



# **ConnectGen South Ripley Solar Project**

Geotechnical Investigation Report

January 22, 2021

Mott MacDonald 111 Wood Avenue South Iselin NJ 08830-4112 United States of America

T +1 (800) 832 3272 F +1 (973) 376 1072 mottmac.com

# **ConnectGen South Ripley Solar Project**

Geotechnical Investigation Report

January 22, 2021

## Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
0	09/09/2020	D. Melgar	E. Pauli, PE	V. Shah, PE	First Issue
1	1/22/2021	D. Melgar	D. Chandler	S. Kibby PE	Revised after comments from EDR
2	5/27/2021	D. Melgar	D. Chandler	S. Kibby PE	Revised, additional EDR comments.

**Document reference:** 505100288-001 | GIR | 0

#### Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

# **Contents**

Exe	ecutive	Summa	ary	1
1	Intro	oduction		2
2	Geo	ologic De	esktop Study	3
	2.1	Surficial	l Geology	3
		2.1.1	Predominant Soil Units – Corrosivity Potential	3
		2.1.2	Predominant Soil Units –Drainage Characteristics and Organic Content	4
	2.2	Bedrock	k Geology	5
	2.3	Karst G		5
	2.4		ic Impacts	5
3	Met	hodology	у	6
	3.1	Soil Bor	ring Explorations	6
		3.1.1	Methodology	6
	3.2	Electrica	al Resistivity Testing	6
4	Inve	stigation	n Results	7
	4.1	Results		7
		4.1.1	Groundwater	7
5	Lab	oratory 1	Γesting	8
	5.1	Soil Inde	ex Testing	8
	5.2	Therma	ll Resistivity Testing	8
6	Seis	smic Site	e Classification	10
	6.1	Prelimin	nary Seismic Evaluation	10
	6.2	Seismic	Site Setting	10
7	Fou	ndation	Considerations	12
	7.1	Frost Co	onsiderations	12
	7.2	Recomr	mended Soil Parameters	12
	7.3	Pile Loa	ading Due to Frost	12
8	Con	struction	n Recommendations	14
	8.1	Excavat	tion	14
		8.1.1	Rock Removal	14

	8.2 Dewatering					
	8.3	Subgrade Preparation	14			
	8.4	Backfilling and Re-use of Native Soils	15			
	8.5	Presence of Native, Moisture-sensitive Soils	15			
	8.6	H-Piles	16			
	8.7	Access Roads	16			
	8.8	Cable Installation	16			
9	Limi	itations	18			
App	endic	es	1			
A.	Inve	estigation Location Plan	2			
B.	Geo	ologic References	3			
C.	Soil	Boring Logs	4			
D.	Elec	etrical Resistivity Testing	5			
E.	Laboratory Testing Results					
F.	The	rmal Resistivity Results	7			
G.	Seis	smic Support Data	8			

# **Executive Summary**

Mott MacDonald was retained by ConnectGen, LLC (ConnectGen) to conduct a preliminary geotechnical investigation to support the proposed South Ripley Solar Project in South Ripley, Chautauqua County, New York. Mott MacDonald proposed and completed an investigation program consisting of 50 soil borings (B-SS-1 through B-SS-3, and B-01 through B-47), three rock coring explorations (B-01, B-05 and B-17), electrical resistivity testing at 21 locations, laboratory thermal resistivity testing, and associated laboratory material index testing.

Observations recorded during our investigation program closely matched geologic conditions identified as part of our desktop study, consisting of silt and clay overburden soils underlain by shale bedrock across the project area. Bedrock was inferred within 18 of the 50 borings at depths ranging between 9 and 19 feet below grade. Samples for corrosion testing were collected during our investigation, and testing results indicated a low risk of corrosion to the proposed foundation elements.

Based on the presence of shallow bedrock, it is our opinion that H-Pile post foundations or screw piles (such as Terrasmart) may be utilized to support the proposed solar panels. Installation of H-Pile foundations may require pre-drilling through bedrock to the desired embedment depth. Preliminary design parameters and bearing capacities are provided in **Section 7.2**. All load-bearing concrete foundations should be underlain by at least six inches of compacted structural fill.

It is important to note that the data used for preliminary design capacities within this submission have been estimated from assumed values based on field observations, laboratory testing, and our engineering judgement. A detailed discussion of foundation considerations as well as limited construction recommendations have been provided within **Sections 7 and 8** of this Report.

1

### 1 Introduction

Mott MacDonald was retained by ConnectGen to conduct a geotechnical investigation in support of the proposed South Ripley Project in Chautauqua County, New York. It is our understanding that the proposed South Ripley solar development will consist of several solar arrays, a substation, equipment pads, utility poles, site access roads, and other associated site features.

To guide the design and construction of the proposed solar facility, Mott MacDonald developed and implemented a geotechnical investigation program which encompassed a desktop study of local geologic conditions, soil boring explorations, rock coring explorations, field electrical resistivity testing, laboratory thermal resistivity testing, and laboratory soil and rock material testing.

This Geotechnical Investigation Report (Report) summarizes the information gathered from our investigation program conducted between July 20 and August 11, 2020, to provide project-specific data and preliminary recommendations to assist in the design and construction of the proposed South Ripley Solar Project. An Investigation Location Plan depicting our subsurface explorations is provided in **Appendix A**.

A depiction of the general site vicinity is provided as Figure 1.



Figure 1 - Project Vicinity Plan

# 2 Geologic Desktop Study

Prior to our field investigation, Mott MacDonald conducted a desktop study of local geology within the project area using publicly available references including published maps and online geologic databases. Geologic materials reviewed within our study are provided as **Appendix B**.

#### 2.1 Surficial Geology

Mott MacDonald reviewed surficial geology mapping provided by the New York State Education Department (NYSED) and observed that the project area is predominantly mapped within the Till and Till Moraine units. These units are generally described as unsorted silts, clays, sands, and gravels. Minor surficial geology units include shallow or exposed bedrock.

Mott MacDonald additionally reviewed surficial soil mapping available from the Natural Resource Conservation Service (NRCS) Web Soil Survey application. NRCS was initially created by the US Department of Agriculture to provide reference information regarding soil characteristics for agricultural purposes, however it also provides preliminary information related to soil chemistry. NRCS identifies the project area to be primarily comprised of the Erie Silt loam unit along with the Langford Silt Loam. It should be noted that NRCS descriptions are generally limited to the upper five (5) feet of overburden. A summary of predominant soil unit properties is provided as Table 1.

Table 1 – WKOO Ooli Troperties							
Soil Unit	Drainage Class	Available Water Storage	Erosion Hazard				
Erie Silt Loam	Somewhat Poorly Drained	Very low (~3.0 inches)	Slight				
Busti Silt Loam	Somewhat Poorly Drained	High (10.0 inches)	Moderate				
Langford Silt Loam	Moderately Well Drained	Low (~3.8 inches)	Moderate				

Table 1 - NRCS Soil Properties

#### 2.1.1 Predominant Soil Units – Corrosivity Potential

Mott MacDonald notes that NRCS mapping indicates the native soil units generally present a low to moderate risk of corrosion to concrete and a high risk of corrosion to steel. Based on NRCS's preliminary assessment of the material, Mott MacDonald collected samples from three to five feet below grade within the borings listed in Table 2 for corrosivity testing. The results of the testing, completed by ANS Consultants, Inc. (ANS), of South Plainfield, New Jersey are summarized in Table 2 and detailed within **Appendix E**.

**Table 2 – Corrosivity Testing Summary** 

Location ID	pH (average)	Sulfate [mg/kg]	Chloride [mg/kg]	Soil Box (Calculated Resistivity) [Ω/cm]	Redox Potential (average)
B-01	7.16	6	74	9,000	+27
B-03	6.71	53	40	TNP	+41
B-04	4.54	14	38	TNP	+75
B-05	6.16	15	30	14,000	+52
B-06	6.68	20	43	TNP	+5
B-07	6.53	18	26	TNP	+11
B-08	6.81	12	32	14,500	+47
B-09	6.39	8	51	17,000	+61
B-10	6.81	21	41	TNP	-24
B-11	7.21	23	30	TNP	+21
B-12	7.12	12	80	TNP	-5
B-14	7.04	17	52	TNP	+15
B-15	7.09	12	43	TNP	+18
B-17	7.94	5	36	20,000	+57
B-18	7.55	5	50	TNP	+71
B-19	6.05	16	45	TNP	+71
B-21	6.37	15	31	19,000	+35
B-23	6.03	10	47	TNP	+25
B-25	7.02	19	40	TNP	+15
B-28	7.22	21	38	TNP	+10
B-35	7.48	8	53	17,000	+17
B-38	7.78	13	51	17,000	+77
B-39	6.84	5	31	TNP	+40
B-40	7.39	15	42	9,000	+93
B-42	6.9	18	45	23,000	+32
B-43	7.24	10	30	13,000	+63
B-44	7.0	12	46	13,000	+55
B-46	7.39	13	68	11,000	+15
B-47	6.87	10	55	28,000	+47
B-SS-2	6.96	16	41	TNP	-12
B-SS-3	6.79	28	70	TNP	-14

Note: TNP - Test not performed

The results of the corrosivity testing indicate a low risk of corrosion to the proposed foundation elements. The contractor should confirm these findings within his or her own location-specific investigation and be prepared to consider alternate mix designs, or the implementation of sacrificial thicknesses or protective coatings, as appropriate.

#### 2.1.2 Predominant Soil Units - Drainage Characteristics and Organic Content

Based on the findings of our desktop study and subsequent field investigation, it is expected that the organic content of natural soils should be negligible. It is expected that a thin layer of organics (topsoil) will exist near the surface in vegetated areas; however, the extent of this was identified to be minimal (less than six inches) during the geotechnical investigation. It is typical for most

developments that any surficial organics are stripped and appropriately staged on-site for re-use in vegetated areas.

At this time, it is expected that construction may occur on or near slopes greater than 25 percent. The topographic relief and nature of the project area is moderately sloped, with some steeper sloped areas featuring significant vegetation thereby minimizing the concern for appreciable erosion. In addition, proper run-on/run-off control, soil erosion and sediment control, and good housekeeping measures should be implemented during construction, which will limit the erodibility of the native materials. It is expected that the proposed improvements should not impact existing groundwater, aquifer systems, historic slopes and relief, or create hazardous conditions with respect to local geology or landforms.

#### 2.2 Bedrock Geology

Review of the "Bedrock Geology Map, Niagara Sheet" prepared by the NYSED indicates that the project area is mapped within the Ellicott and Dexterville Formations which are predominantly composed of shale and siltstone. The depth to bedrock was not publicly noted in available geologic records; however, rock was encountered as shallow as nine feet below grade in some areas of the site during our investigation.

#### 2.3 Karst Geology

Ground subsidence, commonly referred to as "sinkholes", is the local downward movement of surface material with little or no horizontal movement. Subsidence is a potential geologic hazard in areas where karst terrain occurs, or where underground mining has taken place. In karst terrain, limestone and dolomite bedrock (carbonate rock formations) are eroded by water and create karst features such as subsurface channels, caves, and sinkholes.

Based on Mott MacDonald's review of available USGS mapping, the bedrock formation beneath the project site is not made up of carbonate rock, which may be susceptible to karst formations. According to USGS' Digital Karst Map Compilation and Database, the project area is not located in an area where karst formations are likely to occur. As observed within our rock coring exploration, shale bedrock was inferred to be the main, underlying formation within this project area. In addition, the development is expected to include shallow concrete and/or post foundations for panels and will limit the amount of earthwork which could impact subsurface drainage pathways with respect to groundwater flow. Based on the above review and our preliminary investigation, there is a low risk of karst geology within the project footprint.

#### 2.4 Geologic Impacts

It is our professional opinion that the construction of the proposed solar development will not create significant impacts to the regional geology provided appropriate construction practices and proper soil erosion and sediment control measures are maintained. The potential impacts considered include, but are not limited to, significant soil erosion, detrimental fracturing of bedrock, introduction of slippage or failure planes, and creation of subsurface instability.

# 3 Methodology

#### 3.1 Soil Boring Explorations

Mott MacDonald retained Earth Dimensions, Inc., of Elma, New York to advance 50 geotechnical soil borings (B-SS-1 through B-SS-3 and B-01 through B-47), and three rock coring explorations (B-01, B-05 and B-17) throughout the project area between July 20 and August 11, 2020. The typed soil boring logs should be consulted for detailed information, and are provided as **Appendix C**.

#### 3.1.1 Methodology

Each soil boring was advanced to 20 feet below ground surface (BGS) or practical refusal, using a track-mounted Diedrich D-50 drill rig to collect samples. All samples were collected with hollow-stem augers utilizing the Standard Penetration Test (SPT) Method, in accordance with ASTM Standard D1586. Soil samples were generally collected continuously within the upper 10 feet of each boring, then in five-foot intervals thereafter to the boring's termination depth.

At select soil boring locations, auger cuttings were collected from roughly two to five feet below grade with the purpose of obtaining bulk soil samples for laboratory thermal resistivity testing and from roughly three to five feet below grade for corrosion testing. As-drilled boring locations are reflected on the Investigation Location Plan provided as **Appendix A**. Upon completion, each borehole was backfilled to its existing grade with soil cuttings. All subsurface explorations were observed and logged by a Mott MacDonald geotechnical representative, under the direction of a Professional Engineer licensed in the State of New York.

#### 3.2 Electrical Resistivity Testing

Mott MacDonald conducted Electrical Resistivity Testing (ERTs) at 21 locations within the project site. The ERTs were performed between July 20 and August 11, 2020, at the select locations within the project area for the purpose of obtaining in-situ (field) resistivities to guide electrical design considerations. All ERT's were conducted using a Wenner array with "a" spacings of 2, 5, 10, 25, and 50 feet. All tests were conducted in accordance with ASTM G-57 and IEEE Standard 81. Results of the electrical resistivity testing are provided as **Appendix D**.

# 4 Investigation Results

Based on observations from our subsurface investigation program, Mott MacDonald has summarized the encountered subsurface materials in **Section 4.1** below. It should be noted that this summary depicts a generalized representation of materials encountered, and individual soil boring logs, provided as **Appendix C**, should be referenced for detailed information. Because the data presented is derived from spaced explorations points, soils and bedrock depths may vary slightly between sampling intervals and locations.

#### 4.1 Results

The soils encountered during our investigation program were largely consistent between boring locations, generally comprised of low plasticity silts and clays across the project site. Mott MacDonald notes that auger refusal, indicative of bedrock, was encountered within 18 of the 50 soil borings at depths ranging between 9 and 19 feet below grade. A generalized subsurface profile for the project area is provided as Table 3. This profile was established based on our overall observed field observations and is a highly simplified representation of the site's geology. The typed soil boring logs, provided as **Appendix C**, should be consulted for detailed information.

Material	Average Consistency	Description
Topsoil	-	Approximately six inches of topsoil containing organic matter was identified at grade within most investigation locations.
Silt (ML)	Stiff	Stiff to hard silt was encountered underlying the topsoil within a majority of boring locations. This silt stratum also contained varying amounts of clay, sand, and gravel and no organics. This stratum rendered average pocket penetrometer values of approximately 3.0 tons per square foot (tsf).
Clay (CL)	Stiff	Generally, low plasticity clay was encountered underlying the silt layer. This clay contained varying amounts of silt, sand, and gravel, as is typical in glacial till material. Inconsistent layers of poorly-graded sands and gravels were observed throughout this stratum. Clays rendered average pocket penetrometer values of approximately 2.0 tons per square foot (tsf).
Shale	Weak	Bedrock was encountered within 18 of the 50 soil borings. Rock cores were taken after our soil boring investigation at locations B-01, B-05, and B-17. The rock was identified as shale in each rock coring exploration. The shale was generally described as gray, fine grained, weak rock with closely spaced discontinuities.

Table 3 - Generalized Subsurface Profile

A pile load testing investigation should be conducted to evaluate the feasibility of driving piles into bedrock in areas where shallow bedrock depths may conflict with calculated pile embedment depths.

#### 4.1.1 Groundwater

At the time of our investigation, groundwater was inferred based on the soil's moisture content at depths ranging between 3 and 17 feet below grade. No monitoring wells were installed as part of our investigation scope. Groundwater conditions are ephemeral and may fluctuate due to seasonal and climate influences.

# 5 Laboratory Testing

#### 5.1 Soil Index Testing

Representative soil samples collected within our investigation program were submitted to ANS, an accredited geotechnical laboratory for testing of material index properties in accordance with their applicable ASTM standards. A summary of laboratory testing data is provided in Table 4 below. As-received laboratory results have been provided in **Appendix E**.

Table 4 - Laboratory Testing Summary

Boring		Depth	% Gravel*			% Sand*		% Fi	nes	Moisture	
ID	Sample	(ft)	С	F	С	М	F	Silt	Clay	Content (%)	
B-27	S-5	8'-10'	21.6	15.2	7.7	7.5	12.6	35	.4	11.0	
B-37	S-4	6'-8'	0	16	7.9	11.5	18.5	46	.1	13.8	
Bor.5ing ID	Sample	Depth (ft)	Liquid	Limit	PI	astic Lim	nit	Plast Ind	-	Moisture Content (%)	
B-SS-1	S-2	2-4	22.	2		16.7		5.	5	17.2	
B-SS-3	S-3	4-6	29.	5		20.3		9.	2	13.3	
B-1	S-4	6-8	23.	1		17.9		5.	2	12.2	
B-3	S-3	4-6	28.	0		18.0		10	.0	11.4	
B-4	S-2	2-4	28.	1		20.5		7.	6	13.0	
B-7	S-3	4-6	29.	1		18.7		10	.4	11.3	
B-8	S-4	6-8	30.	5	20.4		10.1		18.8		
B-10	S-5	8-10	25.	3	19.8		5.5		16.5		
B-14	S-3	4-6	28.	9		20.9		8.0		11.5	
B-16	S-2	2-4	25.	5	18.9		6.6		13.4		
B-17	S-4	6-8	25.	5	18.2		7.3		12.5		
B-21	S-5	8-10	27.	2	20.0		7.5		11.5		
B-24	S-5	8-10	24.	3	19.4		4.	9	8.7		
B-25	S-3	4-6	25.	7	17.8		7.	9	16.9		
B-30	S-3	4-6	30.	1	20.5		9.	6	19.8		
B-31	S-2	2-4	31.	1		21.9		9.	2	15.7	
B-35	S-3	4-6	24.	1		17.4		6.	7	10.7	
B-40	S-5	8-10	29.	3	20.3			9.	0	15.4	
B-42	S-4	6-8	24.	5		17.0		7.	5	12.0	
B-44	S-4	6-8	27.	0	18.8		18.8		8.	2	13.6
B-46	S-3	4-6	27.	8		19.9		7.	9	12.6	
B-47	S-2	2-4	30.	5	21.7		8.	8	18.1		

Note: \*-% Sand/Gravel described by gradation; "C" - Coarse, "M" - Medium, "F" -- Fine

#### 5.2 Thermal Resistivity Testing

As briefly discussed in **Section 3.1.1**, Mott MacDonald collected native material samples from two to five feet below grade, and delivered these samples to ANS for laboratory testing of Thermal Resistivity. The soil was compacted to 85 percent of its Standard Proctor Density in accordance with ASTM D698, and tested for Thermal Resistivity values in accordance with IEEE Standard 442. Results of the thermal resistivity are provided in Table 5 and as **Appendix F**.

**Table 5 – Soil Thermal Resistivity Results** 

			Thermal at Various	In-Situ	Maximum			
Sample ID	Material Description	% Water	% Water	% Water	% Water	% Water	Moisture Content (%)	Dry Density (lb/ft³)
		(°C- cm/W)	(°C- cm/W)	(°C- cm/W)	(°C- cm/W)	(°C- cm/W)	. ,	, ,
B-01	Clay	0.0	2.5	4.1	6.7	9.1	13.6	105.9
(3'-5')	Olay	284	179	109	96	93	10.0	100.0
B-05	Clay	0.0	2.2	5.8	8.5	11.9	13.2	100.6
(3'-5')	Olay	284	175	116	91	70	10.2	100.0
B-08	Clay	0.0	2.6	5.6	7.9	11.0	15.6	101.0
(3'-5')	Olay	264	155	101	81	57	10.0	101.0
B-09	Clay	0.0	3.9	8.0	12.3	16.4	17.6	91.5
(3'-5')	Clay	347	179	106	88	64	17.0	91.5
B-17	Silt	0.0	2.5	4.5	6.5	9.0	17.0	104.0
(3'-5')	Ont	296	171	111	88	79	17.0	104.0
B-21	Silt	0.0	5.1	10.6	15.1	20.9	21.2	82.0
(3'-5')	Oilt	498	245	121	89	75	21.2	J0
B-35	Clay	0.0	3.0	5.9	8.8	11.8	15.2	102.5
(3'-5')	Clay	194	111	91	77	68	10.2	102.5
B-38	Silt	0.0	1.6	3.4	5.5	6.9	11.4	107.9
(3'-5')	Oiit	231	133	87	65	59	11.4	107.5
B-40	Silt	0.0	3.0	5.4	8.5	11.5	15.1	102.0
(3'-5')	Silt	227	161	141	101	80	13.1	102.0
B-42	Silt	0.0	2.5	4.4	6.0	8.5	12.1	104.6
(3'-5')	Oilt	434	227	134	110	99	12.1	104.0
B-43	Silt	0.0	2.5	4.4	6.5	9.0	11.7	108.0
(3'-5')	Oilt	429	202	90	80	71	11.7	100.0
B-44	Silt	0.0	2.7	4.5	7.0	9.0	14.3	104.9
(3'-5')	Oilt	331	162	107	92	86	17.5	107.3
B-46	Silt	0.0	3.0	5.5	8.4	11.6	15.1	100.6
(3'-5')	Silt	228	193	123	105	97	13.1	100.6
B-47	Clay	0.0	2.7	5.2	8.1	10.5	13.9	104.0
(3'-5')	Ciay	226	171	106	101	96	10.0	107.0

For design purposes, resistivity values obtained for the in-situ moisture conditions, or drier, should be considered. Our investigation was conducted in July and August, and temperature and water table fluctuations due to seasonal variations should be considered.

# 6 Seismic Setting and Site Classification

Mott MacDonald utilized data obtained from the soil boring explorations to determine the Seismic Site Class for the proposed South Ripley Solar Facility. In accordance with the SPT average N-value method as prescribed in Chapter 20 of the ASCE Standard 7-16 design manual, Site Class D for "Stiff Soil" should be utilized across the project site.

The following Site Class D seismic ground motion values were obtained from the USGS Seismic Hazard Maps, referenced in ASCE 7-16 Standard, for this site:

- 0.2 second spectral response acceleration, S<sub>S</sub>= 0.104 g
- 1 second spectral response acceleration, S<sub>1</sub>= 0.039 g
- Maximum spectral acceleration for short periods, S<sub>MS</sub>= 0.167 g
- Maximum spectral acceleration for a 1-second period, S<sub>M1</sub>= 0.093 g
- 5% damped design spectral acceleration at short periods, S<sub>DS</sub>= 0.111 g
- 5% damped design spectral acceleration at 1-second period, S<sub>D1</sub>= 0.062 g

#### 6.1 Preliminary Seismic Evaluation

The seismic site class designated above is based on results from our investigation program. Backup data for the ground motion values is provided as **Appendix G**. Based on our observation of subsurface conditions, computed Site Class ratings, and review of USGS's 2014 National Seismic Hazard Map, Mott MacDonald concludes that there is a low risk of significant seismic activity which may impact the proposed solar facility.

#### 6.2 Tectonic Site Setting

The site is located within the North American Tectonic plate, far from the hazards of plate boundary tectonics. USGS fault mapping was reviewed and no faults were mapped within 100 miles of the site. The closest fault system, the Clarendon-Linden Fault system, is located approximately 100 miles east of the project site. This fault system is likely the cause of most small and moderate earthquakes in the region.

According to the USGS online earthquake catalog, in the last 50 years there have been 21 earthquakes greater than magnitude 2.5. The closest was magnitude 2.5, approximately 30 miles south west from site in 1990. The strongest earthquake was a 4.5 in 1998 located approximately 50 miles south west of the site.

A 4.5 magnitude earthquake is considered a minor earthquake, unlikely to cause damage. A magnitude 2.5 earthquake is just strong enough to be felt by humans. (*earthquake.usgs.gov*)

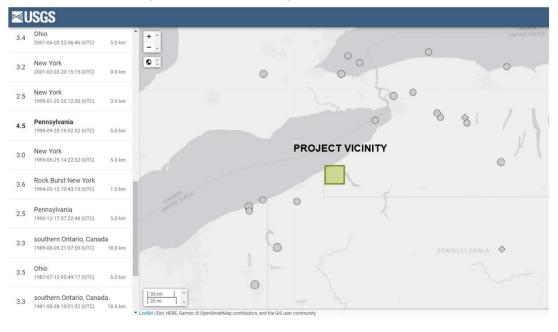


Figure 1 -Earthquakes Magnitude 2.5+ since 1971

Figure 2 presents the USGS Earthquake Hazard rating. The site location falls within the light blue portion of the map, indicating low hazard. Additionally, due to the great distance to the Atlantic Ocean, the site location is at low risk of tsunami impact.

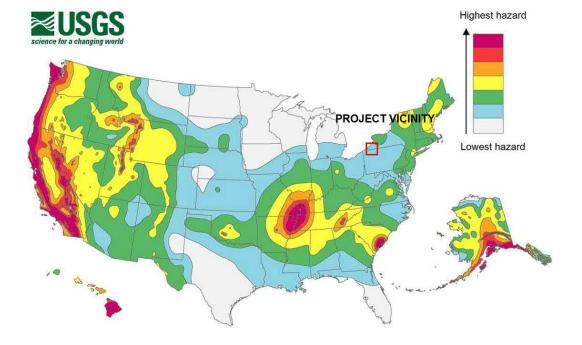


Figure 2 - USGS Earthquake Hazard

#### 7 Foundation Considerations

Mott MacDonald anticipates that driven posts such as W6x9 H-piles or screw piles may be used to support the proposed solar panels. Other conventional shallow foundations such as sonotubes, spread footings, or similar systems may also be utilized for equipment pads and associated support structures.

#### 7.1 Frost Considerations

Within the Chautauqua County, New York region, frost depth is mapped to exist at approximately 48 inches below grade. We recommend that all structural foundations be founded at 48 inches below grade or deeper to ensure adequate protection from frost conditions which may jeopardize the integrity of subgrade soils and associated substructure.

Small slab or isolated footing foundations supporting minor housekeeping structures with minimal loads and applied pressures (500 pounds per square foot or less) may be founded at shallower depths; however, the contractor should implement measures such as free-draining, granular fill beneath the foundation extending beyond the frost depth, or provide sufficient insulation to protect the concrete slabs from frost heave.

#### 7.2 Recommended Soil Parameters

Based on our interpretation of the subsurface conditions observed within our investigation program, supplemented by laboratory testing results, Mott MacDonald recommends that the soil parameters, as depicted within Table 6, be considered for design purposes.

				•		
Depth	Material	Total Unit Weight	Internal Friction	Cohesion	Allowable Bearing Capacity	Allowable Side Resistance
0'-4'	Topsoil & Silt & Clay (frost zone)	100 lb/ft <sup>3</sup>	0°	500 lb/ft <sup>2</sup>	500 lb/ft <sup>2</sup>	-
4'-8'	Upper Silt & Clay (ML/CL)	110 lb/ft <sup>3</sup>	0°	1,000 lb/ft <sup>2</sup>	1,500 lb/ft <sup>2</sup>	100 lb/ft <sup>2</sup>
8'–12'	Middle Silt & Clay (ML/CL)	115 lb/ft <sup>3</sup>	0°	1,500 lb/ft²	2,000 lb/ft <sup>2</sup>	150 lb/ft <sup>2</sup>
12'-20'	Lower Clay (CL)	120 lb/ft <sup>3</sup>	0°	2,000 lb/ft <sup>2</sup>	2,000 lb/ft <sup>2</sup>	225 lb/ft <sup>2</sup>

Table 6 - Recommended Preliminary Soil Parameters

#### 7.3 Pile Loading Due to Frost

Given the location of the project, the potential for frost heave against post foundations is possible. Fine-grained soils, or granular soils with greater than 10 percent fines (such as the silt/clays observed at the site) are frost-susceptible due to the inability of entrapped moisture from infiltrating or evaporating prior to freezing. Trapped moisture will begin to create ice lenses, which will grip the steel posts or embedded structures, followed by ice-jacking due to frost heave. The

phenomenon is more commonly referred to as "adfreeze stress", which can be considered as an external, upward force applied to the post. The magnitude of the upward force will depend on the depth/thickness of the frost zone, the interface bond stress between embedded structure/material and the surrounding area, and the surface area of the structure/material in contact with this bond stress. Adfreeze is typically evaluated using values provided by the Ontario Ministry of Transport, as presented in the Canadian Foundation Engineering Manual, which provides suggested adfreeze bond values based on material type (such as steel post) and soil type (such as silt and clay).

Based on the type of site soil, sandy silt, the degree of frost susceptibility is very high. An adfreeze value of approximately 14.5 psi (2,100 psf) is recommended for this site. The frost load can be calculated as the product of the adfreezing bond stress, the frost depth of 48 inches, and the perimeter of the pile to be used. It should also be noted that these parameters have been established based on our engineering judgment. A detailed investigation program should be performed to confirm these values prior to construction.

#### 8 Construction Recommendations

#### 8.1 Excavation

It is anticipated that excavations greater than four feet in depth may be required during construction activities. As such, the contractor should ensure that all excavation openings following local building code requirements, OSHA Standard 1926.651, and all applicable regulations. The contractor should provide adequate drainage at the base of all excavations to maintain the in-place density of subgrade soils and ensure a safe, stable working base. For preliminary benching and excavation design considerations, overburden soils may be considered as "Type B" material in terms of OSHA's soil classifications and should be sloped no steeper than 1H:1V (horizontal to vertical). OSHA soil classifications should be field determined by the contractor's "competent person" prior to excavation. Any proposed shoring systems should be designed by the contractor's "competent person", be certified by a Professional Engineer licensed in the State of New York and should be submitted to the engineer for review.

#### 8.1.1 Rock Removal

Mott MacDonald notes that bedrock was encountered as shallow as nine feet below grade within our investigation program in some areas of the project site. In 18 of 50 of the borings that encountered bedrock it was found to be weathered.

A detailed investigation including pile load testing is recommended to confirm the strength and brittleness of bedrock as well as drivability of proposed steel post foundations.

Unless significant cuts are required, rock removal is expected to be localized (under spread footings or high spots in roadway grading) and should be removeable utilizing a medium sized trackhoe via ripping or with the use of a hoe ram. Blasting is not expected to be required.

#### 8.2 Dewatering

Mott MacDonald inferred the presence of groundwater as shallow as three feet below grade at the time of our investigation program, with shallower observed perched water conditions. The contractor should perform their own investigation to confirm these findings and should be prepared to dewater excavations and manage shallow water as needed during construction using pump-and-sump or similar techniques to allow for concrete foundation construction in-the-dry. There are no below grade structures proposed which will require post construction dewatering. Water discharge should be managed in compliance with applicable state and local regulations. The contractor should be sure to grade the surface as necessary to divert stormwater away from open excavation to the extent possible.

#### 8.3 Subgrade Preparation

Prior to installation of shallow concrete foundations, Mott MacDonald recommends over-excavating the subgrade by at least six inches, lining the exposed material with a geotextile separation fabric, and bringing the subgrade back up to the design foundation elevation with compacted structural fill as specified within Table 7. Native material beneath the separation fabric should be inspected for unsatisfactory conditions such as standing water, frozen soil, organics, or deleterious materials. Should any unsatisfactory conditions exist within the native subgrade, the unsatisfactory condition should be excavated and replaced prior to placement of the geotextile separation fabric.

Table 7 - Recommended Gradation of Structural Fill

Sieve Size	Percent Passing
3-inch	100
1 ½-inch	60 – 100
No. 4	30 – 60
No. 200	0 – 10

Structural fill material should be placed in loose lifts not exceeding eight (8) inches in height and be compacted to at least 95 percent of its Modified Proctor Density in accordance with ASTM D1557.

#### 8.4 Backfilling and Re-use of Native Soils

The native fine-grained soils on site will likely be difficult to handle, place, and compact without proper moisture conditioning and protection. These soils may be re-used across the project area for fill in landscaped areas; however, they should not be used under or above foundations or load-bearing structures where typically imported structural fill is used. Native material used as backfill for cable trenches should be handled and placed at a moisture content at or above its optimum value to ensure representative thermal properties are maintained.

In areas around and above installed foundations, large utilities, and other buried site features, imported granular material, with less than 15 percent fine-grained content (passing No. 200 Sieve), should be used as general backfill. General backfill material should not be used beneath any load-bearing structures and should be placed in loose lift thicknesses not exceeding 12 inches and be compacted to at least 95 percent of its Modified Proctor Density (ASTM D1557). Soil used as backfill should not be handled when frozen and should be free of organics, deleterious material, or excessive moisture.

In areas beneath foundations, access roads, and load-bearing structures, Mott MacDonald recommends structural fill as described in **Section 8.3** and Table 7.

#### 8.5 Presence of Native, Moisture-sensitive Soils

The near-surface site soils contain sufficient fines (i.e., silt/clay) to be moisture-sensitive. Moisture-sensitive soils are easily disturbed in the presence of moisture. Properly prepared subgrade surfaces and compacted fills that contain moisture-sensitive soils can be protected by the following activities:

- Positive measure should be implemented and maintained to intercept and direct surface water away from moisture-sensitive subgrade surfaces.
- Subgrade surfaces should be sloped and, as appropriate, seal-rolled to facilitate proper drainage. Surfaces should be properly prepared in anticipation of inclement weather. Moisture should not be allowed to collect on subgrade surfaces.
- To the extent practical, the limits of exposed subgrade soils should be minimized.
- Construction traffic should be limited to properly constructed haul roads.
- Disturbed soils should be removed and replaced with compacted controlled fill material.
- In place moisture contents should be maintained within two percent wet/dry of the optimum moisture content as determined by the Modified Proctor Test (ASTM D1557).

Native soils are likely to have a low shrink/swell potential.

#### 8.6 H-Piles

Mott MacDonald anticipates that, as typical with solar farm construction, solar panels may be supported by steel H-Piles, where conditions allow, or via concrete ballast support at grade. Shallow bedrock should be expected during construction however, and as such, pre-drilling may be required prior to installation of H-Piles or similar post foundations. Pile load testing should be conducted to determine drivability of the posts, and should include both axial and lateral testing to confirm their capacities at representative locations prior to full construction. Quantity of piles will need to be determined based on panel loads during final design.

#### 8.7 Access Roads

Mott MacDonald understands that an access road will be required to enter and exit the project site as well as provide access to the equipment pad locations. These proposed access roads are expected to be unpaved to accommodate occasional light vehicular traffic such as utility pickup truck or similar vehicle. Mott MacDonald recommends that any additional access roads be constructed with at least eight inches of crushed stone as specified within Table 8.

Sieve Size	Percent Passing						
1 ½-inch	100						
¾-inch	55 – 90						
No. 4	25 – 50						
No. 50	5 – 20						
No. 200	3 – 10						

Table 8 - Recommended Gradation of Densely Graded Aggregate

Prior to any additional roadway construction, the subgrade should be stripped of vegetation and topsoil, and be proof-rolled with at least three roundtrip passes of a smooth-drum roller with a minimum operating weight of eight tons. The prepared subgrade should be confirmed to maintain a minimum CBR value of 10. If required, additional stabilization may be obtained through chemical treatment of the subgrade including introduction of lime or cement. Crushed stone should be placed in loose lifts not exceeding eight inches in height and be compacted to at least 95 percent of its Modified Proctor Density (ASTM D1557).

#### 8.8 Cable Installation

Cables may be installed via ploughing and may utilize trenchless methods (bored, HDD etc.) to cross roadways. Ploughing/direct bury of cables should be feasible but the contractor should be aware that there is the possibility of localized bedrock outcrops or boulders within the soil. Trenchless installation should also be feasible, depending on installation method, length and subsurface conditions at the proposed location, but we recommend further investigation at those locations to determine ground conditions, select installation methods and perform design.

Trenchless installs may employ a variety of methods and can be combined into two general groups, those requiring a fluid (drilling mud) to remove spoils and those using mechanical means such as an auger. Potential risks are different, but all can be mitigated to some degree through good design and construction practice.

Risks of trenchless methods such as HDD that use a drilling fluid to convey spoils back to the surface are inadvertent return of fluid to the surface. Good HDD design should include a "frac out" analysis and evaluation of the drilling methodology to reduce the risk of an inadvertent return.

Bored crossings do not have the risk of inadvertent returns as no drilling mud is used to convey cuttings. However they do have the potential risk of settlement of the ground surface and are only capable of a shorter overall length. Bored crossings are typically limited to less than 200-300 feet depending on size, methodology and ground conditions.

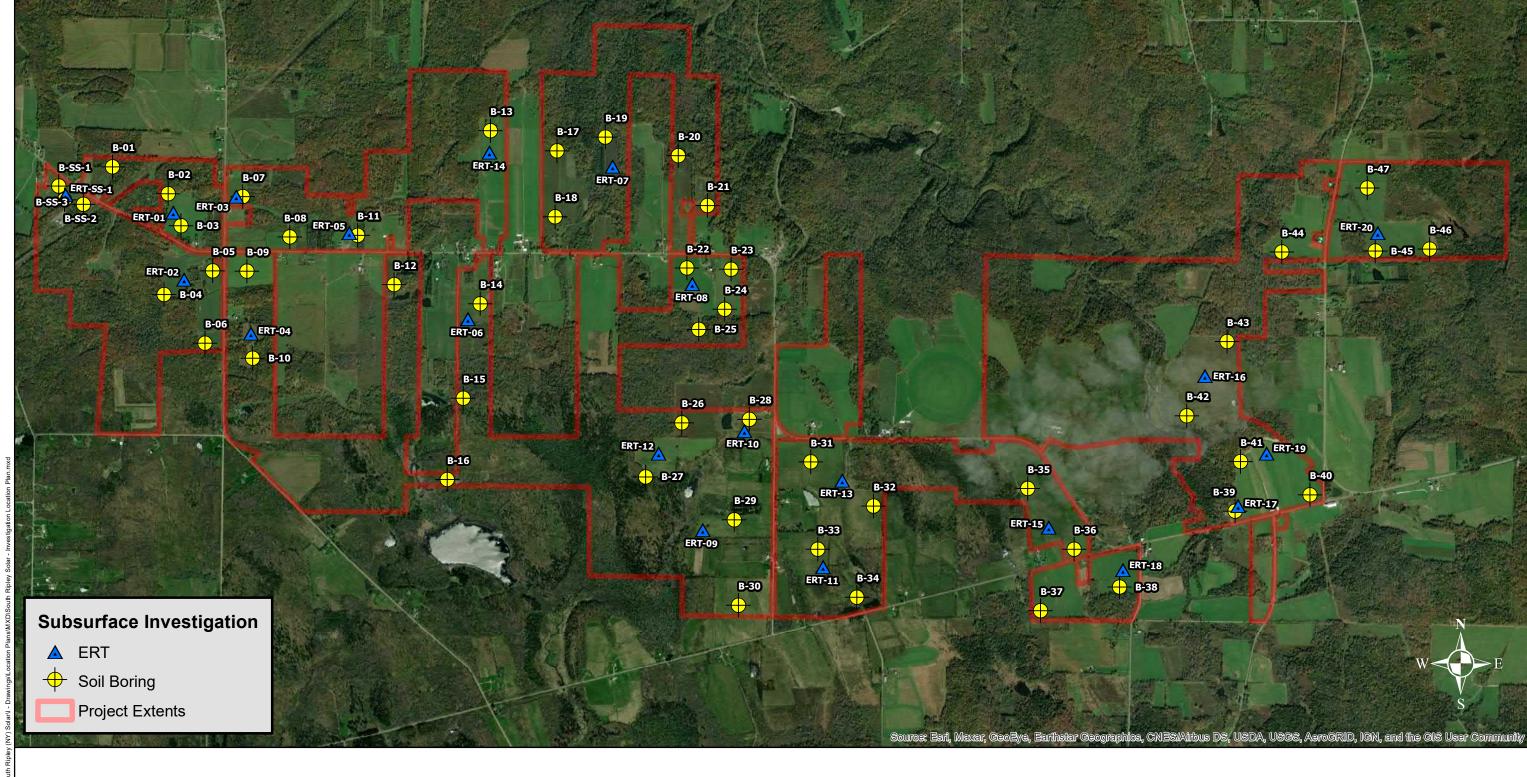
Mitigation strategies for all trenchless crossings should focus on an understanding of ground conditions at the selected bore locations, sound engineering analysis and use of an experienced and competent trenchless contractor.

# 9 Limitations

Mott MacDonald notes that the findings and recommendations presented with this Report are based on a limited investigation program conducted in July and August 2020, laboratory testing, and our engineering judgment. Should further investigations, testing, or revised concept plans reveal new information, Mott MacDonald should be given the opportunity to revise our recommendations as necessary.

# **Appendices**

# A. Investigation Location Plan



© Mott MacDonald

This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied

M MOTT MACDONALD

Mott MacDonald 111 Wood Avenue South Iselin, NJ 08830-4112 United States of America

T +1 973 379 3400 F +1 973 912 2400 mottmac.com

Certificate No. 24GA28016600

ıth			
- 1			
ca			
- 1	ConnectGEN		
- 1			
- 1			
- 1		0	6/9/2021

ii Oiiiis	SIOII WIIICII IS	due to an e	itor or omission in data supplied	to us by o	inei partie	ъ.					
						0	1,000	2,000	3,000		
										- Feet	
						Referen	nce Scale:		Absolute So	ale:	
						1:25,00	0		1 inch = 2,0	083 feet	
				l						1	_

Rev Date Drawn Description

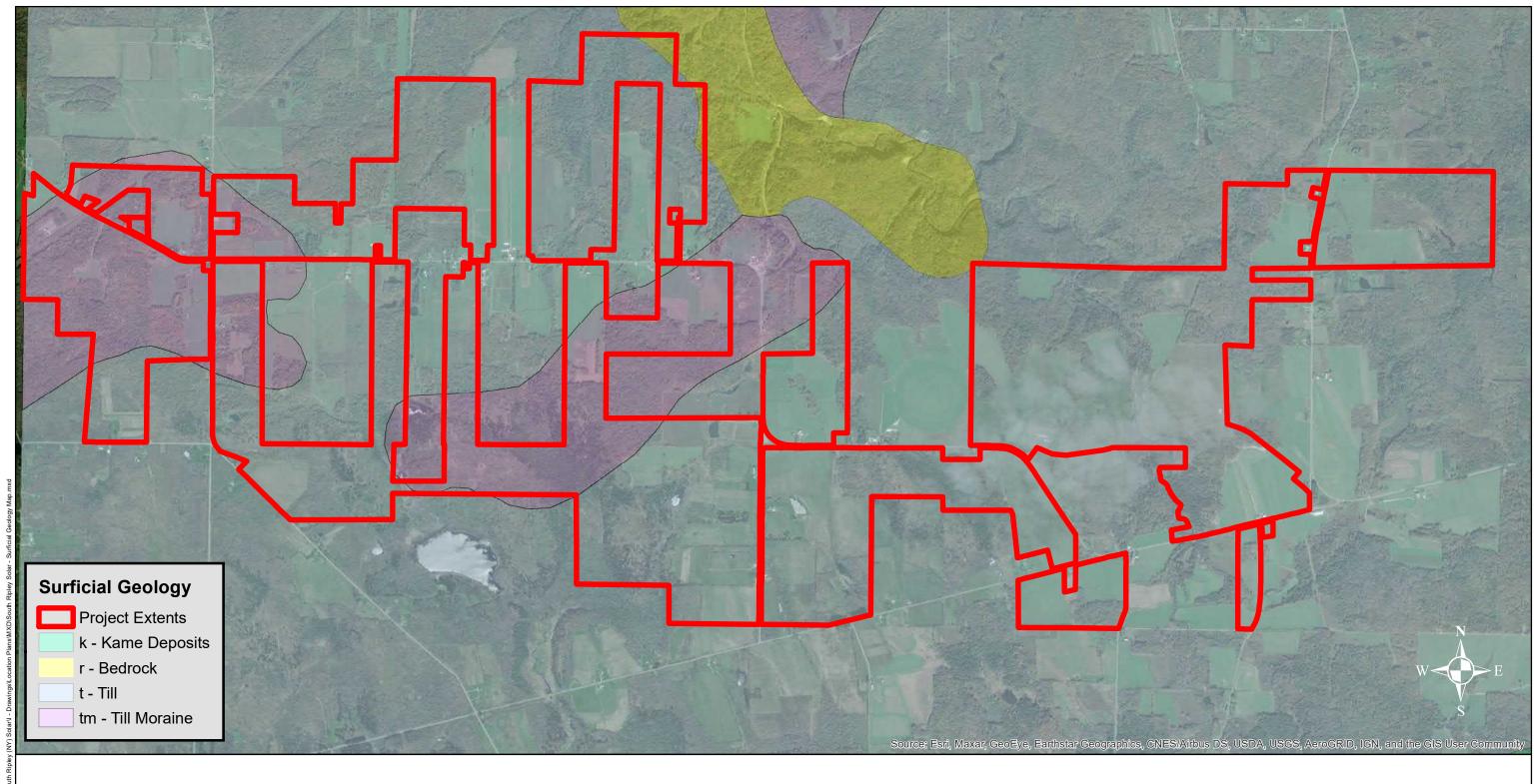
Ch'k'd App'd 505100267-001

	Designed	DM AGW			Е	ing check				Tit
	Drawn				Coordination					
	Dwg Check	EW	Р		A	Approved		VAS		
	Scale at 11" AS SHOWN	Status			Rev		Security			
Drawing Number										
	ILP-1									

INVESTIGATION LOCATION PLAN
CONNECTGEN LLC

SOUTH RIPLEY SOLAR SOUTH RIPLEY, NEW YORK

# **B.** Geologic References



This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

мотт М MACDONALD

Certificate No. 24GA28016600

Mott MacDonald 111 Wood Avenue South Iselin, NJ 08830-4112 United States of America

T +1 973 379 3400 F +1 973 912 2400

mottmac.com

		$\vdash$
	Commontes	
	ConnectGEN	
I		$\vdash$

0 6/9/2021

Rev Date Drawn Description

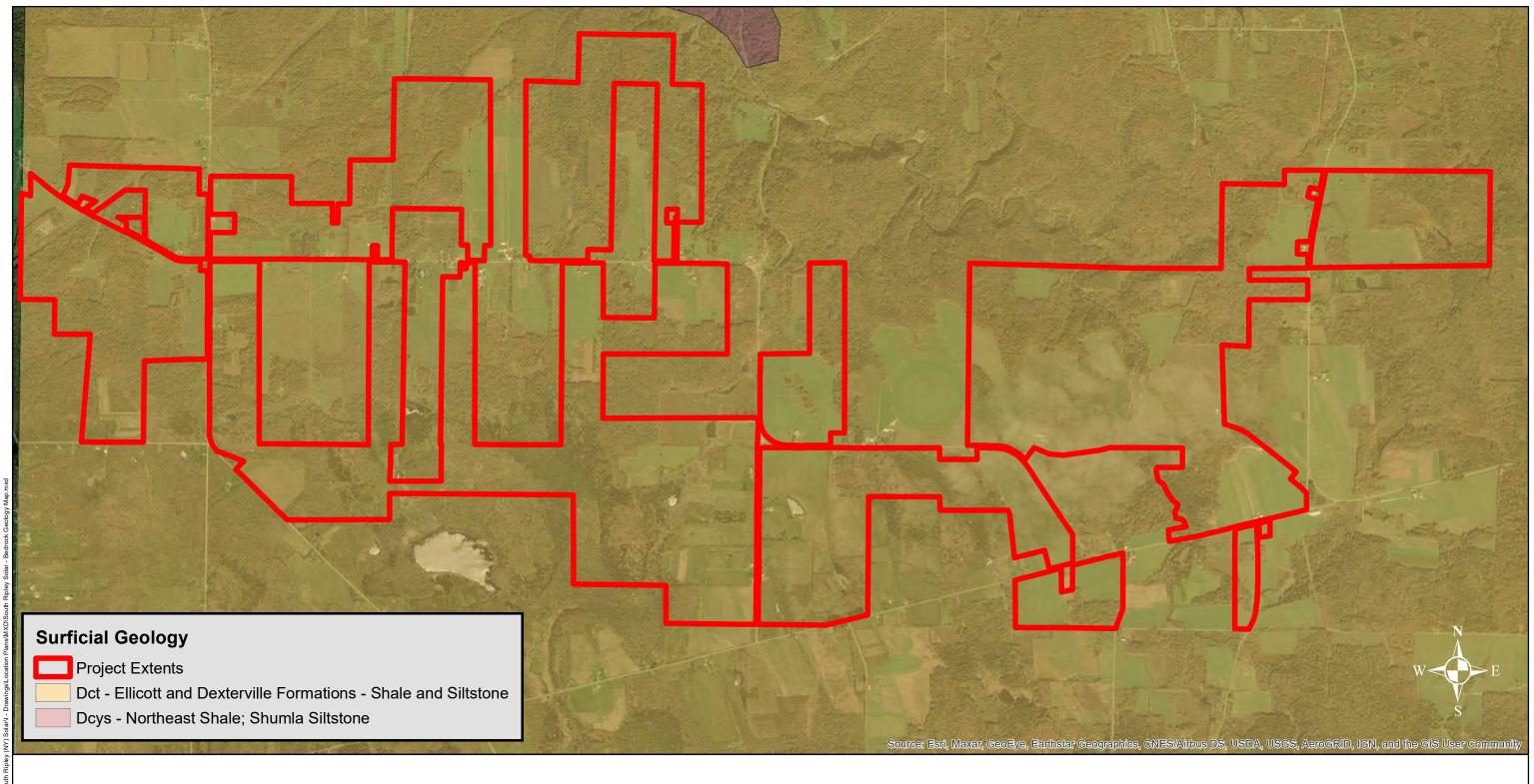
			0	1,000	2,000	3,000	4,000 Feet	
							reet	
			Referen	ice Scale:		Absolute Sc	ale:	
			1:25,00	0		1 inch = 2,0	083 feet	
		ı						_

Ch'k'd App'd 505100267-001

Designed	ned DM		Eng check					H
Drawn	AGV	AGW		C	Coordination			
Dwg Check EW		Р		Approved VAS			VAS	
Scale at 11" AS SHOWN	Status			Rev		Security		
Drawing Nu	mber							
SGM-1								

SURFICIAL GEOLOGY MAP

CONNECTGEN LLC SOUTH RIPLEY SOLAR SOUTH RIPLEY, NEW YORK



This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

мотт М MACDONALD Mott MacDonald 111 Wood Avenue South Iselin, NJ 08830-4112 United States of America

T +1 973 379 3400 F +1 973 912 2400 mottmac.com

Certificate No. 24GA28016600

٠l		
١.		
		⊢
١		l
1	ConnoctCEN	Г
	N COMMECLER	L
		l
		⊢

0 6/9/2021

Rev Date Drawn Description

	 	 	рания						
				0 1	,000	2,000	3,000	4,	000 ∃Feet
									_ reet
				Reference S	Scale:		Absolute S	cale	<b>:</b> :
·				1:25,000			1 inch = 2	,083	3 feet

		0 1,000 2,000	3.000 4	.000	Designed	DM		Eng check	
			.,	⊒ Feet	Drawn	AGW		Coordination	
		Reference Scale:	Absoluts Cool	l	Dwg Check	EWP		Approved	VAS
		1:25,000	Inch = 2 ()83 teet		Scale at 11" x 17" Status AS SHOWN		5	Rev	Security
		Project Number	B/O	Total	Drawing Nu	mber		•	•
Ch'k'd	App'd	505100267-001	1	1	SGM-1				

SURFICIAL GEOLOGY MAP

CONNECTGEN LLC SOUTH RIPLEY SOLAR SOUTH RIPLEY, NEW YORK

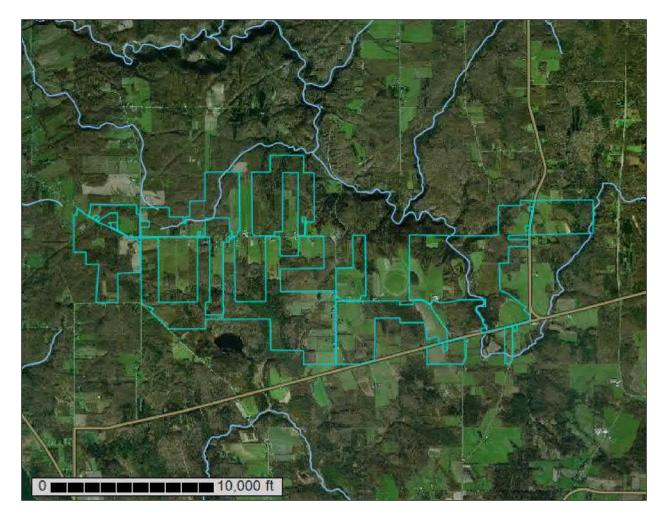


**NRCS** 

Natural Resources Conservation Service A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Chautauqua County, New York, and Erie County, Pennsylvania

**Connect-Gen South Ripley NRCS Report** 



## **Preface**

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# **Contents**

	_
Preface	
How Soil Surveys Are Made	
Soil Map	
Soil Map	
Legend	
Map Unit Legend	
Map Unit Descriptions	
Chautauqua County, New York	
Ad—Alden mucky silt loam	
As—Ashville silt loam	
BsA—Busti silt loam, 0 to 3 percent slopes	
BsB—Busti silt loam, 3 to 8 percent slopes	21
BsC—Busti silt loam, 8 to 15 percent slopes	23
Cb—Canandaigua silt loam, loamy substratum	24
Cc—Canandaigua mucky silt loam	26
ChB—Chadakoin silt loam, 3 to 8 percent slopes	27
ChC—Chadakoin silt loam, 8 to 15 percent slopes	
ChD—Chadakoin silt loam, 15 to 25 percent slopes	
ChE—Chadakoin silt loam, 25 to 35 percent slopes	
ChF—Chadakoin silt loam, 35 to 50 percent slopes	
CkB—Chautauqua silt loam, 3 to 8 percent slopes	
CkC—Chautauqua silt loam, 8 to 15 percent slopes	
CkD—Chautauqua silt loam, 15 to 25 percent slopes	
CnB—Chenango gravelly loam, 3 to 8 percent slopes	
CnC—Chenango gravelly loam, 8 to 15 percent slopes	
CoB—Chenango channery loam, fan, 3 to 8 percent slopes	
DaA—Dalton silt loam, 0 to 3 percent slopes	
DeC—Darien silt loam, 8 to 15 percent slopes	
ErA—Erie silt loam, 0 to 3 percent slopes	
ErB—Erie silt loam, 3 to 8 percent slopes	
ErC—Erie silt loam, 8 to 15 percent slopes	
Fe—Fluvaquents-Udifluvents complex, frequently flooded	
FmA—Fremont silt loam, 0 to 3 percent slopes	
FmB—Fremont silt loam, 3 to 8 percent slopes	
Ho—Holderton silt loam, 0 to 3 percent slopes, occasionally flooded 14	
LnB—Langford silt loam, 3 to 8 percent slopes	
LnC—Langford silt loam, 8 to 15 percent slopes	
MdC—Mardin channery silt loam, 8 to 15 percent slopes	
ShB—Schuyler silt loam, 3 to 8 percent slopes	
· · · · · · · · · · · · · · · · · · ·	
ShC—Schuyler silt loam, 8 to 15 percent slopes	
ToF—Towerville silt loam, 35 to 50 percent slopes	
VaB—Valois gravelly silt loam, 3 to 8 percent slopes	
VaC—Valois gravelly silt loam, 8 to 15 percent slopes	
VoA—Volusia channery silt loam, 0 to 3 percent slopes	69

#### Custom Soil Resource Report

VoB—Volusia channery silt loam, 3 to 8 percent slopes	70
W—Water	
Erie County, Pennsylvania	
MdD—Mardin silt loam, 15 to 25 percent slopes	
VIA—Volusia gravelly silt loam, 0 to 3 percent slopes	
VIB—Volusia gravelly silt loam, 3 to 8 percent slopes	
Soil Information for All Uses	77
Suitabilities and Limitations for Use	77
Building Site Development	77
Corrosion of Steel	77
Corrosion of Concrete	83
Land Management	89
Erosion Hazard (Off-Road, Off-Trail)	
References	

## **How Soil Surveys Are Made**

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

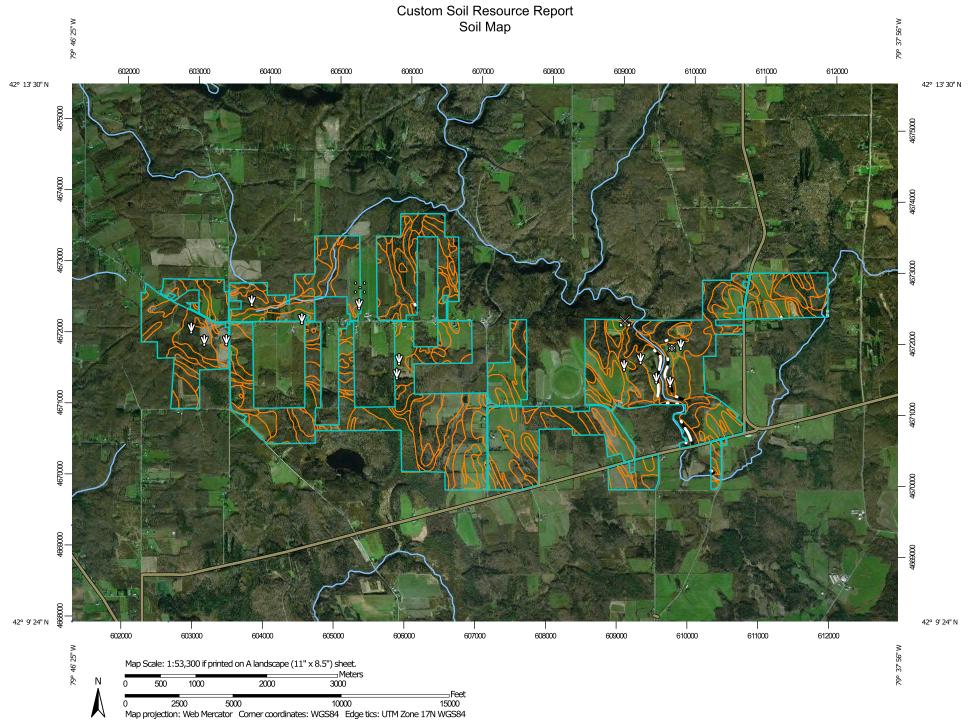
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



#### 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

(0)

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravelly Spot

Landfill

Gravel Pit

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 scales ranging from 1:12,000 to 1:15,800.

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: Chautaugua County, New York Survey Area Data: Version 18, Jun 11, 2020

Soil Survey Area: Erie County, Pennsylvania Survey Area Data: Version 18, Jun 5, 2020

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Dec 31, 2009—May 5, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

## **MAP LEGEND**

## **MAP INFORMATION**

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
Ad	Alden mucky silt loam	75.8	2.2%
As	Ashville silt loam	205.7	6.1%
BsA	Busti silt loam, 0 to 3 percent slopes	97.3	2.9%
BsB	Busti silt loam, 3 to 8 percent slopes	270.2	8.0%
BsC	Busti silt loam, 8 to 15 percent slopes	64.3	1.9%
Cb	Canandaigua silt loam, loamy substratum	8.4	0.2%
Сс	Canandaigua mucky silt loam	72.8	2.2%
ChB	Chadakoin silt loam, 3 to 8 percent slopes	26.8	0.8%
ChC	Chadakoin silt loam, 8 to 15 percent slopes	35.1	1.0%
ChD	Chadakoin silt loam, 15 to 25 percent slopes	42.9	1.3%
ChE	Chadakoin silt loam, 25 to 35 percent slopes	115.7	3.4%
ChF	Chadakoin silt loam, 35 to 50 percent slopes	37.2	1.1%
CkB	Chautauqua silt loam, 3 to 8 percent slopes	86.7	2.6%
CkC	Chautauqua silt loam, 8 to 15 percent slopes	201.2	5.9%
CkD	Chautauqua silt loam, 15 to 25 percent slopes	94.8	2.8%
CnB	Chenango gravelly loam, 3 to 8 percent slopes	2.6	0.1%
CnC	Chenango gravelly loam, 8 to 15 percent slopes	1.9	0.1%
СоВ	Chenango channery loam, fan, 3 to 8 percent slopes	2.7	0.1%
DaA	Dalton silt loam, 0 to 3 percent slopes	12.1	0.4%
DeC	Darien silt loam, 8 to 15 percent slopes	28.8	0.9%
ErA	Erie silt loam, 0 to 3 percent slopes	122.8	3.6%
ErB	Erie silt loam, 3 to 8 percent slopes	759.7	22.5%
ErC	Erie silt loam, 8 to 15 percent slopes	15.7	0.5%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Fe	Fluvaquents-Udifluvents complex, frequently flooded	46.9	1.4%
FmA	Fremont silt loam, 0 to 3 percent slopes	0.6	0.0%
FmB	Fremont silt loam, 3 to 8 percent slopes	3.6	0.1%
Но	Holderton silt loam, 0 to 3 percent slopes, occasionally flooded 140	0.7	0.0%
LnB	Langford silt loam, 3 to 8 percent slopes	348.3	10.3%
LnC	Langford silt loam, 8 to 15 percent slopes	330.7	9.8%
MdC	Mardin channery silt loam, 8 to 15 percent slopes	8.9	0.3%
ShB	Schuyler silt loam, 3 to 8 percent slopes	7.1	0.2%
ShC	Schuyler silt loam, 8 to 15 percent slopes	4.4	0.1%
ToF	Towerville silt loam, 35 to 50 percent slopes	12.4	0.4%
VaB	Valois gravelly silt loam, 3 to 8 percent slopes	1.7	0.1%
VaC	Valois gravelly silt loam, 8 to 15 percent slopes	0.8	0.0%
VoA	Volusia channery silt loam, 0 to 3 percent slopes	121.8	3.6%
VoB	Volusia channery silt loam, 3 to 8 percent slopes	108.6	3.2%
W	Water	2.6	0.1%
Subtotals for Soil Survey Area		3,380.4	100.0%
Totals for Area of Interest		3,381.3	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI		
MdD	Mardin silt loam, 15 to 25 percent slopes	0.1	0.0%		
VIA	Volusia gravelly silt loam, 0 to 3 percent slopes	0.2	0.0%		
VIB	Volusia gravelly silt loam, 3 to 8 percent slopes	0.7	0.0%		
Subtotals for Soil Survey Area		0.9	0.0%		
Totals for Area of Interest		3,381.3	100.0%		

## **Map Unit Descriptions**

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas

shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Chautauqua County, New York

## Ad—Alden mucky silt loam

#### **Map Unit Setting**

National map unit symbol: 9qjk Elevation: 300 to 1,500 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Not prime farmland

## **Map Unit Composition**

Alden and similar soils: 80 percent Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

## **Description of Alden**

## Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Parent material: A silty mantle of local deposition overlying loamy till

#### Typical profile

H1 - 0 to 9 inches: mucky silt loam H2 - 9 to 35 inches: silt loam H3 - 35 to 72 inches: gravelly loam

## Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.06 to 0.57 in/hr) Depth to water table: About 0 inches

Frequency of flooding: None Frequency of ponding: Frequent

Calcium carbonate, maximum content: 15 percent Available water capacity: High (about 9.1 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: C/D

Ecological site: F139XY011OH - Wet Calcareous Depression

Hydric soil rating: Yes

#### **Minor Components**

#### **Fremont**

Percent of map unit: 5 percent

Hydric soil rating: No

#### Canandaigua

Percent of map unit: 5 percent Landform: Depressions Hydric soil rating: Yes

#### **Ashville**

Percent of map unit: 5 percent Landform: Depressions Hydric soil rating: Yes

## Wayland

Percent of map unit: 5 percent Landform: Flood plains Hydric soil rating: Yes

## As—Ashville silt loam

## **Map Unit Setting**

National map unit symbol: 9qjn Elevation: 590 to 1,970 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Farmland of statewide importance

## **Map Unit Composition**

Ashville and similar soils: 75 percent Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

## **Description of Ashville**

#### Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Parent material: Silty local colluvium and in some places the underlying till

## Typical profile

H1 - 0 to 9 inches: silt loam H2 - 9 to 36 inches: silt loam

H3 - 36 to 72 inches: gravelly silt loam

#### **Properties and qualities**

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent Available water capacity: High (about 9.9 inches)

## Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F139XY011OH - Wet Calcareous Depression

Hydric soil rating: Yes

## **Minor Components**

#### **Unnamed soils**

Percent of map unit: 5 percent Landform: Depressions Hydric soil rating: Yes

#### Fremont

Percent of map unit: 5 percent Hydric soil rating: No

## Alden

Percent of map unit: 5 percent Landform: Depressions Hydric soil rating: Yes

## Canandaigua

Percent of map unit: 5 percent Landform: Depressions Hydric soil rating: Yes

#### Busti

Percent of map unit: 5 percent

Hydric soil rating: No

## BsA—Busti silt loam, 0 to 3 percent slopes

## **Map Unit Setting**

National map unit symbol: 2vzpv Elevation: 330 to 2.460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Prime farmland if drained

## **Map Unit Composition**

Busti and similar soils: 80 percent Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Busti**

#### Setting

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Till

#### **Typical profile**

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 17 inches: silt loam
Bw2 - 17 to 25 inches: silt loam
BC - 25 to 33 inches: gravelly silt loam
C - 33 to 72 inches: gravelly silt loam

## **Properties and qualities**

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.14 to 1.42 in/hr) Depth to water table: About 6 to 18 inches

Frequency of flooding: None Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 10.0 inches)

## Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: F139XY002OH - Moist Calcareous Till Flats

Hydric soil rating: No

#### **Minor Components**

#### Fremont

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

## Chautauqua

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex Across-slope shape: Convex Hydric soil rating: No

#### **Ashville**

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

#### Volusia

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope, interfluve, side slope

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

## BsB—Busti silt loam, 3 to 8 percent slopes

## **Map Unit Setting**

National map unit symbol: 2vzpw Elevation: 330 to 2.460 feet

Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Prime farmland if drained

## **Map Unit Composition**

Busti and similar soils: 80 percent Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Busti**

#### Setting

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Till

#### Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 17 inches: silt loam
Bw2 - 17 to 25 inches: silt loam
BC - 25 to 33 inches: gravelly silt loam
C - 33 to 72 inches: gravelly silt loam

#### **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.14 to 1.42 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 10.0 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: F139XY002OH - Moist Calcareous Till Flats

Hydric soil rating: No

## **Minor Components**

#### **Fremont**

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

#### Volusia

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope, interfluve, side slope

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

## Chautauqua

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Backslope, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

## **Ashville**

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

## BsC—Busti silt loam, 8 to 15 percent slopes

## **Map Unit Setting**

National map unit symbol: 2vzpx Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Farmland of statewide importance

#### **Map Unit Composition**

Busti and similar soils: 80 percent Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Busti**

#### Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Till

#### Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 17 inches: silt loam
Bw2 - 17 to 25 inches: silt loam
BC - 25 to 33 inches: gravelly silt loam
C - 33 to 72 inches: gravelly silt loam

#### **Properties and qualities**

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.14 to 1.42 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 10.0 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: F139XY002OH - Moist Calcareous Till Flats

Hydric soil rating: No

#### **Minor Components**

#### Chautauqua

Percent of map unit: 8 percent

Landform: Hills

Landform position (two-dimensional): Backslope, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

#### Fremont

Percent of map unit: 6 percent

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Side slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

#### Volusia

Percent of map unit: 6 percent

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

## Cb—Canandaigua silt loam, loamy substratum

## **Map Unit Setting**

National map unit symbol: 9qjw Elevation: 100 to 1,200 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Farmland of statewide importance

#### **Map Unit Composition**

Canandaigua, loamy substratum, and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

## Description of Canandaigua, Loamy Substratum

#### Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Tread

Down-slope shape: Concave Across-slope shape: Concave

Parent material: Silty and clayey glaciolacustrine deposits

## **Typical profile**

H1 - 0 to 10 inches: silt loam H2 - 10 to 36 inches: silt loam H3 - 36 to 72 inches: silt loam

#### **Properties and qualities**

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20

to 0.57 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None Frequency of ponding: Frequent

Calcium carbonate, maximum content: 15 percent Available water capacity: High (about 11.1 inches)

## Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F139XY011OH - Wet Calcareous Depression

Hydric soil rating: Yes

## **Minor Components**

#### Lamson

Percent of map unit: 4 percent Landform: Depressions Hydric soil rating: Yes

#### Canadice

Percent of map unit: 4 percent Landform: Depressions Hydric soil rating: Yes

## Niagara

Percent of map unit: 4 percent Hydric soil rating: No

#### **Ashville**

Percent of map unit: 4 percent Landform: Depressions Hydric soil rating: Yes

#### Alden

Percent of map unit: 4 percent Landform: Depressions Hydric soil rating: Yes

## Cc—Canandaigua mucky silt loam

## **Map Unit Setting**

National map unit symbol: 9qjx Elevation: 100 to 1,000 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Not prime farmland

#### **Map Unit Composition**

Canandaigua and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Canandaigua**

#### Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Tread

Down-slope shape: Concave Across-slope shape: Concave

Parent material: Silty and clayey glaciolacustrine deposits

#### Typical profile

H1 - 0 to 10 inches: mucky silt loam H2 - 10 to 36 inches: silt loam H3 - 36 to 72 inches: silt loam

## **Properties and qualities**

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20

to 0.57 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None Frequency of ponding: Frequent

Calcium carbonate, maximum content: 15 percent Available water capacity: High (about 11.1 inches)

## Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: C/D

Ecological site: F139XY011OH - Wet Calcareous Depression

Hydric soil rating: Yes

#### **Minor Components**

#### Canadice

Percent of map unit: 3 percent Landform: Depressions Hydric soil rating: Yes

#### Lamson

Percent of map unit: 3 percent Landform: Depressions Hydric soil rating: Yes

#### **Alden**

Percent of map unit: 3 percent Landform: Depressions Hydric soil rating: Yes

#### **Unnamed soils**

Percent of map unit: 3 percent Landform: Depressions Hydric soil rating: Yes

#### **Palms**

Percent of map unit: 3 percent Landform: Marshes, swamps Hydric soil rating: Yes

## ChB—Chadakoin silt loam, 3 to 8 percent slopes

#### **Map Unit Setting**

National map unit symbol: 9qk3 Elevation: 800 to 1,800 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: All areas are prime farmland

## **Map Unit Composition**

Chadakoin and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

## **Description of Chadakoin**

#### Setting

Landform: Till plains, drumlinoid ridges, hills Landform position (two-dimensional): Summit Landform position (three-dimensional): Crest

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Loamy till derived from siltstone, sandstone, and smaller amounts of shale

## **Typical profile**

H1 - 0 to 4 inches: silt loam
H2 - 4 to 24 inches: silt loam
H3 - 24 to 43 inches: gravelly loam
H4 - 43 to 72 inches: gravelly loam

#### **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.20 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Moderate (about 7.0 inches)

## Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

## **Minor Components**

## Chenango

Percent of map unit: 4 percent Hydric soil rating: No

#### **Busti**

Percent of map unit: 4 percent Hydric soil rating: No

#### Chautauqua

Percent of map unit: 4 percent Hydric soil rating: No

#### Schuyler

Percent of map unit: 4 percent Hydric soil rating: No

#### **Towerville**

Percent of map unit: 4 percent Hydric soil rating: No

## ChC—Chadakoin silt loam, 8 to 15 percent slopes

## **Map Unit Setting**

National map unit symbol: 9qk4

Elevation: 800 to 1,800 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Farmland of statewide importance

#### **Map Unit Composition**

Chadakoin and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

## **Description of Chadakoin**

#### Setting

Landform: Till plains, drumlinoid ridges, hills Landform position (two-dimensional): Shoulder Landform position (three-dimensional): Crest

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Loamy till derived from siltstone, sandstone, and smaller amounts

of shale

## **Typical profile**

H1 - 0 to 4 inches: silt loam
H2 - 4 to 24 inches: silt loam
H3 - 24 to 43 inches: gravelly loam
H4 - 43 to 72 inches: gravelly loam

#### **Properties and qualities**

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.20 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Moderate (about 7.0 inches)

## Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hvdrologic Soil Group: B

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

## **Minor Components**

#### **Towerville**

Percent of map unit: 5 percent Hydric soil rating: No

#### **Valois**

Percent of map unit: 5 percent Hydric soil rating: No

#### Busti

Percent of map unit: 5 percent

Hydric soil rating: No

**Schuyler** 

Percent of map unit: 5 percent

Hydric soil rating: No

Chautauqua

Percent of map unit: 5 percent

Hydric soil rating: No

## ChD—Chadakoin silt loam, 15 to 25 percent slopes

#### **Map Unit Setting**

National map unit symbol: 9qk5 Elevation: 800 to 1,800 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Not prime farmland

## **Map Unit Composition**

Chadakoin and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

## **Description of Chadakoin**

#### Setting

Landform: Drumlinoid ridges, hills, till plains Landform position (two-dimensional): Backslope Landform position (three-dimensional): Side slope

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Loamy till derived from siltstone, sandstone, and smaller amounts

of shale

#### Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 24 inches: silt loam
H3 - 24 to 43 inches: gravelly loam
H4 - 43 to 72 inches: gravelly loam

## Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.20 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Moderate (about 7.0 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

## **Minor Components**

#### Busti

Percent of map unit: 4 percent Hydric soil rating: No

#### Schuyler

Percent of map unit: 4 percent Hydric soil rating: No

## **Towerville**

Percent of map unit: 4 percent Hydric soil rating: No

#### Chautauqua

Percent of map unit: 4 percent Hydric soil rating: No

#### **Valois**

Percent of map unit: 4 percent Hydric soil rating: No

## ChE—Chadakoin silt loam, 25 to 35 percent slopes

## **Map Unit Setting**

National map unit symbol: 9qk6 Elevation: 800 to 1,800 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Not prime farmland

## **Map Unit Composition**

Chadakoin and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Chadakoin**

#### Setting

Landform: Till plains, drumlinoid ridges, hills Landform position (two-dimensional): Backslope Landform position (three-dimensional): Side slope

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Loamy till derived from siltstone, sandstone, and smaller amounts

of shale

## **Typical profile**

H1 - 0 to 4 inches: silt loam
H2 - 4 to 24 inches: silt loam
H3 - 24 to 43 inches: gravelly loam
H4 - 43 to 72 inches: gravelly loam

#### **Properties and qualities**

Slope: 25 to 35 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.20 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Moderate (about 7.0 inches)

## Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

## **Minor Components**

#### **Valois**

Percent of map unit: 4 percent

Hydric soil rating: No

#### Chautauqua

Percent of map unit: 4 percent

Hydric soil rating: No

#### **Towerville**

Percent of map unit: 4 percent

Hydric soil rating: No

#### Schuvler

Percent of map unit: 4 percent

Hydric soil rating: No

## **Fluvaquents**

Percent of map unit: 2 percent

Landform: Flood plains Hydric soil rating: Yes

#### **Udifluvents**

Percent of map unit: 2 percent

Hydric soil rating: No

## ChF—Chadakoin silt loam, 35 to 50 percent slopes

## **Map Unit Setting**

National map unit symbol: 9qk7 Elevation: 800 to 1,800 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Not prime farmland

#### **Map Unit Composition**

Chadakoin and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Chadakoin**

#### Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Loamy till derived from siltstone, sandstone, and smaller amounts

of shale

## Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 24 inches: silt loam
H3 - 24 to 43 inches: gravelly loam
H4 - 43 to 72 inches: gravelly loam

#### **Properties and qualities**

Slope: 35 to 50 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.20 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Moderate (about 7.0 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

#### **Minor Components**

#### **Towerville**

Percent of map unit: 7 percent Hydric soil rating: No

#### Schuyler

Percent of map unit: 7 percent Hydric soil rating: No

#### **Valois**

Percent of map unit: 5 percent Hydric soil rating: No

#### **Udifluvents**

Percent of map unit: 3 percent Hydric soil rating: No

## **Fluvaquents**

Percent of map unit: 3 percent Landform: Flood plains Hydric soil rating: Yes

## CkB—Chautauqua silt loam, 3 to 8 percent slopes

#### **Map Unit Setting**

National map unit symbol: 2vzpq Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: All areas are prime farmland

#### **Map Unit Composition**

Chautauqua and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

## **Description of Chautauqua**

#### Setting

Landform: Hills

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Till

## Typical profile

Ap - 0 to 8 inches: silt loam Bw1 - 8 to 22 inches: silt loam

Bw2 - 22 to 35 inches: gravelly silt loam C - 35 to 72 inches: gravelly loam

## **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.14 to 1.42 in/hr)

Depth to water table: About 18 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 9.8 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C/D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

## **Minor Components**

#### Busti

Percent of map unit: 8 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

## Langford

Percent of map unit: 7 percent

Landform: Hills

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex Across-slope shape: Convex Hydric soil rating: No

#### Chadakoin

Percent of map unit: 5 percent

Landform: Hills, drumlinoid ridges, till plains

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve, side slope, crest

Down-slope shape: Convex Across-slope shape: Convex

Hydric soil rating: No

## CkC—Chautauqua silt loam, 8 to 15 percent slopes

## **Map Unit Setting**

National map unit symbol: 2vzpr Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Farmland of statewide importance

#### Map Unit Composition

Chautauqua and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Chautauqua**

#### Setting

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Till

#### Typical profile

Ap - 0 to 8 inches: silt loam Bw1 - 8 to 22 inches: silt loam

Bw2 - 22 to 35 inches: gravelly silt loam C - 35 to 72 inches: gravelly loam

## **Properties and qualities**

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.14 to 1.42 in/hr)

Depth to water table: About 18 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 9.8 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C/D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

#### **Minor Components**

#### Chadakoin

Percent of map unit: 8 percent

Landform: Hills, drumlinoid ridges, till plains

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Interfluve, side slope, crest

Down-slope shape: Convex

Across-slope shape: Linear, convex

Hydric soil rating: No

#### Langford

Percent of map unit: 7 percent

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

#### Busti

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

## CkD—Chautauqua silt loam, 15 to 25 percent slopes

## **Map Unit Setting**

National map unit symbol: 2vzps Elevation: 330 to 2.460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Not prime farmland

## **Map Unit Composition**

Chautauqua and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

## **Description of Chautauqua**

#### Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, head slope

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Till

#### Typical profile

Oa - 0 to 2 inches: highly decomposed plant material

A - 2 to 3 inches: silt loam
BE - 3 to 8 inches: silt loam
Bw1 - 8 to 22 inches: silt loam

Bw2 - 22 to 35 inches: gravelly silt loam C - 35 to 72 inches: gravelly loam

## **Properties and qualities**

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.14 to 1.42 in/hr)

Depth to water table: About 18 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 9.5 inches)

## Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C/D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

## **Minor Components**

#### Chadakoin

Percent of map unit: 10 percent

Landform: Hills, drumlinoid ridges, till plains Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Linear, convex Across-slope shape: Linear, convex

Hydric soil rating: No

#### Langford

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Head slope, side slope

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

#### **Towerville**

Percent of map unit: 5 percent

Landform: Hills, ridges

Landform position (two-dimensional): Backslope, summit Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Concave

Across-slope shape: Linear, convex

Hydric soil rating: No

## CnB—Chenango gravelly loam, 3 to 8 percent slopes

#### **Map Unit Setting**

National map unit symbol: 9qkg Elevation: 600 to 1,800 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: All areas are prime farmland

#### **Map Unit Composition**

Chenango and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Chenango**

#### Setting

Landform: Valley trains, terraces

Landform position (two-dimensional): Summit Landform position (three-dimensional): Tread

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from sandstone, shale, and siltstone

## **Typical profile**

H1 - 0 to 6 inches: gravelly loam

H2 - 6 to 45 inches: very gravelly fine sandy loam H3 - 45 to 72 inches: very gravelly loamy sand

#### **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.57 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent Available water capacity: Low (about 5.4 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

#### **Minor Components**

#### Tioga

Percent of map unit: 4 percent Hydric soil rating: No

#### **Valois**

Percent of map unit: 4 percent Hydric soil rating: No

#### **Unnamed soils**

Percent of map unit: 4 percent Hydric soil rating: No

#### **Allard**

Percent of map unit: 4 percent Hydric soil rating: No

## **Pompton**

Percent of map unit: 4 percent Hydric soil rating: No

## CnC—Chenango gravelly loam, 8 to 15 percent slopes

#### **Map Unit Setting**

National map unit symbol: 9qkh Elevation: 600 to 1,800 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Farmland of statewide importance

#### **Map Unit Composition**

Chenango and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

## **Description of Chenango**

#### Setting

Landform: Valley trains, terraces

Landform position (two-dimensional): Shoulder Landform position (three-dimensional): Tread

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from sandstone, shale, and siltstone

## **Typical profile**

H1 - 0 to 6 inches: gravelly loam

H2 - 6 to 45 inches: very gravelly fine sandy loam H3 - 45 to 72 inches: very gravelly loamy sand

## **Properties and qualities**

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.57 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent Available water capacity: Low (about 5.4 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: A

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

## **Minor Components**

#### **Unnamed soils**

Percent of map unit: 4 percent

Hydric soil rating: No

## **Tioga**

Percent of map unit: 4 percent

Hydric soil rating: No

#### **Pompton**

Percent of map unit: 4 percent

Hydric soil rating: No

#### **Allard**

Percent of map unit: 4 percent

Hydric soil rating: No

#### **Valois**

Percent of map unit: 4 percent

Hydric soil rating: No

## CoB—Chenango channery loam, fan, 3 to 8 percent slopes

#### **Map Unit Setting**

National map unit symbol: 9qkm Elevation: 590 to 1,970 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: All areas are prime farmland

### **Map Unit Composition**

Chenango, fan, and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### Description of Chenango, Fan

### Setting

Landform: Alluvial fans

Landform position (two-dimensional): Summit Landform position (three-dimensional): Tread

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from sandstone, shale, and siltstone

# **Typical profile**

H1 - 0 to 9 inches: channery loam

H2 - 9 to 45 inches: very gravelly fine sandy loam H3 - 45 to 72 inches: very gravelly loamy sand

# **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.57 to 5.95 in/hr)

Depth to water table: About 36 to 72 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent Available water capacity: Low (about 5.5 inches)

# Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

### **Minor Components**

#### **Valois**

Percent of map unit: 5 percent

Hydric soil rating: No

# Middlebury

Percent of map unit: 5 percent

Hydric soil rating: No

# **Unnamed soils**

Percent of map unit: 5 percent

Hydric soil rating: No

### Red hook

Percent of map unit: 5 percent

Hydric soil rating: No

# **Pompton**

Percent of map unit: 5 percent

Hydric soil rating: No

# DaA—Dalton silt loam, 0 to 3 percent slopes

### **Map Unit Setting**

National map unit symbol: 9qkw Elevation: 590 to 1,970 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Farmland of statewide importance

# **Map Unit Composition**

Dalton and similar soils: 80 percent *Minor components:* 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Dalton**

### Setting

Landform: Till plains, drumlinoid ridges, hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, tread

Down-slope shape: Concave Across-slope shape: Linear

Parent material: A silty mantle of glaciolacustrine deposits over loamy till derived

from siltstone, shale, and sandstone

# Typical profile

H1 - 0 to 9 inches: silt loam H2 - 9 to 23 inches: silt loam

H3 - 23 to 46 inches: gravelly silt loam 2C - 46 to 72 inches: gravelly silt loam

# **Properties and qualities**

Slope: 0 to 3 percent

Depth to restrictive feature: 15 to 36 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.06 to 0.20 in/hr) Depth to water table: About 6 to 18 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Low (about 4.2 inches)

# Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

# **Minor Components**

#### **Busti**

Percent of map unit: 4 percent

Hydric soil rating: No

#### Fremont

Percent of map unit: 4 percent Hydric soil rating: No

#### **Unnamed soils**

Percent of map unit: 4 percent Hydric soil rating: No

### Canaseraga

Percent of map unit: 4 percent Hydric soil rating: No

#### Alden

Percent of map unit: 4 percent Landform: Depressions Hydric soil rating: Yes

# DeC—Darien silt loam, 8 to 15 percent slopes

#### **Map Unit Setting**

National map unit symbol: 9ql0 Elevation: 590 to 1,970 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

Darien and similar soils: 80 percent *Minor components*: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Darien**

#### Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Loamy till derived predominantly from calcareous gray shale

### Typical profile

H1 - 0 to 9 inches: silt loam

H2 - 9 to 31 inches: gravelly silty clay loam H3 - 31 to 72 inches: gravelly silt loam

# **Properties and qualities**

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 6 to 12 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent Available water capacity: Moderate (about 7.4 inches)

# Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C/D

Ecological site: F139XY002OH - Moist Calcareous Till Flats

Hydric soil rating: No

### **Minor Components**

#### Erie

Percent of map unit: 4 percent

Hydric soil rating: No

#### Fremont

Percent of map unit: 4 percent

Hydric soil rating: No

#### Volusia

Percent of map unit: 4 percent

Hydric soil rating: No

### Orpark

Percent of map unit: 4 percent

Hydric soil rating: No

### **Ashville**

Percent of map unit: 4 percent Landform: Depressions

Hydric soil rating: Yes

# ErA—Erie silt loam, 0 to 3 percent slopes

# **Map Unit Setting**

National map unit symbol: 2wn3f Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

Erie and similar soils: 80 percent Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### **Description of Erie**

### Setting

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Till

# Typical profile

Ap - 0 to 9 inches: silt loam

E - 9 to 13 inches: channery silt loam Bg - 13 to 15 inches: channery silt loam Bx - 15 to 38 inches: channery silt loam C - 38 to 72 inches: channery loam

# **Properties and qualities**

Slope: 0 to 3 percent

Depth to restrictive feature: 10 to 21 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to

0.14 in/hr)

Depth to water table: About 7 to 14 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water capacity: Very low (about 3.0 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F139XY002OH - Moist Calcareous Till Flats

Hydric soil rating: No

# **Minor Components**

#### **Ashville**

Percent of map unit: 4 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

#### Fremont

Percent of map unit: 4 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

#### Busti

Percent of map unit: 4 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

#### **Darien**

Percent of map unit: 4 percent

Landform: Till plains

Landform position (two-dimensional): Summit, footslope Landform position (three-dimensional): Interfluve, base slope

Down-slope shape: Concave Across-slope shape: Linear

Other vegetative classification: Unnamed (G139XY000OH)

Hydric soil rating: No

# Langford

Percent of map unit: 4 percent

Landform: Hills

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex Across-slope shape: Convex

Hydric soil rating: No

# ErB—Erie silt loam, 3 to 8 percent slopes

# **Map Unit Setting**

National map unit symbol: 2wn3j Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Farmland of statewide importance

# **Map Unit Composition**

Erie and similar soils: 75 percent Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Erie**

#### Setting

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Till

### **Typical profile**

Ap - 0 to 9 inches: silt loam

E - 9 to 13 inches: channery silt loam Bg - 13 to 15 inches: channery silt loam Bx - 15 to 38 inches: channery silt loam C - 38 to 72 inches: channery loam

# **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: 10 to 21 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to

0.14 in/hr)

Depth to water table: About 7 to 14 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water capacity: Very low (about 3.0 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F139XY002OH - Moist Calcareous Till Flats

Hydric soil rating: No

# **Minor Components**

### Langford

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

#### **Ashville**

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

#### **Darien**

Percent of map unit: 5 percent

Landform: Till plains

Landform position (two-dimensional): Summit, footslope Landform position (three-dimensional): Interfluve, base slope

Down-slope shape: Concave Across-slope shape: Linear

Other vegetative classification: Unnamed (G139XY000OH)

Hydric soil rating: No

#### Fremont

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

### Busti

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

# ErC—Erie silt loam, 8 to 15 percent slopes

# **Map Unit Setting**

National map unit symbol: 2wn3l Elevation: 330 to 2.460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

Erie and similar soils: 75 percent Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### **Description of Erie**

### Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Side slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Till

# **Typical profile**

Ap - 0 to 9 inches: silt loam

E - 9 to 13 inches: channery silt loam Bg - 13 to 15 inches: channery silt loam Bx - 15 to 38 inches: channery silt loam C - 38 to 72 inches: channery loam

### **Properties and qualities**

Slope: 8 to 15 percent

Depth to restrictive feature: 10 to 21 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to

0.14 in/hr)

Depth to water table: About 7 to 14 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water capacity: Very low (about 3.0 inches)

# Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D

Ecological site: F139XY002OH - Moist Calcareous Till Flats

Hydric soil rating: No

### **Minor Components**

#### Busti

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Side slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

#### Fremont

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Side slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

#### **Ashville**

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

# Langford

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Head slope, side slope

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

#### Darien

Percent of map unit: 5 percent

Landform: Till plains, drumlinoid ridges, hills Landform position (two-dimensional): Footslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

# Fe—Fluvaquents-Udifluvents complex, frequently flooded

### **Map Unit Setting**

National map unit symbol: 9ql8 Elevation: 100 to 3,000 feet

Mean annual precipitation: 39 to 50 inches
Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Not prime farmland

### **Map Unit Composition**

Fluvaquents and similar soils: 55 percent Udifluvents and similar soils: 30 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Fluvaquents**

# Setting

Landform: Flood plains

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Dip

Down-slope shape: Concave Across-slope shape: Concave

Parent material: Alluvium with highly variable texture

# **Typical profile**

H1 - 0 to 5 inches: gravelly silt loam H2 - 5 to 70 inches: very gravelly silt loam

### **Properties and qualities**

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very

high (0.06 to 19.98 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: FrequentNone Frequency of ponding: Frequent

Calcium carbonate, maximum content: 15 percent Available water capacity: Moderate (about 6.1 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: A/D

Ecological site: F139XY009OH - Wet Floodplain

Hydric soil rating: Yes

# **Description of Udifluvents**

### Setting

Landform: Flood plains

Landform position (two-dimensional): Summit Landform position (three-dimensional): Talf

Down-slope shape: Concave Across-slope shape: Convex

Parent material: Alluvium with a wide range of texture

# **Typical profile**

H1 - 0 to 4 inches: gravelly silt loam H2 - 4 to 70 inches: very gravelly loam

### **Properties and qualities**

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very

high (0.06 to 19.98 in/hr)

Depth to water table: About 24 to 72 inches Frequency of flooding: FrequentNone

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent Available water capacity: Low (about 5.9 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: A

Ecological site: F139XY008OH - Moist Floodplain

Hydric soil rating: No

### **Minor Components**

### Teel

Percent of map unit: 5 percent

Hydric soil rating: No

### Wayland

Percent of map unit: 5 percent Landform: Flood plains Hydric soil rating: Yes

### **Holderton**

Percent of map unit: 5 percent

Hydric soil rating: No

# FmA—Fremont silt loam, 0 to 3 percent slopes

# **Map Unit Setting**

National map unit symbol: 2vzr6 Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Prime farmland if drained

### **Map Unit Composition**

Fremont and similar soils: 80 percent Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### **Description of Fremont**

### Setting

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Till

# **Typical profile**

Ap - 0 to 8 inches: silt loam Bw1 - 8 to 16 inches: silt loam

Bw2 - 16 to 30 inches: channery silt loam
BC - 30 to 34 inches: channery silty clay loam
C - 34 to 72 inches: channery silt loam

#### **Properties and qualities**

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately

low (0.00 to 0.14 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 10.5 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

### **Minor Components**

#### **Ashville**

Percent of map unit: 8 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

#### Volusia

Percent of map unit: 7 percent Landform: Hills, mountains

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope, interfluve, side slope

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

### **Orpark**

Percent of map unit: 5 percent Landform: Till plains, ridges, benches

Landform position (two-dimensional): Summit, shoulder, footslope Landform position (three-dimensional): Interfluve, crest, base slope

Down-slope shape: Convex, concave Across-slope shape: Convex, linear

Hydric soil rating: No

# FmB—Fremont silt loam, 3 to 8 percent slopes

#### Map Unit Setting

National map unit symbol: 2vzrc Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

Fremont and similar soils: 80 percent Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### **Description of Fremont**

# Setting

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Till

# **Typical profile**

Ap - 0 to 8 inches: silt loam Bw1 - 8 to 16 inches: silt loam

Bw2 - 16 to 30 inches: channery silt loam BC - 30 to 34 inches: channery silty clay loam C - 34 to 72 inches: channery silt loam

# **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately

low (0.00 to 0.14 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 10.5 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

### **Minor Components**

### **Ashville**

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

### Volusia

Percent of map unit: 5 percent Landform: Hills, mountains

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope, interfluve, side slope

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

# Orpark

Percent of map unit: 5 percent

Landform: Till plains, ridges, benches

Landform position (two-dimensional): Shoulder, backslope, footslope Landform position (three-dimensional): Crest, nose slope, base slope

Down-slope shape: Convex, concave

Across-slope shape: Linear Hydric soil rating: No

### Schuyler

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

# Ho—Holderton silt loam, 0 to 3 percent slopes, occasionally flooded 140

### **Map Unit Setting**

National map unit symbol: 2rw9q Elevation: 160 to 1,970 feet

Mean annual precipitation: 31 to 68 inches Mean annual air temperature: 43 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Prime farmland if drained

### **Map Unit Composition**

Holderton and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Holderton**

# Setting

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Loamy alluvium derived from sedimentary rock

# **Typical profile**

Ap - 0 to 10 inches: silt loam Bw1 - 10 to 18 inches: loam

Bw2 - 18 to 35 inches: fine sandy loam

C1 - 35 to 42 inches: sandy loam

C2 - 42 to 72 inches: gravelly loamy coarse sand

# Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high

(0.14 to 14.17 in/hr)

Depth to water table: About 6 to 18 inches Frequency of flooding: OccasionalNone

Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: Moderate (about 7.7 inches)

# Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: B/D

Ecological site: F139XY008OH - Moist Floodplain

Hydric soil rating: No

# **Minor Components**

# Middlebury

Percent of map unit: 10 percent

Landform: Flood plains

Landform position (two-dimensional): Summit Landform position (three-dimensional): Talf

Down-slope shape: Concave Across-slope shape: Convex

Hydric soil rating: No

### Wayland

Percent of map unit: 5 percent

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: Yes

# LnB—Langford silt loam, 3 to 8 percent slopes

### Map Unit Setting

National map unit symbol: 2ywp7 Elevation: 330 to 2.460 feet

Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

Langford and similar soils: 85 percent *Minor components:* 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### **Description of Langford**

# Setting

Landform: Hills

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Till

# **Typical profile**

Ap - 0 to 9 inches: silt loam

Bw - 9 to 17 inches: channery silt loam E - 17 to 21 inches: channery loam Bx - 21 to 48 inches: channery silt loam C - 48 to 72 inches: channery silt loam

# **Properties and qualities**

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 15 to 28 inches to fragipan

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to

0.14 in/hr)

Depth to water table: About 14 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water capacity: Low (about 3.8 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: D Hydric soil rating: No

### **Minor Components**

# Erie

Percent of map unit: 10 percent

Landform: Hills

Landform position (two-dimensional): Summit, footslope Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

### Chautauqua

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex Across-slope shape: Convex

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

# LnC—Langford silt loam, 8 to 15 percent slopes

### **Map Unit Setting**

National map unit symbol: 2ywp8 Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 215 days

Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

Langford and similar soils: 85 percent *Minor components:* 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Langford**

# Setting

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Till

# **Typical profile**

Ap - 0 to 9 inches: silt loam

Bw - 9 to 17 inches: channery silt loam E - 17 to 21 inches: channery loam Bx - 21 to 48 inches: channery silt loam C - 48 to 72 inches: channery silt loam

# **Properties and qualities**

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 15 to 28 inches to fragipan

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to

0.14 in/hr)

Depth to water table: About 14 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm) Available water capacity: Low (about 3.8 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D Hydric soil rating: No

### **Minor Components**

# Erie

Percent of map unit: 10 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

# Chautauqua

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Backslope, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

# MdC—Mardin channery silt loam, 8 to 15 percent slopes

# **Map Unit Setting**

National map unit symbol: 2srhj Elevation: 330 to 2.460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

# **Map Unit Composition**

Mardin and similar soils: 88 percent Minor components: 12 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### **Description of Mardin**

### Setting

Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear Parent material: Loamy till

### Typical profile

Ap - 0 to 8 inches: channery silt loam BE - 8 to 12 inches: channery silt loam Bw1 - 12 to 16 inches: channery silt loam Bw2 - 16 to 20 inches: channery silt loam Bx1 - 20 to 36 inches: channery silt loam Bx2 - 36 to 57 inches: channery silt loam C - 57 to 72 inches: channery silt loam

### **Properties and qualities**

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 14 to 26 inches to fragipan

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately

low (0.00 to 0.14 in/hr)

Depth to water table: About 13 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Low (about 3.6 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D Hydric soil rating: No

# **Minor Components**

#### Bath

Percent of map unit: 5 percent Landform: Hills, mountains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

#### Volusia

Percent of map unit: 5 percent Landform: Hills, mountains

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope, interfluve, side slope

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

#### Lordstown

Percent of map unit: 2 percent Landform: Mountains, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountaintop, side slope, nose slope

Down-slope shape: Linear

Across-slope shape: Linear Hydric soil rating: No

# ShB—Schuyler silt loam, 3 to 8 percent slopes

### **Map Unit Setting**

National map unit symbol: 2wn1z Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: All areas are prime farmland

### **Map Unit Composition**

Schuyler and similar soils: 85 percent *Minor components*: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### **Description of Schuyler**

### Setting

Landform: Hills

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Till

#### Typical profile

Ap - 0 to 7 inches: silt loam Bw1 - 7 to 15 inches: silt loam

Bw2 - 15 to 38 inches: channery silty clay loam C - 38 to 72 inches: channery silty clay loam

### **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.01 to 1.42 in/hr)

Depth to water table: About 16 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 9.0 inches)

#### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C/D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

# **Minor Components**

# Mardin

Percent of map unit: 5 percent Landform: Mountains, hills

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex Across-slope shape: Convex Hydric soil rating: No

#### Fremont

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

### **Towerville**

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Crest, nose slope

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

# ShC—Schuyler silt loam, 8 to 15 percent slopes

### Map Unit Setting

National map unit symbol: 2wn20 Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

# **Map Unit Composition**

Schuyler and similar soils: 85 percent *Minor components*: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Schuyler**

# Setting

Landform: Hills

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Till

# Typical profile

Ap - 0 to 7 inches: silt loam
Bw1 - 7 to 15 inches: silt loam

Bw2 - 15 to 38 inches: channery silty clay loam C - 38 to 72 inches: channery silty clay loam

### **Properties and qualities**

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.01 to 1.42 in/hr)

Depth to water table: About 16 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm) Available water capacity: High (about 9.0 inches)

# Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C/D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

# **Minor Components**

#### Towerville

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

#### Fremont

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope, summit Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

# Mardin

Percent of map unit: 5 percent Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear

Hydric soil rating: No

# ToF—Towerville silt loam, 35 to 50 percent slopes

### Map Unit Setting

National map unit symbol: 9qn6 Elevation: 1,000 to 1,800 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Not prime farmland

# **Map Unit Composition**

Towerville and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### **Description of Towerville**

# **Setting**

Landform: Ridges, hills

Landform position (two-dimensional): Summit Landform position (three-dimensional): Side slope

Down-slope shape: Concave Across-slope shape: Convex

Parent material: Loamy till derived mainly from shale, siltstone, and smaller

amounts of sandstone

#### Typical profile

H1 - 0 to 12 inches: silt loam

H2 - 12 to 22 inches: channery silt loam
H3 - 22 to 30 inches: channery silt loam
H4 - 30 to 34 inches: unweathered bedrock

### **Properties and qualities**

Slope: 35 to 50 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately

high (0.00 to 0.20 in/hr)

Depth to water table: About 18 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Low (about 4.5 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C/D

Ecological site: F139XY007OH - Shallow Acidic Slopes

Hydric soil rating: No

### **Minor Components**

### Schuyler

Percent of map unit: 5 percent Hydric soil rating: No

### **Orpark**

Percent of map unit: 5 percent

Hydric soil rating: No

#### Hornell

Percent of map unit: 5 percent

Hydric soil rating: No

### Mardin

Percent of map unit: 5 percent

Hydric soil rating: No

#### Chadakoin

Percent of map unit: 5 percent

Hydric soil rating: No

# VaB—Valois gravelly silt loam, 3 to 8 percent slopes

# **Map Unit Setting**

National map unit symbol: 9qnf Elevation: 600 to 1,750 feet

Mean annual precipitation: 39 to 50 inches

Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: All areas are prime farmland

# **Map Unit Composition**

Valois and similar soils: 85 percent Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Valois**

### Setting

Landform: Lateral moraines, end moraines, valley sides

Landform position (two-dimensional): Summit Landform position (three-dimensional): Crest

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

### Typical profile

H1 - 0 to 6 inches: gravelly silt loam H2 - 6 to 45 inches: gravelly loam

H3 - 45 to 72 inches: very gravelly sandy loam

# **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 2 percent Available water capacity: Low (about 5.9 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

# **Minor Components**

#### Mardin

Percent of map unit: 3 percent

Hydric soil rating: No

### **Unnamed soils**

Percent of map unit: 3 percent

Hydric soil rating: No

# Chautauqua

Percent of map unit: 3 percent

Hydric soil rating: No

### Chenango

Percent of map unit: 3 percent

Hydric soil rating: No

# **Pompton**

Percent of map unit: 3 percent

Hydric soil rating: No

# VaC—Valois gravelly silt loam, 8 to 15 percent slopes

### **Map Unit Setting**

National map unit symbol: 9qng Elevation: 600 to 1,750 feet

Mean annual precipitation: 39 to 50 inches Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

Valois and similar soils: 75 percent Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

### **Description of Valois**

### Setting

Landform: Valley sides, lateral moraines, end moraines

Landform position (two-dimensional): Shoulder Landform position (three-dimensional): Crest

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

# **Typical profile**

H1 - 0 to 6 inches: gravelly silt loam H2 - 6 to 45 inches: gravelly loam

H3 - 45 to 72 inches: very gravelly sandy loam

# **Properties and qualities**

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high

(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 2 percent Available water capacity: Low (about 5.9 inches)

# Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

# **Minor Components**

#### Chenango

Percent of map unit: 5 percent

Hydric soil rating: No

# Chautauqua

Percent of map unit: 5 percent

Hydric soil rating: No

# **Unnamed soils**

Percent of map unit: 5 percent

Hydric soil rating: No

### Mardin

Percent of map unit: 5 percent

Hydric soil rating: No

### **Pompton**

Percent of map unit: 5 percent Hydric soil rating: No

# VoA—Volusia channery silt loam, 0 to 3 percent slopes

### Map Unit Setting

National map unit symbol: 2srfc Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

# **Map Unit Composition**

Volusia and similar soils: 90 percent Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Volusia**

### Setting

Landform: Hills, mountains

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope, interfluve, side slope

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Loamy till derived from interbedded sedimentary rock

### Typical profile

Ap - 0 to 9 inches: channery silt loam Bw - 9 to 15 inches: channery silt loam Eg - 15 to 17 inches: channery silt loam Bx1 - 17 to 29 inches: channery loam Bx2 - 29 to 54 inches: channery loam C - 54 to 72 inches: channery silt loam

# **Properties and qualities**

Slope: 0 to 3 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 10 to 22 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately

low (0.00 to 0.14 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent Available water capacity: Very low (about 3.0 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F140XY024NY - Moist Dense Till

Hydric soil rating: No

# **Minor Components**

# Mardin

Percent of map unit: 5 percent Landform: Hills, mountains

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex Across-slope shape: Convex Hydric soil rating: No

# Chippewa

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

# VoB-Volusia channery silt loam, 3 to 8 percent slopes

# **Map Unit Setting**

National map unit symbol: 2srfh Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

# **Map Unit Composition**

Volusia and similar soils: 90 percent *Minor components*: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Volusia**

### Setting

Landform: Mountains, hills

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope, interfluve, side slope

Down-slope shape: Concave Across-slope shape: Linear

Parent material: Loamy till derived from interbedded sedimentary rock

# **Typical profile**

Ap - 0 to 9 inches: channery silt loam Bw - 9 to 15 inches: channery silt loam Eg - 15 to 17 inches: channery silt loam Bx1 - 17 to 29 inches: channery loam Bx2 - 29 to 54 inches: channery loam C - 54 to 72 inches: channery silt loam

### **Properties and qualities**

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 10 to 22 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately

low (0.00 to 0.14 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent Available water capacity: Very low (about 3.0 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F140XY024NY - Moist Dense Till

Hydric soil rating: No

# **Minor Components**

#### Mardin

Percent of map unit: 5 percent Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

# Chippewa

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

# W—Water

# **Map Unit Setting**

National map unit symbol: 9qnq

Mean annual precipitation: 39 to 50 inches

Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 105 to 190 days

Farmland classification: Not prime farmland

# **Map Unit Composition**

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# Erie County, Pennsylvania

# MdD—Mardin silt loam, 15 to 25 percent slopes

### **Map Unit Setting**

National map unit symbol: 2rg8v Elevation: 600 to 1,800 feet

Mean annual precipitation: 37 to 49 inches Mean annual air temperature: 46 to 48 degrees F

Frost-free period: 120 to 160 days

Farmland classification: Not prime farmland

# **Map Unit Composition**

Mardin and similar soils: 83 percent Minor components: 17 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Mardin**

# **Setting**

Landform: Drumlinoid ridges, hills

Landform position (two-dimensional): Summit Landform position (three-dimensional): Crest

Down-slope shape: Concave Across-slope shape: Convex

Parent material: Loamy till derived mainly from acid sedimentary rock

### Typical profile

Ap - 0 to 10 inches: silt loam
Bw - 10 to 21 inches: silt loam
Bx - 21 to 37 inches: gravelly loam
C - 37 to 81 inches: gravelly loam

### Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 16 to 28 inches to fragipan

Drainage class: Moderately well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to

moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 15 to 28 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent Available water capacity: Very low (about 2.8 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

### **Minor Components**

# **Valois**

Percent of map unit: 12 percent

Landform: Kames, kame moraines, end moraines Landform position (two-dimensional): Summit Landform position (three-dimensional): Crest

Down-slope shape: Convex Across-slope shape: Convex

Hydric soil rating: No

### Venango

Percent of map unit: 5 percent Landform: Ground moraines

Landform position (two-dimensional): Shoulder, summit Landform position (three-dimensional): Interfluve

Down-slope shape: Linear Across-slope shape: Linear Hydric soil rating: No

# VIA—Volusia gravelly silt loam, 0 to 3 percent slopes

# **Map Unit Setting**

National map unit symbol: 2rhrr Elevation: 300 to 1,800 feet

Mean annual precipitation: 37 to 49 inches Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 120 to 185 days

Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

Volusia and similar soils: 90 percent Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Volusia**

# Setting

Landform: Ground moraines

Landform position (two-dimensional): Summit, shoulder Landform position (three-dimensional): Interfluve

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Till

#### Typical profile

Ap - 0 to 10 inches: gravelly silt loam Bw - 10 to 17 inches: channery silt loam Bx - 17 to 60 inches: channery silt loam C - 60 to 80 inches: channery silt loam

### **Properties and qualities**

Slope: 0 to 3 percent

Depth to restrictive feature: 10 to 22 inches to fragipan

Drainage class: Somewhat poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately

high (0.00 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Very low (about 2.1 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

# **Minor Components**

#### Alden

Percent of map unit: 10 percent

Landform: Depressions on ground moraines Landform position (two-dimensional): Summit Landform position (three-dimensional): Dip

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

# VIB—Volusia gravelly silt loam, 3 to 8 percent slopes

### Map Unit Setting

National map unit symbol: 2rhrs Elevation: 300 to 1,800 feet

Mean annual precipitation: 38 to 50 inches Mean annual air temperature: 44 to 52 degrees F

Frost-free period: 120 to 185 days

Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

Volusia and similar soils: 92 percent *Minor components*: 8 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

# **Description of Volusia**

# **Setting**

Landform: Ground moraines

Landform position (two-dimensional): Backslope, summit

Landform position (three-dimensional): Interfluve, base slope, head slope, side

slope

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Till

# **Typical profile**

Ap - 0 to 6 inches: gravelly silt loam Bw - 6 to 17 inches: channery silt loam Bx - 17 to 60 inches: channery silt loam

# **Properties and qualities**

Slope: 3 to 8 percent

Depth to restrictive feature: 10 to 22 inches to fragipan

Drainage class: Somewhat poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately

high (0.00 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Very low (about 2.1 inches)

### Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F139XY006OH - Moist Till Highlands

Hydric soil rating: No

# **Minor Components**

#### Alden

Percent of map unit: 8 percent

Landform: Depressions on ground moraines Landform position (two-dimensional): Summit Landform position (three-dimensional): Dip

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

# Soil Information for All Uses

# **Suitabilities and Limitations for Use**

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

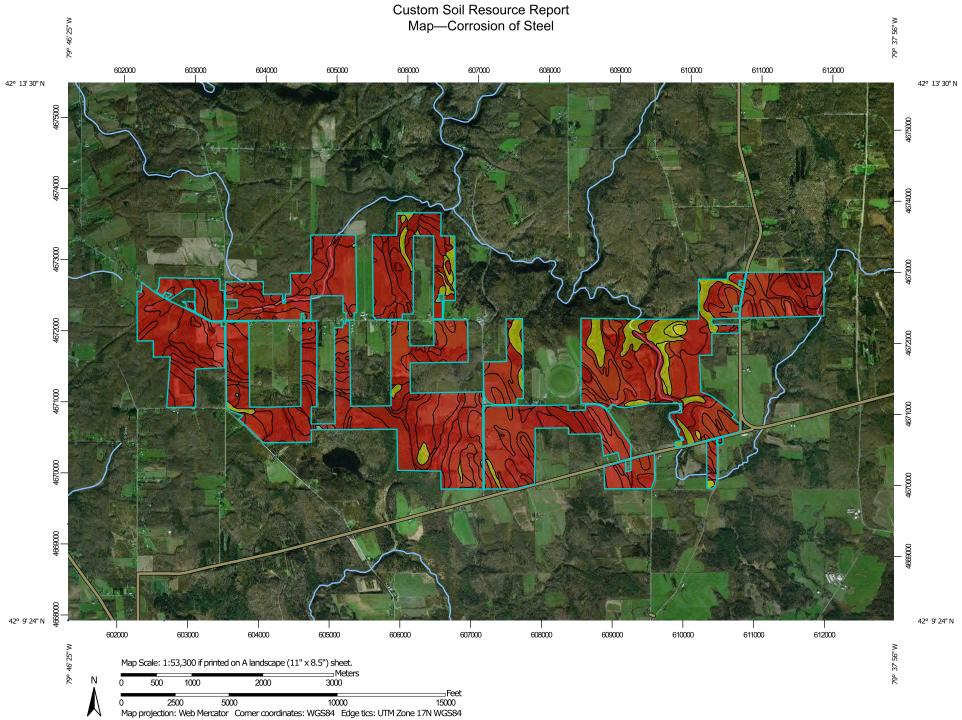
# **Building Site Development**

Building site development interpretations are designed to be used as tools for evaluating soil suitability and identifying soil limitations for various construction purposes. As part of the interpretation process, the rating applies to each soil in its described condition and does not consider present land use. Example interpretations can include corrosion of concrete and steel, shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

# Corrosion of Steel

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."



#### MAP LEGEND

#### Area of Interest (AOI) Background Area of Interest (AOI) Aerial Photography Soils Soil Rating Polygons High Moderate Low Not rated or not available Soil Rating Lines High Moderate Low Not rated or not available **Soil Rating Points** High Moderate Low Not rated or not available **Water Features** Streams and Canals Transportation Rails Interstate Highways **US Routes** Major Roads Local Roads

#### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,800.

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: Chautauqua County, New York Survey Area Data: Version 18, Jun 11, 2020

Soil Survey Area: Erie County, Pennsylvania Survey Area Data: Version 18, Jun 5, 2020

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Dec 31, 2009—May 5, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

## **MAP LEGEND**

## **MAP INFORMATION**

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## **Table—Corrosion of Steel**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ad	Alden mucky silt loam	High	75.8	2.2%
As	Ashville silt loam	High	205.7	6.1%
BsA	Busti silt loam, 0 to 3 percent slopes	High	97.3	2.9%
BsB	Busti silt loam, 3 to 8 percent slopes	High	270.2	8.0%
BsC	Busti silt loam, 8 to 15 percent slopes	High	64.3	1.9%
Cb	Canandaigua silt loam, loamy substratum	High	8.4	0.2%
Сс	Canandaigua mucky silt loam	High	72.8	2.2%
ChB	Chadakoin silt loam, 3 to 8 percent slopes	Moderate	26.8	0.8%
ChC	Chadakoin silt loam, 8 to 15 percent slopes	Moderate	35.1	1.0%
ChD	Chadakoin silt loam, 15 to 25 percent slopes	Moderate	42.9	1.3%
ChE	Chadakoin silt loam, 25 to 35 percent slopes	Moderate	115.7	3.4%
ChF	Chadakoin silt loam, 35 to 50 percent slopes	Moderate	37.2	1.1%
CkB	Chautauqua silt loam, 3 to 8 percent slopes	High	86.7	2.6%
CkC	Chautauqua silt loam, 8 to 15 percent slopes	High	201.2	5.9%
CkD	Chautauqua silt loam, 15 to 25 percent slopes	High	94.8	2.8%
CnB	Chenango gravelly loam, 3 to 8 percent slopes	Moderate	2.6	0.1%
CnC	Chenango gravelly loam, 8 to 15 percent slopes	Moderate	1.9	0.1%
СоВ	Chenango channery loam, fan, 3 to 8 percent slopes	Moderate	2.7	0.1%
DaA	Dalton silt loam, 0 to 3 percent slopes	High	12.1	0.4%
DeC	Darien silt loam, 8 to 15 percent slopes	High	28.8	0.9%
ErA	Erie silt loam, 0 to 3 percent slopes	High	122.8	3.6%
ErB	Erie silt loam, 3 to 8 percent slopes	High	759.7	22.5%
ErC	Erie silt loam, 8 to 15 percent slopes	High	15.7	0.5%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Fe	Fluvaquents-Udifluvents complex, frequently flooded	High	46.9	1.4%
FmA	Fremont silt loam, 0 to 3 percent slopes	High	0.6	0.0%
FmB	Fremont silt loam, 3 to 8 percent slopes	High	3.6	0.1%
Но	Holderton silt loam, 0 to 3 percent slopes, occasionally flooded 140	High	0.7	0.0%
LnB	Langford silt loam, 3 to 8 percent slopes	High	348.3	10.3%
LnC	Langford silt loam, 8 to 15 percent slopes	High	330.7	9.8%
MdC	Mardin channery silt loam, 8 to 15 percent slopes	am, 8 to 15 percent		0.3%
ShB	Schuyler silt loam, 3 to 8 percent slopes	High	7.1	0.2%
ShC	Schuyler silt loam, 8 to 15 percent slopes	High	4.4	0.1%
ToF	Towerville silt loam, 35 to 50 percent slopes	High	12.4	0.4%
VaB	Valois gravelly silt loam, 3 to 8 percent slopes	Moderate	1.7	0.1%
VaC	Valois gravelly silt loam, 8 to 15 percent slopes	Moderate	0.8	0.0%
VoA	Volusia channery silt loam, 0 to 3 percent slopes	High	121.8	3.6%
VoB	Volusia channery silt loam, 3 to 8 percent slopes	High	108.6	3.2%
W	Water		2.6	0.1%
Subtotals for Soil Survey Area			3,380.4	100.0%
Totals for Area of Inter	est		3,381.3	100.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MdD	Mardin silt loam, 15 to 25 percent slopes	High	0.1	0.0%
VIA	Volusia gravelly silt loam, 0 to 3 percent slopes	High	0.2	0.0%
VIB	Volusia gravelly silt loam, 3 to 8 percent slopes	High	0.7	0.0%
Subtotals for Soil Survey Area			0.9	0.0%
Totals for Area of Interest			3,381.3	100.0%

#### Rating Options—Corrosion of Steel

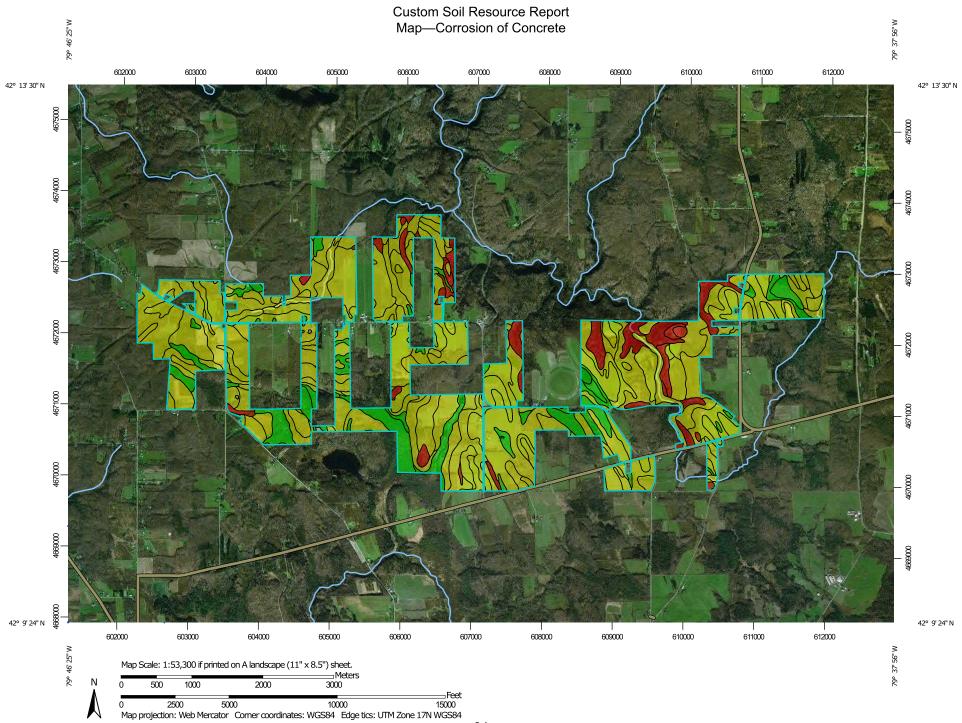
Aggregation Method: Dominant Condition
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

#### **Corrosion of Concrete**

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the concrete in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."



#### MAP LEGEND

#### Area of Interest (AOI) Background Area of Interest (AOI) Aerial Photography Soils Soil Rating Polygons High Moderate Low Not rated or not available Soil Rating Lines High Moderate Low Not rated or not available **Soil Rating Points** High Moderate Low Not rated or not available **Water Features** Streams and Canals Transportation Rails Interstate Highways **US Routes** Major Roads Local Roads

#### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,800.

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: Chautauqua County, New York Survey Area Data: Version 18, Jun 11, 2020

Soil Survey Area: Erie County, Pennsylvania Survey Area Data: Version 18, Jun 5, 2020

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Dec 31, 2009—May 5, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

## **MAP LEGEND**

#### **MAP INFORMATION**

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## **Table—Corrosion of Concrete**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ad	Alden mucky silt loam	Low	75.8	2.2%
As	Ashville silt loam	Low	205.7	6.1%
BsA	Busti silt loam, 0 to 3 percent slopes	Moderate	97.3	2.9%
BsB	Busti silt loam, 3 to 8 percent slopes	Moderate	270.2	8.0%
BsC	Busti silt loam, 8 to 15 percent slopes	Moderate	64.3	1.9%
Cb	Canandaigua silt loam, loamy substratum	Low	8.4	0.2%
Сс	Canandaigua mucky silt loam	Low	72.8	2.2%
ChB	Chadakoin silt loam, 3 to 8 percent slopes	High	26.8	0.8%
ChC	Chadakoin silt loam, 8 to 15 percent slopes	High	35.1	1.0%
ChD	Chadakoin silt loam, 15 to 25 percent slopes	High	42.9	1.3%
ChE	Chadakoin silt loam, 25 to 35 percent slopes	High	115.7	3.4%
ChF	Chadakoin silt loam, 35 to 50 percent slopes	High	37.2	1.1%
CkB	Chautauqua silt loam, 3 to 8 percent slopes	Moderate	86.7	2.6%
CkC	Chautauqua silt loam, 8 to 15 percent slopes	Moderate	201.2	5.9%
CkD	Chautauqua silt loam, 15 to 25 percent slopes	Moderate	94.8	2.8%
CnB	Chenango gravelly loam, 3 to 8 percent slopes	High	2.6	0.1%
CnC	Chenango gravelly loam, 8 to 15 percent slopes	High	1.9	0.1%
СоВ	Chenango channery loam, fan, 3 to 8 percent slopes	High	2.7	0.1%
DaA	Dalton silt loam, 0 to 3 percent slopes	Moderate	12.1	0.4%
DeC	Darien silt loam, 8 to 15 percent slopes	Low	28.8	0.9%
ErA	Erie silt loam, 0 to 3 percent slopes	Moderate	122.8	3.6%
ErB	Erie silt loam, 3 to 8 percent slopes	Moderate	759.7	22.5%
ErC	Erie silt loam, 8 to 15 percent slopes	Moderate	15.7	0.5%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Fe	Fluvaquents-Udifluvents complex, frequently flooded	Moderate	46.9	1.4%
FmA	Fremont silt loam, 0 to 3 percent slopes	Moderate	0.6	0.0%
FmB	Fremont silt loam, 3 to 8 percent slopes	Moderate	3.6	0.1%
Но	Holderton silt loam, 0 to 3 percent slopes, occasionally flooded 140	Moderate	0.7	0.0%
LnB	Langford silt loam, 3 to 8 percent slopes	Moderate	348.3	10.3%
LnC	Langford silt loam, 8 to 15 percent slopes	Moderate	330.7	9.8%
MdC	Mardin channery silt loam, 8 to 15 percent slopes	High	8.9	0.3%
ShB	Schuyler silt loam, 3 to 8 percent slopes	Moderate	7.1	0.2%
ShC	Schuyler silt loam, 8 to 15 percent slopes	Moderate	4.4	0.1%
ToF	Towerville silt loam, 35 to 50 percent slopes	Moderate	12.4	0.4%
VaB	Valois gravelly silt loam, 3 to 8 percent slopes	High	1.7	0.1%
VaC	Valois gravelly silt loam, 8 to 15 percent slopes	High	0.8	0.0%
VoA	Volusia channery silt loam, 0 to 3 percent slopes	Moderate	121.8	3.6%
VoB	Volusia channery silt loam, 3 to 8 percent slopes	Moderate	108.6	3.2%
W	Water		2.6	0.1%
Subtotals for Soil Survey Area			3,380.4	100.0%
Totals for Area of Inter	est		3,381.3	100.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MdD	Mardin silt loam, 15 to 25 percent slopes	Moderate	0.1	0.0%
VIA	Volusia gravelly silt loam, 0 to 3 percent slopes	Moderate	0.2	0.0%
VIB	Volusia gravelly silt loam, 3 to 8 percent slopes	Moderate	0.7	0.0%
Subtotals for Soil Survey Area			0.9	0.0%
Totals for Area of Interest			3,381.3	100.0%

#### Rating Options—Corrosion of Concrete

Aggregation Method: Dominant Condition
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

# **Land Management**

Land management interpretations are tools designed to guide the user in evaluating existing conditions in planning and predicting the soil response to various land management practices, for a variety of land uses, including cropland, forestland, hayland, pastureland, horticulture, and rangeland. Example interpretations include suitability for a variety of irrigation practices, log landings, haul roads and major skid trails, equipment operability, site preparation, suitability for hand and mechanical planting, potential erosion hazard associated with various practices, and ratings for fencing and waterline installation.

#### **Erosion Hazard (Off-Road, Off-Trail)**

The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope, soil erosion factor K, and an index of rainfall erosivity (R). The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

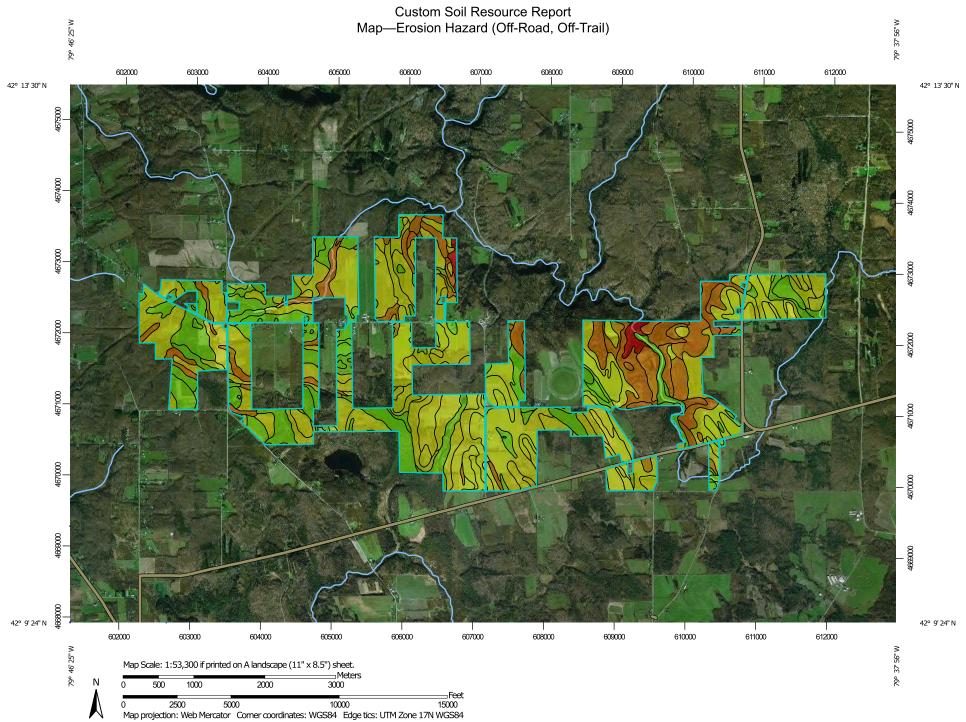
The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition

of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.



#### **MAP LEGEND**

#### **US Routes** Area of Interest (AOI) Area of Interest (AOI) Major Roads Soils Local Roads -Soil Rating Polygons Background Very severe Aerial Photography Severe Moderate Slight Not rated or not available Soil Rating Lines Very severe Severe Moderate Not rated or not available Soil Rating Points Very severe Severe Moderate Slight Not rated or not available **Water Features** Streams and Canals **Transportation** Rails Interstate Highways

#### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,800.

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: Chautauqua County, New York Survey Area Data: Version 18, Jun 11, 2020

Soil Survey Area: Erie County, Pennsylvania Survey Area Data: Version 18, Jun 5, 2020

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Dec 31, 2009—May 5, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

## **MAP LEGEND**

#### **MAP INFORMATION**

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Tables—Erosion Hazard (Off-Road, Off-Trail)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
Ad	Alden mucky silt loam	Slight	Alden (80%)		75.8	2.2%
As	Ashville silt loam	Slight	Ashville (75%)		205.7	6.1%
BsA	Busti silt loam, 0	Slight	Busti (80%)		97.3	2.9%
	to 3 percent slopes		Volusia (5%)			
			Fremont (5%)			
			Ashville (5%)			
BsB	Busti silt loam, 3 to 8 percent slopes	Moderate	Busti (80%)	Surface kw times slope times R index (0.31)	270.2	8.0%
			Fremont (5%)	Surface kw times slope times R index (0.31)		
			Volusia (5%)	Surface kw times slope times R index (0.04)		
BsC	Busti silt loam, 8 to 15 percent slopes	Severe	Busti (80%)	Surface kw times slope times R index (0.79)	64.3	1.9%
			Chautauqua (8%)	Surface kw times slope times R index (0.82)		
			Fremont (6%)	Surface kw times slope times R index (0.79)		
Cb	Canandaigua silt loam, loamy substratum	Slight	Canandaigua, loamy substratum (80%)		8.4	0.2%
Cc	Canandaigua mucky silt loam	Slight	Canandaigua (85%)		72.8	2.2%
ChB	Chadakoin silt loam, 3 to 8 percent slopes	Moderate	Chadakoin (80%)	Surface kw times slope times R index (0.31)	26.8	0.8%
ChC	Chadakoin silt loam, 8 to 15 percent slopes	Severe	Chadakoin (75%)	Surface kw times slope times R index (0.79)	35.1	1.0%
ChD	Chadakoin silt loam, 15 to 25 percent slopes	Severe	Chadakoin (80%)	Surface kw times slope times R index (0.90)	42.9	1.3%
ChE	Chadakoin silt loam, 25 to 35 percent slopes	Severe	Chadakoin (80%)	Surface kw times slope times R index (0.98)	115.7	3.4%
ChF	Chadakoin silt loam, 35 to 50 percent slopes	Very Severe	Chadakoin (75%)	Surface kw times slope times R index (1.00)	37.2	1.1%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI														
CkB	Chautauqua silt loam, 3 to 8 percent slopes	Moderate	Chautauqua (80%)	Surface kw times slope times R index (0.44)	86.7	2.6%														
			Langford (7%)	Surface kw times slope times R index (0.06)																
			Chadakoin (5%)	Surface kw times slope times R index (0.31)																
CkC	Chautauqua silt loam, 8 to 15 percent slopes	Severe	Chautauqua (80%)	Surface kw times slope times R index (0.82)	201.2	5.9%														
			Chadakoin (8%)	Surface kw times slope times R index (0.79)																
CkD	Chautauqua silt loam, 15 to 25 percent slopes	Severe	Chautauqua (80%)	Surface kw times slope times R index (0.98)	94.8	2.8%														
			Chadakoin (10%)	Surface kw times slope times R index (0.90)																
			Towerville (5%)	Surface kw times slope times R index (0.87)																
			Langford (5%)	Surface kw times slope times R index (0.87)																
CnB	Chenango gravelly loam, 3 to 8 percent slopes	Slight	Chenango (80%)		2.6	0.1%														
CnC	Chenango gravelly loam, 8 to 15 percent slopes	Moderate	Chenango (80%)	Surface kw times slope times R index (0.25)	1.9	0.1%														
СоВ	Chenango channery loam, fan, 3 to 8 percent slopes	Slight	Chenango, fan (75%)		2.7	0.1%														
DaA	Dalton silt loam, 0 to 3 percent slopes	Slight	Dalton (80%)		12.1	0.4%														
DeC	Darien silt loam, 8 to 15 percent slopes	Moderate	Darien (80%)	Surface kw times slope times R index (0.75)	28.8	0.9%														
ErA		Slight	Erie (80%)		122.8	3.6%														
	to 3 percent slopes		Busti (4%)																	
			Fremont (4%)																	
			Ashville (4%)		]															
			Darien (4%)																	

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
ErB	Erie silt loam, 3 to 8 percent slopes	Moderate	Erie (75%)	Surface kw times slope times R index (0.44)	759.7	22.5%
			Fremont (5%)	Surface kw times slope times R index (0.31)		
			Langford (5%)	Surface kw times slope times R index (0.67)		
			Busti (5%)	Surface kw times slope times R index (0.31)		
ErC	Erie silt loam, 8 to 15 percent slopes	Severe	Erie (75%)	Surface kw times slope times R index (0.82)	15.7	0.5%
			Fremont (5%)	Surface kw times slope times R index (0.79)		
			Busti (5%)	Surface kw times slope times R index (0.79)		
			Langford (5%)	Surface kw times slope times R index (0.87)		
Fe	Fluvaquents- Udifluvents	Slight	Fluvaquents (55%)		46.9	1.4%
	complex, frequently flooded		Udifluvents (30%)			
FmA	Fremont silt		Fremont (80%)		0.6	0.0%
	loam, 0 to 3 percent slopes		Ashville (8%)			
			Volusia (7%)			
FmB	Fremont silt loam, 3 to 8 percent slopes	Moderate	Fremont (80%)	Surface kw times slope times R index (0.31)	3.6	0.1%
			Volusia (5%)	Surface kw times slope times R index (0.27)		
			Orpark (5%)	Surface kw times slope times R index (0.75)		
Но	Holderton silt	Slight	Holderton (85%)		0.7	0.0%
	loam, 0 to 3 percent slopes, occasionally flooded 140		Middlebury (10%)			
			Wayland (5%)			
LnB	Langford silt loam, 3 to 8 percent slopes	Moderate	Langford (85%)	Surface kw times slope times R index (0.06)	348.3	10.3%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI	
			Chautauqua (5%)	Surface kw times slope times R index (0.44)			
LnC	Langford silt loam, 8 to 15 percent slopes	Moderate	Langford (85%)	Surface kw times slope times R index (0.67)	330.7	9.8%	
			Erie (10%)	Surface kw times slope times R index (0.44)			
MdC	Mardin channery silt loam, 8 to 15 percent	Moderate	Mardin (88%)	Surface kw times slope times R index (0.52)	8.9	0.3%	
	slopes		Volusia (5%)	Surface kw times slope times R index (0.04)			
ShB	Schuyler silt loam, 3 to 8 percent slopes	Moderate	Schuyler (85%)	Surface kw times slope times R index (0.31)	7.1	0.2%	
			Towerville (5%)	Surface kw times slope times R index (0.75)			
ShC	Schuyler silt loam, 8 to 15 percent slopes	Severe	Schuyler (85%)	Surface kw times slope times R index (0.79)	4.4	0.1%	
			Towerville (5%)	Surface kw times slope times R index (0.87)			
ToF	Towerville silt loam, 35 to 50 percent slopes	Severe	Towerville (75%)	Surface kw times slope times R index (0.99)	12.4	0.4%	
VaB	Valois gravelly silt loam, 3 to 8 percent slopes	Moderate	Valois (85%)	Surface kw times slope times R index (0.06)	1.7	0.1%	
VaC	Valois gravelly silt loam, 8 to 15 percent slopes	Moderate	Valois (75%)	Surface kw times slope times R index (0.67)	0.8	0.0%	
VoA	Volusia channery	Slight	Volusia (90%)		121.8	3.6%	
	silt loam, 0 to 3 percent slopes		Mardin (5%)				
			Chippewa (5%)				
VoB	Volusia channery silt loam, 3 to 8 percent slopes	Moderate	Volusia (90%)	Surface kw times slope times R index (0.04)	108.6	3.2%	
			Mardin (5%)	Surface kw times slope times R index (0.52)			
W	Water	Not rated	Water (100%)		2.6	0.1%	
Subtotals for Se	oil Survey Area				3,380.4	100.0%	
Totals for Area	of Interest				3,381.3	100.0%	

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI		
MdD	Mardin silt loam, 15 to 25 percent slopes	Severe	Mardin (83%)	Surface kw times slope times R index (0.93)	0.1	0.0%		
			Valois (12%)	Surface kw times slope times R index (0.93)				
			Venango (5%)	Surface kw times slope times R index (0.78)				
VIA	Volusia gravelly	, , ,	Slight	Volusia (90%)		0.2	0.0%	
	silt loam, 0 to 3 percent slopes		Alden (10%)					
VIB	Volusia gravelly	Slight	Volusia (92%)		0.7	0.0%		
	silt loam, 3 to 8 percent slopes		Alden (8%)					
Subtotals for Se	oil Survey Area				0.9	0.0%		
Totals for Area of Interest					3,381.3	100.0%		

Rating	Acres in AOI	Percent of AOI
Moderate	1,983.9	58.7%
Slight	771.0	22.8%
Severe	586.6	17.3%
Very Severe	37.2	1.1%
Null or Not Rated	2.6	0.1%
Totals for Area of Interest	3,381.3	100.0%

# Rating Options—Erosion Hazard (Off-Road, Off-Trail)

Aggregation Method: Dominant Condition
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

# References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2 053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2 053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2 053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2\_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE\_DOCUMENTS/nrcs142p2\_052290.pdf

# **C. Soil Boring Logs**

MAC	T DONAL	M	М					SOI	L BORING L	0	G							BORING NO.: <b>B-01</b> Page <b>1</b> of <b>1</b>
Project		South Ri	pley Solar								Project No.:			_		002 Paul	67-001 :	r ago i oi i
Client:		Connect									Project Mgr: Field Eng. St	aff:					elgar	
Drilling	g Co.: Helper:		mensions. /Harold K								Date/Time St Date/Time Fi						2020 at 2 2020 at 3	
	n: Grade		ical Datum			Borin	g Location	: See Boring	Location Plan		Date/Time Ti			_	_			° <b>Long:</b> -79.755868°
Item Type		Casing HSA	Samp SS		re Barrel NQ	Ria N	lake & Mod	lel: Diedrich	D-50	-1	Hammer Typ				al D Flu		n: NAD 1	
Length Inside Di	ia (in )	5 ft 4.25	2 ft 1.37		- in	☐ Tru	uck 🗆	Tripod Geoprobe	☐ Cat-Head  ✓ Winch		☐ Safety ☑ Doughnut		Ве		nite			Casing Advance
Hammer	Wt. (lb.)	140	140	)	-	<b>☑</b> Tra	ack 🗆	Air Track	☐ Roller Bit		☐ Automatic		W	ate				Hollow Stem Auger
Hammer		30	30		<u>- l</u>	☐ Sk			✓ Cutting Head	!	<u> </u>	<u> Y</u>		one eld	Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		.	C	(Density/co onstituents,	ual Identification & Donaistency, color, Group particle size, structure, ons, geologic interpreta	p Na , ma	ame, oisture,	•	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1	20	2	<u> </u>	CL	0.4	Top 5" - TO		Y, little fine Sand, little Silt	dn	, (CL)		-	- М	- L	- Н	PP = 1.0	tef
	0.0'- 2.0' 0.4'-'		5				Wedium sui	ii, biowii CLA	r, inde line Sand, inde Sin	, ury	/ (OL)		-	IVI	_	''	TV = N/A	(5)
_		0.1						01.41/									DD 05	
	S-2 2.0'- 4.0'	24	6 8 7		CL		moist (CL)	rown CLAY, S	ome coarse to fine Sand,	trac	ce fine Gravei,			М	L	М	PP = 2.5 TV = 0.5	
-	S-3	24	10		CL		Verv stiff, b	rown CLAY. s	ome Sand, trace fine Gra	vel.	trace Silt. moist			м	L	L	PP = 4.0	tsf
-5	4.0'- 6.0'		8 9 10				(CL)										TV = 1.0	esf
	S-4	24	5 10		CL		Very stiff, b Sand, mois		ome coarse to fine Grave	l, so	ome coarse to find	e	-	М	L	Н	PP = 2.0 TV = N/A	tsf
-	6.0'- 8.0'		13 27															
	S-5 8.0'- 10.0'	5	50/5"		CL		Hard, brown Sand, dry (	n CLAY, some CL)	e coarse to fine Gravel, so	me	coarse to fine		-	М	L	Н	PP = 3.5 TV = N/A	tsf
<del></del> 10						40.5												
				///	1	10.5	Auger refus	sal at 10.5 feet k at 10.5 feet l Coring Log.										
-																		
•																		
— 15																		
-																		
		Water Le	vel Data			-	Sample	e Type	Notes:									
Date	Time	Elapsed Time	Dep Bot. of		Water	0	Open En	d Rod	No groundwater e	enco	ountered during	g subs	urfa	ace	inve	estig	ation.	
		(hr)	Casing	of Hole	* valer	Ū		oed Sample										
						SS G	Split Spo Grab Sar	on Sample mple										
=						┪												o.: <b>B-01</b>
Field Te	st Legend		tancy: ghness:				R - Rapid n H - High	า	Dry Strength: N - N	lone	n-Plastic L - I e L - Low M	- Med	ium	ı H	1 - H	ligh		ry High
							etrometer rea	ading. 2.) "p	pa" denotes soil sample a pler size. 4.) Soil identif								ual method	s per ASTM D2488.

MOT		<b>41</b> D	М	М					CORE BORING LO	DG							ВС	ORING NO.: <b>B-01</b>
MACI	5555000	10-12-00/09		STATE OF THE PARTY.									= 100		201		P	age 1 of 1
Project Location			South F South F							Project No.: Project Mgr:			<u>5100</u> ic Pa		001			
Client:	,ı		Connec		NI.	-	-		·	Field Eng. St	aff:		ego N		ar			
Drilling	Co.:	_			ons, Inc	<u>).</u>				Date/Time St			-	-		2:45	om	
Driller/				. /Harol	ld Kleev					Date/Time Fi	nished:	<u>Ju</u>	ly 20	202	0 at 3	3:30	om	
Elevation	<b>1:</b> Gra	ide ft.	Casi	ng		al Datu Barrel		ore Bit	Boring Location: See Boring Location Pla	n		Co	ord.:	La	<b>t</b> : 42	.1997	'05°	Long: -79.755868
Type			HS 5 f	A		NQ 5 ft	Imp	Diamono 6 in	Horizontal Datum: NAD 1983  Rig Make & Model: Diedrich D-50			Dr	illing	Meth	nod: \	Vireli	ne	
Length Inside Di	a. (in.)		4.2			.875	1	1.875	Rig Wake & Wodel. Diedrich D-50									
Donth/	Avg		Dun/	Doo	RQD				Visual Identification, Description and (Rock type, colour, texture, weath	d Remarks			D:-	4!				
Depth/ Elev.	Nate	Depth (ft)	I(POY)	Rec (in. /	(in /	Rock	c Core	Stratum Graphic	field strength, discontinuity spac	ing,	Depth (ft.)		DIS	conti	nuitie	es 		Remarks
(ft)	(min /ft)	()	No.	%)	%)	Hord	Weath		optional additional geological observ SEE TEST BORING LOG FOR OVERBURDI	<u> </u>	(11.)	(See				ion Syste Aper		
		10.5				Halu.	vveaui		SHALE, gray, fine grained, moderately weat	hered.		туре	ыр	Ngii	vvea	Apei		Augered to 10.5
-	2.29							=	weak, very close to moderately spaced disco	ontinuities								feet BGS and began coring.
									0,		11.50	J	20	P,R	DG		ML	Soft Silt inclusions
-	1.25										11.90	J	30	P,R	DG		ML	throughout core run.
-	1.39		R-1	44 73%	15 24%	R2	М											
											13.20	J	20	P,R	DS		Fe	
-	2.11																	
15	1.20							==										
		15.5				├	—		15.5									
-									End of Boring at 15.5 feet BGS. Borehole backfilled with soil cuttings.									
-																		
_																		
_																		
20																		
_																		
_																		
25																		
23																		
						1												
						1												
						1												
						1												
						1												
						1												
						1												
30																		
55																		
			Vater L lapsed		ata Depth i	in feet	to:	Note	S:	·								
Date	Tim		Time	Bot.	of Bo	ottom	Water											
		$\pm$	(hr) -	odSI	ing of	noie		₫										
		$\dashv$		1	+	$\dashv$		1										
						$\dashv$		-						Во	ring l	No.:	3-0′	1

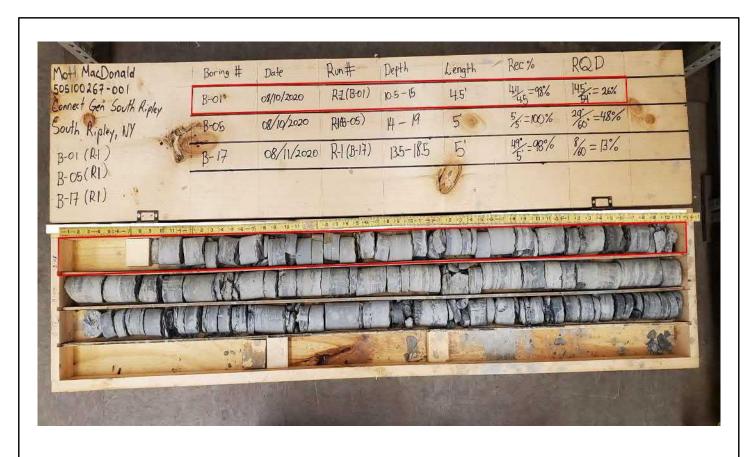


Figure B-01.1 B-01 Box 1 R1 Dry

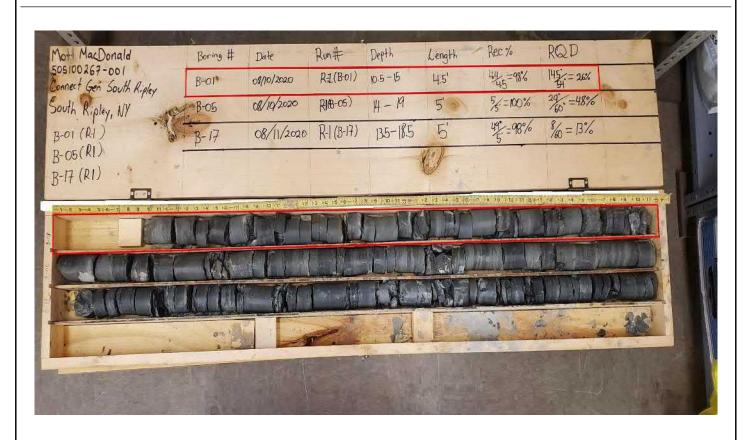


Figure B-01.2 B-01 Box 1 R1 Wet

MOTT M M

South Ripley Solar
Rock Core Photographs

**BORING NO.:** 

B-01

MAC	T DONAL	M	м				SOIL	BORING LO	G						BORING NO.: <b>B-02</b> Page <b>1</b> of <b>1</b>
Project			pley Solar	r					Project No.:		_			67-001 :	l age For F
Location Client:	)II.	South Ri Connect	-						Project Mgr: Field Eng. Staff:	:	_		Paul o Me	ı elgar	
Drilling			mensions	•					Date/Time Start					2020 at 7	
	Helper: 1: Grade t		/Harold Kical Datun			Borin	ng Location: See Boring I		Date/Time Finis		_			2020 at 8 2.198136°	Long: -79.751372°
Item Type		Casing HSA	Samp		re Barrel		Make & Model: Diedrich D		Hammer Type		zoni			n: NAD 1	
Length		5 ft	2 ft	t	-	☐ Tr	uck   Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite		Dilling	Casing Advance
Inside Di Hammer	Wt. (lb.)	4.25 140	1.37 140	)	-	☐ AT		Winch ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P	ate	r			Hollow Stem Auger
Hammer		30	30		<del>-  </del>	□ Sk		✓ Cutting Head		<b>V</b> N F	one ield		sts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic	USCS Group Symbo	.	(Density/con constituents, p	al Identification & Desc sistency, color, Group N article size, structure, m ns, geologic interpretation	lame, oisture,	Dilatancy	ıς	Plasticity	Dry Strength		Remarks
	S-1 0.0'- 2.0'	21	2 5 3	<u> </u>	CL	0.6	Top 7" - TOPSOIL Stiff, brown CLAY, some file	ne Sand, little fine Gravel, lit	ttle Silt, dry (CL)		- М	- L	- М	PP = 2.0 TV = 2.0	
_	0.6'-' S-2	22	10		CL		Vancatiff light hypers CLAN	Y, little coarse to fine Sand,	little fine Crevel		М		VН	PP > 4.5	
-	2.0'- 4.0'	22	11 15 38				dry (CL)	r, illue coalse to line Sand,	illue line Gravel,		IVI	_	VH	TV = 1.5	
- 5	S-3 4.0'- 6.0'	23	10 10 13 18		CL		Very stiff, light brown CLAY fine Gravel, dry (CL)	Y, little coarse to fine Sand,	little Silt, trace	N	М	L	VH	PP = 4.5 TV = 2.5	
-	S-4 6.0'- 8.0'	9	13 50/5"		CL		Hard, light brown CLAY, so Silt, dry (CL)	ome coarse to fine Gravel, li	ittle Sand, little	N	М	L	VH		
-	S-5	5	50/5"		CL	8.5	Hard, light brown CLAY, so	ome fine Gravel, little Sand,	trace Silt, dry	N	М	L	VН	PP > 4.5 TV = 1.5	
-	8.0'- 8.5'						Auger refusal at 8.5 feet B End of Boring at 8.5 feet B Borehole backfilled with so	GS.						Weathere	ed Shale fragments observed 8.5 feet BGS.
— 10 - -															
- 15															
-															
		Water Le	vel Data			_	Sample Type	Notes:					Ш		
Date	Time	Elapsed Time (hr)		Bottom of Hole	Water	- О Т	Open End Rod Thin-Wall Tube	No groundwater ence	ountered during su	ubsurf	ace	inv	estig	ation.	
		. ,				U	Undisturbed Sample								
						–SS G	Split Spoon Sample Grab Sample								
						╧	•		DI						o.: <b>B-02</b>
Field Te	st Legeno		tancy: ghness:						on-Plastic L - Low le L - Low M - N						ry High
							etrometer reading. 2.) "pp on within limitations of sampl	a" denotes soil sample aver er size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MACI	T DONAL	M	М				SOIL	BORING LO	G						BORING NO.: <b>B-03</b> Page <b>1</b> of <b>1</b>
Project Location Client:	on:	South Ri	pley Solar pley, NY Gen mensions						Project No.: Project Mgr: Field Eng. Staff: Date/Time Start		E	ric Dieg	Paul o Me	67-001 li elgar 2020 at 8	
Driller/	Helper:		/Harold K						Date/Time Finis			luly	21, 2	2020 at 9	05 am
Item	1: Grade f	t. Verti	ical Datun Samp		re Barrel	Borin	g Location: See Boring L	Location Plan						2.196256° <b>n:</b> NAD 1	<b>Long:</b> -79.750305° 983
Type Length		HSA 5 ft	SS 2 ft	;	-	Rig N	lake & Model: Diedrich Duck	D-50 ☐ Cat-Head	Hammer Type  Safety		lling	j Flι	ıid	Drill Ro	
Inside Di		4.25	1.37	'5	-	□ AT	V ☐ Geoprobe	<b>✓</b> Winch	✓ Doughnut	□ P	olyn	ner			Hollow Stem Auger
Hammer Hammer		140 30	140 30		-	✓ Tra		☐ Roller Bit  Cutting Head	☐ Automatic	□ W ▼ N					nenen etem / tage.
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		.	(Density/conscipulation)	al Identification & Desc sistency, color, Group N article size, structure, m ns, geologic interpretation	lame, oisture.	Dilatancy 1	ield ssaudino1	Hasticity Fes	Dry Strength St		Remarks
_	S-1 0.0'- 2.0'	16	1 2 29 40	<u>\\</u>	GC	0.6	Top 7" - TOPSOIL  Dense, grayish brown fine Silt, dry (GC)	GRAVEL, some Clay, some	e fine Sand, little	-	-	-	-	Mudstone observed	and Shale fragments from 0 to 2 feet BGS.
-	S-2 2.0'- 4.0'	19	14 9 13 27		CL	2.0	Very stiff, light brown CLAY fine Gravel, trace Silt, dry (	Y, some coarse to fine Sand CL)	i, little coarse to	s	М	L	VН	PP > 4.5 TV = 2.5	tsf tsf
5	S-3 4.0'- 6.0'	24	19 21 29 31		CL		Hard, light brown CLAY, so trace Silt, dry (CL)	ome fine Gravel, some coars	se to fine Sand,	s	М	L	н	PP = 4.5 TV = 1.0	
-	S-4 6.0'- 8.0'	24	13 24 25 49		CL		Hard, light brown CLAY, so Sand, trace Silt, dry (CL)	ome coarse to fine Gravel, li	ittle coarse to fine	N	М	L	М	PP = 4.5 TV = N/A	tsf
- 10	S-5 8.0'- 10.0'	8	14 50/5"		CL	10.0	trace Silt, dry (CL)	ome fine Gravel, little coarse	e to fine Sand,	N	М	L	L	PP = 3.5 TV = 1.0	
-							Auger refusal at 10 feet BC End of Boring at 10 feet BC Borehole backfilled with so	GS.							
- 15															
													$\bigsqcup$		
Date	Time	Water Le Elapsed Time (hr)		Bottom of Hole	Water		Sample Type Open End Rod Thin-Wall Tube	Notes: No groundwater enco	ountered during su	ubsurf	ace	inv	estig	ation.	
						U SS	Undisturbed Sample Split Spoon Sample								
						G	Grab Sample							Borina N	o. <b>₽ 0</b> 2
	st Legend	Tou	tancy: ghness:	L - Lo	ow M - N	/lediur	n H - High 🛛 🖺	Ory Strength: N - Non	on-Plastic L - Low le L - Low M - N	1ediun	n F	l - F	n H ligh	I - High	o.: <b>B-03</b> ry High
							etrometer reading. 2.) "ppartition within limitations of sample	a" denotes soil sample aver ler size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	D M	м				S	OIL	BORING LO	G						BORING NO.: <b>B-04</b> Page <b>1</b> of <b>1</b>
Project Location Client:	on:	South Ri	ipley Solar ipley, NY Gen mensions							Project No.: Project Mgr: Field Eng. Staf Date/Time Star			Eric Dieg	Paul o Me	67-001 i elgar 2020 at 9	
-	Helper:		/Harold K							Date/Time Star					2020 at 1	
Elevation	n: Grade	ft. Vert	ical Datun		re Barrel	Borir	ng Location: See Be	oring L	_ocation Plan						2.192140° <b>n:</b> NAD 1	Long: -79.751582°
Туре		HSA	SS		re Barrei		Make & Model: Died			Hammer Type	Dr	illing	j Flu	iid	Drill Ro	d Size:
Length Inside Di	ia. (in.)	5 ft 4.25	2 ft		-	☐ Tr			☐ Cat-Head  ✓ Winch	☐ Safety  ✓ Doughnut	□ B					Casing Advance
Hammer Hammer	Wt. (lb.)	140 30	140	)	-	✓ Tr	ack 🗆 Air Tra		☐ Roller Bit  Cutting Head	☐ Automatic	□ V	/ate	r			Hollow Stem Auger
панние		30	] 30		<u> </u>	<u> </u>			•	<u> </u>			Tes	ts	<u>l</u>	
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratun Graphi	Symbo	)	(Densit constitue	ty/cons	al Identification & Desc sistency, color, Group N article size, structure, m ns, geologic interpretation	lame, loisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1 0.0'- 2.0'	22	1 2	<u> </u>	// CL	0.6	Top 7" - TOPSOIL Stiff, gravish brown	CLAY.	little fine Sand, moist (CL)		-	-	- L	-	PP = 3.5	tsf
-	0.6'-'		6 7				, 3	,	, (- )						TV = 2.0	
-	S-2 2.0'- 4.0'	24	10 10 9 9		CL		Very stiff, dark brow fine Gravel, trace Sil		own CLAY, some coarse to it (CL)	fine Sand, trace	-	М	L	-	PP = 3.5 TV = 0.5	tsf tsf
- 5	S-3 4.0'- 6.0'	24	3 3 6 8		CL		Stiff, brown CLAY, li moist (CL)	ttle coa	arse to fine Sand, trace fine	e Gravel, trace Silt,	-	М	L	-	PP = 2.0 TV = 1.0	
-	S-4 6.0'- 8.0'	22	5 6 13 15		CL		Very stiff, brown to li fine Gravel, moist (C		own CLAY, some coarse to	fine Sand, little	-	М	L	-	PP = 4.0 TV = 1.5	
-	S-5 8.0'- 10.0'	20	7 14 17 24		CL		Hard, brown to light Sand, moist (CL)	gray C	LAY, some coarse to fine G	Gravel, little fine	-	М	L	-	PP = 2.5 TV = 0.5	
— 10 — — — — — — — — — — — — — — — — — — —	S-6 13.0'- 15.0'	17	5 5 7 9		CL		Stiff, brown to gray (trace Silt, moist (CL)		some coarse to fine Sand, I	little fine Gravel,	-	М	L	-	PP = 2.0 TV = 1.0 Wet Sand 15 feet Bt	sf I pocket observed from 13 to
-	S-7 18.0'- 20.0'	24	7 10 11 16		CL	20.0	Silt, moist (CL)  End of Boring at 20	feet BC	fine Gravel, little coarse to to the Gravel, little coarse to the Gravel in Gravel in Cuttings.	fine Sand, trace	-	М	L	-	Wet Sand 20 feet Bo	I pocket observed from 18 to GS.
		Water Le	_	oth in fe	et to:	Ę	Sample Type		Notes:	acceptance of the contra	uberr		im	t	ation	
Date	Time	Elapsed Time	Bot. of	Botton	n <sub>Water</sub>		Open End Rod		No groundwater enc	ountered during s	ubsur	ace	inve	estig	ation.	
7/21/20	10:33	(hr) -	Casing 13.0	of Hole 15.0	e vvater	ַ ד ט	Thin-Wall Tube Undisturbed San	nnle								
112 1120	10.33	_	13.0	13.0	13	_  ss		•								
						G	Grab Sample								_	<b>-</b> • •
	st Legeno	Tou	tancy: ghness:	L - L	ow M - N	∕lediuı	R - Rapid m H - High		Ory Strength: N - Non	on-Plastic L - Lov ne L - Low M - I	∕lediur	n F	l - F	n H ligh	I - High	o.: <b>B-04</b> ry High
							etrometer reading. on within limitations of		a" denotes soil sample aver er size. 4.) Soil identificat	rage axial pocket pe tions and field tests					ual method	s per ASTM D2488.

MAC	T DONAL	М	м				SOII	L BORING LO	G						BORING NO.: <b>B-05</b> Page <b>1</b> of <b>1</b>
Project Location Client:	on:	South Ri							Project No.: Project Mgr: Field Eng. Staff			ric Dieg	Paul o Me	elgar	
Drilling Driller/	Helper:		mensions /Harold K						Date/Time Start Date/Time Finis		_			2020 at 1 2020 at 1	
	n: Grade		ical Datun			Boring	g Location: See Boring	Location Plan							Long: -79.747878°
Item Type		Casing HSA	Samp SS		re Barrel NQ	Rig M	lake & Model: Diedrich	D-50	Hammer Type			ial D i Flu		n: NAD 1 Drill Ro	
Length Inside Di	ia (in )	5 ft 4.25	2 ft			☐ Tru		☐ Cat-Head  ✓ Winch	☐ Safety  ☑ Doughnut	□ B □ P					Casing Advance
Hammer	Wt. (lb.)	140	140	)	-	<b>✓</b> Tra	ack	☐ Roller Bit	☐ Automatic	□ w	ate	r			Hollow Stem Auger
Hammer		30	30		<u>-                                    </u>	□ Ski		☑ Cutting Head	<u>                                     </u>	▼ N   F		Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic			(Density/cor constituents, p	nal Identification & Description Description   Description	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	17	1 2 5 7	31 1/2 31	CL	$\overline{}$	Top 4" - TOPSOIL Medium stiff, brown CLAY	, some Silt, some fine Sand	, moist (CL)	-	- M	L	Ĺ	PP = 1.5 TV = 0.5	
-	S-2 2.0'- 4.0'	24	6 7 8 8		CL		Very stiff, dark brown to be fine Gravel, trace Silt, moi	rown CLAY, some coarse to st (CL)	fine Sand, little	-	М	L	-	PP = 4.0 TV = 1.5	tsf tsf
<del>-</del> 5	S-3 4.0'- 6.0'	22	4 5 4 6		CL		Stiff, dark brown CLAY, so	ome fine Sand, little fine Gra	vel, moist (CL)	-	М	L	-	PP = 2.5 TV = 0.25	
-	S-4 6.0'- 8.0'	14	7 43 50/6"		CL		Hard, light brown CLAY, s Sand, dry (CL)	some Silt, some coarse to fin	e Gravel, little	-	М	L	-		
-	S-5 8.0'- 8.8'	8	31 50/3"		CL		Hard, brown CLAY, some	fine Sand, little fine Gravel,	dry (CL)	-	М	L	L		
— 10 - -															
	S-6	2	50/3"		CL		Hard, gray CLAY, some S	ilt, some coarse to fine Grav	rel, wet (CL)	N	М	L	N		to B-05 on 8/10/2020 and hit usal at 14 feet BGS.
-	13.0'- 14.0'				1	14.0	Auger refusal at 14 feet B	GS		┦.	L	_		Regan co	ring at 14 feet BGS.
— 15 - -	14.0'-'						Top of Rock at 14 feet BG See Rock Coring Log.							J	
-		Water Le	evel Data				Sample Type	Notes:							
Date	Time	Elapsed Time (hr)		Bottom of Hole	Water	U SS	Open End Rod Thin-Wall Tube Undisturbed Sample Split Spoon Sample	PP = Pocket Penetro TV = Torvane No groundwater enc		ubsurf	ace	inve	estig	ation.	
						G	Grab Sample							Boring N	o.: <b>B-05</b>
	st Legeno	Tou	tancy: ghness:	L - Lo	ow M - N	1edium	n H - High		on-Plastic L - Low le L - Low M - N	1ediur	n F	1 - H	n H ligh	l - High	
							n within limitations of samp		tions and field tests b					ual method	s per ASTM D2488.

MAC		ALC	М	М					CORE BORING L	.OG								DRING NO.: <b>B-05</b>
Project	:		South	Ripley	Solar					Project No.:		_ 50	5100	)267-	001		P	age 1 of 1
Location		_		Ripley	NY					Project Mgr:			ic Pa					
Client: Drilling		_		ctGen Dimen	eione I	nc				Field Eng. St Date/Time St				Melga 202	ar 20 at 1	10.50		
Driller/				3. /Har						Date/Time Fi			-		0 at 1			
Elevation Item	n: Gra	ade ft		sing		tical Date		Core Bit	Boring Location: See Boring Location F	Plan		Co	ord.:	: La	t: 42.	1935	93° L	<b>_ong: -</b> 79.747878°
Туре			Н	SA		NQ		p. Diamono				Dr	illing	Meth	hod: \	Wirel	ine	
Length Inside Di	a. (in.)			ft 25		5 ft 1.875		6 in 1.875	Rig Make & Model: Diedrich D-50									
Depth/ Elev.	Avg Core Rate	Dept	Run/ (Box	Rec			k Core	Stratum	Visual Identification, Description a (Rock type, colour, texture, wea field strength, discontinuity sp	therina.	Depth		Dis	conti	inuitie	es		Remarks
(ft)	(min /ft)	(ft)	No.	(%)	`%)		Weath	Graphic	optional additional geological obs SEE TEST BORING LOG FOR OVERBUF	ervations)	(ft.)				Descripti			
	,	14.0	<del>                                     </del>			паги	vveau	<u> </u>	SHALE, gray, very fine to fine grained, mo	oderately		туре	Dip	Rgn	vvea	Aper	1111111	
	3.00								weathered, weak, very close to moderate discontinuities	y spaced								
<del></del> 15											15.00	J	10	P,R	DG	CA	CL	
	1.45																	
-	0.00	1		60	29		١											
	2.30		R-1	100%		, R2	M				16.40	J	20	P,R	DG	CA	ML	
-	2.30																	
	2.30							E			17.70	J	30	P,R	DG	MW	ML	
	3.00																	
_	3.00	19.0							19.0									
									End of Boring at 19 feet BGS. Borehole backfilled with soil cuttings.									
20																		
-																		
-																		
-																		
-																		
25																		
-																		
-																		
-																		
-																		
20																		
<del></del> 30																		
_																		
_																		
		Ц,	Water	Level	Data			Note	e'						Ш		Ш	
_			Elapse	d	Dept	h in feet	to:	NOTE	٥.									
Date	Tim	ie	Time (hr)	Bo	t. of   I sing   c	Bottom of Hole	Wate	r										
		1	-			-		7										
		$\rightrightarrows$			$\Rightarrow$			$\exists$										
		$\dashv$		+				-[						Во	ring I	No.:	B-05	5

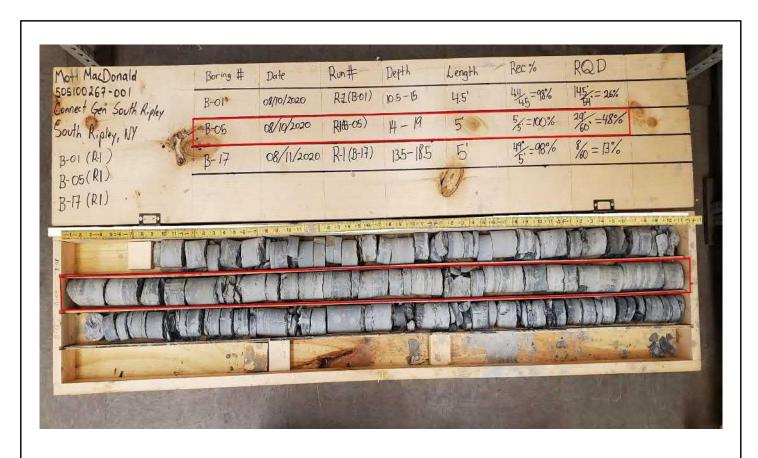


Figure B-05.1 B-05 Box 1 R1 Dry

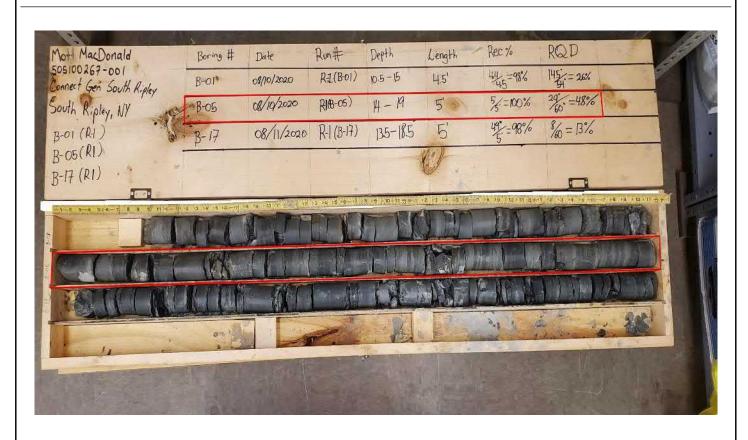


Figure B-05.2 B-05 Box 1 R1 Wet

MOTT M M

South Ripley Solar
Rock Core Photographs

**BORING NO.:** 

B-05

	Part														
Project	: .	South R	ipley Solar	r					Project No.:		_5	051	0026	67-001	- ago i oi i
	on:														
	· Co ·			Inc					_		_				30 nm
-															-
						Borin	g Location: Offset 40 fe	et West.		Coo	_	_			
Item						Dia M	lake & Model: Diadrich I	D 50	Hammer Type						
Length		5 ft	2 ft	i		☐ Tru	uck	☐ Cat-Head	☐ Safety	□в	ento	nite	ıu	Dillino	
															Hollow Stem Auger
										<b>▼</b> N	one				
Depth/ Elev. (ft)	No. / Interval		Blows	Graphic	Group Symbo	.	(Density/con constituents, p	nsistency, color, Group Noarticle size, structure, m	lame, oisture,		_		Strength		Remarks
	S-1	14		71 1/1	4	0.6	Top 7" - TOPSOIL			-	_	-	-		
	0.0'- 2.0'			777	CL	0.0	Medium stiff, dark brown C	CLAY, trace Silt, moist (CL)		╡-	М	L	-		
	0.6'-'				1									TV = 0.25	tsr
-		24	5 4		CL			coarse to fine Sand, little fine	e Gravel, moist	N	М	L	-		
- 5		13	4 6 14		CL		Very stiff, dark brown to gr coarse to fine Sand, trace	ray CLAY, some coarse to fit Silt, moist (CL)	ne Gravel, little	N	М	L	-		isf
- - <u>▽</u>		24	5 8 11		CL			own CLAY, little Sand, trace f	fine Gravel, moist	N	М	L	-		
- 10		24	8 11		CL			ome coarse to fine Sand, sor	ne fine Gravel,	N	М	L	-	TV = 3.0 f Bottom of	sf
-						11.5									
- 15 	S-6 13.0'- 15.0'	14	12 16 19 21		SM		coarse to fine Gravel, wet	rown SAND, some Silt, som (SM)	e Clay, some	-	-		-		
-	S-7 18.0'- 19.1'	14	45 46 50/1"		CL	19.1		Silt, some coarse to fine Gra	avel, trace fine	-    -	М	L	-		
							Borehole backfilled with so	oil cuttings.							
			vel Data	th in fo	at to:	1	Sample Type	Notes:						_	
Date	Time	Elapsed Time	Bot. of	th in fe		0	Open End Rod	PP = Pocket Penetro TV = Torvane	ometer						
		(hr)	Casing	of Hole	vvater	٦ ·	Thin-Wall Tube								
7/21/20	15:30	0:00		19.1	7	U	Undisturbed Sample								
						SS G	Split Spoon Sample Grab Sample								
					+	⊣՝՝	Orab Sarripie							Boring N	o.: <b>B-06</b>
	st Legend	Tou	tancy: ghness:	L - Lo	ow M - N	/lediun	n H - High I	Dry Strength: N - Non	on-Plastic L - Low le L - Low M - N	lediun	n H	l - H	ligh		ry High
							etrometer reading. 2.) "pp in within limitations of samp	oa" denotes soil sample aver der size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MOT	r DONAL	M	м				SOII	L BORING LO	G						BORING NO.: <b>B-07</b> Page 1 of 1
Project	: .	South R	ipley Solar	r				_	Project No.:		_5	051	0026	67-001	1 490 1 01 1
Locatio	on:		ipley, NY						Project Mgr:				Paul		
Client: Drilling	ı Co	Connect	Gen mensions.	Inc					Field Eng. Staff Date/Time Start					elgar 2020 at 9	·10 am
-	Helper:		/Harold K						Date/Time Finis					2020 at 1	·
	1: Grade		ical Datum			Borir	ng Location: Offset 20 fe	et Southwest							<b>Long: -</b> 79.745396°
Item Type		Casing HSA	Samp SS		e Barrel	Ria N	Make & Model: Diedrich	D-50	Hammer Type			tal D		n: NAD 1	
Length		5 ft	2 ft	i i	-	☐ Tr	uck 🗌 Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimite	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	☐ AT		✓ Winch  □ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer	Fall (in.)	30	30		- 1	☐ Sk		✓ Cutting Head		<b>▼</b> N			. 1		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		,	(Density/cor constituents, μ	nal Identification & Desc nsistency, color, Group No particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy	Toughness Tough	Lesticity Plasticity	Dry Strength 67		Remarks
	S-1 0.0'- 2.0' 0.3'-'	16	1 2 3 4		CL	0.3	Top 3" - TOPSOIL  Medium stiff, gray CLAY,	some fine Sand, little Silt, mo	pist (CL)	N	-	M	1 1	PP = 2.5 TV = 1.0	
-	S-2 2.0'- 4.0'	16	3 2 2 3		CL		Medium stiff, grayish brow	vn CLAY, little fine Sand, trac	ce Silt, wet (CL)	N	L	М	-	PP = 2.0 TV = 2.15	
- 5	S-3 4.0'- 6.0'	14.5	5 8 7 8		CL		Very stiff, grayish dark bro trace Silt, moist (CL)	own CLAY, little fine Sand, tra	ace fine Gravel,	N	М	L	-	PP > 4.5 TV = 0.5	
-	S-4 6.0'- 8.0'	20	6 10 11 10		CL		Very stiff, grayish brown C trace fine Gravel, moist (C	CLAY, some Silt, little coarse CL)	to fine Sand,	N	М	н	-	PP > 4.5 TV = 0.5	
-	S-5 8.0'- 10.0'	18	8 11 12 14		CL		Very stiff, grayish brown C trace fine Sand, moist (CL	CLAY, little Silt, little coarse to	o fine Gravel,	N	М	Н	-	PP > 4.5	tsf
- 10	S-6	20	17		CL		Hard brownish arou CLA	Y, some coarse to fine Grave	al little Silt trace	N	M	Н		PP = 4.5	tof.
- 15 	13.0'- 15.0'		19 15 22		92		coarse to fine Sand, wet (		or, nuce on, usee					TV = 2.25	
-	S-7 18.0'- 20.0'	20	11 11 21 29		CL	20.0	Hard, brownish gray CLA' fine Sand, wet (CL)  End of Boring at 20 feet B Borehole backfilled with sc	Y, little Silt, little coarse to fin GGS. oil cuttings.	e Gravel, trace	N	Н	н	-	PP > 4.5 TV = 2.0	
			evel Data				Sample Type	Notes:							
Date	Time	Elapsed Time	Dep Bot. of	th in fee		- ∘	Open End Rod	PP = Pocket Penetro	ometer						
		(hr)	Casing	of Hole	water	┛ ゙	Thin-Wall Tube	I v – TOLVAILE							
7/22/20	9:50	0:00		20.0	16	υ	Undisturbed Sample								
						SS									
						∃G	Grab Sample							Boring N	o.: <b>B-07</b>
	st Legend	Tou	tancy: ghness:	L - Lo	w M - N	/lediu	m H - High	Dry Strength: N - Non	on-Plastic L - Low ne L - Low M - N	lediur	n F	l - l-	n H ligh	- High	
							etrometer reading. 2.) "ppon within limitations of samp	pa" denotes soil sample aver oler size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	м					SOIL	BORING LO	)G						BORING NO.: B-08 Page 1 of 1
Project			ipley Solaı							Project No.:					67-001	
Location Client:			ipley, NY							Project Mgr:	_			Paul		
Drilling		Connect Farth Dir	mensions.	Inc						Field Eng. Staff Date/Time Start					elgar 2020 at 1	 ∩:15 am
-	Helper:		/Harold K							Date/Time Finis					2020 at 1	
	n: Grade f		ical Datum			Bori	ng Location:	See Boring	Location Plan							<b>Long:</b> -79.741586°
Item Type		Casing HSA	Samp SS		re Barrel	Ria	Make & Mode	I. Diedrich I	7-50	Hammer Type			tal D ı Flu		n: NAD 1	
Length		5 ft	2 ft		-	□Ті	uck 🗆	Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimite	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	☐ A		Geoprobe Air Track	✓ Winch  ☐ Roller Bit	✓ Doughnut  ☐ Automatic	□ P					Hollow Stem Auger
Hammer		30	30		-	□s			✓ Cutting Head		<b>▼</b> N					
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratun Graphic		>	(cor	(Density/connstituents, p	al Identification & Des sistency, color, Group N article size, structure, m ns, geologic interpretation	Name, noisture,	Dilatancy	s	Plasticity Des	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	17	2 3 4 3	13.1 15: 15.1	CL	0.3		grayish brow	n CLAY, some coarse to fin	ne Sand, trace fine	- N	- M	L	-	PP = 3.5 TV = 1.0	
-	S-2 2.0'- 4.0'	23	6 5 5		CL		Stiff, light bro moist (CH)	own CLAY, tra	ice fine Sand, trace fine Gra	avel, trace Silt,	N	М	L	-	PP = 2.0 TV = 1.15	
<del>-</del> 5	S-3 4.0'- 6.0'	21	5 7 7 8		CL		Stiff, light bro moist (CH)	own CLAY, so	me fine Sand, little fine Gra	vel, trace Silt,	N	М	L	М	PP = 3.0 TV = 1.0	
-	S-4 6.0'- 8.0'	20	11 11 16 20		CL		Very stiff, bro trace coarse	ownish gray S to fine Sand,	ILT, some Clay, little coarse dry (CL)	e to fine Gravel,	N	М	L	н	PP = 3.5 TV = N/A	tsf
-	S-5 8.0'- 10.0'	24	14 19 17 24		CL		Hard, gray C	LAY, some Si	ilt, little fine Gravel, trace fin	ne Sand, dry (CH)	N	М	L	н	PP = 3.5 TV = N/A	tsf
	S-6 13.0'- 15.0'	24	13 12 12 14		CL	16.	Gravel, dry ((		e Silt, little coarse to fine Sa	and, little fine	N	М	L	М	PP = 4.0 TV = N/A	
-	S-7 18.0'- 20.0'	24	9 13 10 12		ML	20.	(ML)	n at 20 feet B	e Clay, little fine Sand, little f GS. ill cuttings.	fine Gravel, moist	N	н	L	-	PP > 4.5	tsf
			vel Data	th in f	ot to:	1	Sample		Notes:							
Date	Time	Elapsed Time	Dep Bot. of	th in fe	.	- O	- 1		PP = Pocket Penetro TV = Torvane	ometer						
		(hr)	Casing			┛ ゙	Thin-Wall									
						U_ ر	Undisturbe	•								
								-								
						₽G	Grab Sam	ihic							Boring N	o.: <b>B-08</b>
	st Legend	Tou	tancy: ghness:	L - Lo	0w M - 1	Mediu	R - Rapid m H - High	l	Dry Strength: N - Nor	on-Plastic L - Low ne L - Low M - M	lediur	n H	l - l-	n H ligh	l - High	
							etrometer read on within limita		oa" denotes soil sample ave ler size. 4.) Soil identifica	rage axial pocket pen itions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	М				SOII	L BORING LO	)G						BORING NO.: <b>B-09</b> Page <b>1</b> of <b>1</b>
Project			ipley Solaı	r					Project No.:					67-001	<u> </u>
Locatio			ipley, NY						Project Mgr:	_			Paul		
Client: Drilling		Connect Farth Di	<u>Gen</u> mensions	Inc					Field Eng. Staff Date/Time Start		_			elgar 2020 at 1:	2:50 nm
-	Helper:		/Harold K						Date/Time Finis					2020 at 1:	
	n: Grade		ical Datun			Bori	ing Location: See Boring	Location Plan							<b>Long:</b> -79.744977°
Item Type		Casing HSA	Samp SS		e Barrel	Ria	Make & Model: Diedrich	D-50	Hammer Type			tal D ı Flu		n: NAD 1 Drill Ro	
Length		5 ft	2 f	i l	-	□T	ruck	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimine.	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	□ A ✓ T	—p	✓ Winch  □ Roller Bit	✓ Doughnut  ☐ Automatic	□ P					Hollow Stem Auger
Hammer	Fall (in.)	30	30		- 1	□ s	kid 🔲	✓ Cutting Head		<b>▼</b> N					
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		,	(Density/cor constituents, μ	nal Identification & Desc nsistency, color, Group No particle size, structure, m ons, geologic interpretation	lame, loisture,	Dilatancy T	Longhness Toughor	Tes Hasticity	Dry Strength 67		Remarks
-	S-1 0.0'- 2.0'	20	WOH 3 5	<u> </u>	CL	0.4		, some Silt, little fine Sand, n	noist (CL)	-	- M	- L	-	PP = 2.0 t TV = 0.5 t	
-	0.4'-' S-2 2.0'- 4.0'	15	5 6 4 4 5		CL		Stiff, brown CLAY, little fin	ne Sand, trace fine Gravel, m	noist (CL)	N	М	L	-	PP = 2.0 t TV = 0.5 t	
<del>-</del> 5	S-3 4.0'- 6.0'	21	4 4 6 5		CL		Stiff, brown CLAY, some of (CL)	coarse to fine Sand, little fine	e Gravel, moist	N	М	L	-	PP = 1.5 t TV = 1.25	
-	S-4 6.0'- 8.0'	24	6 7 7 12		CL		Stiff, grayish brown CLAY trace Silt, moist (CL)	, some coarse to fine Sand,	little fine Gravel,	N	М	L	-	PP = 2.25 TV = 1.75	
- - 10	S-5 8.0'- 10.0'	24	5 7 8 10		CL		Very stiff, brown CLAY, so moist (CL)	ome fine Gravel, little fine Sa	and, trace Silt,	N	М	L	-	PP = 3.5 t TV = 0.5 t	
-	S-6	16	6		CL		Hard dark brown to gray y	CLAY, some coarse to fine S	Sand some Silt	N	М	L		PP = 4.0	rsf
- 15 -	13.0'- 15.0'	10	27 26 27		92		little fine Gravel, dry (CL)	OLAT, SOME COARSO TO TIME C	zana, some om,					TV = 0.51	
-	S-7 18.0'- 20.0'	18	13 19 22 26		CL	20.	fine Gravel, dry (CL)  End of Boring at 20 feet B  Borehole backfilled with so	oil cuttings.	some Silt, little	N	М	L	М	PP = 4.0 TV = N/A	isf
			vel Data	oth in fee	at to:	1	Sample Type	Notes:							
Date	Time	Elapsed Time	Bot. of	Bottom	Wator	<u> </u>		PP = Pocket Penetro TV = Torvane	ometer						
-		(hr)	Casing					No groundwater enc	ountered during su	ubsurf	ace	inve	estig	ation.	
						٦٠									
						_  SS   G									
						՝	Orab Garripic							Boring N	o.: <b>B-09</b>
	st Legend	Tou	tancy: ghness:	L - Lo	w M - N	/lediu	ım H - High	Dry Strength: N - Non	on-Plastic L - Low ne L - Low M - M	lediur	n H	l - l-	ligh		ry High
							netrometer reading. 2.) "ppi ion within limitations of samp	pa" denotes soil sample aver oler size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MOT	T DONAL	M	м				S	OIL	BORING LO	G						BORING NO.: <b>B-10</b> Page 1 of 1
Project			ipley Solaı							Project No.:					67-001	
Location Client:		South Ri Connect	i <u>pley, NY</u> Con						<del></del>	Project Mgr: Field Eng. Staff				Paul o Mo	i elgar	
Drilling			mensions.	Inc.						Date/Time Start		_			2020 at 7:	20 am
-	Helper:		/Harold K							Date/Time Finis		_			2020 at 8:	-
	n: Grade f		ical Datum			Bori	ng Location: See Bo	oring L	ocation Plan							Long: -79.744437°
Item Type		Casing HSA	Samp SS		re Barrel	Rig N	Make & Model: Died	drich D	0-50	Hammer Type			ial D i Flu		n: NAD 1 Drill Ro	
Length	- (i )	5 ft	2 ft		-	☐ Tr	uck 🗌 Tripod		☐ Cat-Head	☐ Safety	В					Casing Advance
Inside Di Hammer	Wt. (lb.)	4.25 140	1.37 140	)	-	☐ A			✓ Winch ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P	ate	r			Hollow Stem Auger
Hammer	Fall (in.)	30	30		<u>-</u>	☐ Sł	kid 🔲		✓ Cutting Head		<b>▼</b> N		Tes	<sub>40</sub> T		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratun Graphi		)	(Densit constituer	y/cons	al Identification & Desc sistency, color, Group N article size, structure, m ns, geologic interpretation	lame, oisture,	Dilatancy	ı,	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	17	1 2 5 7	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	CL	0.3	<del></del>	brown	CLAY, little fine Sand, little	e Silt, trace fine	- N	- M	L	- L	PP = 4.0 t TV = 0.5 t	
-	S-2 2.0'- 4.0'	20	6 7 6 7		CL		Stiff, grayish brown (	CLAY,	little fine Sand, little fine Gr	avel, wet (CL)	N	М	L	-	PP = 4.5 f TV = 0.5 f	
5	S-3 4.0'- 6.0'	19	3 4 6 6		CL		Medium stiff, grayish Gravel, wet (CL)	ı brown	n CLAY, little Silt, little fine S	Sand, trace fine	N	М	L	-	PP = 2.5 TV = 0.25	
-	S-4 6.0'- 8.0'	18	3 5 7 8		sc	6.0		vn SAN	ID, some Clay, little Silt, tra	ce fine Gravel,	-	н	NP	-		
- - 1₽	S-5 8.0'- 10.0'	12	5 6 6 5		CL	8.0			AY, little Silt, little coarse to	o fine Sand, trace	N	М	L	-	PP = 4.5	tsf< <cr>TV = 0.5 tsf</cr>
-	S-6	23	16		CL			∕, trace	fine Sand, trace coarse to	fine Gravel, moist	N	М	L	-	PP = 4.0 TV = 2.25	
- 15 	13.0'- 15.0'		17 12 13			16.5	(CL)								10 = 2.23	isi
-	S-7 18.0'- 20.0'	18	17 17 19 37		ML	20.0	Hard, gray SILT, son wet (ML)  End of Boring at 20 f Borehole backfilled w	feet BO	rse to fine Gravel, little fine SS. I cuttings	Sand, little Clay,	N	н	L	-	PP = 4.5 t	
		Water Le			1	۷.۱	Sample Type		Notes:				1	1		
Date	Time	Elapsed Time	Dep Bot. of	th in fe	.	-0	Open End Rod		PP = Pocket Penetro	ometer		_		_		
		(hr)	Casing	of Hole	wate	— ¹ ¹	Thin-Wall Tube		ı v – Torvane							
7/22/20	8:15	`-		20.0	10	Jυ	Undisturbed Sam	•	1							
						_ss		ple	1							
						₽G	Grab Sample								Boring N	o.: <b>B-10</b>
	st Legend	Tou	tancy: ghness:	L - L	0w M - 1	Mediu	R - Rapid m H - High		Ory Strength: N - Non	on-Plastic L - Low ne L - Low M - N	lediur	n H	l - l-	n H ligh	- High	
							etrometer reading. 2 on within limitations of		a" denotes soil sample aver er size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	М				SOII	L BORING LO	G						BORING NO.: <b>B-11</b> Page 1 of 1
Project			ipley Sola	r					Project No.:					67-001	<b>,</b>
Location Client:	on:	South Ri	ipley, NY						Project Mgr: Field Eng. Staff:				Paul	i elgar	
Drilling	Co.:		mensions	, Inc.					Date/Time Start			_		2020 at 1	2:46 pm
	Helper:		/Harold K						Date/Time Finis		_			2020 at 1	
Elevation	n: Grade	ft. Vert	ical Datun Samp		re Barrel	Bor	ing Location: See Boring	Location Plan						2.195826° <b>n:</b> NAD 1	<b>Long:</b> -79.736165°
Туре		HSA	SS	;	-		Make & Model: Diedrich		Hammer Type	Dri	lling	jFlι	iid	Drill Ro	d Size:
Length Inside Di	ia. (in.)	5 ft 4.25	2 ft		-	<ul><li>□ T</li><li>□ A</li></ul>		☐ Cat-Head  ✓ Winch	☐ Safety  ☑ Doughnut	□ B					Casing Advance
Hammer Hammer		140 30	140 30		-	✓T □ S		☐ Roller Bit  ✓ Cutting Head	☐ Automatic	□ W ✓ N					Hollow Stem Auger
Hammer		30	30		Ī	T						Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratun Graphi		)	(Density/cor constituents, μ	al Identification & Description Description   barticle size, structure, mons, geologic interpretations.	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1	18	2	7/1/2		0.4	Top 5" - TOPSOIL		: . (01.)	<b>∃</b> :.	-	-	-	DD: 45	
_	0.0'- 2.0'		5 5		CL		Stiff, brown CLAY, some s	Silt, little coarse to fine Sand	, moist (CL)	N	М	L	-	PP > 4.5 TV = N/A	IST
	0.4'-'		8												
-	0.0	22					Oriff harries OLAV annual	Silt. trace coarse to fine San	d turns fine	<sub>N</sub>	١.,	١.		DD - 4.0	
	S-2	22	8 6		CL		Gravel, moist (CL)	Silt, trace coarse to fine San	d, trace fine	N	М	L	-	PP = 4.0 TV = N/A	IST
-	2.0'- 4.0'		6		7										
			7		1										
-	S-3	21	5		CL		Stiff, brown CLAY, little Si	It, trace fine Sand, trace fine	Gravel, moist	R	М	L	_	PP = 3.0	tsf
	4.0'- 6.0'		6				(CL)		·					TV = N/A	
<del></del> 5			6 8												
-	S-4	24	6		CL		Very stiff, brownish gray C Gravel, moist (CL)	CLAY, some Silt, some fine S	Sand, trace fine	R	М	L	-	PP = 3.0 TV = N/A	tsf
_	6.0'- 8.0'		8 12				Graver, moist (CL)							IV - IV/A	
			10												
_				///	4	8.0				╛_	١.				
	S-5	18	5 6		ML		Stiff, gray SILT, trace Clay	y, little fine Sand, moist (ML)		R	L	L	-	PP = 2.25	o tsf
-	8.0'- 10.0'		8												
			9												
<del></del> 10															
-															
-															
_															
	S-6	3	20 17		ML		Very stiff, brown SILT, sor moist (ML)	me Clay, little fine Sand, trac	e fine Gravel,	N	L	L	-	PP = 1.5	tsf
-	13.0'- 15.0'		10				. ,								
			12												
<del></del> 15				$  \   \   \  $											
-						10	5								
				<b>///</b>	才	16	<u>~</u>			-					
-					1										
_															
	S-7	10	3 4		CL		Stiff, gray CLAY, little Silt,	moist (CL)		-	М	L	-	PP = 1.0	tsf
-	18.0'- 20.0'		4	<i>\///</i>	1										
			5				End of Boring at 20 feet B	igs.							
		Water I	evel Data	Y//	1	20	O Borehole backfilled with so	oil cuttings.  Notes:			<u> </u>				
D-4:	T:	Elapsed	Dep	th in fe		0		PP = Pocket Penetro	ometer						
Date	Time	Time (hr)	Bot. of Casing			<u>г</u> ] т	Thin-Wall Tube	TV = Torvane No groundwater enc	ountered during su	ıbsurf	ace	inve	estig	ation.	
		. ,				Ju			<b>J</b>				3		
						_ S:									
					+	$\exists$ $^{G}$	Grab Sample							Boring N	o.: <b>B-11</b>
Field Te	st Legend		tancy:						on-Plastic L - Low						- 1 C-b
NOTES:	1.) "nnd" de		ghness: sample ave					Dry Strength: N - Non pa" denotes soil sample aver	ne L - Low M - M				<u> </u>	vH - Ve	ry Hign
							ion within limitations of samp		tions and field tests b					ual method	s per ASTM D2488.

MOT	T DONAL	M	М				SOII	L BORING LO	G						BORING NO.: <b>B-12</b> Page <b>1</b> of <b>1</b>
Project	: .	South R	ipley Sola	r					Project No.:		_5	051	0026	67-001	, <u>, , , , , , , , , , , , , , , , , , </u>
Locatio			ipley, NY						Project Mgr:				Paul		
Client: Drilling		Connect	<u>Gen</u> mensions	Inc					Field Eng. Staff: Date/Time Start			_		elgar 2020 at 2	:00 nm
-	Helper:		/Harold K						Date/Time Finis					2020 at 2	
	1: Grade f		ical Datun			Bori	ng Location: See Boring	Location Plan							Long: -79.733182°
Item Type		Casing HSA	Samp SS		re Barrel	Ria	Make & Model: Diedrich	D-50	Hammer Type		zont Iling			n: NAD 1	
Length		5 ft	2 f	i l	-	□ T	uck 🗌 Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimite	Casing Advance
Inside Di Hammer		4.25 140	1.37 140		-	☐ A		✓ Winch  ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer	Fall (in.)	30	30		-	□s	kid 🔲	✓ Cutting Head		<b>▼</b> N		_			
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratun Graphi	Symbo	)	(Density/cor constituents, p	nal Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy	eld ssaudbno_	Plasticity a	Dry Strength 67		Remarks
	S-1	18	1	71 1/2	4	0.5				N	Н	L	М	PP = 0.5	tsf
_	0.0'- 2.0'		1 4		ML		Medium stiff, brown SILT,	some Clay, little fine Sand, o	dry (ML)						
			8												
-	S-2	24	7 8		ML		Very stiff, dark brown SIL fine Gravel, dry (ML)	T, some Clay, little coarse to	fine Sand, trace	N	Н	L	м	PP = 1.5	tsf
-	2.0'- 4.0'		9 11												
<del>-</del> 5	S-3 4.0'- 6.0'	12	8 9 7		ML		Very stiff, brown SILT, so	me Clay, little fine Sand, mois	st (ML)	N	L	L	М	PP = 1.5	tsf
-	S-4	22	7		ML		Very stiff, dark brown SIL	T, some Clay, some coarse t	o fine Sand, little	N	н	L	_	PP = 1.5	tsf
-	6.0'- 8.0'		9 7 7				coarse to fine Gravel, moi	ist (ML)							
-	S-5 8.0'- 10.0'	17	4 3 9 11		CL	8.0		/, some coarse to fine Sand,	some Silt, trace	N	М	L	-	PP = 2.5	tsf
— 10 - -						11.	5			_					
- - <del>I</del> Z	S-6 13.0'- 15.0'	11	2 2 3 4		sc		Loose, brown coarse to fit Gravel, wet (SC)	ne SAND, some Clay, some	Silt, trace fine	-	-	NP	-		
-						16.	5			_					
-	S-7 18.0'- 20.0'	18	4 2 3 4		CL		Gravel, wet (CL)	ay CLAY, some Silt, some fin	e Sand, trace fine	N	М	L	-	PP = 7.5	tsf
					1	20	End of Boring at 20 feet B Borehole backfilled with se	BGS. oil cuttings.							
			vel Data		1	20.	Sample Type	Notes:							
Date	Time	Elapsed Time	Dep Bot. of	th in fe		<b>⊣</b> ∘	-1	PP = Pocket Penetro	ometer						
		(hr)	Casing	of Hole	wate	┛゚	Thin-Wall Tube	iv – rorvane							
7/22/20	14:53	0:00		20.0	15	Jυ	Undisturbed Sample								
						∣ գ	Grab Sample							Borina N	o.: <b>B-12</b>
	st Legend	Tou	L tancy: ghness:	L - L	ow M - I	Лediu	m H - High	Dry Strength: N - Non	on-Plastic L - Low e L - Low M - M	lediun	n H	l - H	n H ligh	- High	
							etrometer reading. 2.) "ploon within limitations of samp	pa" denotes soil sample aver bler size. 4.) Soil identificat	age axial pocket pen- tions and field tests b					ual method	s per ASTM D2488.

MOT	T DONAL	M	М					so	IL BORII	NG LO	G							BORING NO.: <b>B-13</b> Page 1 of 1
Project Location Client: Drilling	on:	South Ri Connect Earth Di	mensions	, Inc.							Pro Fiel Date	ject No.: ject Mgr: ld Eng. Staff: e/Time Start	ed:		ric Dieg	Paul o Me	67-001 li elgar 2020 at 7	
	Helper:		/Harold K			_					Date	e/Time Finis		_	_		2020 at 8	:30 am Long: -79.725624°
Item	i. Graue	Casing			ore Barre		soring	Location: See Borin	g Location Plan								<b>m:</b> NAD ′	
Type Length		HSA 5 ft	SS 2 ff		-		Rig Mak	ke & Model: Diedric ← □ Tripod	h D-50 ☐ Cat-Head	1		mmer Type Safety	<b>D</b> ri		Flu		Drill Ro	od Size: Casing Advance
Inside Di		4.25	1.37	75	-		] ATV	☐ Geoprobe	<b>✓</b> Winch		_ <b>∀</b> D	Doughnut	□Р	olyn	ner			Hollow Stem Auger
Hammer Hammer		140 30	30		-		¶Track ∐Skid	k ☐ Air Track	☐ Roller Bit  Cutting H			Automatic	□ W ▼ N					
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph		S Ip		(Density/c	nual Identificat onsistency, colo, particle size, s	ion & Desc or, Group N structure, m	Name, noistur	, re,			Plasticity Particity	Dry Strength	'	Remarks
	S-1	18	2	<u> 1/7</u> . 1	17/	_	0.5 To	op 6" - TOPSOIL					<del> </del> -	-	-	-		
-	0.0'- 2.0' 0.5'-'		4 6 11		ML	-	М	ledium stiff, grayish bro oist (ML)	own SILT, some (	Clay, little coa	arse to	o fine Sand,	s	L	L	-	PP = 1.75	5 tsf
-	S-2 2.0'- 4.0'	21	8 8 8 9		ML			ery stiff, light brown SI parse to fine Gravel, m		tle coarse to	fine S	and, little	N	L	L	-	PP = 4.5	tsf
<del>-</del> 5	S-3 4.0'- 6.0'	22	3 4 8 8		ML		M G	ledium stiff, brownish ç iravel, moist (ML)	gray SILT, some (	Clay, little fine	e Sand	d, trace fine	N	L	L	-	PP = 2.0	tsf
-	S-4 6.0'- 8.0'	22	8 16 27 35		ML			ard, grayish brown SIL parse to fine Gravel, m		o fine Sand,	little C	Clay, little	s	L	L	-	PP = 1.5 Fractured	tsf I rock recovered.
-	S-5 8.0'- 10.0'	24	12 43 42 50/4"		ML		H;	ard, grayish brown SIL parse to fine Gravel, m	.T, some coarse tooist (ML)	o fine Sand,	little C	Clay, trace	s	L	L	-	PP = 2.25	5 tsf
— 10 - -		10	26					and light become to light	Acros CU T	and the first of the second of	in a Cua	wel little					DD - 200	ne f
-	S-6 13.0'- 15.0'	18	36 21 50/3"		ML			ard, light brown to ligh lay, trace fine Sand, d		coarse to fir	ine Gra	avel, little	N	L	L	М	PP = 3.0 Soft Shal feet BGS	e fragments recovered at 13
— 15 - -							Aı Eı	uger refusal at 15 feet nd of Boring at 15 feet orehole backfilled with	BGS.									
		Water Le	evel Data Der	oth in f	eet to:	$\dashv$		Sample Type	Notes:	ket Penetro	omoto	er er						
Date	Time	Time	Bot. of	Botto	m Wat	er		Open End Rod Thin-Wall Tube	TV = Tor	vane								
		(hr)	Casing	of Ho	ie	$\dashv$		rnin-vvaii rube Undisturbed Sample		dwater enc	counte	ered during su	ıbsurf	ace	inve	estig	ation.	
								Split Spoon Sample	1									
						$\exists$		Grab Sample										
						$\exists$		•									Boring N	o.: <b>B-13</b>
Field Tes	st Legend		tancy: ghness:		None S			R - Rapid H - High	Plasticity: Dry Strength:			astic L - Low - Low M - M						rv High
NOTES:	1.) "ppd" de								ppa" denotes soi					_	_	<u> </u>	V.1. VC	.,."9"
	3.) Maximu	m Particle	Size is dete	rmined	by direct of	oser	vation v	within limitations of sar									ual method	ls per ASTM D2488.

MOT	T DONAL	M	М				SOII	L BORING LO	G						BORING NO.: <b>B-14</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on:	South Ri	ipley Solar ipley, NY Gen mensions						Project No.: Project Mgr: Field Eng. Staff: Date/Time Start			ric I Dieg	Paul o Me	67-001 i elgar 2020 at 10	
Driller/	Helper:		/Harold K						Date/Time Finis		J	uly :	24, 2	2020 at 1	1:45 am
Elevation	n: Grade f	t. Verti	ical Datum Samp		re Barrel	Borin	g Location: See Boring	Location Plan						2.191841° <b>n:</b> NAD 1	<b>Long:</b> -79.726277°
Туре		HW	SS		-		lake & Model: Diedrich		Hammer Type	Dri	lling	j Flu		Drill Ro	d Size:
Length Inside Di	a. (in.)	5 ft 4	2 ft 1.37		-	☐ Tru		☐ Cat-Head  ✓ Winch	<ul><li>☐ Safety</li><li>✓ Doughnut</li></ul>	□ B					Casing Advance
Hammer Hammer		140 30	140		-	☑ Tra		☐ Roller Bit  Cutting Head	☐ Automatic	□ W ▼ N				'	Hollow Stem Auger
Hammer		30	30	<u> </u>	Ī							Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratun Graphi			(Density/cor constituents, p	al Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretations	ame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	17.5	1 3 5 6		CL	0.3	Top 3" - TOPSOIL Stiff, dark brown CLAY, so Gravel, moist (CL)	ome Silt, little coarse to fine \$	Sand, trace fine	s	M	L	-	PP = 2.75	i tsf
- - <u>∑</u>	S-2 2.0'- 4.0'	22	3 5 7 6		CL		Stiff, dark brown CLAY, so Gravel, moist (CL)	ome Silt, little coarse to fine \$	Sand, trace fine	s	М	L	-	PP = 4.5	tsf
<del>-</del> 5	S-3 4.0'- 6.0'	22	4 6 6 8		CL		Stiff, brown CLAY, some S (CL)	Silt, trace fine Sand, trace fin	e Gravel, moist	N	М	L	-	PP = 2.25	i tsf
-	S-4 6.0'- 8.0'	22	5 5 9 10		ML	6.0	Stiff, brown SILT, some C Gravel, moist (ML)	clay, little fine Sand, trace coa	arse to fine	s	L	L	-	PP = 2.5	tsf
- - 10	S-5 8.0'- 10.0'	24	6 8 12 14		ML		Very stiff, brown SILT, sor Clay, moist (ML)	me fine Sand, little coarse to	fine Gravel, little	R	L	L	-	PP = 4.0	tsf
-	S-6	16	5		SM	<u>11.5</u>	Medium dense brown co	arse to fine SAND, some Silt	little Clay little	_					
- 15 	13.0'- 15.0'	10	12 15 16				fine Gravel, wet (SM)	and to line GAVD, some one	, mue essy, mue						
-	S-7 18.0'- 20.0'	13	12 14 15 14		SM	20.0	trace Clay, wet (SM)  End of Boring at 20 feet B	se to fine SAND, little Silt, litt BGS. oil cuttings.	le fine Gravel,	-	-	1	1		
		Water Le		th in fe	ot to:	1	Sample Type	Notes:	· · · · · · · · · · · · · · · · · · ·						
Date	Time	Elapsed Time	Bot. of	Botton	1 Water	- 0	Open End Rod	PP = Pocket Penetro	ometer						
7/24/20	11.45	( <b>hr</b> ) 0:00	Casing	of Hole	wate		Thin-Wall Tube								
1124120	11:45	U:UU		20.0	3	U SS	Undisturbed Sample Split Spoon Sample								
							Grab Sample								
							·							Boring N	o.: <b>B-14</b>
	st Legend	Tou	tancy: ghness:	L-L	ow M - 1	Mediun	n H - High	Dry Strength: N - Non	n-Plastic L - Low e L - Low M - N	lediun	n H	1 - H	ligh		ry High
							etrometer reading. 2.) "pp on within limitations of samp	pa" denotes soil sample aver bler size. 4.) Soil identificat	age axial pocket pen ions and field tests b					ual method	s per ASTM D2488.

MOT	T DONAL	M	М					S	OIL	BORING LO	OG	;						BORING NO.: <b>B-15</b> Page 1 of 1
Project Location Client: Drilling	on:	South R Connect	ipley Solai ipley, NY Gen mensions								P	Project No.: Project Mgr: Field Eng. Staff Date/Time Start			ric Dieg	Paul o Me	67-001 i elgar 2020 at 9	
	Helper:		/Harold K		r						D	Date/Time Finis		_	_		2020 at 1	
Item	n: Grade	t. vert	ical Datun Samp		Core	Barrel	Boring	g Location: See B	Boring L	ocation Plan							n: NAD 1	<b>Long: -</b> 79.727528°
Type Length		HSA 5 ft	SS 2 ff			-	Rig Ma	ake & Model: Die		0-50 ☐ Cat-Head		Hammer Type  Safety	<b>D</b> ri		j Flu		Drill Ro	od Size: Casing Advance
Inside Di		4.25	1.37	5		-	□ AT\	V □ Geopr	robe	<b>☑</b> Winch	Į	<b>Z</b> Doughnut	□Р	olyn	ner			Hollow Stem Auger
Hammer Hammer		140 30	140 30				✓ Tra  ☐ Skid		ack	☐ Roller Bit  ✓ Cutting Head	F	☐ Automatic	□ W ▼ N					. iono ii Otom / tago.
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Strat Grap		USCS Group Symbo		Visual - (Densi constitue	ity/cons ents, pa	al Identification & Desc sistency, color, Group N article size, structure, m ns, geologic interpretation	Nan nois	ne, sture,			Plasticity Particity	Dry Strength		Remarks
_	S-1 0.0'- 2.0' 0.3'-'	17	2 3 3 9	, Z4 1 <sup>X</sup> ·	,(1),	ML	$\neg$	Top 4" - TOPSOIL Medium stiff, brown	SILT, s	some Clay, little fine Sand, I	moi	pist (ML)	- N	L	L	-	PP = 1.25	5 tsf
-	S-2 2.0'- 4.0'	24	4 12 15 11			ML		Very stiff, light brow fine Gravel, dry (ML		some fine Sand, little Clay	y, litt	tle coarse to	N	L	L	L	PP > 4.5	tsf
5	S-3 4.0'- 6.0'	24	5 7 7 8			ML		Stiff, brown SILT, so trace Clay, moist (N		arse to fine Sand, little coar	arse	to fine Gravel,	N	L	L	-	PP = 2.0	tsf
-	S-4 6.0'- 8.0'	13	4 3 6 4			ML		Stiff, light brown SIL Sand, wet (ML)	LT, som	e Clay, some coarse to fine	ne G	Gravel, little fine	s	L	L	-	PP = 1.25	5 tsf
- 10	S-5 8.0'- 10.0'	15	3 3 6 6			ML		Stiff, light brown SIL to fine Gravel, mois		e coarse to fine Sand, little	e Cla	ay, little coarse	N	L	L	-	PP = 2.0	tsf
-							11.5											
- 15 	S-6 13.0'- 15.0'	13	12 13 15 9			CL		Very stiff, gray CLA fine Gravel, wet (CL		e Silt, little coarse to fine Sa	Sand	d, little coarse to	S	М	L	-	PP = 1.0	tsf
-	S-7 18.0'- 20.0'	21	7 7 11 16			CL		Sand, moist (CL)  End of Boring at 20	feet BC	e Silt, little fine Gravel, trace	ce co	oarse to fine	N	М	L	-	PP = 4.0	tsf
		Water L	evel Data	<u>//</u>			20.0	Borehole backfilled Sample Type		Notes:				<u> </u>	<u> </u>			
Date	Time	Elapsed Time (hr)	_	th in Bott of H	om	to: Water	О Т	Open End Rod Thin-Wall Tube		PP = Pocket Penetro No groundwater enc			ubsurf	ace	inve	estig	ation.	
		. ,					U SS G											
Field Te	st Legend						Slow	R - Rapid								n H	l - High	<del>-</del>

MAC	T DONAL	M	м					SOI	L BORING LO	)G						BORING NO.: <b>B-16</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on:	South R Connect	ipley Solai ipley, NY :Gen mensions							Project No.: Project Mgr: Field Eng. Staff Date/Time Start			Eric Dieg	Pau o M	67-001 li elgar 2020 at 8	
	Helper:		/Harold K							Date/Time Finis		_	_		2020 at 8	
Item	n: Grade f	t. Vert	ical Datun Samp		ore Barre		oring Lo	ocation: See Boring	Location Plan						2.181355° <b>m:</b> NAD 1	<b>Long:</b> -79.728725°
Туре		HSA 5 ft	SS 2 ft		-	Ri	<b>g Make</b> Truck	e & Model: Diedrich ☐ Tripod	D-50	Hammer Type ☐ Safety		illing	j Flu	ıid		od Size: Casing Advance
Length Inside Di		4.25	1.37	'5	-		ATV	☐ Geoprobe	<b>✓</b> Winch	✓ Doughnut	□Р	olyr	ner			Hollow Stem Auger
Hammer Hammer		140 30	30		-		Track Skid	☐ Air Track	☐ Roller Bit  Cutting Head	☐ Automatic	□ v ☑ n					nonow otem Auger
Trainino		- 00	55			Τ	ORIG						Tes	sts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph		ір		(Density/co constituents,	ual Identification & Desonsistency, color, Group Noparticle size, structure, mons, geologic interpretations.	lame, noisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1 0.0'- 2.0'	20	1 2 4	<u> </u>	ML	_	Med	o 5" - TOPSOIL dium stiff, dark brown be fine Gravel, moist (l	SILT, some Clay, some coar ML)	rse to fine Sand,	- N	- L	L	-	PP = 1.7	5 tsf
_	0.4'-'		9													
-	S-2 2.0'- 4.0'	22	6 8 7 6		ML			ry stiff, grayish brown : avel, moist (ML)	SILT, some fine Sand, some	Clay, trace fine	S	L	L	-	PP = 1.7	ō tsf
<del>-</del> 5	S-3 4.0'- 6.0'	17.5	4 4 7 11		ML			f, brown SILT, some o avel, moist (ML)	coarse to fine Sand, some Cl	ay, trace fine	s	L	L	-	PP = 0.75	5 tsf
-	S-4	16	5 4		SM			dium dense, brown co e Gravel, wet (SM)	parse to fine SAND, some Sill	t, trace Clay, trace	N	-	NP	-		
-	6.0'- 8.0'		6 12													
<del>-</del> 10	S-5 8.0'- 10.0'	14	14 12 8 6		SM			dium dense, brown fin y, wet (SM)	e SAND, some Silt, little fine	Gravel, trace	S	-	NP	-	PP = 1.25	t tef
-						_ 1	<u> 11.5</u>									
- 15	S-6 13.0'- 15.0'	24	9 12 16 17		CL			ry stiff, brown CLAY, s ist (CL)	ome Silt, little fine Sand, trac	e fine Gravel,	S	L	L	-	PP > 4.5 Mottling of 13 feet B	bserved on Clay material at
-																
_	S-7 18.0'- 20.0'	23	10 11 13		CL		Ver (CL		me Silt, little fine Sand, trace	fine Gravel, moist	S	M	L	-	PP > 4.5	tsf
			16					d of Boring at 20 feet I	BGS.							
		Water Le	evel Data	<u>/ / /</u>		2	-0.0	Sample Type	Notes:			_		Ш		
Date	Time	Elapsed Time (hr)				er	<b>O</b> O <sub>I</sub>	pen End Rod nin-Wall Tube	PP = Pocket Penetro No groundwater enothe water table was	countered during	subsu	rfac	e in	vest	igation b	ut wet sampels indicate
						٦:	<b>SS</b> Sp	ndisturbed Sample plit Spoon Sample								
						4	<b>G</b> Gı	rab Sample	1						Boring N	o.: <b>B-16</b>
	st Legend	Tou	tancy: ghness:	L -	None S Low M -	Med	dium F	H - High	Dry Strength: N - Nor	on-Plastic L - Low ne L - Low M - N	1ediur	n I	l - F	n H High	l - High	<del>-</del>
								neter reading. 2.) "p	ppa" denotes soil sample ave pler size. 4.) Soil identifica	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MOT	T DONAL	M	М				SOIL	BORING LO	G						BORING NO.: <b>B-17</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on:	South Ri	pley Solar pley, NY Gen mensions						Project No.: Project Mgr: Field Eng. Staff Date/Time Start			Eric Dieg	Paul o Me	67-001 i elgar 2020 at 9	
Driller/	Helper:	Brian B.	/Harold K	leever					Date/Time Finis	hed:		July	23, 2	2020 at 1	0:30 am
Elevation	n: Grade	t. Verti	ical Datun Samp		ore Barrel	Borin	g Location: See Boring	Location Plan						2.201018° <b>n:</b> NAD 1	<b>Long:</b> -79.720274°
Туре		HSA	SS	;	NQ		lake & Model: Diedrich I		Hammer Type	Dri	illing	j Flι	ıid	Drill Ro	d Size:
Length Inside Di	a. (in.)	5 ft 4.25	2 ft		- in 1.875	☐ Tru		☐ Cat-Head  ✓ Winch	☐ Safety  ☑ Doughnut	□ B □ P					Casing Advance
Hammer Hammer		140 30	140 30		-	✓ Tra		☐ Roller Bit  ✓ Cutting Head	☐ Automatic	□ W ▼ N					Hollow Stem Auger
Hammer		30	30		T -	J						Tes	sts	ı	
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph	Symbo	)	(Density/con constituents, p	al Identification & Description Description   article size, structure, mans, geologic interpretation	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	21	2 4 8 12	13\ 1x\ . X	ML	0.3	Top 4" - TOPSOIL Stiff, brown SILT, some Cl Gravel, moist (ML)	lay, little coarse to fine Sand	, trace fine	- N	L	L	L	PP = 3.5	tsf
-	S-2 2.0'- 4.0'	21	20 16 21 19		ML		Hard, brown SILT, some o	coarse to fine Sand, little Cla	y, moist (ML)	-	L	L	-	PP = 3.0	tsf
<del>-</del> 5	S-3 4.0'- 6.0'	18	8 7 10 15		CL	4.0	Very stiff, brown CLAY, so Gravel, moist (CL)	ome Silt, little coarse to fine \$	Sand, trace fine	s	М	L	-	PP = 3.75	i tsf
-	S-4 6.0'- 8.0'	23	13 25 30 50/3"		CL		Hard, brown CLAY, some Sand, dry (CL)	Silt, little coarse to fine Grav	vel, trace fine	N	М	L	L	PP = 4.0	tsf
-	S-5 8.0'- 10.0'	14	47 36 50/3"		ML		Hard, reddish brown SILT, little Clay, dry (ML)	, some coarse to fine Sand,	little fine Gravel,	-	L	NP	L	PP = 0.5	tsf
— 10 - -	12.0'-'									-	-	-	-		usal at 12 feet on 7/23/2020. cobble or boulder.
_	13.5'-'						Auger refusal at 13.5 feet Top of Rock at 13.5 feet B See Rock Coring Log.	BGS. 3GS.		-	-	-	-	auger refu	to B-17 on 8/11/2020 and hit usal at 13.5 feet BGS. ring at 13.5 feet BGS.
— 15 - -															
		Water Le	vel Data	<u> </u>			Sample Type	Notes:				1	Ш		
Date	Time	Elapsed Time	Dep Bot. of		n <sub>Water</sub>	- О Т	Open End Rod Thin-Wall Tube	PP = Pocket Penetro TV = Torvane		ıber	ioca	in	oeti -	ation	
		(hr)	Casing	of Ho	G	Ü	Undisturbed Sample	No groundwater enc	ounterea auring st	มมรนที	ace	II IV	esug	auOH.	
						_ss	Split Spoon Sample	1							
						G	Grab Sample	1						Borina N	o.: <b>B-17</b>
	st Legend	Tou	tancy: ghness:	L - L	_ow M - N	∕lediun	n H - High I	Dry Strength: N - Non	on-Plastic L - Low le L - Low M - N	1ediur	n F	1 - H	n H ligh	l - High	
							etrometer reading. 2.) "pp on within limitations of samp	oa" denotes soil sample aver der size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MAC		ALC	М	М					CORE BORING L	OG			BORING NO.: <b>B-17</b> Page 1 of 1  505100267-001								
Project	:		South	Ripley	Solar					Project No.:		50	5100	)267-	001			age 1 of 1			
Location	on:	_	South	Ripley	, NY					Project Mgr:		Er	ic Pa	uli							
Client:		_	Conne							Field Eng. St				Melga							
Drilling Driller/					<u>sions, I</u> old Kle					Date/Time St Date/Time Fit			-		0 at 9						
Elevation	_	_		D. /1 Iai		tical Dati	um:		Boring Location: See Boring Location Pl		ilioneu.	$\neg$	_					Long: -79.720274°			
Item Type				<b>sing</b> SA	Co	re Barre NQ		Core Bit p. Diamono										Long79.720274			
Length			Ę	ft		5 ft		6 in	Rig Make & Model: Diedrich D-50			- Dr	illing	Meti	nod: \	vvirei	ine				
Inside Di	<b>a. (in.</b> ) Avg	1	4	.25	1	1.875		1.875	Visual Identification, Description ar	nd Pomarks											
Depth/	Core		Run				1. 0	Stratum	(Rock type, colour, texture, weat	herina.	Depth		Dis	cont	inuitie	es					
Elev. (ft)	Rate (min	(ft)	(Box No.	) (in. / %)	(in /		k Core	Graphic	field strength, discontinuity spa optional additional geological obse	rvations)	(ft.)	(See	Legend	for Rock	Descript	ion Syst	em)	Remarks			
	/ft)		-			Hard.	. Weath	1	SEE TEST BORING LOG FOR OVERBURI			Туре	Dip	Rgh	Wea	Aper	Infill	Silt inclusions			
-	2.35	13.5	5						SHALE, gray, very fine to fine grained, more weathered, weak, very close to close space.	derately ed								observed throughout core			
									discontinuities		14.20	J	10	P,R	DG	VT	ML	run.			
<b>—</b> 15	2.00												_								
											15.00	J	5	P,R	DG	VT	CL				
-	1.35		R-1	59	8	R1	М	==								l					
				98%	13%	<b>'</b>					16.00 16.20	J	10 10	P,R P,R	DG DG	CA VT	CL ML				
	1.48										16.80	J	5	P,R	DG	VT	ML				
	2.29																				
		18.5	5						18.5												
_									End of Boring at 18.5 feet BGS. Borehole backfilled with soil cuttings.												
20																					
_																					
_																					
_																					
_																					
<del></del> 25																					
20																					
-																					
00																					
<del></del> 30																					
-																					
-																					
-																					
			Water			h in fact	t to:	Note	s:				•	•		•					
Date	Tim		Elapse Time	Bo	t. of E	h in feet Bottom	t to:     Wate	.													
		_	(hr) -	Cas	sing (	of Hole	vvatel	-													
		$\Rightarrow$																			
		_+		$\pm$				$\exists$						_		Me •	D 4·	7			
		-T						7						RO	ııng l	NO.:	B-17	1			

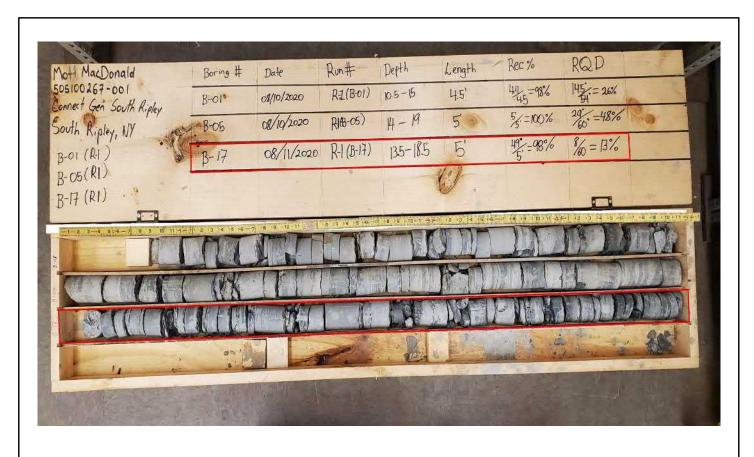


Figure B-17.1 B-17 Box 1 R1 Dry

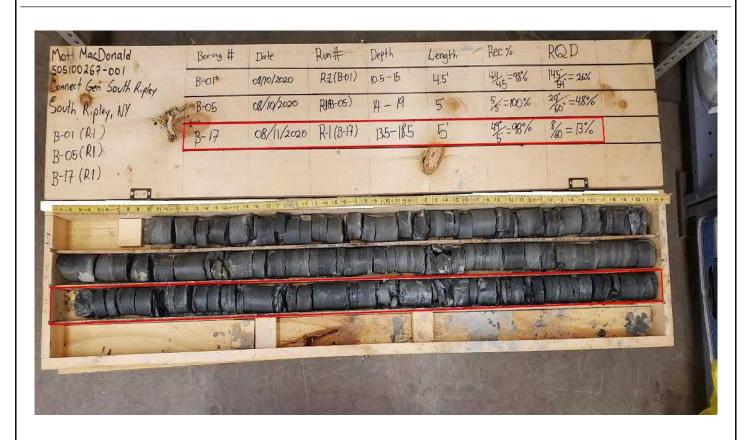


Figure B-17.2 B-17 Box 1 R1 Wet

MOTT M M

South Ripley Solar
Rock Core Photographs

BORING NO.:

B-17

MOT	T DONAL	M	м				SOII	L BORING LO	G						BORING NO.: B-18 Page 1 of 1
Project	: .	South Ri	ipley Sola	-					Project No.:		_5	051	0026	67-001	- ago i oi i
Locatio			ipley, NY						Project Mgr:				Paul		
Client: Drilling		Connect Farth Dir	Gen mensions	Inc					Field Eng. Staff Date/Time Start			_		elgar 2020 at 1	1:02 am
Driller/			/Harold K						Date/Time Finis					2020 at 1	
	ı: Grade f		ical Datun			Borin	g Location: See Boring	Location Plan							<b>Long:</b> -79.720356°
Item Type		Casing HSA	Samp SS		e Barrel	Ria M	lake & Model: Diedrich	D-50	Hammer Type		zoni Iling			n: NAD 1	
Length		5 ft	2 f		-	☐ Tru	uck 🗌 Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimine.	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	☐ AT		✓ Winch  ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer	Fall (in.)	30	30		- 1	☐ Sk	id 🔲	✓ Cutting Head		<b>▼</b> N			. 1		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		)	(Density/cor constituents, p	ual Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy T	Longhness Tough	Plasticity es	Dry Strength		Remarks
_	S-1 0.0'- 2.0' 0.3'-'	19	1 3 6 7	14 18. 14.	ML	0.3	Top 4" - TOPSOIL Stiff, brown SILT, some fit (ML)	ne Sand, trace Clay, trace fir	ne Gravel, moist	- N	Ē	M	-	PP = 3.5	isf
-	S-2 2.0'- 4.0'	19	5 5 5 5		ML		Stiff, light brown SILT, sor Gravel, moist (ML)	me coarse to fine Sand, som	e Clay, trace fine	N	L	М	-	PP > 4.5	tsf
- <del></del> 5	S-3 4.0'- 6.0'	17	6 8 10 11		CL	4.0	Very stiff, brown CLAY, lit (CL)	ttle fine Sand, little Silt, trace	fine Gravel, moist	N	М	L	-	PP = 2.75	i tsf
-	S-4 6.0'- 8.0'	24	10 14 13 16		CL		Very stiff, light brown CLA dry (CL)	AY, some Silt, little fine Grave	el, trace fine Sand,	N	М	L	VH	PP = 2.25	stsf
-	S-5 8.0'- 10.0'	24	7 13 29 41		CL		Hard, dark brown CLAY, s coarse to fine Gravel, moi	some Silt, little coarse to fine ist (CL)	Sand, trace	N	М	L	VH		tsf d bedrock recovered at split spoon.
— 10 - -						11.5									
- 15	S-6 13.0'- 15.0'	24	14 18 24 29		ML		Hard, light gray SILT, son Gravel, little Clay, dry (ML	ne coarse to fine Sand, some	e coarse to fine	-	Н	L	VH	PP = 4.5	sf
- <u>∑</u>	S-7	14	6 23		GC	16.5		arse to fine GRAVEL, some (	Clay, trace Silt,	_	-	-	-		
-	18.0'- 20.0'		30 25			20.0	End of Boring at 20 feet B Borehole backfilled with so	oil cuttings.							
		Water Le		th in fee	et to:	1	Sample Type	Notes: PP = Pocket Penetro	ometer						
Date	Time	Time	Bot. of	Bottom	Wato	-   ° -   T	Open End Rod Thin-Wall Tube	11 - FOCKET FEHELIC	on letel						
7/23/20	11:02	( <b>hr)</b> 0:00	Casing	of Hole 20.0	17	-  ;	Undisturbed Sample								
., 20, 20	11.02	0.00		20.0	<u> </u>	ss	Split Spoon Sample								
					+	G	Grab Sample								
						$\bot$								Boring N	o.: <b>B-18</b>
	st Legend	Tou	tancy: ghness:	L - Lo	w M - N	/lediur	n H - High	Dry Strength: N - Non	on-Plastic L - Low le L - Low M - N	lediur	n F	l - F	ligh		ry High
							etrometer reading. 2.) "pl on within limitations of samp	pa" denotes soil sample aver pler size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ıal method	s per ASTM D2488.

MACI	T DONAL	M	М				SOI	L BORING LO	G						BORING NO.: B-19 Page 1 of 1
Project			ipley Solaı	ſ					Project No.:					67-001	
Location Client:		South Ri	i <u>pley, NY</u> Gen						Project Mgr: Field Eng. Staff				Paul o Me	i elgar	
Drilling			mensions,	, Inc.					Date/Time Start			_		2020 at 1	:45 pm
	Helper:		/Harold K						Date/Time Finis	_	_			2020 at 2	
Elevation	1: Grade f	t. Verti	ical Datum Samp		re Barrel	Bori	ng Location: See Boring	Location Plan						2.201863° <b>n:</b> NAD 1	Long: -79.716425°
Туре		HSA	SS		-		Make & Model: Diedrich		Hammer Type	Dri	lling	j Flu	iid	Drill Ro	d Size:
Length Inside Di	a. (in.)	5 ft 4.25	2 ft		-	☐ Ti		☐ Cat-Head  ✓ Winch	☐ Safety  ✓ Doughnut	□ B					Casing Advance
Hammer Hammer	Wt. (lb.)	140 30	140 30		-	✓ Tı	rack 🗌 Air Track	☐ Roller Bit	☐ Automatic	□ W ▼ N	ate				Hollow Stem Auger
панние		30	30	<u> </u>	T			☑ Cutting Head				Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratun Graphi		)	(Density/co constituents,	ual Identification & Desonsistency, color, Group Neparticle size, structure, mons, geologic interpretations.	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1	17	2	·	CL	0.2	TOP Z TOT COIL	ilt, trace fine Sand, dry (CL)		- N	- M	- L	- H	PP = 4.0	tsf
-	0.0'- 2.0' 0.2'-'		5 7												
-	S-2	20	6		CL		Very stiff, brown CLAY, li	ttle Silt, trace fine Sand, dry (	(CL)	N	М	L	∨н	PP > 4.5	tsf
-	2.0'- 4.0'		11 13												
- 5	S-3 4.0'- 6.0'	24	6 6 9		CL		Very stiff, brown CLAY, s Gravel, dry (CL)	ome Silt, trace fine Sand, tra	ce coarse to fine	N	М	L	VH	PP > 4.5	tsf
-	S-4	24	3		CL		Very stiff, brown CLAY, li	ttle Silt, trace fine Sand, trace	e fine Gravel, dry	N	М	L	н	PP = 3.25	i tsf
-	6.0'- 8.0'		8 11 16				(OL)								
-	S-5 8.0'- 10.0'	24	4 9 13 18		CL		Very stiff, brown CLAY, li (CL)	ttle Silt, trace fine Sand, trace	e fine Gravel, dry	N	М	L	Н	PP > 4.5	tsf
— 10 - -						11.	<u>5</u>			_					
-	S-6 13.0'- 15.0'	24	5 12 12 10		ML		Very stiff, gray SILT, som Sand, dry (ML)	ne Clay, little coarse to fine G	ravel, little fine	s	н	М	н	PP = 1.0	tsf
— 15 - -															
-	S-7 18.0'- 20.0'	20	11 21 32 36		ML			e Sand, little fine Gravel, trace	e Clay, wet (ML)	N	-	NP	-	PP = 0.75	i tsf
				$ \  \  \  $		20	End of Boring at 20 feet I 0 Borehole backfilled with s	BGS. soil cuttings.							
		Water Le		4h : *	-4.4		Sample Type	Notes:							
Date	Time	Elapsed Time	Bot. of	th in fe Botton	<u> </u>	<u>-</u>   •	- 1	PP = Pocket Penetro No groundwater enc		ıbsurf	ace	inve	estia	ation.	
		(hr)	Casing			┛゙		]					9		
						U									
						⊢SS ⊢ G									
						⊣՝՝	Orab Sample							Boring N	o.: <b>B-19</b>
	st Legend	Tou	tancy: ghness:	L - L	ow M - N	Mediu	r R - Rapid ım H - High	Dry Strength: N - Non	on-Plastic L - Low ne L - Low M - N	lediun	n H	l - H	ligh		ry High
							netrometer reading. 2.) "prion within limitations of sam	ppa" denotes soil sample aver pler size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	м				SC	OIL E	ORING LO	)G						BORING NO.: <b>B-20</b> Page <b>1</b> of <b>1</b>
Project	t:	South R	ipley Sola	r						Project No.:		_5	051	002	67-001	- ago i oi i
Locatio	on:		ipley, NY							Project Mgr:	_			Paul		
Client: Drilling	ı Co	Connect	Gen mensions	Inc						Field Eng. Staff Date/Time Start			_		elgar 2020 at 7	20 am
-	Helper:		/Harold K							Date/Time Finis					2020 at 8	
	n: Grade		ical Datun			Bori	ing Location: See Bor	ring Loca	tion Plan							<b>Long:</b> -79.710560°
Item Type		Casing HSA	Samp SS		e Barrel	Ria	Make & Model: Diedr	rich D-50		Hammer Type			tal D ı Flu		n: NAD 1	
Length		5 ft	2 ft	i i	-	□ T	ruck   Tripod		Cat-Head	☐ Safety	□в	ento	nite		Dimite	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	☐ A			Winch Roller Bit	✓ Doughnut  ☐ Automatic	□ P					Hollow Stem Auger
Hammer	Fall (in.)	30	30		-	<u> </u>	kid 🔲	✓ (	Cutting Head		<b>▼</b> N			. 1		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		)	(Density constituen	/consiste ts, partic	entification & Designation of the ency, color, Group of the size, structure, may be a geologic interpretation	lame, noisture,	Dilatancy	Toughness Tough	Plasticity Des	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	16	2 4 8 8	X11,5 X	CL	0.3	- 10p 0 101 001E	Y, some S	ilt, little fine Sand, trac	e fine Gravel, dry	- N	-	Ĺ	Ĺ	PP = 3.0 TV = 0.25	
-	S-2 2.0'- 4.0'	22	6 8 10 8		CL		Very stiff, brown CLA	Y, some S	silt, little fine Sand, dry	(CL)	N	М	L	М	PP = 4.0 TV = 0.50	
5	S-3 4.0'- 6.0'	20	5 5 5 5		CL		Stiff, brown CLAY, so Gravel, moist (CL)	me coarse	e to fine Sand, little Silt	t, trace fine	N	М	L	-	PP > 4.5 TV = 2.0	
-	S-4 6.0'- 8.0'	23	6 12 19 20		ML	6.0		me fine Sa	and, little Clay, trace fir	ne Gravel, moist	s	М	М	-	PP = 3.5 TV = 2.0	
- 10	S-5 8.0'- 10.0'	6	9 20 19 16		CL	8.0		ome Silt, li	ittle fine Gravel, little fir	ne Sand, moist	-	М	L	-	PP = 1.0	tsf
-																
- 15	S-6 13.0'- 15.0'	24	7 10 13 18		CL		Very stiff, gray CLAY,	some Silt	, dry (CL)		N	M	L	Н	PP = 3.75	tsf
-																
-	S-7 18.0'- 20.0'	24	9 10 17 20		CL	20	Very stiff, dark gray C  End of Boring at 20 fe  Borehole backfilled wi	et BGS			N	M	L	H	1-inch of feet BGS	wet Sand recovered at 20
			evel Data			20.	Sample Type		Notes:							
Date	Time	Elapsed Time	Dep Bot. of	th in fee		┦∘	Open End Rod		PP = Pocket Penetro	ometer						
Duit		(hr)	Casing					1	No ground water end	countered during s	ubsur	face	inv	estiç	gation.	
					1	<u>ا</u> ر		' 1								
								oie								
						₽G	Grab Sample								Boring N	o.: <b>B-20</b>
	st Legend	Tou	tancy: ghness:	L - Lo	w M-N	Лediu	/ R - Rapid ım H - High		Strength: N - Nor	on-Plastic L - Low ne L - Low M - N	lediur	n F	l - l-	n H ligh	l - High	
							netrometer reading. 2. ion within limitations of s		enotes soil sample aver ze. 4.) Soil identifica	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	м					SOIL	BORING LO	G						BORING NO.: <b>B-21</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on: g Co.:	South Ri Connect Earth Di	mensions,	, Inc.						Project No.: Project Mgr: Field Eng. Staff Date/Time Start	ed:	E	ric l	Paul	67-001 i elgar	rage rorr
	Helper: n: Grade t		/Harold Kical Datum			Borine	g Location: See	Roring I	ocation Plan	Date/Time Finis		rd.:	La	t: 42	.197866°	Long: -79.708183°
Item	0.440	Casing	Samp	ler Co	e Barrel	· ·					Hori	zon	al D	atun	n: NAD 1	983
Type Length		HSA 5 ft	SS 2 ft		-	Rig M	ake & Model: D		0-50 ☐ Cat-Head	Hammer Type ☐ Safety	Dri □ B	lling ento		id	Drill Ro	d Size: Casing Advance
Inside Di		4.25	1.37	5	-	□ AT	V □ Geo	probe	<b>☑</b> Winch	✓ Doughnut	□Р	olyn	ner			Hollow Stem Auger
Hammer Hammer		140 30	140 30		-	✓ Tra		rack	☐ Roller Bit  Cutting Head	☐ Automatic	□ W ▼ N		•			3
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		3	Visual (Der constit	sity/consuents, pa	al Identification & Desc sistency, color, Group Narticle size, structure, mans, geologic interpretation	ame, oisture,		ield ssaudbno_		Strength	•	Remarks
	S-1 0.0'- 2.0'	18	1 2 5	17. 18. 1st	ML	$\overline{}$	Top 4" - TOPSOI	L .	some Clay, trace fine Sand,		- N	- L	- L	Dry	PP = 1.75	tsf
-	0.3'-' S-2 2.0'- 4.0'	24	7 4 5 5 7		CL		Stiff, dark brown (CL)	CLAY, littl	e Silt, little fine Sand, trace	fine Gravel, moist	s	М	L	-	PP = 3.0 t	tsf
<del>-</del> 5	S-3 4.0'- 6.0'	22	3 6 5 5		CL		Stiff, brown CLAY moist (CL)	', little Silt	, little coarse to fine Gravel,	trace fine Sand,	N	М	L	-	PP = 2.75	i tsf
-	S-4 6.0'- 8.0'	19	4 5 7 13		CL		moist (CL)		/, little coarse to fine Sand,		N		L	-	PP = 1.75	
- 10	S-5 8.0'- 10.0'	24	7 9 13 20		CL		Very stiff, brown \$ moist (CL)	Silty CLAY	∕, little coarse to fine Sand, '	trace fine Gravel,	N	М	L	Н	PP > 4.5 t	sf
-	S-6	24	4		CL		Very stiff, gray Cl	.ΑΥ. some	e Silt, little fine Sand, trace f	īine Gravel. moist	N	L	н	_	PP = 3.5 i	tsf
- 15 	13.0'- 15.0'		6 12 17				(CL)									
-	S-7 18.0'-	20	21 26 36		SM			gray to br	own SAND, some Silt, some	e Clay, trace fine	-	-	NP	N		
	20.0'		34		1		End of Boring at 2	20 feet RO	AS.							
			<u> </u>		:[	20.0	Borehole backfille	d with soi	l cuttings.							
		Water Le	evel Data Den	oth in fee	et to:	_	Sample Typ		Notes:  PP = Pocket Penetro	meter						
Date	Time	Time	Bot. of	Bottom	Water	-   °	Open End Roo		No groundwater enco		ubsurf	ace	inve	estig	ation.	
		(hr)	Casing	of Hole	vvale	T U	Thin-Wall Tub			-				J		
					$\perp$	ss	Undisturbed S Split Spoon Sa	•	1							
							Grab Sample	an ipie	1							
					1	$\dashv$ "	JIAN JAITIPIE		1						Boring N	o.: <b>B-21</b>
	st Legend	Tou	tancy: ghness:	L - Lo	w M - N	Medium	R - Rapid n H - High		Ory Strength: N - Non-	n-Plastic L - Low e L - Low M - N	lediun	n F	1 - H	ligh		ry High
							trometer reading. n within limitations		a" denotes soil sample aver er size. 4.) Soil identificat	age axial pocket pen ions and field tests b					ıal method	s per ASTM D2488.

MACI	T DONAL	М	м				SOIL	BORING LO	G						BORING NO.: <b>B-22</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on:	South Ri							Project No.: Project Mgr: Field Eng. Staff: Date/Time Start			ric Dieg	Paul o Me	67-001 i elgar 2020 at 8	
	Helper:		/Harold K						Date/Time Finis		_	_		2020 at 9:	
Elevation	n: Grade f	t. Verti	cal Datum Samp		ore Barrel		ng Location: See Boring I	Location Plan						2.194130° <b>n:</b> NAD 1	<b>Long:</b> -79.709753°
Туре		HSA	SS		-	Rig I	Make & Model: Diedrich		Hammer Type	Dri	lling	j Flu	iid	Drill Ro	d Size:
Length Inside Di	a. (in.)	5 ft 4.25	2 ft 1.37		-	∏ Tı		☐ Cat-Head  ✓ Winch	☐ Safety  ✓ Doughnut	□ B					Casing Advance
Hammer	Wt. (lb.)	140	140 30		-	Tr	ack 🗌 Air Track	☐ Roller Bit	☐ Automatic	$\square$ W	ate				Hollow Stem Auger
Hammer		30	30		<del>-</del>	□ si		✓ Cutting Head	Ш	<b>V</b> N F	one ield	Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph	nic Symb	p	(Density/con constituents, p	al Identification & Desc sistency, color, Group N article size, structure, mons, geologic interpretation	ame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1 0.0'- 2.0' 0.3'-'	17	2 2 4 6		ML	0.3	Top 3" - TOPSOIL  Medium stiff, dark brown S	SILT, some Clay, little fine Sa	and, dry (ML)	N	Ĺ	L	M	PP > 4.5 TV = N/A	sf
-	S-2 2.0'- 4.0'	24	5 6 6 7		ML		Stiff, brown SILT, some Cla (ML)	ay, little fine Sand, trace fine	Gravel, moist	N	L	L	-	PP = 2.0	sf
													PP = 2.5	sf	
- - <u>Ā</u>	S-4 6.0'- 8.0'	17.5	4 5 5 4		CL		Stiff, brown CLAY, some S fine Gravel, wet (CL)	silt, some coarse to fine San	d, trace coarse to	N	М	L	-	PP = 2.25	tsf
- - 10	S-5 8.0'- 10.0'	20	9 12 16 14		ML	8.0	Very stiff, light brown SILT, Clay, wet (ML)	, some fine Sand, some fine	Gravel, little	s	L	L	-	PP = 1.0	sf
- - - - - 15	S-6 13.0'- 15.0'	24	16 18 19 21		ML		Hard, light brownish gray S little coarse to fine Gravel,	SILT, some Clay, little coarse wet (ML)	to fine Sand,	Ν	L	L	-	PP = 3.75	tsf
-	S-7 18.0'- 20.0'	18.5	15 15 22 30		ML	20.	fine Gravel, wet (ML)  End of Boring at 20 feet Bo  Borehole backfilled with so	il cuttings.	I, trace coarse to	N	L	L	-	PP > 4.5	sf
		Water Le Elapsed		th in 1	eet to:		Sample Type Open End Rod	Notes:  PP = Pocket Penetro	meter						
Date	Time	Time	Bot. of				Thin-Wall Tube	TV = Torvane							
7/27/20	9:55	(hr) -	Casing	of Ho		u	Undisturbed Sample								
						ss	•								
						⊟ G	Grab Sample							Darin **	B 22
	st Legend	Tou	ancy: ghness:	L-	Low M -	Mediu	m H - High [	Ory Strength: N - Non-	n-Plastic L - Low e L - Low M - M	lediun	n H	l - F	n H ligh	- High	o.: <b>B-22</b> ry High
							etrometer reading. 2.) "pp on within limitations of sampl	a" denotes soil sample aver ler size. 4.) Soil identificati	age axial pocket pen- ions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	М	м				SOII	L BORING LO	G						BORING NO.: <b>B-23</b> Page <b>1</b> of <b>1</b>
Project	:	South R	ipley Solar						Project No.:		_ (	5051	002	67-001	Fage 1 01 1
Location	on:		ipley, NY						Project Mgr:				Paul		
Client:	. Co .	Connect	<u>Gen</u> mensions,	lna				<del></del>	Field Eng. Staff Date/Time Start			_		elgar	2.50 mm
Drilling Driller/	Helper:		/Harold K						Date/Time Start					<u>2020 at 1</u> 2020 at 1	
	1: Grade		ical Datum			Borin	g Location: See Boring	Location Plan		_	_	_			Long: -79.706230°
Item		Casing HSA	Samp SS	ler Co	e Barrel	Dia M	lake & Model: Diedrich	D 50	Hammar Time			tal C		n: NAD 1	
Type Length		5 ft	2 ft		-	☐ Tru		☐ Cat-Head	Hammer Type ☐ Safety	□ B				Dilli Ko	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	☐ AT  ✓ Tra		✓ Winch  ☐ Roller Bit	✓ Doughnut  ☐ Automatic	□ P					Hollow Stem Auger
Hammer		30	30		- 1	☐ Ski		✓ Cutting Head		<b>▼</b> N	one				
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		)	(Density/cor constituents, p	nal Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, noisture,	Dilatancy	ıς	Tes Hasticity	Dry Strength St		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	22	1 2 4 7	<u> </u>	CL	0.3	Top 4" - TOPSOIL Medium stiff, brown CLAY moist (CL)	/, some Silt, trace fine Sand,	, trace fine Gravel,	- S	M	L	-	PP = 1.5	tsf
-	S-2 2.0'- 4.0'	24	6 6 10 12		CL		Very stiff, brown CLAY, so	ome Silt, trace fine Gravel, d	iry (CL)	s	М	L	н	PP > 4.5	tsf
- <del></del> 5	S-3 4.0'- 6.0'	24	6 7 10 14		CL		Very stiff, brown CLAY, so	L	м	PP > 4.5	tsf				
-	S-4 6.0'- 8.0'	24	5 8 11 13		CL		Very stiff, brown CLAY, so Gravel, dry (CL)	ome Silt, trace coarse to fine	e Sand, trace fine	N	М	L	М	PP > 4.5	tsf
- - — 10	S-5 8.0'- 10.0'	24	9 7 10 14		CL		Very stiff, brown CLAY, so (CL)	ome Silt, trace fine Sand, tra	N	М	L	Н	PP > 4.5	tsf	
-	S-6	24	6 5		CL		Stiff, gray CLAY, some Sil dry (CL)	lt, trace fine Gravel, trace co	parse to fine Sand,	N	М	L	н	PP = 3.5	tsf
— 15 -	13.0'- 15.0'		7 10			16.5				_					
-	S-7 18.0'- 20.0'	18	8 17 33 21		ML	20.0	Hard, brown SILT, some of Gravel, little Clay, moist (Notes to Boring at 20 feet Borehole backfilled with some	ags.	oarse to fine	N	н	L	-	PP = 4.5	tsf
			vel Data				Sample Type	Notes:				_			
Date	Time	Elapsed Time	Dep Bot. of	th in fee		0	Open End Rod	PP = Pocket Penetro	ometer						
Duit		(hr)	Casing			┛.	Thin-Wall Tube								
					1	U	Undisturbed Sample								
						SS	Split Spoon Sample								
						∃ <sup>G</sup>	Grab Sample							Boring N	o.: <b>B-23</b>
Field Te	st Legend		tancy:						on-Plastic L - Low						
		Tou	ghness:	L - Lo	w M-N	∕lediun	n H - High	Dry Strength: N - Nor	ne L-Low M-M	1ediur	n I	1 - H	ligh		ry High
							etrometer reading. 2.) "pp on within limitations of samp	pa" denotes soil sample aver pler size. 4.) Soil identifica	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MOT	T DONAL	M	М				SOII	L BORING LO	G						BORING NO.: <b>B-24</b> Page <b>1</b> of <b>1</b>
Project			ipley Solaı	r					Project No.:		_			67-001	
Locatio			ipley, NY						Project Mgr:				Paul		
Client: Drilling		Connect Farth Di	mensions	Inc					Field Eng. Staff: Date/Time Starte		_			elgar 2020 at 2	00 pm
-	Helper:		/Harold K						Date/Time Finis					2020 at 3	
	1: Grade f		ical Datun			Boriı	ng Location: See Boring	Location Plan							Long: -79.706700°
Item Type		Casing HSA	Samp SS		re Barrel	Ria I	Make & Model: Diedrich	D-50	Hammer Type			tal D		n: NAD 1	
Length		5 ft	2 ft	i		□ Tr	uck	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimite	Casing Advance
Inside Di Hammer		4.25 140	1.37			☐ Aī <b>V</b> Tr		✓ Winch  ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer		30	30			□ Si		✓ Cutting Head		<b>▼</b> N	one				
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic			(Density/cor constituents, p	nal Identification & Desc nsistency, color, Group No particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy T	<sub>Ω</sub>	Plasticity Ea	Dry Strength St		Remarks
	S-1	22	1	71 1/1	4	0.6	Top 8" - TOPSOIL			T-	-	-	-		
_	0.0'- 2.0'		3 5	////	CL	0.0	Stiff, light brown CLAY, so Gravel, dry (CL)	ome Silt, little coarse to fine S	Sand, trace fine	N	L	L	L	PP = 2.5	tsf
	0.6'-'		6		1		Graver, dry (CL)								
_					4	2.0									
	S-2	20	6 7		ML		Very stiff, brown SILT, sor Gravel, moist (ML)	me Clay, some coarse to fine	e Sand, trace fine	S	L	L	-	PP = 3.0	tsf
_	2.0'- 4.0'		8				, , ,								
			12												
_					l										_
	S-3	22	4 5		ML		Stiff, brown SILT, some fir (ML)	ne Sand, little Clay, little fine	Gravel, moist	S	L	L	-	PP = 3.0	tsf
<del></del> 5	4.0'- 6.0'		5												
			4												
-	0.4	40	0		,,,		\/	6 O t t	- for - OI		١.	١.		DD - 4.00	
	S-4	16	6 10		ML		trace Clay, moist (ML)	me fine Sand, trace coarse to	o fine Gravel,	R	L	L	-	PP = 1.25	o tsi
_	6.0'- 8.0'		19												
			24												
-	0.5	40	44		,,,		Used become OUT some 6	O	O to					DD - 0.00	
	S-5	10	14 25		ML		Clay, dry (ML)	ine Sand, little coarse to fine	Gravei, trace	-	-	-	-	PP = 0.25	) ISI
-	8.0'- 10.0'		50/5"												
<del></del> 10															
-															
-															
-	S-6	15	18		ML		Hard gray SILT some fine	e Sand, trace fine Gravel, dr	ov (ML)			NP		PP = 1.5	tef
		15	47		IVIL		riald, gray SILT, Some illi	e Sand, trace fine Graver, dr	y (IVIL)	-	-	INF		FF = 1.5	ioi
-	13.0'- 15.0'		50/4"												
<del></del> 15															
-						1	-								
				$b \psi \psi$	十	16.5	2			-					
-				6 D9/	4										
				1919	1										
-	S-7	18	38	14 X	GM GM			GRAVEL, some Silt, little Cla	ay, trace coarse to	-	-	NP	н	PP = N/A	
	18.0'-		50/5"			18.9	fine Sand, dry (GM)								
-	18.9'						End of Boring at 18.9 feet Borehole backfilled with so	BGS.	<u> </u>						
						$\perp$							$\lfloor \rfloor$		
			vel Data	oth in fe	at to:	1	Sample Type	Notes:							
Date	Time	Elapsed Time	Bot. of	Bottom	Water	<b>-</b>   °	Open End Rod	PP = Pocket Penetro No groundwater enco		ıbsurf	ace	inve	estia	ation.	
		(hr)	Casing			<b>⊣</b> `	Thin-Wall Tube		5	-			3		
					$\perp$	_ U SS	Undisturbed Sample Split Spoon Sample								
						33   G	Grab Sample								
						Ť								Boring N	o.: <b>B-24</b>
Field Tes	st Legend		tancy:						on-Plastic L - Low						n, High
NOTES:	1 ) "nnd" de		ghness: sample ave					Dry Strength: N - Non pa" denotes soil sample aver	e L - Low M - M				<u> </u>	vH - Ve	ıy mıgn
							etrometer reading. 2.) "pp on within limitations of samp		rage axial pocket pend tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	М	м				SOI	L BORING LO	G						BORING NO.: <b>B-25</b> Page <b>1</b> of <b>1</b>
Project	t:	South R	ipley Sola	r					Project No.:		_5	5051	002	67-001	- ago i oi i
Locatio			ipley, NY						Project Mgr:	_			Paul		
Client: Drilling		Connect Farth Di	<u>Gen</u> mensions	Inc					Field Eng. Staff: Date/Time Start			_		elgar 2020 at 1	):15 am
-	Helper:		/Harold K						Date/Time Finis					2020 at 1	
	n: Grade		ical Datun			Bori	ng Location: Offset 10 fe	eet North.							<b>Long:</b> -79.708745°
Item Type		Casing HSA	Samp SS		re Barrel	Ria	Make & Model: Diedrich	D-50	Hammer Type			tal C 3 Flu		n: NAD 1 Drill Ro	
Length		5 ft	2 ft	t	-	□ Tı	ruck	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimite.	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	☐ A		✓ Winch  ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer	Fall (in.)	30	30		-	□s	kid 🗌	✓ Cutting Head		<b>▼</b> N			. 1		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		)	(Density/co constituents,	ual Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy T	Longhness Toughor	Plasticity Es	Dry Strength		Remarks
	S-1	14	1	71 N 71		0.5					-	-	-		
_	0.0'- 2.0'		2		CL		Medium stiff, dark brown Gravel, dry (CL)	CLAY, some Silt, little fine Sa	and, trace fine	s	М	L	ᅵᅵ	PP = 3.75	tsf
	0.5'-'		3		7		,, (,								
_					1										
	S-2	20	4 7		CL		Stiff, brown CLAY, some (CL)	Silt, little fine Sand, trace fine	e Gravel, moist	N	М	L	-	PP = 4.0	tsf
_	2.0'- 4.0'		7		1		,								
			9												
_					1					١					
	S-3	24	5 7		CL		Stiff, brown CLAY, some (CL)	Silt, little fine Sand, trace fine	e Gravel, moist	N	М	L	-	PP = 4.5 Mottling of	tsf bserved son sample at 4 feet
<del></del> 5	4.0'- 6.0'		7		1									BGS.	
			9		7										
_	0.4				1					١	١.,	١.		DD: 45	
	S-4	24	8 10		CL		(CL)	ttle Silt, little fine Sand, trace	fine Gravel, moist	N	М	L	-	PP > 4.5	IST
_	6.0'- 8.0'		11		1										
			17												
-	S-5	12	10		A GC	8.0		area to fine Crovel some ser	avan ta fina Cand	$\dashv_{N}$	Ь			PP > 4.5	naf
		12	10 12				some Clay, little Silt, wet	parse to fine Gravel, some coa (GC)	arse to fine Sand,	N	"	L	-	PP > 4.5	IST
-	8.0'- 10.0'		13		3										
			15	XX	3										
<del></del> 10					$\langle$										
					K										
-					)										
				9//	<del></del>	- 11.	<u>5</u>			-					
-															
-	S-6	14	18		ML		Very stiff, brown to gray S	SILT, some coarse to fine Sai	nd, some coarse	R	١.	NP		PP = 2.5	tsf
	13.0'-		16				to fine Gravel, trace Clay,	, moist (ML)						Weathere	d bedrock recovered at 13
-	15.0'		13 14												
			14												
<del></del> 15															
-						16.	5								
					才	Ť.,				_					
-					1										
-	S-7	24	10		CL		Very stiff, gray CLAY, sor Gravel, moist (CL)	me Silt, little fine Sand, trace	coarse to fine	N	М	L	-		
	18.0'-		9				Gravei, moist (CL)								
-	20.0'		11 15		1		End of Paris = + 00 f - + 5	208							
					1	20.	End of Boring at 20 feet E Borehole backfilled with s	soil cuttings.			L	L			
		Water Le	evel Data	oth in fe	et to:	Ŧ	Sample Type	Notes:	amotor						
Date	Time	Time	Bot. of	Bottom	Wato	,   °	- 1	PP = Pocket Penetro No groundwater enc		ubsurf	ace	inv	estig	ation.	
		(hr)	Casing	of Hole	vvale	ין ט	Thin-Wall Tube Undisturbed Sample		-				,		
							•								
						G									
						1	·							Boring N	o.: <b>B-25</b>
Field Te	st Legend		tancy: ghness:				R - Rapid m H - High		on-Plastic L - Low ne L - Low M - W						rv High
NOTES:	1.) "ppd" de							ppa" denotes soil sample aver					<u> </u>	vii- ve	ı y ı 11911
							on within limitations of sam		tions and field tests b					ual method	s per ASTM D2488.

MACI	T DONAL	M	м				SOIL	BORING LO	G						BORING NO.: <b>B-26</b> Page <b>1</b> of <b>1</b>
Project	:	South R	ipley Sola	r					Project No.:		_ 5	5051	0026	67-001	1 age 1 of 1
Location			ipley, NY						Project Mgr:				Paul		
Client:		Connect							Field Eng. Staff:		_			elgar	
Drilling	j Co.: Helper:		mensions /Harold K						Date/Time Starte Date/Time Finis					2020 at 1 2020 at 1	
	1: Grade f		ical Datun			Bo	oring Location: See Boring L	ocation Plan	Date/Time Finis		_	_			Long: -79.710005°
Item		Casing			ore Barrel	1				Hori	zon	tal D	atun	n: NAD 1	983
Type		HSA 5 ft	SS 2 ft		-		g Make & Model: Diedrich ☐ Truck ☐ Tripod	D-50 ☐ Cat-Head	Hammer Type  ☐ Safety	Dri		Flu		Drill Ro	d Size: Casing Advance
Length Inside Di	a. (in.)	4.25	1.37		-		ATV Geoprobe	☐ Cat-Head  Winch	☐ Salety  ☑ Doughnut	□Р					Hollow Stem Auger
Hammer Hammer		140 30	140 30		-		Track ☐ Air Track Skid ☐	☐ Roller Bit	☐ Automatic	□ W ✓ N	ate	r			Hollow Sterri Auger
папппе		30	30		Ť	۲		✓ Cutting Head	LU			Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph	ic Symb	р	(Density/con constituents, p	al Identification & Desc sistency, color, Group N article size, structure, m ns, geologic interpretation	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	18	2 2 3 4		ML		2.3 Top 3" - TOPSOIL  Medium stiff, brown SILT, s dry (ML)	some Clay, trace fine Grave	I, trace fine Sand,	- N	Ē	Ĺ	١.	PP = 1.25	i tsf
-	S-2 2.0'- 4.0'	20	7 7 7		ML		Stiff, brown SILT, some Cla Gravel, moist (ML)	ay, little coarse to fine Sand	, trace fine	N	L	L	L	PP = 1.25	i tsf
- 5	S-3 4.0'- 6.0'	16	7 4 6 5		ML		Stiff, brown SILT, some fin (ML)	e Sand, little Clay, trace fine	e Gravel, moist	N	L	L	-	PP = 1.25	i tsf
-	S-4	19	7 5 6		SM	6	6.0  Medium dense, brown fine Gravel, moist (SM)	SAND, some Silt, trace Cla	y, trace fine	s	L	NP	-		
-	6.0'- 8.0'		7 6			8	3.0								
- 10	S-5 8.0'- 10.0'	18	4 4 12 23		ML		Gravel, wet (ML)	ne coarse to fine Sand, little	Ciay, trace line	S	L	L	-	PP = 1.25	) ISI
-	S-6	22	20		CL	1	Hard brown CLAY some S	Silt, some fine Sand, trace f	ine Gravel dry	_   N	н	L		PP = 2.75	i tef
- 15	13.0'- 15.0'		40 32 50/5"				(CL)		ine Gutor, ay					2.10	
-	S-7	17	12		ML	_	Hard, gray SILT, some fine	e Sand, trace fine Gravel, tr	ace Clay, dry (ML)	_	L	L	-		
-	18.0'- 19.4'		43 50/5"			1	9.4 End of Boring at 19.4 feet								
		Water Le	evel Data	<u> </u>		$\dashv$	Borehole backfilled with so Sample Type	il cuttings. Notes:				1			
D: 1	T	Elapsed	Dep	th in f		7	O Open End Rod	PP = Pocket Penetro					.,		
Date	Time	Time (hr)	Bot. of Casing				T Thin-Wall Tube	No groundwater ence	ountered during su	ıbsurf	ace	inve	estig	ation.	
		("")	Casing	01 110		_	U Undisturbed Sample								
						_	SS Split Spoon Sample								
					+		<b>G</b> Grab Sample							_	
														Boring N	o.: <b>B-26</b>
Field Tes	st Legend		tancy: ghness:						on-Plastic L - Low e L - Low M - M						ry High
		enotes soil	sample ave	rage dia	metral pocl	ket p		a" denotes soil sample aver		etrome	eter i	eadi	ng.		

MACI	T DONAL	M	м				SOII	L BORING LO	G						BORING NO.: <b>B-27</b> Page <b>1</b> of <b>1</b>
Project	: ,	South R	ipley Sola	r				_	Project No.:		5	051	0026	67-001	r age r or r
Location			ipley, NY						Project Mgr:				Paul		
Client:		Connect							Field Eng. Staff		_			elgar	
Drilling	j Co.: Helper:		mensions /Harold K						Date/Time Start Date/Time Finis					2020 at 1 2020 at 2	
	1: Grade f		ical Datun			Bori	ng Location: See Boring	Location Plan	Date/Time Tims		_	_			Long: -79.712841°
Item		Casing			re Barrel					Hori	zon	tal D	atun	n: NAD 1	983
Type Length		HSA 5 ft	SS 2 ft		-	Rig □ T	Make & Model: Diedrich ruck  Tripod	D-50  Cat-Head	Hammer Type ☐ Safety	Dri □ B		Flu		Drill Ro	d Size: Casing Advance
Inside Di		4.25	1.37	5	-	$\square$ A	TV ☐ Geoprobe	✓ Winch	✓ Doughnut	□Р	olyn	ner			Hollow Stem Auger
Hammer Hammer		140 30	30		-	✓T □ S		☐ Roller Bit  Cutting Head	☐ Automatic	□ W ☑ N					nonow otem Auger
Hammer		30	30		<u> </u>	T		•				Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratui Graph		,	(Density/cor constituents, p	ual Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	20	2 1 2 7	1 1 <sub>2</sub>	ML	0.3	<u> </u>	Clay, little fine Sand, trace fine	e Gravel, dry (ML)	- N	L	L	L	PP = 1.0	tsf
-	S-2 2.0'- 4.0'	19	6 4 5 4		ML		Stiff, brown SILT, some C	Clay, little fine Sand, little fine	Gravel, dry (ML)	N	L	L	L	PP = 0.25	i tsf
<del>-</del> 5	S-3 4.0'- 6.0'	19	2 2 2 2		CL	4.0		Y, some Silt, little coarse to fin	ne Gravel, trace	N	М	L	-	PP = 1.0	tsf
-	S-4 6.0'- 8.0'	6	2 2 1 2		CL		Soft, brown CLAY, some Gravel, wet (CL)	Silt, some coarse to fine San	nd, trace fine	R	М	L	-	PP = 1.25	i tef
- <u>∑</u> - -10	S-5 8.0'- 10.0'	9	2 5 9 8		sc	8.0		arse to fine SAND, some coa t, wet (SC)	arse to fine	-	-	-	-		
-	S-6	20	9		ML	11.		fine Sand, little Clay, trace fin	ne Gravel, wet	_     N	L	L	-	PP = 1.75	i tsf
- 15 	13.0'- 15.0'		25 34 50/5"				(WL)								
-	S-7 18.0'- 18.9'	16	41 50/5"		ML	18.	wet (ML)	Sand, little Clay, little coarse	to fine Gravel,	N	L	L	L		
							Borehole backfilled with so								
		Waterla	evel Data			+	Sample Type	Notes:			1				
		Elapsed	Dep	th in fe		١,		PP = Pocket Penetro	ometer						
Date	Time	Time	Bot. of			1		No groundwater ence		ıbsurf	ace	inve	estig	ation.	
7/28/20	14:15	(hr) -	Casing 5.0	of Hol 18.9	<b>e</b> 8	ان									
				. 5.5	Ť	S	•								
					-	G									
							·							Boring N	o.: <b>B-27</b>
Field Tes	st Legend		tancy: ghness:						on-Plastic L - Low le L - Low M - N						ry High
							netrometer reading. 2.) "prion within limitations of samp	pa" denotes soil sample aver pler size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	м					SOII	L BORING LC	G						BORING NO.: <b>B-28</b> Page 1 of 1
Project	t:	South R	ipley Solar	-						Project No.:		_ [	051	002	67-001	1 490 1 01 1
Location			ipley, NY							Project Mgr:				Paul		
Client: Drilling		Connect	<u>Gen</u> mensions.	Inc						Field Eng. Staff Date/Time Start		_			elgar 2020 at 9	:30 am
-	Helper:		/Harold K							Date/Time Start					2020 at 9 2020 at 1	·
	n: Grade f		ical Datun	1:		Bor	ring	Location: See Boring	Location Plan		Coo	_	_			<b>Long: -</b> 79.704606°
Item Type		Casing HSA	Samp SS		e Barrel	Dia	Mak	ke & Model: Diedrich	D 50	Hammer Type			tal D		n: NAD 1	
Length		5 ft	2 ft		-		Truck	k 🗌 Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite		Dilling	Casing Advance
Inside Di Hammer		4.25 140	1.37		-		ATV Track		✓ Winch  ☐ Roller Bit	✓ Doughnut  ☐ Automatic	□ P					Hollow Stem Auger
Hammer		30	30		,-				✓ Cutting Head		<b>▼</b> N	one				
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		)		(Density/con constituents, p	nal Identification & Des nsistency, color, Group No particle size, structure, mons, geologic interpretations	Name, noisture,	Dilatancy	y <sub>2</sub>	Plasticity Tes	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	18	2 3 3 3	13(1)2:3(1)	CL	0.3		op 4" - TOPSOIL ledium stiff, brown CLAY	, some Silt, little fine Sand,	dry (CL)	- S	- M	Ĺ	- L	PP = 0.75	5 tsf
-	S-2 2.0'- 4.0'	15	6 8 7 8		ML	2.0	S	tiff, brown SILT, some C Fravel, dry (ML)	clay, some fine Sand, little co	parse to fine	s	L	М	L	PP = 1.25	5 tsf
- 5	S-3 4.0'- 6.0'	18	9 6 5 5		SM	4.0	M	fedium dense, brown coa carse to fine Gravel, moi	arse to fine SAND, some Sil ist (SM)	t, little Clay, trace	-	-	-	-		
-	S-4 6.0'- 8.0'	17	5 2 2 6		ML	6.0	М	ledium stiff, brown SILT, cravel, wet (ML)	some fine Sand, little Clay,	little coarse to fine	R	L	L	-	PP = 0.75	5 tsf
- - 10	S-5 8.0'- 10.0'	16	11 11 16 22		ML			ery stiff, brown SILT, soi lay, wet (ML)	me coarse to fine Sand, little	e fine Gravel, trace	R	L	L	-	PP = 2.25	5 tsf
-	S-6	15	17		SM	11	1. <u>5</u>	env danse brown coarse	e to fine SAND, some Silt, lit	tle coarse to fine	_     R		NP			
- 15 	13.0'- 15.0'	15	30 39 43		SM			ery derise, brown coarse fravel, trace Clay, wet (S		ue coarse to line	K	L	INP	-		
-	S-7 18.0'- 20.0'	20	24 37 47 39		SM	20	E	ery dense, brown coarse coarse to fine Gravel, wet and of Boring at 20 feet B orehole backfilled with so	ags.	tle Clay, little	R	L	L	-		
			vel Data	41		Ť		Sample Type	Notes:							
Date	Time	Elapsed Time	Dep Bot. of	th in fee Bottom				Open End Rod	PP = Pocket Penetr	ometer						
		(hr)	Casing			┛ൎ		Thin-Wall Tube								
					+	٦٩		Undisturbed Sample								
								Split Spoon Sample Grab Sample								
					+	۱,	) د	oran oarripie							Boring N	o.: <b>B-28</b>
	st Legenc	Tou	tancy: ghness:	L - Lo	w M - N	Лedi	ium	H - High	Dry Strength: N - Nor	on-Plastic L - Low ne L - Low M - N	1ediur	n ŀ	<del>  -  </del>	ligh		ry High
								ometer reading. 2.) "p within limitations of samp	pa" denotes soil sample ave bler size. 4.) Soil identifica	rage axial pocket pen itions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	м					SOII	BORING LO	G						BORING NO.: <b>B-29</b> Page <b>1</b> of <b>1</b>
Project	t: ,	South R	ipley Solaı	ſ						Project No.:		_ 5	051	0026	67-001	
Locatio	on:		ipley, NY							Project Mgr:	_			Pauli		
Client: Drilling	ı Co ·	Connect Farth Di	<u>Gen</u> mensions.	Inc						Field Eng. Staff: Date/Time Start					elgar 2020 at 3:	00 pm
-	Helper:		/Harold K							Date/Time Finis					2020 at 4:	-
	n: Grade		ical Datum				Boring	Location: See Boring	Location Plan							Long: -79.705694°
Item Type		Casing HSA	Samp SS		ore Ba		Ria Ma	ake & Model: Diedrich I	D-50	Hammer Type			al D Flu		n: NAD 1 Drill Ro	
Length		5 ft	2 ft		-		☐ Truc	ck 🗌 Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimine.	Casing Advance
Inside Di Hammer		4.25 140	1.37		-		□ ATV <b>⊻</b> Trad	—p	✓ Winch  ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer	Fall (in.)	30	30				Skid	<u> </u>	✓ Cutting Head		<b>▼</b> N		_			
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Grapi	um   Gi	SCS roup mbol		(Density/cor constituents, p optional descriptio	al Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy T	ıς	Plasticity Sel	Dry Strength 6		Remarks
	S-1	17	2	71/2			0.5	Top 6" - TOPSOIL				-		-		
_	0.0'- 2.0'		5		'	ML		Stiff, dark brown SILT, little (ML)	e Clay, little fine Sand, trace	fine Gravel, dry	N	L	М	L	PP = 1.25	tsf
	0.5'-'		8				`	,								
_				IJŢ	Д_		2.0				┨	l				
	S-2	21	10 8		// '	CL		Very stiff, brown CLAY, so Gravel, dry (CL)	ome Silt, little coarse to fine S	Sand, trace fine	N	М	L	L	PP = 2.5	lsf
-	2.0'- 4.0'		12													
			11													
_	0.0	- 10				01	١.		0.11 1.11 5 0 1 1	···		l. <i>.</i>			DD 475	
	S-3	16	6 4		// '	CL		Medium stiff, brown CLAY moist (CL)	, some Silt, little fine Sand, li	ittle fine Gravel,	S	М	L	-	PP = 1.75	tsf
<del></del> 5	4.0'- 6.0'		3													
			5													
-	S-4	19	5	44	4,	ML	6.0	Stiff brown SILT come of	paras to fine Sand little Clay	trace coarse to	-s	١,	м		PP = 2.5	of
		19	4		'	IVIL		Stiff, brown SILT, some co fine Gravel, moist (ML)	parse to fine Sand, little Clay	, trace coarse to	"	L	IVI	-	PP = 2.5	IST
-	6.0'- 8.0'		5													
			4													
-	S-5	17	2		133	SM	8.0	Madium dansa brown cos	arse to fine SAND, some Silt,	little Clay trace	-	_	NP			
		17	3			SIVI		fine Gravel, wet (SM)	arse to line SAND, Some Siit,	, iitile Ciay, trace	\	-	INF	-		
-	8.0'- 10.0'		14													
			22													
<del></del> 10																
-																
					<u> </u>		11.5				-					
-																
-	S-6	24	14		11.	ML		Hard, brown SILT, some fi	ine Sand, little Clay, trace fin	ne Gravel, moist	s	L	L	_	PP = 2.75	itsf
	13.0'-		23					(ML)	,							
-	15.0'		35 48													
			40													
<del></del> 15																
-																
-																
	S-7	2	50/5"			ML	18.5 /	Hard, brown SILT, some fi	ine Sand, little Clay, trace fin	ne Gravel, moist	s	L	L	-	PP = 0.25	tsf
_	18.0'- 18.5'						E	End of Boring at 18.5 feet	BGS.							
							"	Borehole backfilled with so	oii cuttings.							
		Mate: 1	wol Dete					Comple Tree	I Notos:							
		Elapsed	evel Data Dep	th in f	feet to:		0	Sample Type Open End Rod	Notes:  PP = Pocket Penetro	ometer						
Date	Time	Time	Bot. of			ater		Thin-Wall Tube	No groundwater enco		ubsurf	ace	inve	estig	ation.	
		(hr)	Casing	OI FIC	/IC			Undisturbed Sample								
							7	Split Spoon Sample								
							G	Grab Sample							Borina N	o. <b>P. 20</b>
Fiold To	et I 0000	i. Dii-	tones"	N1	None	0 0	Slow '	D Panid	Placticity: ND N-	n Diactic I I	, NA	N/1~	dive			o.: <b>B-29</b>
riela le	st Legend		tancy: ghness:							on-Plastic L - Low ie L - Low M - N						ry High
									pa" denotes soil sample aver							
	<ol><li>3.) Maximu</li></ol>	m Particle	Size is dete	rmined	by direct	t obse	ervation	within limitations of samp	ler size. 4.) Soil identificat	tions and field tests b	ased o	n vis	sual-	manu	ıal method	s per ASTM D2488.

MAC	T DONAL	M D	М				SOII	L BORING LO	G						BORING NO.: <b>B-30</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on:	South R Connect	ipley Solai ipley, NY :Gen mensions						Project No.: Project Mgr: Field Eng. Staff: Date/Time Start	ed:		Fric Dieg July	Paul o Me 29, 2	elgar 2020 at 7	:40 am
	Helper:		/Harold K						Date/Time Finis		_			2020 at 8	:25 am Long: -79.705272°
Item	i. Grade	Casing			ore Barrel	Boring	g Location: See Boring	Location Plan						n: NAD 1	<u>-</u>
Type Length		HSA 5 ft	SS 2 ff			Rig Ma	ake & Model: Diedrich	D-50  Cat-Head	Hammer Type  ☐ Safety	<b>D</b> ri		Flu		Drill Ro	od Size: Casing Advance
Inside Di		4.25	1.37	'5	-	□ AT\	V ☐ Geoprobe	<b>✓</b> Winch	✓ Doughnut	□Р	olyn	ner			Hollow Stem Auger
Hammer Hammer		140 30	30		-	✓ Tra		☐ Roller Bit  Cutting Head	☐ Automatic	□ W ▼ N					. iono ii Otom / tago.
									wintion.			Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph		o	(Density/cor constituents, r	al Identification & Desc nsistency, color, Group N particle size, structure, mons, geologic interpretations.	lame, oisture.	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	16	2 2 6 4	. Z. 1×. V	ML		Top 4" - TOPSOIL Stiff, light brown SILT, soi (ML)	me fine Sand, little Clay, trace	e fine Gravel, dry	s	Ĺ	L	L	PP = 1.75	5 tsf
-	S-2 2.0'- 4.0'	24	9 12 17 16		ML		Very stiff, light brown SILT fine Gravel, dry (ML)	Γ, some coarse to fine Sand,	little Clay, trace	N	L	L	L	PP = 3.75	5 tsf
5	S-3 4.0'- 6.0'	24	6 7 6 8		CL	4.0	Stiff, grayish brown Silty C	CLAY, little fine Sand, dry (CL	-)	s	М	L	М	PP = 3.75	5 tsf
-	S-4 6.0'- 8.0'	20	4 7 10 12		CL		Stiff, grayish brown Silty C	CLAY, little fine Sand, dry (CL	.)	s	М	L	-	PP = 2.25	5 tsf
- - 	S-5 8.0'- 10.0'	20	8 8 11 13		CL		Very stiff, brown CLAY, so	ome Silt, trace fine Sand, mo	ist (CL)	s	М	L	-	PP = 2.0	tsf
-					<del></del>	11.5				_					
- 15 	S-6 13.0'- 15.0'	22	10 17 37 50/4"		ML		Hard, brown SILT, some ( Gravel, moist (ML)	Clay, some coarse to fine Sa	nd, trace fine	N	L	L	-	PP = 3.25	5 tsf
-	S-7 18.0'- 18.6'	7	37 50/2"		ML	18.6	Hard, grayish brown SILT moist (ML) End of Boring at 18.6 feet Borehole backfilled with se	, some Clay, little fine Sand, BGS. oil cuttings.	trace fine Gravel,	N	L	L	-	PP = 1.5	tsf
			vel Data	4h ! 1	not to:	1	Sample Type	Notes:							
Date	Time	Elapsed Time	Bot. of	th in f	I	0	Open End Rod	PP = Pocket Penetro No groundwater enco		ıbsurf	ace	inv	estia	ation	
		(hr)	Casing	of Ho			Thin-Wall Tube	110 groundwater end	Januarou during St	ui I	40 <del>0</del>		July		
						U	Undisturbed Sample								
						SS G	Split Spoon Sample Grab Sample								
					+	$\dashv$	Grap Garriple							Boring N	o.: <b>B-30</b>
	st Legend	Tou	tancy: ghness:	L - I	_ow M - N	Medium	n H - High	Dry Strength: N - Non	on-Plastic L - Low e L - Low M - N	lediur	n F	l - F	ligh		ry High
							trometer reading. 2.) "p n within limitations of samp	pa" denotes soil sample aver bler size. 4.) Soil identificat	age axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MACI	T DONAL	M	м				SC	OIL E	BORING L	0	G						BORING NO.: <b>B-31</b> Page 1 of 1
Project Location Client: Drilling	on:	South Ri	ipley Solar ipley, NY Gen mensions,								Project No.: Project Mgr: Field Eng. Staff Date/Time Start		<u> </u>	Eric Dieg	Paul o Me	67-001 i elgar 2020 at 9	
	Helper:		/Harold KI								Date/Time Finis					2020 at 1	
Item	n: Grade f	t. Verti	ical Datum Samp		re Barrel	Boring	Location: See Box	ring Loc	ation Plan							n: NAD 1	<b>Long:</b> -79.699632°
Туре		HSA 5 ft	SS 2 ft		-	Rig Ma	ke & Model: Diedr		0 Cat-Head		Hammer Type ☐ Safety		illing	j Flu	ıid	Drill Ro	
Length Inside Di		4.25	1.37	5	-	☐ ATV	☐ Geoprol	be 🗹	Winch		✓ Doughnut	□F	olyr	ner			Hollow Stem Auger
Hammer Hammer		140 30	140 30		-	✓ Trac			Roller Bit Cutting Head		☐ Automatic	□ V ▼ N					nonow otem Auger
Tiditilitio									dentification & Do		wintion.			Tes	ts	I.	
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		)	(Density constituen	//consist	tency, color, Group cle size, structure, geologic interpreta	p Na , ma	ame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1 0.0'- 2.0' 0.4'-'	18	2 3 3 4	<u>31/4: 31</u>	CL	OT	Top 5" - TOPSOIL Medium stiff, grayish I Gravel, dry (CL)	brown Cl	LAY, some Silt, trace	fine	e Sand, trace fine	- N	M	L	- L	PP = 1.25	5 tsf
-	S-2 2.0'- 4.0'	18	4 3 2 5		CL		Medium stiff, brown C ine Gravel, moist (CL		me Silt, little fine San	ıd, tr	race coarse to	s	М	L	-	PP = 0.75	5 tsf
- <u>5</u> ∑	S-3 4.0'- 6.0'	11	2 2 2 4		ML		Medium stiff, brown S coarse to fine Gravel,			to fir	ne Sand, trace	s	L	L	-	PP = 1.0	tsf
-	S-4 6.0'- 8.0'	20.5	3 5 6 10		ML		Stiff, brown SILT, son Gravel, moist (ML)	ne Clay, I	little fine Sand, trace	coa	arse to fine	s	L	L	-	PP = 0.75	5 tsf
- 10	S-5 8.0'- 10.0'	20.5	10 14 25 33		ML		Hard, brownish gray S dry (ML)	SILT, little	e Clay, little fine Sand	d, tra	ace fine Gravel,	-	L	L	Н	PP > 4.5 Mottling o	tsf bserved on recovery.
-						11.5_						_					
- 15 	S-6 13.0'- 15.0'	14	22 46 50/2"		SM		/ery dense, brown co Gravel, little Clay, wet		ine SAND, some Silt,	, littl	le coarse to fine	N	-	NP	-		
-	S-7 18.0'- 20.0'	20	12 38 44 47		ML	( E	Hard, gray SILT, som ML) End of Boring at 20 fe	eet BGS.	,	e fine	e Gravel, wet	s	L	L	-	PP = 3.5	tsf
		Water Le	evel Data		1	20.0 E	Borehole backfilled wi		Notes:					<u> </u>	Ш		
Data	Time	Elapsed	Dep	th in fe	. 1		Open End Rod		PP = Pocket Pene	etro	ometer						
Date	Time	Time (hr)	Bot. of Casing	Bottom of Hole		rТ	Thin-Wall Tube										
7/29/20	10:20	-	Ĭ	20.0	5	_	Undisturbed Samp										
					$\pm$		Split Spoon Samp	le									
						G	Grab Sample									Boring N	o.: <b>B-31</b>
	st Legend	Tou	tancy: ghness:	L - Lo	1 - M wo	Medium	R - Rapid H - High	Dry	Strength: N - N	lone	on-Plastic L - Lov e L - Low M - N	1ediu	n I	1 - H	n H ligh	- High	
							ometer reading. 2. within limitations of s		denotes soil sample a size. 4.) Soil identif		age axial pocket per ions and field tests t					ual method	s per ASTM D2488.

MOT	T DONAL	M D	М					SOII	L BORING LO	G						BORING NO.: <b>B-32</b> Page <b>1</b> of <b>1</b>
Project	: .	South Ri	pley Sola	r					_	Project No.:		_ (	5051	002	67-001	r ago i oi i
Location			pley, NY							Project Mgr:				Paul		
Client: Drilling		Connect	<u>Gen</u> mensions	lna						Field Eng. Staff Date/Time Start					elgar 2020 at 1	0.45 am
-	Helper:		/Harold K							Date/Time Start		_			2020 at 1	
	1: Grade f		ical Datun			Bori	ng Loc	cation: See Boring	Location Plan			_	_			Long: -79.694561°
Item		Casing HSA	Samp SS		e Barrel	Dia I	Males 6	Madalı Diadviah	D 50	Hammer Type					n: NAD 1	
Type Length		5 ft	2 fl		-	□ Ti		R Model: Diedrich ☐ Tripod	☐ Cat-Head	☐ Safety	□в		g Flu onite		Drill Ro	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	☐ A		<ul><li>☐ Geoprobe</li><li>☐ Air Track</li></ul>	✓ Winch  □ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer		30	30		-	□ s			✓ Cutting Head		ĬZ N	one	•			
D = = 4 l= /	Sample		01-		USCS			Visual - Manu	al Identification & Desc	cription	F	ield	Tes			
Depth/ Elev.	No. / Interval	Rec. (in)	Sample Blows	Stratum Graphic	Group	)			nsistency, color, Group Noarticle size, structure, m		5	ssau	₹.	Strength		Remarks
(ft)	(ft)	(111)	per 6"	Orapriio	Symbo	ol			ons, geologic interpretation		Dilatancy	Toughness	Plasticity	Dry St		
	S-1	18	2	11. 18. 16		0.3	_ Top 4	1" - TOPSOIL			<b>⊣</b> -	-	-	- 1		
	0.0'- 2.0'		2		CL			um stiff, reddish brow el, dry (CL)	vn CLAY, some Silt, trace fin	ne Sand, trace fine	N	L	Н	ᅵᅵ	PP = 2.5	isf
-	0.3'-'		5 4				Gravi	ci, di y (OL)								
			7			2.0										
-	S-2	17	4		ML	1.0	Stiff,	reddish brown to gra fine Gravel, moist (N	y SILT, some Clay, little coa	rse to fine Sand,	ΠN	L	L	-	PP = 4.25	tsf
	2.0'- 4.0'		5 7				trace	line Gravei, moist (N	nL)							
-			3													
_																
	S-3	7	7		ML		Very moist		me fine Sand, little Clay, trac	ce fine Gravel,	s	L	L	-	PP = 0.75	tsf
<del></del> 5	4.0'- 6.0'		12 7					()								
S-4 20 3 ML Very stiff, brown SILT, some Clay, little fine Sand, trace fine Gravel, S L L L - PP = 1.25 tsf																
		20	3 5		ML		Very moist		me Clay, little fine Sand, trac	ce fine Gravel,	S		L	-	PP = 1.25	tsf
-	6.0'- 8.0'		21													
			10													
-	S-5	24	13		<sub>ML</sub>		Hard	brown SILT some f	îne Sand, little Clay, trace fir	no Gravel moist	s	١,	L		PP = 2.75	tef
		24	27		IVIL		(ML)	, brown Sill, some i	ille Salid, illie Clay, trace ill	le Graver, moist	ľ		-	-	FF = 2.73	151
-	8.0'- 10.0'		23													
			28													
<del></del> 10																
-																
-																
-	S-6	4	28		ML				Clay, some coarse to fine Gr	ravel, little fine	-	L	L	-	Not enoug	gh recovery to perform
	13.0'-		50/4"				Sanu	, moist (ML)							роскет ре	netrometer field test.
-	15.0'															
— 15																
10																
_																
-																
-	S-7	20	32		ML		Hord	gray SILT some Cl	ay, little fine Gravel, trace Sa	and dry (ML)	l <sub>N</sub>	L	L	<sub>M</sub>	PP > 4.5	ef
	18.0'-	20	47		IVIL		, idi U,	, gray OILI, SUITE OR	a,, muo mio Oravei, irace Se	, ury (IVIL)	'	_	-	'*'	4.0	
-	20.0'		39													
			41			20	End o	of Boring at 20 feet B hole backfilled with so	GS. oil cuttings							
		Water Le				20.		ample Type	Notes:			_	_	Ш		
Date	Time	Elapsed Time	Dep Bot. of	th in fee		- ۱	Оре	en End Rod	PP = Pocket Penetro No groundwater enc		iheim	faco	inv	_eti~	ation	
Date		(hr)	Casing					n-Wall Tube	ino groundwater enc	ountered during St	าทอดเม	ace	ii iV	ซอนg	auUH.	
						U		disturbed Sample								
						– SS – G		t Spoon Sample b Sample								
						⊣՝՝	Gia	ω σαπρισ							Boring N	o.: <b>B-32</b>
Field Tes	st Legend		tancy:		one S-					on-Plastic L - Low						n i liah
NOTES:	1 ) "nnd" de		ghness:		ow M - N				Dry Strength: N - Non pa" denotes soil sample aver	ne L - Low M - M				<u> </u>	vH - Ve	ry High
								in limitations of samp		tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	<b>M</b>	м				SOII	L BORING LO	G						BORING NO.: <b>B-33</b> Page <b>1</b> of <b>1</b>
Project	: .	South R	ipley Sola	r					Project No.:		_ (	5051	002	67-001	1 ago 1 oi 1
Locatio			ipley, NY						Project Mgr:				Paul		
Client: Drilling		Connect	Gen mensions	Inc					Field Eng. Staff: Date/Time Start		_			elgar 2020 at 1:	2:50 pm
-	Helper:		/Harold K						Date/Time Finis					2020 at 3	
	1: Grade f		ical Datun			В	oring Location: See Boring	Location Plan							<b>Long:</b> -79.698985°
Item Type		Casing HSA	Samp SS		ore Barrel	Ri	g Make & Model: Diedrich I	D-50	Hammer Type			tal C ı Flu		n: NAD 1	
Length		5 ft	2 ft	t	-		Truck	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimite	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	-	ATV Geoprobe Track Air Track	✓ Winch  ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer	Fall (in.)	30	30		-	4	Skid	✓ Cutting Head		<b>▼</b> N			. 1		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph		p	(Density/cor constituents, p optional descriptio	al Identification & Desc nsistency, color, Group No particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy	ıς	Plasticity Plasticity	Dry Strength ST		Remarks
-	S-1 0.0'- 2.0' 0.4'-'	20	2 2 5 5	\\ \[ \frac{1}{2\psi  \qq \qq     \qq           \qu	ML	(	).4 Top 5" - TOPSOIL  Medium stiff, brown SILT, dry (ML)	some fine Sand, trace Clay,	trace fine Gravel,	-	L	- L	-	PP = N/A	
-	S-2 2.0'- 4.0'	16	5 6 5 7		ML		Stiff, brown SILT, some fir Gravel, moist (ML)	ne Sand, little Clay, trace coa	arse to fine	N	L	L	-	PP = 2.5	tsf
- <del></del> 5	S-3 4.0'- 6.0'	18	2 3 3 3		ML		Medium stiff, light brown S Gravel, moist (ML)	SILT, some Clay, little fine Sa	and, trace fine	N	L	L	-	PP = 1.25	i tsf
-	S-4 6.0'- 8.0'	20	2 8 10		CL	6	Very stiff, brown CLAY, so Gravel, moist (CL)	ome Silt, trace fine Sand, tra	ce coarse to fine	N	М	L	-	PP > 4.5	tsf
-	S-5 8.0'- 10.0'	22	6 13 16 18		CL		Very stiff, brownish gray C Gravel, moist (CL)	CLAY, some Silt, trace fine S	and, trace fine	N	М	L	-	PP > 4.5	tsf
— 10 - -							<u> 11.5</u>			_					
- - —15	S-6 13.0'- 15.0'	24	19 31 35 31		ML		Hard, light gray SILT, som (ML)	ne Clay, little fine Sand, trace	fine Gravel, dry	N	L	L	М	PP = 1.5	tsf
-	S-7 18.0'- 20.0'	24	11 23 29 28		CL			ilt, little fine Sand, trace fine	Gravel, dry (CL)	N	М	L	н	PP = 4.5	tsf
					2	_	End of Boring at 20 feet B 20.0 Borehole backfilled with so	oil cuttings.		_			$\lfloor \  floor$		
			evel Data	th in f	not +	1	Sample Type	Notes:							
Date	Time	Elapsed Time	Bot. of	th in f	m		O Open End Rod	PP = Pocket Penetro No groundwater enc		ubsurf	ace	inv	estin	ation.	
	-	(hr)	Casing			r	T Thin-Wall Tube	3.53.13.140.010	22 231119 30				19		
					+	$\dashv$	U Undisturbed Sample								
						$\exists$	SS Split Spoon Sample G Grab Sample								
						$\dashv$	Grap Sample							Boring N	o.: <b>B-33</b>
	st Legend	Tou	tancy: ghness:	L - I	ow M-	Med	dium H - High	Dry Strength: N - Non	on-Plastic L - Low le L - Low M - M	lediur	n I	l - F	ligh		ry High
							penetrometer reading. 2.) "pp vation within limitations of samp	oa" denotes soil sample aver der size. 4.) Soil identificat	rage axial pocket pen- tions and field tests b					ual method	s per ASTM D2488.

MOT	T DONAL	M D	М				SOIL	BORING LO	G						BORING NO.: <b>B-34</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on:	South R Connect	ipley Solar ipley, NY Gen mensions						Project No.: Project Mgr: Field Eng. Staff: Date/Time Start			ric Dieg	Paul o Me	67-001 i elgar 2020 at 7	
	Helper:		/Harold K			Τ.			Date/Time Finis		_	_		2020 at 8	
Item	i. Grade	Casing	ical Datun Samp		ore Bar		Boring Location: See Boring L	ocation Plan						n: NAD 1	<b>Long:</b> -79.695800° 983
Type Length		HSA 5 ft	SS 2 ff		-		Rig Make & Model: Diedrich D  ☐ Truck ☐ Tripod	0-50  Cat-Head	Hammer Type  Safety	<b>Dri</b> □ B		Flu		Drill Ro	d Size: Casing Advance
Inside Di		4.25	1.37	'5	-		□ ATV □ Geoprobe □	<b>☑</b> Winch	✓ Doughnut	□ P	olym	ner			Hollow Stem Auger
Hammer Hammer		140 30	140 30		-			☐ Roller Bit  Cutting Head	☐ Automatic	□ W ▼ N					ronon otom / tago.
Depth/ Elev.	Sample No. / Interval	Rec.	Sample Blows	Stratı Grapl	hic   Gr	CS	Visual - Manua (Density/cons	al Identification & Desc sistency, color, Group Narticle size, structure, mo	ame,	F	eld	Tes	Strength		Remarks
(ft)	(ft)	7	per 6"	71 1×.	Syn	nbol		ns, geologic interpretatio		- Dilatancy	Toughness	· Plasticity	- Dry St		
-	0.0'- 2.0' 0.3'-'		7 11 10		M	L	Very stiff, dark brown SILT, Gravel, moist (ML)	, some Clay, trace fine Sand	d, trace fine	N	L	L	-	PP = 1.75	i tsf
-	S-2 2.0'- 4.0'	24	6 5 6 7			L	Stiff, brown CLAY, some Si (CL)	ilt, trace fine Sand, trace fin	e Gravel, moist	N	М	L	-	PP = 2.5	tsf
- 5	S-3 4.0'- 6.0'	22	3 4 7 9			L	Stiff, light brown CLAY, son moist (CL)	ne Silt, little fine Sand, trace	e fine Gravel,	N	М	L	-	PP = 4.0	tsf
-	S-4 6.0'- 8.0'	24	8 12 12 7		N	L	6.0  Very stiff, light brown SILT, dry (ML)	some Clay, little fine Sand,	trace fine Gravel,	s	L	L	н	PP > 4.5	tsf
-	S-5 8.0'- 10.0'	24	9 16 26 27		N	L	Hard, brown SILT, some Cl	Gravel, dry (ML)	N	L	L	Н		is tsf recovered at 8 feet BGS. l observed at 8 feet BGS.	
— 10 — — — 15	S-6 13.0'- 15.0'	23	8 18 29 25		M	L	Hard, gray SILT, some Clay dry (ML)	y, little fine Sand, little coars	se to fine Gravel,	N	L	L	VH	PP > 4.5	tsf
-	S-7 18.0'- 18.8'	8	36 50/3"		M	L	Hard, brown to gray SILT, s  18.8 dry (ML)  End of Boring at 18.8 feet E Borehole backfilled with soi	BGS.	trace fine Gravel,	N	L	L	н	PP = 2.25	i tsf
								·-····g-·							
			evel Data	41.			Sample Type	Notes:							
Date	Time	Elapsed Time	Bot. of		feet to:	4	O Open End Rod	PP = Pocket Penetro	meter						
		(hr)	Casing	of Ho		ter	_ Thirt Wall Tabe	1							
					+		U Undisturbed Sample SS Split Spoon Sample	1							
					$\bot$		G Grab Sample	1							
					+		- Grab Gample	1						Boring N	o.: <b>B-34</b>
	st Legend	Tou	tancy: ghness:	L-	Low M	- M	ledium H - High D	Ory Strength: N - Non-	n-Plastic L - Low e L - Low M - N	lediun	ı F	1 - H	ligh		ry High
							et penetrometer reading. 2.) "ppa ervation within limitations of sample	a" denotes soil sample aver er size. 4.) Soil identificat	age axial pocket pen ions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	м					SOIL	BORING LO	G						BORING NO.: <b>B-35</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on:	South Ri Connect Earth Di	mensions,	Inc.						Project No.: Project Mgr: Field Eng. Staff Date/Time Start			Eric Dieg	Paul o Me	elgar	12:45 pm
	Helper:		/Harold Kl			Donto		O Di	Leasting Diag	Date/Time Finis		_	_		, 2020 at	2:05 pm Long: -79.682242°
Item	i. Grade	Casing			re Barrel	Borin	g Location:	See Boring I	Location Plan						n: NAD 1	
Type Length		HSA 5 ft	SS 2 ft		-	Rig M	lake & Mode	I: Diedrich [ Tripod	D-50 ☐ Cat-Head	Hammer Type  ☐ Safety	<b>D</b> ri		Flu		Drill Ro	d Size: Casing Advance
Inside Di		4.25	1.37		-		v 🗆	Geoprobe	☑ Cat-Head  ✓ Winch	☑ Salety ☑ Doughnut	□Р	olyn	ner			Hollow Stem Auger
Hammer Hammer		140 30	140 30		-	▼ Tra		Air Track	☐ Roller Bit  ✓ Cutting Head	☐ Automatic	□ W ▼ N					nonew etem Auger
Hammer		- 50	30	<u> </u>	Ī								Tes	sts	<u>I</u>	
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratun Graphic		>	(cor	Density/con	al Identification & Desc sistency, color, Group N article size, structure, m ns, geologic interpretation	lame, loisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1	18	2	7/ 1/V	<u>'</u>	0.5	Top 6" - TOP	SOIL			-	-	-	-		
-	0.0'- 2.0' 0.5'-'		2 5 8		CL		Medium stiff, Gravel, dry (0		LAY, some Silt, trace fine S	and, trace fine	N	М	L	L	PP = 0.75	i tsf
-	S-2 2.0'- 4.0'	21	8 6 6 7		CL		Stiff, grayish fine Gravel, r		some Silt, little coarse to fir	ne Sand, trace	N	М	L	-	PP = 2.5	tsf
5	S-3 4.0'- 6.0'	19	3 6 8 10		ML		Stiff, brown S (ML)	SILT, some CI	ay, little fine Gravel, trace fir	ne Sand, moist	N	L	L	-	PP = 3.0	tsf
-	S-4 6.0'- 8.0'	21	6 11 35 38		ML		Hard, brown fine Gravel, r		clay, little coarse to fine Sand	d, little coarse to	N	L	L	-	PP = 2.0	tsf
-	S-5 8.0'- 10.0'	17	30 48 50/4"		ML		Hard, brown SILT, some Clay, some coarse to fine Gravel, little fine N L Sand, dry (ML)						L	VH	PP = N/A	
10 15 	S-6 13.0'- 15.0'	24	13 30 32 38		ML		Hard, gray S Sand, dry (M		ny, some coarse to fine Grav	vel, trace fine	N	L	L	VH	PP > 4.5	tsf
-	S-7 18.0'- 20.0'	21	15 29 49 32		ML			n at 20 feet Ri	ay, little fine Gravel, trace fin GS. il cuttings.	e Sand, dry (ML)	N	L	L	L	PP = 2.0	tsf
		Water Le		th in f	ot to:		Sample		Notes:							
Date	Time	Elapsed Time	Bot. of	th in fe Botton		- 0	Open End		PP = Pocket Penetro No groundwater enco		ubsurf	ace	inv	estin	ation.	
		(hr)		of Hole			Thin-Wall		3.53.13.144.01.01.01	55 551119 50				2.19		
						U	Undisturbe	•								
						SS G	Split Spoo Grab Sam									
						$\dashv$ "	GIAD SAM	hic							Boring N	o.: <b>B-35</b>
	st Legenc	Tou	tancy: ghness:	L - L	ow M - N	Mediun	R - Rapid n H - High	I	Dry Strength: N - Non	on-Plastic L - Low ne L - Low M - M	1ediun	n F	1 - H	ligh		ry High
							etrometer read n within limita		oa" denotes soil sample aver ler size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MOT	r DONAL	М	м				SOI	L BORING LO	)G						BORING NO.: <b>B-36</b> Page <b>1</b> of <b>1</b>
Project	: .	South Ri	pley Solar	r					Project No.:		_5	5051	002	67-001	r age i oi i
Location		South Ri	-						Project Mgr:				Paul		
Client:		Connect							Field Eng. Staff					elgar	10.00
Drilling	j Co.: Helper:		mensions, /Harold K						Date/Time Start Date/Time Finis						10:30 am 11:40 am
	1: Grade f		ical Datum			Т	Boring Location: See Boring	I I ocation Plan	Date/Time Finis	_	_	_			Long: -79.678467°
Item		Casing	Samp		ore Bar	rel				Hori	zon	tal D	atur	n: NAD 1	983
Type Length		HSA 5 ft	SS 2 ft		-		Rig Make & Model: Diedrich  ☐ Truck ☐ Tripod	D-50  Cat-Head	Hammer Type ☐ Safety	<b>D</b> ri		Flu		Drill Ro	d Size: Casing Advance
Inside Di	a. (in.)	4.25	1.37		-		☐ ATV ☐ Geoprobe	☑ Cat-nead  ✓ Winch	☑ Salety ☑ Doughnut						Hollow Stem Auger
Hammer Hammer		140 30	140 30		-		<b>⊻</b> Track □ Air Track □ Skid □	☐ Roller Bit  Cutting Head	☐ Automatic	□ W ▼ N	/ate	r			Hollow Sterri Auger
папппе	` '	30	30		Ť				<u>                                     </u>			Tes	sts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Grapl	im Gr	CS oup nbol	(Density/co constituents,	ual Identification & Desc ensistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, noisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	21	1 2 3 7	Z4 1X.	$\overline{}$	IL	0.3 Top 4" - TOPSOIL  Medium stiff, light brown Gravel, moist (ML)	SILT, some Clay, little fine Sa	and, trace fine	- S	L	Ĺ	-	PP = 1.75	i tsf
-	S-2 2.0'- 4.0'	24	7 6 10 14		N	IL	Very stiff, brown SILT, so moist (ML)	ome Clay, trace fine Sand, tra	ace fine Gravel,	s	L	L	-	PP = 2.25	i tsf
- 5	S-3 4.0'- 6.0'	16	5 5 6			:L	Stiff, brown CLAY, some (CL)	Silt, little fine Sand, trace fine	e Gravel, moist	N	М	L	-	PP = 1.5	tsf
_	S-4 6.0'- 8.0'	18	7 4 8		s	M	6.0  Medium dense, brown fin wet (SM)	ne SAND, some Silt, little fine	Gravel, little Clay,	R	L	NP	-		
-	8.0 - 8.0 S-5	21	12 15			IL.	8.0  Hard, brown SILT, some	PP = 1.5	tef						
<del>-</del> 10	8.0'- 10.0'		23 27 28			-	(ML)			s	L	L			
- - <u>▽</u>															
- 15	S-6 13.0'- 15.0'	17	9 18 47 43		, A	IL	Hard, gray SILT, some C fine Sand, wet (ML)	lay, some coarse to fine Grav	vel, little coarse to	N	L	L	-	PP = 3.75	i tsf
-															
-	S-7 18.0'- 20.0'	10.5	7 21 20 26		N	IL	wet (ML)	Γ, some Clay, little fine Grave	l, little fine Sand,	s	L	L	-		
		14/					20.0 Borehole backfilled with s	soil cuttings.							
		Water Le		th in t	eet to:		Sample Type	Notes:  PP = Pocket Penetro	ometer						
Date	Time	Time	Bot. of	Botto	m w	ter	O Open End Rod	Groundwater encour		GS.					
0/E/20	11.10	(hr)	Casing	of Ho	ne		T Thin-Wall Tube								
8/5/20	11:40	-			+	2	U Undisturbed Sample SS Split Spoon Sample								
							G Grab Sample								
					+		- Grab Gample							Boring N	o.: <b>B-36</b>
	st Legenc	Tou	tancy: ghness:	L-	Low M	- M	Slow R - Rapid ledium H - High	Dry Strength: N - Non	on-Plastic L - Low ne L - Low M - N	lediur	n F	<del>  -  </del>	ligh		ry High
							et penetrometer reading. 2.) "pervation within limitations of same	ppa" denotes soil sample aver pler size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MAC	r Donal	M	М						SO	IL BOF	RING LO	G						BORING NO.: <b>B-37</b> Page <b>1</b> of <b>1</b>
Project			ipley Solar	ſ								Project No.:					67-001 ·	. ago . o
Location Client:	on:	Connect	i <u>pley, NY</u> Gen									Project Mgr: Field Eng. Staff	:	_		<u>Paul</u> o Me	ı elgar	
Drilling			mensions									Date/Time Start					2020 at 1	
	Helper:  1: Grade 1		/Harold K		<u> </u>	Т	Boring	Locatio	n: See Borin	g Location P	lan	Date/Time Finis			_		2020 at 1: 2.174003°	2:40 pm Long: -79.681085°
Item Type		Casing HSA	Samp			Barrel -			odel: Diedric			Hammer Type	Hori		tal D	atur	n: NAD 1	983
Length		5 ft	2 ft			-	☐ Truc	ck [	Tripod	☐ Cat-H		☐ Safety	□в	ento	nite		Dilli Ko	Casing Advance
Inside Di Hammer	Wt. (lb.)	4.25 140	1.37 140	)			☐ ATV  Trace	ck [	<ul><li>☐ Geoprobe</li><li>☐ Air Track</li></ul>	Roller	Bit	☑ Doughnut ☐ Automatic	□ P	/ate	r			Hollow Stem Auger
Hammer		30	30			-	Skid			✓ Cutting		<u>                                     </u>	<b>V</b> N	one ield		ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Strat Grap		USCS Group Symbo	·		(Density/constituents,	onsistency, particle size	cation & Desc color, Group N e, structure, m gic interpretation	lame, loisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0'	16	1 2 3 7			ML		Medium s Gravel, dr		own SILT, son	ne Clay, little fine	e Sand, trace fine	S	_	L	L	PP = 3.0	tsf
-	S-2 2.0'- 4.0'	19	6 8 8 12			ML		Very stiff, moist (ML		ome Clay, littl	e fine Sand, trac	e fine Gravel,	N	L	L	-	PP = 1.5	tsf
5	S-3 4.0'- 6.0'	17	ML Stiff, brown SILT, some coarse to fine Sand, little fine Gravel, little Clay, wet (ML)  ML Stiff, brown SILT, some coarse to fine Sand, little fine Gravel, little Clay, wet (ML)  Stiff, brown SILT, some coarse to fine Sand, little fine Gravel, little Clay, wet (ML)  Stiff, brown SILT, some coarse to fine Sand, little fine Gravel, little Clay, wet (ML)  R L NP -												PP = 1.0	tsf		
-	S-4 6.0'- 8.0'	7				SM	SM Very loose, brown Silty coarse to fine SAND, little fine Gravel, little Clay, wet (SM) R L NP -											
- - 10	S-5 8.0'- 10.0'	15	3 6 11 11			ML					o fine Sand, little	coarse to fine	s	L	L	-	PP = 1.75	is tsf
- - - -	S-6 13.0'- 15.0'	2	50/4"			ML			wn to gray SIL ace Clay, mois		se to fine Sand, I	little coarse to fine	N	L	L	L	perform F test.	gh sample recovered to locket Penetrometer field encountered fmr 13.5 to 15
-	S-7 18.0'- 20.0'	24 Water Le	16 32 40 40			ML	"	little Clay, End of Bo Borehole	dry (ML) oring at 20 feet backfilled with	BGS. soil cuttings.		se to fine Gravel,	N	L	L	L	PP = 1.25	i tef
_		Water Le	Dep	th in	_	to:	0	Open E	nd Rod		Pocket Penetro							
Date	Time	Time (hr)	Bot. of Casing	Bott of H		Water		•	all Tube		oundwater end		subsu	rface	e in	vesti	gation, b	ut wet samples indicate
		\''' <i>)</i>	casing	J. 11	J.U		_		rbed Sample	•   '								
									oon Sample									
					$\exists$		G	Grab Sa	ampie								Boring N	o.: <b>B-37</b>
	st Legenc	Tou	tancy: ghness:	L-	- Lov	v M - N	/ledium	R - Rapi H - Hiç	gh	Plasticity: Dry Streng	jth: N - Non	on-Plastic L - Lov ne L - Low M - N	1ediur	n F	1 - H	ligh		ry High
			sample ave Size is dete						eading.    2.) " nitations of san			rage axial pocket per tions and field tests b					ual method	s per ASTM D2488.

MACI	T DONAL	M	м					SOII	L BORING LO	G						BORING NO.: <b>B-38</b> Page <b>1</b> of <b>1</b>
Project	: ,	South Ri	ipley Sola	r					_	Project No.:		Ę	051	002	67-001	r age i oi i
Location			ipley, NY							Project Mgr:				Paul		
Client:		Connect								Field Eng. Staff:			_		elgar	7.50
Drilling	j Co.: Helper:		mensions /Harold K							Date/Time Start					<u>, 2020 at</u> , 2020 at	7:50 am
	1: Grade f		ical Datun			Т	Bori	ng Location: See Boring	Location Plan	Date/Tille Tills	_	_	_			Long: -79.674797°
Item		Casing			Core	Barrel					Hori	zon	tal C	atur	n: NAD 1	983
Type Length		HSA 5 ft	SS 2 ft				Rig I	Make & Model: Diedrich I	D-50 ☐ Cat-Head	Hammer Type ☐ Safety	Dri □ B		Flu		Drill Ro	d Size: Casing Advance
Inside Di	a. (in.)	4.25	1.37				□ A		✓ Winch	✓ Doughnut						Hollow Stem Auger
Hammer Hammer		140 30	30				☑ Tr □ SI		☐ Roller Bit  Cutting Head	☐ Automatic	□ W ☑ N				'	nonow otem Auger
Hammer	` '	30	30				<u> </u>						Tes	sts	1	
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Grap		USCS Group Symbo		(Density/cor constituents, p	al Identification & Description Description   barticle size, structure, mons, geologic interpretations.	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1	15	1	7/1/	<u>\\ \\ \</u>		0.5	Top 6" - TOPSOIL			-	-	-	-		
	0.0'- 2.0'		3 4		$\Box$	ML			SILT, some Clay, trace fine S	Sand, trace fine	N	L	L	-	PP = 1.0	tsf
-	0.5'-'		4					Gravel, moist (ML)								
-	S-2	17	7			ML		Stiff, brown SILT, some C (ML)	lay, little fine Sand, trace fine	e Gravel, moist	N	L	L	-	PP = 1.0	tsf
	2.0'- 4.0'		6 6					(IVIL)								
-			7													
-	S-3	15	4			ML		Stiff, brown SILT, some C (ML)	lay, some fine Sand, trace fir	ne Gravel, moist	N	L	L	-	PP = 2.5	tsf
-	4.0'- 6.0'		3 11					(WL)								
-	S-4	24	13			ML		Hard, brown SILT, some C to fine Gravel, moist (ML)	Clay, some coarse to fine Sa	nd, trace coarse	N	L	L	-	PP > 4.5	tsf
_	6.0'- 8.0'		23 28					to fine Graver, moist (IVIL)								
			33													
_																
	S-5	22	3			ML		Hard, light brown SILT, so Gravel, moist (ML)	me coarse to fine Sand, son	ne Clay, trace fine	N	L	L	-	PP = 1.75	5 tsf
_	8.0'- 10.0'		26 25					Gravos, moiot (m2)								
			20													
<del></del> 10																
10																
_																
_																
_																
	S-6	24	21			ML		Hard, gray SILT, some Cla dry (ML)	ay, little coarse to fine Sand,	little fine Gravel,	N	L	L	VH	PP = 3.75	5 tsf
_	13.0'- 15.0'		28 34					dry (WIE)								
	13.0		50/5"													
— 15																
-																
-																
-	S-7	22	32			N.A.I		Hard grov SILT same for	e Sand some Clay little for	Gravel day (ML)	l <sub>N</sub>	١,		,	PP > 4.5	tef
		22	32			ML		riaru, gray SILT, SOME TIN	e Sand, some Clay, little fine	Glavel, dry (ML)	N	L	L	L	rr / 4.5	ıəı
-	18.0'- 20.0'		36													
			37					End of Boring at 20 feet B	GS.							
		Water Le	evel Data	Ш	Ш		20.0	Borehole backfilled with so Sample Type	Notes:			_		Ш		
		Elapsed	Dep	th in	_	to:	-		PP = Pocket Penetro							
Date	Time	Time (hr)	Bot. of Casing			Water	Т	Thin-Wall Tube	No groundwater ence	ountered during su	ıbsurf	ace	inv	estig	ation.	
		···/					<b>_</b> U	Undisturbed Sample	1							
					$\dashv$		ss		1							
					$\exists$		d G	Grab Sample							Boring N	o.: <b>B-38</b>
Field To	st Legenc	l· Dilat	tancy:	NI	. No	ne S.	Slove	R - Rapid	 Plasticity: NP - No	on-Plastic L - Low	, 1,1	Mo	diun			~ <b>.ப-</b> 50
i iciu i e	. Legent		ghness:							ie L - Low M - M						ry High
								etrometer reading. 2.) "pp on within limitations of samp	oa" denotes soil sample aver bler size. 4.) Soil identificat	rage axial pocket pen- tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M D	м					SOI	L BORING LC	OG	<b>;</b>						BORING NO.: <b>B-39</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on:	South Ri	ipley Solar ipley, NY Gen mensions.							P F	Project No.: Project Mgr: Field Eng. Staff Date/Time Start			Eric Dieg	Pau o M	67-001 li elgar 2020 at 3	
	Helper:		/Harold K		1				<u> </u>	D	Date/Time Finis		_	_		2020 at 3	
Item	i. Grade	Casing		ler Co	re Barrel				Location Plan			Hori	zon	tal [	atu	<b>n:</b> NAD ′	<b>Long: -</b> 79.665621° 983
Type Length		HSA 5 ft	SS 2 ft		-	Rig N		odel: Diedrich  Tripod	D-50		Hammer Type  Safety	Dr		Flu		Drill Ro	od Size: Casing Advance
Inside Di		4.25	1.37	5	-	$\square$ AT	ΓV [	☐ Geoprobe	<b>✓</b> Winch	_ ✓	<b>7</b> Doughnut	□Р	olyn	ner			Hollow Stem Auger
Hammer Hammer		140 30	140 30		-	✓ Tra		☐ Air Track ☐	☐ Roller Bit  Cutting Head	胎	Automatic	□ v ☑ n					
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic	Symbo	)		(Density/co constituents,	ual Identification & Des unsistency, color, Group N particle size, structure, n ons, geologic interpretati	Nam nois	ne, sture,	Dilatancy	ıΩ	Plasticity es	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.6'-'	16	2 3 3 6		CL	0.6			brown CLAY, some Silt, trac	ace fi	ine Sand, trace	- N	- M	- L	-	PP = 2.25	5 tsf
-	S-2 2.0'- 4.0'	22	2 3 2 5		CL			stiff, light brown Gravel, moist (t	CLAY, some Silt, little coarse CL)	se to	fine Sand,	N	М	L	-	PP = 1.0	tsf
<del>-</del> 5	S-3 4.0'- 6.0'	16	3 2 2 2		ML	4.0		stiff, brown SILT y, moist (ML)	, some coarse to fine Sand,	, trac	ce fine Gravel,	s	L	L	-	PP = 1.75	5 tsf
-	S-4 6.0'- 8.0'	18	2 5 6 7		ML		Stiff, brow (ML)	vn SILT, some (	Clay, trace fine Sand, trace fi	fine (	Gravel, moist	s	L	L	-	PP = 2.0	tsf
-	S-5 8.0'- 10.0'	21	4 7 8 11		ML		Very stiff, Gravel, m		ome coarse to fine Sand, little	le Cla	ay, trace fine	s	L	L	-	PP = 3.5	tsf
	S-6 13.0'- 15.0' 14.5'-'	14	13 41 50/4"		ML			wn SILT, some el, wet (ML)	coarse to fine Sand, little Cla	lay, tı	race coarse to	N -	L -	L -	-	PP = 2.0 Augered 15.5 feet	through cobbles from 14.5 to
-	S-7 18.0'- 20.0'	18	14 26 44 49		ML	Hard, gray SILT, some coarse to fine Sand, little Clay, trace coarse to fine Gravel, dry (ML)  End of Boring at 20 feet BGS. 20.0 Borehole backfilled with soil cuttings.								L	VH	PP = 2.25	5 tsf
		Water Le				20.0		ole Type	Notes:				_	1			
Date	Time	Elapsed Time	Dep Bot. of	th in fee		-0	Open E	nd Rod	PP = Pocket Penetr No groundwater end			iheur	acc	inv	ectio	ation	
Date		(hr)	Casing	of Hole				all Tube	ino groundwater end	wul	mereu uuririy Sl	เมอนท	aue	ΠIV	coul	jauon.	
						U		irbed Sample	1								
						⊣SS ⊢G		oon Sample	1								
						՝	Grab S	ampi <del>e</del>	1							Boring N	o.: <b>B-39</b>
	st Legend	Tou	tancy: ghness:	L - Lo	ow M - N	Mediur	R - Rapi m H - Hi	gh	Dry Strength: N - Nor	ne	Plastic L - Low L - Low M - N	lediur	n ŀ	<del> </del>	ligh		ry High
	<ol> <li>1.) "ppd" de</li> <li>3.) Maximu</li> </ol>							eading. 2.) "p nitations of sam	ppa" denotes soil sample ave pler size. 4.) Soil identifica							ual method	s per ASTM D2488.

MOT	r DONAL	M	м				SOII	L BORING LO	G						BORING NO.: <b>B-40</b> Page <b>1</b> of <b>1</b>
Project	:	South R	ipley Sola	r					Project No.:			5051	0026	67-001	1 age 1 of 1
Location	on:		ipley, NY						Project Mgr:				Paul		
Client:		Connect							Field Eng. Staff:			_		elgar	7.40
Drilling	j Co.: Helper:		mensions /Harold K						Date/Time Start		_			<u>, 2020 at</u> , 2020 at	7:10 am
	1: Grade		ical Datun			Т	Boring Location: See Boring	Location Plan	Date/Tille Tills						Long: -79.659652°
Item		Casing			ore Barr	el				Hori	zon	tal D	atun	n: NAD 1	983
Type Length		HSA 5 ft	SS 2 ft		-		Rig Make & Model: Diedrich  ☐ Truck ☐ Tripod	D-50  Cat-Head	Hammer Type ☐ Safety	Dri □ B		Flu		Drill Ro	od Size: Casing Advance
Inside Di	a. (in.)	4.25	1.37		-		☐ ATV ☐ Geoprobe	✓ Winch	✓ Doughnut						Hollow Stem Auger
Hammer Hammer		140 30	30		-		☑ Track ☐ Air Track ☐ Skid ☐	☐ Roller Bit  Cutting Head	☐ Automatic	□ × <b>Y</b> ×	ate	r			Hollow Otern Auger
Hammer		30	30		一			•				Tes	sts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Strati Grap		up	(Density/conconstituents, p	ual Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1	21	1	7/ 1/2	11/		0.5 Top 6" - TOPSOIL			-	-	-	-		
	0.0'- 2.0'		3 7		М	L	Medium stiff, grayish brow Gravel, moist (ML)	vn SILT, some Clay, trace fin	e Sand, trace fine	N	L	L	-	PP = 2.0	tsf
-	0.5'-'		7				Gravei, moist (ML)								
-	S-2	14	5		M	L		me Clay, little fine Sand, trac	e fine Gravel,	N	L	L	-	PP = 2.0	tsf
	2.0'- 4.0'		8				moist (ML)								
-			13 10												
							4.0								
_	S-3	17	2	//	c	_	Medium stiff, brown Silty (	CLAY, some fine Sand, trace	fine Gravel,	$\exists_{N}$	М	L	-	PP = 0.75	5 tsf
	4.0'- 6.0'		3	///			moist (CL)								
<del></del> 5			4 4												
-	S-4	12	2		// c		Stiff, brown Silty CLAY, so	ome fine Sand, trace fine Gra	avel, moist (CL)	N	М	L	-	PP = 0.75	5 tsf
	6.0'- 8.0'		4												
-	0.0 0.0		4												
			5												
-	S-5	13	5	///	/ c		Very stiff, brown Silty CLA	AY, some fine Sand, trace fin	e Gravel, moist	s	М	L		PP = 3.25	5 tsf
	8.0'- 10.0'		8			-	(CL)	tr, como into cana, a aco int	o Graver, molec	١	"	-		0.20	, 101
-	8.0- 10.0		15												
_			21												
— 1 <del>0</del>															
-															
				H	4-		11.5			-					
-															
-	0.0	47	0.5		H			0 5 0 11	5 0 1 1	١	١.	١.		DD 0.70	
	S-6	17	25 44		M	L	(ML)	me Clay, some fine Gravel, tr	ace fine Sand, dry	N	L	L	I <sup>VH</sup>	PP = 2.75	) ISI
_	13.0'- 15.0'		50/5"												
<del></del> 15															
-															
_															
_															
	S-7	18	34 32		M	L	Hard, brownish gray SILT wet (ML)	, some Clay, little fine Sand,	little fine Gravel,	N	L	L	-		
_	18.0'- 20.0'		36												
	_5.5		32				End of Boring at 20 feet B	BGS.							
		1A/-1: 1					20.0 Borehole backfilled with se	oil cuttings.							
		Water Le	evel Data Der	oth in	eet to:		Sample Type O Open End Rod	Notes:  PP = Pocket Penetro	ometer						
Date	Time	Time	Bot. of	Botto	m wa	ter	O Open End Rod T Thin-Wall Tube	Groundwater encour		GS.					
8/5/20	8:10	(hr) -	Casing	of Ho	ole Wa		U Undisturbed Sample								
0/3/20	0.10					_	SS Split Spoon Sample								
							G Grab Sample								
														Boring N	o.: <b>B-40</b>
Field Tes	st Legend		tancy:						on-Plastic L - Low						n, High
NOTES:	1 ) "nnd" d		ghness:					Dry Strength: N - Non pa" denotes soil sample aver	e L - Low M - M				<u> </u>	vH - Ve	ry Hign
							t penetrometer reading. 2.) pervation within limitations of samp		rage axial pocket pen- tions and field tests b					ual method	s per ASTM D2488.

MOT	r DONAL	М	м						SOII	L BORING LO	OG						BORING NO.:  B-41  Page 1 of 1
Project	:	South Ri	ipley Solar	ſ							Project No.:		_	505	1002	267-001	1 ago 1 oi 1
Locatio	on:		ipley, NY								Project Mgr:			Eric			
Client: Drilling	ı Co	Connect Farth Dir	<u>Gen</u> mensions,	Inc							Field Eng. Staff Date/Time Start					lelgar 2020 at	1:40 pm
	Helper:		/Harold Kl								Date/Time Finis						2:35 pm
Elevation	1: Grade	t. Vert	ical Datum				Boring	g Locatio	n: See Boring	Location Plan		_					o° <b>Long: -</b> 79.665242°
Item Type		Casing HSA	Samp SS	oler C	ore E		Ria M:	ako & Mo	del: Diedrich	D-50	Hammer Type			ntal I		ım: NAD	1983 Rod Size:
Length		5 ft	2 ft		-	. [	□ Tru	ick [	☐ Tripod	☐ Cat-Head	☐ Safety	□ E	3ent	onite			Casing Advance
Inside Di Hammer		4.25 140	1.37 140				□ AT\ <b>⊻</b> Tra		☐ Geoprobe ☐ Air Track	✓ Winch  ☐ Roller Bit	✓ Doughnut  ☐ Automatic			mer er			Hollow Stem Auger
Hammer		30	30				Ski			✓ Cutting Head		<b>▼</b> 1	lone	Э			
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph	um   hic	USCS Group Symbol		(	(Density/cor constituents, p	nal Identification & Des nsistency, color, Group I particle size, structure, n ons, geologic interpretati	Name, noisture,	Dilatancv	92	Te Blasticity	gth	_	Remarks
-	S-1 0.0'- 2.0' 0.3'-'	24	2 5 7 7	1 1/2.	17	ML	$\Box$	Top 4" - Top Stiff, brow (ML)		lay, trace fine Sand, trace f	ine Gravel, dry	- N	- I L	L	L	PP = 2.	O tsf
	S-2 2.0'- 4.0'	24	4 7 7 8			CL	2.0	Stiff, brow	n CLAY, some	Silt, trace fine Sand, trace fi	ine Gravel, dry (CL)		I N	L	-	PP = 1.	75 tsf
- —5	S-3 4.0'- 6.0'	19	3 5 7 12			CL		Stiff, brow (CL)	n CLAY, some	Silt, little fine Gravel, trace f	îne Sand, moist	N	I N	l L	-	PP = 3.	5 tsf
-	S-4 6.0'- 8.0'	18	6 11 21 8			ML		Hard, brow Gravel, mo	wn SILT, some ( bist (ML)	25 tsf							
	S-5 8.0'- 10.0'	20	10 21 27 30			ML			wn SILT, some ( el, moist (ML)	Clay, some coarse to fine S	and, little coarse to	s	. L	L	-	PP = 4.	O tsf
	S-6 13.0'- 15.0'	23	21 43 45 44			ML			/ SILT, some Cl al, dry (ML)	ay, little coarse to fine Sand	t, little coarse to		L	L	-	PP = 2.	O tsf
	S-7 18.0'- 19.4'	24	19 41 50/4"			ML	19.4	dry (ML)	rSILT, some Claring at 19.4 feet packfilled with s	ay, some coarse to fine Gra  BGS.	avel, little fine Sand,		ıL	L	L	PP = 1.	25 tsf
			vel Data	4h : '	Foot :	to:		Samp	le Type	Notes:							
Date	Time	Elapsed Time	Dep Bot. of	th in f	-m		0	Open E		PP = Pocket Peneti Groundwater encou		GS.					
		(hr)	Casing			Water	<b>」</b> ⁻	Thin-Wa									
					+		U		rbed Sample								
					#		SS	Grab Sa	oon Sample								
					+		ಁ	JI du Ja	inpic							Boring	No.: <b>B-41</b>
Field Tes	st Legend		tancy:					R - Rapid			lon-Plastic L - Lov						
IOTEC	1 \ "		ghness:					n H - Hig		, ,	ne L - Low M - N				<u> </u>	∨H - \	ery High
			sample ave Size is dete						eading. 2.) "pi nitations of samp	pa" denotes soil sample ave bler size. 4.) Soil identifica	erage axial pocket per ations and field tests b					nual metho	ods per ASTM D2488.

MACI	r Donal	M	м				SOIL	BORING LO	G						BORING NO.: <b>B-42</b> Page <b>1</b> of <b>1</b>
Project Location Client: Drilling	on:	South Ri Connect Earth Di	mensions	, Inc.					Project No.: Project Mgr: Field Eng. Staff: Date/Time Start			ric Dieg Augu	Paul o Me ust 7	elgar , 2020 at	7:45 am
	Helper:		/Harold K						Date/Time Finis		_	_		, 2020 at	8:50 am Long: -79.669588°
Item	i. Graue	Casing			ore Barrel		ng Location: See Boring L			Hori	zont	al D	atur	n: NAD 1	983
Type Length		HSA 5 ft	SS 2 ff		-	Rig I	Make & Model: Diedrich D	0-50 Cat-Head	Hammer Type  Safety	Dri □ B	lling			Drill Ro	od Size: Casing Advance
Inside Di		4.25	1.37		-	□ A	TV ☐ Geoprobe	☑ Cat-Head  ✓ Winch	☐ Salety  ✓ Doughnut	□ P	olym	ner			Hollow Stem Auger
Hammer Hammer		140 30	140 30		-	I ✓ Tı □ Sı		☐ Roller Bit  ✓ Cutting Head	☐ Automatic	□ W		•			Hollow Otern Auger
Depth/	Sample No. /	Rec.	Sample	Stratu	USCS	3	Visual - Manua	al Identification & Desc sistency, color, Group N		F	ield	Tes			
Elev. (ft)	Interval (ft)	(in)	Blows per 6"	Graph	ic Symbo		constituents, pa	article size, structure, mons, geologic interpretation	oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.6'-'	15	1 3 8 12	7/7	ML	0.6	Top 7" - TOPSOIL  Stiff, brownish gray SILT, se Gravel, trace Clay, moist (N		ttle coarse to fine	- N	L	L	-	PP = 1.25	5 tsf
-	S-2 2.0'- 4.0'	13	8 9 12 12		ML		Very stiff, brown SILT, som Gravel, dry (ML)	ne coarse to fine Sand, little	coarse to fine	N	L	L	L	PP = 1.0 Black till r	tsf ecovered at 2 feet BGS.
<del>-</del> 5	S-3 4.0'- 6.0'	23	10 9 14 15		CL	4.0	Very stiff, brown CLAY, son Sand, dry (CL)	me Silt, little coarse to fine C	Gravel, trace fine	N	М	L	VH	PP = 4.0	tsf
-	S-4 6.0'- 8.0'	24	10 11 13 22		CL		Very stiff, brownish gray CL trace fine Sand, dry (CL)	.AY, some Silt, some coarse	e to fine Gravel,	N	М	L	VH	PP > 4.5	tsf
-	S-5 8.0'- 10.0'	22	9 15 16 16		CL		Hard, gray CLAY, some Silt dry (CL)	, trace fine Sand,	N	н	L	VH	PP = 4.25	i tsf	
<del></del> 10 					<b>_</b>	11.	<u>5</u>			_					
- 15	S-6 13.0'- 15.0'	24	13 28 23 40		ML		Hard, gray SILT, some coar fine Gravel, dry (ML)	rse to fine Sand, some Clay	, some coarse to	s	н	L	М	PP = 2.25	5 tsf
-	S-7 18.0'- 20.0'	18	19 17 22 50		ML	20.	Hard, gray SILT, some coar Sand, moist (ML) End of Boring at 20 feet BG 0 Borehole backfilled with soil	GS. Il cuttings.	ay, trace fine	N	н	L	-	PP = 4.0 Foliated n BGS.	tsf ock recovered at 18 feet
			evel Data	oth in f	oot to:	$\perp$	Sample Type	Notes:							
Date	Time	Elapsed Time	Bot. of		<u> </u>	<u> </u>	•	PP = Pocket Penetro No groundwater enco		ıbsurf	ace	inve	estia	ation.	
		(hr)	Casing	of Ho		┙.	Thin-Wall Tube	. To g. sa. idirator of loc	g 50				419		
					-	U	Undisturbed Sample								
						ss g									
					+	⊣՝	Orab Garripie							Boring N	o.: <b>B-42</b>
	st Legend	Tou	tancy: ghness:	L - I	ow M - I	Mediu	m H - High D	Ory Strength: N - Non-	n-Plastic L - Low e L - Low M - M	ediun	n H	l - F	ligh		ry High
							etrometer reading. 2.) "ppa on within limitations of sample	a" denotes soil sample aver er size. 4.) Soil identificati	age axial pocket pen- ions and field tests b					ual method	s per ASTM D2488.

MOT	T DONAL	M	м					SOIL	BORING LO	G						BORING NO.: <b>B-43</b> Page <b>1</b> of <b>1</b>
Project	:	South R	ipley Solar							Project No.:		_	505°	1002	267-001	Fage 1 01 1
Location	on:		ipley, NY							Project Mgr:				Pau		
Client: Drilling	. Co .	Connect	<u>Gen</u> mensions.	lna						Field Eng. Staff Date/Time Start			_		<u>elgar</u> ′. 2020 at	0.20 am
	Helper:		/Harold K		er					Date/Time Start		_				10:45 am
	1: Grade		ical Datum				Borir	ng Location: See Boring I	Location Plan		_	_	_			Long: -79.666428°
Item		Casing HSA			Core	Barrel	Dia N	Anto O Mandalo Diadvich (	D. F.O.						m: NAD 1	
Type Length		5 ft	SS 2 ft				□ Tr	Make & Model: Diedrich [ uck ☐ Tripod	□ Cat-Head	Hammer Type ☐ Safety	□в		g Flu onite		Dilli KC	Casing Advance
Inside Di Hammer		4.25 140	1.37				□ AT <b>▼</b> Tra		₩ Winch  Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer		30	30				☑ Sk		☑ Roller Bit ☑ Cutting Head	Automatic	₩ N	one	:			
<b>5</b>	Sample							Visual - Manu	al Identification & Desc	cription	LF	ield	Tes	_		
Depth/ Elev.	No. /	Rec.	Sample Blows	Stra		USCS Group		(Density/con	sistency, color, Group N	lame,		ess	≥	Strength		Remarks
(ft)	Interval (ft)	(in)	per 6"	Gra	pnic	Symbol	ı		oarticle size, structure, m ns, geologic interpretatio		Dilatancy	Toughness	Plasticity	Dry Str		
	S-1	19	1	'4 1 <sub>2</sub> .	· <u>.\(\ /</u>		+	Top 6" - TOPSOIL				<u> </u>	-	_		
	0.0'- 2.0'		2	$\overline{}$	Ŧ	ML	0.5	<u> </u>	some Clay, little fine Sand, t	trace fine Gravel.	$\dashv_{N}$	L	L	_	PP = 3.0	tsf
	0.5'-'		5					moist (ML)	,	,						
	0.5-		8													
-	S-2	18	8			ML		Stiff, grayish brown SILT, s	some Clay, little fine Sand, t	race fine Gravel,	N	L	L	м	PP = 2.0	tsf
	2.0'- 4.0'		6					dry (ML)								
			5 8													
			0				4.0									
	S-3	20	6	Н		SM	4.0		SAND, some Silt, little fine	Gravel, trace fine	$\dashv_{R}$	L	NP	_		
	4.0'- 6.0'		9					Gravel, wet (SM)								
<b>-</b> 5			12 11													
							6.0									
•	S-4	21	8		1	ML	0.0		ne Clay, some fine Sand, litt	le coarse to fine	⊢s	L	L	-	PP = 1.5	tsf
	6.0'- 8.0'		13					Gravel, moist (ML)								
-			16 15													
	S-5	24	9			ML			ne Clay, little fine Sand, little	fine Gravel, dry	N	L	L	VН	PP > 4.5	tsf
	8.0'- 10.0'		11 17					(ML)								
•			29													
10																
<del></del> 10																
	S-6	24	17 23			ML		Hard, gray SILT, some Cla dry (ML)	ay, little coarse to fine Grave	l, trace fine Sand,	S	L	L	VH	PP > 4.5	tsf
	13.0'- 15.0'		23					, ,								
	10.0		22													
<del></del> 15																
				$  \   \  $												
				$  \   \  $												
				$  \   \  $												
-				$  \   \  $												
				$  \   \  $												
	S-7	16	17	$  \   \  $		ML		Hard gray SILT some fine	e Sand, some Clay, little fine	Gravel dry (ML)	s	L	L	L	PP = 3.5	tsf
		10	49					riara, gray orer, some inte	o dana, some diay, inde ime	Olavol, dry (ML)	ľ	-	-	-	11 0.0	
	18.0'- 20.0'		50/5"	$  \   \  $												
				$  \   \  $				End of Boring at 20 feet Bo Borehole backfilled with so	GS.							
		Water Le	evel Data	$\perp$	$\Box$		20.0	Sample Type	Notes:			_	<u> </u>		L	
Doto	T:	Elapsed	Dep	th in		to:	0	Open End Rod	PP = Pocket Penetro							
Date	Time	Time (hr)	Bot. of Casing			Water	Т.	Thin-Wall Tube	No groundwater enc	ountered during su	ubsur	ace	ınv	estic	gation.	
							Įυ	Undisturbed Sample								
							SS									
							G	Grab Sample							Boring N	o.: <b>B-43</b>
Field Tes	st Legeno	l: Dila	tancy:	N	- No	ne S-S	Slow	R - Rapid I	_ <b>I</b> Plasticity: NP - No	on-Plastic L - Low	/ M -	Me	diur	n F		<del></del>
		Tou	ghness:	L	- Lov	v M - M	lediur	m H - High I	Dry Strength: N - Non	e L-Low M-N	<b>l</b> ediur	n I	H - H	ligh		ry High
								etrometer reading. 2.) "pp on within limitations of samp	oa" denotes soil sample aver ler size. 4.) Soil identificat	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	М				SOII	L BORING LO	G						BORING NO.: <b>B-44</b> Page <b>1</b> of <b>1</b>
Project			ipley Solaı	r					Project No.:					67-001	<u> </u>
Locatio	on:	South R Connect	ipley, NY						Project Mgr:				Pauli		
Client: Drilling	ı Co ·		<u>Gen</u> mensions	Inc					Field Eng. Staff: Date/Time Start		_			elgar 2020 at	8:50 am
-	Helper:		/Harold K						Date/Time Finis					2020 at	
Elevation	n: Grade	ft. Vert	ical Datun			Borin	g Location: See Boring	Location Plan							<b>Long: -</b> 79.662147°
Item Type		Casing HSA	Samp SS		e Barrel	Ria M	lake & Model: Diedrich	D-50	Hammer Type			al D ı Flu		n: NAD 1 Drill Ro	
Length		5 ft	2 ft	t	-	☐ Tru	uck 🗌 Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite		Dim ite	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	☐ AT		✓ Winch  ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer	Fall (in.)	30	30		- 1	□ Sk	id 🗆	✓ Cutting Head		<b>▼</b> N		_			
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic			(Density/cor constituents, p optional description	nal Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy T	eld ssaudbno_	Plasticity Sel	Dry Strength 67		Remarks
	S-1	17	1	71/2. 7/1		0.5	Top 6" - TOPSOIL				-	-	-		
_	0.0'- 2.0'		1 8		CL		Stiff, grayish brown CLAY dry (CL)	, some Silt, trace fine Sand,	trace fine Gravel,	N	L	L	-	PP = 3.0	tsf
	0.5'-'		10				( )								
_															
	S-2	19	3 7		CL		Stiff, brown Silty CLAY, so wet (CL)	ome coarse to fine Sand, trac	ce fine Gravel,	N	L	L	-	PP = 1.75	5 tsf
-	2.0'- 4.0'		7		1		,								
			9												
_					1										
	S-3	18	6 10		CL		Very stiff, brown Silty CLA Gravel, wet (CL)	AY, some coarse to fine Sand	d, trace fine	S	L	L	-	PP = 0.75	i tsf
<del></del> 5	4.0'- 6.0'		8		1										
			8												
-	0.4	- 10			1		\\ .''' \ .''' \			١	١.	١. ا		DD 05	
	S-4	19	4 6		CL		Gravel, wet (CL)	AY, some coarse to fine Sand	i, trace fine	N	L	L	-	PP = 2.5	IST
_	6.0'- 8.0'		9												
			14												
-	0.5	24	10		4		Lland avantal branco CLA	V aansa Cilk kuasa fina Cand	trace fine Cravel		١,	١. ا		PP = 4.5	had .
	S-5	24	10 33		CL		dry (CL)	Y, some Silt, trace fine Sand,	, trace fine Gravei,	N	L	L	VH	PP = 4.5	IST
-	8.0'- 10.0'		42												
			31												
<del></del> 10															
-															
					<u></u>	11.5				-					
-					:										
-	S-6	10	20		SM		Very dense, gray coarse t	to fine SAND, some Silt, trace	e fine Gravel.	R	_	NP			
	13.0'-		50/4"				moist (SM)	,,							
-	15.0'				:										
					.]										
<del></del> 15					:										
					.]										
-					1										
-					]										
					:										
-	S-7	7	15		SM		Very dense, gray fine SAN	ND, some Silt, little fine Grave	el, dry (SM)	R	-	ΝP	-		
	18.0'-		50/5"		4	18.9									
	18.9'						End of Boring at 18.9 feet Borehole backfilled with so								
		Water Le	evel Data Der	oth in fee	et to:	-	Sample Type	Notes:  PP = Pocket Penetro	ometer						
Date	Time	Time	Bot. of	Bottom	Water	ОТ	Open End Rod Thin-Wall Tube	No groundwater ence		ıbsurf	ace	inve	estig	ation.	
		(hr)	Casing	of Hole	710101	-  ¦	Undisturbed Sample		-						
						ss	Split Spoon Sample								
						G	Grab Sample								
						1_									o.: <b>B-44</b>
Field Te	st Legend		tancy: ghness:						on-Plastic L - Low le L - Low M - W						ry Hiah
NOTES:	1.) "ppd" de							pa" denotes soil sample aver					<u> </u>	vii- ve	1 y 1 11911
							on within limitations of samp		tions and field tests b					al method	s per ASTM D2488.

MAC	T DONAL	M	м				SOII	L BORING LO	G						BORING NO.: <b>B-45</b> Page <b>1</b> of <b>1</b>
Project Location Client:	on:	South Ri							Project No.: Project Mgr: Field Eng. Staff		E	ric Dieg	Paul o Me	elgar	
Drilling Driller/	Co.: Helper:		mensions /Harold K						Date/Time Start Date/Time Finis			_			10:35 am 11:25 am
Elevation	n: Grade	t. Vert	ical Datun	n:		Borin	g Location: See Boring	Location Plan		Coo	rd.:	La	ıt: 42	2.195679°	Long: -79.654647°
Item Type		Casing HSA	Samp SS		re Barrel	Ria M	lake & Model: Diedrich	D-50	Hammer Type			tal E ı Flu		n: NAD 1	983 od Size:
Length	- " "	5 ft	2 ft	t	-	☐ Tru	uck 🗌 Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite			Casing Advance
Inside Di Hammer	Wt. (lb.)	4.25 140	1.37 140	)	-	☐ AT		Winch     Roller Bit	☑ Doughnut ☐ Automatic	□ P	ate	r			Hollow Stem Auger
Hammer	Fall (in.)	30	30		-	☐ Ski	id <u> </u>	✓ Cutting Head		<b>V</b> N		Tes	tc		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratur Graphi	Symbo	o ol	(Density/cor constituents, p optional description	nal Identification & Description Description   Description	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1 0.0'- 2.0' 0.3'-'	11	1 1 6 8	3(1);; 3(	CL	0.3	Top 4" - TOPSOIL  Medium stiff, dark brown 0	CLAY, some Silt, trace fine S	Sand, moist (CL)	- N	M	L	-	PP = 0.25	ō tsf
-	S-2 2.0'- 4.0'	15	4 4 3 3		ML	2.0	Medium stiff, reddish brow Clay, moist (ML)	vn SILT, some fine Sand, little	e fine Gravel, little	N	L	L	-	PP = 1.75	5 tsf
- <del></del> 5	S-3 4.0'- 6.0'	14	2 2 1 2		CL	4.0	Soft, brown CLAY, some of Gravel, wet (CL)	coarse to fine Sand, little Silt,	, trace fine	N	М	L	-	PP = 0.75	5 tsf
-	S-4 6.0'- 8.0'	15	2 3 5 6		CL		Stiff, brown CLAY, some of Gravel, moist (CL)	coarse to fine Sand, little Silt,	, trace fine	R	М	L	-	PP = 2.75 Red sand	5 tsf recovered at 6 feet BGS.
- - 10	S-5 8.0'- 10.0'	16	2 3 26 15		CL		Very stiff, brown CLAY, so (CL)	ome Silt, little fine Gravel, little	e fine Sand, moist	N	М	L	-	PP = 1.75	5 tsf
- - <u>∑</u>						<u>11.5</u>									
- 15	S-6 13.0'- 15.0'	24	22 35 46 50/5"		ML		Hard, gray SILT, some fin moist (ML)	e Sand, little coarse to fine G	Gravel, trace Clay,	N	L	L	-	PP = 1.75	5 tsf
-	S-7 18.0'- 18.7'	21	25 50/3"		ML	18.7	Hard, brownish gray SILT, wet (ML)  End of Boring at 18.7 feet Borehole backfilled with so	, some fine Sand, little Clay, BGS. oil cuttings.	little fine Gravel,	N	L	L	-	PP = 1.50	) tsf
			evel Data	oth in fe	et to:	Ę	Sample Type	Notes:	motor						
Date	Time	Elapsed Time	Bot. of	Botton	n <sub>Water</sub>	-   °	Open End Rod	PP = Pocket Penetro Groundwater encour		GS.					
8/5/20	11:25	(hr) -	Casing	of Hol		ַד   ד ט	Thin-Wall Tube Undisturbed Sample								
010120	11.20	-			12	ss	Split Spoon Sample								
					+	G	Grab Sample							<b>5</b>	D 45
Field Te	st Legeno		tancy: ghness:						on-Plastic L - Low e L - Low M - N				n H	I - High	o.: <b>B-45</b> ry High
							etrometer reading. 2.) "pp on within limitations of samp	pa" denotes soil sample aver oler size. 4.) Soil identificat	age axial pocket pen					ual method	s per ASTM D2488.

MOT	T DONAL	M	м					SOII	L BORING LO	)G						BORING NO.: <b>B-46</b> Page <b>1</b> of <b>1</b>
Project	: ,	South Ri	pley Solar	r						Project No.:		_ [	5051	002	67-001	r age 1 or 1
Location			pley, NY							Project Mgr:				Paul		
Client:		Connect								Field Eng. Staff		_			elgar	1.00
Drilling	l Co.: Helper:		mensions, /Harold K							Date/Time Start Date/Time Finis			_		<u>, 2020 at</u> , 2020 at	
	1: Grade f		ical Datum			Bori	ina I o	cation: See Boring	Location Plan	Date/Time Tims						Long: -79.650305°
Item		Casing	Samp		ore Barrel						Hori	zon	tal C	atur	n: NAD 1	983
Type Length		HSA 5 ft	SS 2 ft		-	Rig		Model: Diedrich	D-50 ☐ Cat-Head	Hammer Type ☐ Safety	Dri □ B		Flu		Drill Ro	d Size: Casing Advance
Inside Di	a. (in.)	4.25	1.37		-	A		☐ Geoprobe	✓ Winch	✓ Doughnut						Hollow Stem Auger
Hammer Hammer		140 30	140 30		-	✓ T		☐ Air Track	☐ Roller Bit  ☐ Cutting Head	☐ Automatic	□ W ▼ N					Tollow Cleff Auger
Hammer		30	] 30		Ī	T	KIU		•				Tes	ts	1	
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph		)		(Density/cor constituents, p	al Identification & Desinsistency, color, Group Noarticle size, structure, mons, geologic interpretations.	lame, noisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
_	S-1 0.0'- 2.0'	21	2 2 5	1 1×. 1	ML	0.3	Medi	4" - TOPSOIL ium stiff, grayish brow rel, moist (ML)	n SILT, some Clay, little fine	e Sand, trace fine	- N	Ŀ	- L	-	PP = 1.25	tsf
_	0.3'-'	10	6			2.0		L L L CLAV III		5 0 11	┨				DD: 45	
-	S-2 2.0'- 4.0'	18	7 7 5 9		CL		(CL)	dark brown CLAY, lit	tle Silt, little fine Gravel, trac	e fine Sand, dry	N	М	L	Н	PP > 4.5	st
<del>-</del> 5	S-3 4.0'- 6.0'	22	5 8 9 13		CL		Very dry (		Y, some Silt, little fine Sand	, trace fine Gravel,	N	М	L	н	PP > 4.5	tsf
-	S-4	24	9		ML	6.0			Clay, some fine Gravel, little	fine Sand, dry	- N	L	L	Н	PP > 4.5	tsf
-	6.0'- 8.0'		16 26 36			8.0	, ,									
-	S-5 8.0'- 10.0'	24	9 16 21 28		CL		Hard	l, gray CLAY, some S	ilt, trace fine Gravel, dry (CL	-)	N	M	L	VH	PP > 4.5	isf
10 - -					4	11.	<u>5</u>				-					
-	S-6 13.0'- 15.0'	24	10 27 35 36		ML		Hard	l, gray SILT, some Cla	ay, little fine Gravel, little fine	e Sand, dry (ML)	s	L	L	L	PP = 4.5	lsf
— 15 - -																
-	S-7 18.0'- 20.0'	24	22 39 38 37		ML		Sand	d, dry (ML)	ne Clay, some coarse to fine	Gravel, trace fine	s	L	L	L	PP = 4.0	tsf
		Mata: 1	wol Dots			20.	_	hole backfilled with so					1	Ш		
		Water Le Elapsed		th in fe	et to:	١,		ample Type en End Rod	Notes:  PP = Pocket Penetro	ometer						
Date	Time	Time	Bot. of	Botto	n <sub>Wato</sub>	1 -	- 1	n-Wall Tube	No groundwater end		ubsurf	ace	inv	estig	ation.	
		(hr)	Casing	of Ho	e	⊣ΰ		disturbed Sample								
								it Spoon Sample								
						٦G		ab Sample								
						∄ Ĭ	_		<u> </u>						Boring N	o.: <b>B-46</b>
	st Legend	Tou	tancy: ghness:	L-l	None S-	Mediu	ım H	- High	Dry Strength: N - Nor	on-Plastic L - Low ne L - Low M - N	lediur	n ŀ	l - F	ligh		ry High
								eter reading. 2.) "ppoint in limitations of samp	oa" denotes soil sample ave oler size. 4.) Soil identifica	rage axial pocket pen tions and field tests b					ual method	s per ASTM D2488.

MACI	r DONAL	M	м				SOII	L BORING LO	G						BORING NO.: <b>B-47</b> Page <b>1</b> of <b>1</b>
Project	:	South R	ipley Sola	r					Project No.:		_ [	5051	0026	67-001	Tage For F
Location	on:		ipley, NY						Project Mgr:				Paul		
Client:	_	Connect							Field Eng. Staff:			_		elgar	
Drilling	j Co.: Helper:		mensions /Harold K						Date/Time Starte Date/Time Finis			_		<u>, 2020 at</u> , 2020 at	2:30 pm
	1: Grade		ical Datun			Borin	g Location: See Boring	Location Plan	Date/Time Tims	_	_				Long: -79.655358°
Item		Casing			ore Barrel					Hori	zon	tal D	atun	n: NAD 1	983
Type Length		HSA 5 ft	SS 2 ft		-	Rig N	lake & Model: Diedrich	D-50 ☐ Cat-Head	Hammer Type  ☐ Safety	Dri □ B		Flu		Drill Ro	od Size: Casing Advance
Inside Di		4.25	1.37	'5	-	$\square$ AT	V ☐ Geoprobe	<b>✓</b> Winch	✓ Doughnut	□Р	olyn	ner			Hollow Stem Auger
Hammer Hammer		140 30	140 30		-	☑ Tra		<ul><li>☐ Roller Bit</li><li>✓ Cutting Head</li></ul>	☐ Automatic	□ W ☑ N					. rono ir otom / tagor
						1		•				Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratu Graph		)	(Density/cor constituents, p	al Identification & Description Description   barticle size, structure, mons, geologic interpretations.	lame, oisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
	S-1	17	1	7/1/		0.5	Top 6" - TOPSOIL				-	-	-		
	0.0'- 2.0'		3 5		CL		Stiff, grayish brown CLAY moist (CL)	, some Silt, little fine Sand, tr	ace fine Gravel,	N	L	L	-	PP = 3.5	tsf
	0.5'-'		7				molet (OE)								
_					7										
	S-2	24	5		CL		Very stiff, brown Silty CLA (CL)	AY, some fine Sand, trace fine	e Gravel, moist	N	L	L	-	PP = 2.75	5 tsf
_	2.0'- 4.0'		8 10		7		(/								
			9												
_					7										
	S-3	12	4 5		CL		Very stiff, brown Silty CLA (CL)	AY, some fine Sand, trace fine	e Gravel, moist	N	L	Н	-	PP = 0.25	5 tsf
5	4.0'- 6.0'		4		7		,								
			4												
_				///	4	6.0				١.	١.				
	S-4	12	3 5		ML		Stiff, brown SILT, some co	oarse to fine Sand, little fine	Gravel, trace	S	L	L	-	PP = 1.25	5 tsf
_	6.0'- 8.0'		4												
			5												
-					l I						١.				
	S-5	17	6 10		ML		Gravel, trace Clay, moist	me coarse to fine Sand, little (ML)	coarse to fine	S	L	L	-	PP = 1.25	o tst
-	8.0'- 10.0'		14												
			13												
<del></del> 10															
-															
$\overline{\triangle}$					<del>                                     </del>	11.5				-					
-				6/1											
				Pold	$\triangleleft$										
-	S-6	2	50/5"	• Φ (t	⊃ <sub>GM</sub>		Very dense, gray coarse t	to fine GRAVEL, some Silt, lit	ttle Clay little fine	N		NP			
		2	30/3	[: D1			Sand, wet (GM)	O IIIIe GIVAVEE, SOME SIII, III	tue olay, little lille	'	-	INF			
-	13.0'- 15.0'														
				1X	7										
<del></del> 15				1°47	1										
					$\neg$										
-				[6/16]											
				PH'	+	16.5				-					
-															
-	S-7	13	34		ML		Hard, gray SILT, some co	parse to fine Sand, little fine G	Gravel, little Clay,	N	L	L		PP = 1.0	tsf
	18.0'-		37				wet (ML)		<b>3</b> -						
-	19.3'		50/4"	Ш		19.3									
							End of Boring at 19.3 feet Borehole backfilled with se	: BGS. oil cuttings.							
			evel Data			$\pm$	Sample Type	Notes:			_				
Date	Time	Elapsed Time	Dep Bot. of	th in fo		-0	Open End Rod	PP = Pocket Penetro Groundwater encour		BGS					
		(hr)	Casing		e wate	<b>⊣</b> `	Thin-Wall Tube	Orogrammater encour		<b>_</b>					
8/5/20	15:40	-			11.5	_U	Undisturbed Sample								
						SS	Split Spoon Sample Grab Sample								
						G	Grap Sample							Boring N	o.: <b>B-47</b>
Field Tes	st Legend		tancy:						n-Plastic L - Low						
NOTE:	4 \ 11		ghness:					, ,	e L-Low M-M				<u> </u>	VH - Ve	ry High
							etrometer reading. 2.) "pl on within limitations of samp	pa" denotes soil sample aver bler size. 4.) Soil identificat	age axial pocket pen- tions and field tests b					ual method	s per ASTM D2488.

MOT	r DONAL	<sub>D</sub> M	м				SOI	L BORING LO	G						BORING NO.: B-SS-1 Page 1 of 1
Project	: .	South R	ipley Solar	r					Project No.:		_ [	5051	002	67-001	Page 1 01 1
Location			ipley, NY						Project Mgr:				Paul		
Client:		Connect		Ina					Field Eng. Staff:		_			elgar	20 nm
Drilling Driller/	Helper:		mensions, /Harold K					<del></del>	Date/Time Start					2020 at 1: 2020 at 2:	
	ı: Grade f		ical Datum			Borir	ng Location: See Boring	Location Plan		Coo	_	_			Long: -79.760142°
Item Type		Casing HSA	Samp SS		re Barrel	Dia N	Make & Model: Diedrich	D 50	Hammer Type			tal D		n: NAD 1	
Length		5 ft	2 ft	i i	-	☐ Tr	uck 🗌 Tripod	☐ Cat-Head	☐ Safety	□в	ento	nite		Dimito	Casing Advance
Inside Di Hammer		4.25 140	1.37		-	☐ AT		✓ Winch  ☐ Roller Bit	☑ Doughnut ☐ Automatic	□ P					Hollow Stem Auger
Hammer		30	30		- 1	☐ Sk		✓ Cutting Head		<b>▼</b> N	one				
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratum Graphic		,	(Density/con constituents, p	ual Identification & Desc nsistency, color, Group N particle size, structure, m ons, geologic interpretation	lame, oisture,	Dilatancy	Loughness Toughie	Tes Plasticity	Dry Strength		Remarks
	S-1	19	1	7/ 1× 7/	4	0.6	Top 7" - TOPSOIL			-	-	-	-		
_	0.0'- 2.0'		2 2		CL	0.0		CLAY, little Silt, little coarse	to fine Sand,	┨-	М	L	L	PP = 0.5 t	
	0.6'-'		9		1										<b>.</b>
-	S-2 2.0'- 4.0'	21	4 9 5 7		CL		Very stiff, light brown CLA fine Gravel, moist (CL)	AY, some coarse to fine Sand	d, little Silt, trace	-	М	L	L	PP = 2.25 TV = 1.25	
<del>-</del> 5	S-3 4.0'- 6.0'	23	3 3 3 4		CL		Medium stiff, brown CLAY fine Gravel, moist (CL)	/, some coarse to fine Sand,	little Silt, trace	-	М	L	-	PP = 1.5 t TV = 1.0 t	
-	S-4 6.0'- 8.0'	22	5 6 8 10		CL		Stiff, light brown CLAY, so Gravel, moist (CL)	ome coarse to fine Sand, trad	parse to fine Sand, trace Silt, trace fine - H L						sf tsf
-	S-5 8.0'- 10.0'	24	9 9 10 13		CL		Very stiff, brown CLAY, so Gravel, moist (CL)	ome coarse to fine Sand, sor	ne Silt, trace fine	-	L	L	-	PP = 3.5 t TV = 2.0 t	
	S-6 13.0'- 15.0'	22	14 30 42 47		CL .	<u>16.5</u>	Sand, dry (ČL)	me coarse to fine Gravel, so	me coarse to fine		н	L	VH	PP = 4.5 TV = 3.5 l	
-	S-7 18.0'- 20.0'	13	10 23 26 22		GC	20.0	Hard, dark gray GRAVEL Silt, dry (GC) End of Boring at 20 feet E B Borehole backfilled with s	, some Clay, some coarse to GGS. oil cuttings.	fine Sand, some	-	-	-	1	Quartz fra 20 feet B0	gment observed from 18 to SS.
		Water Le	vel Data	oth in fee	et to:	F	Sample Type	Notes:	motor						
Date	Time	Time	Bot. of	Bottom	Wato	-  °	Open End Rod	PP = Pocket Penetro No groundwater enc		ıbsurf	ace	inve	estig	ation.	
		(hr)	Casing	of Hole	vvate	_ T	Thin-Wall Tube Undisturbed Sample		3				J		
						⊣ss									
						G									
						Ţ								Boring N	o.: <b>B-SS-1</b>
	st Legend	Tou	tancy: ghness:	L - Lo	ow M - N	/lediur	m H - High	Dry Strength: N - Non	on-Plastic L - Low le L - Low M - M	lediur	n ŀ	1 - H	ligh		ry High
							etrometer reading. 2.) "pon within limitations of samp	pa" denotes soil sample aver oler size. 4.) Soil identificat	rage axial pocket pen- tions and field tests b					ual method	s per ASTM D2488.

MAC	T DONAL	M	М				SOIL	BORING LO	G						BORING NO.: B-SS-2 Page 1 of 1
Project			ipley Solar	r				_	Project No.:					67-001	<b>V</b>
Location Client:	on:	Connect	i <u>pley, NY</u> Gen						Project Mgr: Field Eng. Staff:				<u>Paul</u> o Me	ı elgar	
Drilling	Co.:		mensions,	, Inc.					Date/Time Start					2020 at 1	1:30 am
	Helper:		/Harold K						Date/Time Finis	_	_	_		2020 at 1	_
Item	n: Grade	t. Vert	ical Datum		re Barrel	Borir	ng Location: See Boring	Location Plan						2.197701° <b>n:</b> NAD 1	<b>Long:</b> -79.759675°
Туре		HSA	SS		-		Make & Model: Diedrich [		Hammer Type	Dri	lling	j Flu	iid	Drill Ro	d Size:
Length Inside Di	a. (in.)	5 ft 4.25	2 ft 1.37		-	<ul><li>□ Tr</li><li>□ A1</li></ul>	TV ☐ Geoprobe	☐ Cat-Head  ✓ Winch	☐ Safety ✓ Doughnut	□ B					Casing Advance Hollow Stem Auger
Hammer Hammer		140 30	140 30		-	☑ Tr		☐ Roller Bit  Cutting Head	☐ Automatic	□ W ▼ N					Hollow Stelli Augel
riamino	` '	- 00						al Identification & Desc				Tes	ts	·	
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratur Graphi	m USCS Group Symbo	)	(Density/con constituents, p	sistency, color, Group Narticle size, structure, mons, geologic interpretation	ame, oisture,	Dilatancy	Toughness	Plasticity	/ Strength		Remarks
	S-1	16	2	7. 18. 7	. //	0.3	<u> </u>	, gg		<u> </u>	<u>د</u>	- ∐	Dry		
	0.0'- 2.0'	10	2	777	CL	0.0	<u> </u>	coarse to fine Sand, trace S	ilt, moist (CL)	N	М	L	L	PP = 2.25 TV = N/A	i tsf
-	0.3'-'		4 5		1									IV - IN/A	
	0.5-		5												
-	S-2	24	5		CL			me coarse to fine Sand, little	e fine Gravel,	N	М	L	L	PP = 3.5	tsf
	2.0'- 4.0'		6 7				moist (CL)							TV = 2.0	IST
-			7												
_					4										
	S-3	17	3 2		CL		Medium stiff, light brown C Silt, moist (CL)	LAY, some fine Sand, little f	îne Gravel, trace	N	М	L	L	PP = 2.5 TV = 2.0	
<del>-</del> 5	4.0'- 6.0'		5		7										
			6		1										
-	S-4	24	6		CL		Hard gravish brown CLAY	, some Silt, little coarse to fi	ne Sand little fine	l <sub>N</sub>	М	L	н	PP = 3.0	tsf
	6.0'- 8.0'		13				Gravel, moist (CL)	, some one, made oddroc to m	no cana, mac inic	'`	'*'	-		TV = 1.5	
-	0.0 - 0.0		19 16												
			10		7										
-	S-5	22	9		CL			Y, some coarse to fine Sand	d, some fine	N	М	L	-	PP = 2.5	
	8.0'- 10.0'		12		7		Gravel, trace Silt, moist (C	L)							wet Sand recovered at 8
-			17 20											feet BGS	
<del></del> 10					7										
10					7										
					1										
					7										
-					1										
-	S-6	24	17		CL		Hard, light gray CLAY, son	ne fine Gravel, little coarse to	o fine Sand. trace	s	М	L	н	PP = 4.0	tsf
	13.0'-		15		1		Silt, dry (CL)							TV = 1.25 Weathers	tsf d bedrock fragments
-	15.0'		18 22											recovered	l at 13 feet BĞS.
45															
<del></del> 15					1										
				///											
-					1										
				///											
-	S-7	22	14		CL		Hard, brownish gray CLAY	, some Silt, little fine Gravel,	. little coarse to	l <sub>N</sub>	М	L	VH	PP > 4.5	tsf
	18.0'-		20				fine Sand, dry (CL)			'	"	-		TV = 1.25	
-	20.0'		19 20												
			20		1	20.0	End of Boring at 20 feet Bo Borehole backfilled with so	GS. il cuttings.							
			evel Data	th in f	ot to:		Sample Type	Notes:							
Date	Time	Elapsed Time	Bot. of	th in fe Bottor		- 0	•	PP = Pocket Penetro TV = Torvane	ometer						
		(hr)	Casing			T U	Thin-Wall Tube Undisturbed Sample	No groundwater enco	ountered during su	ubsurf	ace	inve	estig	ation.	
						_  ss	•								
						G									D 00 0
						<u></u>		<u> </u>	DI " ' '						o.: <b>B-SS-2</b>
rield Te	st Legend		tancy: ghness:						n-Plastic L - Low e L - Low M - N						ry High
		enotes soil	sample ave	rage dia	metral pock	et pen	etrometer reading. 2.) "pp	a" denotes soil sample aver	age axial pocket pen	etrome	eter	eadi	ng.		
	<ol><li>3.) Maximu</li></ol>	m Particle	Size is dete	rmined b	y direct obs	servatio	on within limitations of sample	ler size. 4.) Soil identificat	ions and field tests b	ased c	n vi	sual-	manı	ual method	s per ASTM D2488.

MAC	r DONAL	D M	м				SO	IL BORING LO	G						BORING NO.: <b>B-SS-3</b> Page <b>1</b> of <b>1</b>
Project Location Client:	on:	South Ri							Project No.: Project Mgr: Field Eng. Staff			ric Dieg	Paul o Me	elgar	
Drilling Driller/	j Co.: Helper:		mensions /Harold K						Date/Time Start Date/Time Finis		_			2020 at 1 2020 at 1	
Elevation	n: Grade f		ical Datun			Boring	g Location: See Boring	g Location Plan			rd.:	La	t: 42	197438°	Long: -79.758142°
Item Type		Casing HSA	Samp SS		re Barrel	Rig M	lake & Model: Diedrich	n D-50	Hammer Type			tal D j Flu		n: NAD 1 Drill Ro	
Length Inside Di	a. (in.)	5 ft 4.25	2 ft		-	☐ Tru		☐ Cat-Head  ✓ Winch	☐ Safety  ✓ Doughnut	В					Casing Advance
Hammer	Wt. (lb.)	140	140	)	-	<b>▼</b> Tra	ack 🗆 Air Track	Roller Bit Cutting Head	☐ Automatic	□ w	/ate	r			Hollow Stem Auger
Hammer		30	30		<u>-  </u>	Ski		1 - 3		<b>⊻</b> N   F		Tes	ts		
Depth/ Elev. (ft)	Sample No. / Interval (ft)	Rec. (in)	Sample Blows per 6"	Stratun Graphic		)	(Density/co constituents,	nual Identification & Designation Designation   particle size, structure, maions, geologic interpretations	lame, noisture,	Dilatancy	Toughness	Plasticity	Dry Strength		Remarks
-	S-1 0.0'- 2.0' 0.3'-'	18	3 4 6 7	17. :4 12.	CL	$\overline{}$	Top 4" - TOPSOIL Stiff, light brown grayish	CLAY, trace Silt, trace fine G	ravel, dry (CL)		L	- NP	Ĺ	PP = 2.0 TV = 0.75	
-	S-2 2.0'- 4.0'	19	6 14 9 11		CL		Very stiff, grayish light be	rown CLAY, trace fine Gravel,	dry (CL)	-	М	L	L	PP = 3.75 TV = 2.5	
<del>-</del> 5	S-3 4.0'- 6.0'	21	4 4 9 11		CL		Stiff, brown CLAY, trace	fine Gravel, trace Silt, moist (	(CL)	-	М	L	L	PP = 4.0 TV = 2.0	
-	S-4 6.0'- 8.0'	21	5 17 11 16		CL		Very stiff, dark brown CL	AY, trace fine Gravel, trace S	Silt, moist (CL)	s	М	L	-	PP = 4.5 TV = 2.5	
-	S-5 8.0'- 10.0'	19	10 12 14 18		CL	Very stiff, brown to light gray, CLAY, some coarse to fine Sand, trace N M L - F fine Gravel, trace Silt, moist (CL)							PP = 3.0 TV = 2.5 Wet Sand BGS.		
— 10 - -															
- 15	S-6 13.0'- 15.0'	24	17 25 27 50		CL		Hard, brown to light gray Sand, trace Silt, dry (CL	CLAY, some fine Gravel, little )	e coarse to fine	N	Н	L	-	PP = 3.0 TV = N/A Weathere feet BGS	d Gravel encountered 15
- - <u>∑</u>															
-	S-7	4	50/4"		CL			e coarse to fine Gravel, little S	Silt, moist (CL)	_  -	н	L	-		
-	18.0'- 18.4'						Split spoon refusal at 18 End of Boring at 18.4 fee Borehole backfilled with	et BGS.							
			evel Data	oth in fe	nt to:		Sample Type	Notes:		_	_				
Date	Time	Elapsed Time	Bot. of	Botton	) Water	- 0	Open End Rod Thin-Wall Tube	PP = Pocket Penetro TV = Torvane	ometer						
7/20/20	11:00	(hr) 0:00	Casing	<b>of Hole</b> 18.4	17	ַ ד ט	Undisturbed Sample								
.,_0,20	. 1.00	0.00		10.7	<u> </u>	ss	Split Spoon Sample								
					$\pm$	G	Grab Sample							Borina N	o.B 66 3
Field Te	st Legenc		tancy: ghness:				R - Rapid n H - High		on-Plastic L - Lov ne L - Low M - N				n H	- High	o.: <b>B-SS-3</b> ry High
							trometer reading. 2.) " n within limitations of san	ppa" denotes soil sample aver apler size. 4.) Soil identifica	rage axial pocket per tions and field tests b					ual method	s per ASTM D2488.

# D. Electrical Resistivity Testing

Project Name:	ConnectGen South Ripley Solar	Date:		July 20 - Aug. 11, 2020
Project Number:	505100267-001	Weather:		Sunny
Project Location:	South Ripley, NY	Temperature:		69-85 F
Equipment:	AG	I MiniSting		
Test Method:	Wenner	4 Electrode Arra	ıy	

Λ κα		Data		Array	spacing (ft)		
Arr	ay	Data	2.00	5.00	10.00	20.00	50.00
	N-S	Measured Resistance (Ω)	167.70	23.51	6.33	1.67	0.77
ERT-SS-1	14-3	Apparent Resistivity (Ω-m)	642.21	225.06	121.28	84.55	74.16
EV1-33-1	E-W	Measured Resistance (Ω)	281.00	27.92	6.15	1.79	0.88
	E-VV	Apparent Resistivity (Ω-m)	1075.64	267.25	117.71	85.68	84.06
	N-S	Measured Resistance (Ω)	110.60	17.90	14.83	1.68	0.83
ERT-01	11-3	Apparent Resistivity (Ω-m)	423.67	171.42	283.92	80.28	79.52
EKI-OI	E-W	Measured Resistance (Ω)	110.40	19.48	5.67	1.73	0.86
	E-VV	Apparent Resistivity (Ω-m)	422.76	186.54	108.48	82.60	82.02
	N-S	Measured Resistance (Ω)	19.08	11.17	4.66	1.67 84.55 1.79 85.68 1.68 80.28 1.73	1.32
ERT-02	11-3	Apparent Resistivity (Ω-m)	73.09	106.92	89.21	118.93	126.34
ERI-UZ	E-W	Measured Resistance (Ω)	19.72	11.56	5.02	2.37	1.26
	E-VV	Apparent Resistivity (Ω-m)	75.53	110.61	96.10	113.20	120.73
	N-S	Measured Resistance (Ω)	50.72	7.16	3.69	1.59	0.80
ERT-03	11-3	Apparent Resistivity (Ω-m)	194.25	68.52	70.71	76.23	76.84
EN1-03	E-W	Measured Resistance (Ω)	23.63	7.87	3.72	1.60	0.82
	E-VV	Apparent Resistivity (Ω-m)	90.40	75.32	71.23	76.81	78.03
		Site Average (Ω)	97.86	15.82	6.26	1.86	0.94
		Site Average (Ω-m)	374.69	151.46	119.83	89.79	90.21

Project Name:	ConnectGen South Ripley Solar	Date:		July 20 - Aug. 11, 2020
Project Number:	505100267-001	Weather:		Sunny
Project Location:	South Ripley, NY	Temperature:		69-85 F
Equipment:	AG	I Ministing		
Test Method:	Wenner	4 Electrode Arra	ıy	

۸۰۰	-214	Data		Array	spacing (ft)		
Arr	ау	Data	2.00	5.00	10.00	20.00	50.00
	N-S	Measured Resistance (Ω)	107.80	30.93	5.32	1.96	0.88
ERT-04	14-3	Apparent Resistivity (Ω-m)	412.70	296.14	101.96	93.39	84.61
EN1-04	E-W	Measured Resistance (Ω)	148.60	15.98	4.68	1.78	0.90
	E-VV	Apparent Resistivity (Ω-m)	569.67	153.01	89.55	85.01	86.29
	N-S	Measured Resistance (Ω)	30.66	9.99	3.66	1.86	1.00
ERT-05	111-3	Apparent Resistivity (Ω-m)	117.44	95.62	70.04	88.82	95.46
EKI-US	E-W	Measured Resistance (Ω)	29.60	8.27	4.03	1.46	0.96
	E-VV	Apparent Resistivity (Ω-m)	113.36	79.22	77.18	69.74	92.17
	N-S	Measured Resistance (Ω)	43.75	10.03	4.30	1.92	1.05
ERT-06	111-3	Apparent Resistivity (Ω-m)	167.61	96.04	82.33	91.68	100.31
EKI-00	E-W	Measured Resistance (Ω)	44.57	8.35	4.30	1.97	1.02
	E-VV	Apparent Resistivity (Ω-m)	170.72	79.92	82.30	94.09	97.66
	N-S	Measured Resistance (Ω)	42.58	4.25	1.96	1.02	0.72
EDT 07	IN-3	Apparent Resistivity (Ω-m)	163.04	40.66	37.43	48.95	68.49
ERT-07	E-W	Measured Resistance (Ω)	25.64	4.28	2.06	1.15	0.77
	E-VV	Apparent Resistivity (Ω-m)	98.18	41.00	39.44	55.17	74.04
		Site Average (Ω)	59.15	11.51	3.79	1.64	0.91
		Site Average (Ω-m)	226.59	110.20	72.53	78.36	87.38

Project Name:	ConnectGen South Ripley Solar	Date:		July 20 - Aug. 11, 2020	
Project Number:	505100267-001	Weather:		Sunny	
Project Location:	South Ripley, NY	Temperature:		69-85 F	
Equipment:	AG	AGI Ministing			
Test Method:	Wenner 4 Electrode Array				

Array		Data	Array spacing (ft)				
Array		Data	2.00	5.00	10.00	20.00	50.00
	N-S	Measured Resistance (Ω)	108.60	13.01	4.88	2.09	1.07
EDT OO	14-3	Apparent Resistivity (Ω-m)	416.05	124.60	93.45	100.04	102.14
E-W	E \\/	Measured Resistance (Ω)	110.40	20.78	5.37	2.13	1.04
	Apparent Resistivity (Ω-m)	423.06	198.97	102.57	102.17	99.24	
N.C	N-S	Measured Resistance (Ω)	214.00	55.34	10.03	3.69	2.06
EDT OO	ERT-09 E-W	Apparent Resistivity (Ω-m)	819.30	530.05	192.08	176.72	196.26
EK1-09		Measured Resistance (Ω)	217.70	51.53	10.81	3.64	1.89
		Apparent Resistivity (Ω-m)	833.63	493.17	207.08	173.64	175.14
	N-S	Measured Resistance (Ω)	121.00	49.40	20.79	7.93	2.15
EDT 10	14-3	Apparent Resistivity (Ω-m)	463.30	473.05	398.07	379.78	205.68
ERT-10	E-W	Measured Resistance (Ω)	111.00	43.97	21.94	6.30	2.29
	E-VV	Apparent Resistivity (Ω-m)	425.20	420.93	420.01	301.81	219.09
	N-S	Measured Resistance (Ω)	32.68	10.80	4.91	2.06	1.11
ERT-11	14-3	Apparent Resistivity (Ω-m)	125.18	103.36	93.91	1013.19	105.98
CK1-TT	E-W	Measured Resistance (Ω)	30.15	9.02	4.96	2.12	1.03
	E-VV	Apparent Resistivity (Ω-m)	115.43	86.32	94.98	101.35	98.69
		Site Average (Ω)	118.19	31.73	10.46	3.75	1.58
		Site Average (Ω-m)	452.64	303.81	200.27	293.59	150.28

Project Name:	ConnectGen South Ripley Solar	Date:		July 20 - Aug. 11, 2020
Project Number:	ject Number: 505100267-001			Sunny
Project Location:	South Ripley, NY	Temperature:		69-85 F
Equipment:	A	AGI Ministing		
Test Method:	Wenner 4 Electrode Array			

Array		Data		Array	spacing (ft)		
Array		Data	2.00	5.00	10.00	20.00	50.00
	N-S	Measured Resistance (Ω)	410.30	136.20	54.11	13.84	2.45
ERT-12	14-3	Apparent Resistivity (Ω-m)	1571.55	1303.93	1036.32	662.94	235.00
ENI-12	E-W	Measured Resistance (Ω)	346.50	181.10	49.48	13.09	2.50
	E-VV	Apparent Resistivity (Ω-m)	1327.10	1732.79	947.01	626.67	239.51
N-S	Measured Resistance (Ω)	220.40	38.23	11.06	3.43	1.54	
ERT-13	14-3	Apparent Resistivity (Ω-m)	843.99	366.06	211.74	164.13	147.13
EK1-12	E-W	Measured Resistance (Ω)	209.10	50.93	9.91	4.33	1.69
	E-VV	Apparent Resistivity (Ω-m)	800.40	487.38	189.74	207.48	161.54
	N-S	Measured Resistance (Ω)	92.26	15.36	4.44	1.73	1.01
ERT-14	14-3	Apparent Resistivity (Ω-m)	353.26	147.07	85.10	82.84	96.59
EK1-14	E-W	Measured Resistance (Ω)	95.51	21.91	5.62	1.82	0.96
	E-VV	Apparent Resistivity (Ω-m)	365.76	209.82	107.59	87.02	91.47
	N-S	Measured Resistance (Ω)	32.50	11.42	5.71	2.19	0.99
ERT-15	IN-3	Apparent Resistivity (Ω-m)	124.48	109.36	109.27	104.64	94.61
EK1-12	E-W	Measured Resistance (Ω)	25.64	12.44	4.90	2.70	1.02
	<b>⊏-VV</b>	Apparent Resistivity (Ω-m)	124.48	109.36	93.88	129.11	97.35
		Site Average (Ω)	179.03	58.45	18.15	5.39	1.52
		Site Average (Ω-m)	688.88	558.22	347.58	258.10	145.40

Project Name:	ConnectGen South Ripley Solar	Date:		July 20 - Aug. 11, 2020
Project Number: 505100267-001		Weather:		Sunny
Project Location:	South Ripley, NY	South Ripley, NY Temperature:		69-85 F
Equipment:	AG	AGI Ministing		
Test Method:	Wenner 4 Electrode Array			

Array		Data	Array spacing (ft)				
		Data	2.00	5.00	10.00	20.00	50.00
	N-S	Measured Resistance (Ω)	46.61	13.75	6.24	2.36	1.18
EDT 16	11-3	Apparent Resistivity (Ω-m)	178.46	131.67	119.39	112.96	112.93
ERT-16	E \//	Measured Resistance (Ω)	45.53	15.52	6.27	2.52	1.24
	E-W	Apparent Resistivity (Ω-m)	174.32	148.59	120.03	120.82	118.93
	N-S	Measured Resistance (Ω)	34.88	12.28	6.18	3.40	1.23
EDT 17	ERT-17 E-W	Apparent Resistivity (Ω-m)	133.59	117.50	118.26	162.58	117.90
ERI-1/		Measured Resistance (Ω)	36.26	14.13	6.08	2.61	1.18
	E-VV	Apparent Resistivity (Ω-m)	138.81	135.27	116.40	125.09	112.53
	N-S	Measured Resistance (Ω)	25.43	12.45	6.33	2.15	1.06
EDT 10	11-3	Apparent Resistivity (Ω-m)	97.41	119.18	121.13	103.08	101.38
ERT-18	E-W	Measured Resistance (Ω)	25.51	15.51	6.43	2.21	1.07
	E-VV	Apparent Resistivity (Ω-m)	97.66	148.53	123.08	105.92	102.05
	N-S	Measured Resistance (Ω)	46.77	11.53	3.86	1.69	0.96
ERT-19	IN-3	Apparent Resistivity (Ω-m)	179.10	110.40	73.97	80.77	91.68
EK1-19	E-W	Measured Resistance (Ω)	33.24	9.55	3.56	1.83	0.91
	E-VV	Apparent Resistivity (Ω-m)	127.31	91.47	68.15	87.66	87.20
		Site Average (Ω)	36.78	13.09	5.62	2.35	1.10
		Site Average (Ω-m)	140.83	125.33	107.55	112.36	105.58



Project Name:	ConnectGen South Ripley Solar	Date:		July 20 - Aug. 11, 2020	
Project Number:	505100267-001	Weather:		Sunny	
Project Location:	South Ripley, NY	Temperature:		69-85 F	
Equipment:	A	AGI Ministing			
Test Method:	Wenner 4 Electrode Array				

Λn	(2)/	Data	Array spacing (ft)				
Arı	ау	Data	2.00	5.00	10.00	20.00	50.00
	N-S	Measured Resistance (Ω)	171.20	16.46	3.40	1.66	0.92
ERT-20	111-3	Apparent Resistivity (Ω-m)	2151.00	516.90	213.40	260.30	288.50
EK1-20	E-W	Measured Resistance (Ω)	141.80	13.75	3.47	1.53	1.07
		Apparent Resistivity (Ω-m)	1781.00	431.80	218.10	240.80	336.80
		Site Average (Ω)	156.50	15.11	3.43	1.60	1.00
		Site Average (Ω-m)	1966.00	474.35	215.75	250.55	312.65

# **E.** Laboratory Testing Results







#### CONSULTANTS, INC. 4405 South Clinton Avenue South Plainfield, NJ 07080

Tel: (800) 545-ATUL (908) 754-8383

Fax: (908) 754-8633

#### NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

August 31, 2020

Mott MacDonald 111 Wood Avenue South Iselin, NJ 08830-4112

Attn.: Mr. Eric Paul

Project Engineer-Geotechnical

Re: Subsurface Soil Investigation & Report- Lab. Test Results

Connect Gen South Ripley, NY Your Project # 505100267-001

Dear Mr. Paul,

Attached, please find three (3) sets of laboratory test reports.

- Appendix A 2 Sieve Analysis Reports
- Appendix B 22 Atterberg Reports
- Appendix E 32 Corrosion Analysis

Should you have any questions or require additional information, please contact the undersigned at (908) 754-8383.



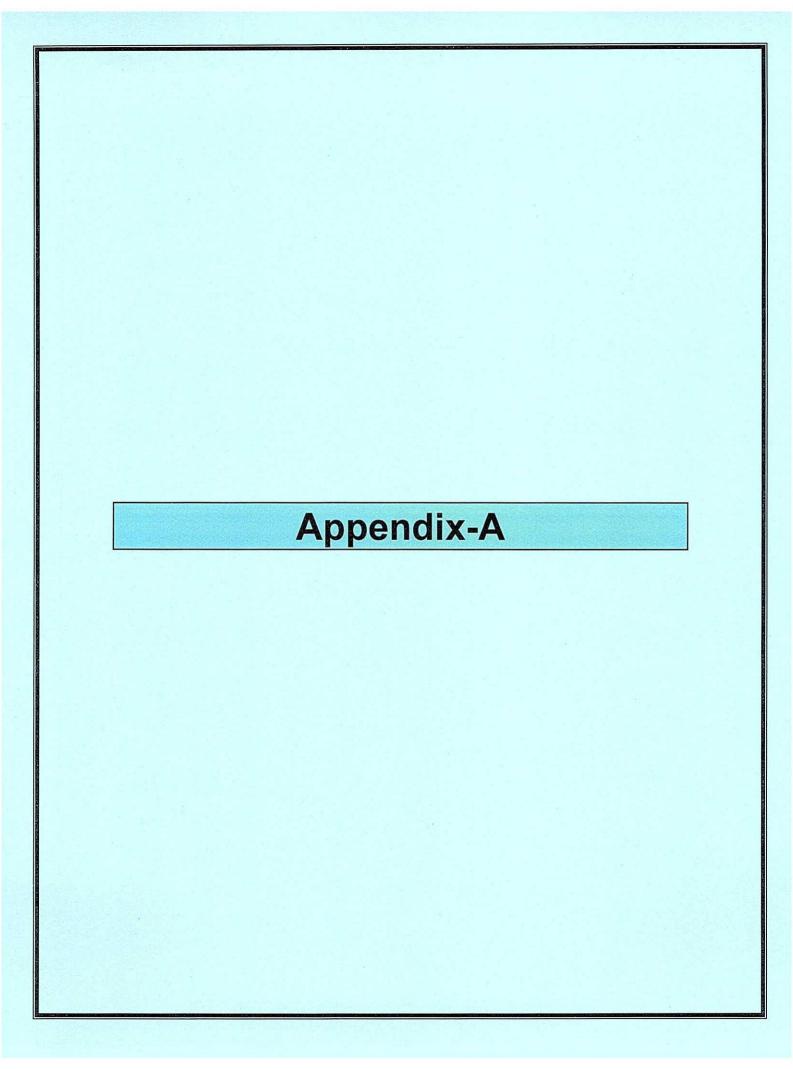
Phone: 973-379-8602

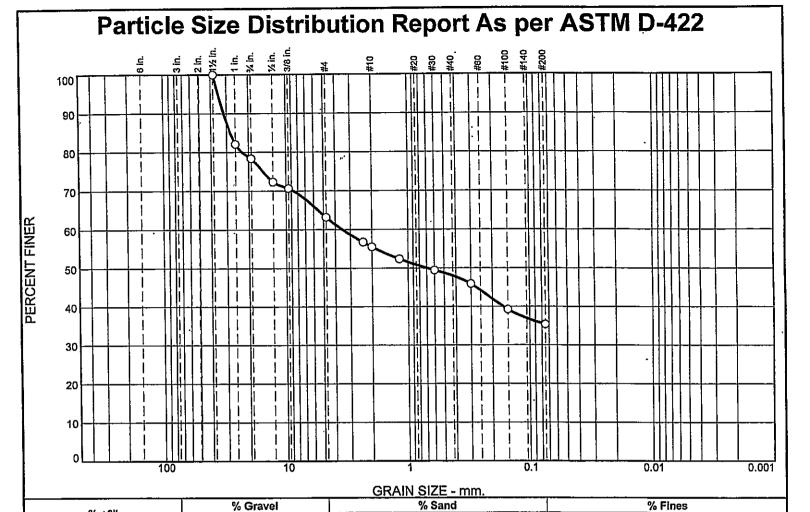
Email: eric.pauli@mottmac.com

Phone: 973-912-7517 Cell: 201-401-0301

Email: Vatsal.Shah@mottmac.com

File: ans.ajs.08312020.0521. Mott MacDonald





Medium

7.5

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
1.5	100.0		
1	82.1		
3/4	78.4	]	
1/2	72.3		
3/8	70.6		
#4	63.2	]	
#8	56.8		
#10	55.5		
#16	52.4		
#30	49.4	Ì	ļ
#50	45.9		]
#100	39.3		
#200	35.4		
		1	

Coarse

21.6

Fine

15.2

Coarse

7.7

	Material Description Brown in color. silty gravel with sand				
	PL= NP	Atterberg Limits LL= NV	Pl= NP		
•	D <sub>90</sub> = 31.4205 D <sub>50</sub> = 0.6902 D <sub>10</sub> =	Coefficients D85= 27.9276 D30= Cu=	D <sub>60</sub> = 3.4905 D <sub>15</sub> = C <sub>c</sub> =		
	USCS= GM	Classification AASHTO=	= A-2-4(0)		
	Remarks Sample was dropped off by client 08/12/20 and tested on 08/19/ 20. In-Situ %MC=11.0 F.M.=3.44				

Silt

35,4

Clay

Date: 08/20/2020

Location: B-27, S-5, 8'-10' Sample Number: S-1

% +3"

0.0

Depth: 8'-10'

ANS CONSULTANTS, INC.

Project: Connect Gen South Ripley, South Ripley, NY

South Plainfield, New Jersey

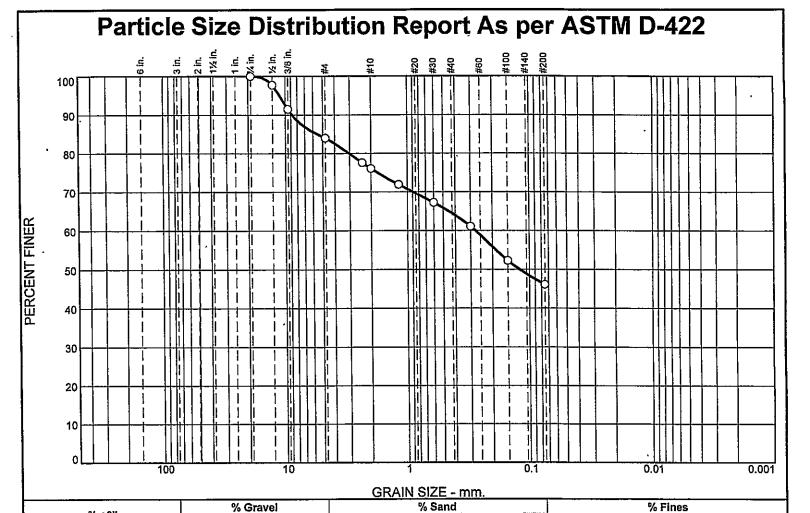
Client: Mott MacDonald

Fine

12.6

Project No: APX-2492 <u>Figure 1</u> F 1

<sup>(</sup>no specification provided)



Coarse

7.9

Fine

16.0

Medium

11.5

Fine

18.5

	SIEVE	PERCENT	SPEC.*	PASS?
	SIZE	FINER	PERCENT	(X=NO)
1	3/4	100.0		
	1/2	97.7		
	3/8	91.5	ł	•
	#4	84.0		
	#8	77.6		
	#10	76.1		3
	#16	71.9		İ
	#30	67.3		
	#50	61.1		
	#100	52.3		
	#200	46.1		1
			İ	
	1			

Coarse

0.0

Material Description Brown in color. silty sand with gravel				
PL= NP	Atterberg Limit	<u>s</u> PI= NP		
D <sub>90</sub> = 8.8000 D <sub>50</sub> = 0.1204 D <sub>10</sub> =	<u>Coefficients</u> D <sub>85</sub> = 5.4994 D <sub>30</sub> = C <sub>u</sub> =	D <sub>60</sub> = 0.2745 D <sub>15</sub> = C <sub>c</sub> =		
USCS= SM	Classification AASH	ÎTO= A-4(0)		
Remarks Sample was dropped off by client on 08/12/20 and tested on 08/19/20. In-Situ %MC=13.8 F.M.=1.94				

Silt

46.1

Clay

\* (no specification provided)

Location: B-37, S-4, 6'-8' Sample Number: S-2

% +3"

0.0

Depth: 6'-8'

ANS CONSULTANTS, INC.

Client: Mott MacDonald

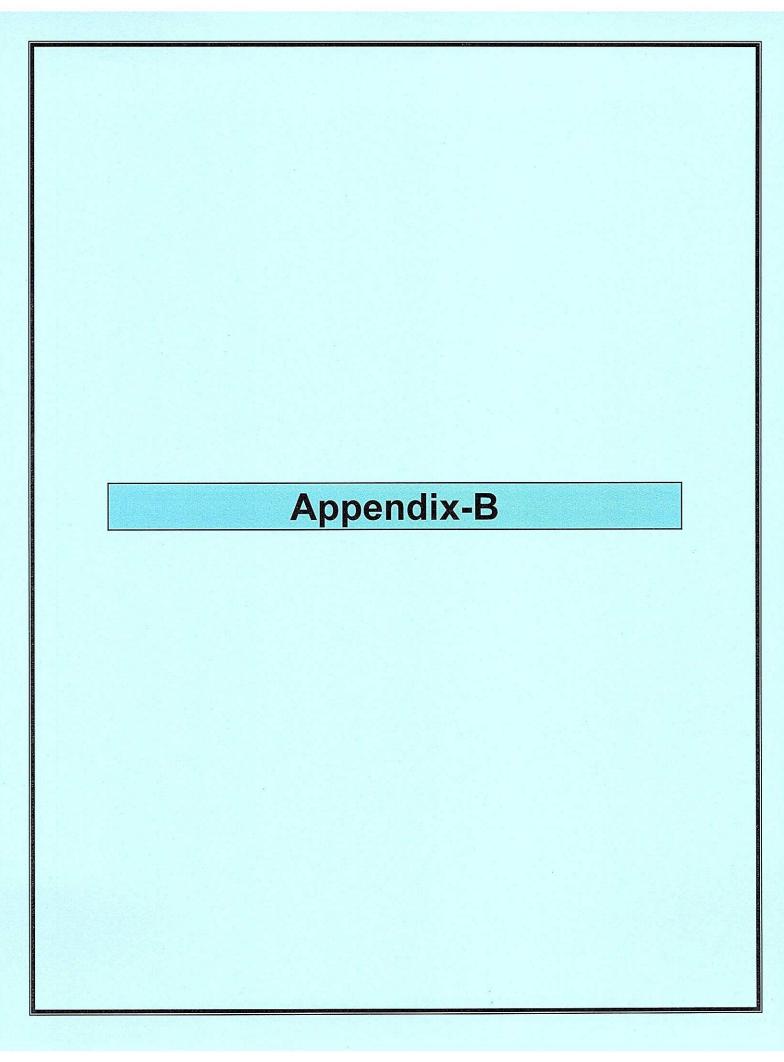
Project: Connect Gen South Ripley, South Ripley, NY

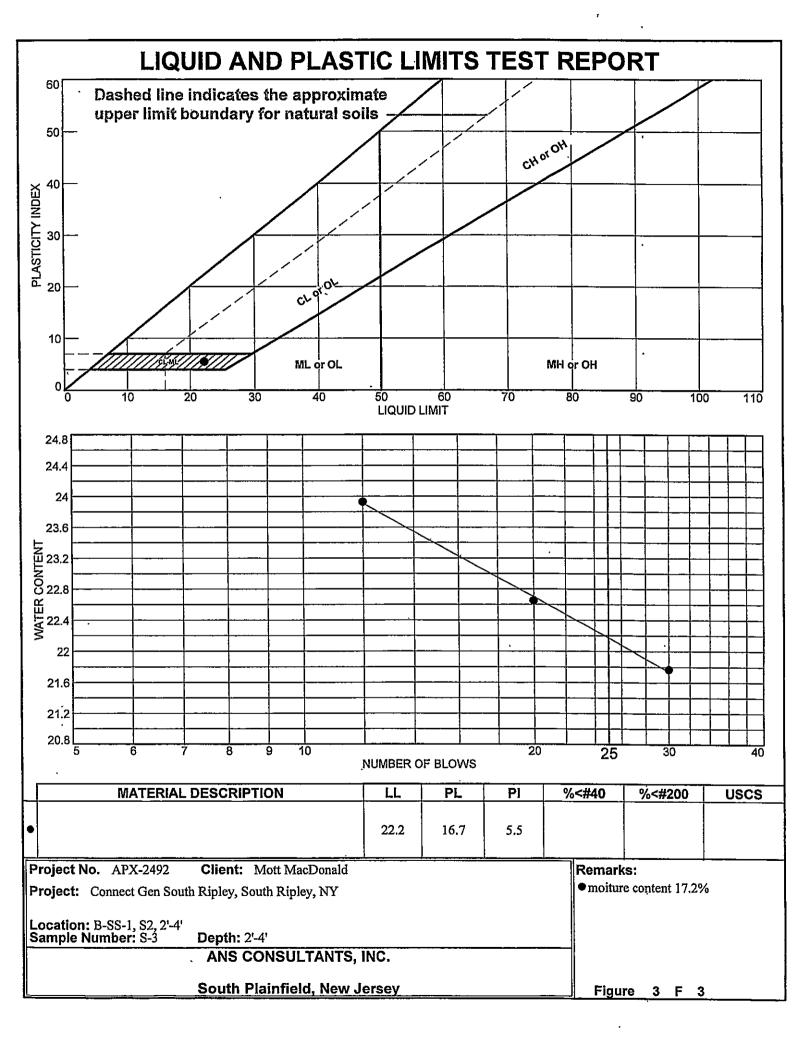
South Plainfield, New Jersey

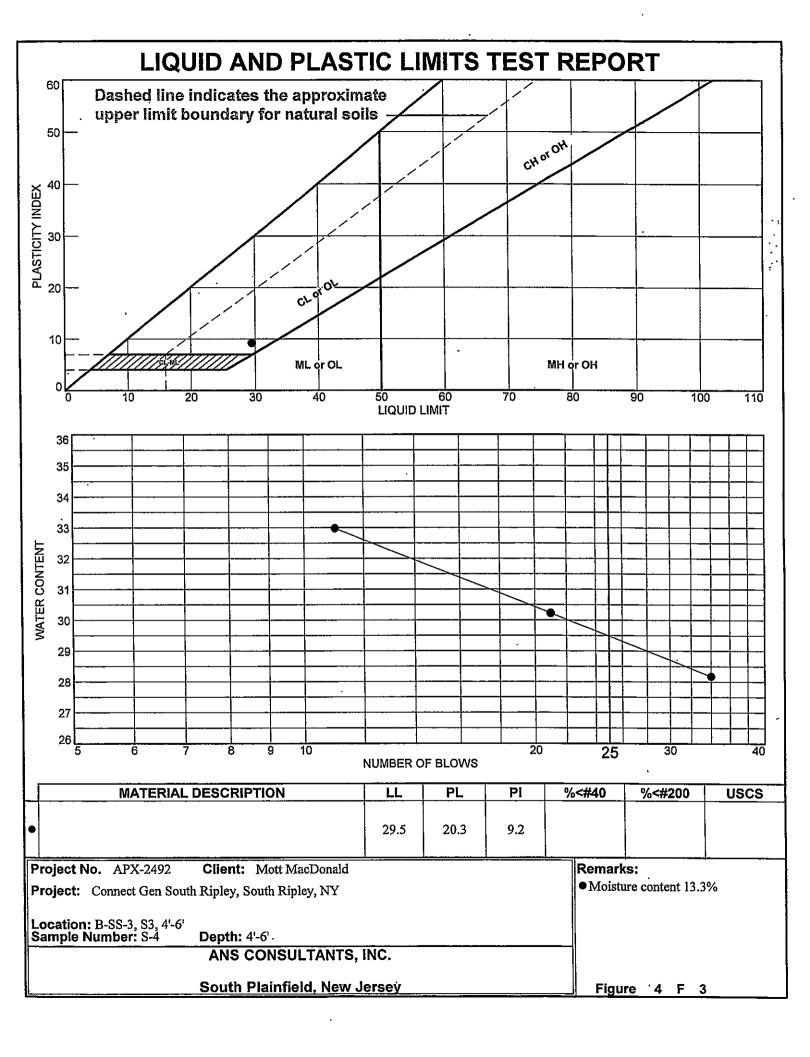
Project No: APX-2492

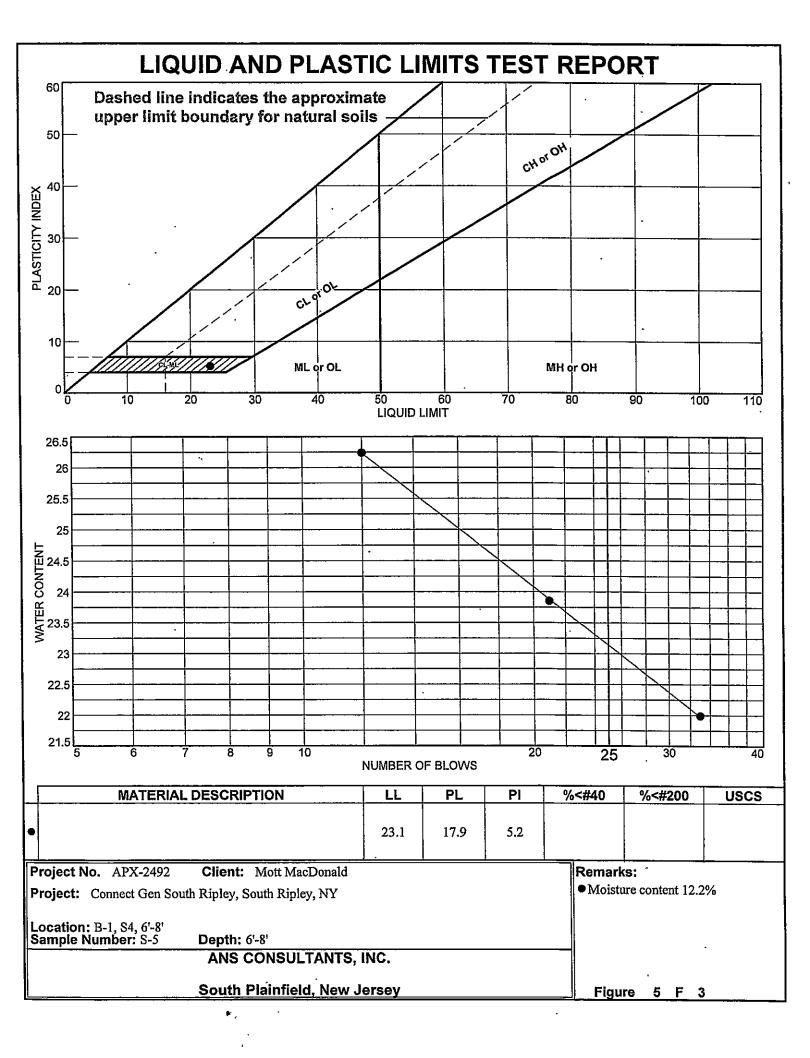
Figure 2 F 1

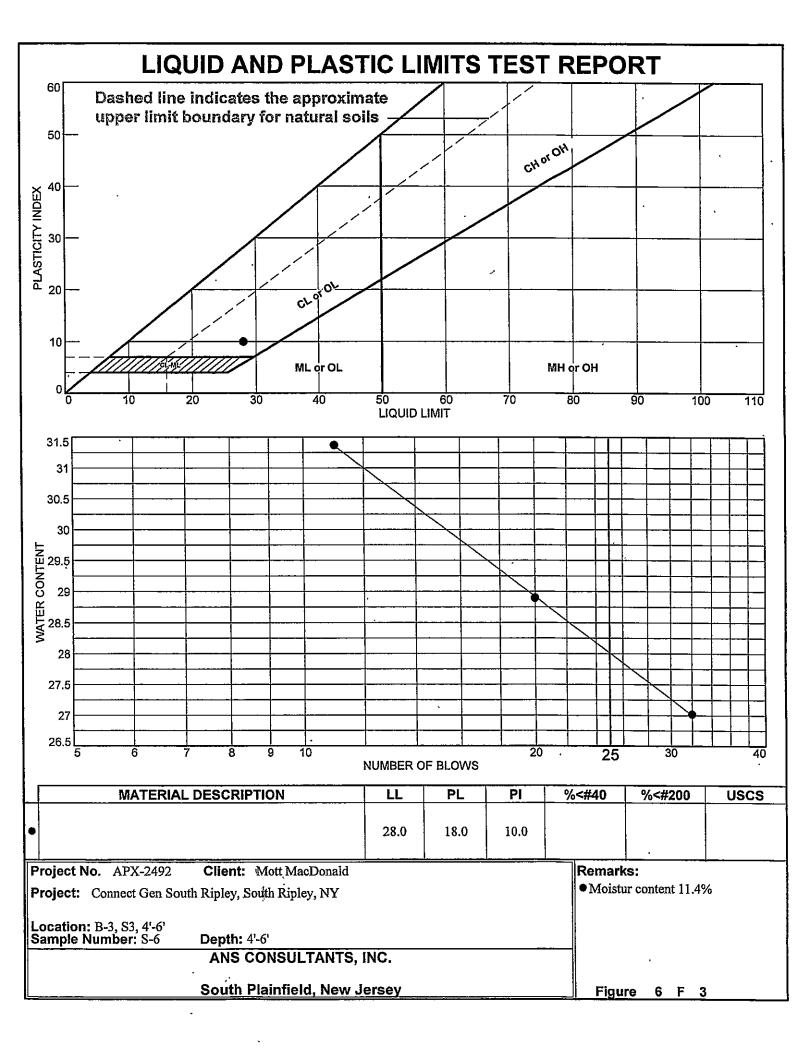
Date: 08/20/2020

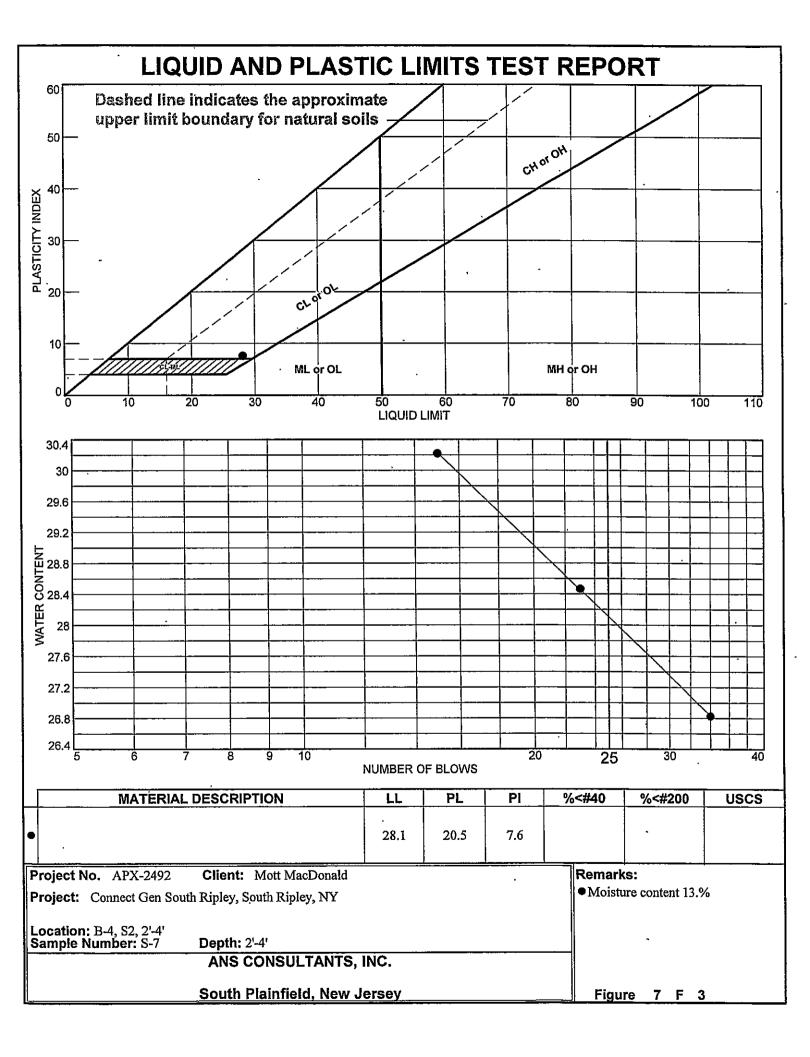


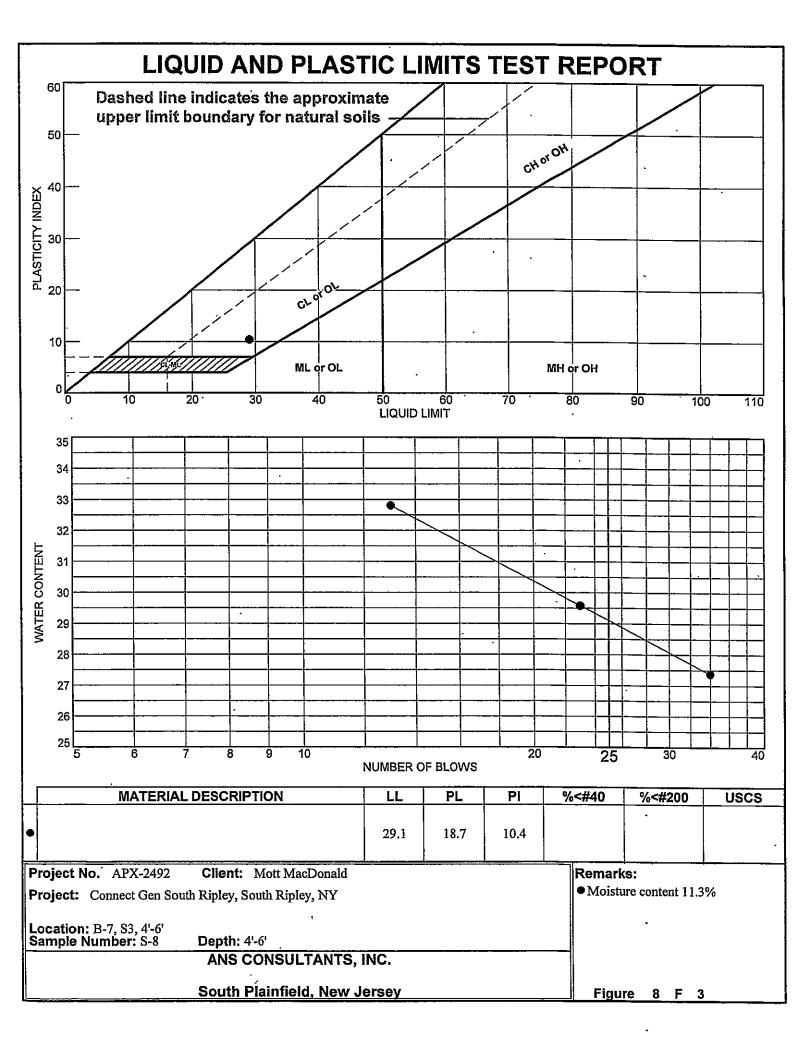


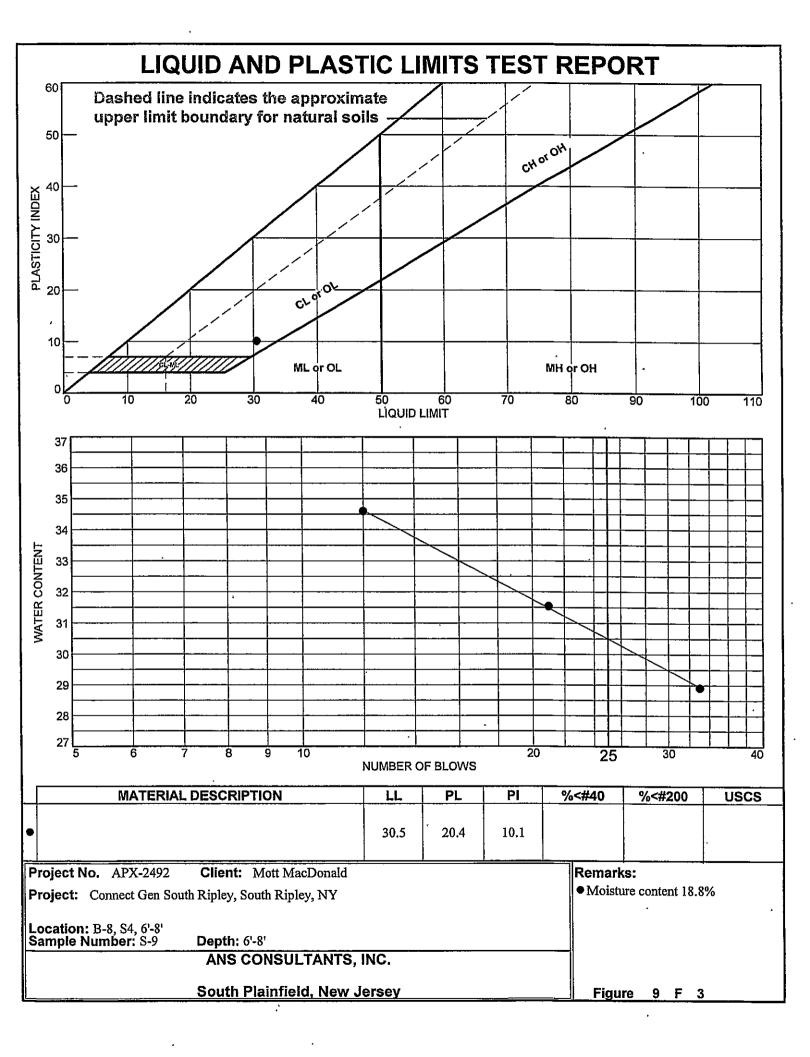


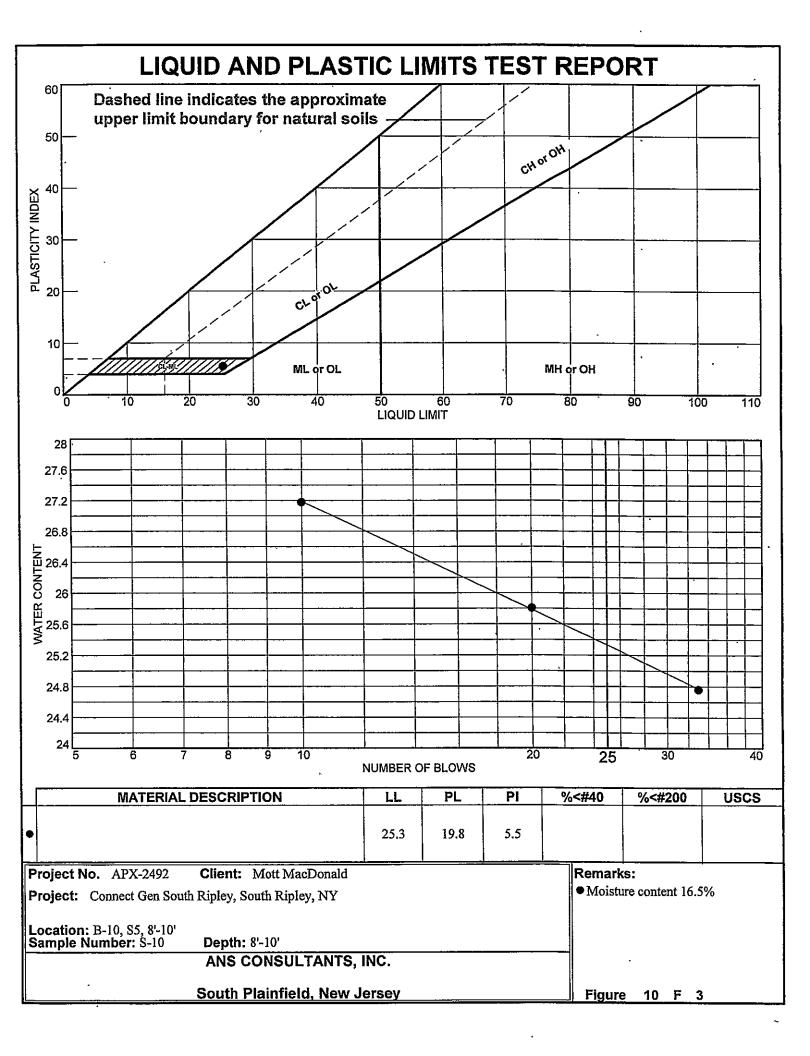


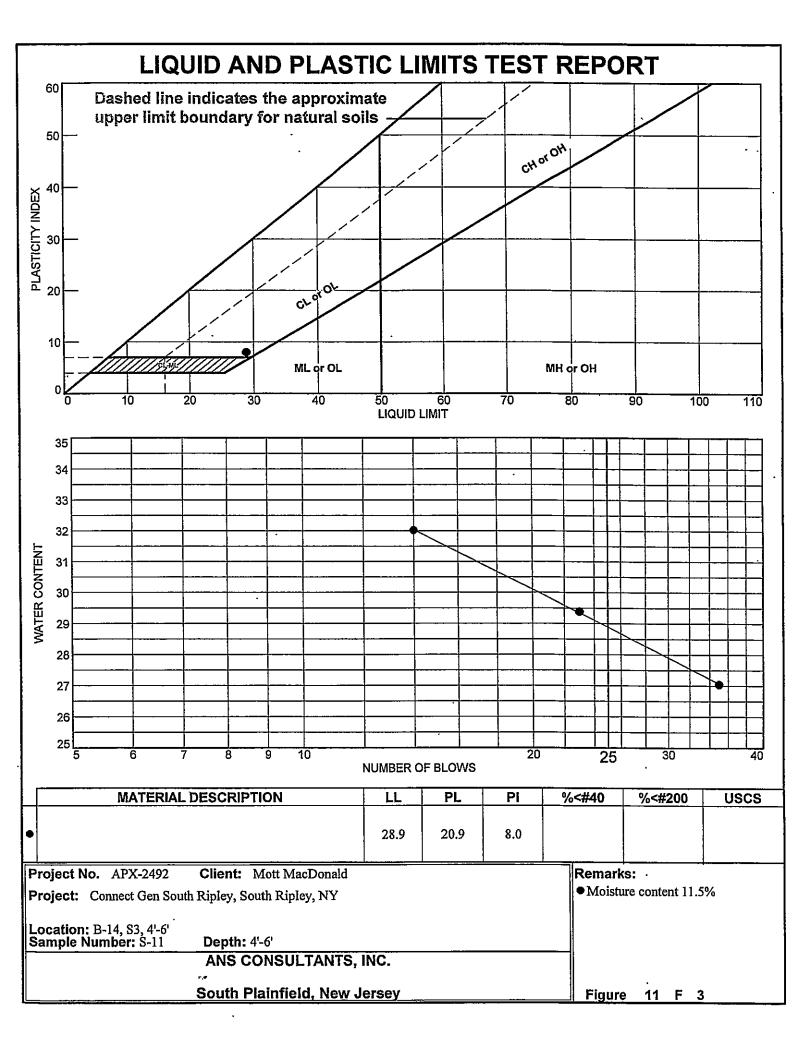


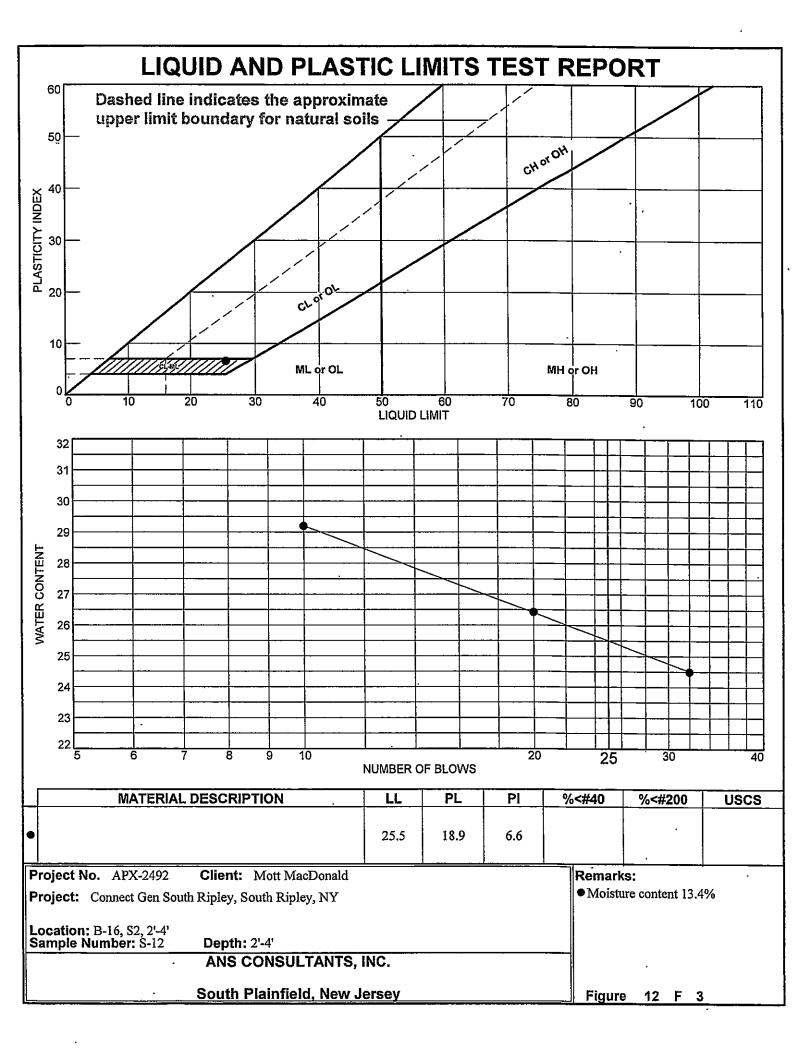


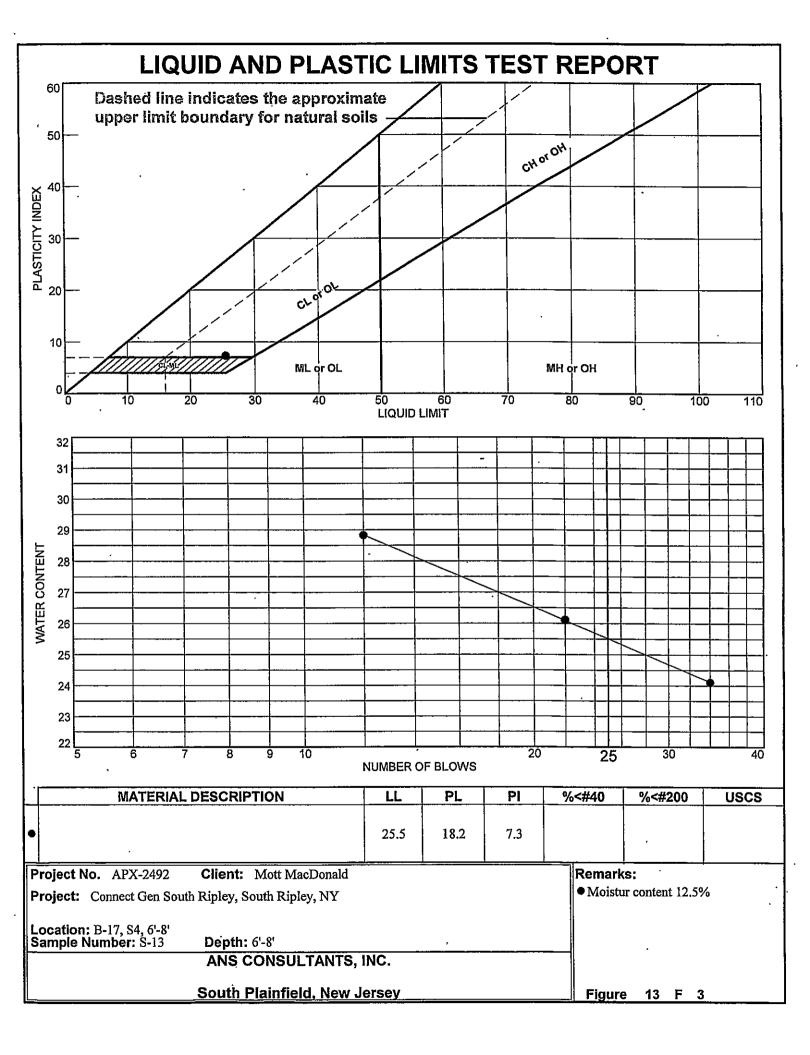


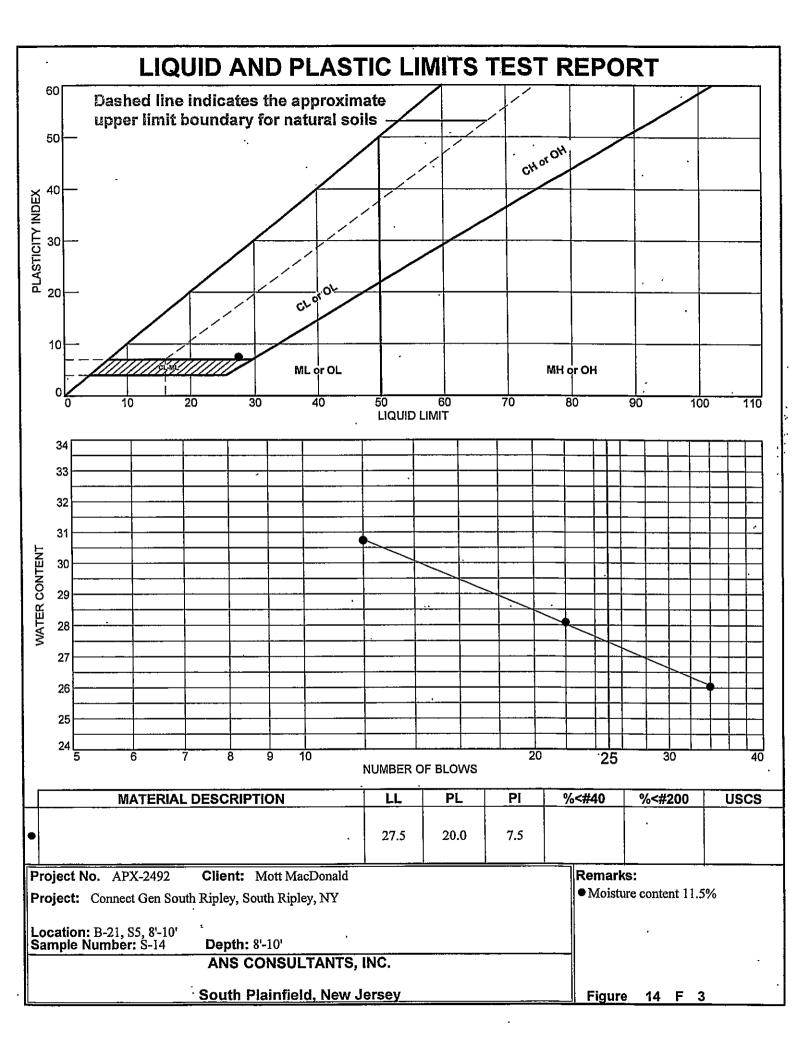


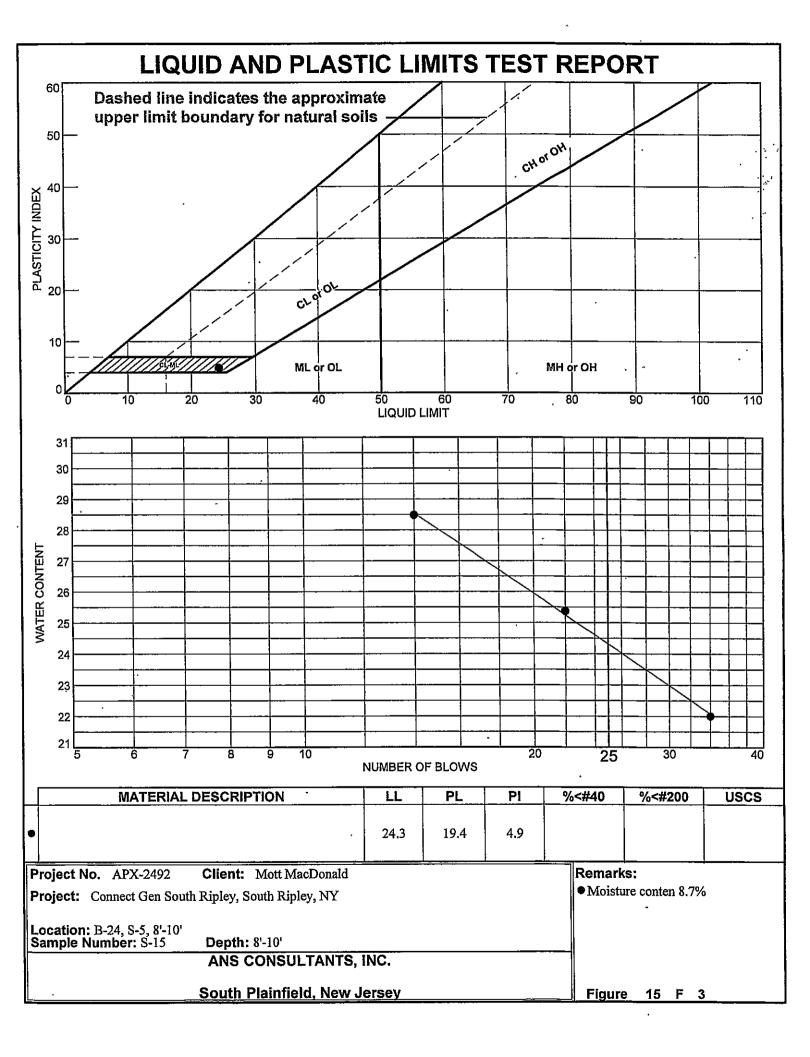


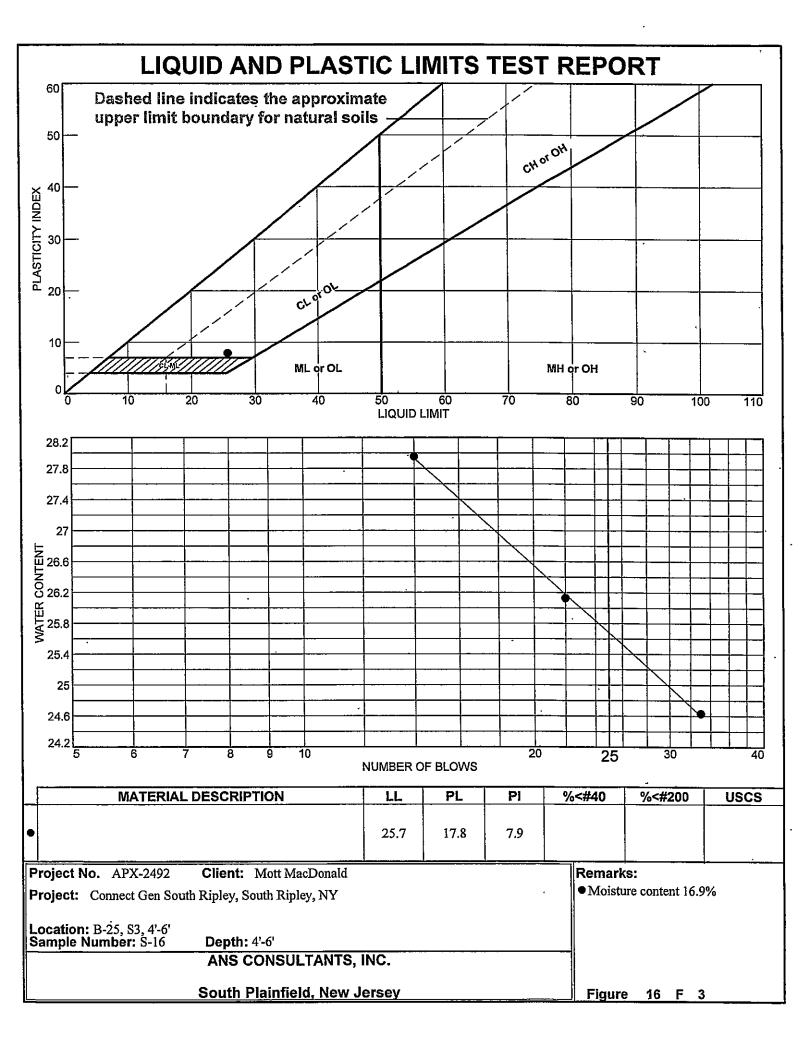


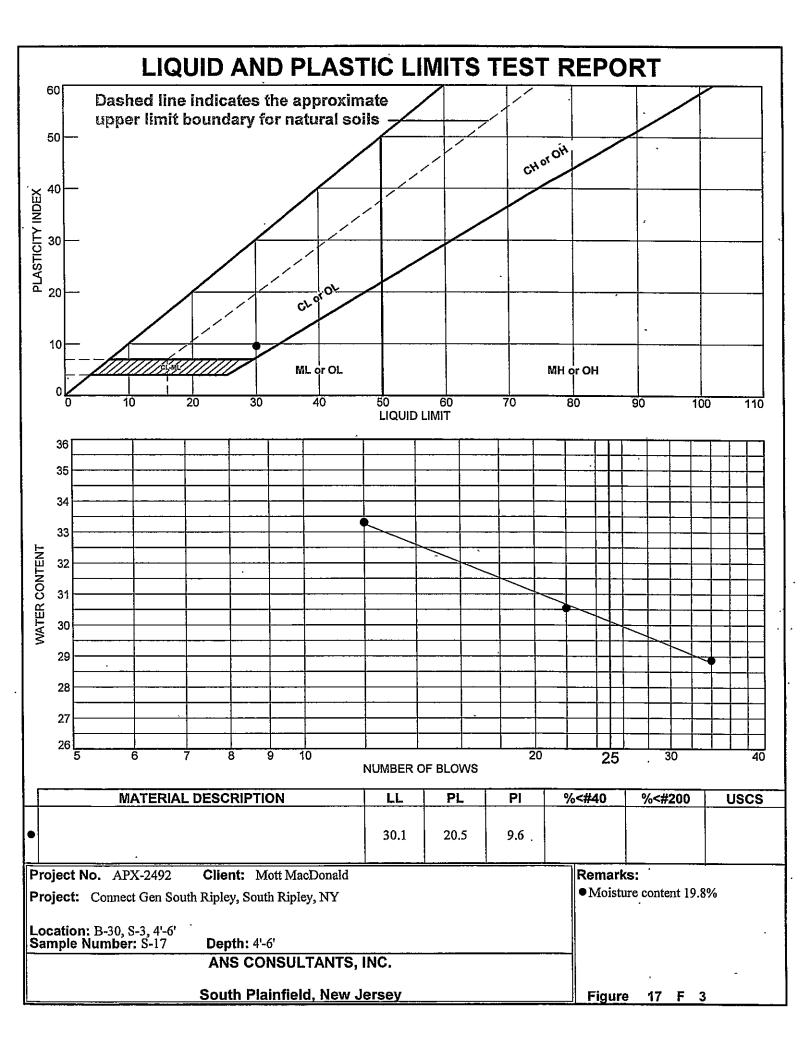


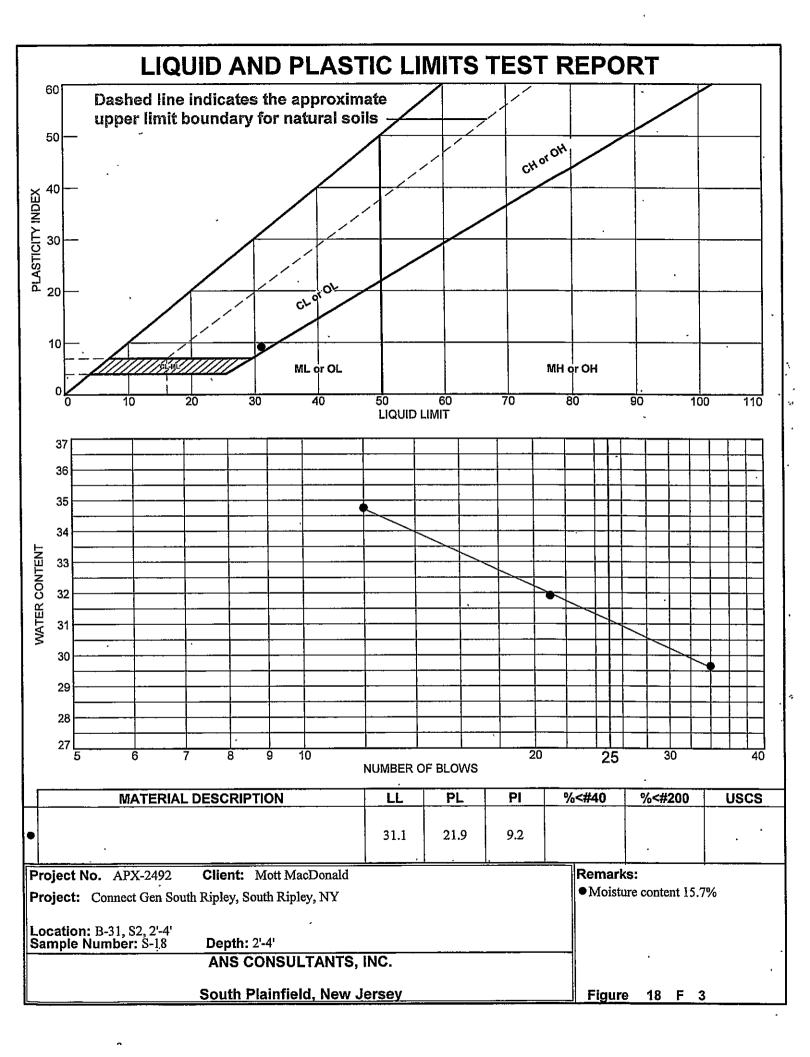


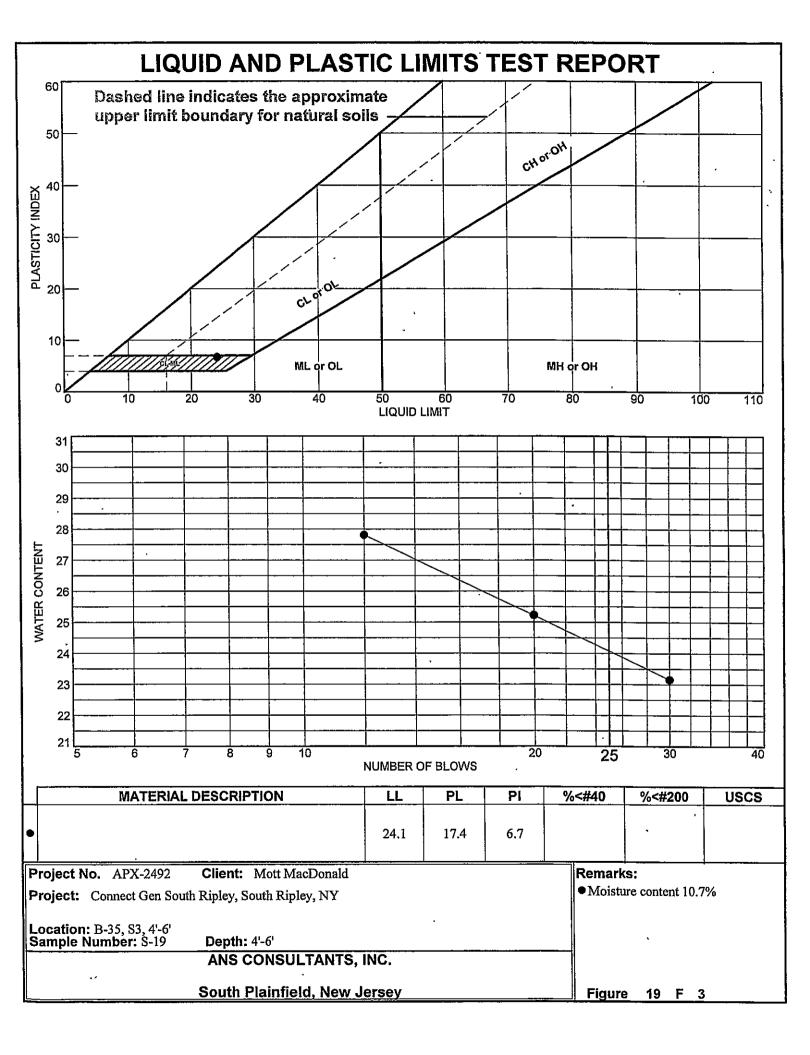


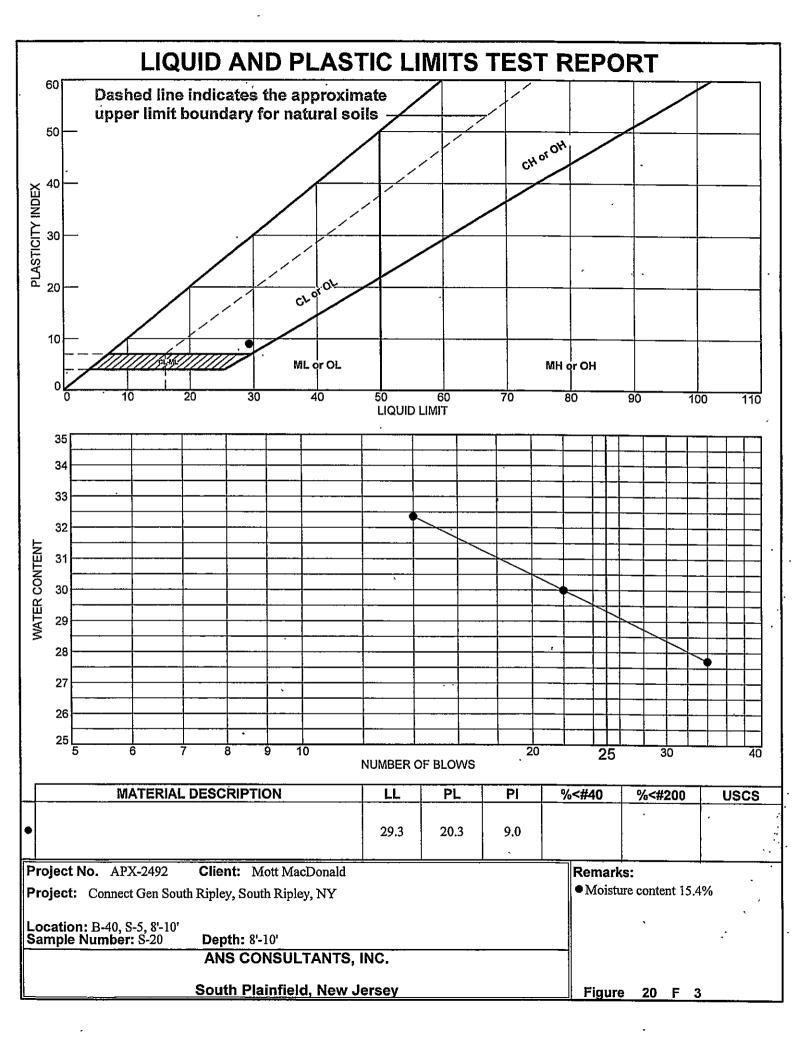


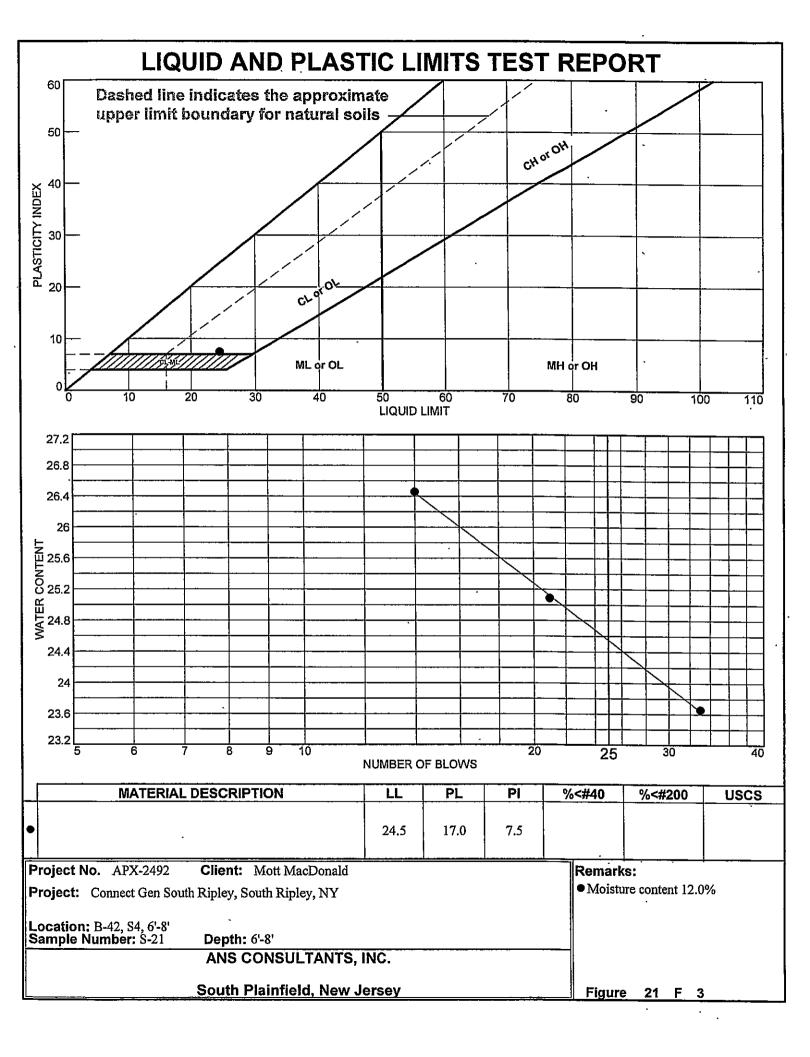


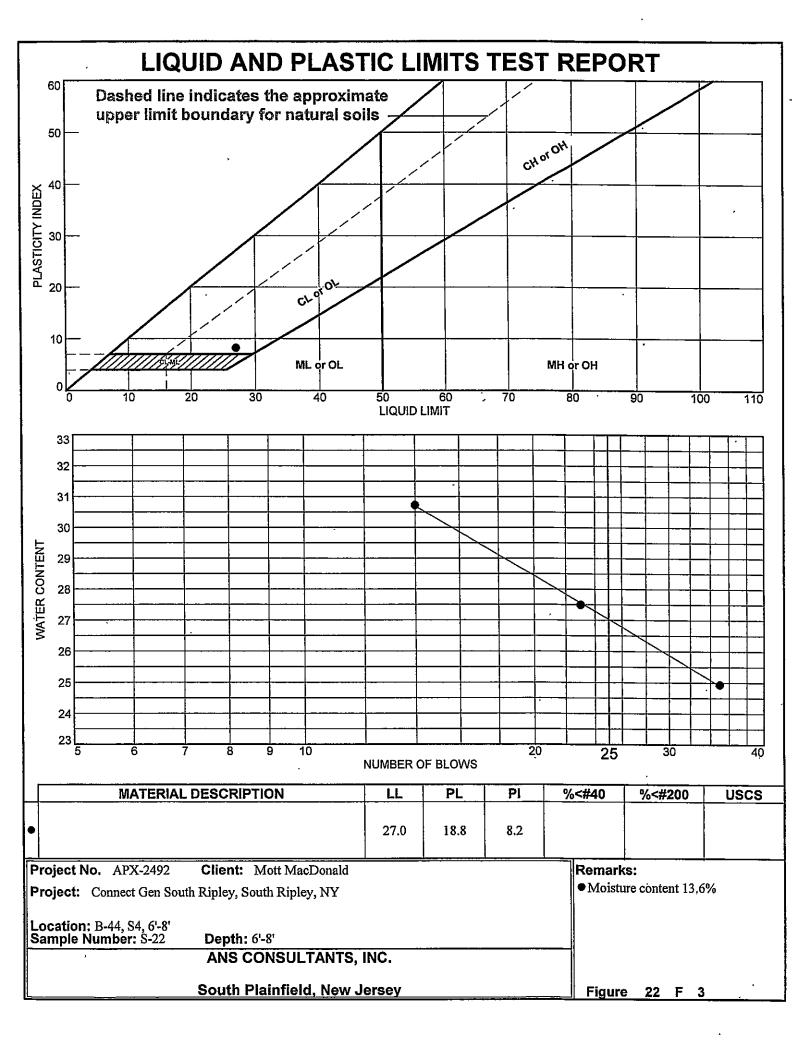


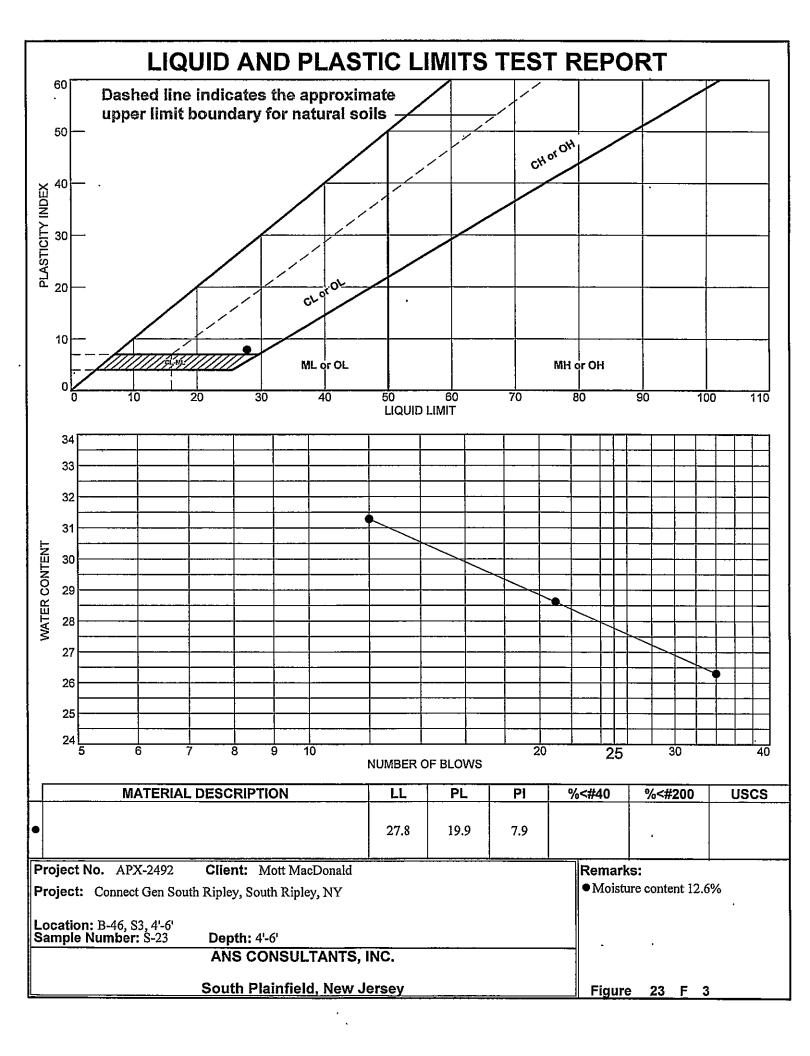


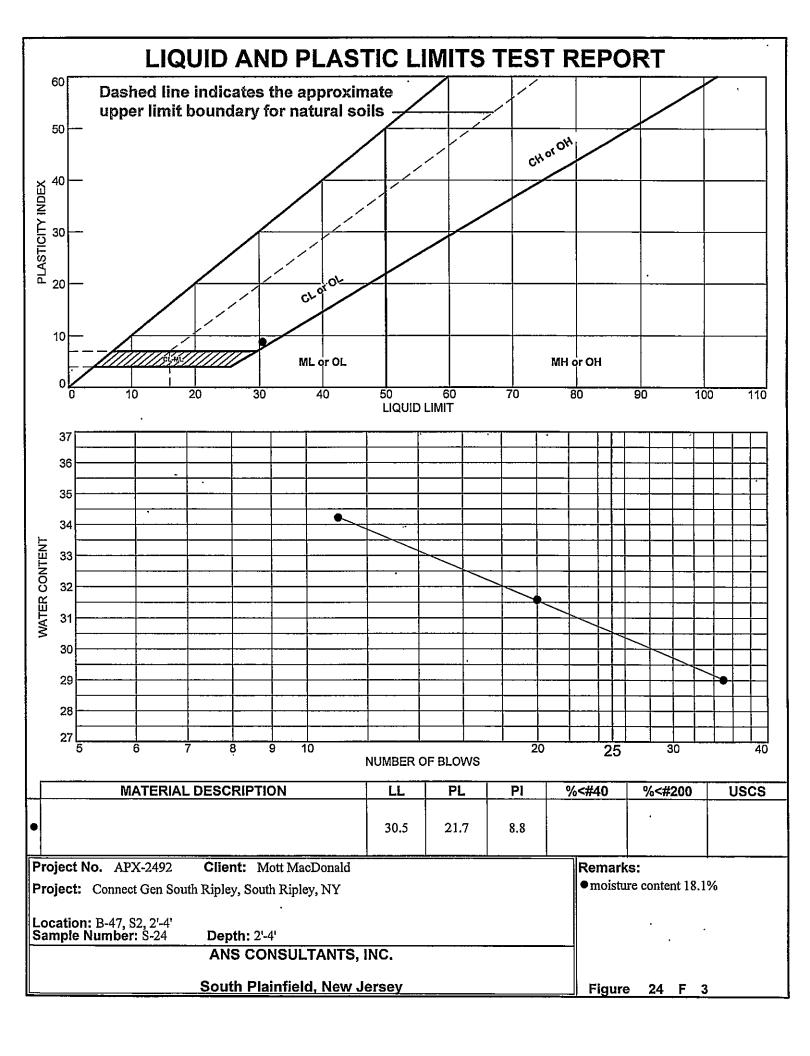


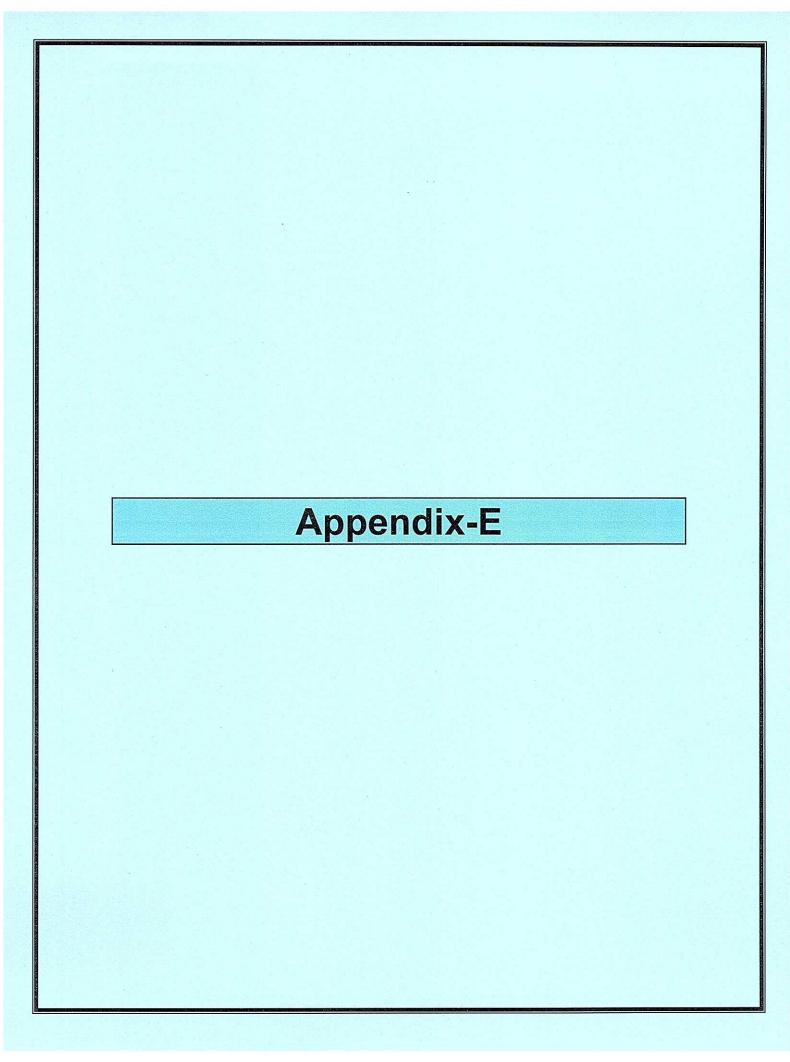


















Tel: (800) 545-ATUL (908) 754-8383

Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

#### **CERTIFICATE OF TEST-CORROSION ANALYSIS**

**CLIENT**: Mott MacDonald

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

Vice President/President Engineer

PROJECT: Connect Gen

South Ripley, NY

**DATE:** 08-28-2020

FILE NO: APX-2492

REPORT NO: S-25 to S-31

**TEST PERFORMED: 1)** Standard Test Method for Water Soluble Sulfate in Soil AS PER ASTM C-1580

 Standard Test Method for Measuring pH of Soil for use in Corrosion Testing AS PER ASTM G51-18

3) Standard Test Method for Measurement of Oxidation-Reduction Potential (ORP) of Soil AS PER ASTM G-200

4) Standard Method for Test for Determining Water Soluble Chloride Ion AS PER AASHTO T-291

5) Standard Test Method for Measuring Soil Resistivity using two-Electrode AS PER ASTM G187-18

Sample No.	Sample ID	Sulfate ( mg/Kg )	рН	ORP (mv)	Chloride ( mg/Kg )	Resistivity (Ohm-cm)
S-25	B-01Bulk 01 2'-5'	6	7.16	+27	74	9,000
S-26	B-05Bulk 05 2'-5'	15	6.16	+52	30	14,000
S-27	B-08Bulk 08 2'-5'	12	6.81	+ 47	32	14,500
S-28	B-09Bulk 09 2'-5'	8	6.39	+61	51	17,000
S-29	B-17Bulk 17 2'-5'	5	7.94	+ 57	36	20,000
S-30	B-21Bulk 21 2'-5'	15	6.37	+35	31	19,000
S-31	B-35Bulk 35 2'-5'	8	7.48	+ 17	53	17,000





Tel: (800) 545-ATUL (908) 754-8383

Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

### **CERTIFICATE OF TEST -CORROSION ANALYSIS**

CLIENT: Mott MacDonald

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

Vice President/President Engineer

PROJECT: Connect Gen

South Ripley, NY

FILE NO: APX-2492

**DATE:** 08-28-2020

REPORT NO: S-32 to S-38

**TEST PERFORMED: 1)** Standard Test Method for Water Soluble Sulfate in Soil AS PER ASTM C-1580

- 2) Standard Test Method for Measuring pH of Soil for use in Corrosion Testing AS PER ASTM G51-18
- 3) Standard Test Method for Measurement of Oxidation-Reduction Potential (ORP) of Soil AS PER ASTM G-200
- 4) Standard Method for Test for Determining Water Soluble Chloride Ion AS PER AASHTO T-291
- 5) Standard Test Method for Measuring Soil Resistivity using two-Electrode AS PER ASTM G187-18

Sample No.	Sample ID	Sulfate ( mg/Kg )	рН	ORP (mv)	Chloride ( mg/Kg )	Resistivity (Ohm-cm)
S-32	B-38Bulk 38 2'-5'	13	7.78	+77	51	17,000
S-33	B-40Bulk 40 2'-5'	15	7.39	+93	42	9,000
S-34	B-42Bulk 42 2'-5'	18	6.9	+ 32	45	23,000
S-35	B-43Bulk 43 2'-5'	10	7.24	+63	30	13,000
S-36	B-44Bulk 44 2'-5'	12	7.0	+ 55	46	13,000
S-37	B-46Bulk 46 2'-5'	13	7.39	+15	68	11,000
S-38	B-47Bulk 47 2'-5'	10	6.87	+ 47	55	28,000



Tel: (800) 545-ATUL (908) 754-8383

Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

#### **CERTIFICATE OF TEST -CORROSION ANALYSIS**

**CLIENT**: Mott MacDonald

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

Vice President/President Engineer

PROJECT: Connect Gen

South Ripley, NY

**DATE:** 08-28-2020

FILE NO: APX-2492

REPORT NO: S-39 to S-44

**TEST PERFORMED: 1)** Standard Test Method for Water Soluble Sulfate in Soil AS PER ASTM C-1580

2) Standard Test Method for Measuring pH of Soil for use in Corrosion Testing AS PER ASTM G51-18

3) Standard Test Method for Measurement of Oxidation-Reduction Potential (ORP) of Soil AS PER ASTM G-200

4) Standard Method for Test for Determining Water Soluble Chloride Ion AS PER AASHTO T-291

5) Standard Test Method for Measuring Soil Resistivity using two-Electrode AS PER ASTM G187-18

Sample No.	Sample ID	Sulfate ( mg/Kg )	рН	ORP (mv)	Chloride ( mg/Kg )	Resistivity (Ohm-cm)
S-39	B-SS-2CRT- SS-2 2'-5'	16	6.96	-12	41	TNP
S-40	B-SS-3CRT- SS-3 2'-5'	28	6.79	-14	70	TNP
S-41	B-03 CRT03 2'-5'	53	6.71	+ 41	40	TNP
S-42	B-04 CRT04 2'-5'	14	4.54	+75	38	TNP
S-43	B-06 CRT06 2'-5'	20	6.68	+ 5	43	TNP
S-44	B-07 CRT07 2'-5'	18	6.53	+11	26	TNP

Note: TNP- Test not performed







Tel: (800) 545-ATUL (908) 754-8383

Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

#### **CERTIFICATE OF TEST -CORROSION ANALYSIS**

CLIENT: Mott MacDonald

**DATE:** 08-28-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen

REPORT NO: S-45 to S-50

South Ripley, NY

**TEST PERFORMED: 1)** Standard Test Method for Water Soluble Sulfate in Soil AS PER ASTM C-1580

- Standard Test Method for Measuring pH of Soil for use in Corrosion Testing AS PER ASTM G51-18
- 3) Standard Test Method for Measurement of Oxidation-Reduction Potential (ORP) of Soil AS PER ASTM G-200
- 4) Standard Method for Test for Determining Water Soluble Chloride Ion AS PER AASHTO T-291
- 5) Standard Test Method for Measuring Soil Resistivity using two-Electrode AS PER ASTM G187-18

Sample No.	Sample ID	Sulfate ( mg/Kg )	рН	ORP (mv)	Chloride ( mg/Kg )	Resistivity (Ohm-cm)
S-45	B-08 CRT08 2'-5'	10	7.21	+19	56	TNP
S-46	B-10 CRT10 2'-5'	21	6.81	-24	41	TNP
S-47	B-11 CRT11 2'-5'	23	7.21	+ 21	30	TNP
S-48	B-12 CRT12 2'-5'	12	7.12	-5	80	TNP
S-49	B-14 CRT14 2'-5'	17	7.04	+ 15	52	TNP
S-50	B-15 CRT15 2'-5'	12	7.09	+18	43	TNP

Note: TNP- Test not performed



Tel: (800) 545-ATUL (908) 754-8383

Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

### **CERTIFICATE OF TEST - CORROSION ANALYSIS**

CLIENT: Mott MacDonald DATE: 08-28-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen REPORT NO: S-51 to S-56

South Ripley, NY

**TEST PERFORMED: 1)** Standard Test Method for Water Soluble Sulfate in Soil AS PER ASTM C-1580

2) Standard Test Method for Measuring pH of Soil for use in Corrosion Testing AS PER ASTM G51-18

3) Standard Test Method for Measurement of Oxidation-Reduction Potential (ORP) of Soil AS PER ASTM G-200

4) Standard Method for Test for Determining Water Soluble Chloride Ion AS PER AASHTO T-291

5) Standard Test Method for Measuring Soil Resistivity using two-Electrode AS PER ASTM G187-18

Sample No.	Sample ID	Sulfate ( mg/Kg )	рН	ORP (mv)	Chloride ( mg/Kg )	Resistivity (Ohm-cm)
S-51	B-18 CRT18 2'-5'	5	7.55	+71	50	TNP
S-52	B-19 CRT19 2'-5'	16	6.05	-12	45	TNP
S-53	B-23 CRT23 2'-5'	10	6.03	+ 25	47	TNP
S-54	B-25 CRT25 2'-5'	19	7.02	+ 15	40	TNP
S-55	B-28 CRT28 2'-5'	21	7.22	+ 10	38	TNP
S-56	B-39 CRT39 2'-5'	.5	6.84	+40	31	TNP

Note: TNP- Test not performed

## F. Thermal Resistivity Results



Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

# THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

**CLIENT**: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 1** 

South Ripley, NY

Test Data- Sample No. S-25 (B-01, Bulk-01, 2'-5')

Standard Proctor Value:

124.6

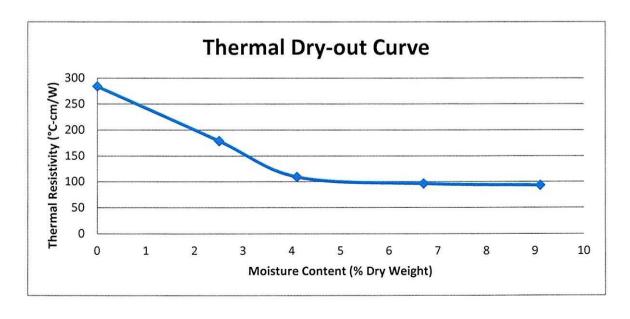
Optimum Moisture Content: 8.7%

Remolded Dry Density:

105.9 (85%)

Moisture Content as received: 13.6%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)	
0.0	25.6	284	
2.5	25.4	179	
4.1	25.3	109	
6.7	25.3	96	
9.1	25.3	93	



125 8 7%, 124.6 pcf

123

121

117

0 5 10 15 20 25 30

Water content, %

Dry density, pcf

# Curve No. S-25

#### **Test Specification:**

ASTM D 698-91 Procedure B Standard

Hammer Wt.	5.5	5 lb.		
Hammer Drop	1	2 in.		
<b>Number of Layers</b>		three		
Blows per Layer		25		
Mold Size	0.03333	cu. ft.		
Test Performed or	ı ıvıateriai			
Passing	3/8 in.	Sieve		
	3/8 in.	Sieve		
	- :			
NM LI	- :	Pl		
NM LL Sp.G. (ASTM D 854 %>3/8 in	- : 4)	PI		
NM LI Sp.G. (ASTM D 854 %>3/8 in	- 4) % <no.2< th=""><th>PI</th></no.2<>	PI		
NM LI Sp.G. (ASTM D 854 %>3/8 in USCS	- 4) % <no.2< td=""><td>PI</td></no.2<>	PI		

Γ	1	2	3	4	5	6
WM + WS	13.50	13.78	14.04	14.10		
WM	9.43	9.43	9.43	9.43		
WW + T #1	606.6	871.4	854.6	868.5	=	
WD + T #1	591.1	823.6	762.7	745.9		
TARE #1	0.0	0.0	0.0	0.0		•
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.6	5.8	12.0	16.4		
DRY DENSITY	119.2	123.4	123.5	120.4		

TEST RESULTS	Material Description			
Maximum dry density = 124.6 pcf				
Optimum moisture = 8.7 %	Remarks:			
Project No. APX-2492 Client: Mott MacDonald Project:				
O Location: B-01, Bulk-01, 2'-5' Depth: 2'-4' Sample Number: S-25	Checked by:			
ANS CONSULTANTS, INC.	Title:			
South Plainfield, New Jersey	Figure 25 F 2			



Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

# THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 2** 

South Ripley, NY

Test Data- Sample No. S-26 (B-05, Bulk-05, 2'-5')

Standard Proctor Value:

118.4

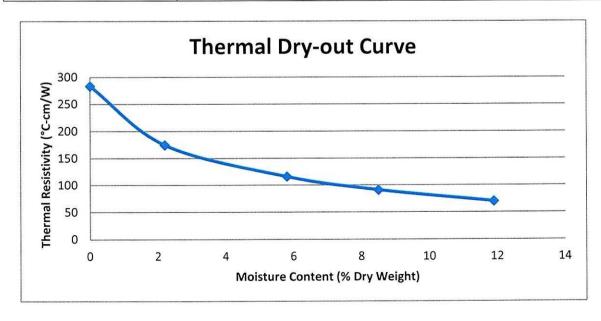
Optimum Moisture Content: 11.7%

Remolded Dry Density:

100.6 (85%)

Moisture Content as received: 13.2%

Moisture Contents (%)	Initial Soil Temperature (°C)	Thermal Resistivity (°C-cm/W)
0.0	24.4	284
2.2	24.1	175
5.8	24.0	116
8.5	23.9	91
11.9	23.8	70



# 121 119 117 115 113 111 0 5 10 15 20 25 30 Water content, %

Dry density, pcf

# Curve No. S-26

**Test Specification:** 

ASTM D 698-91 Procedure B Standard

Hammer Wt.	5.5	1b	
Hammer Drop _	1:	2 in.	
Number of Layer	s	three	
Blows per Layer		25	
Mold Size	0.03333	cu. ft.	
Passing	3/8 in.	Sieve	
	3/8 in.	Sieve _ Pl	
NMI Sp.G. (ASTM D 8	LL	PI	
NMI Sp.G. (ASTM D 8	LL	PI	
NM I Sp.G. (ASTM D 8 %>3/8 in	LL	PI	
NM I Sp.G. (ASTM D 8 %>3/8 in	LL 54) % <no.2< th=""><th> PI</th></no.2<>	PI	
NM I Sp.G. (ASTM D 8 %>3/8 in USCS	LL 54) % <no.2< td=""><td> PI</td></no.2<>	PI	

Γ	1	2	3	4	5	6
WM + WS	13.28	13.65	13.91	14.00		
WM	9.43	9.43	9.43	9.43		
WW + T #1	683.2	606.2	712.5	930.7		
WD + T #1	668.4	561.8	625.4	777.5		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.2	7.9	13.9	19.7		
DRY DENSITY	113.2	117.4	118.1	114.7		

TEST RESULTS	Material Description
Maximum dry density = 118.4 pcf	
Optimum moisture = 11.7 %	Remarks:
Project No. APX-2492 Client: Mott MacDonald	
Project:	
O Location: B-05, Bulk-05, 2-5 Depth: 2-5 Sample Number: S-26	Checked by:
ANS CONSULTANTS, INC.	Title:
South Plainfield, New Jersey	Figure 26 F 2



Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

## THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

**CLIENT**: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 3** 

South Ripley, NY

Test Data- Sample No. S-27 (B-08, Bulk-08, 2'-5')

Standard Proctor Value:

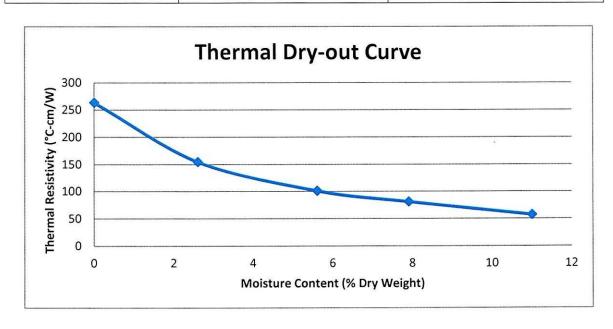
118.8

Optimum Moisture Content: 10.8%

Remolded Dry Density: 101.0 (85%)

Moisture Content as received: 15.6%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)
0.0	24.3	264
2.6	24.2	155
5.6	24.1	101
7.9	24.1	81
11.0	24.1	57



121 119 117 115 113 111 0 5 10 15 20 25 30 Water content, %

Dry density, pcf

Curve No. S-27

**Test Specification:** 

ASTM D 698-91 Procedure B Standard

	od	- 11
Hammer Wt.	5.5	lb.
Hammer Drop _	12	2 in
Number of Layers	<b></b>	three
Blows per Layer		25
Mold Size	0.03333	cu. ft.
Test Performed o	n Material	
Passing	3/8 in.	Sieve
NM L	.L	_ PI
NM L Sp.G. (ASTM D 85		_ PI
Sp.G. (ASTM D 85	54)	
Sp.G. (ASTM D 85 %>3/8 in.	54) % <no.2< th=""><th></th></no.2<>	
Sp.G. (ASTM D 85 %>3/8 in. USCS	54) % <no.2< td=""><td></td></no.2<>	

Γ	1	2	3	4	5	6
WM + WS	13.27	13.60	13.88	13.98		
WM	9.43	9.43	9.43	9.43		
WW + T #1	731.5	883.7	759.4	890.2		
WD + T #1	720.1	829.8	673.5	748.5		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	1.6	6.5	12.8	18.9		
DRY DENSITY	113.4	117.5	118.5	114.8		

TEST RESULTS	Material Description			
Maximum dry density = 118.8 pcf				
Optimum moisture = 10.8 %	Remarks:			
Project No. APX-2492 Client: Mott MacDonald				
Project:				
O Location: B-08, Bulk-08, 2-5 Depth: 2-5 Sample Number: S-27	Checked by:			
ANS CONSULTANTS, INC.	Title:			
South Plainfield, New Jersey	Figure 27 F 2			



Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

## THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 4** 

South Ripley, NY

Test Data- Sample No. S-28 (B-09, Bulk-09, 2'-5')

Standard Proctor Value:

107.6

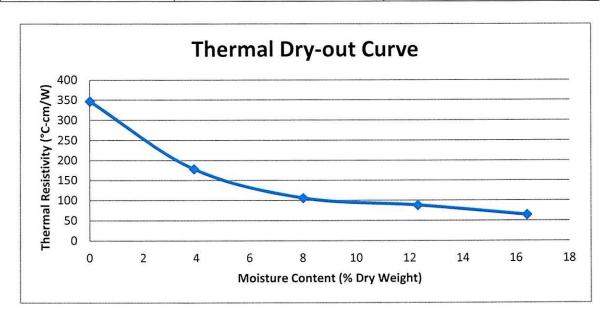
Optimum Moisture Content: 16.4%

Remolded Dry Density:

91.5 (85%)

Moisture Content as received: 17.6%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)
0.0	25.3	347
3.9	25.0	179
8.0	24.9	106
12.3	24.8	88
16.4	24.8	64



# 108 108 106 104 100 0 5 10 15 20 25 30 Water content, %

Curve No. S-28

**Test Specification:** 

ASTM D 698-91 Procedure B Standard

Hammer Wt.		5.5 lb.		
Hammer Drop		12 in.		
Number of Laye	rs	three		
Blows per Layer	•	25		
Mold Size	0.033	333 cu. ft.		
Test Performed				
Passing	3/8 in.	Sieve		
NM	LL	PI		
Sp.G. (ASTM D	354)			
%>3/8 in.	% <n< th=""><th>o.200</th></n<>	o.200		
70/3/0 III	<del></del> _			
	AASH	то		
	AASH	то		
uscs	AASH	то		

Γ	1	2	3	4	5	6
WM + WS	13.04	13.43	13.70	13.76		
WM	9.43	9.43	9.43	9.43		
WW + T #1	624.0	750.5	828.5	791.9		
WD + T #1	590.6	667.3	690.6	632.8		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						•
MOISTURE	5.7	12.5	20.0	25.1		
DRY DENSITY	102.6	106.8	107.0	104.0		

TEST RESULTS	Material Description		
Maximum dry density = 107.6 pcf			
Optimum moisture = 16.4 %	Remarks:		
Project No. APX-2492 Client: Mott MacDonald			
Project:			
S. Landing D. Co. D. H. Co. C. S. Dandha C. S. Gammin Numbers S. C.	Observation		
O Location: B-09, Bulk-09, 2-5 Depth: 2-5 Sample Number: S-28	Checked by:		
ANS CONSULTANTS, INC.	Title:		
South Plainfield, New Jersey	Figure 28 F 2		



Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

## THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 5** 

South Ripley, NY

Test Data- Sample No. S-29 (B-17, Bulk-17, 2'-5')

Standard Proctor Value:

122.3

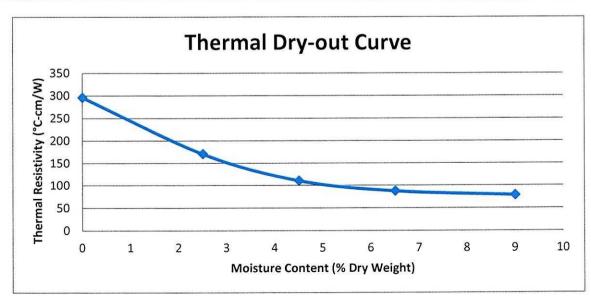
Optimum Moisture Content: 8.7%

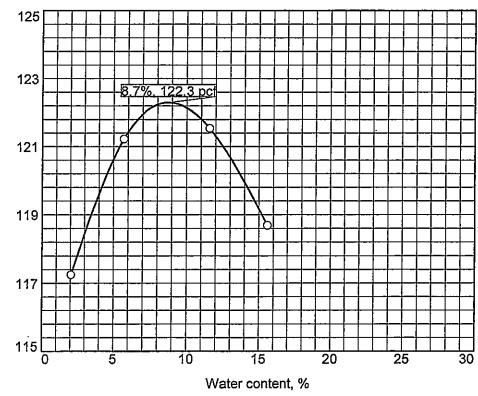
Remolded Dry Density:

104.0 (85%)

Moisture Content as received: 17.%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)	
0.0	24.9	296	
2.5	24.6	171	
4.5	24.5	111	
6.5	24.3	88	
9.0	24.3	79	





Dry density, pcf

# Curve No. S-29

**Test Specification:** 

ASTM D 698-91 Procedure B Standard

Hammer Wt.		5.5 lb.
Hammer Drop		12 in.
Number of Laye	rs	three
Blows per Laye	r	25
Mold Size	0.03	333 cu. ft.
Passing		
/		
Sp.G. (ASTM D 8	· —	
Sp.G. (ASTM D 8 %>3/8 in	· —	lo.200
%>3/8 in	· —	
%>3/8 in	% <n  AASH</n 	
%>3/8 in USCS	% <n  AASH</n 	то

	1	2	3	4	5	6
WM + WS	13.41	13.70	13.95	14.00		
WM	9.43	9.43	9.43	9.43		
WW + T #1	639.7	785.5	947.1	759.3		
WD + T #1	626.9	743.0	848.9	656.9		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.0	5.7	11.6	15.6		
DRY DENSITY	117.2	121.2	121.5	118.7		

TEST RESULTS  Maximum dry density = 122.3 pcf  Optimum moisture = 8.7 %  Project No. APX-2492 Client: Mott MacDonald  Project:  O Location: B-17, Bulk-17, 2-5 Depth: 2-5 Sample Number: S-29  ANS CONSULTANTS, INC.  Checked by:  Title:				
Optimum moisture = 8.7 %  Project No. APX-2492 Client: Mott MacDonald Project:  O Location: B-17, Bulk-17, 2-5 Depth: 2-5 Sample Number: S-29  ANS CONSULTANTS, INC.  Remarks:  Checked by: Title:	TEST RESULTS	Material Description		
Project No. APX-2492 Client: Mott MacDonald Project:  O Location: B-17, Bulk-17, 2-5 Depth: 2-5 Sample Number: S-29  ANS CONSULTANTS, INC.  Reflacks:  Checked by: Title:	Maximum dry density = 122.3 pcf			
Project:  O Location: B-17, Bulk-17, 2-5 Depth: 2-5 Sample Number: S-29  ANS CONSULTANTS, INC.  Checked by: Title:	Optimum moisture = 8.7 %	Remarks:		
O Location: B-17, Bulk-17, 2-5 Depth: 2-5 Sample Number: S-29  ANS CONSULTANTS, INC.  Checked by: Title:	Project No. APX-2492 Client: Mott MacDonald			
ANS CONSULTANTS, INC.  Title:	Project:			
ANS CONSULTANTS, INC.  Title:				
	O Location: B-17, Bulk-17, 2-5 Depth: 2-5 Sample Number: S-29	Checked by:		
Courth Blainfield New Jonesia	ANS CONSULTANTS, INC.	Title:		
SOUTH PLAINTIGIA NOW JORGOV II FIDURE 79 F 7	South Plainfield, New Jersey	Figure 29 F 2		
Journal Infilition, New Jersey 1 19410 20 1 2	Journ Flammera, New Jersey	1.30.0 20 1 2		



Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

# THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

**CLIENT**: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 6** 

South Ripley, NY

Test Data- Sample No. S-30 (B-21, Bulk-21, 2'-5')

Standard Proctor Value:

98.8

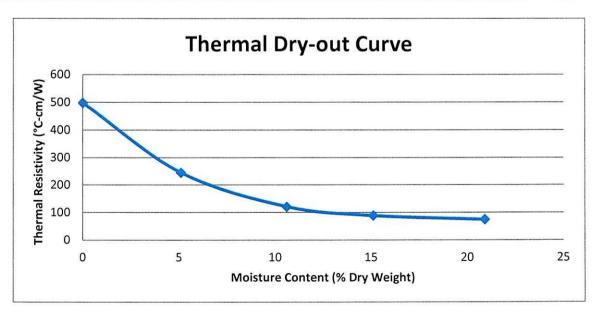
Optimum Moisture Content: 20.5%

Remolded Dry Density:

84.0 (85%)

Moisture Content as received: 21.2%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)	
0.0	24.3	498	
5.1	24.3	245	
10.6	24.1	121	
15.1	24.2	89	
20.9	24.1	75	



99 20.5%, 98.8 pcf 97 95 93 91 91 0 10 20 30 40 50 60 Water content, %

Dry density, pcf

# Curve No. S-30

**Test Specification:** 

ASTM D 698-91 Procedure B Standard

Preparation Metho	<del></del>	
Hammer Wt.	5.5	lb.
Hammer Drop	12	in.
Number of Layers		three
Blows per Layer		25
Mold Size	0.03333	u. ft.
Passing	3/8 in.	Sieve
LIRA		D.
NM LI Sp.G. (ASTM D 854		_ PI
<del></del>		
Sp.G. (ASTM D 854 %>3/8 in.	4)	
Sp.G. (ASTM D 854 %>3/8 in.	4) % <no.20< th=""><th></th></no.20<>	
Sp.G. (ASTM D 854 %>3/8 in. USCS	4) % <no.20< th=""><th></th></no.20<>	

				T		•
	1	2	3	4	5	6
WM + WS	12.62	13.11	13.51	13.70		
WM	9.43	9.43	9.43	9.43		
WW + T #1	660.3	801.9	854.5	1010.8		
WD + T #1	643.1	708.5	686.4	750.2	•	
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2	•	•				
MOISTURE	2.7	13.2	24.5	34.7	4	
DRY DENSITY	93.2	97.7	98.5	95.2		

TEST RESULTS	Material Description		
Maximum dry density = 98.8 pcf			
Optimum moisture = 20.5 %	Remarks:		
Project No. APX-2492 Client: Mott MacDonald			
Project:			
	<u> </u>		
O Location: B-21, Bulk-21, 2-5 Depth: 2-5 Sample Number: S-30	Checked by:		
ANS CONSULTANTS, INC.	Title:		
South Plainfield, New Jersey	Figure 30 F 2		



Tel: (800) 545-ATUL (908) 754-8383 Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

## THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald DATE: 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE FILE NO: APX-2492

Vice President/President Engineer

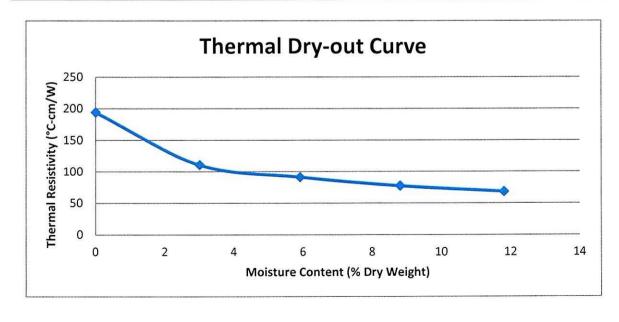
**PROJECT**: Connect Gen, South Ripley REPORT NO: 7

South Ripley, NY

Test Data- Sample No. S-31 (B-35, Bulk-35, 2'-5')

Standard Proctor Value: 120.6 Optimum Moisture Content: 11.8% Remolded Dry Density: 102.5 (85%) Moisture Content as received: 15.2%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)		
0.0	24.3	194		
3.0	24.1	111		
5.9	24.0	91		
8.8	23.9	77		
11.8	23.9	68		



# 123 121 118%, 120.6 pcf 117 115 113 0 5 10 15 20 25 30 Water content, %

Curve No. S-31

**Test Specification:** 

ASTM D 698-91 Procedure B Standard

Hammer Wt.		5.5 lb.		
Hammer Drop		12 in.		
Number of Laye	rs	three		
Blows per Layer		25		
Mold Size	0.033	33 cu. ft.		
Test Performed	on Materi	al		
Passing	3/8 in.	Sieve		
		<del></del>		
NM	LL :	Sieve		
NM Sp.G. (ASTM D 8	LL <u> </u>	PI		
NM Sp.G. (ASTM D 8 %>3/8 in.	LL <u>·</u> 354)	PI		
NM Sp.G. (ASTM D 8 %>3/8 in.	LL <u> </u>	PI		
NM Sp.G. (ASTM D 8 %>3/8 in. USCS	LL <u>·</u> 354)	PI		
NM Sp.G. (ASTM D 8 %>3/8 in.	LL <u>·</u> 354)	PI		

Γ	1	2	3	4	5	6
WM + WS	13.39	13.73	14.02	14.09		
WM	9.43	9.43	9.43	9.43		
WW + T #1	644.7	884.2	910.8	882.8		
WD + T #1	626.4	819.2	792.8	737.4		-
TARE #1	0.0	0.0	0.0	0.0	-	
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.9,	7.9	14.9	19.7		
DRY DENSITY	115.6	119.5	119.9	116.8		

TEST RESULTS	Material Description
Maximum dry density = 120.6 pcf	
Optimum moisture = 11.8 %	Remarks:
Project No. APX-2492 Client: Mott MacDonald Project:	
O Location: B-35, Bulk-35, 2-5 Depth: 2-5 Sample Number: S-31	Checked by:
ANS CONSULTANTS, INC.	Title:
South Plainfield, New Jersey	Figure 31 F 2



Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

## THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 8** 

South Ripley, NY

Test Data- Sample No. S-32 (B-38, Bulk-38, 2'-5')

Standard Proctor Value:

126.9

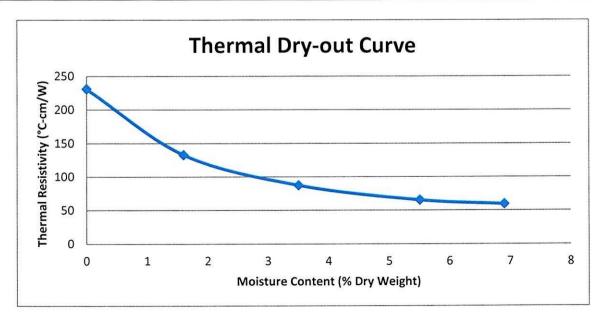
Optimum Moisture Content: 6.9%

Remolded Dry Density:

107.9 (85%)

Moisture Content as received: 11.4%

Moisture Contents (%)	Initial Soil Temperature (℃)	Thermal Resistivity (°C-cm/W)	
0.0	24.4	231	
1.6	24.4	133	
3.5	24.4	87	
5.5	24.4	65	
6.9	24.3	59	



# 

Water content, %

Dry density, pcf

Curve No. S-32

**Test Specification:** 

ASTM D 698-91 Procedure B Standard

Preparation Meth		
Hammer Wt.	5.5	5 lb.
Hammer Drop	1	2 in.
Number of Layers	<b></b>	three
Blows per Layer		25
Mold Size	0.03333	cu. ft.
Test Performed o	n Material	
Passing		Sieve
• —		
NM L	L	PI
NM L Sp.G. (ASTM D 85	<del>-</del>	PI
	<del>-</del>	· · · · · · · · · · · · · · · · · · ·
Sp.G. (ASTM D 85 %>3/8 in.	i4)	00
Sp.G. (ASTM D 85 %>3/8 in.	64) % <no.2< td=""><td>00</td></no.2<>	00
Sp.G. (ASTM D 85 %>3/8 in. USCS	64) % <no.2< td=""><td>00</td></no.2<>	00

Γ	1	2	3	4	5	6
WM + WS	13.64	13.88	13.99	14.00		
. WM	9.43	9.43	9.43	9.43	•	
WW + T #1	652.2	781.4	743.3	799.2		
WD + T #1	630.3	738.5	683.4	717.7		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	3.5	5.8	8.8	11.4		
DRY DENSITY	122.2	126.4	125.9	123.3		

TEST RESULTS	Material Description
Maximum dry density = 126.9 pcf	
Optimum moisture = 6.9 %	Remarks:
Project No. APX-2492 Client: Mott MacDonald	
Project:	
O Location: B-38, Bulk-38, 2-5 Depth: 2-5 Sample Number: S-32	Checked by:
ANS CONSULTANTS, INC.	Title:
South Plainfield, New Jersey	Figure 32 F 2
	<u> </u>



Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

## THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald

DATE: 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

**PROJECT**: Connect Gen, South Ripley

**REPORT NO: 9** 

South Ripley, NY

#### Test Data- Sample No. S-33 (B-40, Bulk-40, 2'-5')

Standard Proctor Value:

119.9

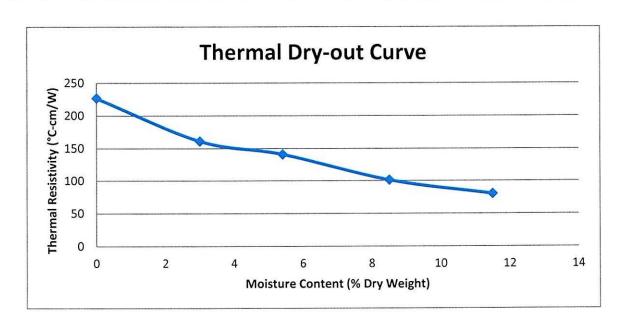
Optimum Moisture Content: 11.1%

Remolded Dry Density:

102.0 (85%)

Moisture Content as received: 15.1%

Moisture Contents (%)	Initial Soil Temperature (℃)	Thermal Resistivity (°C-cm/W)	
0.0	24.4	227	
3.0	24.1	161	
5.4	24.0	141	
8.5	23.9	101	
11.5	23.7	80	



122 120 118 116 114 10 15 20 25 Water content, %

Dry density, pcf

Curve No. S-33

**Test Specification:** ASTM D 698-91 Procedure B Standard

Preparation Meth	od		
Hammer Wt.	. 5.5 lb.		
Hammer Drop	12 in.		
Number of Layers	three		
Blows per Layer			
Mold Size	0.03333 cu. ft.		
Test Performed o	n Material		
Passing	3/8 in. Sieve		
NM L	L PI		
NM L Sp.G. (ASTM D 85			
	54)		
Sp.G. (ASTM D 85	54) % <no.200< th=""></no.200<>		
Sp.G. (ASTM D 85 %>3/8 in	54) % <no.200< th=""></no.200<>		
Sp.G. (ASTM D 85 %>3/8 in	54) % <no.200 AASHTO</no.200 		

Γ	1	2	3	4	5	6
WM + WS	13.32	13.69	13.96	14.07		
WM	9.43	9.43	9.43	9.43		
WW + T #1	649.4	557.6	925.8	894.7		
WD + T #1	635.9	518.2	812.3	744.8		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.1	7.6	14.0	20.1		
DRY DENSITY	114.5	119.0	119.4	116.0		

TEST RESULTS	Material Description
Maximum dry density = 119.9 pcf	
Optimum moisture = 11.1 %	Remarks:
Project No. APX-2492 Client: Mott MacDonald	
Project:	,
O Location: B-40, Bulk-40, 2-5 Depth: 2-5 Sample Number: S-33	Checked by:
ANS CONSULTANTS, INC.	Title:
South Plainfield, New Jersey	Figure 33 F 2



Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

## THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 10** 

South Ripley, NY

Test Data- Sample No. S-34 (B-42, Bulk-42, 2'-5')

Standard Proctor Value:

123.0

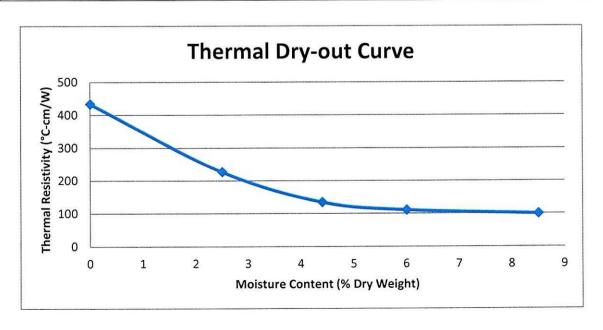
Optimum Moisture Content: 8.2%

Remolded Dry Density:

104.6 (85%)

Moisture Content as received: 12.1%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)	
0.0	27.1	434	
2.5	26.8	227	
4.4	26.8	134	
6.0	26.5	110	
8.5	26.1	99	



124.5 123 121.5 120 118.5 Water content, %

Dry density, pcf

Curve No. S-34

**Test Specification:** ASTM D 698-91 Procedure B Standard

Preparation Me	_	5 5 11
Hammer Wt.		5.5 lb.
Hammer Drop		12 in.
Number of Lay	ers	three
Blows per Laye	er	25
Mold Size	0.03	333 cu. ft.
Test Performed Passing		
Passing	3/8 in	Sieve
Passing	3/8 in	
Passing	3/8 in	Sieve
Passing	3/8 in LL 854)	Sieve
Passing NM Sp.G. (ASTM D %>3/8 in	3/8 in LL 854)	Sieve
Passing NM Sp.G. (ASTM D %>3/8 in	3/8 in LL 854) % <n< th=""><th> Sieve</th></n<>	Sieve
PassingNMSp.G. (ASTM D %>3/8 in	3/8 in LL 854) % <n< td=""><td> Sieve</td></n<>	Sieve

Γ	1	2	3	4	5	6
WM + WS	13.45	13.71	13.92	13.95		
WM	9.43	9.43	9.43	9.43		
WW + T #1	890.3	777.9	829.1	794.3		
WD + T #1	869.9	736.9	754.0	698.0		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2		Ĭ				
WD + T #2						
TARE #2						
MOISTURE	2.3	5.6	10.0	13.8		The state of the s
DRY DENSITY	118.1	121.9	122.6	119.4		

TEST RESULTS	Material Description
	inaterial Description
Maximum dry density = 123.0 pcf	
Optimum moisture = 8.2 %	Remarks:
Project No. APX-2492 Client: Mott MacDonald	
Project:	
O Location: B-42, Bulk-42, 2-5 Depth: 2-5 Sample Number: S-34	Checked by:
ANS CONSULTANTS, INC.	Title:
South Plainfield. New Jersev	Figure 34 F 2



Fax: (908) 754-8633

## NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

# THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 11** 

South Ripley, NY

Test Data- Sample No. S-35 (B-43, Bulk-43, 2'-5')

Standard Proctor Value:

127.0

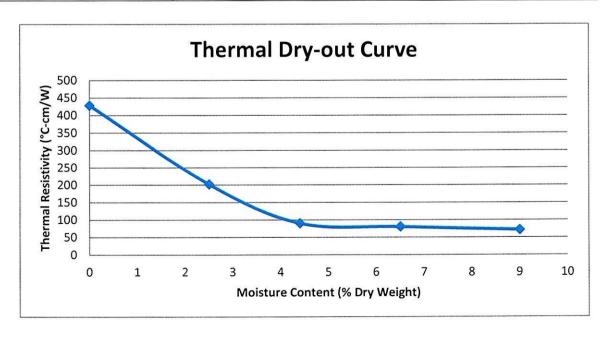
Optimum Moisture Content: 8.9%

Remolded Dry Density:

108.0 (85%)

Moisture Content as received: 11.7%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)
0.0	24.7	429
2.5	24.6	202
4.4	24.5	90
6.5	24.2	80
9.0	23.9	71



129 127.5 8.9%, 127,0 pcf 126 124.5 123 121.5 Water content, %

Dry density, pcf

Curve No. S-35

**Test Specification:** ASTM D 698-91 Procedure C Standard

Hammer Wt.		5.5 lb.
Hammer Drop		12 in.
Number of Laye	ers	three
Blows per Laye	r	56
Viold Size	0.0	75 cu. ft.
Passing	3/4 in.	Sieve
NIVI	LL	PI
NM Sp.G. (ASTM D		PI
	854)	PI
Sp.G. (ASTM D	854)	lo.200
Sp.G. (ASTM D %>3/4 in.	854) <u> </u>	lo.200
Sp.G. (ASTM D %>3/4 in JSCS	854) <u> </u>	lo.200

Γ	1	2	3	4	5	6
WM + WS	23.18	23.80	24.29	24.47		
WM	13.75	13.75	13.75	13.75		
WW + T #1	833.5	807.0	818.5	979.4		
WD + T #1	811.6	759.2	736.8	842.9		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.7	6.3	11.1	16.2		
DRY DENSITY	122.5	126.1	126.5	123.1		

TEST RESULTS	Material Description
Maximum dry density = 127.0 pcf	
Optimum moisture = 8.9 %	Remarks:
Project No. APX-2492 Client: Mott MacDonald	
Project:	
O Location: B-43, Bulk-43, 2-5 Depth: 2-5 Sample Number: S-35  ANS CONSULTANTS, INC.	Checked by: Title:
South Plainfield, New Jersey	Figure 35 F 2

Tel: (800) 545-ATUL (908) 754-8383

Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

# THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald DATE: 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE FILE NO: APX-2492

Vice President/President Engineer

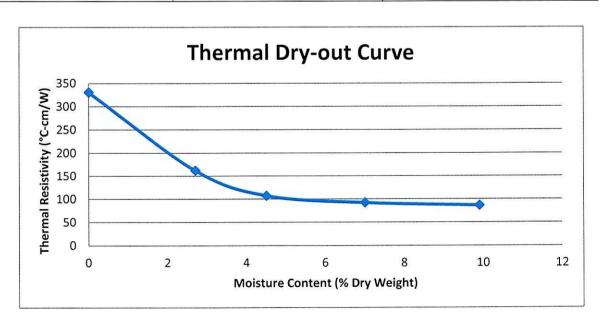
PROJECT: Connect Gen, South Ripley REPORT NO: 12

South Ripley, NY

Test Data- Sample No. S-36 (B-44, Bulk-44, 2'-5')

Standard Proctor Value: 123.4 Optimum Moisture Content: 10.3% Remolded Dry Density: 104.9 (85%) Moisture Content as received: 14.3%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)
0.0	26.2	331
2.7	26.0	162
4.5	25.9	107
7.0	25.6	92
9.9	25.4	86



## **COMPACTION TEST REPORT**

124
122
120
118
116
0
5
10
15
20
25
30
Water content, %

Dry density, pcf

Curve No. S-36

**Test Specification:** 

ASTM D 698-91 Procedure B Standard

Preparation Met	•	: 11.
Hammer Wt		ilb.
Hammer Drop	1	2 in.
Number of Layer	rs	three
Blows per Layer		25
Mold Size	0.03333	cu. ft.
Test Performed	on Material	
Passing	3/8 in.	Sieve
NM	LL	_ PI
NMSp.G. (ASTM D 8		_ PI
	354)	_ ' '
Sp.G. (ASTM D 8 %>3/8 in.	354)	_ ' '
Sp.G. (ASTM D 8 %>3/8 in.	% <no.2< th=""><th>_ ' '</th></no.2<>	_ ' '
Sp.G. (ASTM D 8 %>3/8 in. USCS	% <no.2< td=""><td>_ ' '</td></no.2<>	_ ' '

### **TESTING DATA**

Ī	1	2	3	4	5	6
WM + WS	13.45	13.79	14.05	14.15		
WM	9.43	9.43	9.43	9.43		
WW + T #1	800.8	716.2	832.9	824.3		
WD + T #1	784.0	669.6	736.6	695.4	P	
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.1	7.0	13.1	18.5	•	
DRY DENSITY	118.3	122.5	122.8	119.7		

TEST RESULTS	Material Description
Maximum dry density = 123.4 pcf	
Optimum moisture = 10.3 %	Remarks:
Project No. APX-2492 Client: Mott MacDonald Project:	
O Location: B-44, Bulk-44, 2-5 Depth: 2-5 Sample Number: S-36	Checked by:
ANS CONSULTANTS, INC.	Title:
South Plainfield, New Jersey	Figure 36 F 2



Tel: (800) 545-ATUL (908) 754-8383

Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

# THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald DATE: 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE FILE NO: APX-2492

Vice President/President Engineer

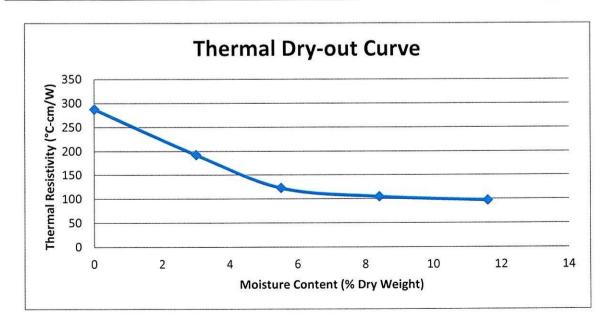
**PROJECT:** Connect Gen, South Ripley REPORT NO: 13

South Ripley, NY

Test Data- Sample No. S-37 (B-46, Bulk-46, 2'-5')

Standard Proctor Value: 118.4 Optimum Moisture Content: 11.7% Remolded Dry Density: 100.6 (85%) Moisture Content as received: 15.1%

Moisture Contents (%)	Initial Soil Temperature	Thermal Resistivity (°C-cm/W)
0.0	26.5	228
3.0	26.5	193
5.5	26.3	123
8.4	25.9	105
11.6	25.8	97



## **COMPACTION TEST REPORT**

118.5 117 115.5 114 112.5 0 5 10 15 20 25 30

Water content, %

Dry density, pcf

Curve No. S-37

Test Specification:

ASTM D 698-91 Procedure B Standard

Preparation Meth	od
Hammer Wt.	5.5 lb.
Hammer Drop	12 in.
Number of Layers	s <u>three</u>
Blows per Layer	25
Mold Size	0.03333 cu. ft.
Test Performed o Passing	
NML	L PI
Sp.G. (ASTM D 85	
%>3/8 in	% <no.200< th=""></no.200<>
uscs	AASHTO
Date Sampled _	
Date Tested	<u> </u>
Tested By	

### **TESTING DATA**

	1	2	3	4	5	6
WM + WS	13.32	13.66	13.91	14.00		
WW	9.43	9.43	9.43	9.43		
WW + T #1	836.4	826.9	846.1	1026.8		·
WD + T #1	813.3	764.9	741.0	857.0		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2	*			_		
TARE #2						
MOISTURE	2.8	8.1	14.2	19.8		
DRY DENSITY	113.6	117.5	117.9	114.5		

7	TEST RESULTS		Material Description
Maximum dry density = 118.4	pcf		
Optimum moisture = 11.7 %			Remarks:
Project No. APX-2492 Client	: Mott MacDonal	d	
Project:			
○ <b>Location:</b> B-46, Bulk-46, 2-5	Depth: 2-5	Sample Number: S-37	Checked by:
ANS CO	ONSULTANTS	, INC.	Title:
South Pl	ainfield, New	Jersey	Figure 37 F 2

Tel: (800) 545-ATUL (908) 754-8383

Fax: (908) 754-8633

%

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

# THERMAL CONDUCTIVITY OF SOIL & SOFT ROCK BY THERMAL NEEDLE PROBE -IEEE 442

CLIENT: Mott MacDonald

**DATE:** 08-27-2020

111 Wood Avenue South Iselin, NJ 08830-4112

Kind Attn: Mr. Vatsal A.Shah. PE, Ph.D,D.GE

FILE NO: APX-2492

Vice President/President Engineer

PROJECT: Connect Gen, South Ripley

**REPORT NO: 14** 

South Ripley, NY

Test Data- Sample No. S-38 (B-47, Bulk-47, 2'-5')

Standard Proctor Value:

122.3

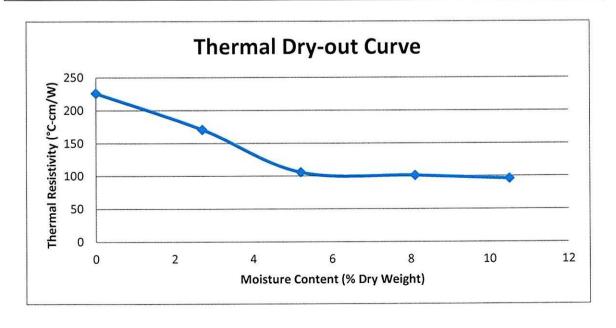
Optimum Moisture Content: 10.4%

Remolded Dry Density:

104.0 (85%)

Moisture Content as received: 13.9

Thermal Resistivity **Moisture Contents Initial Soil Temperature** (°C-cm/W) (%) (°C) 226 0.0 25.6 171 25.4 2.7 25.4 106 5.2 25.3 101 8.1 25.2 96 10.5



## COMPACTION TEST REPORT

123
123
124
119
117
115
0
5
10
15
20
25
30
Water content, %

Dry density, pcf

# Curve No. S-38

**Test Specification:** 

ASTM D 698-91 Procedure B Standard

Hammer Wt.	5.5	lb.
Hammer Drop	12	in.
Number of Layers	·	three
Blows per Layer		25
Mold Size	0.03333	cu. ft.
Test Performed or	n Material	
Passing	3/8 in.	Sieve
	L	_ PI
NM L Sp.G. (ASTM D 85		_ Pi
		_ · · ·
Sp.G. (ASTM D 85 %>3/8 in.	4)	_ · · ·
Sp.G. (ASTM D 85 %>3/8 in.	4) % <no.20< th=""><th>_ · · ·</th></no.20<>	_ · · ·
Sp.G. (ASTM D 85 %>3/8 in. USCS .	4) % <no.20< td=""><td>_ · · ·</td></no.20<>	_ · · ·

### **TESTING DATA**

	1	2	3	4	5	6
WM + WS	13.45	13.72	14.03	14.10		
WM	9.43	9.43	9.43	9.43		
WW + T #1	639.9	564.7	835.1	793.0		
WD + T #1	621.6	529.6	734.2	669.5		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.9	6.6	13.7	18.4		
DRY DENSITY	117.2	121.0	121.5	118.5		,

TEST RESULTS	Material Description		
Maximum dry density = 122.3 pcf			
Optimum moisture = 10.4 %	Remarks:		
Project No. APX-2492 Client: Mott MacDonald Project:			
O Location: B-47, Bulk-47, 2-5 Depth: 2-5 Sample Number: S-38  ANS CONSULTANTS, INC.	Checked by: Title:		
South Plainfield, New Jersey	Figure 38 F 2		

## G. Seismic Support Data



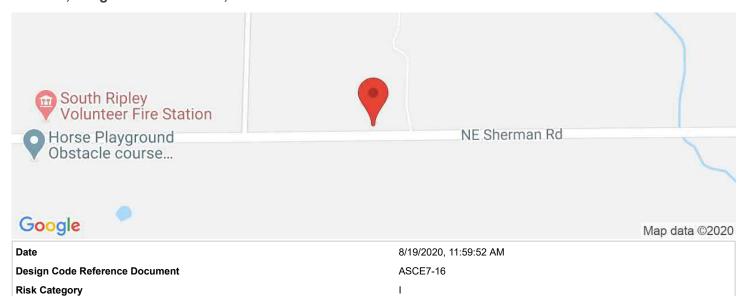
Site Class



### **Connect Gen-South Ripley**

### South Ripley, NY 14775, USA

Latitude, Longitude: 42.1950571, -79.72060259999999



Туре	Value	Description
S <sub>S</sub>	0.104	MCE <sub>R</sub> ground motion. (for 0.2 second period)
S <sub>1</sub>	0.039	MCE <sub>R</sub> ground motion. (for 1.0s period)
S <sub>MS</sub>	0.167	Site-modified spectral acceleration value
S <sub>M1</sub>	0.093	Site-modified spectral acceleration value
S <sub>DS</sub>	0.111	Numeric seismic design value at 0.2 second SA
S <sub>D1</sub>	0.062	Numeric seismic design value at 1.0 second SA

D - Default (See Section 11.4.3)

Туре	Value	Description
SDC	Α	Seismic design category
Fa	1.6	Site amplification factor at 0.2 second
F <sub>v</sub>	2.4	Site amplification factor at 1.0 second
PGA	0.052	MCE <sub>G</sub> peak ground acceleration
F <sub>PGA</sub>	1.6	Site amplification factor at PGA
PGA <sub>M</sub>	0.084	Site modified peak ground acceleration
TL	12	Long-period transition period in seconds
SsRT	0.104	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.112	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.039	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.042	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
C <sub>RS</sub>	0.93	Mapped value of the risk coefficient at short periods

https://seismicmaps.org

Туре	Value	Description	
C <sub>R1</sub>	0.925	Mapped value of the risk coefficient at a period of 1 s	

https://seismicmaps.org

#### DISCLAIMER

While the information presented on this website is believed to be correct, <u>SEAOC /OSHPD</u> and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

https://seismicmaps.org 3/3

