REMOTE FIELD REVIEW

ALL-POINTS TECHNOLOGY CORPORATION

CONNECTICUT SITING COUNCIL PETITION NO. 1431

PROPOSED SOLAR FACILITY
78 THOMSON ROAD
BETHLEHEM, CONNECTICUT

PREPARED FOR:

SUNJET
OUR ENERGY FUTURE

PREPARED BY:
ALL-POINTS TECHNOLOGY CORPORATION, P.C.
567 Vauxhall Street Extension – Suite 311
Waterford, CT 06385

Photographed September 23, 2020

PHOTO LOG

Photo Locations
Photo Markers
Site
Limit of Disturbance
Solar Modules (System 1)
Solar Modules (System 2)
Gravel Access Road
Conc. Equipment Pad
Perimeter Fence
Interconnection Path (OVH)
Interconnection Path (Underground)
Interconnection Pole
Stormwater Swale
Stormwater Basin
Stormwater Overflow Gravel
Field Identified Wetland Boundary
Approx. Wetland Area

N

400 200 0 400 Feet

1 inch = 400 feet

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78 Thomson Road
Bethlehem, CT

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PHOTO	DESCRIPTION
1	**THOMPSON ROAD LOOKING WEST**

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PHOTO	DESCRIPTION
2	**THOMPSON ROAD LOOKING NORTH**

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PHOTO	DESCRIPTION
3	**EXISTING GRAVEL DRIVEWAY LOOKING EAST**

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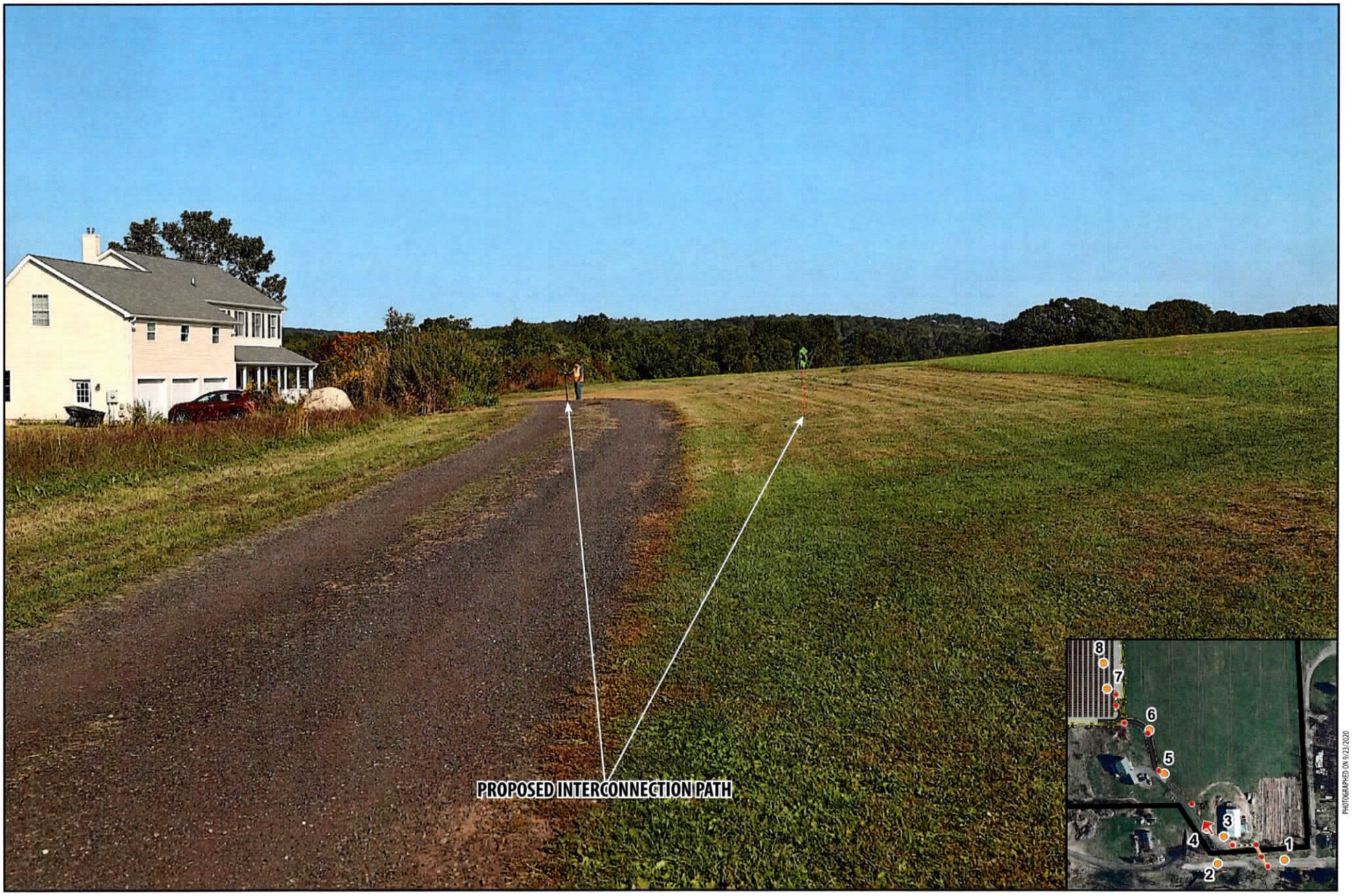

PHOTO	DESCRIPTION
4	**EXISTING GRAVEL DRIVEWAY LOOKING NORTHWEST**

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PHOTO	DESCRIPTION
5	**EXISTING GRAVEL DRIVEWAY LOOKING NORTH**

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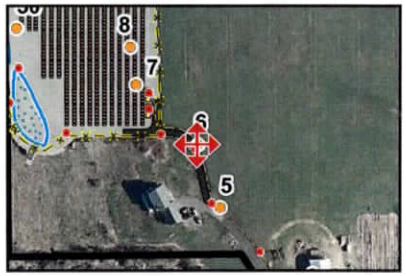

PHOTO	DESCRIPTION
6	**PROPOSED GRAVEL ACCESS ROAD - FOUR CARDINAL POINTS**

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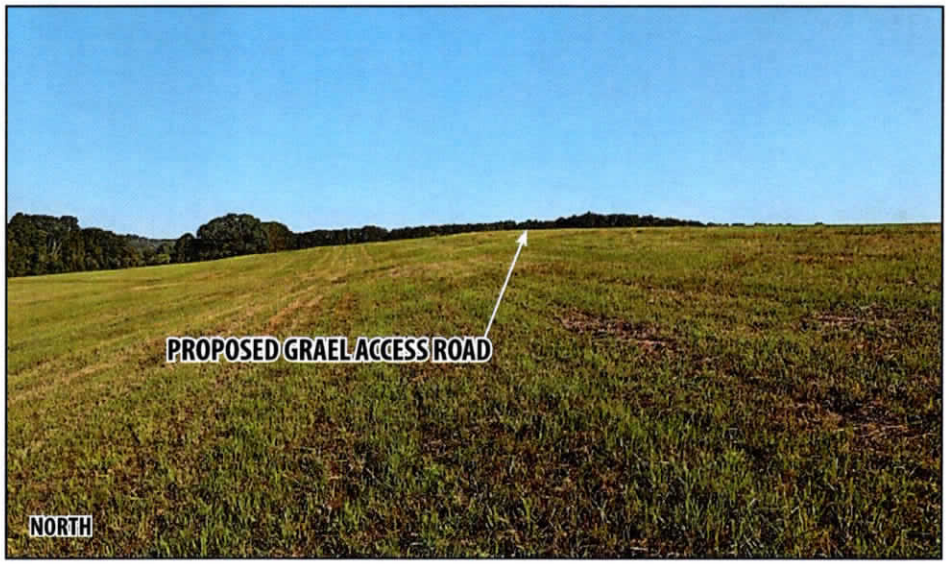

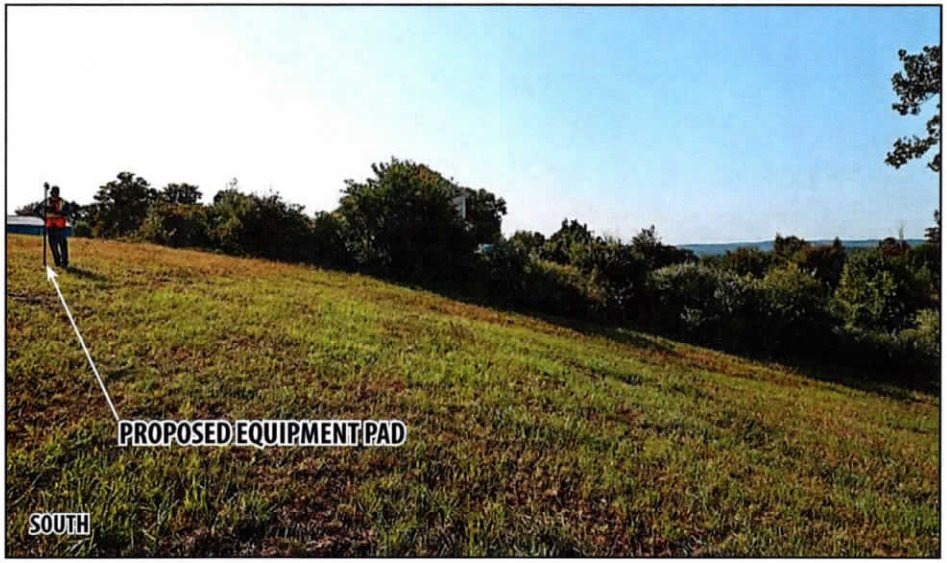

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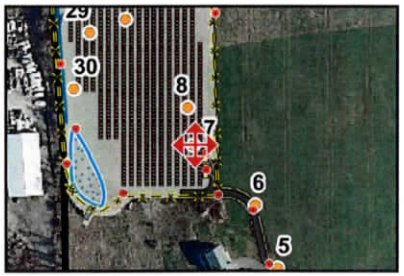

PHOTO	DESCRIPTION
7	**FOUR CARDINAL POINTS**

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PHOTO	DESCRIPTION
8	**LOOKING NORTH**

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PHOTO	DESCRIPTION
9	**LOOKING EAST**

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PHOTO	DESCRIPTION
10	**LOOKING NORTHEAST**

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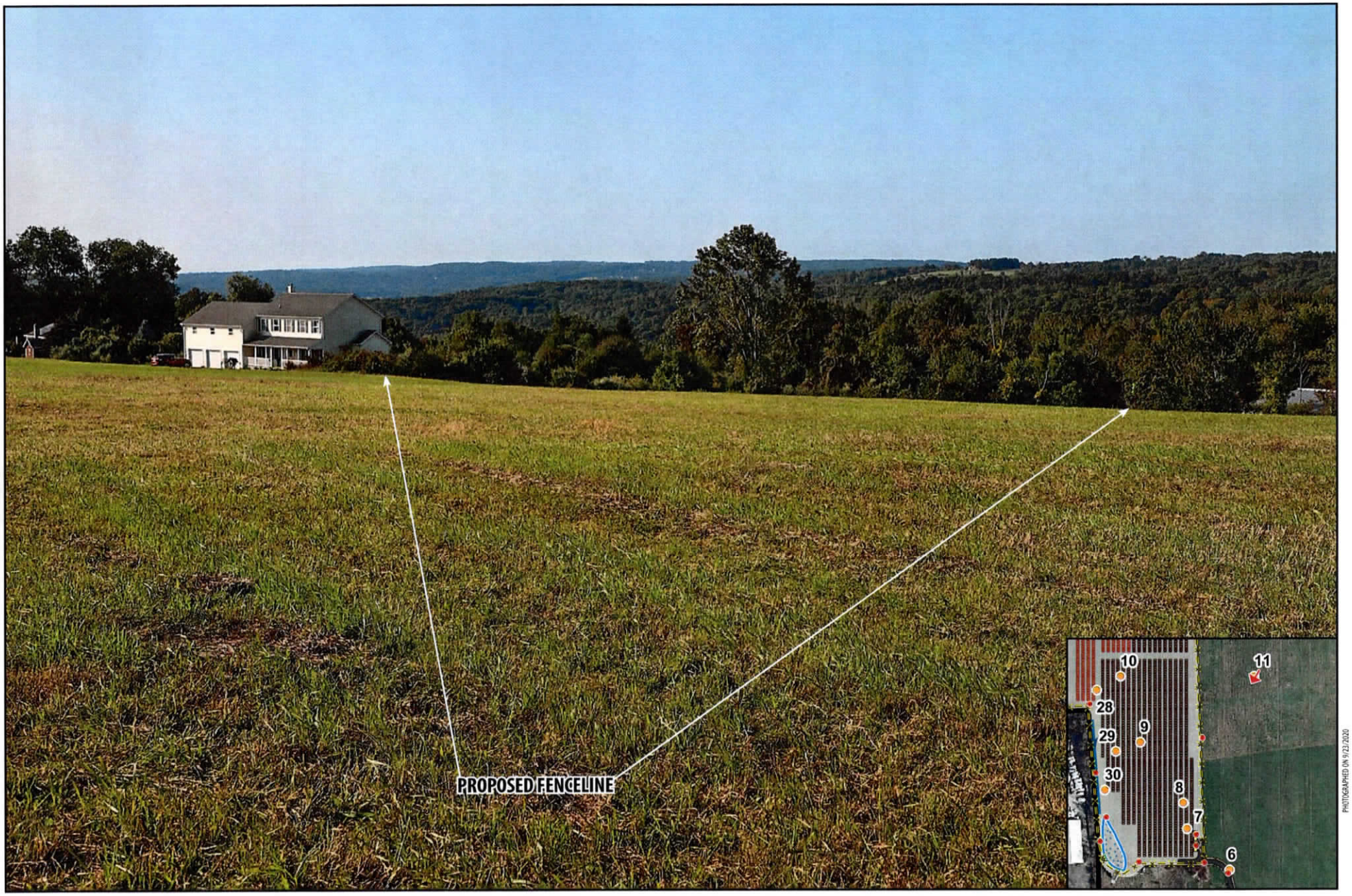

PHOTO	DESCRIPTION
11	**LOOKING SOUTHWEST**

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PHOTO	DESCRIPTION
12	**LOOKING EAST**

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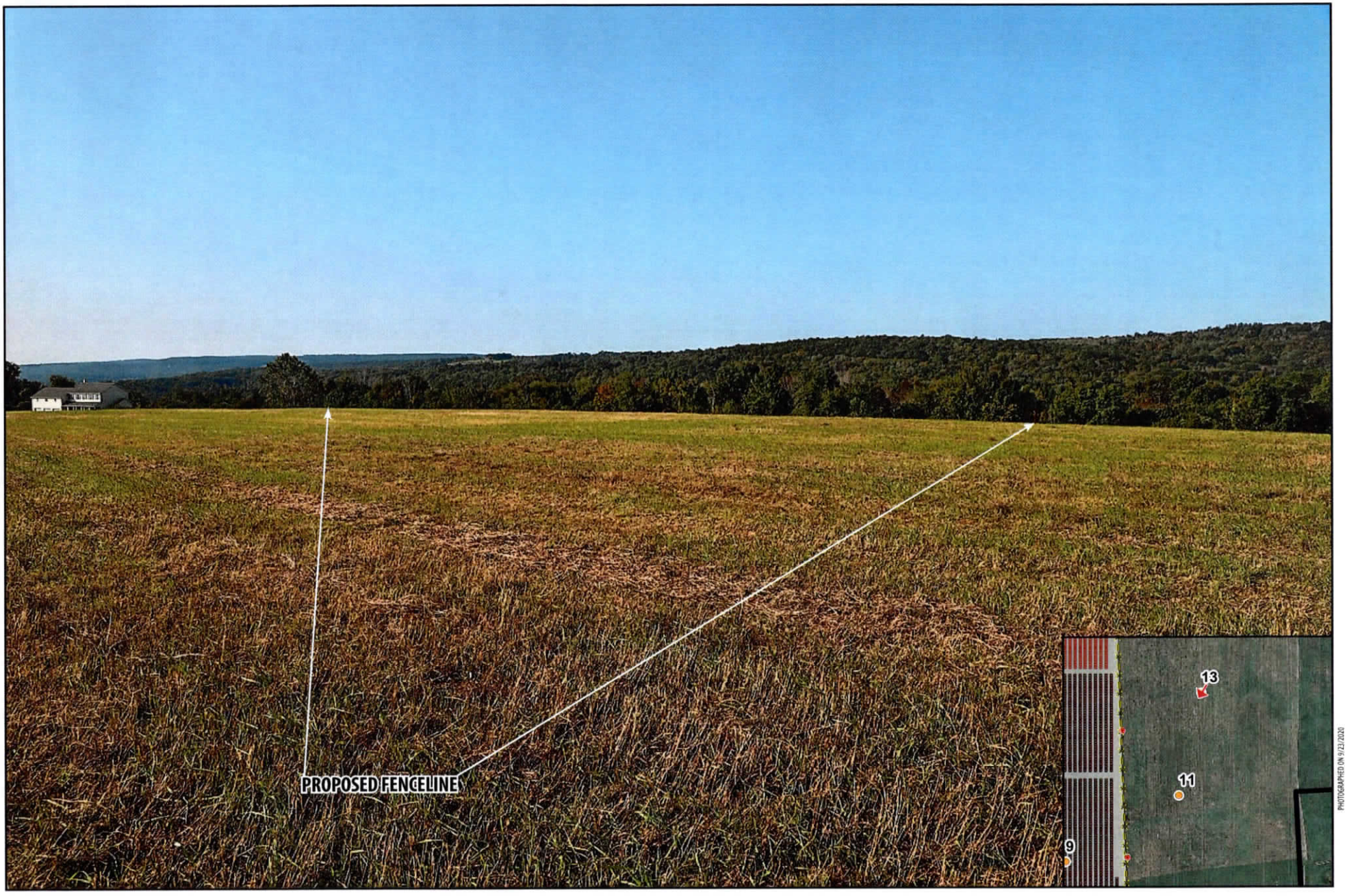

PHOTO	DESCRIPTION
13	**LOOKING SOUTHWEST**

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PHOTO	DESCRIPTION
14	**LOOKING WEST**

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PHOTO	DESCRIPTION
14A	**LOOKING WEST**

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PHOTO	DESCRIPTION
14B	**LOOKING NORTHWEST**

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PHOTO	DESCRIPTION
15	**LOOKING SOUTHWEST**

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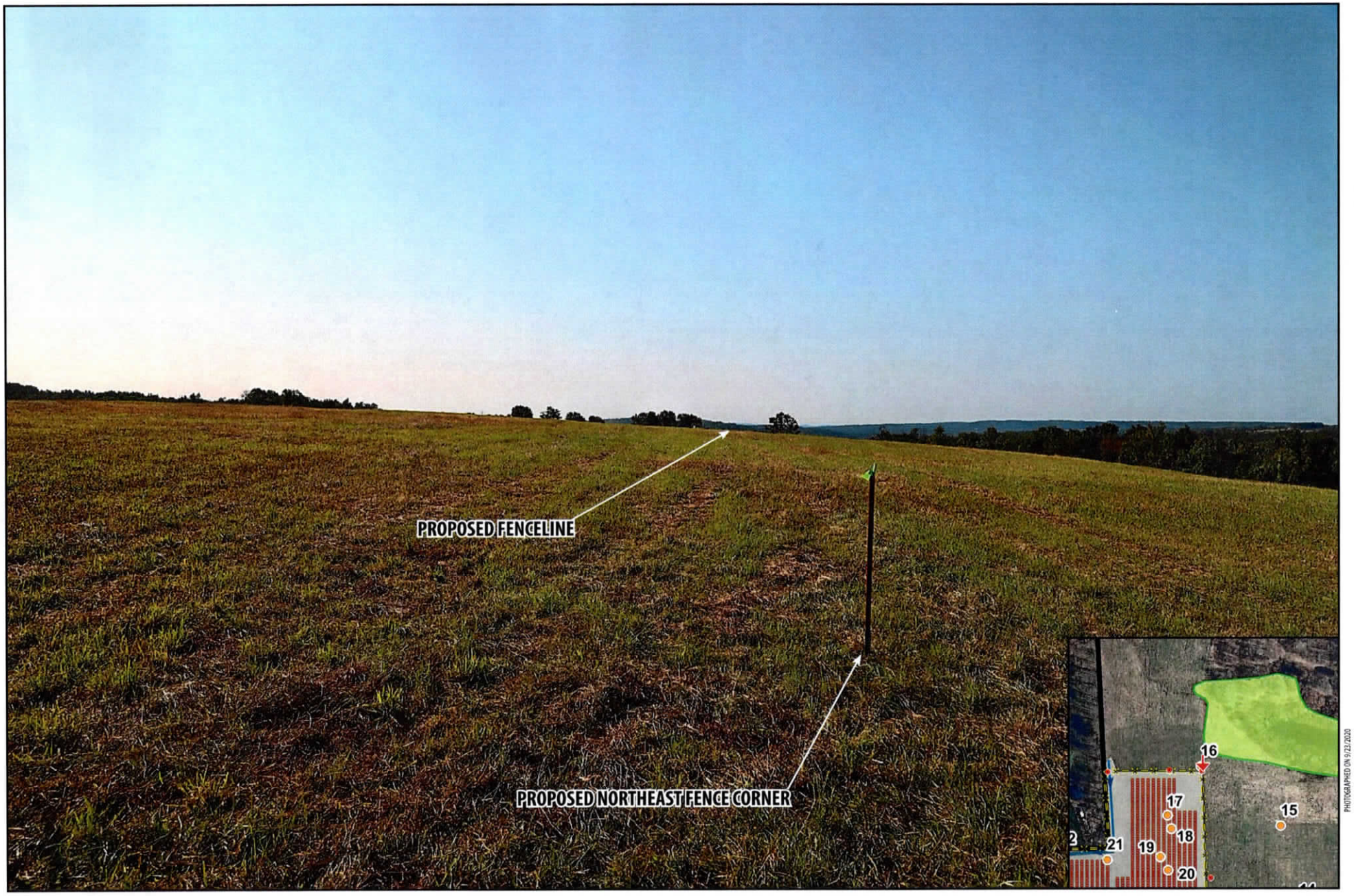

PHOTO	DESCRIPTION
16	LOOKING SOUTH

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PHOTO	DESCRIPTION
17	**LOOKING NORTH**

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PHOTO	DESCRIPTION
18	**LOOKING NORTHWEST**

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PHOTO	DESCRIPTION
19	**FOUR CARDINAL POINTS**

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PHOTO	DESCRIPTION
20	**LOOKING NORTHWEST**

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PHOTO	DESCRIPTION
21	**LOOKING WEST**

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PHOTO	DESCRIPTION
21A	**LOOKING SOUTHWEST**

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PHOTO	DESCRIPTION
22	**LOOKING NORTH TOWARDS ADJACENT PROPERTY**

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PHOTO	DESCRIPTION
23	**LOOKING WEST TOWARDS ADJACENT PROPERTY**

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PHOTO	DESCRIPTION
24	**LOOKING WEST TOWARDS ADJACENT PROPERTY**

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PHOTO	DESCRIPTION
25	**LOOKING WEST TOWARDS ADJACENT PROPERTY**

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PHOTO	DESCRIPTION
26	FOUR CARDINAL POINTS

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PHOTO	DESCRIPTION
27	**LOOKING SOUTH TOWARDS ADJACENT PROPERTY**

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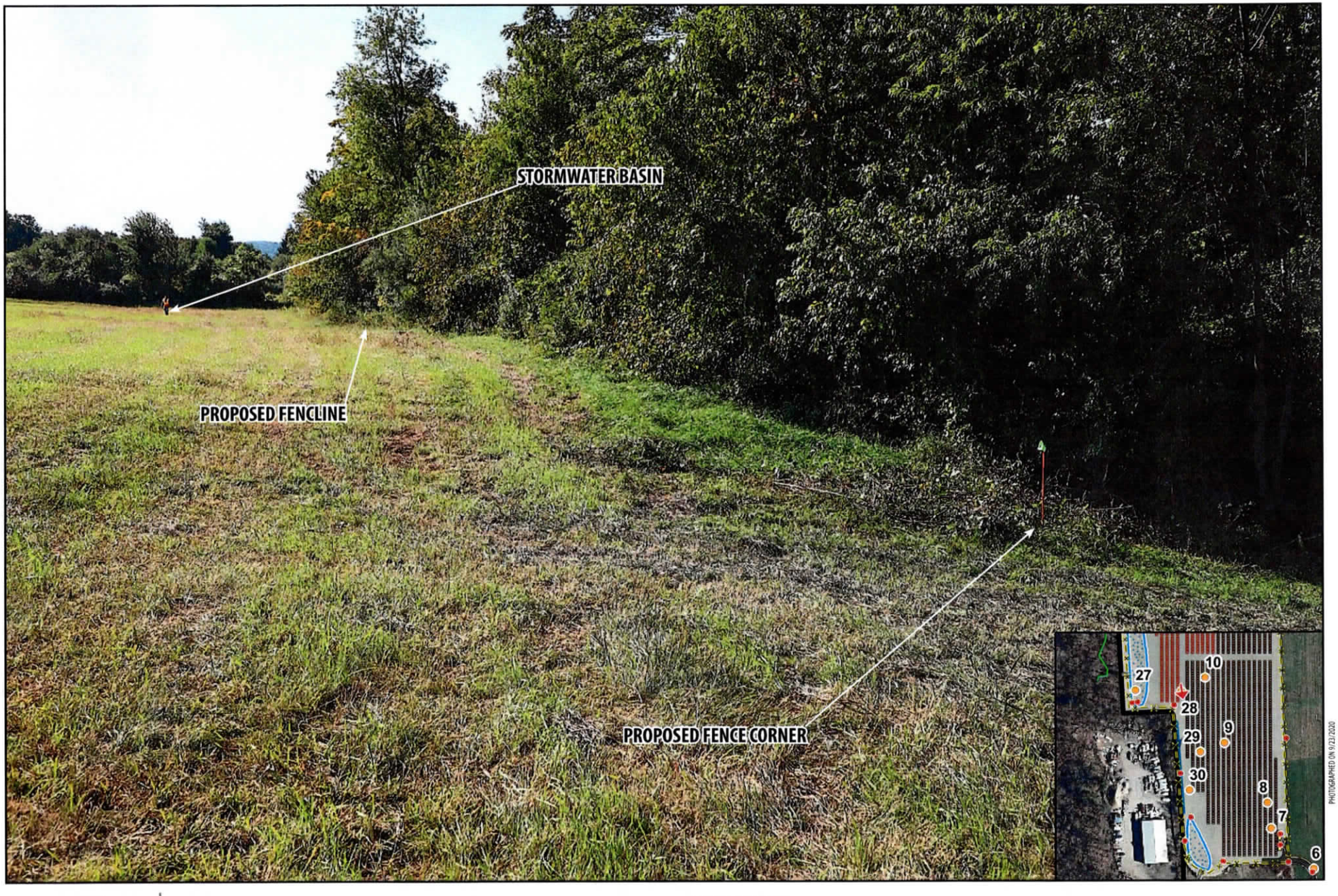

PHOTO	DESCRIPTION
28	LOOKING SOUTH

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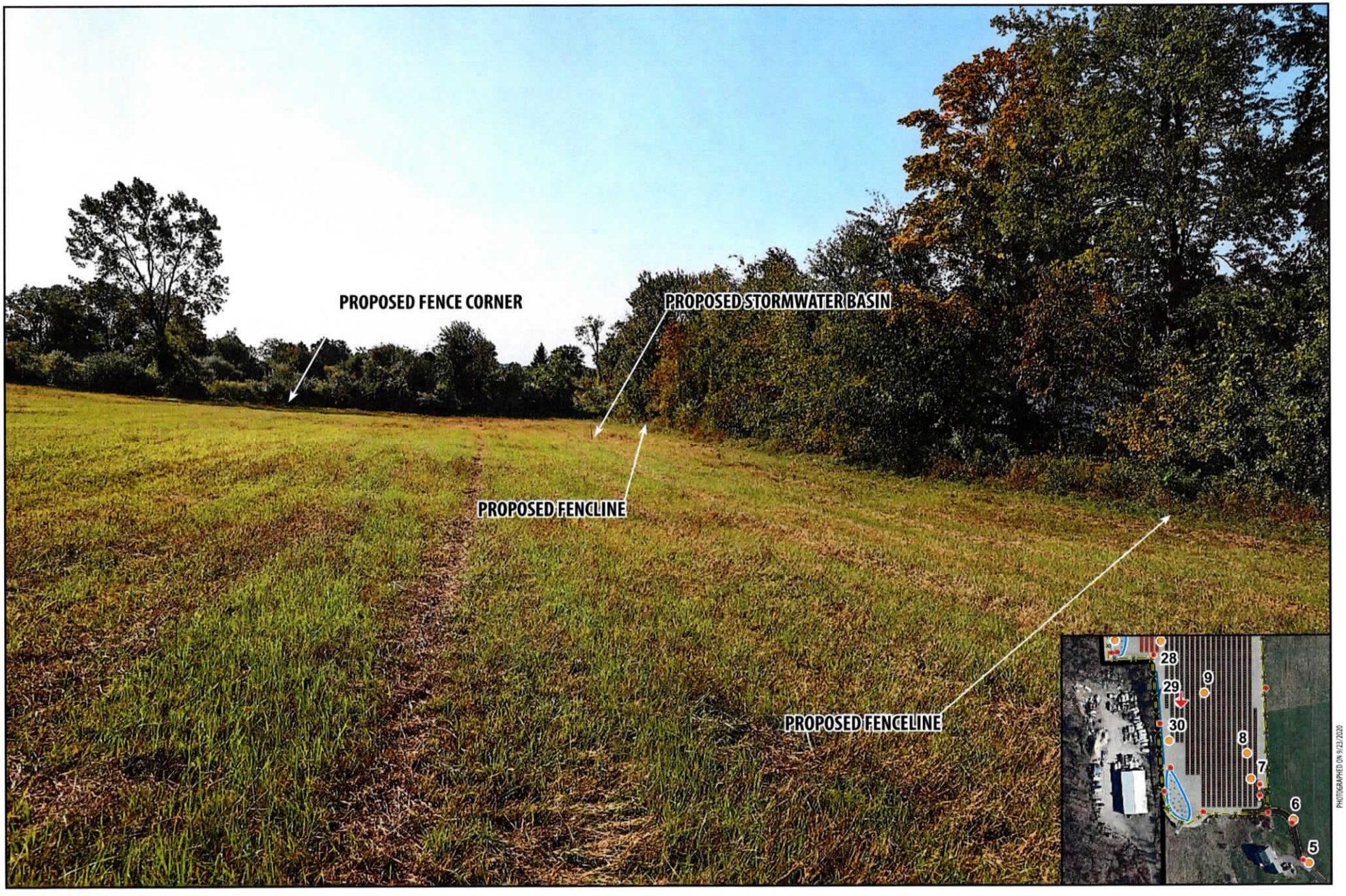

PHOTO	DESCRIPTION
29	LOOKING SOUTH

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PHOTO	DESCRIPTION
30	LOOKING SOUTH

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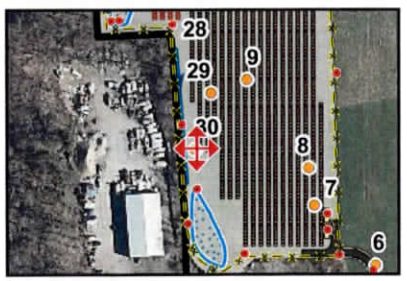

PHOTO	DESCRIPTION
30A	**FOUR CARDINAL POINTS**

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DOWN TO EARTH
CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

GEOTECHNICAL ENGINEERING REPORT
PROPOSED SOLAR ARRAY
SUNJET BETHLEHEM
THOMSON ROAD
BETHLEHEM, CONNECTICUT

Prepared for:

All-Points Technology Corporation, P.C.
567 Vauxhaul Street Extension – Suite 311
Waterford, Connecticut 06385

Prepared by:

Down To Earth Consulting, LLC
122 Church Street
Naugatuck, Connecticut 06770

File No. 0032-037.00
June 2020

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

June 19, 2020
File No. 0032-037.00

Mr. Bradley J. Parsons, PE
All-Points Technology Corporation
567 Vauxhaul Street Extension – Suite 311
Waterford, Connecticut 06385

Via email: bparsons@allpointstech.com

Re: Geotechnical Engineering Report
Sunjet Bethlehem
Thomson Road, Bethlehem, Connecticut

Down To Earth Consulting, LLC (DTE) is pleased to submit this geotechnical engineering report for the Sunjet Bethlehem Project that will be located at Thomson Road in Bethlehem, Connecticut (Site) for All-Points Technology Corporation (Client). Our services were completed in general accordance with our current Master Services Agreement. We appreciate this opportunity to work with you and look forward to our continued involvement. Please call if you have any questions.

Sincerely,

Down To Earth Consulting, LLC

Raymond P. Janeiro, P.E.
Principal

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APPENDICES

1.0 INTRODUCTION

Down To Earth Consulting, LLC, completed a subsurface exploration program and geotechnical engineering evaluation for the proposed Sunjet Bethlehem solar array foundations. Our geotechnical engineering services included: reviewing provided project plans, completing borings and soils testing, characterizing subsurface conditions within the proposed solar array limits, performing geotechnical engineering analyses, and providing geotechnical design and construction recommendations for the project. Refer to Figures 1 and 2 (in Appendix 1) for an area plan and site plan, respectively. Our services were based, in part, on a provided *Concept Plan No. 4*, prepared by the Client, revision dated May 26, 2020.

2.0 BACKGROUND

The Sunjet Bethlehem Site is generally bordered by Thomson Road to the south, Thomson Airfield to the east, residential properties to the north, and undeveloped land to the west. A proposed ground-mount solar array will be constructed that will consist of about 6,800 modules. Nominal cuts on the order of 2-feet or less are anticipated to achieve design grades, as the solar array structures will generally conform to existing Site topography. We understand that deeper cuts will be required to accommodate proposed detention basins. Refer to Figure 2 (Appendix 1) for existing site features and the proposed solar array location.

3.0 SUBSURFACE DATA

3.1 GENERAL SITE GEOLOGY

Published surficial and bedrock geological map data (*1:125,000 scale, Surficial Materials Map of Connecticut, Janet Radway Stone, 1992 and 1:125,000 scale, Bedrock Geological Map of Connecticut, John Rodgers, 1985*) was reviewed. The Site surficial material is mapped as a variable mixture of gravel, sand, silt, and clay that is intermixed with cobbles and boulders (Glacial Till). The underlying bedrock is classified as schist of the Hartland Formation.

3.2 TEST BORINGS

We observed and logged seven test borings (B-1 through B-7) drilled by our subcontractor General Borings, Inc. on May 15, 2020. Boring locations are depicted on Figure 2 (Appendix 1) and the logs are included in Appendix 2. Borings were located in the field by taping/pacing from existing site features, thus their locations should be considered approximate.

The borings were drilled to explore the soil, bedrock, and groundwater conditions in the proposed solar array areas. Hollow-stem auger drilling methods were used to advance borings to depths ranging from approximately 5.5 to 17.5 feet below existing grades.

Representative soil samples were obtained in the borings for soil classification and laboratory testing by split barrel sampling procedures in general accordance with ASTM D-1586. The split-spoon sampling procedure utilizes a standard 2-inch O.D. split-barrel sampler that is driven into the bottom of the boring with a 140-pound hammer falling a distance of 30 inches. The number of blows required to advance the sampler the middle 12-inches of a normal 24-inch penetration is

recorded as the Standard Penetration Resistance Value (N). The blows (i.e., "N-Value") are indicated on the boring logs at their depth of occurrence and provide an indication of the relative consistency of the material.

Groundwater levels were measured using a weighted tape in open drill holes and/or inferred from wet soil samples during drilling.

4.0 SUBSURFACE CONDITIONS

4.1 SUBSURFACE PROFILE

The generalized subsurface profile, as inferred from the subsurface data, consists of Fill overlying Glacial Till, and Bedrock. An approximate 9- to 12-inch layer of Topsoil was encountered at the surface of the explorations. The following is a more detailed description of the subsurface materials encountered:

4.1.1 Fill

Fill was encountered directly below the Topsoil at each of the boring locations. This stratum was about 2 to 3 feet thick and typically consisted of loose, dark brown, silt with varying amounts of fine to coarse sand and gravel. Trace (0 to 5%) amounts of roots were also observed in the Fill. The existing Fill appeared to generally consist of native soils mixed with topsoil associated with former site activities. The thickness, character, and consistency of the Fill will vary between exploration locations.

4.1.2 Glacial Till

Glacial Till was observed below the Fill in each of the explorations. This material generally consisted of medium dense to very dense, gray/brown, fine to coarse sand with varying amounts of fine gravel (5 to 50%) and silt (10 to 60%). In some instances, the presence of cobbles and possibly boulders were inferred by "rig chatter" and refusal during drilling and sampling. Decomposed rock fragments were encountered in some samples of Glacial Till at depth (i.e., at Borings B-2, B-4, and B-6).

4.1.3 Weathered Rock

Weathered Rock was observed in split spoon samples at Boring B-3 at about 5 feet below existing grades. Bedrock was inferred from split spoon and/or auger refusal at Borings B-3, B-5, and B-6 at depths ranging from about 5.5 to 12 feet below existing grades (bgs).

4.2 GROUNDWATER

Groundwater was measured in the boreholes during drilling or inferred from wet soil samples and ranged from about 5 to 10 feet below existing grades (where encountered in Boring B-1, B-4, and B-6). Groundwater levels measured in the boreholes may not have had sufficient time to stabilize and should be considered approximate. Groundwater levels will vary depending on factors such as temperature, season, precipitation, construction activity, and other conditions, which may be different from those at the time of these measurements.

5.0 SOILS TESTING

5.1 LABORATORY TESTING

Soils laboratory testing was completed on samples obtained from the borings. Three soil samples were collected in the area of the proposed detention basins (at proposed cut depths indicated by the Client) for grain size distribution testing. This data was used to estimate hydraulic conductivity values for the sampled materials (see Section 5.2).

Soil samples were also collected from 0 to 4 feet below grade at Borings B-5 and B-6 to evaluate the corrosivity potential of sampled soils. Samples were analyzed for pH, Sulfates, Chlorides, and Electrical Resistivity. Based on the laboratory test results, the soil samples are not considered to be corrosive. The results of the laboratory testing are included in Appendix 3.

5.2 ESTIMATED HYDRAULIC CONDUCTIVITY

Kozeny-Carman methodology was used to estimate the hydraulic conductivity (permeability) of the three soil samples submitted for gradation testing. The estimated hydraulic conductivity of the sampled soils ranged from about 2x10-2 to 8x10-2 feet per day. Details of the analyses are provided in Appendix 4. Note that the Kozeny-Carman methodology provides estimated hydraulic conductivity values; field infiltration tests may be required to obtain a more accurate permeability estimate of subsurface soils.

5.3 SOIL RESISTIVITY TESTING

On May 15, 2020, DTE field personnel conducted in-situ soil resistivity testing in accordance with accepted engineering practices using the Wenner electrode configuration. Electrodes were spaced at 5, 10, 20, 30, and 40 feet. One set of two approximately perpendicular resistivity lines were completed in the general vicinity of the proposed solar array area. The approximate locations and orientations of the resistivity lines are shown on the attached Figure 2. The results of the resistivity tests are as follows:

	Resistivity (ohm-cm)	
Electrode Spacing (ft)	Line 1	Line 2
5	112,602	115,378
10	145,923	154,732
20	150,136	155,115
30	108,982	116,910
40	90,541	88,856

Field resistivity results may be influenced by boulders, shallow groundwater, and bedrock. Resistivity results will fluctuate depending on the degree of compaction, moisture content, constituent solubility, and temperature. Field resistivity values may also vary depending upon season, precipitation, and other conditions that may differ from those at the time of testing.

6.0 ENGINEERING IMPLICATIONS OF SUBSURFACE CONDITIONS

Subsurface conditions generally consist of dense to very dense glacial till soils, containing cobbles and boulders, over relatively shallow bedrock in some areas. Due to the presence of obstructions (e.g., cobbles, boulders, and shallow bedrock), pile driving refusal should be expected throughout the limits of the proposed solar array. The presence of obstructions may also cause the piles to be driven out of tolerance as piles deflect off obstructions during driving.

In areas of pile driving difficulties, predrilling of pilot holes (up to 2/3 of the pile diameter) may be required to accommodate pile installation. The pilot holes would then be backfilled with drill cuttings (absent any cobble-sized material) prior to driving piles. If piles still cannot penetrate soils sufficiently, drilling of oversized holes backfilled with grout may be required. Ground screws (e.g., Krinner) may also be used to support the racking systems, but similarly we recommend predrilling a pilot hole to accommodate ground screw installation.

Piles will need to be designed to resist compression, tension, and lateral loads. Preliminary geotechnical design parameters are provided below. The pile design capacities will need to be verified in the field based on the results of pile load testing completed at the Site.

7.0 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

We offer the following geotechnical design recommendations based on the subsurface conditions encountered at the Site, available project information, and the proposed construction.

7.1 SEISMIC DESIGN

The site class is "C" per the Building Code. Based on the standard penetration test results, visual soil classification, and design peak ground acceleration at this locale, the site soils are not susceptible to liquefaction.

7.2 DRIVEN PILE FOUNDATIONS

The proposed racking systems may be supported on driven steel piles end bearing in natural Glacial Till Deposits. The steel piles should conform to ASTM A 572, Grade 50 and have hardened pile tips (e.g., pile driving shoes) to minimize pile damage on potential obstructions (e.g., boulders and bedrock). A minimum steel section corrosion loss of 1/16-inch all around the piles should be used. DTE recommends the following preliminary static design parameters for a driven pile foundation alternative:

DESCRIPTION	VALUE
Maximum Net Allowable Bearing Capacity[1] Glacial Till/Weathered Rock Bedrock	 6 kips per square foot (ksf) 10 ksf
Ultimate Skin Friction Value[2] Glacial Till (>3.5 fbg)	 750 pounds per square foot (psf)

Modulus of Lateral Subgrade Reaction[3]	
Glacial Till (>3.5 fbg) – dry	150 pounds per cubic inch (pci)
Glacial Till (>3.5 fbg) – wet	90 pci
Weathered Rock	150 pci
Angle of Internal Friction	
Glacial Till	35
Weathered Rock	38
Total Soil Unit Weight	
Glacial Till	135 pounds per cubic foot (pcf)
Weathered Rock	140 pcf

1. End-bearing should be neglected for uplift calculations. Provided value assumes a factor of safety of 3.
2. Contribution to pile capacity within the frost depth (i.e., above depths of 3.5 feet) should be ignored. The uplift capacity should be based on the dead weight of the pile and side resistance provided by the subsurface soils (i.e., end bearing should be neglected).
3. To analyze foundation under lateral loading (e.g., Ensoft LPILE).
4. All values provided in this table are preliminary and must be verified in the field by load testing.

Center-to-center pile spacing should not be less than 30 inches or 3 pile diameters. Final pile order lengths should be established based on the results of pile testing and the contractor should be prepared to increase anticipated pile lengths as conditions are exposed in the field.

Piles should be installed to a minimum ultimate geotechnical axial capacity of the structural load multiplied by 2 (assuming load testing is performed). Based on the recommended pile type, bearing material, and anticipated loads, we estimate negligible pile settlements. We recommend an adfreeze stress of 500 psf be considered when determining frost heave load on the piles. The box perimeter of the pile acting over the recommended frost depth of 3.5 feet should be considered when determining the frost heave load on a pile.

The lateral capacity of the upper 30 inches of soil should be neglected due to loss of strength from frost action and the presence of loose surficial soils. Appropriate lateral capacity reductions associated with group effects should be used for piles having a center-to-center spacing of less than 5 times their largest cross-sectional dimension.

7.2.1 Load Testing and Drivability

Tension and lateral load tests should be performed on test piles to finalize foundation design for uplift and lateral load capacity. Compression load tests should also be completed if end bearing capacity of piles is used. Load tests should be completed near the boring explorations in order to corroborate the load test and subsurface exploration data and develop final design recommendations. The testing results should be provided to DTE to reevaluate the above design parameters.

We recommend that a drivability analysis (i.e., Wave Equation Analysis for Piles (WEAP)) be performed for the site-specific conditions and selected pile driving hammer to evaluate the proposed pile driving equipment and development of stresses in the piles. The maximum allowable driving stress in both tension and compression should not exceed 45 ksi, which is based on applying a reduction factor of 0.9 to the yield strength of Grade 50 Steel.

7.3 DRILLED PIER FOUNDATIONS

DTE recommends the following static design parameters for a drilled pier foundation alternative:

DESCRIPTION	VALUE
Maximum Net Allowable Bearing Capacity[1]	
Glacial Till/Weathered Rock	6 kips per square foot (ksf)
Bedrock	10 ksf
Allowable Bond Value[2]	
Glacial Till/Weathered Rock (>3.5 feet)	7 pounds per square inch (psi)
Sound Bedrock	100 psi
Lateral Loading Analysis[3]	
Glacial Till (>3.5 feet) dry - k_{py}	150 pounds per cubic inch (pci)
Glacial Till (>3.5 feet) wet - k_{py}	90 pci
Weathered Rock - k_{py}	150 pci
Sound Bedrock – k_{rm}	0.0005
Angle of Internal Friction	
Glacial Till	35
Weathered Rock	38
Bedrock	45
Total Soil Unit Weight	
Glacial Till	135 pounds per cubic foot (pcf)
Weathered Rock	140 pcf
Bedrock	165 pcf
Minimum Embedment	3.5 feet

1. The allowable end bearing capacity assumes a factor of safety of 3 and that loose, disturbed soil/rock has been removed from the base of the pier.
2. Grout-to-ground values are provided (i.e., no permanent casing is assumed). Allowable values are based on a factor of safety of 2 assuming a successful load test is performed. Contribution to pier capacity from soil above a depth of 3.5 feet should be ignored. The uplift capacity should be based on the dead weight of the pier and side resistance provided by the subsurface soils.
3. To analyze foundation under lateral loading (e.g., Ensoft LPILE).

We anticipate that the design length of the piers will be primarily dependent on the embedment/lateral capacity required to resist live loading. The pier will be subject to tension loads and therefore should have reinforcing steel that extends through the entire length of the pier.

Tension and lateral load tests should also be performed on test piers to finalize foundation design for uplift and lateral load capacity. Load tests should be completed near available boring explorations in order to corroborate the load test and subsurface exploration data and develop final design recommendations. The testing results should be provided to DTE to reevaluate the above design parameters.

7.4 GROUND SCREW FOUNDATION ALTERNATIVE

The proposed racking systems may also be supported on a ground screw foundation system (Krinner or similar) that derive their capacity in the natural Glacial Till deposits. Tension and lateral

load tests should also be performed if a ground screw foundation system is selected to assess uplift and lateral capacities. Ground screw foundations are typically designed by a design-build contractor.

7.5 EQUIPMENT FOUNDATIONS

The proposed accessory structures may be designed as mat foundations bearing on a base course of at least 12-inches of Compacted Granular Fill (CGF) or Crushed Stone overlying proof-rolled natural Glacial Till deposits, or CGF or Crushed Stone placed above a proof-rolled natural soil subgrade. Soils with appreciable organic content (i.e., Topsoil and Fill) are not considered suitable bearing materials and must be excavated from foundation areas during site preparation.

When CGF is used beneath the foundations (e.g., in fill areas, if needed), we recommend that it be placed one foot beyond the edge of the foundations and at a one horizontal to one vertical slope away and down from the bottom outside edge of the foundations (i.e., foundation zone of influence). Crushed Stone can be used in place of CGF as it is much easier to compact.

We recommend a maximum allowable design bearing pressure of five kips per square foot (5 ksf) for foundations bearing on the recommended bearing materials. Shallow foundations should be embedded 42-inches below finished grades to account for frost. Based on the recommended bearing strata and anticipated loads, we anticipate that foundations will undergo less than one inch of total settlement and less than a half inch of differential settlement. Settlements will occur as the loads are applied and are expected to be complete at the end of construction.

We recommend an ultimate coefficient of sliding friction of 0.45. A factor of safety of at least 1.5 should be applied to calculated sliding resistance.

8.0 MATERIALS RECOMMENDATIONS

8.1 COMPACTED GRANULAR FILL

Compacted Granular Fill (CGF) for use as structural fill shall consist of inorganic soil free of clay, loam, ice and snow, tree stumps, roots, and other organic matter; graded within the following limits:

Sieve Size	Percent finer by weight
4-inches	100%
No. 10	30 - 100
No. 40	10 - 90
No. 200	0 - 12*

* To be considered non-frost susceptible, granular fill should have a maximum of 3 percent of particles by weight smaller than 0.02mm in effective diameter.

8.2 CRUSHED STONE

Crushed Stone for use below foundations shall consist of sound, tough, durable, rock that is graded within the following:

Sieve Size	Percent finer by weight
5/8-inches	100%
1/2-inch	85 - 100
3/8 inch	15 - 45
No. 4	0 - 15
No. 8	0 - 5

8.3 COMPACTION REQUIRMENTS

CGF should be placed in loose lifts not exceeding 8-inches in depth and compacted to at least 95 percent of its maximum dry density, and within 2% of optimum moisture content, as determined by ASTM D1557, Method C (Modified Proctor) below foundations and other structures.

Crushed Stone is considered to be "self-compacting" and would negate the need to run laboratory proctor testing and have field density testing of in-place lifts. The crushed stone should be plate compacted to "chink up" the working surface in lifts. We recommend placing Crushed Stone in maximum 12-inch lifts and compacting the lifts with a minimum of four passes with a vibratory plate compactor weighing a minimum of 1,000 pounds and with a minimum centrifugal force of 10,000 pounds.

9.0 CONSTRUCTION RECOMMENDATIONS

9.1 DRIVEN PILES

Technical specifications should be prepared by the design team that require detailed material and construction submittals and proof of experience in pile installation. The installation method or combination of methods selected by the contractor should be submitted for review by the design team, prior to mobilization of equipment. Specifications should include provisions for removing encountered cobbles, boulders, and other obstructions as a contingency. Any pile driving refusal remedies (pre-drilling, etc.) that are adopted by the Contractor during construction will require that those piles be load tested.

9.2 GROUND SCREW FOUNDATION ALTERNATIVE

Ground screws should be designed and installed by a specialty contractor with a minimum of 5 years of experience with designing and installing ground screw systems. The specialty contractor should also be licensed by the manufacturer of the selected ground screw system. The axial capacity of the ground screws must be confirmed during installation using the designer's recommended torque resistance. Predrilling is anticipated to install the ground screws due to the relative density of Site soils and the presence of cobbles and boulders.

9.3 SHALLOW FOUNDATIONS – EQUIPMENT PADS

The proposed equipment areas should be cleared of existing vegetation and topsoil. Cobbles, boulders, and any identifiable compressible or deleterious materials should be removed. Existing fill (including re-worked parent materials), and other unsuitable materials, must be removed from beneath bearing zones of influence to the top of firm, natural Glacial Till Deposits prior to

construction. Over-excavation below bearing areas should include the zone of influence, defined as the area beneath 1 horizontal to 1 vertical (1H:1V) lines extending downward and outward from pad areas. Equipment pads shall bear on a prepared subgrade of firm natural Glacial Till Deposits, or CGF or Crushed Stone (over firm natural soils). Refer to Section 8.0 for material and placement recommendations.

Earthwork should be performed in dry conditions so that disturbance to foundation subgrades is limited. During earthwork, the Contractor should be responsible for protecting subgrades from the elements and maintaining the soils in a suitable state until completion of the project. Backfill should not be placed over a subgrade with standing water or that is frozen. Standing water, if present, should be removed and any soft and yielding soil should be removed prior to backfill placement. Excavations to subgrade levels should be performed using a smooth-edged bucket to minimize possible disturbance to the in-place subgrade soils.

Soil subgrades should be proof-rolled under the observation of a qualified Geotechnical Engineer with at least four (4) passes of a smooth-drum vibratory roller (minimum 8,000 pounds, minimum centrifugal force of 12,500 pounds) or, where approved by the geotechnical engineer, a vibratory plate compactor with a minimum of 2,500 pounds of centrifugal force. Any soft or loose zones identified during proof-rolling should be excavated and replaced with CGF, as necessary, and as required by the Geotechnical Engineer.

9.4 TEMPORARY EXCAVATIONS

The site soils are classified as OSHA Class "C" soil and can be cut at a maximum one vertical to one and a half horizontal (1V:1.5H) slope up to a maximum excavation depth of 20 feet. These maximum slope and excavation depths assume no surcharge load (i.e., stockpiles, construction equipment, etc.) at the top of the excavations or groundwater seepage.

9.5 TEMPORARY GROUNDWATER CONTROL

Based on information obtained from the subsurface exploration program, groundwater may be encountered during construction. We anticipate that water (stormwater, perched water, etc.) can be managed with conventional sump pumps and trenches in the excavations. Stormwater runoff should not be permitted to accumulate on/within exposed subgrades and the runoff should be directed away from the exposed subgrade areas. Discharge of dewatering wastewaters must meet applicable local, state, and environmental regulations.

10.0 REVIEW OF FINAL DESIGN, PLANS, AND SPECIFICATIONS

When project plans are finalized, and specifications are available, they should be provided to DTE for review of conformance with our geotechnical recommendations. If any changes are made to the proposed structure locations or bearing levels, the recommendations provided in this report will need to be verified by DTE for applicability.

11.0 CONSTRUCTION QUALITY CONTROL

We further recommend that DTE be retained during earthwork construction to observe excavation to subgrade, fill placement and compaction, subgrade preparation, and deep foundation

installation. The geotechnical engineer in the field should observe the work for compliance with the recommendations in this report, identify changes in subsurface conditions from those observed in the explorations should they become apparent, and assist in the development of design changes should subsurface conditions differ from those anticipated prior to the start of construction.

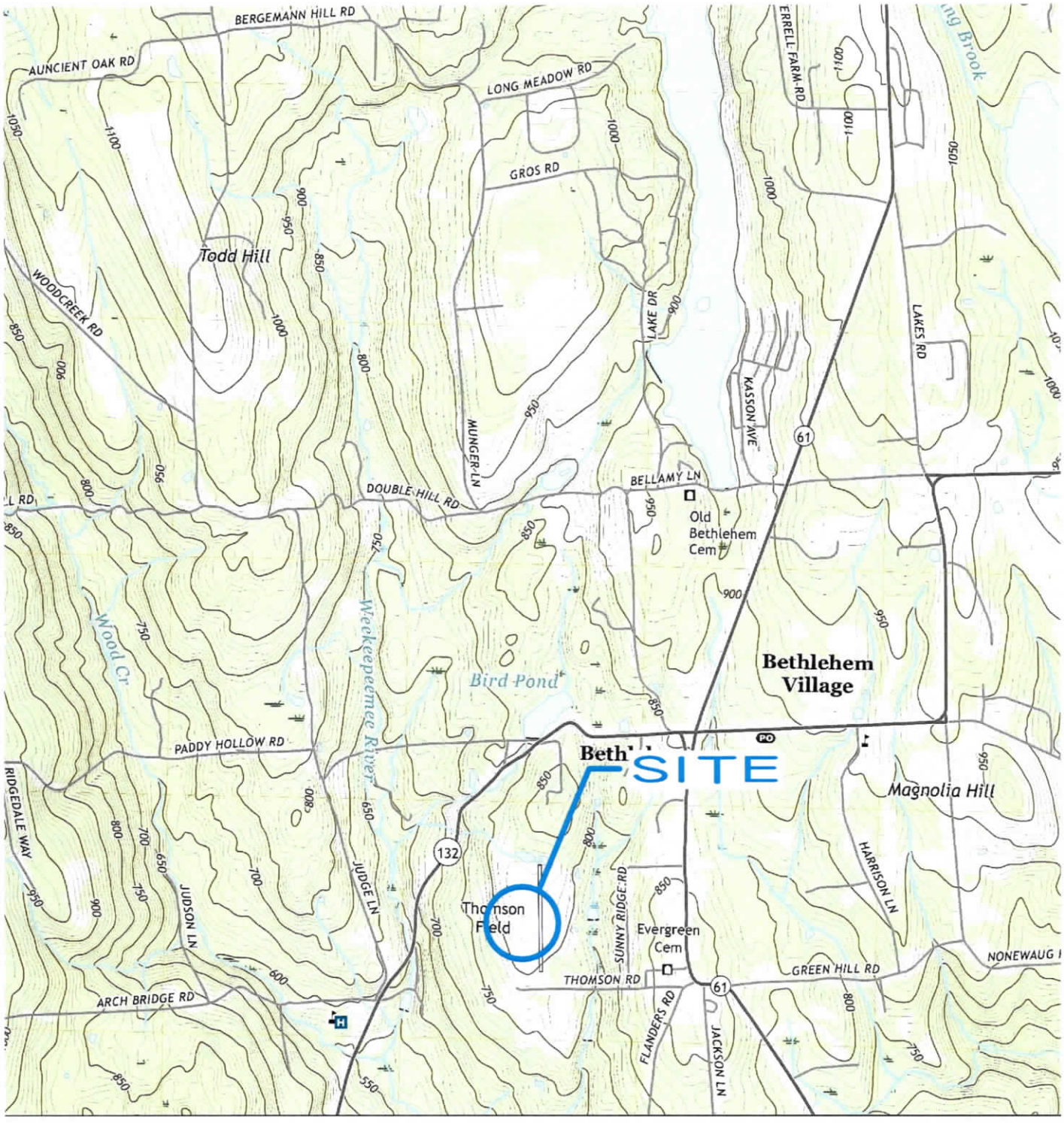
12.0 CLOSURE

We trust the information presented herein is sufficient for your use to progress design of the proposed solar array. We have enjoyed working with you on this project and look forward to our continued involvement. Please do not hesitate to call us if you have any questions.

This report is subject to the limitations included in Appendix 5.

APPENDIX 1 -

FIGURES



DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

122 CHURCH STREET
NAUGATUCK, CONNECTICUT 06770

CONNECTICUT

QUADRANGLE LOCATION

AREA PLAN
PROPOSED SOLAR ARRAY
THOMSON ROAD
BETHLEHEM, CONNECTICUT

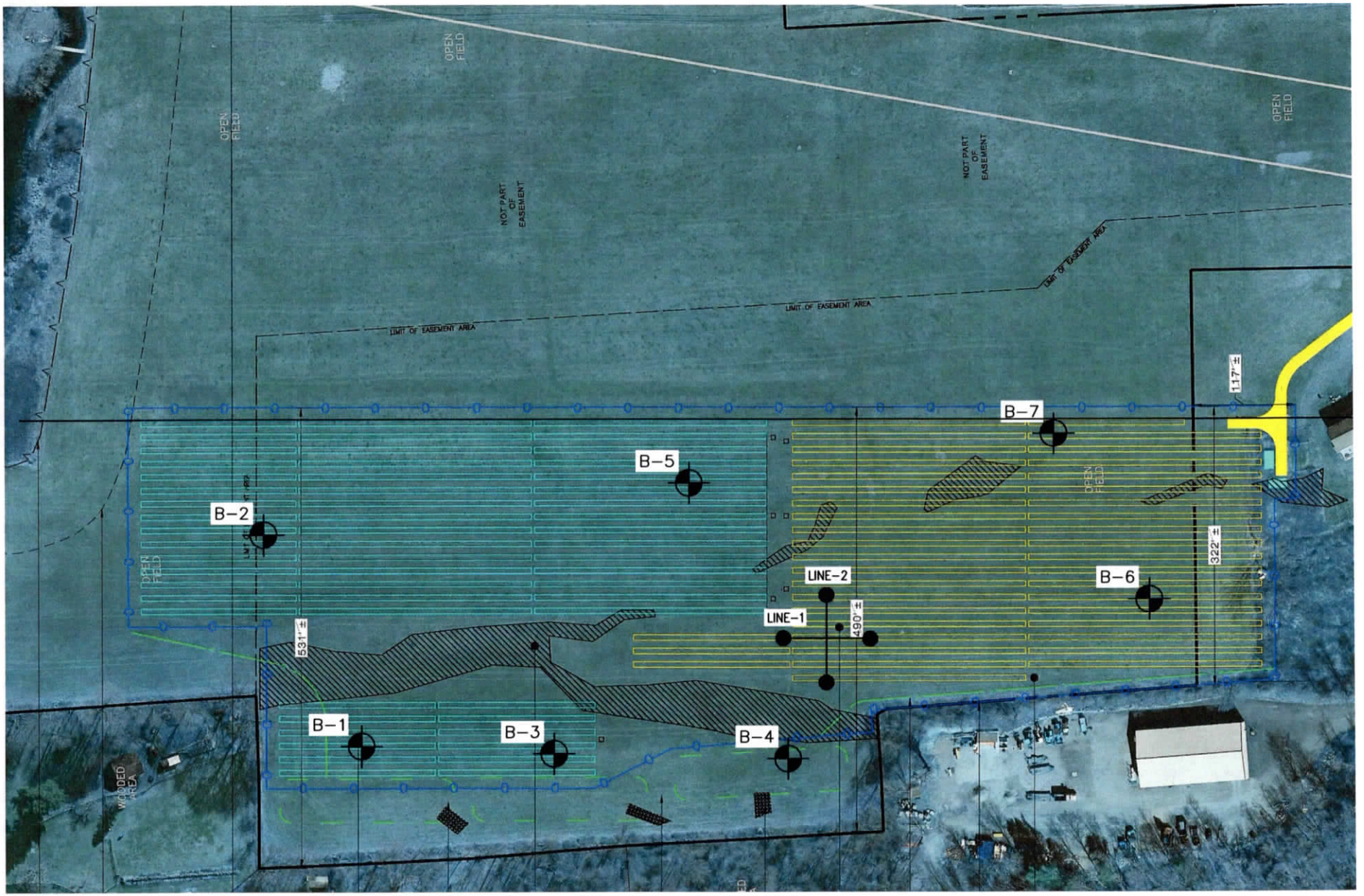
REFERENCE:
USGS TOPOGRAPHIC QUADRANGLE: LITCHFIELD, CT

SCALE 1"= 2,000'

2,000' 1,000' 0 2,000'

PROJECT NO.	0032-037.00
DATE:	6/16/20
FIGURE NO.	1

DRAWN BY: MF	REVIEWED BY: RPJ


OPEN FIELD
NOT PART OF EASEMENT
LIMIT OF EASEMENT AREA
B-1
B-2
B-3
B-4
B-5
B-6
B-7
LINE-1
LINE-2
531'±
490'±
322'±
117'±
WOODED AREA

APPENDIX 2 -

TEST BORING LOGS

DOWN TO EARTH CONSULTING, LLC

PROJECT
PROPOSED SOLAR ARRAY
THOMSON ROAD
BETHLEHEM, CONNECTICUT

BORING NO. B-1
SHEET 1 of 1
FILE NO. 0032-037.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	John Wyant	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	5/15/2020	Date End	5/15/2020

Hammer Type:	Winch Cable Operated Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
5/15/20	-	5	-	wet sample
5/15/20	-	5.5	-	end of drilling

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA DESCRIPTION
1		S-1	11/24	0 to 2	1-4-3-2		Loose, dark brown SILT and fine to coarse SAND, trace (-) Roots	12"+/- Topsoil FILL
2								
3		S-2	14/15	2 to 3.3	4-22-50/3"		Very dense, brown fine to coarse SAND and SILT, little fine Gravel	
4								BOULDER
5								GLACIAL TILL
6		S-3	19/24	5 to 7	16-31-46-33		Very dense, brown fine to medium SAND, some Silt, little fine Gravel, wet	
7								
8		S-4	9/24	7 to 9	31-23-23-25		Dense, gray/brown fine to coarse SAND and fine GRAVEL, little Silt	
9								
10								
11		S-5	11/24	10 to 12	16-28-24-50		Very dense, gray fine to coarse SAND and SILT, some fine Gravel	
12								
13								
14								
15								
16		S-6	12/21	15 to 16.8	24-49-42-50/3"		Very dense, gray SILT and fine to coarse SAND, trace fine Gravel	
17								
18							END OF EXPLORATION AT 16.8 FEET BELOW GROUND SURFACE	
19								
20								
21								
22								
23								
24								
25								
26								
27								
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29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Auger refusal encountered at 4 feet below grade (fbg) on inferred boulder. Boring relocated 5 feet west and advanced to 5 fbg prior to collecting subsequent sample.

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED SOLAR ARRAY
THOMSON ROAD
BETHLEHEM, CONNECTICUT

BORING NO. B-2
SHEET 1 of 1
FILE NO. 0032-037.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	John Wyant	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	5/15/2020	Date End	5/15/2020

Hammer Type:	Winch Cable Operated Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
5/15/20	-	-	-	not encountered

DEPTH	Casing Blows (ft)	Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA DESCRIPTION
1		S-1	13/24	0 to 2	1-3-4-5		Loose, dark brown to gray/brown, fine to coarse SAND and SILT, little fine Gravel, trace (-) Roots	12"+/- Topsoil
2								FILL
3		S-2	16/24	2 to 4	7-17-22-14		Dense, gray/brown fine to coarse SAND and SILT, little fine Gravel	
4								
5								
6		S-3	13/23	5 to 6.9	21-13-18-50/5"		Medium dense, brown fine to coarse SAND, some Silt, some fine Gravel	
7								
8								
9								
10								GLACIAL TILL
11		S-4	16/22	10 to 11.8	20-37-50-50/4"		Very dense, gray/brown SILT and fine to coarse SAND, trace fine Gravel	
12								
13								
14								
15								
16		S-6	12/24	15 to 17	21-32-31-40		Very dense, brown fine to coarse SAND and SILT, little fine to coarse Gravel, with decomposed rock fragments	
17								
18							END OF EXPLORATION AT 17 FEET BELOW GROUND SURFACE	
19								
20								
21								
22								
23								
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27								
28								
29								
30								
31								
32								
33								
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36								
37								
38								
39								
40								

SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Intermittent auger chatter observed from about 6 to 8 feet below grade on inferred cobbles/boulders.

DOWN TO EARTH CONSULTING, LLC

PROJECT		BORING NO.	B-3
PROPOSED SOLAR ARRAY		SHEET	1 of 1
THOMSON ROAD		FILE NO.	0032-037.00
BETHLEHEM, CONNECTICUT		CHKD. BY	RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	John Wyant	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	5/15/2020	Date End	5/15/2020

Hammer Type:	Winch Cable Operated Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
5/15/20	-	-	-	not encountered

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA DESCRIPTION
1		S-1	11/24	0 to 2	2-2-5-4		Loose, dark brown fine to coarse SAND and SILT, trace fine Gravel, trace (-) Roots	9"+/- Topsoil
2								FILL
3		S-2	15/18	2 to 3.5	6-16-50/6"		Medium dense, brown fine to coarse SAND, little Silt, little fine Gravel	GLACIAL TILL
4								
5		S-3	3/3	5 to 5.3	60/3"		Very dense, gray SCHIST fragments	WEATHERED ROCK
6							END OF EXPLORATION AT 5.5 FEET BELOW GROUND SURFACE	
7								
8								
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SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Auger refusal encountered at 4 feet below grade (fbg) on inferred boulder/possible bedrock. Boring relocated 5 feet north.
3) Auger refusal encountered at 4 fbg again on inferred boulder. Boring relocated 4 feet north.
5) Auger refusal encountered at 5.5 fbg on inferred bedrock.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED SOLAR ARRAY
THOMSON ROAD
BETHLEHEM, CONNECTICUT

BORING NO. B-4
SHEET 1 of 1
FILE NO. 0032-037.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	John Wyant	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	5/15/2020	Date End	5/15/2020

Hammer Type:	Winch Cable Operated Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
5/15/20	-	10	-	wet sample

DEPTH	Casing Blows (ft)	Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA DESCRIPTION
1		S-1	11/24	0 to 2	2-6-5-5		Medium dense, dark brown SILT and fine to coarse SAND, trace fine Gravel, trace (-) Roots	9"+/- Topsoil
2								FILL
3		S-2	0/5	2 to 2.4	50/5"		Very dense, No Recovery	
4								
5								
6		S-3	21/24	5 to 7	50-49-50-40		Very dense, brown fine to coarse SAND, little fine Gravel, little Silt	
7								
8		S-4	8/24	7 to 9	26-28-20-27		Dense, brown/gray fine to coarse SAND, some fine to coarse Gravel, little Silt, with decomposed rock fragments	GLACIAL TILL
9								
10								
11		S-4	7/24	10 to 12	25-35-31-23		Very dense, brown/gray fine to coarse SAND and GRAVEL, some Silt, with decomposed rock fragments	
12								
13							END OF EXPLORATION AT 12 FEET BELOW GROUND SURFACE	
14								
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SPT N-Values	SPT N-Values	Proportions
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%
Over 50 - Very Dense	16 to 30 - Very Stiff	
	Over 30 - Hard	

SYMBOL KEY

1. S denotes split-barrel sampler.
2. ST denotes 3-inch O.D. undisturbed sample.
3. UO denotes 3-inch Osterberg undisturbed sample.
4. PEN denotes penetration length of sampler.
5. REC denotes recovered length of sample.
6. SPT denotes Standard Penetration Test.
7. WH denotes weight of hammer
8. WR denotes weight of rods
9. PP denotes Pocket Penetrometer.
10. FVST denotes field vane shear test.
11. RQD denotes Rock Quality Designation.
12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.

DOWN TO EARTH CONSULTING, LLC

PROJECT
PROPOSED SOLAR ARRAY
THOMSON ROAD
BETHLEHEM, CONNECTICUT

BORING NO. B-5
SHEET 1 of 1
FILE NO. 0032-037.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	John Wyant	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	5/15/2020	Date End	5/15/2020

Hammer Type:	Winch Cable Operated Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
5/15/20	-	-	-	not encountered

DEPTH	Casing Blows (ft)	Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA DESCRIPTION
1		S-1	10/24	0 to 2	3-3-4-5		Loose, dark brown to brown, fine to coarse SAND and SILT, some fine Gravel, trace (	12"+/- Topsoil
2							) Roots	FILL
3		S-2	17/24	2 to 4	9-11-18-16		Medium dense, gray/brown fine to coarse SAND, some Silt, little fine to coarse Gravel	
4								
5								
6		S-3	19/24	5 to 7	25-21-19-22		Dense, brown fine to coarse SAND, some Silt, some fine Gravel	GLACIAL TILL
7								
8		S-4	20/24	7 to 9	18-18-17-21		Dense, brown fine to coarse SAND, some fine Gravel, some Silt	
9								
10								
11		S-5	10/10	10 to 10.8	13-50/4"		Very dense, gray/brown fine to coarse SAND and fine to coarse GRAVEL, some Silt	
12							END OF EXPLORATION AT 11 FEET BELOW GROUND SURFACE	
13								
14								
15								
16								
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SPT N-Values	SPT N-Values	Proportions
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%
Over 50 - Very Dense	16 to 30 - Very Stiff	
	Over 30 - Hard	

SYMBOL KEY

1. S denotes split-barrel sampler.
2. ST denotes 3-inch O.D. undisturbed sample.
3. UO denotes 3-inch Osterberg undisturbed sample.
4. PEN denotes penetration length of sampler.
5. REC denotes recovered length of sample.
6. SPT denotes Standard Penetration Test.
7. WH denotes weight of hammer
8. WR denotes weight of rods
9. PP denotes Pocket Penetrometer.
10. FVST denotes field vane shear test.
11. RQD denotes Rock Quality Designation.
12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Auger chatter observed from about 6 to 7 and 8 to 10 feet below ground surface on inferred cobbles/boulders.
4) Auger refusal encountered at about 11 feet below ground surface on inferred boulder/possible bedrock.

DOWN TO EARTH CONSULTING, LLC

PROJECT
PROPOSED SOLAR ARRAY
THOMSON ROAD
BETHLEHEM, CONNECTICUT

BORING NO. B-6
SHEET 1 of 1
FILE NO. 0032-037.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	John Wyant	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	5/15/2020	Date End	5/15/2020

Hammer Type:	Winch Cable Operated Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
5/15/20	-	10	-	wet sample

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA DESCRIPTION
1		S-1	16/24	0 to 2	1-3-4-3		Loose, dark brown SILT and fine to coarse SAND, trace fine Gravel, trace (-) Roots	9"+/- Topsoil FILL
2								
3		S-2	18/24	2 to 4	10-17-28-40		Dense, dark brown to gray/brown SILT and fine to coarse SAND, little fine Gravel	
4								
5								
6		S-3	20/24	5 to 7	28-28-31-30		Very dense, gray/brown fine to coarse SAND and SILT, little fine to coarse Gravel	
7								
8		S-4	20/24	7 to 9	26-26-23-19		Dense, gray/brown fine to coarse SAND and GRAVEL, little Silt, with decomposed rock fragments	GLACIAL TILL
9								
10								
11		S-4	13/23	10 to 11.9	23-24-23-50/5"		Dense, gray/brown fine to coarse SAND, some fine to coarse Gravel, little Silt, with decomposed rock fragments, wet	
12								
13							END OF EXPLORATION AT 11.9 FEET BELOW GROUND SURFACE	
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

SPT N-Values	SPT N-Values	Proportions
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%
Over 50 - Very Dense	16 to 30 - Very Stiff	
	Over 30 - Hard	

SYMBOL KEY

1. S denotes split-barrel sampler.
2. ST denotes 3-inch O.D. undisturbed sample.
3. UO denotes 3-inch Osterberg undisturbed sample.
4. PEN denotes penetration length of sampler.
5. REC denotes recovered length of sample.
6. SPT denotes Standard Penetration Test.
7. WH denotes weight of hammer
8. WR denotes weight of rods
9. PP denotes Pocket Penetrometer.
10. FVST denotes field vane shear test.
11. RQD denotes Rock Quality Designation.
12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
4) Sampler refusal encountered at about 11.9 feet below ground surface on inferred boulder/possible bedrock.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

PROJECT
PROPOSED SOLAR ARRAY
THOMSON ROAD
BETHLEHEM, CONNECTICUT

BORING NO. B-7
SHEET 1 of 1
FILE NO. 0032-037.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	John Wyant	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	5/15/2020	Date End	5/15/2020

Hammer Type:	Winch Cable Operated Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
5/15/20	-	-	-	not encountered

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA DESCRIPTION
1		S-1	13/24	0 to 2	3-4-6-4		Loose, dark brown SILT and fine to coarse SAND, little fine Gravel, trace (-) Roots	12"+/- Topsoil
2								FILL
3		S-2	20/24	2 to 4	5-19-22-20		Dense, brown SILT and fine to coarse SAND, little fine Gravel	
4								
5								
6		S-3	19/24	5 to 7	10-15-14-25		Medium dense, brown SILT and fine to coarse SAND, trace fine Gravel	
7								
8		S-4	20/24	7 to 9	15-20-23-23		Dense, brown fine to coarse SAND and SILT, little fine Gravel	
9								
10								GLACIAL TILL
11		S-5	20/24	10 to 12	4-12-16-23		Medium dense, gray/brown, fine to coarse SAND and SILT, some fine Gravel, with decomposed rock fragments	
12								
13								
14								
15								
16		S-6	18/24	15 to 17	13-25-41-29		Very dense, gray/brown fine to coarse SAND, some Silt, some fine Gravel	
17								
18							END OF EXPLORATION AT 17.5 FEET BELOW GROUND SURFACE	
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Auger refusal encountered at about 17.5 feet below ground surface on inferred boulder/possible bedrock.

APPENDIX 3 -

LABORATORY TEST RESULTS

THIELSCH ENGINEERING
195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
Down to Earth Consulting, LLC
Naugatuck, CT
PM: Ray Janeiro
Assigned By: Ran Janeiro
Collected By: Client

Project Information:
Sunjet Bethlehem
Bethlehem, CT
DTE Project Number: 0032-037.00
Summary Page: 1 of 1
Report Date: 06.19.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-E-172 Rev.1

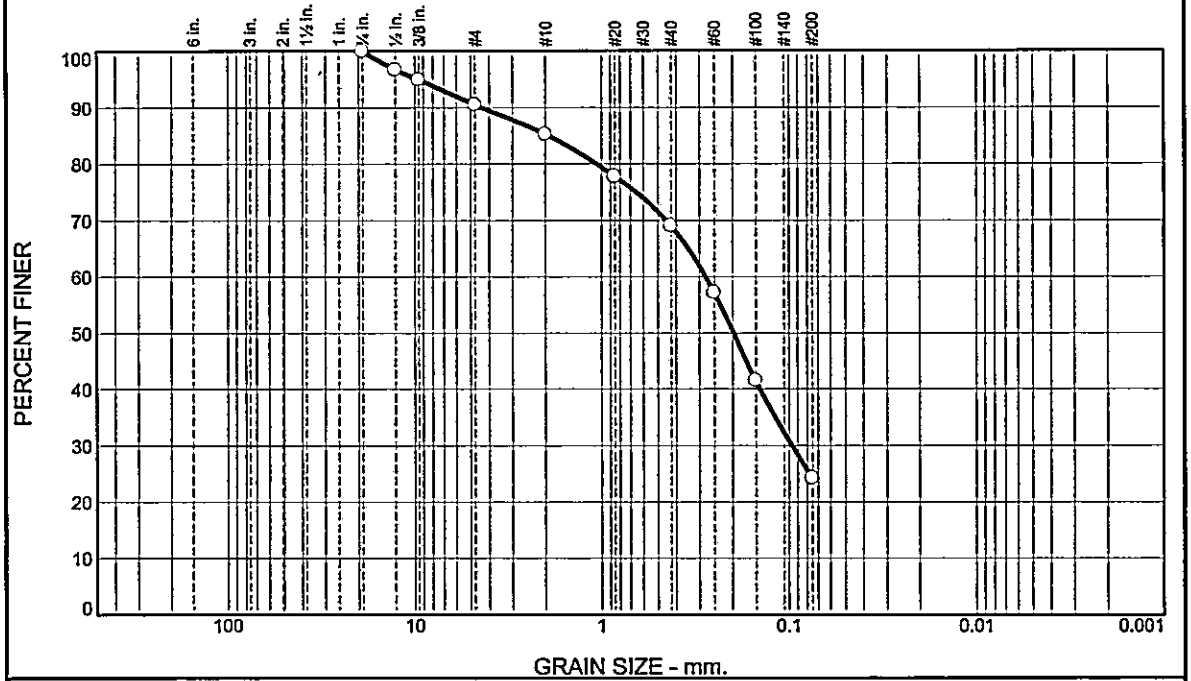
Boring ID	Sample No.	Depth (ft)	Laboratory No.	Identification Tests						Corrosivity Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Resitivity (Mohms-cm)	Sulfate (mg/kg)	Chloride (mg/kg)	Sulfide (mg/kg)	Redox Potential (mv)	pH	Electrical Resist. As Received Ohm-cm @ 60°F	Electrial Resist. Saturated Ohm-cm @ 60°F	
				D2216	D4318		D6913			EPA	D4327	D4327	EPA		D4972	G57		
B-5	Grab	0-4	20-S-1409	13.0							44	6			6.90	32900	13500	Corrosivity Only
B-6	Grab	0-4	20-S-1410	11.9							ND	ND			7.29	100000	52700	Corrosivity Only
B-1	S-3	5-7	20-S-1411				9.5	66.3	24.2									Light Brown silty sand
B-3	S-2	2-4	20-S-1412				12.6	74.1	13.3									Brown silty sand
B-4	S-3	5-7	20-S-1413				15.4	71.6	13.0									Light Brown silty sand with gravel

Date Received: *05.26.2020*

Reviewed By:

Date Reviewed: *06.19.2020*

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.5	5.3	16.2	44.8	24.2	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	96.7		
0.375"	94.9		
#4	90.5		
#10	85.2		
#20	77.8		
#40	69.0		
#60	57.2		
#100	41.5		
#200	24.2		

* (no specification provided)

Material Description

Light Brown silty sand

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 4.3942 D_{85}= 1.9361 D_{60}= 0.2777
D_{50}= 0.1972 D_{30}= 0.0964 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 05.26.2020 **Date Tested:** 05.28.2020

Tested By: IA

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 5-7' **Date Sampled:**

Sample Number: B-1 / S-3

Thielsch Engineering Inc.

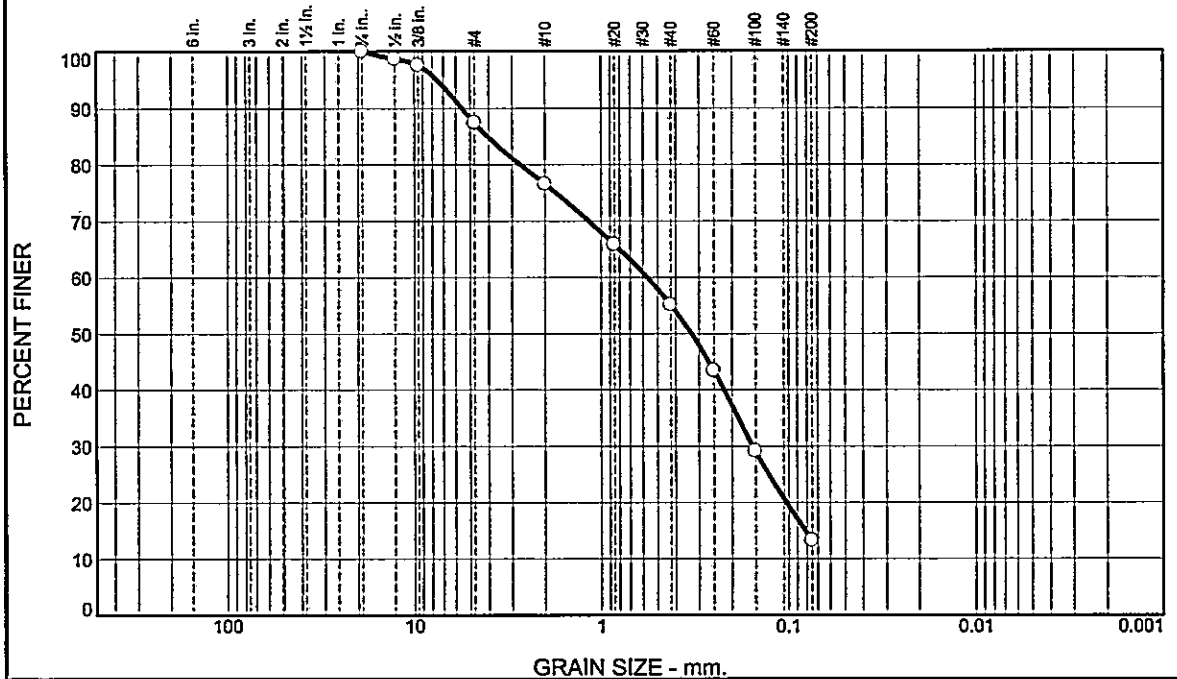
Cranston, RI

Client: Down to Earth Consulting, LLC

Project: Sunjet Bethlehem
Bethlehem, CT

Project No: 0032-037.00 **Figure** 20-S-1411

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	12.6	10.9	21.4	41.8	13.3	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	98.7		
0.375"	97.6		
#4	87.4		
#10	76.5		
#20	65.8		
#40	55.1		
#60	43.4		
#100	29.1		
#200	13.3		

* (no specification provided)

Material Description

Brown silty sand

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 5.5415 D_{85}= 4.0425 D_{60}= 0.5676
D_{50}= 0.3290 D_{30}= 0.1549 D_{15}= 0.0814
D_{10}= C_u= C_c=

Remarks

Date Received: 05.26.2020 **Date Tested:** 05.28.2020

Tested By: IA

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 2-4' **Date Sampled:**

Sample Number: B-3 / S-2

Thielsch Engineering Inc.

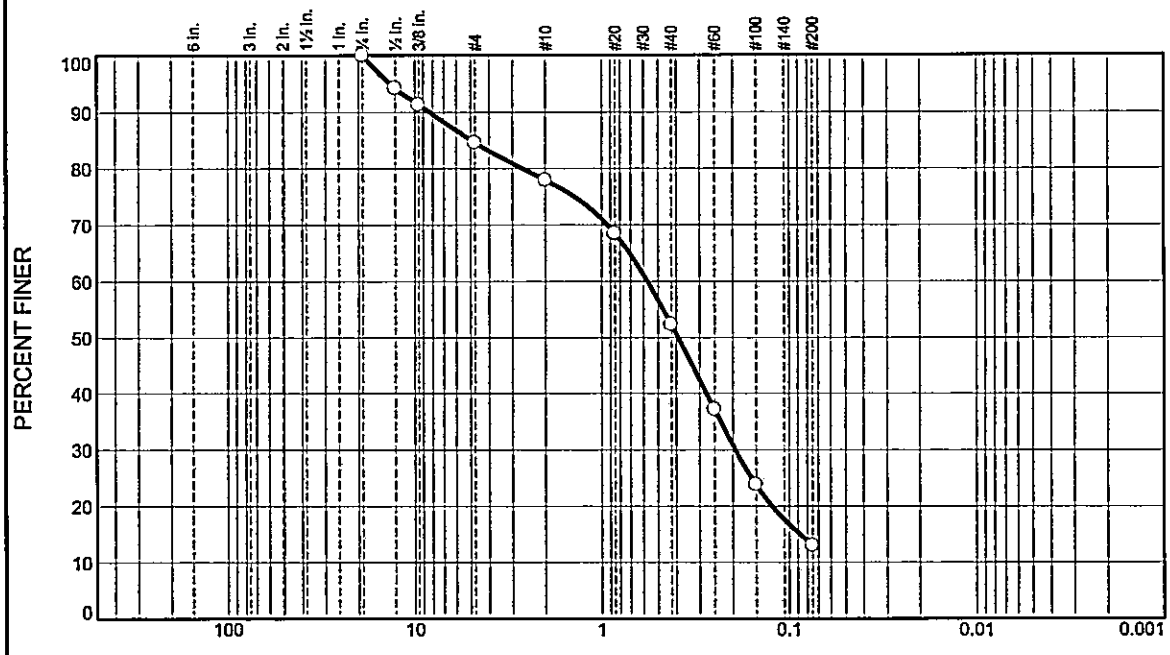
Cranston, RI

Client: Down to Earth Consulting, LLC

Project: Sunjet Bethlehem
Bethlehem, CT

Project No: 0032-037.00 **Figure** 20-S-1412

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	15.4	6.7	25.6	39.3	13.0	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	94.2		
0.375"	91.3		
#4	84.6		
#10	77.9		
#20	68.5		
#40	52.3		
#60	37.2		
#100	23.8		
#200	13.0		

* (no specification provided)

Material Description

Light Brown silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 8.3241 D_{85}= 4.9876 D_{60}= 0.5702
D_{50}= 0.3907 D_{30}= 0.1935 D_{15}= 0.0878
D_{10}= C_u= C_c=

Remarks

Date Received: 05.26.2020 **Date Tested:** 05.28.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 5-7' **Date Sampled:**

Sample Number: B-4 / S-3

Thielsch Engineering Inc.

Cranston, RI

Client: Down to Earth Consulting, LLC

Project: Sunjet Bethlehem
Bethlehem, CT

Project No: 0032-037.00 **Figure** 20-S-1413

CERTIFICATE OF ANALYSIS

Steve Accetta
Thielsch Engineering, Inc.
195 Frances Avenue
Cranston, RI 02910

RE: Sunjet Bethlehem Down to Earth (0032-037.00)
ESS Laboratory Work Order Number: 20E0674

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 12:00 pm, Jun 03, 2020

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Sunjet Bethlehem Down to Earth

ESS Laboratory Work Order: 20E0674

SAMPLE RECEIPT

The following samples were received on May 27, 2020 for the analyses specified on the enclosed Chain of Custody Record.

The client did not deliver the samples in a cooler.

Lab Number	Sample Name	Matrix	Analysis
20E0674-01	B-5 20-S-1409	Soil	D4327
20E0674-02	B-6 20-S-1410	Soil	D4327

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Sunjet Bethlehem Down to Earth

ESS Laboratory Work Order: 20E0674

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Sunjet Bethlehem Down to Earth

ESS Laboratory Work Order: 20E0674

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH
MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Sunjet Bethlehem Down to Earth
Client Sample ID: B-5 20-S-1409
Date Sampled: 05/27/20 09:00
Percent Solids: 89

ESS Laboratory Work Order: 20E0674
ESS Laboratory Sample ID: 20E0674-01
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Chloride	**WL 6** (6)		D4327		1	EEM	05/28/20 19:08	mg/kg dry	DE02831
Sulfate	**WL 44** (11)		D4327		1	EEM	05/28/20 19:08	mg/kg dry	DE02831

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Sunjet Bethlehem Down to Earth
Client Sample ID: B-6 20-S-1410
Date Sampled: 05/27/20 09:00
Percent Solids: 90

ESS Laboratory Work Order: 20E0674
ESS Laboratory Sample ID: 20E0674-02
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Chloride	**WL** ND (6)		D4327		1	EEM	05/28/20 19:25	mg/kg dry	DE02831
Sulfate	**WL** ND (11)		D4327		1	EEM	05/28/20 19:25	mg/kg dry	DE02831

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Sunjet Bethlehem Down to Earth

ESS Laboratory Work Order: 20E0674

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch DE02831 - General Preparation										
Blank										
Chloride	ND	0.5	mg/kg wet							
Sulfate	ND	1	mg/kg wet							
LCS										
Chloride	10		mg/L	10.00		97	85-115			
Sulfate	10		mg/L	10.00		98	80-120			

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Sunjet Bethlehem Down to Earth ESS Laboratory Work Order: 20E0674

Notes and Definitions

WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probably Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Sunjet Bethlehem Down to Earth

ESS Laboratory Work Order: 20E0674

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Thielsch Engineering, Inc - ESS

Shipped/Delivered Via: Client

ESS Project ID: 20E0674
Date Received: 5/27/2020
Project Due Date: 6/3/2020
Days for Project: 5 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? No
   Temp: 22.1 Iced with: None
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** Yes / No / NA
10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes / No
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? Yes / No
    a. Air bubbles in aqueous VOAs? Yes / No
    b. Does methanol cover soil completely? Yes / No / NA
13. Are the samples properly preserved? Yes / No
    a. If metals preserved upon receipt: Date: Time: By:
    b. Low Level VOA vials frozen: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / No
    a. Was there a need to contact the client? Yes / No
    Who was contacted? Date: Time: By:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	45077	Yes	N/A	Yes	8 oz jar	NP	
2	45078	Yes	N/A	Yes	8 oz jar	NP	

2nd Review
Were all containers scanned into storage/lab? Initials
Are barcode labels on correct containers? Yes / No
Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA
Are all Hex Chrome stickers attached? Yes / No / NA
Are all QC stickers attached? Yes / No / NA
Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: Date & Time: 5/27/20 1124
Reviewed By: Date & Time: 5/27/20 11:58
Delivered By: 5/27/20 11:58

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

ESS LAB PROJECT ID: 20E0674

Turn Time: Standard Rush _____ Approved By: _____

Reporting Limits -

State where samples were collected: CT

Is this project for any of the following: (please circle)
MA-MCP CT-RCP RGP DOD Other_____

Electonic Deliverable Yes_X__ No___
Format: Excel___ Access___ PDF_X_ Other____

Project Manager: Steve Accetta
Company: Thielsch Engineering
Address: 195 Frances Ave
Cranston, RI 02910

Project # 0032-037.00

Project Name / Client Name:
Sunjet Bethlehem
Down to Earth Consulting, LLC

Contract Pricing __x___
Special Pricing WO#: _____

ESS Lab Sample ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample Identification	# of Container	Analysis: Sulfate	Analysis: Chloride	Comment #
1	05.27.2020	9:00	G	S	~~Beth B-5 S-1409~~ B-5,20-S-1409	1	X	X	
2	05.27.2020	9:00	G	S	~~Beth B-6 S-1410~~ B-6,20-S-1410	1	X	X	
					hdm 5/28/20				

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_CH_3OH____ — NP NP

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA — AG AG

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present _____Yes ~~X~~ No
Seals Intact _____ Yes _____ No NA: X
Cooler Temperature: 22.1

Sampled by : J. McDaniel

Comments: Please send report to: Rroth@thielsch.com, Saccetta@thielsch.com, mcolman@thielsch.com

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	05.27.20 10:50	[signature]			
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

Please E-mail all changes to Chain of Custody in writing.

Page ____ of ____

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

ESS LAB PROJECT ID: 20E0674

Turn Time: Standard ____ Rush ____ Approved By: ____

Reporting Limits:

State where samples were collected: CT

Is this project for any of the following: (please circle)
MA-MCP CT-RCP RGP DOD Other____

Electonic Deliverable Yes X No ____
Format: Excel ____ Access ____ PDF X Other ____

Project Manager: Steve Accetta
Company: Thielsch Engineering
Address: 195 Frances Ave
Cranston, RI 02910

Project # 0032-037.00
Project Name / Client Name:
Sunjet Bethlehem
Down to Earth Consulting, LLC
Contract Pricing __x___
Special Pricing WO#: ____

ESS Lab Sample ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample Identification	# of Container	Analysis: Sulfate	Chloride								Comment #
1	05.27.2020	9:00	G	S	Beth B-5 S-1409	1	X	X								
2	05.27.2020	9:00	G	S	Beth B-6 S-1410	1	X	X								
							NP	NP								
							AG	AG								

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_CH_3OH____

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ____Yes ✓ No
Seals Intact ____Yes ____No NA: X
Cooler Temperature: 22.1

Sampled by : J. McDaniel

Comments: Please send report to: Rroth@thielsch.com, Saccetta@thielsch.com, mcolman@thielsch.com

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	05.27.20 10:50				
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

Please E-mail all changes to Chain of Custody in writing.

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APPENDIX 4 -

KOZENY-CARMAN ANALYSES

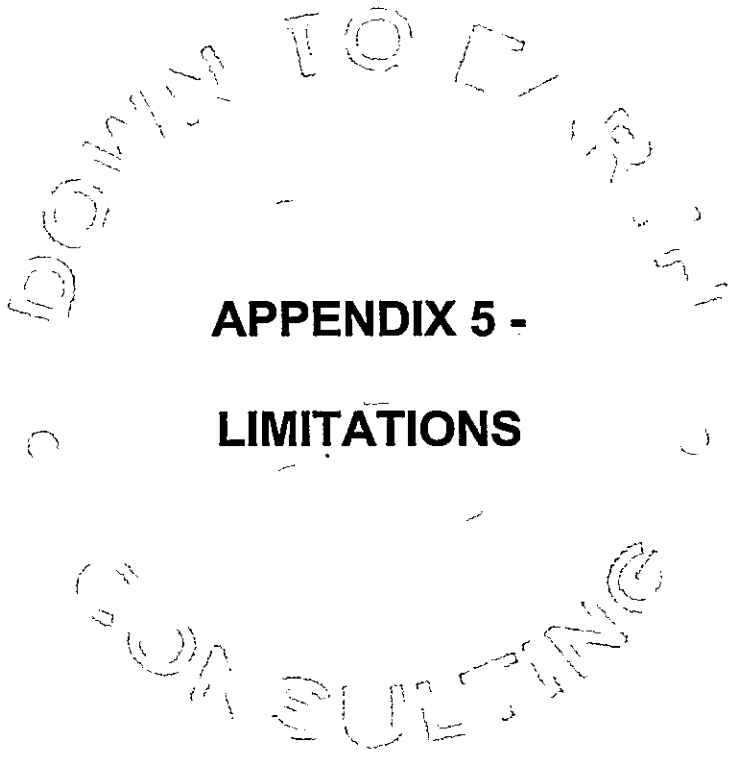
Table 1
Kozeny - Carman Analyses
to Estimate Hydraulic Conductivity

Sunjet Bethlehem
Bethlehem, Connecticut
Project Number: 0032-037.00

Test Boring No.	Sample No.	Sample Depth (ft.)	D_{10} (mm)	Descriptive Density	Est. Relative Density (%)	in-situ void ratio e	in-situ porosity n	Coefficient of Permability k (cm/sec)	Coefficient of Permability k (ft/day)
B-1	S-3	5'-7'	0.02	Very Dense	95	0.176	0.15	8.65E-06	2.45E-02
B-3	S-2	2'-3.5'	0.04	Very Dense	100	0.140	0.12	1.81E-05	5.13E-02
B-4	S-3	5'-7'	0.05	Very Dense	100	0.140	0.12	2.83E-05	8.02E-02

SPT (bl/ ft)	Descriptive Density	Relative Density (%)
0 to 4	Very loose	0 to 15
4 to 10	Loose	15 to 35
10 to 30	Medium Dense	35 to 65
30 to 50	Dense	65 to 85
50 +	Very dense	85 to 100

emin	emax
0.14	0.85



APPENDIX 5 -

LIMITATIONS

LIMITATIONS

Explorations

1. The analyses and recommendations submitted in this report are based in part upon the data obtained from subsurface explorations by Down To Earth Consulting, LLC (DTE) and others. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the boring logs.

3. Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, tidal, temperature, and other factors occurring since the time measurements were made.

Review

4. In the event that any changes in the nature, design or location of the proposed solar arrays are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by DTE. It is recommended that this firm be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications.

Construction

5. It is recommended that this firm be retained to provide soil engineering services during construction of the earthworks and foundation phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

Use of Report

6. This report has been prepared for the exclusive use of All-Points Technology Corporation, PC for specific application to the project noted in this geotechnical report in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.

7. This soil and foundation engineering report has been prepared for this project by DTE. This report is for design purposes only and is not sufficient to prepare an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to design considerations only.

8. This report may contain comparative cost estimates for the purpose of evaluating alternative foundation schemes. These estimates may also involve approximate quantity evaluations. It should be noted that quantity estimates may not be accurate enough for construction bids. Since DTE has no control over labor and materials cost and design, the estimates of construction costs have been made on the basis of experience. DTE does not guarantee the accuracy of cost estimates as compared to contractor's bids for construction costs.