PEDRICK ROAD WAREHOUSE

DIXON, CALIFORNIA

GEOTECHNICAL EXPLORATION

SUBMITTED TO

Mr. Joe Livaich
Buzz Oates
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Sacramento, CA 95814

PREPARED BY

ENGEO Incorporated

June 21, 2022

PROJECT NO.
20357.000.001

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Project No.
20357.000.001

June 21, 2022

Mr. Joe Livaich
Buzz Oates
555 Capitol Mall, Suite 900
Sacramento, CA 95814

Subject: Pedrick Road Warehouse
Dixon, California

GEOTECHNICAL EXPLORATION

Dear Mr. Livaich:

ENGEO prepared this geotechnical report for Buzz Oates as outlined in our agreement dated May 5, 2022. We characterized the subsurface conditions at the site to provide the enclosed geotechnical recommendations for design.

From a geotechnical engineering viewpoint, in our opinion, the site is suitable for the proposed development, provided the geotechnical recommendations in this report are properly incorporated into the design plans and specifications. The primary geotechnical concern that could affect development on the site is expansive soil.

Our experience and that of our profession clearly indicate that the risk of costly design, construction, and maintenance problems can be significantly lowered by retaining the design geotechnical engineering firm to review the project plans and specifications and provide geotechnical observation and testing services during construction. Please let us know when working drawings are nearing completion and we will be glad to discuss these additional services with you.

If you have any questions or comments regarding this report, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

We prepared this geotechnical report for design of Pedrick Road Warehouse in Dixon, California. As outlined in our agreement dated May 5, 2022, you authorized us to conduct the following scope of services.

- Service plan development
- Subsurface field exploration
- Percolation testing
- Soil laboratory testing
- Data analysis and conclusions
- Report preparation

For our use, we received the following:

- Preliminary Site Plan (Option D), prepared by RMW, dated April 8, 2022.
- Preliminary building loads, provided by Mathewson & Associates, Inc. via email on June 13, 2022.
- A.L.T.A./N.S.P.S. Land Title Survey prepared by Morton & Pitalo, Inc., dated March 2022.
- Preliminary Landscape Plan for TEC Equipment Dixon Truck Sales and Service Facility, prepared by James Ferguson Clabaugh, dated January 18, 2017.

This report was prepared for the exclusive use of our client and their consultants for design of this project. If any changes are made in the character, design, or layout of the development, we must be contacted to review the conclusions and recommendations contained in this report to evaluate whether modifications are recommended. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without our express written consent.

1.2 PROJECT LOCATION

Figure 1 displays a Site Vicinity Map. The site is located on the west side of Pedrick Road on the southeastern side of Interstate 80 (I-80).

Figure 2 shows site boundaries, proposed building and pavement areas, and our exploratory locations. Pedrick Road borders the site to the east, a commercial property borders the site to the north, I-80 borders the site to the west, and agricultural fields border the site to the south.

1.3 PROJECT DESCRIPTION

Based on our review of the Preliminary Site Plan, we understand that the project will include 4 one-story warehouse buildings, a stormwater detention basin, and paved parking and drive lanes. The large central warehouse is about 400,000 square feet and the smaller surrounding warehouses are about 50,000 square feet each. The warehouses will have concrete slab-on-grade floors, depressed trailer dock positions with retaining walls, and a 26-foot clear interior height. Preliminary structural loads indicate maximum perimeter loads (dead-plus-live) of about 4,100 to 4,600 pounds per linear foot and maximum interior loads of about 43 to 86 kips. Grading plans are yet to be developed; however, we assume that only minor grading will be required. Based on discussion with Morton & Pitalo, we understand that the proposed detention basin will be approximately 10 feet deep and that there is consideration to enlarging the detention basins on the neighboring property to the north.

2.0 FINDINGS

2.1 FIELD EXPLORATION

Our field exploration included drilling ten borings and advancing four cone penetration tests (CPTs) at various locations on the site. Six of the borings, designated as P1 through P6 were converted into percolation test holes. The remaining four borings and four CPTs, 1-B1 through 1-B4 and 1-CPT1 through 1-CPT4, were performed within or near the footprint of the proposed warehouse buildings. We performed our field exploration between May 23 and May 27, 2022.

The locations of our explorations are shown on Figure 2. They were estimated by using Google Earth and a GPS-enabled cell phone; they should be considered accurate only to the degree implied by the method used.

2.1.1 Borings

We observed the drilling of 10 borings at the locations shown on the Site Plan, Figure 2. An ENGEO representative observed the drilling and logged the subsurface conditions at each location. We retained a truck-mounted B24 drill rig and crew to advance the borings. Borings 1-B1 through 1-B4 were advanced using a 4-inch-diameter solid-flight auger and Borings P1 through P4 were advanced using a 6-inch-diameter solid-flight auger. The borings were advanced to depths ranging from 5 to 26½ feet below existing grade.

We obtained bulk soil samples from drill cuttings and retrieved disturbed samples at various intervals in the borings using both standard penetration test (SPT) (2-inch-outside-diameter) and modified California (3-inch-outside-diameter) split-spoon samplers. The blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows to drive the last 1 foot of penetration; the blow counts have not been converted using any correction factors. When sampler driving was difficult, penetration was recorded as the number of blows divided by inches penetrated.

The boring logs are included in Appendix A and depict the subsurface conditions at the exploration locations and during the time of exploration; however, subsurface conditions may vary with time.

2.1.2 Percolation Tests

We performed six percolation tests in the boreholes designated as P1 through P6. Tests P1 through P3 were located in the proposed basin on the west side of the site and P4 through P6 were located off site in the existing basin on the neighboring property to the north. Percolation testing was performed in general accordance with the EPA *Design Manual for Onsite Wastewater Treatment and Disposal Systems* (U.S. EPA, 1980). After drilling and logging the borings, we placed an approximately 2-inch-thick layer of open-graded gravel at the bottom of the borehole and then a 3-inch-diameter perforated plastic pipe that extended to just above the ground surface. We presoaked the hole with water overnight prior to performing the percolation tests.

After presoaking, we filled the holes with water to approximately 12 inches above the top of the gravel. The water level was then measured until the percolation rate generally stabilized. At the end of each interval, additional water was added, as needed, to reset the water level to approximately 12 inches above the gravel. Based on the time interval between test readings and the difference in water level measurements, we calculated the field percolation rates for each test hole. We corrected the field percolation rates to vertical infiltration rates using the Porchet Method (Orange County, 2013). The infiltration data is summarized in Table 2.1.2-1 below; the values presented do not include a factor of safety.

TABLE 2.1.2-1: Infiltration Rates from Percolations Tests

TEST LOCATION	DEPTH OF TEST (FEET)	SOIL TYPE AT TEST DEPTH	INFILTRATION RATE (INCH/HOUR)
P1	10	Fat Clay (CH)	0.44
P2	10	Lean Clay (CL)	0.46
P3	10	Fat Clay (CH)	0.34
P4	5	Fat Clay (CH)	0.14
P5	5	Fat Clay (CH)	0.02
P6	5	Fat Clay (CH)	0.14

2.1.3 Cone Penetration Tests

We retained a track-mounted CPT rig to push the cone penetrometer at three locations to a maximum depth of about 52 feet. The CPT has a 20-ton compression-type cone with a 15-square-centimeter (cm^2) base area, an apex angle of 60 degrees, and a friction sleeve with a surface area of 225 cm^2. The cone, connected with a series of rods, was pushed into the ground at a near constant rate. Cone readings were taken at approximately 5-cm intervals with a penetration rate of 2 cm per second in accordance with ASTM D5778. Measurements include the tip resistance to penetration of the cone (Qc), the resistance of the surface sleeve (Fs), and pore pressure (U) (Robertson and Campanella, 1988). We also performed shear-wave velocity measurements in 1-CPT3. The CPT data are presented in Appendix C.

2.2 GEOLOGY

The site is located in the Great Valley geomorphic province. The Great Valley is an elongate, northwest-trending structural trough bound by the Coast Range on the west and the Sierra Nevada on the east. The northern portion of the Great Valley is commonly referred to as the Sacramento Valley. The Sacramento Valley has been and is presently being filled with alluvium transported by powerful river systems originating in the surrounding mountains. These sediments of various ages underlie the site and are estimated to be several thousand feet thick at the site (Helley and Harwood, 1982). The origin and character of these deposits is related to the paleo-climactic conditions and the nature of the ancient depositional environment.

Surface deposits at the site are mapped as Holocene alluvial fan deposits (Dawson, 2009), as shown in Figure 3. Holocene alluvial fan deposits are described as *sand, gravel, silt, and clay that are moderately to poorly sorted and moderately to poorly bedded.* Typical of the alluvial sequence in Sacramento Valley, underlying the Holocene deposits are older Pleistocene deposits.

Pleistocene alluvial fan deposits (11,700 to 42,000 years old) are mapped to the west of the site and are likely below the Holocene deposits. These Pleistocene alluvial formations consist of gravel, sand, silt, and clay that generally show evidence of aging such as increased density, weathering, and cementation (Helley and Harwood, 1985).

2.3 SEISMICITY

The northern California area contains numerous active earthquake faults. Nearby active faults include the Great Valley and Hunting Creek faults. An active fault is defined by the California Geologic Survey as one that has had surface displacement within Holocene time (about the last 11,700 years) (CGS, 2018). The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone and no known surface expression of active faults is believed to exist within the site. Fault rupture through the site; therefore, is not anticipated.

Although fault rupture is not anticipated, an earthquake in the region could generate ground shaking at the site. Numerous small earthquakes occur every year in the Northern California region and larger earthquakes have been recorded and can be expected to occur in the future. Figure 4 shows the approximate locations of faults and significant historical earthquake epicenters recorded in the region. The Uniform California Earthquake Rupture Forecast (UCERF3) estimates the 30-year probability for a magnitude 6.7 or greater earthquake in Northern California Region at approximately 95 percent (Field et al., 2015).

The table below summarizes the distance to the fault rupture surface (R_{rup}) and the associated moment magnitude for nearby seismic sources used for the National Seismic Hazard Maps, which are incorporated into the California Building Code (CBC). We obtained the data using the USGS Unified Hazard Tool (Dynamic Conterminous U.S. 2014 (update) (v4.2.0)) and deaggregated the hazard at the peak ground acceleration (PGA) for 2,475-year return period, and Site Class D. These results represent fault sources contributing at least one percent to the seismic hazard at the site; gridded or areal sources are not presented.

TABLE 2.3-1: Nearby Seismic Sources (Latitude: 38.4828 Longitude: -121.8070)

SOURCE	R_{RUP}		MOMENT MAGNITUDE M_W
	(KM)	(MILES)	
Great Valley 06 (Midland) alt1 [0]	7	4	6.75
Great Valley 04a Trout Creek [2]	21	13	7.07
Hunting Creek – Berryessa [0]	37	23	7.20
Great Valley 03a Dunnigan Hills [0]	17	11	6.18
Great Valley 04b Gordon Valley [2]	23	14	6.34
Great Valley 04b Gordon Valley [1]	23	14	6.62

Source: USGS Unified Hazard Tool (USGS, n.d.)

2.4 SURFACE CONDITIONS

According to the Land Title Survey by Morton & Pitalo, the site slopes gently downward towards the southeast with surface grades ranging from approximately Elevation 61½ to 66 feet (NAVD88).

We observed the following site features during our field exploration.

- The site was an agricultural field that was recently disced. The disced ground surface was rough with desiccated clods of soil and dried grass/weeds.
- Overhead utility lines were located along the southern boundary of the site.
- The detention basin located on the neighboring property to the north was about 5 to 10 feet lower in elevation than the site and contained no water.

The photograph below shows the typical surface conditions at the time of performing our field exploration.

PHOTO 2.4-1: Typical Surface Conditions

2.5 SUBSURFACE CONDITIONS

All of our borings encountered clay at the ground surface that extended to a depth of at least about 4 feet. The near-surface clay was stiff to hard and ranged from low to high plasticity. Laboratory testing of the near-surface clay indicates that this soil exhibits medium to high expansion potential. In most of the borings, the clay extended to about 20 feet deep. Boring 1-B1 encountered a loose to medium dense sand layer from about 4 to 14 feet deep. The CPTs encountered similar subsurface conditions in the depth range explored by the borings. The deepest CPT, 1-CPT3, encountered fine-grained soil (predominantly clay) from about 3 to 52 feet deep.

Shear-wave velocity measurements were performed at 1-CPT3. We extrapolated the data to a depth of 100 feet and calculated an average shear-wave velocity of 863 feet per second using the formula provided in Section 20.4.1 of ASCE/SEI 7-16.

Consult the Site Plan and exploration logs for specific subsurface conditions at each location. We include our boring logs in Appendix A and CPT data in Appendix C. The boring logs contain the soil type, color, consistency, and visual classification in general accordance with the Unified Soil Classification System. The boring logs and CPT data graphically depict the subsurface conditions encountered at the time of the exploration.

2.6 GROUNDWATER CONDITIONS

We did not observe static or perched groundwater in any of our subsurface explorations, which extended to a maximum depth of about 52 feet. Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation practice, and other factors not evident at the time measurements were made.

2.7 LABORATORY TESTING

We performed laboratory tests on selected soil samples to evaluate their engineering properties. For this project, we performed moisture content, sieve, dry density, plasticity index, resistance value (R-value), and soil corrosion potential testing. Moisture content, plasticity index, fines content, and dry density results are recorded on the boring logs in Appendix A. Individual laboratory test reports are included in Appendix B.

3.0 CONCLUSIONS

From a geotechnical engineering viewpoint, in our opinion, the site is suitable for the proposed development, provided the geotechnical recommendations in this report are properly incorporated into the design plans and specifications. The primary geotechnical concern that could affect development on the site is expansive soil. We summarize our conclusions below.

3.1 EXPANSIVE SOIL

We observed potentially expansive clay near the surface of the site in all of our borings. Our laboratory testing indicates that this soil exhibits medium to high shrink/swell potential with variations in moisture content.

Expansive soil changes in volume with changes in moisture. They can shrink or swell and cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations. To reduce the potential for damage to the planned buildings, we recommend that the upper 18 inches of the building pad extending at least 5 feet laterally beyond building areas be underlain by low expansive fill. Due to the relatively flat nature of the site, selective grading to mitigate expansive soil may not be practical and imported fill may be recommended. In lieu of importing low expansive fill, it may be cost effective to lime treat the upper 18 inches of the building pad to reduce the expansion potential of the on-site soil.

Expansive soil generally provides poor subgrade support for pavement, as indicated by the low R-value laboratory test results included in Appendix B. A low R-value results in thicker pavement structural sections than a higher R-value. If desired to reduce the pavement section thickness, the subgrade can be lime-treated to increase the R-value for design. We provide lime treatment recommendations in Section 5.6 and provide pavement design options in Section 9.

We have also provided specific grading recommendations for compaction of clay soil at the site. The purpose of these recommendations is to reduce the swell potential of the clay by compacting the soil at a higher moisture content and controlling the amount of compaction. Expansive soil mitigation recommendations are presented in Section 5.1 of this report.

3.2 STORMWATER INFILTRATION

As described in Section 2.1.2, we performed percolation tests to determine infiltration rates for use in designing stormwater detention basins. The infiltration rates varied from 0.02 to 0.46 inch/hour, with slightly higher infiltration rates measured at locations P1 through P3 compared to P4 through P6. We recommend that a conservative factor of safety (reduction factor) be applied to the actual rates for determination of the design infiltration rate. Infiltration in detention basins is known to decrease over time, largely due to sedimentary particles accumulating at the infiltration surface. In addition, the variability in test procedures and soil deposits need to be considered in the overall performance of the infiltration system. The civil engineer should select a factor of safety commensurate with the risk of potential flooding or discharge.

3.3 SEISMIC HAZARDS

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. Common secondary seismic hazards include ground shaking, liquefaction, and ground lurching. The following sections present a discussion of these hazards as they apply to the site. Based on topographic and lithologic data, the risk of regional subsidence or uplift, lateral spreading, landslides, tsunamis, flooding, or seiches is considered low to negligible at the site.

3.3.1 Ground Rupture

Since there are no known active faults crossing the property and the site is not located within an Earthquake Fault Special Study Zone, it is our opinion that ground rupture is unlikely at the subject property.

3.3.2 Ground Shaking

An earthquake of moderate to high magnitude generated within the region could cause considerable ground shaking at the site, similar to that which has occurred in the past. To mitigate the shaking effects, structures should be designed using sound engineering judgment and the 2019 California Building Code (CBC) requirements, as a minimum. Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead and live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the comparable forces that would be associated with a major earthquake. Therefore, structures should be able to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1999).

3.3.3 Liquefaction

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. Soil most susceptible to liquefaction is clean, loose, saturated, uniformly graded, fine-grained sand. Based on the depth to groundwater being over 50 feet deep, we judge the potential for liquefaction at the site is low during seismic shaking.

3.3.4 Ground Lurching

Ground lurching is a result of the rolling motion imparted to the ground surface during energy released by an earthquake. Such rolling motion can cause ground cracks to form in weaker soil. The potential for the formation of these cracks is considered greater at contacts between deep alluvium and bedrock. Such an occurrence is possible at the site as in other locations in the region, but based on the site location, it is our opinion that the offset is expected to be minor. We provide recommendations for foundation and pavement design in this report that are intended to reduce the potential for adverse impacts from lurch cracking.

3.4 2019 CBC SEISMIC DESIGN PARAMETERS

The 2019 CBC utilizes seismic design criteria established in the ASCE/SEI Standard *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* (ASCE 7-16). Based on the subsurface conditions encountered and shear-wave velocity measurements, we characterized the site as Site Class D.

ASCE 7-16 requires a site-specific ground-motion hazard analysis for Site Class D sites with a mapped S_1 value greater than or equal to 0.2. However, Section 11.4.8 of ASCE 7-16 and Supplement 3 provide an exception to this requirement. A site-specific ground-motion hazard analysis is not required where the value of the parameter S_{M1} determined by Equation 11.4-2 of ASCE 7-16 and shown in Table 3.4-1 below is increased by 50 percent for developing the mapped Risk-Targeted Maximum Considered Earthquake (MCE_R) spectral response, calculating S_{D1}, and evaluating C_s in accordance with Chapter 12 of ASCE 7-16.

In Table 3.4-1 below, we provide the CBC seismic parameters based on the United States Geological Survey's (USGS) Seismic Design Maps for your use. When using this table, consideration should be given to exceptions in Section 11.4.8 of ASCE 7-16, as described above.

**TABLE 3.4-1: 2019 CBC Seismic Design Parameters
Latitude: 38.4828 Longitude: -121.8070**

PARAMETER	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	0.943
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.355
Site Coefficient, F_a	1.123
Site Coefficient, F_v	*1.945**
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.059
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	*0.69**
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	0.706

PARAMETER	VALUE
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	*0.46**
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.395
Site Coefficient, F_{PGA}	1.205
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.476
Long period transition-period, T_L (sec)	8

*The parameters above should only be used for calculation of T_s, determination of Seismic Design Category, and, when taking the exceptions under Items 1 and 2 of ASCE 7-16 Section 11.4.8 (Supplement 3 https://ascelibrary.org/doi/epdf/10.1061/9780784414248.sup3).

We recommend that we collaborate with the structural engineer of record to further evaluate the effects of taking the exception on the structural design and identify the need for performing a site-specific ground-motion hazard analysis. We can prepare a proposal for a site-specific ground-motion hazard analysis, if requested.

3.5 SOIL CORROSION POTENTIAL

As part of this study, we obtained representative soil samples and submitted them to an analytical lab for determination of pH, minimum resistivity, sulfate content, and chloride content. The results are included in Appendix B and summarized in the table below.

TABLE 3.5-1: Corrosivity Test Results

SAMPLE LOCATION	DEPTH (FEET)	pH[1]	MINIMUM RESISTIVITY[1] (OHMS-CM)	CHLORIDE[2] (PPM)	SULFATE[3] (PPM)
1-B2	3	7.40	1,530	1.1	18.8
1-B3	3½	7.35	1,340	1.4	13.8

[1] CA DOT Test 643; [2] CA DOT Test 422; [3] CA DOT Test 417

The 2019 CBC references the 2014 American Concrete Institute Manual, ACI 318-14, Section 19.3.1 for concrete durability requirements. ACI Table 19.3.1.1 provides the following exposure categories and classes, and ACI Table 19.3.2.1 provides requirements for concrete in contact with soil based upon the exposure class.

The 2019 CBC references the 2014 American Concrete Institute Manual, ACI 318-14, Section 19.3.1 for concrete durability requirements. ACI Table 19.3.1.1 provides the following exposure categories and classes, and Table 19.3.2.1 provides requirements for concrete in contact with soil based upon the exposure class.

TABLE 3.5-2: ACI Table 19.3.1.1: Exposure Categories and Classes

CATEGORY	SEVERITY	CLASS	CONDITION
F Freezing and thawing	Not Applicable	F0	Concrete not exposed to freezing-and-thawing cycles
	Moderate	F1	Concrete exposed to freezing-and-thawing cycles and occasional exposure to moisture
	Severe	F2	Concrete exposed to freezing-and-thawing cycles and in continuous contact with moisture

CATEGORY	SEVERITY	CLASS	CONDITION	
	Very Severe	F3	Concrete exposed to freezing-and-thawing cycles and in continuous contact with moisture and exposed to deicing chemicals	
			WATER- SOLUBLE SULFATE IN SOIL % BY WEIGHT	**DISSOLVED SULFATE IN WATER MG/KG (PPM)**
S Sulfate	Not applicable	S0	$SO_4 < 0.10$	$SO_4 < 150$
	Moderate	S1	$0.10 \leq SO_4 < 0.20$	$150 \leq SO_4 \leq 1,500$ seawater
	Severe	S2	$0.20 \leq SO_4 \leq 2.00$	$1,500 \leq SO_4 \leq 10,000$
	Very severe	S3	$SO_4 > 2.00$	$SO_4 > 10,000$
			CONDITION	
P Requiring low permeability	Not applicable	P0	In contact with water where low permeability is not required.	
	Required	P1	In contact with water where low permeability is required.	
C Corrosion protection of reinforcement	Not applicable	C0	Concrete dry or protected from moisture	
	Moderate	C1	Concrete exposed to moisture but not to external sources of chlorides	
	Severe	C2	Concrete exposed to moisture and an external source of chlorides from deicing chemicals, salt, brackish water, seawater, or spray from these sources	

In accordance with the criteria presented in the table above, the soil is categorized as F0 freeze-thaw class, S0 sulfate exposure class, P0 exposure class, and C1 corrosion class. Cement type, water-cement ratio, and concrete strength are not specified for these ranges.

Considering a ‘Not Applicable’ sulfate exposure, there is no requirement for cement type or water-cement ratio; however, a minimum concrete compressive strength of 2,500 psi is specified by the building code. For this sulfate range, we recommend Type II cement and a concrete mix design for foundations and building slabs-on-grade that incorporates a maximum water-cement ratio of 0.50. It should be noted; however, that the structural engineering design requirements for concrete may result in more stringent concrete specifications.

The resistivity measurements indicate the soil is considered severely to very severely corrosive, according to the National Association of Corrosion Engineers’ interpretation of resistivity (Roberge, 2006).

If desired to investigate this further, we recommend a corrosion consultant be retained to evaluate if specific corrosion recommendations are advised for the project.

4.0 CONSTRUCTION MONITORING

Our experience and that of our profession clearly indicate that the risk of costly design, construction, and maintenance problems can be significantly lowered by retaining the design geotechnical engineering firm to:

1. Review the final grading and foundation plans and specifications prior to construction to evaluate whether our recommendations have been implemented, and to provide additional or modified recommendations, as needed. This also allows us to check if any changes have

occurred in the nature, design or location of the proposed improvements and provides the opportunity to prepare a written response with updated recommendations.

2. Perform construction monitoring to check the validity of the assumptions we made to prepare this report. Earthwork operations should be performed under the observation of our representative to check that the site is properly prepared, the selected fill materials are satisfactory, and that placement and compaction of the fill has been performed in accordance with our recommendations and the project specifications. Sufficient notification to us prior to earthwork is important.

If we are not retained to perform the services described above, then we are not responsible for any party's interpretation of our report (and subsequent addenda, letters, and verbal discussions).

5.0 EARTHWORK RECOMMENDATIONS

As used in this report, relative compaction refers to the in-place dry unit weight of soil expressed as a percentage of the maximum dry unit weight of the same soil, as determined by the ASTM D1557 laboratory compaction test procedure, latest edition. Compacted soil is not acceptable if it is unstable; it should exhibit only minimal flexing or pumping, as observed by an ENGEO representative. The term "moisture condition" refers to adjusting the moisture content of the soil by either drying if too wet or adding water if too dry.

We define "structural areas" as any area sensitive to settlement of compacted soil. These areas include, but are not limited to building pads, sidewalks, pavement areas, loading docks, and retaining walls.

We define "expansive" soil as fine-grained soil with a plasticity index of 12 or greater and "low expansive" soil as soil with a plasticity index less than 12.

5.1 EXPANSIVE SOIL MITIGATION

We recommend that structural elements, such as foundations, slabs-on-grade, and pavements be designed for highly expansive soil conditions.

We recommend constructing the upper 18 inches of building pads with low expansive fill. As an alternative to importing low expansive fill for grading building pads, it may be cost effective to lime treat the upper 18 inches of the finished building pad and to 5 feet laterally beyond. See Section 5.6 for specific lime treatment recommendations.

To reduce expansion potential of compacted fill, we recommend that clay on site be compacted at a slightly lower relative compaction at a moisture content well over optimum, as detailed in Section 5.5.

Our foundations recommendations in Section 6, slab-on-grade recommendations in Section 7, and pavement recommendations in Section 9 account for the expansive soil conditions.

5.2 GENERAL SITE CLEARING

Areas to be developed should be cleared of surface and subsurface deleterious materials, including existing building foundations, slabs, buried utility and irrigation lines, pavements, debris, and designated trees, shrubs, and associated roots. Clean and backfill excavations extending below the planned finished site grades with suitable material compacted to the recommendations presented in Section 5.5. ENGEO should be retained to observe and test backfilling.

Following clearing, the site should be stripped to remove surface organic materials. Strip organics from the ground surface to a depth of at least 2 to 3 inches below the surface. Remove stripping from the site or, if considered suitable by the landscape architect and owner, use them in landscape fill.

It may also be feasible to mulch organics in place, depending on the amount and type of vegetation present at the time of grading as well as the proposed mulching method. If desired, ENGEO can evaluate site vegetation at the time of grading to assess the feasibility of mulching organics in place. In general, we recommend that the organics content be reduced to no more than 3 percent by weight.

5.3 OVER-OPTIMUM SOIL MOISTURE CONDITIONS

The contractor should anticipate encountering excessively over-optimum (wet) soil moisture conditions during winter or spring grading, or during or following periods of rain. Wet soil can make proper compaction difficult or impossible. Wet soil conditions can be mitigated by:

- Frequent spreading and mixing during warm dry weather,
- Mixing with drier materials,
- Mixing with a lime, lime-flyash, or cement product, or
- Stabilizing with aggregate or geotextile stabilization fabric, or both.

Options 3 and 4 should be evaluated by ENGEO prior to implementation.

5.4 ACCEPTABLE FILL

On-site soil material is suitable as fill material provided it is processed to remove concentrations of organic material, debris, and particles greater than 8 inches in maximum dimension.

Imported fill materials should meet the above requirements and have a plasticity index less than 12 and at least 20 percent passing the No. 200 sieve. Allow ENGEO to sample and test proposed imported fill materials at least 5 days prior to delivery to the site.

5.5 FILL COMPACTION

5.5.1 Grading in Structural Areas

Areas to receive fill should be scarified to a depth of 8 inches, moisture conditioned, and recompacted to provide adequate bonding with the initial lift of fill. Fill should be placed with a loose lift thickness no greater than 8 inches. The following compaction recommendations should be used for the placement and compaction of fill.

TABLE 5.5.1-1: Compaction and Moisture Content Requirements

DESCRIPTION	SOIL	RECOMMENDED RELATIVE COMPACTION (%)	MINIMUM MOISTURE CONTENT (PERCENTAGE POINTS ABOVE OPTIMUM)
Grading in Structural Areas	Expansive	87 to 92	4
	Low Expansive	90 or greater	1
Upper 6 inches of Pavement Subgrade	Expansive	90 or greater	4
	Low Expansive	95 or greater	1
Pavement Aggregate Base and Slab Subbase	Caltrans Class 2 AB	95 or greater	0

Optimum moisture is the moisture content corresponding to the maximum dry density. We recommend that the expansive soil be compacted at higher than optimum moisture contents as shown above to reduce potential swell.

5.5.2 Underground Utility Backfill

The contractor is responsible for conducting trenching and shoring in accordance with CALOSHA requirements. Project consultants involved in utility design should specify pipe bedding materials.

Place and compact trench backfill in structural areas as follows.

- Trench backfill should have a maximum particle size of 6 inches.
- Moisture condition fill outside the trench to the moisture content specified in Table 5.5.1-1.
- Place fill in loose lifts not exceeding 12 inches.
- Compact fill to the relative compaction specified in Table 5.5.1-1.

Where utility trenches cross underneath buildings, we recommend that a plug be placed within the trench backfill to help prevent the normally granular bedding materials from acting as a conduit for water to enter beneath the building. The plug should be constructed using a sand cement slurry (minimum 28-day compressive strength of 500 psi) or relatively impermeable native soil for pipe bedding and backfill. We recommend that the plug extend for a distance of at least 3 feet in each direction from the point where the utility enters the building perimeter.

Jetting of backfill is not an acceptable means of compaction. We may allow thicker loose lift thicknesses based on acceptable density test results, where increased effort is applied to rocky fill, or for the first lift of fill over pipe bedding.

5.5.3 Landscape Fill

Process, place, and compact fill in accordance with Sections 5.5.1, except compact to at least 85 percent relative compaction (ASTM D1557).

5.6 LIME TREATMENT

Where lime treatment of the soil is used to enhance slab-on-grade and pavement subgrade support, we recommend uniformly mixing the subgrade soil with at least 4 percent high calcium lime by dry weight. The soil should be moisture conditioned to at least 3 percentage points above the optimum moisture content before mixing. The mixing should be performed in accordance with the current version of Caltrans Standard Specifications with the following exceptions.

- Following mixing, the treated soil should be allowed to fully hydrate prior to compaction.
- Following hydration, the treated soil should be compacted to not less than 95 percent relative compaction at a moisture content at least 2 percentage points above the optimum to a non-yielding surface.

5.7 SLOPE GRADIENTS

Construct final slope gradients to 2:1 (horizontal:vertical) or flatter. The contractor is responsible to construct temporary construction slopes in accordance with CALOSHA requirements.

5.8 SURFACE DRAINAGE

The project civil engineer is responsible for designing surface drainage improvements. With regard to geotechnical engineering issues, we recommend that finish grades be sloped away from buildings and pavements to the maximum extent practical to reduce the potentially damaging effects of expansive soil. The latest California Building Code Section 1804.4 specifies that pervious surfaces have a minimum slope of 5 percent away from foundations. As a minimum, we recommend the following:

- Discharge roof downspouts into closed conduits and direct away from foundations to appropriate drainage devices.
- Do not allow water to pond near foundations, pavements, or exterior flatwork.

5.9 STORMWATER BIORETENTION AREAS

If bioretention areas are implemented, we recommend that, when practical, they be planned a minimum of 5 feet away from structural site improvements, such as buildings, streets, retaining walls, and sidewalks/driveways. When this is not practical, bioretention areas located within 5 feet of structural site improvements can either:

- Be constructed with structural side walls capable of withstanding the loads from the adjacent improvements, or
- Incorporate filter material compacted to between 85 and 90 percent relative compaction and a waterproofing system designed to reduce the potential for moisture transmission into the subgrade soil beneath the adjacent improvement.

The retaining wall structures adjacent to the bioretention basins should be a cast-in-place or CMU wall system that would not allow water to freely pass through the wall.

We recommend that each of the bioretention basins and swales incorporate a waterproofing system lining the excavation and a subdrain, or other storm drain system, to collect and convey water to an approved outlet. The waterproofing system should cover the bioretention area excavation in such a manner as to reduce the potential for moisture transmission beneath the adjacent improvements.

Site improvements located adjacent to bioretention areas that are underlain by base rock, sand, or other imported granular materials, should be designed with a deepened edge that extends to the bottom of the imported material underlying the improvement.

Bioretention system internal slopes should follow the slope guidelines described in Section 5.7 of this report.

Given the nature of bioretention systems and possible proximity to improvements, we recommend we be retained to review design plans and provide testing and observation services during the installation of linings, compaction of the filter material, and connection of designed drains.

It should be noted that the contractor is responsible for conducting all excavation and shoring in a manner that does not cause damage to adjacent improvements during construction and future maintenance of the bioretention areas. As with any excavation adjacent to improvements, the contractor should reduce the exposure time such that the improvements are not detrimentally impacted.

5.10 LANDSCAPING CONSIDERATION

As the near-surface soil is moderately to highly expansive, we recommend greatly restricting the amount of surface water infiltration near structures, pavements, flatwork, and slabs-on-grade. This may be accomplished by:

- Selecting landscaping that requires little or no watering, especially within 3 feet of structures, slabs-on-grade, or pavements.
- Using low precipitation sprinkler heads.
- Regulating the amount of water distributed to lawn or planter areas by installing timers on the sprinkler system.
- Providing surface grades to drain rainfall or landscape watering to appropriate collection systems and away from structures, slabs-on-grade, or pavements.
- Preventing water from draining toward or ponding near building foundations, slabs-on-grade, or pavements.
- Avoiding open planting areas within 3 feet of the building perimeter.

We recommend that these items be incorporated into the landscaping plans.

6.0 FOUNDATION RECOMMENDATIONS

Provided the upper 18 inches of building pads consist of low expansive fill or lime treated soil, then the proposed warehouse buildings can be supported on continuous and/or isolated spread footings with a concrete slab-on-grade floor.

6.1 FOOTING DIMENSIONS AND ALLOWABLE BEARING CAPACITY

We recommend the minimum footing dimensions in Table 6.1-1 below.

TABLE 6.1-1: Minimum Footing Dimensions

FOOTING TYPE	MINIMUM DEPTH* (INCHES)	MINIMUM WIDTH (INCHES)
Continuous	24	12
Isolated	24	18

* below lowest adjacent pad grade

Minimum footing depths shown above are taken from lowest adjacent pad grade. The cold joint between the exterior footing and slab-on-grade should be located at least 4 inches above adjacent exterior grade.

Design foundations recommended above for a maximum allowable bearing pressure of 4,000 pounds per square foot (psf) for dead-plus-live loads. Increase this bearing capacity by one-third for the short-term effects of wind or seismic loading.

The maximum allowable bearing pressure is a net value; the weight of the footing may be neglected for design purposes. Footings located adjacent to utility trenches should have their bearing surfaces below an imaginary 1:1 (horizontal:vertical) plane projected upward from the bottom edge of the trench to the footing.

6.2 WATERSTOP

If a two-pour system is used for footings and slab, the cold joint between the exterior footing and slab-on-grade should be located at least 4 inches above adjacent finish exterior grade. If this is not done, then we recommend the addition of a waterstop between the two pours to reduce moisture penetration through the cold joint and migration under the slab. Use of a monolithic pour would eliminate the need for the waterstop.

6.3 REINFORCEMENT

The structural engineer should design footing reinforcement to support the intended structural loads without excessive settlement. Reinforce continuous footings with top and bottom steel to provide structural continuity and to permit spanning of local irregularities. At a minimum, design continuous footings to structurally span a clear distance of 5 feet.

To help resist expansive soil movement, reinforce continuous footings with at least four No. 4 steel reinforcement bars, two top and two bottom.

6.4 LATERAL RESISTANCE

Lateral loads may be resisted by friction along the base and by passive pressure along the sides of foundations. The passive pressure is based on an equivalent fluid pressure in pounds per cubic foot (pcf). We recommend the following allowable values for design:

- Passive Lateral Pressure: 300 pcf
- Coefficient of Friction: 0.25

The above allowable values include a factor of safety of 1.5. Increase the above values by one-third for the short-term effects of wind or seismic loading.

Passive lateral pressure should not be used for footings on or above slopes.

6.5 SETTLEMENT

Provided our report recommendations are followed and given the proposed construction (Section 1.3), we estimate total and differential foundation settlements to be less than approximately 1 and ½ inch, respectively.

7.0 SLABS-ON-GRADE

7.1 INTERIOR CONCRETE FLOOR SLABS

7.1.1 Minimum Design Section

We anticipate that the operation of the warehouse facilities will include the use of heavy equipment and storage systems on the interior of the buildings. We recommend that a structural engineer design interior concrete slabs-on-grade as structural slabs for the anticipated interior floor loads. At a minimum, we recommend the following.

- Provide a minimum section of 6 inches of Portland Cement concrete over 6 inches of aggregate base (such as Caltrans Class 2 Aggregate Base) compacted to at least 95 percent relative compaction.
- Place minimum steel reinforcing of No. 3 rebar on 18-inch centers each way within the middle third of the slab to help control the width of shrinkage cracking that inherently occurs as concrete cures.

The structural engineer should provide the final design thickness, joint spacing, and reinforcement for any structural loads, including traffic, forklift, and/or rack loads.

7.1.2 Slab Moisture Vapor Reduction

When buildings are constructed with concrete slab-on-grade, water vapor from beneath the slab will migrate through the slab and into the building. This water vapor can be reduced but not stopped. Vapor transmission can negatively affect floor coverings and lead to increased moisture within a building. When water vapor migrating through the slab would be undesirable, such as at office areas or where floor coverings may be applied, we recommend the following.

- Install a vapor retarder membrane directly beneath the slab-on-grade sealed at all seams and pipe penetrations and connected to all footings. Vapor retarders shall conform to Class A vapor retarder in accordance with ASTM E1745, latest edition, *Standard Specification for Plastic Water Vapor Retarders used in Contact with Soil or Granular Fill under Concrete Slabs*. The vapor retarder should be underlain by at least 6 inches of aggregate base, as recommended in Section 7.1.1
- Use a concrete water-cement ratio for slabs-on-grade of no more than 0.50.
- Provide inspection and testing during concrete placement to check that the proper concrete and water cement ratio are used.

- Moist cure slabs for a minimum of 3 days or use other equivalent curing specified by the structural engineer.

The structural engineer should be consulted as to the use of a layer of clean sand or pea gravel (less than 5 percent passing the U.S. Standard No. 200 Sieve) placed on top of the vapor retarder membrane to assist in concrete curing.

7.1.3 Subgrade Modulus for Structural Slab Design

Provided the site earthwork is conducted in accordance with the recommendations of this report, a subgrade modulus of 200 psi/in can be used for structural slab design.

7.2 EXTERIOR FLATWORK

Exterior flatwork includes items such as concrete sidewalks, steps, and outdoor courtyards exposed to foot traffic only. Provide a minimum section of 4 inches of concrete over 4 inches of aggregate base. Compact the aggregate base to at least 95 percent relative compaction (ASTM D1557). Thicken flatwork edges to at least 8 inches to help control moisture variations in the subgrade and place wire mesh or rebar within the middle third of the slab to help control the width and offset of cracks. Construct control and construction joints in accordance with current Portland Cement Association Guidelines.

7.3 TRENCH BACKFILL

Backfill and compact all trenches below building slabs-on-grade and to 5 feet laterally beyond any edge in accordance with Section 5.5.2.

8.0 RETAINING WALLS

8.1 LATERAL SOIL PRESSURES

Design proposed retaining walls to resist lateral earth pressures from adjoining natural materials and/or backfill and from any surcharge loads. Provided that adequate drainage is included as recommended below, design walls restrained from movement at the top to resist an equivalent fluid pressure of 60 pounds per cubic foot (pcf). In addition, design restrained walls to resist an additional uniform pressure equivalent to one half of any surcharge loads applied at the surface.

Design unrestrained retaining walls with adequate drainage to resist an equivalent fluid pressure of 45 pcf plus one third of any surcharge loads.

The above lateral earth pressures assume level backfill conditions and sufficient drainage behind the walls to prevent any build-up of hydrostatic pressures from surface water infiltration and/or a rise in the groundwater level. If adequate drainage is not provided, we recommend that an additional equivalent fluid pressure of 40 pcf be added to the values recommended above for both restrained and unrestrained walls. Damp-proofing of the walls should be included in areas where wall moisture would be problematic.

Construct a drainage system, as recommended below, to reduce hydrostatic forces behind the retaining wall.

8.2 RETAINING WALL DRAINAGE

Construct either graded rock drains or geosynthetic drainage composites behind the retaining walls to reduce hydrostatic lateral forces. For rock drain construction, we recommend two types of rock drain alternatives.

- A minimum 12-inch-thick layer of Class 2 Permeable Filter Material (Caltrans Specification 68-2.02F) placed directly behind the wall.
- A minimum 12-inch-thick layer of washed, crushed rock with 100 percent passing the ¾-inch sieve and less than 5 percent passing the No. 4 sieve. Envelop rock in a minimum 6-ounce, nonwoven geotextile filter fabric.

For both types of rock drains:

- Place the rock drain directly behind the walls of the structure.
- Extend rock drains from the wall base to within 12 inches of the top of the wall.
- Place a minimum of 4-inch-diameter perforated pipe (glued joints and end caps) at the base of the wall, inside the rock drain and fabric, with perforations placed down.
- Place pipe at a gradient at least 1 percent to direct water away from the wall by gravity to a drainage facility.

ENGEO should review and approve geosynthetic composite drainage systems prior to use.

8.3 BACKFILL

Backfill behind retaining walls should be placed and compacted in accordance with Section 5.5. Use light compaction equipment within 5 feet of the wall face. If heavy compaction equipment is used, the walls should be temporarily braced to avoid excessive wall movement.

8.4 FOUNDATIONS

Retaining walls may be supported on continuous footings designed in accordance with recommendations presented in Section 6.1 and 6.4, except that the minimum footing width should be increased to 18 inches.

9.0 PAVEMENT DESIGN

9.1 FLEXIBLE PAVEMENTS

We obtained two representative bulk samples of the near-surface soil and performed R-value tests to provide data for pavement design. The results of the tests are included in Appendix B and indicate R-values of 6 and 7. Based on these test results and considering the predominance of expansive clay at the site, it is our opinion that an R-value of 5 is applicable for design. Using estimated traffic indexes for various pavement loading requirements, we developed the following recommended flexible pavement sections using Topic 633 of the Caltrans Highway Design Manual (including the asphalt factor of safety), presented in the table below. The table includes recommended pavement sections for native soil subgrade and lime-treated subgrade.

TABLE 9.1-1: Recommended Asphalt Concrete Pavement Sections

TRAFFIC INDEX	NATIVE SOIL SUBGRADE		LIME-TREATED SUBGRADE*	
	ASPHALT CONCRETE (INCHES)	CLASS 2 AGGREGATE BASE (INCHES)	ASPHALT CONCRETE (INCHES)	CLASS 2 AGGREGATE BASE (INCHES)
5	3	10	3	4
6	3½	13	3½	4
7	4	15½	4	4½
8	5	17½	5	5
9	5½	20½	5½	6½

* Assumed R-value of 50 for lime-treated subgrade

The civil engineer should determine the appropriate traffic indexes based on the estimated traffic loads and frequencies.

9.2 RIGID PAVEMENTS

We recommend that rigid pavement be used in heavily loaded exterior traffic areas of the warehouse facility such as truck parking, loading, and travel lanes. Using various daily truck traffic, we developed the following recommended rigid pavement sections using the ACI *Guide for the Design and Construction of Concrete Site Paving for Industrial and Trucking Facilities* (ACI, 2017), presented in the tables below. Table 9.2-1 includes recommended rigid pavement sections for pavement on native soil subgrade and Table 9.2-2 includes recommended rigid pavement sections for pavement on 12 inches of lime-treated subgrade.

TABLE 9.2-1: Recommended Rigid Pavement Sections on Native Subgrade

NO. OF TRUCKS PER DAY	CONCRETE (INCHES)	CLASS 2 AGGREGATE BASE (INCHES)	MAX. JOINT SPACING (FEET)
50	6½	8	13
100	7	8	14
200	7	8	14
500	7½	8	15
1000	8	8	15

TABLE 9.2-2: Recommended Rigid Pavement Sections on 12 inches of Lime-Treated Subgrade

NO. OF TRUCKS PER DAY	CONCRETE (INCHES)	CLASS 2 AGGREGATE BASE (INCHES)	MAX. JOINT SPACING (FEET)
50	6	4	12
100	6½	4	13
200	6½	4	14
500	7	4	15
1000	7½	4	15

The recommendations above assume jointed plain concrete pavement with no dowels and a minimum compressive strength of 3,000 psi. We recommend that control joints be spaced and constructed in accordance with ACI guidelines.

9.3 SUBGRADE AND AGGREGATE BASE COMPACTION

Compact finish subgrade and aggregate base in accordance with Section 5.5.1. Aggregate Base should meet the requirements for ¾-inch maximum Class 2 AB in accordance with Section 26-1.02B of the latest Caltrans Standard Specifications.

9.4 CUTOFF CURBS

Saturated pavement subgrade or aggregate base can cause premature failure or increased maintenance of pavements. This condition often occurs where landscape areas directly abut and drain toward pavements. If desired to install pavement cutoff barriers, they should be considered where pavement areas lie downslope of any landscape areas that are to be sprinklered or irrigated and should extend to a depth of at least 4 inches below the base rock layer. Cutoff barriers may consist of deepened concrete curbs or deep-root moisture barriers.

If reduced pavement life and greater than normal pavement maintenance is acceptable to the owner, then the cutoff barrier may be eliminated.

10.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report presents geotechnical recommendations for design of the improvements discussed in Section 1.3 for the Pedrick Road Warehouse project. If changes occur in the nature or design of the project, we should be allowed to review this report and provide additional recommendations, if any. It is the responsibility of the owner to transmit the information and recommendations of this report to the appropriate organizations or people involved in design of the project, including but not limited to developers, owners, buyers, architects, engineers, and designers. The conclusions and recommendations contained in this report are solely professional opinions and are valid for a period of no more than 2 years from the date of report issuance.

We strived to perform our professional services in accordance with generally accepted principles and practices currently employed in the area; there is no warranty, express or implied. There are risks of earth movement and property damages inherent in building on or with earth materials. We are unable to eliminate all risks; therefore, we are unable to guarantee or warrant the results of our services.

This report is based upon field and other conditions discovered at the time of report preparation. We developed this report with limited subsurface exploration data. We assumed that our subsurface exploration data are representative of the actual subsurface conditions across the site. Considering possible underground variability of soil and groundwater, additional costs may be required to complete the project. We recommend that the owner establish a contingency fund to cover such costs. If unexpected conditions are encountered, ENGEO must be notified immediately to review these conditions and provide additional and/or modified recommendations, as necessary.

Our services did not include excavation sloping or shoring, soil volume change factors, flood potential, or a geohazard exploration. In addition, our geotechnical exploration did not include work to determine the existence of possible hazardous materials. If any hazardous materials are encountered during construction, the proper regulatory officials must be notified immediately.

This document must not be subject to unauthorized reuse; that is, reusing without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time.

Actual field or other conditions will necessitate clarifications, adjustments, modifications or other changes to ENGEO's documents. Therefore, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include on-site construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

We determined the lines designating the interface between layers on the exploration logs using visual observations. The transition between the materials may be abrupt or gradual. The exploration logs contain information concerning samples recovered, indications of the presence of various materials such as clay, sand, silt, rock, existing fill, etc., and observations of groundwater encountered. The field logs also contain our interpretation of the subsurface conditions between sample locations. Therefore, the logs contain both factual and interpretative information. Our recommendations are based on the contents of the final logs, which represent our interpretation of the field logs.

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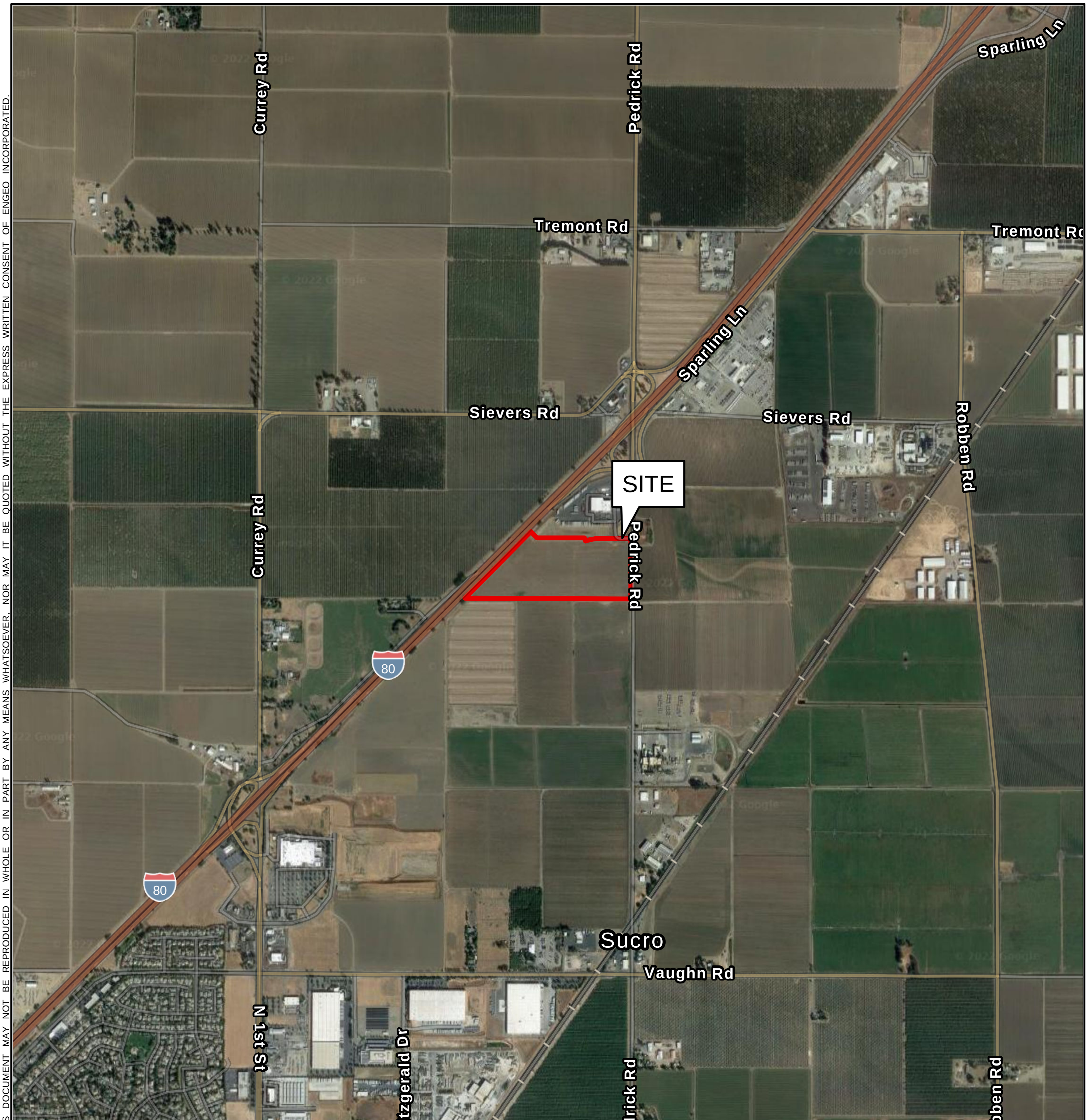
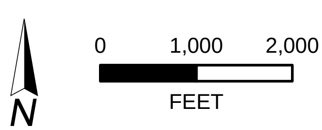
FIGURES

FIGURE 1: Vicinity Map
FIGURE 2: Site Plan
FIGURE 3: Regional Geologic Map
FIGURE 4: Regional Faulting and Seismicity





BASEMAP SOURCE: GOOGLE EARTH MAPPING SERVICE 6/3/2021

ENGEO Expect Excellence	VICINITY MAP PEDRICK ROAD WAREHOUSE DIXON, CALIFORNIA	PROJECT NO. : 20357.000.001 SCALE: AS SHOWN DRAWN BY: JV / CHECKED BY: MMG	FIGURE NO. 1

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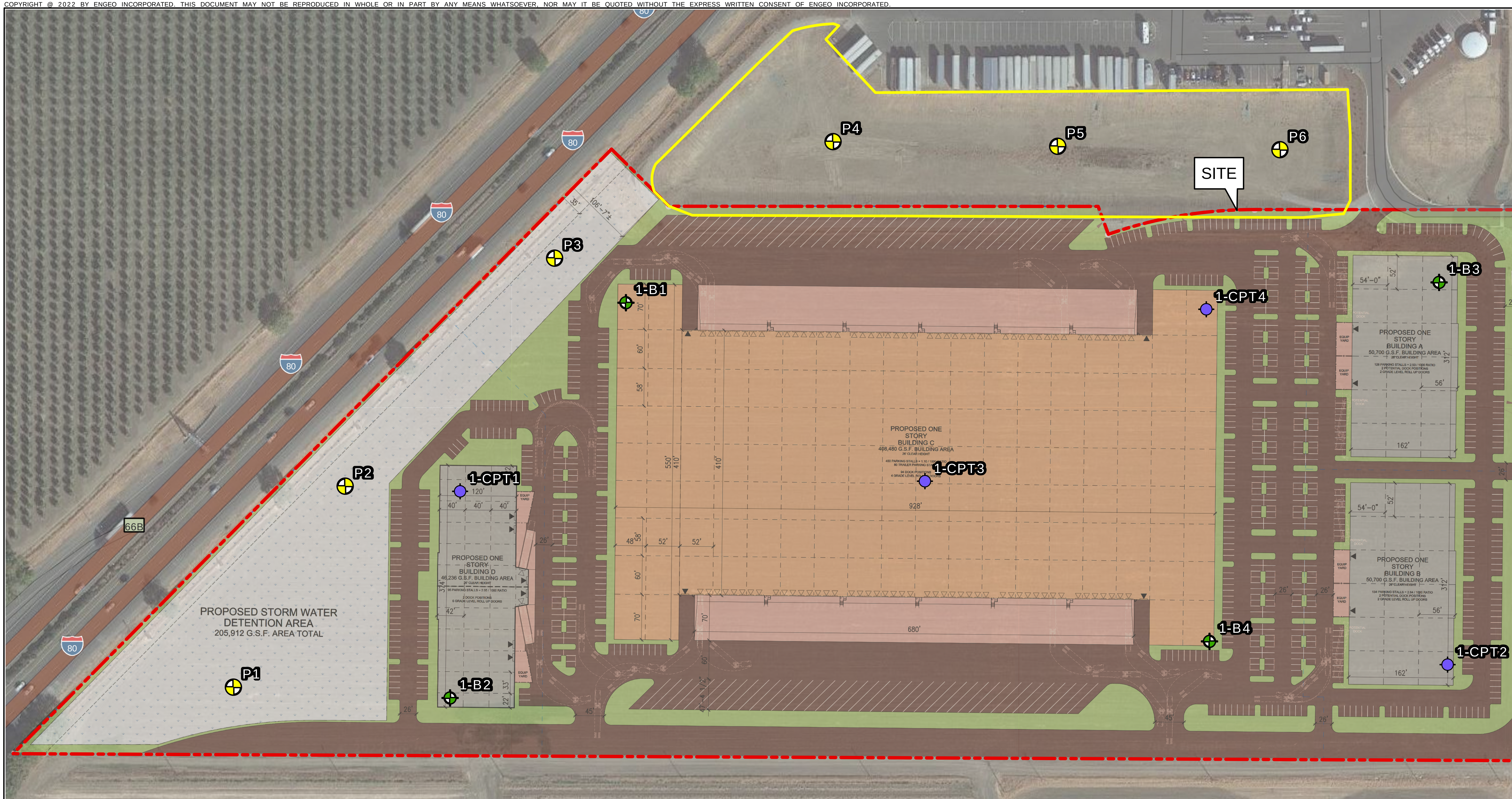
LAYOUT: VICINITY USER: JVERGARA

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- BORING (ENGEO, 2022)
- CONE PENETRATION TEST (ENGEO, 2022)
- BORING AND PERCOLATION TEST (ENGEO, 2022)
- OFFSITE DETENTION BASIN

N

0 75 150

FEET

BASE MAP SOURCE: GOOGLE EARTH MAPPING SERVICE 10/21/2020 AND RMW 2022

ENGEO Expect Excellence	SITE PLAN PEDRICK ROAD WAREHOUSE DIXON, CALIFORNIA	PROJECT NO.: 20357.000.001 SCALE: AS SHOWN DRAWN BY: JV / CHECKED BY: MMG	FIGURE NO. 2

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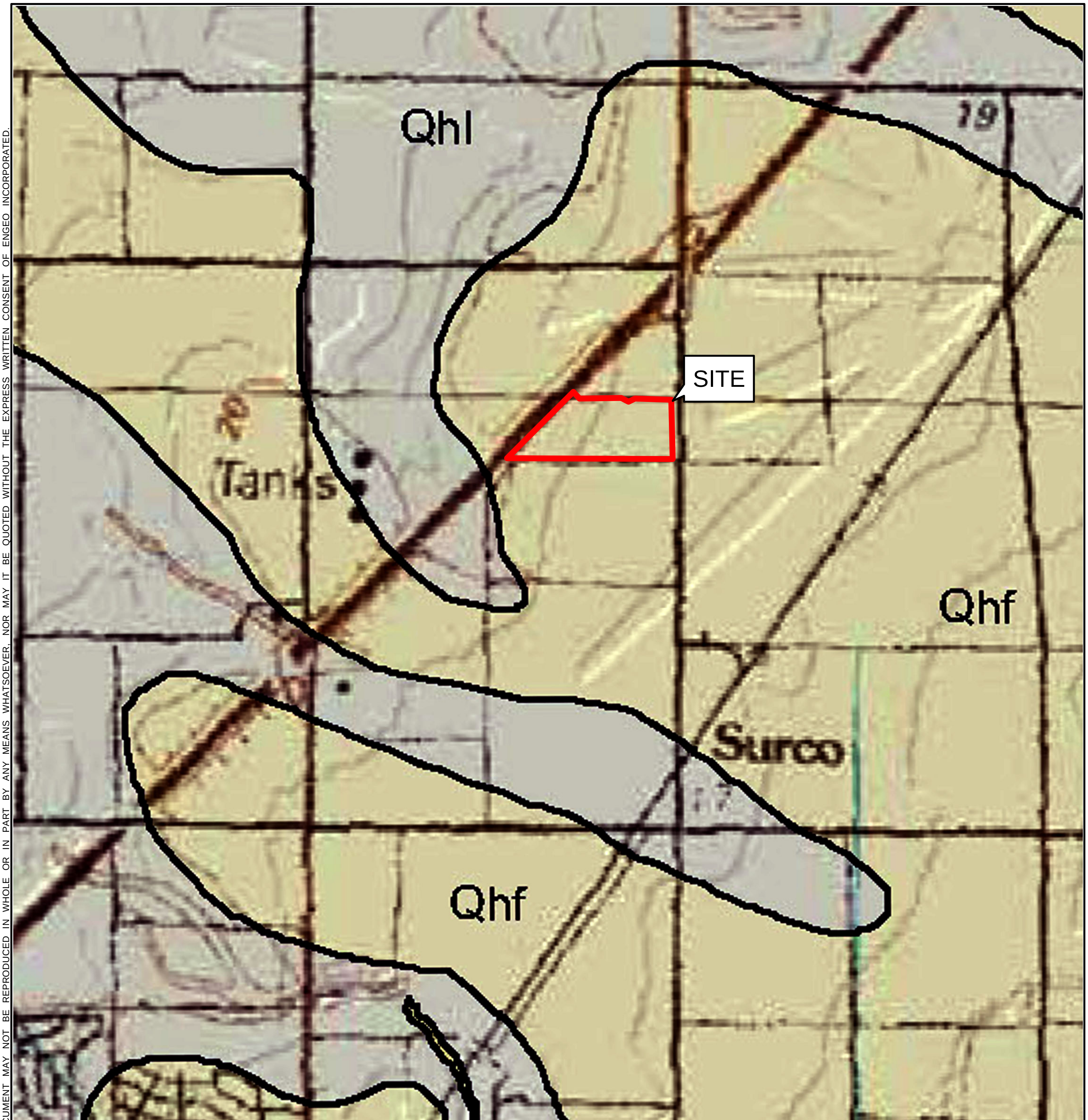
LAYOUT: B-SIZE LANDSCAPE USER: JVERGARA

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

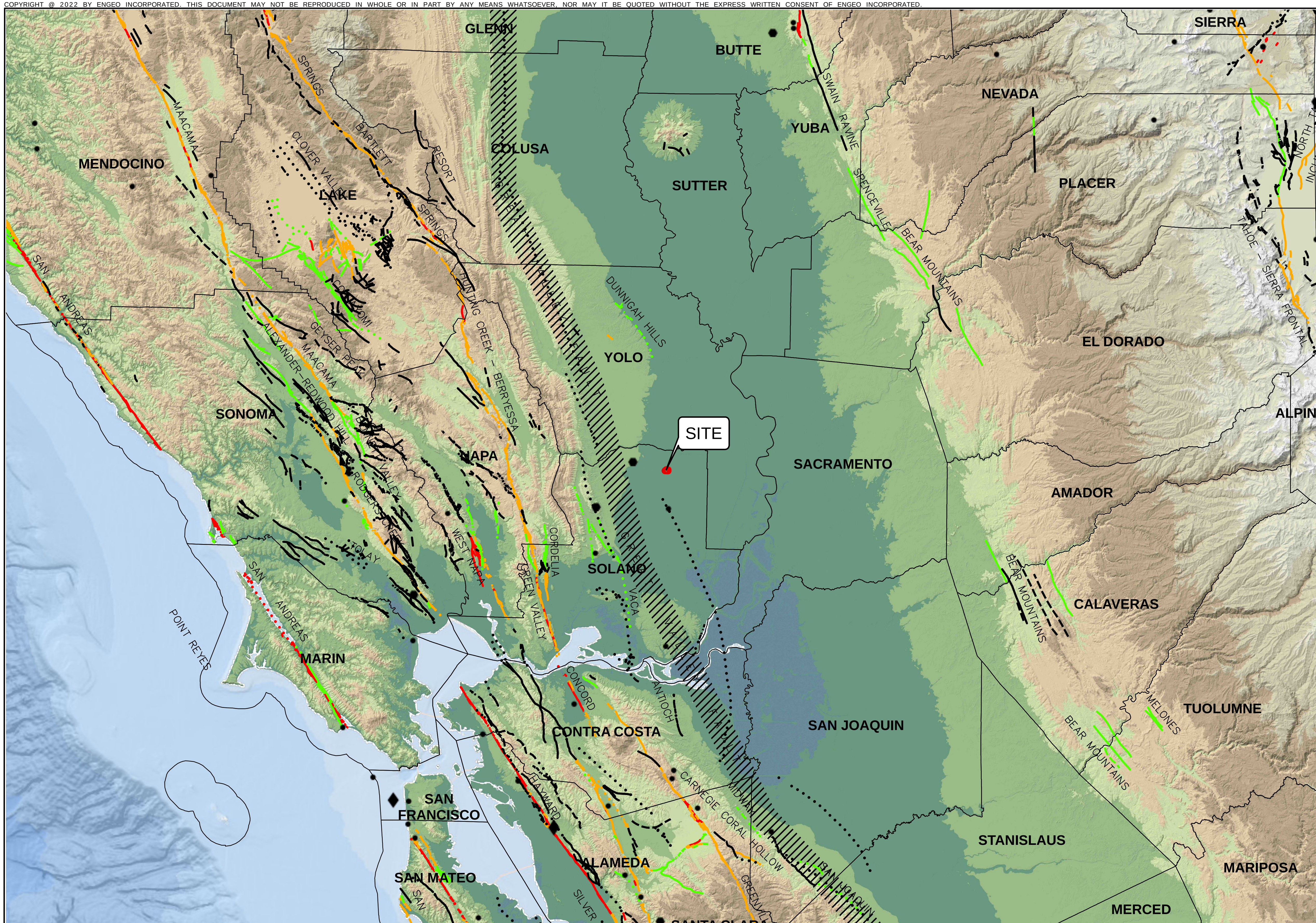
Qhl	HOLOCENE FAN LEVEE DEPOSITS
Qhf	HOLOCENE ALLUVIAL FAN DEPOSITS

BASEMAP SOURCE: DAWSON, 2009

ENGEO Expect Excellence	REGIONAL GEOLOGIC MAP PEDRICK ROAD WAREHOUSE DIXON, CALIFORNIA	PROJECT NO.: 20357.000.001 SCALE: AS SHOWN DRAWN BY: JV / CHECKED BY: MMG	FIGURE NO. 3

PATH: G:\DRAFTING\PROJECTS_20000 TO 21999\20357\20357000001\GEOTECH\GEX\20357000001_GEX.APRX
LAYOUT: GEOLOGIC USER: JVERGARA

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

EARTHQUAKE

- MAGNITUDE 7+
- MAGNITUDE 6-7
- MAGNITUDE 5-6

QUATERNARY FAULTS

BASED ON TIME OF MOST RECENT SURFACE DEFORMATION

- HISTORICAL (<150 YEARS), WELL CONSTRAINED LOCATION
- HISTORICAL (<150 YEARS), MODERATELY CONSTRAINED LOCATION
- HISTORICAL (<150 YEARS), INFERRED LOCATION
- LATEST QUATERNARY (<15,000 YEARS), WELL CONSTRAINED LOCATION
- LATEST QUATERNARY (<15,000 YEARS), MODERATELY CONSTRAINED LOCATION
- LATEST QUATERNARY (<15,000 YEARS), INFERRED LOCATION
- LATE QUATERNARY (<130,000 YEARS), WELL CONSTRAINED LOCATION
- LATE QUATERNARY (<130,000 YEARS), MODERATELY CONSTRAINED LOCATION
- LATE QUATERNARY (<130,000 YEARS), INFERRED LOCATION
- UNDIFFERENTIATED QUATERNARY(<1.6 MILLION YEARS), WELL CONSTRAINED LOCATION
- UNDIFFERENTIATED QUATERNARY(<1.6 MILLION YEARS), MODERATELY CONSTRAINED LOCATION
- UNDIFFERENTIATED QUATERNARY(<1.6 MILLION YEARS), INFERRED LOCATION
- GREAT VALLEY FAULT ZONE

BASE MAP SOURCE
ESRI, GEBCO, DELORME, NATURALVUE
COLOR HILLSHADE IMAGE BASED ON THE NATIONAL ELEVATION DATA SET (NED) AT 30 METER RESOLUTION
U.S.G.S. QUATERNARY FAULT DATABASE, 2020
U.S.G.S. HISTORIC EARTHQUAKE DATABASE (1800-PRESENT)
U.S.G.S OPEN-FILE REPORT 96-705

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REGIONAL FAULTING AND SEISMICITY
PEDRICK ROAD WAREHOUSE
DIXON, CALIFORNIA

PROJECT NO. : 20357.000.001	FIGURE NO. 4
SCALE: AS SHOWN	
DRAWN BY: JV	CHECKED BY:MMG

PATH: G:\DRAFTING\PROJECTS_20000 TO 21999\20357\20357000001\GEOTECH\GEX\20357000001_GEX.APRX
LAYOUT: FAULT&SEISMICITY USER: JVERGARA

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX A

BORING LOG KEY
BORING LOGS

KEY TO BORING LOGS

MAJOR TYPES			DESCRIPTION
COARSE-GRAINED SOILS MORE THAN HALF OF MAT'L LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW - Well graded gravels or gravel-sand mixtures
			GP - Poorly graded gravels or gravel-sand mixtures
		GRAVELS WITH OVER 12 % FINES	GM - Silty gravels, gravel-sand and silt mixtures
			GC - Clayey gravels, gravel-sand and clay mixtures
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW - Well graded sands, or gravelly sand mixtures
			SP - Poorly graded sands or gravelly sand mixtures
		SANDS WITH OVER 12 % FINES	SM - Silty sand, sand-silt mixtures
			SC - Clayey sand, sand-clay mixtures
FINE-GRAINED SOILS MORE THAN HALF OF MAT'L SMALLER THAN #200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50 % OR LESS		ML - Inorganic silt with low to medium plasticity
			CL - Inorganic clay with low to medium plasticity
			OL - Low plasticity organic silts and clays
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50 %		MH - Elastic silt with high plasticity
			CH - Fat clay with high plasticity
			OH - Highly plastic organic silts and clays
	HIGHLY ORGANIC SOILS		PT - Peat and other highly organic soils

For fine-grained soils with 15 to 29% retained on the #200 sieve, the words "with sand" or "with gravel" (whichever is predominant) are added to the group name.

For fine-grained soil with >30% retained on the #200 sieve, the words "sandy" or "gravelly" (whichever is predominant) are added to the group name.

GRAIN SIZES

U.S. STANDARD SERIES SIEVE SIZE: 200, 40, 10, 4 — CLEAR SQUARE SIEVE OPENINGS: 3/4 ", 3", 12"

SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT (S.P.T.)
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	STRENGTH*
VERY SOFT	0-1/4
SOFT	1/4-1/2
MEDIUM STIFF	1/2-1
STIFF	1-2
VERY STIFF	2-4
HARD	OVER 4

SAMPLER SYMBOLS

- Modified California (3" O.D.) sampler
- California (2.5" O.D.) sampler
- S.P.T. - Split spoon sampler
- Shelby Tube
- Dames and Moore Piston
- Continuous Core
- Bag Samples
- Grab Samples
- NR No Recovery

MOISTURE CONDITION

DRY	Dusty, dry to touch
MOIST	Damp but no visible water
WET	Visible freewater

LINE TYPES

________	Solid - Layer Break
– – – – – –	Dashed - Gradational or approximate layer break

GROUNDWATER SYMBOLS

- ▽ Groundwater level during drilling
- ▼ Stabilized groundwater level

(S.P.T.) Number of blows of 140 lb. hammer falling 30" to drive a 2-inch O.D. (1-3/8 inch I.D.) sampler

* Unconfined compressive strength in tons/sq. ft., asterisk on log means determined by pocket penetrometer

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LOG OF BORING 1-B1

LATITUDE: 38.483757 LONGITUDE: -121808819

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED:	5/23/2022	LOGGED / REVIEWED BY:	R. Rud / MMG
HOLE DEPTH:	Approx. 25½ ft.	DRILLING CONTRACTOR:	West Coast Exploration
HOLE DIAMETER:	4.0 in.	DRILLING METHOD:	Solid Flight Auger
SURF ELEV (NAVD88):	65.5 ft.	HAMMER TYPE:	140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	DESCRIPTION	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	65	SANDY LEAN CLAY (CL), brown, very stiff, moist, low plasticity, approximately 30% fine-grained sand									
				16					7.9	93.4	2*
				10							
		POORLY GRADED SAND WITH CLAY (SP-SC), brown, loose, moist, fine- to medium-grained sand, approximately 7% fines									
5	60			9				7	5.5		
		grades to medium dense, fine- to coarse-grained sand		18							
10	55	grades to approixmately 15% fine gravel		14							
		SANDY LEAN CLAY (CL), brown, hard, moist, medium plasticity, approximately 40% fine-to coarse-grained sand									
15	50			9					13.5		4*
		FAT CLAY (CH), yellowish brown, hard, moist, high plasticity, trace calcium carbonate									
20											

LOG OF BORING 1-B1

LATITUDE: 38.483757 LONGITUDE: -121808819

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 25½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (NAVD88): 65.5 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	45		FAT CLAY (CH), yellowish brown, hard, moist, high plasticity, trace calcium carbonate			50/6							>4.5*
25			grades to some iron oxide staining			50/6							>4.5*
	40		Boring terminated at approximately 25½ feet. No groundwater encountered										

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LOG OF BORING 1-B2

LATITUDE: 38.482068 LONGITUDE: -121.809782

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 26½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (NAVD88): 65 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	DESCRIPTION	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
		LEAN CLAY (CL), brown, hard, slightly moist, medium plasticity								
			33	48	19	29	95	15.8		>4.5*
		FAT CLAY (CH), brown, hard, moist, high plasticity								
5	60									
			40					19.5	106.5	>4.5*
			43							4*
10	55									
			46					23.2		4.5*
		LEAN CLAY (CL), yellowish brown, stiff, moist, medium plasticity								
15	50									
			16							1*
20	45									

LOG OF BORING 1-B2

ENGEO
Expect Excellence

LATITUDE: 38.482068 LONGITUDE: -121.809782

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 26½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (NAVD88): 65 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			LEAN CLAY (CL), yellowish brown, stiff, moist, medium plasticity			24					12.3		>4.5*
			SANDY SILT (ML), brown, hard, moist, low plasticity, approximately 40% fine-grained sand										
25	40		grades to very stiff, approximately 45% sand, iron oxide staining			14							2.25*
			Boring terminated at approximately 26½ feet. No groundwater encountered.										

LOG - GEOTECHNICAL W/ELEV. 20357000001 PEDRICK ROAD WAREHOUSE BORING LOGS.GPJ ENGEO INC.GDT 6/20/22

LOG OF BORING 1-B3

LATITUDE: 38.483836 LONGITUDE: -121.80439

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 26½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (NAVD88): 62 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			LEAN CLAY (CL), brown, hard, slightly moist, medium plasticity			35	43	17	26	89	14		>4.5*
	60												
			FAT CLAY (CH), brown, hard, slightly moist, high plasticity			52					16.8	108.4	>4.5*
5													
			grades to some calcium carbonate filaments			48							>4.5*
	55												
10			grades to occasional fine calcium carbonate nodules			58					17.4	108.5	4.5*
	50												
			LEAN CLAY (CL), brown, hard, moist, low plasticity, slightly silty										
15						58							>4.5*
	45												
			LEAN CLAY WITH SAND (CL), brown mottled with greenish gray, hard, low plasticity, approixmately 25% coarse-grained sand										
20													

LOG OF BORING 1-B3

ENGEO Expect Excellence

LATITUDE: 38.483836 LONGITUDE: -121.80439

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 26½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (NAVD88): 62 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			LEAN CLAY WITH SAND (CL), brown mottled with greenish gray, hard, low plasticity, approixmately 25% coarse-grained sand			38							4.5*
	40		SANDY SILT (ML), brown, hard, moist, low plasticity, approximately 30% fine-grained sand										
25			POORLY GRADED SAND WITH CLAY (SP-SC), brown, medium dense, moist, fine-grained sand, approximately 5% fines, rare subrounded fine gravel			22							
			Boring terminated at approximately 26½ feet. No groundwater encountered										

LOG - GEOTECHNICAL W/ELEV. 20357000001 PEDRICK ROAD WAREHOUSE BORING LOGS.GPJ ENGEO INC.GDT 6/20/22

LOG OF BORING 1-B4

LATITUDE: 38.482303 LONGITUDE: -121.805645

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED:	5/23/2022
HOLE DEPTH:	Approx. 26½ ft.
HOLE DIAMETER:	4.0 in.
SURF ELEV (NAVD88):	62.5 ft.
LOGGED / REVIEWED BY:	R. Rud / MMG
DRILLING CONTRACTOR:	West Coast Exploration
DRILLING METHOD:	Solid Flight Auger
HAMMER TYPE:	140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	DESCRIPTION	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
		LEAN CLAY WITH SAND (CL), dark brown, hard, slightly moist, medium plasticity, 29% fine-grained sand								
			24	43	23	20	71	14.1		>4.5*
	60									
			31							>4.5*
5										
		grades to very stiff, brown, some translocated clays						20.1		3.75*
			42							
	55									
		SANDY FAT CLAY WITH GRAVEL (CH), reddish brown, hard, moist, high plasticity, approximately 30% fine- to coarse-grained sand, approximately 20% rounded fine to coarse gravel								
10										>4.5*
			48							
	50									
		SANDY LEAN CLAY WITH GRAVEL (CL), reddish brown, very stiff, moist, low plasticity, approximately 30% fine- to coarse-grained sand, approximately 20% subrounded fine gravel								
15										
			18					11.4		
	45									
		POORLY GRADED SAND WITH CLAY (SP-SC), brown, medium dense, moist, fine- to coarse-grained sand, <10% fines								
20										

ENGEO
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LOG OF BORING 1-B4

LATITUDE: 38.482303 LONGITUDE: -121.805645

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 26½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (NAVD88): 62.5 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	40		POORLY GRADED SAND WITH CLAY (SP-SC), brown, medium dense, moist, fine- to coarse-grained sand, <10% fines			38				6	10.8		
25			POORLY GRADED SAND WITH GRAVEL (SP), brown, very dense, moist, fine- to coarse-grained sand, approximately 30% rounded to subangular fine to coarse gravel			85/11							
			Boring terminated at approximately 26½ feet. No groundwater encountered										

LOG OF BORING P-1

ENGEO
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LATITUDE: 38.482116 LONGITUDE: -121.810962

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED:	5/23/2022
HOLE DEPTH:	Approx. 10 ft.
HOLE DIAMETER:	6.0 in.
SURF ELEV (NAVD88):	65.5 ft.
LOGGED / REVIEWED BY:	R. Rud / MMG
DRILLING CONTRACTOR:	West Coast Exploration
DRILLING METHOD:	Solid Flight Auger
HAMMER TYPE:	140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	65		FAT CLAY (CH), dark brown, hard, slightly moist, high plasticity			38							>4.5*
			LEAN CLAY (CL), brown, hard, moist, medium plasticity			22							>4.5*
5	60		FAT CLAY (CH), brown, hard, moist, high plasticity			40							>4.5*
			grades to dark brown			48				95	19.6		>4.5*
10			Boring terminated at approximately 10 feet. No groundwater encountered										

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LOG OF BORING P-2

LATITUDE: 38.482975 LONGITUDE: -121.810351

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 10 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (NAVD88): 66 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			FAT CLAY (CH), dark brown, hard, moist, high plasticity										
	65					30							>4.5*
			LEAN CLAY (CL), brown, hard, moist, medium plasticity										
						19							>4.5*
5													
	60		LEAN CLAY (CL), brown, very stiff, moist, medium plasticity, weak greenish gray mottling										
						28							3.25*
			grades to stiff			27	45	24	21	88	21		1.75*
10			Boring terminated at approximately 10 feet. No groundwater encountered										

LOG OF BORING P-3

ENGEO
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LATITUDE: 38.483948 LONGITUDE: -121.809207

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 10 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (NAVD88): 65.5 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	65		FAT CLAY (CH), dark brown, hard, moist, high plasticity										
						25							>4.5*
			SILT (ML), yellowish brown, very stiff, moist, low plasticity, <10% fine-grained sand										
5	60					20							3.5*
			FAT CLAY (CH), brown, very stiff, moist, high plasticity										
			grades to hard			49				96	20.4		4.5*
10			Boring terminated at approximately 10 feet. No groundwater encountered										

LOG - GEOTECHNICAL W/ELEV. 20357000001 PEDRICK ROAD WAREHOUSE BORING LOGS.GPJ ENGEO INC.GDT 6/20/22

LOG OF BORING P-4

Expect Excellence

LATITUDE: 38.48444 LONGITUDE: -121.807689

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (NAVD88): 56 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			FAT CLAY (CH), brown, hard, moist, high plasticity, occasional calcium carbonate nodules										
	55					40							>4.5*
			grades to very stiff			46				94	22.1		4*
5			Boring terminated at approximately 5 feet. No groundwater encountered										

LOG - GEOTECHNICAL W/ELEV. 20357000001 PEDRICK ROAD WAREHOUSE BORING LOGS.GPJ ENGEO INC.GDT 6/20/22

LOG OF BORING P-5

ENGEO
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LATITUDE: 38.48442 LONGITUDE: -121.806466

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (NAVD88): 56 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	55		FAT CLAY (CH), brown, hard, moist, high plasticity, some fine calcium carbonate nodules			32							>4.5*
						46				94	19.2		>4.5*
5			Boring terminated at approixmately 5 feet. No groundwater encountered										

LOG OF BORING P-6

LATITUDE: 38.484406 LONGITUDE: -121.80525

Geotechnical Exploration
Pedrick Road Warehouse
Dixon, CA
20357.000.001

DATE DRILLED: 5/23/2022
HOLE DEPTH: Approx. 5 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (NAVD88): 56 ft.

LOGGED / REVIEWED BY: R. Rud / MMG
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

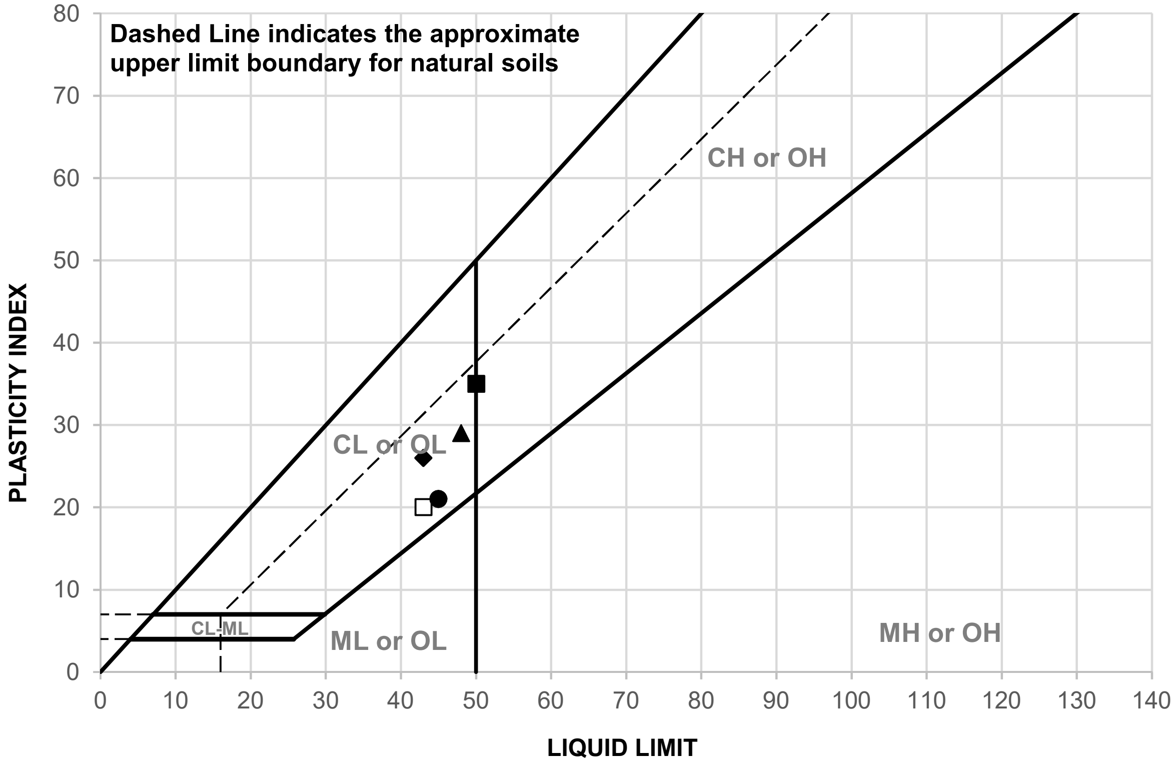
Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			FAT CA (CH), brown, hard, moist, high plasticity, some fine calcium carbonate nodules										
	55					33							4*
						48	50	15	35	91	20.3		4.25*
5			Boring terminated at approximately 5 feet. No groundwater encountered										

APPENDIX B

LABORATORY TEST DATA

Liquid and Plastic Limits Test Report
Particle Size Distribution Reports
Moisture Content Report
Moisture-Density Determination Report
R-Value Test Reports
Analytical Results of Soil Corrosion

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH (ft)	MATERIAL DESCRIPTION	LL	PL	PI
▲	1-B2@2.5	2.5	See exploration logs	48	19	29
◆	1-B3@1	1	See exploration logs	43	17	26
□	1-B4@1.5	1.5	See exploration logs	43	23	20
●	P2@9.5	9.5	See exploration logs	45	24	21
■	P6@4.5	4.5	See exploration logs	50	15	35

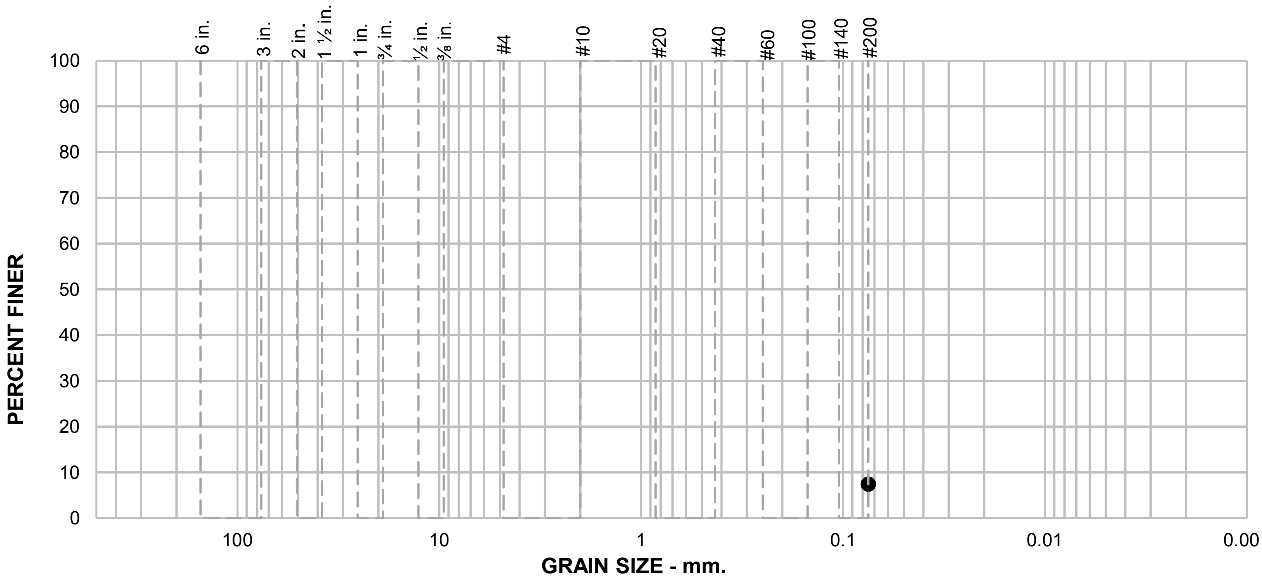
	SAMPLE ID	TEST METHOD	REMARKS
▲	1-B2@2.5	PI: ASTM D4318, Wet Method	
◆	1-B3@1	PI: ASTM D4318, Wet Method	
□	1-B4@1.5	PI: ASTM D4318, Wet Method	
●	P2@9.5	PI: ASTM D4318, Wet Method	
■	P6@4.5	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/6/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: 1-B1@5

DEPTH (ft): 5

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	7		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = LL = PI =

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

Soak time = 180 min
Dry sample weight = 569.9 g
Largest particle size ≥ No. 4 Sieve

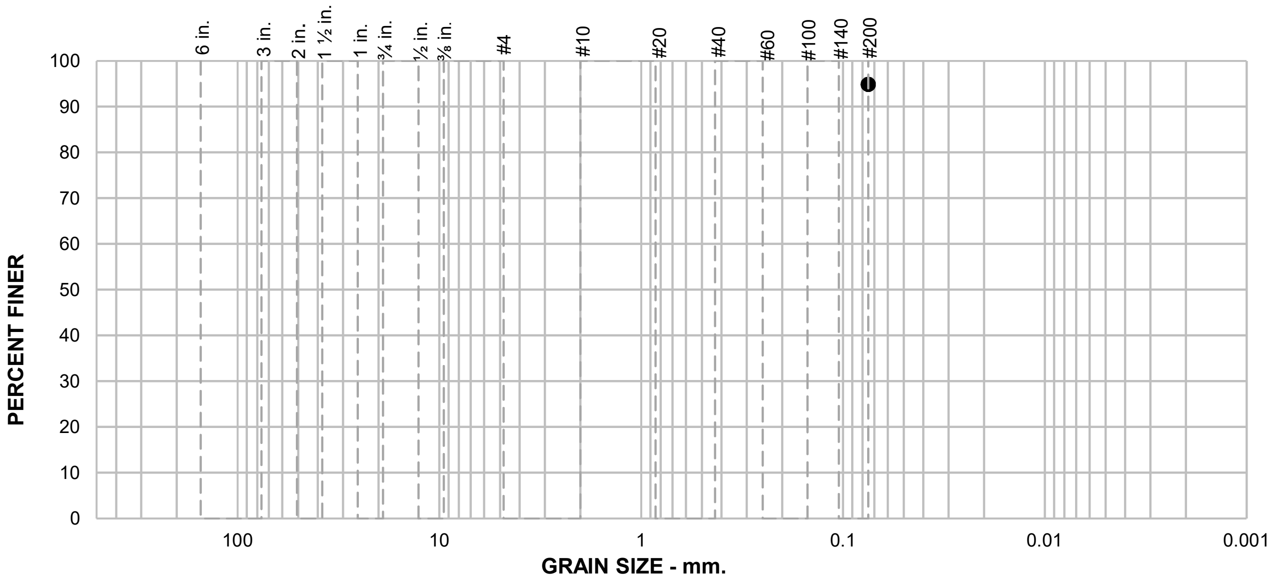
* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/3/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: 1-B2@2.5

DEPTH (ft): 2.5

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						94.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	94.9		

* (no specification provided)

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = 19	LL = 48	PI = 29

COEFFICIENTS

D_{90} =	D_{85} =	D_{60} =
D_{50} =	D_{30} =	D_{15} =
D_{10} =	C_u =	C_c =

CLASSIFICATION

USCS = CL

REMARKS

PI: ASTM D4318, Wet Method

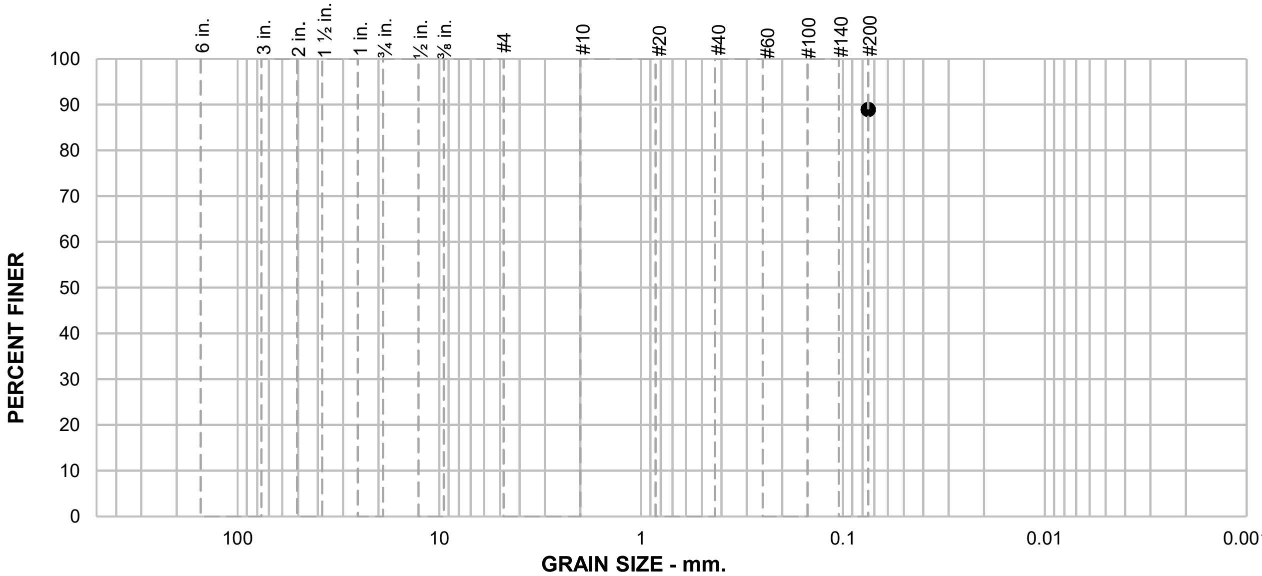
Soak time = 180 min
Dry sample weight = 371.2 g
Largest particle size < No. 4 Sieve

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/6/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: 1-B3@1

DEPTH (ft): 1

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						88.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	88.9		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = 17 LL = 43 PI = 26

COEFFICIENTS

D_{90} =	D_{85} =	D_{60} =
D_{50} =	D_{30} =	D_{15} =
D_{10} =	C_u =	C_c =

CLASSIFICATION

USCS = CL

REMARKS

PI: ASTM D4318, Wet Method

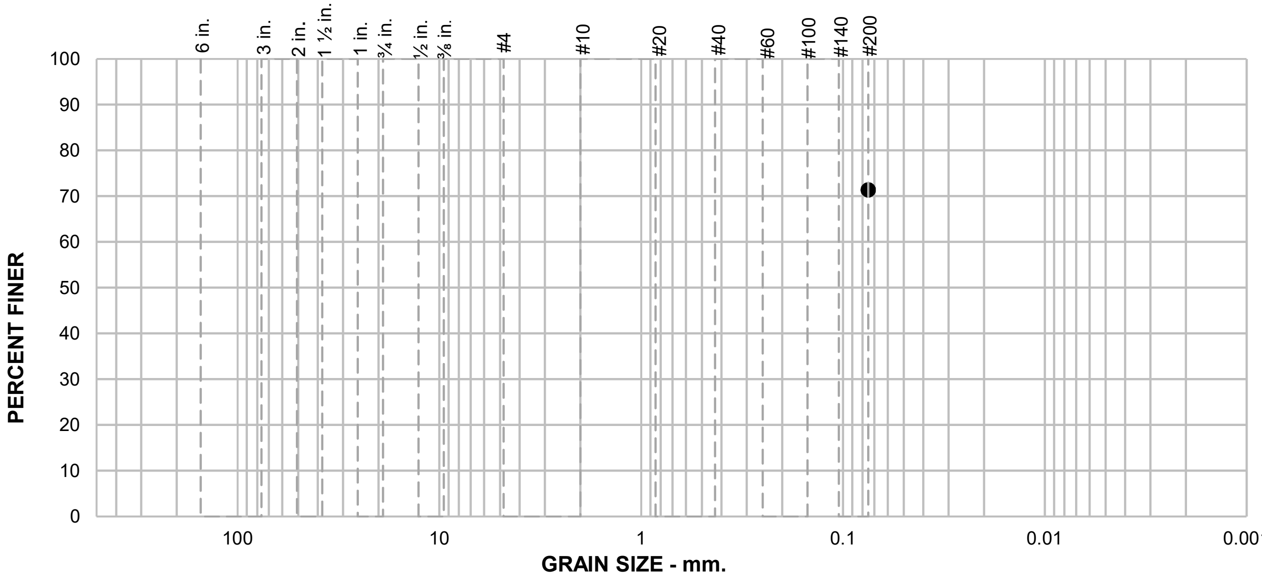
Soak time = 180 min
Dry sample weight = 362 g
Largest particle size < No. 4 Sieve

* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/6/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

PARTICLE SIZE DISTRIBUTION REPORT
ASTM D1140, Method B



SAMPLE ID: 1-B4@1.5

DEPTH (ft): 1.5

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						71.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	71.3		

* (no specification provided)

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = 23 LL = 43 PI = 20

COEFFICIENTS

D_{90} =	D_{85} =	D_{60} =
D_{50} =	D_{30} =	D_{15} =
D_{10} =	C_u =	C_c =

CLASSIFICATION

USCS = CL

REMARKS

PI: ASTM D4318, Wet Method

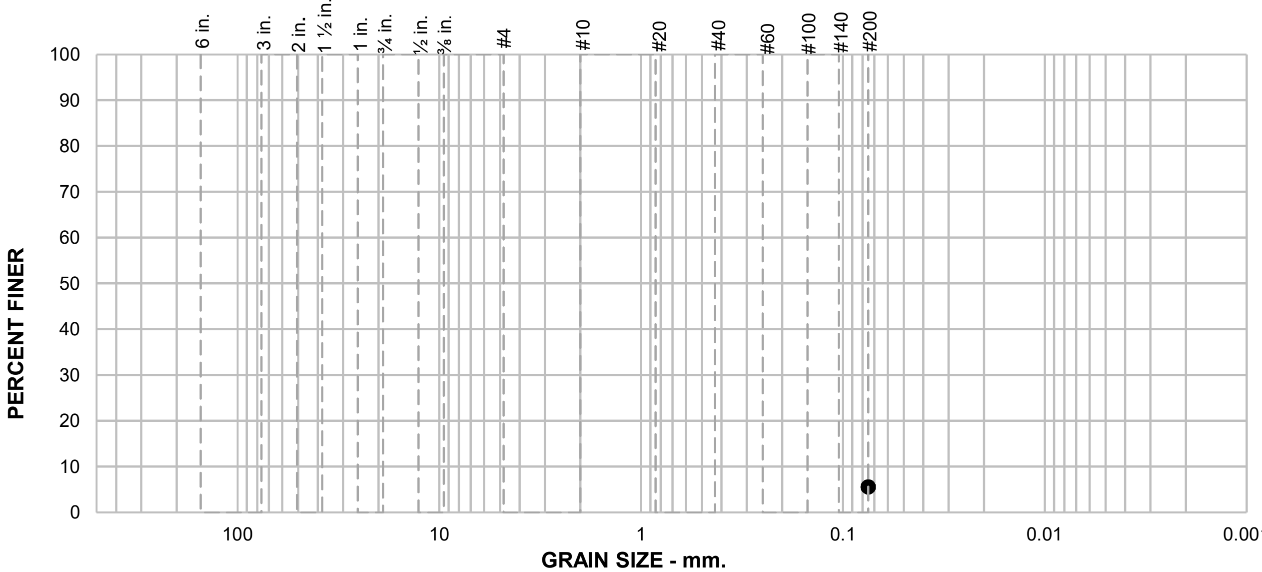
Soak time = 180 min
Dry sample weight = 393.1 g
Largest particle size < No. 4 Sieve

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/6/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: 1-B4@21

DEPTH (ft): 21

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	6		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = LL = PI =

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

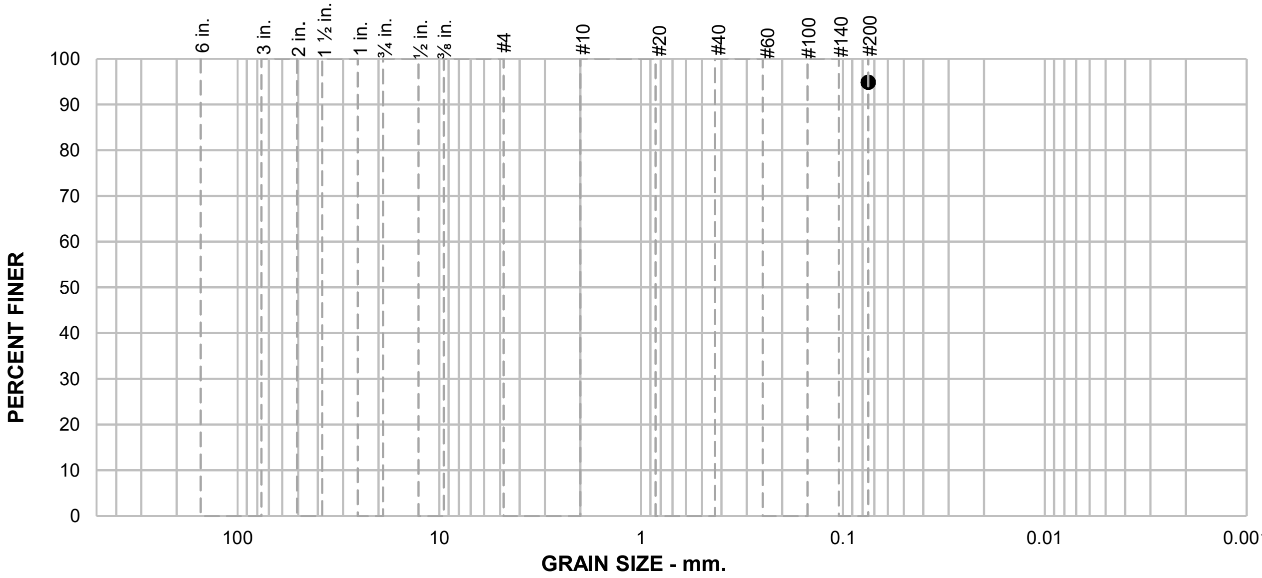
Soak time = 180 min
Dry sample weight = 747.7 g
Largest particle size ≥ No. 4 Sieve

* (no specification provided)

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/3/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

ENGEO Expect Excellence

PARTICLE SIZE DISTRIBUTION REPORT
ASTM D1140, Method B



SAMPLE ID: P1@8

DEPTH (ft): 8

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						95	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	95		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = LL = PI =

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

Soak time = 180 min
Dry sample weight = 756.1 g
Largest particle size ≥ No. 4 Sieve

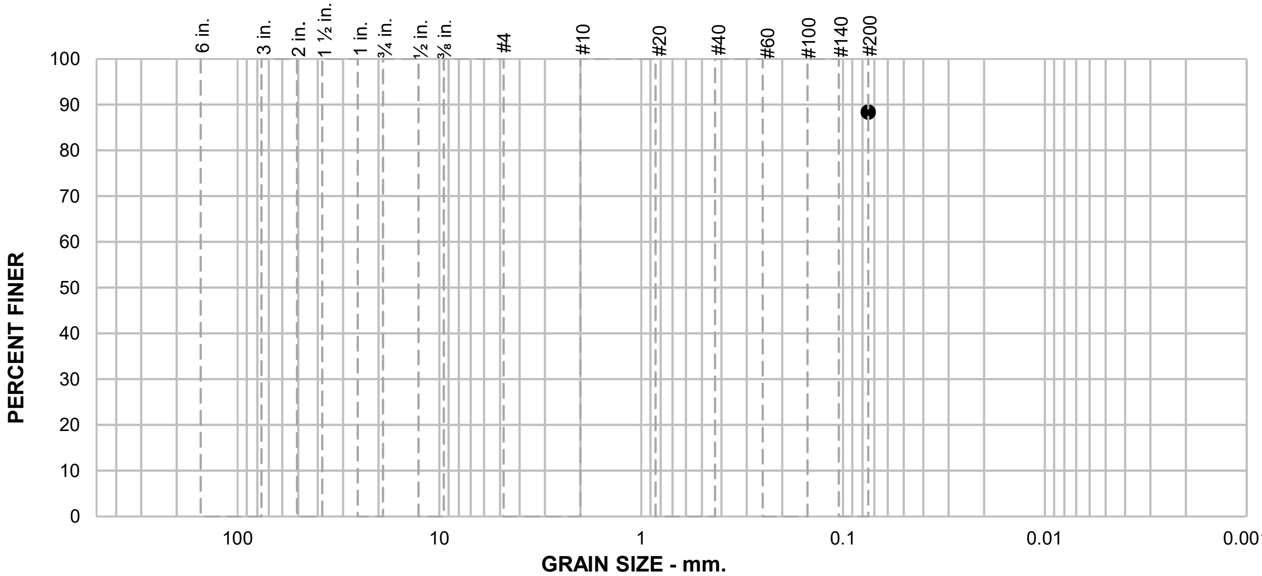
* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/3/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: P2@9.5

DEPTH (ft): 9.5

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						88.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	88.3		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = 24   LL = 45   PI = 21

COEFFICIENTS

D_{90} =	D_{85} =	D_{60} =
D_{50} =	D_{30} =	D_{15} =
D_{10} =	C_u =	C_c =

CLASSIFICATION

USCS = CL

REMARKS

PI: ASTM D4318, Wet Method

Soak time = 180 min
Dry sample weight = 449.6 g
Largest particle size < No. 4 Sieve

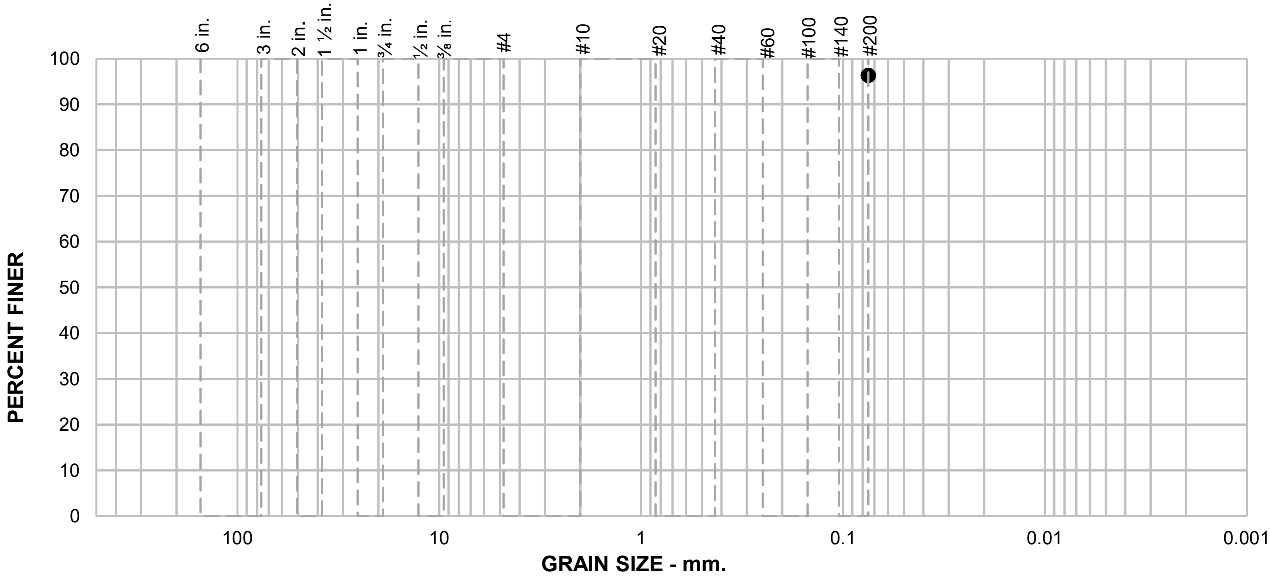
* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/6/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: P3@9.5

DEPTH (ft): 9.5

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						96	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	96		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = LL = PI =

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

Soak time = 180 min
Dry sample weight = 754.4 g
Largest particle size ≥ No. 4 Sieve

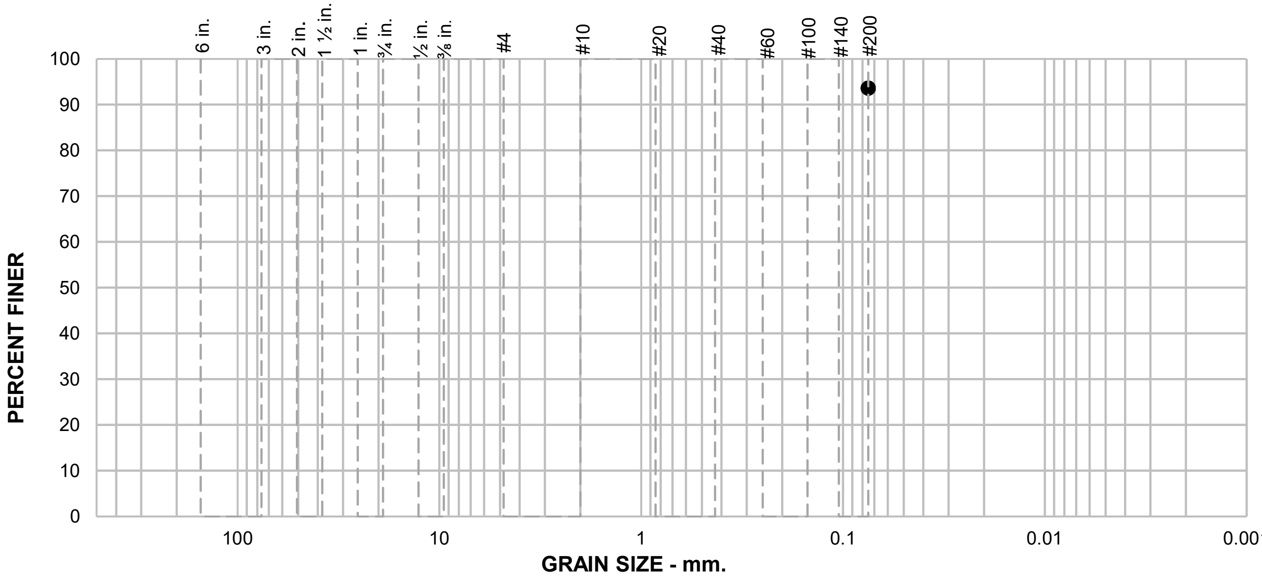
* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/3/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: P4@4

DEPTH (ft): 4

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						94	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	94		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = LL = PI =

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

Soak time = 180 min
Dry sample weight = 717.9 g
Largest particle size ≥ No. 4 Sieve

* (no specification provided)

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/3/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

ENGEO
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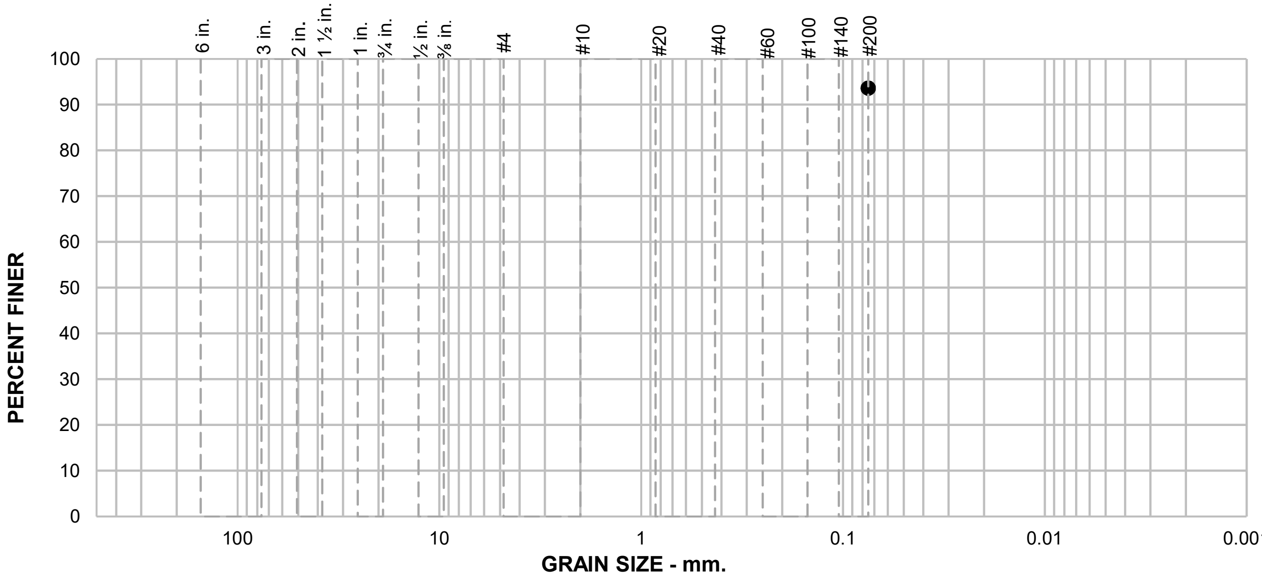
PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: P5@3.5

DEPTH (ft): 3.5

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						94	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	94		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = LL = PI =

COEFFICIENTS

D_{90} = D_{85} = D_{60} =

D_{50} = D_{30} = D_{15} =

D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

Soak time = 180 min
Dry sample weight = 762.7 g
Largest particle size ≥ No. 4 Sieve

* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Buzz Oates

PROJECT NAME: Pedrick Road Warehouse

PROJECT NO: 20357.000.001 PH001

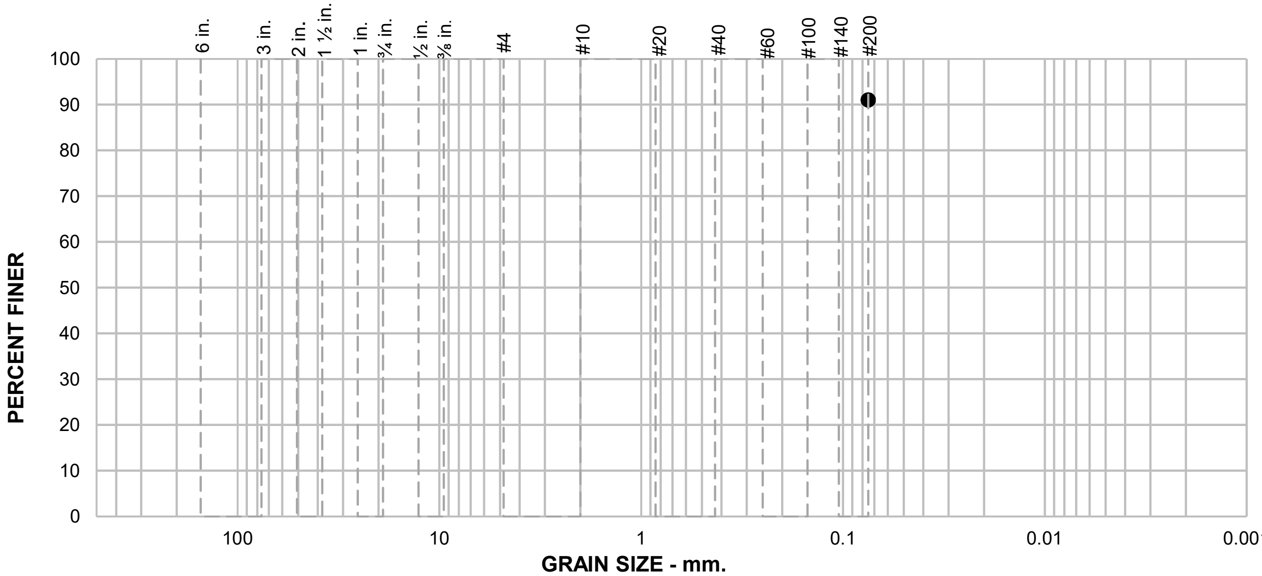
PROJECT LOCATION: Dixon, CA

REPORT DATE: 6/3/2022

TESTED BY: L. Schmitz

REVIEWED BY: M. Gilbert

PARTICLE SIZE DISTRIBUTION REPORT
ASTM D1140, Method B



SAMPLE ID: P6@4.5

DEPTH (ft): 4.5

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						91	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	91		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = 15 LL = 50 PI = 35

COEFFICIENTS

D_{90} =	D_{85} =	D_{60} =
D_{50} =	D_{30} =	D_{15} =
D_{10} =	C_u =	C_c =

CLASSIFICATION

USCS = CH

REMARKS

PI: ASTM D4318, Wet Method

Soak time = 180 min
Dry sample weight = 497.7 g
Largest particle size ≥ No. 4 Sieve

* (no specification provided)

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/6/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

ENGEO Expect Excellence

MOISTURE CONTENT REPORT
ASTM D2216

SAMPLE ID	1-B1@5	1-B1@16	1-B2@2.5	1-B2@10.5	1-B2@21	1-B3@1	1-B4@1.5	1-B4@7
DEPTH (ft.)	5	16	2.5	10.5	21	1	1.5	7
METHOD A OR B	B	B	B	B	B	B	B	B
MOISTURE CONTENT (%)	5.5	13.5	15.8	23.2	12.3	14.0	14.1	20.1

SAMPLE ID	1-B4@15	1-B4@21	P1@8	P2@9.5	P3@9.5	P4@4	P5@3.5	P6@4.5
DEPTH (ft.)	15	21	8	9.5	9.5	4	3.5	4.5
METHOD A OR B	B	B	B	B	B	B	B	B
MOISTURE CONTENT (%)	11.4	10.8	19.6	21.0	20.4	22.1	19.2	20.3

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/2/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

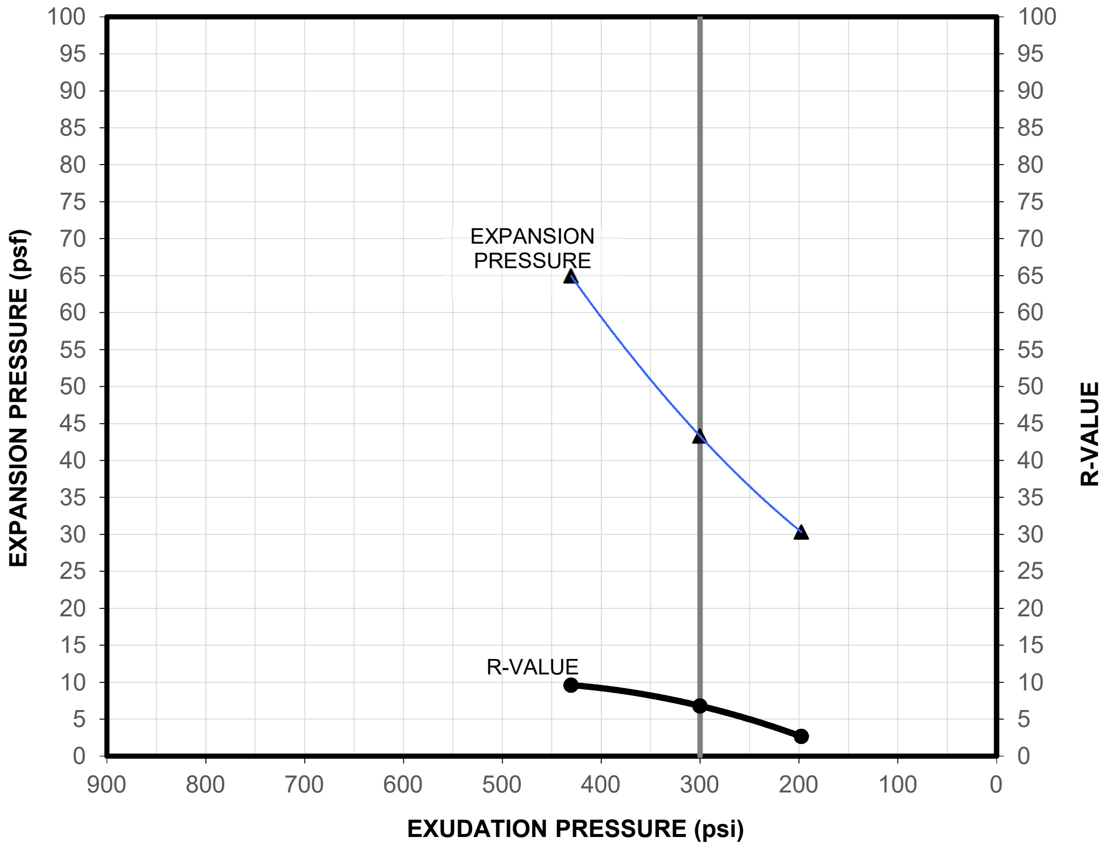
MOISTURE-DENSITY DETERMINATION REPORT
ASTM D7263

SAMPLE ID	1-B1@2	1-B2@6	1-B3@4	1-B3@10.5				
DEPTH (ft.)	2	6	4	10.5				
METHOD A OR B	B	B	B	B				
MOISTURE CONTENT (%)	7.9	19.5	16.8	17.4				
DRY DENSITY (pcf)	83.4	106.5	108.4	108.5				

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/2/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

R-VALUE TEST REPORT
CTM 301



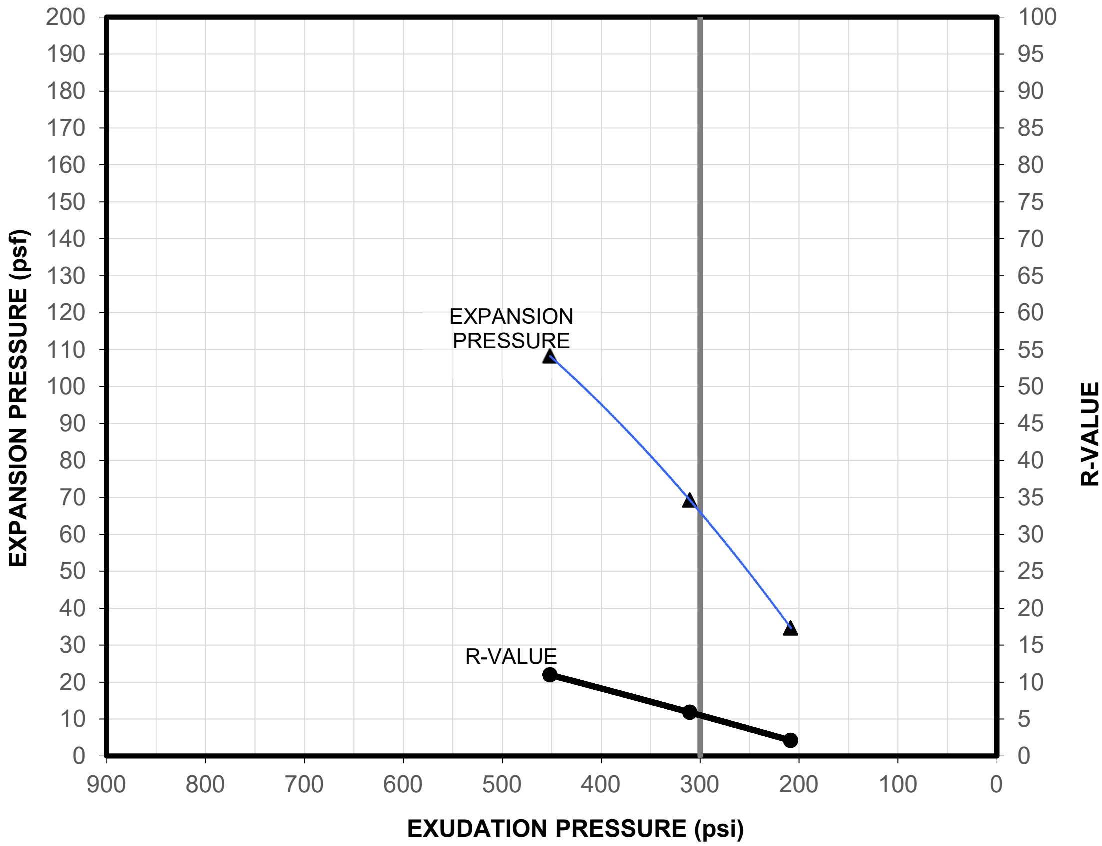
SAMPLE ID	MATERIAL DESCRIPTION	SAMPLE LOCATION		
BS1@0.5	See exploration logs	BS1 at 0.5 feet		
SPECIMENS		**1**	**2**	**3**
EXUDATION PRESSURE (psi)		430	300	198
EXPANSION PRESSURE (psf)		65	43	30
R-VALUE		10	7	3
MOISTURE CONTENT (%)		20.6	22.2	23.7
DRY DENSITY (pcf)		98.8	96.4	94.2
EXPANSION PRESSURE (psf) AT EXUDATION PRESSURE OF 300 psi			43	
R-VALUE AT EXUDATION PRESSURE OF 300 psi			**TEST RESULT**	
			7	

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/3/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

R-VALUE TEST REPORT

CTM 301



SAMPLE ID	MATERIAL DESCRIPTION	SAMPLE LOCATION
BS2@0.5	See exploration logs	BS2 at 0.5 feet

SPECIMENS	1	2	3
EXUDATION PRESSURE (psi)	452	311	208
EXPANSION PRESSURE (psf)	108	69	35
R-VALUE	11	6	2
MOISTURE CONTENT (%)	21.9	23.4	25.3
DRY DENSITY (pcf)	96.8	94.1	90.5
EXPANSION PRESSURE (psf) AT EXUDATION PRESSURE OF 300 psi		65	
R-VALUE AT EXUDATION PRESSURE OF 300 psi		**TEST RESULT**	
		6	

ENGEO
Expect Excellence

CLIENT: Buzz Oates
PROJECT NAME: Pedrick Road Warehouse
PROJECT NO: 20357.000.001 PH001
PROJECT LOCATION: Dixon, CA
REPORT DATE: 6/3/2022
TESTED BY: L. Schmitz
REVIEWED BY: M. Gilbert

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 06/08/2022
Date Submitted 06/01/2022

To: Abram Magel
Engeo, Inc.
2213 Plaza Dr.
Rocklin, CA 95765

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 20357.000.001 PH001 Site ID : 1-B2 @ 3.
Thank you for your business.

* For future reference to this analysis please use SUN # 87492-181939.

EVALUATION FOR SOIL CORROSION

Soil pH	7.40	
Minimum Resistivity	1.53 ohm-cm (x1000)	
Chloride	1.1 ppm	00.00011 %
Sulfate	18.8 ppm	00.00188 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 06/08/2022
Date Submitted 06/01/2022

To: Abram Magel
Engeo, Inc.
2213 Plaza Dr.
Rocklin, CA 95765

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 20357.000.001 PH001 Site ID : 1-B3 @ 3.5.
Thank you for your business.

* For future reference to this analysis please use SUN # 87492-181940.

EVALUATION FOR SOIL CORROSION

Soil pH	7.35	
Minimum Resistivity	1.34 ohm-cm (x1000)	
Chloride	1.4 ppm	00.00014 %
Sulfate	13.8 ppm	00.00138 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

APPENDIX C

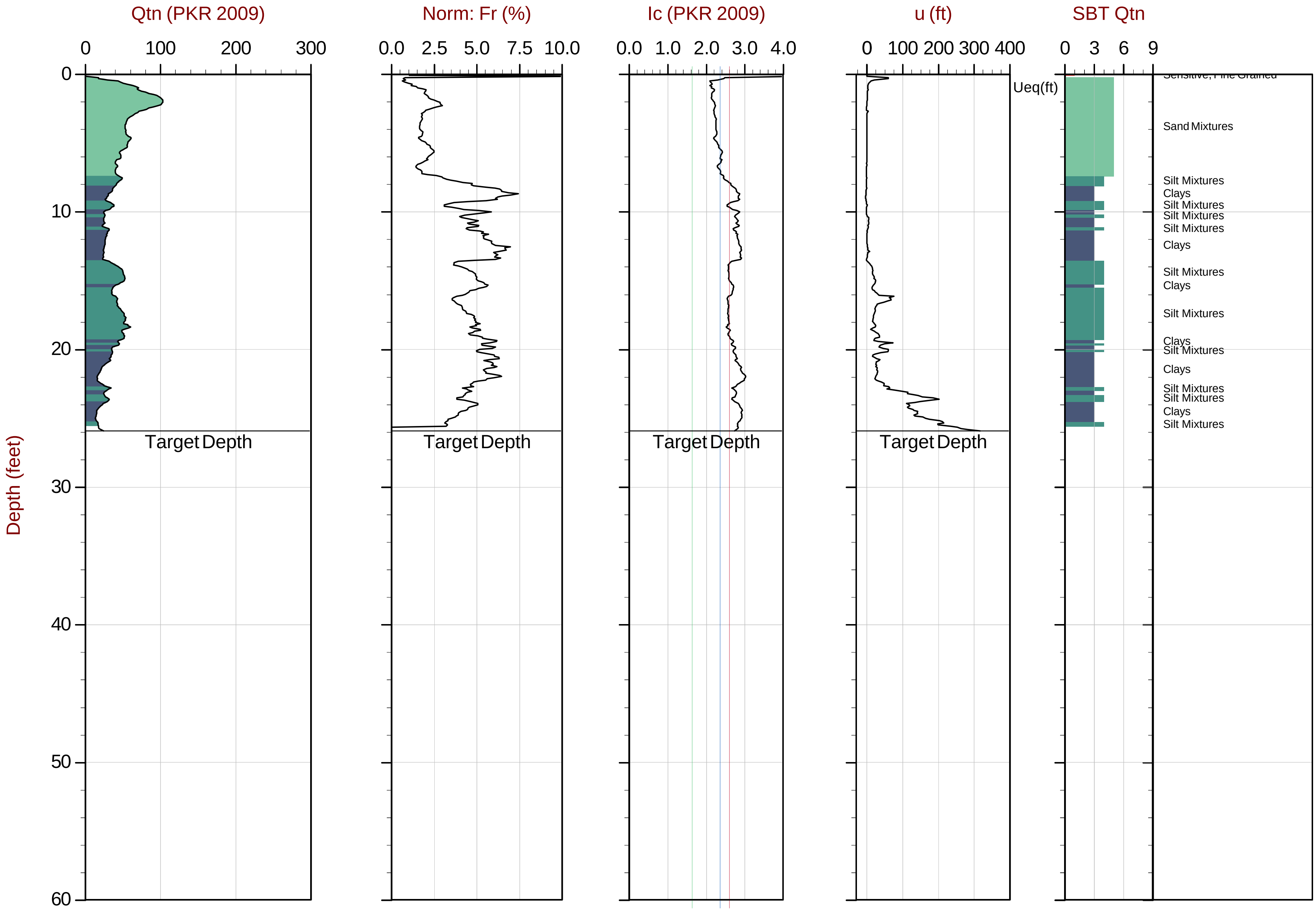
CPT DATA

CONETEC

ENGEO

Job No: 22-56-24229
Date: 2022-05-27 13:13
Site: Pedrick Rd Warehouse

Sounding: 1-CPT1
Cone: 811:T1500F15U35



Max Depth: 7.900 m / 25.92 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 22-56-24229_CP01.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10S N: 4260066m E: 603821m

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

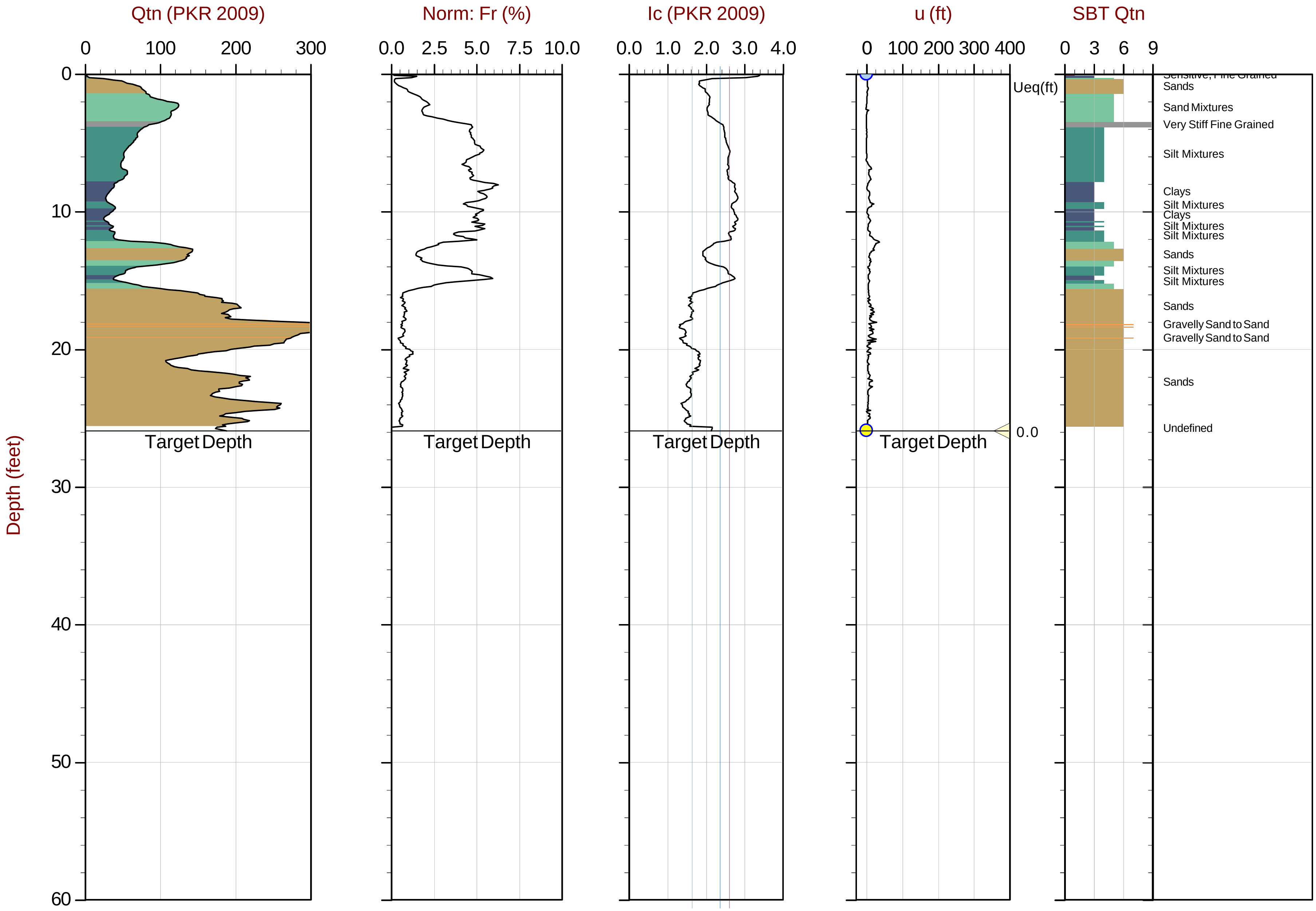
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

ENGEO

Job No: 22-56-24229
Date: 2022-05-27 15:07
Site: Pedrick Rd Warehouse

Sounding: 1-CPT2
Cone: 811:T1500F15U35



Max Depth: 7.900 m / 25.92 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 22-56-24229_CP02.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10S N: 4259991m E: 604287m

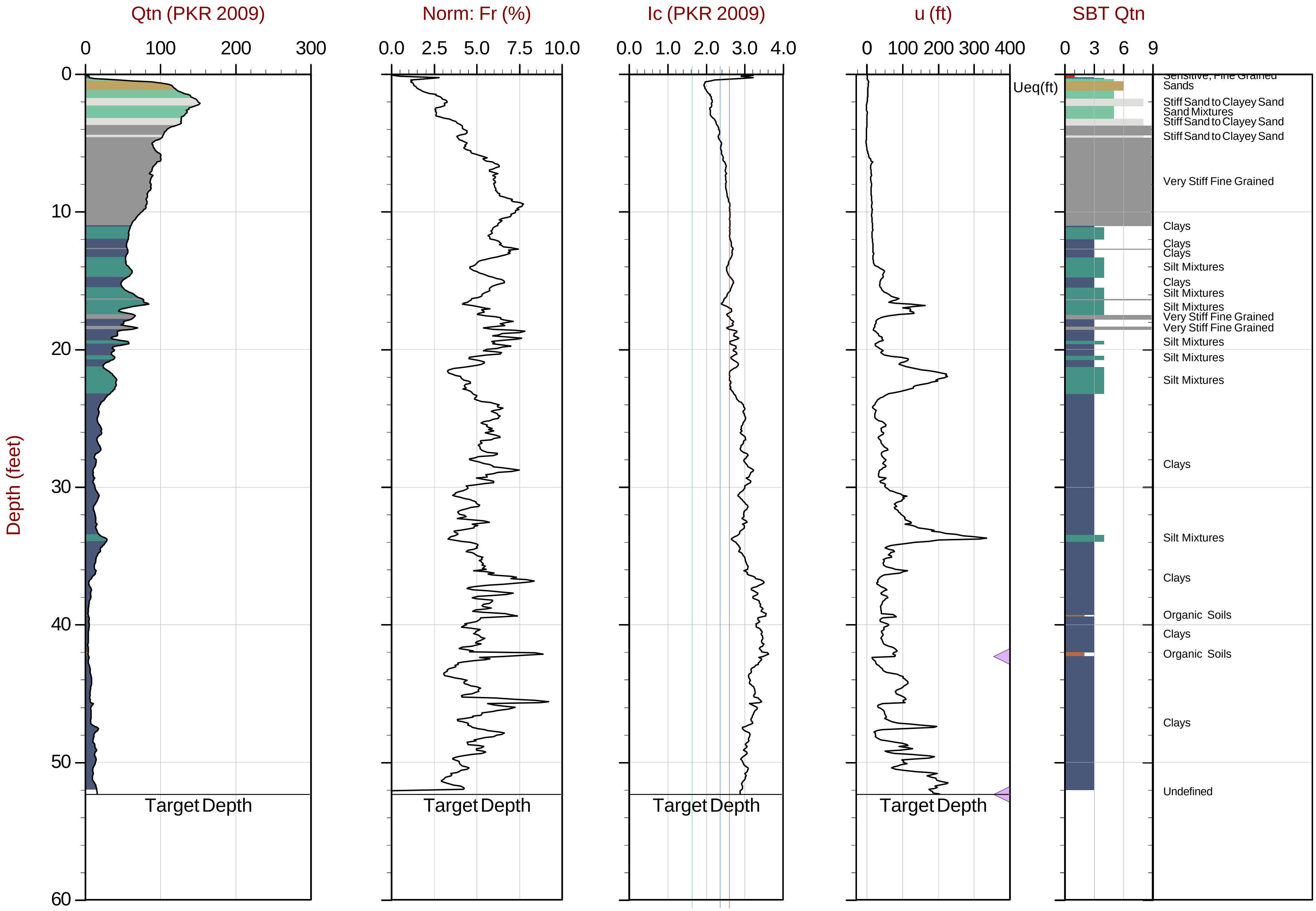
Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

ENGEO

Job No: 22-56-24229
Date: 2022-05-27 09:47
Site: Pedrick Rd Warehouse
Sounding: 1-CPT3
Cone: 811:T1500F15U35



Max Depth: 15.950 m / 52.33 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 22-56-24229_SP03.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM 10S N: 4260078m E: 604039m

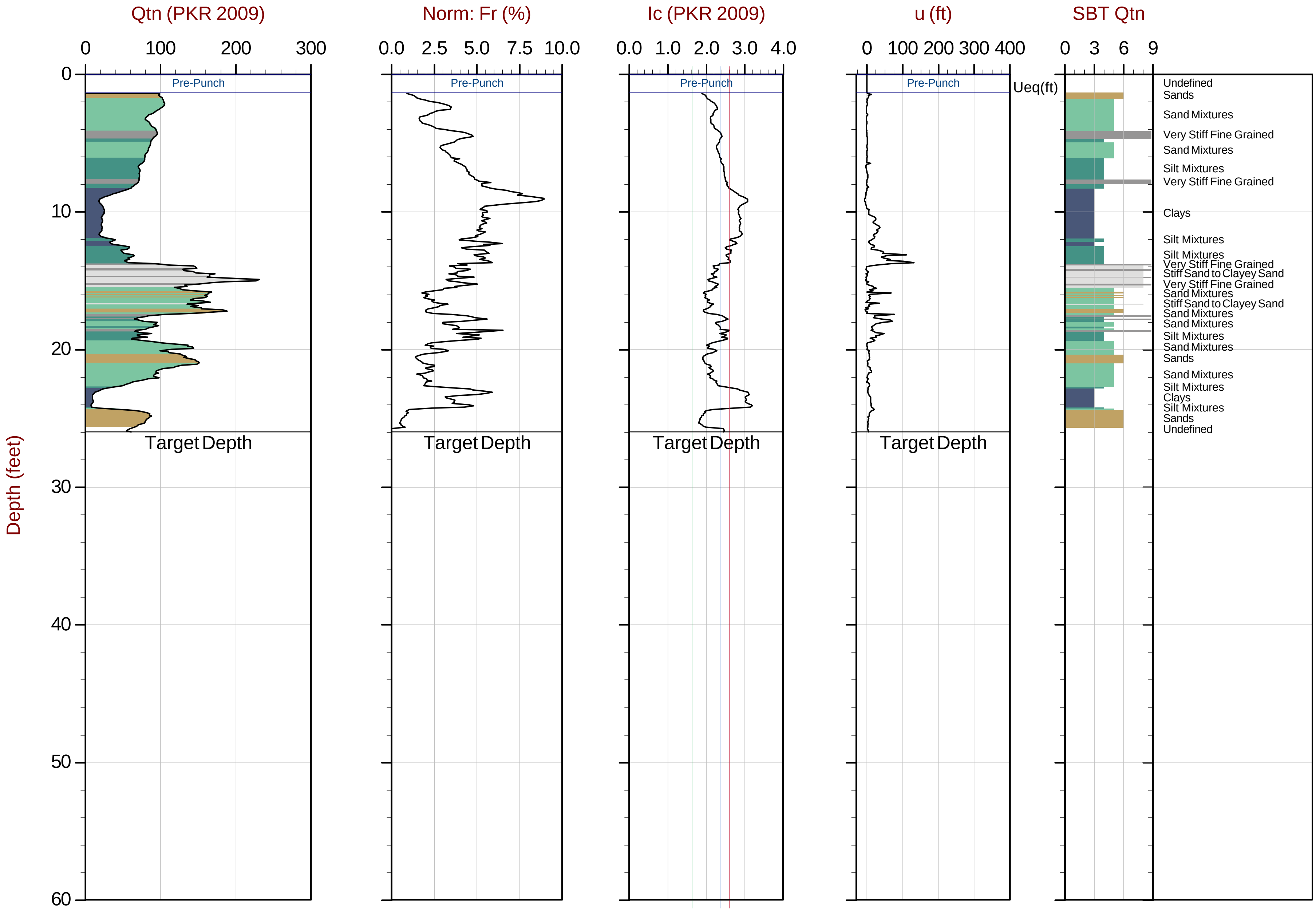
Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ENGEO

Job No: 22-56-24229
Date: 2022-05-27 14:05
Site: Pedrick Rd Warehouse

Sounding: 1-CPT4
Cone: 811:T1500F15U35



Max Depth: 7.925 m / 26.00 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 22-56-24229_CP04.COR
Unit Wt: SBTQtn (PKR2009)

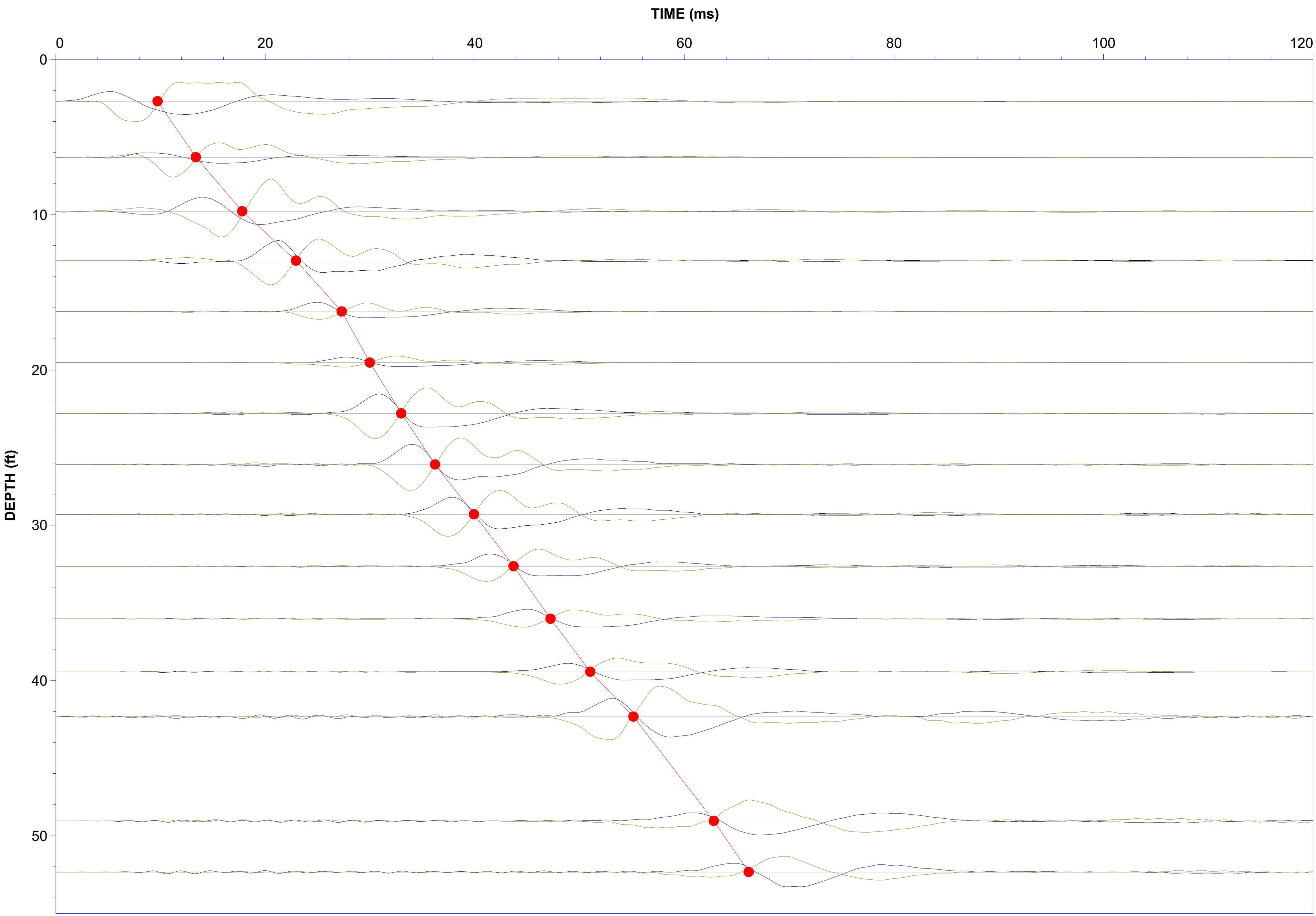
SBT: Robertson, 2009 and 2010
Coords: UTM 10S N: 4260159m E: 604167m

Equilibrium Pore Pressure (Ueq) Assumed Ueq Dissipation, Ueq achieved Dissipation, Ueq not achieved Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Job No: 22-56-24229 | Client: ENGEO | Project Title: Pedrick Rd Warehouse | Filter: BP 0-500 Hz | Hole: 1-CPT3 | Filter: Shear Wave

Date: 05:27:22 08:29 | Cone: 811:T1500F15U35



ENGEO

Expect Excellence