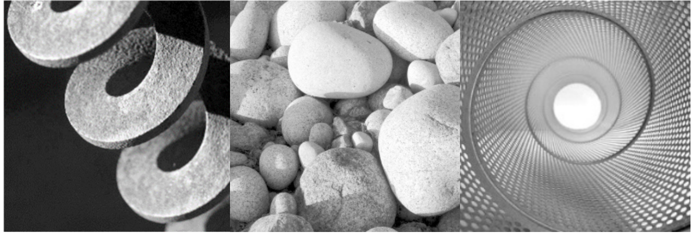
EXHIBIT D

Geotechnical Report



GEI Consultants

Consulting
Engineers and
Scientists

Geotechnical Report

Suffield Solar

Spencer Street
Suffield, Connecticut

Submitted to:
BL Companies
355 Research Parkway
Meriden, CT 06450

Submitted by:
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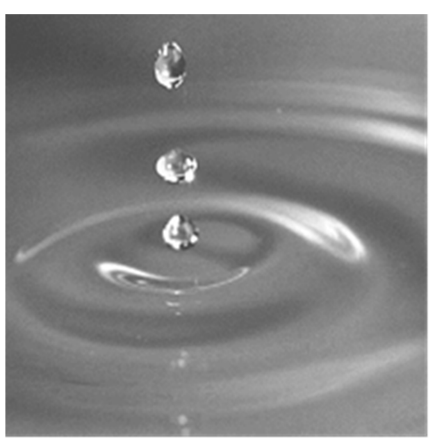
February 18, 2022
Project No. 2104784



Matthew Glunt, P.E.
Senior Geotechnical Engineer

Thomas Rezzani, E.I.T.
Geotechnical Staff Professional

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1. Introduction

1.1 Project Summary

GEI Consultants, Inc. (GEI) prepared this report to present the results of a subsurface exploration program and foundation recommendations for the proposed ground-mounted photovoltaic (PV) array in Suffield, Connecticut. On behalf of Tritec, BL Companies has engaged GEI to provide geotechnical engineering services for this project.

1.2 Scope of Services

GEI completed the following scope of services for this report. These services were performed to investigate the subsurface conditions at the Site:

- Marked out borings in preparation for the public utility service mark out (Call Before You Dig).
- Conducted a subsurface exploration program consisting of five (5) test borings.
- Graphed the grain size distribution test results on the USDA Soil Texture Triangle, obtained the NRCS Hydrologic Soil Group, and estimated a soil infiltration rate.
- Assigned three (3) sieve analyses with hydrometer and moisture content laboratory tests.
- Assigned soil resistivity, pH, sulfates, and chlorides testing on one (1) composite soil sample.
- Provided soil corrosivity analysis.
- Developed recommendations for a ballast-supported PV array, should this be evaluated as an option by the design team.
- Developed soil parameters that can be used in the design of a pile-supported PV array.
- Developed frost parameters that can be used in the design of a pile-supported PV array and the solar developer's risk evaluation.
- Developed recommendations for the access roadway cross section.
- Prepared this *Geotechnical Report* presenting the results of the subsurface explorations and our recommendations.

We performed these services in general accordance with the Connecticut Building Code (Building Code), which is comprised of the 2015 International Building Code (IBC) and a separate package of state-specific amendments.

1.3 Authorization

Our work was performed in general accordance with our proposal dated October 22, 2021, and the resulting Subconsultant Agreement executed January 13, 2022.

1.4 GEI Team

The following GEI personnel performed the services for this report:

- Matthew Glunt, P.E. — Project Manager / Technical Review
- Anna Hernberg, P.E. — Geotechnical Engineer
- Thomas Rezzani, E.I.T. — Geotechnical Professional

1.5 Vertical and Horizontal Reference

Elevations provided in this report are in feet and are referenced to the contours on the plan titled "Site Plan, SP-1" prepared by BL Companies dated December 20, 2021.

Boring locations were geo-referenced at the site using a handheld GPS unit with accuracy on the order of 5 to 10 feet. These locations were overlaid onto the provided site plan and sketched on Figure 1. Boring locations shown should be considered approximate.

2. Site and Project Description

2.1 Site Description

The referenced 11.7-acre agricultural parcel is located on Spencer Street in Suffield, Connecticut. The property is bounded by Spencer Street to the North, seasonal farm fields to the south, and residential parcels to the east and west. Overall topographic relief on the property is approximately 25 feet, sloping downward to the southeast and southwest from a central ridge.

2.2 Proposed Construction

We were provided with a copy of the preliminary Site Plan drawing (SP-1) by BL Companies. We understand an approximate 1-MW ground-mounted solar array will be sited on the property. Based on the provided preliminary Site Plan, in addition to the PV array, the development will consist of the following:

- One concrete electrical equipment pad located in the central portion of the proposed project.
- One (1) stormwater management basin located on the southeastern portion of the property.
- A 12-ft wide gravel road ringing the solar array.
- A small gravel parking area for maintenance personnel.
- A 24-ft wide entrance for Spencer Street.

We understand the preference of the solar developer is to support the array on pile foundations. Recommendations for design and construction of racking pile foundations, as well as a ballast foundation alternative, are provided in Sections 5.3 and 5.4.

We expect that most of the proposed solar array will generally follow the existing contours.

3. Exploration Procedures

3.1 Field Testing Procedures

The boring locations were laid out within areas of interest on the site from the provided sketch plan using a handheld GPS unit. Approximate boring locations relative to the site plan are shown in Figure 1.

Five (5) soil test borings (B1 through B5) were performed at the site on December 23, 2021, by Seaboard Drilling, under subcontract to GEI. The appropriate one-call utility location service (Call Before You Dig) was contacted prior to our arrival. Borings were advanced to depths of 15.25 feet to 17 feet utilizing a track-mounted drilling rig and hollow-stem augering techniques. Soil boring logs are attached in Appendix A.

Standard Penetration Testing (SPT) and split-spoon sampling were generally performed continuously through the upper 6 feet of the borings and at 5-foot intervals thereafter using an automatic hammer. Representative samples of the soils obtained by the sampler were classified by the on-site GEI professional. The samples were placed in appropriately identified sealed glass jars and transported to our office for laboratory assignment. Borings were backfilled with drill cuttings upon completion.

3.2 Laboratory Testing

Laboratory testing was conducted on representative soil samples to confirm field identification of the soils and establish engineering characteristics for design. Tests performed by GeoTesting Express, under subcontract to GEI, included the following:

- Three (3) grain-size analyses with standard sieve set and hydrometer (ASTM D6913/D7928)
- Three (3) moisture content analyses (ASTM D2216)
- The following corrosion tests on one composite sample from borings B1, B2, and B3, composited from depths ranging from 1 to 4 feet:
  - pH (ASTM D4972)
  - Sulfates (ASTM D516)
  - Chlorides (ASTM D512)
  - Electrical resistivity (ASTM G57).

Results of the laboratory testing program are attached in Appendix B.

4. Subsurface Conditions

4.1 Geologic Setting

Local surficial geologic maps describe overburden soils as upland glacial tills of sand, silt, and gravel, transitioning to glacial-lake clays and silts on the low areas to the southwest and southeast.

Bedrock underlying the site is mapped as Portland Arkrose, a reddish sandstone common to the Connecticut River valley.

4.2 Subsurface Conditions

The generalized subsurface conditions at the site are described below, in order of increasing depth. The subsurface conditions between boring locations may differ. The nature and extent of variations between the sampling points will not become evident until construction.

Topsoil –Topsoil was generally measured at thicknesses of 18 to 24 inches, with occasional thicker zones up to 36 inches. These soils were generally characterized as predominantly (50 to 90 percent) silty fines with sand and organic fibers.

It should be noted that the topsoil thickness will vary across the site. Organic soils are often plowed into naturally-occurring low areas to level agricultural fields. The thicker zones of organic soils, where they exist, will be difficult to discern until the upper topsoil layer is stripped.

Glacial Till – Glacial till was encountered in all borings on upland areas of the site, and below silts on the low-lying portions. These soils were characterized with variable proportions of sand, silt, and gravel, with classifications of silty gravel with sand (GM), silty sand with gravel (SM), and sandy silt with gravel (ML). The proportion of silty fines varied between approximately 30 and 60 percent. Though cobbles to boulders were not noted at the specific boring locations, this soil type is known to contain cobble-laden seams with some potential for small boulders.

Uncorrected SPT N-values generally ranged from 10 to 33 blows/foot, indicating medium-dense to dense conditions.

Silt – Glacial-lake silt deposits common to the area were encountered beneath topsoil in borings B-4 and B-5 on low areas of the site to a depth of about 14 feet. These soils were characterized as olive to brown or reddish-brown non-plastic to medium-plasticity silts with between about 1 and 10 percent sand.

Uncorrected SPT N-values in these soils ranged from 9 to 14 blows/foot, indicating stiff conditions.

4.3 Groundwater Conditions

Groundwater was observed in borings B-1, B-2, and B-4 at depths of 3.2, 2.9 and 10.9 feet, respectively. Free groundwater was not noted in borings B-3 and B-5 prior to backfilling the boreholes. We note that glacial till and dense silt deposits may exhibit very slow infiltration and recharge rates. Therefore, groundwater may be present within these soils but not observed as free water within boreholes (or excavations) until several hours after the hole is opened. Samples in dense glacial till below groundwater may have been described as "damp" or "moist" due to the compact matrix of the stratum.

Groundwater levels are subject to seasonal and weather-related variations. Groundwater measurements made at different times and different locations may be significantly different than the measurements taken as part of this investigation.

5. Design Recommendations

5.1 Design Load Recommendations

The foundation of the ground mounted PV array should be designed to resist the forces caused by the load combinations in the Building Code for a Risk Category I structure.

We recommend that wind and snow loading from the Building Code be considered when developing foundation designs as follows:

- Wind load should be calculated in accordance with Chapter 6 of ASCE 7 with the exception of basic wind speed, which is specified in Chapter 16 of the Building Code Table 1604.11. The ultimate wind speed, V_{ult}, for Risk Category I for Suffield is 110 mph.
- Snow load should be calculated in accordance with Chapter 7 of ASCE 7 with the exception of ground snow load, which is specified in Chapter 16 of the Building Code, Table 1604.11. The ground snow load for Suffield is 35 lb/ft^2.

5.2 Allowable Soil Bearing Capacity

The maximum allowable bearing pressures that should be used for the design of equipment pads or PV ballast pads, should they be used, are listed below. Based on the results of this investigation, the equipment pad will likely be founded on silty gravel glacial till. Any PV ballast pads, if used, installed on low areas of the site below approx. El. 152 feet would likely be founded on native silts.

Bearing Stratum	Net Allowable Bearing Pressure
Native Glacial Till or Structural Fill	2.0 tons/ft^2
Native Silt	1.0 tons/ft^2

The natural soils may be susceptible to frost heave. We recommend that the proposed equipment pads or other slabs or footings bear on Structural Fill that extends below the frost depth. If some seasonal movement of the equipment pads is acceptable, we recommend all organics, and the top foot of existing frost susceptible material below the slab should be removed and replaced with compacted Structural Fill. At least 18 inches of Structural Fill should be placed below the slab in all areas.

5.3 Pile-supported PV Array Recommendations

We understand that piles will likely be favored by the solar developer to support the PV array in the in-situ soils. Recommended geotechnical parameters for pile design are provided in Table 1. As discussed above, soil conditions will vary between upland and low areas of the site. Racking piles installed on areas of the site below (current) grades of approx. El. 152 feet will likely be installed in stiff native silts, while those at higher elevations will be in silty and gravelly glacial tills.

Though cobbles to boulders were not noted at the specific boring locations, this soil type is known to contain cobble-laden seams with some potential for small boulders. Difficulties such as misalignments due to cobble and boulder obstructions should be expected, for at least some of the piles. Capabilities of foundation products for installation in these difficult conditions will vary by manufacturer, some of which may have proprietary solutions for working in this type of environment. We recommend forwarding the results of this investigation to pile suppliers/designers, who will have a better understanding of the capabilities and limitations of their specific foundation products, as well as potential mitigation options.

Potential pile-support systems include but are not limited to ground screw piles and driven piles. Ground screws have been advertised as a cost-effective solution to rocky soil environments. We understand that pilot holes for the ground screws can be drilled through boulders.

For lateral pile capacity calculations in soil, we recommend using the passive earth pressure coefficients, K_p, for each soil type provided in Table 1. The pile designer must also consider potential lateral pile movements. Movements of several inches may be needed to develop the lateral capacity.

For axial loading, we recommend that piles be designed using an allowable skin friction and allowable end bearing based on the NAVFAC DM 7.02 analysis procedure provided in Appendix C. Alternatively, the pile designer can opt to perform on-site load tests to estimate the allowable loads.

The soil chemical and resistivity test results in Section 5.8 are provided so that the pile designer can perform a corrosivity analysis based on the materials of the pile.

The pile designer should consider the forces caused by frost on the piles, compared to the pile tension capacity. Recommended adfreeze and frost depth consideration are discussed below.

5.4 Ballast-supported PV Array Recommendations

An alternative to the proposed pile foundation is a ballast system. Potential Ballast-Support systems include but are not limited to:

- Precast Concrete Ballast
- Cast-in-Place Concrete Ballast

If the PV array or a portion of the PV array is supported by ballast ground-mount systems, the subgrade should be proof-rolled with a 5-ton vibratory roller before placing the ballast system. Where fill is added, we recommend that Structural Fill, Ordinary Fill, or on-site soils be placed and compacted to at least 92 percent of its maximum dry density determined in accordance with ASTM D1557 (Modified Proctor).

We recommend a maximum allowable soil bearing pressure as shown in the Allowable Soil Bearing Capacity table above.

The details of the surface preparation for the ballast system depend on the system selected. Generally, the bearing surface for each ballast system element should be level.

The natural soils and Ordinary Fill may be susceptible to frost heave. Therefore, some movement of the ballast foundation should be expected.

5.5 Adfreeze/Freezing Conditions

Soil in contact with foundations near the ground surface can freeze to the foundation and develop a substantial adfreeze bond. If the soil in contact with the foundation is frost susceptible, heave can transmit uplift forces to the foundation. Based on the boring and laboratory results, soils expected to be in contact with racking piles contain high proportions of fine material and are frost susceptible. On upland areas (higher than approx. El. 152 feet), piles will be embedded in materials with about 30 to 60 percent silty fines. On low areas of the site, piles will be embedded in silts with over 90 percent fines.

We recommend using the average value of adfreeze bond stress of 100 kPa (approximately 2,100 lb/ft^2) and 65 kPa (approximately 1,300 lb/ft^2) for fine-grained soils frozen to steel and concrete, respectively, as reported in the Canadian Foundation Engineering Manual 4th Edition.

5.6 Frost Depth

The Connecticut State Building Code specifies a minimum embedment of 42 inches for frost protection of foundations for buildings and structures.

5.7 Seismic Design

The 2018 edition of the Connecticut Building Code document mirrors the 2015 International Building Code, with exception of the revisions and supplemental information provided by state building officials.

Based on the criteria of Building Code Section 1613.3.2 and the SPT N-values measured on site, we recommend the use of Site Class D for seismic design. The Site Class was used in conjunction with the seismic hazard (S_S, S_1) for this location to determine spectral design values, as follows:

Corresponding spectral response design parameters are as follows:

2018 Connecticut Building Code	
Site Class	D
Risk Category	I
Use/Occupancy Group	U
S_S	0.176 g
S_1	0.065 g
S_{DS}	0.188 g
S_{D1}	0.103 g
PGA_M	0.139 g
Seismic Design Category	B

We calculated the spectral response parameters for the Site using general procedures outlined in Building Code Section 1613.3. Peak ground acceleration (PGA_M) is adjusted for Site Class effects, per ASCE 7-10 Section 11.8.3.

Soils present below the site are not judged to be susceptible to liquefaction and this does not need to be accounted for in the design.

5.8 Soil Corrosivity

Electrical resistivity is a broad indicator of soil corrosivity because corrosion reactions are electrochemical in nature and proceed most rapidly when resistivity (i.e., resistance to the flow of ions and electrical current) is low. Specifically, resistivity is a measure of how strongly a given material opposes the flow of electrical current. The composite sample collected from boring B3 at depths 0 to 16.8 feet had an electrical resistivity reading of 4,752 Ω-cm, indicating a moderately corrosive environment.

Sulfates in soil and groundwater in concentrations greater than 1,000 mg/kg are generally considered to be corrosive to structural elements. The American Concrete Institute recommends that Type II cement be used if sulfate concentrations exceed 1,000 mg/kg. Sample test results indicate sulfates concentrations of 14 mg/kg, which is less than 1,000 mg/kg.

Chloride concentrations above 500 mg/kg are generally considered to be corrosive to structural elements. Sample test results indicate chloride concentrations of 31 mg/kg, which is less than 1,000 mg/kg.

We summarized our evaluation of the soil corrosivity to structural elements shown in the table below by comparing the laboratory test results to some available corrosivity references.

Test	Laboratory Results	Reference	Corrosivity to Structural Elements
pH	6.4	Caltrans - Corrosion Guidelines January 2015	Not corrosive
Electrical Resistivity	4,752 Ω-cm	EPRI - Environmental Factors Governing Corrosion Rates, Report 1021854 December 2011	Moderately corrosive
Chloride	31 mg/kg	Caltrans - Corrosion Guidelines January 2015	Not corrosive
Sulfate	14 mg/kg	Caltrans - Corrosion Guidelines January 2015	Not corrosive

5.9 Estimated Infiltration Rate

As currently shown, we expect the bottom of the proposed stormwater basin will be in poorly-draining stiff silts. We evaluated the USDA soil texture of the sample collected in this region by plotting the grain size analysis results on the USDA Soil Texture Triangle. The soil texture class for this sample is “Silt Loam.”

We then evaluated the NRCS hydrologic soil group and infiltration rate based on the USDA soil textures. The NRCS hydrologic soil group and estimated infiltration rate for “Silt Loam” is “C” and 0.57 inches/hour. NRCS data is summarized in Table 2.

6. Construction Considerations

6.1 Subgrade Preparation

6.1.1 General

To prepare the site for grading operations, topsoil, organic matter, and other deleterious material should be stripped from the site improvement areas. Soft, wet, loose, or otherwise un-suitable soils should be removed and replaced, or potentially re-compacted in-place.

6.1.2 Equipment Pad

Excavations to final subgrade for the equipment pad should be performed in such a way that limits disturbing or loosening subgrade soils. After stripping and cutting and prior to placing pad base materials, the resulting subgrade should be firm, stable, and unyielding. Stabilization, where required, may consist of removing unsuitable material and replacement with compacted Structural Fill, or where unsuitable soils are relatively thin, drying and compacting in place.

Equipment pad soil subgrades should be proof-rolled with at least four (4) passes of a minimum 5-ton vibratory roller.

We recommend that a GEI representative observe the final preparation of all subgrades prior to equipment pad construction.

6.1.3 Access Roads

We understand that the access roads at the site will be gravel surface roads. We caution that portions of this road constructed on low areas of the site, below approx. El. 152 feet, will be constructed on poorly-draining soils with fairly high susceptibility to frost and drainage impacts.

The following roadway sections are suitable for the access roads:

- 12 inches of CTDOT M.02.03 Gravel Surface over a geotextile. Geotextile fabric for roadway underlayment should be a heavy-duty woven product, consisting of GEOTEX 200ST or an approved equivalent.

On upland areas, we recommend that the gravel road section be compacted with at least four (4) passes of a vibratory roller imparting an impact load of at least 10 tons. The resulting subgrade should be firm, stable, and unyielding. Water should be added to materials as needed during compaction.

Vibratory compaction of silt roadway subgrades on low areas of the site would be detrimental to strength and stability. In these areas, excavation to subgrade should be conducted with smooth-edge buckets or scrapers and the geotextile and stone placed very soon after. Exposed soils will be highly susceptible to disturbance by moisture and equipment movements.

We recommend that the road surface be graded with a minimum cross slope of ½ inch per foot of road width to allow water to drain. Drainage ditches should be provided along the edges of the road to direct surface water and runoff away from the road and subbase.

We recommend that a GEI representative observe the final preparation of all subgrades prior to access road construction.

6.2 Excavation

Excavations will be primarily through topsoil, glacial tills and silt. Cobbles, small boulders, and some moderately difficult excavation should be expected within native soils, especially in the upland glacial tills. We expect that excavation through soils can be accomplished with conventional earthmoving equipment.

All excavations should be sloped or shored in accordance with the local, state, and federal regulations, including Occupational Safety and Health Agency (OSHA 29 CFR Part 1926) excavation trench safety standards.

Groundwater is not likely to impact construction operations; however, the site soils will be susceptible to moisture intrusion and softening. Therefore, surface water should be controlled during construction.

6.3 Freezing Conditions

The soils at the site are frost susceptible. Therefore, if construction is performed during freezing weather, special precautions will be required to prevent the subgrade soils from freezing. Freezing of the soil beneath the foundation during construction may result in subsequent settlement of the structure.

All subgrades should be free of frost before placement of concrete. Frost-susceptible soils that have frozen should be removed and replaced with compacted Structural Fill. The footing and the soil adjacent to the footing should be insulated until they are backfilled. Soil placed as fill should be free of frost, as should the ground on which it is placed.

If slabs-on-grade or footings are built and left exposed during the winter, precautions should be taken to prevent freezing of the underlying soil.

6.4 Backfilling and Compaction

We recommend that all final cut and fill slopes be constructed at no steeper than 2H:1V grade to allow for the planting and maintenance of grass cover. These slopes should be protected and seeded as soon as practicable after they are completed to reduce the potential for surface erosion.

Recommended specifications for gradation and compaction of backfill soils are provided in the attached recommended Material Specifications (Appendix D).

Native glacial till soils on upland areas of the site excavated as part of earthwork activities can likely be re-used on site as Structural Fill or Ordinary Fill, provided they do not contain oversize, organic, or otherwise deleterious material and can meet the appropriate compaction requirements. We caution that cobbles and small boulders may be encountered within these soils. Native silts, if excavated from low areas of the site, are not suitable for re-use as Structural Fill or Ordinary Fill. Re-use of these soils would be limited to landscaped and other non-structural areas.

Fill imported from off site should meet the attached gradation requirements. Fill placed within structural limits, under the access roadway and equipment pad, and behind any retaining walls should meet the compaction requirements for Structural Fill. Backfill placed in non-structural areas should meet the compaction requirements for Ordinary Fill. Proposed borrow materials that fall slightly outside of these specifications may also be suitable for use, subject to review and approval by GEI.

7. Closure

7.1 Follow-on Services

We recommend that GEI be kept on the project through the final design and construction phases for the following services:

- Review geotechnical-related contractor submittals and assist in developing responses to questions from the contractor (i.e. RFI's).
- Provide periodic site visits during construction to view subgrades and consult on geotechnical-related issues that occur.

7.2 Limitations

This report was prepared for the use of the project team, exclusively. Our recommendations are based on the project information provided to us at the time of this report and may require modification if there are any changes in the nature, design, or location of the proposed PV array. We cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to determine whether any changes in the project affect the validity of our recommendations, and whether our recommendations have been properly implemented in the design.

Our professional services for this project have been performed in accordance with generally accepted engineering practices. No warranty, express or implied, is made.

Tables

Table 1. Recommended Geotechnical Design Parameters
Suffield Solar
Suffield, Connecticut

Soil Material	Total Unit Weight Above Water Table	Drained Friction Angle	Undrained Strength	Earth Pressure Coefficients(2)		
	γ_t (pcf)	ϕ' (degrees)	C (ksf)	K_o	K_a	K_p
Ordinary Fill (92% Compaction)(3)	120	32	0	0.47	0.31	3.25
Structural Fill (95% Compaction)(4)	125	34	0	0.44	0.28	3.54
Native Silty/Gravelly Glacial Till	125	36	0	0.41	0.26	3.85
Native Silt	115	28	900	0.53	0.36	2.77

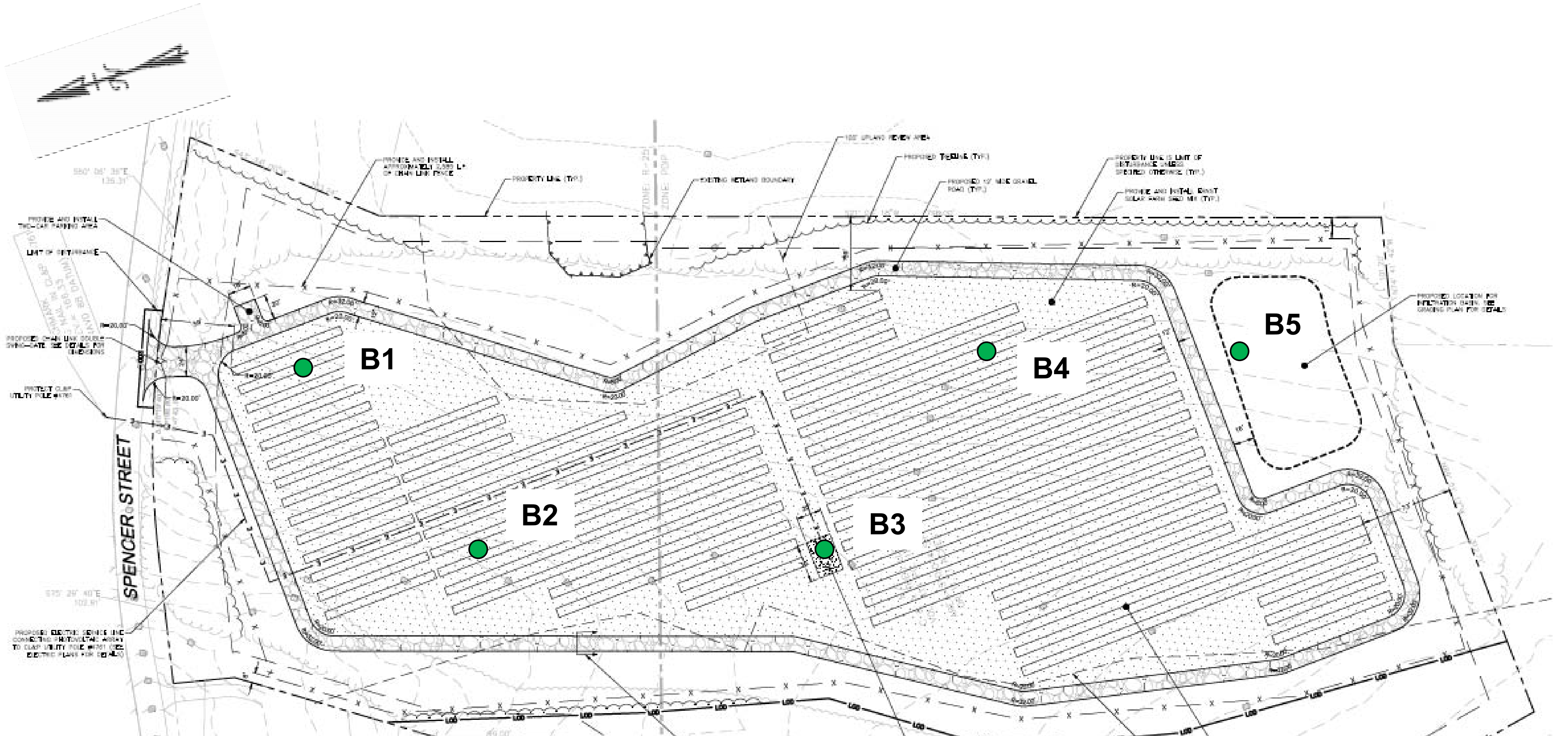
Notes:
1. The values of soil properties in this table are based on empirical correlations using the results of standard penetration tests and laboratory index tests, and engineering judgment.
2. K_o = Coefficient of Earth Pressure at Rest K_a = Active Earth Pressure Coefficient (Rankine) K_p = Passive Earth Pressure Coefficient (Rankine).
3. For material compacted to ~92% of Modified Proctor maximum dry density in accordance with ASTM D1557.
4. For material compacted to ~95% of Modified Proctor maximum dry density in accordance with ASTM D1557.

Table 2. USDA Soil Texture, NRCS Soil Group, and Infiltration Rate
Suffield Solar
Suffield, Connecticut

Boring ID	Sample Depth (feet)	Percent Sand[1]	Percent Silt[1]	Percent Clay[1]	USDA Soil Texture[2]	NRCS Hydrologic Soil Group[3]	Infiltration Rate (inches/hour)[3]
B1 (S-3)	4-6	42	52	6	Silt Loam	C	0.57
B4 (S-4)	10-12	6	77	17	Silt Loam	C	0.57
B5 (S-4)	10-12	1	81	18	Silt Loam	C	0.57

Notes:
1. USDA classification of soil particle sizes (mm): Sand: 0.05 to 2, Silt: 0.002 to 0.05, Clay: <0.002.
2. USDA soil texture is based on the soil texture triangle.
3. National Resources Conservation Service (NRCS) Hydrologic Soil Group and Infiltration Rate (referred to as Rawls rate) are based on Soil Texture Class and Table 7-1 of the NRCS Part 630 Hydrology National Engineering Handbook (2009) and Rawls et al 1998 *"Use of Soil Texture, Bulk Density and Slope of Water Retention Curve to Predict Saturated Hydraulic Conductivity"*

Figures



ZONING INFORMATION

LOCATION: SUFFIELD, HARTFORD COUNTY, CONNECTICUT				
ZONE: R-25 (RESIDENTIAL ZONE) / PDIP (PLANNED DEVELOPMENT INDUSTRIAL PARK ZONE)				
USE: PHOTOVOLTAIC ARRAY				
ITEM #	ITEM	REQUIREMENTS	PROPOSED	VARIANCE
1	MINIMUM LOT AREA	25,000 S.F./80,000 S.F.	509,652 S.F. (11.70 AC.)	NO
2	MINIMUM LOT WIDTH	NONE REQUIRED	679 FEET	NO
3	MINIMUM LOT FRONTAGE	125 FEET/150 FEET	434 FEET	NO
4	MINIMUM FRONT SETBACK	50 FEET	59 FEET	NO
5	MINIMUM SIDE SETBACK	20 FEET/35 FEET	58 FEET	NO
6	MINIMUM REAR SETBACK	40 FEET/30 FEET	73 FEET	NO
7	MAXIMUM BUILDING HEIGHT	30 FEET/ 50 FEET	N/A	NO
8	MAXIMUM BUILDING COVERAGE	25 PERCENT/50 PERCENT	N/A	NO

GENERAL NOTES

1. LOAM AND SEED ALL DISTURBED AREA WITHIN THE PROPOSED TREELINE AND THE GRAVEL ROAD.
2. PROVIDE AND INSTALL ERNST SOLAR FARM SEED MIX TO ALL AREAS WITHIN THE GRAVEL ROAD.

SOURCE: BL Companies

GEI Consultants

BORING LOCATION PLAN
SPENCER STREET
SUFFIELD, CT

GEI PROJECT NO: **2104784**

FIGURE NO. 1

Appendix A

Boring Logs

BORING B1

BORING INFORMATION

LOCATION: Refer to Boring Location Plan.

GROUND SURFACE EL. (ft): 157

DATE START/END: 12/23/2021 - 12/23/2021

VERTICAL DATUM:

DRILLING COMPANY: Seaboard Drilling, Inc.

TOTAL DEPTH (ft): 15.3

DRILLER NAME: Jeff Nitsch

LOGGED BY: Tom Rezzani

RIG TYPE:

DRILLING INFORMATION

HAMMER TYPE: Automatic

CASING I.D./O.D.: NA/ NA

CORE BARREL TYPE: NA

AUGER I.D./O.D.: 4.25 inch / NA

DRILL ROD O.D.: NM

CORE BARREL I.D./O.D. NA / NA

DRILLING METHOD: Hollow Stem Auger

WATER LEVEL ELEVATIONS (ft): ▼ 153.8 12/23/2021 10:35 am

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/17	2-2-3-5		TOPSOIL	S1: SANDY SILT (ML); ~50% NP fines, ~40% F-C sand, ~10% F-M gravel, organic fibers, brown, moist. TOPSOIL
		S2	2 to 4	24/21	6-8-8-10		GLACIAL TILL	S2: SILTY GRAVEL WITH SAND (GM): ~40% F-C gravel, ~35% F-C sand, ~25% NP fines, reddish brown, dry.
	5	S3	4 to 6	24/21	16-7-8-11			S3: SILTY SAND WITH GRAVEL (SM): ~45.4% NP fines, ~38.1% sand, ~16.5% gravel, reddish brown, moist.
150								
	10	S4	10 to 12	24/12	43-23-24-31			S4: Similar to S3, finer with depth.
	15	S5	15 to 15.3	3/3	50/3"			S5: SILTY SAND WITH GRAVEL (SM); ~40% NP fines, ~30% F-C sand, ~30% F-C gravel, brown, moist.
140								Spoon refusal at 15.25'. Backfilled with drill cuttings.
	20							

NOTES:
Ground surface elevation is approximate.

PROJECT NAME: Suffield Solar Array

CITY/STATE: Suffield, Connecticut

GEI PROJECT NUMBER: 2104784

GEI Consultants

BORING INFORMATION

LOCATION: Refer to Boring Location Plan.

GROUND SURFACE EL. (ft): 167

VERTICAL DATUM:

TOTAL DEPTH (ft): 17.0

LOGGED BY: Tom Rezzani

DATE START/END: 12/23/2021 - 12/23/2021

DRILLING COMPANY: Seaboard Drilling, Inc.

DRILLER NAME: Jeff Nitsch

RIG TYPE:

BORING B2

DRILLING INFORMATION

HAMMER TYPE: Automatic

AUGER I.D./O.D.: 4.25 inch / NA

CASING I.D./O.D.: NA/ NA

DRILL ROD O.D.: NM

CORE BARREL TYPE: NA

CORE BARREL I.D./O.D. NA / NA

DRILLING METHOD: Hollow Stem Auger

WATER LEVEL ELEVATIONS (ft): ▽ 164.1 12/23/2021 1:35 pm

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample No.	Depth (ft)	Pen./Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/14	1-2-3-3		TOPSOIL	S1: SANDY SILT (ML); ~65% NP fines, ~30% F-C sand, ~5% F gravel, organic fibers, gray, moist. TOPSOIL
		S2	2 to 4	24/16	5-8-5-4		TOPSOIL	S2: SANDY SILT (ML); ~60% NP fines, ~30% F-C sand, ~10% F-M gravel, organic fibers, brown, dry. TOP SOIL
	5	S3	4 to 6	24/13	4-5-6-6		GLACIAL TILL	S3: SANDY SILT WITH GRAVEL (ML); ~65% NP fines, ~20% F-C sand, ~15% F-M gravel, brown, moist.
160								
	10	S4	10 to 12	24/17	10-14-18-18		GLACIAL TILL	S4: GRAVELLY SILT WITH SAND (ML); ~50% NP fines, ~30% F-M gravel, ~20% F-C sand, reddish brown, dry to moist.
	15	S5	15 to 17	24/24	11-15-24-30		GLACIAL TILL	S5: SILTY SAND WITH GRAVEL (SM); ~40% F-C sand, ~40% NP fines, ~20% F-M gravel, finer with depth, brown, moist.
150								End of boring at 17'. Planned extent. Backfilled with drill cuttings.
	20							

NOTES:
Ground surface elevation is approximate.

PROJECT NAME: Suffield Solar Array

CITY/STATE: Suffield, Connecticut

GEI PROJECT NUMBER: 2104784

GEI Consultants

BORING INFORMATION

LOCATION: Refer to Boring Location Plan.

GROUND SURFACE EL. (ft): 160 | **DATE START/END:** 12/23/2021 - 12/23/2021

VERTICAL DATUM: | **DRILLING COMPANY:** Seaboard Drilling, Inc.

TOTAL DEPTH (ft): 17.0 | **DRILLER NAME:** Jeff Nitsch

LOGGED BY: Tom Rezzani | **RIG TYPE:**

BORING B3

DRILLING INFORMATION

HAMMER TYPE: Automatic | **CASING I.D./O.D.:** NA/ NA | **CORE BARREL TYPE:** NA

AUGER I.D./O.D.: 4.25 inch / NA | **DRILL ROD O.D.:** NM | **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow Stem Auger

WATER LEVEL ELEVATIONS (ft): Not encountered

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/19	1-1-2-3		TOPSOIL	S1: SILT WITH SAND (ML); ~80% NP fines, ~15% F-C sand, ~5% F gravel, organic fibers, olive, moist.
		S2	2 to 4	24/18	4-4-6-5		GLACIAL TILL	S2: SILTY GRAVEL WITH SAND (GM); ~40% NP fines, ~35% F-C gravel (up to 2 1/2"), ~25% F-C sand, brown, moist.
	5	S3	4 to 6	24/17	7-11-11-13		GLACIAL TILL	S3: Similar to S2, reddish brown, moist.
150	10	S4	10 to 12	24/24	4-6-10-11		GLACIAL TILL	S4: SILTY GRAVEL WITH SAND (SM); ~40% NP fines, ~30% F-M gravel up to 3/4", ~30% F-C sand, reddish brown, moist.
	15	S5	15 to 16.8	22/4	16-16-17-20		GLACIAL TILL	S5: SILTY GRAVEL WITH SAND (GM); ~45% F-C gravel, ~35% F-C sand, ~20% NP fines, reddish brown, moist.
								End of boring at 17'. Planned extent. Backfilled with drill cuttings.
140	20							

NOTES:
Ground surface elevation is approximate.

PROJECT NAME: Suffield Solar Array

CITY/STATE: Suffield, Connecticut

GEI PROJECT NUMBER: 2104784

GEI Consultants

BORING INFORMATION

LOCATION: Refer to Boring Location Plan.

GROUND SURFACE EL. (ft): 149 **DATE START/END:** 12/23/2021 - 12/23/2021

VERTICAL DATUM: **DRILLING COMPANY:** Seaboard Drilling, Inc.

TOTAL DEPTH (ft): 17.0 **DRILLER NAME:** Jeff Nitsch

LOGGED BY: Tom Rezzani **RIG TYPE:**

BORING B4

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** NA/ NA **CORE BARREL TYPE:** NA

AUGER I.D./O.D.: 4.25 inch / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.** NA / NA

DRILLING METHOD: Hollow Stem Auger

WATER LEVEL ELEVATIONS (ft): ▼ 138.3 12/23/2021 3:54 pm

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/15	WOH-2-3-4		TOPSOIL	S1: GRAVELLY SILT WITH SAND (ML); ~65% NP fines, ~20% F-C gravel, ~15% F-C sand, organic fibers, olive, moist. TOP SOIL.
		S2	2 to 4	24/20	3-6-8-8		SILT	S2: SILT (ML); ~90% NP fines, ~10% F sand, olive, moist.
	5	S3	4 to 6	24/22	3-5-4-6			S3: Similar to S2, olive and reddish brown banding, NP-LP fines
140	10	S4	10 to 12	24/18	3-5-6-8			S4: SILT (ML); ~94.0% NP-LP fines, ~6.0% F-M sand, brown, moist.
	15	S5	15 to 17	24/16	7-9-12-12		GLACIAL TILL	S5A (0-8"): SILT (ML-MH); ~95% LP-MP fines, ~5% F-C sand, olive, damp. S5B (8-16"): SILTY GRAVEL WITH SAND (GM); ~40% NP fines, ~35% F-C gravel, ~25% F-C sand, reddish brown, damp.
								End of boring at 17'. Planned extent. Backfilled with drill cuttings.
130	20							

NOTES:
Ground surface elevation is approximate.

PROJECT NAME: Suffield Solar Array

CITY/STATE: Suffield, Connecticut

GEI PROJECT NUMBER: 2104784

GEI Consultants

BORING B5

PAGE 1 of 1

BORING INFORMATION

LOCATION: Refer to Boring Location Plan.

GROUND SURFACE EL. (ft): 150
DATE START/END: 12/23/2021 - 12/23/2021

VERTICAL DATUM:
DRILLING COMPANY: Seaboard Drilling, Inc.

TOTAL DEPTH (ft): 17.0
DRILLER NAME: Jeff Nitsch

LOGGED BY: Tom Rezzani
RIG TYPE:

DRILLING INFORMATION

HAMMER TYPE: Automatic
CASING I.D./O.D.: NA/ NA
CORE BARREL TYPE: NA

AUGER I.D./O.D.: 4.25 inch / NA
DRILL ROD O.D.: NM
CORE BARREL I.D./O.D. NA / NA

DRILLING METHOD: Hollow Stem Auger

WATER LEVEL ELEVATIONS (ft): Not encountered

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
	0	S1	0 to 2	24/18	1-2-3-4		TOPSOIL	S1: SILT WITH GRAVEL (ML); ~75% NP fines, ~15% F-C gravel, ~10% F-C sand, organic fibers, olive, moist. TOP SOIL
		S2	2 to 4	24/16	4-5-6-7		SILT	S2: SILT (ML); ~90% NP fines, ~10% F-C sand, olive (banded), moist.
	5	S3	4 to 6	24/24	6-6-7-8		SILT	S3: SILT (ML); ~99.2% NP fines, ~0.8% F sand, brown, moist.
140	10	S4	10 to 12	24/20	4-5-5-6		SILT	S4: Similar to S3, moist.
	15	S5	15 to 17	24/14	3-4-4-9		SILT	S5A (0-6"): Similar to S3, moist.
							GLACIAL TILL	S5B (6-14"): GRAVELLY SILT WITH SAND (ML); ~50% NP fines, ~35% F-C gravel, ~15% F-C sand, reddish brown, moist.
								End of boring at 17'. Planned extent. Backfilled with drill cuttings.
130	20							

NOTES:
Ground surface elevation is approximate.

PROJECT NAME: Suffield Solar Array

CITY/STATE: Suffield, Connecticut

GEI PROJECT NUMBER: 2104784

GEI Consultants

GEI WOBURN STD 1-LOCATION-LAYER NAME SUFFIELD GINT.GPJ GEI DATA TEMPLATE 2013.GDT 2/18/22

Appendix B

Laboratory Test Results

Client: GEI Consultants, Inc.			
Project: Suffield Solar			
Location: Suffield, CT		Project No:	GTX-314960
Boring ID: ---	Sample Type: ---	Tested By:	ckg
Sample ID: ---	Test Date: 01/31/22	Checked By:	bfs
Depth : ---	Test Id: 653014		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
B1	S3	4.-6'	Moist, reddish brown sandy clay	11.7
B4	S4	10-12'	Moist, brown gravely clay	27.5
B5	S4	10-12'	Moist, brown clay	33.0

Notes: Temperature of Drying : 110º Celsius

Client:	GEI Consultants, Inc.				
Project:	Suffield Solar				
Location:	Suffield, CT			Project No:	GTX-314960
Boring ID:	B3	Sample Type:	bag	Tested By:	amp
Sample ID:	Composite 1	Test Date:	02/01/22	Checked By:	bfs
Depth :	0-16.8'	Test Id:	653005		
Test Comment:	---				
Visual Description:	Moist, reddish brown sandy silt				
Sample Comment:	---				

pH of Soil by ASTM D4972

Boring ID	Sample ID	Depth	Visual Description	pH of Soil in Distilled Water	pH of Soil in Calcium Chloride
B3	Composite 1	0-16.8'	Moist, reddish brown sandy silt	6.4	6.3

Notes: Sample Preparation: screened through #10 sieve
Method A, pH meter used

Client:	GEI Consultants, Inc.
Project:	Suffield Solar
Location:	Suffield, CT
GTX#:	314960
Test Date:	01/28/22
Tested By:	AMP
Checked By:	bfs

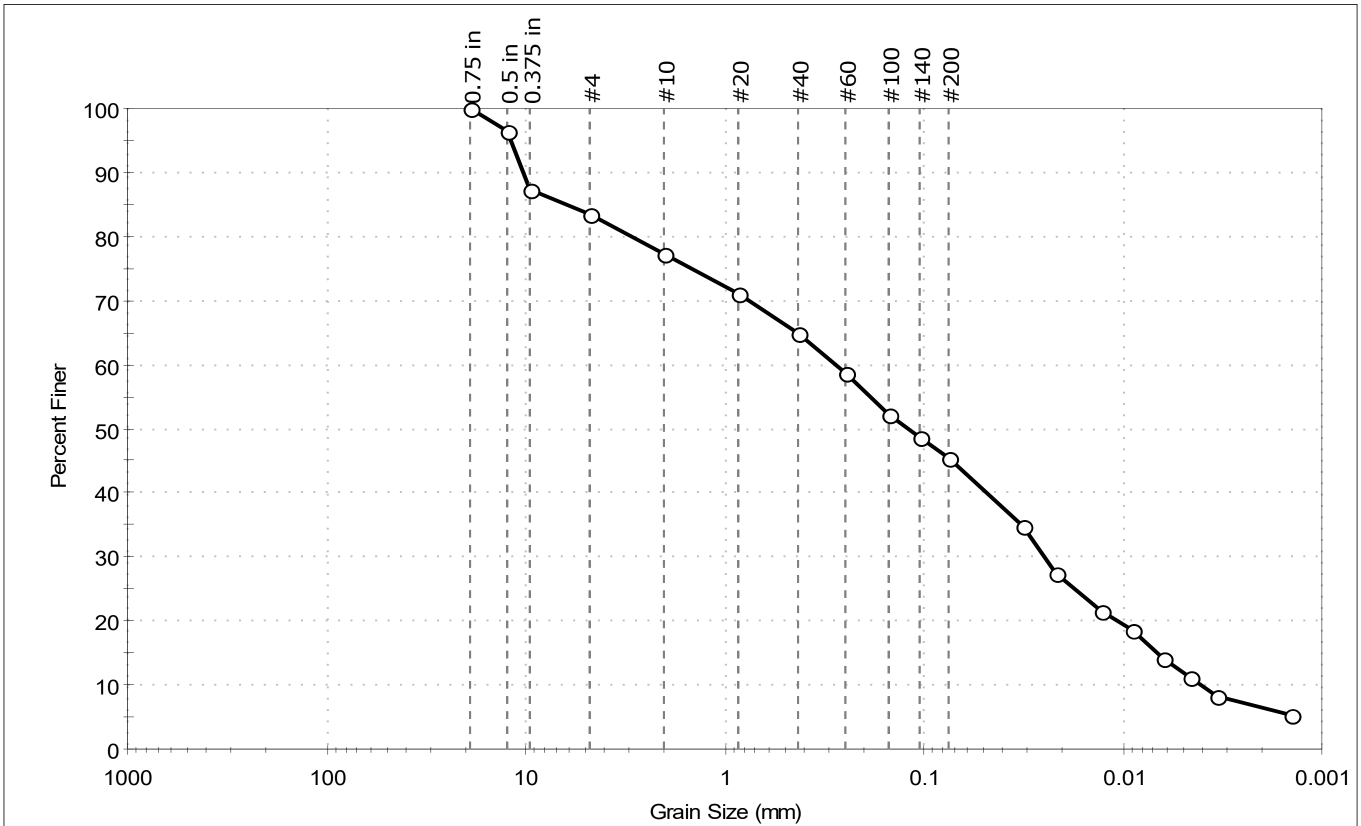
Laboratory Measurement of Soil Resistivity Using the Wenner Four-Electrode Method by ASTM G57 (Laboratory Measurement)

Boring ID	Sample ID	Depth, ft.	Sample Description	Electrical Resistivity, ohm-cm	Electrical Conductivity, $(\text{ohm-cm})^{-1}$
B3	Composite 1	0-16.8	Moist, reddish brown sandy silt	4,752	2.10E-04

Notes:
Test Equipment: Nilsson Model 400 Soil Resistance Meter, MC Miller Soil Box
Water added to sample to create a thick slurry prior to testing (saturated condition).
Electrical Conductivity is calculated as inverse of Electrical Resistivity (per ASTM G57)
Test conducted in standard laboratory atmosphere: 68-73 F

Client:	GEI Consultants, Inc.		
Project:	Suffield Solar		
Location:	Suffield, CT	Project No:	GTX-314960
Boring ID: B1	Sample Type: bag	Tested By:	ckg
Sample ID: S3	Test Date: 01/26/22	Checked By:	bfs
Depth : 4.-6'	Test Id: 653009		
Test Comment:	---		
Visual Description:	Moist, reddish brown clayey sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	16.5	38.1	45.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	96		
0.375 in	9.50	87		
#4	4.75	83		
#10	2.00	77		
#20	0.85	71		
#40	0.42	65		
#60	0.25	59		
#100	0.15	52		
#140	0.11	49		
#200	0.075	45		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0321	35		
---	0.0216	27		
---	0.0127	21		
---	0.0089	19		
---	0.0063	14		
---	0.0046	11		
---	0.0034	8		
---	0.0014	5		

Coefficients

D_{85} =6.2895 mm	D_{30} =0.0248 mm
D_{60} =0.2823 mm	D_{15} =0.0068 mm
D_{50} =0.1213 mm	D_{10} =0.0041 mm
C_u =68.854	C_c =0.531

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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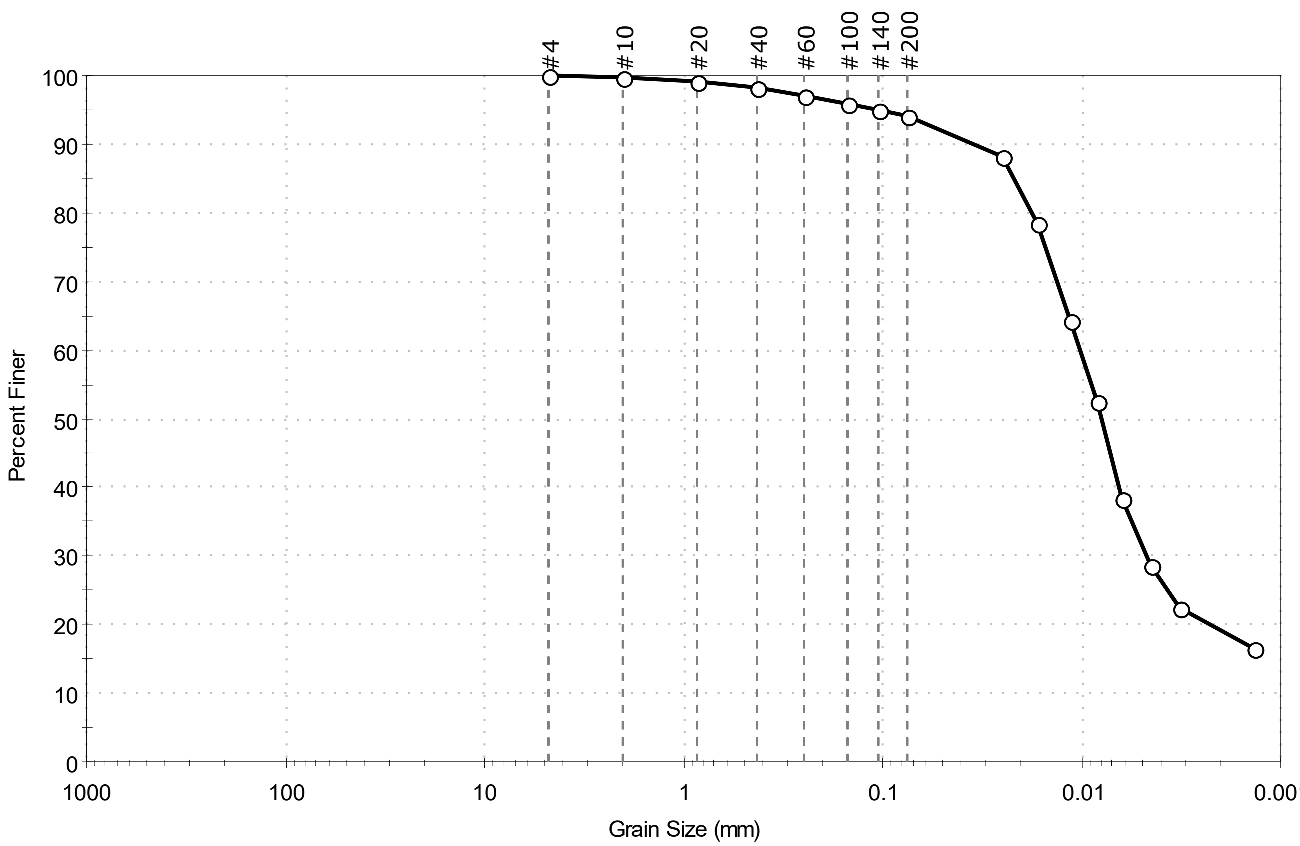
Client:	GEI Consultants, Inc.		
Project:	Suffield Solar		
Location:	Suffield, CT	Project No:	GTX-314960
Boring ID: B4	Sample Type: bag	Tested By:	ckg
Sample ID: S4	Test Date: 01/26/22	Checked By:	bfs
Depth : 10-12'	Test Id: 653010		
Test Comment:	Removed one unrepresentitive 3/4" rock		
Visual Description:	Moist, brown clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	6.0	94.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	98		
#60	0.25	97		
#100	0.15	96		
#140	0.11	95		
#200	0.075	94		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0253	88		
---	0.0165	78		
---	0.0113	64		
---	0.0083	52		
---	0.0062	38		
---	0.0045	29		
---	0.0032	23		
---	0.0014	17		

Coefficients

D_{85} =0.0219 mm D_{30} =0.0048 mm

D_{60} =0.0101 mm D_{15} =N/A

D_{50} =0.0079 mm D_{10} =N/A

C_u =N/A C_c =N/A

Classification

ASTM   N/A

AASHTO   Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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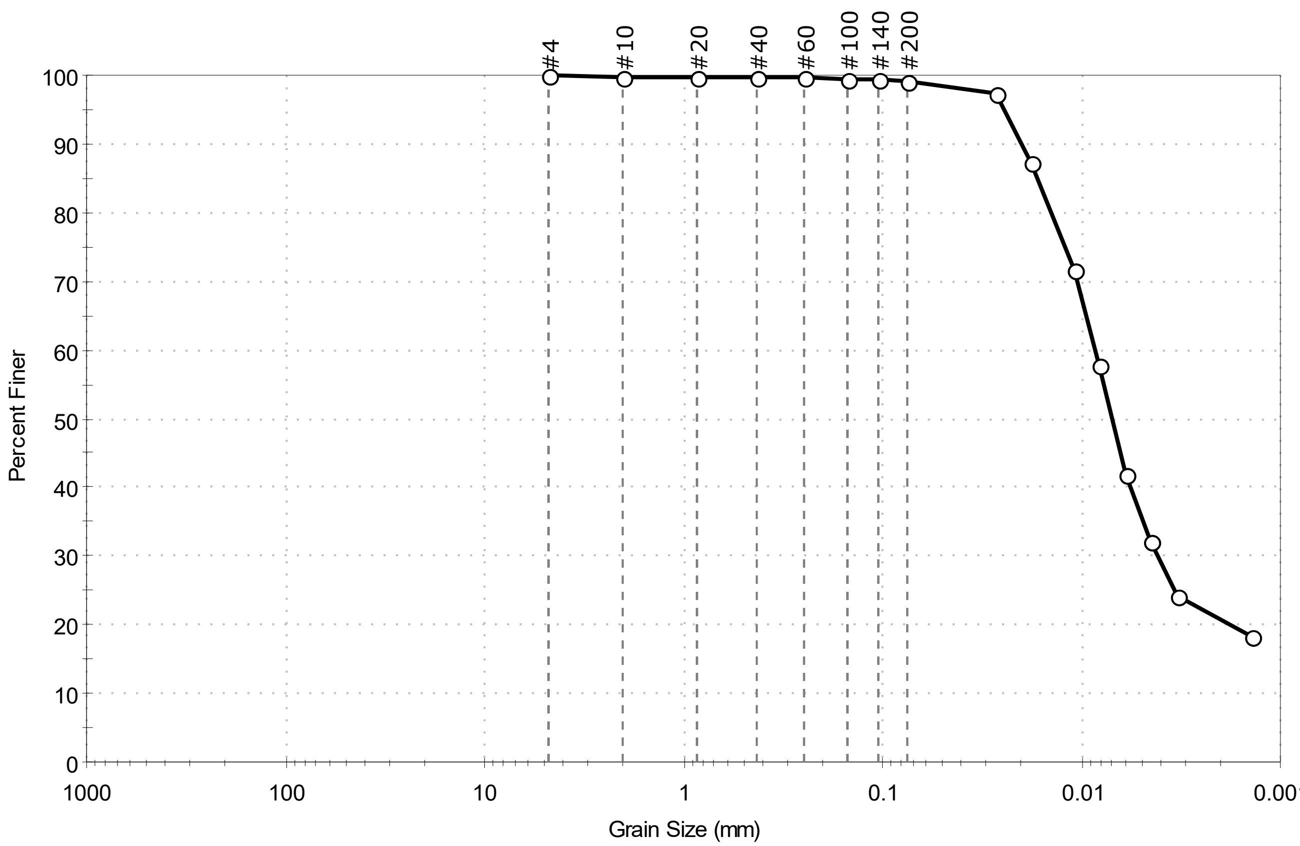
GeoTesting EXPRESS

Client:	GEI Consultants, Inc.				
Project:	Suffield Solar				
Location:	Suffield, CT			Project No:	GTX-314960
Boring ID:	B5	Sample Type:	bag	Tested By:	ckg
Sample ID:	S4	Test Date:	01/26/22	Checked By:	bfs
Depth :	10-12'	Test Id:	653011		
Test Comment:	---				
Visual Description:	Moist, brown clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	0.8	99.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	99		
#140	0.11	99		
#200	0.075	99		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0270	97		
---	0.0180	87		
---	0.0108	72		
---	0.0082	58		
---	0.0060	42		
---	0.0045	32		
---	0.0033	24		
---	0.0014	18		

Coefficients

D_{85} =0.0167 mm
D_{30} =0.0041 mm
D_{60} =0.0086 mm
D_{15} =N/A
D_{50} =0.0070 mm
D_{10} =N/A
C_u =N/A
C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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testing services sm

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GEOTESTING EPXRESS INCORPORATED
125 NAGOG PARK
ACTON MA 01720-3451
USA

Analysis No.	TS-A2210104
Report Date	28 January 2022
Date Sampled	21 January 2022
Date Received	25 January 2022
Where Sampled	Acton, MA USA
Sampled By	Client

This is to attest that we have examined: Soil: Project: Suffield Solar; Site Location: Suffield, CT; Job Number: GTX-314960

When examined to the applicable requirements of:

ASTM D 512-12* “Standard Test Methods for Chloride Ion in Water” Method B

ASTM D 516-16 “Standard Test Method for Sulfate Ion in Water”

Results:

ASTM D 512 – Chloride Method B

Sample		Results		Detection Limit
		ppm (mg/kg)	%[1]	
Composite 1		31.	0.0031	10.
- - -	- - -			

NOTE: [1]Percent by weight after drying and prepared as per the Standard. *Withdrawn 2021 without Replacement

ASTM D 516 – Sulfates (Soluble)

Sample		Results		Detection Limit
		ppm (mg/kg)	%[1]	
Composite 1		14.	0.0014	10.
- - -	- - -			

NOTE: [1]Percent by weight after drying and prepared as per the Standard.

END OF ANALYSIS

USEPA Laboratory ID UT00930

Merrill Gee P.E. – Engineer in Charge

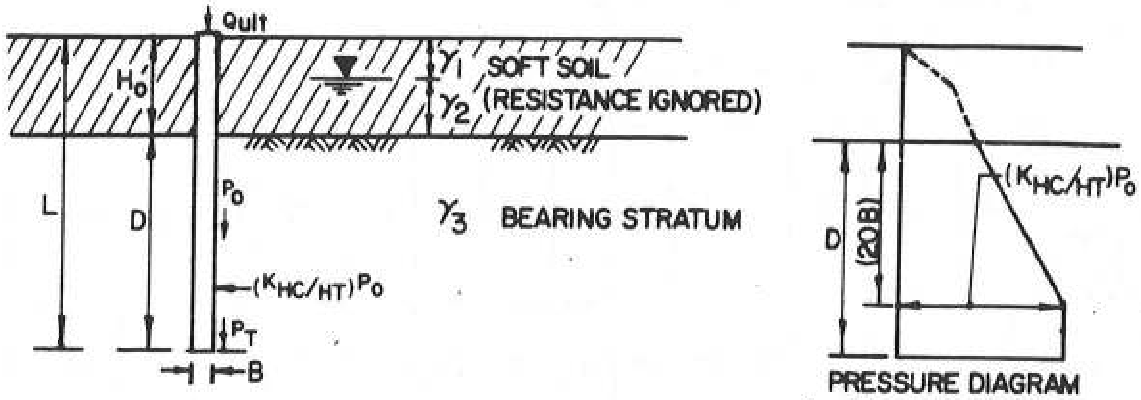
Appendix C

NAVFAC DM 7.02

Naval Facilities Engineering Command
200 Stovall Street
Alexandria, Virginia 22332-2300   APPROVED FOR PUBLIC RELEASE

Foundations & Earth Structures

DESIGN MANUAL 7.02
REVALIDATED BY CHANGE 1 SEPTEMBER 1986



PRESSURE DIAGRAM
$K_{HC}P_o$ AND $K_{HT}P_o$

(A) ULTIMATE LOAD CAPACITY IN COMPRESSION

$$Q_{ult} = P_T N_q A_T + \sum_{H=H_o}^{H=H_o+D} (K_{HC})(P_o)(\tan \delta)(S)$$

WHERE Q_{ult} = ULTIMATE LOAD CAPACITY IN COMPRESSION

P_T = EFFECTIVE VERTICAL STRESS AT PILE TIP (SEE NOTE 1)

N_q = BEARING CAPACITY FACTOR (SEE TABLE, FIGURE 1 CONTINUED)

A_T = AREA OF PILE TIP

K_{HC} = RATIO OF HORIZONTAL TO VERTICAL EFFECTIVE STRESS ON SIDE OF ELEMENT WHEN ELEMENT IS IN COMPRESSION.

P_o = EFFECTIVE VERTICAL STRESS OVER LENGTH OF EMBEDMENT, D (SEE NOTE 1)

δ = FRICTION ANGLE BETWEEN PILE AND SOIL (SEE TABLE, FIGURE 1 CONTINUED)

S = SURFACE AREA OF PILE PER UNIT LENGTH

FOR CALCULATING Q_{all}, USE F_S OF 2 FOR TEMPORARY LOADS, 3 FOR PERMANENT LOADS. (SEE NOTE 2)

(B) ULTIMATE LOAD CAPACITY IN TENSION

$$T_{ult} = \sum_{H=H_o}^{H=H_o+D} (K_{HT})(P_o)(\tan \delta)(S)(H)$$

WHERE: T_{ult} = ULTIMATE LOAD CAPACITY IN TENSION, PULLOUT

K_{HT} = RATIO OF HORIZONTAL TO VERTICAL EFFECTIVE STRESS ON SIDE OF ELEMENT WHEN ELEMENT IS IN TENSION

FOR CALCULATING T_{all}, USE $F_S = 3$ ON T_{ult} PLUS THE WEIGHT OF THE PILE (W_P), THUS $T_{all} = \frac{T_{ult}}{3} + W_P$ (SEE NOTE 2)

NOTE-1: EXPERIMENTAL AND FIELD EVIDENCE INDICATE THAT BEARING PRESSURE AND SKIN FRICTION INCREASE WITH VERTICAL EFFECTIVE STRESS P_o UP TO A LIMITING DEPTH OF EMBEDMENT, DEPENDING ON THE RELATIVE DENSITY OF THE GRANULAR SOIL AND POSITION OF THE WATER TABLE. BEYOND THIS LIMITING DEPTH (10B± TO 40B±) THERE IS VERY LITTLE INCREASE IN END BEARING, AND INCREASE IN SIDE FRICTION IS DIRECTLY PROPORTIONAL TO THE SURFACE AREA OF THE PILE. THEREFORE, IF D IS GREATER THAN 20 B, LIMIT P_o AT THE PILE TIP TO THAT VALUE CORRESPONDING TO D = 20B.

NOTE-2: IF BUILDING LOADS AND SUBSURFACE CONDITION ARE WELL DOCUMENTED IN THE OPINION OF THE ENGINEER, A LESSER FACTOR OF SAFETY CAN BE USED BUT NOT LESS THAN 2.0 PROVIDED PILE CAPACITY IS VERIFIED BY LOAD TEST AND SETTLEMENTS ARE ACCEPTABLE.

FIGURE 1
Load Carrying Capacity of Single Pile in Granular Soils

BEARING CAPACITY FACTORS - N_q

ϕ* (DEGREES)	26	28	30	31	32	33	34	35	36	37	38	39	40
N_q (DRIVEN PILE DISPLACEMENT)	10	15	21	24	29	35	42	50	62	77	86	120	145
N_q ** (DRILLED PIERS)	5	8	10	12	14	17	21	25	30	38	43	60	72

EARTH PRESSURE COEFFICIENTS K_{HC} AND K_{HT}

PILE TYPE	K_{HC}	K_{HT}
DRIVEN SINGLE H-PILE	0.5 – 1.0	0.3 – 0.5
DRIVEN SINGLE DISPLACEMENT PILE	1.0 – 1.5	0.6 – 1.0
DRIVEN SINGLE DISPLACEMENT TAPERED PILE	1.5 – 2.0	1.0 – 1.3
DRIVEN JETTED PILE	0.4 – 0.9	0.3 – 0.6
DRILLED PILE (LESS THAN 24" DIAMETER)	0.7	0.4

FRICTION ANGLE - δ

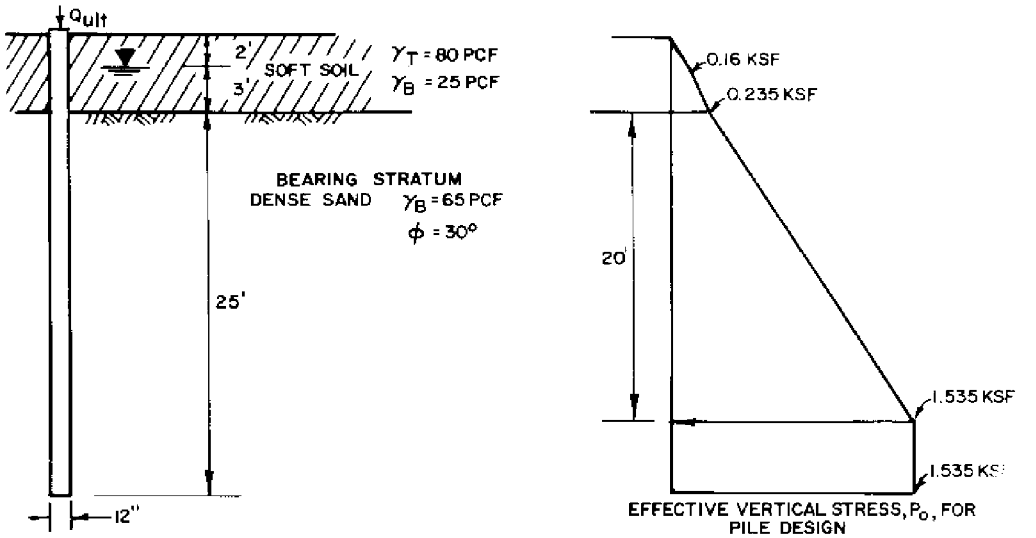
PILE TYPE	δ
STEEL	20°
CONCRETE	3/4 ϕ
TIMBER	3/4 ϕ

* LIMIT ϕ TO 28° IF JETTING IS USED

** (A) IN CASE A BAILER OR GRAB BUCKET IS USED BELOW GROUNDWATER TABLE, CALCULATE END BEARING BASED ON ϕ NOT EXCEEDING 28°.

(B) FOR PIERS GREATER THAN 24-INCH DIAMETER, SETTLEMENT RATHER THAN BEARING CAPACITY USUALLY CONTROLS THE DESIGN. FOR ESTIMATING SETTLEMENT, TAKE 50% OF THE SETTLEMENT FOR AN EQUIVALENT FOOTING RESTING ON THE SURFACE OF COMPARABLE GRANULAR SOILS. (CHAPTER 5, DM-7.1).

FIGURE 1 (continued)
Load Carrying Capacity of Single Pile in Granular Soils



FOR A 12" DIAMETER CLOSED END, DRIVEN PIPE PILE, CONCRETE FILLED, FIND Q_{all} AND T_{all} FOR A 30 FOOT LONG PILE.

P_o MAX OCCURS AT 20B, OR 20' INTO BEARING STRATUM.

$\phi = 30°$, $N_q = 21$

$K_{HC} = 1.5$, $\delta = 20°$

$K_{HT} = 1.0$

$A_T = \pi \times 0.5^2 = 0.78$ SF

CIRCUM. AREA / lf $= 1 \times \pi = 3.14$ SF / lf

$$Q_{ult} = 1.535 \times 21 \times 0.78 + \left[\left(1.5 \times \left(\frac{0.235 + 1.535}{2}\right) \times \text{TAN } 20 \times 20 \times 3.14\right) + \left(1.5 \times 1.535 \times \text{TAN } 20 \times 5 \times 3.14\right) \right]$$

$$= 25.14 + [30.34 + 13.16]$$

$$= 68.64 \text{ K}$$

FOR $F_S = 3$, $Q_{all} = \frac{68.64}{3} = 22.9$ K

$$T_{ult} = 1.0 \times \left(\frac{0.235 + 1.535}{2}\right) \times \text{TAN } 20 \times 20 \times 3.14 + 1.0 \times 1.535 \times \text{TAN } 20 \times 5 \times 3.14$$

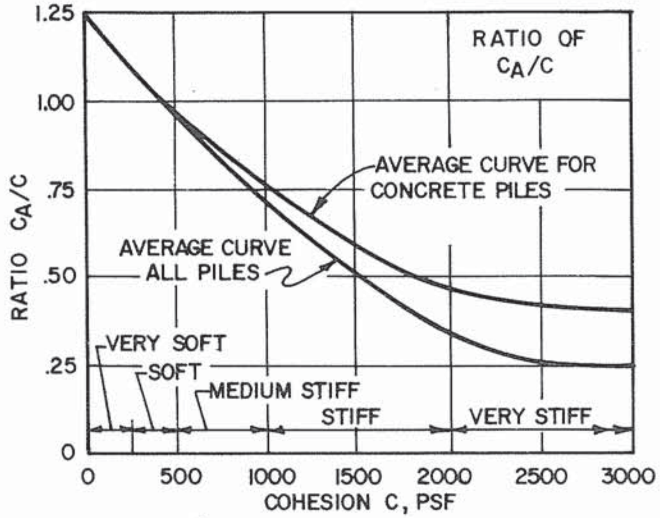
$$= 20.23 + 8.77$$

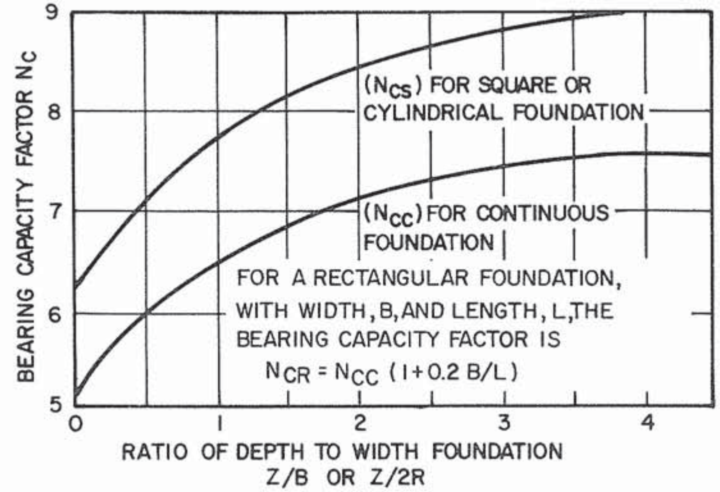
$$= 29.0 \text{ K}$$

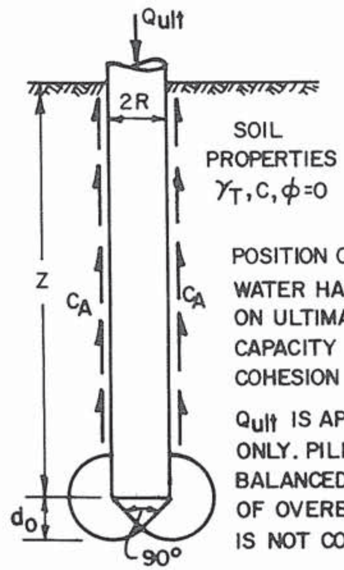
$W_P \approx .117$ K/lf $\times$ 30' = 3.5 K

$$T_{all} = \frac{29.0}{3} + 3.5 = 13.2 \text{ K}$$

FIGURE 1 (continued)
Load Carrying Capacity of Single Pile in Granular Soils







POSITION OF GROUND-WATER HAS NO EFFECT ON ULTIMATE LOAD CAPACITY UNLESS COHESION IS CHANGED.

Q_{ult} IS APPLIED LOAD ONLY. PILE WEIGHT IS BALANCED BY WEIGHT OF OVERBURDEN AND IS NOT CONSIDERED.

ULTIMATE LOAD CAPACITY IN COMPRESSION

$$Q_{ult} = C \begin{matrix}(N_{CS}) \\ (N_{CC})\end{matrix} \pi R^2 + C_A\, 2\pi RZ$$

RECOMMENDED VALUES OF ADHESION

PILE TYPE	CONSISTENCY OF SOIL	COHESION, C PSF	ADHESION, C_A PSF
TIMBER AND CONCRETE	VERY SOFT	0 - 250	0 - 250
	SOFT	250 - 500	250 - 480
	MED. STIFF	500 - 1000	480 - 750
	STIFF	1000 - 2000	750 - 950
	VERY STIFF	2000 - 4000	950 - 1300
STEEL	VERY SOFT	0 - 250	0 - 250
	SOFT	250 - 500	250 - 460
	MED. STIFF	500 - 1000	460 - 700
	STIFF	1000 - 2000	700 - 720
	VERY STIFF	2000 - 4000	720 - 750

ULTIMATE LOAD CAPACITY IN TENSION

$$T_{ult} = C_A\, 2\pi RZ$$

T_{ult} UNDER SUSTAINED LOAD MAY BE LIMITED BY OTHER FACTORS, SEE TEXT.

FIGURE 2
Ultimate Load Capacity of Single Pile or Pier in Cohesive Soils

(3) Drilled Piers. For drilled piers greater than 24 inches in diameter settlement rather than bearing capacity may control. A reduced end bearing resistance may result from entrapment of bentonite slurry if used to maintain an open excavation to the pier's tip. Bells, or enlarged bases, are usually not stable in granular soils.

(4) Piles and Drilled Piers in Cohesive Soils. See Figure 2 and Table 3. Experience demonstrates that pile driving permanently alters surface adhesion of clays having a shear strength greater than 500 psf (see Figure 2). In softer clays the remolded material consolidates with time, regaining adhesion approximately equal to original strength. Shear strength for point-bearing resistance is essentially unchanged by pile driving. For drilled piers, use Table 3 from Reference 4, Soils and Geology, Procedures for Foundation Design of Buildings and Other Structures, by the Departments of Army and Air Force, for determining side friction. Ultimate resistance to pullout cannot exceed the total resistance of reduced adhesion acting over the pile surface or the effective weight of the soil mass which is available to react against pullout. The allowable sustained pullout load usually is limited by the tendency for the pile to move upward gradually while mobilizing an adhesion less than the failure value.

Adhesion factors in Figure 2 may be very conservative for evaluating piles driven into stiff but normally consolidated clays. Available data suggests that for piles driven into normally to slightly overconsolidated clays, the side friction is about 0.25 to 0.4 times the effective overburden.

(5) Piles Penetrating Multi-layered Soil Profile. Where piles penetrate several different strata, a simple approach is to add supporting capacity of the individual layers, except where a soft layer may consolidate and relieve load or cause drag on the pile. For further guidance on bearing capacity when a pile penetrates layered soil and terminates in granular strata see Reference 5, Ultimate Bearing Capacity of Foundations on Layered Soils Under Inclined Loads, by Meyerhoff and Hanna, which considers the ultimate bearing capacity of a deep member in sand underlying a clay layer and for the case of a sand bearing stratum overlying a weak clay layer.

(6) Pile Buckling. For fully embedded piles, buckling usually is not a problem. For a fully embedded, free headed pile with length equal to or greater than 4T, the critical load for buckling is as follows (after Reference 6, Design of Pile Foundations, by Vesic):

$$P_{crit} = 0.78\ T^3 f \quad \text{for } L \geq 4T$$

where:

P_{crit} = critical load for buckling

f = coefficient of variation of lateral subgrade reaction (see Figure 10)

T = relative stiffness factor (see Figure 10)

L = length of pile.

TABLE 3
Design Parameters for Side Friction for Drilled Piers in Cohesive Soils

Design Category	Side Resistance		Remarks
	C_A/C	Limit on side shear - tsf	
A. Straight-sided shafts in either homogeneous or layered soil with no soil of exceptional stiffness below the base			
1. Shafts installed dry or by the slurry displacement method	0.6	2.0	
2. Shafts installed with drilling mud along some portion of the hole with possible mud entrapment	0.3(a)	0.5(a)	(a) C_A/C may be increased to 0.6 and side shear increased to 2.0 tsf for segments drilled dry
B. Belled shafts in either homogeneous or layered clays with no soil of exceptional stiffness below the base			
1. Shafts installed dry or by the slurry displacement methods	0.3	0.5	
2. Shafts installed with drilling mud along some portion of the hole with possible mud entrapment	0.15(b)	0.3(b)	(b) C_A/C may be increased to 0.3 and side shear increased to 0.5 tsf for segments drilled dry

Appendix D

Recommended Material Specifications

Recommended Material Specifications
Suffield Solar
Spencer Street
Suffield, CT

Structural Fill and Ordinary Fill shall consist of hard, durable sand and gravel, free of clay, organic matter, surface coatings, and other deleterious materials. Soil finer than the No. 200 sieve (the "fines") should be nonplastic.

Native glacial till soils on upland areas of the site excavated as part of earthwork activities can likely be re-used on site as Structural Fill or Ordinary Fill, provided they do not contain oversize, organic, or otherwise deleterious material and can meet the appropriate compaction requirements. Cobbles and small boulders may be encountered within these soils. Native silts, if excavated from low areas of the site, are not suitable for re-use as Structural Fill or Ordinary Fill. Re-use of these soils would be limited to landscaped areas.

Fill imported from off site should meet the below gradation requirements. Fill placed within structural limits, under the access roadway and equipment pad, and behind any retaining walls should meet the compaction requirements for Structural Fill. Backfill placed in non-structural areas should meet the compaction requirements for Ordinary Fill. Proposed borrow materials that fall slightly outside of these specifications may also be suitable for use, subject to review and approval by GEI.

Structural Fill

Structural Fill should consist of hard, durable sand and gravel. It should be free of clay, organic matter, surface coatings, and other deleterious materials. Soil finer than the No. 200 sieve (the "fines") should be nonplastic. Structural Fill shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
3 inches	100
1 - ½ inch	55 – 100
No. 4	35 – 85
No. 16	20 – 65
No. 50	5 – 40
No. 200 (fines)	0 – 10

Structural Fill should be compacted in maximum 12-inch-thick, loose lifts to at least 95 percent of the maximum dry density determined in accordance with ASTM D1557 (Modified AASHTO Compaction). The moisture content should be held to within +/- 3 percent of optimum moisture content (as determined by ASTM D1557).

Ordinary Fill

Ordinary fill should consist of hard, durable sand and gravel, free of clay, organic matter, surface coatings, and other deleterious materials. Soil finer than the No. 200 sieve (the "fines") should be nonplastic. Ordinary Fill shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
6 inches	100
3 inches	80 – 100
No. 4	20 – 100
No. 200 (fines)	0 – 20

Ordinary fill should be compacted in maximum 12-inch-thick, loose lifts to at least 92 percent of the maximum dry density determined in accordance with ASTM D1557 (Modified AASHTO Compaction). The moisture content should be held to within +/- 3 percent of optimum moisture content (as determined by ASTM D1557).

Geotextile Fabric

Geotextile fabric for roadway underlayment should be a heavy-duty woven fabric, consisting of GEOTEX 200ST or an approved equivalent product.