Foundation Design, P.C.
SOIL • BEDROCK • GROUNDWATER

July 9, 2019

Delaware River Solar
33 Irving Place
New York, New York 10003

Attention: Mr. Peter Dolgos

Reference: Yellow Mills Road Solar Farm
466 Yellow Mills Road, Farmington, New York
Geotechnical Evaluation, 4618.0 (Revised)

Dear Mr. Dolgos:

This letter report summarizes our geotechnical evaluation for the referenced project. The 7mW Yellow Mills Road Solar Farm will cover 30± acres west of Yellow Mills Road in Palmyra, New York. The racking system, likely to be supported by driven piles, will be located in the open field. We base this report on our review of U.S.G.S. topographic mapping, National Resource Conservation Service mapping, test boring exploration; field and laboratory testing; and consultation with the design team. Delaware River Solar, LLC. retained Foundation Design, P.C. to perform the services outlined in our May 17, 2019 *Geotechnical Services Proposal, P4264.0*. We intend this report for exclusive use on this project.

The Yellow Mills Road Solar Farm will be located at 466 Yellow Mills Road in Farmington, New York. Fox Road lies to the north. A *General Location Plan*, on 2016 U.S.G.S. topographic mapping, is attached to this report. The parcel is pasture farmland located on the north face of a knoll. The ground surface rises gradually from approximately elevation 555 at the north end of the site to 570 to the south. A large hill lies south of the development area.

We completed soil borings P-1 though P-24 between June 13 and June 18, 2018. Target Drilling provided a CME-75 truck-mounted drill rig for the soil sampling. They advanced the test borings using hollow stem auger casings, recovering SPT split spoon soil samples continuously to 10 feet and at five foot intervals after that to completion; several borings terminated at auger refusal on cobbles/boulders within the soil matrix. The test borings terminated 12.5 to 20.0 feet below grade. A *Boring Location Plan* and the test boring logs are enclosed.

On June 21, 2019, we performed four, 4-point Wenner soil resistivity test (ASTM G-57) and eight soil thermal conductivity tests (ANSI/IEEE 442). These tests were performed in/adjacent to borings P-6, P-7, P-19, and P-23. For the 4-point Wenner soil resistivity tests, we used an AEMC Instruments 4630 digital ground resistance meter. Pins were spaced at 10 foot intervals and inserted six inches below grade. We measured in-place soil resistances as shown in Table No. 1 below. The field test reports are attached.

Table No. 1 – Field Resistivity Test Results

Location	Resistivity (ohm-cm)
P-6	10,176
P-7	9,858
P-19	38,641
P-23	18,246

For the soil thermal conductivity tests, we used a Decagon Devices KD-2 Pro thermal conductivity meter for the testing. Macedon Excavating and Paving provided a Cat 307 excavator to extend the holes to a 36-inch depth; testing at P-6 was performed at a 30-inch depth due to heavy water flow. CME Associates, Inc. performed in-place density tests (ASTM D-6938), documenting the in-place wet and dry density and the moisture content of the soil at that depth. We measured in-place soil thermal conductivity and thermal resistance values as shown in Table No. 2 below. The field test reports are attached.

Table No. 2 – Soil Thermal Conductivity Test Results						
Location	**Wet Density (pcf)**	**Dry Density (pcf)**	**Moisture Content (%)**	**Thermal Conductivity (W/(m*K))**	**Thermal Resistivity (°C*(cm/W))**	**Initial Temp. (°C)**
P-4	107.5	94.1	13.4	2.436	41.0	15.96
P-5	124.5	111.0	13.4	1.694	59.0	16.65
P-6	125.0	105.8	19.1	2.760	36.2	17.09
P-7	122.8	108.1	14.7	1.075	93.0	15.80
P-10	115.7	92.5	23.2	1.998	50.1	14.80
P-11	150.4	139.9	15.1	3.861	25.9	12.96
P-19	152.4	140.9	8.2	0.889	122.5	16.98
P-23	114.4	99.4	15.1	1.665	60.1	15.99

Upon completion of the fieldwork, we selected representative soil samples for laboratory testing. The testing program consisted of three pH determination, three lab resistivity test, two soluble chlorides tests, two soluble sulfates tests, seven sieve analysis, one liquid/plastic limits tests, and eleven moisture content tests. The test results are discussed below. The laboratory report is enclosed.

We encountered a subsurface profile consisting of surface topsoil over glacial outwash sand/gravel, then glacial till. The surface topsoil ranges from 6 to 30 inches thick at the sampled locations. The glacial outwash is a highly variable deposit. It consists primarily of sand and gravel with trace to some silt (SM or GM). The sand/gravel formation contains thinner layers of silty sand (SP-SM), clayey silt with sand (ML) and silt clay (CL). The outwash is loose to very dense. Numerous cobbles and boulders were noted during the augering. The glacial till formation consists of firm to very dense silt with sand, gravel and clay (ML in the Unified Soil Classification System). The till surfaces along the southern edge of the site; we believe the hill to the south is comprised of the till deposit.

Bedrock was not encountered in the test borings and is estimated to lie over 30 feet below grade. Geologic mapping indicates that the bedrock is the Akron and Bertie Formations. The Akron Formation consists of dolomites; the Bertie Formation consist of black shales.

We noted three water surfaces on the parcel. In general, the depth to groundwater drops from south to north across the parcel. We believe that the ponded water around elevation 545 north of the site (along Fox Road) is more representative of the true groundwater table.

Surface water appears to be travelling on top of the topsoil where the 'intermitten stream' is present southeast of the development; the stream appears to flow into the pond northwest of the barnyard and infiltrate. The surface gradient allows for water flow over the well compacted topsoil faster than infiltrating. Note that the groundwater in the borings adjacent to the stream (borings P-5 and P-7) did not encounter water until a depth of seven feet below ground surface. Test pits excavated adjacent to the 'stream' for in-place density testing and soil thermal conductivity tests were dry to a three foot depth.

Shallow, 'perched' groundwater conditions (wet/saturated soil samples within four feet of the surface) were noted at borings P-2, P-6, P-8, P-12, P-14, P-15, and P-22. Groundwater was not encountered at soil borings P-13, P-19, and P-21 located along the north edge of the proposed development. Heavy water flow occurred into the test pit excavated adjacent to P-6 below 2.5 feet after heavy rains the day before; soil samples at a similar depth were wet (not saturated) when boring P-6 was performed a week prior. While we believe this 'perched water condition' is due to water travelling on top of the dense glacial till formation, it may intersect with the groundwater that surfaces near Fox Road. The high permeability of the upper sand/gravel formation overlying the dense soil likely results in large fluctuations in the water levels over short periods.

As part of this evaluation, we performed laboratory testing to assess the corrosive environment on-site. This testing consisted of soluble chloride concentrations, soluble sulfates concentrations, pH determinations and lab resistivity testing. Chloride and sulfate levels were very low, below the detectable limits. Table No. 3 below summarizes the test results. Although the soil resistivity values

are somewhat low, the pH values are near neutral. Based on these results, we do not anticipate a corrosive environment on this parcel.

Table No. 3 - Corrosion Test Results				
Boring Location	**Lab Resistivity (ohm-cm)**	**pH**	**Soluble Chlorides (mg/L)**	**Soluble Sulfates (mg/L)**
P-9 S-1/S-2	---	---	34	34
S-3/S-4	5,200	7.4	---	---
P-17 S-1/S-2	---	---	33	33
S-3/S-4	4,200	7.3	---	---
P-19 S-3/S-4	21,000	7.7	---	---
Criteria for Potential Corrosive Environment:				
pH	< 5.5			
Resistivity	< 2,000 ohm-cm			
Chlorides	> 500 mg/L			
Sulfates	>2,000 mg/L			

Based on the above, we make the following specific recommendations:

1. Clear and grub the solar array area. If re-grading is required, remove the surface topsoil prior to starting major site grading operations. The contractor should provide a loaded ten-wheel truck or similar heavy construction equipment for the proof-rolling. Rework or replace as directed areas that rut, weave, quake, or are otherwise deemed unsuitable prior to starting the filling operations.

2. It is our opinion that the on-site sand/gravel soil is suitable for use as structural fill during re-grading operations (if required). However, the near surface on-site soils are silty/clayey, will tend to be moisture sensitive, and are frost susceptible. If planning to reuse the on-site soil as structural fill, plan for the earthwork/utility backfilling to be performed during the drier summer months. Place and moisture condition structural fill to within two percent of optimum moisture. Compact structural fill to at least 95 percent of maximum dry density as determined by the Standard Proctor method, ASTM D-698. Place fill in loose lifts not exceeding twelve inches thick. Maintain good surface drainage.

3. We understand that the preferred foundation system would consist of the light-weight steel I-beams or C-channel. While it is our opinion that this type of system is viable for the soil conditions expected, pre-augering of each hole should be expected due to cobbles, boulders,

and very dense soil conditions that will limit the penetration depths. The racking system design should account for frost impact and potential heaving of the racks. For preliminary estimating of the pile performance, assume the soil properties outlined in Table No. 4 below. We recommend performing uplift and lateral load tests to confirm that the required design resistance is developed and that production piles be installed using equipment and methods similar as those used during the test pile installation process.

Table No. 4 – Soil Properties		
Soil Property	**Upper Four Feet**	**Deeper Soil Conditions**
Unit Weight (Moist)	120 pcf	140 pcf
Friction Angle	28°	34°
Cohesion	0 psf	0 psf
Vertical Subgrade Modulus	20 psi/in	60 psi/in

4. The corrosion testing performed leads us to believe that a corrosive environment is not present on this parcel.

5. Based on values from the nearby Canandaigua Station, we recommend designing the solar array based on mean annual temperature of 48°F, and the Air Freezing Index Return Periods (°F-Days) tabulated below:

Table No. 5 – Air Freezing Index Return Periods (°F-Days)		
5-Year	**10-Year**	**20-Year**
870	965	1,045

Based on these Air Freeze values and assuming a clear, turf surface condition, we recommend using a site specific frost depth of 30 inches below the surface. For the on-site soils, we recommend using an ad-freeze value of 25 psi for the sand/gravel soil within the frost zone.

6. Construct the transformer pad and other support equipment on mat foundations. Remove all surface topsoil from under the new equipment. We recommend placing at least 12-inches of granular material under the mat slabs. N.Y.S.D.O.T. Item 304.12 (No. 2 crusher-run stone) meets this criterion. Rework and re-compact the underlying native soil to structural fill standards outlined in Paragraph No. 2 above prior to installing the stone base course. Design the mat foundations based on a uncorrected Modulus of Subgrade Reaction, K_{vi}, of 250 psi/in at the bottom of slab/top of stone; the structural engineer should adjust this subgrade value for the size of the mat.

Frost may heave the pad, potentially separating pipe conduit at joints. To protect the pad, we suggest 1.) undercutting the pad to a 48-inch depth and backfilling with a non-frost susceptible material such as No. 2 crusher-run stone subbase (NYSDOT Item 304.12) or 2.) installing a high density insulation board under the pad. Under the insultation approach, extend the board horizontally 48-inches in each direction beyond the edge of the pad. Cover the board with a minimum of six inches of soil. If insulation board is used, we suggest using a 2-inch thick, Type IV, V, VI or VII XPS board.

7. The measured in-place soil thermal resistivity values (Rho) documented at a 36-inch depth ranged from 25.0 to 122.5°C*(cm/W), representative of the highly variable soil conditions in the upper portion of the soil profile. As part of this design, we have not developed dry-out curves (plots of Rho versus density and Rho versus moisture) to assess further variability of these values.

   Due to the highly variable test result, we do not recommend backfilling the electric trenches using the on-site soil. We are concerned that localized hot spots may develop that burn out the wiring. We recommend backfilling with an imported processed, uniform material that would allow for more consistent design values to be used.

8. The NYS Building Code identifies various seismic design criteria for this project. We identify the site as having a Site Classification of D (Stiff Soil Profile). Based on ASCE 7-10 guidelines and using a Risk Category IV, we recommend using the following seismic design parameters.

Table No. 6 – Seismic Design Parameters

Spectral Response Acceleration		Soil Factors		Design Spectral Response Acceleration	
S_S	S_1	S_{MS}	S_{M1}	SD_s	SD_1
0.150g	0.059g	0.240g	0.141g	0.160g	0.094g

9. Perform the trenching and excavating work in accordance with NYS Building Code and OSHA safety standards. The contractor is responsible for determining what measures are required to meet these standards. Under no circumstances should slopes be steeper than 1 horizontal on 1 vertical. While it is our opinion that the foundation and utility excavation work can be achieved with 'normal' excavating equipment capable of achieving the desired depths, cobbles and boulders should be expected. Remove water that accumulates in open excavations using sumps and pumps.

10. Due to the on-site soil conditions, we suggest budgeting for the following minimum pavement sections for your access roadway. Be sure to completely remove all topsoil from under the new roadway; make up undercuts to remove thick topsoil areas using extra subbase material. Thicken this section as needed if used as the construction haul road for the material deliveries expected.

Table No. 7 –Pavement Section		
9.0"	No. 2 Crusher-run Stone Subbase	NYSDOT Item 304.12
	Geogrid	Tensar T-130
	Subgrade	Approved Proof Roll

11. Establish site drainage to keep water from ponding. Ponding water will result in more significant frost heave developing during the winter months and may impact rack performance in areas nearby.

Attached is a Geoprofessional Business Council paper entitled *Important Information about your Geotechnical Engineering Report*. It describes how we intend this report to be used. We will continue to work cooperatively with you, other project principals, and interested parties to achieve win/win solutions that benefit all.

This concludes our geotechnical consultation services; call if you have questions or if you require additional design information. Forward a copy of the near final plans and specifications for our review and comment. It has been a pleasure to work with you on this project and we look forward to hearing from you again in the near future.

Very truly yours,
FOUNDATION DESIGN, P.C.

Jeffrey D. Netzband, P.E., P.G.
Vice President
Enc.

STATE OF NEW YORK ★ JEFFREY D. NETZBAND ★ LICENSED PROFESSIONAL ENGINEER 074888

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

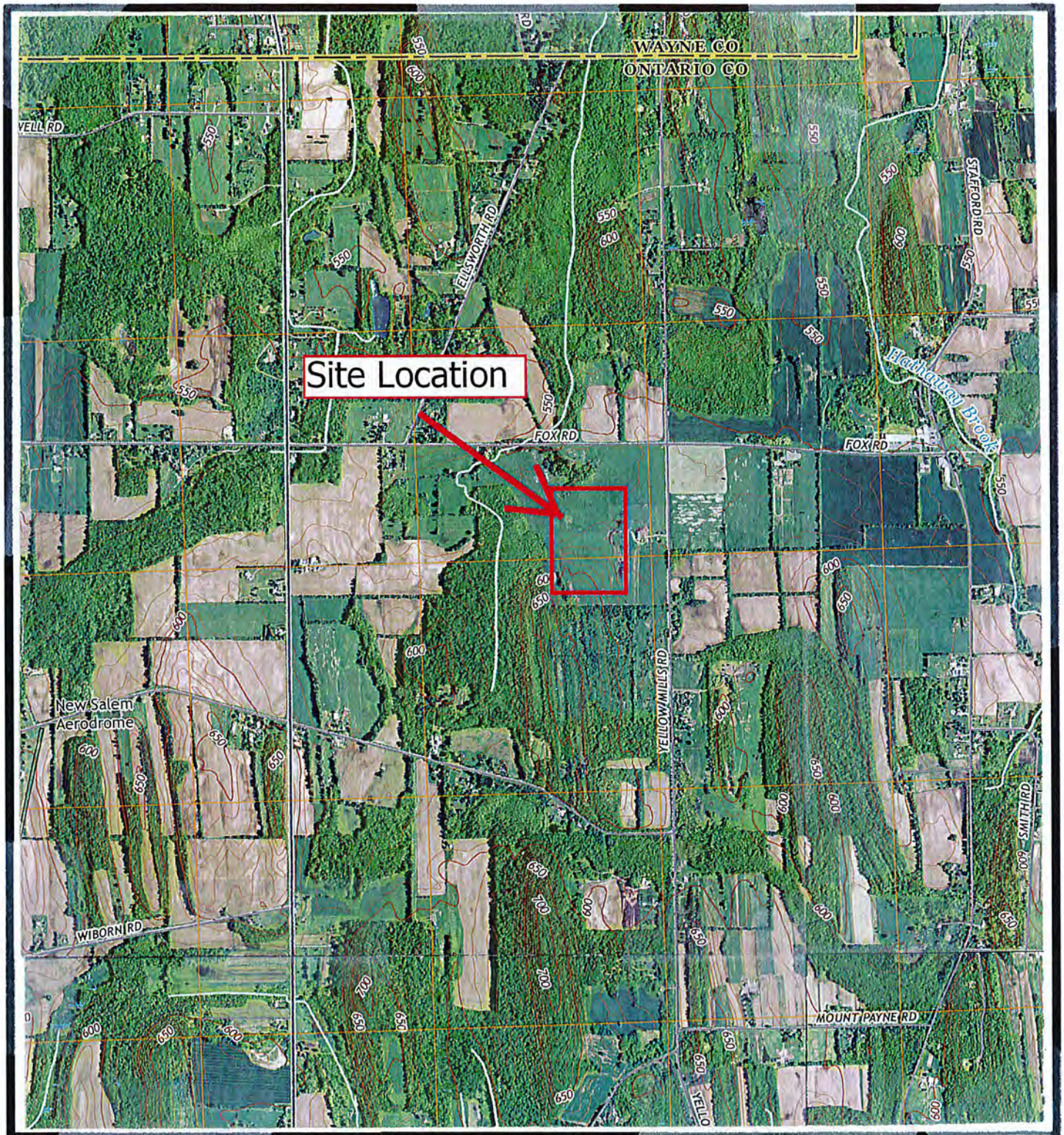
The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org



Foundation Design, P.C.

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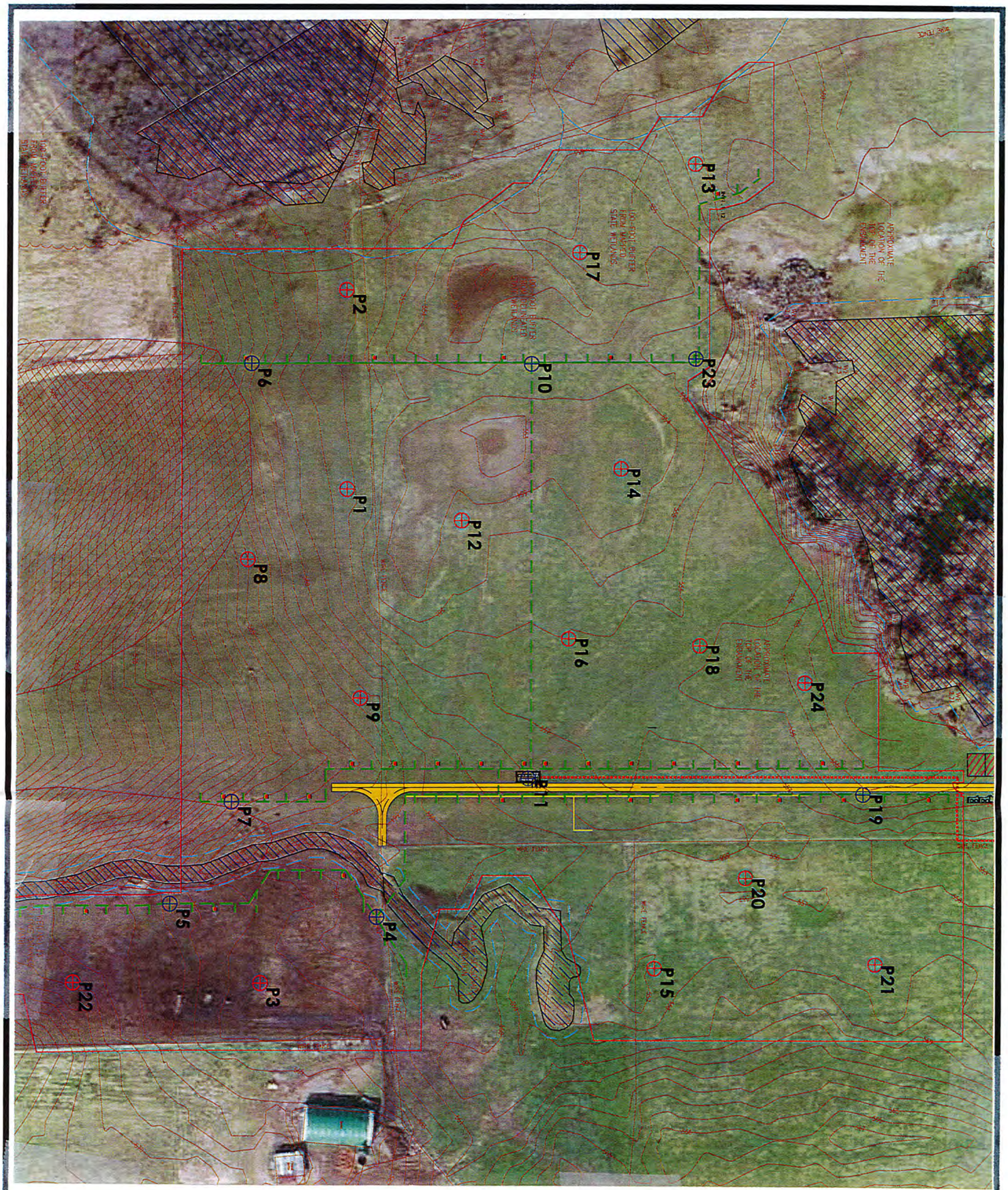
Rochester, New York 14607
Phone (585) 458-0824
FAX (585) 458-3323

Yellow Mills Road Solar
466 Yellow Mills Road, Farmington, NY
General Location Plan
Adapted from: USGS topographic mapping *Macedon, Palmyra, Canandaigua, and Clifton Springs* Quadrangles dated 2016

CHECKED BY:	**JDN**	Scale 1"= 2,000'	**DATE: 06-24-19**
DRAWN BY:	**JAG**		**JOB NO.:4618.0**



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Yellow Mills Road Solar
466 Yellow Mills Road, Farmington, NY
Boring Location Plan
Adapted from: Delaware River Solar
Boring Location Layout reviewed and modified 08/22/18

CHECKED BY:	**JDN**	Scale 1" = 150'	**DATE: 07-9-19**
DRAWN BY:	**JAG**		**JOB NO.: 4618.0**

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SOIL • BEDROCK • GROUNDWATER

SOIL DESCRIPTIONS

COHESIVE SOIL

Very fine grained soils. Plastic soils that can be rolled into a thin thread if moist. Clays and silty clays show cohesion.

DESCRIPTION	STP –BLOWS/FOOT
Very Soft	0-2
Soft	3-5
Medium	6-15
Stiff	16-25
Hard	26 or more

NON-COHESIVE SOIL

Soils composed of silt, sand and gravel, showing no cohesion or very slight cohesion

DESCRIPTION	STP –BLOWS/FOOT
Loose	0-10
Firm	11-25
Compact	26-40
Dense	41-50
Very Dense	51 or more

SOIL COMPOSITION	DESCRIPTION	ESTIMATED PERCENTAGE
	and	50
	some	30-49
	little	11-29
	trace	0-10

MOISTURE CONDITIONS Dry, Damp, Moist, Wet, Saturated
Groundwater measured in the boring or test pit may not have reached equilibrium

SOIL STRATA:	TERM	DESCRIPTION
	layer	Soil deposit more than 6" thick
	seam	Soil deposit less than 6" thick
	parting	Soil deposit less than 1/8" thick
	varved	Horizontal uniform layers or seams of soil

GRAIN SIZE

MATERIAL	SIEVE SIZE
Boulder	Larger than 12 inches
Cobble	3 inches to 12 inches
Gravel - coarse	1 inch to 3 inches
- medium	3/8 inch to 1 inch
- fine	No. 4 to 3/8 inch
Sand - coarse	No. 10 to No. 4
- medium	No. 40 to No. 10
- fine	No. 200 to No. 40
Silt and Clay	Less than No. 200

Standard Penetration Test: The number of blows required to drive a split spoon sampler into the soil with a 140 pound hammer dropped 30 inches. The number of blows required for each 6-inches of penetration is recorded. The total number of blows required for the second and third 6-inches of penetration is termed the penetration resistance, or the "N" value.

Split Spoon Sampler: Typically a 2-foot long, 2-inch diameter hollow steel tube that breaks apart or splits in two down the tube length.

Refusal: Depth in the boring where more than 100 blows per 5-inches are needed to advance the sample spoon.

Core Recovery (%): The total length of rock core recovered divided by the total core run.

RQD (%): Rock Quality Designation – the total length of all the pieces of the rock core longer than 4-inches divided by the total length of the rock core run.

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-1
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Rain, 60°	**Engineer**	E. Ashley
Date Started	06.13.2019	**Completed**	06.14.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth
	3	3					
			8	15	11	1	0-2'
	4	4					
			4	3	8	2	2-4'
5	8	18					
			27	31	45	3	4-6'
	7	22					
			51	50/3"	73	4	6-7'9"
	30	25					
10			18	20	43	5	8-10'
15							
20							
25							
30							

Visual Soil and Rock Classifications

Remarks

TOPSOIL

2'2"

Loose red-brown moist SAND, little silt, trace gravel

4'0"

Dense tan-brown moist SILT, some sand, little to some gravel, trace clay

cobbles/boulders noted while augering

S-4: very dense, damp

S-5: damp

12'5"

Boring Terminated at 12'5" (Auger Refusal)

Notes:
1. Dry on completion. Auger left in overnight to check groundwater level; water at 10'6" in AM.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-2
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Overcast,50°	**Engineer**	E. Ashley
Date Started	06.14.2019	**Completed**	06.14.2019	**Driller**	J. Loomis
Drilling Company:	Target Drilling Co.				

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	3	4						TOPSOIL
			3	4	7	1	0-2'	2'6"
	3	3						Loose red-brown wet SAND, little silt, trace organic to 3'
			5	5	8	2	2-4'	
5	3	4						S-3: firm, wet to saturated
			9	10	13	3	4-6'	7'6"
	9	9						Firm red-brown wet to saturated varved SILT, CLAY and SAND 8'6"
			12	50/1"	21	4	6-8'	Very dense tan-brown moist SILT, some sand, some gravel, trace clay
	5	29						
10			41	50/2"	70	5	8-9'8"	cobbles/boulders noted while augering
	50/5"							S-6: tan-brown-grey, wet
15					50/5"	6	13-13'5"	14'6"
								Boring Terminated at 14'6" (Auger Refusal)
20								
25								
								Notes:
								1. Water encountered at 4'0"
								2. Advanced hole using hollow stem augers.
								3. Bore hole backfilled using auger spoils.
								4. Large obstruction (boulder) at 7'6". Moved boring 10' east, augered to 8' and resumed sampling
30								

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-3
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Overcast,60°	**Engineer**	E. Ashley
Date Started	06.13.2019	**Completed**	06.13.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	3	4						TOPSOIL, little sand, trace gravel 1'0"
			5	7	9	1	0-2'	Firm brown moist SILT and GRAVEL, some sand, little organic
	7	6						cobbles noted while augering 3'6"
			6	6	12	2	2-4'	Firm tan-brown moist SAND, trace silt
5	9	8						
			9	10	17	3	4-6'	S-3: trace gravel, brown organic staining noted
	12	12						S-4: tan, trace to little silt
			11	10	23	4	6-8'	wet below 7'0" 8'0"
	5	8						Firm tan-brown saturated SAND, little silt,
10			7	8	15	5	8-10'	trace gravel (may run)
								11'0"
								Dense brown wet SAND, some gravel, little silt
								cobbles noted while augering
	22	18						
15			22	17	40	6	13-15'	
	22	26						S-7: compact, light brown, saturated (may run)
20			12	11	38	7	18-20'	
								20'0"
								Boring Terminated at 20'0"
25								
30								Notes: 1. Water at 15'1" upon completion 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-4
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	E. Ashley
Date Started	06.14.2019	**Completed**	06.14.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	3	12						TOPSOIL
			10	14	22	1	0-2'	Cobbles noted while augering 2'6"
	15	17						Compact brown moist GRAVEL, some sand, little silt
			12	10	29	2	2-4'	4'0"
5	8	7						Firm brown moist SAND, little silt, little gravel
			7	10	14	3	4-6'	6'0"
	8	9						Firm brown moist SAND some gravel,
			11	11	20	4	6-8'	trace to little silt
	9	8						cobbles noted while augering
10			7	6	15	5	8-10'	
	11	5						
15			5	6	10	6	13-15'	S-6: loose, saturated
								grades to SAND and GRAVEL, trace silt
	5	7						
20			13	13	20	7	18-20'	S-7: saturated
								20'0"
								Boring Terminated at 20'0"
25								
								Notes:
30								1. Water at 13'4" upon completion 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-5
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Overcast,60°	**Engineer**	E. Ashley
Date Started	06.13.2019	**Completed**	06.13.2019	**Driller**	J. Loomis
Drilling Company:	Target Drilling Co.				

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth
	4	4					
			5	2	9	1	0-2'
	9	7					
			9	8	16	2	2-4'
5	9	7					
			8	6	15	3	4-6'
	5	4					
			4	4	8	4	6-8'
	5	3					
10			8	25	11	5	8-10'
15							
20							
25							
30							

Visual Soil and Rock Classifications

Remarks

TOPSOIL 0'6"

Loose red-brown moist SAND, some silt, little to some gravel, trace organic

S-2: no recovery - pushing gravel 4'0"

Firm red-tan-brown moist SAND, trace silt, trace gravel

S-4: loose, tan-brown wet saturated below 7'6" (may run)

saturated sand seam from 7'3"-7'6" 7'6"

Firm brown moist SILT and SAND, little gravel, trace clay

cobbles/boulders noted while augering

13'0"

Boring Terminated at 13'0" (Auger Refusal)

Notes:
1. Water encountered at 8'0"
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-6
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Overcast,50°	**Engineer**	E. Ashley
Date Started	06.14.2019	**Completed**	06.14.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	2	3						TOPSOIL 0'8"
			3	4	6	1	0-2'	Loose red-brown wet SAND, some silt, trace gravel trace organic
	10	12						2'6"
			11	12	23	2	2-4'	Firm brown moist-wet SAND, some gravel, little to some silt, trace clay
5	9	15						
			25	19	40	3	4-6'	S-3: compact, wet
	18	18						7'0"
			17	23	35	4	6-8'	Compact red-brown saturated SAND, little silt, trace gravel (may run) 8'0"
	8	22						Compact brown saturated SAND, some gravel, little silt
10			16	12	38	5	8-10'	
								cobbles./boulders noted while augering
								13'0"
	23	52						Very dense grey-brown saturated GRAVEL, little to some sand, trace to little silt
15			50/1"		102/7"	6	13-14'1"	15'6"
								Boring Terminated at 15'6" (Auger Refusal)
20								
25								
30								

Notes:
1. Water encountered at 6'0"
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.
4. Sand rose in augers 8-inches at 13'0"

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-7
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Rain, 50°	**Engineer**	E. Ashley
Date Started	06.13.2019	**Completed**	06.13.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	3	4						TOPSOIL 0'9"
			3	3	7	1	0-2'	Loose red-brown moist SAND, little silt, little gravel
	3	1						S-2: poor recovery
			1	3	2	2	2-4'	4'0"
5	3	6						Firm brown moist SAND and GRAVEL, trace silt 5'0"
			9	10	15	3	4-6'	Firm tan-brown moist SILT, some sand, some gravel, trace clay
	12	14						
			16	19	30	4	6-8'	S-4: compact
	8	18						
10			24	24	42	5	8-10'	S-5: dense
								Cobbles/boulders noted while augering
	13	20						
15			24	50/1"	44	6	13-14'7"	S-6: dense
								17'0"
								Boring Terminated at 17'0" (Auger Refusal)
20								
25								
30								Notes: 1. Dry upon completion. 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-8
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Overcast,60°	**Engineer**	E. Ashley
Date Started	06.13.2019	**Completed**	06.13.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	2	2						TOPSOIL 0'8"
			3	3	5	1	0-2'	Loose tan-brown wet SILT, some sand, some gravel, trace clay
	5	9						
			14	15	23	2	2-4'	S-2: firm wet
5	3	12						moist below 2'6"
								S-3: compact
			25	29	37	3	4-6'	
	51	50/3"						S-4: very dense
					50/3"	4	6-6'9"	cobbles/boulders noted while augering.
	21	50						
10			50/4"		108/10	5	8-9'4"	S-5: very dense, damp, little gravel
	32	50/1"						
15					50/1"	6	13-13'7"	S-6: very dense, damp 14'1"
								Boring Terminated at 14'1" (Auger Refusal)
20								
25								
								Notes:
								1. Dry upon completion.
								2. Advanced hole using hollow stem augers.
								3. Bore hole backfilled using auger spoils.
								4. Boring Terminated at 500 psi downpressure for 15± minutes with no advancement
30								

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-9
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Overcast,60°	**Engineer**	E. Ashley
Date Started	06.14.2019	**Completed**	06.14.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	3	4						TOPSOIL 0'8"
			11	9	15	1	0-2'	Firm brown moist SILT, little sand, trace gravel
	7	7						trace to little organics to 2'6"
			7	7	14	2	2-4'	
5	1	2						
			3	5	5	3	4-6'	S-3: loose, little gravel, trace to little clay
	4	6						
			18	35	24	4	6-8'	(rock fragments from 7'6" to 8'0") 8'0"
	9	19						Dense grey-brown-yellow moist GRAVEL,
10			22	31	41	5	8-10'	little to some sand, little silt, trace clay
								cobbles/boulders noted while augering
								12'6"
								Boring Terminated at 12'6" (Auger Refusal)
15								
20								
25								
30								

Notes:
1. Dry upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-10
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	A. Viar
Date Started	06.17.2019	**Completed**	06.30.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	2	5						TOPSOIL 0'8"
			6	6	11	1	0-2'	Firm brown damp SILT, some fine sand, trace organics
	4	5						
			5	6	10	2	2-4'	S-2: medium, little fine sand, little clay
5	2	4						
			1	5	5	3	4-6'	wet from 5'6"-6'6"
	3	6						6'6"
			12	11	18	4	6-8'	Loose grey-brown damp SILT, some sand, some gravel, trace clay
	10	8						
10			8	5	16	5	8-10'	S-5: No recovery
								11'6"
								Stiff orange-brown wet SILT, some clay, little sand, little gravel
	2	2						13'0"
15			W/H	W/H	2	6	13-15"	Loose grey saturated GRAVEL, trace to little sand, trace silt (poor recovery)
								S-7: very dense
	38	50/2"						18'8"
20					50/2"	7	18-18'8"	Boring Terminated at 18'8"
25								
30								Notes: 1. Water encountered at 10'0" 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-11
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	A. Viar
Date Started	06.18.2019	**Completed**	06.18.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	1	5						TOPSOIL 2'0"
			5	10	10	1	0-2'	Firm brown damp SAND, little silt, little gravel, trace organics
	7	9						
			10	14	19	2	2-4'	cobbles/boulders noted at 3'0" while augering
5	3	7						5'0"
			8	12	15	3	4-6'	Firm brown damp SILT, little sand, little gravel, trace to little clay
	6	31						
			19	17	50	4	6-8'	S-4: dense, grey-brown moist
	10	8						
10			10	11	18	5	8-10'	S-5: moist
	3	4						
15			5	12	9	6	13-15"	S-6: no recovery - rock in shoe
								18'0"
	3	3						Loose grey saturated GRAVEL, some sand, little silt
20			2	1	5	7	18-20'	20'0"
								Boring Terminated at 20'0"
25								
30								Notes: 1. Water encountered at 13'0" 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-12
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	A. Viar / E. Ashley
Date Started	06.17.2019	**Completed**	06.17.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth
	2	2					
			3	4	5	1	0-2'
	4	4					
			3	5	7	2	2-4'
5	3	4					
			3	4	7	3	4-6'
	7	17					
			10	6	27	4	6-8'
	4	5					
10			20	14	25	5	8-10'
15	50/5"				50/5"	6	13-15"
20							
25							
30							

Visual Soil and Rock Classifications

Remarks

TOPSOIL 1'3"

Loose brown damp SILT, some sand, trace clay, trace organics

3'0"

Loose red-brown-tan moist to wet varved SILT, SAND and CLAY 4'0"

Loose red-brown saturated fine SAND, some silt, trace clay

few silty clay seams, trace fine gravel below 7'0"

7'6"

Compact grey moist GRAVEL, little to some sand, little to some silt, trace clay

S-5: firm, wet to saturated, SILT and SAND

S-6: very dense grey-brown, white mineral inclusions poor recovery

14'6"

Boring Terminated at 14'6" (Auger Refusal)

Notes:
1. Water encountered at 8'0"
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-13
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	E. Ashley
Date Started	06.14.2019	**Completed**	06.14.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	2	2						TOPSOIL 0'9"
			4	7	6	1	0-2'	Loose brown moist SILT, some sand, some gravel, trace organic to 2'0"
	14	22						
			38	40	60	2	2-4'	S-2: very dense
5	40	50/4"						cobbles/boulders noted while augering
					50/4"	3	4-4'10"	S-3: very dense
								augered through very dense till to 8'
	57	50/4"						
10					50/4"	4	8-8'10"	S-4: very dense, tan-brown, damp
	50/5"							S-5: very dense tan-brown damp 13'6"
15					50/5"	5	13-13'5"	Boring Tewrminated at 13'6" (Auger Refusal)
20								
25								
								Notes:
								1. Dry upon completion
								2. Advanced hole using hollow stem augers.
								3. Bore hole backfilled using auger spoils.
								4. Boring terminated at 600 psi downpressure on augers in dense till.
30								

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-14
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	A. Viar
Date Started	06.18.2019	**Completed**	06.18.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	1	4						TOPSOIL
			4	6	8	1	0-2'	1'8"
	5	6						Loose brown damp SILT, some sand, trace organic
			7	6	13	2	2-4'	S-2: grades into SILT & SAND
5	5	4						4'0"
			3	7	7	3	4-6'	Firm grey-brown saturated SILT, little sand, trace gravel, trace clay, trace organic
	5	6						white mineral inclusions at 6'0" 6'0"
			6	8	12	4	6-8'	Medium red-brown moist SILT, some clay
	3	3						S-4: no recovery 8'0"
10			4	6	7	5	8-10'	Loose orange-brown moist SILT, little sand, little gravel, trace clay (poor recovery)
								12'0"
								Loose brown-grey saturated GRAVEL, some sand, little silt, trace clay
	1	1						
15			1	1	2	6	13-15"	cobbles/boulders noted at 16'0"
								18'0"
	50/0"			50/0"	0	7	18'0"	Boring Tterminated @ 18'0"
20								
25								
30								Notes: 1. Dry upon completion 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-15
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	A. Viar
Date Started	06.18.2019	**Completed**	06.18.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	2	4						TOPSOIL
			9	6	13	1	0-2'	2'6"
	8	9						Firm gray-brown moist GRAVEL, some sand, some silt, trace organic
			9	8	18	2	2-4'	cobbles/boulders noted below 3'0", rough augering
5	12	17						S-3: compact, wet (no organic)
			19	17	36	3	4-6'	6'6"
	9	22						Dense brown wet SILT, some sand, little gravel
			25	30	47	4	6-8'	
	25	39						
10			50/5"		89/11"	5	8-9'5"	S-5: very dense, grey-brown damp, some gravel, little sand
	14	50						S-6: very dense brown-grey, little sand, trace gravel
15			27	20	77	6	13-15"	
								18'0"
	14	50/4"						Very dense GRAVEL some sand
20					50/4"	7	18-20'	20'0"
								Boring Terminated at 20'0"
25								
30								

Notes:
1. Water encountered at 15'0"
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.
4. Offset +-8' north due to pond. Obstruction encountered at 3'0"; moved boring 4'0"± east and augered down to 4'0" to resume sampling.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-16
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	A. Viar
Date Started	06.18.2019	**Completed**	06.18.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	2	3						TOPSOIL
			3	2	6	1	0-2'	1'8"
	2	3						Loose brown damp SAND, little silt
			3	2	6	2	2-4'	
5	4	4						
			4	7	8	3	4-6'	S-3: trace gravel, wet at 5'4"
	5	11						S-4: wet, little to some gravel, trace clay
			13	25	24	4	6-8'	
	13	20						grey weathered rock at 8'0" 8'0"
10			23	25	43	5	8-10'	Dense brown moist SILT, some sand, little to some gravel, trace clay
	4	9						
15			11	9	20	6	13-15"	S-6: no recovery
								18'0"
	1	2						Loose grey saturated GRVAEL, some clay, little silt poor recovery
20			1	2	3	7	18-20'	20'0"
								Boring Terminated @ 20'0"
25								
30								Notes: 1. Water encountered at 10'5" 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-17
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	E. Ashley
Date Started	06.17.2019	**Completed**	06.17.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth
	2	5					
			6	8	11	1	0-2'
	12	18					
			15	9	33	2	2-4'
5	3	8					
			5	7	13	3	4-6'
	8	7					
			7	9	14	4	6-8'
	14	41					
10			26	14	67	5	8-10'
	5	5					
15			7	10	12	6	13-15"
	5						
20		3	2	2	5	7	18-20'
25							
30							

Visual Soil and Rock Classifications

Remarks

TOPSOIL 0'9"

Firm brown moist SILT, some sand, little to some gravel, trace clay

S-2: compact, tan-brown

cobbles/boulders noted while augering 4'0"

Medium red-brown moist SILT, little to some clay, little sand, little gravel

S-4: brown, poor recovery

S-5: hard, grey-brown

11'6"

Firm grey wet SILT, some sand, some gravel, trace clay

cobbles/boulders noted while augering

16'6"

Soft grey wet SILT, some clay, trace sand, trace gravel

4" saturated gravel seam at 18'0"

20'0"

Boring terminated @ 20'0"

Notes:

1. Water encountered at 13'0" during drilling; water level at 7'6" upon completion
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-18
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	A. Viar
Date Started	06.17.2019	**Completed**	06.17.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	2	3						TOPSOIL 1'6"
			4	5		1	0-2'	Loose brown moist SAND, some silt 3'0"
	4	4						
			4	4	8	2	2-4'	Loose brown moist SILT, little sand, trace gravel cobbles/boulders noted while augering 5'6"
5	3	4						
			3	5	7	3	4-6'	Loose brown damp SAND and GRAVEL, little silt (poor recovery) 6'0"
	6	11						
			10	17	21	4	6-8'	Firm brown-grey damp GRAVEL, some sand, little silt
	38	40						
10			15	7	55	5	8-10'	S-5: very dense, damp (poor recovery) cobbles/boulders noted below 9'
	18	23						
15			16	11	39	6	13-15"	S-6: compact
	13	13						
20			10	9	23	7	18-20'	S-7: firm, brown, saturated 20'0"
								Boring terminated @ 20'0"
25								
30								

Notes:
1. Water encountered at 18'0"
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-19
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	A. Viar
Date Started	06.18.2019	**Completed**	06.18.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	4	6						TOPSOIL
			6	7	12	1	0-2'	2'0"
	9	11						Firm brown damp SAND, little silt, little gravel
			11	13	22	2	2-4'	
5	10	9						S-3: some gravel, grey-brown below 5'5"
			7	6	16	3	4-6'	6'0"
	10	15						Compact grey-brown damp GRAVEL, some sand, little silt 8'0"
			17	22	32	4	6-8'	Compact light brown damp SAND, some gravel, little silt
	8	9						cobbles/boulders noted @ 10'0"
10			19	13	27	5	8-10'	
								11'6"
								Compact brown moist SILT, little clay, little gravel, trace to little sand
	6	11						
15			14	14	25	6	13-15"	
	7	22						
20			25	27	47	7	18-20'	S-7: dense
								20'0"
								Boring terminated @ 20'0"
25								
30								

Notes:
1. Dry upon completion
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-20
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	E. Ashley
Date Started	06.18.2019	**Completed**	06.18.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth
	1	2					
			3	4		1	0-2'
	2	6					
			9	9	15	2	2-4'
5	15	8					
			16	11	24	3	4-6'
	8	9					
			9	15	18	4	6-8'
	6	5					
10			3	2	8	5	8-10'
	3	5					
15			2	2	7	6	13-15"
	50	50/4"					18'-
20					50/4"	7	18'10"
25							
30							

Visual Soil and Rock Classifications

Remarks

TOPSOIL 1'1"

Loose red-brown moist SILT, little sand, trace to little organic, trace gravel 3'0"

Firm brown moist GRAVEL, some sand, trace to little silt
cobbles/boulders noted while augering
S-3: moist to damp 6'0"

Firm brown moist SILT, little clay, little sand, little gravel
few silty sand seams 8'0"

Loose tan-brown moist SILT, some sand, some gravel 9'0"

Loose red-brown-orange moist SILT, little sand, little gravel, trace clay 11'6"

Loose tan-brown wet SILT, some sand, little gravel, trace clay

16'6"

Very dense grey saturated GRAVEL, trace silt

18'10"

Boring terminated @ 18'10"

Notes:
1. Water encountered at 11'0"
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-21
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	E. Ashley
Date Started	06.18.2019	**Completed**	06.18.2019	**Driller**	J. Loomis
Drilling Company:	Target Drilling Co.				

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	1	2						TOPSOIL 0'9"
			3	7	5	1	0'-2'	Loose brown moist SILT, little to some sand,
	3	6						trace fine gravel,trace organic/rootlets 2'0"
			9	9	15	2	2'-4'	Firm brown moist SILT, little clay, little sand, little gravel
5	5	12						cobbles/boulders noted while augering
			12	12	24	3	4'-6'	
	11	13						
			14	18	27	4	6'-8'	S-4: compact, little to some gravel
	11	19						
10			27	42	46	5	8'-10'	
	9	25						
15			31	50/5	56	6	13'-15'	S-6: dense
	21	41						
20			48	50/4"	89	7	18'-19'10"	S-7: very dense 19'10"
								Boring Terminated at 19'10"
25								
30								

Notes:
1. Dry upon completion
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-22
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	E. Ashley
Date Started	06.18.2019	**Completed**	06.30.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth
	3	7					
			5	7	12	1	0'-2'
	8	10					
			8	7	18	2	2'-4'
5	5	8					
			8	8	16	3	4'-6'
	7	8					
			7	6	15	4	6'-8'
	5	8					
10			18	11	26	5	8'-10'
	16	31					
15			34	50/3"	65	6	13'-14'9"
20							
25							
30							

Visual Soil and Rock Classifications

Remarks

TOPSOIL 0'10"

Firm tan-brown damp SAND and GRAVEL, trace silt

4'0"

Firm light brown fine SAND, little silt 5'0"

Firm brown moist SAND and GRAVEL, trace silt

saturated below 6" 7'0"

Firm tan-brown saturated fine SAND, little to some silt (may run) 9'11"

Compact brown wet SAND, some gravel, little silt cobbles/boulders noted while augering

S-6: very dense, sand rose in augers ±6" 15'0"

Boring Terminated at 15'0" (Auger Refusal)

Notes:
1. Water encountered at 7'8" while drilling, water at 6'0" upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-23
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	E. Ashley
Date Started	06.18.2019	**Completed**	06.18.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Visual Soil and Rock Classifications / Remarks
	2	5						TOPSOIL 0'8"
			8	7	13	1	0'-2'	Firm tan-brown moist SILT, some sand, little gravel, trace organics/rootlets (possible fill)
	4	16						
			10	11	26	2	2'-4'	
5	2	3						
			3	3	6	3	4'-6'	S-3: loose, brown, poor recovery
	3	4						6'0"
			4	5	8	4	6'-8'	Loose brown moist SAND and GRAVEL, trace to little silt (possible fill)
	3	3						
10			2	1	5	5	8'-10'	S-5: wet
								11'6"
								Dense grey moist SILT, some sand, some gravel, trace clay
	11	16						
15			29	19	45	6	13'-15'	
	56	50/4"			50/4"	7	18'-18'10"	S-7: very dense, grey-brown, moist
20								18'10"
								Boring Terminated at 18'10"
25								
30								

Notes:
1. Dry on completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

Boring Log

Project No.	4618.0	**Page** 1 **of** 1		**Test Boring No.**	P-24
Project Name	Yellow Mills Road Solar Array, 466 Yellow Mills Road, Farmington, New York				
Client	Delaware River Solar LLC, 33 Irving Place, Suite 1090, New York, New York				
Elevation		**Weather**	Sunny, 60°	**Engineer**	E. Ashley
Date Started	06.18.2019	**Completed**	06.18.2019	**Driller**	J. Loomis
Drilling Company: Target Drilling Co.					

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth
	3	2					
			4	8	6	1	0'-2'
	6	5					
			5	4	10	2	2'-4'
5	7	12					
			10	7	22	3	4'-6'
	6	7					
			11	8	18	4	6'-8'
	19	25					
10			13	12	38	5	8'-10'
	7	26					
15			28	19	54	6	13'-15'
20							
25							
30							

Visual Soil and Rock Classifications

Remarks

TOPSOIL 0'10"

Loose red-brown moist SILT, trace to little fine sand, trace organic/rootlets 2'4"

Loose brown moist SILT, little to some sand little to some gravel, trace clay, trace organic 4'0"

Firm brown moist SAND and GRAVEL, trace silt, poor recovery
cobbles/boulders noted while augering

S-4: poor recovery (rough augering)

S-5: compact

11'6"

Very dense grey moist GRAVEL, little sand

17'1"

Boring Terminated at 17'1"

Notes:
1. Water at 10'6" overnight.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Drop Rods: 2-inch

Foundation Design, P.C.

SOIL • BEDROCK • GROUNDWATER

June 27, 2019

Delaware River Solar
33 Irving Place
New York, New York 10003

Attention: Mr. Peter Dolgos

Reference: Yellow Mills Road Solar Farm
466 Yellow Mills Road, Farmington, New York
Laboratory Test Results, 4618.0

Dear Mr. Dolgos:

Foundation Design, P.C. is pleased to present the following results of the laboratory testing performed on the referenced project. The testing was performed in accordance with the following ASTM test methods:

7	Sieve Analysis	ASTM D-422/ASTM D-1140
11	Moisture Content Test	ASTM D-2216
1	Plastic Limits/Liquid Limits/Plasticity Index	ASTM D-4318
3	pH Test	ASTM D-4972
3	Laboratory Soil Box Resistivity Test	ASTM G187-12a
4	4 Point Resistivity Test	ASTM G-57
8	Soil Thermal Conductivity Test	ANSI/IEEE 442

We appreciate the opportunity to provide these testing services and look forward to hearing from you again in the near future.

Very truly yours,

FOUNDATION DESIGN, P.C.

Elizabeth Ashley

Elizabeth Ashley, P.G.
Laboratory Manager

Foundation Design, P.C.

SOIL • BEDROCK • GROUNDWATER

Yellow Mills Road Solar Farm
466 Yellow Mills Road
Farmington, New York
4618.0

June 19, 2019

Moisture Content Test Report
(ASTM D-2216)

Moisture Content Test Results				
Boring Number	P-1	P-2	P-3	P-3
Sample Number	S-2	S-4	S-4	S-6
Depth	2'-4'	6'-8'	6'-8'	13'-15'
Moisture Content (%)	**13.2**	**19.2**	**21.2**	**10.2**

Moisture Content Test Results				
Boring Number	P-4	P-6	P-8	P-10
Sample Number	S-5	S-3	S-5	S-2
Depth	8'-10'	4'-6'	8'-9'4"	2'-4'
Moisture Content (%)	**7.2**	**9.4**	**7.9**	**24.9**

Moisture Content Test Results			
Boring Number	P-13	P-15	P-20
Sample Number	S-3	S-4	S-4
Depth	4'-4'10"	6'-8'	6'-8'
Moisture Content (%)	**6.7**	**10.1**	**11.9**

Foundation Design, P.C.

SOIL • BEDROCK • GROUNDWATER

Yellow Mills Road Solar Farm
Yellow Mills Road, Farmington, New York
4618.0

In-place Density Test and Soil Thermal Conductivity Test Report
(ASTM D-1557 and ANSI/IEEE 442)

P-4					
Depth:		3'0"			
Soil Classification:		Compact brown GRAVEL, some sand, little silt			
Wet Density (pcf)	**Dry Density (pcf)**	**Moisture Content (%)**	**Thermal Conductivity (W/(m*K))**	**Thermal Resistivity (°C*(cm/W))**	**Initial Temp. (°C)**
107.5	94.1	13.4	2.436	41.0	15.96

P-5					
Depth:		3'0"			
Soil Classification:		Compact red-brown SAND, some silt, little gravel			
Wet Density (pcf)	**Dry Density (pcf)**	**Moisture Content (%)**	**Thermal Conductivity (W/(m*K))**	**Thermal Resistivity (°C*(cm/W))**	**Initial Temp. (°C)**
124.5	111.0	13.4	1.694	59.0	16.65

P-6					
Depth:		2'6"			
Soil Classification:		Compact red-brown SAND, some gravel, little silt, trace clay			
Wet Density (pcf)	**Dry Density (pcf)**	**Moisture Content (%)**	**Thermal Conductivity (W/(m*K))**	**Thermal Resistivity (°C*(cm/W))**	**Initial Temp. (°C)**
125.0	105.8	19.1	2.760	36.2	17.09

P-7					
Depth:		3'0"			
Soil Classification:		Loose red-brown SAND, little silt, little gravel			
Wet Density (pcf)	**Dry Density (pcf)**	**Moisture Content (%)**	**Thermal Conductivity (W/(m*K))**	**Thermal Resistivity (°C*(cm/W))**	**Initial Temp. (°C)**
122.8	108.1	14.7	1.075	93.0	15.80

Foundation Design, P.C.

SOIL • BEDROCK • GROUNDWATER

Yellow Mills Road Solar Farm
Yellow Mills Road, Farmington, New York
4618.0

In-place Density Test and Soil Thermal Conductivity Test Report
(ASTM D-1557 and ANSI/IEEE 442)

P-10					
Depth:	3'0"				
Soil Classification:	Firm brown SILT, little sand, trace clay				
Wet Density (pcf)	**Dry Density (pcf)**	**Moisture Content (%)**	**Thermal Conductivity (W/(m*K))**	**Thermal Resistivity (°C*(cm/W))**	**Initial Temp. (°C)**
115.7	92.5	23.2	1.998	50.1	14.80

P-11					
Depth:	3'0"				
Soil Classification:	Firm brown SAND, little silt, little gravel, few cobbles/boulders				
Wet Density (pcf)	**Dry Density (pcf)**	**Moisture Content (%)**	**Thermal Conductivity (W/(m*K))**	**Thermal Resistivity (°C*(cm/W))**	**Initial Temp. (°C)**
150.4	139.9	15.1	3.861	25.9	12.96

P-19					
Depth:	3'0"				
Soil Classification:	Firm brown SAND, little silt, little gravel, few cobbles/boulders				
Wet Density (pcf)	**Dry Density (pcf)**	**Moisture Content (%)**	**Thermal Conductivity (W/(m*K))**	**Thermal Resistivity (°C*(cm/W))**	**Initial Temp. (°C)**
152.4	140.9	8.2	0.889	112.5	16.98

P-23					
Depth:	3'0"				
Soil Classification:	Firm brown SILT, some sand, little gravel				
Wet Density (pcf)	**Dry Density (pcf)**	**Moisture Content (%)**	**Thermal Conductivity (W/(m*K))**	**Thermal Resistivity (°C*(cm/W))**	**Initial Temp. (°C)**
114.4	99.4	15.1	1.665	60.1	15.99

Foundation Design, P.C.

SOIL • BEDROCK • GROUNDWATER

Yellow Mills Road Solar Farm
466 Yellow Mills Road
Farmington, New York
4618.0

June 19, 2019

pH and Resistivity Test Report
(ASTM D-4972 and ASTM G-57)

	pH and Laboratory Resistivity Test Results		
Boring Number	**P-9**	**P-17**	**P-19**
Sample Number	S-3 & S-4	S-3 & S-4	S-3 & S-4
Depth	4'-8'	4'-8'	4'-8'
pH	7.4	7.3	7.7
Resistivity(Ω·cm) Natural Moisture	5200	4200	21000
Resistivity(Ω·cm) Saturated Moisture	5300	9300	3700
Natural Moisture Content (%)	16.5	13.5	4.6
Saturated Moisture Content (%)	28.9	20.3	22.4

Soil Resistivity Test

Foundation Design, P.C.

Test Date 06.21.19

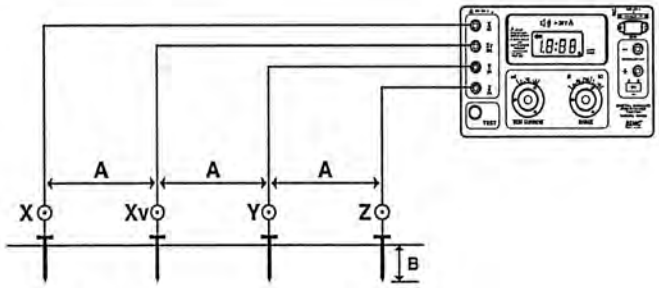
Test Location: Yellow Mills Road Solar, Farmington, New York — P-6

Address: 466 Yellow Mills Road, Farmington, New York

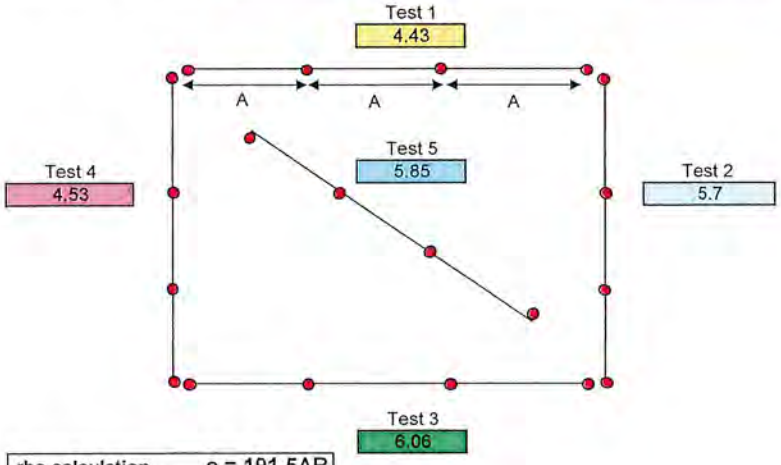
Model: AEMC 4620 — Operator Name: J. Goggin

Test Conditions

Soil Condition:	[X] Moist	[ ] Dry	Temperature 70's	°F °C
Soil Type:	[ ] Clay	[ ] Limestone	[X] Sand & Gravel	
	[ ] Granite	[ ] Shale	[ ] Sandstone	
	[X] Loam	[ ] Slate	[ ] Other	



Electrode Spacing (A): 10 ft — Electrode depth (B): 0.5 ft



rho calculation: ρ = 191.5AR

Test	Test Reading R	Soil Resistivity ρ
1	4.43	8483.45
2	5.7	10915.5
3	6.06	11604.9
4	4.53	8674.95
5	5.85	11202.8

Effective soil resistivity: **10176.31** Ω - cm

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

Soil Resistivity Test

Foundation Design, P.C.

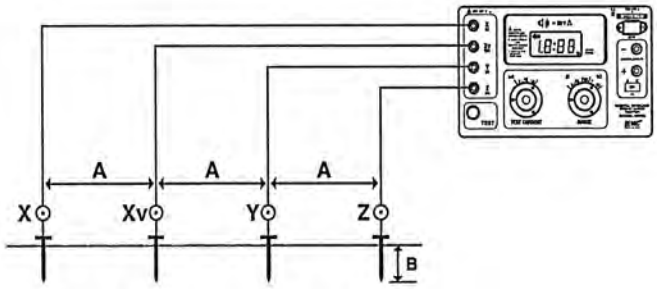
Test Date 06.21.19

Test Location Yellow Mills Road Solar, Farmington, New York P-7

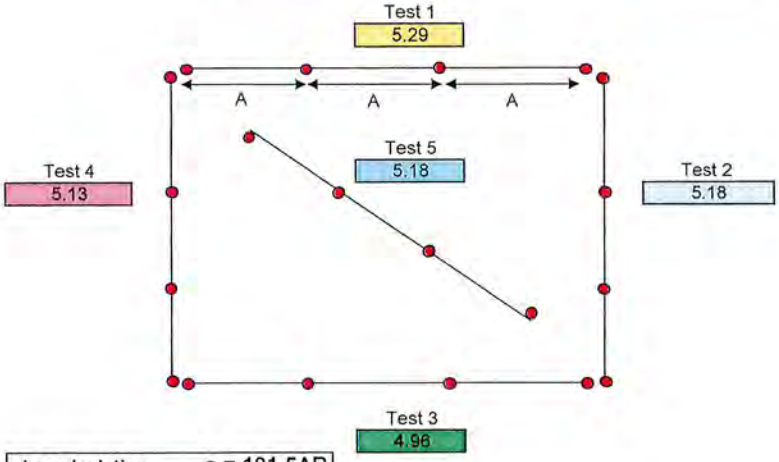
Address 466 Yellow Mills Road, Farmington, New York

Model AEMC 4620 Operator Name: J. Goggin

Test Conditions				
Soil Condition:	[X] Moist	[ ] Dry	Temperature 70's	°F °C
Soil Type:	[ ] Clay	[ ] Limestone	[X] Sand & Gravel	
	[ ] Granite	[ ] Shale	[ ] Sandstone	
	[X] Loam	[ ] Slate	[ ] Other	



Electrode Spacing (A) 10 ft Electrode depth (B) 0.5 ft



rho calculation ρ = 191.5AR

	Test Reading	Soil Resistivity
Test	R	ρ
1	5.29	10130.4
2	5.18	9919.7
3	4.96	9498.4
4	5.13	9823.95
5	5.18	9919.7

Effective soil resistivity: **9858.42** Ω - cm

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

Soil Resistivity Test

Foundation Design, P.C.

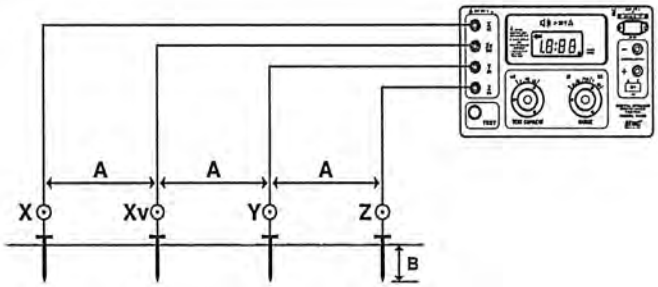
Test Date 06.21.19

Test Location Yellow Mills Road Solar, Farmington, New York P-19

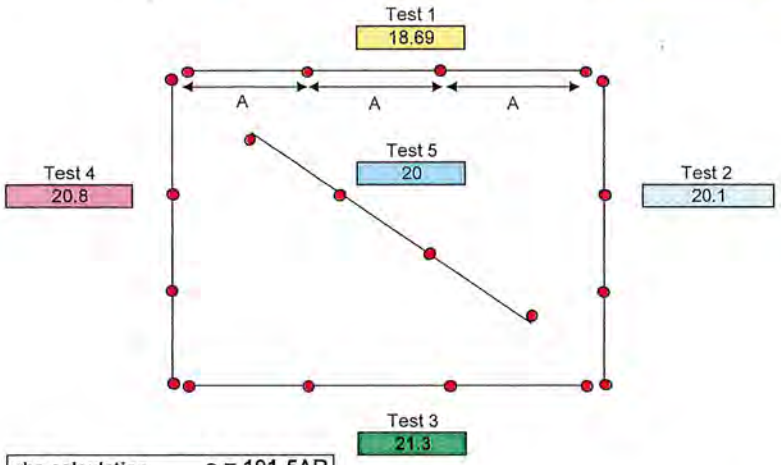
Address 466 Yellow Mills Road, Farmington, New York

Model AEMC 4620 Operator Name: J. Goggin

Test Conditions				
Soil Condition:	[X] Moist	[ ] Dry	Temperature 70's	°F °C
Soil Type:	[ ] Clay	[ ] Limestone	[X] Sand & Gravel	
	[ ] Granite	[ ] Shale	[ ] Sandstone	
	[X] Loam	[ ] Slate	[ ] Other	



Electrode Spacing (A) 10 ft Electrode depth (B) 0.5 ft



rho calculation ρ = 191.5AR

Test	Test Reading R	Soil Resistivity ρ
1	18.69	35791.4
2	20.1	38491.5
3	21.3	40789.5
4	20.8	39832
5	20	38300

Effective soil resistivity: **38640.87** Ω - cm

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

Soil Resistivity Test

Foundation Design, P.C.

Test Date 06.21.19

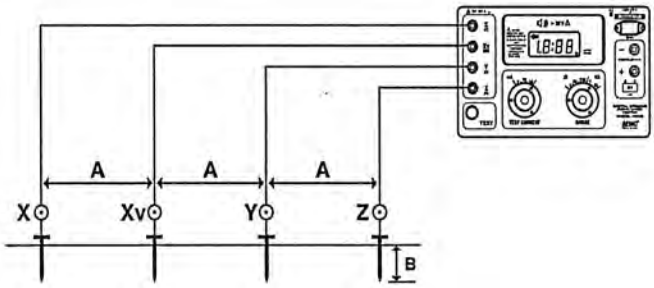
Test Location Yellow Mills Road Solar, Farmington, New York P-23

Address 466 Yellow Mills Road, Farmington, New York

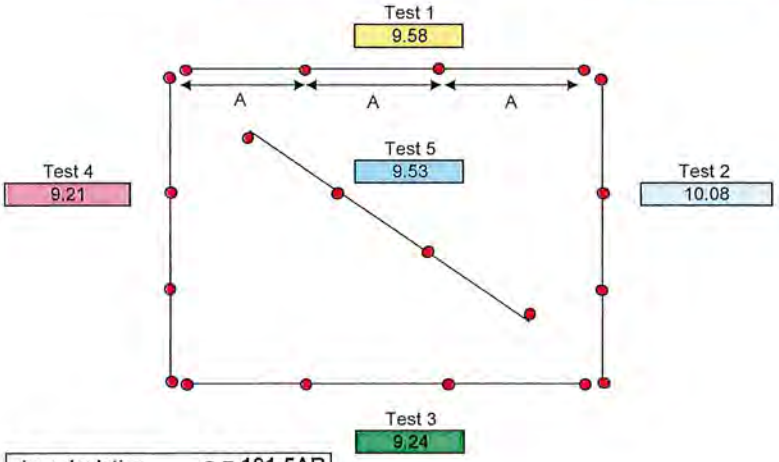
Model AEMC 4620 Operator Name: J. Goggin

Test Conditions

Soil Condition:	[X] Moist	[ ] Dry	Temperature 70's	°F °C
Soil Type:	[ ] Clay	[ ] Limestone	[X] Sand & Gravel	
	[ ] Granite	[ ] Shale	[ ] Sandstone	
	[X] Loam	[ ] Slate	[ ] Other	



Electrode Spacing (A) 10 ft Electrode depth (B) 0.5 ft



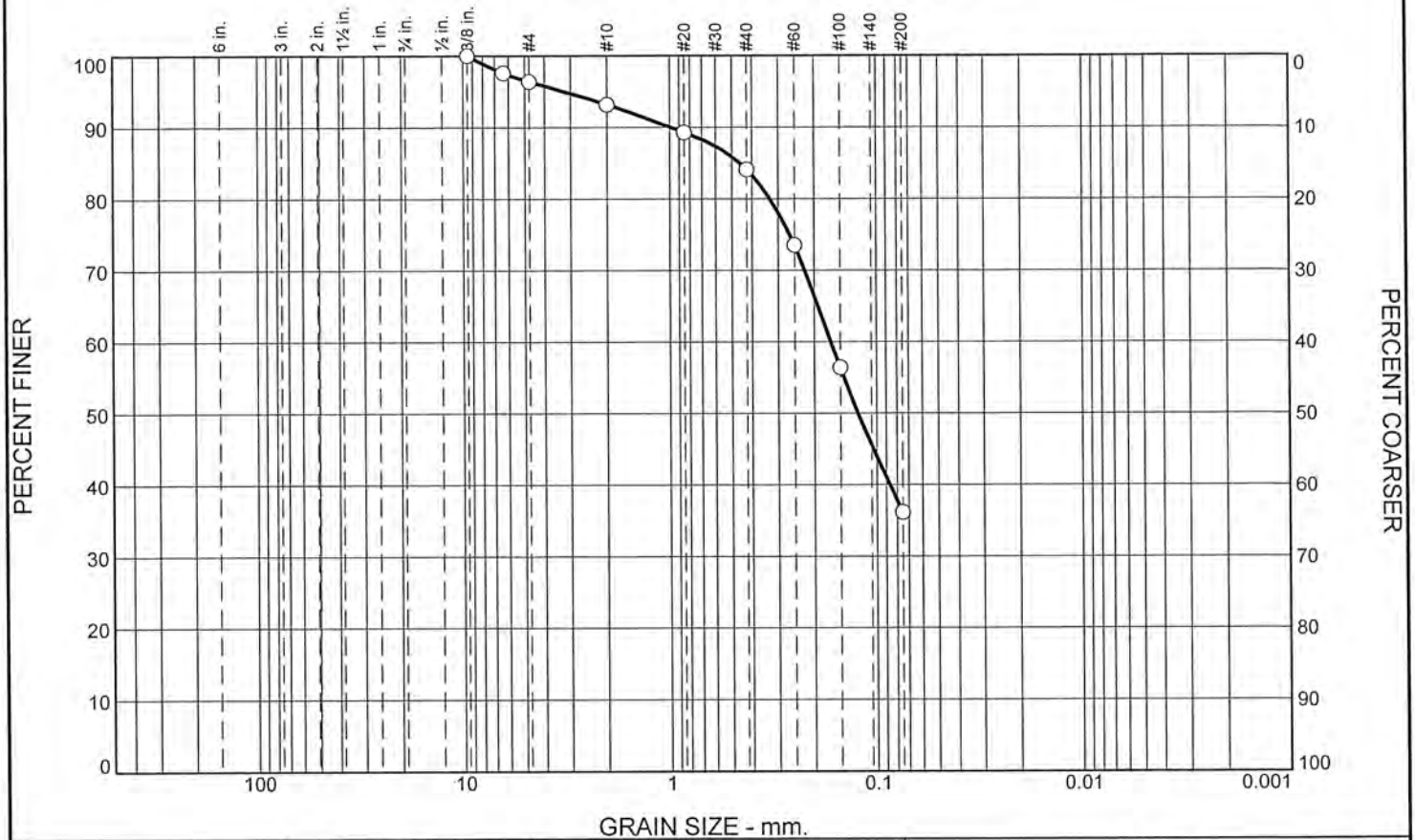
rho calculation ρ = 191.5AR

	Test Reading	Soil Resistivity
Test	R	ρ
1	9.58	18345.7
2	10.08	19303.2
3	9.24	17694.6
4	9.21	17637.2
5	9.53	18250

Effective soil resistivity: **18246.12** Ω - cm

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	4	3	9	48	36	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
1/4"	98		
#4	96		
#10	93		
#20	89		
#40	84		
#60	74		
#100	56		
#200	36		

* (no specification provided)

Material Description

Tan cmf SAND, some silt/clay, trace fine gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.9884 D_{85}= 0.4586 D_{60}= 0.1667
D_{50}= 0.1229 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 287.59 grams of oven dried split spoon sample

Source of Sample: P-1 **Depth:** 2'-4'
Sample Number: S-2

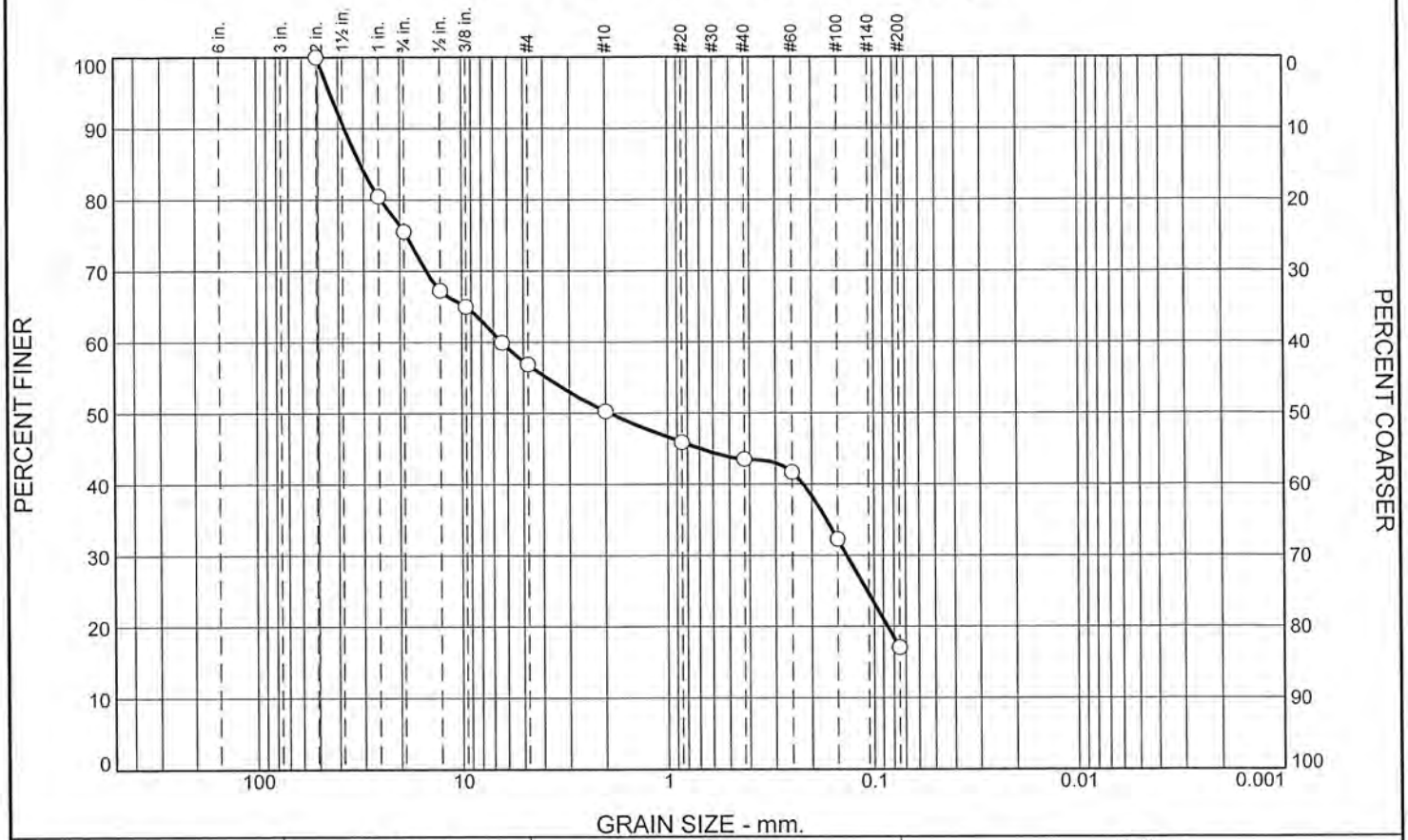
Date: 06.19.19

Foundation Design, P.C.

Client: Delaware River Solar, 33 Irving Place, New York, New York
Project: Yellow Mills Road Solar Farm, 466 Yellow Mills Road, Farmington, New York
Project No: 4618.0 **Figure**

Tested By: TJB **Checked By:** EAA

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	24	19	7	6	27	17	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100		
1"	80		
3/4"	76		
1/2"	67		
3/8"	65		
1/4"	60		
#4	57		
#10	50		
#20	46		
#40	44		
#60	42		
#100	32		
#200	17		

* (no specification provided)

Material Description

Tan cf GRAVEL, some cmf sand, little silt/clay

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 37.0923 D_{85}= 31.0245 D_{60}= 6.3849
D_{50}= 1.9254 D_{30}= 0.1353 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 292.64 grams of oven dried split spoon sample

Source of Sample: P-3 **Depth:** 13'-15'
Sample Number: S-6

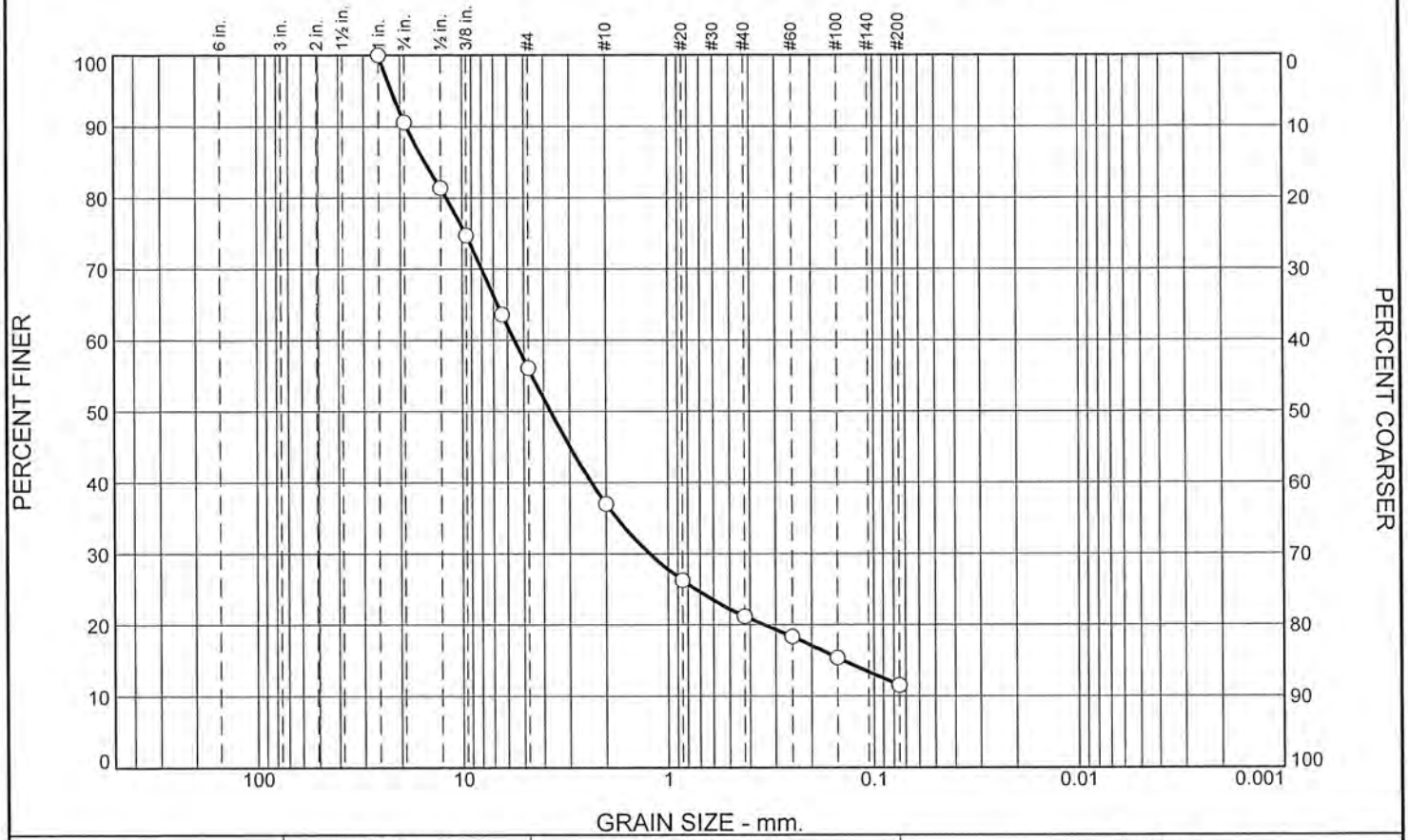
Date: 06.19.19

Foundation Design, P.C.

Client: Delaware River Solar, 33 Irving Place, New York, New York
Project: Yellow Mills Road Solar Farm, 466 Yellow Mills Road, Farmington, New York
Project No: 4618.0 **Figure**

Tested By: TJB **Checked By:** EAA

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	9	35	19	16	10	11	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	91		
1/2"	81		
3/8"	75		
1/4"	64		
#4	56		
#10	37		
#20	26		
#40	21		
#60	18		
#100	15		
#200	11		

* (no specification provided)

Material Description

Tan cmf SAND, some cf gravel, little silt/clay

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 18.6246 D_{85}= 15.0983 D_{60}= 5.5408
D_{50}= 3.7067 D_{30}= 1.2291 D_{15}= 0.1409
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 428.43 grams of oven dried split spoon sample

Source of Sample: P-4 **Depth:** 8'-10'
Sample Number: S-5

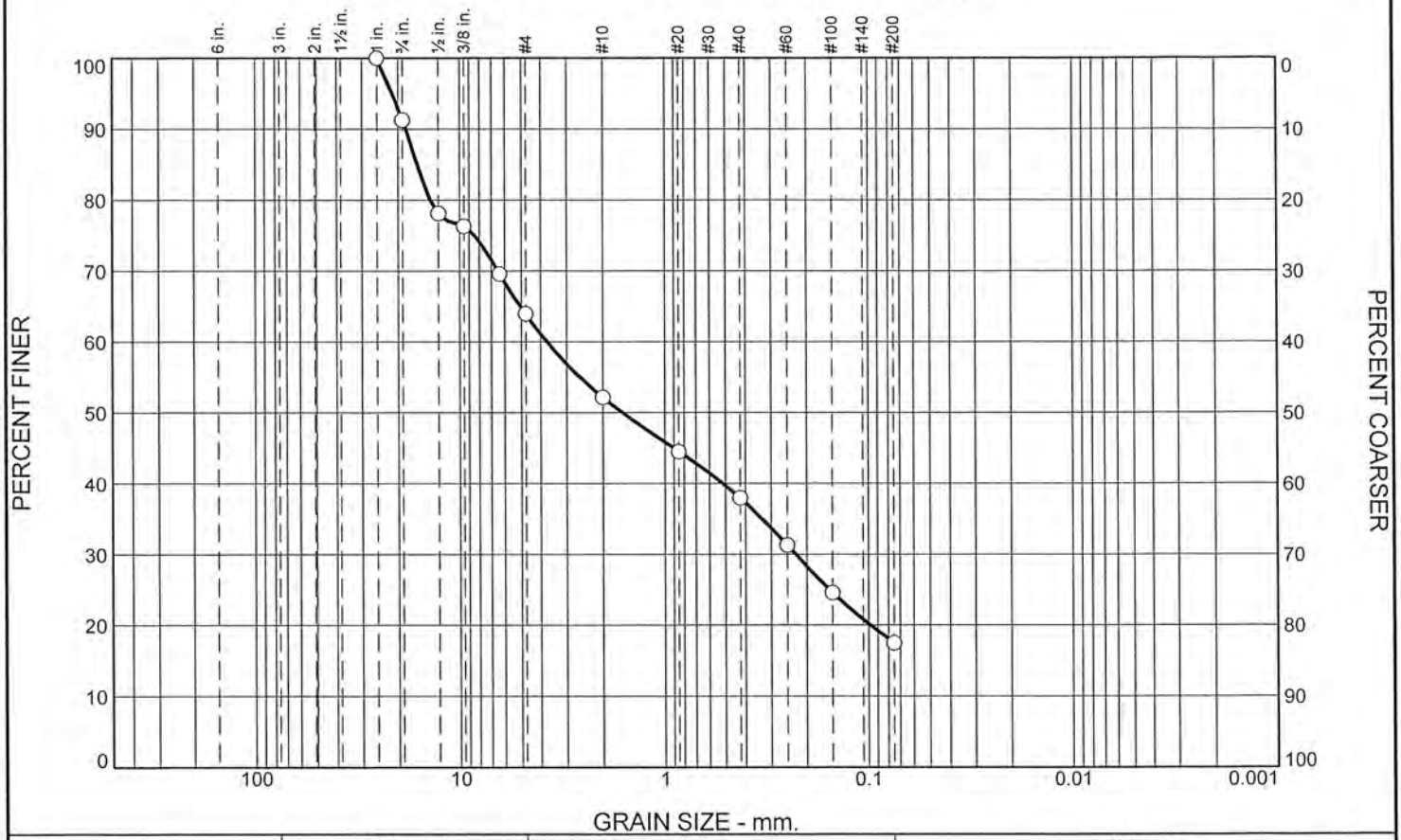
Date: 06.19.19

Foundation Design, P.C.

Client: Delaware River Solar, 33 Irving Place, New York, New York
Project: Yellow Mills Road Solar Farm, 466 Yellow Mills Road, Farmington, New York
Project No: 4618.0 **Figure**

Tested By: TJB **Checked By:** EAA

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	9	27	12	14	21	17	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	91		
1/2"	78		
3/8"	76		
1/4"	70		
#4	64		
#10	52		
#20	44		
#40	38		
#60	31		
#100	25		
#200	17		

* (no specification provided)

Material Description

Tan cmf SAND, some cf gravel, little silt/clay

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 18.3786 D_{85}= 16.0970 D_{60}= 3.7384
D_{50}= 1.6097 D_{30}= 0.2274 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 368.55 grams of oven dried split spoon sample

Source of Sample: P-6 **Depth:** 4'-6'
Sample Number: S-3

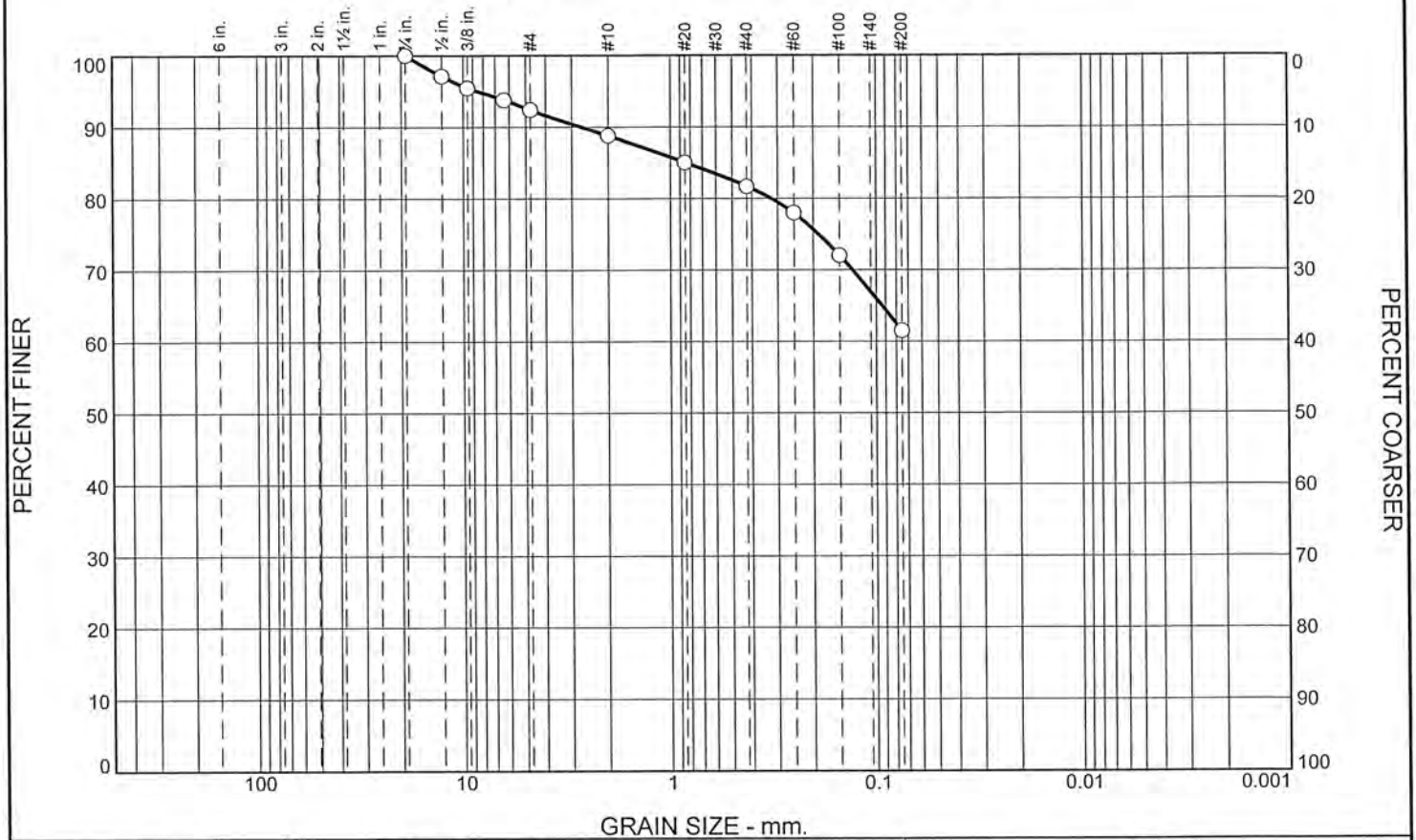
Date: 06.19.19

Foundation Design, P.C.

Client: Delaware River Solar, 33 Irving Place, New York, New York
Project: Yellow Mills Road Solar Farm, 466 Yellow Mills Road, Farmington, New York
Project No: 4618.0 **Figure**

Tested By: TJB **Checked By:** EAA

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	8	3	7	21	61	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
1/2"	97		
3/8"	95		
1/4"	94		
#4	92		
#10	89		
#20	85		
#40	82		
#60	78		
#100	72		
#200	61		

* (no specification provided)

Material Description

Tan SILT/CLAY, some cmf sand, trace fine gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.7053 D_{85}= 0.8446 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 284.48 grams of oven dried split spoon sample

Source of Sample: P-8 **Depth:** 8'-9'4"
Sample Number: S-5

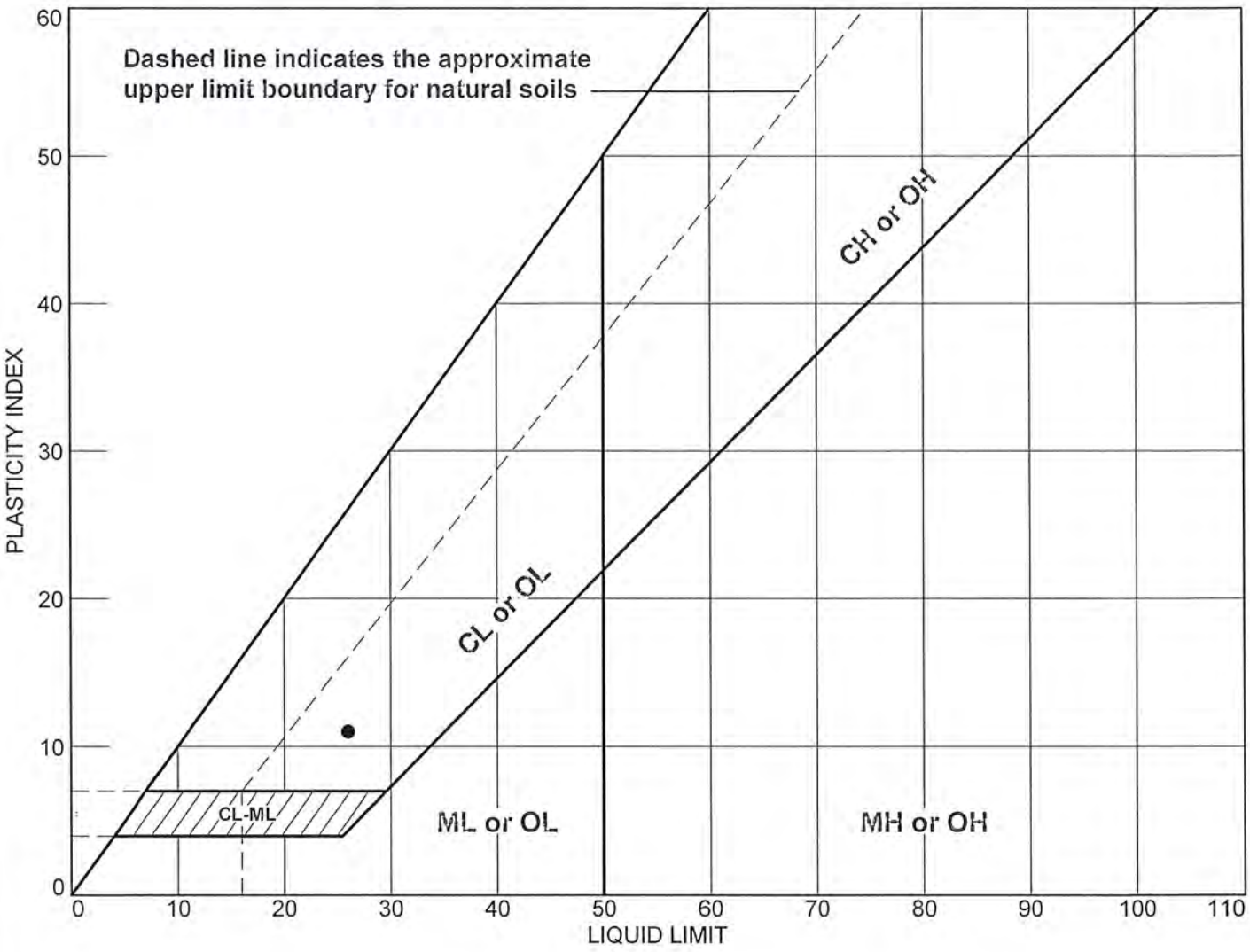
Date: 06.19.19

Foundation Design, P.C.

Client: Delaware River Solar, 33 Irving Place, New York, New York
Project: Yellow Mills Road Solar Farm, 466 Yellow Mills Road, Farmington, New York
Project No: 4618.0 **Figure**

Tested By: TJB **Checked By:** EAA

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	P-10	S-2	2'-4'	24.9	15	26	11	

Foundation Design, P.C.

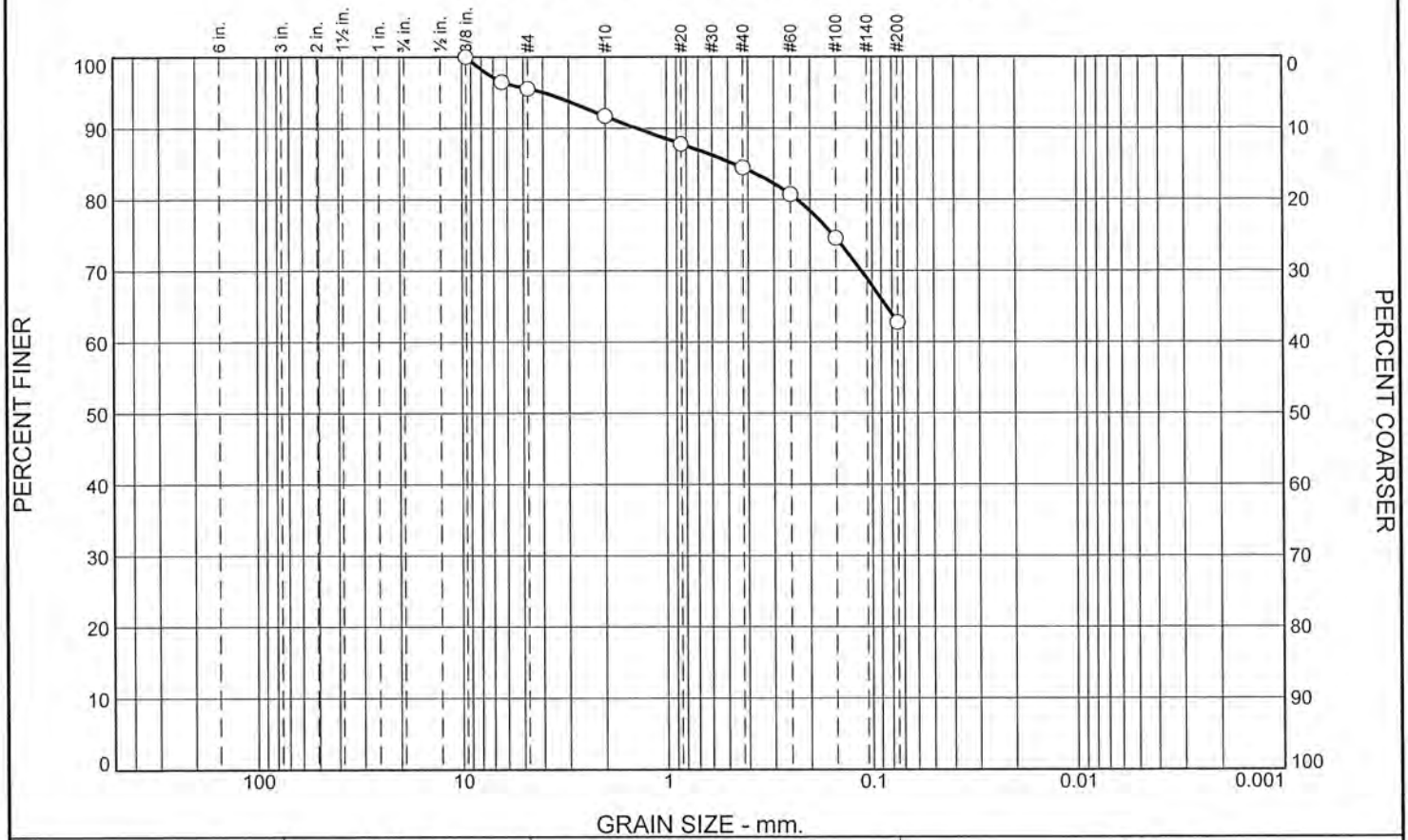
Client: Delaware River Solar, 33 Irving Place, New York, New York

Project: Yellow Mills Road Solar Farm, 466 Yellow Mills Road, Farmington, New York

Project No.: 4618.0 **Figure**

Tested By: EAA **Checked By:** TB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	4	4	8	21	63	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
1/4"	97		
#4	96		
#10	92		
#20	88		
#40	84		
#60	81		
#100	75		
#200	63		

* (no specification provided)

Material Description

Tan SILT/CLAY, some cmf sand, trace fine gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.3978 D_{85}= 0.4694 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 316.35 grams of oven dried split spoon sample

Source of Sample: P-15 **Depth:** 6'-8'
Sample Number: S-4

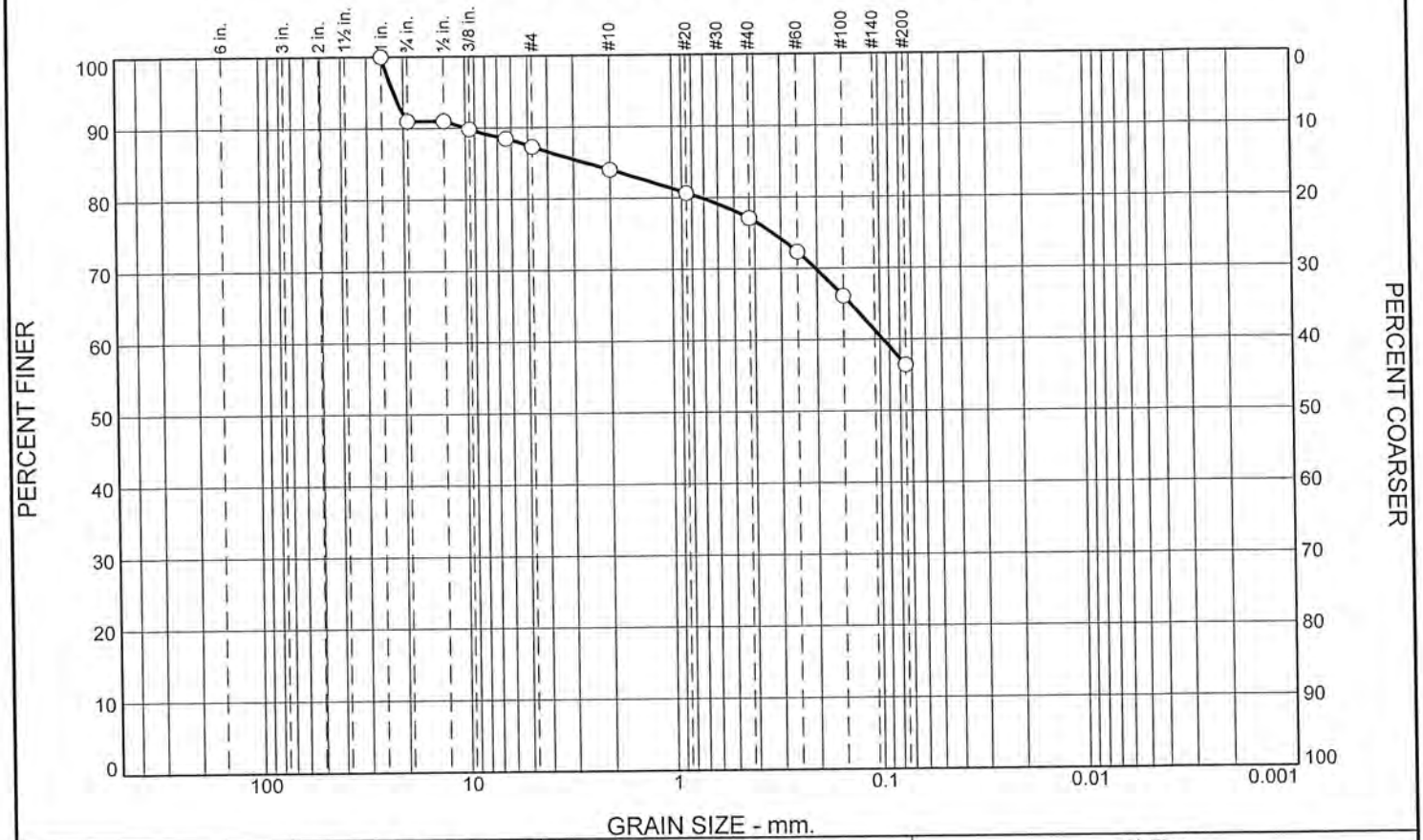
Date: 06.19.19

Foundation Design, P.C.

Client: Delaware River Solar, 33 Irving Place, New York, New York
Project: Yellow Mills Road Solar Farm, 466 Yellow Mills Road, Farmington, New York
Project No: 4618.0 **Figure**

Tested By: TJB **Checked By:** EAA

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	9	4	3	7	21	56	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	91		
1/2"	91		
3/8"	90		
1/4"	88		
#4	87		
#10	84		
#20	81		
#40	77		
#60	72		
#100	66		
#200	56		

* (no specification provided)

Material Description

Tan SILT/CLAY, some cmf sand, little cf gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.8914 D_{85}= 2.6218 D_{60}= 0.0966
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 332.25 grams of oven dried split spoon sample

Source of Sample: P-20 **Depth:** 6'-8'
Sample Number: S-4

Date: 06.19.19

Foundation Design, P.C.

Client: Delaware River Solar, 33 Irving Place, New York, New York
Project: Yellow Mills Road Solar Farm, 466 Yellow Mills Road, Farmington, New York
Project No: 4618.0 **Figure**

Tested By: TJB **Checked By:** EAA

June 26, 2019

Service Request No:R1905667

Mr. Jeff Netzband
Foundation Design
46A Sager Drive
Rochester, NY 14607

Laboratory Results for: Yellow Mills Solar

Dear Mr.Netzband,

Enclosed are the results of the sample(s) submitted to our laboratory June 19, 2019
For your reference, these analyses have been assigned our service request number **R1905667.**

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 7471. You may also contact me via email at Brady.Kalkman@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Brady Kalkman
Project Manager

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

ALS Environmental

Narrative Documents

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

1565 Jefferson Rd, Building 300, Rochester, NY 14623 | 585-288-5380 | www.alsglobal.com

ALS Environmental

Client: Foundation Design
Project: Yellow Mills Solar
Sample Matrix: Soil

Service Request: R1905667
Date Received: 06/19/2019

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Three soil samples were received for analysis at ALS Environmental on 06/19/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

SMO:

No significant anomalies were noted with this analysis.

Approved by _____ Date 06/26/2019

ALS Environmental

SAMPLE DETECTION SUMMARY

CLIENT ID: P-17, S-1/S-2, 0-4			Lab ID: R1905667-001			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Total Solids	92.3				Percent	ALS SOP

CLIENT ID: P-9, S-1/S-2, 0-4			Lab ID: R1905667-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Total Solids	88.4				Percent	ALS SOP

CLIENT ID: P-24, S-1/S-2, 0-4			Lab ID: R1905667-003			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Total Solids	86.1				Percent	ALS SOP

ALS Environmental

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Foundation Design **Service Request:** R1905667

Project: Yellow Mills Solar/4618.0

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1905667-001	P-17, S-1/S-2, 0-4	6/17/2019	
R1905667-002	P-9, S-1/S-2, 0-4	6/14/2019	
R1905667-003	P-24, S-1/S-2, 0-4	6/17/2019	

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

49453

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE 1 OF 1

Project Name	Project Number
Yellow Mills Solar	4618.0
Project Manager	**Report CC**
Jeff Netzband	
Company/Address	
Foundation Design, P.C.	
46A Sager Drive	
Rochester, NY 14607	
Phone #	**Email**
585-458-0824	JNetzband@FoundationDesignPC.com
Sampler's Signature	**Sampler's Printed Name**
Liz Ashley	Liz Ashley

ANALYSIS REQUESTED *(Include Method Number and Container Preservative)*

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	PRESERVATIVE	NUMBER OF CONTAINERS	GC/MS VOAs ○ 8260 ○ 624 ○ CLP	GC/MS SVOAs ○ 8270 ○ 625	GC VOAs ○ 8021 ○ 601/602	PESTICIDES ○ 8081 ○ 608	PCBs ○ 8082 ○ 608	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	Chlorides	Sulfates	REMARKS/ ALTERNATE DESCRIPTION
P-17, S-1/S-2, 0'-4'		6/17		S		2								X	X	combine both samples @
P-9, S-1/S-2, 0'-4		6/14		S		2								x	x	combine both samples
P-24, S-1/S-2, 0'-4'		6/17		S		2								x	x	combine both samples

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

SPECIAL INSTRUCTIONS/COMMENTS
Metals

See QAPP ☐

STATE WHERE SAMPLES WERE COLLECTED

TURNAROUND REQUIREMENTS
____ RUSH (SURCHARGES APPLY)
____ 1 day ____ 2 day ____ 3 day
____ 4 day __X__ 5 day
REQUESTED REPORT DATE _____

REPORT REQUIREMENTS
____ I. Results Only
____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
____ III. Results + QC and Calibration Summaries
____ IV. Data Validation Report with Raw Data
Edata ____ Yes ____ No

INVOICE INFORMATION
PO #
BILL TO:

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name Adam Vest	Printed Name Brady Kalkman	Printed Name	Printed Name	Printed Name	
Firm Foundation Design	Firm ALS	Firm	Firm	Firm	
Date/Time 6/19/19 11:13	Date/Time 6/19/19 11:13	Date/Time	Date/Time	Date/Time	

Distribution: White - Lab Copy; Yellow - Return to Originator

R1905667 5
Foundation Design
Yellow Mills Solar

Cooler Receipt and Preservation Check Form

R1905667 5
Foundation Design
Yellow Mills Solar

Project/Client Foundation Folder Number

Cooler received on 6/19/19 by: [illegible]

COURIER: ALS UPS FEDEX VELOCITY (CLIENT)

1	Were **Custody seals** on outside of cooler?	Y (N)	5a	**Perchlorate** samples have required headspace?	Y N (NA)
2	**Custody papers** properly completed (ink, signed)?	(Y) N	5b	Did VOA vials, Alk,or Sulfide have sig* **bubbles**?	Y N (NA)
3	Did all bottles arrive in good **condition** (unbroken)?	(Y) N	6	Where did the bottles originate? ALS/ROC	(CLIENT)
4	Circle: **Wet Ice Dry Ice Gel packs** present?	Y (N)	7	Soil VOA received as: Bulk Encore 5035set	(NA)

8. Temperature Readings Date: 6/19/19 Time: 1150 ID: IR#7 (IR#10) From: Temp Blank (Sample Bottle)

Observed Temp (°C)	23.8						
Correction Factor (°C)	–						
Corrected Temp (°C)	23.8						
Temp from:Type of bottle	–						
Within 0-6°C?	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N.	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R-002 by e on 6/19/19 at 1200
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown/Preservation Check**: Date: 6/19/19 Time: 1845 by: dlw

9. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
10. Did all bottle labels and tags agree with custody papers? (YES) NO
11. Were correct containers used for the tests indicated? (YES) NO
12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO (N/A)
13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated (N/A)

pH	Lot of test paper	Reagent	Preserved? Yes	Preserved? No	Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
≥12		NaOH								
≤2		HNO_3								
≤2		H_2SO_4								
<4		$NaHSO_4$								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522			If +, contact PM to add $Na_2S_2O_3$ (625, 608, CN), ascorbic (phenol).					
		$Na_2S_2O_3$								
		ZnAcetate	-	-			**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).			
		HCl	**	**						

Bottle lot numbers: client

Explain all Discrepancies/ Other Comments:

CLRES	BULK
DO	FLDT
HPROD	HGFB
HTR	LL3541
PH	SUB
SO3	MARRS
ALS	REV

Labels secondary reviewed by: dlw

PC Secondary Review: _____

*significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

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Miscellaneous Forms

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REPORT QUALIFIERS AND DEFINITIONS

U	Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.
J	Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).
B	Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.
E	Inorganics- Concentration is estimated due to the serial dilution was outside control limits.
E	Organics- Concentration has exceeded the calibration range for that specific analysis.
D	Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.
*	Indicates that a quality control parameter has exceeded laboratory limits. Under the "Notes" column of the Form I, this qualifier denotes analysis was performed out of Holding Time.
H	Analysis was performed out of hold time for tests that have an "immediate" hold time criteria.
#	Spike was diluted out.
+	Correlation coefficient for MSA is <0.995.
N	Inorganics- Matrix spike recovery was outside laboratory limits.
N	Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.
S	Concentration has been determined using Method of Standard Additions (MSA).
W	Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.
P	Concentration >40% difference between the two GC columns.
C	Confirmed by GC/MS
Q	DoD reports: indicates a pesticide/Aroclor is not confirmed (≥100% Difference between two GC columns).
X	See Case Narrative for discussion.
MRL LOQ	Method Reporting Limit. Also known as: Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.
MDL	Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).
LOD	Limit of Detection. A value at or above the MDL which has been verified to be detectable.
ND	Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

ACCREDITED IN ACCORDANCE WITH nelac

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	Pennsylvania ID# 68-786
Delaware Approved	New Hampshire ID # 2941	Rhode Island ID # 158
DoD ELAP #65817	New York ID # 10145	Virginia #460167
Florida ID # E87674	North Carolina #676	

[1] Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to https://www.alsglobal.com/locations/americas/north-america/usa/new-york/rochester-environmental

ALS Laboratory Group

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client: Foundation Design **Service Request:** R1905667
Project: Yellow Mills Solar/4618.0

Non-Certified Analytes

Certifying Agency: New York Department of Health

Method	Matrix	Analyte
ALS SOP	Soil	Total Solids

Client: Foundation Design
Project: Yellow Mills Solar/4618.0
Service Request: R1905667

Sample Name: P-17, S-1/S-2, 0-4
Lab Code: R1905667-001
Sample Matrix: Soil
Date Collected: 06/17/19
Date Received: 06/19/19

Analysis Method	Extracted/Digested By	Analyzed By
9056A	CWOODS	CWOODS
ALS SOP		KAWONG

Sample Name: P-9, S-1/S-2, 0-4
Lab Code: R1905667-002
Sample Matrix: Soil
Date Collected: 06/14/19
Date Received: 06/19/19

Analysis Method	Extracted/Digested By	Analyzed By
9056A	CWOODS	CWOODS
ALS SOP		KAWONG

Sample Name: P-24, S-1/S-2, 0-4
Lab Code: R1905667-003
Sample Matrix: Soil
Date Collected: 06/17/19
Date Received: 06/19/19

Analysis Method	Extracted/Digested By	Analyzed By
9056A	CWOODS	CWOODS
ALS SOP		KAWONG

INORGANIC PREPARATION METHODS

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9014 Cyanide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Acid Soluble	9030B
9056A Bomb (Halogens)	5050A
9066 Manual Distillation	9065
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7196A	3060A
7199	3060A
9056A Halogens/Halides	5050
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction

For analytical methods not listed, the preparation method is the same as the analytical method reference.

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Sample Results

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Analytical Report

Client:	Foundation Design	**Service Request:**	R1905667
Project:	Yellow Mills Solar/4618.0	**Date Collected:**	06/17/19
Sample Matrix:	Soil	**Date Received:**	06/19/19 11:13
Sample Name:	P-17, S-1/S-2, 0-4	**Basis:**	Dry
Lab Code:	R1905667-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Chloride	9056A	33 U	mg/Kg	33	1	06/25/19 18:10	06/25/19	
Sulfate	9056A	33 U	mg/Kg	33	1	06/25/19 18:10	06/25/19	

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Analytical Report

Client:	Foundation Design	**Service Request:**	R1905667
Project:	Yellow Mills Solar/4618.0	**Date Collected:**	06/17/19
Sample Matrix:	Soil	**Date Received:**	06/19/19 11:13
Sample Name:	P-17, S-1/S-2, 0-4	**Basis:**	As Received
Lab Code:	R1905667-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Total Solids	ALS SOP	**92.3**	Percent	-	1	06/26/19 08:50	NA	

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Analytical Report

Client:	Foundation Design	**Service Request:**	R1905667
Project:	Yellow Mills Solar/4618.0	**Date Collected:**	06/14/19
Sample Matrix:	Soil	**Date Received:**	06/19/19 11:13
Sample Name:	P-9, S-1/S-2, 0-4	**Basis:**	Dry
Lab Code:	R1905667-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Chloride	9056A	34 U	mg/Kg	34	1	06/25/19 18:17	06/25/19	
Sulfate	9056A	34 U	mg/Kg	34	1	06/25/19 18:17	06/25/19	

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Analytical Report

Client:	Foundation Design	**Service Request:**	R1905667
Project:	Yellow Mills Solar/4618.0	**Date Collected:**	06/14/19
Sample Matrix:	Soil	**Date Received:**	06/19/19 11:13
Sample Name:	P-9, S-1/S-2, 0-4	**Basis:**	As Received
Lab Code:	R1905667-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Total Solids	ALS SOP	**88.4**	Percent	-	1	06/26/19 08:50	NA	

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Analytical Report

Client:	Foundation Design	**Service Request:**	R1905667
Project:	Yellow Mills Solar/4618.0	**Date Collected:**	06/17/19
Sample Matrix:	Soil	**Date Received:**	06/19/19 11:13
Sample Name:	P-24, S-1/S-2, 0-4	**Basis:**	Dry
Lab Code:	R1905667-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Chloride	9056A	35 U	mg/Kg	35	1	06/25/19 18:23	06/25/19	
Sulfate	9056A	35 U	mg/Kg	35	1	06/25/19 18:23	06/25/19	

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Analytical Report

Client:	Foundation Design	**Service Request:**	R1905667
Project:	Yellow Mills Solar/4618.0	**Date Collected:**	06/17/19
Sample Matrix:	Soil	**Date Received:**	06/19/19 11:13
Sample Name:	P-24, S-1/S-2, 0-4	**Basis:**	As Received
Lab Code:	R1905667-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Total Solids	ALS SOP	**86.1**	Percent	-	1	06/26/19 08:50	NA	

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QC Summary Forms

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Analytical Report

Client:	Foundation Design	**Service Request:**	R1905667
Project:	Yellow Mills Solar/4618.0	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	Dry
Lab Code:	R1905667-MB		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Chloride	9056A	30 U	mg/Kg	30	1	06/25/19 17:56	06/25/19	
Sulfate	9056A	30 U	mg/Kg	30	1	06/25/19 17:56	06/25/19	

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QA/QC Report

Client:	Foundation Design	**Service Request:**	R1905667
Project	Yellow Mills Solar/4618.0	**Date Collected:**	06/17/19
Sample Matrix:	Soil	**Date Received:**	06/19/19
		Date Analyzed:	06/26/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	P-17, S-1/S-2, 0-4	**Units:**	Percent
Lab Code:	R1905667-001	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample R1905667-001DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	92.3	91.4	91.9	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client: Foundation Design
Project: Yellow Mills Solar/4618.0
Sample Matrix: Soil

Service Request: R1905667
Date Analyzed: 06/25/19

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/Kg
Basis: Dry

Lab Control Sample
R1905667-LCS

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Chloride	9056A	200	200	100	80-120
Sulfate	9056A	207	200	104	80-120