DOCKETED

Docket Number:	23-OPT-01
Project Title:	Fountain Wind Project
TN #:	248292-1
Document Title:	Prelim Geotech Report
Description:	N/A
Filer:	Caitlin Barns
Organization:	Stantec Consulting Services, Inc.
Submitter Role:	Applicant Consultant
Submission Date:	1/3/2023 1:06:40 PM
Docketed Date:	1/3/2023

Preliminary Geotechnical Engineering Report

Fountain Wind Project
Shasta County, California
September 10, 2021
Terracon Project No. NB215025

Prepared for:
ConnectGen LLC
Houston, TX

Prepared by:
Terracon Consultants, Inc.
Sacramento, California

September 10, 2021

ConnectGen LLC
1001 McKinney, Suite 70
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Attn: Mr. Henry Woltag, Director
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Re: **Preliminary Geotechnical Engineering Report**
Fountain Wind Project
Shasta County, California
Terracon Project No. NB215025

Dear Mr. Woltag:

Terracon Consultants, Inc. (Terracon) has completed the Preliminary Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PNB215025 dated March 26, 2021. This report presents the findings of the subsurface exploration and provides preliminary geotechnical engineering recommendations concerning earthwork and the design and construction of Wind Turbine Generator foundations, substation and switchyard elements, O&M building foundations, and roadways for the proposed project. It is our understanding that further geotechnical exploration and a final report will be performed in the future for design and construction purposes.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

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Geophysical Subject Matter Expert (SME) review provided by Donald J. Kirker, PGp

REPORT TOPICS

Note: This report was originally delivered in a web-based format. Orange Bold text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the *GeoReport* logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES
SITE LOCATION AND EXPLORATION PLANS
EXPLORATION RESULTS (Boring Logs, Laboratory Data, Electrical Resistivity Test Results, Thermal Resistivity Test Results)
SUPPORTING INFORMATION (WTG Design Tables, Liquefaction Analyses Figures and Geophysical Report)

Preliminary Geotechnical Engineering Report

Fountain Wind Project
Shasta County, California

Terracon Project No. NB215025
September 10, 2021

INTRODUCTION

This report presents the results of our preliminary subsurface exploration and geotechnical engineering services performed for the proposed Fountain Wind Project to be spread throughout the approximately 29,500 acre site area located approximately 35 miles northeast of Redding, California. The purpose of these services is to provide information and preliminary geotechnical engineering recommendations relative to:

- Subsurface soil and bedrock conditions
- Groundwater conditions
- Site preparation and earthwork
- Seismic hazards
- Turbine foundation design and construction
- Support structure foundation design
- Seismic site classification per CBC
- Roadway design and construction

The geotechnical engineering Scope of Services for this project included the advancement of ten (10) test borings at the proposed wind turbine locations, six (6) test borings near the proposed substation and switchyard, one (1) test boring near the proposed Operations and Maintenance building area and two (2) test borings at proposed overhead collection line locations to depths ranging from approximately 5 to 61½ feet below existing site grades. A total of eight (8) test pits were also advanced in proposed underground collection areas to depths of approximately 4 feet below existing site grades.

It is our understanding that further geotechnical exploration and a final report will be performed in the future for design and construction purposes. Future exploration should include test borings at every proposed turbine location. Furthermore, the exploration program should cover areas of major grading to assess the stability of future turbines, roads, and other facilities associated with this project.

Furthermore, field electrical resistivity tests were performed at nine (9) locations. The tests were performed at the Switchyard, Substation and underground collection areas. Field testing results for ER-1 through ER-8 can be found within the **Exploration Results** section. Field testing results for ER-9 can be found with the Geophysical Report provided in **Supporting Information**.

In addition, a total of twelve (12) seismic refraction (SR) profiles and multichannel analysis of surface waves (MASW) soundings were performed at the site. SR profiles and MASW soundings were performed at proposed wind turbine, substation, and switchyard locations. SR profiles and MASW sounding results can be found within the Geophysical Report provided in **Supporting Information**.

Maps showing the site, boring and test pit locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and as separate graphs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Site Information	■ The approximately 29,500 acre site is located approximately 35 miles northeast of Redding, California and resides both north and south of California State Hwy 299 in the Southern Cascades and Modoc Plateau Province. ■ The approximate center of the site is located at the coordinates 40.823°N, 121.822°W ■ See **Site Location**
Existing Improvements	The project site is comprised of mostly vacant, undeveloped land and associated logging roads.
Current Ground Cover	The majority of the surface appears to consist of exposed soils and native forest vegetation.
Existing Topography	The proposed site is located within hilly to mountainous terrain. The existing ground elevations at the proposed locations vary between approximately 3,823 feet and 5,148 feet above mean sea level (MSL).
Geology	The site is situated within the southern Cascade Range Physiographic Province in Northern California which extends from southern British Columbia to Lassen Peak. The Cascade Range is a chain of large volcanoes containing lava plateaus, lava and cinder cones, plug domes, ash beds, and glacial deposits. The range is transected by deep canyons of the Pit River.[1] The native soils and rock materials within the project site are composed of or derived from Pliocene and Pleistocene age volcanic basalt.[2] The general composition of these formations includes sandy loam, stony loam, and clay loam with varying amounts of gravel as indicated by the United States Department of Agriculture (USDA).

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[1] *California Geomorphic Provinces California Geological Survey Note 36, California Department of Conservation, California Geological Survey 2002*

[2] *United States Geological Survey (USGS), "Geologic Units of California".*

PROJECT DESCRIPTION

Item	Description
Proposed Structures	The approximately 29,500-acre site will be used to construct a 200MW wind turbine project which may utilize an anticipated total of 69 wind turbines with 3 alternate locations. The project will also include construction of a substation, switchyard and O&M building. In addition to the wind turbine generators (WTGs), site infrastructure is anticipated to include major grading to widen and improve the existing timber roads as well as constructing new access roads, and an electrical cable collection system. Other possible improvements may be performed for transmission lines.
Planned Construction	It is our understanding that design plans for the proposed development are not finalized at the time of preparation of this preliminary report. Depending on the type of foundation system utilized, development of working pads and foundations may require cuts and fills up to an estimated depth or height of 20 feet. The project will require establishment of access roads to each turbine location. We anticipate aggregate surfaced roadways will be installed and utilized to construct the wind turbines, and then to provide access to maintenance personnel during normal operations. The proposed structures at this time are planned to consist of 4 to 6.2-megawatt wind turbines. We anticipate that foundation system(s) will consist of gravity spread mat foundations.

Item	Description
Maximum Loads	ConnectGen has provided Terracon with three WTG alternatives currently being considered for site. These WTGSs consist of the following: ■ Nordex N149 (4.0 to 4.5 MW model) ■ Nordex N149 (5.5 to 5.7 MW model) ■ Siemens Gamesa SG 6.0-170 (6.0 to 6.2 MW model) The SG 6.0-170 WTG produces the highest loads and was thus used to generate the recommendations presented in this preliminary report. The maximum loads provided by Connect Gen for the SG 6.0-170 are as follows: Extreme: ■ Vertical Dead Loads: 6,751 kN ■ Overturning Moment: 174,612 kN-m ■ Horizontal Base Shear: 1,663 kN Characteristic: ■ Vertical Dead Loads: 6,317 kN ■ Overturning Moment: 131,066 kN-m ■ Horizontal Base Shear: 1,234 kN Loading conditions associated with proposed Substation, Switchyard, Operations and Maintenance building and overhead collection towers have not been provided at this time. Terracon has assumed the following maximum loads for these developments: Substation Switchyard Equipment Pads: ■ Axial Load 10 kips Substation, Switchyard and Overhead Collection Drilled Shaft Foundations: ■ Axial: 10-50 kips ■ Shear: 5-35 kips ■ Moment: 50-200 kip-ft Operations and Maintenance Buildings: ■ Axial: 40 to 80 kips ■ Floor Loads: 150 psf
Grading	The construction of the foundation of each WTG will include excavations for the foundations and grading for access roads. WTG foundations are anticipated at an approximate depth of at least 12.5 feet below adjacent grades.

SITE GEOLOGY AND HAZARDS

Site Geology

The proposed wind turbine areas are situated in the southern Cascade Range physiographic province characterized by a north-south trending chain of large volcanoes. Turbines are proposed to be located southwest of the Hatchet Mountains (north turbines), west of Ward Butte (central turbines) and at the north end of a range of mountains including Lookout Mt., Snow Mt. and Green MT. The geology of the project area is described below based on our review of the following publications:

- Lydon P.A., Gay T.E., Jr., et al. 1960. Geologic Map of California Olaf P. Jenkins Edition Westwood Sheet, California Division of Mines, U.S. Geological Survey.
- California Geomorphic Provinces California Geological Survey Note 36, California Department of Conservation, California Geological Survey 2002

The surficial geologic materials across the project area are generally defined by underlying bedrock units that provide parent materials for soils development composed of Tephra, residuum weathered from volcanic rock, and residuum and/or colluvium derived from volcanic rock. Bedrock units include Pliocene and Pleistocene age volcanic basalt.

As mapped by Lydon and Gay et al. (1960), the most northern turbine array is underlain by Pleistocene volcanic age basalt (Qpv^b) and the remaining turbine array locations are underlain by Pliocene volcanic age basalt (Pv^b). The formations produce an upper layer of elastic silt with varying amounts of sand and gravel underlain by basaltic bedrock.

Mapped USDA Soils

Terracon reviewed the United States Department of Agriculture (USDA) Soil Survey (2021) web-based application to identify the major soil associations present within the project area. The major soil association was identified as any association occupying 5.0 percent or more of the area of interest (AOI). The following table lists the soils present, their general parent materials, compositions, and topographic locations.

Association	Parent Material	General Composition	General Topographic Location
Gasper-Scarface Complex	Tephra	Gravelly to very cobbly sandy loam	15 to 30 percent slope
Gasper-Scarface Complex	Tephra	Gravelly to very cobbly sandy loam	30 to 50 percent slope
Cohasset Stony Loam	Residuum weathered from volcanic rock	Stony loam to stony clay loam	0 to 30 percent slope
Cohasset Stony Loam	Residuum and/or colluvium derived from volcanic rock	Stony loam to stony clay loam to stony clay	10 to 50 percent slope
Windy and McCarthy Stony Sandy Loams	Residuum weathered from volcanic rock	Stony sandy loam to very gravelly sandy loam	0 to 30 percent slope
Windy and McCarthy Very Stony Sandy Loams	Residuum weathered from volcanic rock	Very stony sandy loam to very gravelly sandy loam	30 to 50 percent slope

Association	Parent Material	General Composition	General Topographic Location
Windy and McCarthy Very Stony Sandy Loams	Residuum weathered from volcanic rock	Very stony sandy loam to very gravelly sandy loam	50 to 75 percent slope

Geologic Hazards

Mining

According to Diggings^{TM} Shasta County Mine Locations interactive map, there are no records of active and/or closed mines present at the project site. These records were provided by the Bureau of Land Management and the Unites States Geological Survey (USGS). Evidence of prior mining operation activity was not observed during field exploration. Though evidence of mining was not observed during our field exploration or from our brief desktop review of the site, there may be existing mines within the site area that have never been registered. Prior to preparing a final geotechnical engineering report for the project, a more detailed review of the site for existing mines should be performed.

Earthquakes/Seismicity

The project is located in a seismically active region that is exposed to occasional strong earthquake shaking. Terracon performed a “circular area search” query for records of earthquakes with epicenters within 200 kilometers of the project area through the USGS Earthquake Database, which includes records of earthquakes between 1900 and 2021 with a magnitude of 4.5 and greater. Selected events are summarized in the following table.

Summary of Historical Seismicity

Event	Date	Magnitude	Distance (miles)	Direction
Bayview	12-21-1954	6.5	123	W
Fieldbrook	04-23-1906	6.4	113	NWW
Klamath Falls	9-21-1993	6.0	103	N
Canyondam	05-24-2013	5.7	60	SE
Willow Creek	02-13-2012	5.6	155	NWW
Burnt Ranch	04-30-2008	5.4	90	W
Doyle	02-22-1979	5.3	110	SE
Blairsden	08-10-2001	5.2	95	SE
Palermo	08-02-1975	5.1	97	S
Redding	11-26-1998	5.1	35	SWW
Klamath Falls	12-04-1993	5.1	100	N
Palermo	08-02-1975	5.1	97	N
Upper Lake	08-10-2016	5.1	116	SWS

The search returned 100 records of earthquakes. A 6.5 magnitude earthquake was recorded 123 miles from the center of the project site. A 5.7 magnitude earthquake was recorded 60 miles from the center of the project site. A 5.1 magnitude earthquake was recorded 35 miles from the center of the project site. These events illustrate the potential for strong seismic shaking at the project site.

Deaggregation of seismic hazards using the USGS Unified Hazard Tool indicates that the seismic hazard is dominated by the Cascadia Megathrust fault. Additional seismic considerations are addressed later in the report for the O&M, OHCL1, OHCL2, Substation, and Switchyard Building locations.

Slope Failure/Landslides

Landslides include deep-seated and surficial-type slips. Deep-seated slides are typically related to geologic structure in the underlying bedrock. Surficial slips typically involve the volume of soil resting on underlying bedrock so are limited to masses several feet in thickness and do not rupture the underlying bedrock.

The site terrain is formed in extrusive igneous rocks that underlay the project area. California Geologic Survey (CGS) Department of Conservation has not mapped any landslides in the project area. Although slope failure is not a major concern and is rare in the High Cascades range, it has been known to occur in Shasta County. The United States Forest Service (USFS) characterized slopes of greater than 30 percent as having higher risk of slope movement. The geologic units in the project area are not known to be prone to failure, however, given the steepness of the slopes in the area, there may be potential for slope failure and landslides.

Design and grading of roads and pads should mitigate adverse conditions where practical. The cost/benefit and maintenance requirements may be considered in design of non-public access improvements. Roads that traverse mapped landslides can be expected to require more frequent maintenance and repair. Turbines sited in potential landslide areas should be relocated outside of these zones.

Erosion

The surface soils at the site primarily consist of cohesionless sands and decomposed basaltic rock which are typically subject to significant wind/water erosion or sedimentation. This is evident at the dirt roads accessing the site and running through the site. The project civil engineer while developing the plans should plan to limit wind/water erosion and sedimentation during and after construction to levels acceptable to the owner.

We have provided minimum recommendations to reduce the potential for surface erosion and potential undercutting of any slopes. We understand that it will be the owner’s responsibility to maintain all drainages and manage surface run-off water for the life of the project using BMP’s. The owner shall determine what level of maintenance is acceptable. Some options have been provided herein based on what we have been informed is acceptable to the owner. The owner, contractor, civil engineer, and our office shall work together to develop the best civil and grading plans to fit the owner's level of acceptable maintenance.

Natural drainages exist throughout the property and may impact the proposed development. Ultimately, our office recommends that the project Civil Engineer plan his or her work to take into account any major drainage that may be altered as part of development (road crossing etc.). Typically, our office recommends protecting any bare soil from erosion by placing rip rap at the abutments of both sides of the embankment or provide drainage swales, etc.

Flooding

The project occupies hillside and mountain terrain that is subject to periods of heavy precipitation and locally concentrated surface flows. According to the Shasta County FEMA Flood Zones Map (2020), the project is in an area of unmapped flood hazards or minimal flood hazard. Based on the elevation of the proposed WTGs, flooding is not anticipated to be an issue of concern. Design of improvements within valley locations or crossing existing drainage pathways should include features to transmit surface flows and mitigate erosion by water runoff.

Geologic Hazard Summary

Description	Hazard Potential	Comment / Risk
Mining	Low	Mining operations (active or closed) have not been identified at the site, however, existing unregistered mines may exist in the area.
Earthquake / Seismicity	Low to Moderate	Project is within seismically active region. USGS earthquake probabilities and estimated peak ground accelerations for the project area are low to moderate.
Slope Failure/ Landslides	Low to Moderate	The site topography is potentially conducive to slope failure or landslides. Design and/or mitigate to prevent landslides.
Erosion	Moderate	Exposed cuts in association with steep slopes will require erosion mitigation.
Flooding	Low	Flooding may be a potential hazard wherever the project area coincides with drainages. Various proposed access roads cross unnamed seasonal streams and drainages.

GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. The following table provides our geotechnical characterization.

The geotechnical characterization forms the basis of our geotechnical calculations and evaluation of site preparation, foundation options and pavement options. As noted in **General Comments**, the characterization is based upon widely spaced exploration points across the site, and variations are likely.

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density
1	variable	Residual bedrock soils comprised of variable amounts of silt, sand and gravel	variable
2[1]	encountered at depths ranging from 6.0 to 30 feet bgs	Pleistocene to Pliocene Age Basalt Bedrock: moderately to highly weathered, very weak to very strong, very poor to fair RQD	not applicable

1. Basalt bedrock was only encountered in 7 of the 15 borings advanced to depths greater than 10 feet bgs (C-06, E-01, J-02, M-10, N-02, OHCL-2, SWT).

Conditions encountered at each boring location are indicated on the individual boring logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual.

Laboratory Test Results

Laboratory tests were conducted on selected soil samples and the test results are presented in the **Exploration Results** section and on the boring logs. Atterberg limit tests results indicate that the on-site soils generally have low plasticity or are non-plastic. Consolidation/collapse tests performed at depths ranging from 6 to 30 feet below ground surface (bgs) within borings A-01, B-05 and SWT indicate that the residual bedrock soils have a negligible collapse potential when saturated under loads of 2,000 pounds per square foot (psf). The consolidation/collapse tests indicate that the weathered bedrock soils have very slight to slight compressibility. Direct shear testing performed on samples taken at depths of 10 to 15 feet bgs in borings K04 and F06 resulted in cohesion values of 907 and 109 psf with effective friction angles of 38° and 42°, respectively.

Groundwater Conditions

Groundwater was encountered in 7 out of the 15 borings advanced to depths greater than 10 feet bgs. Groundwater measurements were recorded during drilling operations and immediately after completion in borings that encountered groundwater. Results of our groundwater measurements are shown in the following table:

Groundwater Measurements (below existing ground surface)		
Boring	**While Drilling (feet)**	**At Completion of Drilling (feet)**
F-06	45	18
K-04	35	30
M-10	33	30
O&M	40	30
OHCL-1	15	10
OHCL-2	20	--[1]
SUB	27	20

1. Measurement could not be recorded at completion of drilling due to sidewall collapse of boring.

Groundwater was not encountered in the borings not listed above. Based on our field investigation and variable topography noted across the site, the depth to groundwater is anticipated to vary across the site. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7.

Description	O&M	OHCL1	OHCL2	Substation	Switchyard
2019 California Building Code Site Soil Classification [1]	D [2, 4]	C [2]	C [2]	C [2]	C [2]
Site Latitude	40.868465	40.796109	40.857884	40.823689	40.823400
Site Longitude	-121.860198	-121.826921	-121.837405	-121.820053	-121.822464
S_S – Spectral Acceleration Parameter for a Short Period[3]	0.820	0.836	0.826	0.834	0.834
S_1 – Spectral Acceleration Parameter for a 1-Second[3]	0.331	0.334	0.331	0.332	0.331
F_a – Site Amplification Factor for a Short Period	1.172	1.2	1.2	1.2	1.2
F_v – Site Amplification Factor for a 1-Second Period	1.969	1.5	1.5	1.5	1.5
PGA_M – Site Modified Peak Ground Acceleration	0.448	0.441	0.436	0.440	0.440
Mean Magnitude	6.83	6.76	6.82	6.76	6.77

1. Seismic site soil classification in general accordance with the 2019 California Building Code, which refers to ASCE 7-16.
2. The 2019 California Building Code uses a site profile extending to a depth of 100 feet for seismic site soil classification. Explorations extending to at least 100 feet bgs were performed at the substation and switchyard locations. Explorations extended to a maximum depth of 51.5, 51.5 and 40 feet bgs at the O&M, OHCL-1 and HCL-2 locations, respectively. For these areas, for the classification assumes similar or denser conditions continue below this depth.
3. These values were obtained using online seismic design maps and tools provided by SEAOC and OSHPD (https://seismicmaps.org/).
4. The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than or equal 0.2. However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) states that “In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites.” Based on our understanding of the proposed O&M structures, it is our assumption that the exception in Section 11.4.8 applies to the proposed O&M structures. However, the structural engineer should verify the applicability of this exception. Based on this exception, the spectral response accelerations presented above were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 1613 of the 2019 CBC.

Individual WTG seismic site classifications, in general accordance with the 2019 California Building Code, can be found in the **Supporting Information** section of this report. It should be noted that site class D was determined at WTG locations A-01, B-05 and K-04.

The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than or equal 0.2. Thus, we recommend that site-specific ground motion studies be performed at proposed WTG locations at and near the locations of A-01, B-05 and K-04. This assumes that the proposed WTGs do not meet the exception outlined in Section 11.4.8 of ASCE 7-16.

Faulting and Estimated Ground Motions

The site is located in Northern California, which is a seismically active area. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. As calculated using the USGS Unified Hazard Tool, the Cascadia Megathrust fault is considered to have the most significant effect at the site from a design standpoint. The fault has a maximum credible earthquake magnitude of 9.12 and is located approximately 111 kilometers from the site.

Based on the OSHPD Seismic Design Maps Report, using the American Society of Civil Engineers (ASCE 7-16) standard, the peak ground acceleration (PGAM) at the O&M, OHCL1, OHCL2, Substation, and Switchyard is expected to be 0.448g, 0.441g, 0.436g, 0.440g, and 0.440g, respectively. Based on the USGS Unified Hazard Tool, the O&M, OHCL1, OHCL2, Substation, and Switchyard have a mean magnitude of 6.83, 6.76, 6.82, 6.76, and 6.77 respectively. Furthermore, the site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.[3]

LIQUEFACTION

Liquefaction is a mode of ground failure that results from the generation of high pore water pressures during earthquake ground shaking, causing loss of shear strength. Liquefaction is typically a hazard where loose sandy soils exist below groundwater. The California Geological Survey (CGS) has designated certain areas as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table. The project site is not located within a liquefaction hazard zone mapped by the CGS.

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[3] California Department of Conservation Division of Mines and Geology (CDMG), *"Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region"*, CDMG Compact Disc 2000-003, 2000.

Although the site is not mapped for liquefaction hazard, the potential for liquefaction hazard at the site was analyzed in eight (8) borings which indicated having the most potential for liquefaction. Liquefaction analysis results can be found in **Supporting Information**. In each analysis, we performed a quantitative evaluation of the potential for liquefaction to occur and the effects if liquefaction were to occur at each boring location. In performing our evaluations, we utilized data for the site obtained from the United States Geological Survey (USGS) website to determine the Peak Ground Acceleration (PGA_M) based on the ASCE 7-16 standard and the Peak Ground Acceleration (PGA) for the probabilistic exceedance of 2% in 50 years for the Maximum Considered Earthquake. The PGA_M and mean magnitude earthquake for each boring location are shown on their respective figures in **Supporting Information**. Groundwater depths used in our analyses corresponded with the highest recorded groundwater depth measured in each respective boring.

The liquefaction analyses were performed in general accordance with California Geologic Survey Special Publication 117. The liquefaction study utilized “LiquefyPro” by CivilTech Software. “LiquefyPro” was used to analyze potential liquefaction occurring from the existing ground surface to a depth of 50 feet bgs in all borings analyzed with the exception of boring K-04 which was analyzed to a depth of 60 feet bgs. The analyses were based on the soil data obtained from each respective boring. Fines corrections were made using the Modify Stark/Olson method and the settlement analyses were performed using the Tokimatsu, M-correction method. A factor of safety of 1.3 was used against liquefaction.

Based on our review of the calculations by the various methods, the anticipated potential total liquefaction-induced settlement in all analyses performed were less than ½ inch with the exception of boring K-04. K-04 encountered anticipated potential total liquefaction-induced settlement up to 1.8 inches. Liquefaction appears to primarily occur from 50 to 60 feet bgs within the soft to medium stiff elastic silt with sand layer. The detailed liquefaction potential analyses results are attached to this report in **Supporting Documents** section of the **Appendix**.

It should be noted that liquefaction typically occurs in cohesionless silt, sand and fine-grained gravel deposits of Holocene to late Pleistocene age in areas where groundwater is shallower than about 50 feet below existing grades[4]. Geology at the site is anticipated to be older than mid to early Pleistocene age and the majority of liquefaction induced settlements are anticipated to occur at depths greater than 50 feet bgs based on our analyses. Pocket penetrometer results taken within the potentially liquefiable layer also indicate that the elastic silt soils contain cohesion. For these reasons, it is our opinion that the potential for the total calculated maximum liquefaction induced settlement of 1.8 inches to fully manifest at the ground surface is considered low.

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[4] *Recommended Procedures for implementation of DMB Special Publication 117 Guidelines for Analyzing and Mitigating Liquefaction Hazards in California (1999)*

With regards to the potential for liquefaction-induced lateral spreading, we note that liquefaction-induced settlements calculated in our analyses were relatively minor to negligible in all borings with the exception of K-04. It is our opinion that liquefaction-induced lateral spreading in these areas, with the exception of K-04, should also be considered minor to negligible.

It was noted that liquefaction primarily occurred from 50 to 60 feet bgs in our liquefaction analysis for boring K-04. Due to the depth of occurrence, it is our opinion that the probability of liquefaction induced lateral spread to impact this site is considered low.

CORROSIVITY

The following table lists the results of laboratory soluble sulfate, soluble sulfide, soluble chloride, Redox potential, electrical resistivity, total salts, and pH testing. The values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary

Boring	Sample Depth (feet)	Soil Description	Soluble Sulfate (%)	Sulfides (ppm)	Chlorides (ppm)	Red-Ox Potential (mV)	Electrical Resistivity (Ω-cm)	Total Salts (ppm)	pH
A-01	1.0 - 2.5	Sandy Elastic Silt	0.0008	Nil	10	+366	13,423	117	7.0
B-05	1.0 - 2.5	Silty Sand	0.0069	Nil	18	+383	10,325	177	7.0
C-06	1.0 - 2.5	Silty Sand	0.0003	Nil	7	+427	185,850	20	7.4
E-01	1.0 - 2.5	Sandy Silt with Gravel	0.0005	Nil	10	+424	32,008	49	7.0
F-06	1.0 - 2.5	Silty Sand with Gravel	0.0012	Nil	7	+416	17,553	78	6.8
J-02	1.0 - 2.5	Sandy Elastic Silt with Gravel	0.0014	Nil	8	+421	15,488	58	6.6
K-04	1.0 - 2.5	Silty Sand	0.0007	Nil	10	+417	175,525	27	6.7
L-05	1.0 - 2.5	Sandy Elastic Silt	0.0018	Nil	9	+432	36,138	53	6.6
M-10	1.0 - 2.5	Silty Sand	0.0010	Nil	6	+424	15,488	83	6.5
N-02	1.0 - 2.5	Elastic Silt	0.0012	Nil	14	+427	20,650	70	6.4
O&M	1.0 - 2.5	Silty Sand with Gravel	0.0021	Nil	11	+418	30,975	52	6.4
OHCL1	1.0 - 2.5	Sandy Silt	0.0030	Nil	10	+410	22,715	62	6.3
OHCL2	1.0 - 2.5	Sandy Silt with Gravel	0.0008	Nil	9	+412	20,650	67	6.3

Corrosivity Test Results Summary									
Boring	**Sample Depth (feet)**	**Soil Description**	**Soluble Sulfate (%)**	**Sulfides (ppm)**	**Chlorides (ppm)**	**Red-Ox Potential (mV)**	**Electrical Resistivity (Ω-cm)**	**Total Salts (ppm)**	**pH**
SUB	1.0 - 2.5	Silty Sand	0.0014	Nil	13	+416	15,488	82	6.2
SWT	1.0 - 2.5	Silt with Sand	0.0017	Nil	8	+423	27,878	85	6.1

Results of soluble sulfate testing indicate samples of the on-site soils tested possess negligible sulfate concentrations when classified in accordance with Table 19.3.1.1 of the ACI Design Manual. Concrete should be designed in accordance with the exposure class S0 provisions of the ACI Design Manual, Section 318, Chapter 19.

STORMWATER MANAGEMENT

Two (2) in-situ percolation tests were performed from 5 to 10 feet bgs within the proposed substation (boring P-1 and P-2) and switchyard (boring P-3 and P-4) locations for a total of four (4) percolation tests. A 2-inch thick layer of gravel was placed in the bottom of each boring after the borings were drilled to investigate the soil profile. A 2-inch diameter perforated pipe was installed on top of the gravel layer in each boring. Gravel was used to backfill between the perforated pipes and the boring sidewall. The borings were then filled with water for a pre-soak period of approximately 20 hours. Testing began after the pre-soak period. At the beginning of the test, the pipes were refilled with water and readings were taken at standardized time intervals. Percolation rates are provided in the following table:

TEST RESULTS				
Test Location (depth, feet bgs)	**Soil Classification**	**Slowest Measured Percolation Rate (in/hr.)**	**Correlated Infiltration Rate[1,2] (in/hr.)**	**Water Head (in)**
Substation				
P-1 (0 to 5 ft)	Silty Sand	2.40	0.16	21.12
P-2 (0 to 10 ft)	Silty Sand	4.08	0.25	22.86
Switchyard				
P-3 (0 to 10 ft)	Silty Sand	0.24	0.01	24.42
P-4 (0 to 5 ft)	Silty Sand	1.20	0.08	21.18

1. If proposed infiltration system will mainly rely on vertical downward seepage, the correlated infiltration rates should be used. The infiltration rates were correlated using the Porchet method.

TEST RESULTS				
Test Location (depth, feet bgs)	**Soil Classification**	**Slowest Measured Percolation Rate (in/hr.)**	**Correlated Infiltration Rate[1,2] (in/hr.)**	**Water Head (in)**

2. The Porchet Formula (aka Inverse Borehole Formula) was used to calculate the test infiltration rates which takes into account sidewall area of the borehole.

Based on the field test results, it is our opinion, from a geotechnical standpoint, that onsite stormwater infiltration may be feasible within the proposed substation area but may not be considered feasible within the proposed switchyard area given the low infiltration rates. The field test results are not intended to be design rates. They represent the results of our tests, at the depths and locations indicated, as described above. Once a location for proposed stormwater basins is finalized, we recommend additional testing be performed to confirm the results presented in the table above.

If an infiltration system is still required onsite, the design rate should be determined by the designer by applying an appropriate factor of safety. The designer should take into consideration the variability of the native soils when selecting appropriate design rates. With time, the bottoms of infiltration systems tend to plug with organics, sediments, and other debris. Long term maintenance will likely be required to remove these deleterious materials to help reduce decreases in actual percolation rates.

The percolation tests were performed with clear water, whereas the storm water will likely not be clear, but may contain organics, fines, and grease/oil. The presence of these deleterious materials will tend to decrease the rate that water percolates from the infiltration systems. Design of the stormwater infiltration systems should account for the presence of these materials and should incorporate structures/devices to remove these deleterious materials. A safety factor should be applied to these measured rates.

Based on the soils encountered in our borings, we expect the percolation rates of the soils could be different than measured in the field due to variations in fines and gravel content. The design elevation and size of the proposed infiltration system should account for this expected variability in infiltration rates.

If an infiltration system is still required onsite, infiltration testing should be performed after construction of the infiltration system to verify the design infiltration rates. It should be noted that siltation and vegetation growth along with other factors may affect the infiltration rates of the infiltration areas. The actual infiltration rate may vary from the values reported here.

VES SOUNDING RESULTS

The results of the vertical electrical resistivity sounding (VES) surveys are summarized in the **Exploration Results** found in the Appendix of this report. The left four columns of the tables contain the a-spacing (a) and electrode depth (b). The right two columns of the tables comprise the associated electrical resistivity values in ohms and ohm-centimeters. The apparent resistivity is calculated as:

$$\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$$

The overall range of values measured generally vary from approximately 10,000 Ω-cm to 518,650 Ω-cm. Data obtained from locations ER-1, ER-3, ER-4, ER-5, ER-6, and ER-7 produced graphs that are relatively smooth, indicating little to no outside interference when testing. Data obtained from locations ER-2 and ER-8 produce more erratic graphs with outliers. These outliers may indicate outside interference due to loose sandy surface soils. They may also represent a slight change in geology beneath orthogonal traverses.

THERMAL RESISTIVITY TESTING

Select bulk samples were obtained and tested for thermal resistivity characteristics at a total of eight (8) test pit locations designated at TR-1 to TR-8. Sampling included excavating both bulk samples and obtaining in-situ samples from each location. The bulk samples were excavated with a backhoe equipped with an 18-inch wide toothed bucket. Testing was performed in accordance with ASTM D5334-14. Thermal resistivity results can be located in **Exploration Results**.

Thermal resistivity of soils is influenced by the degree of compaction, chemical and mineral constituents within the soil, moisture content, groundwater conditions, and variability of the soil's particle size and distribution among many other contributing factors. The thermal resistivity test results presented are for the samples tested and at the reported dry density and moisture contents. Given the weathered rock included in some of the samples, material was broken down to the minus No. 4 sieve where possible and any larger material was discarded from the test.
Soils placed at different dry density and/or moisture content values would have different thermal resistivity properties.

GEOTECHNICAL OVERVIEW

The subject site has several geotechnical considerations that will affect the construction and performance of the proposed project discussed in this report. The primary geotechnical consideration that has been identified at the site that will affect development of the site is the following:

- Excavation considerations
- Erosion considerations
- Potential for liquefaction induced settlement from a strong nearby seismic event

Excavation Considerations

It is anticipated that excavations within the upper residual soil and decomposed basalt at the proposed WTG foundations can be accomplished with conventional large earthmoving equipment. However, excavations penetrating basalt bedrock may require the use of specialized heavy-duty equipment and/or blasting. WTG foundation locations with shallow (within 10 feet or less) bedrock (Vp less than 3,000 feet per second) included E-01, M-10 and N-02. The Rock Quality Designation (RQD) for the HQ coring performed at these locations ranged from 0 to 15 with compressive strengths ranging from 15,295 to 17,650 pounds per square inch. The contractor should anticipate such conditions and plan their work accordingly.

Erosion Considerations

The surface soils at the site primarily consist of residual bedrock soils with varying amounts of silt, sand and gravel which may be subject to significant wind/water erosion or sedimentation. This is evident at the dirt roads running through steeper terrains or through existing site drainages. The project civil engineer while developing the plans should plan to limit wind/water erosion and sedimentation during and after construction to levels acceptable to the owner.

We have provided minimum recommendations to reduce the potential for surface erosion and potential undercutting of any slopes. We understand that it will be the owner’s responsibility to maintain all drainages and manage surface run-off water for the life of the project using BMP’s. The owner shall determine what level of maintenance is acceptable. Some options have been provided herein based on what we have been informed is acceptable to the owner. The owner, contractor, civil engineer, and our office shall work together to develop the best civil and grading plans to fit the owner’s level of acceptable maintenance.

Natural drainages exist throughout the property and may impact the proposed development. Ultimately, our office recommends that the project Civil Engineer plan his or her work to take into account any major drainage that may be altered as part of development (road crossing etc.). Typically, our office recommends protecting any bare soil from erosion by placing rip rap at the abutments of both sides of the embankment or provide drainage swales, etc.

Liquefaction Induced Settlement Considerations

Liquefaction potential analyses were performed from existing grades up to 60 feet bgs at the site. Our liquefaction analyses were based on data obtained from 8 borings across the site which exhibited the most potential for liquefaction to occur (borings A-01, B-05, F-06, K-04, L-05, O&M, SUB and SWT). Based on our analyses, liquefaction induced settlements were generally less than 1/2-inch with the exception of our analyses which was performed with data obtained from boring K-04. Our analysis of boring K-04 encountered total potential liquefaction-induced settlements up to 1.8 inches. Due to reasons discussed above in **Liquefaction**, it is our opinion that the potential for 1.8 inches of total liquefaction induced settlement to manifest at the ground surface is low. However, preliminary WTG designs should incorporate the total 1.8-inches of liquefaction induced settlements. If these settlements in combination with the loading settlements presented in **Supporting Information** exceed allowable limits, Terracon should be contacted to provide additional soil improvement recommendations for the WTGs.

General

Additional site preparation recommendations, including subgrade improvement and fill placement, are provided in the **Earthwork** section.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

The following recommendations include site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations, slabs, and roadways are contingent upon following the recommendations outlined in this section.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, permanent slope cuts, grading in documented landslide areas, and other geotechnical conditions exposed during the construction of the project.

Site Preparation

The grading plans for the proposed project are not finalized at this stage of the project. However, we anticipate major rough grading operations within the outline of the future turbine foundations. The WTG areas should be initially graded to provide relatively uniform supporting materials beneath the proposed turbine foundations. We recommend that grading design avoid transition between cut and fill within the outline of the proposed turbine foundations.

We recommend that earthwork begin with stripping of organic-rich topsoil (soil with 5 percent or more organics), vegetation, and soft or otherwise unsuitable materials from the surface of the proposed construction areas. The majority of site locations were forested with mature trees and based on the visual classification of the near-surface soils, typical stripping depths, where encountered, are expected to vary from about 2 to 3 feet in depth. Stripping depths in heavily forested areas with large trees could be greater than 3 feet. Stripping depths between our boring locations and across the site will likely vary. We recommend actual stripping depths be evaluated by a representative of Terracon during construction. The stripped materials should be stockpiled for placement on the completed grade and should not be used as foundation backfill or structural fill.

Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. The site should be initially graded to create a relatively level surface to receive fill and provide for a relatively uniform thickness of fill, if required.

Although no evidence of underground utilities and structures were observed during the site reconnaissance. Underground utilities and structures within proposed grading limits could be encountered. If unexpected fills or underground facilities are encountered, such features should be removed, and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Excavation

It is anticipated that excavations within the upper residual soil and decomposed basalt at proposed foundation locations can be accomplished with conventional large earthmoving equipment such as a large excavator possibly equipped with a hammer bucket and/or large dozer equipped with a single ripper tooth. For the sites having competent/strong bedrock, pre-blasting or “popping” prior to ripping may be required in order to permit ripper tooth entry of the dozer. These recommendations are strictly suggestions to the contractor. Our boring and geophysical data along with local experience and equipment performance handbooks shall be used to come up with the most effective way to excavate the proposed foundations. Appropriate excavating equipment shall be utilized on this site for the given soil conditions identified. The Caterpillar Performance Handbook should be used in conjunction with the Vp velocity profiles provided as part of the Geophysical report (attached) when deciding on the means and methods to advance excavations into the subsurface materials. The competency of the rock across each site can vary, hence the contractor shall plan his work accordingly.

Subgrade Preparation

Once any required cuts have been made, and prior to placing any fill, the subgrade soil should be scarified, moisture conditioned and compacted. The depth of scarification of subgrade soils and moisture conditioning of the subgrade is highly dependent on the time of year of construction and the site conditions that exist immediately prior to construction. If construction occurs during the winter or spring, when the subgrade soils are typically already in a moist condition, scarification and compaction may only be 8 inches. If construction occurs during the summer or fall when the subgrade soils have been allowed to dry out deeper, the depth of scarification and moisture conditioning may be as much as 18 to 24 inches. The geotechnical engineer or their representative shall be present to observe the exposed subgrade and specify the depth of scarification and moisture conditioning required. The moisture content and compaction of subgrade soils should be maintained until foundation construction. Care should be taken to prevent wetting or drying of the bearing materials during construction.

Spread footings bearing on recompacted native soils or engineered fill are recommended for support of proposed substation and Operations and Maintenance (O&M) building foundations. Recompacted native soils or engineered fill should extend to a minimum depth of 1 foot below the bottom of foundations, or 3 feet below existing grades, whichever is greater. Grading for the proposed substation and O&M foundations should incorporate the limits of each foundations plus a lateral distance of 3 feet beyond the outside edge of perimeter footings.

Spread footings bearing on engineered fill are recommended for support of proposed switch station foundations. Engineered fill should extend to a minimum depth of 1.5 feet below the bottom of foundations. Grading for the proposed switchyard foundations should incorporate the limits of each foundation plus a lateral distance of 3 feet beyond the outside edge of perimeter footings.

Subgrade soils beneath exterior slabs and roadways should be scarified, moisture conditioned, and compacted to a minimum depth of 12 inches. The moisture content and compaction of subgrade soils should be maintained until slab or pavement construction.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable. However, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

At the time of our study, moisture contents of the surface and near-surface native soils ranged from about 21 percent to 79 percent. Based on these moisture contents, some moisture conditioning will likely be needed for the project. The soils may need to be dried by aeration during dry weather conditions. If drying is not an option, the subgrade soils may also be stabilized with the use of aggregate base course reinforced with geogrids or lime/cement.

Fill Materials and Placement

The on-site soils primarily consist of sandy material which is considered suitable for use as engineered fill beneath foundations. Furthermore, use of materials beneath foundations should be observed and evaluated by a geotechnical engineer licensed to practice in the State of California or their designated representative. Clean on-site sandy soils or approved imported materials may be used as engineered fill material for the following areas:

- general site grading
- foundation areas
- foundation backfill
- roadway areas

Imported soils for used as engineered fill, if required, should conform to non-expansive materials as indicated in the following recommendations:

Gradation	Percent Finer by Weight (ASTM C 136)
3"	100*
No. 4 Sieve	50 - 100
No. 200 Sieve	15 - 50

■ Liquid Limit	30 (max)
■ Plasticity Index	15 (max)
■ Maximum Expansive Index*	20 (max)

*ASTM D 4829

Clean onsite native sandy soils or imported fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed ten inches in loose thickness.

Fill Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction Above Optimum	
		Minimum	Maximum
<u>On-site sandy soils and low volume change (non-expansive) imported fill:</u>			
Native soil beneath and within 5 feet of foundations:	90	0%	+3%
Fill greater than 5 feet in depth below foundations:	95	0%	+3%
Miscellaneous backfill:	90	0%	+3%
Fill within 5 vertical feet of roadways**:	90	0%	+3%
Fill greater than 5 feet in depth beneath roadways:	93	0%	+3%
Utility Trenches at structures/roadways*:	90	0%	+3%
Roadway subgrade and aggregate base surface:	95	0%	+3%

* The ultimate compaction requirement of the collection utility trenches should follow the collection system design requirements. The upper 12 inches of the utility trench should be compacted to 95% in roadway or other structural areas.

We recommend compacted native soil or any engineered fill be tested for moisture content and relative compaction during placement. Fill should be tested frequently for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture content or compaction requirements have not been met, the area represented by the test should be reworked and retested as required until the specified moisture content and relative compaction requirements are achieved.

Grading and Drainage

Positive drainage should be provided during construction and maintained throughout the life of the development. Infiltration of water into utility trenches or foundation excavations should be prevented during construction. Exposed ground should be sloped and maintained at a minimum 5% away from the structures for at least 10 feet beyond the perimeter of the structure and foundation. Grades around any structures should also be periodically inspected and adjusted as necessary as part of the structure's maintenance program.

Exterior Slab Design and Construction

Exterior slabs-on-grade, exterior architectural features, and utilities founded on, or in backfill may experience some movement due to the volume change of the backfill. To reduce the potential for damage caused by movement, we recommend:

- minimizing moisture increases in the backfill;
- controlling moisture-density during placement of backfill;
- using designs which allow vertical movement between the exterior features and adjoining structural elements;
- placing effective control joints on relatively close centers.

Utility Trenches

It is anticipated that the on-site soils and fill materials will provide suitable support for underground utilities and piping that may be installed. Any soft and/or unsuitable material encountered at the bottom of excavations should be removed and be replaced with an adequate bedding material. A non-expansive granular material with a sand equivalent greater than 30 should be used for bedding and shading of utilities, unless permitted by the utility manufacturer.

On-site sandy materials are considered suitable for backfill, other than pipe bedding, of utility and pipe trenches provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Flooding or jetting for placement and compaction of backfill is not recommended. For the collection system backfill in non-structural areas, the project electrical consultant shall specify ultimate relative percent compaction and backfill material requirements.

Slopes

For permanent slopes in compacted fill areas, recommended maximum configurations for on-site materials are as follows:

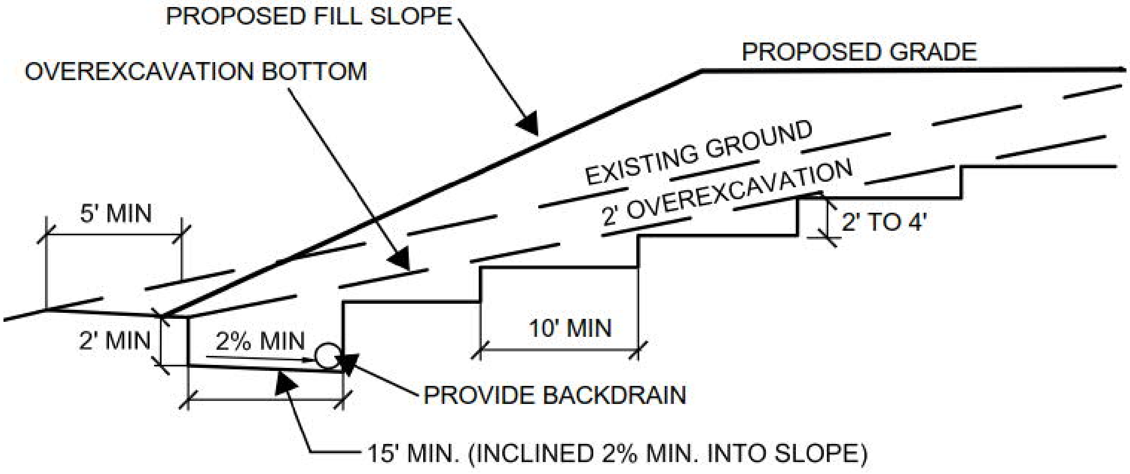
Maximum Slope Configuration*	
Inclination (horizontal:vertical)	**Slope Treatment**
5:1 to less steep than 2:1	Re-vegetate
2:1 to less steep than 1.5:1	Rip-rap over filter fabric
Steeper than 1.5:1	Stability analysis or structural retaining wall required

*Provided slope configurations are based off cursory slope stability analyses utilizing strength values from laboratory direct shear results.

We recommend that the slope and geologic stability of future hillside grading be evaluated once the grading plans are finalized and the final geotechnical exploration and engineering are conducted for this project.

We expect slopes with these configurations to be resistant to erosion and stable against circular failure. The face of all slopes should be compacted to the minimum specification for fill embankments. Alternately, fill slopes can be over-built with compacted material and trimmed to final configurations. If any slope in cut or fill will exceed 25 feet in height, the grading design should include mid-height benches to intercept surface drainage and divert flow from the face of the embankment.

If fill is placed in areas of the site where existing slopes are steeper than 5:1 (horizontal: vertical), the area should be benched to reduce the potential for slippage between existing slopes and fills. Benches should be wide enough to accommodate compaction and earth moving equipment, and to allow placement of horizontal lifts of fill.



Topsoil and organic subsoil (subsoil with visible roots) should be removed prior to placing fill for slopes. Soil placed to create fill slopes should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557. Organic subsoil should only be re-used in fill slopes within 12 inches of the surface of the slope.

Cut and fill slopes should be covered with some type of erosion control measure immediately after construction. Erosion control measures can consist of a spray tacifyer with erosion resistant vegetation seed, jute netting, or geotextile erosion control mats. These should be installed per the manufacturer’s specifications. Some minor, relatively shallow erosion should be planned for. Routine maintenance will be required on all cut and fill slopes. Any detected problems should be repaired immediately. It is important that the bottom of all cuts and fills be protected from erosion or undercutting that could jeopardize the integrity of the slope. Substantial slope failure could occur if the bottoms of the slopes are not protected.

<u>Terracon should be afforded the opportunity to review grading plan and be present during grading and when any cuts are being made to observe the soil/bedrock lithology and help identify any adverse conditions that may be present that would warrant our recommendations to be revised.</u>

Construction Considerations

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil, proofrolling, fill placement, cut slopes/adverse jointing or bedding, backfilling of excavations, and mitigation of areas delineated by the proofroll to require mitigation.

On-site silt soils may pump and unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. Should unstable subgrade conditions develop, stabilization measures will need to be employed. Stabilization measures may include placement of aggregate base and multi-axial geogrid or lime/cement treatment.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the foundation areas and 5,000 square feet in roadway areas. One density and water content test should be performed for every 12-inch thick lift for 100 linear feet of compacted utility trench backfill. The frequency of the testing may be adjusted during construction under the direction of the geotechnical engineer.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters- Operations and Maintenance Building and Substation

Item	Description
Foundation Type	Conventional Shallow Spread Footings
Bearing Material	12 inches of compacted native soil or engineered fill
Allowable Bearing Pressure	3,000
Minimum Dimensions	Walls: 12 inches; Columns: 24 inches
Maximum Dimensions	Walls: 8 feet; Columns: 13 feet
Ultimate Passive Resistance (equivalent fluid pressures)	300
Ultimate Coefficient of Sliding Friction	0.35
Minimum Embedment Depth Below Finished Grade	18 inches
Total Estimated Settlement	Less than about 1 inch
Estimated Differential Settlement	about ½ of total settlement (measured across 40 feet)

Design Parameters- Switch Station

Item	Description
Foundation Type	Conventional Shallow Spread Footings
Bearing Material	18 inches of new engineered fill
Allowable Bearing Pressure	2,000
Minimum Dimensions	Walls: 12 inches; Columns: 24 inches
Maximum Dimensions	Walls: 5 feet; Columns: 9 feet
Ultimate Passive Resistance (equivalent fluid pressures)	300
Ultimate Coefficient of Sliding Friction	0.35
Minimum Embedment Depth Below Finished Grade	18 inches
Total Estimated Settlement	Less than about 1 inch
Estimated Differential Settlement	about ½ of total settlement (measured across 40 feet)

Finished grade is defined as the lowest adjacent grade within five feet of the foundation for perimeter (or exterior) footings. The allowable foundation bearing pressures apply to dead loads plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions. The weight of the foundation concrete below grade may be neglected in dead load computations.

The values provided in the tables above are for maximum loads as noted in **Project Description**. The use of passive earth pressures requires the sides of the excavation for the spread footing foundations to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted engineered fill be placed against the vertical footing face. If passive resistance is used to resist lateral loads, the base friction should be reduced by 25 percent.

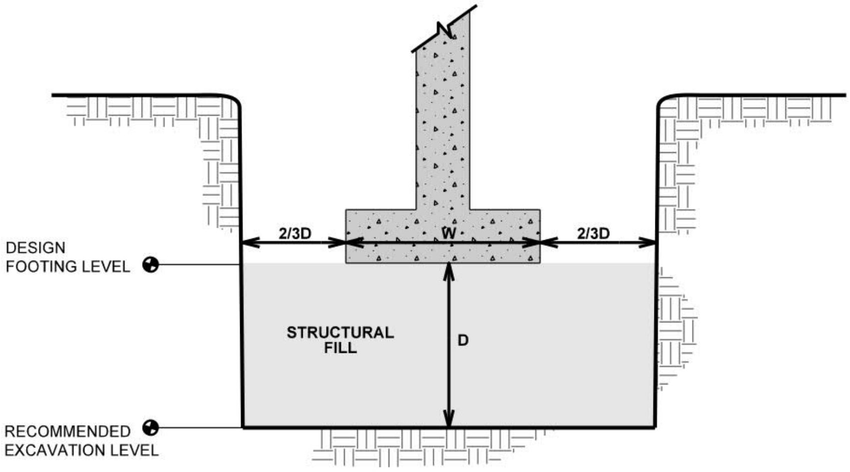
The ultimate coefficients provided for sliding friction can be used to compute sliding resistance where foundations are placed on suitable soil/materials. These values should be neglected for foundations subject to net uplift conditions.

Minimum embedment depths provided above are necessary to minimize the effects of freezing, desiccation or seasonal water content variations.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete or fill. Concrete or fill should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

Over-excavation for structural fill placement below footings should be conducted as shown below. The over-excavation should be backfilled up to the footing base elevation, with engineered fill placed, as recommended in the **Earthwork** section.



OVER-EXCAVATION / BACKFILL ZONE

NOTE: EXCAVATIONS ARE SHOWN VERTICAL; HOWEVER, THE SIDEWALLS SHOULD BE SLOPED AS NECESSARY FOR SAFETY

To ensure foundations have adequate support, special care should be taken when footings are located adjacent to trenches. The bottom of such footings should be at least 1 foot below an imaginary plane with an inclination of 1.5 horizontal to 1.0 vertical extending upward from the nearest edge of the adjacent trench.

FLOOR SLABS

Design Parameters- Operations and Maintenance Building and Substation

DESCRIPTION	RECOMMENDATION
Interior floor system	Slab-on-grade concrete
Floor slab support[1]	12 inches of compacted native soil or engineered fill
Subbase	Minimum 4 inches of:

DESCRIPTION	RECOMMENDATION
	■ Free-draining crushed aggregate in areas with floor coverings or in areas sensitive to moisture vapor[2] ■ Aggregate base course in areas not sensitive to moisture vapor[3]
Modulus of subgrade reaction[4]	200 pounds per square inch per inch (psi/in) (The modulus was obtained based on estimates obtained from NAVFAC 7.1 design charts). This value is for a small loaded area (1 Sq. ft or less) such as for forklift wheel loads or point loads and should be adjusted for larger loaded areas.

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Free-draining granular material should have less than 5% fines (material passing the No. 200 sieve). Other design considerations such as cold temperatures and condensation development could warrant more extensive design provisions.
3. Aggregate base course should meet the requirements for Class 2 Aggregate Base Course within the Current Caltrans Standard Specifications, latest edition.
4. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

DEEP FOUNDATIONS

Drilled Shaft Design Parameters – Substation, Switchyard and Overhead Collection areas

The proposed substation, switchyard and overhead collection towers can be supported on drilled shafts with a minimum embedment depth of 10 feet bgs. Total required embedment of the drilled shafts should be determined by the structural engineer based on structural loading and parameters provided in this report.

The allowable end bearing and side friction components of resistance were evaluated and are presented in the following tables. The allowable axial and uplift parameters are based on a minimum factor of safety of 2.5 when using ASD type of analyses. In order for end bearing to be considered, the bottom of the shafts shall be verified to be cleaned of any loose soil.
Recommended geotechnical parameters for lateral load analyses of drilled shaft foundations have been developed for use in the L-PILE computer program. Based on our review of the subsurface conditions within the outline of the substation and the Standard Penetration Test (SPT) results, engineering properties have been estimated for the soils conditions as shown in the following table. We recommend that Terracon review the final drilled shaft design to verify that sufficient embedment is achieved.

Axial & Lateral Load Analyses for Overhead Collection Foundations (OHCL-1)
Engineering Properties of Soils

Top Depth Bottom Depth	Unit Weight (pcf)	L-PILE/ GROUP Soil Type	Cohesion (psf)/ Friction Angle (deg)	Coeff. of Static Subgrade Reaction K_s (pci)	End Bearing Capacity (psf)	Skin Friction (psf)
2 7	105	Stiff Clay w/out free water	1,200	Default	--	250
7 10	120	Sand	42˚	Default	--	200
10 30	55	Sand	42˚	Default	--	450
30 50	55	Sand	42˚	Default	--	700

Axial & Lateral Load Analyses for Overhead Collection Foundations (OCHL-2) Estimated Engineering Properties of Soils

Top Depth Bottom Depth (ft)	Unit Wt. (pcf)	L-PILE/ GROUP Soil Type	Cohesion (psf)/Friction Angle (deg)	Poisson's Ratio/ UC Strengh (psi)	Geologic Strength Index, GSI	Rock Mass Modulus (psi)	Coeff. of Static Subgrade Reaction K_s (pci)	End Bearing Capacity (psf)	Skin Friction (psf)
2 12	105	Stiff Clay w/out free water	1,300	--	--	--	Default	--	265
12 20	120	Sand	42˚	--	--	--	Default	--	350
20 40	65	Weak Rock (Basalt) Mi=25	--	0.30 / 2,960 psi	35	611,000	--	--	860

Axial & Lateral Load Analyses for Substation Foundations (SUB) Engineering Properties of Soils

Top Depth Bottom Depth	Unit Weight (pcf)	L-PILE/ GROUP Soil Type	Cohesion (psf)/ Friction Angle (deg)	Coeff. of Static Subgrade Reaction K_s (pci)	End Bearing Capacity (psf)	Skin Friction (psf)
2 10	120	Sand	40˚	Default	--	160
10 20	120	Sand	39˚	Default	--	400
20 40	50	Sand	35˚	Default	--	570
40 50	50	Stiff Clay w/out free water	1,500	Default	--	330

Axial & Lateral Load Analyses for Switchyard Foundations (SWT) Estimated Engineering Properties of Soils

Top Depth Bottom Depth (ft)	Unit Wt. (pcf)	L-PILE/ GROUP Soil Type	Cohesion (psf)/Friction Angle (deg)	Poisson's Ratio/ UC Strengh (psi)	Geologic Strength Index, GSI	Rock Mass Modulus (psi)	Coeff. of Static Subgrade Reaction K_s (pci)	End Bearing Capacity (psf)	Skin Friction (psf)
2 15	105	Stiff Clay w/out free water	1,000	--	--	--	Default	3,000	250
15 20	115	Sand	35˚	--	--	--	Default	15,000	300
20	120	Sand	40	--	--	--	Default	30,000	580

Axial & Lateral Load Analyses for Switchyard Foundations (SWT)
Estimated Engineering Properties of Soils

Top Depth Bottom Depth (ft)	Unit Wt. (pcf)	L-PILE/ GROUP Soil Type	Cohesion (psf)/Friction Angle (deg)	Poisson's Ratio/ UC Strengh (psi)	Geologic Strength Index, GSI	Rock Mass Modulus (psi)	Coeff. of Static Subgrade Reaction K_s (pci)	End Bearing Capacity (psf)	Skin Friction (psf)
30									
30	125	Weak Rock (Basalt) Mi=25	--	0.37 / 1,000 psi	25	344,000	--	30,000	1,000
40									

The depth below ground surface indicated in the table above is referenced from the existing ground surface at the site at the time of the field exploration. If fill is placed to raise the site grades, the depths shown in the table above must be increased by the thickness of fill placed. The required depths of shaft embedment should also be determined for design lateral loads and overturning moments to determine the most critical design condition.

Lateral load design parameters are valid within the elastic range of the soil. The coefficients of subgrade reaction are ultimate values; therefore, appropriate factors of safety should be applied in the shaft design or deflection limits should be applied to the design.

It should be noted that the load capacities provided herein are based on the stresses induced in the supporting soils. The structural capacity of the shafts should be checked to assure that they can safely accommodate the combined stresses induced by axial and lateral forces. Furthermore, the response of the drilled shaft foundations to lateral loads is dependent upon the soil/structure interaction as well as the shaft's actual diameter, length, stiffness and "fixity" (fixed or free-head condition).

Drilled Shaft Construction Considerations

For drilled shaft depths extending into basalt bedrock, additional effort or coring into the weathered bedrock may be required.

We recommend that all drilled shaft installations be observed on a full-time basis by an experienced geotechnical engineer or representative of the engineer in order to evaluate that the soils encountered are consistent with the recommended design parameters. If the subsurface soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

The drilled shaft installation process should be performed under the direction of the Geotechnical Engineer. The Geotechnical Engineer should document the shaft installation process including soil/rock and groundwater conditions encountered, consistency with expected conditions, and details of the installed shaft.

WTG FOUNDATIONS

Subsurface conditions are considered suitable for supporting the proposed WTGs on gravity base foundations bearing on native soil deposits and/or bedrock. In general, WTG foundations are anticipated to be supported on residual alluvium soils or weathered bedrock. Specific conditions and design parameters for the WTG foundations are provided in this section and in tables provided in the **Supporting Information**.

Results from the geotechnical borings and laboratory testing were evaluated to develop design parameters for the turbine foundations. The following considerations and parameters were used to develop these recommendations:

- The contact pressures are based on the provided loading information and calculations of effective areas and the impact of moment, shear, and axial load of the bearing soils at the bottom of the foundations.
- The relationship between the anticipated contact pressure and the anticipated settlement values provided in this report are based on settlement analysis utilizing Hough and Westergaard.
- The bottoms of foundations are assumed to be at a minimum of 12 feet below original grade with 12 feet of engineered fill cover.

Design Parameters

Foundation Net Bearing Pressures:
We have evaluated foundation support for contact pressures of 2,800 pounds per square foot (psf) bearing entirely on scarified and recompacted native soil, on residual bedrock soils or bedrock. The preliminary design parameters are based on the mat foundations being placed a minimum of 12 feet below existing grades with 12 feet of engineered fill cover. These parameters should be verified once the final grading plans are prepared. The tabulated values attached to this report provide the relationship between anticipated contact pressure and the resulting settlement values. Terracon should be notified if the settlement values are not within the acceptable tolerance of the proposed foundations.

Lateral and Uplift Loading:
Lateral loads transmitted to spread footings can be resisted by a combination of soil-concrete friction on the base of the footings and passive pressure on the sides of the footings. The friction between the base of the footings and bearing soils (or lean concrete or granular structural fill) may be computed using ultimate friction coefficients as shown in the **Supporting Information**. If the footings are backfilled in accordance with our recommendations in the **Earthwork** section of

this report, the allowable passive pressure distributions provided in Supporting documents may be used. Passive resistance in the upper 2 feet of soil should be neglected due to moisture variations, effects of frost and potential disturbance. Some movement of the foundation element will be required to mobilize passive pressures.

The ultimate uplift capacity of a spread footing due to deadweight forces is limited to the effective weight of the foundation plus the effective weight of any soil directly above the foundation divided by an appropriate factor of safety. For backfill compacted to at least 90 percent of the material's Modified Proctor maximum dry density (ASTM D 1557), a total wet unit weight of 100 pounds per cubic foot may be used. Due to varying total unit weights across the site, we recommend that a thorough construction testing program be performed during excavations to evaluate that the minimum design backfill density criterion is met.

Foundation Stiffness and Settlement Estimates:

The geotechnical parameters outlined in the **Supporting Information** are based upon values obtained from the test data and our analysis. It should be noted that the parameters obtained from these analyses are based on our interpretation of the variability of the data and soil profiles from the sites and idealized methods used in the analysis. The stiffness values (E, and G) have no factor of safety included.

Due to the preliminary nature of this report, recommended parameters are only limited to the WTG locations explored in this phase. Variations of the soils and their engineering properties are likely to occur across the site that could result in deviations from the parameters discussed in this report. Future exploration should include test borings at every proposed turbine location. If any of the information regarding foundation loading and geometry outlined in this report is incorrect or changes occur during design, Terracon should be contacted so that modifications to our analysis can be made.

Foundation Construction Considerations – Turbine Foundations

Foundation Excavations

Due to the size of the turbine foundations relative to our boring test areas, it is likely that variations in bearing conditions, including possible unsuitable soil, are present in other portions of foundation areas that were not detected at our test boring locations. The contact pressures provided in this report present anticipated foundation bearing conditions, based upon the geophysics/boring data and the provided structural loading. At locations where bearing conditions are not as anticipated, additional recommendations and direction will be required by the Geotechnical Engineer. Overexcavation of low strength soils (loose residual soil) to expose higher strength soils and replacement with structural fill or lean concrete may be required at some turbine locations.

To provide additional evaluation of bearing conditions, we recommend a qualified geotechnical engineer representative observe foundation excavations at the time the excavations expose the anticipated bearing materials and prior to placement of working mats or reinforcing steel. We recommend in addition to observation, if needed, testing during construction include probing with the excavator at the bases of the completed turbine foundation excavations to confirm that suitable soils consistent with the boring data and foundation recommendations are present. If unsuitable materials are encountered at that time, the geotechnical engineer may recommend the foundation subgrade be improved by overexcavation and backfilling as discussed herein.

Overexcavation for structural fill placement below footings, if required, should extend laterally beyond all edges of the footings at least 8 inches per foot of overexcavation depth below footing base elevation. The overexcavation should then be backfilled up to the footing base elevation with structural fill material placed in accordance with **Earthwork**. To ensure foundations have adequate support, special care should be taken when foundations are located near descending slopes. The bottom of such foundations nearest to descending slopes should be at or above an imaginary plane with an inclination of 1.7 horizontal to 1.0 vertical extending downward from the beginning of the descending slope.

ROADWAYS

General Roadway Comments

Roadway and pavement designs are provided for the traffic conditions and pavement life conditions as noted in the following sections of this report. A critical aspect of pavement and roadway performance is site preparation. Roadway designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

Access Roadways

Based on our review of the operation roadway layouts provided in a KMZ file provided by ConnectGen in an email dated March 22, 2021, new access roads will be constructed throughout the site with varying alignments and grades.

Surficial soils at the site varied but generally consisted of weathered bedrock soils consisting of silts and sands varying in consistency and density. In an attempt to classify the surficial soils strength properties with respect to roadway design, we obtained bulk samples for California Bearing Ratio (CBR) testing at three locations (TR-2, TR-3 and TR-6). Samples were obtained at depths of between 1 and 4 feet bgs. CBR tests resulted in CBR values of 5.8, 0.8, and 1.2 at locations TR-2, TR-3 and TR-6, respectively. Due to the varying test results, we have provided two separate pavement sections for CBR values of 1.0 and 5.0. We recommend that a thorough construction testing program be performed during roadway construction and after rough grading is complete to evaluate that the subgrade soils and to confirm applicable pavement sections.

Access Roads - Aggregate Surface Design Recommendations

Aggregate surface roadway design was conducted in general accordance with the Army Corps of Engineers (Corps), Technical Manual TM-5-822, Design of Aggregate Surface Roads and Airfields (1990).

The design of aggregate surface thickness was based on assumed traffic consisting of less than 70 vehicles per day with 15 percent trucks, and about 1 percent of the total traffic composed of trucks having three or more axles, and no tracked vehicles. Terracon should be contacted if significant changes in assumed traffic loads or characteristics are anticipated.

The following table provides the recommended minimum aggregate base course section for each road alignment. The minimum aggregate surface course thicknesses are after full compaction, and should be constructed directly above 10 inches of scarified, moisture conditioned, and compacted native soils.

ACCESS ROAD LOCATION	ANTICIPATED SOILS	AGGREGATE BASE THICKNESS (INCHES)
AREAS NEAR TEST PIT TR-3 AND TR-6	Silty Sand to Silty Sand with Gravel (CBR = 1.0)	15.0*
AREAS NEAR TEST PIT TR-2	Silty Sand with Gravel (CBR = 5.0)	6.0

* Alternatively, a multi-axial geogrid such as Tensar TX-7 may be utilized to provide additional support. The geogrid should be placed between the prepared subgrade and aggregate base course. The aggregate base course may be reduced to a depth of 9 inches if used in conjunction with the geogrid reinforcement.

The aggregate base course should conform to specifications of Class II aggregate base in accordance with the California Department of Transportation.

The aggregate base course should be compacted to a minimum of 95 percent of the soils maximum dry density as determined by ASTM D1557. The surface course should be compacted at moisture content not more than 4 percent above the optimum moisture content defined by ASTM D1557.

Operations Roads - Compacted Native Soil Design Recommendations

Based upon the soil conditions encountered in the test borings, the use of on-site soils for construction of onsite roads is considered acceptable. However, without the use of asphalt concrete or other hardened material to surface the roadways, there is an increased potential for erosion of the roadways to occur.

If high traffic loading is anticipated during wet seasons or when the upper soils are in saturated conditions, the proposed compacted soil roadways may experience wheel path rutting and depressions up to 6 inches deep.

Construction of unsurfaced roadways should consist of a minimum 12-inches of compacted on-site soils. More specifically, the upper twelve inches of subgrade soils beneath existing grade, and any fill required to raise site grades should be moisture conditioned and compacted to a minimum density of 90 percent of the maximum density determined in accordance with ASTM D-1557.

Operations Roads – Soil-Cement Treated Roadway Considerations

The use of soil-cement, using on site subgrade soils as the source material, could also be considered as a viable alternative wearing surface to the recommended aggregate surfaced roadways. The thickness of the soil-cement as an alternative would generally be on the order of 50% of the specified aggregate thickness with a minimum of 12 inches being specified for any design case. Portions of pads which will encounter high point stresses, such as from vehicle turnaround areas should thicken the soil-cement section to 18 inches. A minimum of 4 inches of aggregate base may be used for additional traction and support when supported by the soil-cement stabilized subgrade. For the soil-cement alternative, a minimum compressive strength of 400 psi is recommended. A soil-cement mix design will be required to determine the required cement content necessary to achieve the design strength when utilizing the on-site subgrade soils as the source material. For preliminary planning and cost estimation purposes, a minimum cement content in the range of 6 to 8% would likely be required to achieve the minimum design strength.

Soil-cement shall consist of soil, portland cement, and water which are uniformly mixed, compacted, finished, and cured in such a manner that the in-place soil-cement mixture forms a dense, uniform mass conforming to the lines, grades, and cross sections shown on the Plans. Subgrade material that is to be treated in place shall be shaped and rolled to specified cross section prior to the scarification and treatment.

Mixing of the soil, cement, and water shall be accomplished either by the mixed-in-place or the central-plant-mixed method. No cement or soil-cement mixture shall be spread when the aggregate or subgrade is frozen or when the air temperature is less than 40°F (5°C) in the shade. The finished soil-cement shall be protected against freezing.

After mixing is complete, the soil shall be so pulverized that 100 percent by dry weight passes a 1 inch (25 mm) sieve, and a minimum of 80 percent passes a No. 4 (4.75 mm) sieve. The specified quantity of cement shall be spread uniformly on the soil to be treated. Cement that has been spread and then tracked or displaced by traffic or other operations shall be replaced before mixing is started to provide a uniform coverage in all areas. Cement shall be spread by an approved cement spreader in such a manner that cement content shall not vary from the specified rate of application by more than 10 percent.

The mixture may be spread and compacted in one layer where the required thickness is 8 inches or less. Soil cement layers should be compacted to a minimum of 95% of maximum dry density per ASTM D-558. As a minimum, one compaction test should be performed for every 2000 square yards. Compaction shall commence within 30 minutes after the mixture is placed on the grade and shall proceed continuously until completed. Final compaction of the mixture to the specified density shall be completed within 2½ hours after the application of water during the mixing operation.

When two or more layers of soil-cement are to be placed, the surface which will be in contact with succeeding layers shall be kept continuously moist for 7 days or until the placement of the subsequent layer. Any loose material on the surface of the completed layer shall be removed and the surface moistened immediately before placement of the next layer. No standing water will be permitted.

A qualified testing agency should be retained during the construction phase of the project to observe earthwork and to perform necessary tests, measurements, and observations during subgrade preparation; cement mixing, proof-rolling; placement and compaction of controlled compacted fills; backfilling of excavations to the completed subgrade. We recommend field verification of the cement content percentage (by weight of soil) in the production soil cement mixtures. The field verification should be determined and calculated on no less than a daily basis by the testing agency based on the weight and volume of the soil cement placed.

Roadway Design and Construction Considerations

Regardless of the design, un-surfaced roadways are anticipated to experience variable levels of wear and deterioration. We recommend site inspection program at a minimum of once per year to verify the adequacy of the roadways. Preventative measures should be applied as needed for erosion control and regrading. An initial site inspection should be completed approximately three months following construction.

Shoulder build-up on both sides of proposed roadways should match the aggregate surface elevation and slope outwards at a minimum grade of 10% for a minimum of five feet.

Materials and construction of pavements for the project should be in accordance with the requirements and specifications of the State of California Department of Transportation, or other approved local governing specifications.

Positive drainage should be provided during construction and maintained throughout the life of the roadways. Proposed roadway design should maintain the integrity of the road and eliminate ponding. The un-surfaced roads are expected to function with periodic maintenance.

Base course or surfacing materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of roadways to reduce lateral moisture transmission into the subgrade.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

FIGURES

Contents:

Note: All attachments are one page unless noted above.

SITE LOCATION

Fountain Wind Project ■ Burney, CA
September 10, 2021 ■ Terracon Project No. NB215025

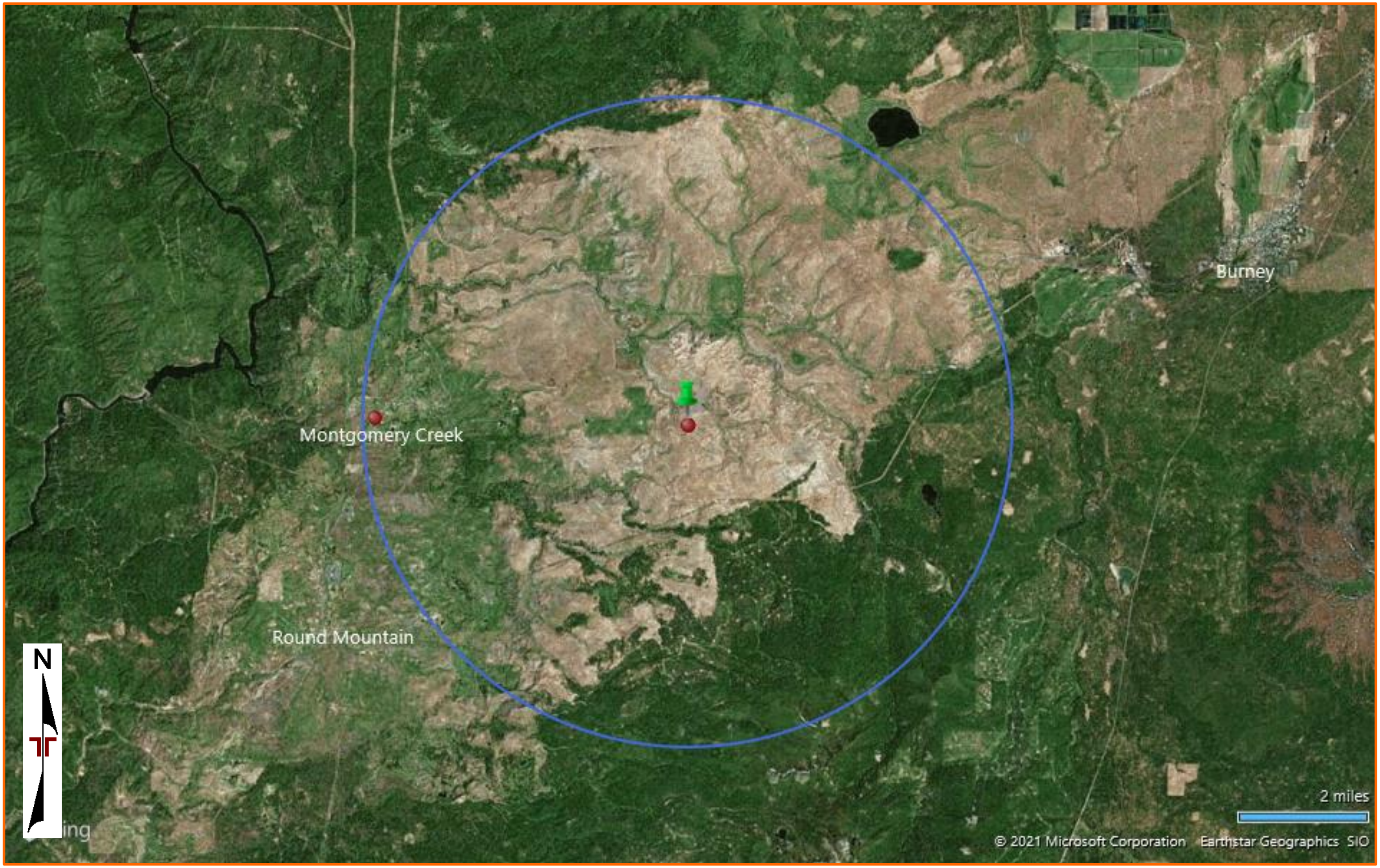


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

Fountain Wind Project ■ Burney, CA
September 10, 2021 ■ Terracon Project No. NB215025

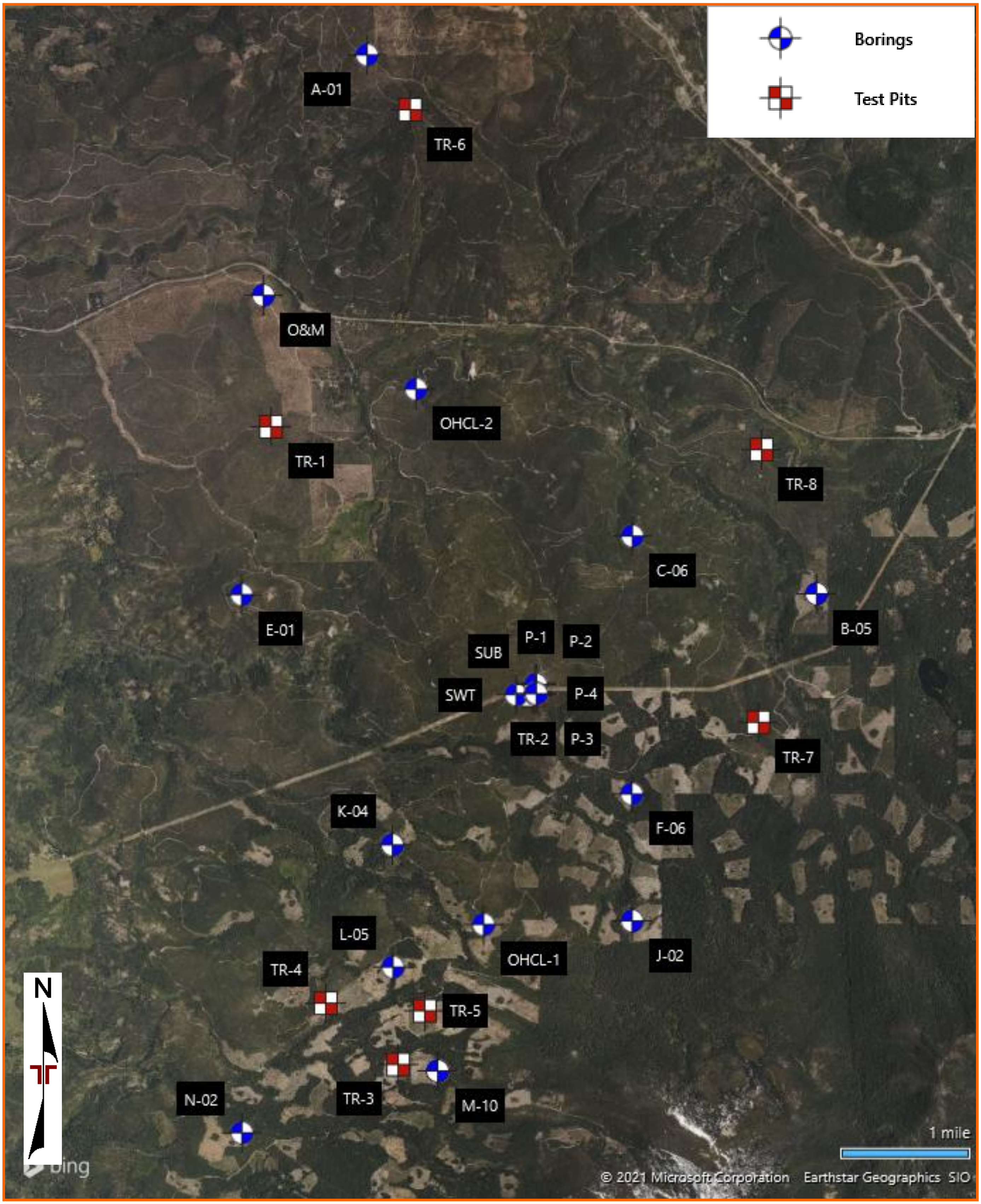


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Explorations	Depths (feet)	Planned Location
10 borings	31.0 to 61.5	Wind Turbine Areas
1 boring	51.5	Substation Area
1 boring	51.0	Switchyard Area
1 boring	51.5	O&M Building
2 borings	40.0 to 51.5	Overhead Collection Line
8 test pits	4	Underground Collection (Thermal Resistivity Test Locations)
2 borings	5.0 to 10.0	Substation Area (Percolation Borings)
2 borings	5.0 to 10.0	Switchyard Area (Percolation Borings)

Boring Layout and Elevations: We used handheld GPS equipment to locate borings with an estimated horizontal accuracy of +/-20 feet.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted rotary drill rigs using continuous solid stem flight augers and HQ coring methods. We obtained 4 samples within the top 10 feet bgs and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. 2.5 and 3.0-inch O.D. split-barrel sampling spoons with 2.0 and 2.5-inch I.D. tube lined samplers were also used for sampling. Tube-lined, split-barrel sampling procedures are similar to standard split spoon sampling procedure; however, blow counts are typically recorded for 6-inch intervals for a total of 12 inches of penetration. For safety purposes, all borings were backfilled with neat cement grout in accordance with Shasta County guidelines after their completion. In addition, we observed and recorded groundwater levels during drilling and sampling.

Rock coring was performed in accordance with ASTM D2113 using HQ wireline coring methods, with rock logging performed in accordance with ASTM D5434. Coring was performed at seven (7) boring locations (C-06, E-01, J-02, M-10, N-02, OHCL-2 and SWT).

We advanced the test pits with a John Deere 410 backhoe equipped with an 18-inch toothed excavator bucket. Four to seven samples were obtained from each test pit. Soil sampling was done from the excavation spoils, or directly from the side walls of the excavation. The samples were placed in appropriate containers, taken to our laboratory for testing and classified by a professional engineer.

VES data collected at ER locations ER-1 to ER-8 was collected using a MiniRes Electrical Resistivity Meter manufactured by L&R Instruments. The MiniRes is a self-contained unit that transmits current at outputs ranging from 0.5 to 5.0 milliamps (mA). The instrument measures the potential drop (voltage) caused by the current influx and converts the data to values of resistance and apparent resistivity. The data are recorded for subsequent processing and archiving.

The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a geotechnical engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs include visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil and rock strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D7263 Standard Test Methods for Laboratory Determination of Dry Density (unit Weight) of Soil Specimens
- ASTM D1140 Standard Test Method for Determining the Amount of Material Finer than No. 200 Sieve by Soil Washing
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D2166/D2166M Standard Test Method for Unconfined Compressive Strength of Cohesive Soil and Rock
- ASTM D1557 Standard Test Methods for laboratory Compaction Characteristics of Soil Using Modified Effort
- ASTM D3080 Standard Test Method for Direct Shear

- ASTM D2435/D2435M Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
- Corrosivity Testing including pH, chlorides, sulfates, sulfides, Redox potential, Total Salts, and electrical lab resistivity
- ASTM D1883 Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils
- ASTM D5334-14 Standard Test Method for Determination of Thermal Conductivity of Soil and Soft Rock by Thermal Needle Probe Procedure

The laboratory testing program included examination of soil samples by an engineer and geologist. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Rock classification was conducted using locally accepted practices for engineering purposes; petrographic analysis may reveal other rock types. Boring log rock classification was determined using the Description of Rock Properties.

EXPLORATION RESULTS

Contents:

Note: All attachments are one page unless noted above.

BORING LOG NO. A-01

Page 1 of 2

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8956° Longitude: -121.8447°

Approximate Surface Elev.: 4872 (Ft.) +/-

GRAPHIC LOG	DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SANDY SILT (ML), sand fine grained, low to medium plasticity, red-brown to gray, stiff to very stiff, completely weathered to residual soil			✋									
				⧗		4-4-9			2.0 (HP)	59.9	61		
	5.0 4867+/- **SILTY SAND (SM)**, fine to coarse grained, red-brown to gray, loose to medium dense, completely weathered to residual soil	5		☒		3-4-6 N=10				61.5		63-57-6	39
				⧗		4-6-7				65.6	58		
		10		☒		3-5-3 N=8				65.9			
				⧗		4-5-7							
		15		☒		2-2-2 N=4				76.5			
		20		⧗		4-8-10							
		25		☒		4-5-5 N=10				80.9			
		30		⧗		8-11-14				73.3			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. A-01

PROJECT: **Fountain Wind Project**

CLIENT: **ConnectGen Operating, LLC**
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8956° Longitude: -121.8447°

Approximate Surface Elev.: 4872 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILTY SAND (SM), fine to coarse grained, red-brown to gray, loose to medium dense, completely weathered to residual soil *(continued)*													
dense		35		☒		8-19-25 N=44				54.6			
very dense		40				50/1"							
dense		45		☒		25-17-17 N=34				30.9			
50.1 very dense ***Boring Terminated at 50.08 Feet***	4822+/-	50				50/1"							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. B-05

PROJECT: **Fountain Wind Project**

CLIENT: **ConnectGen Operating, LLC**
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8348° Longitude: -121.7776°

Approximate Surface Elev.: 4610 (Ft.) +/-

DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), trace gravel, subrounded, brown, loose, completely weathered to residual soil				✋									
					⧗		5-4-8				56.7		64-52-12	35
	very dense		5		☒		50							
	olive to orange-brown, loose				☒		2-2-5 N=7				36.9			
9.0	**SILTY SAND WITH GRAVEL (SM)**, fine to coarse grained, subrounded, low to medium plasticity, dark gray with orange, medium dense, completely weathered to residual soil	4601+/-	10		⧗		4-8-15				47.8	73		
	very dense		15		☒		50				31.4			
	subrounded to angular, olive to orange-brown, dense		20		☒		7-17-22 N=39				38.4			
24.0	**SANDY ELASTIC SILT (MH)**, fine to medium grained, low to medium plasticity, dark brown, very stiff, completely weathered to residual soil, black mineralized veins	4586+/-	25		☒		30-13-11 N=24							
	stiff		30		⧗		5-9-10							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-29-2021	Boring Completed: 05-29-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL NB215025 FOUNTAIN WIND PRO.GPJ TERRACON_DATATEMPLATE.GDT 7/14/21

BORING LOG NO. B-05

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8348° Longitude: -121.7776°

Approximate Surface Elev.: 4610 (Ft.) +/-

GRAPHIC LOG	DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SANDY ELASTIC SILT (MH), fine to medium grained, low to medium plasticity, dark brown, very stiff, completely weathered to residual soil, black mineralized veins *(continued)* olive, medium stiff	35		☒		1-2-4 N=6			2 (HP)	74.4			
	very stiff	40		☒		5-10-11 N=21				58.6			
	olive to dark yellow, hard	45		☒		10-14-27 N=41				71.5			
	48.0 4562+/-												
	SILTY SAND WITH GRAVEL (SM), low to medium plasticity, olive-gray, dense, completely weathered to residual soil	50		☒		9-16-26 N=42				60.4			
	51.5 4558.5+/-												
	Boring Terminated at 51.5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-29-2021	Boring Completed: 05-29-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. C-06

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8413° Longitude: -121.8051°

Approximate Surface Elev.: 4676 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILTY SAND (SM), low to medium plasticity, red-brown to dark red, loose, completely weathered to residual soil, black mineralized veins				✋									
				⧗		8-7-8				40.6			
5.0	4671+/-	5											
SANDY SILT WITH GRAVEL (ML), subrounded, brown, hard, completely weathered to residual soil				☒		13-24-30 N=54				41.7			
medium stiff				⧗		2-3-6							
stiff		10		☒		2-4-8 N=12				50.2		NP	68
very stiff to hard				⧓		6-12-15			4.0 (HP)	44.1			
15.0	4661+/-	15											
SANDY SILT (ML), trace gravel, angular, low to medium plasticity, brown, hard, moderate cementation, completely weathered to residual soil				☒						43.7			
		20		⧓		6-30-50/3"							
		25		☒		6-8-25 N=33				50.4			
30.0	4646+/-	30		⧓		50				36.8			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-21-2021	Boring Completed: 05-21-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL NB215025 FOUNTAIN WIND PRO.GPJ TERRACON_DATATEMPLATE.GDT 7/14/21

BORING LOG NO. C-06

PROJECT: **Fountain Wind Project**

CLIENT: **ConnectGen Operating, LLC**
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8413° Longitude: -121.8051°

Approximate Surface Elev.: 4676 (Ft.) +/-

GRAPHIC LOG	DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SANDY SILT WITH GRAVEL (ML), angular, low to medium plasticity, brown with gray, hard, completely weathered to residual soil *(continued)*												
		35		☒		30-50/4"				28.5			
	40.0 4636+/-	40		☒		50/4"				18.7			
	BASALT BEDROCK, gray, highly weathered, very weak												
		45			12		0						
					60		0						
	51.0 4625+/-	50											
	Boring Terminated at 51 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-21-2021	Boring Completed: 05-21-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. E-01

PROJECT: Fountain Wind Project

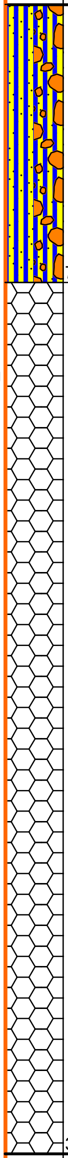
CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8347° Longitude: -121.8634°

Approximate Surface Elev.: 4216 (Ft.) +/-



DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SANDY SILT WITH GRAVEL (ML), sand fine grained, angular, orange-brown, very stiff, completely weathered to residual soil						7-9-18 N=27				23.3			
subrounded, dark yellow		5								28.2		42-32-10	55
7.5	4208.5+/-												
BASALT BEDROCK, gray, moderately weathered to highly weathered, weak to very strong		10			36		0						
		15			60		0	17,650					
		20			60		15						
		25			60		0						
		30			60		0						
31.0	4185+/-												
Boring Terminated at 31 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with 3 inch NQ rock core barrel

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-19-2021	Boring Completed: 05-19-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. F-06

Page 1 of 2

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8122° Longitude: -121.8052°

Approximate Surface Elev.: 4552 (Ft.) +/-

DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND WITH GRAVEL (SM), fine to coarse grained, subrounded to subangular, nonplastic, brown, medium dense, completely weathered to residual soil				✋									
					☒		4-9-8 N=17				20.9			26
5.0	**SANDY SILT (ML)**, fine to medium grained, brown with brown-gray, hard, completely weathered to residual soil	4547+/-	5		⧓		4-7-9			4.5 (HP)	39.0	83		
	stiff, completely weathered to residual soil				☒		3-4-6 N=10				36.9		43-40-3	58
	hard		10		⧓		19-19-18			+4.5 (HP)	34.4	92		
12.5	**SILTY SAND (SM)**, sand fine grained, low to medium plasticity, orange-brown, medium dense, completely weathered to residual soil	4539.5+/-			☒		4-6-10 N=16				35.4			
			15		⧓		4-8-10							
				▽										
20.0	**SANDY ELASTIC SILT (MH)**, trace gravel, sand fine to medium grained, subangular, low to medium plasticity, dark red-gray, very stiff to hard, completely weathered to residual soil	4532+/-	20		☒		2-5-6 N=11			4.0 (HP)	27.0			
			25		⧓		6-8-10			4.5 (HP)	23.1	108		
	hard		30		☒		9-12-15 N=27			+4.5 (HP)	19.8			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-25-2021	Boring Completed: 05-25-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. F-06

Page 2 of 2

PROJECT: **Fountain Wind Project**

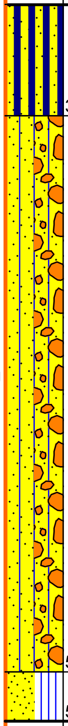
CLIENT: **ConnectGen Operating, LLC**
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8122° Longitude: -121.8052°

Approximate Surface Elev.: 4552 (Ft.) +/-



DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
35.0		4517+/-	35				8-15-24				17.7			
	SILTY SAND WITH GRAVEL (SM), sand fine to medium grained, dark red-gray to brown, medium dense, completely weathered to residual soil													
	orange-brown to olive-brown		40				3-11-15 N=26				17.1			
	very dense		45	▽			28-50/4"				22.9			
50.0		4502+/-	50				13-26-50/4"				16.0			
	POORLY GRADED SAND WITH SILT (SP-SM), medium grained, dark red-gray to brown, very dense, completely weathered to residual soil													
51.3		4500.5+/-												
	Boring Terminated at 51.33 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-25-2021	Boring Completed: 05-25-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. J-02

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.7978° Longitude: -121.8052°

Approximate Surface Elev.: 5148 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SANDY ELASTIC SILT WITH GRAVEL (MH), fine to medium grained, subangular, medium to high plasticity, dark yellow to orange-brown, medium stiff to stiff, completely weathered to residual soil				✋									
				⧓		4-5-7				20.9			
		5		☒		4-4-7 N=11				32.7			
7.0	5141+/-												
SILTY SAND (SM), fine to coarse grained, low to medium plasticity, orange-brown, medium dense, completely weathered to residual soil				⧓		6-12-21				24.0			
10.0	5138+/-												
SILTY SAND WITH GRAVEL (SM), fine to coarse grained, low to medium plasticity, orange-brown, very dense, completely weathered to residual soil		10		☒		6-22-50/4"				22.7			
				⧓		30-50/3"				13.4			
dense		15		☒		9-13-29 N=42				26.6			
20.0	5128+/-												
BASALT BEDROCK, gray, moderately weathered to highly weathered, weak rock		20		☒		50/3"							
		25		▮▮	36		0						
		30		▮▮	60		29						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-25-2021	Boring Completed: 05-25-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. J-02

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.7978° Longitude: -121.8052° Approximate Surface Elev.: 5148 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	BASALT BEDROCK, gray, moderately weathered to highly weathered, weak rock *(continued)*	35			60		8						
		40			60		0						
	41.0 5107+/-												
	Boring Terminated at 41 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-25-2021	Boring Completed: 05-25-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. K-04

PROJECT: Fountain Wind Project

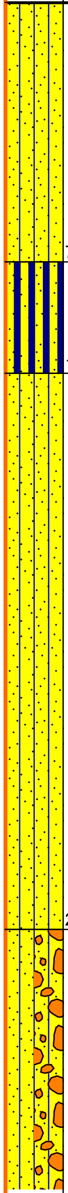
CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8064° Longitude: -121.8409°

Approximate Surface Elev.: 4551 (Ft.) +/-



GRAPHIC LOG	DEPTH		ELEVATION (Ft.)
		SILTY SAND (SM), sand fine grained, low to medium plasticity, orange-brown to dark-red, loose, completely weathered to residual soil	
	7.0		4544+/-
		SANDY ELASTIC SILT (MH), fine grained, low to medium plasticity, orange-brown to dark-red, medium stiff, completely weathered to residual soil	
	10.0		4541+/-
		SILTY SAND (SM), trace gravel, fine to medium grained, subrounded, low to medium plasticity, orange-brown to dark-red, loose to medium dense, completely weathered to residual soil	
	25.0		4526+/-
		SILTY SAND WITH GRAVEL (SM), fine to coarse grained, subrounded, low to medium plasticity, dark yellow, medium dense, completely weathered to residual soil brown to olive	

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		✋									
		☒		3-3-6 N=9				52.7			
5		⧗		3-5-6				74.4	54		39
		☒		3-2-4 N=6				72.7			
10		⧗		6-10-16							
		☒		2-3-4 N=7				86.4			
15		⧗		4-7-11				47.3			
20		☒		2-3-5 N=8				72.4			
25		⧗		5-11-12				83.7			
30	▽	☒		8-7-12 N=19				82.7			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL NB215025 FOUNTAIN WIND PRO.GPJ TERRACON_DATATEMPLATE.GDT 7/14/21

BORING LOG NO. K-04

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8064° Longitude: -121.8409°

Approximate Surface Elev.: 4551 (Ft.) +/-

DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND WITH GRAVEL (SM), fine to coarse grained, subrounded, low to medium plasticity, dark yellow, medium dense, completely weathered to residual soil *(continued)*		35	▽	⧗		13-11-7				60.0			
			40		☒		12-13-15 N=28				40.4			
44.0	**ELASTIC SILT WITH SAND (MH)**, sand fine to medium grained, subrounded, low to medium plasticity, olive-brown, very stiff, completely weathered to residual soil	4507+/-	45		☒		2-5-17 N=22			2.5 (HP)	63.4			
	trace gravel, medium stiff		50		☒		2-3-2 N=5			0.75 (HP)	49.8			
	soft to medium stiff		55		☒		0-0-1 N=1			0.5 (HP)	67.6		60-56-4	72
	dark red-gray		60		☒		2-5-4 N=9			0.5 (HP)	75.0			
61.5		4489.5+/-												
	Boring Terminated at 61.5 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▼ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. L-05

Page 1 of 2

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.7926° Longitude: -121.8408°

Approximate Surface Elev.: 4808 (Ft.) +/-

GRAPHIC LOG	DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SANDY ELASTIC SILT (MH), trace gravel, fine to medium grained, low to medium plasticity, yellow-brown to orange-brown, stiff to very stiff, moderate cementation, completely weathered to residual soil			✋									
				☒		2-4-5 N=9				47.6			
		5		⧗		5-8-23				47.3			
				☒		5-6-11 N=17				51.1			
	hard	10		⧗		6-18-18			+4.5 (HP)	52.8	71		
	stiff			☒		4-4-6 N=10			1.8 (HP)	55.8			
	hard	15		⧗		14-28-24			+4.5 (HP)	49.6	74		
	red-brown, very stiff	20		☒		3-3-5 N=8			2.5 (HP)	58.0			
	24.0 4784+/-												
	SILTY SAND (SM), fine to coarse grained, red-brown with gray, medium dense, completely weathered to residual soil	25		⧗		5-14-23				55.0	71	62-59-3	47
		30		☒		4-6-11 N=17				56.9			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-27-2021	Boring Completed: 05-27-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL NB215025 FOUNTAIN WIND PRO.GPJ TERRACON_DATATEMPLATE.GDT 7/14/21

BORING LOG NO. L-05

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.7926° Longitude: -121.8408°

Approximate Surface Elev.: 4808 (Ft.) +/-

DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
35.0	**SILTY SAND (SM)**, fine to coarse grained, red-brown with gray, medium dense, completely weathered to residual soil *(continued)*	4773+/-												
	SILTY SAND WITH GRAVEL (SM), fine to coarse grained, angular, red-brown with gray, medium dense, completely weathered to residual soil, black mineralized veins		35		⧗		6-14-26				52.9			
			40		☒		7-10-11 N=21				40.4			
	gray, very dense		45		⧗		50				18.7			
50.8		4757.5+/-	50		☒		21-50/3"				25.0			
	Boring Terminated at 50.75 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-27-2021	Boring Completed: 05-27-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. M-10

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.7809° Longitude: -121.8342°

Approximate Surface Elev.: 4928 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILTY SAND (SM), trace gravel, fine to medium grained, subrounded, low to medium plasticity, medium dense, moderate cementation, completely weathered to residual soil					2-4-16 N=20				40.9			
		5			11-13-22/0"				44.8			
6.0	4922+/-											
BASALT BEDROCK, gray, moderately weathered to highly weathered, weak to very strong				48		15	15,295					
		10		60		10						
		15		60		0						
		20		0		0						
25.0	4903+/-	25										
SILTY SAND WITH GRAVEL (SM), sand fine to coarse grained, subrounded, low to medium plasticity, brown-gray, medium dense, completely weathered to residual soil					8-10-16 N=26				30.0			
30.0	4898+/-	30	▽		50/3"							
BASALT BEDROCK, gray, moderately weathered to highly weathered, very weak												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-27-2021	Boring Completed: 05-27-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. M-10

PROJECT: **Fountain Wind Project**

CLIENT: **ConnectGen Operating, LLC**
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.7809° Longitude: -121.8342°

Approximate Surface Elev.: 4928 (Ft.) +/-

GRAPHIC LOG	DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	BASALT BEDROCK, gray, moderately weathered to highly weathered, very weak *(continued)*		▽										
		35		☒		50/3"							
	40.0 4888+/-												
	SILTY SAND WITH GRAVEL (SM), sand fine to coarse grained, subrounded to subangular, low to medium plasticity, olive to dark red, dense to very dense, completely weathered to residual soil	40		☒		50				27.9			
		45		☒		11-13-37 N=50				43.5			
		50		☒		37-45-50/3"				28.3			
	51.3 4877+/-												
	Boring Terminated at 51.25 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-27-2021	Boring Completed: 05-27-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. N-02

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.7739° Longitude: -121.8634°

Approximate Surface Elev.: 4650 (Ft.) +/-

DEPTH		ELEVATION (Ft.)
	ELASTIC SILT (MH), trace sand, fine grained, orange-brown, stiff, completely weathered to residual soil	
10.0		4640+/-
	BASALT BEDROCK, gray, moderately weathered to highly weathered, very weak	
15.0		4635+/-
	ELASTIC SILT WITH SAND (MH), fine to medium grained, low to medium plasticity, orange-brown to dark yellow, very stiff to hard, completely weathered to residual soil	
25.0		4625+/-
	BASALT BEDROCK, gray, highly weathered, weak rock to strong rock	

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		✋									
5		☒		2-4-8 N=12			3 (HP)	51.9		51-50-1	89
10		☒		50/3"							
		☒		50							
15		☒		45-27-46 N=73			3.75 (HP)	26.1			
20		☒		9-42-50/3"				44.7			
25		☒		50/2"							
30		▮	48		63						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-28-2021	Boring Completed: 05-28-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. N-02

PROJECT: Fountain Wind Project	**CLIENT: ConnectGen Operating, LLC Houston, TX**
SITE: Eastern Shasta County Burney, CA	

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.7739° Longitude: -121.8634° Approximate Surface Elev.: 4650 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	BASALT BEDROCK, gray, highly weathered, weak rock to strong rock *(continued)*	35			60		6						
		40			60		24						
	42.0 4608+/-												
	Boring Terminated at 42 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-28-2021	Boring Completed: 05-28-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. O&M

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8685° Longitude: -121.8602°

Approximate Surface Elev.: 4732 (Ft.) +/-

DEPTH (Ft.)	DEPTH / DESCRIPTION / ELEVATION (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND WITH GRAVEL (SM), sand fine grained, subangular, red-brown, medium dense, completely weathered to residual soil		✋									
			⧗		5-11-29				24.2		42-37-5	37
5			☒		5-10-12 N=22				22.8			
			☒		5-9-11 N=20				10.4			
10	gray, very dense		☒		13-49-50/3"				12.7			
			☒		33-20-30 N=50				14.3			
15	medium dense		☒		20-12-7 N=19				13.2			
20	very dense		☒		13-50				19.1			
25			☒		50/3"				21.0			
	fine to medium grained, subangular to subrounded, low to medium plasticity, dark yellow, loose											
30		▽	☒		10-5-3 N=8				28.3			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-17-2021	Boring Completed: 05-17-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. O&M

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8685° Longitude: -121.8602°

Approximate Surface Elev.: 4732 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND WITH GRAVEL (SM), sand fine grained, subangular, red-brown, medium dense, completely weathered to residual soil *(continued)*												
		dark brown, medium dense	35		☒		2-10-13 N=23				46.4			
		very dense	40	▽	☒		50				58.0			
45.0	4687+/-	**SANDY ELASTIC SILT (MH)**, fine to medium grained, low to medium plasticity, dark red to gray, stiff to very stiff, completely weathered to residual soil	45		☒		2-3-6 N=9				23.0			
51.5	4680.5+/-		50		☒		5-4-4 N=8			2.5 (HP)	53.4			

Boring Terminated at 51.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-17-2021	Boring Completed: 05-17-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. OHCL-1

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.7974° Longitude: -121.8273°

Approximate Surface Elev.: 4867 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
0.0		**SANDY SILT (ML)**, fine to medium grained, brown to gray, stiff to very stiff, completely weathered to residual soil
7.0	4860+/-	**SILTY SAND WITH GRAVEL (SM)**, fine to coarse grained, subangular, gray to olive, very dense, completely weathered to residual soil

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		✋									
2.5		☒		4-5-3 N=8				33.0		38-34-4	55
5		⧗		4-7-28			2.5 (HP)	36.5			
7.5		☒		13-25-30 N=55				27.2			
10	▽	⧗		7-27-50				42.7			
15	▽	☒		12-50/3"				31.6			
20		☒		50/3"				18.3			
25		☒		30-50/3"				21.8			
30		☒		50/4"				22.8			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. OHCL-1

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

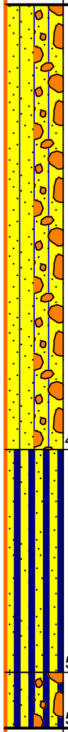
SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG

LOCATION See Exploration Plan

Latitude: 40.7974° Longitude: -121.8273°

Approximate Surface Elev.: 4867 (Ft.) +/-



DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILTY SAND WITH GRAVEL (SM), fine to coarse grained, subangular, gray to olive, very dense, completely weathered to residual soil *(continued)*													
		35		☒		29-50/3"				25.9			
		40		☒		19-50				24.8			
44.0	4823+/-												
SANDY ELASTIC SILT (MH), fine to medium grained, subangular, low to medium plasticity, red and brown, hard, completely weathered to residual soil		45		☒		29-33-50 N=83				34.0			
50.0	4817+/-	50		☒		6-12-14 N=26							
SANDY ELASTIC SILT WITH GRAVEL (MH), fine to medium grained, subangular, low to medium plasticity, yellow-brown, very stiff, completely weathered to residual soil													
51.5	4815.5+/-												

Boring Terminated at 51.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. OHCL-2

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8579° Longitude: -121.8374°

Approximate Surface Elev.: 3823 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
		SANDY SILT WITH GRAVEL (ML), fine to medium grained, angular to subangular, low to medium plasticity, dark red, very stiff, completely weathered to residual soil stiff very stiff
12.0	3811+/-	**SILTY SAND WITH GRAVEL (SM)**, sand fine to medium grained, angular to subangular, red-brown to yellow-brown, very dense, completely weathered to residual soil
20.0	3803+/-	**BASALT BEDROCK**, gray, moderately weathered to completely weathered, weak to strong rock

RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	9-13-9 N=22				27.0			
	7-7-8				78.9			
	5-4-5 N=9				39.6			
	6-9-10 N=19				44.8			
	5-15-39 N=54				54.3			
	23-45-50 N=95				13.5			
	50							
	50/3"							
24		29	2,960					
60		56						

Depth (Ft.) scale: 5, 10, 15, 20, 25, 30. Water level ▽ at 20.

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-18-2021	Boring Completed: 05-18-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. OHCL-2

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.8579° Longitude: -121.8374° Approximate Surface Elev.: 3823 (Ft.) +/- DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	BASALT BEDROCK, gray, moderately weathered to completely weathered, weak to strong rock *(continued)*	35			60		6						
					0		0						
	40.0 / 3783+/-	40											
	Boring Terminated at 40 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-18-2021	Boring Completed: 05-18-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL NB215025 FOUNTAIN WIND PRO.GPJ TERRACON_DATATEMPLATE.GDT 7/14/21

BORING LOG NO. SUB

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8237° Longitude: -121.8201°

Approximate Surface Elev.: 4621 (Ft.) +/-

DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILTY SAND (SM), sand fine to medium grained, low to medium plasticity, yellow-brown to gray, medium dense, completely weathered to residual soil			✋									
			⧗		6-7-21				45.0			34
dense to very dense			☒		12-23-50/2"				26.2			
	5		⧗		11-50/5"				20.9			17
			☒		9-20-24 N=44				24.8			
	10		⧗		13-50/5"				22.0			
	15		☒		9-17-23 N=40				32.6			
gray to gray-brown	20	▽	⧗		5-19-50				30.0			
	25		☒		7-13-21 N=34				37.2	90		
		▽										
	30		☒		7-14-21 N=35				30.7			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*
▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-20-2021	Boring Completed: 05-20-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. SUB

PROJECT: Fountain Wind Project

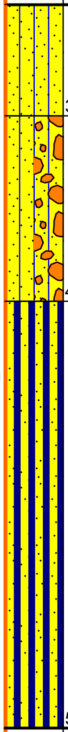
CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8237° Longitude: -121.8201°

Approximate Surface Elev.: 4621 (Ft.) +/-



GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	35.0	**SILTY SAND (SM)**, sand fine to medium grained, low to medium plasticity, yellow-brown to gray, medium dense, completely weathered to residual soil *(continued)*	4586+/-												
		SILTY SAND WITH GRAVEL (SM), fine to coarse grained, subrounded, low to medium plasticity, gray to gray-brown, medium dense, completely weathered to residual soil, black mineralized veins		35		☒		9-13-13 N=26				54.4			
	40.0		4581+/-												
		SANDY ELASTIC SILT (MH), fine grained, low to medium plasticity, dark red-brown, hard, moderate cementation, completely weathered to residual soil, mineralized veins		40		⧗		5-13-20			4.5 (HP)	32.0	91		
				45		☒		9-16-35 N=51				26.4			
	51.5		4569.5+/-	50		☒		7-9-11 N=20			4.5 (HP)	41.5			
		Boring Terminated at 51.5 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-20-2021	Boring Completed: 05-20-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. SWT

Page 1 of 2

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8234° Longitude: -121.8225°

Approximate Surface Elev.: 4638 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILT WITH SAND (ML), fine to medium grained, brown to olive, very stiff, completely weathered to residual soil				✋									
				⧗		3-3-7			2.5 (HP)	49.6		46-39-7	79
stiff		5		☒		4-5-6 N=11				51.2			
medium stiff				⧗		3-4-6							
medium stiff to stiff				☒		2-3-6 N=9			1 (HP)	69.7			
orange-brown to brown		10		⧗		4-6-11			1.5 (HP)	50.3			
15.0	4623+/-	15											
SILTY SAND (SM), sand fine and medium grained, low to medium plasticity, dark red-gray, medium dense, completely weathered to residual soil				☒		7-11-16 N=27				31.7			31
very dense		20		⧗		20-37-50/2"				32.8			
red-brown, dense		25		☒		10-16-28 N=44				48.3			
30.0	4608+/-	30											
BASALT BEDROCK, gray, highly weathered to completely weathered, extremely weak				☒		50/2"							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-20-2021	Boring Completed: 05-20-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. SWT

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8234° Longitude: -121.8225°

Approximate Surface Elev.: 4638 (Ft.) +/-

DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	BASALT BEDROCK, gray, highly weathered to completely weathered, extremely weak *(continued)*		35				50/2"							
	moderately weathered to highly weathered, very weak to weak rock, very poor RQD		40			24		18						
			45			60		0						
			50			36		0						
51.0		4587+/-												

Boring Terminated at 51 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Rotary auger advanced with 6 inch hollow stem auger, coring advanced with a NQ3 wire line core system.

Abandonment Method:
Boring backfilled with cement grout and capped with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-20-2021	Boring Completed: 05-20-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

TEST PIT LOG NO. TR-1

PROJECT: **Fountain Wind Project**

CLIENT: **ConnectGen Operating, LLC**
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.8536° Longitude: -121.8590°

Approximate Surface Elev.: 3920 (Ft.) +/-

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
▨	**SILTY SAND WITH GRAVEL (SM)**, with cobbles up to 12 inches and boulders, fine to coarse grained, subrounded to angular, brown to red brown, completely weathered to residual soil, tree roots up to ~ 2 inches in diameter 4.0	3916+/-			✋						30.6		NP	36
	Test Pit Terminated at 4 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
18" bucket

Abandonment Method:
Backfilled with uncompacted soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Test Pit Started: 05-17-2021	Test Pit Completed: 05-17-2021
Excavator: Backhoe	Operator: Axner
Project No.: NB215025	

TEST PIT LOG NO. TR-2

Page 1 of 1

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.8233° Longitude: -121.8199° Approximate Surface Elev.: 4613 (Ft.) +/- DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND WITH GRAVEL (SM), with cobbles up to 8 inches, fine to coarse grained, subangular to angular, brown to gray brown, completely weathered to residual soil, tree roots up to ~ 0.5 inches in diameter 4.0	4609+/-			✋						41.9	70	NP	29
	Test Pit Terminated at 4 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
18" bucket

Abandonment Method:
Backfilled with uncompacted soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Test Pit Started: 05-17-2021	Test Pit Completed: 05-17-2021
Excavator: Backhoe	Operator: Axner
Project No.: NB215025	

TEST PIT LOG NO. TR-3

Page 1 of 1

PROJECT: **Fountain Wind Project**

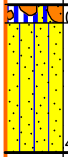
CLIENT: **ConnectGen Operating, LLC**
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.7816° Longitude: -121.8401°

Approximate Surface Elev.: 4770 (Ft.) +/-



GRAPHIC LOG	DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	0.5	**FILL - GRAVELLY SILT WITH SAND (ML)**, fine to coarse grained, subangular, light brown	4769.5+/-												
	4.0	**SILTY SAND (SM)**, trace gravel, fine to coarse grained, subrounded to subangular, brown to gray brown, completely weathered to residual soil, tree roots up to ~ 0.5 inches in diameter	4766+/-			✋						34.4	84	NP	40
		Test Pit Terminated at 4 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
18" bucket

Abandonment Method:
Backfilled with uncompacted soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Test Pit Started: 05-17-2021	Test Pit Completed: 05-17-2021
Excavator: Backhoe	Operator: Axner
Project No.: NB215025	

TEST PIT LOG NO. TR-4

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

LOCATION See Exploration Plan

Latitude: 40.7886° Longitude: -121.8509°

Approximate Surface Elev.: 4700 (Ft.) +/-

GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	4.0	**SILTY SAND WITH GRAVEL (SM)**, with cobbles up to 8 inches, fine to coarse grained, subrounded to angular, dark brown to yellow brown, completely weathered to residual soil, tree roots up to ~ 0.5 inches in diameter	4696+/-			✋						33.3	69	NP	46
		Test Pit Terminated at 4 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
18" bucket

Abandonment Method:
Backfilled with uncompacted soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Test Pit Started: 05-17-2021	Test Pit Completed: 05-17-2021
Excavator: Backhoe	Operator: Axner
Project No.: NB215025	

TEST PIT LOG NO. TR-5

Page 1 of 1

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.7877° Longitude: -121.8361° Approximate Surface Elev.: 4817 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND WITH GRAVEL (SM), with cobbles up to 8 inches, fine to coarse grained, subrounded to angular, brown to gray brown, completely weathered to residual soil, tree roots up to ~ 0.5 inches in diameter 4.0 4813+/-			✋						36.4	76	NP	31
	Test Pit Terminated at 4 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
18" bucket

Abandonment Method:
Backfilled with uncompacted soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Test Pit Started: 05-17-2021	Test Pit Completed: 05-17-2021
Excavator: Backhoe	Operator: Axner
Project No.: NB215025	

TEST PIT LOG NO. TR-6

Page 1 of 1

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.8894° Longitude: -121.8383° Approximate Surface Elev.: 4930 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND WITH GRAVEL (SM), with cobbles up to 12 inches, fine to coarse grained, angular, gray brown to gray with orange, completely weathered to residual soil, tree roots up to ~ 0.5 inches in diameter 4.0 4926+/-			✋						40.6	64	NP	44
	Test Pit Terminated at 4 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
18" bucket

Abandonment Method:
Backfilled with uncompacted soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Test Pit Started: 05-17-2021	Test Pit Completed: 05-17-2021
Excavator: Backhoe	Operator: Axner
Project No.: NB215025	

TEST PIT LOG NO. TR-7

Page 1 of 1

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.8203° Longitude: -121.7863° Approximate Surface Elev.: 4605 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
▨	**SILTY SAND WITH GRAVEL (SM)**, with cobbles up to 12 inches, fine to coarse grained, subrounded to angular, brown, completely weathered to residual soil, tree roots up to ~ 0.5 inches in diameter 4.0 4601+/-			✋						23.7	75	NP	25
	Test Pit Terminated at 4 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
18" bucket

Abandonment Method:
Backfilled with uncompacted soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Test Pit Started: 05-17-2021	Test Pit Completed: 05-17-2021
Excavator: Backhoe	Operator: Axner
Project No.: NB215025	

TEST PIT LOG NO. TR-8

Page 1 of 1

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.8511° Longitude: -121.7858° Approximate Surface Elev.: 4389 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
▨	**SILTY SAND WITH GRAVEL (SM)**, with cobbles up to 12 inches, fine to coarse grained, subangular to angular, red brown, completely weathered to residual soil, tree roots up to ~ 0.5 inches in diameter 4.0 4385+/-			✋								NP	43
	Test Pit Terminated at 4 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
18" bucket

Abandonment Method:
Backfilled with uncompacted soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

50 Golden Land Ct Ste 100
Sacramento, CA

Test Pit Started: 05-17-2021	Test Pit Completed: 05-17-2021
Excavator: Backhoe	Operator: Axner
Project No.: NB215025	

BORING LOG NO. P-1

Page 1 of 1

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.8246° Longitude: -121.8195° Approximate Surface Elev.: 4615 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
▨	**SILTY SAND (SM)**, sand fine grained, low plasticity, brown to gray, medium dense, completely weathered to residual soil 5.0 4610+/-	5		☒		5-7-9 N=16							
	Boring Terminated at 5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. P-2

Page 1 of 1

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

CLIENT: ConnectGen Operating, LLC
Houston, TX

LOCATION See Exploration Plan

Latitude: 40.8246° Longitude: -121.8195°

Approximate Surface Elev.: 4615 (Ft.) +/-

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
▨	**SILTY SAND (SM)**, sand fine grained, low plasticity, brown to gray, medium dense, completely weathered to residual soil													
▨			5		☒		4-4-9 N=13							
▨	10.0	4605+/-	10		☒		2-8-13 N=21							
	Boring Terminated at 10 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. P-3

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: **Eastern Shasta County**
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.8235° Longitude: -121.8195° Approximate Surface Elev.: 4626 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), sand fine grained, low plasticity, brown to gray, dense, completely weathered to residual soil												
		5		☒		7-16-26 N=42							
	10.0 4616+/-	10		☒		14-14-19 N=33							
	Boring Terminated at 10 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

BORING LOG NO. P-4

PROJECT: Fountain Wind Project

CLIENT: ConnectGen Operating, LLC
Houston, TX

SITE: Eastern Shasta County
Burney, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 40.8235° Longitude: -121.8194° Approximate Surface Elev.: 4626 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	UCC ROCK (psi)	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), sand fine grained, brown, dense to very dense, completely weathered to residual soil 5.0 4621+/-	5		☒		11-21-29 N=50							
	Boring Terminated at 5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6 inch hollow stem auger

Abandonment Method:
Backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

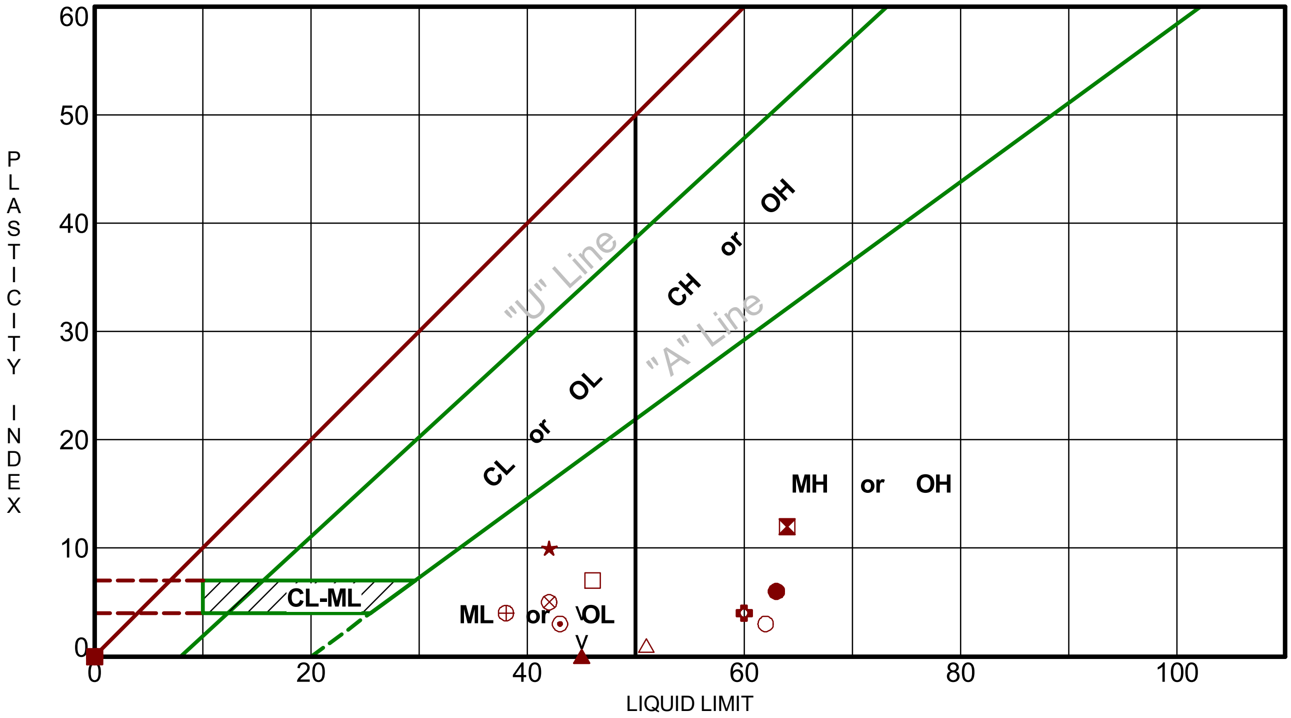
Groundwater not encountered

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

Boring Started: 05-26-2021	Boring Completed: 05-26-2021
Drill Rig: D-90 Truck	Driller: Terracon, Lodi
Project No.: NB215025	

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth	LL	PL	PI	Fines	USCS	Description
●	A-01	5 - 6.5	63	57	6	39.2	SM	SILTY SAND
⊠	B-05	2.5 - 4	64	52	12	35.3	SM	SILTY SAND
▲	C-06	10 - 11.5	45	46	NP	68.0	ML	SANDY SILT with GRAVEL
★	E-01	5 - 6.5	42	32	10	54.6	ML	SANDY SILT with GRAVEL
⊙	F-06	7.5 - 9	43	40	3	58.4	ML	SANDY SILT
✿	K-04	55 - 56.5	60	56	4	72.1	MH	ELASTIC SILT with SAND
○	L-05	25 - 26.5	62	59	3	47.2	SM	SILTY SAND
△	N-02	5 - 6.5	51	50	1	89.4	MH	ELASTIC SILT
⊗	O&M	2.5 - 4	42	37	5	37.1	SM	SILTY SAND with GRAVEL
⊕	OHCL-1	2.5 - 4	38	34	4	54.5	ML	SANDY SILT
□	SWT	2 - 3.5	46	39	7	79.4	ML	SILT with SAND
◕	TR-1	1 - 4	NP	NP	NP	36.3	SM	SILTY SAND with GRAVEL
◕	TR-2	1 - 4	NP	NP	NP	28.6	SM	SILTY SAND with GRAVEL
☆	TR-3	1 - 4	NP	NP	NP	39.9	SM	SILTY SAND
❀	TR-4	1 - 4	NP	NP	NP	45.6	SM	SILTY SAND with GRAVEL
■	TR-5	1 - 4	NP	NP	NP	31.2	SM	SILTY SAND with GRAVEL
◆	TR-6	1 - 4	NP	NP	NP	44.1	SM	SILTY SAND with GRAVEL
◇	TR-7	1 - 4	NP	NP	NP	25.4	SM	SILTY SAND with GRAVEL
×	TR-8	1 - 4	NP	NP	NP	42.5	SM	SILTY SAND with GRAVEL

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

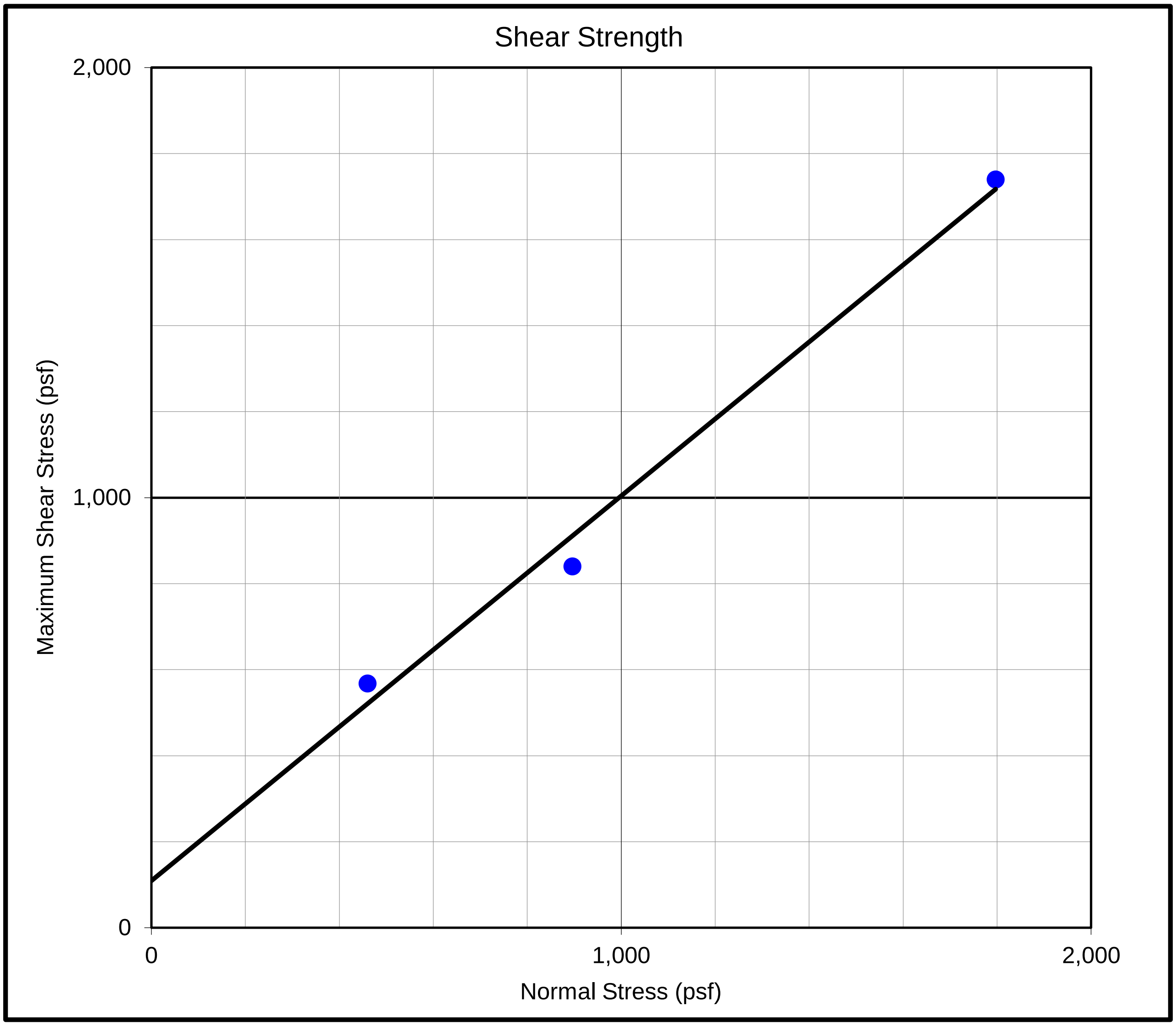
PROJECT NUMBER: NB215025

CLIENT: ConnectGen Operating, LLC
Houston, TX

Terracon
750 Pilot Road, Suite F Las Vegas, Nevada 89119
PH. (702) 597-9393 FAX. (702) 597-9009

SOIL DIRECT SHEAR RESULTS

Sample Location: F06 @ 15.0' - 16.5'



Test Parameters

Sample Information				Test Stresses		Initial Conditions			Final Conditions	
Test #	Sample Lab ID	Depth (ft)	Diameter (in)	Normal (psf)	Max Shear (psf)	Height (in)	Moisture (%)	Density (pcf)	Height (in)	Moisture (%)
1	A	15	2.41	460.0	568.2	1.00	33.6	113.6	0.99	48.2
2	B	15	2.41	895.9	840.7	1.00	33.6	114.1	1.00	44.4
3	C	15	2.41	1,796.9	1,740.2	1.00	33.6	113.9	0.99	52.1

Notes and Special Test Conditions

Samples A, B, and C were remolded.

Project Information

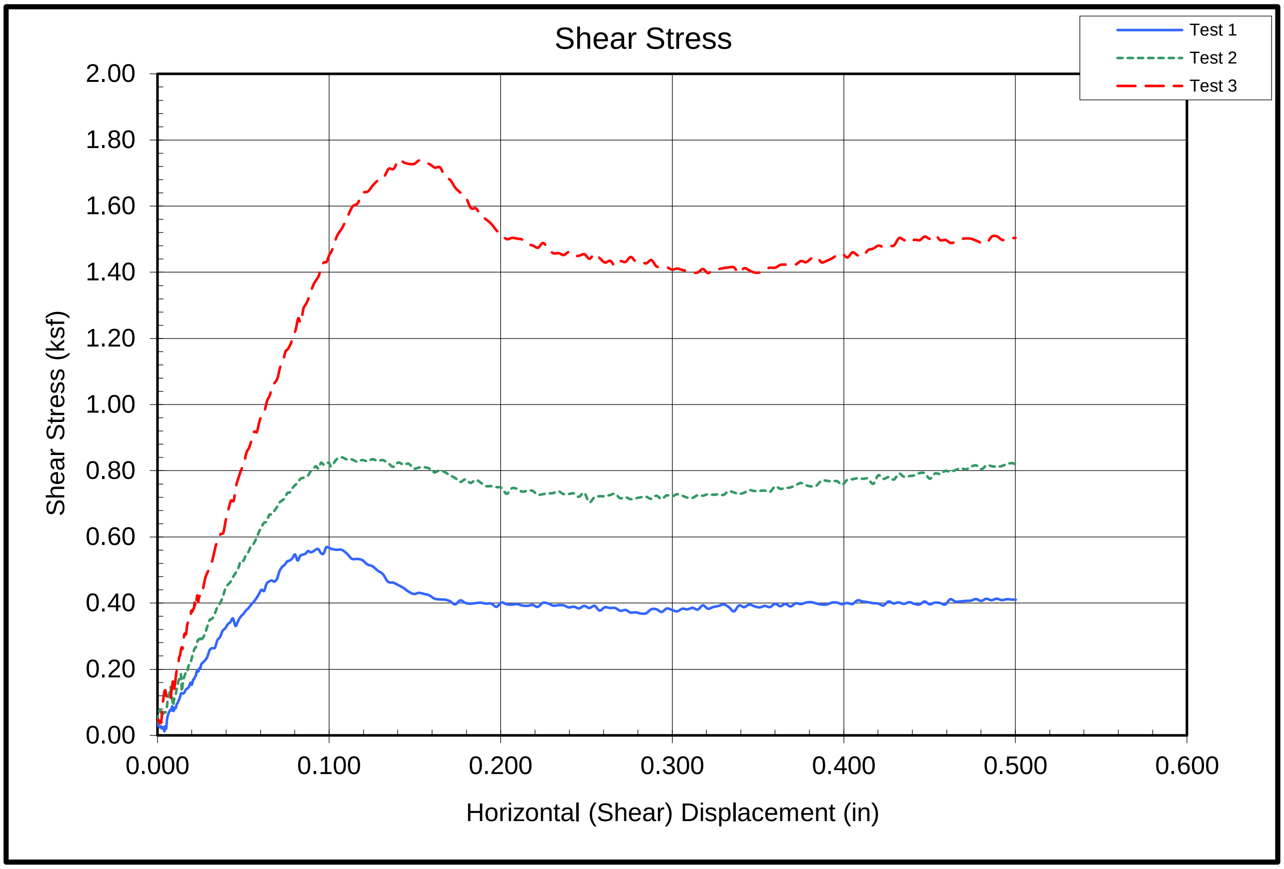
Project Name	**Fountain Wind Project**
Location	**Eastern Shasta County**
Client	**ConnectGen Operating, LLC**
Project #	**NB215025**

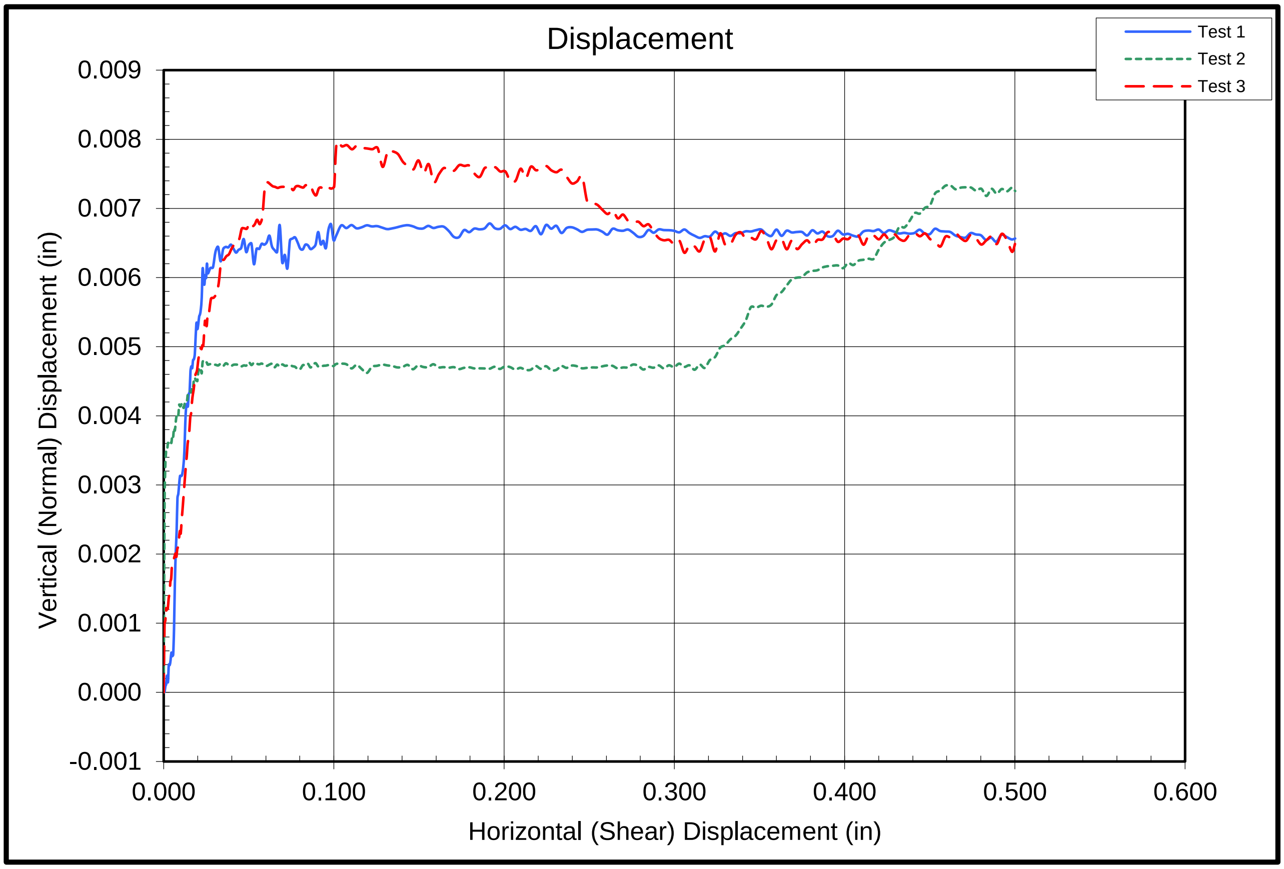
Test Results

Friction Angle (°)	**42**
Cohesion (psf)	**109**
Shear Rate (in/min)	0.005

SOIL DIRECT SHEAR RESULTS (PAGE 2) F06 @ 15.0' - 16.5'

F06 @ 15.0' - 16.5'

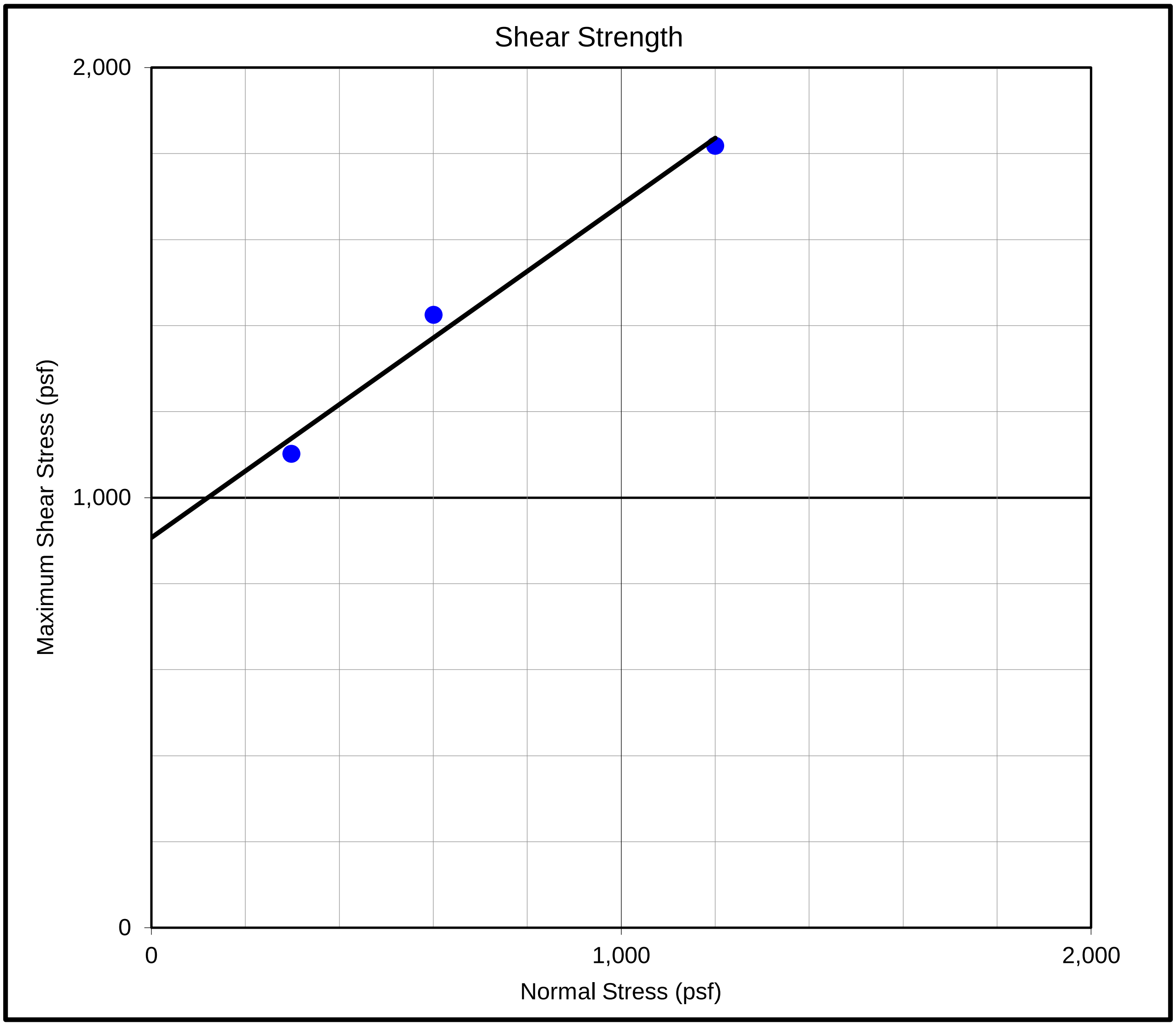




Terracon
750 Pilot Road, Suite F Las Vegas, Nevada 89119
PH. (702) 597-9393 FAX. (702) 597-9009

SOIL DIRECT SHEAR RESULTS

Sample Location: K04 @ 10'



Test Parameters

Sample Information				Test Stresses		Initial Conditions			Final Conditions	
Test #	Sample Lab ID	Depth (ft)	Diameter (in)	Normal (psf)	Max Shear (psf)	Height (in)	Moisture (%)	Density (pcf)	Height (in)	Moisture (%)
1	A	10	2.41	297.9	1,102.1	1.00	70.2	89.7	0.99	70.0
2	B	10	2.41	600.7	1,425.5	1.00	48.6	94.5	1.01	48.4
3	C	10	2.41	1,200.2	1,818.2	1.00	50.1	91.9	0.99	49.9

Notes and Special Test Conditions

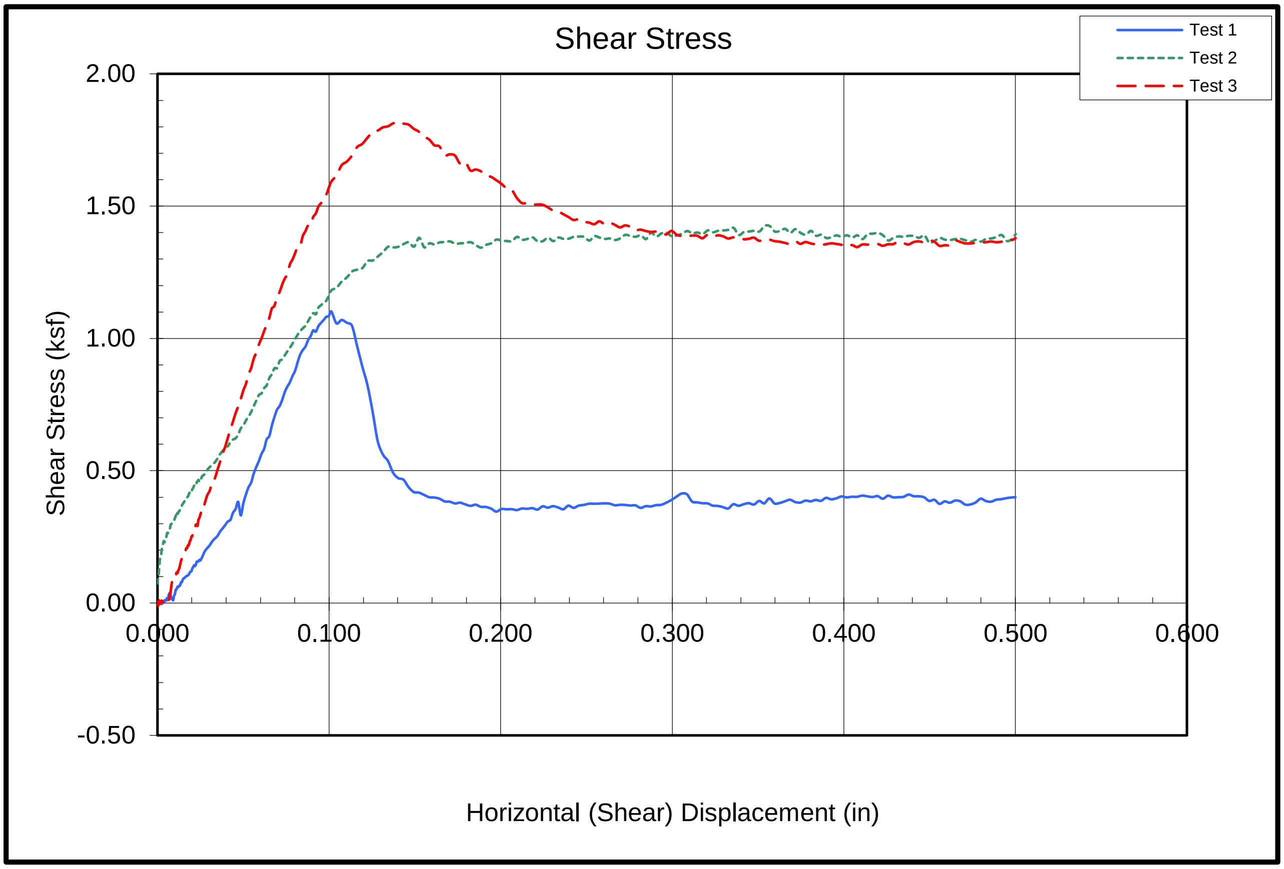
Samples A, B, and C were in-situ.

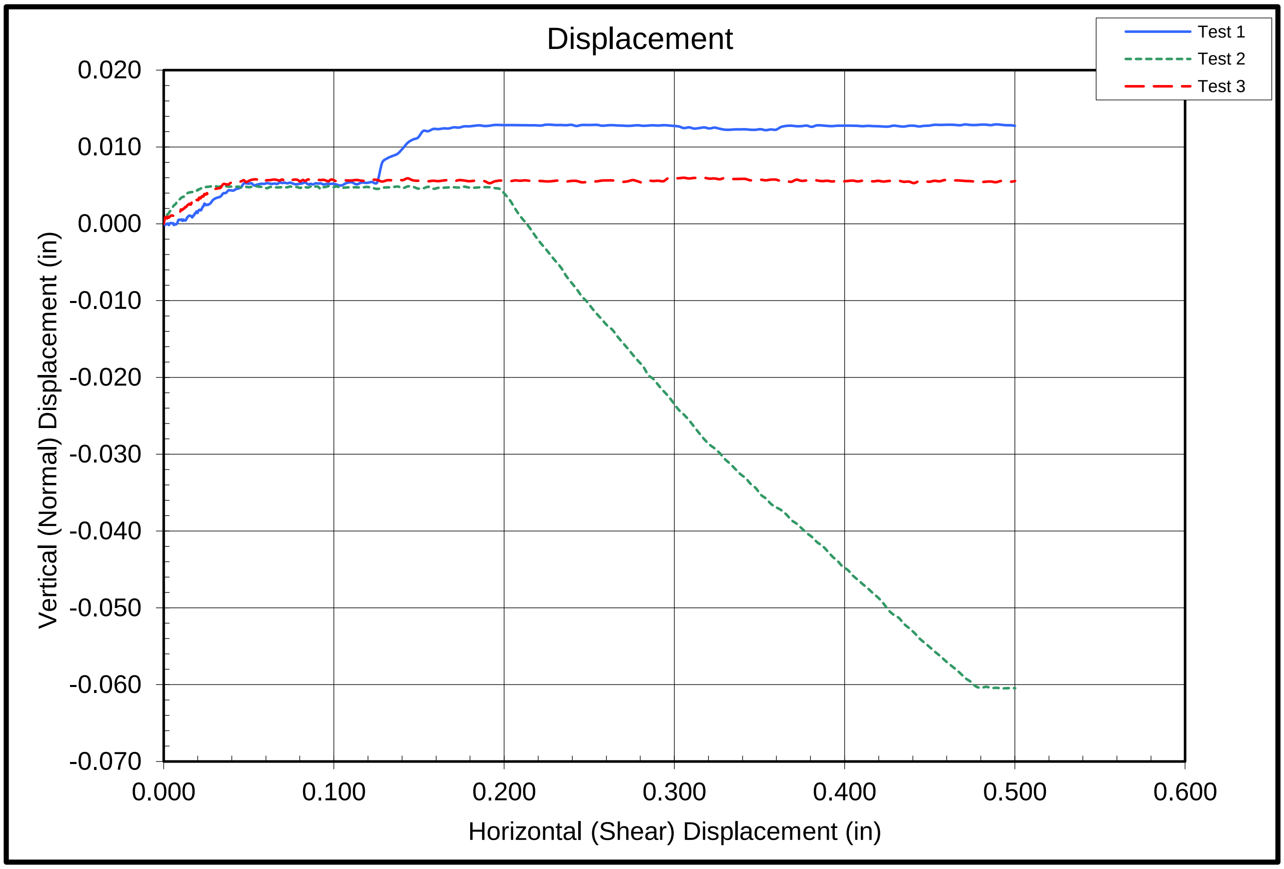
Project Information	
Project Name	**Fountain Wind Project**
Location	**Eastern Shasta County**
Client	**ConnectGen Operating, LLC**
Project #	**NB215025**

Test Results	
Friction Angle (°)	**38**
Cohesion (psf)	**907**
Shear Rate (in/min)	0.005

SOIL DIRECT SHEAR RESULTS (PAGE 2) K04 @ 10'

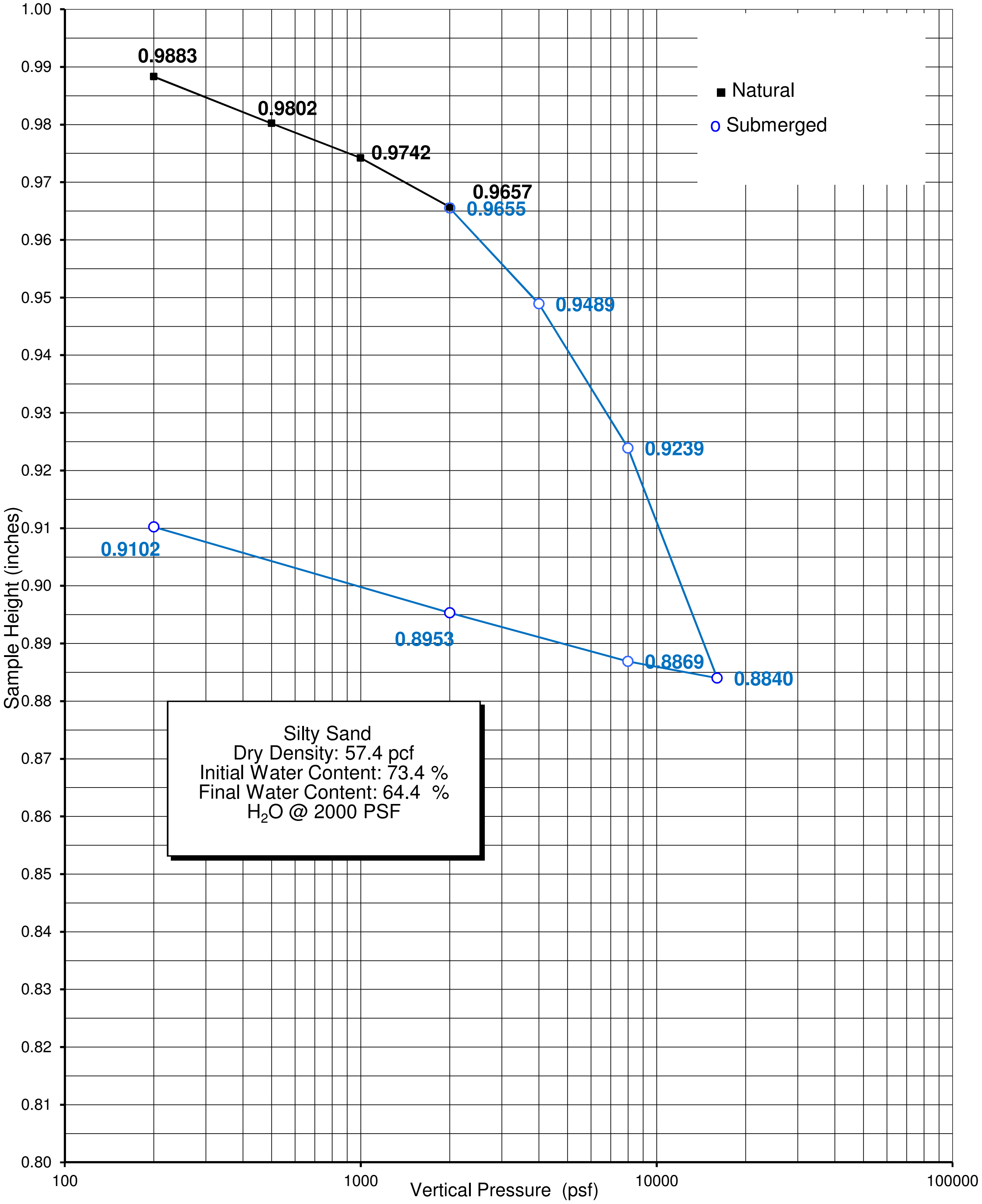
K04 @ 10'





CONSOLIDATION TEST - ASTM D2435

Boring / Sample No.	A-01	Depth:	10.0'	Date:	06-23-21



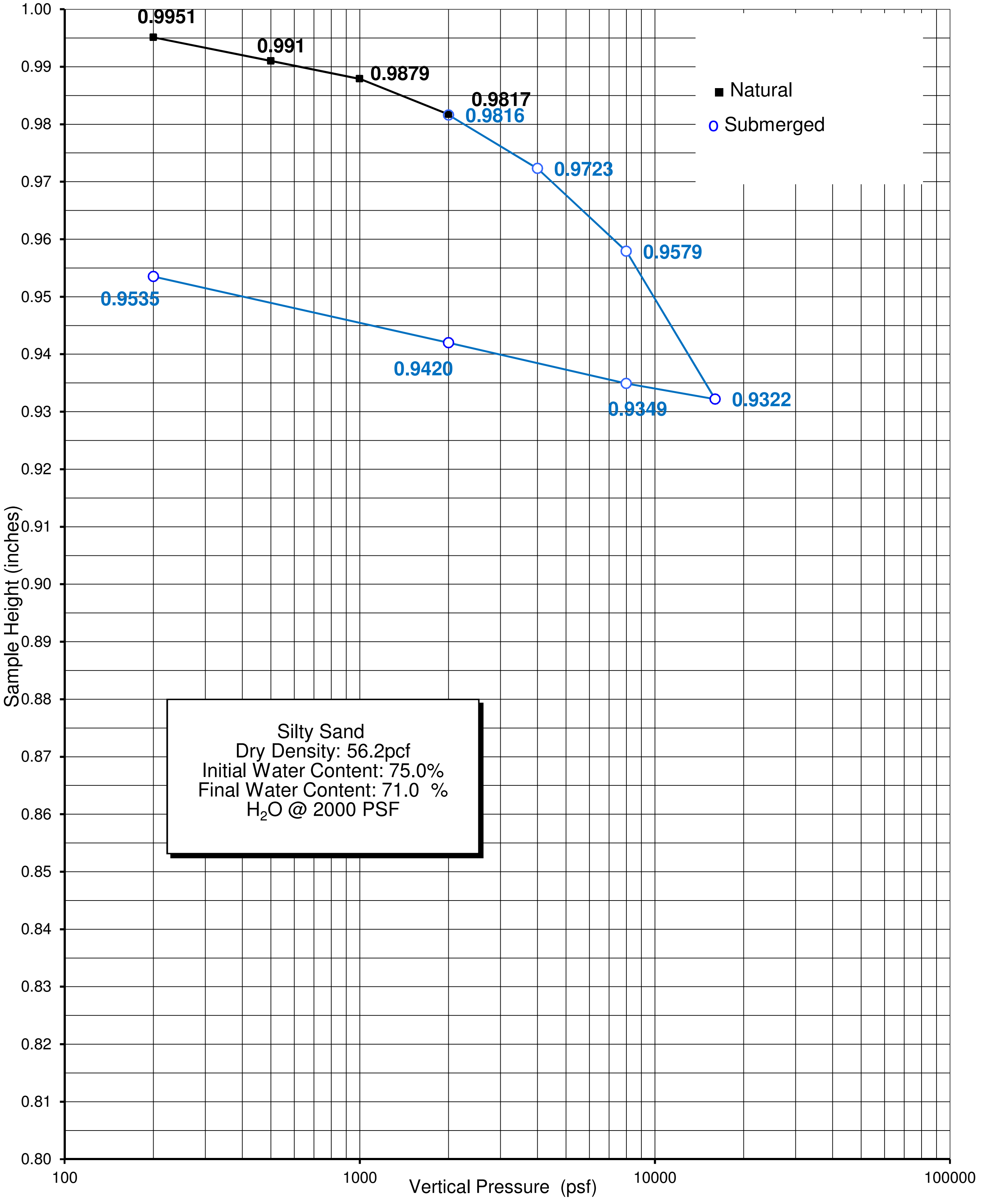
Silty Sand
Dry Density: 57.4 pcf
Initial Water Content: 73.4 %
Final Water Content: 64.4 %
H_2O @ 2000 PSF

Terracon # NB215025

CONSOLIDATION TEST - ASTM D2435

Job No. 2011-0104

Boring / Sample No. A-01	Depth: 20.0'	Date: 06-23-21



Silty Sand
Dry Density: 56.2pcf
Initial Water Content: 75.0%
Final Water Content: 71.0 %
H_2O @ 2000 PSF

Geo-Logic
ASSOCIATES

Terracon # NB215025

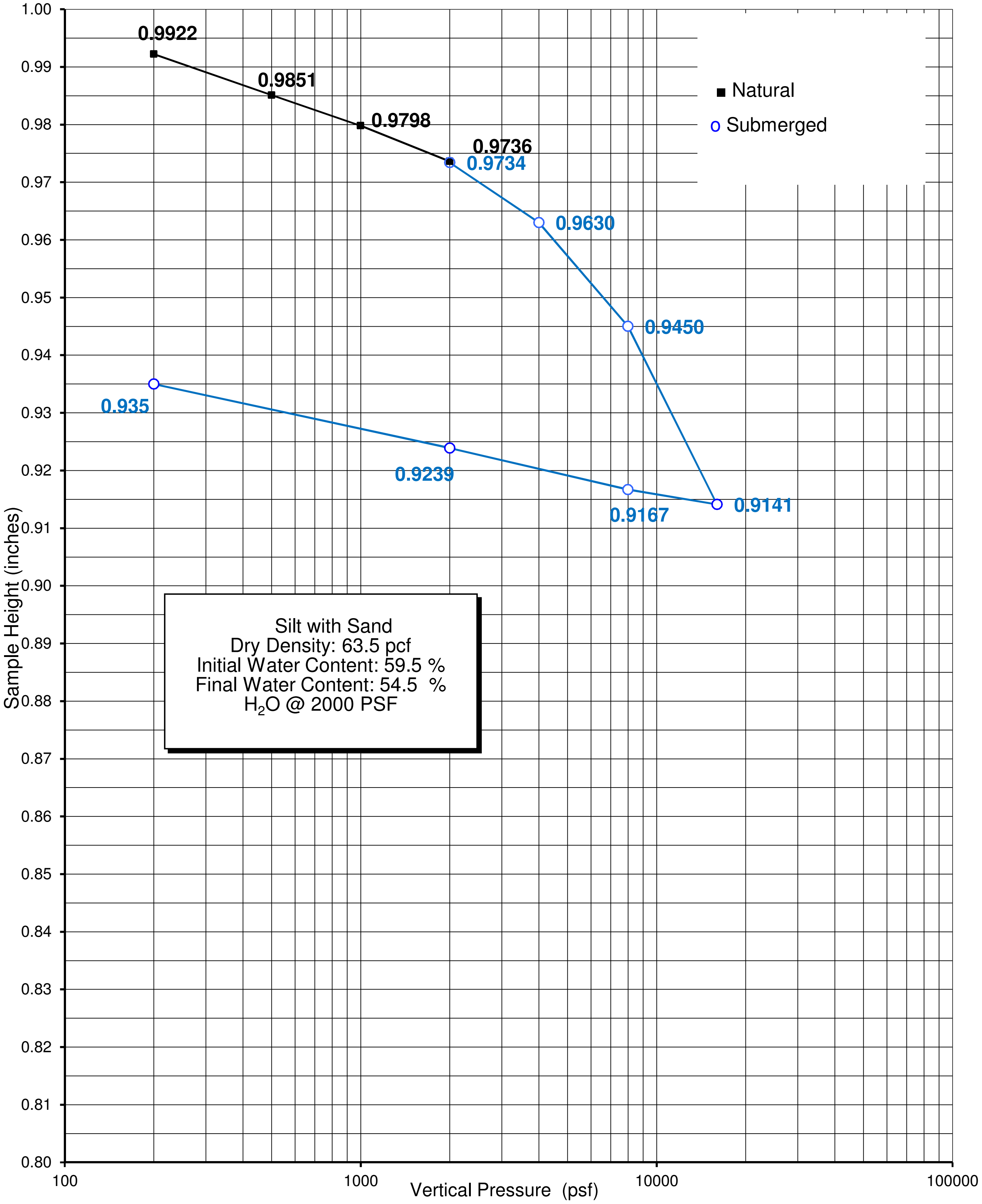
CONSOLIDATION TEST - ASTM D2435

Job No. 2011-0104

Boring / Sample No. SWT

Depth: 6.0'

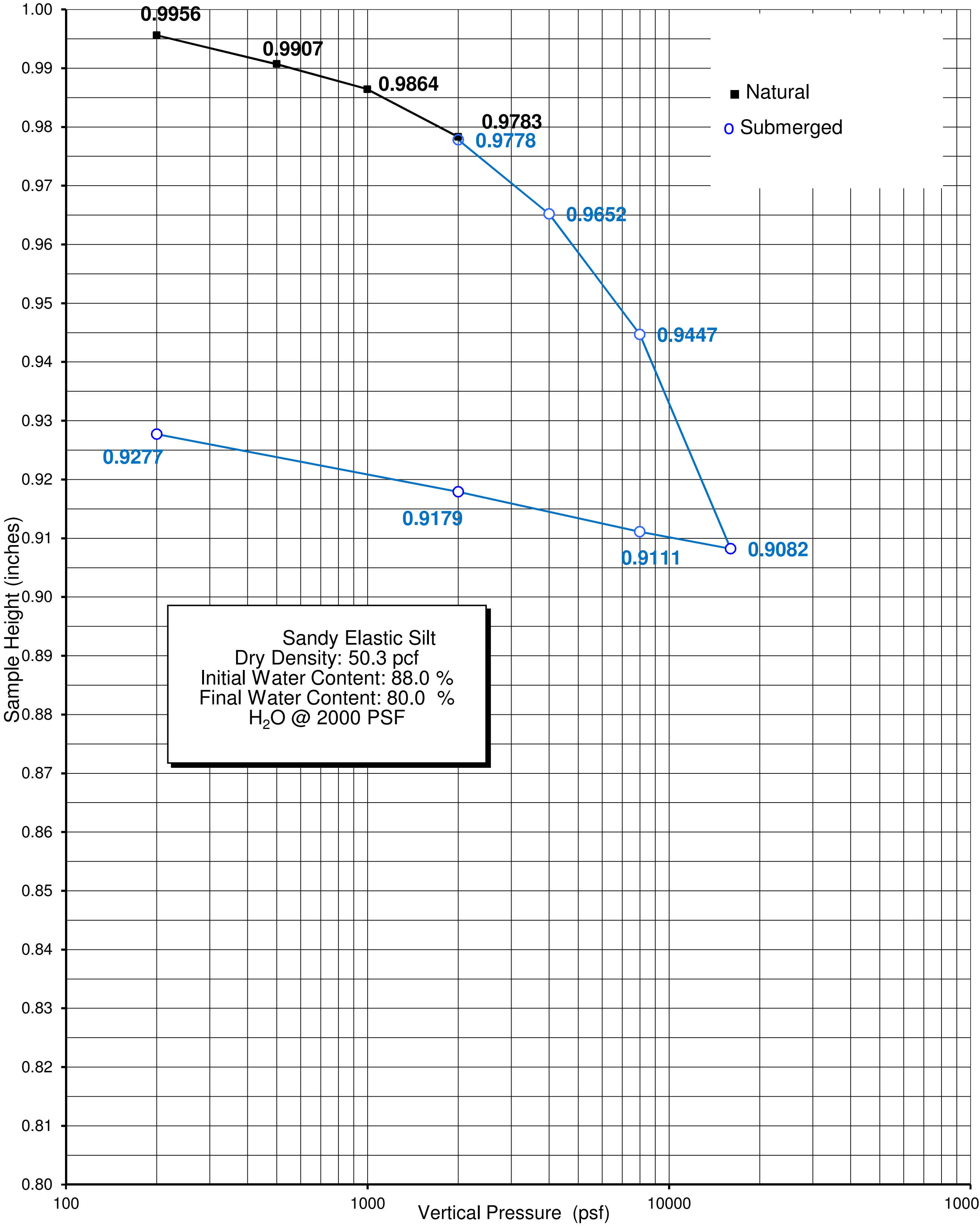
Date: 06-23-21



Geo-Logic
ASSOCIATES

CONSOLIDATION TEST - ASTM D2435

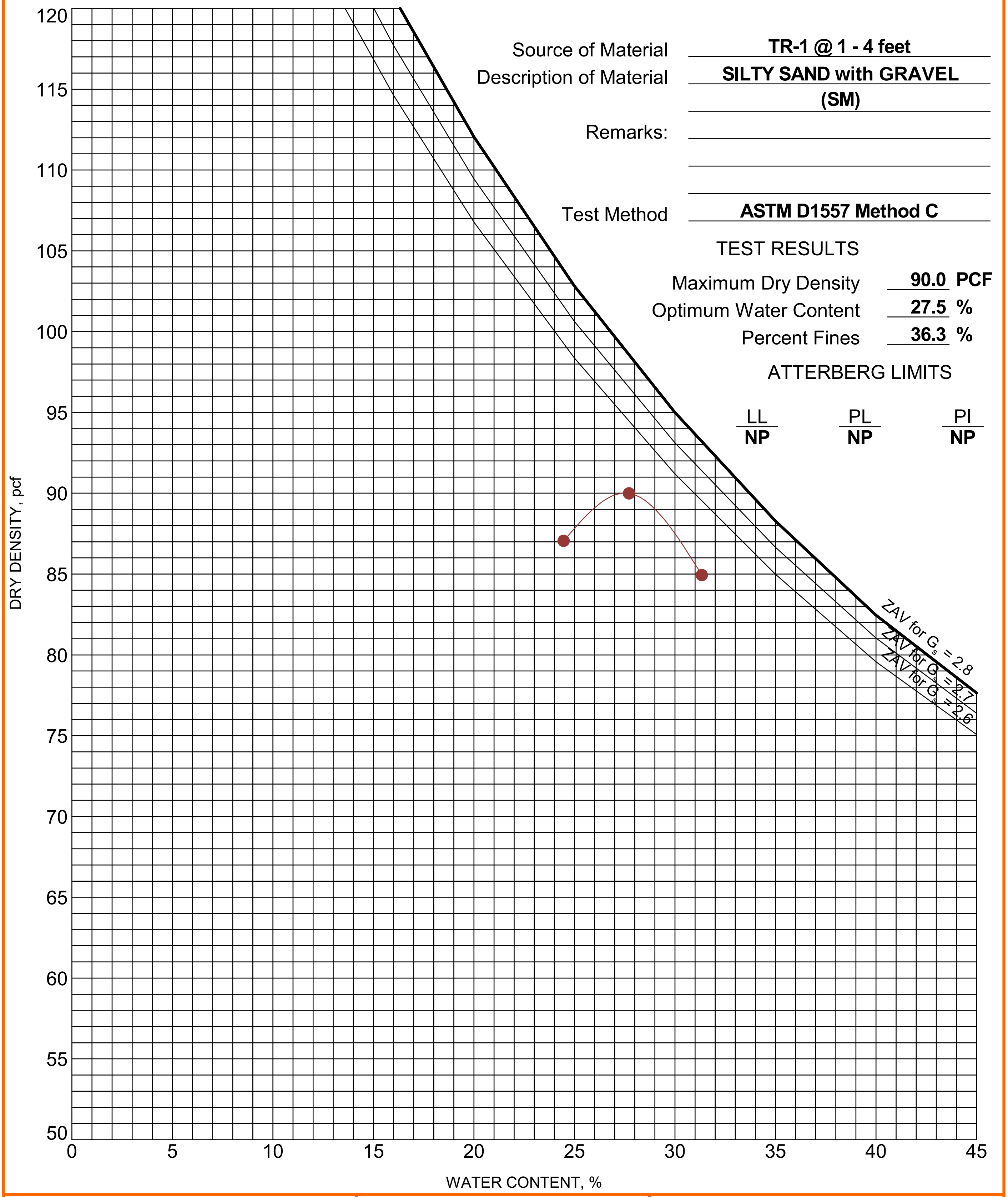
Boring / Sample No. B-05	Depth: 30.0'	Date: 06-23-21



Sandy Elastic Silt
Dry Density: 50.3 pcf
Initial Water Content: 88.0 %
Final Water Content: 80.0 %
H_2O @ 2000 PSF

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **TR-1 @ 1 - 4 feet**

Description of Material **SILTY SAND with GRAVEL (SM)**

Remarks:

Test Method **ASTM D1557 Method C**

TEST RESULTS

Maximum Dry Density	**90.0**	**PCF**
Optimum Water Content	**27.5**	**%**
Percent Fines	**36.3**	**%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

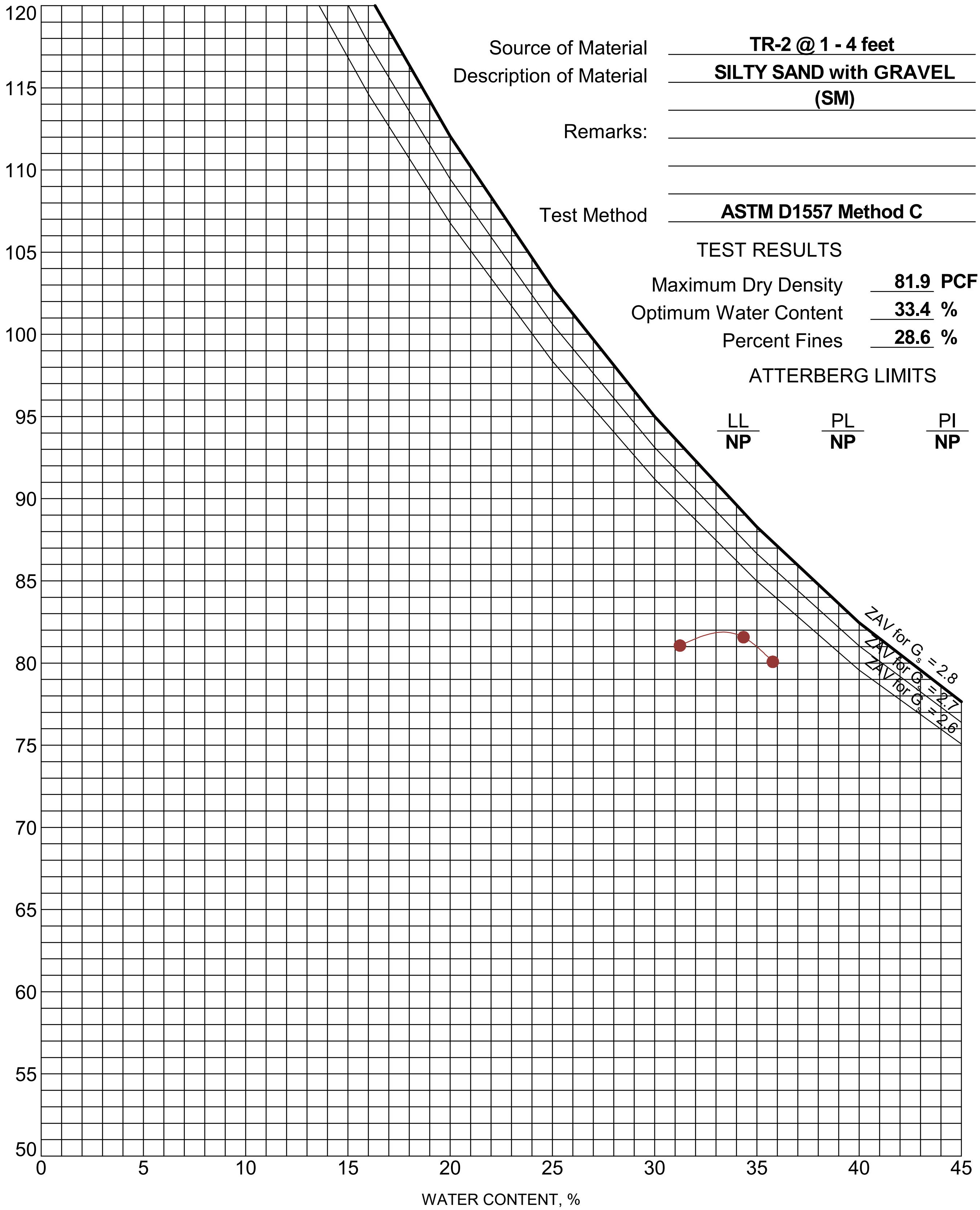
Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

PROJECT NUMBER: NB215025

CLIENT: ConnectGen Operating, LLC
Houston, TX

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**TR-2 @ 1 - 4 feet**
Description of Material	**SILTY SAND with GRAVEL (SM)**
Remarks:	
Test Method	**ASTM D1557 Method C**

TEST RESULTS

Maximum Dry Density	**81.9**	**PCF**
Optimum Water Content	**33.4**	**%**
Percent Fines	**28.6**	**%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

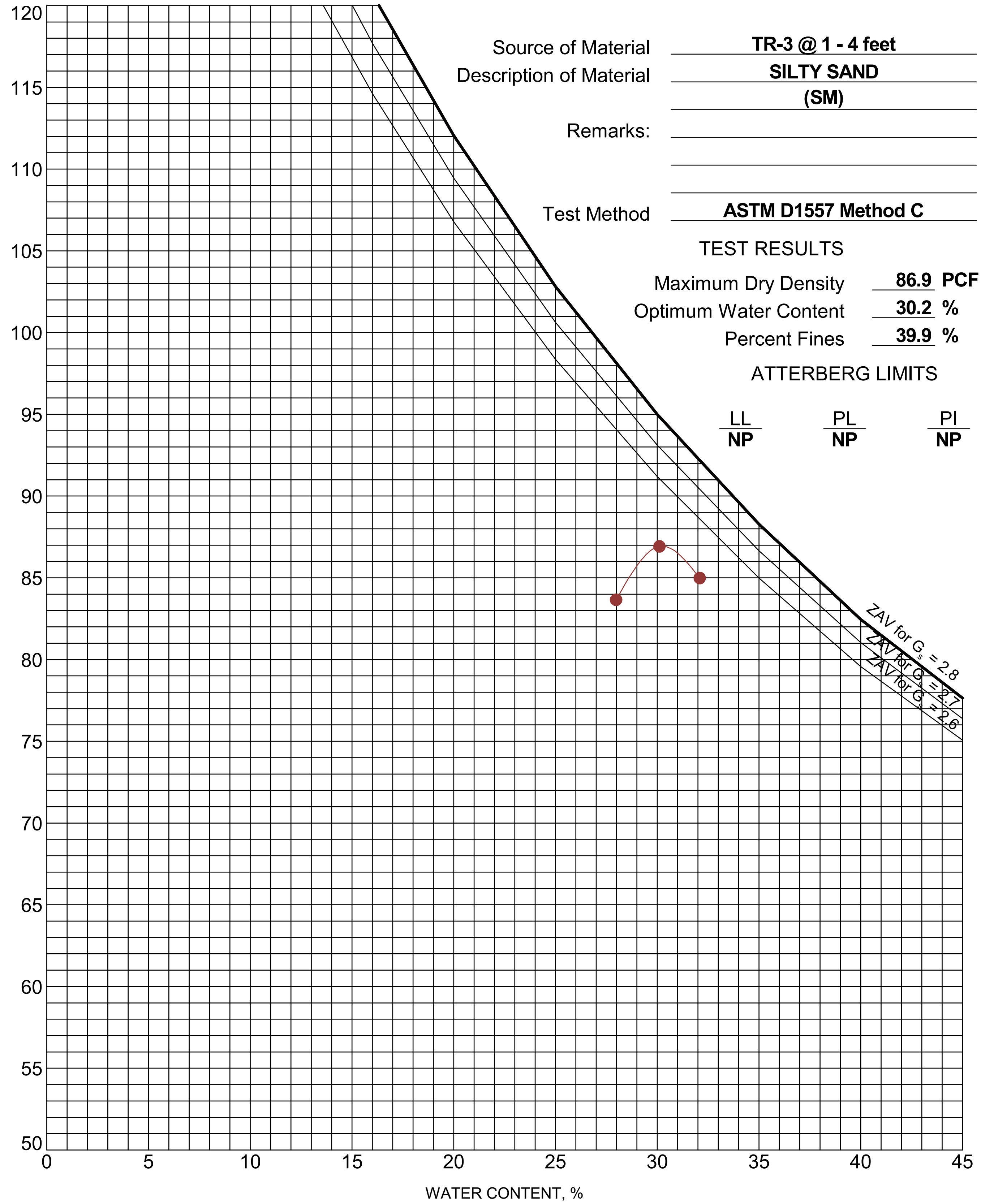
Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

PROJECT NUMBER: NB215025

CLIENT: ConnectGen Operating, LLC
Houston, TX

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **TR-3 @ 1 - 4 feet**

Description of Material **SILTY SAND**
(SM)

Remarks:

Test Method **ASTM D1557 Method C**

TEST RESULTS

Maximum Dry Density	**86.9**	**PCF**
Optimum Water Content	**30.2**	**%**
Percent Fines	**39.9**	**%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V3 NB215025 FOUNTAIN WIND PRO.GPJ TERRACON_DATATEMPLATE.GDT 7/9/21

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

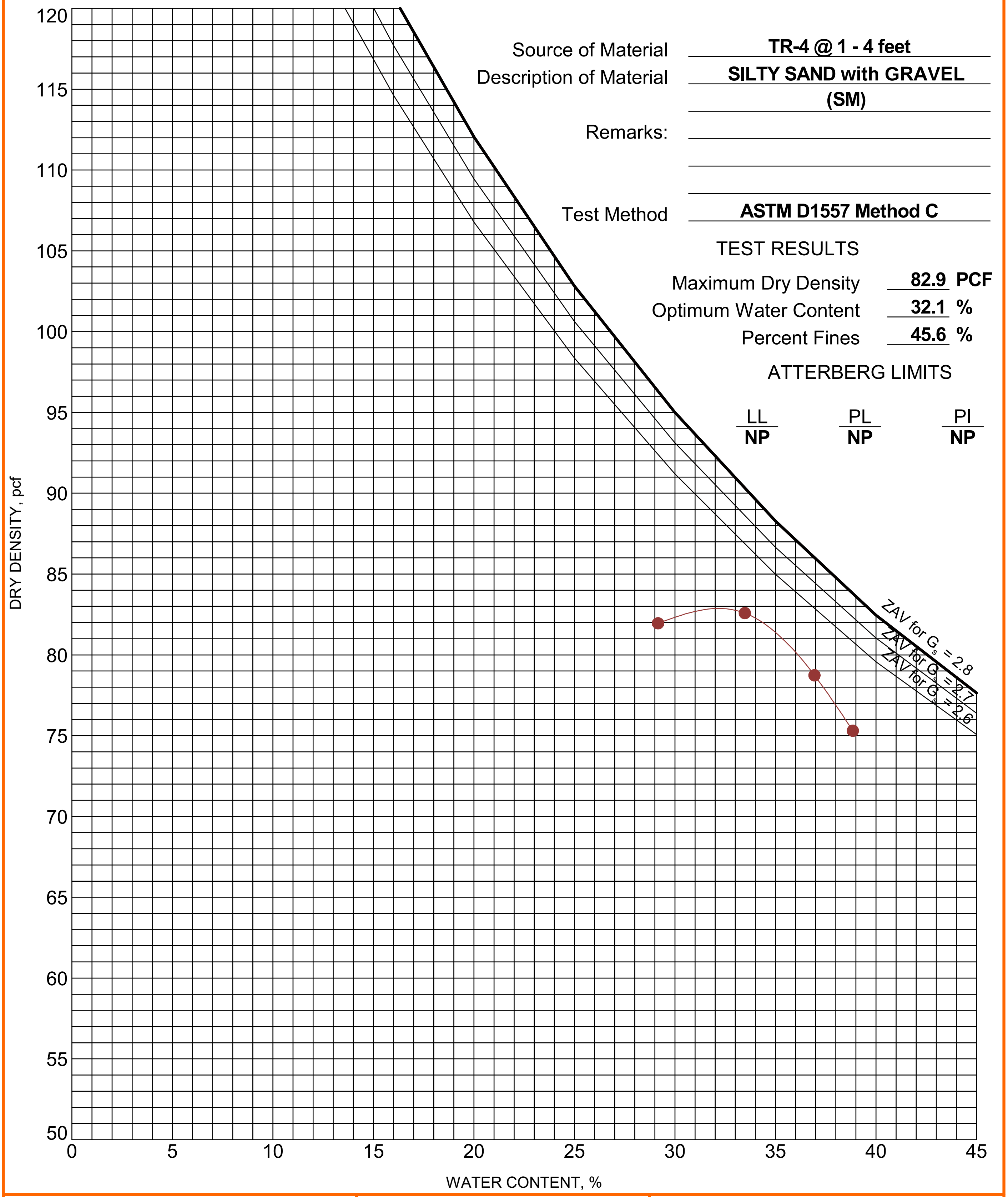
Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

PROJECT NUMBER: NB215025

CLIENT: ConnectGen Operating, LLC
Houston, TX

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **TR-4 @ 1 - 4 feet**

Description of Material **SILTY SAND with GRAVEL (SM)**

Remarks:

Test Method **ASTM D1557 Method C**

TEST RESULTS

Maximum Dry Density	82.9	PCF
Optimum Water Content	32.1	%
Percent Fines	45.6	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

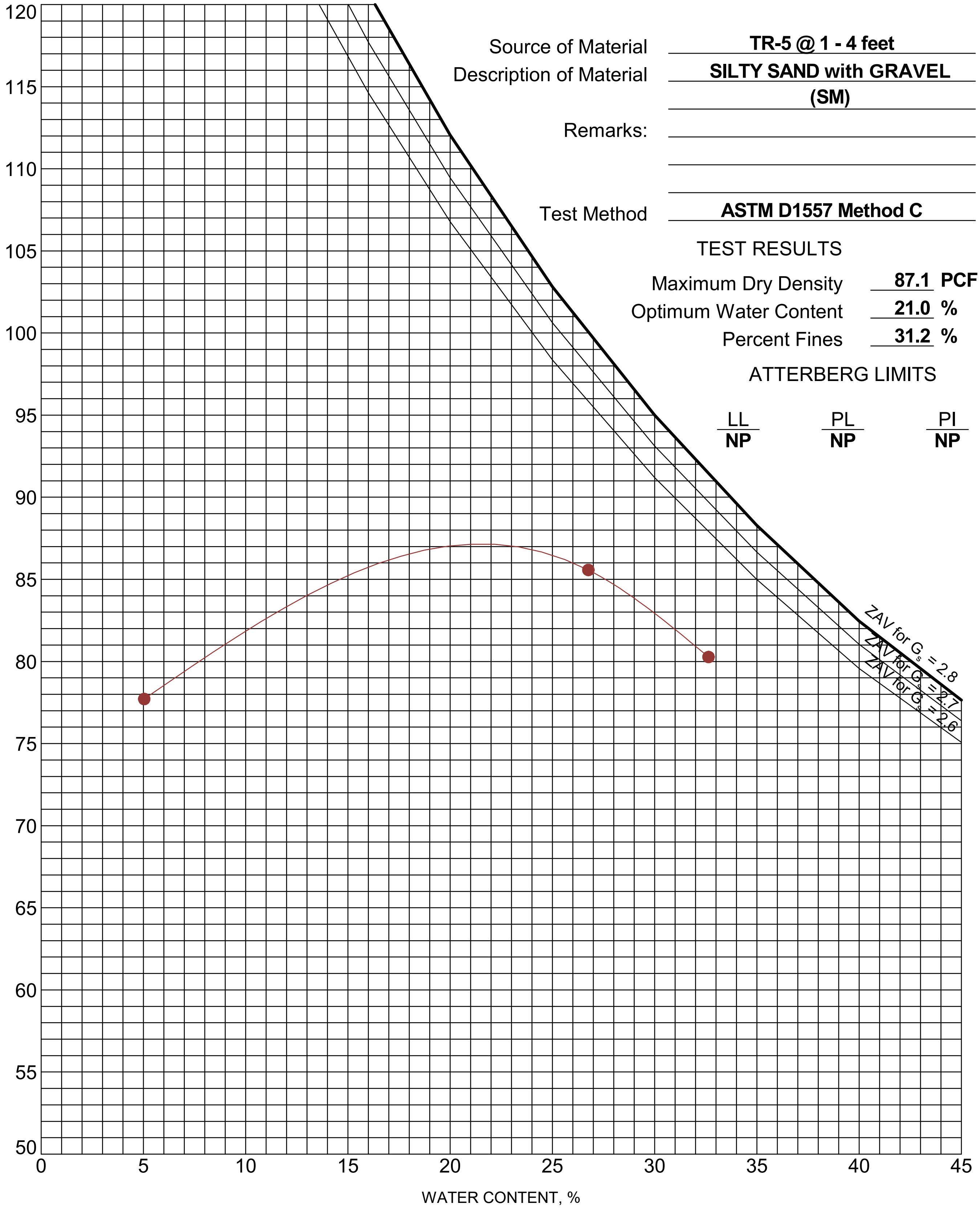
Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

PROJECT NUMBER: NB215025

CLIENT: ConnectGen Operating, LLC
Houston, TX

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **TR-5 @ 1 - 4 feet**

Description of Material **SILTY SAND with GRAVEL (SM)**

Remarks:

Test Method **ASTM D1557 Method C**

TEST RESULTS

Maximum Dry Density **87.1** **PCF**

Optimum Water Content **21.0** **%**

Percent Fines **31.2** **%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

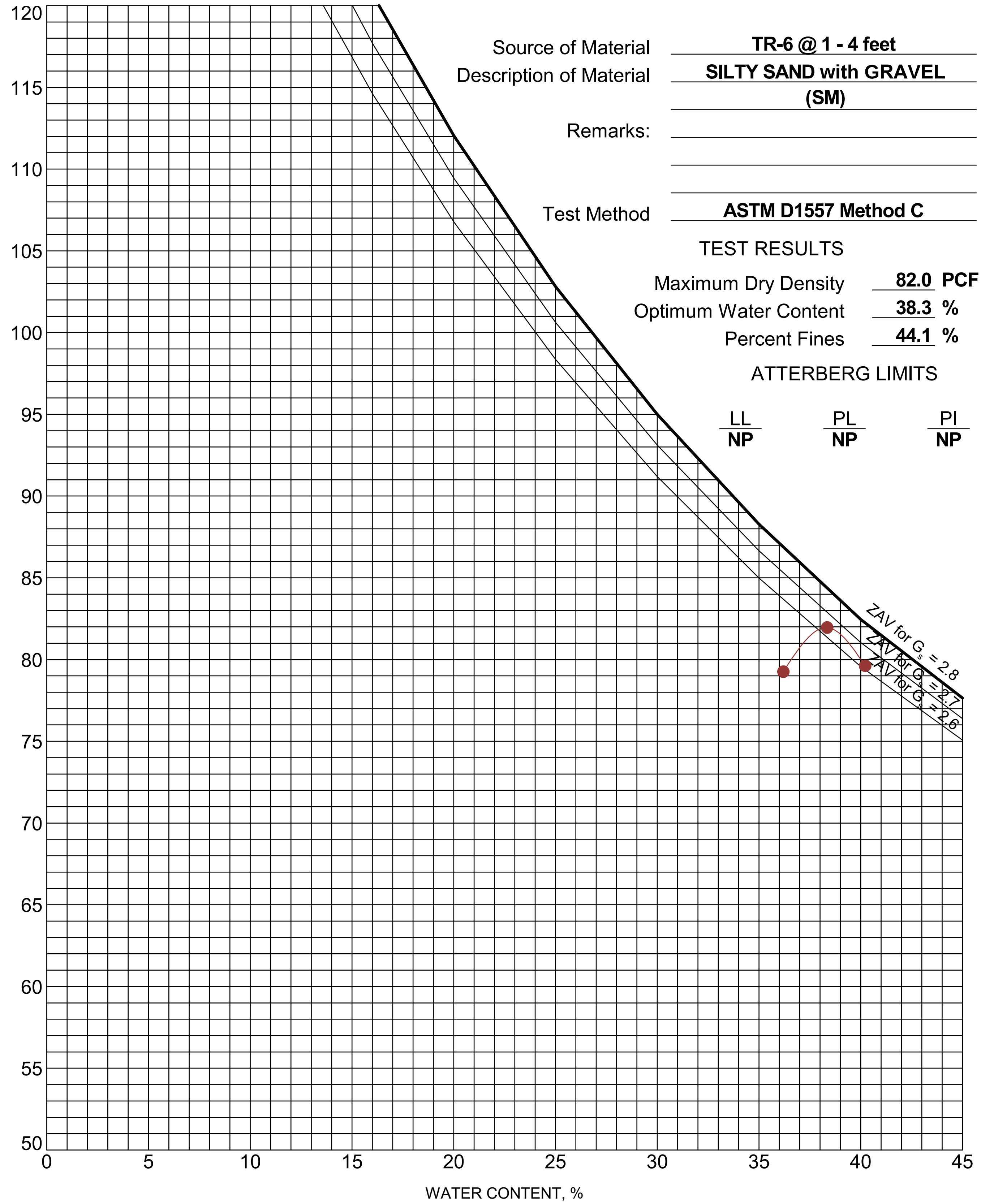
Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

PROJECT NUMBER: NB215025

CLIENT: ConnectGen Operating, LLC
Houston, TX

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **TR-6 @ 1 - 4 feet**

Description of Material **SILTY SAND with GRAVEL (SM)**

Remarks:

Test Method **ASTM D1557 Method C**

TEST RESULTS

Maximum Dry Density	**82.0**	**PCF**
Optimum Water Content	**38.3**	**%**
Percent Fines	**44.1**	**%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

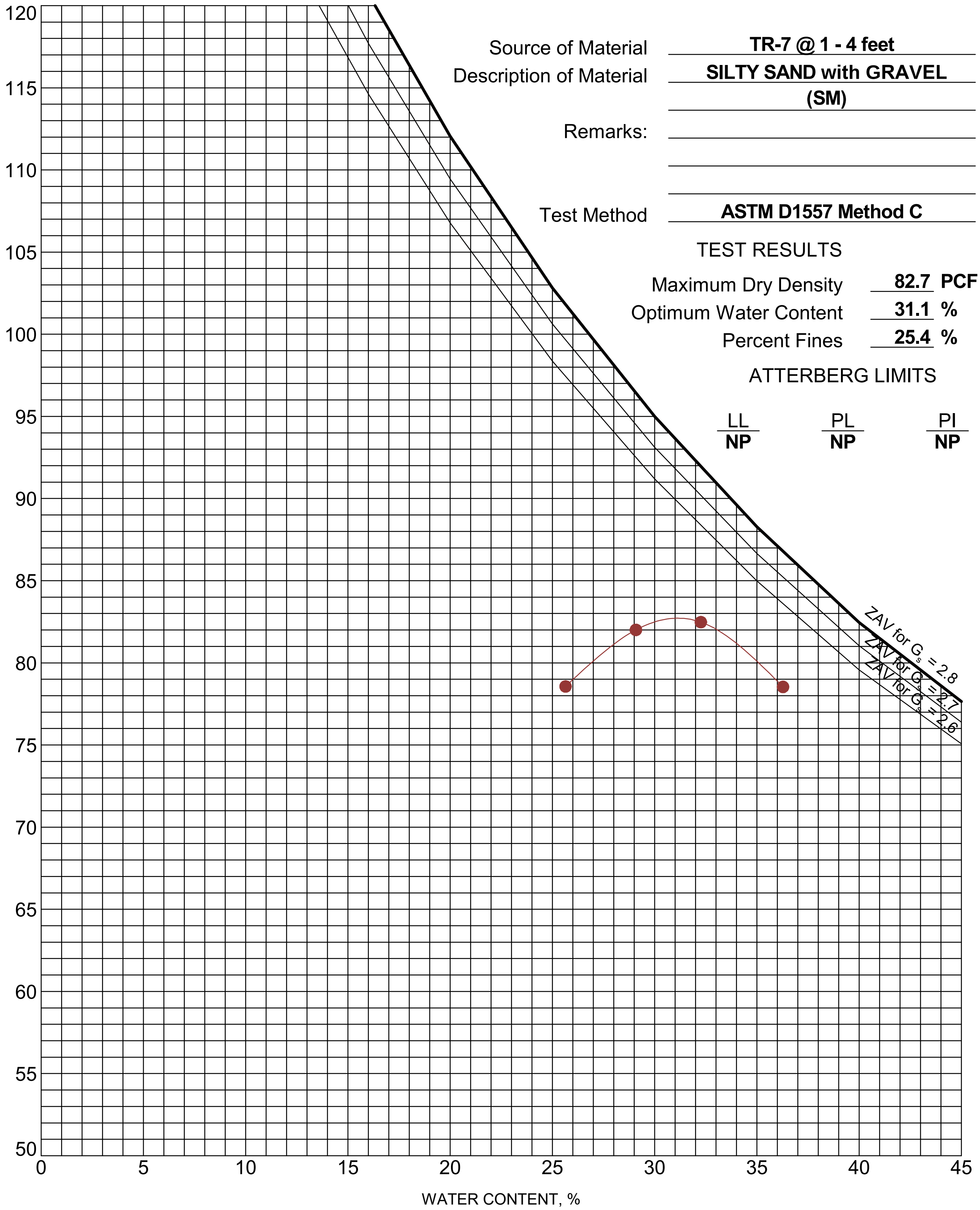
Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

PROJECT NUMBER: NB215025

CLIENT: ConnectGen Operating, LLC
Houston, TX

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **TR-7 @ 1 - 4 feet**

Description of Material **SILTY SAND with GRAVEL (SM)**

Remarks:

Test Method **ASTM D1557 Method C**

TEST RESULTS

Maximum Dry Density **82.7** **PCF**

Optimum Water Content **31.1** **%**

Percent Fines **25.4** **%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

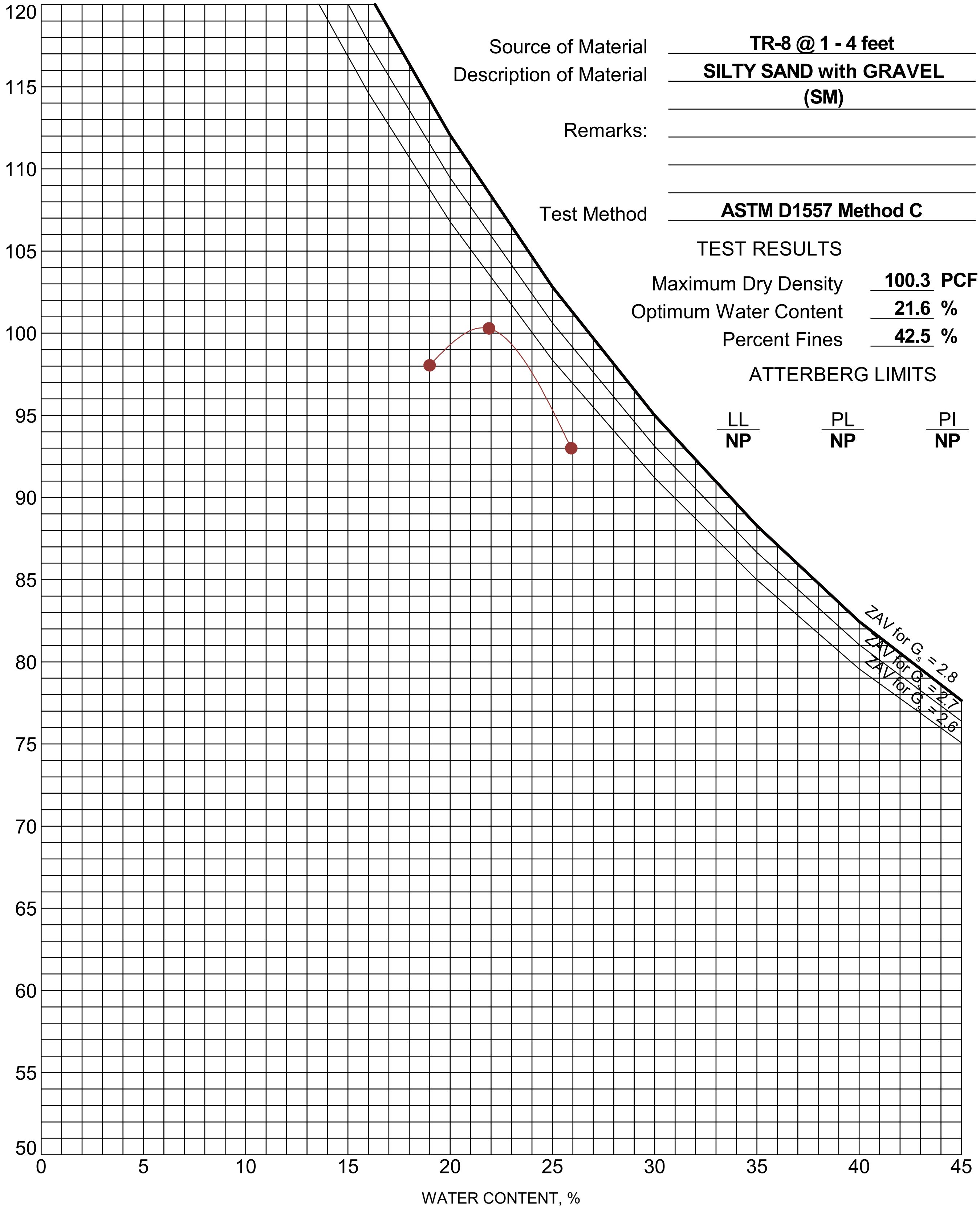
Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

PROJECT NUMBER: NB215025

CLIENT: ConnectGen Operating, LLC
Houston, TX

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **TR-8 @ 1 - 4 feet**

Description of Material **SILTY SAND with GRAVEL (SM)**

Remarks:

Test Method **ASTM D1557 Method C**

TEST RESULTS

Maximum Dry Density **100.3** **PCF**

Optimum Water Content **21.6** **%**

Percent Fines **42.5** **%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

PROJECT: Fountain Wind Project

SITE: Eastern Shasta County
Burney, CA

Terracon
50 Golden Land Ct Ste 100
Sacramento, CA

PROJECT NUMBER: NB215025

CLIENT: ConnectGen Operating, LLC
Houston, TX

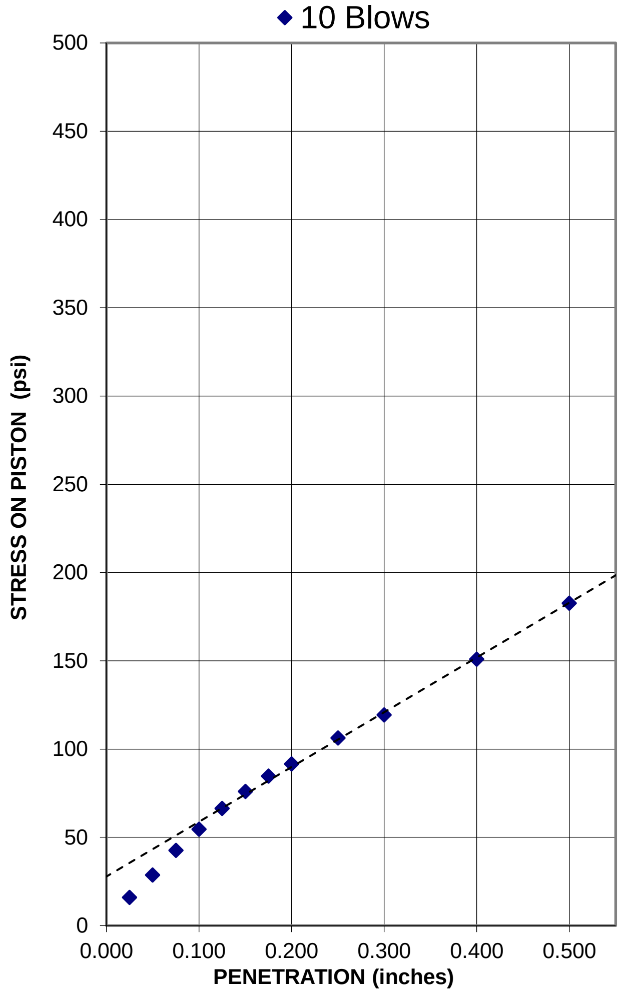
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

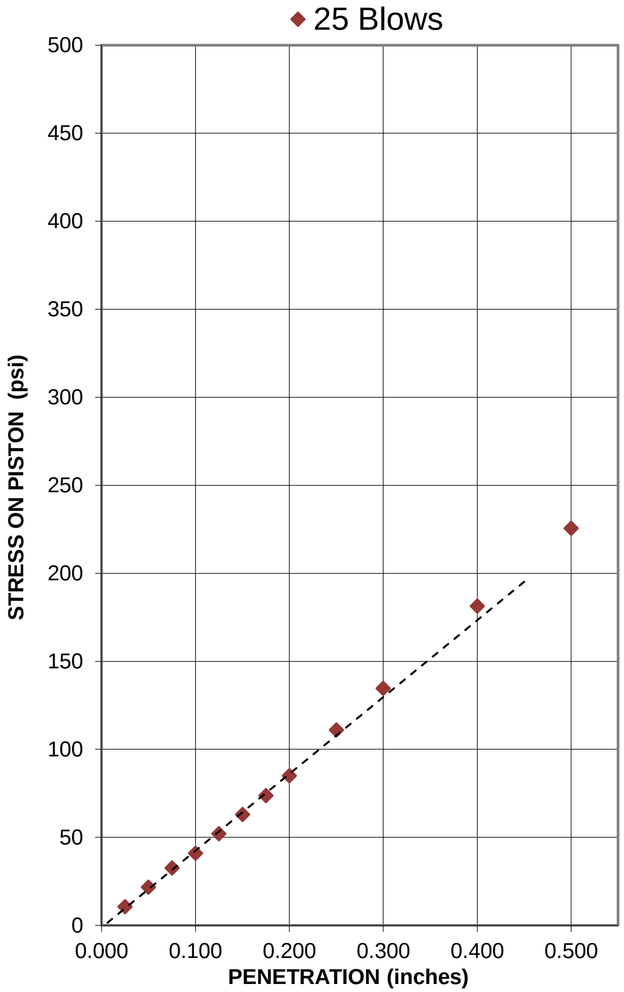
Terracon

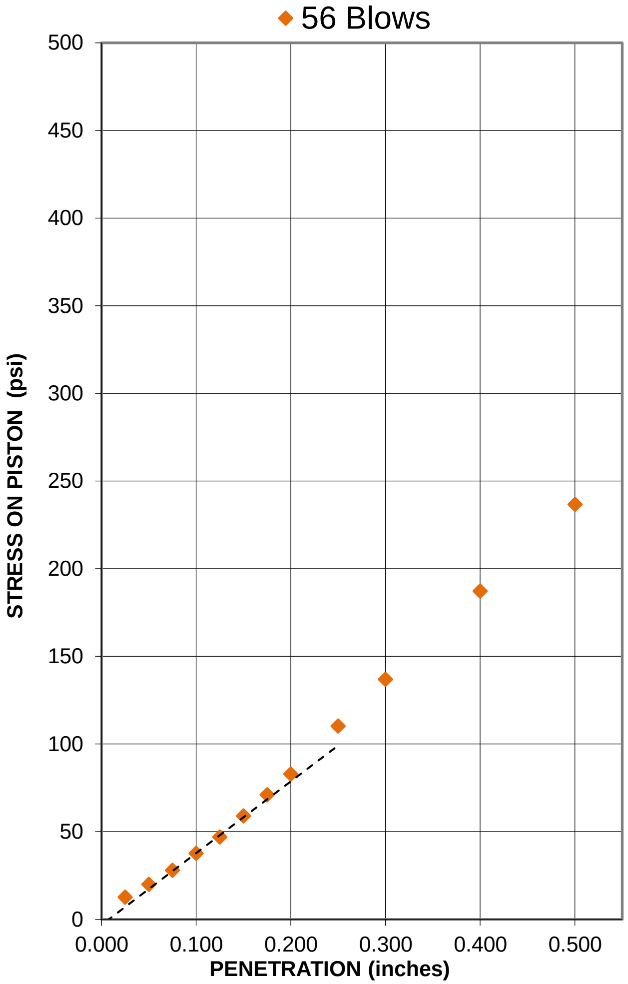
PROJECT: Fountain Wind Project
LOCATION: Eastern Shasta County
MATERIAL: TR-2 @ 1' - 4'
SAMPLE SOURCE: Native

PROJECT NO: NB215025
WORK ORDER NO: 01
LAB NO: 064
DATE SAMPLED: 5/17/21

	Blows per Lift	Compaction %	Compaction Method	Surcharge Weight (Lb.)	Sample Condition	Percent Swell	Before Soak		After Soak	
							Dry Density	Moisture %	Dry Density	Moisture %
Point 1	10	88.0	ASTM D1557	10	Soak	0.11	72.1	40.6	74.5	38.5
Point 2	25	94.3	ASTM D1557	10	Soak	0.11	77.2	39.3	78.7	38.0
Point 3	56	100.6	ASTM D1557	10	Soak	0.31	82.4	32.9	78.9	40.1







REVIEWED BY

CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

Terracon

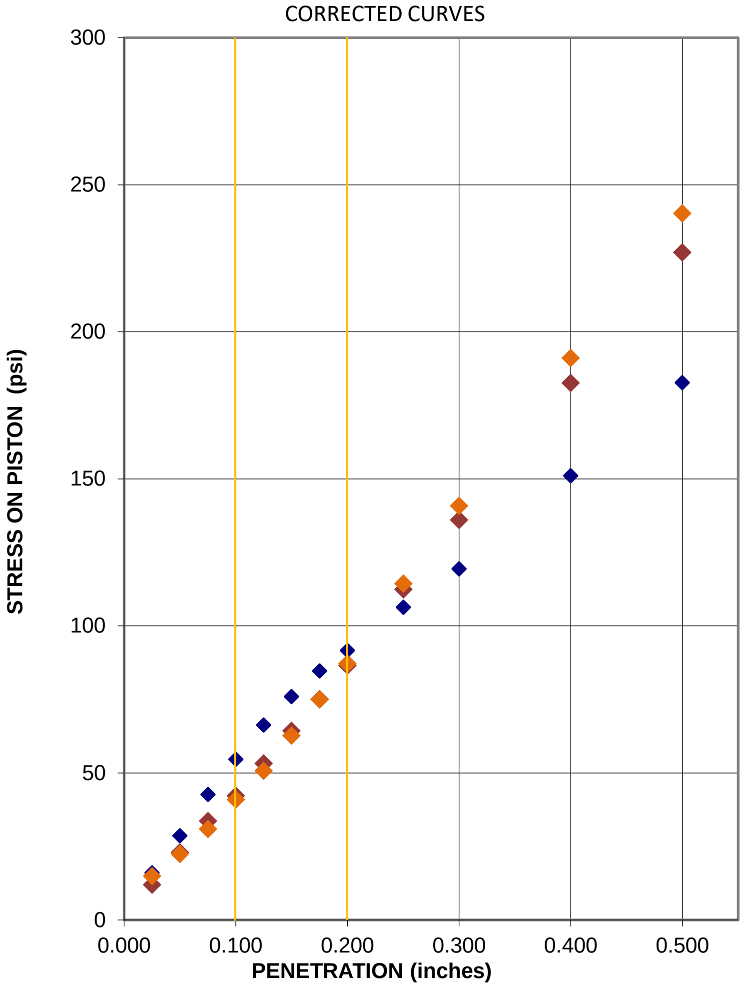
PROJECT:	Fountain Wind Project	**JOB NO:**	NB215025
LOCATION:	Eastern Shasta County	**WORK ORDER NO:**	01
MATERIAL:	TR-2 @ 1' - 4'	**LAB NO:**	064
SAMPLE SOURCE:	Native	**DATE SAMPLED:**	5/17/21

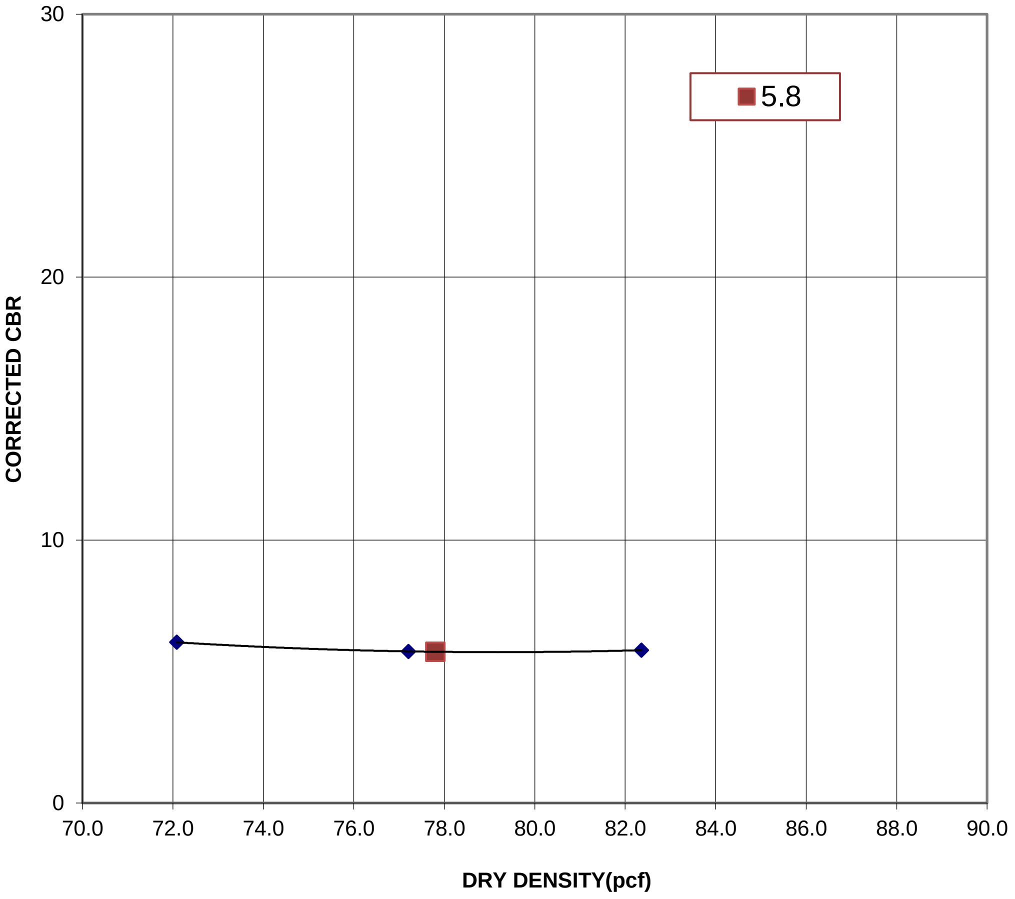
	Correction Factor		Corrected CBR		
	0.1"	0.2"	0.1"	0.2"	CBR
Point 1	0.00	0.00	5.5	6.1	6.1
Point 2	0.00	0.00	4.2	5.8	5.8
Point 3	0.01	0.01	4.1	5.8	5.8

ASTM D1557			
Moisture	Dry Density (pcf)		
%	100%	95%	90%
33.4	81.9	77.8	73.7

95% COMPACTION CBR (.2")

5.8





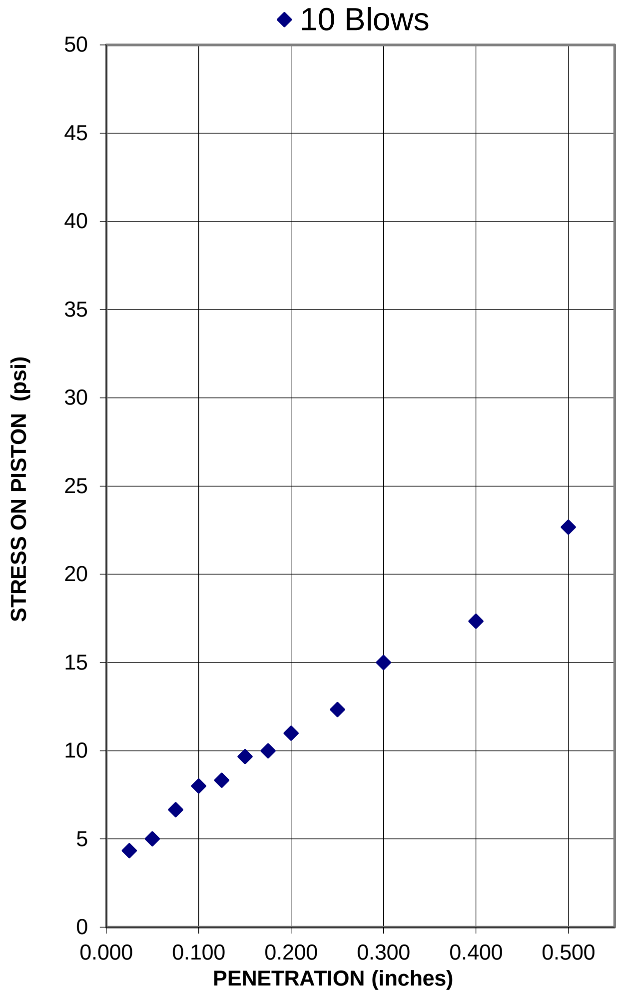
REVIEWED BY

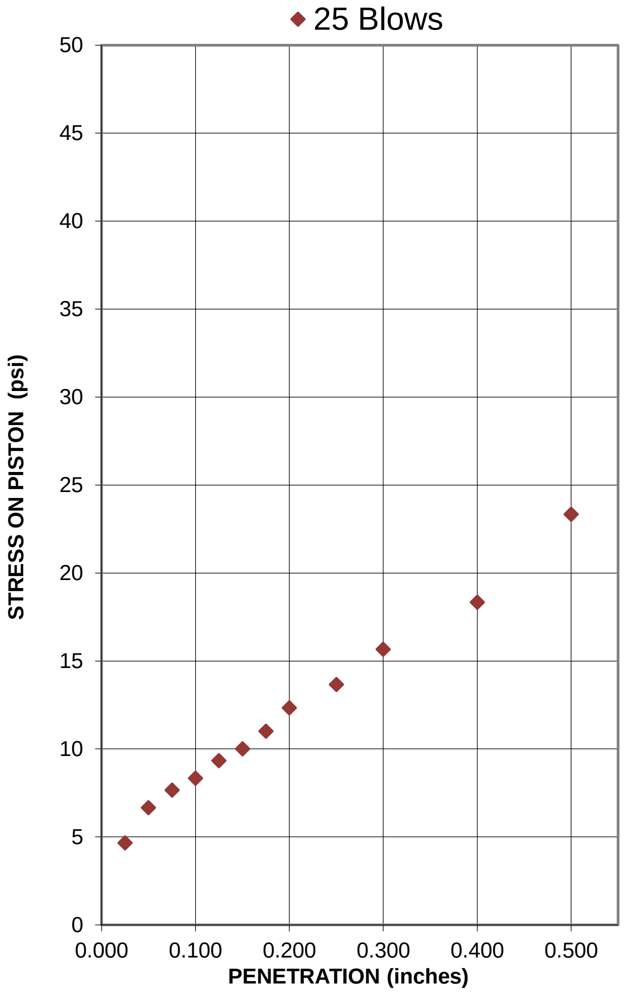
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

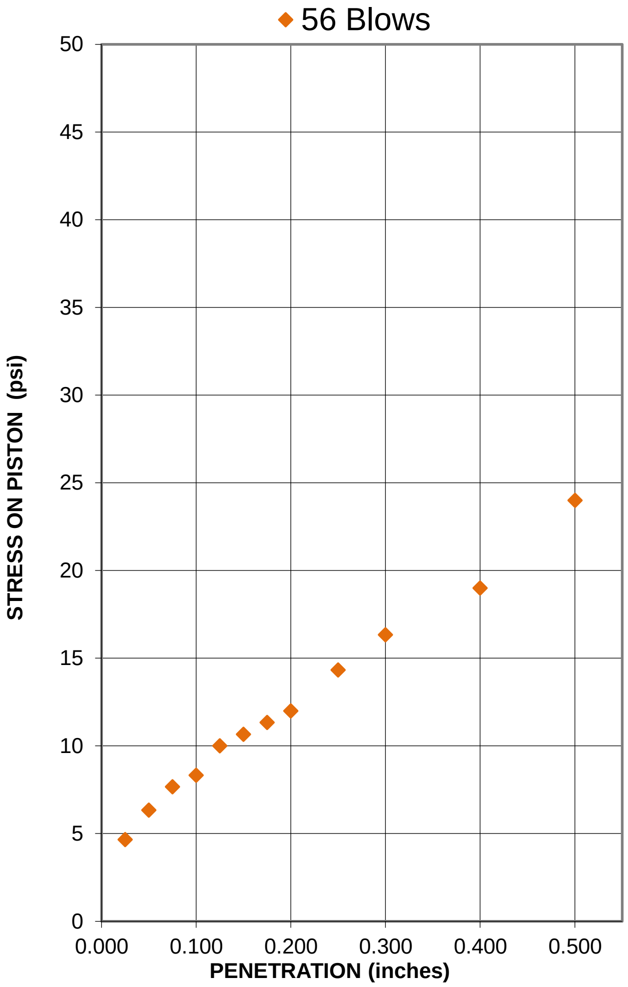
PROJECT: Fountain Wind Project
LOCATION: Easter Shasta County
MATERIAL: TR-3 @ 1' - 4'
SAMPLE SOURCE: Native

PROJECT NO: NB215025
WORK ORDER NO: 02
LAB NO: 064
DATE SAMPLED: 5/17/2021

	Blows per Lift	Compaction %	Compaction Method	Surcharge Weight (Lb.)	Sample Condition	Percent Swell	Before Soak		After Soak	
							Dry Density	Moisture %	Dry Density	Moisture %
Point 1	10	91.6	ASTM D1557	10	Soak	-0.04	79.6	35.2	81.5	32.8
Point 2	25	94.8	ASTM D1557	10	Soak	-0.09	82.4	35.3	84.9	31.4
Point 3	56	99.8	ASTM D1557	10	Soak	-0.15	86.7	34.9	88.7	31.3







REVIEWED BY

CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

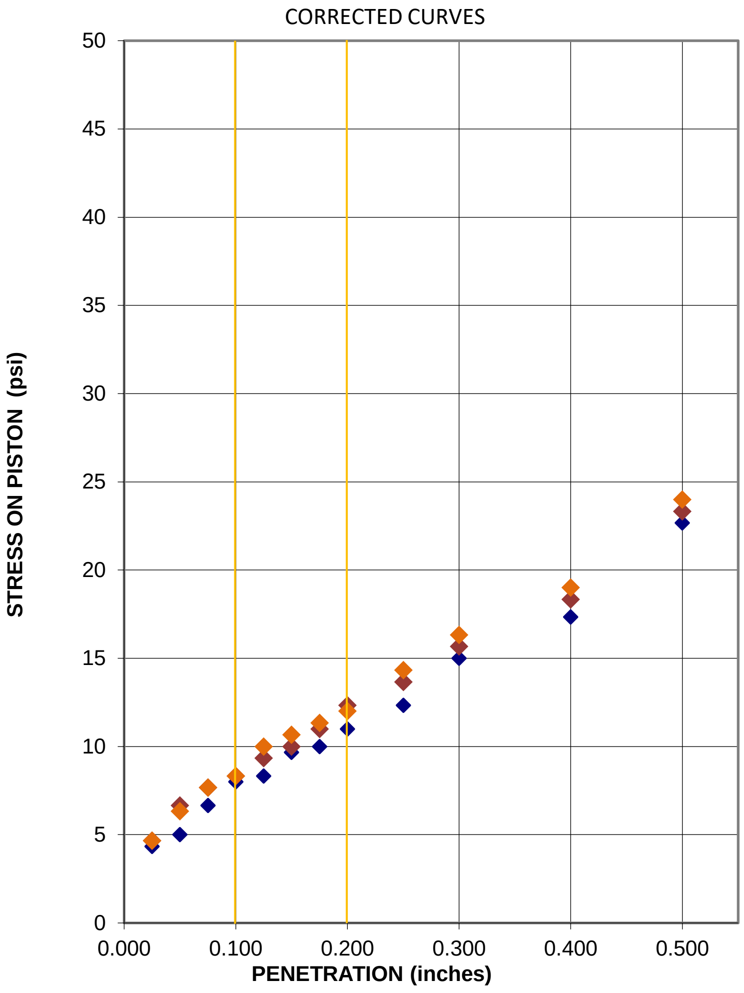
Terracon

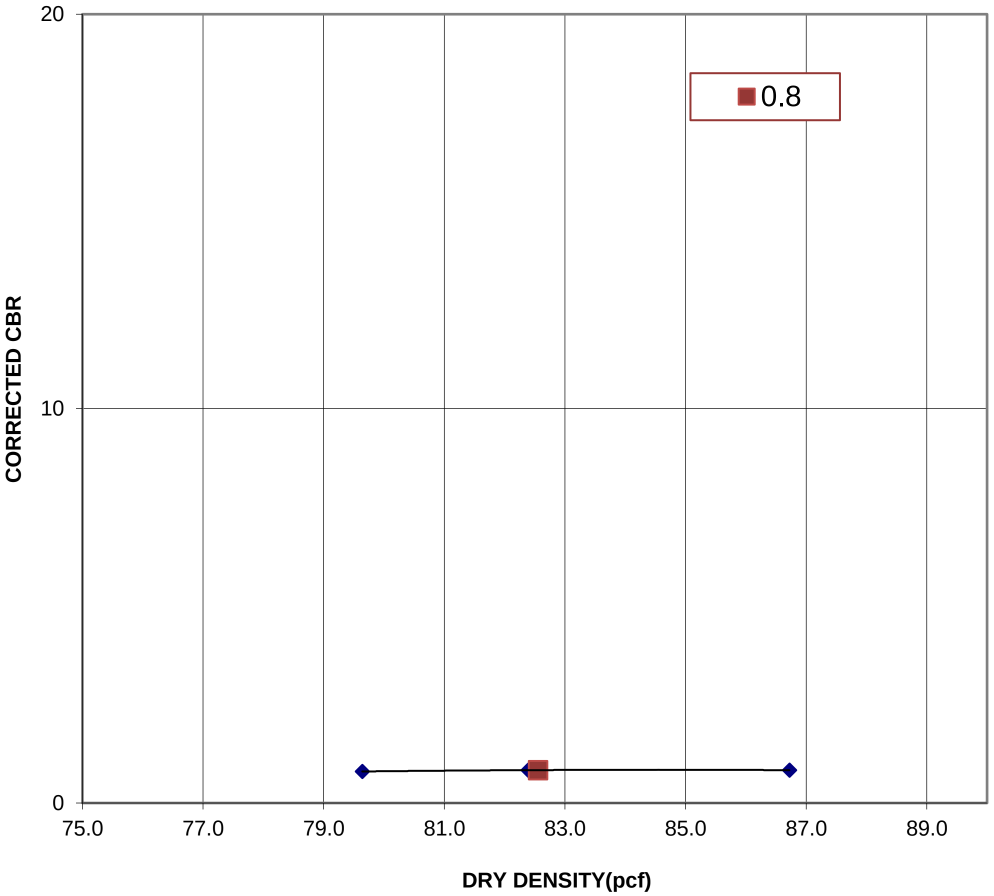
PROJECT:	**Fountain Wind Project**	**JOB NO:**	**NB215025**
LOCATION:	**Easter Shasta County**	**WORK ORDER NO:**	**02**
MATERIAL:	**TR-3 @ 1' - 4'**	**LAB NO:**	**064**
SAMPLE SOURCE:	**Native**	**DATE SAMPLED:**	**5/17/21**

	Correction Factor		Corrected CBR		
	0.1"	0.2"	0.1"	0.2"	CBR
Point 1	0.00	0.00	0.8	0.7	0.8
Point 2	0.00	0.00	0.8	0.8	0.8
Point 3	0.00	0.00	0.8	0.8	0.8

ASTM D1557			
Moisture	Dry Density (pcf)		
%	100%	95%	90%
30.2	86.9	82.6	78.2

95% COMPACTION
CBR (.2")
0.8





REVIEWED BY

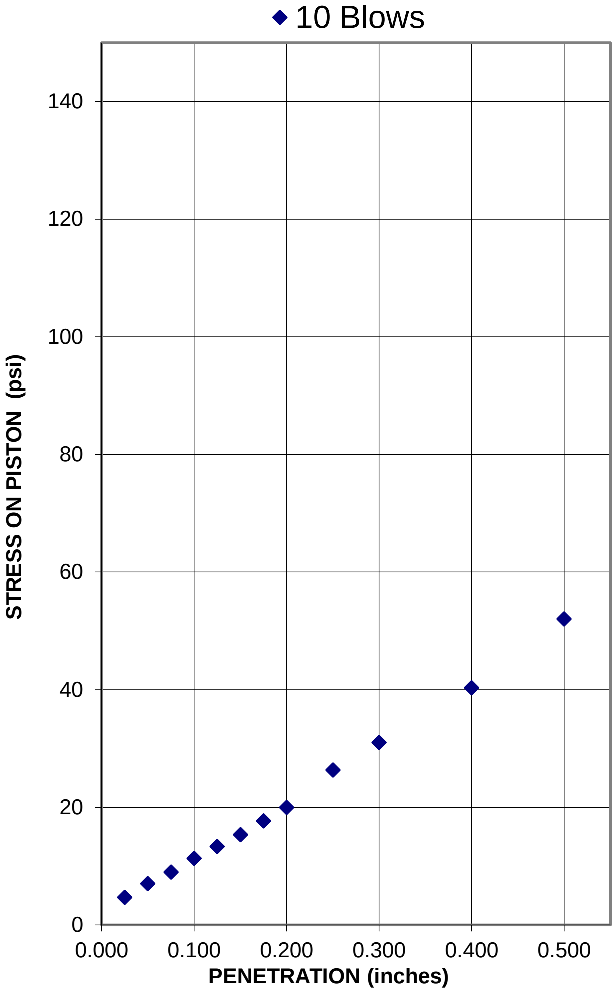
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

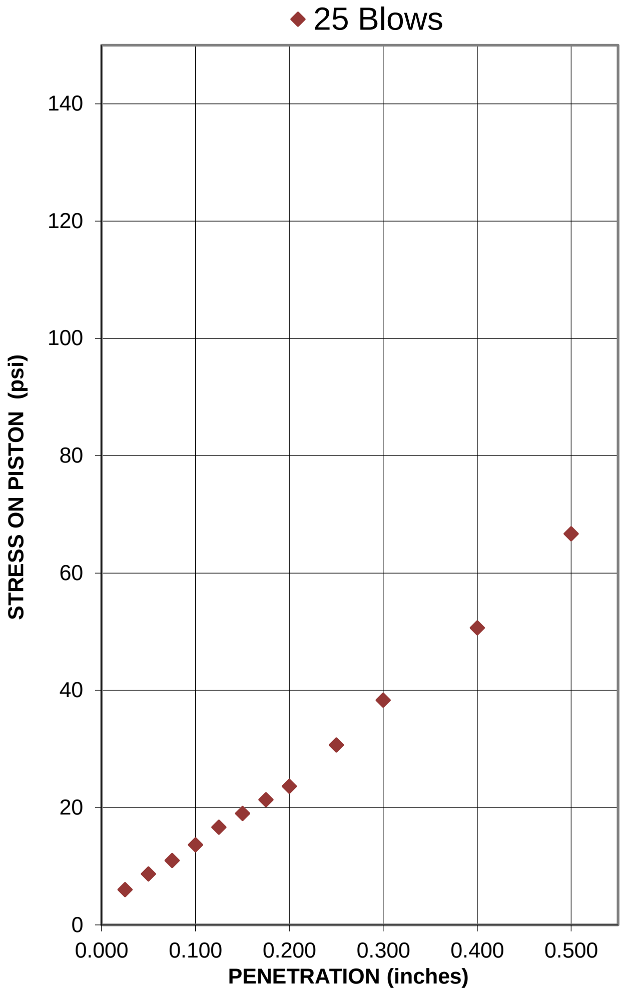
Terracon

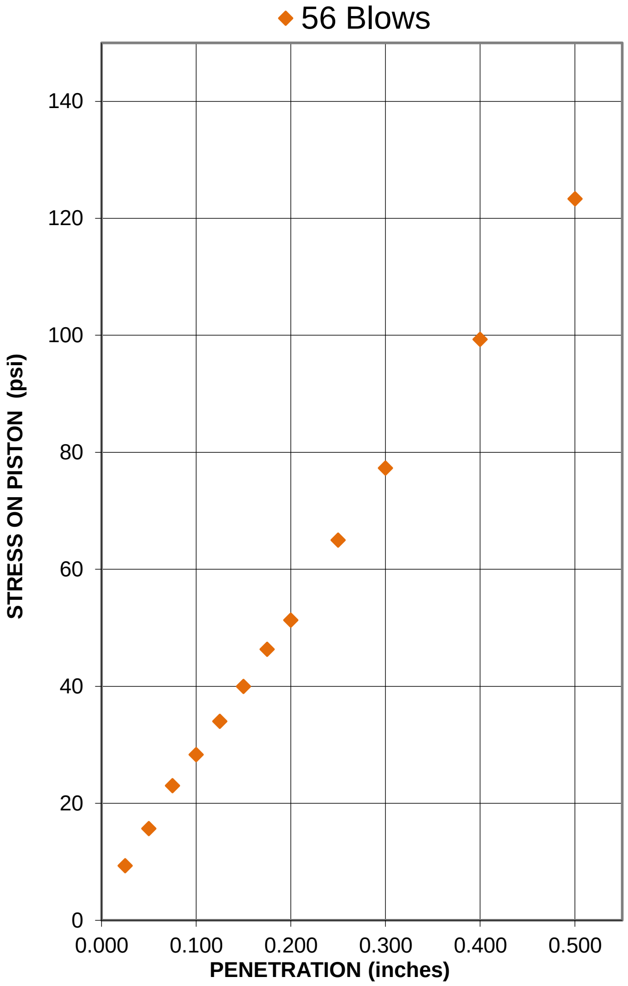
PROJECT: Fountain Wind Project
LOCATION: Eastern Shasta County
MATERIAL: TR-6 @ 1' - 4'
SAMPLE SOURCE: Native

PROJECT NO: NB215025
WORK ORDER NO: 03
LAB NO: 064
DATE SAMPLED: 5/17/21

	Blows per Lift	Compaction %	Compaction Method	Surcharge Weight (Lb.)	Sample Condition	Percent Swell	Before Soak		After Soak	
							Dry Density	Moisture %	Dry Density	Moisture %
Point 1	10	87.7	ASTM D1557	10	Soak	0.11	71.9	44.9	74.8	41.8
Point 2	25	96.9	ASTM D1557	10	Soak	0.11	79.4	44.8	81.6	41.9
Point 3	56	101.4	ASTM D1557	10	Soak	0.11	83.2	42.5	84.2	38.2







REVIEWED BY

CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

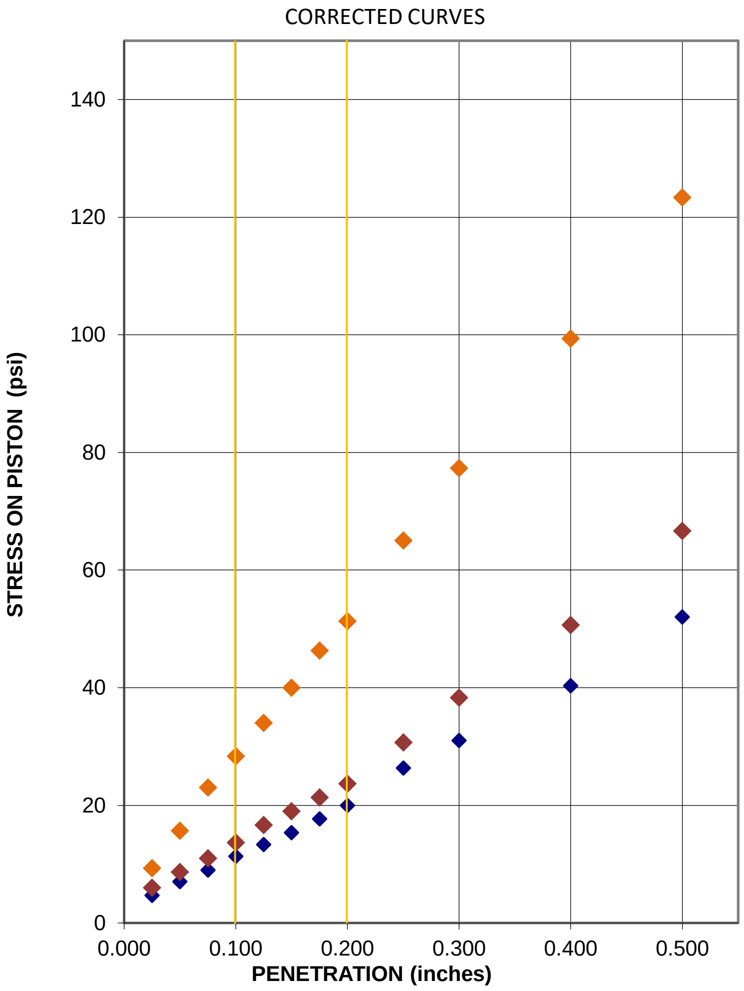
PROJECT:	Fountain Wind Project	**JOB NO:**	NB215025
LOCATION:	Eastern Shasta County	**WORK ORDER NO:**	03
MATERIAL:	TR-6 @ 1' - 4'	**LAB NO:**	064
SAMPLE SOURCE:	Native	**DATE SAMPLED:**	5/17/21

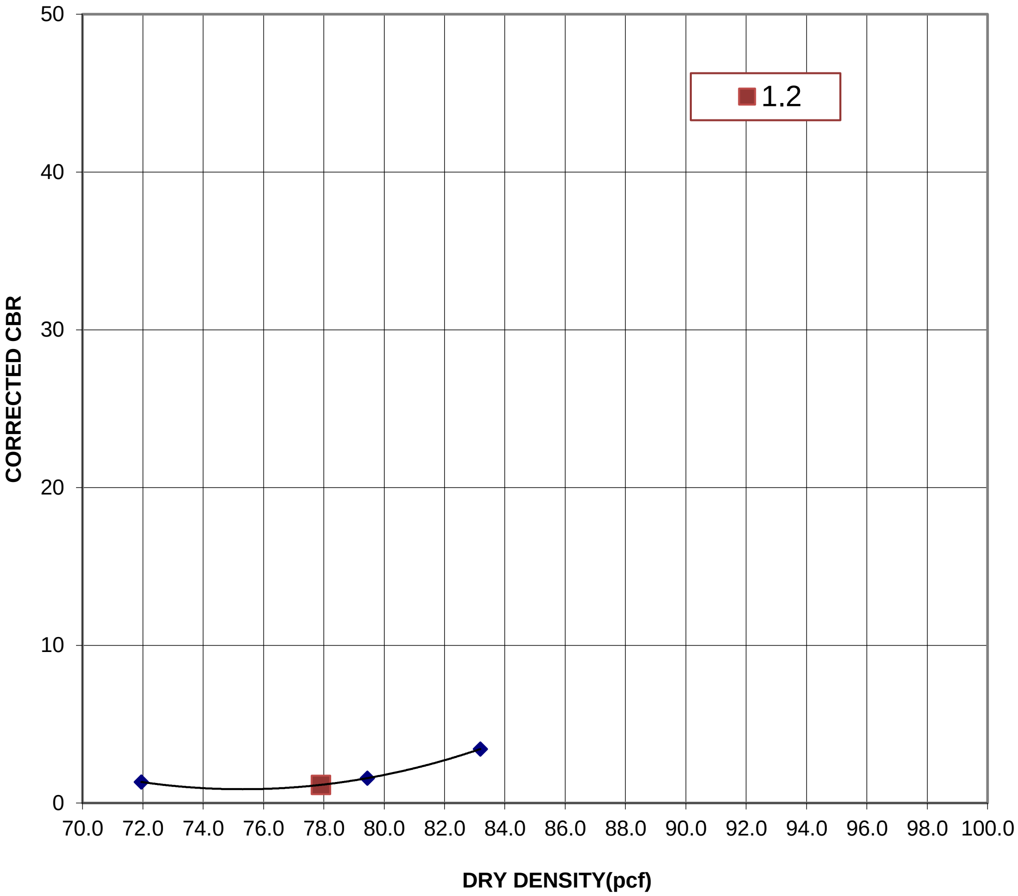
	Correction Factor		Corrected CBR		
	0.1"	0.2"	0.1"	0.2"	CBR
Point 1	0.00	0.00	1.1	1.3	1.3
Point 2	0.00	0.00	1.4	1.6	1.6
Point 3	0.00	0.00	2.8	3.4	3.4

ASTM D1557			
Moisture	Dry Density (pcf)		
%	100%	95%	90%
38.3	82.0	77.9	73.8

95% COMPACTION CBR (.2")

1.2





REVIEWED BY

CHEMICAL LABORATORY TEST REPORT

Project Number: NB215025
Service Date: 06/16/21
Report Date: 06/17/21

Terracon

10400 State Highway 191
Midland, Texas 79707
432-684-9600

Client

ConnectGen Operating LLC
1001 McKinney Street, Suite 700
Houston, TX 77002

Project

Fountain Wind Project
Eastern Shasta County
Burney, CA 96013

Sample Location	A01	B05	C06	E01	F06	J02	K04
Sample Depth (ft.)	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5
pH Analysis, ASTM - G51-18	7.00	7.00	7.40	7.00	6.80	6.60	6.70
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	8	69	3	5	12	14	7
Sulfides, ASTM - D4658-15, (mg/kg)	nil	nil	nil	nil	nil	nil	nil
Chlorides, ASTM D 512 , (mg/kg)	10	18	7	10	7	8	10
RedOx, ASTM D-1498, (mV)	+366	+383	+427	+424	+416	+421	+417
Total Salts, ASTM D1125-14, (mg/kg)	117	177	20	49	78	58	27
Resistivity, ASTM G187, (ohm-cm)	13,423	10,325	185,850	32,008	17,553	15,488	175,525

Analyzed By:

Nohelia Monasterios
Field Engineer

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

CHEMICAL LABORATORY TEST REPORT

Project Number: NB215025
Service Date: 06/16/21
Report Date: 06/17/21

Terracon
10400 State Highway 191
Midland, Texas 79707
432-684-9600

Client

ConnectGen Operating LLC
1001 McKinney Street, Suite 700
Houston, TX 77002

Project

Fountain Wind Project
Eastern Shasta County
Burney, CA 96013

Sample Location	L05	M10	N02	O&M	OHCL-1	OHCL-2	SUB
Sample Depth (ft.)	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5	1-2.5
pH Analysis, ASTM - G51-18	6.60	6.50	6.40	6.40	6.30	6.30	6.20
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	18	10	12	21	30	8	14
Sulfides, ASTM - D4658-15, (mg/kg)	nil	nil	nil	nil	nil	nil	nil
Chlorides, ASTM D 512 , (mg/kg)	9	6	14	11	10	9	13
RedOx, ASTM D-1498, (mV)	+432	+424	+427	+418	+410	+412	+416
Total Salts, ASTM D1125-14, (mg/kg)	53	83	70	52	62	67	82
Resistivity, ASTM G187, (ohm-cm)	36,138	15,488	20,650	30,975	22,715	20,650	15,488

Analyzed By:

Nohelia Monasterios
Field Engineer

CHEMICAL LABORATORY TEST REPORT

Project Number: NB215025
Service Date: 06/16/21
Report Date: 06/17/21

Terracon
10400 State Highway 191
Midland, Texas 79707
432-684-9600

Client

ConnectGen Operating LLC
1001 McKinney Street, Suite 700
Houston, TX 77002

Project

Fountain Wind Project
Eastern Shasta County
Burney, CA 96013

Sample Location	SWT
Sample Depth (ft.)	1-2
pH Analysis, ASTM - G51-18	6.10
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	17
Sulfides, ASTM - D4658-15, (mg/kg)	nil
Chlorides, ASTM D 512 , (mg/kg)	8
RedOx, ASTM D-1498, (mV)	+423
Total Salts, ASTM D1125-14, (mg/kg)	85
Resistivity, ASTM G187, (ohm-cm)	27,878

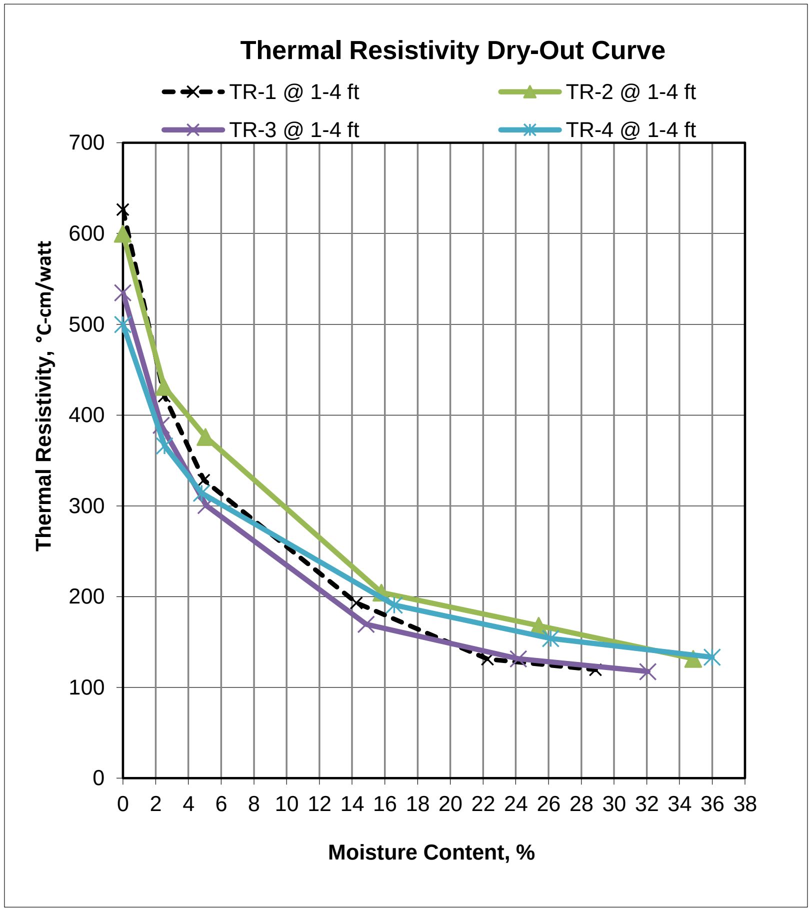
Analyzed By:

Nohelia Monasterios
Field Engineer

Project Name: Fountain Wind Project
Project Number: NB215025

Sample ID	Soil Type	Proctor Method	Max. Dry Density (pcf)	Optimum Moisture Content (%)	Sample Compaction (%)	Thermal Resistivity Test Results		
						Moisture Content (%)	**Thermal Resistivity (˚C-cm/watt)**	**Temperature (˚C)**
TR-1 @ 1-4 ft	SM	ASTM D 1557-A	90.0	27.5	90	0.0	626	24.2
						2.5	421	24.1
						5.0	328	23.9
						14.3	193	24.2
						22.3	131	23.5
						28.9	119	23.8
TR-2 @ 1-4 ft	SM	ASTM D 1557-A	81.9	33.4	90	0.0	600	23.6
						2.5	431	23.7
						5.1	376	23.7
						15.8	204	23.3
						25.4	168	23.3
						34.8	132	23.9
TR-3 @ 1-4 ft	SM	ASTM D 1557-A	86.9	30.2	90	0.0	535	22.2
						2.3	389	22.7
						5.1	300	23.0
						14.9	169	23.3
						24.2	132	23.3
						32.1	118	23.8
TR-4 @ 1-4 ft	SM	ASTM D 1557-A	82.9	32.1	89	0.0	500	22.7
						2.5	366	22.2
						4.8	314	22.4
						16.6	191	23.2
						26.1	154	23.7
						36.0	133	23.6

Notes: Material appears to be residual bedrock with low densities and high moisture contents. These soil conditions are conducive to the noted high thermal resistivity test values.



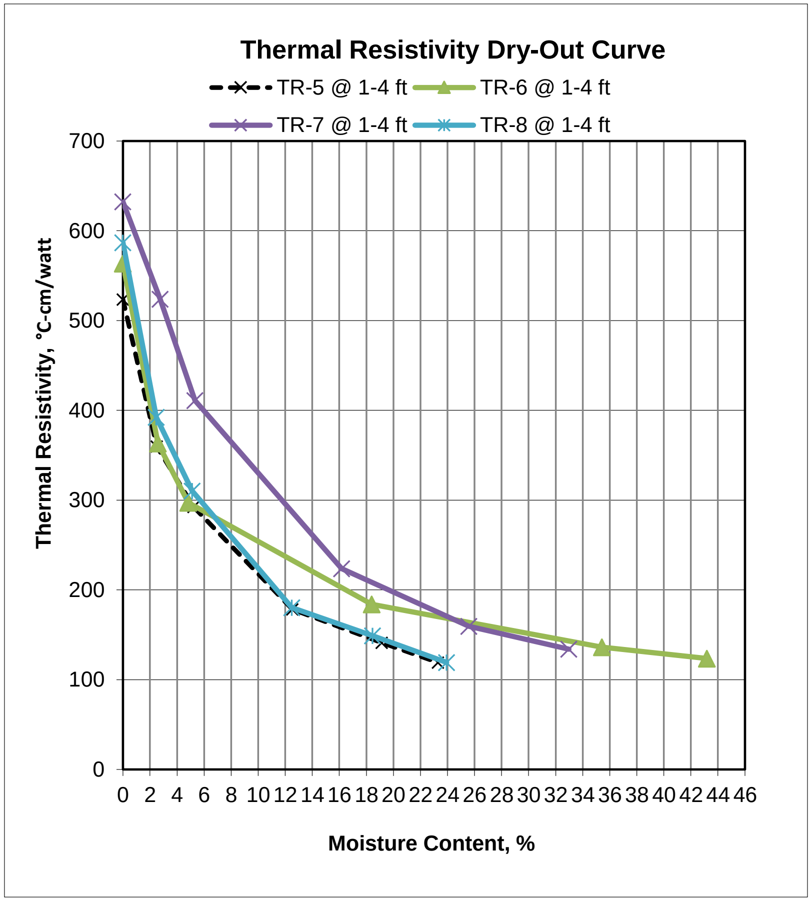
Date: 6/23/21
Run By: P. Arends
Reviewed By: BWP

Terracon

Project Name: Fountain Wind Project
Project Number: NB215025

						Thermal Resistivity Test Results		
Sample ID	**Soil Type**	**Proctor Method**	**Max. Dry Density (pcf)**	**Optimum Moisture Content (%)**	**Sample Compaction (%)**	**Moisture Content (%)**	**Thermal Resistivity (˚C-cm/watt)**	**Temperature (˚C)**
TR-5 @ 1-4 ft	SM	ASTM D 1557-A	87.1	21.0	89	0.0	523	22.8
						2.5	360	23.2
						5.2	292	23.6
						12.5	178	24.0
						19.1	141	24.1
						23.3	119	24.8
TR-6 @ 1-4 ft	SM	ASTM D 1557-A	82.0	38.3	89	0.0	564	22.7
						2.6	363	22.9
						4.8	297	23.1
						18.4	184	22.9
						35.4	136	23.3
						43.2	124	23.5
TR-7 @ 1-4 ft	SM	ASTM D 1557-A	82.7	31.1	89	0.0	632	22.2
						2.8	524	23.2
						5.3	411	22.8
						16.2	224	22.8
						25.6	159	22.8
						33.0	134	22.9
TR-8 @ 1-4 ft	SM	ASTM D 1557-A	100.3	21.6	89	0.0	587	23.8
						2.5	392	23.8
						5.1	310	24.2
						12.5	180	23.4
						18.5	149	23.3
						23.9	119	23.1

Notes: MMaterial appears to be residual bedrock with low densities and high moisture contents. These soil conditions are conducive to the noted high thermal resistivity test values.



Date: 6/25/21	Run By: P. Arends	Reviewed By: BWP

Terracon

FIELD ELECTRICAL RESISTIVITY TEST DATA

Fountain Wind ■ Burney, Shasta County, California
July 13, 2021 ■ Terracon Project No. NB215025

Array Loc. ER1: 40.846092, -121.828823

Instrument Mini-Res Resistivity Meter, LRI

Weather Partly Cloudy, 70°F

Serial # SN-021

Ground Cond. Earthen: short grasses, trees, gravel, cobbles

Cal. Check May 19, 2021

Tested By S.D.

Test Date May 20, 2021

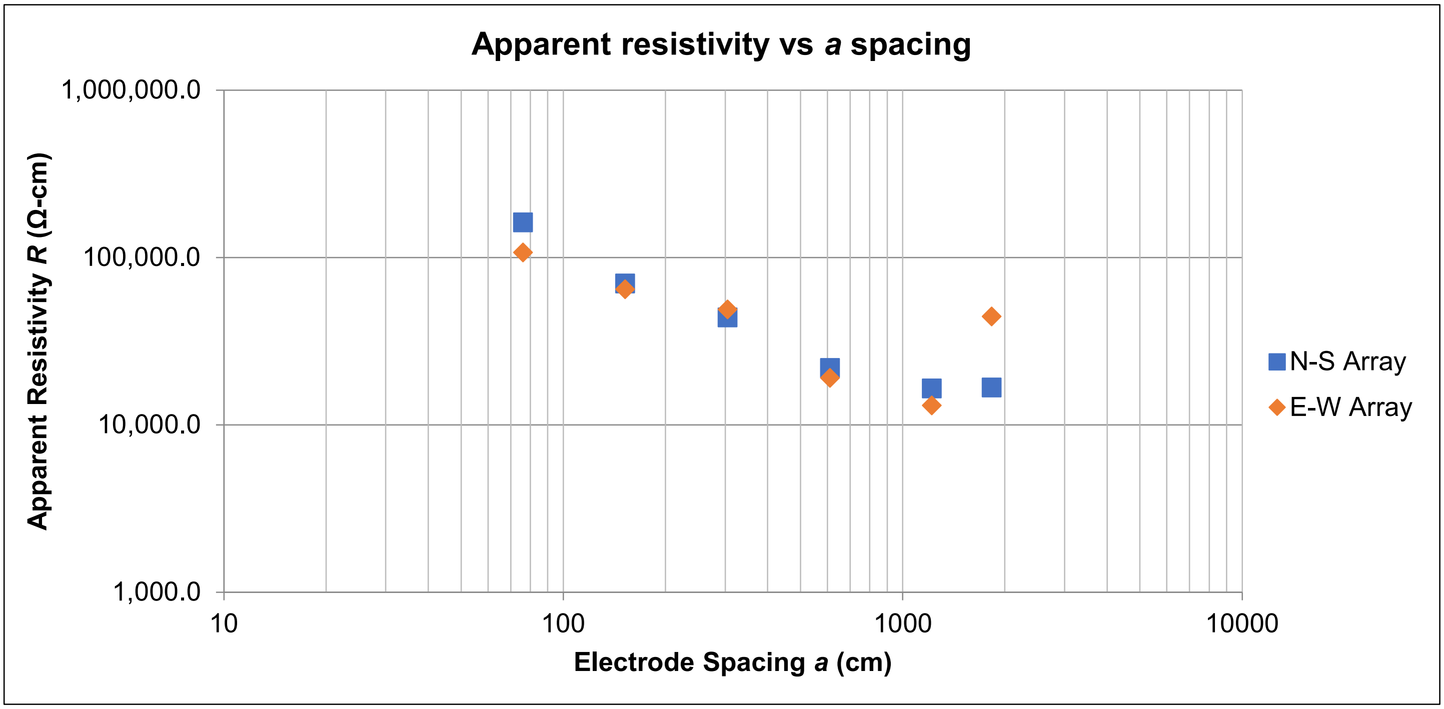
Method Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)

Notes & Conflicts

Apparent resistivity ρ is calculated as :

$$\rho = \frac{4\pi a R}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$$

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity *ρ*	Measured Resistance *R*	Apparent Resistivity *ρ*
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	4	10	331.00	162720	219.00	107660
5	152	4	10	72.95	70190	67.55	65000
10	305	4	10	22.90	43970	25.57	49090
20	610	4	10	5.72	21930	5.00	19170
40	1219	4	10	2.16	16550	1.71	13100
60	1829	4	10	1.46	16780	3.89	44710



FIELD ELECTRICAL RESISTIVITY TEST DATA

Fountain Wind ■ Burney, Shasta County, California
July 13, 2021 ■ Terracon Project No. NB215025

Array Loc. ER2: 40.8526972822, -121.851529152

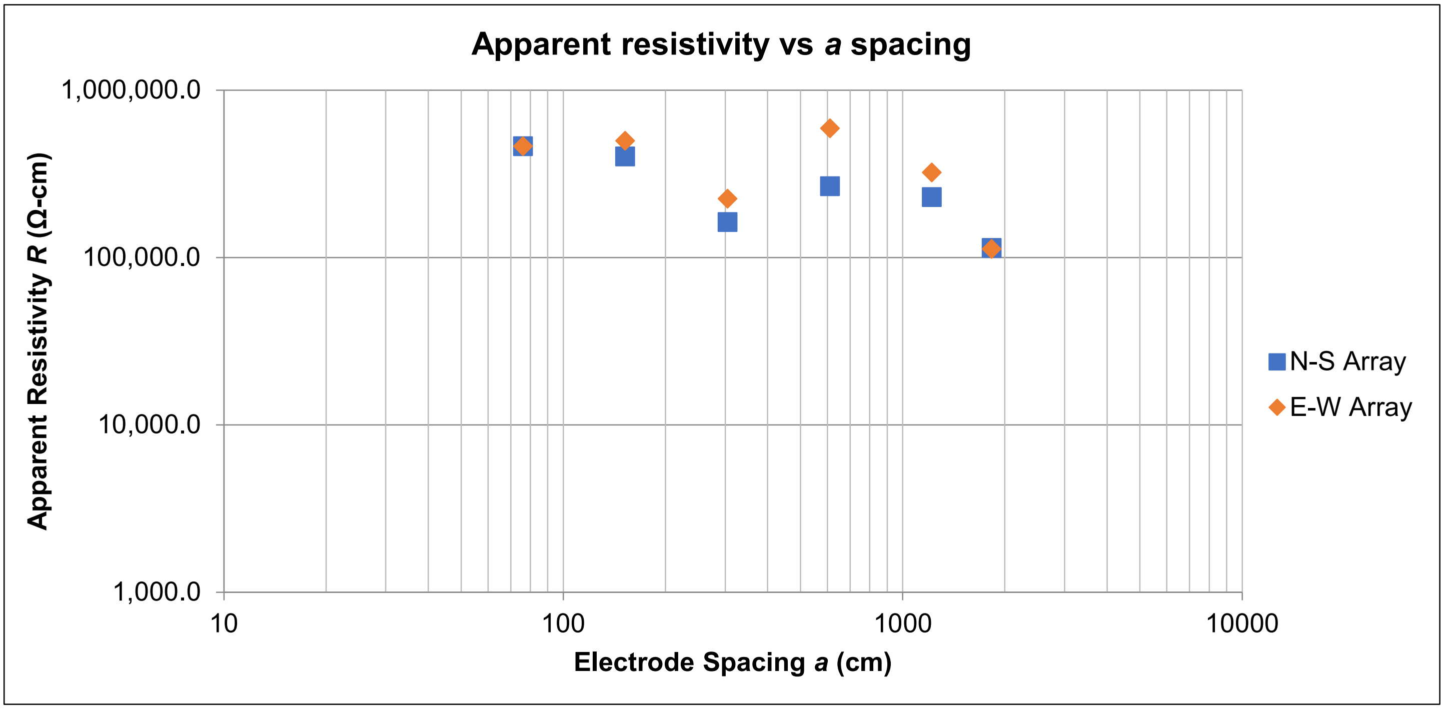
Instrument	Mini-Res Resistivity Meter, LRI	**Weather**	Partly Cloudy, 70°F
Serial #	SN-021	**Ground Cond.**	Earthen: short grasses, trees, gravel, cobbles
Cal. Check	May 19, 2021	**Tested By**	S.D.
Test Date	May 19, 2021	**Method**	Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)

Notes & Conflicts

Apparent resistivity ρ is calculated as :

$$\rho = \frac{4\pi a R}{1+\frac{2a}{\sqrt{a^2+4b^2}}-\frac{a}{\sqrt{a^2+b^2}}}$$

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity *ρ*	Measured Resistance *R*	Apparent Resistivity *ρ*
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	4	10	946.00	465060	947.00	465550
5	152	4	10	420.00	404140	520.00	500360
10	305	4	10	85.17	163520	117.70	225980
20	610	4	10	69.88	267960	155.31	595540
40	1219	4	10	30.08	230420	42.21	323330
60	1829	4	10	9.95	114350	9.82	112860



FIELD ELECTRICAL RESISTIVITY TEST DATA

Fountain Wind ■ Burney, Shasta County, California
July 13, 2021 ■ Terracon Project No. NB215025

Array Loc. ER3: 40.835275, -121.779196

Instrument Mini-Res Resistivity Meter, LRI

Weather Partly Cloudy, 70°F

Serial # SN-021

Ground Cond. Earthen: short grasses, trees, gravel, cobbles

Cal. Check May 19, 2021

Tested By S.D.

Test Date May 19, 2021

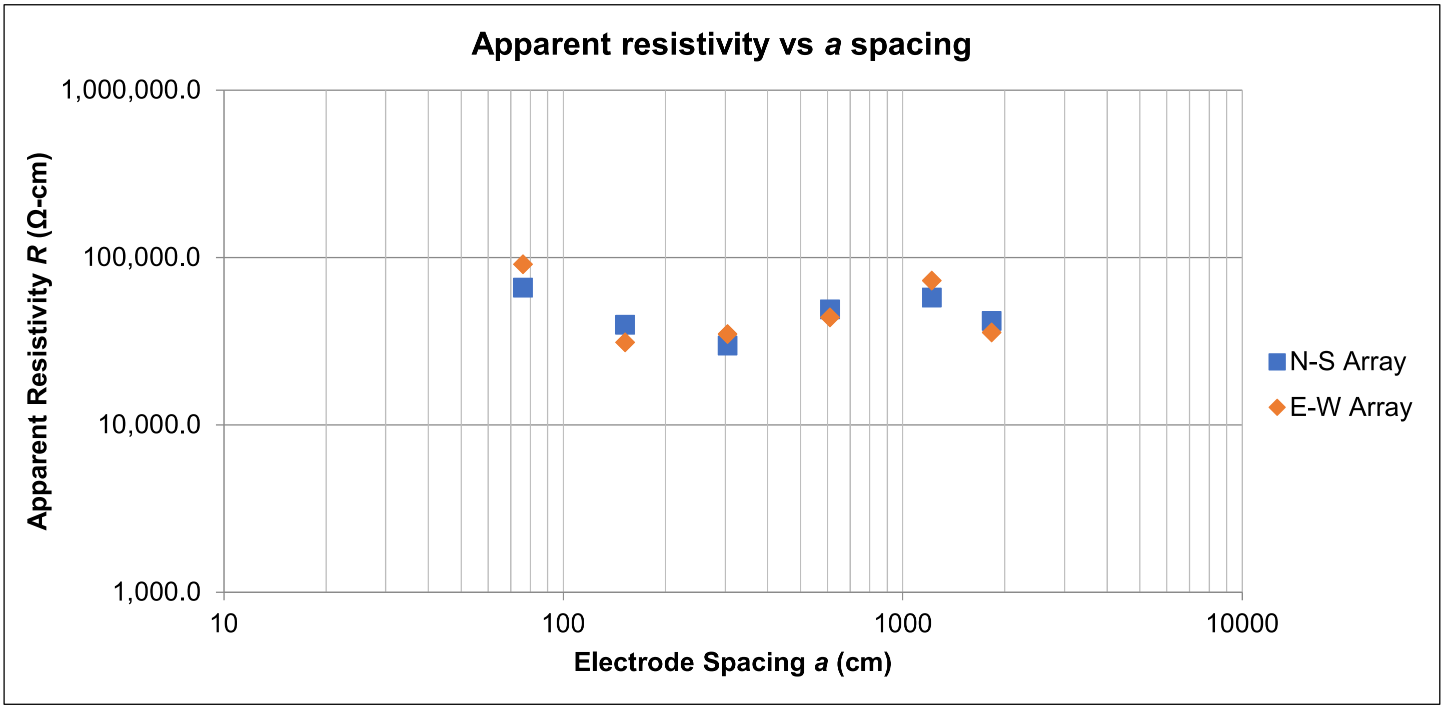
Method Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)

Notes & Conflicts

Apparent resistivity ρ is calculated as :

$$\rho = \frac{4\pi a R}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$$

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	4	10	134.94	66340	186.46	91670
5	152	4	10	41.34	39780	32.46	31230
10	305	4	10	15.60	29950	18.25	35040
20	610	4	10	12.82	49160	11.51	44140
40	1219	4	10	7.54	57760	9.53	73000
60	1829	4	10	3.66	42060	3.11	35740



FIELD ELECTRICAL RESISTIVITY TEST DATA

Fountain Wind ■ Burney, Shasta County, California
July 13, 2021 ■ Terracon Project No. NB215025

Terracon GeoReport

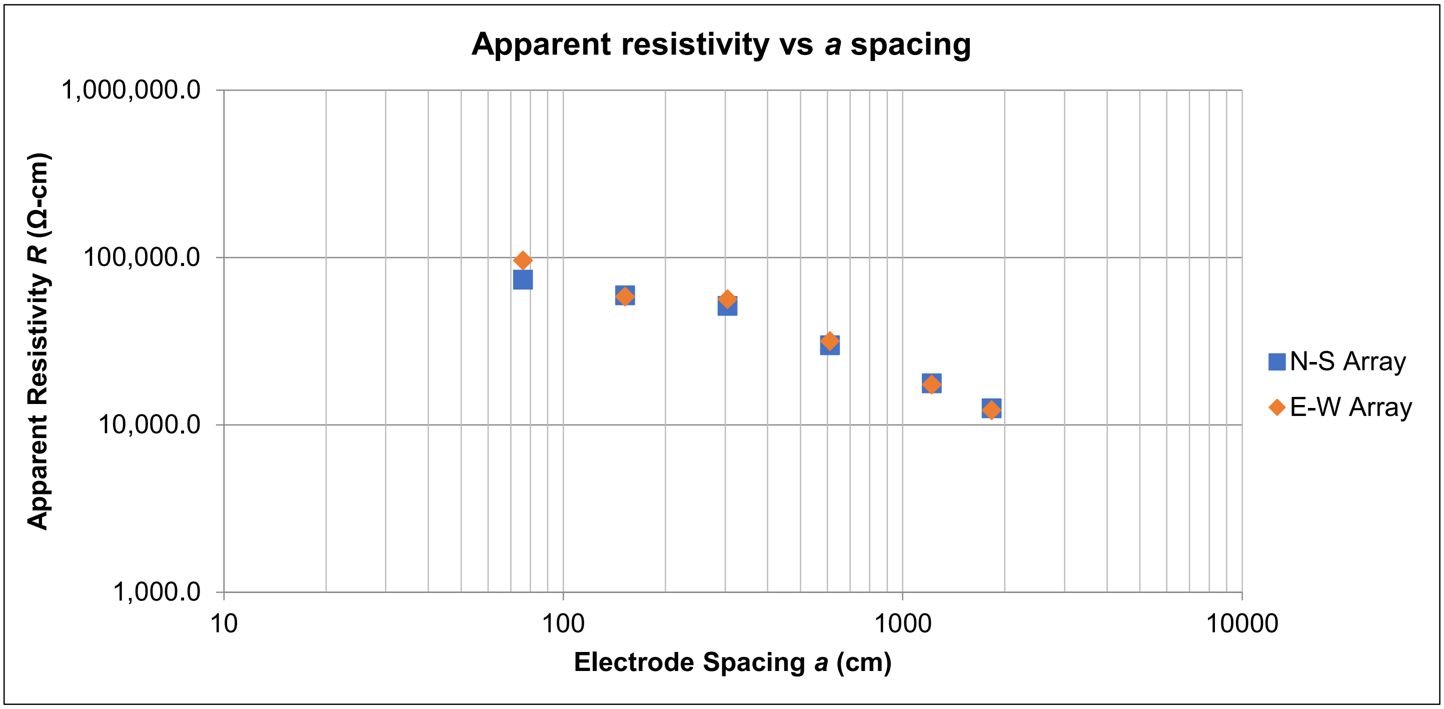
Array Loc. ER4: 40.81340914, -121.827679879

Instrument	Mini-Res Resistivity Meter, LRI	**Weather**	Partly Cloudy, 70°F
Serial #	SN-021	**Ground Cond.**	Earthen: short grasses, trees, gravel, cobbles
Cal. Check	May 19, 2021	**Tested By**	S.D.
Test Date	May 20, 2021	**Method**	Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)

Notes & Conflicts

Apparent resistivity ρ is calculated as : $\rho = \dfrac{4\pi a R}{1 + \dfrac{2a}{\sqrt{a^2+4b^2}} - \dfrac{a}{\sqrt{a^2+b^2}}}$

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	4	10	150.38	73930	195.91	96310
5	152	4	10	62.12	59770	60.84	58540
10	305	4	10	26.93	51700	29.47	56580
20	610	4	10	7.82	29990	8.31	31870
40	1219	4	10	2.32	17770	2.28	17470
60	1829	4	10	1.10	12640	1.07	12300



FIELD ELECTRICAL RESISTIVITY TEST DATA

Fountain Wind ■ Burney, Shasta County, California
July 13, 2021 ■ Terracon Project No. NB215025

Array Loc. ER5: 40.7948096096, -121.841487569

Instrument Mini-Res Resistivity Meter, LRI

Weather Partly Cloudy, 70°F

Serial # SN-021

Ground Cond. Earthen: short grasses, trees, gravel, cobbles

Cal. Check May 19, 2021

Tested By S.D.

Test Date May 20, 2021

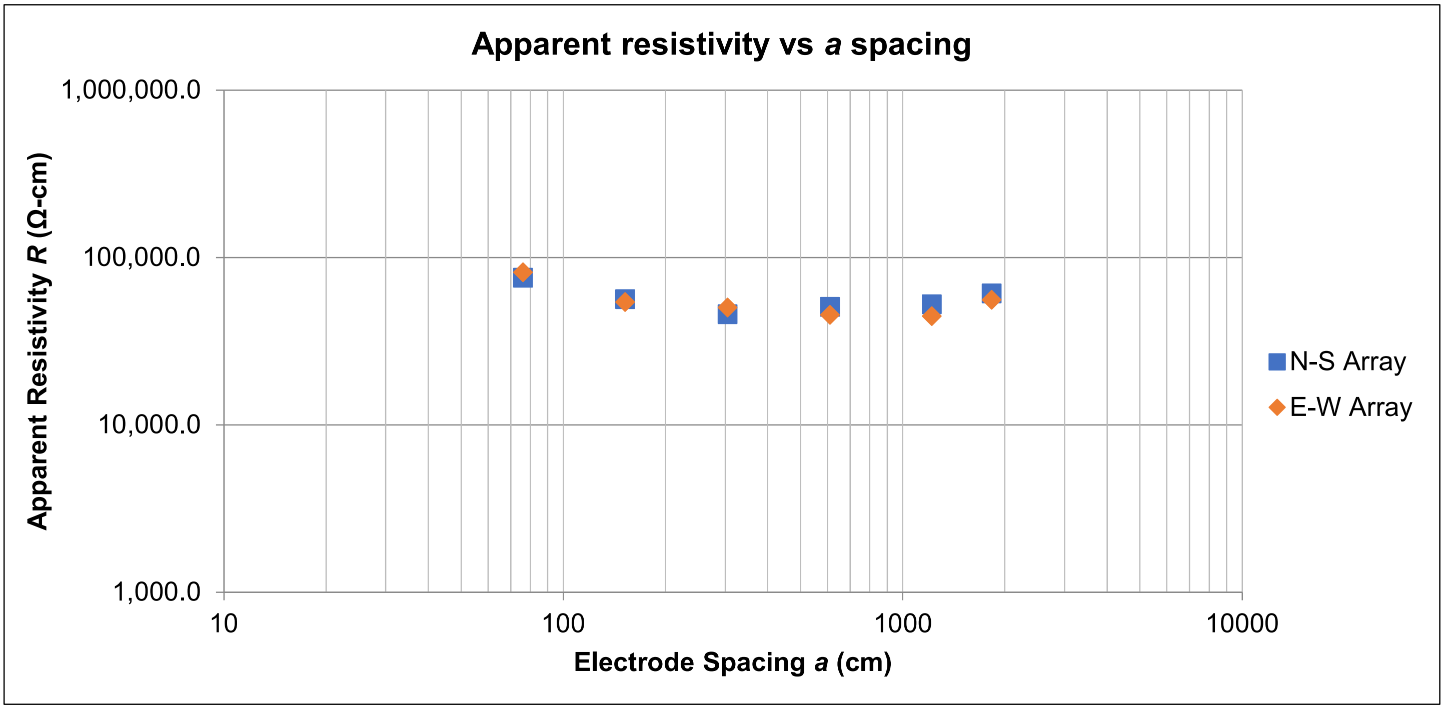
Method Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)

Notes & Conflicts

Apparent resistivity ρ is calculated as :

$$\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$$

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	4	10	154.62	76010	166.54	81870
5	152	4	10	58.92	56690	56.56	54420
10	305	4	10	24.00	46080	26.30	50500
20	610	4	10	13.31	51040	11.88	45550
40	1219	4	10	6.90	52850	5.85	44810
60	1829	4	10	5.33	61260	4.89	56200



FIELD ELECTRICAL RESISTIVITY TEST DATA

Fountain Wind ■ Burney, Shasta County, California
July 13, 2021 ■ Terracon Project No. NB215025

Array Loc. ER6: 40.887488, -121.834829

Instrument Mini-Res Resistivity Meter, LRI

Weather Partly Cloudy, 70°F

Serial # SN-021

Ground Cond. Earthen: short grasses, trees, gravel, cobbles

Cal. Check May 19, 2021

Tested By S.D.

Test Date May 19, 2021

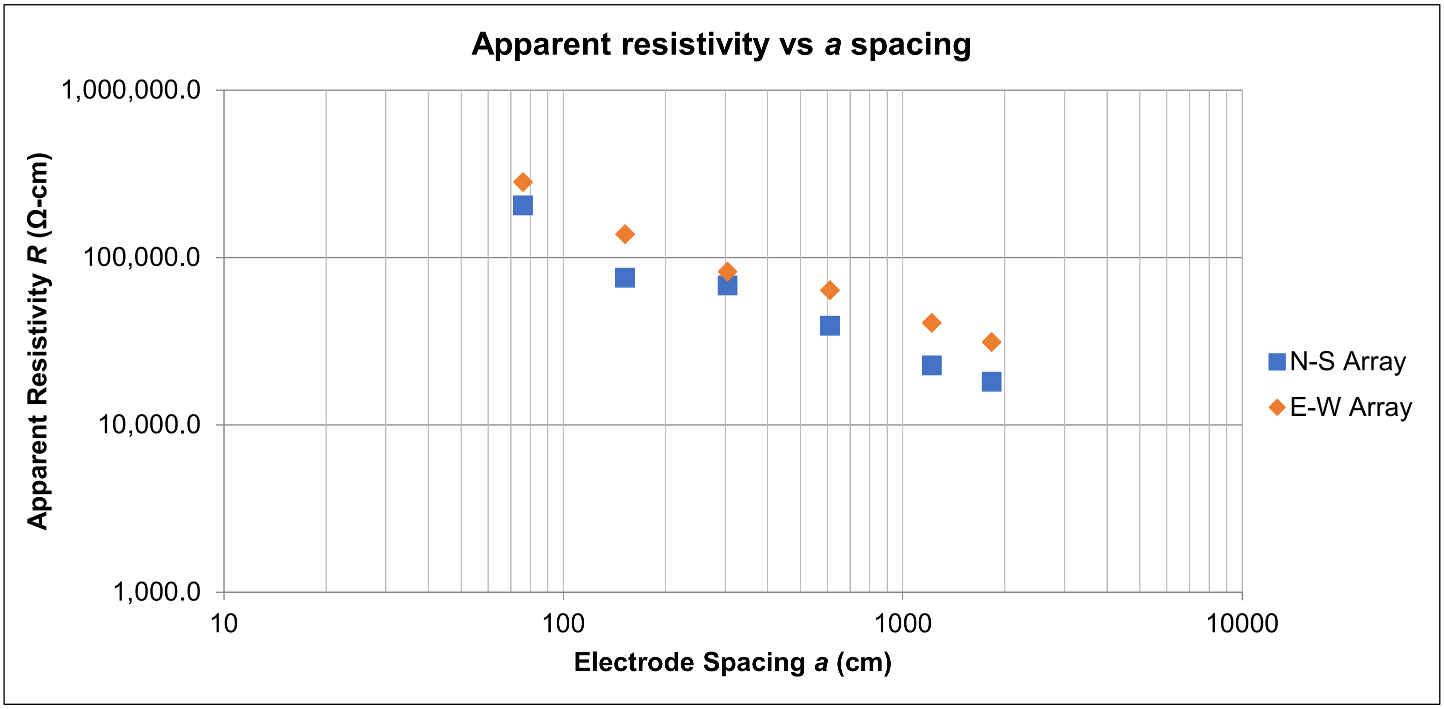
Method Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)

Notes & Conflicts

Apparent resistivity ρ is calculated as :

$$\rho = \frac{4\pi a R}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$$

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity *ρ*	Measured Resistance *R*	Apparent Resistivity *ρ*
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	4	10	418.00	205490	576.00	283170
5	152	4	10	79.01	76030	144.10	138660
10	305	4	10	35.70	68540	43.00	82560
20	610	4	10	10.25	39300	16.73	64150
40	1219	4	10	2.97	22750	5.34	40900
60	1829	4	10	1.58	18160	2.73	31370



FIELD ELECTRICAL RESISTIVITY TEST DATA

Fountain Wind ■ Burney, Shasta County, California
July 13, 2021 ■ Terracon Project No. NB215025

Array Loc. ER7: 40.781748, -121.836943

Instrument Mini-Res Resistivity Meter, LRI

Serial # SN-021

Cal. Check May 19, 2021

Test Date May 20, 2021

Weather Partly Cloudy, 70°F

Ground Cond. Earthen: short grasses, trees, gravel, cobbles

Tested By S.D.

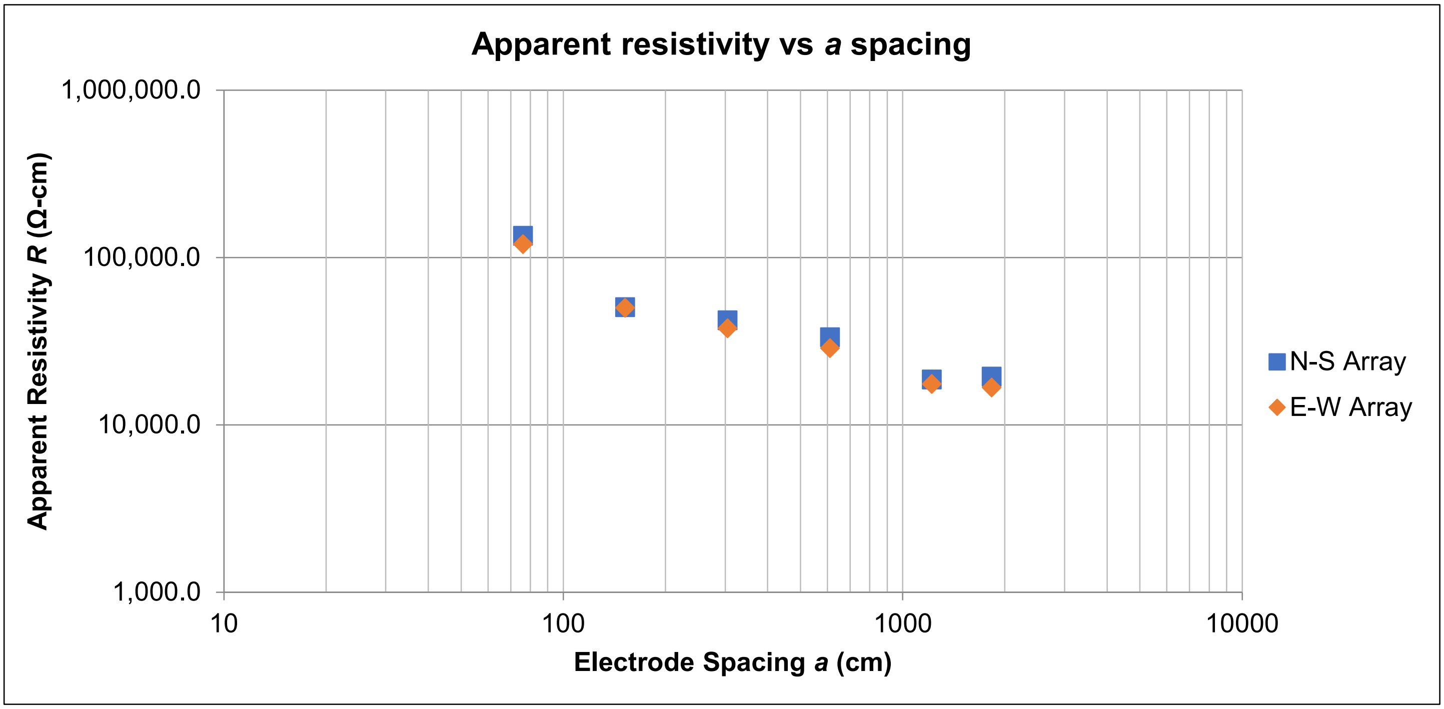
Method Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)

Notes & Conflicts

Apparent resistivity ρ is calculated as :

$$\rho = \frac{4\pi a R}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$$

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity *ρ*	Measured Resistance *R*	Apparent Resistivity *ρ*
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	4	10	276.00	135680	246.00	120940
5	152	4	10	52.76	50770	52.16	50190
10	305	4	10	22.03	42300	19.76	37940
20	610	4	10	8.75	33550	7.52	28840
40	1219	4	10	2.45	18770	2.30	17620
60	1829	4	10	1.70	19540	1.46	16780



FIELD ELECTRICAL RESISTIVITY TEST DATA

Fountain Wind ■ Burney, Shasta County, California
July 13, 2021 ■ Terracon Project No. NB215025

Terracon GeoReport

Array Loc. ER8: 40.8192332525, -121.793622182

Instrument Mini-Res Resistivity Meter, LRI

Weather Partly Cloudy, 70°F

Serial # SN-021

Ground Cond. Earthen: short grasses, trees, gravel, cobbles

Cal. Check May 19, 2021

Tested By S.D.

Test Date May 20, 2021

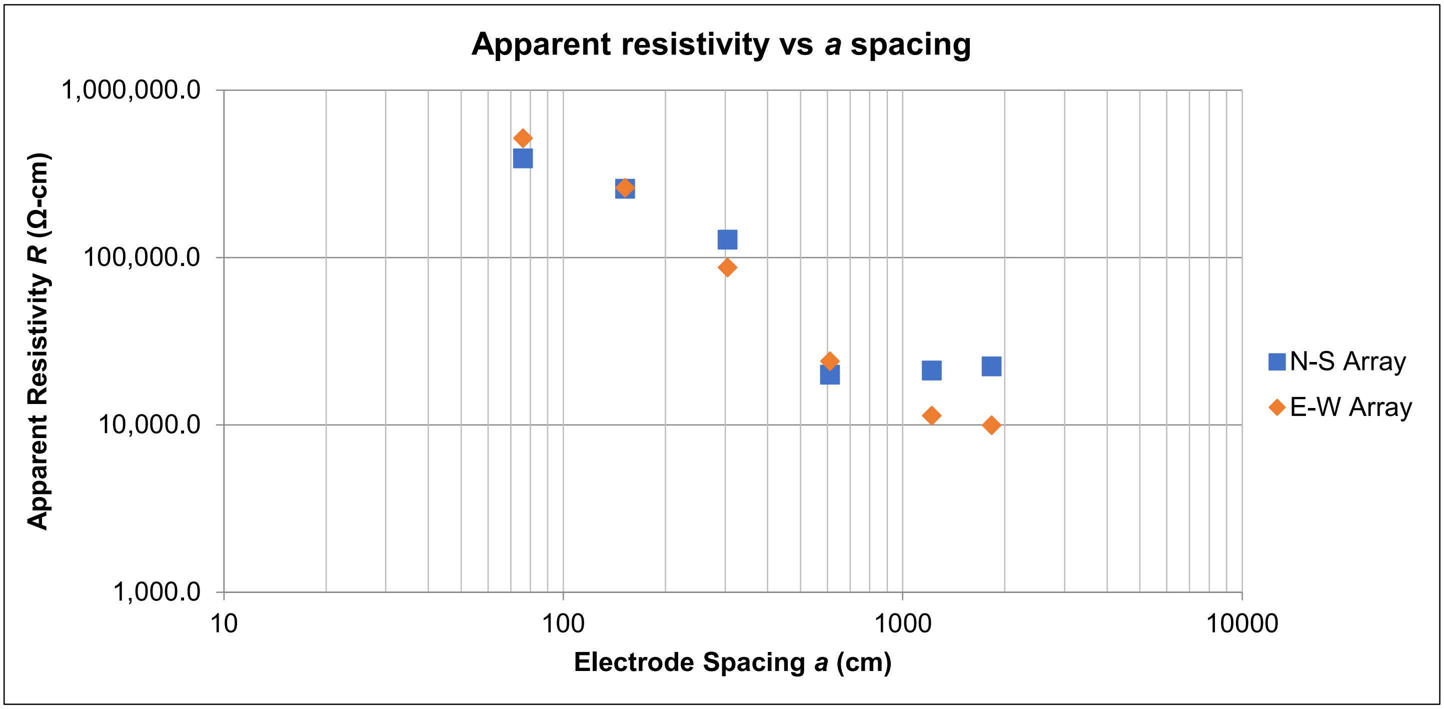
Method Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)

Notes & Conflicts

Apparent resistivity ρ is calculated as :

$$\rho = \frac{4\pi a R}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$$

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity *ρ*	Measured Resistance *R*	Apparent Resistivity *ρ*
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	4	10	801.00	393780	1,055.00	518650
5	152	4	10	269.00	258840	272.00	261730
10	305	4	10	66.93	128500	45.51	87380
20	610	4	10	5.22	20020	6.28	24080
40	1219	4	10	2.77	21220	1.49	11410
60	1829	4	10	1.95	22410	0.87	10000



SUPPORTING INFORMATION

Contents:

Note: All attachments are one page unless noted above.

Wind Turbine Generator Seismic Parameters

Boring No.	Latitude	Longitude	CBC 2019 Parameters							
			S_s	S_1	Site Class	PGA	PGA_M	Mean Magnitude	Fa	Fv
A-01	40.895587	-121.844703	***	***	D	***	***	***	***	***
B-05	40.834784	-121.777612	***	***	D	***	***	***	***	***
C-06	40.841301	-121.805107	0.835	0.331	C	0.367	0.440	6.74	1.200	1.500
E-01	40.834691	-121.863436	0.828	0.334	C	0.365	0.438	6.81	1.200	1.500
F-06	40.812176	-121.805193	0.837	0.333	C	0.367	0.441	6.71	1.200	1.500
J-02	40.797846	-121.805150	0.838	0.333	C	0.368	0.441	6.69	1.200	1.500
K-04	40.806437	-121.840925	***	***	D	***	***	***	***	***
L-05	40.792627	-121.840843	0.836	0.335	C	0.367	0.441	6.78	1.200	1.500
M-10	40.780898	-121.834169	0.837	0.335	C	0.368	0.441	6.78	1.200	1.500
N-02	40.773909	-121.863392	0.840	0.338	C	0.369	0.443	6.85	1.200	1.500

***Site class D sites with a mapped S_1 values greater than or equal to 0.2 require a site-specific ground motion study be performed to determine applicable seisimic design paramters. This assumes WTGs do not meet excpetion outlined in Section 11.4.8 of ASCE 7-16.

WIND TURBINE GENERATOR SOIL DYNAMIC PRPERTIES

			Small Strain Moduli		Moderate Strain Moduli (Wind Loads)	
Depth	**Shear Wave Velocity Vs (ft/sec)**	**Poisson's Ratio, υ**	**Estimated Shear Modulus, G_O (ksf)**	**Estimated Elastic Modulus, E_O (ksf)**	**Estimated Shear Modulus, G_1 (ksf)**	**Estimated Elastic Modulus, E_1 (ksf)**
A-01						
2 to 20	620	0.405	1313	3689	459	1289
20 to 50	1100	0.405	4133	11613	1446	4063
B-05						
2 to 17	923	0.405	2910	8177	1018	2860
17 to 32	1050	0.405	3766	10582	1318	3703
32 to 40	545	0.405	1012	2843	354	994
40 to 50	1150	0.405	4517	12692	1580	4439
C-06						
2 to 15	600	0.405	1229	3453	430	1208
15 to 20	1100	0.405	4321	12142	1512	4248
20 to 50	1500	0.373	8385	23025	2934	8056
E-01						
2 to 20	750	0.405	1921	5398	672	1888
20 to 50	1100	0.373	4509	12381	1578	4333
F-06						
2 to 25	900	0.405	2767	7775	968	2720
25 to 50	1180	0.405	4756	13364	1664	4675
J-02						
2 to 21	1226	0.405	5134	14426	1796	5046
21 to 50	1910	0.373	13028	35774	4559	12519
K-04						
2 to 20	684	0.405	1598	4490	559	1570
20 to 48	910	0.405	2828	7946	989	2779
48 to 58	442	0.405	667	1874	233	654
L-05						
2 to 19	600	0.405	1229	3453	430	1208
19 to 50	1433	0.405	7015	19712	2455	6898
M-10						
2 to 20	864	0.405	2550	7165	892	2506
20 to 50	1590	0.373	8636	23714	3022	8298
N-02						
2 to 21	1022	0.405	3568	10026	1248	3506
21 to 50	1590	0.373	9028	24790	3159	8674

WIND TURBINE GENERATOR FOUNDATION DESIGN RECOMMENDATIONS*						
WTG No.	Foundation Diameter	Embedment Depth	Anticipated Contact Pressure**	Allowable Lateral Pressure***	Base Coefficient of Friction	Estimated Settlement
A-01	80 feet	12 feet	2,800	250	0.33	2.00
B-05	80 feet	12 feet	2,800	250	0.35	2.00
C-06	80 feet	12 feet	2,800	250	0.35	<0.75
E-01	80 feet	12 feet	2,800	250	0.40	<0.75
F-06	80 feet	12 feet	2,800	250	0.33	1.75
J-02	80 feet	12 feet	2,800	250	0.35	<0.75
K-04	80 feet	12 feet	2,800	250	0.33	2.75
L-05	80 feet	12 feet	2,800	250	0.33	1.75
M-10	80 feet	12 feet	2,800	250	0.40	<0.75
N-02	80 feet	12 feet	2,800	250	0.40	<0.75

*Values provided in table are applicable for octagonal foundations

**Values calculated using an effective area determined from characteristic moment loads provided by ConnectGen.

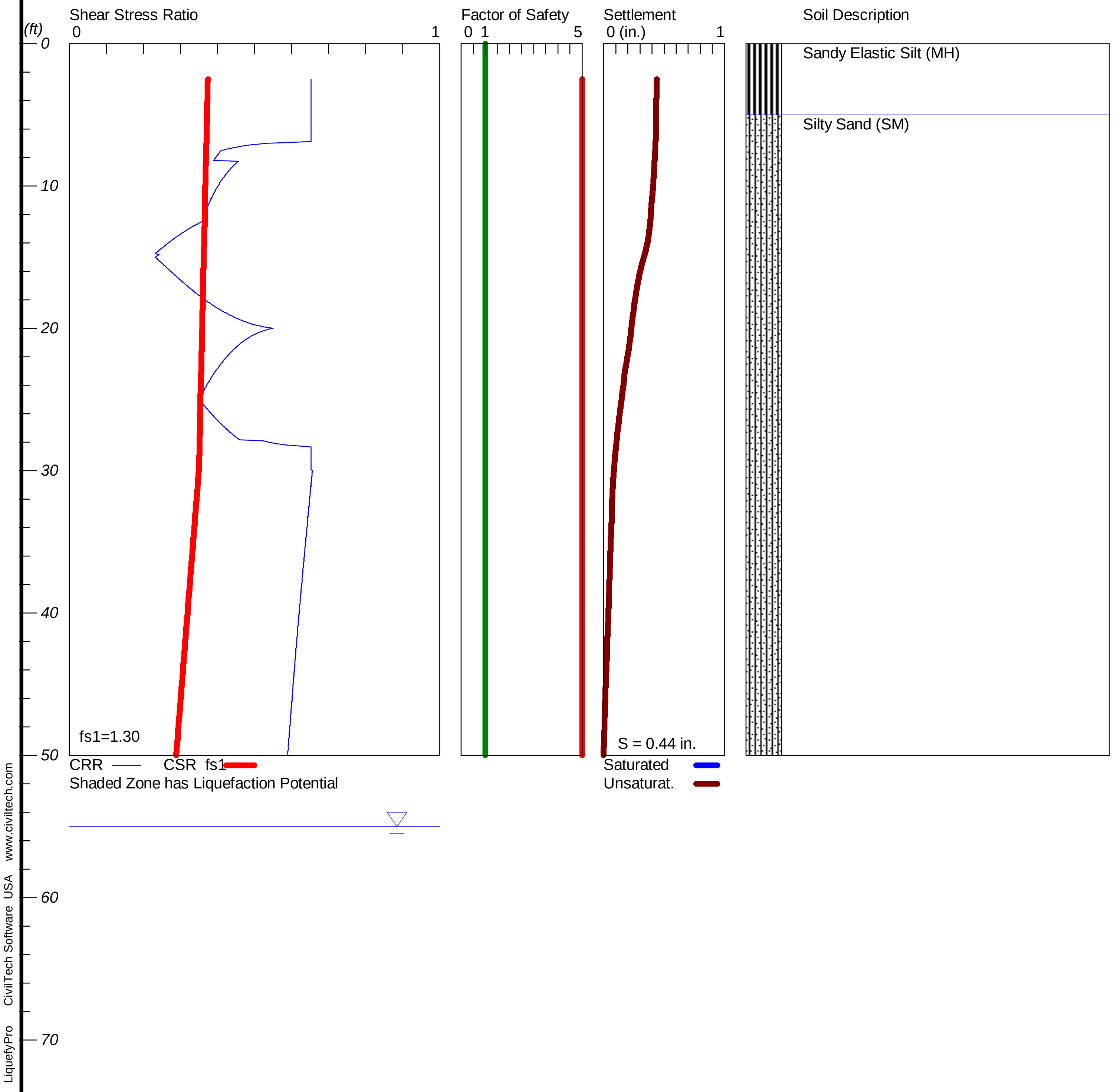
***These values are divided by a safety facor of 1.5.

LIQUEFACTION ANALYSIS

A-01

Hole No.=A-01 Water Depth=55 ft Surface Elev.=4872

Magnitude=6.76
Acceleration=0.445g

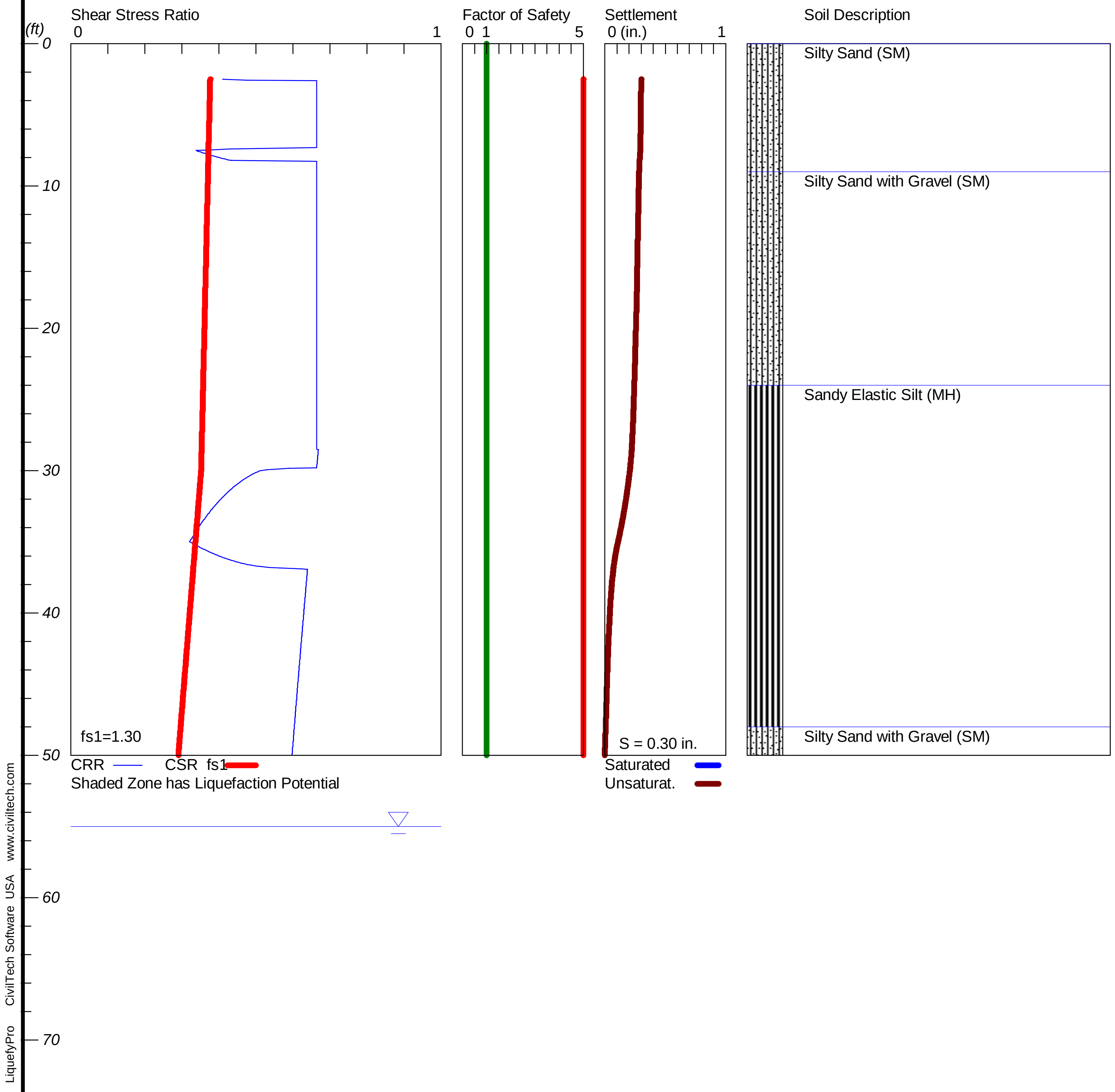


LIQUEFACTION ANALYSIS

B-05

Hole No.=B-05 Water Depth=55 ft Surface Elev.=4610

Magnitude=6.71
Acceleration=.448g

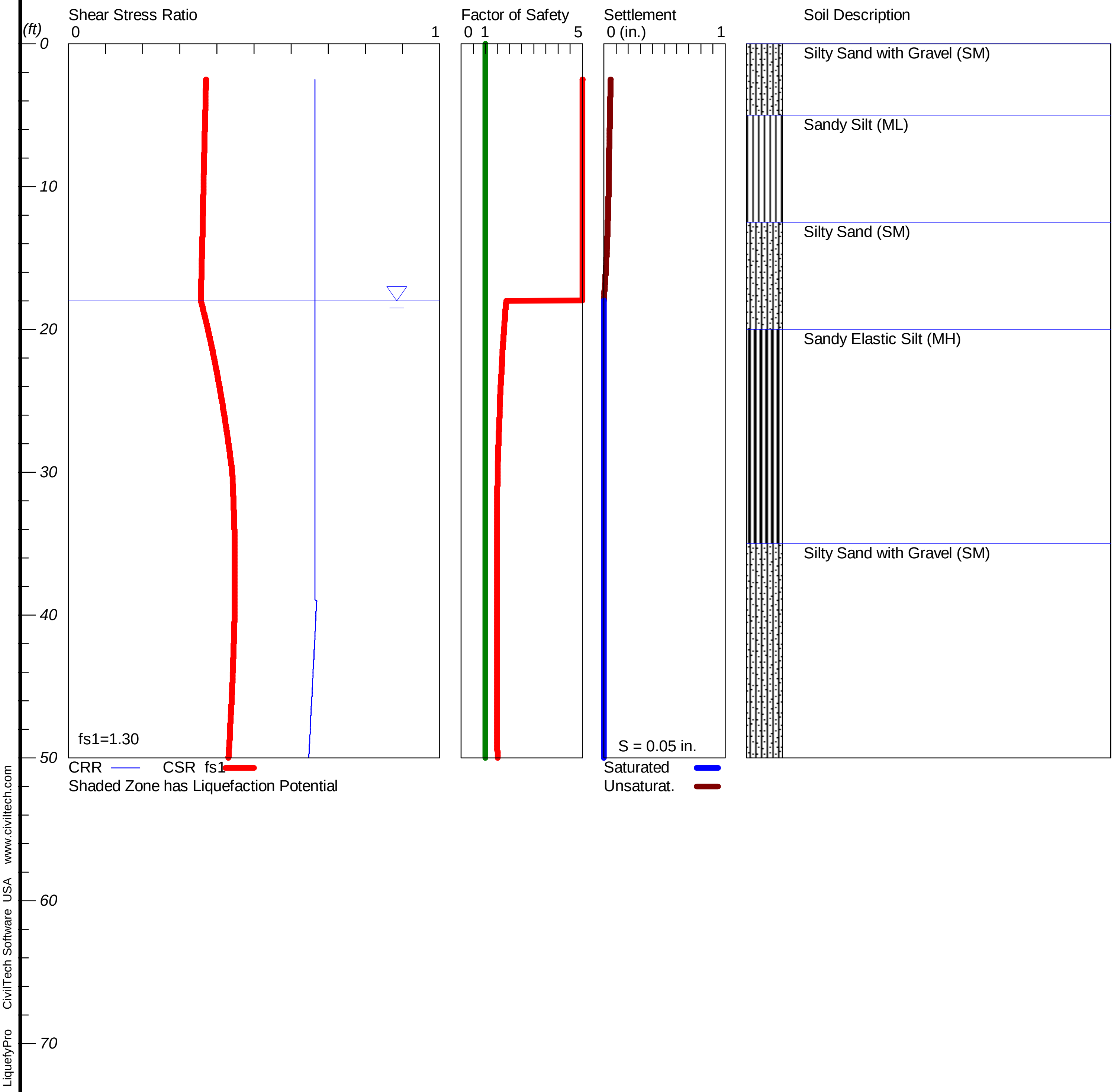


LIQUEFACTION ANALYSIS

F-06

Hole No.=F-06 Water Depth=18 ft Surface Elev.=4552

Magnitude=6.71
Acceleration=0.441g

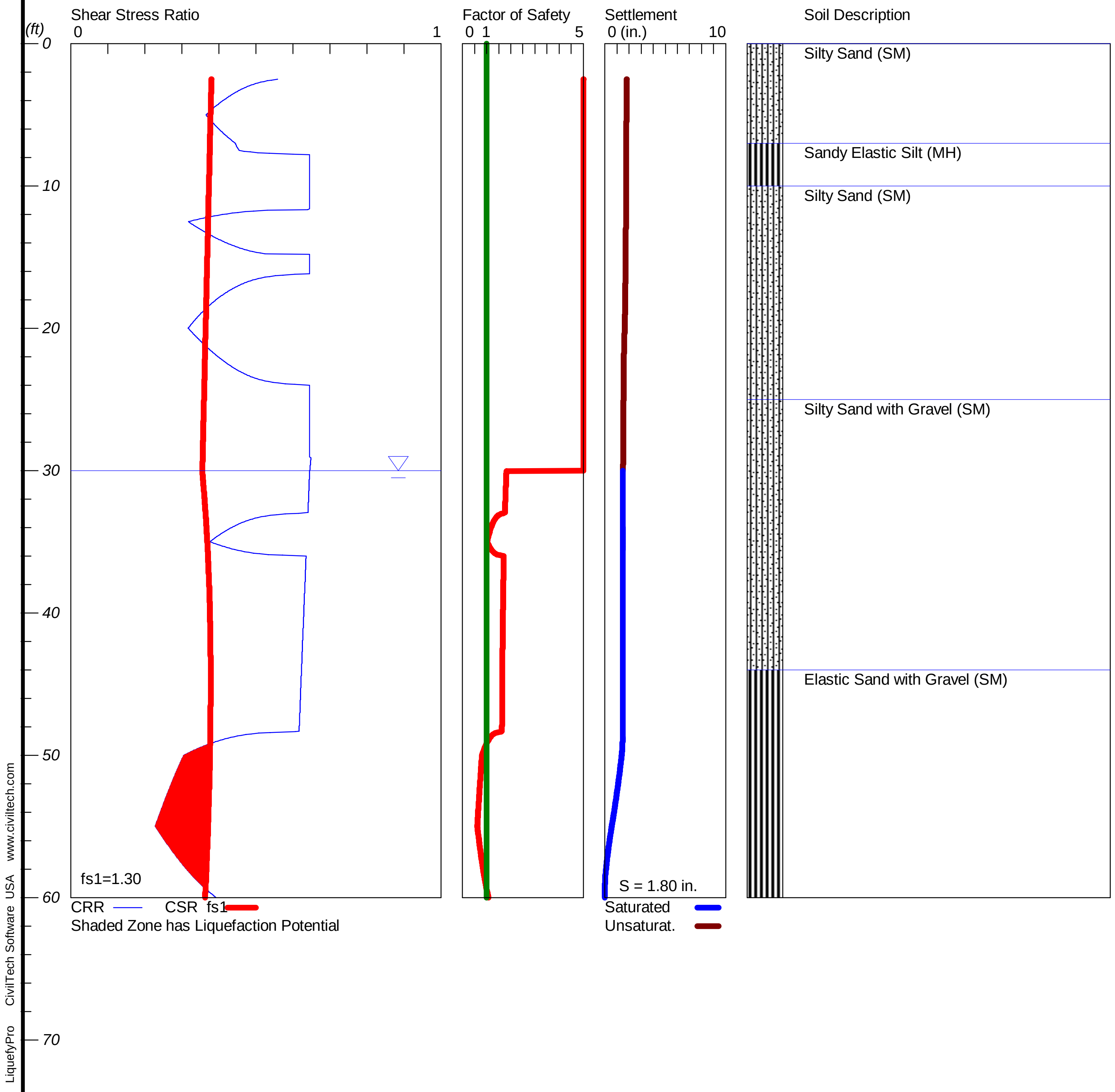


LIQUEFACTION ANALYSIS

K-04

Hole No.=K-04   Water Depth=30 ft   Surface Elev.=4551

Magnitude=6.79
Acceleration=0.452g

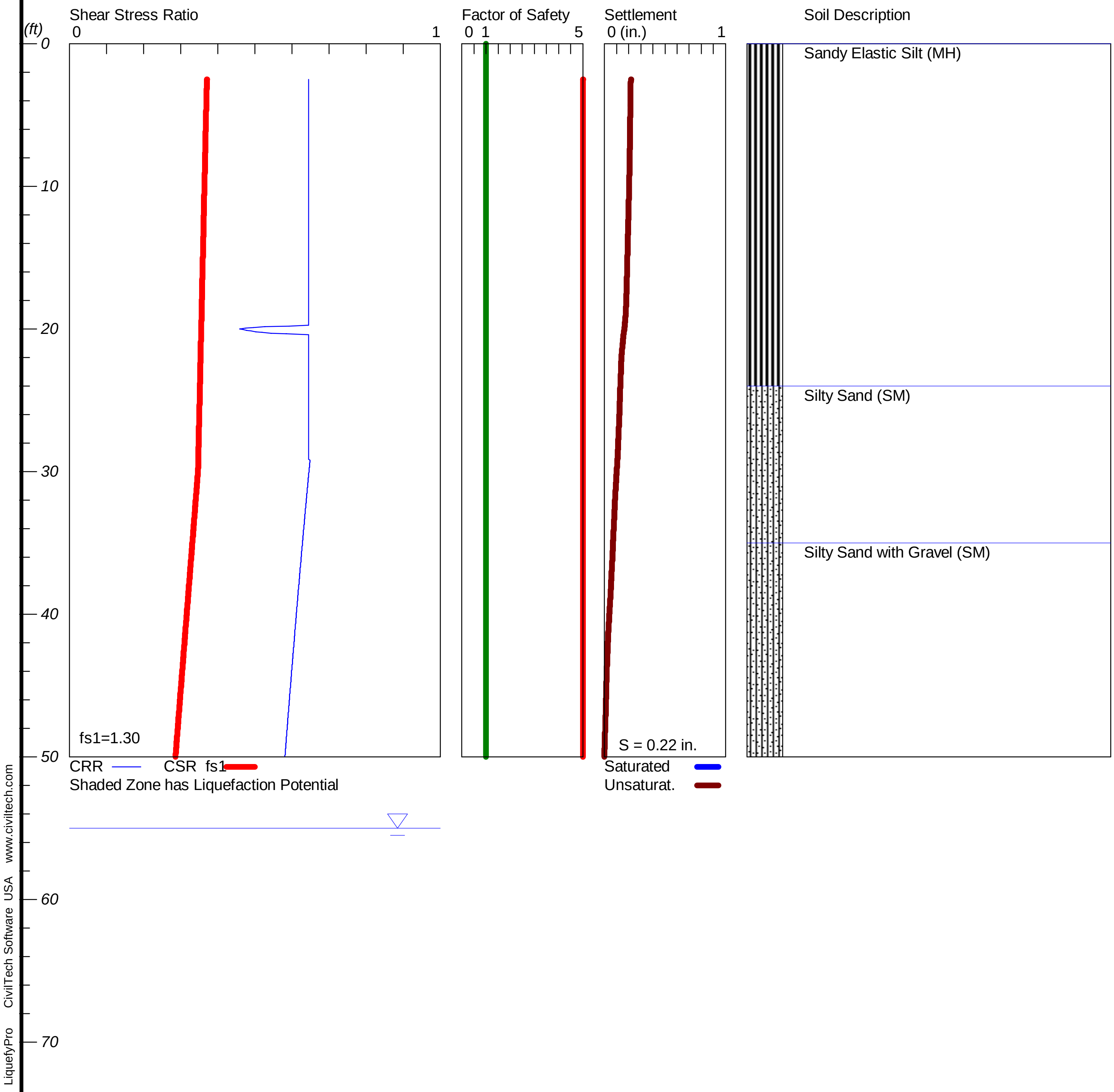


LIQUEFACTION ANALYSIS

L-05

Hole No.=L-05   Water Depth=55 ft   Surface Elev.=4808

Magnitude=6.79
Acceleration=.441g

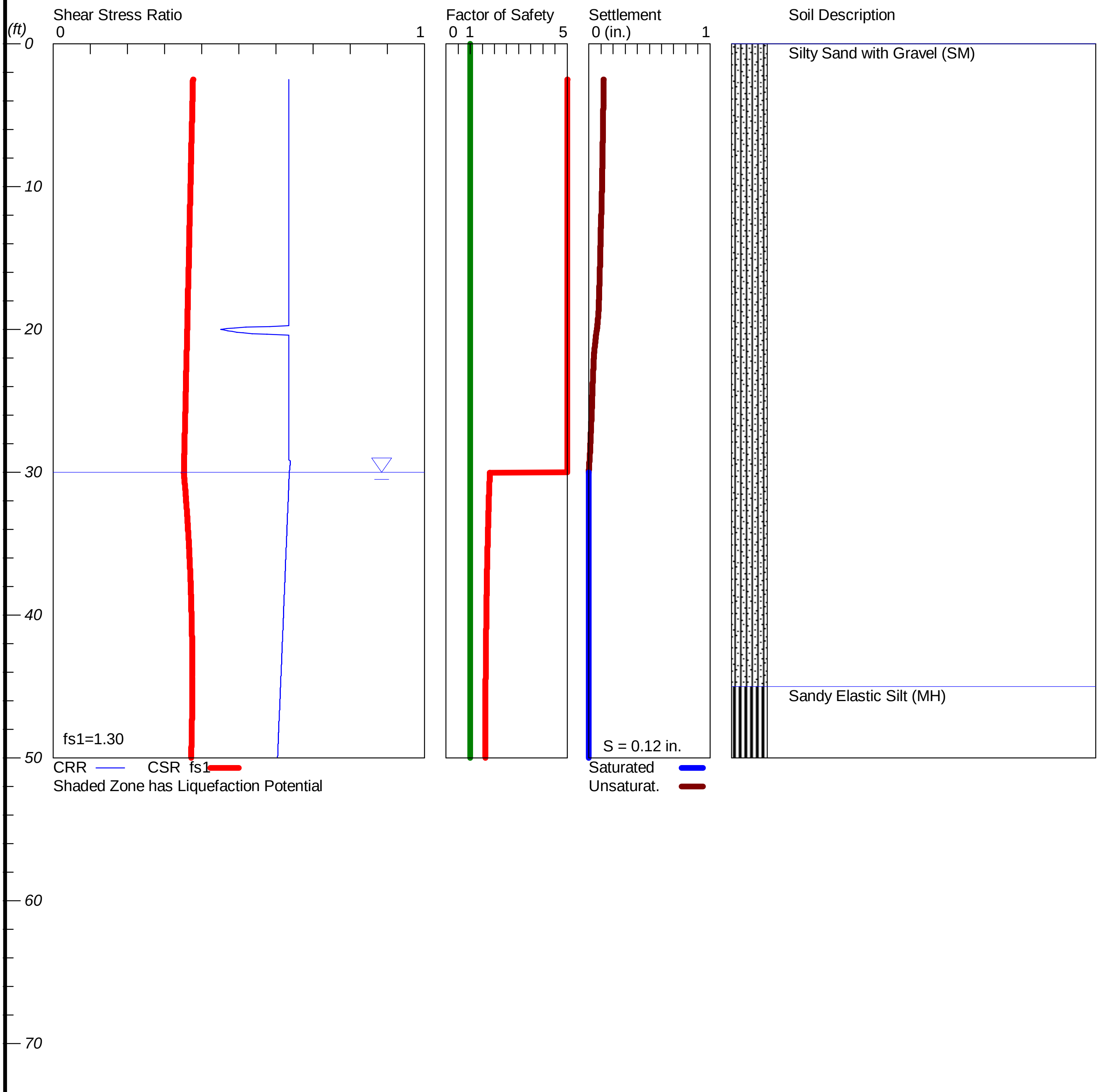


LIQUEFACTION ANALYSIS

O&M

Hole No.=O&M   Water Depth=30 ft   Surface Elev.=4732

Magnitude=6.83
Acceleration=.448g



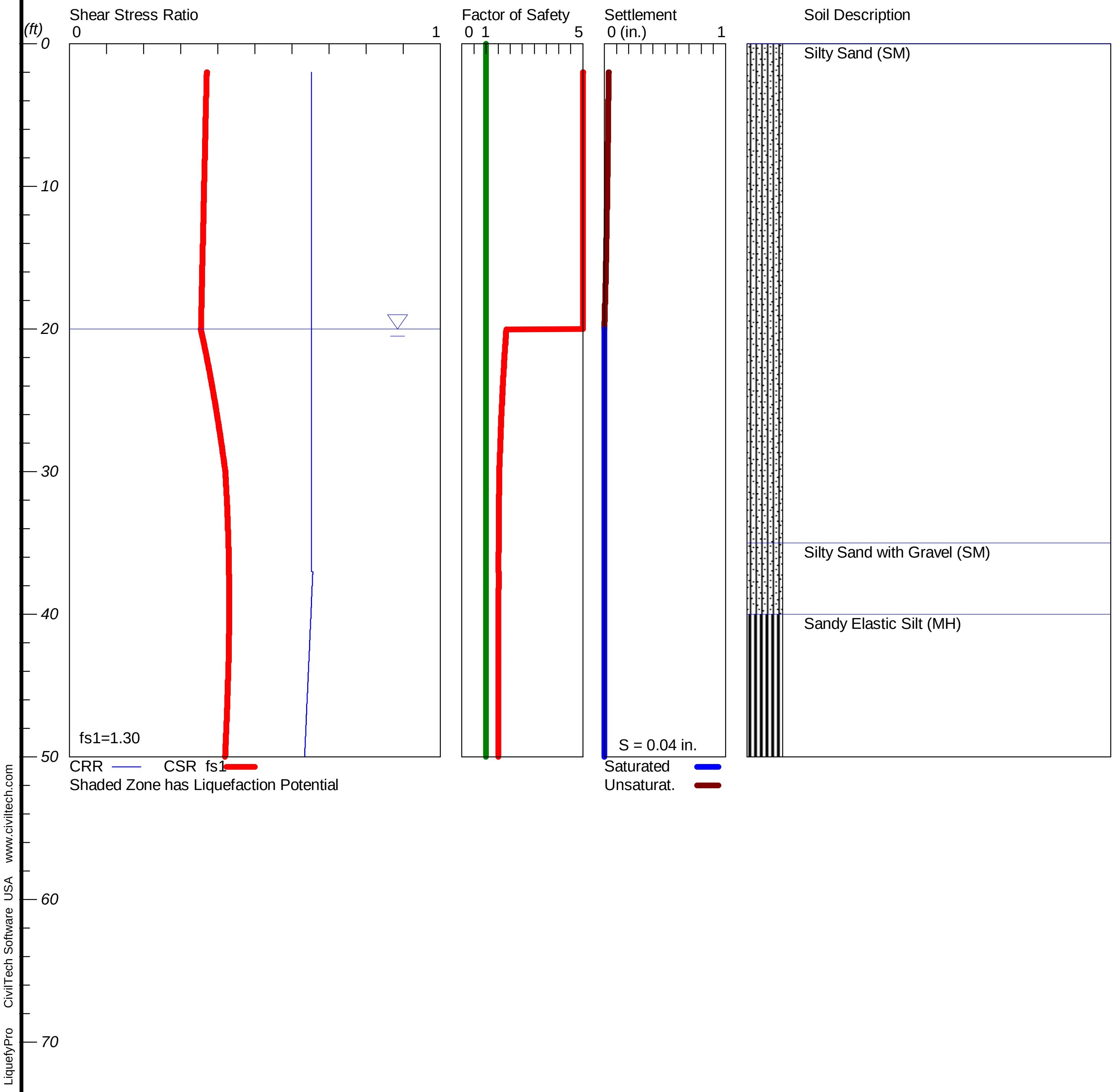
LiquefyPro   CivilTech Software USA   www.civiltech.com

LIQUEFACTION ANALYSIS

SUB

Hole No.=SUB   Water Depth=20 ft   Surface Elev.=4621

Magnitude=6.76
Acceleration=.440g

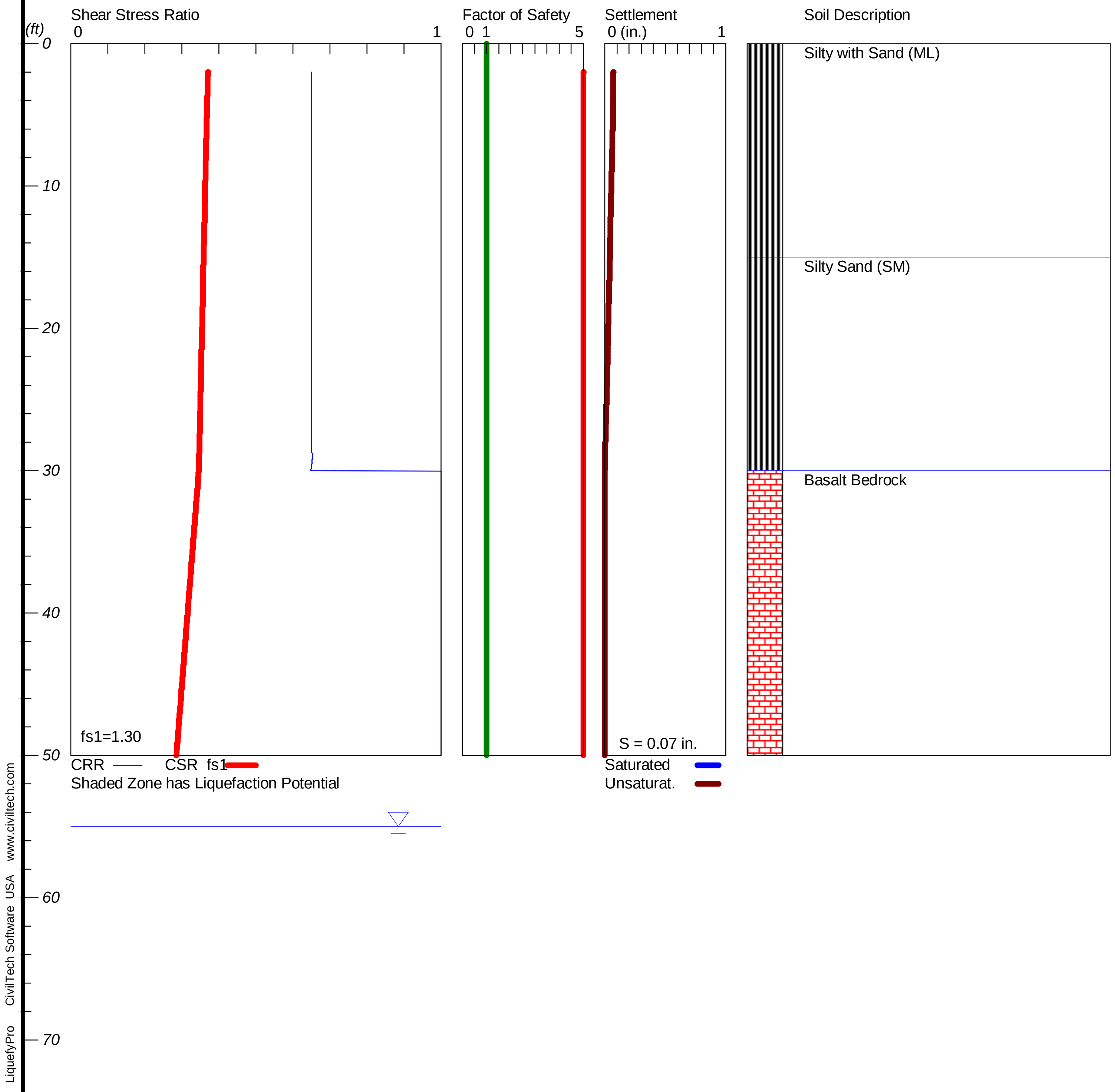


LIQUEFACTION ANALYSIS

SWT

Hole No.=SWT   Water Depth=55 ft   Surface Elev.=4638

Magnitude=6.77
Acceleration=.440g



GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Fountain Wind Project ■ Burney, CA

Terracon Project No. NB215025

SAMPLING

▯ Auger Cuttings	⧗ Modified California Ring Sampler
▮ Rock Core	✋ Grab Sample
☒ Standard Penetration Test	

WATER LEVEL

▽	**Water Initially Encountered**
▽	**Water Level After a Specified Period of Time**
▼	**Water Level After a Specified Period of Time**
▨	**Cave In Encountered**

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

N	**Standard Penetration Test Resistance (Blows/Ft.)**
(HP)	**Hand Penetrometer**
(T)	**Torvane**
(DCP)	**Dynamic Cone Penetrometer**
UC	**Unconfined Compressive Strength**
(PID)	**Photo-Ionization Detector**
(OVA)	**Organic Vapor Analyzer**

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve) Density determined by Standard Penetration Resistance			**Consistency of Fine-Grained Soils** (50% or more passing the No. 200 sieve) Consistency determined by laboratory shear strength testing, field visual0manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**2.5-inch California Modified Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**	**2.5-inch California Modified Sampler Blows/Ft.**
Very Loose	0 to 3	0 to 5	Very Soft	less than 0.25	< 2	< 3
Loose	4 to 10	5 to 12	Soft	0.25 to 0.50	2 to 4	3 to 5
Medium Dense	10 to 30	19 to 58	Medium Stiff	0.50 to 1.00	5 to 8	6 to 11
Dense	31 to 50	36 to 60	Stiff	1.00 to 2.00	9 to 15	12 to 21
Very Dense	> 50	> 60	Very Stiff	2.00 to 4.00	16 to 30	22 to 42
			Hard	> 4.00	> 30	> 42

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	**Group Name [B]**
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or [Cc<1 or Cc>3.0] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or [Cc<1 or Cc>3.0] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above “A”		CL	Lean clay [K, L, M]
			PI < 4 or plots below “A” line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above “A” line		CH	Fat clay [K, L, M]
			PI plots below “A” line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add “with sand” to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add “with organic fines” to group name.

[I] If soil contains ≥ 15% gravel, add “with gravel” to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add “with sand” or “with gravel,” whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add “sandy” to group name.

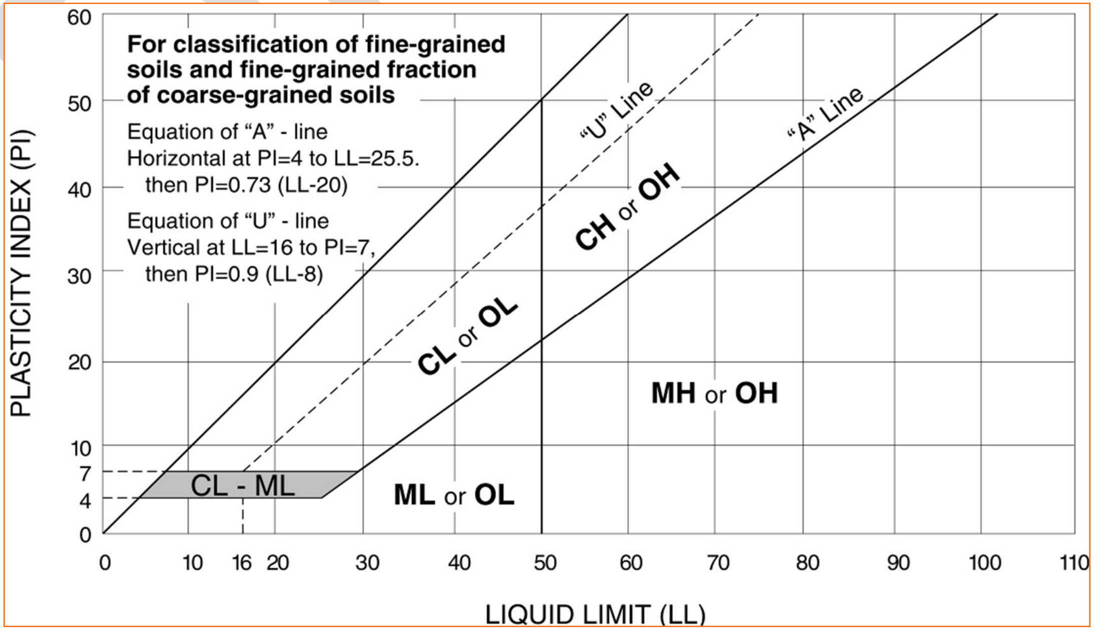
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add “gravelly” to group name.

[N] PI ≥ 4 and plots on or above “A” line.

[O] PI < 4 or plots below “A” line.

[P] PI plots on or above “A” line.

[Q] PI plots below “A” line.



DESCRIPTION OF ROCK PROPERTIES

WEATHERING

Term	Description
Unweathered	No visible sign of rock material weathering, perhaps slight discoloration on major discontinuity surfaces.
Slightly weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition.
Moderately weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones.
Highly weathered	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones.
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

STRENGTH OR HARDNESS

Description	Field Identification	Uniaxial Compressive Strength, psi (MPa)
Extremely weak	Indented by thumbnail	40-150 (0.3-1)
Very weak	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife	150-700 (1-5)
Weak rock	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer	700-4,000 (5-30)
Medium strong	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer	4,000-7,000 (30-50)
Strong rock	Specimen requires more than one blow of geological hammer to fracture it	7,000-15,000 (50-100)
Very strong	Specimen requires many blows of geological hammer to fracture it	15,000-36,000 (100-250)
Extremely strong	Specimen can only be chipped with geological hammer	>36,000 (>250)

DISCONTINUITY DESCRIPTION

Fracture Spacing (Joints, Faults, Other Fractures)		Bedding Spacing (May Include Foliation or Banding)	
Description	**Spacing**	**Description**	**Spacing**
Extremely close	< ¾ in (<19 mm)	**Laminated**	< ½ in (<12 mm)
Very close	¾ in – 2-1/2 in (19 - 60 mm)	**Very thin**	½ in – 2 in (12 – 50 mm)
Close	2-1/2 in – 8 in (60 – 200 mm)	**Thin**	2 in – 1 ft. (50 – 300 mm)
Moderate	8 in – 2 ft. (200 – 600 mm)	**Medium**	1 ft. – 3 ft. (300 – 900 mm)
Wide	2 ft. – 6 ft. (600 mm – 2.0 m)	**Thick**	3 ft. – 10 ft. (900 mm – 3 m)
Very Wide	6 ft. – 20 ft. (2.0 – 6 m)	**Massive**	> 10 ft. (3 m)

Discontinuity Orientation (Angle): Measure the angle of discontinuity relative to a plane perpendicular to the longitudinal axis of the core. (For most cases, the core axis is vertical; therefore, the plane perpendicular to the core axis is horizontal.) For example, a horizontal bedding plane would have a 0-degree angle.

ROCK QUALITY DESIGNATION (RQD) [1]

Description	RQD Value (%)
Very Poor	0 - 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 - 100

1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.

Reference: U.S. Department of Transportation, Federal Highway Administration, Publication No FHWA-NHI-10-034, December 2009 Technical Manual for Design and Construction of Road Tunnels – Civil Elements

DESCRIPTION OF ROCK PROPERTIES

WEATHERING

Fresh	Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.
Very slight	Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.
Slight	Rock generally fresh, joints stained, and discoloration extends into rock up to 1 in. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.
Moderate	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.
Moderately severe	All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick.
Severe	All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.
Very severe	All rock except quartz discolored or stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.
Complete	Rock reduced to "soil". Rock "fabric" no discernible or discernible only in small, scattered locations. Quartz may be present as dikes or stringers.

HARDNESS (for engineering description of rock – not to be confused with Moh's scale for minerals)

Very hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately hard	Can be scratched with knife or pick. Gouges or grooves to ¼ in. deep can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium	Can be grooved or gouged 1/16 in. deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1-in. maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

Joint, Bedding, and Foliation Spacing in Rock [1]

Spacing	Joints	Bedding/Foliation
Less than 2 in.	Very close	Very thin
2 in. – 1 ft.	Close	Thin
1 ft. – 3 ft.	Moderately close	Medium
3 ft. – 10 ft.	Wide	Thick
More than 10 ft.	Very wide	Very thick

1. Spacing refers to the distance normal to the planes, of the described feature, which are parallel to each other or nearly so.

Rock Quality Designator (RQD) [1]

RQD, as a percentage	Diagnostic description
Exceeding 90	Excellent
90 – 75	Good
75 – 50	Fair
50 – 25	Poor
Less than 25	Very poor

1. RQD (given as a percentage) = length of core in pieces 4 inches and longer / length of run

Joint Openness Descriptors

Openness	Descriptor
No Visible Separation	Tight
Less than 1/32 in.	Slightly Open
1/32 to 1/8 in.	Moderately Open
1/8 to 3/8 in.	Open
3/8 in. to 0.1 ft.	Moderately Wide
Greater than 0.1 ft.	Wide

References: American Society of Civil Engineers. Manuals and Reports on Engineering Practice - No. 56. Subsurface Investigation for Design and Construction of Foundations of Buildings. New York: American Society of Civil Engineers, 1976. U.S. Department of the Interior, Bureau of Reclamation, Engineering Geology Field Manual.

GEOPHYSICAL REPORT

Seismic Survey
ConnectGEN Fountain Wind Project
California State Route 299
Shasta County, CA

June 8, 2021
NORCAL Project No. NS215061
Terracon Project No. NB215025

Prepared for:

ConnectGEN
1001 McKinney, Suite 700
Houston, TX 77002

Prepared by:

NORCAL GEOPHYSICAL CONSULTANTS INC.
A Terracon COMPANY

ConnectGEN
1001 McKinney, Suite 700
Houston, TX 77002

Attn:	Mr. Henry Woltag, Director
Telephone:	(281) 520-6995
E-mail:	hwoltag@connectgenllc.com

Re: Geophysical Report
ConnectGEN Fountain Wind Project
California State Route 299
Shasta County, CA
NS215061

Dear Mr. Henry Woltag, Director,

NORCAL Geophysical Consultants, Inc. (NORCAL), a Terracon Company is pleased to submit the Geophysical Report for the above-referenced site.

This report presents the findings of a geophysical survey performed by NORCAL Geophysical Consultants, Inc. for ConnectGEN at the proposed wind power project located along California State Route 299 in Shasta County, CA. The survey was authorized under MSA Agreement for Professional Services dated January 13, 2018. The field work was performed during the period of May 17 - 21, 2021 by NORCAL Professional Geophysicist Hunter S. Philson (PGp No. 1094) and Staff Geophysicist J. Sage Wagner III. Geotechnical Project Manager Beau Donaldson, P.E. provided site orientation and logistical support.

The results of the geophysical investigation are displayed as **Appendix A, Plates 2B, 2C thru 14B – Seismic Refraction Profile, MASW Sounding, and Field Electrical Resistivity Test Data** and are summarized below.

- SR profiles with low Vp values within the range of 1,200 to 2,400 ft/s are SR-1, SR-3, and SR-9. SR profiles with higher Vp values within the range of 2,400 to 5,000 ft/s are SR-2, SR-4, SR-5, SR-6, SR-7, SR-8, SR-10, SR-11, and SR-12.
- The interval Vs values across the site range from a minimum of 550 ft/s to a maximum of 3,040 ft/s.
- The overall range of electrical resistivity sounding values measured varies from approximately 125,000 Ω-cm at the surface to 35,000 Ω-cm at depth. These values appear to correlate with the local volcanic flow rocks mapped at the site.

We appreciate the opportunity to provide our geophysical services for ConnectGEN. Please contact either of the undersigned at (707) 796-7170 if you have questions regarding the information provided in the report.

Respectfully,

NORCAL Geophysical Consultants, Inc

Prepared by:	**Approved by:**
J. Sage Wagner	Donald J. Kirker
J. Sage Wagner III Project Manager Staff Geophysicist	Donald J. Kirker Authorized Project Reviewer / SME CA Professional Geophysicist, PGp 997

cc: Mr. Henry Woltag, Director, hwoltag@connectgenllc.com
Ms. Nike Thompson, athompson@connectgenllc.com
Mr. Moustafa Abdou, mabdou@connectgenllc.com

DONALD KIRKER
No. 997

6/8/2021

1.0 INTRODUCTION

This report presents the results of a geophysical survey consisting of twelve seismic refraction (SR) profiles and multichannel analysis of surface waves (MASW) soundings. The geophysical survey also consisted of one field vertical electrical resistivity sounding (VES). The survey was performed to provide information to aid in design for the proposed wind power project located to the north and south of California State Route 299 in Shasta County, CA.

Maps showing the site vicinity and the location of the SR profiles and MASW soundings are provided in **Appendix A, Plate 1 – Site Overview Map**. The Site Overview Map includes satellite imagery showing the location of the SR profiles, MASW soundings, and the VES as yellow boxes. The SR profiles and MASW soundings are designated as Line SR-1 thru SR-12 and the VES is designated as ER-9. These locations are shown in further detail in **Appendix A, Plate 2A thru 14A – Site Location Map** and also include satellite imagery, with each SR profile shown as a red line, MASW sounding as a red diamond, VES perpendicular array as blue lines, and boring survey stakes as a yellow soil boring symbol. A text description of the site conditions, which includes pertinent site-specific information, current ground cover, topography and local geology, is summarized in Section 2.0, below.

2.0 SITE DESCRIPTION

The following description of site conditions is derived from our site visit and a review of publicly available geologic and topographic maps.

Item	Description
Site information	The project site, the proposed wind power project, is located 35 miles northwest of Redding and resides both north and south of California State Route 299 in the Southern Cascades and Modoc Plateau Province. The approximate coordinates of the SR line are: (40.823, -121.822). The site is approximately 29,500-acres and the substation and switchyard are planned near the center of the site, with wind turbine generators (WTGs) being located across the site.
Current ground cover	The geophysical locations were collected along pre-existing logging roads. The soil at the surface consisted of dry, silty-sand with some organic material (roots).
Existing topography	Based on Trimble GPS elevation data, the terrain in the area of investigation varies from flat to steep and ranges in elevation from about 4,111- to 5,042-ft above mean sea level.

Item	Description
Site geology	Available geologic maps (i.e. Luedke, R.G., and Smith, R.L., 1981, Map showing distribution, composition, and age of late Cenozoic volcanic centers in California and Nevada: U.S. Geological Survey Miscellaneous Investigations Series Map I-1091-C, scale 1: 1,000,000) indicate that the site is underlain by Quaternary and Tertiary volcanic flow rocks, primarily andesite. SR-1 and SR-2 are approximately 2 miles to the south and west, respectively, from faults related to the Cascade Volcanic Field.

3.0 SCOPE OF WORK

As part of a larger geotechnical investigation related to the wind farm power project, NORCAL collected SR profiles and MASW soundings at a total of twelve locations and one VES at the site. The locations relate to ten proposed turbine towers, one substation area, and one switchyard area. The purpose of the of the SR and MASW surveys were to measure compressional (P-) and shear (S-) wave velocities, respectively, in selected areas and provide our interpretation regarding the thickness of overburden, the depth to bedrock and an assessment of excavation characteristics. The SR and MASW surveys were designed to image the upper 50 and 100 feet (ft) below grade surface (bgs), respectively. The P-wave velocity and the S-wave velocity will be herein referred to as Vp and Vs, respectively. The purpose of the VES, using the Wenner 4-Pin method, was to measure variations in electrical resistivity versus depth beneath a fixed point to provide information regarding the design of electrical grounding grids.

For reference in this geophysical report, the corresponding SR profiles, MASW soundings, and soil borings ID are summarized in Table A and data will be referenced by SR profile designation.

Table A : Boring ID, SR Profile, & MASW Sounding Designation

Fountain Wind Project Seismic Survey		
SR Profile	**MASW Sounding**	**Soil Boring ID**
SR-1	MASW-1	A-01
SR-2	MASW-2	B-05
SR-3	MASW-3	E-01
SR-4	MASW-4	N-02
SR-5	MASW-5	M-10
SR-6	MASW-6	L-05
SR-7	MASW-7	SWITCHYARD
SR-8	MASW-8	SUBSTATION
SR-9	MASW-9	K-04
SR-10	MASW-10	J-02
SR-11	MASW-11	F-06
SR-12	MASW-12	C-06

4.0 SEISMIC SURVEY

4.1 SEISMIC REFRACTION RESULTS

The results of the SR survey are illustrated by the color contoured seismic velocity cross-sections (profiles) shown on **Appendix A, Plate 2B thru 13B – Seismic Refraction Profile**. On these profiles, the vertical axis represents elevation in feet (NAVD88) and the horizontal axis represents distance in feet along the profile, referred to herein as Station. Seismic P-wave velocity (Vp) in feet per second (ft/s) is represented by labeled contours and by color shading between the contours. The relationship between color and Vp is represented by the color scale shown below the profile. The solid black line along the top of the contoured portion of the profile represents the ground surface.

The Vp measured by the seismic refraction survey range from approximately 1,000 ft/s near the surface to about 5,000 ft/s at depth and are considered low to moderate.

- Low Vp range from 1,200 to 2,400 ft/s and are represented by light brown to yellow shading. Vp in this range typically represent stiff surficial soils and/or colluvium. SR profiles with Vp values within this range are SR-1, SR-3, and SR-9.
- Moderate Vp range from 2,400 to 5,000 ft/s and are represented by yellow to green to blue coloration. Vp in this range tend to indicate more consolidated, cemented and/or saturated sediments and/or intensely to moderately weathered rock. It is our interpretation that bedrock is represented by the higher end of this Vp range and probably consists of highly to moderately weathered volcanic flow rocks. SR profiles with Vp values within this range are SR-2, SR-4, SR-5, SR-6, SR-7, SR-8, SR-10, SR-11, and SR-12.

4.2 RIPPABILITY ASSESSMENT

Seismic P-wave velocity can be used to assess the rippability of rock materials based on empirical data. Charts relating Vp to excavation characteristics have been developed from field tests by others. These charts list different types of ripping equipment and their relative ease of excavation of several types of rock with varying Vp.

Caterpillar Tractor Company publishes a performance manual that lists ripper performance charts for the D8, D9, D10 and D11 series tractors. Although the equipment to be used may vary from the models listed, the charts may still provide a relative guide to aid in characterizing rippability. The information presented in Table B is taken from the ripper performance charts contained in the Caterpillar Performance Handbook (Caterpillar, Edition 48, June 2018) for the tractors listed above. As local bedrock is mapped as Quaternary and Tertiary volcanic flow rocks, we have selected the values presented for equipment operating in basalt.

Table B : *Seismic P-Wave Velocity and General Rippability in Basalt Rock*

Equipment Model	Rippable Velocity (ft/s)	Marginal Velocity (ft/s)	Non-rippable Velocity (ft/s)
D8R/D8T	<6,300	6,300 to 8,000	>8,000
D9R/D9T	<7,600	7,600 to 8,600	>8,600
D10T2	<8,000	8,000 to 9,000	>9,000
D11T	<8,800	8,800 to 9,800	>9,800
D11T CD	<9,100	9,100 to 10,100	>10,100

Caterpillar, Edition 48, June 2018

Table B may be a useful aid in selection of the appropriate equipment for excavation. Depending on the selected equipment and the depth of excavation, it is unlikely marginal to non-rippable conditions may be encountered in the locations, as indicated by the SR profiles.

This information should only be used as a general guide to rippability. Many factors other than seismic velocity also contribute to rock rippability. These factors include rock jointing and fracture patterns, the experience of the equipment operator, and the equipment and excavation methods selected.

4.3 MASW SOUNDING RESULTS

The MASW results are illustrated as Vs versus depth plots in **Appendix A, Plate 2C thru 13C – MASW Sounding Profile**. Measured Vs data was processed to the upper 100 ft in most MASW soundings; however, where data quality permitted, the Vs data was processed to achieve maximum depth of 130 ft bgs. The interval Vs values across the site range from a minimum of 550 ft/s to a maximum of 3,040 ft/s.

Generally, we note a good correlation between the Vp values measured by the SR survey and the Vs values measured by the MASW survey, noting that Vs values are typically ½ to ¼ of the Vp values for most earth materials. In addition, Vs tends to increase with increasing depth; however, slight velocity inversions were modeled at the site. It is our interpretation that these features may be due to variations of stiffness (or rigidity) of subsurface materials at the respective location.

The standard method of reporting MASW data is to consider the location of the 1D velocity vs. depth model as the center point of the MASW spread. However, this does not mean that the measured velocity values represent materials solely beneath that location. In fact, the subsurface conditions underlying the entire length of the array, and for several tens of feet to either side, contribute to the measured velocity values.

5.0 VES SOUNDING RESULTS

The results of the VES survey are summarized in **Appendix A, Plate 14B – Field Electrical Resistivity Test Data**. The left four columns of the table contain the a-spacing (a) and electrode depth (b). The right four columns of the table comprise the associated electrical resistivity values in ohm-centimeters in both north to south (N-S Test) and east to west (E-W Test) orientations. The apparent resistivity (ρ) is calculated as:

$$\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$$

The apparent resistivity is presented in ohm-centimeters (Ω-cm). The overall range of values measured varies from approximately 125,000 Ω-cm at the surface and 35,000 Ω-cm at depth. These values appear to correlate with the local volcanic flow rocks mapped at the site. Generally, we note agreement between the orthogonal readings at each location, especially at greater depth, with the exception of an anomalous reading at A=200 for E-W Test, where eastern outer probe at 300 ft. was approximately 15 ft from an overhead powerline. The measurement was taken several times to note variance, however a reasonable data point based on the value from the N-S test was not achieved. This data point was plotted but should be considered an outlier due to cultural interference.

6.0 SUMMARY OF FINDING

For a more comprehensive description of the SR, MASW and VES methodology, our data acquisition and analysis procedures, and the instrumentation we used for the geophysical survey, please see **Appendix B: Geophysical Methods**. The workflow described in Appendix B, as well as our local experience interpreting the data, provided the findings described above. These findings of the geophysical investigation can be summarized as follows:

- SR profiles with low Vp values within the range of 1,200 to 2,400 ft/s are SR-1, SR-3, and SR-9. SR profiles with higher Vp values within the range of 2,400 to 5,000 ft/s are SR-2, SR-4, SR-5, SR-6, SR-7, SR-8, SR-10, SR-11, and SR-12.
- The interval Vs values across the site range from a minimum of 550 ft/s to a maximum of 3,040 ft/s.
- The overall range of electrical resistivity sounding values measured varies from approximately 125,000 Ω-cm at the surface to 35,000 Ω-cm at depth. These values appear to correlate with the local volcanic flow rocks mapped at the site.

APPENDIX A – Report Plates

Plate 1 – Site Overview Map
Plate 2A, 2B, 2C – Site Location Map, Seismic Refraction Profile Line SR-1, MASW Sounding Line SR-1
Plate 3A, 3B, 3C – Site Location Map, Seismic Refraction Profile Line SR-2, MASW Sounding Line SR-2
Plate 4A, 4B, 4C – Site Location Map, Seismic Refraction Profile Line SR-3, MASW Sounding Line SR-3
Plate 5A, 5B, 5C – Site Location Map, Seismic Refraction Profile Line SR-4, MASW Sounding Line SR-4
Plate 6A, 6B, 6C – Site Location Map, Seismic Refraction Profile Line SR-5, MASW Sounding Line SR-5
Plate 7A, 7B, 7C – Site Location Map, Seismic Refraction Profile Line SR-6, MASW Sounding Line SR-6
Plate 8A, 8B, 8C – Site Location Map, Seismic Refraction Profile Line SR-7, MASW Sounding Line SR-7
Plate 9A, 9B, 9C – Site Location Map, Seismic Refraction Profile Line SR-8, MASW Sounding Line SR-8
Plate 10A, 10B, 10C – Site Location Map, Seismic Refraction Profile Line SR-9, MASW Sounding Line SR-9
Plate 11A, 11B, 11C – Site Location Map, Seismic Refraction Profile Line SR-10, MASW Sounding Line SR-10
Plate 12A, 12B, 12C – Site Location Map, Seismic Refraction Profile Line SR-11, MASW Sounding Line SR-11
Plate 13A, 13B, 13C – Site Location Map, Seismic Refraction Profile Line SR-12, MASW Sounding Line SR-12
Plate 14A, 14B – Site Location Map, Field Electrical Resistivity Test Data ER-9

APPENDIX B – Geophysical Methods

Seismic Refraction (SR) Survey
1-D Multi-Channel Analysis of Surface Waves (MASW)
Vertical Electrical Sounding (VES)

SEISMIC REFRACTION (SR) SURVEY

Glossary of relevant geophysical terminology.

Term	Definition
Geophone	A device that measures ground movement
Line	A traverse along which seismic data are acquired; may consist of one or more spreads
Multichannel Analysis of Surface Waves (MASW)	A technique for measuring S-wave velocities versus depth to produce a Vs sounding
P-wave Velocity (Vp)	The propagation velocity of primary (compressional) seismic waves in the earth, which relates to the density and elastic properties of the subsurface
Profile	A cross-section depicting variations in P-wave velocities beneath a portion of a line
S-wave Velocity (Vs)	The propagation velocity of secondary (shear) seismic waves in the earth, which relates to the density and stiffness (rigidity) of the subsurface
Seismic Refraction (SR)	A technique for measuring P-wave velocities along a traverse (line) to produce a Vp cross-section (profile)
Sounding	A graph depicting variations in S-wave velocities versus depth beneath the center point of a spread
Spread	A collinear array of geophones

METHODOLOGY

The seismic refraction method provides information regarding the seismic velocity structure of the subsurface. An impulsive (mechanical or explosive) source is used to produce compressional (P) wave seismic energy at the surface. The P-waves propagate into the earth and are refracted along interfaces caused by an increase in velocity. A portion of the P-wave energy is typically re-radiated back to the surface where it is detected by sensors (geophones) that are coupled to the ground surface in a collinear array (spread). The detected signals are recorded on a multi-channel seismograph and are analyzed to determine the shot point-to-geophone travel times. These data can be used along with the corresponding shot point-to-geophone distances and elevation data to determine the depth, thickness, and velocity of subsurface seismic layers. Profiles depicting the variations in P-wave velocities are produced by a mathematical iterative process. The data density is higher near the center of the profile and reduced near the ends of the profile.

This information should only be used as a general guide to rippability. Many factors other than seismic velocity also contribute to rock rippability. These factors include rock jointing and fracture patterns, the experience of the equipment operator, and the equipment and excavation methods selected.

DATA ACQUISITION

We collected SR data along twelve separate seismic spreads designated as SR-1 through SR-12, as shown on Plate 1. ConnectGEN determined the location of the survey points. We acquired the SR data using arrays of 24 geophones and 7 shot points. The geophones were distributed at 8-ft intervals for each array. Shot-points were placed off each end of the geophone arrays as well as equally distributed within the arrays. All the SR lines are comprised of a single array.

INSTRUMENTATION

The seismic waveforms produced at each shot point were recorded using a Geometrics ***Geode*** 24-channel engineering distributed array seismograph, as pictured in Figure 1, and Oyo ***Geospace*** geophones with a natural frequency of 8 Hz. The geophones were coupled to the ground surface by a metal spike affixed to the bottom of each geophone case. Seismic energy was produced at each shot point by multiple impacts with a 16-pound sledge hammer against a metal strike plate placed on the ground surface. The seismic waveforms were digitized, processed and amplified by the Geode, transmitted via a ruggedized Ethernet cable to a field computer and algebraically summed (stacked) until sufficient signal to noise ratio was achieved. The data were displayed on the computer's LCD screen in the form of seismograms, analyzed for quality assurance and archived for subsequent processing. These images were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in the array.

***Figure 1:** Geometrics Geode 24-channel engineering distributed array seismograph.*

DATA ANALYSIS

The seismic refraction data were processed using the software package ***SeisImager,*** written by Oyo Corporation (Japan) and distributed by Geometrics Inc. This package consists of two programs titled ***Pickwin,*** Version 5.1.1.2 (2013) and ***Plotrefa*, **Version 3.0.0.6 (2014). For each seismic line we used ***Pickwin*** to view the seismic records and identify first arriving P-wave energy at each geophone and to determine the shot point to geophone travel time associated with each arrival. We then used ***Plotrefa*** to assign elevations to each geophone and to plot the shot point to geophone travel times versus their distance (Station) along the line. A sample Time versus Depth (T-D) graph is shown in Figure 2. After examining the T-D graph we assigned velocity layers (1-3) to each travel time and then computed a 2D model using ***Plotrefa's*** time-term routine.

This resulted in 2D layered cross-sections (profiles) illustrating seismic velocity versus depth. A sample 2D time-term model is shown in Figure 3.

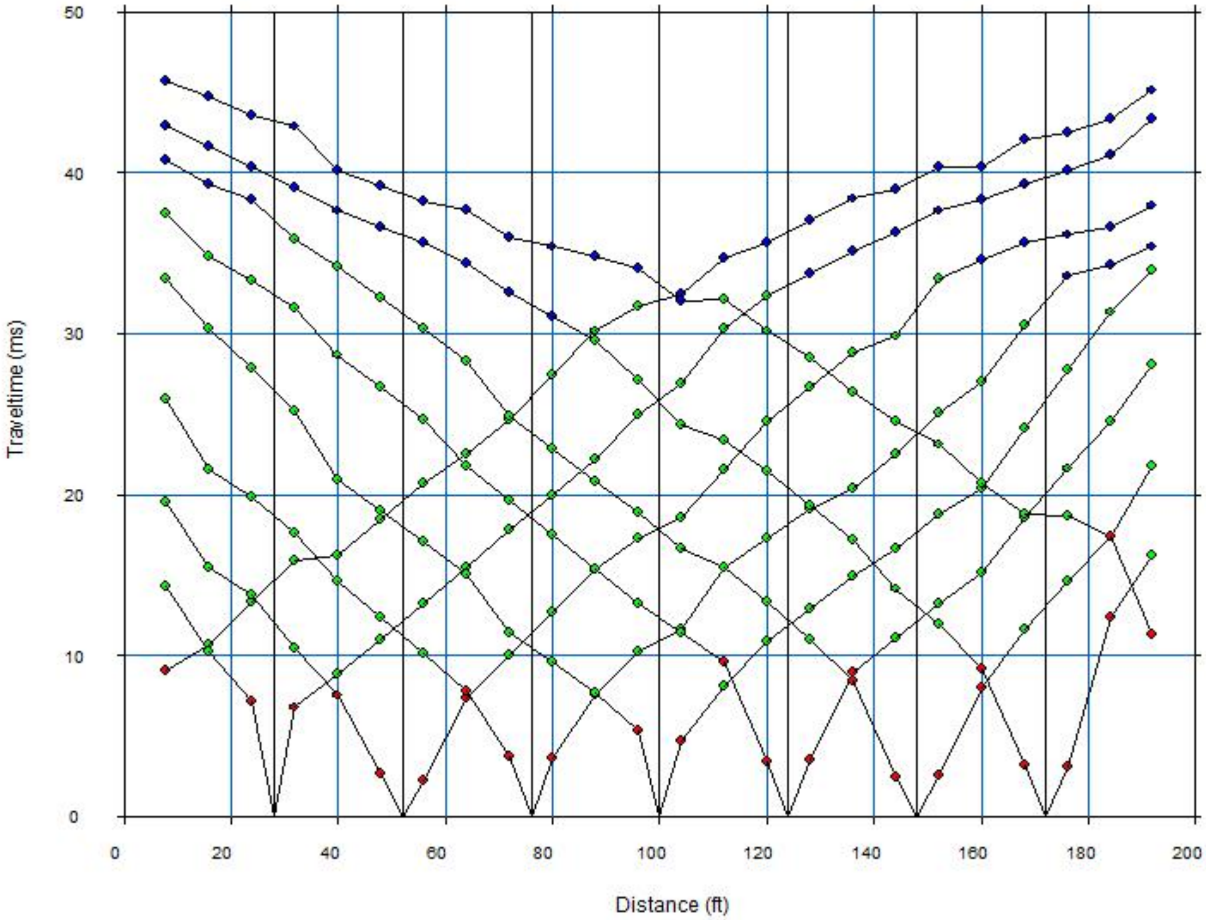


***Figure 2:** Sample SR Time-Distance Graph. Red circles represent layer 1 (V1), green circles represent V2 and blue circles represent V3.*

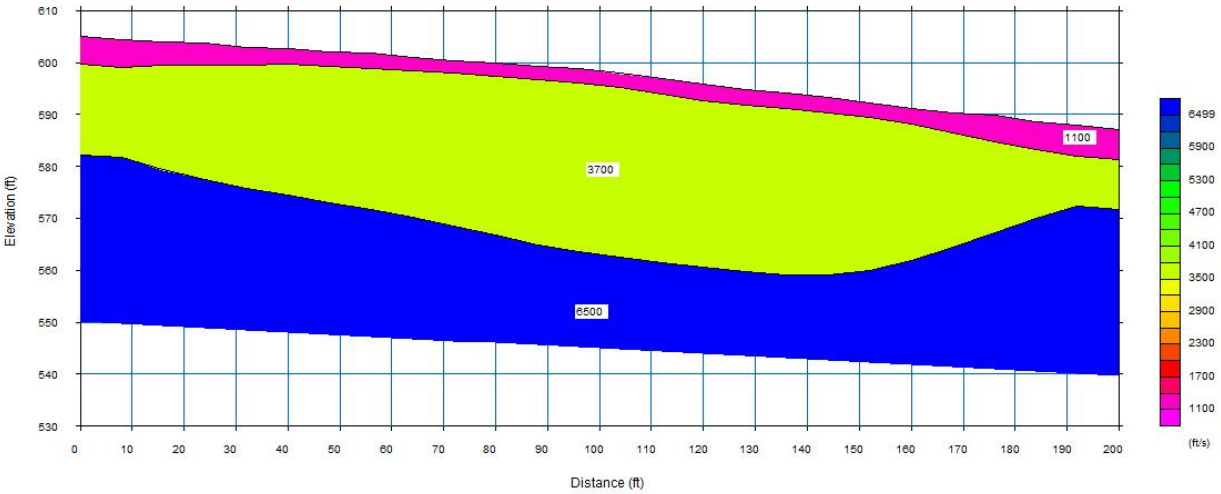


Figure 3: *Sample Time-Term Seismic Velocity Model. Velocities are labeled and indicated by the color bar on the right.*

Finally, we used the time term model as input to ***Plotrefa's*** tomographic routine. This routine divided the input model into cells according to the geophone spacing and depth range and assigned a velocity to each cell. It then used a ray tracing routine to compute synthetic travel times through the model from each shot point to every geophone. The synthetic travel times were compared with the observed travel times to determine the goodness of fit. If the fit was not within certain assigned parameters, the program then adjusted the velocity in each cell and reran the ray tracing. This procedure was repeated through as many as 20 iterations in order to achieve the optimum fit between observed and synthetic travel times. A sample tomographic model is shown in Figure 4.

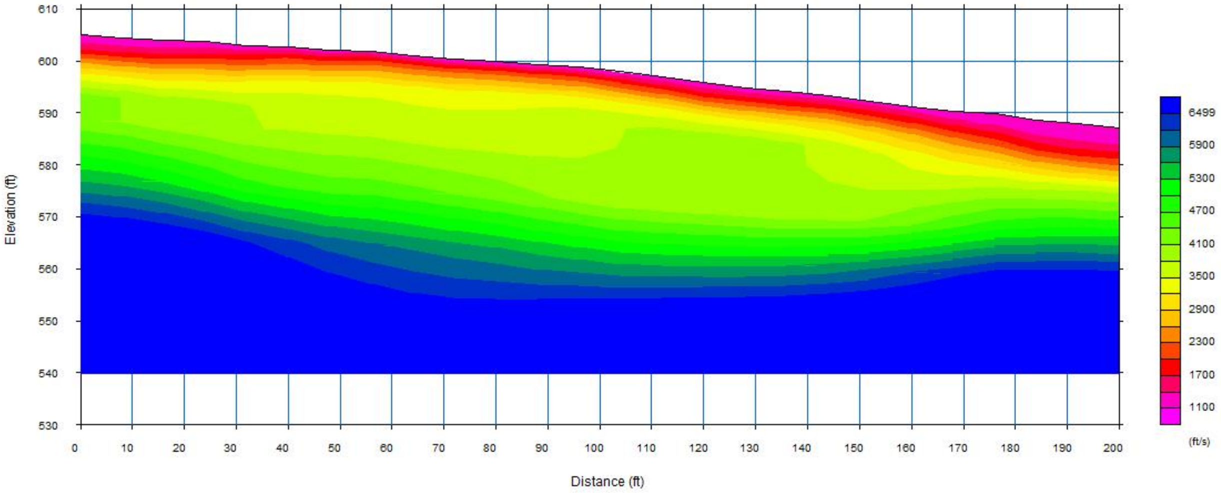


Figure 4: *Sample tomographic Inverted Seismic Velocity Model. Velocities indicated by color bar on right.*

Once the tomographic processing was complete, we used the computer program ***Surfer 13.0*** by Golden Software to construct a color contoured 2D cross-section (profile) illustrating the results for each seismic line.

INTERPRETATION

The SR profile described above is a model of the subsurface based on P-wave velocities. How these velocities and their subsurface distribution relate to geology is a matter of interpretation. This interpretation can be based on experience and a general knowledge of the local geology. However, the best results are achieved when the models can be correlated with subsurface information provided by other means such as onsite observations, borehole geological and/or geophysical logs, trench logs or projections based on mapped surface geology. This type of information is referred to as “ground truth.”

In any case, the resulting seismic velocity profile represents a model of the subsurface that must be interpreted by the best means available. Thus, the interpreted profile is conceptual in nature, and is not expected to represent an exact depiction of the subsurface.

LIMITATIONS

Based on the physical properties of refraction (Snell’s Law), for a seismic wave to be refracted back toward the surface the seismic velocity of the upper layer must be less than the velocity of the lower layer. When higher velocities overlie lower velocities, often referred to as a velocity inversion, the seismic energy will be refracted downward and the lower layer will not be detected at the surface. As a result, the calculated depths of any deeper higher velocity layers may be over-estimated. Furthermore, some layers may be truncated, or too thin to detect. These are referred to as “hidden layers”.

If the seismic source used for the survey does not produce sufficient energy to propagate through the entire spread at detectable levels, the first arriving P-waves at each geophone may not be visible on the seismic records. Additionally, extraneous seismic energy sources such as wind, traffic or nearby machinery may create “noise” on the recorded waveforms that may mask the first arrivals.

In noisy conditions many “stacks” may be necessary to achieve an acceptable signal to noise ratio. Stacking consists of superposition of waveforms such that the stacked shot energy builds with successive shots whereas the noise tends to cancel itself out due to its random nature.

Another common external noise source is overhead power lines. If the cable is laid out parallel to the lines electrical noise may be induced in the cable. Possible internal noise sources may be faulty geophone connections due to dirt or moisture or use of an unsuppressed power supply.

Finally, seismic refraction processing algorithms assume that the seismic velocity layers are isotropic. That is, that the velocity is uniform within the length and breadth of each layer. Another assumption is that the velocity distribution does not change in a direction transverse to the seismic line. In other words, that there is true 2D symmetry. If these conditions are not met, the actual subsurface conditions will vary from those represented by the seismic model.

1-D MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

METHODOLOGY

When seismic energy is generated at or near the ground surface, both body and surface waves are produced. Body waves expand omni-directionally throughout the subsurface. They consist of both compressional (P) and shear (S) waves. Surface waves (e.g., Rayleigh, Love, etc.) radiate along the ground surface at velocities that are proportional to shear wave velocity (Vs). Rayleigh waves are characterized by retrograde elliptical particle motion, and travel at approximately 0.9 times the velocity of S-waves.

If a vertical impact source is used, approximately two-thirds of the seismic energy that is produced is in the form of ground roll. As a result, surface waves are typically the most prominent signal on multi-channel seismic records. In addition, surface waves have dispersion properties that body waves lack. That is, different wavelengths have different penetration depths and, therefore, propagate at different velocities. By analyzing the dispersion of surface waves, it is possible to obtain an Vs versus depth plot. Since Vs is directly proportional to shear modulus, this provides a direct indication in the variation of stiffness (or rigidity) of subsurface materials with depth.

Surface waves can be recorded and analyzed using a method referred to as Seismic Multichannel Analysis of Surface Waves (MASW). This method is used to collect surface wave data using a fixed array of geophones and shot points. This is referred to as a sounding and results in a 1D model depicting variation in Vs versus depth beneath the center of the array. However, the subsurface conditions underlying the entire length of the array, and for several tens of feet to either side, contribute to the measured velocity values. The method requires an energy source that is capable of producing ground roll and geophones that are capable of detecting low frequencies (<10 Hz) signals.

DATA ACQUISITION

Each MASW sounding was configured using a seismic array consisting of four shot points and 24-geophones distributed at 6-ft intervals in a collinear array, yielding a total length of 210-ft. The array configuration is depicted in Figure 1 of this appendix, shown below.

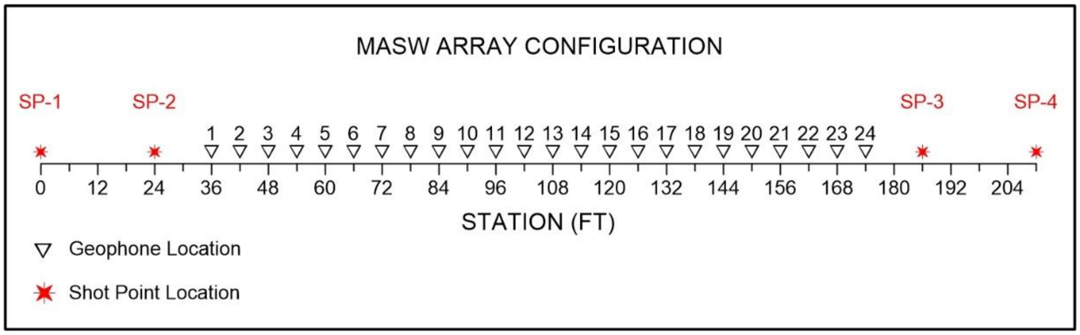


Figure 1: *MASW Array Configuration*

Seismic energy was produced at each shot point using a 16-pound sledgehammer striking a aluminum/polyurethane plate on the ground surface. The resulting seismic waveforms were detected by an array of 24 Oyo ***Geospace*** geophones with a natural frequency of 8-Hz and recorded using a Geometrics ***Geode*** 24-channel distributed array engineering seismograph. The seismic waveforms were digitized, processed and amplified by the Geode and transmitted via a ruggedized Ethernet cable to a field computer. The recorded data were archived for subsequent processing and displayed on the computer screen in the form of seismograms for quality assurance purposes.

DATA ANALYSIS

The seismic wave-traces (shot gathers) recorded at each shot point were analyzed using the computer program ***SURFSEIS*** developed by the Kansas Geological Survey (Version 6.3, 2017). This interactive program converts the data acquired from all four shot points in a given sounding into a dispersion curve representing phase velocity versus frequency. This curve is then inverted to produce a 1D model indicating Vs versus depth. The steps involved in this procedure are as follows:

1) The shot gathers are converted to KGS format.
2) Stations are assigned to the geophone and shot point locations.
3) The resulting records are viewed to determine their overall quality. If necessary, portions of the records are muted to remove interference from refractions, reflections and higher mode events.
4) For each formatted (and/or muted) record, the program produces what is referred to as an “overtone plot”. This is a colored cross-section indicating phase velocity versus frequency and amplitude. The vertical axis represents phase velocity (increasing upward); the horizontal axis represents frequency (increasing to the right); and signal amplitude is indicated by various colors, with the hottest colors (orange to red to dark brown) representing the greatest signal to noise ratio. Typically, the strongest signals align in a curved pattern with a symmetry similar to a “hockey stick” where the blade is pointing

upward at the lower end of the frequency spectrum (higher velocity at greater depth) and the handle projects to the right in the direction of increasing frequencies indicating lower velocities.

5) The overtone plots compiled from the four shot points are reviewed to determine their overall quality and the best among them (possibly all) are merged to form a single overtone. This enhances the overall signal to noise ratio of the survey and incorporates data from both ends of the spread (if feasible).
6) The resulting overtone plot is used as a guide in deriving a dispersion curve representing phase velocity versus frequency. This is done by fitting the curve along the center of the hockey stick where the signal to noise ratio is highest.
7) The resulting dispersion curve is inverted through an iterative process to compute a 1D model representing Vs versus depth.

The calculated seismic Vs in each depth range for the MASW soundings are presented in Table A, in the main body of the report.

VERTICAL ELECTRICAL SOUNDING (VES)

METHODOLOGY

Electrical resistivity (ER) is the resistance of a volume of earth material to the flow of electrical current. The ER of sedimentary earth materials is directly affected by factors such as grain size, porosity, mineralogy, moisture content and groundwater salinity. However, it has been our experience through numerous ER surveys conducted throughout the Bay Area that, in unconsolidated materials, grain size seems to have the largest effect on ER of all these parameters. Specifically, fine grained materials such as clays and silts typically have relatively low ER whereas coarse grained materials such as sands and gravels have relatively high ER.

The ER of rock is affected primarily by mineralogy and the degree of weathering and fracturing. Rock formations that are deeply buried and not exposed to chemical weathering are generally impermeable, contain little water, and have a relatively high electrical resistivity. Conversely, highly weathered and fractured rock that contains moisture typically has lower resistivity values. Alternatively, some rocks contain conductive minerals that can result in the rock having relatively low ER.

Given the relationships described above, geophysical methods that measure subsurface ER can be used to determine the depth, thickness and lateral extent of groundwater aquifers, the depth to groundwater, the depth to rock, the depth, thickness and lateral extent of clay layers and the depth, thickness and lateral extent of sand/gravel deposits. ER measurements can also be used to evaluate soil corrosion potential and to provide parameters for the design of electrical grounding systems.

Measuring the variation in ER versus depth beneath a fixed point is referred to as a vertical electrical sounding (VES). This involves transmitting electrical current *(I)* into the ground between two electrodes, and measuring the resulting electrical potential or voltage drop (*V*) between two other electrodes. There are many different electrode configurations that can be used. The most common are the Wenner and Schlumberger arrays. With both techniques, the four electrodes are arranged in a collinear array. Current is transmitted between the outer two electrodes (referred to as A and B) and the resulting voltage is measured across the inner two electrodes (referred to as M and N). Readings are typically taken with many different electrode separations, ranging from less than one foot to several hundreds of feet. The larger the separation, the deeper the current is forced to flow to complete a circuit. The actual current flow occurs within a generally hemi-spherical volume of earth between the current electrodes. The readings obtained with each electrode separation are used to compute a value referred to as apparent resistivity (ρ_a). The term "apparent" is used because the value represents the resistivity of a volume of earth with varying resistivity values rather than a discrete layer with consistent resistivity. The location of the sounding is defined as the center of the electrode array.

For ER surveys involving the design of grounding systems, including this survey, the Four Pin Wenner Array is typically used. With this array the electrode separation (a) is uniform between all four electrodes and increases from one reading to the next. The depth of the electrode (b) is also increased at greater a-spacings. The equation that is used to compute apparent resistivity values is presented on the Terracon GeoReport Plate 14B.

IINSTRUMENTATION

We collected VES data using a ***SuperSting R8*** Resistivity Meter, manufactured by Advanced Geosciences Incorporated (AGI). The SuperSting is a self-contained unit that transmits current at outputs ranging from 1 to 2,000 milliAmps (mA). The instrument measures the potential drop (voltage) caused by the current influx and converts the data to values of resistance and apparent resistivity. The data are stored in internal memory and can be downloaded to a computer for subsequent processing and archiving.

DATA ACQUISITION

The VES survey consisted of two bi-directional electrode arrays denoted as Sounding ER-9A and ER-9B, as shown on Plates 1 and 14B. The ***SuperSting R8*** was connected to the four electrodes in the array using 14-gauge insulated single conductor wires. Once programmed with the a-spacing for a given measurement, the instrument transmitted electrical current through the outer electrodes (A and B) and measured the voltage drop across the inner pair (M and N). Each measurement was made twice, and the results compared to make sure that there was no more than 2% deviation between the measurements. The averaged readings were then saved for subsequent processing. This procedure was repeated for every prescribed a-spacing starting with small values (a=0.5-ft) and expanding with each subsequent measurement to the largest spacing (a=200-ft).

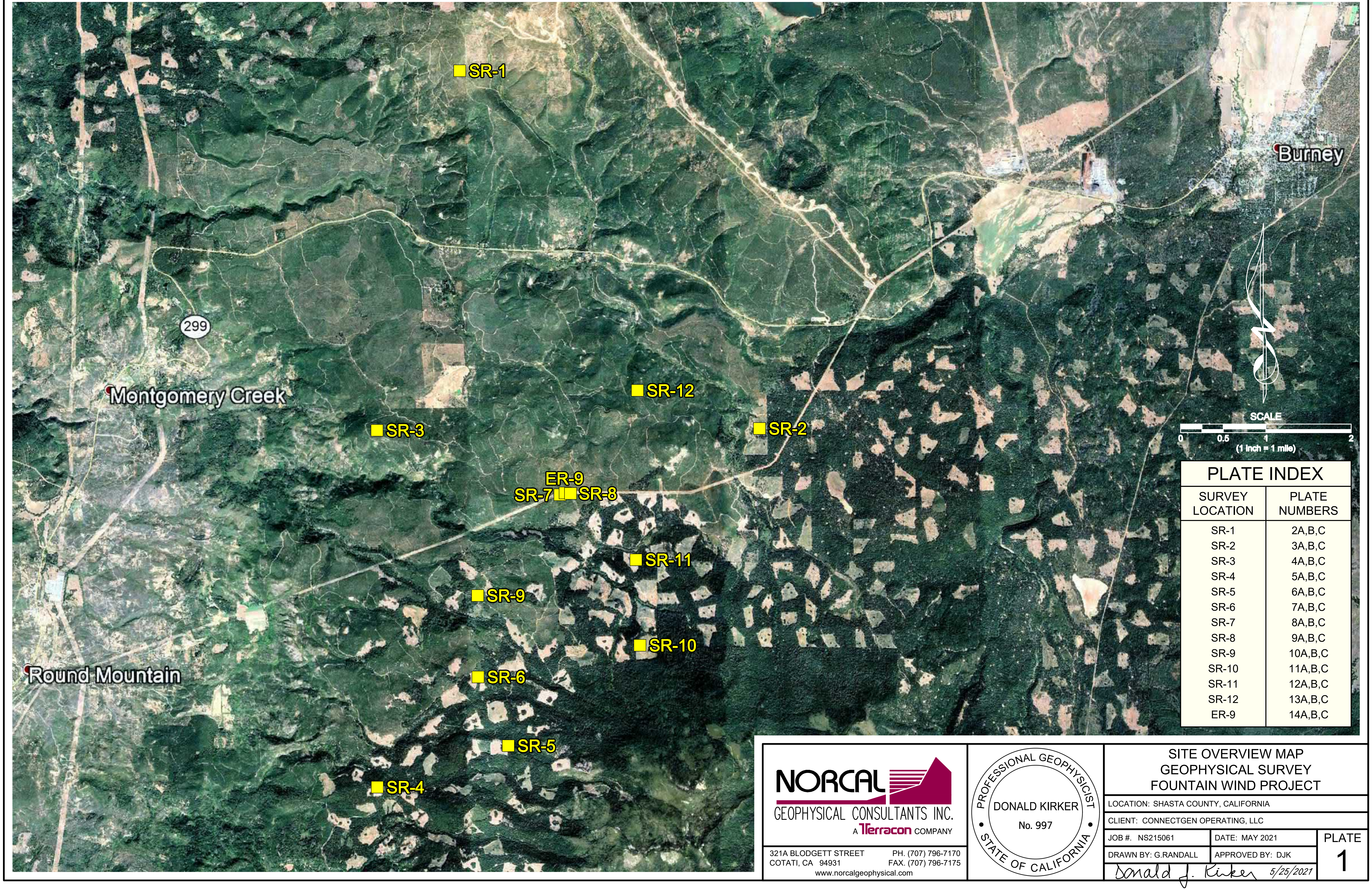


PLATE INDEX	
SURVEY LOCATION	PLATE NUMBERS
SR-1	2A,B,C
SR-2	3A,B,C
SR-3	4A,B,C
SR-4	5A,B,C
SR-5	6A,B,C
SR-6	7A,B,C
SR-7	8A,B,C
SR-8	9A,B,C
SR-9	10A,B,C
SR-10	11A,B,C
SR-11	12A,B,C
SR-12	13A,B,C
ER-9	14A,B,C

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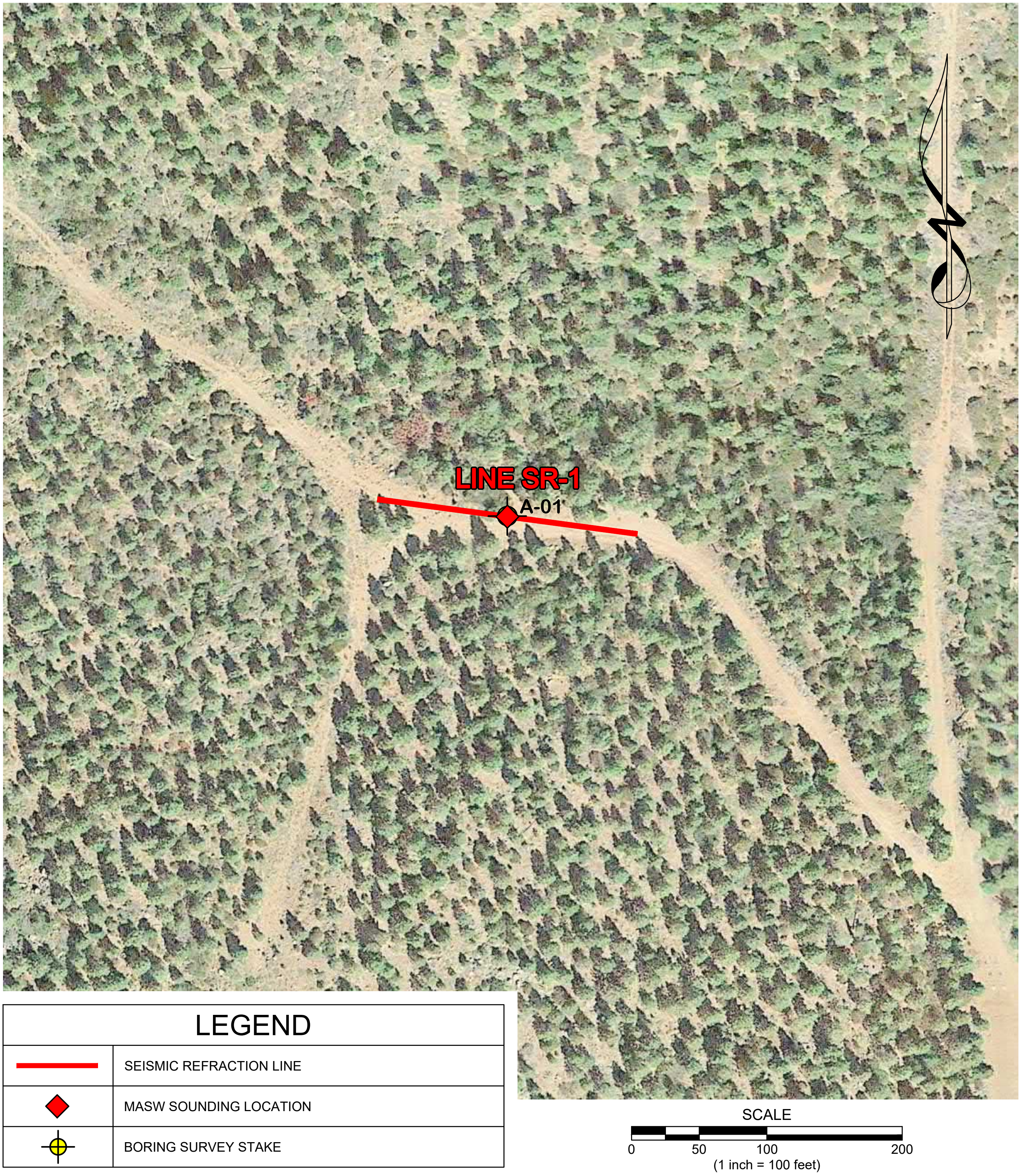
STATE OF CALIFORNIA

SITE OVERVIEW MAP
GEOPHYSICAL SURVEY
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
CLIENT: CONNECTGEN OPERATING, LLC
JOB #. NS215061
DATE: MAY 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK
Donald J. Kirker 5/25/2021
PLATE
1



LEGEND

▬	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

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SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-1
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061

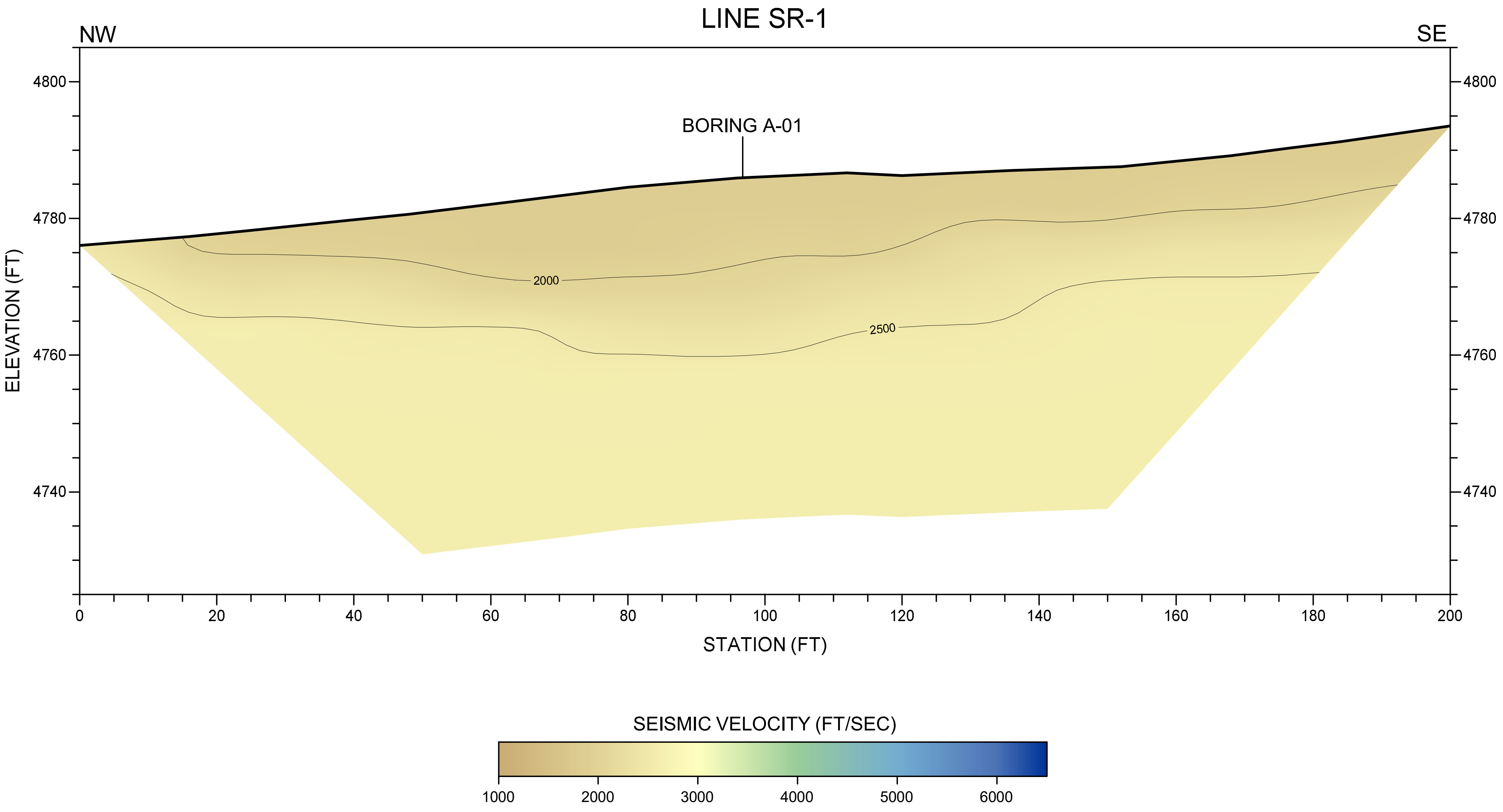
DATE: MAY 2021

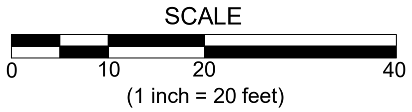
DRAWN BY: G.RANDALL

APPROVED BY: DJK

Donald J. Kirker 5/25/2021

PLATE
2A





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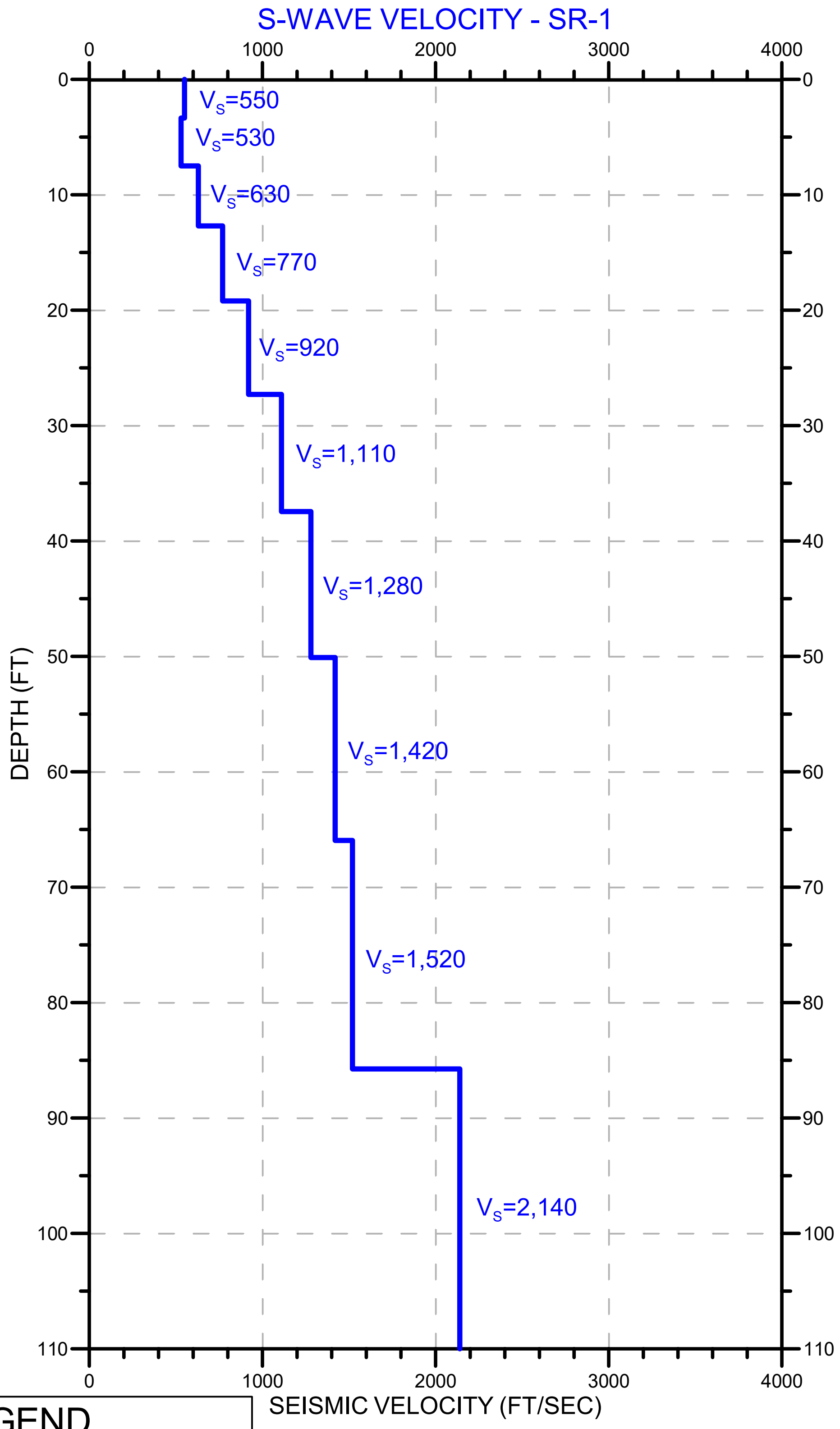
SEISMIC REFRACTION PROFILE
LINE SR-1
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
CLIENT: CONNECTGEN OPERATING, LLC
JOB #: NS215061
DATE: JUNE 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK

Donald J. Kirker 6/7/2021

PLATE
2B



LEGEND

▬	S-WAVE VELOCITY (MASW)

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MASW SOUNDING
LINE SR-1
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

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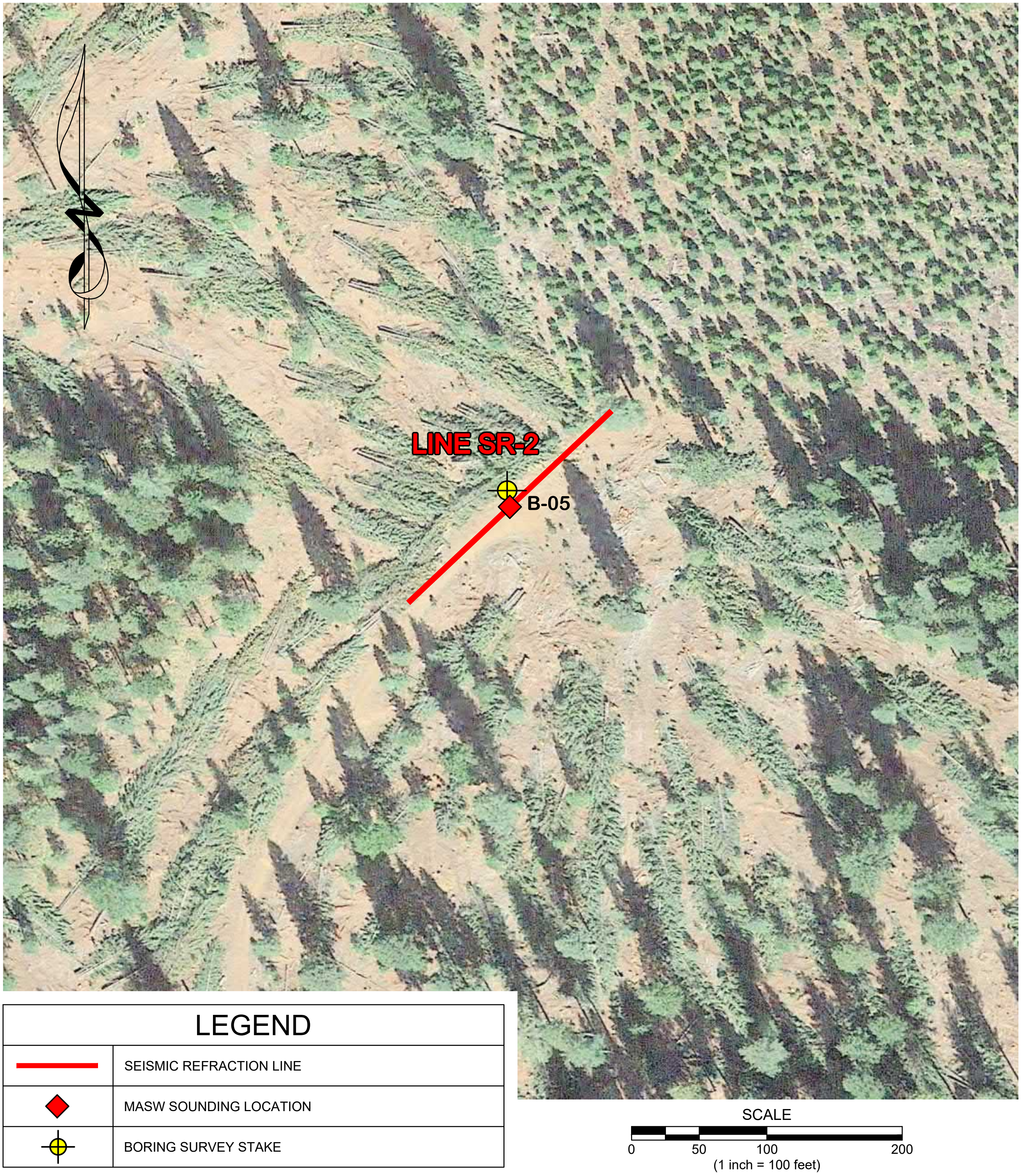
PLATE
2C



LEGEND

🟥	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

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SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-2
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061

DATE: MAY 2021

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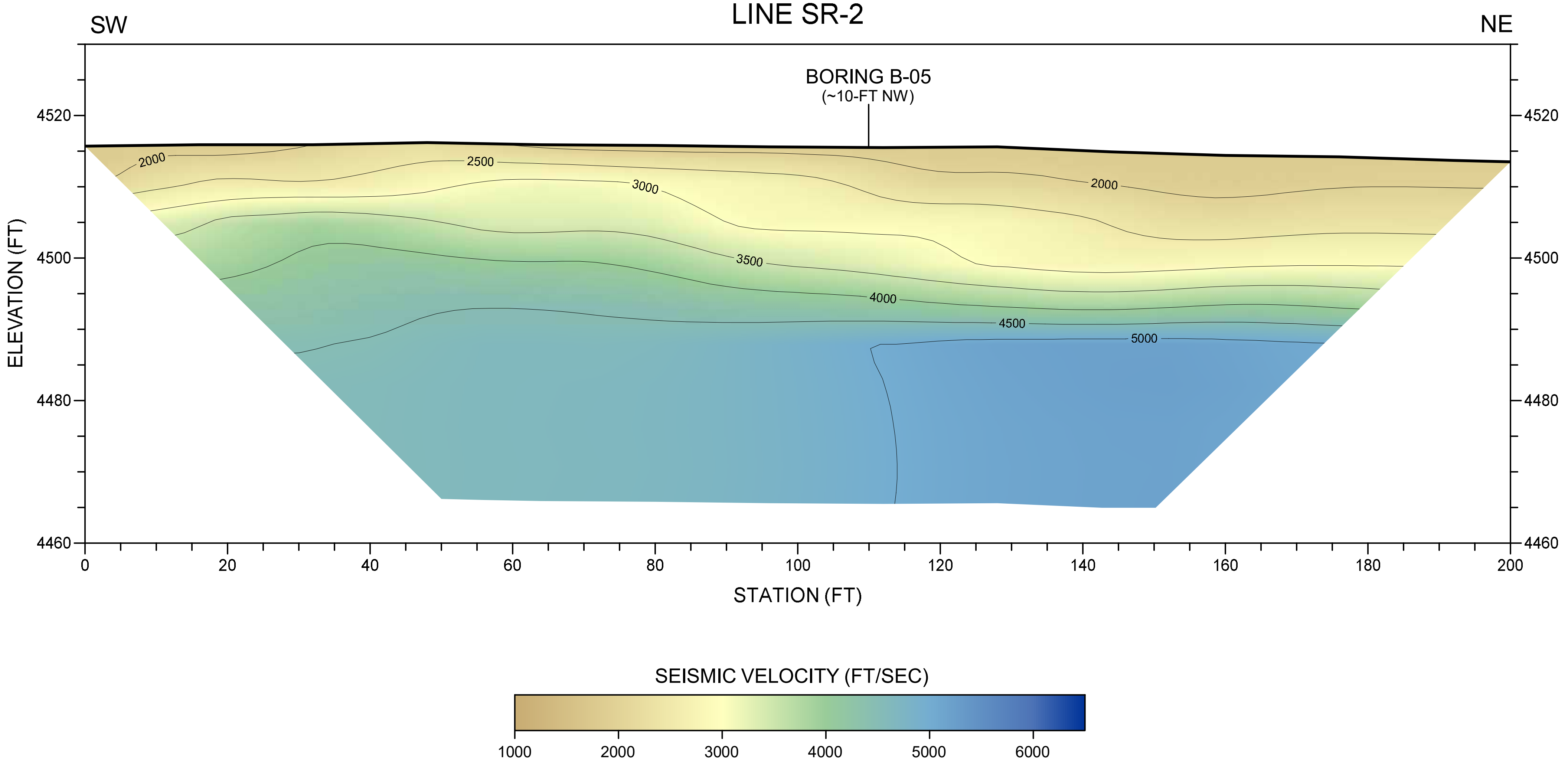
PLATE
3A

LINE SR-2



SCALE
0 10 20 40
(1 inch = 20 feet)

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SEISMIC REFRACTION PROFILE
LINE SR-2
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
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APPROVED BY: DJK
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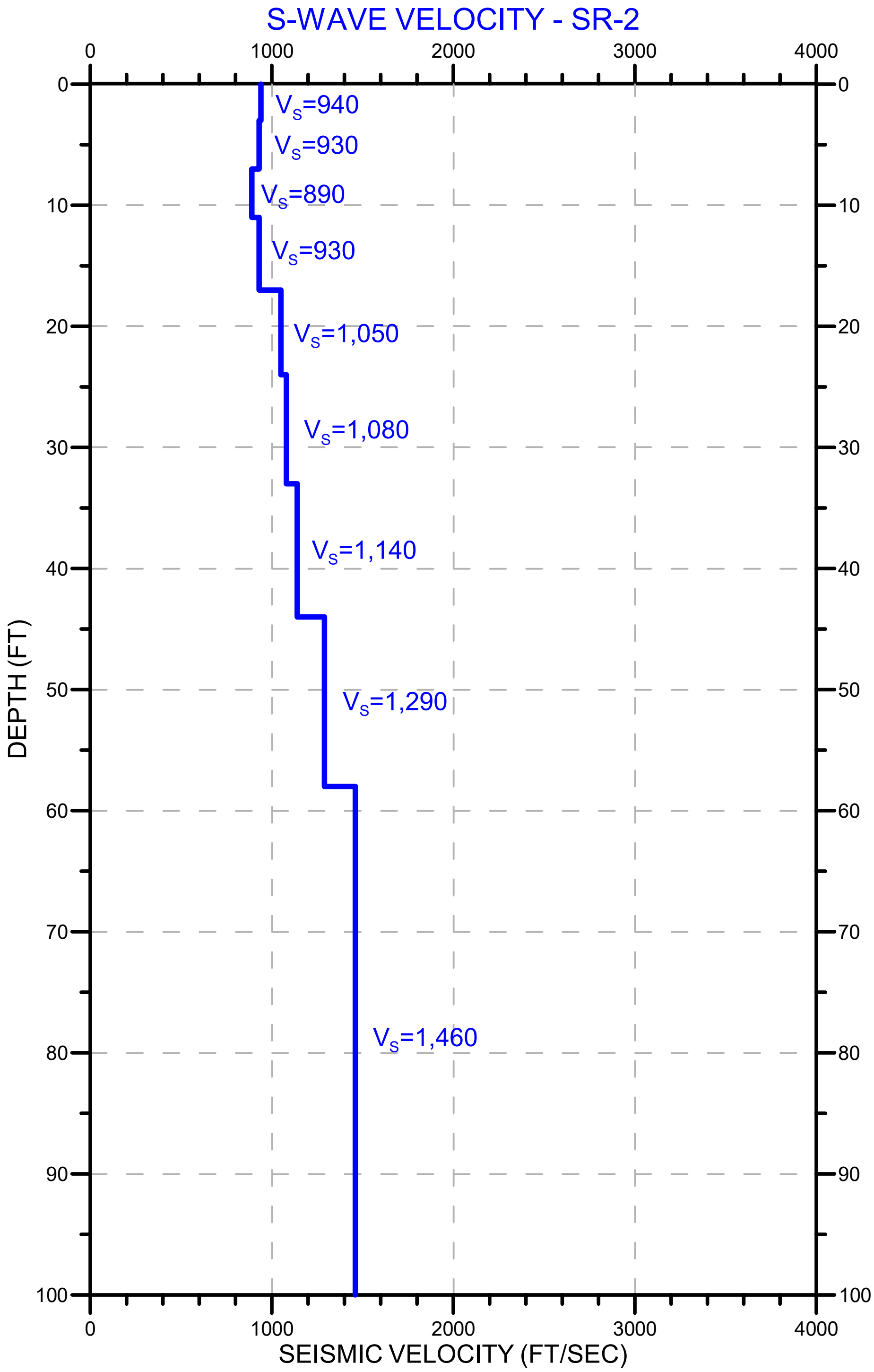
PLATE
3B



LEGEND	
▬	S-WAVE VELOCITY (MASW)

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MASW SOUNDING
LINE SR-2
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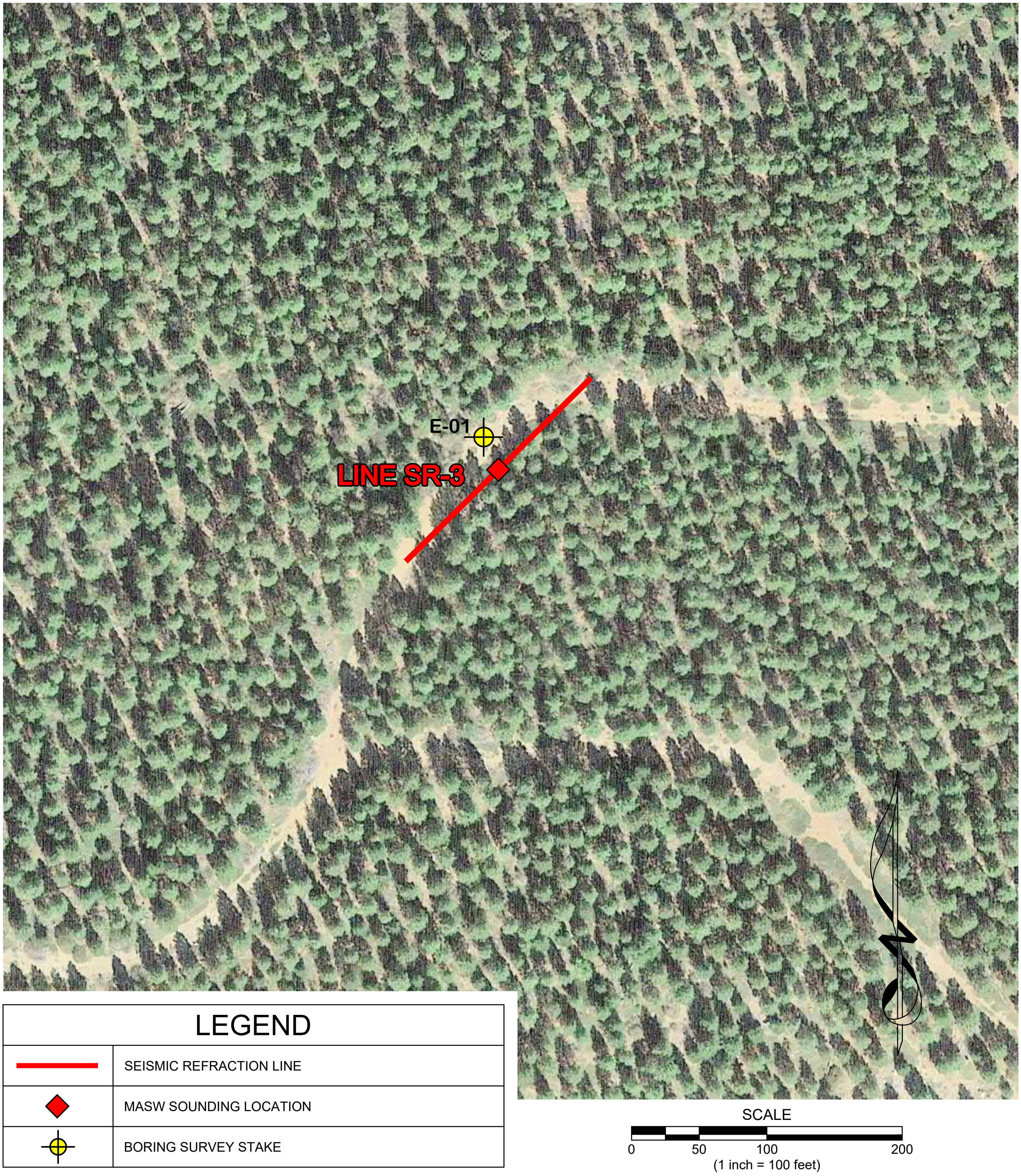
PLATE
3C



LEGEND

━	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

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SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-3
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

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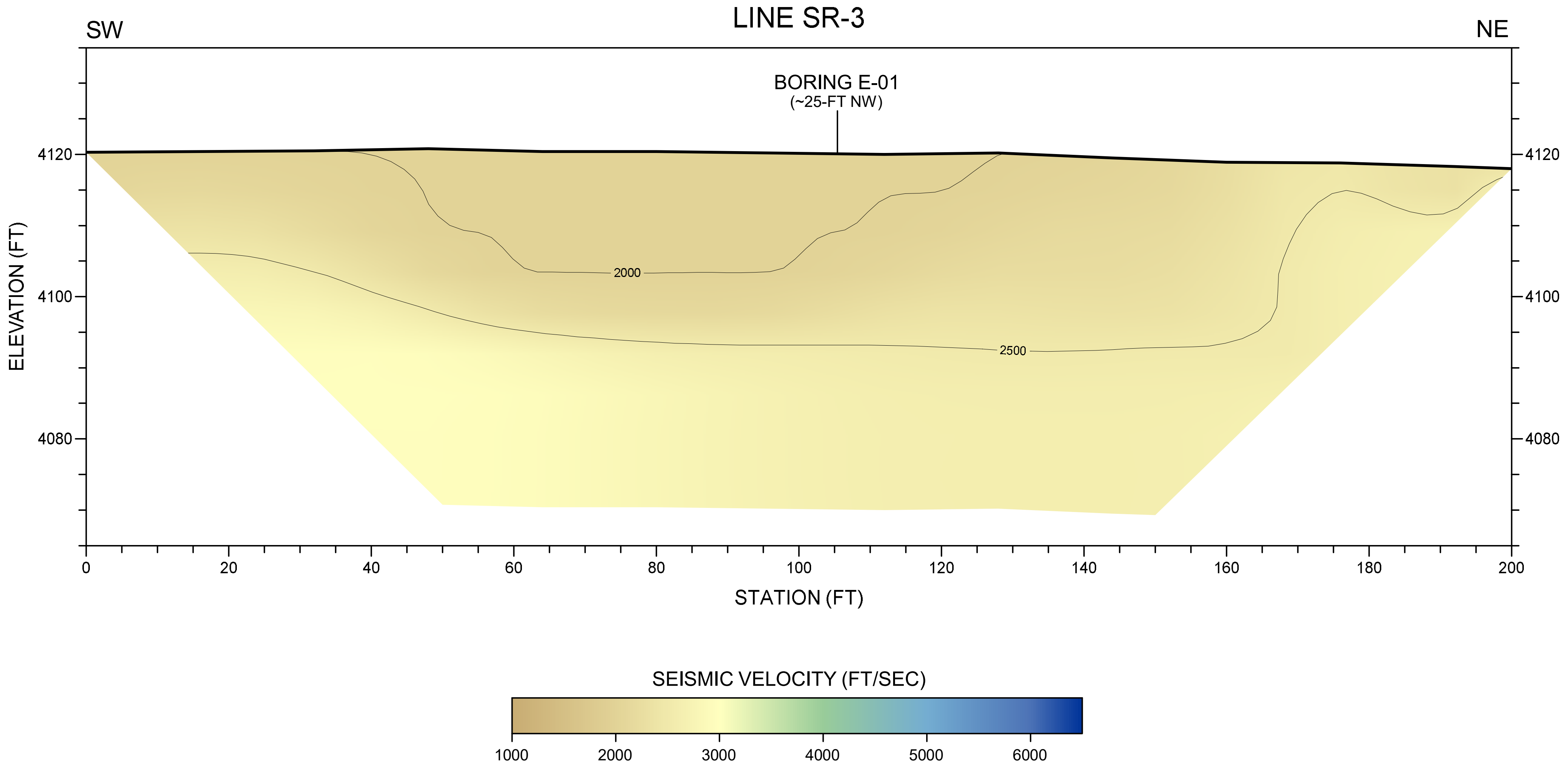
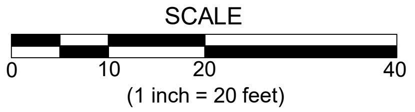
PLATE
4A





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SEISMIC REFRACTION PROFILE
LINE SR-3
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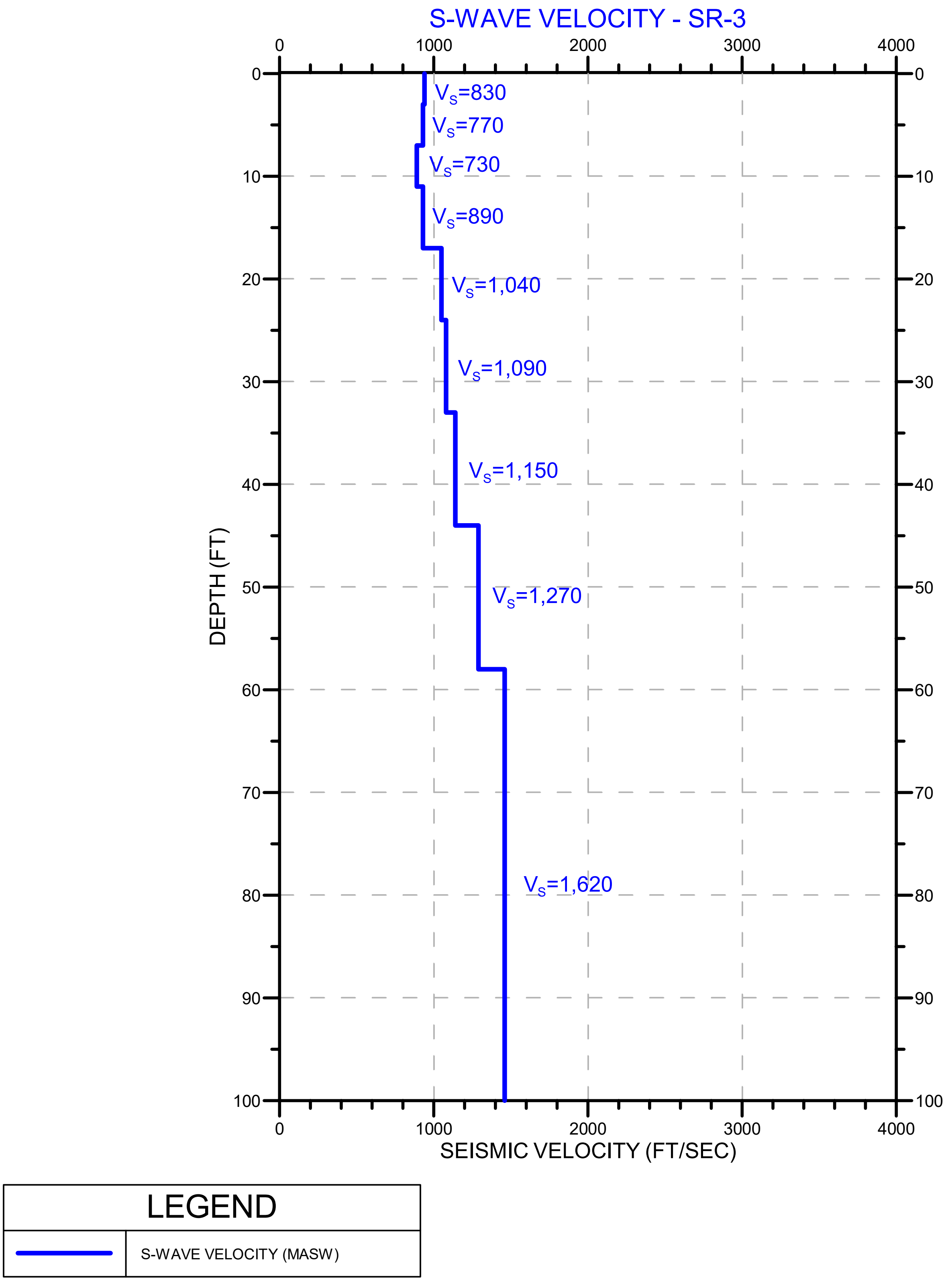
PLATE
4B



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MASW SOUNDING
LINE SR-3
FOUNTAIN WIND PROJECT

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CLIENT: CONNECTGEN OPERATING, LLC

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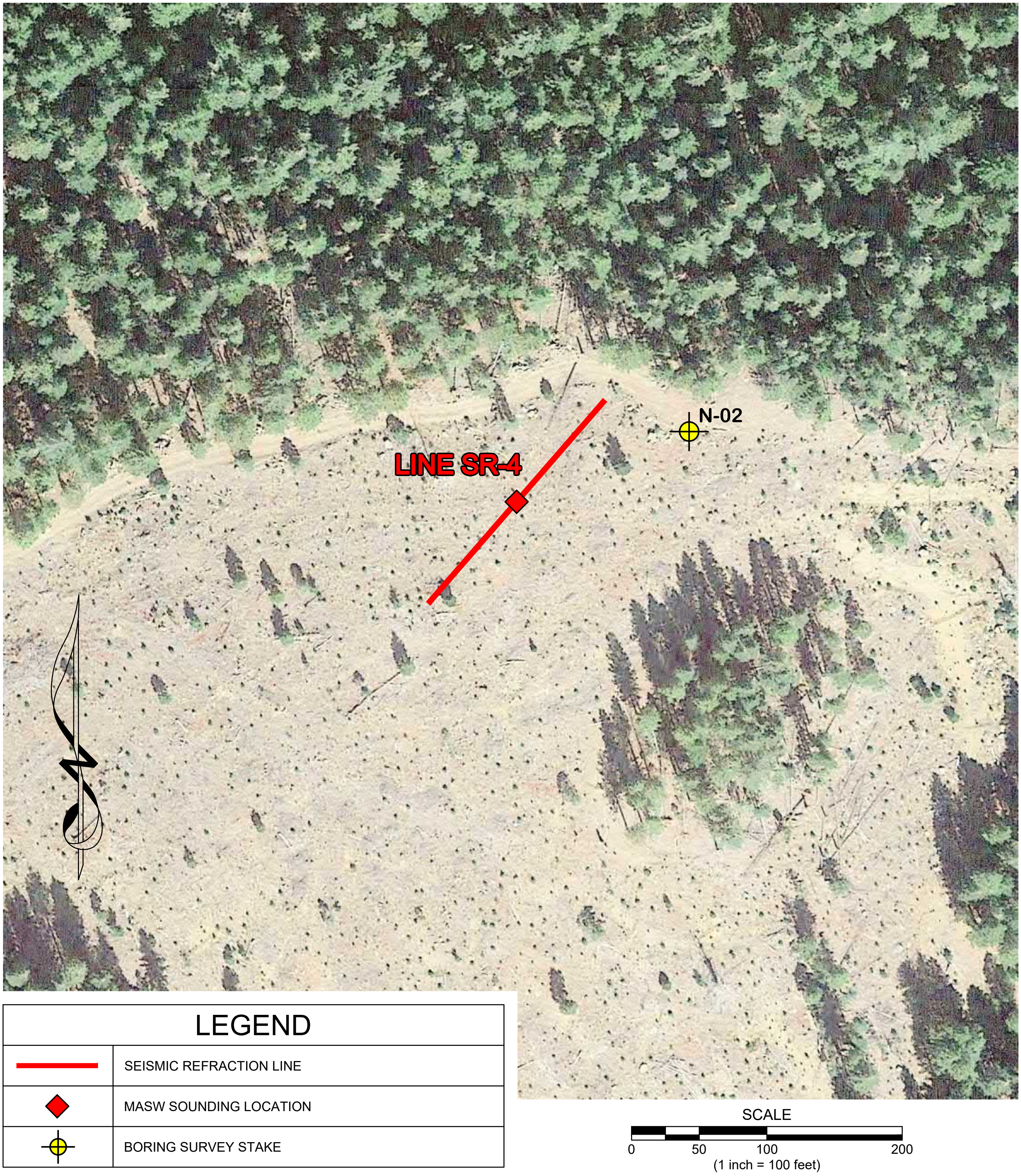
4C



LEGEND

—	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

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SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-4
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061
DATE: MAY 2021
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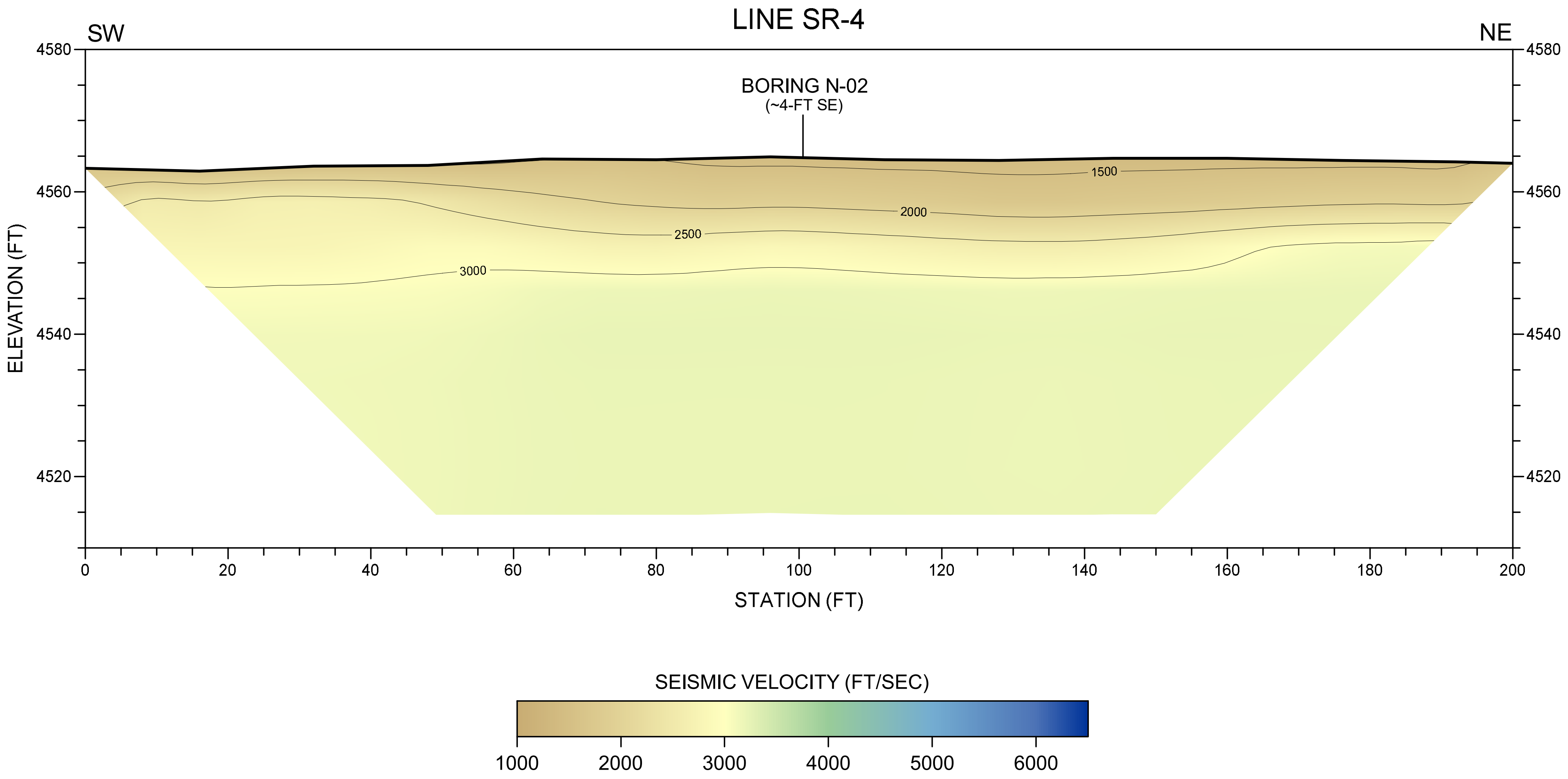
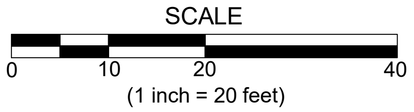
PLATE
5A





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SEISMIC REFRACTION PROFILE
LINE SR-4
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061	DATE: JUNE 2021	PLATE
DRAWN BY: G.RANDALL	APPROVED BY: DJK	5B

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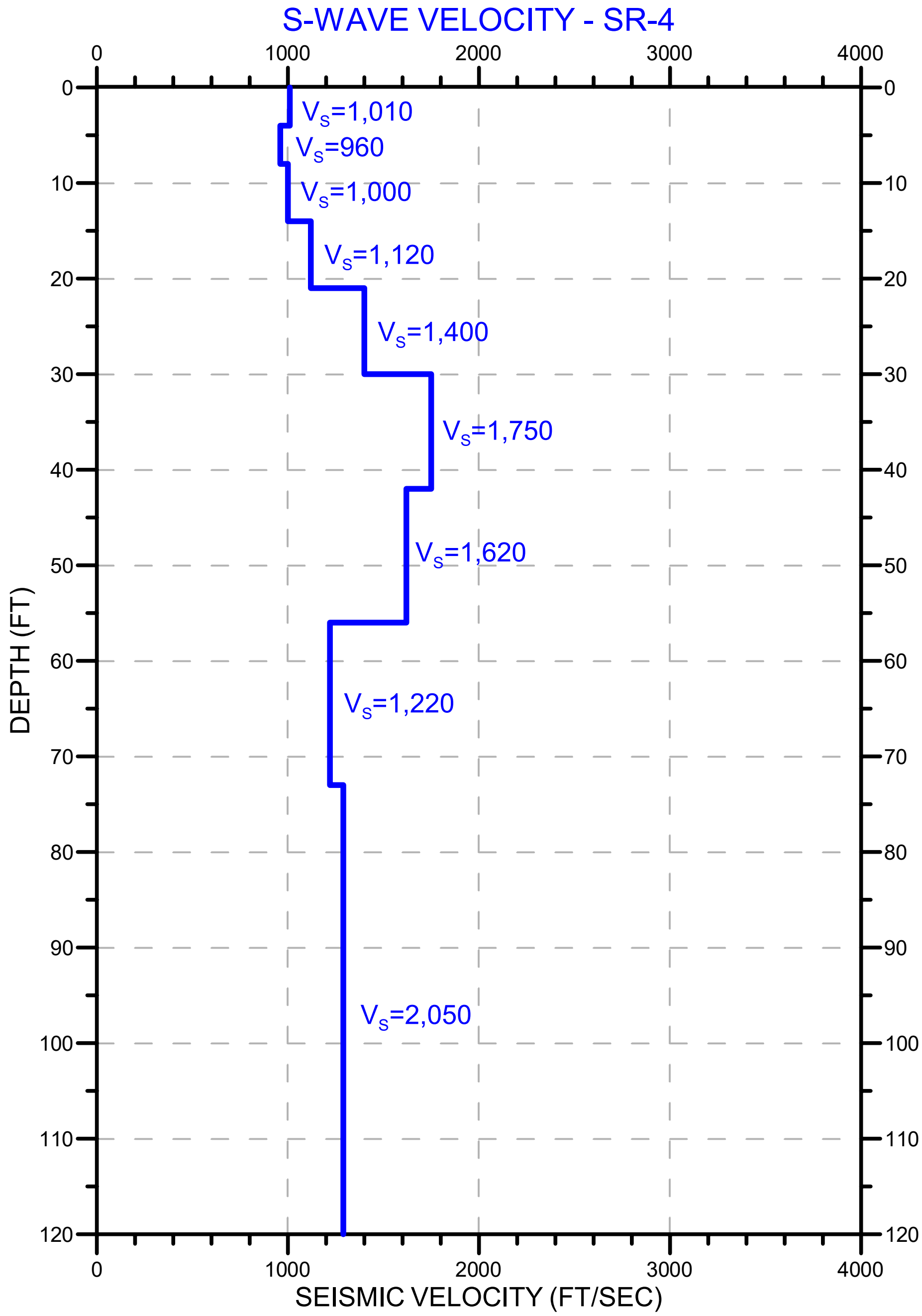

LEGEND	
▬	S-WAVE VELOCITY (MASW)

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STATE OF CALIFORNIA

MASW SOUNDING
LINE SR-4
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061

DATE: MAY 2021

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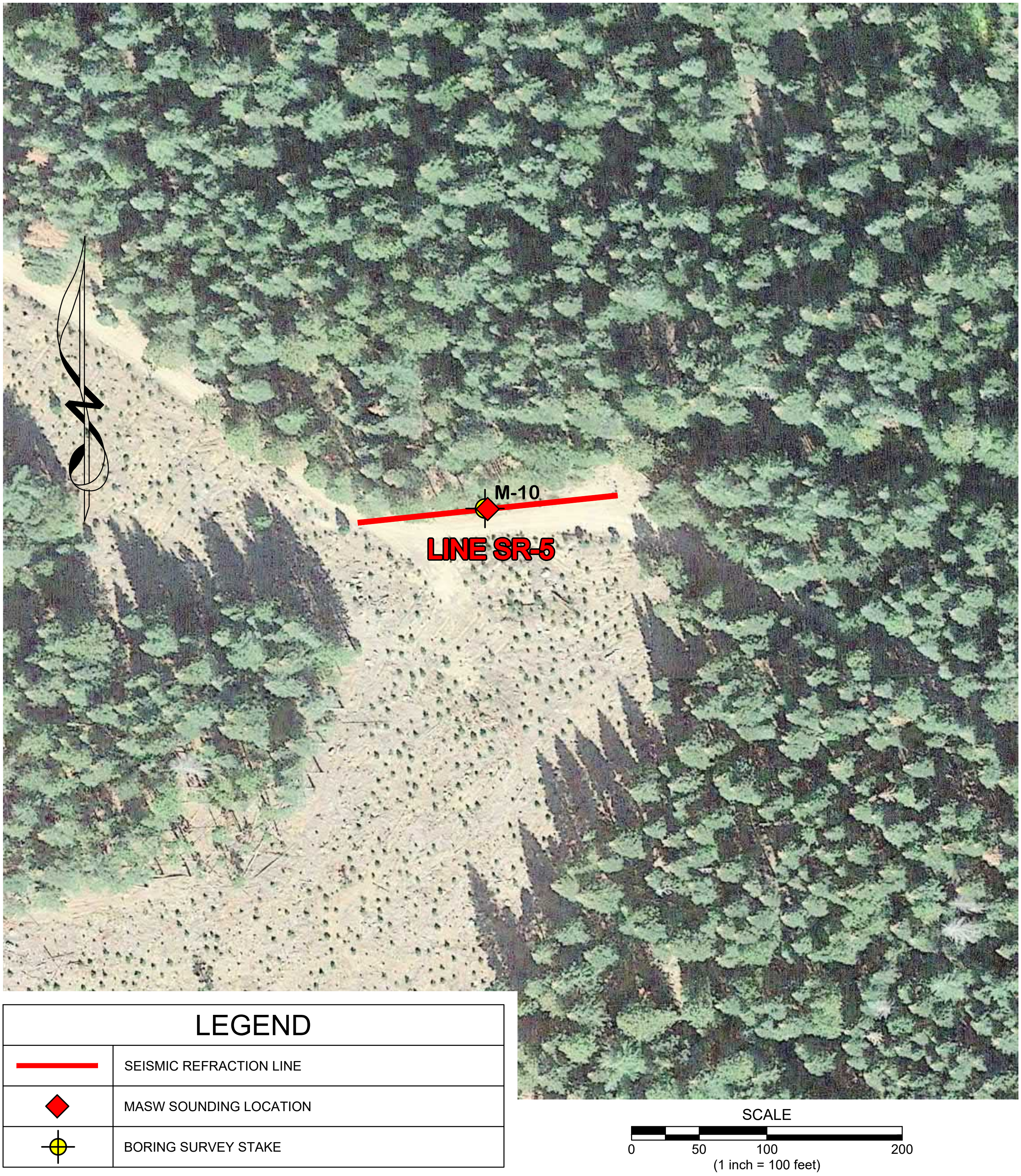
PLATE
5C



LEGEND	
🟥	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

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SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-5
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061

DATE: MAY 2021

DRAWN BY: G.RANDALL

APPROVED BY: DJK

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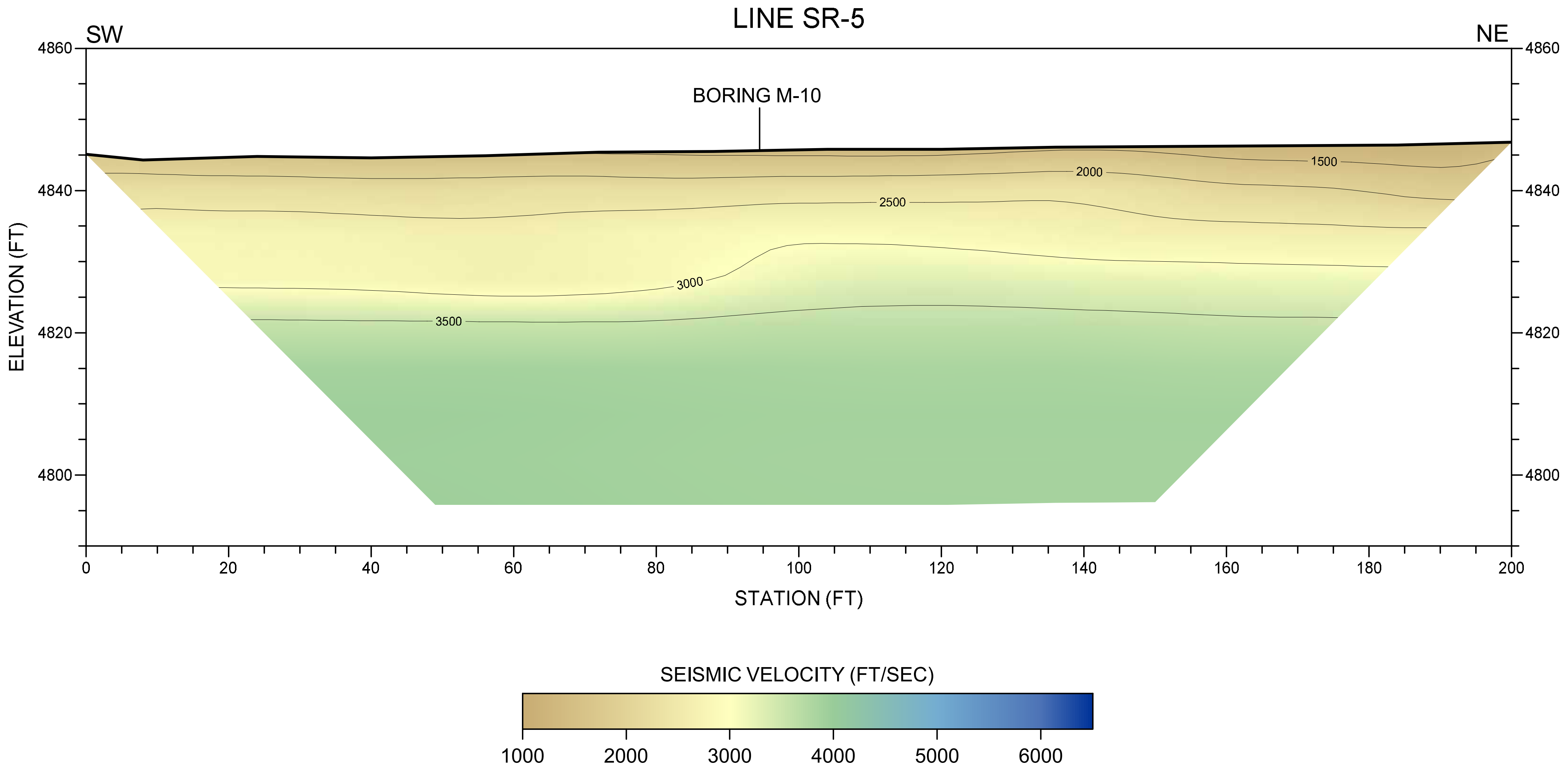
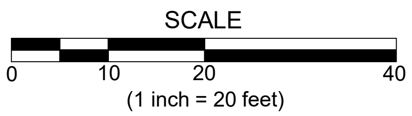
PLATE
6A





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SEISMIC REFRACTION PROFILE
LINE SR-5
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
CLIENT: CONNECTGEN OPERATING, LLC
JOB #: NS215061
DATE: JUNE 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK

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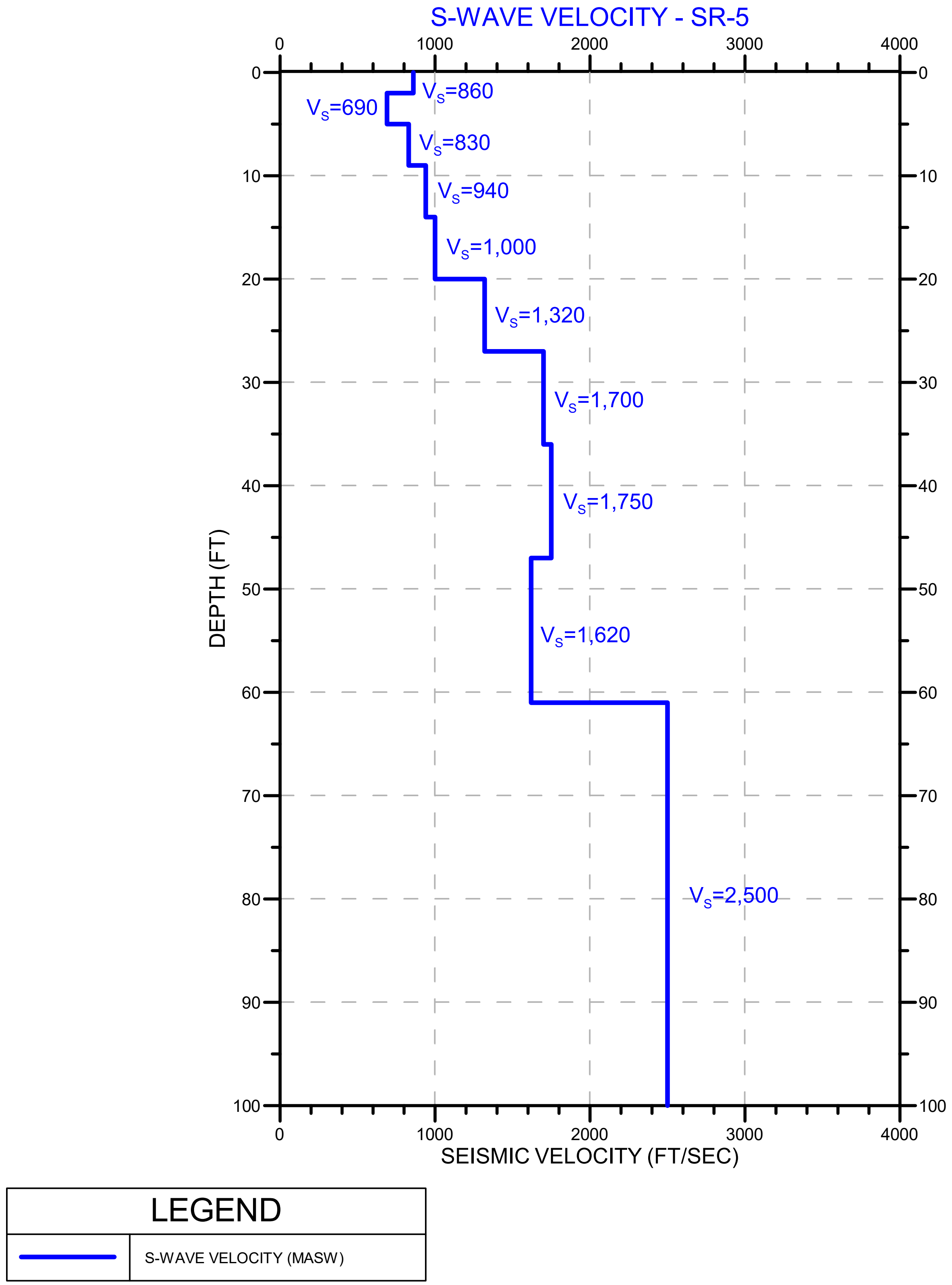
PLATE
6B



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MASW SOUNDING
LINE SR-5
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061
DATE: MAY 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK

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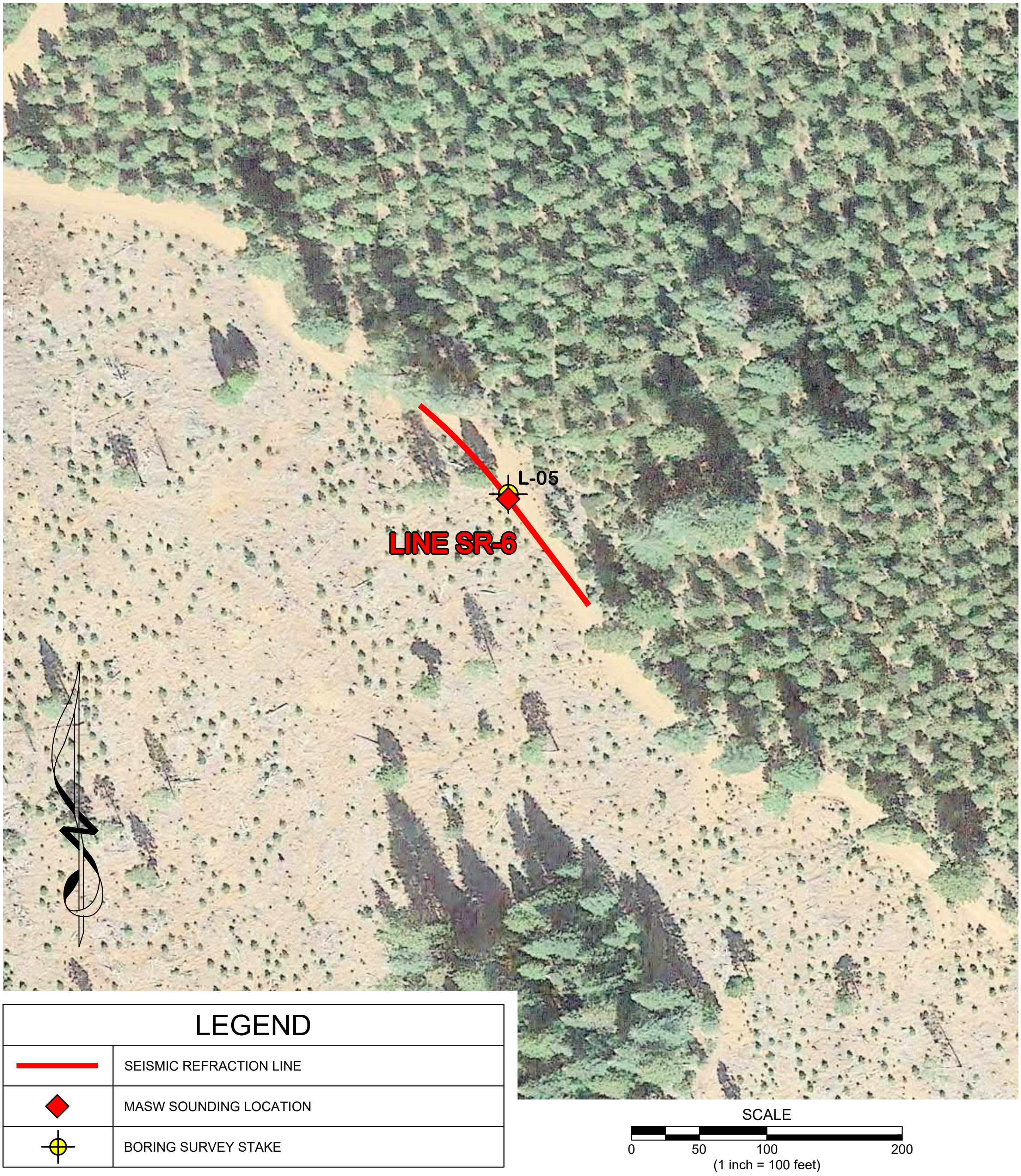
PLATE
6C



LEGEND

▬	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

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PROFESSIONAL GEOPHYSICIST
DONALD KIRKER
No. 997
STATE OF CALIFORNIA

SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-6
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061

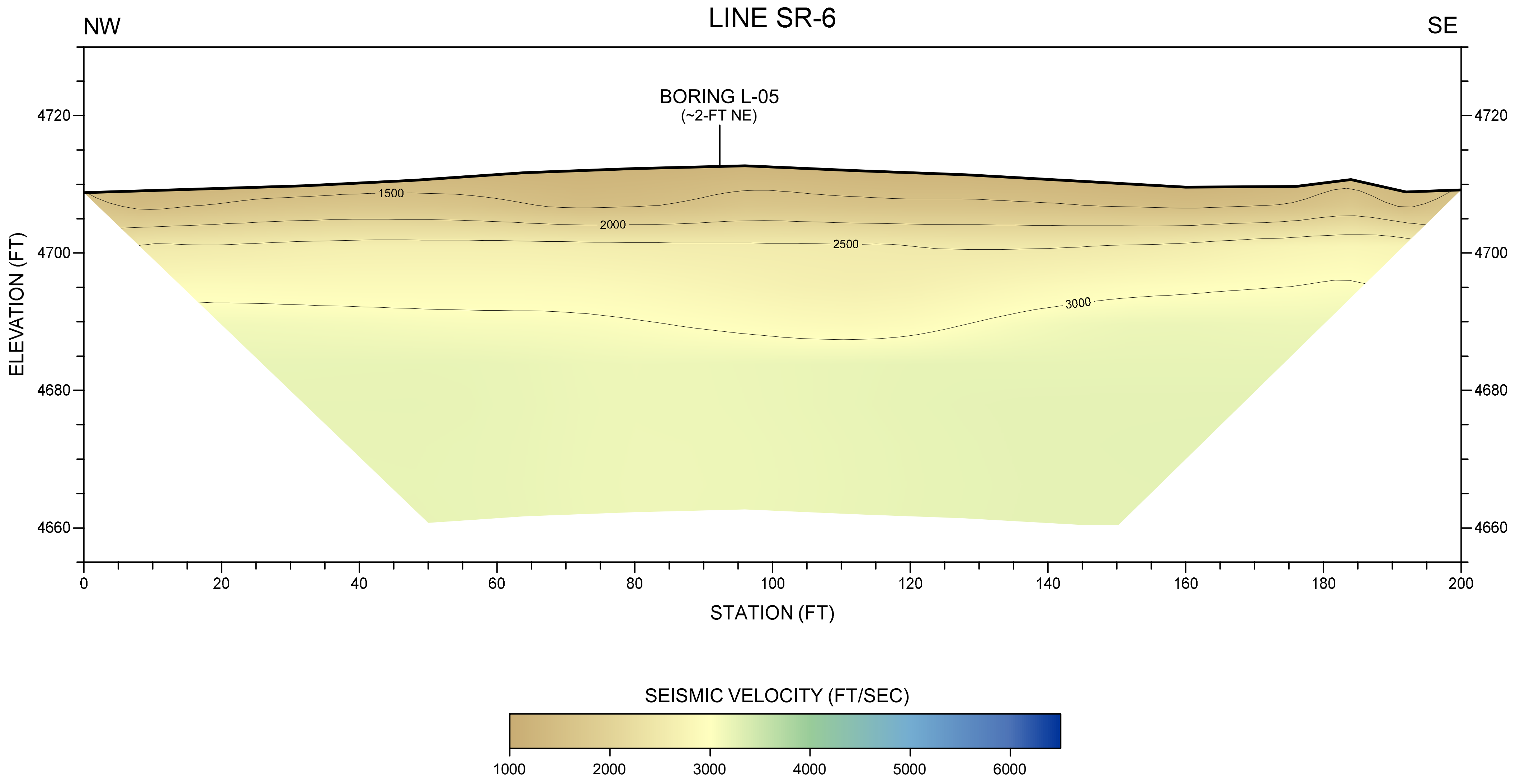
DATE: MAY 2021

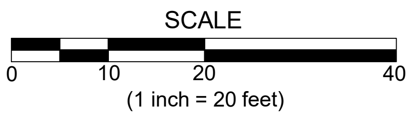
DRAWN BY: G.RANDALL

APPROVED BY: DJK

Donald J. Kirker 5/25/2021

PLATE
7A





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STATE OF CALIFORNIA

SEISMIC REFRACTION PROFILE
LINE SR-6
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061	DATE: JUNE 2021
DRAWN BY: G.RANDALL	APPROVED BY: DJK

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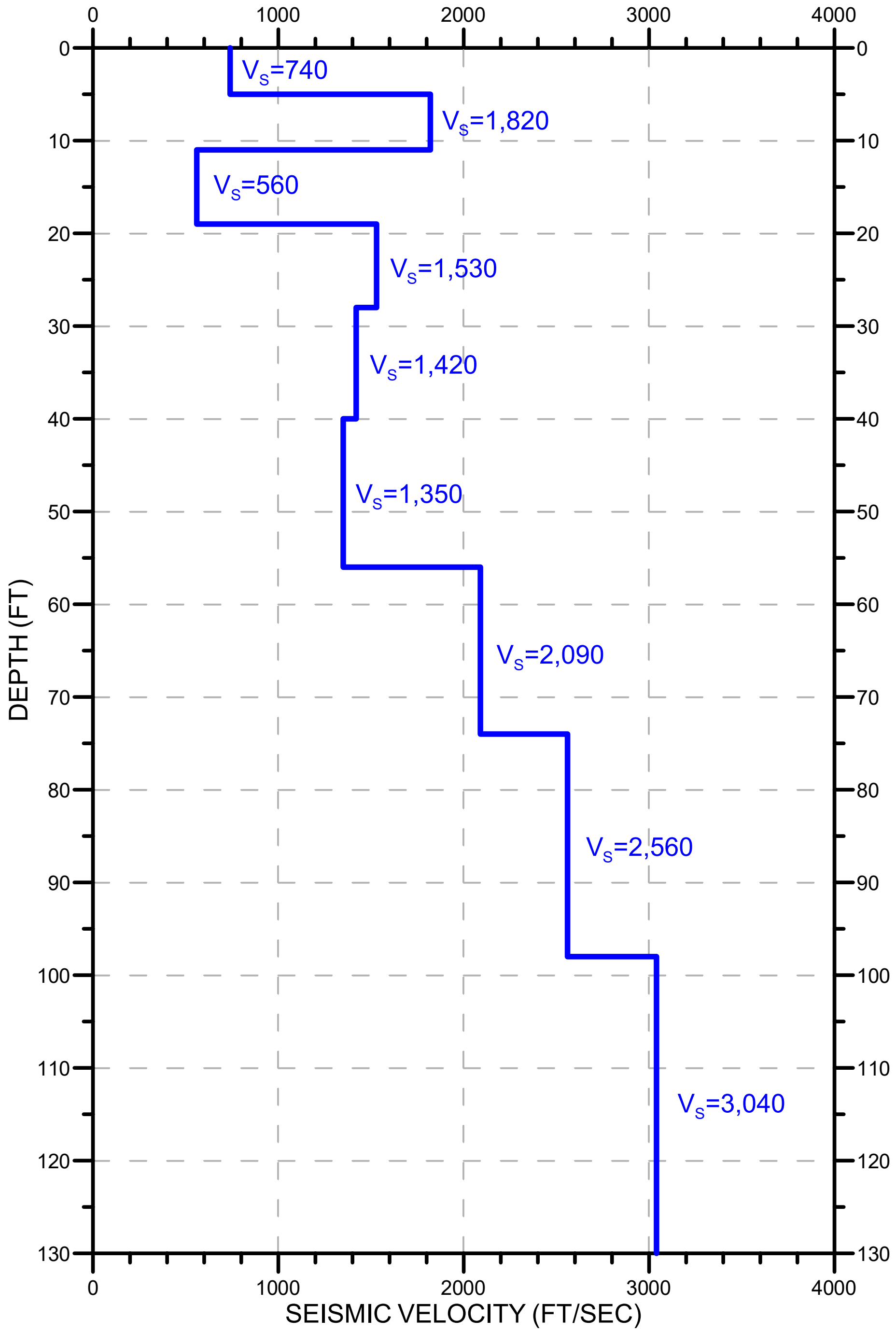
PLATE
7B

S-WAVE VELOCITY - SR-6



LEGEND	
▬	S-WAVE VELOCITY (MASW)

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MASW SOUNDING
LINE SR-6
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061

DATE: MAY 2021

DRAWN BY: G.RANDALL

APPROVED BY: DJK

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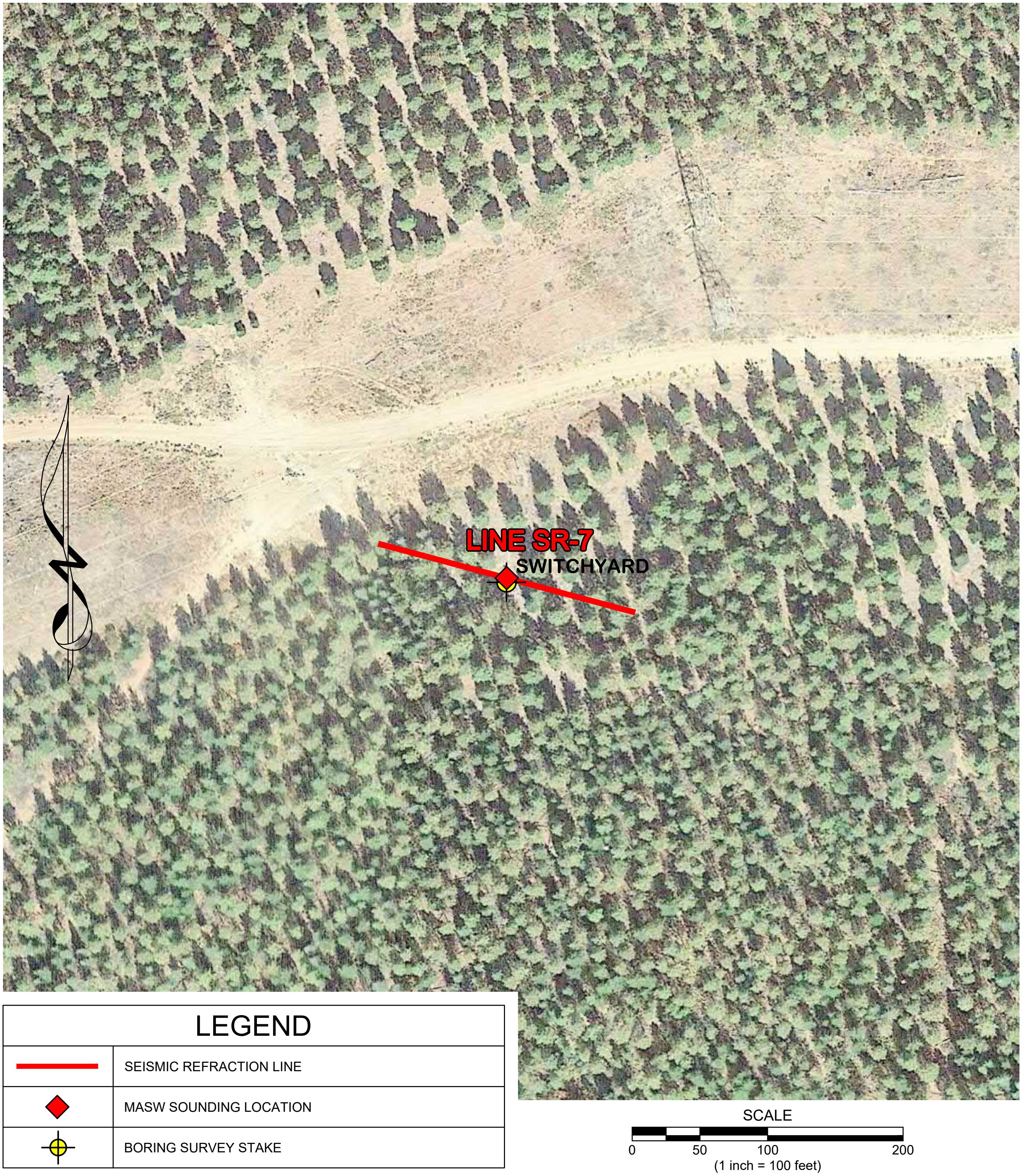
PLATE
7C



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STATE OF CALIFORNIA

SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-7
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061

DATE: MAY 2021

DRAWN BY: G.RANDALL

APPROVED BY: DJK

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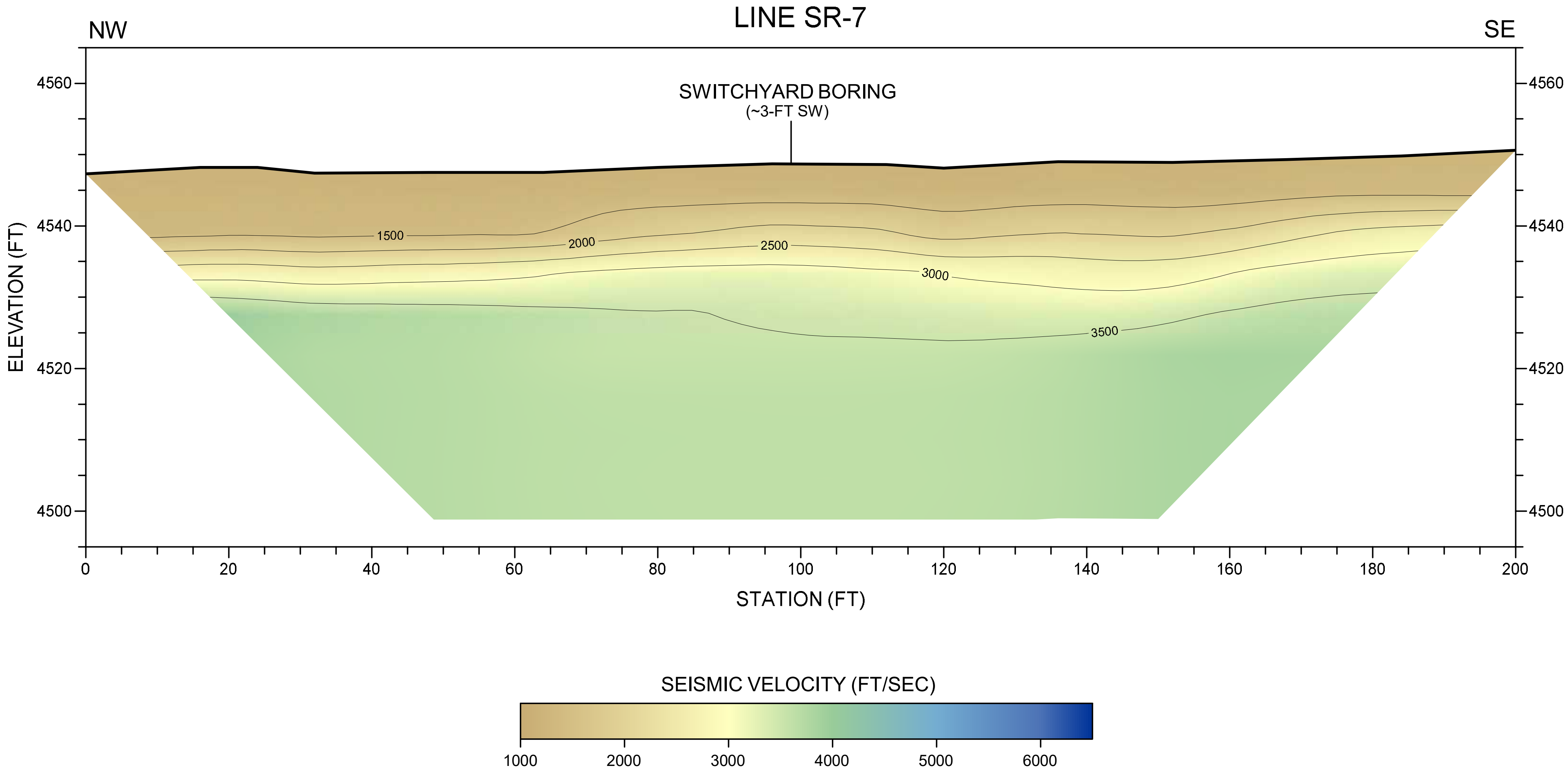
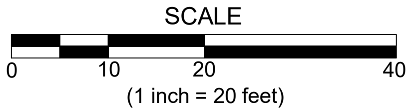
PLATE
8A





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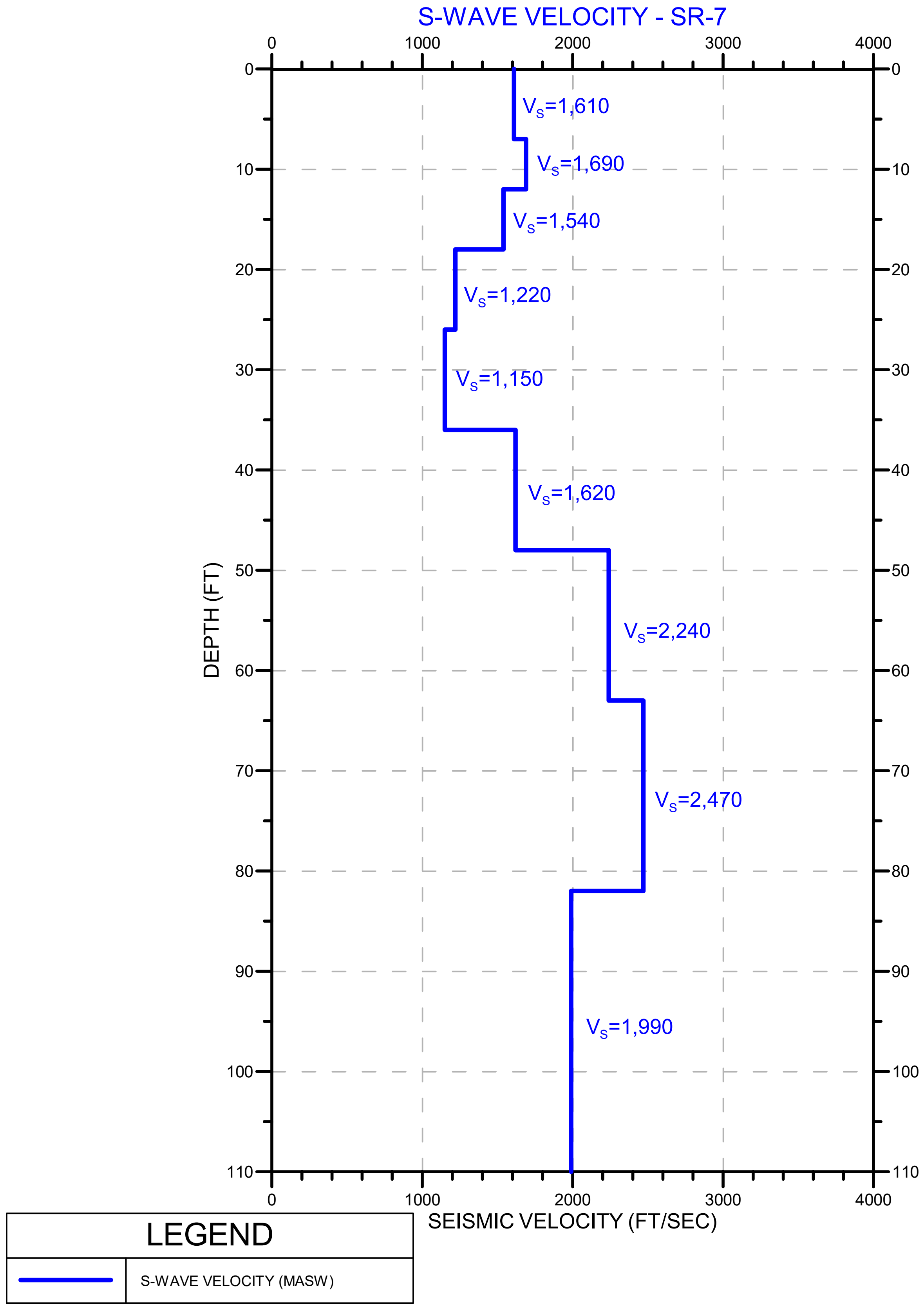
SEISMIC REFRACTION PROFILE
LINE SR-7
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061	DATE: JUNE 2021	PLATE
DRAWN BY: G.RANDALL	APPROVED BY: DJK	8B
Donald J. Kirker	6/7/2021	



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DONALD KIRKER
No. 997
STATE OF CALIFORNIA

MASW SOUNDING
LINE SR-7
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061	DATE: JUNE 2021	PLATE
DRAWN BY: G.RANDALL	APPROVED BY: DJK	8C

Donald J. Kirker 6/7/2021

LEGEND

▬	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

SCALE

0 50 100 200

(1 inch = 100 feet)

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PROFESSIONAL GEOPHYSICIST
DONALD KIRKER
No. 997
STATE OF CALIFORNIA

SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-8
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061

DATE: MAY 2021

DRAWN BY: G.RANDALL

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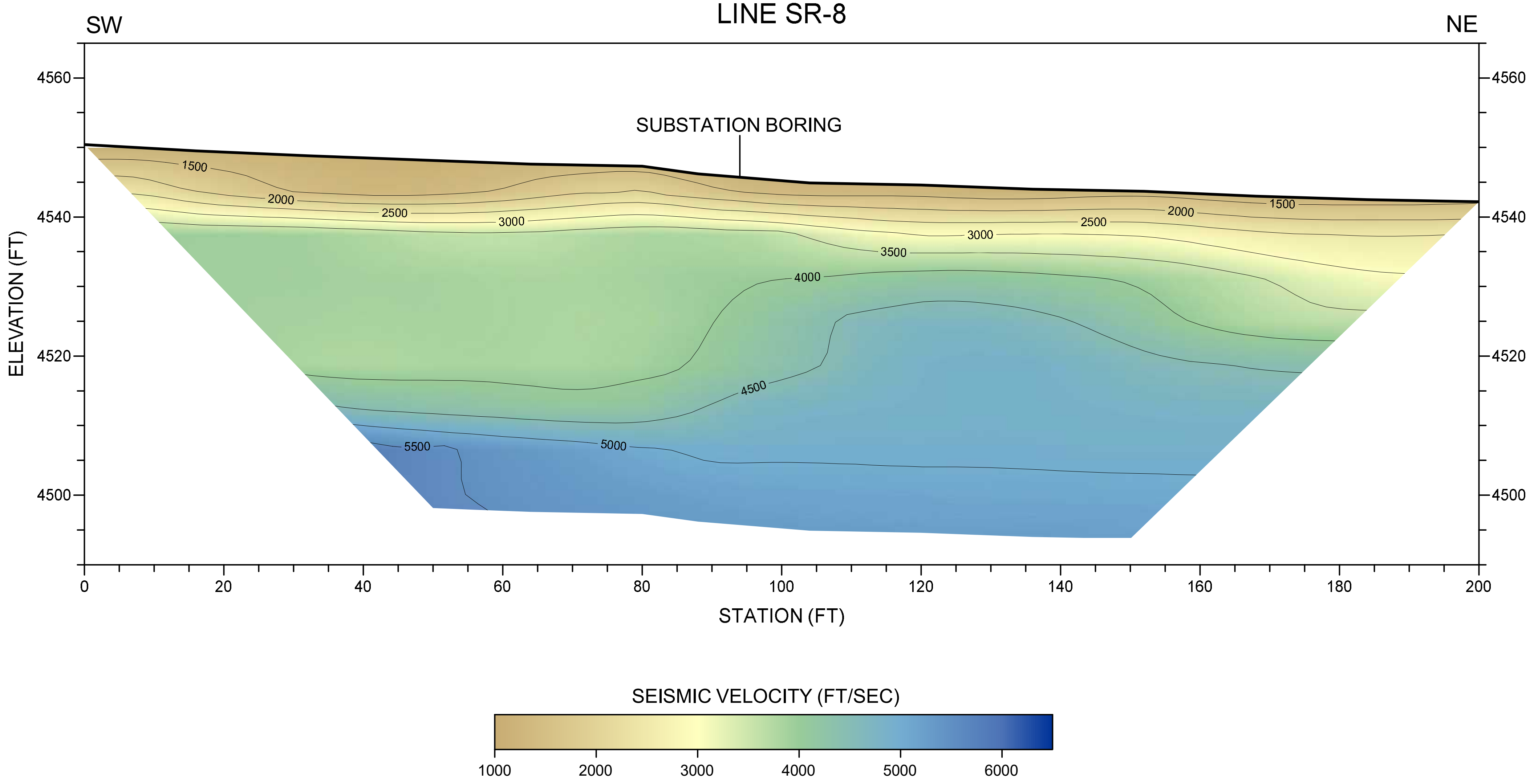
PLATE
9A

LINE SR-8



SCALE

0 10 20 40

(1 inch = 20 feet)

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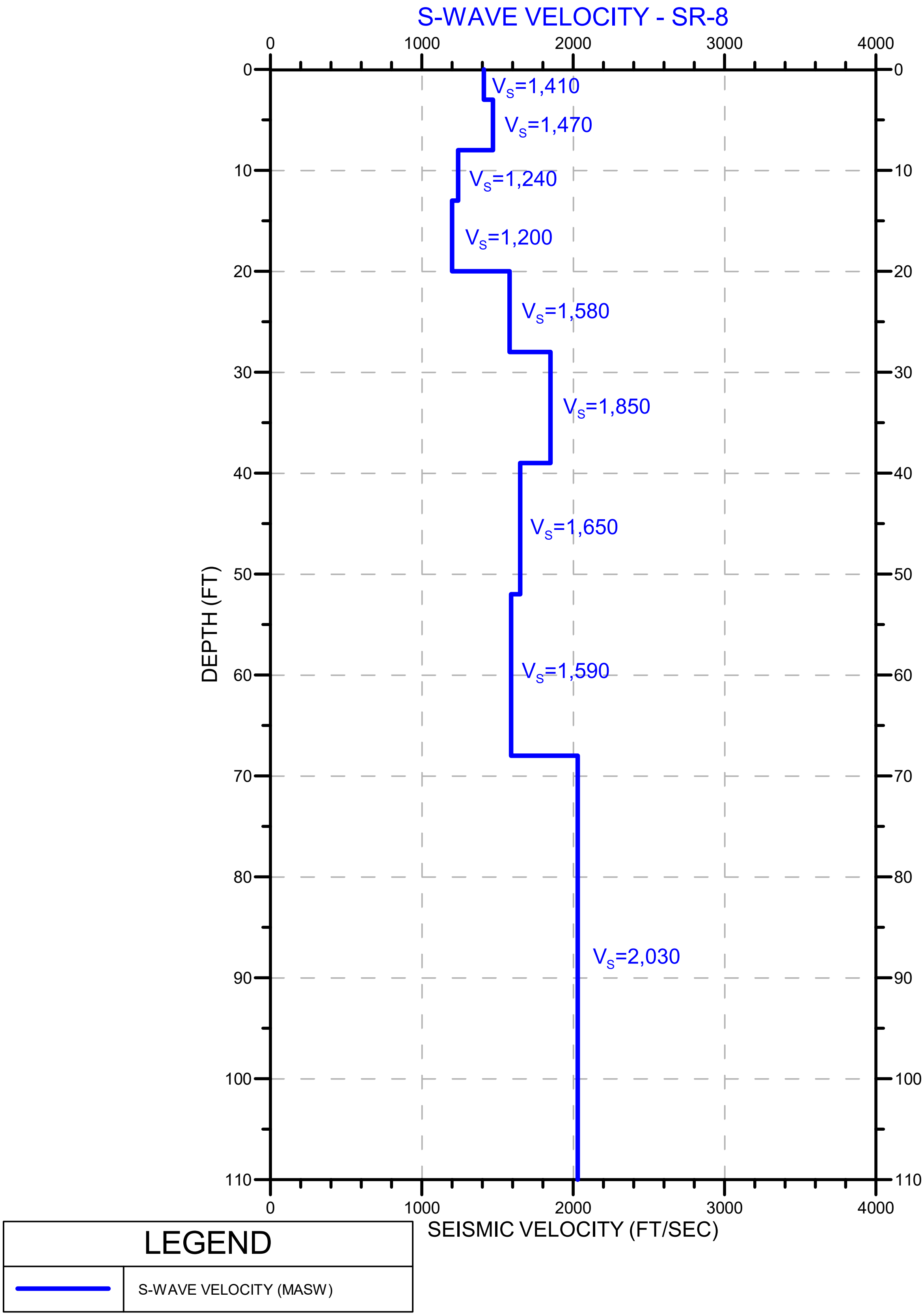
DONALD KIRKER
No. 997

SEISMIC REFRACTION PROFILE
LINE SR-8
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
CLIENT: CONNECTGEN OPERATING, LLC
JOB #: NS215061
DATE: JUNE 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK

Donald J. Kirker 6/7/2021

PLATE
9B



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DONALD KIRKER
No. 997
STATE OF CALIFORNIA

MASW SOUNDING
LINE SR-8
FOUNTAIN WIND PROJECT

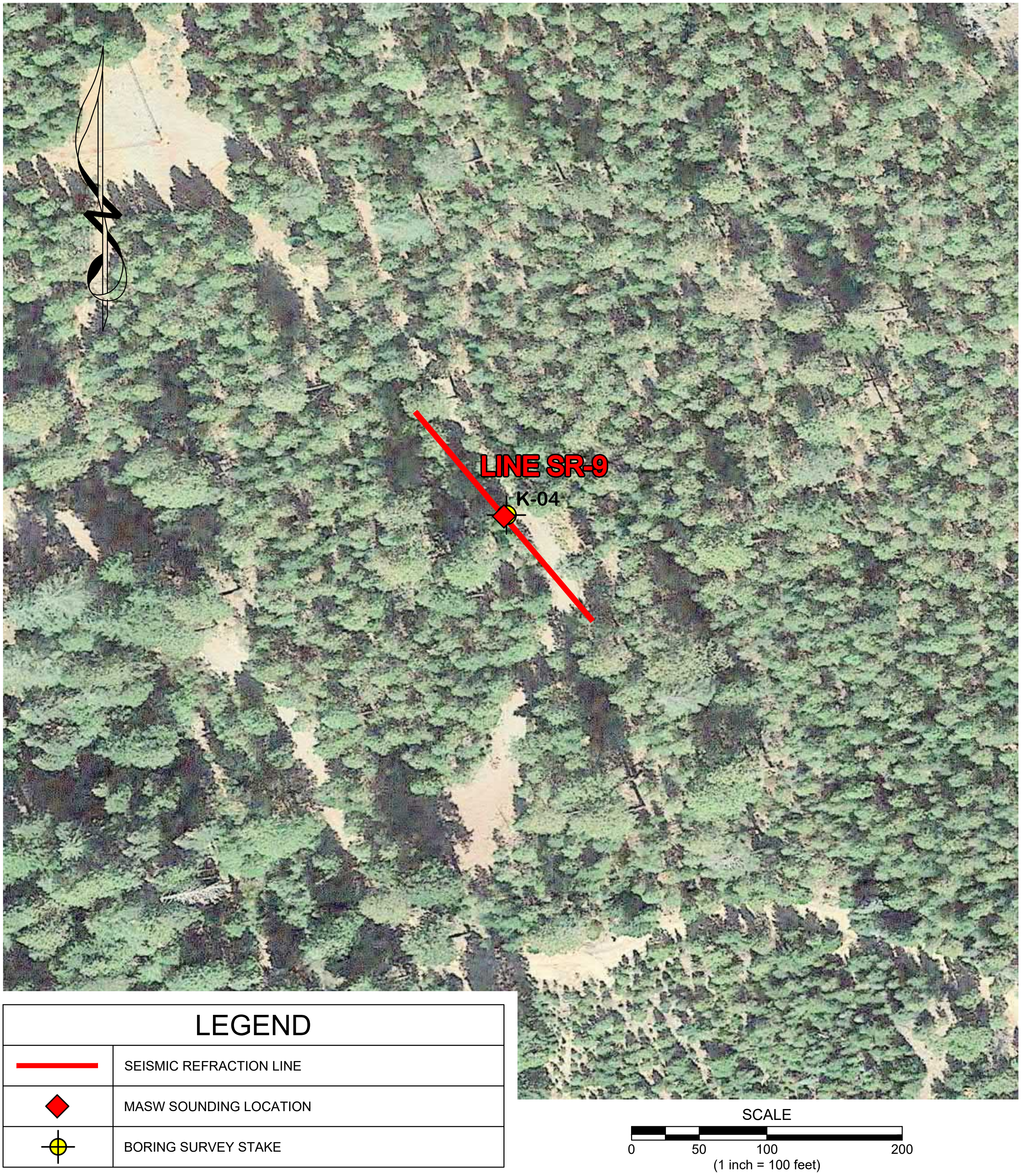
LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061
DATE: MAY 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK

Donald J. Kirker 5/28/2021

PLATE
9C



LEGEND	
━	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

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No. 997
STATE OF CALIFORNIA

SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-9
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061	DATE: MAY 2021	PLATE
DRAWN BY: G.RANDALL	APPROVED BY: DJK	10A

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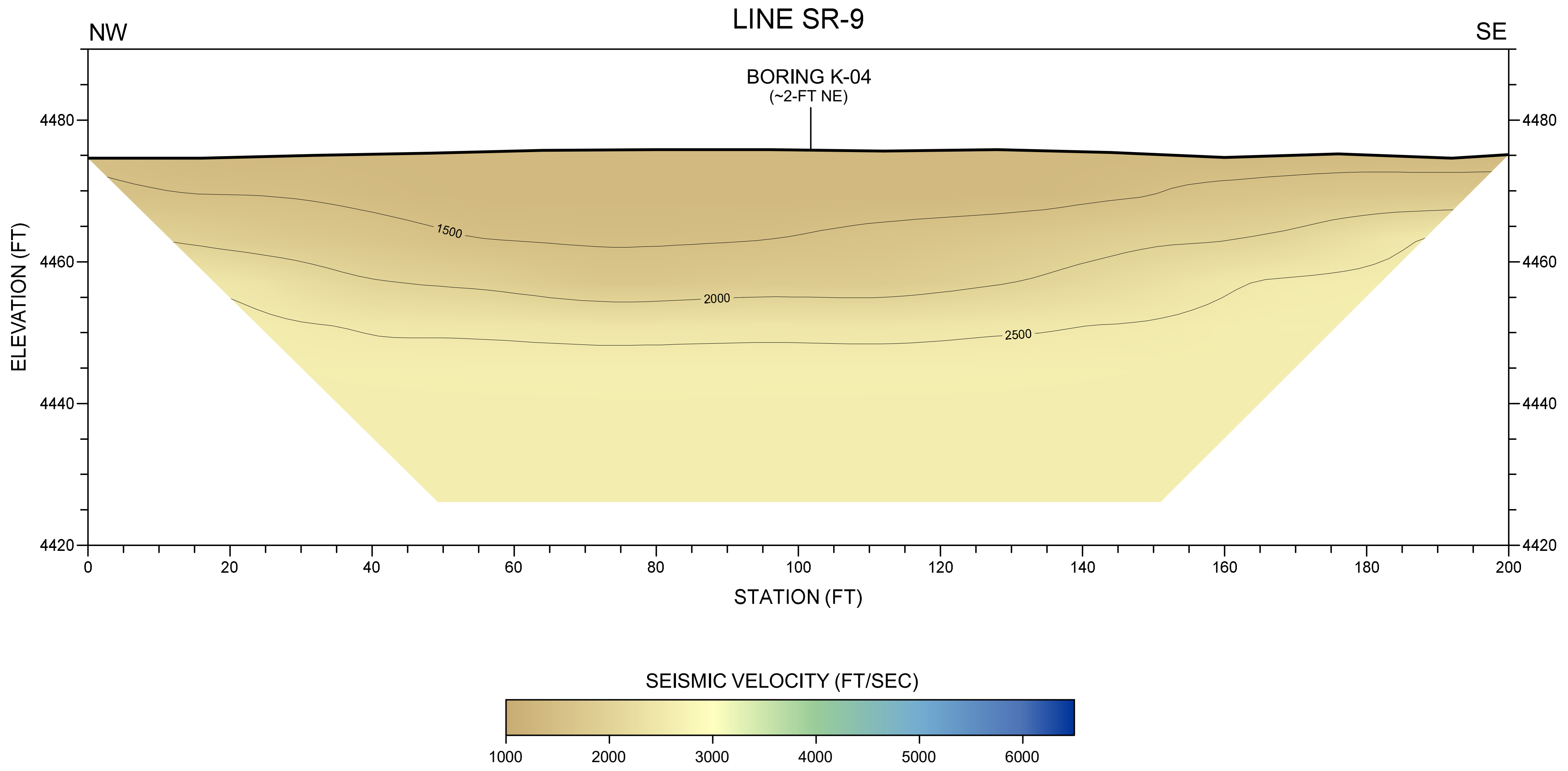

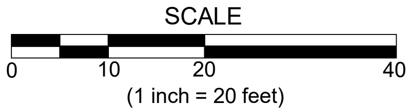

(1 inch = 20 feet)

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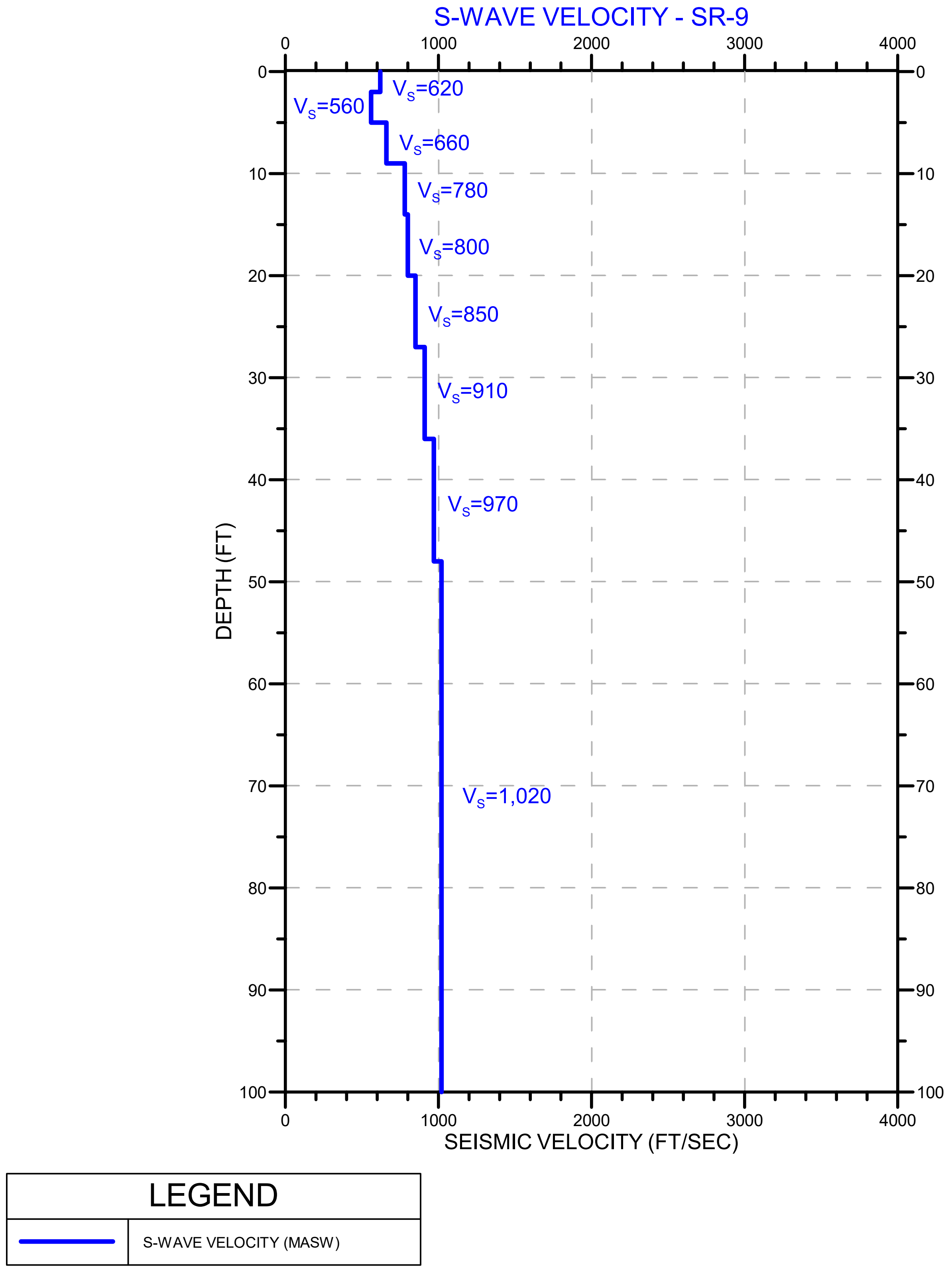
STATE OF CALIFORNIA

SEISMIC REFRACTION PROFILE
LINE SR-9
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
CLIENT: CONNECTGEN OPERATING, LLC
JOB #: NS215061
DATE: JUNE 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK
Donald J. Kirker 6/7/2021

PLATE
10B



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STATE OF CALIFORNIA

MASW SOUNDING
LINE SR-9
FOUNTAIN WIND PROJECT

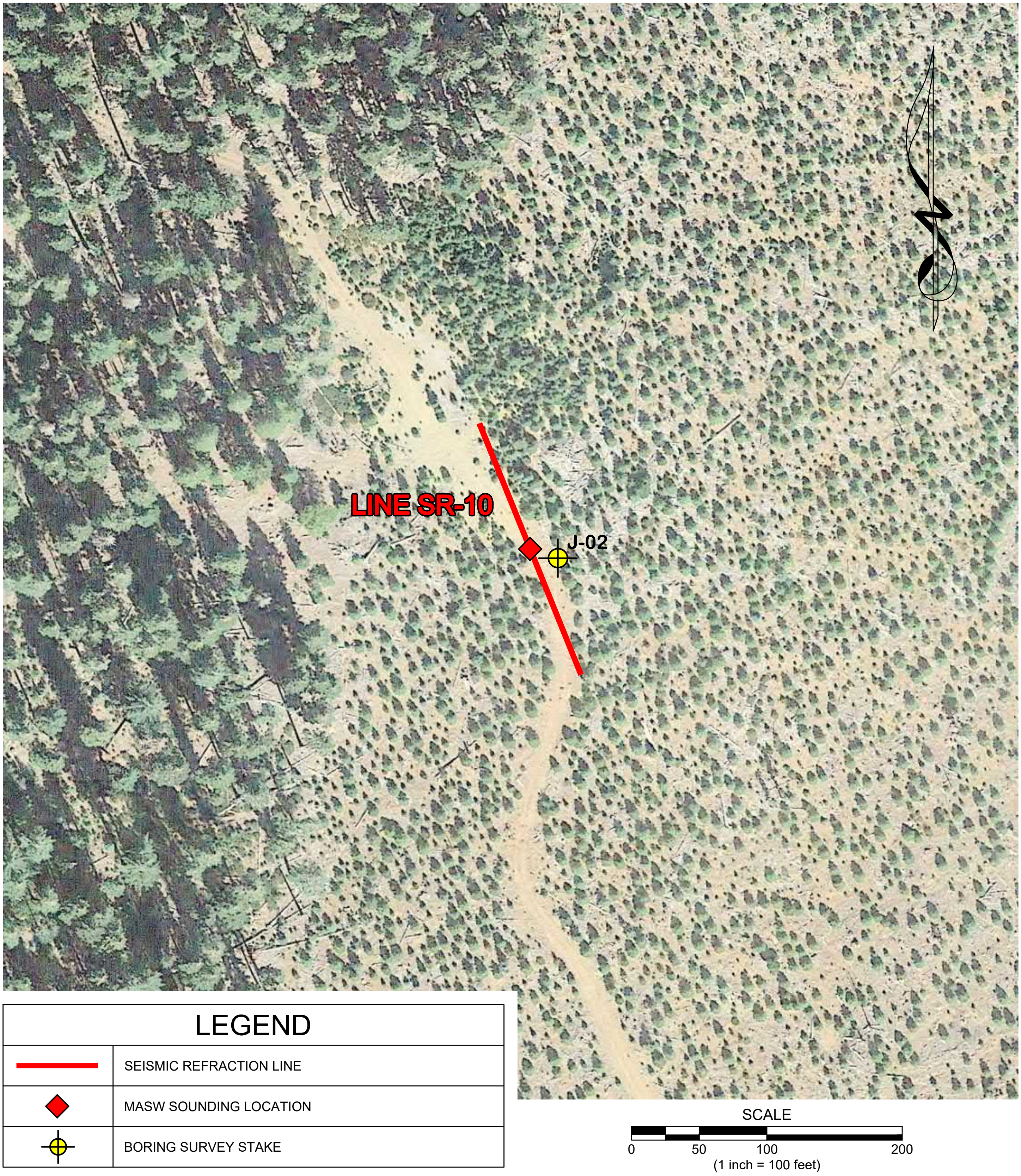
LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061	DATE: MAY 2021
DRAWN BY: G.RANDALL	APPROVED BY: DJK

Donald J. Kirker 5/28/2021

PLATE
10C



LEGEND

━	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

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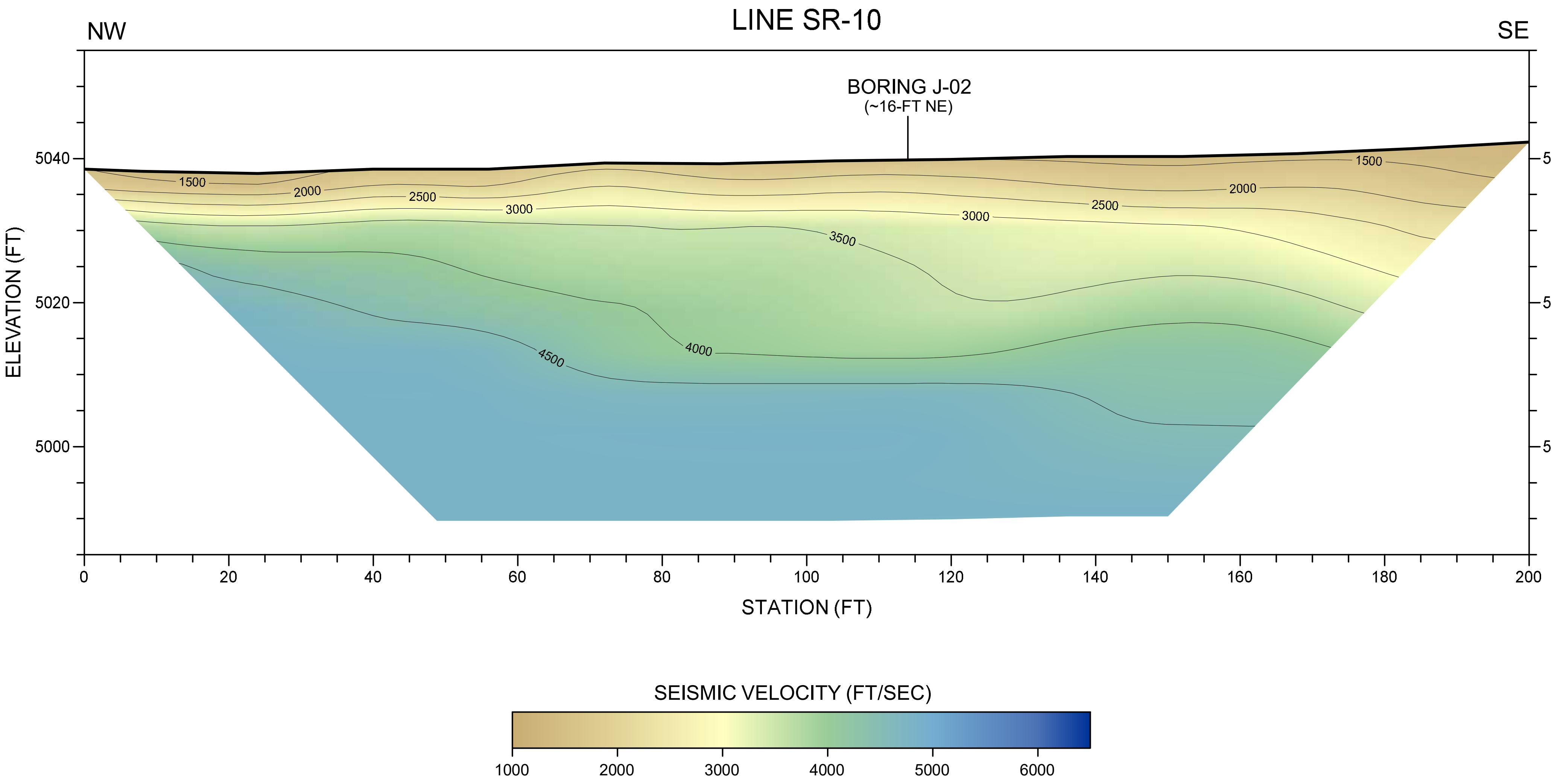
No. 997
STATE OF CALIFORNIA

SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-10
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
CLIENT: CONNECTGEN OPERATING, LLC
JOB #. NS215061
DATE: MAY 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK

Donald J. Kirker 5/25/2021

PLATE
11A



SCALE
0 10 20 40
(1 inch = 20 feet)

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No. 997
STATE OF CALIFORNIA

SEISMIC REFRACTION PROFILE
LINE SR-10
FOUNTAIN WIND PROJECT

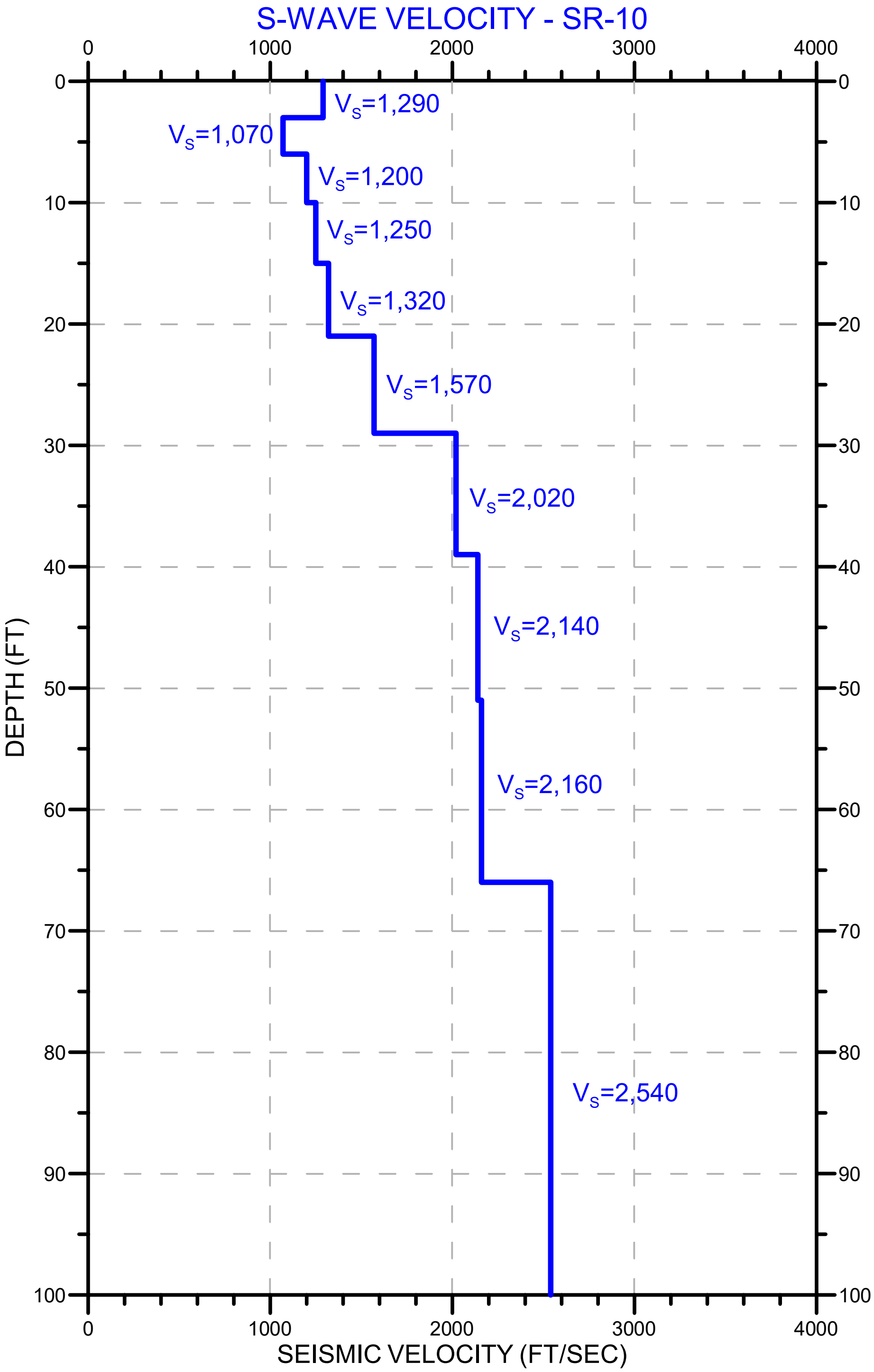
LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061	DATE: JUNE 2021
DRAWN BY: G.RANDALL	APPROVED BY: DJK

Donald J. Kirker 6/7/2021

PLATE
11B



LEGEND	
▬	S-WAVE VELOCITY (MASW)

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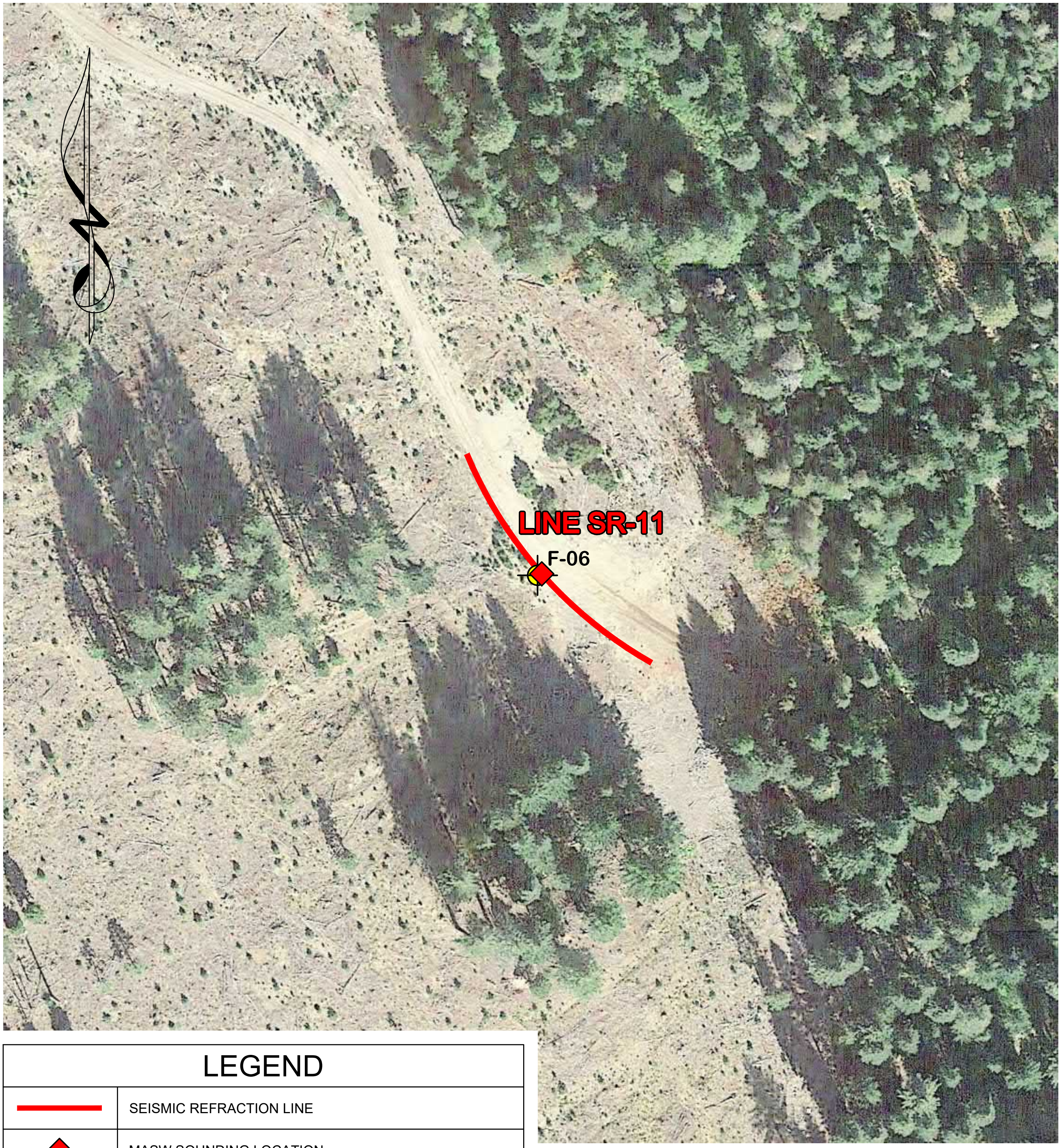
STATE OF CALIFORNIA

MASW SOUNDING
LINE SR-10
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
CLIENT: CONNECTGEN OPERATING, LLC
JOB #: NS215061
DATE: JUNE 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK

Donald J. Kirker 6/7/2021

PLATE
11C



LEGEND	
🟥	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

SCALE
0 50 100 200
(1 inch = 100 feet)

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STATE OF CALIFORNIA

SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-11
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061

DATE: MAY 2021

DRAWN BY: G.RANDALL

APPROVED BY: DJK

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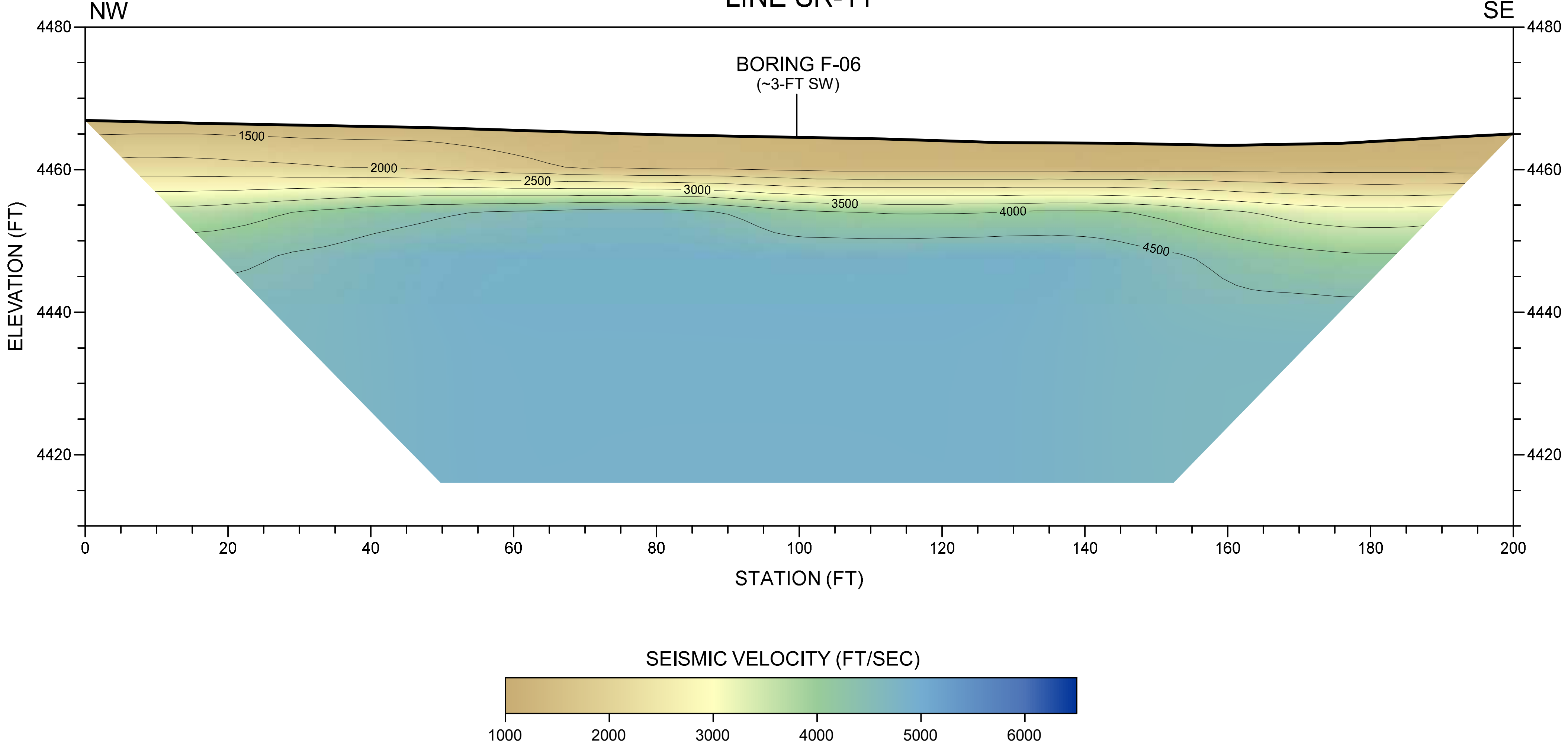
PLATE
12A

LINE SR-11



SCALE

0 10 20 40

(1 inch = 20 feet)

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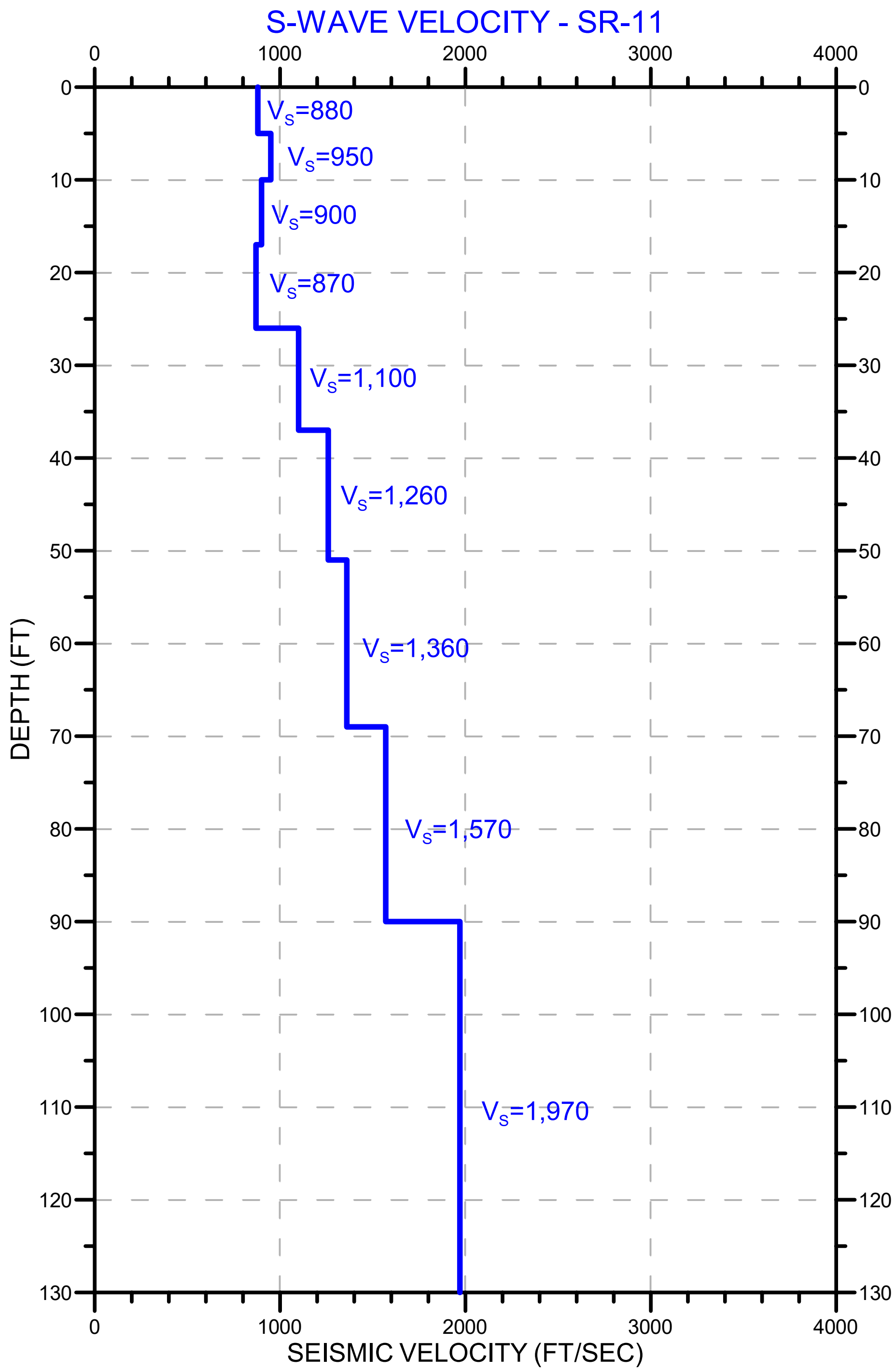
STATE OF CALIFORNIA

SEISMIC REFRACTION PROFILE
LINE SR-11
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061	DATE: JUNE 2021	PLATE
DRAWN BY: G.RANDALL	APPROVED BY: DJK	12B
Donald J. Kirker	6/7/2021	



LEGEND

▬	S-WAVE VELOCITY (MASW)

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STATE OF CALIFORNIA

MASW SOUNDING
LINE SR-11
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061

DATE: MAY 2021

DRAWN BY: G.RANDALL

APPROVED BY: DJK

Donald J. Kirker 5/28/2021

PLATE
12C

LEGEND

—	SEISMIC REFRACTION LINE
◆	MASW SOUNDING LOCATION
⊕	BORING SURVEY STAKE

SCALE
0 50 100 200
(1 inch = 100 feet)

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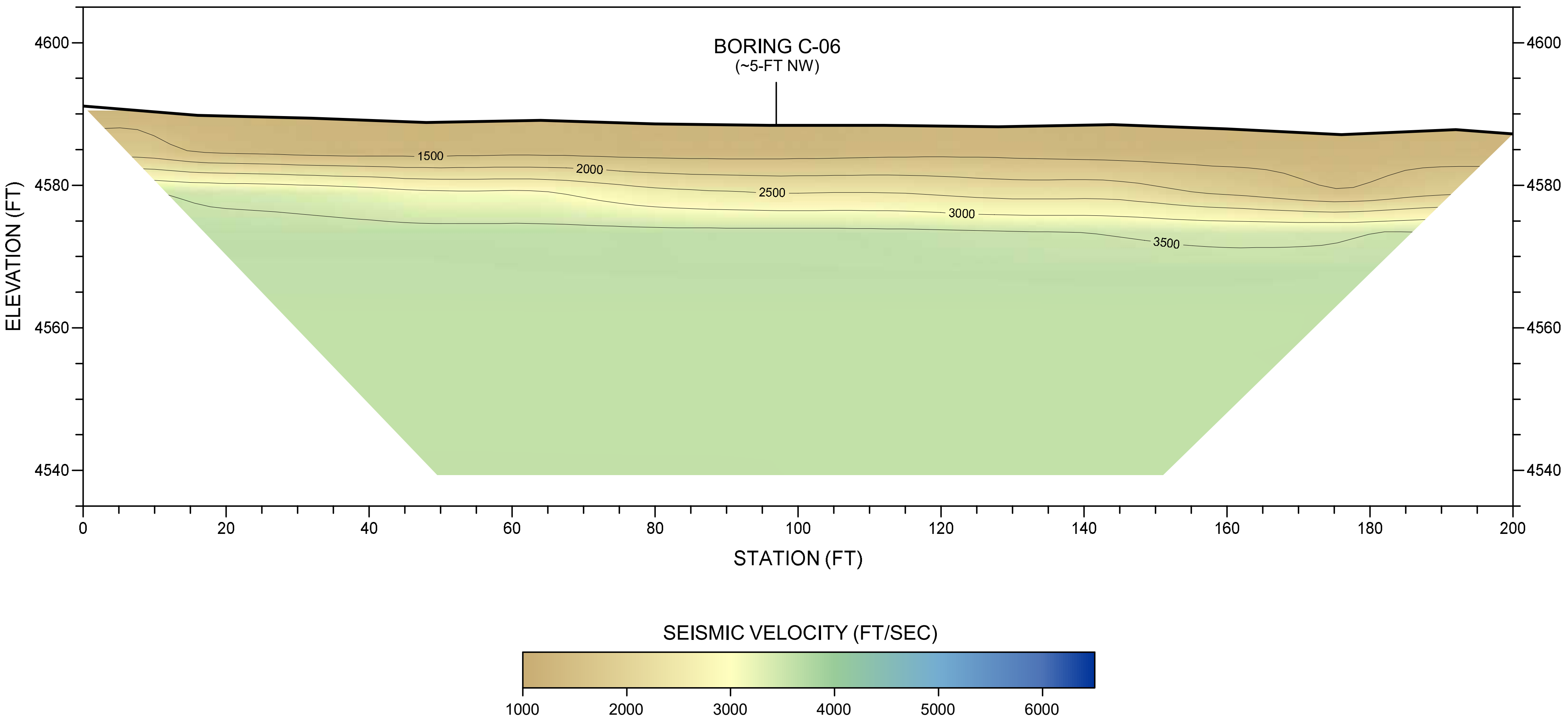
SITE LOCATION MAP
SEISMIC SURVEY - LINE SR-12
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
CLIENT: CONNECTGEN OPERATING, LLC
JOB #. NS215061
DATE: MAY 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK
Donald J. Kirker 5/25/2021

PLATE
13A

LINE SR-12



SCALE
0 10 20 40
(1 inch = 20 feet)

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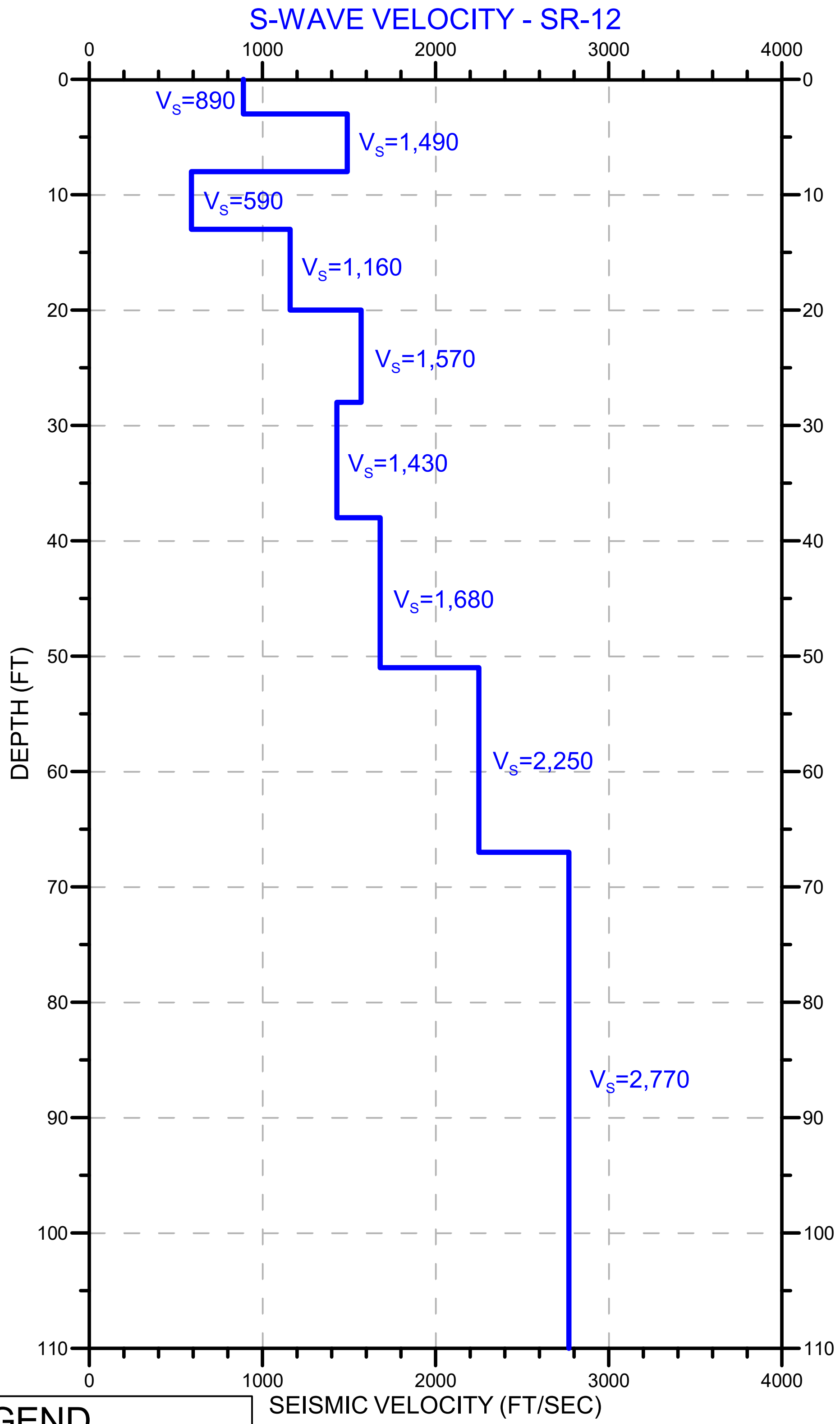
No. 997

SEISMIC REFRACTION PROFILE
LINE SR-12
FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA
CLIENT: CONNECTGEN OPERATING, LLC
JOB #: NS215061
DATE: JUNE 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK
Donald J. Kirker 6/7/2021

PLATE
13B



LEGEND

▬	S-WAVE VELOCITY (MASW)

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MASW SOUNDING
LINE SR-12
FOUNTAIN WIND PROJECT

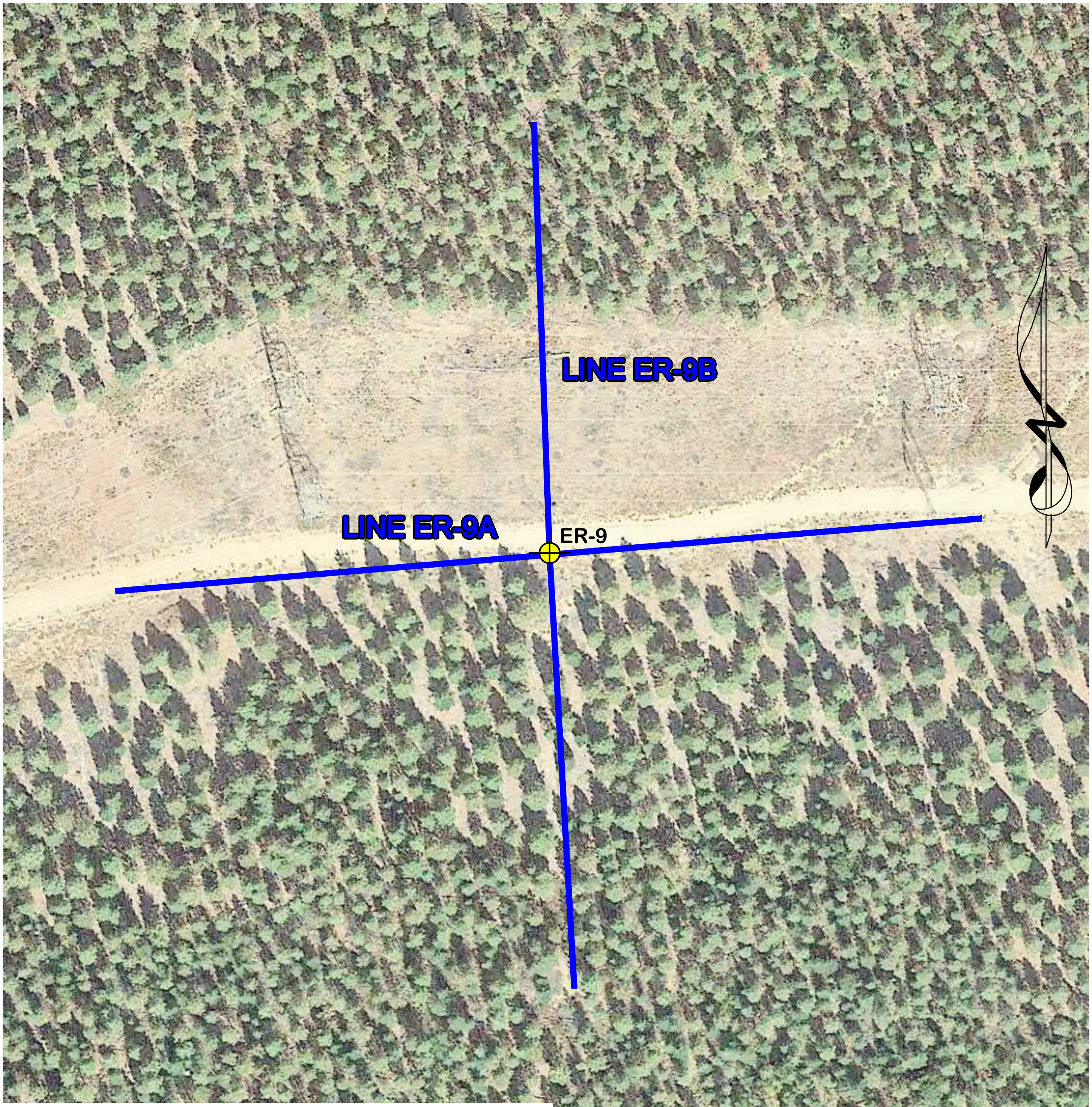
LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #: NS215061
DATE: MAY 2021
DRAWN BY: G.RANDALL
APPROVED BY: DJK

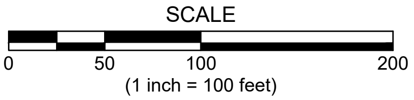
Donald J. Kirker 5/28/2021

PLATE
13C



LEGEND

▬	ELECTRICAL RESISTIVITY LINE
⊕	BORING SURVEY STAKE



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DONALD KIRKER
No. 997
STATE OF CALIFORNIA

SITE LOCATION MAP
ELECTRICAL RESISTIVITY SURVEY
LINE ER-9 - FOUNTAIN WIND PROJECT

LOCATION: SHASTA COUNTY, CALIFORNIA

CLIENT: CONNECTGEN OPERATING, LLC

JOB #. NS215061	DATE: MAY 2021	PLATE
DRAWN BY: G.RANDALL	APPROVED BY: DJK	14A

Donald J. Kirker 5/25/2021

FIELD ELECTRICAL RESISTIVITY TEST DATA

ConnectGen Fountain Wind Project ■ Shasta County, CA
June 7, 2021 ■ Terracon Project No. NS215023

NORCAL GEOPHYSICAL CONSULTANTS INC. A Terracon COMPANY

Terracon GeoReport

Sounding ER-9

Instrument AGI SuperSting R8

Serial # SP0303161

Cal. Check 1/10/2020

Test Date May 19, 2021

Job Location Shasta County, CA

Weather 85° F, Sunny

Ground Cond. Silty sand, organic material (roots), dry

Tested By JSW / HSP

Method Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012

Notes & Conflicts GPS: 40.82385017 -121.8213304, Anomalous reading at A=200 for E-W Test, where eastern outer probe at 300 ft. was approximately 15 ft from overhead powerline; considered outlier due to cultural interference.

Apparent resistivity ρ is calculated as :

$$\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2+4b^2}} - \frac{a}{\sqrt{a^2+b^2}}}$$

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test - ER-9B**		**E-W Test - ER-9A**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity *ρ*	Measured Resistance *R*	Apparent Resistivity *ρ*
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	4	10	316.500	126780	321.200	128660
4	122	4	10	109.600	84990	136.900	106160
6	183	4	10	74.240	85810	71.720	82890
8	244	4	10	57.260	88040	43.220	66450
10	305	4	10	39.700	76220	30.840	59210
25	762	4	10	5.124	24540	4.794	22960
50	1524	4	10	1.577	15100	1.562	14960
75	2286	4	10	1.201	17250	1.163	16710
100	3048	4	10	1.087	20820	1.073	20550
200	6096	4	10	0.917	35120	36.590	1401490