# DRAFT GEOTECHNICAL INVESTIGATION REPORT

For the Proposed

**Overhead Transmission** 

at the

Arkwright Summit Wind Farm Town of Arkwright Chautauqua County, NY

**Prepared For:** 

**Arkwright Summit Wind Farm LLC** 

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Prepared by:



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June 26, 2015

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#### 1.0 Executive Summary

This draft report presents the geotechnical investigation performed for the Overhead Transmission (OT) component of the Arkwright Summit Windfarm in Chautauqua County, New York. The proposed locations of 31 monopole foundations to support the OT were explored for this investigation.

The wind farm is to be located on the land that rises between the Portage Escarpment to the Allegheny Plateau west of Lake Erie. Ground surface elevations at turbine locations generally range between El. 1300 and El. 1800 feet. The geomorphology of this area is heavily influenced by glaciation, and surficial geology generally includes undifferentiated stratified drift assemblages, kame moraines, and glacial till.

It is our understanding that the OT structures will be supported by two types of foundations: 80-foot timber monopoles for in-line structures, and 80 ft. multi-column steel frames for structures at turning points. Although foundation designs were not available for this report, typically monopoles of this height are supported on drilled shaft foundations.

The test borings encountered subsurface conditions consistent with local surficial geology and typically included undifferentiated stratified glacial drift (glacial drift) overlying glacial till and shale bedrock. The thickness of the glacial drift varied from a few feet to over 50 feet. The glacial drift typically consisted of layers of sand, silty sand, and silty clay. In general, the cohesionless layers in the glacial drift were loose to medium dense, and the cohesive layers were stiff to very stiff. The glacial till generally consisted of hard gravelly lean silty clay with cobbles and boulders. The shale was typically soft to medium hard and horizontally bedded.

The following geotechnical parameters are recommended for design of drilled shafts used to support the OT's:

Stratum	Total Unit Weight (pcf)	Internal Friction Angle	Long Term Cohesion (psf)	Ultimate Skin Friction (psf)
Glacial Drift (to depth of 20 feet)	115	32	0	800
Glacial Drift (20 feet to 40 feet)	125	33	0	1200
Glacial Till	135	32	300	2000
Shale	140	38	1000	4000

Refer to subsequent sections of the report for more details regarding our design recommendations, along with earthwork construction considerations. <u>Please note *italicized* words</u> are further defined in Exhibit A - Terms & Definitions.

#### 2.0 Introduction

#### 2.1 General

Fisher Associates, P.E., L.S., L.A, D.P.C. (Fisher Associates) was retained by Arkwright Summit Wind Farm, LLC (ASWF), to provide geotechnical engineering services for the proposed Arkwright Summit Wind Farm. The proposed wind farm will be located in the Town of Arkwright, Chautauqua County, New York.

Fisher Associates conducted this geotechnical investigation to obtain general subsurface condition information in the proposed area of the Overhead Transmission Lines (OTs). This report presents a data summary of the preliminary subsurface exploration work performed including the field and laboratory data, and a description of the subsurface soil and water conditions encountered at the preliminary test boring locations.

#### 2.2 Site Description

The wind turbines are to be located on the land that rises between the Portage Escarpment to the Allegheny Plateau west of Lake Erie. Ground surface elevations at turbine locations generally range between El. 1300 and El. 1800 feet. The sites are presently either wooded areas or farmland.

#### 2.3 Project Description

The proposed overhead transmission line will connect the substation on Center Road to the Interconnect Area on Webster Road.

#### 3.0 Subsurface Exploration

#### 3.1 Test Borings

The subsurface exploration program consisted of the advancement of 32 test borings. The test borings were performed by Earth Dimensions, Inc., and Nature's Way Environmental Consultants & Contractors, Inc. during the period of April 6, 2015 to May 29, 2015. The test borings were advanced using all-terrain rotary drill rigs equipped with 4-1/4" I.D. hollow stem augers and diamond-bit rock coring barrels. Explorations were advanced to depths of up to 41 feet below ground surface (bgs).

The test boring location and ground surface elevations were established in the field by Fisher Associates' survey personnel and utility clearances were provided by the drillers. The approximate exploration location is shown on Figure No. 2 - Subsurface Exploration Location Plan. Test boring logs prepared by the drilling companies are attached as Appendix A - Test Boring Logs.

#### 3.2 Laboratory Testing

Laboratory testing was performed by testing laboratories retained by the drilling contractors.

Testing was performed upon samples selected by Fisher Associates. Laboratory testing included the performance of Natural Moisture Content Determination (ASTM D-2216), Grain Size Analysis (ASTM D-422), and Atterberg Limits Determination (ASTM D-4518). Laboratory testing results are attached as Appendix B to this report.

#### 3.3 Geophysical Exploration

Geophysical exploration to measure the in-situ shear wave velocity and electrical resistivity of the ground within the wind farm are planned but have not been performed as of the date of publication of this draft report.

#### 4.0 Summary of Subsurface Conditions

#### 4.1 General

The OTs are to be located on the land that rises between the Portage Escarpment to the Allegheny Plateau west of Lake Erie. Ground surface elevations in the area generally range between El. 1300 and El. 1800 feet. The geomorphology of this area is heavily influenced by glaciation, and surficial geology generally includes undifferentiated stratified drift assemblages, kame moraines, and glacial till.

The test borings encountered subsurface conditions consistent with local surficial geology and typically included undifferentiated stratified glacial drift (glacial drift) overlying glacial till and shale bedrock. The thickness of the glacial drift varied from a few feet to over 40 feet. The glacial drift typically consisted of layers of sand, silty sand, and silty clay. In general, the cohesionless layers in the glacial drift were loose to medium dense, and the cohesive layers were stiff to very stiff. The glacial till generally consisted of hard gravelly lean silty clay with cobbles and boulders. The shale was typically soft to medium hard and horizontally bedded. **Table 1 presents a summary of subsurface conditions encountered at each of the OT locations** 

The generalized soil profile described below and shown on the test boring logs is intended to convey trends in subsurface conditions. The boundaries between the soil strata are approximate and are based on interpretations between widely spaced explorations. Actual soil transitions and conditions may vary between the subsurface exploration locations. See the attached exploration logs within Appendix A for more details regarding the subsurface conditions.

#### 4.2 Topsoil

A topsoil or organic layer was encountered at the ground surface at each boring location. The thickness of the topsoil encountered ranged from approximately 0.1 feet to 1.0 feet.

#### 4.3 Glacial Drift

Glacial drift was encountered at all of the boring locations. The glacial drift generally consisted of stratified layers of sand, silty sand and silty clay. The drift sometimes included small amounts of gravel. The thickness of the glacial drift varied from 3.2 feet to over 40 feet. Standard Penetration Testing "N" values in the glacial drift varied from 2 blows per foot (bpf) to 78 bpf but were typically between 10 to 30 bpf. The cohesive layers in the glacial drift were typically stiff

and lean.

#### 4.4 Glacial Till

Glacial till was typically encountered below the glacial drift. The glacial till typically consisted of a binder of hard clay and silt with interbedded gravel and sand. Cobbles and boulders may also be present within the glacial till. Standard Penetration Testing "N" values in the glacial till ranged from 13 bpf to over 100 bpf, and typically exceeded 40 bpf. The glacial till typically classified as a lean silty clay during Atterberg limits testing, and generally consisted of approximately 50% silt and clay with the remainder sand and gravel.

#### 4.5 Shale

Shale was occasionally encountered below the glacial drift or glacial till in the test borings. The shallowest depth at which shale was encountered was 4 feet, but more often it was encountered at depths greater than 10 feet. The shale was typically thinly bedded, with a Rock Quality Designation values ranging from 31 to 53. The upper five feet of shale could be augered with the drill rigs utilized during the subsurface investigation.

#### 4.6 Groundwater

Groundwater was not encountered at the completion of the majority of the test borings. Groundwater was detected within the following boreholes:

Boring	Depth to Groundwater (feet)
TL-480	29.9
TL-499	15.9
TL-503	36.3
TL-506	20.2

Long term ground water measurements were not obtained for this study. Groundwater levels may be impacted by regional and local site considerations and may fluctuate over time. The fluctuations can be due to seasonal variations in precipitation and variations in soil conditions between explorations.

#### **5.0** Geotechnical Engineering and Construction Considerations

#### 5.1 Monopole Foundations

We anticipate that the monopoles and multi-pole frames will be supported by a drilled shaft foundation. We assume that the drilled shafts will be constructed using temporary steel casing to support the augered borehole. Loose material should be removed from the bottom of the drilled shaft prior to the placement of concrete. Dewatering should be performed prior to concrete placement if more than 2 feet of water accumulates in the bottom of the shaft. Concrete should be placed in the shafts the same working day that drilling is completed. A dropchute that extends at least 75% of the length of the drilled shaft should be utilized during concrete placement. The top of the fluid concrete placement must be maintained at least 3 feet above the bottom of the

temporary casing as it is being extracted during placement. Reinforcing cages should be supported at the ground surface until the concrete adequately hardens.

The following geotechnical parameters are recommended for design of drilled shafts used to support the OT's:

	Total Unit	Internal	Long Term	
	Weight	Friction	Cohesion	Ultimate Skin
Stratum	(pcf)	Angle	(psf)	Friction (psf)
Glacial Drift (to depth of 20 feet)	115	32	0	800
Glacial Drift (20 feet to 40 feet)	125	33	0	1200
Glacial Till	135	32	300	2000
Shale	140	38	1000	4000

#### 5.2 Seismic Site Classification

A seismic investigation is planned for this project but was not initiated at the time of writing of this report. Once we have performed this evaluation, this information will be added to the final report. However, for planning purposes, we developed the *seismic design classification* in accordance with the 2010 Building Code of New York State, was developed based on the test boring information. We recommend that seismic site class "C" be used for the project site. See Exhibit A - Terms & Definitions section at the end of this report for more information regarding the Seismic Site Classification.

#### **6.0 Construction Observation**

We recommend that a geotechnical engineer, and/or a qualified engineering technician, working under the direction of the geotechnical engineer, be retained during construction. The Engineer and/or their representative will make observations of the prepared subgrade and bearing surfaces to review that unsuitable materials have been removed. The Engineer or their representative will also observe the subsurface conditions exposed during construction for comparison to the exploration data. This will allow for adjustments that may be necessary to accommodate actual soil conditions revealed at the proposed improvement location.

#### 7.0 Closing

We prepared this report to provide information about potential foundation design and construction considerations for the proposed. Test borings were made as part of this evaluation, and the recommendations provided herein are based on information available from the subsurface explorations. This report presents field observations, data collection and research, results, and professional opinions, and may be subject to modification if Arkwright Summit Wind Farm LLC or any other party develops subsequent information. The report has been prepared in accordance with generally accepted soil and foundation engineering practice, and no other warranty, expressed or implied, is made.

This report has been prepared for the specific and exclusive use of Arkwright Summit Wind Farm LLC, and the design team for this project and site. The report and the findings in the report shall not, in whole or in part, be disseminated or conveyed to any other party, or used or relied upon by any other party, except for the specific purpose and to the specific parties alluded to above, without the prior written consent of Fisher Associates. Fisher Associates would be pleased to discuss the conditions associated with any such additional dissemination, use, or reliance by other parties.

These conclusions and recommendations do not reflect variations in subsurface conditions which could exist in unexplored areas of the site. Regardless of the thoroughness of a subsurface exploration, there is a possibility that conditions between test borings will differ from those at the boring locations, that the conditions are not anticipated by the designers, or that the construction process has altered the soil conditions. Therefore, an experienced geotechnical engineer should evaluate earthwork and foundation construction to verify that the field conditions match those anticipated in design, as recommended above. In the event changes are made in the proposed constructions plans, the recommendations presented in this report shall be reviewed by the geotechnical engineer and the conclusions of this report modified or verified in writing.

#### **EXHIBIT A**

#### **Terms and Definitions**

*Structural Fill:* Recommended to consist of Crusher Run Stone or Crushed Gravel and Sand mixture that is free of Clays, Organics, Snow, Ice and friable or deleterious particles. At minimum it should meet the following; New York State DOT specifications Item 304.12 Type 2 material.

*Select Granular Fill:* Material meeting the requirements of New York State DOT, standard specification Item 203.07 - Select Granular Fill.

**Compacted:** All fill beneath structural elements, slab-on-grade, pavement areas, and interior walls should be placed in *lifts* and compacted to 95% of maximum dry density as determined by modified proctor test (ASTM D-1557). For exterior areas with no overlying structures, 92% of maximum dry density as determined by modified proctor test (ASTM D-1557) may be used.

**Lifts:** Placement of fill should occur in nearly horizontal, uniform lifts not exceeding 9-inches in loose thickness and *compacted* with at least three (3) passes of suitable compaction equipment. Fill should also be placed in a stable well engineered condition and should not "pump" or show signs of movement or significant deflection (i.e. unstable conditions) as it is being constructed. All fill should be placed and *compacted* within  $\pm 2\%$  of optimum moisture content, and the equipment used to compact the granular materials must be compatible with the material type and lift thickness. The loose lift thickness should be reduced to 6-in. in excavations where hand operated compaction equipment will be utilized.

**Excavated soils** - may be used for general site grading or trench backfilling in landscape areas, providing they are free of any organics, particles greater than 6-inch diameter, deleterious materials, and can be properly *compacted*. However, as previously noted, they are frost susceptible and sensitive to moisture and, therefore, may be difficult to place and compact. These soils may require drying, prior to placement, to adequately achieve the proper compaction and moisture requirements as noted above.

**Densification** - The subgrade densification/re-compaction should be performed prior to *proof-rolling*, under the observation of a qualified geotechnical engineer. We recommended that the exposed native soil subgrade surface be densified/re-compaction to a minimum of 95% of its maximum dry density, as determined by the modified proctor moisture-density relationship (ASTM D-1557) and meeting the above moisture requirements. This will require sampling of exposed subgrade soils, prior to commencing this work, and performing laboratory moisture-density relationship testing (ASTM D-1557) on the representative soils to establish proper control densities for the subgrade compaction. We recommend that the subgrades be compacted a minimum of ten (10) sets of overlapping passes of a vibratory compaction equipment weighing at least 10 to 15 tons.

**Proper Subgrade Preparation / Proof Rolling:** Excavation and removal of all surface materials, topsoil, trees, and loose/soft or wet soils. The prepared subgrade surface should be visually observed, and all deleterious materials and organic matter, should be excavated and removed. The subgrade surface should be proof-rolled with at least three (3) sets of overlapping passes of a smooth-wheel vibratory compaction equipment weighing at least 10 to 15 tons, under the

observation of a qualified geotechnical engineer. Areas that are wet, unstable, or weave excessively during proof-rolling should be excavated and replaced with compacted *structural fill*. A suitable stabilization/separation geotextile, such as Mirafi 500X, should be placed between the soil subgrades and the overlying *structural fill* layer.

Minimize Potential Degradation of the Subgrade Soils - Efforts should be made to maintain the subgrades in a dry and stable condition at all times, and traffic over exposed subgrades should be minimized to the extent practicable during construction. These efforts could include: installation of drainage swales and underdrains (i.e. "French drains") to intercept and divert surface runoff and perched groundwater away from the construction areas; sloping of the subgrade and "sealing" of the surface with a smooth drum roller to promote runoff; and restricting construction equipment traffic from traveling directly over the subgrade surfaces, especially when they are wet. Construction traffic over these subgrade soils, particularly when they are wet may cause the soils to become disturbed, destabilize, and rut/pump. Accordingly any areas that are disturbed should be undercut or over excavated and backfilled with compacted structural fill.

*Seismic Design Classification* - The spectral accelerations for the project site were obtained from the United States Geologic Survey (USGS), U.S. Seismic "Design Maps" Web Application, using the project site for the Arkwright, NY area, for a seismic site class "C". The following accelerations are based on the 2010 ASCE 7 Standard mapping, which makes use of the 2008 USGS seismic hazard data, as published in the 2010 Building Code of New York State.

Short Period	1 Second Period	5% Damped	5% Damped
Response	Response	Design Spectral	Design Spectral
		Response	Response
$S_{ms}$	$S_{M1}$	$S_{ m DS}$	$S_{D1}$
0.181g	0.089g	0.120g	0.059g

## **TABLE**

#### Table No. 1

Summary of Subsurface Conditions
Arkwright Summit Wind Farm
Town of Arkwright, Chautauqua County, New York

	Ground		Topsoil		Gla	cial Drift			G	Blacial Till			Weathered Bedrock			Apparent Bedrock		
Test Boring Number	Surface Elevation (ft.)	Exploration Total Depth (ft.)	Thickness (ft.)	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation of Top (ft.)	Recovery/ RQD
								И	/ind Turbine I	Exploration Bo	rings	,						
TL-517		40.8	0.3	0.3		3.2	10	3.5		UNKNOWN	15 < N < 70		NOT	FENCOUNTER!	ED		NOT ENCOU	NTERED
TL-516		41.0	0.3	0.3		3.2	9	3.5		UNKNOWN	12 < N < 84		NOT ENCOUNTERED			NOT ENCOUNTERED		
TL-515		19.2	0.4	0.4		4.1	11		NOT E	NCOUNTERE	)	4.5		4.7	GREATER THAN 100	9.2		RUN 1: REC = 98% RQD 48% RUN 2: REC = 86% RQD = 53%
TL-514		20.4	0.2	0.2		8.8	20 < N < 50	9.0		UNKNOWN	32 < N < 100++		NOT	FENCOUNTER!	ED		NOT ENCOL	INTERED
TL-513		23.3	0.1	0.1		18.9	9 < N < 96		NOT E	NCOUNTERE	)	19.0		UNKNOWN	GREATER THAN 100		NOT ENCOU	NTERED
TL-511		21.3	0.2	0.2		17.8	10 < N < 47	18.0		UNKNOWN	44		NOT	Γ ENCOUNTERI	ED		NOT ENCOL	INTERED
TL-510		22.1	0.1	0.1		13.9	14 < N < 23	14.0		5.5	24	19.5		UNKNOWN	100++	28.5		RUN 1: REC = 97% RQD 31% RUN 2: REC = 93% RQD = 38%
TL-508		22.7	0.4	0.4		4.0	6 < N < 8		NOT E	NCOUNTERED	)	4.0		UNKNOWN	64 < N < 100++		NOT ENCOL	INTERED
TL-507		23.3	0.3	0.3		3.7	5 < N < 7	4.0		3.5	56 < N < 97	7.5		UNKNOWN	100++		NOT ENCOL	INTERED
TL-506		23.1	0.5	0.5		3.5	5 < N < 19	4.0		15.0	24 < N < 100	19.0		UNKNOWN	100++		NOT ENCOL	INTERED
TL-505		40.2	0.2	0.2		33.8	6 < N < 28	34.0		UNKNOWN	34 < N < 100		NO1	Γ ENCOUNTERI	ED		NOT ENCOL	INTERED
TL-503		40.0	0.6	0.6		11.9	8 < N < 24	12.5		UNKNOWN	16 < N < 149		NO1	Γ ENCOUNTERI	ED		NOT ENCOL	NTERED
TL-502		32.1	0.6	0.6		15.4	5 < N < 25	16.0		UNKNOWN	49 < N < 100		NOT	Γ ENCOUNTERI	ED		NOT ENCOL	NTERED
TL-500		40.3	0.5	0.5		7.5	8 < N < 20	8.0		UNKNOWN	34< N< 145		NOT	Γ ENCOUNTERI	ED		NOT ENCOU	INTERED
TL-499		33.4	0.7	0.7		26.3	8 < N < 40	27.0		UNKNOWN	100		NOT	Γ ENCOUNTERI	ED		NOT ENCOL	NTERED
TL-498		41.0	0.8	0.8		25.2	2 < N < 65	26.0		UNKNOWN	28 < N < 100		NOT	Γ ENCOUNTERI	ED		NOT ENCOL	NTERED
TL-497		37.6	0.3	0.3		31.2	5 < N < 89	31.5		UNKNOWN	100+		NOT	Γ ENCOUNTERI	ED		NOT ENCOL	INTERED
TL-496		40.5	0.4	0.4		23.6	5 < N < 47	24.0		UNKNOWN	100+	NOT ENCOUNTERED NOT ENCOUNTERE		INTERED				
TL-495		32.0	0.3	0.3		9.7	11< N < 47	10.0		UNKNOWN	58 < N < 100		NOT	Γ ENCOUNTERI	ED		NOT ENCOL	INTERED

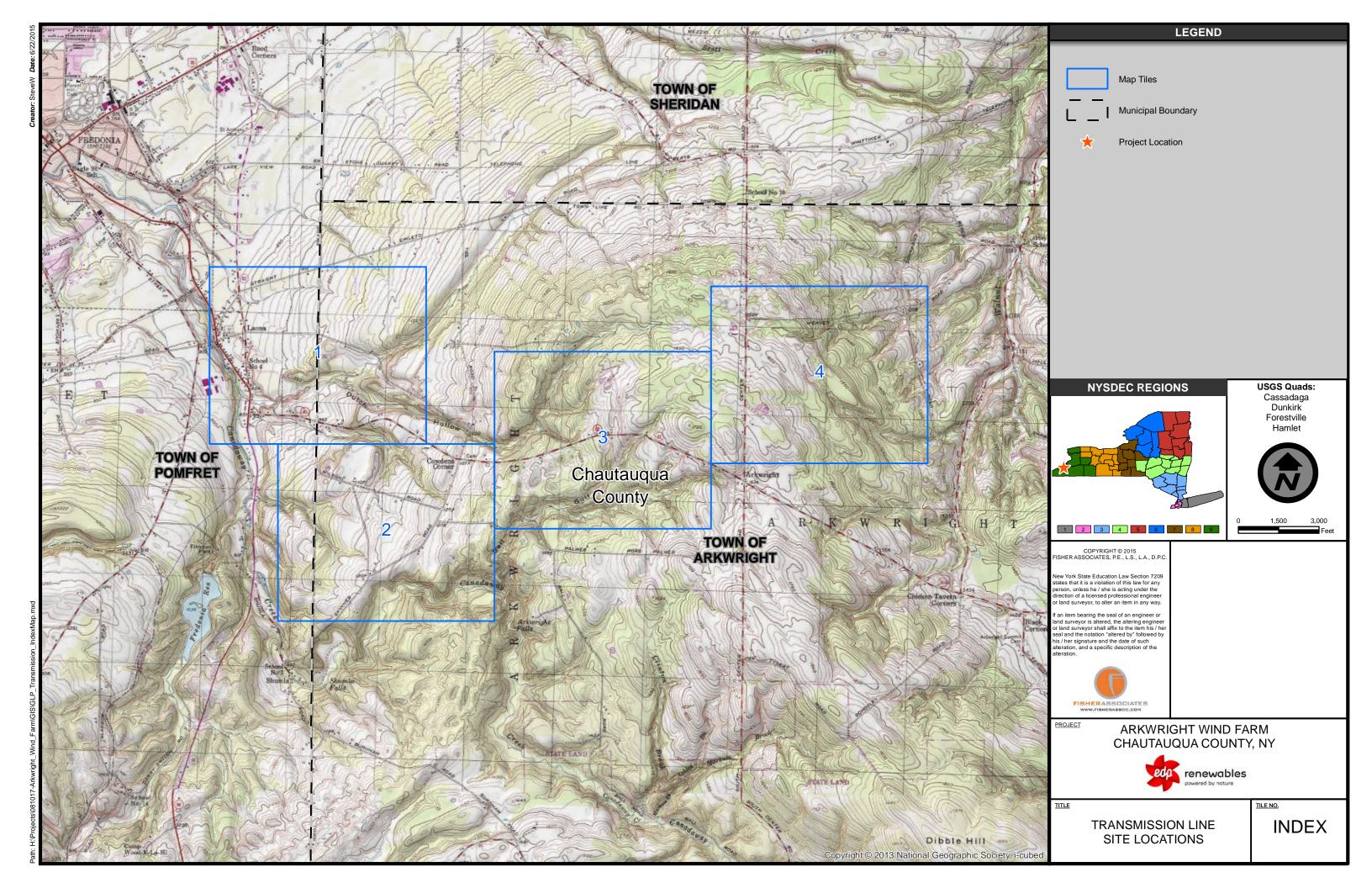
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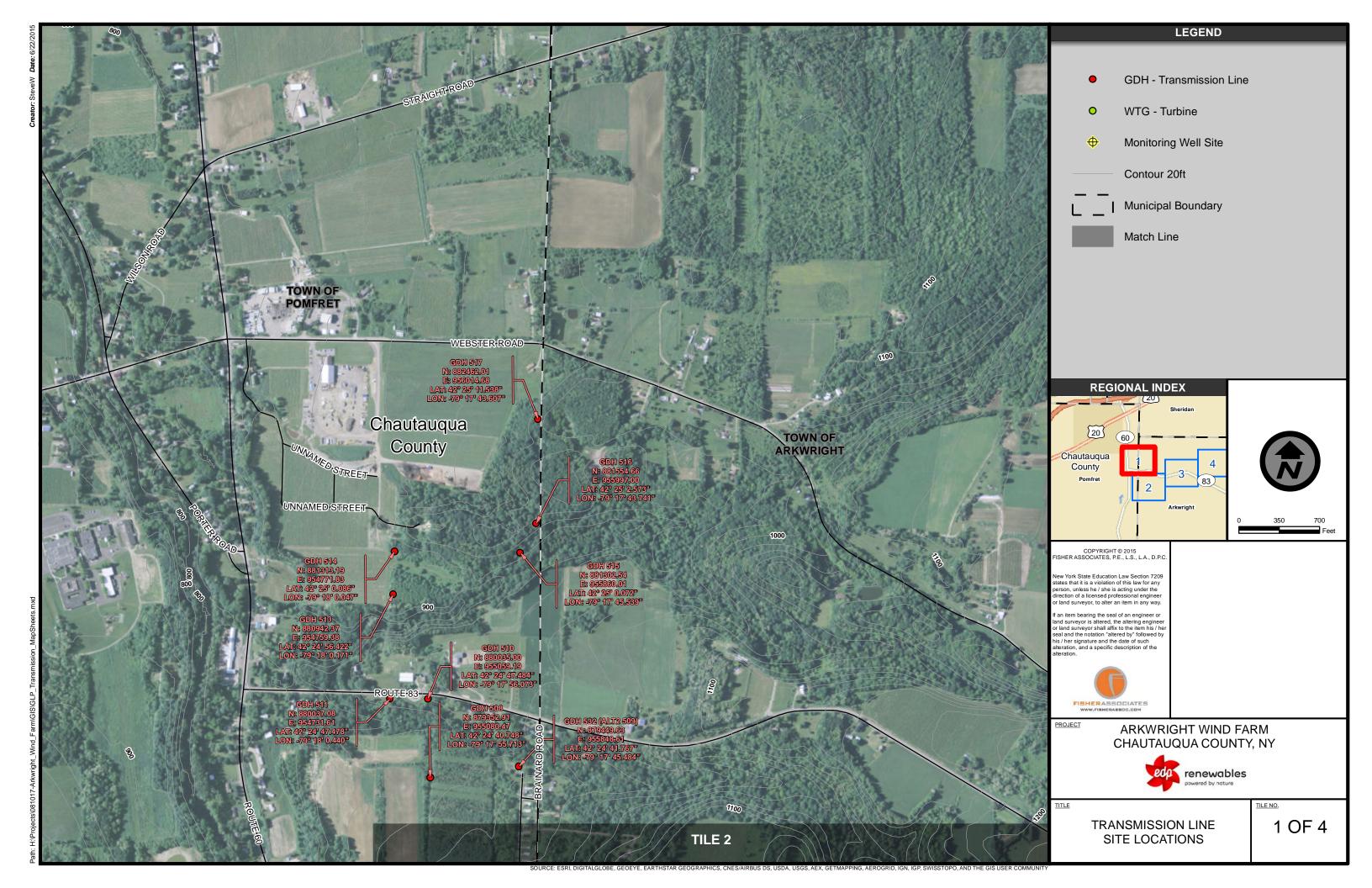
## Summary of Subsurface Conditions Arkwright Summit Wind Farm Town of Arkwright, Chautauqua County, New York

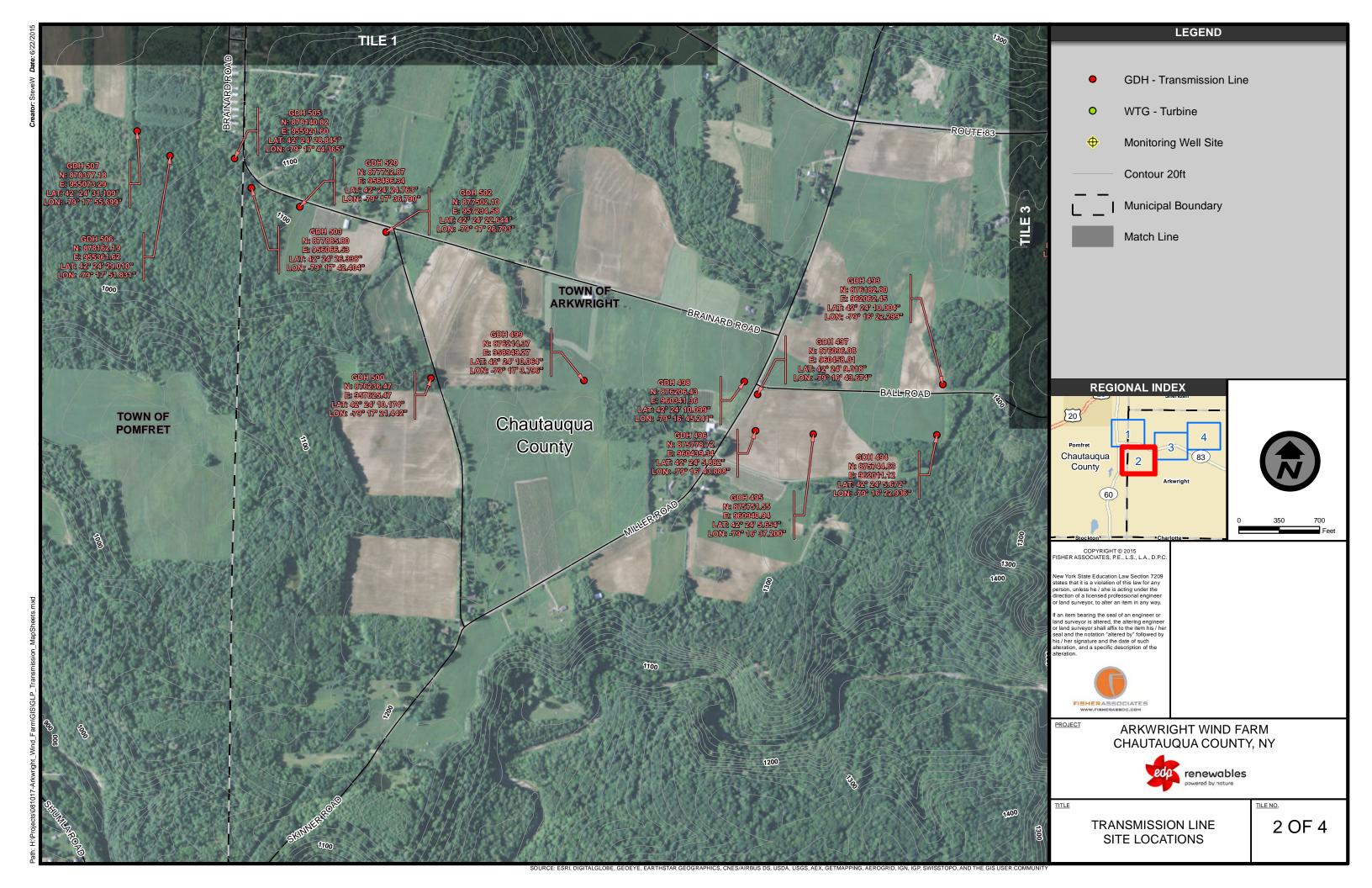
	Ground		Topsoil		Gla	cial Drift			G	lacial Till		Weathered Bedrock			Apparent Be	drock		
Test Boring Number	Surface Elevation (ft.)	Exploration Total Depth (ft.)	Thickness (ft.)	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation of Top (ft.)	Recovery/ RQD
TL-494		41.4	0.4	0.4		15.6	10 < N < 39	16.0		UNKNOWN	18 < N < 44		NOT	ENCOUNTER	ED		NOT ENCOUN	TERED
TL-493		41.0	0.5	0.5		9.5	6 < N < 32	10.0		UNKNOWN	13 < N < 54		NOT	ENCOUNTER	ED		NOT ENCOUN	TERED
TL-491		41.0	0.3	0.3		27.2	5 < N < 38	27.5		UNKNOWN	25 < N < 42		NO1	ENCOUNTER	ED		NOT ENCOUN	TERED
TL-490		41.0	0.3	0.3		UNKNOWN	6 < N < 55		U	NKNOWN			NO1	ENCOUNTER	ED		NOT ENCOUN	TERED
TL-489		40.0	0.5	0.5		2.5	6	3.0		UNKNOWN	16 < N < 75		NO1	ENCOUNTER	ED		NOT ENCOUN	TERED
TL-485		41.0	0.3	0.3		32.2	7 < N < 42	32.5		UNKNOWN	38 < N < 42		NO1	ENCOUNTER	ED		NOT ENCOUN	TERED
TL-483		40.0	0.2	0.2		28.8	6 < N < 25	29.0		UNKNOWN	33 < N < 42		NOT	ENCOUNTER	ED		NOT ENCOUN	TERED
TL-482		40.0	0.3	0.3		37.7	7 < N < 38	38.0		UNKNOWN	63 < N < 161		NOT ENCOUNTERED			NOT ENCOUN	TERED	
TL-480		41.0	0.4	0.4		32.6	8< N < 28	33.0		UNKNOWN	46	NOT ENCOUNTERED		NOT ENCOUNTERED			NOT ENCOUN	TERED
TL-478		34.9	0.3	0.3		34.2	12 < N < 18		NOT EN	COUNTERED		34.5		UNKNOWN	GREATER THAN 100		NOT ENCOUN	TERED
TL-477		34.9	1.0	1.0		33.5	9 < N < 21		NOT EN	COUNTERED		34.5		UNKNOWN	GREATER THAN 100		NOT ENCOUN	TERED
TL-475		40.0	0.2	0.2		33.8	10 < N < 31	34.0		UNKNOWN	27	NOT ENCOUNTERED NOT EI		NOT ENCOUN	TERED			
TL-473		35.2	0.2	0.2		28.8	19 < N < 78	29.0		UNKNOWN	100+	)+ NOT ENCOUNTERED NOT ENCOUNTERED		TERED				
Notes:						18.8												

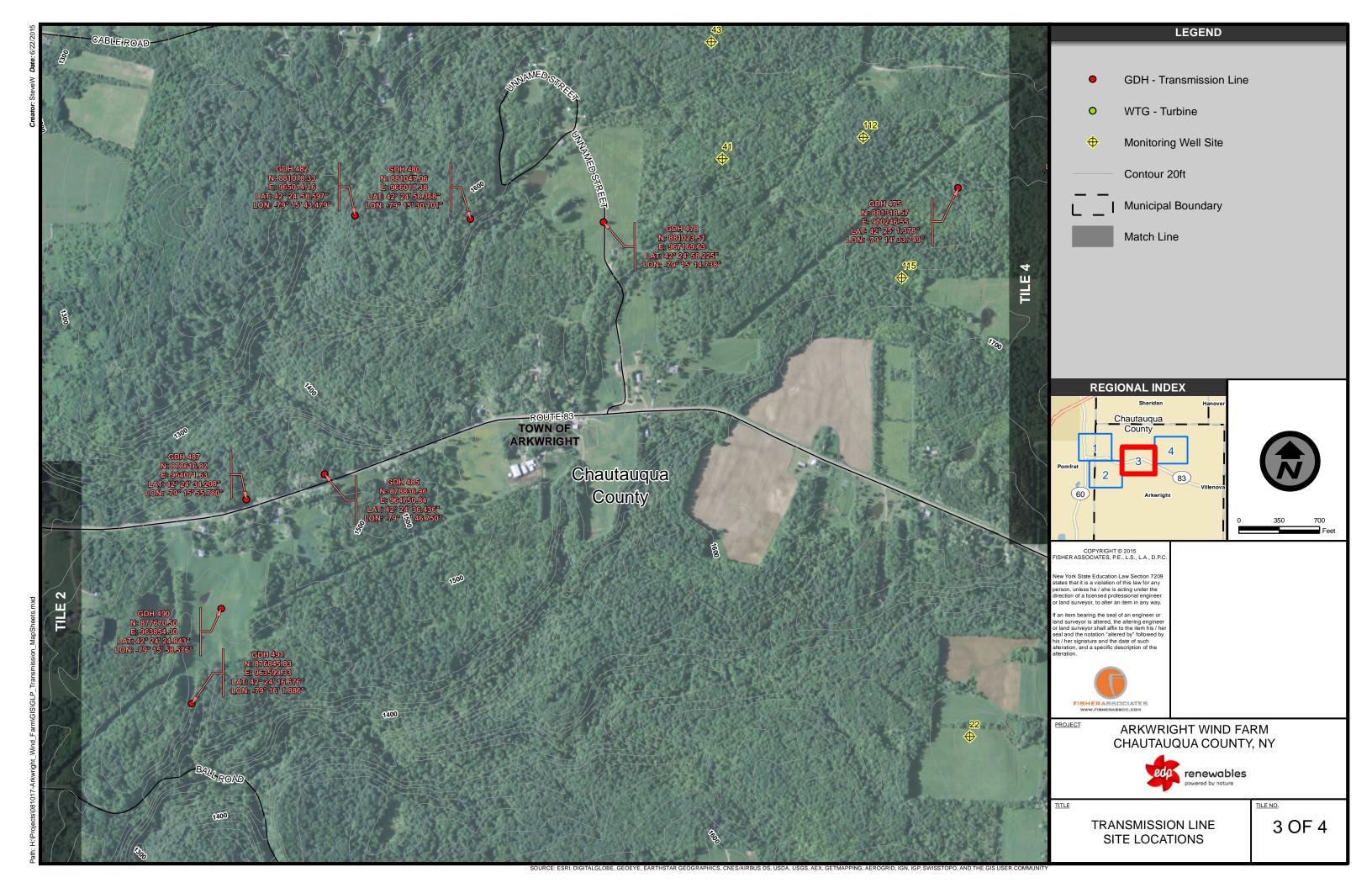
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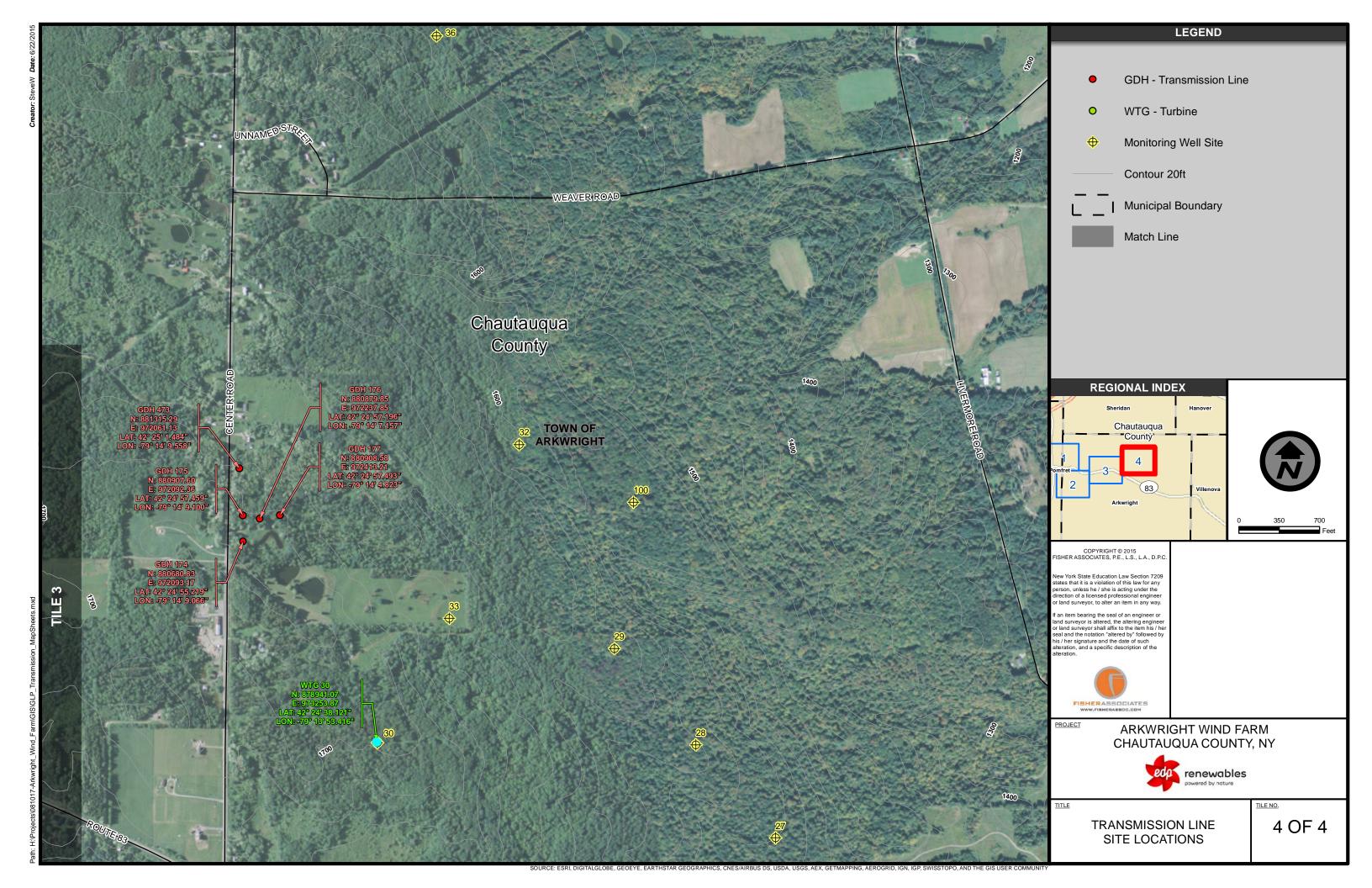
### **FIGURES**











### **APPENDIX A**

Test Boring Logs As prepared by Nature's Way, Inc. and Earth Dimensions, Inc.



www.natureswayenvironmental.com

Hole Number: TL 517

DATE: 4/29/15	ELEVATION:
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm

Arkwright, NY

			RED					Fisher Associates		
BC	DR	RING	LO	CAT	ION:	:		Northing: 882462.0130, Easting: 956	014.67	760
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0	1	4						┐ Moist, dark brown (SILT) topsoil with trace <sub>0.3</sub>	0.8'	Topsoil to 0.3 foot over clayey
			4			8		very fine size sand, loose, with fine size roots		lake sediment to 3.5 feet over
				4		0		Moist, highly mottled, brown (CLAYEY-		clayey glacial till to 27.0 feet over silty glacial till to end of
					6			SILT) with some clay, firm, thinly laminated		boring
	2	4						with very thin coarse silt lenses	0.7'	
			5			10				
				5				3.5		
					6			Moist, faintly mottled, brown, shaley	4 41	
L	3	9						(CLAYEY-SILT) with 15 to 30% mostly shale gravel, some clay, very stiff, massive	1.4'	
5			10			20		soil structure		
_				10						
-					14				1.2'	
	4	10							1.2	
-			12			24				
-				12						
-					13				0.9'	
-	5	10							0.9	
-			11			23				
-				12						
10 —					12				0.9'	
-	6	9	40						0.0	
-			10			19				
				9	_					
-	_	9			7				0.9'	
-	7	9	13						0.0	
$\vdash$			13	21		34				
-					13					
-	8	11			13				0.3'	
-	•		20							
15 —			20	13		33				
$\vdash$					10					
$\vdash$					10					
-										
-										
-										
-										
-										
	9	7							1.3'	
 	-	-	13							
20 — L	_C	GG	ED	BY:	Da	ale l	M. Gra	amza / Senior Geologist		PAGE 1 of 3



www.natureswayenvironmental.com Hole Number: TL 517

		_		4/29/	15					EVATION:
Р	RC	JEC	CT:				Sub	surface Investigation for Arkwright Su	mmit W	/ind Farm
D	DE	DΛE	)  - 	FOF	<b>.</b>			Arkwright, NY		
					ION	:		Fisher Associates Northing: 882462.0130, Easting: 956	014.676	 30
	SN	0/	6/	12/	18/	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
		6	12	18 <b>8</b>	24	21			0	
					8					
								Extremely moist, faintly mottled, brown,		
								shaley (CLAYEY-SILT) with 15 to 30%		
								mostly shale gravel, some clay, very stiff, massive soil structure		
									o =:	
	10	7							0.5'	
25 —			7	8		15				
					7					
								27.0		
								Moist, gray (SILT) with 1 to 3% fine size gravel, trace clay, very dense, massive soil		
								structure		
	11	7							0.9'	
30 —			20			>70				
				50/5"	50/4"					
					50/4"					
							• • •			
	12	11							1.2'	
0.5			20			F.4				
35 —				31		51				
					50/4"					
	42	25							1.1'	
	13	25	29							
40 —	LC	GG		BY:	Da	ale l	M. Gra	amza / Senior Geologist		_ PAGE 2 of <u>3</u>



www.natureswayenvironmental.com TL 517

								Hole Number: TL 517		
	)AT	E: _		4/29/	15				EL	EVATION:
F	PRC	JEC	CT:				Sub	surface Investigation for Arkwright Su		
			_					Arkwright, NY		
F	RE	PAF								
Е	OF	RING	LO	CAT	014.676	60				
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
		0	12	34	24	63		See previous sheet		
					50/4"			40.8		No Water at Completion
								Boring Completed at 40.8' BGS		No water at Completion
<del>1</del> 5 —										
50 —										
55 —										
	$\vdash$									
60 —	LC	GG	ED	BY:	Da	ale I	M. Gr	amza / Senior Geologist		_ PAGE 3 of <u>3</u>



4/27/15

DATE:

3553 Crittenden Road Alden, NY 14004 (716) 937- 6527

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Hole Number: \_\_\_\_\_ TL 516 ELEVATION: \_\_\_\_\_

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm

Arkwright, NY

PREPARED FOR:

			RED S LO	FOF CAT	_	•		Fisher Associates Northing: 881554.6610, Easting: 955	5997.00	020
_	SN	0/	6/	12/	18/	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	6 <b>2</b>	12	18	24		0.3333	¬ Moist, dark brown, mucky (SILT) topsoil ₀.₃	1.0'	Topsoil to 0.3 foot over silty
	-		4			1		with trace very fine size sand, loose, with	1.0	slack water sediment with trace
			4			8		fine size roots		clay to 3.5 feet over clayey
				4		1		Moist, faintly mottled, brown (SILT) with		glacial till to 29.0 feet over silty
					8			trace clay, loose, blocky soil structure	0.5'	lake sediment with trace clay to
	2	3							0.5	34.0 feet over silty glacial till to
			3			9				end of boring
				6				3.5		
					9			Moist, faintly mottled, olive brown, gravelly		
	3	9						(CLAYEY-SILT) with 15 to 30% gravel,	1.4'	
_			13					some clay, very stiff, massive soil structure		
5 —				17		30				
					18	1				
	4	10				1			1.5'	
			10			1				
				16		26				
					20	1				
	5	7				1			1.0'	
		<b>'</b>	10			-	FAA			
			10	40		23				
				13		-				
10 —					11				0.8'	
	6	12							0.6	
			8			17				
				9						
					9					
	7	6							1.0'	
			6			12				
				6		12				
					7					
	8	9							1.0'	
			9			1				
15 —				11		20				
					11	1				
						1				
						1				
						1				
						-				
						1				
						-				
						-			1.3'	
	9	11				-			1.3	
20			13			<u> </u>				
-	LC	JGC	ED	BY:	: <u>D</u> a	ale	M. Gra	amza / Senior Geologist		PAGE 1 of <u>3</u>



		www.natureswayenvironmental.cor
I a KI aalaa a	TI [10	-

							Hole Number:TL 516	<b>i</b>		
DA	TE:		4/27/	15					EL	EVATION:
PR	OJE	CT:				Sub	surface Investigation for Arkwrigh	nt Sum	nmit W	/ind Farm
							Arkwright, NY			
PR	EPAI	RED	FOF	₹:			Fisher Associates	3		
ВО	RINC	G LO	CAT	ION	:		Northing: 881554.6610, Eastin	g: 9559	997.00	020
SI	0/	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION		REC	COMMENTS

OF	RING	LO	CAT	ION	:		Northing: 881554.6610, Easting: 95	5997.00	<u> </u>
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			10		23		See previous sheet		
				12			21.0		
							Moist, faintly mottled, olive brown, gravelly (CLAYEY-SILT) with 15 to 30% gravel,		
							some clay, very stiff to hard, massive soil		
							structure		
40	40							0.3'	
10	10	17						0.0	
		''	15		32				
			13	15					
							29.0		
11	8						Moist, faintly mottled, brown (SILT) with	1.2'	
		9			19		trace clay. compact, thinly bedded		
			10						
				13					
12	30						Moist, gray (SILT) with 1 to 3% gravel,	0.8'	
		34			_		trace very fine size sand, very dense with		
			50/5"		>84		brittle consistence, massive soil structure		
40								0.8'	
13	9	33						3.5	
닏		1	DV:			M C 5	amza / Senior Geologist		PAGE 2 of 3



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Hole Number: \_\_\_\_\_ TL 516 DATE: 4/27/15 ELEVATION: \_\_\_\_\_ PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm Arkwright, NY PREPARED FOR: Fisher Associates

SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	C COMMENTS
			50/5"		>83		See previous sheet		
								41.0	
							Boring Completed at 41.0' BGS		No Water at Completion
$\downarrow$									
+									
_									
-									
$\dashv$									
$\dashv$									
_									
_ T									
								1	



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Hole Number: \_\_\_\_\_ TL 515 DATE: ELEVATION: \_\_\_\_ 4/30/15 PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm Arkwright, NY PREPARED FOR: Fisher Associates

		S LO	_	_			Fisher Associates Northing: 881302.5440, Easting: 955		770
	0/	6/	12/	18/	_				
0 SN	6	12	18	24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	1					<u> </u>	Extremely moist, dark brown (SILT) topsoil 0.4 with trace clay, loose	1.1'	Topsoil to 0.4 foot over clayey lake sediment to 4.5 feet over
		4			9		Extremely moist, faintly mottled, olive		weathered shale rock to 9.2 fee
			5				brown to brown (CLAYEY-SILT) with some		over shale bedrock to end of
				8		bzd	clay, thinly laminated with very thin coarse		coring
2	1					535	silt lenses and nearly vertical gray	1.5'	
		6					desiccation cracks		
			5		11				
				6					
3	16							0.5'	
	16	50/48					Chala made array and much house finalls	0.0	
5	-	50/4"			>50	三三	Shale rock, gray and rusty brown, fissile, weathered		
						巨马	Weathered		
						<b>三</b> 司		0.0:	
4	50/5"					註頭		0.3'	
5	50/4"							0.3'	
F	3 30/4								
						FEE	9.2		
	$+ \Phi$						Shale rock, gray to light gray, moderately		No Water in Boring prior to
0 —		RUN				====	hard, can be etched with a knife, very thin		coring with 4 1/4" HSA at 9.2' BGS
			# 1				to thinly bedded, 1/2" to 5" thick, with		BGS
							occasional thin hard siltstone layers 1/2" to 1" thick below 12.0'		
							1 thick below 12.0		
						FEE			
									CORE DATA
									Run# Interval Length Rec Rec RQD
									(6) (6) (6) % %
									1 9.2 to 14.2 5.0 4.9 98 48
	$+\Psi$					====			2 14.2 to 19.2 5.0 4.3 86 53
	$+$ $\Lambda$								
5 —	++	RUN				F==3			
	$\perp \perp$		# 2			巨哥			
						<b>E==</b>			
						註頭			
					1	FEE]			
	$\dagger \dagger$					巨耳			
	++								
$\vdash$	++					巨耳			
<u> </u>	+					三三			
	+					巨骂	19.2		
	₩						Coring Completed at 19.2' BGS		
$_{0}$					<u> </u>	لييا			
	OGC	GED	BY:	<u>D</u> a	ale l	M. Gr	amza / Senior Geologist		PAGE 1 of1



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Hole Number: TL 514 DATE: 4/27/15 ELEVATION: \_\_\_\_\_ PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm Arkwright, NY

				FOF				Fisher Associates		
В	OF	RING	S LO	CAT	ION	:		Northing: 881313.1880, Easting: 954	771.83	800
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	2					V V V V	Moist, dark brown (SILT) topsoil with trace 0.2	1.0'	Topsoil to 0.3 foot over loamy
			3			R		very fine size sand, loose  Moist, faintly mottled, brown, gravelly		glacial drift to 8.0 feet over silty glacial till to end of boring
				5				(SAND-SILT-CLAY) with 20 to 40% gravel		glacial till to end of borning
					9			with channers, little clay and very fine size	4 51	
	2	17						sand, massive soil structure to weakly	1.5'	
			11			20		thinly bedded		
				9						
					22				1.0'	
	3	9	44						1.0	Note: First attempt refusal was
5 —			11	13		24				hit at 7.5' BGS, moved 3.0'
				13	14					south for second attempt and refusal was hit at 7.7' BGS,
	4	9			'-				0.7'	moved 3.0' south again for third
			50/5"							attempt and refusal was hit at
						>50				20.4' BGS
								8.0		
	5	12						Moist, gray (SILT) with 5 to 15% gravel,	1.3'	
			12				¥	trace very fine size sand, dense to very		
				24		36		dense, massive soil structure		
10 —					50/3"					
10 -	6	15							1.7'	
			16			32				
				16		52				
					24				0.01	
	7	32							0.3'	
			39			80				
				41						
					50/3"				0.5'	
	8	48	40						0.0	
15 —			40	50/4"		>90				
				50/4						
••										
20 —	LC	GG	ED	BY	Da	ale	M. Gr	amza / Senior Geologist		PAGE 1 of 2



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ı	ТАС	E٠		4/27/	15			Tible Number. 12 314		EVATION:
					10		Sub	osurface Investigation for Arkwright Sum		
			_					Arkwright, NY		
				FOF	_			Fisher Associates		
	30R	RING	LO	CAT	ION	:		Northing: 881313.1880, Easting: 9547	71.83	00
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH		REC	COMMENTS
25 -			12		27			Moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, dense to very dense, massive soil structure  Auger Refusal at 20.4' BGS		No Water at Completion
30 -										
40 -										
-70	LC	)GG	ED	BY:	Da	ale I	И. Gr	amza / Senior Geologist		PAGE 2



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	Hole Number: IL 513	
DATE:4/24/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
<del>_</del>		_

В	OF	RING	LO	CAT	ION	:		Northing: 880942.3660, Easting: 954	759.38	320
•	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	3						∖Extremely moist, dark brown (SILT) topsoil 0.1	1.0'	Topsoil to 0.1 foot over loamy
			4					with trace very fine size sand, loose		glacial drift to 6.0 feet over
				4		8		Extremely moist, faintly mottled, brown, gravelly (SAND-SILT-CLAY) with 15 to		water sorted and deposited sand and gravel with little silt to
					6			25% gravel, little clay and very fine size		10.0 feet over silty slack water
	2	2						sand, loose to dense, weakly thinly bedded	0.8'	sediment with trace sand to
			4							19.0 feet over shale rock to
				5		9				refusal
					7					
	3	12							0.7'	
			15							
5 —				16		31				
					17					
	4	7						Wet, brown, very gravelly (SILTY-SAND)	1.0'	
			14					with 40 to 50% gravel, very fine to fine size		
				24		38		sand, little silt, dense in place, stratified		
					31					
	5	9							1.3'	
			14							
				19		33	6,00			
					27			40.0		
0 —	6	13						Extremely moist, faintly mottled, gray	1.7'	
			17					(SILT) with trace very fine size sand, dense		
				22		39		to very dense in place, weakly thinly		
					35			bedded		
	7	29							1.5'	
			52							
				44		96				
					35					
	8	29							1.3'	
			37							
5 —				40		77				
					50/3"					
							97.31%			
								40.0		
	9	50/5"						Shale rock, gray, moderately hard, wet	0.2'	▼ Water Level at 18.9' BGS at
								, , , , , , , , , , , , , , , , , , , ,		Completion
0 —		GG	FD	RY	<u> D</u> :	عاد	M Gr	amza / Senior Geologist		PAGE 1 of 2



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Hole Number: TL 513 DATE: ELEVATION: \_\_\_\_\_ 4/24/15 Subsurface Investigation for Arkwright Summit Wind Farm PROJECT: Arkwright, NY PREPARED FOR: Fisher Associates Northing: 880942.3660, Easting: 954759.3820 BORING LOCATION: LITH DESCRIPTION AND CLASSIFICATION COMMENTS 18 Shale rock, gray, moderately hard, wet Auger Refusal at 23.3' BGS 25 35



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	Hole Number: IL 511
DATE: 4/21/15	ELEVATION:
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm
	Arkwright, NY
PREPARED FOR:	Fisher Associates
BORING LOCATION	N:Northing: 880037.0830, Easting: 954731.6110

		G LO		_			Fisher Associates Northing: 880037.0830, Easting: 95	<u>4</u> 731 6	<u> </u>
DC						1 1	1401thing. 660037.0630, Easting. 93	4/31.0	1
0 S	N 0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
ٽ <u>ا</u>	2					V 4.4 4 4	Textremely moist, dark brown (SILT) topsoil 0.2	0.7'	Topsoil to 0.2 foot over silty
		4			11		with trace very fine size sand, loose, with fine size roots		slack water sediment to 1.5 feet over water sorted and deposited
			7		''		Moist, faintly mottled, brown (SILT) with		sand with some gravel to 4.0
				21			trace very fine size sand, compact, thinly	0.01	feet over silty lake sediment
2	2 3						bedded	0.3'	with trace clay to 18.0 feet over
		5			11		Extremely moist, faintly mottled, brown, gravelly (SILTY-SAND) with 20 to 40%		silty glacial till to refusal
			6				gravel, very fine size sand, little silt,		
				9			compact, stratified 4.0	4 51	
3	3 2						Moist, becoming wet below 12.0', brown	1.5'	
5		2			10		and gray (SILT) with trace clay, loose to		
			8		1		dense, bedded		
				6	-			1 7'	
4	9							1.7'	
L		9			21				
			12						
				14	-			1.8'	
5	15							1.0	
		20			43				
			23						
10				44				1.5'	
6	17							1.5	
		21			47				
			26						
_				42	-			1.3'	
7	9	<u> </u>				2 2 2		1.5	
		7			17				
$\vdash$			10						
	_			10	-			1.3'	
8	7	+			-			1.5	
15		10			21				
			11		-				
				10	-				
$\vdash$					1				
$\vdash$					-				
$\vdash$					1		Extremely moist, gray (SILT) with 5 to 15%		
$\vdash$					-		gravel, trace very fine size sand, very		
<u> </u>					1		dense, massive soil structure	0.8'	
9	17	24			-			0.0	
20 —			DV	· D			amza / Sonior Coologist		DACE 1
L	UG	ĿΝ	BY:	: <u>D</u>	ale l	vi. Gr	amza / Senior Geologist		PAGE 1 of <u>2</u>



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Hole Number: TL 511 DATE: 4/21/15 ELEVATION: \_\_\_\_\_ PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm Arkwright, NY PREPARED FOR: Fisher Associates

SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
		12	20	24	44		Extremely moist, gray (SILT) with 5 to 15%		
				50/4"			gravel, trace very fine size sand, very		
				00,4			dense, massive soil structure		
$\dashv$							Auger Refusal at 21.3' BGS		No Water at Completion
-									
$\dashv$									
$\dashv$									
$\dashv$									
$\dashv$									
$\dashv$									
-									
_									

LOGGED BY: Dale M. Gramza / Senior Geologist PAGE 2 of 2



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			0011041		a 001111			Hole Number: TL 510		•	
DATE:4/22/15									ELEVATION:		
PROJECT: Subsurface								surface Investigation for Arkwright Su	mmit V	Vind Farm	
								Arkwright, NY	Arkwright, NY		
								Fisher Associates			
BORING LOCATION:								Northing: 880035.0040, Easting: 955059.1880			
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS	
0 —	1	4						∖ Moist, dark brown (SANDY-SILT) topsoil	0.7'	Topsoil to 0.1 foot over loamy	
			7			1		with little very fine size sand, loose		glacial drift to 6.5 feet over silty	
				15		22		Moist, faintly mottled, brown, gravelly (SAND-SILT-CLAY) with 20 to 40% gravel,		lake sediment with trace clay to 10.0 feet over silty glacial drift to	
					16			little clay and very fine size sand, compact,		12.5 feet over silty lake	
	2	7				1		weakly stratified	0.3'	sediment with trace sand to	
			6			1				14.0 feet over silty glacial till to	
				9		15				19.5 feet over apparent shale rock to refusal	
					14	1				Tock to refusal	
	3	8				1			1.3'		
_			8			]					
5 —				9		17					
					7						
	4	8						6.5	1.2'		
			7			١.,		Extremely moist, faintly mottled, brown			
				7		14		(SILT) with trace clay, compact, thinly			
					5	1		bedded			
	5	9							1.7'		
			9			1					
				9		18					
					11	1		10.0			
0 —	6	9				]		Extremely moist to wet, olive brown,	1.3'		
			12			25		gravelly (CLAYEY-SILT) with 20 to 40%			
				13		25		gravel, little clay, very stiff, weakly stratified			
					16						
	7	11				]		12.5	1.2'		
			11			23		Extremely moist, rusty brown (SILT) with			
				12		23		trace very fine size sand, compact, thinly			
					9			bedded 14.0			
	8	6						Extremely moist, gray (SILT) with 5 to 10%	1.2'		
<b>5</b> —			12			]		gravel, trace to little clay, compact to very			
5 —				12		24		dense, massive soil structure			
					14	]					

50/5"

0.5'



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PAGE 2

Hole Number: TL 510 DATE: ELEVATION: \_\_\_\_\_ 4/22/15 Subsurface Investigation for Arkwright Summit Wind Farm PROJECT: Arkwright, NY PREPARED FOR: Fisher Associates BORING LOCATION: Northing: 880035.0040, Easting: 955059.1880 LITH **DESCRIPTION AND CLASSIFICATION** COMMENTS 18 >50 Shale rock, gray, weathered No Water at Completion Auger Refusal at 22.1' BGS 25 35

LOGGED BY: Dale M. Gramza / Senior Geologist



4/17/15

DATE:

3553 Crittenden Road Alden, NY 14004 (716) 937- 6527

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Hole Number: \_\_\_\_\_ TL 508 ELEVATION: \_\_\_\_\_

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm

Arkwright, NY

Р	RE	PAF	RED	FOF	₹:			Fisher Associates		
В	OF	RING	LO	CAT	ION	:		Northing: 879352.9060, Easting: 955	080.46	90
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	3					<del></del>	Extremely moist, dark brown (CLAYEY-	0.3'	Topsoil to 0.4 foot over silty lake
			4			8		\SILT) topsoil with little clay  Extremely moist, brown (CLAYEY-SILT)		sediment with little clay to 4.0 feet over shale rock to refusal
				4				with little clay, soft, thinly laminated with		leet over shale rock to relusar
					4			very thin coarse silt lenses	4.01	
	2	2							1.0'	
			3			6				
				3						
					5			4.0	4.01	
	3	11						Shale rock, gray, moderately soft to soft,	1.2'	
5 —			29			64		fissile		
-				35						
					47				c =:	
	4	41							0.7'	
			50/5"			>50				
						-50				
	5	50/5"							0.3'	
40										
10 —	6	44							0.8'	
			50/5"			. 50				
						>50				
	7	50/2"							0.0'	
	8	50/5"							0.4'	
							EEE			
15 —										
							巨马			
							開閉			
	9	50/4"					EEヨ		0.3'	
	_	55/4					註頭			
20 —		)G(-	FD	BY	ר	ale I	M. Gr	amza / Senior Geologist		PAGE 1 of <u>2</u>



www.natureswayenvironmental.com
Hole Number: \_\_\_\_\_ TL 508

				4/17/						EVATION:
F	PRC	JEC	CT: _				Sub	surface Investigation for Arkwright Su		
	חר							Arkwright, NY		
				FOF CAT	t. ION:			Fisher Associates Northing: 879352.9060, Easting: 955	080 469	90
_		0/	6/	12/	18/				i	
	SN	6	12	18	24	N	LITH	DESCRIPTION AND CLASSIFICATION  Shale rock, gray, moderately soft to soft,	REC	COMMENTS
								fissile		
								22.7		
								Auger Refusal at 22.7' BGS		No Water at Completion
25 –										
30 -										
35 –										
40 –										
+0	LC	)GC	SED	BY:	Da	ale I	M. Gra	amza / Senior Geologist		PAGE 2 of 2



www.natureswayenvironmental.com

Hole Number: \_\_\_\_\_ TL 507

DATE:	4/20/15			ELEVATION:	
· · · · · · · · · · · · · · · · · · ·					

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm

Arkwright, NY

PREPARED FOR:

		PAF RING		FOF CAT	_	:	Fisher Associates Northing: 878377.1790, Easting: 955073.2860					
- 1	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS		
0	1	1						$_{\gamma}$ Extremely moist, dark brown, mucky (SILT) $_{0.3}$	1.2'	Topsoil to 0.3 foot over clayey		
			2			5		\topsoil with trace very fine size sand, loose		lake sediment to 4.0 feet over		
				3		]		Moist, highly mottled, olive brown (CLAYEY-SILT) with some clay, firm to		clayey glacial till to 7.5 feet over shale rock to refusal		
					5			stiff, blocky soil structure		Shale residue		
	2	2							0.5'			
			4			7						
				3		1						
					6			4.0	4 51			
	3	27						Moist, olive brown, gravelly (CLAYEY-	1.5'			
5			30			56		SILT) with 20 to 40% gravel, some clay, hard, massive soil structure				
-				26		-		nara, massivo son su astaro				
					29				0.8'			
	4	27				-			0.6			
-			47			>97						
				50/4"				Chala reals gray maderately soft to soft				
-	_	40						Shale rock, gray, moderately soft to soft, fissile	0.4'			
ŀ	5	48	50/5"			-			0.1			
			50/5"			>50						
-						-						
10 —	6	48				1			0.3'			
	0	40	50/2"				<b>三三</b>					
-			30/2			>50						
	7	50/2"				1			0.1'			
-												
						1						
						1						
ŀ	8	50/1"				1			0.05'			
_						1						
15 —						1						
ļ						1	巨弱					
ļ						1	臣到					
						1	EEE					
						]						
	9	50/4"							0.3'			
20												
	LC	)GG	ED	BY:	Da	ale I	M. Gra	amza / Senior Geologist		PAGE 1 of 2		



www.natureswayenvironmental.com Hole Number: TL 507 DATE: ELEVATION: \_\_\_\_\_ 4/20/15 Subsurface Investigation for Arkwright Summit Wind Farm PROJECT: Arkwright, NY PREPARED FOR: Fisher Associates Northing: 878377.1790, Easting: 955073.2860 **BORING LOCATION:** LITH DESCRIPTION AND CLASSIFICATION COMMENTS 18 Shale rock, gray, moderately soft to soft, No Water at Completion Auger Refusal at 23.3' BGS 25 35



www.natureswayenvironmental.com

Hole Number: \_\_\_\_\_ TL 506

DATE: 4/20/15	ELEVATION:
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm

Subsurface Investigation for Arkwright Summit Wind Farm Arkwright, NY

PREPARED FOR:

			RED S LO		_	<u> </u>		Fisher Associates Northing: 878162.1930, Easting: 955	361.61	70
	SN	0/	6/	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	1	12	10	27		7 2 3 3 3	Extremely moist, dark gray, mucky (SILT) 0.5	1.4'	Topsoil to 0.5 foot over silty
			2			6		∖ topsoil with trace clay, loose, with partially/		slack water sediment with trace
				4		•		\decomposed fibrous wood material Extremely moist, faintly mottled, brown		gravel to 4.0 feet over silty glacial till to 19.0 feet over shale
					6			(SILT) with 5 to 10% gravel, trace very fine		rock to refusal
	2	2						size sand, loose, weakly thinly bedded	0.8'	
			3			8				
				5		-				
					5		9	Maint arguite provide brown (CUT) with 5	0.7'	
	3	19	_			-		Moist, gray to grayish brown (SILT) with 5 to 15% gravel, trace very fine size sand,	0.7	
5 —			8	46		24		compact to dense, massive soil structure		
	$\vdash$			16	22	1				
	4	9				-			1.5'	
	Ė		14							
				23		37				
					27					
	5	17							1.8'	
			16			200				
				13		29				
10 —					22					
10	6	10							1.3'	
			15			32				
				17						
					21	-			0.9'	
	7	23				-			0.9	
			31	F0/F1		>81				
				50/5"		-				
	8	21							0.5'	
	Ů		50/5"			1				
15 —			00/0			>50				
						1				
						1				
						1				
								19.0	<b>.</b>	
	9	37						Shale rock, gray, soft, fissile, wet	0.8'	
20 —	Ļ		50/4"			<u> </u>				
	LC	JGG	iΕD	RX:	<u> D</u>	ale l	VI. Gra	amza / Senior Geologist		PAGE 1 of _2_



PAGE 2

www.natureswayenvironmental.com Hole Number: TL 506 DATE: ELEVATION: \_\_\_\_\_ 4/20/15 Subsurface Investigation for Arkwright Summit Wind Farm PROJECT: Arkwright, NY PREPARED FOR: Fisher Associates BORING LOCATION: Northing: 878162.1930, Easting: 955361.6170 LITH DESCRIPTION AND CLASSIFICATION COMMENTS 18 >50 Shale rock, gray, soft, fissile, wet ▼ Water Level at 20.2' BGS at Completion Auger Refusal at 23.1' BGS 25 35

LOGGED BY: Dale M. Gramza / Senior Geologist



www.natureswayenvironmental.com

Hole Number: \_\_\_\_\_ TL 505

DATE: ELEVATION: \_\_\_\_\_ 4/6/15 PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm

Arkwright, NY

PREPARED FOR: BORING LOCATION:					₹: _			Fisher Associates		
В	OF	RING	LO	CAT	ION:			Northing: 878140.8230, Easting: 955	921.59	060
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	1	2			6	V V V V V	Extremely moist, dark brown (SILT) topsoil 0.2 with trace very fine size sand, loose, with	0.5'	Topsoil to 0.2 foot over silty glacial drift to 4.0 feet over
				4	8	Ū		\fine size roots  Moist, rusty brown, gravelly (SILT) with 15 to 25% gravel, trace clay, loose to		clayey glacial drift with some gravel to 8.0 feet over apparent water sorted and deposited
	2	8	9					compact, weakly thinly bedded	0.5'	sand and gravel with little to some silt to 14.0 feet over water
				9	8	18		4.0		sorted and deposited sand with little to some silt to 26.0 feet over silty lake sediment with
5 —	3	4	5			11		Extremely moist, faintly mottled, brown, gravelly (CLAYEY-SILT) with 20 to 40% gravel, some clay, stiff to very stiff, weakly	1.7'	trace clay to 34.0 feet over clayey glacial till to end of
3				6	8			thinly bedded		boring
	4	6	9			20			0.8'	
				11	12	20		8.0		
	5	8	10			25		Moist, brown, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine size sand, little to some silt, compact in place, weakly	0.4'	
10 —				15	15	20		stratified	0.01	
10	6	6	5			12			0.0'	
				7	8				0.41	
	7	7	9			19			0.1'	
				10	11			14.0	0.21	
15 —	8	3	6			14		Extremely moist, brown (SILTY-SAND) with very fine size sand, little to some silt, compact, thinly bedded	0.3'	
				8	14			, -9 ,		
							2-16-16-1 2-16-16-1 2-16-16-1			
	9	11						County State of the County	1.7'	
20 —		) )GG	10 FD	BY.	Da	ale I	M Gr	amza / Senior Geologist		PAGE 1 of G



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OF	RING	LO	CAT	ION:			Northing: 878140.8230, Easting: 9559	921.596	60
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			10		20				
				14					
							Extremely moist, brown (SILTY-SAND)		
							with very fine size sand, little to some silt,		
							compact, thinly bedded		
10	6							1.8'	
-"	<u> </u>	7							
		'	10		17				
			10	44					
				11			Cytromoly majet, gray (SILT) with trace		
							Extremely moist, gray (SILT) with trace clay, very stiff, weakly thinly laminated		
							siay, vory our, would armin larimated		
								4 71	
11	9							1.7'	
		14			28				
			14						
				13					
						977.74 3-74.78			
							34.0		
12	11						Moist, gray (CLAYEY-SILT) with 5 to 15%	1.5'	
		13					gravel, some clay, hard, massive soil		
			21		34		structure		
				32					
	-								
12	49							0.7'	
13	49	50/4"					Boring Completed at 40.2' BGS		No Water at Completion
		50/4"		Щ			amza / Senior Geologist		PAGE 2 of C



www.natureswayenvironmental.com TL 503 Hole Number:

	ΑТ	_		4/6/1	15					LEVATION:
Р	RC	JEC	CT:				Sub	surface Investigation for Arkwright Sur	mmit V	Vind Farm
_								Arkwright, NY		
				FOF	K: ION			Fisher Associates	CC F20	0
D								Northing: 877885.7970, Easting: 95606	00.032	<u>U</u>
0 —	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
	2	3	1	4	3	5		Moist, dark brown (SILT) topsoil with trace 0.3 very fine size sand, loose  Moist, faintly mottled, brown (SILT) with trace very fine size sand, loose to compact, thinly bedded	0.6' 1.5'	Topsoil to 0.3 foot over silty lake sediment with trace sand to 3.5 feet over clayey glacial drift to 6.0 feet over water sorted and deposited sand and gravel with some silt to 10.0 feet over silty
			6	10		16		3.5		lake sediment (possible glacial till) to 39.0 feet over water sorted and deposited sand with
	3	5			7			Extremely moist, faintly mottled, brown, gravelly (CLAYEY-SILT) with 20 to 40% gravel, some clay, stiff to very stiff, weakly	1.3'	little silt to end of boring
5 —			6	7		13		thinly bedded		
	4	11	13		10			Wet, faintly mottled, brown, very gravelly (SILTY-SAND) with 40 to 50% gravel, very	0.7'	
			13	12		25		fine size sand, some silt, compact, stratified		
	5	12			12				1.3'	
			10	9		19				
0 —	6	5			11			Moist, gray (SILT) with trace clay, very stiff to hard, weakly thinly bedded	1.0'	
			5	10		15		to flard, weakly tilling bedded		
	7	10			8				1.5'	
			41	32		73				
	8	18			35				1.3'	
5 —			30			55				
				25	33					
	9	18	47						1.0'	
20 —	LC	GG		BY:	Da	ale I	M. Gr	amza / Senior Geologist		PAGE 1 of <u></u>



	Hole Number: TL 503	
DATE:4/6/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
PODING LOCATIONS	Northing, 077005 7070, Facting, 050005 5000	

SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			50/3"		>97				
10	49							0.7'	
		50/3"			>50				
					-00				
							Moiet grov (SILT) with trace clay hard	0.3'	
11	50/4"						Moist, gray (SILT) with trace clay, hard, weakly thinly bedded	0.3	
							wouldy timing bodded		
						1 m			
								0.0'	
12	50/5"							0.0	
						1.33			▼ Water Level at 36.3' BGS
									Completion
							38.0		
							Wet, gray (SILTY-SAND) with very fine size sand, little silt, very dense in place,		
							thinly bedded	0.8'	
13	27						Boring Completed at 40.0' BGS	0.0	
		50/3"			>50		amza / Senior Geologist		PAGE 2 of _G



4/8/15

DATE:

3553 Crittenden Road Alden, NY 14004 (716) 937- 6527

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Hole Number: TL 502 ELEVATION: \_\_\_\_\_

Subsurface Investigation for Arkwright Summit Wind Farm PROJECT:

Arkwright, NY

PREPARED FOR: Figher Associates

	EPA			_			Fisher Associates		
ВО	RING	3 LO	CAT	ION	:		Northing: 877502.1010, Easting: 9572	234.57	80
SI	N 0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 1	3					\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \	Moist, dark brown (SILT) topsoil with trace	0.8'	Topsoil to 0.6 foot over silty
		4			1		very fine size sand, loose, with fine size		glacial drift to 8.0 feet over silty
			9		13		\roots // Moist, distinctly mottled, brown, gravelly		lake sediment with trace clay to 16.0 feet over silty glacial till to
				14			(CLAYEY-SILT) with 15 to 30% gravel, little		end of boring
2	18				]		clay, stiff to very stiff, weakly thinly bedded	1.8'	
		9			18				
			9		] 16				
				7					
3	2							0.5'	
_		2							
5			7		9				
				7					
4	10							1.0'	
		8			15				
			7		] 15				
				6			8.0		
5	5						Moist, brown to gray (SILT) with trace clay,	1.8'	
		10			25		compact, thinly bedded		
			15			23			
10				12					
6	11							2.0'	
		10			22	23			
			13						
				14					
7	14							1.3'	
		1			5				
			4		]				
				15					
8	8							1.9'	
15		10			20				
			10			97.94.74 . 3 . 7 . 7			
				10			16.0		
							Moist, gray (SILT) with 10 to 15% gravel,		
						27.0	trace very fine size sand, very dense, massive soil structure		
							massive soil structure		
9	12				]			1.0'	
20		40			L				
:0 <u> </u>	ÓGO	GED	BY:	: D	ale l	M. Gr	amza / Senior Geologist		PAGE 1 of 2



www.natureswayenvironmental.com Hole Number: TI 502

	AT	_		4/8/1	15		0.1	11010 14d111001		EVATION:
F	'RC	)JEC	) i :				Sub	surface Investigation for Arkwright Su Arkwright, NY	mmıt V	Vind Farm
F	RE	PAF	RED	FOF	₹:			Fisher Associates		
Е	OF	RING	LO	CAT	ΊΟÑ	:		Northing: 877502.1010, Easting: 9572	34.578	0
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
	10	20		50/5"		>90		Moist, gray (SILT) with 10 to 15% gravel, trace very fine size sand, very dense to	1.6'	
25 —			23	26	37	49		dense, massive soil structure		
30 —	11	50/5"						Boring Completed at 32.1' BGS	0.4'	No Water at Completion
35 —										
40 —	LC	GG	ED	BY:	Di	ale I	M. Gra	amza / Senior Geologist		PAGE 2



4/8/15

DATE:

3553 Crittenden Road Alden, NY 14004 (716) 937- 6527

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o. 1110	Hole Number:	TL 500	_	
			FI E\/∆TIΩN:	

Subsurface Investigation for Arkwright Summit Wind Farm PROJECT:

Arkwright, NY

PREPARED FOR:BORING LOCATION:							Fisher Associates						
В	OF	RING	S LO	CAT	ION:	:		Northing: 876236.4710, Easting: 9576	25.473	30			
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS			
0 —	1	2					12441	Moist, dark brown (SILT) topsoil with trace output fine size sand, loose, with fine size	1.5'	Topsoil to 0.5 foot over silty lake			
			2			4				sediment with trace clay to 8.0			
				2		4		\roots Moist, distinctly mottled, brown (SILT) with		feet over silty glacial till to 24.0 feet over sandy glacial drift to			
					5			trace clay, soft to firm, thinly laminated with		29.0 feet over loamy glacial till			
	2	2						very thin coarse silt lenses	1.2'	to end of boring			
			3			8							
				5									
					6				0.01				
	3	17							0.3'				
5 —			12			20							
				8									
					9				1.8'				
	4	8							1.0				
			6	_		15							
				9									
	_							Moist, gray (SILT) with 5 to 10% gravel,	1.7'				
	5	8	44				* *	trace very fine size sand, dense, massive					
			14	20		34		soil structure					
				20	20								
10 —	6	9			20				1.3'				
			14										
				16		30							
					20								
	7	8							1.2'				
			17										
				24		41	41						
					29								
	8	32							0.5'				
			33										
15 —				50/4"		>83							
									0.01				
	9	19							0.2'				
20 —	لِــا		18			<u> </u>							
	LC	)GC	έED	BY:	<u>Da</u>	ale l	M. Gra	amza / Senior Geologist		PAGE 1 of <u>3</u> _			



	Hole Number:TL 500	
DATE:4/8/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
DODING LOCATION	Northing 070000 4740 Forting 057005 4700	

BORING LOCATION: Northing: 876236.4710, Easting: 957625.4730										0
S	N	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
				24		42		Moist, gray (SILT) with 5 to 10% gravel,		
					31			trace very fine size sand, dense, massive soil structure		
								3011 Structure		
								24.0	0.3'	
1	0	26						Extremely moist to wet, gray, gravelly (SILTY-SAND) with 15 to 25% gravel, very	0.3	
5 —	+		24			53		fine size sand, little silt, very dense in		
$\vdash$				29				place, weakly stratified		
	+				36					
	+									
$\vdash$	+									
	+						2.2			
								29.0		
1	1	21						Moist, gray (SAND-SILT-CLAY) with 15 to	0.7'	
_			50/5"					25% gravel, little clay and very fine size		
0						>50		sand, very dense to dense, massive soil structure		
								o. aotaro		
	4									
_										
$\vdash$	+									
	_	15							1.2'	
1	2	15	19							
5 —	+		19	30		49				
$\vdash$	+			30	50/5"					
	+				00/0					
	$\dagger$									
	$\top$									
	$\top$									
1:	3	36							0.8'	
			45							
Ľ	Ō	GG	GED	BY	: Da	ale	M. Gra	amza / Senior Geologist		PAGE 2 of <u>3</u>



		Hole Number: I L 500
DATE:	4/8/15	ELEVATION:
PROJECT:		Subsurface Investigation for Arkwright Summit Wind Farm
_		Arkwright, NY
PREPARED	FOR:	Fisher Associates
<b>BORING LO</b>	CATION:	Northing: 876236.4710, Easting: 957625.4730

	ORING LOCATION: Northing: 876236.4710, Easting: 957625.4730									
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS	
			50/4"		>95	7. T. S. S.	See previous sheet		No Water at Completion	
							Boring Completed at 40.3' BGS		No Water at Completion	
$\vdash$										
-	-									
$\vdash$										
	-									
1										
$\vdash$										
-	-									
<u>Ļ</u>					<u> </u>					
L(	JGG	jED	BY:	Da	ale l	vi. Gr	amza / Senior Geologist		PAGE 3 of _3	



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Hole Number: \_\_\_\_\_ TL 499

DATE:	4/9/15	ELEVATION:
PROJECT:		Subsurface Investigation for Arkwright Summit Wind Farm

Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION:								Northing: 876214.3740, Easting: 9589	<del>3</del> U	
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0	1	2	3			_	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Extremely moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with	0.7'	Topsoil to 0.7 foot over silty lake sediment with trace clay to 10.0
				5		8		\fine size roots Extremely moist, brown, becoming gray		feet over loamy glacial drift to 12.0 feet over water sorted and
-					7			below 8.0' (SILT) with trace clay, compact	0.3'	deposited sand and gravel with
ŀ	2	4	6					to loose, thinly bedded	0.5	little silt to 21.0 feet over silty lake sediment to 27.0 feet over
-				5		11				silty glacial till to refusal
					9					
	3	4							1.3'	
5			4			10				
ŀ				6	7					
ŀ	4	5			′				1.5'	
	•		5							
				4		9				
					6				4.01	
	5	4							1.2'	
ŀ			6	7		13				
ŀ				<b>'</b>	9					
10	6	5						Moist, gray (SAND-SILT-CLAY) with 5 to	1.7'	
ŀ			7			22		10% gravel, compact, massive soil		
				15		22		structure to weakly thinly bedded		
					17			12.0	1.5'	
ŀ	7	10						Wet, gray, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine to fine size	1.5	
ŀ			9	13		22		sand, little silt, compact, stratified		
ŀ					10					
ŀ	8	5							0.8'	
15			7			18				
'				11		.0				
-					9		2			▼ Water Level at 15.9' BGS at
ŀ										Completion
ŀ										
ŀ										
ļ										
									0.01	
	9	21							0.2'	
20	   (	) <u>C</u> C	22 ED	BV:		ا ماد	M Cr	amza / Senior Geologist		PAGE 1 of 2



www.natureswayenvironmental.com

Hole Number: TL 499 ELEVATION: \_\_\_\_\_ DATE: 4/9/15 PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm Arkwright, NY PREPARED FOR: Fisher Associates

SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			18		40		See previous sheet		
				26			21.0		
						*	Extremely moist, gray (SILT) with trace		
							clay, compact, thinly bedded		
10	10							1.5'	
10	10	12							
		12	45		27				
			15						
				23					
							Maiot gray (CLAVEY CH.T) with 5 to 150/		
							Moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, very dense, massive soil		
							structure		
								0.41	
11	50/5"							0.4'	
						FIG			
							33.4		
							Auger Refusal at 33.4' BGS		



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Hole Number: TL 498

DATE:	4/9/15	ELEVATION:
PROJECT:		Subsurface Investigation for Arkwright Summit Wind Farm

Arkwright, NY

F	RE	PAF	RED	FOF	₹: _			Fisher Associates		
В	OF	RING	LO	CAT	ION	:		Northing: 876206.4320, Easting: 96034	11.358	0
•	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	3	3				V V V V V	Moist, dark brown (SILT) topsoil with trace clay, loose, with fine size roots	2.0'	Topsoil to 0.8 foot over clayey slack water sediment with some
				4		7		Moist, faintly mottled, brown (CLAYEY-SILT) with some clay, stiff, blocky soil		clay to 4.0 feet over water sorted and deposited sand with
	2	2			10			structure	1.5'	some silt to 6.0 feet over silty slack water sediment with trace
			4			9				clay to 8.0 feet over water sorted and deposited sand with
				5	6			4.0		little to some silt to 12.0 feet over silty slack water sediment
	3	3	2					Wet, brown (SILTY-SAND) with very fine size sand, some silt, loose, thinly bedded	1.5'	to 17.0 feet over coarse silty glacial drift to 26.0 feet over silty
5 —				4		6				glacial till to end of boring
					4			6.0	1 0!	
	4	2	2					Moist, brown (SILT) with trace clay, loose, thinly bedded	1.8'	
				2		4				
					4			8.0		
	5	4						Wet, brown (SILTY-SAND) with very fine to fine size sand, little to some silt, very loose	2.0'	
			1	1		2	********	to loose, thinly bedded		
				•	1					
10 —	6	1							1.9'	
			3			6				
				3	5					
	7	2						Moist, brown (SILT) with 3 to 5% gravel,	2.0'	
			2			6		trace clay, loose to dense, weakly thinly bedded		
				4	<u> </u>			bodded		
	8	9			9				1.7'	
			14							
15 —				27		41				
					38					
								47.0		
								Moist, faintly mottled, brown, gravelly (SANDY-SILT) with 15 to 25% gravel, little		
								very fine size sand, very dense, massive		
								soil structure to weakly thinly bedded	0.7'	
	9	43	33						0.7'	
20 —	Щ	)GC		BY.	· D:	ale I	M Gr	amza / Senior Geologist		PAGE 1 of 3



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Hole Number: TL 498 ELEVATION: \_\_\_\_\_ DATE: 4/9/15 PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm Arkwright, NY PREPARED FOR: Fisher Associates

SN 6 6/2 12/2 18 24 No. LITH DESCRIPTION AND CLASSIFICATION REC COMMENTS    1	В	OF	RING	G LO	CAT	ION	:		Northing: 876206.4320, Easting: 9603	41.358	0
Moist, faintly mottled, brown, gravelly (SANDY-SILT) with 15 to 25% gravel, little very fine size sand, very dense to compact, massive soil structure to weakly thinly bedded   1.2'   Extremely moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, compact to dense, massive soil structure to weakly thinly bedded   1.2'   Extremely moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, compact to dense, massive soil structure to weakly thinly bedded, with occasional thin wet (SILTY-SAND) layers   1.0'		SN		6/ 12	12/ 18	18/ 24		I I	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
Moist, faintly mottled, brown, gravelly (SANDY-SILT) with 15 to 25% gravel, little very fine size sand, very dense to compact, massive soil structure to weakly thinly bedded  10 7 7 1 13 27 27 28 Extremely moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, compact to dense, massive soil structure to weakly thinly bedded, with occasional thin wet (SILTY-SAND) layers  11 20 16 12 28 1.0°  12 21 22 3 36 47 36 36 36 36 36 36 36 36 36 36 36 36 36					32		65				
(SANDY-SiLT) with 15 to 25% gravel, little very fine size sand, very dense to compact, massive soil structure to weakly thinly bedded  10 7 7 13 27  Extremely moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, compact to dense, massive soil structure to weakly thinly bedded with occasional thin wet (SILTY-SAND) layers  11 20 16 12 28 1.0°  12 21 22 3 47  13 15 500°  13 15 500°  13 15 500°  15 0.6°  16 0.6°						21			Moist faintly mottled brown gravelly		
massive soil structure to weakly thinly bedded  10 7 7									(SANDY-SILT) with 15 to 25% gravel, little		
bedded  10 7 7							-		very fine size sand, very dense to compact,		
11 20											
25							-				
25											
25   13   13   20   25   28   27   28   28   28   28   28   29   29   29		10	7							1.2'	
Extremely moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, compact to dense, massive soil structure to weakly thinly bedded, with occasional thin wet (SILTY-SAND) layers  11 20	25 —			7			20				
Extremely moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, compact to dense, massive soil structure to weakly thinly bedded, with occasional thin wet (SILTY-SAND) layers  11 20					13	27					
gravel, trace very fine size sand, compact to dense, massive soil structure to weakly thinly bedded, with occasional thin wet (SILTY-SAND) layers  11 20						21		er en en			
thinly bedded, with occasional thin wet (SILTY-SAND) layers  11 20									gravel, trace very fine size sand, compact		
30 16 28 28 36 1.0'  11 20 30 47 36 36 36 36 36 36 36 36 36 36 36 36 36	-						-		to dense, massive soil structure to weakly		
30 16 28 28 36 47 35 36 36 36 36 36 36 36 36 36 36 36 36 36											
30 16 28 28 36 47 35 36 36 36 36 36 36 36 36 36 36 36 36 36											
30 16 28 28 36 47 35 36 36 36 36 36 36 36 36 36 36 36 36 36										1 0'	
30		11	20	16			-			1.0	
35	30 —			"	12		28				
35 22 36 47 36 36 36 36 36 36 36 36 36 36 36 36 36						15	-				
35 22 36 47 36 36 36 36 36 36 36 36 36 36 36 36 36											
35							-				
35 22 36 47 36 36 36 36 36 36 36 36 36 36 36 36 36											
35 22 36 47 36 36 36 36 36 36 36 36 36 36 36 36 36											
35 22 47 47 36 36 36 36 36 36 36 36 36 36 36 36 36											
35		12	21							0.3'	
25 36 31 31 315 50/3"	35			22			47				
13 15 0.6'					25		''				
50/3"						36	_				
50/3"											
50/3"											
50/3"											
50/3"											
50/3"										0.6'	
		13	15	E0/3"						0.0	
LOGGED BY: Dale M. Gramza / Senior Geologist PAGE 2 of Control PAGE 2	40 —	T (	)G(-		RY.		l ale l		amza / Senior Geologist		PAGE 2 of 3



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		LO					Northing: 876206.4320, Easting: 960341.3580			
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS	
					>50		See previous sheet			
							41.0			
							Boring Completed at 41.0' BGS		No Water at Completion	
							amza / Senior Geologist			



ENV	IRON	MENTAL	CONSU	LTANTS	& CONTI	RACTOR	S. INC	Hole Number: TL 497	www.	natureswayenvironmental.con
С	ΑT	E:		4/10/	15				— El	_EVATION:
P	RC	)JEC	CT:				Sub	osurface Investigation for Arkwright Su	mmit V	Vind Farm
								Arkwright, NY		
P	PRE	PAF	RED	FOF	₹:			Fisher Associates		
В	OF	RING	LO	CAT	ION	:		Northing: 876096.0780, Easting: 9604	158.012	20
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	2					, , , , , ,	$_{ m \sim}$ Extremely moist, dark brown (SILT) topsoil $_{ m 0.3}$	1.5'	Topsoil to 0.3 foot over silty
			2	3		5		\with trace clay, loose / Moist, faintly mottled, brown (SILT) with		slack water sediment with trace sand to 9.0 feet over water
					2			trace very fine size sand, loose to compact, thinly bedded		sorted and deposited sand with little silt to 10.0 feet over silty
	2	3						uning bedded	1.2'	glacial drift to 29.0 feet over
			3			7				water sorted and deposited sand and gravel with little silt to
				4		'				31.5 feet over silty glacial till to
					5				1.7'	end of boring
	3	7				-			1.7	
5 —			5	6		11				
					6					
	4	3				-			1.7'	
	<b>—</b>	1		1		1	Listal			

			3			_				water sorted and deposited
				4		7				sand and gravel with little silt to 31.5 feet over silty glacial till to
					5				4	end of boring
5 —	3	7							1.7'	
			5			11				
				6						
					6				1.7'	
	4	3							1.7	
			2	_		5				
				3	_	-				
	_				5	-	27.50		0.8'	
	5	4				-			0.0	
			8	10		18	********	Wet, faintly mottled, brown (SILTY-SAND)		
				10	22	-		with very fine size sand, little silt, compact,		
10 —	6	17			22	1		tilling bedded	1.3'	
	•	17	38					Extremely moist, brown to gray (CLAYEY-		
			30	50/5"		>88		SILT) with 5 to 15% gravel, little clay, hard, massive soil structure to weakly thinly		
				30/3		_		bedded		
	7	14							0.3'	
	-		16							
				20		36				
					32	1				
	8	12				1			1.3'	
			20			1				
15 —				13		33				
					11	1				
						1				
						1				
						1				
						1				
									0.7'	
	9	42					[-]			
20 —			50/3"							
20	LC	)GG	ED	BY:	Di	ale	M. Gra	amza / Senior Geologist		PAGE 1 of 2

LOGGED BY: Dale M. Gramza / Senior Geologist



www.natureswayenvironmental.com
Hole Number: TL 497

	TE:		4/10/	15					EVATION:
PF	ROJE	CT:				Sub	osurface Investigation for Arkwright Su	mmit W	ind Farm
DE	REPA	DEU _	FO	<b></b>			Arkwright, NY		
	)RIN(				•		Fisher Associates Northing: 876096.0780, Easting: 9604	58.0120	)
Г	0/	6/	12/	18/	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
F	6	12	18	24	>50	-,	DESCRIPTION AND SERIOSITION	ILLO	COMMENTO
25 —	10 36	39			>89		Extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, hard, massive soil structure to weakly thinly bedded	1.0'	
-			50/4"		>89		29.0		
30 —	9	12	15	27	27		Wet, gray, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine size sand, little silt, compact, stratified	0.7'	
-							Moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, very dense, massive soil structure		
35 —	50	50/5"			>50			0.8'	
40 —							Auger Refusal at 37.6' BGS		No Water at Completion
L	_UG(	∪∟د	BY:	. <u>D</u> a	<u> 916</u>	<u>vi. G</u> r	amza / Senior Geologist		_ PAGE 2 of _2



	noie Numberi <u>1 490</u>	
DATE: 4/10/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
BORING LOCATION:	Northing: 875778.7250, Easting: 960439.3380	

				CAT	ION	:		Fisher Associates Northing: 875778.7250, Easting: 9604	39.338	30
	SN	0/	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	2					/	Extremely moist, dark brown (SILT) topsoil 0.4	0.7'	Topsoil to 0.4 foot over silty
			2			_ ا		with trace very fine size sand, loose		slack water sediment with trace
				3		5		Extremely moist, faintly mottled, brown (SILT) with trace very fine size sand, loose,		sand to 4.0 feet over silty glacia drift with trace gravel to 12.0
					5			weakly thinly bedded		feet over water sorted and
	2	2						,	1.2'	deposited sand with some
			3			]				gravel to 14.0 feet over silty
				5		8				glacial drift to 24.0 feet over silty glacial till to end of boring
					6			4.0		glacial till to end of borning
	3	10						Moist, faintly mottled, brown (CLAYEY-	1.2'	
			32			i		SILT) with 5 to 15% gravel, little clay, hard		
5 —				15		47		to stiff, weakly thinly bedded		
					17					
	4	7							2.0'	
			6							
				6		12				
					10					
	5	11							1.7'	
			8			22				
				14		22				
					14	-				
10 —	6	10				-			1.3'	
			11			-				
				14		25				
					16	-		12.0		
	7	21				-	• • •	Wet, faintly mottled, brown, gravelly	1.3'	
			14			-		(SILTY-SAND) with 20 to 40% gravel, very		
				14		28		fine size sand, little to some silt, compact in		
					23			place, stratified		
	8	10				-		Extremely moist, brown (SILT) with 5 to	1.2'	
			16					10% gravel, little clay, dense, massive soil		
15 —				16		32		structure to weakly thinly bedded		
					14					
						-				
						-				
						1				
						1				
						1				
	9	13				1			0.3'	
			15			1				
20 —	LC	GG	ED	BY:	Di	ale I	M. Gra	amza / Senior Geologist		PAGE 1 of 3



	Hole Number: IL 496	
DATE:4/10/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
PODING LOCATION:	Northing, 975779 7250 Easting, 060420 2200	

3OF	RING	LO	CAT	ION:			Northing: 875778.7250, Easting: 9604	39.338	0
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			17		32		Extremely moist, brown (SILT) with 5 to		
				21			10% gravel, little clay, dense, massive soil structure to weakly thinly bedded		
							chactare to meanly aminy because		
							24.0	1.2'	
10	15						Moist to extremely moist, gray (SILT) with 5 to 10% gravel, trace very fine size sand,	1.2	
		43	50/01		>93		very dense, massive soil structure to		
			50/3"				weakly thinly bedded		
11	21							1.2'	
		50							
			50/5"		>100				
	_							1.3'	
12	21							1.5	
1		43	50/4"		>93				
			50/4"						
13	44							0.7'	
		50/4"							
[	)GC	ED	BY:	Da	ale I	M. Gr	amza / Senior Geologist		_ PAGE 2 of _3



	Hole Number: TL 496
DATE:4/10/15	ELEVATION:
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm
	Arkwright, NY
PREPARED FOR:	Fisher Associates
BORING LOCATION:	Northing: 875778.7250, Easting: 960439.3380
0/ 6/ 12/ 18/	

В	OR	RING	S LO	CAT	ION	:		Northing: 875778.7250, Easting: 9604	<del>1</del> 39.338	80
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
						>50		See previous sheet		
								Boring Completed at 40.5' BGS		No Water at Completion
45 —										
50 —										
55 —										
60 —	LC	GC	ED	BY	Da	ale I	M. Gr	amza / Senior Geologist		PAGE 3 of <u>3</u>
	_~						🔾 !	<u></u>		



	Hole Number: IL 495	
DATE:4/13/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
PODING LOCATION:	Northing, 975751 5540, Easting, 960040 0290	_

			FUI	_			Fisher Associates	240.00	00
BO	RINC				_		Northing: 875751.5540, Easting: 9609	940.93	80
SN	1 6 0/	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	3						Moist, dark brown (SILT) topsoil, with trace 0.3	1.3'	Topsoil to 0.3 foot over silty
		3			12		clay, compact		slack water sediment with trac
			9		'2		Moist, brown (SILT) with trace clay, compact, weakly thinly bedded		clay to 6.0 feet over silty glaciad drift to 10.0 feet over silty glaciad
				12			compact, weakly tilling bedded		till to end of boring
2	3							1.0'	
		5			۱.,				
			6		11				
				10					
5	5							0.3'	
		5			١				
			8		13				
				8			6.0		
4	30						Moist, brown, becoming gray below 8.0'	2.0'	
		17					(SILT) with 5 to 15% gravel, trace clay,		
			30		47		dense, massive soil structure to weakly thinly bedded		
				43			tillily bedded		
5	15							1.6'	
		15							
			28		43				
				37			10.0		
6	23						Moist to extremely moist, gray (CLAYEY-	1.5'	
		32					SILT) with 5 to 15% gravel, little clay, hard,		
			26		58		massive soil structure		
				36					
7	22							1.2'	
		33							
			50/4"		>83				
8	27							1.7'	
		37							
	1		46		83				
				50/5"					
9	17						1.1'		
		39							
╁,	og G		BV	· D	ale I	M Cr	amza / Senior Geologist		PAGE 1 of 2



	Hole Number: TL 495	
DATE:4/13/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
BORING LOCATION:	Northing: 875751.5540. Easting: 960940.9380	

В	OF	RING	S LO	CAT	ION	:		Northing: 875751.5540, Easting: 960	0940.93	380
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
				50/5"		>89				
						-				
						_				
	10	37						Moist to extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, hard,	0.8'	
25 —			50/4"			>50		massive soil structure		
						-				
									0.6'	
	11	42	F0/F"						0.6	
30 —			50/5"			>50				
						-				
								32.0		
								Auger Refusal at 32.0' BGS		No Water at Completion
						-				
						-				
35 —										
						-				
40 —										
<del>-10</del>	LC	)GC	SED	BY:	Da	ale I	M. Gra	amza / Senior Geologist		PAGE 2



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PAGE 1

	, III.OIII		oonou	LIMITO	a oomii		0.1110	Hole Number:	TL 494		•	
Е	)AT	E:		4/14/	15					E	LEVATION:	
F	PRC	JEC	CT:				Sub	surface Investigation	for Arkwright Su	mmit \	Wind Farm	
									wright, NY			
F	RE	PAF	RED	FOF	₹:			Fisher	Associates			
Е	OF	RING	LO	CAT	TON	:		Northing: 875744.6260, Easting: 962011.1160				
	ON	0/	6/	12/	18/							
0 —	SN	6	12	18	24	N	LITH LITH	DESCRIPTION AND CLA		REC	COMMENTS	
	1	2					12241	Extremely moist, dark browith trace very fine size s		1.7'	Topsoil to 0.4 foot over silty slack water sediment with trace	
			2			9		fine size roots	and, 1003e, with		clay to 1.5 feet over water	
				7				$_{ m }$ Extremely moist, faintly m			sorted and deposited sand with	
	_				12			(SILT) with trace clay, loo		0.3'	little gravel and silt to 4.0 feet	
	2	12						Extremely moist, faintly m gravelly (SILTY-SAND) w		0.5	over clayey lake sediment to 12.0 feet over water sorted and	
			23			39		gravel, very fine size sand			deposited sand with little silt to	
				16				in place, stratified	.,,		14.0 feet over water sorted and	
		_			22			Maint faintly mattled brow	4.0	1.3'	deposited sand and gravel with	
	3	7						Moist, faintly mottled, bro SILT) with some clay, stif		1.5	little silt to 16.0 feet over silty glacial till to end of boring	
5 —			6			10		weakly thinly laminated	to vory our,		glacial till to one or borning	
				4	_							
	<u> </u>	_			9		Lxd			1.2'		
	4	5								'		
			6	_		15						
				9	40							
	5	6			12					1.7'		
	5	0	9									
			9	16		25						
				16	19							
10 —	6	4			19					1.3'		
	-	-	7									
			'	8		15						
				-	12							
	7	8						Wet, gray (SILTY-SAND)	with very fine	1.7'		
			10					size sand, little silt, compa				
				12		22						
					13							
	8	8			"		• 4	Wet, gray, very gravelly (	SILTY-SAND)	0.8'		
			15					with 40 to 50% gravel, ve				
15 —				20		35		little silt, dense, stratified				
					26							
								Extremely moist, gray (Cl				
								5 to 15% gravel, little clay				
								massive soil structure				
	9	10								1.2'		

LOGGED BY: Dale M. Gramza / Senior Geologist



	Hole Number: TL 494	
DATE:4/14/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
BORING LOCATION:	Northing: 875744 6260 Fasting: 962011 1160	

<u> </u>		LO			•		Northing: 875744.6260, Easting: 962	.011.110	50
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			15		28				
				15					
10	7							1.3'	
-10	•	7							
		•	11		18				
				13					
11	12						Extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, very stiff to	1.2'	
		16			30		hard, massive soil structure		
			14						
				13					
$\forall$									
12	15							1.5'	
		15							
			16		31				
				15					
						12.4			
								1.2'	
13	17							1.4	
$oxed{oxed}$		21					amza / Senior Geologist		_ PAGE 2 of _3



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Hole Number: \_\_\_\_ TL 494 ELEVATION: \_\_\_\_\_ DATE: 4/14/15 Subsurface Investigation for Arkwright Summit Wind Farm PROJECT: Arkwright, NY PREPARED FOR: Fisher Associates
Northing: 875744.6260. Easting: 962011.1160 BORING LOCATION:

)()	VIIVC	LO	CAI	ION:	•		Northing: 875744.6260, Easting: 9620	011.110	50
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			23		44		See Previous sheet		
				19			41.0		
							Boring Completed at 41.0' BGS		No Water at Completion
4	<u>\</u> C.	FD	BV.	- D	اعاد	M Gr	amza / Senior Geologist		PAGE 3 of3



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PAGE 1

	, III.OIII		oonou	LIMITO	a oomii		0.1110	Hole Number:	TL 494		•	
Е	)AT	E:		4/14/	15					E	LEVATION:	
F	PRC	JEC	CT:				Sub	surface Investigation	for Arkwright Su	mmit \	Wind Farm	
									wright, NY			
F	RE	PAF	RED	FOF	₹:			Fisher	Associates			
Е	OF	RING	LO	CAT	TON	:		Northing: 875744.6260, Easting: 962011.1160				
	ON	0/	6/	12/	18/							
0 —	SN	6	12	18	24	N	LITH LITH	DESCRIPTION AND CLA		REC	COMMENTS	
	1	2					12241	Extremely moist, dark browith trace very fine size s		1.7'	Topsoil to 0.4 foot over silty slack water sediment with trace	
			2			9		fine size roots	and, 1003e, with		clay to 1.5 feet over water	
				7				$_{ m }$ Extremely moist, faintly m			sorted and deposited sand with	
	_				12			(SILT) with trace clay, loo		0.3'	little gravel and silt to 4.0 feet	
	2	12						Extremely moist, faintly m gravelly (SILTY-SAND) w		0.5	over clayey lake sediment to 12.0 feet over water sorted and	
			23			39		gravel, very fine size sand			deposited sand with little silt to	
				16				in place, stratified	.,,		14.0 feet over water sorted and	
		_			22			Maint faintly mattled brow	4.0	1.3'	deposited sand and gravel with	
	3	7						Moist, faintly mottled, bro SILT) with some clay, stif		1.5	little silt to 16.0 feet over silty glacial till to end of boring	
5 —			6			10		weakly thinly laminated	to vory our,		glacial till to one or borning	
				4	_							
	<u> </u>	_			9		Lxd			1.2'		
	4	5								'		
			6	_		15						
				9	40							
	5	6			12					1.7'		
	5	0	9									
			9	16		25						
				16	19							
10 —	6	4			19					1.3'		
	-	-	7									
			'	8		15						
				-	12							
	7	8						Wet, gray (SILTY-SAND)	with very fine	1.7'		
			10					size sand, little silt, compa				
				12		22						
					13							
	8	8			"		• 4	Wet, gray, very gravelly (	SILTY-SAND)	0.8'		
			15					with 40 to 50% gravel, ve				
15 —				20		35		little silt, dense, stratified				
					26							
								Extremely moist, gray (Cl				
								5 to 15% gravel, little clay				
								massive soil structure				
	9	10								1.2'		

LOGGED BY: Dale M. Gramza / Senior Geologist



	Hole Number: TL 494	
DATE:4/14/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
BORING LOCATION:	Northing: 875744 6260 Fasting: 962011 1160	

<u> </u>		LO			•		Northing: 875744.6260, Easting: 962	.011.110	50
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			15		28				
				15					
10	7							1.3'	
-10	•	7							
		•	11		18				
				13					
11	12						Extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, very stiff to	1.2'	
		16			30		hard, massive soil structure		
			14						
				13					
$\forall$									
12	15							1.5'	
		15							
			16		31				
				15					
						12.4			
								1.2'	
13	17							1.4	
$oxed{oxed}$		21					amza / Senior Geologist		_ PAGE 2 of _3



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Hole Number: \_\_\_\_ TL 494 ELEVATION: \_\_\_\_\_ DATE: 4/14/15 Subsurface Investigation for Arkwright Summit Wind Farm PROJECT: Arkwright, NY PREPARED FOR: Fisher Associates
Northing: 875744.6260. Easting: 962011.1160 BORING LOCATION:

)()	VIIVC	LO	CAI	ION:	•		Northing: 875744.6260, Easting: 9620	011.110	50
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			23		44		See Previous sheet		
				19			41.0		
							Boring Completed at 41.0' BGS		No Water at Completion
1	<u>\</u> C.	FD	BV.	- D	اعاد	M Gr	amza / Senior Geologist		PAGE 3 of3



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		PAF	RED	FUF	≺			Fisher Associates		
В	OR	RING	LO	CAT	ION	: _		Northing: 876182.8030, Easting: 962	062.45	520
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	1	13					~v.*~:	Moist, brown (CLAYEY-SILT) topsoil with 0.5	1.3'	Topsoil to 0.5 foot over clayey
ŀ			10			-		\rangle little to some clay, compact, with fine size $\sqrt{}$		lake sediment to 6.0 feet over
ı				12		22	F = F	roots		silty glacial drift to 10.0 feet over
ı					10	-	F=3	Extremely moist, distinctly mottled, brown (CLAYEY-SILT) with some clay, very stiff		silty glacial till to end of boring
ŀ	2	5				-	PEA	to stiff, becoming firm below 4.0', blocky	1.3'	
			6				FRA	soil structure		
ı				7		13	<b>8</b> 47			
ı					5	-				
5	3	4				-	FÆA		1.7'	
			2			-				
				4		6	F = F			
ı					4	-		6.0		
ı	4	8				-		Moist, faintly mottled, brown (SILT) with 5	1.4'	
			10			-		to 10% gravel, trace clay, dense to		
Ì				22		32		compact, weakly thinly bedded		
ŀ					28	-	27			
5	5	13				-			1.8'	
			15							
				12		27				
ı					15	-		10.0		
	6	10						Moist, gray, gravelly (SILT) with 15 to 25%	1.5'	
			14					gravel, trace clay, compact, massive soil structure to weakly thinly bedded		
ı				16		30				
					17					
	7	8							1.7'	
ı			7							
				10		17				
					7		966			
	8	4							1.3'	
			5			1				
5				8		13				
					12					
	9	13					2番号 金貨	1.0'		
_[			10 ED			L		amza / Senior Geologist		PAGE 1 of 3



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							Hole Number: TL 493				
DATE: 4/14/15						ELEVATION:					
PROJECT: Subs							surface Investigation for Arkwright Summit Wind Farm				
		_					Arkwright, NY				
PRI	EPAF	RED	FOF	₹: _			Fisher Associates				
BORING LOCATION:					:	Northing: 876182.8030, Easting: 962062.4520					
SN	0/	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS		
		12	20	24	30						
				24							
								0.01			
10	15							0.6'			
5		19			44						
			25								
$\vdash$				31							
$\vdash$											
11	11						Moist, gray, gravelly (SILT) with 15 to 25%	1.3'			
		16					gravel, trace clay, dense to very dense,				
0			21		37		massive soil structure to weakly thinly bedded				
				24							
$\vdash$											
								1.5'			
12	25	20						'.5			
5		29	23		52						
			23	24							
$\vdash$											
13	22							1.3'			

LOGGED BY: Dale M. Gramza / Senior Geologist

PAGE 2

of

\_3



www.natureswayenvironmental.com TL 493 Hole Number:

DATE: 4/14/15 ELEVATION:								EVATION:				
							Sub	surface Investigation for Arkwright Sur	nmit W	/ind Farm		
_		<b>545</b>	_					Arkwright, NY				
PREPARED FOR: BORING LOCATION:								Fisher Associates Northing: 876182.8030, Easting: 962062.4520				
					18/							
	SN	0/ 6	6/ 12	12/ 18	24	N 54	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS		
				30	22	34		See previous sheet				
					33	_		Boring Completed at 41.0' BGS		No Water at Completion		
						-						
						_						
45 –						-						
						-						
						-						
						_						
						-						
50 -												
						_						
						-						
						-						
						-						
55 –												
						-						
						-						
						-						
						-						
						-						
60 –	LO	GG	ED	BY:	L Da	l ale l	I <u> </u>	amza / Senior Geologist		PAGE 3 of 3		



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	Hole Number:IL49I	
DATE:4/15/15	ELEVATION:	
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm	
	Arkwright, NY	
PREPARED FOR:	Fisher Associates	
BORING LOCATION:	Northing: 876845.8280, Easting: 963599.3290	_

				CAT	_	:	Northing: 876845.8280, Easting: 963599.3290					
•	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS		
0 —	1	3	2			5	X	Extremely moist, dark brown (SILT) topsoil 0.4 with trace very fine size sand, loose, with fine size roots	1.7'	Topsoil to 0.4 foot over silty slack water sediment with trace clay to 10.0 feet over loamy		
				3	11			Moist, faintly mottled, brown (SILT) with trace clay, loose to compact, weakly thinly bedded		glacial drift to 19.0 feet over		
	2	3			- ' '				1.3'	coarse silty glacial drift with some gravel to 27.5 feet over		
			5					Journal		apparent silty glacial till to end		
				6		11				of boring		
					9				1.8'			
	3	7	44						1.0			
5 —			11	10		21						
				10	7							
	4	6				-			1.5'			
			8			16						
				8		"						
	_				8				1.0'			
5	5	5	5						1.0			
			,	5		10						
					9			10.0				
10 —	6	5						Moist, faintly mottled, brown, gravelly	0.8'			
			7			17		(SAND-SILT-CLAY) with 15 to 25% gravel, little clay and very fine size sand, compact,				
				10				massive soil structure to weakly thinly				
	7	27			11		2.2	bedded	0.7'			
	-	21	19			-			0.1			
			13	19		38						
					14	1						
	8	7							1.3'			
15 —			17			32						
-				15								
					19							
						-						
						1						
						1						
								19.0				
	9	12						See next sheet	0.7'			
20 —			18	BY:		ale l		amza / Senior Geologist		PAGE 1 of 3		



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							Hole Number: TL 491				
DA	-		4/15/	15					_EVATION:		
PR	OJE	CT:				Sub	surface Investigation for Arkwright Su	mmit V	Vind Farm		
		_					Arkwright, NY				
	EPAF						Fisher Associates				
ВО	RING	) LO	CAT	ION	:		Northing: 876845.8280, Easting: 963599.3290				
SN	0/	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS		
	0	12	23	24	41		Extremely moist to wet, olive gray, gravelly				
				19			(SANDY-SILT) with 20 to 40% gravel,				
							some very fine size sand, dense, weakly stratified				
						•	Stratified				
10	8							1.0'			
25		11			27						
			16								
				13							
							27.5				
							Extremely moist, gray (SILT) with 5 to 15% gravel, trace clay, dense to compact,				
							massive soil structure to weakly thinly				
11	12						bedded	0.2'			
-   -	'-	22									
30			20		42						
				23							
								4.01			
12	11							1.3'			
5 —		14			25						
			11	40		• • •					
				18							
-	1										
13	26							0.0'			

LOGGED BY: Dale M. Gramza / Senior Geologist



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	IIIV	LO	CAI	ION	•		Northing: 876845.8280, Easting: 96	<u> </u>	3290
SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			19		40		See previous sheet		
				21			41.0		
						<b>**</b>	Boring Completed at 41.0' BGS		No Water at Completion
$\vdash$									
$\vdash$									
H									
$\vdash$		-	-						
$\square$									
$\bigsqcup$							amaa / Caniar Caalagist		



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Hole Number: \_\_\_\_\_ TL 490

DATE:4/15/15	ELEVATION:
PROJECT:	Subsurface Investigation for Arkwright Summit Wind Farm

Arkwright, NY

Р	RE	PAF	RED	FOF	₹:			Fisher Associates		
В	OF	RING	LO	CAT	ION	·		Northing: 877670.4950, Easting: 963	854.30	30
•	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	2						Moist, dark brown (SILT) topsoil with little	0.8'	Topsoil to 0.3 foot over silty
			2			6		\clay, loose, with fine size roots  Moist, faintly mottled, brown (SILT) with 3		slack water sediment with trace clay to 6.0 feet over silty glacial
				4				to 5% gravel, trace clay, loose to compact,		drift to 12.0 feet over silty lake
					12			weakly thinly bedded	0.21	sediment with little clay to 24.0
	2	3							0.3'	feet over silty glacial drift to end of boring
			4			10				or borning
				6						
					8				0.4'	
	3	10							0.4	
5 —			10			22				
				12	44					
		_			11			Moist, faintly mottled, brown (CLAYEY-	0.8'	
	4	7	8					SILT) with 5 to 15% gravel, little clay, very	0.0	
			8	12		20		stiff, weakly thinly bedded		
				12	11					
	5	6			11				1.1'	
	-	•	9							
				13		22				
				10	15					
10 —	6	7							1.2'	
			10							
				10		20				
					14			12.0		
	7	9						Moist, gray (CLAYEY-SILT) with little clay,	1.6'	
			6					stiff, thinly laminated with very thin coarse		
				7		13		silt lenses		
					11					
	8	4					r.÷4		1.8'	
15 —			5			14	Fal			
15 —				6		11				
					8					
									4 51	
	9	6							1.5'	
20 —			21					(0)		
	LC	GG	Ŀυ	RA:	. <u>Da</u>	ale l	vi. Gra	amza / Senior Geologist		PAGE 1 of <u>3</u> _



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		Hole Number: 1L 490	
DATE: 4	1/15/15	ELEVA	ATION:
PROJECT: _		Subsurface Investigation for Arkwright Summit Wind	Farm
		Arkwright, NY	
PREPARED F	FOR:	Fisher Associates	
BORING LOC	CATION: _	Northing: 877670.4950, Easting: 963854.3030	

В	OF	RING	S LO	CAT	ION:	_		Northing: 877670.4950, Easting: 963	<u>3854.30</u>	)30
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
				22		43		Moist, gray (CLAYEY-SILT) with little clay,		
					24			stiff, thinly laminated with very thin coarse silt lenses		
								SIR ISTIGES		
								24.0	0.01	
	10	7						Moist, gray, gravelly (SILT) with 15 to 25%	0.8'	
25 —			19			36		gravel, trace very fine size sand, dense to very dense, massive soil structure to		
				17				weakly thinly bedded		
					19					
	_								1.1'	
	11	23	29							
30 —			29	26		55				
				20	33					
					33					
	12	16							1.7'	
			15							
35 —				21		36				
					27					
	13	13							1.3'	
40 —	Ļ		13							
	LC	JGG	ED	BY:	<u>Da</u>	ale l	M. Gra	amza / Senior Geologist		PAGE 2



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Hole Number: TL 490 ELEVATION: \_\_\_\_\_ DATE: 4/15/15 PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm Arkwright, NY PREPARED FOR: Fisher Associates

SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	R	EC	COMMENTS
			23		36		See previous sheet			
				27				11.0		
						1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Boring Completed at 41.0' BGS	+1.0		No Water at Completion
										•
$\dashv$										
1										
$\dashv$									1	
_										
1										
1										
$\dashv$										
$\dashv$										
$\dashv$										
_C				1		1		1		



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059

10B13a

(716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-54n-15

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 489, Northing:878508.64450900000

Town of Arkwright, Chautauqua Co., NY

Easting: 964091.07506000000

CLIENT Fisher Associates

DATE STARTED 05/29/15 COMPLETED 05/29/15

DEPTH BLOWS ON IN FT SAMPLER

П	T	20000000	_					
	SN <b>REC</b>	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION WELL WATER TABLE AND REMARKS
ľ	1	2					<b>********</b>	
	20		2			_	0	Extremely moist dark brown  (CLAYEY STIT) toposit with 1 to 5%  (CLAYEY STIT) toposit with 1 to 5%
T	-	P		4		6	0 0	(CLAYEY-SILT) topsoil with 1 to 5%
- 1				-4	9			trace sand soft granular soil
1	2	11			9_		0 -0 0 -0	structure, (ML-CL).
-		11						0.5
-	18	(4	_11_			19		T- T- T- TOPOGN STU
-			-	8			000	(a) composite
-	$\rightarrow$				9_		0-0-	TOTOWN (CEATET SIET) WITH 10 to 10%
-	3	5	_				000	gravel, some clay, firm, very stiff below 1.5 feet with nearly vertical gray
5—	22		_13_		_	31	0.00	desiccation cracks, (CL). Silty topsoil with little organic
				18			2000	matter and clay trace gravel
					12		200	grades downward to 3.0 and sand to 0.5 feet over clayey
	4	8						Extremely moist distinctly mottled olive glacial drift with little gravel to
	22		11			20	000	brown gravelly (CLAYEY-SILT) with 15 3.0 feet over clayey glacial till
				9		20		to 40% mostly subangular gravel, some to 9.5 feet over silty glacial till
					10		200	clay, trace sand, very stiff and hard to 10.0 feet over water sorted
F	5	5			10		50-7	with nearly vertical gray desiccation and deposited sand with little to
-	20	ن	8			1. Teconomic	000	cracks, (CL). some gravel, little silt and clay to
H	20		_0_	_	-	16	0	grades downward to 9.5  12.0 feet over clayey glacial till to 18.0 feet over silty glacial till
-	-	_		8			2 0 2 0	
10-	-	0			10		5 25	Extremely moist olive gray  (CLAYEY-SILT) with 5 to 10% gravel,
-	6	10			-		0.0	little clay, trace sand, very stiff,
H	24		11			24	0 60	massive soil structure, (ML-CL). Note: advanced bore hole with 4
-	-	_		13			0.00	grades downward to 10.0 1/4 inch ID x 8 inch 0D hollow
_					12		0.0	stem auger casing with
	7	9					000	grades downward to 10.0 1/4 inch ID x 8 inch 0D hollow stem auger casing with continuous split spoon sampling (SAND-SILT-CLAY) with 15 to 40%
	22		10			20	0-0-	The second continued below
				10			000	mostly subrounded gravel, little silt and with auger with 5 foot interval
			N=======		12		0 0	clay, very stiff, stratified, (SC).
	8	6	o Hesto				200	12.0
15	24		8			17	00	Extremely moist olive gray gravelly
15—				9		1/	0.0	(CLAYEY-SILT) with 15 to 40% mostly
				<u> </u>	11		0-0-	subangular gravel, some clay, very
-	-				-11		000	stiff, massive soil structure, (CL).
-	$\rightarrow$	-		_	· =		0-00	
-	-			100	-		The Car	<u> </u>
-	-							grades downward to 18.0
-	$\rightarrow$						PA WA	
1	9	4		_			00.0	Extremely moist olive gray gravelly
	18		9			18	ا می ۵	(SAND-SILT-CLAY) with 15 to 40%
				9			0000	gravel, little sand and clay, very stiff,
20 L					13		0_ 70	massive soil structure, (ML-CL).



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1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-54n-15

10B13a

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 489, Northing:878508.64450900000

Town of Arkwright, Chautaugua Co., NY

Easting: 964091.07506000000

CLIENT Fisher Associates

DATE STARTED 05/29/15 COMPLETED 05/29/15

BLOWS ON DEPTH SAMPLER IN FT

	SN REC	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
							0.0	Extremely moist olive gray gravelly		
						1	مي ه	(SAND-SILT-CLAY) with 15 to 40%	F. F. F.	3
			-			1	0000	gravel, little sand and clay, very stiff, massive soil structure, (ML-CL).	LY47.4	A A
						1	0000			
						1	Ō. °Θ.	grades downward to	23.0	á
	10	10					0.00	Extremely moist olive gray gravelly		
	8		38			75	0,00	(SAND-SILT-CLAY) with 15 to 40%		A A
				37		7-2000	0000	mostly subangular gravel, little sand and clay, hard, massive soil structure,		9 9
25—			_		38	-	0.00	(ML-CL).		ĝ.
						1	o o			
						1	-0000			
						]	0.00		<b>47.47.4</b>	3.
							0 20			
							0.0			
	11	15	5338				0.60		1. 传令	Š
	22		20	22		42	0.00			Š
20				-22	16		0000		BACK	8 2
30—					10_		0.00		7.7.7.1.TMGS.	
							0.0		<b>- 深深</b> 瘪	
							0.00		F. + - 5	
		-				ł	0 0		F. A. A.	
_	_					1	2 0 4			
	12	5					000			
	20		16			32	0.00			
				16		] ""				
35—					15		-000 0			
				-			0.00			
							0.0			
							0.00			3 V
							0 0 0 0 0 0		<b>片:</b>	
	13	5					0000			
	12		19 .	1243		38	Ö , Ö V-O ⊕ .O O , Ö			No water at completion.
				19	45		FO 0 O			
40					15		0 0 .	Boring completed at 40.0 feet.	40.0	<b>1</b> ← 40.0'



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Hole Number: TL 485 DATE: ELEVATION: \_\_\_\_\_ 4/16/15 PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm Arkwright, NY

Ρ	RE	PAF	RED	FOF	₹: _			Fisher Associates		
В	OF	RING	LO	CAT	ION	:		Northing: 878836.9570, Easting: 9647	750.83	70
	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0 —	1	4					, , , , ,	Moist, dark brown (SILT) topsoil with trace 0.3	0.8'	Topsoil to 0.3 foot over silty
			1			8		very fine size sand, loose, with fine size roots		slack water sediment with trace to little clay to 2.0 feet over
				7				Moist, distinctly mottled, brown (SILT) with		water sorted and deposited
					4			trace to little clay, loose, thinly bedded 2.0	4.01	sand with little silt to 10.0 feet
	2	2						Moist to extremely moist, distinctly mottled,	1.0'	over water sorted and deposited
			5			10		brown (SILTY-SAND) with very fine size sand, little silt, loose to compact, thinly		sand with little gravel to 12.0 feet over silty lake sediment
				5				bedded		with trace sand to 32.5 feet over
					6				1.2'	silty glacial till to end of boring
	3	11							1.2	
5 —			6			12				
				6						
	_				6				1.3'	
	4	2							1.5	
			3	_		7				
				4						
	5	3			6				1.4'	
	- J	3	4							
			4	6		10				
				-	6					
10 —	6	5						Wet, brown, gravelly (SILTY-SAND) with	1.7'	
	Ľ		3					15 to 25% gravel, very fine size sand, little		
				4		7		to some silt, loose, stratified		
				<u> </u>	5					
	7	16						Extremely moist, gray (SILT) with trace	1.3'	
			11					very fine size sand, compact, thinly bedded		
				14		25				
					15					
	8	11							1.5'	
			11							
15 —				11		22				
					11					
									4	
	9	11					27.54		1.2'	
20 —	ـِــا		11							
-	LC	)GG	ED	BY:	: <u>Da</u>	ale l	M. Gra	amza / Senior Geologist		PAGE 1 of <u>3</u>



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ENVIRONMENTAL BUNGULTANTO & BUNTHAUTUNG, IND	Hole Number:	TL 485		,	
DATE:4/16/15			EL	_EVATION:	
PROJECT: S	ubsurface Investigation	for Arkwright Sui	mmit V	Vind Farm	
	Ark	wright, NY			
PREPARED FOR:	Fishe	r Associates			
BORING LOCATION:	Northing: 878836.9	570, Easting: 9647	750.837	70	
0/ 6/ 12/ 19/			1		

			FOF CAT			Fisher Associates Northing: 878836.9570, Easting: 964750.8370							
			12/	18/				i					
SN	0/ 6	6/ 12	18	24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS				
			12		23								
				13									
							5 4 4 (OU.T) :::	4.01					
10	19						Extremely moist, gray (SILT) with trace very fine size sand, compact to dense,	1.3'					
		14			31		thinly bedded						
			17				•						
				21									
								1.6'					
11	15							1.0					
		18			42								
			24										
				27									
						200							
							32.5 Moist, gray, gravelly (SILT) with 15 to 25%						
							gravel, trace very fine size sand, dense,						
							massive soil structure						
12	17							1.7'					
'-	''	18											
			20		38								
				22									
13	20							1.4'					
		21											
10	<u>)CC</u>		RV.	בח	عاد ا	M Gr	amza / Senior Geologist		_ PAGE 2 of _3				



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PAGE 3

Hole Number: TL 485 DATE: ELEVATION: \_\_\_\_\_ 4/16/15 Subsurface Investigation for Arkwright Summit Wind Farm PROJECT: Arkwright, NY PREPARED FOR: Fisher Associates BORING LOCATION: Northing: 878836.9570, Easting: 964750.8370 LITH DESCRIPTION AND CLASSIFICATION COMMENTS 18 See previous sheet 21 26 No Water at Completion Boring Completed at 41.0' BGS 45 55

LOGGED BY: Dale M. Gramza / Senior Geologist



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059

(716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-60-15

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project LOCATION Survey ID 483, Northing: 880377,184258

Easting: 964995.181058

Town of Arkwright, Chautaugua Co., NY

DATE STARTED 04/22/15 COMPLETED 04/22/15

BLOWS ON DEPTH SAMPLER INFT

CLIENT Fisher Associates

10B13a

	INFI		JAI	MPLER	<u>.</u>			A CONTRACTOR OF THE CONTRACTOR
	SN <b>REC</b>	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION WELL WATER TABLE AND REMARKS
	1	2					0 0 0 0	Extremely moist black (MUCK), granular ← 0.5'
	16		2			11	<u> </u>	soil structure (OL)
				9		11:	000	0.2
					14		0 °0	3 3 3 00
	2	6					000	Extremely moist highly mottled brown (SANDY-SILT) with 5 to 10% gravel,
	18		7			17	م م	! little sand, very loose, blocky soil
				10		"	TO 07 A	structure, (ML).
1					13	1	000	clear transition to 0.8 (2) CONCRETE
	3	7				1		
_	24		6		-		D 07	Extremely moist distinctly mottled olive
5-			U	7		13	400	brown gravelly (CLAYEY-SILT) with 15 Note: GLP-60-15 drilled 7.0 feet
					12	1	0	to 40% mostly subangular gravel, little north of staked location.
		8	-		12		000	clay, trace sand, very stiff with nearly vertical gray desiccation cracks,
	4	8_	10			ł	00_	(ML-CL). Organic rich mucky surface to
	22	-	12			24	000	grades downward to 4.0 0.2 feet over coarse silty glacial
2	-	-		12			0 0	drift with trace gravel, little sand
-		- 1			16		A	Extremely moist distinctly mottled olive to 0.8 feet over silty glacial drift
- }	_5	2	- 8		_		0.0	brown gravelly (CLAYEY-SILT) with 15 with little to some gravel, little
- 1	18		3			6	ا می ۵	to 40% mostly subangular gravel, some clay, trace sand to 4.0 feet over
				3			0000	clay, trace sand, stiff, very stiff below clayey glacial drift with little to some gravel, trace sand to 8.0
10-					3		0-00	desiccation cracks, (CL). some gravel, trace sand to 8.0 feet over water sorted and
	6	3					F000	clay, trace sand, stiff, very stiff below 6.0 feet with nearly vertical gray desiccation cracks, (CL).  clear transition to  clayey glacial drift with little to some gravel, trace sand to 8.0 feet over water sorted and deposited silt with little to some
ļ	18		4			10		
- }				6		1000	- 6- Y	Extremely moist faintly mottled olive 18.0 feet over water sorted and
- 1					6		-040	Extremely moist faintly mottled olive grayish brown gravelly (SAND-SILT-CLAY) with 15 to 40% gravel, little sand and clay, firm and gravel, little sand and clay to 18.0 feet over water sorted and deposited sand with some silt to 18.5 feet over water sorted and gravel, little sand and clay to 18.0 feet over water sorted and gravel, little sand and clay to 18.0 feet over water sorted and gravel, little sand and clay to 18.0 feet over water sorted and gravel, little sand and clay to 18.0 feet over water sorted and deposited sand with some gravel.
	7	4		KIROLE R			0 0	(SAND-SILT-CLAY) with 15 to 40%  18.5 feet over water sorted and
20	16		4			8	0.0	etiff weakly stratified (SC)
Í				4		. 0	ا من ۵	E . E . to lo.o feet over water sorted
Ī					3		000	and deposited sand with some
Ì	8	3					0.00	silt to 23.0 feet over water sorted and deposited sand to
,,	16		3			6	0000	28.0 feet over water sorted and
15				3		٥	0.00	deposited sand with little to
İ			200		4		-0 0 Q	some gravel, little silt and clay to
İ			*		-70		0.00	29.0 feet over clayey glacial till
ł				1			0-4	to end of boring.
ł					_		× 0 0-0	である。 であるである。
	_						0 0	grades downward to 18.0
ł	_				-		0	<u>[35,58,53</u> ]
}	9	1		_	-		<del>ن ن ن</del>	
}	17		2	- 22		6		
}	-	-		_4_	Vavo			
20 L					4		1.14 1.15 1.25 4	See next sheet.



 $Soil\ and\ Hydrogeologic\ Investigations * We tland\ Delineations$ 

1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-60-15

10B13a HOLE NO. GLP-60-15

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 483, Northing: 880377.184258

Town of Arkwright, Chautaugua Co., NY

Easting: 964995,181058

CLIENT Fisher Associates

DATE STARTED 04/22/15 COMPLETED 04/22/15

DEPTH BLOWS ON IN FT SAMPLER

	SN <b>REC</b>	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION WELL WATER TABLE AND REMARKS
-								Extremely moist faintly mottled grayish Note: advanced bore hole with 4
-						ł		brown (SILTY-SAND), very fine size 4.4 inch ID x 8 inch OD hollow
-						-		sand with some silt, very loose, thinly
-	$\dashv$		_			-		bedded, (SM). continuous split spoon sampling
4					-	-	7	18.5 to 16.0 feet. Continued below with auger with 5 foot interval
1						1		wet gray gravelly (SAND) with 20 to
-	10	10				1		40% mostly subrounded gravel, fine to
-	21		12			25		very coarse size sand, very loose, stratified, (SW).
-				13		ļ		18.8
+				-	15	ļ		1 (577) 577(577)
1				-		1		Extremely moist faintly mottled grayish brown (SILTY-SAND), very fine size
-								sand with some silt, very loose, thinly
-	_							bedded, (SM).
L						ļ		grades downward to 23.0
+					_			
-	_	-				ļ		Extremely moist brownish gray (SAND), very fine to coarse size, compact,
-	-11	13				1	00.0	\ stratified, (SW).
-	24		20			42	88	grades downward to 28.0
ŀ				22		-	000	L
+	_			_	21	ļ	0-0-	Extremely moist faintly mottled olive (SAND-SILT-CLAY) with (SAND-SILT-CLAY) with
-	_			-		ļ	000	15 to 40% mostly subrounded gravel,
1	_						0.00	very fine to very coarse size sand,
-	_					ł	200	little silt and clay, hard, stratified,
ŀ	_					ļ	000	(SC).
+	_			-				29.0
1	_				_		000	Extremely molist olive gray gravelly
H	12	_10_			_		0_0	(CLAYEY-SILT) with 15 to 40% mostly
-	24	-	16	_	-	33	D 0 D	subangular gravel, some clay, trace
-	-		200	17			0-0-0	sand, hard, massive soil structure,
+	-				17		000	(CL).
-	-	_		-			000	
1						1	0 0	
1	_	-					000	
1	-						000	
+	-				-		000	
-	100 P	ASSECT TO	1 7 20-				0-0	
1	13	12	00000				7-07	
H	18		15			37	000	
-	-	_	SERVICE	22	- 67		0 0	No water at completion.
L					20		·o	Boring completed at 40.0 feet. 40.0 40.0 ← 40.9



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-62-15

10B13a HOLE NO. <u>GLP-62-15</u>

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 482, Northing: 881076,686859

Town of Arkwright, Chautaugua Co., NY

Easting: 965021.564962

CLIENT Fisher Associates

DATE STARTED 04/21/15 COMPLETED 04/21/15

	DEPTH N FT	1		WS ON PLER	1					
	SN REC	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	(I) 3 WELL	WATER TABLE AND REMARKS
ľ	1	2					<b>********</b>	Extremely moist black (SANDY-SILT)		← 0.5'
	20		3			7	000	topsoil with little organic matter and	3-3-3	- 0.5
				4		'	0-0	sand, very loose, granular soil	5 3 5 3 Q	
Ī					6	1	000	structure, (ML).	13,3,4	0.01
1	2	10				1	000	0.3		← 2.0'
	24		9							
				8		17	000	Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15		Note: GLP-62-15 drilled 1.0 foot
ı					7	ĺ	0 0	to 40% mostly subangular gravel, some	P. P. P. P. J	southeast of staked location.
ı	3	4			-		0000	clay, trace sand, stiff, weakly blocky		
_ l	22	-4	5		-	200	0_0	soil structure, (CL).		
5+			-U	10		15	000	clear transition to 2.0	4,4,4,	(1) TOPSOIL FILL
ı				_10_	_		0-0			(2) CONCRETE
ŀ	4	5			8		00	Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15		
1	24	5_	8	_			0_0	to 40% mostly subangular gravel, some	<i></i>	Coarse silty topsoil with little
ŀ	24	-	- 8	_		17	<u> </u>	clay, trace sand, very stiff with nearly		organic matter and sand to 0.3
-	-		_	9			200	vertical gray desiccation cracks,		feet over clayey glacial drift
ł	_	_			14		0 0	(CL).	4.4.4.	with little to some gravel, trace
ŀ	5 8	8					000			sand to 15.5 feet over loamy
ŀ	8	-	-11	Carrie		25	0			glacial drift with little to some
ŀ	_	-		_14			000		필.	gravel, little sand and clay to 23.0 feet over water sorted and
0+	1,0	100			17		0-0-	clear transition to 10.5	[	deposited coarse silt with trace
ŀ	6	10							F BACKETIL	gravel and clay, little to some
ŀ	22	-	15	-	-	29	000	Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly	5.	sand to 23.5 feet over clayey
1		_		14			0-0	subangular gravel, some clay, trace		glacial drift with little to some
-				-	16		000	sand, very stiff, massive soil structure,		gravel, trace sand to 28.0 feet
$\rightarrow$	7	6	7.00				0.00	(CL).	느. 느. 공.	over silty glacial drift with little
-	24		10			24	V 0 V	Workston		to some gravel, little sand and clay to 28.8 feet over water
-				14			000	Î		sorted and deposited sand and
-		_			16		ě ě			gravel with little silt and clay to
-	8	7					000			33.0 feet over water sorted and
54	24		14			31	0 0	clear transition to 15.5		deposited sand with trace gravel
-				17			SO AND			and silt to 38.0 feet over clayey
-					20		000	Extremely moist faintly mottled olive		glacial till to end of boring.
							ا می ه	brown gravelly (SAND-SILT-CLAY)		
1							00.0	with 15 to 40% gravel, little sand and clay, very stiff, weakly stratified.		Note: advanced bore hole with 4
_							0.00	(SC).		1/4 inch ID x 8 inch OD hollow
							-00 Q			stem auger casing with
	9	11					000			continuous split spoon sampling
L	12		10			19	-0 <del>0</del> 0			to 16.0 feet. Continued below
				9			070	*		with auger with 5 foot interval
o L					13		0.0			sampling to 40.0 feet.



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059

(716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-62-15

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 482, Northing: 881076,686859

Town of Arkwright, Chautaugua Co., NY

Easting: 965021,564962

CLIENT Fisher Associates

DATE STARTED 04/21/15 COMPLETED 04/21/15

DEPTH BLOWS ON IN FT SAMPLER

10B13a

	SN REC	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION WELL WATER TABLE AND REMARKS
2.								Extremely moist faintly mottled olive brown gravelly (SAND-SILT-CLAY) with 15 to 40% gravel, little sand and clay, very stiff, weakly stratified, (SC).  grades downward to 23.0
	10	3				1	0 0 0 0	
	17	,,	6	6		12	0-0-0	brownish olive gray (SANDY-SILT) with 5 to 10% gravel, little to some
25—				-0	9			sand, trace clay, loose, weakly stratified, (ML).
							000	grades downward to 23.5  Extremely moist olive gray gravelly
							000	(CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace
-								sand, stiff, massive soil structure, (CL).
	11 24	_11_	15	_		20	0.0	grades downward to 28.0
30—				23	40	38	00000 0030	Extremely moist faintly mottled olive brown gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel, little sand and clay, stiff,
							000	massive soil structure, (ML-CL).  clear transition to 28.8
	12	24					000 000 000	Extremely moist faintly mottled brownish gray very gravelly (SAND-SILT-CLAY) with 40 to 60%
	24	24	70			161	2	mostly subrounded gravel, little silt and clay, hard, weakly stratified, (SC).
				91		101		grades downward to 33.0
35—					76		9	Extremely moist highly mottled brownish gray (SAND) with 5 to 10%
							b	gravel, very fine to very coarse size sand, trace silt, very dense, stratified, (SW).
_							0.000	grades downward to 38.0
	13 23	22	34			63	000	Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly
40				29	46		0.00	subangular gravel, some clay, trace sand, hard, massive soil structure, (CL).

Boring completed at 40.0 feet.

40.0



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059

(716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-64-15

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 480, Northing: 881054,260773

Town of Arkwright, Chautaugua Co., NY

Easting: 965984.851068

CLIENT Fisher Associates

DATE STARTED 04/23/15 COMPLETED 04/23/15

DEPTH BLOWS ON IN FT SAMPLER

TIM	FI		JAN	IPLEK				
	SN EC	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION  WELL  WATER TABLE AND REMARKS
	1	2						\ Extremely moist black (MUCK), granular ← 0.5'
	12		2			4		soil structure, (OL).
				2		9	à 6	0.4
Г					1	1	000	
Г	2	1			1 7	1	0000	Extremely moist brown (SANDY-SILT)
_	16	-4-	6			88835	0 00	with 3 to 5% gravel, little sand, trace
H	-		-6			16	0000	clay, very loose, blocky soil structure, (1) TOPSOIL FILL
$\vdash$	_			10_	Y2/	ł	0000	(2) CONCRETE
-		owen i	- 1		12	1	0 0	grades downward to 1.5
	3	6				-	0000	Extremely moist faintly mottled brown
- 1	16		9			17	0 0	gravelly (SANDY-SILT) with 15 to 40% Note: GLP-64-15 drilled 5.0 feet
_	_			8			0000	mostly subangular gravel, little sand, northwest of staked location.
					10		0 00	trace clay, compact with brittle
L	4	4					000	consistence, massive soil structure,
1	10		8			13	0 00	(SM). Organic rich mucky surface to
				5		13	000	20.4 feet over coarse silty slack
					4		0 0	grades downward to 8.0 water sediment with trace grave
1	5	2			-		2.0	Extremely moist distinctly mottled and clay, little sand to 1.5 feet
	8	-	3				0.00	gravies brown gravelly
H	•	-	3	_		8	رين دي	(CAND CILT CLAY) 15 15 20%
-	-			5			500.0	gravel, little salt and clay, stiff, massive
					4		0.00	gravel, little silt and clay, stiff, massive soil structure, (SC).  gravel, little silt and clay, stiff, massive feet over sandy glacial drift with little to some gravel, little silt and clay to 12.0 feet over water
100	6	6					F0 0 4	and clay to 12.0 feet over water
2	20		5			10	000	sorted and deposited sand with
				5		.0587	- 0 b V	12 0 little to some gravel, little silt,
					5		-0-0	sorted and deposited sand with  12.0  12.0  12.0  12.0  12.0  13.0 feet over silty
	7	3					0000	Extremely moist faintly mottled grayish Slack water sediment with little
2	22		6			11	0 0	brown gravelly (SILTY-SAND) with 15 clay to 14.0 feet over water
				5		- 11	70.70	to 40% mostly subrounded gravel, very sorted and deposited sand with
					7			fine to very coarse size sand, little some gravel, trace silt and clay
-	8	2					7.00.	silt, trace clay, compact, stratified, to 23.5 feet over coarse silty
1	6	2	-				0.0.0	(SM). slack water sediment with little
+'		-	5	_	-	10	0.00	13.0 sand to 28.0 feet over clayey
		-		5	750.5		0.0.0	Extremely moist faintly mottled grayish glacial drift with trace gravel and sand to 33.0 feet over clavey
_	+				6		00	beauty (OLAVEY OTLT) with Butter of the Control of
_	_						0.0.0.0	stiff, thinly laminated, (ML-CL).
								14.0 Note: advanced bore hole with 4
							0.0.0	14.0 Note: advanced bore note with 4
								stem auger casing with
	9	4					6	continuous split spoon sampling
			9			26		to 16.0 feet. Continued below
2	U						0 17 11 17	
	-			17		20	6	with auger with 5 foot interval



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059

(716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-64-15

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION <u>Survey ID 480, Northing: 881054.260773</u>

Easting: 965984.851068

Town of Arkwright, Chautauqua Co., NY

DATE STARTED 04/23/15 COMPLETED 04/23/15

DEPTH BLOWS ON IN FT SAMPLER

CLIENT Fisher Associates

10B13a

SI	1 ^	0.0	337	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
							0.0.0	Extremely moist brownish gray gravelly	-, -, -,	
		_					00	(SAND) with 20 to 40% mostly		
							0.0.0	subrounded gravel, very fine to very		
								coarse size sand, trace silt and clay,		
							0.0.0	loose, compact below 18.5 feet,		
							0.00	stratified with occasional thin coarse silt seam below 18.0 feet, (SW).	(S. 48.48)	
10		4					0.0.0	\ 23.5		
22		- 2	13			28		\	F. F. F.	
				15				Extremely moist olive gray		
					12			(SANDY-SILT) with little sand,		
								compact, thinly bedded, (ML).	F. F. F.	
_			_							
								grades downward to 28.0		
_11	_	1	_					Extremely moist olive gray gravelly	片· / / 有	
12	4		4			11	0 -0 -0	(CLAYEY-SILT) with 5 to 10% gravel,		
				7			0 0 0	some clay, trace sand, stiff, massive soil structure, (CL).	Ď	
					88			son structure, (or).	<del>V</del>	Water level at 29.9 feet below
_	_		_	_			0 0		T. High	ground surface at completion.
	4					5	0 0 0		[85.75. <b>E</b> ]	
-	_		-						T- T- 8	
_	-	-	-				0		A:A:A:	
-	-	-	-				0 0 0	grades downward to 33.0		
		-		-						
12	0 10 10		_				000	Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly	F. F. F.	
16	+	-	7	-		17	0-0	subangular gravel, some clay, very		
-	-	+	-	10			000	stiff, hard below 39.5 feet, massive soil		
-	-	-	-	-	-11		0.00	structure, (CL).	F3.75.753	
_	+-	-	+	_			0 0			
$\vdash$	+	+	-				000			
-		+	_				00		<b>性态性态性</b> 到	
-	-	+	-				00		医阴道阴道的	
-	-	+	-	-			0-0-0			
-	-	+	-	10			000		traction to	
-	+	+	+	_			000			
- 2	-	-	_	-			000			
13	5			_	-		-0-		1.50	



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-64-15

10B13a

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 480, Northing: 881054,260773

Town of Arkwright, Chautaugua Co., NY

Easting: 965984.851068

CLIENT Fisher Associates

DATE STARTED 04/23/15 COMPLETED 04/23/15

DEPTH BLOWS ON IN FT SAMPLER

INFI			LEN			т т			
SN	0/ 6	6/	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
			25	36	46	0-0	Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, hard, massive soil structure, (CL).		← CUTTINGS BACKFILL ← 41.0'
							Boring completed at 41.0 feet.		
							E		



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-67-15

10B13a HOLE NO.

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 478, Northing; 881026,669357

Town of Arkwright, Chautaugua Co., NY

Easting: 967170.007803

CLIENT Fisher Associates

20

DATE STARTED 04/20/15 COMPLETED 04/21/15

DEPT IN F			WS ON	1					
SN REC		6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	(I) B MELL	WATER TABLE AND REMARKS
1	WH						Wet dark olive gray (CLAYEY-SILT)		← 0.5'
20		2			4		topsoil with little organic matter, some	3-3-3	7 0.5
			2				clay, very soft, granular soil structure,	5 3 5 3 Q	
6				5		0 -00 -0	(CL).	15,5,4	
2	5				1	200	0.3		← 2.0
24	1	6				000			
		1	6		12	- 25	Extremely moist dark brown	tartarta	(1) TOPSOIL FILL
	_		10	_	ĺ	0 0	(SAND-SILT-CLAY) topsoil with little		(2) CONCRETE
	1000			-8	1	000	organic matter, silt and clay, soft, granular soil structure, (SC).		(E) GONGHETE
3	3	(40)	9.70		1	6 6	The second of th	4.4.4.	
24	1	6			12	CAC	1.5		WH: Sampler penetration with
-		-	6			0 0	Extremely moist distinctly mottled olive		weight of rods and hammer.
-				8		00.0	brown (CLAYEY-SILT) with 10 to 15%		<del></del>
4	4					0 0	gravel, some clay, trace sand, stiff		
24		7			17	0000	with nearly vertical gray desiccation		Augers left in bore hole over
			10		111	O -O	cracks, (CL).		night at 33.0 feet, no water in
				11		000	grades downward to 2.0		bore hole the next morning.
5	5					0,0	Extremely maint distinctly mattled alive	-, -, -,	
24	1-5	7			2000.000	LOAG	Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15		
24	<del>                                     </del>	-		_	15	0_00	to 40% mostly subangular gravel, some		Clayey topsoil with little organic
-	-		8			000	clay, trace sand, stiff, very stiff below	글.	matter to 0.3 feet over sandy
-	-	_		_7		0-0-	6.5 feet with nearly vertical gray		topsoil with little organic matter,
6	4	_				000	desiccation cracks, (CL).	BACKFILL	silt and clay to 1.5 feet over clayey glacial drift with little
20		6			15	0_0	grades downward to 9.0		gravel, trace sand to 2.0 feet
			9			000		E	over clayey glacial drift with
				13		0_0	Extremely moist olive gray gravelly	4. 4. 詹川	little to some gravel, trace sand
7	4					000	(CLAYEY-SILT) with 15 to 40% mostly	5	to 14.0 feet over water sorted
22		6				0	subangular gravel, some clay, trace		and deposited sand with little to
		Ť	8	-	14	<u> </u>	sand, stiff, massive soil structure,		some gravel, trace silt to 15.5
-			0			0	(CL).		feet over silty glacial drift with
_	-			14		<del>ÀNON</del>	14.0		little gravel and clay, trace sand
17	5	_		_		0.0.0	Wet olive gray gravelly (SAND) with 15	Strait vita	to 18.0 feet over water sorted
.17	-	7			14	0.00.	to 40% mostly subrounded gravel, very		and deposited sand with little silt
	-		7			F0 50	fine to very coarse size sand, trace		to 19.5 feet over silty glacial
				9		DO d	silt, compact, stratified, (SW).		drift with little to some gravel,
						6 20 000	15.5	73/73/73	little clay, trace sand to 28.0
						000			feet over clayey glacial drift
						0,0	Wet olive gray gravelly		with little to some gravel, trace
						1000	(CLAYEY-SILT) with 15 to 20% gravel,		clay to 34.5 feet over siltstone
9	4						little clay, trace sand, stiff, massive		rock to refusal.
22	4	_					soil structure, (ML-CL).	14/14/14	
22		9			18	100000000000000000000000000000000000000	grades downward to 18.0	STOKETOKASTA	



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059

(716) 655-1717 • FAX (716) 655-2915 10B13a HOLE NO. GLP-67-15

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 478, Northing: 881026,669357

Town of Arkwright, Chautaugua Co., NY

Easting: 967170.007803

CLIENT Fisher Associates

DATE STARTED 04/20/15 COMPLETED 04/21/15

DEPTH BLOWS ON IN FT SAMPLER

	SN REC	0/ 6	6/	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
0 000 000 000 000 000 000 000 000 000								Wet olive gray (SILTY-SAND), very fine size sand with little silt, compact, tends to liquefy when disturbed, thinly bedded, (SM).  grades downward to 19.5		Note: advanced bore hole with 4 1/4 inch ID x 8 inch 0D hollow stem auger casing with continuous split spoon sampling to 16.0 feet. Continued below
-	10	5					o .o -0 0 0 o .o	Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly		with auger with 5 foot interval sampling to 34.9 feet.
	16		6	10	13	16	700-0 00-0	subangular gravel, little clay, trace sand, very stiff, massive soil structure, (ML-CL).		EDI Rock Hardness Classification
25—									BACKFILL I	Medium hardness: can be easily etched with knife.
_							-000 000 000	grades downward to 28.0	The state of the state of the state of	
	11 22	4	8	10		18	0.00	Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace	ָר. ר. כערדוו	
30—				10	13			sand, very stiff, massive soil structure, (CL).		
	12	7	19				000			
35—				100/5			777	Olive gray siltstone rock, medium hardness.		← 34.9'
								Split spoon refusal at 34.9 feet.		
-										
40										



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915

10B13a

HOLE NO. GLP-70-15

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 477, Northing: 881360,298842

Town of Arkwright, Chautaugua Co., NY

Easting: 968575.582833

CLIENT Fisher Associates

DATE STARTED 04/20/15 COMPLETED 04/20/15

	DEPTH IN FT			WS ON						
	SN REC	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	(I) Z WELL	WATER TABLE AND REMARKS
	1	2						Extremely moist dark brown		← 0.5'
	13		3_		-	6		(SAND-SILT-CLAY) topsoil with 5 to	1 5 5 5 5	C. 200 A 000 CD
- 1				3_			000	10% gravel, little organic matter, sand	5 5 6 a	
					4	-	0-0-	and clay, firm, granular soil structure, (ML-CL).	3 3 3	← 2.0
-	2	7	923	_		1	000	1.0		
ł	20		8		-	16	0.00		'	(1) TOPSOIL FILL
1	-			8	-	ł	0 · · · · · ·	Extremely moist distinctly mottled olive		(2) CONCRETE
1	3	3			-	ł	000	brown (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay,		(2) SONONETE
1	18	3	4				00	trace sand, very stiff, stiff below 4.0	to to to	
5	10		_4_	5		9	000	feet with nearly vertical gray		Silty topsoil with little organic
Ì				_ 0	8			desiccation cracks, (CL).		matter, sand and clay, trace gravel to 1.0 feet over clayey
İ	4	4			0	ĺ	5,70	grades downward to 6.	0	glacial drift with little to some
Ì	22		5				0.0	Extremely moist olive gray gravelly	F. F. F.	gravel, trace sand to 6.0 feet
_ [				7		12	00.0	(SAND-SILT-CLAY) with 15 to 40%		over silty glacial drift with little
					6		0 0	mostly subangular gravel, little sand		to some gravel, little sand and
	5	3					000	and clay, stiff and very stiff, massive soil structure, (ML-CL).		clay to 15.0 feet over clayey glacial drift with little to some
[	16		5			15	0.00	Son Structure, (INC CE).		gravel, trace sand to 34.5 feet
				10		10	-0 0 Q			over shale rock to refusal.
10-					8		-070		L L L	
	6	5					0 0		<u>š</u> .	Note: advanced bore hole with 4
-	22		8			19	0.00		60	1/4 inch ID x 8 inch OD hollow
-				_11_			0.60.			stem auger casing with
-					18		0000		h. t. 图4	continuous split spoon sampling
-	7	8		_	-	8	000		트 트 공.	to 16.0 feet. Continued below
1	12	_	10	100		21	0,0			with auger with 5 foot interval sampling to 34.9 feet.
ł	-			11			-000			company to 54.0 reet.
ŀ		_		-	17		0.00		H. H. H.	
_	8 24	4	5			1000	20 Q-Q	grades downward to 15	.o <u>.</u> o.	
15+	1		5	8		13	-0	Extremely moist olive gray gravelly		
t			2 1	0	9		是写	(CLAYEY-SILT) with 15 to 40% mostly		
t					9		000	subangular gravel, some clay, trace		
t							0 0	sand, stiff, massive soil structure,		
							200	(CL).		
							0_0		<b>户3.并3.并3</b>	
	9	3					200			
	22	7	6			13	000			
				7					1-1-1-1	
o [					15		000			



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-70-15

10B13a

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 477, Northing: 881360,298842

Town of Arkwright, Chautaugua Co., NY

Easting: 968575.582833

CLIENT Fisher Associates

DATE STARTED 04/20/15 COMPLETED 04/20/15

BLOWS ON DEPTH **IN FT** SAMPLER

7	SN REC	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	I	WELL	WATER TABLE AND REMARKS
E							000	Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostl	V		EDI Rock Hardness Classification
							000	subangular gravel, some clay, trace sand, stiff, massive soil structure,			Medium hardness: can be easily etched with knife.
1							000	(CL).			
-	10 23	_4_	6								
F				8	9	14					
+							0_0				
F							000			r r CKF, IC	
-							<u>0_0</u> 0_0			B A	
F	11	4	_				000			T. T. TTINGS	
-	24		6	9		15	000			_, _, <u>¤</u> ,	
†					10	3	000				
F							000				
1							000				
	12	3					0_0				
	20		5	7		12			34.5	. 4.4	No water at completion.
+					100/5			Olive gray shale rock, medium hardness.		tetta getta getta	← 34.9'
								Split spoon refusal at 34.9 feet.	34.9		
								and and the state of the state			



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-75-15

10B13a

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 475. Northing: 881333.616189

Town of Arkwright, Chautaugua Co., NY

Easting: 970318.967759

CLIENT Fisher Associates

DATE STARTED 04/23/15 COMPLETED 04/24/15

BLOWS ON DEPTH IN FT SAMPLER

	SN	0/ 6	6/	12/	18/	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
	REC		16	10	24				(1) 2	
	1	2					0 0 0	Extremely moist black mucky	***************************************	← 0.5'
	17		2			8	9 0	(SANDY-SILT) topsoil with some	3-3-3	. 0.5
				6		٥	0 0 0 0	organic matter, little sand, very loose,	5 3 5 3 Q T	
					10	1	-0-	granular soil structure, (ML) tending	1 5 1 5 1 4	ore activations.
	2	8			10	1		towards (OL).		← 2.0'
_	21						0.0	0.2		
	- 21		9			18	c. 60.		**************************************	(1) TOPSOIL FILL
		_		9			0.00	Moist faintly mottled orangish brown		(2) CONCRETE
					- 11		0.00	(SANDY-SILT) with 5 to 10% gravel,		(2) CONCRETE
	3	_7			3		F00 A	little sand, very loose, weakly blocky		
5—	8		7			14	0	soil structure, (ML).		Note: GLP-75-15 drilled 7.5 feet
				7			* *	clear transition to 1.5		south of staked location.
					7		2 02 0	Extremely moist faintly mottled olive		The state of the s
	4	2					× 0~~	brown gravelly (CLAYEY-SILT) with 15		
	18		5			10	200	to 20% mostly subangular gravel, some	生,什么什么	Augers left in bore hole over
				5		10	000	clay, trace sand, very stiff, blocky soil	244444	night at 40.0 feet, water level
_	-	-		_5_	_		200	structure, (CL).		the next morning was 10.2 feet
				_	6		000	grades downward to 2.0		below ground surface.
	5	8		_	-		10000			
	8		11			23	-O A-O	Extremely moist faintly mottled olive	*****	Organic rich coarse silty topsoil
				12			0 0	brown gravelly (SAND-SILT-CLAY)		with some organic matter, little
10—					16		50-50	with 15 to 40% mostly subangular gravel, little sand and clay, very stiff	를. 출.	sand to 0.2 feet over coarse
	6	9					-00-0	with nearly vertical gray desiccation	š.	silty glacial drift with little sand,
	18		16			31	00-0	cracks, (ML-CL) tending towards	BA	trace gravel to 1.5 feet over
				15		31	0 0	(SC).		clayey glacial drift with little
					12		000	grades downward to 5.0	L	gravel, trace sand to 2.0 feet over loamy glacial drift with little
	7	5			15		0 0	<u></u>	\$ \$ \$ \$ \$	to some gravel to 5.0 feet over
	24	3	9				0000	Extremely moist distinctly mottled olive	5.	silty glacial drift with little gravel
1			9	-		17	o o	brown (CLAYEY-SILT) with 10 to 15%		to 10.0 feet over loamy glacial
-	-	-		8	26		-0 A C	gravel, little clay, trace sand, stiff,		drift with little to some gravel to
	725				7		0 0	massive soil structure, (ML-CL).	4:4:4:	10.5 feet over silty glacial drift
1	8	3					500-0	grades downward to 6.0		with little to some gravel to 18.0
15_	22		7			17	0 0	Extremely moist distinctly mottled olive	13/13/13	feet over loamy glacial drift with
0/07/				10			0.0	brown gravelly (CLAYEY-SILT) with 15		little to some gravel to 34.0 feet
Į					12		0.00	to 40% mostly subangular gravel, little		over clayey glacial till to end of
							0000	clay, trace sand, stiff, very stiff below	+3.43.43	boring.
							0.00	8.0 feet, massive soil structure,	3000	
Ì							000	¦ (ML-CL).	13 TE TE	Note: advanced bore hole with 4
	-						0.00	grades downward to 10.0		1/4 inch ID x 8 inch OD hollow
	_	_		-			<u> </u>			stem auger casing with
-	9	5					0.00			continuous split spoon sampling
-	23	$\dashv$	9			18	0,00		Mark Control	to 16.0 feet. Continued below
ļ				9			0000			with auger with 5 foot interval
o l					10		0- 0	See next sheet.		sampling to 40.0 feet.



Soil and Hydrogeologic Investigations \* Wetland Delineations

1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-75-15

10B13a

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project LOCATION Survey ID 475, Northing: 881333,616189

Town of Arkwright, Chautaugua Co., NY

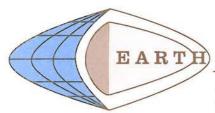
Easting: 970318.967759

CLIENT Fisher Associates

DATE STARTED 04/23/15 COMPLETED 04/24/15

DEPTH BLOWS ON IN FT SAMPLER

	SN REC	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION		WELL	WATER TABLE AND REMARKS
							0 0 0	Extremely moist distinctly mottled olive brown gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular			
								gravel, little sand and clay, hard, very	-	-,	
	10	3					Ō-, Ō }-O ⊕_O	structure, (ML-CL) tending towards (SC).	10.5		
	18		6	10		16	0.00	Extremely moist olive gray gravelly	10.5		
25—					11_			(SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel, trace to little sand and clay, very stiff, massive			
							0.00	soil structure, (ML-CL).	18.0		
							-000 -000	Extremely moist olive gray gravelly (SAND-SILT-CLAY) with 15 to 40%			
	11	4	9				o. ,o )	mostly subangular gravel, little sand and clay, very stiff, massive soil structure, (SC).		<u>.</u>	
20	10		9	15	18	24				P. I.	
30—							0.000			TINGS	
										5. 5.	
	10						0 0-0		<u> </u>		
	20	3	7	13		20	0.0	grades downward to	34.0		
35				10	17			(CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace	<u></u>		
							000	sand, very stiff, massive soil structure, (CL).	-		
							) <del>0</del> 0 <del>0</del>				
	13	5					0 0				
40			11	16	23	27		Boring completed at 40.0 feet.	40.0		← 40.0'



Soil and Hydrogeologic Investigations \* Wetland Delineations

1091 Jamison Road • Elma, NY 14059 (716) 655-1717 • FAX (716) 655-2915 HOLE NO. GLP-80-15

10B13a

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 473. Northing: 881307.118584

Town of Arkwright, Chautaugua Co., NY

Easting: 972050,262077

CLIENT Fisher Associates

DATE STARTED 04/24/15 COMPLETED 04/24/15

DEPTH BLOWS ON IN FT SAMPLER

SN			6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	(I) 3	WATER TABLE AND REMARKS
1	1	1					********	Tytemaly maint to yet dark army		÷ 0.5'
14			2			7	——————————————————————————————————————	Extremely moist to wet dark gray mucky (SANDY-SILT) topsoil with little	3-3-3	£ 0.5
				5			000	to some organic matter, little sand,	5 3 5 3 8 3	
					6	1	0-0-	very loose, granular soil structure,	1,2,5,4	2001
2	c						000	(ML) tending towards (OL).	F. F. F.	← 2.0'
21	· *		9			10000	0.00	0.2	1862/812/81	
	_	$\neg$	9	10		19	000			(1) TOPSOIL FILL
	_			10			9-0-0	Extremely moist faintly mottled dark	L. L. L.	(2) CONCRETE
			-		10		200	gray (CLAYEY-SILT) topsoil with 5 to 10% gravel, little organic matter and		
3	- 3		7		_		000	clay, soft, granular soil structure,	1.50	
24	-	-	9	_		22		(ML-CL).	<b>这</b> 多这多这个	Organic rich coarse silty topsoil
_			-	13			000	0.7		with little to some organic matter
-	-		$\dashv$		14		0-0	Harris I was a superior of the	<b>产3.产3.产3</b>	little sand to 0.2 feet over silty
4	4	_	_				000	Extremely moist distinctly mottled olive	20020	topsoil with little organic matter
24			7			20	0.0	brown gravelly (CLAYEY-SILT) with 15		and clay to 0.7 feet over clayey
				13			200	to 40% mostly subangular gravel, some	<u></u>	glacial till to 13.0 feet over water sorted and deposited sand with
					15		<del>-</del>	clay, trace sand, very stiff, hard below 13.5 feet with nearly vertical gray		little to some gravel, little silt to
5	13	3					0-0-0	desiccation cracks, (CL).		14.0 feet over coarse silty slack
24			19			42	0_0	300000000000000000000000000000000000000	[ <del></del> ]	water sediment with little sand to
	T			23		42	<u>000</u>			15.5 feet over silty slack water
					29		0_0		[** <del>***   ]</del> [	sediment with little clay to 19.5
6	7	,							T. T. BA¢KFIU	feet over clayey glacial till to
24		١,	22			ega <u>u</u> n			BA A	23.0 feet over water sorted and
				23		45	5 6 Y		· · · · se	deposited coarse silt with little
	+	$\vdash$		23	23		0.00		T. T. T.	to some gravel, some sand to
7	1,	_	-		23		0 X			29.0 feet over silty glacial till to refusal.
24	12		-		-		000	grades downward to 13.0	ō.	rerusal.
24		+	19			38	000			
-	+-	+	-	19	- 1		0000	Extremely moist faintly mottled olive brown gravelly (SILTY-SAND) with 15	Table Table	Note: advanced bore hole with 4
		_	$\dashv$		17		0 0	to 40% mostly subrounded gravel, very	P2.42.43	1/4 inch ID x 8 inch OD hollow
8	5		-		_			fine to very coarse size sand, little		stem auger casing with
22			9			19		silt, dense, stratified, (SM).		continuous split spoon sampling
				10				14.0	F. F. F.	to 16.0 feet. Continued below
		$\perp$			16			Manager and the second of the		with auger with 5 foot interval
								Extremely moist faintly mottled brown	1000	sampling to 35.2 feet.
								(SANDY-SILT) with little very fine size	国际实际证明	
							T- (T-	sand, compact, thinly bedded, (ML). grades downward to 15.5		
_	-		-				75.75	3.555		
24	7	_					£32.		<b>生态生态生态</b>	
24			11	-		24				
-		+	-	13			J			
V-14-21-2					27		منمض	See next sheet.	<u> </u>	



Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059 

10B13a

SURF. ELEVATION \_

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project

LOCATION Survey ID 473. Northing: 881307.118584

Town of Arkwright, Chautaugua Co., NY

Easting: 972050,262077

CLIENT Eisher Associates

DATE STARTED 04/24/15 COMPLETED 04/24/15

DEPTH BLOWS ON SAMPLER IN FT

2000-000	SN	0/ 6	6/ 12	12/ 18	18/ 24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
								Extremely moist faintly mottled olive brown (CLAYEY-SILT) with little clay, very stiff, thinly laminated, (ML-CL).  grades downward to 19.5		
	10 8	4	22			78	0 0 0 0 0 0	Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, hard, massive soil structure,		
25—				56	63	,,,	000	(CL). grades downward to 23.0 Extremely moist faintly mottled grayish		
10-								brown gravelly (SANDY-SILT) with 15 to 40% mostly subrounded gravel, some sand, very dense, stratified, (SM).	F F F F F F TILE	
	11 12	6	10/200				000 000 000 000	grades downward to 29.0  Extremely moist olive gray gravelly (SAND-SILT-CLAY) with 15 to 40%	T	
30—	12		17	100/5				mostly subangular gravel and occasional channer, little sand and clay, hard, massive soil structure, (ML-CL).		
	12	27					-000 000 000 000 000			
35—	15		55	100/4				35.2		No water at completion. ← 35.2'
								Auger refusal at 35.2 feet.		
-										
40										

## APPENDIX B

Laboratory Test Results As prepared by Glynn Group



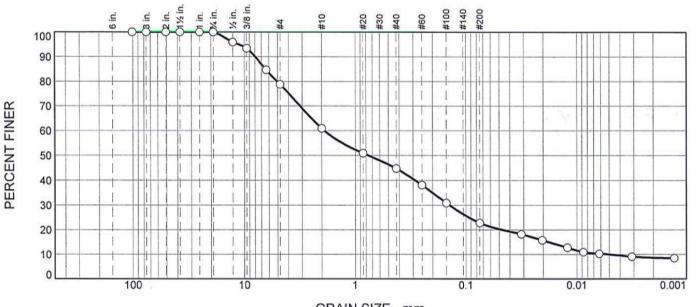
**Project No.: 05-1090** Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: 174 (S3) Sample Number: 15-28

Depth: 4 - 6 ft

Date: 06.13.15



			G	RAIN SIZE -	mm.			
% +3"	% Gr	avel		% Sand		% Fines		
70 +3	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
0.0	0.0	21.2	17.9	16.2	21.9	12.8	10.0	

SIEVE	PERCENT	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0	T LITTOLITY	(110)
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	95.9		
3/8"	93.4		
1/4"	84.7		
#4	78.8		
#10	60.9		
#20	50.9		
#40	44.7		
#60	38.1		
#100	30.9		
#200	22.8		

	22.0
(no specif	ication provided)

500 87 87 87 87 87 87 87 87 87 87 87 87 87	Material Description	<u>on</u>
silty sand with g	gravel	
PL= NP	Atterberg Limits LL= NV	PI= NP
D <sub>85</sub> = 6.4382 D <sub>30</sub> = 0.1404 C <sub>u</sub> = 371.46	Coefficients D60= 1.8949 D15= 0.0179 C <sub>C</sub> = 2.04	D <sub>50</sub> = 0.7597 D <sub>10</sub> = 0.0051
USCS= SM	Classification AASHT	O= A-1-b
	Remarks	

**Figure** 

GLYNN GEOTECHNICAL ENGINEERING





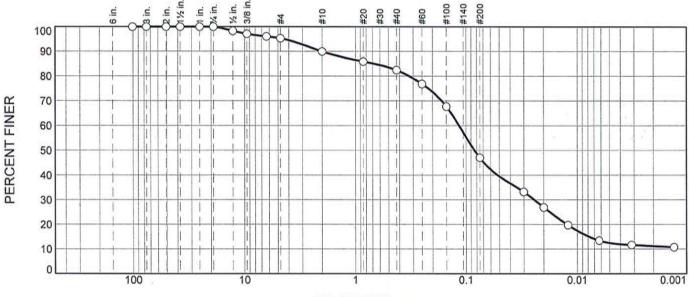
Project: Arkwright Project No.: 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-485 (S4) Sample Number: 15-31

Depth: 6 - 8 ft

Date: 06.13.15



GRAIN SIZE - mm.								
0/ . 211	% Gr	avel	% Sand			% Fines		
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
0.0	0.0	4.7	5.3	7.6	35.4	34.6	12.4	

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	98.3		
3/8"	97.1		
1/4"	96.1		
#4	95.3		
#10	90.0		
#20	85.8		
#40	82.4		
#60	76.8		
#100	67.7		
#200	47.0		

AND THE PROPERTY OF THE PARTY O	Section of the sectio
(no specification	on provided)

silty sand	Material Description	on
5.		
PL= NP	Atterberg Limits	PI= NP
D <sub>85</sub> = 0.6841 D <sub>30</sub> = 0.0243 C <sub>u</sub> =	$     \begin{array}{r}       \text{Coefficients} \\       \hline       D_{60} = 0.1153 \\       D_{15} = 0.0078 \\       C_{c} =     \end{array} $	D <sub>50</sub> = 0.0837 D <sub>10</sub> =
USCS= SM	Classification AASHT	O= A-4(0)
	Remarks	

**Figure** 

#### GLYNN GEOTECHNICAL ENGINEERING





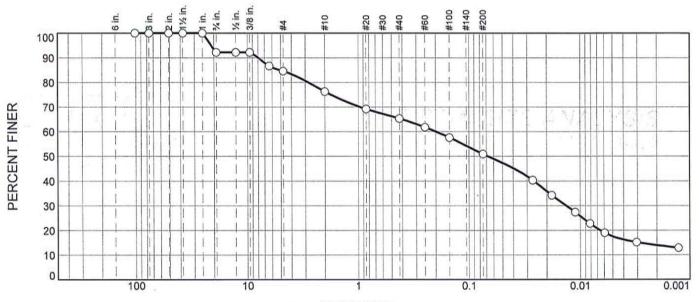
Project: Arkwright Project No.: 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-487 (S3) Sample Number: 15-34

**Depth:** 4 - 6 ft

Date: 06.13.15



GRAI	N S	IZE	mm	ß

0/ .011	% Gr	avel		% Sand	allow with the second s	% Fine	es
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.8	7.5	8.4	11.0	14.4	33.3	17.6

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	92.2		
1/2"	92.2		
3/8"	92.2		
1/4"	86.7		
#4	84.7		
#10	76.3		
#20	69.2		
#40	65.3		
#60	61.8		
#100	57.6		
#200	50.9		

(1	io sp	ecif	icati	on p	orovi	ded)
----	-------	------	-------	------	-------	------

Ī	Material Descriptio	<u>in</u>
PL=	Atterberg Limits	PI=
D <sub>85</sub> = 5.0286 D <sub>30</sub> = 0.0134 C <sub>u</sub> =	Coefficients D <sub>60</sub> = 0.1989 D <sub>15</sub> = 0.0029 C <sub>c</sub> =	D <sub>50</sub> = 0.0677 D <sub>10</sub> =
USCS=	Classification AASHT	O=
Atterberg testing	Remarks g not performed.	

**Figure** 

#### GLYNN GEOTECHNICAL ENGINEERING





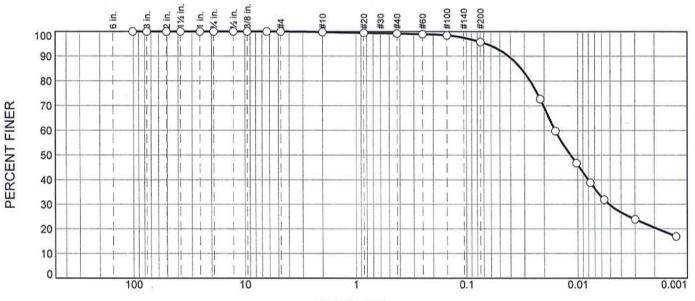
Project: Arkwright Project No.: 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-490 (S8) Sample Number: 15-37

Depth: 14 - 16 ft

Date: 06.13.15



<b>GRAIN</b>	SIZE -	mm.
--------------	--------	-----

0/ . 211	% Gr	avel		% Sand	NOTE AND ADDRESS OF THE PARTY O	% Fin	es
% +3	% +3" Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.6	3.4	66.2	29.6

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	100.0		
#4	100.0		
#10	99.8		
#20	99.5		
#40	99.2		
#60	99.0		
#100	98.5		
#200	95.8		

1/2/11/19		1 200	740000		6
(no	spec	ifica	tion	provided	1
(110	Spec	*****		provided	,

PL=	Atterberg Limits	PI=
D <sub>85</sub> = 0.0321 D <sub>30</sub> = 0.0051 C <sub>u</sub> =	Coefficients D <sub>60</sub> = 0.0160 D <sub>15</sub> = C <sub>c</sub> =	D <sub>50</sub> = 0.0116 D <sub>10</sub> =
USCS=	Classification AASHT	O=
Atterberg testing	Remarks g not performed.	

**Figure** 

#### GLYNN GEOTECHNICAL ENGINEERING





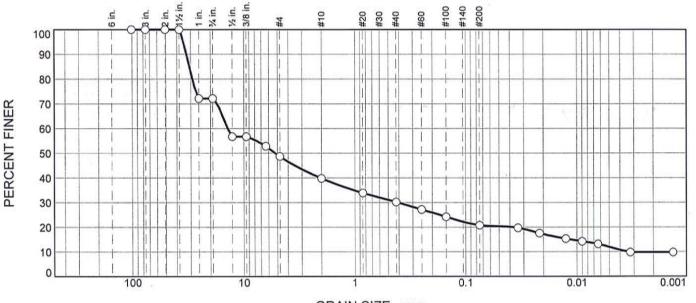
Project: Arkwright Project No.: 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-491 (S7) Sample Number: 15-40

Depth: 12 - 14 ft

Date: 06.13.15



			Gl	RAIN SIZE -	mm.		
% +3"	% Gr	avel		% Sand		% Fin	es
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	27.8	23.5	8.9	9.6	9.4	. 8.9	11.9

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	72.2		
3/4"	72.2		
1/2"	56.7		
3/8"	56.7		
1/4"	52.9		
#4	48.7		
#10	39.8		
#20	33.9		
#40	30.2		
#60	27.2		
#100	24.2		
#200	20.8		

#200	20.8
(no specif	ication provided)

1	Material Descriptio	n
silty gravel with	sand	
PL= NP	Atterberg Limits LL= NV	PI= NP
D <sub>85</sub> = 30.8652 D <sub>30</sub> = 0.4103 C <sub>u</sub> = 4115.27	Coefficients D <sub>60</sub> = 13.9711 D <sub>15</sub> = 0.0114 C <sub>C</sub> = 3.55	D <sub>50</sub> = 5.2304 D <sub>10</sub> = 0.0034
USCS= GM	Classification AASHT	O= A-1-b
	Remarks	

**Figure** 

GLYNN GEOTECHNICAL ENGINEERING





**Project No.: 05-1090** 

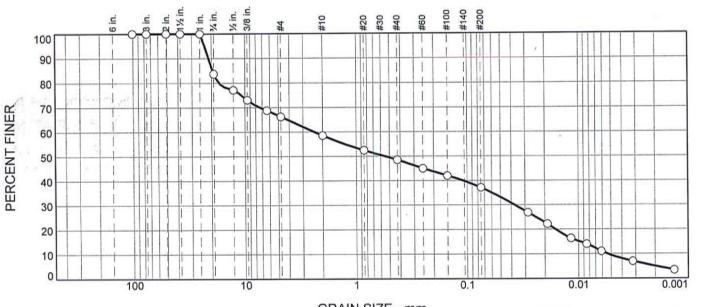
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL 493 (S3) Sample Number: 15-43

Depth: 4 - 6 ft

Date: 06.23.15



			Gi	RAIN SIZE -	mm.		
04 . 011	% Gr	avel		% Sand		% Fin	es
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.3	17.4	7.7	10.0	11.5	27.6	9.5

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0	590	
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	83.7		
1/2"	77.2		
3/8"	73.1		
1/4"	68.8		
#4	66.3		
#10	58.6		
#20	52.5		
#40	48.6		
#60	45.1		
#100	42.0		
#200	37.1		

· .		Charles Committee	/W	■ **************	4.71 N. K. C. C. C. C.	13
(	no	speci	fical	non	provid	ed)

<u>M</u>	aterial Descriptio	<u>on</u>
PL=	Atterberg Limits LL=	PI=
D <sub>85</sub> = 19.5520 D <sub>30</sub> = 0.0373 C <sub>u</sub> = 438.81	$\frac{\text{Coefficients}}{D_{60} = 2.3676} \\ D_{15} = 0.0097 \\ C_{c} = 0.11$	D <sub>50</sub> = 0.5436 D <sub>10</sub> = 0.0054
USCS=	Classification AASHT	O=
Atterberg testing	Remarks not performed.	

**Figure** 

#### GLYNN GEOTECHNICAL ENGINEERING



**Project No.: 05-1090** 

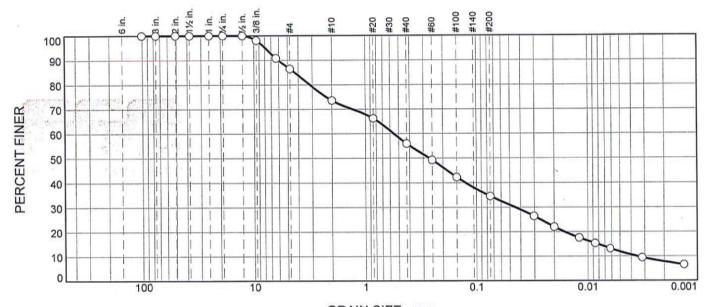
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-494 (S5) Sample Number: 15-46

Depth: 8 - 10 ft

Date: 06.23.15



	% Gr	avel		% Sand		% Fine	es
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.5	12.9	17.7	21.3	22.7	11.9

SIEVE	PERCENT	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		( )
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	98.1		
1/4"	90.9		
#4	86.5		
#10	73.6		
#20	66.3		
#40	55.9		
#60	49.3		
#100	42.2		
#200	34.6		

_			
•		1.00	
	(no	specification	provided)
	(110	specification	provided

	Material Description	<u>on</u>
silty sand		
PL= NP	Atterberg Limits	PI= NP
D <sub>85</sub> = 4.2893 D <sub>30</sub> = 0.0447 C <sub>u</sub> = 156.66	Coefficients D60= 0.5537 D15= 0.0081 Cc= 1.02	D <sub>50</sub> = 0.2652 D <sub>10</sub> = 0.0035
USCS= SM	Classification AASHT	O= A-2-4(0)
	Remarks	

**Figure** 

GLYNN GEOTECHNICAL ENGINEERING





**Project No.: 05-1090** 

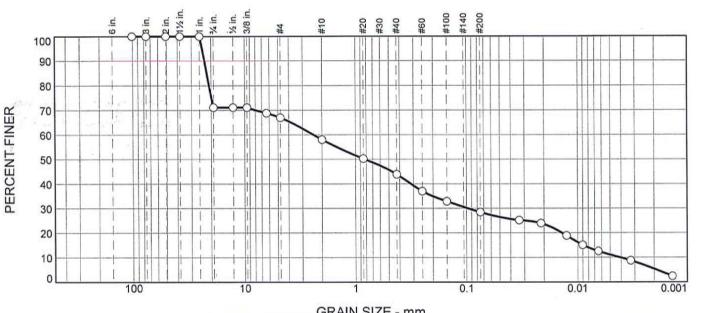
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-495 (S2) Sample Number: 15-49

Depth: 2 - 4 ft

Date: 06.23.15



9/ . 21	% Gr	avel		% Sand		% Fine	es
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	28.9	4.1	9.0	14.1	15.5	17.3	11.1

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	71.1		
1/2"	71.1		
3/8"	71.1		
1/4"	68.8		
#4	67.0		
#10	58.0		
#20	50.3		
#40	43.9		
#60	37.0		
#100	32.9		
#200	28.4	1	

(no	speci	ficat	ion	provided	1
(110	Speci	neau	1011	provided	,

N silty sand with gr	laterial Description	<u>on</u>
	Attorborg Limits	
PL= NP	Atterberg Limits	PI= NP
D <sub>85</sub> = 21.8908 D <sub>30</sub> = 0.0971 C <sub>u</sub> = 587.86	Coefficients D60= 2.3924 D15= 0.0090 C <sub>c</sub> = 0.97	D <sub>50</sub> = 0.8229 D <sub>10</sub> = 0.0041
USCS= SM	Classification AASH	ΓO= A-2-4(0)
	Remarks	,

**Figure** 

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415 South Transit Street, Lockport, New York 14094 voice 716.625.6933 / fax 716.625.6983 www.glynngroup.com

Reviewed by



Project No.: 05-1090

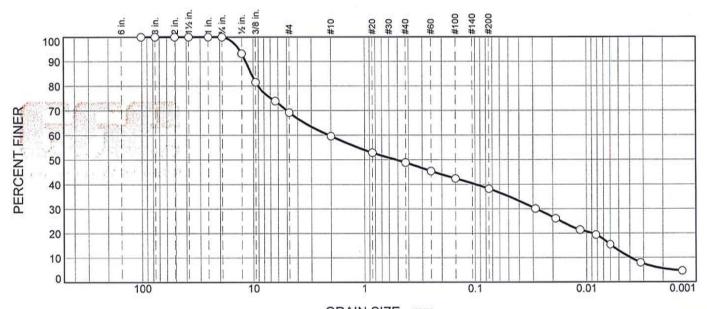
**Project:** Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-496 (S4) Sample Number: 15-52

**Depth:** 6 - 8 ft

Date: 06.23.15



GRAIN SIZE - mm. % Gravel % Sand %						% Fine	es
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	30.8	9.6	10.7	10.7	25.4	12.8

SIEVE	PERCENT	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0	4.	
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	93.2		
3/8"	81.6		
1/4"	73.8		
#4	69.2	3	
#10	59.6		
#20	52.9		
#40	48.9		
#60	45.4		
#100	42.4		
#200	38.2		

fication	provided)
	fication

<u>N</u>	Material Descriptio	<u>on</u>
PL=	Atterberg Limits	PI=
D <sub>85</sub> = 10.4083 D <sub>30</sub> = 0.0282 C <sub>u</sub> = 528.68	Coefficients D <sub>60</sub> = 2.0867 D <sub>15</sub> = 0.0059 C <sub>c</sub> = 0.10	D <sub>50</sub> = 0.5149 D <sub>10</sub> = 0.0039
USCS=	Classification AASHT	O=
Atterberg testing	Remarks g not performed.	

**Figure** 

#### GLYNN GEOTECHNICAL ENGINEERING

415 South Transit Street, Lockport, New York 14094 voice 716.625.6933 / fax 716.625.6983 www.glynngroup.com

MW/Mpw
Reported/Reviewed by



Project No.: 05-1090

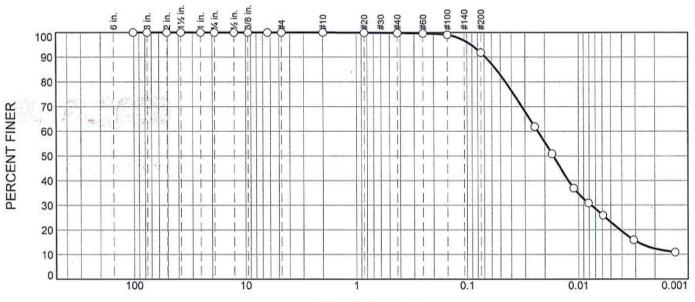
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-497 (S4) Sample Number: 15-55

Depth: 8 - 10 ft

Date: 06.23.15



GR	AIN	SI	ZE	_	mm

0/ . 9!!	% Gravel % Sand		2300000000	% Fines			
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	8.0	68.7	23.1

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	100.0		
#4	100.0		
#10	100.0		
#20	99.9		
#40	99.8		
#60	99.6		
#100	99.1		
#200	91.8		

(no	specification	provided)

	Material Description	<u>on</u>
silt		
PL= NP	Atterberg Limits	PI= NP
D <sub>85</sub> = 0.0547 D <sub>30</sub> = 0.0077 C <sub>u</sub> =	Coefficients D60= 0.0231 D15= 0.0029 Cc=	D <sub>50</sub> = 0.0167 D <sub>10</sub> =
USCS= ML	Classification AASHT	O= A-4(0)
	Remarks	

**Figure** 

GLYNN GEOTECHNICAL ENGINEERING





**Project No.:** 05-1090

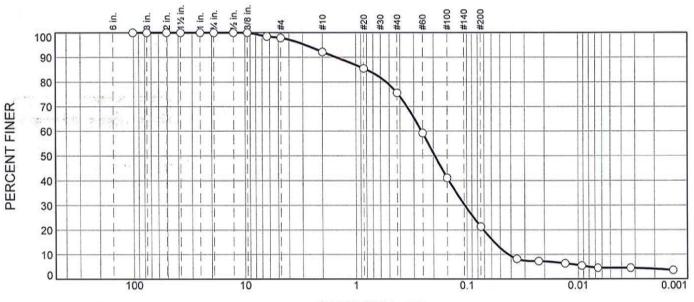
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-498 (S5) Sample Number: 15-58

Depth: 8 - 10 ft

Date: 06.23.15



			GI	RAIN SIZE -	mm.		
97 . 911	% Gr	avel		% Sand	Wighterstan	% Fine	es
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.1	57	16.6	54.2	16.0	1.5

silty sand

SIEVE	PERCENT	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		(/
. 3"	100.0	2	
2"	100.0		
1-1/2"	100.0		
1-0"	100.0	_	
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	98.5		
#4	97.9		
#10	92.2		
#20	85.5		
#40	75.6		
#60	59.2		
#100	41.1		
#200	21.4		

Vs		F	igure	
		<u>Remarks</u>		
	USCS= SM	Classification AASHT	O= A-2-4(0)	
. 1	D <sub>85</sub> = 0.8031 D <sub>30</sub> = 0.1043 C <sub>u</sub> = 6.06	$\begin{array}{c} \underline{\text{Coefficients}} \\ D_{60} = 0.2558 \\ D_{15} = 0.0566 \\ C_{\text{C}} = 1.01 \end{array}$	D <sub>50</sub> = 0.1937 D <sub>10</sub> = 0.0422	
	PL= NP	Atterberg Limits LL= NV	PI= NP	

**Material Description** 

GLYNN GEOTECHNICAL ENGINEERING



<sup>(</sup>no specification provided)



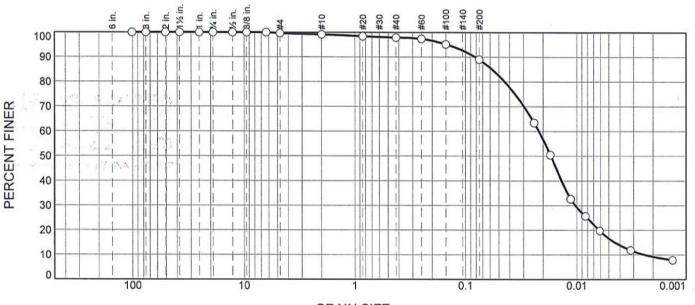
Project: Arkwright Project No.: 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-499 (S4) Sample Number: 15-61

**Depth:** 6 - 4 ft

Date: 06.23.15



GF	₹A	11	1	S	IZE	-	mm	

% +3"	% Gr	avel		% Sand		% Fin	es
7 <sub>0</sub> +3	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	0.5	1.3	8.9	72.4	16.6

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0	(1)	
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	100.0		
#4	99.7	5	
#10	99.2		
#20	98.5		
#40	97.9	2	
#60	97.4		
#100	95.2		
#200	89.0		

(	no	speci	ficatio	n prov	ided)	
---	----	-------	---------	--------	-------	--

	Material Description	<u>on</u>
	Atterberg Limits	
PL=	LL=	PI=
D <sub>85</sub> = 0.0574 D <sub>30</sub> = 0.0103 C <sub>u</sub> = 9.14	Coefficients D <sub>60</sub> = 0.0219 D <sub>15</sub> = 0.0044 C <sub>c</sub> = 2.03	D <sub>50</sub> = 0.0170 D <sub>10</sub> = 0.0024
USCS=	Classification AASHT	O=
Atterberg testin	Remarks ng not performed.	

**Figure** 

#### GLYNN GEOTECHNICAL ENGINEERING





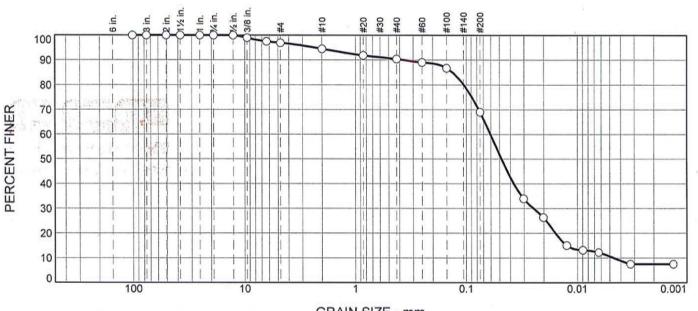
Project: Arkwright Project No.: 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-500 (S4) Sample Number: 15-64

Depth: 6 - 8 ft

Date: 06.23.15



0/ . 211	% Gr	avel		% Sand		% Fine	es
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.0	2.5	4.1	21.4	58.4	10.6

SIEVE	PERCENT	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0	I CALL COMMENTS OF THE SALES	A November 1
3"	100.0		
2"	100.0	-	
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	98.9		
1/4"	97.5		
#4	97.0		
#10	94.5		
#20	91.9		
#40	90.4		
#60	89.0		
#100	86.8		
#200	69.0		

(no specification provided)	(	no sp	ecifi	cation	n prov	ided)
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	Material Descripti	<u>on</u>
sandy silt		2
DI - NB	Atterberg Limits	
PL= NP	LL= NV	PI= NP
D <sub>85</sub> = 0.1324 D <sub>30</sub> = 0.0248 C <sub>u</sub> = 13.06	Coefficients D60= 0.0604 D15= 0.0125 Cc= 2.20	D <sub>50</sub> = 0.0480 D <sub>10</sub> = 0.0046
USCS= ML	Classification AASHT	ΓO= A-4(0)
	Remarks	
8		
1	2	

**Figure** 

## GLYNN GEOTECHNICAL ENGINEERING





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Project: Arkwright

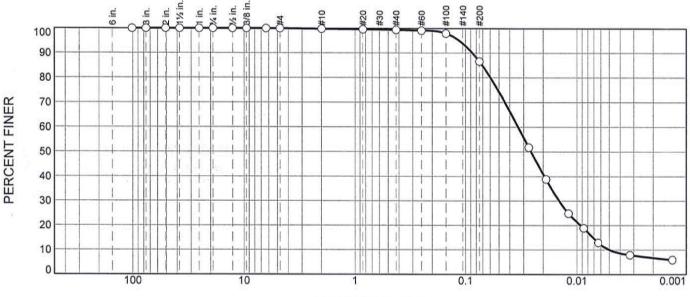
**Project No.: 05-1090** 

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-502 (S7) Sample Number: 15-67

Depth: 12 - 14 ft

Date: 06.23.15



			GI	RAIN SIZE -	mm.		
% +3" % Coarse	% Gravel		% Sand			% Fine	es
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.4	12.8	76.6	10.0

SIEVE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		()( 1(0)
3"	100.0	8.7	
2"	100.0		
1-1/2"	100.0	(a. 4. )	
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	100.0		
#4	100.0		
#10	99.8		
#20	99.6		
#40	99.4		
#60	99.2		
#100	98.0		
#200	86.6		

	1000000 1452	1525 333
(no	specification	provided)

<u>N</u> silt	Naterial Description	on
SIIL		
PL= NP	Atterberg Limits	PI= NP
D <sub>85</sub> = 0.0706 D <sub>30</sub> = 0.0144 C <sub>u</sub> = 6.73	Coefficients D60= 0.0336 D15= 0.0071 Cc= 1.24	D <sub>50</sub> = 0.0257 D <sub>10</sub> = 0.0050
USCS= ML	Classification AASHT	TO= A-4(0)
	Remarks	

**Figure** 

#### GLYNN GEOTECHNICAL ENGINEERING





Project No.: 05-1090

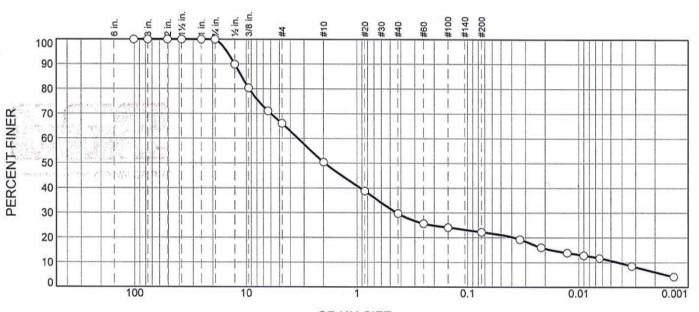
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-503 (S3) Sample Number: 15-70

Depth: 4 - 6 ft

Date: 06.23.15



			GI	RAIN SIZE -	mm.		
% +3" % Coarse	% Gr	avel	% Sand		WANTED STATE OF THE STATE OF TH	% Fin	es
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	33.9	15.7	20.7	7.5	11.5	10.7

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	89.9		
3/8"	80.4		
1/4"	71.1		
#4	66.1		
#10	50.4		
#20	38.8		
#40	29.7		
#60	25.6		
#100	24.1		
#200	22.2		

lna	engoi	fina	tion	provided)	
uno	SUCCI	HCa	поп	Diovided	r

<u>N</u>	Material Description	<u>n</u>
PL=	Atterberg Limits	PI=
D <sub>85</sub> = 10.9957 D <sub>30</sub> = 0.4368 C <sub>u</sub> = 784.85	Coefficients D60= 3.4025 D15= 0.0177 C <sub>C</sub> = 12.93	D <sub>50</sub> = 1.9457 D <sub>10</sub> = 0.0043
USCS=	Classification AASHTO	)=
Atterberg testing	Remarks not performed.	

**Figure** 

GLYNN GEOTECHNICAL ENGINEERING





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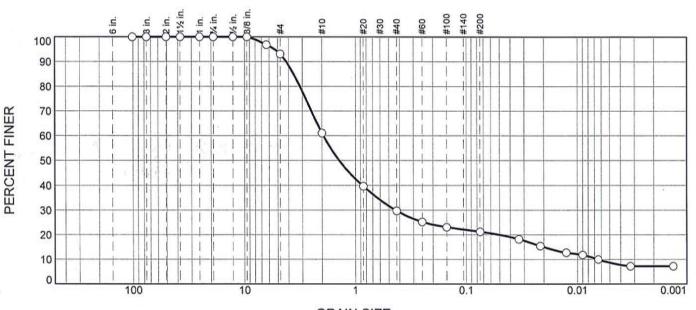
**Project No.: 05-1090** Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-505 (S3) Sample Number: 15-73

Depth: 4 - 6 ft

Date: 06.23.15



 GRAIN SIZE - mm.	
% Sand	% Fine

9/ .2"	% Gravel		% Sand		% Fines		
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.9	32.0	31.4	8.5	12.5	8.7

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0	4	
2"	100.0		
1-1/2"	100.0	1	
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	96.8		
#4	93.1		
#10	61.1		
#20	39.7		
#40	29.7		
#60	25.3		
#100	23.1		
#200	21.2		

(no specification provided)	(no s	specifica	ation p	rovided)
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J	Material Descriptio	<u>n</u>
	A44	
PL=	Atterberg Limits LL=	PI=
D <sub>85</sub> = 3.5976 D <sub>30</sub> = 0.4347 C <sub>u</sub> = 302.72	Coefficients D <sub>60</sub> = 1.9429 D <sub>15</sub> = 0.0199 C <sub>C</sub> = 15.16	D <sub>50</sub> = 1.4003 D <sub>10</sub> = 0.0064
USCS=	Classification AASHT	O=
Atterberg testin	Remarks g not performed.	

**Figure** 

GLYNN GEOTECHNICAL ENGINEERING





**Project No.:** 05-1090

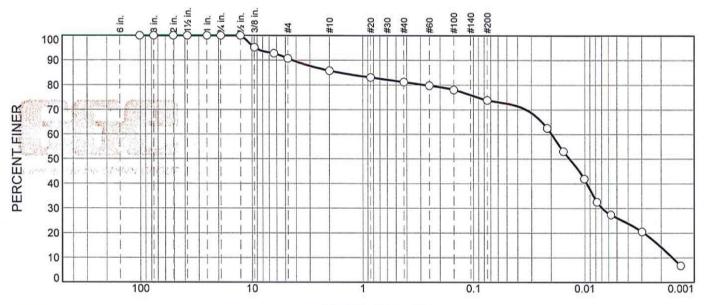
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-509 (S5) Sample Number: 15-76

Depth: 8 - 10 ft

Date: 06.23.15



			GI	RAIN SIZE -	mm.			
0/ +2"	% Gravel		% Gravel % Sand				% Fin	es
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
0.0	0.0	9.3	4.9	4.6	7.3	47.8	26.1	

SIEVE	PERCENT	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0	J.	
3"	100.0	(i)	
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	95.2		
1/4"	92.8		
#4	90.7		
#10	85.8		
#20	83.0		
#40	81.2		
#60	79.8		
#100	78.1		
#200	73.9		

(no specification p	rovided)
---------------------	----------

	Material Descriptio	<u>n</u>
PL=	Atterberg Limits	PI=
D <sub>85</sub> = 1.6227 D <sub>30</sub> = 0.0070 C <sub>u</sub> = 12.53	Coefficients D <sub>60</sub> = 0.0198 D <sub>15</sub> = 0.0021 C <sub>C</sub> = 1.55	D <sub>50</sub> = 0.0137 D <sub>10</sub> = 0.0016
USCS=	Classification AASHT	O=
Atterberg testin	Remarks g not performed.	

**Figure** 

### GLYNN GEOTECHNICAL ENGINEERING





Project No.: 05-1090

a member of the GLYNN GROUP

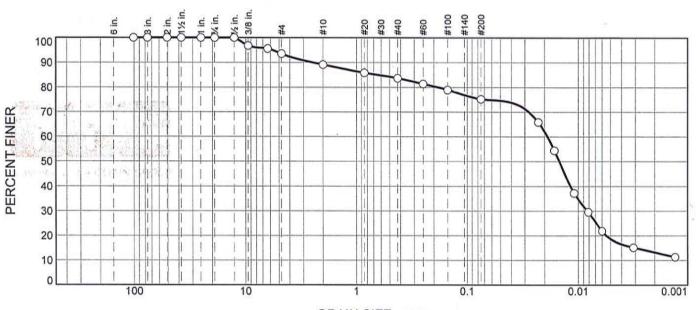
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-511 (S3) Sample Number: 15-79

**Depth:** 4 - 6 ft

Date: 06.23.15



			GI	RAIN SIZE -	mm.				
0/ 12!!	% Gra		% Gravel		% Gravel % Sand		MONGARD	% Fin	es
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	0.0	6.4	4.4	5.5	8.4	56.6	18.7		

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
4"	100.0		
3"	100.0	(=	
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	96.8		
1/4"	95.6		
#4	93.6		
#10	89.2		
#20	85.9		
#40	83.7		
#60	81.4	<u>'</u>	
#100	79.0		
#200	75.3		

March 1	AND SHOULD AND SHOULD BE SHOULD BE	Carlotte Committee Committ	Upwarder Street and the
1	provided	fication	(no speci
1	i provideo	ncation	(no speci

,	Material Descriptio	<u>n</u>
PL=	Atterberg Limits	PI=
D <sub>85</sub> = 0.6318 D <sub>30</sub> = 0.0083 C <sub>u</sub> =	Coefficients D <sub>60</sub> = 0.0188 D <sub>15</sub> = 0.0030 C <sub>C</sub> =	D <sub>50</sub> = 0.0148 D <sub>10</sub> =
USCS=	Classification AASHT	O=
Atterberg testin	Remarks g not performed.	

**Figure** 

### GLYNN GEOTECHNICAL ENGINEERING





**Project No.:** 05-1090

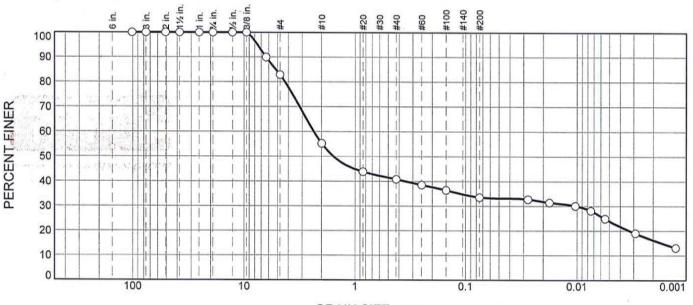
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-517 (S3) Sample Number: 15-82

Depth: 4 - 6 ft

Date: 06.23.15



			GI	RAIN SIZE -	mm.		
% +3"	% Gravel		% Gravel % Sand		% Fines		
76 +3	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	17.1	27.6	14.5	7.3	9.6	23.9

SIEVE	PERCENT	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0	6.6	
2"	100.0	T.	
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	89.9		
#4	82.9		
#10	55.3		
#20	43.9		
#40	40.8		
#60	38.5		
#100	36.4		
#200	33.5		

(no	speci	fication	provided)

	Material Description	1
PL=	Atterberg Limits LL=	PI=
D <sub>85</sub> = 5.1758 D <sub>30</sub> = 0.0100 C <sub>u</sub> =	Coefficients D <sub>60</sub> = 2.3555 D <sub>15</sub> = 0.0017 C <sub>c</sub> =	D <sub>50</sub> = 1.5627 D <sub>10</sub> =
USCS=	Classification AASHTC	)=
Atterberg testing	Remarks ng not performed.	

**Figure** 

## GLYNN GEOTECHNICAL ENGINEERING





**Project No.: 05-1090** 

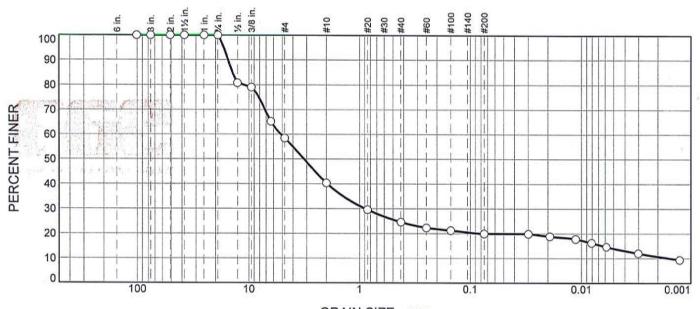
Project: Arkwright

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-520 (S5) Sample Number: 15-85

Depth: 8 - 10 ft

Date: 06.23.15



GRAIN SIZE - mm.							
% +3"	% Gravel		% Sand		% Fines		
/0 T3	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	41.5	18.1	15.8	4.7	5.9	14.0

SIEVE	PERCENT	SPEC.* PERCENT	PASS? (X=NO)
	7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PERCENT	(X-NO)
4"	100.0		
3"	100.0	G.	
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	80.8		
3/8"	79.0		
1/4"	65.3		
#4	58.5		
#10	40.4		
#20	29.6		
#40	24.6		
#60	22.3		
#100	21.2		
#200	19.9		

	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	PR			
(no	speci	ficat	lon	provided)	

N	laterial Descriptio	<u>on</u>
PL=	Atterberg Limits LL=	PI=
D <sub>85</sub> = 14.1203 D <sub>30</sub> = 0.8920 C <sub>u</sub> = 3291.46	Coefficients D <sub>60</sub> = 5.1361 D <sub>15</sub> = 0.0063 C <sub>c</sub> = 99.27	D <sub>50</sub> = 3.1797 D <sub>10</sub> = 0.0016
USCS=	Classification AASHT	O=
Atterberg testing	Remarks not performed.	

**Figure** 

## **GLYNN GEOTECHNICAL ENGINEERING**

