Appendix H

Report of Geotechnical Engineering Investigation, Proposed Industrial Facility Development, Vacant 5.97-Acre Lot (Adjacent East of 150 Mapes Road), APN 330-080-006, Perris, California.
QCI Project No.: 21-188-001 GE

Cal Land Engineering, Inc

July 20, 2021

Cal Land Engineering, Inc.
dba Quartech Consultants
Geotechnical, Environmental, and Civil Engineering

July 20, 2021

Mr. Jimmy Lee
13841 Roswell Ave, Suite A,
Chino, CA 91710-5467

Subject: Report of Geotechnical Engineering Investigation, Proposed Industrial Facility Development, Vacant 5.97-Acre Lot (Adjacent East of 150 Mapes Road), APN 330-080-006, Perris, California. QCI Project No.: 21-188-001 GE

Gentlemen:

In accordance with your request, Quartech Consultants (QCI) is pleased to submit this Geotechnical Engineering Report for the subject site. The purpose of this report was to evaluate the subsurface conditions and provide recommendations for foundation designs and other relevant parameters of the proposed construction.

Based on the findings and observations during our investigation, the proposed construction of the subject site for the intended use is considered feasible from the geotechnical engineering viewpoints, provided that specific recommendations set forth herein are followed.

This opportunity to be of service is sincerely appreciated. If you have any questions pertaining to this report, please call the undersigned.

Respectfully submitted,
Cal Land Engineering, Inc. (CLE)
dba Quartech Consultants (QCI)

REGISTERED PROFESSIONAL ENGINEER
JACK C. S. LEE
2153
Exp. 3-31-23
GEOTECHNICAL
STATE OF CALIFORNIA

Jack C. Lee, GE 2153
Principal Engineer

John Tran
Project Engineer

Abe Kazemzadeh
Project Engineer

Dist: (4) Addressee

REPORT OF GEOTECHNICAL ENGINEERING INVESTIGATION

Proposed Industrial Facility Development

At

Vacant 5.97-Acre Lot (Adjacent East of 190 Mapes Road),

APN 330-080-006,

Perris, California

Prepared by

QUARTECH CONSULTANTS (QCI)

Project No.: 21-188-001GE

July 20, 2021

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1.0 INTRODUCTION

1.1 Purpose

This report presents a summary of our geotechnical engineering investigation for the proposed construction at the subject site. The purposes of this investigation were to evaluate the subsurface conditions at the area of proposed construction and to provide recommendations pertinent to grading, foundation design and other relevant parameters of the development.

1.2 Scope of Services

Our scope of services included:

- Review of available soil engineering data of the area.
- Subsurface exploration consisting of logging and sampling of three 8-inch diameter hollow stem auger borings to a maximum depth of 21.5 feet below the existing grade at the subject site. The exploration was logged by a QCI engineer. Boring logs are presented in Appendix A.
- Laboratory testing of representative samples to establish engineering characteristics of the on-site soil. The laboratory test results are presented in Appendices A and B.
- Engineering analyses of the geotechnical data obtained from our background studies, field investigation, and laboratory testing.
- Preparation of this report presenting our findings, conclusions, and recommendations for the proposed construction.

1.3 Proposed Construction

The subject site would be used for industrial facility constructions and associated improvements. The proposed buildings are anticipated to be storage of mobile offices one-story structure with concrete slab-on-grade. Column loads are unknown at this time, but are expected to be light to medium. Minor cut and fill grading operation is anticipated to reach the desired grades.

1.4 Site Location

The project site is located on the north side of Mapes Road, a relatively short distance west of Goetz Road, in the city of Perris, California. The approximate location of the site is presented in the attached Site Location Map (Figure 1). The site is currently vacant and is relatively flat. The site is approximately 5.97 acres. No major surface erosions were observed during our subsurface investigation.

2.0 SUBSURFACE EXPLORATION AND LABORATORY TESTING

2.1 Subsurface Exploration

Our subsurface exploration consisted of drilling three 8-inch diameter hollow stem auger borings to a maximum depth of 21.5 feet at the locations shown on the attached Site Plan, Figure 2. The excavation of the boring was supervised and logged by a QCI engineer. Relatively undisturbed and bulk samples were collected for laboratory testing. Boring logs are presented in Appendix A.

2.2 Laboratory Testing

Representative samples were tested for the following parameters: in-situ moisture content and density, consolidation, direct shear strength, percent fines, expansion, and corrosion potential. Results of our laboratory testing along with a summary of the testing procedures are presented in Appendix B. In-situ moisture and density test results are presented on the boring logs in Appendix A.

3.0 SUMMARY OF GEOTECHNICAL CONDITIONS

3.1 Soil Conditions

The onsite near surface soils consist predominantly of fine grained silty sand (SM). In general, these soils exist in medium dense to dense and slightly moist conditions. Underlying the surface soils, fine to medium grained clayey sand (SC), medium grained silty sand (SM) and sandy clay (CL) were disclosed in the borings to the depths explored (21.5 feet below the existing ground surface). These soils exist in the medium dense to very dense and very stiff and slightly moist to very moist conditions. Generally, soils become denser as depth increases.

3.2 Groundwater

No groundwater or seepage was encountered in the test borings to the depths explored. Groundwater is not expected during the proposed construction.

4.0 SEISMICITY

4.1 Faulting

Based on our study, there are no known active faults crossing the property. The nearest known active regional fault is Elsinore;W+GI Fault zones located approximately 9 miles from the site.

4.2 Seismicity

The subject site is located in Southern California, which is a tectonically active area. The type and magnitude of seismic hazards affecting the site depend on the distance to causative faults, the intensity, and the magnitude of the seismic event. Table 1 indicates the distance of the fault zones and the associated maximum magnitude earthquake that can be produced by nearby seismic events. As indicated in Table 1, the Elsinore;W+GI fault zones are considered to have the most significant effect to the site from a design standpoint.

TABLE 1

Characteristics and Estimated Earthquakes for Regional Faults

Fault Name	Approximate Distance to Site (mile)	Maximum Magnitude Earthquake (Mw)
Elsinore;W+GI	9.0	7.3
Elsinore;GI+T+J	9.5	7.6
Elsinore;T+J+CM	10.1	7.6
San Jacinto;A+CC+B+SM	11.2	7.6
San Jacinto;SJV+A+CC+B	12.6	7.7
San Jacinto;SBV+SJV	12.8	7.4
San Jacinto;SBV	17.9	7.1

Reference: 2008 National Seismic Hazard Maps - Source Parameters

4.3 Estimated Earthquake Ground Motions

In order to estimate the seismic ground motions at the subject site, QCI has utilized the seismic hazard map published by California Geological Survey. According to this report, the peak ground Alluvium acceleration at the subject site for a 2% and 10% probability of exceedance in 50 years is about 0.669g and 0.435g respectively (USGS, 2008 Deaggregation of Seismic Hazards). Site modified peak ground acceleration (PGA_M), corresponding to USGS Design Map Summary Report, ASCE 7-16 Standard, is 0.600g.

5.0 CONCLUSIONS

Based on our subsurface investigation, it is our opinion that the proposed construction is feasible from a geotechnical standpoint, provided the recommendations contained herein are incorporated in the design and construction. The following is a summary of the geotechnical design and construction factors that may affect the development of the site:

5.1 Seismicity and Seismic Induced Hazard

The site is located in a seismically active region and is subject to seismically induced ground shaking from nearby and distant faults, which is a characteristic of all Southern California.

5.2 Seismic Induced Hazards

Based on our review of the County of Riverside GIS map and Riverside county parcel report, it is concluded that the site is mapped in the low liquefaction potential areas.

5.3 Excavatability

Based on our subsurface investigation, excavation of the subsurface materials should be accomplished with conventional earthwork equipment.

5.4 Surficial Soil Removal and Recompaction

Based on our investigation, it is concluded that the existing surficial soils may not be suitable for structure support as they presently exist and will require remedial grading as discussed herein.

5.5 Groundwater

Groundwater was not encountered during our field exploration. Groundwater is not anticipated to be encountered during the near surface construction.

6.0 RECOMMENDATIONS

6.1 Site Grading

6.1.1 Site Preparation

Prior to initiating grading operations, any existing vegetation, trash, debris, over-sized materials (greater than 8 inches), and other deleterious materials within construction areas should be removed from the subject site.

6.1.2 Surficial Soil Removals

Based on our field exploration and laboratory data obtained to date, it is recommended that the existing surficial soils be removed to a minimum depth of 4 feet below the existing grade or two feet below the bottom of the footing, whichever is deeper to provide a uniform support for the foundation and concrete slab. The recommended removal should be extended at least 4 feet beyond building lines or to the limit of the existing building. The existing near surface soils should also be removed to a depth of about 18 inches within the proposed driveway and concrete flatwork areas. Locally deeper removals may be necessary to expose competent natural uniform ground. The actual removal depths should be determined in the field as conditions are exposed. Visual inspection and/or testing may be used to define removal requirements.

6.1.3 Treatment of Removal Bottoms

Soils exposed within areas approved for fill placement should be scarified to a depth of 6 inches, conditioned to near optimum moisture content, then compacted in-place to minimum project standards.

6.1.4 Structural Backfill

The onsite soils may be used as compacted fill provided they are free of organic materials and debris. Fills should be placed in relatively thin lifts (6 to 8 inches), brought to near optimum moisture content, then compacted to at least 90 percent relative compaction based on laboratory standard ASTM D-1557-12.

6.2 Foundation Design

6.2.1 Bearing Value

An allowable bearing value of 2000 pounds per square foot may be used for evaluation of existing shallow continuous footings 12 inches wide and 24 inches deep, and shallow pad footings at least 24 square inches and 24 inches deep, below the lowest adjacent grade. This value may be increased by 200 pounds per square foot for each additional foot of depth or width to a maximum value of 2500 pounds per square foot. This value may be increased by one-third when considering short duration seismic or wind loads.

6.2.2 Settlement

Settlement of the footings placed as recommended, and subject to no more than allowable loads is not expected to exceed 1/2 inch. Differential settlement between adjacent columns is not anticipated to exceed 1/4 inch for the adjacent column spaced at a distance of about 30 feet.

6.2.3 Lateral Resistance

Passive earth pressure may be computed as an equivalent fluid pressure of 300 pounds per cubic foot, with a maximum earth pressure of 2000 pounds per square foot. An allowable coefficient of friction between soil and concrete of 0.30 may be used with the dead load forces. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

6.2.4 Foundation Construction

It is anticipated that the entire structure will be underlain by onsite soils of very low expansion potential. All footings should be founded at a minimum depth of 24 inches below the lowest adjacent ground. All continuous footings should have at least two No. 4 reinforcing bars placed both at the top and two No. 4 reinforcing bars placed at the bottom of the footings.

6.2.5 Concrete Slab and Flatwork

Concrete slabs and flatworks should be a minimum of 4 inches thick and reinforced with a minimum of No. 3 reinforcing bar spaced 16-inch each way or its equivalent. All slab reinforcement should be supported to ensure proper positioning during placement of concrete.

In order to comply with the requirements of the 2019 CalGreen Section 4.505.2.1 within the moisture sensitive concrete slabs, a minimum of 4-inch thick base of ½ inch or larger clean aggregate should be provided with a vapor barrier in direct contact with concrete. A 10-mil Polyethylene vapor retarder, with joints lapped not less than 6 inches, should be placed above the aggregate and in direct contact with the concrete slab. As an alternate method, 2 inches of sand then 10-mil polyethylene membrane and another 2 inches of sand over the membrane and under the concrete may be used, provided this request for an alternative method is approved by City or County Building Officials.

6.3 Temporary Trench Excavation and Backfill

All trench excavations should conform to CAL-OSHA and local safety codes. All utility trenches backfill should be brought to near optimum moisture content and then compacted to obtain a minimum relative compaction of 90 percent of ASTM D-1557-12.

7.0 INSPECTION

As a necessary requisite to the use of this report, the following inspection is recommended:

- Temporary excavations.
- Removal of surficial and unsuitable soils.
- Backfill placement and compaction.
- Utility trench backfill.

The geotechnical engineer should be notified at least 1 day in advance of the start of construction. A joint meeting between the client, the contractor, and the geotechnical engineer is recommended prior to the start of construction to discuss specific procedures and scheduling.

8.0 CORROSION POTENTIAL

Chemical laboratory tests were conducted on the existing onsite near surface materials sampled during QCI's field investigation to aid in evaluation of soil corrosion potential and the attack on concrete by sulfate soils. The testing results are presented in Appendix B.

According to 2019 CBC and ACI 318-19, a "negligible" exposure to sulfate can be expected for concrete placed in contact with the onsite soils. Therefore, Type II cement or its equivalent may be used for this project. Based on the resistivity test results, it is estimated that the subsurface soils are moderately corrosive to buried metal pipe. It is recommended that any underground steel utilities be blasted and given protective coating. Should additional protective measures be warranted, a corrosion specialist should be consulted.

9.0 SEISMIC DESIGN

Based on our studies on seismicity, there are no known active faults crossing the property. However, the subject site is located in Southern California, which is a tectonically active area. Based on ASCE 7-16 Standard, CBC 2019, the following seismic related values may be used:

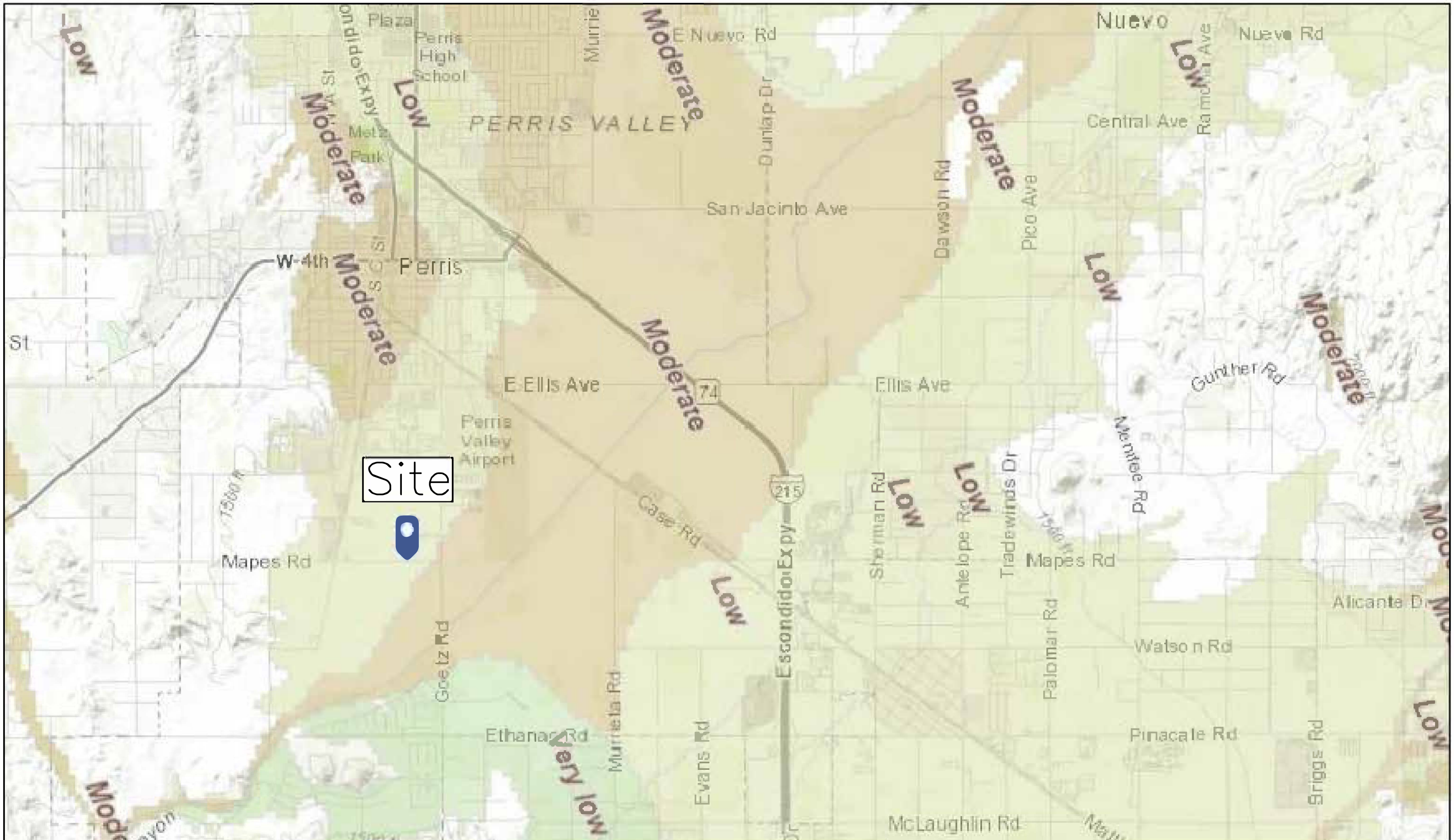
Seismic Parameters (Latitude: 33.7577993, Longitude: -117.2269393)	Site Class "D"
Mapped 0.2 Sec Period Spectral Acceleration, $\mathbf{S_S}$	1.441g
Mapped 1.0 Sec Period Spectral Acceleration, $\mathbf{S_1}$	0.531g
Site Coefficient for Site Class "D", $\mathbf{F_a}$	1.2
Site Coefficient for Site Class "D", $\mathbf{F_v}$	1.7
Maximum Considered Earthquake Spectral Response Acceleration Parameter at 0.2 Second, $\mathbf{S_{MS}}$	1.730g
Maximum Considered Earthquake Spectral Response Acceleration Parameter at 1.0 Second, $\mathbf{S_{M1}}$	0.903g
Design Spectral Response Acceleration Parameters for 0.2 sec, $\mathbf{S_{DS}}$	1.153g
Design Spectral Response Acceleration Parameters for 1.0 Sec, $\mathbf{S_{D1}}$	0.602g

The Project Structural Engineer should be aware of the information provided above to determine if any additional structural strengthening is warranted.

10.0 REMARKS

The conclusions and recommendations contained herein are based on the findings and observations at the exploratory locations. However, soil materials may vary in characteristics between locations of the exploratory locations. If conditions are encountered during construction, which appear to be different from those disclosed by the exploratory work, this office should be notified so as to recommend the need for modifications.

This report has been prepared in accordance with generally accepted professional engineering principles and practice. No warranty is expressed or implied. This report is subject to review by controlling public agencies having jurisdiction.



LIQUEFACTION

- VERY HIGH
- HIGH
- MODERATE
- LOW
- VERY LOW
- UNKNOWN

N

NOT TO SCALE

Map Modified from Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | California Geological Survey, C.W. Jennings, W.A. Bryant | Seismic Hazards Program, California Geological Survey, California Department of Conservation

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Geotechnical, Environmental & Civil Engineering Services

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Vacant Lot, Adj East of 150 Mapples Road, Perris, CA

Site Location Map

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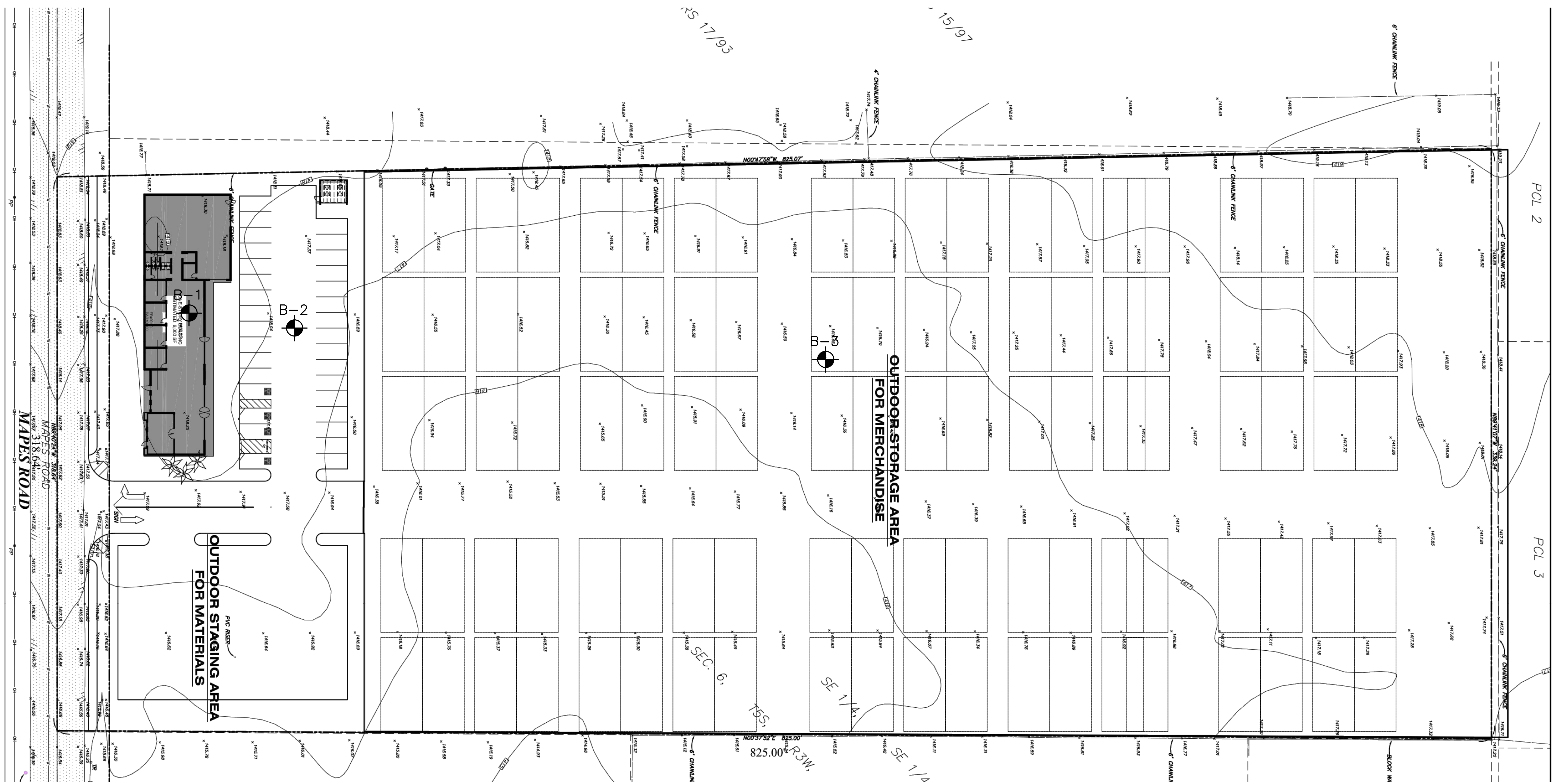
FIGURE 1



LEGEND

B-1

Approximate boring location

SCALE: 1" = 60'

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SITE PLAN

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FIGURE 2

APPENDIX A
FIELD INVESTIGATION

Our subsurface investigation consisted of excavation of logging and sampling of three 8-inch diameter hollow stem auger boring to a maximum depth of 21.5 feet below the existing grade at the subject site at approximate locations shown on the enclosed Site Plan, Figure 2.

The drilling of the boring was supervised by a QCI's engineer, who continuously logged the borings and visually classified the soils in accordance with the Unified Soil Classification System. Ring and SPT samples were taken at frequent intervals. These samples were obtained by driving a sampler with successive blows of 140-pound hammer dropping from a height of 30 inches.

Representative undisturbed samples of the subsurface soils were retained in a series of brass rings, each having an inside diameter of 2.42 inches and a height of 1.00 inch. All ring samples were transported to our laboratory. Bulk surface soil samples were also collected for additional classification and testing.

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BORING LOG B-1

PROJECT LOCATION: Vacant Lot, E of 150 Mapes Road, Perris, CA
PROJECT NO.: 21-188-001

DATE DRILLED: 5/28/2021
SAMPLE METHOD: Hollow Stem
ELEVATION: N/A
LOGGED BY: JT

B: Bulk Bag
S: Standard Penetration Test
R: Ring Sample

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/6"	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Description of Material
	B			SM		2.6	Silty sand, fine grained, tan brown, slightly moist, dense. Percent of Fines: 33.0
		R	32 50/5"	SM	122.8	6.3	Silty sand, fine grained, tan brown, slightly moist, dense.
5		R	8 24 30	SC	121.1	7.9	Clayey sand, fine grained, medium brown, slightly moist, dense. Percent of Fines: 38.3
10		R	6 27 32	SC	122.3	9.1	Clayey sand, medium grained, medium brown, slightly moist, dense. Percent of Fines: 37.1
15		R	10 17 21	SM	118.6	10.8	Silty sand, medium grained, medium brown, slightly moist, medium dense. Percent of Fines: 28.8
20		R	2 18 18	CL	107.0	20.3	Sandy clay, , light brown, very moist, very stiff. Percent of Fines: 27.5
25							Total Depth: 21.5 feet No Groundwater Hole Backfilled
30							Hammer Driving Weight: 140 lbs Hammer Driving Height: 30 inches
35							

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BORING LOG B-2

PROJECT LOCATION: Vacant Lot, E of 150 Mapes Road, Perris, CA
PROJECT NO.: 21-188-001

DATE DRILLED: 5/28/2021
SAMPLE METHOD: Hollow Stem
ELEVATION: N/A
LOGGED BY: JT

B: Bulk Bag
S: Standard Penetration Test
R: Ring Sample

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/6"	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Description of Material
0		R	12 43 50/5"	SM	128.8	8.5	Silty sand, fine grained, tan brown, slightly moist, very dense
5		S	5 13 13	SC		8.3	Clayey sand, fine grained, medium brown, slightly moist, medium dense Percent of Fines: 31.8
10		R	1 11 49	SC	117.7	8.4	Clayey sand, fine grained, medium brown, slightly moist, dense Percent of Fines: 33.0
15							Total Depth: 11.5 feet No Groundwater Hole Backfilled Hammer Driving Weight: 140 lbs Hammer Driving Height: 30 inches
20							
25							
30							
35							

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BORING LOG B-3

PROJECT LOCATION: Vacant Lot, E of 150 Mapes Road, Perris, CA
PROJECT NO.: 21-188-001

DATE DRILLED: 5/28/2021
SAMPLE METHOD: Hollow Stem
ELEVATION: N/A
LOGGED BY: JT

B: Bulk Bag
S: Standard Penetration Test
R: Ring Sample

Depth (ft)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/6"	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Description of Material
0							
		R	12 16 22	SM	107.3	6.0	Silty sand, medium grained, medium brown, slightly moist, medium dense
5		R	15 21 33	SM	128.7	11.7	Silty sand, fine grained, medium brown, slightly moist, dense Percent of Fines: 43.6
10							Total Depth: 6.5 feet No Groundwater Hole Backfilled Hammer Driving Weight: 140 lbs Hammer Driving Height: 30 inches
15							
20							
25							
30							
35							

APPENDIX B
LABORATORY TESTING

During the subsurface exploration, QCI personnel collected relatively undisturbed ring samples and bulk samples. The following tests were performed on selected soil samples:

Moisture-Density

The moisture content and dry unit weight were determined for each relatively undisturbed soil sample obtained in the test borings in accordance with ASTM D2937 standard. The results of these tests are shown on the boring logs in Appendix A.

Shear Tests

Shear tests were performed in a direct shear machine of strain-control type in accordance with ASTM D3080 standard. The rate of deformation was 0.010 inch per minute. Selected samples were sheared under varying confining loads in order to determine the Coulomb shear strength parameters: internal friction angle and cohesion. The shear test results are presented in the attached plates.

Consolidation Tests

Consolidation tests were performed on selected undisturbed soil samples in accordance with ASTM D2435 standard. The consolidation apparatus is designed for a one-inch high soil filled brass ring. Loads are applied in several increments in a geometric progression and the resulting deformations are recorded at selected time intervals. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore fluid. The samples were inundated with water at a load of two kilo-pounds (kips) per square foot, and the test results are shown on the attached Figures.

Expansion Index

Laboratory Expansion Index test was conducted on the existing onsite near surface materials sampled during QCI's field investigation to aid in evaluation of soil expansion potential. The test is performed in accordance with ASTM D-4829. The testing result is presented below:

Sample Location	Expansion Index	Expansion Potential
B-1 @ 0-4'	3	Very Low

Corrosion Potential

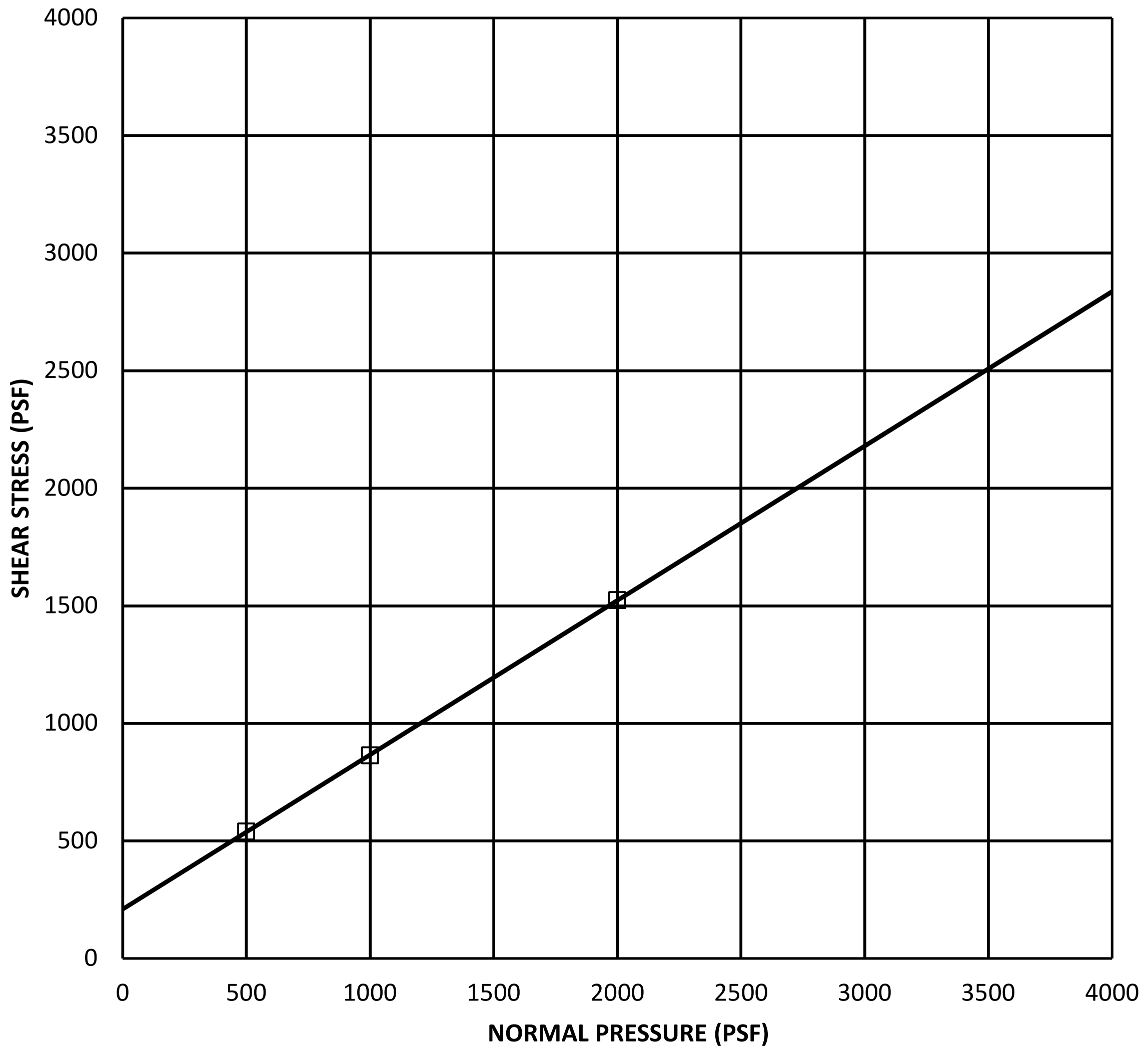
Chemical laboratory tests were conducted on the existing onsite near surface materials sampled during QCI's field investigation to aid in evaluation of soil corrosion potential and the attack on concrete by sulfate soils. These tests are performed in accordance with California Test Method 417, 422, 532, and 643. The testing results are presented below:

Sample Location	pH	Chloride (ppm)	Sulfate (% by weight)	Min. Resistivity (ohm-cm)
B-1 @ 0'-4'	8.40	80	0.0020	5,600

Percent Passing #200 Sieve

Percent of soil passing #200 sieve was determined for selected soil samples in accordance with ASTM D1140 standard. The test results are presented in the following table:

Sample Location	% Passing #200
B-1 @ 0-4'	33.0
B-1 @ 5'	38.3
B-1 @ 10'	37.1
B-1 @ 15'	28.8
B-1 @ 20'	27.5
B-2 @ 5'	31.8
B-2 @ 8'	33.0
B-3 @ 5'	43.6



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	COHESION (PSF)	FRICTION ANGLE (DEG)
□	B-1	N/A	2.0	RING	SM	210	33

Vertical Loads (PSF)	Moisture Content Before Test (%)	Moisture Content After Test (%)
500	6.3	13.6
1000	6.3	13.4
2000	6.3	13.1

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DIRECT SHEAR

(ASTM D3080)

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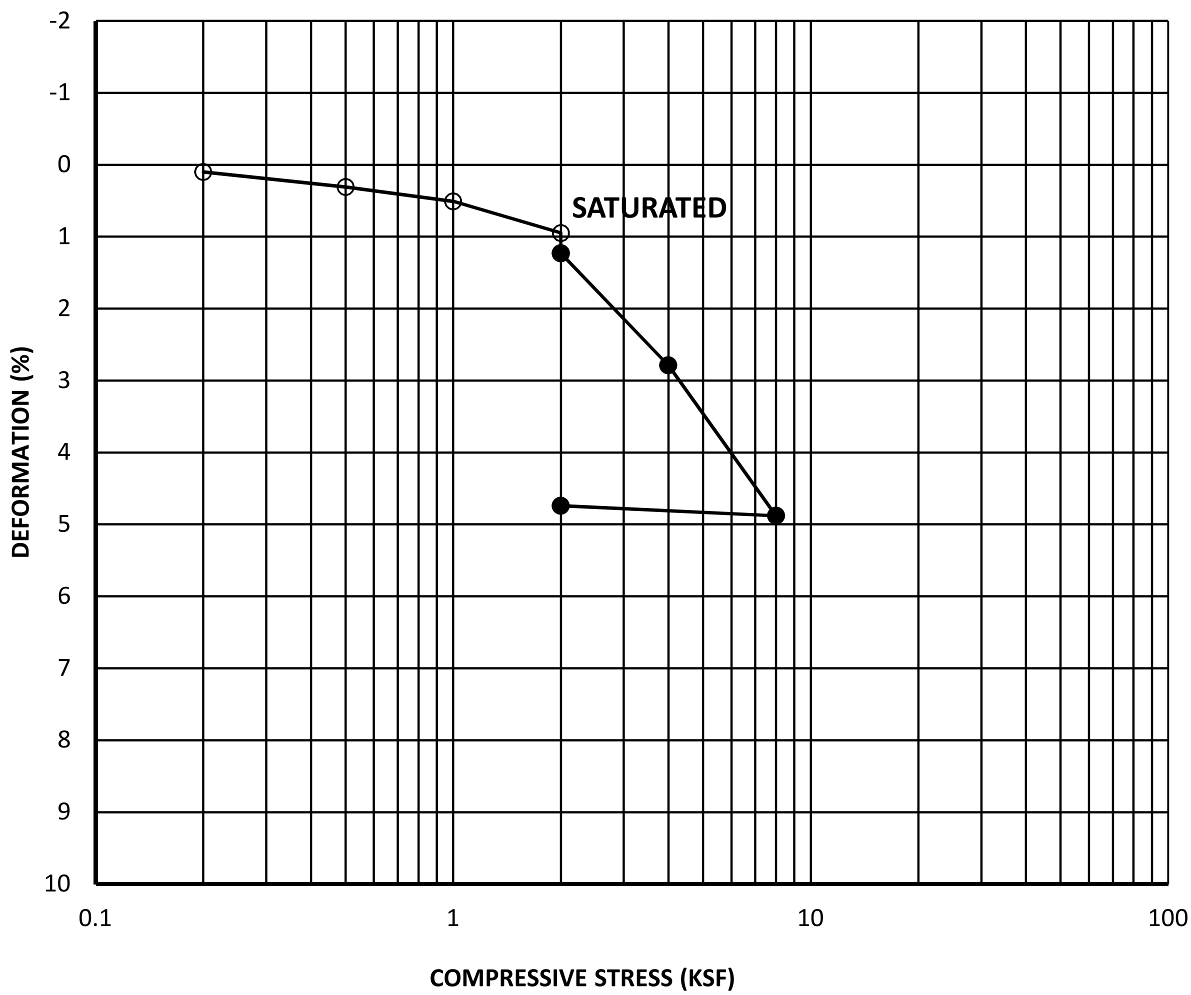
FIGURE 3



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SOIL TYPE	INIT. MOISTURE CONTENT (%)	INIT. DRY DENSITY (PCF)	INIT. VOID RATIO
○	B-1	N/A	5	SC	7.9	121.1	0.391

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CONSOLIDATION

(ASTM D2435)

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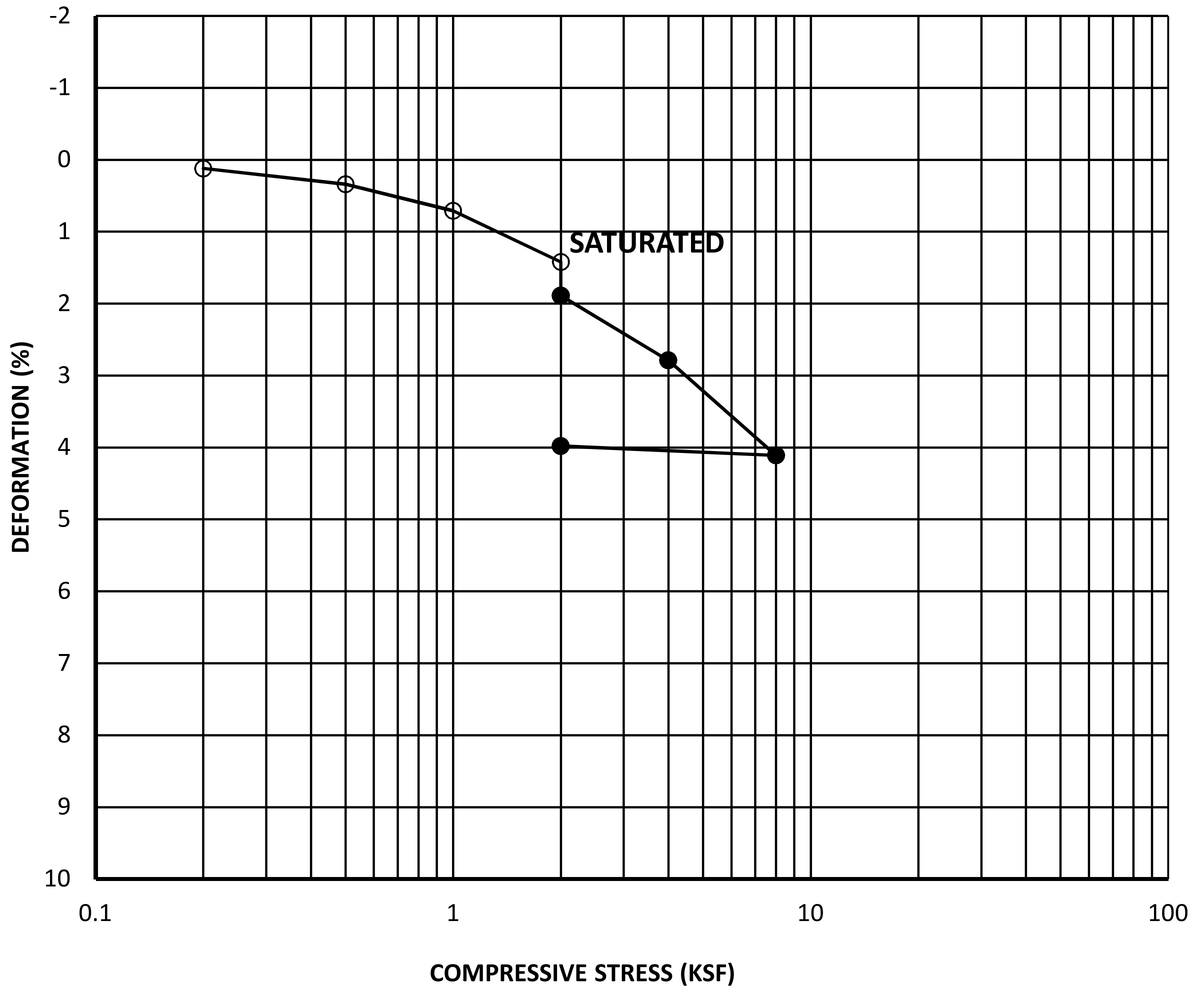
FIGURE 4



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SOIL TYPE	INIT. MOISTURE CONTENT (%)	INIT. DRY DENSITY (PCF)	INIT. VOID RATIO
○	B-1	N/A	10	SC	9.1	122.3	0.378

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(ASTM D2435)

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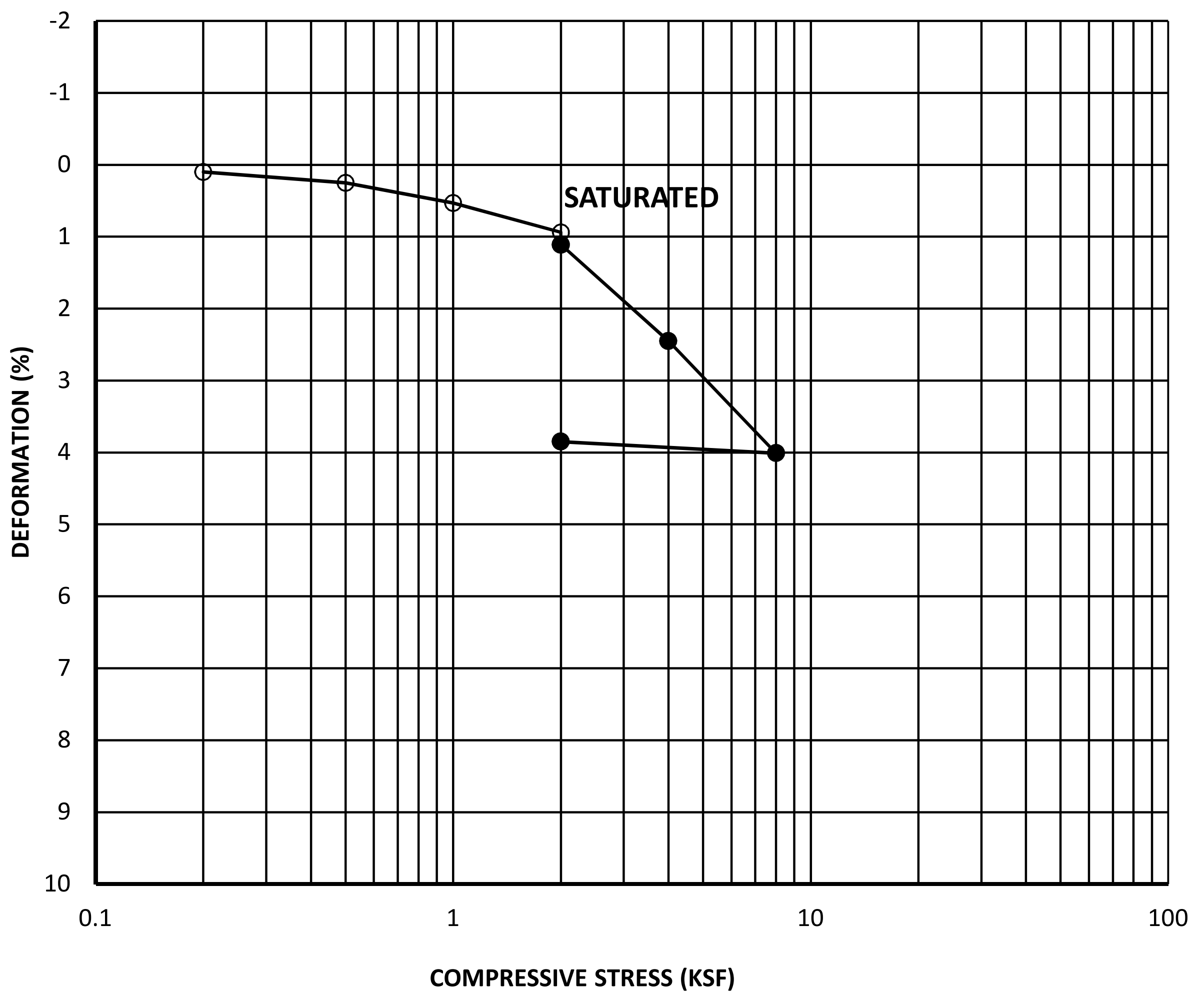
FIGURE 5



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SOIL TYPE	INIT. MOISTURE CONTENT (%)	INIT. DRY DENSITY (PCF)	INIT. VOID RATIO
○	B-1	N/A	15	SM	10.8	118.6	0.421

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FIGURE 6