STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:	:	
	:	
A PETITION FOR A DECLARATORY	:	PETITION NO. 1425
RULING THAT A CERTIFICATE OF	:	
ENVIRONMENTAL COMPATIBILITY AND	:	
PUBLIC NEED IS NOT REQUIRED FOR THE	:	
CONSTRUCTION, OPERATION AND	:	
MAINTENANCE OF A 1.9 MWAC SOLAR	:	
PHOTOVOLTAIC PROJECT AT 360	:	
GAYLORD MOUNTAIN ROAD IN HAMDEN,	:	
CONNECTICUT	:	OCTOBER 20, 2020

RESPONSES OF GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC
TO CONNECTICUT SITING COUNCIL INTERROGATORIES, SET ONE

On September 29, 2020, the Connecticut Siting Council ("Council") issued Interrogatories, Set One to Gaylord Mountain Solar Project 2019, LLC ("Gaylord" or "Petitioner"), relating to Petition No. 1425. The Petitioner offers the following responses.

Project Development

Question No. 1

If the project is approved, identify all permits necessary for construction and operation and which entity will hold the permit(s)?

Response

The following permits will be required for construction and operation of the Gaylord Mountain Solar Project 2019, LLC solar facility.

a. Connecticut Department of Energy and Environmental Protection, General Permit for the Discharge of Stormwater and Dewatering Wastewater from Construction Activity.

b. Town of Hamden, Building Permit.

c. Town of Hamden, Electrical Permit.

With the exception of any permits needed for the electrical interconnection work, permits will be obtained and held by Gaylord Mountain Solar Project 2019, LLC.

Question No. 2

Was the project selected through an RFP process? If so, which RFP?

Response

In part, the Virtual Net Metering ("VNM") Credits being sold from the Petitioner were part of a State RFP: VNM RFP CSCU-1809. The RFP was a transaction for financial credits, not an energy purchase. Proposers were responsible for project costs and risks, including site selection on private land not located at any Connecticut State College and University ("CSCU") member institution. Gaylord was awarded the RFP and subsequently the opportunity to sell VNM credits to CSCU member institutions located within the United Illuminating ("UI") service territory.

Question No. 3

Was the project selected for the LREC/ZREC Program? If yes, indicate which utilities and the percentage of the renewable energy credits (RECs) that would be sold to each utility.

Response

Yes, this project was awarded in the Year 8 UI - LREC program with 100% of the RECs going to UI.

Question No. 4

Petition p. 4 states "Energy produced by the project will be sold to **Southern Connecticut State University**". The May 14, 2020 correspondence to Mayor Leng behind

Exhibit C states, "This solar facility will utilize ground-mounted solar arrays that generate 3 MW DC/±1.7 MW AC of clean renewable energy for use in the State of Connecticut at **Gateway Community College in New Haven.**" Exhibit H p. 8 indicates, "In addition, the off-taker for the energy generated by the project is **Central Connecticut State University.**" (Emphasis added).

a. To which entity or entities is the energy produced by the project to be sold?

b. Is the project subject to a virtual net metering (VNM) agreement?

c. If so, what is the length of this agreement?

d. Would all 1.9 megawatts AC be dedicated to virtual net metering?

Response

a. As part of the VNM rider as set forth in General Statutes §16-244u and §16-244u(e)(3), as amended by Public Act No. 13-298, Sections 35, Public Act 13-247, Section 119, Public Act 16-216, Section 1, Public Act 17-218, Sec. 5, and Public Act 19-35, Section 7, the CSCU (Host Meter) has the right to select and change the utility accounts allocated to receive the respective VNM credits. The VNM application – attachment 3 statement of excess kWh, contemplates both Gateway Community College (2 utility meters) and Southern Connecticut State University (1 utility meter) as beneficiary accounts. These accounts are subject to annual change, if required by the CSCU.

b. Yes.

c. 20 years.

d. Yes.

Question No. 5

If the VNM agreement expires and is not renewed and the solar facility has not reached the end of its lifespan, will the Petitioner decommission the facility or seek other revenue mechanisms for the power produced by the facility?

Response

The current Lease Agreement is for 20 years and is aligned with the 20-year VNM program duration. The Petitioner will decommission the facility if the Lease Agreement is not extended. If the Lease Term is extended, the Petitioner would seek other revenue mechanisms in place in the market at that time and continue to produce power from the facility.

Question No. 6

Would the petitioner participate in the ISO-NE Forward Capacity Auction? If yes, which auction(s) and capacity commitment period(s)?

Response

No.

Proposed Site

Question No. 7

In the lease agreement with the landowner, are there any provisions related to decommissioning or site restoration at the end of the project's useful life? If so, please describe and/or provide any such provisions.

Response

Yes. Pursuant to the provisions of the Lease Agreement, the Petitioner must decommission and remove all solar improvements and any associated equipment and other personal property from the Leased Premises and the Easements upon termination of the lease.

Below is the relevant portion of Section 5.1.5 of the Lease Agreement.

Section 5.1.5 Removal. Lessee shall decommission and remove the Solar Facility and any associated equipment and other personal property owned by Lessee from the Leased Premises and the Easements. Lessee shall leave the Leased Premises in a neat and orderly condition and free of all equipment or other personal property of Lessee containing Hazardous Materials (whether at, above or below grade). For the avoidance of doubt, Lessee shall have no obligation to (a) regrade the Leased Premises or the Easements to their contours prior to construction of the Solar Facility, (b) restore any improvements removed in connection with the Permitted Use, (c) remove subgrade supports, foundations, anchors, penetrations, underground conduits (provided all cables, wiring or similar items within such conduit shall be removed) or other similar subgrade ancillary equipment if, in Lessee's reasonable determination, such removal would require disturbing the land or could cause harm or damage to the Leased Premises or the applicable Easement, but Lessee shall remove any portions of the foregoing which are at or above-grade, or (c) replant any vegetation removed in connection with the Permitted Use (provided, however, that Lessee shall rake and re-seed the land with appropriate grass seed or other ground cover upon removal of the Solar Facility).

Question No. 8

Is the site parcel, or any portion thereof, part of the Public Act 490 Program? If so, how does the municipal land use code classify the parcel(s)? How would the project affect the use classification?

Response

No.

Question No. 9

Has the State of Connecticut Department of Agriculture purchased any development rights for the project site or any portion of the project site as part of the State Program for the Preservation of Agricultural Land?

Response

No.

Question No. 10

Provide photographic simulations of the proposed project prepared from area vantage points (i.e. at the location of the permanent access road from Gaylord Mountain Road and from the end of Hunting Ridge Road.

Response

The Photographic simulations requested is included as Attachment 1 to these responses.

Question No. 11

Referencing footnote 2 on Petition p. 4 and footnote 4 on Petition p. 12, what is the status of any agreements between the Petitioner, Eversource and the property owner for access to the project area from the north for construction purposes only?

Response

The Property owner is willing to allow the Petitioner to access the Project Area from the north for construction purposes. To do so, the Petitioner would need to cross the existing Eversource transmission line right of way that bisects the Property. The Petitioner has filed a "Permitted Use Application" with Eversource seeking permission to cross the right of way. That application is pending with Eversource.

Question No. 12

Figure 1A behind Exhibit C and Figure 3 behind Exhibit H on p. 6 depicts the "site" to include the existing telecommunications facility and Eversource right-of-way, as well as undeveloped portions of the parcel further west. "Site" is defined under Regulations of Connecticut State Agencies §16-50j-2a(29) as "a contiguous parcel of property with specified boundaries, including, but not limited to, the leased area, right-of-way, access and easements on which a facility and associated equipment is located, shall be located, or is proposed to be located." Are these areas of the parcel, or any portions thereof, part of the "site" as that term is defined under the Regulations? Could solar panels be relocated to these areas of the parcel?

Response

No. The term "site" as it is shown in Exhibit C, Figure 1A and Exhibit H Figure 3 in the Petition shows the entire 33.88-acre parcel owned by the Petitioner's landlord, Vertical Bridge LandCo LLC. This 33.88-acre parcel is defined as the "Property" in the Petition narrative. The area leased for the Gaylord solar facility is the 12.3-acre portion of the Property, defined as the "Project Area" in the Petition narrative. The portions of the Property used for the existing telecommunications facility, the Eversource right of way and the "undeveloped portions of the parcel further west" are outside of the Project Area and not currently under the control of the Petitioner.

The western portion of the Property maintains grades that are significantly steeper than those within the Project Area. Use of this portion of the Property would present significant challenges for construction, energy production and efficiency and would increase project costs and would require interconnection service to cross the existing Eversource transmission line right of way to reach the point of interconnection along Gaylord Mountain Road.

Question No. 13

What is the operational life of the facility?

Response

The operational life of the proposed solar facility is approximately 35 years.

Question No. 14

Would all components of the solar photovoltaic panels be recyclable? Could components of panels be reused to make photovoltaic cells or whole panels be used to make new solar panels at the end of the life of this project? Could the solar panels and/or associated components be repurposed for a different use or product?

Response

Yes. Recyclable components, including glass, copper wire, steel racking, aluminum and other specific components from inverters and switchgear equipment will be transported dismantled and removed from the Property and taken to a designated recycling facility. The Petitioner does not suggest repurposing or reusing any components of the solar facility as panel efficiency decreases over time and there are associated safety issues.

Question No. 15

Provide the distance, direction and address of the nearest property line and nearest off-site residence from the solar field perimeter fence.

Response

The nearest adjacent property line to the proposed solar field perimeter fence is approximately 22 feet to the northeast, a parcel at 380 Gaylord Mountain Road. The nearest off-site residence from the proposed solar field perimeter fence is approximately 183 feet to the southeast, at 3 Hunting Ridge Road. *See* Attachment 2.

Question No. 16

Petition p. 4 states a 6-foot tall farm fence with 4-6 inch opening at base of fence for wildlife movement, however, the space at the base of the fence is not shown on Exhibit H Site Plan DN-1. Provide revised Site Plan DN-1.

Response

The proposed Farm Fence & Gate Detail (Detail 5/DN-1) on sheet DN-1 of the Site Plan (Petition – Exhibit H) has been updated to reflect the proposed 4-6 inch opening at the base of the fence for wildlife movement. *See* revised plan sheet DN-1 included as Attachment 3.

Question No. 17

Would the Petitioner consider a 7-foot high farm fence consistent with Section 691.4(2) of the National Electrical Code (NEC), 2020 Edition notes that, "Access to PV electric supply stations shall be restricted by fencing or other adequate means in accordance with 110.31…" Section 110.31 notes that for over 1,000 Volts, "…a wall, screen, or fence shall be used…A fence shall not be less than 7 feet in height or a combination of 6 feet or more of fence fabric and a 1 foot or more…utilizing barbed wire or equivalent."

Response

The Petitioner would agree to install a 7-foot high farm fence. The proposed Farm Fence & Gate Detail (Detail 5/DN-1) on sheet DN-1 of the Site Plan (Exhibit H) has been updated to reflect the 7-foot high fence, which is consistent with Section 694.4(2) of the National Electrical Code (NEC), 2020 Edition. *See* Attachment 3.

Energy Output

Question No. 18

Provide the megawatt output in alternating current (AC) and direct current (DC).

Response

2.7648 MW DC / 1.86 MW AC.

Question No. 19

Have electrical loss assumptions been factored in to the output of the facility? What is the output (MW AC) at the point of interconnection?

Response

Yes, electrical loss assumptions have been factored into the output of the facility. The output of the facility is 1.83 MW AC at the point of interconnection.

Question No. 20

What is the projected capacity factor (expressed as a percentage) for the proposed project? For clarity, is this capacity factor based on a ratio of AC MWh to AC MWh, or a ratio of AC MWh to DC MWh?

Response

The Project's net capacity factor is estimated to be 18.7% (2999 AC MWh AC / (1.83 AC MW * 8760 [hours in a year])).

Question No. 21

What is the efficiency of the photovoltaic module technology of the proposed project?

Response

98.5% Maximum Efficiency – SMA PEAK3 125KW Inverter

19.9% Maximum Efficiency – Hanwha Q Cells L-G5.3 400W

Question No. 22

Is the project being designed to accommodate a potential future battery storage system? If so, please indicate the anticipated size of the system, where it may be located on the site, and

the impact it may have on the VNM agreement.

Response

The Petitioner has no plans to incorporate a battery energy storage system into the project.

Question No. 23

Would the impact of soft or hard shading reduce the energy production of the proposed project? If so, was this included in the proposed projects capacity factor?

Response

Yes, any shading of the solar facility panels would reduce the energy output. To address concerns raised by several of the adjoining property owners, the Petitioner agreed to cut fewer trees within the Project Area. This would result in a 10% soft shading loss in energy output. This loss was included in the capacity factor for the Project.

Question No. 24

Could the project be designed to serve as a microgrid?

Response

The Project was not contemplated to serve as a microgrid and would require extensive design changes to do so, including, but not limited to the inclusion of an energy storage component.

Question No. 25

If one section of the solar array experiences electrical problems causing the section to shut down, could other sections of the system still operate and transmit power to the grid?

Response

If a section of modules within the solar array were to experience electrical problems, the rest of the array would be able to operate and transmit power to the grid. The system utilizes 16

decentralized string inverters. If one inverter were to fail for whatever reason, the system could still operate at 15/16 of its nameplate capacity.

Question No. 26

Do solar facilities present a challenge for the independent system operator for balancing loads and generation (to maintain the system frequency) due to the changing (but not controlled) megawatt output of a solar facility? What technology or operational protocols could be employed to mitigate any challenges?

Response

Solar facilities do not present a challenge for the independent system operator for balancing loads and generation. In fact, the megawatt output of the proposed Gaylord solar facility will improve the system frequency by absorbing VARs pursuant to UI's request. By operating at a 0.93 power factor, this 2000 KVA system has an output of 1860 KW, and absorbs 735.12 KVARs, which offers a beneficial power factor correction to the grid. UI is requiring the use of a Supervisory Control and Data Acquisition (SCADA) system that can open the facility's recloser and shutdown the plant as needed.

Site Components and Solar Equipment

Question No. 27

Different values for the number of 400W solar panels were presented in the petition (i.e., 2,292, 6292, and 11,492) Please identify the number of panels.

Response

The Project will install 6912 400W solar panels.

Question No. 28

Will the Project solar panels be mounted in a portrait or landscape fashion?

Response

The solar panels with be mounted in a portrait fashion.

Question No. 29

Provide the following information regarding the Project solar panel rack system:

a. What is the length of the driven posts and to what depth would the posts be driven into the ground to provide the required structural stability?

b. How many panels will each rack hold?

Response

a. The Petitioner anticipates that posts 12 feet in length would be utilized, and that the posts would be driven into the ground to a depth of 8 to 10 feet for structural stability.

b. Each rack will hold 24 panels.

Question No. 30

Is the wiring from the panels to the inverters installed on the racking? If wiring is external, how would it be protected from potential damage from weather exposure, vegetation maintenance, or animals?

Response

The majority of the wiring will be run on the racking system itself. Where wiring is not run on the racking, it would run in conduit installed as a part of the Project.

All exposed wiring is UV-rated USE-2 Solar Wire commonly used as solar power cable in green energy applications. The cross-linked insulation is a general purpose, chemically cross-linked polyethylene compound combining the best properties of rubber and polyethylene to provide a thermosetting material with excellent thermal, electrical and physical properties. This

is secured to the hardware supporting the solar modules (racking) by UV-rated stainless-steel bundle straps at a minimum of 3 feet above grade to protect it from small animals and damage during mowing operations.

Question No. 31

What is the length and width (in feet) of the existing, proposed temporary and permanent access routes? Does the existing access road on the subject parcel require any upgrades? If so, describe the improvements.

Response

The existing access road, serving the Property owner's telecommunications facility compound, is approximately 800 feet long and 12 feet wide and does not require any upgrades. The proposed temporary access road, an extension of the existing telecommunications facility road, is 330 feet long and 15 feet wide. The permanent access road is approximately 370 feet long and varies in width from 15 to16.8 feet.

Question No. 32

What is the aisle width between the solar panel rows from panel edge to panel edge? What is the minimum aisle width at which the solar panel rows could be installed?

Response

The proposed and minimum aisle width between the solar panel rows from panel edge to panel edge is 8.0 feet.

Interconnection

Question No. 33

Is the project interconnection required to be reviewed by ISO-NE?

Response

No.

Question No. 34

Petition p. 11 indicates "the inverter step-up transformers located at each equipment pad will use biodegradable oil for cooling." Explain "biodegradable."

Response

The transformer insulating oil the Petitioner proposes to use is described as an environmentally-friendly and readily biodegradable fluid, meaning the fluid can be degraded biologically consistent with OECD 301 standards. There would be no harm to the environment if this fluid were to leak from the transformer. The Petitioner would be monitoring transformer oil levels and would be notified immediately if there were a leak.

Question No. 35

At what point will the underground electrical connection transition to an overhead progression to connect to the distribution system?

Response

The Petitioner plans to install a riser pole approximately 100 feet west of Gaylord Mountain Road south of the site access driveway.

Question No. 36

Referring to Petition p. 5, what is the height above grade of the proposed utility poles?

Response

The new distribution poles would extend to a height of be 36' above grade (40' tall pole, 6' in the ground).

Public Safety

Question No. 37

Would the project comply with the National Electrical Code, the National Electrical Safety Code and any applicable National Fire Protection Association codes and standards, including, but not limited to, NFPA Code Section 11.12.3?

Response

Yes.

Question No. 38

Where is the nearest federally-obligated airport? Is a glare analysis required to comply with FAA policy?

Response

New Haven Tweed Airport, East Haven, Connecticut. A glare analysis is not required to comply with FAA policy. All necessary FAA approvals and sign offs have been secured.

Question No. 39

With regard to emergency response:

a. How would site access be ensured for emergency responders?

b. In the event of a brush or electrical fire, how would the Petitioner mitigate potential electric hazards that could be encountered by emergency response personnel?

c. Could the entire facility be shut down and de-energized in the event of a fire? If so, how?

Response

a. The proposed access road off Gaylord Mountain Road has been designed and will

be maintained to accommodate emergency service vehicles.

b. The Petitioner will have the ability to de-energize the solar facility remotely in the event of a brush or electrical fire.

c. Yes, the facility can be de-energized remotely in the event of a fire. The Petitioner will be able to access the SCADA system that can tell the recloser to close the remotely operable breaker, so the system can be de-energized.

Environmental

Question No. 40

Petition Exhibit H p. 25 Table 4 express values that are not listed elsewhere in the petition. Please provide a corrected table.

Table 4: Farmland Soils Assessment and Impacts Table

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Farmland Soil Classification	Total Area On-Site (+/- ac.)	Area within Project Limits (+/- ac.)
Prime Farmland Soil Area	54.3	0.0
Unique Farmland Soil Area	n/a	n/a
Statewide Important Farmland Soils Area	160624.6	94582.02

Response

The units presented in Table 4 should have been stated in square feet and not acres. The narrative description in the Petition regarding Prime Farmland Soils is incorrect and should reflect a total of 54.3 square feet on the Site and no such soils within the Project limits. The conclusion presented in the Petition, stating that the Project will not materially affect Prime Farmland Soils remains accurate. Please see corrected Table 4 below.

Table 4: Farmland Soils Assessment and Impacts Table

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Farmland Soil Classification	Total Area On-Site (+/- sq. ft.)	Area within Project Limits (+/- sq. ft.)
Prime Farmland Soil Area	54.3	0.0
Unique Farmland Soil Area	n/a	n/a
Statewide Important Farmland Soils Area	160624.6	94582.02

Question No. 41

Petition Exhibit H, page 3, states "Ground elevations range from approximately 452 feet AMSL in the west to 716 feet AMSL in the east." Should 452 feet be on the east side of the subject parcel and 716 feet on the west of the subject parcel?

Response

Correct. The Project Area slopes down from west to east.

Question No. 42

Is tree clearing required for the proposed project? If so, please provide the following:

a. Acreage of tree clearing only;

b. Acreage of tree clearing and grubbing;

c. Acreage of tree clearing in wetlands; and

d. What methods would be used to clear trees in wetlands?

Response

a. Acreage of tree clearing only is approximately 2.03 Acres;

b. Acreage of tree clearing, and grubbing is approximately 10.28 Acres;

c. Acreage of tree clearing in wetlands is approximately 0.06 Acres; and

d. Tree clearing within wetlands would be accomplished without any machinery encroaching within these resource areas. If machinery cannot reach into wetland areas from upland areas to remove trees, hand felling measures will be implemented. No stump removal will occur within wetland areas.

Question No. 43

Did the Petitioner conduct a Shade Study Analysis? Would shading present any challenges for the proposed project? If so, provide acreage of trees that would be removed to mitigate for shading? How were the limits of tree shading determined?

Response

The Petitioner did conduct a Shade Study Analysis which resulted in the layout as proposed. Shading does present challenges for the proposed project due to the significant amount of forest present on the Site. To mitigate for visual concerns from the surrounding neighbors, the Petitioner reduced the amount of tree clearing determined by the Shade Study Analysis to provide a 50-foot buffer of trees to the south. To maximize the production of this system per the Shade Study Analysis, an additional three (3) acres of trees would be required, which would produce about 8% more energy.

Question No. 44

Are there any wells on the site or in the vicinity of the site? If so, how would the petitioner protect the wells and/or water quality from construction impacts?

Response

There are no wells located on the Property. Neighboring properties to the east off Gaylord Mountain Road are served by private wells. Based on a May 2020 geotechnical engineering report prepared by Down To Earth Consulting, LLC, subsurface conditions within

the Project Area generally consist of an approximate 8 to 12-inch layer of topsoil/forest duff layer overlying one to two feet of sub-soil grading to glacial till (ranging from 3 to 12 feet deep). Bedrock was encountered at depths of 5 to 10 feet below grade. A copy of the geotechnical engineering report is included in Attachment 4.

The final design of the racking system has not been determined. Racking will consist of a combination of driven posts, drilled piers and/or ground screws, with maximum depths extending to approximately 10 feet. Subsurface conditions will dictate the specific type of support mechanism to be employed at the post locations.

Based on this data, and the separating distances from the Project Area to neighboring properties, the Petitioner does not anticipate construction activities will affect surrounding wells or water quality. Inserting the racking posts into these soil conditions is not expected to cause excessive vibrations beyond the Project Area and would therefore not represent a concern for causing sediment releases to nearby wells. Although the specific construction of these wells is unknown, it is likely that any potable drinking water wells are installed within the bedrock aquifer, not in the overburden material, at depths far exceed the construction zone. As a result, no disruption to well water flow or water quality is anticipated and therefore no special precautions are warranted.

Question No. 45

What effect would runoff from the drip edge of each row of solar panels have on the site drainage patterns? Would channelization below the drip edge be expected? Are energy dissipators, as depicted in DEEP's draft Appendix I, Stormwater Management at Solar Array Construction Projects-Figure 2, proposed for this Project? If not, why not?

Response

The rows of solar panels are not considered "closed systems," because there are gaps between each module (both north/south and east/west). As such, the drip edge of each solar panel will not have an impact on the site's drainage patterns, as stormwater will flow off the panels at multiple locations as the panels follow the contours of the existing land. For the same reason, after construction is complete and the Site is fully stabilized, channelization along the drip edge is not expected. Therefore, energy dissipators were not deemed necessary for this project.

Question No. 46

Petition Exhibit H Appendix A Project Plans reference upland wetland review area distances of 50 and 100 feet. What is the host municipality's setback regulation from wetlands?

Response

The Town of Hamden Inland Wetland Commission regulates a setback of 200 feet from wetland and watercourses.

Question No. 47

Petition p. 16 under "Wetlands" states, "None of these wetland areas will not be adversely impacted by ant project development activity." Explain.

Response

The statement has a typographical error and should read: **"**None of these wetland areas will be adversely impacted by any project development activity."

Direct impacts to wetlands associated with the Project are limited to tree clearing within Wetland 5. Proposed methods for tree clearing within wetlands will not result in significant ground disturbances as noted in the response to Question 42 above. Indirect impacts associated

with the Project include minimal grading and clearing associated with access road improvements, fencing installation, and installation of stormwater features. These minor impacts shall maintain a minimum wetland setback of 20 feet. Wetlands 1, 4, and 5 consist of isolated wetland features that do not support any significant functions or values. As such, minor impacts to the buffers associated with these wetlands will not result in a degradation of their existing functions or values. Wetland 2 has experienced historic disturbances in the form of residential development, vegetation management associated with pasture conversion, and surface alteration. Wetland 3 has been significantly altered through historical development and routine maintenance of Gaylord Mountain Road. Due to the diminished functions and values provided by Wetlands 2 and 3 resulting from these disturbances, the Project will not result in a measurable loss of these functions or values.

Question No. 48

What is the length of the posts and to what depth would the posts be driven into the ground to provide structural stability? Are any impacts to groundwater quality anticipated? If so, how would the petitioner manage and/or mitigate these impacts?

Response

As discussed above in response to Question 29, the Petitioner anticipates that posts 12 feet in length would be utilized, and that they would be driven into the ground to a depth of 8 to 10 feet for structural stability. No impacts to groundwater quality are anticipated from either the installation or the ongoing presence of the posts and the Project as a whole.

Depths to groundwater at the Site range from 1.5 to 5 feet below grade, based on recent geotechnical data. While buried galvanized metal infrastructure has a potential to contribute to zinc levels in surrounding soils, it is unlikely that the buried posts associated with the Project

would raise local zinc concentrations substantially in soil or groundwater. The portion of galvanized post most exposed to oxidation would be that section extending from the ground surface to three or four feet down into underlying soil. Below a few feet down, the soil (and groundwater) quickly becomes deficient in oxygen and oxidation-reduction reactions are inhibited. Zinc coatings that are exposed to air and weather will oxidize, however this occurs very slowly (often over 75 years or more) before making its way into surface soils. After this time, the metallic zinc is completely consumed and barring any other reactions, would be present in the soil as zinc oxide (which is used routinely in sunscreen, among other products). There is minimal vertical movement of zinc in the soil. Similarly, zinc concentrations in surface soil influenced by corrosion decrease with distance horizontally from the steel post. As a result, no management or mitigation actions are required.

Question No. 49

Has the Petitioner received a response from the State Historic Preservation Office? If so, provide such response.

Response

At this time, no official response has been received by the State Historic Preservation Office.

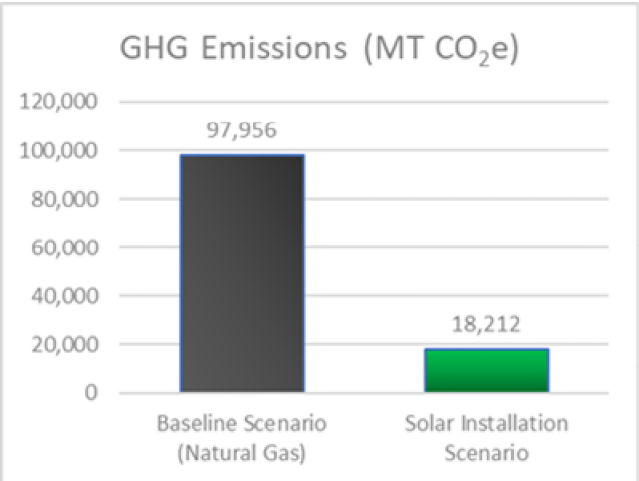
Question No. 50

The Greenhouse Gas (GHG) Assessment in Appendix M of Council Petition No. 1352 compared the life cycle GHG emissions from a solar project to a scenario where the solar project is avoided, and an equivalent amount of natural gas-fired electric generation operated for the estimated life of the solar facility. For the proposed project, how would the net GHG emissions (or reduction) over the life of the solar facility and carbon debt payback be affected under this

natural gas-fired generation versus proposed solar generation scenario?

Response

A calculation based on the GHG emissions estimates scenario listed in Appendix M of Petition No. 1352 indicates that whereas the proposed solar project would generate 18,212 MT CO2e over its 20-year lifetime, producing the same amount of electricity with natural gas would generate 97,956 MT CO2e. Thus, the proposed Gaylord solar project would reduce GHG emissions by 81% as depicted in the graph below.



The approach used for the calculation was to scale the GHG emissions estimates listed in Appendix M of Petition No. 1352 for the size of the PV system, the acres of forest to be cleared, and the amount of natural gas electricity generation that would be offset. Specifically, whereas the analysis for Petition No. 1352 was for a 19.99 MW PV system requiring 95.3 acres of forest to be cleared that would offset 744,038 MWh of natural gas electricity production over 20 years, the proposed Gaylord solar project is for a PV system with 1.86 MW AC maximum output requiring a total of 12.31 acres of forest to be cleared and that would offset 57,214 MWh of natural gas electricity production. Total lifecycle emissions associated with each of these factors

were accordingly scaled and summed to arrive at the stated result, and the full calculation is performed in the spreadsheet included in Attachment 5.

Question No. 51

Provide response/comment to the Connecticut of Department of Health letter dated September 8, 2020.

Response

The Petitioner has reached out, on several occasions, to the Regional Water Authority ("RWA") and offered to meet to discuss any issues or concern it may have with the Project. To date, the RWA has not responded to those offers.

While the Project Area is located within the Mill River Watershed, the existing surface runoff from the Project Area drains away from Regional Water Authority property west. The nearest waterbody, Lake Bethany (the Lake Whitney Reservoir) is located more than 5 miles southeast of the Project Area. Additionally, surface runoff currently does not infiltrate the soils in the Project Area and thus would not recharge the groundwater associated with this drinking water aquifer. The Project would not change either of these existing conditions and thus would not negatively impact the Mill River Watershed.

A spill prevention plan has been proposed and is included in the Resource Protection Plan provided as Appendix B of the Environment Assessment. This plan details measures to install and maintain erosion and sedimentation controls and manage refueling and fuel storage procedures (no hazardous materials will be used), spill prevention and response protocols, and requirements for supplying and maintaining a fuel spill remediation kit.

The Petitioner will contact the Regional Water Authority prior to construction and, with proper notice, allow Regional Water Authority personnel to inspect the Project Area.

Question No. 52

Provide response/comment to the Town of Hamden Planning and Zoning Commission letter dated September 9, 2020 and the Hamden Inland Wetland Commission letter dated August 28, 2020.

Response

Hamden Planning and Zoning Commission comments dated September 9, 2020

The site is steeply sloped. There is a substantial risk of storm water runoff causing flooding and erosion.

While the Project Area is sloped, the Petitioner has taken care to locate the proposed solar arrays within areas that have an existing slope that is less than 20%. Additionally, the proposed solar array development will be supported by an engineered system of stormwater best management practices, which include a detention basin, swales, level spreaders, and plunge pools.

The site lies within the Mill River Watershed and is thus an area of particular concern.

While the Project Area lies within the Mill River Watershed, the development sequence will establish erosion control measures prior to major site work. Additionally, the proposed stormwater best management practices are sized to both treat the expected sediment generated during construction as well as the water quality volumes using the assumption that the proposed solar panels are an impervious surface.

The project is located very close to five wetland areas, putting them at great risk of degradation.

Potential wetland impacts associated with the Project are documented in the Petition and

in responses to interrogatories Questions 47 and 52 herein.

One year ago, the Planning and Zoning Commission approved its ten-year Plan of Conservation and Development. The document, which emphasizes environmental sustainability, notes the critical role played by trees in combatting the negative impacts of Climate change as well as in reducing flooding.

The Petitioner has made all attempts to minimize tree clearing to maximize renewable energy production, reducing overall greenhouse emissions. As explained in Question 50, the proposed solar project would generate 18,212 MT CO2e over its 20-year lifetime, producing the same amount of electricity with natural gas would generate 97,956 MT CO2e. Thus, the proposed solar project would reduce GHG emissions by 81%.

The Site stormwater plan has been designed to ensure that stormwater generated by the Facility will not increase flooding issues off-Site using a large stormwater basin and intermediate stabilization and energy dissipating controls.

Public Act 17-218 requires a comprehensive environmental review by DEEP that has not been carried out. It also encourages use of landfills and brownfields as better alternative sites:

Sec. 2. (NEW) (Effective July 1, 2017) In any solicitation issued under section 16a-3f, 16a-3g, 16a-3h, or 16-a3j of the general statues, as amended by this act, after July 1, 2017, the commissioner of Energy and Environmental Protection shall consider the environmental impacts of any proposal in the state that is received in response to such solicitation, including, but not limited to, the impacts to prime farmland and core forests and the reuse of sites with limited Senate Bill No. 943 Public Act No. 17-218 2 of 17 development opportunities such as brownfields and landfills, as identified by the

commissioner.

The Project Area is not currently used for agricultural purposes and does not contain any prime farmland. (*See* Petition Exhibit H). The Petitioner estimates this site does contain a small area of core forest totaling approximately one (1) acre. The Petitioner investigated several alternative sites prior to entering into it lease with the Property owner. The Project Site was selected to take advantage of the State's VNM ZREC incentive program and the siting criteria presented in Exhibit C of the Petition. Additionally, the incentive that was awarded by the State is tied to the physical location in Hamden, and pursuant to the ZREC rules, changes are not permitted.

The environmental assessment submitted by the applicant is flawed and inadequate. It omits a key wildlife corridor and minimizes the significance of the core forest. The applicants should be required to submit a comprehensive DEEP study of the specific site and the likely impact of the project.

The Petitioners evaluation of core forest associated with the Project is based on methodology established by UConn's Center for Land Use Education and Research's Forest Fragmentation Analysis. Through this analysis, it was determined that core forest associated with the Site was identified as a small core forest block totaling approximately one (1) acre. While the Project will result in the clearing of this core forest habitat, due to its limited size and fragmentation from other more substantial core forested habitats to the west due to utility infrastructure and public roadways, the wildlife utilization value of the on-Site core forest is heavily diminished. In addition, the Petitioner has provided, in detail, a comprehensive study of the specific environmental Site setting including a habitat survey.

The project will adversely affect the quality of life and housing values of adjacent residential properties.

A solar project's impact on housing values on adjacent residential properties is not one of the criteria the Council considers in its evaluation of solar facilities and the Town has not offered any evidence to support this statement. Based on information presented by Solar Energy Industries Association (SEIA) "large-scale solar arrays often have no measurable impact on the value of adjacent properties, and in some cases may even have positive effects" on property values in the area. (*See* Attachment 6). That said, the Petitioner understands the community's concerns and has worked closely with its engineering team and development partners to minimize the amount of clearing on the perimeter of the Project Site to provide screening to adjacent property owners.

The analysis of alternative sites not surprisingly identified other locations that were deficient. It's not a convincing argument and begs the question of what are the other options that would not destroy over twelve acres of forest.

The Petitioner assessed a number of sites but the one chosen was the only site that met the needs of the project (included being within the Utility's zone) and also ensured the Petitioner would receive the incentives provided by the state. The incentive that was awarded by the States VNM ZREC program is tied to the physical location in Hamden, and per the ZREC rules, changes are not permitted. And although not required by Connecticut Siting Council, in an effort to provide transparency to the public DSD presented site alternatives to help local abutters and neighbors understand the criteria of our site selection process. This was submitted in Appendix C of the initial Petition submission. The Petitioner presented three alternative sites which had initially assessed

based on the following criteria:

- Willing landlord
- Land specifications (current land use; access and rights; topography; soil conditions; historical land uses [e.g., previous contamination])
- Interconnection constraints (including distance from potential point of interconnection and available capacity at the substation)
- Distance from energy off taker
- Proximity to wetlands/waterways
- Stormwater management
- Construction access
- Rare/endangered species habitat
- Cultural resources and preservation
- Complexity of permitting pathway

During an initial meeting with local abutting landowners, two other sites had been recommended within the Town of Hamden which the Petitioner also included within the Site Selection Process package. These sites were analyzed holistically, and the Petitioner explained the issues at each site and reasons why these sites were not selected, and ultimately why the site at 360 Gaylord Mountain Road was selected.

The project doesn't even provide electrical power to Hamden. The solar field offers no appreciable benefit to the Town.

The Petitioner was awarded an RFP (VNM RFP CSCU-1809) with the State of Connecticut and subsequently the opportunity to sell Virtual Net Metering credits to CSCU member institutions located within the United Illuminating territory. Once

awarded the Project, the Petitioner reached out to the Mayor's Office numerous times to discuss the Project in greater detail, including how the Town would benefit directly, but unfortunately did not receive a response from the Town. Because the Town is in the utility's territory, it will benefit from the electricity produced by the project, not to mention this solar project will be advancing the state of Connecticut's renewable energy goals.

Hamden Inland Wetland Commission letter dated August 28, 2020

It is important to note in response to these comments that the proposed solar facility is under the exclusive jurisdiction of the Council and that the provisions of the Hamden Inland Wetlands and Watercourses Regulations referenced below are preempted by the Council's authority.

Section 10.2.k of the Regulations requires "at a minimum, a Non-disturbance Buffer Zone encompassing the land area one hundred (100) feet from any wetland or watercourse… unless the applicant demonstrates through substantial evidence in the record that such activity within the 100-foot non-disturbance area does not pose an impact to the regulated area."

Potential wetland impacts associated with the Project are documented in the Petition and in responses to interrogatories Questions 47 and 52 herein.

Section 10.2.k also stipulates that "Factors to be considered in determining the appropriate width of a buffer zone include but are not necessarily limited to the presence of steep slopes, the intensity of adjacent land use, soil erodibility…."

The design of the Project has been carefully considered to maximize buffer distances where feasible to the onsite wetland resources. Furthermore, the Project has undergone an

iterative redesign process significantly reducing the overall footprint and increasing the separating distances to wetland resources where feasible, as discussed in the Petition. While some Project activities will encroach within 100 feet of wetlands (Town of Hamden Inlands Wetlands Commission's non-disturbance buffer target), as discussed above, they will not result in a significant negative impact to wetland resources. Regarding tree removal and the potential impact to wildlife populations utilizing the Property and the surrounding environs, the Project is not anticipated to have a significant negative impact on these populations. The habitat block associated with the Project Site is isolated from larger habitat blocks west of the Project Site by the transmission utility corridor and other habitats north, east, and west by residential development and public roads. The geometry of these proximate developments results in much of the habitat block associated with the Project Site being influenced by 'edge' effects reducing its use by key core forest wildlife species. It is likely that this habitat block is heavily utilized by more generalist wildlife species that tolerate these anthropogenic stressors. However, as these species are generally more tolerant of human disturbance and are highly transient it is unlikely that the loss of the habitat block will result in a significant negative impact to these generalist wildlife species.

Sections 10.3 and 10.4 address the question of "feasible and prudent alternatives to the proposed regulated activity which have less adverse impact on wetlands or watercourses."

The Petitioner previously investigated alternative sites for solar development and presented local abutters and neighbors with this analysis. This analysis was submitted in as Exhibit C in Petition No. 1425. Many of the sites presented and recommended were in

close proximity to major wetland features and raised concerns around stormwater management and floodplain zones. As outlined in response to Question 51, these sites, as well as the currently proposed Project Site, were investigated holistically and the current site was ultimately the most feasible and prudent for development.

It cannot be understated that the design of the Project thoughtfully considered way to maximize buffer distances where feasible to the onsite wetland resources and has undergone an iterative redesign process significantly reducing the overall development footprint and increasing the separating distances to wetland resources where possible.

Section 10.4 also authorizes the Agency in certain circumstances to "propose on the record in writing the types of alternatives which the applicant may investigate…"

The Petitioner's Site Selection Analysis included two sites which were recommended during a virtual public information meeting on May 21, 2020 which the Petitioner hosted. Local abutters and neighbors, as well as Hamden's Town Planner, Daniel Kops were in attendance and recommended the Petitioner investigate the following two sites:

- Hamden Landfill/Transfer Station, Wintergreen Ave Hamden, CT 06518 (Site 5 within the Site Selection Analysis)
- 100 Skiff St. Hamden, CT 06514 (Site 6 within the Site Selection Analysis)

Section 11.9.g stipulates that "The boundary of the Non-disturbance Buffer Zone(s)…shall be marked at every thirty-five foot interval using….such materials…and medallions as the Agency may direct".

The Limits of Disturbance will be surveyed and marked prior to the start of construction. In addition, perimeter E&S controls shall be established prior to the start of construction marking the edge of the Non-Disturbance Buffer Zone. Finally, as per the Resource

Protection Plan, signage will be posted at regular intervals identifying sensitive wetland resource areas and a contractor education training session shall be performed to educate the contractor and personnel on the location and sensitivity of nearby wetland resources to prevent potential unintentional wetland impacts.

Question No. 53

Provide response/comment to the Connecticut Council on Environmental Quality letter dated September 18, 2020.

Response

Regarding visibility, an approximately 50-foot buffer of existing trees/vegetation will be maintained along the southern Project Area boundary. In addition, a proposed berm will be planted with coniferous trees to provide screening during leaf-off conditions. An additional planted berm that would serve to screen the historic Caleb Doolittle Jr. House northeast of the Project Area would require additional tree/vegetative clearing to install. As such, it was determined that a planted berm would be counterproductive to the visual screening of this portion of the Project Area.

Regarding wetlands, existing conditions of the resources (and their relatively low qualities) and anticipated Project-related effects are documented in the Petition and in responses to interrogatories Questions 47 and 52 herein.

Regarding stormwater, the Petitioner, as part of the Resource Protection Plan, is committed to employing an Environmental Monitor tasked with inspecting the Project throughout and post construction to ensure compliance with the proposed protection measures as detailed in the erosion and sedimentation control plan, as well as the Project's stormwater permit requirements.

Question No. 54

Please submit photographic site documentation with notations linked to the site plans or a detailed aerial image that identify locations of site-specific and representative site features. The submission should include photographs of the site from public road(s) or publicly accessible area(s) as well as site-specific locations depicting site features including, but not necessarily limited to, the following locations as applicable:

For each photo, please indicate the photo viewpoint direction and stake or flag the locations of site specific and representative site features. Site-specific and representative site features include, but are not limited to, as applicable:

1. wetlands, watercourses and vernal pools;
2. forest/forest edge areas;
3. agricultural soil areas;
4. sloping terrain;
5. proposed stormwater control features;
6. nearest residences;
7. site access and interior access road(s);
8. utility pads/electrical interconnection(s);
9. clearing limits/property lines;
10. mitigation areas; and
11. any other noteworthy features relative to the Project.

A photolog graphic must accompany the submission, using a site plan or a detailed aerial image, depicting each numbered photograph for reference. For each photo, indicate the photo location number and viewpoint direction, and clearly identify the locations of site-specific and

representative site features show (e.g., physical staking/flagging or other means of marking the subject area).

The submission shall be delivered electronically in a legible portable document format (PDF) with a maximum file size of <20MB. If necessary, multiple files may be submitted and clearly marked.

Response

The Remote Field Review exhibit is included as Attachment 7.

Facility Construction

Question No. 55

Has the petitioner submitted an application for a General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities from the Department of Energy and Environmental Protection? If so, when?

Response

The Petitioner has not formally submitted its application for a General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities ("GP"). Prior to the filing of the Petition with the Council, the Petitioner discussed and met with DEEP Stormwater Division personnel on several occasions, including video calls on May 19, and May 26, 2020, and a subsequent field visit on June 10, 2020. The details of the discussions from these meetings are provided in the response to Question 56 below.

Given DEEP's recently efforts to renew the storm water GP, the Petitioner has elected to wait for any further comments from DEEP and the Council regarding the Project before submitting its application for a GP.

Question No. 56

Referencing pages 9 and 10 of the Petition, the Petitioner met with DEEP Stormwater Division on May 10, 2020 and a follow-up field visit on June 10, 2020. Were any subsequent meetings with DEEP Stormwater held? Please describe any recommendations, comments or concerns about the project provided by the Stormwater Division.

Response

The Petitioner presented an initial concept plan for the Project on the video conference call with DEEP Stormwater Division on May 19, 2020. The concept presented during that call consisted of 6,968 400W solar panel modules in a 2-panel portrait layout with a zero (0) degree azimuth orientation. DEEP expressed concerns regarding the existing slopes on site and the orientation of the array at the zero degree azimuth in respects to stormwater runoff due to the proposed drip edge being parallel to the existing topography. Based on these concerns, the petitioner redesigned the Project to consist of 6,292 400W solar panel modules, a decrease of 672 proposed modules, removing modules from slopes greater than 20 percent, and rotated the orientation to be perpendicular to the existing topography, an azimuth of approximately 72.6 degrees. Upon completion of the redesign the Petitioner had another follow up conference call with DEEP on May 26, 2020 to review the revised design. At this point DEEP was satisfied that adjustments were able to be made including the addition of compost filter sock on grade along the slope and wanted to perform a site walk to review things further.

The June 10, 2020 field walk included Neal Williams and Chris Stone of DEEP and Bradley Parsons of APT. The site walk started at Gaylord Mountain Road to review the location of the proposed access into the site and the discharge of the stormwater basin. The existing wetland, culvert and outlet on the east side of the road were reviewed at this time. It was noted

that there were some improvements added by the Town to help the stormwater in the road including the existing HDPE cross culvert. DEEP Stormwater requested that the project reach out to Dam Safety for a determination on the stormwater basin that would be located up gradient from the road. The site visit continued into the array field where the slopes were reviewed including areas over 20 percent from which modules were removed. The walk continued to the Eversource ROW where some of the existing swales and culverts were reviewed along with the upper drainage area and the addition of the swale and level-spreader to remove flow from the array area. This proceeded by heading down back down the slope to the south of the array to review how the existing topography from the level-spreader remained on site flowing east towards Gaylord Mountain Road. DEEP understood that the site was complex from a stormwater standpoint but appreciated that a good amount of thought and design went into the project to get the Project to its current state.

Question No. 57

DEEP's proposed revisions to the General Permit, including draft Appendix I, Stormwater Management at Solar Array Construction Projects specifies a 100-foot buffer between the solar array and on-site wetlands. Given that the proposed solar array is within 100 feet of wetlands, has the DEEP Stormwater Division offered any comments as to the proposed site design?

Response

DEEP's January 2020 draft Appendix I does not specifically specify a 100-foot buffer between the solar array and on-site wetlands. Appendix I Section (1) states that if the requirements of (a)-(e) cannot be met, then the solar panels should be considered effective impervious for the purposes of calculating water quality volume. Section (1)(e) states "A one-

hundred (100) foot buffer shall be maintained between any part of the solar array and any of the following: "wetland" as defined in in Conn. Gen. Stat. § 22a-29, "wetlands" as defined in Conn. Gen. Stat. § 22a-38, or "waters" as defined in Conn. Gen. Stat. § 22a-423, which shall include vernal or intermittent waters. The buffer shall consist of undisturbed existing vegetation or native shrub plantings." The Project complies with Section (1) by considering the solar panels effective impervious for the purposes of calculating water quality volume. DEEP Stormwater Division personnel have reviewed the plans as submitted to the Council and has not expressed concerns with respect to wetlands.

Question No. 58

With regard to earthwork required to develop the site, provide the following:

a. Will the site be graded? If so, in what areas?

b. What is the desired slope within the solar array areas?

c. Could the solar field areas be installed with minimal alteration to existing slopes?

d. If minimal alteration of slopes are proposed, can existing vegetation be maintained to provide ground cover during construction?

e. Estimate the amounts of cut and fill in cubic yards for the temporary and permanent access road(s).

f. Estimate the amounts of cut and fill in cubic yards for solar field grading.

Response

a. Grading on-site will be isolated within the areas associated with the temporary access road, proposed access road, and the proposed stormwater management best management practices which includes the stormwater management basin, swales, and level spreader.

b. The maximum slope that is conducive to the construction and operation of solar array areas is 30% grade. The majority of the proposed solar array modules have been designed and located within existing slopes that are less that 15% grade, with a few areas of existing slope that do not exceed 20% grade.

c. The solar field is intended to be installed with minimal alteration to existing slopes.

d. While minimal alteration to the existing slopes is anticipated within the areas of the proposed solar array modules, the Project does intend to phase construction and use additional erosion control measures to minimize the impacts to the stability of the existing slopes. Grubbing is anticipated to be isolated within the direct areas associated with the proposed solar array. Additionally, a minimum of thirty (30) days is proposed within the construction schedule to allow hydroseeding of disturbed areas during clearing of the Site to establish prior to any additional site work. A series of filter sock will also be placed on contour approximately every 75 feet up the existing slope and maintained throughout construction to further break up the potential channelization of stormwater runoff down the slope.

e. While the area associated with the proposed solar field is not anticipated to require grading, the grading associated with the temporary access road, proposed permanent access road, and stormwater management best management practices is as follows:

    1. Approximate volume of cut: 5,639 cubic yards.

    2. Approximate volume of fill: 4,181 cubic yards.

3. Approximate net volume: 1,458 cubic yards of cut. (The excess cut can be spread and stabilized within upland areas on site or disposed of offsite in accordance with applicable laws and regulations.)

Question No. 59

Petition Exhibit H, p. 65 states the temporary access road would be decommissioned upon Project completion. Describe decommissioning and land restoration procedures.

Response

Only a portion of the temporary access road would require decommissioning, which is associated with crossing the existing Eversource transmission line right of way. The existing right of way is currently being maintained in terms of vegetation. The removal of the temporary access road would consist of stabilizing any disturbances with an approved hydroseed mix.

Question No. 60

Referring to Site Plan EC-3, what is the purpose of the proposed riprap drainage swale in the western portion of the property, isolated from the main project area?

Response

The proposed rip-rap drainage swale located in the western portion of the Project Site is intended to collect and direct stormwater runoff from the west and south to the level spreader and away from the proposed solar array area. The combined swale and level spreader are intended to reduce the channelization of stormwater runoff from off-site and promote less erosive sheet flows on site and away from the solar array area.

Question No. 61

Referring to Site Plan EC-3, how will Wetland 5 be protected for sedimentation or accidental vehicle disturbance during clearing/grubbing activities? If clearing of this wetland and

the surrounding area is only necessary for Project shading mitigation, can a no grub upland buffer be established around the wetland?

Response

The Petitioner has proposed a Resource Protection Plan (provided as Appendix B in the Environmental Assessment) which includes an educational training session focused on identifying where sensitive wetland resources are located on the Site, how to avoid unintentional impacts, and stressing the importance of installing and maintaining erosion and sedimentation controls proximate to these resources. In addition, routine monitoring is proposed as part of this plan which will focus on ensuring proper controls are installed and maintained to protect nearby wetland resources (including but not limited to Wetland 5).

Clearing of Wetland 5 is necessary to mitigate shading. Due to the proximity of Wetland 5 to the installations of solar arrays and security fencing, a no grub upland buffer is not feasible.

Question No. 62

Has a comprehensive geotechnical study been completed for the site to determine if site conditions support the overall Project design? If so, summarize the results. If not, has the Petitioner anticipated and designed the Project with assumed subsurface conditions? What are these assumed conditions?

Response

Yes, a comprehensive geotechnical study has been completed for the Site (see response to Question 44 above). Findings of this study have been and will continue to be used in the development of the final Project design, including stormwater and structural considerations.

As previously noted, subsurface conditions were found to include subsoil overlying glacial till deposits and bedrock. The field investigation took borings from 6 locations spread

throughout the Project site and generally found bedrock at an average depth of ±6' deep.

Based upon observed surface conditions, the subsurface is assumed to contain a large percentage of rocks and cobbles and a high probability that the more common pounded I-beam supports will be difficult to install. Therefore, the Petitioner is proposing the use of earth screw supports with the assumption that the majority of these will require pre-drilling to facilitate installation. Additionally, the resistance to uplift forces will be evaluated from pre-construction pull tests to ensure we meet or exceed design minimums.

The removal of trees and brush will be limited to flush-cutting, leaving the root systems undisturbed. This, along with the pre-drilled ground screw supports, will allow the installation to be completed with little or no change in the pre-construction site conditions.

Question No. 63

How will the proposed stormwater swales and basins be installed if shallow or exposed bedrock is encountered?

Response

The proposed stormwater swales and basins are designed to minimize the need to be "cut-in" on site to reduce the probability of encountering bedrock.

Question No. 64

The Site Plans show the outlet and emergency overflow of the single Stormwater Basin discharging towards Gaylord Mountain Road. What is the distance from the outlet structure end points to the Gaylord Mountain Road? What are the grades after the point of discharge? Will basin discharge flow onto Gaylord Mountain Road? Describe further mitigation to minimize overflow.

Response

The proposed outlet control structures and emergency overflow weir of the proposed single Stormwater Basin is located approximately 135 linear feet from Gaylord Mountain Road. The grade at the immediate point of discharge, along the proposed riprap section of the fill berm associated with the basin, is approximately 33%. The discharge then flows over a rip-rap energy dissipater prior to transitioning to the existing slope of 13% before entering the proposed plunge pool along the road and reaching existing Wetland 3 where the existing flows are directed today. Existing Site stormwater currently flows over approximately 33% grade directly west of wetland 3.

The existing stormwater runoff currently flows pond into wetland 3 and through the existing culvert or overtop Gaylord Mountain Road. It is anticipated that the installation of the stormwater management basin and reduction of the pre-development peak stormwater discharge will reduce the likelihood of the water that collects in wetland 3 from over topping Gaylord Mountain Road in the future.

The stormwater management basin that is being installed to the west of Gaylord Mountain Road has been designed to reduce the 100-year Peak Stormwater Discharge from the site by 6.3 cubic feet per second. The stormwater calculations also take into account the requirement of the draft Appendix I to reduce the hydrologic soil group by one step in the post-development stormwater calculations. This reduction of a hydrologic soil group exceeds industry standards and results in an increase in the size of the stormwater basin to hold back more water, which will further aid in the reduction of stormwater overtopping Gaylord Mountain Road.

Maintenance Questions

Question No. 65

Would the installed solar panels require regular cleaning or other, similar, maintenance and how often? If so, describe cleaning procedures including substances used. Would this maintenance activity have any impacts to water quality?

Response

The amount of precipitation per year is more than enough to keep the panels free of any heavy soiling which could impact production. However, cleaning would be provided twice per year. This would utilize deionized water and therefore, would not have any impacts to water quality. Additionally, we would prescribe a once per year preventive maintenance plan, in addition to 24-hour monitoring and unplanned maintenance as needed.

Question No. 66

Would the petitioner store any replacement modules on-site in the event solar panels are damaged or are not functioning properly? If so, where? How would damaged panels be detected?

Response

No, replacement modules would not be stored on-site. Damaged panels would be detected and marked for replacement one of two ways, either remotely through alarms in the monitoring system or during routine site inspections by operations and maintenance technicians.

Question No. 67

How will sediment be removed and transported from stormwater features? Where would removed sediment be disposed of?

Response

Sediment will likely be removed and transported from the stormwater features via a skid-steer loader. The sediment can be spread and stabilized within upland areas on site or disposed of offsite in accordance with applicable laws and regulations.

Question No. 68

Does the petitioner intend to establish a Habitat Enhancement Area around the periphery of the facility, as described in Petition Exhibit H, Section 3.1.3? If so, at what time of year would mowing be conducted to reduce the impact to nesting birds and other wildlife?

Response

The Petitioner intends to establish a Habitat Enhancement area around the periphery of the facility, as described in Section 3.1.3 of the Petition. Where feasible, mowing shall be performed on a 4 to 7-year basis during late summer/early fall to reduce the impact to nesting birds and other wildlife.

CERTIFICATE OF SERVICE

I hereby certify that on the 20th day of October 2020, a copy of the foregoing was sent, via electronic mail, to:

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Gaylord Mountain Solar Project 2019, LLC
200 Harborside Drive, Suite 200
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jenny.nicolas@dsdrenewables.com

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Kenneth C. Baldwin

ATTACHMENT 1

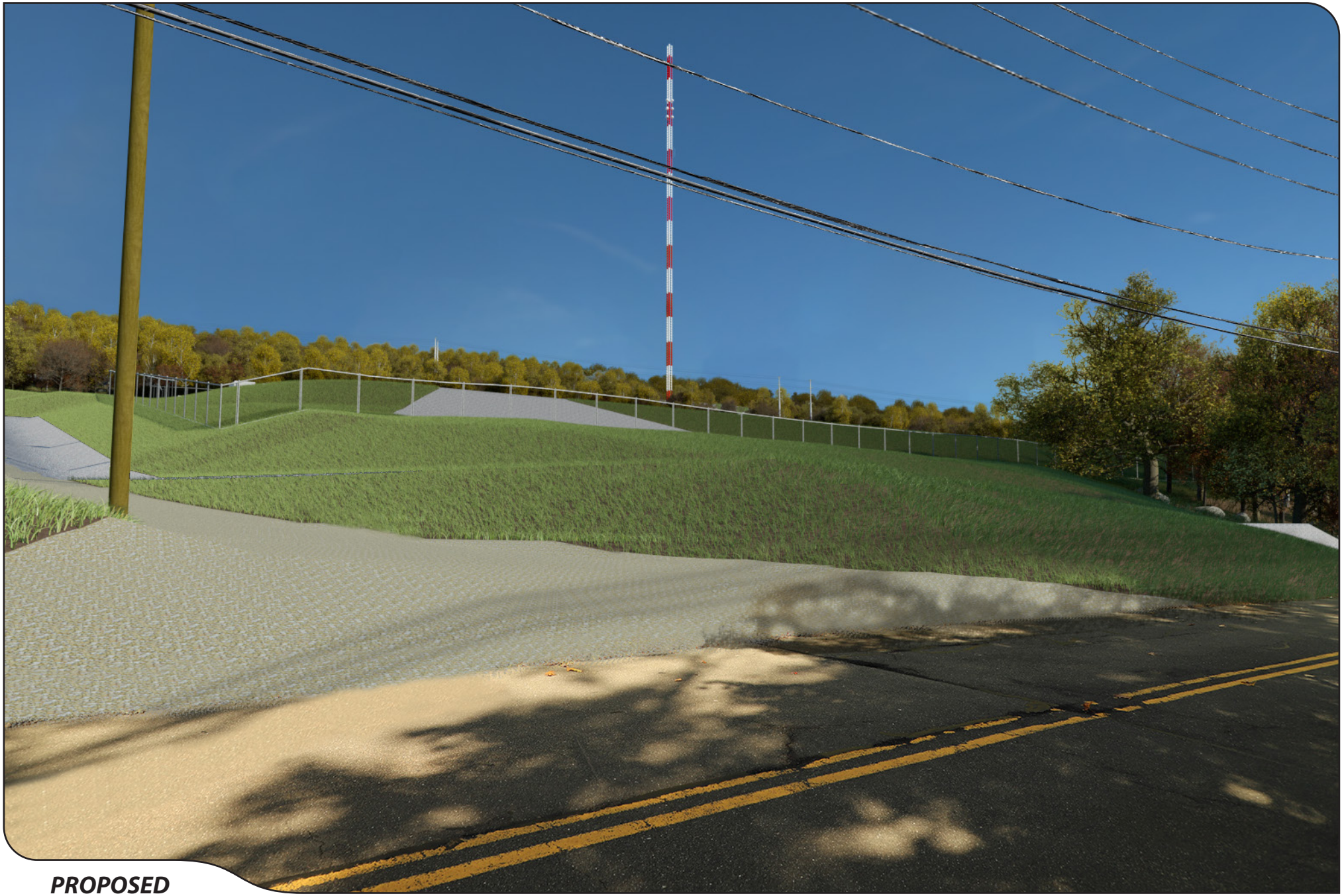
PHOTOGRAPHED ON 10/7/2020

EXISTING

PHOTO	LOCATION	ORIENTATION
1	**GAYLORD MOUNTAIN ROAD AT PROPOSED SITE ENTRANCE**	**NORTHWEST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

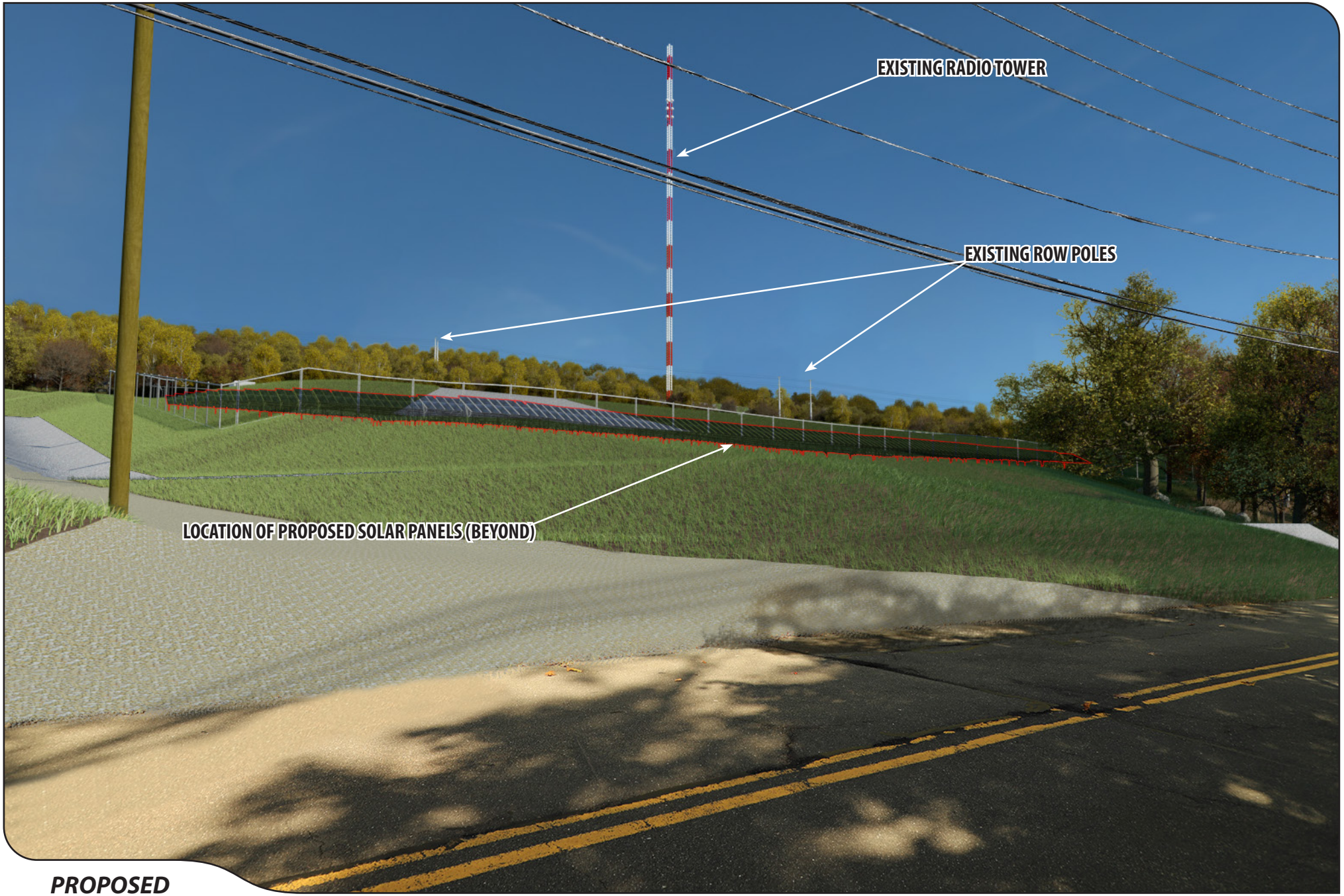


PROPOSED

PHOTO	LOCATION	ORIENTATION
1	**GAYLORD MOUNTAIN ROAD AT PROPOSED SITE ENTRANCE**	**NORTHWEST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD



PROPOSED

PHOTO	LOCATION	ORIENTATION
1	**GAYLORD MOUNTAIN ROAD AT PROPOSED SITE ENTRANCE**	**NORTHWEST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

PHOTOGRAPHED ON 10/7/2020

EXISTING

PHOTO	LOCATION	ORIENTATION
2	**GAYLORD MOUNTAIN ROAD AT PROPOSED SITE ENTRANCE**	**WEST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

PROPOSED

PHOTO	LOCATION	ORIENTATION
2	**GAYLORD MOUNTAIN ROAD AT PROPOSED SITE ENTRANCE**	**WEST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

PROPOSED

PHOTO	LOCATION	ORIENTATION
2	**GAYLORD MOUNTAIN ROAD AT PROPOSED SITE ENTRANCE**	**WEST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

PHOTOGRAPHED ON 10/7/2020

EXISTING

PHOTO	LOCATION	ORIENTATION
3	**HUNTING RIDGE ROAD**	**NORTHEAST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

PROPOSED

PHOTO	LOCATION	ORIENTATION
3	**HUNTING RIDGE ROAD**	**NORTHEAST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

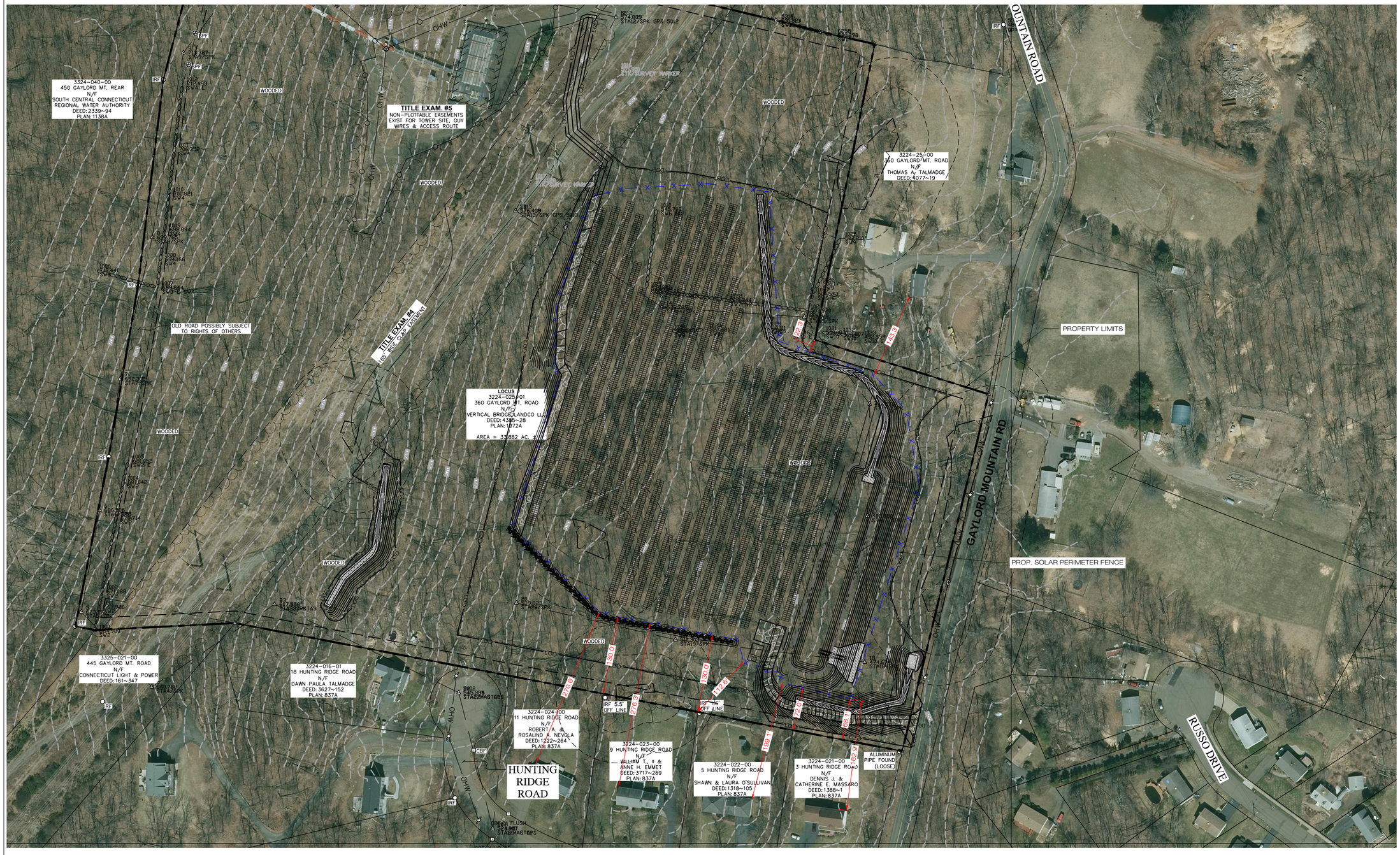
PROPOSED

PHOTO	LOCATION	ORIENTATION
3	**HUNTING RIDGE ROAD**	**NORTHEAST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

ATTACHMENT 2



1 EXH-1 **EXHIBIT 1**
SCALE : 1" = 80'-0"

80 0 40 80 160
(IN FEET) 1 inch = 80 ft.

GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC

200 HARBORSIDE DRIVE SUITE 200 SCHENECTADY, NY 12305

ALL-POINTS TECHNOLOGY CORPORATION
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WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

EXHIBIT

NO	DATE	REVISION
0	10/09/20	FOR REVIEW: BJP
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: VERTICAL BRIDGE LANCO LLC
ADDRESS: 750 PARK OF COMMERCE DR S200 BOCA RATON, FL 33487

HAMDEN SOLAR

SITE ADDRESS: 360 GAYLORD MOUNTAIN RD HAMDEN, CT

APT FILING NUMBER: CT619100

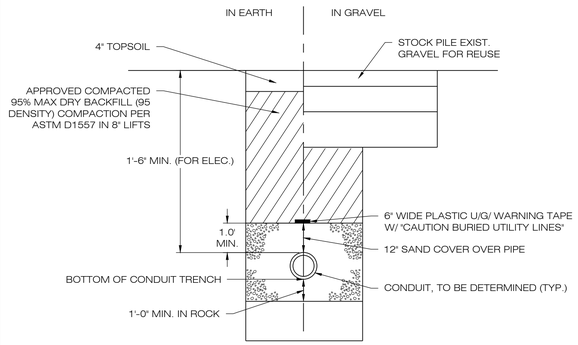
DRAWN BY: JT

DATE: 10/09/20 CHECKED BY: BJP

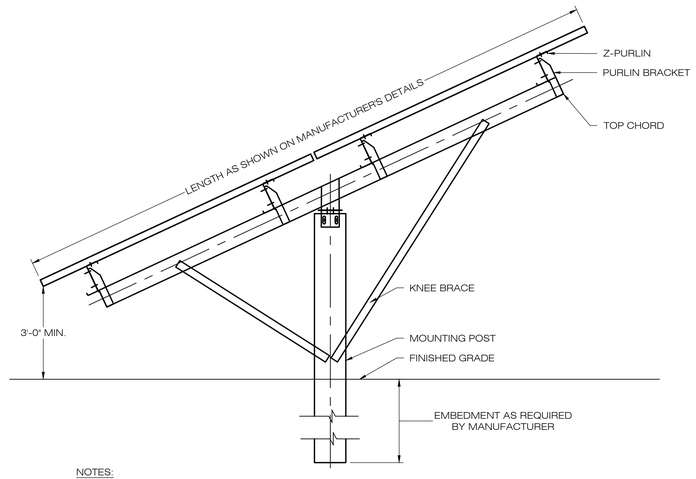
SHEET TITLE:
EXHIBIT 1 RESPONSE TO INTERROGATORY QUESTION NO. 15

SHEET NUMBER:
EXH-1

ATTACHMENT 3

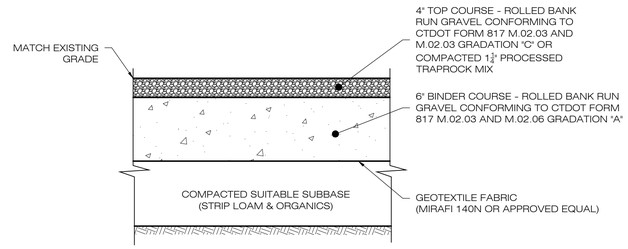


1 DN-1 **ELECTRICAL TRENCH DETAIL**
SCALE : N.T.S.



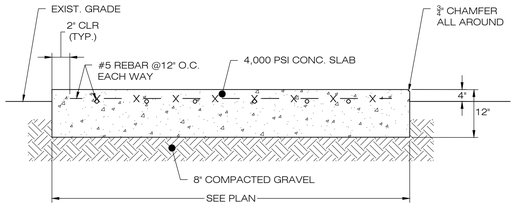
NOTES:
SEE MANUFACTURER'S DETAIL SHEETS FOR ADDITIONAL INFORMATION REGARDING RACKING SYSTEM REQUIREMENTS AND INSTALLATION PROCEDURES. RACKING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

2 DN-1 **TYPICAL POST MOUNTED RACKING SYSTEM**
SCALE : N.T.S.

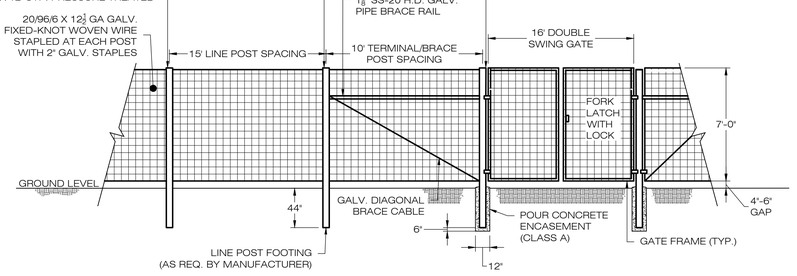


NOTES:
1. SUBBASE MAY CONSIST OF NATIVE MATERIALS IF FOUND ACCEPTABLE BY THE ENGINEER. SUBBASE TO BE COMPACTED TO 95% MAX DRY DENSITY.
2. SUBBASE IS TO BE FREE FROM DEBRIS AND UNSUITABLE MATERIALS.

3 DN-1 **GRAVEL ACCESS DRIVE SECTION**
SCALE : N.T.S.



4 DN-1 **CONCRETE EQUIPMENT PAD**
SCALE : N.T.S.



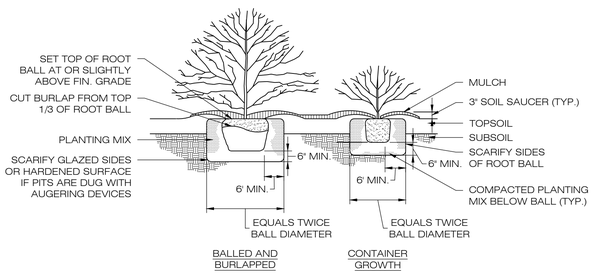
5 DN-1 **FARM FENCE & GATE DETAIL**
SCALE : N.T.S.

HAMDEN SOLAR
FARM LLC

IN CASE OF EMERGENCY
CALL T.B.D.

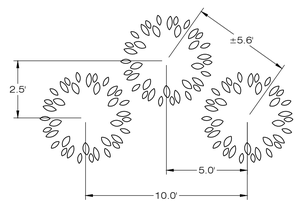
NOTES:
EMERGENCY CALL NUMBER TO BE PROVIDED ONCE DETERMINED.

6 DN-1 **NOTIFICATION SIGN DETAIL**
SCALE : N.T.S.



NOTES:
IN AREAS OF MASS PLANTINGS, CONTINUOUSLY EXCAVATE AND MULCH ENTIRE BED..

7 DN-1 **TYPICAL PLANTING DETAIL**
SCALE : N.T.S.



8 DN-1 **SCREENING TREE SPACING**
SCALE : N.T.S.

GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC

200 HARBORSIDE DRIVE SUITE 200 SCHENECTADY, NY 12305

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CSC PERMIT SET

NO	DATE	REVISION
0	08/07/20	ISSUED FOR PERMIT: BJP
1	10/19/20	INTERR. RESPONSE: BJP
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
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SITE ADDRESS: 360 GAYLORD MOUNTAIN RD HAMDEN, CT

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DRAWN BY: JT
DATE: 08/07/20 CHECKED BY: BJP

SHEET TITLE:
SITE DETAILS

SHEET NUMBER:
DN-1

ATTACHMENT 4

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

GEOTECHNICAL ENGINEERING REPORT
PROPOSED SOLAR ARRAY
HAMDEN SOLAR ONE
360 GAYLORD MOUNTAIN ROAD
HAMDEN, 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. 0032-032.00
May 2020

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

May 22, 2020
File No. 0032-032.00

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
Hamden Solar One
360 Gaylord Mountain Road, Hamden, Connecticut

Down To Earth Consulting, LLC (DTE) is pleased to submit this geotechnical engineering report for the Hamden Solar One Project that will be located on Gaylord Mountain Road in Hamden, 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

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

Down To Earth Consulting, LLC, completed a subsurface exploration program and geotechnical engineering evaluation for the proposed 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*, prepared by the Client, revision dated April 3, 2020.

2.0 BACKGROUND

The Hamden Solar One project is generally bordered by Gaylord Mountain Road to the east, a residential development to the south, powerlines to the west, and undeveloped land to the north. A proposed ground-mount solar array will be constructed that will consist of about 7,000 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 reddish-brown New Haven Arkose (a.k.a. brownstone) to the northeast and dark-gray West Rock Dolerite (a.k.a. traprock) to the southwest.

3.2 TEST BORINGS

We observed and logged six test borings (B-1 through B-6) drilled by our subcontractor General Borings, Inc. on April 21, 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 6 to 10.5 feet below existing grades. Each boring was advanced until encountering drilling and/or sampling refusal on inferred bedrock.

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 Subsoil overlying Glacial Till Deposits and Bedrock. An approximate 8- to 12-inch layer of Topsoil/Forest Debris was encountered at the surface of the explorations. The following is a more detailed description of the subsurface materials encountered:

4.1.1 Subsoil

Subsoil was encountered at each of the boring locations directly below the Topsoil/Forest Debris. This stratum ranged in thickness from about 1 to 2 feet and generally consisted of loose, orange-brown/brown, silt with varying amounts of fine to medium sand (about 35 to 60%) and trace to little amounts (0% to 20%) of fine gravel. The subsoil did not have an organic odor, but trace (0 to 5%) amounts of organic material (e.g., rootlets) was observed in many samples.

4.1.2 Glacial Till

Glacial Till was observed below the Subsoil in the borings and ranged in thickness from about 3 to 7 feet. This material generally consisted of dense to very dense, red-brown, fine to coarse sand with varying amounts (10% to 60%) of silt and fine to coarse gravel. In some instances, the presence of cobbles and boulders were inferred by "rig chatter" and refusal during drilling and sampling.

4.1.3 Weathered Rock

Weathered Rock was observed in split spoon samples at most borings (except B-3 and B-5) at about 5 to 10 feet below existing grades. Bedrock was inferred from split spoon and/or auger refusal at depths ranging from about 6 to 10.6 feet below existing grades.

4.2 GROUNDWATER

Groundwater was measured in the boreholes during drilling or inferred from wet soil samples and ranged from about 1.5 to 5 feet below existing grades. 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. A soil sample was collected within the proposed southeastern detention basin 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-4 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. A soil sample was also collected at 3 feet below grade at the Boring B-2 location for Thermal Resistivity testing. 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 soil sample submitted for gradation testing. The estimated hydraulic conductivity of the sample was estimated at 8e-4 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 April 20, 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	262,068	265,227
10	222,140	240,332
20	144,774	123,326
30	114,038	105,823
40	36,845	31,176

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 glacial till soils, containing cobbles and boulders, over relatively shallow bedrock. 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 “B” 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, Weathered Rock, or Bedrock. 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	225 pounds per cubic inch (pci)
Glacial Till (>3.5 fbg) – wet	175 pci
Weathered Rock	225 pci
Angle of Internal Friction	
Glacial Till	36
Weathered Rock	40
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)
Sound Bedrock	10 ksf
Allowable Bond Value[2]	
Glacial Till/Weathered Rock (>3.5 feet)	7 pounds per square inch (psi)
Sound Bedrock	35 psi
Lateral Loading Analysis[3]	
Glacial Till (>3.5 feet) dry - k_{py}	225 pounds per cubic inch (pci)
Glacial Till (>3.5 feet) wet - k_{py}	175 pci
Weathered Rock - k_{py}	225 pci
Sound Bedrock – k_{rm}	0.0005
Angle of Internal Friction	
Glacial Till	36
Weathered Rock	40
Bedrock	45
Total Soil Unit Weight	
Glacial Till	135 pounds per cubic foot (pcf)
Weathered Rock	140 pcf
Bedrock	145 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 and/or Weathered

Rock. 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) 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 six kips per square foot (6 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 DRILLED PIERS

Technical specifications should be prepared by the design team that require detailed material and construction submittals and proof of experience in drilled pier installation by the specialty Contractor. Again, the drilling method or combination of methods selected by the contractor should be submitted for review by the geotechnical engineer, prior to mobilization of drilling equipment.

A section of temporary casing may be required to reduce the likelihood of caving of the side walls of the drill hole. Concrete should be placed by directing the concrete down the center of the shaft to reduce the likelihood of hitting the reinforcing steel and segregating. Groundwater, if encountered in the drill hole, should be removed prior to placing concrete; alternatively, concrete may be placed by tremie methods.

9.3 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.

9.4 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.

9.5 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.

9.6 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.

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 preliminary 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.

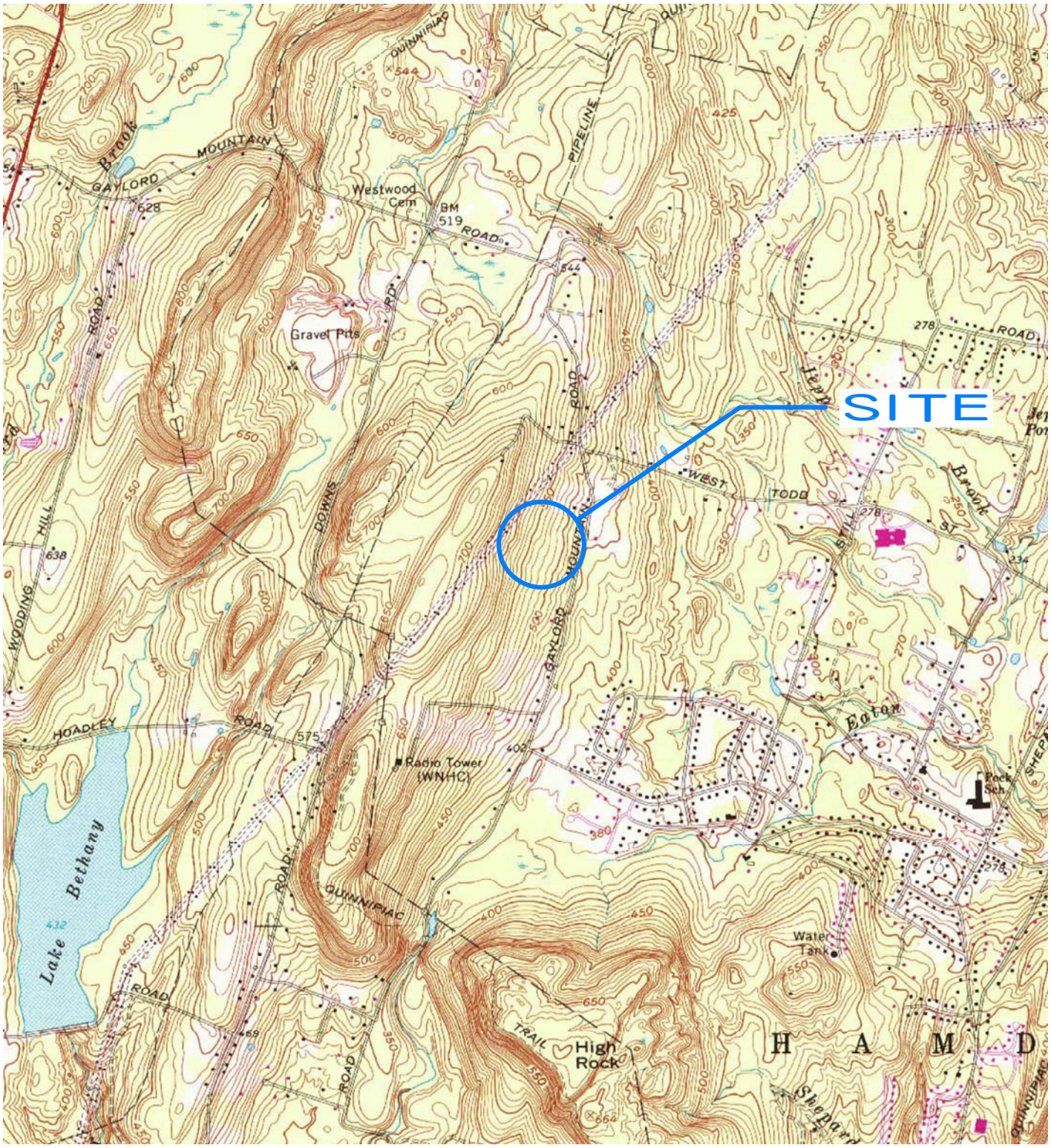
12.0 CLOSURE

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



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DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

122 CHURCH STREET
NAUGATUCK, CONNECTICUT 06770

CONNECTICUT

QUADRANGLE LOCATION

AREA PLAN
PROPOSED SOLAR ARRAY
360 GAYLORD MOUNTAIN ROAD
HAMDEN, CONNECTICUT

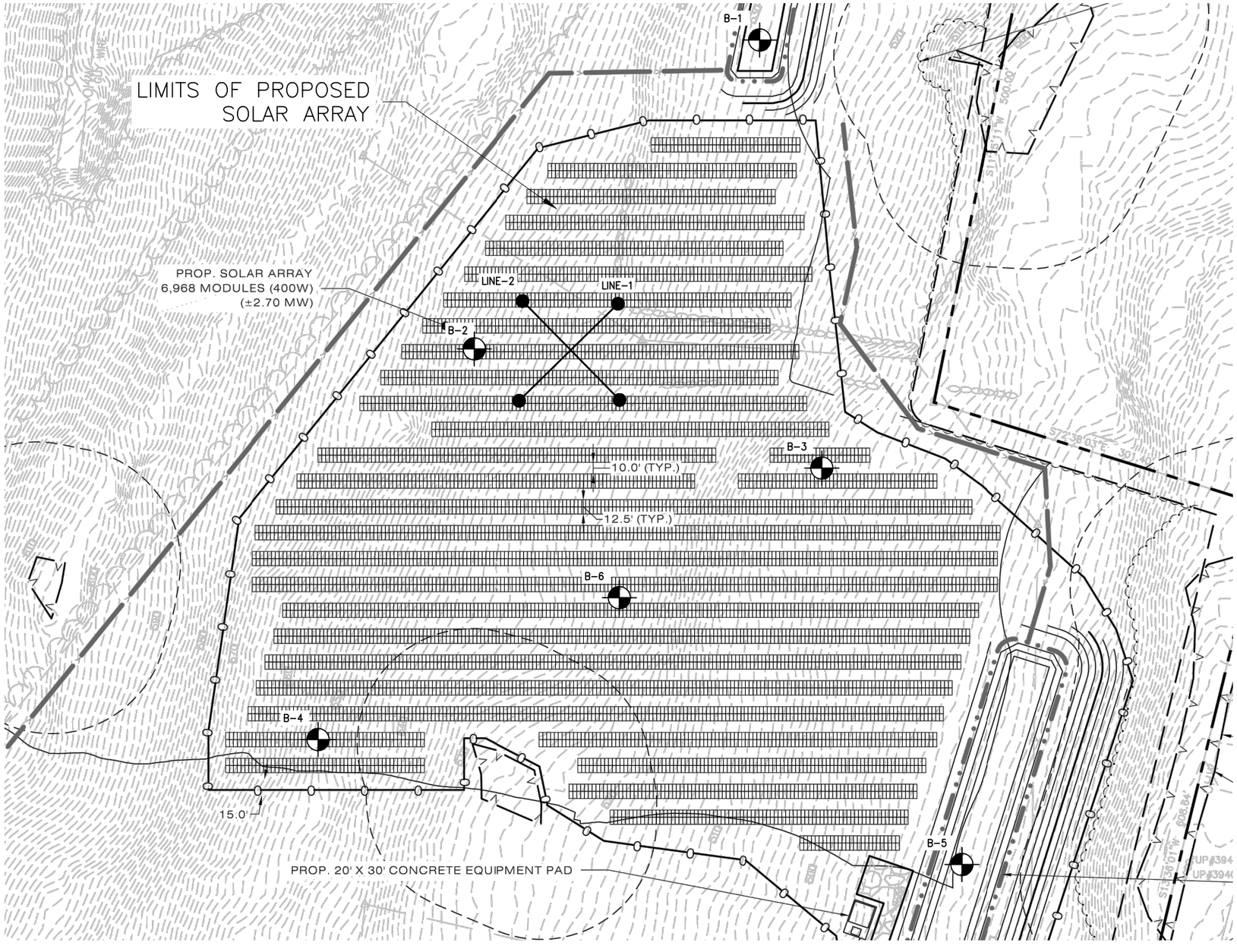
REFERENCE:
USGS TOPOGRAPHIC QUADRANGLE: MOUNT CARMEL, CT

SCALE 1"= 2,000'

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

DRAWN BY: ARB	REVIEWED BY: RPJ

PROJECT NO.	0032-032.00
DATE:	4/30/20
FIGURE NO.	1



LEGEND

B-1 — TEST BORING NO. AND APPROX. LOCATION

LINE-1 — RESISTIVITY TEST LOCATION (TYP.)

NOTES:

1) BASE MAP DEVELOPED FROM AN ELECTRONIC FILE PREPARED BY ALL-POINTS TECHNOLOGY, ENTITLED "CONCEPT PLAN, HAMDEN SOLAR, 360 GAYLORD MOUNTAIN ROAD, HAMDEN, CT", DATED MARCH 18, 2020. ORIGINAL SCALE 1"=80'.
2) BORINGS WERE COMPLETED BY GENERAL BORINGS, INC. AND OBSERVED BY DOWN TO EARTH CONSULTING, LLC.
3) RESISTIVITY TESTING WAS PERFORMED ON APRIL 20, 2020 BY DOWN TO EARTH CONSULTING, LLC.
4) THE LOCATIONS OF THE EXPLORATIONS AND RESISTIVITY TESTING WERE DETERMINED BY TAPING AND VISUAL ESTIMATES FROM EXISTING SITE FEATURES. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

DESIGNED BY OTHERS						
DRAWN BY ARB						
CHECKED BY RPJ	NO.	DATE	REVISIONS	DRWN.	CHKD	APPVD
APPROVED BY RPJ						

SCALE 1"= 100'

100' 50' 0 100'

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING
122 CHURCH STREET
NAUGATUCK, CONNECTICUT 06770

PROJECT
HAMDEN SOLAR ONE
360 GAYLORD MOUNTAIN ROAD
HAMDEN, CONNECTICUT

DWG. TITLE.
SITE AND BORING LOCATION PLAN

FILE NO. 0032-032.00
SCALE AS NOTED
DATE 4/30/20
FIGURE NO. 2

G:\My Drive\DTE Root Drive\Client Folders (new)\0032 - All-Points Technology\032 - Hamden Solar\0032-032.00 AREA AND SITE PLAN.dwg Raymond Janeiro 4/30/2020 12:20 PM

APPENDIX 2 -

TEST BORING LOGS

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
HAMDEN SOLAR ONE
360 GAYLORD MOUNTAIN ROAD
HAMDEN, CONNECTICUT

BORING NO. B-1
SHEET 1 of 1
FILE NO. 0032-032.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Tom McGovern	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/21/2020	Date End	4/21/2020

Hammer Type:	Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Track
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/21/20	-	5	-	wet sample
4/21/20	12:00 PM	1.5	-	3 hours (perched)

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	7/24	0 to 2	1-1-1-1		Very loose, Top 3": dark brown TOPSOIL; Bottom 4": orange-brown SILT and fine to medium SAND, trace (-) Roots, moist	12"+/- Topsoil/ Forest Debris SUBSOIL
2								
3		S-2	12/12	2 to 3	33-50/6"		Very dense, reddish brown fine to coarse SAND and fine to coarse GRAVEL, little Silt, moist	GLACIAL TILL
4								
5								
6		S-3	6/6	5 to 5.5	50/6"		Very dense, reddish brown fine to coarse SAND, some fine to coarse Gravel, trace Silt, with decomposed rock fragments at sample tip, wet	
7								DECOMPOSED ROCK
8								
9		S-4	0/0	8.5	50/0"		Very dense, No Recovery	
10							END OF EXPLORATION AT 8.5 FEET BELOW GROUND SURFACE	
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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 grinding observed from about 5 feet below ground surface on inferred boulders/decomposed bedrock.
4) Auger refusal encountered at 8.5 feet below ground surface on inferred bedrock.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT		BORING NO.	B-2
HAMDEN SOLAR ONE		SHEET	1 of 1
360 GAYLORD MOUNTAIN ROAD		FILE NO.	0032-032.00
HAMDEN, CONNECTICUT		CHKD. BY	RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Tom McGovern	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/21/2020	Date End	4/21/2020

Hammer Type:	Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Track
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/21/20	-	3	-	wet sample (perched)

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	8/24	0 to 2	1-25-3-4		Loose, Top 2": dark brown/black TOPSOIL; Middle 2": red-brown coarse GRAVEL fragments; Bottom 4": red-brown fine to coarse SAND, little fine to coarse Gravel, little Silt, moist	12"+/- Topsoil/ Forest Debris
2								
3		S-2	12/24	2 to 4	8-18-40-50		Very dense, Top 6": brown fine to coarse SAND and SILT, some fine Gravel, wet; Bottom 6": red-brown fine to coarse SAND, some fine to coarse Gravel, little Silt	SUBSOIL
4								
5								GLACIAL TILL
6		S-3	18/23	5 to 6.9	52-62-49-50/5"		Very dense, red-brown fine to coarse SAND and fine to coarse GRAVEL, little Silt	
7								
8								
9		S-4	15/24	8 to 10	35-52-36-56		Very dense, brown fine to coarse SAND, some fine to coarse Gravel, little Silt	
10								
11		S-5	1/1	10.5 to 10.6	50/1"		Very dense, light gray coarse decomposed ROCK fragments	DECOMP. ROCK
12							END OF EXPLORATION AT 10.6 FEET BELOW GROUND SURFACE	
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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 chatter observed from about 5 to 10.5 feet below ground surface on inferred cobbles/boulders.
5) Auger refusal encountered at about 10.5 feet below ground surface on inferred bedrock.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
HAMDEN SOLAR ONE
360 GAYLORD MOUNTAIN ROAD
HAMDEN, CONNECTICUT

BORING NO. B-3
SHEET 1 of 1
FILE NO. 0032-032.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Tom McGovern	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/21/2020	Date End	4/21/2020

Hammer Type:	Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Track
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/21/20	-	2	-	wet sample
4/21/20	-	2	-	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	12/24	0 to 2	1-2-2-2		Very loose, Top 5" dark brown Topsoil Bottom 7" red-brown SILT and fine to medium SAND, trace (-) Roots	12"+/- Topsoil/ Forest Debris
2								SUBSOIL
3		S-2	9/23	2 to 3.9	4-14-29-50/5"		Dense, reddish brown fine to coarse SAND, some fine to coarse Gravel, little Silt	
4								
5								GLACIAL TILL
6		S-3	0/5	5 to 5.4	50/5"		Very dense, No Recovery	
7								
8		S-4	0/0	8 to 8	50/0"		Very dense, No Recovery	
9							END OF EXPLORATION AT 8 FEET BELOW GROUND SURFACE	
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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 chatter observed from about 5 to 8 feet below ground surface (fbg) on inferred boulders/possible decomposed rock.
4) Auger refusal encountered at about 8 fbg. Boring relocated about 5 feet east and redrilled.
5) Auger refusal encountered again at 8 fbg on inferred boulders/possible bedrock. Boring terminated.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
HAMDEN SOLAR ONE
360 GAYLORD MOUNTAIN ROAD
HAMDEN, CONNECTICUT

BORING NO. B-4
SHEET 1 of 1
FILE NO. 0032-032.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Tom McGovern	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/21/2020	Date End	4/21/2020

Hammer Type:	Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Track
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/21/20	5:30 PM	3	-	end of drilling (inferred perched)

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	12/24	0 to 2	1-2-1-1		Very loose, brown SILT and fine to medium SAND, trace fine Gravel, trace (-) Roots	12"+/- Topsoil/ Forest Debris
2								SUBSOIL
3		S-2	8/24	2 to 4	12-15-18-28		Dense, brown fine to coarse SAND and SILT, little fine Gravel, wet	GLACIAL TILL
4								
5								
6		S-3	1/1	5 to 5.1	50/1"		Very dense, one-inch fractured GRAVEL fragment	DECOMP. ROCK
7							END OF EXPLORATION AT 6 FEET BELOW GROUND SURFACE	
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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 chatter observed from about 3 to 6 feet below ground surface on inferred boulders/possible bedrock.
4) Auger refusal encountered at about 6 feet below ground surface on inferred bedrock.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
HAMDEN SOLAR ONE
360 GAYLORD MOUNTAIN ROAD
HAMDEN, CONNECTICUT

BORING NO. B-5
SHEET 1 of 1
FILE NO. 0032-032.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Tom McGovern	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/21/2020	Date End	4/21/2020

Hammer Type:	Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Track
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/21/20	4:30 PM	2	-	end of drilling (perched)

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	2-1-1-1		Very loose, brown SILT and fine to coarse SAND, trace Roots, moist	12"+/- Topsoil/ Forest Debris
2								SUBSOIL
3		S-2	15/22	2 to 3.8	17-41-58-50/4"		Very dense, red-brown fine to coarse SAND, some Silt, little fine Gravel	
4								GLACIAL TILL
5		S-3	5/5	5 to 5.4	60/5"		Very dense, red-brown fine to coarse SAND and GRAVEL, little Silt, with decomposed rock fragments at sample tip	
6								
7							END OF EXPLORATION AT 6 FEET BELOW GROUND SURFACE	
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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 chatter observed from about 3 to 6 feet below ground surface on inferred cobbles/boulders.
4) Auger refusal encountered at about 6 feet below ground surface on inferred bedrock.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
HAMDEN SOLAR ONE
360 GAYLORD MOUNTAIN ROAD
HAMDEN, CONNECTICUT

BORING NO. B-6
SHEET 1 of 1
FILE NO. 0032-032.00
CHKD. BY RPJ

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Tom McGovern	Ground Surface El.	Not Available	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/21/2020	Date End	4/21/2020

Hammer Type:	Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Track
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/21/20	-	5	-	wet rods

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	7/24	0 to 2	1-2-2-4		Very loose, Top 2" dark brown Topsoil Bottom 5" brown fine to coarse SAND and SILT, little fine Gravel, moist	8"+/- Topsoil/ Forest Debris
2								SUBSOIL
3		S-2	0/2	2 to 4	50/2"		Very dense, No Recovery	
4								
5								GLACIAL TILL
6		S-3	12/24	5 to 7	64-51-59-50/3"		Very dense, red-brown fine to coarse SAND, some fine to coarse GRAVEL, trace Silt, moist	
7								
8		S-4	1/1	7.5 to 7.6	50/1"		Very dense, one-inch fractured GRAVEL fragment	DECOMP. ROCK
9							END OF EXPLORATION AT 7.6 FEET BELOW GROUND SURFACE	
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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 chatter observed from about 2 to 7.5 feet below ground surface on inferred cobbles/boulders.
4) Auger refusal encountered at about 7.5 feet below ground surface on inferred 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: Ray Janeiro
Collected By: Client

Project Information:
Hamden Solar One
Hamden, CT
DTE Project Number: 0032-032.00
Summary Page: 2 of 2
Report Date: 05.15.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-E-106 Rev.1

Boring ID	Sample No.	Depth (ft)	Laboratory No.	Identification Tests								Proctor / Thermal Resistivity								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Target Test Setup as % of Proctor	Thermal Resistivity Optimum (°C*cm/W)	Thermal Resistivity Mid Point (°C*cm/W)	Thermal Resistivity Oven Dried (°C*cm/W)	
				D2216	D4318		D6913			D2974	D854			D1557			D5334			
B-2	Grab	3	20-S-1202				5.1	67.9	27.0			128.8	7.4	135.5 / 7.7	NA	95	46.03	64.52	122.43	Red-Brown silty sand
B-2	Grab	3	20-S-1202b									113.7	8.9			85	53.98	62.66	191.61	Red-Brown silty sand
B-5	S-2	2-3.8	20-S-1263				14.2	60.3	25.5											Red-Brown silty sand

Date Received: *05.05.2020*

Reviewed By:

Date Reviewed: *05.15.2020*

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:
Hamden Solar One
Hamden, CT
DTE Project Number: 0032-032.00
Summary Page: 1 of 1
Report Date: 05.13.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-E-106

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-4	Grab	0-4	20-S-1200	25.5							19	ND			5.52	68200	64800	Corrosivity Only
B-6	Grab	0-4	20-S-1201	7.9							50	ND			6.82	64200	18600	Corrosivity Only

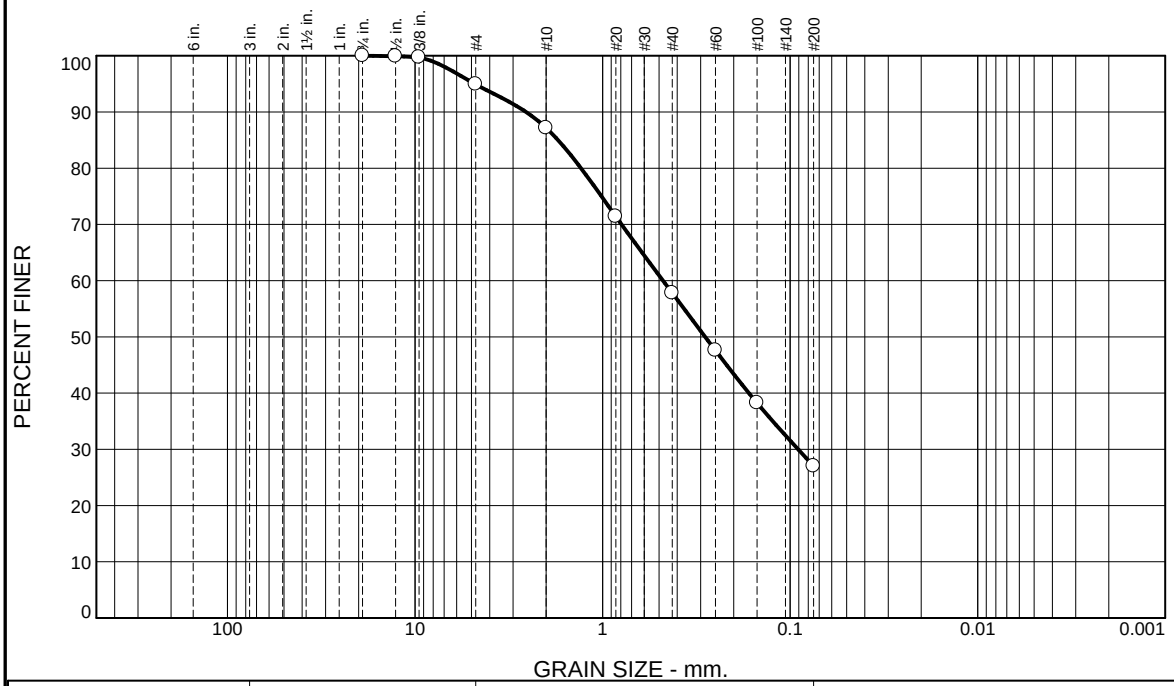
Electrical Resistivity and pH was completed by JM on 05.08.2020

Date Received: *05.05.2020*

Reviewed By:

Date Reviewed: *05.13.2020*

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.1	7.7	29.4	30.8	27.0	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	99.9		
0.375"	99.7		
#4	94.9		
#10	87.2		
#20	71.4		
#40	57.8		
#60	47.6		
#100	38.2		
#200	27.0		

* (no specification provided)

Material Description

Red-Brown silty sand

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

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

Coefficients

D_{90}= 2.5584 D_{85}= 1.7266 D_{60}= 0.4761
D_{50}= 0.2837 D_{30}= 0.0907 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 05.05.2020 **Date Tested:** 05.08.2020

Tested By: RR / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

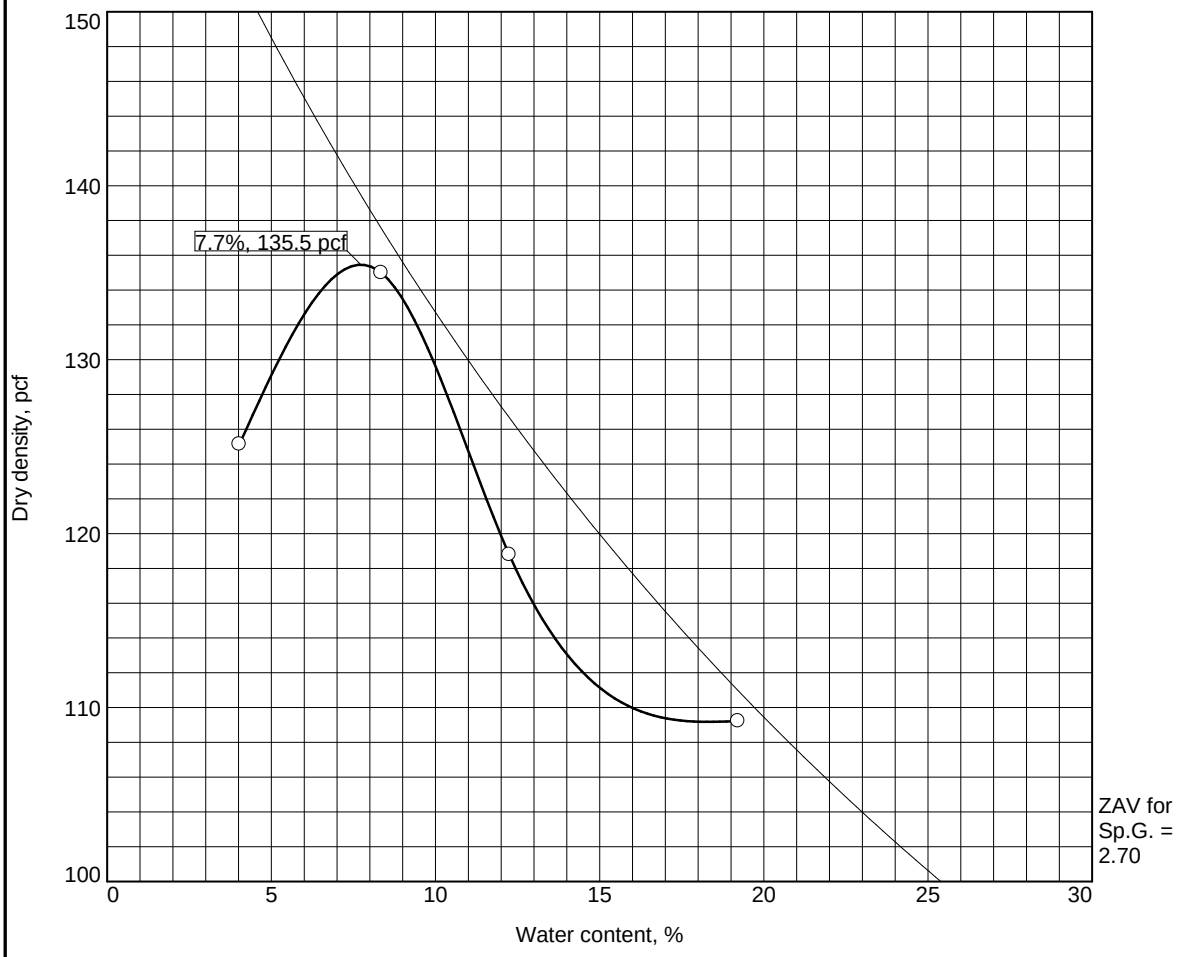
Source of Sample: Boring **Depth:** 3' **Date Sampled:**
Sample Number: B-2

Thielsch Engineering Inc.

Cranston, RI

Client: Down To Earth
Project: Hamden Solar One
Hamden, Ct
Project No: 0032-032.00 **Figure** 20-S-1202

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method B Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
3'	SM	A-2-4(0)		2.7	0	0	0.3	27.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 135.5 pcf Optimum moisture = 7.7 %	Red-Brown silty sand

Project No. 0032-032.00 **Client:** Down To Earth
Project: Hamden Solar One
Hamden, Ct
○**Source of Sample:** Boring **Sample Number:** B-2

Thielsch Engineering Inc.

Cranston, RI

Remarks:

Figure 20-MC-1202

Tested By: MN **Checked By:** Steven Accetta

THIELSCH ENGINEERING

195 Frances Avenue
Cranston RI, 02910
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Client Information
Down to Earth Consulting, LLC
Naugatuck, CT
Ray Janeiro
ray@downtoearthconsulting.com

Determination of Thermal Conductivity of Soil by Thermal Needle Probe Procedure

ASTM D5334-14

Project Name:	Hamden Solar One	**Thermal Meter:**	TEMPOS
Project Number:	0032.032.00	**Calibration:**	08.09.18
Lab Number:	20-S-1202	**Thermal Probe:**	TR-3 000143
Sample Number:	B-2	**Calibration:**	05.11.2020
Material Source:	Hamden, CT	**Specimen Prep:**	Reconstituted Specimen
Depth:	3"	**Mold Type:**	"B" Proctor
Date:	05.15.2020	**Tested by:** RR	**Reviewed by:** sa

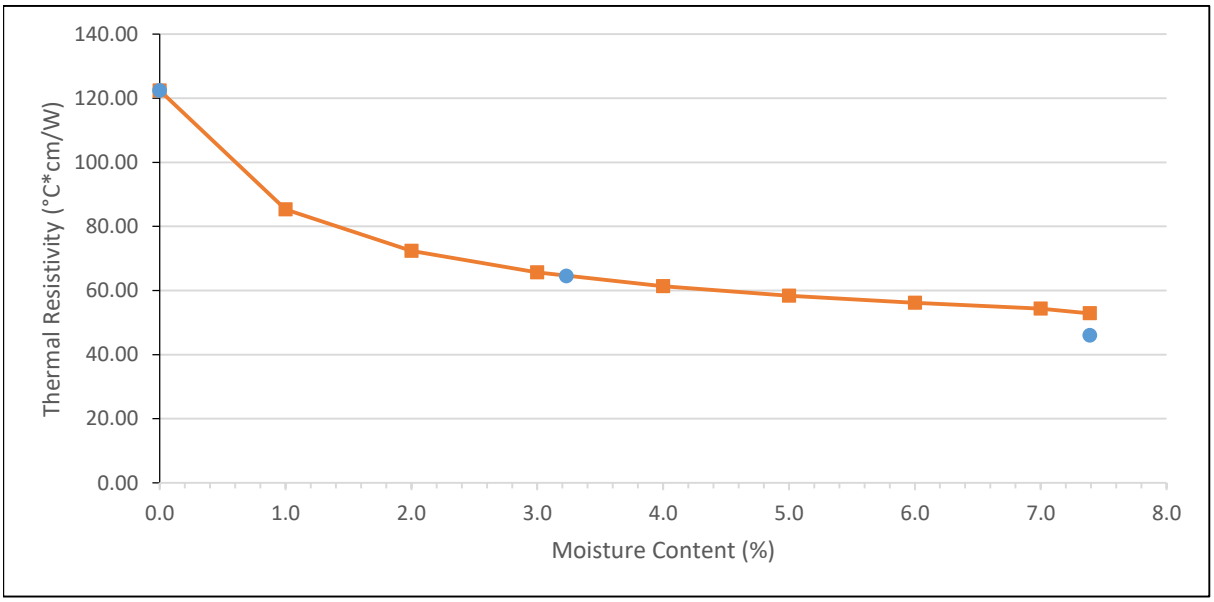
Compaction & Moisture Content Information

Soil Description:	Red-Brown silty sand		
Oversized Material (%):	0.0	Passing #200 Sieve (%):	27.0
Proctor Method:	ASTM D1557 B	Requested % Compaction:	85.00
Maximum Dry Density (pcf):	135.5	Opt. Moisture Content (%):	7.7
Remolded Dry Density (pcf):	128.8	In-situ Moisture Cont. (%):	

Thermal Resistivity Test Results

Moisture Content (%)	Thermal Conductivity (W/m*K)	Thermal Resistivity (°C*cm/W)
3.2	1.5498	64.52
7.4	2.1726	46.03
0.0	0.8168	122.43

Thermal Resistivity Dryout Curve



Test Notes:

Optimum, Mid-Point, and Oven-Dried Test Conditions provided for Dryout Curve.
Maximum particle size used for reconstituted sample was 3/8".

THIELSCH ENGINEERING
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Client Information
Down to Earth Consulting, LLC
Naugatuck, CT
Ray Janeiro
ray@downtoearthconsulting.com

Determination of Thermal Conductivity of Soil by Thermal Needle Probe Procedure
ASTM D5334-14

Project Name:	Hamden Solar One	**Thermal Meter:**	TEMPOS
Project Number:	0032.032.00	**Calibration:**	08.09.18
Lab Number:	20-S-1202b	**Thermal Probe:**	TR-3 000143
Sample Number:	B-2	**Calibration:**	05.11.2020
Material Source:	Hamden, CT	**Specimen Prep:**	Reconstituted Specimen
Depth:	3"	**Mold Type:**	"B" Proctor
Date:	05.15.2020	**Tested by:** RR	**Reviewed by:** sa

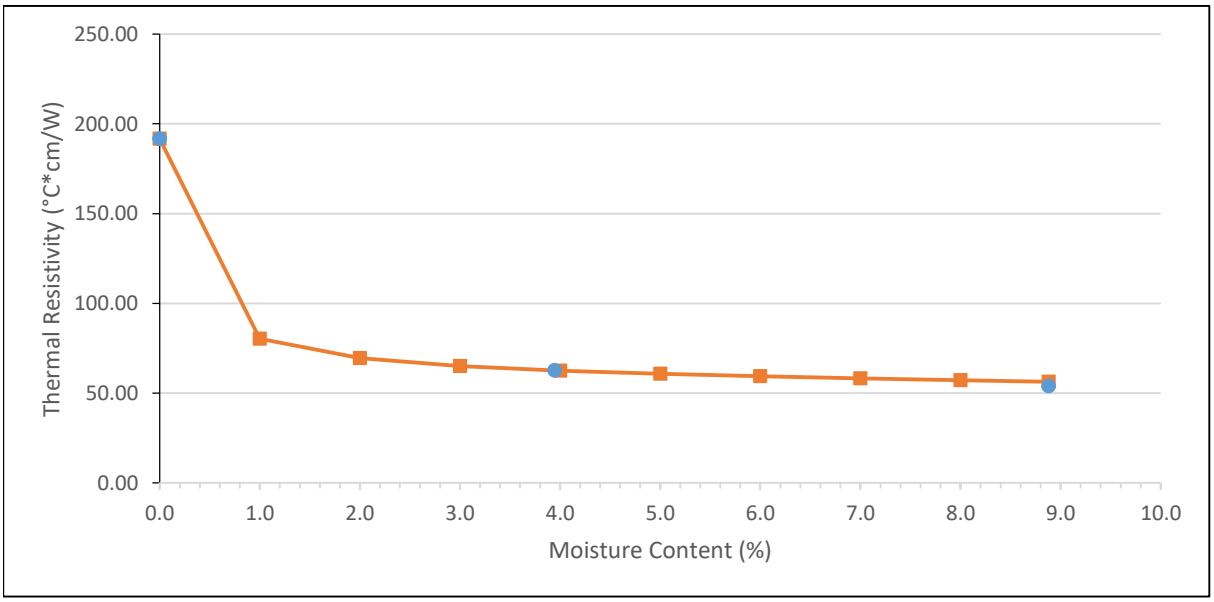
Compaction & Moisture Content Information

Soil Description:	Red-Brown silty sand		
Oversized Material (%):	0	Passing #200 Sieve (%):	27.0
Proctor Method:	ASTM D1557 B	Requested % Compaction:	85.00
Maximum Dry Density (pcf):	135.5	Opt. Moisture Content (%):	7.7
Remolded Dry Density (pcf):	113.7	In-situ Moisture Cont. (%):	

Thermal Resistivity Test Results

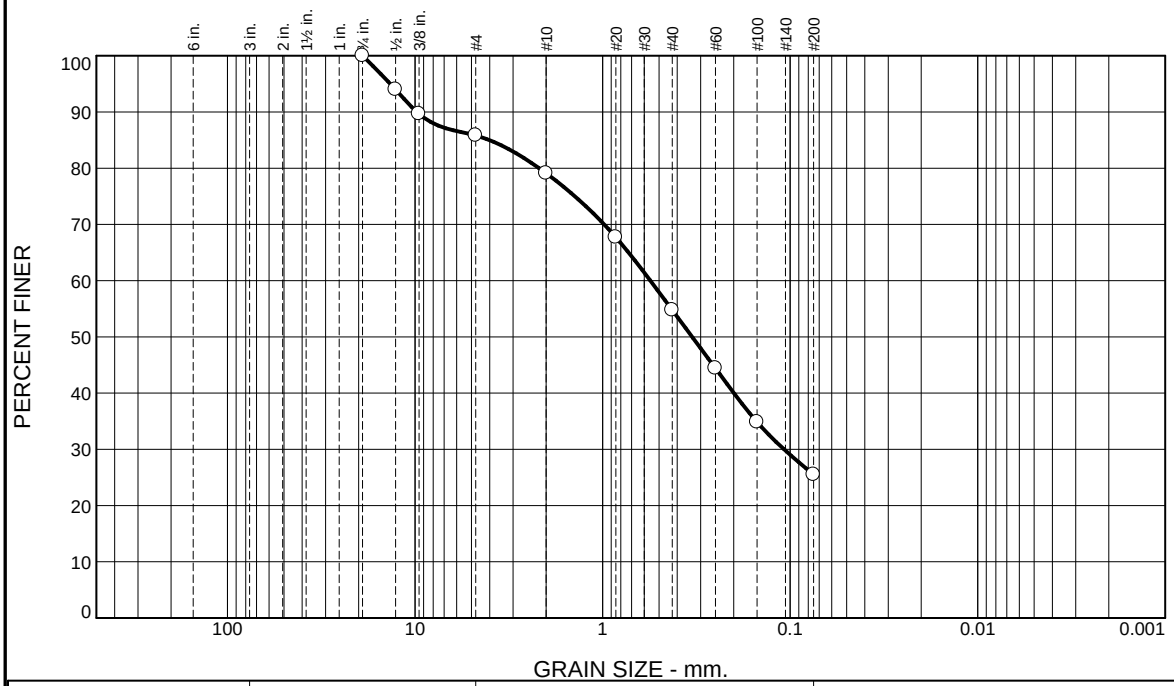
Moisture Content (%)	Thermal Conductivity (W/m*K)	Thermal Resistivity (°C*cm/W)
3.9	1.5958	62.66
8.9	1.8524	53.98
0.0	0.5219	191.61

Thermal Resistivity Dryout Curve



Test Notes:
Optimum, Mid-Point, and Oven-Dried Test Conditions provided for Dryout Curve.
Maximum particle size used for reconstituted sample was 3/8".

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.2	6.7	24.3	29.3	25.5	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	94.0		
0.375"	89.7		
#4	85.8		
#10	79.1		
#20	67.7		
#40	54.8		
#60	44.4		
#100	34.9		
#200	25.5		

* (no specification provided)

Material Description

Red-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}= 9.7896 D_{85}= 4.0136 D_{60}= 0.5561
D_{50}= 0.3329 D_{30}= 0.1078 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 05.07.2020 **Date Tested:** 05.11.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 2-3.8' **Date Sampled:**
Sample Number: B-5 / S-2

Thielsch Engineering Inc.

Cranston, RI

Client: Down To Earth

Project: Hamden Solar One
Hamden, Ct

Project No: 0032-032.00 **Figure** 20-S-1263

CERTIFICATE OF ANALYSIS

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

RE: Hamden Solar One Down to Earth (0032-032.00)
ESS Laboratory Work Order Number: 20E0076

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 1:44 pm, May 12, 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: Hamden Solar One Down to Earth

ESS Laboratory Work Order: 20E0076

SAMPLE RECEIPT

The following samples were received on May 05, 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
20E0076-01	B-4 20-S-1200 0-4ft	Soil	D4327
20E0076-02	B-6 20-S-1201 0-4ft	Soil	D4327

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Hamden Solar One Down to Earth ESS Laboratory Work Order: 20E0076

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: Hamden Solar One Down to Earth

ESS Laboratory Work Order: 20E0076

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: Hamden Solar One Down to Earth
Client Sample ID: B-4 20-S-1200 0-4ft
Date Sampled: 05/05/20 12:00
Percent Solids: 80

ESS Laboratory Work Order: 20E0076
ESS Laboratory Sample ID: 20E0076-01
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Chloride	**WL** ND (6)		D4327		1	EEM	05/06/20 13:44	mg/kg dry	DE00616
Sulfate	**WL 19** (6)		D4327		1	EEM	05/06/20 13:44	mg/kg dry	DE00616

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Hamden Solar One Down to Earth
Client Sample ID: B-6 20-S-1201 0-4ft
Date Sampled: 05/05/20 12:00
Percent Solids: 93

ESS Laboratory Work Order: 20E0076
ESS Laboratory Sample ID: 20E0076-02
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Chloride	**WL** ND (5)		D4327		1	EEM	05/06/20 14:34	mg/kg dry	DE00616
Sulfate	**WL 50** (5)		D4327		1	EEM	05/06/20 14:34	mg/kg dry	DE00616

CERTIFICATE OF ANALYSIS

Client Name: Thielsch Engineering, Inc.
Client Project ID: Hamden Solar One Down to Earth

ESS Laboratory Work Order: 20E0076

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch DE00616 - General Preparation										
Blank										
Chloride	ND	0.5	mg/kg wet							
Sulfate	ND	0.5	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: Hamden Solar One Down to Earth ESS Laboratory Work Order: 20E0076

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: Hamden Solar One Down to Earth

ESS Laboratory Work Order: 20E0076

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: 20E0076
Date Received: 5/5/2020
Project Due Date: 5/12/2020
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: 20.4 Iced with: Ice
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	38737	Yes	N/A	Yes	8 oz jar	NP	
2	38738	Yes	N/A	Yes	8 oz jar	NP	

2nd Review
Were all containers scanned into storage/lab? Initials ~~SA~~
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: 5/5/20 1541
Reviewed By: Date & Time: 5/5/20 1559
Delivered By: 5/5/20 1559

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: 2002076

Turn Time: Standard X 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 # 0032-032.00

Project Name / Client Name:
Hamden Solar One
Down to Earth

Contract Pricing __x___
Special Pricing WO#: _____

ESS Lab Sample ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample Identification	# of Container	Analysis: Sulfate (D4327)	Analysis: Chloride (D4327)									Comment #
1	05.05.2020	12:00	G	S	B-4, 20-S-1200, 0-4'	1	X	X									
2	05.05.2020	12:00	G	S	B-6, 20-S-1201, 0-4'	1	X	X									
Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_CH_3OH____							1	1									
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 __V__No
Seals Intact _____Yes _____No NA: V
Cooler Temperature: 20.4

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)
05.05.2020		5/5/20 1436			

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

Page ____ of ____

APPENDIX 4 -

KOZENY-CARMAN ANALYSES

Table 1
Kozeny - Carman Analyses
to Estimate Hydraulic Conductivity

Hamden Solar One
Hamden, Connecticut
Project Number: 0032-032.00

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-2	S-2	2'-3.8'	0.005	Very Dense	100	0.140	0.12	2.83E-07	8.02E-04

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

e_{min}	e_{max}
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.

ATTACHMENT 5

Lifecycle GHG Emissions Assessment - Gaylord Mountain Solar Project

SOLAR INSTALLATION SCENARIOS

NUTMEG SOLAR PROJECT

Life Cycle Stage	Basis	Amount	GHG Emissions (MT CO_2e)
Solar Panels and Infrastructure	MW AC	19.99	134,152
Wood Chips	acres of forest	95.3	6,121
Wood Products (Firewood)	acres of forest	95.3	24,205
Lost Forest Carbon (below ground & annual sequestration)	acres of forest	95.3	13,739
Land clearing & wood chipping	acres of forest	95.3	288
Total Life Cycle Emissions			**178,505**

GAYLORD MOUNTAIN SOLAR PROJECT

Life Cycle Stage	Basis	Amount	GHG Emissions (MT CO_2e)
Solar Panels and Infrastructure	MW AC	1.86	12,482
Wood Chips	acres of forest	12.31	791
Wood Products (Firewood)	acres of forest	12.31	3,127
Lost Forest Carbon (below ground & annual sequestration)	acres of forest	12.31	1,775
Land clearing & wood chipping	acres of forest	12.31	37
Total Life Cycle Emissions			**18,212**

BASELINE (NATURAL GAS) SCENARIOS

NUTMEG SOLAR PROJECT

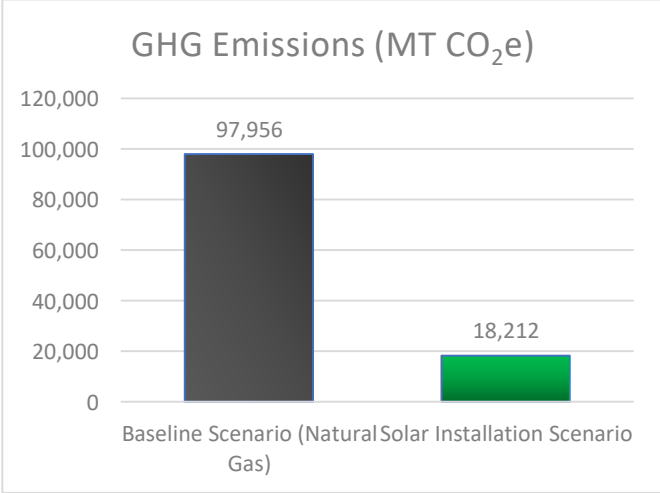
Life Cycle Stage	Basis	Amount	GHG Emissions (MT CO_2e)
Natural gas electricity (US/46% shale gas)	MWh electricity over 20 years	744,038	1,273,861
Total Life Cycle Emissions			**1,273,861**

GAYLORD MOUNTAIN SOLAR PROJECT

Life Cycle Stage	Basis	Amount	GHG Emissions (MT CO_2e)
Natural gas electricity (US/46% shale gas)	MWh electricity over 20 years	57,214	97,956
Total Life Cycle Emissions			**97,956**

Comparitive Results for Gaylord Mountain Solar Project

Scenario	GHG Emissions (MT CO_2e)
Baseline Scenario (Natural Gas)	97,956
Solar Installation Scenario	18,212
Net Reduction	79,744
Percent Reduction	81%



ATTACHMENT 6

Solar and Property Value

Correcting the Myth that Solar Harms Property Value

It is a common misconception that ground mounted solar farms decrease nearby property values.

- Examining property value in states across the United States demonstrates that large-scale solar arrays often have no measurable impact on the value of adjacent properties, and in some cases may even have positive effects.
- Proximity to solar farms does not deter the sales of agricultural or residential land.
- Large solar projects have similar characteristics to a greenhouse or single-story residence. Usually no more than 10 feet high, solar farms are often enclosed by fencing and/or landscaping to minimize visual impacts.

Vegetative screening will grow to obscure panels from the road and nearby homes, when desired.
Photo Credit: Borrego Solar

The Numbers

- A study conducted across Illinois determined that the value of properties within one mile *increased* by an average of 2 percent after the installation of a solar farm.[1]
- An examination of 5 counties in Indiana indicated that upon completion of a solar farm, properties within 2 miles were an average of 2 percent *more* valuable compared to their value prior to installation.[2]
- An appraisal study spanning from North Carolina to Tennessee shows that properties adjoining solar farms match the value of similar properties that do not adjoin solar farms within 1 percent.[3]

Paired Sale Analysis: Solar Farms and Adjoining Land		
	Potentially Impacted by Solar Farm	Adjusted Median Price Per SF
Control Area Sales (5)	No: Not adjoining solar farm	$79.95
Adjoining Property 10 (Test Area)	Yes: Solar Farm was completed by the sale date	$82.42
Difference		3.09%

Various studies have shown that solar can potentially have a positive impact on adjoining property value. The above table references one of many in a report written by CohnReznick.[4]

[1] Kirkland, Richard C. *Grandy Solar Impact Study*. Kirkland Appraisals, 25 Feb. 2016, kirdlandapprasials.com.
[2] Lines, Andrew. "Property Impact Study: Solar Farms in Illinois." *Mcleancounty.gov*, Nexia International, 7 Aug. 2018.
[3] McGarr, Patricia. Property Value Impact Study. Cohn Reznick LLP Valuation Advisory Services, 2 May 2018.

Solar and Property Value

Harmony with Nearby Residential and Agricultural Property

1. **Appearance**: Large solar projects have similar characteristics to a greenhouse or single-story residence. Usually no more than 10 feet high, solar farms are often enclosed by fencing and/or landscaping to minimize visual impacts.

2. **Noise**: Solar projects are effectively silent. Tracking motors and inverters may produce an ambient hum that is not typically audible from outside the enclosure.

3. **Odor**: Solar projects do not produce any byproduct or odor.

4. **Traffic**: Solar projects do not attract high volumes of additional traffic as they do not require frequent maintenance after installation.

A ground-mounted solar system sited in a rural area.

Credit: Blattner

5. **Hazardous Material**: PV modules are constructed with the solar cells laminated into polymers and the minute amounts of heavy metals used in some panels cannot mix with water or vaporize into the air. Even in the case of module breakage, there is little to no risk of chemicals releasing into the environment.[5]

[5] "Clean Energy Results, Questions and Answers, Ground Mounted Solar Photovoltaic Systems." Energy Center, June 2015. http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf

ATTACHMENT 7

REMOTE FIELD REVIEW

CONNECTICUT SITING COUNCIL PETITION NO. 1425
PROPOSED SOLAR ENERGY FACILITY - CSCU - VNM
360 GAYLORD MOUNTAIN ROAD
HAMDEN, CONNECTICUT

PREPARED FOR:

DSD

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

Photographed October 7, 2020

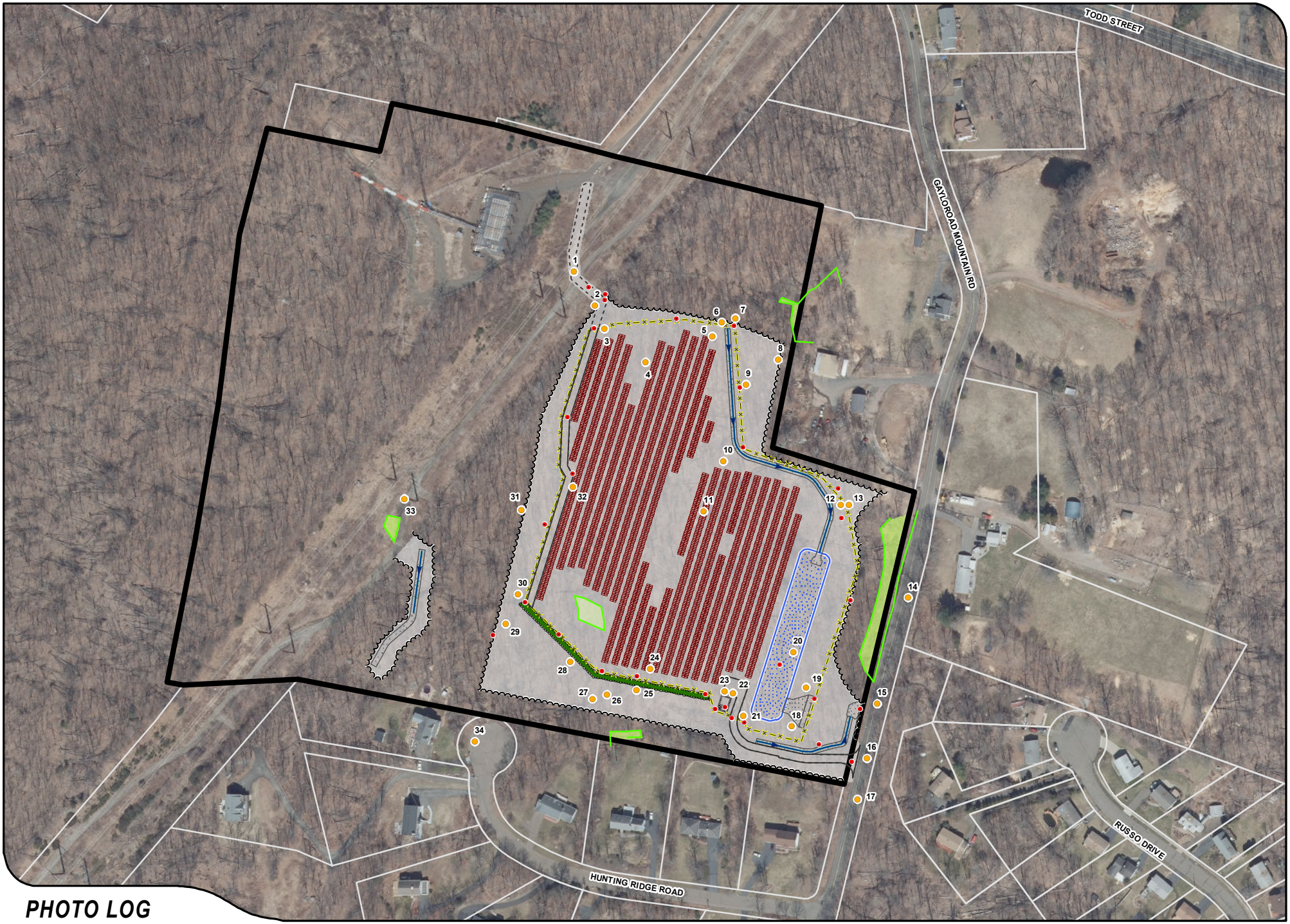


PHOTO LOG

- Photo Locations
- Photo Markers
- Site
- Approximate Parcel Boundary
- Solar Modules
- Stormwater Swale
- Perimeter Fence
- Temporary Construction Access
- Gravel Access Road
- Concrete Equipment Pad
- Stormwater Basin
- Gravel Level Spreader
- Berm and Landscape Screening
- Treeline
- Limit of Disturbance
- Delineated Wetland Boundary
- Wetland Area

N

250 125 0 250 Feet

1 inch = 250 feet

ALL-POINTS TECHNOLOGY CORPORATION

Gaylord Mountain Solar Project 2019, LLC
360 Gaylord Mountain Road
Hamden, Connecticut

PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
1	**ELECTRICAL TRANSMISSION RIGHT-OF-WAY LOOKING SOUTHEAST**

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PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
1A	**ELECTRICAL TRANSMISSION RIGHT-OF-WAY LOOKING NORTHWEST**

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PHOTO	DESCRIPTION
2	**EDGE OF ELECTRICAL TRANSMISSION RIGHT-OF-WAY LOOKING EAST**

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PHOTO	DESCRIPTION
3	**LOOKING NORTHWEST**

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PHOTO	DESCRIPTION
4	**LOOKING NORTHEAST**

ALL-POINTS TECHNOLOGY CORPORATION

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PHOTO	DESCRIPTION
5	**LOOKING NORTHWEST**

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PHOTO	DESCRIPTION
5A	**LOOKING NORTHEAST**

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PHOTO	DESCRIPTION
6	**LOOKING EAST TOWARDS ADJACENT PROPERTY**

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PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
7	**LOOKING SOUTHEAST**

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PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
8	**AT APPROXIMATE LIMIT OF DISTURBANCE LOOKING EAST TOWARDS ADJACENT PROPERTY**

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PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
8A	**AT APPROXIMATE LIMIT OF DISTURBANCE LOOKING SOUTHWEST**

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PHOTO	DESCRIPTION
9	**LOOKING EAST TOWARDS ADJACENT PROPERTY**

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PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
9A	**LOOKING WEST**

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PHOTO	DESCRIPTION
10	**LOOKING NORTHEAST TOWARDS ADJACENT PROPERTY**

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PHOTOGRAPHED ON 10/7/2020

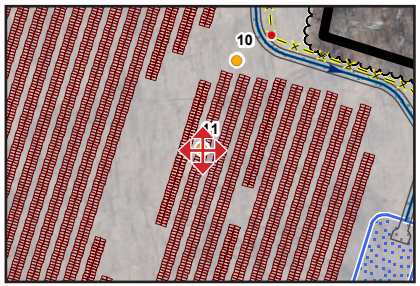

PHOTO	DESCRIPTION
11	**NORTH CENTRAL PORTION OF FACILITY - FOUR CARDINAL POINTS**

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PHOTOGRAPHED ON 10/7/2020

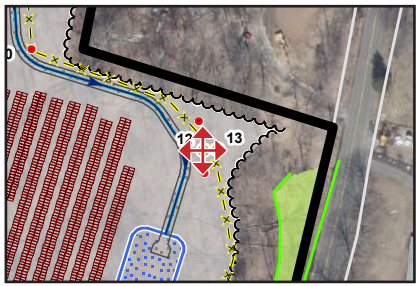

PHOTO	DESCRIPTION
12	**ALONG EASTERN FENCELINE - FOUR CARDINAL POINTS**

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PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
13	**LOOKING NORTHWEST TOWARDS ADJACENT PROPERTY**

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PHOTO	DESCRIPTION
14	**GAYLORD MOUNTAIN ROAD LOOKING WEST**

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PHOTO	DESCRIPTION
15	GAYLORD MOUNTAIN ROAD LOOKING SOUTHWEST

PHOTO	DESCRIPTION
16	GAYLORD MOUNTAIN ROAD LOOKING WEST

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PHOTO	DESCRIPTION
17	**GAYLORD MOUNTAIN ROAD LOOKING NORTHWEST**

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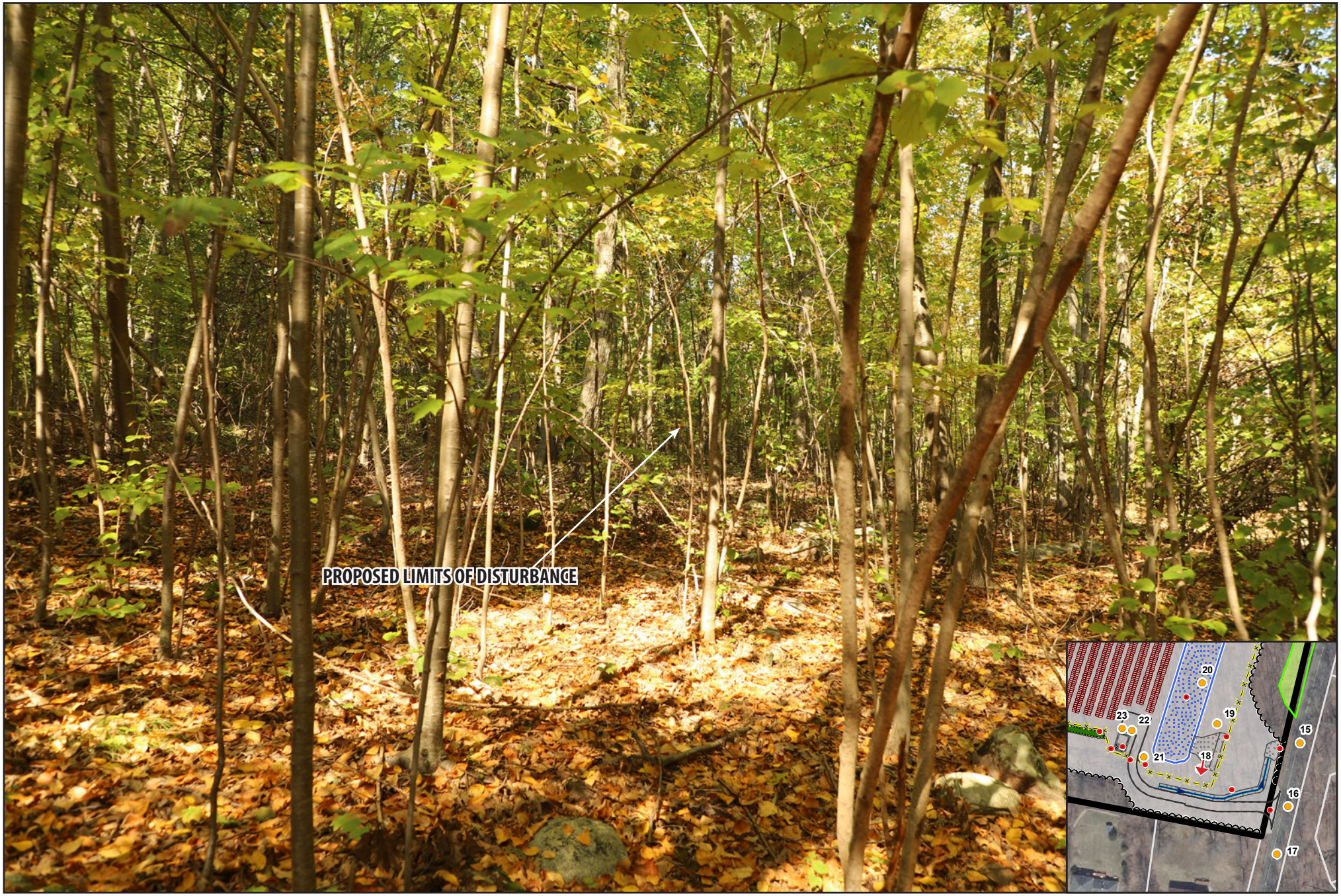

PHOTO	DESCRIPTION
18	AT SOUTH END OF STORMWATER BASIN OUTFALL - LOOKING SOUTH TOWARDS ADJACENT PROPERTY

PHOTOGRAPHED ON 10/7/2020

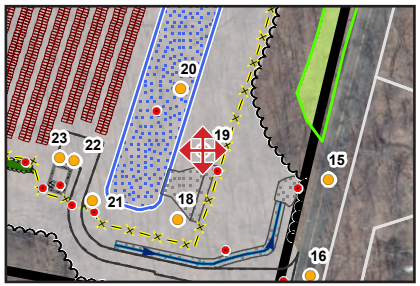

PHOTO	DESCRIPTION
19	**FOUR CARDINAL POINTS**

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PHOTOGRAPHED ON 10/7/2020

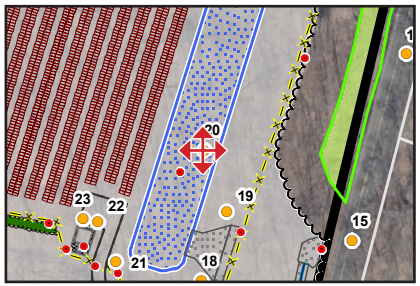

PHOTO	DESCRIPTION
20	**WITHIN PROPOSED STORMWATER BASIN - FOUR CARDINAL POINTS**

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

ALL-POINTS TECHNOLOGY CORPORATION

DSD

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

ALL-POINTS TECHNOLOGY CORPORATION

DSD

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

ALL-POINTS TECHNOLOGY CORPORATION

DSD

PHOTO	DESCRIPTION
24	SOUTH CENTRAL EDGE OF FACILITY LOOKING SOUTH TOWARDS ADJACENT PROPERTY

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PHOTO	DESCRIPTION
25	**AT APPROXIMATE PLANTED EARTHEN BERM - LOOKING SOUTH TOWARDS ADJACENT PROPERTY**

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PHOTO	DESCRIPTION
25A	**AT APPROXIMATE PLANTED EARTHEN BERM - LOOKING NORTH**

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PHOTO	DESCRIPTION
26	**LOOKING NORTH**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

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

ALL-POINTS TECHNOLOGY CORPORATION

DSD

PHOTO	DESCRIPTION
28	AT APPROXIMATE PLANTED EARTHEN BERM - LOOKING NORTHWEST

ALL-POINTS TECHNOLOGY CORPORATION

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PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
28A	**AT APPROXIMATE PLANTED EARTHEN BERM - LOOKING SOUTH TOWARDS ADJACENT PROPERTY**

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PHOTO	DESCRIPTION
29	NEAR SOUTHWEST LIMIT OF DISTURBANCE - LOOKING NORTHEAST

ALL-POINTS TECHNOLOGY CORPORATION

DSD

PHOTO	DESCRIPTION
29A	**NEAR SOUTHWEST LIMIT OF DISTURBANCE - LOOKING SOUTHWEST**

ALL-POINTS TECHNOLOGY CORPORATION

DSD

PHOTOGRAPHED ON 10/7/2020

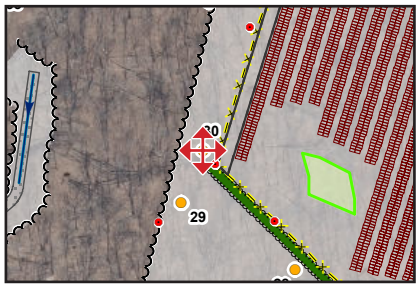

PHOTO	DESCRIPTION
30	**AT SOUTHWEST FENCE CORNER - FOUR CARDINAL POINTS**

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PHOTO	DESCRIPTION
31	NEAR WESTERN LIMIT OF DISTURBANCE - LOOKING SOUTHEAST

ALL-POINTS TECHNOLOGY CORPORATION

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PHOTO	DESCRIPTION
32	**WEST CENTRAL PORTION OF FACILITY - LOOKING NORTH**

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PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
33	**WITHIN ELECTRICAL TRANSMISSION RIGHT-OF WAY LOOKING SOUTH**

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PHOTOGRAPHED ON 10/7/2020

PHOTO	DESCRIPTION
34	**HUNTING RIDGE ROAD LOOKING NORTHEAST**

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