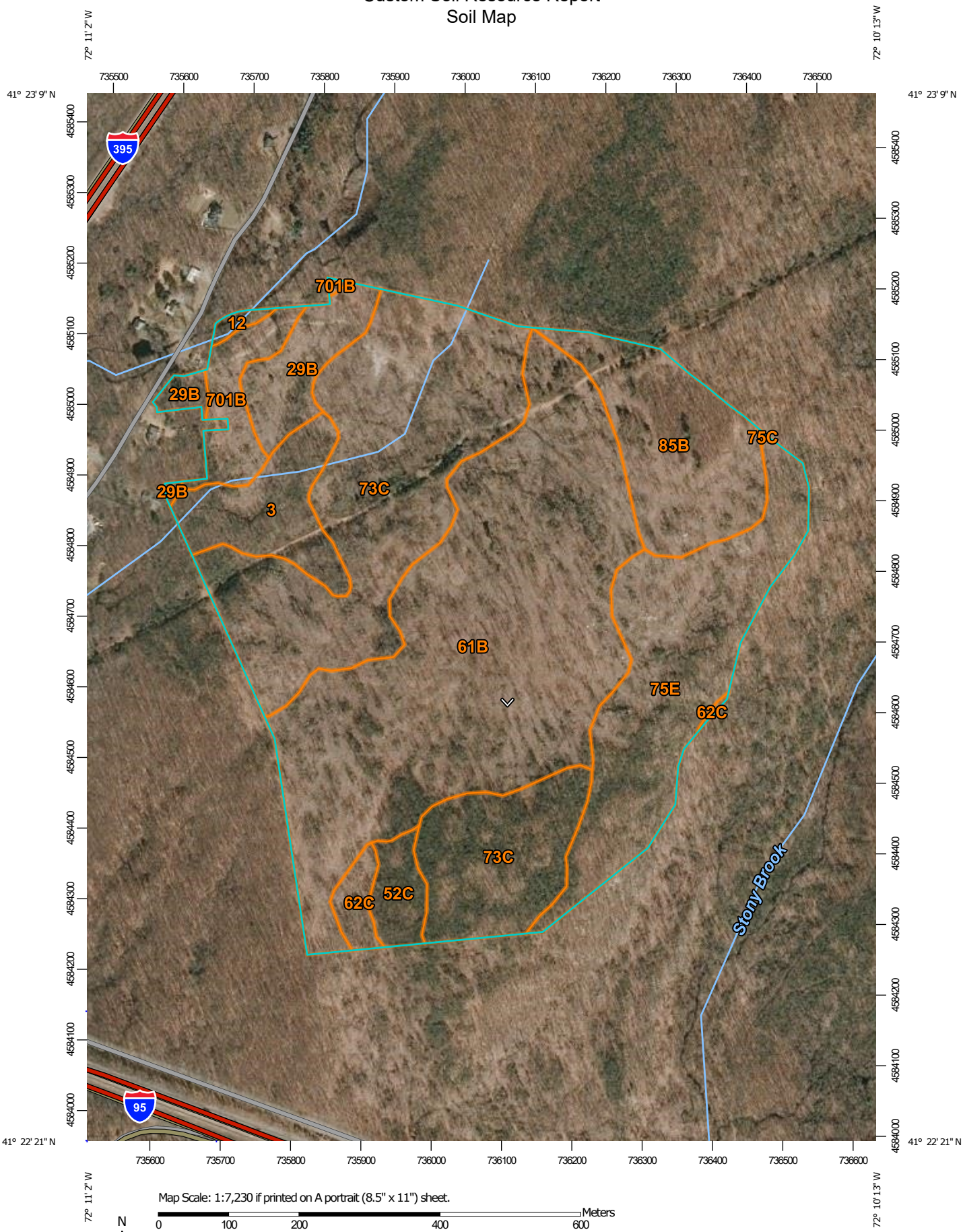
# Custom Soil Resource Report
## Soil Map




Map Scale: 1:7,230 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 20, 2019—Mar 27, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 3 | Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony | 7.3 | 4.9% |
| 12 | Raypol silt loam | 0.5 | 0.3% |
| 29B | Agawam fine sandy loam, 3 to 8 percent slopes | 6.0 | 4.0% |
| 52C | Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony | 2.6 | 1.7% |
| 61B | Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony | 51.1 | 34.3% |
| 62C | Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony | 1.7 | 1.1% |
| 73C | Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky | 41.4 | 27.8% |
| 75C | Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes | 0.0 | 0.0% |
| 75E | Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes | 21.0 | 14.1% |
| 85B | Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony | 13.1 | 8.8% |
| 701B | Ninigret fine sandy loam, 3 to 8 percent slopes | 4.3 | 2.9% |
| **Totals for Area of Interest** | | **149.0** | **100.0%** |

March 21, 2019

BL Companies
355 Research Parkway
Meriden, CT 06450

Attn: Mr. Christopher Albino, P.E. – Senior Project Manager / Principal
P: (203) 608 2509
E: calbino@blcompanies.com

Re: Addendum to Geotechnical Engineering Report – *In-Situ* Permeability Testing
Photovoltaic Installation
117 Oil Mill Road
Waterford, Connecticut
Terracon Project No. J2185052

Dear Mr. Albino:

At your request, Terracon Consultants, Inc. (Terracon) has completed this addendum to our Geotechnical Engineering Report, dated May 22, 2018, for the above-referenced project. The additional services included performing *in-situ* permeability testing at 13 locations throughout the site. Our services were conducted in general accordance with our supplemental proposal dated January 23, 2019. The General Conditions in our report apply to the *in-situ* testing in this letter.

## 1.0 PROJECT INFORMATION

The project site is an approximately 140-acre parcel west of Oil Mill Road and north of Parkway North, in the town of Waterford, Connecticut. The site undulates between relative highs and lows, generally sloping downward to the west from approximately Elevations 240 to 100 feet. The majority of the site is heavily wooded. However, portions of the site have been cleared, presumably in anticipation of site development.

Our understanding of the project comes from our recent conversations and review of the site plan titled *"SWMB – Geotech Boring Locations"*, Project No. 17D3515, Sheet No. EXH-1, dated July 30, 2018, by BL Companies of Meriden, Connecticut. As such, we understand that the project will include the construction of 13 stormwater management basins within the solar power facility. Cuts and fills, up to about 10 feet, are anticipated for site and stormwater detention development.

# 2.0 FIELD EXPLORATION AND GEOLOGIC DESCRIPTION

## Field Exploration Description

The approximate exploration and test locations, which are shown in Exhibit A-2, were obtained using a handheld GPS unit (estimated horizontal accuracy of about ±10 feet) and approximate elevations were obtained by interpolating from 7.5 minute topographic quadrangle maps, including Montville, Connecticut (1983) and Niantic, Connecticut (1983). Ground surface elevations rounded to the nearest foot are shown on the individual exploration logs. The locations of the explorations and tests as well as their elevations should be considered accurate only to the degree implied by the method used to define them.

Terracon advanced 13 test probes (INF-1 through INF-13) between February 22 and April 1, 2019 for the purpose of performing *in-situ* infiltration tests. With the exception of INF-6, INF-7, and INF-8, the probes were advanced using 3¼-inch inside diameter continuous flight hollow-stem augers or 4-inch diameter continuous flight solid stem augers powered by an all-terrain vehicle (ATV) mounted Diedrich D-50 rotary drill rig. INF-6, INF-7, and INF-8 were in an area that was inaccessible to our drill rig and therefore were advanced by hand using a 2-inch diameter auger.

Select soil samples were collected in the field and placed in labeled bags and glass jars and transported to our Rocky Hill (Hartford) laboratory for further review by a Terracon geotechnical engineer, laboratory testing, and classification. Information provided on the exploration logs attached to this report includes soil descriptions, exploration depths, and groundwater conditions. Field logs of the explorations were prepared by a Terracon field engineer. These logs included visual classifications of the materials encountered during drilling as well as interpretation by our field engineer of the subsurface conditions between samples. Final exploration logs included with this report represent further interpretation by the geotechnical engineer of the field logs and incorporate, where appropriate, modifications based on observations and laboratory classification of the samples.

## Geotechnical Characterization

Based on our knowledge of the site, the subsurface conditions consist of forest mat underlain by glacial till over bedrock. The glacial till consists of brown, medium dense to very dense silty, silty sand (SM), with gravel, occasional to frequent cobbles and boulders. Bedrock, the upper several feet of which is weathered, consists of gray granitic gneiss.

INF-1 through INF-5, INF-9, INF-12, and INF-13 terminated without refusal in the glacial till at a depth of approximately 10 feet below existing grade. INF-6 terminated on a probable boulder in the glacial till at a depth of approximately 2 feet. INF-7, INF-8, INF-10, and INF-11 terminated on bedrock at depths ranging from approximately 2 to 4 feet.

### Groundwater

With the exception of INF-1 and INF-2, groundwater was not encountered at the time of our explorations. Fluctuations in groundwater level may occur because of seasonal variations in the amount of rainfall, runoff, and other factors. Additionally, grade adjustments on and around the site, as well as surrounding drainage improvements, may affect the water table. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. Groundwater levels are tabulated below:

| Boring | Depth to Groundwater While Drilling (feet) |
|---|---|
| INF-1 | 0.5 |
| INF-2 | 1.0 |

## 3.0 *IN-SITU* PERMEABILITY TESTING

Between February 22 and March 15, 2019, Terracon performed *in-situ* soil hydraulic conductivity testing at 13 locations (INF-1 through INF-13) using falling head infiltration testing. Testing was performed by installing 2-inch diameter PVC well pipe to the bottom of the test hole. Granular filter media (i.e. coarse sand) was placed at the bottom of the pipe to prevent scouring and silting. The pipes were then filled with water to the top of pipe and allowed to presoak. Following the presoaking period, infiltration testing was performed in general accordance with the *2004 Connecticut Stormwater Quality Manual* by the Connecticut Department of Environmental Protection. The results are tabulated below.

Soils at the appropriate test depths from each location were collected and classified using the USDA Textural Triangle. Classification was by visual/manual procedures. Results of the field permeability testing is summarized below:

| Test No. | Approximate Depth (feet) | Material at Test Depth | Textural Class | Infiltration Rate, K, (inches/hour) |
|---|---|---|---|---|
| INF-1 | 10 | Weathered Rock | Loamy Sand | <0.1 |
| INF-2 | 10 | Glacial Till | Loamy Sand | No Movement[1] |
| INF-3 | 10 | Glacial Till | Loamy Sand | No Movement[1] |
| INF-4 | 10 | Glacial Till | Loamy Sand | No Movement[1] |
| INF-5 | 10 | Glacial Till | Loamy Sand | No Movement[1] |

| Test No. | Approximate Depth (feet) | Material at Test Depth | Textural Class | Infiltration Rate, K, (inches/hour) |
|---|---|---|---|---|
| INF-6 | 2 | Glacial Till | Loamy Sand | 2.8 |
| INF-7 | 2 | Bedrock | Not Applicable | No Movement[1] |
| INF-8 | 3.6 | Bedrock | Not Applicable | No Movement[1] |
| INF-9 | 10 | Glacial Till | Loamy Sand | 3.0 |
| INF-10 | 2.6 | Weathered Rock | Loamy Sand | <0.1 |
| INF-11 | 4 | Bedrock | Not Applicable | 0.1 |
| INF-12 | 10 | Glacial Till | Loamy Sand | 2.3 |
| INF-13 | 10 | Glacial Till | Loamy Sand | 2.3 |

1. No perceivable movement in water level after 60 minutes.

Individual permeability tests only measure the hydraulic conductivity in the immediate vicinity of the test, and may not be representative of the average hydraulic conductivity of the soil. Additionally, field hydraulic conductivity values are generally accurate to an order of magnitude.

Various factors may influence field infiltration testing results, including lack of soil saturation, a non-homogenous soil profile surrounding the test interval, the presence of bedrock, gravel, cobbles, boulders, or deleterious material, or variation in soil density. Field infiltration values should be evaluated based on the measured data in conjunction with published values for the material.

We trust that this report meets your current needs. We appreciate the opportunity to have been of service to you on this project. Should you require further information, please contact us.

Sincerely,
**Terracon Consultants, Inc.**

Brian D. Opp, P.E.
Senior Engineer

Stephen C. Lanne, P.E.
Geotechnical Department Manager

/bdo/J2185052

**APPENDIX A – FIELD EXPLORATION**

| | |
|---|---|
| Exhibit A-1 | Site Location Map |
| Exhibit A-2 | Test Location Diagram |
| Exhibits A-3 to A-15 | Test Probe Logs (INF-1 through INF-13) |

**APPENDIX B – SUPPORTING DOCUMENTS**

| | |
|---|---|
| Exhibit B-1 | General Notes |
| Exhibit B-2 | Unified Soil Classification System |
| Exhibit B-3 | Description of Rock Properties |

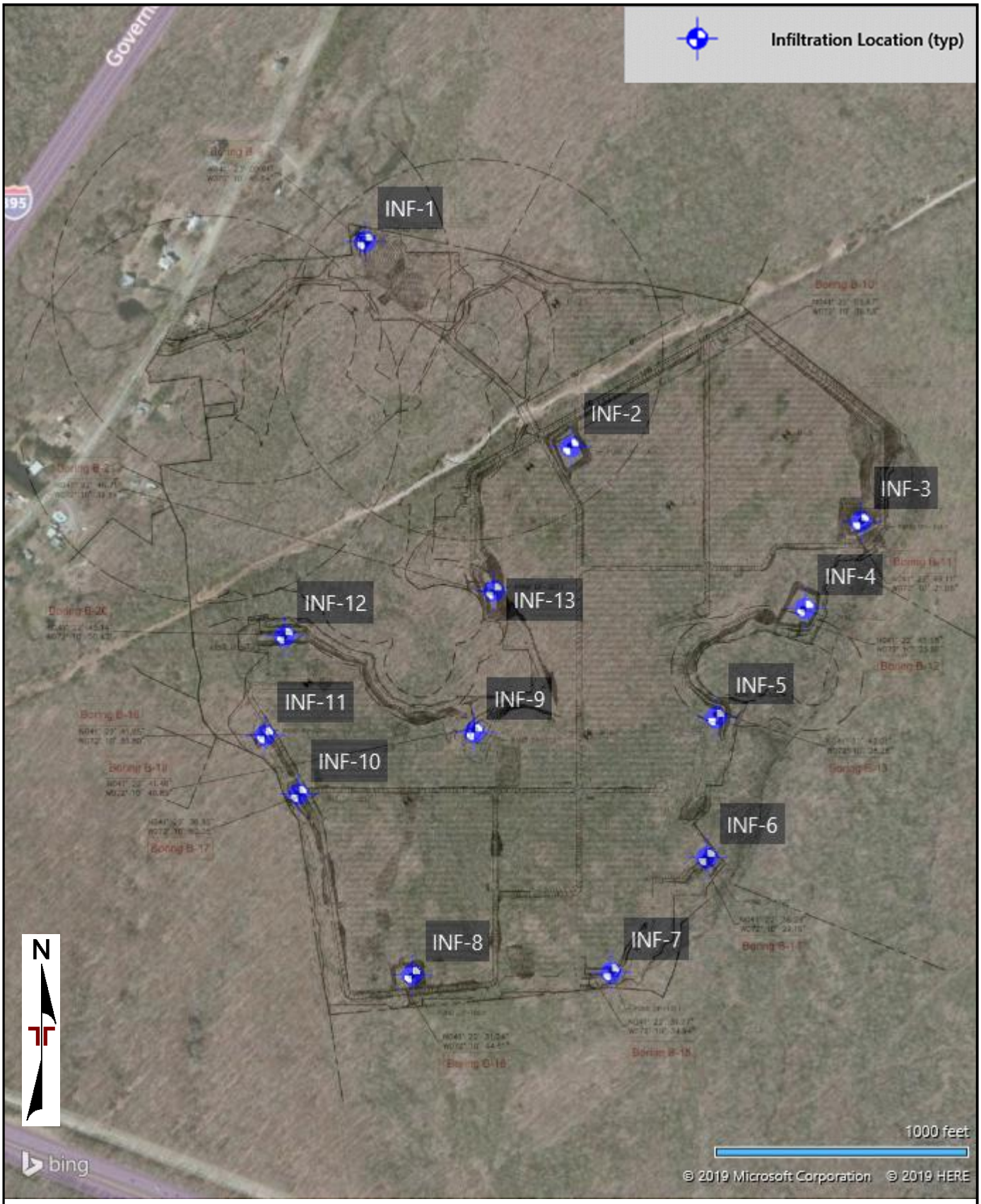



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

BASED ON THE SITE PLAN TITLED *'SWMB – GEOTECH BORING LOCATIONS'*, SHEET No. EXH-1, DATED JULY 30, 2018, BY BL COMPANIES AND AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

| | |
|---|---|
| Project Manager: | BDO |
| Drawn by: | BDO |
| Checked by: | SCL |
| Approved by: | SCL |

| | |
|---|---|
| Project No. | J218505 |
| Scale: | AS SHOWN |
| File Name: | J2185052 |
| Date: | MAR 2019 |

Terracon
201 Hammer Mill Rd
Rocky Hill, CT 06067-3768

# TEST LOCATION PLAN

Proposed Solar Power Facility, Waterford, CT
**117 Oil Mill Road**
**Waterford, CT**

Exhibit
A-2