Preliminary Geotechnical Engineering Report

Flat Creek Solar Site
Town of Root, Montgomery County, New York
November 17, 2021
Terracon Project No. J5215096

Prepared for:
SED NY Holdings LLC
Old Lyme, CT

Prepared by:
Terracon Consultants-NY, Inc.
Rochester, New York

November 17, 2021

SED NY Holdings LLC
5-2 Davis Road East
Old Lyme, CT 06371

Attn: Mr. Reed Wills
P: (302) 540-2696
E: reed.wills@suneastpower.com

Re: Preliminary Geotechnical Engineering Report
Flat Creek Solar Site
Town of Root, Montgomery County, New York
Terracon Project No. J5215096

Dear Mr. Wills:

We have completed the Preliminary Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PJ5215096 dated May 3, 2021. This report presents the findings of the subsurface exploration and provides preliminary geotechnical recommendations concerning driven steel piles for support of solar panel foundations, earthwork, unpaved access roads, and shallow foundations for support of ancillary structures for the proposed project.

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

Sincerely,
Terracon Consultants-NY, Inc.

STATE OF NEW YORK
MICHELE A. FIORILLO
085888
LICENSED PROFESSIONAL ENGINEER

Blake J. Pilarski, E.I.T.
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SME Review By: James M. Jackson, P.E. (FL)

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.

REPORT SUMMARY

Topic [1]	Overview Statement [2]
Project Description	The approximately 1,230-acre site (fenced areas) is to be developed with a solar facility.
Subsurface Conditions	The site can be broken into three zones, with Zone 1 consisting of silty and clayey soils overlaying hard/dense to very dense soil or bedrock. The borings in Zone 2 generally consisted of silty and sandy soils. The borings in Zone 3 generally consisted of silty and clayey soils overlaying clayey soils. Groundwater was observed in FC-5, FC-9, FC-13 and FC-15 at depths ranging from 3 to 8 feet below grade. Groundwater was generally not observed in the remainder of the borings.
Pile Load Testing	Pile load testing was not part of the scope in this preliminary study.
PV Array	Preliminary parameters for driven steel piles for the support of solar panel racking systems and other miscellaneous structures are provided in this section. Shallow or mat foundations also appear suitable, based on the preliminary data, for support of miscellaneous structures utilizing the bearing capacity values provided in this section.
General Comments	This section contains important information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Preliminary Geotechnical Engineering Report

Flat Creek Solar Site

Town of Root, Montgomery County, New York

Terracon Project No. J5215096

November 17, 2021

INTRODUCTION

This report presents the results of our subsurface exploration and preliminary geotechnical engineering services performed for the proposed 200 MW (AC) photovoltaic (PV) solar power facility to be located in the Town of Root, Montgomery County, New York. The purpose of these services is to provide information and preliminary geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- L-Pile parameters
- Pile skin friction and end bearing
- Seismic site classification
- Mat/slab foundations
- Laboratory test results
- Seismic site classification per IBC
- Unpaved access roads
- Adfreeze stress and frost depth
- Estimated settlement (shallow foundations)

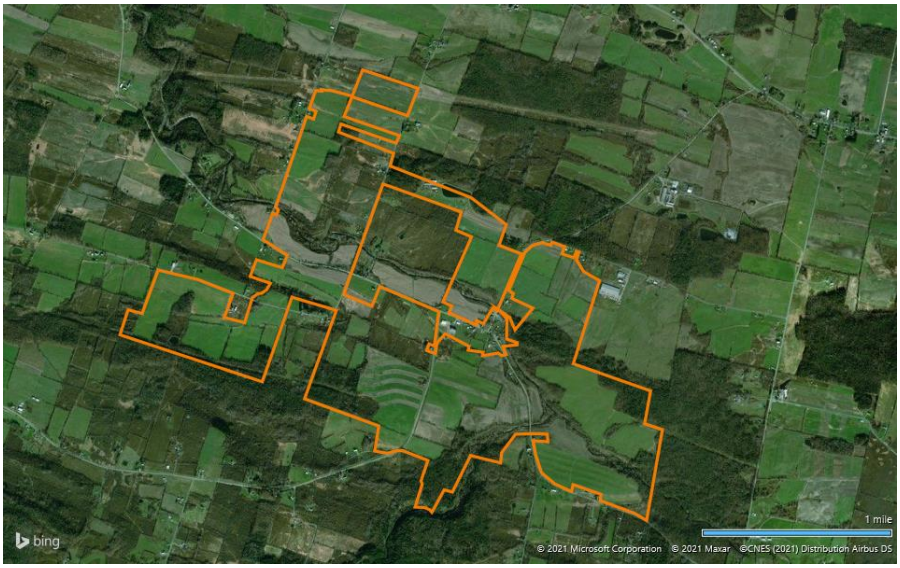
The preliminary geotechnical engineering Scope of Services for this project included the following:

- Soil borings at sixteen locations (FC-Series) to depths ranging from approximately 13 to 20 feet;
- Geotechnical laboratory testing of soil samples consisting of Grain-Size Distributions, Atterberg limits and standard Proctors;
- Field electrical resistivity testing at eight locations (FC-1, FC-3, FC-6, FC-9, FC-11, FC-12, FC-14 and FC-16);
- Laboratory thermal resistivity test on soil samples collected from FC-6, FC-9, FC-12 and FC-16 at depths of 1 to 4 feet;
- Corrosivity suite testing on eight soil samples collected from borings FC-1, FC-3, FC-6, FC-9, FC-11, FC-12, FC-14 and FC-16 at depths of 1 to 4 feet;
- Geotechnical engineering analysis and preparation of this report.

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

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of the site plans provided by SunEast Development LLC and publicly available topographic maps.

Item	Description
Parcel Information	The project is located in the Town of Root, Montgomery County, New York. The site is approximately 1,230 acres (fenced areas). The approximate center of the parcel is located at about Latitude 42.8449° N and Longitude 74.5113° W. The approximate site boundary is marked in orange on the below aerial. 
Existing Improvements	The proposed solar power facility consists of vacant agricultural parcels with scattered wooded areas. Flat Creek flows through the center of the site.
Current Ground Cover	Agricultural land with scattered wooded areas.
Existing Topography (USGS)	Ground surface elevations (EL.) within the proposed solar array appear to vary greatly throughout the proposed site with elevations ranging from about El. 680 feet along the center portion of the site in proximity to Flat Creek to El. 900 feet in the hilltops. .

PROJECT DESCRIPTION

Our final understanding of the project conditions is as follows:

Item	Description
Information Provided	The following documents were provided to Terracon ■ Flat Creek Solar Conceptual Site Layout Plan dated September 30, 2020. ■ SunEast Development RFP dated March 2021.
Project Description	The site development consists of an approximately 200 MW (AC) (PV) solar power facility on about 1,230 acres of land (fenced areas). The power facility will also include transformers, switchgear, and buried and/or overhead collector system. A substation is assumed to be planned for the site but the location is currently unknown.
Proposed Construction	The PV array field will be comprised of PV modules attached to a fixed tilt racking system supported on driven steel piles. Electrical equipment will be supported on concrete slabs-on-grade / mat foundations.
Typical Loads for Racking Structures (estimated)	Structural loads were not provided, but have been estimated based on our experience on projects using single axis tracking rack systems: ■ Compression: 1½ to 4 kips ■ Lateral: 1 to 3½ kips ■ Uplift: 1.5 kips exclusive of frost heave loads ■ Ancillary Equipment Slabs: 1,500 pounds per square foot (psf)
Grading/Slopes	We anticipate that minimal grading will take place across the solar arrays and proposed grades will follow existing grades. We anticipate less than 2 feet of cut/fill.
Access Roadways	We understand that 15 feet wide 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 3 inches are what we are to design for in this report. We anticipate low-volume, aggregate-surfaced and native soil access roads will have a maximum HS-20 vehicle load and will travel over the access roads only once per week.

GEOTECHNICAL CHARACTERIZATION

Geology

The project is located within the Appalachian Plateaus physiographic province. Geological maps indicate surficial deposits at the project site to consist of Lacustrine Beach, Lacustrine Sand, Kame Deposits and Glacial Till underlain by shale bedrock of the Utica Shale formation (Middle Ordovician) or dolostone of the Beekmantown Group (Lower Ordovician).

Subsurface Profile

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, termed GeoModel, 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 boring logs. The individual logs and GeoModel can be found in the **Exploration Results** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description [1,2]
1	Surface	Topsoil
2	Native Soil - 1	Mixtures of Silt, Sand, Clay and Gravel (CL-ML, ML, SM, CL); trace rock fragments; brown, gray; soft to hard or loose to medium dense to dense (SPT N values range from 3 to 41)
3	Native Soils -2	Mixtures of Silt, Sand, Clay and Gravel (ML, SM, CL-ML, SP); contains rock, cobble and boulder fragments; brown, gray; very stiff to hard or dense to very dense (SPT N values range from 35 to >50)
4	Bedrock	Shale; highly to moderately weathered; gray; weak rock

1. The sampling equipment utilized may preclude sampling particles larger than 2-inch in dimension. Cobble-sized fragments were encountered in most soil borings, as also indicated by the sample spoon penetration refusals encountered in most of the borings within the depths explored.
2. Bedrock was encountered in borings FC-6 and FC-7 at depths of approximately 10 to 13 feet, respectively. At FC-6 the drillers were able to advance the auger within the weathered bedrock to a depth of about 18 feet below existing grade. In FC-7 auger refusal was encountered at the surface of the shale bedrock, at a depth of about 13.1 feet. .

Specific conditions encountered at each SPT boring are indicated on the individual logs included in the **Exploration Results** of this report. Stratification boundaries on the logs and profiles represent the approximate location of changes in soil/rock types; in-situ, the transition between materials may be more gradual.

Groundwater Conditions

Groundwater generally appears as either a permanent or temporary water source. Permanent groundwater is generally present year-round, which may or may not be influenced by seasonal and climatic changes. Temporary groundwater water is also referred to as a “perched” water source, which generally develops because of seasonal and climatic conditions.

We observed the boreholes for the presence of groundwater during and at completion of drilling or excavation. The groundwater levels at each exploration location can be found on the boring logs of the **Exploration Results** section of this report. A summary of the groundwater at the exploration locations are presented below:

Boring Number	Approximate Depth to Groundwater[1] (feet)
FC-5	3
FC-9	6
FC-13	6
FC-15	8

1. Below ground surface (bgs)

Groundwater was generally not encountered in the remainder of the borings. 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. Water may also become temporarily perched over low permeability layers or bedrock, especially after rainfall. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

CONTRIBUTORY RISK COMPONENTS

ITEM	DESCRIPTION
Supplementary Exploration and Services	Additional soil test borings should be performed to adequately explore the site as part of a design-level study. Additionally, a full-scale pile load testing (PLT) program should be considered as the project design progresses.
Suitability Statement	The proposed site appears suitable for the use of driven steel W-Section steel piles for the support of the proposed solar arrays. We anticipate pile installation could require predrilling at several locations across the proposed solar development. However, further tests are necessary to confirm this.
Soil Conditions	The subsurface conditions in Zone 1 (FC-1, FC-2, FC-4, FC-6, FC-7, FC-8, FC-10, FC-11, FC-13, FC-15, and FC-16) generally consist of medium stiff to hard (SPT-N values ranging from 5 to 26) silty and clayey soils to depths ranging from about 4 to 10 feet. Below these depths the borings generally encountered a significant amount of large cobbles and boulders, and the soils are generally stiff to very hard to dense to very dense. Borings FC-6 and FC-7 also encountered highly to moderately weathered shale at depths of 7 and 13 feet, respectively. The borings were generally terminated at depths ranging from about 13 to 19 feet. The subsurface conditions in Zone 2 (FC-3, FC-5, and FC-9) generally consist of medium stiff to very stiff or medium dense (SPT-N values ranging from 6 to 21) silty and sandy soils to depths of about 6 to 10 feet underlain by hard or dense

ITEM	DESCRIPTION
	(SPT-N values ranging from 21 to >50) silty and sandy soils to a depth of approximately 20 feet below grade. The subsurface conditions in Zone 3 (FC-12 and FC-14) generally consist of medium stiff to hard (SPT-N values ranging from 6 to 41) silty and clayey soils to depths of about 8 to 10 feet underlain by soft to very stiff (SPT-N values ranging from 3 to 17) clayey soils to a depth of approximately 18 to 20 feet below grade. In boring FC-14, hard Sandy Silt with rock fragments was encountered at a depth of about 18 feet below grade.
Access	Wet and loose/soft surface conditions due to rainwater will create access issues for vehicles. The site will generally be more accessible in the summer and early fall due to the improved drying conditions.
Grading	We anticipate very little grading will be required. On-site materials that are used as fill or backfill will likely require moisture conditioning prior to re-compaction. Alternatively, these materials could be replaced with imported soils containing an appropriate moisture content and plasticity index. Site soils that are mostly clay are not suitable for use as engineered fill. Stabilization measures, such as over-excavation and replacement, should be expected.
Groundwater	Groundwater was observed in FC-5, FC-9, FC-13 and FC-15 at depths ranging from 3 to 8 feet below ground surface. Groundwater was generally not encountered in the borings. 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. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. Excavations, such as trenches for electrical cable and conduit, may encounter groundwater and require dewatering. Excavations for shallow foundations could also encounter groundwater, especially if construction is performed during periods of seasonally high groundwater. While precipitation is relatively constant throughout the year, groundwater levels are expected to be deepest during the late summer due to increased evaporation rates.
Site Drainage	It is likely that the site may have ditches/canals which may have been installed to facilitate farming activities and site access. If encountered, filling the drainage canals or destruction of other site drainage systems will result in increased groundwater levels, softer soils, and generally undesirable subsurface conditions.
Corrosion Hazard	The results of our laboratory testing of soil chemical properties are expected to assist a qualified engineer design corrosion protection for the production piles and other project elements.
Excavation Hazards	Based on the results of our borings and our experience with the geology of the project site, we do not expect that difficult excavation conditions will be encountered during construction. However, excavations advanced within the very dense soils may be difficult as a result of encountering large cobbles and/or boulders.

ITEM	DESCRIPTION
Anticipated Pile Drivability	We have separated the site into zones based on the results of the subsurface conditions encountered in the test borings. Zones 1 through 3 were based on the penetration resistance (SPT-N values) as well the indication of large cobbles and boulders (as indicated by the sampler refusal) encountered within the native soils and shale bedrock. In general, piles installed in Zone 1 and Zone 2 could encounter penetration refusal prior reaching the design embedment depth and therefore we would expect pre-drilling to be required. Piles installed in Zone 1 have a higher probability of encountering penetration refusal than pies installed in Zone 2. The pre-drilling could negatively affect the axial and lateral capacity. Piles installed in Zone 3 are likely able to be installed to the design embedment depths, and predrilling is likely not required within Zone 3 Additional soil test borings should be performed to adequately explore the site as part of a design-level study. Additionally, a full-scale pile load testing (PLT) program should be considered as the project design progresses. We also recommend that the PLT program includes piles installed in pre-drilled holes in Zone 1 and Zone 2.
General Construction Considerations	The near-surface soils are moderately moisture sensitive and subject to degradation with exposure to moisture. To the extent practical, earthwork should be performed during warmer and drier periods of weather to reduce the amount of necessary subgrade remedial measures for soft and unsuitable conditions beneath access roadways, equipment pads, etc.

PRELIMINARY RECOMMENDATIONS FOR DRIVEN PILE FOUNDATIONS

We have performed preliminary geotechnical analyses for driven pile foundations to support the typical PV panel racking system. Subsequent analyses will be required once design level geotechnical information is available and once other design considerations are more fully defined. **THEREFORE, THE RESULTS OF THE ANALYSES DESCRIBED BELOW ARE NOT SUITABLE FOR FINAL DESIGN.** Instead, this analysis is intended to assist you in roughly evaluating construction costs and development viability for the proposed project. It should also be noted that our analyses are based on short-term conditions based on boring information. For this type of foundation system, provisions for flexible or adjustable connection between the posts and the array superstructure are recommended.

FROST CONSIDERATIONS

Based on the provided information, the solar arrays for this project are anticipated to be supported by driven piles. The driven piles should be designed to resist design loads including compression, uplift, frost heave action and lateral forces. The soils at this site are frost susceptible. Frost heave effects on pile foundations can be significant. If the anchorage of the foundations and the

deadweight of the structure are not sufficient to resist these forces, it can cause uplift to structures. Based on our review of soil samples and published soil maps of the area, we recommend that an adfreeze stress (frost heave) of 1,500 pounds per square foot (psf) acting along the pile perimeter to a depth of 2.5 feet below the ground surface should be considered for calculating the potential frost induced heave force along with a load factor of 1.0. This depth is referred to as the "adfreeze" depth in the following design parameter tables.

GEOTECHNICAL AXIAL CAPACITY

The following preliminary geotechnical parameters can be used to estimate the capacity of driven W-section pile foundations. These values should also be suitable to prepare a full-scale pile load testing program which is recommended as part of the overall project design. Final design values will vary from the preliminary estimates below. The upper 2.5 feet of soil should be neglected when calculating the ultimate capacity from skin friction.

Zone 1: Pre-Drilling Likely Required[1]		
Minimum Pile Embedment Depth Below Ground Surface (feet)	**Ultimate Skin Friction (psf)**	**Ultimate End Bearing Capacity (psf)**
0 to 2.5	Neglect	Neglect
3 to 8	240	44,000
8 to 13	820	120,000
13 to Varies[2,3]	N/A	180,000

1. Borings located in Zone 1: FC-1, FC-2, FC-4, FC-6, FC-7, FC-8, FC-10, FC-11, FC-13. FC-15, and FC-16.
2. Refer to the individual boring logs for the depth to bedrock.
3. Ultimate skin friction values for bedrock are not applicable for driven piles which refuse on bedrock. For piles that must be pre-drilled and grouted, refer to the **Pre-Drilled Pile Considerations** section for the bond strength between grout and bedrock.

Zone 2: Pre-Drilling Potentially Required[1]		
Minimum Pile Embedment Depth Below Ground Surface (feet)	**Ultimate Skin Friction (psf)**	**Ultimate End Bearing Capacity (psf)**
0 to 2.5	Neglect	Neglect
3 to 8	200	36,000
8 to 13	500	76,000
13 to 20	600	88,000

1. Borings located in Zone 2: FC-3, FC-5, and FC-9.

Zone 3: Pre-Drilling Likely Not Required[1]		
Minimum Pile Embedment Depth Below Ground Surface (feet)	**Ultimate Skin Friction (psf)**	**Ultimate End Bearing Capacity (psf)**
0 to 2.5	Neglect	Neglect
3 to 6	800	12,000
6 to 10	1,000	18,000
10 to 15	800	12,000
15 to 20	500	3,000

1. Borings located in Zone 3: FC-12 and FC-14.

The above values are to be used in the following equations to obtain the ultimate uplift or compression load capacity of a pile:

$$Q_{ult\ (compressive)} = q_t \times A + H \times P \times q_s$$
$$Q_{ult\ (uplift)} = H \times P \times q_s$$

Q_{ult} = Ultimate uplift or compression capacity of post (lbs.)
$Q_{ult\ (end)}$ = Ultimate end bearing capacity per table above (lbs.)
H = Depth of embedment of pile (ft.)
P = Perimeter area/ft. of pile. (i.e. W6x9 = 1.64 sf/ft.)
q_s = Skin friction per depth per table above (psf)
q_t = unit toe-bearing resistance per table above (psf)
A = cross sectional area of pile (i.e. W6x9 = 0.019 sf).

The skin friction is appropriate for uplift and compressive loading and represents ultimate values. A factor of safety of 2 should be applied to the skin friction values. The end bearing is also an ultimate value and should have a factor of safety of 2 applied for design.

Piles should have a minimum center-to-center spacing of at least 3 times their largest cross-sectional dimension to prevent reduction in the axial capacities due to group effects. If the piles are designed using the above parameters, settlements are not anticipated to exceed 1 inch.

GEOTECHNICAL LATERAL CAPACITY

The parameters in the following table can be used for a preliminary analysis of the lateral capacity of driven steel piles in support of solar panel arrays:

LPile Parameters – Zone 1: Pre-Drilling Likely Required[1]						
Soil Type	**Depth (feet)**	**LPile (P-y) Curve Soil Model[3]**	**Effective Unit Weight, γ (pcf)**	**Undrained Cohesion (psf)**	**Friction Angle, Φ (degree)**	**P-Multiplier [2]**
Clayey Soils	0 to 2.5	Stiff Clay w/o Free Water (Reese)	105	500	--	0.7
	3 to 8		110	1,500	--	1.0
Sandy Soils	8 to 13	Sand (Reese)	125	--	34	1.0
	13 to varies[4]		125	--	36	1.0

1. Borings located in Zone 1: FC-1, FC-2, FC-4, FC-6, FC-7, FC-8, FC-10, FC-11, FC-13. FC-15, and FC-16.
2. Reduced in the upper 2.5 feet to account for freeze/thaw effects.
3. Use the LPile default values for Soil Modulus, k and Strain Factor, E_{50}
4. The weathered shale bedrock was assumed to behave like a cohesionless soil..

LPile Parameters – Zone 2: Pre-Drilling Potentially Required[1]					
Soil Type	**Depth (feet)**	**LPile (P-y) Curve Soil Model[4]**	**Effective Unit Weight, γ (pcf) [2]**	**Friction Angle, Φ (degree)**	**P-Multiplier [3]**
Sandy and Silty Soils	0 to 2.5	Sand (Reese)	105	27	0.7
	2.5 to 8		48	28	1.0
	8 to 14		58	30	1.0
	14 to 20		53	33	1.0

1. Borings located in Zone 2: FC-3, FC-5, and FC-9.
2. Buoyant unit weight used below groundwater (assumed to be at 3 feet bgs).
3. Reduced in the upper 3.0 feet to account for freeze/thaw effects.
4. Use a default value of Soil Modulus, k.

LPile Parameters – Zone 3: Pre-Drilling Likely Not Required[1]					
Soil Type	**Depth (feet)**	**LPile (P-y) Curve Soil Model[3]**	**Effective Unit Weight, γ (pcf)**	**Undrained Cohesion (psf)**	**P-Multiplier [2]**
Clayey Soils	0 to 2.5	Stiff Clay w/o Free Water (Reese)	105	750	0.7
	2.5 to 6		120	1,200	1.0
	6 to 10		115	2,000	1.0
	10 to 15		120	1,200	1.0

LPile Parameters – Zone 3: Pre-Drilling Likely Not Required[1]					
Soil Type	**Depth (feet)**	**LPile (P-y) Curve Soil Model[3]**	**Effective Unit Weight, γ (pcf)**	**Undrained Cohesion (psf)**	**P-Multiplier [2]**
	15 to 20	Soft Clay (Matlock)	110	500	1.0

1. Borings located in Zone 3: FC-12 and FC-14
2. Reduced in the upper 2.5 feet to account for freeze/thaw effects.
3. Use the LPile default values for Soil Modulus, k and Strain Factor, E_{50}

The above indicated effective unit weight, effective friction angle, and cohesion values have no factor of safety and may be used to analyze suitability of the proposed section and serviceability requirements. These parameters are based on correlations with SPT results, published values, and our experience with similar soil types. Existing p-y models typically under-predict the lateral capacity of shallow driven piles in clay soils. Therefore, the P-multiplier is most likely higher but would need to be confirmed based on results of site-specific load test results.

DRIVEN PILE CONSTRUCTION CONSIDERATIONS

Based on the field exploration, it is our opinion that the soils on the site are suitable for pile installation. However, difficult pile-driving conditions should be expected in Zone 1 and Zone 2 and especially where SPT N-Values greater than 40 were encountered during our field exploration. We anticipate pile installation could require predrilling in these areas.

PRE-DRILLED PILE CONSIDERATIONS

There are two pre-drilling applications which can be utilized to improve pile installation in areas with difficult pile driving conditions. Where very dense soil or highly weathered rock are encountered, pre-drilling under-sized holes (approximately 80% to 90% of the largest pile dimension) before pile installation can help to facilitate pile driving. Where bedrock would cause pile refusal conditions, over-sized holes (minimum 2-inches greater than the largest pile dimension) can be drilled before placing and grouting the pile in place. A load testing program should be completed to determine the feasibility of using either pre-drilled option. The pre-drilled under-sized holes should not extend the entire design embedment depth and should instead be terminated about 3 to 6 inches less than the desired embedment depth. Actual pre-drilled depths should be documented in the installation records for each pile location. The skin friction, end bearing, and LPile parameters provided in the previous sections may be used to estimate preliminary capacities of piles installed in pre-drilled under-sized holes. Additionally, an ultimate skin friction value of 1,000 psf may be used for the drilled bedrock zone. However, full-scale load testing should be completed on piles installed in under-sized holes since capacity can be significantly impacted by this construction method.

PRELIMINARY RECOMMENDATIONS FOR ISOLATED SLAB FOUNDATIONS

We understand that some equipment may be supported on mat/slab foundations while other structures and O&M building may be supported on shallow foundations. Based on the anticipated types of structures and the expected magnitude of loading, surface soil replacement that is provided in the **PRELIMINARY EARTHWORK RECOMENDATIONS** sections of this report will be needed. We would expect an allowable bearing capacity of 2,000 psf with total and differential settlements of about 1 inch and ¾ inch, respectively, depending on minimum foundation width and embedment.

PRELIMINARY EARTHWORK RECOMMENDATIONS

The site work conditions will be largely dependent on the weather conditions and the contractor's means and methods in controlling surface drainage and protecting the subgrade. The clayey and silty soils encountered in the borings may provide poor surface water drainage at the site for construction. Site preparation where inverter mat foundations will be installed should include clearing and grubbing, installation of a site drainage system (where necessary), subgrade preparation, proof rolling and vibratory densification as necessary. Site preparation is not necessary in the PV Array field or where inverters will be supported on driven piles except to improve site drainage where necessary.

We would expect typical earthmoving equipment (bulldozers, excavators, steel drum vibratory rollers) to be suitable for completion of earthwork activities on the site. The most challenging obstacle for earthwork construction will be the control of surface water, especially during the typical wet season. The site should be graded to prevent ponding of surface water.

Typical unpaved access roads in the lightly loaded array areas consisting of about 6 to 9 inches of aggregate base on compacted stable native soil should be suitable. The substation access road will likely require 6 to 9 inches of aggregate base over 12 inches of stabilized subgrade or native soils reinforced with a geogrid.

CORROSIVITY

Corrosivity test results performed on samples collected from bulk samples throughout the site. These 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. Location of the samples and the test result are included in our results of corrosion analysis included in the appendix of this report.

These test results are provided to assist in determining the type and degree of corrosion protection that may be required. We recommend that a certified corrosion engineer be retained to analyze the need for corrosion protection and to design appropriate protective measures, if required.

As discussed in Section 10.7.5 of the AASHTO LRFD Bridge Manual, 8th Edition, 2017, the following soil or site conditions should be considered as indicative of potential deterioration or corrosion situation for steel piles:

- Soil electrical resistivity less than 2,000 ohm-cm
- pH less than 5.5
- pH between 5.5 and 8.5 with high organic content
- Sulfate concentration greater than 1,000 ppm (mg/kg)

FIELD RESISTIVITY TEST RESULTS

Field measurements of soil electrical resistivity were performed by Terracon on September 16, 2021. The soil resistivity testing was performed at the locations identified in the **Exploration Plan**. The Wenner arrangement (equal electrode spacing) was used with "a" spacings of 2.5, 5, 10, 15, 20 and 50 feet at eight locations within the solar array area and at one location within the proposed substation. The "a" spacing is generally considered to be the depth of influence of the test. The testing was performed in both a north-south and an east-west orientation at each location. Results of the soil resistivity measurements are presented in the **Exploration Results** section.

SEISMIC CONSIDERATIONS

Description	Value
2018 International Building Code Site Classification (IBC) [1]	C or D [2]

1/ The site class definition was determined using SPT N-values in conjunction with section 1613.3.2 in the 2018 IBC and Table 20.3-1 in the 2010 ASCE-7.

2/ Borings extended to a maximum depth of 20 feet, and this seismic site class definition considers that similar conditions continue below the maximum depth of the subsurface exploration.

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. Prior to construction of the project, Terracon should be retained as the Geotechnical Engineer to provide design level geotechnical engineering services.

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.

ATTACHMENTS

FIELD EXPLORATION

Contents:

Note: All attachments are one page unless noted above.

FIELD EXPLORATION PROCEDURES

Number of Explorations	Type of Exploration	Approximate Depth or Description	Planned Location
16 locations (FC-1 through FC-16)	SPT Boring	13 to 20 feet bgs	Array Areas
8 locations (FC-1, FC-3, FC-6, FC-9, FC-11, FC-12, FC-14 and FC-16)	Field Electrical Resistivity	'a' spacing: 2.5, 5, 10, 15, 20, and 50 feet.	Array Areas
4 locations (FC-6, FC-9, FC-12 and FC-16)	Bulk Sample for Thermal Resistivity	1 to 4 feet bgs	Array Areas
8 locations (FC-1, FC-3, FC-6, FC-9, FC-11, FC-12, FC-14 and FC-16)	Bulk Samples for Corrosion Testing	1 to 4 feet bgs	Array Areas

Boring Layout and Elevations: The exploration locations were selected by Terracon personnel based on the site and access conditions and the planned footprint of the PV arrays locations provided by SunEast Development, LLC. The GPS coordinates of the boring locations were obtained with a handheld GPS unit with estimated horizontal accuracy of about ±15 feet. Elevations were estimated from USGS. The boring locations and elevations should be considered accurate only to the degrees implied by the methods used to determine them. If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

SPT Borings: The SPT soil borings utilized a track-mounted, rotary drilling rig equipped with an automatic hammer. Soil samples were obtained by the split spoon sampling procedure in general accordance with the Standard Penetration Test (SPT) procedure. In the split spoon sampling procedure, the number of blows required to advance the sampling spoon the last 12 inches of an 18-inch penetration or the middle 12 inches of a 24-inch penetration by means of a 140-pound hammer with a free fall of 30 inches, is the standard penetration resistance value (N). This value is used to estimate the in-situ relative density of cohesionless soils and the consistency of cohesive soils. The sampling depths and penetration distance, plus the standard penetration resistance values, are shown on the boring logs.

Portions of the samples from the borings were sealed in jars to reduce moisture loss, and then the jars were taken to our laboratory for further observation and classification. Upon completion, the boreholes were backfilled with soil cuttings.

Field logs of each boring were prepared by a field geologist. These logs included visual classifications of the materials encountered during drilling as well as the geologist's interpretation of the subsurface conditions between samples.

Soil Electrical Resistivity Testing: Soil electrical resistivity data was obtained in accordance with ASTM G57 Standard Test Method for Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method. For testing, we performed two mutually perpendicular lines with electrode “a” spacing of 2.5, 5, 10, 15, 20 and 50 feet at two locations within the solar array area

SITE LOCATION

Flat Creek Solar Site ■ Town of Root, NY
Terracon Project No. J5215096

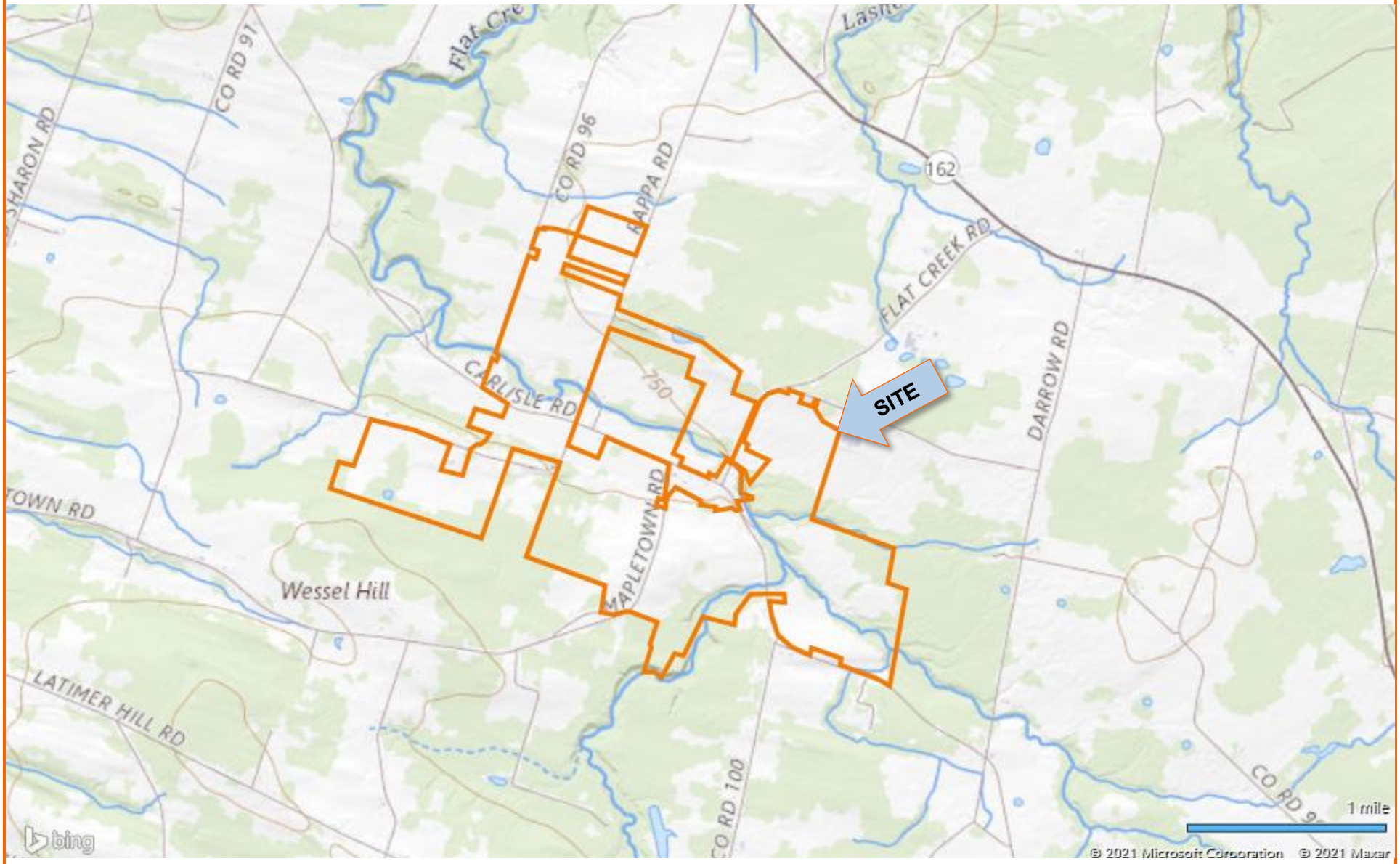


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY USGS.

EXPLORATION PLAN WITH AERIAL IMAGE

Flat Creek Solar Site ■ Town of Root, NY

Terracon Project No. J5215096

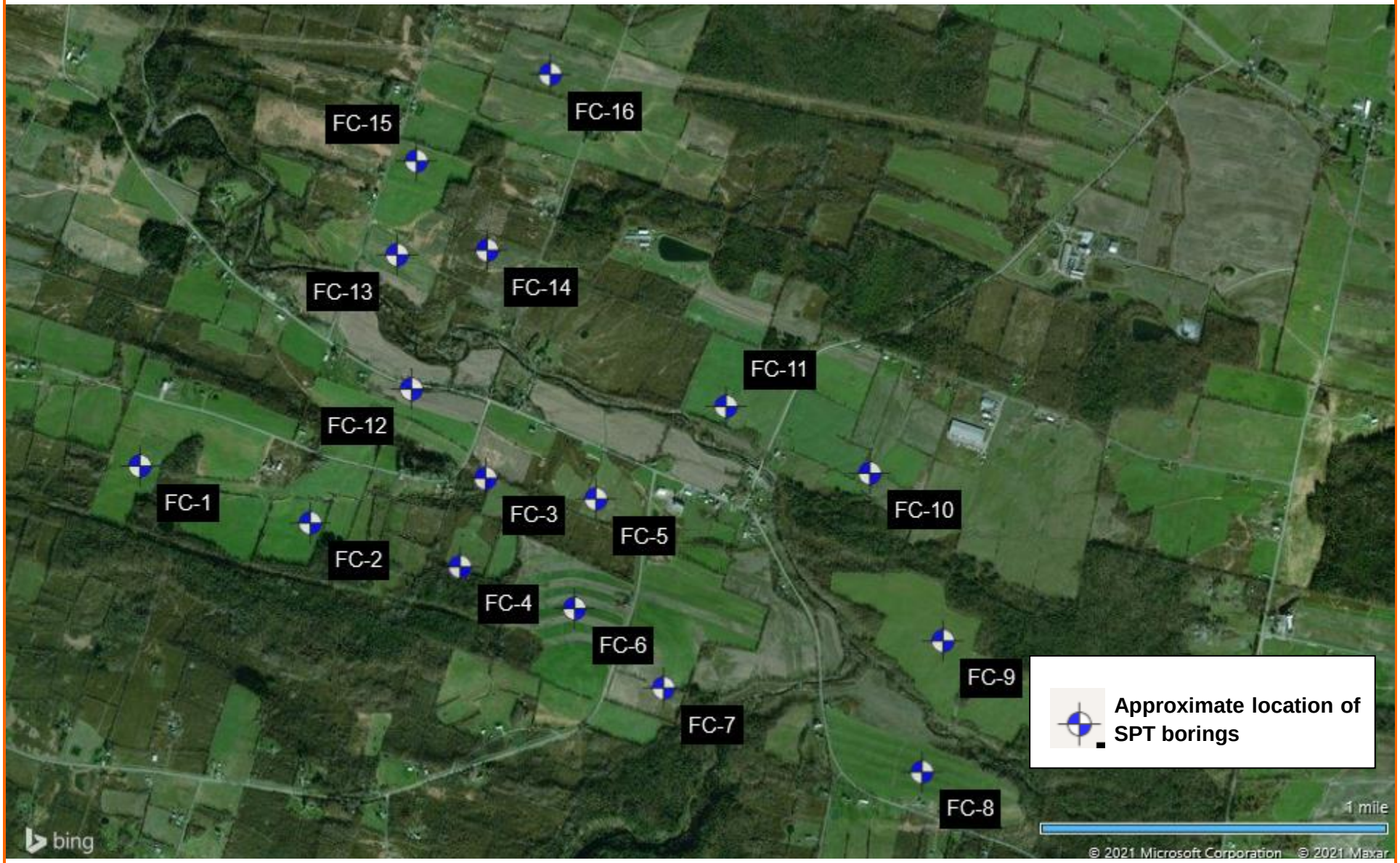


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY BING MAPS

EXPLORATION PLAN WITH PROJECT OVERLAY

Flat Creek Solar Site ■ Town of Root, NY

Terracon Project No. J5215096

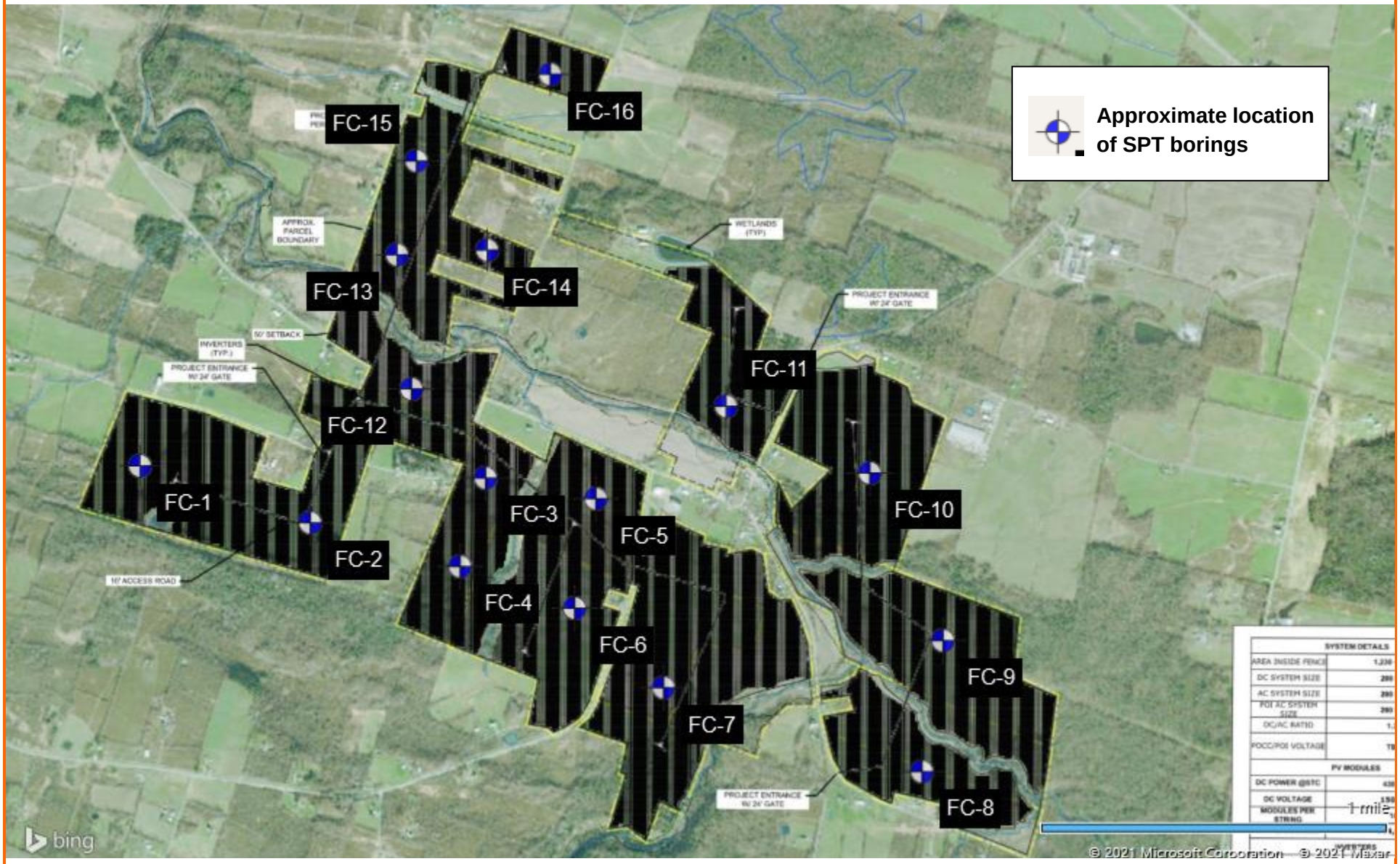


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY SUNEAST DEVELOPMENT, LLC.

EXPLORATION PLAN WITH ANALYSIS ZONES

Flat Creek Solar Site ■ Town of Root, NY

Terracon Project No. J5215096

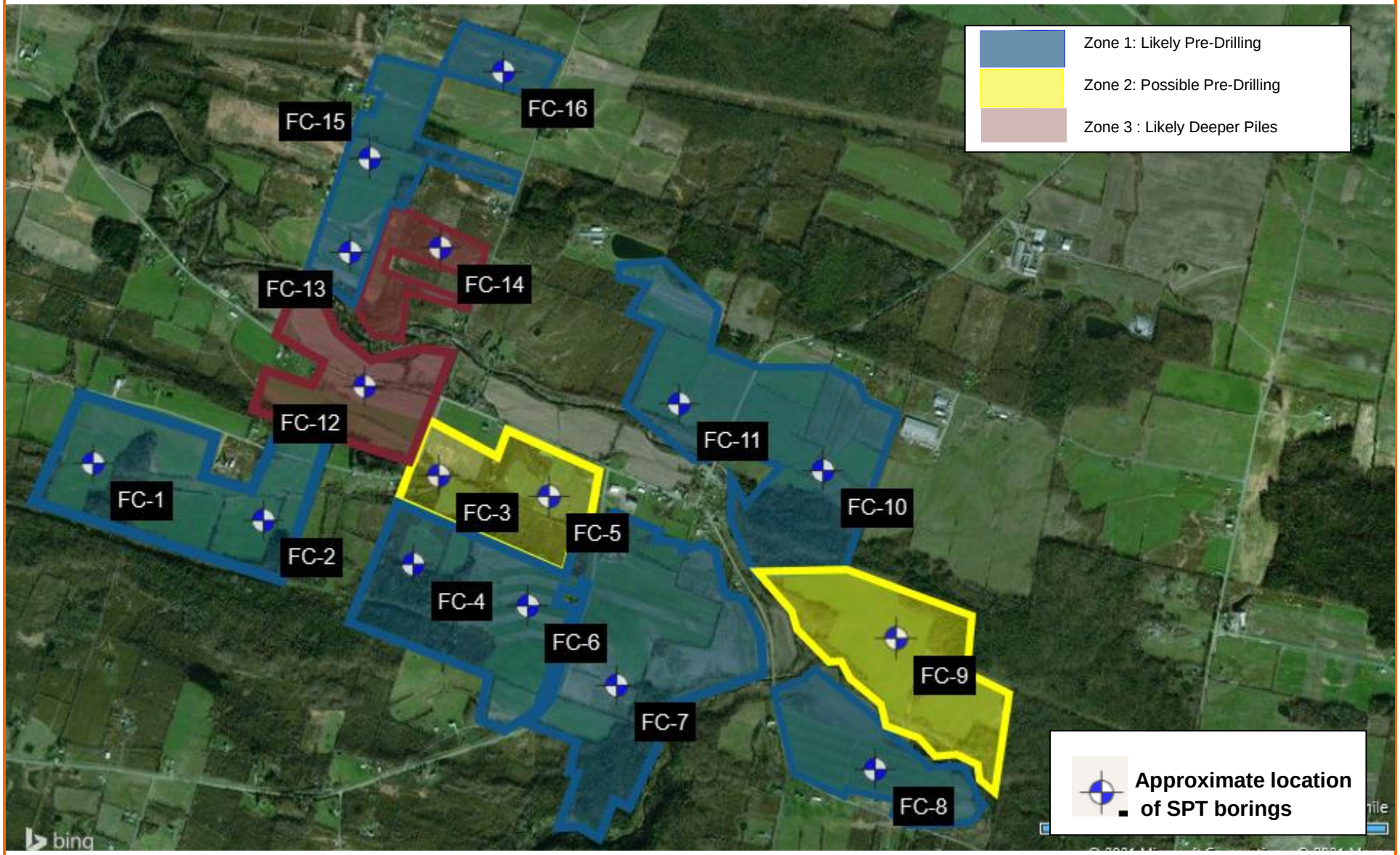


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY BING MAPS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS
SunEast Solar PV NY Sites ■ Town of Root, NY
Terracon Project No. J5215096

Terracon GeoReport

SAMPLING	WATER LEVEL	FIELD TESTS
Rock Core Grab Sample Standard Penetration Test	**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

Terracon GeoReport

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 ≥ 4 and 1 ≤ Cc ≤ 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 ≥ 6 and 1 ≤ Cc ≤ 3 [E]		SW	Well-graded sand [I]
			Cu < 6 and/or [Cc<1 or Cc>3.0] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"		CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K, L, M]
			PI plots below "A" line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

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

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

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

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

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

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

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

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

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

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

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

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

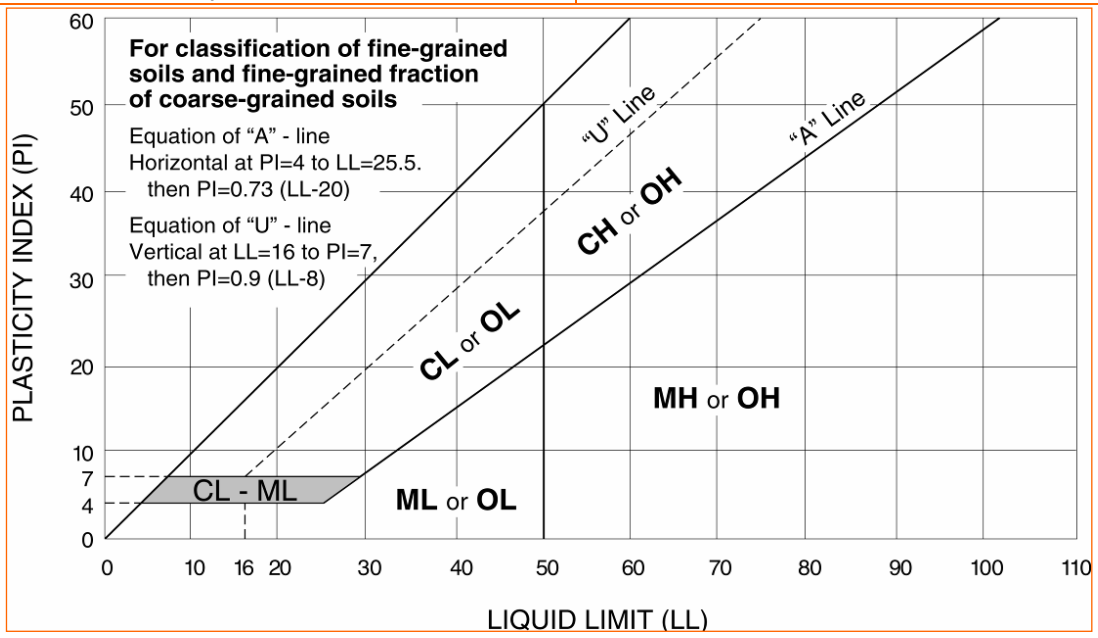
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

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

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

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

[Q] PI plots below "A" line.



DESCRIPTION OF ROCK PROPERTIES

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

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

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

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

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

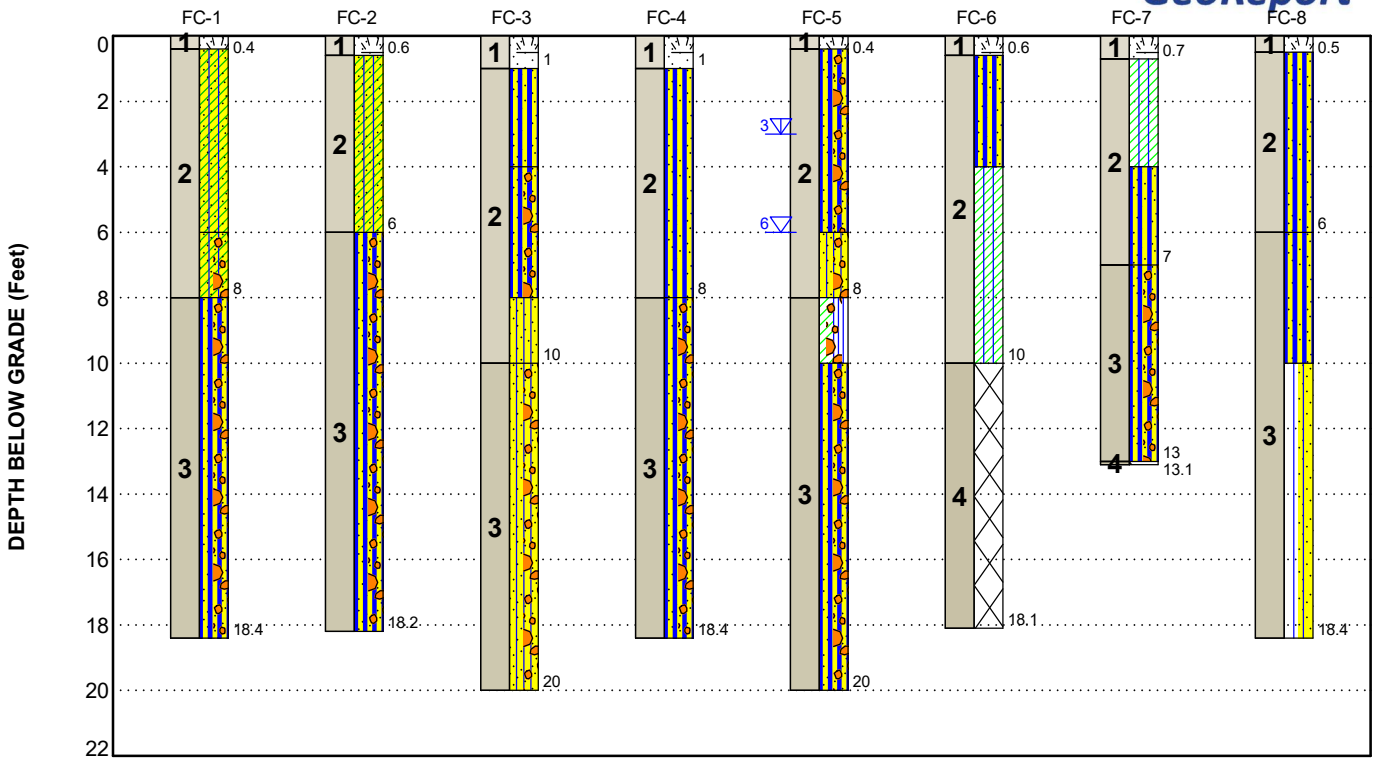
1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.

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

GEOMODEL

SunEast Solar PV NY Sites ■ Town of Root, NY
Terracon Project No. J5215096

Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Surface	Topsoil
2	Native Soil 1	Mixtures of Silt, Sand, Clay and Gravel (CL-ML, ML, SM, CL); trace rock fragments; brown, gray; soft to hard or loose to medium dense to dense (SPT N values range from 3 to 41)
3	Native Soil 2	Mixtures of Silt, Sand, Clay and Gravel (ML, SM, CL-ML, SP); contains rock, cobble and boulder fragments; brown, gray; very stiff to hard or dense to very dense (SPT N values range from 35 to >50)
4	Bedrock	Shale; highly to moderately weathered; gray; weak rock

LEGEND

- Topsoil
- Sandy Silty Clay
- Sandy Silty Clay with Gravel
- Sandy Silt with Gravel
- Sandy Silt
- Silty Sand
- Silty Sand with Gravel
- Silty Clay with Gravel
- Silty Clay
- Weathered Rock
- Silt with Sand

▽ First Water Observation
▽ Second Water Observation

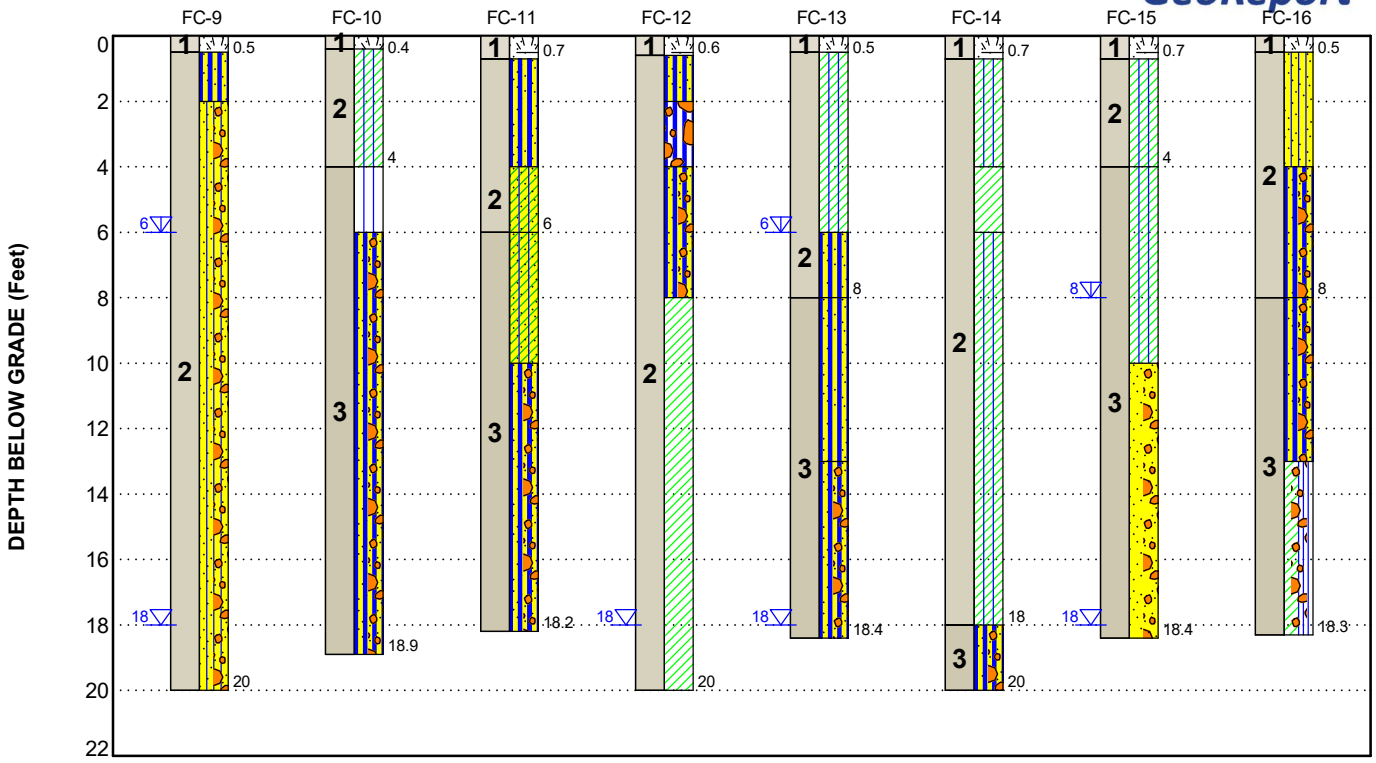
Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

SunEast Solar PV NY Sites ■ Town of Root, NY
Terracon Project No. J5215096

Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Surface	Topsoil
2	Native Soil 1	Mixtures of Silt, Sand, Clay and Gravel (CL-ML, ML, SM, CL); trace rock fragments; brown, gray; soft to hard or loose to medium dense to dense (SPT N values range from 3 to 41)
3	Native Soil 2	Mixtures of Silt, Sand, Clay and Gravel (ML, SM, CL-ML, SP); contains rock, cobble and boulder fragments; brown, gray; very stiff to hard or dense to very dense (SPT N values range from 35 to >50)
4	Bedrock	Shale; highly to moderately weathered; gray; weak rock

LEGEND

- Topsoil
- Silty Clay
- Sandy Silty Clay
- Poorly-graded Sand with Gravel
- Sandy Silt
- Silt
- Gravelly Silt
- Silty Sand
- Silty Sand with Gravel
- Sandy Silt with Gravel
- Lean Clay
- Silty Clay with Gravel

▽ First Water Observation
▽ Second Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

BORING LOG NO. FC-1

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8443° Longitude: -74.5358°

Approximate Surface Elev.: 810 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ATTERBERG LIMITS LL-PL-PI
1		0.4	809.5+/-						
			TOPSOIL						
2			**SANDY SILTY CLAY (CL-ML)**, trace gravel, brown, medium stiff to very stiff				2	2-4-4-6 N=8	31-21-10
							20	4-4-7-8 N=11	
				5			24	4-7-9-9 N=16	
		6.0	804+/-						
			SANDY SILTY CLAY WITH GRAVEL (CL-ML), brown, very stiff, contains rock fragments				20	8-10-16-18 N=26	
		8.0	802+/-						
3			**SANDY SILT WITH GRAVEL (ML)**, dark grayish brown, hard				13	21-36-50/5"	
				10			20	19-36-40-35 N=76	
			Becomes dark gray				18	15-18-21-25 N=39	
				15					
		18.4	791.5+/-				5	50/5"	
			Boring Terminated at 18.4 Feet						

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-02-2021 | Boring Completed: 08-02-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-2

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8419° Longitude: -74.5261°

Approximate Surface Elev.: 807 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.6	806.5+/-	**TOPSOIL**					
2	6.0	801+/-	**SANDY SILTY CLAY (CL-ML)**, trace gravel, brown to dark brown, medium stiff to very stiff	5			19	2-3-3-5 N=6
							22	4-5-5-6 N=10
							22	5-13-13-15 N=26
3			**SANDY SILT WITH GRAVEL (ML)**, brown, hard, contains cobbles and boulders				24	21-24-25-23 N=49
							1	50/2"
			Becomes dark gray	10			24	24-30-34-50/5" N=64
							0	50/2"
				15				
	18.2	789+/-					0	50/2"
			Boring Terminated at 18.2 Feet					

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-03-2021 | Boring Completed: 08-03-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-3

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8438° Longitude: -74.5161°

Approximate Surface Elev.: 730 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ATTERBERG LIMITS LL-PL-PI
1		1.0	729+/-						
2							19	2-3-3-4 N=6	NP
							14	3-3-4-3 N=7	
		4.0	726+/-						
				5			2	3-3-3-4 N=6	
							24	5-6-6-7 N=12	
		8.0	722+/-						
							14	5-5-10-12 N=15	
		10.0	720+/-	10					
3							13	8-19-27-32 N=46	
							13	9-16-20-23 N=36	
				15					
							14	10-16-14-13 N=30	
		20.0	710+/-	20					

TOPSOIL

SANDY SILT (ML), trace gravel, brown, medium stiff

SANDY SILT WITH GRAVEL (ML), brown, medium stiff to stiff

SILTY SAND (SM), dark brown, medium dense

SILTY SAND WITH GRAVEL (SM), dark brown, dense

Contains rock fragments

Boring Terminated at 20 Feet

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-03-2021 | Boring Completed: 08-03-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-4

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8401° Longitude: -74.5175°

Approximate Surface Elev.: 818 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		RECOVERY (In.)	FIELD TEST RESULTS
1	1.0	817+/-	**TOPSOIL**	19	2-2-3-3 N=5
2	8.0	810+/-	**SANDY SILT (ML)**, trace gravel, brown, medium stiff to very stiff	12	3-3-3-4 N=6
				19	3-4-4-10 N=8
				12	8-8-9-9 N=17
3			**SANDY SILT WITH GRAVEL (ML)**, brown to dark brown, hard, contains cobbles and boulders		30-50/2"
			Becomes dark gray	20	17-30-36-35 N=66
				11	10-17-19-20 N=36
	18.4	799.5+/-		5	50/5"
			Boring Terminated at 18.4 Feet		

DEPTH (Ft.): 5, 10, 15

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-03-2021 | Boring Completed: 08-03-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-5

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8429° Longitude: -74.5098°

Approximate Surface Elev.: 733 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.4	732.5+/-	**TOPSOIL**					
2			**SANDY SILT WITH GRAVEL (ML)**, dark brown, medium stiff to very stiff				11	3-3-3-4 N=6
					▽		12	4-5-5-10 N=10
				5			16	10-8-8-8 N=16
	6.0	727+/-			▽			
			SILTY SAND WITH GRAVEL (SM), brown, medium dense				12	8-9-12-10 N=21
	8.0	725+/-						
			SILTY CLAY WITH GRAVEL (CL-ML), brown, hard				28	16-18-24 N=42
	10.0	723+/-		10				
3			**SANDY SILT WITH GRAVEL (ML)**, brown, hard				13	15-18-21-26 N=39
			Becomes dark gray				14	13-16-21-19 N=37
				15				
			Becomes very stiff				13	10-9-12-12 N=21
	20.0	713+/-						
			Boring Terminated at 20 Feet	20				

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

▽ *6' While drilling*

▽ *3' At completion*

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-03-2021 | Boring Completed: 08-03-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-6

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8384° Longitude: -74.5110°

Approximate Surface Elev.: 848 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
1		0.6	847.5+/-							
			TOPSOIL							
			SANDY SILT (ML), trace gravel, dark brown, medium stiff to stiff				17	3-4-4-5 N=8		
							22	5-5-5-6 N=10	33.5	NP
		4.0	844+/-							
2			**SILTY CLAY (CL-ML)**, dark brown, medium stiff to very stiff	5			17	4-4-4-5 N=8		
							23	6-6-7-9 N=13		
		10.0	838+/-				23	6-8-11-16 N=19		
4			**WEATHERED SHALE**, gray, highly to moderately weathered with depth, weak rock	10			12	24-50/5"		
							6	50/5"		
				15						
		18.1	830+/-				1	50/1"		
			Boring Terminated at 18.1 Feet							

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-04-2021 | Boring Completed: 08-04-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-7

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8350° Longitude: -74.5060°

Approximate Surface Elev.: 862 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.7	861.5+/-	**TOPSOIL**					
2	4.0	858+/-	**SILTY CLAY (CL-ML)**, brown, medium stiff				24	2-2-3-5 N=5
							11	4-4-4-5 N=8
	7.0	855+/-	**SANDY SILT (ML)**, brown, stiff to hard, contains clay seams	5			24	5-6-6-8 N=12
							18	13-27-50/5"
3	13.0	849+/-	**SANDY SILT WITH GRAVEL (ML)**, brown, hard				24	12-14-19-17 N=33
				10			5	50/5"
4	13.1	849+/-	**WEATHERED SHALE**, dark gray, moderately weathered, weak rock				1	50/1"

Sample Spoon penetration refusal encountered at 13.1' BGS. Auger penetration refusal encountered at 13.1 Feet

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-04-2021 | Boring Completed: 08-04-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-8

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8316° Longitude: -74.4913°

Approximate Surface Elev.: 821 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	
1	0.5	820.5+/-	**TOPSOIL**
2	6.0	815+/-	**SANDY SILT (ML)**, trace gravel, brown, stiff to very stiff
3	10.0	811+/-	**SANDY SILT (ML)**, trace gravel, brown, hard, Contains rock fragments
	18.4	802.5+/-	**SILT WITH SAND (ML)**, gray, hard, contains rock fragments
			Boring Terminated at 18.4 Feet

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
		20	3-4-4-5 N=8
		22	7-7-7-7 N=14
5		10	6-5-5-11 N=10
		16	26-21-27-30 N=48
		0.42	50/5"
10		17	2-27-50/5"
		5	50/5"
15			50/5"

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-04-2021 | Boring Completed: 08-04-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-9

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8370° Longitude: -74.4901°

Approximate Surface Elev.: 825 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
1		0.5	824.5+/-							
		TOPSOIL								
		SANDY SILT (ML), trace gravel, contains wood fragments, brown, stiff					16	4-5-5-5 N=10		
		2.0	823+/-						15.1	NP
		SILTY SAND WITH GRAVEL (SM), brown, medium dense to dense					12	9-10-10-12 N=20		
				5			24	5-6-8-12 N=14		
							24	12-18-17-22 N=35		
		Becomes dark gray					24	24-18-22-17 N=40		
2				10			16	12-13-17-19 N=30		
		Becomes medium dense					16	5-9-13-13 N=22		
				15						
							13	6-8-12-17 N=20		
		20.0	805+/-	20						
		Boring Terminated at 20 Feet								

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

18' While drilling

6' At completion

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-04-2021 | Boring Completed: 08-04-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-10

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8440° Longitude: -74.4943°

Approximate Surface Elev.: 814 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.4	813.5+/-	**TOPSOIL**					
2	4.0	810+/-	**SILTY CLAY (CL-ML)**, trace gravel, brown, stiff				22	5-4-4-5 N=8
							17	5-5-10-10 N=15
	6.0	808+/-	**SILT (ML)**, trace gravel, brown, hard	5			16	22-35-50/5"
3			**SANDY SILT WITH GRAVEL (ML)**, dark brown, hard				16	19-20-50/5"
							23	8-17-20-20 N=37
			Contains cobbles and boulders	10			10	29-50/5"
							10	25-22-29-17 N=51
				15				
	18.9	795+/-					10	27-50/5"
			Boring Terminated at 18.9 Feet					

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-05-2021 | Boring Completed: 08-05-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-11

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8468° Longitude: -74.5024°

Approximate Surface Elev.: 760 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ATTERBERG LIMITS LL-PL-PI
1	0.7	759.5+/-	**TOPSOIL**						
			SANDY SILT (ML), trace gravel, brown, medium stiff to hard				17	2-2-2-2 N=4	
							11	7-19-18-21 N=37	NP
	4.0	756+/-							
2	6.0	754+/-	**SANDY SILTY CLAY (CL-ML)**, trace gravel, dark brown, hard	5			17	8-14-19-21 N=33	
			SANDY SILTY CLAY (CL-ML), trace gravel, dark brown, hard				10	35-50/5"	
							10	33-50/5"	
	10.0	750+/-		10					
3			**SANDY SILT WITH GRAVEL (ML)**, brown, hard				4	50/5"	
							10	22-25-50/5"	
				15					
	18.2	742+/-					2	50/2"	
			Boring Terminated at 18.2 Feet						

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-05-2021 | Boring Completed: 08-05-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-12

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8475° Longitude: -74.5203°

Approximate Surface Elev.: 702 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	DESCRIPTION
1	0.6	701.5+/-	**TOPSOIL**
			SANDY SILT (ML), trace gravel, dark brown, medium stiff
	2.0	700+/-	
			GRAVELLY SILT (ML), dark gray, hard
	4.0	698+/-	
			SANDY SILT WITH GRAVEL (ML), brown, stiff to hard
	8.0	694+/-	
2			**LEAN CLAY (CL)**, gray, very stiff to soft
	20.0	682+/-	
			Boring Terminated at 20 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
			13	2-2-3-3 N=5		
			8	17-17-50/5"	19.6	NP
5			15	4-6-8-12 N=14		
			15	37-23-18-21 N=41		
10			18	6-8-9-10 N=17		
			18	8-7-4-4 N=11		
15			18	3-2-3-2 N=5		
	▽			2-2-1-8 N=3		
20						

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

▽ *18' While drilling*

Dry at completion

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-05-2021 | Boring Completed: 08-05-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-13

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8531° Longitude: -74.5211°

Approximate Surface Elev.: 717 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	716.5+/-	**TOPSOIL** **SILTY CLAY (CL-ML)**, brown, medium stiff to stiff	12	2-3-3-3 N=6
				24	3-4-7-7 N=11
				10	5-5-7-8 N=12
2	6.0	711+/-	**SANDY SILT (ML)**, trace gravel, brown, very stiff	24	10-10-11-14 N=21
	8.0	709+/-	**SANDY SILT (ML)**, trace gravel, brown, hard		50/5"
			Cored boulder from 10.2' to 13.0'		50/2"
3	13.0	704+/-	**SANDY SILT WITH GRAVEL (ML)**, gray, hard	16	18-21-22-20 N=43
	18.4	698.5+/-	***Boring Terminated at 18.4 Feet***	4	50/5"

DEPTH (Ft.): 5, 10, 15

WATER LEVEL OBSERVATIONS: ▽ 18' While drilling; ▽ 6' At completion

SAMPLE TYPE

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-05-2021 | Boring Completed: 08-05-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-14

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8533° Longitude: -74.5160°

Approximate Surface Elev.: 719 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
1		0.7	718.5+/-							
		TOPSOIL								
2		**SILTY CLAY (CL-ML)**, brown, medium stiff to stiff					18	2-3-3-4 N=6	42.7	63-35-28
							24	5-6-7-8 N=13		
		4.0	715+/-							
		LEAN CLAY (CL), brown, very stiff		5			22	5-8-9-13 N=17		
		6.0	713+/-							
		SILTY CLAY (CL), brown, hard to stiff					24	20-19-21-12 N=40		
							18	8-12-11-10 N=23		
		Becomes dark gray		10			22	10-9-7-8 N=16		
							16	3-4-5-6 N=9		
				15						
		18.0	701+/-							
3		**SANDY SILT WITH GRAVEL (ML)**, dark gray, hard, contains rock fragments					14	10-25-25-25 N=50		
		20.0	699+/-	20						
		Boring Terminated at 20 Feet								

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-06-2021 | Boring Completed: 08-06-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-15

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8570° Longitude: -74.5200°

Approximate Surface Elev.: 738 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	
1	0.7	737.5+/-	**TOPSOIL**
2	4.0	734+/-	**SILTY CLAY (CL-ML)**, brown, medium stiff to very stiff
			SILTY CLAY (CL-ML), brown, hard Contains cobble and boulders
3	10.0	728+/-	**POORLY GRADED SAND WITH GRAVEL (SP)**, trace silt, gray, dense to very dense
	18.4	719.5+/-	Contains rock fragments
			Boring Terminated at 18.4 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
			10	2-3-3-4 N=6
			18	5-7-10-13 N=17
5			16	5-10-33-16 N=43
	▽		11	22-40-47-35 N=87
			15	30-25-32-34 N=57
10			15	8-12-23-12 N=35
			10	10-25-10-7 N=35
15				
	▽		3	50/5"

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

▽ *18' While drilling*

▽ *8' At completion*

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-06-2021 | Boring Completed: 08-06-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

BORING LOG NO. FC-16

PROJECT: SunEast Solar PV NY Sites

CLIENT: SunEast Development, LLC
Old Lyme, CT

SITE: Flat Creek
Town of Root, NY

LOCATION See Exploration Plan

Latitude: 42.8606° Longitude: -74.5124°

Approximate Surface Elev.: 770 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
1		0.5	769.5+/-							
		TOPSOIL								
		SILTY SAND (SM), dark brown, loose to medium dense					17	1-2-2-3 N=4		
							17	5-12-7-11 N=19	37.6	NP
		4.0	766+/-							
2		**SANDY SILT WITH GRAVEL (ML)**, dark brown, very stiff to hard		5			18	3-7-9-14 N=16		
							23	12-22-17-14 N=39		
		8.0	762+/-							
		SANDY SILT WITH GRAVEL (ML), gray, hard, contains cobbles and boulders					1	50/1"		
				10			24	29-38-28-22 N=66		
		13.0	757+/-							
3		**SILTY CLAY WITH GRAVEL (CL-ML)**, dark brown, hard, contains cobbles and boulders					16	14-19-50/5"		
				15						
		18.3	751.5+/-				4	50/4"		
		Boring Terminated at 18.3 Feet								

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

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

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

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from USGS topographic site maps.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-06-2021 | Boring Completed: 08-06-2021

Drill Rig: CME-550 | Driller: M. Powell

Project No.: J5215096

FIELD SOIL RESISTIVITY TEST LOCATIONS

Flat Creek Solar Site ■ Town of Root, NY

Terracon Project No. J5215096

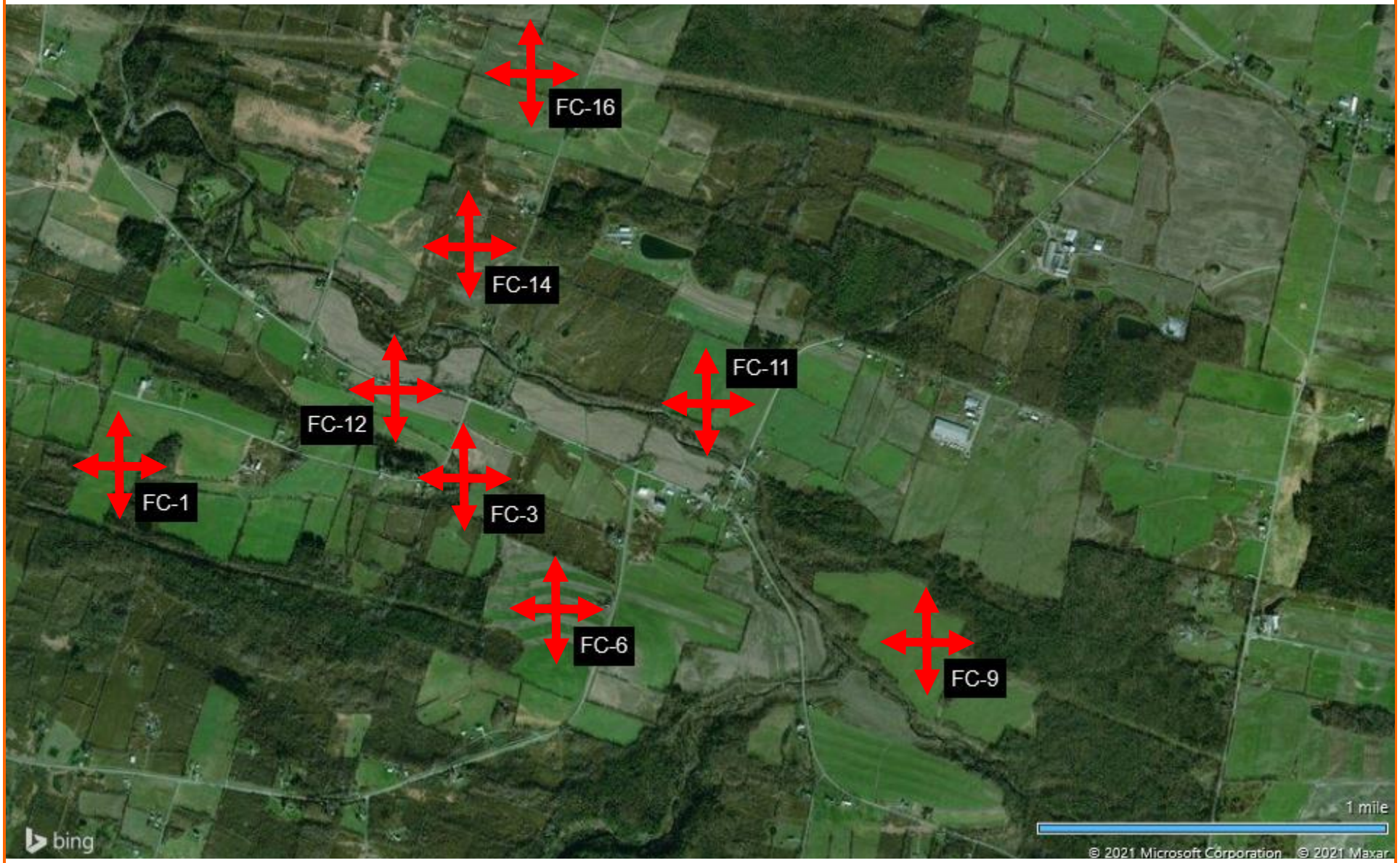


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY BING MAPS

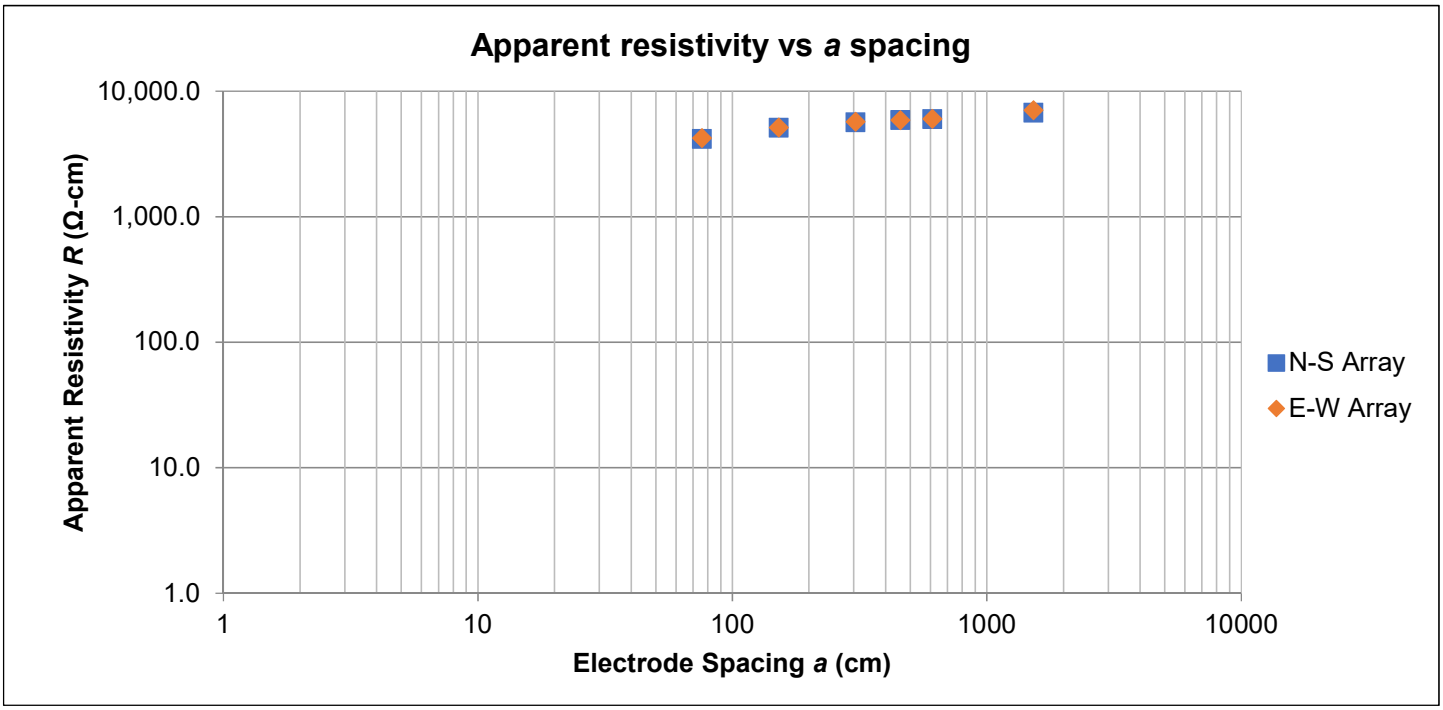
FIELD ELECTRICAL RESISTIVITY TEST DATA (SUNEAST SOLAR - 7 SITES)

Flat Creek Solar ■ Root, NY
Terracon Project No. J5215096

Array Loc.	FC-1		
Instrument	Mini-Res Resistivity Meter	**Weather**	Partly Cloudy, 64°F
Serial #	SN-306	**Ground Cond.**	Wet, 68°F Ground Temperature
Cal. Check	8/18/2021	**Tested By**	Brandon Luther
Test Date	9/16//2021	**Method**	Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)
Notes & Conflicts	Corn Field, Wet Surface		

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	6	15	8.24	4190	8.36	4250
5	152	6	15	5.30	5140	5.31	5160
10	305	12	30	2.91	5680	2.93	5710
15	457	12	30	2.06	5940	2.04	5900
20	610	12	30	1.57	6040	1.57	6050
50	1524	12	30	0.71	6790	0.74	7070



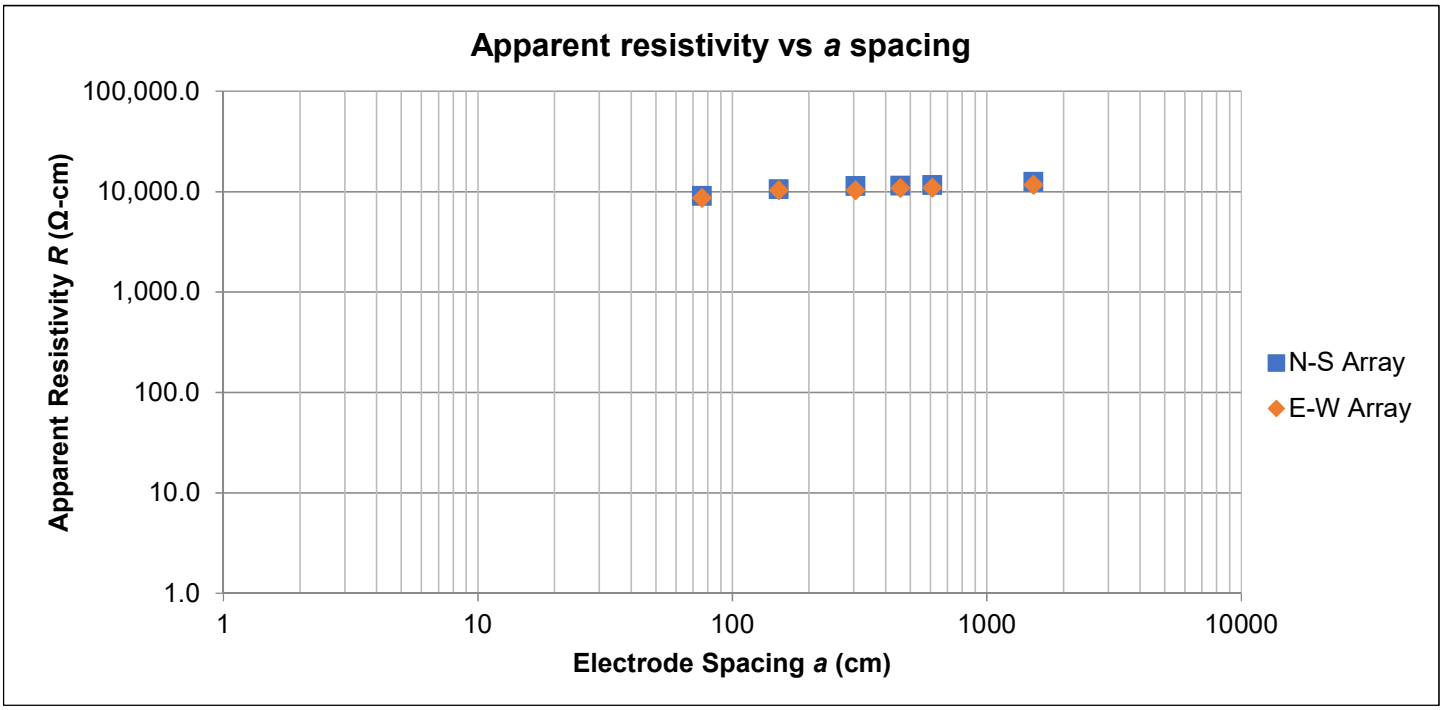
FIELD ELECTRICAL RESISTIVITY TEST DATA (SUNEAST SOLAR - 7 SITES)

Flat Creek Solar ■ Root, NY
Terracon Project No. J5215096

Array Loc.	FC-3		
Instrument	Mini-Res Resistivity Meter	**Weather**	Partly Cloudy, 65°F
Serial #	SN-306	**Ground Cond.**	Moist, 68°F Ground Temperature
Cal. Check	8/18/2021	**Tested By**	Brandon Luther
Test Date	9/16//2021	**Method**	Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)
Notes & Conflicts	Crop Field, Moist Surface, Clay/sand		

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	6	15	17.95	9120	17.06	8670
5	152	6	15	10.94	10620	10.63	10320
10	305	12	30	5.90	11500	5.30	10330
15	457	12	30	3.99	11550	3.77	10900
20	610	12	30	3.05	11730	2.85	10970
50	1524	12	30	1.31	12590	1.22	11690



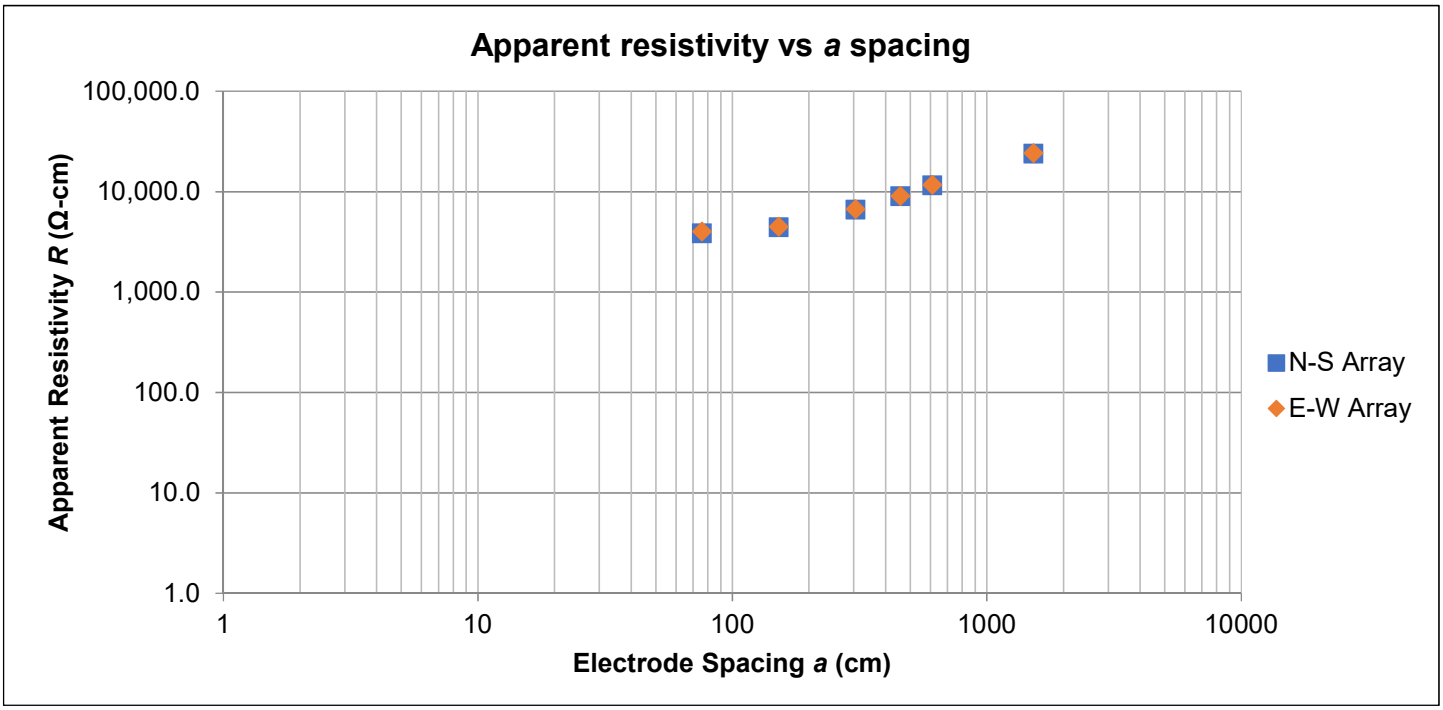
FIELD ELECTRICAL RESISTIVITY TEST DATA (SUNEAST SOLAR - 7 SITES)

Flat Creek Solar ■ Root, NY
Terracon Project No. J5215096

Array Loc.	FC-6		
Instrument	Mini-Res Resistivity Meter	**Weather**	Partly Cloudy, 69°F
Serial #	SN-306	**Ground Cond.**	Moist, 69°F Ground Temperature
Cal. Check	8/18/2021	**Tested By**	Brandon Luther
Test Date	9/16//2021	**Method**	Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)
Notes & Conflicts	Crop Field, Moist Surface		

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	6	15	7.64	3880	7.89	4010
5	152	6	15	4.58	4450	4.62	4490
10	305	12	30	3.42	6660	3.44	6700
15	457	12	30	3.14	9090	3.13	9060
20	610	12	30	3.03	11670	3.05	11720
50	1524	12	30	2.52	24140	2.52	24190



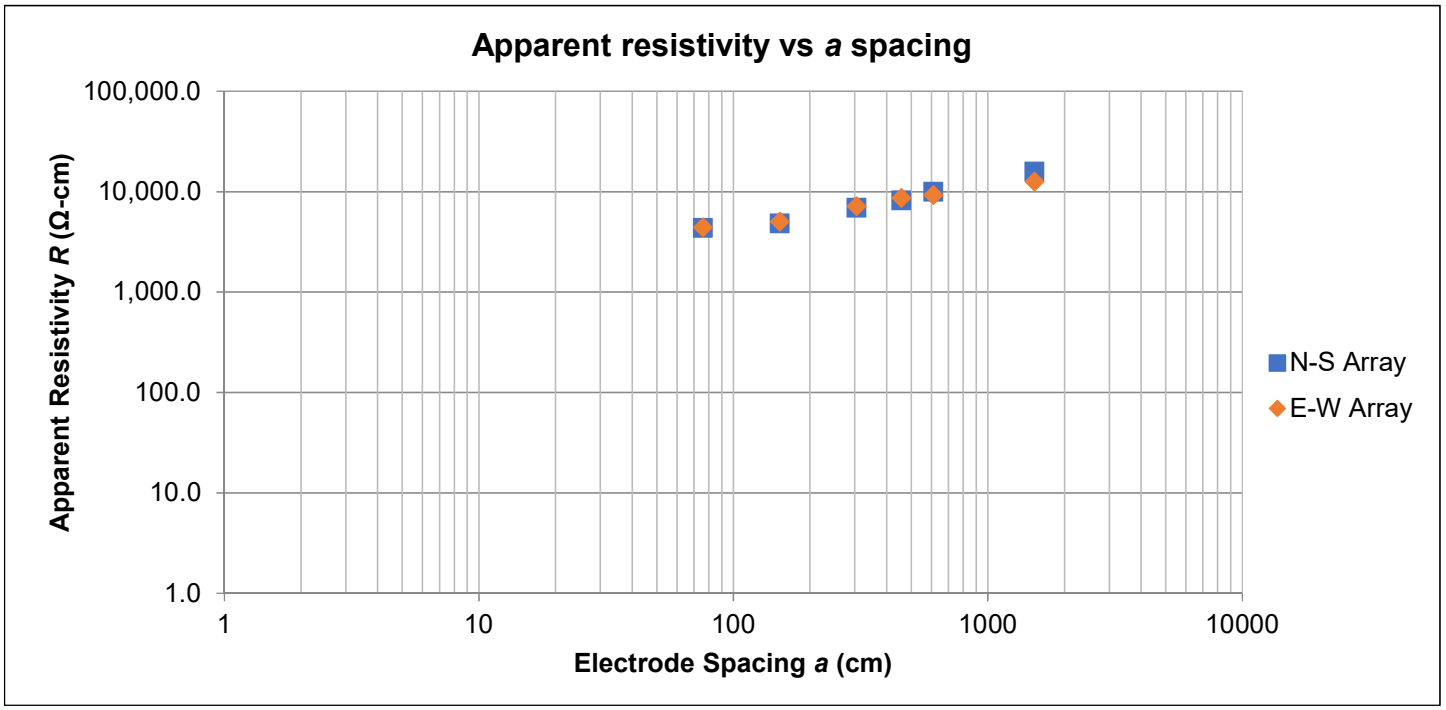
FIELD ELECTRICAL RESISTIVITY TEST DATA (SUNEAST SOLAR - 7 SITES)

Flat Creek Solar ■ Root, NY
Terracon Project No. J5215096

Array Loc.	FC-9		
Instrument	Mini-Res Resistivity Meter	**Weather**	Partly Cloudy, 70°F
Serial #	SN-306	**Ground Cond.**	Moist, 67°F Ground Temperature
Cal. Check	8/18/2021	**Tested By**	Brandon Luther
Test Date	9/16//2021	**Method**	Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)
Notes & Conflicts	Crop Field, Moist Surface		

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	6	15	8.65	4390	8.72	4430
5	152	6	15	5.01	4870	5.18	5030
10	305	12	30	3.58	6980	3.68	7180
15	457	12	30	2.86	8260	2.99	8650
20	610	12	30	2.62	10080	2.41	9290
50	1524	12	30	1.67	16010	1.31	12590



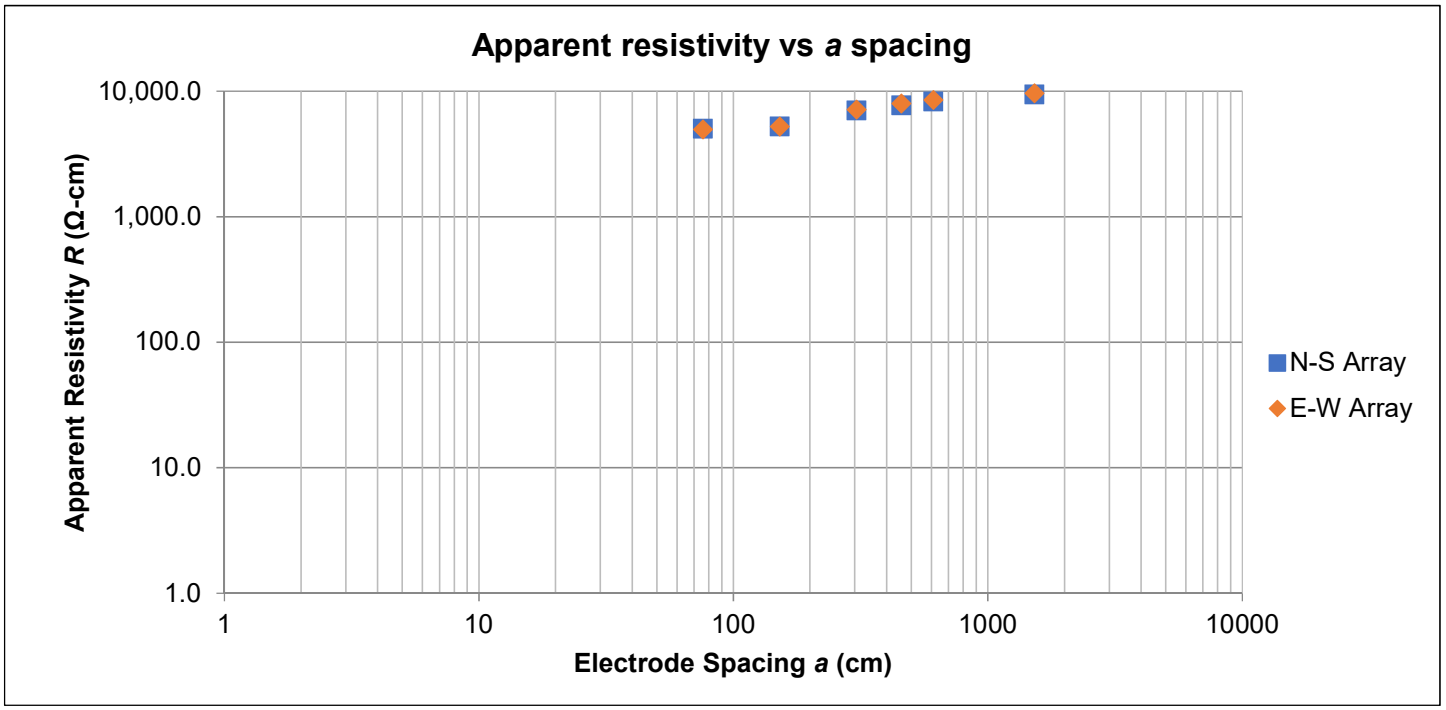
FIELD ELECTRICAL RESISTIVITY TEST DATA (SUNEAST SOLAR - 7 SITES)

Flat Creek Solar ■ Root, NY
Terracon Project No. J5215096

Array Loc.	FC-11		
Instrument	Mini-Res Resistivity Meter	**Weather**	Partly Cloudy, 69°F
Serial #	SN-306	**Ground Cond.**	Moist, 70°F Ground Temperature
Cal. Check	8/18/2021	**Tested By**	Brandon Luther
Test Date	9/16//2021	**Method**	Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)
Notes & Conflicts	Crop Field, Moist Surface		

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	6	15	9.94	5050	9.79	4980
5	152	6	15	5.44	5280	5.38	5230
10	305	12	30	3.64	7090	3.67	7150
15	457	12	30	2.68	7760	2.76	7980
20	610	12	30	2.16	8320	2.22	8550
50	1524	12	30	0.99	9470	1.01	9660



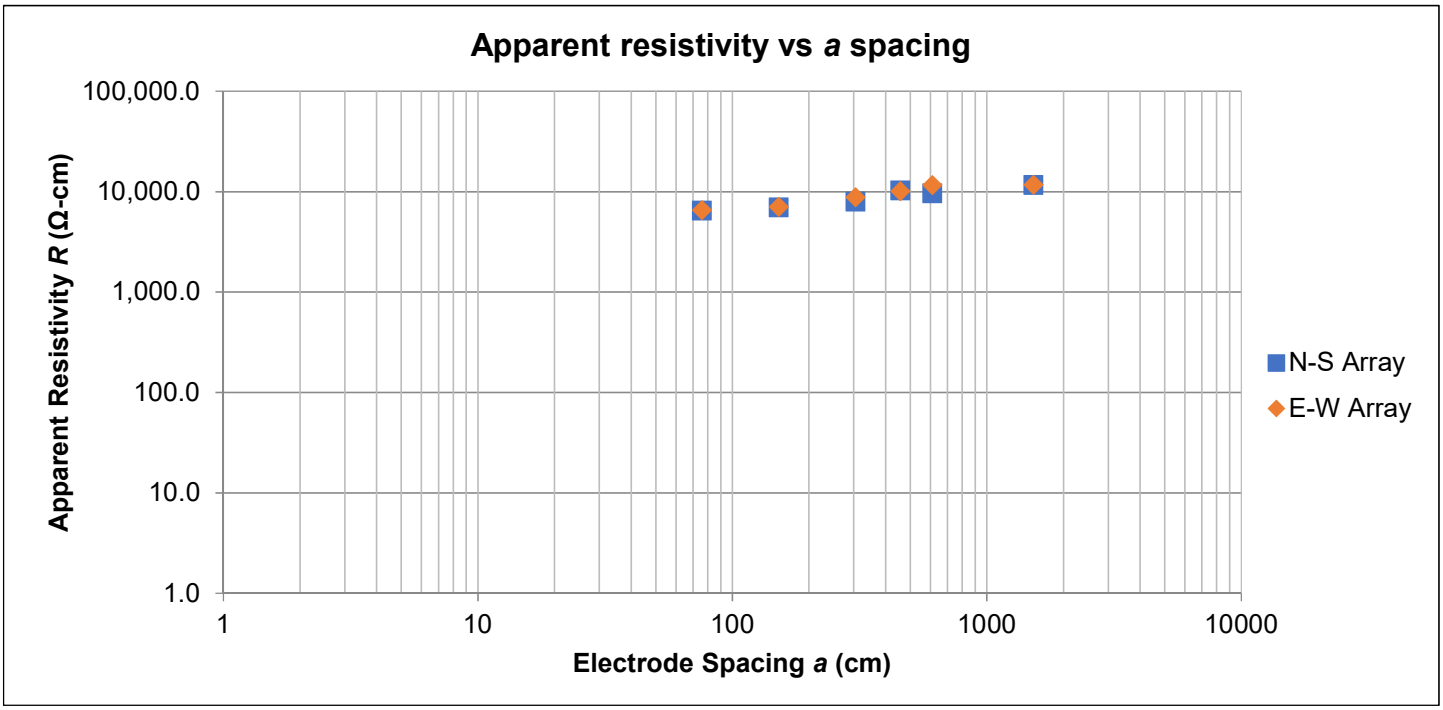
FIELD ELECTRICAL RESISTIVITY TEST DATA (SUNEAST SOLAR - 7 SITES)

Flat Creek Solar ■ Root, NY
Terracon Project No. J5215096

Array Loc.	FC-12		
Instrument	Mini-Res Resistivity Meter	**Weather**	Partly Cloudy, 70°F
Serial #	SN-306	**Ground Cond.**	Moist, 71°F Ground Temperature
Cal. Check	8/18/2021	**Tested By**	Brandon Luther
Test Date	9/16//2021	**Method**	Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)
Notes & Conflicts	Crop Field, Moist Surface		

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	6	15	12.80	6510	12.90	6560
5	152	6	15	7.20	6990	7.29	7080
10	305	12	30	4.10	7990	4.53	8830
15	457	12	30	3.57	10330	3.49	10100
20	610	12	30	2.51	9670	3.01	11600
50	1524	12	30	1.22	11690	1.22	11690



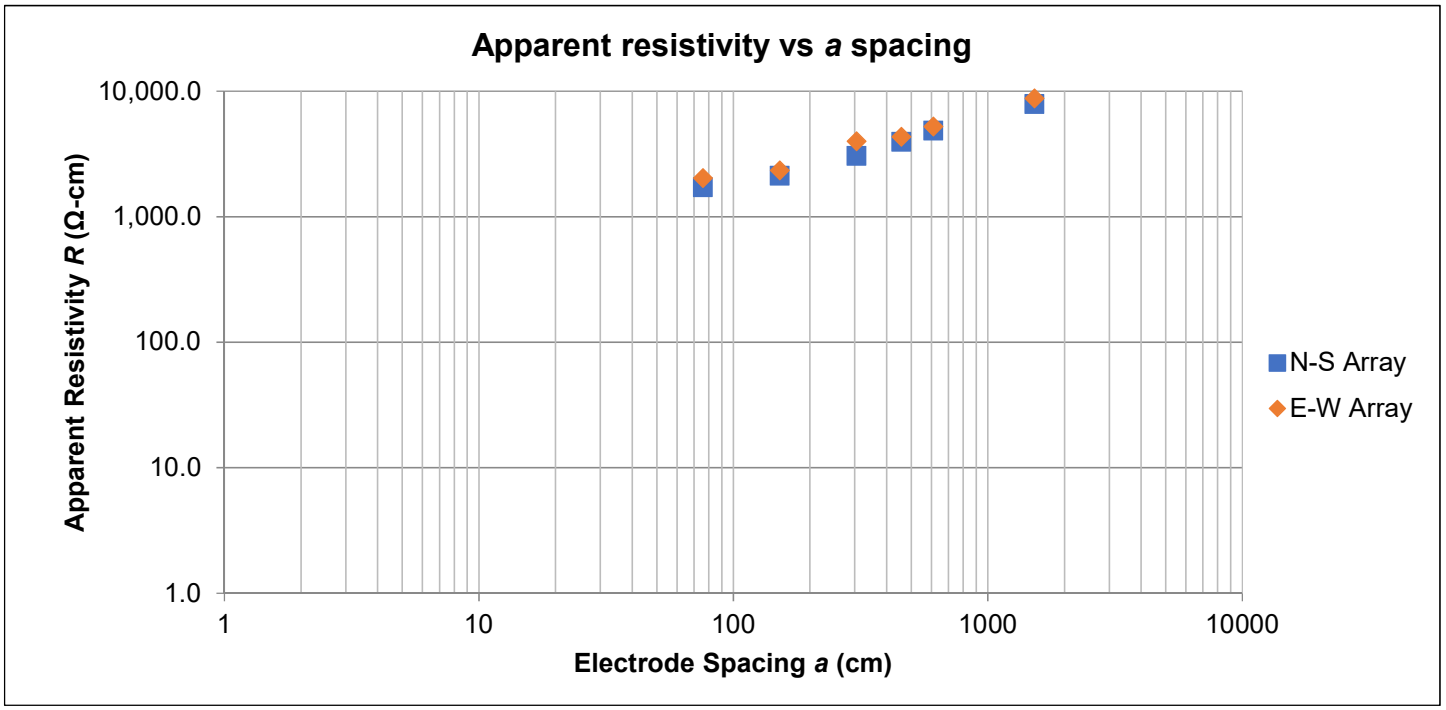
FIELD ELECTRICAL RESISTIVITY TEST DATA (SUNEAST SOLAR - 7 SITES)

Flat Creek Solar ■ Root, NY
Terracon Project No. J5215096

Array Loc.	FC-14		
Instrument	Mini-Res Resistivity Meter	**Weather**	Partly Cloudy, 69°F
Serial #	SN-306	**Ground Cond.**	Saturated, 70°F Ground Temperature
Cal. Check	8/18/2021	**Tested By**	Brandon Luther
Test Date	9/16//2021	**Method**	Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)
Notes & Conflicts	Goldenrod Field, Wet Surface		

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	6	15	3.41	1730	4.01	2040
5	152	6	15	2.20	2140	2.41	2340
10	305	12	30	1.58	3070	2.06	4010
15	457	12	30	1.37	3970	1.50	4340
20	610	12	30	1.26	4870	1.36	5230
50	1524	12	30	0.83	7960	0.92	8800



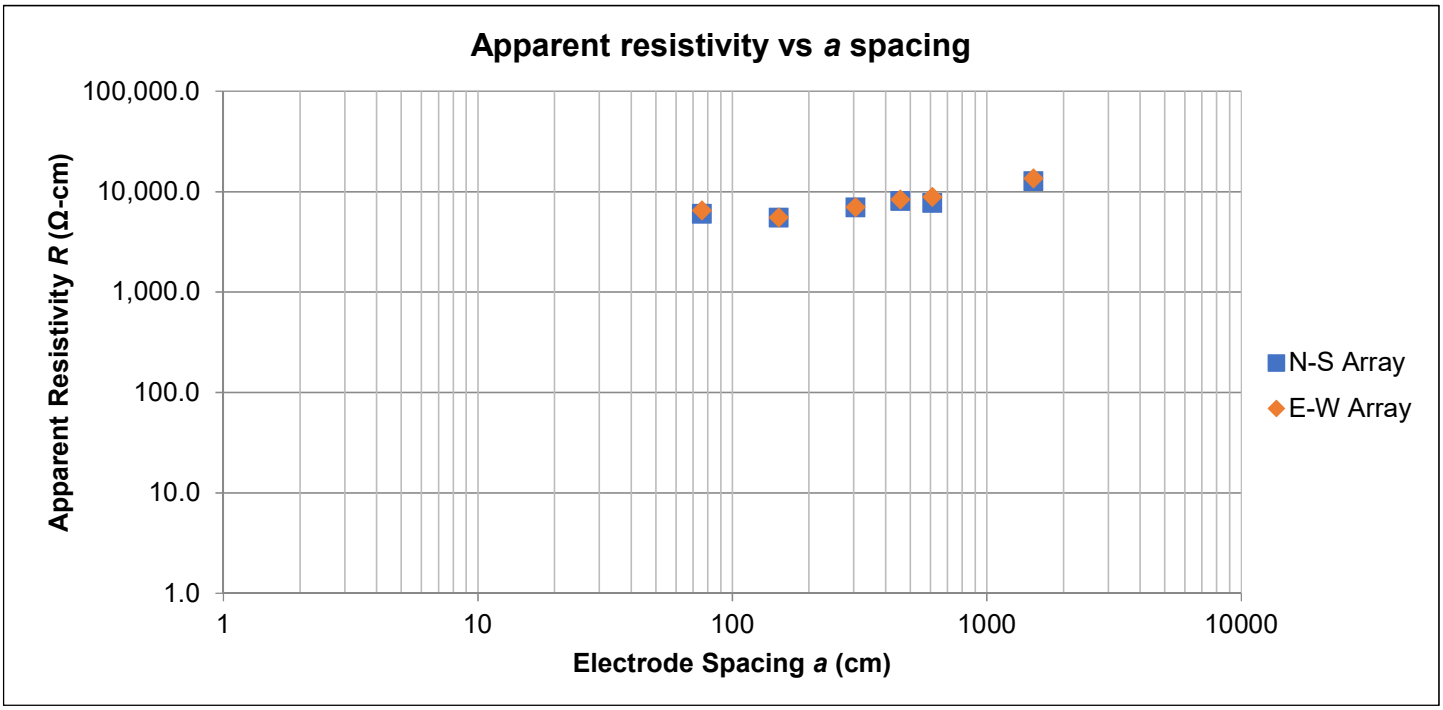
FIELD ELECTRICAL RESISTIVITY TEST DATA (SUNEAST SOLAR - 7 SITES)

Flat Creek Solar ■ Root, NY
Terracon Project No. J5215096

Array Loc.	FC-16		
Instrument	Mini-Res Resistivity Meter	**Weather**	Partly Cloudy, 72°F
Serial #	SN-306	**Ground Cond.**	Moist, 67°F Ground Temperature
Cal. Check	8/18/2021	**Tested By**	Brandon Luther
Test Date	9/16//2021	**Method**	Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)
Notes & Conflicts	Cut Crop Field, Moist Surface		

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

Electrode Spacing *a*		Electrode Depth *b*		N-S Test		E-W Test	
(feet)	(centimeters)	(inches)	(centimeters)	Measured Resistance *R*	Apparent Resistivity ρ	Measured Resistance *R*	Apparent Resistivity ρ
				Ω	(Ω-cm)	Ω	(Ω-cm)
2.5	76	6	15	11.90	6050	12.80	6510
5	152	6	15	5.70	5540	5.70	5540
10	305	12	30	3.60	7010	3.60	7010
15	457	12	30	2.80	8100	2.90	8390
20	610	12	30	2.01	7750	2.31	8900
50	1524	12	30	1.34	12850	1.41	13540



LABORATORY TESTING

Contents:

Note: All attachments are one page unless noted above.

LABORATORY TEST PROCEDURES

Geotechnical 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.

- Moisture Contest Test
- Atterberg Limit Test
- Grain Size Distribution Test

Our laboratory testing program also included examination of soil samples by an engineer. Based on observation and test data, the engineer classified the soil samples in accordance with the Unified Soil Classification System (ASTM D2487). Additional laboratory testing was also completed as described below:

Corrosion Test Samples

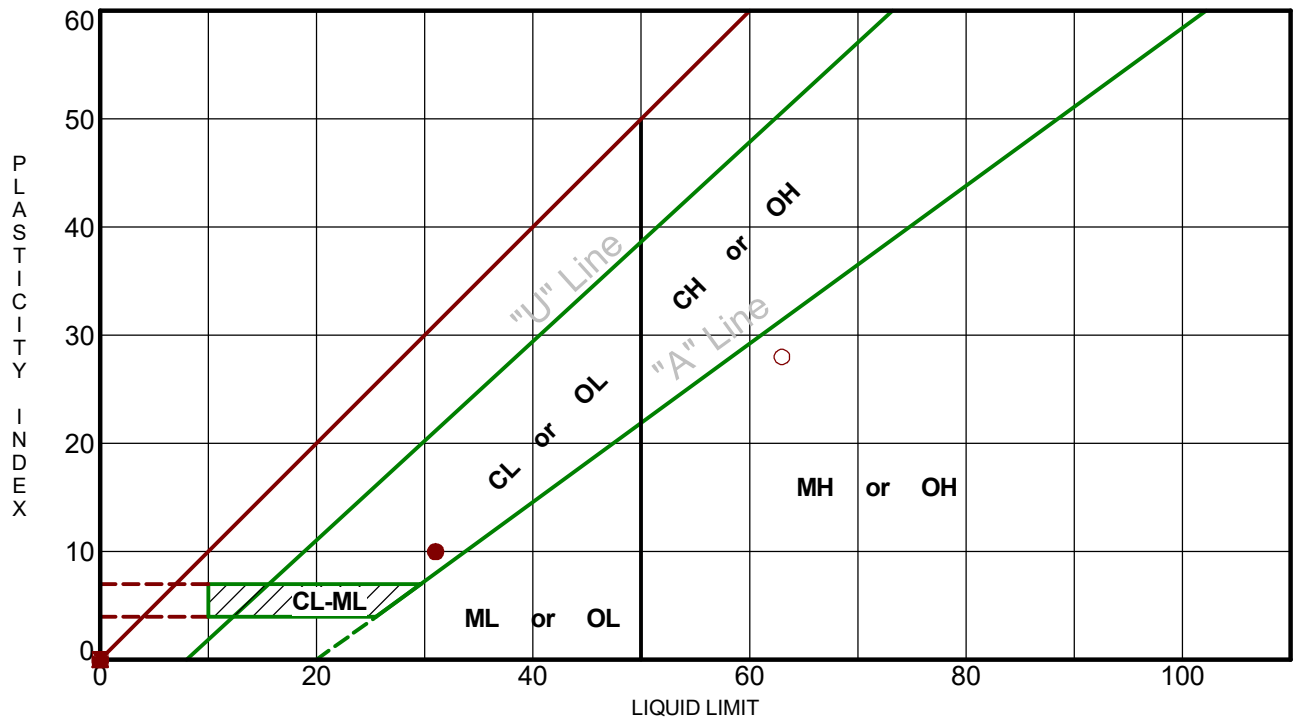
Eight soil samples were collected from a depth of 1 to 4 feet bgs for laboratory corrosion testing. The corrosion testing consisted of water-soluble sulfate ion content (ASTM C1580), water-soluble chloride ion content (ASTM D512), pH (ASTM D4972), Sulfides (ASTM D4658), Oxidation Reduction Potential (ASTM G200), and electrical resistivity using the “soil box” method (ASTM G187). Eight tests were run as part of our study.

Laboratory Thermal Resistivity Testing

Laboratory thermal resistivity testing was performed by Geotherm USA on a soil sample obtained during our field exploration from depths ranging from approximately 1 to 4 feet below the existing ground surface. The thermal resistivity testing was performed in general accordance with the IEEE standard. The dry-out curve was developed from the soil specimen compacted to 90 percent of the standard Proctor criteria (ASTM D698) at the optimum moisture content.

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth	LL	PL	PI	Fines	USCS	Description
●	FC-1	1 - 4	31	21	10			SANDY SILTY CLAY
⊠	FC-3	1 - 4	NP	NP	NP			SANDY SILT
▲	FC-6	1 - 4	NP	NP	NP	69.5	ML	SANDY SILT
★	FC-9	1 - 4	NP	NP	NP	28.7	SM	SILTY SAND with GRAVEL
⊙	FC-11	1 - 4	NP	NP	NP			SANDY SILT
✿	FC-12	1 - 4	NP	NP	NP	67.1	ML	GRAVELLY SILT
○	FC-14	1 - 4	63	35	28			SILTY CLAY
△	FC-16	1 - 4	NP	NP	NP	49.7	SM	SILTY SAND

PROJECT: SunEast Solar PV NY Sites

PROJECT NUMBER: J5215096

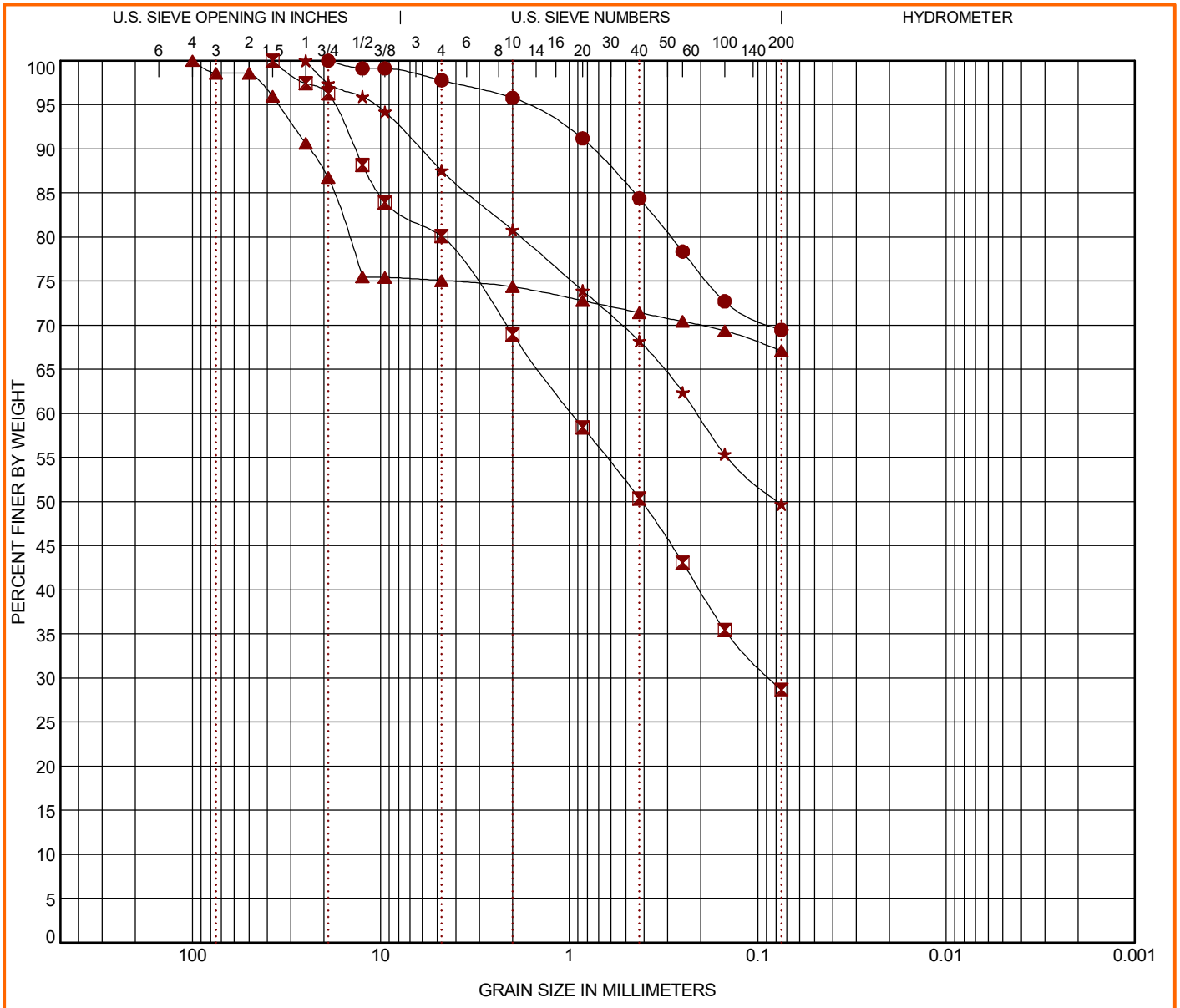
SITE: Flat Creek
Town of Root, NY

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

CLIENT: SunEast Development, LLC
Malvern, PA

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
●	FC-6	1 - 4	SANDY SILT (ML)	33.5	NP	NP	NP		
⊠	FC-9	1 - 4	SILTY SAND with GRAVEL (SM)	15.1	NP	NP	NP		
▲	FC-12	1 - 4	GRAVELLY SILT (ML)	19.6	NP	NP	NP		
★	FC-16	1 - 4	SILTY SAND (SM)	37.6	NP	NP	NP		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	FC-6	1 - 4	19				0.0	2.2	28.3		69.5	
⊠	FC-9	1 - 4	37.5	0.964	0.086		0.0	19.9	51.4		28.7	
▲	FC-12	1 - 4	100				1.4	23.5	8.0		67.1	
★	FC-16	1 - 4	25	0.21			0.0	12.4	37.8		49.7	

PROJECT: SunEast Solar PV NY Sites

SITE: Flat Creek
Town of Root, NY

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

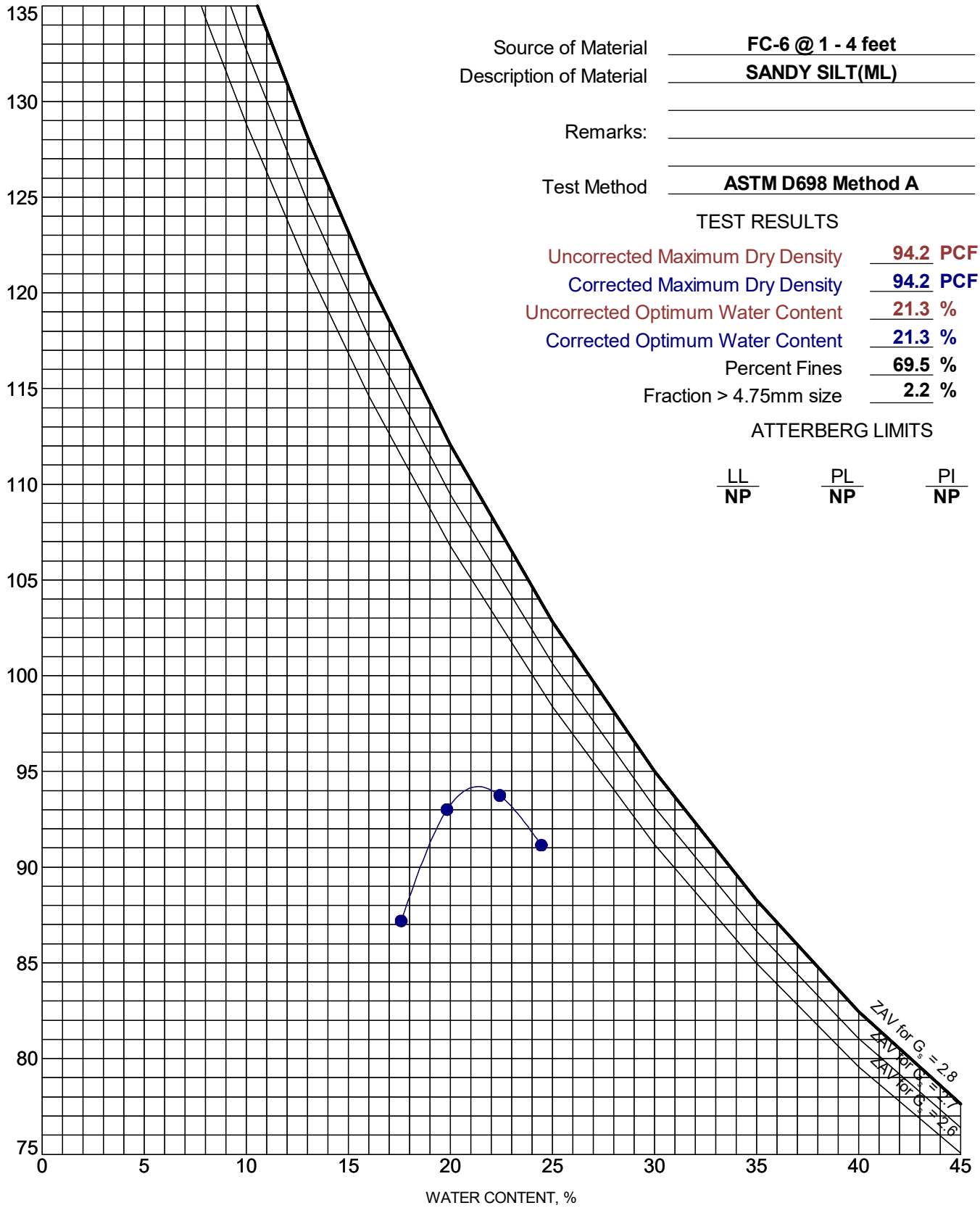
PROJECT NUMBER: J5215096

CLIENT: SunEast Development, LLC
Malvern, PA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 J5215096 SUNEAST SOLAR PV .GPJ TERRACON_DATATEMPLATE.GDT 10/14/21

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**FC-6 @ 1 - 4 feet**
Description of Material	**SANDY SILT(ML)**
Remarks:	
Test Method	**ASTM D698 Method A**

TEST RESULTS

Uncorrected Maximum Dry Density	**94.2**	**PCF**
Corrected Maximum Dry Density	**94.2**	**PCF**
Uncorrected Optimum Water Content	**21.3**	**%**
Corrected Optimum Water Content	**21.3**	**%**
Percent Fines	**69.5**	**%**
Fraction > 4.75mm size	**2.2**	**%**

ATTERBERG LIMITS

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

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 J5215096 SUNEAST SOLAR PV .GPJ TERRACON_DATATEMPLATE.GDT 10/14/21

PROJECT: SunEast Solar PV NY Sites

PROJECT NUMBER: J5215096

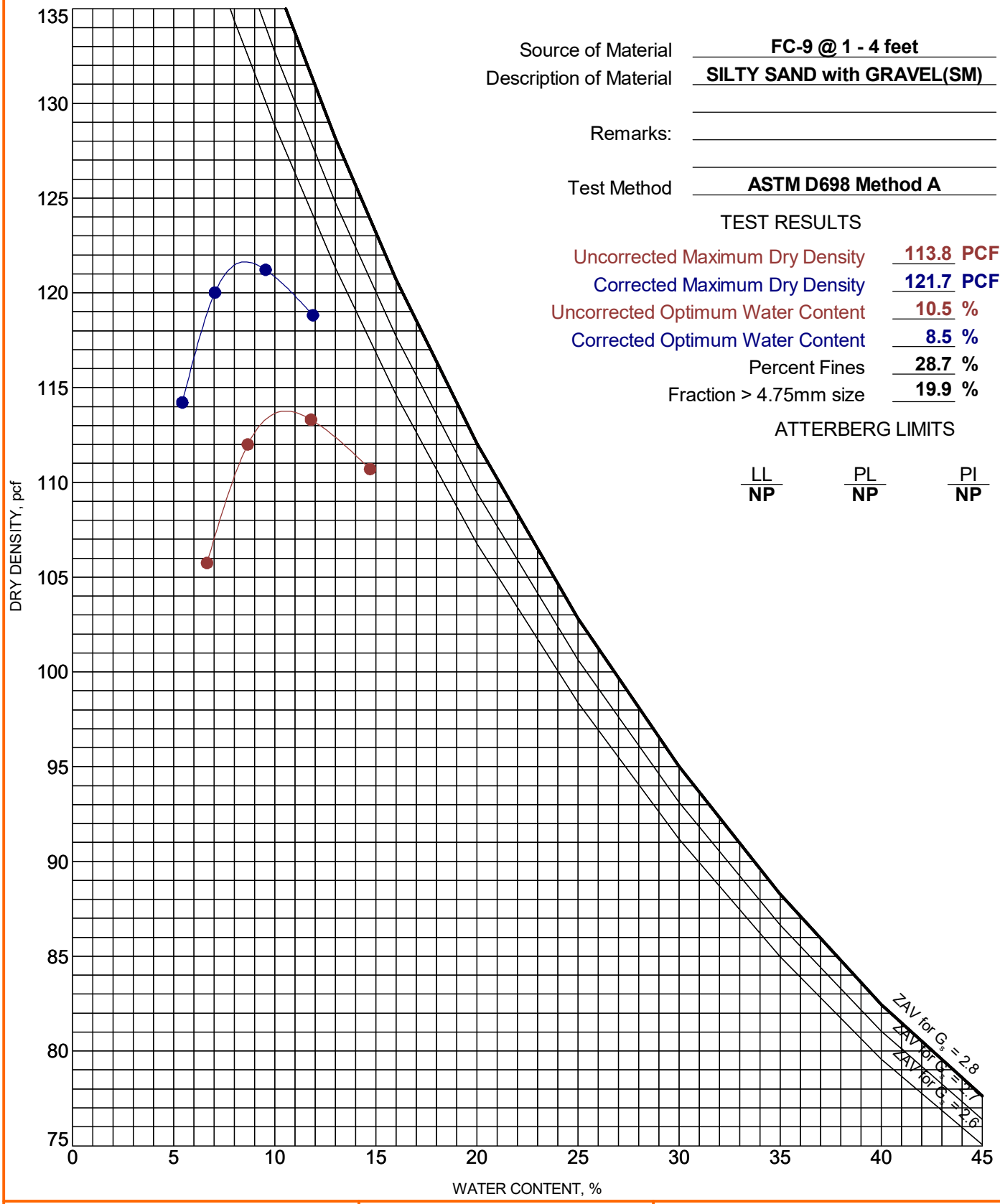
SITE: Flat Creek
Town of Root, NY

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

CLIENT: SunEast Development, LLC
Malvern, PA

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**FC-9 @ 1 - 4 feet**
Description of Material	**SILTY SAND with GRAVEL(SM)**
Remarks:	
Test Method	**ASTM D698 Method A**

TEST RESULTS

Uncorrected Maximum Dry Density	**113.8**	**PCF**
Corrected Maximum Dry Density	**121.7**	**PCF**
Uncorrected Optimum Water Content	**10.5**	**%**
Corrected Optimum Water Content	**8.5**	**%**
Percent Fines	**28.7**	**%**
Fraction > 4.75mm size	**19.9**	**%**

ATTERBERG LIMITS

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

PROJECT: SunEast Solar PV NY Sites

PROJECT NUMBER: J5215096

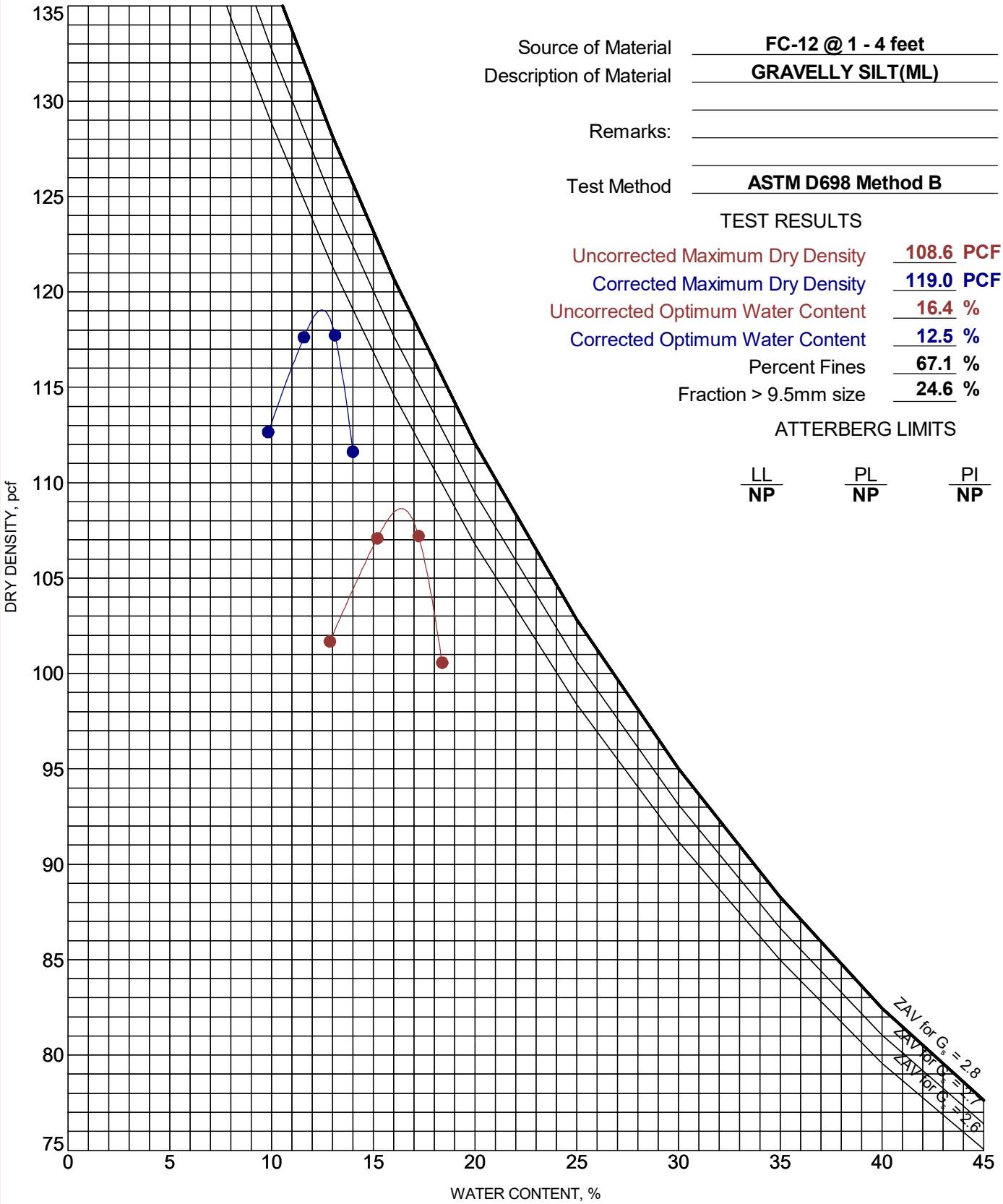
SITE: Flat Creek
Town of Root, NY

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

CLIENT: SunEast Development, LLC
Malvern, PA

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**FC-12 @ 1 - 4 feet**
Description of Material	**GRAVELLY SILT(ML)**
Remarks:	
Test Method	**ASTM D698 Method B**

TEST RESULTS

Uncorrected Maximum Dry Density	**108.6**	**PCF**
Corrected Maximum Dry Density	**119.0**	**PCF**
Uncorrected Optimum Water Content	**16.4**	**%**
Corrected Optimum Water Content	**12.5**	**%**
Percent Fines	**67.1**	**%**
Fraction > 9.5mm size	**24.6**	**%**

ATTERBERG LIMITS

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

PROJECT: SunEast Solar PV NY Sites

PROJECT NUMBER: J5215096

SITE: Flat Creek
Town of Root, NY

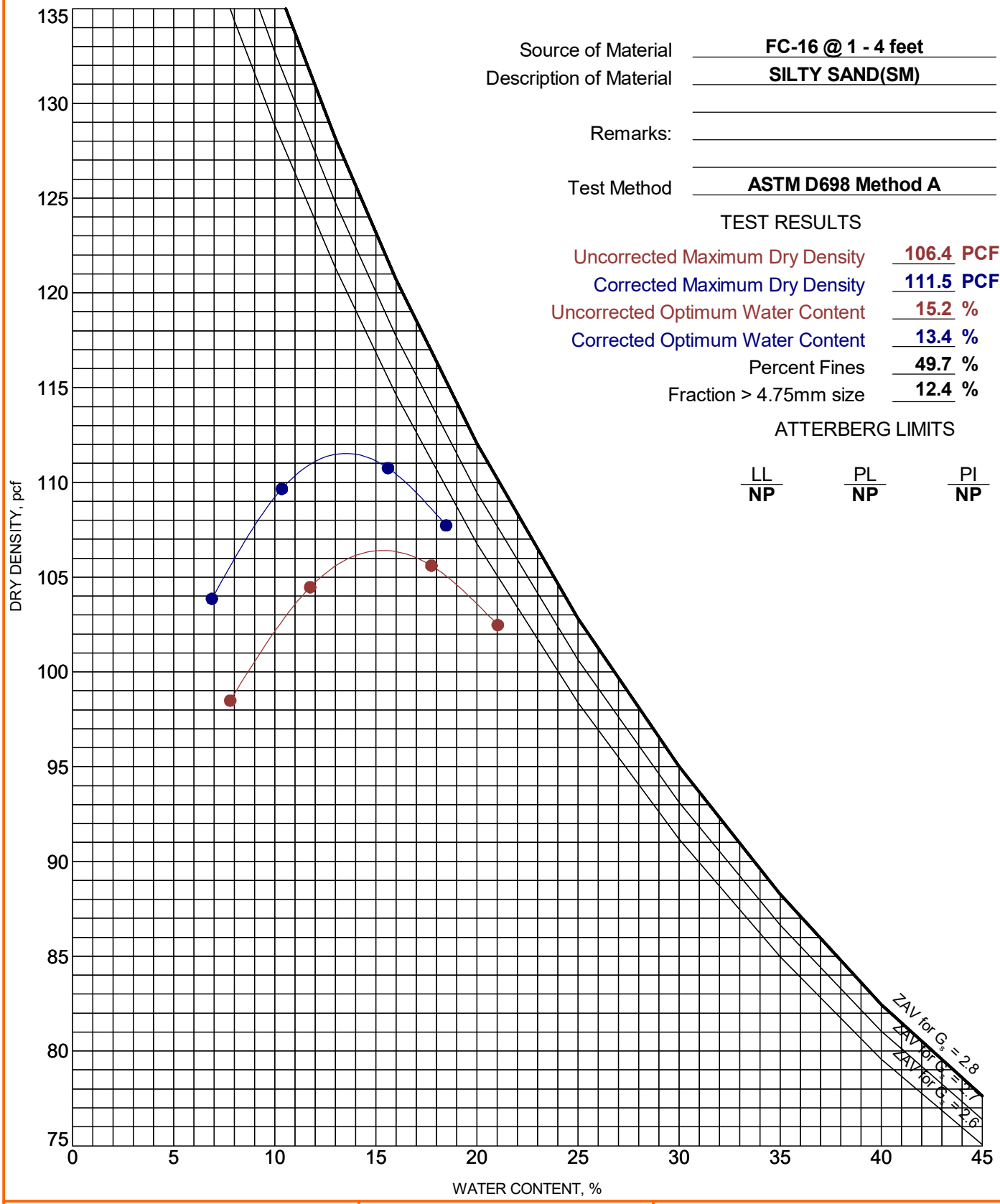
Terracon
15 Marway Cir, Ste 2B
Rochester, NY

CLIENT: SunEast Development, LLC
Malvern, PA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 J5215096 SUNEAST SOLAR PV .GPJ TERRACON_DATATEMPLATE.GDT 10/14/21

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**FC-16 @ 1 - 4 feet**
Description of Material	**SILTY SAND(SM)**
Remarks:	
Test Method	**ASTM D698 Method A**

TEST RESULTS

Uncorrected Maximum Dry Density	**106.4**	**PCF**
Corrected Maximum Dry Density	**111.5**	**PCF**
Uncorrected Optimum Water Content	**15.2**	**%**
Corrected Optimum Water Content	**13.4**	**%**
Percent Fines	**49.7**	**%**
Fraction > 4.75mm size	**12.4**	**%**

ATTERBERG LIMITS

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

PROJECT: SunEast Solar PV NY Sites

PROJECT NUMBER: J5215096

SITE: Flat Creek
Town of Root, NY

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

CLIENT: SunEast Development, LLC
Malvern, PA

15 Marway Cir Ste 2B
Rochester, NY 14624
(585) 247-3471

Client
SED NY Holdings LLC
Old Lyme, CT

Project
SunEast Solar
J5215096

Date Received: 9/15/2021

Results from Corrosion Testing

Sample Location	FC-1	FC-3	FC-6	FC-9
Sample Depth (ft.)	1'-4'	1'-4'	1'-4'	1'-4'
pH Analysis, ASTM G 51	9.00	8.67	8.48	8.47
Water Soluble Sulfate (SO4), ASTM C 1580 (ppm)	11	10	11	13
Sulfides, AWWA 4500-S D, (mg/kg)	Nil	Nil	Nil	Nil
Chlorides, ASTM D 512, (ppm)	31	51	42	39
Red-Ox, ASTM G 200, (mV)	+570	+453	+461	+472
Total Salts, AWWA 2520 B, (mg/kg)	36	191	180	270
Resistivity (Saturated), ASTM G 187, (ohm-cm)	7240	3520	5320	8580

Analyzed By:
Robert Castronovo
Environmental Lab Technician

15 Marway Cir Ste 2B
Rochester, NY 14624
(585) 247-3471

Client
SED NY Holdings LLC
Old Lyme, CT

Project
SunEast Solar
J5215096

Date Received: 9/15/2021

Results from Corrosion Testing

Sample Location	FC-11	FC-12	FC-14	FC-16
Sample Depth (ft.)	1'-4'	1'-4'	1'-4'	1'-4'
pH Analysis, ASTM G 51	8.94	8.53	8.84	8.95
Water Soluble Sulfate (SO4), ASTM C 1580 (ppm)	23	16	6	12
Sulfides, AWWA 4500-S D, (mg/kg)	Nil	Nil	Nil	Nil
Chlorides, ASTM D 512, (ppm)	41	45	52	38
Red-Ox, ASTM G 200, (mV)	+570	+462	+460	+461
Total Salts, AWWA 2520 B, (mg/kg)	36	315	213	343
Resistivity (Saturated), ASTM G 187, (ohm-cm)	16570	>20000	17530	19220

Analyzed By: _____
Robert Castronovo
Environmental Lab Technician

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http://www.geothermusa.com

September 14, 2021

Terracon Consultants, Inc.
15 Marway Circle, Suite 2B
Rochester, NY 14624
Attn: Travis Wooden, E.I.T.

Re: Thermal Analysis of Native Soil Samples
Flat Creek – Rochester, NY (Project No. J5215096)

The following is the report of thermal dryout characterization tests conducted on four (4) native soil samples from the referenced project sent to our laboratory.

Thermal Resistivity Tests: The samples were reconstituted at the 'as received' or 'optimum' moisture content (greater of the two) and at 90% of standard Proctor dry density **provided by Terracon**. The tests were conducted in accordance with the IEEE standard 442-2017. The results are tabulated below and the thermal dryout curves are presented in **Figures 1 to 4.**

Sample ID, Description, Thermal Resistivity, Moisture Content and Density

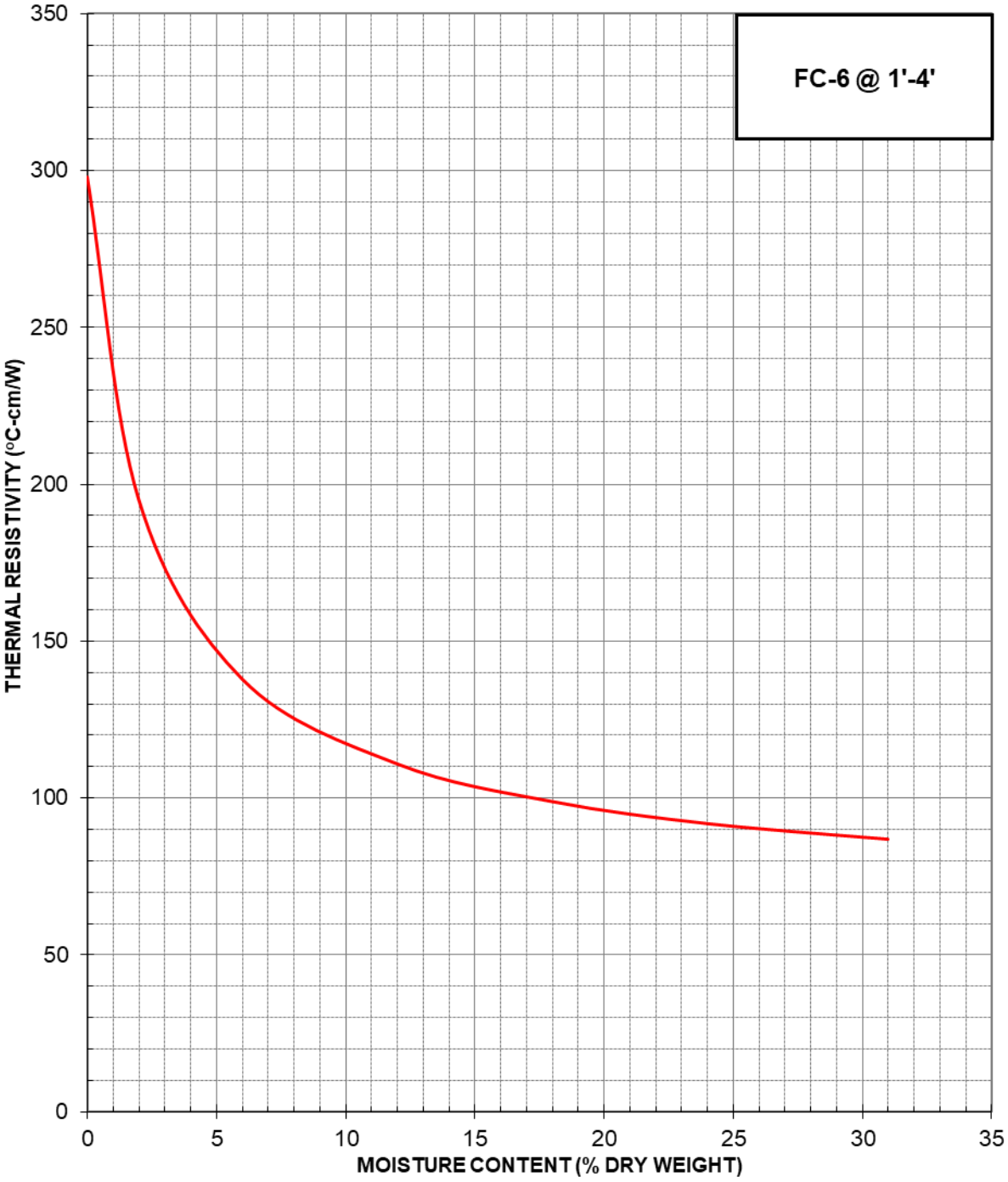
Sample ID @ 1' – 4'	Description (Terracon)	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft^3)
		Wet	Dry		
FC-6	Sandy silt (ML)	87	298	31	85
FC-9	Silty sand with gravel (SM)	58	174	15	110
FC-12	Gravelly silt (ML)	66	182	18	107
FC-16	Silty sand (SM)	64	219	21	100

Please contact us if you have any questions or if we can be of further assistance.

Geotherm USA

Deepak Parmar

THERMAL DRYOUT CURVE



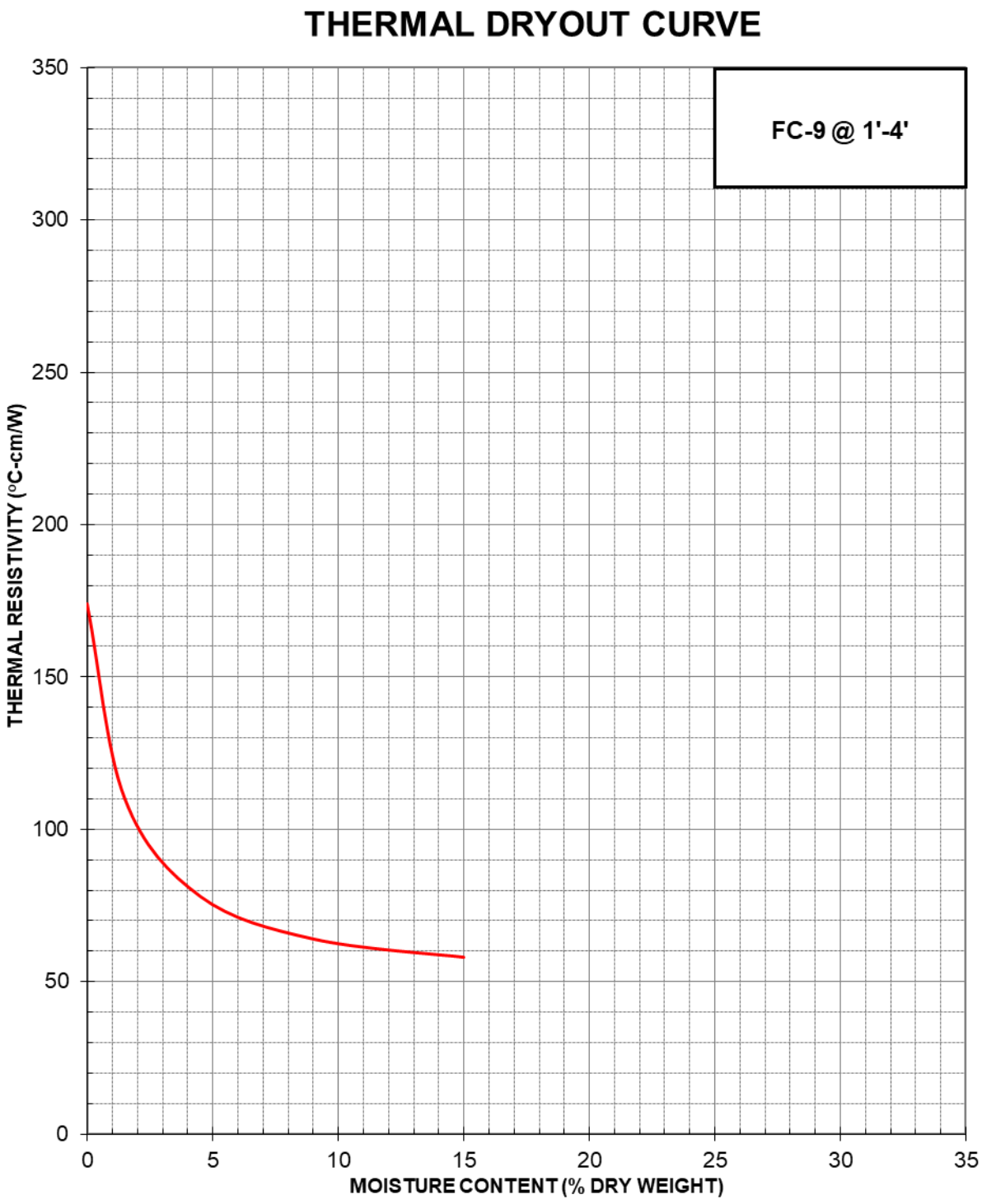
Terracon Consultants, Inc. (Project No. J5215096)

SunEast Solar PV NY Sites – Flat Creek

Thermal Analysis of Native Soil Samples

September 2021

Figure 1



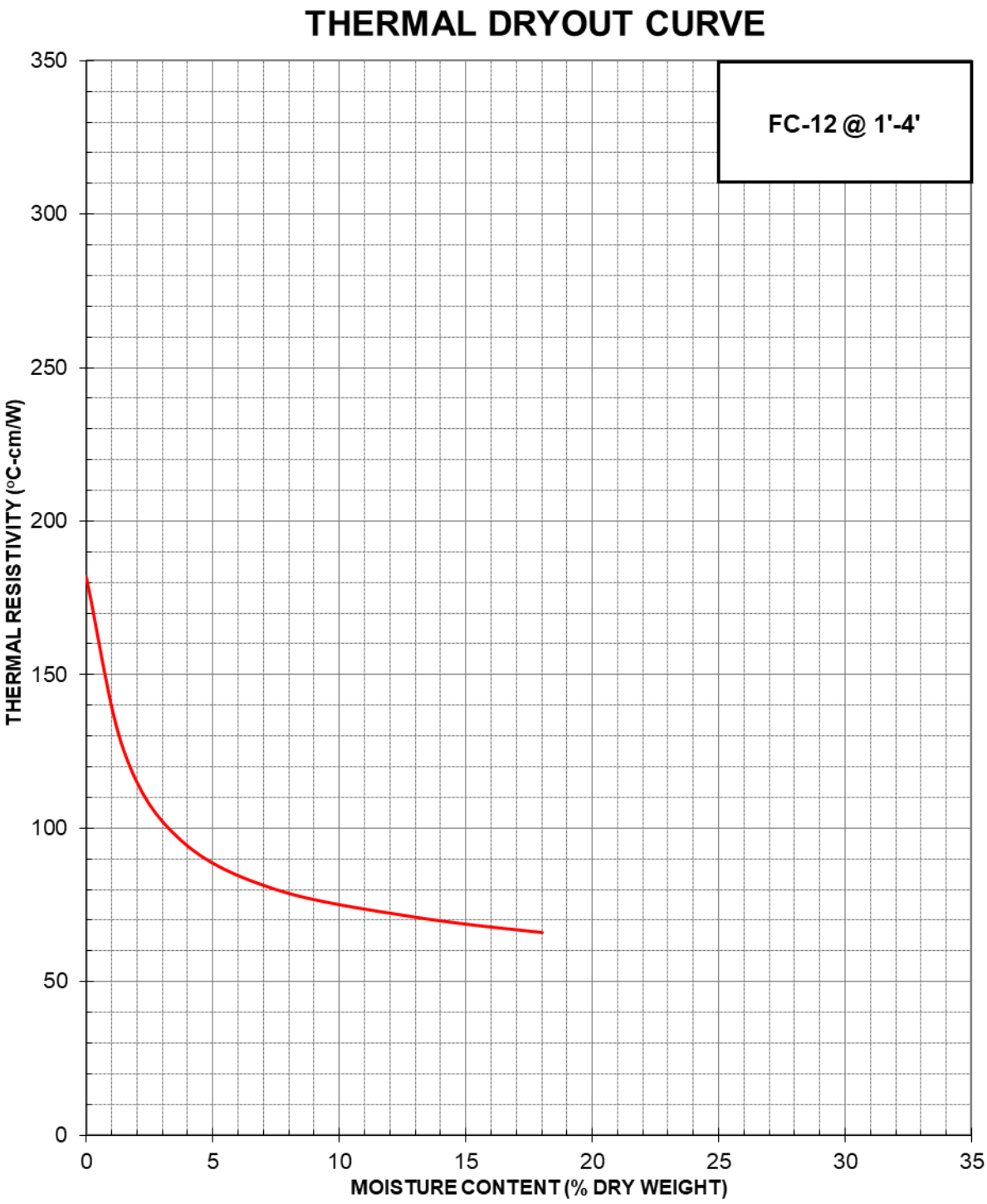
Terracon Consultants, Inc. (Project No. J5215096)

SunEast Solar PV NY Sites – Flat Creek

Thermal Analysis of Native Soil Samples

September 2021

Figure 2



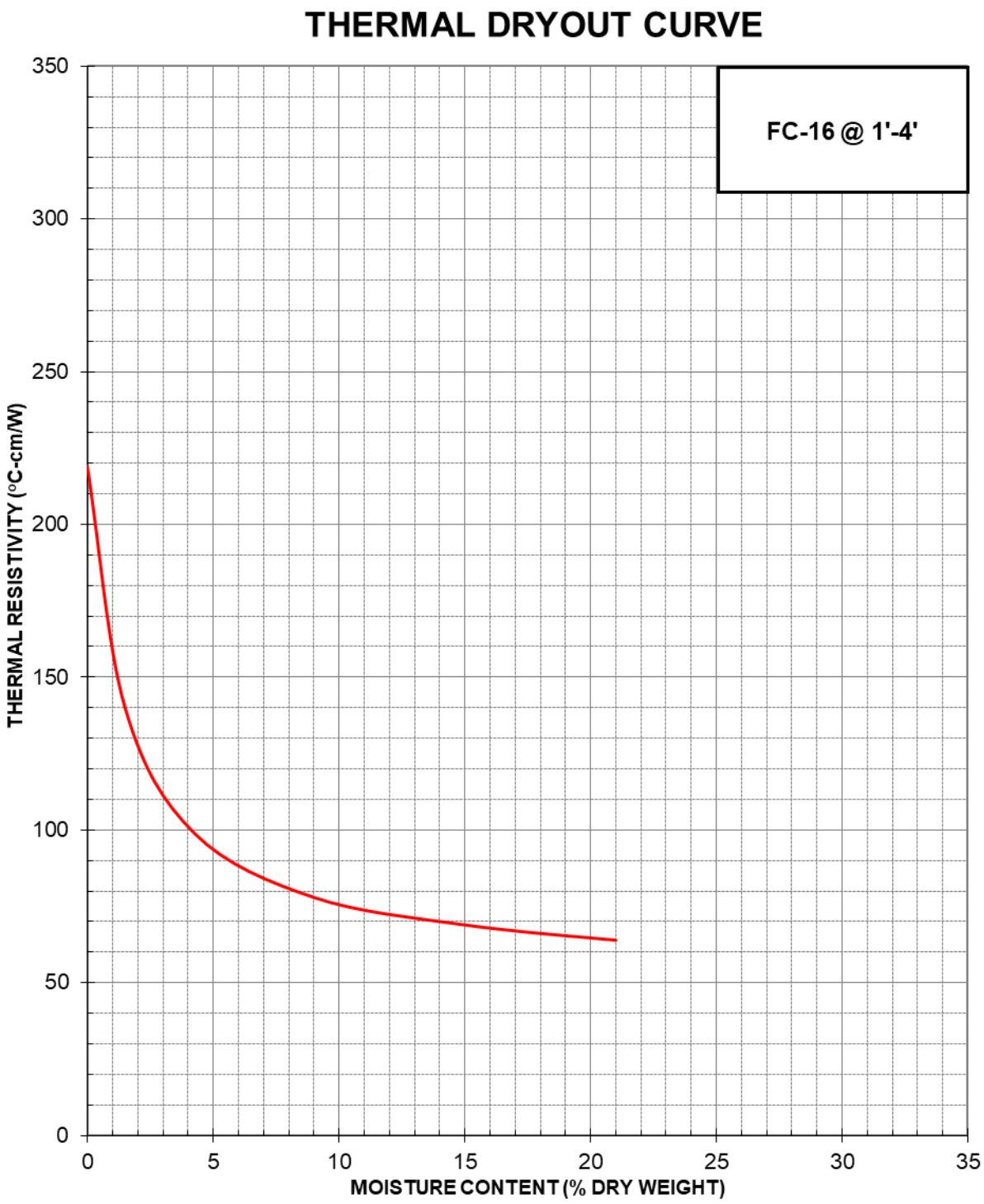
Terracon Consultants, Inc. (Project No. J5215096)

SunEast Solar PV NY Sites – Flat Creek

Thermal Analysis of Native Soil Samples

September 2021

Figure 3



Terracon Consultants, Inc. (Project No. J5215096)

SunEast Solar PV NY Sites – Flat Creek

Thermal Analysis of Native Soil Samples

September 2021

Figure 4