Appendix G

Geotechnical Investigation

Harrington Geotechnical Engineering, Inc.

May 30, 2024 Via E-mail

Mr. Storm Bird, Senior Project Manager
STORM PROPERTIES, INC.
23233 Normandie Ave.
Torrance, CA 90501

Subject: Preliminary Geotechnical Investigation for Design and Construction of New Multi-Family Residential Development Located at 1314 Le Borgne Ave., Baldwin Park, CA 91746

HGEI Project No. 24-01-4781

Dear Mr. Bird:

This report presents the results of a geotechnical investigation performed at your request to establish information on the materials underlying the proposed construction area and, based thereon, to provide recommendations for design and construction of the new multi-family residential development at the undeveloped site.

Preliminary information provided by Mr. Bird was used in outlining the scope of the investigation and preparing this report. The investigation was performed in accordance with generally accepted geotechnical engineering practice in this area and our Proposal No. P-6389, dated November 9, 2023.

Based on analysis and evaluation of the data obtained it has been concluded that construction of the project as proposed is feasible from a geotechnical engineering standpoint provided the recommendations presented herein are used in the design and construction of the project.

Thank you for this opportunity to be of service. If you have any questions concerning this report, or if we can be of further assistance at this time, please call at your convenience.

Very truly yours,
HARRINGTON GEOTECHNICAL ENGINEERING, INC.

Sheng-Zong John Ho, Ph.D., P.E., G.E.
Geotechnical Engineer

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INTRODUCTION

This report presents the results of a geotechnical investigation of the subject site. The purposes of the investigation were to evaluate: 1) the types and condition of the materials underlying the proposed construction area; 2) static physical and limited chemical properties of the materials; 3) groundwater conditions; and to provide recommendations for design and construction of the foundation for the proposed new multi-family residential development; and soil parameters for associated site improvements.

SCOPE OF WORK

The scope of work for this geotechnical investigation consisted of the following:

Review of published geologic maps and reports (see References).

A field exploration was conducted on April 10, and April 11, 2024 which consisted of drilling, logging, and sampling nine hollow-stem auger borings (B-1 through B-9). Three infiltration test (I-1 through I-3), and one cone penetration test (CPT-1). The field exploration is described in detail in Appendix A.

Selected samples were tested in HGEI's AMRL Accredited Geotechnical Laboratory to develop data necessary for analysis of subsurface conditions and used in preparation of this report. A description of the geotechnical laboratory testing conducted for the samples collected at the site and presentation of the results are found in the Laboratory Procedures & Test Results in Appendix B.

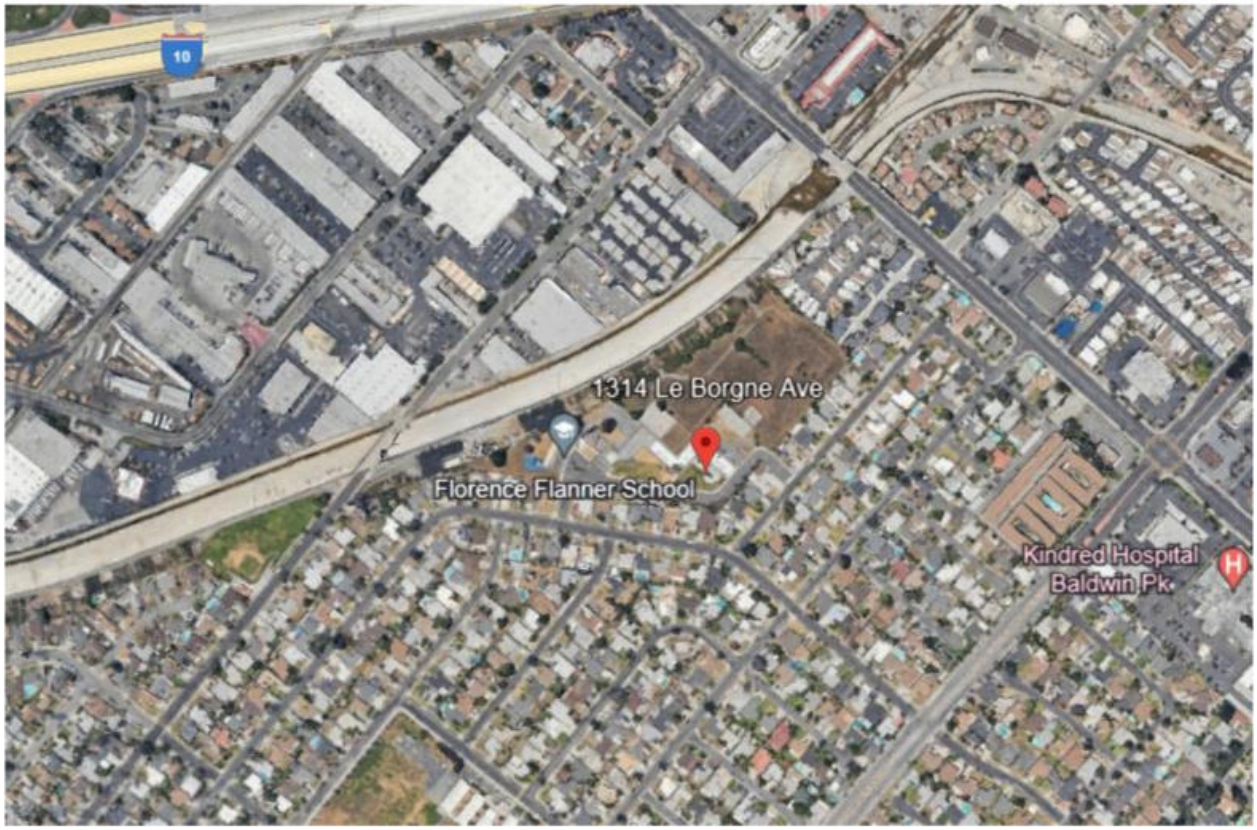
HGEI conducted engineering analysis, constructed figures, and prepared this report depicting the findings and conclusions of the investigation.

SITE DESCRIPTION

Based on a review of preliminary plans and information prepared by KTGY, the project site is located at 1314 Le Borgne Ave. in Baldwin Park, California as shown on the Vicinity Map, Figure 1, which follows. The relatively level site is bounded on the north by Walnut Creek; on the south and east by residences and on the west by Florence Flanner School.

The site consists of vegetation in the form of trees, grass, shrubs and mounds of woodchips.

Vicinity Map - Figure 1



PROJECT DESCRIPTION

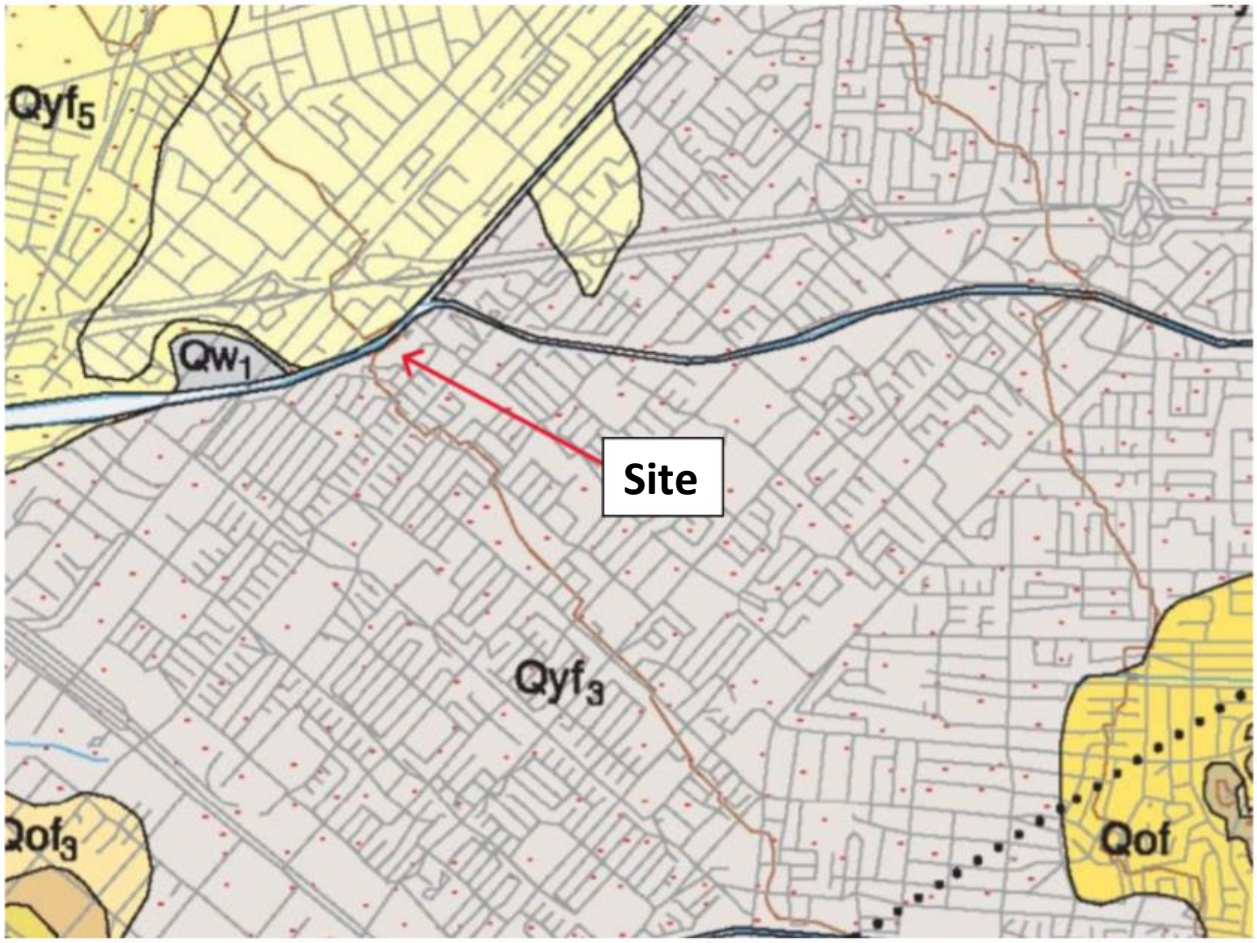
We understand that the proposed construction consists of approximately 100 new multi-family units, open space recreation areas, new streets, and open parking spaces.

REGIONAL GEOLOGIC SETTING

The subject site is situated along the northwesterly portion of the Peninsular Ranges Geomorphic Province of Southern California in the northeastern Los Angeles sedimentary basin north of the Puente hills. The Peninsular Ranges Geomorphic Province is characterized by elongated northwest to southeast trending ridges and valleys subparallel to faults branching from the San Andreas Fault. The site is directly adjacent to the urban stream, Walnut Creek.

Published maps (References 4 through 6) have been used to identify the geologic unit underlying the property. As shown on Figure 2, these maps indicate that the property is underlain at depth by young alluvial fan deposits of Holocene and late Pleistocene geologic age.

Regional Geologic Map - Figure 2



Qyf – Young Alluvial Fan Deposits (Holocene & Late Pleistocene), unconsolidated to moderately consolidated silt, sand, pebbly cobbly sand and bouldery alluvial fan deposits

SUBSURFACE CONDITIONS

Earth Materials

Subsurface conditions encountered during this investigation are described in more detail in Appendix A. The subsurface exploration locations and surface geologic conditions are indicated on Plate A. Logs of the borings are presented on Plates A-1 through A-9.

Subsurface soils encountered at the boring locations generally consist of approximately 45 feet of Alluvium (Qyf_3). The Alluvial deposits generally consist of dark brown, dense, moist Silty Sand (SM) and dark brown, loose to medium dense, moist Sand (SP) to the maximum depth explored, approximately 45 feet below the ground surface (bgs).

Groundwater Conditions

Groundwater was not encountered during this investigation to the maximum depth explored, approximately 45½ feet. Historic groundwater depth in the area is reported to be in excess of 40 feet (Reference 1).

Percolation Rates

Three percolation tests (I-1, I-2, and I-3) were conducted using the Boring Percolation testing Procedures in general accordance with the County of Los Angeles GSS 200.1 Low Impact Development Best Management Practices Guideline. I-1 is located next to B-1; I-2 is located next to B-7; and with I-3 next to B-8. Average stabilized percolation rates vary from approximately 2.8 to 17.5, as shown in Table 1.

Table 1 Average Stabilized Percolation Rates

Test No.	Adjacent Boring Location	Average Stabilized Percolation Rate (inch/hour)
I-1	B-1	8.0
I-2	B-7	2.8
I-3	B-8	17.5

Cave-ins

Cave-ins of the exploratory borings did not occur due to the types of soil encountered and is not expected to be a major concern during construction. The regulations of Cal/OSHA should be complied with during performance of all underground construction.

Expansion Potential

Based on the results of laboratory testing (Table 3, Appendix B) the Expansion Index of the typical near-surface material is 0. The 2022 California Building Code (Section 1803.5.3) categorizes this material as being very low expansion potential and special design is not required per Section 1808.6.

Water-Soluble Sulfate

A soil sample was delivered to a state approved analytical laboratory for testing to evaluate water-soluble sulfate content. Based on the results of laboratory testing (Table 2, Appendix B) a sulfate exposure class of S0 is indicated (ACI 318-19, Table 19.3.2.1).

Consolidation

Five samples of soil were loaded in increments from 400 to 6400 pounds per square foot (psf) at their overburden pressures and were saturated to determine their hydro-collapse potential (Plates B-1 through B-5, Appendix B). Test results showed 0.2 to 0.8% hydro-collapse potential at a depth ranging from approximately 2.5 to 7.5 feet.

GEOLOGIC CONDITIONS AND HAZARDS

Faulting/Fault Rupture

The site is in a portion of California that is seismically active and anticipated to be subjected to strong ground motions by earthquakes generated by active faults in the area. The site is not within a presently designated earthquake fault zone as established by the Alquist-Priolo Fault Zoning Act (References 2 and 3).

The site is situated approximately 8.9 km away from the nearest fault (San Jose) and 9.4 km from the next nearest fault (Whittier). The likelihood of surface rupture occurring at the site is therefore considered low.

Liquefaction-Induced Settlement

The site is located in a mapped potential liquefaction hazard zone as shown on the State of California Earthquake Zones of Required Investigation (Appendix C). Based on a historical high ground water level of 40 feet, and very dense sands below approximately 40 feet where Cone Penetration Testing (CPT-1) refusal was encountered, it is our opinion that soil liquefaction-induced settlement potential is low.

Seismically-Induced Dry Sand Settlement

Dry sand settlement was estimated using computer program CLiq v.3.5.3.8 with a design Moment Magnitude (Mw) of 6.92 based on Deaggregation using USGS Unified Hazard Tool (Reference 6) using dynamic conterminous U.S. 2014 database, and a hazard level of 2 percent probability of exceedance in 50 years, as shown in Appendix C. The design Peak Ground Acceleration (PGAm) is 0.87g.

An analysis was performed based on the Cone Penetration Test (CPT) data collected using the Boulanger and Idriss (2014) method and a factor of safety (FS) of 1.30. Results of the analysis is presented in Appendix D which show that the estimated seismically-induced dry sand settlement is on the order of 5½ inches. The project design will require mitigation in foundation design.

CONCLUSIONS AND RECOMMENDATIONS

Based on conditions encountered/established during this investigation, it is our conclusion that construction of the new multi-family residential development is feasible from a geotechnical engineering standpoint provided the recommendations herein are implemented during design and construction of the project.

For foundation support and to control settlement, the following approaches may be considered to mitigate the estimated 5½ inches of seismically-induced dry sand settlement:

- Over-excavation and re-compaction.
- Ground Improvement using Rapid Impact Compaction or Densified Aggregate Piers.

Following our evaluation of conditions encountered in the field exploration and review of laboratory test data, the following recommendations for the proposed design and construction areas are being provided.

The following recommendations reflect our best assessment of project conditions and requirements based on analysis and evaluation of results reported herein. Anticipated conditions and these recommendations are subject to confirmation during grading and/or construction. Additional recommendations may be provided during the course of work if warranted by conditions encountered.

The foundation plans and calculations should be reviewed by the geotechnical engineer and any necessary recommendations provided in a review letter.

The following recommendations reflect our best assessment of project conditions and requirements based on analysis and evaluation of results reported herein. Anticipated conditions and these recommendations are subject to confirmation during construction. Additional recommendations may be provided during design and construction of the project if warranted by the exposed site conditions encountered.

The foundation plan should be reviewed by the geotechnical engineer and any necessary recommendations provided in a review letter.

Site Clearing and Grading

The site development area should be cleared of all foundations, pavements, undocumented fill, utilities, surface vegetation, or other improvements in conflict with the new construction. All materials resulting from demolition of the existing improvements should be legally disposed off-site according to the city's requirements.

Over-excavation/Re-compaction

Following site clearing and grubbing, subgrade soils should be over-excavated to a minimum depth of 6.5 feet for total vertical settlement of 1.5 inches (refer to Table 2); or to a depth of 8-feet for total vertical settlement of 1-inch to mitigate seismically-induced dry sand settlement.

TABLE 2
Excavation Depth Recommendation to Mitigate Seismically Induced Dry Sand Settlement

Excavation Depth (ft)	Seismically Induced Settlement (in)	Static Settlement (in)	Total Vertical Settlement (in)
6.5	1.5	0.5	2.0
8	0.5	0.5	1.0

The excavation bottom must be scarified 12 inches deep, moisture-conditioned to 2-3 % above moisture content, and compacted to a minimum relative compaction of 90% based on the results of compaction tests performed in accordance with ASTM Test Method D1557. Where feasible, excavations should extend 3-foot laterally but may be limited by existing improvements. The excavated soil should be replaced in thin, loose lifts and similarly moisture-conditioned and compacted as indicated above.

If any imported soil is required it should be approved by the geotechnical engineer for expansion, sulfate, and strength qualities prior to being transported to the project site. Final acceptance of any imported soil will be based on observation and/or testing of soil actually delivered to the site. It is recommended that grading operations be monitored by a representative of this office in order to confirm compliance with these recommendations and, in turn, the foundation design recommendations which follow.

Ground Improvement

Following site clearing and removal of the unsuitable soil (where necessary), the proposed building site should be improved. Rapid Impact Compaction (RIC) or Densified Aggregate Piers (DAP) can be implemented to mitigate potential seismic concerns. HGEI should review ground improvement design and be retained for full-time observation during ground improvement operations. Ground improvement limits should extend at least 5 feet beyond the proposed building limits.

Rapid Impact Compaction (RIC)

The RIC treatment system should be designed and performed by an experienced geotechnical specialty contractor using a track-mounted RIC machine that imparts energy by dropping an approximately 7.5-ton weight for 36 inches, hitting a 5-foot-diameter steel foot. RIC compaction should be performed at a maximum spacing of 5 feet on center. The weight drops at a rate ranging from 40 to 60 blows per minute. The drop height, number of blows, and penetration per blow are monitored and controlled by an on-board data acquisition system and manually recorded.

Compaction at each point is considered completed using the following criteria: 1) tamping a maximum of 40 blows, 2) a compaction footprint (dimple) depth greater than 2.5 feet, or 3) a refusal set (penetration per blow) depth less than 0.2 inches per blow. If the dimples are deeper than 18 inches, the area will be re-graded and a second pass is generally performed.

The post-RIC subgrade should be proof-rolled with a heavy rubber-tired piece of construction equipment (15 tons or similar, if possible) in the presence of the Geotechnical Engineer's representative. Areas that deflect more than 1 inch during proof-roll should be moisture-conditioned to near optimum moisture content and then compacted prior to placing Engineered Fill or structures.

Densified Aggregate Pier (DAP)

DAP ground improvement system is generally designed and constructed by a geotechnical specialty contractor. DAPs are typically constructed by drilling a 24- to 30-inch-diameter borehole and filling the cavity with compacted aggregate. The aggregate generally consists of clean, open-graded crushed rock near groundwater table and Class 2 aggregate base above groundwater table.

The aggregate is compacted in approximately 12-inch-thick lifts using a modified hydraulic hammer mounted on an excavator. Due to the potential for vibrations and equipment reach, DAPs constructed using the open-hole method are generally installed no deeper than 10 to 15 feet below ground surface; and not more than 1-2 feet below groundwater to minimize cave-in or sloughing. Large, angular stones may be used to stabilize the bottom of boreholes as needed. In areas where shallow groundwater is anticipated and the open-hole method is not feasible, mandrels are often used to install aggregate piers to a deeper depth, typically range from 25 to 35 feet or more below ground surface.

DAPs develop vertical support through a combination of frictional resistance along the shaft of the pier and improvement of the surrounding soil matrix, allowing use of higher bearing capacities than feasible in unimproved soil. DAPs can also be designed to resist transient uplift loads by installing steel rods in the center of the pier; the rods are attached to a flat steel plate at the base of the of the footings. Lateral loads are resisted through a combination of passive pressure on the face of the footings and friction along the base of the footings. The frictional resistance is larger for a DAP-supported footing than for a footing supported on unimproved ground because of the presence of the compacted aggregate. The required size, spacing, length, and strength of piers should be determined by the specialty contractor, based on the desired level of improvement.

For preliminary planning purposes, 24 to 30-inch diameter DAP installed to a depth of approximately 15 feet below the bottom of footings can reduce total (static + seismic) settlement to approximately 1 inch, and a differential settlement of approximately ½-inch. Foundations supported on DAPs as described above can be designed for an allowable bearing capacity of 4000 pounds per square foot.

Seismic Design

The provisions of Chapter 16, Section 1613, of the 2022 California Building Code and the Structural Engineer Associates of California guidelines are considered appropriate for design of the project.

Earthquake factors were determined using the ASCE database websites and Chapter 16 requirements and are presented in Appendix C.

Foundation Design in Compacted Fill

Upon completion of over-excavation/Recompaction, footings should be supported entirely in engineered artificial fill which will provide uniform support. Footings for the proposed structure should be at least 18 inches wide and 2 foot deep may be designed using a net dead load plus live load bearing pressure of 2,000 pounds per square foot. This value may be increased 250 pounds per square foot for each additional foot of width to a maximum of 2,500 pounds per square foot. The final value may be increased by 1/3 to resist transient wind or seismic loads in combination with vertical loads.

For the purpose of resisting lateral forces, an unfactored passive bearing pressure of 250 pounds per square foot per foot of depth, limited to 2,500 pounds per square foot, may be used in design. A coefficient of friction of 0.40 may be used for concrete placed on compacted fill. These values may be combined without reduction. An appropriate safety factor should be applied.

One No. 4 bar, top and bottom, is recommended as minimum reinforcement for continuous footings. Reinforcement for isolated pad footings will be governed by structural design.

It is recommended that the geotechnical engineer observe and/or test the foundation excavations in order to verify compliance with the recommendations of the report.

Slab Design/Construction

It is recommended that the floor slab be a nominal 4 inches thick, reinforced with No. 4 bars at 24 inches on center, each way.

A moisture vapor retarder installed in accordance with the manufacturer's instructions should be provided in living areas. We would recommend that 2 inches of clean sand be placed over a minimum 10 mil visqueen vapor barrier underlain by 4 inches of coarse sand or gravel to comply with the requirements of CALGREEN.

HGEI does not practice in the field of moisture vapor transmission evaluation/mitigation. Therefore, we recommend that a qualified consultant be engaged with to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. This consultant should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structure as deemed appropriate.

Temporary Excavations/Cave-ins

Due to the presence of loose sandy soils, cave-ins and raveling should be expected. Temporary excavations deeper than three feet or steeper than 1:1 (h:v) should be shored. The regulations of Cal/OSHA should be followed during performance of all subsurface work and concrete should be placed as soon as possible to minimize this occurrence.

Concrete Quality

A negligible amount of water-soluble sulfate is indicated for the prevalent surface material and special sulfate-resistant concrete will not be required on this project. The exposure class (ACI 318-19, Table 19.3.1.1) is S0. Based on this test result concrete may contain Type II cement (Section 1904.2A of the 2022 CBC and ACI 318-19, Table 19.3.2.1).

Concrete Flatwork

Miscellaneous flatwork should be a nominal 4-inch-thick, reinforced at mid-depth with No. 4 bars at 24 inches on center, each way, and provided with adequate control joints. Low-slump concrete should be used for all flatwork to further minimize cracking.

It should be noted that due to normal concrete shrinkage some minor cracking of the miscellaneous flatwork may occur. Additional reinforcement beyond that recommended herein and careful control of concrete slump would be beneficial in reducing such cracking. Also, it is very important that all control joints be caulked and properly maintained to inhibit infiltration of surface water into the soil and thereby minimize expansion.

Site Drainage

The 2022 CBC Section 1804.4 requires that the minimum drainage for the ground around the perimeter of a building should be 5% away from the foundation for a distance of 10 feet. Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2%. In no case should surface waters be allowed to flow into drilled holes, pond near foundations, or flow over adjacent slopes (if any) in an uncontrolled manner.

Plan Review

It is recommended that final project plans, details and specifications be submitted to this office for geotechnical review for compliance with the findings and recommendations of this report. Additional recommendations can then be provided if necessary.

Observations and Testing

It is recommended that drilled pier installation be observed by a representative of this firm during drilling to confirm soil conditions. Alternate/additional recommendations can be provided if necessary due to a change in conditions.

Utility Trench Backfills

Backfill for any trenches associated with this project should consist of site and/or similar material (the use of imported sand is not recommended) that must be adequately compacted to preclude detrimental settlement. It is recommended, therefore, that backfills for all excavations associated with the project should consist of site material placed in appropriate lifts, moisture conditioned to 2% to 4% above optimum moisture content and compacted to 90% relative compaction based on the maximum dry density obtained in the laboratory in accordance with ASTM test method D1557-12ε1.

Pre-Grade/Construction Meeting

A pre-construction meeting should be attended by the owner's representative, members of the design team, grading contractor, city/county inspector, and a representative from HGEI at the site to review the findings and recommendations of this report and project plans and specifications prior to starting work on the project.

GENERAL COMMENTS

The services provided under the purview of this report have been performed in accordance with generally accepted geotechnical engineering principles and standards of practice for this area. The comments and recommendations presented are professional opinions based on observations and our best estimation of project conditions and requirements as indicated by evaluation of presently available information and data. No further warranty, express or implied, is intended by issuance of this report.

The investigation did not include sampling, field measurements or laboratory tests for the presence of any toxic/hazardous substances in the earth materials at the site. However, this does not imply that the site is subject to any unusual environmental hazard.

Any unanticipated condition encountered in the course of foundation construction should be brought to the attention of the geotechnical engineer for evaluation prior to proceeding with the work.

This report has been developed for the sole use of the client and/or clients authorized representative. These conclusions and recommendations should be verified by a qualified geotechnical engineer based in part upon additional subsurface information obtained during grading and/or foundation construction. No part of the report should be taken out of context, nor utilized without full knowledge and awareness of its intent.

This report is issued on condition that HGEI will be retained to observe the backfilling and foundation construction operations. If another firm provides this service then that firm must review and accept this report, or provide alternate recommendations, and assume responsibility for the project. This report will be valid for a period of one year form date of issue and will then require updating.

0-0-0

REFERENCES

1. California Department of Conservation, Division of Mines and Geology, 1998 Seismic Hazard Zone Report for the Baldwin Park 7.5-Minute Quadrangle, Los Angeles County, California, Seismic Hazard Zone Report 022.

2. California Department of Conservation, California Geological Survey, March 25, 1999, State of California, Earthquake Zones of Required Investigation, Baldwin Park 7.5-Minute Quadrangle, Scale 1:24,000.

3. California Department of Conservation, California Geological Survey, Earthquake Zone App, https://maps.conservation.ca.gov/cgs/EQZApp/.

4. California Department of Conservation, Division of Mines and Geology, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication, 117A.

5. International Code Council (ICC), 2022 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2.

6. USGS, Earthquake Hazards Program, Unified Hazard Tool, https://earthquake.usgs.gov/hazards/interactive/.

APPENDIX A

FIELD INVESTIGATION

HGEI conducted a field investigation of the subject site on April 10 and 11, 2024 which consisted of drilling, logging and sampling nine exploratory borings (B-1 through B-9) drilled by Discovery Drilling using a truck-mounted CME-75 drill rig equipped with 8-inch-diameter, continuous-flight hollow-stem augers and an automatic hammer (140lb/30").

In addition to the drilling program, a Cone Penetration Test (CPT) program was performed by Kehoe Testing & Engineering (KTE) on April 11, 2024, using a 30-ton CPT rig and a summary of the results are presented on Appendix D. Approximate locations of the subsurface exploratory borings and the CPT program are indicated on Plate A and the logs of the borings are presented on Plates A-1 through A-9. The descriptions represent the prevalent soil types and slightly different material types may be present within the major groupings. Also, the transition from one soil type or condition to another may be gradual rather than abrupt as implied, and differing conditions may exist in unexplored areas.

Unified Soil Classification System Classification Criteria/Symbols are presented on Plate A-10.

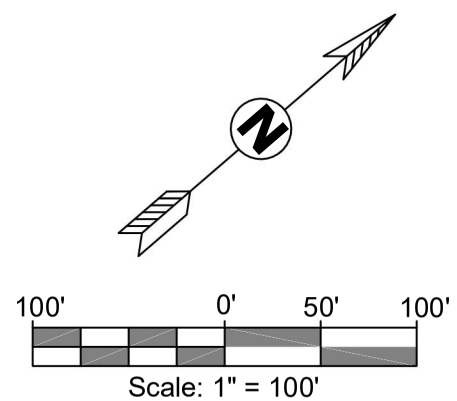
A representative of the geotechnical engineer observed the field work, collected samples for transportation to our geotechnical laboratory and prepared field logs by visual/tactile examination of the materials. Representative core samples were obtained at discreet intervals using a modified California split-spoon sampler loaded with 2.42" I.D. x 1"-high, thin-wall, brass rings. Additional samples were obtained at discreet intervals using a standard penetration sampling test tube. Bulk samples of the materials were also collected. Samples were placed in plastic bags immediately upon removal from the sampler to conserve moisture and labeled for identification.

The borings were backfilled with excavated soils immediately upon completion of logging and sampling. Groundwater was not encountered at the borings prior to backfill.



Legend

Qyf_3	Alluvium
	Approximate Boring Location
	Approximate Infiltration Location
	Approximate CPT Location



HARRINGTON GEOTECHNICAL ENGINEERING, INC. ORANGE, CA

Project: New Multi-Family Residential Development

Address: 1314 Le Borgne Ave., Baldwin Park, CA 91746

HGEI Project No.: 24-01-4781

Drawing Name: Geotechnical Map

DRAWN BY: LC

CHECKED BY: JH

DATE: 05/28/24

REVISIONS:

Plate A

\\HGEI-PC\ENGINEERING\ACTIVE PROJECT FILES\4700\4781 1314 LE BORGNE AVE., BALDWIN PARK, CA\AUTOCAD\PLATE A.DWG

LOG OF BORING B-1

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					**ALLUVIUM (Qyf_3):** SAND (SP), dark brown, moist, loose, moderate mica flakes, trace pebbles <1/8" diameter, trace fines, medium grained	10		
	5					SILTY SAND (SM), dark brown, moist, loose, moderate mica flakes, trace pebbles <1/8" diameter, slight cohesion, fine to medium grained	6	111	14
						@ 7.5' becomes medium dense	20		
	10					SAND (SP), tan/white, moist, medium dense, abundant pebbles <1/2" diameter, moderate mica flakes, medium to coarse grained	23		

Completion Depth: 11.5
Date Boring Started: 4/10/24
Date Boring Completed: 4/10/24
Logged By: JB
Drilling Contractor: Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-1

LOG OF BORING B-2

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					**ALLUVIUM (Qyf_3)** SAND (SP), dark brown, moist, loose, fine to medium grained, moderate pebbles <1/4" diameter, moderate mica flakes	9		
	5					@ 5' encountered pebbles	14/6"	111	13
							7	96	14
	10					SAND (SP), grey/white, damp to moist, medium dense, coarse grained, abundant pebbles >1/4" diameter	25		
							35		
	15					@ 15' becomes dense	49		
	20					SAND (SP), grey/white, moist, dense, fine grained, trace pebbles <1/8" diameter, large gravel approximately 3" long axis, very poorly sorted	45		
	25					@ 25' very dense	87		

Completion Depth:	26.5
Date Boring Started:	4/10/24
Date Boring Completed:	4/10/24
Logged By:	JB
Drilling Contractor:	Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-2

LOG OF BORING B-3

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					**ALLUVIUM (Qyf_3):** **SILTY SAND (SM), darkbrown/red, moist, loose, trace pebbles <1/8" diameter, moderate mica flakes, fine to medium grained**	12		
	5						8	108	12
						SAND (SP), grey/white, moist, loose to dense, fine grained, moderate to abundant pebbles <1/4" to 15" diameter	13		
	10					becomes SP-SM, medium dense @ 10' medium to coarse grained	24		
						@ 11' fine grained, moist			
						dense @ 12.5' fine grained, moist	46		
						@ 13.5' medium grained, moist			
	15					medium dense @ 15' coarse grained with abundant pebbles <1/2" diameter	35		
	20					@ 20' coarse grained with abundant pebbles <1" diameter			
	25					becomes SP, dense @ 25' fine grained, trace pebbles, damp	54		
						@ 26' coarse grained, abundant pebbles, very poorly sorted, damp			
	30								

Completion Depth:	45.5
Date Boring Started:	4/10/24
Date Boring Completed:	4/10/24
Logged By:	JB
Drilling Contractor:	Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-3a

LOG OF BORING B-3

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	30					very dense @ 30' fine grained, damp to moist, trace pebbles <1/8" diameter	88		
	35					@ 35' coarse grained, moist, abundant pebbles <1/5" diameter	32		
						@ 36.5' fine grained, moist	50/5"		
	40					@ 40' becomes SP-SM	50/5"		
	45					@ 45' coarse sand (SP) with abundance of pebbles and cobbles <3" diameter, moist			
							55		

Completion Depth: 45.5
Date Boring Started: 4/10/24
Date Boring Completed: 4/10/24
Logged By: JB
Drilling Contractor: Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-3b

LOG OF BORING B-4

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					**ALLUVIUM (Qyf_3):** SAND (SP), dark brown, moist, medium dense, fine to coarse grained, abundant pebbles <1" diameter			
						@ 2' predominently grey/white	27	98	8
	5						23	94	9
						@ 6' fine to medium grained, moist, abundant pebbles <1/2" diameter, moist, dense, tan/grey			
						@ 7.5' tan/grey, coarse grained, abundant pebbles <1", moist, dense	44		
	10						29		
						@ 12.5' brown/grey, fine grained, moist trace pebbles <1/8" diameter			
						@ 13.5' white/grey, coarse grained, abundant pebbles <1" diameter, moist, dense			
	15					very dense @ 15' white/grey/brown, fine grained, moderate pebbles <1/2" diameter	80		
	20					medium dense @ 20' brown, small silty clay layer, cohesive 24" thick, firm	38		
	25					very dense @ 25' white/grey, coarse grained, moist, dense	60		
						@ 26.5' grey/brown, fine grained, dense			

Completion Depth:	26.5
Date Boring Started:	4/10/24
Date Boring Completed:	4/10/24
Logged By:	JB
Drilling Contractor:	Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-4

LOG OF BORING B-5

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					**ALLUVIUM (Qyf_3):** SILTY SAND (SM), dark brown, moist, loose, fine to medium grained, trace pebbles <1/8" diameter, moderate mica flakes	8		
	5						9		
						SILTY SAND (SM), tan/light brown, moist, medium dense to dense	17	109	16
	10					@ 10' grey/white, coarse grained, damp, abundant pebbles <1/8" diameter	24		
						@ 11.5' fine to medium grained, moist, dense	27		
						@ 13' tan/white, coarse grained, abundant pebbles <1/8" diameter, dense			
	15					@ 15' dense	52		
	20					@ 20' grey/white/tan, fine to coarse grained, moist, abundant pebbles and cobbles <3" diameter, medium dense	19		
	25					@ 25' very dense	83/11"		
	30								

Completion Depth: 43.0
Date Boring Started: 4/10/24
Date Boring Completed: 4/10/24
Logged By: JB
Drilling Contractor: Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-5a

LOG OF BORING B-5

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	30					SANDY SILTY (ML), grey/tan, moist, medium dense, fine grained, trace pebbles <1/8" diameter, dense	33		
	35					SAND (SP-SM), tan/grey, damp, very dense, abundant pebbles and cobbles <3" diameter	80/10"		
	40						50/4"		

Completion Depth: 43.0
Date Boring Started: 4/10/24
Date Boring Completed: 4/10/24
Logged By: JB
Drilling Contractor: Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-5b

LOG OF BORING B-6

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					1' of wood chips			
						ALLUVIUM (Qyf_3): SAND (SP), brown, moist, loose, fine grained, trace pebbles <1/8" diameter	12		
	5					SILTY SAND (SM), brown, moist, loose, fine grained, moderate mica flakes	5	106	14
							14	109	16
	10					SAND (SP), grey/white, damp, medium dense, fine to medium grained, moderate pebbles <1/8" diameter	25		
						@ 12.5' moderate pebbles <1" diameter	32		
	15					@ 15.5' coarse grained, moist, abundant pebbles and cobbles <2" diameter	40		
	20					dense @ 20' fine grained, moist, dense, trace pebbles <1/8" diameter	55		
	25						38		

Completion Depth: 25.5
Date Boring Started: 4/10/24
Date Boring Completed: 4/10/24
Logged By: JB
Drilling Contractor: Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-6

LOG OF BORING B-7

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					**ALLUVIUM (Qyf_3):** SILTY SAND (SM), dark brown, moiste, loose to medium dense, fine grained, trace pebbles <1/8" diameter, moderate mica flakes	18		
	5						4	101	18
						@ 7.5' very moist	18	120	13
	10					SAND (SP), light brown/grey, moist, medium dense, fine to medium grained			

Completion Depth: 10.5
Date Boring Started: 4/10/24
Date Boring Completed: 4/10/24
Logged By: JB
Drilling Contractor: Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-7

LOG OF BORING B-8

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					**ALLUVIUM (Qyf_3):** SILTY SAND (SP), dark brown/brown, moist, loose, fine grained, mica flakes, moderate cohesion	5		
	5					SAND (SP), tan/grey, moist, medium dense, abundant pebbles <1/2" diameter, fine to coarse grained	8		
							22		
	10					@ 10' tan/grey, fine grained, moist	29		

Completion Depth: 11.5
Date Boring Started: 4/10/24
Date Boring Completed: 4/10/24
Logged By: JB
Drilling Contractor: Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-8

LOG OF BORING B-9

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					**ALLUVIUM (Qyf_3):**			
						SILTY SAND (SM), dark brown, moist, loose, fine grained, medium cohesion		108	11
							4	100	8
	5						5	106	15
						SAND (SP), brown, moist, loose to dense, fine grained, trace pebbles <1" diameter	13		
	10					@ 10' fine to medium grained, moist, medium dense, trace pebbles <1/2" diameter	32		
							22		
	15					@ 15' dense	46		
	20					@ 20' coarse grained, moist, dense, abundant pebbles and cobbles <3" diameter	55		
	25								
						SILTY SAND (SM), brown/grey, moist, dense, fine grained, slight cohesion	40		
	30								

Completion Depth:	44.0
Date Boring Started:	4/10/24
Date Boring Completed:	4/10/24
Logged By:	JB
Drilling Contractor:	Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-9a

LOG OF BORING B-9

Project:	Storm Properties	Surface Elev.:	Grade
Job No.:	24-01-4781	Top of Casing Elev.:	N/A
Location:	1314 Le Borgne Ave., Baldwin Park, CA	Drilling Method:	CME-75 - 6" Hollow-Stem
Coordinates:		Sampling Method:	Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	30					SAND (SP), brown/orange, layer about 4" thick, moist, medium dense, very fine grained	34		
						SILTY SAND (SM), brown, moist, very dense			
	35					very dense @ 35' large cobble stuck in sampler	50/5"		
	40						81		

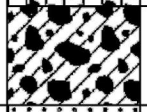
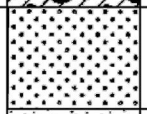
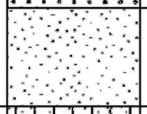
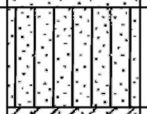
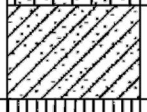
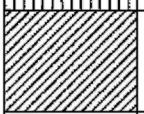
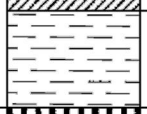
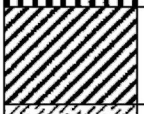
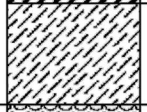
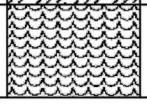
Completion Depth: 44.0
Date Boring Started: 4/10/24
Date Boring Completed: 4/10/24
Logged By: JB
Drilling Contractor: Discovery Drilling

Remarks:
Groundwater was not encountered. Caving was not apparent.

The stratification lines represent approximate boundaries. The transition may be gradual.

Harrington Geotechnical Engineering, Inc.

PLATE A-9b

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SAND, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

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DRAWN BY: BBC | USCS | CHECKED BY: MVD

SOIL CLASSIFICATION CHART

05/30/2024
JUNE 22, 2017

HGEI Project No. 24-01-4787
HGEI Project No.: 17-01-3590

-PLATE A-10
PLATE B-9

APPENDIX B

LABORATORY TEST RESULTS

The samples collected during the field investigation were examined and classified by the geotechnical engineer/engineering geologist in the laboratory using the visual/tactile method (ASTM D2487-11 & D2488-17) and selected samples were assigned laboratory testing. Tests were performed in general accordance with the latest ASTM standards. The following is a description of the laboratory testing and presents the results which are incorporated in the previous sections of the report.

Moisture and Density Determination (ASTM D2216-10 & D7263-09)

Field Moisture contents were determined for all samples. The core samples were trimmed and weighed and the dry units of the material calculated. Moisture and unit weight data are presented on the boring logs in Appendix A.

Water-Soluble Sulfate Tests (EPA 300.0)

In order to determine the proper cement type for the site, the amount of water-soluble sulfate present in a representative sample was evaluated. The test results are presented in Table B1.

Expansion Index Test (ASTM D4829-11)

An expansion index test was conducted on a representative sample to evaluate data on which to base recommendations for design. The test results are presented in Table B2.

Compaction Test (ASTM D1557-12$^{\varepsilon 1}$)

A compaction test was performed on a sample of surface soil to evaluate values for initial use during grading and backfilling work. The results are presented in Table B3.

Consolidation Tests (ASTM D2435/D2435M-11)

A consolidation test was performed on an undisturbed sample to evaluate the magnitude and rate of consolidation of the soil when subjected to incrementally applied controlled-stress loading. The graphs of the test results are presented on Plates B-1 through B-5.

Direct Shear (ASTM D3080/D3080 M-11)

Direct Shear tests were performed to evaluate the static strength of the soil. Tests were performed at increased moisture contents and at various confining pressures using a displacement rate of 0.0012 in./min. to establish peak and ultimate strength parameters under adverse conditions of moisture. The shear test results (graphs) are presented on Plates B-6 through B-13.

Particle Size Distribution (Gradation) of Soils Using Sieve Analysis D6913

Particle Size Distribution analysis was performed on several representative samples for data needed for liquefaction-induced settlement evaluation. The results are shown in Plates B-14, 15, and 16.

TABLE B1
Water-Soluble Sulfate (EPA 300.0)

Sample ID	Water-Soluble Sulfate (%)
B-9 @ 1'-3'	Not Detected (ND)

TABLE B2
Expansion Index Test Results (ASTM D4829-11)

Sample ID	Moisture Content (%)		Dry Density (pcf)		Calculated Expansion Index	Expansion Potential
	Initial	Final	Initial	Final		
B-9 @ 1'-3'	9.1	9.0	112.9	113.0	0	Very Low

TABLE 3
Compaction Test Results (ASTM D1557-12ε1)

Sample ID	Maximum Dry Density, pcf	Optimum Moisture Content, %
B-9 @ 1'-3'	120.0	8.5

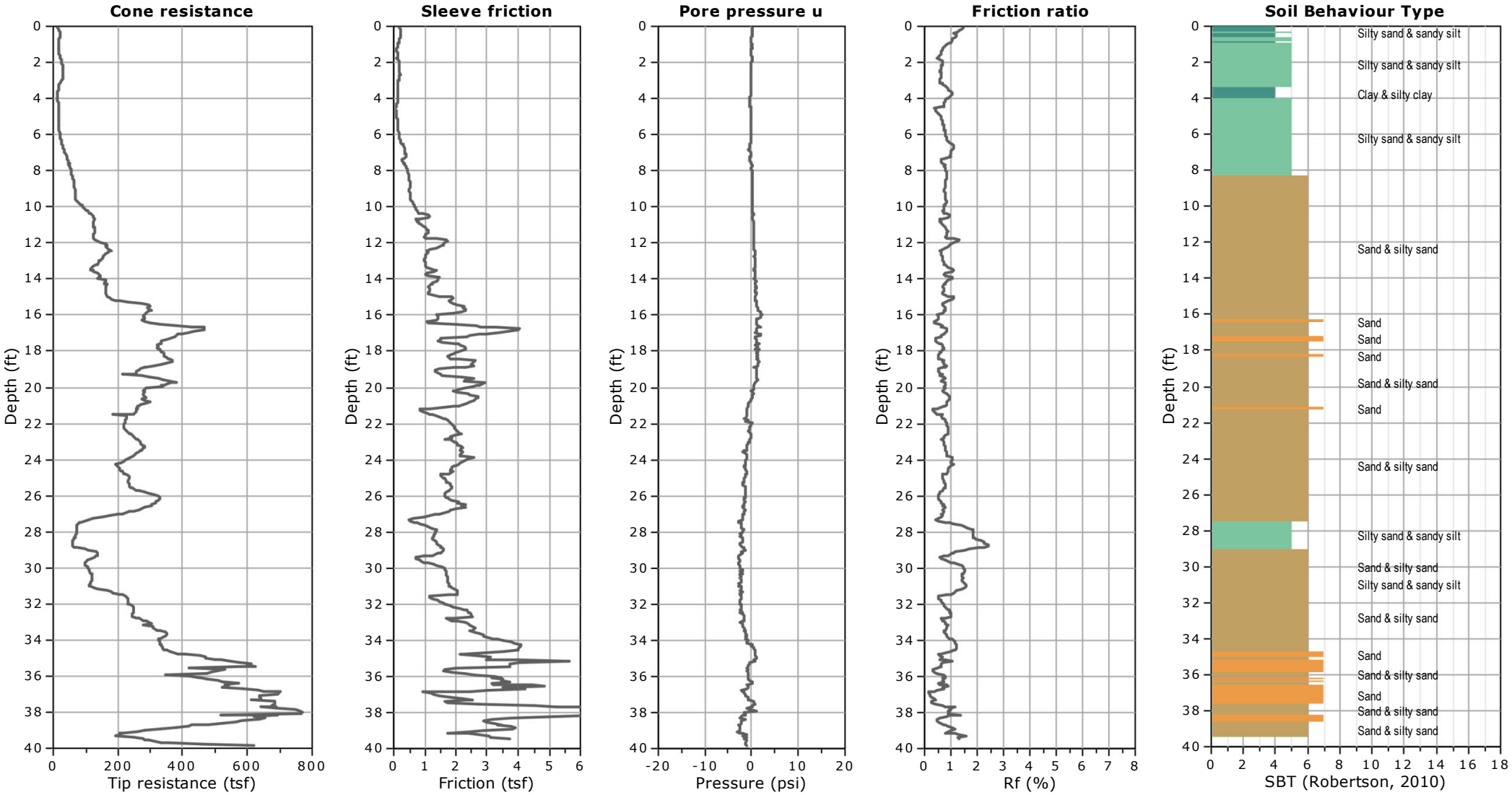
SAMPLE STORAGE

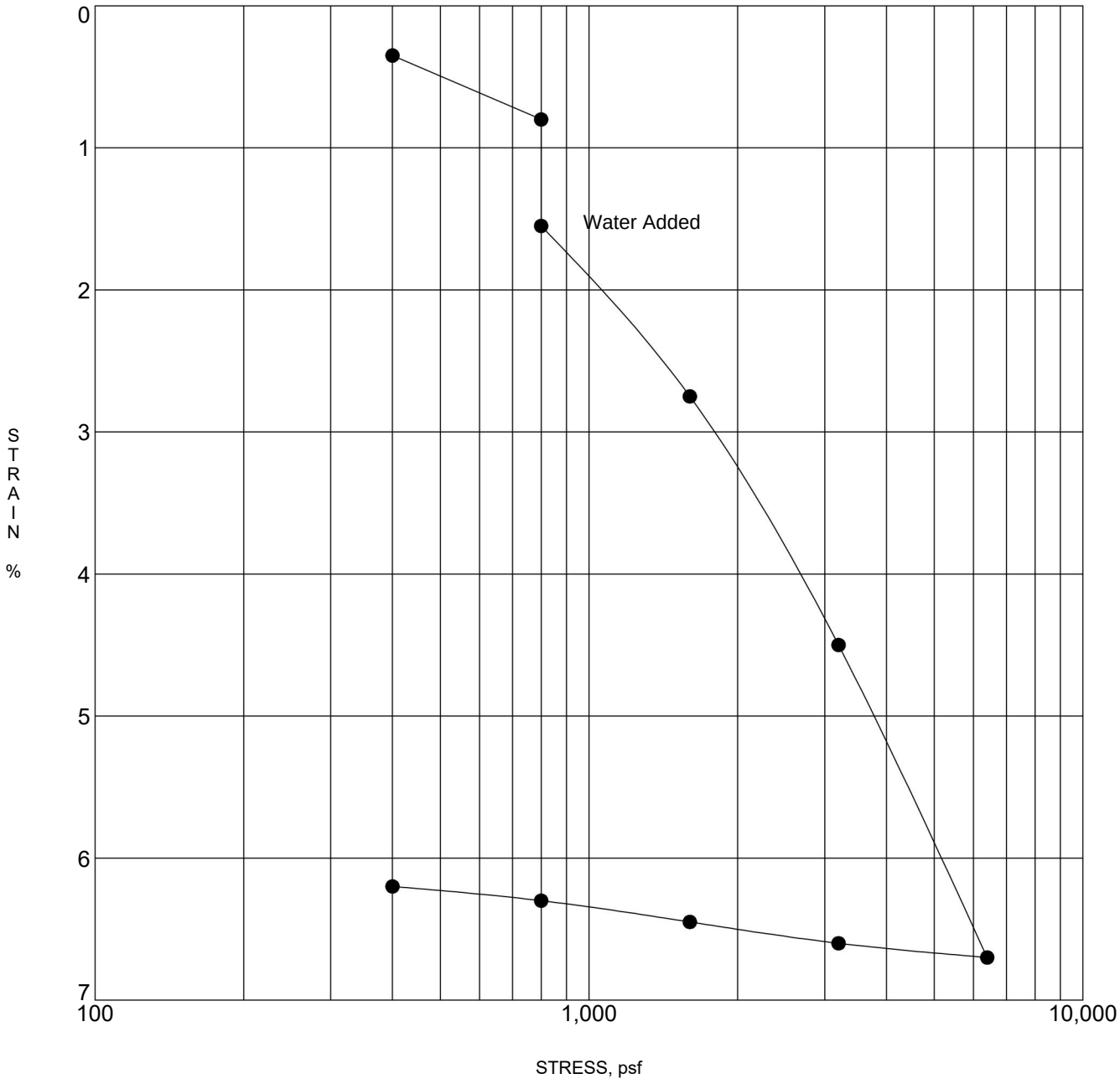
Soil samples presently stored in our laboratory will be discarded 30 days after the date of this report unless this office receives a written request to retain the samples for a longer period. Note that prolonged storage will result in sample degradation and may render them unsuitable for further testing.

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

Project: **Harrington Geotechnical Engineering / Storm Properties**
Location: **1314 Le Borgne Ave, Baldwin Park, CA**

CPT-1
Total depth: 39.85 ft, Date: 4/11/2024





Specimen Identification		Classification	DD	MC%
● B-2 7.5		**SAND**	**96**	**14**

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

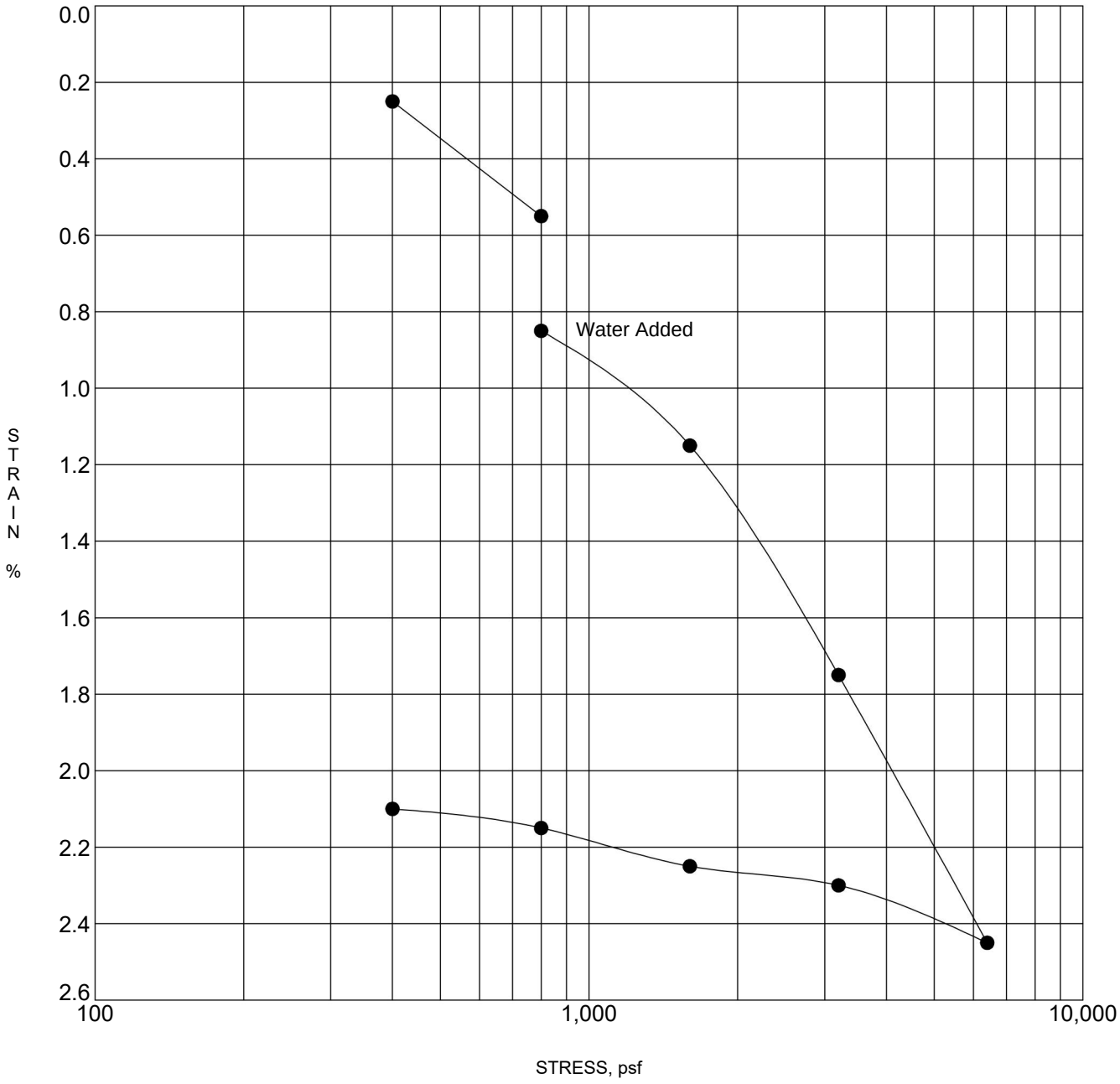
JOB NO. **24-01-4781**

DATE **5/9/24**

CONSOLIDATION TEST

Harrington Geotechnical Engineering, Inc.

PLATE B-1



Specimen Identification		Classification	DD	MC%
● B-4 5.0		SAND	94	9

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

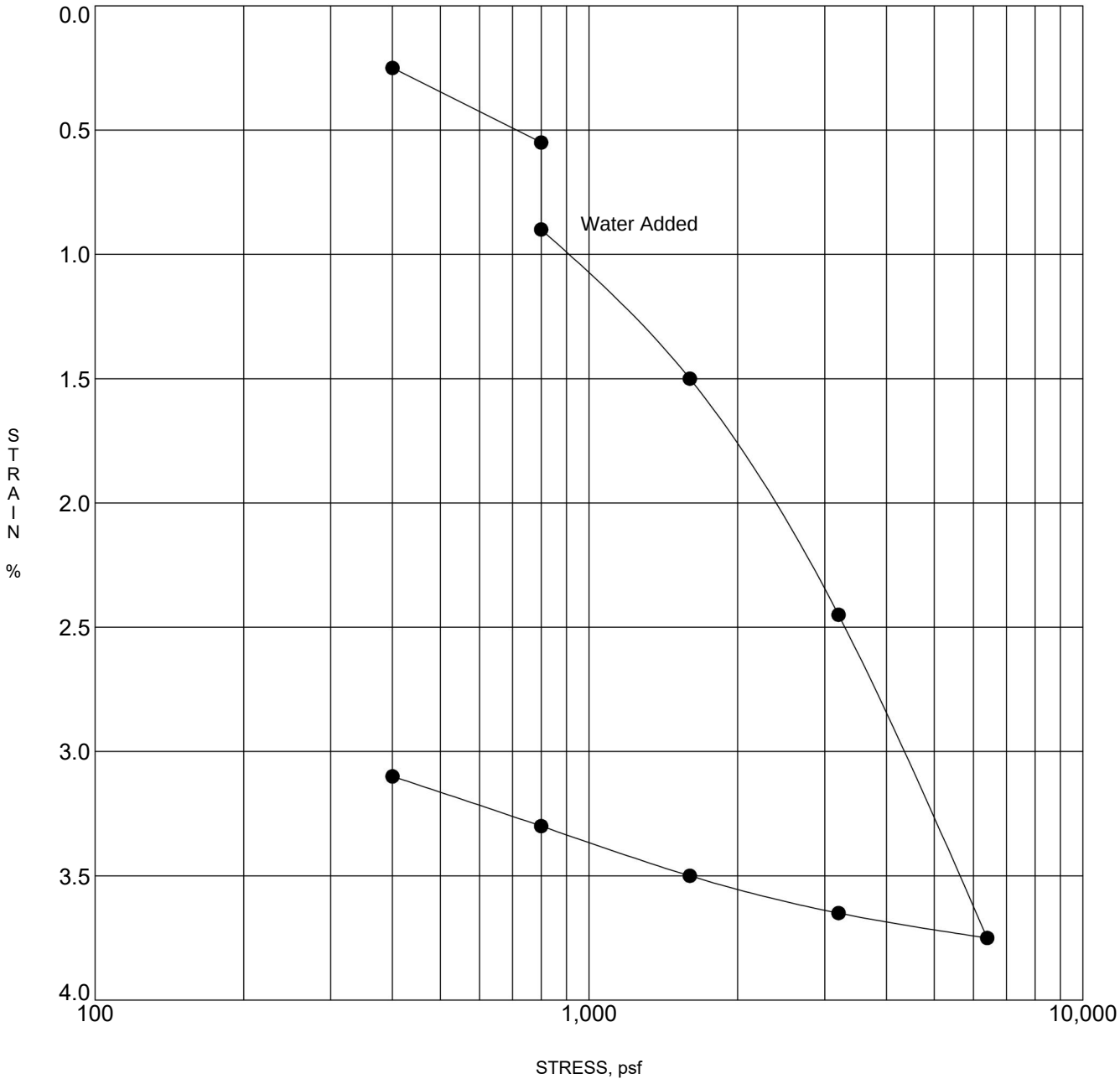
JOB NO. **24-01-4781**

DATE **5/9/24**

CONSOLIDATION TEST

Harrington Geotechnical Engineering, Inc.

PLATE B-2



Specimen Identification		Classification	DD	MC%
● B-6 5.0		SILTY SAND	106	14

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

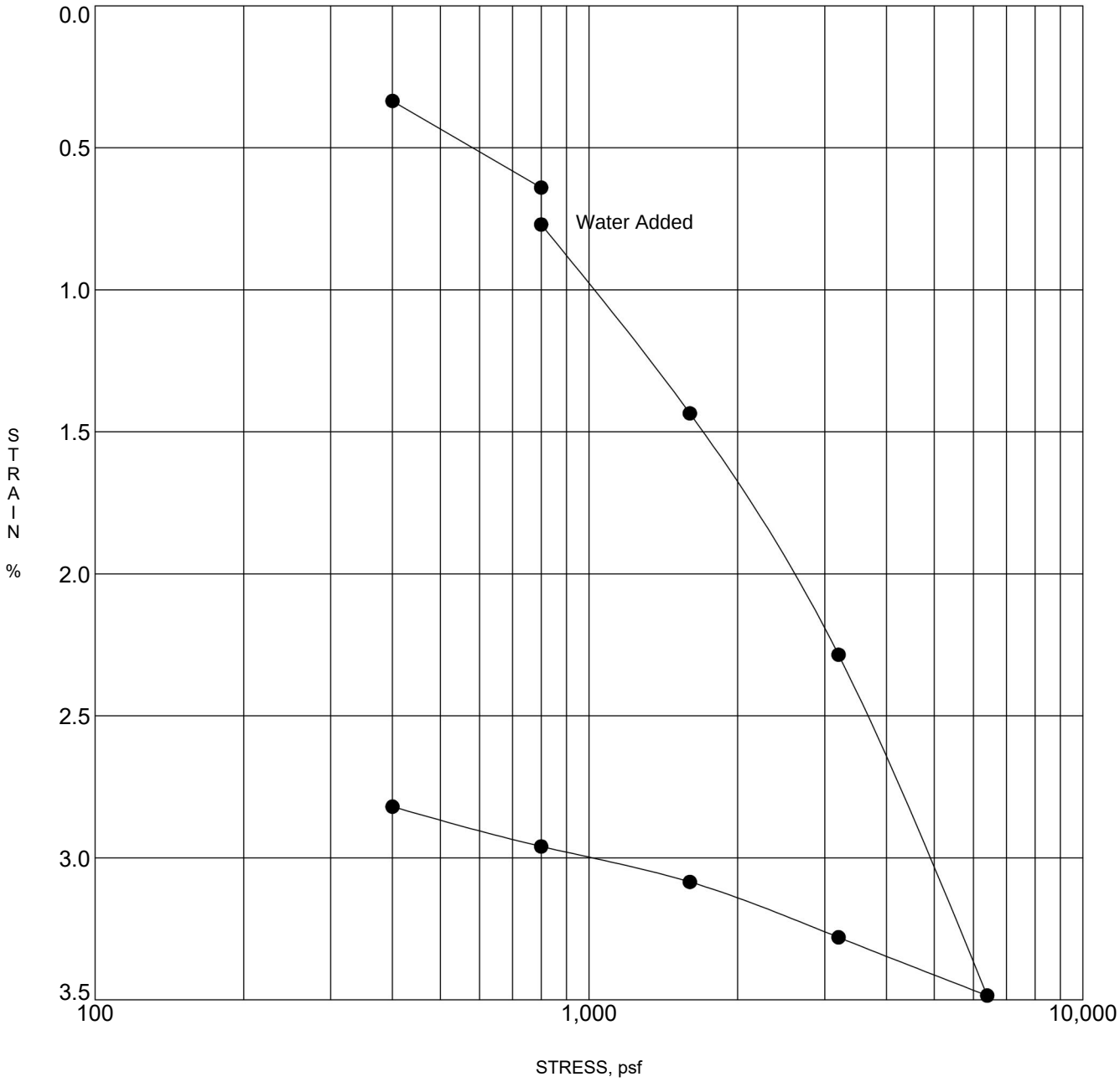
JOB NO. **24-01-4781**

DATE **5/9/24**

CONSOLIDATION TEST

Harrington Geotechnical Engineering, Inc.

PLATE B-3



Specimen Identification		Classification	DD	MC%
● B-7 7.5		SILTY SAND	120	13

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

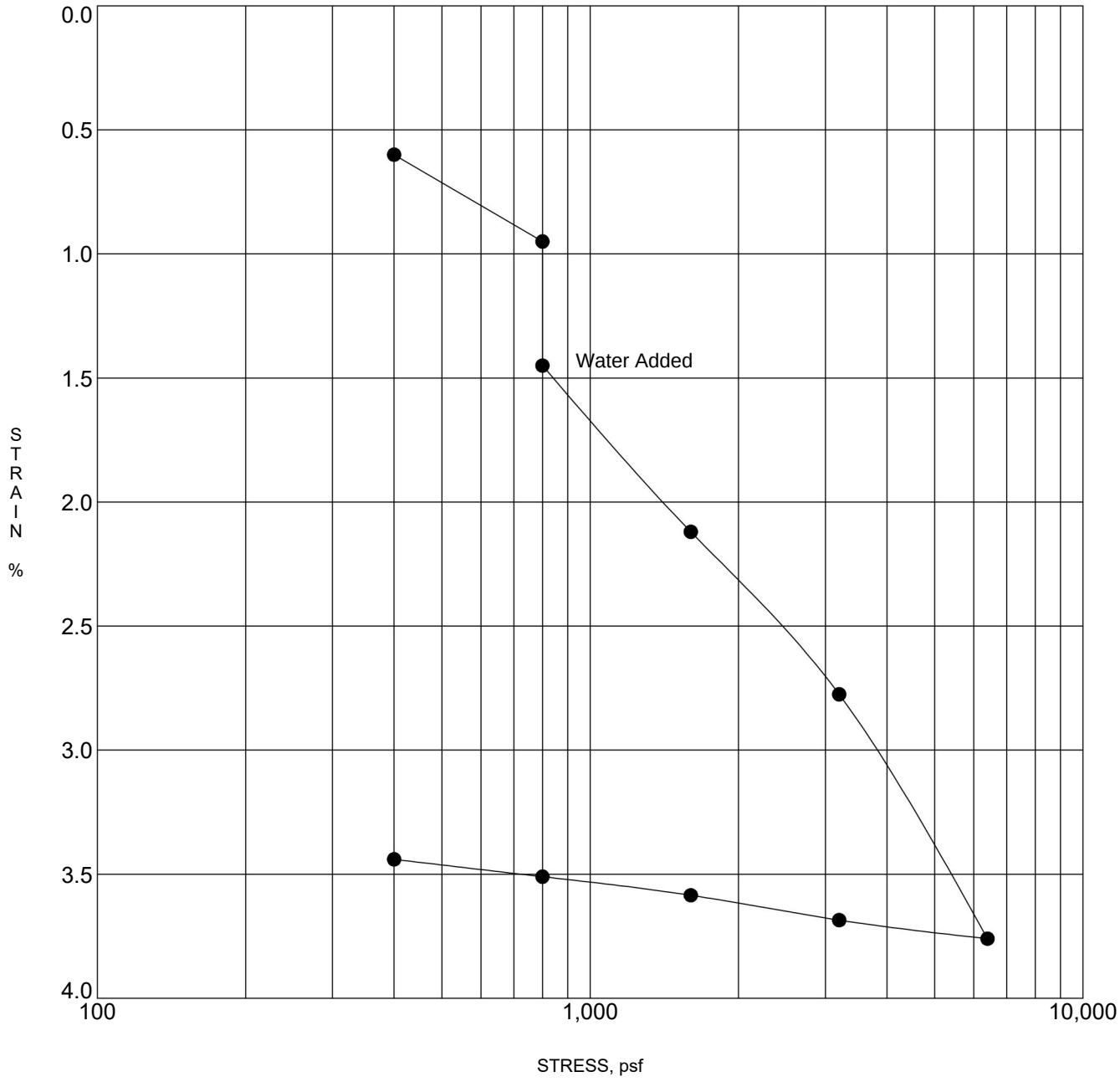
JOB NO. **24-01-4781**

DATE **5/9/24**

CONSOLIDATION TEST

Harrington Geotechnical Engineering, Inc.

PLATE B-4



Specimen Identification		Classification	DD	MC%
● B-9 2.5		**SILTY SAND**	**100**	**8**

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

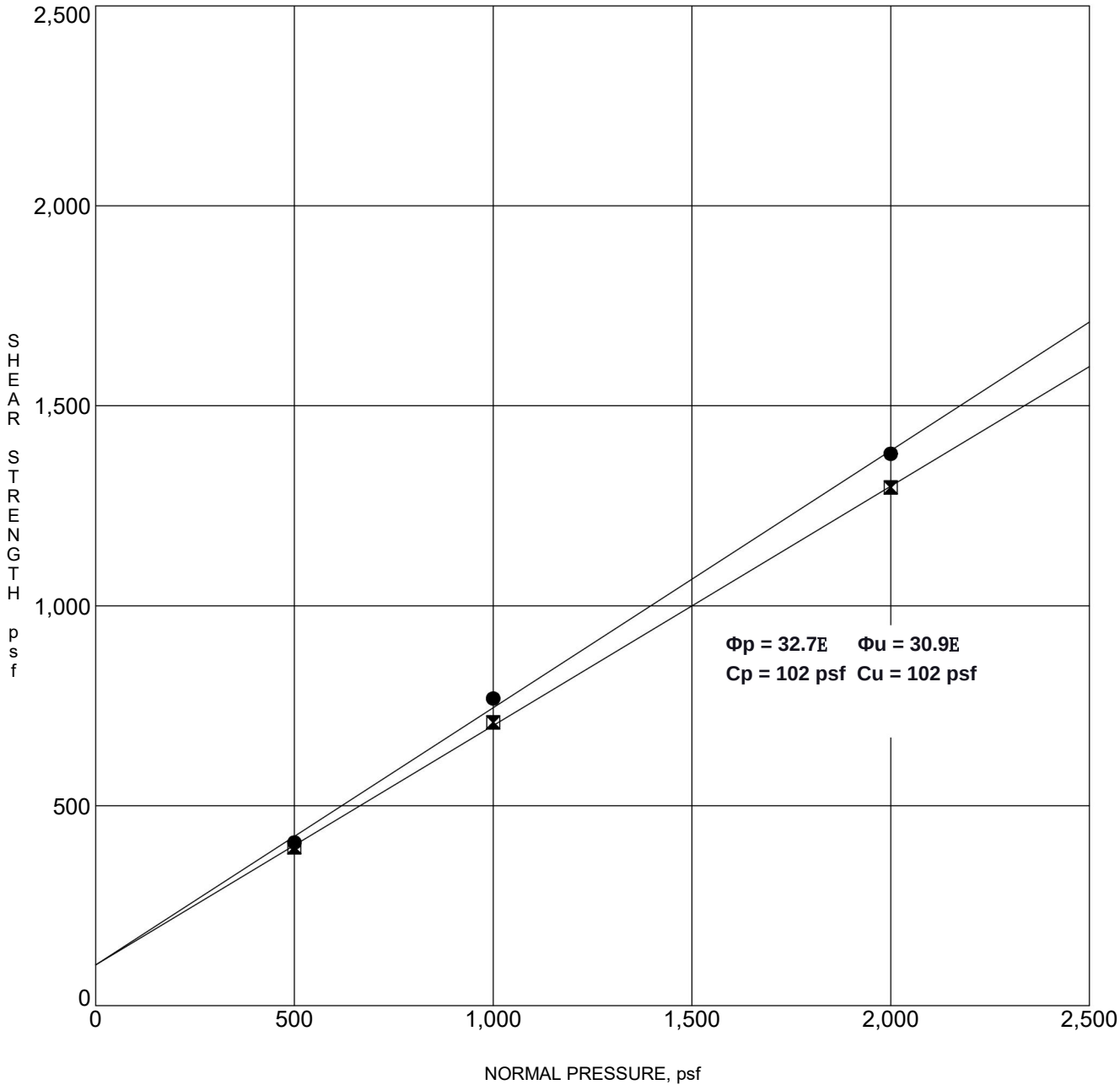
JOB NO. **24-01-4781**

DATE **5/9/24**

CONSOLIDATION TEST

Harrington Geotechnical Engineering, Inc.

PLATE B-5



Specimen Identification			Classification	DD	MC%
●	**B-1**	**5.0**	**SILTY SAND (Peak)**	**111**	**14**
⊠	**B-1**	**5.0**	**(Ultimate)**		

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

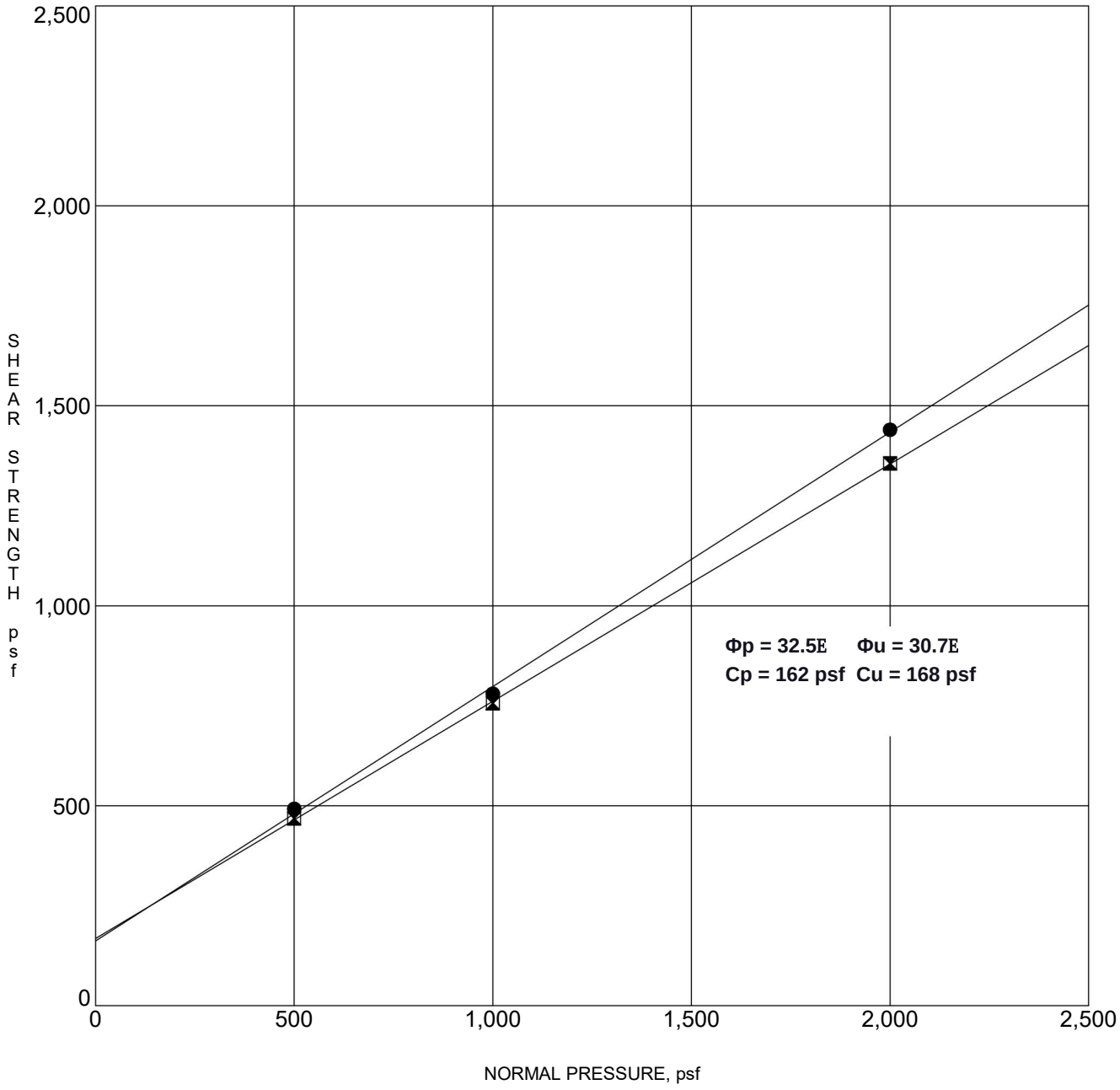
JOB NO. **24-01-4781**

DATE **5/9/24**

SHEAR TEST DIAGRAM

Harrington Geotechnical Engineering, Inc.

PLATE B-6



Specimen Identification			Classification	DD	MC%
●	B-2	5.0	SAND (Peak)	111	13
⊠	B-2	5.0	(Ultimate)		

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

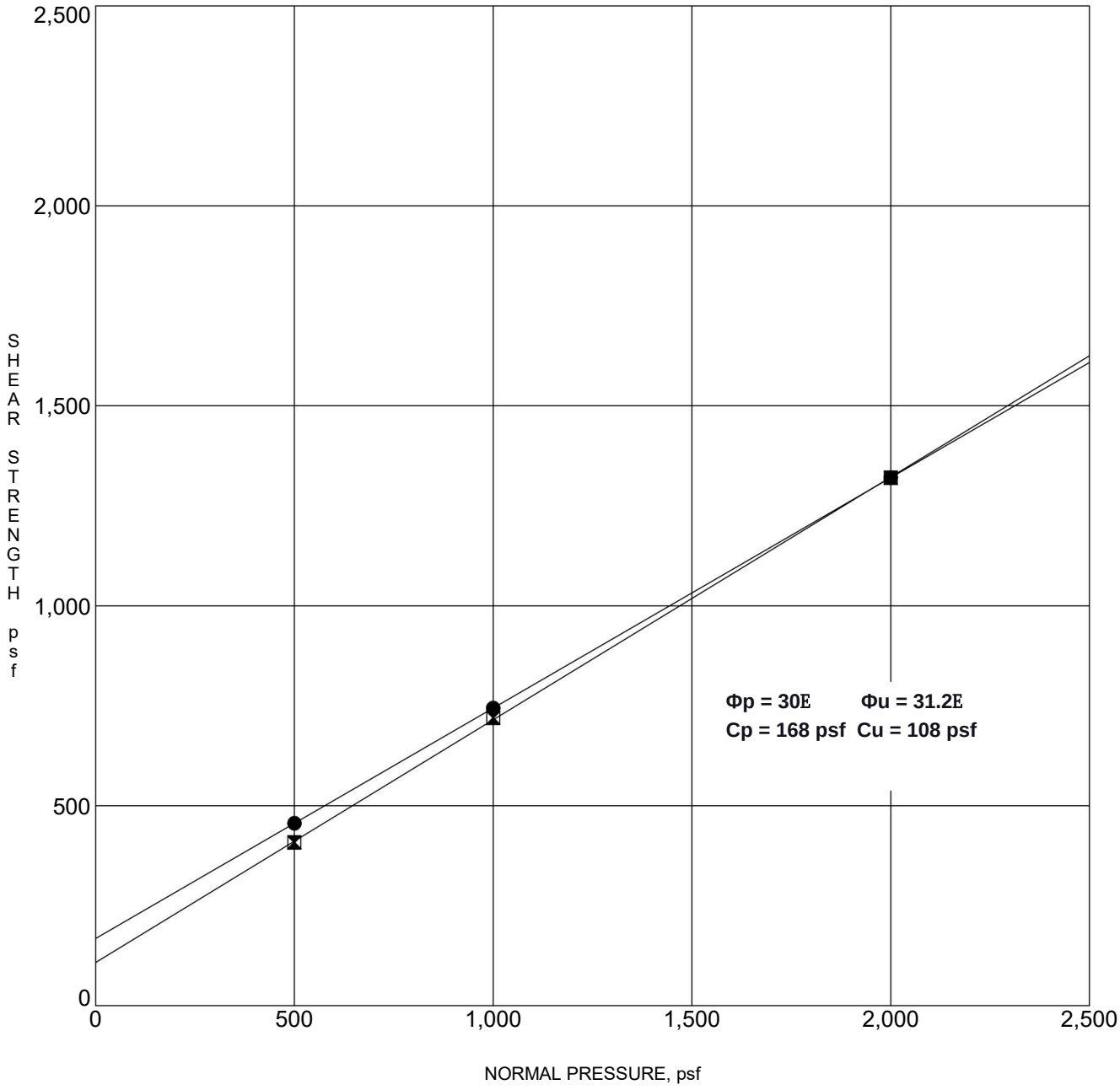
JOB NO. **24-01-4781**

DATE **5/9/24**

SHEAR TEST DIAGRAM

Harrington Geotechnical Engineering, Inc.

PLATE B-7



Specimen Identification			Classification	DD	MC%
●	B-3	5.0	SILTY SAND (Peak)	108	12
⊠	B-3	5.0	(Ultimate)		

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

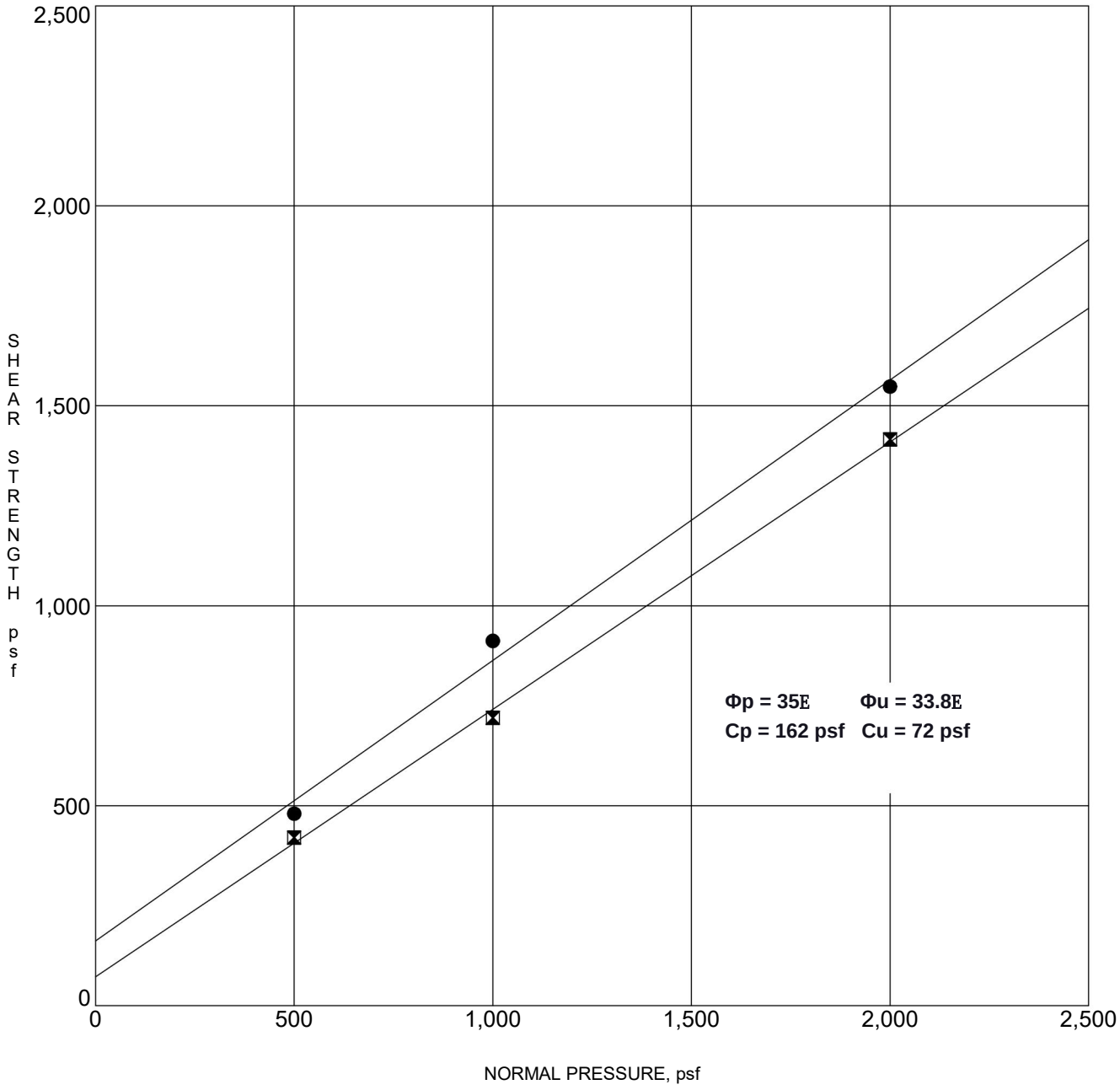
JOB NO. **24-01-4781**

DATE **5/9/24**

SHEAR TEST DIAGRAM

Harrington Geotechnical Engineering, Inc.

PLATE B-8



Specimen Identification			Classification	DD	MC%
●	B-4	2.5	SAND (Peak)	98	8
⊠	B-4	2.5	(Ultimate)		

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

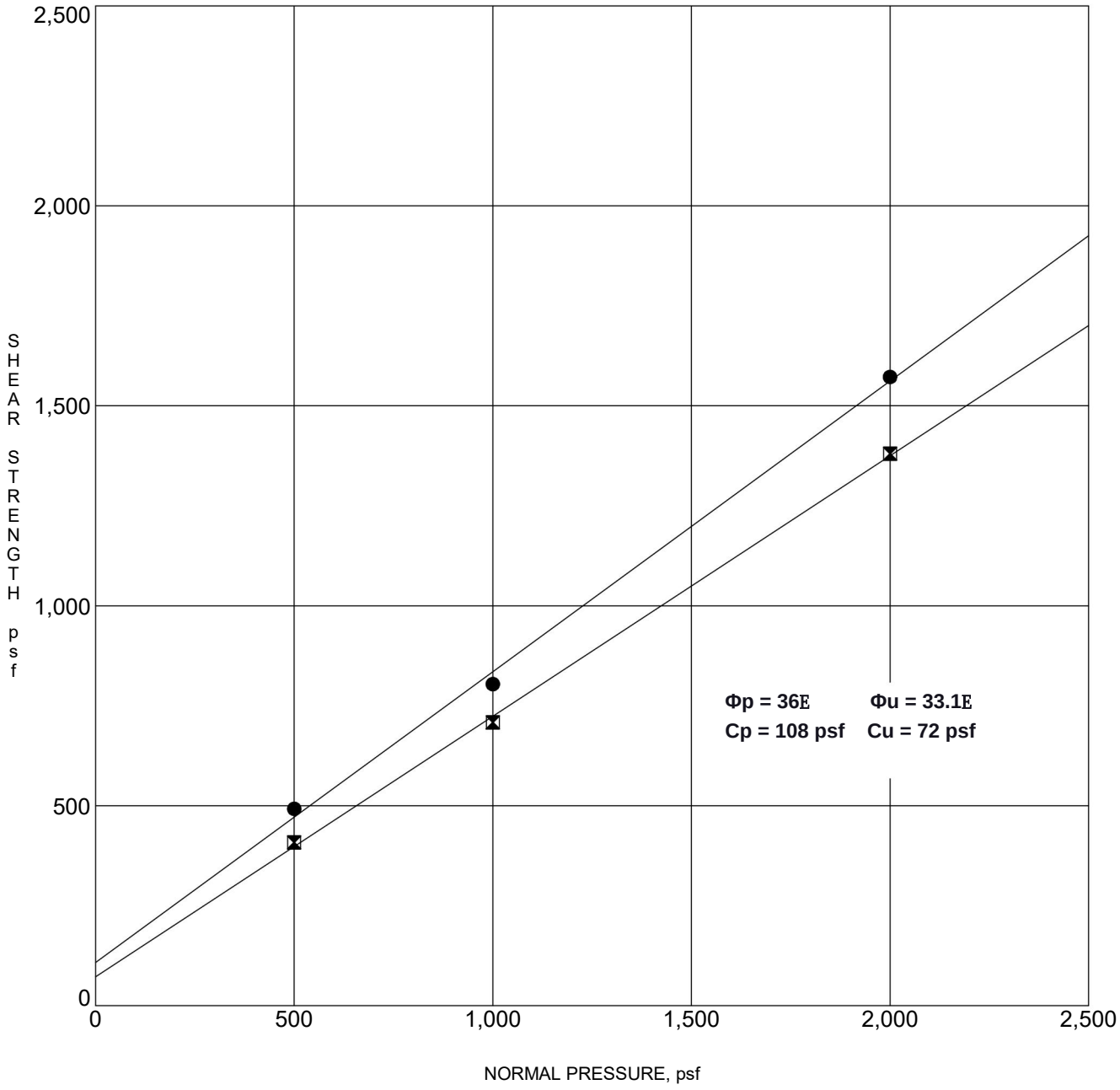
JOB NO. **24-01-4781**

DATE **5/9/24**

SHEAR TEST DIAGRAM

Harrington Geotechnical Engineering, Inc.

PLATE B-9



Specimen Identification			Classification	DD	MC%
●	B-6	7.5	SILTY SAND (Peak)	109	16
⊠	B-6	7.5	(Ultimate)		

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

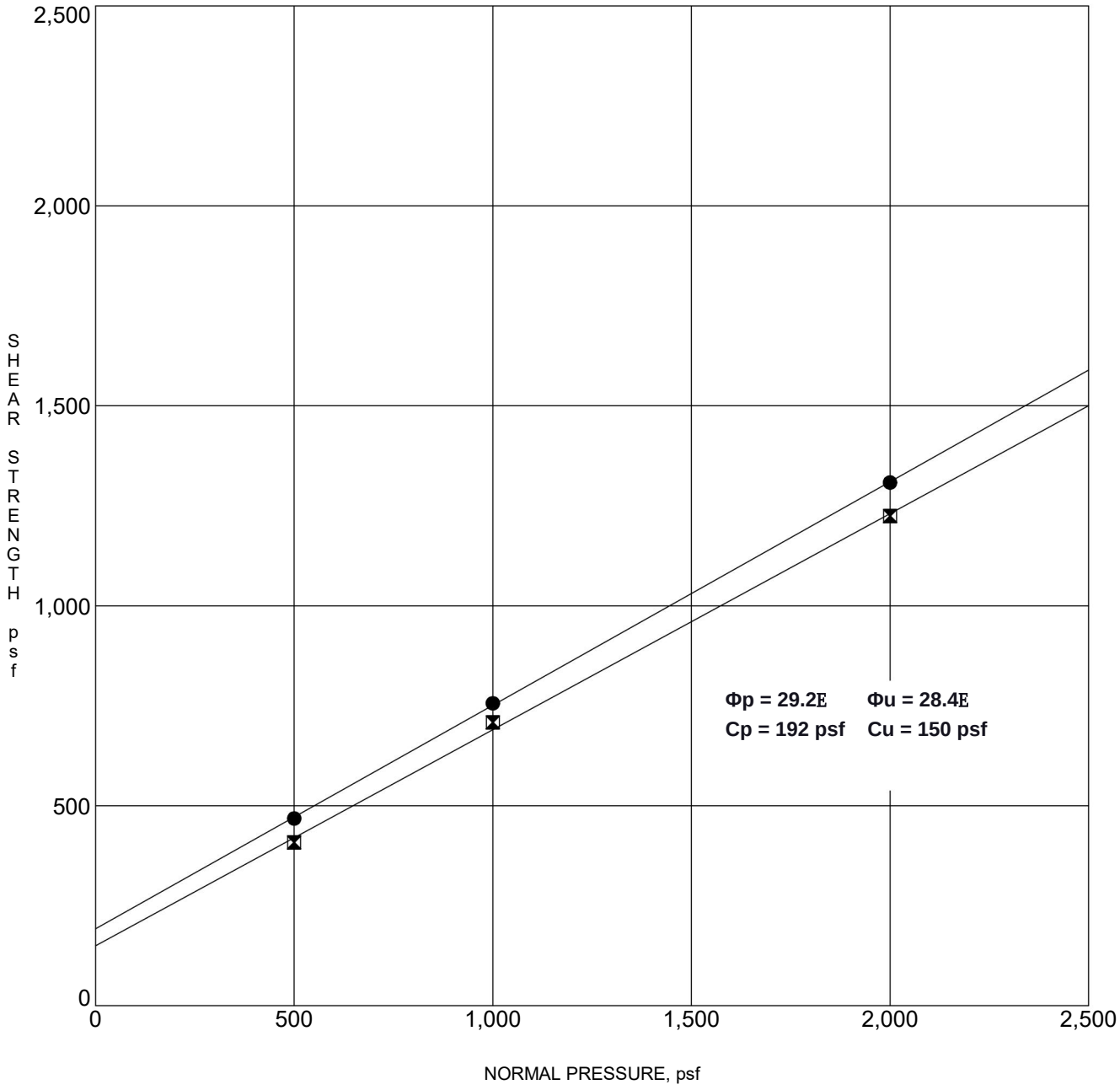
JOB NO. **24-01-4781**

DATE **5/9/24**

SHEAR TEST DIAGRAM

Harrington Geotechnical Engineering, Inc.

PLATE B-10



Specimen Identification			Classification	DD	MC%
●	B-7	5.0	SILTY SAND (Peak)	101	18
⊠	B-7	5.0	(Ultimate)		

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

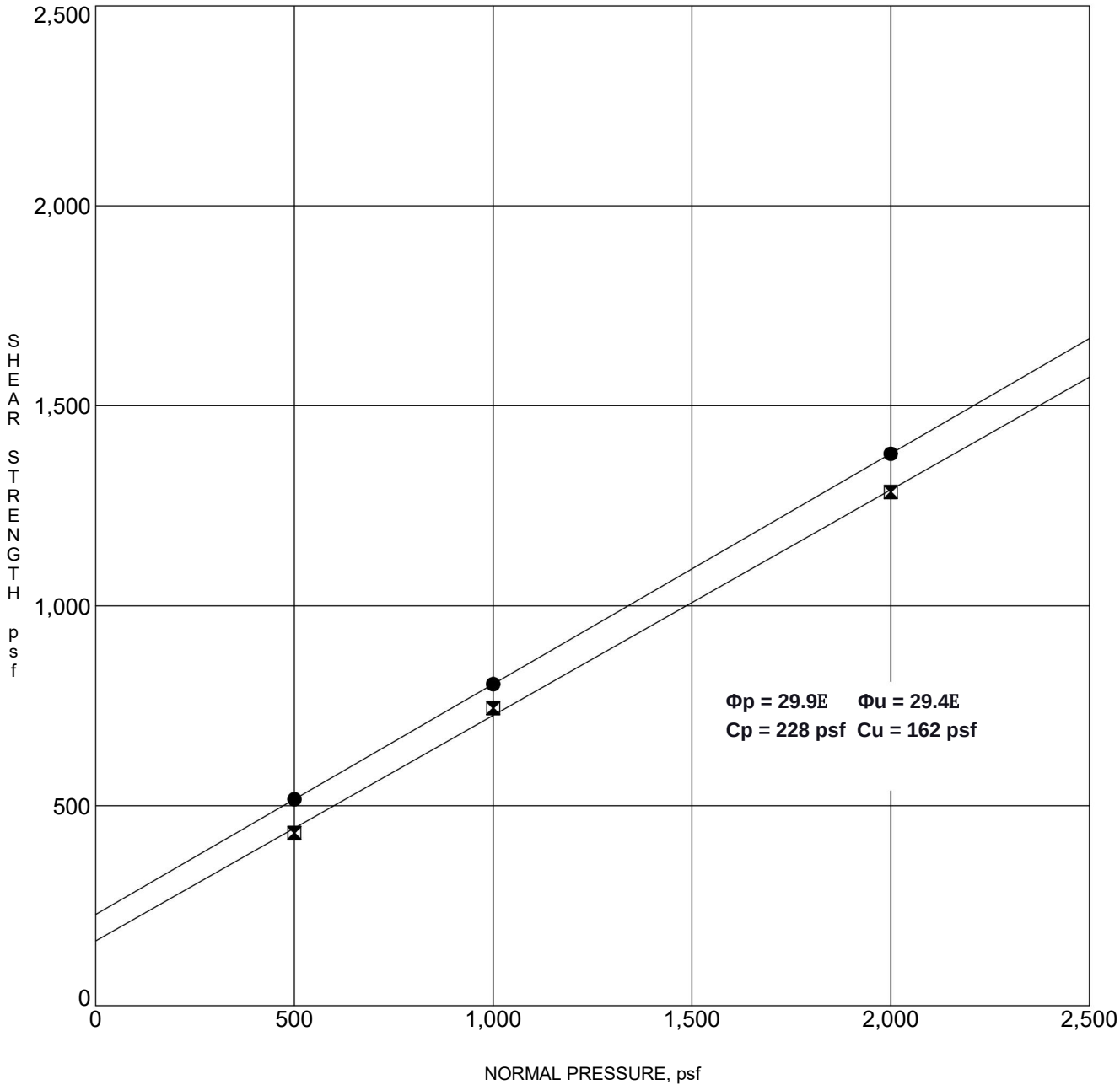
JOB NO. **24-01-4781**

DATE **5/9/24**

SHEAR TEST DIAGRAM

Harrington Geotechnical Engineering, Inc.

PLATE B-11



Specimen Identification			Classification	DD	MC%
●	B-9	1.0	SILTY SAND (Peak)	108	11
⊠	B-9	1.0	(Ultimate)		

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

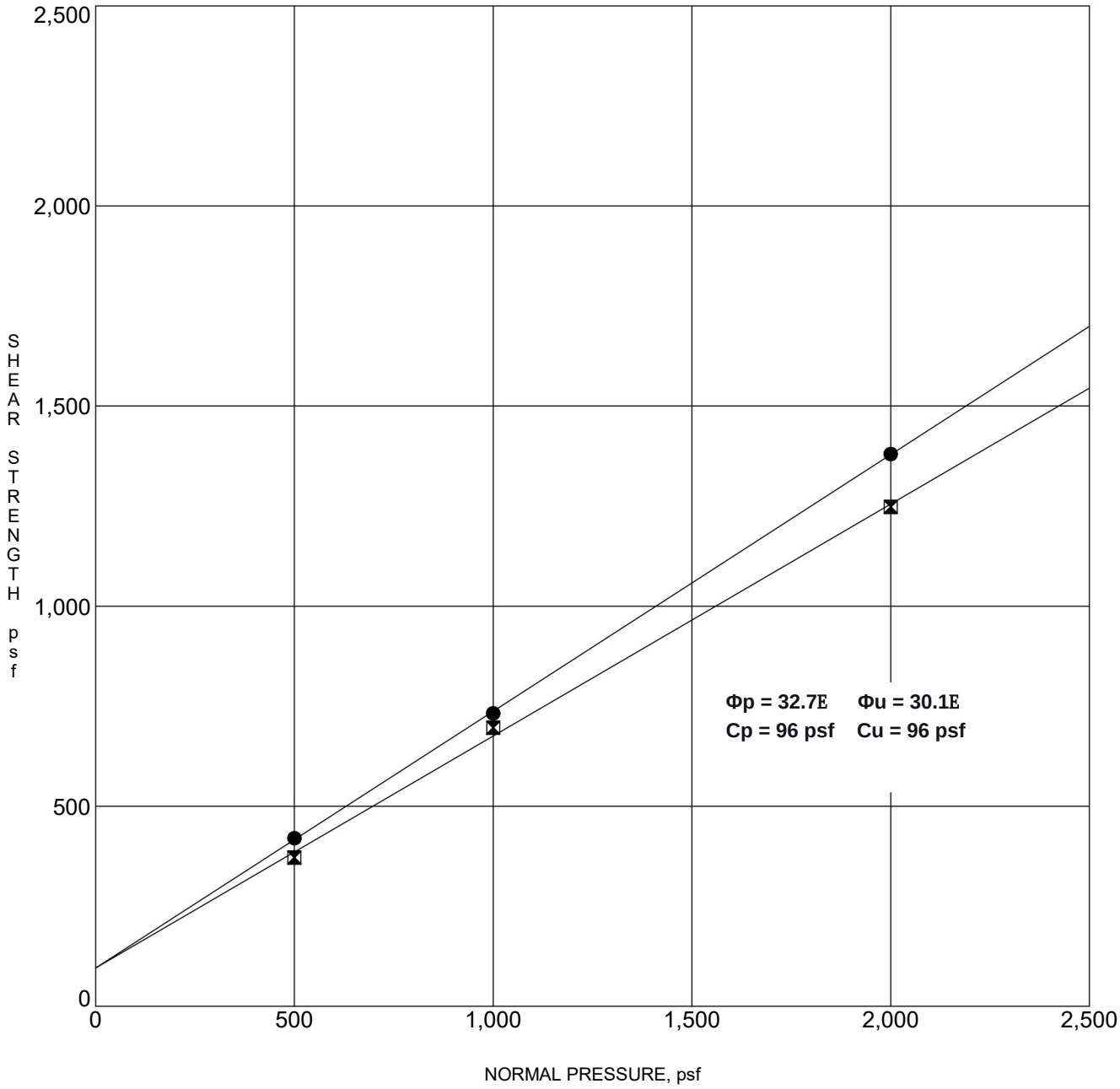
JOB NO. **24-01-4781**

DATE **5/9/24**

SHEAR TEST DIAGRAM

Harrington Geotechnical Engineering, Inc.

PLATE B-12



Specimen Identification			Classification	DD	MC%
●	B-9	5.0	SILTY SAND (Peak)	106	15
⊠	B-9	5.0	(Ultimate)		

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

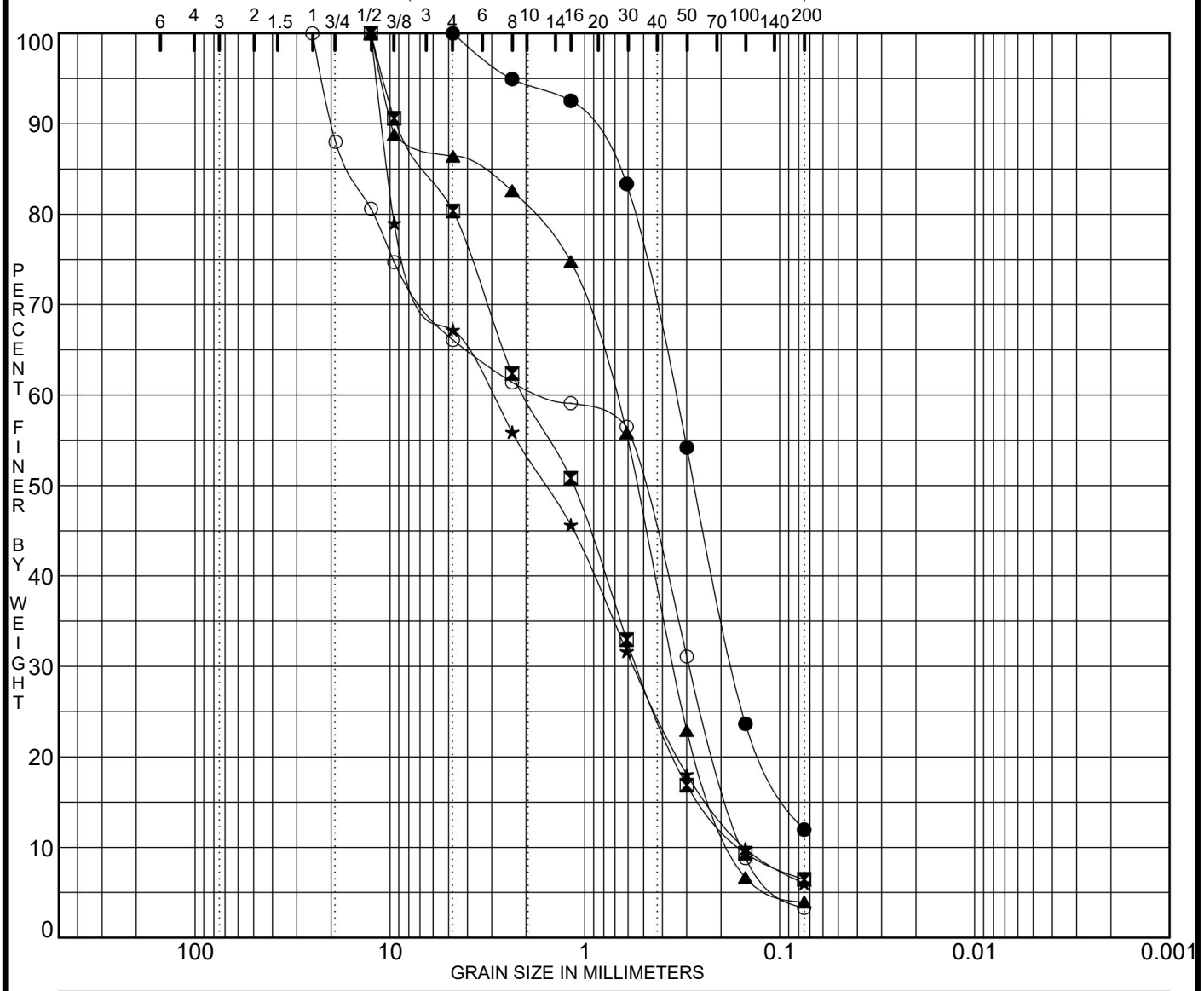
JOB NO. **24-01-4781**

DATE **5/9/24**

SHEAR TEST DIAGRAM

Harrington Geotechnical Engineering, Inc.

PLATE B-13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-3	10.0						1.30	5.2
⊠	B-3	20.0						0.88	12.8
▲	B-3	25.0	**POORLY GRADED SAND SP**					1.00	4.1
★	B-3	40.0						0.68	20.0
⊙	B-3	45.0	**POORLY GRADED SAND with GRAVEL SP**					0.35	9.9

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-3	10.0	4.75	0.35	0.173		0.0	88.1	12.0	
⊠	B-3	20.0	12.50	2.04	0.536	0.1593	19.7	73.9	6.5	
▲	B-3	25.0	12.50	0.71	0.350	0.1730	13.6	82.5	4.0	
★	B-3	40.0	12.50	3.04	0.560	0.1519	32.8	61.2	6.0	
⊙	B-3	45.0	25.00	1.55	0.290	0.1557	33.9	62.8	3.3	

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

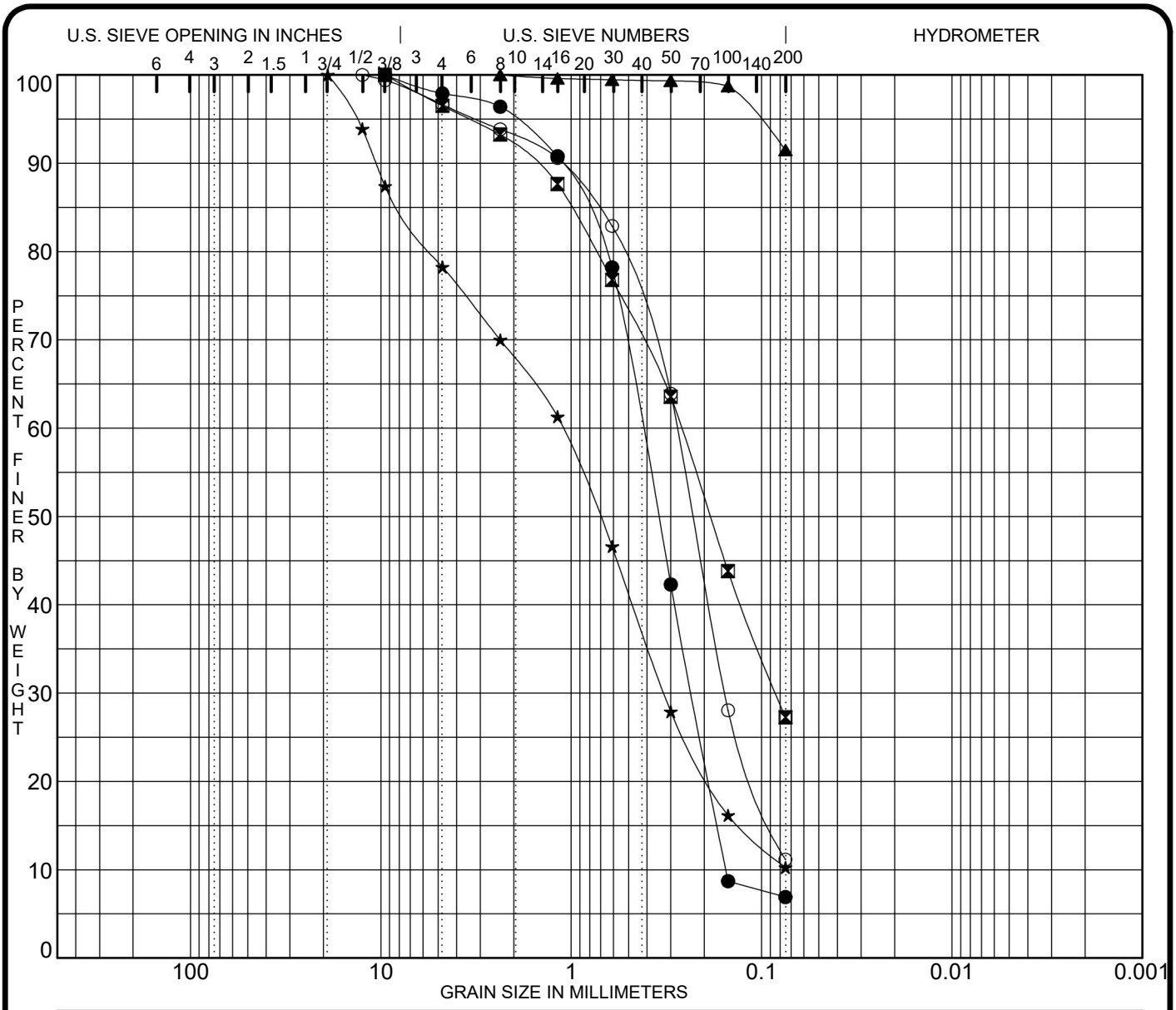
JOB NO. **24-01-4781**

DATE **5/30/24**

GRADATION CURVES

Harrington Geotechnical Engineering, Inc.

PLATE B-14



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	B-5	10.0						0.83	2.8
⊠	B-5	20.0							
▲	B-5	30.0							
★	B-5	35.0						1.30	15.3
⊙	B-5	40.0						1.22	3.9

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-5	10.0	9.50	0.43	0.233	0.1541	2.1	91.0	6.9	
⊠	B-5	20.0	9.50	0.26	0.084		3.5	69.3	27.3	
▲	B-5	30.0	2.36				0.0	8.5	91.5	
★	B-5	35.0	19.00	1.11	0.325		21.8	68.0	10.3	
⊙	B-5	40.0	12.50	0.28	0.156		3.3	85.5	11.2	

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

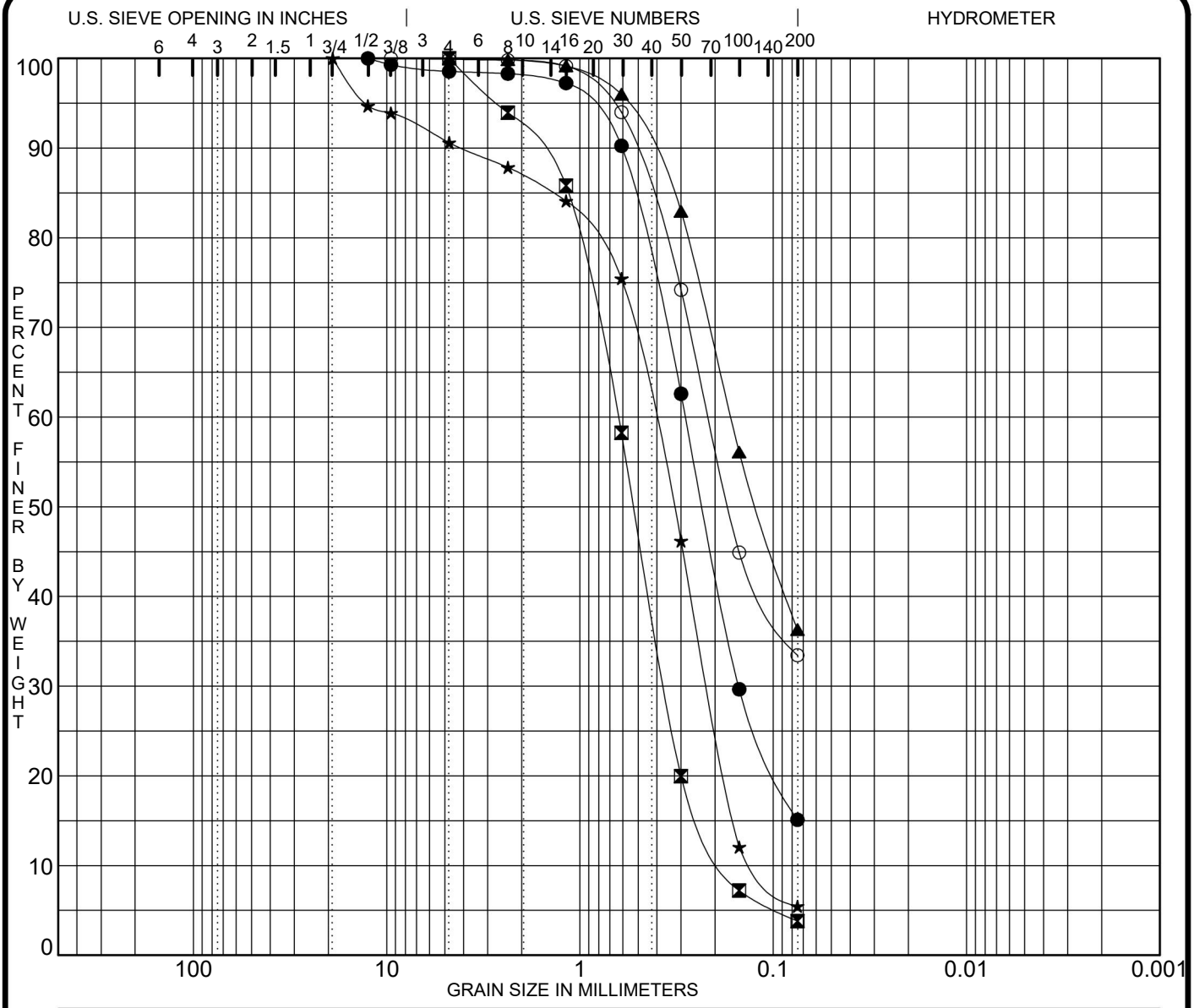
JOB NO. **24-01-4781**

DATE **5/30/24**

GRADATION CURVES

Harrington Geotechnical Engineering, Inc.

PLATE B-15



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	MC%	LL	PL	PI	Cc	Cu
●	B-9	10.0							
⊠	B-9	20.0	**POORLY GRADED SAND SP**					1.18	3.6
▲	B-9	25.0							
★	B-9	30.0						0.92	3.5
⊙	B-9	40.0							

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-9	10.0	12.50	0.28	0.151		1.4	83.5	15.1	
⊠	B-9	20.0	4.75	0.64	0.361	0.1747	0.0	96.2	3.8	
▲	B-9	25.0	4.75	0.17			0.0	63.7	36.3	
★	B-9	30.0	19.00	0.42	0.216	0.1209	9.4	85.1	5.5	
⊙	B-9	40.0	9.50	0.21			0.1	66.5	33.5	

PROJECT **Storm Properties - 1314 Le Borgne Ave., Baldwin Park, CA**

JOB NO. **24-01-4781**

DATE **5/30/24**

GRADATION CURVES

Harrington Geotechnical Engineering, Inc.

PLATE B-16

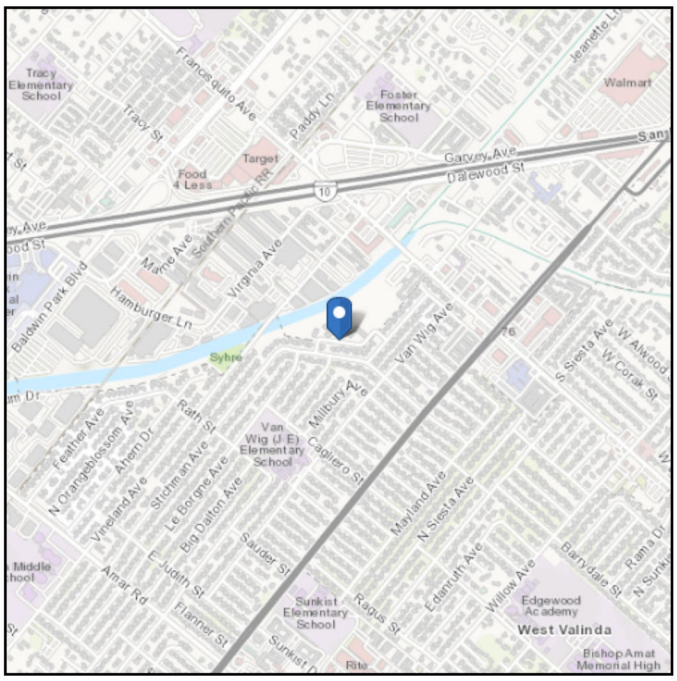
APPENDIX C

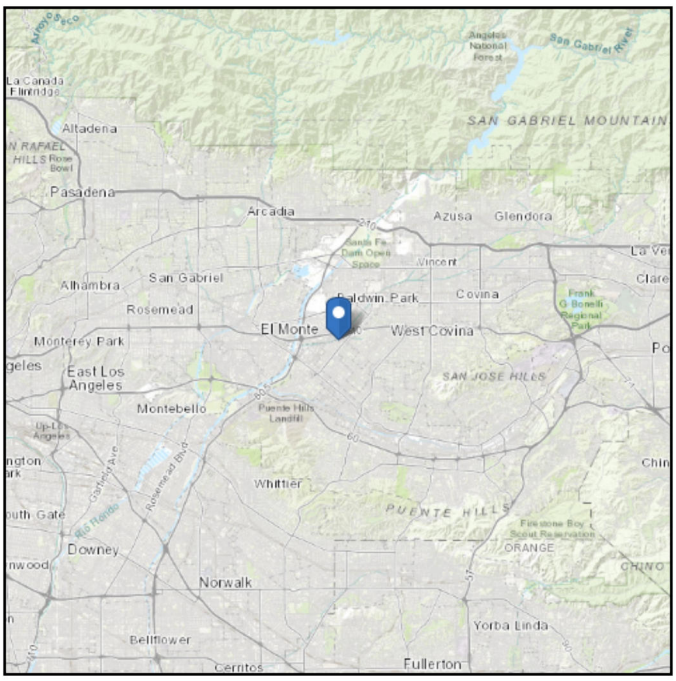
ASCE DESIGN HAZARDS REPORT AND USGS SEISMIC HAZARD DEAGGREGATION RESULTS

ASCE 7 Hazards Report

Address:
Le Borgne Ave
La Puente, California
91746

Standard:	ASCE/SEI 7-16	**Elevation:**	0 ft ()
Risk Category:	II	**Latitude:**	34.064033
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-117.97391





Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	1.704	S_{D1} :	N/A
S_1 :	0.62	T_L :	8
F_a :	1.2	PGA :	0.724
F_v :	N/A	PGA_M :	0.868
S_{MS} :	2.045	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.364	C_v :	1.441

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Mon May 06 2024

Date Source: USGS Seismic Design Maps

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Please also see the new USGS Earthquake Hazard Toolbox for access to the most recent NSHMs for the conterminous U.S. and Hawaii.

Input

Edition

Dynamic: Conterminous U.S. 2014 (u…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

34.064033

Time Horizon

Return period in years

2475

Longitude

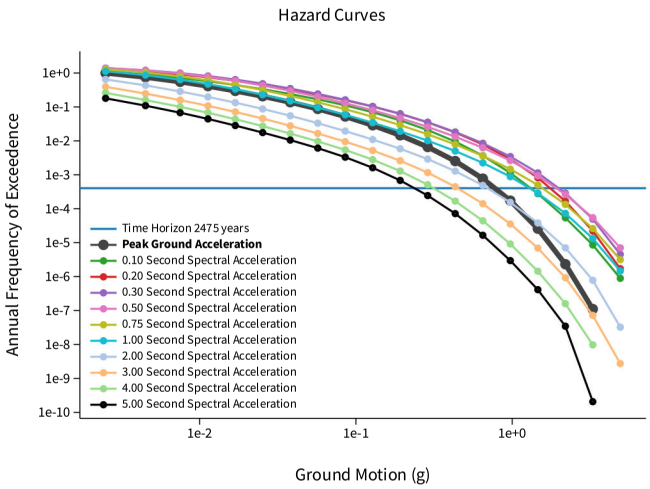
Decimal degrees, negative values for western longitudes

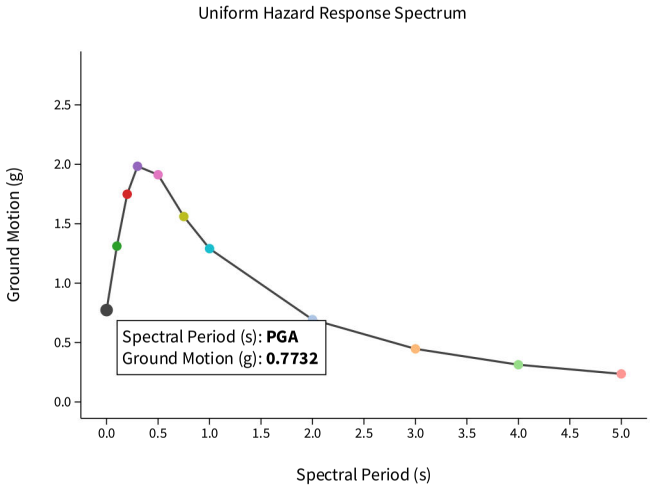
-117.97391

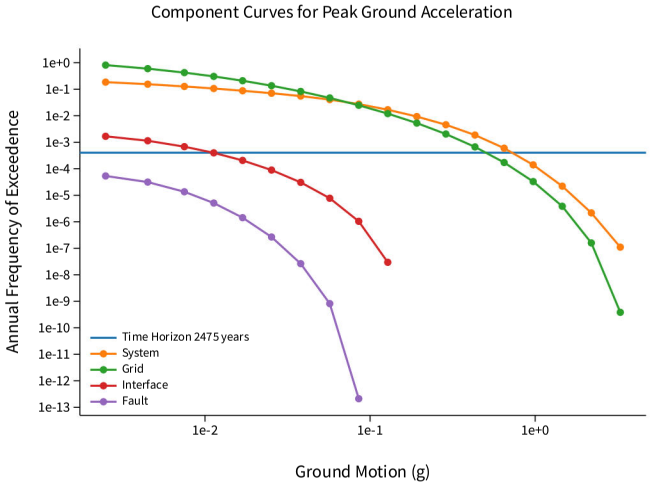
Site Class

259 m/s (Site class D)

Hazard Curve





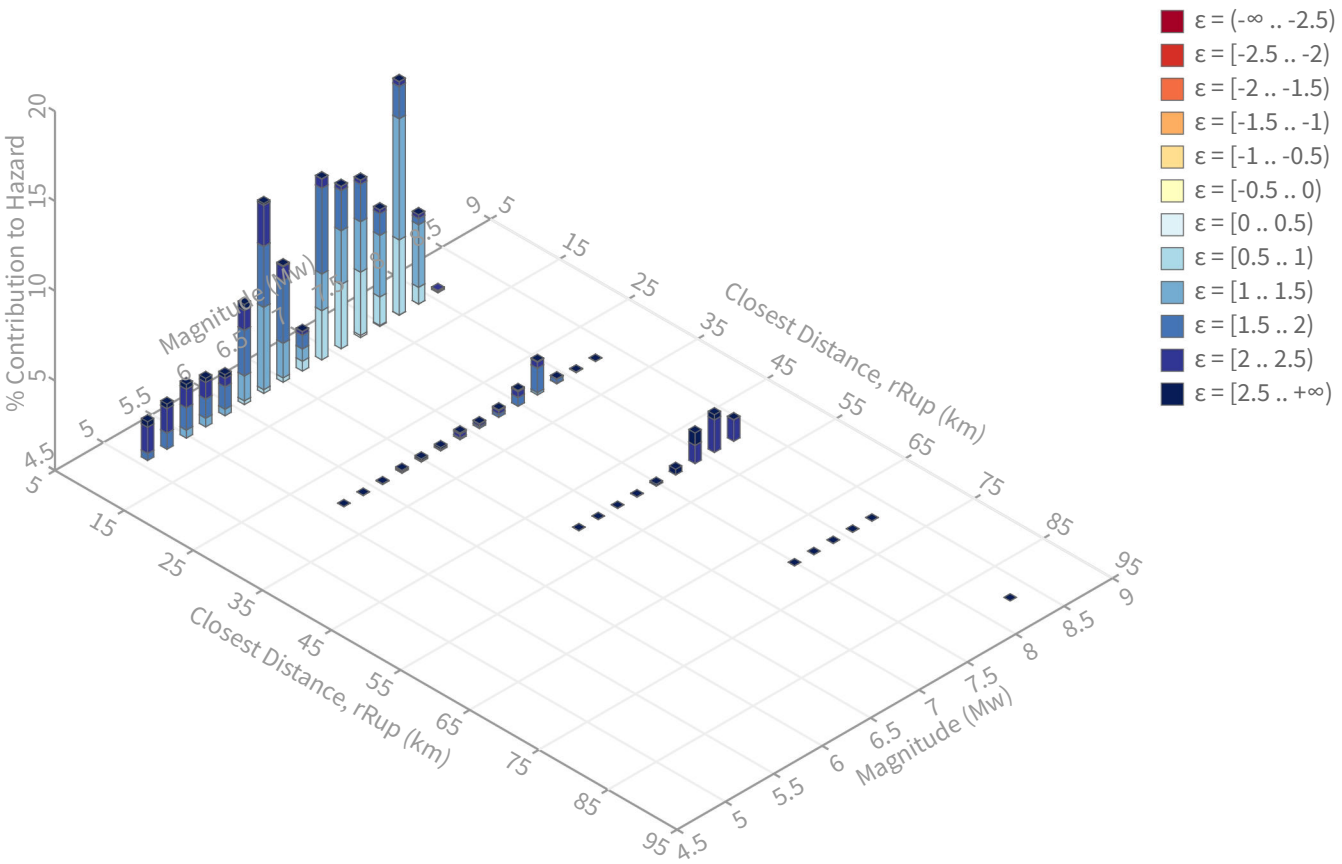


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.77323684 g

Recovered targets

Return period: 2952.6762 yrs
Exceedance rate: 0.00033867581 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.07 %

Mean (over all sources)

m: 6.92
r: 13.41 km
ε_0: 1.54 σ

Mode (largest m-r bin)

m: 7.72
r: 11.4 km
ε_0: 1.17 σ
Contribution: 13.01 %

Mode (largest m-r-ε_0 bin)

m: 7.71
r: 11.51 km
ε_0: 1.24 σ
Contribution: 6.75 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM31	System							40.89
Puente Hills [1]		11.08	7.37	0.85	117.978°W	33.944°N	181.54	6.62
Whittier alt 1 [7]		9.35	6.77	1.39	118.018°W	33.987°N	205.41	6.14
Sierra Madre [2]		11.22	7.67	1.36	117.942°W	34.161°N	15.21	4.34
San Jose [2]		9.01	7.04	1.00	117.881°W	34.043°N	105.29	3.70
Elysian Park (Upper) [0]		12.17	6.51	1.97	118.097°W	34.077°N	277.33	3.25
Raymond [0]		11.26	7.11	1.62	118.019°W	34.157°N	338.05	2.64
San Andreas (Mojave S) [11]		42.77	8.07	2.38	117.766°W	34.408°N	26.55	2.52
Compton [1]		19.84	7.28	1.55	118.161°W	33.764°N	207.43	2.04
Whittier alt 1 [6]		9.86	6.45	1.56	117.990°W	33.975°N	188.63	1.69
Puente Hills [2]		11.59	7.01	0.98	118.052°W	33.949°N	209.37	1.04
UC33brAvg_FM32	System							39.20
Whittier alt 2 [6]		9.61	7.26	1.24	118.019°W	33.986°N	205.75	5.90
Sierra Madre [2]		11.22	7.68	1.36	117.942°W	34.161°N	15.21	4.34
San Jose [2]		9.01	7.03	1.00	117.881°W	34.043°N	105.29	3.66
Whittier alt 2 [5]		10.31	7.25	1.08	117.982°W	33.972°N	184.22	3.42
Elysian Park (Upper) [0]		12.17	6.95	1.70	118.097°W	34.077°N	277.33	3.05
Raymond [0]		11.26	7.12	1.61	118.019°W	34.157°N	338.05	2.87
Puente Hills (Santa Fe Springs) [0]		11.61	6.93	1.11	118.023°W	33.950°N	199.84	2.62
San Andreas (Mojave S) [11]		42.77	8.06	2.38	117.766°W	34.408°N	26.55	2.52
Compton [1]		19.84	7.34	1.52	118.161°W	33.764°N	207.43	2.20
Richfield [1]		14.86	6.17	1.85	117.870°W	33.882°N	154.65	1.55
Puente Hills (Coyote Hills) [1]		11.66	7.12	0.88	118.024°W	33.910°N	195.16	1.35
Puente Hills (LA) [0]		12.79	7.23	1.32	118.116°W	33.990°N	238.08	1.05
UC33brAvg_FM32 (opt)	Grid							10.07
PointSourceFinite: -117.974, 34.131		8.60	5.78	1.83	117.974°W	34.131°N	0.00	1.99
PointSourceFinite: -117.974, 34.131		8.60	5.78	1.83	117.974°W	34.131°N	0.00	1.99
PointSourceFinite: -117.974, 34.105		6.72	5.70	1.58	117.974°W	34.105°N	0.00	1.56
PointSourceFinite: -117.974, 34.105		6.72	5.70	1.58	117.974°W	34.105°N	0.00	1.56
UC33brAvg_FM31 (opt)	Grid							9.84
PointSourceFinite: -117.974, 34.131		8.67	5.75	1.85	117.974°W	34.131°N	0.00	1.94
PointSourceFinite: -117.974, 34.131		8.67	5.75	1.85	117.974°W	34.131°N	0.00	1.94
PointSourceFinite: -117.974, 34.105		6.73	5.69	1.59	117.974°W	34.105°N	0.00	1.58
PointSourceFinite: -117.974, 34.105		6.73	5.69	1.59	117.974°W	34.105°N	0.00	1.58

APPENDIX D

SEISMICALLY-INDUCED DRY SAND SETTLEMENT

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

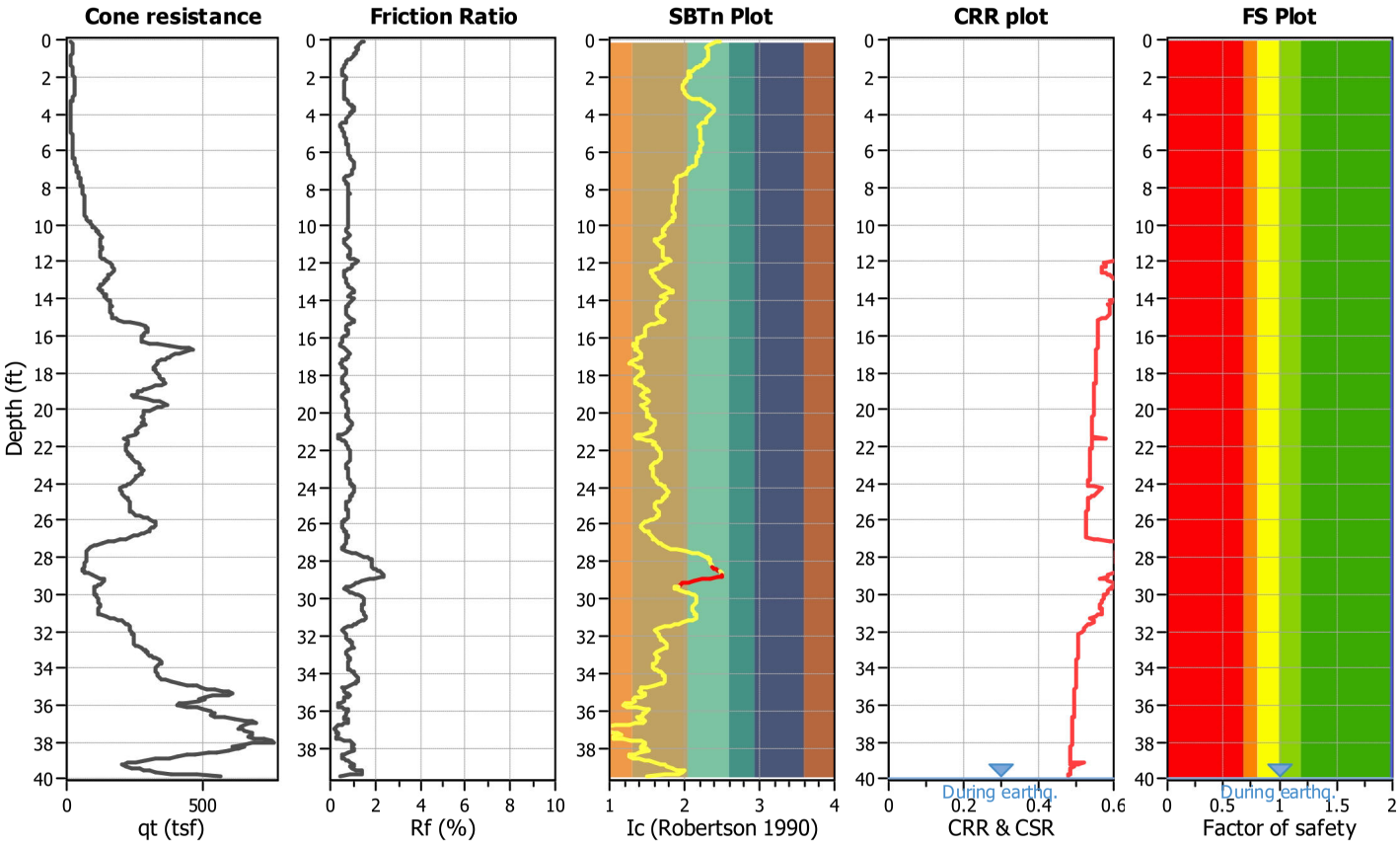
LIQUEFACTION ANALYSIS REPORT

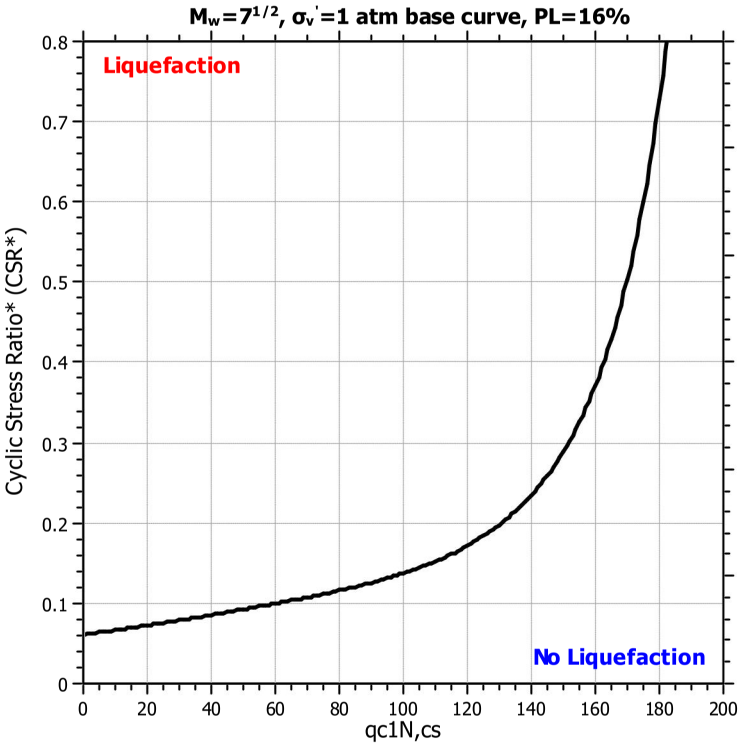
Project title : New Multi-Family Residential Development **Location : 1314 Le Borgne Ave., Baldwin Park, CA 91746**

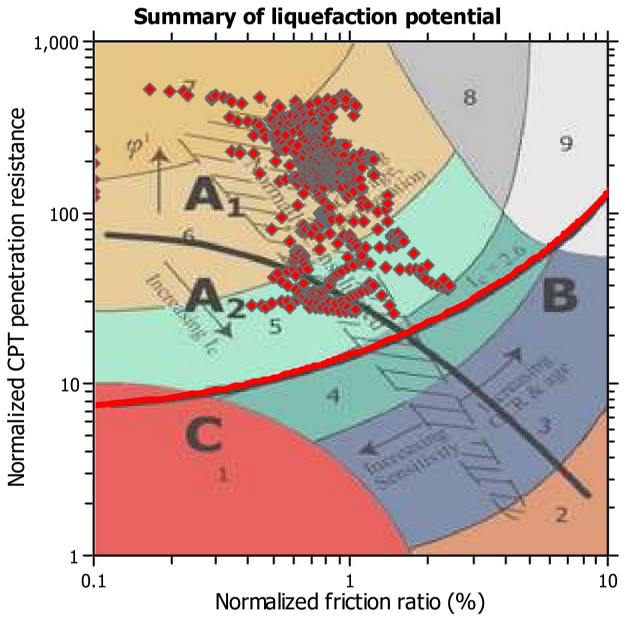
CPT file : CPT-1

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	45.50 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	40.00 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:	6.92	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.87	Unit weight calculation:	Based on SBT	K_σ applied:	No		

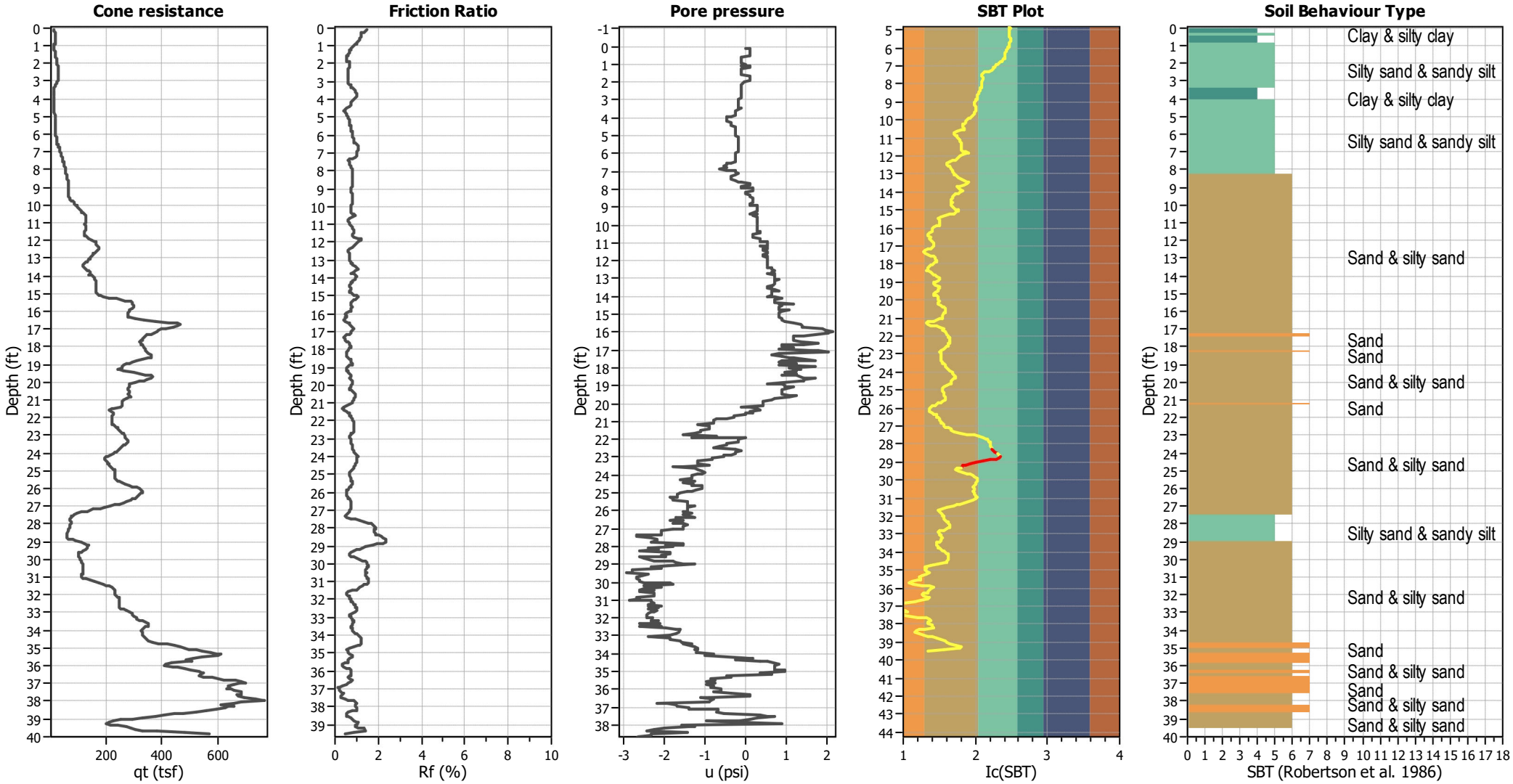






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



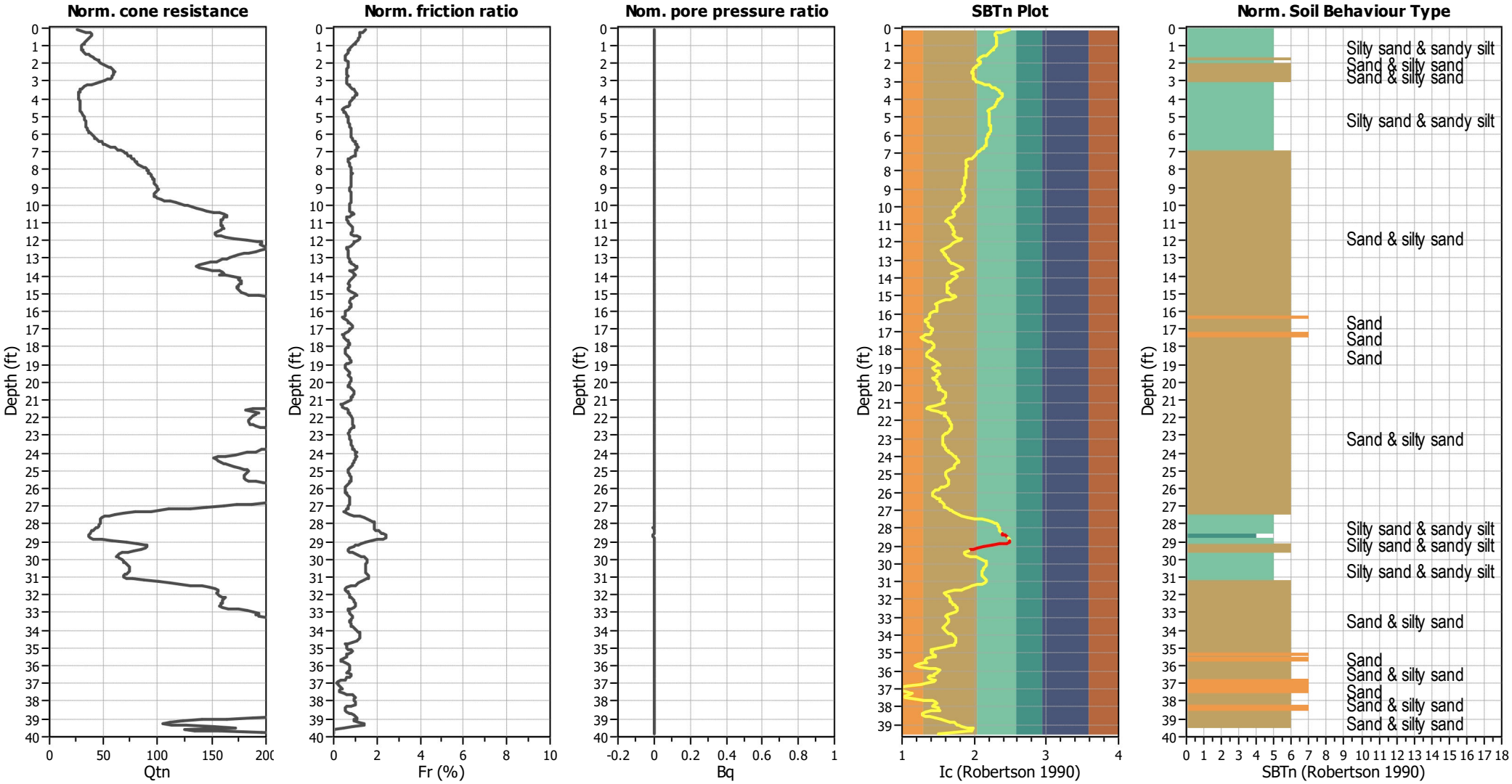
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	40.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.92	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.87	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	45.50 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)



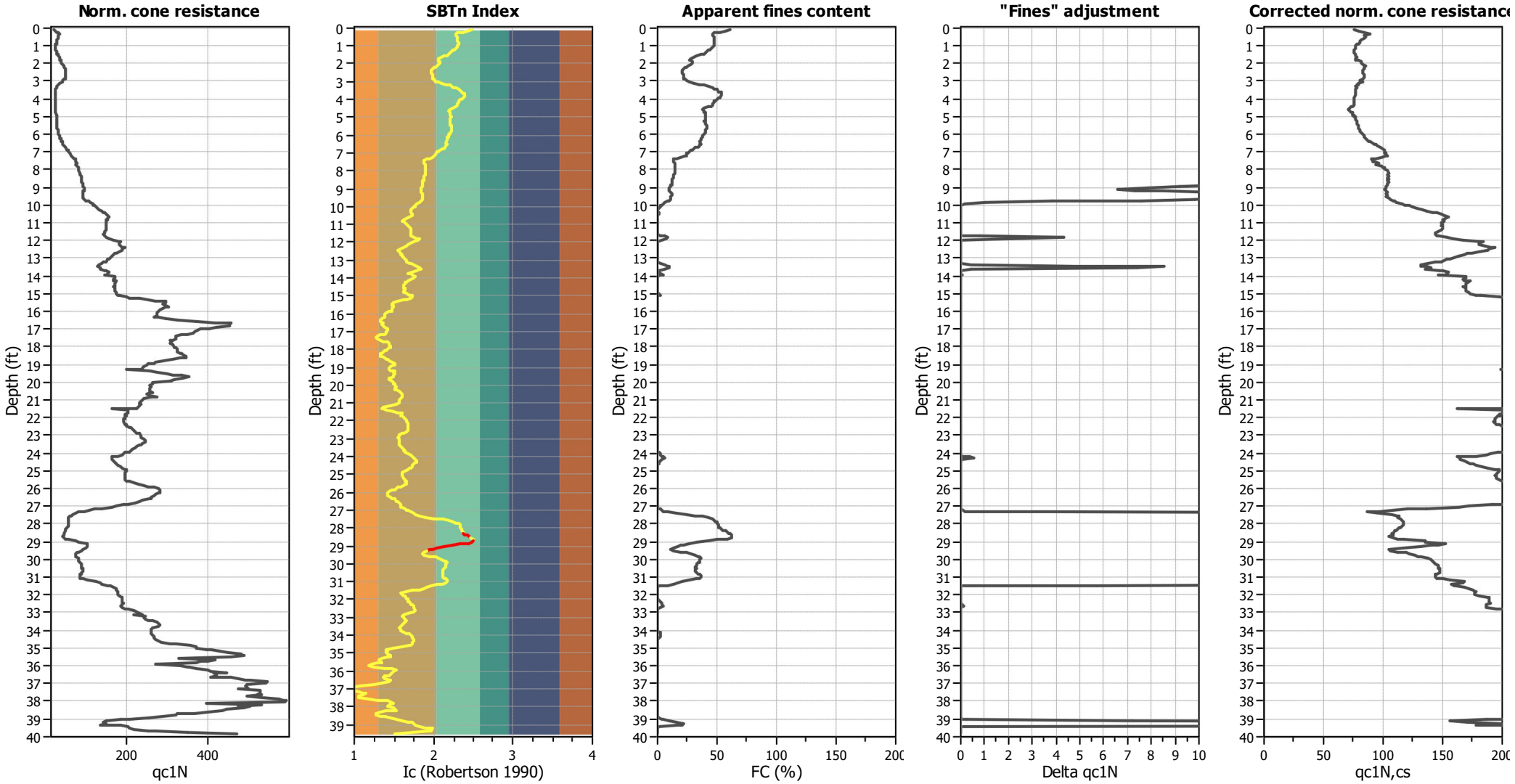
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	40.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.92	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.87	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	45.50 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

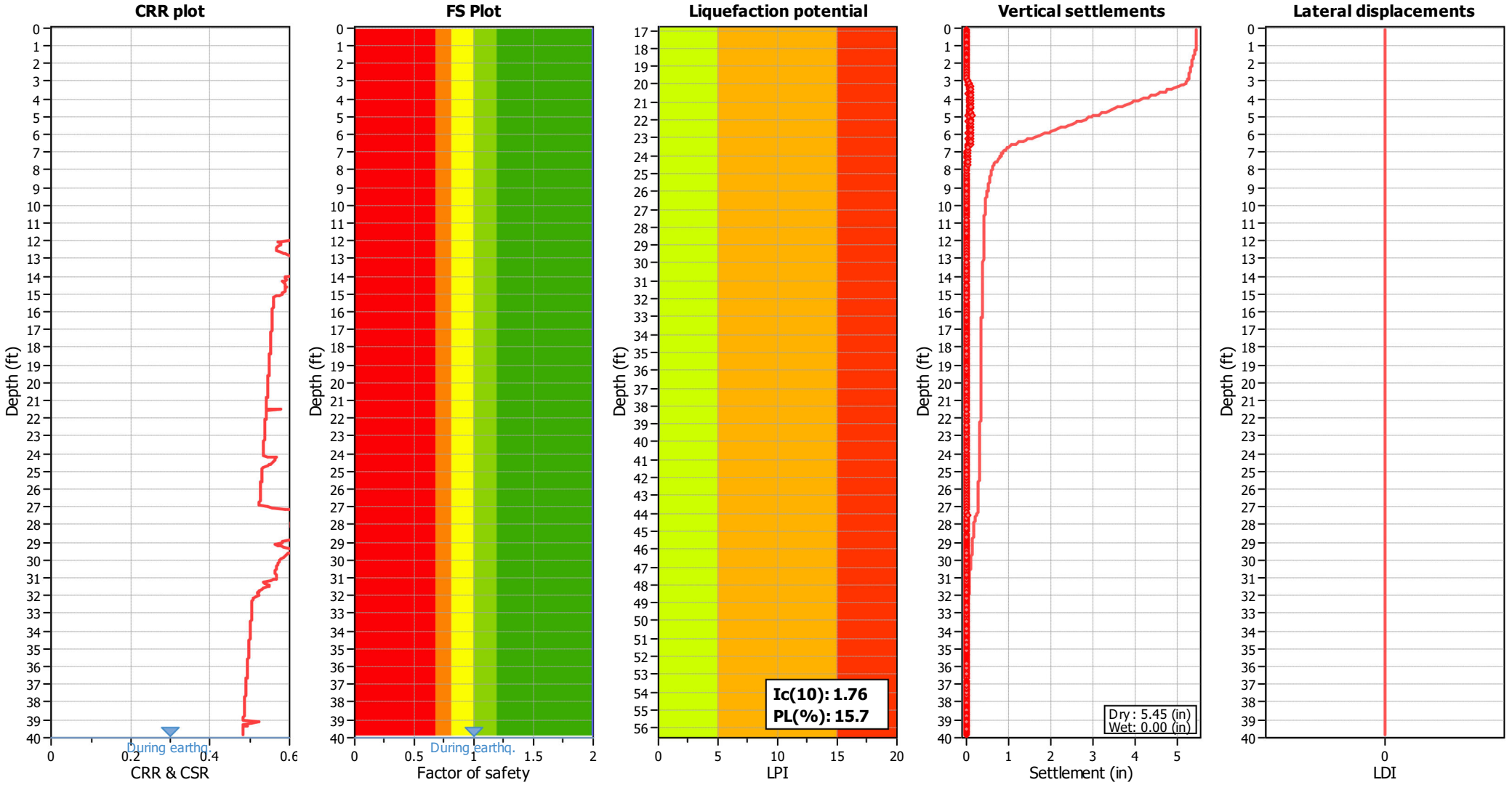
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	40.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.92	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.87	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	45.50 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	40.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.92	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.87	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	45.50 ft	Fill height:	N/A	Limit depth:	60.00 ft

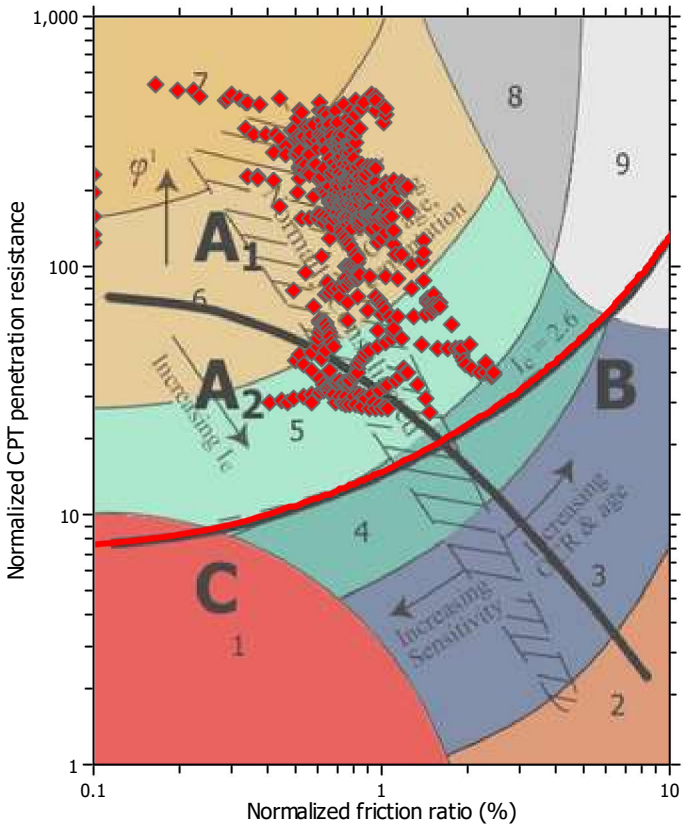
F.S. color scheme

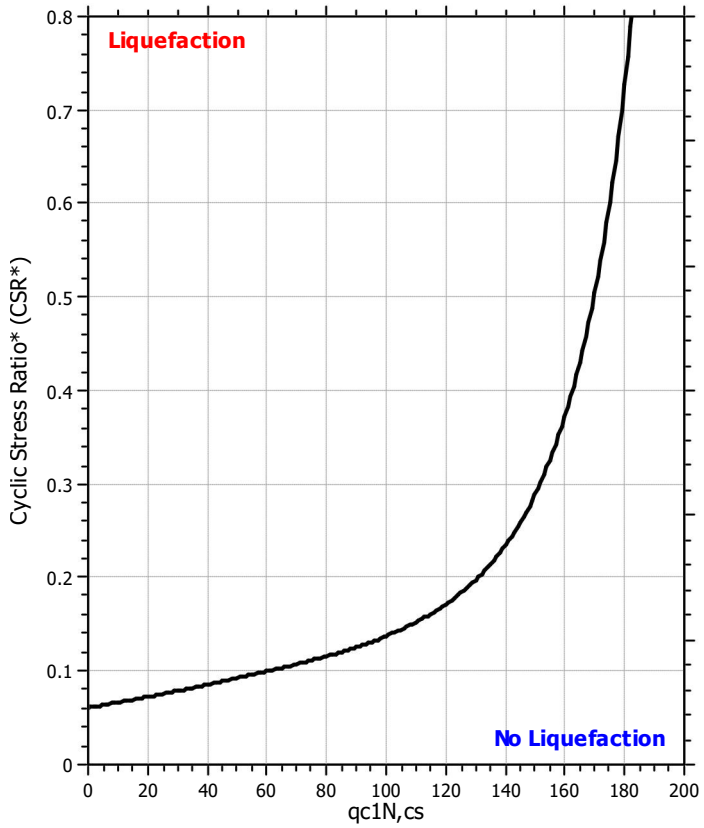
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

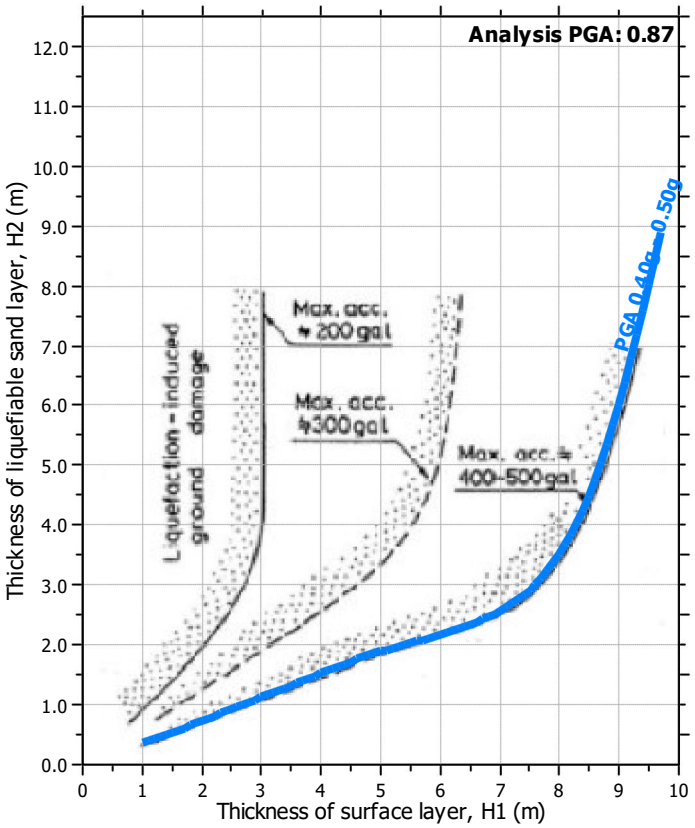
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



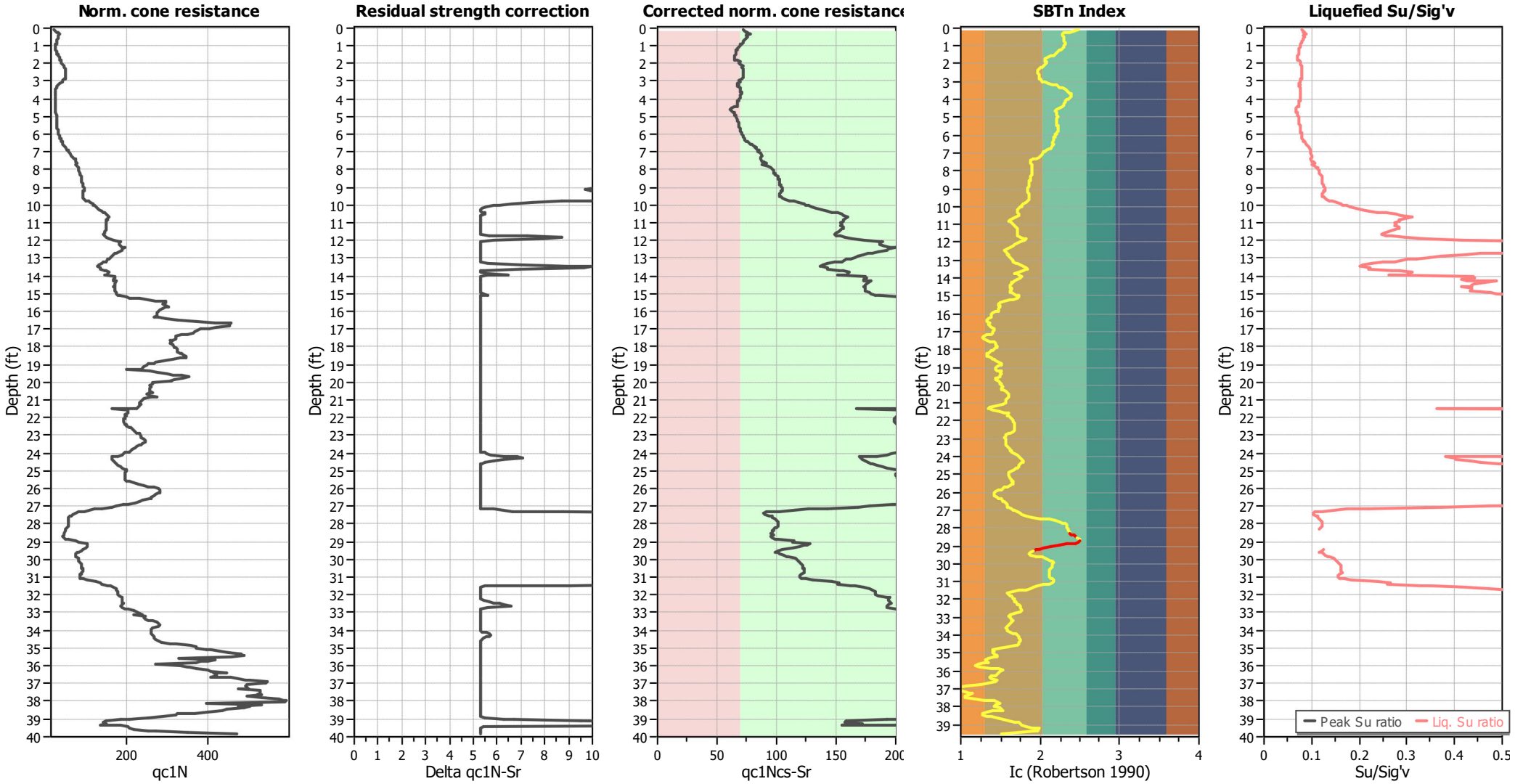




Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	40.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.92	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.87	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	45.50 ft	Fill height:	N/A	Limit depth:	60.00 ft

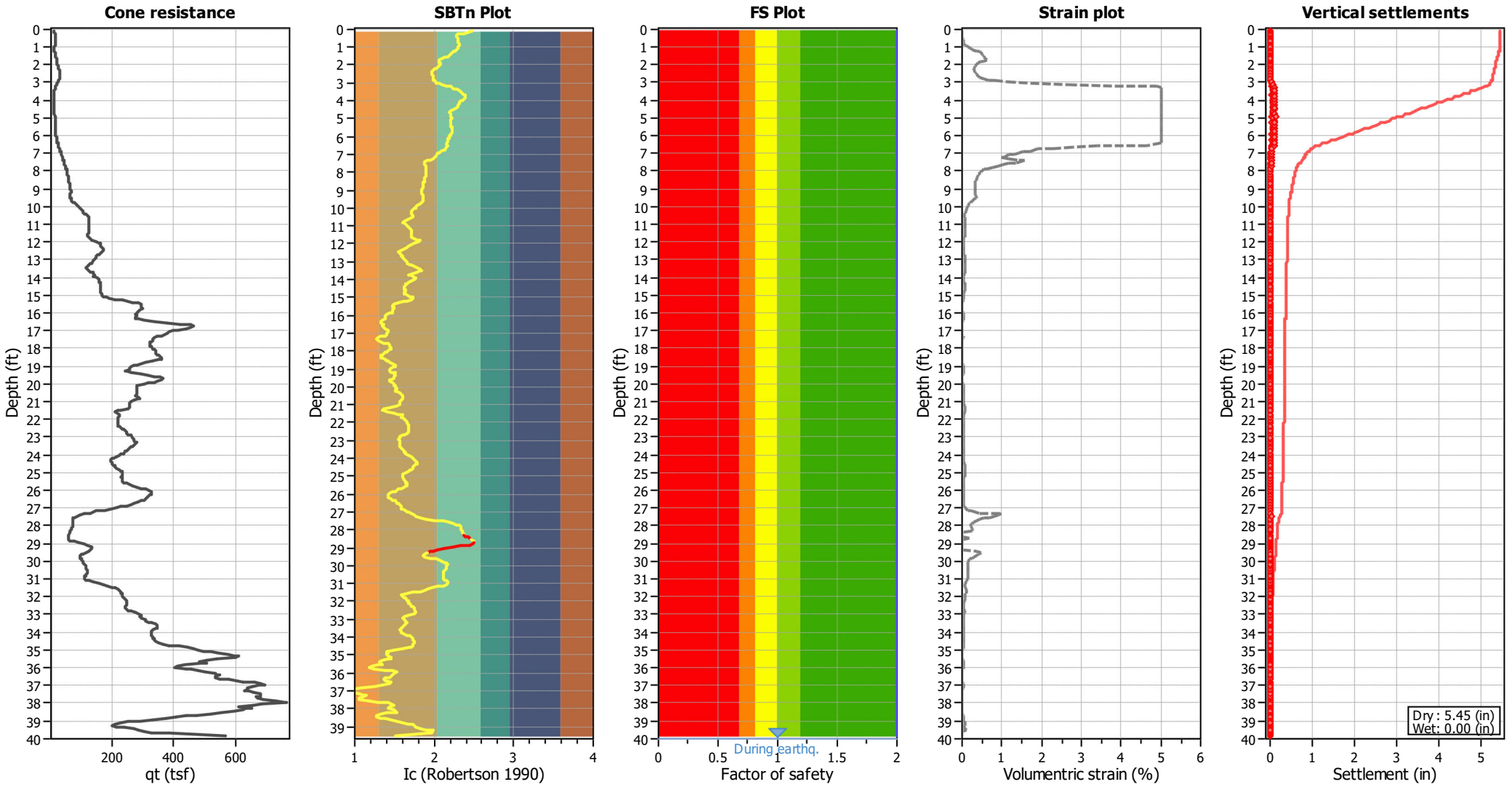
Check for strength loss plots (Idriss & Boulanger (2008))



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	40.00 ft	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.92	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.87	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	45.50 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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