Geotechnical Engineering Report

North Stonington Solar Facility
North Stonington, Connecticut
January 25, 2021
Terracon Project No. J2185196

Prepared for:
Silicon Ranch Corporation
Nashville, TN

Prepared by:
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January 25, 2021

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Attn: Mr. Sriganesh Ananthanarayanan
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Re: Geotechnical Engineering Report
North Stonington Solar Facility
Providence-New London Turnpike
North Stonington, Connecticut
Terracon Project No. J2185196

Dear Mr. Ananthanarayanan:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PJ2185196 dated May 13, 2019. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of the proposed solar facility.

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

Sincerely,
Terracon Consultants, Inc.

Shengkai Tu, P.E.
Geotechnical Department Manager

Carl W. Thunberg, P.E.
Authorized Project Reviewer

Reviewed by Scott D. Neely, P.E., G.E.
Solar Sector Subject Matter Expert

REPORT TOPICS

Note: This report was originally delivered in a web-based format. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

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INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed solar facility to be located south of Providence-New London Turnpike in North Stonington, Connecticut. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- L-Pile parameters
- Seismic site classification per IBC
- Foundation design and construction
- Pile load test results and design
- Laboratory test results
- Unpaved road design and construction
- Frost considerations

The geotechnical engineering Scope of Services for this project included the advancement of four (4) test borings and nine (9) test pits to depths ranging from approximately 3.0 to 20.5 feet below existing site grades.

Maps showing the site and boring locations are shown in **Site Location** and **Exploration Plan**. Boring logs and the results of laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in **Exploration Results**.

SITE CONDITIONS

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

Item	Description
Parcel Information	The project is located south of Providence-New London Turnpike (Route 184), approximately ½ mile west of its intersection with Boom Bridge Road, in the town of North Stonington, Connecticut. The site consists of seven (7) solar arrays located south of Route 184 totaling approximately 48.5 acres in size. The approximate site center coordinates are 41.4322° N 71.8200° W. See **Site Location**

Item	Description
Existing Improvements	Mostly wooded land. However, two former quarries exist within the southern and southwestern portions of the site with associated access roads. The size of the quarries are approximately 8 acres and 3 acres, respectively.
Current Ground Cover	Moderately to heavily-wooded throughout the majority of the site. Bare ground anticipated within the area of the former quarries. Topsoil is anticipated within the array to the southeast of the intersection of Route 184 and Boom Bridge Road.
Existing Topography	The site appears to gradually slope downward towards an intermittent stream located in the central portion of the southern parcels, from approximately Elevation +215 to Elevation +60.
Geology	The *Surficial Materials Map of Connecticut, 1992,* depicts soils within the vicinity of the site consist of glacial till and glaciofluvial deposits. The *Bedrock Geological Map of Connecticut, 1985,* identifies bedrock underlying the site consists of gneiss.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	■ North Stonington Quarry Outline kmz file. ■ North Stonington Parcels – Final ALTA kmz file. ■ *'Preliminary Layout'*, Sheet No. PV-100, dated February 12, 2018, by Solvida of Berkeley, California ■ *'Request for Proposal'*, dated December 10, 2018, by Silicon Ranch of Nashville, Tennessee.
Project Description	The project consists of the construction of an approximate 9.9 MWac solar facility with interconnection capacity of 15 kV.
Proposed Structures	■ Ground-mounted, fixed-tilt photovoltaic modules ■ Other various project components could include electric cable/conduit laid in trenches, equipment and appurtenances (e.g. inverters, meteorological stations, and combiner boxes)
Array Construction	Steel-framed racking-system supported on driven W6x12 steel piles.
Finished Grade Elevation	Grading plan is not available at the time of this report. The project is expecting to follow the existing topography.

Item	Description
Estimated Maximum Loads	**Pile Foundation Loads** ■ Uplift: 2 to 3.5 kips (assumed – does not consider frost heave) ■ Lateral: 1 to 3 kips at 4 to 7 feet above grade (assumed) **Equipment Slabs** ■ 100 pounds per square foot (psf)
Pavements	Gravel access roads are anticipated throughout the solar fields.
Estimated Start of Construction	TBD

GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in **Exploration Results**.

As part of our analyses, we identified the following model layers within the subsurface profile.

Model Layer	Layer Name	General Description
1	**Surface Material**	Forest Mat
2	**Subsoil**	Silty Sand (SM), varying amounts of roots and gravel, brown to orange
3	**Glacial Till**	Silty Sand (SM) to Poorly Graded Sand with Silt (SP-SM), with gravel, occasional to with cobbles and boulders, brown, medium dense to very dense
4	**Bedrock**	Granitic Gneiss

Groundwater Conditions

The boreholes were observed while drilling and after completion for the presence and level of groundwater. The water levels observed in the boreholes can be found on the boring logs in **Exploration Results**, and are summarized below.

Boring Number	Approximate Depth to Groundwater while Drilling Below Grade(feet)
B-5	16.0
TP-5	6.0
TP-6	8.5

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

CORROSIVITY

Terracon collected soil samples from test pits excavated at the site to determine the potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials that will be used for project construction.

The table below lists the results of laboratory water soluble sulfate, soluble chloride, electrical resistivity, and pH testing. Results are also presented in the **Exploration Results** section. The values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary

Location	Sample Depth (feet)	Soil Description	Water Soluble Sulfate (mg/kg)	Soluble Chloride (mg/kg)	Electrical Resistivity (Ω-cm)	pH
TP-1	2 to 5	Silty Sand (SM)	22	40	23280	6.45
TP-2	3 to 5	Silty Sand (SM)	28	25	44620	6.08
TP-3	2 to 4	Poorly Graded Sand (SP)	30	25	44620	6.57
TP-4	2 to 3	Silty Sand (SM)	20	27	29100	6.90

Results of water-soluble sulfate testing indicate samples of the on-site soils tested have an exposure class of S0 when classified in accordance with Table 19.3.1.1 of the American Concrete Institute of Concrete (ACI) Design Manual. Concrete should be designed in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 19.

These test results are provided to assist in determining the type and degree of corrosion protection that may be required. For protection against corrosion to buried metals, Terracon recommends that an experienced corrosion engineer be retained to design a suitable corrosion protection system for underground metal structures or components.

THERMAL RESISTIVITY

Laboratory thermal resistivity testing was performed by Terracon on four (4) soil samples obtained during our field exploration from depths of approximately 2 to 5 feet below the existing ground surface. The thermal resistivity testing was performed in general accordance with the IEEE standard. The dry-out curves were developed from soil specimens compacted to 90% of the standard Proctor criteria (ASTM D698) at the optimum moisture content and dried to 0% moisture to develop the dry-out curves. The thermal resistivity ranged from approximately 46 to 91 °C-cm/watt for moist soils and approximately 216 to 317 °C-cm/watt for dry soils. The results of the laboratory thermal resistivity testing are presented in the **Exploration Results** section.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is D**. Subsurface explorations at this site were extended to a maximum depth of 20.5 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

GEOTECHNICAL OVERVIEW

Subsurface conditions below this site generally consist of forest mat overlying subsoil underlain by glacial till, which is, in turn underlain by bedrock classified as granitic gneiss. We believe these subsurface conditions are generally suitable for the proposed development and construction of a solar plant.

As presented in **Exploration Results**, up to 12 inches of forest mat was encountered at all test boring and test pit locations. A layer of subsoil consisting of silty sand with roots and gravel was encountered to a depth of approximately 3.5 feet below grade. The relative density of the subsoil appears to be in a medium dense condition. The glacial till deposits consist of medium dense to very dense silty sand with gravel, occasional cobbles and boulders, or medium dense to dense poorly graded sand with silt and gravel. The glacial till deposits were encountered to the maximum depth of exploration at 20.5 feet below existing grade in boring B-5. However, boulders were encountered in borings B-6 and B-7. Probable bedrock was encountered prior to planned exploration depth of six (6) test pits as shown below.

Test Pit ID	Bucket Refusal Depth Below Grade (feet)
TP-2	8.0
TP-3	4.0

TP-4	3.0
TP-5	7.5
TP-6	8.5
TP-8	8.5

We consider development of the photovoltaic solar project to be technically feasible from a geotechnical standpoint. However, piles driven into the subgrade can be expected to encounter damage and refusal due to very dense glacial till and the presence of numerous cobbles and boulders or probable bedrock expected to be within the subsurface at any given location, as demonstrated during the boring exploration and pile load test programs.

Understanding that driven piles are the preferred foundation system for a solar PV project, and the presence of very dense glacial till and cobbles and boulders or probable bedrock within the anticipated foundation driving depth, we recommend a pile driving program be developed to confirm the amount of piles deflected off their alignment due to cobbles and/or boulders or probable bedrock, and the record the drive times to assess the difficulty with which piles may penetrate the subgrade soil conditions on this site.

An alternative to driving piles would be to install piles in pre-drilled full-size (oversized) holes. Another alternative would be to consider ground screw piles (Krinner, or similar). Design recommendations and construction considerations for the foundations are presented in the **Foundations** section of this report. The axial capacity of the steel piles is highly dependent upon near surface conditions and must take into consideration environmental factors reducing the axial capacity in the near surface. One of the major environmental factors impacting pile length is adfreeze stress and the depth to which it applies. The soil in the active frost zone consists primarily of sand with high silt content and is frost susceptible. We recommend an adfreeze stress of 1,500 psf be used to calculate the uplift loads due to frost heave. We recommend the depth to which the adfreeze stress applies to be 1.7 feet.

We anticipate several small structures to house equipment and provide storage as part of the project. The proposed structure type and loading information was not available at the time of this report. We believe these ancillary structures may be supported on shallow spread footing foundation systems or reinforced concrete mat foundation systems bearing on a minimum of 1 foot of non-frost susceptible soil placed as presented in the **Site Preparation** section of this report. For loads exceeding 80 kips, we should be contacted to perform settlement analyses on a case-by-case basis.

Additional site preparation recommendations, including subgrade improvement and fill placement, are provided in the **Earthwork** section. The **General Comments** section provides an understanding of the report limitations.

PILE LOAD TESTING

A total of six (6) locations were selected for installation of test piles on the project. The approximate locations of the pile load tests are shown in the **Exploration Plan** section. A group of three (3) test piles were installed at each of the five locations and single load test was performed on each pile. The test piles consisted of wide flange W6x12 galvanized steel piles.

Pile Driving

The pile driving operations were completed by Geo Support Solutions, LLC on May 23, 2019, utilizing a track-mounted Vermeer PD-10 to install the piles.

At each location, three test piles were driven approximately 10 feet apart from each other. In the table below, the 9-foot embedded piles are indicated by the letter A in the Pile Location (e.g. PLT-1A) and the 12-foot embedded piles are indicated by the letters B and C. The total time required to advance each pile to its specified embedment depth was recorded and is summarized in the following table. Pile installation logs showing individual pile drive times per foot are included in the **Exploration Results** section.

Pile Location	Pile Tip Depth (feet)[1]	Total Drive Time (seconds)	Pre-Drill Depth (feet)	Average Drive Time (seconds/foot)[2]
PLT-1A	9.00	80.1	3.00	13.4
PLT-1B	9.25[3]	146.2	3.00	23.4
PLT-1C	9.00	122.5	0.00	13.6
PLT-2A	9.00	93.7	3.00	15.6
PLT-2B	12.00	177.4	3.00	19.7
PLT-2C	5.00	47.2	0.25	9.9
PLT-3A	9.00	107.7	2.75	17.2
PLT-3B	6.83[3]	92.9	3.00	24.3
PLT-3C	7.33[3]	139.5	0.50	20.4
PLT-4A	4.00[3]	12.1	2.75	9.6
PLT-4B	4.75[3]	15.1	3.00	8.6
PLT-4C	6.00	115.4	0.00	19.2
PLT-5A	8.00	198.2	3.00	39.6
PLT-5B	7.67[3]	212.8	3.00	45.6

Pile Location	Pile Tip Depth (feet)[1]	Total Drive Time (seconds)	Pre-Drill Depth (feet)	Average Drive Time (seconds/foot)[2]
PLT-5C	6.75	82.2	0.25	12.6
PLT-6A[4]	3.50[3]	13.9	2.00	9.2
PLT-6B[4]	3.17[3]	19.8	2.00	16.5
PLT-6C[4]	3.50[3]	91.6	0.00	26.2

1. Below ground surface.
2. The average drive time is equal to the total time divided by the pile tip depth minus the pre-drill depth.
3. These piles encountered driving refusal at the depth indicated.
4. These piles removed immediately after driving at the request of Field Engineer, LJ Salyers. Piles not tested.

Pile Load Test Procedures and Equipment

Terracon personnel performed axial tensile, compression and lateral load tests on test piles on May 23, 2019. The pile load testing was completed using the following procedures.

Axial Tensile Load Tests

The “pull-out” load reaction was developed using a tripod frame supported at an appropriate lateral distance from the pile. The composite steel and aluminum “tripod” frame was centered over the test pile and a system of appropriately rated chains and clevises were used to connect the reaction system (i.e. the eyebolt within the head of the tripod) in series with a block and tackle, a 25,000-pound Dillon EDjunior Dynamometer load cell, and a locking “E-grip” clamp gripping the test pile web. The chain attached to the block and tackle was hoisted to create an upward reaction on the pile and test loads were applied in successive 500-pound increments. Pile deflections were measured with a pair of digital displacement gauges secured with magnetic mounting brackets to each outside flange of the test pile. The probe of each gauge rested on a 4x4-inch lumber grade beam which spanned the ground surface near the test pile.

The axial tensile loading was applied at approximately 500-pound increments until the pile reached ¾ inches of vertical displacement, at which point the test halted. Axial tensile load tests which did not exceed ¾ inches of displacement were stopped at a maximum uplift load of 7,000 pounds uplift load.

Lateral Load Tests

After testing under axial tensile load, the piles at each location were then tested under lateral load. The test piles were installed in-line with each other, so they provided opposing reactions for each other and tested simultaneously in the strong axis direction.

For rigging, a flange clamp was secured to each test pile at a height of 3 feet above the ground surface. An appropriately rated system of chain and clevises was used to connect each flange clamp, to one Enerpac hydraulic pump, and a 25,000-pound Dillon EDjunior Dynamometer load cell. Pile lateral displacement was measured at about 6 inches above the ground surface by securing digital displacement gauges as previously described. The loads were generally applied with the hydraulic pump in loading and unloading cycles at approximately 500-pound increments until the pile reached 1 inch of horizontal displacement, at which point the test halted. Lateral load tests which did not exceed 1 inch of displacement were stopped at a maximum lateral load of 7,000 pounds.

Summary of Pile Load Test Results

Pile load test results are included in the **Exploration Results** section. The following table provides a summary of each pile test location, embedment depth, uplift load at ¼ inches of vertical displacement, lateral load at ½ inch of lateral displacement at 6 inches above the ground surface, and at ¾ inch deflection for compression loads.

Pile Location	Pile Tip Depth (feet)[1]	Uplift Load at ¼ inches of Vertical Movement (lbs)	Lateral Load at ½ inches of Movement (lbs)
PLT-1A	9.00	> 7,000	750
PLT-1B	9.25	--	2,200
PLT-1C	9.00	--	--
PLT-2A	9.00	> 7,000	2,500
PLT-2B	12.00	> 7,000	1,800
PLT-2C	5.00	--	--
PLT-3A	9.00	> 7,000	1,000
PLT-3B	6.83	> 7,000	900
PLT-3C	7.33	--	--
PLT-4A	4.5	5,500	> 7,000
PLT-4B	4.75	--	--
PLT-4C	6.00	--	--
PLT-5A	8.00	> 7,000	3,000
PLT-5B	7.60	> 7,000	2,500
PLT-5C	9.00	--	--

1. Below ground surface.

SOLAR ARRAY PILE FOUNDATION

We recommend the photovoltaic panels be supported on driven steel pile foundations. We expect driven piles may encounter refusal above the required embedment depth. Therefore, pre-drilling of oversized holes to allow for the installation of the piles to the required embedment depth will likely be required. Ground screws (Krinner or similar) may also be used to support the racking system that supports the panels.

Design recommendations and construction considerations for the recommended foundation systems are presented below.

We understand driven piles are the preferred foundation system for support of the solar arrays. Piles used for foundation support transmit structural loads to a stratum of comparatively higher bearing capacity and should experience relatively small amounts of movement. Based on the geotechnical engineering analyses, subsurface exploration, and laboratory test results, the proposed arrays may be supported on driven steel piles. The following section addresses support of the solar arrays using driven piles. The **Slab on Grade or Mat** section addresses slab-on-grade/mat support of ancillary structures. Preliminary soil resistance parameters and anticipated pile embedment lengths based on the testing programs performed for this study are recommended in the following sections.

The axial capacity of driven piles may be estimated based on skin friction developed along the perimeter of the pile, while the compression capacity may be estimated using the skin friction and end bearing. When determining embedment depths, the perimeter of a wide flange beam should be taken as twice the sum of the flange width and web depth, and the upper 12 inches of soil for each pile should be neglected.

Axial Capacity Recommendations

The panels may be supported on driven steel piles, which should be structurally designed to resist compression, uplift, and bending forces. We recommend piles be driven at least 9 feet below finished grade in soil to achieve the required resistance. For design purposes, available resistance should be based on soil below 1.7 feet for frost and adfreeze considerations. Driving resistance may be correlated to vertical load capacity, based on the size of the post and the equipment used to install the posts.

Pile load tests were performed on selected posts to determine uplift and lateral capacities. Based on the results of the pile load testing program, at ¼ inch vertical displacement we recommend following design parameters for production piles.

Pile Embedment Depth Below Ground Surface (feet)	Material	Ultimate Skin Friction (psf)	Ultimate End Bearing Pressure (lbs)
0 to 1.7	Frost zone	Neglect	Neglect

Pile Embedment Depth Below Ground Surface (feet)	Material	Ultimate Skin Friction (psf)	Ultimate End Bearing Pressure (lbs)
1.7 to 9	Glacial Till Deposits	750	1,000

Notes:

- We recommend a factor of safety of 1.5 be applied to the ultimate skin friction and 2.0 to the end bearing.

The axial tensile (pull-out) capacity can be developed from skin friction while the axial compressive capacity can be developed from skin friction and end bearing. The above indicated skin friction values are appropriate for uplift and compressive loading. The skin friction perimeter for driven piles can be calculated using the perimeter of the pile which equals twice the sum of the flange width and web depth. The upper 1.7 feet of soil should be neglected when calculating skin friction resistance to loading, due to the potential effects of frost as well as moisture variations that result in periodic loss or reduction of soil contact with piles.

Lateral Capacity Recommendations

The parameters in the following table can be used for analysis of the lateral capacity of steel piles driven in native soil for support of solar panel arrays. These parameters are based on correlations with SPT results, published values, pile load test results, and our experience with similar soil types.

Zone[1]	Depth (feet)	Material	LPile Soil Model[2]	γ' (pcf)[3]	ϕ (°)[4]	k (pci)[5]	p-Multiplier
A	0 to 0.2	Top Soil	Sand (Reese)	90	30	Default	3.5
	0.2 to 1.7	Glacial Till (Above Groundwater)		110	32		5.0
	1.7 to 2			110	32		5.0
	2 to 9			120	34		5.0
B	0 to 0.2	Top Soil	Sand (Reese)	90	30	Default	0.7
	0.2 to 1.7	Glacial Till (Above Groundwater)		110	32		1.0
	1.7 to 2			110	32		1.0
	2 to 9			120	34		1.0

Notes:

1. See p-Multiplier Zoning Plan in **Exploration Results**
2. p-y curve
3. γ': Effective Unit Weight
4. ϕ: Friction Angle of Soil
5. k: Soil Modulus

L-PILE analyses were performed by applying the field test load that resulted in approximately ½-inch deflection at a point about 6 inches above the ground surface. The shear load was applied at approximately 3 feet above the ground surface. The effective unit weight, friction angle, default soil modulus, and strain factor were based on the result of the field penetration resistance values obtained from the borings. These parameters and the p-multiplier were then adjusted (by trial and error method) such that the applied load resulted with a deflection value that matched the in-situ results. These results should be used for LPILE analysis only. These parameters are only applicable to piles embedded 9 feet below grade. In our evaluation, the piles were modeled as an elastic section (non-yielding).

The structural engineer should evaluate the moment capacity of the pile as part of their structural evaluation. Piles should have a minimum center-to-center spacing of at least 5 times their largest cross-sectional dimension on the direction of the lateral loads, or the lateral capacities should be reduced due to group effects. If piles are spaced closer than 5 times their largest cross-sectional dimension we should be notified to provide supplemental recommendations.

Driven Pile Construction Considerations

Very dense glacial till along with cobbles and boulders were encountered in the borings and are commonly found in glacially deposited soil. Pile installation via conventional methods – such as driving into a virgin subgrade may encounter difficulty and may result in early refusal and inadequate penetration, or else may cause excessive pile deflection, rotation or torsional rotation. We recommend a pile driving program be developed to confirm the amount of piles knocked off their alignment due to difficult driving conditions, and record the drive times to assess the difficulty with which piles may penetrate the subgrade soil conditions on this site. Obstructions should be anticipated based on the results of the borings and, such conditions may require pre-drilling either undersized or over-sized holes and grouting.

Auger drilling typically is unsuccessful for subgrades containing appreciable cobbles and boulders. We expect that percussive drilling methods such as ODEX or air-rotary will be necessary to complete pre-drilled holes to their design depth.

Piles set in a grout- or concrete-backfilled borehole would develop considerable axial and lateral capacity over a relatively short embedded distance. This would result in somewhat reduced pile lengths for the project, which may offset some of the expense of drilling and the use of grout or concrete backfill. Production pile testing should be performed on piles installed in predrilled holes with or without cement grout holes to confirm their capability to carry the foundation loads.

Undersize Holes Design Recommendations

In areas of driven pile refusal prior to reaching the desired pile depth, it may be appropriate to predrill an undersized hole at the pile location to a depth less than the design depth of the pile. The predrilled hole may then be backfilled with the cuttings, provided cobbles and boulders are culled from the material. The objective of predrilling an undersized hole is to facilitate the driving of the web without disturbing the native soils supporting the flanges. Since the lateral and axial capacities are mostly reliant on the soil pile interaction at the flanges, the soil parameters used for design should be confirmed with a pile load testing program that includes pre-drilling undersized holes.

Oversize Holes Design Recommendations

As an alternative to mitigate pile driving refusal, an oversized hole drilled may be advanced to the minimum design embedment depth prior to the installation of piles. For this approach, the pile would be set in the pre-drilled hole and then the hole is backfilled using cement grout, i.e. controlled low-strength material (CLSM). This method may be appropriate in areas of frequent obstructions and may result in shorter embedment depths due to increased side resistance along the pile length. Design parameters for oversized holes are provided below.

Soil Description	p-y Model	Depth (feet)	Ultimate End Bearing Capacity (psf)[1]	Ultimate Bond Resistance (psf)[2]	Effective Unit Weight γ' (pcf)[3]	Friction Angle, Φ[3]	Soil Modulus, k (pci)[3]
Glacial Till (Above Groundwater)	Sand (Reese)	0 to 1.7	---	---	110	32°	Default
		1.7 to 9	5,000	1,000	120	34°	

1. A minimum factor of safety of at least 3 should be applied to end bearing.
2. Applicable to compression and uplift loading. Contribution to pile capacity from within the frost zone depth of 1.7 feet should be ignored. A factor of safety of at least 2 should be applied to the side resistance.
3. For use with L-Pile™ design program.

Ground Screw Foundation Recommendations

The photovoltaic panels may be supported on a ground screw system (Krinner, or similar) deriving support from medium dense to dense. The ground screws should be structurally designed to resist vertical loading and uplift, and also bending forces. The upper 1.7 feet in soil should not be relied upon for axial compression and uplift resistance because it is within the active frost zone.

The ground screws should be designed by the design-build engineer. Full-scale pull-out and lateral load testing should be performed on selected screws to assess compression, uplift and lateral capacities and screw length.

Lateral capacity of vertically installed ground screws is primarily dependent on the type and strength of the soil against which the screw is pushed by the horizontal load. Ground screws should be designed to have an allowable lateral capacity of at least 2 kips. Higher lateral capacities may be feasible; however, we recommend lateral load testing be performed

Ground Screw Construction Considerations

Ground screws should be installed by a contractor experienced in this type of foundation construction and licensed by the manufacturer of the foundation components. The allowable load carrying capacity of ground screws depends mainly on the final torque resistance. Each screw installation should be independently monitored and the depth and final torque resistance checked against the calculations by the Engineer for the manufacturer. Cobbles and very dense soil conditions were encountered in the explorations; the designer and contractor should consider these aspects in completing the design and choosing installation methods.

Frost Heave Considerations for Driven Piles

The axial capacity of the steel piles is highly dependent upon near surface conditions and must take into consideration environmental factors reducing the axial capacity in the near surface. One of the major environmental factors impacting pile length is adfreeze stress and the depth to which it applies. The soil in the active frost zone consists primarily of sand with high silt content and is frost susceptible.

As the frost penetrates deeper into the soil and the ground swells due to freezing, the ground surface will rise due to frost heaving. The upward displacement is due to freezing water contained in the soil voids along with the formation of ice lenses in the soil. The freezing material grips the steel pile and exerts an uplift force due to the adfreeze stress developed around the surface area of the pile. The amount of upward force depends on the following:

- The thickness of ice lenses formed in the seasonal frozen ground
- The bond between the steel pile surface and the frozen ground
- The surface area of the steel pile in the seasonally frozen ground

We recommend an adfreeze stress of 1,500 psf be used to calculate the uplift loads due to frost heave. We recommend the depth to which the adfreeze stress applies to be 1.7 feet.

Frost heave uplift forces may govern the design and length of the driven piles. The factor of safety against uplift should be determined based on discussions with the owner and design engineer considering the desired level or risk, construction costs, and the long-term maintenance program.

EARTHWORK

Earthwork is anticipated to include clearing and grading for access road and ancillary equipment. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, slabs, and aggregate surfaced roadways.

Site Preparation

Prior to placing fill, existing vegetation and root mat should be removed. Complete stripping of the topsoil should be performed in the proposed equipment slab areas, access roadways, and staging areas. Exposed surfaces within the footprint of the self-contained structures should be free of mounds and depressions which could prevent uniform compaction.

Stripped materials consisting of vegetation and organic materials should be wasted from the site or used to revegetate landscaped areas or exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on-site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

Foundation, slab/mat and roadway inorganic subgrades should be proofrolled to aid in the identification of weak or unstable areas within the near surface soils. Proof-rolling should be performed with an adequately loaded vehicle such as a fully-loaded tandem-axle dump truck. The proof-rolling should be performed under the direction of the Geotechnical Engineer. Areas excessively deflecting under the proofroll should be delineated and subsequently addressed by the Geotechnical Engineer.

Based on the outcome of the proof-rolling operations, some undercutting or subgrade stabilization may be expected. Methods of stabilization, outlined below, could include scarification and re-compaction and/or replacing unstable materials with granular fill (with or without geotextiles). The more suitable method of stabilization, if required, will be dependent upon factors such as schedule, weather, size of area to be stabilized and the nature of the instability.

- **Scarification and Re-compaction** – It may be feasible to scarify, dry, and re-compact the exposed subgrades during periods of dry weather. The success of this procedure would depend primarily upon the extent of the disturbed area. Stable subgrades may not be achievable if the thickness of the soft soil is greater than 12 inches.
- **Granular Fill** – The use of Crushed Stone or Structural Fill could be considered to improve subgrade stability. Typical undercut depths would range from about 8 to 24 inches. The use of high modulus geotextiles should be limited to outside of the array area. The maximum particle size of granular material placed immediately over geotextile fabric or geogrid should not exceed 2 inches.

Over-excavations should be backfilled with Structural Fill placed and compacted in accordance with the following sections. Subgrade preparation and selection, placement, and compaction of Structural Fill should be performed under engineering-controlled conditions in accordance with the project specifications.

Fill Material Types

Fill required to achieve design grade should be classified as Structural Fill and General Fill. Structural Fill is material used below, or within 10 feet of structures such as mats/slabs, access roads, or constructed slopes. General Fill is material used to achieve grade outside of these areas. Earthen materials used for Structural and General Fill should meet the following material property requirements:

Fill Type[1]	Connecticut State Department of Transportation (CTDOT) Item	Application
General Fill	M.02.01 (Grade[2] A) – Granular Fill	General raise in grade fill. General Fill should not be placed within the foundation bearing zone of settlement sensitive structures.
Structural Fill	M.02.02 (Grade B) - Subbase	Beneath exterior slabs.
Aggregate Surface Course	M.02.01 (Grade[2] A) – Granular Fill	Access road surface course
Aggregate Base	M.02.03 – Granular Base (Binder – Grade A) (Top Course – Grade C)	Foundation for pavements.
Gravel Shoulders	M.02.04 – Gravel Shoulders (Grade A) (Upper 3 inches – Grace C)	Shoulders, trails, landscape.
Pervious Structure Backfill	M.02.05[3] – Pervious Structure Fill	Area adjacent to structures.
Free-Draining Materials	M.02.07[4] – Free-Draining Materials	

Fill Type[1]	Connecticut State Department of Transportation (CTDOT) Item	Application

1. Fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.
2. CTDOT gradation:

Grading			
Sieve Size	A	B	C
5″		100	
3 ½″	100	90-100	
1 ½″	55-100	55-95	100
¾″			45-80
¼″	25-60	25-60	25-60
No. 10	15-45	15-45	15-45
No. 40	5-25	5-25	5-25
No. 100	0-10	0-10	0-10
No. 200	0-5	0-5	0-5

3. Pervious structure backfill shall consist of broken or crushed stone, broken or crushed gravel, or reclaimed miscellaneous aggregate containing no more than 2% by weight of asphalt cement or mixtures thereof.
4. Free-draining material shall consist of sand, gravel, rock fragments, quarry run stone, broken stone, reclaimed miscellaneous aggregate containing no more than 2% by weight of asphalt cement or mixtures thereof. This material shall not have more than 70% by weight passing the No. 40 sieve and not more than 10% by weight passing the No. 200 sieve.

Structural and General Fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Fill Lift Thickness	■ 12 inches or less in loose thickness when heavy, self-propelled compaction equipment is used. ■ 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used.	
Minimum Compaction Requirements[1, 2]	At least 95% of the maximum dry density as determined by ASTM D1557, Method C	93% of maximum dry density as determined by ASTM D698
Water Content Range[1]	Granular: ±3% of optimum	As required to achieve min. compaction requirements

Item	Structural Fill	General Fill

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D698 or D1557). We recommend testing fill for moisture content and compaction during placement. If the results of in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested, as required, until the specified moisture and compaction requirements are achieved.
2. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 70% relative density (ASTM D 4253 and D 4254).

Utility Trench Backfill

Trench excavations should be made with sufficient working space to permit construction including backfill placement and compaction. If backfilled with relatively clean granular material, utility trenches should be capped with at least 12 inches of cohesive fill in unpaved areas to reduce the infiltration and preferential conveyance of surface water through the trench backfill. Alternatively, trenches should be backfilled with material that approximately matches the permeability characteristics of the surrounding soil. Fill placed as backfill for utilities located below the slab should consist of compacted Structural Fill or suitable bedding material.

Grading and Drainage

We understand there will be limited change to site grading. Adequate drainage should be provided to reduce the likelihood of an increase in moisture content of the foundation soils. Runoff should be directed away from the slab foundation.

Earthwork Construction Considerations

Unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. Should unstable subgrade conditions develop, stabilization measures will need to be employed.

Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become frozen, wet, or disturbed, the affected material should be removed, or should be scarified, moisture conditioned, and recompacted.

As a minimum, temporary excavations should be sloped or braced, as required by Occupational Safety and Health Administration (OSHA) regulations, to provide stability and safe working conditions. The contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations, as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, State, and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

Terracon should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; proofrolling; placement and compaction of controlled compacted fills; backfilling of excavations in the completed subgrade; and just prior to construction of foundations.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of mulch, topsoil, and bituminous concrete, proof-rolling and mitigation of areas delineated by the proof-roll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 5,000 square feet of compacted fill around carport structures and equipment slabs. One density and water content test for every 50 linear feet of compacted utility trench backfill should be performed.

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

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

SLAB ON GRADE / MAT

Several pieces of equipment for the project will be supported on slabs or mats, constructed near the finished grade surface. Design parameters for slabs or mats assume the requirements in the **Earthwork** section have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the slab/mat.

The following sections present design recommendations and construction considerations for the shallow foundations for proposed lightly-loaded structures and related structural elements.

Design Recommendations

Item	Description
Slab-on-Grade or Mat Support[1]	Minimum 24 inches of NFS Fill compacted to at least 95% of ASTM D 1557
Allowable Bearing Capacity[2]	4,000 psf

Item	Description
Settlement	
Total	<1.0 inch
Differential	About ⅔ of total settlement
Estimated Modulus of Subgrade Reaction[3]	200 pounds per square inch per inch (psi/in) for point loads
Ultimate Coefficient of Sliding Friction	0.45

1. Slabs should be structurally independent of footings or walls to reduce the possibility of slab cracking caused by differential movements between the slab and foundation.
2. Allowable bearing capacity developed using factor of safety of 3.0.
3. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in the **Earthwork** section, and the slab support as noted in this table. It is provided for point loads. The modulus recommended is for compacted NFS or Structural Fill over dense native soil and point-load areas of 1 foot by 1 foot. An adjustment is necessary for larger mat sizes.

Construction Considerations

Finished subgrade within and for at least 10 feet beyond the slab/mat should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition. If the subgrade should become damaged or desiccated prior to construction of slabs/mats, the affected material should be removed and Structural Fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the slab/mat support course.

The Geotechnical Engineer should approve the condition of the subgrades immediately prior to placement of the slab/mat support course, reinforcing steel and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

FROST CONSIDERATIONS

Mats and Slabs

The soils on this site are frost susceptible, and surface water infiltration or migration or wetting of soil by capillary rise can affect the performance of the slabs on-grade exposed to freezing climate. Exterior slabs should be anticipated to heave during winter months. If frost action needs to be eliminated in critical areas, we recommend a minimum 24 inches of non-frost susceptible (NFS) fill beneath mats and slabs. Placement of NFS material in large areas may not be feasible; however, the following recommendations are provided to help reduce potential frost heave:

- Provide surface drainage away from slabs, and toward the site storm drainage system.
- Install drains below exterior slabs and connect them to the storm drainage system.

- Slope subgrades to allow potentially perched water in aggregate base layers to be directed toward a site drainage system.
- Place NFS fill as backfill beneath slabs critical to the project.
- Place a 3 horizontal to 1 vertical (3H:1V) transition zone between NFS fill and other soils.

As an alternative to extending NFS fill to the full frost depth, consideration can be made to placing extruded polystyrene or cellular concrete under a buffer of at least 2 feet of NFS material.

ACCESS ROADS

Aggregate-Surfaced Roadways

Pavements – Subgrade Preparation

On most project sites, the site grading is accomplished relatively early in the construction phase. Fills are typically placed and compacted in a uniform manner. However, as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, or rainfall/snow melt. As a result, the aggregate-surfaced roadway subgrade may not be suitable for construction and corrective action will be required. The subgrade should be carefully evaluated at the time of construction for signs of disturbance or instability. We recommend the subgrade be thoroughly proofrolled with a loaded tandem-axle dump truck prior to final grading. All aggregate-surfaced roadway subgrade areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to placement of the aggregate surfacing.

Pavements – Design Recommendations

We understand that access road cross sections used for construction of the project will be the responsibility of the EPC, and that only post construction traffic with an allowable rut depth of 2 inches is what we are to design for in this report. We anticipate low-volume, aggregate-surfaced and native soil access roads will have a maximum vehicle load of 30,000 lbs. and will travel over the access roads only once per week. Based on the above assumptions, we have provided the following minimum aggregate thicknesses for the access roadways.

Layer	Material Type and Recommended Thickness (inches)
Aggregate Surface	6 inches of CTDOT M.02.01 (Grade A) – Granular Fill
Aggregate Base	12 inches of CTDOT M.02.03 (Grade B) – Granular Base

Roadway aggregate surfacing materials should consist of a blend of gravel, sand, and fines (clay and silt). We believe the maximum size particle should not exceed 2.5 inch in diameter and the gravel should be crushed with angular edges (not rounded). The blend of materials should be selected to allow for easy compaction resulting in a firm, low permeable surface promoting surface drainage off of the roadway surface. Aggregate base course should be placed in lifts not exceeding 6 inches and compacted to a minimum of 95 percent of the maximum dry unit weight as determined by ASTM D1557.

A roadway aggregate surfacing material should also contain approximately 10 percent fines (silt and clay-sized particles passing the No. 200 sieve). The fines should exhibit low to moderate plasticity (plastic index less than 15) and will act as a binder to help reduce risk for wash boarding. If the fines content of a roadway surfacing material is comprised mostly of silt, the fines will be non-plastic and the surfacing materials will not have the benefit of the binder or cohesive aspects.

In order to reduce dust, reclaimed asphalt pavement (RAP) may be used as the upper 2 to 4 inches of the aggregate-surfacing. The RAP should be graded to the specified limits for CTDOT M.04.02. Periodic (1 to 2 times a year following maintenance grading) spraying of the surface with magnesium chloride or other dust suppressant may also be considered to reduce dust and wash boarding.

Aggregate-surfaced roadways performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of aggregate-surfaced roadways:

- Site grades should slope a minimum of 10 percent away from the roadways;
- The subgrade and the aggregate-surfaced roadways have a minimum 10 percent slope to promote proper surface drainage;
- Consider appropriate edge drainage; and
- Install pavement drainage surrounding areas anticipated for frequent wetting.

Pavements – Maintenance

The aggregate sections are considered minimal sections based upon the expected traffic and the composite subgrade conditions; however, they are expected to function with periodic maintenance if good drainage is provided and maintained.

Preventative maintenance should be planned and provided for an ongoing aggregate-surfaced roadways management program in order to enhance future roadway performance. Preventative maintenance is usually the first priority when implementing a planned maintenance program and provides the highest return on investment for aggregate-surfaced roadways.

Periodic maintenance extends the service life of the aggregate-surfaced roadways and should include re-grading and replacement of aggregate base course in any deteriorated areas. Also, thicker aggregated base course sections could be used to reduce the required maintenance and extend the service life of the aggregate-surfaced roadways. Design alternatives which could reduce the risk of subgrade saturation and improve long-term performance include installing surface drains next to any areas where surface water could pond. Properly designed and constructed subsurface drainage will reduce the time subgrade soils are saturated and can also improve subgrade strength and performance.

GENERAL COMMENTS

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

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

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

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

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings/Test Pits	Boring Depth (feet)	Planned Location
4 borings	6.5 to 20.5	Planned solar array
9 test pits	3 to 11	Planned solar array

Boring Layout and Elevations: Terracon laid out the borings during our site reconnaissance. We used handheld GPS equipment to locate borings with an estimated horizontal accuracy of +/- 15 feet. If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: Terracon observed the advancement of four (4) test borings (B-4 through B-7) and nine (9) test pits throughout the site from May 22 to June 21, 2019 using an all-terrain vehicle (ATV)-mounted rotary drill rig owned and operated by New England Boring Contractors, Inc. of Glastonbury, Connecticut. The borings were advanced using 4¼-inch inside diameter continuous flight hollow-stem augers. At all boring locations, four (4) samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter unless auger refusal was encountered. Soil sampling was performed using split-barrel sampling procedures using a standard 2-inch outer diameter split-barrel sampling spoon driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The split-barrel samplers were driven in accordance with ASTM D 1586 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils. The number of blows required to advance the sampling spoon the middle 12 inches of a normal 24-inch penetration was recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the depths where they are performed.

Auger refusal was encountered within the depth of exploration, rock coring (using an NQ2-sized rock core barrel) was performed at B-6 and B-7 locations where 10 feet of coring has been obtained. Water was used as a drilling fluid for rock coring and the spent water was discharged on site.

The test pits were excavated using a track-mounted excavator. Representative soil samples were obtained from the excavated soil. Upon completion, the test pits were backfilled with excavated materials.

Descriptive classifications of the soils indicated on the boring logs are in accordance with the General Notes and the Unified Soil Classification System (USCS). USCS symbols are also shown. A brief description of the USCS is attached to this report. Classification was generally by visual/manual procedures, aided by laboratory testing.

Rock classification was conducted using locally accepted practices for engineering purposes; petrographic analysis may reveal other rock types. Rock core samples typically provide an improved specimen for this classification. Boring log rock classification was determined using the Description of Rock Properties.

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

Field Electrical Resistivity Testing: Field electrical resistivity of in-situ soil was completed at seven (7) locations as shown on the **Exploration Plan**. Measurements were taken along two relatively perpendicular lines having a common center point. Measurements were made in general accordance with ASTM G 57-06 (2012) using a Wenner array configuration at "a" spacings at 2, 5, 8, 12, 15, 25, 40, 60, and 75 feet. The results of field electrical resistivity are presented in our **Exploration Results**.

Laboratory Testing

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

- Two (2) ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- Four (4) ASTM D422/C136 Standard Test Method for Particle-Size Distribution of Soils/ Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

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

Thermal Resistivity Testing: Four (4) composite soil samples were tested in accordance with ASTM D5334 Standard Test Method for Determination of Thermal Conductivity of Soil. Sampling and testing were completed in accordance with ASTM D3740. Terracon collected soil samples from 2 to 5 feet below existing grade. Samples were remolded to approximately 90% of Modified

Proctor density (ASTM D1557). Terracon tested each sample at as-found moisture content, 0% moisture content, and at least two intermediate moisture contents, one of which is at approximately 2% moisture content. We reported thermal resistivity in °C-cm/watt and all test results are presented in the form of a dry out curve.

Corrosion Testing: Terracon tested four (4) bulk soil samples obtained from 2 to 5 feet for corrosivity testing. The testing included water-soluble sulfate ion content in soil in accordance with ASTM C1580 presented in percent by weight, water-soluble chloride ion content in accordance with ASTM D512 presented in percent by weight, pH in accordance with ASTM D4972, and electrical resistivity using the "soil box" method in accordance with ASTM G187.

Topsoil Analysis: Terracon tested three (3) bulk soil samples for topsoil analyses. Each analysis included organic content, grain size distribution, soluble salts, pH, soil salinity, secondary nutrient groups (calcium, magnesium, sodium), and micronutrients (zinc, manganese, iron, and copper). Our analysis excludes both the nitrogen-phosphorous-potassium (N-P-K) ratio and Sodium Absorption Ratio (SAR), as these tests are not applicable to topsoil found in New England.

SITE LOCATION AND EXPLORATION PLANS

Contents:

Site Location
Exploration Plan

Note: All attachments are one page unless noted above.

SITE LOCATION

North Stonington Solar Facility ▪ North Stonington, Connecticut

January 25, 2021 ▪ Terracon Project No. J2185196

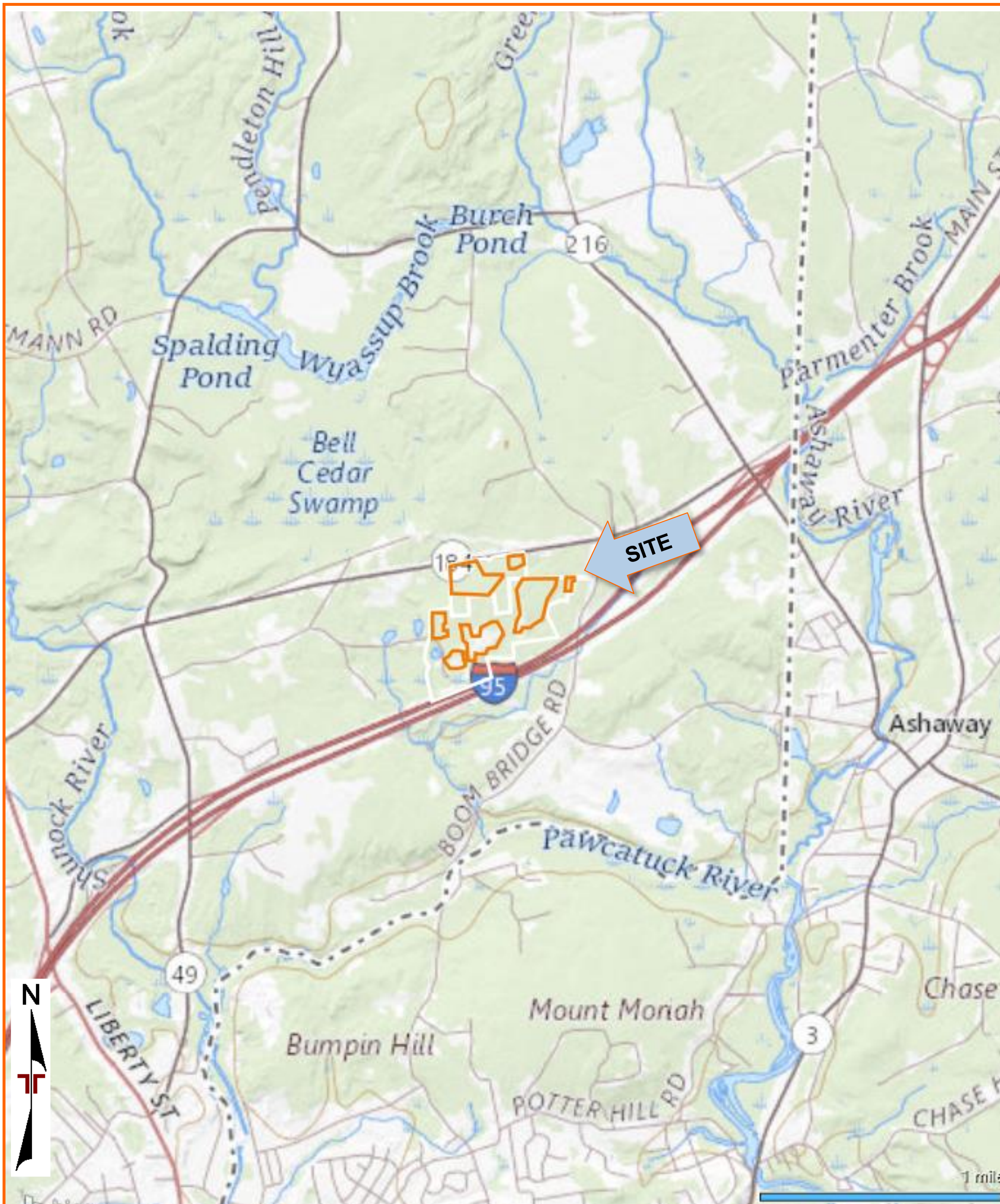


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

North Stonington Solar Facility ■ North Stonington, Connecticut

January 25, 2021 ■ Terracon Project No. J2185196

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

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

North Stonington Solar Field ■ North Stonington, Connecticut

Terracon Project No. J2185196

Terracon GeoReport

SAMPLING	WATER LEVEL	FIELD TESTS
Rock Core Grab Sample Split Spoon	**Water Initially Encountered** **Water Level After a Specified Period of Time** **Water Level After a Specified Period of Time** **Cave In Encountered** Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**N** **Standard Penetration Test Resistance (Blows/Ft.)** **(HP)** **Hand Penetrometer** **(T)** **Torvane** **(DCP)** **Dynamic Cone Penetrometer** **UC** **Unconfined Compressive Strength** **(PID)** **Photo-Ionization Detector** **(OVA)** **Organic Vapor Analyzer**

DESCRIPTIVE SOIL CLASSIFICATION

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

LOCATION AND ELEVATION NOTES

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

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		**CONSISTENCY OF FINE-GRAINED SOILS** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELEVANCE OF SOIL BORING LOG

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

UNIFIED SOIL CLASSIFICATION SYSTEM

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

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

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

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

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

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

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

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

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

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

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

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

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

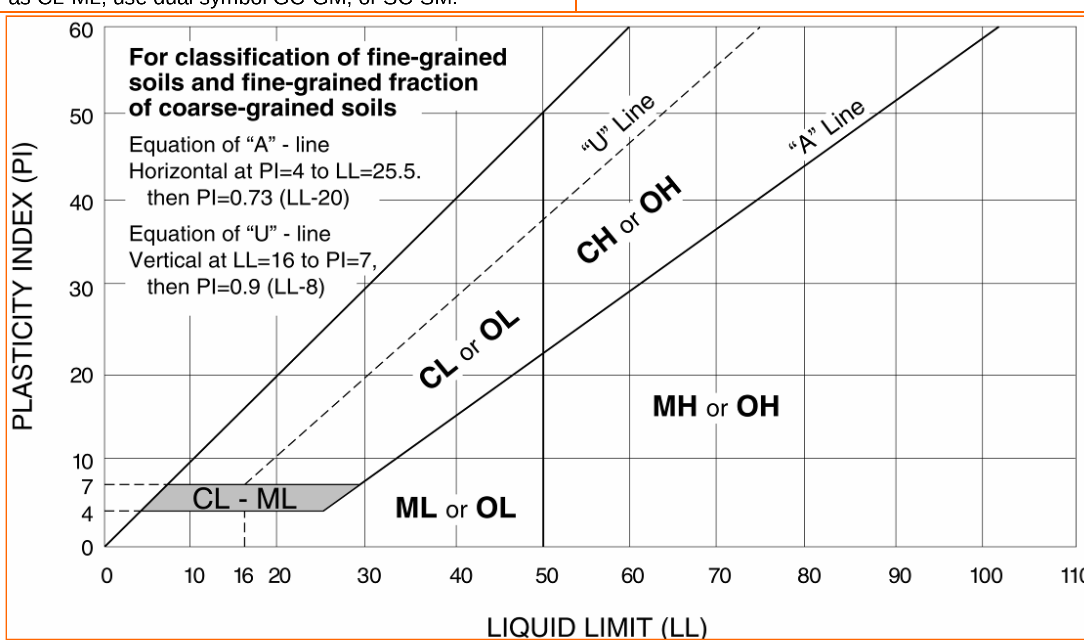
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

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

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



DESCRIPTION OF ROCK PROPERTIES

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

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

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

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

ROCK QUALITY DESIGNATION (RQD) [1]	
Description	**RQD Value (%)**
Very Poor	0 - 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 - 100

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

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

DESCRIPTION OF ROCK PROPERTIES

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

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

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

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

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

Rock Quality Designator (RQD) [1]

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

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

Joint Openness Descriptors

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

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

BORING LOG NO. B-4

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation Nashville, Tennessee

SITE: 428 Providence-New London Turnpike North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4343° Longitude: -71.816°

Surface Elev.: 178 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1		0.5	**FOREST MAT**	177.5			X	10	3-4-50 N=54	
3			**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, medium dense to very dense, **(GLACIAL TILL)**		5		X	6	14-50/4"	
		6.5		171.5						

Auger Refusal on Probable Boulder at 6.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.
Samples obtained using a 2" O.D. split spoon sampler

Hammer Type: Automatic

Advancement Method:
4 1/4-inch inside diameter continuous flight hollow stem augers

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

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

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Boring Started: 05-29-2019	Boring Completed: 05-29-2019
Drill Rig: Diedrich D-50	Driller: S. Marino
Project No.: J2185196	

BORING LOG NO. B-5

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation Nashville, Tennessee

SITE: 428 Providence-New London Turnpike North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4342° Longitude: -71.8146°

Surface Elev.: 169 (Ft.)

MODEL LAYER	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1	0.2	**FOREST MAT**	169						
2	2.0	**SILTY SAND (SM)**, trace gravel, with roots, brown, medium dense, **(SUBSOIL)**	167			X	2	8-9-5-6 N=14	
3		**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, very dense, **(GLACIAL TILL)**				X	12	8-17-35-37 N=52	
				5		X	20	19-26-30-31 N=56	
						X	4	48-50/4"	
				10		X	14	32-47-48-50/4" N=95	
				15	▽	X	2	50/4"	
	20.5		148.5	20		X	0	50/4"	

Boring Terminated at 20.5 Feet

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

Samples obtained using a 2" O.D. split spoon sampler

Hammer Type: Automatic

Advancement Method:
4 1/4-inch inside diameter continuous flight hollow stem augers

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

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

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Boring Started: 05-29-2019	Boring Completed: 05-29-2019
Drill Rig: Diedrich D-50	Driller: S. Marino
Project No.: J2185196	

BORING LOG NO. B-6

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation Nashville, Tennessee

SITE: 428 Providence-New London Turnpike North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4324° Longitude: -71.8178°

Surface Elev.: 140 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
		0.3	**FOREST MAT**	139.5						
3			**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, very dense, **(GLACIAL TILL)**					8	15-48-46-50/2" N=94	
			Note: Cored through boulders from 3 to 13 feet.		5			18		
		13.0		127	10			7		

Boring Terminated at 13 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.
Samples obtained using a 2" O.D. split spoon sampler

Hammer Type: Automatic

Advancement Method:
4 1/4-inch inside diameter continuous flight hollow stem augers to 3 feet then NQ2-sized core barrel to 13 feet.

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

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

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Boring Started: 05-29-2019	Boring Completed: 05-30-2019
Drill Rig: Diedrich D-50	Driller: S. Marino
Project No.: J2185196	

BORING LOG NO. B-7

PROJECT: North Stonington Solar Field

**CLIENT: Silicon Ranch Corporation
Nashville, Tennessee**

**SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut**

LOCATION See Exploration Plan

Latitude: 41.4311° Longitude: -71.8204°

Surface Elev.: 95 (Ft.)

MODEL LAYER	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1	0.5	**FOREST MAT**	94.5					
3		**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, very dense, **(GLACIAL TILL)**			Split spoon	16	4-24-28-50/1" N=52	
					Split spoon	6	29-50/4"	
					Split spoon	2	50/5"	
		Note: Cored through boulders from 7 to 13 feet.			Core	39		
	13.0		82					
4		**GRANITIC GNEISS**, brown to gray, close fracture spacing, slightly weathered, medium strong to strong, fair RQD			Core	60	Core Rate (min./ft): 2-1-2-2-3 RQD = 65%	
	17.0		78					
		Boring Terminated at 17 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.
Samples obtained using a 2" O.D. split spoon sampler

Hammer Type: Automatic

Advancement Method:
4 1/4-inch inside diameter continuous flight hollow stem augers to 7 feet then NQ2-sized core barrel to 17 feet.

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

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

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Boring Started: 05-30-2019	Boring Completed: 05-30-2019
Drill Rig: Diedrich D-50	Driller: S. Marino
Project No.: J2185196	

TEST PIT LOG NO. TP-1

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation, Nashville, Tennessee

SITE: 428 Providence-New London Turnpike, North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4343° Longitude: -71.8219°

Surface Elev.: 124 (Ft.)

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1	1.0	**FOREST MAT**	123						
2	3.5	**SILTY SAND (SM)**, with gravel, with roots, brown to orange, **(SUBSOIL)**	120.5			Grab			6.7
3	10.0	**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, estimated to be medium dense to dense, **(GLACIAL TILL)**	114	5, 10					

Test Pit Terminated at 10 Feet

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

Advancement Method:
Track-mount excavator with 14-foot reach and 1 cubic yard bucket capacity

Abandonment Method:
Test pit backfilled with soil cuttings

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

Notes:
Test Pit Dimensions: 2' W x 9' L x 10' D

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Test Pit Started: 05-22-2019	Test Pit Completed: 05-22-2019
Excavator: CAT 320	Operator:
Project No.: J2185196	

TEST PIT LOG NO. TP-2

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation
Nashville, Tennessee

SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4332° Longitude: -71.8172°

Surface Elev.: 160 (Ft.)

MODEL LAYER	DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1	1.0	**FOREST MAT**	159						
2	3.0	**SILTY SAND (SM)**, with gravel, trace roots, brown to orange, **(SUBSOIL)**	157						
3	8.0	**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, estimated to be medium dense to dense, **(GLACIAL TILL)**	152	5					7.8
		Bucket Refusal on Probable Bedrock at 8 Feet							

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

Advancement Method:
Track-mount excavator with 14-foot reach and 1 cubic yard bucket capacity

Abandonment Method:
Test pit backfilled with soil cuttings

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

Notes:

Test Pit Dimensions: 2' W x 9' L x 8' D

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Test Pit Started: 05-22-2019	Test Pit Completed: 05-22-2019
Excavator: CAT 320	Operator:
Project No.: J2185196	

TEST PIT LOG NO. TP-3

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation
Nashville, Tennessee

SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4307° Longitude: -71.8218°

Surface Elev.: 100 (Ft.)

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1	0.3	**FOREST MAT**	99.5						
2	1.5	**SILTY SAND (SM)**, with gravel, trace roots, brown to orange, **(SUBSOIL)**	98.5						
3	4.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, with gravel, occasional cobbles, brown, estimated to be medium dense to dense, **(GLACIAL TILL)**	96			Grab			

Bucket Refusal on Probable Bedrock at 4 Feet

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

Advancement Method:
Track-mount excavator with 14-foot reach and 1 cubic yard bucket capacity

Abandonment Method:
Test pit backfilled with soil cuttings

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

Notes:

Test Pit Dimensions: 2' W x 9' L x 4' D

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Test Pit Started: 05-22-2019	Test Pit Completed: 05-22-2019
Excavator: CAT 320	Operator:
Project No.: J2185196	

TEST PIT LOG NO. TP-4

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation
Nashville, Tennessee

SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4315° Longitude: -71.8247°

Surface Elev.: 81 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1		0.5	**FOREST MAT**	80.5						
2		1.2	**SILTY SAND (SM)**, with gravel, trace roots, brown to orange, **(SUBSOIL)**	80						
3		3.0	**SILTY SAND (SM)**, with gravel, occasional cobbles, brown, estimated to be medium dense to dense, **(GLACIAL TILL)**	78						
			Bucket Refusal on Probable Bedrock at 3 Feet							

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

Advancement Method:
Track-mount excavator with 14-foot reach and 1 cubic yard bucket capacity

Abandonment Method:
Test pit backfilled with soil cuttings

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

Notes:

Test Pit Dimensions: 2' W x 9' L x 3' D

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Test Pit Started: 05-22-2019	Test Pit Completed: 05-22-2019
Excavator: CAT 320	Operator:
Project No.: J2185196	

TEST PIT LOG NO. TP-5

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation
Nashville, Tennessee

SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4299° Longitude: -71.8232°

Surface Elev.: 78 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1		0.3	**FOREST MAT**	77.5						
2		1.5	**SILTY SAND WITH GRAVEL (SM)**, trace roots, brown to orange, **(SUBSOIL)**	76.5						
3		7.5	**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, estimated to be medium dense to dense, **(GLACIAL TILL)**	70.5	5	▽ (approx. 5.8 ft)				
			Bucket Refusal on Probable Bedrock at 7.5 Feet							

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

Advancement Method:
Track-mount excavator with 14-foot reach and 1 cubic yard bucket capacity

Abandonment Method:
Test pit backfilled with soil cuttings

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

Notes:

Test Pit Dimensions: 7' W x 15' L x 7.5' D

WATER LEVEL OBSERVATIONS

▽ *While test pitting*

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Test Pit Started: 06-19-2019	Test Pit Completed: 06-19-2019
Excavator: CAT 320	Operator:
Project No.: J2185196	

TEST PIT LOG NO. TP-6

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation
Nashville, Tennessee

SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4317° Longitude: -71.8244°

Surface Elev.: 87 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1		0.3	**FOREST MAT**	87						
2		1.5	**SILTY SAND WITH GRAVEL (SM)**, trace roots, brown to orange, **(SUBSOIL)**	85.5						
3		8.5	**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, estimated to be medium dense to dense, **(GLACIAL TILL)**	78.5	5	▽				
			Bucket Refusal on Probable Bedrock at 8.5 Feet							

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

Advancement Method:
Track-mount excavator with 14-foot reach and 1 cubic yard bucket capacity

Abandonment Method:
Test pit backfilled with soil cuttings

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

Notes:

Test Pit Dimensions: 7' W x 15' L x 8.5' D

WATER LEVEL OBSERVATIONS

▽ *At completion of test pitting*

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Test Pit Started: 06-20-2019	Test Pit Completed: 06-20-2019
Excavator: CAT 320	Operator:
Project No.: J2185196	

TEST PIT LOG NO. TP-7

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation Nashville, Tennessee

SITE: 428 Providence-New London Turnpike North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4343° Longitude: -71.8224°

Surface Elev.: 121 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1		0.3	**FOREST MAT**	121						
2		3.5	**SILTY SAND (SM)**, with gravel, trace roots, brown to orange, **(SUBSOIL)**	117.5						
3		11.0	**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, estimated to be medium dense to dense, **(GLACIAL TILL)**	110	5, 10					
			Test Pit Terminated at 11 Feet							

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

Advancement Method:
Track-mount excavator with 14-foot reach and 1 cubic yard bucket capacity

Abandonment Method:
Test pit backfilled with soil cuttings

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

Notes:

Test Pit Dimensions: 8' W x 14' L x 11' D

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Test Pit Started: 06-21-2019	Test Pit Completed: 06-21-2019
Excavator: CAT 320	Operator:
Project No.: J2185196	

TEST PIT LOG NO. TP-8

PROJECT: North Stonington Solar Field

CLIENT: Silicon Ranch Corporation
Nashville, Tennessee

SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut

LOCATION See Exploration Plan

Latitude: 41.4341° Longitude: -71.8208°

Surface Elev.: 128 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1		0.5	**FOREST MAT**	127.5						
2		3.0	**SILTY SAND (SM)**, trace gravel, trace roots, brown to orange, **(SUBSOIL)**	125						
3		8.5	**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, estimated to be medium dense to dense, **(GLACIAL TILL)**	119.5	5					
			Bucket Refusal on Probable Bedrock at 8.5 Feet							

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

Advancement Method:
Track-mount excavator with 14-foot reach and 1 cubic yard bucket capacity

Abandonment Method:
Test pit backfilled with soil cuttings

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

Notes:

Test Pit Dimensions: 8' W x 13' L x 8.5' D

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Test Pit Started: 06-21-2019	Test Pit Completed: 06-21-2019
Excavator: CAT 320	Operator:
Project No.: J2185196	

TEST PIT LOG NO. TP-9

PROJECT: North Stonington Solar Field

**CLIENT: Silicon Ranch Corporation
Nashville, Tennessee**

**SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut**

LOCATION See Exploration Plan

Latitude: 41.4355° Longitude: -71.8185°

Surface Elev.: 0 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
1		0.3	**FOREST MAT**	-0.5						
2		3.0	**SILTY SAND (SM)**, trace roots, trace gravel, brown to orange, **(SUBSOIL)**	-3						
3		10.5	**SILTY SAND (SM)**, with gravel, occasional cobbles and boulders, brown, estimated to be medium dense to dense, **(GLACIAL TILL)**	-10.5	5, 10					

Test Pit Terminated at 10.5 Feet

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

Advancement Method:
Track-mount excavator with 14-foot reach and 1 cubic yard bucket capacity

Abandonment Method:
Test pit backfilled with soil cuttings

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

Notes:

Test Pit Dimensions: 9' W x 14' L x 10.5' D

WATER LEVEL OBSERVATIONS

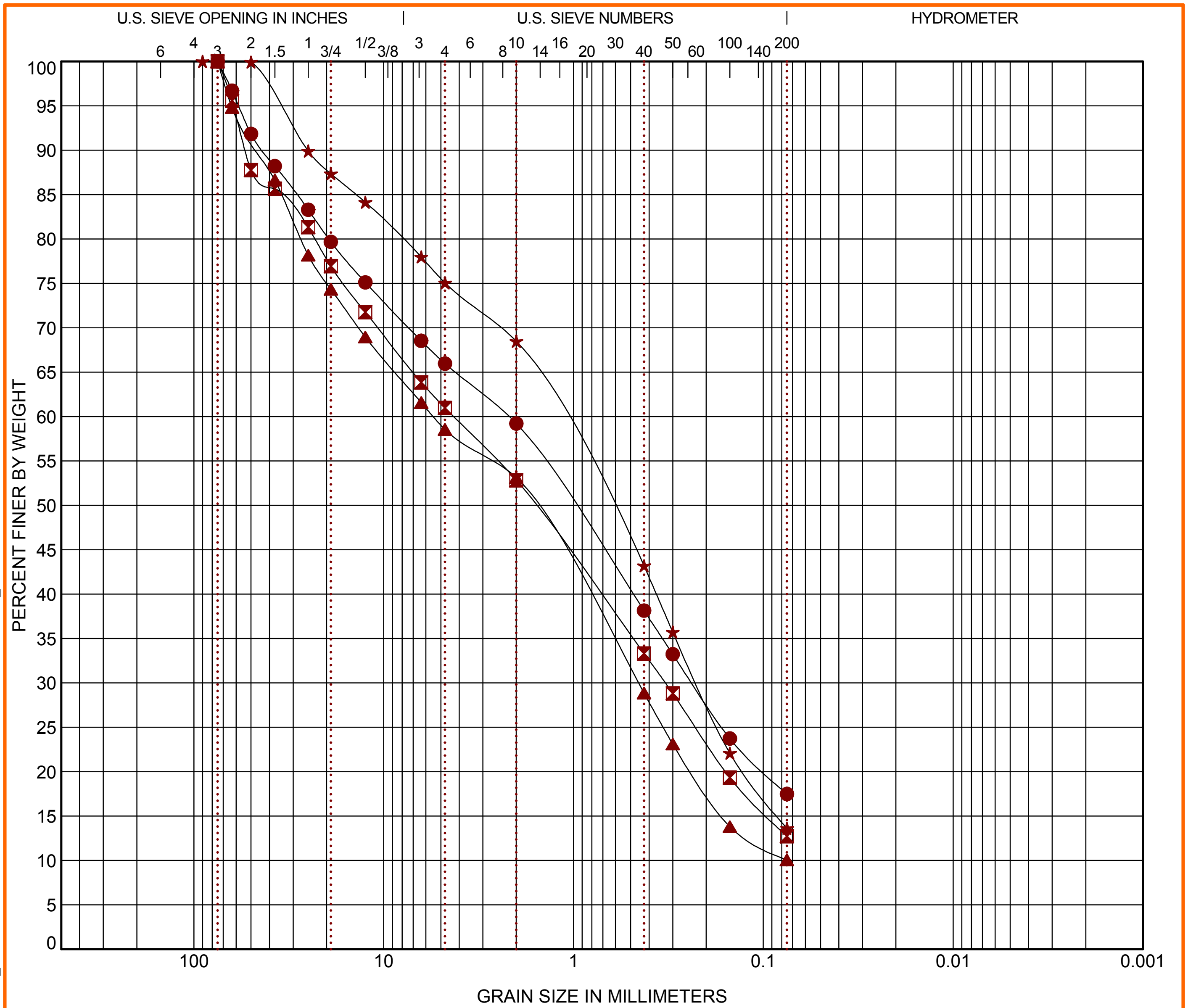
No free water observed

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

Test Pit Started: 06-21-2019	Test Pit Completed: 06-21-2019
Excavator: CAT 320	Operator:
Project No.: J2185196	

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	TP-1	2 - 5	Silty Sand with gravel (SM)	7					
⊠	TP-2	3 - 5	Silty Sand with gravel (SM)	8					
▲	TP-3	2 - 4	Well-graded Sand with Gravel (SW-SM)					0.52	73.61
★	TP-4	2 - 3	Silty Sand with gravel (SM)						

	Boring ID	Depth	D_{90}	D_{50}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	TP-1	2 - 5	43.226	1.016	0.237		34.0	48.5		17.5	
⊠	TP-2	3 - 5	53.431	1.597	0.329		39.0	48.2		12.7	
▲	TP-3	2 - 4	46.441	1.64	0.457		41.5	48.5		10.1	
★	TP-4	2 - 3	25.162	0.645	0.224		24.9	61.4		13.6	

PROJECT: North Stonington Solar Field

PROJECT NUMBER: J2185196

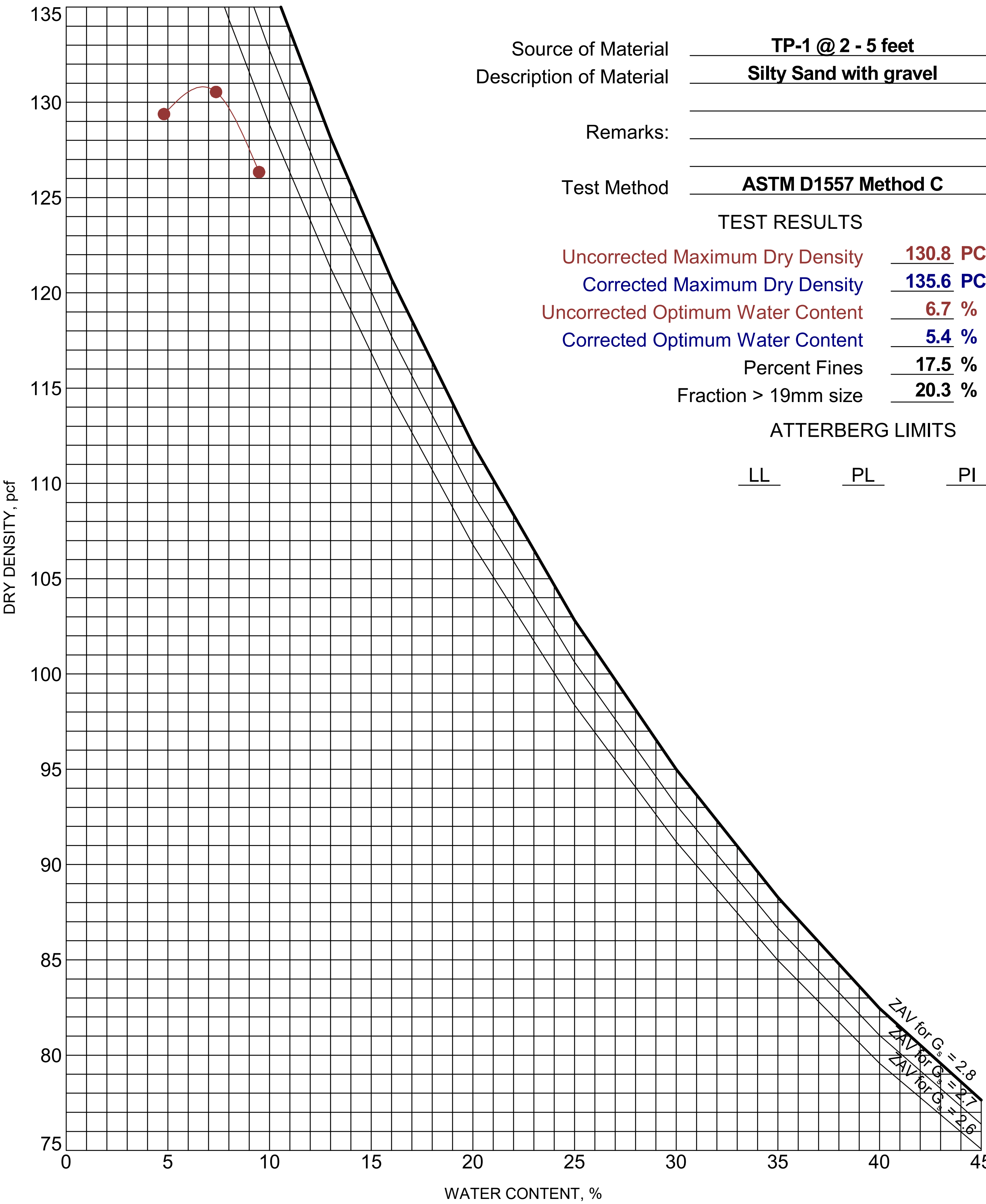
SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

CLIENT: Silicon Ranch Corporation
Nashville, Tennessee

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**TP-1 @ 2 - 5 feet**
Description of Material	**Silty Sand with gravel**
Remarks:	
Test Method	**ASTM D1557 Method C**

TEST RESULTS

Uncorrected Maximum Dry Density	**130.8**	**PCF**
Corrected Maximum Dry Density	**135.6**	**PCF**
Uncorrected Optimum Water Content	**6.7**	**%**
Corrected Optimum Water Content	**5.4**	**%**
Percent Fines	**17.5**	**%**
Fraction > 19mm size	**20.3**	**%**

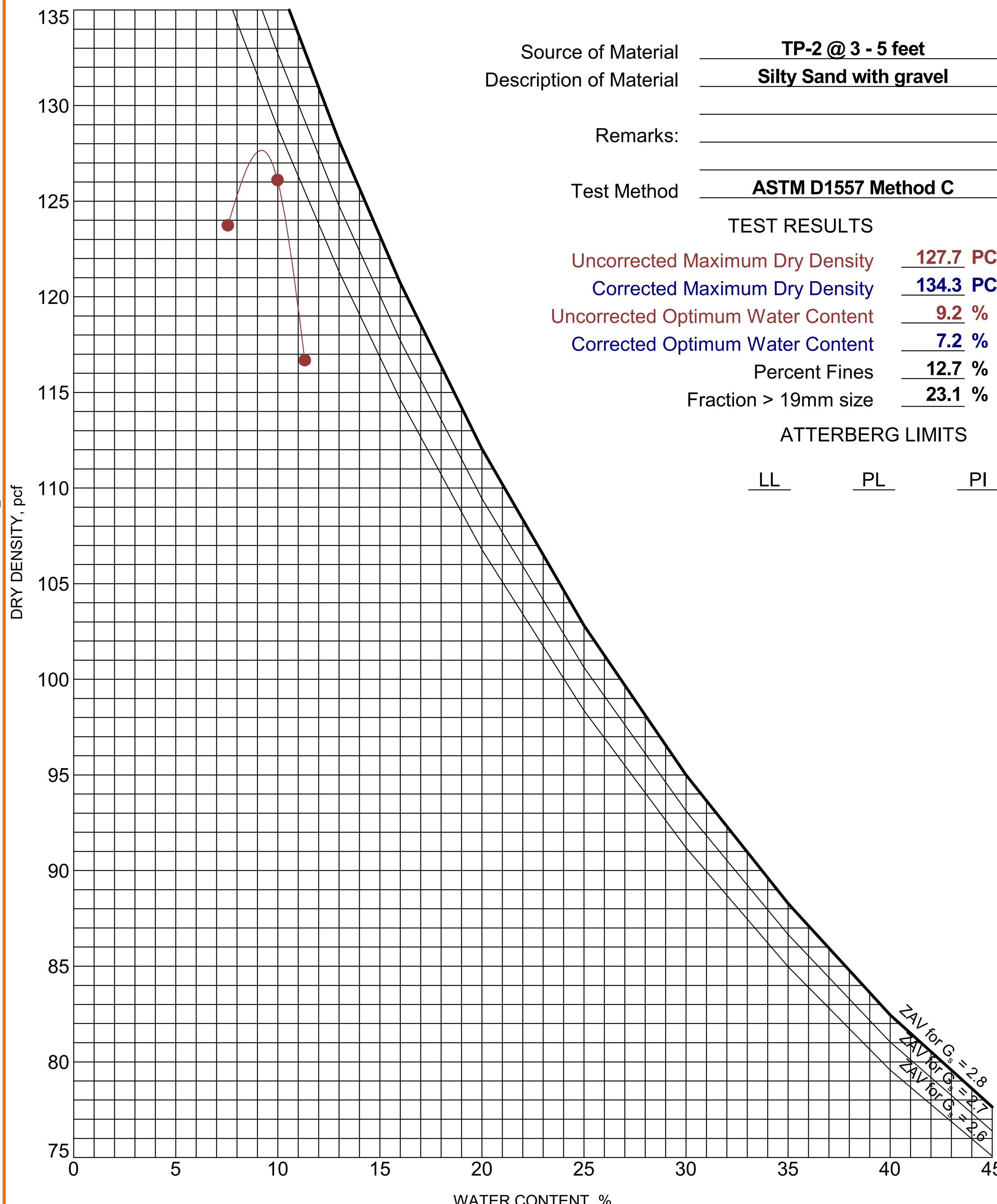
ATTERBERG LIMITS

LL	PL	PI

PROJECT: North Stonington Solar Field	Terracon 201 Hammer Mill Rd Rocky Hill, CT	PROJECT NUMBER: J2185196
SITE: 428 Providence-New London Turnpike North Stonington, Connecticut		CLIENT: Silicon Ranch Corporation Nashville, Tennessee

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**TP-2 @ 3 - 5 feet**
Description of Material	**Silty Sand with gravel**
Remarks:	
Test Method	**ASTM D1557 Method C**

TEST RESULTS

Uncorrected Maximum Dry Density	127.7	PCF
Corrected Maximum Dry Density	134.3	PCF
Uncorrected Optimum Water Content	9.2	%
Corrected Optimum Water Content	7.2	%
Percent Fines	12.7	%
Fraction > 19mm size	23.1	%

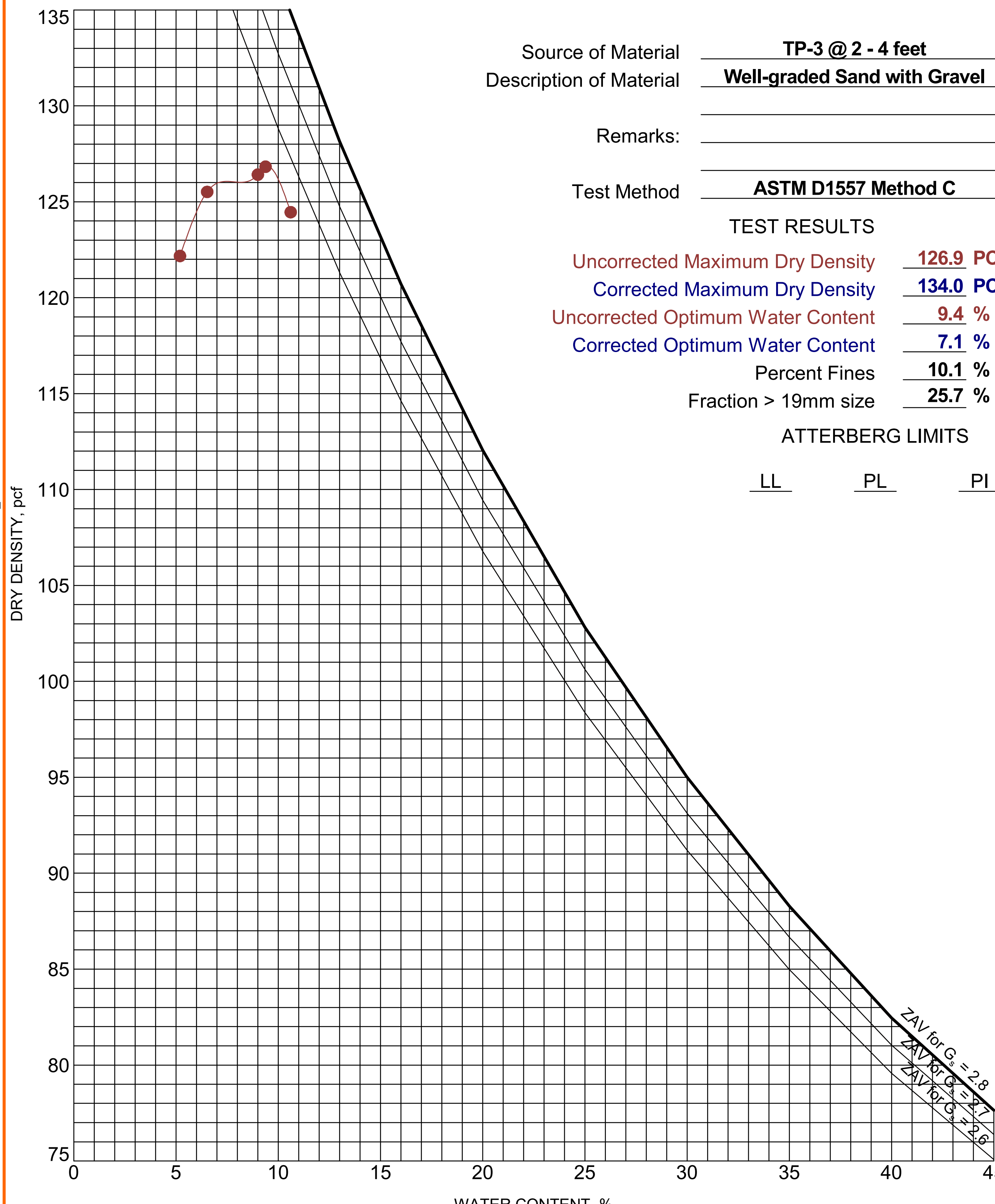
ATTERBERG LIMITS

LL	PL	PI

PROJECT: North Stonington Solar Field	Terracon 201 Hammer Mill Rd Rocky Hill, CT	PROJECT NUMBER: J2185196
SITE: 428 Providence-New London Turnpike North Stonington, Connecticut		CLIENT: Silicon Ranch Corporation Nashville, Tennessee

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**TP-3 @ 2 - 4 feet**
Description of Material	**Well-graded Sand with Gravel**
Remarks:	
Test Method	**ASTM D1557 Method C**

TEST RESULTS

Uncorrected Maximum Dry Density	**126.9**	**PCF**
Corrected Maximum Dry Density	**134.0**	**PCF**
Uncorrected Optimum Water Content	**9.4**	**%**
Corrected Optimum Water Content	**7.1**	**%**
Percent Fines	**10.1**	**%**
Fraction > 19mm size	**25.7**	**%**

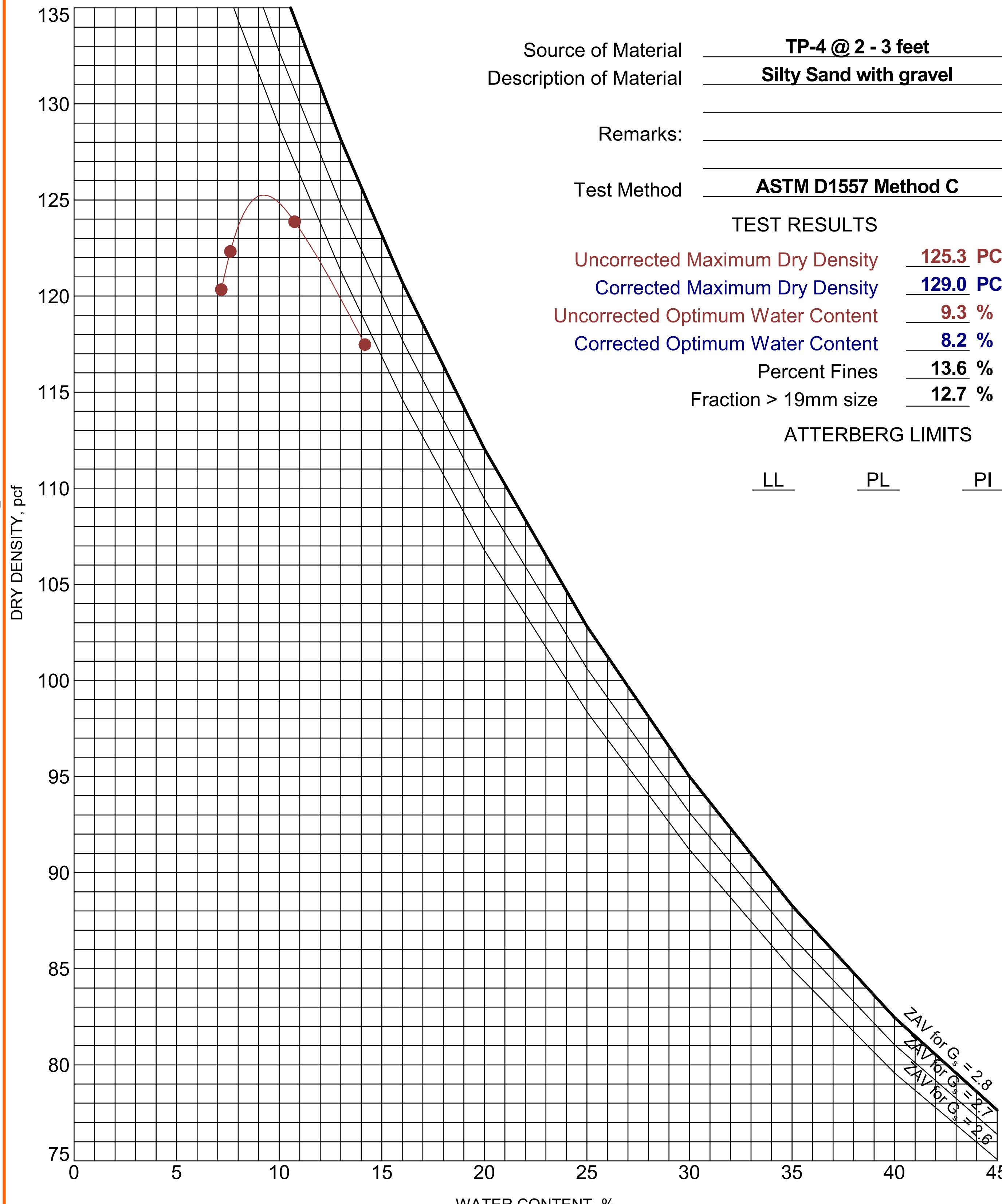
ATTERBERG LIMITS

LL	PL	PI

PROJECT: North Stonington Solar Field	Terracon 201 Hammer Mill Rd Rocky Hill, CT	PROJECT NUMBER: J2185196
SITE: 428 Providence-New London Turnpike North Stonington, Connecticut		CLIENT: Silicon Ranch Corporation Nashville, Tennessee

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**TP-4 @ 2 - 3 feet**
Description of Material	**Silty Sand with gravel**
Remarks:	
Test Method	**ASTM D1557 Method C**

TEST RESULTS

Uncorrected Maximum Dry Density	125.3	PCF
Corrected Maximum Dry Density	129.0	PCF
Uncorrected Optimum Water Content	9.3	%
Corrected Optimum Water Content	8.2	%
Percent Fines	13.6	%
Fraction > 19mm size	12.7	%

ATTERBERG LIMITS

LL	PL	PI

PROJECT: North Stonington Solar Field

SITE: 428 Providence-New London Turnpike
North Stonington, Connecticut

Terracon
201 Hammer Mill Rd
Rocky Hill, CT

PROJECT NUMBER: J2185196

CLIENT: Silicon Ranch Corporation
Nashville, Tennessee

CHEMICAL LABORATORY TEST REPORT

Project Number: J2185196
Service Date: 06/06/19
Report Date: 06/11/19
Task:

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

Client

Silicon Ranch Corp
Nashville, TN

Project

20 MW North Stonington Solar Field

Sample Submitted By: Terracon (J2) **Date Received:** 6/5/2019 **Lab No.: 19-0621**

Results of Resistivity Analysis

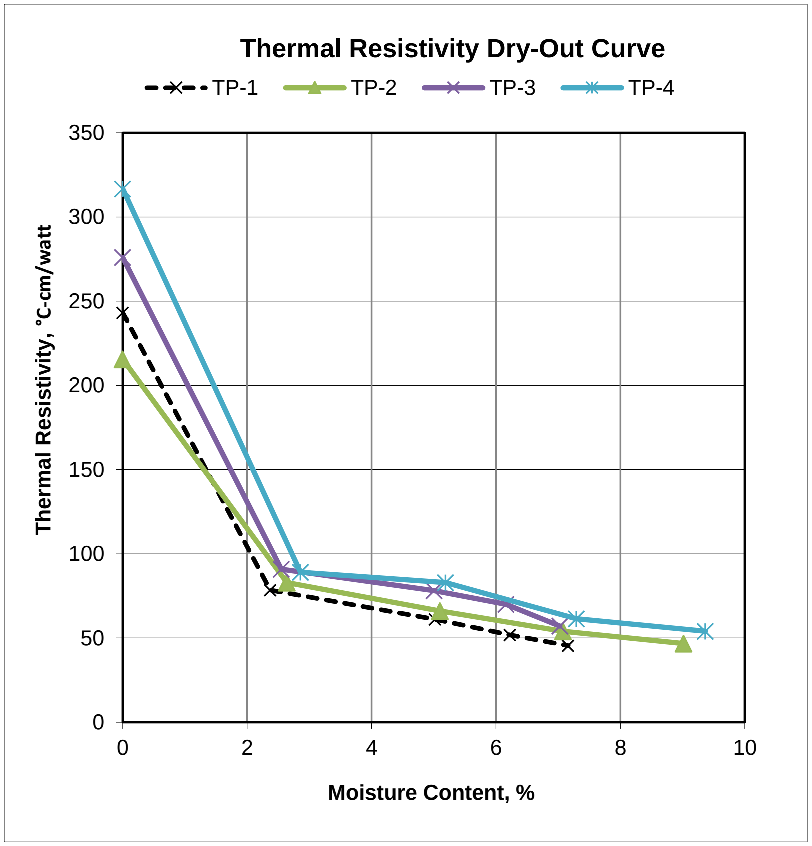
Sample Number				
Sample Location	TP-1	TP-2	TP-3	TP-4
Sample Depth (ft.)	2.0-5.0	3.0-5.0	2.0-4.0	2.0-3.0
pH Analysis, ASTM G 51	6.45	6.08	6.57	6.90
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	22	28	30	20
Chlorides, ASTM D 512, (mg/kg)	40	25	25	27
Resistivity, ASTM G 57, (ohm-cm)	23280	44620	44620	29100

Analyzed By: Trisha Campo

Trisha Campo
Chemist

Project Name: North Stonington
Project Number: J2185196

Sample ID	Soil Type	Proctor Method	Max. Dry Density (pcf)	Optimum Moisture Content (%)	Sample Compaction (%)	Thermal Resistivity Test Results		
						Moisture Content (%)	Thermal Resistivity (˚C-cm/watt)	Temperature (˚C)
TP-1	GM	ASTM D 1557-C	135.3	5.3	90	0.0	243	24.6
						2.4	78	25.8
						5.0	61	24.7
						6.2	52	24.8
						7.2	46	24.6
TP-2	GM	ASTM D 1557-C	134.4	7.1	90	0.0	216	24.3
						2.6	83	25.6
						5.1	66	24.8
						7.1	54	25.0
						9.0	47	24.5
TP-3	GM	ASTM D 1557-C	134.1	6.4	90	0.0	276	24.7
						2.6	91	23.6
						5.0	78	23.2
						6.2	70	23.5
						7.0	57	23.1
TP-4	GM	ASTM D 1557-C	127.6	8.7	90	0.0	317	24.5
						2.9	89	24.4
						5.2	83	24.7
						7.3	61	24.2
						9.4	54	23.9



Date: 7/17/2019	Run By: DMS	Reviewed By: BWP

Terracon

UConn Soil Nutrient Analysis Laboratory
6 Sherman Place, Unit 5102, Union Cottage
Storrs, CT 06269-5102
860-486-4274
www.soiltest.uconn.edu

UCONN
COLLEGE OF AGRICULTURE, HEALTH AND NATURAL RESOURCES
PLANT SCIENCE AND LANDSCAPE ARCHITECTURE

Soil Test Report

Order Number: 8171

Prepared For:
Brian Opp
Terracon Consultants Inc
201 Hammer Mill Rd
Rocky Hill, CT 06067

brian.opp@terracon.com
203.610.9061

Sample Information:

Sample Name:	TP - 2
Lab Number:	5255
Area Sampled:	
Received:	6/5/2019
Reported:	6/12/2019

Results

Nutrients Extracted From Your Soil (Modified Morgan)

		Below Optimum	Optimum	Above Optimum	Excessive*
Calcium	**190 lbs/acre**				
Magnesium	**126 lbs/acre**				
Phosphorus	**2 lbs/acre**				
Potassium	**97 lbs/acre**				

Excessive only defined for Phosphorus (>40 lbs/acre)

Soil pH (1:1, H2O)	3.5
Est. Cation Exch. Capacity (cmole+/100g)	21.7
Buffered pH (Mod. Mehlich)	4.9

Base Saturation	***%***	***Suggested***
Potassium	1	2.0 - 7.0
Magnesium	2	10 - 30
Calcium	2	40 - 50

Element	***ppm***	***Soil Range in CT***
Boron (B)	0.1	0.1 - 2.0
Copper (Cu)	0.1	0.3 - 0.8
Iron (Fe)	20.8	1.0 - 40.0
Manganese (Mn)	3.4	3.0 - 20.0
Zinc (Zn)	1.1	0.1 - 70.0
Sulfur (S)	16.3	10 - 100
Aluminum (Al)	140.6	10 - 300
Est. Total Lead (Pb)	low	

Limestone & Fertilizer Recommendations for Groundcovers

Limestone (Target pH of 6.3)

30 lbs / 100 sq ft

Comments:

LIMESTONE:
Apply ground limestone as recommended to raise the soil pH. For new plantings, work the entire amount into the top 6 to 8 inches of soil before planting. For established beds, gently scratch in limestone into soil around plants. If more than 10 lbs of limestone per 100 sq. ft. is recommended, put one-half down now and the other half in a month or more.
FERTILIZER:
Soil test values for both PHOSPHORUS and POTASSIUM are BELOW OPTIMUM.

Apply 2 pounds (4 cups) of 5-10-10 or the equivalent from other sources per 100 square feet. See the SUGGESTED FERTILIZER PRACTICES TREES, SHRUBS, VINES AND GROUNDCOVERS fact sheet for instructions on how and when to add fertilizer.

If you have questions about this report or fertilizer recommendations, contact the UConn Soil Nutrient Analysis Lab at (860) 486-4274 or email soiltest@uconn.edu.

If you have questions about any other plant, pest or disease problems, contact the UConn HOME and GARDEN EDUCATION CENTER, Dept. of Plant Science and Landscape Architecture. Phone: (877) 486-6271; email:ladybug@uconn.edu; website:www.ladybug.uconn.edu.

References (Crop Related):

Soil Test Interpretation and Recommendations	http://www.soiltest.uconn.edu/documents/interpretationofsoiltestresults6-2016.pdf
Suggested Fertilizer Practices for Trees, Shrubs, Groundcovers & Vines	http://www.soiltest.uconn.edu/documents/SuggFertPracttreesshrubsvinesgroundcovers5-2016.pdf
Fertilizer Conversions & Garden Measurements	http://www.soiltest.uconn.edu/documents/fertilizerandgardenmeasurements2-5-15.pdf

UConn Soil Nutrient Analysis Laboratory
6 Sherman Place, Unit 5102, Union Cottage
Storrs, CT 06269-5102
860-486-4274
www.soiltest.uconn.edu

UCONN
COLLEGE OF AGRICULTURE, HEALTH AND NATURAL RESOURCES
PLANT SCIENCE AND LANDSCAPE ARCHITECTURE

Soil Test Report

Order Number: 8171

Prepared For:
Brian Opp
Terracon Consultants Inc
201 Hammer Mill Rd
Rocky Hill, CT 06067

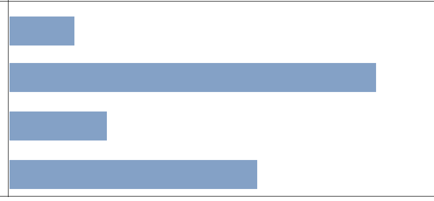
brian.opp@terracon.com
203.610.9061

Sample Information:
Sample Name: B - 5
Lab Number: 5256
Area Sampled:
Received: 6/5/2019
Reported: 6/12/2019

Results

Nutrients Extracted From Your Soil (Modified Morgan)

		Below Optimum	Optimum	Above Optimum	Excessive*
Calcium	**266 lbs/acre**				
Magnesium	**148 lbs/acre**				
Phosphorus	**3 lbs/acre**				
Potassium	**145 lbs/acre**				



**** Excessive only defined for Phosphorus (>40 lbs/acre)***

Soil pH (1:1, H2O)	4.6
Est. Cation Exch. Capacity (cmole+/100g)	22.7
Buffered pH (Mod. Mehlich)	4.9

Base Saturation	***%***	***Suggested***
Potassium	1	2.0 - 7.0
Magnesium	3	10 - 30
Calcium	3	40 - 50

Element	***ppm***	***Soil Range in CT***
Boron (B)	0.3	0.1 - 2.0
Copper (Cu)	0.1	0.3 - 0.8
Iron (Fe)	15.8	1.0 - 40.0
Manganese (Mn)	7.2	3.0 - 20.0
Zinc (Zn)	2.2	0.1 - 70.0
Sulfur (S)	11.6	10 - 100
Aluminum (Al)	63.8	10 - 300
Est. Total Lead (Pb)	low	

Limestone & Fertilizer Recommendations for Groundcovers

Limestone (Target pH of 6.3)

30 lbs / 100 sq ft

Comments:

LIMESTONE:
Apply ground limestone as recommended to raise the soil pH. For new plantings, work the entire amount into the top 6 to 8 inches of soil before planting. For established beds, gently scratch in limestone into soil around plants. If more than 10 lbs of limestone per 100 sq. ft. is recommended, put one-half down now and the other half in a month or more.
FERTILIZER:
Soil test values for both PHOSPHORUS and POTASSIUM are BELOW OPTIMUM.

Apply 2 pounds (4 cups) of 5-10-10 or the equivalent from other sources per 100 square feet. See the SUGGESTED FERTILIZER PRACTICES TREES, SHRUBS, VINES AND GROUNDCOVERS fact sheet for instructions on how and when to add fertilizer.

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References (Crop Related):

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Suggested Fertilizer Practices for Trees, Shrubs, Groundcovers & Vines	http://www.soiltest.uconn.edu/documents/SuggFertPracttreesshrubsvinesgroundcovers5-2016.pdf
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PLANT SCIENCE AND LANDSCAPE ARCHITECTURE

Soil Test Report

Order Number: 8171

Prepared For:
Brian Opp
Terracon Consultants Inc
201 Hammer Mill Rd
Rocky Hill, CT 06067

brian.opp@terracon.com
203.610.9061

Sample Information:
Sample Name: TP - 3
Lab Number: 5257
Area Sampled:
Received: 6/5/2019
Reported: 6/12/2019

Results

Nutrients Extracted From Your Soil (Modified Morgan)

		Below Optimum	Optimum	Above Optimum	Excessive*
Calcium	**183 lbs/acre**				
Magnesium	**58 lbs/acre**				
Phosphorus	**5 lbs/acre**				
Potassium	**56 lbs/acre**				

**** Excessive only defined for Phosphorus (>40 lbs/acre)***

Soil pH (1:1, H2O)	5.0
Est. Cation Exch. Capacity (cmole+/100g)	9.0
Buffered pH (Mod. Mehlich)	5.9

Base Saturation	***%***	***Suggested***
Potassium	1	2.0 - 7.0
Magnesium	3	10 - 30
Calcium	5	40 - 50

Element	***ppm***	***Soil Range in CT***
Boron (B)	0.1	0.1 - 2.0
Copper (Cu)	0.2	0.3 - 0.8
Iron (Fe)	7.5	1.0 - 40.0
Manganese (Mn)	3.0	3.0 - 20.0
Zinc (Zn)	1.0	0.1 - 70.0
Sulfur (S)	8.1	10 - 100
Aluminum (Al)	150.9	10 - 300
Est. Total Lead (Pb)	low	

Limestone & Fertilizer Recommendations for Groundcovers

Limestone (Target pH of 6.3)

15 lbs / 100 sq ft

Comments:

LIMESTONE:
Apply ground limestone as recommended to raise the soil pH. For new plantings, work the entire amount into the top 6 to 8 inches of soil before planting. For established beds, gently scratch in limestone into soil around plants. If more than 10 lbs of limestone per 100 sq. ft. is recommended, put one-half down now and the other half in a month or more.
FERTILIZER:
Soil test values for both PHOSPHORUS and POTASSIUM are BELOW OPTIMUM.

Apply 2 pounds (4 cups) of 5-10-10 or the equivalent from other sources per 100 square feet. See the SUGGESTED FERTILIZER PRACTICES TREES, SHRUBS, VINES AND GROUNDCOVERS fact sheet for instructions on how and when to add fertilizer.

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Suggested Fertilizer Practices for Trees, Shrubs, Groundcovers & Vines	http://www.soiltest.uconn.edu/documents/SuggFertPracttreesshrubsvinesgroundcovers5-2016.pdf
Fertilizer Conversions & Garden Measurements	http://www.soiltest.uconn.edu/documents/fertilizerandgardenmeasurements2-5-15.pdf

FIELD ELECTRICAL RESISTIVITY TEST DATA

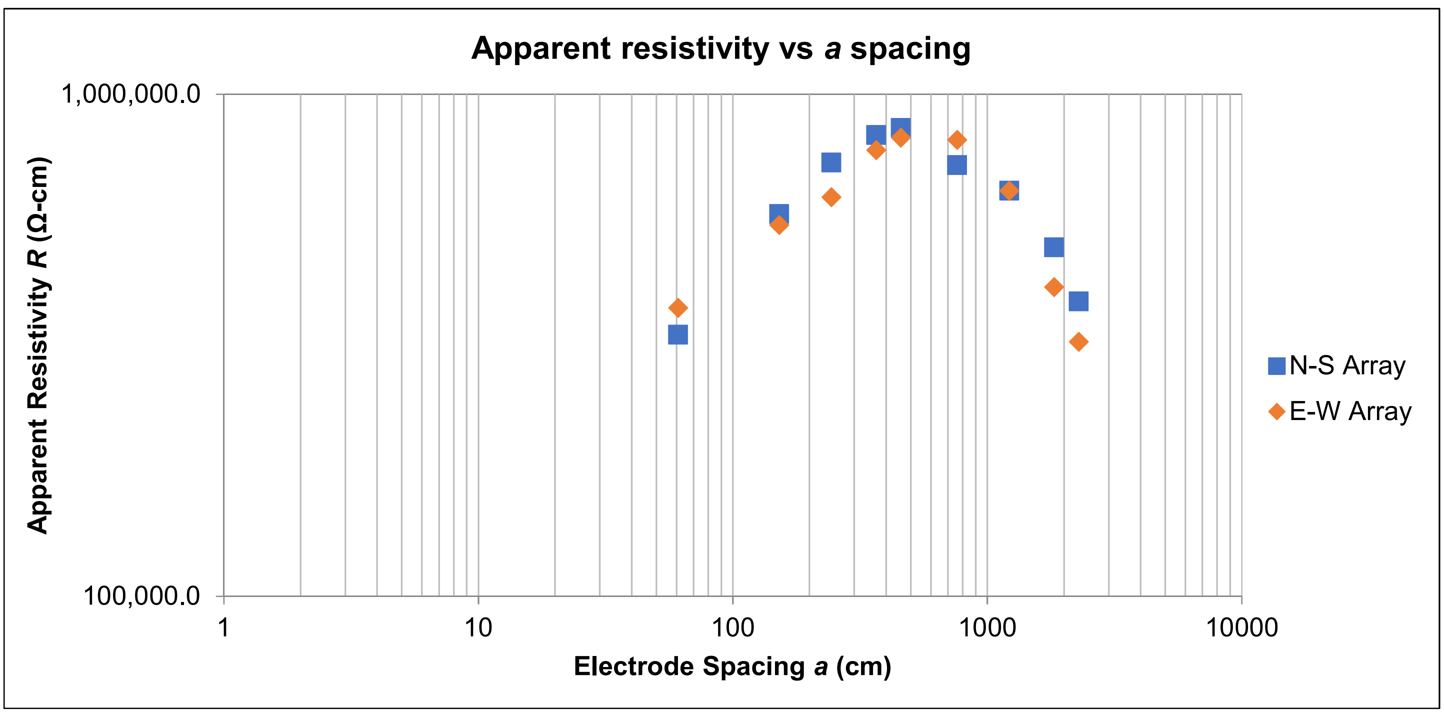
North Stonington Solar Facility ■ North Stonington, Connecticut
December 11, 2020 ■ Terracon Project No. J2185196

Terracon GeoReport

Array Loc.	TP-1		
Instrument	MiniSting R1/IP, Model 289	**Weather**	Temperature, weather
Serial #	S1507299	**Ground Cond.**	
Cal. Check	9/3/2020	**Tested By**	LJ Salyers
Test Date	May 20, 2019	**Method**	Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)
Notes & Conflicts			

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)
2	61	6	15	791.30	332,620	893.10	375,410
5	152	6	15	595.40	578,180	565.80	549,430
8	244	6	15	474.50	732,240	404.70	624,520
12	366	6	15	360.50	831,450	336.00	774,950
15	457	12	30	296.80	858,620	283.60	820,430
25	762	12	30	150.80	723,950	169.00	811,330
40	1219	12	30	84.01	644,130	83.85	642,900
60	1829	12	30	43.19	496,570	35.95	413,330
75	2286	12	30	26.98	387,640	22.37	321,410



FIELD ELECTRICAL RESISTIVITY TEST DATA

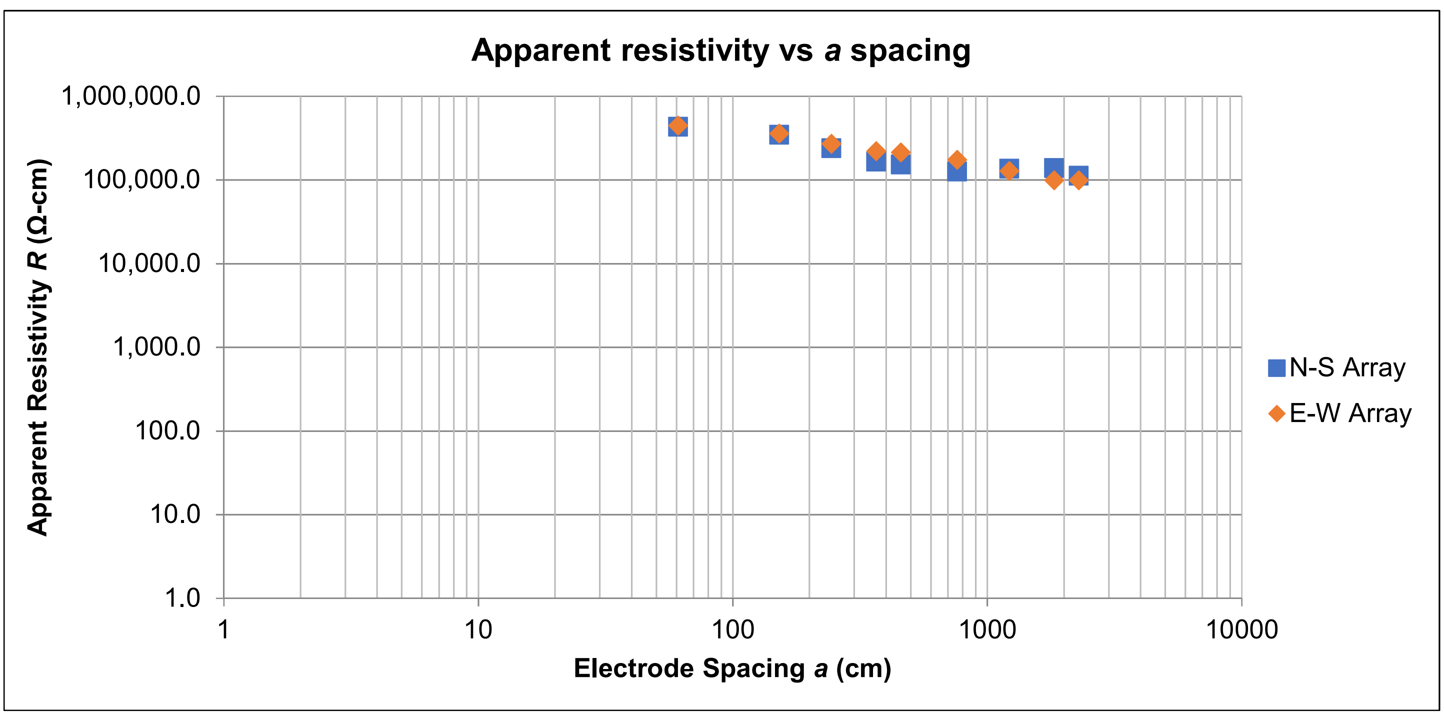
North Stonington Solar Facility ■ North Stonington, Connecticut

December 11, 2020 ■ Terracon Project No. J2185196

Array Loc.	B-2		
Instrument	MiniSting R1/IP, Model 289	**Weather**	Temperature, weather
Serial #	S1507299	**Ground Cond.**	
Cal. Check	9/3/2020	**Tested By**	LJ Salyers
Test Date	May 20, 2019	**Method**	Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)
Notes & Conflicts			

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

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)
2	61	6	15	1,042.00	438,000	1,068.00	448,930
5	152	6	15	360.70	350,270	372.10	361,340
8	244	6	15	156.40	241,350	175.70	271,140
12	366	6	15	72.78	167,860	96.14	221,740
15	457	12	30	53.23	153,990	73.77	213,410
25	762	12	30	26.49	127,170	36.41	174,800
40	1219	12	30	17.92	137,400	16.74	128,350
60	1829	12	30	12.24	140,730	8.63	99,200
75	2286	12	30	7.89	113,390	6.95	99,780



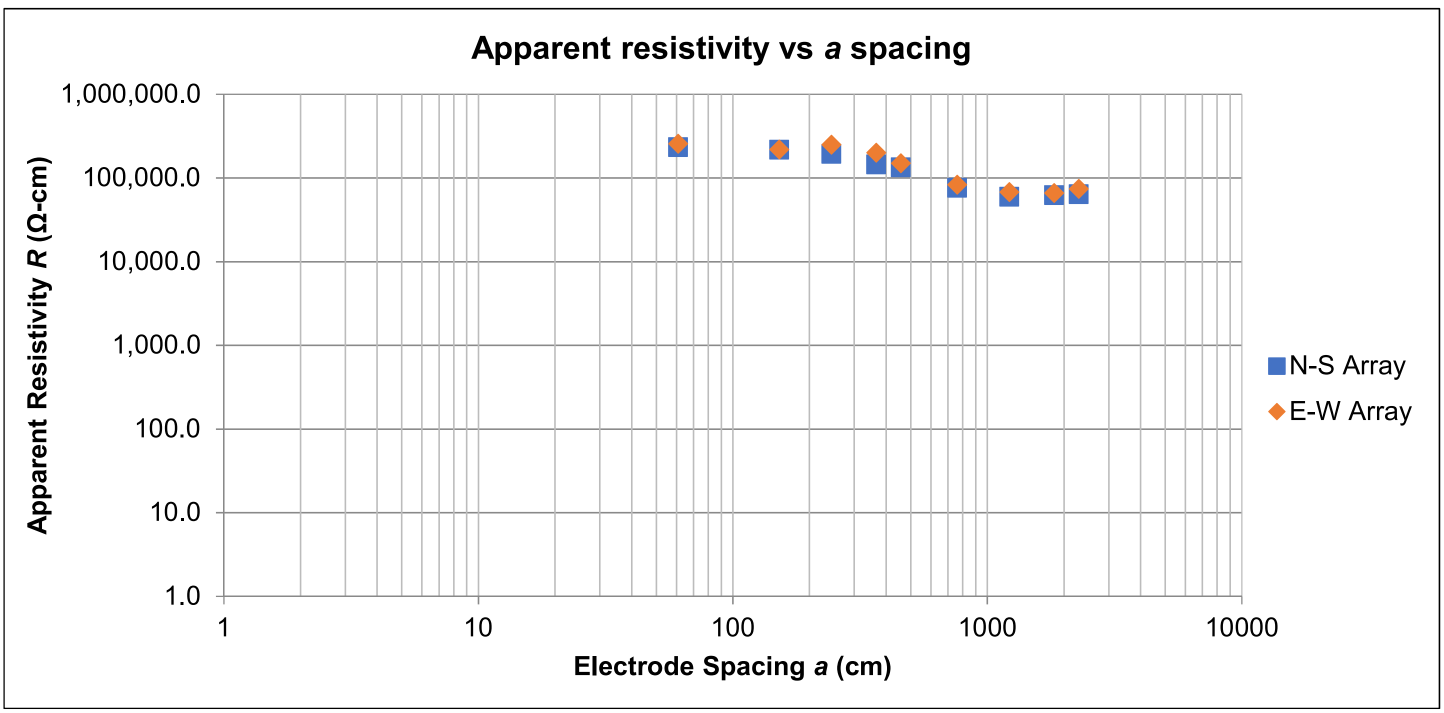
FIELD ELECTRICAL RESISTIVITY TEST DATA

North Stonington Solar Facility ■ North Stonington, Connecticut
December 11, 2020 ■ Terracon Project No. J2185196

Array Loc.	B-5		
Instrument	MiniSting R1/IP, Model 289	**Weather**	Temperature, weather
Serial #	S1507299	**Ground Cond.**	
Cal. Check	9/3/2020	**Tested By**	LJ Salyers
Test Date	May 20, 2019	**Method**	Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)
Notes & Conflicts			

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

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R* Ω	Apparent Resistivity *ρ* (Ω-cm)	Measured Resistance *R* Ω	Apparent Resistivity *ρ* (Ω-cm)
2	61	6	15	562.40	236,400	613.10	257,710
5	152	6	15	226.20	219,660	227.00	220,430
8	244	6	15	127.50	196,760	161.90	249,840
12	366	6	15	63.58	146,640	86.98	200,610
15	457	12	30	46.85	135,530	52.19	150,980
25	762	12	30	16.03	76,960	17.32	83,150
40	1219	12	30	7.88	60,420	8.91	68,290
60	1829	12	30	5.49	63,170	5.78	66,490
75	2286	12	30	4.48	64,340	5.16	74,150

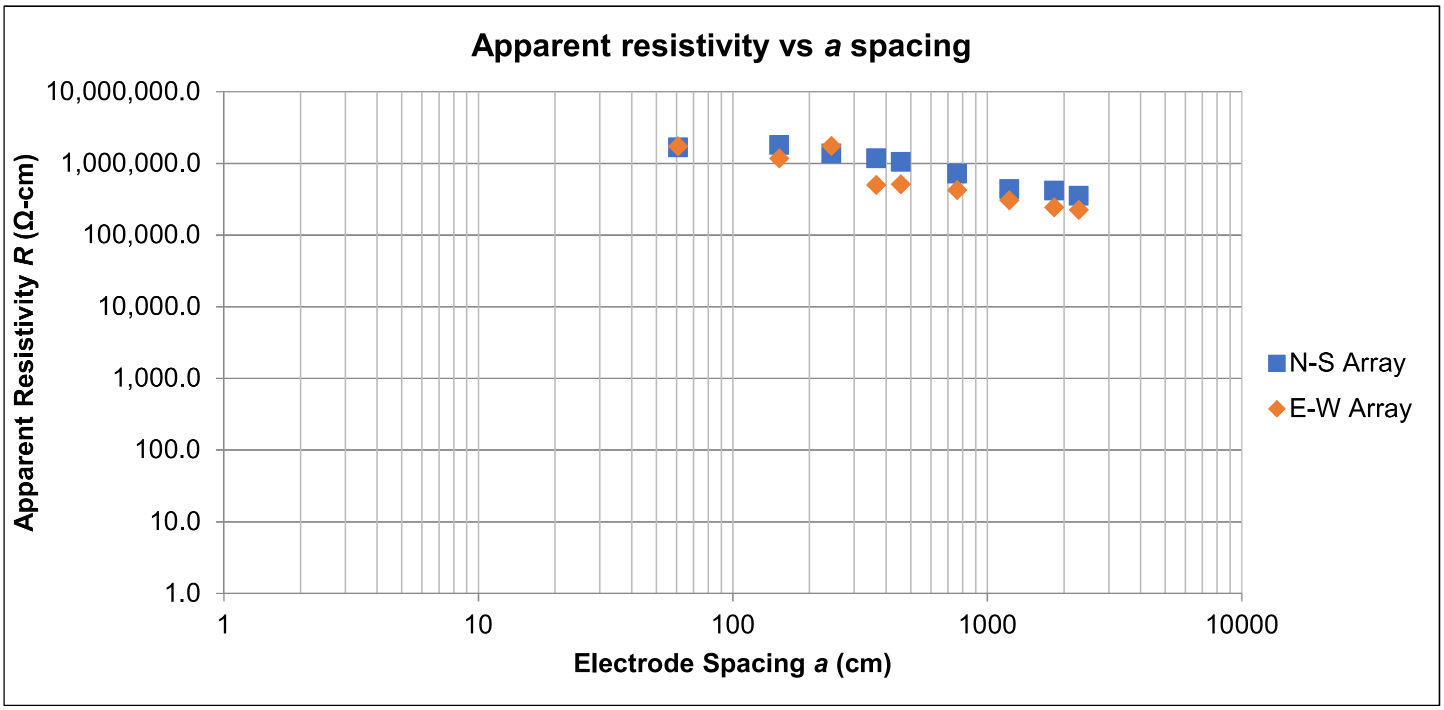


FIELD ELECTRICAL RESISTIVITY TEST DATA
North Stonington Solar Facility ■ North Stonington, Connecticut
December 11, 2020 ■ Terracon Project No. J2185196

Array Loc.	B-7		
Instrument	MiniSting R1/IP, Model 289	**Weather**	Temperature, weather
Serial #	S1507299	**Ground Cond.**	
Cal. Check	9/3/2020	**Tested By**	LJ Salyers
Test Date	May 20, 2019	**Method**	Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)
Notes & Conflicts			

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)
2	61	6	15	4,031.00	1,694,400	4,146.00	1,742,740
5	152	6	15	1,881.00	1,826,590	1,216.00	1,180,830
8	244	6	15	904.70	1,396,110	1,135.00	1,751,510
12	366	6	15	517.20	1,192,860	218.70	504,410
15	457	12	30	368.20	1,065,170	177.10	512,340
25	762	12	30	151.40	726,830	88.83	426,450
40	1219	12	30	58.11	445,550	40.03	306,920
60	1829	12	30	36.53	420,000	21.31	245,010
75	2286	12	30	24.95	358,470	15.76	226,430



FIELD ELECTRICAL RESISTIVITY TEST DATA

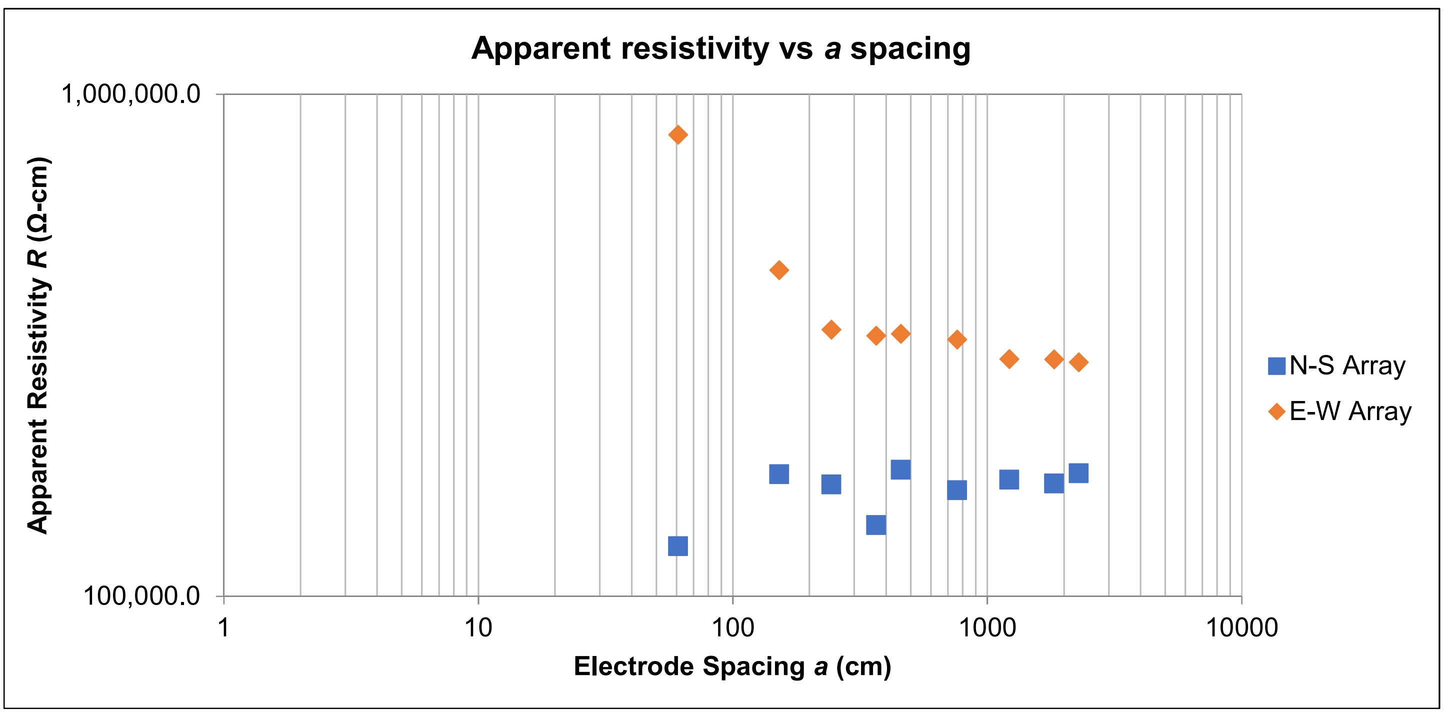
North Stonington Solar Facility ■ North Stonington, Connecticut
December 11, 2020 ■ Terracon Project No. J2185196

Terracon GeoReport

Array Loc.	B-9		
Instrument	MiniSting R1/IP, Model 289	**Weather**	Temperature, weather
Serial #	S1507299	**Ground Cond.**	
Cal. Check	9/3/2020	**Tested By**	LJ Salyers
Test Date	May 20, 2019	**Method**	Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)
Notes & Conflicts			

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R* Ω	Apparent Resistivity *ρ* (Ω-cm)	Measured Resistance *R* Ω	Apparent Resistivity *ρ* (Ω-cm)
2	61	6	15	299.80	126,020	1,976.00	830,600
5	152	6	15	180.70	175,470	459.90	446,600
8	244	6	15	108.40	167,280	220.20	339,810
12	366	6	15	60.22	138,890	143.40	330,740
15	457	12	30	61.86	178,960	115.30	333,550
25	762	12	30	33.92	162,840	67.71	325,060
40	1219	12	30	22.31	171,060	38.74	297,030
60	1829	12	30	14.61	167,980	25.79	296,520
75	2286	12	30	12.25	176,000	20.37	292,670



FIELD ELECTRICAL RESISTIVITY TEST DATA

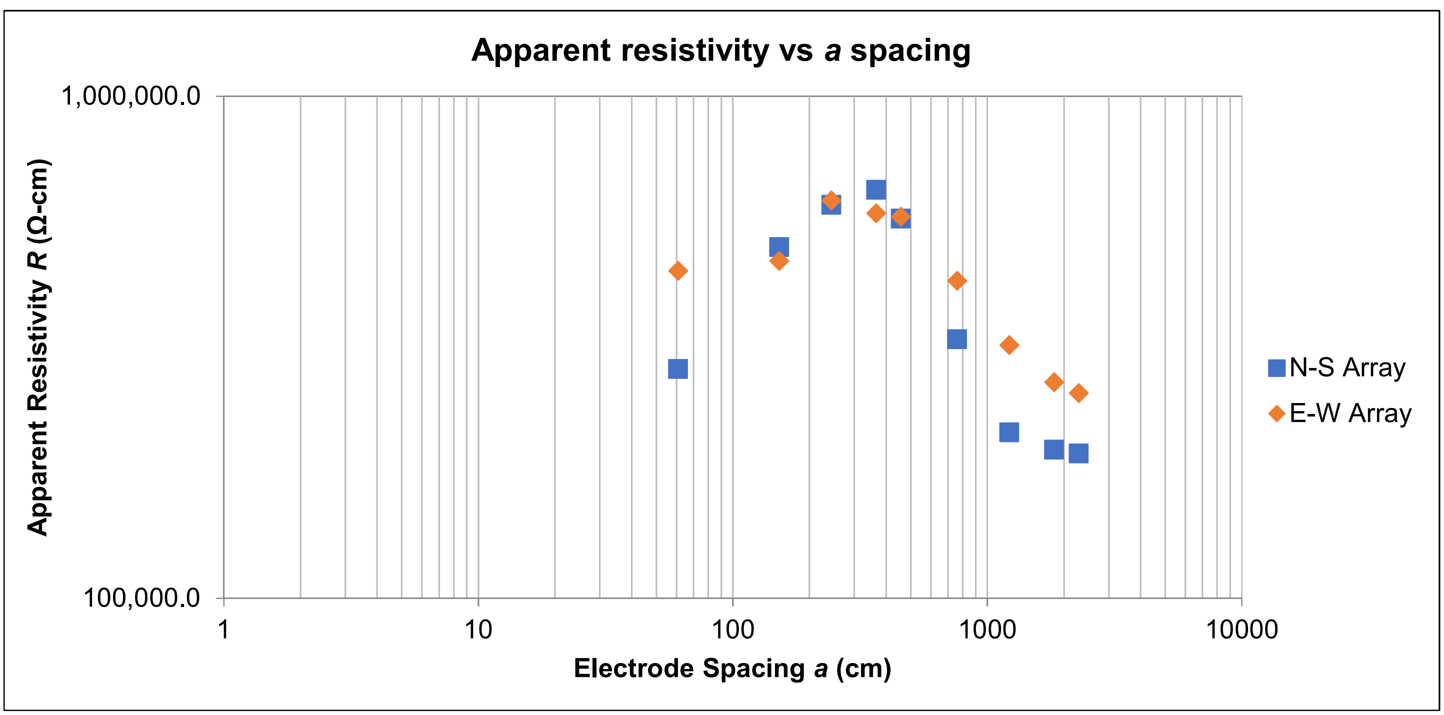
North Stonington Solar Facility ■ North Stonington, Connecticut
December 11, 2020 ■ Terracon Project No. J2185196

Terracon GeoReport

Array Loc.	B-10		
Instrument	MiniSting R1/IP, Model 289	**Weather**	Temperature, weather
Serial #	S1507299	**Ground Cond.**	
Cal. Check	9/3/2020	**Tested By**	LJ Salyers
Test Date	May 20, 2019	**Method**	Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)
Notes & Conflicts			

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

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)
2	61	6	15	681.80	286,590	1,069.00	449,350
5	152	6	15	516.50	501,560	484.40	470,390
8	244	6	15	394.50	608,780	401.90	620,200
12	366	6	15	282.90	652,480	253.80	585,360
15	457	12	30	197.50	571,350	198.90	575,400
25	762	12	30	68.43	328,510	89.39	429,140
40	1219	12	30	27.97	214,450	41.71	319,800
60	1829	12	30	17.22	197,980	23.46	269,730
75	2286	12	30	13.55	194,680	17.85	256,460

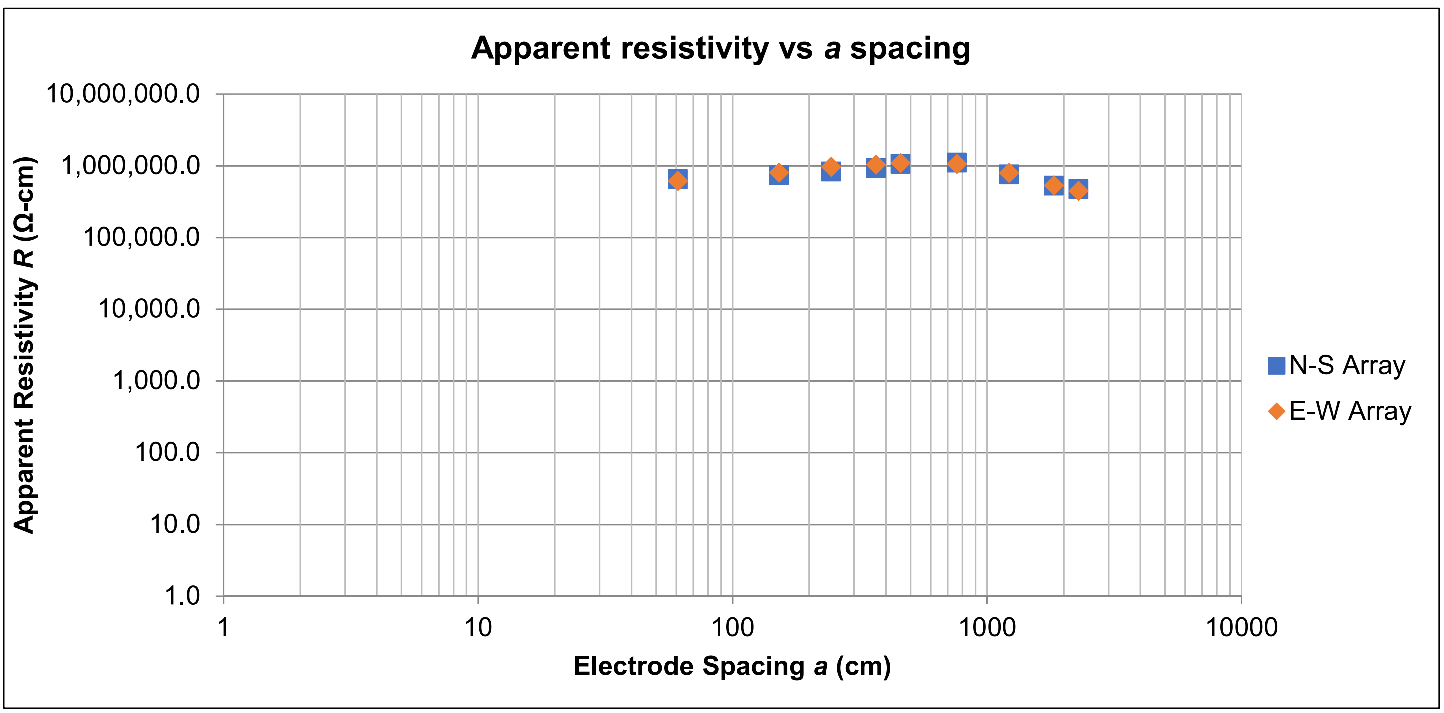


FIELD ELECTRICAL RESISTIVITY TEST DATA
North Stonington Solar Facility ■ North Stonington, Connecticut
December 11, 2020 ■ Terracon Project No. J2185196

Array Loc.	PLT-5		
Instrument	MiniSting R1/IP, Model 289	**Weather**	Temperature, weather
Serial #	S1507299	**Ground Cond.**	
Cal. Check	9/3/2020	**Tested By**	LJ Salyers
Test Date	May 20, 2019	**Method**	Wenner 4-pin (ASTM G57-06 (2012); IEEE 81-2012)
Notes & Conflicts			

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

Electrode Spacing *a*		**Electrode Depth *b***		**N-S Test**		**E-W Test**	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)	Measured Resistance *R* Ω	Apparent Resistivity ρ (Ω-cm)
2	61	6	15	1,556.00	654,050	1,468.00	617,060
5	152	6	15	772.30	749,960	832.30	808,230
8	244	6	15	546.30	843,040	629.70	971,740
12	366	6	15	406.60	937,780	452.60	1,043,870
15	457	12	30	371.70	1,075,300	380.00	1,099,310
25	762	12	30	233.90	1,122,890	221.50	1,063,360
40	1219	12	30	99.83	765,430	104.00	797,400
60	1829	12	30	46.40	533,480	46.67	536,580
75	2286	12	30	33.39	479,740	31.29	449,570



Site Name: North Stonington Solar Facility

	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)
Installation Data	3	0	3	0	0	0	3	0	3	0	0.25	0	2.75	0	3	0	0.5	0
	4	3.1	4	4.3	1	1.4	4	7.0	4	2.5	1	2.7	3	0.3	4	7.1	1	0.9
	5	11.4	5	13.9	2	3.2	5	20.0	5	13.7	2	4.7	4	4.2	5	36.1	2	3.1
	6	25.4	6	33.0	3	7.1	6	33.1	6	32.3	3	9.0	5	23.3	6	61.3	3	4.8
	7	43.6	7	44.4	4	14.1	7	55.4	7	43.8	4	14.1	6	51.5	6.83	92.9	4	15.4
	8	55.2	8	60.8	5	22.9	8	70.7	8	52.8	5	47.2	7	70.1			5	54.9
	9	80.1	9	97.4	6	33.9	9	93.7	9	63.5			8	89.1			6	81.4
			9.25	146.2	7	46.6			10	82.9			9	107.7			7	108.8
					8	67.5			11	102.1							7.33	139.5
					9	122.5			12	177.4								
Pile ID	PT-1A		PT-1B		PT-1C		PT-2A		PT-2B		PT-2C		PT-3A		PT-3B		PT-3C	
Refusal?	X		X								X				X		X	
Final Embedment, ft	9		9.25		9		9		12		5		9		6.83		7.33	
Total Drive Time, sec	80.12		146.21		122.49		93.74		177.42		47.23		107.66		92.93		139.5	
Section	W6x12		W6x12		W6x12		W6x12		W6x12		W6x12		W6x12		W6x12		W6x12	
Approx. Push Depth, feet	3		3		0		3		3		0.25		2.75		3		0.5	
Installation Date	5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019	
Driving Comments			At 5'3" the pile became out of plumb. Refusal at 15s/in		Pile twisted at 3' during drive.				At 5'6" the pile became out of plumb during drive.				Pile twisted at 3'6" during drive.		At 5'7" the pile became out of plumb during drive.		At 4' the pile was twisted and became out of plumb during drive.	

	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)	Depth (ft)	Cumulative Drive Times (sec.)
Installation Data	2.75	0	3	0	0	0	3	-0.5	3	-1.0	0.25	-1.5	2	-2.0	2	-2.5	0	-3.0
	3	2.0	4	5.3	1	3.5	4	12.4	4	5.2	1	1.5	3	3.0	3	6.7	1	2.4
	4	12.1	4.75	15.1	2	12.1	5	43.8	5	16.5	2	3.2	3.5	13.9	3.17	19.8	2	8.3
					3	29.1	6	64.8	6	39.5	3	6.5					3	39.2
					4	50.3	7	88.0	7	101.3	4	22.1					3.5	91.6
					5	75.0	8	198.2	7.67	212.8	5	41.6						
					6	115.4					6	58.4						
											6.75	82.2						
Pile ID	PT-4A		PT-4B		PT-4C		PT-5A		PT-5B		PT-5C		PT-6A		PT-6B		PT-6C	
Refusal?	X		X		X		X		X		X		X		X		X	
Final Embedment, ft	4		4.75		6		8		7.67		6.75		3.5		3.17		3.5	
Total Drive Time, sec	12.05		15.09		115.37		198.16		212.8		82.2		13.87		19.82		91.57	
Section	W6x12		W6x12		W6x12		W6x12		W6x12		W6x12		W6x12		W6x12		W6x12	
Approx. Push Depth, feet	2.75		3		0		3		3		0.25		2		2		0	
Installation Date	5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019		5/23/2019	
Driving Comments	Attempted to drive pile multiple times. Met absolute refusal in less than 3'. Per LJ's request, removed pile completely.				At 4'9" the pile became out of plumb.		At 4' the pile became out of plumb, slowed down to 15 s/in before meeting absolute refusal.		Pile slowed down to 15 s/in, then 20 s/in before meeting absolute refusal.		Pile slowed down to 15 s/in before meeting absolute refusal.		Attempted to drive multiple times. Pile met absolute refusal at approx 3'6". Per LJ's request, removed pile completely.		Attempted to drive pile multiple times. Pile met absolute refusal at approx. 3' Per LJ's request, removed pile completely.			

Tension Load Test Result for PLT-1A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connectic
Project Number:	J2185196

Axial Load Test Set Up

Number of Gauges:	2
Height of Gauges [in]:	6
Load Cell:	DEDR2602695

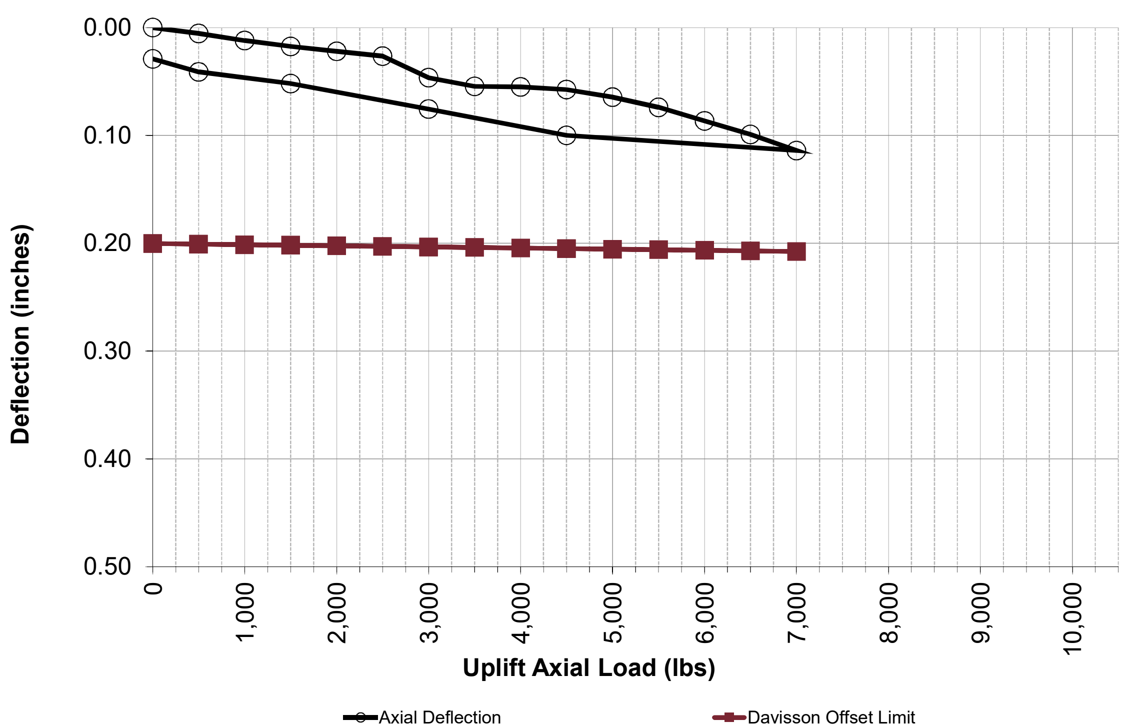
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-1A
Latitude:	41.4355
Longitude:	-71.8185
Pile Type:	W6x12
Pile Embedment Depth [in]:	108
Pile Diameter [in]:	6.03
Pile Stick-Up [in]:	36
Axial Design Load [lbs]:	7000
Pile Area [sq. in]:	3.55
Elastic Modulus [ksi]:	29,000
Drive Time [sec]:	80.12

Tension Test Results			Davisson Offset Limit Lines		
% of Design Load	Axial Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Elastic Data (in) (PL/AE)	Davisson Offset Limit (in) (0.15+D/120+(PL/AE))	Comments
0%	0	0.000	0.000	0.200	
7%	500	0.006	0.001	0.201	
14%	1000	0.012	0.001	0.201	
21%	1500	0.018	0.002	0.202	
29%	2000	0.022	0.002	0.202	
36%	2500	0.027	0.003	0.203	
43%	3000	0.047	0.003	0.203	
50%	3500	0.055	0.004	0.204	
57%	4000	0.055	0.004	0.204	
64%	4500	0.058	0.005	0.205	
71%	5000	0.065	0.005	0.205	
79%	5500	0.074	0.006	0.206	
86%	6000	0.087	0.006	0.207	
93%	6500	0.099	0.007	0.207	
100%	7000	0.114	0.007	0.208	
64%	4500	0.100	0.005	0.205	
43%	3000	0.076	0.003	0.203	
21%	1500	0.052	0.002	0.202	
7%	500	0.041	0.001	0.201	
0%	0	0.029	0.000	0.200	



Tension Load Test Result for PLT-2A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Axial Load Test Set Up

Number of Gauges:	2
Height of Gauges [in]:	6
Load Cell:	DEDR2602695

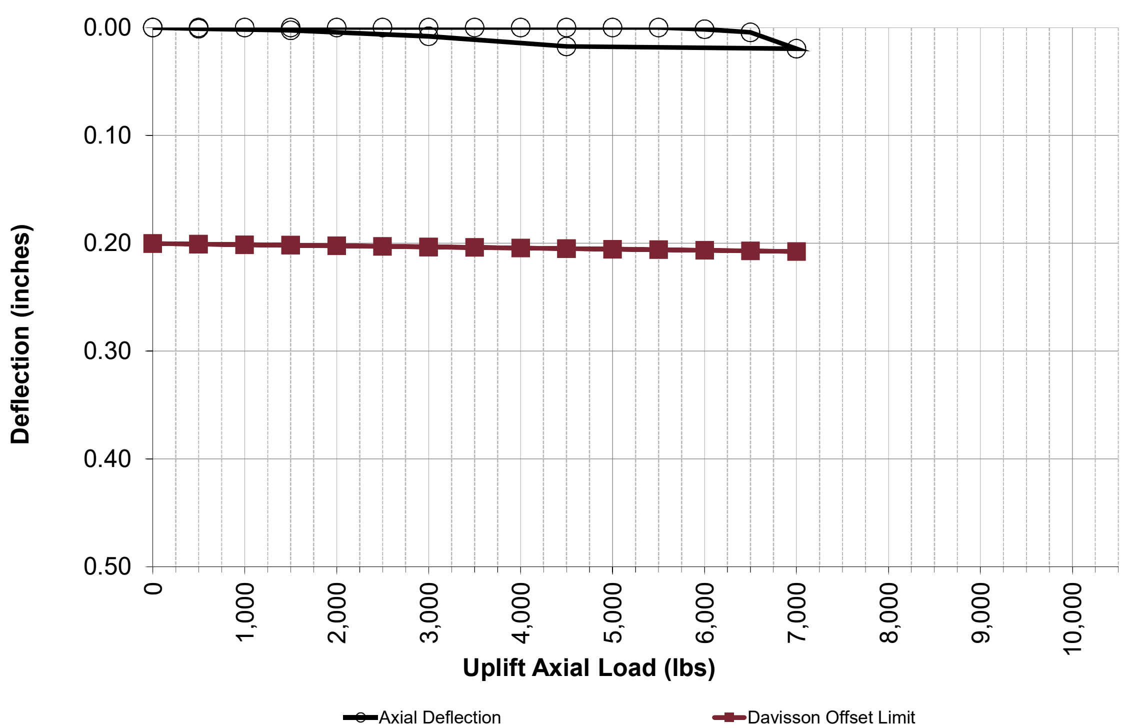
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-2A
Latitude:	41.4340
Longitude:	-71.8142
Pile Type:	W6x12
Pile Embedment Depth [in]:	108
Pile Diameter [in]:	6.03
Pile Stick-Up [in]:	36
Axial Design Load [lbs]:	7000
Pile Area [sq. in]:	3.55
Elastic Modulus [ksi]:	29,000
Drive Time [sec]:	93.74

Tension Test Results			Davisson Offset Limit Lines		
% of Design Load	Axial Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Elastic Data (in) (PL/AE)	Davisson Offset Limit (in) (0.15+D/120+(PL/AE))	Comments
0%	0	0.000	0.000	0.200	
7%	500	0.000	0.001	0.201	
14%	1000	0.000	0.001	0.201	
21%	1500	0.000	0.002	0.202	
29%	2000	0.000	0.002	0.202	
36%	2500	0.000	0.003	0.203	
43%	3000	0.000	0.003	0.203	
50%	3500	0.000	0.004	0.204	
57%	4000	0.000	0.004	0.204	
64%	4500	0.000	0.005	0.205	
71%	5000	0.000	0.005	0.205	
79%	5500	0.000	0.006	0.206	
86%	6000	0.002	0.006	0.207	
93%	6500	0.005	0.007	0.207	
100%	7000	0.020	0.007	0.208	
64%	4500	0.018	0.005	0.205	
43%	3000	0.008	0.003	0.203	
21%	1500	0.003	0.002	0.202	
7%	500	0.001	0.001	0.201	
0%	0	0.000	0.000	0.200	



Tension Load Test Result for PLT-2B

Project Information

Project Name: North Stonington Solar Facility
Project Location: North Stonington, Connectic
Project Number: J2185196

Axial Load Test Set Up

Number of Gauges: 2
Height of Gauges [in]: 6
Load Cell: DEDR2602695

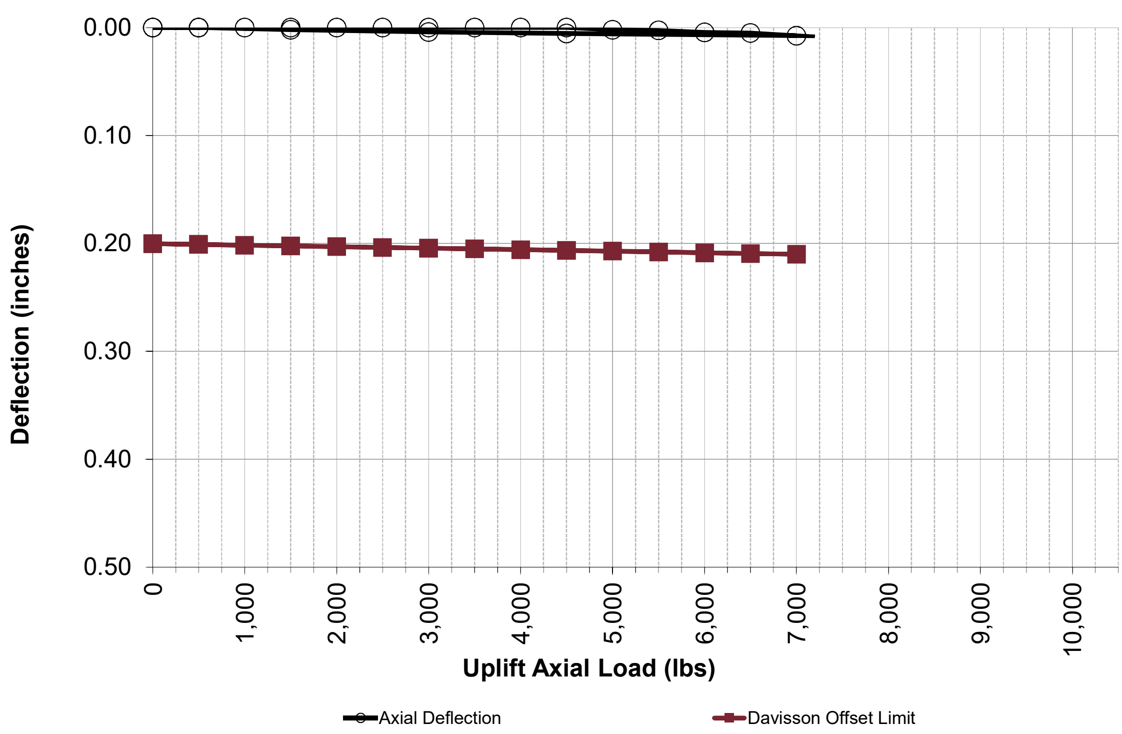
Test Date and Representative

Tested By Terracon Rep: LJ Salyers
Date Tested: 5/23/2019

Pile Information

Pile ID: PLT-2B
Latitude: 41.4340
Longitude: -71.8142
Pile Type: W6x12
Pile Embedment Depth [in]: 144
Pile Diameter [in]: 6.03
Pile Stick-Up [in]: 36
Axial Design Load [lbs]: 7000
Pile Area [sq. in]: 3.55
Elastic Modulus [ksi]: 29,000
Drive Time [sec]: 177.42

Tension Test Results			Davisson Offset Limit Lines		
% of Design Load	Axial Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Elastic Data (in) (PL/AE)	Davisson Offset Limit (in) (0.15+D/120+(PL/AE))	Comments
0%	0	0.000	0.000	0.200	
7%	500	0.000	0.001	0.201	
14%	1000	0.000	0.001	0.202	
21%	1500	0.000	0.002	0.202	
29%	2000	0.000	0.003	0.203	
36%	2500	0.000	0.003	0.204	
43%	3000	0.000	0.004	0.204	
50%	3500	0.000	0.005	0.205	
57%	4000	0.000	0.006	0.206	
64%	4500	0.000	0.006	0.207	
71%	5000	0.002	0.007	0.207	
79%	5500	0.003	0.008	0.208	
86%	6000	0.005	0.008	0.209	
93%	6500	0.005	0.009	0.209	
100%	7000	0.008	0.010	0.210	
64%	4500	0.006	0.006	0.207	
43%	3000	0.004	0.004	0.204	
21%	1500	0.002	0.002	0.202	
7%	500	0.000	0.001	0.201	
0%	0	0.000	0.000	0.200	



Tension Load Test Result for PLT-3A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connectic
Project Number:	J2185196

Axial Load Test Set Up

Number of Gauges:	2
Height of Gauges [in]:	6
Load Cell:	DEDR2602695

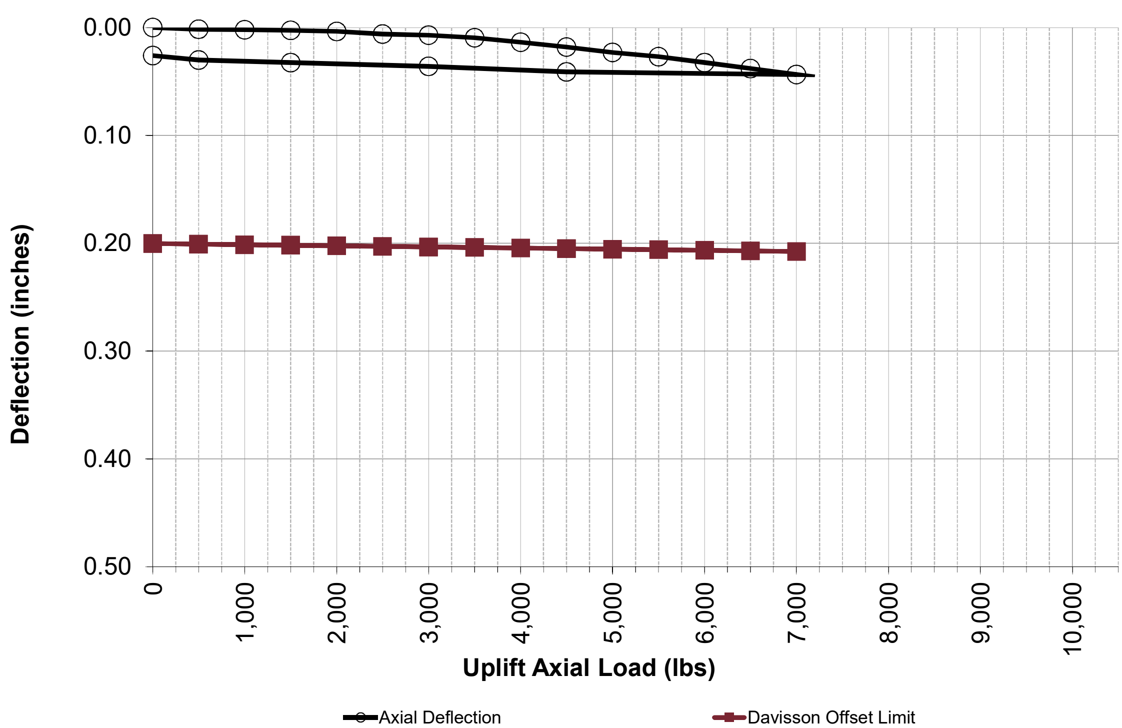
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-3A
Latitude:	41.4343
Longitude:	-71.8224
Pile Type:	W6x12
Pile Embedment Depth [in]:	108
Pile Diameter [in]:	6.03
Pile Stick-Up [in]:	36
Axial Design Load [lbs]:	7000
Pile Area [sq. in]:	3.55
Elastic Modulus [ksi]:	29,000
Drive Time [sec]:	107.66

Tension Test Results			Davisson Offset Limit Lines		
% of Design Load	Axial Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Elastic Data (in) (PL/AE)	Davisson Offset Limit (in) (0.15+D/120+(PL/AE))	Comments
0%	0	0.000	0.000	0.200	
7%	500	0.002	0.001	0.201	
14%	1000	0.002	0.001	0.201	
21%	1500	0.003	0.002	0.202	
29%	2000	0.004	0.002	0.202	
36%	2500	0.006	0.003	0.203	
43%	3000	0.007	0.003	0.203	
50%	3500	0.010	0.004	0.204	
57%	4000	0.014	0.004	0.204	
64%	4500	0.018	0.005	0.205	
71%	5000	0.023	0.005	0.205	
79%	5500	0.027	0.006	0.206	
86%	6000	0.033	0.006	0.207	
93%	6500	0.038	0.007	0.207	
100%	7000	0.044	0.007	0.208	
64%	4500	0.041	0.005	0.205	
43%	3000	0.036	0.003	0.203	
21%	1500	0.033	0.002	0.202	
7%	500	0.030	0.001	0.201	
0%	0	0.026	0.000	0.200	



Tension Load Test Result for PLT-3B

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connectic
Project Number:	J2185196

Axial Load Test Set Up

Number of Gauges:	2
Height of Gauges [in]:	6
Load Cell:	DEDR2602695

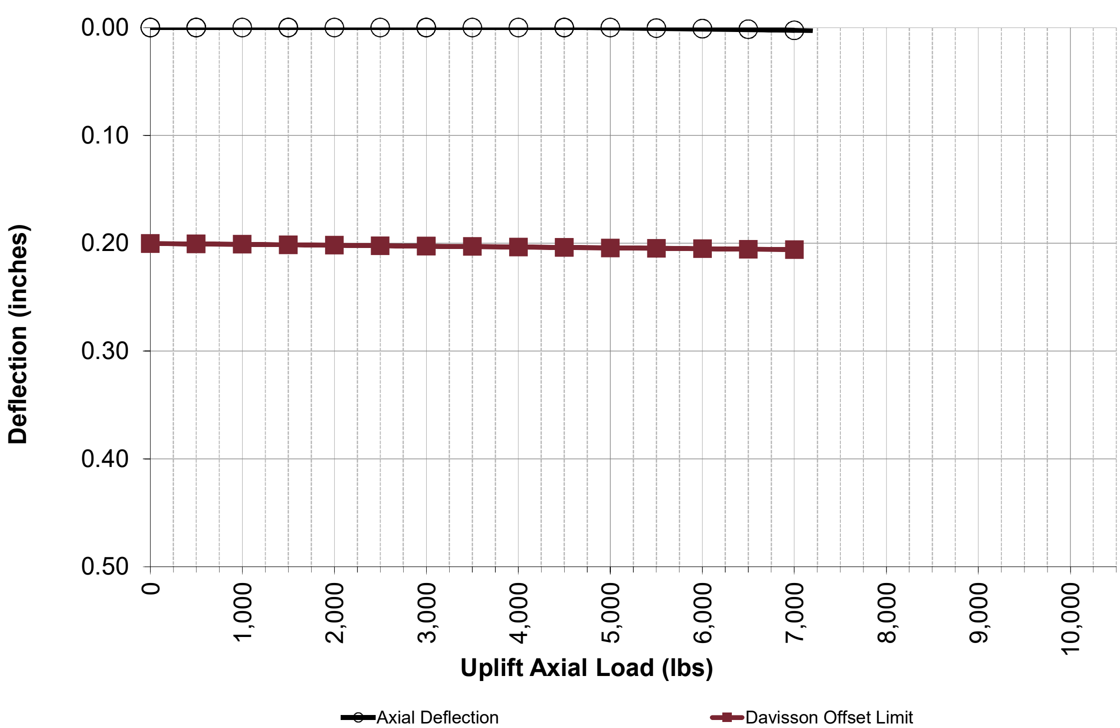
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-3B
Latitude:	41.4343
Longitude:	-71.8224
Pile Type:	W6x12
Pile Embedment Depth [in]:	81.96
Pile Diameter [in]:	6.03
Pile Stick-Up [in]:	36
Axial Design Load [lbs]:	7000
Pile Area [sq. in]:	3.55
Elastic Modulus [ksi]:	29,000
Drive Time [sec]:	92.93

Tension Test Results			Davisson Offset Limit Lines		
% of Design Load	Axial Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Elastic Data (in) (PL/AE)	Davisson Offset Limit (in) (0.15+D/120+(PL/AE))	Comments
0%	0	0.000	0.000	0.200	
7%	500	0.000	0.000	0.201	
14%	1000	0.000	0.001	0.201	
21%	1500	0.000	0.001	0.201	
29%	2000	0.000	0.002	0.202	
36%	2500	0.000	0.002	0.202	
43%	3000	0.000	0.002	0.203	
50%	3500	0.000	0.003	0.203	
57%	4000	0.000	0.003	0.203	
64%	4500	0.000	0.004	0.204	
71%	5000	0.000	0.004	0.204	
79%	5500	0.001	0.004	0.205	
86%	6000	0.001	0.005	0.205	
93%	6500	0.002	0.005	0.205	
100%	7000	0.003	0.006	0.206	
64%	4500	0.000	0.004	0.204	
43%	3000	0.000	0.002	0.203	
21%	1500	0.000	0.001	0.201	
7%	500	0.000	0.000	0.201	
0%	0	0.000	0.000	0.200	



Tension Load Test Result for PLT-4A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connectic
Project Number:	J2185196

Axial Load Test Set Up

Number of Gauges:	2
Height of Gauges [in]:	6
Load Cell:	DEDR2602695

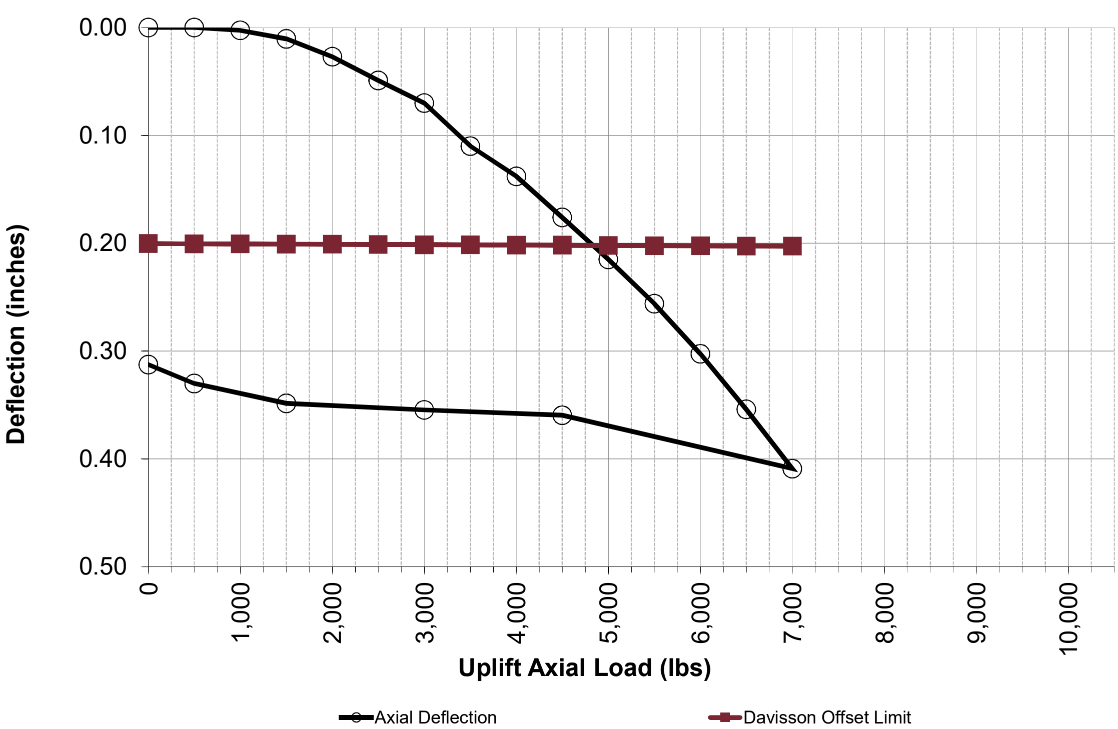
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-4A
Latitude:	41.4317
Longitude:	-71.8244
Pile Type:	W6x12
Pile Embedment Depth [in]:	36
Pile Diameter [in]:	6.03
Pile Stick-Up [in]:	36
Axial Design Load [lbs]:	7000
Pile Area [sq. in]:	3.55
Elastic Modulus [ksi]:	29,000
Drive Time [sec]:	12.05

Tension Test Results			Davisson Offset Limit Lines		
% of Design Load	Axial Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Elastic Data (in) (PL/AE)	Davisson Offset Limit (in) (0.15+D/120+(PL/AE))	Comments
0%	0	0.000	0.000	0.200	
7%	500	0.000	0.000	0.200	
14%	1000	0.003	0.000	0.201	
21%	1500	0.011	0.001	0.201	
29%	2000	0.027	0.001	0.201	
36%	2500	0.049	0.001	0.201	
43%	3000	0.070	0.001	0.201	
50%	3500	0.110	0.001	0.201	
57%	4000	0.138	0.001	0.202	
64%	4500	0.176	0.002	0.202	
71%	5000	0.215	0.002	0.202	
79%	5500	0.256	0.002	0.202	
86%	6000	0.303	0.002	0.202	
93%	6500	0.354	0.002	0.203	
100%	7000	0.409	0.002	0.203	
64%	4500	0.360	0.002	0.202	
43%	3000	0.355	0.001	0.201	
21%	1500	0.349	0.001	0.201	
7%	500	0.330	0.000	0.200	
0%	0	0.313	0.000	0.200	



Tension Load Test Result for PLT-5A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Axial Load Test Set Up

Number of Gauges:	2
Height of Gauges [in]:	6
Load Cell:	DEDR2602695

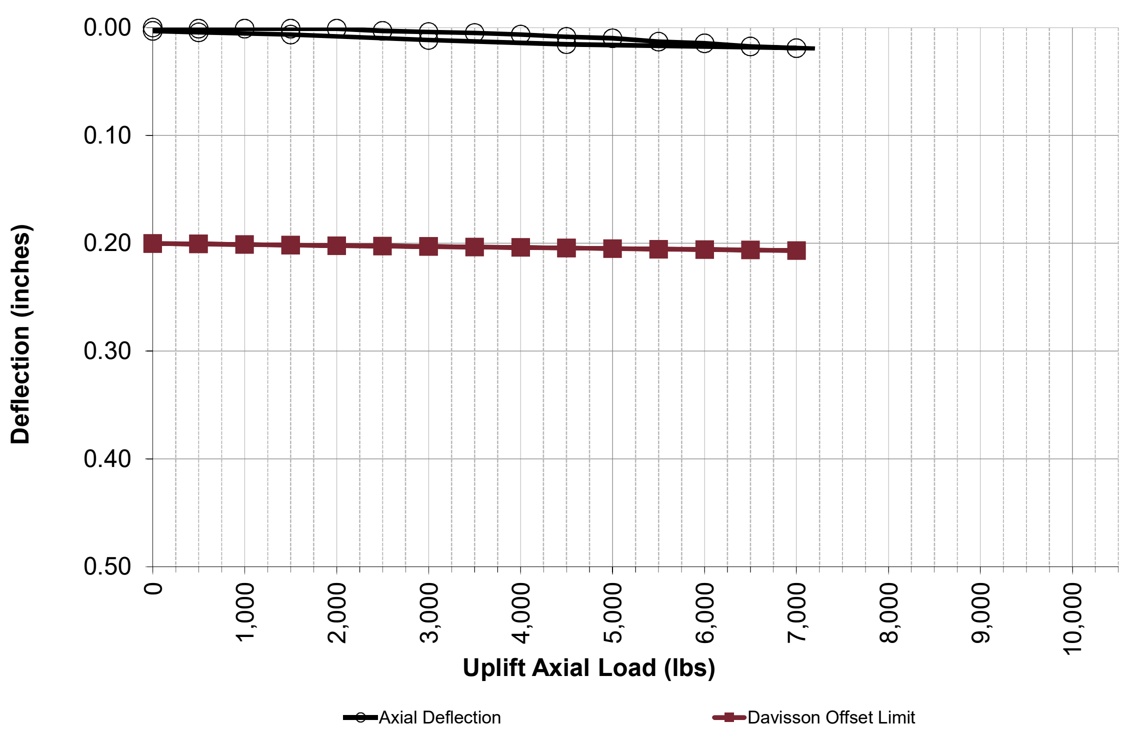
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-5A
Latitude:	41.4333
Longitude:	-71.8175
Pile Type:	W6x12
Pile Embedment Depth [in]:	96
Pile Diameter [in]:	6.03
Pile Stick-Up [in]:	36
Axial Design Load [lbs]:	7000
Pile Area [sq. in]:	3.55
Elastic Modulus [ksi]:	29,000
Drive Time [sec]:	198.16

Tension Test Results			Davisson Offset Limit Lines		
% of Design Load	Axial Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Elastic Data (in) (PL/AE)	Davisson Offset Limit (in) (0.15+D/120+(PL/AE))	Comments
0%	0	0.000	0.000	0.200	
7%	500	0.001	0.000	0.201	
14%	1000	0.001	0.001	0.201	
21%	1500	0.001	0.001	0.202	
29%	2000	0.001	0.002	0.202	
36%	2500	0.003	0.002	0.203	
43%	3000	0.004	0.003	0.203	
50%	3500	0.005	0.003	0.204	
57%	4000	0.007	0.004	0.204	
64%	4500	0.009	0.004	0.204	
71%	5000	0.010	0.005	0.205	
79%	5500	0.013	0.005	0.205	
86%	6000	0.015	0.006	0.206	
93%	6500	0.018	0.006	0.206	
100%	7000	0.019	0.007	0.207	
64%	4500	0.016	0.004	0.204	
43%	3000	0.012	0.003	0.203	
21%	1500	0.007	0.001	0.202	
7%	500	0.005	0.000	0.201	
0%	0	0.003	0.000	0.200	



Tension Load Test Result for PLT-5B

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connectic
Project Number:	J2185196

Axial Load Test Set Up

Number of Gauges:	2
Height of Gauges [in]:	6
Load Cell:	DEDR2602695

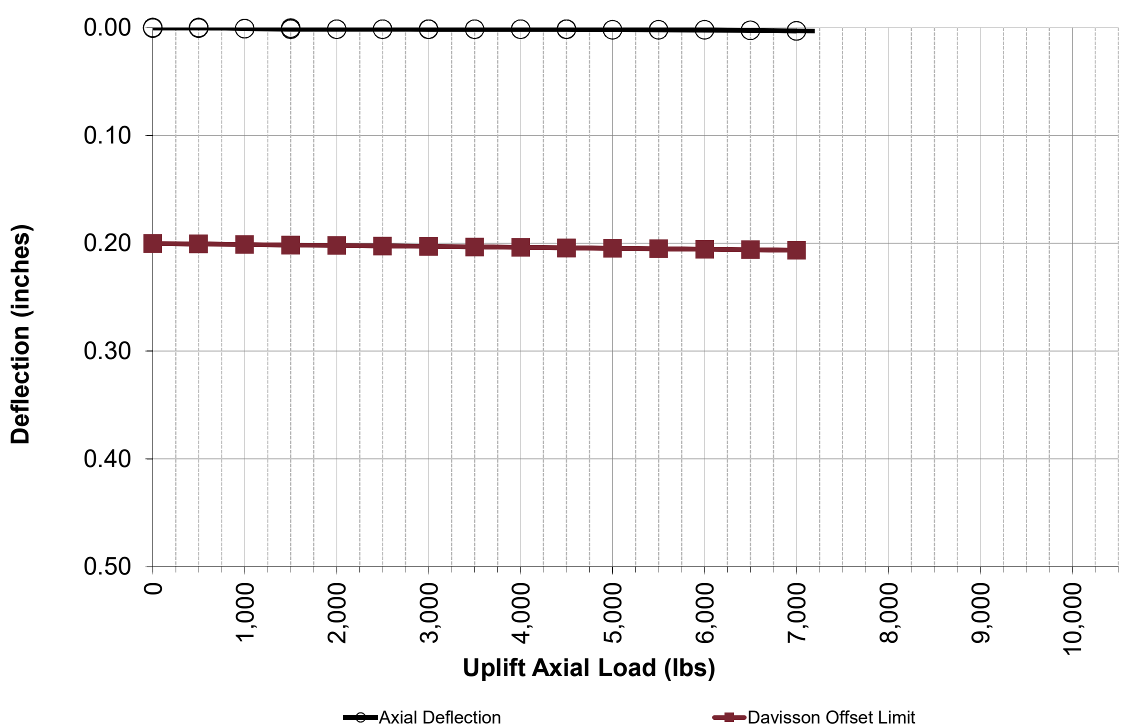
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-5B
Latitude:	41.4333
Longitude:	-71.8175
Pile Type:	W6x12
Pile Embedment Depth [in]:	91.2
Pile Diameter [in]:	6.03
Pile Stick-Up [in]:	36
Axial Design Load [lbs]:	7000
Pile Area [sq. in]:	3.55
Elastic Modulus [ksi]:	29,000
Drive Time [sec]:	212.8

Tension Test Results			Davisson Offset Limit Lines		
% of Design Load	Axial Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Elastic Data (in) (PL/AE)	Davisson Offset Limit (in) (0.15+D/120+(PL/AE))	Comments
0%	0	0.000	0.000	0.200	
7%	500	0.000	0.000	0.201	
14%	1000	0.001	0.001	0.201	
21%	1500	0.002	0.001	0.202	
29%	2000	0.002	0.002	0.202	
36%	2500	0.002	0.002	0.202	
43%	3000	0.002	0.003	0.203	
50%	3500	0.002	0.003	0.203	
57%	4000	0.002	0.004	0.204	
64%	4500	0.002	0.004	0.204	
71%	5000	0.002	0.004	0.205	
79%	5500	0.002	0.005	0.205	
86%	6000	0.002	0.005	0.206	
93%	6500	0.003	0.006	0.206	
100%	7000	0.003	0.006	0.206	
64%	4500	0.002	0.004	0.204	
43%	3000	0.002	0.003	0.203	
21%	1500	0.001	0.001	0.202	
7%	500	0.001	0.000	0.201	
0%	0	0.001	0.000	0.200	



Lateral Load Test Result for PLT-1A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in]:	6
Height of Bottom Gauges [in]:	6
Height of Applied Load [in]:	36
Load Cell:	DEDR2602695

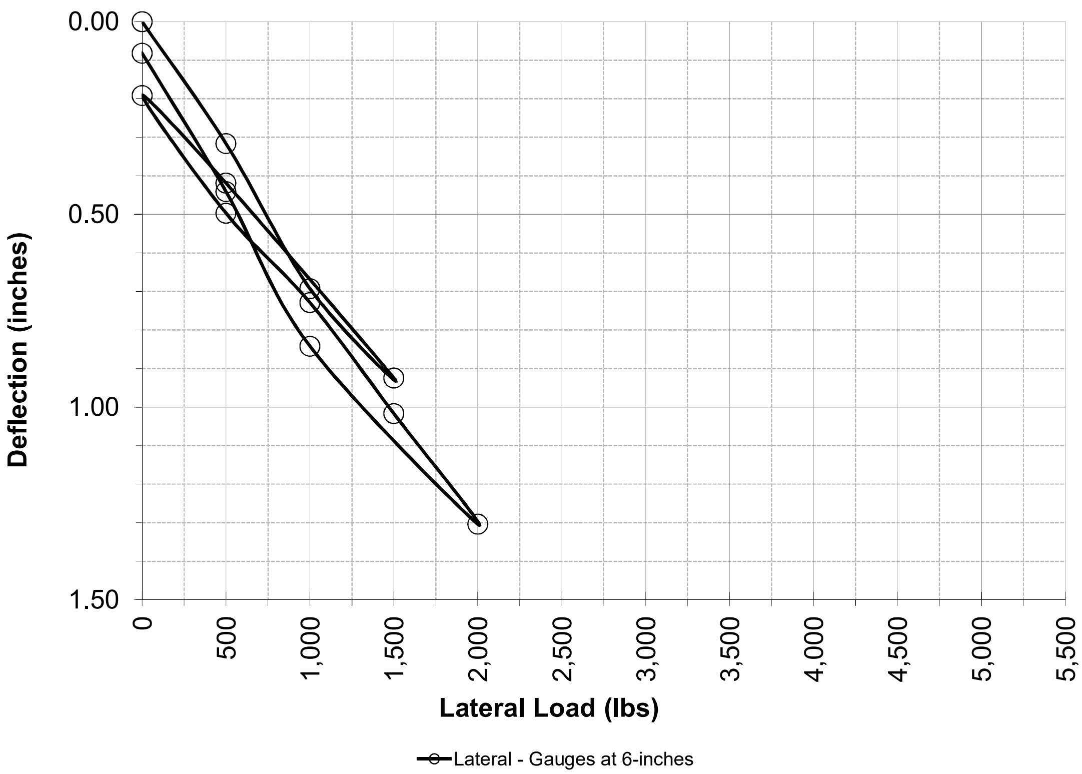
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-1A
Latitude:	41.4355
Longitude:	-71.8185
Pile Type:	W6x12
Pile Embedment Depth [in]:	108
Pile Stick-Up [in]:	36
Lateral Design Load [lbs]:	7000
Drive Time [sec]:	80.12

% of Design Load	Lateral Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Comments
0%	0	0.000	
7%	500	0.317	
14%	1000	0.693	
21%	1500	0.925	
7%	500	0.419	
0%	0	0.192	
7%	500	0.497	
14%	1000	0.729	
21%	1500	1.017	
29%	2000	1.304	
14%	1000	0.843	
7%	500	0.441	
0%	0	0.082	



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Lateral Load Test Result for PLT-1B

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in]:	6
Height of Bottom Gauges [in]:	6
Height of Applied Load [in]:	36
Load Cell:	DEDR2602695

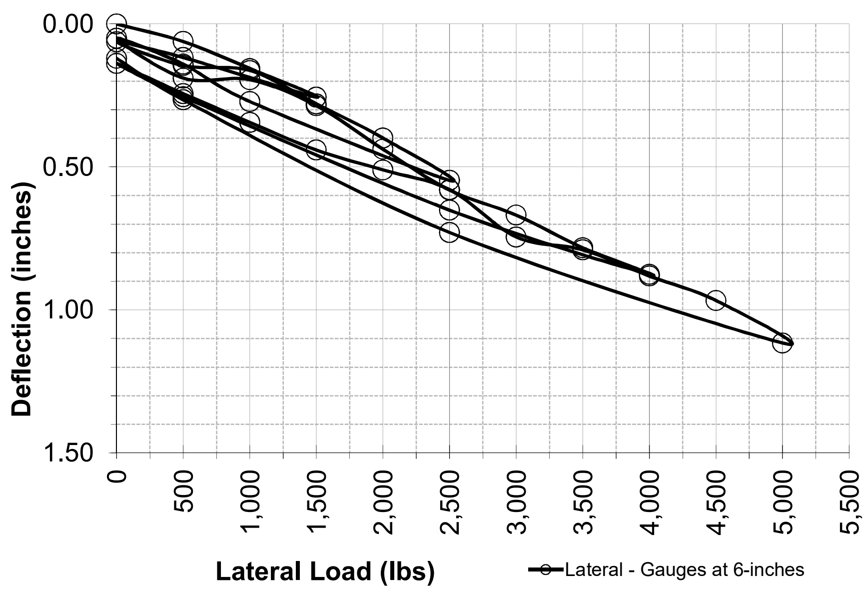
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-1B
Latitude:	41.4355
Longitude:	-71.8185
Pile Type:	W6x12
Pile Embedment Depth [in]:	111
Pile Stick-Up [in]:	36
Lateral Design Load [lbs]:	7000
Drive Time [sec]:	146.21

% of Design Load	Lateral Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Comments
0%	0	0.000	
7%	500	0.062	
14%	1000	0.156	
21%	1500	0.256	
7%	500	0.118	
0%	0	0.063	
7%	500	0.146	
14%	1000	0.163	
21%	1500	0.280	
29%	2000	0.399	
36%	2500	0.547	
14%	1000	0.272	
7%	500	0.141	
0%	0	0.050	
7%	500	0.190	
14%	1000	0.195	
21%	1500	0.286	
29%	2000	0.438	
36%	2500	0.581	
43%	3000	0.669	
50%	3500	0.783	
57%	4000	0.876	
36%	2500	0.651	
7%	500	0.255	
0%	0	0.138	
7%	500	0.244	
14%	1000	0.344	
21%	1500	0.441	
29%	2000	0.511	
36%	2500	0.580	
43%	3000	0.745	
50%	3500	0.790	
57%	4000	0.882	
64%	4500	0.967	
71%	5000	1.116	
36%	2500	0.729	
7%	500	0.266	
0%	0	0.121	



Lateral Load Test Result for PLT-2A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in]:	6
Height of Bottom Gauges [in]:	6
Height of Applied Load [in]:	36
Load Cell:	DEDR2602695

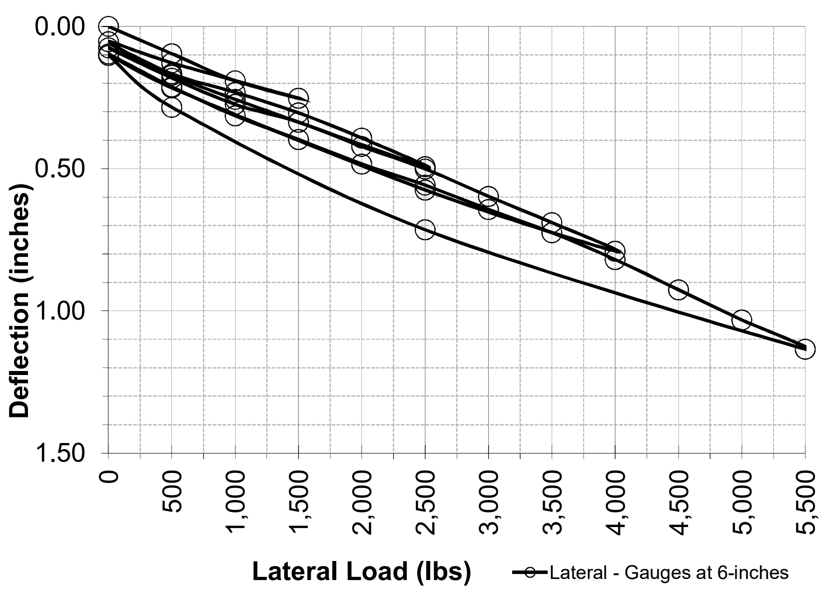
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-2A
Latitude:	41.4340
Longitude:	-71.8142
Pile Type:	W6x12
Pile Embedment Depth [in]:	108
Pile Stick-Up [in]:	36
Lateral Design Load [lbs]:	7000
Drive Time [sec]:	93.74

% of Design Load	Lateral Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Comments
0%	0	0.000	
7%	500	0.096	
14%	1000	0.191	
21%	1500	0.252	
7%	500	0.128	
0%	0	0.054	
7%	500	0.167	
14%	1000	0.232	
21%	1500	0.304	
29%	2000	0.393	
36%	2500	0.493	
14%	1000	0.257	
7%	500	0.172	
0%	0	0.075	
7%	500	0.182	
14%	1000	0.274	
21%	1500	0.337	
29%	2000	0.422	
36%	2500	0.501	
43%	3000	0.598	
50%	3500	0.690	
57%	4000	0.790	
36%	2500	0.575	
7%	500	0.216	
0%	0	0.097	
7%	500	0.213	
14%	1000	0.314	
21%	1500	0.398	
29%	2000	0.484	
36%	2500	0.558	
43%	3000	0.644	
50%	3500	0.725	
57%	4000	0.820	
64%	4500	0.926	
71%	5000	1.032	
79%	5500	1.135	
36%	2500	0.715	
7%	500	0.284	
0%	0	0.102	



Terracon

Lateral Load Test Result for PLT-2B

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in]:	6
Height of Bottom Gauges [in]:	6
Height of Applied Load [in]:	36
Load Cell:	DEDR2602695

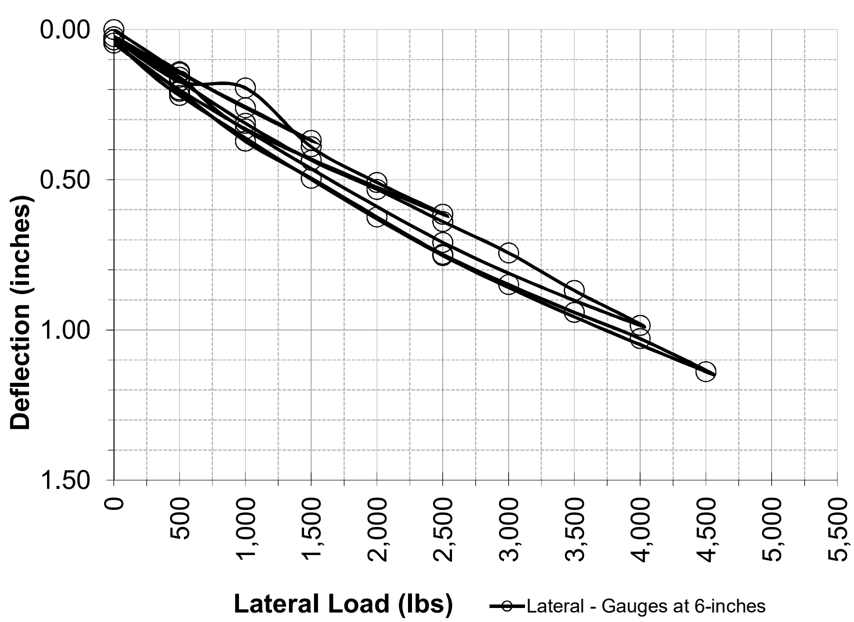
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-2B
Latitude:	41.4340
Longitude:	-71.8142
Pile Type:	W6x12
Pile Embedment Depth [in]:	144
Pile Stick-Up [in]:	36
Lateral Design Load [lbs]:	7000
Drive Time [sec]:	177.42

% of Design Load	Lateral Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Comments
0%	0	0.000	
7%	500	0.141	
14%	1000	0.261	
21%	1500	0.369	
7%	500	0.145	
0%	0	0.024	
7%	500	0.173	
14%	1000	0.195	
21%	1500	0.391	
29%	2000	0.509	
36%	2500	0.615	
14%	1000	0.331	
7%	500	0.159	
0%	0	0.035	
7%	500	0.171	
14%	1000	0.313	
21%	1500	0.435	
29%	2000	0.532	
36%	2500	0.640	
43%	3000	0.744	
50%	3500	0.869	
57%	4000	0.985	
36%	2500	0.709	
7%	500	0.201	
0%	0	0.046	
7%	500	0.206	
14%	1000	0.372	
21%	1500	0.495	
29%	2000	0.624	
36%	2500	0.749	
43%	3000	0.849	
50%	3500	0.942	
57%	4000	1.029	
64%	4500	1.139	
36%	2500	0.753	
7%	500	0.220	
0%	0	0.035	



Lateral Load Test Result for PLT-3A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in]:	6
Height of Bottom Gauges [in]:	6
Height of Applied Load [in]:	36
Load Cell:	DEDR2602695

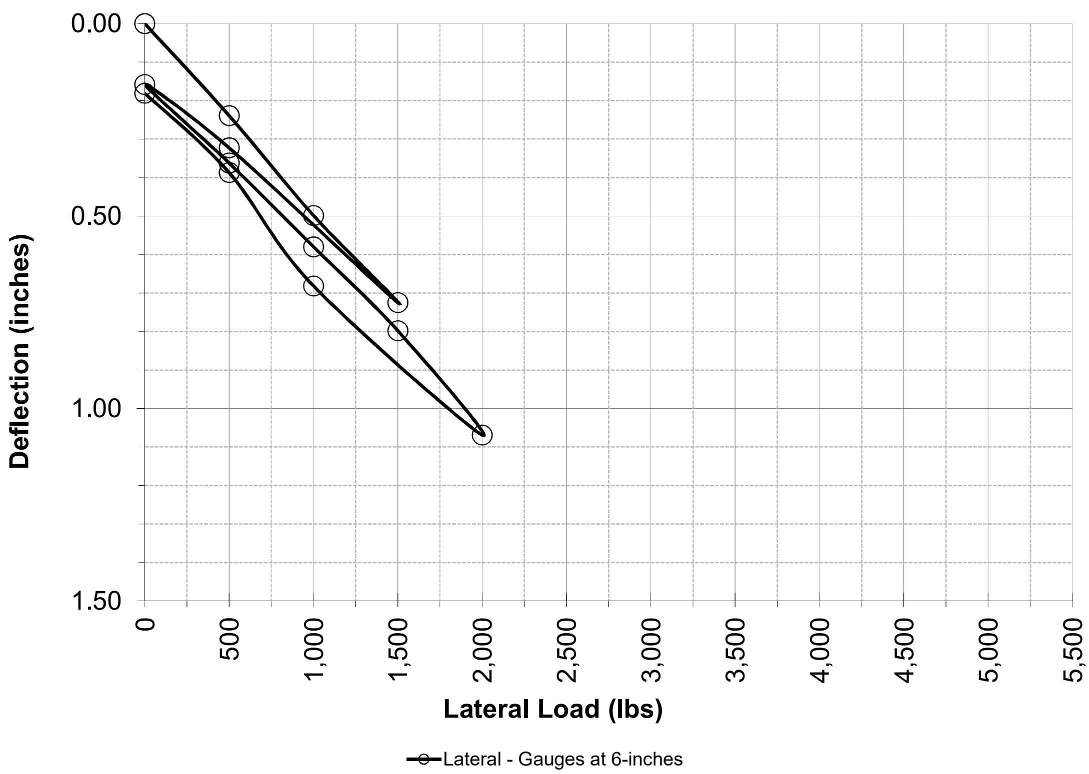
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-3A
Latitude:	41.4343
Longitude:	-71.8224
Pile Type:	W6x12
Pile Embedment Depth [in]:	108
Pile Stick-Up [in]:	36
Lateral Design Load [lbs]:	7000
Drive Time [sec]:	107.66

% of Design Load	Lateral Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Comments
0%	0	0.000	
7%	500	0.239	
14%	1000	0.499	
21%	1500	0.725	
7%	500	0.323	
0%	0	0.158	
7%	500	0.362	
14%	1000	0.580	
21%	1500	0.798	
29%	2000	1.069	
14%	1000	0.682	
7%	500	0.387	
0%	0	0.181	



Lateral Load Test Result for PLT-3B

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in]:	6
Height of Bottom Gauges [in]:	6
Height of Applied Load [in]:	36
Load Cell:	DEDR2602695

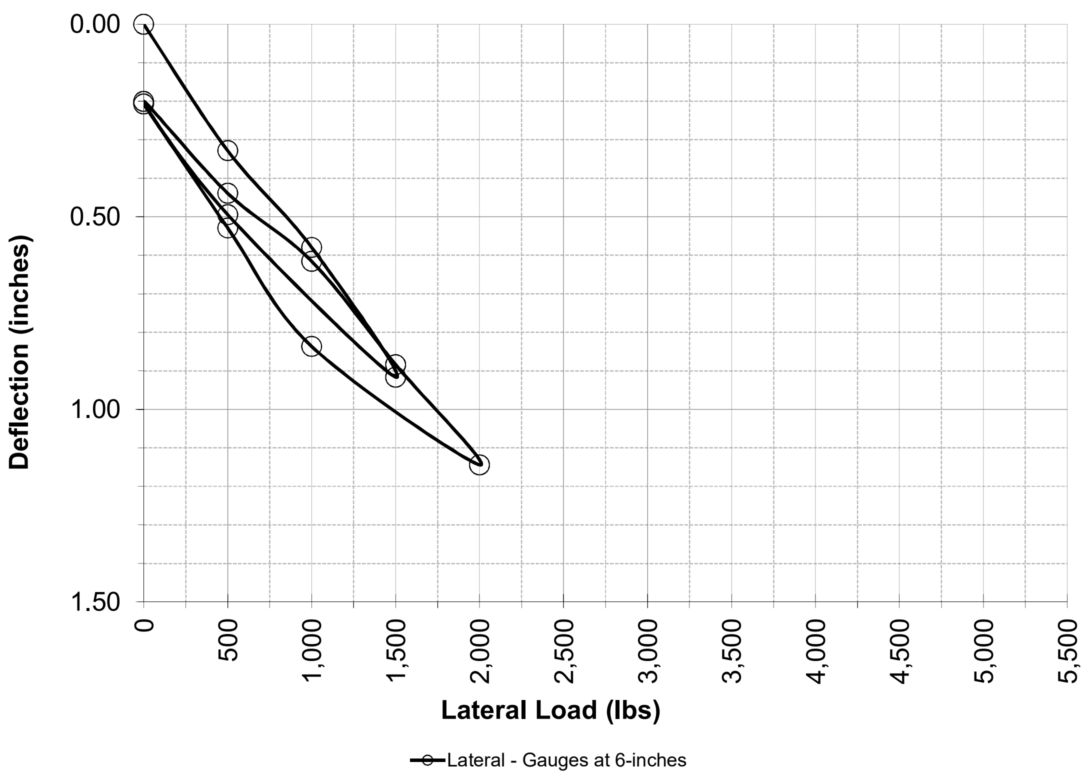
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-3B
Latitude:	41.4343
Longitude:	-71.8224
Pile Type:	W6x12
Pile Embedment Depth [in]:	81.96
Pile Stick-Up [in]:	36
Lateral Design Load [lbs]:	7000
Drive Time [sec]:	92.93

% of Design Load	Lateral Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Comments
0%	0	0.000	
7%	500	0.329	
14%	1000	0.580	
21%	1500	0.917	
7%	500	0.495	
0%	0	0.201	
7%	500	0.439	
14%	1000	0.616	
21%	1500	0.884	
29%	2000	1.144	
14%	1000	0.837	
7%	500	0.529	
0%	0	0.208	



Lateral Load Test Result for PLT-4A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in]:	6
Height of Bottom Gauges [in]:	6
Height of Applied Load [in]:	36
Load Cell:	DEDR2602695

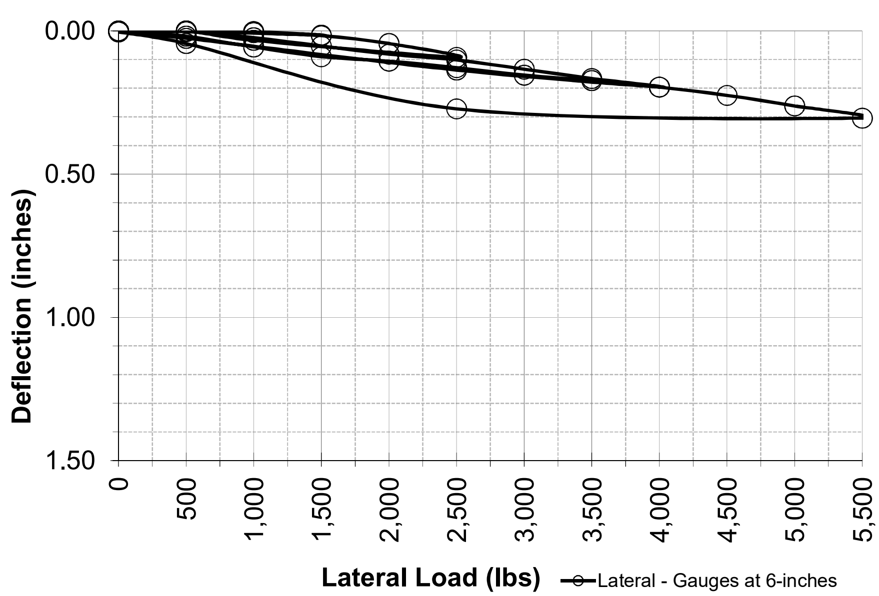
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-4A
Latitude:	41.4317
Longitude:	-71.8244
Pile Type:	W6x12
Pile Embedment Depth [in]:	36
Pile Stick-Up [in]:	36
Lateral Design Load [lbs]:	7000
Drive Time [sec]:	12.05

% of Design Load	Lateral Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Comments
0%	0	0.000	
7%	500	0.000	
14%	1000	0.003	
21%	1500	0.015	
7%	500	0.001	
0%	0	0.000	
7%	500	0.002	
14%	1000	0.006	
21%	1500	0.017	
29%	2000	0.044	
36%	2500	0.092	
14%	1000	0.033	
7%	500	0.000	
0%	0	0.000	
7%	500	0.002	
14%	1000	0.024	
21%	1500	0.053	
29%	2000	0.081	
36%	2500	0.102	
43%	3000	0.134	
50%	3500	0.166	
57%	4000	0.196	
36%	2500	0.137	
7%	500	0.026	
0%	0	0.001	
7%	500	0.019	
14%	1000	0.056	
21%	1500	0.090	
29%	2000	0.106	
36%	2500	0.129	
43%	3000	0.155	
50%	3500	0.174	
57%	4000	0.196	
64%	4500	0.225	
71%	5000	0.262	
79%	5500	0.305	
36%	2500	0.272	
7%	500	0.044	
0%	0	0.004	



Lateral Load Test Result for PLT-5A

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in]:	6
Height of Bottom Gauges [in]:	6
Height of Applied Load [in]:	36
Load Cell:	DEDR2602695

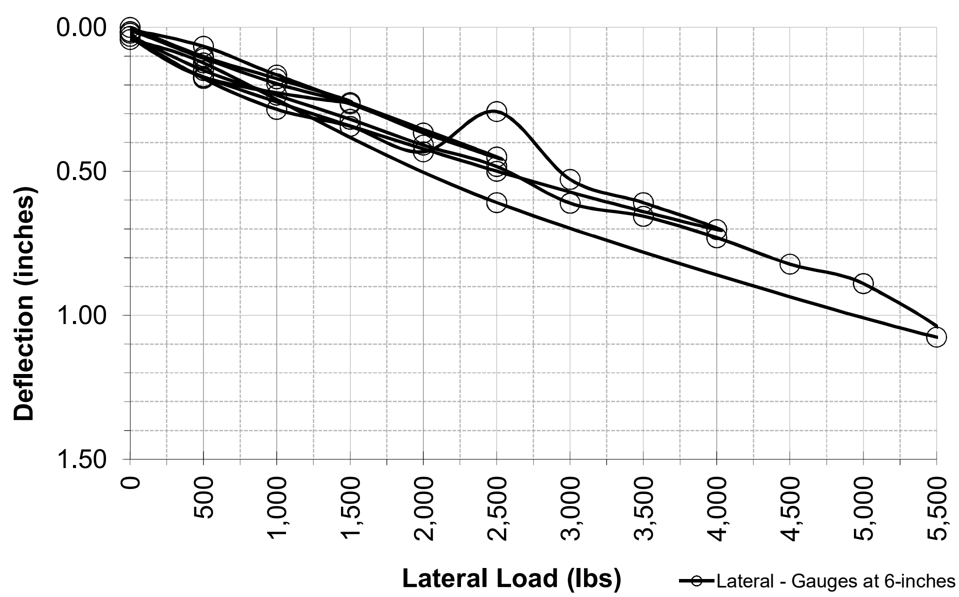
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-5A
Latitude:	41.4333
Longitude:	-71.8175
Pile Type:	W6x12
Pile Embedment Depth [in]:	96
Pile Stick-Up [in]:	36
Lateral Design Load [lbs]:	7000
Drive Time [sec]:	198.16

% of Design Load	Lateral Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Comments
0%	0	0.000	
7%	500	0.102	
14%	1000	0.179	
21%	1500	0.262	
7%	500	0.174	
0%	0	0.015	
7%	500	0.108	
14%	1000	0.196	
21%	1500	0.266	
29%	2000	0.367	
36%	2500	0.450	
14%	1000	0.166	
7%	500	0.066	
0%	0	0.020	
7%	500	0.178	
14%	1000	0.285	
21%	1500	0.344	
29%	2000	0.433	
36%	2500	0.293	
43%	3000	0.528	
50%	3500	0.609	
57%	4000	0.703	
36%	2500	0.500	
7%	500	0.172	
0%	0	0.031	
7%	500	0.150	
14%	1000	0.236	
21%	1500	0.319	
29%	2000	0.409	
36%	2500	0.484	
43%	3000	0.611	
50%	3500	0.656	
57%	4000	0.731	
64%	4500	0.823	
71%	5000	0.890	
79%	5500	1.076	
36%	2500	0.609	
7%	500	0.124	
0%	0	0.043	



Lateral Load Test Result for PLT-5B

Project Information

Project Name:	North Stonington Solar Facility
Project Location:	North Stonington, Connecticut
Project Number:	J2185196

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in]:	6
Height of Bottom Gauges [in]:	6
Height of Applied Load [in]:	36
Load Cell:	DEDR2602695

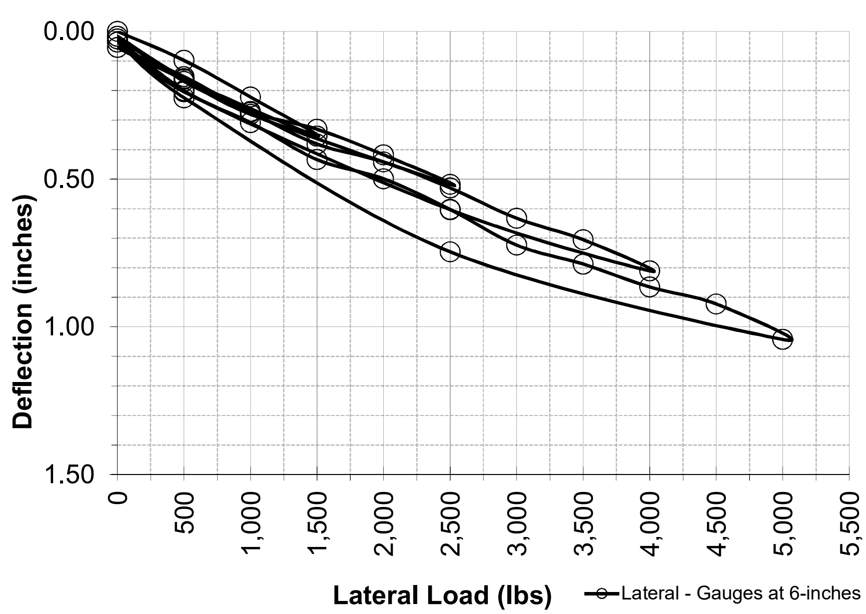
Test Date and Representative

Tested By Terracon Rep:	LJ Salyers
Date Tested:	5/23/2019

Pile Information

Pile ID:	PLT-5B
Latitude:	41.4333
Longitude:	-71.8175
Pile Type:	W6x12
Pile Embedment Depth [in]:	91.2
Pile Stick-Up [in]:	36
Lateral Design Load [lbs]:	7000
Drive Time [sec]:	212.8

% of Design Load	Lateral Load [lbs]	Deflection Δ (in.) Gauges #1 & #2	Comments
0%	0	0.000	
7%	500	0.098	
14%	1000	0.222	
21%	1500	0.355	
7%	500	0.163	
0%	0	0.055	
7%	500	0.153	
14%	1000	0.272	
21%	1500	0.331	
29%	2000	0.418	
36%	2500	0.518	
14%	1000	0.281	
7%	500	0.160	
0%	0	0.017	
7%	500	0.169	
14%	1000	0.274	
21%	1500	0.381	
29%	2000	0.442	
36%	2500	0.530	
43%	3000	0.633	
50%	3500	0.705	
57%	4000	0.811	
36%	2500	0.604	
7%	500	0.205	
0%	0	0.026	
7%	500	0.201	
14%	1000	0.309	
21%	1500	0.434	
29%	2000	0.499	
36%	2500	0.603	
43%	3000	0.724	
50%	3500	0.788	
57%	4000	0.865	
64%	4500	0.923	
71%	5000	1.043	
36%	2500	0.746	
7%	500	0.225	
0%	0	0.036	



P-MULTIPLIER ZONING PLAN

North Stonington Solar Facility ■ North Stonington, Connecticut

December 23, 2020 ■ Terracon Project No. J2185196

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

MAP PROVIDED BY MICROSOFT BING MAPS