

Appendix D
**Revised Limited Geotechnical
Exploration**

BOARD OF
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DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

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GENERAL MANAGER
SUPERINTENDENT OF BUILDING

JOHN WEIGHT
EXECUTIVE OFFICER

GEOLOGY AND SOILS REPORT APPROVAL LETTER

October 30, 2024

LOG # 131896-01
SOILS/GEOLOGY FILE - 2

Ventus Group, Inc.
2030 Main Street, Suite 440
Irvine, CA 92612

TRACT: ZOBELEIN'S GRAND AVENUE AND FIGUEROA STREET TRACT
(MP 9-41)
BLOCK: BLK 14
LOTS: 1-11, 16, 17, 18
LOCATION: 3822 - 3830 S. Figueroa Street, 3801-3855 S. Flower Drive

CURRENT REFERENCE <u>REPORT/LETTER</u>	REPORT <u>No.</u>	DATE OF <u>DOCUMENT</u>	<u>PREPARED BY</u>
Response Report	10884.015	09/25/2024	Leighton
PREVIOUS REFERENCE <u>REPORT/LETTER(S)</u>	REPORT <u>No.</u>	DATE OF <u>DOCUMENT</u>	<u>PREPARED BY</u>
Dept. Review Letter	131896	09/04/2024	LADBS
Geology/Soils Report	10884.015	3/8/23 rev. 6/4/24	Leighton

The Grading Division of the Department of Building and Safety has reviewed the referenced reports that provide an evaluation of the subsurface conditions and geological hazards to support an Environmental Impact Report (EIR). The referenced reports are acceptable as EIR documents provided that prior to issuance of any building permits, a site specific soils investigation and recommendations for future proposed structures or grading shall be submitted to the Grading Division for review and approval.


CASEY LEE JENSEN
Engineering Geologist Associate III


DAN L. STOICA
Geotechnical Engineer I

CLJ/DLS:clj/dls
Log No. 131896-01
213-482-0480

cc: Leighton and Associates, Inc., Project Consultant
LA District Office

CITY OF LOS ANGELES
DEPARTMENT OF BUILDING AND SAFETY
Grading Division

District	Log No. 13189601
----------	------------------

APPLICATION FOR REVIEW OF TECHNICAL REPORTS

INSTRUCTIONS

- A. Address all communications to the Grading Division, LADBS, 221 N. Figueroa St., 12th Fl., Los Angeles, CA 90012
Telephone No. (213)482-0480.
- B. Submit two copies (three for subdivisions) of reports, one "pdf" copy of the report on a CD-Rom or flash drive,
and one copy of application with items "1" through "10" completed.
- C. Check should be made to the City of Los Angeles.

1. LEGAL DESCRIPTION

Tract: Zobelein's Grand Avenue and Figueroa Street

Block: 14 Lots: 1-11 and 16-18

3. OWNER: Ventus Group, Inc.

Address: 2030 Main St, Ste 440

City: Irvine, CA Zip: 92612

Phone (Daytime): 949-501-0343

2. PROJECT ADDRESS:

3801 to 3855 Flower Dr. and 3822 to 3830 S Figueroa St.

4. APPLICANT Ventus Group, Inc.

Address: 2030 Main St, Ste 440

City: Irvine, CA Zip: 92612

Phone (Daytime): 949-501-0343

E-mail address: kduccini@verdantas.com

5. Report(s) Prepared by:

Leighton and Associates

6. Report Date(s):

9/25/2024

7. Status of project: ☒ Proposed

☐ Under Construction

☐ Storm Damage

8. Previous site reports? ☒ YES if yes, give date(s) of report(s) and name of company who prepared report(s)

March 8, 2023, revised June 4, 2024 (Leighton and Associates)

9. Previous Department actions? ☒ YES if yes, provide dates and attach a copy to expedite processing.

Dates: September 4, 2024

10. Applicant Signature: Kalie Duccini

Digitally signed by Kalie Duccini
Date: 2024.09.25 09:31:27 -0700

Position: Project Geologist, Geo Consultant for Owner

(DEPARTMENT USE ONLY)

REVIEW REQUESTED	FEES	REVIEW REQUESTED	FEES
☐ Soils Engineering		No. of Lots	
☐ Geology		No. of Acres	
☐ Combined Soils Engr. & Geol.		☐ Division of Land	
☐ Supplemental		Other	
☒ Combined Supplemental	3605.00	☒ Expedite	181.50
☐ Import-Export Route		☐ Response to Correction	
Cubic Yards:		☐ Expedite ONLY	
		Sub-total	544.50
		Surcharge	129.80
		TOTAL FEE	674.30

Fee Due: 674.30
Fee Verified By: ML Date: 9/26/24
(Cashier Use Only)

Receipt # PB9382
pd 10/2

ACTION BY:

THE REPORT IS: ☐ NOT APPROVED

☐ APPROVED WITH CONDITIONS

☐ BELOW

☐ ATTACHED

For Geology

Date

For Soils

Date



**RESPONSE TO LADBS REVIEW COMMENTS
REVISED LIMITED GEOTECHNICAL EXPLORATION
3801 TO 3855 FLOWER DRIVE
AND 3822 TO 3830 SOUTH FIGUEROA STREET
CITY OF LOS ANGELES
CALIFORNIA**

Prepared For **VENTUS GROUP, INC.**
2030 MAIN STREET, SUITE 440
IRVINE, CA 92612

Prepared By **LEIGHTON AND ASSOCIATES, INC.**
2600 MICHELSON DRIVE, SUITE 400
IRVINE, CA 92612

Project Number: 10884.015

Issue Date September 25, 2024

September 25, 2024

Project No. 10884.015

LADBS Log # 131896

Ventus Group, Inc.
2030 Main Street, Suite 440
Irvine, California 92614

Attention: Mr. Mike O'Melveny, VP - Acquisition and Development

**Subject: Response to LADBS Review Comments
Revised Limited Geotechnical Exploration
3801 to 3855 Flower Drive and 3822 to 3830 South Figueroa Street
City of Los Angeles, California**

References: Leighton and Associates, Inc., 2024, *Revised Limited Geotechnical Exploration, 3801 to 3855 Flower Drive and 3822 to 3830 South Figueroa Street, City of Los Angeles, California*, Project No. 10884.015, dated March 8, 2024, revised June 4, 2024

Per your request, Leighton and Associates, Inc. (Leighton) is pleased to submit our responses to review comments from the Los Angeles Department of Building and Safety (LADBS) in their review letter, dated September 4, 2024, Log No. 131896. Comments are reproduced below in italics followed by responses. A copy of the LADBS review letter is attached as Appendix A.

Comment 1

Provide a design-level geotechnical report including a geotechnical map showing the location of all proposed improvements, and recommendations to support the proposed improvement design.

Response to Comment 1

The purpose of the limited geotechnical investigation was to generally characterize the subsurface conditions and geological hazards to support preparation/analysis of the Environmental Impact Report (EIR) and concept plan development. Design level investigations will be conducted in the future to support the project as it is developed. We have used Sheet 1 of 2 of the *Preliminary Rough Grading Plan*, prepared by David Evans and Associates, dated June 6, 2024, as the base map to present our boring locations and

cross section locations. Figure 2c, *Cross Sections AA and BB* present the general subsurface conditions interpreted from the boring data.

Comment 2

In the event ground improvement is recommended, provide geotechnical design parameters to support the ground improvement design. At a minimum, the report shall include: the allowable bearing pressure, depth to groundwater, unit weight of soil, soil friction angle, elastic modulus, compression/re-compression indexes, OCR. Additionally, a certified ground improvement designer shall provide design calculations, recommendations and testing program of the ground improvement.

Response to Comment 2

Future design level studies to evaluate the need for and/or constructability of ground improvement (GI) will be performed using Cone Penetrometer Test (CPT) soundings. CPT data will be provided to specialty contractors to determine preliminary design, spacing and depth of embedment and other factors related to design, cost, and production.

The design and detailing of the selected ground improvement system is considered proprietary and under the purview of the design engineer retained by the specialty contractor. Ground improvement activities should they be required would be performed in the presence of the geotechnical engineer due to importance of evaluation of the subsurface conditions during installation and verification of proper embedment depth into native material.

Comment 3

In the event on-site infiltration is proposed, provide a plan showing the location of the infiltration system, required setbacks, and provide an evaluation on the following items (please refer to Information Bulletin P/BC 2023-118, which can be downloaded from our website www.ladbs.org):

- a. Potential on creating perched groundwater conditions.*
- b. Presence of potential expansive soils and/or susceptibility for hydroconsolidation.*

- c. *Influence of the proposed infiltration system on adjacent proposed/existing foundations and retaining walls.*

Response to Comment 3

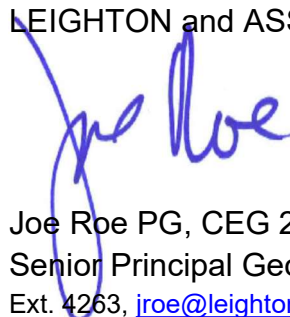
The project is in the early stages of preparation of the Environmental Impact Report and as such infiltration facilities have not been identified. As design progresses, future design level studies will include infiltration testing to determine feasibility in accordance with the County of Los Angeles Department of Public Works (LADPW) *Guidelines for Design, Investigation, and Reporting Low Impact Development Stormwater Infiltration*, dated June 30, 2021, and LADBS Information Bulletin P/BC 2023-118 Guidelines for Storm Water Infiltration

Closing

We appreciate the opportunity to be of continued service to you on this project. If you have any questions or if we can be of further service, please contact us at **+1-949-250-1421**; specifically at the phone extensions or e-mail as listed below.

Respectfully submitted,

LEIGHTON and ASSOCIATES, INC.


Joe Roe PG, CEG 2456
Senior Principal Geologist
Ext. 4263, jroe@leightongroup.com




Carl Kim, GE
Senior Principal Engineer
Ext. 1658, ckim@leightongroup.com



Attachments: Revised Figure 2a – Exploration Location Map
Figure 2b – Proposed Design Exploration Location Map
Figure 2c – Cross Sections AA' and BB'
Appendix A – LADBS Review Comments, dated September 4, 2024

Distribution: (1) Addressee

Revised Figure 2a – Exploration Location Map

Figure 2b – Exploration Location Map

LEGEND

- LB-4

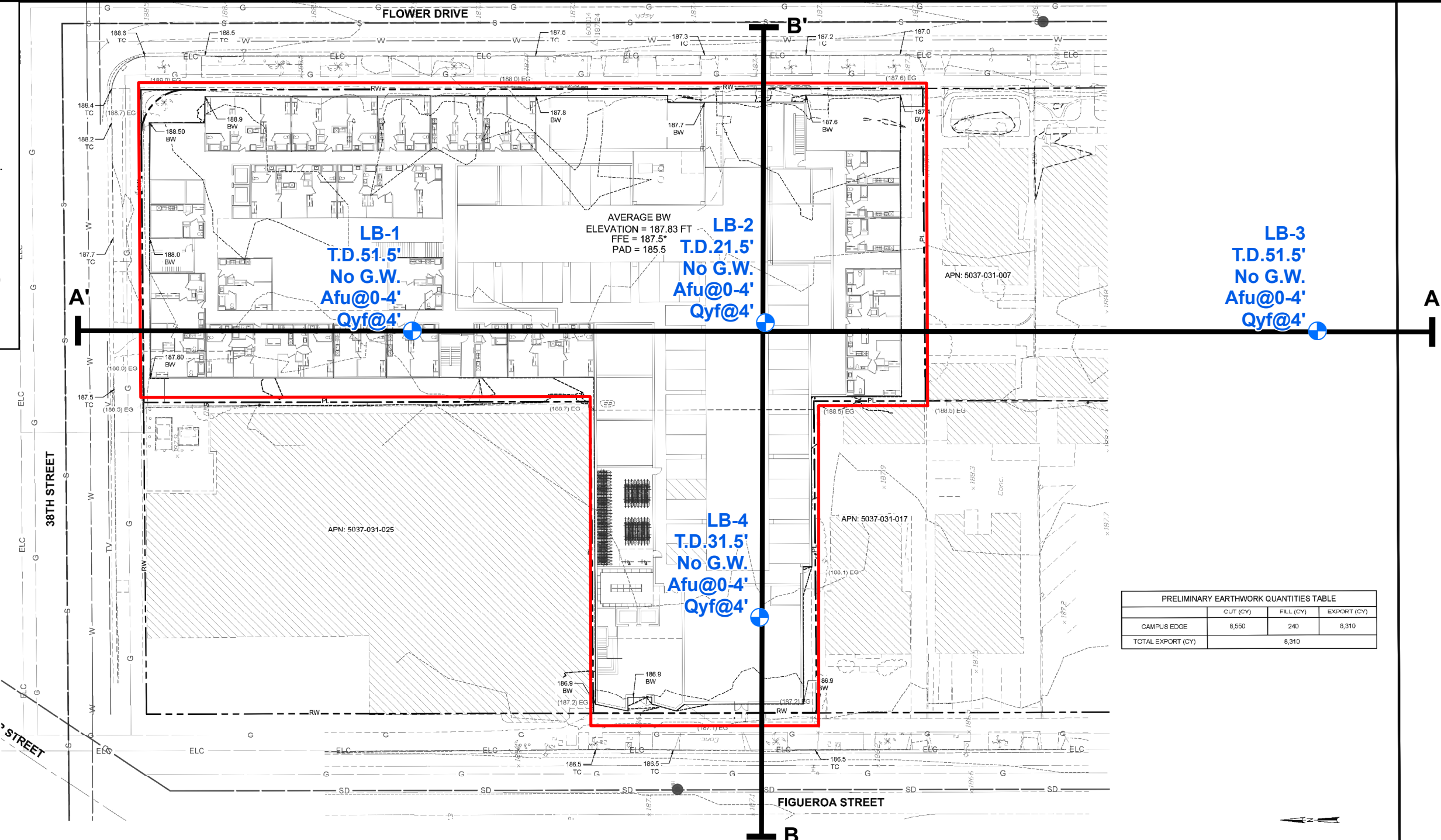
Approximate location of hollow stem auger borings shown with total depth (T.D.) groundwater conditions (G.W.) at time of drilling and depth to earth units in feet below ground surface.
- Afu

Artificial Fill, Undocumented
- Qyf

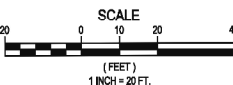
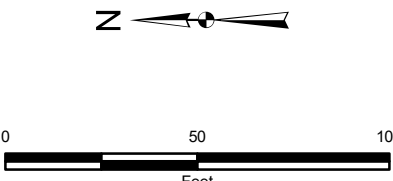
Quaternary Young Fluvial Deposits
- B

B'

Geologic Cross Section (See Figure 2c)
- Approximate Site Boundary



PRELIMINARY EARTHWORK QUANTITIES TABLE			
	CUT (CY)	FILL (CY)	EXPORT (CY)
CAMPUS EDGE	8,550	240	8,310
TOTAL EXPORT (CY)		8,310	



LEGEND:

- RW--- RIGHT OF WAY
- FL--- BACK OF WALK
- BW EXISTING GRADE
- EG FLOW LINE
- FL FLOW LINE
- TC TOP OF CURB

NOTE:

THIS DOCUMENT IS NOT FOR CONSTRUCTION PURPOSES. THIS PLAN IS PRELIMINARY AND SUBJECT TO CHANGE, WHICH MAY ALSO AFFECT INCLUDED EARTHWORK QUANTITIES AS NOTED.

ALL ELEVATIONS ARE BASED ON THE AERIAL SURVEY PERFORMED ON JUNE 22, 2023. NO FOUNDATION DESIGN WAS AVAILABLE AT THE TIME THIS PRELIMINARY GRADING PLAN WAS CREATED.

24" DEPTH TO PAD WAS ASSUMED FOR EXCAVATION ELEVATION DETERMINATION.

DATUM:
HORIZONTAL:
CORS83, ZONE 5, (2010.0
EPOCH), STATION AZU1, VDCY
VERTICAL:
LOS ANGELES BM 18-15112
NAVD88 ELEV. = 181.438 FT

CHECKED BY: AK
DESIGNED BY:
DRAWN BY: RDKC / TJCB / AK

REVIEWED BY:		DATE	
NO	DATE	REVISION	BY
			CK

**DAVID EVANS
AND ASSOCIATES INC.**
201 S. FIGUEROA ST. SUITE 240
LOS ANGELES, CA 90012
PHONE: 213.337.3880

PRELIMINARY ROUGH GRADING PLAN

CAMPUS EDGE
3822 S. FIGUEROA STREET
LOS ANGELES, CA 90037

PROJECT NO.
VEGR00000001

DATE: 06-06-2024

SHEET NO.
1 OF 2

Project: 10884.015 Eng/Geol: CCK/JAR

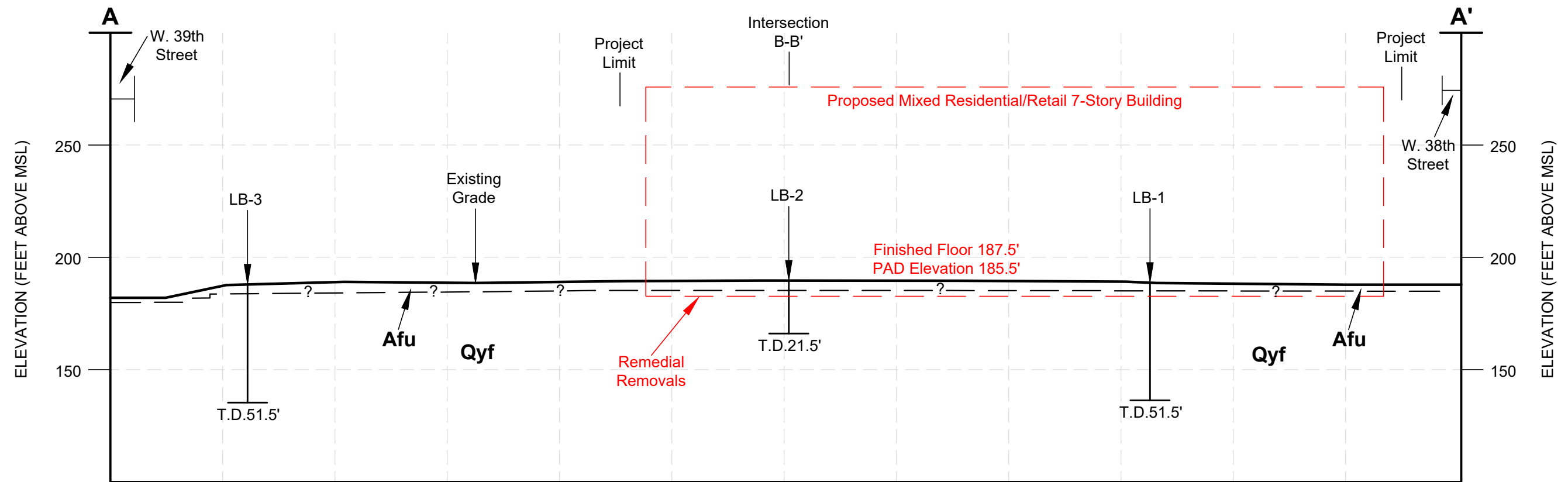
Scale: 1" = 50' Date: September 2024

Service Layer Credits:

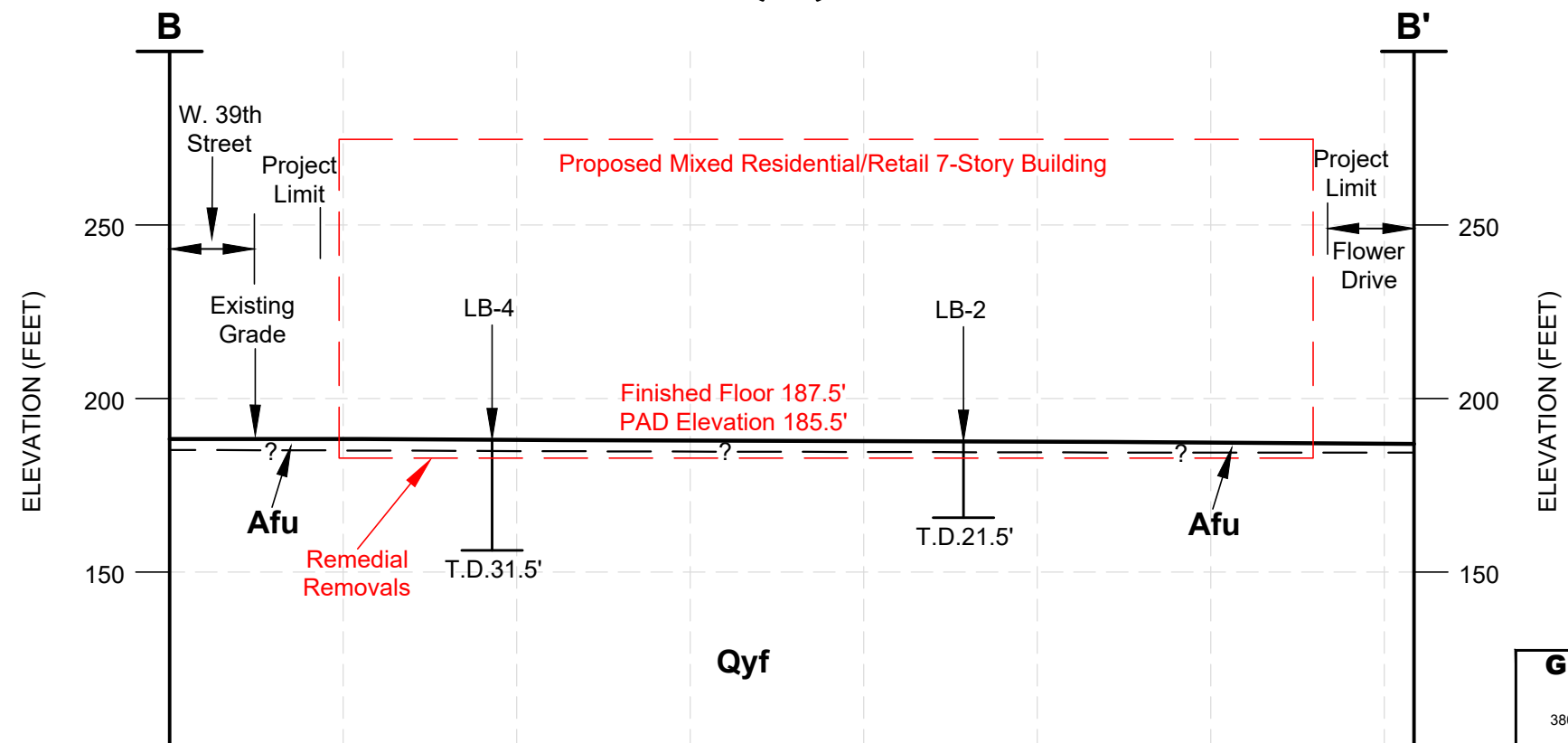
Author: (btran)

EXPLORATION LOCATION MAP
3801 to 3833 Flower Drive and 3822-3838 South Figueroa Street
Los Angeles, California

Figure 2c – Cross Sections AA' and BB'



NS



EW

GEOLOGIC CROSS SECTIONS	
A-A' AND B-B'	
3801 to 3833 Flower Drive and 3822-3838 South Figueroa Street Los Angeles, California	
	
FIGURE 2c	
Scale: 1"=50'	
Date: September 2024	
Proj: 10884.015	
Eng/Geol: CCK/JAR	

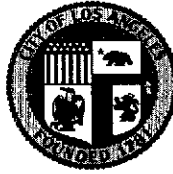
APPENDIX A

LADBS Review Comments, dated September 4, 2024

JACOB STEVENS
PRESIDENT

NANCY YAP
VICE PRESIDENT

CORISSA HERNANDEZ
JAVIER NUNEZ
MOISES ROSALES



KAREN BASS
MAYOR

OSAMA YOUNAN, P.E.
GENERAL MANAGER
SUPERINTENDENT OF BUILDING

JOHN WEIGHT
EXECUTIVE OFFICER

GEOLOGY AND SOILS REPORT REVIEW LETTER

September 4, 2024

LOG # 131896
SOILS/GEOLOGY FILE - 2

Ventus Group, Inc.
2030 Main Street, Suite 440
Irvine, CA 92612

TRACT: ZOBELEIN'S GRAND AVENUE AND FIGUEROA STREET TRACT (MP 9-41)
BLOCK: BLK 14
LOTS: 1-11, 16, 17, 18
LOCATION: 3822 - 3830 S. Figueroa Street, 3801-3855 S. Flower Drive

CURRENT REFERENCE	REPORT	DATE OF	
<u>REPORT/LETTER</u>	<u>No.</u>	<u>DOCUMENT</u>	<u>PREPARED BY</u>
Geology/Soils Report	10884.015	3/8/23 rev. 6/4/24	Leighton

The Grading Division of the Department of Building and Safety has reviewed the referenced report that provides an evaluation of the subsurface conditions and geological hazard.

The project site is currently occupied by 2-story apartment buildings and paved surfaces. The site exploration included four hollow-stem auger borings with a maximum depth of 51.5 feet. The earth materials at the subsurface exploration locations consist of up to 4 feet of uncertified fill underlain by native soils. The consultants recommend to support the proposed structures on conventional and/or mat-type foundations bearing on native undisturbed soils and/or a blanket of properly placed fill. Ground improvement may also be considered.

The site is not located in a designated liquefaction hazard zone nor in a designated seismically induced landslide hazard zone, as shown on the Seismic Hazard Zones map issued by the State of California.

The project is not located within a Fault Zone identified by the State of California Alquist-Priolo Act.

The review of the subject report cannot be completed at this time and will be continued upon submittal of an addendum to the report, which shall include, but not be limited to, the following:

(Note: Numbers in parenthesis () refer to applicable sections of the 2023 City of LA Building Code. P/BC numbers refer to the applicable Information Bulletin. Information Bulletins can be accessed on the internet at LADBS.ORG.)

1. Provide a design-level geotechnical report including a geotechnical map showing the location of all proposed improvements, and recommendations to support the proposed improvements design.
2. In the event ground improvement is recommended, provide geotechnical design parameters to support the ground improvement design. As a minimum, the report shall include: the allowable bearing pressure, depth to groundwater, unit weight of soil, soil friction angle, elastic modulus, compression/re-compression indexes, OCR. Additionally, a certified ground improvement designer shall provide design calculations, recommendations and testing program of the ground improvement.
3. In the even on-site infiltration is proposed, provide a plan showing the location of the infiltration system, required setbacks and provide an evaluation on the following items (please refer to Information Bulletin P/BC 2023-118, which can be downloaded from our web site www.ladbs.org):
 - a. Potential on creating perched ground water conditions.
 - b. Presence of potential expansive soils and/or susceptibility for hydroconsolidation.
 - c. Influence of the proposed infiltration system on adjacent proposed/existing foundations and retaining walls.

The consultants shall prepare a report containing an itemized response to the review items indicated in this letter. If clarification concerning the review letter is necessary, the report review engineer may be contacted. Two copies of the response report, including one unbound wet-signed original for archiving purposes, a pdf-copy of the complete report in flash drive, and the appropriate fees will be required for submittal.


CASEY LEE JENSEN
Engineering Geologist Associate III


DAN L. STOICA
Geotechnical Engineer I

CLJ/DLS:clj/dls
Log No. 131896
213-482-0480

cc: Leighton, Project Consultant
LA District Office

APPLICATION FOR REVIEW OF TECHNICAL REPORTS

INSTRUCTIONS

- A. Address all communications to the Grading Division, LADBS, 221 N. Figueroa St., 12th Fl., Los Angeles, CA 90012
Telephone No. (213)482-0480.
- B. Submit two copies (three for subdivisions) of reports, one "pdf" copy of the report on a CD-Rom or flash drive,
and one copy of application with items "1" through "10" completed.
- C. Check should be made to the City of Los Angeles.

1. LEGAL DESCRIPTION

Tract: Zobelein's Grand Avenue and Figueroa Street

Block: 14 Lots: 1-11 and 16-18

3. OWNER: Ventus Group, Inc.

Address: 2030 Main St, Ste 440

City: Irvine, CA Zip: 92612

Phone (Daytime): 949-501-0343

2. PROJECT ADDRESS:

3801 to 3855 Flower Dr. and 3822 to 3830 S Figueroa St.

4. APPLICANT Ventus Group, Inc.

Address: 2030 Main St, Ste 440

City: Irvine, CA Zip: 92612

Phone (Daytime): 949-501-0343

E-mail address: kduccini@verdantas.com

5. Report(s) Prepared by:

Leighton and Associates

6. Report Date(s):

06/04/2024

7. Status of project: ☒ Proposed ☐ Under Construction ☐ Storm Damage
8. Previous site reports? ☒ YES if yes, give date(s) of report(s) and name of company who prepared report(s)
March 8, 2023, revised June 4, 2024 (Leighton and Associates)

9. Previous Department actions? ☐ YES if yes, provide dates and attach a copy to expedite processing.

Dates: -

10. Applicant Signature: [Signature] Brynn Rodriguez 8/12/24

Position: Project Geologist, Geo Consultant for Owner

(DEPARTMENT USE ONLY)

REVIEW REQUESTED	FEES	REVIEW REQUESTED	FEES
☐ Soils Engineering		No. of Lots	
☐ Geology		No. of Acres	<u>14</u>
☒ Combined Soils Engr. & Geol.	<u>726-</u>	☐ Division of Land	
☐ Supplemental		Other	
☐ Combined Supplemental		☒ Expedite	<u>363-</u>
☐ Import-Export Route		☐ Response to Correction	
Cubic Yards:		☐ Expedite ONLY	
		Sub-total	<u>1219.00</u>
		Surcharge	<u>356.48</u>
		TOTAL FEE	<u>1575.48</u>

Fee Due: 1575.48
Fee Verified By: [Signature] Date: 8/13/24
(Cashier Use Only)

Receipt # 1902109

ACTION BY:

THE REPORT IS: ☐ NOT APPROVED

☐ APPROVED WITH CONDITIONS

☐ BELOW

☐ ATTACHED

For Geology

Date

For Soils

Date



**REVISED LIMITED GEOTECHNICAL EXPLORATION
3801 TO 3855 FLOWER DRIVE AND
3822 TO 3830 SOUTH FIGUEROA STREET
CITY OF LOS ANGELES, CALIFORNIA**

Prepared For **VENTUS GROUP, INC.**
2030 MAIN STREET, SUITE 440
IRVINE, CALIFORNIA 92614

Prepared By **LEIGHTON AND ASSOCIATES, INC.**
2600 MICHELSON DRIVE, SUITE 400
IRVINE, CALIFORNIA 92612

Project Number 10884.015

March 8, 2023

Revised June 4, 2024



Leighton and Associates, Inc.

March 8, 2023

(Revised June 4, 2023)

Project No. 10884.015

Ventus Group, Inc.
2030 Main Street, Suite 440
Irvine, California 92614

Attention: Mr. Mike O'Melveny, VP - Acquisition and Development

**Subject: Revised Limited Geotechnical Exploration
3801 to 3855 Flower Drive and 3822 to 3830 South Figueroa Street
City of Los Angeles, California**

Per your request and authorization, Leighton and Associates, Inc. (Leighton) is presenting this limited geotechnical exploration report for the subject project. The area is currently occupied by two-story residential apartment buildings and paved surfaces consisting of narrow (6-foot-wide) concrete driveways and parking areas separated by chain link and wrought iron fencing. We understand there are currently no conceptual development plans for this block and the purpose of the limited geotechnical investigation is to characterize the subsurface conditions and geological hazards to aid in future development plans for the site.

Based on the results of our exploration, development is feasible at the project site from a geotechnical standpoint. The results of this limited geotechnical exploration report are to provide you with geotechnical information for planning, budgeting, and cost analysis that you can rely on during planning and conceptual design. The most significant potential geotechnical hazards affecting the project site are strong seismic shaking and loose sandy soils in the near surface susceptible to static and seismic settlements. Geotechnical recommendations presented in this report are intended to provide sufficient geotechnical information to reduce these potential geotechnical hazards to less than a significant level. Additional exploration and/or seismic settlement analyses will be required to develop design-level recommendations once a concept plan is prepared and finalized.

We appreciate the opportunity to continue providing our services for this interesting project. If you have any questions, please contact us at your convenience. The undersigned can be reached at (866) LEIGHTON, specifically at the phone extensions and e-mail addresses listed below.



Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

Joe Roe, PG, CEG 2456
Senior Principal Geologist
jroe@leightongroup.com Ext. 4263



Carl Kim, PE, GE 2620
Senior Principal Engineer
ckim@leightongroup.com Ext. 4262

JAR/CCK/ECB/KMD/lr

Distribution: (1) Addressee

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ATTACHMENTS

Figure 1 - Site Location Map
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 Figure 3 – Regional Geologic Map
 Figure 4 – Regional Fault and Seismicity Map
 Figure 5 – Seismic Hazard Map
 Figure 6 – Flood Hazard Map

Appendix A – Boring Logs (Current Exploration)

Appendix B – Boring and CPT Logs (Exposition Point Explorations)

Appendix C – Laboratory Test Results

Appendix D – GBA's Important Information About Your Geotechnical Report

1.0 INTRODUCTION

1.1 Site Location and Topography

The project site is located in an urbanized area of Los Angeles, at 3801 through 3855 Flower Drive and 3822 to 3830 South Figueroa Street. The site is bounded by existing commercial/retail buildings and 38th Street to north, South Flower Drive to the east, commercial/retail buildings and Figueroa Street to the west, and 39th Street to the south (latitude +34.0148°, longitude -118.2819°). See Figure 1, *Site Location Map*, for approximate site boundaries.

The project site is irregular in shape and is currently occupied by two-story residential apartment buildings and paved surfaces consisting of narrow (6-foot-wide) concrete driveways and parking areas separated by chain link and wrought iron fencing. A 5-foot-tall masonry block wall is located at the southwest portion of the site fronting 39th Street. The individual residential areas are accessed via narrow concrete driveways fronting Flower Drive and Figueroa Street.

Review of the United States Geological Survey (USGS) “Hollywood, California” Quadrangle map (USGS, 1981) indicates the site is in Section 7, Township 2 South, Range 13 West of the San Bernardino Baseline and Meridian. Topographic map coverage of the subject site and vicinity indicates the ground surface at the site is relatively flat ranging from Elevation (El.) +180 to +185 feet mean sea level (msl). Drainage is accomplished as sheetflow over paved surfaces to curbs and gutters along adjacent streets.

1.2 Purpose and Scope of Work

The purpose of this limited geotechnical report was to evaluate the subsurface conditions to identify adverse geologic and seismic conditions at the site that could significantly impact development on the site. Our scope of work for this study consisted of the following:

- Reviewed available published reports and geologic maps. The literature search also included review and analysis of aerial photographs from flights between 1927 and 2020 obtained from our in-house library and outside sources. The references reviewed are listed in Section 6.0, *References*.
- Advanced four (4) hollow-stem auger borings. LB-1 through LB-4 were drilled, logged, and sampled to depths of approximately 20.9 to 51.5 feet below the

existing ground surface (bgs). Locations of borings are shown on Figure 2, *Exploration Location Map*. Boring logs from the current exploration are provided in Appendix A, *Boring Logs (Current Exploration)*.

- Performed geotechnical laboratory testing of representative samples of the on-site soils to determine their physical and engineering characteristics. The test results are presented in Appendix C, *Laboratory Test Results*.
- Reviewed previously collected field data on adjacent properties for Ventus Group (Leighton, 2023, 2022a, b, c) and correlated with newly collected field and laboratory data. Pertinent exploration logs from prior studies are included in Appendix B, *Boring and CPT Logs (Exposition Point Explorations)*.
- Performed analysis of collected data to determine the potential for geotechnical or geologic hazards that may affect the development site. Preparation of this report documenting our geotechnical findings and conclusions. The report addresses the following:
 - Site Conditions: Review and summarize surface, subsurface and groundwater conditions, and engineering properties of soils encountered during our geotechnical exploration and prior work on the adjacent parcels (Leighton, 2023, 2022).
 - Geologic Hazards: Discuss potential geologic hazards at the site, including the potential for surface fault rupture, liquefaction and ground shaking to determine the level of impact on the project site.
 - Seismicity: Provide seismic coefficients in accordance with the 2023 Los Angeles Building Code (LABC).
 - Corrosivity: Characterize corrosion potential of metal or concrete in contact with onsite soils and identify if special design and measures are required.

1.3 **Aerial Review and Previous Site Uses**

Review of aerial photos (NETR, 2023 and UCSB, 2019) spanning the time period from 1927 to 2020, and parcel details obtained from Los Angeles County Assessor Portal, indicate development of the site with 13 two-story detached residential units occurred between 1921 and 1927 with the surrounding neighborhoods occupied by high-density residential units. There do not appear to have been significant changes to the buildings or lots on which they were constructed between the time of original construction and present day. Construction of State Route 110 (Harbor

Freeway), located adjacent to South Flower Drive along the eastern boundary of the site, occurred from 1954 through 1964.

Review of regional geologic maps and historical topographic maps spanning the time period from 1896 to 1995 did not reveal any geologic features of significance that could potentially impact the proposed development.

1.4 Current Exploration

Our subsurface exploration was performed on January 19, 2023 and included four (4) hollow-stem auger borings (designated LB-1 through LB-4). Borings were drilled, logged, and sampled to depths of approximately 20.9 to 51.5 feet bgs. The approximate locations of the explorations are shown on Figure 2. The boring logs from the current exploration and adjacent explorations are presented in Appendix A and Appendix B, respectively.

During drilling of the borings, bulk and drive samples were obtained for geotechnical laboratory testing. Driven ring samples were collected from the borings using a Modified California ring-lined sampler conducted in accordance with ASTM Test Method D 3550. Standard Penetration Tests (SPTs) were also performed within the borings in accordance with ASTM Test Method D 1586. Samples were collected at 2.5 and 5-foot intervals throughout the depth of exploration. In both test methods, the sampler is driven below the bottom of the borehole by a 140-pound weight (hammer) free-falling 30 inches. The drilling rig was equipped with an automatic hammer to provide greater consistency in the drop height and striking frequency. The number of blows to drive the sampler the final 12 inches of the 18-inch drive interval is termed the “blowcount” or SPT N-value. The N-values provide a measure of relative density in granular (non-cohesive) soils and comparative consistency in cohesive soils. The number of blows per 6 inches of penetration was recorded on the boring logs, see Appendix A.

1.5 Shear Wave Velocity

Shear wave velocities were profiled in CPT-1C and CPT-1D during exploration for the adjacent Exposition Point development across 39th Street to the south (Leighton, 2023). Shear wave velocities were profiled at 3-foot intervals to a depth of 35 feet bgs to estimate average S-wave velocities (V_{s100}) and 30 meters (V_{s30}). The shear wave velocity report is included in Appendix B. Based on collected velocities the soils at this site are classified as Seismic Site Class D.

2.0 GEOTECHNICAL FINDINGS

2.1 Regional Geologic Setting

The project site is located in the Los Angeles Basin in the northwestern portion of the Peninsular Ranges Geomorphic Province of Southern California. The Peninsular Ranges province extends approximately 900 miles southward from the Santa Monica Mountains to the tip of Baja California (Yerkes, et al., 1965) and is characterized by elongated, northwest-trending mountain ridges and sediment-floored valleys. The province includes numerous northwest-trending fault zones, most of which either gradually truncate, merge with, or are terminated by faults that form the southern margin of the Transverse Ranges province. These northwest-trending fault zones include the San Jacinto, Whittier-Elsinore, Palos Verdes, and Newport-Inglewood fault zones.

Approximately 65 million years ago (at the end of the Cretaceous Period), a deep structural trough existed off the current coast of southern California (Yerkes, 1972). Over time, sedimentation filled the trough with hundreds to thousands of feet of sediment. About 7 million years ago, as sedimentation continued, an eastward shift of the boundary between the Pacific and North American plates to its present position would begin shaping the Los Angeles basin from this deep trough.

The Los Angeles basin is currently referenced as the area defined by the Santa Monica, Whittier, and Palos Verdes faults; and the San Joaquin Hills. Basin depth is limited to the sediments deposited over the basement rock in the last 7 million years (Wright, 1991). The deepest part of the Los Angeles basin contains Tertiary to Quaternary-aged (65 million years and younger) marine and non-marine sedimentary rocks that are about 24,000 feet thick (Yerkes, et al, 1965; Wright, 1991). During the Pleistocene epoch (the last two million years), the region was flooded as sea level rose in response to the worldwide melting of the Pleistocene glaciers.

Specifically, the site is located 3.4 miles west of the concrete channelized Los Angeles River. The site is underlain by quaternary young alluvium consisting of sand, gravel, and silt laid down by the ancestral Los Angeles River. See Figure 3, *Regional Geology Map*, for the distribution of earth units with in the general area.

2.2 Earth Units

In general, alluvial materials were generated from mass wasting of the uplifted Santa Monica and San Gabriel Mountains located north-northwesterly of the project site. As observed during our subsurface explorations at the project site and nearby locations (Leighton, 2023, 2022), these materials are interbedded and interfingering strata containing lenses to massive deposits of silty sands and sands. Minor interbedded gravelly sands are also present. As erosion and transport of sediment occurred within the Santa Monica and San Gabriel Mountains, these materials were deposited in a generally south-southwesterly direction during regional flooding events along the ancestral path of Los Angeles River.

2.2.1 Artificial Fill, Undocumented (Afu)

Undocumented artificial fill was encountered at each of the boring locations (Figure 2). In general, the fill material thickness was approximately 4 feet at the explored locations. Deeper isolated pockets of fill or remnants of past construction (i.e., foundation elements, basements, underground utilities, etc.) may be encountered during grading of the site. Undocumented fill in its current state is unsuitable for support of new structures and should be removed, reconditioned, and replaced as engineered fill as described later in this report. The majority of the undocumented artificial fill consisting of sand, silty sand, sandy silt, and sandy silty clay should be suitable for use as engineered fill provided any oversized and deleterious or hazardous materials are removed.

2.2.2 Quaternary Young Fluvial Deposits (Qyf)

Geological mapping of the area (Dibblee, 1991) indicates near-surface native soils at the project site laid down by the ancestral course of the Los Angeles River consist chiefly of Holocene age (<11,700 years) fluvial soils forming a mantle over well indurated Pleistocene-age (11,700 years to 1.8 million years old) nonmarine alluvium at depth ranging from 25 to 30 feet below the current ground surface (Appendix A). Samples recovered from the hollow stem auger borings during our explorations are characterized primarily as light-yellow brown to tannish gray, loose to very dense, unconsolidated, fine to coarse grained sand, sand with gravel, and silty sand.

2.2.3 Quaternary Age Old Alluvium (Qoa)

Pleistocene-age (11,700 years to 1.8 million years old) nonmarine alluvium was encountered at depths generally below 25 to 30 feet. This material is characterized primarily as dense to very dense, interbedded to massive, yellowish brown to light brown sand, gravel, and cobbles. Interbedded and moderately well oxidized, mottled dark reddish brown silt and clay was encountered generally at 40 to 45 feet bgs and deeper.

For detailed descriptions of the earth materials encountered onsite during the subsurface explorations, please see the boring logs presented in Appendix A. For an overview of geologic units see Figure 3.

2.3 Groundwater

Groundwater was not encountered during our explorations to maximum depth explored of 51.5 feet bgs. Review of the Seismic Hazard Zone Report for the Hollywood Quadrangle (CGS, 1998) indicates the historically high groundwater level in the area is deeper than 50 feet bgs. In addition, based on review of available groundwater information from the California Department of Water Resources (DWR, 2023) for a nearby groundwater monitoring well located approximately 1.45 miles west of the project site (State Well Number 02S14W12E004S), the shallowest groundwater level measured for a monitoring period between September 2010 and December 2023 was approximately 155 feet bgs in March 2020.

Groundwater is not expected to pose a constraint to construction of the project as currently planned. Because the anticipated depths of excavation for the project are less than both historic high groundwater levels and explored depths for this exploration, the potential impact of encountering groundwater during construction is considered less than significant.

2.4 Infiltration Potential

In-situ percolation testing was performed for the proposed Exposition Point development, located to the south of the subject site across 39th Street. In 2017, monitoring wells LP-1 and LP-2 (Leighton, 2022) and monitoring wells 2022-LP-1 through 2022-LP-3 (Leighton, 2023) were installed for testing. Testing was performed in general conformance with the County of Los Angeles Department of Public Works (LADPW) *Guidelines for Design, Investigation, and Reporting Low*

Impact Development Stormwater Infiltration (LADPW, 2017 and LADPW, 2021). Locations of percolation test borings, infiltration data, and discussion of results can be located in Leighton (2023).

Each boring was converted to temporary percolation test wells upon completion of drilling and sampling. A 2-inch-diameter perforated PVC pipe was placed in each borehole within the zone to be tested (see Table 1 below) and solid PVC pipe was placed above the perforated section. The annulus of the boreholes was filled with clean sand (#3 Monterey Sand) to at least 1-foot above the screen zone. The percolation test well was pre-soaked prior to the testing in an attempt to model the behavior of the stormwater quality control measure during a design storm event.

Falling Head Test Method: The falling head procedure was conducted on LP-1 and LP-2 in 2017, which records the drop of water levels inside the well over the testing period (10-minute intervals). The volume of discharge was calculated by adding the total volume of water that dropped within the PVC pipe and within the annulus, and incorporating a porosity reduction factor to account for the porosity of the annulus material. The infiltration surface area was calculated based on the average water height within the test well. The infiltration rate was calculated by dividing the rate of discharge (cubic inches per hour) by the infiltration surface area, or flow area (square inches).

Constant Head Testing Method: Tests for wells 2022-LP-1 through 2022-LP-3 (Leighton, 2023) were performed using a constant-head method, which records the approximate volume of water delivered to the test zone while maintaining a relatively constant height of water in the well over the testing period. A water source (800 gallon water truck) was used to deliver water to each well at a constant rate while recording the water height in the well. The measured infiltration rate for each supplemental percolation test was calculated by dividing the total volume of water infiltrated by the total duration of the test and dividing by the percolation surface area. The results of the infiltration testing are shown in the table below.

Measured Infiltration Rate

Percolation Test Boring/Well Designation	Approximate Depth of Test Zone Below Ground Surface (feet)	Unfactored Infiltration Rate (inches per hour)
LP-1	60 to 70	1.9
LP-2	50 to 60	2.9
2022 LP-1	20 to 40	7.7
2022 LP-2	40 to 60	12.5
2022 LP-3	30 to 50	41.5

Note: The invert of any stormwater infiltration shall be set back at least 15 feet and outside a 1:1 plane drawn down and out from the bottom of adjacent foundations.

The results of the supplemental percolation tests (2022-LP-1 through 2022-LP-3) indicate favorable infiltration rates for sandy soils at the specific locations and depths tested as noted above. Based on the requirements of LADPW (2021), infiltration is **feasible** at the locations and **depths** evaluated (see Leighton, 2023).

Additional infiltration testing will need to be performed for any new facilities at the planned location and invert depth.

2.5 **Soil Expansion Potential**

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and shrink with the loss of water. Foundations and structures constructed on these soils can be subjected to uplifting forces caused by the swelling, potentially resulting in heaving and cracking of both building foundations and slabs-on-grade. However, implementation of standard engineering and earthwork construction practices, such as proper foundation design and proper moisture conditioning of earthen fills will reduce the impacts associated with expansive soils.

Expansion index testing of the near-surface soil, characterized as silty sand, indicates an Expansion Index of EI=2, which is considered very low expansion potential. The laboratory test result is presented in Appendix C, *Laboratory Test Results*. Therefore, potential impacts due to expansive soils are considered to be less than significant for the project site.

2.6 Soil Corrosion Potential

In general, soil environments that are detrimental to concrete have high concentrations of soluble sulfates and/or pH values of less than 5.5. Soils with chloride content greater than 500 ppm per California Test 532 are considered corrosive to steel, either in the form of reinforcement protected by concrete cover or plain steel substructures, such as steel pipes. Additionally, soil with a minimum resistivity between 1,000 and 2,000 ohm-cm is considered severely corrosive to ferrous metal.

We performed corrosivity testing of a sample of the near-surface soil characterized as sandy silty clay. The results indicate the near-surface soil has “negligible” effects of sulfate attack on concrete, chloride content of less than 500 ppm, and pH greater than 5.5. Additionally, test results indicate a minimum resistivity of 3,900 ohm-cm, which characterizes the soil as moderately corrosive to ferrous metal. Laboratory test results are presented in Appendix C.

General recommendations for ferrous corrosion protection are provided in Section 3.6 of this report, and include use of non-ferrous pipe or protective measures to separate ferrous pipes from on-site soils. Through implementation of these recommendations, potential impacts relating to corrosive soils would be less than significant.

2.7 Excavation Characteristics

Based on our subsurface exploration and experience from grading jobs in the vicinity of the site, we anticipate that soils at the site will be readily rippable. Based on our field observations, caving of cohesionless strata and loose fill soil will likely be encountered in unshored excavations. To protect workers entering excavations, excavations should be performed in accordance with OSHA and Cal-OSHA requirements, and the current edition of the California Construction Safety Orders, see: <http://www.dir.ca.gov/title8/sb4a6.html>

Contractors should be advised that fill soil should be considered Type C soil as defined in the California Construction Safety Orders. As indicated in Table B-1 of Article 6, Section 1541.1, Appendix B, of the California Construction Safety Orders, excavations less-than (<) 20 feet deep within Type C soil should be sloped back no steeper than 1½:1 (horizontal:vertical), where workers are to enter the excavation. This may be impractical near adjacent existing utilities and structures; so shoring may be required depending on trench locations. Loose, non-cohesive

sand and sandy gravel channels below the site should be expected to ravel and cave in unshored excavations.

During construction, soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor is responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and Leighton and Associates, Inc. should be maintained to facilitate construction while providing safe excavations.

2.8 **Geologic and Seismic Hazards**

Geologic and seismic hazards include surface faulting, seismic shaking, landslides, liquefaction, seismically induced settlement, lateral spreading, seismically induced landslides, seiches and tsunamis, subsidence, methane, and flooding. The following sections discuss these hazards and their potential impact at the project site.

2.8.1 **Faults**

A map showing the active and older faults mapped near the site is included herein as Figure 4, *Regional Faults and Historical Seismicity Map*. Details specific to these faults is provided below:

Puente Hills Blind-Thrust Fault: Movement on the Puente Hills Blind-Thrust Fault (PHT) caused the 1987 magnitude 6.0 Whittier Narrows earthquake. The hypocenter of the 1987 event was at depth of approximately 13 km (8 miles) below the San Gabriel Valley. From the hypocentral region the fault shallows southward towards the surface. The PHT has a subsurface extent of 44 km (27 miles), from west of downtown Los Angeles to near Brea, California. This fault does not reach the surface but instead a fold is formed above the fault and is expressed as a fold-scarp at or just below the surface (Shaw *et al.*, 1996 and 2002, Christofferson *et al.*, 2002). To the north of the 1987 hypocenter the fault flattens and continues beneath the San Gabriel mountains and merges with the Sierra Madre-Cucamonga fault system. Buried fold scarps along the Santa Fe Springs segment reveal evidence for 4 major earthquakes ($M_w > 7.0$) generated by the PHT in the past 11,000 years (Dolan *et al.*, 2003). Late Quaternary slip rates range from 0.3 – 1.1 mm/yr; however, minimum Holocene slip rates range from 1.1 to 1.6 mm/yr (Dolan *et al.*, 2003; Frankel *et al.*, 2002). The estimated maximum

earthquake on this fault is Mw 7.1. The PHT is considered a Class B fault (Frankel et al., 2002). The closest segment of PHT is located approximately 0.69 miles (1.1 km) southwest of the site.

Hollywood Fault: The Hollywood Fault begins near the Los Angeles River and eastern edge of the Santa Monica Mountains and extends westward for approximately 9½ miles before shifting its locus of active deformation to the area of the West Beverly Hills Lineament (WBHL), where faulting takes a left step to the Santa Monica Fault. The Hollywood Fault is capable of producing a Mw 6.4 to 6.6 earthquake (Dolan et al., 1997). Investigators have estimated the lateral slip rate to be about 1.0 ± 0.5 mm/year, with a vertical slip rate to be 0.25 mm/year (Dolan et al., 1997). Conversely, a lower slip rate of 0.04-0.4 mm/year (Ziony and Yerkes, 1985) leads to a long return period. Recent detailed geologic and geotechnical studies have provided cumulative physical evidence for Holocene displacements resulting in an Alquist-Priolo Special Study Zone being established for the Hollywood Fault (CGS, 2014). Exposures identified in prior explorations (Crook and Proctor, 1992), coupled with bulk-soil radiocarbon ages provide scant evidence for an early to mid-Holocene age for the most recent surface rupture approximately 6,000 years to 11,000 years ago; suggesting a long period of quiescence between surface rupturing on the Hollywood Fault (Dolan, 1997, 2000) (Ziony and Yerkes, 1985). The closest segment of the Hollywood Fault is located approximately 6.8 miles (10.9 km) north of the site.

Newport Inglewood Fault Zone: The Newport Inglewood Fault Zone (NIFZ) is an active northwest-trending, approximately 2- to 4-mile wide belt of anticlinal folds and faults disrupting early Holocene to Late Pleistocene-age and older deposits (Barrows, 1974). The NIFZ is characterized by trends related to right-lateral shearing at depth (Moody and Hill, 1956). The zone defines the boundary between the western basement complex of Catalina type schist and related rocks to the southwest, and the eastern basement complex of metasedimentary, metavolcanic and plutonic rocks to the northeast (Yerkes, et al., 1965). Right-lateral, strike-slip displacement of 3,000 to 5,000 feet has been measured in Lower Pliocene strata along the NIFZ (Dudley, 1954; Hill, 1954; Poland, et al., 1959). Apparent vertical offset across faults of the NIFZ ranges from 4,000 feet at the basement interface, to 1,000 feet in the Pliocene strata, and 200 feet at the Plio-Pleistocene boundary (Yerkes, et al., 1965). Movement along this structural

zone is inferred to have been initiated during middle Miocene time (circa 15 million years ago), with seismic activity continuing to the present time. There is abundant seismic evidence that the zone is tectonically active; thus, the surrounding metropolitan area is subject to certain seismic risks. At least five earthquakes of magnitude 4.9 or larger have been associated with the NIFZ since 1920 (Barrows, 1974). Estimated maximum deterministic magnitude earthquake is generally modeled between Magnitude (M_0) 6.5 and 7.2. The closest segment of the NIFZ is located approximately 4.5 miles (7.2 km) west of the site.

2.8.2 Historical Seismicity

Documentation of only the strongest earthquakes in southern California from the past 200 years is available. Early descriptions of earthquakes were rarely specific enough to allow an association with any particular fault zone. It is also not possible to precisely locate epicenters of earthquakes that have occurred prior to the Twentieth Century. A search of historical earthquakes was performed using EQSearch (Blake, 2000) for the 220 year time period between 1800 and 2020. Within that time frame, 489 earthquakes greater than or equal to an M_w of 4 were found within a 100-kilometer (62-mile) radius of the site. See Figure 4, *Regional Fault and Seismicity Map*.

Of these closest earthquakes, the magnitude 5.3 M_w earthquake was located 1.4 miles (2.3 km) southwest of the site and occurred on September 3, 1905. Although not precisely located, its epicenter (N34.0000° latitude, W-118.0000° longitude) is approximately located within the seismically active Newport-Inglewood fault zone located westerly to the site.

2.8.3 Surface Fault Rupture

In general, the primary seismic hazards for sites in Southern California include surface fault rupture and strong ground shaking. The site may experience strong ground shaking after redevelopment of the site resulting from an earthquake occurring along several major active or potentially active faults in southern California. The potential for surface fault rupture and seismic shaking are discussed below.

Our review of available in-house literature indicates that no known active faults have been mapped across the site, and the site is not located within an Alquist-Priolo Earthquake Fault Zone (Hart and Bryant, 2007). The locations

of the closest active surface faults to the site were generated using the United States Geological Survey Earthquake Hazards Program (USGS, 2008b), and are described in more detail above. The closest fault to the site is the Puente Hills Blind Thrust located in the subsurface of the Los Angeles Basin approximately 0.69 miles (1.1 km) southwest of the site. The closest major active faults near the site with surface expression include the Newport-Inglewood fault zone and Hollywood faults, which are located approximately 4.5 miles (7.2 km) and 6.8 miles (10.9 km) to the southwest and north of the site, respectively. Considering the locations of these mapped faults relative to the site, the potential impact of surface fault rupture occurrence at the site is considered to be low. Therefore, the impact of fault rupture is less than significant.

2.8.4 Seismic Shaking

The site may experience strong ground shaking after the site is redeveloped resulting from an earthquake occurring along one or more of the major active or potentially active faults identified above. Accordingly, any new structures at the site should be designed in accordance with all applicable current codes (LABC, 2023) and standards utilizing the appropriate seismic design parameters presented in Section 3.3 of this report to reduce seismic risk as defined by California Geological Survey (CGS) Chapter 2 of Special Publication 117a (CGS, 2008). Through compliance with these regulatory requirements and the utilization of appropriate seismic design parameters selected by the design professionals, potential impacts relating to seismic shaking can be reduced to less than significant.

2.9 Secondary Seismic Hazards

In general, secondary seismic hazards for sites in the region could include soil liquefaction, earthquake-induced settlement, lateral displacement, landsliding, seiches, and tsunamis. The potential for secondary seismic hazards at the subject site is discussed below.

2.9.1 Liquefaction

Liquefaction is the loss of soil strength or stiffness due to a buildup of excess pore-water pressure during strong ground shaking. Liquefaction is associated primarily with low density, granular, saturated soil. Effects of

severe liquefaction can include sand boils, excessive settlement, bearing capacity failures, and lateral spreading.

The site is not mapped within an area prone to liquefaction as shown on the State of California Seismic Hazard Zones Map for the Hollywood Quadrangle (CGS, 1999), see Figure 5, *Seismic Hazard Map* as overlain in green. The site is also not mapped as an area susceptible to liquefaction by the City of Los Angeles General Plan's Safety Element Exhibit B (City of Los Angeles, 1996).

Our explorations advanced to a maximum depth of 51.5 feet below ground surface did not encounter groundwater, nor did explorations at a site approximately 100 feet to the south, drilled to a depth of 101.5 feet bgs. Based on these considerations and soil correlations, the potential for liquefaction occurring at the site is considered low.

As a part of geotechnical exploration for the proposed Exposition Point development (Leighton, 2023), we have evaluated the liquefaction potential at that site using the data obtained from the CPT soundings with the computer program Cliq (v.3.0.3.4). Based on our evaluation using the Maximum Considered Earthquake (MCE) and a design groundwater level of 80 feet bgs (Amin Adini, 1993) for the CPTs performed at that site, potential for liquefaction to occur at the site is low, with generally little to no expression of liquefaction at the surface.

2.9.2 Seismically Induced Settlement

Seismically induced settlement generally consists predominantly of liquefaction-induced settlement (below groundwater) and to a lesser extent dynamic compaction of unsaturated, granular soil (above groundwater). These settlements occur primarily within low-density sandy soil due to reduction in volume during and shortly after an earthquake event. Based on the depth to groundwater at the site, the potential for liquefaction is considered to be low; therefore, the potential for seismically induced settlement due to liquefaction is also considered low.

The seismic settlement of soil above the historic high groundwater level due to $\frac{2}{3}$ of PGA_M with a modal magnitude of 6.35 was evaluated for the proposed Expo Point development using the CPT data obtained during the subsurface exploration (Leighton, 2023). Seismic settlement is expected to

be on the order of ¼ inch or less. The estimated seismic differential settlement is less than ¼ inch over a span of 40 feet. Accordingly, the potential impacts relating to seismically induced settlement is less than significant.

2.9.3 Earthquake-Induced Lateral Displacement

Liquefaction may also cause lateral spreading. For lateral spreading to occur, the liquefiable zone must be continuous, unconstrained laterally, and free to move along gently sloping ground toward an unconfined area such as an unlined river channel. Since the potential for liquefaction at the site is considered to be low and the site is laterally confined, the potential for lateral spreading at the site is also considered low.

2.9.4 Seismically Induced Landslides

According to the State of California Seismic Hazard Zones Report for the Hollywood Quadrangle (CGS, 1998), see Figure 5, (landslide areas shown in blue on Figure 5) the Site is not located within a zone of potential seismically induced landslides. The site is also not located within any mapped landslide area by the City of Los Angeles General Plan's Safety Element Exhibit C (City of Los Angeles, 1996). Due to relatively level ground surrounding the site, the potential for seismically induced landslides at the site is not a consideration for this project.

2.9.5 Earthquake-Induced Flooding

Earthquake-induced flooding can result from the failure of dams or other water-retaining structures resulting from earthquakes. The project site is located within the potential inundation area for the Los Angeles Department of Water and Power (LADWP) Hollywood Reservoir held by Mulholland Dam (Los Angeles Safety Element, 1996). Built in 1924 to hold more than 2.5 billion gallons of water, Mulholland Dam is located in the city of Los Angeles within the former Weid Canyon, east of Cahuenga Pass and Highway 101 approximately 7.7 miles northwest of the project site. The dam is 210 feet high, 933 feet long and 16 feet wide at the crest with a maximum retained water depth of 183 feet.

This dam, as well as others in California, are continually monitored by the State of California Division of Safety of Dams and the U.S. Army Corps of Engineers to guard against the threat of dam failure. Current design and construction practices and ongoing programs of review, modification, or total reconstruction of existing dams are intended to ensure that all dams are capable of withstanding the maximum design basis earthquake for the site. Mulholland Dam is regularly inspected and meets current safety regulations. In addition, LADWP has emergency response plans to address any potential impacts to its dams. Given the distance of the Mulholland Dam to the Project Site, the oversight by the Division of Safety of Dams, including regular inspections, and LADWP's emergency response program, the potential for substantial adverse impacts related to inundation at the Project Site as a result of dam failure would be less than significant.

2.9.6 Tsunamis and Seiches

Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Based on the inland and elevated location of the site, tsunamis are not considered hazards at the site (City of Los Angeles, 1996).

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. In some instances, earthquakes of significant magnitude could cause a seiche in pools.

2.10 Flood Hazard

Based on the Flood Insurance Rate Map prepared by the Federal Emergency Management Agency (FEMA), the site is not located within a flood hazard zone (Figure 6, *Flood Hazard Zone Map*). The City of Los Angeles General Plan Safety Element Exhibit F indicates the site is not within a 100-year or 500-year flood plain area (City of Los Angeles, 1996.) Based on this information, the potential for flooding at the site is considered low.

2.11 Slope Stability and Landslides

The site is not located within any mapped landslide area by the City of Los Angeles General Plan's Safety Element Exhibit C (City of Los Angeles, 1996). Since the site generally consists of relatively level terrain, the potential for slope instability and landslides is not considered a geotechnical hazard for the site.

2.12 Oil Wells and Methane Gas

The site is not located within the boundaries of an oilfield as mapped by California Geologic Energy Management Division (CalGEM), formerly the California Division of Oil, Gas and Geothermal Resources, and no oil wells are located on or in the vicinity of the site. The site is not located within the mapped zones by the City of Los Angeles, Department of Public Works, Bureau of Engineering as a methane or methane buffer zone (City of Los Angeles, 2004). Therefore, potential impacts related to oil wells or methane gas would be less than significant.

2.13 Sedimentation and Erosion

The erosion characteristics of the unconsolidated alluvial deposits exposed on any future potential temporary cut slopes onsite is expected to be moderately to highly susceptible to erosion. Although not currently anticipated, any manufactured slopes composed of compacted fill would be expected to be moderately susceptible to erosion.

The native soils onsite, as well as fill slopes constructed with native soils, will have a moderate susceptibility to erosion. These materials will be particularly prone to erosion during excavation and site development, especially during heavy rains.

The potential for erosion can be mitigated through the application of best management practices (BMPs) and other Storm Water Pollution Prevention Plan (SWPPPs), such as temporary catchment basins and/or sandbagging to control runoff and contain sediment transport within the project site during construction. Following completion of the project, the site will be improved with structures, hardscape, landscaping and appropriate drainage infrastructure. Therefore, sedimentation and erosion impacts upon completion of construction are considered less than significant.

2.14 Regional Subsidence

Regional ground subsidence generally occurs due to rapid and intensive removal of subterranean fluids, typically water or oil. It is generally attributed to the consolidation of sediments as the fluid in the sediment is removed. The total load of the soils in partially or fully saturated deposits is born by their granular structure and the fluid. When the fluid is removed, the load is born by the sediment alone and it settles. No reports on regional subsidence have documented subsidence in

the site vicinity, and the project would not involve the removal of water or oil at the site, making the potential for ground subsidence very low.

2.15 **Summary of Geologic and Seismic Hazard Review**

The results of our geologic and seismic hazard review are summarized below.

GEOLOGIC AND SEISMIC HAZARDS	FINDINGS
• Fault rupture	Low Risk
• Seismic Ground Shaking	Low Risk
• Liquefaction	Low Risk
• Seismically induced settlement	Low Risk
• Seismically induced lateral displacement	Low Risk
• Seismically induced landslide	Low Risk
• Seismically induced flooding and seiches	Low Risk
• Tsunamis	Low Risk
• Flood hazard	Low Risk
• Soil expansion	Low Risk
• Soil corrosion	Low Risk
• Slope stability and landslide	Low Risk
• Methane Gas	Low Risk
• Erosion/Sedimentation	Low Risk
• Regional Subsidence	Low Risk

3.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

Based on the results of this study, it is our opinion that the subject site is suitable for development from a geotechnical viewpoint. Preliminary geotechnical recommendations are presented in the following sections and are intended to provide sufficient geotechnical information to develop the project plans in accordance with the 2023 LABC requirements. *A design-level geotechnical investigation that includes additional soil borings, laboratory testing, and engineering analysis will be required for the site by the reviewing agency in pursuit of building permits.* Design of the project in accordance with standard engineering practice, including requirements of the 2023 LABC requirements, and the recommendations of the project civil and structural engineers, geotechnical consultant and others will reduce the potential for adverse geotechnical conditions impacting the proposed improvements.

The preliminary recommendations presented below are based on results of our exploration, laboratory testing and engineering analysis.

3.1 Earthwork

We understand project earthwork is expected to include complete demolition/removal of existing residential improvements. Earthwork should also include complete overexcavation and recompaction of any remaining undocumented fill soils below new improvement footprints as described in the following subsections.

3.1.1 Earthwork Observation and Testing

Leighton and Associates, Inc. should observe and test all grading and earthwork, to check that the site is properly prepared, the selected fill materials are satisfactory, and that placement and compaction of fills has been performed in accordance with our final design-level recommendations and the project specifications.

Variations in site conditions are possible and may be encountered during construction. To confirm correlation between soil data obtained during our field and laboratory testing and actual subsurface conditions encountered during construction, and to observe conformance with approved plans and specifications, it is essential that we be retained to perform continuous or intermittent review during earthwork, excavation and foundation construction phases. Therefore, conclusions and recommendations presented in this

report are contingent upon us performing a supplementary design-level investigation and providing construction observation services.

3.1.2 Surface Drainage

Water should not be allowed to pond or accumulate anywhere except in detention basins. Pad drainage should be designed to collect and direct surface water away from structures to approved drainage facilities. Hardscape drains should be installed and drain to storm water disposal systems. Drainage patterns approved at the time of fine grading should be maintained throughout the life of proposed structures. Irrigation and/or percolation should not be allowed for at least 10 feet horizontally around buildings.

3.1.3 Site Preparation

After demolition and removal of existing improvements, the site areas for future improvements such as concrete hardscape, buildings, and paving should be excavated to a minimum of five feet deep to remove any undocumented fill. Approximately 5 feet of undocumented fill was encountered during our subsurface exploration. Deeper fill or seepage pits may be encountered between exploration locations or below existing structures.

The excavated soil should be replaced as engineered fill provided the soil is suitable for residential or commercial reuse. The majority of the sandy soil on site should be suitable for use as engineered fill. Overexcavation should extend laterally a distance equal to the thickness of the fill below the foundation. Excavation and overexcavation bottoms should expose competent native sandy soil and should be observed and evaluated by the geotechnical engineer or his representative prior to processing and compaction. If unsuitable soil, as determined by the geotechnical engineer, is encountered at the bottom, additional excavation to remove the unsuitable soil should be performed, or additional geotechnical recommendations will be provided. The bottom of excavations and overexcavations should be processed by scarification and moisture conditioning to a depth of approximately 6 to 8 inches and compacted to at least 95 percent relative compaction. The scarified soil should be moisture conditioned to within 2 percent above near optimum moisture content prior to compaction.

References to relative compaction and optimum moisture content should be in accordance with ASTM D 1557.

Any underground obstructions such as foundation elements, seepage pits or other man-made items encountered should be removed. Efforts should be made to locate any existing utility lines. Those lines should be removed or rerouted where interfering with proposed construction. It is essential that excavation not undermine existing adjacent utility infrastructure.

3.1.4 Reuse of Concrete and Asphalt in Fill

Pulverized demolition concrete free of rebar and other materials and demolished asphalt pavement can be pulverized to particles no-larger-than ($\leq$) 3-inches, and mixed with site soils for use in compacted fill. Blended pulverized concrete and asphalt should be mixed with at least 25% soils by weight. Such materials must be free of and segregated from any hazardous materials and/or organic material of any kind.

3.1.5 Engineered Fill

Onsite soils free of organics, debris and oversized material (greater-than 3-inches in largest dimension) are suitable for use as engineered fill. However, any soil to be placed as fill, whether onsite or imported material, should be first viewed by Leighton, and then tested if necessary, prior to approval for use as compacted fill. All structural fill must be free of hazardous materials.

All fill soil should be placed in thin, loose lifts suitable to the type of compaction equipment being used, moisture-conditioned, as necessary, to within 2 percent above optimum moisture content, and compacted to a minimum 95% relative compaction as determined by ASTM D 1557 standard test method (modified Proctor compaction curve). Anticipated shrinkage for the onsite soils range from 7 to 15 percent.

3.1.6 Pipeline Backfilling

Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1.2 and 306-1.3 of the Standard Specifications for Public Works Construction, ("Greenbook"), 2021 Edition, except noted herein. Utility trenches can be backfilled with onsite sands free of rubble, debris,

organic and oversized material up to ($\leq$) 3-inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

1. **Sand:** A uniform, sand material that has a Sand Equivalent (SE) greater-than-or-equal-to ($\geq$) 30, passing the No. 4 U.S. Standard Sieve (or as specified by the pipe manufacturer), water densified in place, or
2. **CLSM:** Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the *Standard Specifications for Public Works Construction*, ("Greenbook"), 2021 Edition. CLSM is preferred under the building footprint, to reduce the potential for water infiltration under the building.

Pipe bedding should extend at least 4-inches below the pipeline invert and at least 12 inches over the top of the pipeline. Native and clean fill soils can be used as backfill over the pipe bedding zone, and should be placed in thin lifts, moisture conditioned above optimum, and mechanically compacted to at least 95 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

3.2 **Foundation Recommendations**

Footings for the proposed residential/multi or commercial use and future parking structures may be founded on shallow foundation systems bearing on undisturbed natural soils or engineered fill. Ground improvement may also be considered depending upon the type of construction and future building loads.

3.2.1 **Spread Footings**

On a preliminary basis, in consideration of residential reuse, footings should have a minimum embedment depth of 24 inches and have a minimum width of 24 inches.

Footings for structures without basements may be designed to impose an allowable bearing pressure of 4,000 pounds per square foot (psf). A one third increase in the bearing value for short duration loading, such as wind or seismic forces may be used. The ultimate bearing capacity can be taken as 12,000 psf, which does not incorporate a factor of safety. A resistance factor of 0.45 should be used for bearing capacity evaluation with factored loads. The recommended bearing value is a net value, and the weight of concrete in the footings can be taken as 50 pounds per cubic foot (pcf); the

weight of soil backfill can be neglected when determining the downward loads.

3.2.2 Mat Foundation

Proposed structures may also be supported on a mat foundation.

Mat foundations should be embedded a minimum of 3 feet below the lowest adjacent grade. A mat foundation may be designed for a modulus of subgrade reaction of 35 pounds per cubic inch (pci). The bearing pressure under conventional dead plus live loads should not exceed 4,000 psf; however, the allowable bearing pressure may be increased by one-third for short duration, dynamic loads including wind or seismic forces.

3.2.3 Lateral Load Resistance

Soil resistance available to withstand lateral loads on a shallow foundation is a function of the frictional resistance along the base of the footing and the passive resistance that may develop as the face of the structure moves into the soil. The frictional resistance between the base of the foundation and the subgrade soil may be computed using a coefficient of friction of 0.40. The passive resistance may be computed using an equivalent fluid pressure of 350 pounds per cubic foot (pcf), assuming there is constant contact between the footing and undisturbed soil. The values above are ultimate values. Appropriate factors of safety should be applied for design.

3.3 Seismic Design Parameters

To accommodate effects of ground shaking produced by regional seismic events, seismic design can, at the discretion of the designing structural engineer, be performed in accordance with the 2023 LABC. The table below, *2023 LABC Seismic Parameters*, tabulates seismic design parameters based on ASCE/SEI 7-16.

2023 LABC Mapped Seismic Parameters

Categorization/Coefficients	Code-Based ⁽¹⁾ ₍₂₎
Site Longitude (decimal degrees) West	-118.2822°
Site Latitude (decimal degrees) North	34.0122°
Site Class	D
Mapped Spectral Response Acceleration at 0.2s Period, S_s	1.873
Mapped Spectral Response Acceleration at 1s Period, S_1	0.663
Short Period Site Coefficient at 0.2-second Period, F_a	1
Long Period Site Coefficient at 1-second Period, F_v	1.7 ⁽¹⁾
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}	1.873
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}	1.127 ⁽¹⁾
Design Spectral Response Acceleration at 0.2s Period, S_{DS}	1.249
Design Spectral Response Acceleration at 1s Period, S_{D1}	0.752 ⁽¹⁾
Site Modified Peak Ground Acceleration, PGA_M	0.879

1. A ground motion hazard analysis is not required where the value of the parameter S_{M1} determined by Eq. (11.4-2) of ASCE 7-16 is increased by 50% for all applications of S_{M1} in ASCE 7-16. The resulting value of the parameter S_{D1} determined by Eq. (11.4-4) shall be used for all applications of S_{D1} in ASCE 7-16.

3.4 Lateral Earth Pressures and Retaining Wall Design

We recommend that retaining walls, if any, be backfilled with very low expansive soil and constructed with a backdrain. Using expansive soil as retaining wall backfill will result in higher lateral earth pressures exerted on the wall and are, therefore, not recommended. Onsite soils are considered generally suitable for use as wall backfill and should be confirmed during grading. Based on these recommendations, the following parameters may be used for the design of conventional retaining walls with backfill that is properly drained.

Lateral Earth Pressures

Retaining Wall Condition (Level Backfill)	Equivalent Fluid Pressure (pounds-per-cubic-foot)*
Active (cantilever)	40
At-Rest (braced)	60
Passive Resistance (ultimate)	300

The above values were calculated by applying a factor of safety of 1.5 to the peak soil shear strengths from laboratory direct shear testing results. Cantilever walls that are designed to yield at least $0.001H$, where H is equal to the wall height, may be designed using the active condition. Rigid walls and walls braced at the top should be designed using the at-rest condition. Passive pressure is used to compute soil resistance to lateral structural movement. In addition, for sliding resistance, a frictional resistance coefficient of 0.40 may be used at the concrete and soil interface. The lateral passive resistance should be taken into account only if it is ensured that the soil providing passive resistance, embedded against the foundation elements, will remain intact with time. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of the soil over the wall footing.

In addition to the above lateral forces due to retained earth, surcharge due to improvements, such as an adjacent structure or traffic loading, should be considered in the design of the retaining wall. Loads applied within a 1:1 projection from the surcharging structure on the stem of the wall should be considered in the design. A third of uniform vertical surcharge loads should be applied at the surface as a horizontal pressure on cantilever (active) retaining walls, while half of uniform vertical surcharge-loads should be applied as a horizontal pressure on braced (at-rest) retaining walls. To account for automobile parking surcharge, we suggest that a uniform horizontal pressure of 100 psf (for restrained walls) or 70 psf (for cantilever walls) be added for design, where autos are parked within a horizontal distance behind the retaining wall less than the height of the retaining wall stem.

For walls with a retained height over 12 feet, or where otherwise required by the building code or deemed appropriate by the structural engineer, we recommend that the wall designs be checked seismically using an *additive seismic* pressure of $25H$ psf, which is to be applied with a resultant at $\frac{2}{3}$ above the bottom of the wall.

3.5 **Concrete Slab-On-Grade**

Concrete slabs-on-grade should be designed by the structural engineer in accordance with 2023 LABC requirements for soils with a low expansion potential. More stringent requirements may be required by the structural engineer and/or architect; however, slabs-on-grade should have the minimum recommended components described below.

Slab-on-grade subgrade soil should be moisture conditioned to at least optimum moisture content to a minimum depth of 12 inches within building footprints, and

compacted to 95% of the modified proctor (ASTM D 1557) laboratory maximum density prior to placing either a moisture barrier, steel and/or concrete.

A moisture barrier consisting of 10-mil Visqueen (or equivalent) should then be placed below slabs where moisture-sensitive floor coverings or equipment will be placed.

A conventionally reinforced concrete slab-on-grade with a thickness of at least 5-inches should be placed in pedestrian areas without heavy loads. Reinforcing steel should be designed by the structural engineer, but as a minimum should be No. 3 rebar placed at 24 inches on-center, each direction (perpendicularly), mid-depth in the slab. A modulus of subgrade reaction (k) as a linear spring constant, of 175 pounds-per-square-inch per inch deflection (pci) can be used for design of heavily loaded slabs-on-grade, assuming a linear response up to deflections on the order of $\frac{3}{4}$ -inch.

Minor cracking of concrete after curing due to expansion, drying and shrinkage is normal and should be expected. However, cracking is often aggravated by a high water-to-cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low-slump concrete or low water/cement ratios can reduce the potential for shrinkage cracking.

3.6 Sulfate Attack and Ferrous Corrosion Protection

Water-soluble sulfates in soil can react adversely with concrete. Concrete subject to exposure to sulfates shall comply with requirements set forth in ACI 318. Based on results of laboratory testing, concrete structures in contact with the onsite soil will have "negligible" exposure to water-soluble sulfates in the soil (exposure class S0). Therefore, common Type II Portland cement may be used for concrete construction onsite. Import fill soils should be tested for corrosivity and sulfate attack before import to the site.

Soil with a chloride content of 500 ppm or more is considered corrosive. Four soil samples were tested for corrosivity, one from this study (LB-3, BB-1), and three from the prior phase of work located to the south of the subject site across 39th Street (2022-LP-1, S-2 & S-3 mix, and 2022-LP-2, S-4, and BH-3, BB-1). These tests indicated a minimum electrical resistivity of 3900, 1145, 5044, and 1630 ohm-

cm, chloride content of 50, 60, 50, and 31 ppm, and pH of 6.88, 7.35, 7.19 and 7.32.

An exposure class of C1 may be assumed for concrete in contact with soil exposed to moisture per ACI 318-14, but not due to external sources of chlorides.

The onsite soil is considered corrosive to ferrous metals. Ferrous pipe buried in moist to wet site earth materials should be avoided by using high-density polyethylene (HDPE), polyvinyl chloride (PVC) and/or other non-ferrous pipe when possible. Ferrous pipe can also be protected by polyethylene bags, tap or coatings, di-electric fittings or other means to separate the pipe from on-site soils.

3.7 Pavement Sections

Based on design procedures outlined in the current Caltrans *Highway Design Manual* and an assumed design R-values of at least 40 for the subgrade soil (one laboratory test result indicated an R-value of 66) and 78 for the Class 2 aggregate base, preliminary flexible pavement sections were calculated for the Traffic Indices (TIs) tabulated, and are listed below:

Hot Mixed Asphalt (HMA) Pavement Sections

Assumed Traffic Index	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
4.0 (automobile parking)	3	3
5.0 (driveways and truck traffic)	3	4
6.0 (roadways, heavy truck traffic)	3½	5½

Portland cement concrete pavement sections were calculated in accordance with procedures developed by the Portland Cement Association. Concrete paving sections for three Traffic Indices (TIs) are presented below:

Portland Cement Concrete Pavement Sections

Assumed Traffic Index	PC Concrete (inches)	Class 2 Agg. Base Course (inches)
4.0 (automobile parking)	5	4
5.0 (driveways and truck traffic)	5½	
6.0 (roadways and heavy truck traffic)	6½	

We have assumed that this Portland cement concrete will have a compressive strength of at least 3,000 pounds-per-square-inch (psi). Prior to placement of aggregate base, subgrade soils should be prepared in accordance with the Earthwork section of this report. Aggregate base should be placed in thin lifts; moisture conditioned, as necessary, and compacted to a minimum of 95 percent relative compaction.

Upon completion of rough grading samples of pavement subgrade should be collected and tested for R-value to compare the assumed value used in design of structural sections in this report remains applicable.

Traffic Indices (TIs) used in our pavement design are considered reasonable values for the proposed parking areas, and should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. Irrigation adjacent to pavements, without a deep curb or other cutoff to separate landscaping from the paving, will result in premature pavement failure. Traffic parameters used for design were selected based on engineering judgment and not on information furnished to us such as an equivalent wheel-load analysis or a traffic study. The assumed TIs should be reviewed by the project civil engineer to determine the applicability of the assumed TIs for the site.

4.0 CONSTRUCTION CONSIDERATIONS

4.1 Temporary Excavations

All temporary excavations, including footings, utility trenches, should be performed in accordance with project plans, specifications, and all OSHA requirements. Excavations 5 feet or deeper should be laid back or shored in accordance with OSHA requirements before personnel are allowed to enter.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the cut, unless the cut is shored appropriately.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor shall be responsible for providing the “competent person” required by OSHA standards to evaluate soil conditions. Soil types will vary, but Type C soils can be expected at shallow depths. Close coordination between the competent person and the geotechnical engineer should be maintained to facilitate construction while providing safe excavations.

4.2 Temporary Shoring

Should adequate space onsite not be obtainable to layback excavations at inclinations no steeper than 1½:1, then the excavation should be retained by conventional soldier piles or sheet pile walls. Support of all adjacent existing structures without distress is the contractor’s responsibility. These shoring systems adjacent to existing infrastructure should be designed by a California licensed civil or structural engineer. The contractor should forward their plans for the support system to Leighton for pre-construction review. In addition, it should be the contractor’s responsibility to undertake a pre-construction survey with benchmarks and photographs of the adjacent improvements should shoring be required.

The contractor should be aware of the granular nature of the soils, being careful to guard against potential for sloughing and caving of excavation sides. This is for both human safety and safety of the improvements being shored.

Our borings were drilled with a hollow-stem auger. Therefore, we do not have empirical information regarding the potential for caving in drilled holes (e.g. for soldier piles and tiebacks). The contractor may therefore choose to evaluate the potential for difficult drilling conditions and caving of shafts by drilling pilot holes

with the intended production drilling equipment. We expect the granular soils at this site will be prone to caving.

The contractor and shoring designer should perform additional geotechnical studies as necessary to refine the means and methods of shoring construction. As preliminary design guidelines, we present the following geotechnical parameters for shoring design, based on the assumption that grade behind and in front of the shoring will be relatively level (e.g. not for shoring at the toe or top of a cut slope).

4.2.1 Design Lateral Earth Pressures

Unrestrained (cantilever) shoring can be designed to resist an equivalent fluid pressure of 35 pcf, for shoring no more than approximately 15 feet in height. For braced shoring (restrained from movement at the top) a uniform pressure of $28H$ psf should be used, where H is the shoring height in feet. Braced shoring should be used for shoring heights greater than 15 feet but not to exceed 25 feet.

4.2.2 Surcharge Pressures

The additional lateral stress resulting from adjacent surcharge loads is presented in Section 3.4 and should be considered in design of the shoring system. Surcharges need not be included in design if the surcharge is setback behind the shoring a horizontal distance greater than the height of the shoring.

4.2.3 Soldier Piles

For the design of soldier piles spaced at least 3 diameters on centers (OC), the allowable lateral bearing value (passive value) of the soils below the level of excavation may be assumed to be 600 psf at the excavated surface, up to a maximum of 6,000 psf. To develop the full lateral value, provisions should be taken to assure firm contact between the soldier piles and the undisturbed soils. The concrete placed in the soldier pile excavations may be a lean-mix concrete. However, the concrete used in that portion of the soldier pile which is below the planned excavated level should be of sufficient strength to adequately transfer the imposed loads from the soldier pile to the surrounding soils.

The frictional resistance between the soldier piles and the retained earth may be used in resisting the downward component of the design load. The coefficient of friction between the soldier piles and the retained earth may be taken as 0.4. This value is based on the assumption that uniform full bearing will be developed between the steel soldier beam and the lean-mix concrete and between the lean-mix concrete and the retained earth. In addition, provided that the portion of the soldier piles below the excavated level is backfilled with structural concrete, the soldier piles below the excavated level may be used to resist downward loads. The frictional resistance between the concrete soldier piles and the soils below the excavated level may be taken as equal to 500 psf.

4.2.4 Lagging

Continuous lagging will be required between the soldier piles. Careful installation of the lagging will be necessary to achieve bearing against the retained earth.

The soldier piles should be designed for the full anticipated lateral pressure. However, the pressure on the lagging will be less due to arching in the soils. For clear spans up to 8 feet, we recommend that the lagging be designed for a semi-circular distribution of earth pressure where the maximum pressure is 400 psf at the midline between soldier piles, and 0 psf at the soldier piles.

4.2.5 Anchor Design

Tie-back friction anchors may be used to resist lateral loads. For design purposes, it may be assumed that the active wedge adjacent to the shoring is defined by a plane drawn at 35 degrees from the vertical through the bottom of the excavation. The anchors should extend at least 40 feet beyond the potential active wedge and to a greater length if necessary to develop the desired capacities.

The capacities of anchors should be determined by testing of the initial anchors as outlined in the following section, Anchor Testing. For design purposes, it may be estimated that drilled friction anchors will develop an average friction value of 600 psf. For post-grouted anchors, it may be estimated that the anchors could develop an average friction of up to 1,800 psf. Only the frictional resistance developed beyond the active wedge would be effective in resisting lateral loads. If the anchors are spaced at

least 6 feet on centers, no reduction in the capacity of the anchors need be considered due to group action.

4.2.6 Anchor Installation

The anchors may be installed at angles of 15 to 40 degrees below the horizontal. Caving of the anchor holes should be anticipated and provisions made to minimize such caving. Mining (removal of soils from the anchor holes without advancing the drilling auger) of the sandy and gravelly soils could occur and the shoring contractor should take special care to prevent, or at least minimize, such mining.

Conventional anchors should be filled with concrete placed by pumping from the tip outward, and the concrete should extend from the tip of the anchor to the active wedge. To minimize chances of caving, we suggest that the portion of the anchor shaft within the active wedge be backfilled with sand before testing the anchor. This portion of the shaft should be filled tightly and flush with the face of the excavation. The sand backfill may contain a small amount of cement to allow the sand to be placed by pumping.

4.2.7 Anchor Testing

For post-grouted anchors where concrete is used to backfill the anchor along its entire length, the test load should be computed as that required to develop the appropriate friction along the entire bonded length of the anchor. The test load should therefore be computed as:

$$P_{test} = P_{design} * \frac{L_t}{L_b} * M$$

where L_t = Total Length of Anchor
 L_b = Post-grouted Length of Anchor
 M = 150%

The unbonded length of anchors within the active wedge may be encased in PVC sheathing to prevent load transfer to surrounding soil. Accordingly, the test loads need not be increased using the criteria described above if the unbonded length of anchors is thus isolated from surrounding soil.

All of the production anchors should be pretested to at least 150% of the design load; the total deflection during the tests should not exceed 12 inches. The rate of creep under the 150% tests should not exceed 0.1 inch over a 15-minute period for the anchor to be approved for the design loading.

After a satisfactory test, each production anchor should be locked-off at the design load. The locked-off load should be verified by rechecking the load in the anchor. If the locked-off load varies by more than 10% from the design load, the load should be reset until the anchor is locked-off within 10% of the design load.

The installation of the anchors and the testing of the completed anchors should be observed by our firm.

4.2.8 Internal Bracing

Raker bracing, if used, could be supported laterally by temporary concrete footings (deadmen). For design of such temporary footings, poured with the bearing surface normal to rakers inclined at 45 to 60 degrees with the vertical, a bearing value of 4,000 psf may be used, provided the shallowest point of the footing is at least 1 foot below the lowest adjacent grade. To reduce the movement of the shoring, the rakers should be tightly wedged against the footings and/or shoring system.

4.2.9 Deflection

It is difficult to accurately predict the amount of deflection of a shored embankment. It should be realized, however, that some deflection will occur. We estimate that this deflection could be on the order of 1 inch at the top of a shored embankment up to 20 feet in height.

If greater deflection occurs during construction, additional bracing may be necessary to minimize settlement of adjacent structures and of any utilities in the adjacent streets. To reduce the deflection of the shoring, if desired, a greater active pressure could be used in the shoring design.

4.2.10 Monitoring

For shored excavations greater than 12 feet deep and/or supporting a surcharge load from any adjacent footings, soldier piles should be monitored weekly for line and grade, surveyed by a California licensed

Professional Land Surveyor (PLS). Survey results should be sent to Leighton, weekly, preferably by e-mail for our review. If total horizontal deflection inward (towards the excavation) exceeds 1 inch, then excavation adjacent to excessively deflecting soldier/sheet pile(s) should be halted immediately, and the shoring design at that location should be reevaluated by the shoring designer, owner and Leighton. Any movement more than one inch will require remedial shoring at the location of excessive deflection, to prevent additional movement prior to further construction in that area.

4.3 Additional Geotechnical Services

The geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited laboratory testing. Our conclusions and recommendations presented in this report should be reviewed and verified by Leighton during site grading and construction and revised accordingly, if exposed geotechnical conditions vary from our preliminary findings and interpretations. The recommendations presented in this report are only valid if Leighton verifies the site conditions during construction.

Geotechnical observation and testing should be provided during the following activities:

- Precise grading and excavation of the site;
- Subgrade preparation;
- Compaction of all fill materials;
- Utility trench backfilling and compaction;
- Footing excavation and slab-on-grade preparation;
- During installation of temporary shoring, wherever needed; and
- When any unusual conditions are encountered.

5.0 LIMITATIONS

This report was necessarily based in part upon data obtained from a limited number of observances, site visits, soil samples, tests, analyses, histories of occurrences, spaced subsurface explorations and limited information on historical events and observations. Such information is necessarily incomplete. The nature of many sites is such that differing characteristics can be experienced within small distances and under various climatic conditions. Changes in subsurface conditions can and do occur over time. This exploration was performed with the understanding that this subject site is proposed for development as described in this report. Important information about limitations of geotechnical reports in general is presented in Appendix D, GBA's *Important Information About Your Geotechnical Report*.

This report was prepared for Ventus Group based on their needs, directions and requirements at the time of our explorations, in accordance with generally accepted geotechnical engineering practices at this time in California. This report is not authorized for use by, and is not to be relied upon by, any party except Ventus Group and their design and construction management team, with whom Leighton and Associates, Inc. has contracted for this work. Use of or reliance on this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton and Associates, Inc. from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, and/or strict liability of Leighton and Associates, Inc.

6.0 REFERENCES

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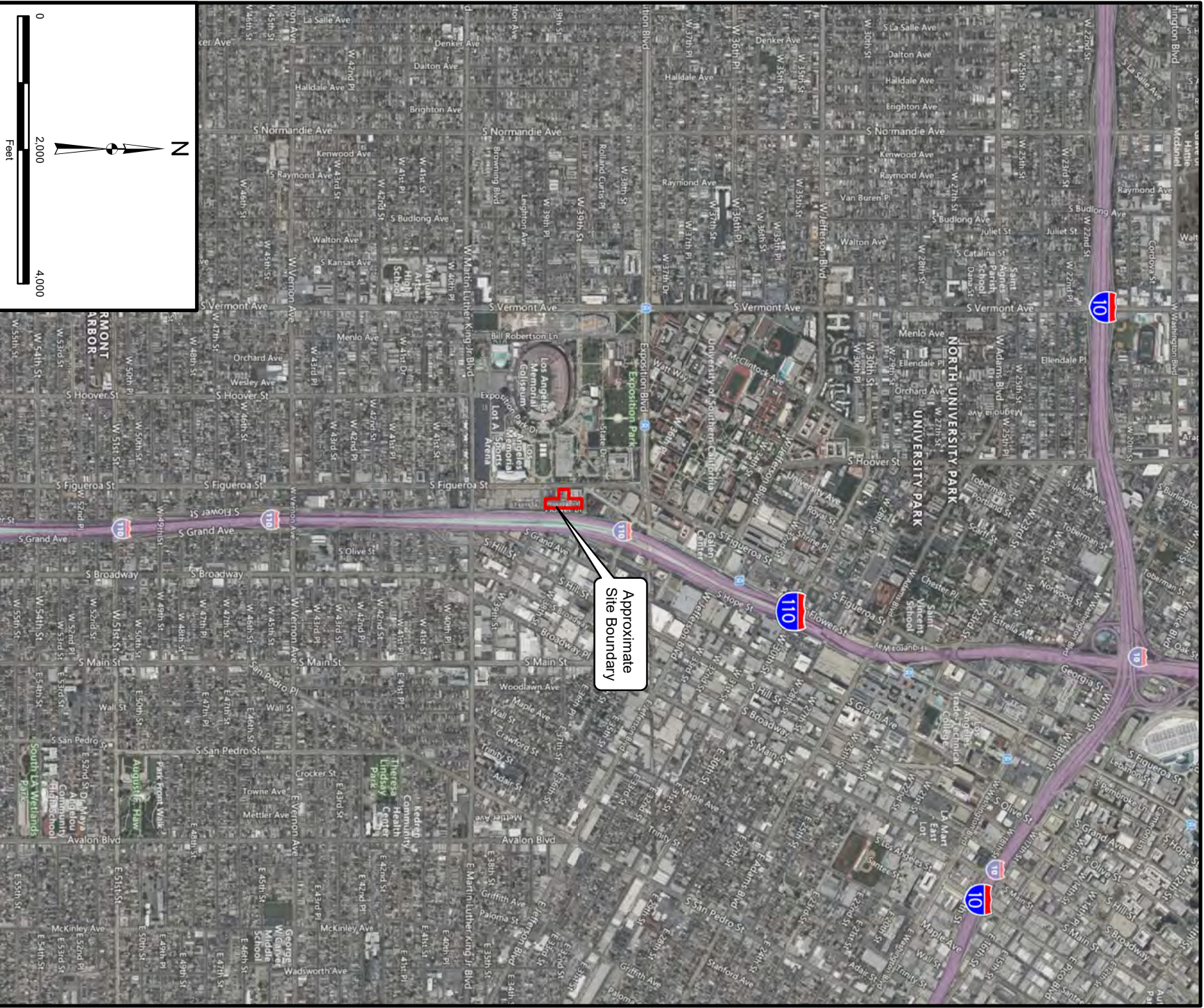
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FIGURES



Project: 10884.015

Eng/Geol: CCKUJAR

Scale: 1" = 2,000'

Date: May 2024

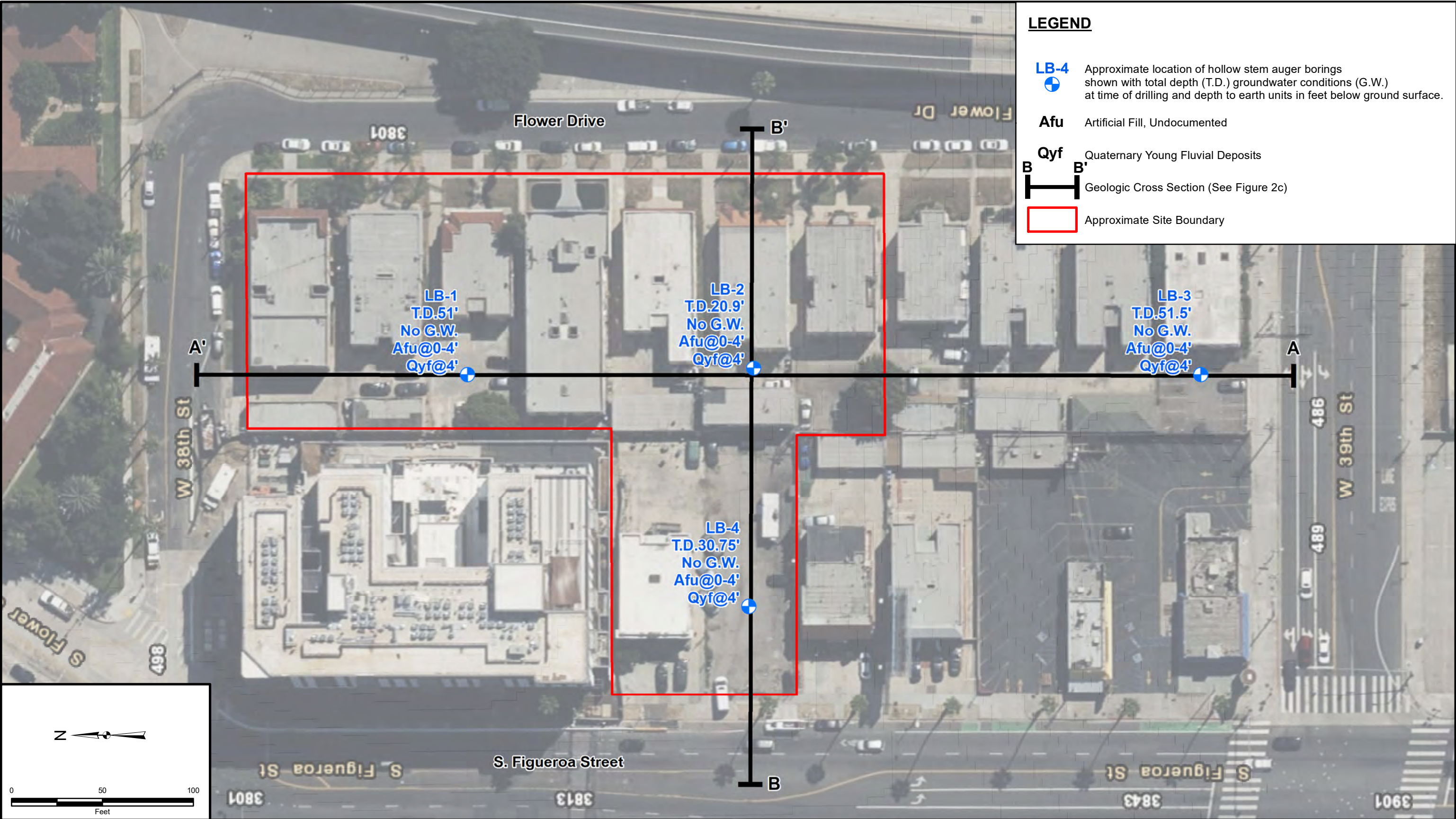
Reference: © 2024 Microsoft Corporation ©
2024 Maxar ©CNES (2024) Distribution Airbus

SITE LOCATION MAP

3801 to 3855 Flower Drive
Los Angeles, California

FIGURE 1



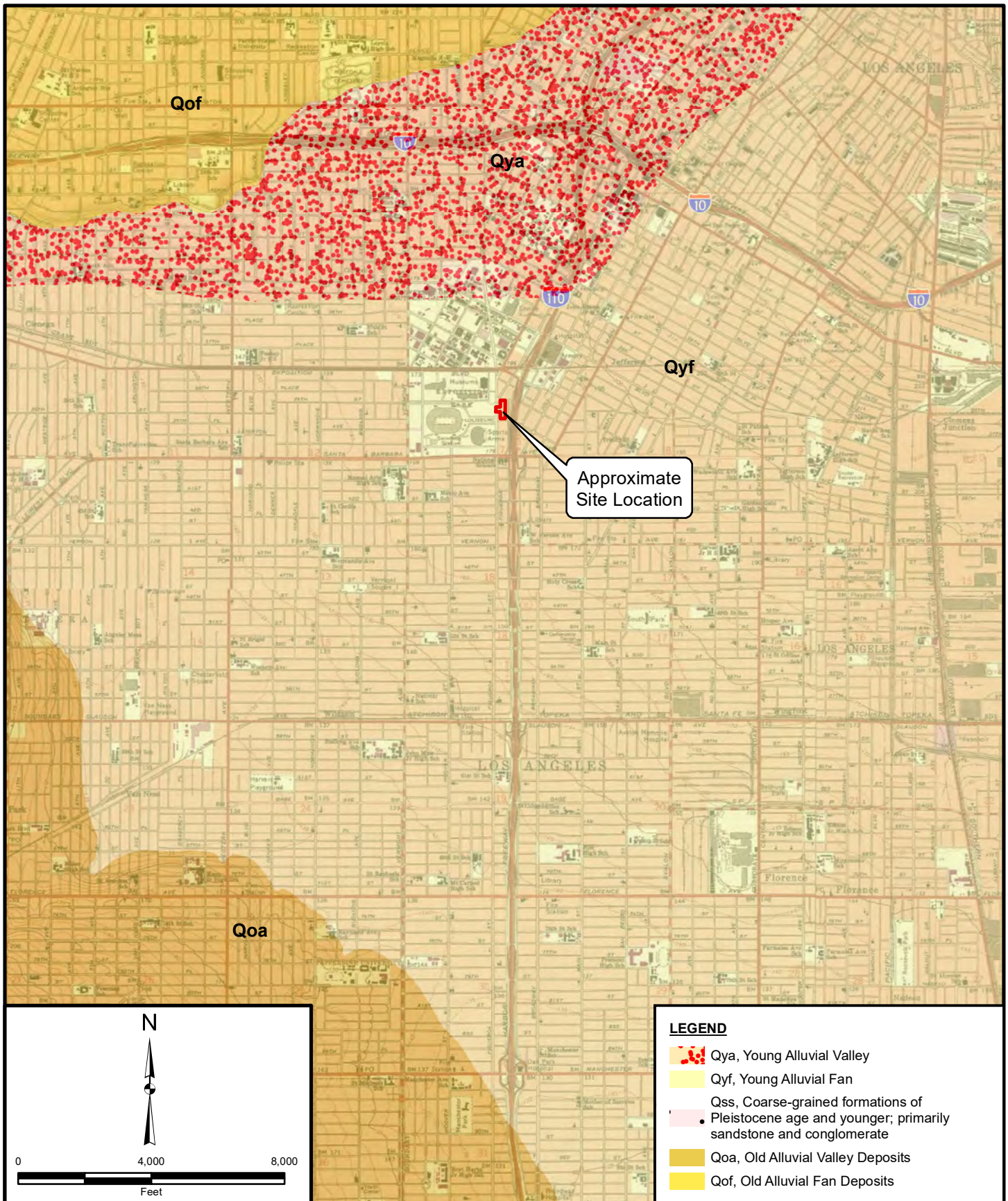


Project: 10884.015		Eng/Geol: CCK/JAR	
Scale: 1" = 50'		Date: October 2024	
Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors © 2024 Microsoft Corporation © 2024 Maxar ©CNES (2024) Distribution Airbus DS			
Author: (btran)			

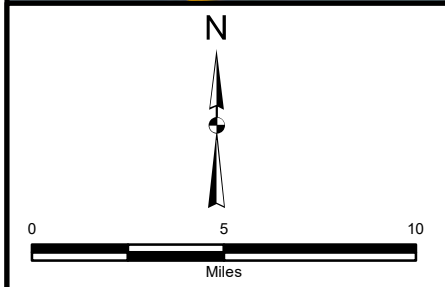
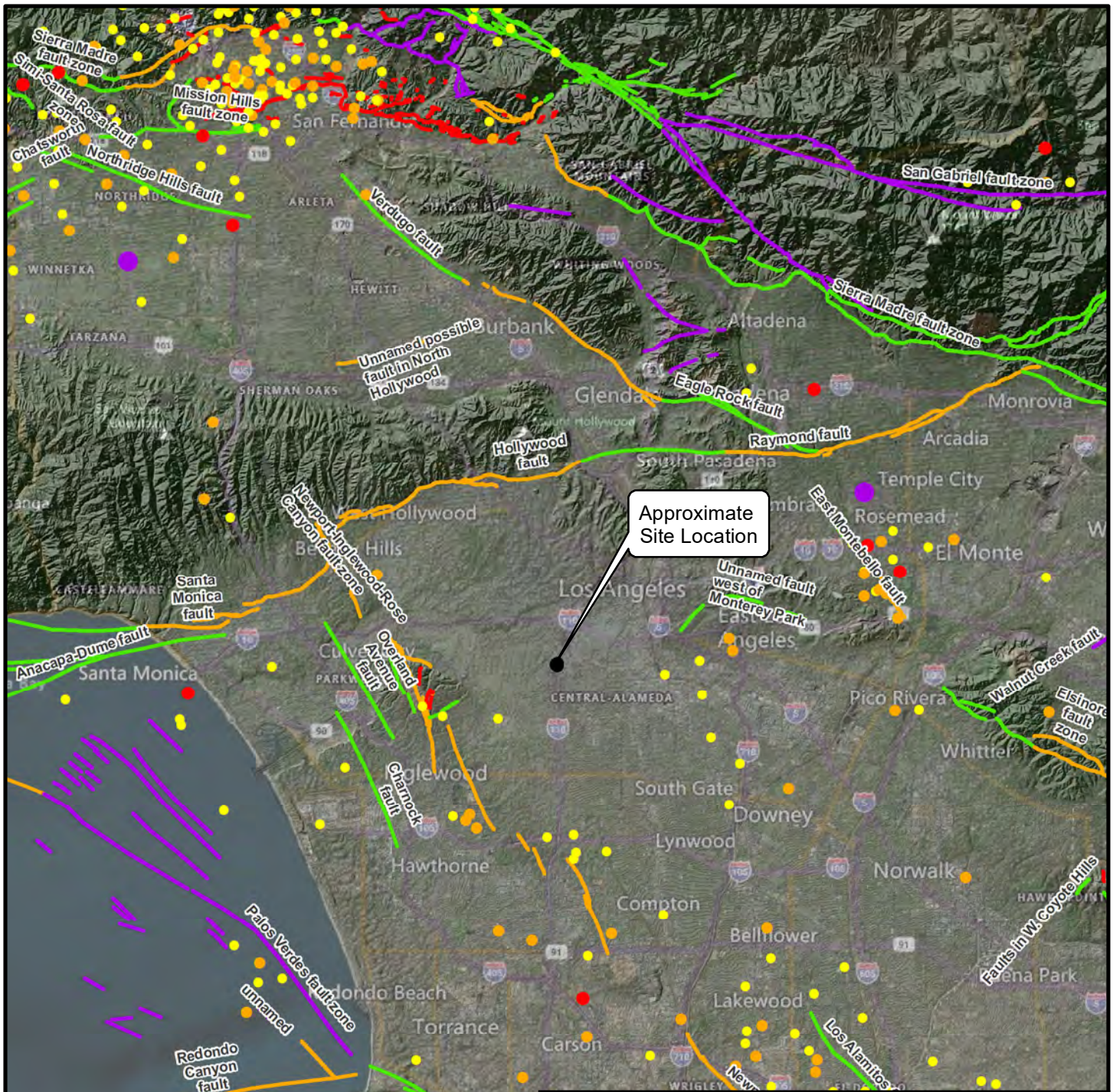
EXPLORATION LOCATION MAP

3801 to 3833 Flower Drive and 3822-3838 South Figueroa Street
Los Angeles, California

FIGURE 2



Project: 10884.015	Eng/Geol: CCK/JAR	REGIONAL GEOLOGY MAP	FIGURE 3
Scale: 1" = 4,000'	Date: May 2024		
Reference: State of California, Department of Conservation, California Geological Survey, 2012.		3801 to 3855 Flower Drive Los Angeles, California	Leighton



LEGEND

Fault activity

Recency of Movement

- Historic (<200 years)
- Holocene (<11,700 years)
- Late Quaternary (last 700,000 years)
- Quaternary (<1.6M years)

Historical Earthquakes (≥M3.5)

- 3.5 - 3.99
- 4.0 - 4.99
- 5.0 - 5.99
- 6.0 - 6.99

Project: 10884.015 Eng/Geol: CCK/JAR

Scale: 1" = 5 miles Date: May 2024

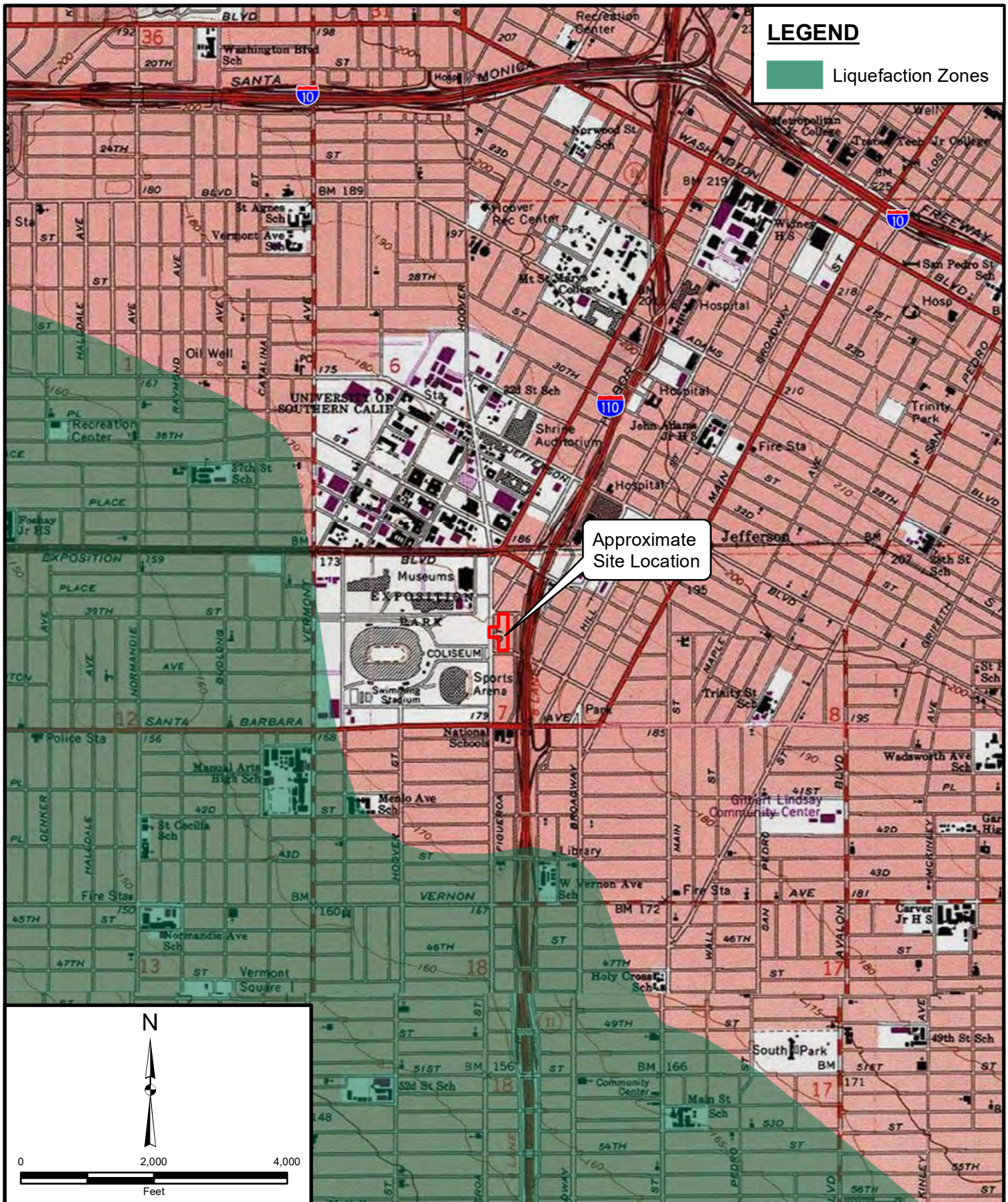
Base Map: ESRI ArcGIS Online 2024
Reference: maps.conservation.ca.gov

REGIONAL FAULTS AND HISTORIC SEISMICITY MAP

3801 to 3855 Flower Drive
Los Angeles, California

FIGURE 4





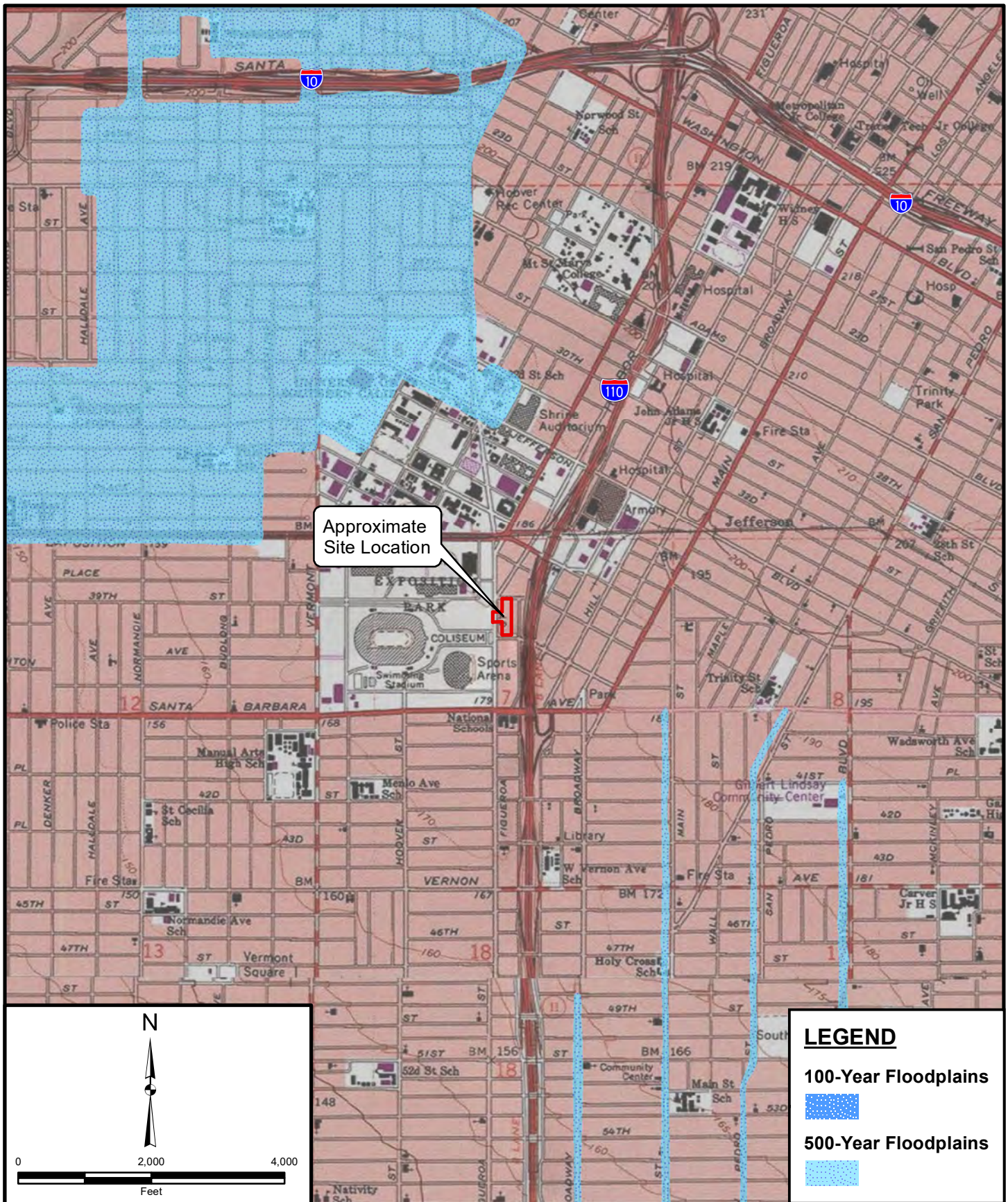
Project: 10884.015	Eng/Geol: CCK/JAR
Scale: 1" = 2,000'	Date: May 2024
Base Map: Seismic Hazards Program, California Geological Survey, California Department of Conservation	

SEISMIC HAZARD MAP

3801 to 3855 Flower Drive
Los Angeles, California

FIGURE 5





Project: 10884.015	Eng/Geol: CCK/JAR
Scale: 1" = 2,000'	Date: May 2024
Base Map: ESRI ArcGIS Online 2024 Reference: FEMA, DWR	

FLOOD HAZARD ZONE MAP 3801 to 3855 Flower Drive Los Angeles, California

FIGURE 6



APPENDIX A

Boring Logs (Current Exploration)

GEOTECHNICAL BORING LOG LB-1

Project No.	10884.015	Date Drilled	1-19-23
Project	Exposition Point - 38th and Figueroa	Logged By	ECB
Drilling Co.	Choice Drilling	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	182'
Location	34.015340, -118.282027	Sampled By	ECB

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
	0	N S		BB-1				SM	@SURFACE: 3-inch Concrete Slab @0.25': Artificial fill, undocumented (Afu) Silty SAND, dark brown, moist to very moist, fine to medium sand, chunks of wood, trace medium to coarse angular gravel, some rootlets	
180										
	5			R-1	3 6 10			SP	Quaternary young fluvial deposits (Qyf)	
175				S-2	3 4 6		3	SM	@5': Silty SAND, light olive brown, moist, medium dense, primarily fine sand, trace fine subangular gravel	DS
	10			R-3	6 10 13			SP	@7.5': Poorly-graded SAND, yellow brown, slightly moist, loose, primarily fine sand, trace fines, trace fine subangular gravel	
170									@10': Poorly-graded SAND, light brown, moist, medium dense, primarily fine to medium sand, trace coarse sand, trace micas	DS
	15			S-4	4 5 7		9	SM	@15': Silty SAND, olive brown, moist, medium dense, primarily fine sand, micaceous, homogenous	
165										
	20			R-5	8 12 16	102	14	SC	@20': Silty SAND, light tan, slightly moist, medium dense, fine sand, homogenous	
160									@21.5': Clayey SAND, dark brown, slightly moist, primarily fine sand, low plasticity, micaceous	
	25			S-6	10 13 20		7	CL	Pleistocene Age Soils @25': Sandy CLAY with gravel, reddish brown, moist, hard, fine to coarse sand, low plasticity, 2-inch thick gravel layer, fine to coarse subangular gravel, CaCO3 stringers	
155										
	30									

SAMPLE TYPES:

B BULK SAMPLE
C CORE SAMPLE
G GRAB SAMPLE
R RING SAMPLE
S SPLIT SPOON SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
AL ATTERBERG LIMITS
CN CONSOLIDATION
CO COLLAPSE
CR CORROSION
CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
EI EXPANSION INDEX
H HYDROMETER
MD MAXIMUM DENSITY
PP POCKET PENETROMETER
RV R VALUE

SA SIEVE ANALYSIS
SE SAND EQUIVALENT
SG SPECIFIC GRAVITY
UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-1

Project No. 10884.015
 Project Exposition Point - 38th and Figueroa
 Drilling Co. Choice Drilling
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location 34.015340, -118.282027

Date Drilled 1-19-23
 Logged By ECB
 Hole Diameter 8"
 Ground Elevation 182'
 Sampled By ECB

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
30		N S		R-7	40 50/6"	130	2	GW	@30': Well-graded GRAVEL, variety of gravel compositions/colors, slightly moist, very dense, fine to coarse subangular gravel, trace cobbles, fine to coarse sand matrix	
150				S-8	50/6"		3	SW	@35': Well-graded SAND with gravel, brown, slightly moist, very dense, fine to coarse sand, fine to coarse subrounded to subangular gravel	
35				R-9	50/6"	113	2		@40': Well-graded SAND with gravel, yellow brown, slightly moist, very dense, fine to coarse sand, some fine to medium subangular gravel	
145				S-10	50/6"		10			
40								CL	@46': CLAY, olive brown, moist, hard, trace fine sand, low plasticity	
140				R-11	29 50/6"	108	22		@50': CLAY, olive brown, very moist, hard, MnO specs, oxidized blebs, medium to high plasticity	
45										
135										
50										
130									T.D. 51 feet bgs No groundwater encountered during drilling Backfilled to surface with soil cuttings and concrete patched surface on 01/19/2023	
55										
125										
60										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-2

Project No. 10884.015
 Project Exposition Point - 38th and Figueroa
 Drilling Co. Choice Drilling
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location 34.014927, -118.282034

Date Drilled 1-19-23
 Logged By ECB
 Hole Diameter 8"
 Ground Elevation 182'
 Sampled By ECB

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
	0	N S		BB-1					@SURFACE: 3.5-inch Concrete Slab @0.3': Artificial fill, undocumented (Afu)	
180				S-1	1 1 1		8	SM	@2.5': Silty SAND, dark brown, very moist, loose, primarily fine to medium sand, trace fine subrounded gravel	
	5			S-2	3 4 5		5	SP	Quaternary young fluvial deposits (Qyf) @5': Poorly-graded SAND, light tannish brown, moist, loose, fine to medium sand, trace coarse sand	
175				R-3	8 12 15	103	4	SW	@7.5': Well-graded SAND, tannish brown, moist, medium dense, fine to coarse sand, trace fines, trace fine gravel	
	10			S-4	12 6 8		5	SP	@10': Poorly-graded SAND, light grayish brown, moist, medium dense, mostly fine sand, trace fine rounded gravel, micaceous	
170										
	15			R-5	12 16 21	106	3	GP	@15': Poorly-graded GRAVEL, variety of gravel compositions/colors, slightly moist, medium dense, primarily fine subangular gravel, matrix of fine to coarse sand	
165										
	20			S-6	16 50/5"			GW	@20': No Recovery, some material in sampler: Well-graded GRAVEL, some sand, cobbles	
160									T.D. 20.9 feet bgs (refusal due to mechanical issues) No groundwater encountered during drilling Backfilled to surface with soil cuttings and concrete patched surface on 01/19/2023	
	25									
155										
	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-3

Project No. 10884.015
 Project Exposition Point - 38th and Figueroa
 Drilling Co. Choice Drilling
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location 34.014218, -118.282075

Date Drilled 1-19-23
 Logged By JMW
 Hole Diameter 8"
 Ground Elevation 183'
 Sampled By JMW

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
180	0			BB-1				CLs	@SURFACE: 2.5-inch Asphalt over 3-inch Concrete Slab @0.45': Artificial fill, undocumented (Afu) Sandy Silty CLAY, olive brown, moist, trace fine to medium sand	CN, CR, DS, EI
175	5			S-1	2 3 3		6	SW-SM	@4': Quaternary young fluvial deposits (Qyf) @5': Well-graded SAND with silt, tan to brown, moist, loose, 1-foot of dark brown sandy silt over tan fine to medium sand	
175				R-2	7 12 21	100	2	SP	@7.5': Poorly-graded SAND, tan/beige, slightly moist, dense, primarily fine sand, some medium sand	
170	10			S-3	6 7 8		2	SW	@10': Well-graded SAND, tan/beige, slightly moist, medium dense, mostly fine to medium sand	
165	15			R-4	19 28 40	99	3		@15': very dense	
160	20			S-5	6 6 8		11	CL	@20': Sandy Silty CLAY, dark yellowish brown, moist, stiff, slightly mottled, oxidation, mostly fine sand, trace medium sand	
155	25			R-6	19 22 26	125	9	CL	@25': Pleistocene Age Soils Sandy CLAY, dark brown, moist, hard, some medium sand	
								GP	@27': GRAVEL layer, granitic gravels within a fine sand and clay matrix	
	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
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 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-3

Project No. 10884.015
 Project Exposition Point - 38th and Figueroa
 Drilling Co. Choice Drilling
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location 34.014218, -118.282075

Date Drilled 1-19-23
 Logged By JMW
 Hole Diameter 8"
 Ground Elevation 183'
 Sampled By JMW

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
30		N S		S-7	16 22 30		3	SW	@30': Well-graded SAND with gravel, tan/yellow/brown, slightly moist, very dense, mostly fine to medium sand, some coarse sand, slightly oxidized, some granitic gravel layers	
150				R-8	40 50/4"	102	5	GP SW	@37': GRAVEL layer	
145				S-9	21 30 33		20	CL	@40': Sandy CLAY, dark yellow brown and gray, moist, hard, mottled, oxidized, fine sand, micaceous	
140				R-10	33 50/5"	103	24	GP CL	@44': GRAVEL layer @45': Sandy CLAY, gray and dark reddish brown, moist, hard, mottled, oxidized, slightly laminated, some fine to medium sand	
135				S-11	25 33 45		16		@50': hard, higher percentage of sand	
130									T.D. 51.5 feet bgs No groundwater encountered during drilling Backfilled to surface with soil cuttings and asphalt patched surface on 01/19/2023	
55										
125										
60										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
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GEOTECHNICAL BORING LOG LB-4

Project No. 10884.015
 Project Exposition Point - 38th and Figueroa
 Drilling Co. Choice Drilling
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location 34.014909, -118.282544

Date Drilled 1-19-23
 Logged By JMW
 Hole Diameter 8"
 Ground Elevation 181'
 Sampled By JMW

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0	N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
180				BB-1				ML	@SURFACE: 2-inch Asphalt (No Base) @0.16': Artificial fill, undocumented (Afu) Sandy SILT, dark brown, moist, some fine sand, trace medium sand	
175	5			R-1	13 14 21	100	2	SW	Quaternary young fluvial deposits (Qyf) @5': Well-graded SAND, tannish brown, slightly moist, dense, mostly fine sand, some medium sand, trace coarse sand	
				S-2	11 8 10		4		@7.5': Well-graded SAND, tannish gray, moist, medium dense, mostly fine to medium sand, some coarse sand, trace medium gravel	
170	10			R-3	19 32 40	107	2	SP	@10': Poorly-graded SAND with gravel, grayish tan, slightly moist, very dense, primarily medium to coarse sand, some fine to medium gravel	
165	15			S-4	7 8 9		8	CL	@15': Sandy CLAY, brownish tan, moist, very stiff, mottled, slightly oxidized, mostly fine sand	
160	20			R-5	20 28 40	128	11	CL	Pleistocene Age Soils @20': Sandy Silty CLAY with gravel, dark brown, moist, hard, some coarse granitic gravel, slightly micaceous	
								GP	@22': GRAVEL layer	
								CL		
155	25			S-6	60 50/6"		2	SW	@25': Well-graded SAND, brown, slightly moist, very dense, mostly fine to medium sand, soe coarse sand, fractured granitic gravels in sample shoe	
30										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
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GEOTECHNICAL BORING LOG LB-4

Project No. 10884.015
 Project Exposition Point - 38th and Figueroa
 Drilling Co. Choice Drilling
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location 34.014909, -118.282544

Date Drilled 1-19-23
 Logged By JMW
 Hole Diameter 8"
 Ground Elevation 181'
 Sampled By JMW

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
150	30			R-7	45 50/3"	115	3		@30': Well-graded SAND with gravel, light tannish brown, moist, very dense, mostly medium to coarse sand, some fine sand, cobble in sample shoe T.D. 30.75 feet bgs No groundwater encountered during drilling Backfilled to surface with soil cuttings and asphalt patched surface on 01/19/2023	
145	35									
140	40									
135	45									
130	50									
125	55									
120	60									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
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APPENDIX B

Boring and CPT Logs (Exposition Point Explorations)

GEOTECHNICAL BORING LOG BH-1

Project No.	10884.005	Date Drilled	4-21-15
Project	cv	Logged By	AR
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	187'
Location	Figure 2A, Exploration Location Map	Sampled By	AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
	0	N S		BB-1	Bulk Driven			SM	@Surface: 1/2-inch heavily distressed, cracked and missing concrete	SA, MD
185									Artificial Fill, undocumented (Afu) @1/2": Silty SAND (SM), dark olive brown, moist, fine sand, trace medium sand 1% gravel, 81% sand, 18% fines	
	5			R-1	2 6 8	96	5	SP	Young Alluvial Fan Deposits (Qyf) @3.5': SAND (SP), light yellowish brown, moist, fine sand, trace medium sand @5': SAND (SP) loose, trace coarse sand, poorly graded	-200
180				R-2	5 8 14	104	4		@7': SAND (SP), medium dense, moist, fine to medium grained sand, trace coarse sand	
	10			R-3	6 7 11	98	6	SM	@10': Silty SAND (SM), light olive brown, moist, fine sand, trace medium and coarse sand	DS
175										
	15			S-1	3 4 3			SP-SM	@15': SAND with silt (SP-SM), light brown, moist, loose, fine sand, trace medium sand and coarse subrounded granitic gravel, poorly graded	-200
170										
	20			S-2	2 3 3			SM	@20': Silty SAND (SM), dark olive brown, slightly moist, loose, fine sand	-200
165										
	25			S-3	10 11 10			SP	@25': SAND (SP), light yellowish brown, slightly moist, medium dense, few mechanically broken coarse weathered granitic and metamorphic gravel, poorly graded	
160										
	30									

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING

AL ATTERBERG LIMITS

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CR CORROSION

CU UNDRAINED TRIAXIAL

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GEOTECHNICAL BORING LOG BH-1

Project No.	10884.005	Date Drilled	4-21-15
Project	cv	Logged By	AR
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	187'
Location	Figure 2A, Exploration Location Map	Sampled By	AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
155	30	N S		R-4	50/4"			SP	@30': Quaternary Old Alluvium (Qoa) SAND (SP), dark yellowish brown, dry to moist, very dense, fine to coarse sand, few silt lenses, gravelly in sample shoe, poorly graded	
150	35			S-4	15 30 38				@35': Gravelly SAND (SP), yellowish brown, dry to moist, very dense, fine to coarse sand, fine and coarse angular and highly weathered and decomposing granitic gravel, few mechanically crushed gravel, poorly graded	
145	40			S-5	8 14 21				@40': SAND (SP), light brown, slightly moist, dense, very fine to fine sand, poorly graded	
140	45			R-5	8 19 31			ML	@45': SILT (ML), light gray with oxide stains, moist, hard, laminated, few very fine sand laminations	
135	50			S-6	8 11 13			SP	@50': SAND (SP), light brown with oxide stains, slightly moist, medium dense, very fine grained, poorly graded	
130	55			R-6	15 38 50/4"			SM	@55' Silty SAND (SM) with sandy SILT (ML) interbeds, dark yellowish brown, moist, very dense/hard, very fine sand, thinly to thickly bedded	
60										

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING

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GEOTECHNICAL BORING LOG BH-1

Project No. 10884.005
 Project cv
 Drilling Co. Martini Drilling Corp.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location Figure 2A, Exploration Location Map

Date Drilled 4-21-15
 Logged By AR
 Hole Diameter 8"
 Ground Elevation 187'
 Sampled By AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
60		N S		S-7	4 10 11			ML	@60': SILT (ML), light gray to grayish brown with oxide stains, moist, very stiff, few very fine sand lenses	
125										
65				S-8	11 33 33			SP	@65': SAND (SP), light yellowish brown, slightly moist, very dense, fine sand, trace medium sand, poorly graded	
120										
70				S-9	7 19 28				@70': SAND (SP), yellowish brown, moist, dense, fine to medium sand, 1" thick oxide band stains, trace coarse subrounded gravel, poorly graded	
115									Notes: Total Depth: 71.5 feet bgs Boring hand augered in upper 5 feet No groundwater encountered during drilling Boring backfilled with soil cuttings and capped with asphalt patch	
75										
110										
80										
105										
85										
100										
90										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
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GEOTECHNICAL BORING LOG BH-2

Project No.	10884.005	Date Drilled	4-21-15
Project	cv	Logged By	AR
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	187'
Location	Figure 2A, Exploration Location Map	Sampled By	AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S			Bulk Driven				<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
185	0			BB-1					@Surface: 5-inches asphalt (AC), distressed and cracked Artificial Fill, undocumented (Afu) @0.5': Silty SAND (SM), dark brown, slightly moist, fine sand, trace rounded fine gravel	
180	5			R-1 BB-2	3 5 8	96	3	SP-SM	Young Alluvial Fan Deposits (Qyf) @3.5': SAND with Silt (SP-SM), light brown, moist, fine sand, trace medium sand, poorly graded @5': light olive brown, slightly moist, loose, fine to medium sand, poorly graded, 1% gravel, 90% sand, 9% fines	SA, MD
175	10			R-2	6 9 14	99	2	SP	@7': SAND (SP), light olive brown, medium dense, fine sand, friable, poorly graded	DS
170	15			R-3	6 11 15	99	4		@10': light brown, moist, fine to medium sand	
165	20			S-1	3 6 8				@12': trace medium sand, trace subrounded coarse granitic gravel	
160	25			R-4	6 12 15				@15': light yellowish brown, slightly moist, medium dense, fine to medium sand	
				S-2	3 5 6				@17': light brown, moist, fine to medium sand, trace coarse sand and decomposing granitic gravel	
				R-5	7 14 24				@20': yellowish brown, dense, fine to medium sand with few coarse lenses, becomes gravelly with depth	
				S-3	2 3 14			SM	@25': Silty SAND with Gravel (SM), dark olive brown, very moist, medium dense, angular gravel	SA
								SP	24% gravel, 46% sand, 30% fines @26.3': Quaternary Old Alluvium (Qoa) Gravelly SAND (SP), yellowish brown, moist, medium dense, fine to coarse sand	

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
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GEOTECHNICAL BORING LOG BH-2

Project No. 10884.005
 Project cv
 Drilling Co. Martini Drilling Corp.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location Figure 2A, Exploration Location Map

Date Drilled 4-21-15
 Logged By AR
 Hole Diameter 8"
 Ground Elevation 187'
 Sampled By AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
30		N S		R-6	44 50/3"			SP	@30': slightly moist, very dense, fine to coarse sand, angular gravel, mechanically broken cobble in sampler	
155				S-4	35 30 40				@35': light yellowish brown, dry to slightly moist, fine sand, few medium to coarse sand, mechanically broken coarse gravel and cobbles	
35				R-7	12 21 29			ML	@40': SILT (ML), light grayish brown with faint oxide stains, moist, very stiff, trace very fine sand	
150				S-5	8 12 17			SM	@45': Silty SAND (SM), light olive brown, slightly moist, medium dense, trace very fine sand	-200
40				R-8	8 13 26			CL	@50': CLAY (CL), olive brown, very stiff, lean, trace fine sand, trace oxide stains, laminated LL=34, PL=18, PI=16	AL
145				S-6	6 11 13			ML	@55': SILT (ML), light brown, slightly moist, very stiff, trace fine sand, trace oxide stains	
45										
140										
50										
135										
55										
130										
60										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
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 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG BH-2

Project No. 10884.005
 Project cv
 Drilling Co. Martini Drilling Corp.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location Figure 2A, Exploration Location Map

Date Drilled 4-21-15
 Logged By AR
 Hole Diameter 8"
 Ground Elevation 187'
 Sampled By AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
60				R-9	5 13 20			ML	@60': Brown with faint oxide stains, moist, very stiff, trace clay	
125										
65				S-7	3 6 14			CL	@65': CLAY (CL), light brown, becomes orangish brown at 65.5', slightly moist, very stiff, trace fine white sand	
120										
70				R-10	7 25 50/3"			CL	@70': orangish brown, slightly moist, hard, trace fine white sand	
115									Notes: Total Depth: 71.25 feet bgs Boring hand augered in upper 5-feet No groundwater encountered during drilling Boring backfilled with soil cuttings and patched with asphalt patch	
75										
110										
80										
105										
85										
100										
90										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
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GEOTECHNICAL BORING LOG BH-3

Project No.	10884.005	Date Drilled	4-21-15
Project	cv	Logged By	AR
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	185'
Location	Figure 2A, Exploration Location Map	Sampled By	AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
185	0			BB-1				SM	@Surface: 3-inches asphalt (AC) over 3-inches aggregate base (AB) Artificial Fill, undocumented (Afu) @0.5': Silty SAND (SM), olive brown, slightly moist, fine sand, few medium sand, non-expansive (very low)	EI, CR
180	5			R-1	2 3 5	106	7	SM	Young Alluvial Fan Deposits (Qyf) @5': Silty SAND (SM), light olive brown, slightly moist, loose, fine sand, trace medium sand	DS, -200
				R-2	5 8 10	95	3	SP	@7': SAND (SP), light grayish brown, moist, medium dense, fine sand, few medium to coarse sand	
175	10			R-3	5 10 11	96	2	SM	@10': Silty SAND (SM), light brown, slightly moist, medium dense, fine sand, friable	DS
170	15			S-1	2 2 2			ML	@15': SILT (ML), olive brown, moist, soft to medium stiff, trace very fine sand, laminated	
165	20			R-4	5 10 13			SP	@20': SAND (SP), brown, moist, medium dense, fine sand, trace coarse granitic gravel	
160	25			S-2	3 5 8			SM	@25': Silty SAND with Gravel (SM), strong brown, moist, medium dense, fine to coarse sand, angular decomposing granitic gravels	
155	30									

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING

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GEOTECHNICAL BORING LOG BH-3

Project No. 10884.005
 Project cv
 Drilling Co. Martini Drilling Corp.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location Figure 2A, Exploration Location Map

Date Drilled 4-21-15
 Logged By AR
 Hole Diameter 8"
 Ground Elevation 185'
 Sampled By AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
155	30			R-5	50/3"			SP	<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i> @30': Quaternary Old Alluvium (Qoa) Gravelly SAND (SP), brown, moist, very dense, angular gravel Notes: Total Depth: 30.3 feet bgs Boring hand augered in upper 5-feet No groundwater encountered during drilling Boring backfilled with soil cuttings and patched with asphalt patch	
150	35									
145	40									
140	45									
135	50									
130	55									
125	60									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
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 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG BH-4

Project No.	10884.005	Date Drilled	4-21-15
Project	cv	Logged By	AR
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	187'
Location	Figure 2A, Exploration Location Map	Sampled By	AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S			Bulk Driven				<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
185	0			BB-1				SP	@Surface: 4-inches asphalt (AC) Artificial Fill, undocumented (Afu) @0.3': SAND (SP), olive brown, moist, fine to medium sand	
								SP	Young Alluvial Fan Deposits (Qyf) @3': SAND (SP), light yellowish brown, moist, fine sand, poorly graded	
180	5			R-1	3 8 11	102	3	SP-SM	@5': SAND with silt (SP-SM), dark brown, moist, loose, fine sand, few medium to coarse sand, poorly graded	-200
				R-2	6 10 13	97	2		@7': Light grayish brown, medium dense	
175	10			R-3	7 15 12	118	3		@10': light yellowish brown, few medium to coarse sand, trace subrounded gravel	
170	15			R-4	18 20 22				@15': light grayish brown, dense	
165	20			S-1	2 3 3			SM	@20': Silty SAND (SM), brown, moist, loose, very fine sand	
				S-2	3 5 6				@22.5': olive brown, medium dense	-200
160	25			R-5	5 10 12				@25': brown, trace gray sand lenses, trace coarse sand and fine gravel	
	30									

SAMPLE TYPES:

B BULK SAMPLE
C CORE SAMPLE
G GRAB SAMPLE
R RING SAMPLE
S SPLIT SPOON SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG BH-4

Project No. 10884.005
 Project cv
 Drilling Co. Martini Drilling Corp.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location Figure 2A, Exploration Location Map

Date Drilled 4-21-15
 Logged By AR
 Hole Diameter 8"
 Ground Elevation 187'
 Sampled By AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
30				S-3	7			SP	@30': SAND (SP), dark yellowish brown, moist, medium dense, fine to medium sand, few coarse sand, trace fine and coarse angular gravel, poorly graded	
155					9				Notes: Total Depth: 31.5 feet bgs Boring hand augered in upper 5-feet No groundwater encountered during drilling Boring backfilled with soil cuttings and patched with asphalt patch	
35					10					
150										
40										
145										
45										
140										
50										
135										
55										
130										
60										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
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GEOTECHNICAL BORING LOG BH-5

Project No. 10884.005
 Project cv
 Drilling Co. Martini Drilling Corp.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location Figure 2A, Exploration Location Map

Date Drilled 4-21-15
 Logged By AR
 Hole Diameter 8"
 Ground Elevation 186'
 Sampled By AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S			Bulk Driven				<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
185	0			BB-1				SP	@Surface: 4-inches asphalt (AC) Artificial Fill, undocumented (Afu) @0.3': SAND (SP), olive brown, moist, fine sand, few medium sand, poorly graded	
180	5			R-1	4 5	100	4	SP	Young Alluvial Fan Deposits (Qyf) @3.5': SAND (SP), light yellowish brown, very moist, fine sand, few medium sand, friable, poorly graded @5': moist, medium dense, fine sand	
				R-2	6 10	98	4		@7': yellowish brown, trace oxide staining	
175	10			R-3	7 12	101	3		10': Gravelly SAND (SP), yellowish brown, moist, medium dense, fine to coarse sand, fine and coarse subrounded gravel, grades finer with depth, poorly graded	
170	15			R-4	8 14				@15': SAND (SP), light yellowish brown, fine to coarse sand, moist, medium dense, friable	
165	20			S-1	3 4			SM	@20': Silty SAND (SM), olive brown, moist, loose, fine to medium sand	
				S-2	5 7			SP-SM	@22': SAND with silt (SP-SM), olive brown, moist, medium dense, fine sand, poorly graded	-200
160	25			R-5	9 16			SP	@25': Quaternary Old Alluvium (Qoa) SAND (SP), light yellowish brown, slightly moist, dense, few zones of fine gravel	
30										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
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GEOTECHNICAL BORING LOG BH-5

Project No. 10884.005
 Project cv
 Drilling Co. Martini Drilling Corp.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location Figure 2A, Exploration Location Map

Date Drilled 4-21-15
 Logged By AR
 Hole Diameter 8"
 Ground Elevation 186'
 Sampled By AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
155	30			S-3	18 20			SP/GP	<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i> @30': Gravelly SAND to Sandy GRAVEL (SP/GP), light brown, slightly moist, dense, fine to coarse sand, fine to coarse mechanically broken gravel, poorly graded Notes: Total Depth: 31.5 feet bgs Boring hand augered in upper 5-feet No groundwater encountered during drilling Boring backfilled with soil cuttings and patched with asphalt patch	
150	35									
145	40									
140	45									
135	50									
130	55									
125	60									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG BH-6

Project No. 10884.005
 Project cv
 Drilling Co. Martini Drilling Corp.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location Figure 2A, Exploration Location Map

Date Drilled 9-21-15
 Logged By AR
 Hole Diameter 8"
 Ground Elevation 186'
 Sampled By AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S			Bulk Driven				<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
185	0			BB-1				SP	@Surface: 3 inches asphalt concrete, no base Artificial Fill, undocumented (Afu) @0.25': SAND (SP), dark brown, moist, loose, fine sand, few medium sand, trace silt, some asphalt fragments, poorly graded	
180	5			S-1	2 2 3			SW-SM	Quaternary Young Alluvial Fan Deposits (Qyf) @5.25': SAND with Silt (SW-SM), light brown, slightly moist, loose, fine sand, friable, well graded 1%gravel, 89%sand, 10%fines	SA
175	10			R-1	17 16 12	111	4	SP-SM	@10': SAND with silt (SP-SM), light brown, moist, medium dense, fine to coarse sand, few fine subrounded gravel, quartz rich granitic cobble in upper portion of sampler, poorly graded	
170	15			S-2	6 4 3			SP	@15': SAND (SP), pale brown, slightly moist, loose, fine sand, friable, poorly graded, trace silt 2%gravel, 96%sand, 2%fines	SA
165	20			R-2	6 4 8	105	22	CL	@20': Lean CLAY (CL), olive brown, moist, stiff, fine sand, trace fine rounded gravel	CN
160	25			S-3	5 6 8			SP	@25': SAND (SP), light brown, slightly moist, medium dense, fine sand, trace coarse subrounded gravel, friable	
	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG BH-6

Project No.	10884.005	Date Drilled	9-21-15
Project	cv	Logged By	AR
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	186'
Location	Figure 2A, Exploration Location Map	Sampled By	AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
155	30			R-3	10 10 13	118	14	CL-ML	@30': Silty CLAY (CL-ML), dark brown, moist, very stiff, trace fine to coarse sand, trace fine and coarse subrounded gravel	CN
150	35			S-4	12 17 18			GP	@35': Quaternary Old Alluvium (Qoa) Sandy GRAVEL (GP), grayish brown, slightly moist, dense, fine to coarse sand, very weathered fine and coarse mechanically broken granitic gravel @36': Rig chatter	
145	40			R-4	50/5"			SP	@40': SAND (SP), brown, moist, very dense, fine to coarse sand, poorly graded	
140	45			S-5	40 50/5"			GP	@45': Sandy GRAVEL (GP), light grayish brown, slightly moist, very dense, fine to coarse sand, very weathered fine and coarse mechanically broken granitic gravel @47': Cobbles in soil cuttings	
135	50			S-6	15 19 22			SP	@50': SAND (SP), light brown to brown, slightly moist, dense, fine sand, friable, poorly graded	
130	55			S-7	9 13 14			ML	@55': Sandy SILT (ML), olive brown, moist, stiff, fine sand 1%gravel, 49%sand, 50%fines	SA
60	60									

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG BH-6

Project No.	10884.005	Date Drilled	9-21-15
Project	cv	Logged By	AR
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	186'
Location	Figure 2A, Exploration Location Map	Sampled By	AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
125	60	N S		S-8	8 14 19			ML	@60': Trace fine to medium sand, stiff	
120	65			S-9	6 11 15			CL	@65': Lean CLAY (CL), brown, moist, stiff, trace fine to medium sand, micaceous LL=31, PL=17, PI=14	AL
115	70			S-10	4 19 23			SP	@70.5': SAND (SP), gray to orange gray, moist, dense, very fine sand, abundant oxide staining, poorly graded	
110	75			S-11	16 23 30				@75': SAND (SP), light brown, moist, very dense, fine sand, trace medium sand, friable, poorly graded	
105	80			S-12	21 25 36				@80': SAND (SP), light brown, slightly moist to moist, very dense, fine to medium sand, trace mechanically broken granitic gravel, poorly graded	
100	85			S-13	14 21 24			SP-SM	@85': SAND with silt (SP-SM), light brown, slightly moist, dense, fine sand, slightly micaceous, poorly graded 94% sand, 6% fines	SA
90										

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG BH-6

Project No.	10884.005
Project	cv
Drilling Co.	Martini Drilling Corp.
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location	Figure 2A, Exploration Location Map

Date Drilled	9-21-15
Logged By	AR
Hole Diameter	8"
Ground Elevation	186'
Sampled By	AR

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION		Type of Tests
									<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>		
90		N S		S-14	5 20 25			CL	@90': Lean CLAY (CL), olive brown, slightly moist, hard LL=27, PL=17, PI=10		AL
95				S-15	10 17 26			SM	@95': Silty SAND (SM), light reddish brown, moist, dense, fine sand, trace coarse rounded sand		
100				S-16	20 29 32			SP	@100': SAND (SP), yellowish brown, moist, very dense, fine to medium sand, trace coarse sand, friable, poorly graded		
85									Notes: Total Depth: 101.5 feet bgs No groundwater encountered during drilling Boring backfilled with soil cuttings and capped with cold patch asphalt 9/21/15		
105											
80											
110											
75											
115											
70											
120											

SAMPLE TYPES:
B BULK SAMPLE
C CORE SAMPLE
G GRAB SAMPLE
R RING SAMPLE
S SPLIT SPOON SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:
-200 % FINES PASSING
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GEOTECHNICAL BORING LOG BH-7

Project No.	10884.005	Date Drilled	1-27-16
Project	cv	Logged By	EMH
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	187'
Location	Figure 2A, Exploration Location Map	Sampled By	EMH

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
	0	N S		BB-1	Bulk Driven			SM	@0': ~3-inches Concrete Artificial Fill (Afu): Silty SAND (SM), brown, fine to medium sand	
185										
	5							SP	Quaternary Young Alluvial Fan Deposits (Qyf) @3': SAND (SP), tan, slightly moist, fine to medium sand, trace silt	
180				R-1	6 9 12	101	2		@7': SAND (SP), tan, slightly moist, medium dense, fine to medium sand, few coarse sand, trace fine gravel	
	10			S-1	3 2 2				@10': very loose, with thin lamination of sandy silt	
175										
	15			R-2	6 15 20	99	3		@15': SAND (SP), tan, slightly moist, medium dense, mostly fine to medium sand, few coarse sand, trace silt, coarse gravel near tip	
170										
	20			S-2	3 3 4			SM	@20': Silty SAND (SM), light reddish brown, slightly moist, fine sand, occasional medium grained sand, nonplastic	AL
165										
	25			R-3	6 11 15				@25': Silty SAND with Gravel (SM), light reddish brown, slightly moist, very stiff, fine to medium sand, few coarse sand, few fine gravels	CN
160										
	30									

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING

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GEOTECHNICAL BORING LOG BH-7

Project No.	10884.005	Date Drilled	1-27-16
Project	cv	Logged By	EMH
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	187'
Location	Figure 2A, Exploration Location Map	Sampled By	EMH

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
155	30			S-3	12 17 18			SP	@30': Quaternary Old Alluvium (Qoa) SAND with Gravel (SP), tan, slightly moist, dense, fine to coarse sand, fine subangular granitic gravels	
150	35			R-4	37 50/5"			GP	@35': Sandy Gravel (GP), tan, slightly moist, fine to coarse subrounded granitic gravels, fine to coarse sand	
145	40			S-4	6 12 12			ML	@40': Sandy SILT (ML), olive brown to brown, slightly moist, very stiff, laminated with silt and clayey silt, slightly gleyed and mottled	
140	45			R-5	8 21 36			SM	@45': Silty SAND (SM), mottled orangish brown, tan and light grayish brown, fine sand, gleyed and oxidized, laminated	
135	50			S-5	7 12 12			CL	@50': grades into Silty CLAY (CL), olive brown, slightly moist, very stiff, few fine sand, oxidation staining, MnO spotting, medium plasticity	
130	55			S-6	8 11 13			ML	@55': Sandy SILT to SILT (ML), mottled orange and light gray, fine sand, laminated, oxidized and gleyed, trace clay, low plasticity	
60										

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING

AL ATTERBERG LIMITS

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GEOTECHNICAL BORING LOG BH-7

Project No.	10884.005	Date Drilled	1-27-16
Project	cv	Logged By	EMH
Drilling Co.	Martini Drilling Corp.	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	187'
Location	Figure 2A, Exploration Location Map	Sampled By	EMH

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S			Bulk Driven				<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
60				S-7	12 25 39			SP	@60': SAND (SP), tan, slightly moist, very dense, fine to medium sand, trace coarse sand and fine gravel, slightly oxidized, trace silt	
125										
65				S-8	12 38 33				@65': abundant subangular to subround gravels in tip of sampler	
120										
70				S-9	6 11 17			CL	@70': Sandy CLAY (CL), reddish brown, slightly moist, very stiff, fine to medium sand, faintly laminated, low to medium plasticity, poorly developed blocky structure, little silt	
115										
75				S-10	9 11 16			ML	@75': Sandy SILT with Clay (ML), reddish brown to olive brown, slightly moist, very stiff, fine sand, little clay, MnO spotting, poorly developed blocky structure with shimmer on faces, grades into SAND (SP) in tip.	
110										
80				S-11	14 35 40			SP	@80': SAND with Gravel (SP), orange to tannish brown, slightly moist, very dense, mostly fine to medium sand, grades coarser with fine gravels increasing, subrounded gravels	
105										
85				S-12	15 32 40				@85': SAND (SP), dark tannish brown, slightly moist, very dense, fine to coarse sand, trace fine subrounded gravels	
100										
90										

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG BH-7

Project No. 10884.005
 Project cv
 Drilling Co. Martini Drilling Corp.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location Figure 2A, Exploration Location Map

Date Drilled 1-27-16
 Logged By EMH
 Hole Diameter 8"
 Ground Elevation 187'
 Sampled By EMH

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
90				S-13	15 34 43				@90': SAND with Gravel (SP), tan, slightly moist, very dense, fine to coarse sand, fine subrounded granitic gravels, trace silt	
95				S-14	50/3"				@95': SAND with Gravel (SP), tan, slightly moist, very dense, fine to coarse sand, fine subrounded granitic gravels, trace silt, grades slightly coarser	
100				S-15	21 34 43				@100': SAND (SP), light tan, mostly fine to medium sand, trace coarse sand, trace silt	
85									Notes: Total Depth: 101.5 feet bgs No groundwater encountered during drilling Boring backfilled with soil cuttings and patched with rapid-set concrete	
105										
80										
110										
75										
115										
70										
120										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
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GEOTECHNICAL BORING LOG LP-1

Project No.	10884.008	Date Drilled	8-15-17
Project	Student Housing, Mixed Income and Hotel	Logged By	SAM
Drilling Co.	Martini Drilling Corporation	Hole Diameter	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	Ground Elevation	'
Location	See Figure 2 - Geotechnical Exploration Map	Sampled By	SAM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0	N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
									@0' to 10': Continuous drilling	
	5									
	10			S1	5 10 11			SP	Quaternary young fluvial deposits: (Qyf) @10': SAND (SP), brown, fine grained, moist @10.2': SAND (SP), yellow brown to olive brown, medium dense, slightly moist, fine to coarse grained, trace fine subrounded gravel, thin laminations every inch to half-inch	
	15			S2	5 9 11				@15': Fine to medium grained sand, no gravel, slightly oxidized	
	20			S3	3 4 6			SM	@20': Silty SAND (SM), medium brown, loose, fine grained, trace pea-sized subrounded gravel, trace coarse grained sand	
	25			S4	4 6 7			SP-ML	@25': Interlayered SAND and Sandy SILT (SP-ML), dark brown, loose/stiff, some fine gravel, trace clay	
	30									

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING

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GEOTECHNICAL BORING LOG LP-1

Project No. 10884.008
Project Student Housing, Mixed Income and Hotel
Drilling Co. Martini Drilling Corporation
Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location See Figure 2 - Geotechnical Exploration Map

Date Drilled 8-15-17
Logged By SAM
Hole Diameter 8"
Ground Elevation '
Sampled By SAM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
30				S5	16 35 19			SP	Quaternary alluvium: (Qal) @30': SAND (SP), light orange brown to yellow brown, dense, slightly moist, fine to coarse grained, some crushed gravels, less than 1-inch long dimension, subrounded @32': Light rig chatter	
35				S6	30 25 21			SM	@35': Some light tan silt and fine grained sand, patches of heavy oxidation, decreasing with depth, weathered gravels, can be pulverized with fingers	
40				S7	6 15 17			ML SM	@40': SILT (ML), yellow to olive brown, hard, slightly moist, some fine to medium grained sand, very light oxidation in patches, minor gleying @41': Silty SAND (SM), light yellow brown, medium dense, slightly moist, fine grained	
45				S8	12 12 13			ML	@45': Sandy SILT (ML), yellow to olive brown, very stiff, slightly moist, fine grained sand, lightly oxidized, increased gleying with depth	
50				S9	8 14 18			SM	@50': Grades to Silty SAND (SM), yellow to olive brown, medium dense, slightly moist, fine grained, decreased gleying with depth and increased oxidation with depth	
55				S10	7 17 19			ML	@55': Sandy SILT (ML), yellow to olive brown, hard, slightly moist, fine grained sand, some gleying and light oxidation along parting surfaces	
60										

SAMPLE TYPES:
 B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:
 -200 % FINES PASSING
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GEOTECHNICAL BORING LOG LP-1

Project No. 10884.008
Project Student Housing, Mixed Income and Hotel
Drilling Co. Martini Drilling Corporation
Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location See Figure 2 - Geotechnical Exploration Map

Date Drilled 8-15-17
Logged By SAM
Hole Diameter 8"
Ground Elevation '
Sampled By SAM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
60				S11	6 22 38			ML SP	@60': SILT (ML), olive brown, hard, slightly moist, oxidized along parting surfaces, trace fine grained sand @60.5': SAND (SP), orange brown, dense, slightly moist, fine to medium grained, trace coarse grained sand, grades to moderately oxidized with depth, some silt @62.5': Becomes fine to coarse grained, some fine to pea-sized subangular to subrounded gravel, oxidation decreases with depth, some silt	
				S12	20 31 50/6"					
65				S13	21 36 37			SP-GP	@65': Trace gravel @65.5': Silty SAND (SM), dark brown, moist	
				S14	13 43 50/5"				@67.5': SAND (SP), orange brown, dense, slightly moist, fine to medium grained, fine to coarse grained, some fine to pea-sized subangular to subrounded gravel, oxidation decreases with depth, some silt @69': Gravelly SAND (SPg), tan, very dense, fine to medium grained, fine to pea-sized subrounded gravels	
70									Total Depth of Boring: 71.4 Feet No groundwater encountered during drilling Temporary percolation well installed on 8/15/2017. Percolation Test run from 60 to 70 feet on 8/16/2017.	
75										
80										
85										
90										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG LP-2

Project No. 10884.008
Project Student Housing, Mixed Income and Hotel
Drilling Co. Martini Drilling Corporation
Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location See Figure 2 - Geotechnical Exploration Map

Date Drilled 8-15-17
Logged By SAM
Hole Diameter 8"
Ground Elevation '
Sampled By SAM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0	N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
									@0' to 10': Continuous drilling	
	5									
	10			S1	4 5 7			SM	Q_{uf} @10': Silty SAND (SM), dark brown, slightly moist, fine grained @10.5': Silty SAND (SM), yellow to olive brown, loose, slightly moist, fine grained, micaceous, trace fine subrounded gravels	
	15			S2	5 7 6				@15': Fine to medium grained	
	20			S3	3 4 5			ML	@20': Sandy SILT (ML), brown, stiff, slightly moist, fine grained sand, some clay, trace fine subrounded gravels	
	25			S4	5 7 9			SM	@25': Silty SAND (SM), dark yellow brown, medium dense, slightly moist, fine grained, micaceous	
	30									

SAMPLE TYPES:
 B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:
 -200 % FINES PASSING
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GEOTECHNICAL BORING LOG LP-2

Project No. 10884.008
Project Student Housing, Mixed Income and Hotel
Drilling Co. Martini Drilling Corporation
Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location See Figure 2 - Geotechnical Exploration Map

Date Drilled 8-15-17
Logged By SAM
Hole Diameter 8"
Ground Elevation '
Sampled By SAM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
30				S5	22 30 30			SP	Quaternary alluvium: (Qal) @30': SAND (SP), orange brown, dense, slightly moist to dry, fine to coarse grained, some crushed gravels, up to 1-inch long dimension, subrounded, patches of heavier oxidation, some silt	
35				S6	21 24 22				@35': Lightly oxidized, with heavier oxidation around gravels	
40				S7	22 23 25				@38': Rig chatter	
45				S8	10 18 23				@45': SAND (SP), yellow brown, medium dense, slightly moist to dry, fine to medium grained, trace coarse grained sand, micaceous	
50				S9	15 15 28			SP-ML	@50': Interlayered SAND and Sandy SILT (SP-ML), sand is yellow brown, medium dense, slightly moist to dry, fine to medium grained, sandy silt is olive brown, hard, slightly moist, fine to coarse grained sand	
55				S10	4 11 18			ML	@52.5': SILT (ML), olive brown, very stiff, dry to slightly moist, pinholes with oxidation and abundant gleying in top half, oxidized thin laminations begin @54 feet	
				S11	10 19 27			CL-ML	@54': CLAY (CL) in shoe @55': Silty CLAY (CL-ML), dark brown, slightly moist, oxidation and gleying along parting surfaces, trace MnO stringers and concretions	
				S12	9 14 13			ML	@57.5': Sandy SILT (ML), olive brown to orange brown, very stiff, slightly moist, very fine to fine grained sand, patches of oxidation laminations at depth @59': Silty CLAY (CL-ML), dark brown, slightly moist, oxidation	
60										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
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GEOTECHNICAL BORING LOG LP-2

Project No. 10884.008
Project Student Housing, Mixed Income and Hotel
Drilling Co. Martini Drilling Corporation
Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location See Figure 2 - Geotechnical Exploration Map

Date Drilled 8-15-17
Logged By SAM
Hole Diameter 8"
Ground Elevation '
Sampled By SAM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
60									and gleying along parting surfaces, trace MnO stringers and concretions Total Depth of Boring: 60 Feet No groundwater encountered during drilling Temporary percolation well installed on 8/15/2017. Percolation Test run from 50 to 60 feet on 8/16/2017.	
	65									
	70									
	75									
	80									
	85									
90										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
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 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LP-1

Project No. 10884.014
 Project LMP USC Property - Figueroa Street
 Drilling Co. Martini Drilling Corporation
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 1 - Geotechnical Exploration Map

Date Drilled 1-4-23
 Logged By JWJ
 Hole Diameter 8"
 Ground Elevation '
 Sampled By JWJ

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
	0	N S						SM	Artificial fill, undocumented: (Afu) @0': 6-inches Asphalt Concrete (AC) over 1-inch Aggregate Base (AB) @7-inches: Silty SAND, light yellow brown, moist, mostly fine grained, trace coarse gravel, trace clay @1' to 5': Silty SAND, as above, light yellow brown, moist, mostly fine grained, trace coarse grained sand Quaternary young fluvial deposits: (Qyf) @5': Fine to medium grained	
	5							SM		
	10									
	15									
	20			S-1	3 4 5			SM	@20': Silty SAND, medium dense, medium brown, moist, mostly fine grained, trace coarse grained sand Gravel = 2%; Sand = 70%; fines = 28%	SA
	25			S-2-1 S-2-2	5 34 25			GP SM-SC SW-SM	@22' to 25': Sandy GRAVEL, poorly-graded @25': Silty SAND with Clay, loose to medium dense, reddish brown, wet @26': Transition to Well-Graded SAND with silt, very dense, white to light yellow, dry, pulverized granitic rock clasts Gravel = 9%; Sand = 82%; fines = 9%	CR SA
	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
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GEOTECHNICAL BORING LOG LP-1

Project No. 10884.014
 Project LMP USC Property - Figueroa Street
 Drilling Co. Martini Drilling Corporation
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 1 - Geotechnical Exploration Map

Date Drilled 1-4-23
 Logged By JWJ
 Hole Diameter 8"
 Ground Elevation '
 Sampled By JWJ

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
30		N S		S-3	22 22 21			GP	@30': Sandy GRAVEL, very dense, white to yellow, dry, fine to medium grained sand, granitic rock fragments, mechanically broken	CR
35				S-4	2 3 17			SM-SC GP	@35': Silty Clayey SAND, loose, olive gray to yellow orange brown @36': Transition, ~1-inch heavily oxidized layer, becomes Sandy GRAVEL, orange brown to white, medium dense to dense, fine to coarse grained sand, subangular granitic gravels	
40				S-5	7 12 15			SM	@40': Silty SAND, dense, yellow orange brown, moist, fine grained	
45									Total Depth of Boring: 41.5 feet No groundwater encountered during drilling Boring converted to percolation test well, screen interval @20' to 40', annulus filled with No. 3 Monterey SAND in test zone.	
50										
55										
60										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG LP-2

Project No. 10884.014
 Project LMP USC Property - Figueroa Street
 Drilling Co. Martini Drilling Corporation
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 1 - Geotechnical Exploration Map

Date Drilled 1-4-23
 Logged By JWJ
 Hole Diameter 8"
 Ground Elevation '
 Sampled By JWJ

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0	N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
								SM	Artificial fill, undocumented: (Afu) @0': 8-inches Asphalt Concrete (AC) over Subgrade @8-inches: Silty SAND, dark brown, moist, well-graded, trace coarse grained sand	
								SP	Quaternary young fluvial deposits: (Qyf) @2.5': Poorly-graded SAND, light tan to beige, moist, well-graded, some fine grained, some medium grained sand, trace coarse grained sand	
	5									
	10									
	15									
	20							SM	@20': Silty SAND, dark yellow brown, moist, mostly medium grained sand, trace coarse grained sand, trace gravel	
	25								@25': Rig Chatter, Silty SAND, dark yellow brown, moist, mostly fine grained sand, few coarse grained sand, few coarse grained gravel	
	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG LP-2

Project No. 10884.014
Project LMP USC Property - Figueroa Street
Drilling Co. Martini Drilling Corporation
Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location See Figure 1 - Geotechnical Exploration Map

Date Drilled 1-4-23
Logged By JWJ
Hole Diameter 8"
Ground Elevation '
Sampled By JWJ

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
30		N S						GP	@30': GRAVEL layer, dissipated	
								SM	@31': Silty SAND, dark yellow brown, moist, mostly fine grained sand, few coarse grained sand, few coarse grained gravel	
35										
40				S-1	10 19 24			SP-SM	@40': Poorly Graded SAND with silt, tan to light brown, moist, very dense, mainly medium to coarse grained sand, trace fine gravel, well graded, fine gravels to 45 feet Gravel = 1%; Sand = 92%; fines = 7%	SA
45				S-2	23 50/4"			GP-GM	@45': No Recovery, some coarse gravels in soil cuttings, sandy matrix	
50				S-3	6 11 34			CL-ML SW-SM	@50': Poor Recovery, granitic rock, mechanically broken in sampler Gravel = 60%; Sand = 10%; fines = 30% @51.5' Silty CLAY, dark brown, moist, hard, trace coarse gravel	SA
55				S-4	7 16 17			ML	@55': Sandy SILT, light gray and tan, mostly fine grained, hard, cross-bedding of oxidized and non-oxidized soil	CR
60										

SAMPLE TYPES:

B BULK SAMPLE
C CORE SAMPLE
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S SPLIT SPOON SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

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GEOTECHNICAL BORING LOG LP-2

Project No. 10884.014
 Project LMP USC Property - Figueroa Street
 Drilling Co. Martini Drilling Corporation
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 1 - Geotechnical Exploration Map

Date Drilled 1-4-23
 Logged By JWJ
 Hole Diameter 8"
 Ground Elevation '
 Sampled By JWJ

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
60				S-5	9 15 16			ML	@60': Yellow brown.	
									Total Depth of Boring: 61.5 feet No groundwater encountered during drilling Boring converted to percolation test well, screen interval @40' to 60', annulus filled with No. 3 Monterey SAND in test zone.	
65										
70										
75										
80										
85										
90										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LP-3

Project No. 10884.014
 Project LMP USC Property - Figueroa Street
 Drilling Co. Martini Drilling Corporation
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 1 - Geotechnical Exploration Map

Date Drilled 1-4-23
 Logged By JWJ
 Hole Diameter 8"
 Ground Elevation '
 Sampled By JWJ

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0	N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
	0							SM	@0': 4-inches Asphalt Concrete (AC) over 5-inches Aggregate Base (AB) @9-inches: Silty SAND, dark brown, moist, fine grained	
	5							SP	Quaternary young fluvial deposits: (Qyf) @3': Poorly-graded SAND, tan and beige, moist, mostly medium grained sand, no apparent change to 23'	
	10									
	15									
	20									
	25							SW-SM	@23': Silty SAND with Gravel, tan and beige, moist,, fine to coarse grained sand @28': Rig Chatter	
	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
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 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LP-3

Project No. 10884.014
Project LMP USC Property - Figueroa Street
Drilling Co. Martini Drilling Corporation
Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
Location See Figure 1 - Geotechnical Exploration Map

Date Drilled 1-4-23
Logged By JWJ
Hole Diameter 8"
Ground Elevation '
Sampled By JWJ

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
	30	N S		S-1	12 16 21			SP-SM	@35': Poorly Graded SAND with silt and gravel, brown and tan, moist, dense, fine grained, trace fine gravel, few medium gravel, ~2-inch long dimension Gravel = 29%; Sand = 65%; fines = 6%	SA
	35			S-2	50/6"			ML	@35': Sandy SILT, gray and tan/red, moist, hard, mainly fine grained, trace medium grained sand, cross-bedding of oxidized and unoxidized layersm gravelly sand in shoe	
	40			S-3	14 29 50/6"			SW-SM	@40': Silty Gravelly SAND, gray to tan, moist, very dense, mostly medium grained sand, few fine gravels, granitic rock clasts, mechanically broken @46.5'	
	45			S-4	10 20 24			SP-SM	@45': Poorly-graded SAND with silt, beige to light tan, moist, very dense, trace fine gravel, with silt Gravel = 0%; Sand = 93%; fines = 7%	SA
								SW	@47': Gravel bed, with trace cobbles	
								SP	@48': Poorly-graded SAND, tan to light beige, slightly moist, dense, mostly fine grained, moist	
	50			S-5	9 17 18			CL-ML	@51': Silty CLAY, dark brown, moist, low plasticity	
									Total Depth of Boring: 51.5 feet No groundwater encountered during drilling Boring converted to percolation test well, screen interval @30' to 50', annulus filled with No. 3 Monterey SAND in test zone.	
	55									
	60									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
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SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH





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

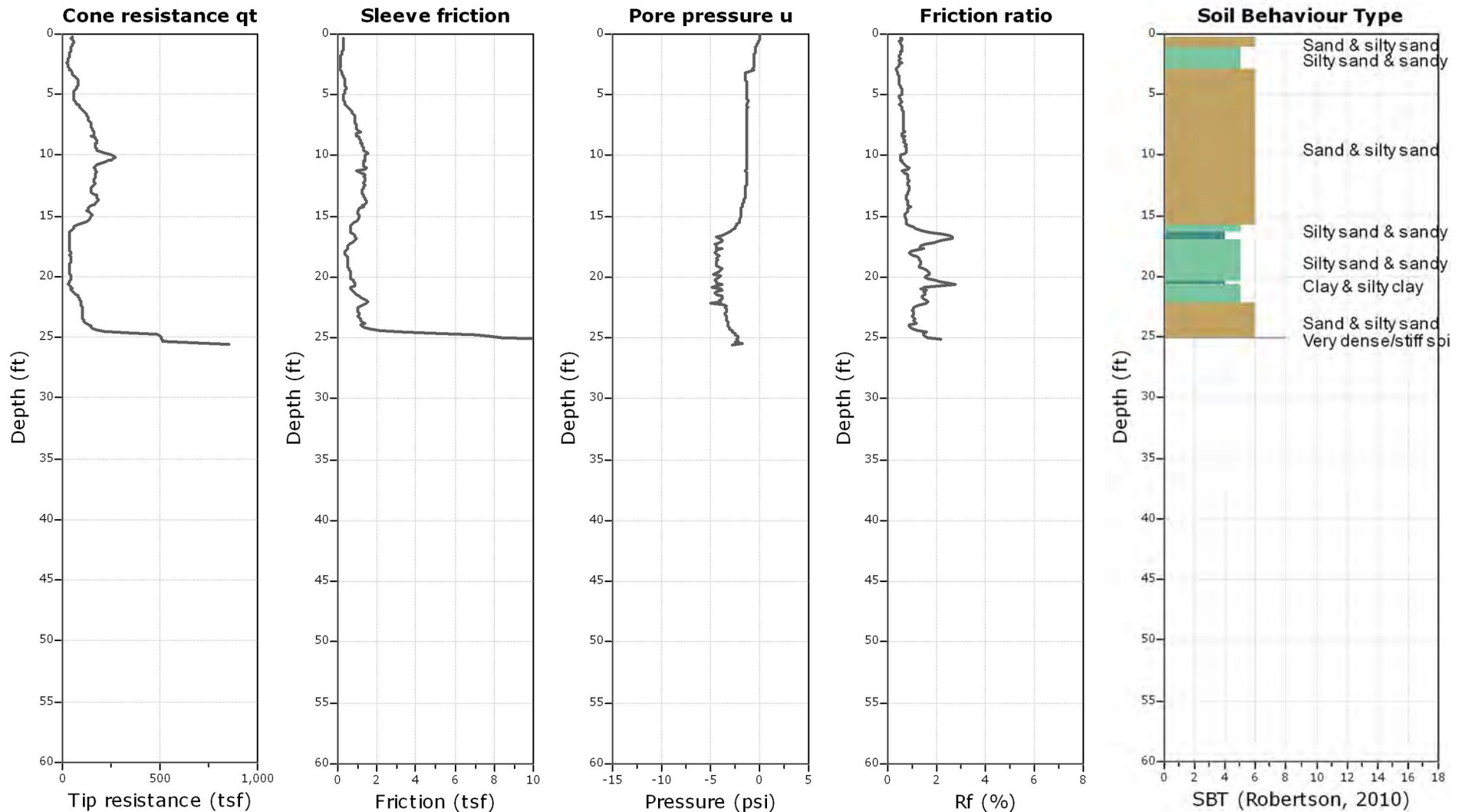
Project: Leighton & Associates/Spectrum Fig & Flower

Location: S. Figueroa St & W. 39th St Los Angeles, CA

CPT: CPT-1C

Total depth: 25.51 ft, Date: 10/5/2015

Cone Type: Vertek





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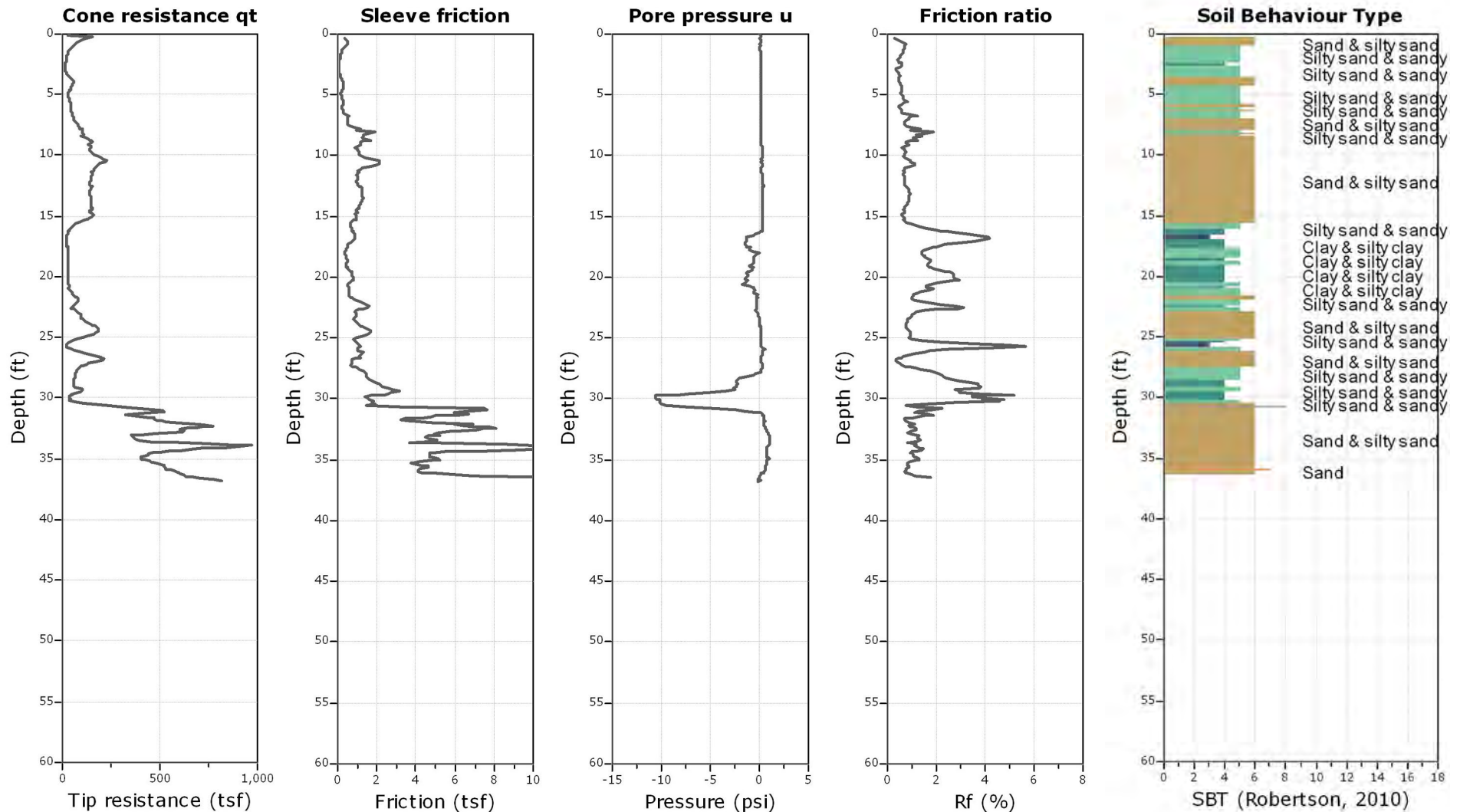
Project: Leighton & Associates/Spectrum Fig & Flower

Location: S. Figueroa St & W. 39th St Los Angeles, CA

CPT: CPT-1D

Total depth: 36.80 ft, Date: 10/5/2015

Cone Type: Vertek



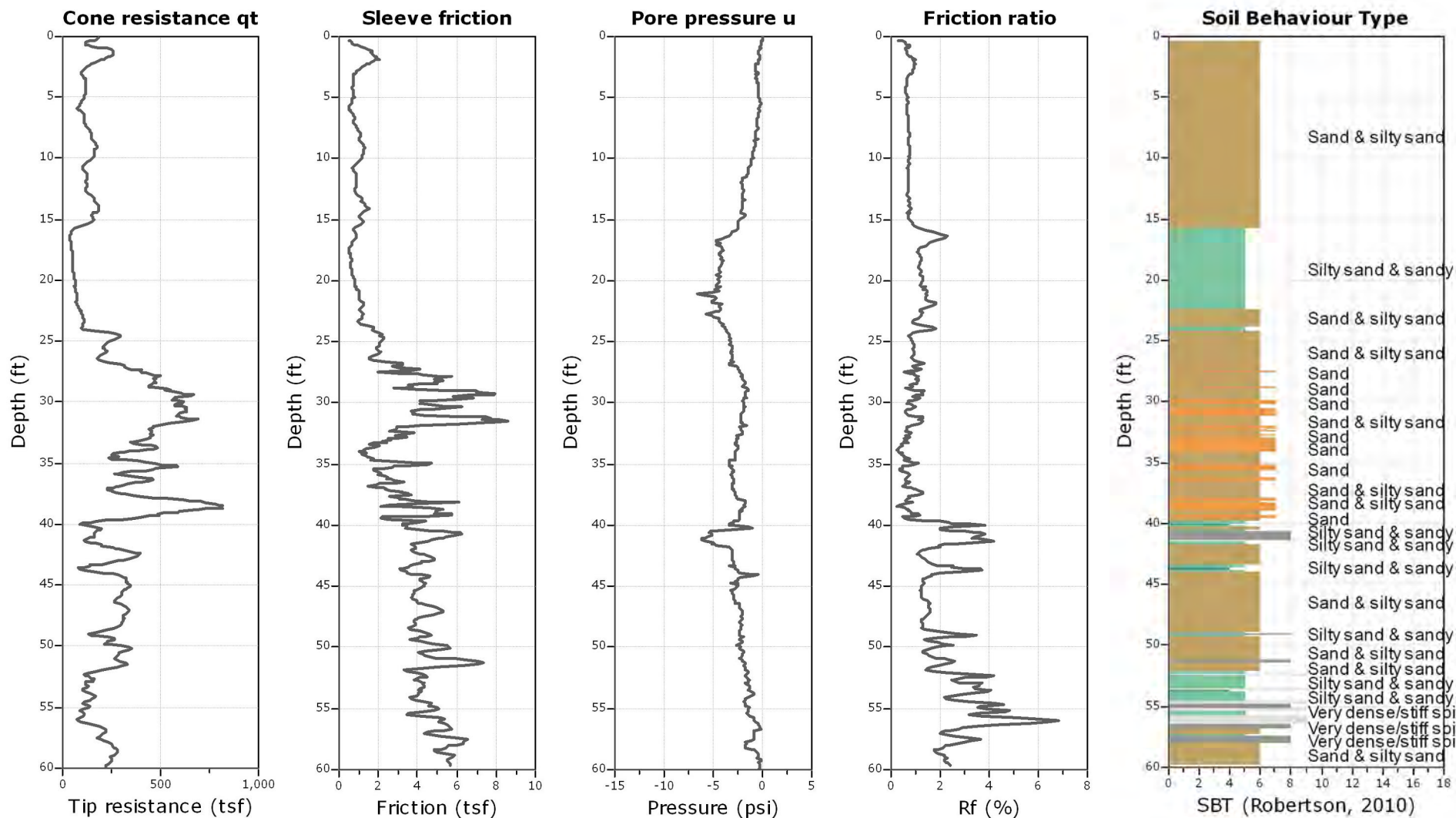


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 www.kehoetesting.com

Project: Leighton & Associates/Spectrum Fig & Flower
Location: S. Figueroa St & W. 39th St Los Angeles, CA

CPT: CPT-2

Total depth: 60.13 ft, Date: 10/5/2015
 Cone Type: Vertek





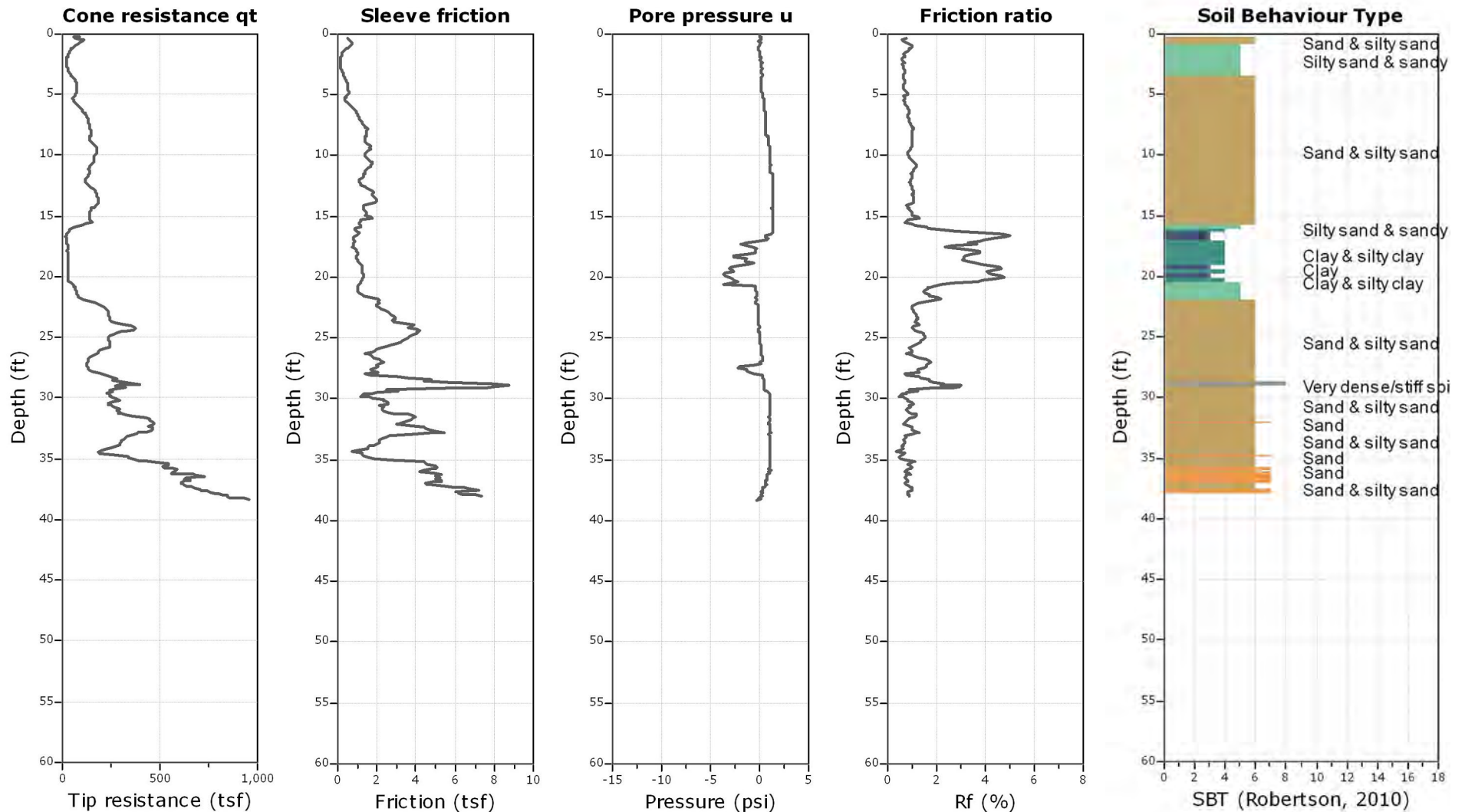
Kehoe Testing and Engineering
 714-901-7270
 rich@kehoetesting.com
 www.kehoetesting.com

Project: Leighton & Associates/Spectrum Fig & Flower
Location: S. Figueroa St & W. 39th St Los Angeles, CA

CPT: CPT-3

Total depth: 38.35 ft, Date: 10/5/2015

Cone Type: Vertek





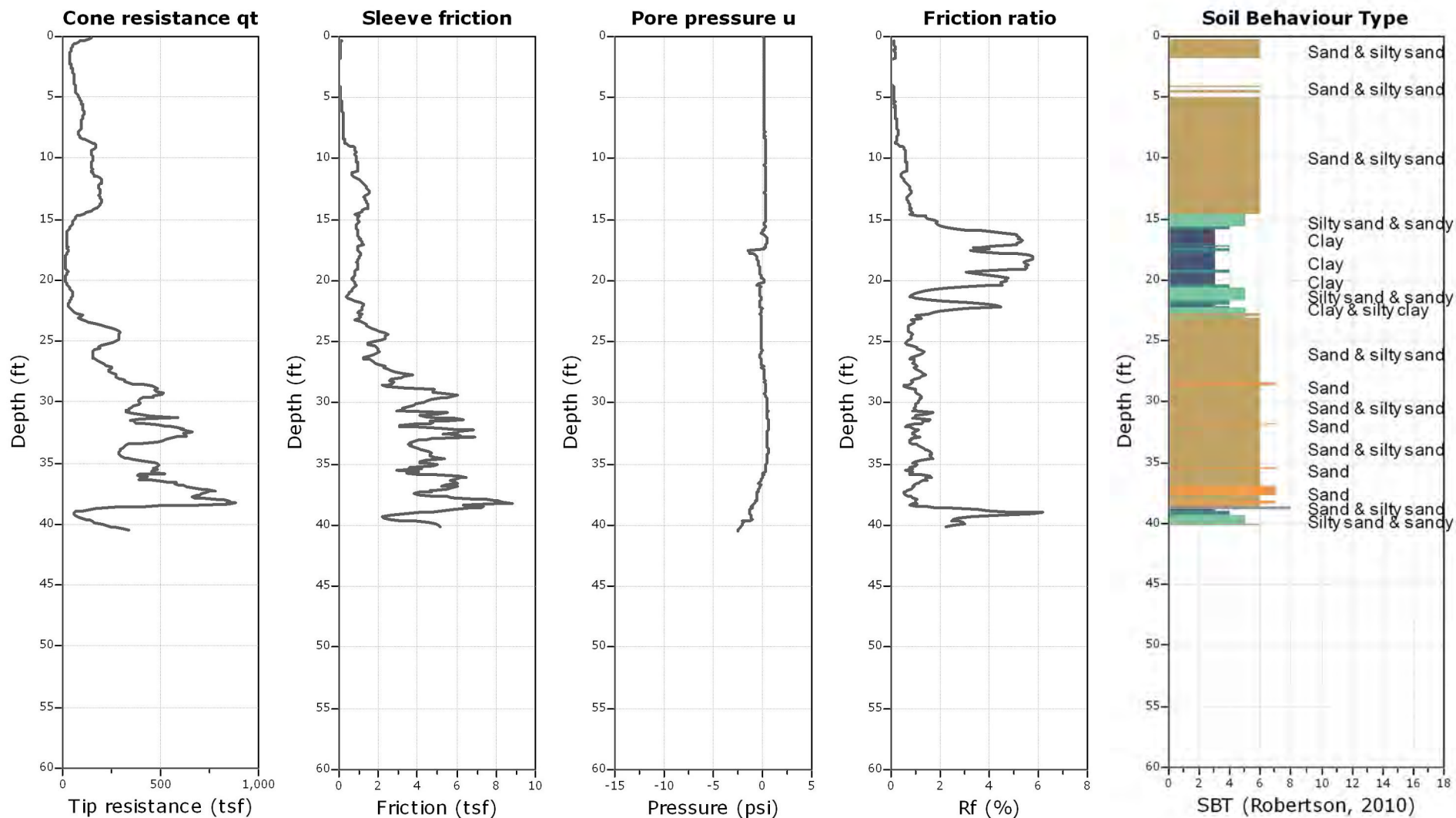
Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

Project: Leighton & Associates/Spectrum Fig & Flower
Location: S. Figueroa St & W. 39th St Los Angeles, CA

CPT: CPT-4

Total depth: 40.49 ft, Date: 10/5/2015

Cone Type: Vertek





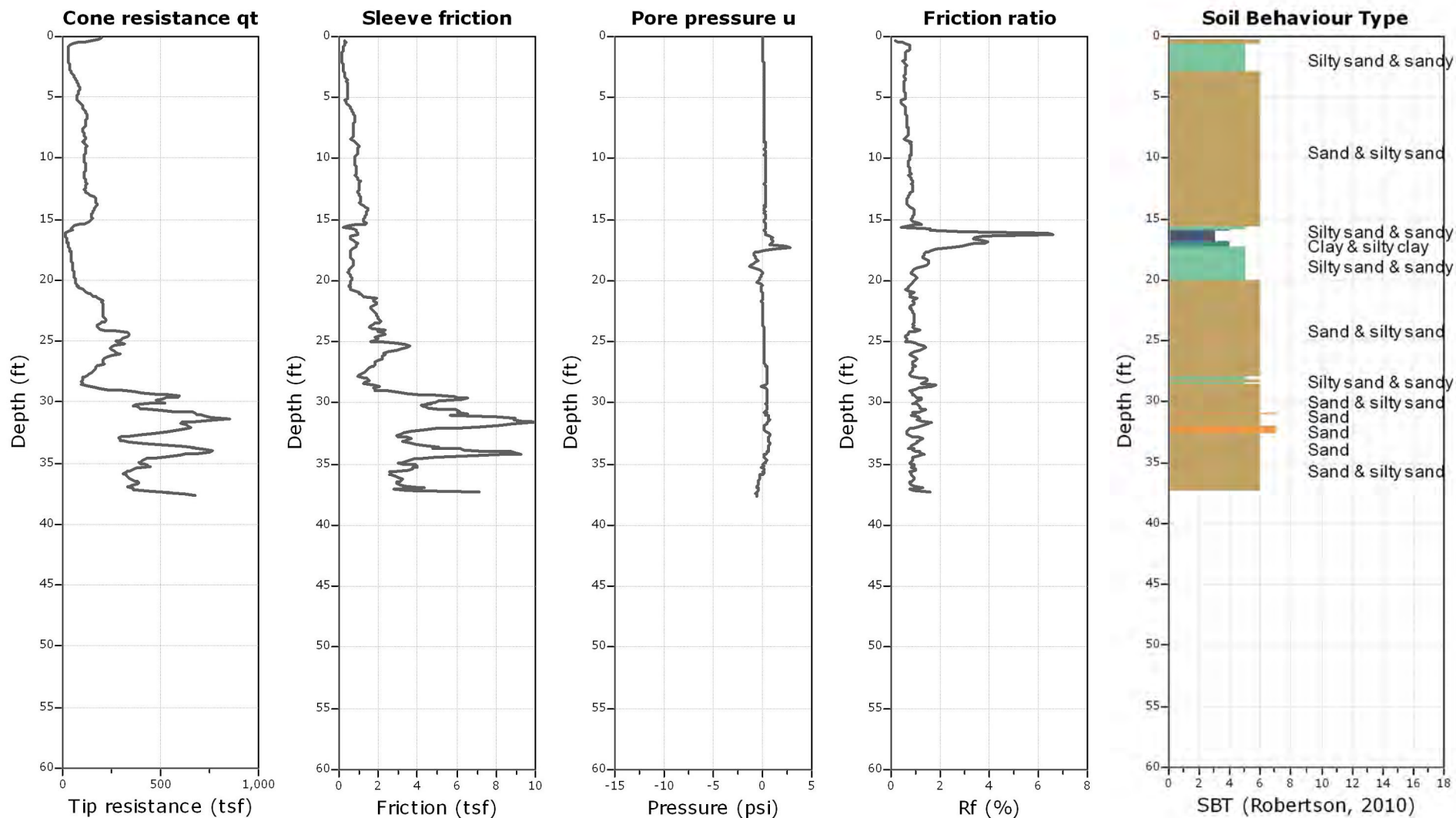
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 rich@kehoetesting.com
 www.kehoetesting.com

Project: Leighton & Associates/Spectrum Fig & Flower
Location: S. Figueroa St & W. 39th St Los Angeles, CA

CPT: CPT-5

Total depth: 37.62 ft, Date: 10/5/2015

Cone Type: Vertek





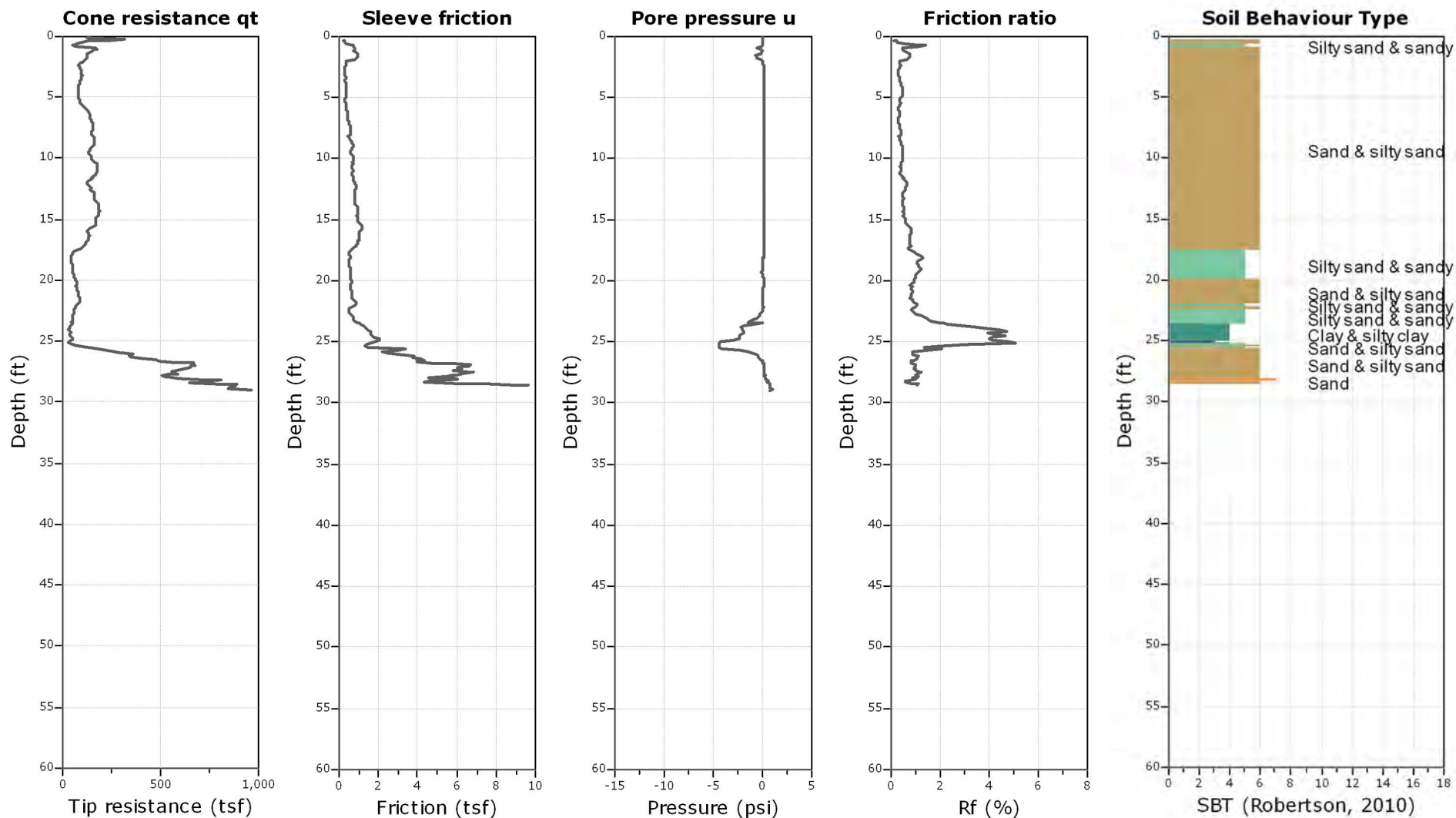
Kehoe Testing and Engineering
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 rich@kehoetesting.com
 www.kehoetesting.com

Project: Leighton & Associates/Spectrum Fig & Flower
Location: S. Figueroa St & W. 39th St Los Angeles, CA

CPT: CPT-6

Total depth: 28.94 ft, Date: 10/5/2015

Cone Type: Vertek





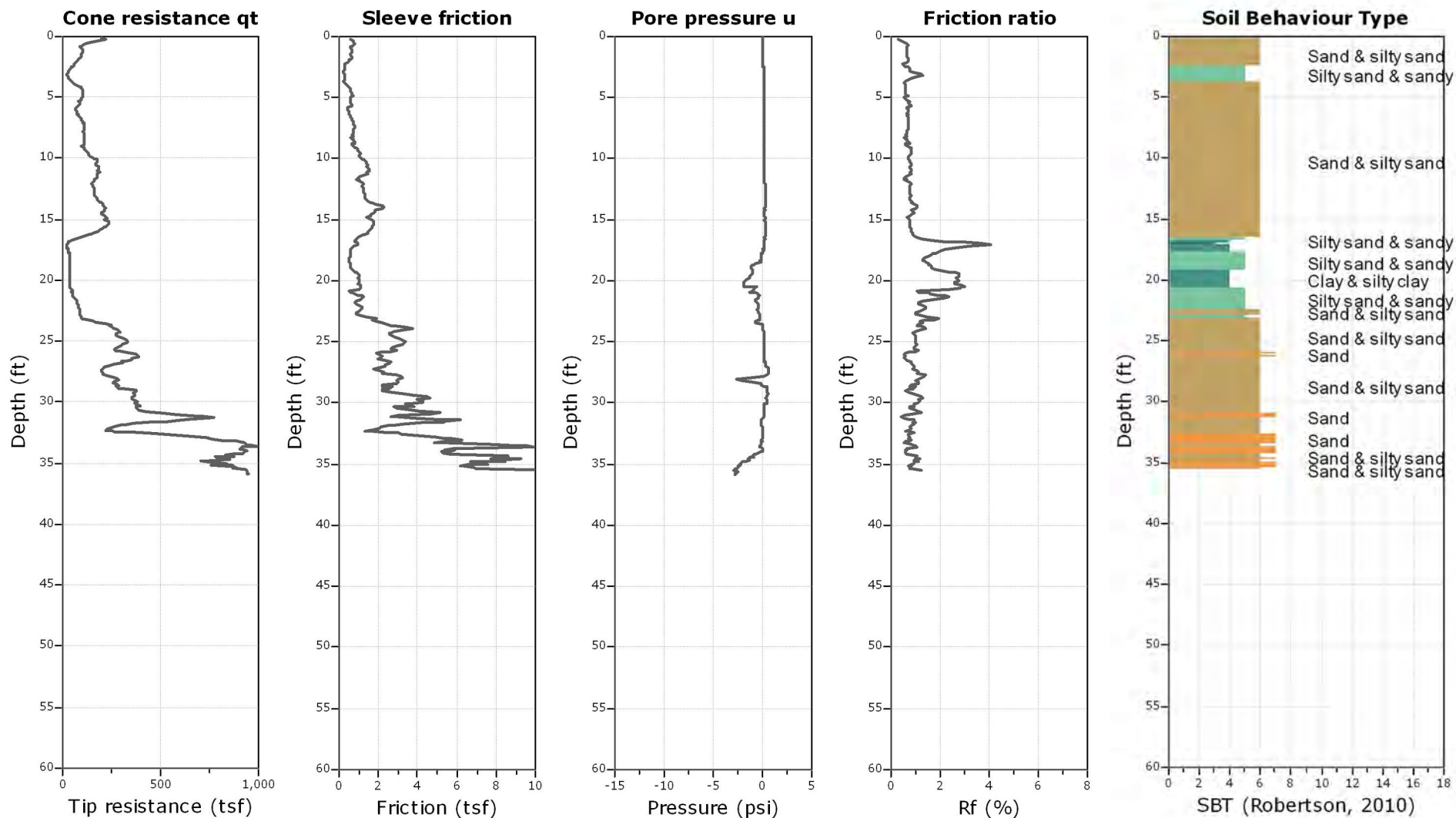
Kehoe Testing and Engineering
 714-901-7270
 rich@kehoetesting.com
 www.kehoetesting.com

Project: Leighton & Associates/Spectrum Fig & Flower
Location: S. Figueroa St & W. 39th St Los Angeles, CA

CPT: CPT-7

Total depth: 35.91 ft, Date: 10/5/2015

Cone Type: Vertek



S. Figueroa St & W. 39th St
Los Angeles, CA

CPT Shear Wave Measurements

CPT-1C	Tip Depth (ft)	Geophone Depth (ft)	Travel Distance (ft)	S-Wave Arrival (msec)	S-Wave Velocity from Surface (ft/sec)	Interval S-Wave Velocity (ft/sec)
	3.09	2.09	5.42	8.46	640.57	
	6.06	5.06	7.11	15.13	470.17	254.03
	9.04	8.04	9.47	20.66	458.27	425.73
	12.00	11.00	12.08	23.71	509.62	857.42
	15.11	14.11	14.97	27.94	535.78	682.43
	18.12	17.12	17.84	31.09	573.66	909.68
	21.09	20.09	20.70	33.83	611.97	1046.59
	24.07	23.07	23.61	37.07	636.78	895.91
	25.53	24.53	25.03	38.29	653.81	1171.13

CPT-1D	Tip Depth (ft)	Geophone Depth (ft)	Travel Distance (ft)	S-Wave Arrival (msec)	S-Wave Velocity from Surface (ft/sec)	Interval S-Wave Velocity (ft/sec)
	3.09	2.09	5.42	6.29	861.56	
	6.17	5.17	7.19	13.11	548.61	259.98
	9.08	8.08	9.50	16.61	572.06	659.90
	12.22	11.22	12.28	20.26	606.30	762.12
	15.08	14.08	14.94	23.07	647.66	945.83
	18.03	17.03	17.75	26.91	659.56	731.09
	21.07	20.07	20.68	30.32	682.17	860.59
	24.07	23.07	23.61	33.28	709.30	987.22
	27.05	26.05	26.53	36.57	725.34	887.51
	30.08	29.08	29.51	39.32	750.43	1084.08
	33.04	32.04	32.43	42.67	759.97	871.96
	36.09	35.09	35.44	45.14	785.21	1221.31

Shear Wave Source Offset = 5 ft

S-Wave Velocity from Surface = Travel Distance/S-Wave Arrival

Interval S-Wave Velocity = (Travel Dist2-Travel Dist1)/(Time2-Time1)

CPT-7	Tip Depth (ft)	Geophone Depth (ft)	Travel Distance (ft)	S-Wave Arrival (msec)	S-Wave Velocity from Surface (ft/sec)	Interval S-Wave Velocity (ft/sec)
	3.09	2.09	5.42	7.63	710.25	
	6.06	5.06	7.11	11.19	635.71	475.95
	9.08	8.08	9.50	14.41	659.40	741.71
	12.03	11.03	12.11	18.05	670.93	716.61
	15.04	14.04	14.90	22.18	671.95	676.36
	18.44	17.44	18.14	27.25	665.78	638.83
	21.11	20.11	20.72	30.78	673.24	730.78
	24.04	23.04	23.58	34.18	689.77	839.42
	27.08	26.08	26.55	37.26	712.69	967.10
	30.06	29.06	29.49	40.35	730.78	948.88
	33.07	32.07	32.46	42.84	757.64	1192.94
	35.91	34.91	35.27	44.81	787.02	1425.79

Shear Wave Source Offset = 5 ft

S-Wave Velocity from Surface = Travel Distance/S-Wave Arrival
Interval S-Wave Velocity = (Travel Dist2-Travel Dist1)/(Time2-Time1)

APPENDIX C

Laboratory Test Results

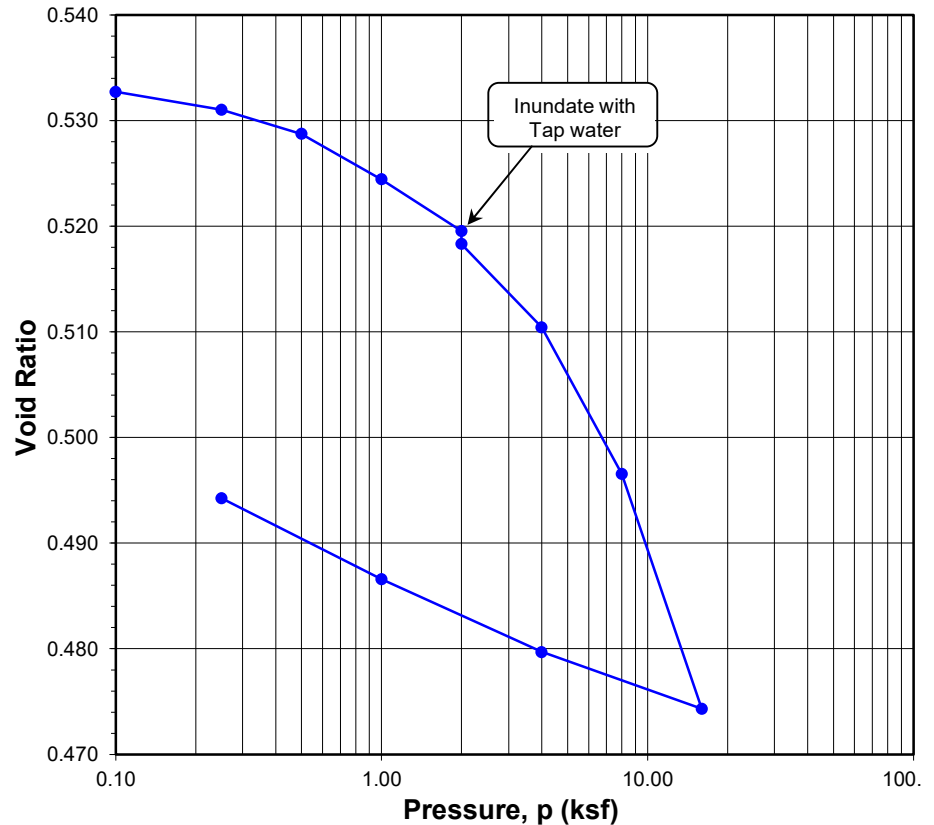


ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS ASTM D 2435

Project Name: Exposition Point - 38th and Figueroa
Project No.: 10884.015
Boring No.: LB-3
Sample No.: BB-1
Soil Identification: Olive brown sandy silty clay s(CL-ML)

Tested By: GB/JD Date: 01/24/23
Checked By: A. Santos Date: 02/02/23
Depth (ft.): 0-5
Sample Type: 90% Remold

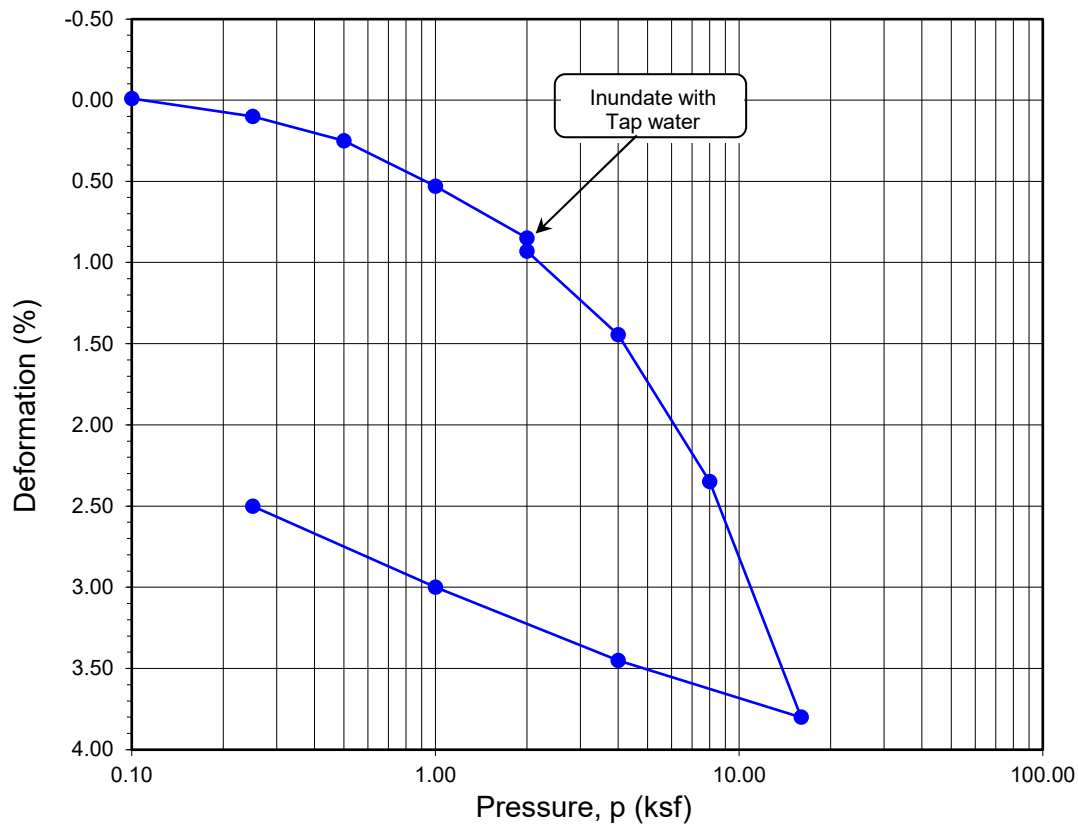
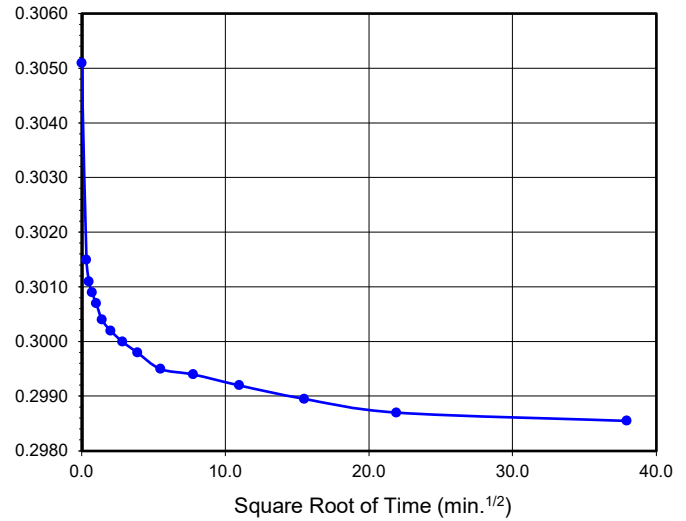
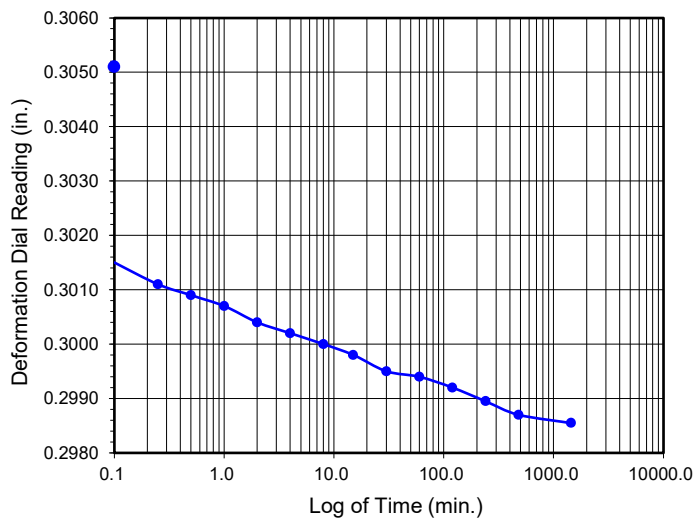
Sample Diameter (in.)	2.415
Sample Thickness (in.)	1.000
Wt. of Sample + Ring (g)	185.79
Weight of Ring (g)	40.65
Height after consol. (in.)	0.9750
Before Test	
Wt. Wet Sample+Cont. (g)	167.83
Wt. of Dry Sample+Cont. (g)	158.14
Weight of Container (g)	58.73
Initial Moisture Content (%)	9.7
Initial Dry Density (pcf)	110.0
Initial Saturation (%)	49
Initial Vertical Reading (in.)	0.3175
After Test	
Wt. of Wet Sample+Cont. (g)	251.60
Wt. of Dry Sample+Cont. (g)	231.84
Weight of Container (g)	59.14
Final Moisture Content (%)	14.96
Final Dry Density (pcf)	112.6
Final Saturation (%)	81
Final Vertical Reading (in.)	0.2890
Specific Gravity (assumed)	2.70
Water Density (pcf)	62.43



Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.10	0.3176	1.0001	0.00	-0.01	0.533	-0.01
0.25	0.3160	0.9985	0.05	0.15	0.531	0.10
0.50	0.3139	0.9964	0.11	0.36	0.529	0.25
1.00	0.3102	0.9927	0.20	0.73	0.524	0.53
2.00	0.3059	0.9884	0.31	1.16	0.520	0.85
2.00	0.3051	0.9876	0.31	1.24	0.518	0.93
4.00	0.2986	0.9811	0.45	1.90	0.510	1.45
8.00	0.2879	0.9704	0.61	2.96	0.497	2.35
16.00	0.2714	0.9539	0.81	4.61	0.474	3.80
4.00	0.2763	0.9588	0.67	4.12	0.480	3.45
1.00	0.2826	0.9651	0.49	3.49	0.487	3.00
0.25	0.2890	0.9715	0.35	2.85	0.494	2.50

Time Readings @ 4 ksf				
Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rds. (in.)
1/27/23	7:40:00	0.0	0.0	0.3051
1/27/23	7:40:06	0.1	0.3	0.3015
1/27/23	7:40:15	0.2	0.5	0.3011
1/27/23	7:40:30	0.5	0.7	0.3009
1/27/23	7:41:00	1.0	1.0	0.3007
1/27/23	7:42:00	2.0	1.4	0.3004
1/27/23	7:44:00	4.0	2.0	0.3002
1/27/23	7:48:00	8.0	2.8	0.3000
1/27/23	7:55:00	15.0	3.9	0.2998
1/27/23	8:10:00	30.0	5.5	0.2995
1/27/23	8:40:00	60.0	7.7	0.2994
1/27/23	9:40:00	120.0	11.0	0.2992
1/27/23	11:40:00	240.0	15.5	0.2990
1/27/23	15:40:00	480.0	21.9	0.2987
1/28/23	7:40:00	1440.0	37.9	0.2986

Time Readings @ 4 ksf



Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
LB-3	BB-1	0-5	9.7	15.0	110.0	112.6	0.533	0.494	49	81

Soil Identification: Olive brown sandy silty clay s(CL-ML)



ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS ASTM D 2435

Project No.: 10884.015

Exposition Point - 38th and Figueroa

02-23



**TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS**

Project Name: Exposition Point - 38th and Figueroa Tested By : GB/GEB Date: 06/30/21
Project No. : 10884.015 Checked By: A. Santos Date: 07/14/21

Boring No.	LB-3			
Sample No.	BB-1			
Sample Depth (ft)	0-5			
Soil Identification:	Olive brown s(CL-ML)			
Wet Weight of Soil + Container (g)	207.27			
Dry Weight of Soil + Container (g)	207.06			
Weight of Container (g)	59.21			
Moisture Content (%)	0.14			
Weight of Soaked Soil (g)	100.17			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	7			
Crucible No.	7			
Furnace Temperature (°C)	860			
Time In / Time Out	8:30/9:15			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	22.7059			
Wt. of Crucible (g)	22.7038			
Wt. of Residue (g) (A)	0.0021			
PPM of Sulfate (A) x 41150	86.41			
PPM of Sulfate, Dry Weight Basis	87			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30			
ml of AgNO ₃ Soln. Used in Titration (C)	0.7			
PPM of Chloride (C -0.2) * 100 * 30 / B	50			
PPM of Chloride, Dry Wt. Basis	50			

pH TEST, DOT California Test 643

pH Value	6.88			
Temperature °C	20.7			



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name: Exposition Point - 38th and Figueroa

Tested By : G. Berdy Date: 01/23/23

Project No. : 10884.015

Checked By: A. Santos Date: 01/31/23

Boring No.: LB-3

Depth (ft.) : 0-5

Sample No. : BB-1

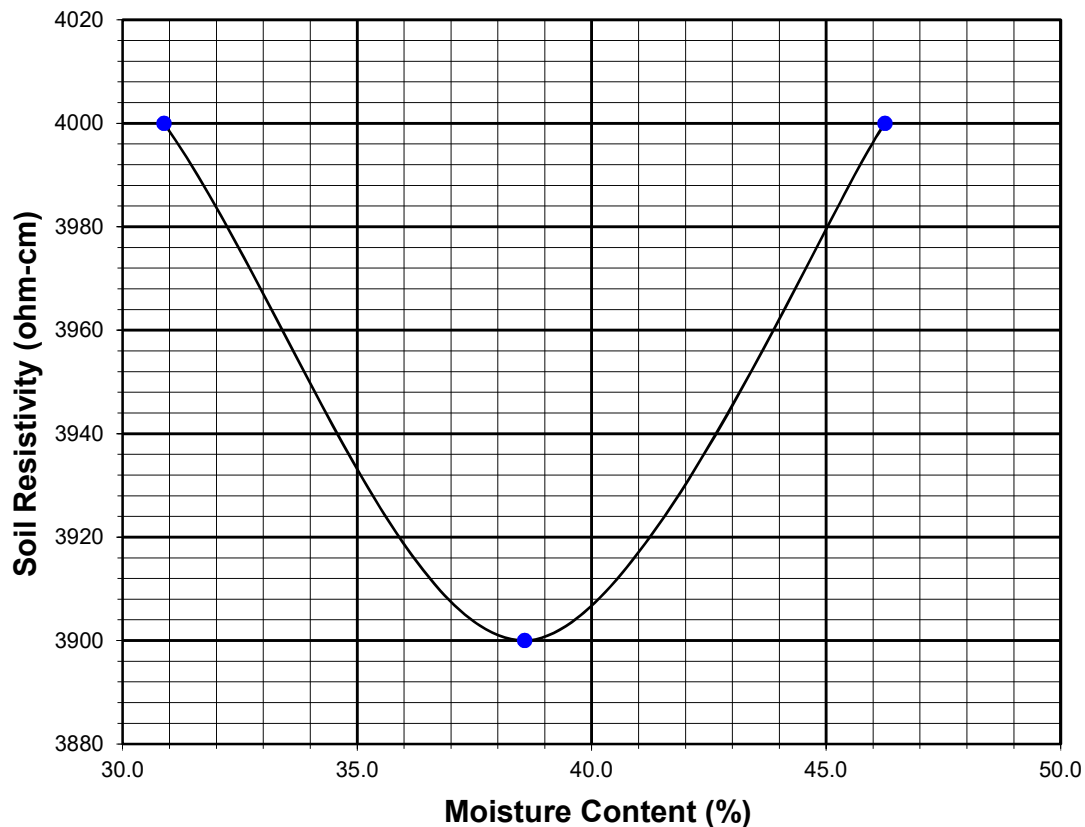
Soil Identification:* Olive brown s(CL-ML)

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	40	30.88	4000	4000
2	50	38.57	3900	3900
3	60	46.26	4000	4000
4				
5				

Moisture Content (%) (MCi)	0.14
Wet Wt. of Soil + Cont. (g)	207.27
Dry Wt. of Soil + Cont. (g)	207.06
Wt. of Container (g)	59.21
Container No.	
Initial Soil Wt. (g) (Wt)	130.30
Box Constant	1.000
$MC = (((1 + MC_i / 100) \times (W_a / W_t + 1)) - 1) \times 100$	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
3900	38.6	87	50	6.88	20.7





DIRECT SHEAR TEST
Consolidated Drained - ASTM D 3080

Project Name: [Exposition Point - 38th and Figueroa](#) Tested By: [G. Bathala](#) Date: [01/25/23](#)
Project No.: [10884.015](#) Checked By: [A. Santos](#) Date: [01/31/23](#)
Boring No.: [LB-1](#) Sample Type: [Ring](#)
Sample No.: [R-1](#) Depth (ft.): [5.0](#)
Soil Identification: [Light olive brown silty sand \(SM\)](#)

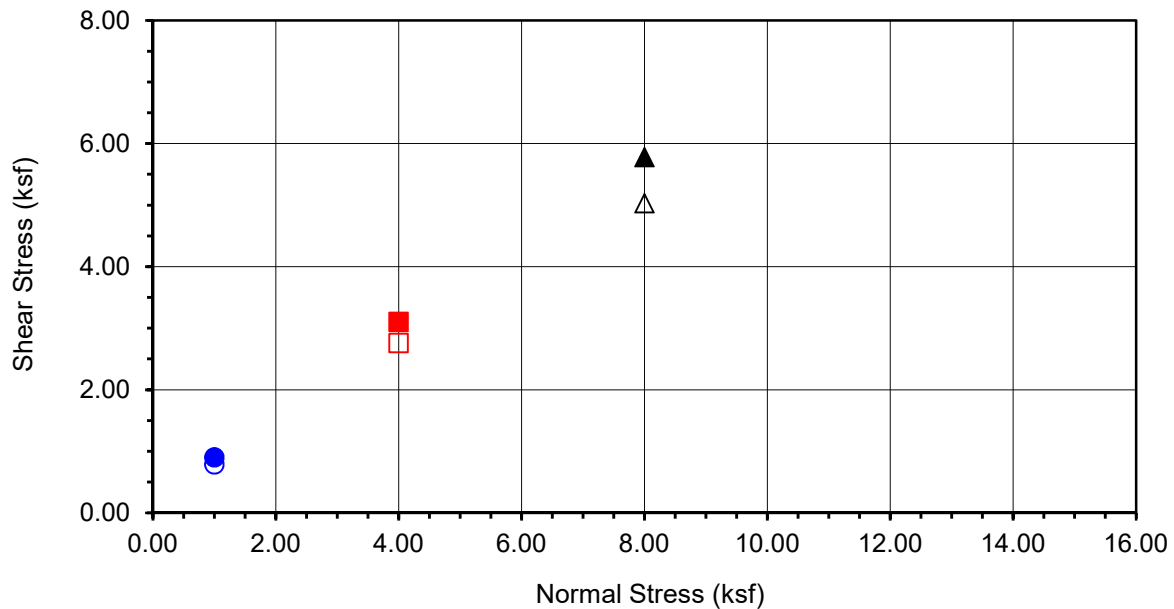
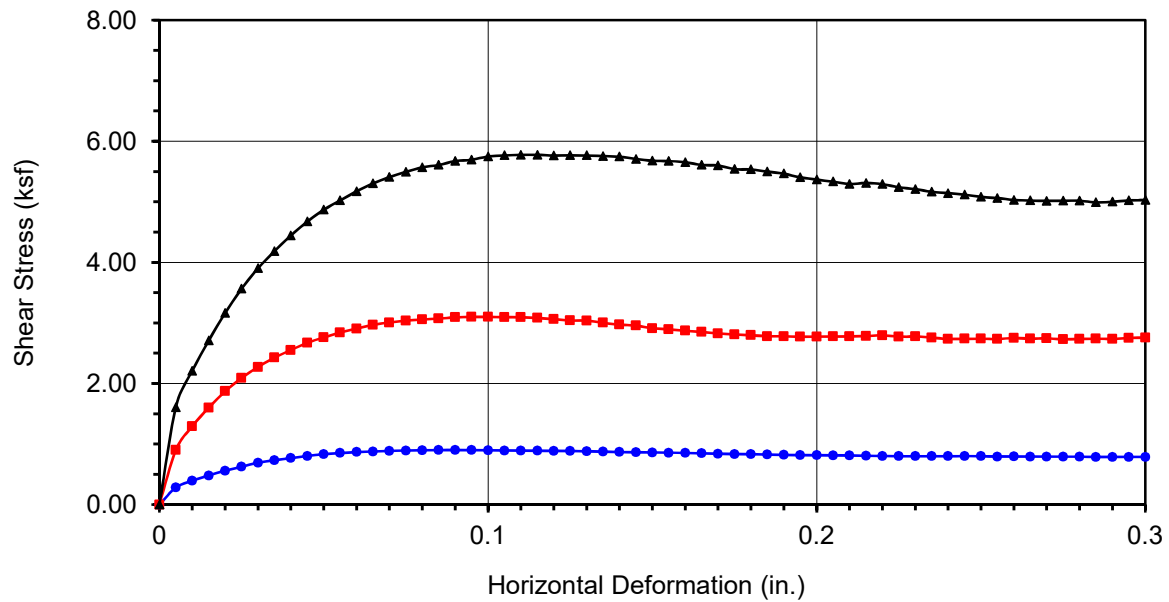
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	176.31	174.52	177.48
Weight of Ring(gm):	45.24	43.01	45.46

Before Shearing

Weight of Wet Sample+Cont.(gm):	176.56	176.56	176.56
Weight of Dry Sample+Cont.(gm):	172.33	172.33	172.33
Weight of Container(gm):	61.07	61.07	61.07
Vertical Rdg.(in): Initial	0.0000	0.2178	0.2438
Vertical Rdg.(in): Final	-0.0111	0.2366	0.2757

After Shearing

Weight of Wet Sample+Cont.(gm):	179.30	207.35	200.14
Weight of Dry Sample+Cont.(gm):	159.57	187.70	181.01
Weight of Container(gm):	39.79	66.41	58.52
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43



Boring No.	LB-1
Sample No.	R-1
Depth (ft)	5
<u>Sample Type:</u>	
Ring	
<u>Soil Identification:</u>	
Light olive brown silty sand (SM)	

Normal Stress (kip/ft ²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft ²)	● 0.902	■ 3.100	▲ 5.775
Shear Stress @ End of Test (ksf)	○ 0.786	□ 2.757	△ 5.030
Deformation Rate (in./min.)	0.0033	0.0033	0.0033
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	3.80	3.80	3.80
Dry Density (pcf)	105.0	105.4	105.8
Saturation (%)	17.0	17.1	17.3
Soil Height Before Shearing (in.)	0.9889	0.9812	0.9681
Final Moisture Content (%)	16.5	16.2	15.6



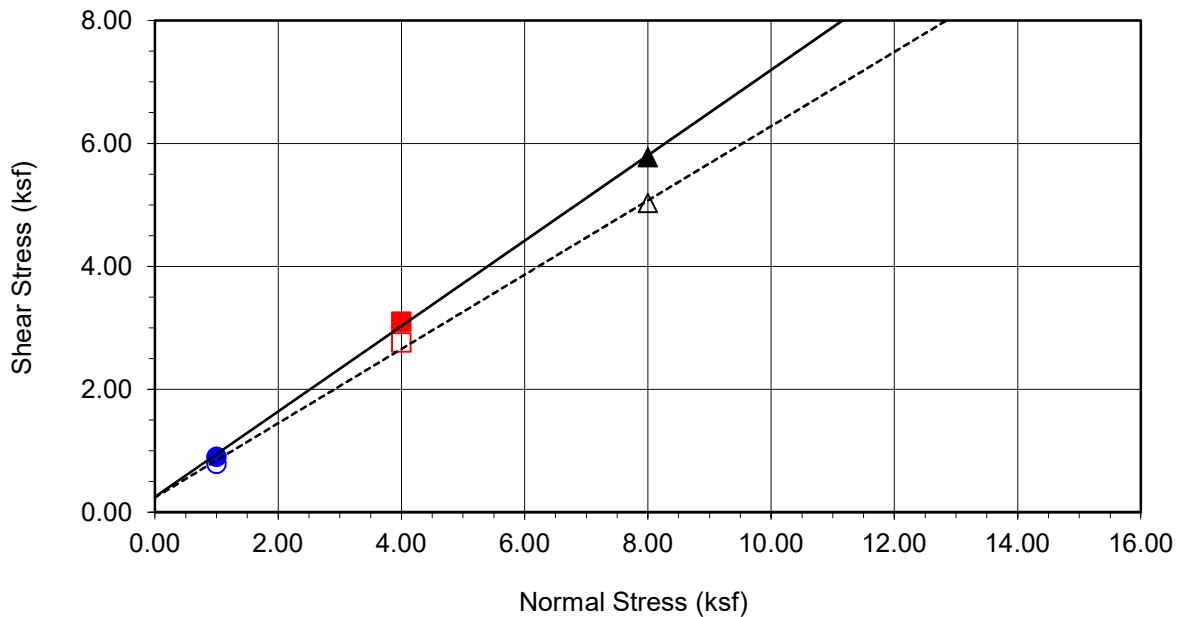
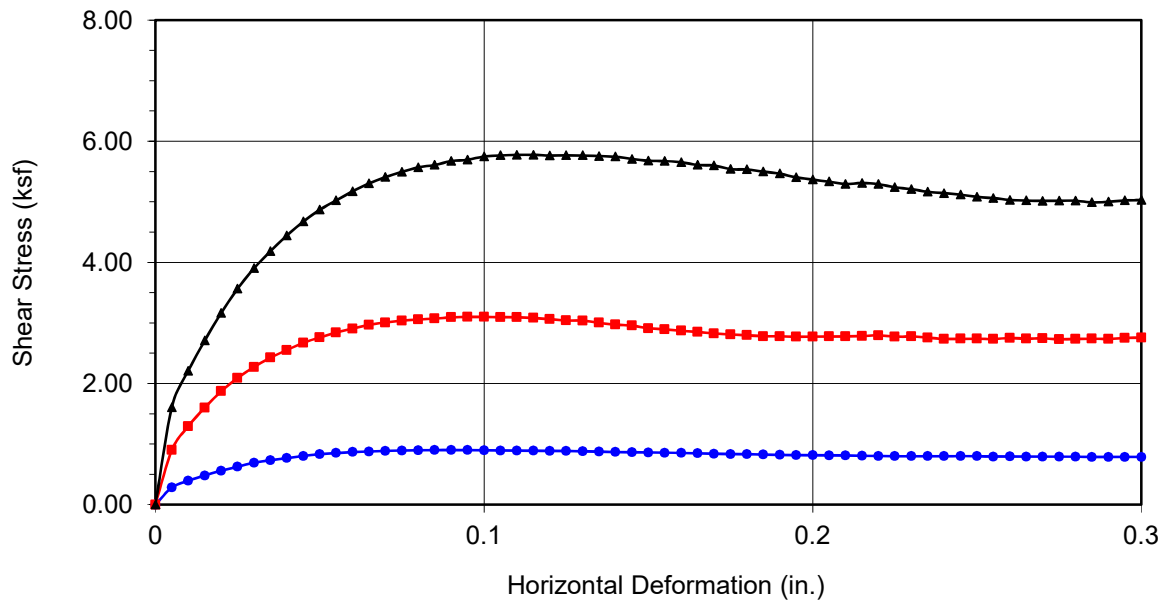
DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 10884.015

Exposition Point - 38th and Figueroa

01-23



Boring No.	LB-1	
Sample No.	R-1	
Depth (ft)	5	
<u>Sample Type:</u>		Ring
<u>Soil Identification:</u> Light olive brown silty sand (SM)		
<u>Strength Parameters</u>		
	C (psf)	ϕ (°)
Peak	249	35
Ultimate	239	31

Normal Stress (kip/ft ²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft ²)	● 0.902	■ 3.100	▲ 5.775
Shear Stress @ End of Test (ksf)	○ 0.786	□ 2.757	△ 5.030
Deformation Rate (in./min.)	0.0033	0.0033	0.0033
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	3.80	3.80	3.80
Dry Density (pcf)	105.0	105.4	105.8
Saturation (%)	17.0	17.1	17.3
Soil Height Before Shearing (in.)	0.9889	0.9812	0.9681
Final Moisture Content (%)	16.5	16.2	15.6



DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 10884.015

Exposition Point - 38th and Figueroa

01-23



DIRECT SHEAR TEST
Consolidated Drained - ASTM D 3080

Project Name: [Exposition Point - 38th and Figueroa](#) Tested By: [G. Bathala](#) Date: [01/25/23](#)
Project No.: [10884.015](#) Checked By: [A. Santos](#) Date: [01/31/23](#)
Boring No.: [LB-1](#) Sample Type: [Ring](#)
Sample No.: [R-3](#) Depth (ft.): [10.0](#)
Soil Identification: [Light brown poorly-graded sand \(SP\)](#)

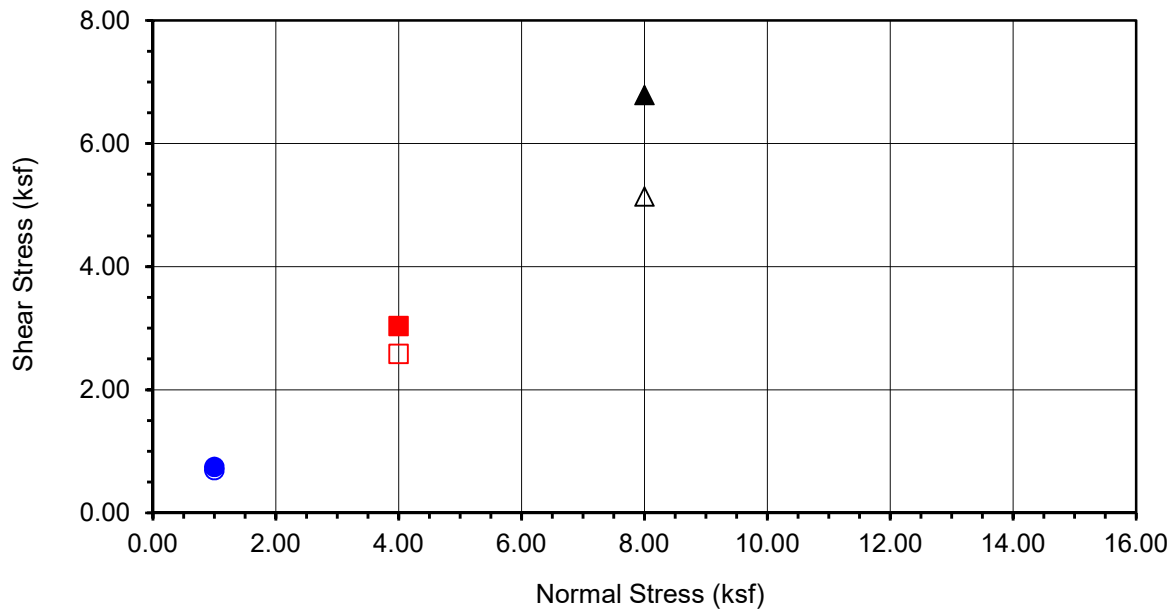
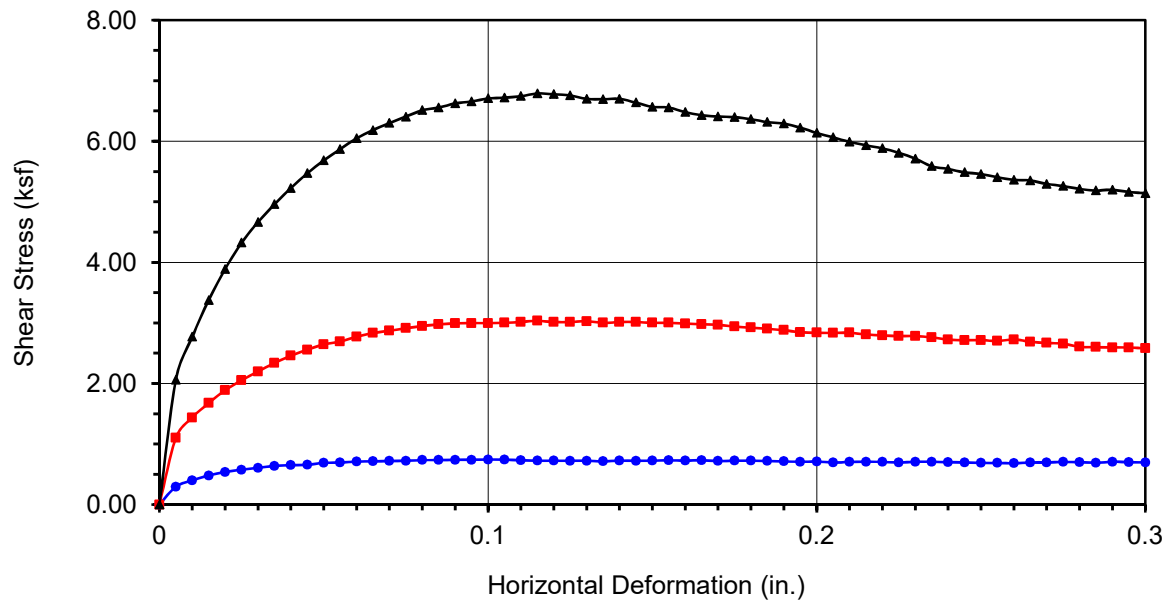
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	153.96	163.64	164.41
Weight of Ring(gm):	41.11	45.85	44.02

Before Shearing

Weight of Wet Sample+Cont.(gm):	132.63	132.63	132.63
Weight of Dry Sample+Cont.(gm):	131.77	131.77	131.77
Weight of Container(gm):	39.38	39.38	39.38
Vertical Rdg.(in): Initial	0.0000	0.2481	0.2577
Vertical Rdg.(in): Final	-0.0096	0.2752	0.2982

After Shearing

Weight of Wet Sample+Cont.(gm):	190.39	187.14	180.44
Weight of Dry Sample+Cont.(gm):	169.64	165.46	159.74
Weight of Container(gm):	66.05	57.48	59.17
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43



Boring No.	LB-1
Sample No.	R-3
Depth (ft)	10
<u>Sample Type:</u>	
Ring	
<u>Soil Identification:</u>	
Light brown poorly-graded sand (SP)	

Normal Stress (kip/ft ²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft ²)	● 0.745	■ 3.034	▲ 6.787
Shear Stress @ End of Test (ksf)	○ 0.695	□ 2.581	△ 5.140
Deformation Rate (in./min.)	0.0050	0.0050	0.0050
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	0.93	0.93	0.93
Dry Density (pcf)	93.0	97.1	99.2
Saturation (%)	3.1	3.4	3.6
Soil Height Before Shearing (in.)	0.9904	0.9729	0.9595
Final Moisture Content (%)	20.0	20.1	20.6



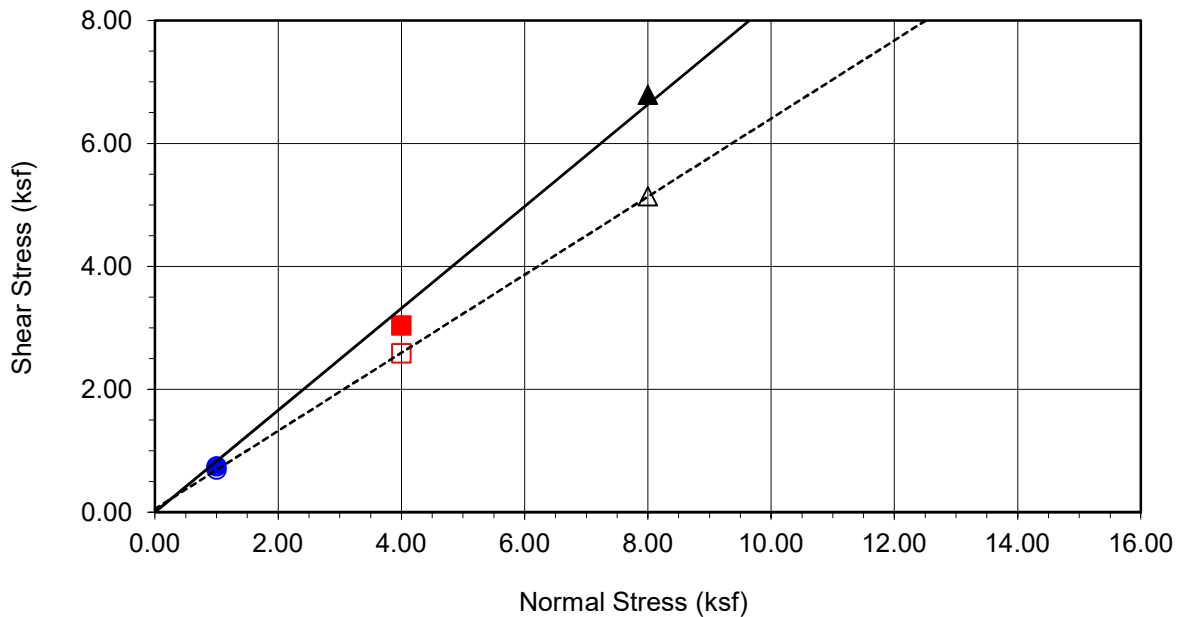
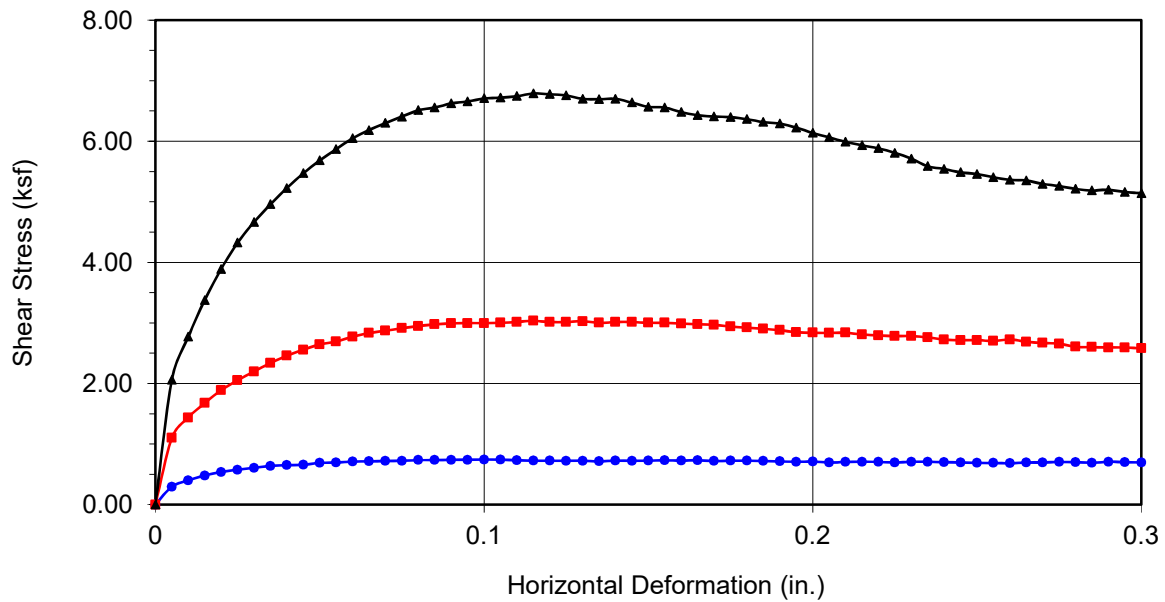
DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 10884.015

Exposition Point - 38th and Figueroa

01-23



Boring No.	LB-1	
Sample No.	R-3	
Depth (ft)	10	
<u>Sample Type:</u> Ring		
<u>Soil Identification:</u> Light brown poorly-graded sand (SP)		
<u>Strength Parameters</u>		
	C (psf)	ϕ (°)
Peak	0	40
Ultimate	53	32

Normal Stress (kip/ft ²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft ²)	● 0.745	■ 3.034	▲ 6.787
Shear Stress @ End of Test (ksf)	○ 0.695	□ 2.581	△ 5.140
Deformation Rate (in./min.)	0.0050	0.0050	0.0050
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	0.93	0.93	0.93
Dry Density (pcf)	93.0	97.1	99.2
Saturation (%)	3.1	3.4	3.6
Soil Height Before Shearing (in.)	0.9904	0.9729	0.9595
Final Moisture Content (%)	20.0	20.1	20.6



DIRECT SHEAR TEST RESULTS Consolidated Drained - ASTM D 3080

Project No.: 10884.015

Exposition Point - 38th and Figueroa

01-23



DIRECT SHEAR TEST
Consolidated Drained - ASTM D 3080

Project Name: [Exposition Point - 38th and Figueroa](#) Tested By: [G. Bathala](#) Date: [01/26/23](#)
Project No.: [10884.015](#) Checked By: [A. Santos](#) Date: [01/31/23](#)
Boring No.: [LB-3](#) Sample Type: [90% Remold](#)
Sample No.: [BB-1](#) Depth (ft.): [0-5](#)
Soil Identification: [Olive brown sandy silty clay s\(CL-ML\)](#)

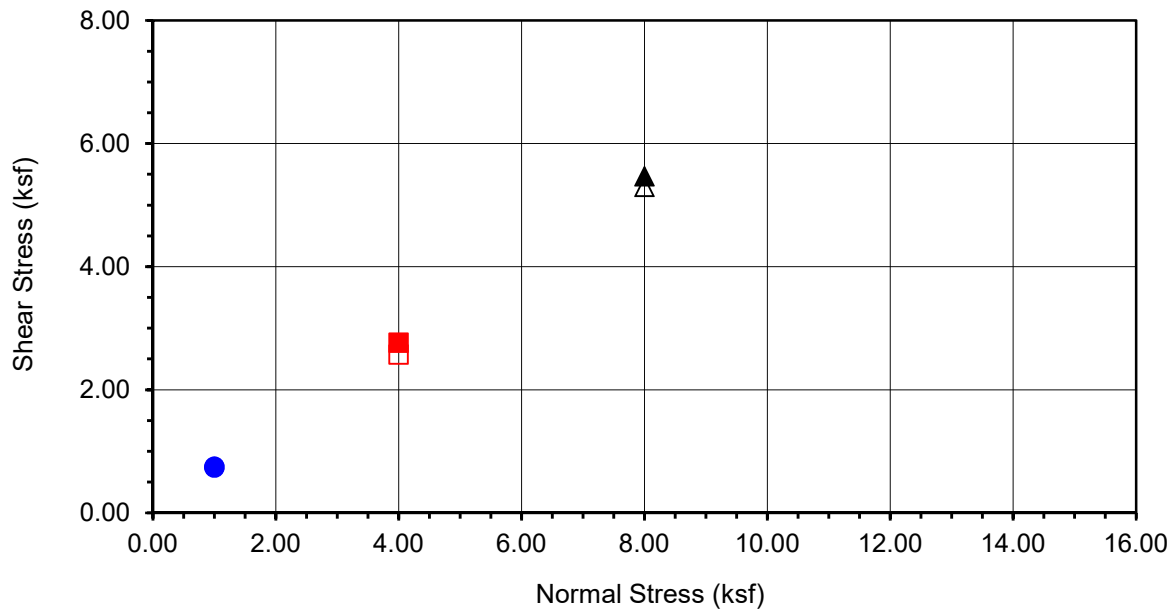
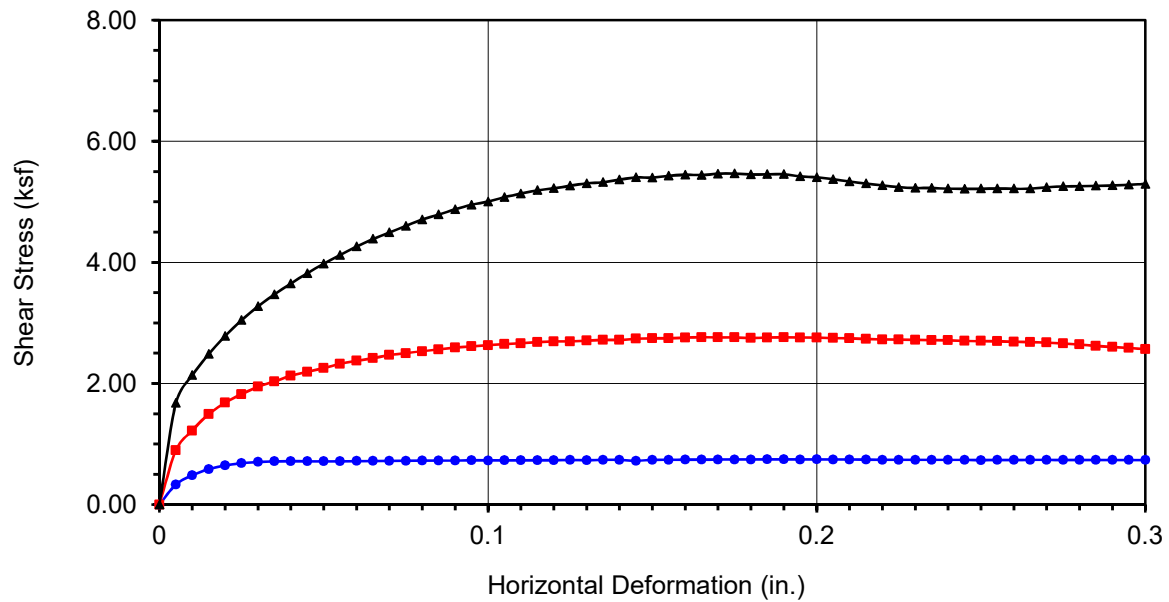
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	190.71	191.00	191.45
Weight of Ring(gm):	45.44	45.63	45.83

Before Shearing

Weight of Wet Sample+Cont.(gm):	167.83	167.83	167.83
Weight of Dry Sample+Cont.(gm):	158.14	158.14	158.14
Weight of Container(gm):	58.73	58.73	58.73
Vertical Rdg.(in): Initial	0.2562	0.2496	0.0000
Vertical Rdg.(in): Final	0.5652	0.2702	-0.0349

After Shearing

Weight of Wet Sample+Cont.(gm):	208.46	189.31	215.71
Weight of Dry Sample+Cont.(gm):	188.06	169.80	197.63
Weight of Container(gm):	57.47	39.39	66.05
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43



Boring No.	LB-3
Sample No.	BB-1
Depth (ft)	0-5
<u>Sample Type:</u>	
90% Remold	
<u>Soil Identification:</u>	
Olive brown sandy silty clay s(CL-ML)	

Normal Stress (kip/ft ²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft ²)	● 0.748	■ 2.763	▲ 5.467
Shear Stress @ End of Test (ksf)	○ 0.736	□ 2.568	△ 5.294
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	9.75	9.75	9.75
Dry Density (pcf)	110.1	110.2	110.3
Saturation (%)	49.5	49.6	49.9
Soil Height Before Shearing (in.)	0.6910	0.9794	0.9651
Final Moisture Content (%)	15.6	15.0	13.7



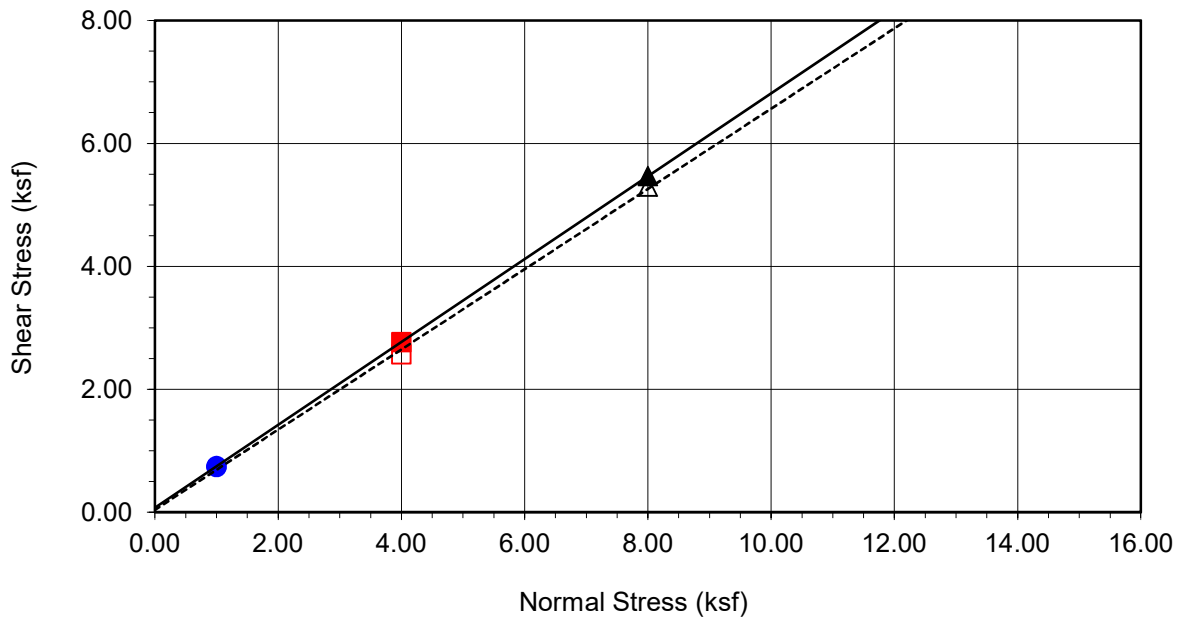
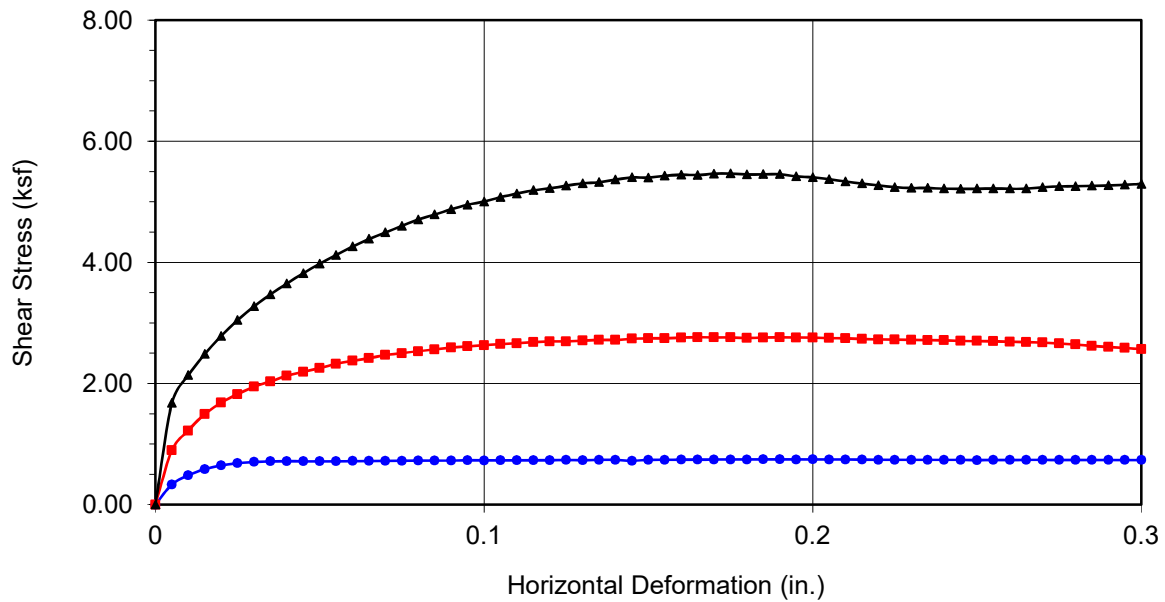
DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 10884.015

Exposition Point - 38th and Figueroa

01-23



Boring No.	LB-3	
Sample No.	BB-1	
Depth (ft)	0-5	
<u>Sample Type:</u> 90% Remold		
<u>Soil Identification:</u> Olive brown sandy silty clay s(CL-ML)		
<u>Strength Parameters</u>		
	C (psf)	ϕ (°)
Peak	71	34
Ultimate	37	33

Normal Stress (kip/ft ²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft ²)	● 0.748	■ 2.763	▲ 5.467
Shear Stress @ End of Test (ksf)	○ 0.736	□ 2.568	△ 5.294
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	9.75	9.75	9.75
Dry Density (pcf)	110.1	110.2	110.3
Saturation (%)	49.5	49.6	49.9
Soil Height Before Shearing (in.)	0.6910	0.9794	0.9651
Final Moisture Content (%)	15.6	15.0	13.7



DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 10884.015

Exposition Point - 38th and Figueroa

01-23



EXPANSION INDEX of SOILS
ASTM D 4829

Project Name: Exposition Point - 38th and Figueroa Tested By: G. Berdy Date: 01/24/23
Project No.: 10884.015 Checked By: A. Santos Date: 01/31/23
Boring No.: LB-3 Depth (ft.): 0-5
Sample No.: BB-1
Soil Identification: Olive brown sandy silty clay s(CL-ML)

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0015
Wt. Comp. Soil + Mold (g)	622.00	445.30
Wt. of Mold (g)	203.90	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	0	0
Wet Wt. of Soil + Cont. (g)	842.70	649.20
Dry Wt. of Soil + Cont. (g)	780.30	591.03
Wt. of Container (g)	0.00	203.90
Moisture Content (%)	8.00	15.03
Wet Density (pcf)	126.1	134.1
Dry Density (pcf)	116.8	116.6
Void Ratio	0.444	0.446
Total Porosity	0.307	0.308
Pore Volume (cc)	63.6	63.9
Degree of Saturation (%) [S _{meas}]	48.7	91.0

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
01/24/23	12:49	1.0	0	0.5365
01/24/23	12:59	1.0	10	0.5360
Add Distilled Water to the Specimen				
01/24/23	13:40	1.0	41	0.5375
01/25/23	6:10	1.0	1031	0.5380
01/25/23	8:00	1.0	1141	0.5380

Expansion Index (EI _{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	2
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MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name: Exposition Point - 38th and Figueroa Tested By: J. Gonzalez Date: 01/23/23
Project No.: 10884.015 Checked By: A. Santos Date: 01/24/23
Boring No.: LB-3 Depth (ft.): 0-5
Sample No.: BB-1
Soil Identification: Olive brown sandy silty clay s(CL-ML)

Preparation Method:

☒ Moist
☐ Dry

☒ Mechanical Ram
☐ Manual Ram

Mold Volume (ft³)

0.03330

Ram Weight = 10 lb.; Drop = 18 in.

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3748	3834	3863			
Weight of Mold (g)	1826	1826	1826			
Net Weight of Soil (g)	1922	2008	2037			
Wet Weight of Soil + Cont. (g)	473.8	446.3	481.5			
Dry Weight of Soil + Cont. (g)	445.3	411.1	433.9			
Weight of Container (g)	39.8	39.0	39.6			
Moisture Content (%)	7.03	9.46	12.07			
Wet Density (pcf)	127.2	132.9	134.9			
Dry Density (pcf)	118.9	121.4	120.3			

Maximum Dry Density (pcf)

121.6

Optimum Moisture Content (%)

10.0

PROCEDURE USED

☒ Procedure A

Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if + #4 is 20% or less

☐ Procedure B

Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + #4 is >20% and + 3/8 in. is 20% or less

☐ Procedure C

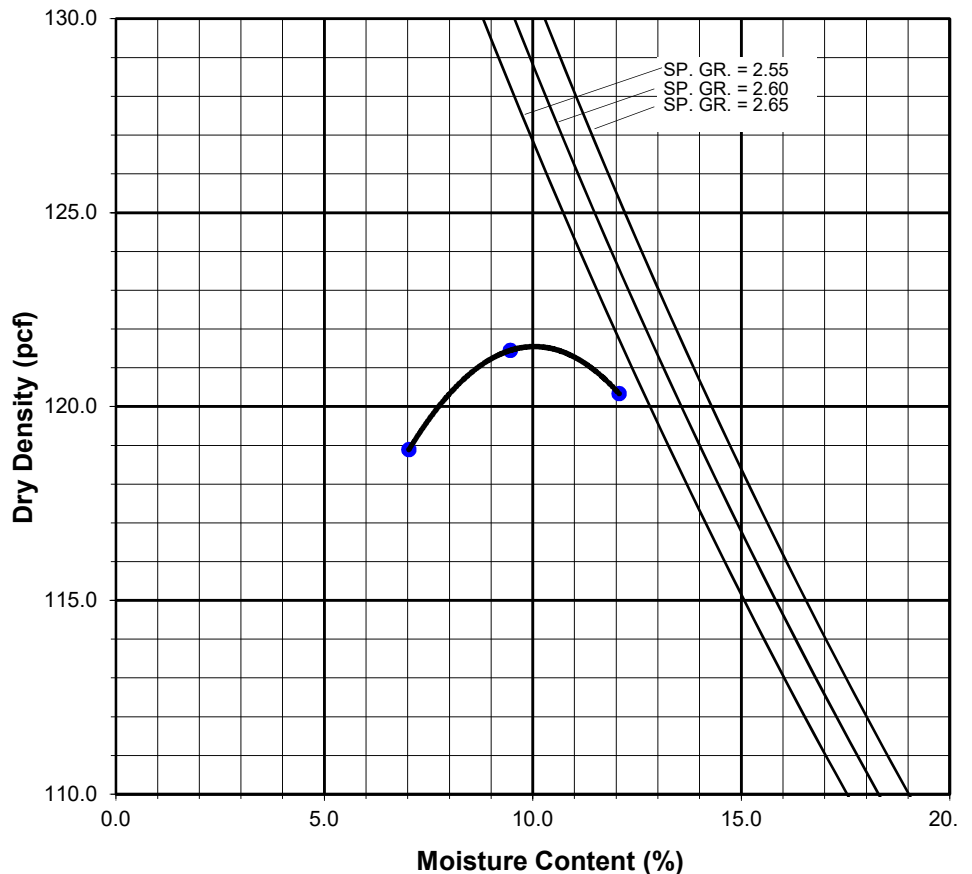
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8 in. is >20% and + 3/4 in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL, PL, PI



Project Name: Exposition Point - 38th and Figueroa.
Project No.: 10884.015

Summary of Pocket Penetrometer Test Results

Tested by: J. Han Date: 01/24/23

Prepared by: G. Bathala Date: 01/31/23

Boring No.	Sample No.	Depth (ft.)	Readings	Remarks
LB-1	R-5	20	2.00/4.00	
	R-7	30	N/A	
	R-9	40	N/A	
	R-11	50	2.00/4.00	
LB-2	R-3	7.5	N/A	
	R-5	15	N/A	
LB-3	R-2	7.5	N/A	
	R-4	15	N/A	
	R-6	25	4.00	
	R-8	35	N/A	
	R-10	45	4.00	
LB-4	R-1	5	N/A	
	R-3	10	N/A	
	R-5	20	4.00	
	R-7	30	N/A	



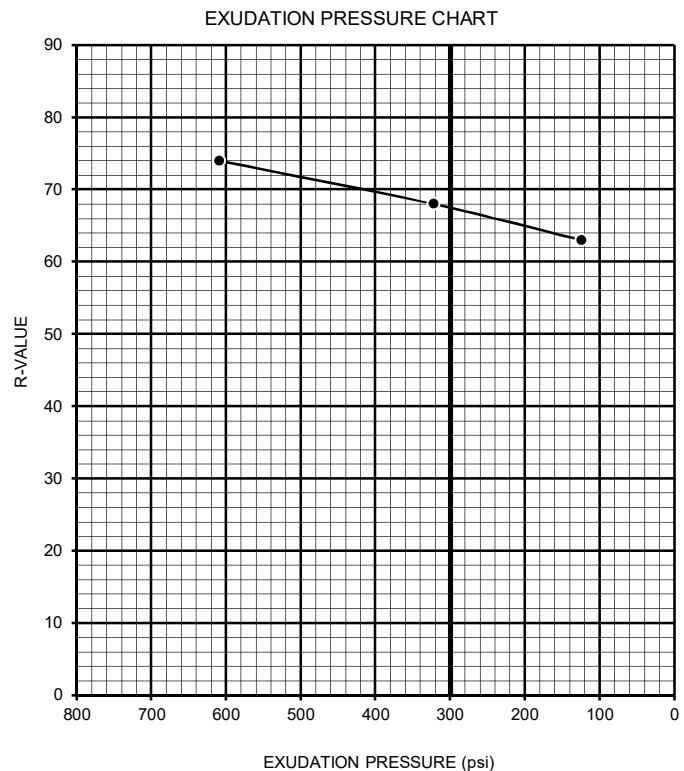
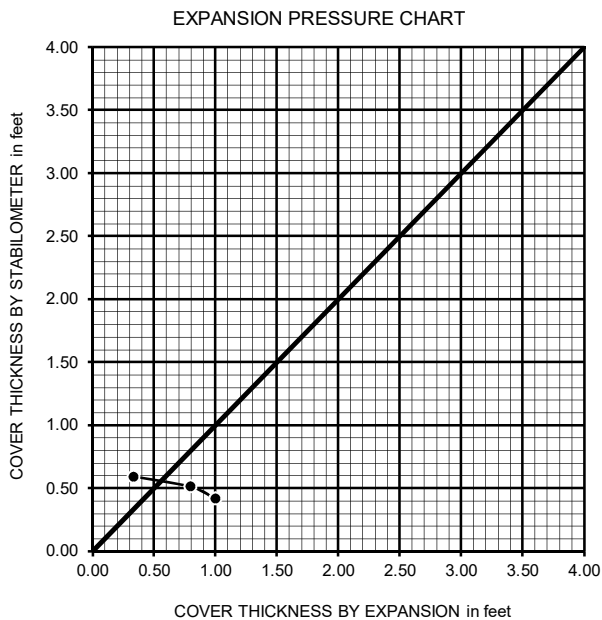
R-VALUE TEST RESULTS

DOT CA Test 301

PROJECT NAME: Exposition Point - 38th and Figueroa PROJECT NUMBER: 10884.015
BORING NUMBER: LB-3 DEPTH (FT.): 0-5
SAMPLE NUMBER: BB-1 TECHNICIAN: O. Figueroa
SAMPLE DESCRIPTION: Olive brown sandy silty clay s(CL-ML) DATE COMPLETED: 1/24/2023

TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	10.7	11.6	12.5
HEIGHT OF SAMPLE, Inches	2.44	2.49	2.50
DRY DENSITY, pcf	123.2	121.3	120.7
COMPACTOR PRESSURE, psi	350	275	200
EXUDATION PRESSURE, psi	609	322	124
EXPANSION, Inches x 10exp-4	30	24	10
STABILITY Ph 2,000 lbs (160 psi)	22	28	33
TURNS DISPLACEMENT	5.00	5.60	5.75
R-VALUE UNCORRECTED	76	68	63
R-VALUE CORRECTED	74	68	63

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.42	0.51	0.59
EXPANSION PRESSURE THICKNESS, ft.	1.00	0.80	0.33



R-VALUE BY EXPANSION: 66
R-VALUE BY EXUDATION: 67
EQUILIBRIUM R-VALUE: 66

APPENDIX D

GBA's Important Information About Your Geotechnical Report

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual site-wide subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

conspicuously that you’ve included the material for information purposes only. To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists.*



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