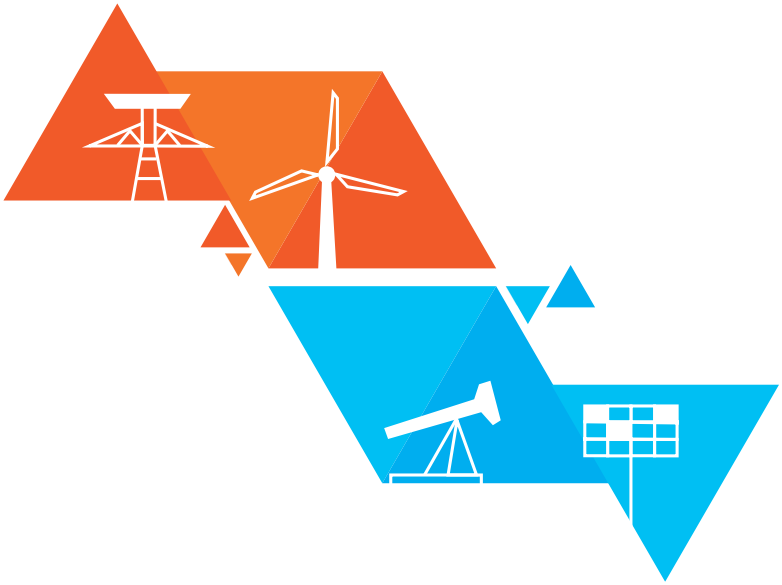
Preliminary Geotechnical Report

Wautoma Solar Project

Benton County, Washington

PREPARED FOR

Innergex Renewable Development USA, LLC



Prepared By:

810 Hesters Crossing Road, Suite 120
Round Rock, TX 78681
512.992.2087| www.RRCcompanies.com

RRC Project No. GE2110052

experience matters

Wautoma Solar Project

BENTON COUNTY, WASHINGTON

REVISION HISTORY

Revision	Reason for Change	Performed by	Issued Date
0	--	JL	02/18/2022

Prepared by

Yuqing “Jeffrey” Liu
Geotechnical Engineer

Reviewed by
2/18/2022

J. Edward Vasquez, P.E
Director/Partner

FEBRUARY 18, 2022 **PROJECT NO. GE2110052**

TABLE OF CONTENTS

1.0 INTRODUCTION 4
2.0 PROPOSED CONSTRUCTION 4
3.0 SITE EXPLORATION 4
3.1 Field Exploration and Testing 5
3.2 Laboratory Tests 6
4.0 SUBSURFACE CONDITIONS 6
4.1 Geology 6
4.2 Subsurface Stratigraphy 7
4.3 Laboratory Test Results 7
4.4 Groundwater Conditions 9
4.5 Geohazard Assessment 9
4.6 Field Electrical Resistivity and Laboratory Thermal Resistivity Measurements 10
5.0 GEOTECHNICAL RECOMMENDATIONS 11
5.1 General PV Tracking System Foundation Expectations 11
5.2 Shallow Foundation Systems 14
5.3 Corrosivity of Soils 15
5.4 Lateral Earth Pressures 16
5.5 Seismic Design 16
6.0 FOUNDATION CONSTRUCTION CRITERIA 17
6.1 Site Preparation 17
6.2 General Site Grading Fill Specifications 17
6.3 Structural Fill Specifications 17
6.4 Native Soils as Select Fill 18
6.5 Specifications for PV Array and Substation Structures 18
6.6 Open Excavations 20
6.7 Drainage and Construction Dewatering 21
7.0 ACCESS ROADWAYS 21
8.0 LIMITATIONS 23
9.0 REFERENCES 23

APPENDICES

APPENDIX A

Table A1: Geographic Latitude and Longitude and Summary of Field Exploration Program
Table A2: Well Log Information Obtained from the Washington State Department of Ecology
Figure 1: Site Location Map
Figure 2: Boring Locations on a Topographic Map
Figure 3: Electrical Resistivity (ER) and Thermal Resistivity (TR) Testing Locations Map
Figure 4: Site Vicinity Geologic Map
Figure 5: Soil to Concrete Corrosion Map
Figure 6: Soil to Steel Corrosion Map
Figure 7: Well Locations Obtained from the Washington State Department of Ecology
Log of Boring Key
Logs of Boring

APPENDIX B

Moisture-Density Relationships – ASTM D698
CBR Test Results– ASTM D1883
Grain Size Distribution Results – ASTM D6913
Corrosion Testing Results
Summary of Laboratory Results

APPENDIX C – GEOPHYSICS

Electrical Resistivity Test Results
Thermal Resistivity Test Results

APPENDIX D – DEEP FOUNDATION DESIGN

Table D1.1: Soil Parameters for Driven Pile Axial Capacity Analysis for PV Array
Table D1.2: L-PILE Computer Program Parameters for Lateral Load Analysis for PV Array
Table D2.1: Direct Embedment/Drilled Pier Foundation Design Parameters for PV Array

PRELIMINARY GEOTECHNICAL REPORT

1.0 INTRODUCTION

RRC has completed the authorized preliminary subsurface exploration and preliminary geotechnical engineering evaluation for the proposed Wautoma Solar Project. The site is in Benton County, Washington. The approximate boundaries of the site are shown on Figure 1, Site Location Map.

The purpose of this investigation and report is to:

- Perform a limited number of boreholes to explore subsurface soil, bedrock, and groundwater conditions;
- Conduct preliminary phase field and laboratory tests to characterize the subsurface soil and bedrock properties at selected locations across the site; and
- Provide preliminary geotechnical engineering recommendations for the design and construction of proposed foundation systems and access roadways.

The preliminary recommendations contained in this report are based upon our field and laboratory testing results, engineering analyses, experience with similar soil conditions, and our understanding of the proposed project; and review of published geological maps and groundwater level data obtained from published well logs.

2.0 PROPOSED CONSTRUCTION

This project will include a solar photovoltaic (PV) system, an underground cable collection system, substation, and private access roadways. We assume that the proposed solar trackers will be supported on driven steel piles of W-beams or drilled shaft/pier foundations with anticipated foundation embedment depths of about 6 to 8 feet below existing ground surface. We assume the minimum center-to-center spacing to be 5 feet or more between adjacent tracker piles. We also assume that there will be some site grading to be performed in the solar array area.

3.0 SITE EXPLORATION

RRC's surface exploration consisted of drilled a limited number of geotechnical boreholes within the project area. The following section describes our site exploration program in detail.

RRC's subsurface exploration program consisted of:

- Drilled 20 borings within the proposed PV Array area;
- Sampled 5 bulk samples for laboratory thermal resistivity testing;
- Sampled 3 bulk samples for laboratory California Bearing Ratio (CBR) testing; and
- 5 Electrical Resistivity (ER) surveys.

Figures 1 to 3 in Appendix A consist of maps for the various boreholes, sample locations, and geophysics locations. A summary of subsurface exploration is provided within Table A1 within Appendix A.

3.1 Field Exploration and Testing

Drillers performed a total of 20 borings between October 25 and October 28, 2021, under the direction of RRC's field representative. These 20 borings were drilled to depths ranging between 5.5 feet to 15.5 feet within the proposed solar array area. Early termination boring depth was caused by auger refusal due to bedrock.

A summary of geographic latitude and longitude coordinates, and depth of each boring location drilled as part of the subsurface exploration program is presented in Table A1 within Appendix A. RRC's field representative used a handheld GPS device with accuracy of approximately 15 feet to obtain coordinates. Figure 2 within Appendix A shows the boring locations on a topographic map.

Drillers used Track-mounted CME-55 drill rigs using hollow stem auger (HSA) drilling technique from the existing ground surface to the full depth of exploration. Soil samples were obtained using Standard Penetration Test (SPT) samplers. In addition, bulk samples were collected between 2 and 4 feet below ground at selected locations. Due to dry and relatively high blow count soils, RRC was not able to obtain samples that would be testable for complex lab tests, such as one-dimensional volumetric change.

Standard Penetration Test (SPT) samplers obtain disturbed soil samples. RRC documented each penetration resistance value in accordance with *ASTM D1586: Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*. This test consists of driving the sampler into the ground with a 140-pound hammer free-falling 30 inches. The number of blows required to advance the SPT sampler 18 inches is counted and recorded, with the sum of the blows to drive the last 12 inches referred to as the standard penetration resistance value (N-value). Results of the field tests are shown on the logs of boring under the "Field Data" column and are preceded by the letter "N". Each soil sample from the SPT samplers collected in the field were visually classified, placed in plastic bags to preserve moisture content, and labeled as to location and depth. All SPT samples were arranged in core boxes and transported to our laboratory facility in Round Rock, Texas for further analysis.

RRC classifies soils in general accordance with the Unified Soil Classification System (USCS); *ASTM D2488: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*. The soil and bedrock classification symbols appear on the logs of boring and are briefly described in Appendix A.

RRC's field geologist prepared field logs for each boring. The logs of boring contain classification of the materials encountered during drilling as well as interpolation of the subsurface conditions between samples.

The project engineer/geologist reviewed all the field logs, soil samples, and lab test data to make appropriate modifications to the logs of boring as necessary. Final Logs of Boring and laboratory testing results are provided in Appendix A. The logs of boring describe the strata encountered, their approximate thickness, SPT results, soil and rock classifications, the various depths at which the samples were obtained, as well as the presence of groundwater.

3.2 Laboratory Tests

RRC commissioned Beyond Engineering & Testing to perform laboratory tests. Beyond Engineering is an affiliate of RRC. The soil samples were returned to the laboratory, examined by the project engineer/geologist, and applicable laboratory testing was assigned on selected soil samples. Laboratory testing was performed in general accordance with ASTM and locally accepted practices. RRC ordered the following laboratory test methods, where sample quality allowed:

- Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System): ASTM D2487;
- Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass: ASTM D2216;
- Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils: ASTM D4318;
- Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75-µm) Sieve: ASTM D1140;
- Standard Test Method for Particle-Size Analysis of Soils: ASTM D6913;
- Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort: ASTM D698;
- Standard Test Methods for CBR (California Bearing Ratio) of Laboratory-Compacted Soils: ASTM D1883;
- Standard Test Method for Measurement of Soil Resistivity Using the Two-Electrode Soil Box Method: ASTM G187;
- Standard Test Method for Measuring pH of Soil for Use in Corrosion Testing: ASTM G51; and
- Standard Test Method for Water-Soluble Sulfate and Chlorides in Soil: ASTM D4327.

4.0 SUBSURFACE CONDITIONS

4.1 Geology

The geologic interpretations contained herein are based on available geological maps and literature, and review of the logs of borings as part of this study. The Wautoma Solar project site is located within the Columbia Plateau physiographic province of Washington, an extensive region comprised of early Tertiary (17 to 6 million years old) volcanic and sedimentary rocks and Quaternary volcanic rock and sediment. Around 17 million years ago, a series of extensive flood basalt eruptions known as the Columbia River Basalt Group (CRB) began to cover up the surface of the state of Washington, reaching as much as 10,000 square miles and over 100 feet in depth (Reference 1). The CRB group is thought to originate from a hot spot that shifted over time and

is now found beneath the Yellowstone Caldera (Reference 2). The project site is located on top of the Saddle Mountains Basalt, the youngest of the seven major groupings (or formations) within the CRB group (Reference 2). The Quaternary silty and sandy deposits found on top of the Saddle Mountain basalt are a product of wind-blown and lake deposits.

The Geologic Map of Washington – Southeast quadrant, scale 1:250,000 (Reference 3), indicates that the subsurface materials on the site consist of the following geologic units of the listed geologic time periods.

Quaternary Period

- **Alluvium** (Qal): Clay, silt, sand, and gravel deposited in streambeds and fans. Includes terrace and organic deposits in places; commonly includes reworked loess and outburst flood deposits.
- **Loess** (Ql): Eolian silt and fine sand, some clay and caliche, pale orange, light brown. Typical geomorphic expression is a complex of dunes.
- **Outburst flood deposits, silt and sand** (Qfs): Lacustrine silt and fine sand and fluvial fine to coarse sand, predominantly quartz and feldspar, with basalt grains in coarser sections.

Tertiary Period

- **Saddle Mountain Basalt** (Mvs): Basalt flows, predominantly fine to medium grained. Most phenocrysts consisting of plagioclase.
- **Wanapum Basalt** (Mvw): Basalt flows, fine to coarse grained, microphenocrysts and phenocrysts consisting of plagioclase and olivine.

Figure 4 within Appendix A shows the project site plotted on the surficial geologic map.

4.2 Subsurface Stratigraphy

As indicated on the logs of boring, the soil stratigraphy at the site generally consisted of topsoil underlain by silt layers. Bedrock was encountered in some borings between 5.5 to 15.5 feet below ground, as the reason of auger refusal, which was considered as Basalt bedrock layers. The soil layers can generally be described as:

- Soft to hard, Silt soils with varying amounts of sand and gravel.
- Dense to very dense, Sand with varying amounts of silt and gravel.
- Dense to very dense, Gravel with varying amounts of sand and silt.

Detailed Logs of Boring present detailed stratum descriptions, soil classifications, types of sampling used, laboratory test data, and additional field data. Bore logs are presented in Appendix A. The lines separating stratum types on the Logs of Boring do not necessarily represent distinct lines of demarcation because transitions can be gradual. The Boring Log Key, defining the terms and descriptive symbols used on each log of boring, is also presented in Appendix A.

4.3 Laboratory Test Results

RRC obtained the service of Beyond Engineering & Testing, LLC to conduct laboratory tests. All individual test reports and a Summary are presented in Appendix B.

Laboratory test results indicate the native soils possess in-situ moisture contents in the range from about 3 to 12% with an average of 6%.

Most native soils are non-plastic (NP), while soils collected at TP-1 and TP-3 have Plasticity Indices (PI) about 4%. Wind-blown loess soils, with low PI, are often prone to collapse if the soils are subject to higher loads or become saturated under moderate induced loads. Clay soils with a PI less than 15 are generally considered to exhibit a low expansive potential provided their moisture contents are stable. We did not encounter high plasticity clay soils at this site. High plasticity clays, with a PI greater than 25, are generally considered to exhibit a high expansive potential if their moisture contents are allowed to change significantly.

We performed five moisture/density relationships (proctors) to determine the maximum dry unit weight and optimum moisture content in accordance with ASTM D698 (standard method). Two samples, TR-1 and Tr-5, possessed significant rock content, which requires an Oversize Correction Factor that affects the overall total unit weight. We also conducted Atterberg Limits on these samples to assess soil type. A summary of the test results is presented below.

Table 4.3.1 Summary of Proctors and Atterberg Test Results

Sample Location	Depth (feet)	Material Type	Liquid Limit (%)	Plasticity Index (%)	Maximum Dry Unit Weight (pcf)	Optimum Moisture Content (%)
TR-1	2 to 4	SC-SM	23	4	143.6	6.9
TR-2	2 to 4	ML	NP	NP	109.0	15.3
TR-3	2 to 4	CL-ML	25	4	108.4	15.8
TR-4	2 to 4	ML	NP	NP	110.9	14.7
TR-5	2 to 4	GM	NP	NP	134.9	9.0

Notes: pcf = pounds per cubic foot; NP = Non-Plastic; ML = Silt; CL-ML = Silty Clay; SC-SM = Silty, Clayey Sand; GM = Silty Gravel.

We assigned three California Bearing Ratio (CBR) tests on select samples. The test specimens soaked for 96 hours prior to the CBR load test. A summary of the CBR test results is presented in Table 4.3.2. Design CBR values represent strength at 95% compaction relative to the maximum dry density as determined by ASTM D698. CBR increases with increased density.

Table 4.3.2 Summary of CBR Test Results

Sample Location	Depth (feet)	Material Type	Design Dry Unit Weight (pcf)	Design CBR (%)
TR-2	2 to 4	ML	103.5	4.5
TR-3	2 to 4	CL-ML	102.9	2.5
TR-5	2 to 4	GM	117.2	8.0

Notes: pcf = pounds per cubic foot; ML = Silt; CL-ML = Silty Clay; GM = Silty Gravel.

Individual test reports and a summary of laboratory test results are presented in Appendix B.

4.4 Groundwater Conditions

Groundwater was not encountered across the project site during this site investigation. Boring results are summarized in Table A1, Geographic Latitude and Longitude Summary of Field Exploration Program, presented in Appendix A. Upon completion of the drilling operations, the borings were backfilled in accordance with applicable state and local regulations; therefore, subsequent groundwater measurements are not available.

RRC reviewed published water well logs near the project site, Washington (Washington State Department of Ecology) (Reference 4). Static groundwater levels are reported to vary from 65 to 429 feet in those historical water well logs. These published well data are presented in Table A2 within Appendix A. The well locations shown in Table A2 are plotted on Figure 7 within Appendix A.

Based upon the information obtained from the boring logs drilled as part of this study and our review of published well logs, it is RRC's opinion that consistent groundwater should not have an impact on design and construction of proposed foundations and excavations of up to 20 feet deep below existing ground surface at the solar project site. We note that the majority of the water wells were installed to deep aquifers below typical foundation depths and indicate piezometric or static groundwater level within those deep aquifers only. The static water levels from the deep wells do not always provide useful groundwater information for shallow aquifers or perched water tables near foundation depths that should be considered in foundation design.

It is imperative to note that the short-term groundwater level observations performed as part of this study are not an accurate evaluation of groundwater levels at the project sites and should not be interpreted as a comprehensive groundwater study. The observations made during this investigation may also not represent conditions at the time of construction and it should be understood the presence of groundwater may have an effect on certain construction activities and long-term performance of foundations and pavements. Groundwater levels are highly dependent on climatic and hydrologic conditions before and after construction, and sites development including irrigation demands, drainage and other factors. If a detailed groundwater study is desired, a groundwater hydrologist should be retained to perform these services.

4.5 Geohazard Assessment

The following items within Table 4.5.1 represent geologic or physical hazards to the project. Within each item, we address the level of risk associated with the particular hazard relative to this project.

Table 4.5.1 Geohazard Assessment

Geohazard	Site Risk	Comment
Swelling/shrinking soils	Low	Expansive soil has not been encountered across the proposed project area.
Collapsible Soils	Moderate	Collapsible soils (Wind-Blown Silt) were encountered across this project site. Potential for collapse is mostly dependent on access to water.
Frost Penetration Depth	Low to Moderate	Approximately 18 inches.
Corrosive Soils (Concrete)	Low	Surficial soils are expected to exhibit a low potential for corrosion of concrete.
Corrosive Soils (Steel)	Moderate to High	Surficial soils are expected to exhibit a moderate to high potential for corrosion of unprotected steel.
Earthquake (Ground Rupture)	Low to Moderate	The state of Washington is a relatively seismic area. This project site is distant from the known active faults and will experience lower levels of shaking, less frequently.
Earthquake (Seismicity)	Low to Moderate	The state of Washington is a relatively seismic area. This project site is distant from the known active faults and will experience lower levels of shaking, less frequently.
Liquefaction	Low	Groundwater was not encountered within 15 feet during this investigation. Historical well logs indicate shallowest depth at 65 feet.
Flooding	Moderate	Part of proposed project area is within the 100-year flood zones.
Settlement	Low	Anticipated settlement for typical solar PV system and associated structures is anticipated low and within manufacturers limit.
Slope Failure	TBD	We assume that there will be some site grading to be performed in the solar array area, but detailed site grading plan is not available during this preliminary phase study.
Subsidence (Caves/Karst)	Low	The risk of finding karstic features within the project area boundaries is low.

4.6 Field Electrical Resistivity and Laboratory Thermal Resistivity Measurements

RRC performed five field electrical resistivity (ER) surveys within the proposed PV Array. Table A1 presents ER location coordinates. ER locations are mapped in Figure 3.

RRC conducted the field electrical resistivity measurements using a Megger Digital Ground Resistivity Tester using the Wenner 4-pin array method in accordance with the ASTM G57. Each survey consists of two perpendicular arrays centered at the test location. Each ER survey at PV locations has arrays with ‘a’ spacings ranging from 0.5 to 100 feet. The results of the electrical resistivity measurements are presented in Appendix C.

Beyond Engineering remolded soil samples in order to conduct thermal resistivity tests. The tests represent samples collected at depths 2 to 4 feet below existing site grade. The disturbed samples were remolded (compacted) to 85% of their respective maximum dry density as determined by ASTM D698. Thermal resistivity values were then determined at a series of moisture contents from "as-received" moisture content to dried condition to provide a thermal resistivity dry-out curve. Thermal resistivity results completed as part of this study are presented within Appendix C.

When additional geotechnical studies are performed for final design, RRC recommends conducting more thermal resistivity tests with a target density of 90% compaction.

Interpretation of the electrical resistivity and thermal resistivity testing results is beyond the scope of this study and should be performed by the design team.

5.0 GEOTECHNICAL RECOMMENDATIONS

The PV Array supporting system proposed to be used is a typical tracking system. We assume tracking systems will likely be supported on steel, driven-pile foundations.

The extent and location of site grading is currently unknown. RRC anticipates that the proposed foundations will bear on/in native soils with finish grade near current existing site grade with minimal slope stability impacts. RRC should be retained to review the civil drawings and cross-sections for PV Array areas and other critical areas along the proposed roadways during final phase site investigation. This will allow us to evaluate the need for additional studies such as slope stability analyses. If site grade is changed at structure locations, we can assess whether our original recommendations apply. Once the final / design phase geotechnical study is performed, the geotechnical engineer shall review these Preliminary recommendations and provide appropriate updates.

5.1 General PV Tracking System Foundation Expectations

The site appears suitable for the proposed solar project construction. Selecting foundation types will be dictated by the presence of shallow bedrock. Where bedrock is deeper, driven piles or drilled shaft foundations may be used to support solar trackers. Where bedrock is shallow, shallow footings might be more economical. The project team may need to consider alternate foundation types for different areas of the facility. *The final geotechnical investigation should take considerable effort to map the presence of bedrock.*

A summary of anticipated issues that may impact the design and construction of foundation systems for this project:

- During this preliminary site investigation, we encountered bedrock in 11 out of 20 boring locations at depths ranging from 5.5 to 15 feet below existing ground surface. Drivability of driven piles will be an issue in these materials. Therefore, RRC recommends test piles be installed to evaluate drivability of candidate pile types during design phase site

investigation. We also recommend pile load tests to confirm geotechnical parameters and determine more economical pile depths.

- We encountered gravel in a majority of boreholes. Gravel can also be an issue for pile drivability.

- For shallow spread footings, conventional earth moving equipment may be used.

- Historical published water well logs indicate the ground water can be 50 feet or deeper below existing ground. We did not encounter groundwater during the preliminary study. If shallower groundwater conditions are encountered during construction, RRC shall be notified in order to provide supplemental recommendations, if needed.

- We assume typical cut and fill for the proposed solar development and anticipate the majority of driven piles/deep foundations will bear on native soils with minimal slope stability impacts. The geotechnical engineer of record should be commissioned to review the final grading plan.

- Ponding water conditions were not observed during our site visit. However, we recommend the design engineers take site flooding/scour into account during civil, structural and electrical design.

Detailed foundation design and construction recommendations are outlined in subsequent sections of this report.

5.1.1 Driven Pile for PV Tracking System

The presence of bedrock will dictate the ability to use deep foundations for the solar panels. The presence of relatively dense silts, sands and gravel will likely require driven piles. Soils are likely too dense to allow hydraulically driven piles. Assuming that soil/bedrock condition does allow piles, pile lengths will be dictated by uplift, compressive or overturning resistance. The length of the steel piles should be determined by the structural engineer to meet axial and lateral loading requirements.

RRC does not expect driving refusal within soils with SPT N-values of less than 50 blows/ft. However, drivability of driven piles may be an issue in the bedrock and in soils with SPT N-values of greater than 50 blows/ft. Predrilling prior may be required if very dense soils are encountered shallow. RRC cautions that bedrock is likely basalt, which is typically hard and difficult to pre-drill. If predrilling is performed, the predrilling diameter can be less than the diameter of the steel pile. Predrilling means and methods shall be determined by the foundation designer and construction contractor.

Due to potential scour, frost considerations, and soil deformation after lateral loading, we typically recommend that the pile design ignore the upper 12 inches of the pile during the lateral load analysis and for friction. The axial skin friction resistances of driven piles provided in Table D1.1 within Appendix D are estimated based on the methods provided in FHWA HI 97-013, “Design

and Construction of Driven Pile Foundation". RRC included a factor of safety of 2.0 to calculate the allowable skin friction resistance. We also applied a safety factor of 2.5 for allowable bearing pressure.

When calculating the axial side friction capacity of driven piles, the perimeter of a wide flange pile shall be taken as twice the sum of the flange width and web depth (i.e. the "box" perimeter). For the axial end bearing capacity calculation, only the area of the steel pile at the pile tip shall be used. To maintain the integrity of the piles and reduce excessive stress overlap from adjacent foundations, the minimum center-to-center spacing between adjacent piles should be at least 3 times the diameter of the larger piles, and the minimum allowable edge-to-edge spacing between adjacent piles should not be less than 3 feet.

Lateral load analysis of driven pile foundations can be performed using the LPILE computer program. LPILE uses a p-y curve finite difference technique for predicting the soil-structure interaction and response. Based on our interpretation of the subsurface strata and the results of the field and laboratory tests, the parameters outlined in Table D1.2 within Appendix D may be used to evaluate driven pile/drilled piers. We caution that Table D1.2 is based only on this Preliminary study. Further geotechnical studies will refine these parameters.

A foundation monitoring program should be established and maintained throughout the project life. Particular attention and maintenance should be performed after storm events.

5.1.2 Drilled Pier Foundations

Drilled shafts/pier foundations are an option for structure elements with heavy axial loads and/or large overturning moments. Pier lengths will likely be dictated by overturning resistance. Allowable end bearing pressures and allowable skin friction values at the substation location are presented in Table D3.1 of Appendix D. Allowable end bearing pressures include a factor of safety of 2.5. Skin frictions incorporate a safety factor of 2.0. Skin friction values should be reduced by 25% when calculating pull-out resistance, where applicable. Settlement of drilled piers using the full allowable loads are anticipated to be on the order of about ½ to 1 inch.

RRC recommends drilled shafts have a minimum diameter of 1.5-feet, to allow inspection and proper installation of rebar. The length of the drilled piers should be determined by the structural engineer to satisfy axial and lateral loading. Vertical steel reinforcement to resist tensile loads caused by uplift forces should extend the full length of the pier shaft. Additional reinforcement required by structural demands for axial compressive loads, lateral loads, or minimum reinforcement required by design codes should be satisfied.

A foundation monitoring program should be established and maintained throughout the project life. Particular attention and maintenance should be performed after storm events.

RRC did not encounter expansive clay soils during this study. If other regions of the project do possess expansive clays, then shrink/swell movements can occur. It is imperative that proper drainage be maintained during construction and throughout the life of these structures.

5.2 Shallow Foundation Systems

Lightly loaded structures, including inverter/transformer skids within the solar array area may use shallow foundations. The frost penetration depth is approximately 1.5 feet for shallow foundations. Therefore, we recommend that shallow foundations have a minimum embedment of 1.5 feet below finish site grade. Other alternatives are non-frost susceptible fill under foundations or thermal insulation to protect against frost.

At some locations, soft silt soils require remediation for bearing capacity. Where remediation is necessary, RRC recommends that the continuous or square footings should bear on a minimum of 2 feet of compacted structural fill materials. The over-excavation should extend a minimum lateral distance of about one-foot beyond the edge of the footings. Footings that bear at least 1.5-feet below the found surface may use an allowable bearing capacity of 1,500 psf. Anticipated settlement of the foundations under service loads will be on the order of about 1 inch or less.

For reinforced concrete slabs (mat foundations) bearing at finished grade or ballasted ground mount system, we recommend over-excavation of foundation subgrade soils to a minimum of 1.5 feet below the finished grade or design of frost walls as alternate option. Within the frost depth (about 1.5 feet), replace with non-frost susceptible fill material or flowable fill (controlled low strength material) having compressive strength of at least 150 psi. The non-frost susceptible fill material should be compacted to a minimum of 97% of the maximum dry density as determined by ASTM D698, moisture is not a critical criterion. Other alternatives such as thermal insulation might be an option to protect against frost. The designer of thermal insulation shall be responsible for compliance with local building codes. A net allowable bearing pressure 1,000 psf can be used for reinforced concrete slabs bearing at finished graded provided the above design guidelines are followed.

Shallow foundations should be adequately reinforced and proportioned to resist adfreezing forces associated within the frost depth. For structural design of the footings and mat foundations within the project site, the parameters outlined in Table 5.2.1 can be used.

Table 5.2.1 Soil Parameters for Shallow Foundations at PV area

Soil Parameters and Allowable Bearing Pressures	Design Value
Average Unit Weight, pcf	110
Modulus of Subgrade Reaction, pci	30*
Cohesion (undrained), psf	600
Friction Coefficient at Foundation Base	0.35
Net Allowable bearing pressure for Strip or Continuous Footings (psf)	1,000
Net Allowable bearing pressure for Square or Pad Footings (psf) bearing at least 1.5-feet below finish ground surface	1,500

Soil Parameters and Allowable Bearing Pressures	Design Value
Net Allowable bearing pressure for Mat Foundations on earthen pad bearing 1.5-feet below finish ground surface	1,000

* For a 1 ft. x 1 ft. Plate.

RRC recommends that a qualified representative of the geotechnical engineer observe shallow foundation excavations in this area to assess the need for any over-excavation and re-compaction and/or replacement.

Shallow foundations should be adequately reinforced and proportioned to resist swell/uplift forces associated with the near surface clay soils. For shallow foundation systems founded on compacted fill material at project site, net allowable bearing pressures, which include a factor of safety of 3, outlined in Table 6.3.1 can be used.

Other design and construction recommendations outlined in the ACI design Manual should be followed. It is imperative that proper drainage be maintained during construction and throughout the life of Substation structures to provide for adequate shallow foundation performance.

5.3 Corrosivity of Soils

RRC commissioned Project X to conduct chemical tests on selected soil samples. Results are provided within Appendix B. Water-soluble sulfate and chloride test results are presented in Appendix B. Most test results indicate soil corrosion potential to concrete is “Not applicable”. Foundation concrete should be designed in accordance with *ACI 318: Building Code Requirements for Structural Concrete and Commentary*.

For chlorides, the test results indicate “non-aggressive” corrosion potentials to steel.

pH tests vary from 7.7 to 8.9, which is slightly alkaline and possessing low corrosion potential to steel.

Minimum Soil Box Electrical Resistivity test results range from 1400 ohm-cm to 8710 ohm-cm. This indicates that soils within the upper 3 feet exhibit “Corrosive” to “Mildly Corrosive” electrical characteristics with regards to galvanic corrosion of steel. Cathodic protection for buried metal pipe should be designed by a qualified corrosion engineer. The following table 5.3.1 presents a corrosivity scale for the Soil Box Electrical Resistivity under saturated soil conditions.

Table 5.3.1 Effect of Soil Box Electrical Resistivity on Corrosion

Aggressiveness	Resistivity in ohm-cm
Very Corrosive	< 700
Corrosive	700 – 2,000
Moderately Corrosive	2,000 – 5,000
Mildly Corrosive	5,000 – 10,000

Aggressiveness	Resistivity in ohm-cm
Non-Corrosive	> 10,000

5.4 Lateral Earth Pressures

Lateral earth pressures will apply in soil strata. The proposed foundations will be designed to resist all lateral movements; therefore, the "at rest" lateral earth pressure will apply. The following "at rest" equivalent fluid pressures are recommended in Table 5.4.1. The lightweight range is more conservative and necessary for the "at rest" and "passive" condition. The heavier weights are more conservative for the "active" condition.

Table 5.4.1 Equivalent Fluid Pressures for Silt and Sand

Soil Type	Condition	Equivalent Fluid Pressure (psf/ft)
Silt / Sand Soils ϕ=32, γ_t=115 pcf	At Rest, k_o= 0.47	54
	Active, k_a= 0.31	35
	Passive, k_p= 3.25	374

Passive and active earth pressure resistance will only mobilize after significant movement of the foundation. The passive case occurs where a structural element tends to move into the soil mass. The active case occurs when the element tends to move away from the soil mass. Both cases are applicable for unrestrained foundation elements.

The above earth pressure values do not include safety factors. We recommend a minimum safety factor of 2.0 be applied when using passive earth pressure for lateral load resistance. Surcharge loads should also be considered where appropriate. The values apply only to cases where the ground surface is level. We should be contacted to provide suitable values for cases where the ground surface is sloped. Similarly, if a structure is submerged below water, then the earth pressures change dramatically and require a different analysis.

5.5 Seismic Design

RRC provides seismic design using *2018 International Building Code* (IBC) (Reference 6). We recommend using a Site Class C for very dense soils and bedrock conditions. The Mapped Spectral Response Acceleration for the 1 second (S_1) and short periods (S_S) were computed using the Applied Technology Council *Seismic Design Maps,* which is a web-based application program (Reference 7). The table below summarizes recommended seismic parameters to be used in the design:

Table 5.5.1 Recommended Seismic Parameters

Parameter	Recommended Value
S_S – Mapped Spectral Response Acceleration at Short Period (0.2-Second)	0.419 g
S_1 – Mapped Spectral Response Acceleration at 1-Second Period	0.168 g

Parameter	Recommended Value
F_a (Site Coefficient) – Site Class C	1.3
F_v (Site Coefficient) – Site Class C	1.5

6.0 FOUNDATION CONSTRUCTION CRITERIA

6.1 Site Preparation

Prior to construction, we recommend adequate positive drainage be provided to maintain a relatively dry condition in the area of proposed construction. This will be very important if any work is attempted during periods of prolonged rainfall or heavy snow susceptible to melt. Ponding of water in the areas of construction should be avoided. Winter conditions can also impact the construction process. Newly placed fill should not be placed on frozen subgrade and frozen material should not be used for fill.

Site preparation should begin by removing surface vegetation and major root systems within the foundation areas. Topsoil or organics shall not be allowed underneath proposed facilities, structures or permanent pavement. Deleterious materials should be placed in non-structural areas or removed from the sites. Proper slopes meeting federal, and state OSHA requirements should be maintained.

6.2 General Site Grading Fill Specifications

Native sand and silt material can be used as general site grading fill provided that they do not contain significant amounts of organics. After site clearing and grubbing, the general fill should be placed in loose lifts not exceeding 12 inches in thickness and compacted to a minimum of 90% of the ASTM D698 maximum dry unit weight. If the general site grading is located below proposed pavement, foundations or equipment pads, then other compaction requirements apply. See following sections for details.

Both cut and fill slopes shall be no steeper than 3 horizontal to 1 vertical. Fill areas shall be cleared of all vegetation and debris, recompacted to a minimum of 90% of the ASTM D698 maximum dry unit weight, proof-rolled and inspected by the grading inspector and geotechnical engineer prior to the placing of fill. The proof-rolling should be conducted with a fully loaded water truck or dump truck to assess the presence of soft areas and the need for remedial measures, if any. Proof-rolling acceptance standards include no rutting or pumping greater than 1.5 inches. Typically, 9-inch lifts are a maximum, but if a contractor can complete thicker lifts and it can be verified that full densification occurs throughout the lift, then lifts up to 12-inches are possible.

6.3 Structural Fill Specifications

Structural fill should consist of a non-expansive, well-graded material with sufficient binder for compaction purposes and meet the requirements of 2020 Standard Specifications, Publication No. M41-10, Division 9 Materials, “Item 9-03-10 Aggregate for Gravel Base” issued by the

Washington Department of Transportation. It is RRC's intent to make Structural Fill interchangeable with flexible road base.

Structural fill should be compacted to a minimum of 95% of maximum dry density determined by ASTM D1557. The structural fill under foundations should be moisture conditioned within 2% of optimum moisture content. Lift thickness is a function of energy, equipment, and ideal moisture. Typically, 9-inch lifts are a maximum, but if a contractor can complete thicker lifts and it can be verified that full densification occurs throughout the lift, then lifts up to 12-inches are possible.

6.4 Native Soils as Select Fill

RRC understands the importance of using native soils whenever feasible. The following specifications allow reasonable native soil reuse while maintaining structural requirements for end bearing capacity and settlement. Modification of unsuitable foundation soils shall consist of over-excavation and replacement with any of the following materials:

All soils that possess the following properties qualify as Select Fill that may be used under foundations: maximum plasticity index of 15 and a maximum liquid limit of 40, and classify as SC-SM, SC, Sandy CL, GC, and GS.

Select Fill placement below foundations should be limited to two-feet thick. Deeper replacement must be approved by the Geotechnical Engineer in order to assess settlement potentials for that specific location. Otherwise, use Structural Fill.

When dealing with subgrade pumping, rutting, or moisture, and the remediation has a maximum thickness of 12-inches, then the excavated soils may be scarified and reused to complete the remediation. Deeper remediation requires either Select Fill or Structural Fill.

All recompacted and Select Fill soils used under foundations shall be compacted to a minimum of 98% of the maximum dry density as determined by ASTM D698 and shall be moisture conditioned within 3% of optimum moisture content.

6.5 Specifications for PV Array and Substation Structures

This section provides construction recommendations and specifications related to shallow and deep foundations for the proposed structures. This section is intended to apply for all electrical substation and transmission line structures. If future, more specific geotechnical studies for those facilities are conducted, then disregard this section and refer to the recommendations in those more specific studies.

6.5.1 Shallow Foundation Construction

The following construction criteria and general guidance should be observed during foundation construction:

- During excavation of the foundations, every effort should be made to avoid disturbing the subgrade materials at the planned foundation bearing elevation. When the subgrade is disturbed, the resulting surface should be re-compacted to achieve a minimum

compaction of 95% of the maximum dry density as determined by ASTM D698 and moisture conditioned to within 3% of the optimum moisture content.

- All foundation excavations should be observed by the engineer's qualified representative to assess proper bearing materials are present at foundation bearing elevation in accordance with the recommendations given herein, and to assess the need for densification of the subgrade materials.

- Care should be taken to protect the exposed soils from being disturbed, freezing or desiccation.

- The foundation excavation should be sloped sufficiently to create internal sumps for runoff collection and removal. Foundation excavations subject to rainfall and possible deterioration from accumulated water should be protected using a protective "mud-slab" (lean concrete). If surface runoff water or groundwater seepage accumulates at the bottom of the foundation excavation, it should be collected and removed and not allowed to adversely affect the quality of the bearing surface.

- The foundation excavations should be checked for size and cleaned prior to the placement of reinforcing steel. Take precautions during the placement of reinforcement and concrete to prevent the loose material from falling into the excavation.

6.5.2 Drilled Shaft Foundation Construction

The following items are important for the successful completion of drilled shaft foundations:

- The engineer's representative should observe all drilled shaft excavations. This inspection is to verify proper depth, bearing stratum, cleanliness, verticality (plumbness) and to record other observations regarding the drilled shaft construction.

- If water is present within the shaft, it is imperative that the contractor use proper construction methods to account for the water. Either the water must be removed, or the contractor must use tremies or pumps to allow concrete placement under water.

- Prompt placement of concrete in the excavation as it is completed, cleaned, and inspected is strongly recommended. Under no circumstances should a shaft be drilled that cannot be filled with concrete before the end of the workday.

- The reinforcement steel cage placed in the shaft should be designed to be stable and centered during the placement of concrete.

- The use of a casing or liner may be required in areas where shaft excavations extend into areas of caving sand soils. The drilling contractor should be prepared to provide means and methods to properly construct drilled shafts. We recommend that the construction contract include a budget for temporary casing and/or slurry drilling in case the sloughing of sands or entry of water prevents the proper construction of piers.

- Varying subsurface soil conditions may be encountered at a distance from a boring location or some interval between boring locations along the transmission line alignment. A Geotechnical Engineer or his representative should observe subsurface conditions during installation of any intermediate poles or ancillary structures such as anchors to verify subsurface conditions match the design criteria.

- Drilled shaft construction should follow applicable industry standard. Means and methods of construction shall be determined by the contractor.

6.5.3 Driven Pile Foundation Construction

The following items are important for the successful completion of driven pile foundations:

- The Project Engineer or his/her representative should observe pile driving. Steel W-piles shall be of the cross section, size, and weight per foot (mass per meter) specified in the contract documents. All piles which have been improperly driven, broken, or are otherwise defective shall be removed and replaced or otherwise corrected, as directed by the Project Engineer or his/her representative.

- Pile driving equipment furnished by the Contractor shall be approved by the pile design Engineer or his/her representative. All pile driving equipment shall be sized so that the project piles can be driven with reasonable effort to the required lengths without damage.

- Upon completion of driving, inspection, and approval, the pile (if required) shall be neatly cut on a horizontal plane at the elevation specified in the contract documents.

- Consider protecting piles against corrosion, abrasion or other detrimental factors.

- We recommend that pile load tests for production piles to verify pile capacities. Qualified geotechnical personnel should conduct the pile load tests and present the test results to the design engineer of record for further evaluation. Load tests should be performed in general accordance with ASTM standards. Piles driving time shall be recorded for all test and production piles and submitted to the design engineer of record for review.

- Pile driving can affect existing structures in the vicinity. Structures located close to the proposed pile foundations should be surveyed prior to construction and pre-existing conditions of such structures and their vicinity be adequately recorded.

6.6 Open Excavations

With all excavations in soils, sloped excavations and trench shields are required for excavations greater than four feet in depth. The contractor's "Competent Person" (as defined by OSHA) must inspect each trench wall to determine the type of bench or slope that is required. With all excavations, only a "Competent Person" shall determine whether sloped, benched, or trench shields can be used. OSHA and applicable state and local standards should be observed and followed. Site safety is the responsibility of the contractor. For general planning purposes, RRC offers the following:

- We caution that we did find relatively shallow water at this site. The presence of water within any excavation automatically creates a Type C classification. All Type C class excavations require a 1.5H:1V slope or bench.

- The surficial cohesive clay soils across this site are generally stiff. This soil type classifies as an OSHA Type A material that requires the excavation's sidewall be sloped at 3/4H:1V (or flatter).

- The sandy soils at the site possess low to zero cohesion. This soil type classifies as an OSHA Type B material that requires the excavation's sidewall be sloped at a 1H:1V slope (or flatter). The silt content may give the appearance of cohesion when first excavated, but this is not correct.

Protect construction slopes and permanent embankment slopes from surface runoff water. Design site grading to deter surface water from flowing down unprotected slopes. The contractor should avoid surcharge loads, either static or dynamic, adjacent to an excavation slope. Prevent construction equipment from traveling along or near the top of the excavation slope. The contractor's "Competent Person" must monitor temporary slopes, trenches, and dewatering during construction in order to detect early warnings of movement. Site safety is the responsibility of the contractor.

6.7 Drainage and Construction Dewatering

Proper drainage should be provided away from the foundation elements during all phases of construction and post-construction grading. Proper drainage is essential to the long-term stability of the structures. Ponding of water near the foundation elements from improper drainage should not be permitted.

Based on the available groundwater information, shallow groundwater should not be a concern for proposed foundation excavations. If rain causes perched water conditions, we anticipate the groundwater re-charge rate should be slow enough to conduct excavation dewatering with conventional sumps and pumps.

7.0 ACCESS ROADWAYS

Private access roadways will be built for construction and maintenance purposes. These roadways will consist of compacted earth with an aggregate road base layer. Traffic volumes during construction are anticipated to be frequent with medium to heavy equipment utilizing the access roadways. Following the construction period, the traffic volumes will be light and vehicles accessing the roadways will generally consist of pickup trucks and occasional single and multi-unit truck traffic. Thus, roadway design is mostly intended to support the construction traffic.

Native soils consist mostly of silt soils with varying amounts of sand and clay. This soil type is considered to be a poor when used for support pavements. RRC provides estimated aggregate base thickness based on basic ESAL estimates for different traffic expectations. Based on laboratory testing results, we used the CBR value 2.5 for silty subgrade soils. The final access

roadway section thickness and required aggregate course material thickness recommendation should be provided by the Civil Engineer of Record of this project following.

Table 7.0.1 Estimated Aggregate Base Thickness for Access Roadway

Anticipated Minimum ESAL for different road sections	**Aggregate Base Thickness (inches) with Maximum Allowable Rut Depth of 2-inch**	
	Wet Subgrade Design CBR=2.5 (without Subgrade Improvement)	Soil-Cement Subgrade, at least 9-inches deep. Assumed CBR=15*
1,000	4.5	4.0
10,000	10.0	5.5

Notes: * A formal cement mix design should be performed prior to construction to determine design unconfined compressive strengths, CBR values and aggregate base thicknesses.

We caution that 2-inch rut is the AASHTO criteria for determining the limits to a failing pavement. In a practice, 2-inches of rut is very poor performance. Therefore, RRC recommends a 1-inch proof-roll test limit to assess “acceptable” performance.

Strip topsoil prior to road construction. Topsoil and organics should not be allowed for use along roadway alignments. The exposed subgrade should then be proof-rolled using a fully loaded water-truck or similar heavy equipment to assess the presence of soft areas and the need for remedial measures, if any. Proof-roll tests for roadways should maintain a 1-inch maximum deflection and/or rutting. In areas where excessive “pumping” of the subgrade is observed, partial removal of unsuitable soils in these areas and re-compaction and/or replacement with granular materials will be required. If soft subgrades are prevalent, consider using geogrids (Tensar Biaxial Type 2 or equivalent) on top of geotextile (Mirafi HP 570 or equivalent).

Another option is soil-cement mix to stabilize the subgrade soils. Stabilized subgrade materials treated to a depth of 8 to 12 inches with about 4 to 6% cement by dry weight can achieve significantly higher CBR values. Aggregate base thickness can be reduced when subgrade soils are properly stabilized.

Aggregate flexible road base should be compacted to a minimum of 95% of ASTM D1557, where moisture is not a pass/fail criteria.

It is imperative that proper drainage be provided in the construction of the roadways to enhance their performance. Post-construction proof rolling of the access roads should be performed prior to re-opening the roadways for traffic after periods of heavy rainfall/snow melt to assess stability of the roadway and the need for remedial measures. Areas where remedial measures are required should be re-worked and corrected prior to acceptance. It is also imperative that periodic inspection of the access roadways be performed following periods of rainfall or snowmelt to assess the condition of the roads.

8.0 LIMITATIONS

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is likely soil conditions will vary between or beyond the points explored. If soil conditions are encountered during construction that differ from those described herein, we should be notified immediately in order to provide supplemental recommendations (if needed). If the scope of the proposed construction, including the proposed loads or structural locations, changes from those described in this report, our data should also be reviewed.

We have prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the site area at the time of our study. No warranty is expressed or implied. The recommendations provided in this report assume RRC will conduct an adequate program of tests and observations during the construction phase in order to evaluate compliance with our recommendations.

This report may be used only by the client and only for the purposes stated, within three years from its issuance. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client, or the client's design team members for this project, who wishes to use this report shall notify RRC of such intended use. Based on the intended use of the report, RRC may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release RRC from any liability resulting from the use of this report by any unauthorized party.

Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the authors of this report, are only mentioned in the given standard; they are not incorporated into it or "included by reference," as that latter term is used relative to contracts or other matters of law.

9.0 REFERENCES

1. Madin, Ian P., 2009, Oregon: A Geologic History, Oregon Department of Geology and Mineral Industries Interpretive Series Map 28, accessed February 24th, 2020 at: https://www.oregongeology.org/pubs/ims/ims-028
2. Washington State Department of Natural Resources, 2019, Geologic Provinces: Columbia Basin, accessed February 24th. 2020, at: https://www.dnr.wa.gov/programs-and-services/geology/explore-popular-geology/geologic-provinces-washington/columbia-basin
3. Schuster, J.E., Gulick, C.W., Reidel, S.P., Fecht, K.R., and Zurenko, Stephanie, 1997, Geologic map of Washington--Southeast quadrant: Washington Division of Geology and Earth Resources, Geologic Map GM-45, scale 1:250,000, accessed February 24th, 2020 at: https://ngmdb.usgs.gov/ngm-bin/pdp/zui_viewer.pl?id=6963
4. Washington State Department of Ecology, Well Construction and Licensing Well Report Viewer, accessed Nov 18th 2021 at: https://appswr.ecology.wa.gov/wellconstruction/map/WCLSWebMap/WellConstructionMapSearch.aspx

5. EM 1110-1-1905 Bearing Capacity of Soils. US Army Corps of Engineers, 1992
6. International Building Code (IBC) 2018, International Code Council.
7. Applied Technology Council (ATC), https://hazards.atcouncil.org/
8. U.S. Department of Transportation, Federal Highway Administration, “Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes,” Publication No. FHWA-NHI-00-044, September 2000.
9. U.S. Department of Transportation, Federal Highway Administration, "Design and Construction of Driven Pile Foundations – Volume 1," FHWA-NHI-16-009, September 2016.
10. U.S. Department of Transportation, Federal Highway Administration, "Drilled Shafts: Construction Procedures and LRFD Design Methods," FHWA-NHI-10-016, May 2010.
11. Washington State Department of Transportation, Standard Specifications for Road, Bridge, and Municipal Construction, 2020, Publication No. M 41-10.

www.RRCcompanies.com

810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
512.992.2087

APPENDIX A

Table A1: Geographic Latitude and Longitude and Summary of Field Exploration Program

Boring ID	Latitude	Longitude	Electrical Resistivity Testing	Thermal Resistivity Testing	CBR	Chemical Samples	Drilling/ Test Date	Auger (ft)	Total Depth (ft)	Groundwater During Drilling (ft)	Groundwater Immediately After Drilling (ft)	Remarks
B-01	46.510995	-119.867407	X	X		X	10/25/2021	12.5	12.5	NE	NE	Auger refusal
B-02	46.511384	-119.857108					10/25/2021	12.5	12.5	NE	NE	Auger refusal
B-03	46.511391	-119.845314					10/25/2021	15.5	15.5	NE	NE	
B-04	46.516197	-119.820139					10/26/2021	15.5	15.5	NE	NE	
B-05	46.511020	-119.817709	X	X	X	X	10/26/2021	12.5	12.5	NE	NE	Auger refusal
B-06	46.504650	-119.868338					10/26/2021	8.5	8.5	NE	NE	Auger refusal
B-07	46.502476	-119.858756					10/26/2021	10.5	10.5	NE	NE	Auger refusal
B-08	46.504893	-119.845996	X	X	X	X	10/26/2021	15.5	15.5	NE	NE	Offset to avoid crop damage
B-09	46.503271	-119.833847					10/27/2021	15.5	15.5	NE	NE	
B-10	46.505071	-119.815266					10/27/2021	8.5	8.5	NE	NE	Auger refusal
B-11	46.496694	-119.868159	X	X		X	10/28/2021	8.5	8.5	NE	NE	Auger refusal
B-12	46.493570	-119.860738					10/28/2021	8.5	8.5	NE	NE	same refusal depth at 20 feet offset
B-13	46.496233	-119.850880					10/28/2021	5.5	5.5	NE	NE	same refusal depth at 30 feet offset
B-14	46.493236	-119.841835					10/27/2021	15.5	15.5	NE	NE	
B-15	46.497082	-119.830199					10/27/2021	15.5	15.5	NE	NE	
B-16	46.487974	-119.845968					10/27/2021	14.5	14.5	NE	NE	
B-17	46.498498	-119.817106					10/27/2021	15.5	15.5	NE	NE	
B-18	46.488572	-119.831616	X	X	X	X	10/27/2021	15.5	15.5	NE	NE	
B-19	46.514034	-119.801566					10/28/2021	10.0	10.0	NE	NE	Auger refusal
B-20	46.493616	-119.806665					10/28/2021	5.5	5.5	NE	NE	same refusal depth at 25 feet offset
			5	**5**	**3**	**5**	**10/25/21**	**5.5**	**5.5**	**0.0**	**0.0**	
							10/28/21	**15.5**	**15.5**			

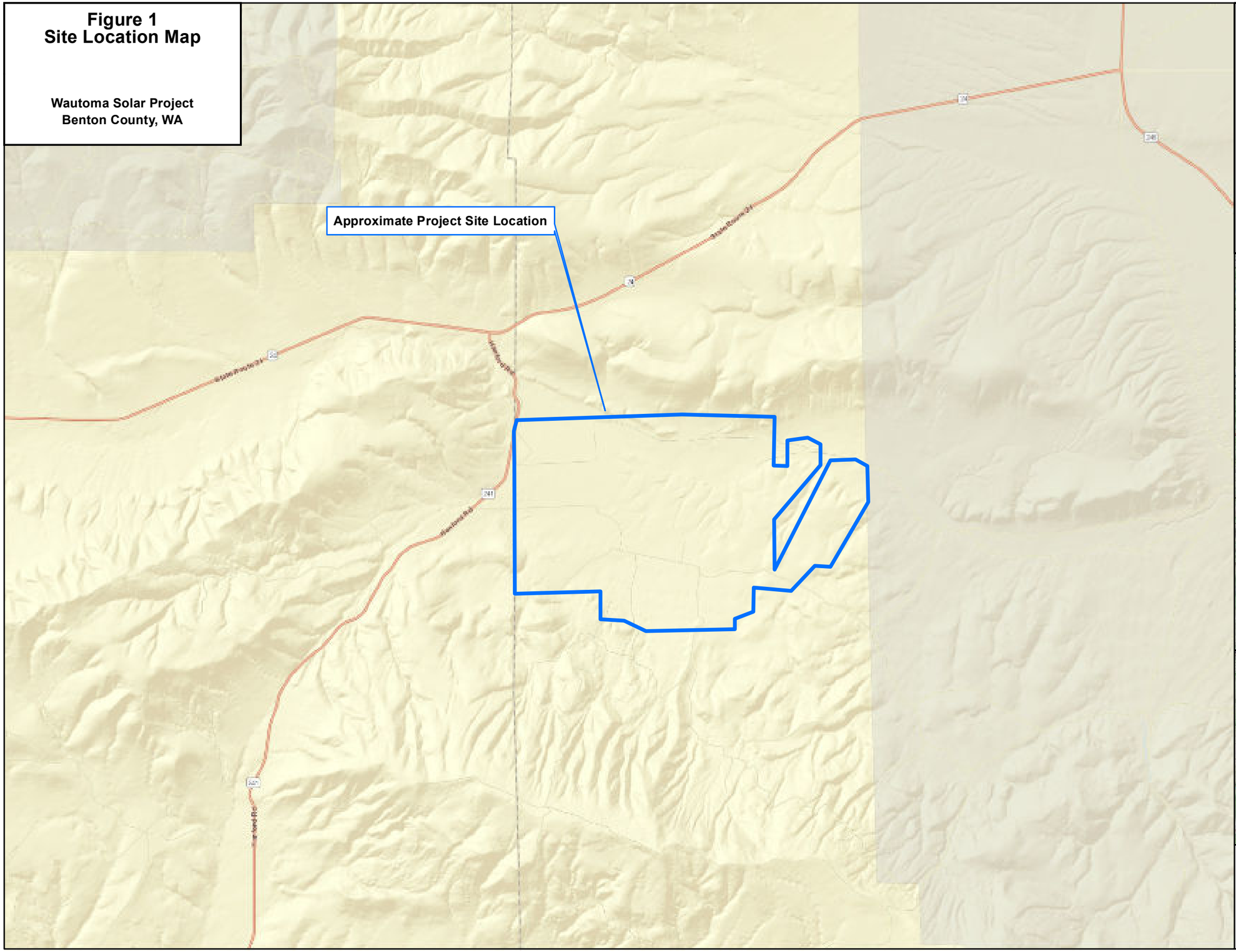
Notes: NE = Not Encountered; NA = Not Available

Table A2 : Well Log Information Obtained from the **Washington State Department of Ecology**

Well Report ID	**Latitude**	**Longitude**	**Elevation** (feet above sea level)	**Well Depth** (feet below land surface)	**Water Level Record** (feet below land surface)	**Reported Drilling Date** (MM/DD/YYYY)
368455	46.5214	-119.8571	1,070	303	255	07/10/2003
1329417	46.5212	-119.8441	1,090	400	240	08/28/2015
139626	46.5013	-119.8691	1,160	1280	105	12/29/1975
602884	46.5103	-119.8821	1,320	430	260	07/05/2001
727227	46.5017	-119.8589	1,100	602	312	04/29/2011
417307	46.5139	-119.8822	1,420	300	179	06/30/2004
408934	46.5175	-119.8822	1,440	660	429	05/10/2005
1589343	46.503	-119.887	1,300	156	65	08/04/2016

Figure 1
Site Location Map

Wautoma Solar Project
Benton County, WA

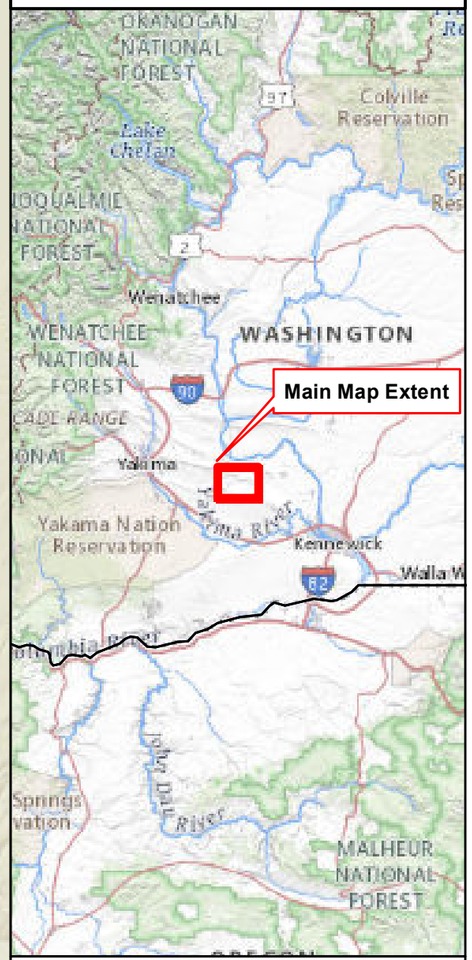


0 1 2 3 Miles

N

Legend

Project_Boundary



RRC Power & Energy, LLC

810 Hesters Crossing Rd
Suite 120
Round Rock, TX 78681
Phone: (512) 992-2087

Figure 2
Boring Locations on a Topographic Map

Wautoma Solar Project
Benton County, WA

0 0.25 0.5 0.75 1 Miles

N

Legend

- Boring Locations
- Project_Boundary

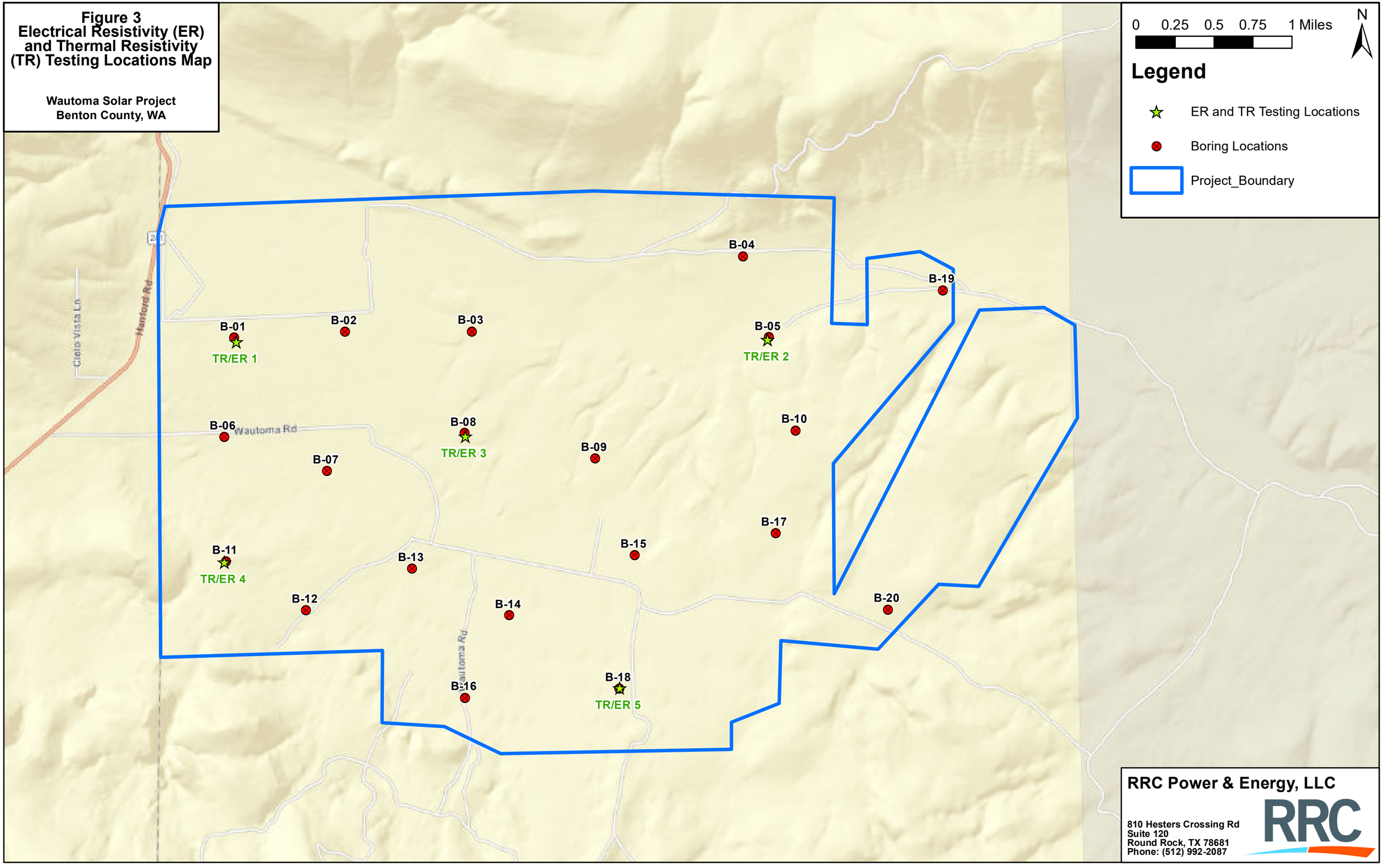
B-01
B-02
B-03
B-04
B-05
B-06
B-07
B-08
B-09
B-10
B-11
B-12
B-13
B-14
B-15
B-16
B-17
B-18
B-19
B-20

RRC Power & Energy, LLC

810 Hesters Crossing Rd
Suite 120
Round Rock, TX 78681
Phone: (512) 992-2087

Figure 3
Electrical Resistivity (ER) and Thermal Resistivity (TR) Testing Locations Map

Wautoma Solar Project
Benton County, WA



RRC Power & Energy, LLC

810 Hesters Crossing Rd
Suite 120
Round Rock, TX 78681
Phone: (512) 992-2087

Figure 4
Site Vicinity Geologic Map

Wautoma Solar Project
Benton County, WA

0 0.25 0.5 0.75 1 Miles

N

Legend

- ER and TR Testing Locations
- Boring Locations
- Project_Boundary

Geologic Units

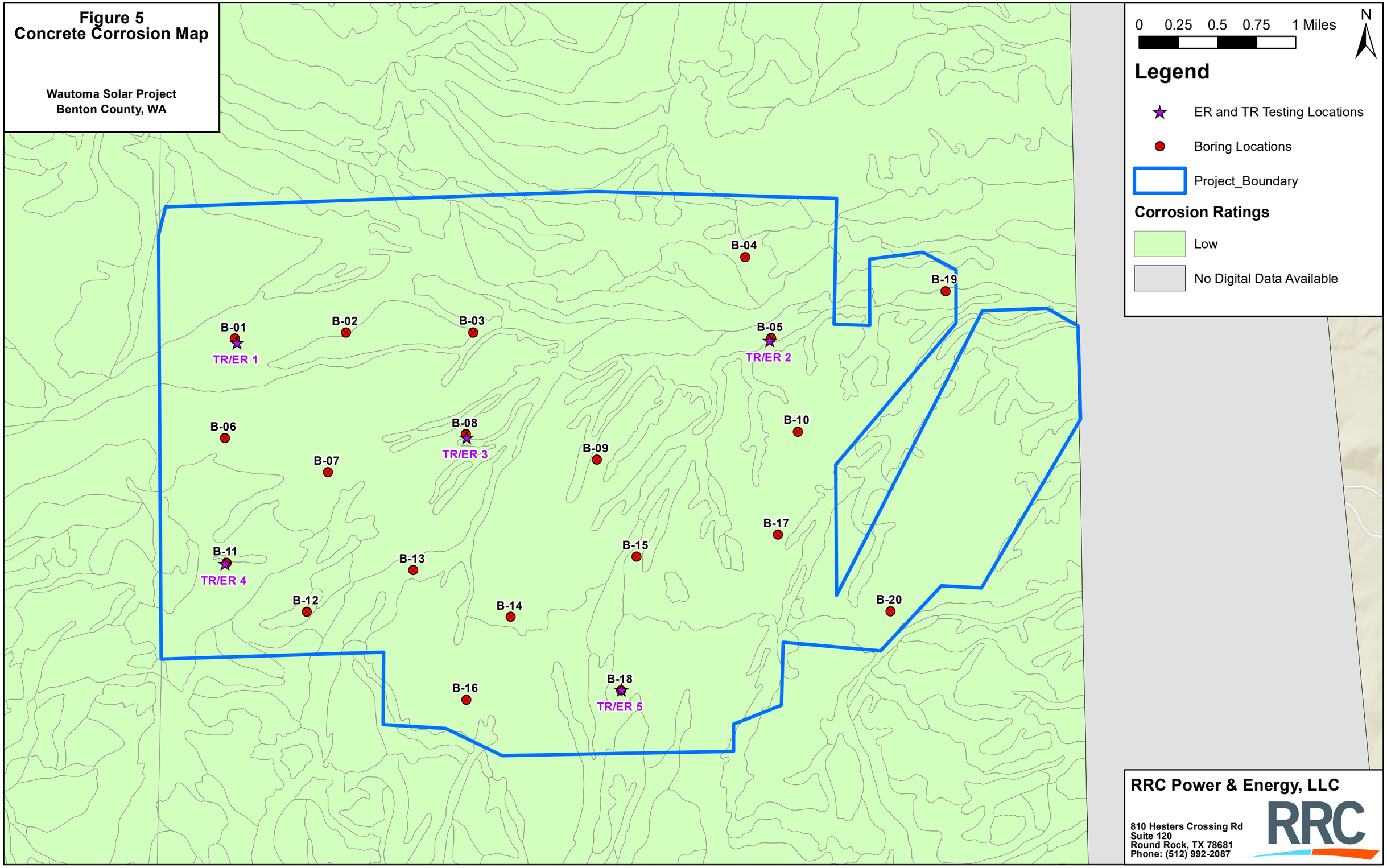
Qa	*Alluvium*
Ql	*Loess*
Qfs	*Outburst flood deposits, silt and sand*
Mv(s)	*Saddle Mountain Basalt*
Mv(w)	*Wanapum Basalt*

B-01 TR/ER 1
B-02
B-03
B-04
B-05 TR/ER 2
B-06
B-07
B-08 TR/ER 3
B-09
B-10
B-11 TR/ER 4
B-12
B-13
B-14
B-15
B-16
B-17
B-18 TR/ER 5
B-19
B-20

RRC Power & Energy, LLC
810 Hesters Crossing Rd
Suite 120
Round Rock, TX 78681
Phone: (512) 992-2087

Figure 5
Concrete Corrosion Map

Wautoma Solar Project
Benton County, WA

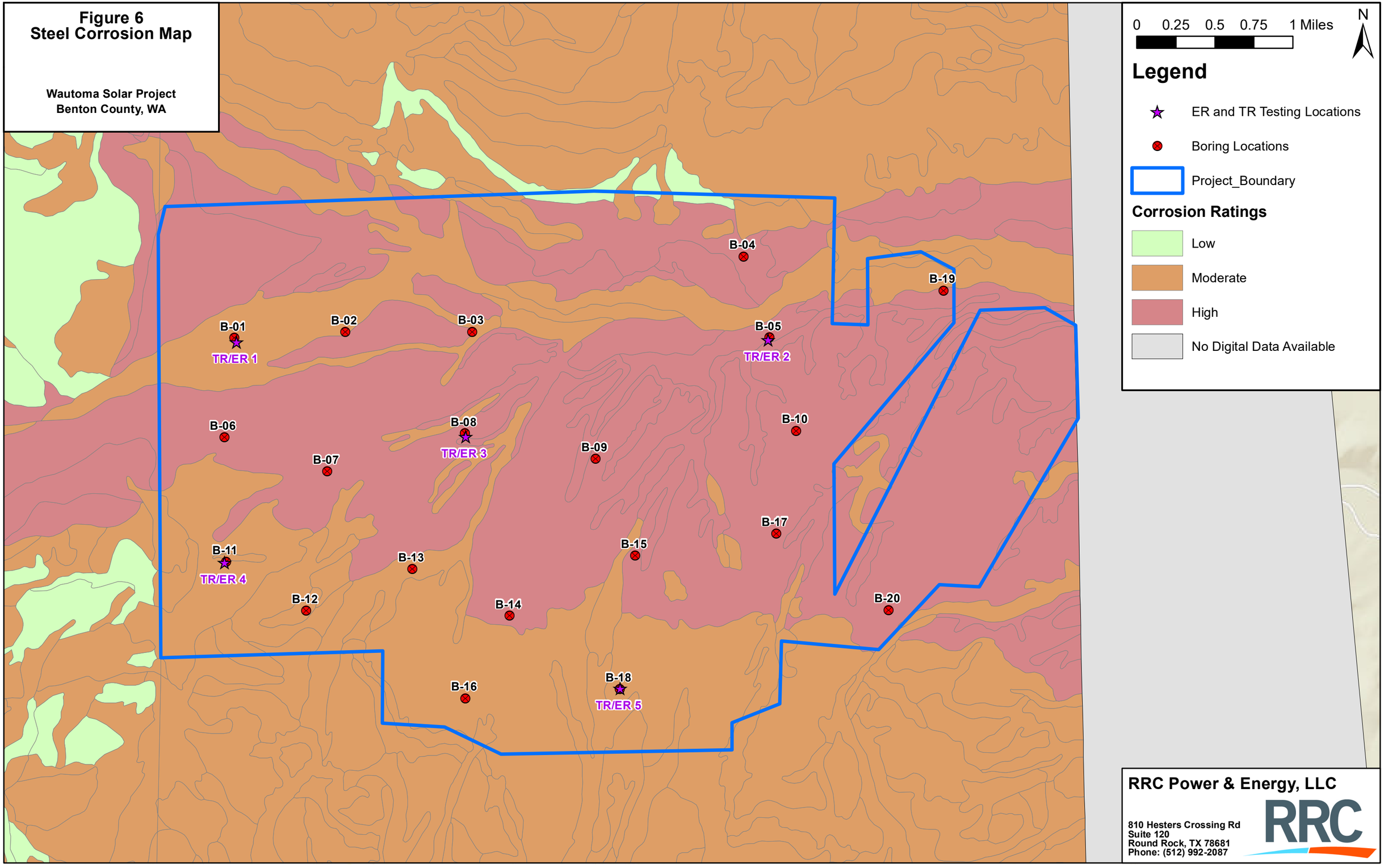


RRC Power & Energy, LLC

810 Hesters Crossing Rd
Suite 120
Round Rock, TX 78681
Phone: (512) 992-2087

Figure 6
Steel Corrosion Map

Wautoma Solar Project
Benton County, WA

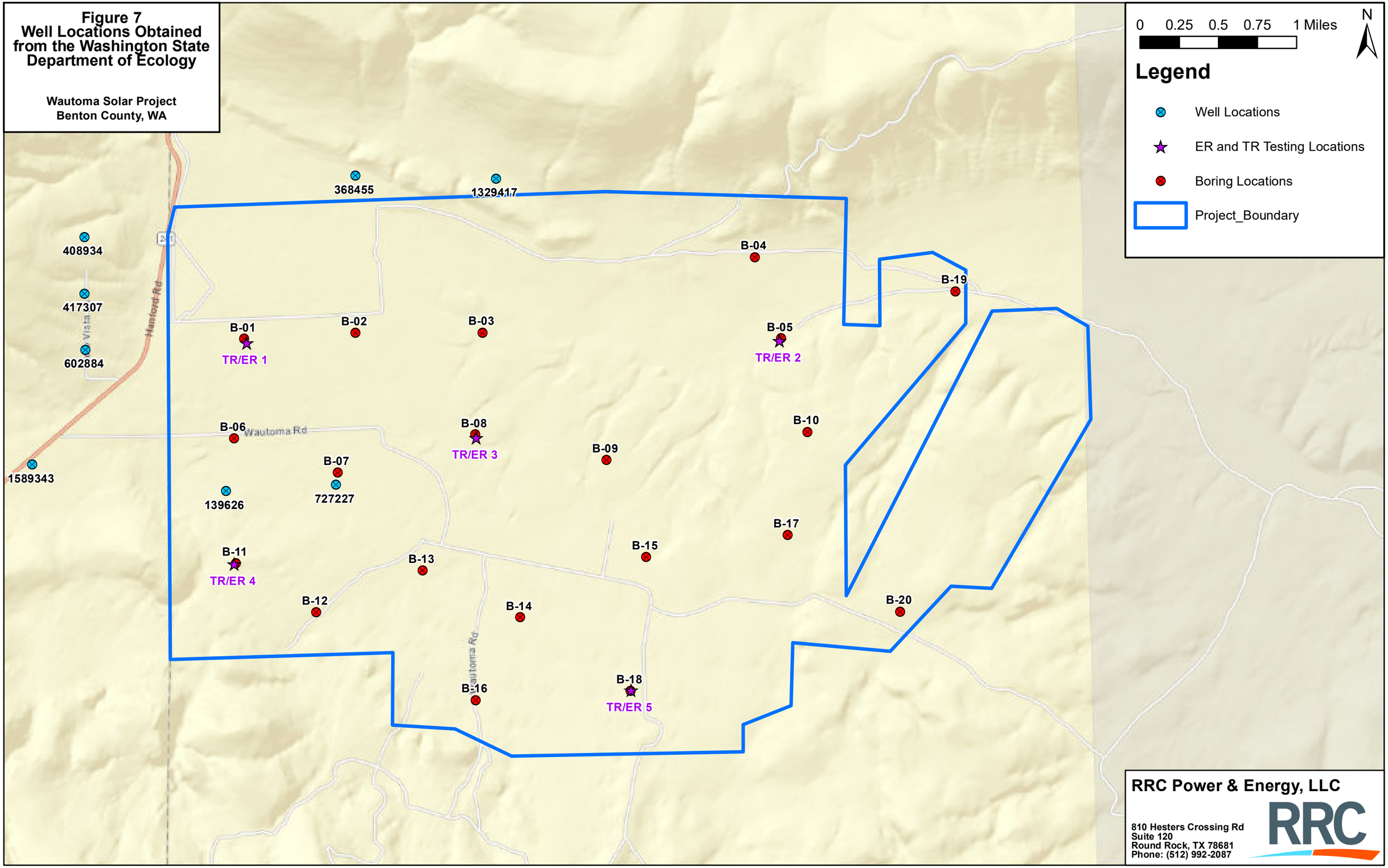


RRC Power & Energy, LLC

810 Hesters Crossing Rd
Suite 120
Round Rock, TX 78681
Phone: (512) 992-2087

Figure 7
Well Locations Obtained from the Washington State Department of Ecology

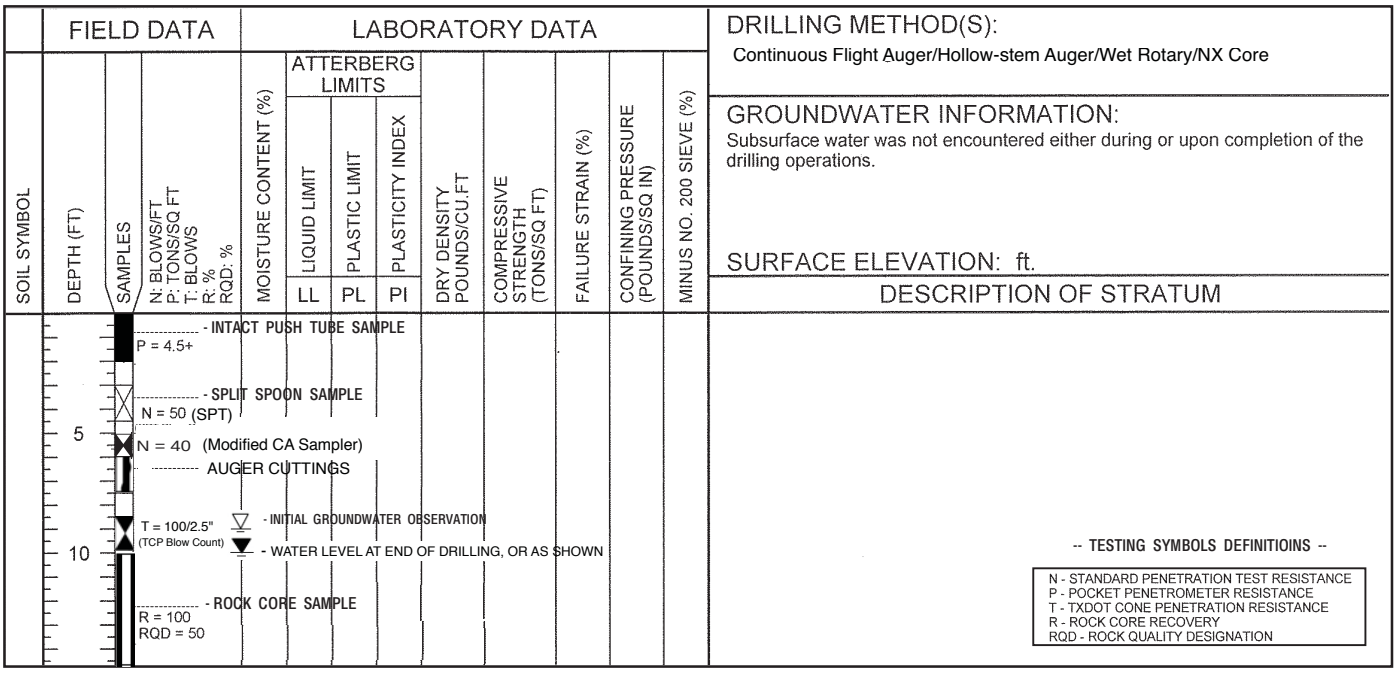
Wautoma Solar Project
Benton County, WA



RRC Power & Energy, LLC

810 Hesters Crossing Rd
Suite 120
Round Rock, TX 78681
Phone: (512) 992-2087

BORING LOG KEY



TYPICAL SOIL AND ROCK SYMBOLS (USCS CLASSIFICATION)

- Lean Clay (CL)
- Fat Clay (CH)
- Silt (ML)
- Elastic Silt (MH)
- Silty Sand (SM)
- Clayey Sand (SC)
- Silty, Clayey Sand (SC-SM)
- Poorly-Graded Sand (SP)
- Well-Graded Sand (SW)
- Poorly-Graded Gravel (GP)
- Well-Graded Gravel (GW)
- Clayey Gravel (GC)
- Silty Gravel (GM)
- Silty Clay (CL-ML)
- Claystone
- BASALT
- Limestone
- Sandstone
- Siltstone
- Fill Material
- Shale

DEGREE OF WEATHERING

1) Unweathered: No evidence of any chemical or mechanical alteration.
2) Slightly weathered: Slight discoloration on surface, slight alteration along discontinuities, less than 10% of the rock volume altered.
3) Moderately weathered: Discoloring evident, surface pitted and altered with alteration penetrating well below rock surfaces, weathering "halos" evident, 10% to 50% of the rock volume altered.
4) Highly weathered: Entire mass discolored, alteration pervading nearly all of the rock with some pockets of slightly weathered rock noticeable, some minerals leached away.
5) Decomposed: rock reduced to a soil with relicit rock texture, generally molded and crumbled by hand.

SOIL STRUCTURE

Calcareous..... Containing calcium carbonate

Slickensided..... The presence of planes of weakness having a slick and glossy appearance

Interbedded..... Alternating layers of varying material

LOG OF BORING B-01

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/25/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													8 in. Topsoil
	1												SILT (ML), with Gravel, brown, stiff to hard, dry to moist
	2		N = 14	3									
	3												
	4												
	5		N = 83/11"	3									
	6												
	7												
	8		N = 50/3"										
	9												
	10		N = 42										
	11												
	12		N = 50/2"										
													Total Depth = 12.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.510995, Long. -119.867412
Auger Refusal at 12.5 ft.

LOG OF BORING B-02

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/25/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													8 in. Topsoil
	1												SILT (ML), with Gravel, brown, very stiff to hard, dry to moist
	2		N = 30										
	3												
	4												
	5		N = 45										
	6												
	7												
	8		N = 29										
	9												
	10		N = 38										
	11												
	12		N = 50/3"										
													Total Depth = 12.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.511383, Long. -119.857110
Auger Refusal at 12.5 ft.

LOG OF BORING B-03

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/25/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, brown, stiff to hard, dry to moist, trace roots
	2		N = 13	7									
	3												
	4												Roots grade out
	5		N = 26										
	6												
	7												
	8		N = 32	7									
	9												
	10		N = 30										
	11												
	12												SILTY GRAVEL (GM), brown, dense to very dense, dry to moist, fine grained
	13		N = 48										
	14												
	15		N = 53										
													Total Depth = 15.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.511393, Long. -119.845316

LOG OF BORING B-04

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/26/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILTY SAND (SM), light brown, soft to hard, dry to moist
	2		N = 5	6	NP	NP	NP					36	
	3												
	4												
	5		N = 23	9									
	6												
	7												
	8		N = 18										
	9												
	10		N = 25										
	11												
	12												
	13		N = 39										
	14												
	15		N = 52										
													Total Depth = 15.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.516197, Long. -119.820139

LOG OF BORING B-05

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

DATE(S) DRILLED: 10/26/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, light brown, medium stiff to hard, dry to moist
	2		N = 8										
	3												
	4												Grading with Sand
	5		N = 4	8	NP	NP	NP					74	
	6												
	7												
	8		N = 21	6									
	9												Grading trace Gravel
	10		N = 50/5"										
	11												
	12												
			N = 50/6"										SILTY GRAVEL (GM), brown, very dense, dry to moist, medium grained
													Total Depth = 12.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.511022, Long. -119.817713
Auger Refusal at 12.5 ft.

LOG OF BORING B-06

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/26/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, light brown, very stiff to hard, dry to moist
	2		N = 17										
	3												
	4												Grading trace Gravel
	5		N = 55										
	6												
	7		N = 50/5"										Grading with Gravel, brown
													Total Depth = 7.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.504646, Long. -119.868338
Auger Refusal at 7.5 ft.

LOG OF BORING B-07

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

DATE(S) DRILLED: 10/26/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, light brown, soft to very stiff, dry to moist
	2		N = 4	7									
	3												
	4												Grading trace Gravel
	5		N = 20										
	6												
	7												SILTY SAND (SM), trace Gravel, brown, very dense, dry to moist, fine grained
	8		N = 50/3"										
	9												
	10		N = 55	6									
													Total Depth = 10.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.502490, Long. -119.858760
Auger Refusal at 10.5 ft.

LOG OF BORING B-08

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/26/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, brown, stiff to very stiff, dry to moist
	2		N = 9										
	3												
	4												
	5		N = 18										
	6												
	7												
	8		N = 14										
	9												
	10		N = 17										
	11												
	12												
	13		N = 14										
	14												
	15		N = 15										
													Total Depth = 15.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.505053, Long. -119.845929

LOG OF BORING B-09

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/27/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, light brown, stiff to hard, dry to moist
	2		N = 9	8									
	3												
	4												
	5		N = 21	7									
	6												
	7												
	8		N = 11	8									
	9												
	10		N = 14										
	11												
	12												
	13		N = 25	11									
	14												
	15		N = 35										
													Total Depth = 15.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.503270, Long. -119.833846

LOG OF BORING B-10

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/27/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, light brown, stiff to hard, dry to moist
	2		N = 15										
	3												
	4												
	5		N = 25										
	6												
	7												Grading with Gravel, brown
	8		N = 83										
													Total Depth = 8.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.505070, Long. -119.815266
Auger Refusal at 8.5 ft.

LOG OF BORING B-11

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/28/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													6 in. Topsoil
	1												SILT (ML), with Gravel, light brown, hard, dry to moist
	2		N = 81										
	3												
	4												
	5		N = 69										
	6												
	7												
	8		N = 94/8"										
													Total Depth = 8.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.496697, Long. -119.868162
Auger Refusal at 8.5 ft.

LOG OF BORING B-12

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/28/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													6 in. Topsoil
	1												SILT (ML), trace Sand, light brown, stiff to hard, dry to moist
	2		N = 12	4									
	3												
	4												
	5		N = 31	4									
	6												
	7												Grading with Gravel
	8		N = 80/11"										
													Total Depth = 8.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.493569, Long. -119.860740
Auger Refusal at 8.5 ft.

LOG OF BORING B-13

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/28/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													5 in. Topsoil
	1												SILT (ML), trace Sand, light brown, very stiff to hard, dry to moist
	2		N = 36										
	3												
	4												Grading with Gravel
	5		N = 22										
													Total Depth = 5.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.496232, Long. -119.850880
Auger Refusal at 5.5 ft.

LOG OF BORING B-14

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

DATE(S) DRILLED: 10/27/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												
	2		N = 7	7	NP	NP	NP					62	SANDY SILT (ML), with Gravel, light brown, medium stiff to hard, dry to moist
	3												
	4												
	5		N = 9										
	6												
	7												
	8		N = 16	7									
	9												
	10		N = 17										
	11												
	12												
	13		N = 32										
	14												
	15		N = 51										
													Total Depth = 15.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.493063, Long. -119.841913

LOG OF BORING B-15

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/27/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, light brown, medium stiff to hard, dry to moist
	2		N = 5	9									
	3												
	4												
	5		N = 8	6									
	6												
	7												Grading with Gravel
	8		N = 71										
	9												
	10		N = 50/6"										
	11												
	12												
	13		N = 44										
	14												
	15		N = 52										
													Total Depth = 15.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.497007, Long. -119.829622

LOG OF BORING B-16

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/27/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, light brown, medium stiff to stiff, dry to moist
	2		N = 9	6									
	3												
	4												Grading trace Gravel
	5		N = 6										
	6												
	7												SILTY SAND (SM), light brown, loose to very dense, dry to moist, fine grained
	8		N = 7	6	NP	NP	NP					46	
	9												Grading with Gravel, brown
	10		N = 20	4									
	11												
	12												
	13		N = 68										
	14		N = 50/6"										
													Total Depth = 14.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.487972, Long. -119.845966

LOG OF BORING B-17

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/27/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													1 ft. Topsoil
	1												SILT (ML), trace Sand, light brown, stiff to hard, dry to moist
	2		N = 15										
	3												
	4												
	5		N = 10										
	6												
	7												
	8		N = 20										
	9												Grading trace Gravel
	10		N = 32										
	11												
	12												
	13		N = 19										
	14												
	15		N = 41										
													Total Depth = 15.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.498500, Long. -119.817108

LOG OF BORING B-18

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

DATE(S) DRILLED: 10/27/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													10 in. Topsoil
	1												SILT (ML), with Gravel, brown, very stiff to hard, dry to moist
	2		N = 18										
	3												
	4												
	5		N = 28										
	6												
	7												
	8		N = 31										
	9												
	10		N = 21										
	11												
	12												
	13		N = 44										
	14												
	15		N = 57										
													Total Depth = 15.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.488571, Long. -119.831616

LOG OF BORING B-19

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/28/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													6 in. Topsoil
	1												SILT (ML), trace Sand, light brown, stiff to hard, dry to moist
	2		N = 13	5									
	3												
	4												Grading with Gravel
	5		N = 23	4									
	6												
	7												
	8		N = 16										
	9												
	10		N = 50/6"										
													Total Depth = 10 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.514033, Long. -119.801567
Auger Refusal at 10.5 ft.

LOG OF BORING B-20

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052
DATE(S) DRILLED: 10/28/2021

DRILLING METHOD(S):
Hollow Stem Auger

GROUNDWATER INFORMATION:
Groundwater not encountered during or immediately after drilling

SURFACE ELEVATION (FT):

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ. FT)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													8 in. Topsoil
	1												SILT (ML), with Sand, light brown, medium stiff to hard, dry to moist
	2		N = 5	5	NP	NP	NP					74	
	3												
	4												Grading with Gravel
	5		N = 89/11"	7									
													Total Depth = 5.5 ft.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:
GPS COORDINATES: Lat. 46.493615, Long. -119.806662
Auger Refusal at 5.5 ft.

www.RRCcompanies.com

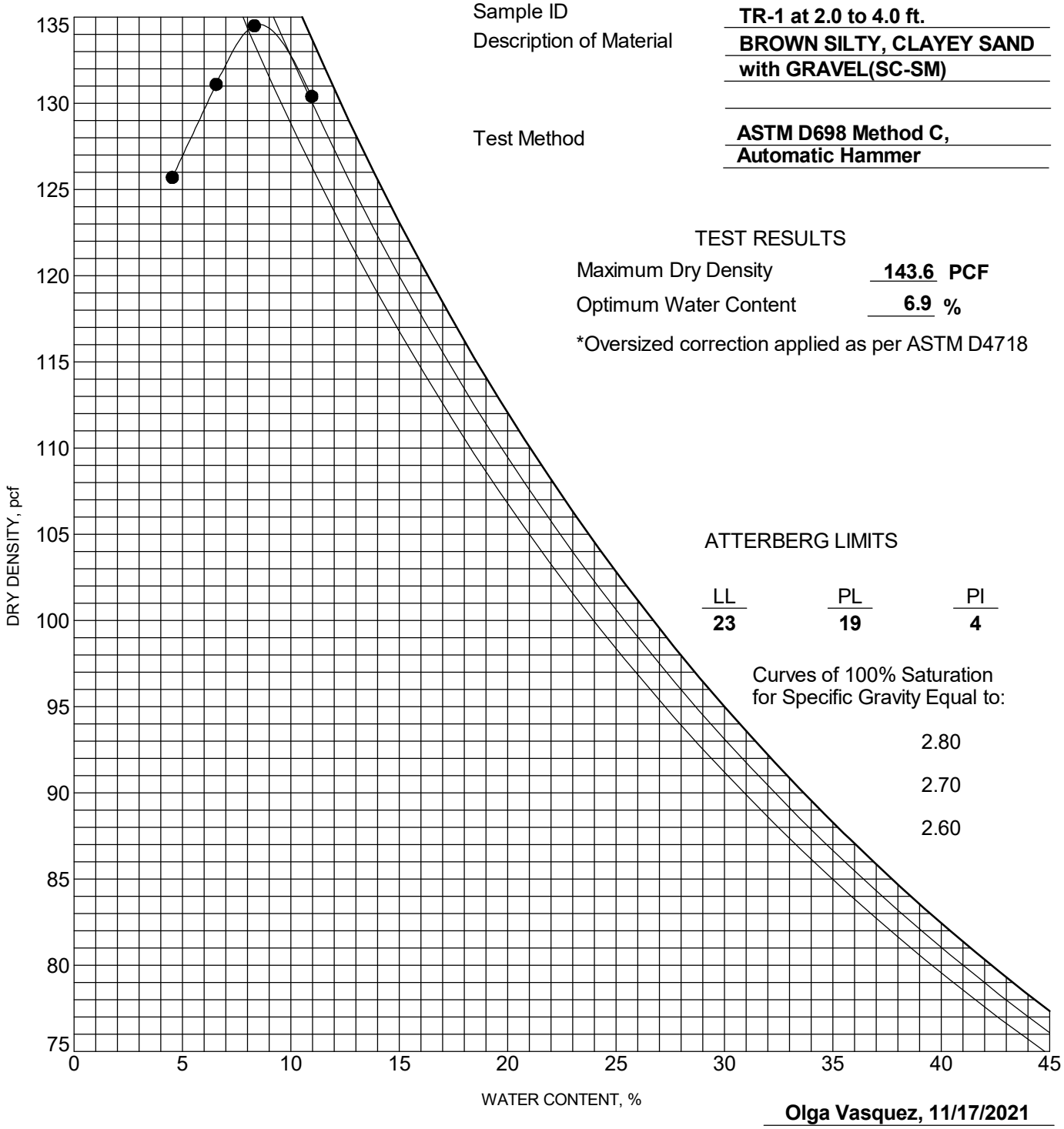
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
512.992.2087

APPENDIX B

MOISTURE-DENSITY RELATIONSHIP

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052



Sample ID: **TR-1 at 2.0 to 4.0 ft.**
Description of Material: **BROWN SILTY, CLAYEY SAND with GRAVEL(SC-SM)**

Test Method: **ASTM D698 Method C, Automatic Hammer**

TEST RESULTS

Maximum Dry Density **143.6** **PCF**
Optimum Water Content **6.9** **%**

*Oversized correction applied as per ASTM D4718

ATTERBERG LIMITS

LL	PL	PI
23	**19**	**4**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80
2.70
2.60

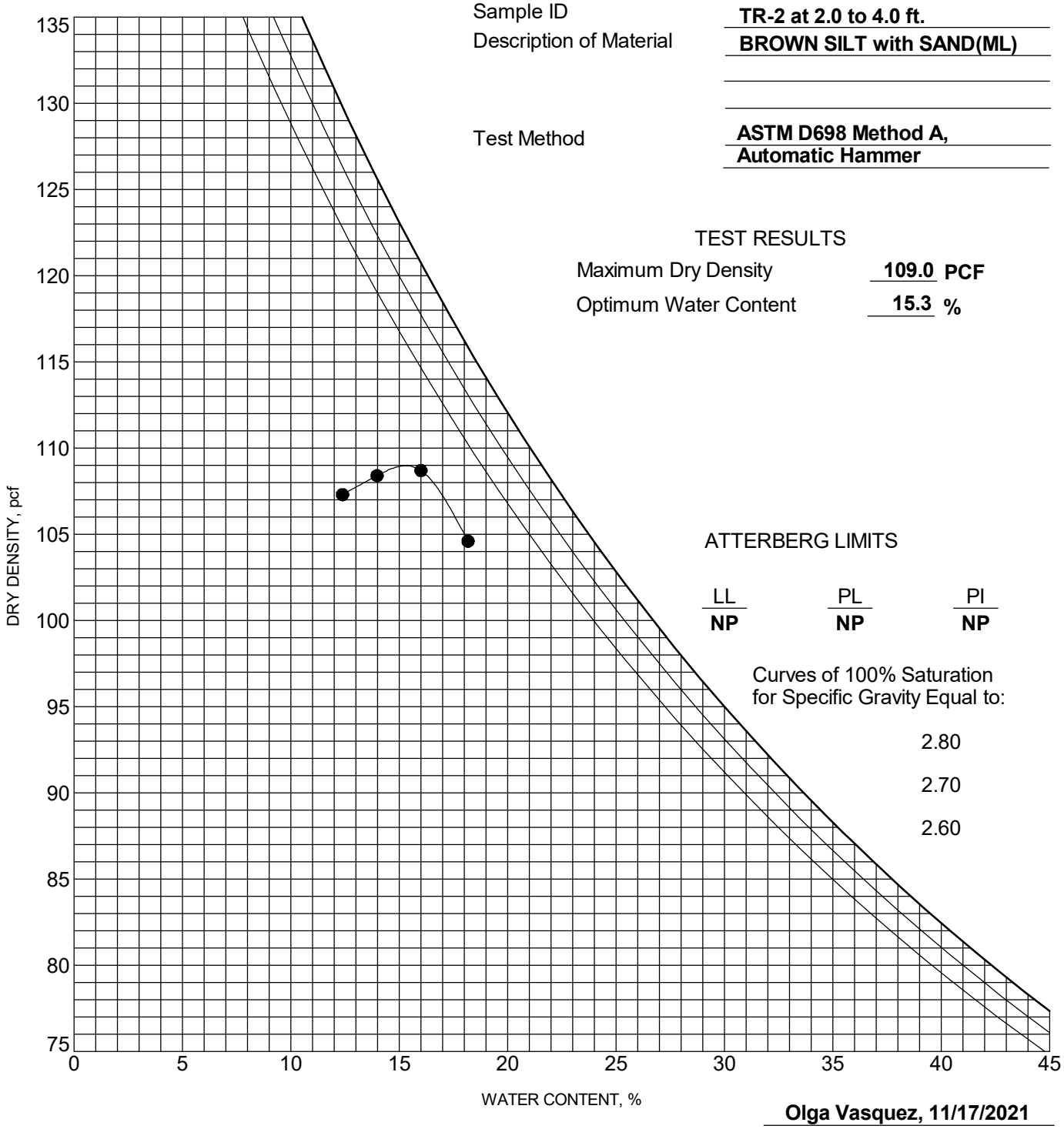
Olga Vasquez, 11/17/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

MOISTURE-DENSITY RELATIONSHIP

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052



Sample ID: **TR-2 at 2.0 to 4.0 ft.**
Description of Material: **BROWN SILT with SAND(ML)**

Test Method: **ASTM D698 Method A, Automatic Hammer**

TEST RESULTS

Maximum Dry Density: **109.0** **PCF**
Optimum Water Content: **15.3** **%**

ATTERBERG LIMITS

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

Curves of 100% Saturation for Specific Gravity Equal to:

2.80
2.70
2.60

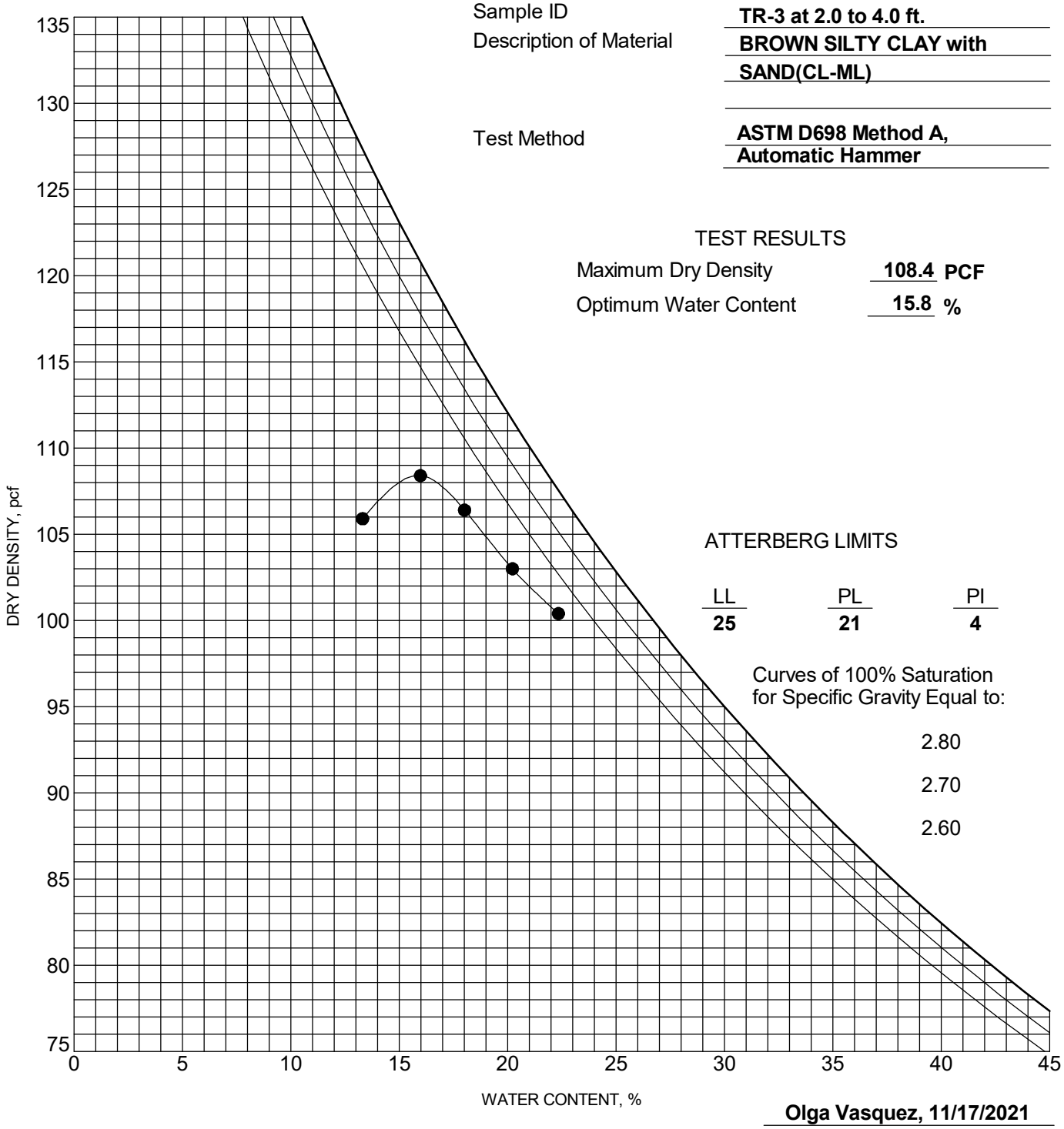
Olga Vasquez, 11/17/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

MOISTURE-DENSITY RELATIONSHIP

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052



Sample ID: **TR-3 at 2.0 to 4.0 ft.**
Description of Material: **BROWN SILTY CLAY with SAND(CL-ML)**

Test Method: **ASTM D698 Method A, Automatic Hammer**

TEST RESULTS

Maximum Dry Density	**108.4**	**PCF**
Optimum Water Content	**15.8**	**%**

ATTERBERG LIMITS

LL	PL	PI
25	**21**	**4**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80
2.70
2.60

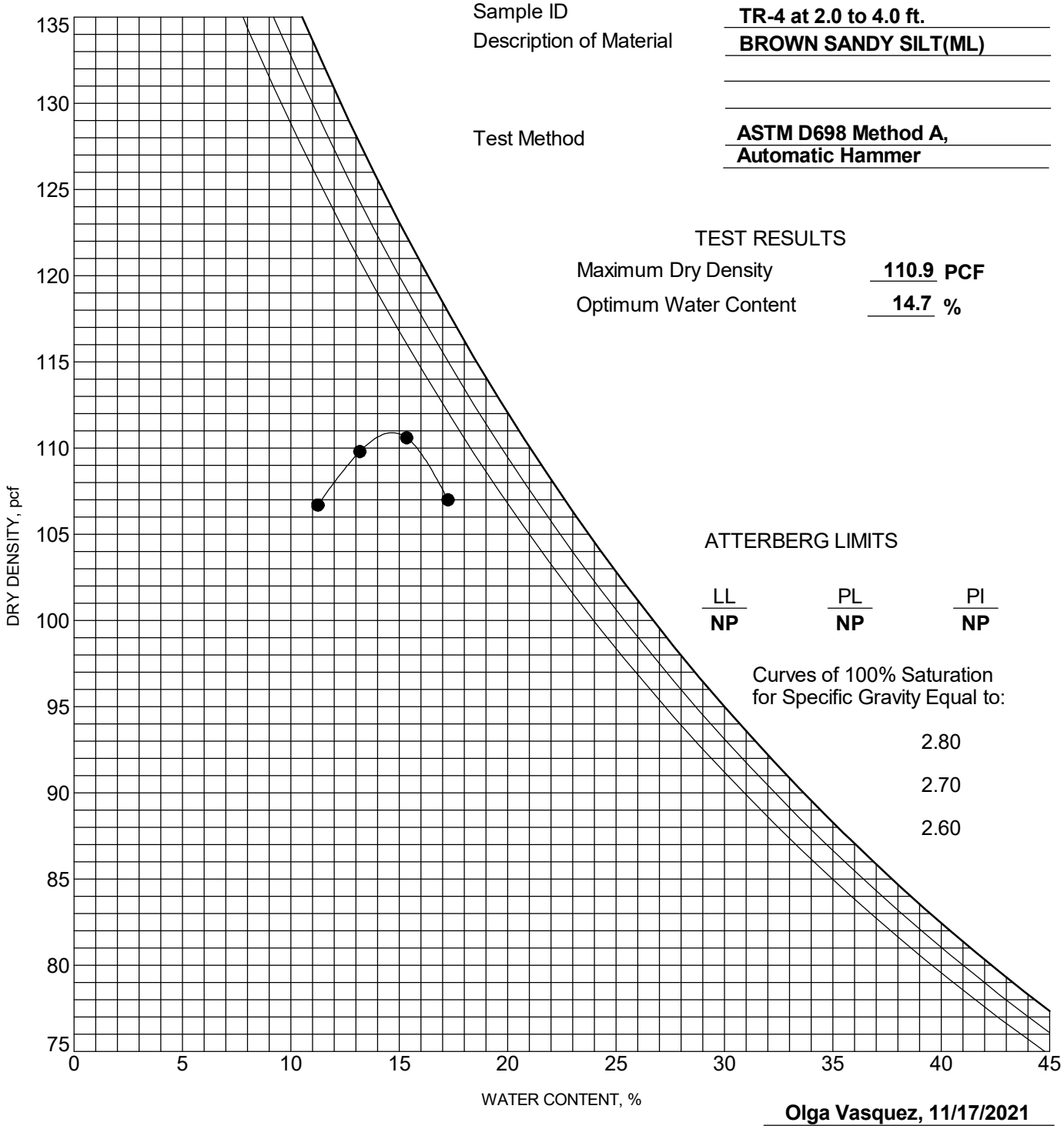
Olga Vasquez, 11/17/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

MOISTURE-DENSITY RELATIONSHIP

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052



Sample ID: **TR-4 at 2.0 to 4.0 ft.**
Description of Material: **BROWN SANDY SILT(ML)**

Test Method: **ASTM D698 Method A, Automatic Hammer**

TEST RESULTS

Maximum Dry Density	**110.9**	**PCF**
Optimum Water Content	**14.7**	**%**

ATTERBERG LIMITS

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

Curves of 100% Saturation for Specific Gravity Equal to:

2.80
2.70
2.60

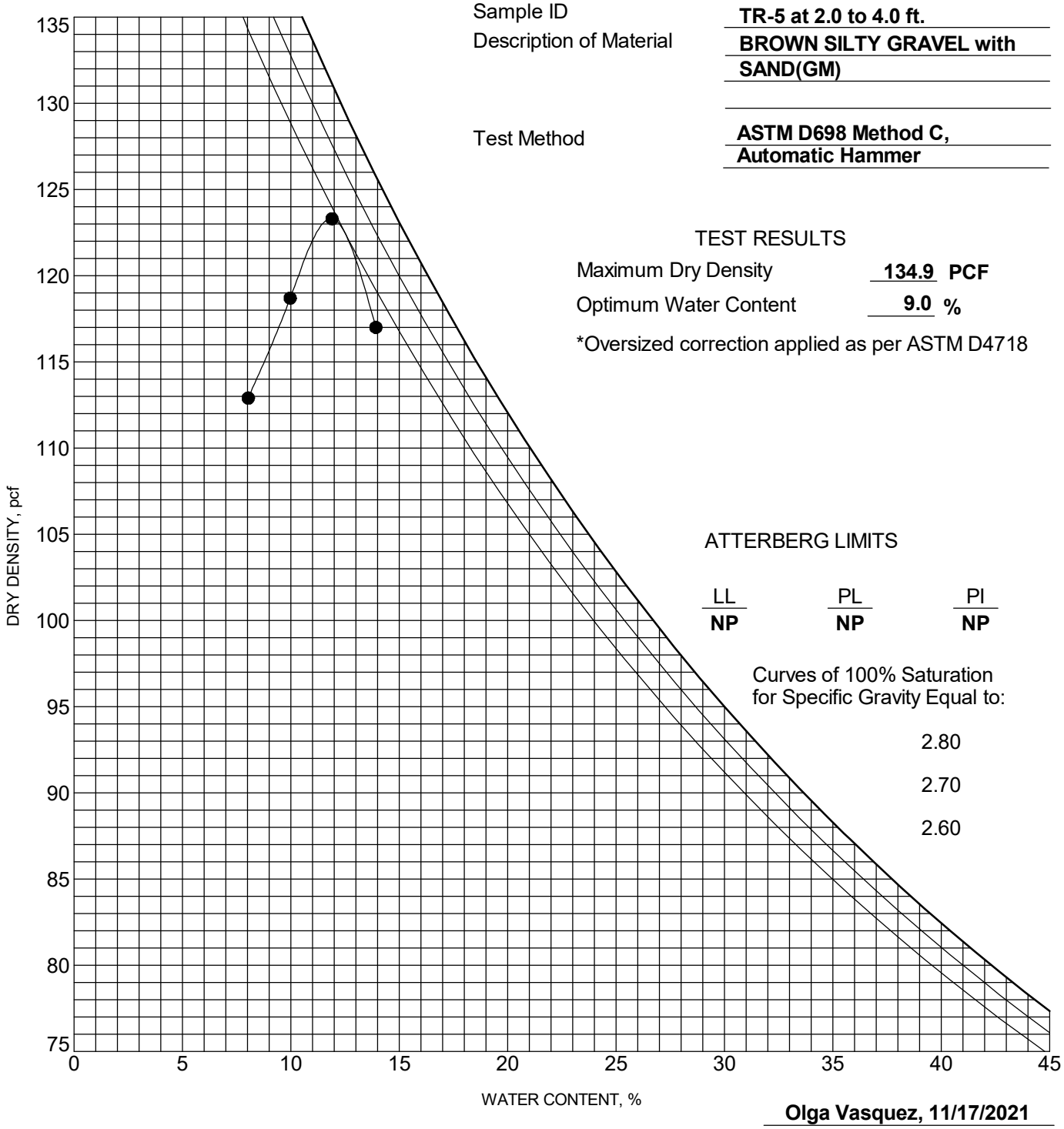
Olga Vasquez, 11/17/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

MOISTURE-DENSITY RELATIONSHIP

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052



Sample ID: **TR-5 at 2.0 to 4.0 ft.**
Description of Material: **BROWN SILTY GRAVEL with SAND(GM)**

Test Method: **ASTM D698 Method C, Automatic Hammer**

TEST RESULTS

Maximum Dry Density **134.9** **PCF**
Optimum Water Content **9.0** **%**

*Oversized correction applied as per ASTM D4718

ATTERBERG LIMITS

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

Curves of 100% Saturation for Specific Gravity Equal to:

2.80
2.70
2.60

Olga Vasquez, 11/17/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

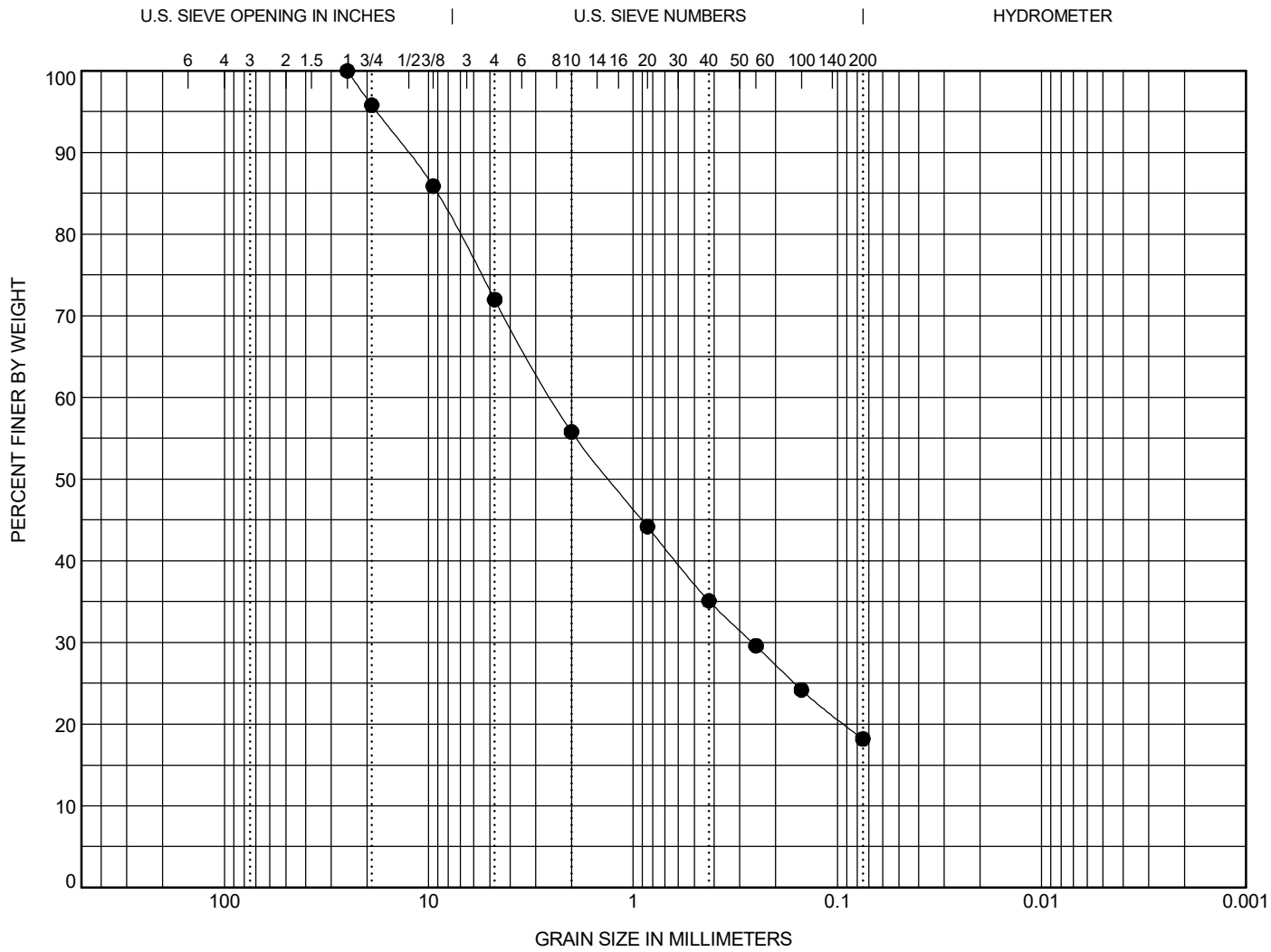
GRAIN SIZE DISTRIBUTION

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

Sample ID: **TR-1 at 2.0 ft.** Date: 11/23/2021

Test Method: **ASTM D6913 (ASTM D7928 if with Hydrometer)**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Classification	LL	PL	PI	Cc	Cu
SILTY, CLAYEY SAND with GRAVEL(SC-SM)	**23**	**19**	**4**		

D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
25	**2.503**	**0.26**		**28.0**	**53.8**	**18.2**	

Olga Vasquez, 11/23/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

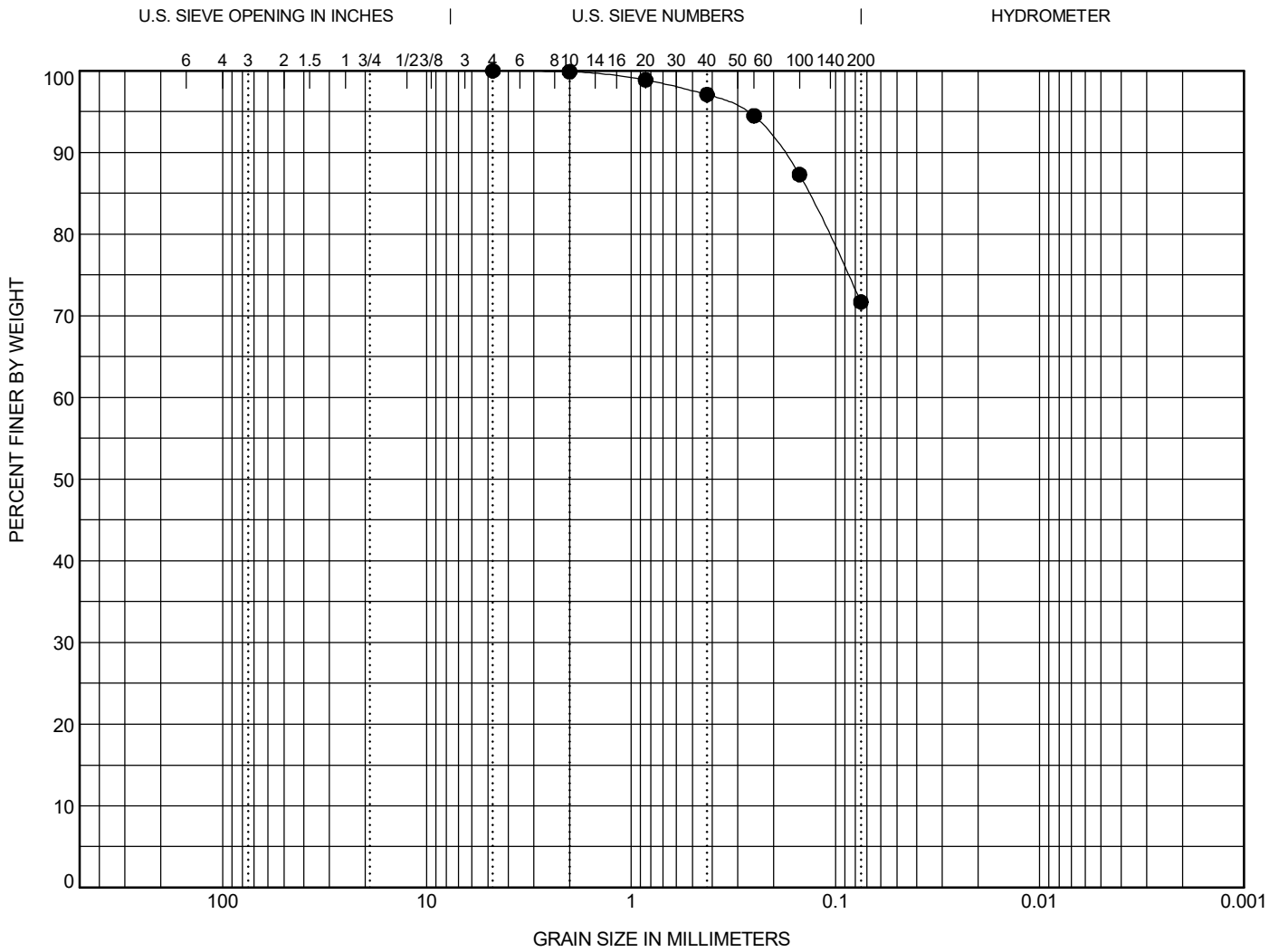
GRAIN SIZE DISTRIBUTION

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

Sample ID: **TR-2 at 2.0 ft.** Date: 11/23/2021

Test Method: **ASTM D6913 (ASTM D7928 if with Hydrometer)**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Classification	LL	PL	PI	Cc	Cu
SILT with SAND(ML)	**NP**	**NP**	**NP**		

D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
4.75				**0.0**	**28.3**	**71.7**	

Olga Vasquez, 11/23/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

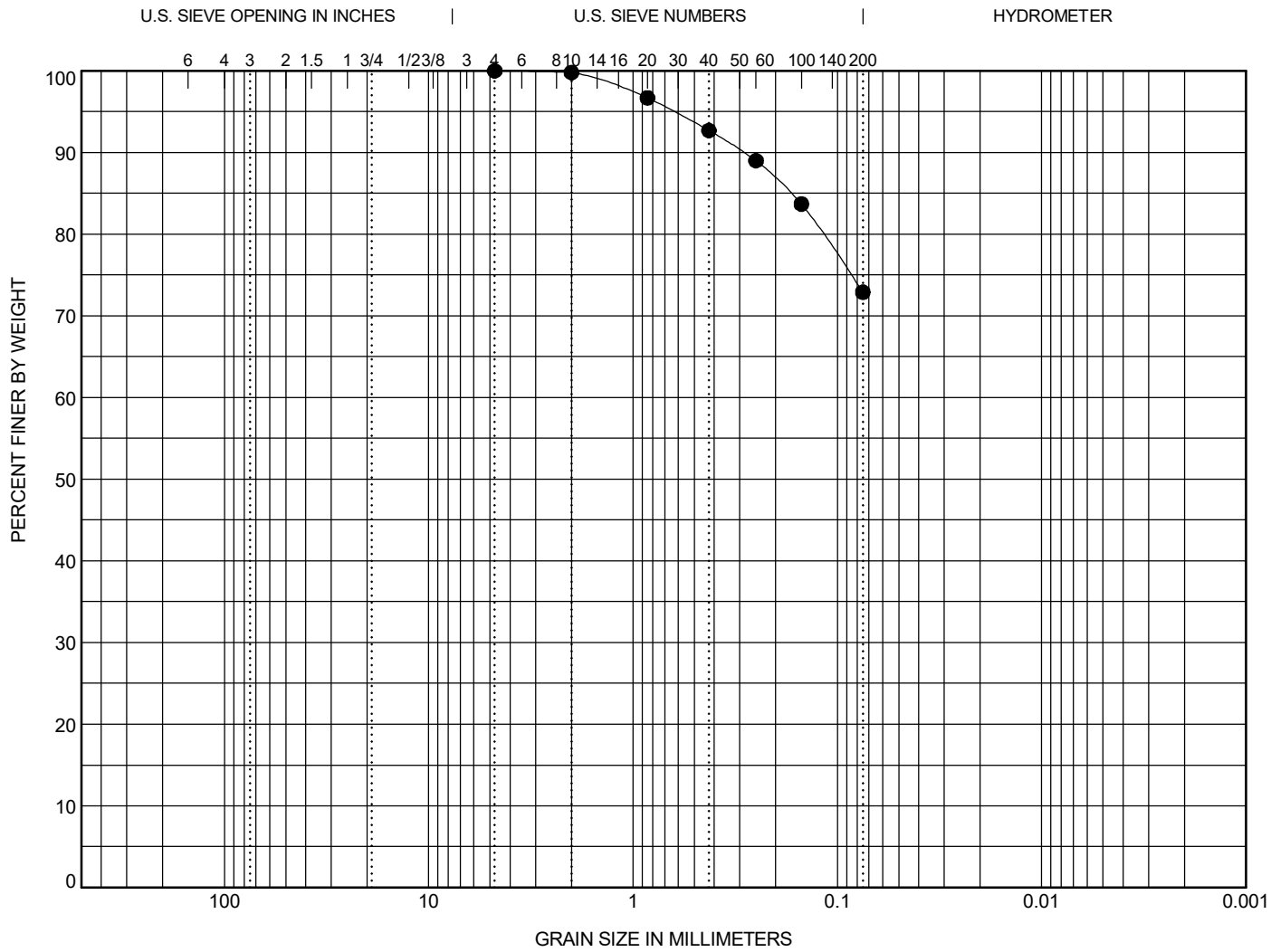
GRAIN SIZE DISTRIBUTION

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

Sample ID: **TR-3 at 2.0 ft.** Date: 11/23/2021

Test Method: **ASTM D6913 (ASTM D7928 if with Hydrometer)**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Classification	LL	PL	PI	Cc	Cu
SILTY CLAY with SAND(CL-ML)	**25**	**21**	**4**		

D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
4.75				**0.0**	**27.1**	**72.9**	

Olga Vasquez, 11/23/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

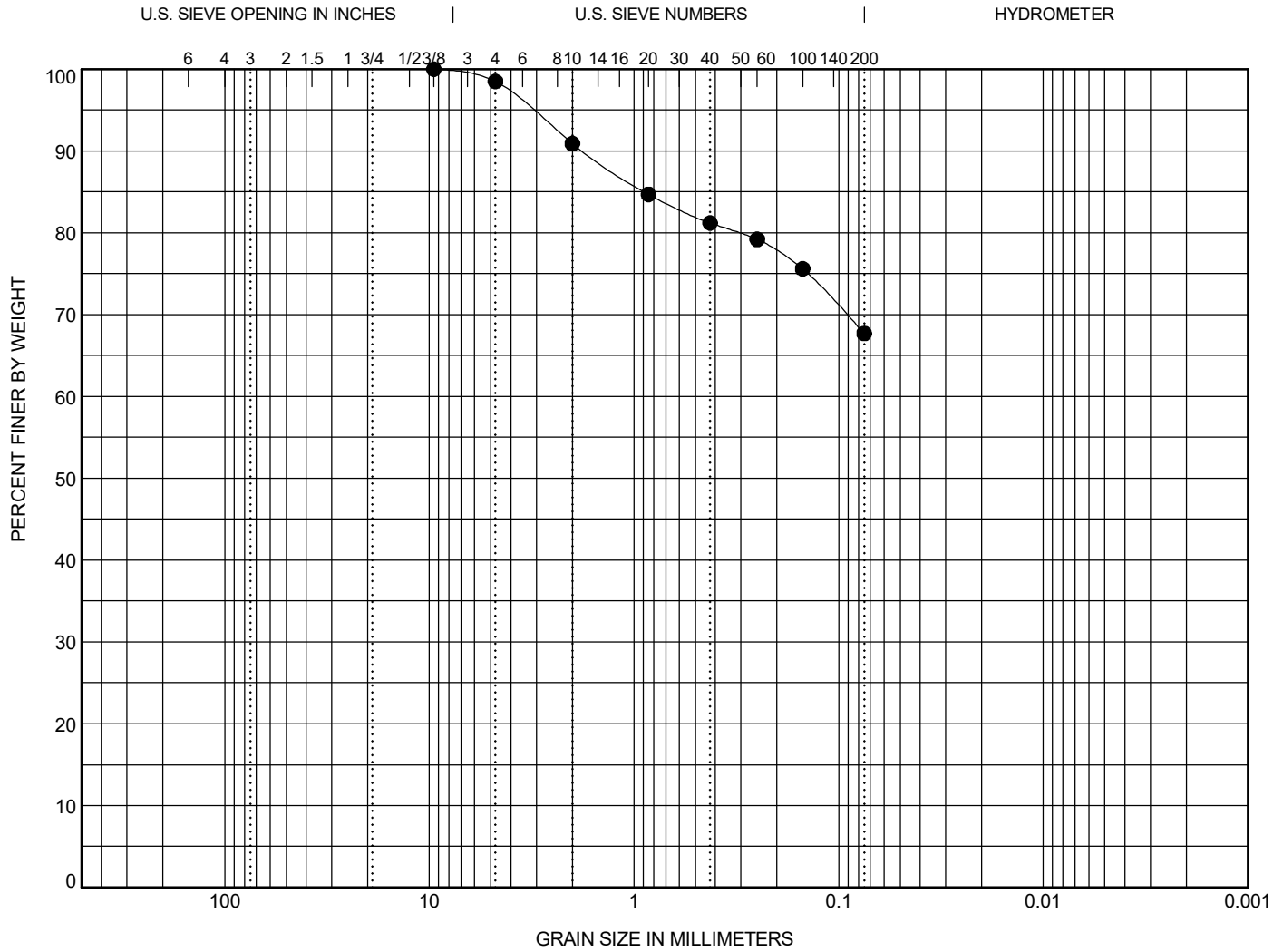
GRAIN SIZE DISTRIBUTION

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

Sample ID: **TR-4 at 2.0 ft.** Date: 11/23/2021

Test Method: **ASTM D6913 (ASTM D7928 if with Hydrometer)**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Classification	LL	PL	PI	Cc	Cu
SANDY SILT(ML)	**NP**	**NP**	**NP**		

D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
9.5				**1.5**	**30.8**	**67.7**	

Olga Vasquez, 11/23/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

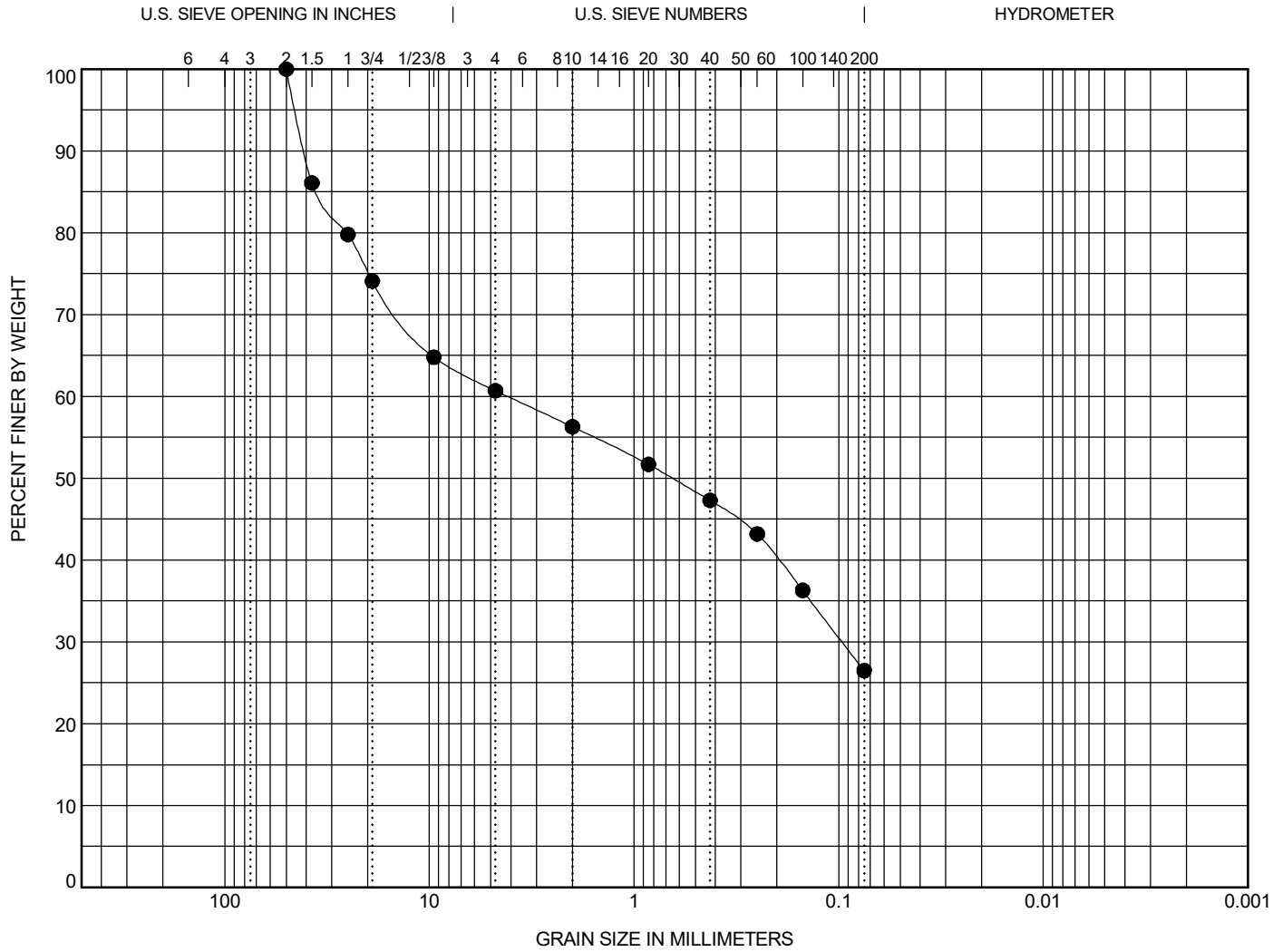
GRAIN SIZE DISTRIBUTION

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
Telephone: (512) 358-6048

CLIENT: RRC Power & Energy, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

Sample ID: **TR-5 at 2.0 ft.** Date: 11/23/2021

Test Method: **ASTM D6913 (ASTM D7928 if with Hydrometer)**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Classification	LL	PL	PI	Cc	Cu
SILTY GRAVEL with SAND(GM)	**NP**	**NP**	**NP**		

D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
50	**4.139**	**0.096**		**39.3**	**34.2**	**26.5**	

Olga Vasquez, 11/23/2021
Analysis & Quality Review/Date

Specimens prepared by: T.W.

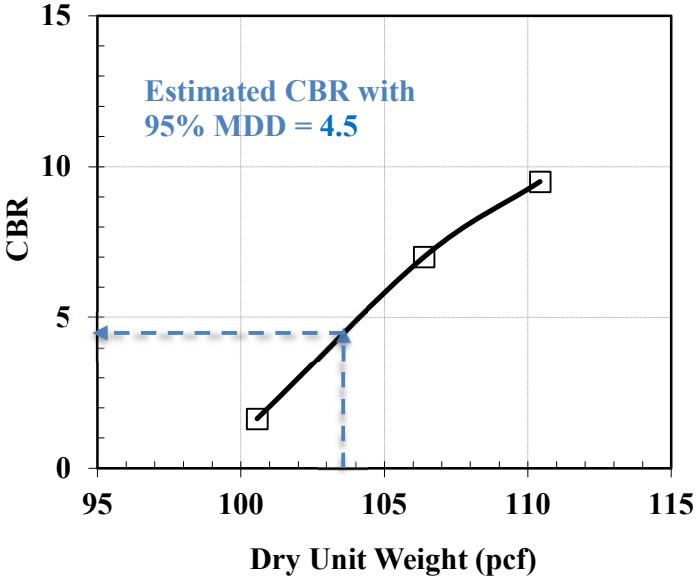
Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
(512) 358-6048

CBR (California Bearing Ratio) Test

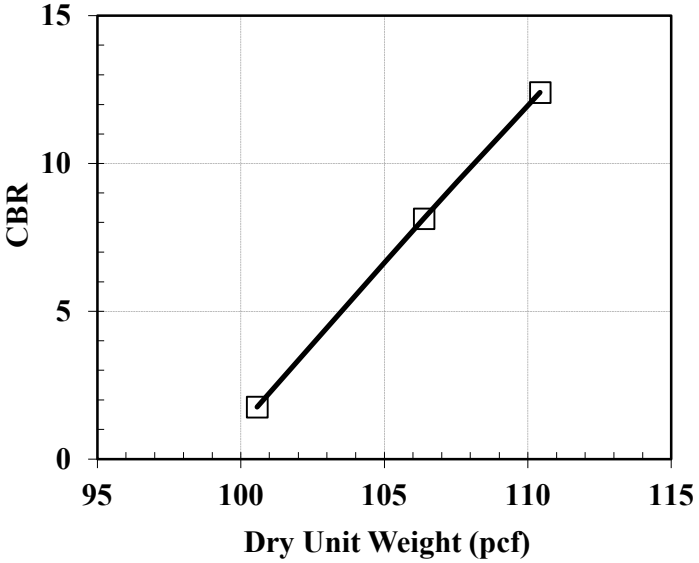
Client: RRC Power & Energy, LLC
Project: Wautoma Solar
Sample No: TR-2 at 2-4 ft

Beyond Project No.: GE2110052
Test Method: ASTM D1883
Test Date: 11/23/2021
Rate of Penetration: 0.05 in/min

CBR for 0.100-in Penetration



CBR for 0.200-in Penetration



Initial Conditions			
Specimen No.	1	2	3
Blows per Layer	15	30	60
Surcharge Weight (lbs)	10	10	10
Water Content (%)	15.9	15.3	15.5
Dry Unit Weight (pcf)	100.6	106.4	110.4
Percent Compaction (%)	92.3	97.6	101.3
Final Conditions (soaked)			
Water Content (%) at top 1-in layer after soaking	21.5	19.1	17.7
Swell (% of initial height)	0.2	0.3	0.1
Bearing Ratio of Sample at 0.100 in penetration	1.6	7.0	9.5
Bearing Ratio of Sample at 0.200 in penetration	1.8	8.1	12.4

Note: Soil specimens were molded to a range of densities using 15, 30 and 60 blows at optimum moisture content as per ASTM D 1883 to develop the CBR versus dry density curve. It was allowed the specimens to soak for 96 hrs prior bearing test. Removed the free water and allow the specimens to drain out for 15 min. The 10-lbs surcharge load was placed during bearing test.

HuaMiao Cao, P.E., 11/24/21

Analysis & Quality Review/Date
Specimens prepared and tested by: T.Z.

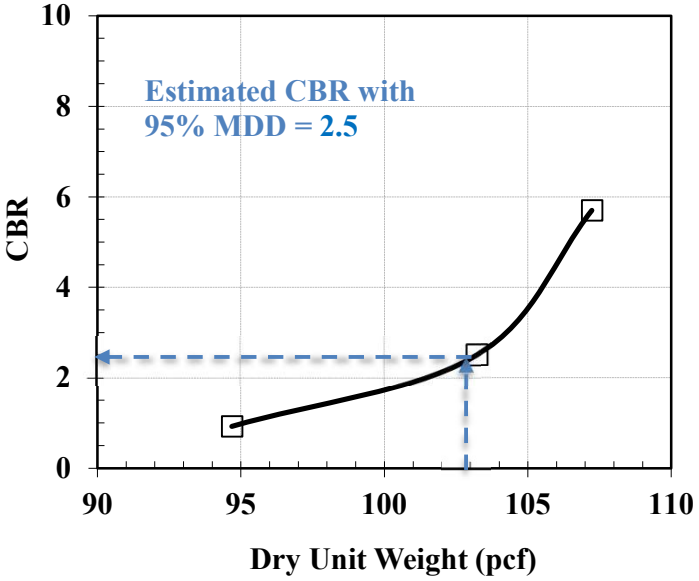
Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
(512) 358-6048

CBR (California Bearing Ratio) Test

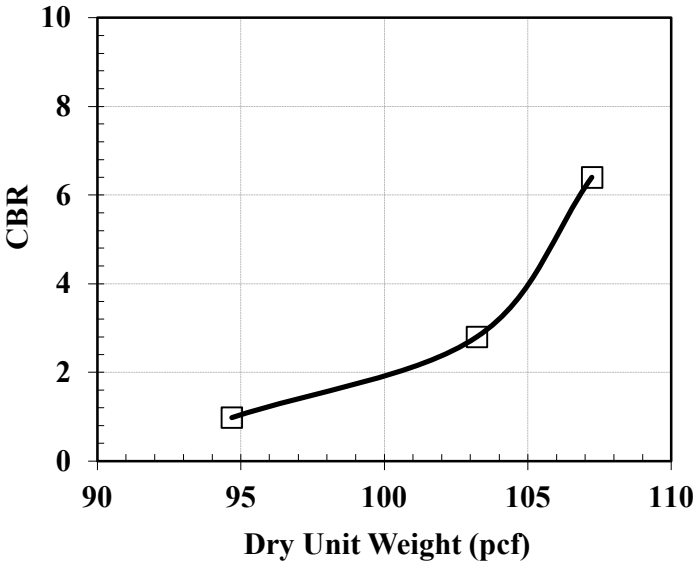
Client: RRC Power & Energy, LLC
Project: Wautoma Solar
Sample No: TR-3 at 2-4 ft

Beyond Project No.: GE2110052
Test Method: ASTM D1883
Test Date: 11/23/2021
Rate of Penetration: 0.05 in/min

CBR for 0.100-in Penetration



CBR for 0.200-in Penetration



Initial Conditions			
Specimen No.	1	2	3
Blows per Layer	15	30	60
Surcharge Weight (lbs)	10	10	10
Water Content (%)	14.8	15.4	15.3
Dry Unit Weight (pcf)	94.7	103.2	107.2
Percent Compaction (%)	87.3	95.2	98.9
Final Conditions (soaked)			
Water Content (%) at top 1-in layer after soaking	26.0	22.9	21.0
Swell (% of initial height)	0.7	1.1	1.0
Bearing Ratio of Sample at 0.100 in penetration	0.9	2.5	5.7
Bearing Ratio of Sample at 0.200 in penetration	1.0	2.8	6.4

Note: Soil specimens were molded to a range of densities using 15, 30 and 60 blows at optimum moisture content as per ASTM D 1883 to develop the CBR versus dry density curve. It was allowed the specimens to soak for 96 hrs prior bearing test. Removed the free water and allow the specimens to drain out for 15 min. The 10-lbs surcharge load was placed during bearing test.

HuaMiao Cao, P.E., 11/24/21

Analysis & Quality Review/Date
Specimens prepared and tested by: T.Z.

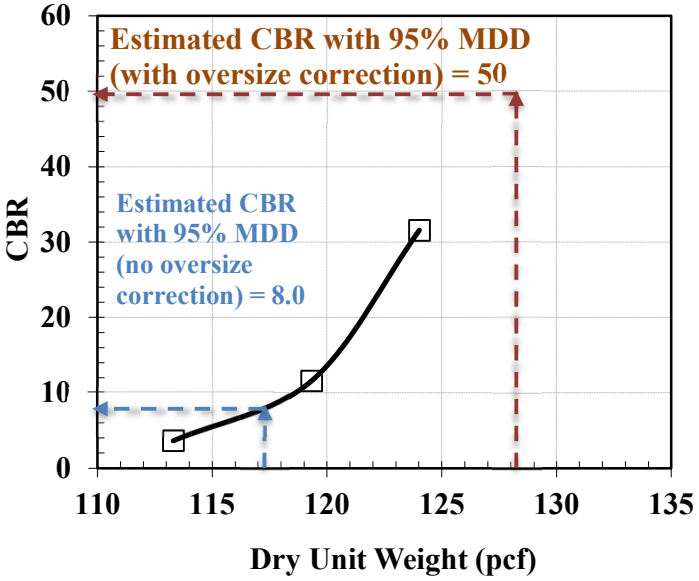
Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
(512) 358-6048

CBR (California Bearing Ratio) Test

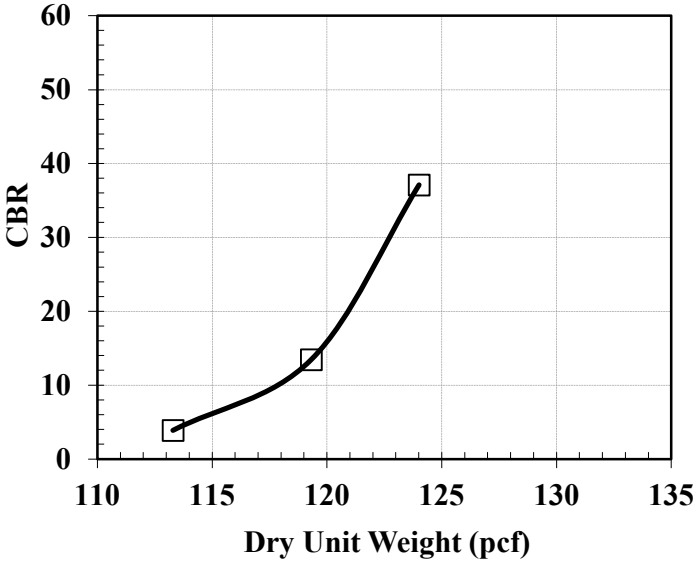
Client: RRC Power & Energy, LLC
Project: Wautoma Solar
Sample No: TR-5 at 2-4 ft

Beyond Project No.: GE2110052
Test Method: ASTM D1883
Test Date: 11/23/2021
Rate of Penetration: 0.05 in/min

CBR for 0.100-in Penetration



CBR for 0.200-in Penetration



Initial Conditions			
Specimen No.	1	2	3
Blows per Layer	15	30	60
Surcharge Weight (lbs)	10	10	10
Water Content (%)	11.5	11.4	11.0
Dry Unit Weight (pcf)	113.3	119.3	124.0
Percent Compaction (%)	91.8	96.7	100.5
Final Conditions (soaked)			
Water Content (%) at top 1-in layer after soaking	16.3	15.4	12.6
Swell (% of initial height)	0.1	0.1	0.2
Bearing Ratio of Sample at 0.100 in penetration	3.6	11.6	31.6
Bearing Ratio of Sample at 0.200 in penetration	3.9	13.4	37.1

Note: Soil specimens were molded to a range of densities using 15, 30 and 60 blows at optimum moisture content as per ASTM D 1883 to develop the CBR versus dry density curve. It was allowed the specimens to soak for 96 hrs prior bearing test. Removed the free water and allow the specimens to drain out for 15 min. The 10-lbs surcharge load was placed during bearing test.

HuaMiao Cao, P.E., 11/24/21

Analysis & Quality Review/Date

Specimens prepared and tested by: T.Z.

Soil Analysis Lab Results

Client: RRC Power & Energy LLC
Job Name: Wautoma Solar
Client Job Number: GE2110052
Project X Job Number: S211118D
November 22, 2021

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM D4972	ASTM G200	ASTM D4658	ASTM D4327	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D4327	ASTM D4327
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** As Rec'd | Minimum		**pH**	**Redox**	**Sulfide** S^{2-}	**Nitrate** NO_3^-	**Ammonium** NH_4^+	**Lithium** Li^+	**Sodium** Na^+	**Potassium** K^+	**Magnesium** Mg^{2+}	**Calcium** Ca^{2+}	**Fluoride** F_2^{--}	**Phosphate** PO_4^{3-}
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)		(mV)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
TR-1 Soil	1 to 3	7.5	0.0007	5.3	0.0005	24,790	6,566	8.1	120	0.07	12.3	1.3	ND	43.5	11.1	8.1	35.9	4.7	0.2
TR-2 Soil	1 to 3	82.2	0.0082	259.2	0.0259	10,720	1,474	8.9	121	0.02	3.8	9.1	0.02	194.2	2.7	3.2	49.6	7.0	3.1
TR-3 Soil	1 to 3	236.0	0.0236	37.7	0.0038	5,427	1,809	8.8	126	0.07	29.2	7.4	ND	141.1	3.5	11.3	83.0	6.1	3.7
TR-4 Soil	1 to 3	206.2	0.0206	113.9	0.0114	28,810	8,710	8.6	118	<0.01	1.8	4.6	ND	128.7	2.7	7.5	36.8	7.2	1.1
TR-5 Soil	1 to 3	5.1	0.0005	3.7	0.0004	32,830	1,474	7.7	129	0.03	7.7	6.8	0.08	62.8	12.4	5.9	25.6	3.3	0.4

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

SUMMARY OF LABORATORY RESULTS

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

Borehole	Depth (ft)	USCS	Water Content (%)	Dry Unit Weight (pcf)	< No. 200 (%)	LL	PL	PI	Compressive Strength (tsf)	Strain at Failure (%)	Confining Pressure (psi)	Chlorides (%/weight)	Sulfates (%/weight)	pH	Minimum Resistivity (ohm-cm)
B-01	1.0		3												
B-01	4.0		3												
B-03	1.0		7												
B-03	7.0		7												
B-04	1.0	SM	6		36	NP	NP	NP							
B-04	4.0		9												
B-05	4.0	ML	8		74	NP	NP	NP							
B-05	7.0		6												
B-07	1.0		7												
B-07	9.0		6												
B-09	1.0		8												
B-09	4.0		7												
B-09	7.0		8												
B-09	12.0		11												
B-12	1.0		4												
B-12	4.0		4												
B-14	1.0	ML	7		62	NP	NP	NP							
B-14	7.0		7												
B-15	1.0		9												
B-15	4.0		6												
B-16	1.0		6												
B-16	7.0	SM	6		46	NP	NP	NP							
B-16	9.0		4												
B-19	1.0		5												
B-19	4.0		4												
B-20	1.0	ML	5		74	NP	NP	NP							
B-20	4.0		7												
TR-1	2.0	SC-SM	3		18	23	19	4							
TR-2	2.0	ML	6		72	NP	NP	NP							
TR-3	2.0	CL-ML	12		73	25	21	4							
TR-4	2.0	ML	6		68	NP	NP	NP							

ND Not Detected; **D** Diluted;
*Denotes Total Unit Weight

RRC Power & Energy, LLC
810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
Telephone: (512) 992-2087

SUMMARY OF LABORATORY RESULTS

CLIENT: Innergex Renewables US, LLC
PROJECT: Wautoma Solar
LOCATION: Benton County, Washington
NUMBER: GE2110052

Borehole	Depth (ft)	USCS	Water Content (%)	Dry Unit Weight (pcf)	< No. 200 (%)	LL	PL	PI	Compressive Strength (tsf)	Strain at Failure (%)	Confining Pressure (psi)	Chlorides (%/weight)	Sulfates (%/weight)	pH	Minimum Resistivity (ohm-cm)
TR-5	2.0	GM	4		27	NP	NP	NP							

ND Not Detected; **D** Diluted;
*Denotes Total Unit Weight

www.RRCcompanies.com

810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
512.992.2087

APPENDIX C

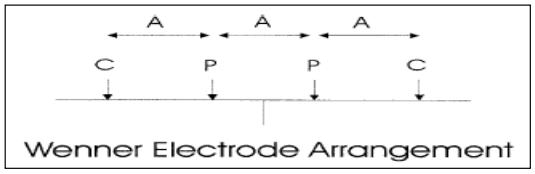
SOIL RESISTIVITY MEASURMENT DATA SHEET

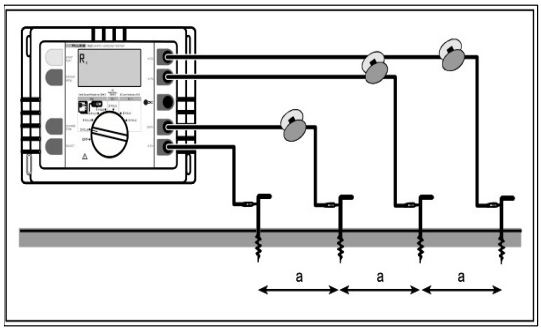
Survey ID ER-1
DATE 10/29/2021
CLIENT Innergex Renewables US, LLC
PROJECT Wautoma Solar Project
Project No. GE2110052
LOCATION: Benton County, WA
LATITUDE : 46.510759
LONGITUDE : -119.867069
WEATHER: Sunny
Temp. (°F) 55°F
TOP SOIL: Silt (ML), brown, dry to moist
TYPE OF TEST : Wenner 4-Pin Method
EQUIPMENT: Megger
SERIAL NO. 101943201
MODEL: DET 2/3
CALIBRATION DUE DATE: 1/25/2022
TEST PERFORMED BY : RRC

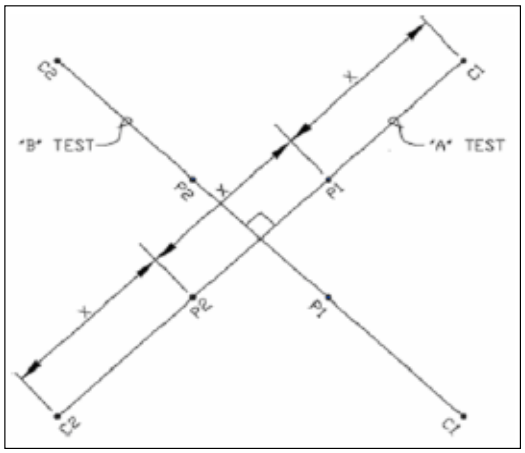
TEST SET RANGE
Meter Current: 1mA - 50mA
Meter Resistance: 0.01Ohm - 19.99kOhom

PROB Spacing (ft)	PROBE C DEPTH (Inches)	PROBE P DEPTH (Inches)	APPARENT ELECTRICAL RESISTIVITY						
			E-W		N-S				
			Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Average Soil Resistivity (Ωm)
0.5	4	2	189.800	181.65	189.000	180.89			181.27
1	4	2	144.100	275.83	151.800	290.57			283.20
1.5	4	2	124.600	357.75	107.300	308.08			332.92
2	4	2	101.100	387.04	97.410	372.91			379.98
3	4	2	89.650	514.81	82.780	475.36			495.08
5	4	2	55.580	531.94	52.140	499.02			515.48
7	12	6	38.590	517.07	35.650	477.67			497.37
10	12	6	23.350	446.95	23.700	453.65			450.30
15	12	6	12.500	358.90	13.250	380.44			369.67
20	12+	6	8.080	309.33	8.090	309.71			309.52
30	12+	6	3.970	227.97	3.840	220.51			224.24
45	12+	6	1.920	165.38	1.770	152.46			158.92
70	12+	6	1.050	140.69	1.000	133.99			137.34
100	12+	6+	0.420	80.39	0.400	76.57			78.48

Notes:





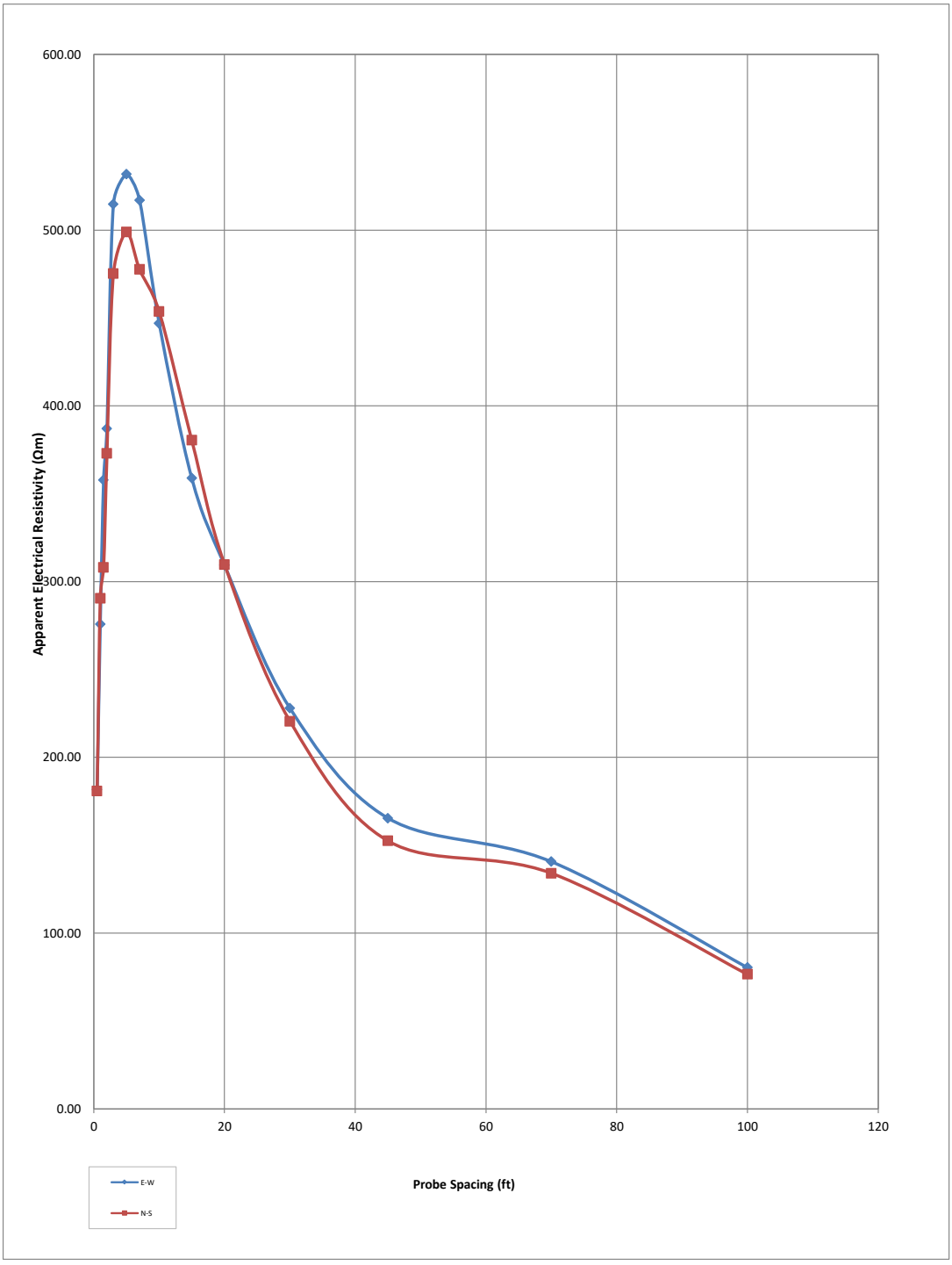


General Sketch of the test set up.

Total Array length is 3 times the probe spacing. The Apparent resistivity is calculated using the following equation: r=2*p*R*spacing*0.3048, where last item converts feet to meters. Wenner Array surveys were performed generally in accordance with IEEE std 81-2012 "IEEE Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Grounding System." and ASTM G-57.

Wautoma Solar Project

Electrical Resistivity Survey at ER-1



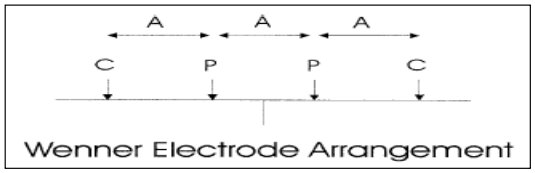
SOIL RESISTIVITY MEASURMENT DATA SHEET

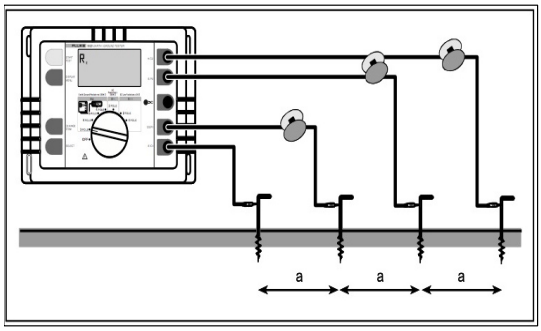
Survey ID ER-2
DATE 10/30/2021
CLIENT Innergex Renewables US, LLC
PROJECT Wautoma Solar Project
Project No. GE2110052
LOCATION: Benton County, WA
LATITUDE : 46.510879
LONGITUDE : -119.517839
WEATHER: Sunny
Temp. (°F) 53°F
TOP SOIL: Silt (ML), brown, dry to moist
TYPE OF TEST : Wenner 4-Pin Method
EQUIPMENT: Megger
SERIAL NO. 101943201
MODEL: DET 2/3
CALIBRATION DUE DATE: 1/25/2022
TEST PERFORMED BY : RRC

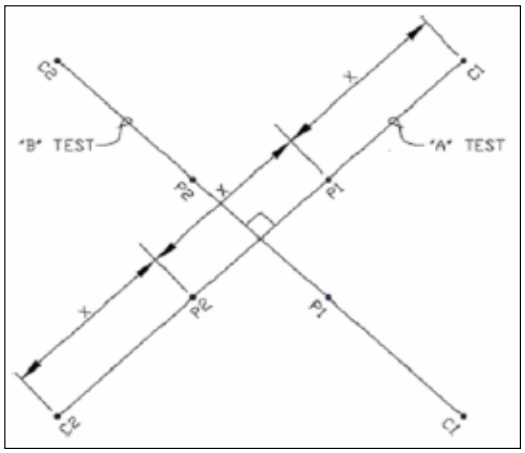
TEST SET RANGE
Meter Current: 1mA - 50mA
Meter Resistance: 0.01Ohm - 19.99kOhm

PROB Spacing (ft)	PROBE C DEPTH (Inches)	PROBE P DEPTH (Inches)	APPARENT ELECTRICAL RESISTIVITY						
			E-W		N-S				
			Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Average Soil Resistivity (Ωm)
0.5	4	2	165.700	158.59	181.700	173.90			166.24
1	4	2	109.200	209.02	131.100	250.94			229.98
1.5	4	2	86.250	247.64	93.090	267.28			257.46
2	4	2	64.960	248.69	69.830	267.33			258.01
3	4	2	33.470	192.20	38.840	223.04			207.62
5	4	2	13.230	126.62	15.490	148.25			137.44
7	12	6	6.780	90.85	6.330	84.82			87.83
10	12	6	2.810	53.79	2.830	54.17			53.98
15	12	6	1.840	52.83	1.890	54.27			53.55
20	12+	6	1.670	63.93	1.740	66.61			65.27
30	12+	6	1.380	79.25	1.370	78.67			78.96
45	12+	6	1.060	91.30	0.980	84.41			87.86
70	12+	6	0.560	75.03	0.650	87.09			81.06
100	12+	6+	0.550	105.28	0.510	97.62			101.45

Notes:





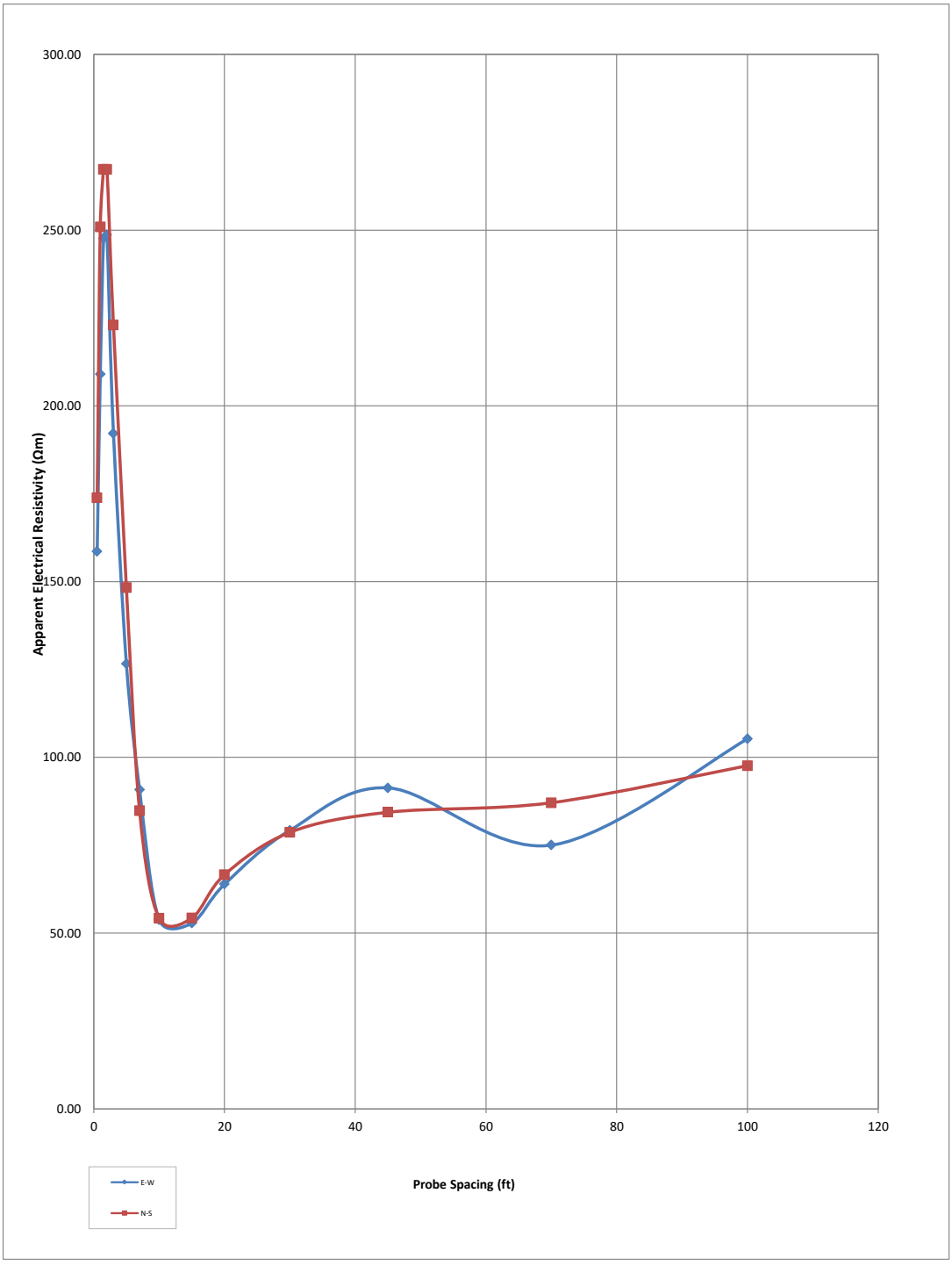


General Sketch of the test set up.

Total Array length is 3 times the probe spacing. The Apparent resistivity is calculated using the following equation: r=2*p*R*spacing*0.3048, where last item converts feet to meters. Wenner Array surveys were performed generally in accordance with IEEE std 81-2012 "IEEE Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Grounding System." and ASTM G-57.

Wautoma Solar Project

Electrical Resistivity Survey at ER-2



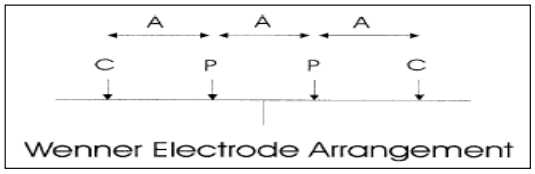
SOIL RESISTIVITY MEASURMENT DATA SHEET

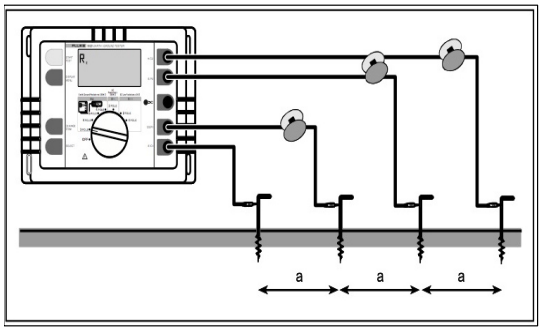
Survey ID ER-3
DATE 10/31/2021
CLIENT Innergex Renewables US, LLC
PROJECT Wautoma Solar Project
Project No. GE2110052
LOCATION: Benton County, WA
LATITUDE : 46.504687
LONGITUDE : -119.845936
WEATHER: Sunny
Temp. (°F) 52°F
TOP SOIL: Silt (ML), brown, dry to moist
TYPE OF TEST : Wenner 4-Pin Method
EQUIPMENT: Megger
SERIAL NO. 101943201
MODEL: DET 2/3
CALIBRATION DUE DATE: 1/25/2022
TEST PERFORMED BY : RRC

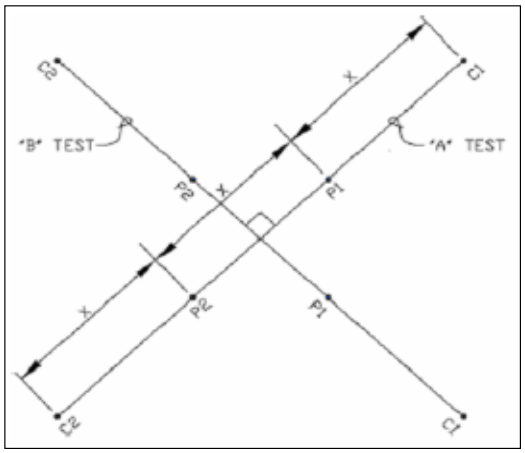
TEST SET RANGE
Meter Current: 1mA - 50mA
Meter Resistance: 0.01Ohm - 19.99kOhom

PROB Spacing (ft)	PROBE C DEPTH (Inches)	PROBE P DEPTH (Inches)	APPARENT ELECTRICAL RESISTIVITY						
			E-W		N-S				
			Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Average Soil Resistivity (Ωm)
0.5	4	2	77.520	74.19	77.860	74.52			74.35
1	4	2	39.530	75.67	43.130	82.56			79.11
1.5	4	2	35.600	102.22	39.570	113.61			107.91
2	4	2	29.730	113.82	34.080	130.47			122.14
3	4	2	22.060	126.68	21.960	126.10			126.39
5	4	2	12.780	122.31	14.650	140.21			131.26
7	12	6	9.864	132.17	10.260	137.47			134.82
10	12	6	6.943	132.90	6.806	130.28			131.59
15	12	6	4.417	126.82	4.215	121.02			123.92
20	12+	6	3.149	120.55	2.975	113.89			117.22
30	12+	6	1.879	107.90	1.874	107.61			107.76
45	12+	6	1.043	89.84	1.137	97.94			93.89
70	12+	6	0.616	82.54	0.559	74.90			78.72
100	12+	6+	0.344	65.85	0.282	53.98			59.91

Notes:





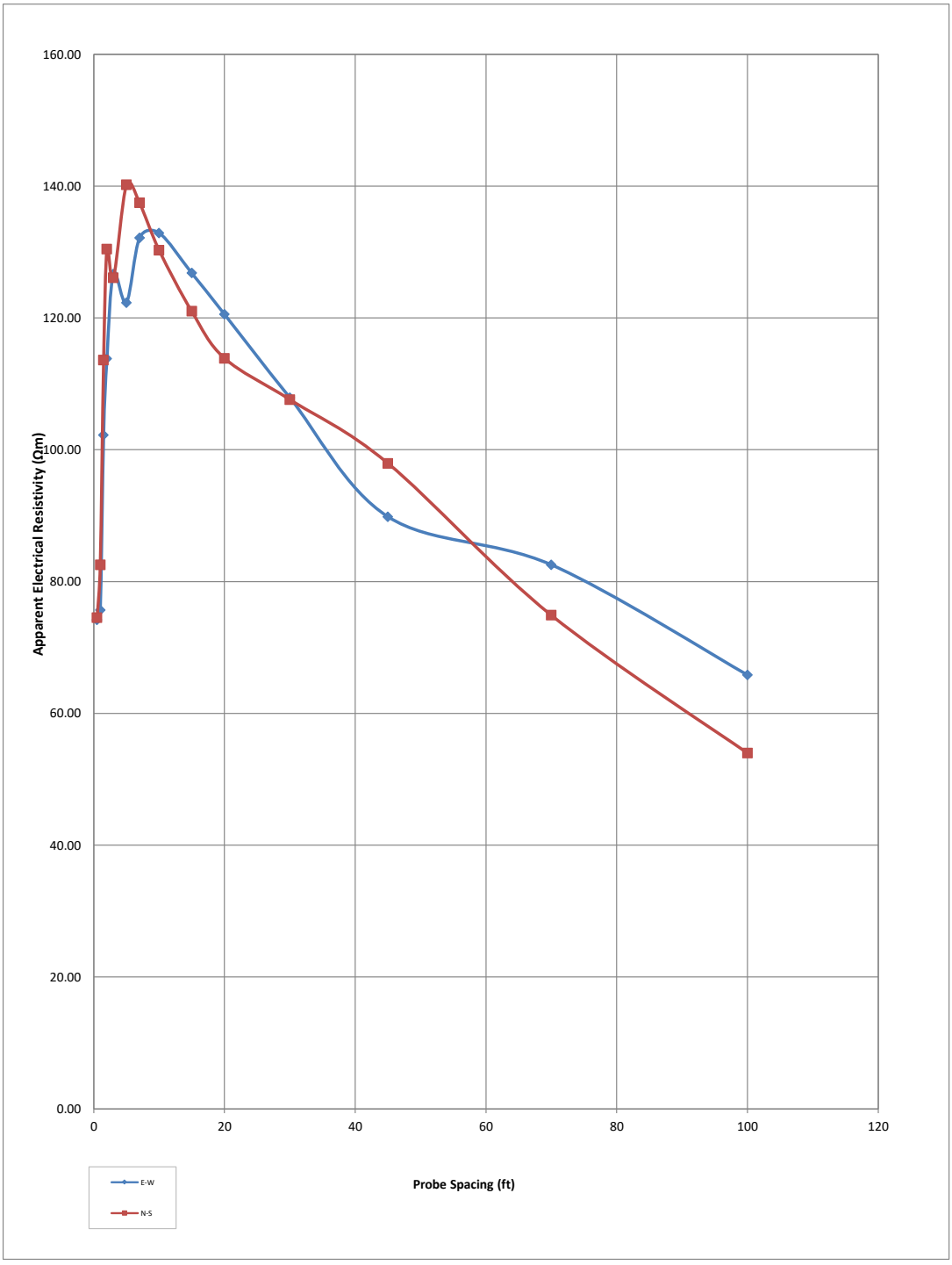


General Sketch of the test set up.

Total Array length is 3 times the probe spacing. The Apparent resistivity is calculated using the following equation: r=2*p*R*spacing*0.3048, where last item converts feet to meters. Wenner Array surveys were performed generally in accordance with IEEE std 81-2012 "IEEE Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Grounding System." and ASTM G-57.

Wautoma Solar Project

Electrical Resistivity Survey at ER-3



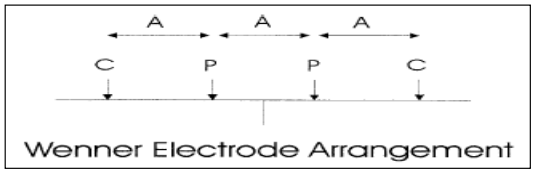
SOIL RESISTIVITY MEASURMENT DATA SHEET

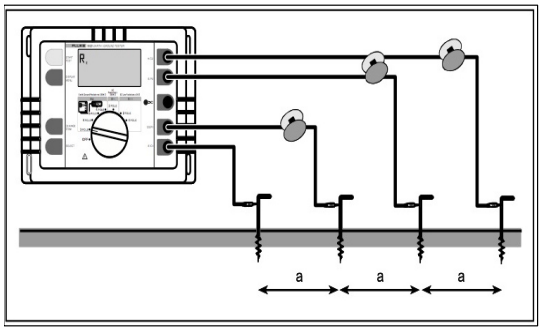
Survey ID ER-4
DATE 11/1/21-11/2/21
CLIENT Innergex Renewables US, LLC
PROJECT Wautoma Solar Project
Project No. GE2110052
LOCATION: Benton County, WA
LATITUDE : 46.496699
LONGITUDE : -119.868158
WEATHER: Sunny
Temp. (°F) 49°F
TOP SOIL: Silt (ML), light brown, dry to moist
TYPE OF TEST : Wenner 4-Pin Method
EQUIPMENT: Megger
SERIAL NO. 101943201
MODEL: DET 2/3
CALIBRATION DUE DATE: 1/25/2022
TEST PERFORMED BY : RRC

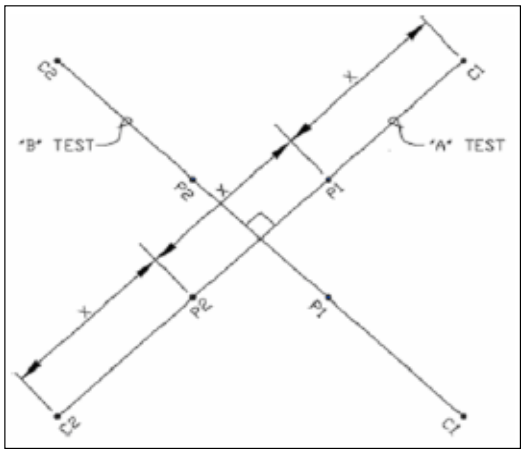
TEST SET RANGE
Meter Current: 1mA - 50mA
Meter Resistance: 0.01Ohm - 19.99kOhom

PROB Spacing (ft)	PROBE C DEPTH (Inches)	PROBE P DEPTH (Inches)	APPARENT ELECTRICAL RESISTIVITY						
			E-W		N-S				
			Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Average Soil Resistivity (Ωm)
0.5	4	2	208.500	199.55	210.200	201.18			200.36
1	4	2	143.200	274.11	147.400	282.14			278.13
1.5	4	2	140.500	403.41	133.600	383.59			393.50
2	4	2	81.780	313.08	82.110	314.34			313.71
3	4	2	50.380	289.30	47.350	271.90			280.60
5	4	2	19.180	183.57	19.090	182.71			183.14
7	12	6	10.490	140.56	10.970	146.99			143.77
10	12	6	5.890	112.74	6.220	119.06			115.90
15	12	6	3.260	93.60	3.190	91.59			92.60
20	12+	6	2.240	85.75	2.050	78.48			82.12
30	12+	6	1.120	64.32	1.080	62.02			63.17
45	12+	6	0.610	52.54	0.650	55.99			54.27
70	12+	6	0.600	80.39	0.670	89.77			85.08
100	12+	6+	0.310	59.34	0.350	67.00			63.17

Notes:





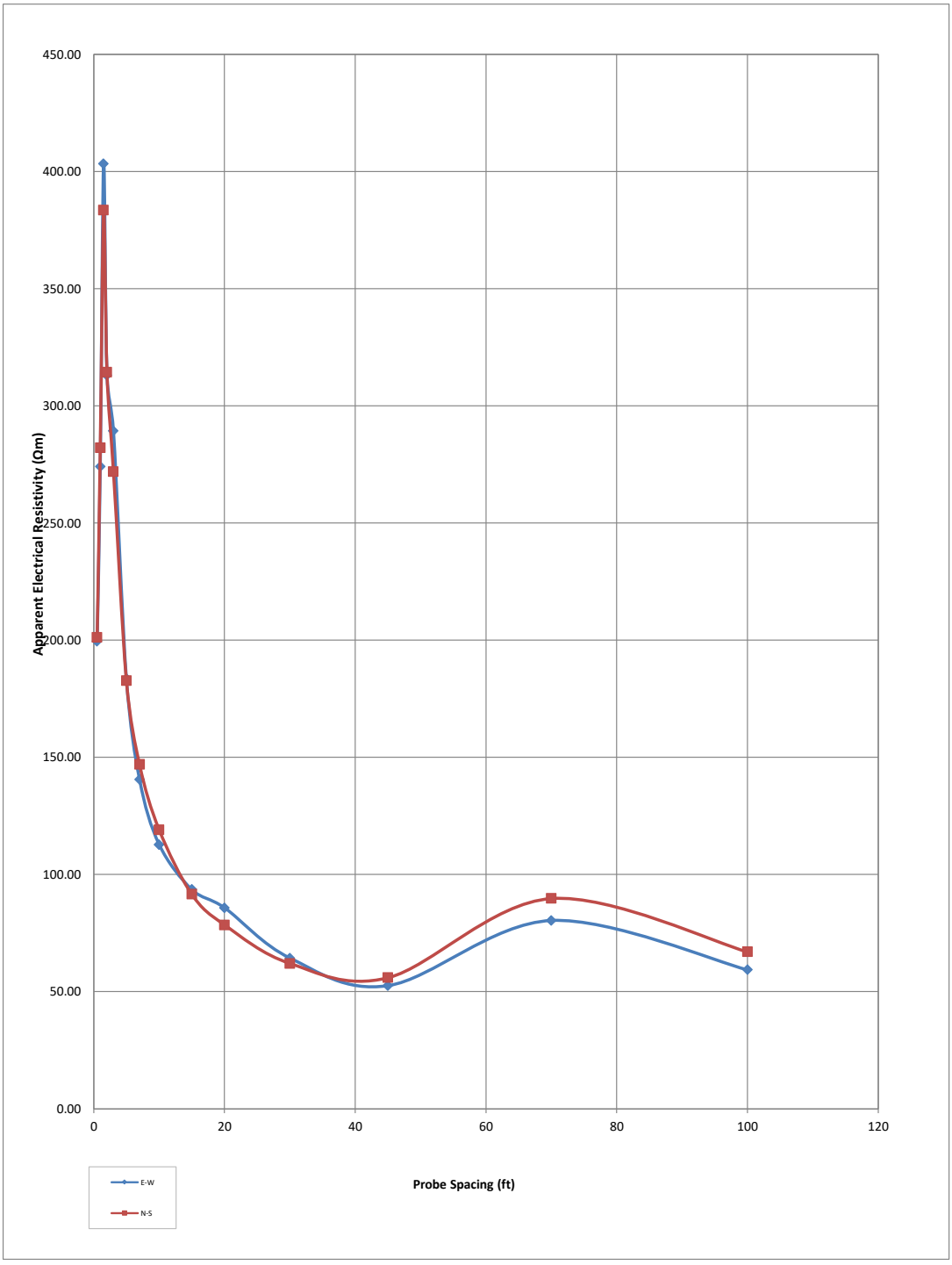


General Sketch of the test set up.

Total Array length is 3 times the probe spacing. The Apparent resistivity is calculated using the following equation: r=2*p*R*spacing*0.3048, where last item converts feet to meters. Wenner Array surveys were performed generally in accordance with IEEE std 81-2012 "IEEE Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Grounding System." and ASTM G-57.

Wautoma Solar Project

Electrical Resistivity Survey at ER-4



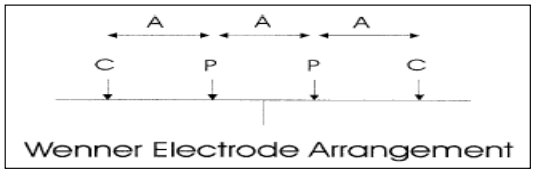
SOIL RESISTIVITY MEASURMENT DATA SHEET

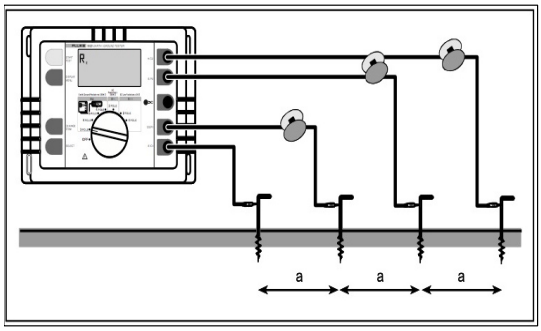
Survey ID ER-5
DATE 11/2/2021
CLIENT Innergex Renewables US, LLC
PROJECT Wautoma Solar Project
Project No. GE2110052
LOCATION: Benton County, WA
LATITUDE : 46.488588
LONGITUDE : -119.831597
WEATHER: Sunny
Temp. (°F) 40°F
TOP SOIL: Silt (ML), brown, dry to moist
TYPE OF TEST : Wenner 4-Pin Method
EQUIPMENT: Megger
SERIAL NO. 101943201
MODEL: DET 2/3
CALIBRATION DUE DATE: 1/25/2022
TEST PERFORMED BY : RRC

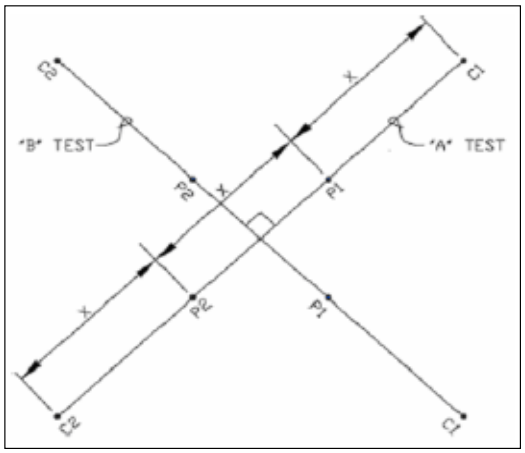
TEST SET RANGE
Meter Current: 1mA - 50mA
Meter Resistance: 0.01Ohm - 19.99kOhm

PROB Spacing (ft)	PROBE C DEPTH (Inches)	PROBE P DEPTH (Inches)	APPARENT ELECTRICAL RESISTIVITY						
			E-W		N-S				
			Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Meter reading (Ω)	Soil Resistivity (Ωm)	Average Soil Resistivity (Ωm)
0.5	4	2	319.700	305.98	252.000	241.18			273.58
1	4	2	189.500	362.73	211.400	404.65			383.69
1.5	4	2	177.500	509.64	206.500	592.91			551.27
2	4	2	133.100	509.55	136.100	521.03			515.29
3	4	2	67.270	386.29	71.830	412.48			399.39
5	4	2	30.190	288.94	29.160	279.08			284.01
7	12	6	17.000	227.78	15.660	209.83			218.81
10	12	6	9.390	179.74	9.340	178.78			179.26
15	12	6	5.270	151.31	4.800	137.82			144.57
20	12+	6	3.780	144.71	3.180	121.74			133.22
30	12+	6	2.420	138.97	2.110	121.17			130.07
45	12+	6	1.380	118.87	1.450	124.90			121.88
70	12+	6	0.930	124.61	1.070	143.37			133.99
100	12+	6+	0.730	139.73	0.840	160.79			150.26

Notes:





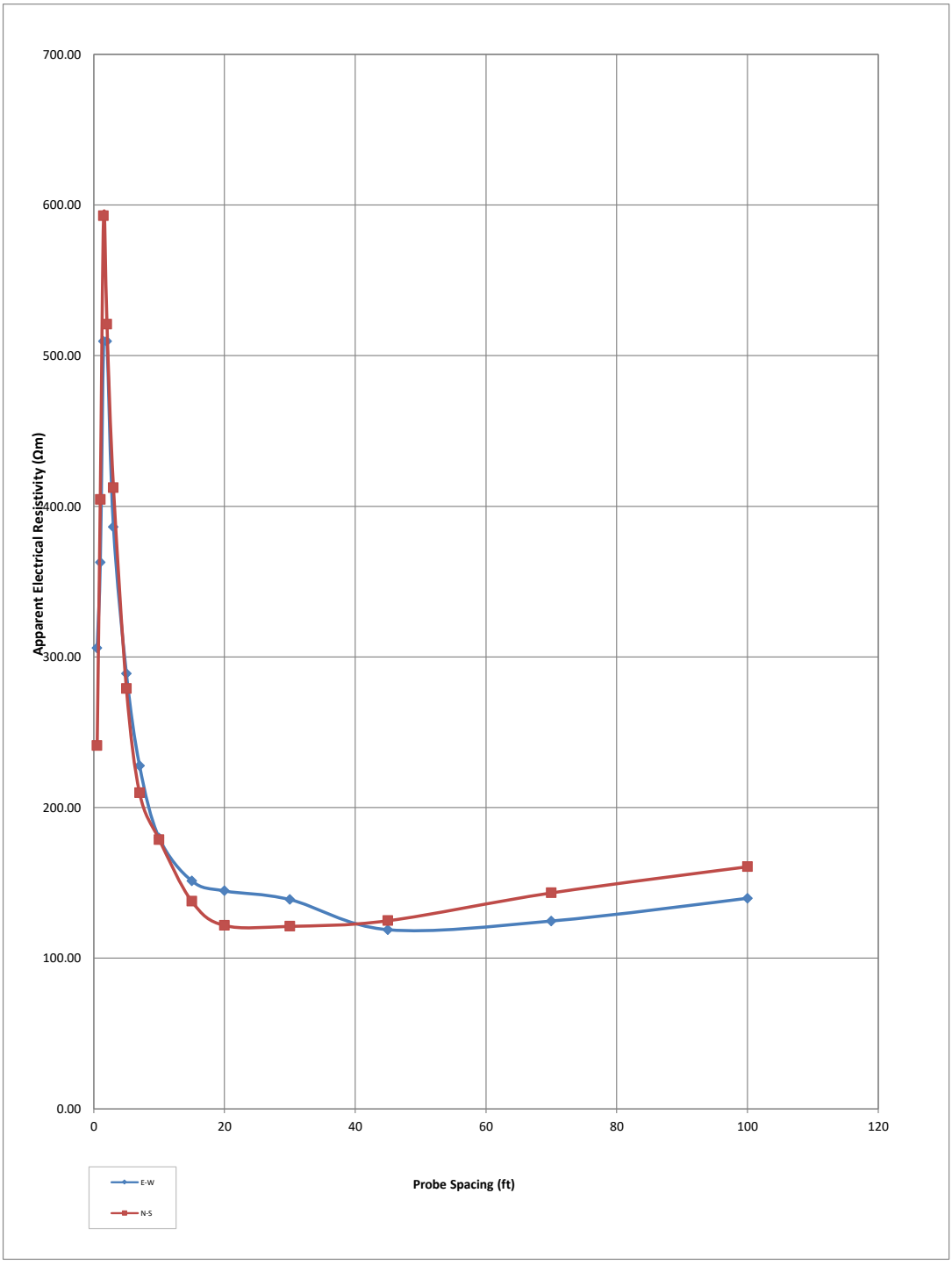


General Sketch of the test set up.

Total Array length is 3 times the probe spacing. The Apparent resistivity is calculated using the following equation: r=2*p*R*spacing*0.3048, where last item converts feet to meters. Wenner Array surveys were performed generally in accordance with IEEE std 81-2012 "IEEE Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Grounding System." and ASTM G-57.

Wautoma Solar Project

Electrical Resistivity Survey at ER-5



Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
(512) 358-6048

Soil Thermal Resistivity Sample & Testing Summary
Wautoma Solar Project (PN: GE2110052)

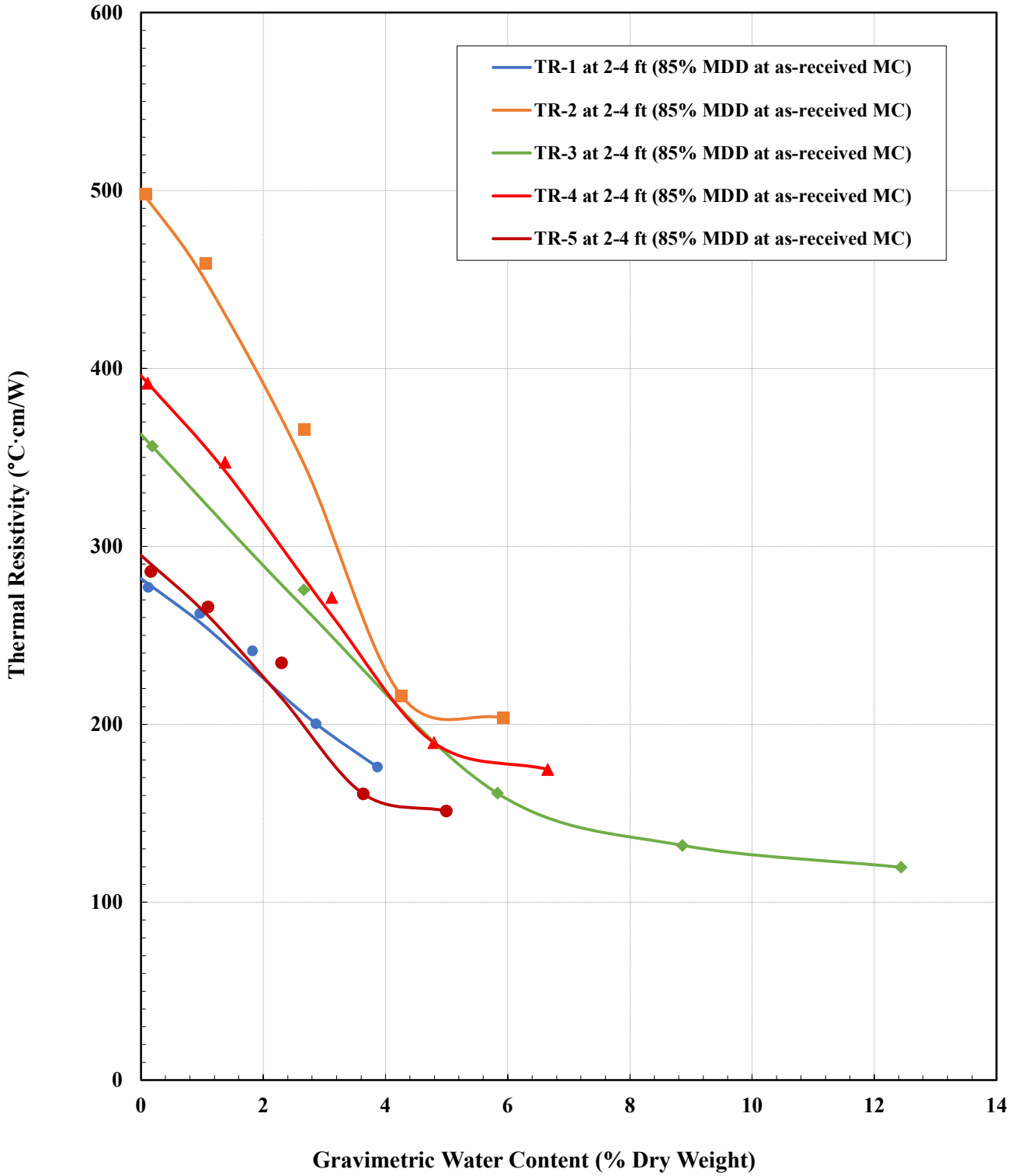
Boring	*Depth*	*Percent Passing #200 Sieve*	*Maximum Dry Density (ASTM D698)*	*Optimum Water Content (ASTM D698)*	*LL*	*PL*	*PI*
	ft	*%*	*pcf*	*%*			
TR-1	2-4	18.2	143.6	6.9	23	19	4
TR-2	2-4	71.7	109.0	15.3	NP	NP	NP
TR-3	2-4	72.9	108.4	15.8	25	21	4
TR-4	2-4	67.7	110.9	14.7	NP	NP	NP
TR-5	2-4	26.5	134.9	9.0	NP	NP	NP

Boring	*Depth*	*Soil Type (USCS)*
TR-1	2-4	BROWN SILTY, CLAYEY SAND with GRAVEL (SC-SM)
TR-2	2-4	BROWN SILT with SAND (ML)
TR-3	2-4	BROWN SILTY CLAY with SAND (CL-ML)
TR-4	2-4	BROWN SANDY SILT (ML)
TR-5	2-4	BROWN SILTY GRAVEL with SAND (GM)

Remolded Samples						
Boring	*Remold Water Content*	*Percent Compaction*	*Target Remold Dry Density*	*Actual Remold Dry Density*	*Thermal Resistivity at Wet (ASTM D5334)*	*Thermal Resistivity at Dry (ASTM D5334)*
	%	*%*	*pcf*	*pcf*	*°C-cm/W*	*°C-cm/W*
TR-1	3.9	85	122.1	122.4	176	282
TR-2	5.9		92.7	93.0	204	500
TR-3	12.4		92.1	92.5	120	363
TR-4	6.7		94.3	94.8	175	396
TR-5	5.0		114.7	114.8	151	295

Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
(512) 358-6048

Soil Thermal Resistivity Testing Dryout Curves
Wautoma Solar Project (PN: GE2110052)



www.RRCcompanies.com

810 Hesters Crossing Rd, Suite 120
Round Rock, TX 78681
512.992.2087

APPENDIX D

Table D1.1
Soil Parameters for Driven Pile Capacity Analysis – PV Array

Soil Layer	Depth Interval (feet)	USGS Soil & Rock Classification	Effective Unit Weight (pcf)	Allowable Unit Skin Friction in Compression[(1)] (FOS = 2.0) (psf)	Allowable Bearing Pressure** (FOS = 2.5) (psf)
1*	0 to 1	SOFT SILT	105	--	--
2	1 to 4	SILT	110	30	--
3	4 to 7	SILT	110	90	5,000
4	7 to 9	SILT	110	130	7,000
5	9 to 12	SILT	115	180	7,000
6	12 to 15	SILT	115	230	7,000

Note: ***Upper 12 inches below scour depth of skin friction should be neglected due to seasonal moisture change and soil disturbance.**
****Allowable Bearing Pressure can be applied for steel cross section area only.**
(1) For uplift resistance, the allowable skin friction provided in table above should be reduced by 25 percent.

Table D1.2
L-PILE Computer Program Parameters for Lateral Load Analysis – PV Array

Soil Layer	Depth Interval (feet)	LPILE Soil Type	K (pci)		γ (pcf)	*C* (psf)	ϕ (deg)	ε_{50} (in/in)	E_{rm} (psi)	UCS (psi)	RQD (%)	K_{rm}
			Static	Cyclic								
1*	0 to 1	SOFT SILT	--	--	105	--	--	--	--	--	--	--
2	1 to 4	Sand (Reese)	25	--	110	--	31	--	--	--	--	--
3	4 to 7	Sand (Reese)	25	--	110	--	32	--	--	--	--	--
4	7 to 9	Sand (Reese)	90	--	110	--	32					
5	9 to 12	Sand (Reese)	90	--	115	--	32					
6	12 to 15	Sand (Reese)	90	--	115	--	32	--	--	--	--	--

Notes: K is the modulus of subgrade reaction; γ is the effective unit weight; C is the cohesion of soil; ϕ is the friction angle of soil; ε_{50} is the soil strain parameter; E_{rm} is the rock mass modulus of the rock; UCS is average Unconfined Compressive Strength of rock; RQD is average Rock Quality Designation; K_{rm} is the rock strain parameter.

Notes: ***Upper 12 inches or scour depth, whichever is deeper, should be neglected due to seasonal moisture change and soil disturbance.**

Table D2.1
Drilled Pier Foundation Design Parameters – PV Array

Soil Layer	Depth Interval (feet)	USGS Soil & Rock Classification	Effective Unit Weight (pcf)	Undrained Shear Strength (psf)	K	ϕ (degree)	SPT N-Value (blows/ft)	Allowable Skin Friction (FOS = 2.0)[1] (psf)	Allowable Bearing Pressure (FOS = 2.5) (psf)
1*	0 to 3	SOFT SILT	105	--	--	--	--	--	--
2	3 to 4	SILT	110	--	25	31	6	80	--
3	4 to 7	SILT	110	--	25	32	9	230	4,000
4	7 to 9	SILT	110	--	90	32	12	380	5,500
5	9 to 12	SILT	115	--	90	32	15	490	7,000
6	12 to 15	SILT	115	--	90	32	15	550	7,000

Note: ***Upper 3 feet of skin friction should be neglected due to seasonal moisture change and soil disturbance.**
(1) For uplift resistance, the allowable skin friction provided in table above should be reduced by 25 percent.