Structure Foundation Exploration Report

ROS-23-13.06/15.67 PID 115446
Chillicothe, Ross County, Ohio
November 23, 2022
Terracon Project No. N1225105

Prepared for:
143 Engineers
Cincinnati, Ohio

Prepared by:
Terracon Consultants, Inc.
Cincinnati, Ohio

November 23, 2022

143 Engineers
3249 Plateau Place
Cincinnati, Ohio 45241

Attn: Ms. Caroline F. Duffy, P.E.
P: (513) 476-6271
E: 143Engineers@gmail.com

Re: Structure Foundation Exploration Report
ROS-23-13.06/15.67 PID 115446
Chillicothe, Ross County, Ohio
Terracon Project No. N1225105

Dear Ms. Duffy:

We appreciate the opportunity to submit this report to 143 Engineers for Geotechnical services for the ROS-23-13.06/15.67 project generally in accordance with ODOT Specifications for Geotechnical Explorations (SGE) and the scope discussed with ODOT D9 and 143 Engineers. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and design parameters for the construction of high mast lighting tower foundations.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

K.M. Dy

Nithya K. Manikkam, E.I.
Staff Engineer

David Westendorf

David W. Westendorf, P.E.
Principal/Group Manager

REPORT TOPICS

Note: This report was originally delivered in a web-based format. For more interactive features, please view your project online at client.terracon.com.

APPENDICES

Note: Refer to each individual Attachment for a listing of contents.

EXECUTIVE SUMMARY

This report presents the findings of geotechnical exploration performed for the proposed high mast tower lighting along ROS-23-13.06 North Merge/Split and ROS 23/159 interchange in Chillicothe, Ross County, Ohio. A total of nine (9) borings were performed to approximate depths of 25 to 30 feet for the proposed high mast tower lighting structure.

Borings B-006 and B-008 encountered fill materials to depths ranging from approximately 8 to 11 feet below the existing ground surface. The fill materials consisted of medium dense silt (A-4b), very loose to loose coarse and fine sand (A-3a) and very stiff to hard silt and clay (A-6a). Existing fill was not encountered in the remaining borings. The native cohesive soils encountered in the borings included medium stiff to hard silt and clay (A-6a), very stiff to hard silty clay (A-6b) and stiff clay (A-7-6). The native granular soils encountered in borings included dense to very dense gravel with sand (A-1b), medium dense to very dense gravel with sand, silt, and clay (A-2-6 / A-2-7), medium dense to very dense coarse and fine sand / fine sand (A-3a / A-3), medium dense to dense sandy silt / silt (A-4a/ A-4b).

Borings B-001 and B-003 encountered groundwater during drilling at depths of approximately 14.5 and 20.5 feet below ground surface respectively (about elevation of 613.3 feet and 601.1 feet respectively). Groundwater was not encountered in any of the other borings during drilling and after completion.

Based on the subsurface conditions encountered at the site, it is recommended that a deep foundation system consisting of drilled shaft be employed for the support of proposed structure. The recommended design parameters are presented in this report.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. This report do not include ODOT submittals such as cover sheet, plan and profile and design checklists. It will be included along with the stage 2 report submission. The section titled **General Comments** should be read for an understanding of the report limitations.

Structure Foundation Exploration Report

ROS-23-13.06/15.67 PID 115446

Chillicothe, Ross County, Ohio

Terracon Project No. N1225105

November 23, 2022

INTRODUCTION

The project consists of high mast tower lighting along ROS-23-13.06 (North Merge/Split) and ROS 23-15.67 (23/159 interchange) in Chillicothe, Ross County, Ohio. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and design parameters for the construction of high mast lighting tower foundations.

GEOLOGY AND OBSERVATIONS OF THE PROJECT

Geology

Based on the Ohio Department of Natural Resources Quaternary Geology Map of Ohio, the project site is located within the Illinoian Glaciated Allegheny Plateau physiographic province of Ohio. This region is characterized with a dissected plateau smoothed by glaciation, and consists mostly of rugged hills; loesss and older drifts on ridgetops. It consists of Colluvium and Illinoian-age till over Devonian to Pennsylvanian age shales, siltstones and sandstones.

According to the Ohio Department of Natural Resources Division of Geological Survery, the project site consists of illinoiam age water deposited units. This outwash deposits generally consist of uniform beds of sands and gravel and some coarse silts. The bedrock geology consists of Devonian aged sedimentary rocks. These are sedimentary rocks with a marine or marginal marine origin. The primary rock is anticipated to be mainly shale and siltstone with some sandstone. Bedrock is generally brownish black to greenish gray, weathers brown; carbonaceous to clayey, laminated to thin bedded, fissile parting; carbonate and/or siderite concretions in lowermost 50 feet. The Ohio Division of geological Survey has maaped the bedrock elevation in the area at approximately 500 feet. In addition, the Ohio Department of Natural Resources “Ohio Karst Areas” map and “Mine Location” map indicates that karst features and mines are not documented in the approximate vicinity of the project site.

Site Conditions

Field reconnaissance visits of the project area was performed by a Terracon geologist on June 1 and June 13, 2022. During our site reconnaissance Terracon personnel observed regularly spaced transverse cracking and longitudinal cracking on the existing asphalt pavements. At some

sections, the edges of the pavements have begun to erode. No obvious slumps or slides outside of guardrail for at least 15 feet along the embankment slopes. Standing water was observed in the ditch at the toe of the SR-159 embankment at the southwest corner of the SR-159 bridge over SR-23. Portions of this standing water appeared to be in areas of tire tracks off the road that had deepened the ditch and impacted the flow line of the ditch. Trees and brush outside of guard rail on the slopes are growing upright and not showing signs of slumping. Current light posts and road signs show no apparent sign of movement. Embankment slope angle is approximately range from about 2H:1V to approximately 1.5H:1V . EXPLORATION

Field Exploration

A total of nine (9) borings, designated as B-001-0-22 to B-009-0-22 were performed during October 17 to 19, 2022 to depths approximately 25 to 30 feet below the existing ground surface.

The borings were performed in general accordance with Section 303.7 of the Ohio Department of Transportation (ODOT) Specifications for Geotechnical Explorations (SGE) Type E5 borings.

The borings were performed at the approximate location indicated on the Structure Foundation Exploration sheets provided in Appendix A and summarized in the following table.

Boring Number	Surface Elevation (feet)	Latitude	Longitude	Total Boring Depth (feet) [1]	Alignment
B-001-0-22	627.83	39.348493	-82.960625	25.0	Ros-23-13.06
B-002-0-22	623.65	39.349148	-82.962151	25.0	Ros-23-13.06
B-003-0-22	621.63	39.349575	-82.964935	25.0	Ros-23-13.06
B-004-0-22	641.62	39.350963	-82.964283	25.0	Ros-23-13.06
B-005-0-22	661.41	39.352618	-82.965285	25.0	Ros-23-13.06
B-006-0-22	679.06	39.386591	-82.970084	25.0	Ros 23-15.67
B-007-0-22	684.46	39.387605	-82.968880	25.0	Ros 23-15.67
B-008-0-22	682.66	39.388354	-82.970201	25.0	Ros 23-15.67
B-009-0-22	695.59	39.389568	-82.969466	30.0	Ros 23-15.67

1. Below ground surface

The borings were located in the field prior to drilling operations by Terracon personnel using existing site features as references. Ground surface elevations and coordinates were obtained using a Leica Zeno GPS.

The borings were drilled with a track mounted drill rig utilizing continuous flight hollow stem augers to advance the boreholes between sampling intervals. The drillers obtained split spoon soil samples at 2.5-foot intervasl in the upper 20 feet and at 5-foot intervals thereafter using Standard Penetration Tests (SPT). In the split barrel sampling procedure, a standard 2-inch outer diameter split barrel sampling spoon was driven into the ground by a 140 pound automatic hammer falling a

distance of 30 inches, is the standard penetration resistance value (SPT-N). This value is corrected to an equivalent (60 percent) energy ratio (N60) utilizing the hammer efficiency energy ratio. The SPT hammer used for this project was calibrated in August of 2022 and had an energy ratio of 90 percent in obtaining industry standard N-values (N60-values). We observed and recorded groundwater levels during drilling and upon completion of drilling.

In the field, the samples recovered at the boring locations were examined and field logs were prepared indicating the conditions encountered at each location. Representative portions of samples obtained during the field exploration were preserved in sealable glass jars and delivered to our laboratory for additional examination and testing.

Following the completion of drilling, the boreholes were backfilled with auger cuttings mixed with bentonite chips.

Laboratory Testing Program

As part of the testing program, all samples were examined in our laboratory by a geologist. Soil samples were classified in general accordance with ODOT SGE Section 600 Laboratory Testing based on the texture and plasticity of the soils.

Visual soil classification was performed on all recovered soil samples. Atterberg limits, moisture content, hand penetrometer and grain size analysis testing were performed on selected soil samples to obtain accurate information. The results of lab testing are shown on the boring logs and/or presented in the **Exploration Results** of this report.

FINDINGS

Subsurface Profile

At the surface, borings B-004, B-005, B-007 and B-009 encoundered 1 to 3 inches of topsoil. Distinguishable surface materials were not encountered in the remaining borings.

Below the surface material, borings B-006 and B-008 encountered fill materials to depths ranging from approximately 8 to 11 feet below the existing ground surface. The fill materials consisted of medium dense to dense gravel with sand, silt and clay (A-2-6), medium dense silt (A-4b), very loose to loose coarse and fine sand (A-3a) and hard silt and clay (A-6a). The native cohesive soils encountered in the borings included medium stiff to hard silt and clay (A-6a), very stiff to hard silty clay (A-6b) and stiff clay (A-7-6). The native granular soils encountered in borings included dense to very dense gravel/ gravel with sand (A-1a /A-1b), medium dense to very dense gravel with sand, silt, and clay (A-2-6 /A-2-7), medium dense to very dense coarse and fine sand / fine sand (A-3a / A-3), medium dense to dense sandy silt / silt (A-4a /A-4b).

The Standard Penetration Test (SPT) and moisture content values within the fill ranged mostly from 2 to 50 blows per foot (bpf) and from 2 to 14 percent respectively. The SPT values and moisture contents within natural deposits ranged from 5 to over 50 blows per foot (bpf), and from 3 to 24 percent respectively. The Liquid Limits and Plasticity Index of the cohesive soils ranged from 18 to 34 percent and 4 to 12 percent respectively.

Groundwater Conditions

Borings B-001 and B-003 encountered groundwater during drilling at depths of approximately 14.5 and 20.5 feet below ground surface respectively (about elevation of 613.3 feet and 601.1 feet respectively). Groundwater was not encountered in any of the other borings during drilling and after completion.

ANALYSES AND RECOMMENDATIONS

Based on our evaluation of the subsurface conditions encountered at the site and available information, it is recommended that a deep foundation system consisting of drilled shaft foundations can be used to support the proposed high mast lighting tower structures.

Drilled Shaft Recommendation

The drilled shaft lengths will need to be designed to satisfy axial compressive, uplift, and lateral load requirements. The soil parameters were estimated based on the test borings, laboratory test results, and our experience with these soil types. Soil design parameters are provided below in the **Drilled Shaft Design Summary** table for the design of drilled shaft foundations.

B-001-0-22 - Drilled Shaft Design Summary				
Elevation (feet)	**Soil Type**	**Moist Unit Weight, γ (pcf)**	**Undrained Shear Strength S_u (psf)**	**Friction Angle, ϕ (degree)**
627.8 to 624.8	-	115	2501	-
622.8 to 614.3	Gravel with Sand, Dense	120	-	36
614.3 to 606.8	Silt and Clay, Very Stiff	120	3,000	-
606.8 to 602.8	Gravel with Sand and Silt, Medium Dense	120	-	34

1.To account for soill weekened by freeze-thaw or other disturbance. (Section:1200, GDM, July 2022)

B-002-0-22 - Drilled Shaft Design Summary				
Elevation (feet)	**Soil Type**	**Moist Unit Weight, γ (pcf)**	**Undrained Shear Strength S_u (psf)**	**Friction Angle, ϕ (degree)**
623.7 to 620.7	-	120	250[1]	-
620.7 to 612.7	Sandy Silt / Silt, Medium Dense	115	-	32
612.7 to 607.7	Silt and Clay, Very Stiff	115	4,000	-
606.8 to 602.8	Gravel with Sand, Medium Dense to Dense	120	-	34

1.To account for soill weekened by freeze-thaw or other disturbance. (Section:1200, GDM, July 2022)

B-003-0-22 - Drilled Shaft Design Summary				
Elevation (feet)	**Soil Type**	**Moist Unit Weight, γ (pcf)**	**Undrained Shear Strength S_u (psf)**	**Friction Angle, ϕ (degree)**
621.6 to 618.6	-	120	250[1]	-
618.6 to 610.6	Silty Clay, Medium stiff	115	3,000	-
610.6 to 596.6	Gravel with Sand / Sandy Silt, Medium dense to dense	125	-	34

1.To account for soill weekened by freeze-thaw or other disturbance. (Section:1200, GDM, July 2022)

B-004-0-22 - Drilled Shaft Design Summary				
Elevation (feet)	**Soil Type**	**Moist Unit Weight, γ (pcf)**	**Undrained Shear Strength S_u (psf)**	**Friction Angle, ϕ (degree)**
641.6 to 638.6	-	120	250[1]	-
638.6 to 628.1	Gravel with Sand and Silt / Coarse and Fine Sand, Medium dense to dense	120	-	35
628.1 to 616.6	Silt and Clay, Stiff to Very Stiff	115	3,500	-

1.To account for soill weekened by freeze-thaw or other disturbance. (Section:1200, GDM, July 2022)

B-005-0-22 - Drilled Shaft Design Summary				
Elevation (feet)	**Soil Type**	**Moist Unit Weight, γ (pcf)**	**Undrained Shear Strength S_u (psf)**	**Friction Angle, ϕ (degree)**
661.3 to 658.3	-	115	250[1]	-
658.3 to 652.9	Gravel with Sand, Medium dense	115	-	32
652.9 to 636.4	Gravel with Sand, Dense to Very dense	120	-	36

1.To account for soill weekened by freeze-thaw or other disturbance. (Section:1200, GDM, July 2022)

B-006-0-22 - Drilled Shaft Design Summary				
Elevation (feet)	**Soil Type**	**Moist Unit Weight, γ (pcf)**	**Undrained Shear Strength S_u (psf)**	**Friction Angle, ϕ (degree)**
679.1 to 676.1	-	110	250[1]	-
676.1 to 668.1	Coarse and Fine Sand, Very Loose to Loose	110	-	28
668.1 to 654.1	Fine sand / sandy silt, Medium dense	115	-	34

1.To account for soill weekened by freeze-thaw or other disturbance. (Section:1200, GDM, July 2022)

B-007-0-22 - Drilled Shaft Design Summary				
Elevation (feet)	**Soil Type**	**Moist Unit Weight, γ (pcf)**	**Undrained Shear Strength S_u (psf)**	**Friction Angle, ϕ (degree)**
684.5 to 681.5	-	110	250[1]	-
681.5 to 673.5	Sandy Silt, Stiff to very stiff	110	2,500	-
673.5 to 663.5	Gravel with sand and silt / Sandy Silt, Medium dense	115	-	32
661.0 to 659.5	Gravel with sand, silt and clay, Very Dense	125	-	36

1.To account for soill weekened by freeze-thaw or other disturbance. (Section:1200, GDM, July 2022)

B-008-0-22 - Drilled Shaft Design Summary				
Elevation (feet)	**Soil Type**	**Moist Unit Weight, γ (pcf)**	**Undrained Shear Strength S_u (psf)**	**Friction Angle, ϕ (degree)**
682.7 to 679.7	-	110	250[1]	-
679.7 to 657.7	Gravel with sand, Medium Dense	120	-	35

1.To account for soill weekened by freeze-thaw or other disturbance. (Section:1200, GDM, July 2022)

B-009-0-22 - Drilled Shaft Design Summary				
Elevation (feet)	**Soil Type**	**Moist Unit Weight, γ (pcf)**	**Undrained Shear Strength S_u (psf)**	**Friction Angle, ϕ (degree)**
695.6 to 692.6	-	110		
692.6 to 679.6	Sandy Silt, Medium dense	115	-	32
679.6 to 673.6	Gravel with Sand, Medium dense	115	-	34
673.6 to 665.6	Gravel with Sand, Dense	120	-	36

1.To account for soill weekened by freeze-thaw or other disturbance. (Section:1200, GDM, July 2022)

The ODOT Geotechnical Design Manual (GDM) recommends that groundwater be considered in the high mast tower analysis at a depth of 3 feet below the proposed ground surface, unless shallower groundwater is identified in the test boring logs.

Site Preparation and Earthwork

Subgrade preparation for the new embankment fill should be performed in accordance with ODOT C&MS Items 203 and 204. Prior to subgrade preparation, perform clearing and grubbing, including removal of stumps and roots, in accordance with ODOT C&MS Item 201. Remove other structures or obstructions, as necessary, in accordance with ODOT C&MS Item 202. The subgrade should be stripped of any topsoil, organics, or other deleterious or unsuitable materials.

All embankment materials should be spread and compacted in accordance with Items 203.06 and 203.07 and subgrade materials should be spread and compacted in accordance with Items 204.07 and 204.03. Frozen materials should not be incorporated into any new fill nor should new

fill, pavement materials, or structures be placed on top of frozen materials. Material to be utilized as borrow should be restricted to conform to Item 203.02R and 203.3 for embankment construction and Item 204.2 for subgrade. Clay with high plasticity should not be used for the embankment.

Earthwork, including subgrade preparation should be performed in accordance with respective items in Section 200 of the current ODOT C&MS. Consideration may be given to using the in-situ soils or from the local borrow sources. However, the material may require moisture adjustments to achieve proper compaction.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering

requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

APPENDICES

APPENDIX A - SITE LOCATION AND EXPLORATION PLANS

Contents:

SITE LOCATION

ROS-23-13.06/15.67 PID 115446 ■ Chillicothe, Ross County, Ohio
November 23, 2022 ■ Terracon Project No. N1225105

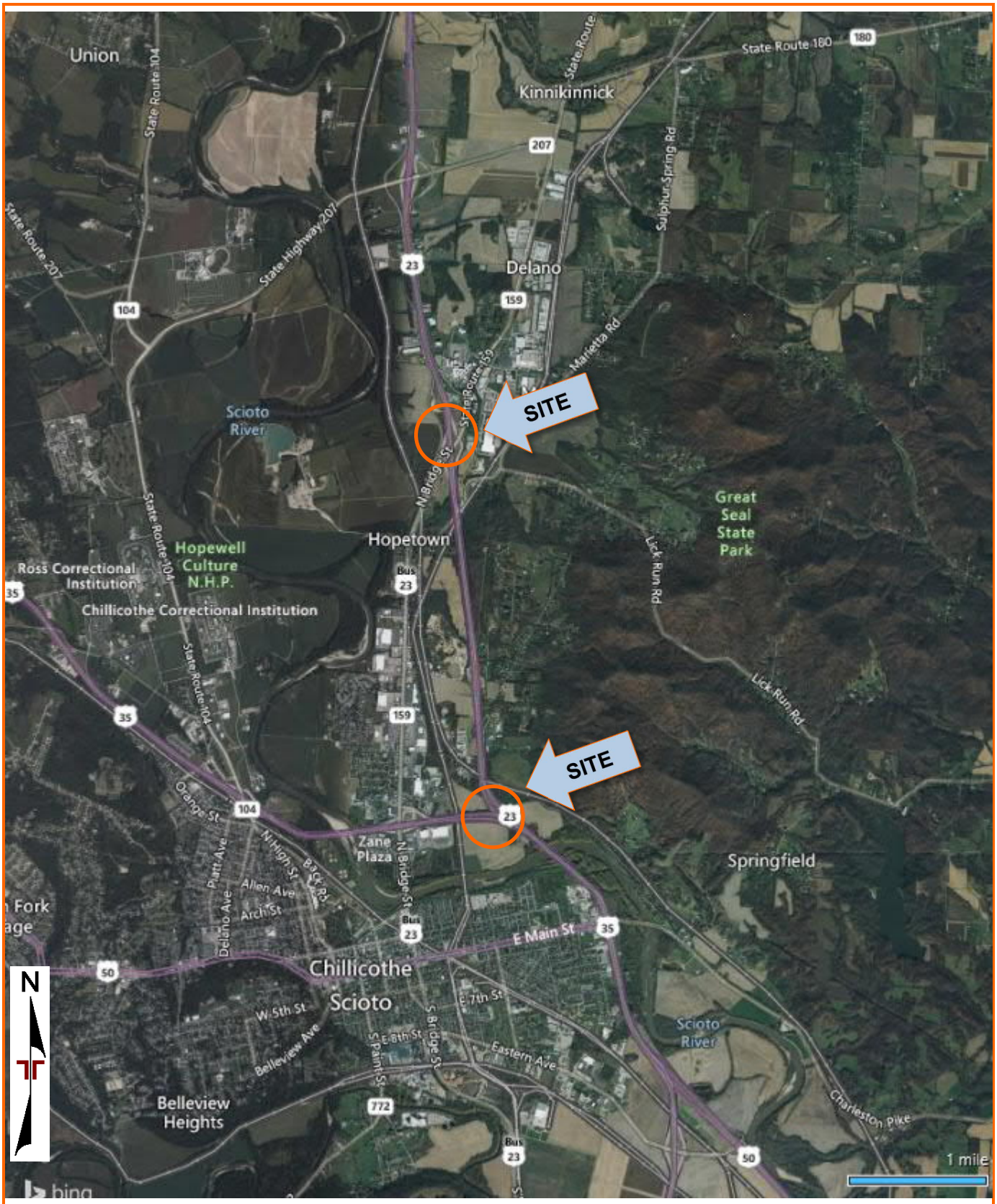

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

BORING LOCATION PLAN

ROS-23-13.06/15.67 PID 115446 ■ Chillicothe, Ross County, Ohio

Publish Date ■ Terracon Project No. N1225105

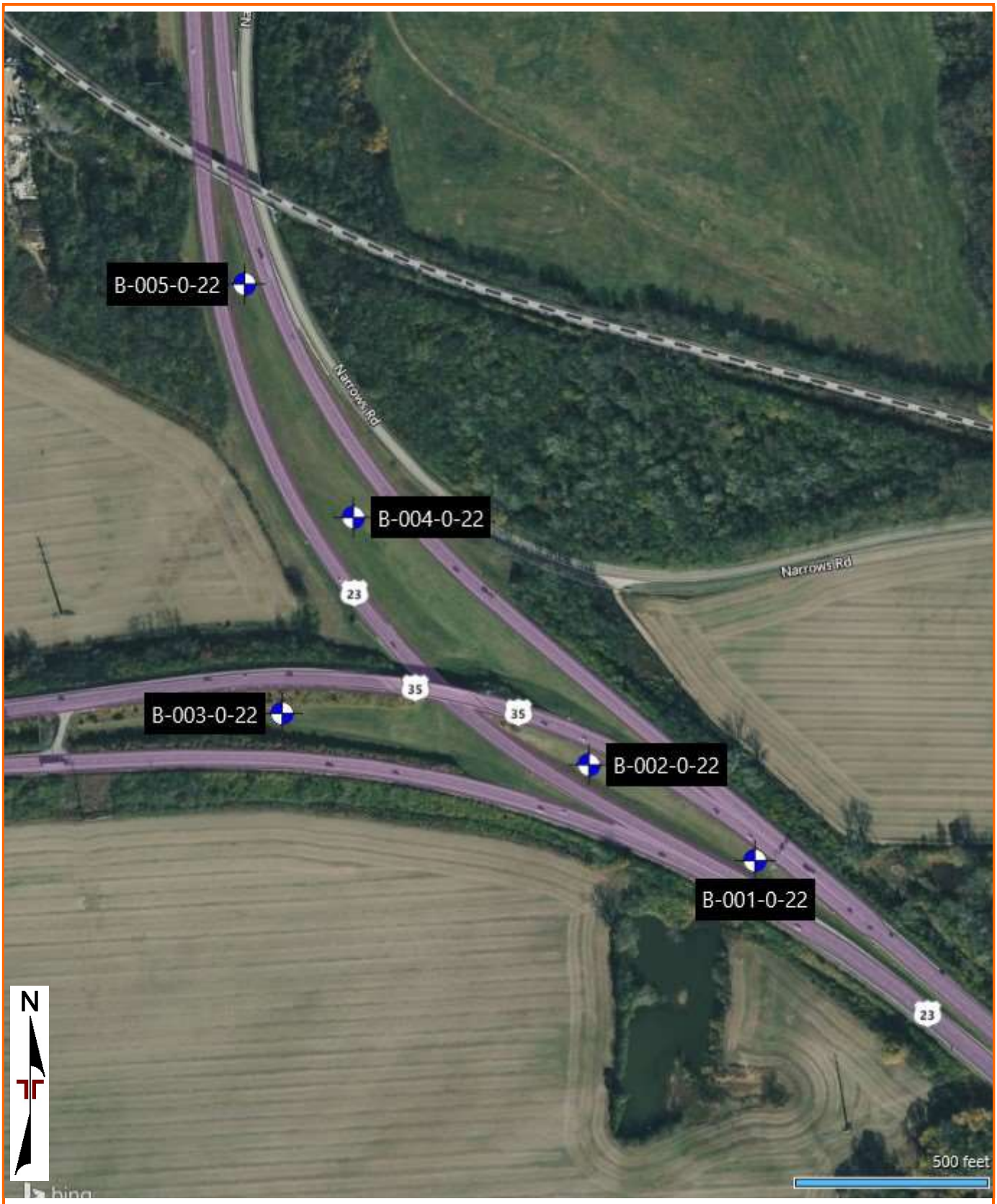

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

BORING LOCATION PLAN

ROS-23-13.06/15.67 PID 115446 ■ Chillicothe, Ross County, Ohio

Publish Date ■ Terracon Project No. N1225105

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

MAP PROVIDED BY MICROSOFT BING MAPS

APPENDIX B - LABORATORY TESTING RESULTS

Contents:

Boring Logs

PROJECT: ROS-23-13.06	DRILLING FIRM / OPERATOR: TERRACON / A.M.	DRILL RIG: GEOPROBE 628	STATION / OFFSET:
TYPE: LIGHT TOWER	SAMPLING FIRM / LOGGER: TERRACON / A.M.	HAMMER: GEOPROBE AUTOMATIC	ALIGNMENT:
PID: 115446 SFN:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 8/19/22	ELEVATION: 627.8 (MSL) EOB: 25.0 ft.
START: 10/19/22 END: 10/19/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	LAT / LONG: 39.348494, -82.960625

EXPLORATION ID B-001-0-22

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 627.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
MEDIUM DENSE, BROWN, **COARSE AND FINE SAND**, DAMP	624.3	1–3	7 8 8	24	100	SS-1	-	-	-	-	-	-	-	-	-	8	A-3a (V)	
DENSE, BROWN, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, DAMP TO MOIST	614.3	4–7	8 10 14	36	100	SS-2	-	50	21	15	10	4	NP	NP	NP	11	A-1-b (0)	
		6–7	9 9 14	35	100	SS-3	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	
		9–10	10 12 13	38	28	SS-4	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		11–12	8 13 13	39	100	SS-5	-	-	-	-	-	-	-	-	-	15	A-1-b (V)	
VERY STIFF, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP	606.8	W 613.3; 14–15	27 24 30	81	100	SS-6	-	-	-	-	-	-	-	-	-	14	A-6a (V)	
		16–17	7 14 16	45	100	SS-7	3.00	-	-	-	-	-	-	-	-	13	A-6a (V)	
		19–20	21 24 18	63	100	SS-8	3.00	-	-	-	-	-	-	-	-	8	A-6a (V)	
MEDIUM DENSE, BROWN, **GRAVEL WITH SAND AND SILT**, LITTLE CLAY, DAMP	602.8	21–22	6 10 10	30	100	SS-9	-	19	24	24	21	12	25	17	8	13	A-2-4 (0)	
		EOB 24–25	8 8 10	27	100	SS-10	-	-	-	-	-	-	-	-	-	13	A-2-4 (V)	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS; HOLE PLUG

PROJECT: ROS-23-13.06	DRILLING FIRM / OPERATOR: TERRACON / A.M.	DRILL RIG: GEOPROBE 628	STATION / OFFSET:
TYPE: LIGHT TOWER	SAMPLING FIRM / LOGGER: TERRACON / A.M.	HAMMER: GEOPROBE AUTOMATIC	ALIGNMENT:
PID: 115446 SFN:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 8/19/22	ELEVATION: 623.7 (MSL) EOB: 25.0 ft.
START: 10/19/22 END: 10/19/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	LAT / LONG: 39.349149, -82.962152

EXPLORATION ID B-002-0-22

MATERIAL DESCRIPTION AND NOTES	ELEV. 623.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY STIFF, DARK YELLOW BROWN, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, SILTSTONE FRAGMENTS, DAMP	620.2	1, 2, 3	9 12 19	47	100	SS-1	4.00	-	-	-	-	-	-	-	-	9	A-6b (V)	
DENSE, GRAY BROWN TO BROWN, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP	617.7	4, 5	9 16 17	50	100	SS-2	-	45	21	13	15	6	19	15	4	10	A-1-b (0)	
MEDIUM DENSE, DARK GRAY, **SILT**, SOME CLAY, SOME SAND, TRACE GRAVEL, DAMP	615.2	6, 7, 8	6 5 6	17	100	SS-3	-	-	-	-	-	-	-	-	-	10	A-4b (V)	
MEDIUM DENSE, VERY DARK BROWN, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, TRACE ORGANICS, MOIST	612.7	9, 10	5 4 6	15	100	SS-4	-	-	-	-	-	-	-	-	-	17	A-4a (V)	
VERY STIFF, DARK GRAY, **SILT AND CLAY**, SOME SAND, LITTLE GRAVEL, DAMP	610.2	11, 12, 13	6 7 7	21	100	SS-5	4.00	14	13	14	35	24	32	20	12	15	A-6a (6)	
HARD, OLIVE BROWN GRAY, **SILTY CLAY**, TRACE SAND, MOIST	607.7	14, 15	5 6 6	18	100	SS-6	4.25	-	-	-	-	-	-	-	-	19	A-6b (V)	
MEDIUM DENSE TO DENSE, OLIVE AND GRAY BROWN, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, MOIST TO DAMP	598.7	16, 17	5 4 5	14	100	SS-7	-	-	-	-	-	-	-	-	-	16	A-1-b (V)	
		18, 19, 20	8 12 13	38	100	SS-8	-	56	19	8	11	6	NP	NP	NP	9	A-1-b (0)	
		21, 22, 23	7 8 7	23	100	SS-9	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
		24, 25 EOB	10 12 13	38	100	SS-10	-	-	-	-	-	-	-	-	-	6	A-1-b (V)	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS; HOLE PLUG

PROJECT: ROS-23-13.06	DRILLING FIRM / OPERATOR: TERRACON / A.M.	DRILL RIG: GEOPROBE 628	STATION / OFFSET:
TYPE: LIGHT TOWER	SAMPLING FIRM / LOGGER: TERRACON / A.M.	HAMMER: GEOPROBE AUTOMATIC	ALIGNMENT:
PID: 115446 SFN:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 8/19/22	ELEVATION: 621.6 (MSL) EOB: 25.0 ft.
START: 10/19/22 END: 10/19/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	LAT / LONG: 39.349575, -82.964936

EXPLORATION ID B-003-0-22

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 621.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
STIFF TO HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE ROOT HAIRS, DAMP TO MOIST		1–2	4 5 5	15	100	SS-1	4.50	-	-	-	-	-	-	-	-	19	A-6a (V)	
		3–5	7 6 8	21	100	SS-2	4.50	0	2	21	40	37	34	22	12	20	A-6a (9)	
		6–7	3 3 3	9	100	SS-3	-	-	-	-	-	-	-	-	-	16	A-6a (V)	
@8.5'; MEDIUM STIFF, TRACE SAND, TRACE GRAVEL		8–10	1 5 5	15	100	SS-4	0.50	-	-	-	-	-	-	-	-	19	A-6a (V)	
VERY DENSE, BROWN, **GRAVEL**, SOME SAND, TRACE SILT, TRACE CLAY, DAMP	610.6	11–13	21 20 21	62	100	SS-5	-	54	21	13	10	2	NP	NP	NP	5	A-1-a (0)	
MEDIUM DENSE TO DENSE, BROWN, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, DAMP	608.1	14–15	17 14 11	38	100	SS-6	-	-	-	-	-	-	-	-	-	6	A-1-b (V)	
		16–17	10 7 7	21	100	SS-7	-	-	-	-	-	-	-	-	-	6	A-1-b (V)	
MEDIUM DENSE TO DENSE, BROWN, **COARSE AND FINE SAND**, LITTLE GRAVEL, LITTLE SILT, TRACE CLAY, DAMP	603.1	19–20	8 10 13	35	100	SS-8	-	-	-	-	-	-	-	-	-	5	A-3a (V)	
@21.0'; WET		21–22	11 8 9	26	100	SS-9	-	12	23	51	11	3	NP	NP	NP	20	A-3a (0)	
DENSE, BROWN, **SANDY SILT**, WET	598.1	24	5 11 13	36	100	SS-10	-	-	-	-	-	-	-	-	-	24	A-4a (V)	
	596.6	EOB 25																

W 601.1

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS; HOLE PLUG

PROJECT: ROS-23-13.06	DRILLING FIRM / OPERATOR: TERRACON / A.M.	DRILL RIG: GEOPROBE 628	STATION / OFFSET:
TYPE: LIGHT TOWER	SAMPLING FIRM / LOGGER: TERRACON / A.M.	HAMMER: GEOPROBE AUTOMATIC	ALIGNMENT:
PID: 115446 SFN:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 8/19/22	ELEVATION: 641.6 (MSL) EOB: 25.0 ft.
START: 10/17/22 END: 10/17/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	LAT / LONG: 39.350964, -82.964284

EXPLORATION ID B-004-0-22

MATERIAL DESCRIPTION AND NOTES	ELEV. 641.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
TOPSOIL (3")	641.4																	
MEDIUM DENSE, BROWN, **GRAVEL WITH SAND AND SILT**, TRACE CLAY, TRACE ROOT HAIRS, DRY	638.1	1, 2, 3	9 11 8	29	100	SS-1	-	44	25	13	13	5	22	15	7	5	A-2-4 (0)	
HARD, GRAYISH BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, TRACE SILT, DAMP	635.6	4, 5	23 20 28	72	100	SS-2	4.5+	-	-	-	-	-	-	-	-	10	A-6a (V)	
VERY DENSE, GRAYISH BROWN, **COARSE AND FINE SAND**, SOME GRAVEL, LITTLE CLAY, TRACE SILT, DRY	633.1	6, 7, 8	45 46 44	135	100	SS-3	-	-	-	-	-	-	-	-	-	5	A-3a (V)	
MEDIUM DENSE TO DENSE, GRAY AND BROWN, **GRAVEL WITH SAND, SILT, AND CLAY**, DRY	628.1	9, 10	12 16 14	45	100	SS-4	-	-	-	-	-	-	-	-	-	4	A-2-6 (V)	
		11, 12	12 6 8	21	100	SS-5	-	-	-	-	-	-	-	-	-	8	A-2-6 (V)	
STIFF TO VERY STIFF, GRAYISH BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		13, 14	7 5 5	15	100	SS-6	1.75	-	-	-	-	-	-	-	-	19	A-6a (V)	
@13.5'; TRACE ROOT HAIRS, ORGANIC ODOR		15, 16																
@16.0'; BROWN, TRACE GRAVEL		17	3 3 3	9	100	SS-7	2.00	-	-	-	-	-	-	-	-	20	A-6a (V)	
		18																
		19	3 3 3	9	100	SS-8	3.50	2	10	7	52	29	31	18	13	21	A-6a (9)	
		20, 21																
		22	3 5 7	18	100	SS-9	3.50	-	-	-	-	-	-	-	-	21	A-6a (V)	
		23																
	616.6	24, 25 EOB	4 6 7	20	100	SS-10	2.50	-	-	-	-	-	-	-	-	18	A-6a (V)	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS; HOLE PLUG

PROJECT: ROS-23-13.06	DRILLING FIRM / OPERATOR: TERRACON / A.M.	DRILL RIG: GEOPROBE 628	STATION / OFFSET:
TYPE: LIGHT TOWER	SAMPLING FIRM / LOGGER: TERRACON / A.M.	HAMMER: GEOPROBE AUTOMATIC	ALIGNMENT:
PID: 115446 SFN:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 8/19/22	ELEVATION: 661.4 (MSL) EOB: 25.0 ft.
START: 10/17/22 END: 10/17/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	LAT / LONG: 39.352619, -82.965285

EXPLORATION ID B-005-0-22

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 661.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
TOPSOIL (1")	661.3																	
STIFF, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP	657.9	1–3	7 5 3	12	100	SS-1	-	-	-	-	-	-	-	-	-	6	A-6a (V)	
MEDIUM DENSE, BROWN, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, DAMP	652.9	4–8	7 8 10	27	22	SS-2	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
		6–7	6 6 10	24	100	SS-3	-	43	22	23	10	2	NP	NP	NP	9	A-1-b (0)	
DENSE TO VERY DENSE, BROWN, **GRAVEL**, SOME SAND, TRACE SILT, TRACE CLAY, DAMP	647.9	9–13	14 40 50/3"	-	40	SS-4	-	-	-	-	-	-	-	-	-	9	A-1-a (V)	
		11–13	17 16 15	47	100	SS-5	-	59	24	10	5	2	NP	NP	NP	5	A-1-a (0)	
DENSE TO VERY DENSE, BROWN, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, DAMP		14–15	16 12 17	44	100	SS-6	-	-	-	-	-	-	-	-	-	4	A-1-b (V)	
		16–17	15 16 20	54	100	SS-7	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
		19–20	12 15 21	54	100	SS-8	-	48	37	6	8	1	NP	NP	NP	5	A-1-b (0)	
		21–22	12 11 14	38	100	SS-9	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
@23.5'; MEDIUM DENSE	636.4	24–25	9 9 11	30	100	SS-10	-	-	-	-	-	-	-	-	-	4	A-1-b (V)	
		EOB																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS

PROJECT: ROS-23-13.06	DRILLING FIRM / OPERATOR: TERRACON / A.M.	DRILL RIG: GEOPROBE 628	STATION / OFFSET:
TYPE: LIGHT TOWER	SAMPLING FIRM / LOGGER: TERRACON / A.M.	HAMMER: GEOPROBE AUTOMATIC	ALIGNMENT:
PID: 115446 SFN:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 8/19/22	ELEVATION: 679.1 (MSL) EOB: 25.0 ft.
START: 10/19/22 END: 10/19/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	LAT / LONG: 39.386591, -82.970084

EXPLORATION ID B-006-0-22

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 679.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
MEDIUM DENSE, BROWN, **SILT**, LITTLE CLAY, SOME SAND, TRACE ROOT HAIRS, DAMP (FILL)	675.6	1–3	7 7 6	20	100	SS-1	-	0	6	25	50	19	21	14	7	9	A-4b (7)	
HARD, GRAYISH BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, WOOD FRAGMENTS, DAMP (FILL)	673.1	4–5	5 2 3	8	100	SS-2	4.5+	-	-	-	-	-	-	-	-	14	A-6a (V)	
VERY LOOSE TO LOOSE, GRAYISH BROWN TO BROWN, **COARSE AND FINE SAND**, TRACE GRAVEL, TRACE ROOT HAIRS, DRY (FILL)	668.1	6–7	1 0 1	2	50	SS-3	-	-	-	-	-	-	-	-	-	2	A-3a (V)	
		9–10	2 3 3	9	67	SS-4	-	-	-	-	-	-	-	-	-	3	A-3a (V)	
MEDIUM DENSE, BROWN, **FINE SAND**, TRACE TO LITTLE GRAVEL, TRACE TO SOME SILT, DRY	663.1	11–12	4 5 5	15	67	SS-5	-	-	-	-	-	-	-	-	-	4	A-3 (V)	
@13.5'; VERY DENSE, TRACE ROOT HAIRS		14	50/3"	-	100	SS-6	-	-	-	-	-	-	-	-	-	3	A-3 (V)	
MEDIUM STIFF, BROWN, **SANDY SILT**, "AND" GRAVEL,LITTLE CLAY, DAMP	658.1	16–17	4 8 9	26	100	SS-7	0.75	20	18	18	32	12	20	15	5	15	A-4a (2)	
@18.5'; VERY STIFF, TRACE ROCK FRAGMENTS		19	4 9 11	30	100	SS-8	-	-	-	-	-	-	-	-	-	11	A-4a (V)	
MEDIUM DENSE, BROWN, **COARSE AND FINE SAND**, SOME GRAVEL, LITTLE SILT, TRACE CLAY, DAMP	654.1	21–22	5 9 11	30	100	SS-9	-	22	25	37	12	4	NP	NP	NP	8	A-3a (0)	
		24	10 7 10	26	100	SS-10	-	-	-	-	-	-	-	-	-	8	A-3a (V)	
		EOB 25																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS; HOLE PLUG

PROJECT: ROS-23-13.06	DRILLING FIRM / OPERATOR: TERRACON / A.M.	DRILL RIG: GEOPROBE 628	STATION / OFFSET:
TYPE: LIGHT TOWER	SAMPLING FIRM / LOGGER: TERRACON / A.M.	HAMMER: GEOPROBE AUTOMATIC	ALIGNMENT:
PID: 115446 SFN:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 8/19/22	ELEVATION: 684.5 (MSL) EOB: 25.0 ft.
START: 10/18/22 END: 10/18/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	LAT / LONG: 39.387605, -82.968886

EXPLORATION ID B-007-0-22

MATERIAL DESCRIPTION AND NOTES	ELEV. 684.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
TOPSOIL (1")	684.4																	
HARD, BROWN, **SILT AND CLAY**, TRACE SAND, TRACE GRAVEL, DAMP	681.0	1–3	8 6 7	20	100	SS-1	4.50	-	-	-	-	-	-	-	-	15	A-6a (V)	
MEDIUM DENSE, BROWN, **GRAVEL WITH SAND, SILT, AND CLAY**, DRY	678.5	4–5	3 3 4	11	100	SS-2	-	-	-	-	-	-	-	-	-	3	A-2-6 (V)	
STIFF TO VERY STIFF, BROWN, **SANDY SILT**, SOME GRAVEL, LITTLE CLAY, MOIST	673.5	6–8	3 4 4	12	100	SS-3	3.00	24	22	17	16	21	-	-	-	17	A-4a (V)	
		9–10	2 1 2	5	100	SS-4	1.50	-	-	-	-	-	-	-	-	17	A-4a (V)	
MEDIUM DENSE, BROWN, **GRAVEL WITH SAND**, TRACE SILT, TRACE SILT, DAMP	668.5	11–13	6 7 9	24	100	SS-5	-	43	42	8	7	0	NP	NP	NP	4	A-1-b (0)	
		14–15	9 7 7	21	100	SS-6	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
STIFF, GRAY, **SANDY SILT**, LITTLE CLAY, LITTLE GRAVEL, DAMP	663.5	16–17	6 7 7	21	100	SS-7	1.00	-	-	-	-	-	-	-	-	15	A-4a (V)	
@18.5'; BROWNISH GRAY		19–20	2 3 3	9	100	SS-8	1.25	11	13	19	41	16	18	13	5	12	A-4a (4)	
MEDIUM DENSE, BROWN, **FINE SAND**, TRACE GRAVEL, DAMP	661.0	21–22	8 5 6	17	100	SS-9	-	-	-	-	-	-	-	-	-	7	A-3 (V)	
VERY DENSE, BROWN, **GRAVEL WITH SAND, SILT, AND CLAY**, DAMP	659.5	24	8 17 18	53	100	SS-10	-	-	-	-	-	-	-	-	-	9	A-2-6 (V)	
		EOB 25																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS; HOLE PLUG

PROJECT: ROS-23-13.06	DRILLING FIRM / OPERATOR: TERRACON / A.M.	DRILL RIG: GEOPROBE 628	STATION / OFFSET:
TYPE: LIGHT TOWER	SAMPLING FIRM / LOGGER: TERRACON / A.M.	HAMMER: GEOPROBE AUTOMATIC	ALIGNMENT:
PID: 115446 SFN:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 8/19/22	ELEVATION: 682.7 (MSL) EOB: 25.0 ft.
START: 10/18/22 END: 10/18/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	LAT / LONG: 39.388354, -82.970201

EXPLORATION ID B-008-0-22

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 682.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
MEDIUM DENSE TO DENSE, BROWN, **GRAVEL WITH SAND, SILT, AND CLAY**, DAMP TO MOIST (FILL)		1 2	15 19 14	50	67	SS-1	-	-	-	-	-	-	-	-	-	6	A-2-6 (V)	
@3.5'; TRACE COAL, TRACE ASHES		3 4 5	3 3 4	11	83	SS-2	-	33	22	13	22	10	29	18	11	12	A-2-6 (0)	
@6.0'; BROWN AND GRAY, TRACE SHALE FRAGMENTS	674.2	6 7 8	8 14 18	48	100	SS-3	-	-	-	-	-	-	-	-	-	10	A-2-6 (V)	
DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL WITH SAND**, LITTLE TO TRACE SILT, TRACE CLAY, DAMP		9 10	18 17 18	53	100	SS-4	-	34	23	29	11	3	NP	NP	NP	7	A-1-b (0)	
@11.0'; MEDIUM DENSE, BROWN		11 12 13	15 9 9	27	83	SS-5	-	-	-	-	-	-	-	-	-	6	A-1-b (V)	
		14 15	12 13 13	39	100	SS-6	-	-	-	-	-	-	-	-	-	6	A-1-b (V)	
		16 17 18	14 18 14	48	100	SS-7	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
		19 20	10 14 21	53	100	SS-8	-	35	46	12	7	0	NP	NP	NP	5	A-1-b (0)	
		21 22 23	9 11 14	38	100	SS-9	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
	657.7	24 25 EOB	8 12 12	36	100	SS-10	-	-	-	-	-	-	-	-	-	4	A-1-b (V)	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS; HOLE PLUG

PROJECT: ROS-23-13.06	DRILLING FIRM / OPERATOR: TERRACON / A.M.	DRILL RIG: GEOPROBE 628	STATION / OFFSET:
TYPE: LIGHT TOWER	SAMPLING FIRM / LOGGER: TERRACON / A.M.	HAMMER: GEOPROBE AUTOMATIC	ALIGNMENT:
PID: 115446 SFN:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 8/19/22	ELEVATION: 695.6 (MSL) EOB: 30.0 ft.
START: 10/18/22 END: 10/18/22	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	LAT / LONG: 39.389568, -82.969466

EXPLORATION ID B-009-0-22

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 695.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
TOPSOIL (1")	695.5																	
HARD, BROWN, **SILT AND CLAY**, TRACE SAND, MOIST	692.1	1, 2, 3	4 6 6	18	83	SS-1	4.50	-	-	-	-	-	-	-	-	17	A-6a (V)	
VERY STIFF TO HARD, BROWN, **SANDY SILT**, SOME GRAVEL, LITTLE TO TRACE CLAY, DAMP	679.6	4, 5	8 6 6	18	100	SS-2	-	31	18	12	29	10	20	16	4	13	A-4a (1)	
		6, 7	5 9 11	30	100	SS-3	4.5+	-	-	-	-	-	-	-	-	11	A-4a (V)	
		8, 9, 10	11 9 12	32	100	SS-4	4.5+	21	11	15	36	17	21	14	7	12	A-4a (4)	
		11, 12, 13	8 19 23	63	83	SS-5	-	-	-	-	-	-	-	-	-	11	A-4a (V)	
		14, 15	13 9 9	27	100	SS-6	-	-	-	-	-	-	-	-	-	7	A-4a (V)	
MEDIUM DENSE TO DENSE, BROWN, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, MOIST TO WET		16, 17	2 3 8	17	100	SS-7	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
		18, 19, 20	11 7 8	23	100	SS-8	-	31	29	17	20	3	NP	NP	NP	14	A-1-b (0)	
		21, 22, 23																
		24, 25	13 11 16	41	100	SS-9	-	-	-	-	-	-	-	-	-	22	A-1-b (V)	
		26, 27, 28																
@28.5'; DRY	665.6	29	10 10 13	35	100	SS-10	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
		EOB																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS; HOLE PLUG

APPENDIX C - SUPPORTING INFORMATION

Contents:

ODOT Quick Reference for Visual Description of Soils
ODOT Classification of Soils

APPENDIX A.1 - ODOT Quick Reference for Visual Description of Soils

1) STRENGTH OF SOIL:

Non-Cohesive (granular) Soils - Compactness	
Description	**Blows Per Ft.**
Very Loose	≤ 4
Loose	5 – 10
Medium Dense	11 – 30
Dense	31 – 50
Very Dense	> 50

2) COLOR :

If a color is a uniform color throughout, the term is single, modified by an adjective such as light or dark. If the predominate color is shaded by a secondary color, the secondary color precedes the primary color. If two major and distinct colors are swirled throughout the soil, the colors are modified by the term "mottled"

3) PRIMARY COMPONENT

Use **DESCRIPTION** from ODOT Soil Classification Chart on Back

Cohesive (fine grained) Soils - Consistency

Description	Qu (TSF)	Blows Per Ft.	Hand Manipulation
Very Soft	<0.25	<2	Easily penetrates 2" by fist
Soft	0.25-0.5	2 - 4	Easily penetrates 2" by thumb
Medium Stiff	0.5-1.0	5 - 8	Penetrates by thumb with moderate effort
Stiff	1.0-2.0	9 - 15	Readily indents by thumb, but not penetrate
Very Stiff	2.0-4.0	16 - 30	Readily indents by thumbnail
Hard	>4.0	>30	Indent with difficulty by thumbnail

4) COMPONENT MODIFIERS:

Description	Percentage By Weight
Trace	0% - 10%
Little	>10% - 20%
Some	>20% - 35%
"And"	>35%

5) Soil Organic Content

Description	% by Weight
Slightly Organic	2% - 4%
Moderately Organic	4% - 10%
Highly Organic	> 10%

6) Relative Visual Moisture

Description	Criteria	
	Cohesive Soil	**Non-cohesive Soils**
Dry	Powdery; Cannot be rolled; Water content well below the plastic limit	No moisture present
Damp	Leaves very little moisture when pressed between fingers; Crumbles at or before rolled to $^1/_8$"; Water content below plastic limit	Internal moisture, but no to little surface moisture
Moist	Leaves small amounts of moisture when pressed between fingers; Rolled to $^1/_8$" or smaller before crumbling; Water content above plastic limit to -3% of the liquid limit	Free water on surface, moist (shiny) appearance
Wet	Very mushy; Rolled multiple times to $^1/_8$" or smaller before crumbles; Near or above the liquid limit	Voids filled with free water, can be poured from split spoon.

CLASSIFICATION OF SOILS

Ohio Department of Transportation

(The classification of a soil is found by proceeding from top to bottom of the chart.
The first classification that the test data fits is the correct classification.)

SYMBOL	DESCRIPTION	Classifcation AASHTO	Classifcation OHIO	$LL_O/LL \times 100$*	% Pass #40	% Pass #200	Liquid Limit (LL)	Plastic Index (PI)	Group Index Max.	REMARKS
	Gravel and/or Stone Fragments	A-1-a			30 Max.	15 Max.		6 Max.	0	Min. of 50% combined gravel, cobble and boulder sizes
	Gravel and/or Stone Fragments with Sand	A-1-b			50 Max.	25 Max.		6 Max.	0	
F.S.	Fine Sand	A-3			51 Min.	10 Max.	NON-PLASTIC		0	
	Coarse and Fine Sand	--	A-3a			35 Max.		6 Max.	0	Min. of 50% combined coarse and fine sand sizes
	Gravel and/or Stone Fragments with Sand and Silt	A-2-4				35 Max.	40 Max.	10 Max.	0	
		A-2-5					41 Min.			
	Gravel and/or Stone Fragments with Sand, Silt and Clay	A-2-6				35 Max.	40 Max.	11 Min.	4	
		A-2-7					41 Min.			
	Sandy Silt	A-4	A-4a	76 Min.		36 Min.	40 Max.	10 Max.	8	Less than 50% silt sizes
	Silt	A-4	A-4b	76 Min.		50 Min.	40 Max.	10 Max.	8	50% or more silt sizes
	Elastic Silt and Clay	A-5		76 Min.		36 Min.	41 Min.	10 Max.	12	
	Silt and Clay	A-6	A-6a	76 Min.		36 Min.	40 Max.	11 - 15	10	
	Silty Clay	A-6	A-6b	76 Min.		36 Min.	40 Max.	16 Min.	16	
	Elastic Clay	A-7-5		76 Min.		36 Min.	41 Min.	≤LL-30	20	
	Clay	A-7-6		76 Min.		36 Min.	41 Min.	>LL-30	20	
	Organic Silt	A-8	A-8a	75 Max.		36 Min.				W/o organics would classify as A-4a or A-4b
	Organic Clay	A-8	A-8b	75 Max.		36 Min.				W/o organics would classify as A-5, A-6a, A-6b, A-7-5 or A-7-6

MATERIAL CLASSIFIED BY VISUAL INSPECTION

Sod and Topsoil

Pavement or Base

Uncontrolled Fill (Describe)

Bouldery Zone

P Peat

* Only perform the oven-dried liquid limit test and this calculation if organic material is present in the sample.