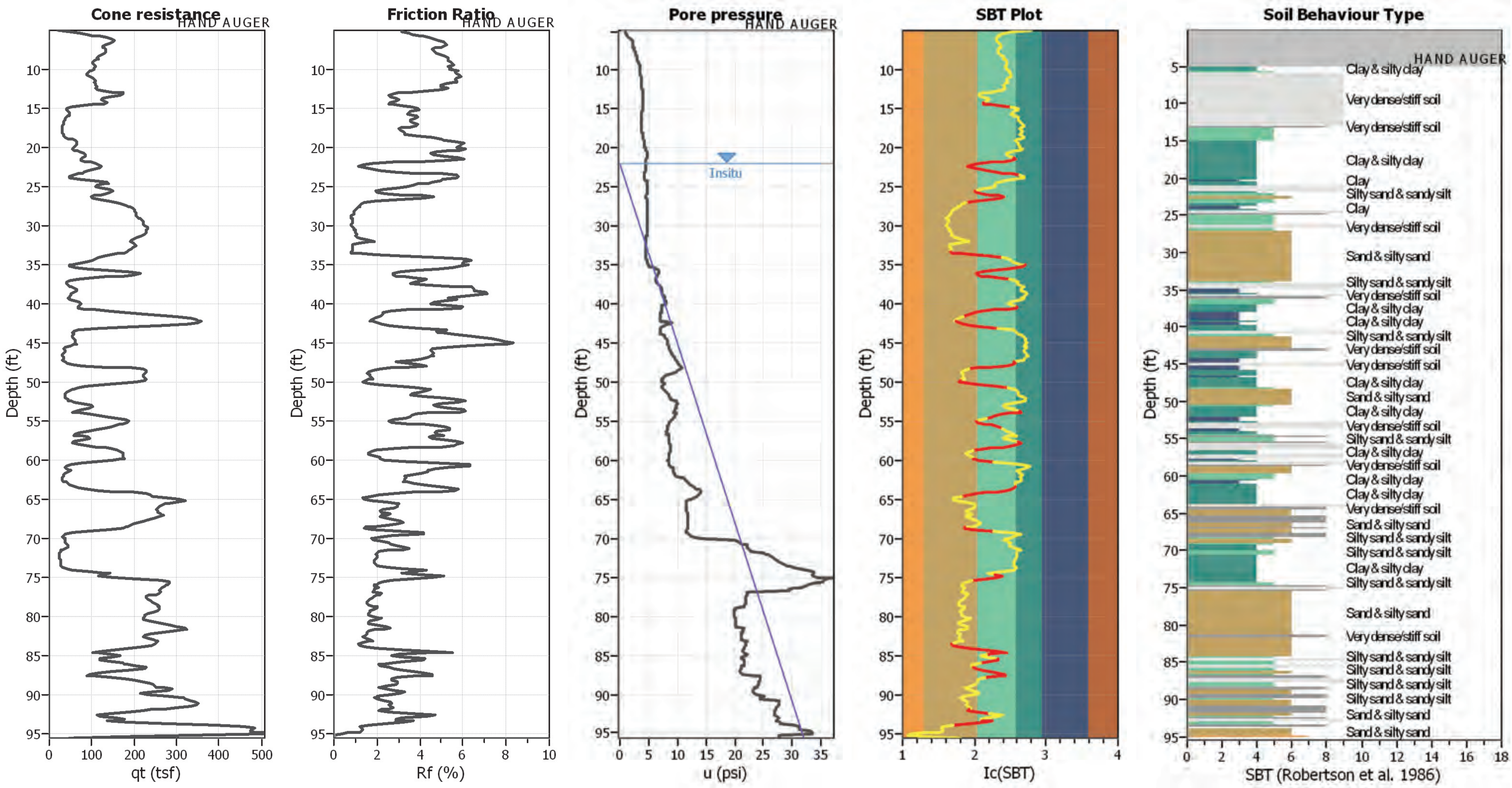






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



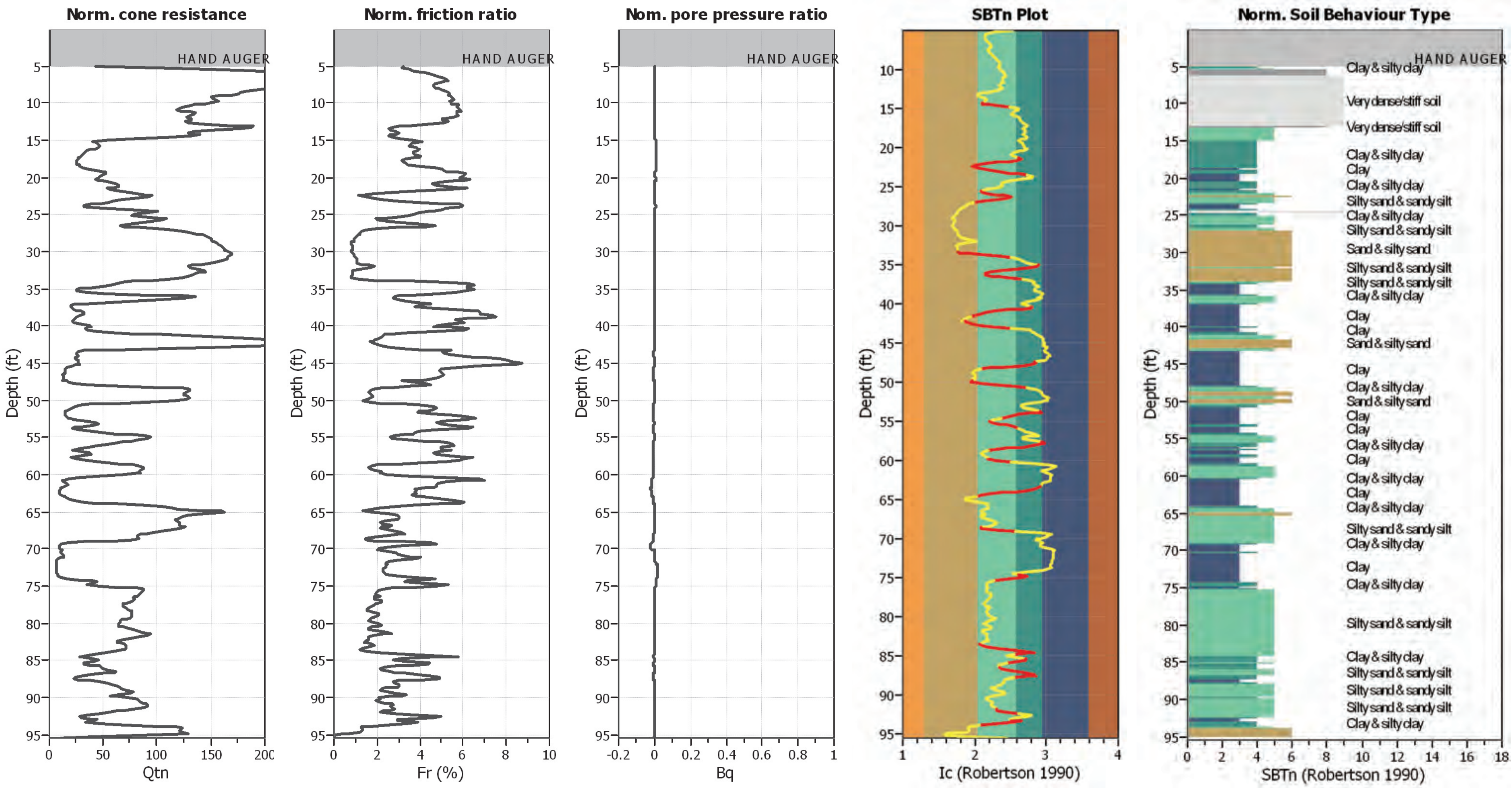
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



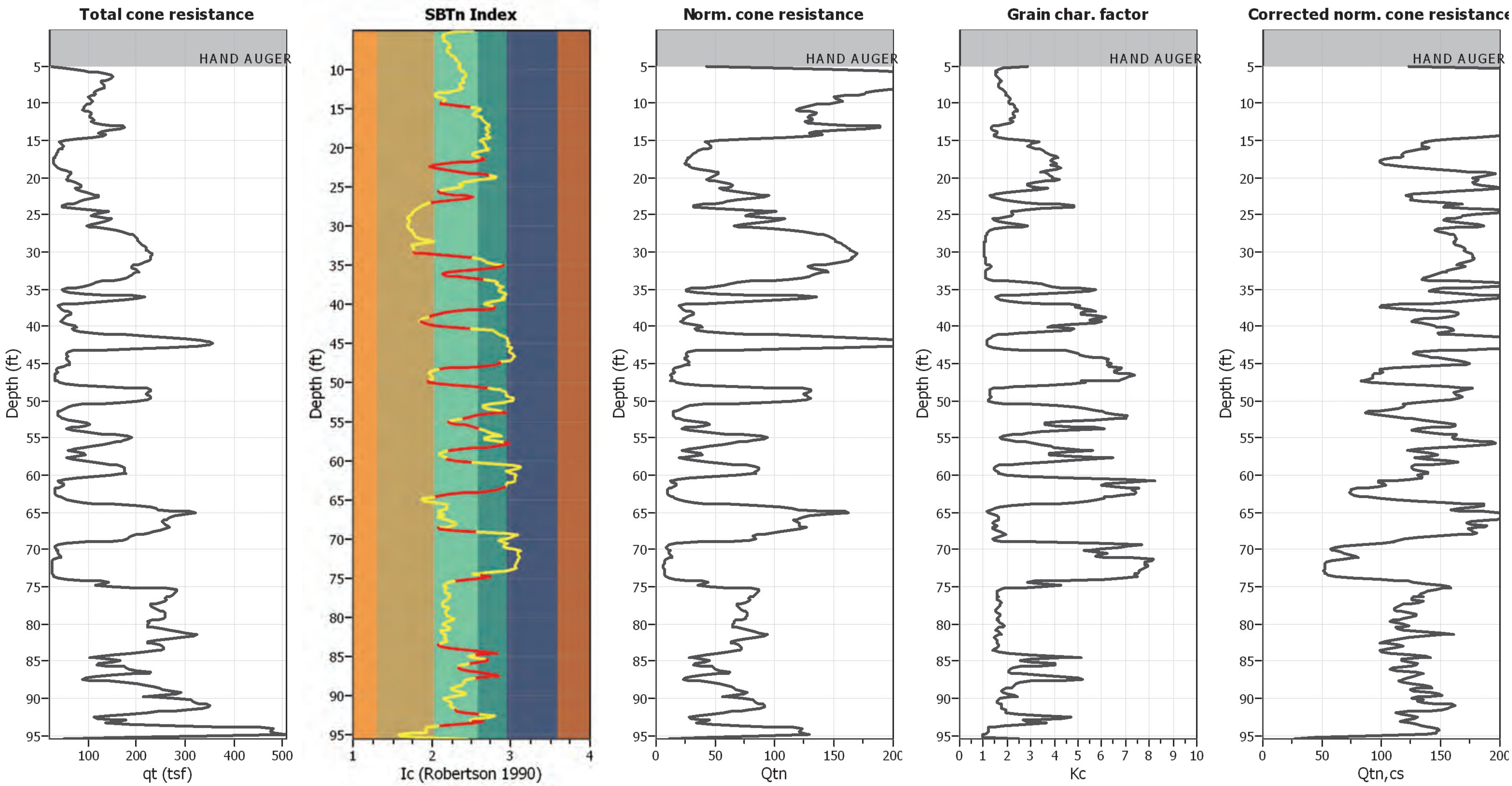
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

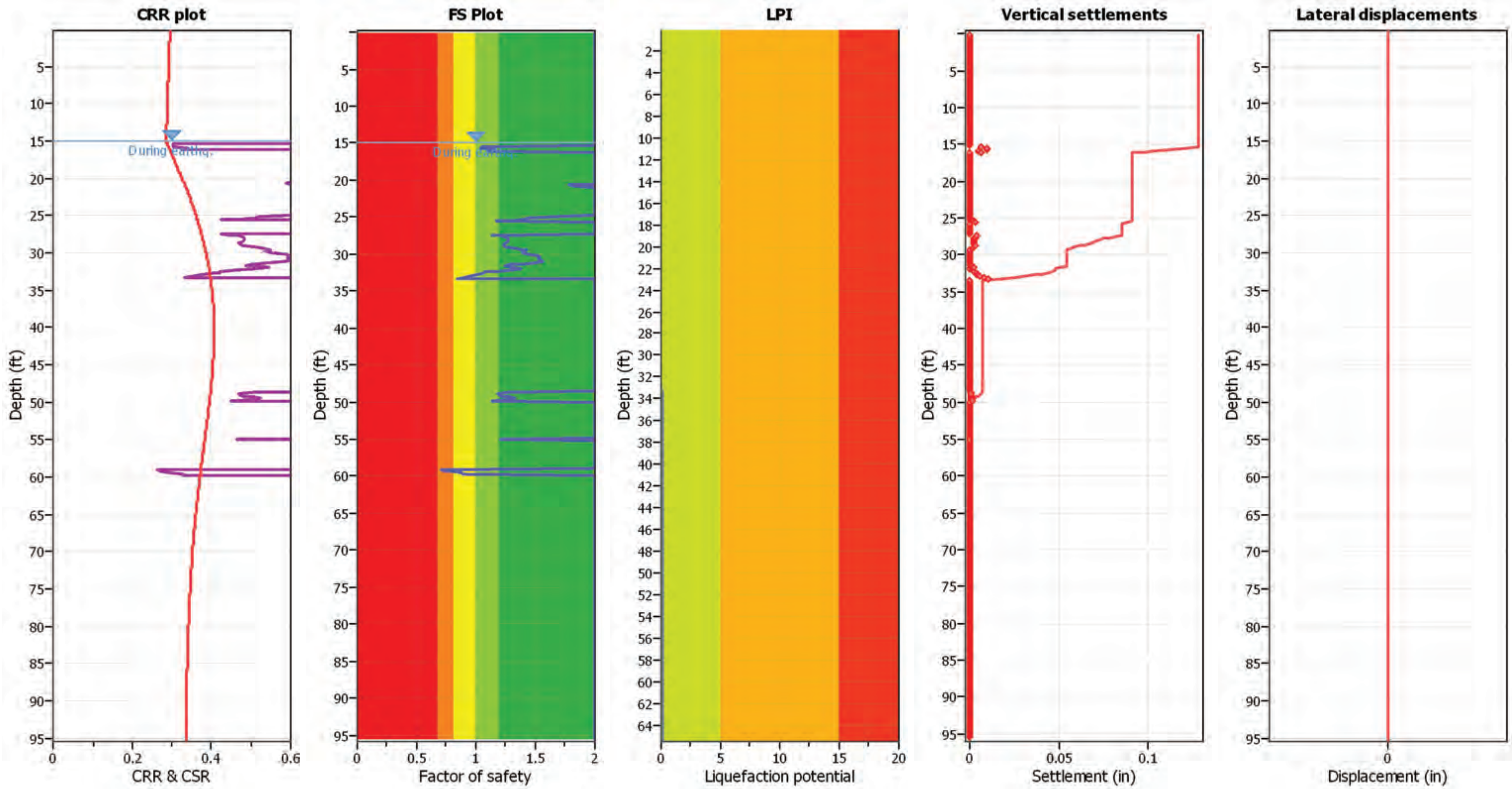
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

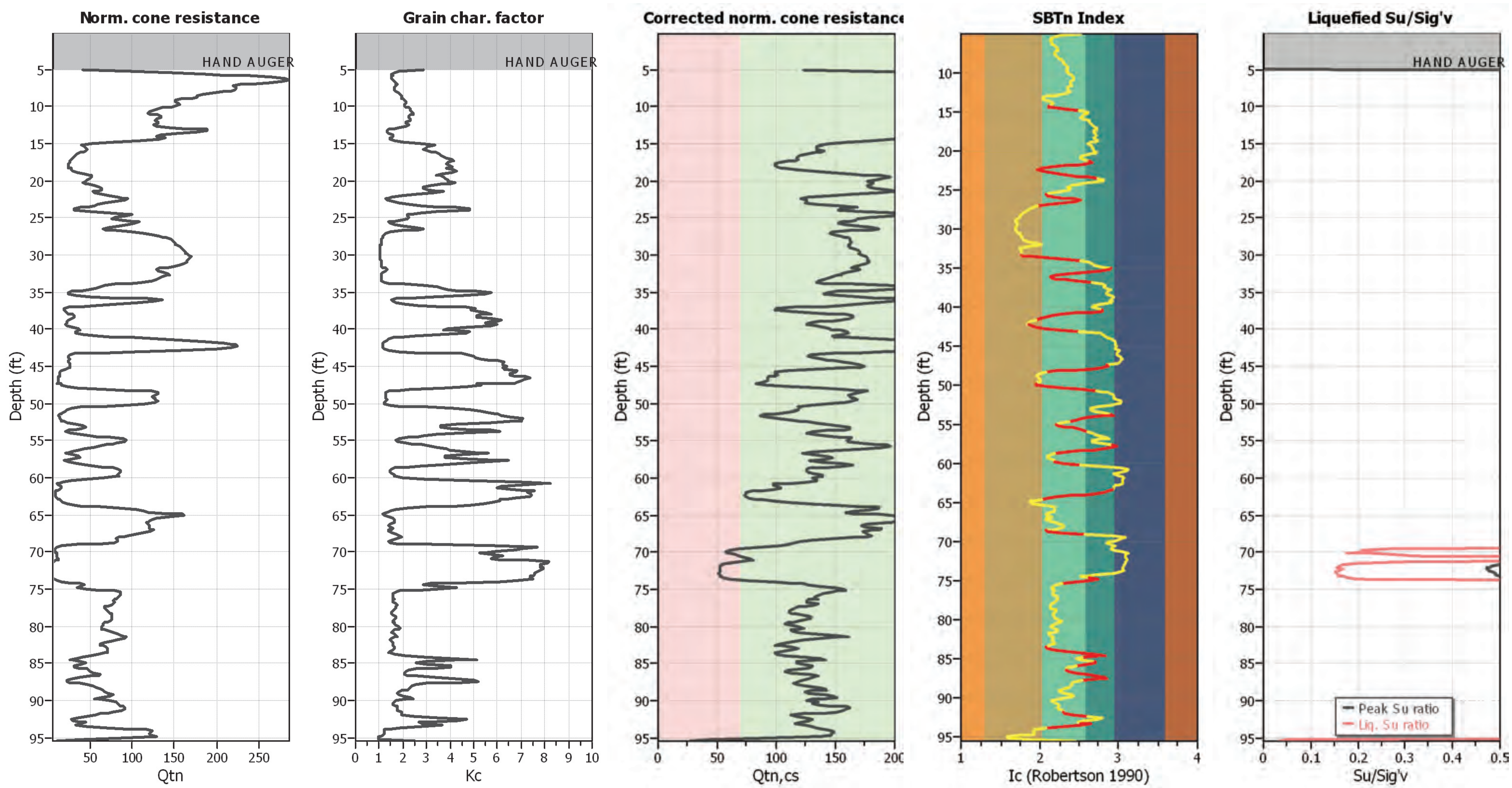
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

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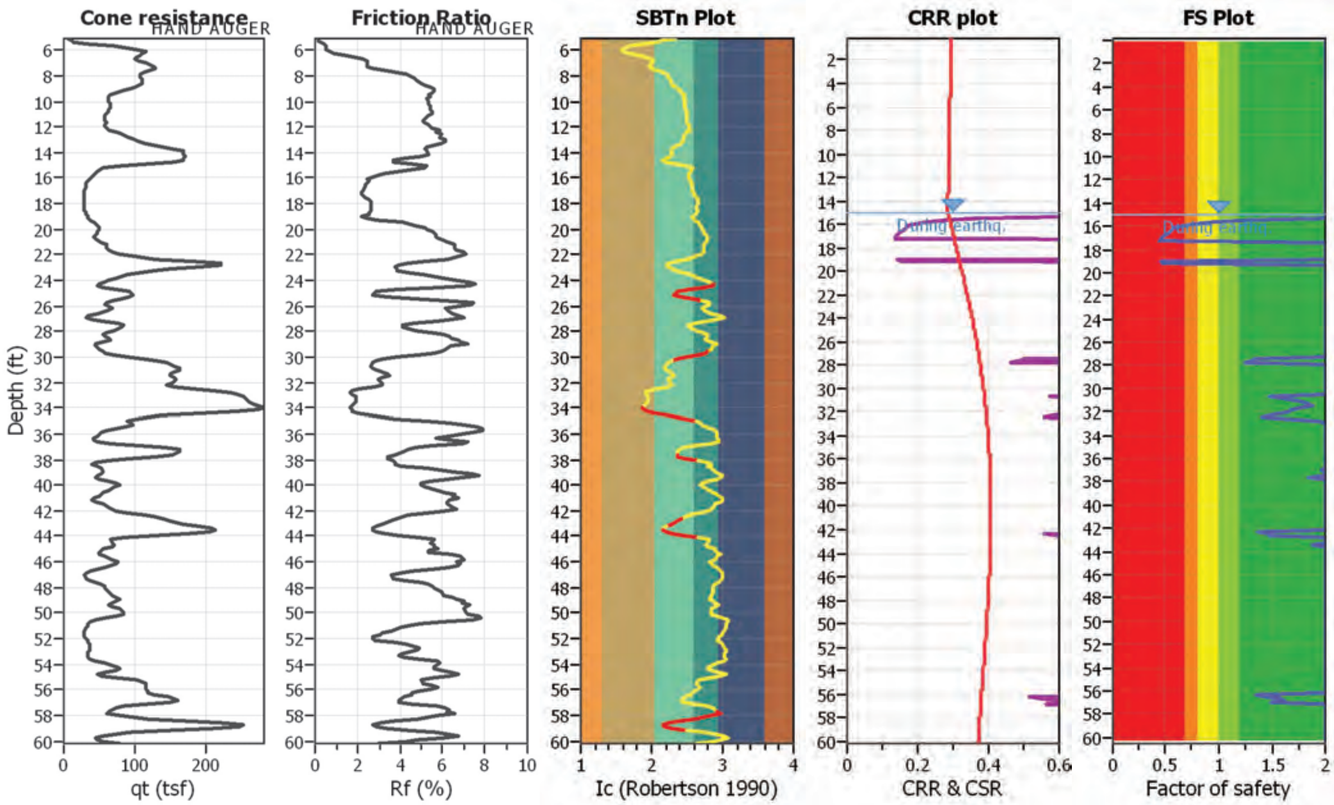
LIQUEFACTION ANALYSIS REPORT

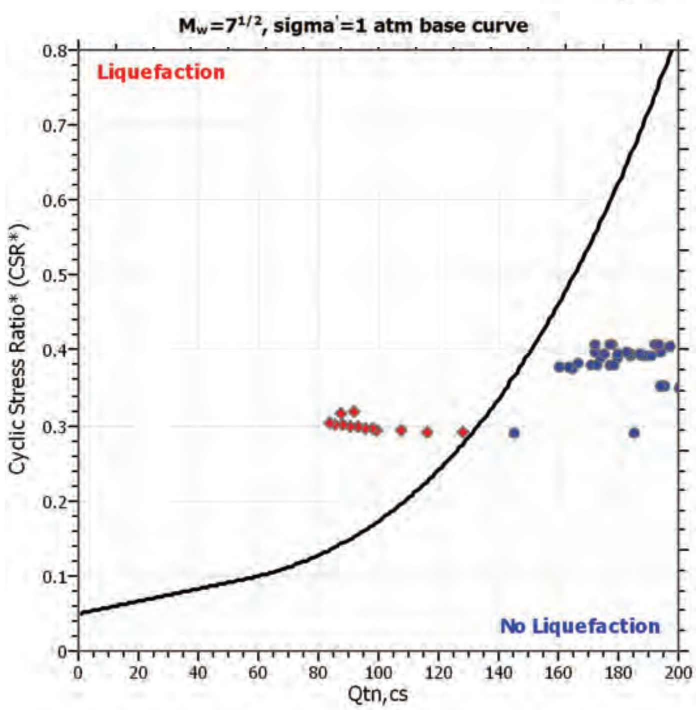
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

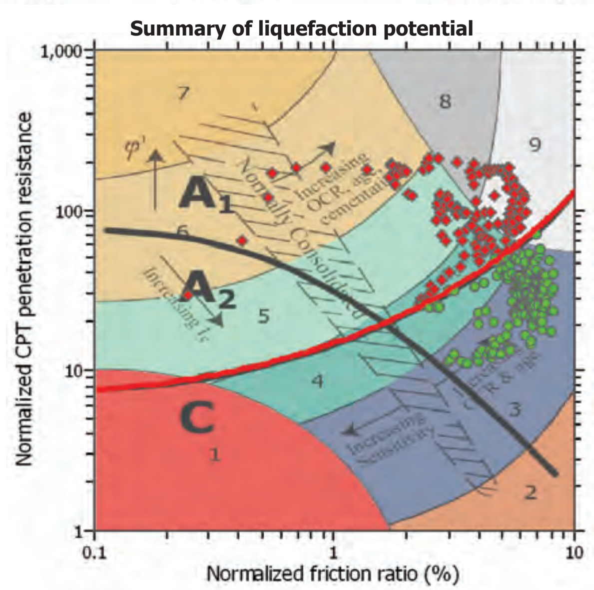
CPT file : CPT-5 (2/3 PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

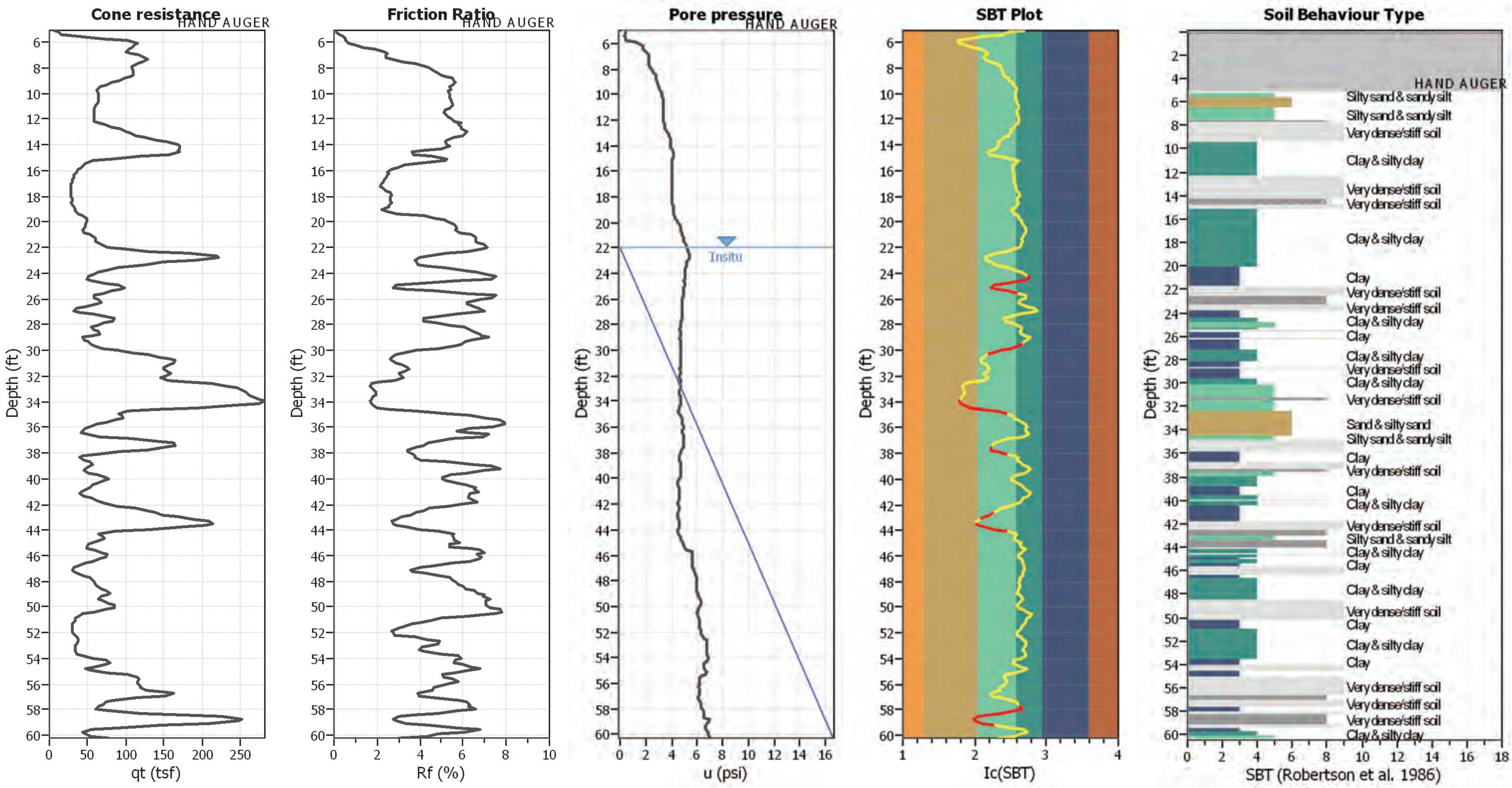






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



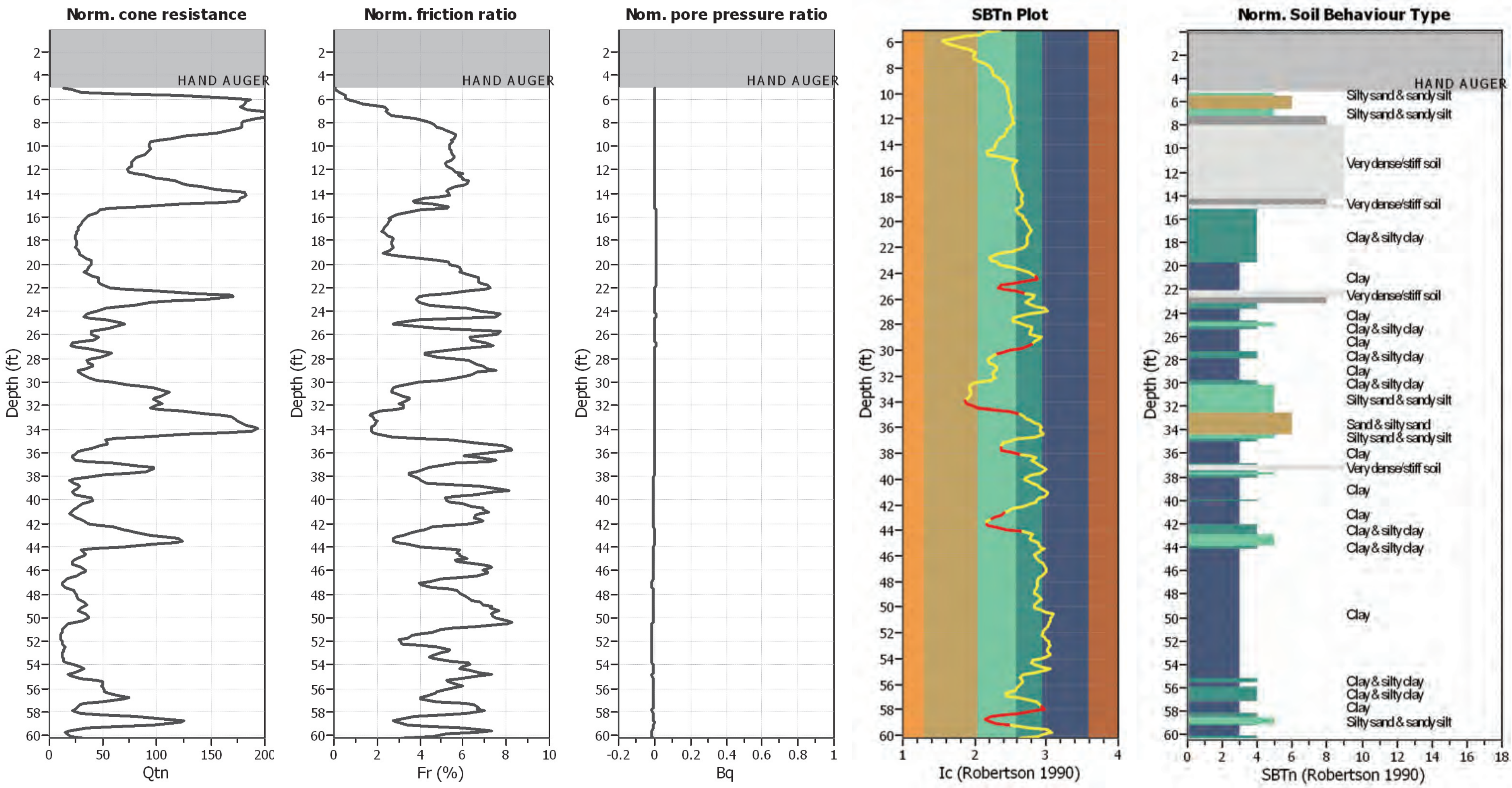
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



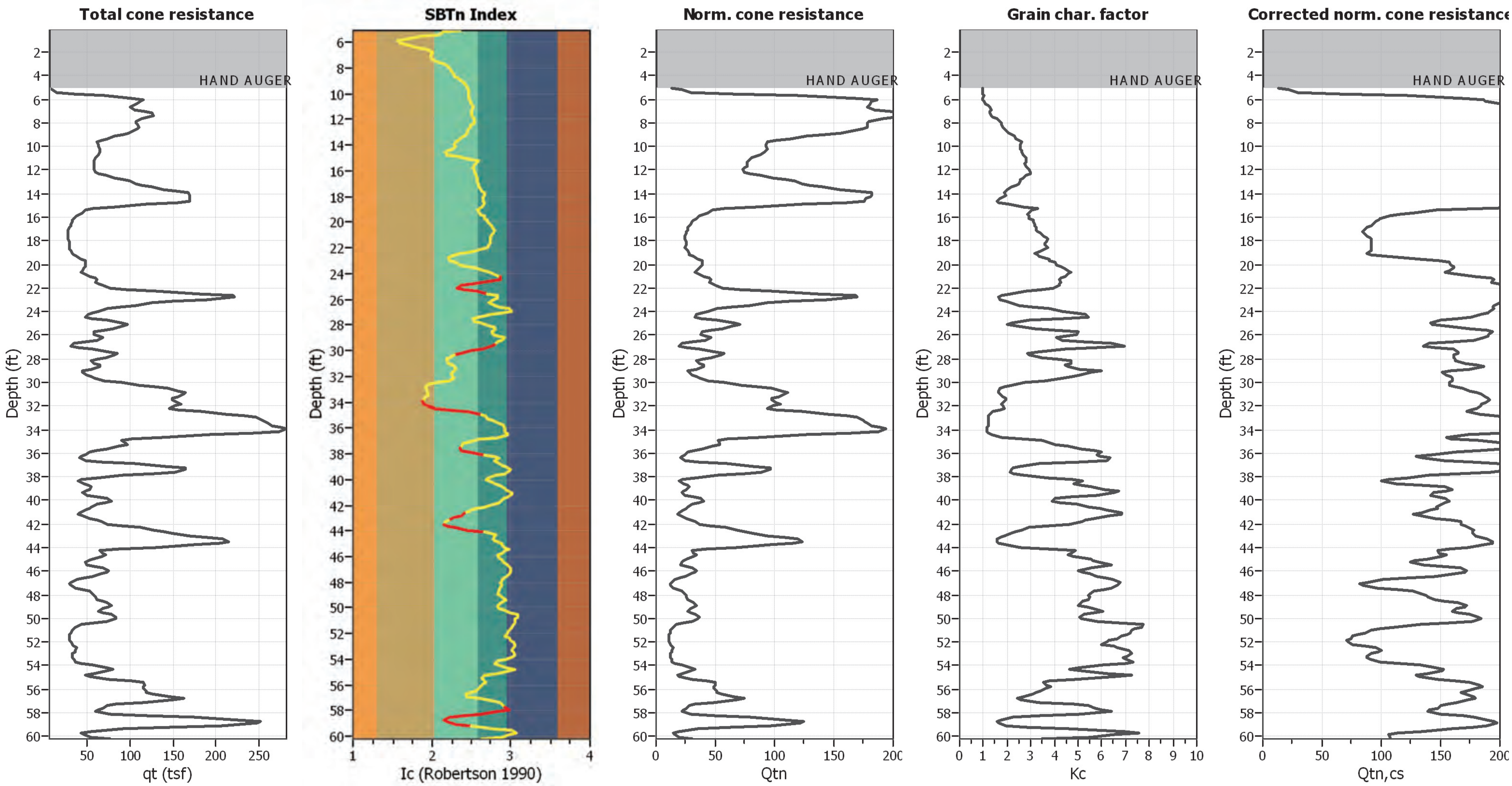
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

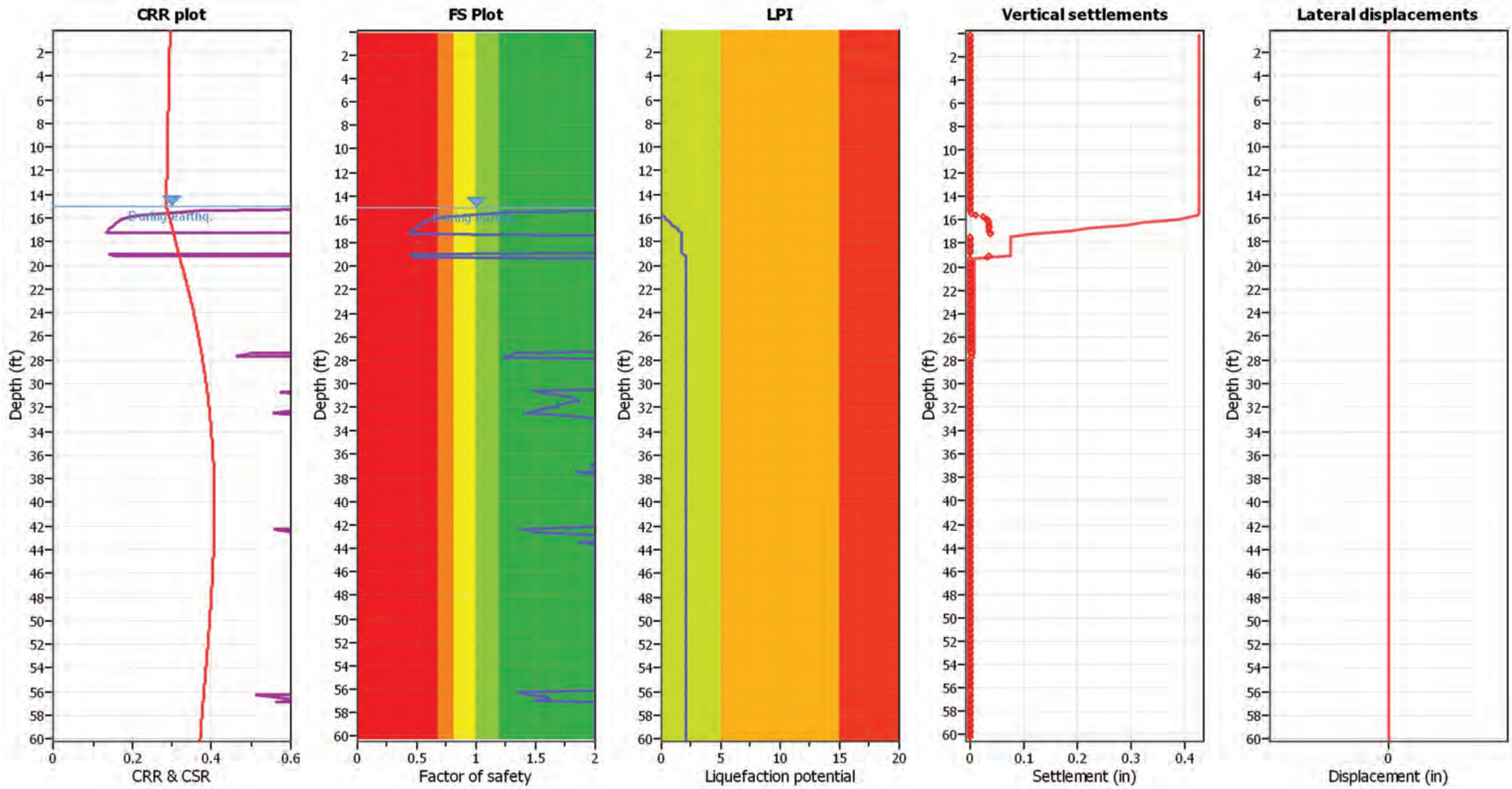
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

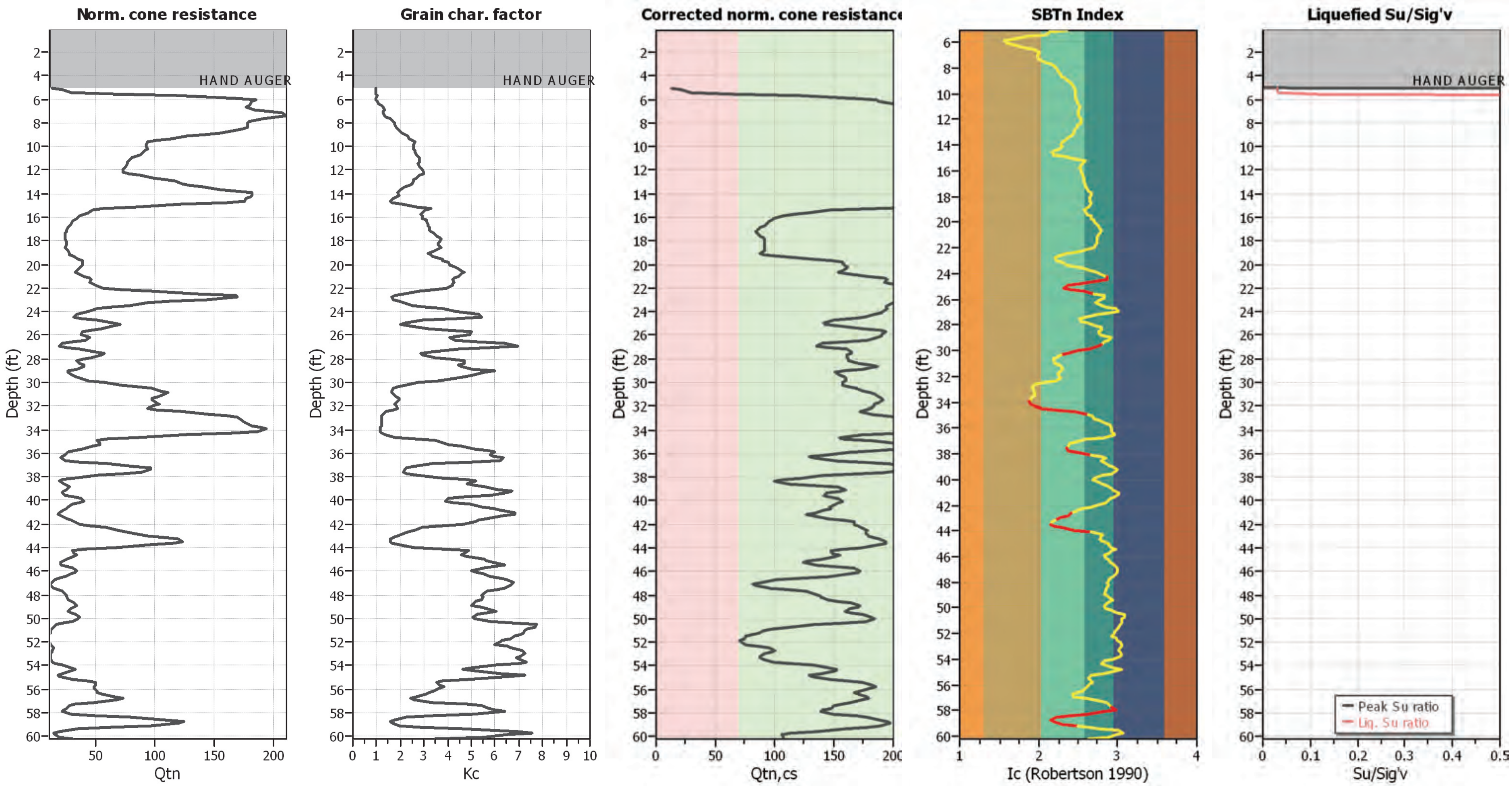
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

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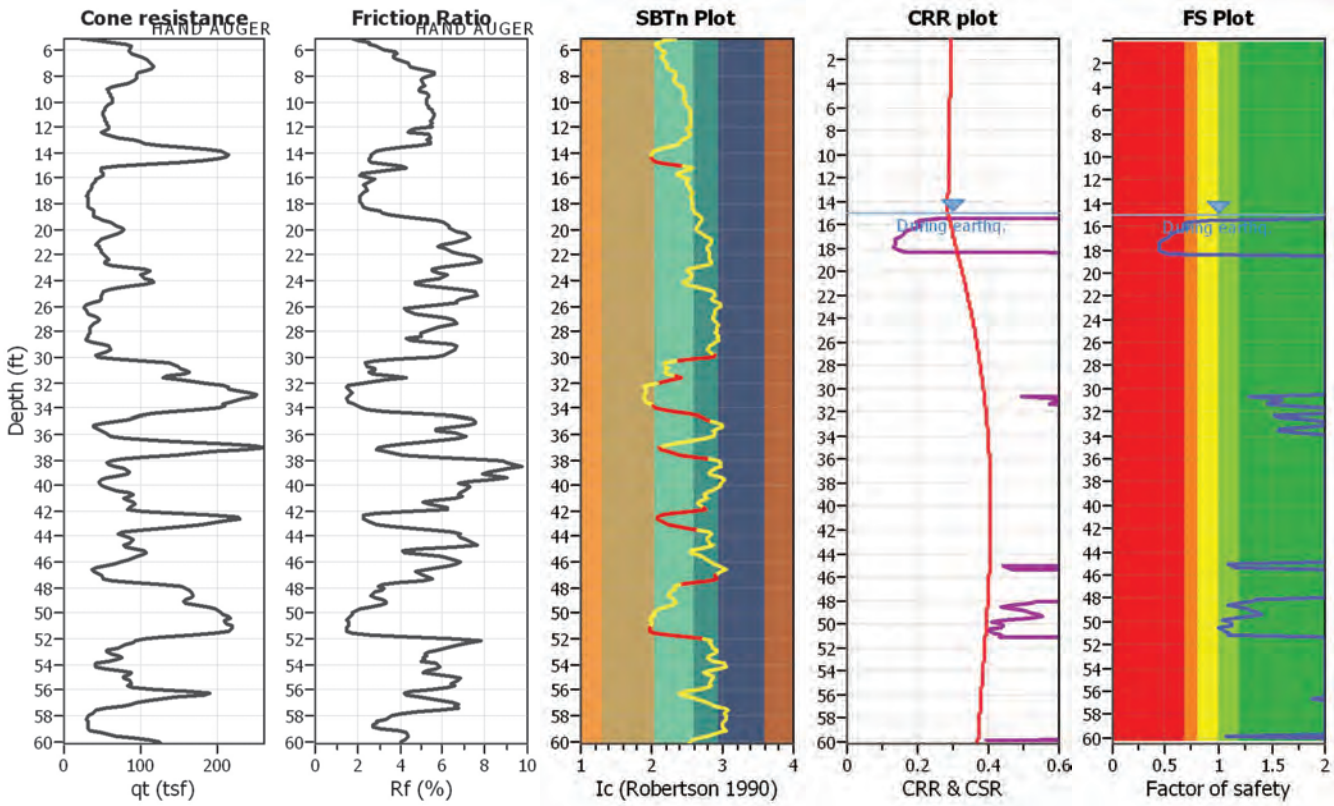
LIQUEFACTION ANALYSIS REPORT

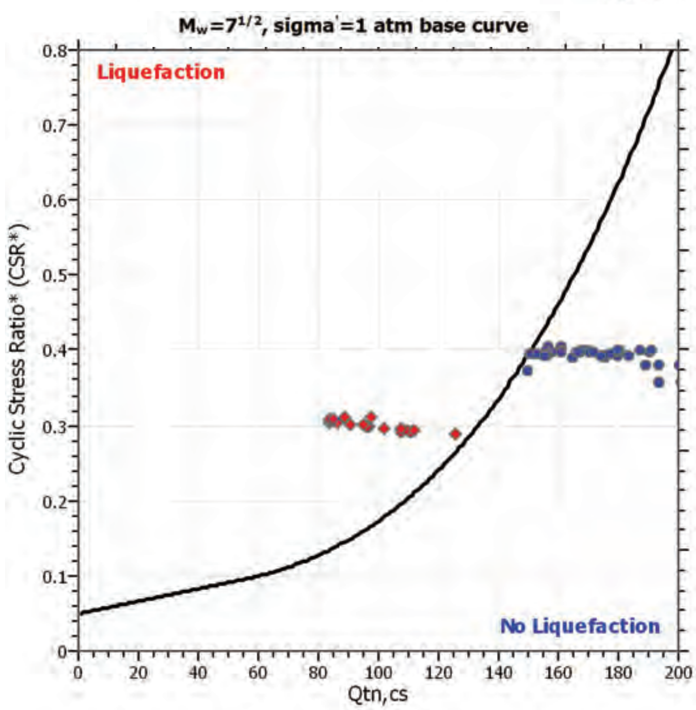
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

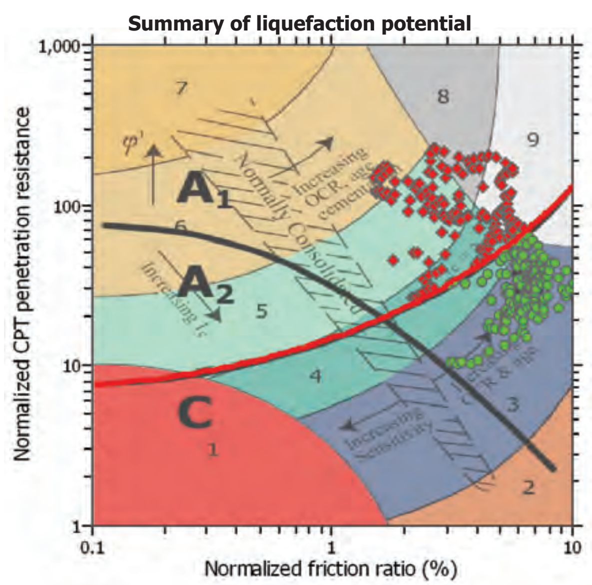
CPT file : CPT-6 (2/3 PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	6.61	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

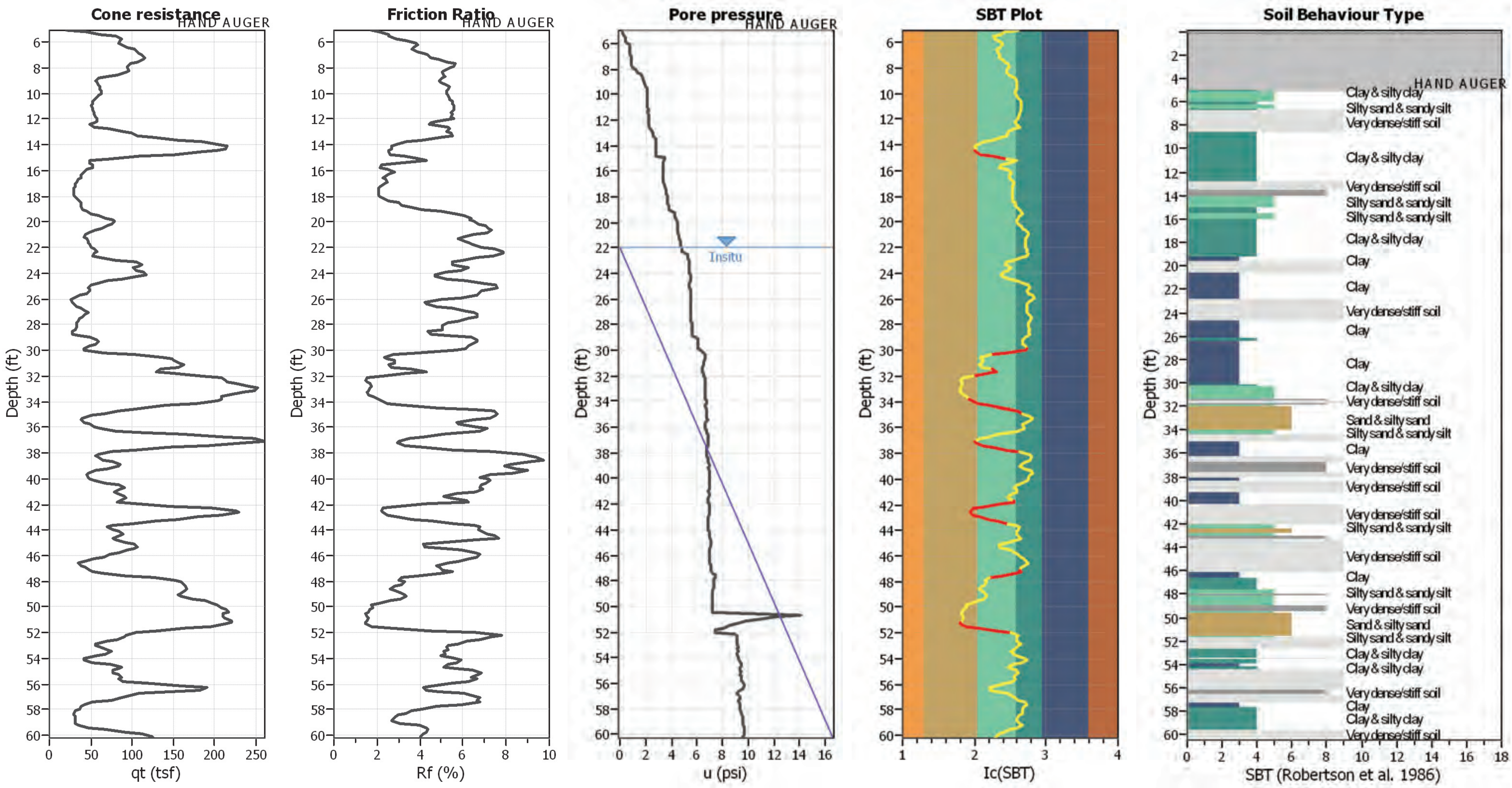






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



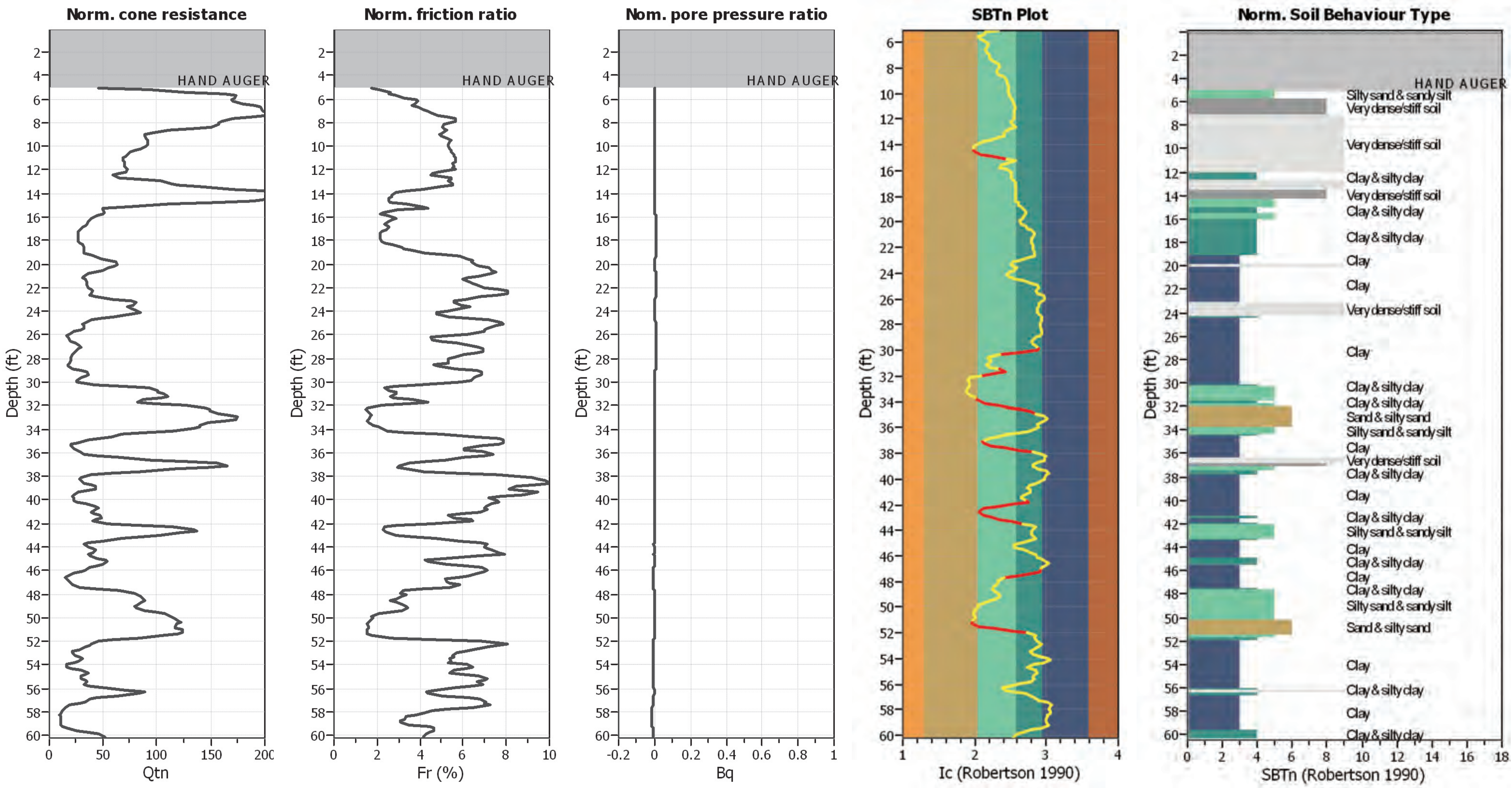
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only		
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes		
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft		

SBT legend

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

CPT basic interpretation plots (normalized)



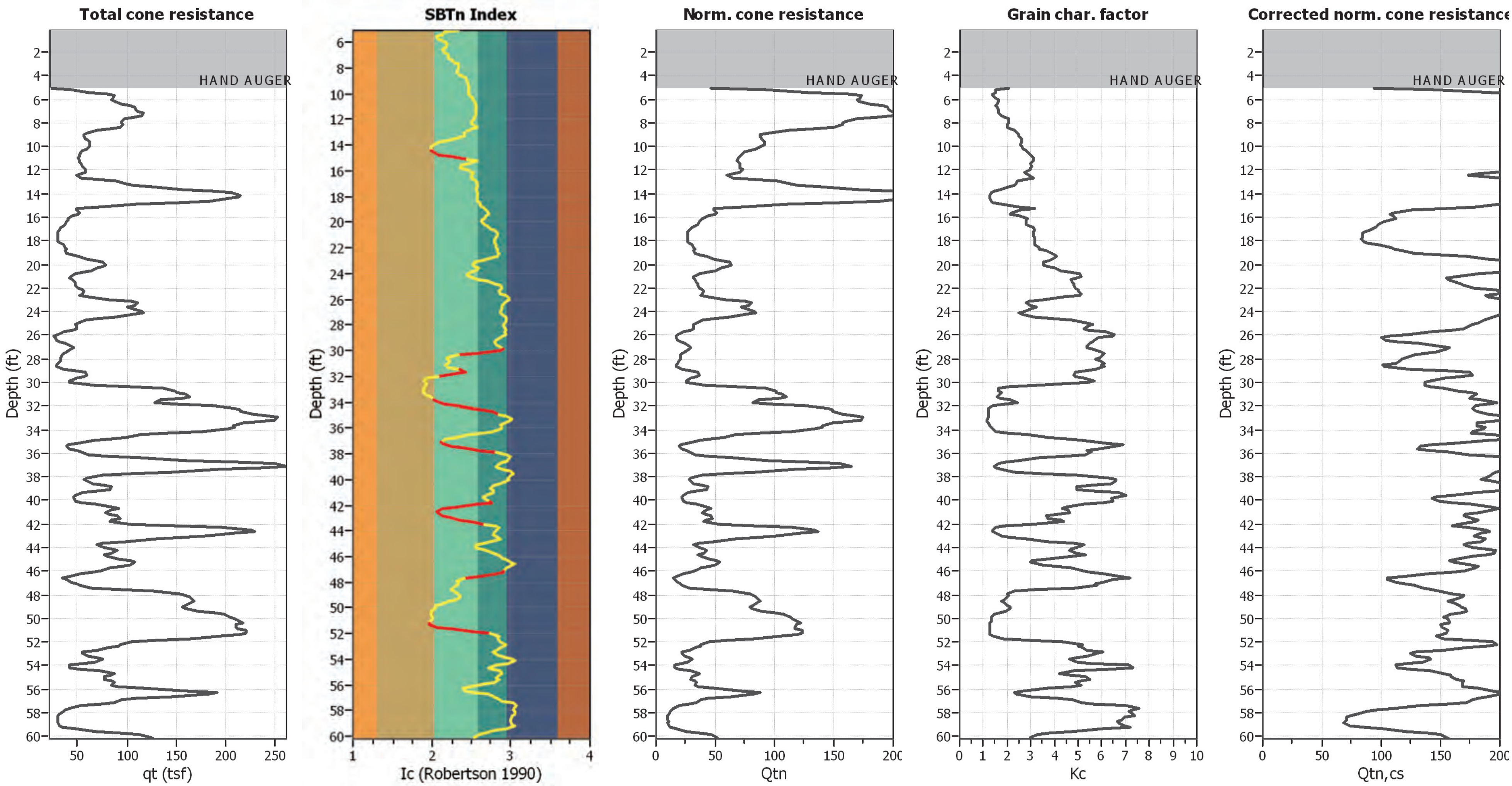
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

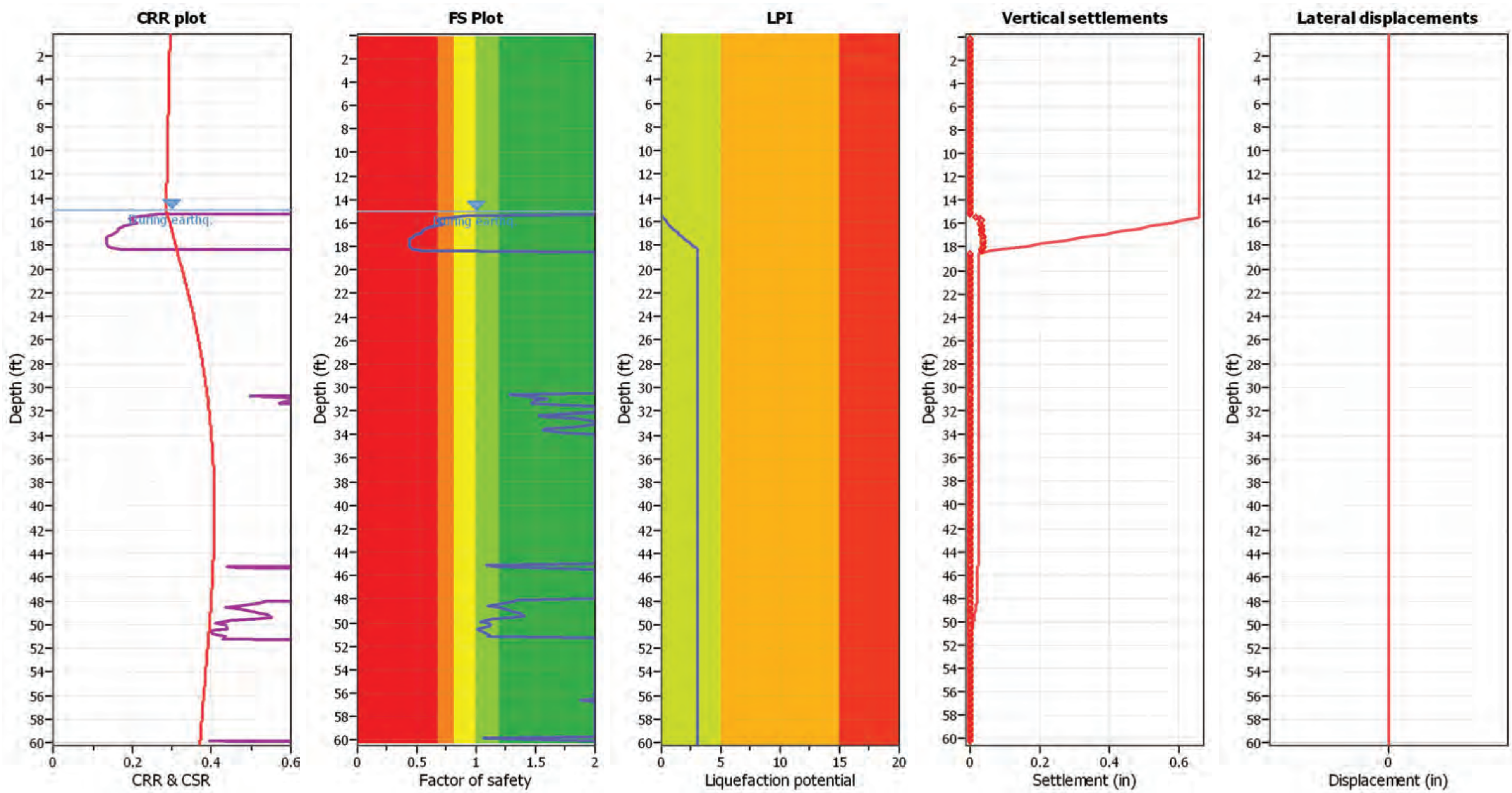
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

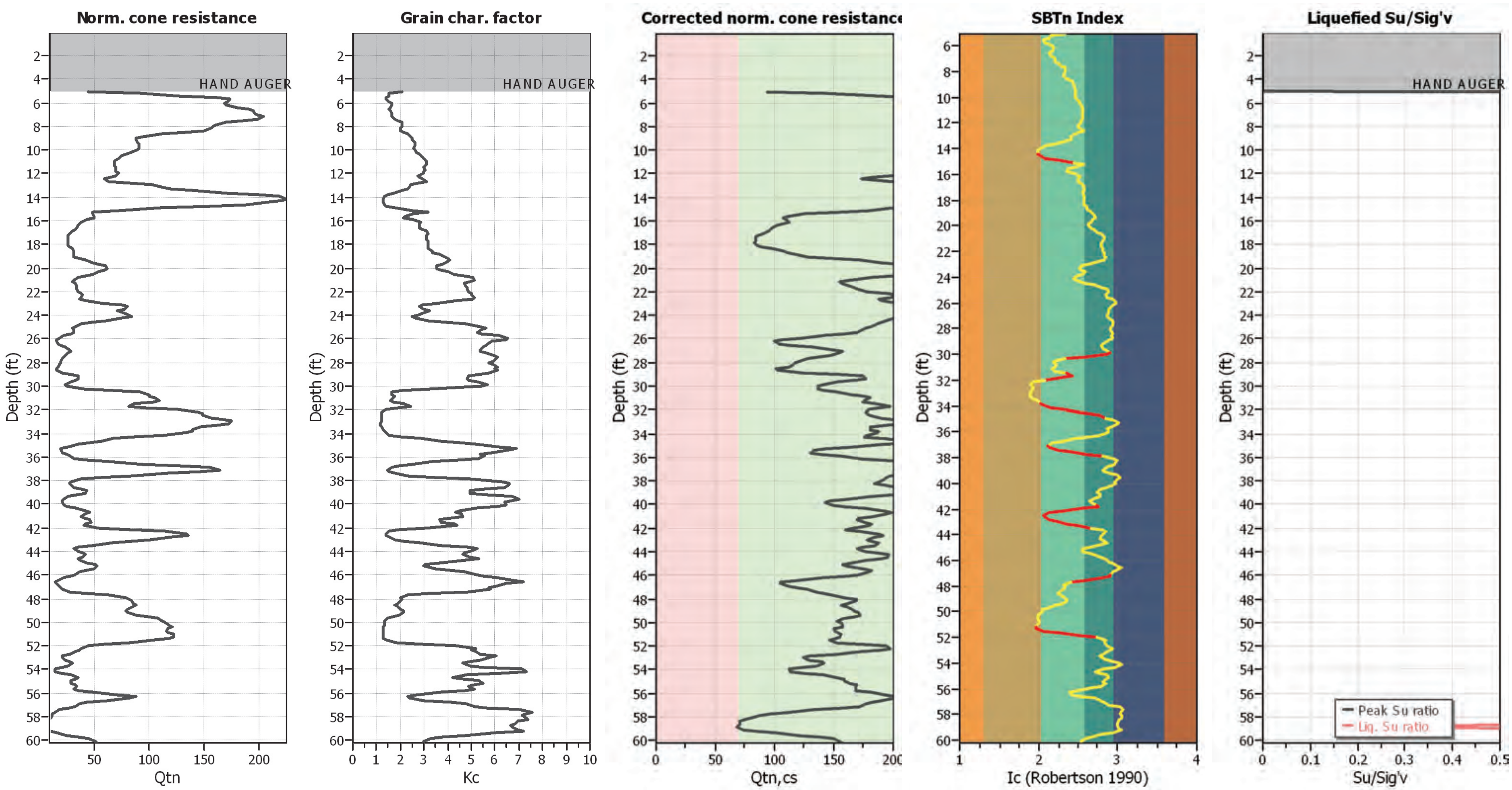
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



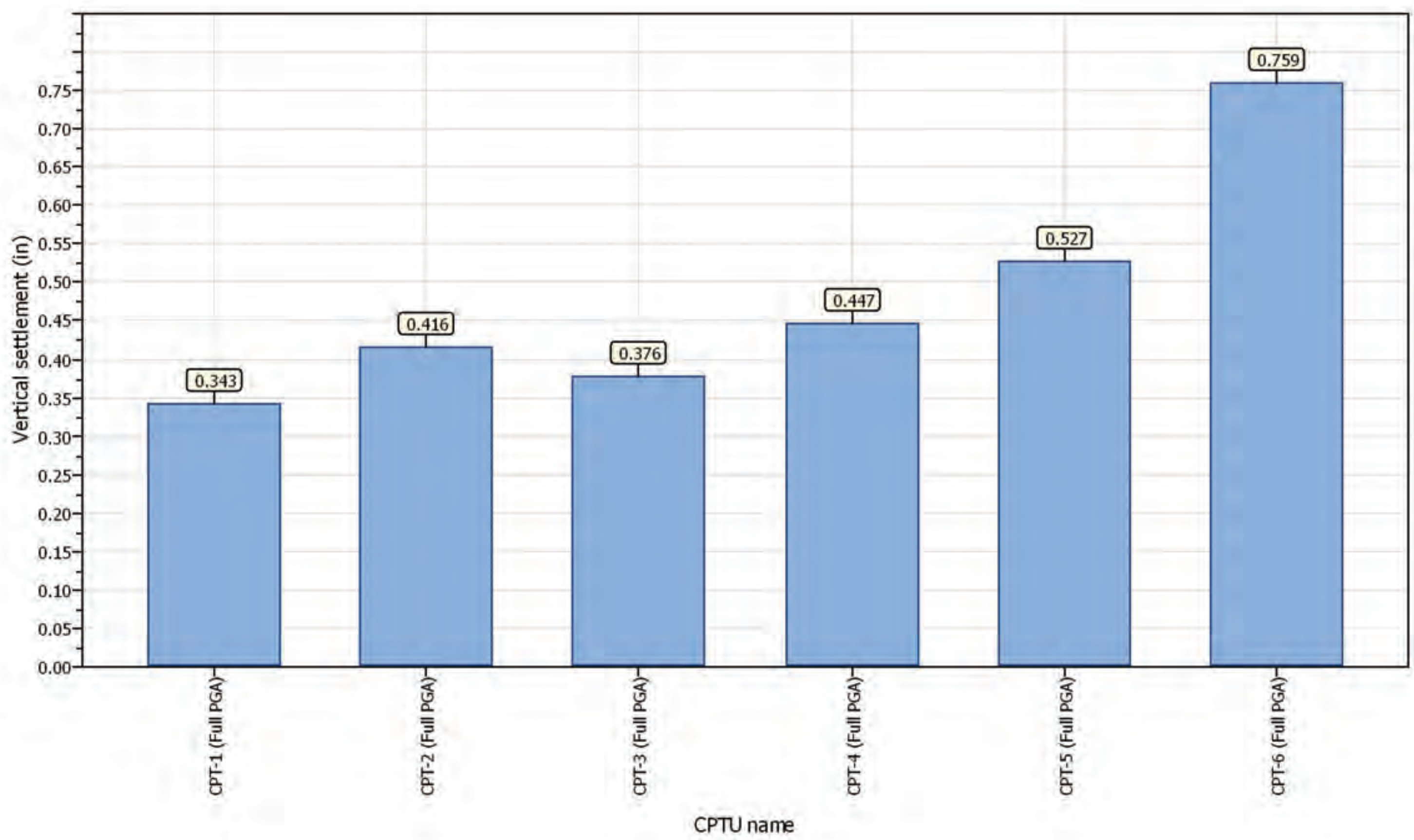
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.61	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Project title : 21-2971 16911 Normandie Associates, LLC

Location :

Overall vertical settlements report



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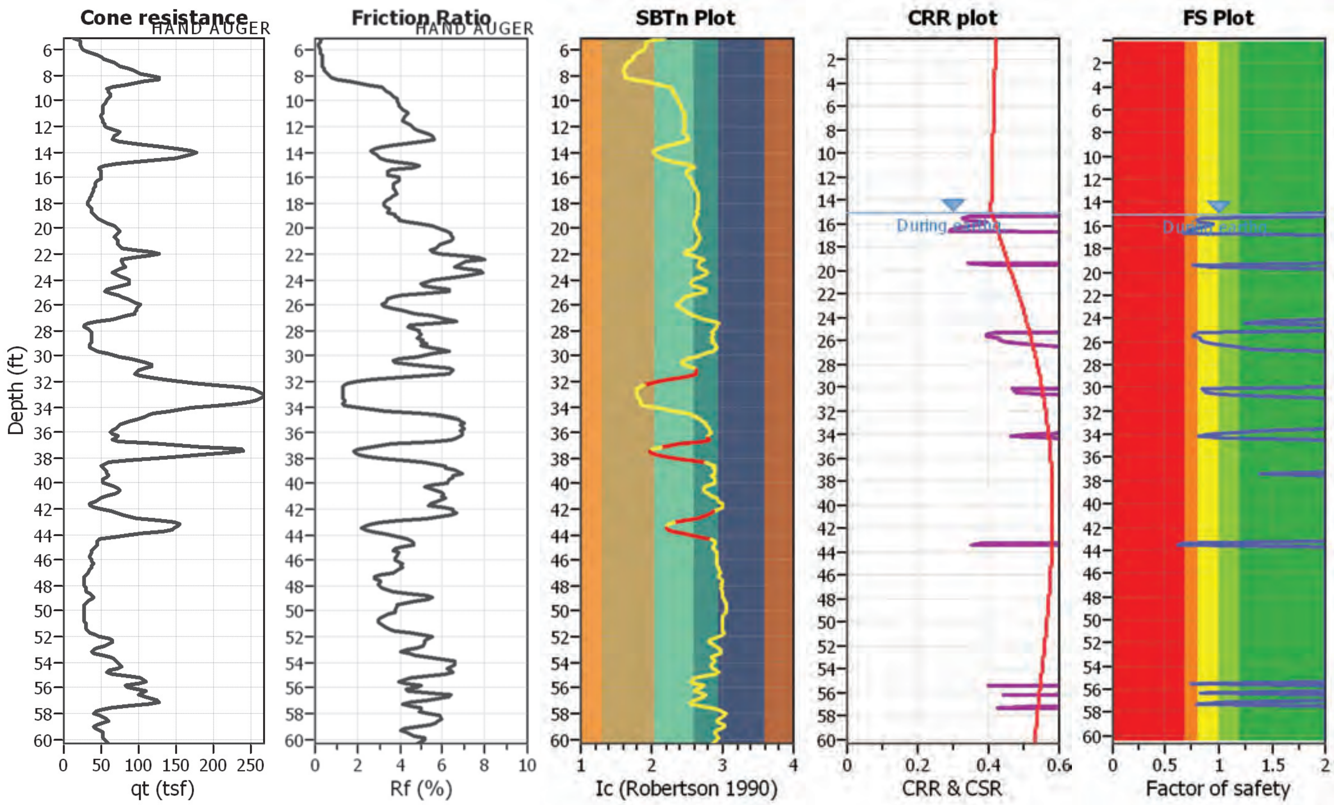
LIQUEFACTION ANALYSIS REPORT

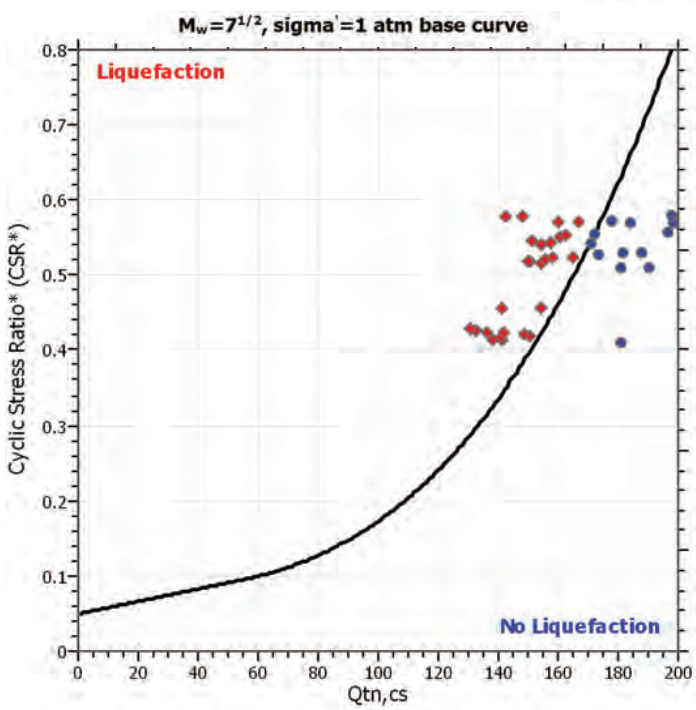
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

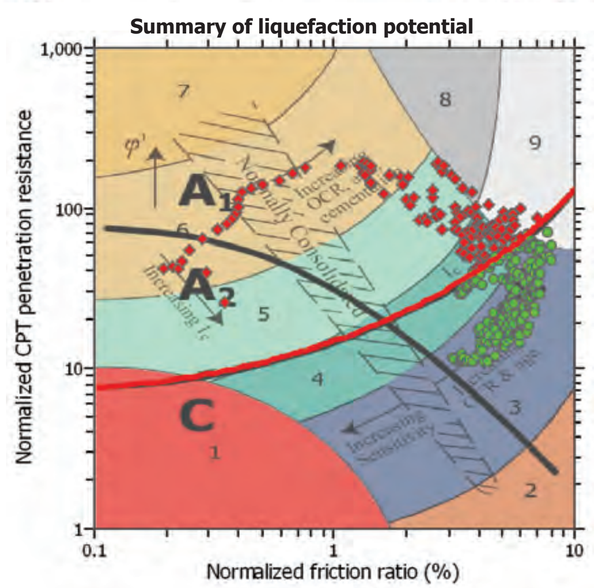
CPT file : CPT-1 (Full PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.74	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.85	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

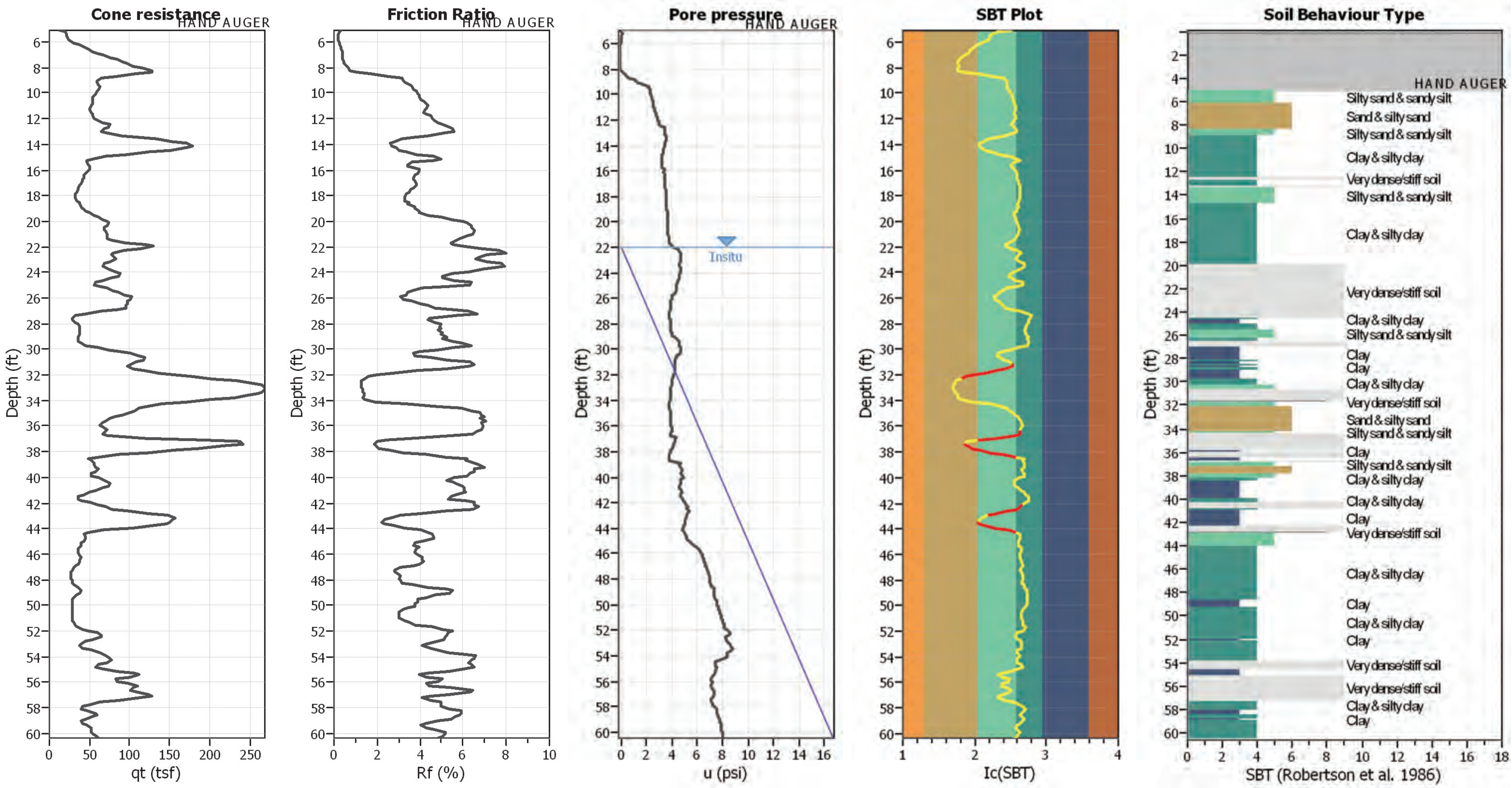






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



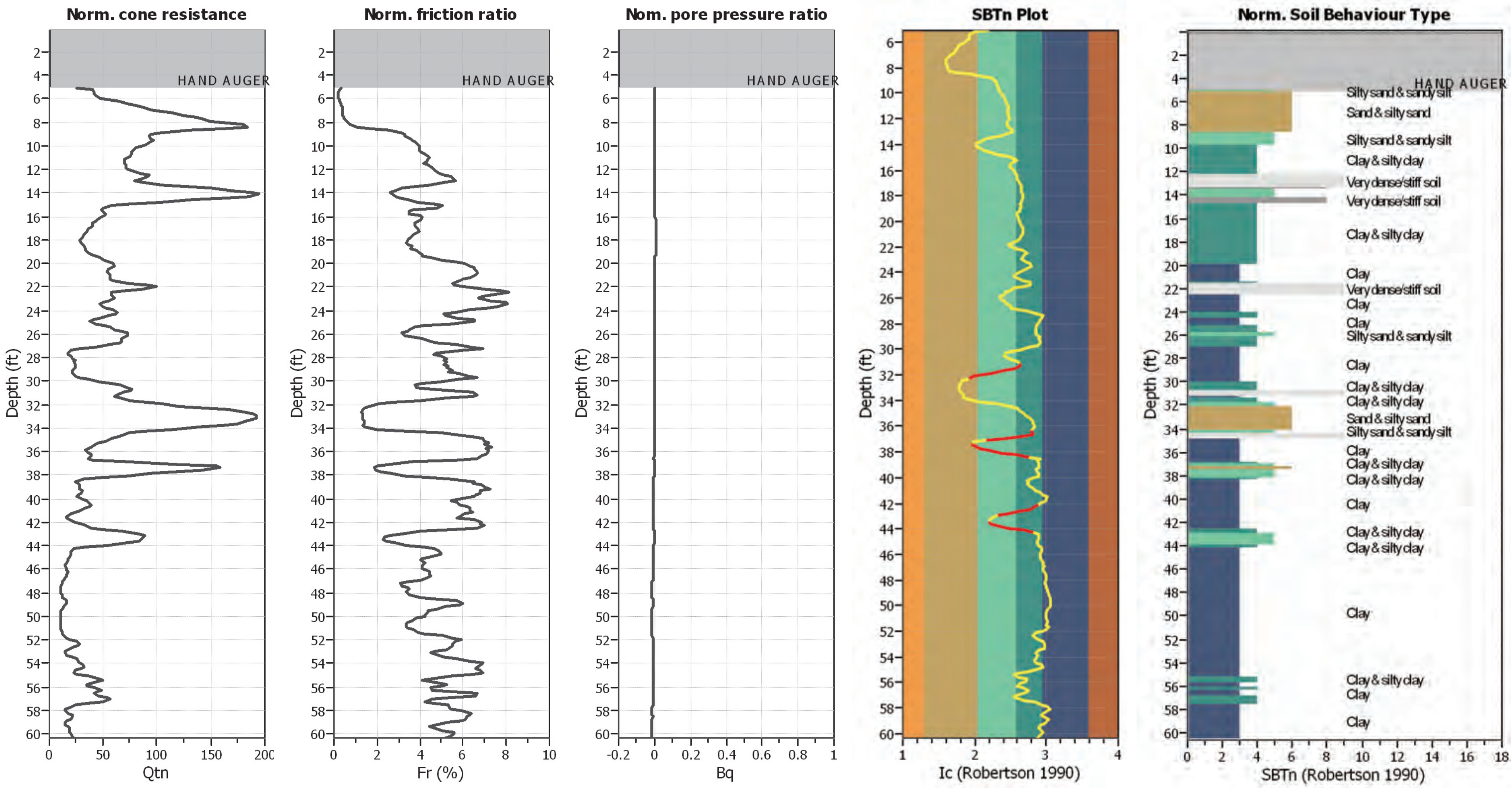
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only		
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes		
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft		

SBT legend

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

CPT basic interpretation plots (normalized)



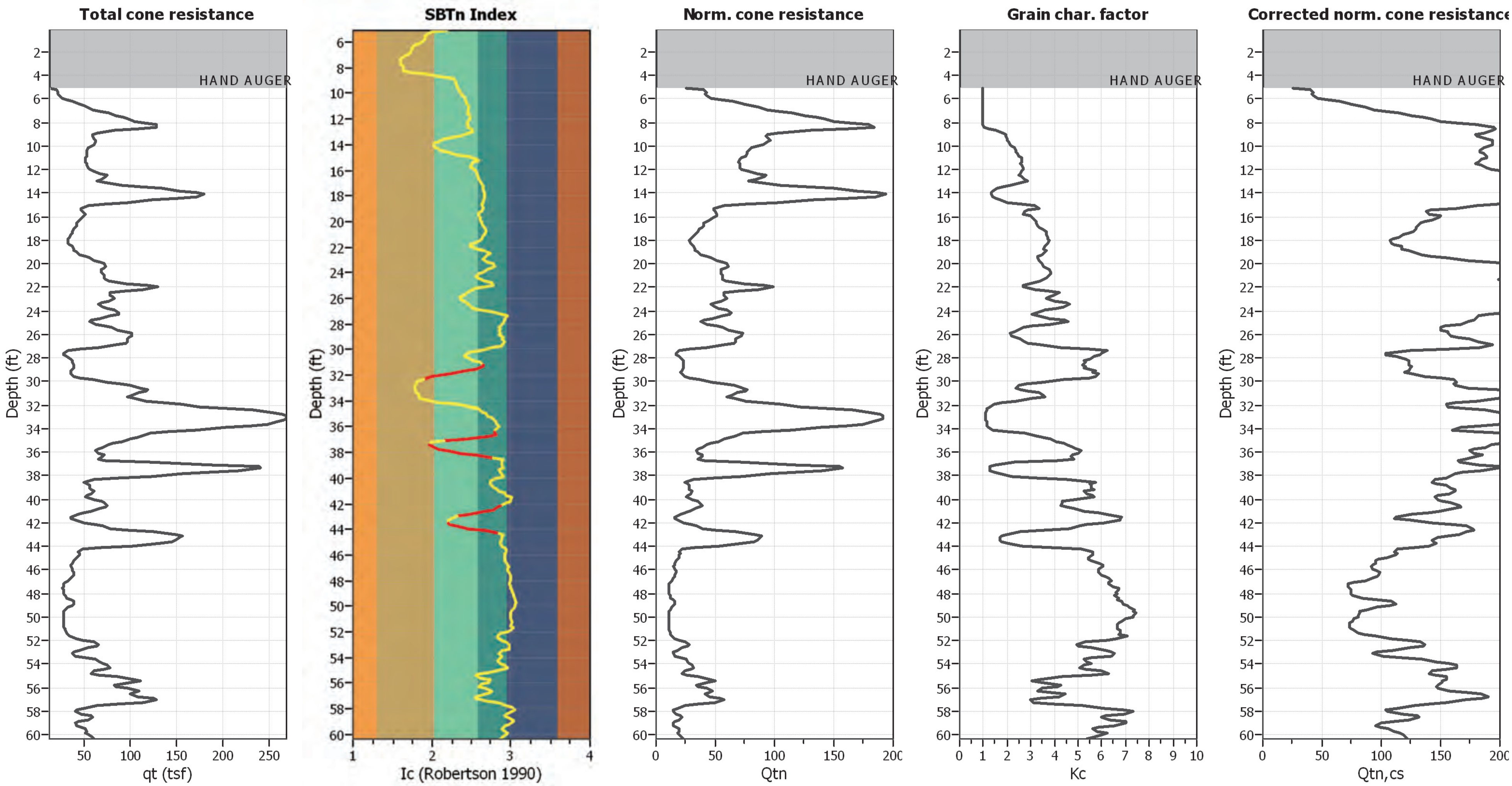
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

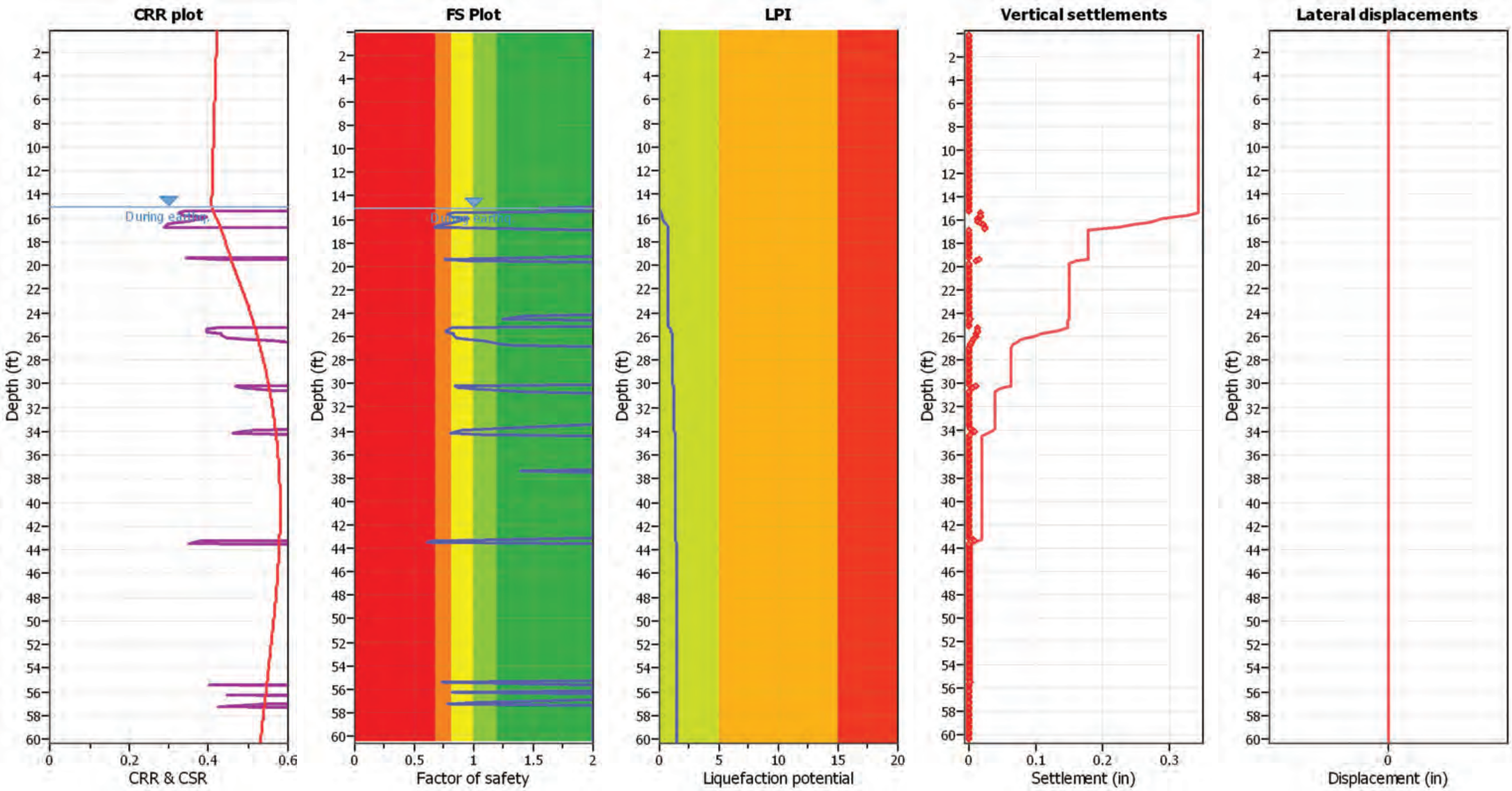
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

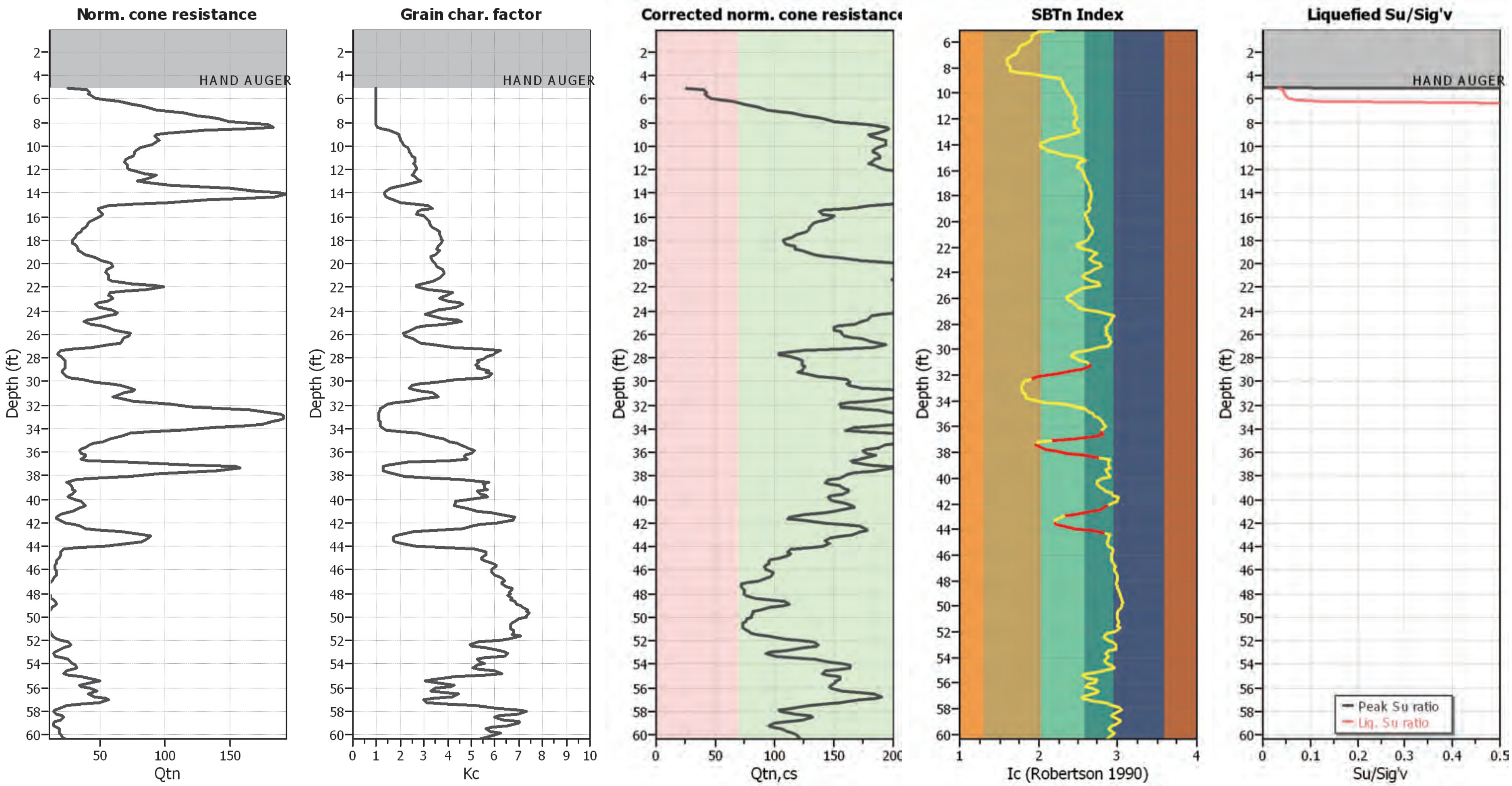
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

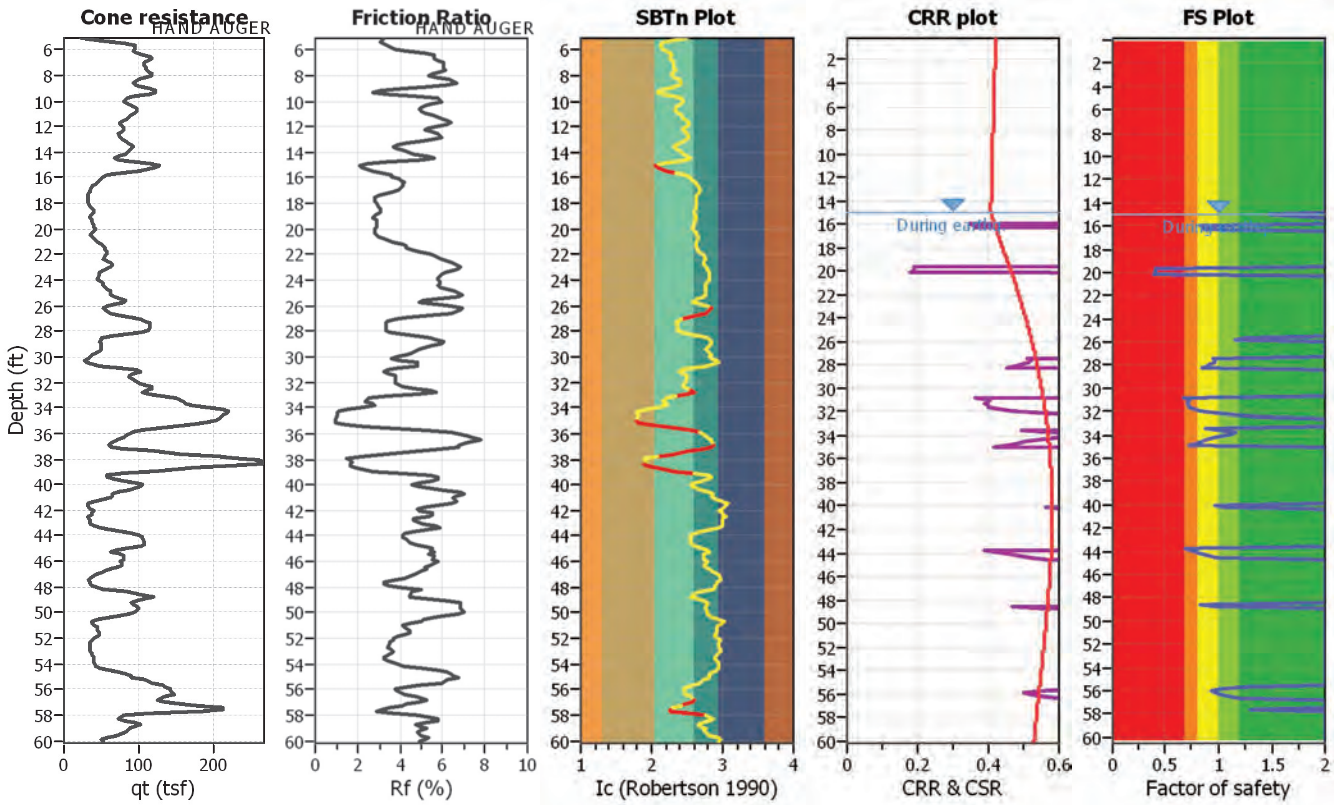
LIQUEFACTION ANALYSIS REPORT

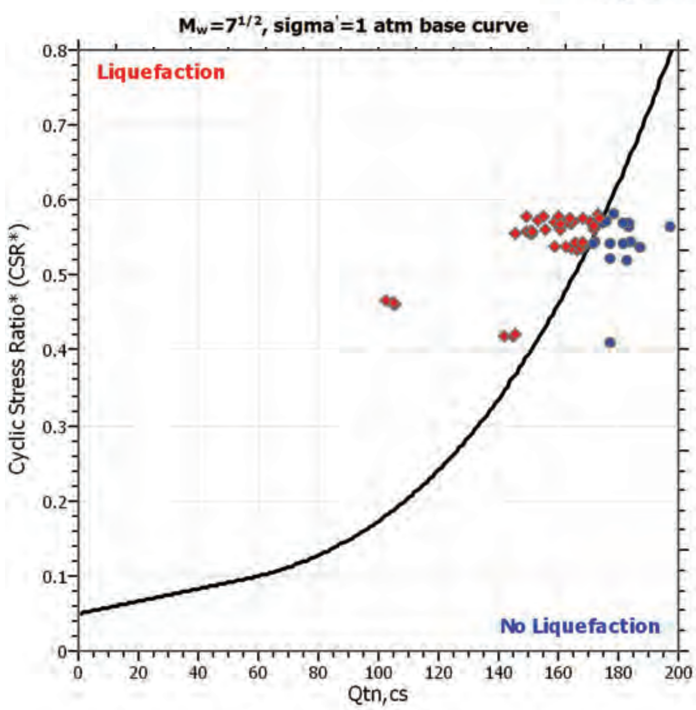
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

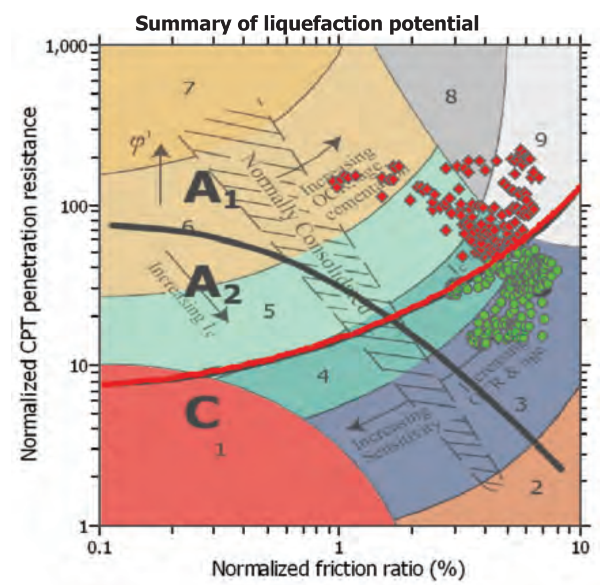
CPT file : CPT-2 (Full PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.74	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.85	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

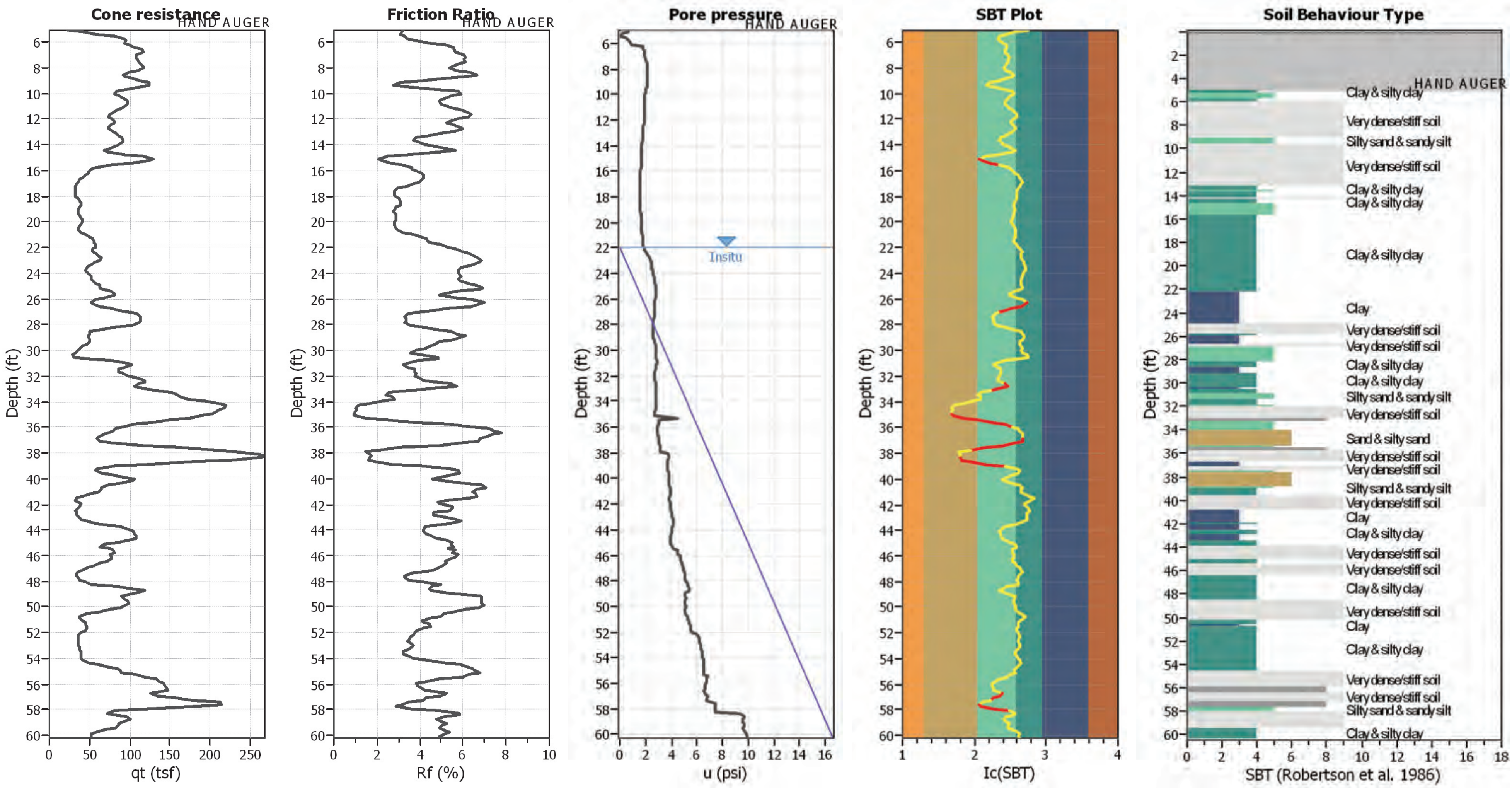






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



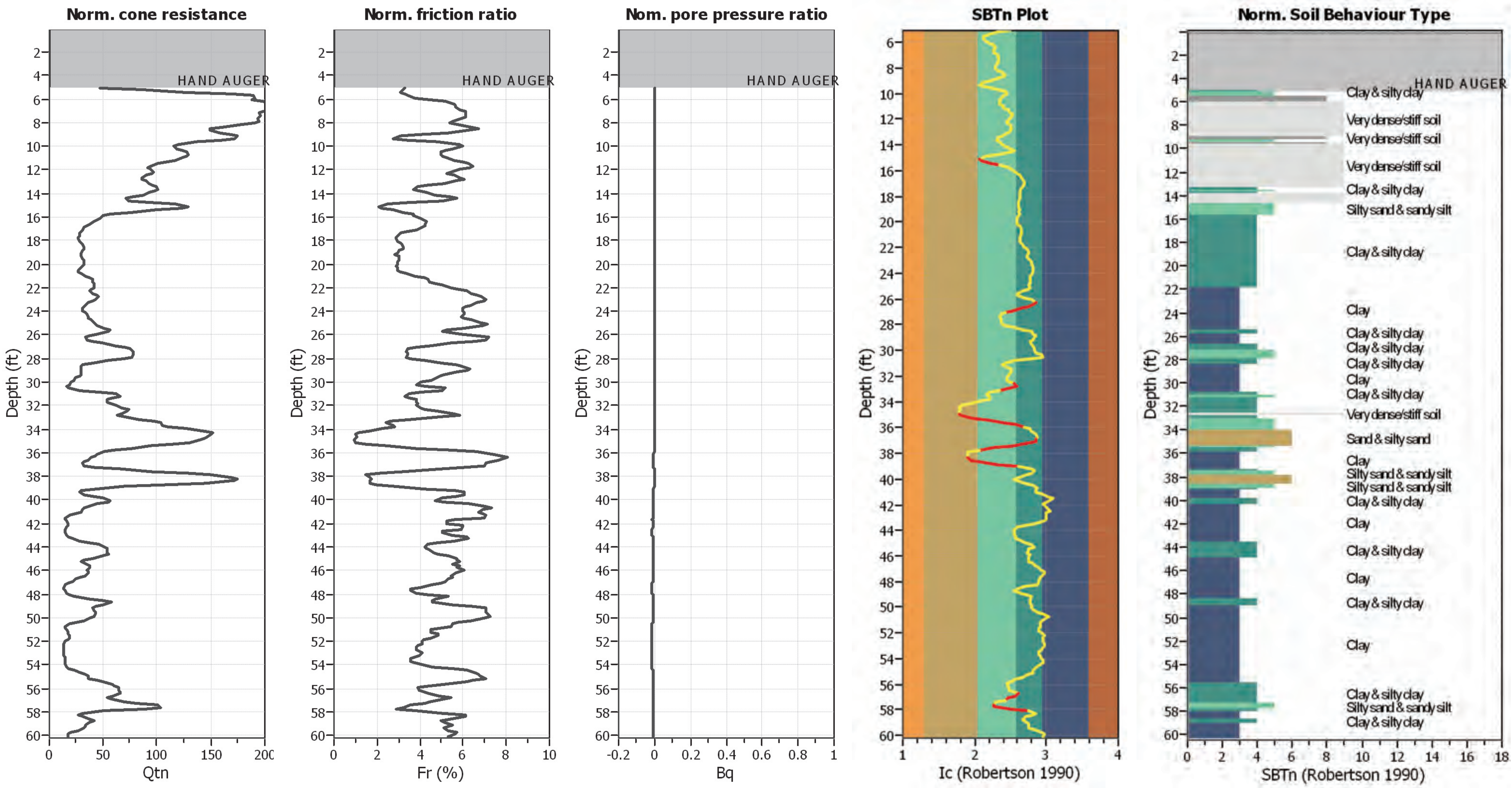
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



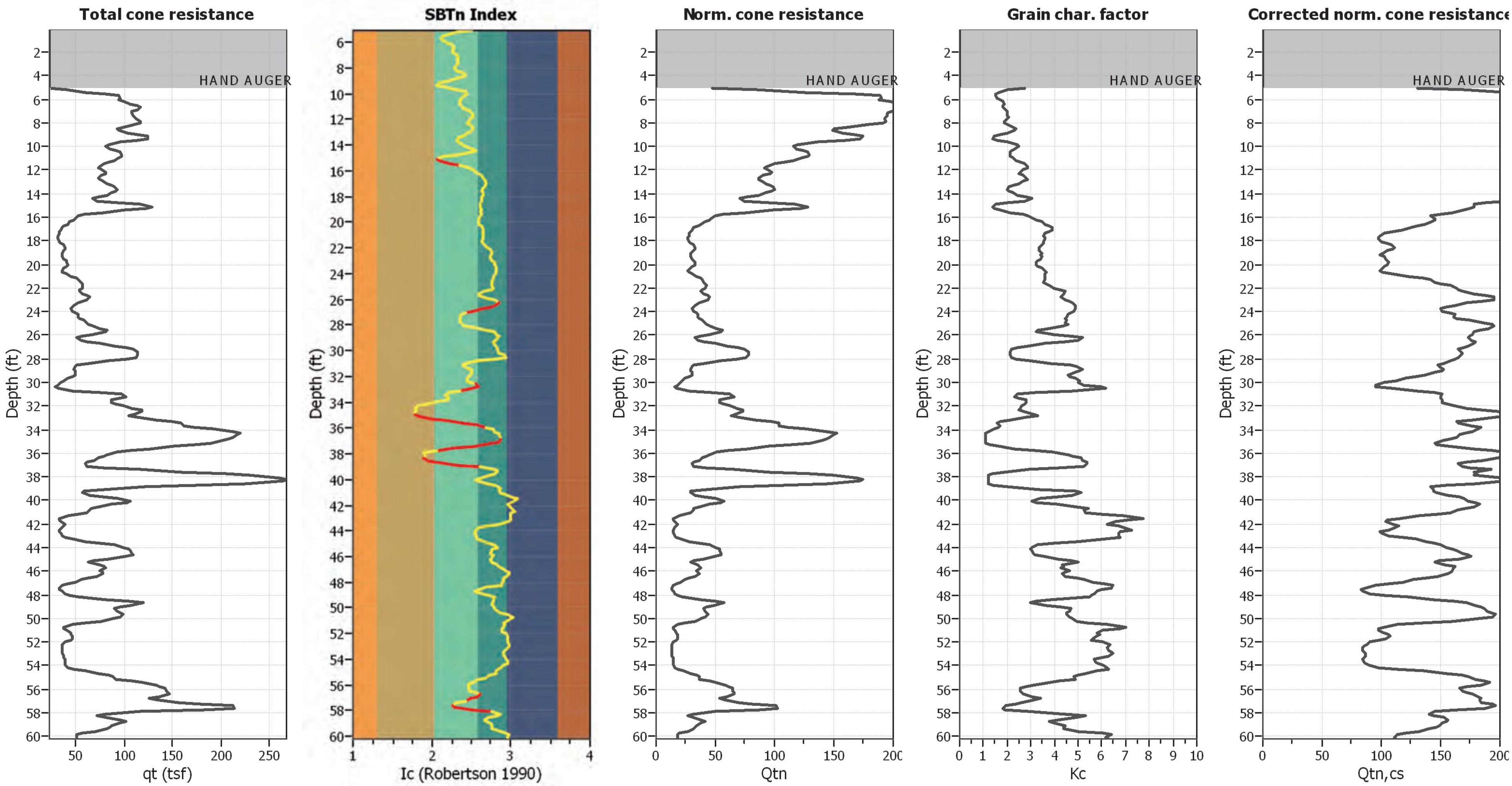
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

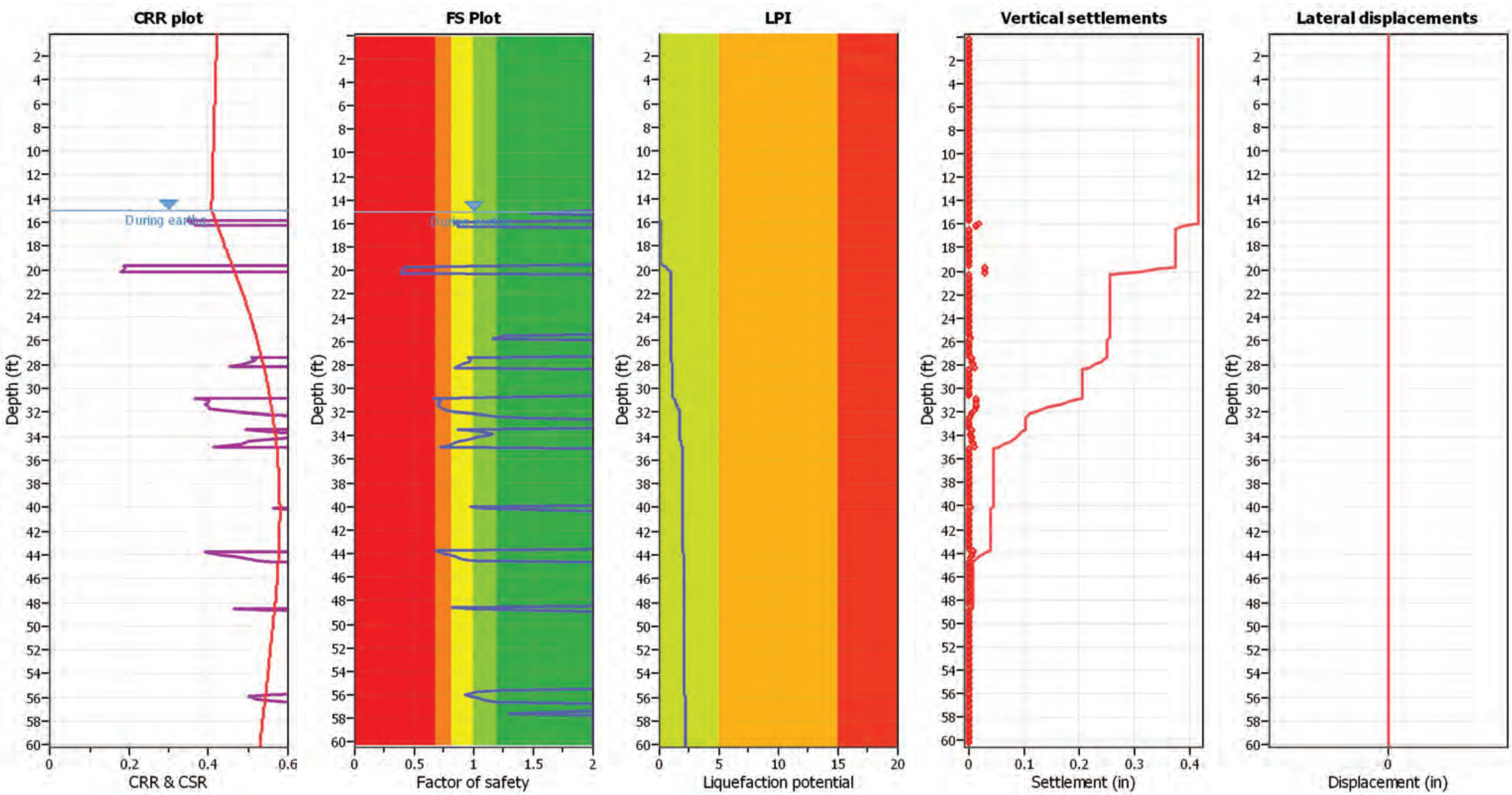
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

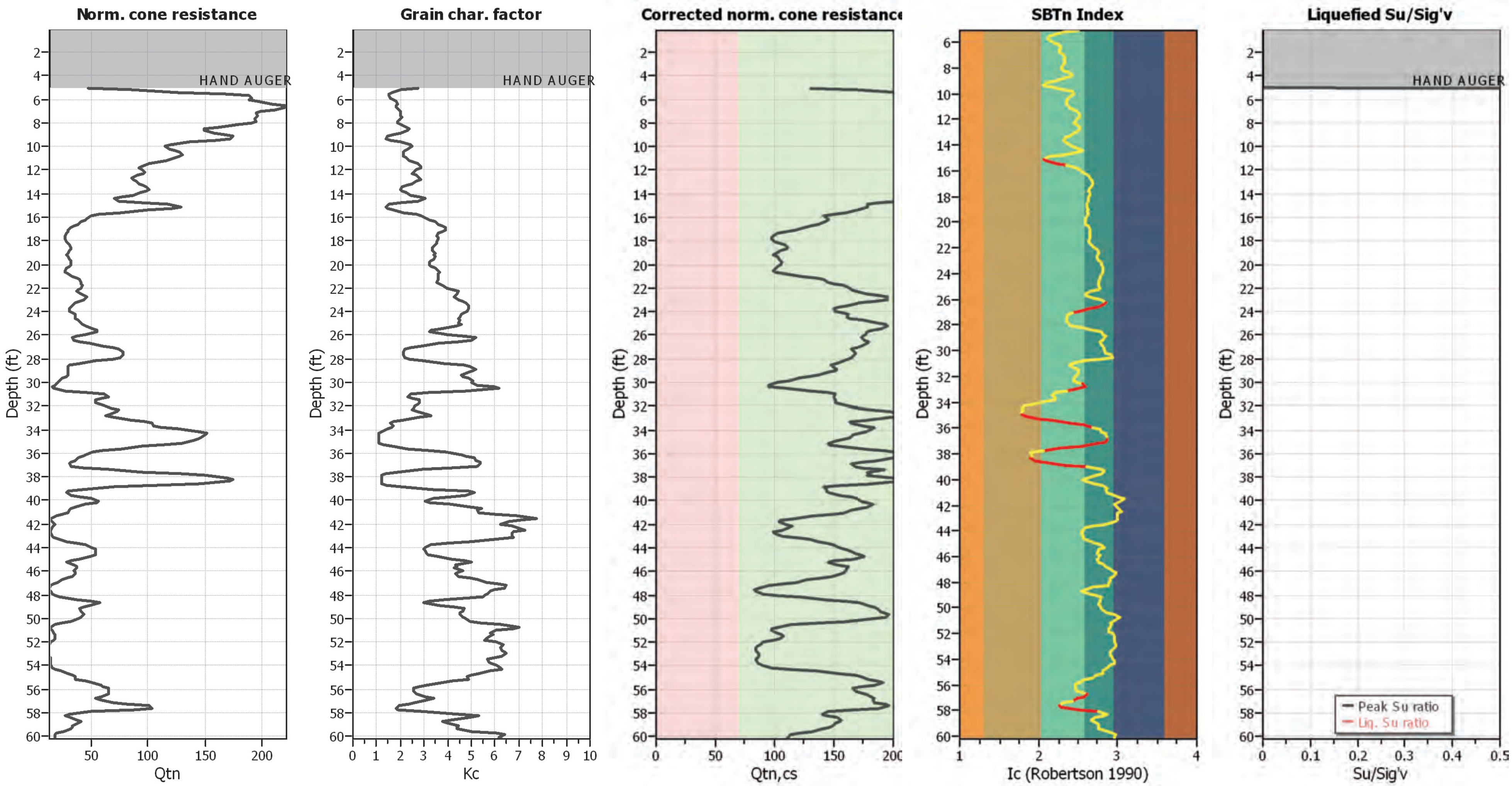
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

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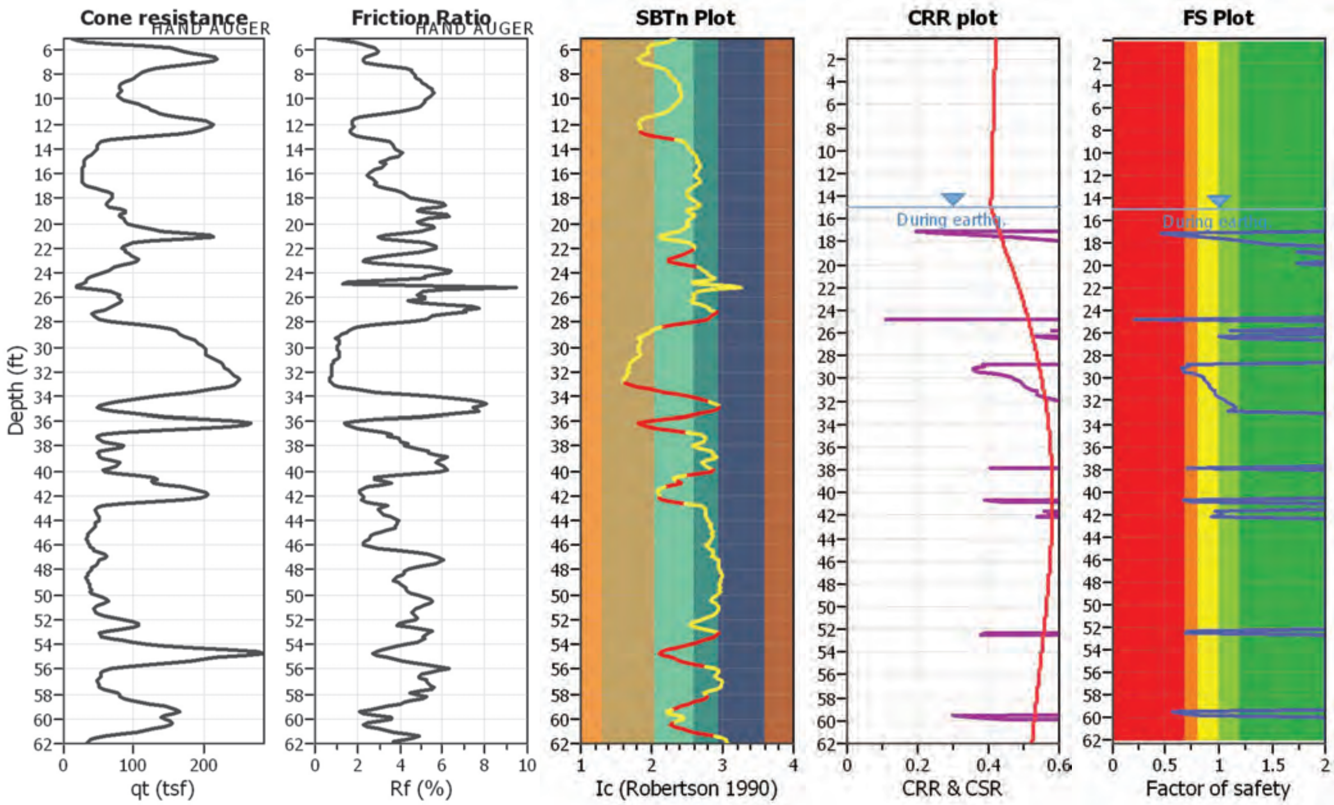
LIQUEFACTION ANALYSIS REPORT

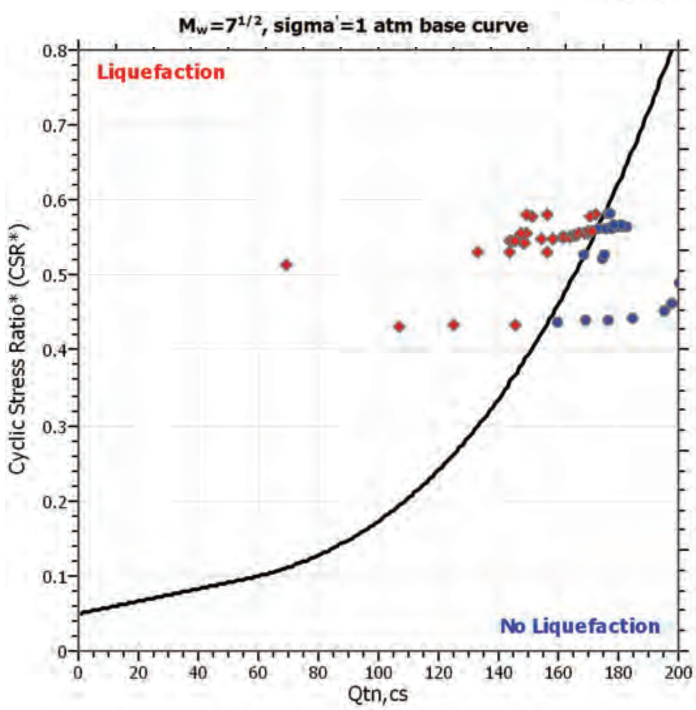
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

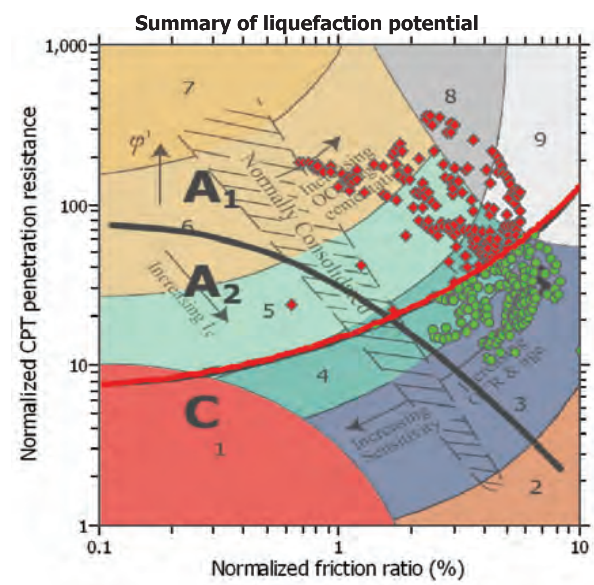
CPT file : CPT-3 (Full PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.74	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.85	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

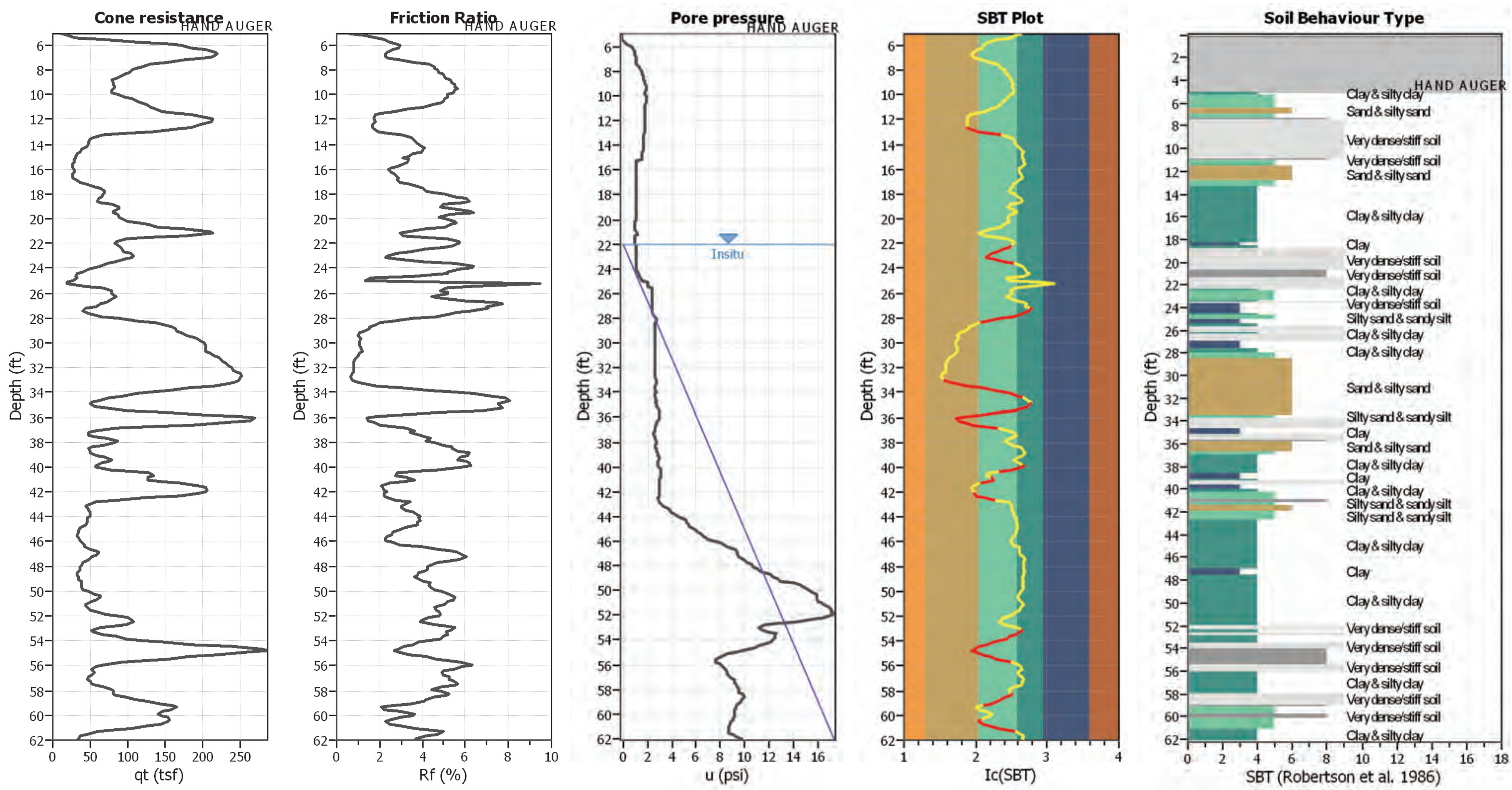






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



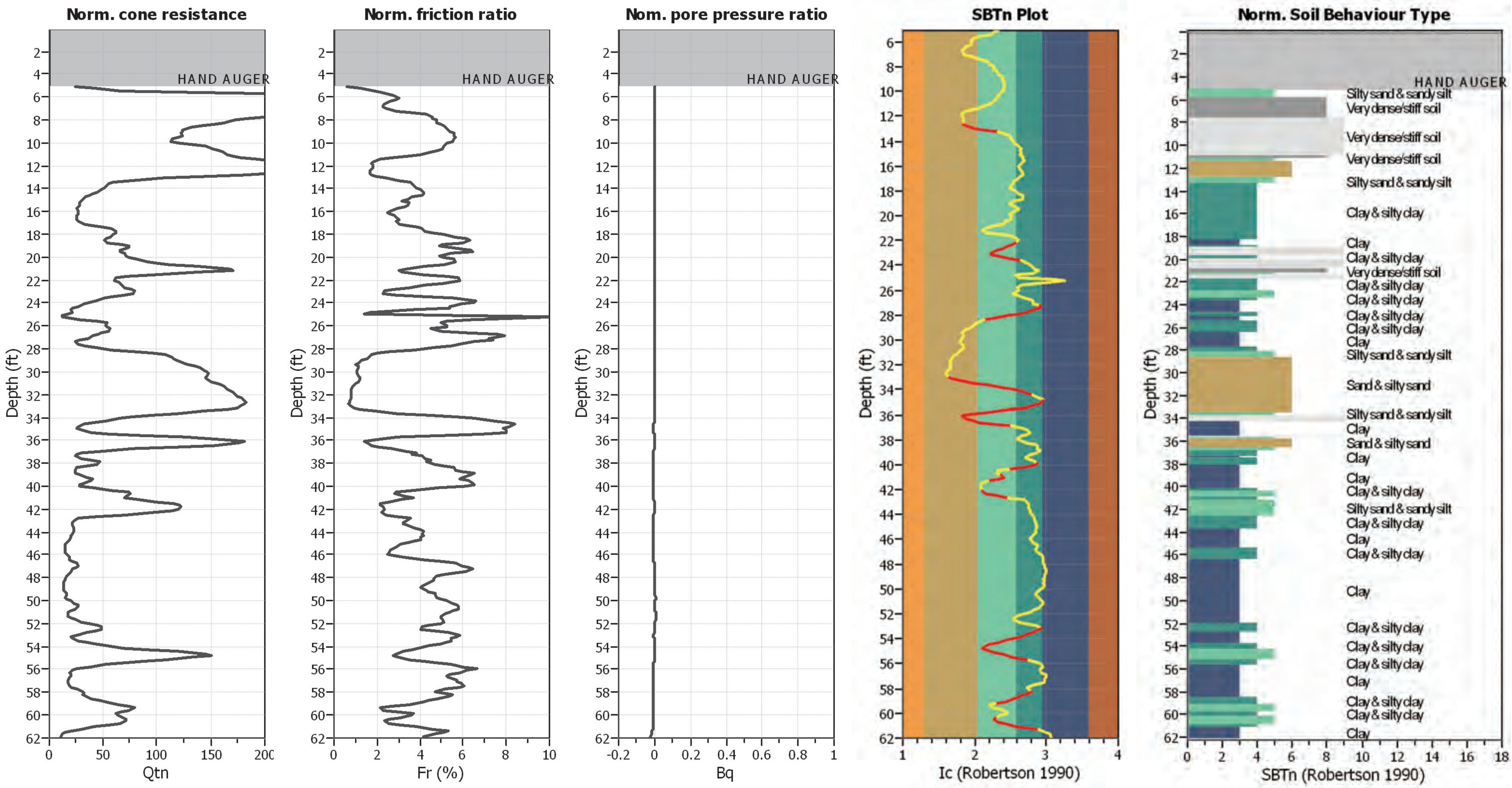
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



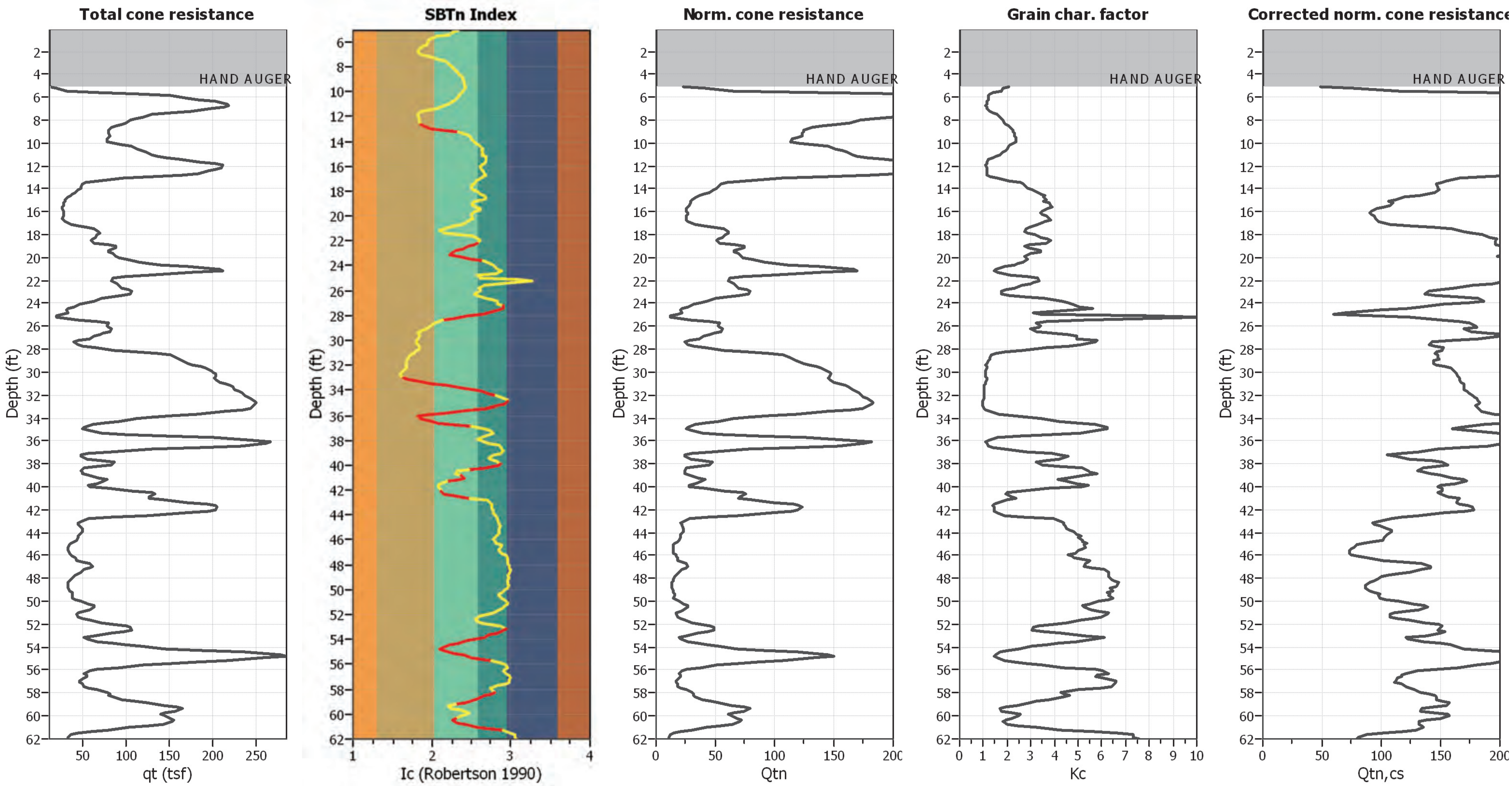
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

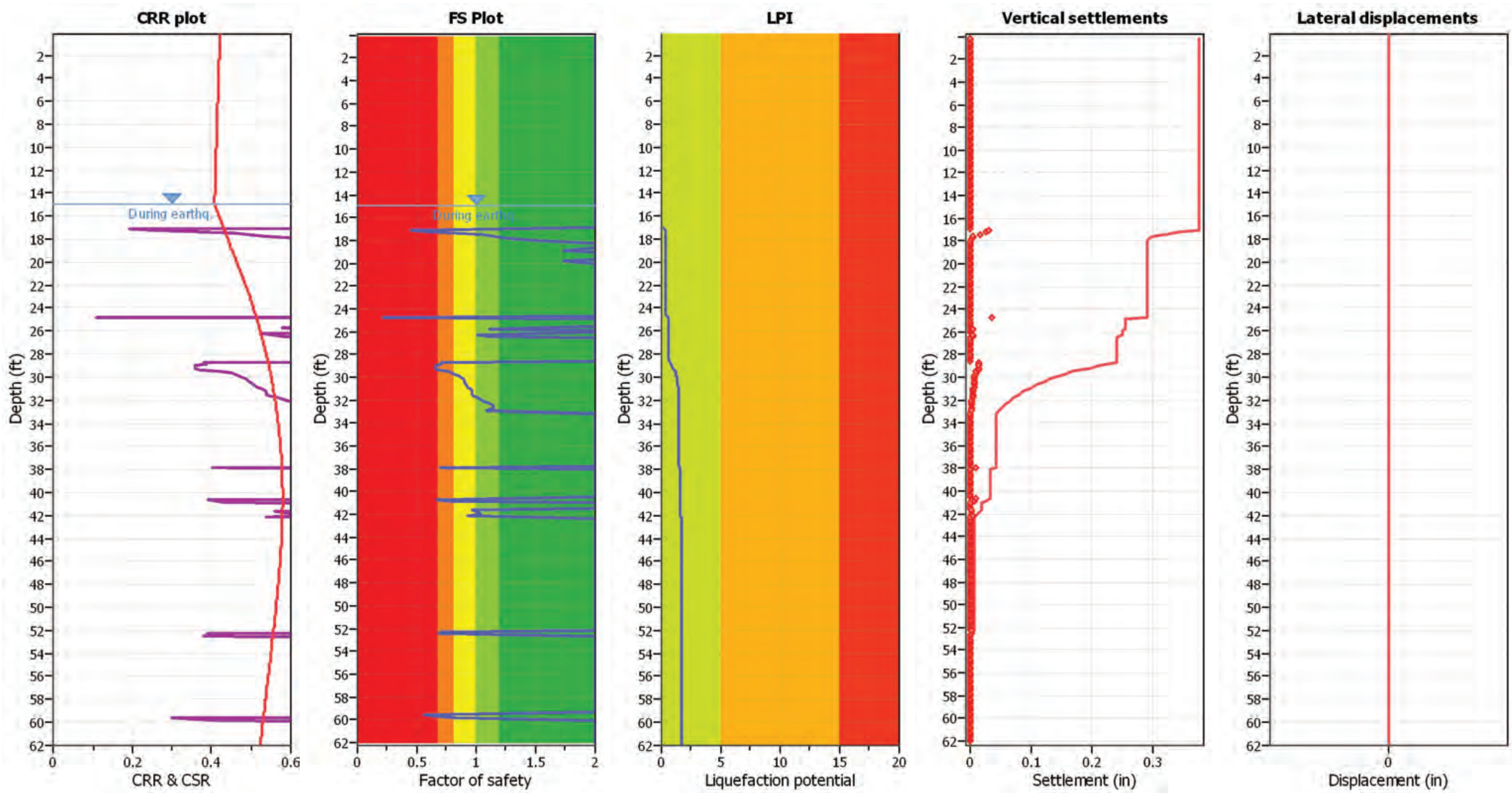
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

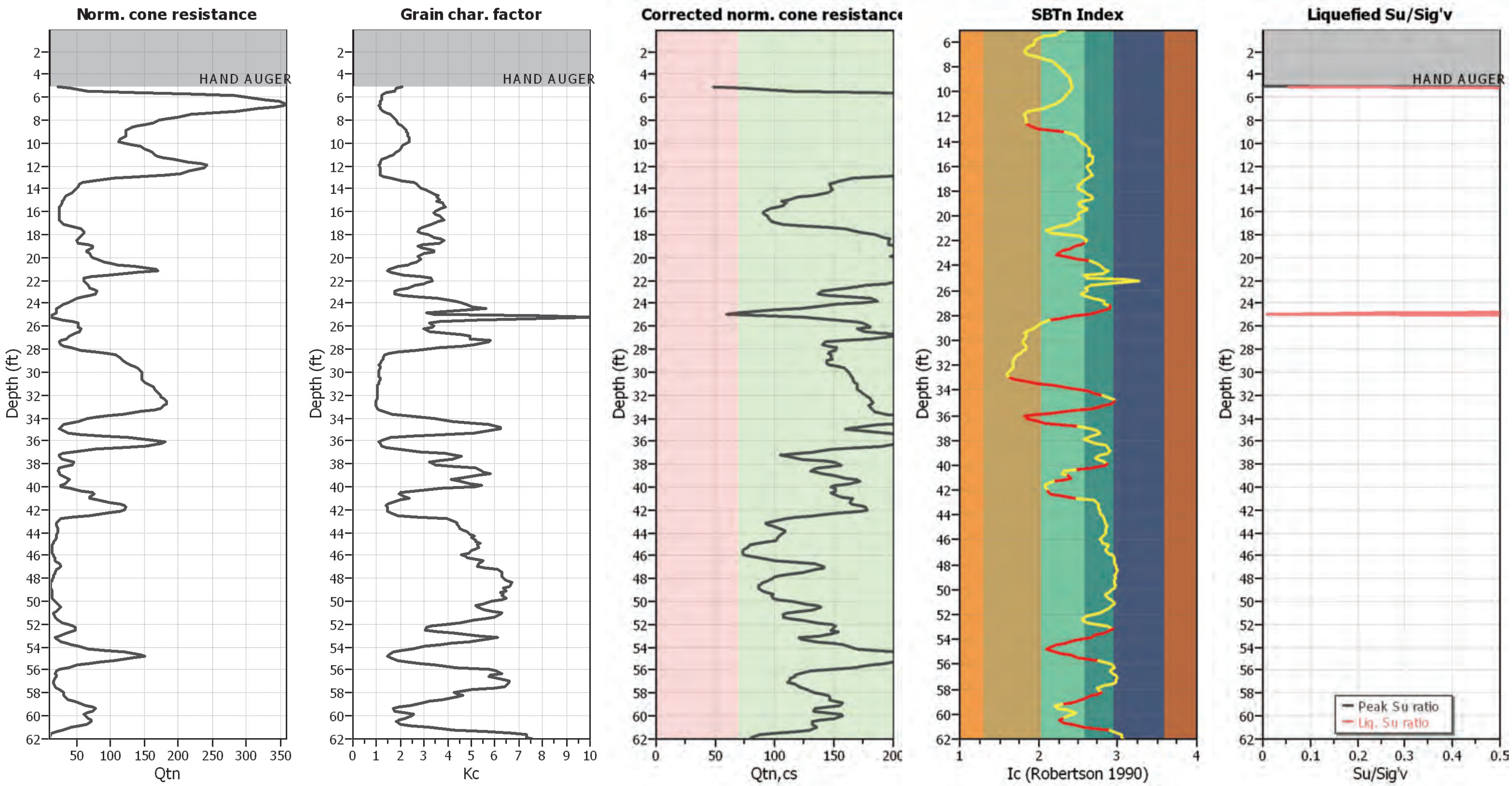
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

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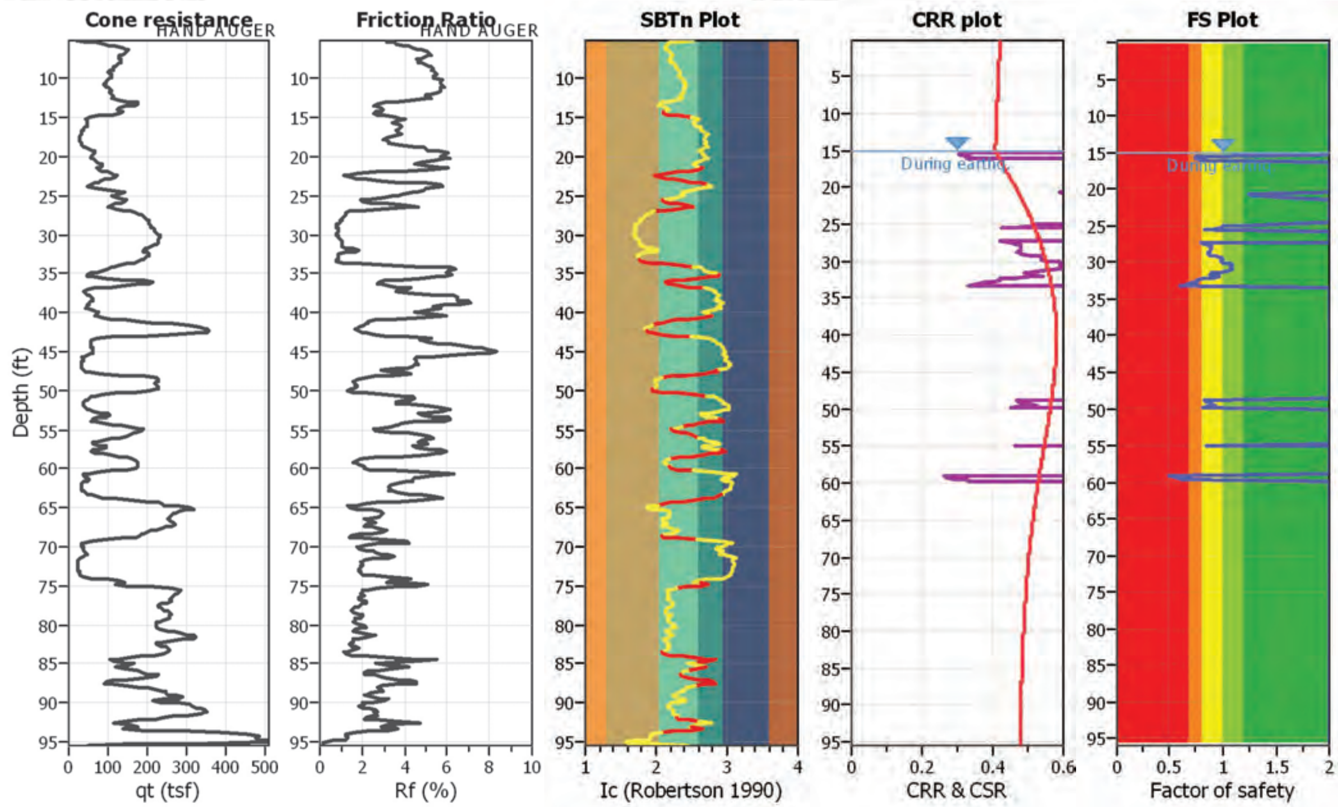
LIQUEFACTION ANALYSIS REPORT

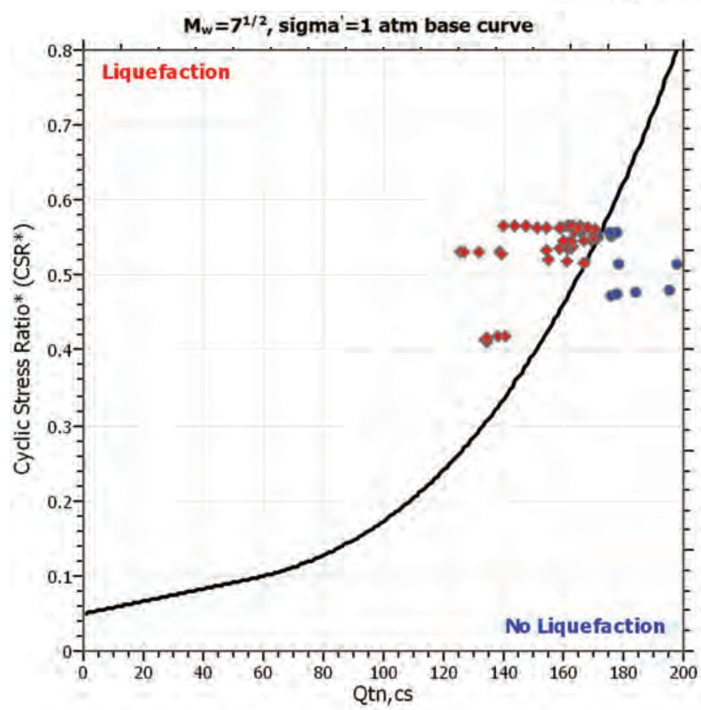
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

CPT file : CPT-4 (Full PGA)

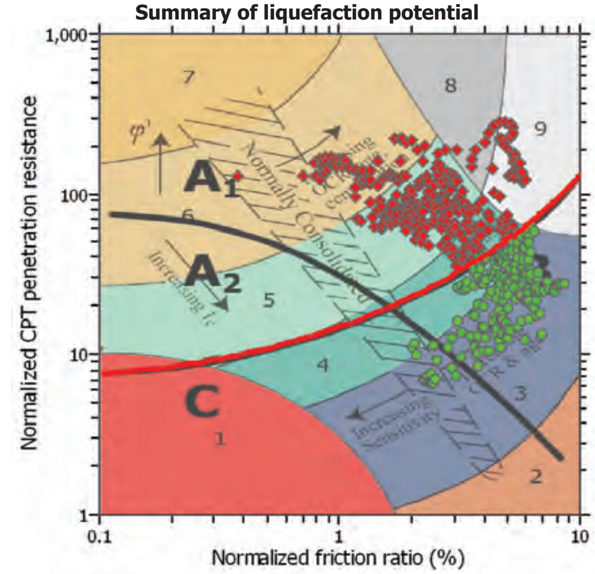
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.74	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.85	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



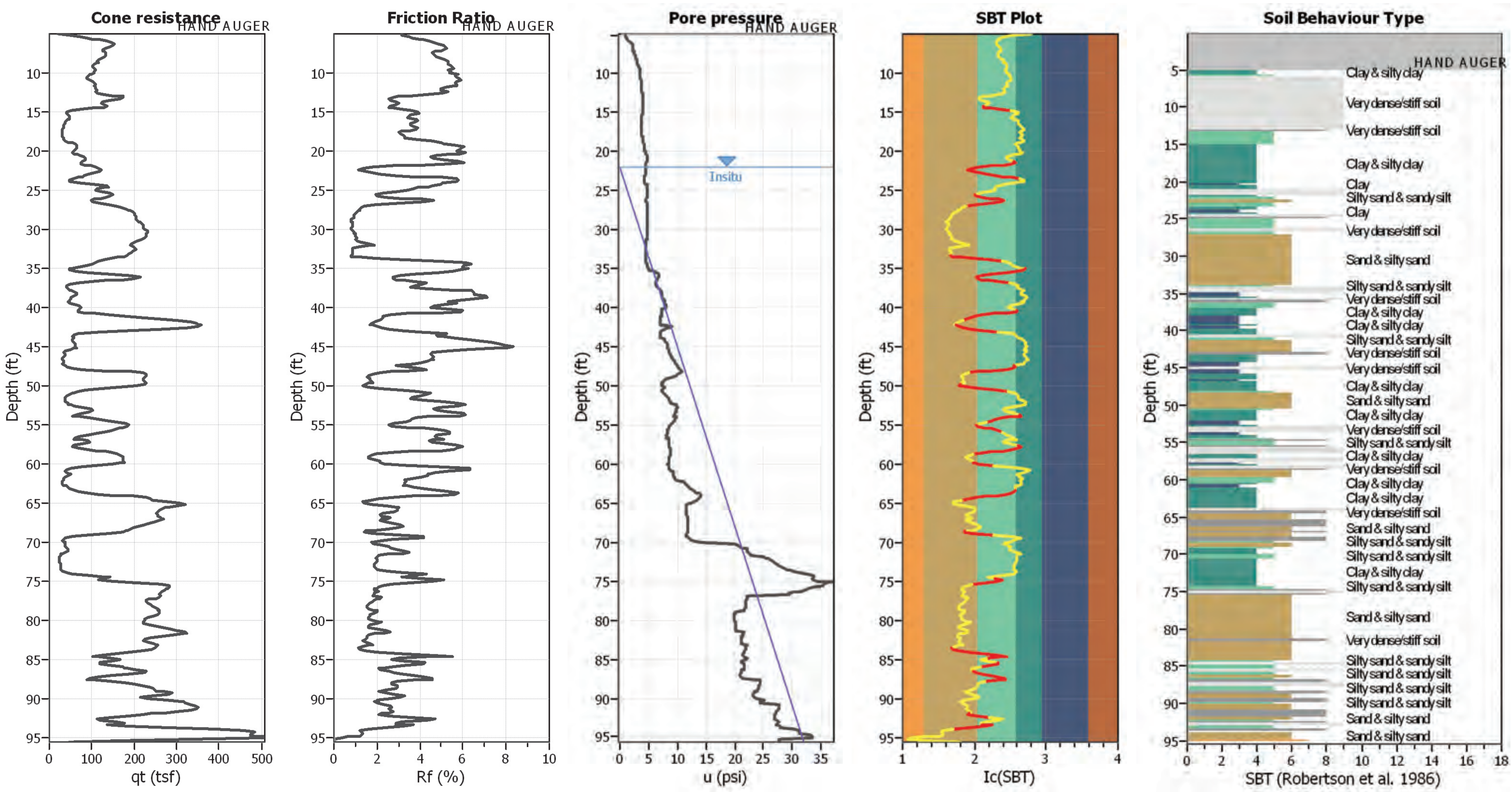


Summary of liquefaction potential



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

CPT basic interpretation plots



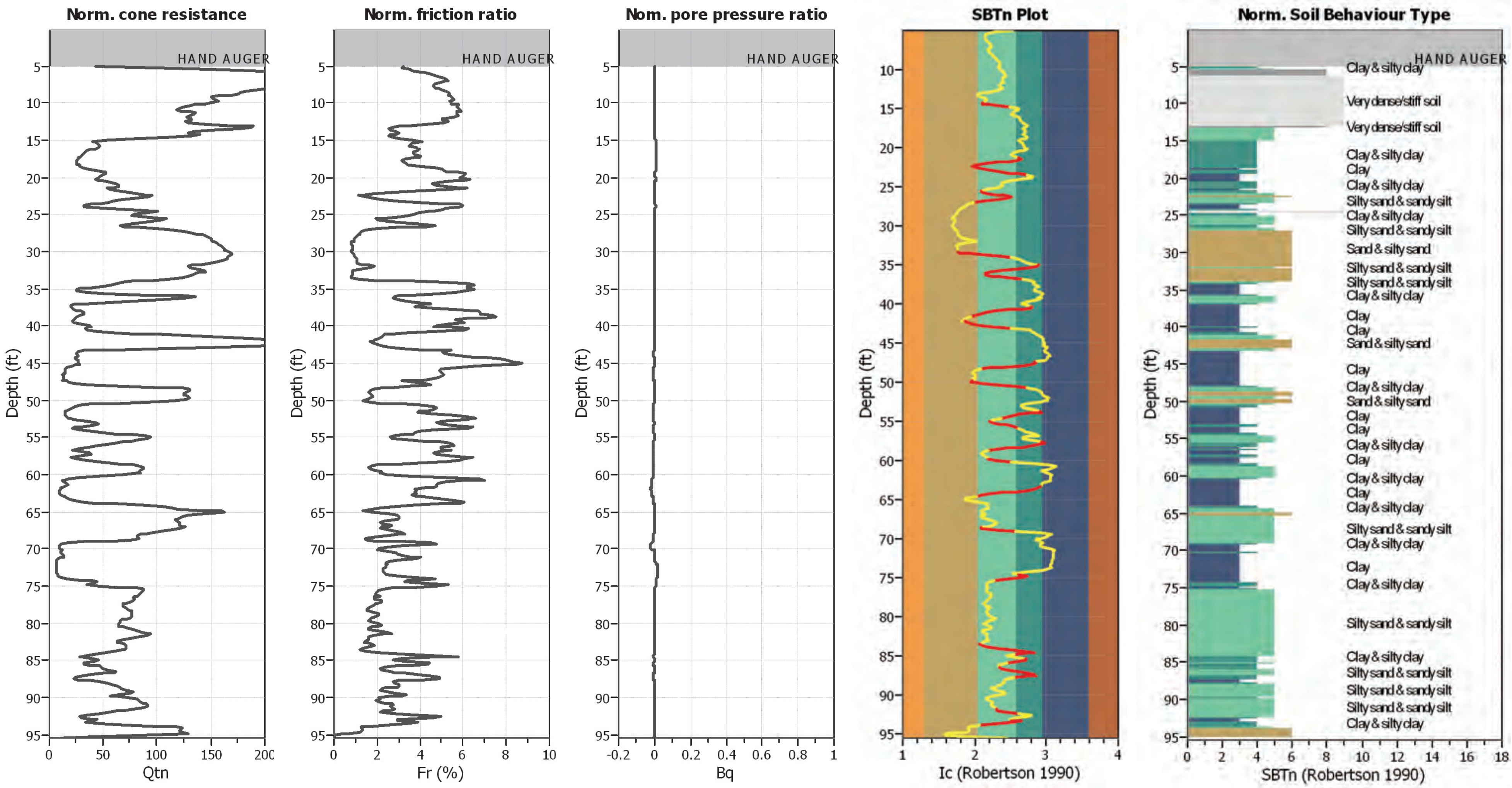
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



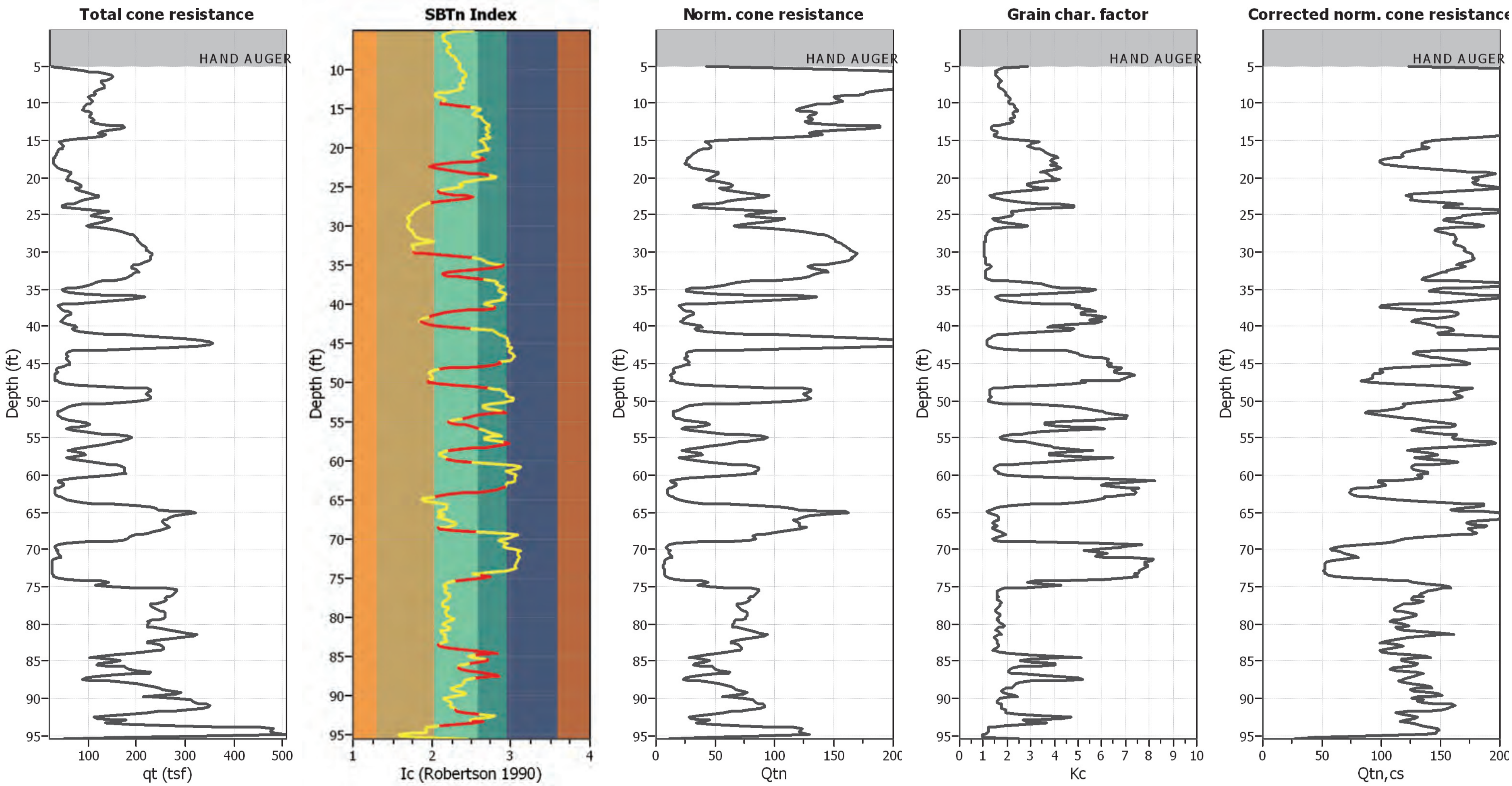
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

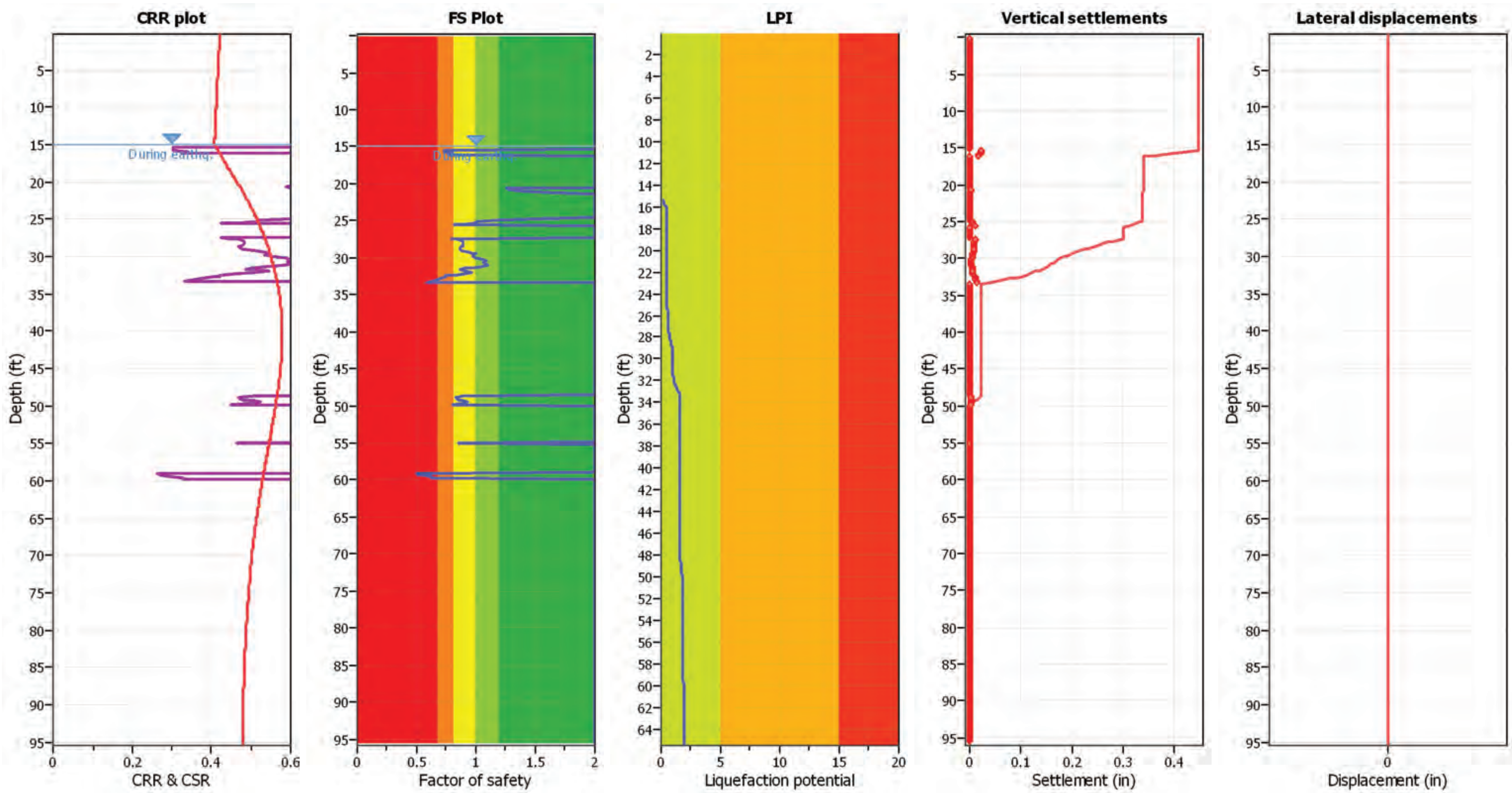
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

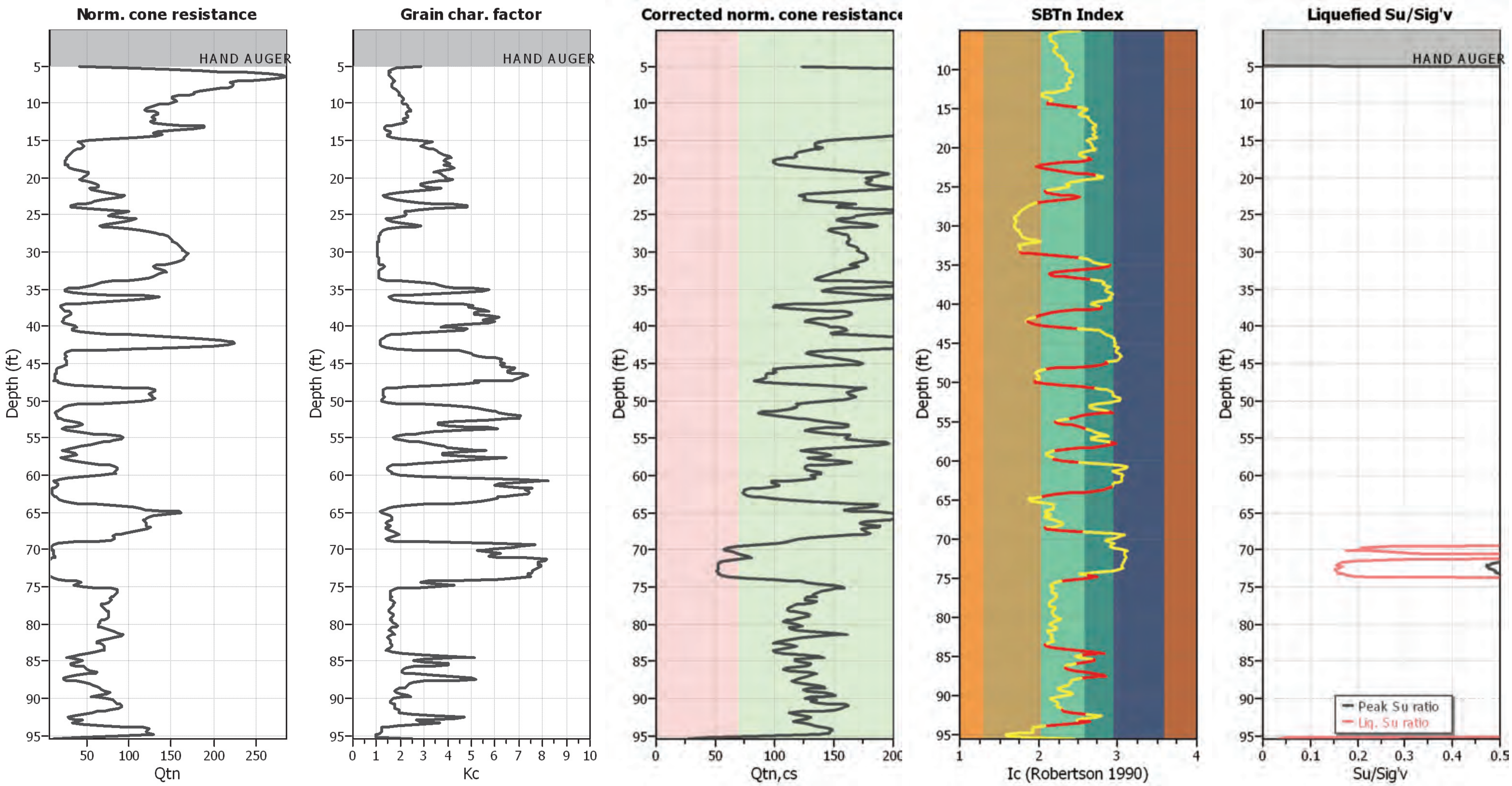
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

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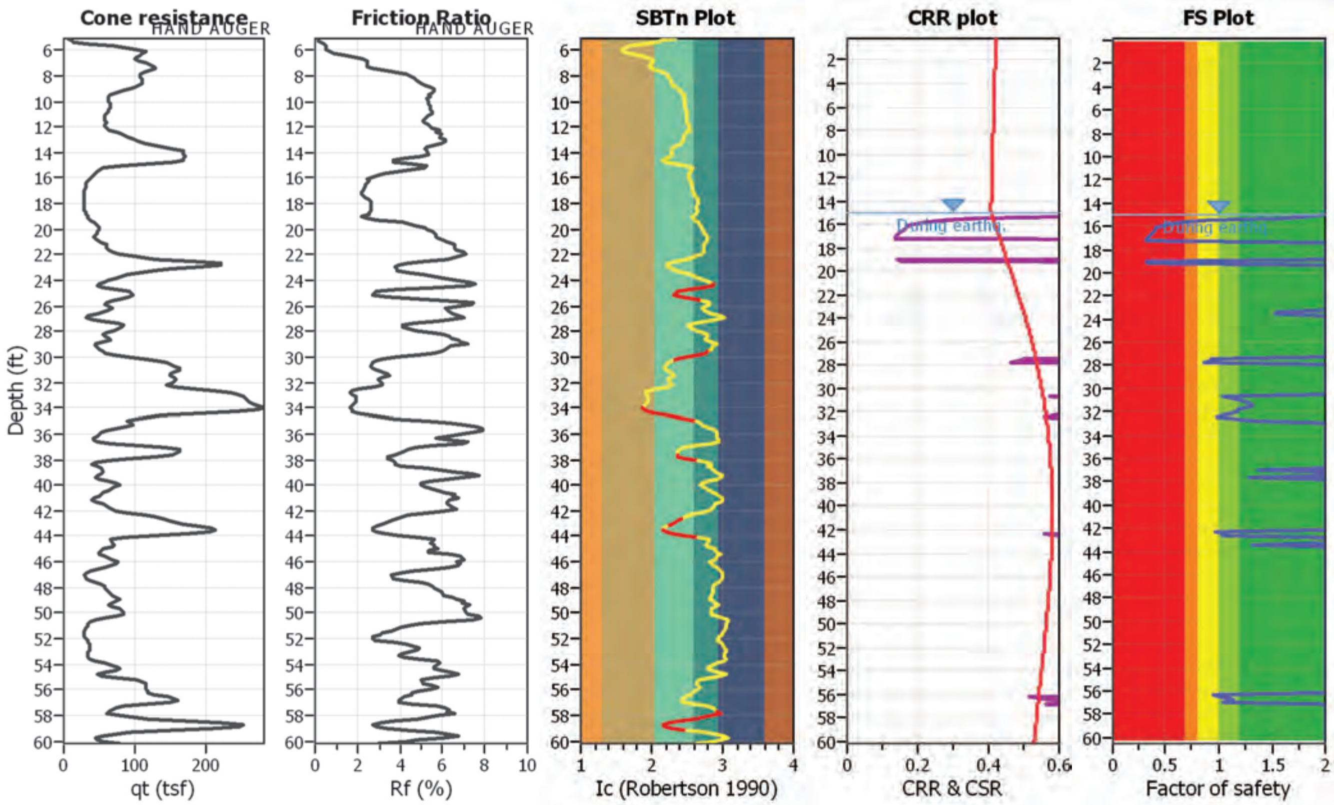
LIQUEFACTION ANALYSIS REPORT

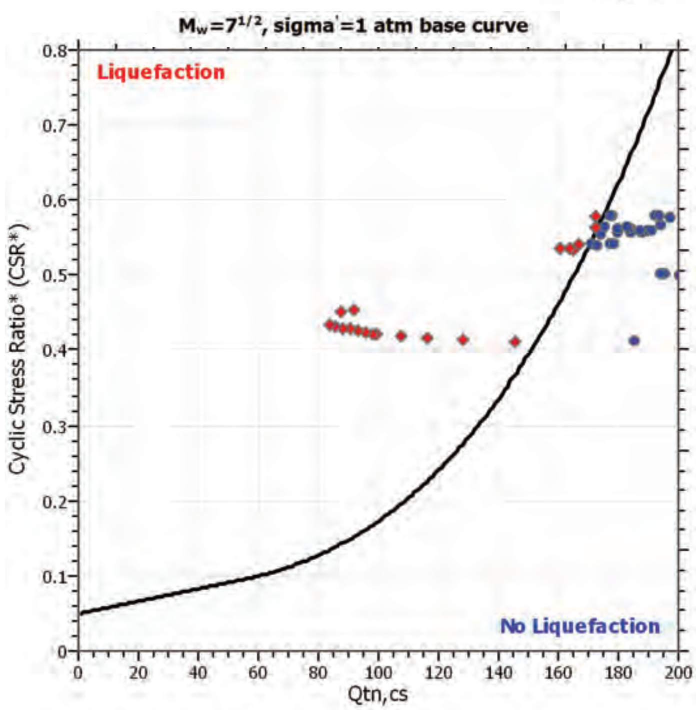
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

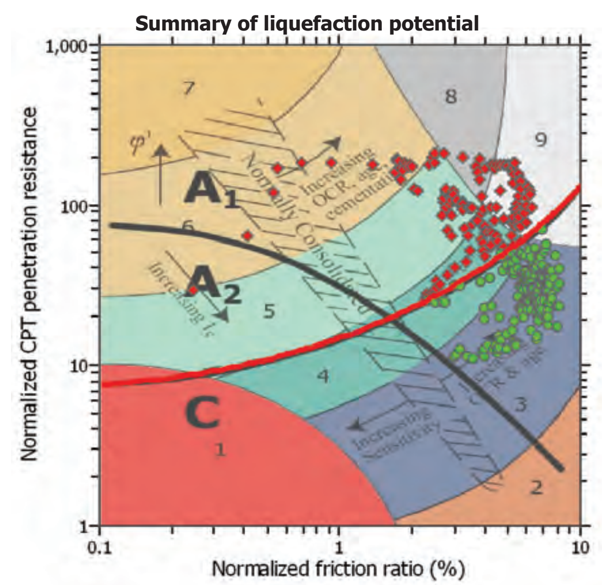
CPT file : CPT-5 (Full PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.74	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.85	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

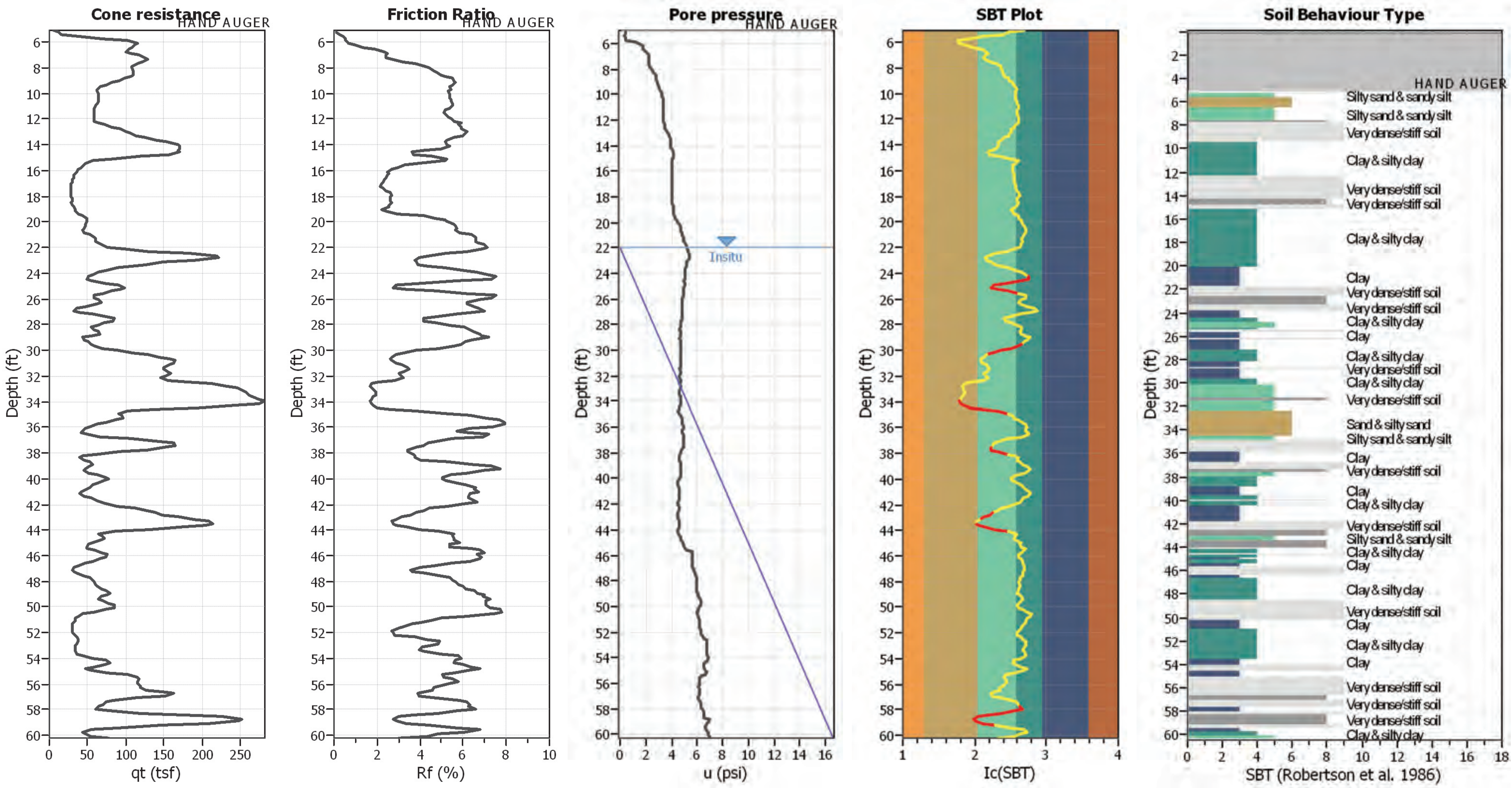






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



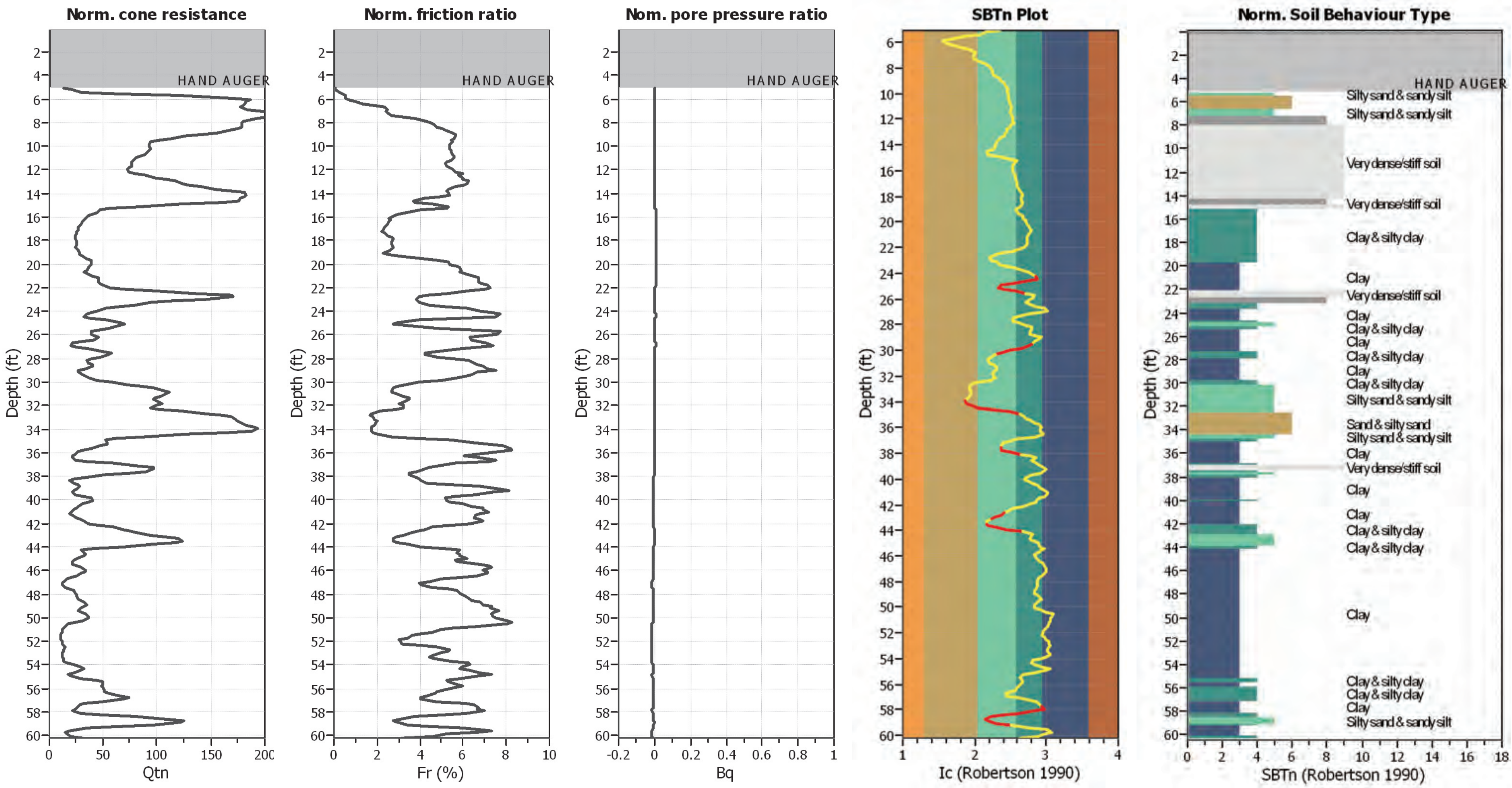
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



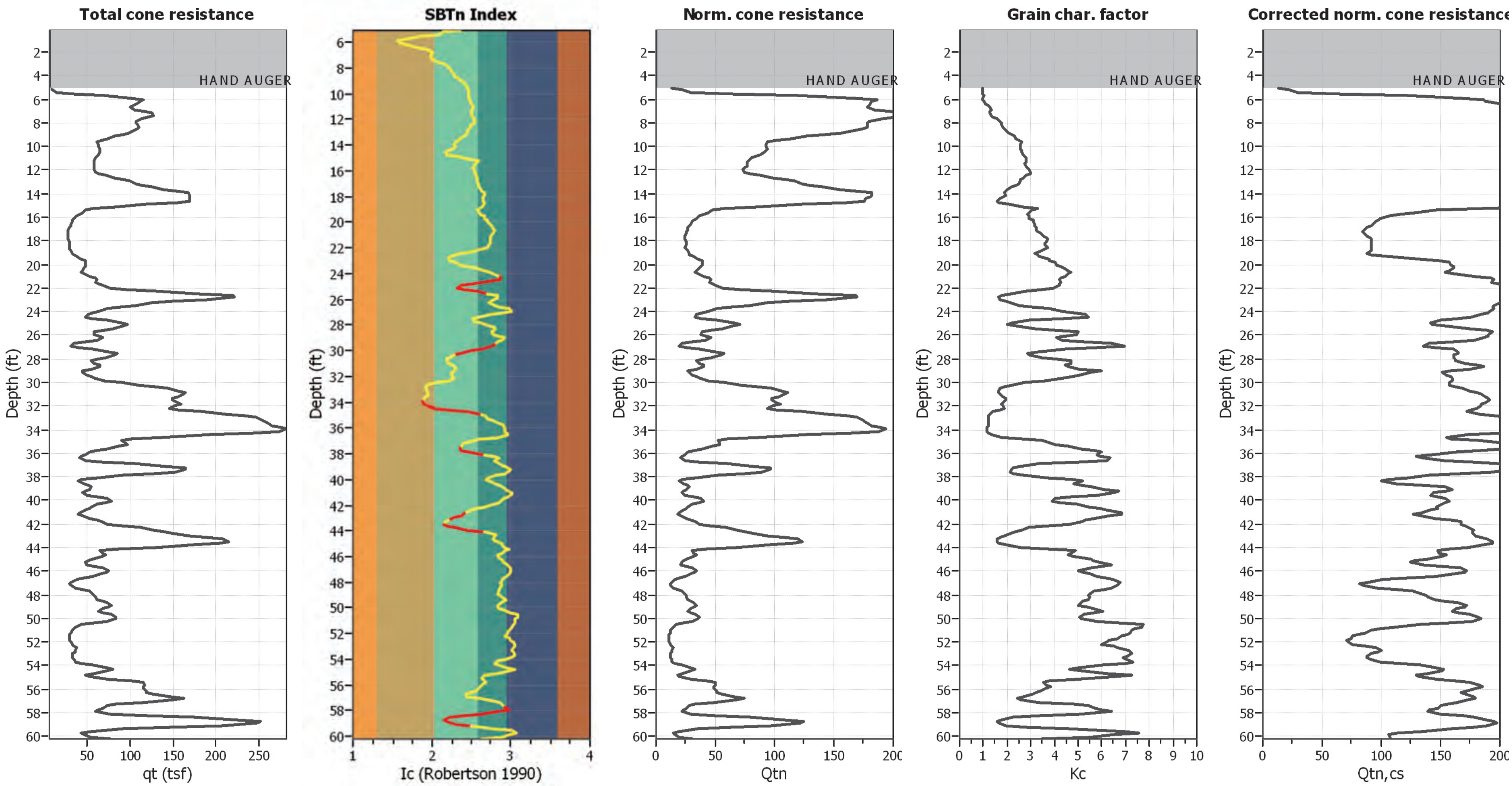
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

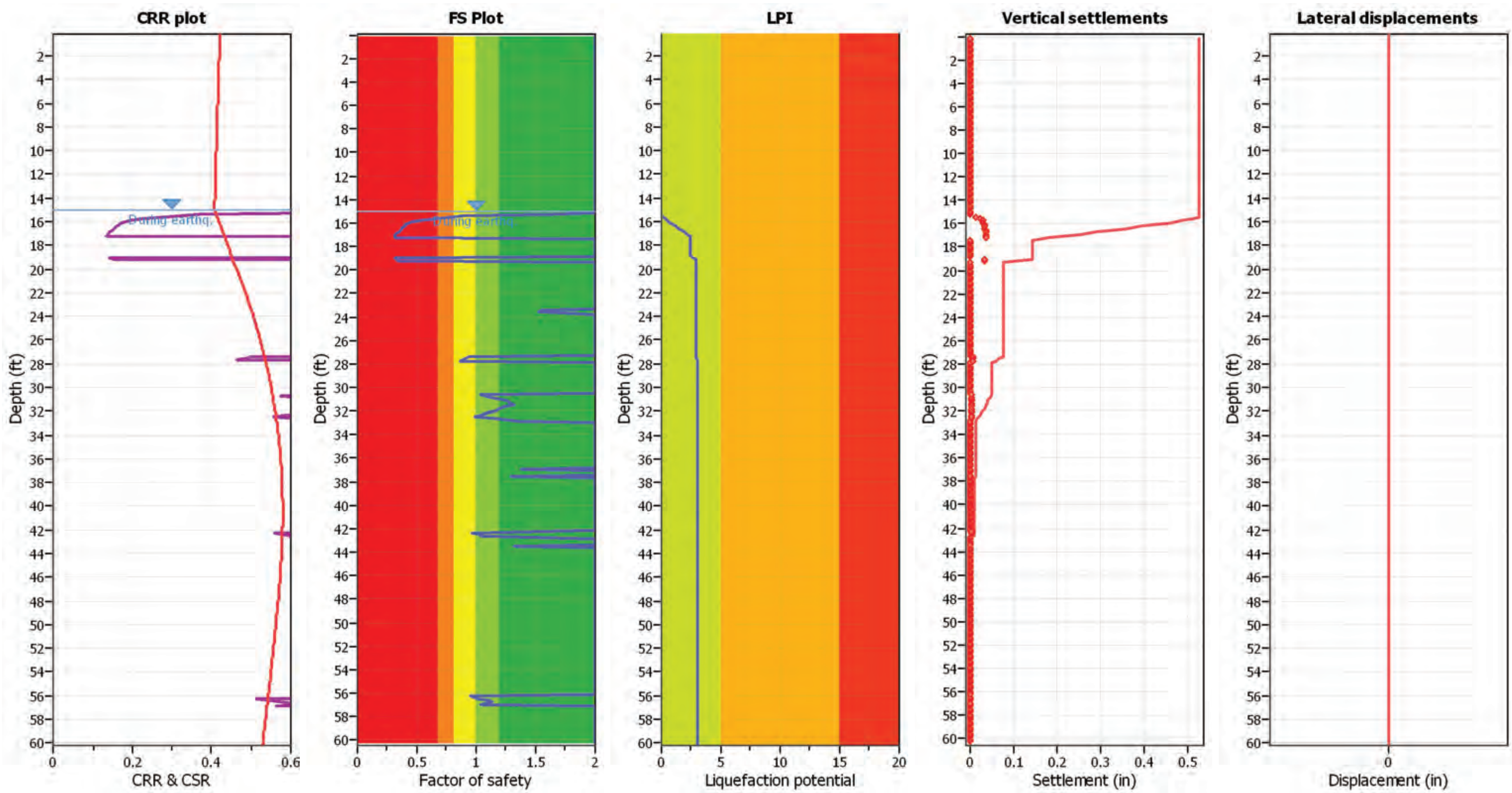
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

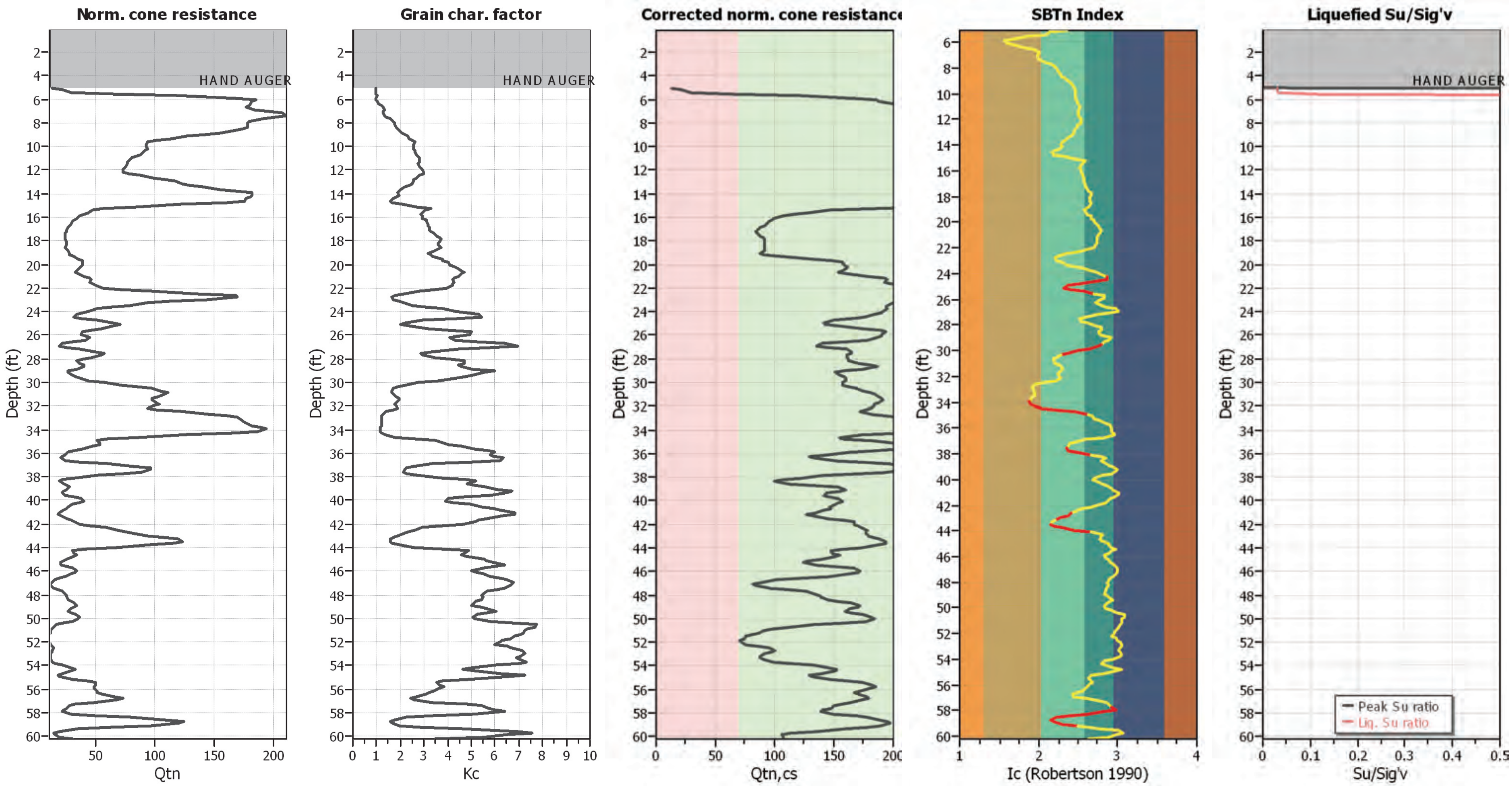
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

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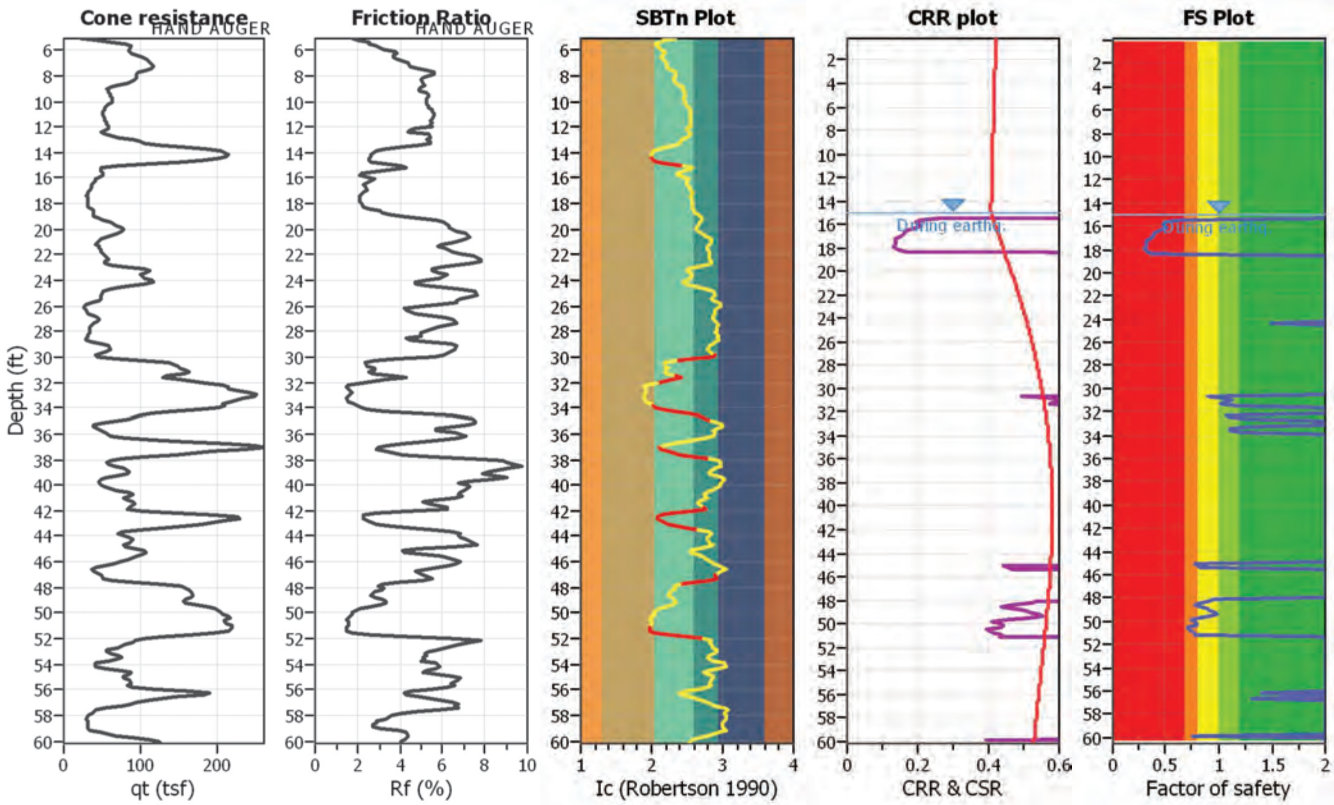
LIQUEFACTION ANALYSIS REPORT

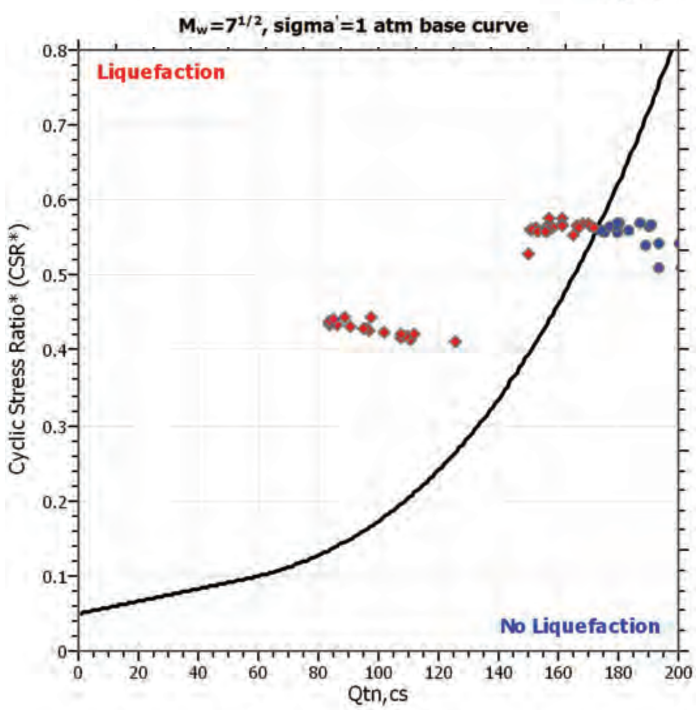
Project title : 21-2971 16911 Normandie Associates, LLC **Location :**

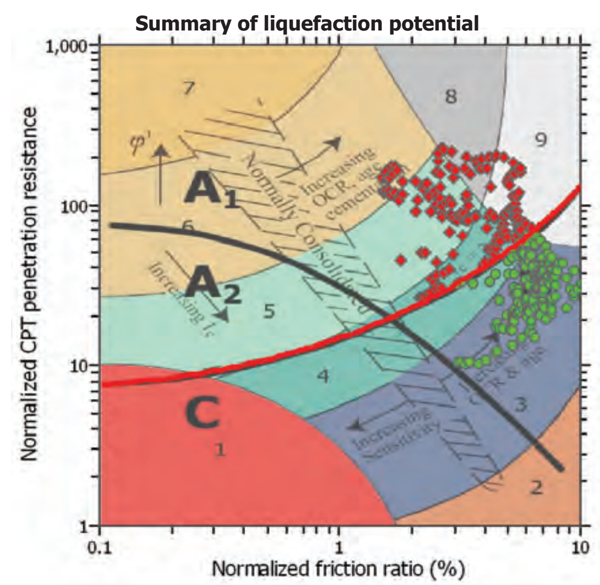
CPT file : CPT-6 (Full PGA)

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	22.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	6.74	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.85	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

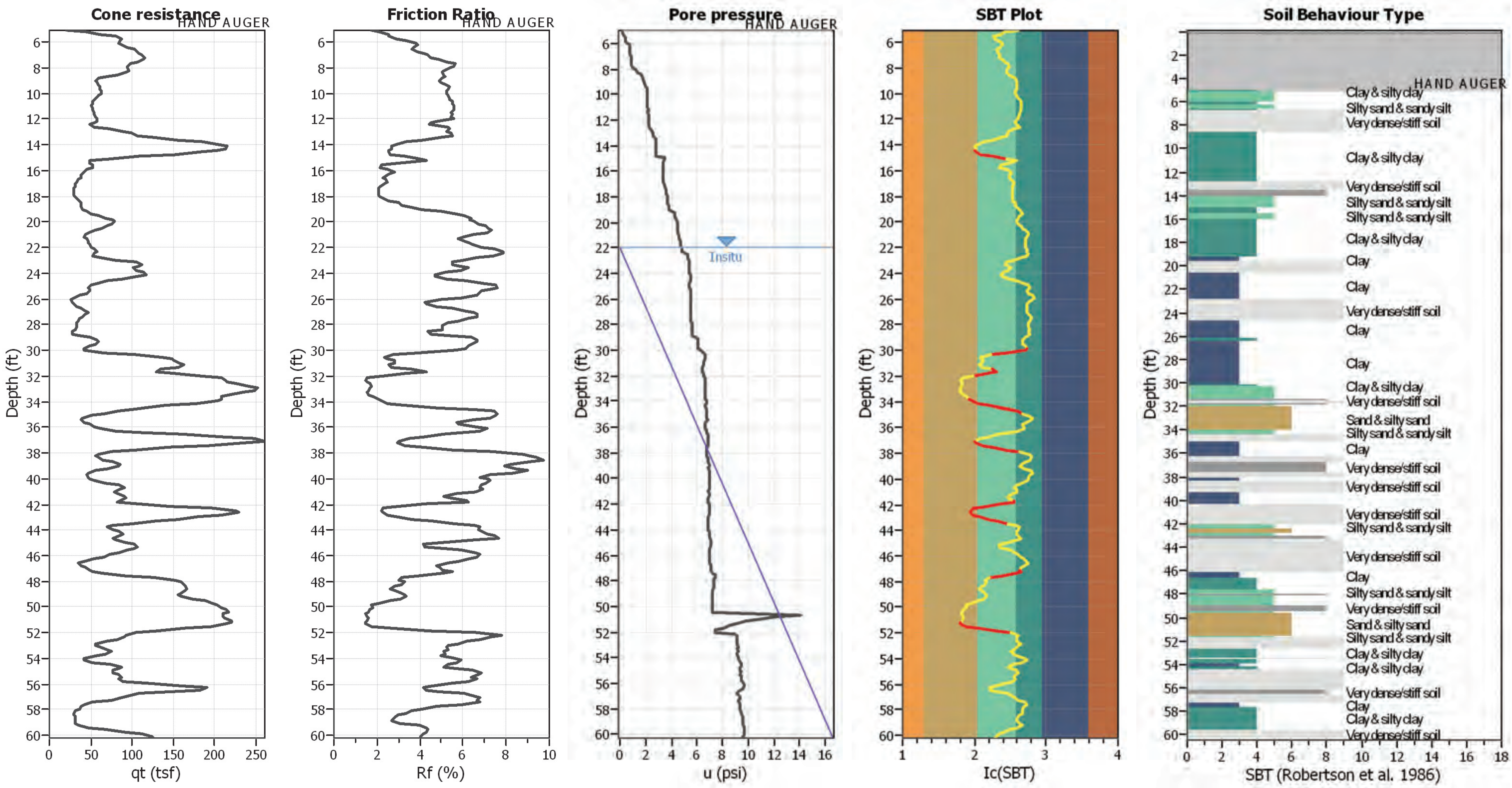






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



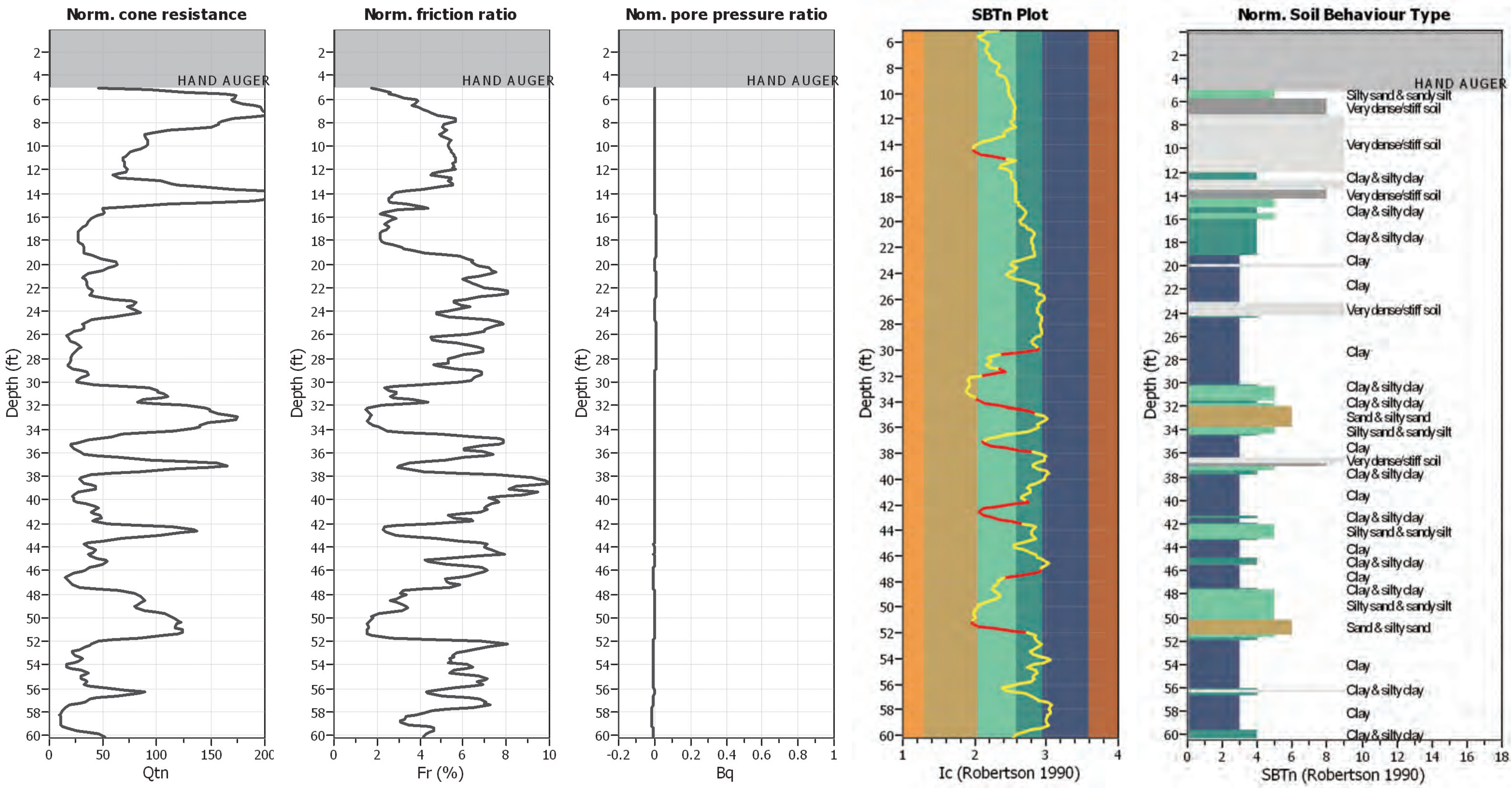
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



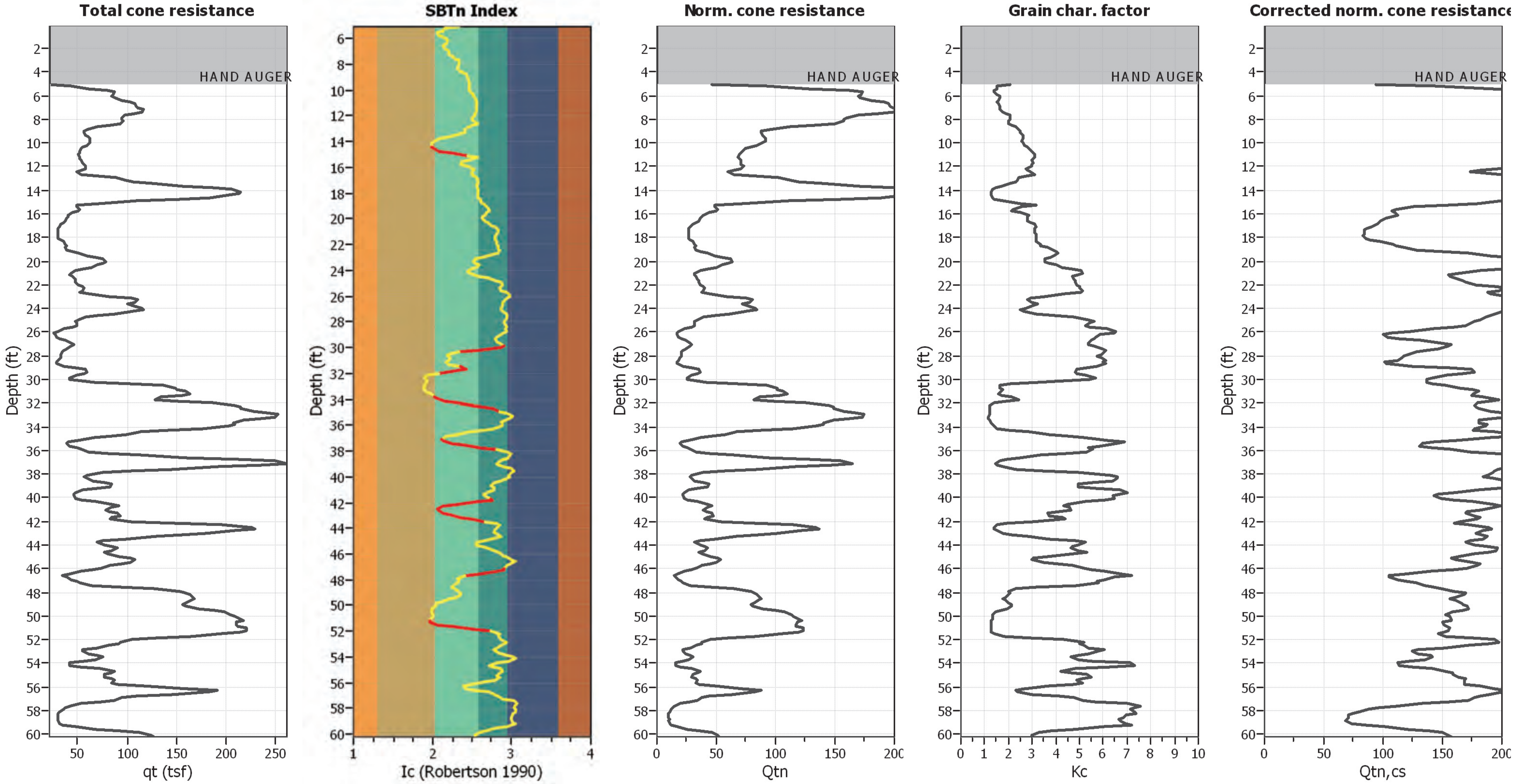
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

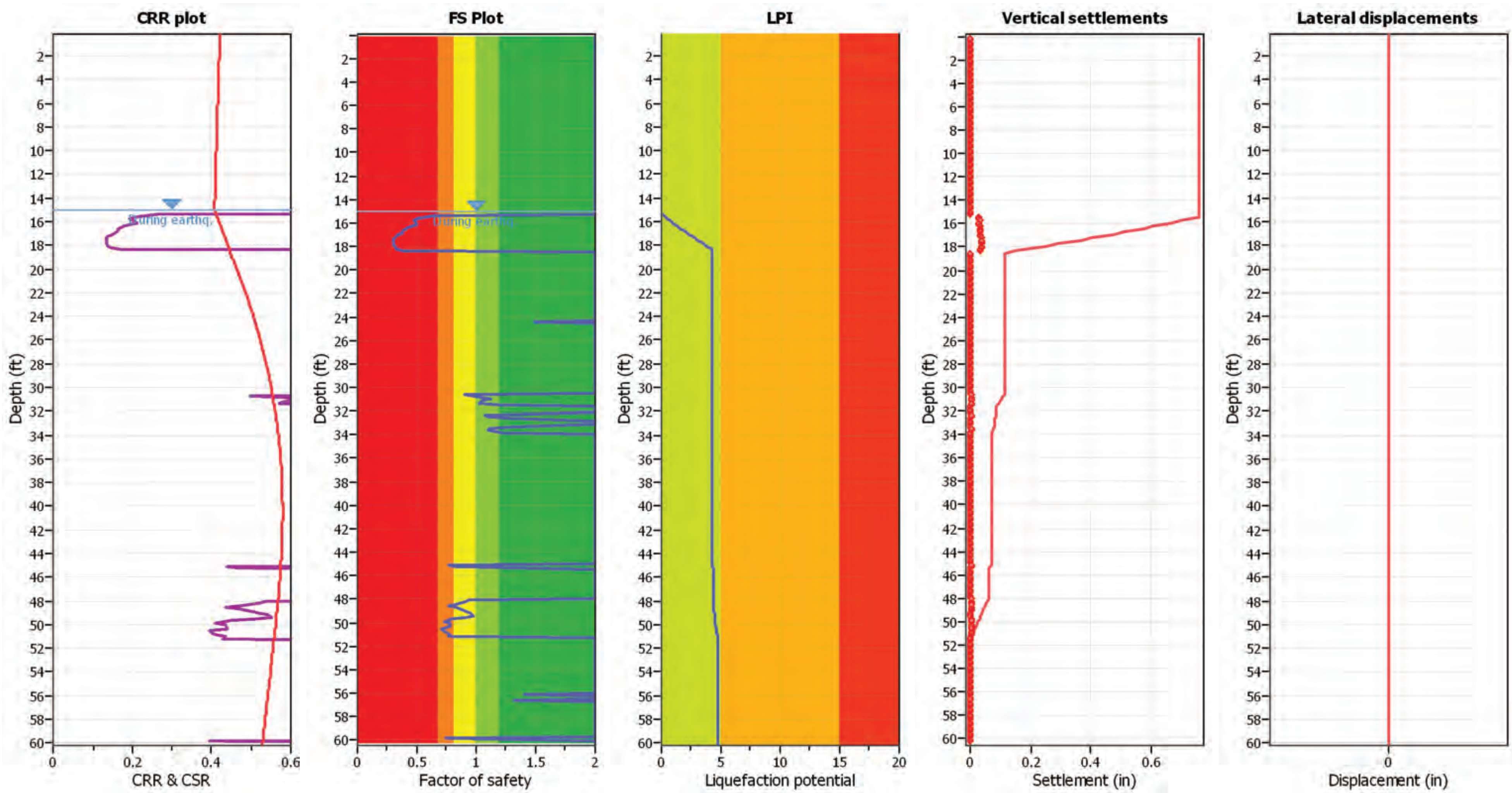
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

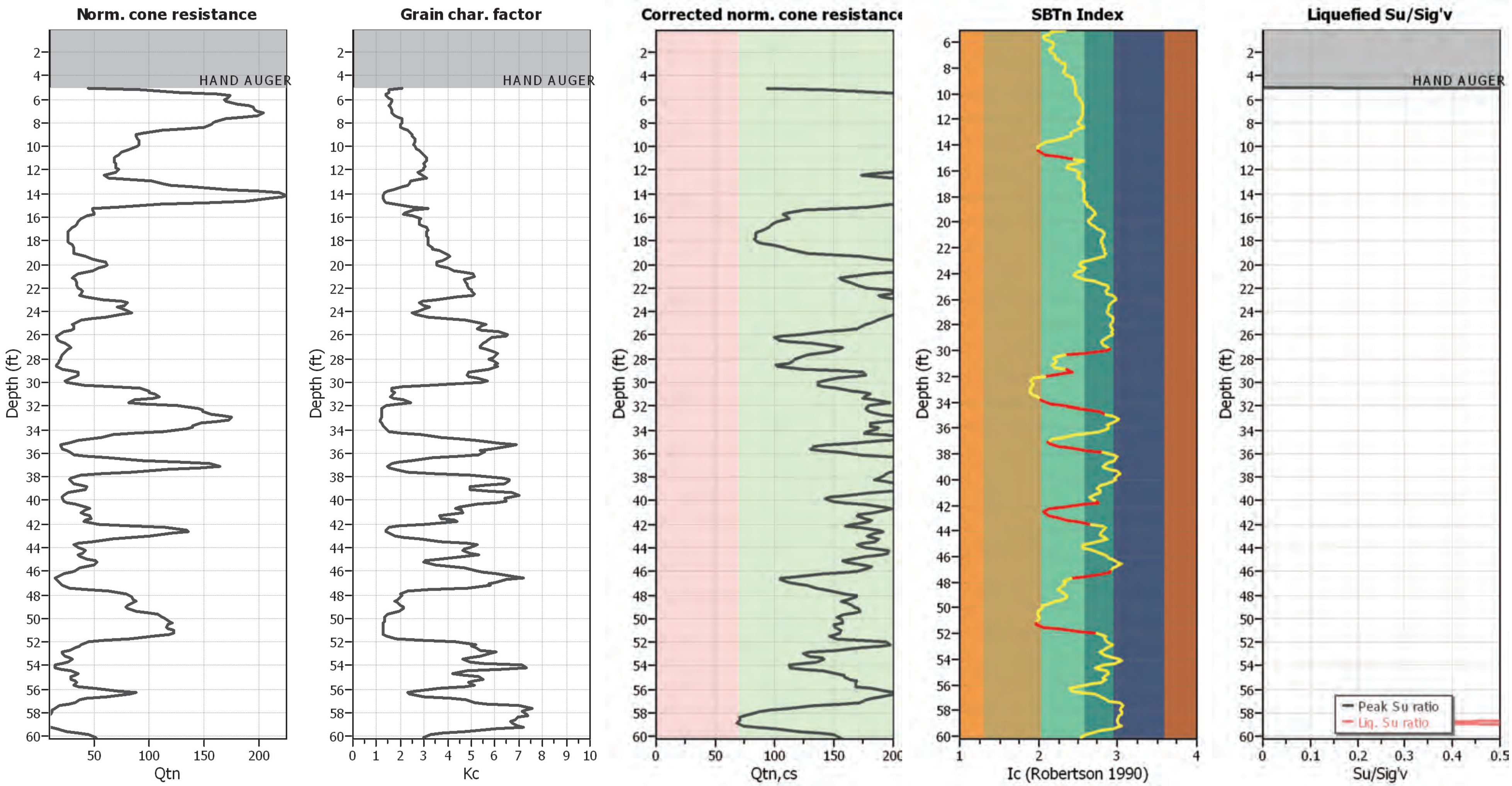
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))

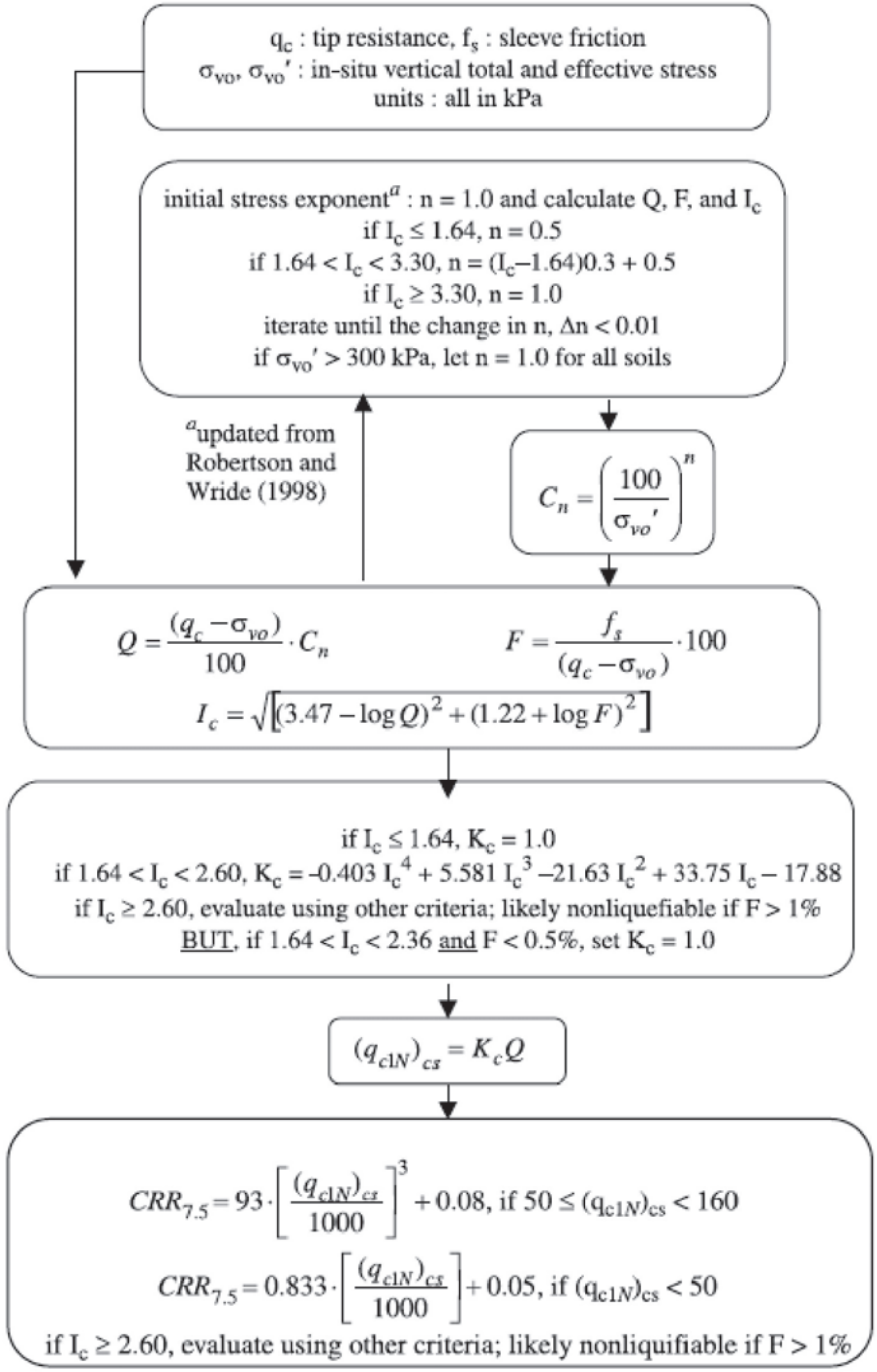


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	15.00 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:	6.74	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.85	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	22.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Procedure for the evaluation of soil liquefaction resistance, NCEER (1998)

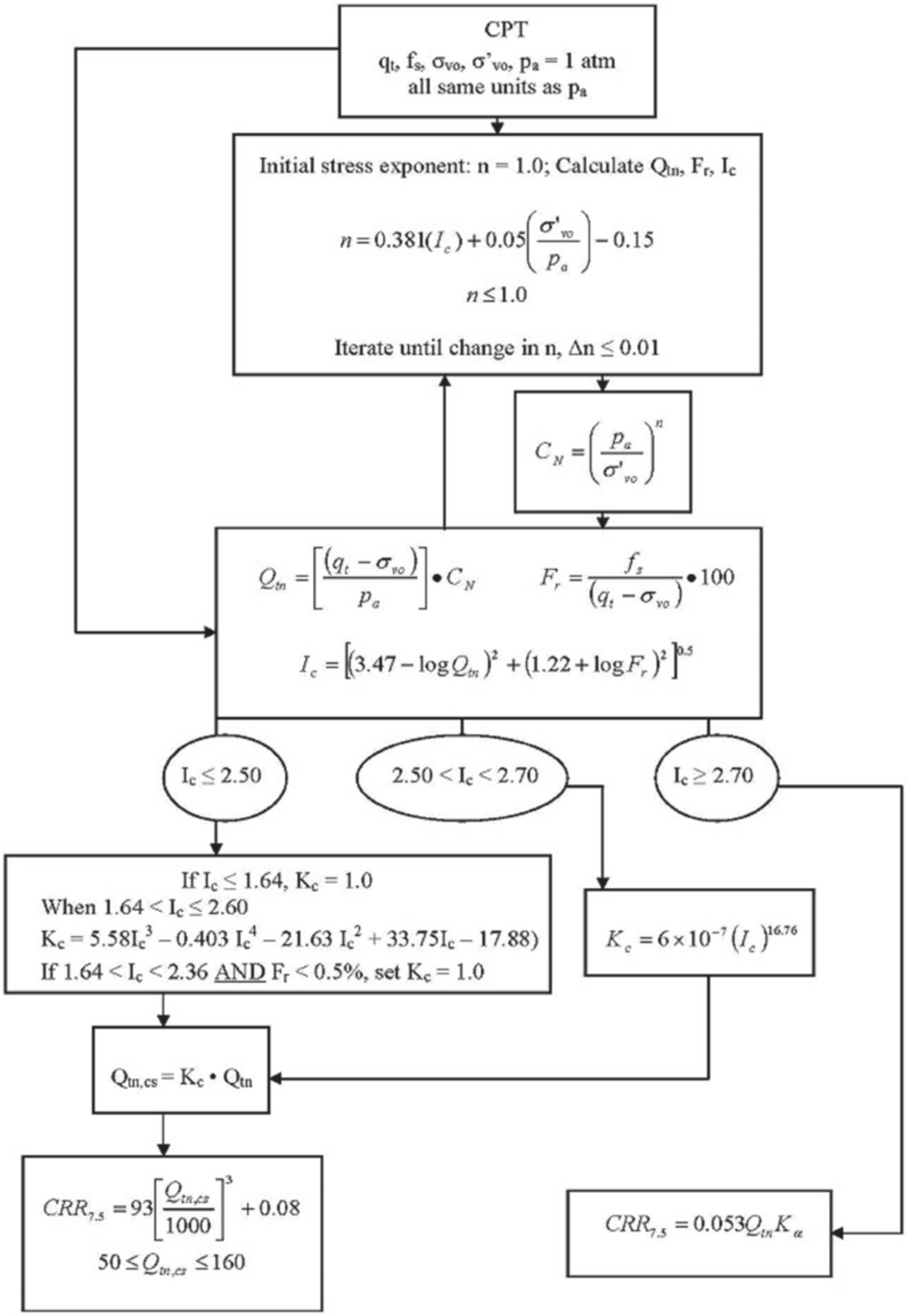
Calculation of soil resistance against liquefaction is performed according to the Robertson & Wride (1998) procedure. The procedure used in the software, slightly differs from the one originally published in NCEER-97-0022 (Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils). The revised procedure is presented below in the form of a flowchart[1]:



[1] "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

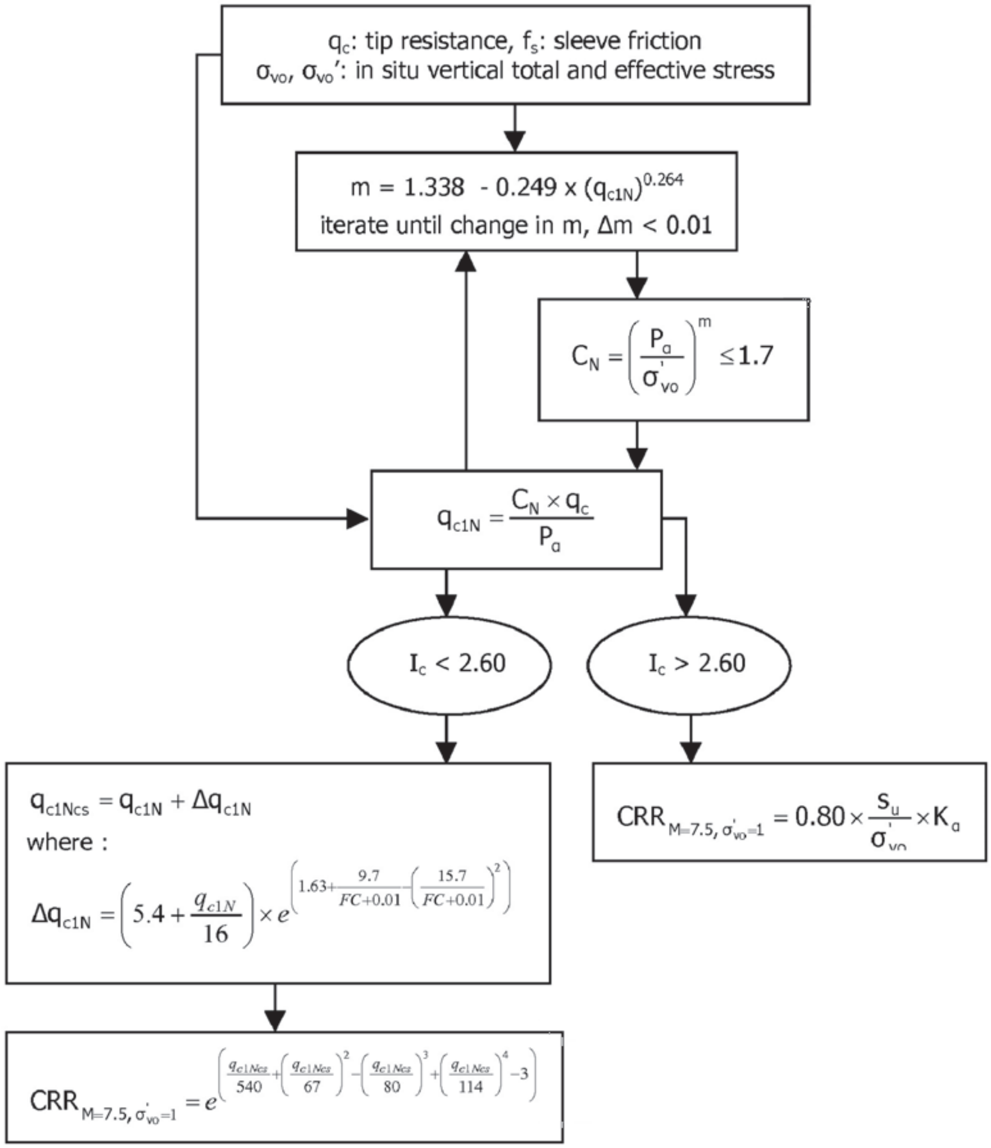
Procedure for the evaluation of soil liquefaction resistance (all soils), Robertson (2010)

Calculation of soil resistance against liquefaction is performed according to the Robertson & Wride (1998) procedure. This procedure used in the software, slightly differs from the one originally published in NCEER-97-0022 (Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils). The revised procedure is presented below in the form of a flowchart[1]:

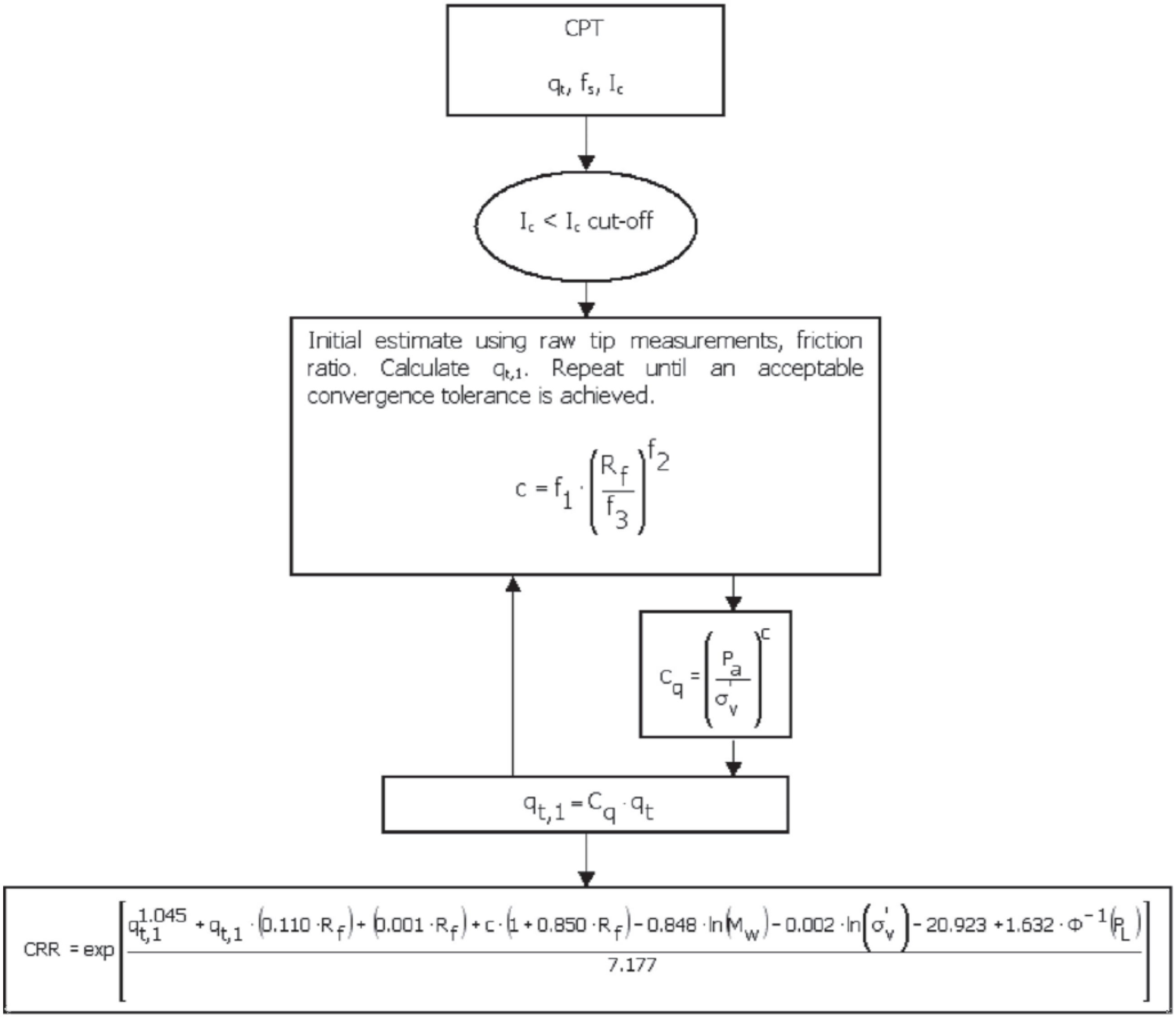


[1] P.K. Robertson, 2009. "Performance based earthquake design using the CPT", Keynote Lecture, International Conference on Performance-based Design in Earthquake Geotechnical Engineering – from case history to practice, IS-Tokyo, June 2009

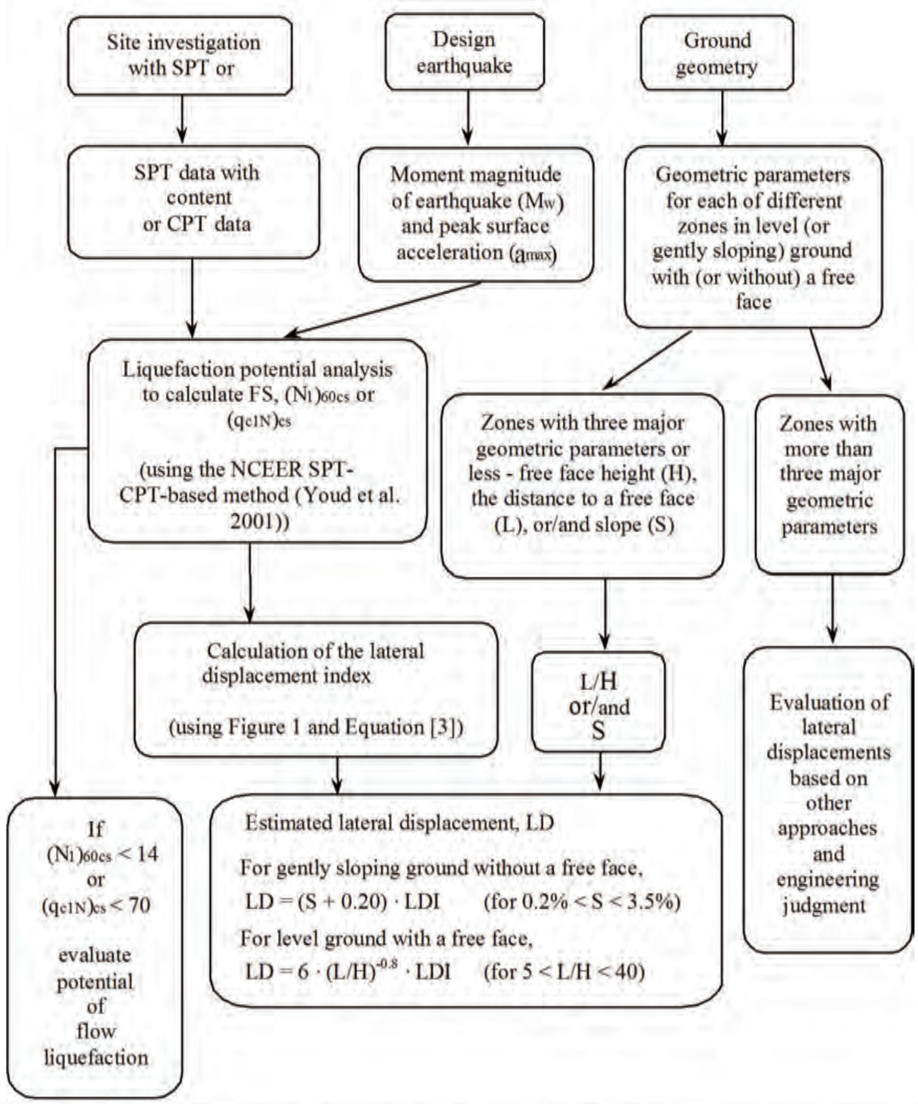
Procedure for the evaluation of soil liquefaction resistance, Idriss & Boulanger (2008)



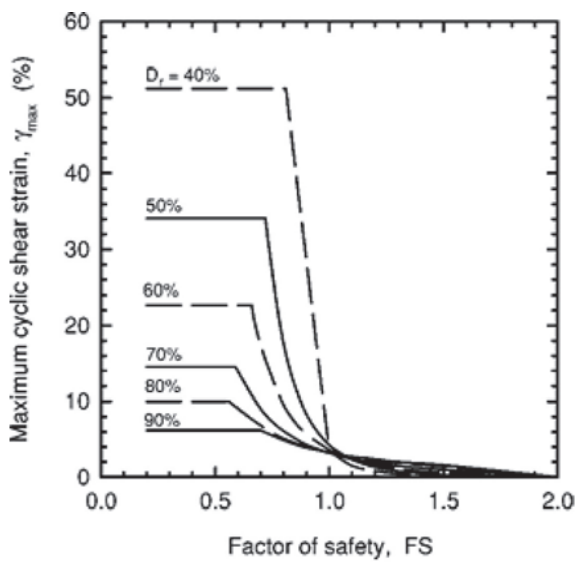
Procedure for the evaluation of soil liquefaction resistance (sandy soils), Moss et al. (2006)



Procedure for the evaluation of liquefaction-induced lateral spreading displacements



[1] Flow chart illustrating major steps in estimating liquefaction-induced lateral spreading displacements using the proposed approach



[1] **Figure 1**

$$LDI = \int_0^{Z_{max}} \gamma_{max} dz$$

[1] **Equation [3]**

[1] "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

Procedure for the estimation of seismic induced settlements in dry sands

Average shear stress, τ_{av}

$$\tau_{av} = CSR^{*} \cdot \sigma_{v0}' = 0.65 \cdot \frac{a_{max}}{g} \cdot \sigma_{v0} \cdot \tau_{a}$$

Estimate small shear strain modulus, G_0

$$G_0 = 0.0188 \cdot \left[10^{(0.55 I_c - 1.68)}\right] \cdot (q_t - \sigma_v)$$

Estimate shear strain amplitude, γ

(based on Pradel (1998))

$$\gamma = \left[\frac{1 + a \cdot e^{bR}}{1 + a}\right] \cdot R \cdot 100\ (\%)$$

$$R = \frac{\tau_{av}}{G_0} \text{ (Note } \tau_{av} \text{ and } G_0 \text{ same units)}$$

$$a = 0.0389 \cdot \left(\frac{\sigma_v}{p_a}\right) + 0.124$$

$$b = 6400 \cdot \left(\frac{\sigma_v}{p_a}\right)$$

Estimate volumetric strain in 15 cycles

$$\varepsilon_{vol(15)} = \gamma \cdot \left[\frac{(N_1)_{60,cs}}{20}\right]^{-1.20}$$

$$(N_1)_{60,cs} = \frac{Q_{tn,cs}}{8.5 \cdot \left[1 - \frac{I_c}{4.6}\right]}$$

Volumetric strain in design earthquake

$$\Sigma_{vol} = \varepsilon_{vol(15)} \cdot \left[\frac{N_c}{15}\right]^{0.45}$$

$$N_c = (M - 4)^{2.17}$$

Seismic settlement, s

$$s = 2 \cdot \int_0^{GWT} \Sigma_{vol} \cdot dz$$

Robertson, P.K. and Lisheng, S., 2010, “Estimation of seismic compression in dry soils using the CPT” FIFTH INTERNATIONAL CONFERENCE ON RECENT ADVANCES IN GEOTECHNICAL EARTHQUAKE ENGINEERING AND SOIL DYNAMICS, Symposium in honor of professor I. M. Idriss, San Diego, CA

Liquefaction Potential Index (LPI) calculation procedure

Calculation of the Liquefaction Potential Index (LPI) is used to interpret the liquefaction assessment calculations in terms of severity over depth. The calculation procedure is based on the methology developed by Iwasaki (1982) and is adopted by AFPS.

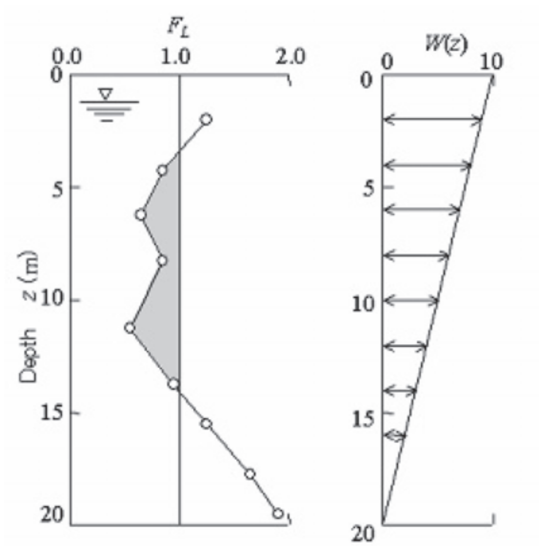
To estimate the severity of liquefaction extent at a given site, LPI is calculated based on the following equation:

$$\textbf{LPI} = \int_0^{20} (10 - 0{,}5_z) \times F_L \times d_z$$

where:
F_L = 1 - F.S. when F.S. less than 1
F_L = 0 when F.S. greater than 1
z depth of measurment in meters

Values of LPI range between zero (0) when no test point is characterized as liquefiable and 100 when all points are characterized as susceptible to liquefaction. Iwasaki proposed four (4) discrete categories based on the numeric value of LPI:

- LPI = 0 : Liquefaction risk is very low
- 0 < LPI <= 5 : Liquefaction risk is low
- 5 < LPI <= 15 : Liquefaction risk is high
- LPI > 15 : Liquefaction risk is very high



Graphical presentation of the LPI calculation procedure

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<u>APPENDIX C</u>

DATA BY OTHERS

Geotechnologies, Inc., June 4, 2021, Boring Logs and Lab Data

BORING LOG NUMBER 1

TAS Realty Associates | **Date: 01/08/21** | **Elevation: 35'**

File No. 22079 | **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking Lot
				0		4½-inch Asphalt over 3½-inch Base
				1		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				2		
2.5	32	12.9	125.1			
				3	SM	ALLUVIUM: Silty Sand, dark brown, moist, medium dense, fine grained
				4		
5	14	12.2	SPT	5		
				6		
				7		
7.5	90	16.1	116.3			
				8		
				9		
10	17	16.6	SPT	10	SM/ML	Silty Sand to Sandy Silt, dark brown, moist, medium dense, fine grained, stiff
				11		
				12		
12.5	88	16.2	117.2		SM	Silty Sand, dark and yellowish brown, moist, very dense, fine grained
				13		
				14		
15	16	18.5	SPT	15	ML	Sandy Silt, dark and grayish brown, moist, stiff, fine grained
				16		
				17		
17.5	56	21.7	105.4		ML/SM	Sandy Silt to Silty Sand, dark brown, moist, medium dense, fine grained, stiff
				18		
				19		
20	15	19.9	SPT	20	SM	Silty Sand, dark brown, moist , medium dense, fine grained
				21		
				22		
22.5	52	17.3	114.9		SM/ML	Silty Sand to Sandy Silt, dark and grayish brown, moist, medium dense, fine grained
				23		
				24		
25	15	26.5	SPT	25		

BORING LOG NUMBER 1

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
27.5	48	19.4	110.4			
				28		
				29		
30	18	19.8	SPT	30		
					SP	Sand, dark brown, wet, medium dense, fine grained
				31		
				32		
32.5	77	18.1	110.5			
				33		
				34		
35	19	20.2	SPT	35		
					SM/ML	Silty Sand to Sandy Silt, dark brown, moist, medium dense, fine grained
				36		
				37		
37.5	64	23.7	100.4			
				38		
				39		
40	16	27.3	SPT	40		
				41		
				42		
42.5	59	23.4	99.8			
				43	SP/ML	Sand to Sandy Silt, dark brown, wet, medium dense, stiff, fine grained
				44		
45	20	20.4	SPT	45		
					SM/ML	Silty Sand to Sandy Silt, dark and yellowish brown, wet, medium dense, stiff, fine grained
				46		
				47		
47.5	59	23.3	103.4			
				48	SM	Silty Sand, dark brown, moist, medium dense, fine grained
				49		
50	34	23.5	SPT	50		
					ML	Sandy Silt, dark brown, moist, stiff, fine grained

BORING LOG NUMBER 1

TAS Realty Associates

File No. 22079
km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				51		
				52		
52.5	71	29.7	92.7			
				53	SM/ML	Silty Sand to Sandy Silt, dark brown, moist to wet, dense, stiff, fine grained
				54		
55	35	24.4	SPT	55		
				56		
				57		
57.5	69	25.9	100.1			
				58		
				59		
60	42	26.3	SPT	60		
				61		Total Depth 60 feet Water at 17 feet Fill to 3 feet
				62		
				63		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				64		
				65		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				66		
				67		SPT=Standard Penetration Test
				68		
				69		
				70		
				71		
				72		
				73		
				74		
				75		

BORING LOG NUMBER 2

TAS Realty Associates | **Date: 01/07/21** | **Elevation: 34'**

File No. 22079 | **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking Lot
				0		3-inch Asphalt over 5-inch Base
				-		
				1		
				-		FILL: Clayey Sand, dark brown, moist, medium dense, fine grained, debris fragments
				2		
2.5	43	13.8	120.0	-		
				3	SC	ALLUVIUM: Clayey Sand, dark brown, moist, medium dense, fine grained
				-		
				4		
				-		
5	10	12.1	SPT	5		- - - - - - - - - -
				-		brown, few fine gravel
				6		
				-		
				7		
7.5	50 50/5"	14.4	123.1	-		
				8	SP/SC	Sand with Clay, mottled brown, moist, dense, fine grained
				-		
				9		
				-		
10	22	16.2	SPT	10		
				-	SC	Clayey Sand, mottled light to yellowish brown, moist, medium dense, fine grained
				11		
				-		
				12		
12.5	46	16.2	110.8	-		
				13	SM	Silty Sand, light brown, moist, medium dense, fine grained
				-		
				14		
				-		
15	17	19.4	SPT	15		
				-	CL	Sandy Clay, mottled olive brown, moist, stiff, fine grained
				16		
				-		
				17		
17.5	28	20.2	107.9	-		
				18	SC	Clayey Sand, light brown, very moist, medium dense, fine grained
				-		
				19		
				-		
20	20	22.7	SPT	20		- - - - - - - - - -
				-		wet
				21		
				-		
				22		
22.5	68	16.4	121.9	-		- - - - - - - - - -
				23		grayish brown
				-		
				24		
				-		
25	16	18.0	SPT	25		
				-	SP	Sand, brown, wet, medium dense, fine grained, minor clay

GEOTECHNOLOGIES, INC.

Plate A-2a

BORING LOG NUMBER 2

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
27.5	65 50/5"	22.5	103.8	28		
				29		
30	21	22.7	SPT	30		
				31		
				32		
32.5	46	20.9	110.4	33		mottled grayish brown
				34		
35	28	22.9	SPT	35		
				36		
				37		
37.5	82	21.0	108.3	38	ML	Sandy to Clayey Silt, mottled grayish brown, wet, stiff, fine grained
				39		
40	30	23.4	SPT	40		
				41		
				42		
42	49	21.2	106.8	43	CL	Sandy Clay, grayish brown, wet, very stiff, fine grained
				44		
45	17	22.3	SPT	45		
				46		
				47		
47.5	64	20.6	109.2	48	CL/ML	Sandy Clay to Sandy Silt, grayish brown, wet, stiff. Fine grained
				49		
50	18	25.3	SPT	50		mottled grayish brown

BORING LOG NUMBER 2

File No. 22079
km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				51		
				52		
52.5	73 50/4"	19.6	111.3			
				53		
				54		
55	34	25.6	SPT	55		
				56		
				57		
57.5		No Recovery				
				58		
				59		
					ML	Sandy to Clayey Silt, mottled grayish brown, wet, very stiff
60	36	31.4	SPT	60		
				61		Total Depth 60 feet Water at 18 feet Fill to 2½ feet
				62		
				63		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				64		
				65		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				66		SPT=Standard Penetration Test
				67		
				68		
				69		
				70		
				71		
				72		
				73		
				74		
				75		

BORING LOG NUMBER 3

TAS Realty Associates | **Date: 01/08/21** | **Elevation: 35'**

File No. 22079 | **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Concrete Slab for Parking Lot
				0		6½-inch Concrete, No Base
				1		FILL: Sandy Silt to Silty Sand, dark brown, moist, medium dense, stiff, fine grained
				2		
				3		
				4	SM	ALLUVIUM: Silty Sand, dark brown, moist, dense, fine grained
5	59	11.9	118.0	5		
				6		
				7		
				8		
				9		
10	65 50/5"	17.1	113.8	10	SM/ML	Silty Sand to Sandy Silt, dark and grayish brown, moist, very dense, very stiff, fine grained
				11		
				12		
				13		
				14		
15	75	18.5	112.7	15	SM	Silty Sand, dark brown, moist, dense, fine grained
				16		
				17		
				18		
				19		
20	58	16.6	116.8	20	SM/SP	Silty Sand to Sand, dark brown, moist, medium dense, fine grained
				21		
				22		
				23		
				24		
25	41	28.0	93.3	25	ML	Sandy Silt, dark brown, moist, stiff, fine grained

BORING LOG NUMBER 3

TAS Realty Associates

File No. 22079

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
				28		
				29		
						Sandy to Clayey Silt, dark brown, moist, stiff, fine grained
30	30 50/5"	27.4	97.9	30		
						Total Depth 30 feet Water at 18½ feet Fill to 4 feet
				31		
				32		
				33		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				34		
				35		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				36		
				37		
				38		
				39		
				40		
				41		
				42		
				43		
				44		
				45		
				46		
				47		
				48		
				49		
				50		

BORING LOG NUMBER 4

TAS Realty Associates — **Date: 01/07/21** — **Elevation: 33'**

File No. 22079 — **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking Lot
				0		5-inch Asphalt over 2½-inch Base
				1		FILL: Silty Sand to Sandy Silt, dark brown, moist, stiff
				2		
2.5	61	11.0	126.8			
				3	SM	ALLUVIUM: Silty Sand, dark and grayish brown, moist, medium dense to dense, fine grained
				4		
5	72	14.1	118.8	5		
				6		
				7		
				8		
				9		
10	42 50/3"	13.7	114.5	10	SM/SP	Silty Sand to Sand, dark and grayish brown, moist, very dense, fine grained
				11		
				12		
				13		
				14		
15	49	20.4	106.2	15	SM/ML	Silty Sand to Sandy Silt, dark and grayish brown, moist, medium dense, fine grained
				16		
				17		
				18		
				19		
20	72	14.9	119.5	20		
				21		
				22		
				23		
				24		
25	83	19.3	107.9	25	SM/SP	Silty Sand to Sand, dark and grayish brown, very moist, very dense, fine grained

BORING LOG NUMBER 4

TAS Realty Associates

File No. 22079

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
				28		
				29	SP	Sand, dark and grayish brown, very dense, fine grained
30	36 50/5"	21.6	100.9	30		
				31		Total Depth 30 feet Water at 17 feet Fill to 3 feet
				32		
				33		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				34		
				35		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				36		
				37		
				38		
				39		
				40		
				41		
				42		
				43		
				44		
				45		
				46		
				47		
				48		
				49		
				50		

BORING LOG NUMBER 5

TAS Realty Associates — **Date: 01/07/21** — **Elevation: 32'**

File No. 22079 — **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking Lot
				0		5-inch Asphalt over 6-inch Base
				1		FILL: Sandy Clay, brown, moist, firm debris fragments
2.5	60	12.7	122.4	2		
				3	SC	ALLUVIUM: Clayey Sand, mottled brown, moist, medium dense, fine grained
5	32 50/6"	14.2	121.2	5		
10	74	8.2	107.9	10	SP	Sand, light brown, slightly moist, dense, fine grained
15	44	20.0	112.0	15	CL	Sandy Clay, mottled dark and yellowish brown, moist, stiff, fine grained
20	47	22.9	107.7	20	ML	Sandy Silt, grayish brown, wet, stiff, fine grained
25	80	16.8	117.3	25	SP/SC	Sand with clay, light brown, wet, dense, fine grained

BORING LOG NUMBER 5

TAS Realty Associates

File No. 22079

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
				28		
				29		
					SP	Sand, light brown, wet, dense, fine grained
30	34 50/6"	29.7	94.7	30		
				31		Total Depth 30 feet Water at 16 feet Fill to 3 feet
				32		
				33		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				34		
				35		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				36		
				37		
				38		
				39		
				40		
				41		
				42		
				43		
				44		
				45		
				46		
				47		
				48		
				49		
				50		

BORING LOG NUMBER 6

TAS Realty Associates | **Date: 01/08/21** | **Elevation: 35'**

File No. 22079 | **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking Lot
				0		3½-inch Asphalt over 1½-inch Base
				1		FILL: Silty Sand to Sandy Silt, dark brown, moist, medium dense, fine grained, stiff
				2		
				3		
				4		
					SM	ALLUVIUM: Silty Sand, dark and grayish brown, moist, medium dense to dense, fine grained
5	68	12.4	123.5	5		
				6		
				7		
				8		
				9		
10	82	16.1	114.7	10		
				11		
				12		
				13		
				14		
15	14	7.9	SPT	15		
				16		
				17		
17.5	49	18.4	112.8			
				18	SM/ML	Silty Sand to Sandy Silt, dark brown, moist, medium dense, stiff, fine grained
				19		
20	11	18.6	SPT	20		
					SM/SP	Silty Sand to Sand, gray to dark gray, moist to very moist, medium dense, fine grained
				21		
				22		
22.5	85	15.4	114.4			
				23		
				24		
25	24	17.7	SPT	25		
					SP	Sand, dark and gray, wet, medium dense, fine grained

BORING LOG NUMBER 6

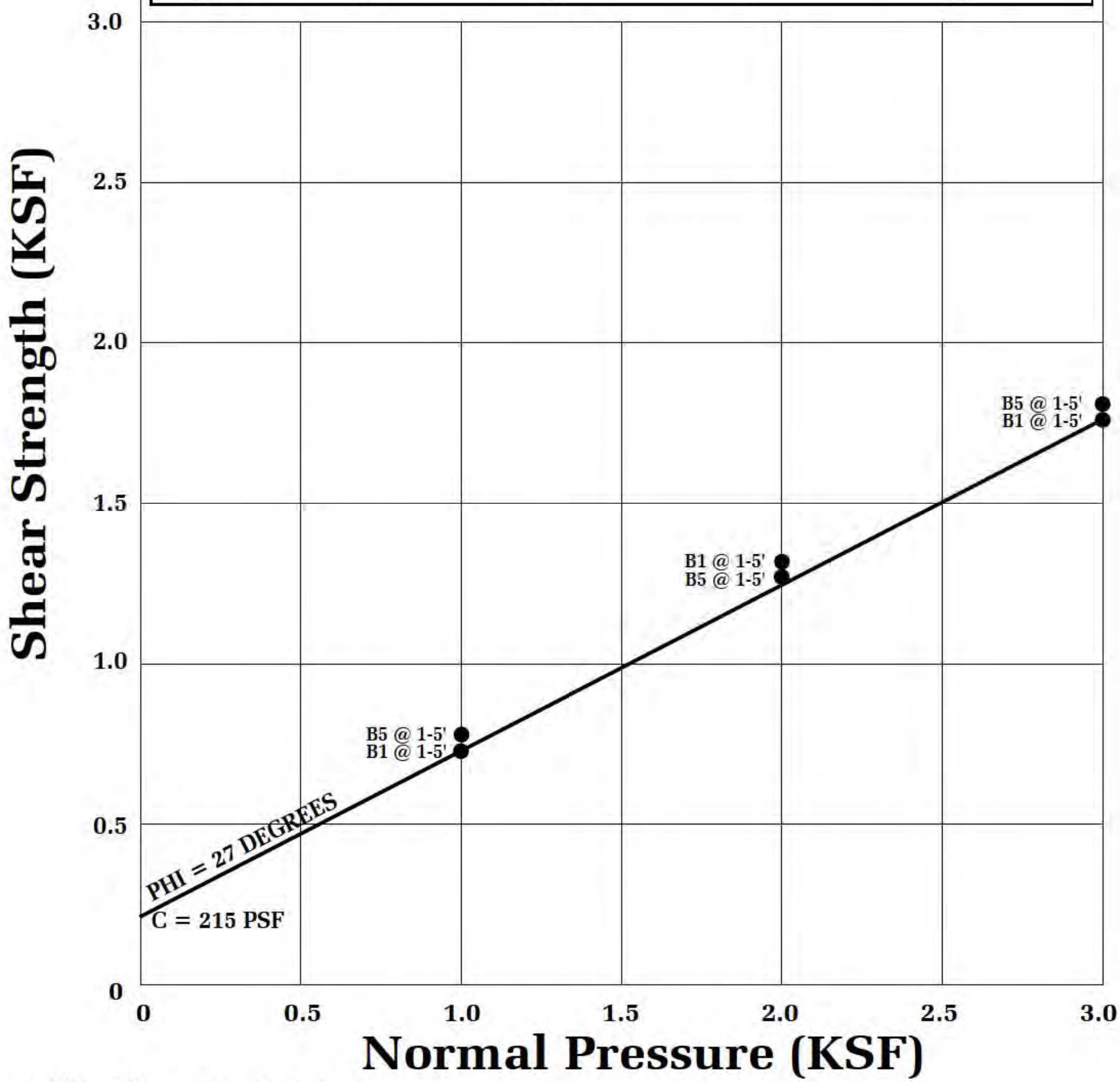
Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
27.5	74	20.9	106.6			- - - - - - - - - - - -
				28		Sand, dark brown, wet, dense, fine grained
				29		
30	37	21.7	SPT	30		
				31		
				32		
32.5	69	20.7	112.3			
				33	SM/SP	Silty Sand to Sand, dark brown, wet, dense, fine grained
				34		
35	30	25.9	SPT	35		
					SM/ML	Silty Sand to Sandy Silt, dark brown, wet, medium dense, fine grained
				36		
				37		
37.5	64	29.6	94.8			
				38		
				39		
40	21	24.5	SPT	40		
					SM/SP	Silty Sand to Sand, dark brown and gray, wet, medium dense, fine grained
				41		
				42		
42.5	62	20.0	105.9			
				43		
				44		
45	23	22.3	SPT	45		
					SM/ML	Silty Sand to Sandy Silt, dark brown, moist, medium dense, stiff, fine grained
				46		
				47		
47.5	68	25.0	101.9			
				48	SM	Silty Sand, dark brown, wet, dense, fine grained
				49		
50	24	21.2	SPT	50		
					SM/ML	Silty Sand to Sandy Silt, dark brown, moist to wet, medium dense, stiff, fine grained

File No. 22079
km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				51		
				52		
52.5	69	23.9	103.4			
				53		
				54		
55	23	28.2	SPT	55		
				56		
				57		
57.5	75 50/5"	25.1	100.6			
				58	SM/SP	Silty Sand to Sand, dark and yellowish brown, wet, very dense, fine grained
				59		
					SM/ML	Silty Sand to Sandy Silt, dark brown and gray, dense, fine grain
60	41	32.3	SPT	60		
						Total Depth 60 feet Water at 19 feet Fill to 4 feet
				61		
				62		
				63		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				64		
						Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				65		
				66		SPT=Standard Penetration Test
				67		
				68		
				69		
				70		
				71		
				72		
				73		
				74		
				75		

BULK SAMPLE REMOLDED TO 90 PERCENT OF THE MAXIMUM LABORATORY DENSITY

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B1 @ 1-5'	SM	120.1	8.3	13.5
B5 @ 1-5'	SC	117.3	9.4	14.9



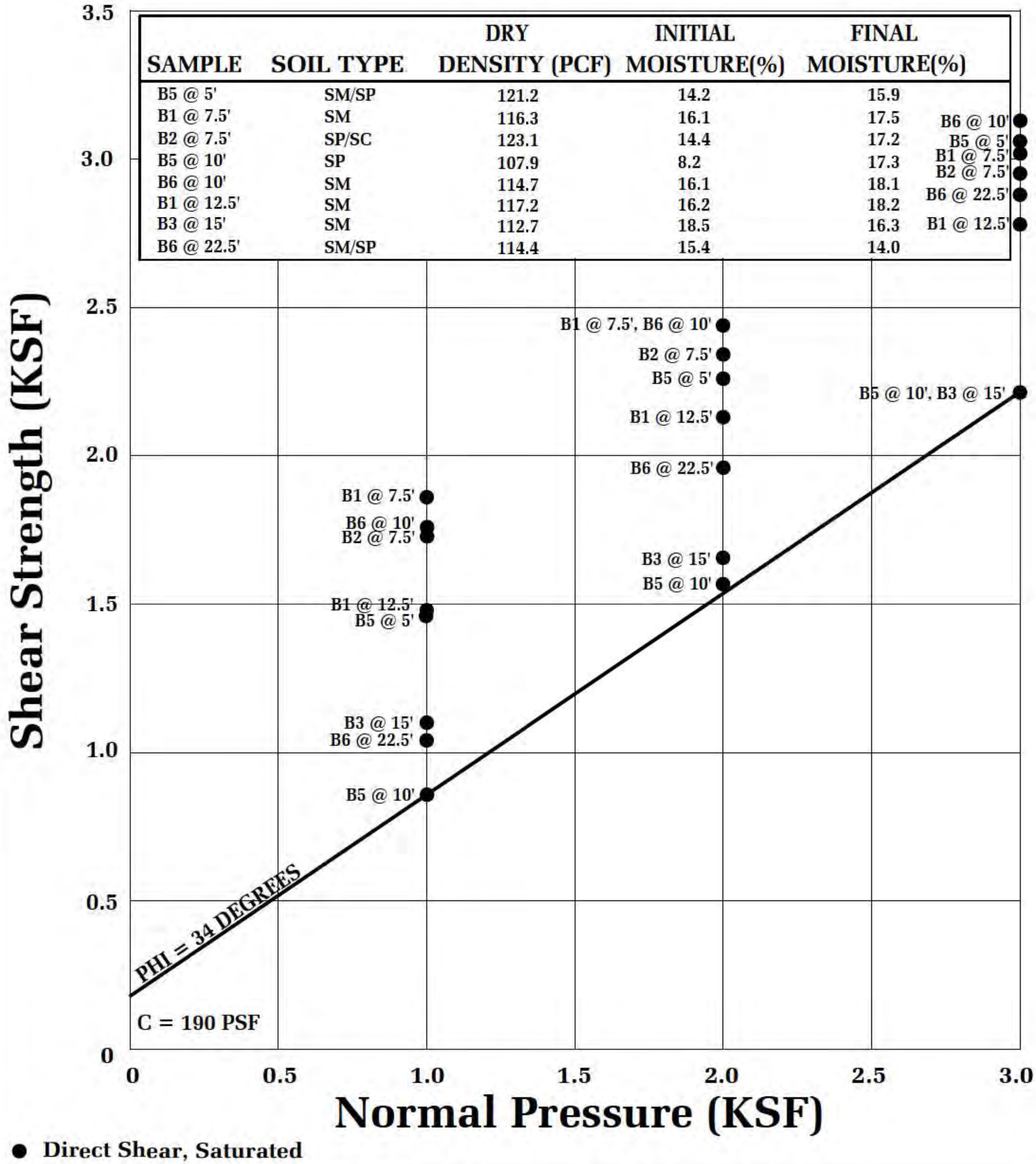
● Direct Shear, Saturated

SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TAS REALTY ASSOCIATES, LLC
16911 NORMANDIE AVENUE, GARDENA

FILE NO. 22079	PLATE: B-1



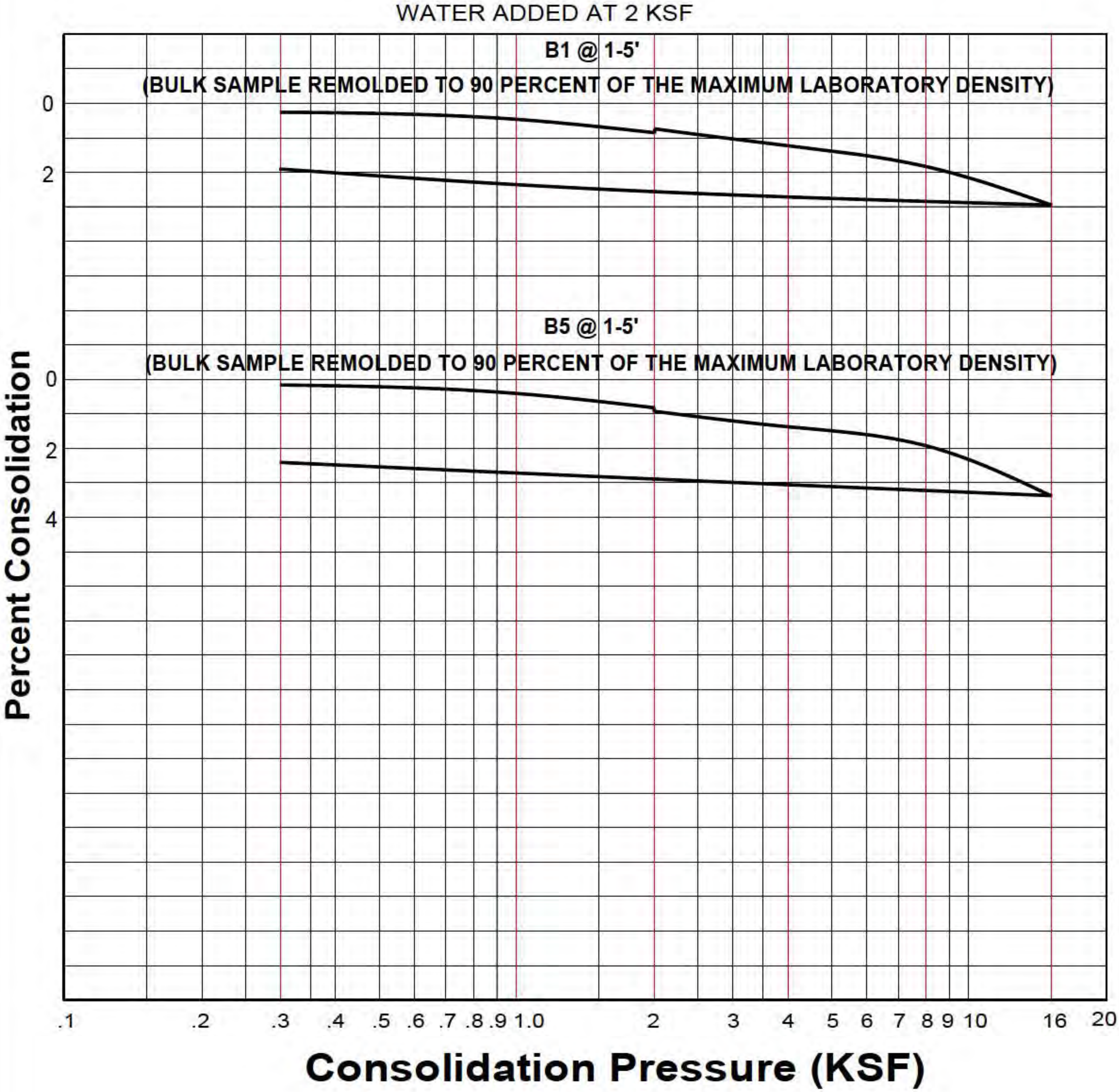
SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B5 @ 5'	SM/SP	121.2	14.2	15.9
B1 @ 7.5'	SM	116.3	16.1	17.5
B2 @ 7.5'	SP/SC	123.1	14.4	17.2
B5 @ 10'	SP	107.9	8.2	17.3
B6 @ 10'	SM	114.7	16.1	18.1
B1 @ 12.5'	SM	117.2	16.2	18.2
B3 @ 15'	SM	112.7	18.5	16.3
B6 @ 22.5'	SM/SP	114.4	15.4	14.0

SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TAS REALTY ASSOCIATES, LLC
16911 NORMANDIE AVENUE, GARDENA

FILE NO. 22079 | PLATE: B-2



CONSOLIDATION TEST

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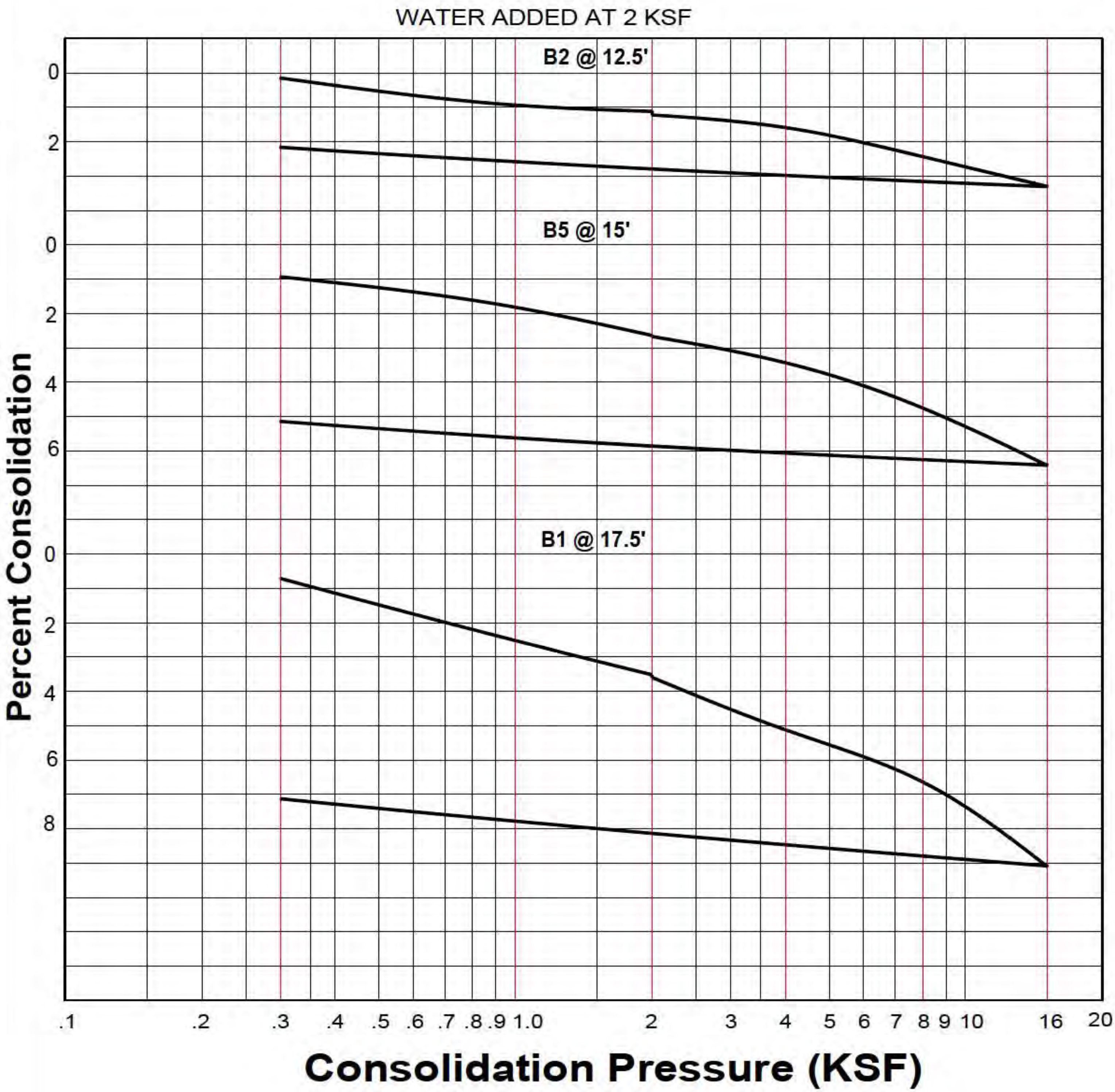
TAS REALTY ASSOCIATES, LLC

FILE NO. 22079 | **PLATE: C-1**



CONSOLIDATION TEST

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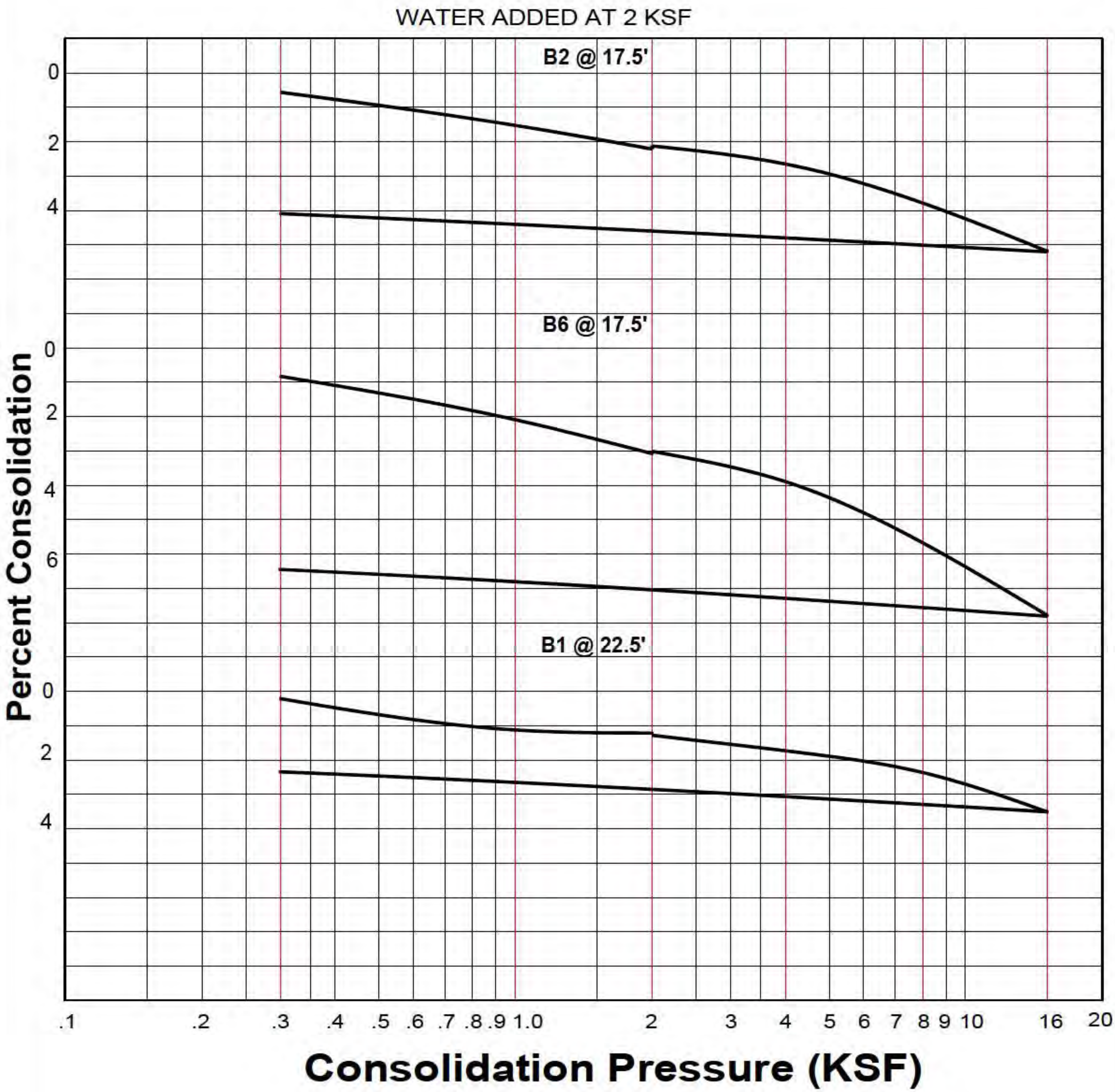
TAS REALTY ASSOCIATES, LLC

FILE NO. 22079 | **PLATE: C-2**



CONSOLIDATION TEST

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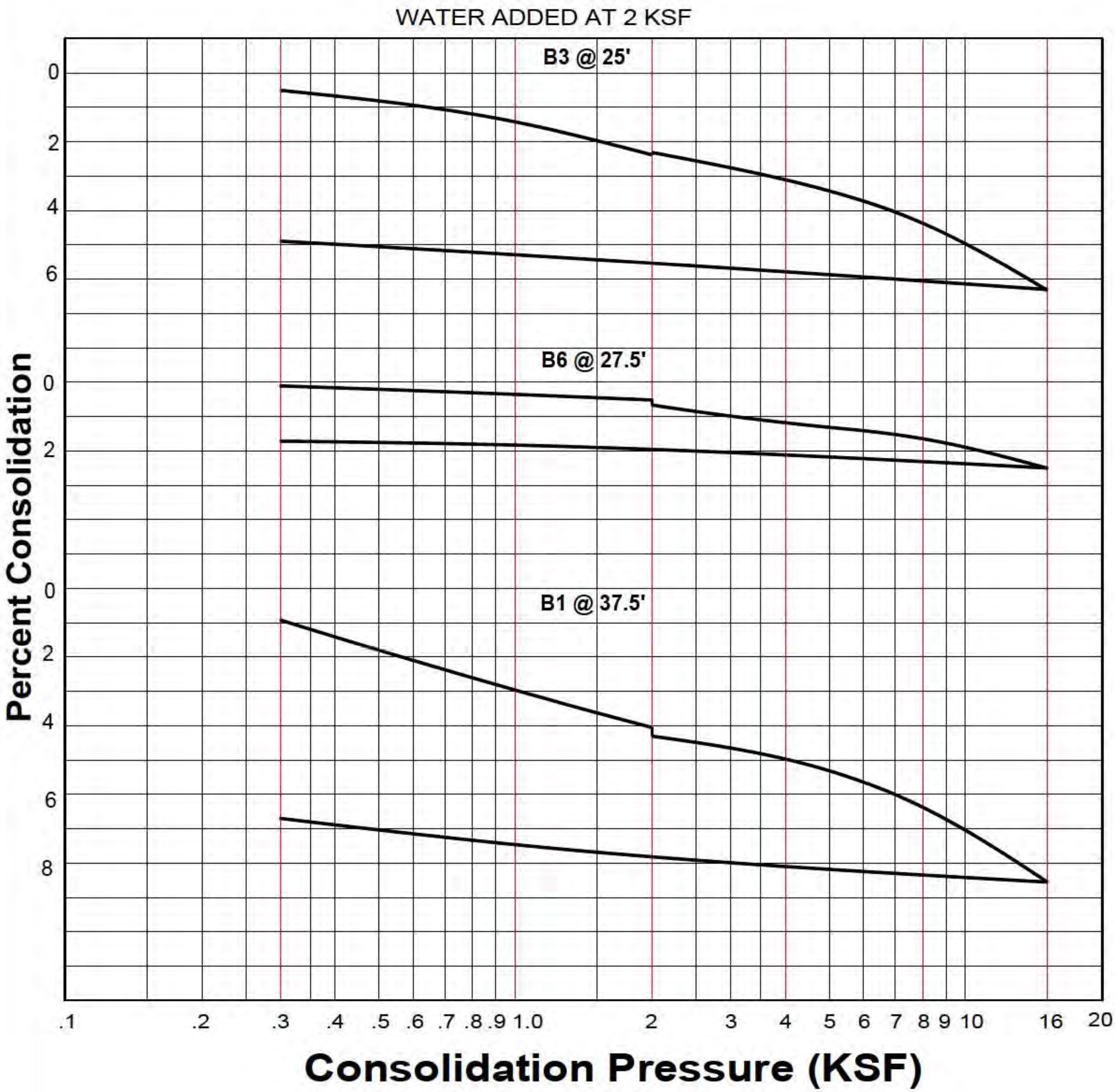
TAS REALTY ASSOCIATES, LLC

FILE NO. 22079	**PLATE: C-3**



CONSOLIDATION TEST

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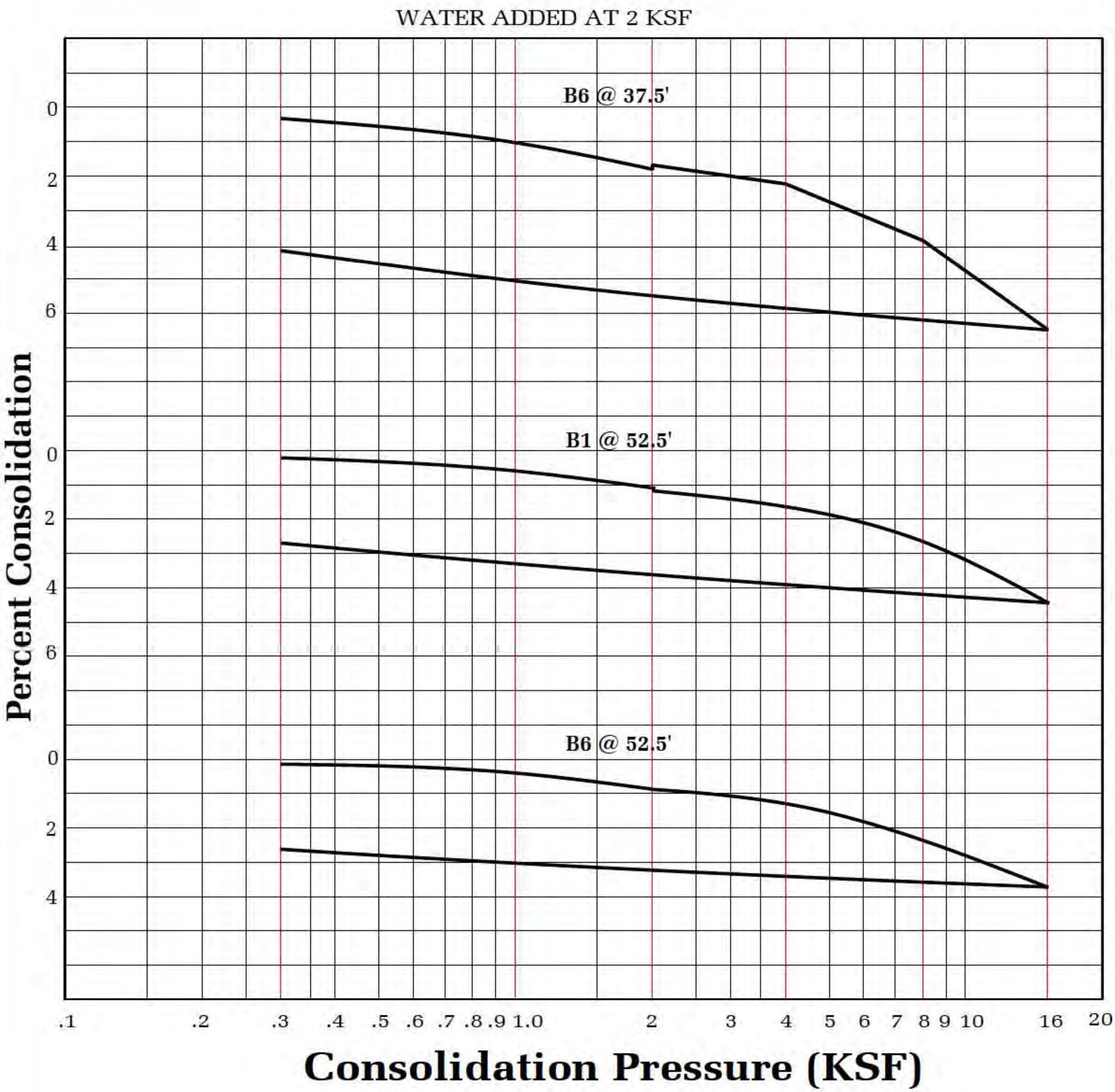
TAS REALTY ASSOCIATES, LLC

FILE NO. 22079 | **PLATE: C-4**



CONSOLIDATION TEST

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TAS REALTY ASSOCIATES, LLC

FILE NO. 22079	PLATE: C-5

ASTM D-1557

SAMPLE	B1 @ 1-5'	B5 @ 1-5'
SOIL TYPE:	SM	SM
MAXIMUM DENSITY pcf.	133.4	130.3
OPTIMUM MOISTURE %	8.3	9.4

ASTM D 4829

SAMPLE	B1 @ 1-5'	B5 @ 1-5'
SOIL TYPE:	SM	SM
EXPANSION INDEX UBC STANDARD 18-2	7	10
EXPANSION CHARACTER	VERY LOW	VERY LOW

SULFATE CONTENT

SAMPLE	B1 @ 1-5'	B5 @ 1-5'
SULFATE CONTENT: (percentage by weight)	< 0.10%	< 0.10%

COMPACTION/EXPANSION/SULFATE DATA SHEET

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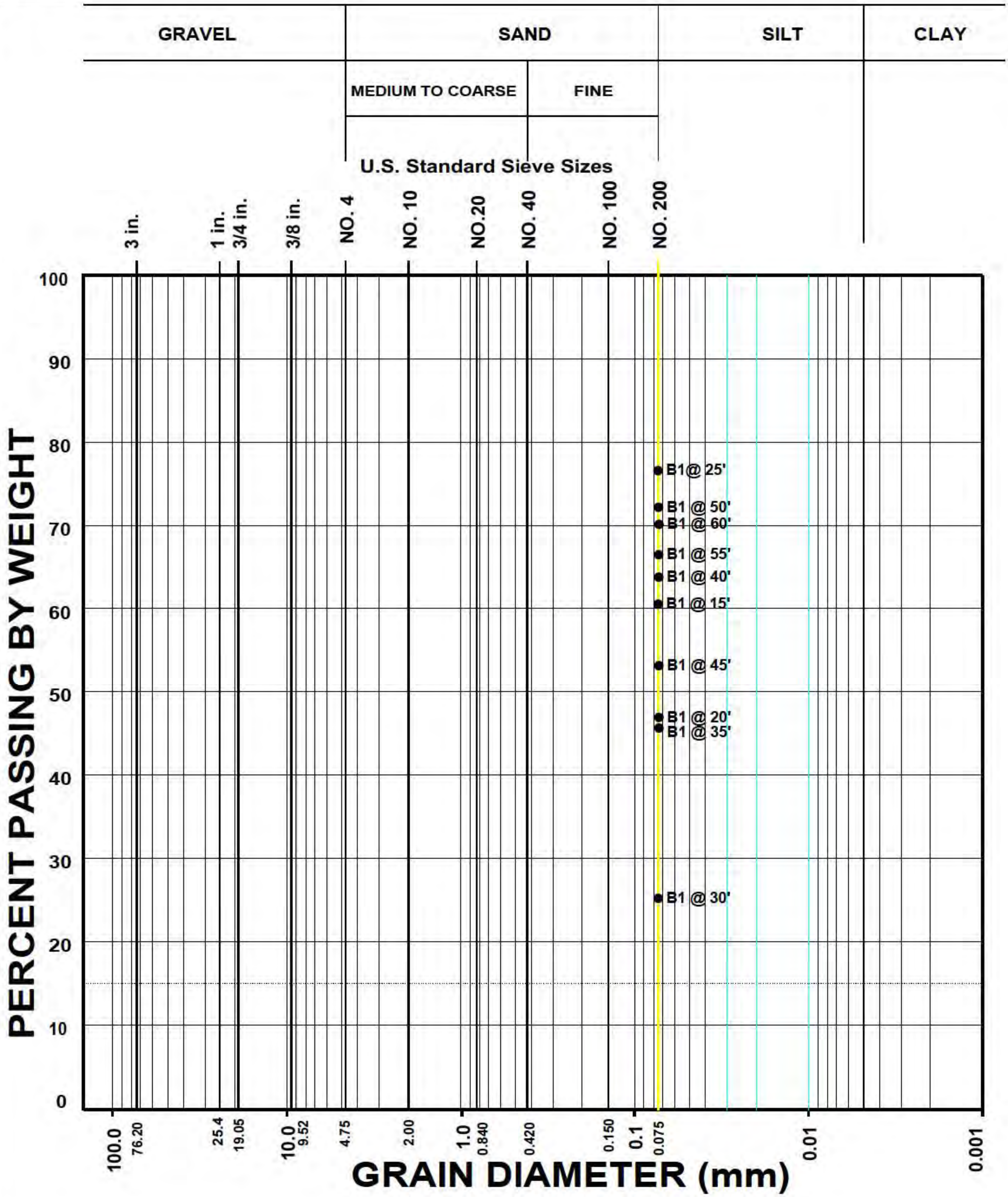
FILE NO. 22079 | PLATE: D



GRAIN SIZE DISTRIBUTION

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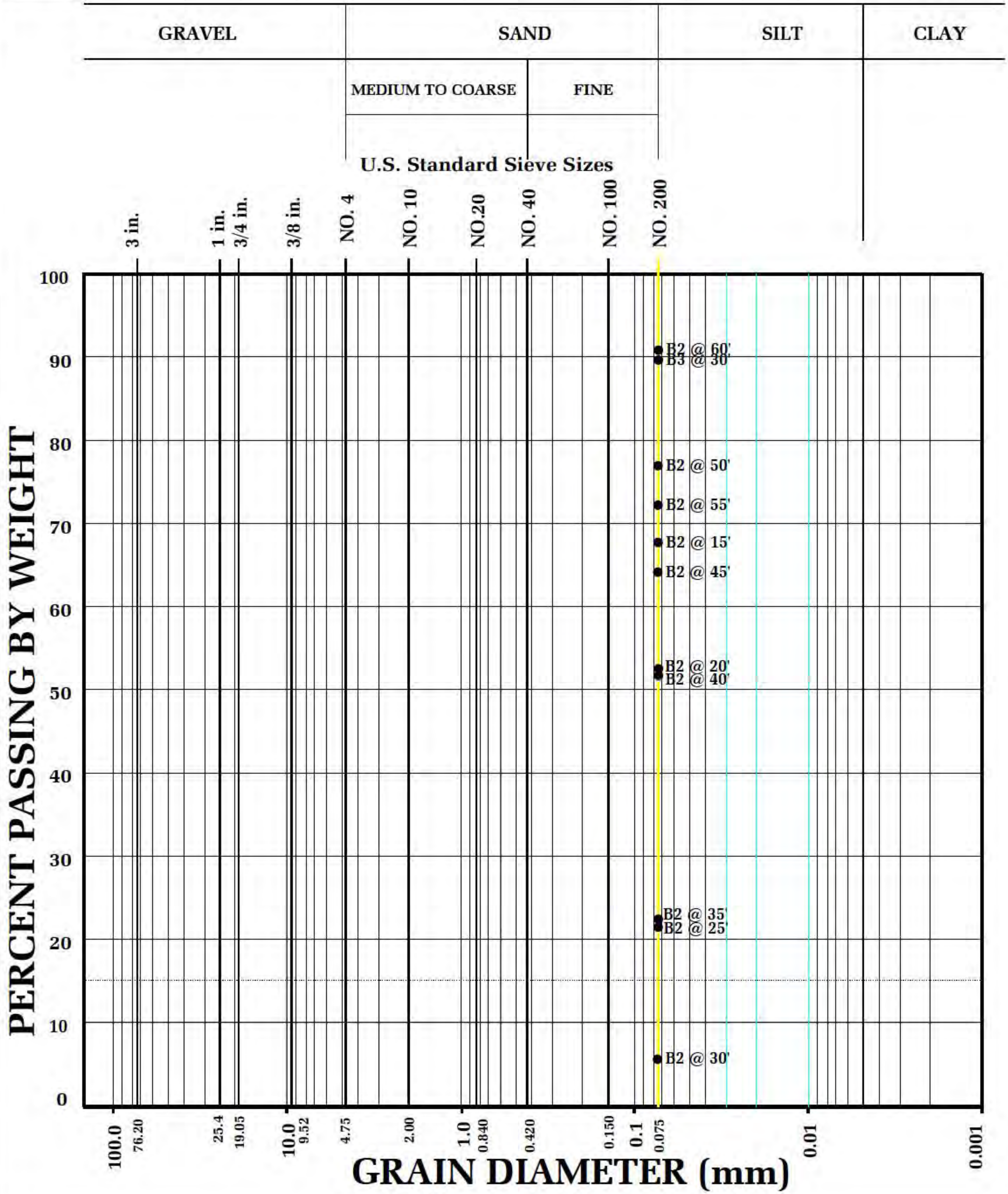
TAS REALTY ASSOCIATES, LLC	
FILE NO. 22079	PLATE: E-1



GRAIN SIZE DISTRIBUTION

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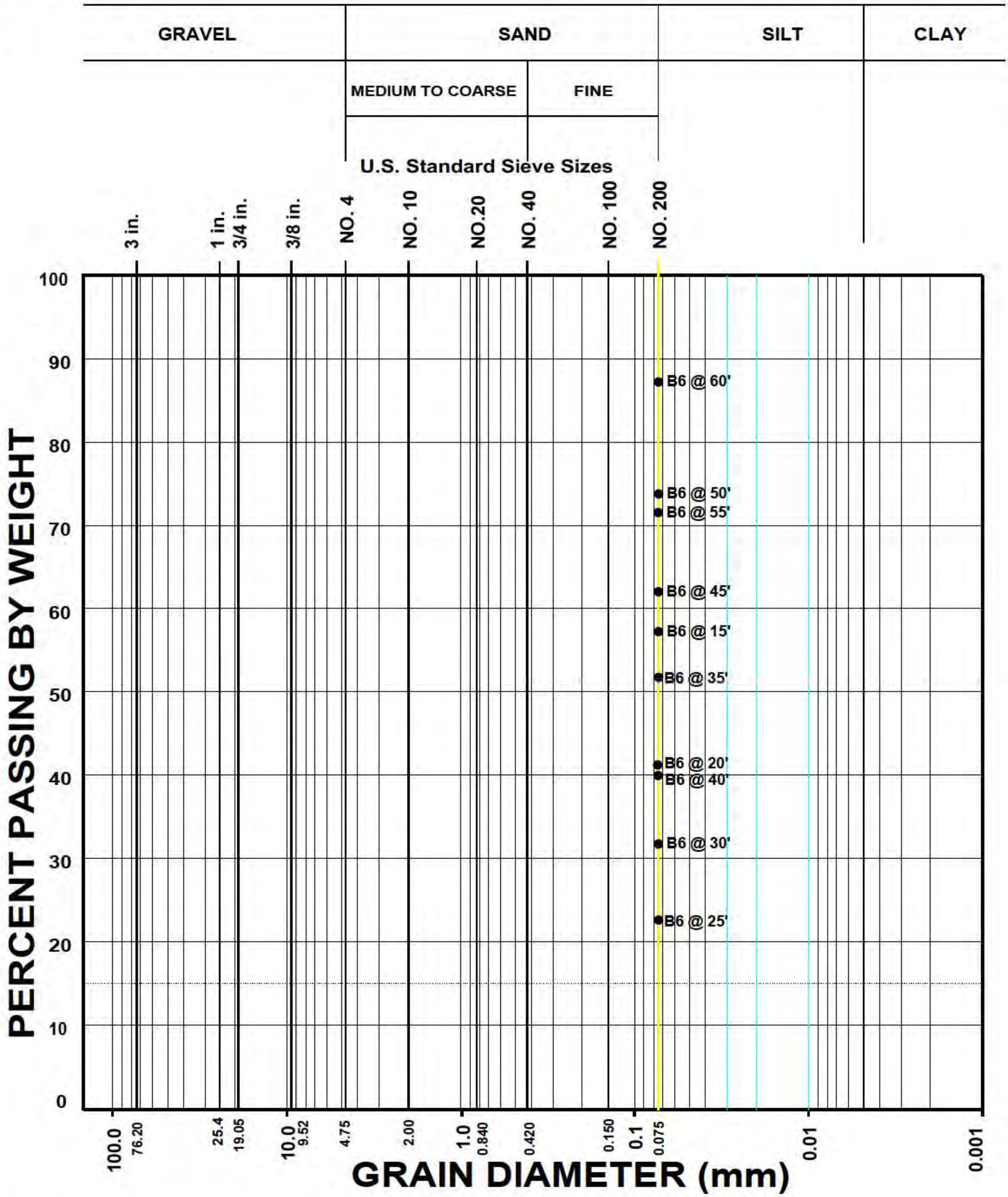
TAS REALTY ASSOCIATES, LLC	
FILE NO. 22079	PLATE: E-2



GRAIN SIZE DISTRIBUTION

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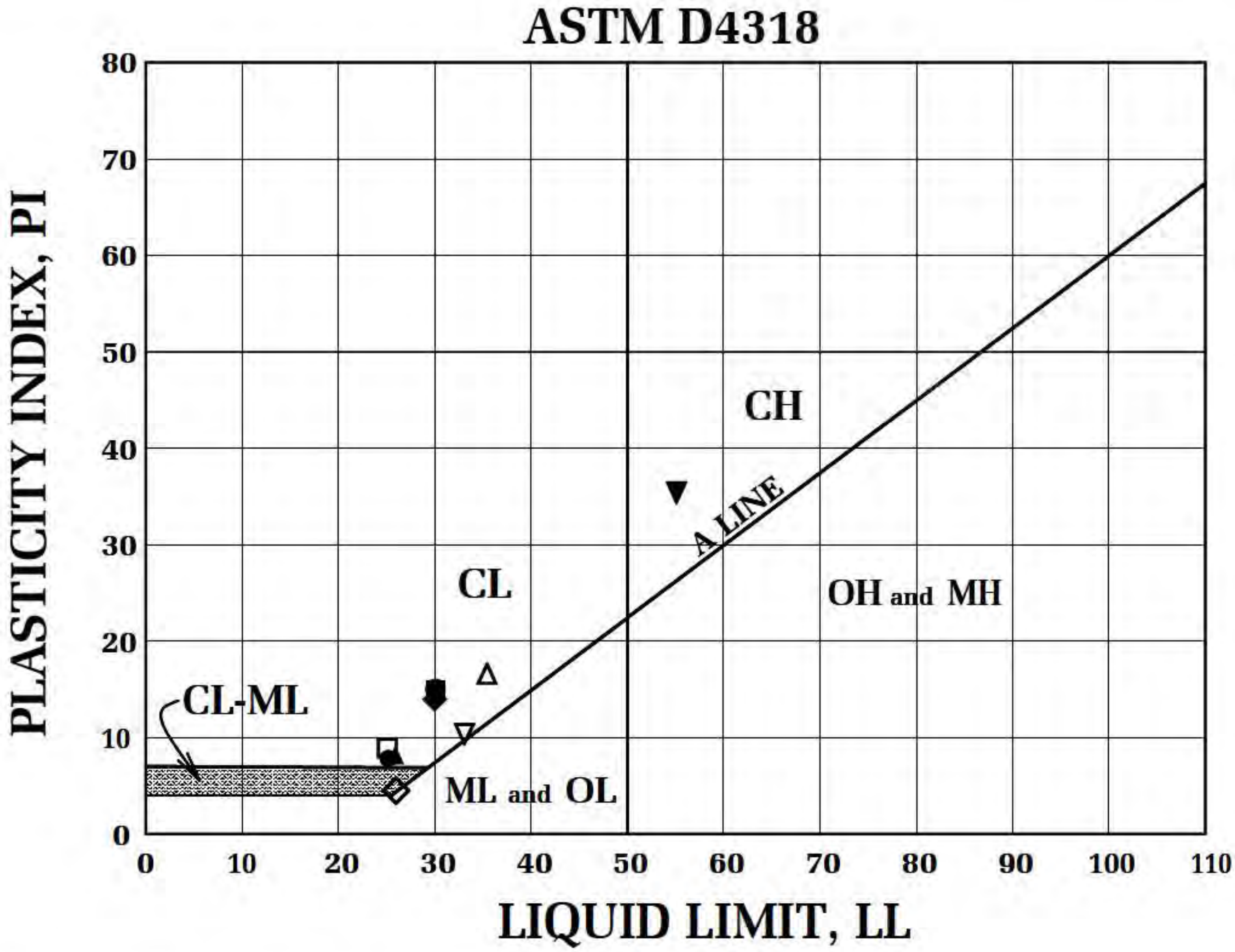
TAS REALTY ASSOCIATES, LLC

FILE NO. 22079 | PLATE: E-3



BORING NUMBER	DEPTH (FEET)	TEST SYMBOL	LL	PL	PI	DESCRIPTION
B1	15	○	30	15	15	CL
B1	20	●	25	17	8	CL
B1	25	△	35	19	16	CL
B1	35	▲	26	18	8	CL
B1	40	■	30	15	15	CL
B1	45	□	25	16	9	CL
B1	50	◆	30	16	14	CL
B1	55	◇	26	22	4	ML
B1	60	▽	33	22	11	CL
B3	30	▼	55	23	36	CH

ATTERBERG LIMITS DETERMINATION

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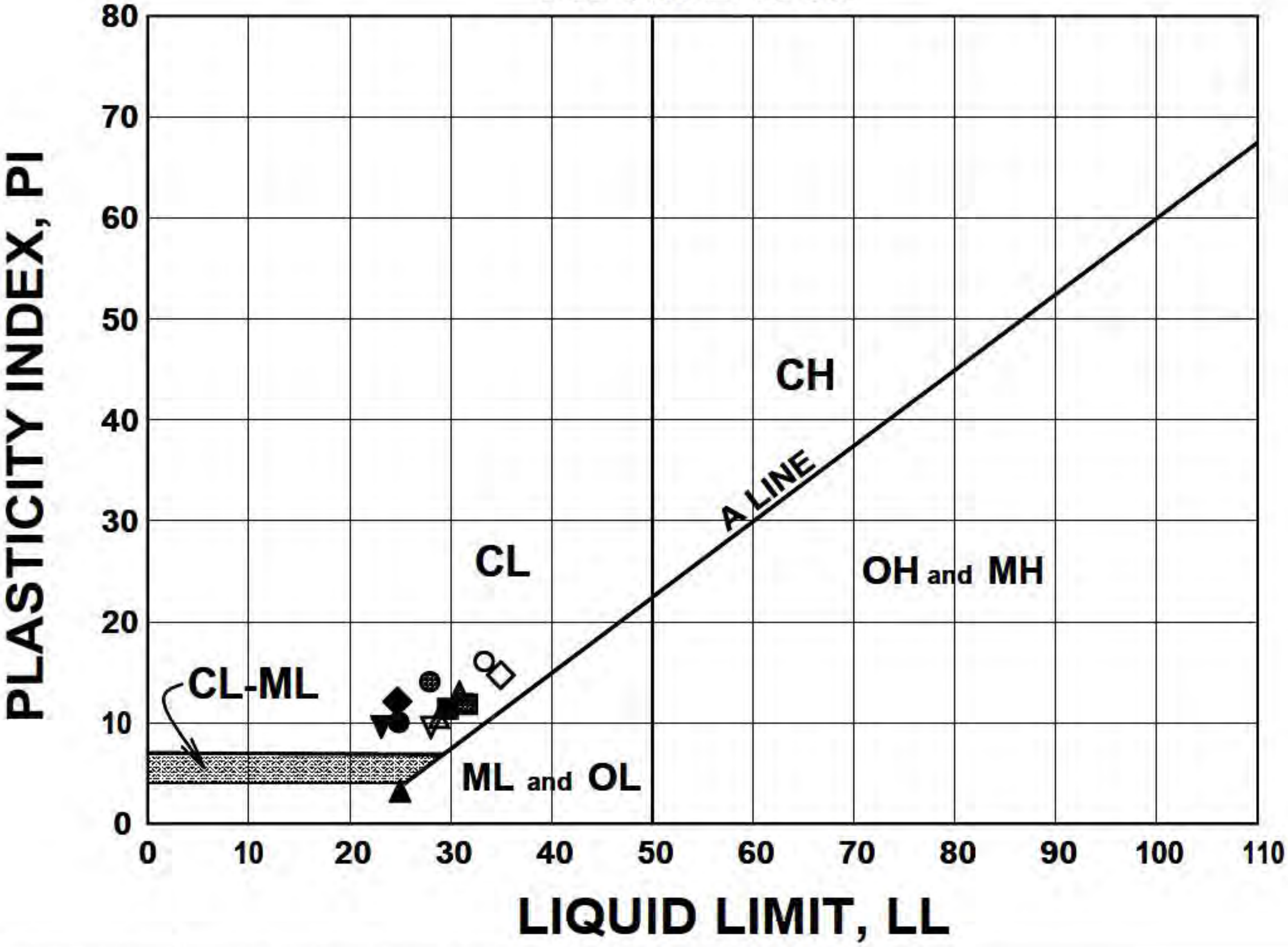
TAS REALTY ASSOCIATES, LLC

FILE NO. 22079 | PLATE: F-1

ASTM D4318



BORING NUMBER	DEPTH (FEET)	TEST SYMBOL	LL	PL	PI	DESCRIPTION
B2	15	○	34	18	16	CL
B2	20	●	25	15	10	CL
B2	40	▲	25	22	3	ML
B2	45	△	29	19	10	CL
B2	50	□	31	19	12	CL
B2	55	■	30	19	11	CL
B2	60	◇	35	20	15	CL
B6	15	◆	25	13	12	CL
B6	35	▽	28	18	10	CL
B6	40	▼	23	17	6	CL/ML
B6	45	◍	28	14	14	CL
B6	50	▲	31	18	13	CL
B6	55	▩	32	20	12	CL

ATTERBERG LIMITS DETERMINATION

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TAS REALTY ASSOCIATES, LLC

FILE NO. 22079

PLATE: F-2