Greenman-Pedersen, Inc.
Engineering and Construction Services

MEMO

To: Aaron Estabrook and Daniel Livermore

From: Paul F. Bailey

Date: November 02, 2024 (Revised September 18, 2025)

Subject: Foundation Design Requirements for North Main Street Replacement

Project Information

JOB No.: 20300017.00
CONTRACT No. D214887
PIN S53076
STRUCTURE: North Main St. over the NYS Thruway
CLIENT: NYS Thruway Authority

This report is a combination fo the original report and the subsequent additions, such that everything is in one document.

Foundation Design Requirements

The foundation design requirements are based on the following elevations:

LOCATION	BOTTOM)-OF-FOOTING ELEVATIONS (Feet)
Begin Abutment	449.19
Pier	429.65
End Abutment	449.19

Notify Paul Bailey if the above footing elevations vary by more than a foot from the final design.

Based on the results of our analyses, the seismic soil classifications for the structure are:

Importance Category	Substructure	Seismic Soil Site Classification
Normal	Pier	C

Substructures

Support the abutments and the pier on HP 12x53 Steel H-Piles, Item 551.012053. Design the integral abutment stems and pier pile cap so that these piles have a maximum Strength Limit State axial load of 200 kips per pile; They will be driven to a nominal resistance of 308 kips per pile. Show a reinforced shoe as a toe treatment. Vertical pile deflections at the Service Limit State axial load will be less than 0.5 inches. At the pier, the piles have a maximum Strength Limit State uplift resistance of 79 kips per pile.

The estimated vertical pile lengths for this structure are:

LOCATION	ESTIMATED VERTICAL PILE LENGTH (feet)*	APPROXIMATE TIP ELEVATION (FEET)
Begin Abutment (South Abutment)	**81.2***	**370.0**
Pier	**51.0****	**379.6**
End Abutment (North Abutment)	**52.8***	**398.4**

*Estimated vertical pile lengths include the pile projecting two feet above the bottom of stem.

**Estimated vertical pile lengths include the pile projecting one foot above the bottom of footing.

The piles at the pier have a maximum Strength Limit State lateral resistance of 42 kips per pile. The single pile maximum Service Limit State lateral resistance is 32 kips at a deflection of 0.5 inches. Use Table 10.7.2.4-1 to adjust this resistance according to the actual pile layout.

Show the actual maximum pile Service Limit State axial load on the Contract Plans to the nearest kip. Estimate the quantity of splices for piles as 1/2 the total number of piles used in the structure. Two Dynamic Pile Tests, Item 551.14, must be performed at each substructure. The tests should be om piles near the ends of substructure.

Excavation and Backfill

Detail the excavation and backfill requirements of this structure in accordance with the Appropriate BD sheets. Design and detail a support system for excavations greater than 5 feet in height which cannot be laid back on a 1 vertical on 1-1/2 horizontal slope or flatter

Notes to be included in the Contract Plans

DYNAMIC PILE TESTS WILL BE CONDUCTED BY REPRESENTATIVES OF NEW YORK STATE THRUWAY ON TWO PILES AT EACH SUBSTRUCTURE, OR AT OTHER LOCATIONS ORDERED BY THE ENGINEER. PERFORM THE WORK IN ACCORDANCE WITH DYNAMIC PILE TESTING,

ITEM 551.14. NOTIFY THE THRUWAY THREE WORKING DAYS PRIOR TO DYNAMIC TESTING. THE PILES ARE DESIGNED TO SUPPORT A MAXIMUM STRENGTH LIMIT STATE AXIAL LOAOF 200 KIPS PER PILE. DRIVE THESE PILES TO ACHIEVE A NOMINAL RESISTANCE OF 308 KIPS PER PILE.

THE MAXIMUM SERVICE LIMIT STATE AXIAL LOAD APPLIED TO THE PILES AT THE BEGIN ABUTMENT IS ___ KIPS PER PILE.

THE MAXIMUM SERVICE LIMIT STATE AXIAL LOAD APPLIED TO THE PILES AT THE PIER IS ___ KIPS PER PILE.

THE MAXIMUM SERVICE LIMIT STATE AXIAL LOAD APPLIED TO THE PILES AT THE END ABUTMENT IS ___ KIPS PER PILE.

THE EXISTING PIER IS PILE SUPPORTED. THESE EXISTING PILES MAY INTERFERE WITH THE INSTALLATION OF THE PROPOSED PILES. IF THERE ARE PILE INTERFERENCES, THE ENGINEER WILL DIRECT THE CONTRACTOR HOW TO PROCEED.

THE FOLLOWING INFORMATION WAS USED IN THE DESIGN OF THE STEEL SHEETING::

LOCATION	**ELEVATION (FEET)**	**UNIT WEIGHT (LBS/FT^3)**	**FRICTION ANGLE (DEGREES)**	**COHESION (LBS/FT^2)**	**WALL FRICTION (DEGREES)**
PIER	OGS-438 438-434 BELOW 434	125 115 120	35 28 30	0 0 0	0 0 0

A. DIVIDE THE PASSIVE EARTH PRESSURE COEFFICIENT (K_P) BY 1.25.

B. GROUNDWATER IS ASSUMED AT ELEVATION 434 FEET.

C. A SURCHARGE LOAD OF 250 POUNDS PER SQUARE FOOT IS ASSUMED AT THE TOP OF THE WALL.

Appendix

The report calls for driving to a nominal resistance, rather than refusal. Driving to refusal does not account for if the hammer is adequate or if the pile is being overstressed. It requires a very hard rock to achieve the 5 blows to a quarter of an inch. In addition, there was no rock encountered in any of the explorations. There was some possible decomposed shale. This brings up another reason. The shale material west of the Hudson River and south of the Adirondacks has a tendency to relax when the pile is overdriven. Piles driven in this material have been restruck and driven up to two additional feet.

Appendix - Preliminary Geotechnical Services Report

PIN S53076_D2148847

MP257.09 NORTH MAIN STREET BRIDGE
REPLACEMENT OVER INTERSTATE 90
ONEIDA COUNTY, NEW YORK

RENAISSANCE PROJECT #: 23.0050

GEOTECHNICAL ENGINEERING SERVICES REPORT

RENAISSANCE GEOTECHNICAL ENGINEERING™

STATE OF NEW YORK
ALSENY DIOP
099180
LICENSED PROFESSIONAL ENGINEER

08/05/2024

PREPARED FOR:

NEW YORK STATE THRUWAY AUTHORITY
C/O GREENMAN-PEDERSEN, INC (GPI)
80 WOLF ROAD #600
ALBANY, NY 12205

PREPARED BY:

RENAISSANCE GEOTECHNICAL ENGINEERING
P.O. BOX 2503, GLENVILLE, NY 12302
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August 5, 2024

NEW YORK STATE THRUWAY AUTHORITY
c/o GPI/GREENMAN-PEDERSEN, INC.
80 Wolf Road #600
Albany, New York 12205

Attn.: Mr. Greg Kehn, E.I.T   Via Email to: gkehn@gpinet.com

RE: Geotechnical Engineering Services Report
PIN S53076_D214887
MP257.09 North Main Street Bridge Over Interstate 90
Oneida County, New York
RENAISSANCE PROJECT#: 23.0050

Dear Mr. Kehn:

Renaissance Geotechnical Engineering, PLLC (RGE) has completed the subsurface investigation and geotechnical evaluation for the proposed replacement of the North Main Street Bridge over Interstate Highway 90 at Mile Post 257.09 in Oneida County, New York.

The purpose of this investigation is to estimate the geotechnical engineering properties of the soils and rocks at the above referenced project site. Results of the field investigations, laboratory tests and engineer's review provide the information needed to evaluate the potential for soil compressibility and estimate shear strength properties of the soil and rock for foundation design.

Mr. Kehn, we appreciate the opportunity to work with you on this project, and at your request, we are prepared to assist you with the proper construction administration. If you have any questions regarding the information contained in this report or if we can be of further assistance, please call us at (518) 902-9222 or email at al@renaissancegeo.com

Respectfully Submitted,
Renaissance Geotechnical Engineering, PLLC

Alseny Diop, P.E.
Principal Geotechnical Engineer

REPORT SECTIONS

List of Tables:

1.0 INTRODUCTION

RGE has completed the subsurface investigation and geotechnical evaluation for the design of a replacement bridge along North Main Street over Thruway 90 at MP257.09 in Oneida County, New York. This report describes the subsurface conditions encountered in the borings, furnishes the laboratory data acquired, and provides geotechnical recommendations for general earthwork, and the design and construction of the foundations.

Lateral earth pressures for the design of above grade and/or below grade walls, along with L-Pile soil input parameters for lateral load analysis of deep foundations are included.

2.0 PROJECT DESCRIPTION

The subject project consists of a total replacement of a multi-span bridge crossing Interstate 90 near MP257.09 in Oneida, New York. A vicinity map of the current bridge location can be found in Appendix B.

We understand the current bridge may be replaced by another multi-span bridge with integral abutments.

3.0 SUBSURFACE EXPLORATION

Maintenance of traffic was conducted by personnel from the Thruway Authority. Subsurface investigations were performed by Northeast Specialized Drilling Inc. (NSD) under the supervision of RGE between April 1, 2024, and April 30, 2024. Drilling oversight including logging of the borings was performed by Mr. Alseny Diop, P.E., Principal Geotechnical Engineer from RGE. Mr. Diop's Resume can be found in Appendix A. Personnel from NSD included Mr. Marc Cheney as lead driller, and Mr. Zack Cheney as the helper.

Investigations consisted of the completion of three (3) conventional test borings (B-1, B-2, B-3) using a CME-55 drill rig, equipped with 3– ¼ inch ID hollow stem augers, 3-inch, casing, NWJ Rods, 2-in OD split spoon samplers, and a hammer with a cathead and a rope.

Representative soil samples were obtained on a continuous basis to a depth of approximately 37 feet in boring B-1, 50 feet in boring B-2, and 40 feet in boring B-3. The standard penetration test (SPT) sampling process was conducted in accordance with ASTM Designation D-1586. Two (2) Shelby tube samples were attempted from boring B-1 at a depth of approximately 34 feet, and in boring B-2 at a depth of approximately 45 feet in accordance with ASTM Designation D-1587. The borings were advanced to depths of approximately 59 feet at B-1, 88 feet at B-2, and 60 feet at B-3.

The SPT sampling process requires a split-barrel sampling tube be used to obtain soil samples. A 2-inch outside diameter sampling tube is hammered, using a drive hammer with a cathead and a rope, into the bottom of the borehole with a 140-pound weight falling 30 inches. The number of blows required to advance the tube, the middle two, 6-inch increments of a 24-inch sampling interval or portion thereof, is recorded as the standard penetration resistance value, N. The in-situ relative density of granular soils, the consistency of cohesive soils, and the hardness of weathered bedrock can be estimated from the N values. The uncorrected N values recorded for each test are shown on the attached boring logs at their relative sampling depths.

An approximate location map of the completed SPT Borings, can be found in Appendix B. Log Data from the borings can be found in Appendix C.

4.0 SUBSURFACE EVALUATION

4.1 Site Geology

The Surficial Geologic Map of New York, Finger Lakes 1986, identifies the project area as part of lacustrine deposits of silt and clay with the possibility of alluvial, lacustrine sand, and/or till deposits.

According to the United States Geological Survey (USGS) and the Geologic Map of New York, Finger Lakes, the project site is situated in a geologic area best described as being part of the Lockport Group characterized by the presence of dolostone and/or limestone. The bedrock formation is not expected within the top 60 to 80 feet based on the subsurface materials encountered.

4.2 Typical Soil Profiles

Borings B-1 and B-2 were completed along North Main Street. Boring B-1 was located approximately 14 feet north, 7 feet East, away from northwest abutment. Boring B-2 was located approximately 11 feet South, 12 feet West, away from the southeast abutment.

Boring B-3 was completed along Interstate Highway 90, on the median, approximately 25 feet west of the west most pier of the existing bridge.

In Boring B-1, we encountered approximately 4 inches of asphaltic cement pavement over 27 feet of fill, generally consisting of 19 feet of Silty, Clayey SAND with Gravel (SC-SM) overlaying 8 feet of Silty SAND with Gravel (SM).

At 27 feet, the fill material was underlain by Silty SAND (SM) and Clayey SILT (ML), interlayered through the boring termination depth of approximately 59 feet. The fill material within the top 27 feet varied from loose to well compact with an average N-value of 12.5.

Underlaying the fill is a 5-foot layer of Silty SAND (SM) with an average N-value of 23.5 indicating medium dense to dense conditions. This layer is followed by another 4-foot layer of very stiff, Clayey SILT (ML) with an estimated unconfined compressive strength of 69.4 psi.

From 36 feet, the materials continued with mainly Silty SAND (SM) at an average N-value of 50, indicating dense to very dense in relative density through the boring termination. However, between 48 and 56.5 feet, we encountered an 8.5-foot layer of Clayey SILT (ML), hard with an average N-value of 42.

In Boring B-2, below a 4-inch-thick asphaltic cement, is approximately 8 inches of Portland cement concrete over 24 inches of crusher run gravel base over fill to a depth of approximately 29 feet. The FILL (SC-SM) at this location generally varied from loose to well compact with average N-value of 15.

The fill is underlain by a thick cohesive Clayey SILT layer (CL-ML) to the top of TILL at approximately 81 feet. This Clayey SILT (ML) layer is generally very stiff to hard in consistency with an average N-value of 32.

At 81 feet, we encountered a TILL layer classified as a Silty GRAVEL with Sand (GM). This Till was generally dense to very dense in relative dense with frequent decomposed shale rock cobbles. The average N-value of this layer is estimated to be approximately 44.

As previously noted, Boring B-3 was completed in the median of Interstate 90 on the west side of the bridge. This boring showed more layering of the onsite soils starting with crushed stone the top 2 feet followed by a Silty, Clayey SAND with Gravel layer (SC-SM) to approximately 9 feet. This layer was generally loose to medium dense with an average N-value of 8.

The above material is underlain by a thin layer (3.5 feet thick) of stiff to very stiff Lean CLAY (CL) with an average N-value of 20.5 over a layer of non-plastic SITL (ML) at an average N-value of 47, to a depth of approximately 18 feet. These layers are followed by another very stiff to hard layer of Lean CLAY (CL) with an average N-value of 28 to the top of another non-plastic SILT layer at approximately 22.5 feet.

The non-plastic Sandy SILT (ML) layers extended to 35.5 feet with an average N-value of 44, characteristics of dense conditions. At 35.5 feet, began another layer of hard cohesive, Clayey SILT (ML) with an average N-value of 47 to the top of the till at a depth of approximately 54 feet.

The TILL, classified as Silty GRAVEL with Sand (GM), varied from very dense to extremely dense with an average N-value of 63.5 between 54 and 60 feet where boring B-3 was terminated.

The following tables provide our recommended design profile from each boring:

Table IA: Typical Soil Profile & Estimated Design Parameters (B-1)

Depth (feet)	Thickness H_i (feet)	Material Description	$N_{avg.}$	γ (pcf)	s_u (psf)	ϕ (degrees)
0 – 27	27	FILL (SC-SM)	12.5	111	-	31
27 – 32	5	SM	23.5	119	-	34
32 – 36	4	CL-ML	28	121	3,000	-
36 – 48	12	SM	50	129	-	41
48 – 56.5	8.5	CL-ML	42	125	4,500	-
56.5 – 59	2.5	SM	50	128	-	41

Table IB: Typical Soil Profile & Estimated Design Parameters (B-2)

Depth (feet)	Thickness H_i (feet)	Material Description	$N_{avg.}$	γ (pcf)	s_u (psf)	ϕ (degrees)
0 – 29	29	FILL (SC-SM)	15	113	-	31
29 – 81	52	CL-ML	32	118	3,500	-
81 – 88	7	TILL (GM)	44	122	-	35

Table IC: Typical Soil Profile & Estimated Design Parameters (B-3)

Depth (feet)	Thickness H_i (feet)	Material Description	$N_{avg.}$	γ (pcf)	s_u (psf)	ϕ (degrees)
0 – 9	9	SC-SM	8	110	-	29
9 – 12.5	3.5	CL	20.5	123	2,500	-
12.5 – 18	5.5	ML	47	134	-	40
18 – 22.5	4.5	CL	28	125	3,000	-
22.5 – 35.5	13	ML	44	130	-	39
35.5 – 54	18.5	CL-ML	47	130	5,000	-
54 – 60	6	TILL (GM)	47	129	-	40

4.3 Liquefaction & Settlement Evaluation

Liquefaction is defined as a sudden drop in shear strength of saturated cohesionless soils. Seed et al. (2003) and the New York State Department of Transportation (NYSDOT) Geotechnical Design Manual also designate cohesive and/or cohesionless soils with moisture contents of more than 80 to 85% of the Liquid Limit to be potentially liquefiable. Factors that contribute to liquefaction include but are not limited to very low to low Standard Penetration Test (SPT)–N values, high water table, lightly loaded medium sand particles, and high moisture content of cohesive soils. The onsite soils at this site are not expected to liquefy.

4.4 Seismic Considerations

An undrained shear strength of the cohesive soils is estimated to be at least 1,500 psf with an average SPT N-value across all borings well in excess of 15. Therefore, we recommend assuming the characteristics of a seismic Site Class "D" in accordance with Section 1613.3.2 entitled "Site Class Definitions" in the 2020 New York State Building Code and Chapter 20 of ASCE 7-16. For this Class, the mapped spectral accelerations listed in Table II can be used for design. Additionally, the New York State Department of Transportation (NYSDOT) has assigned a Seismic Performance Category B to bridges in Oneida County. Output parameters summarized in Table II from the ASCE/SEI 7-16 Seismic Standard Tool can be found in Appendix E.

Table II – Seismic Site Class and Spectral Accelerations

Seismic Site Class		D
Estimated Site Coordinates	Latitude	43.110375
	Longitude	-75.664780
Adjusted Peak Ground Acceleration - PGA_M		0.128g
S_{MS} – Short Period, Site Class Modified Spectral Acceleration		0.252g
S_{M1} – 1 Second Period, Site Class Modified Spectral Acceleration		0.13g
S_{DS} – Short Period, Five Percent Damping, Spectral Acceleration		0.168g
S_{D1} – 1 Second Period, Five Percent Damping, Spectral Acceleration		0.087g
S_s – Short Period Spectral Acceleration		0.157g
S_1 – 1 Second Period Spectral Acceleration		0.054g
Note: Final Seismic Design Category Should be Established by the Bridge Structural Engineer		

4.5 Groundwater Conditions

The presence of water was observed at a depth of approximately 35 feet in Boring B-1, 35 feet in Boring B-2, and 7 feet in Boring B-3. Groundwater level fluctuations and/or perched water conditions may occur due to seasonal variations in the amount of rainfall and other factors such as drainage characteristics. To obtain more accurate groundwater level information, long-term observations in a monitoring well or piezometer that is sealed from the influence of surface water would be needed.

5.0 LABORATORY EVALUATION

As part of the geotechnical evaluation, the field engineer examined each of the soil samples and selected representative samples for further laboratory testing. Laboratory tests were conducted by EINCK, CORP from Maryland. The lab AASHTO accreditation is included in Appendix A of this report.

The tests included ASTM Designations D2216 - "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass", C136 "Standard Test Methods for Sieve Analysis of Fine and Coarse Aggregates", C117 "Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing", D4318-17e1, the "Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils", D-7928, "Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis", and D-2166-06, "Standard Test Method for the Unconfined Compressive Strength of Cohesive Soil". The results of these tests can be found in the appropriate column of the boring logs and in Appendix D.

6.0 FOUNDATION RECOMMENDATIONS

6.1 Site Evaluation

Based on the subsurface materials encountered, we recommend using low displacement driven H-piles to support the bridge substructures. Our analysis is based on the use of an HP12X74 driven H-Pile with an estimated width of 12.2 inches and depth of 12.1 inches,

6.2 Driven Piles

Borings B-2 and B-3 showed the possibility of large cobbles, and because of the granular materials encountered within the top 2 to 9 feet of the borings, difficult driving conditions must be expected, and the use of driving shoes shall be planned to minimize damages to the piles.

If obstructions are encountered, it may be necessary to pre-drill prior to advancing the piles to the required bearing elevations. Pre-drilling should be completed in accordance with NYSDOT Item 551.03020017 – Predrilling Holes for Piles – Casing Required. Pilot holes should be drilled, bored, or augered through the existing soils to form a hole at least 6 inches larger than the maximum diagonal axis measurement of the H-Pile, and 6 inches larger than the pipe pile diameter. Jetting of soils should not be permitted. A casing will likely be required, due to these difficult drilling conditions and expected groundwater. The casing should not be advanced more than 5 feet ahead of the bottom of the excavation during the predrilling process. Pilot holes for pile installation should be backfilled with cushion sand, meeting the requirements of Section 703-06 of the NYSDOT Standard Specifications. The casing can be removed after backfilling the installed piles.

Our recommended nominal end bearing and side resistance stresses at each boring location are provided in the following tables for an HP12X74 driven pile:

Table III – Allowable Soil Bearing Capacities for an HP12X74

Boring No.	q_p (ksf)	q_s (ksf/ft)	Uplift (ksf/ft)	Minimum Bearing Depth (ft)
B-1	178	1	1	55
B-2	90	1	1	55
B-3	255	1	1	55

Notes:

The top 9 feet from B-1, the top 11 feet from B-2, and the top 8 feet from B-3 should be neglected when computing the allowable loads in compression.

Uplift resistance should be calculated by adding the weight of the piles to the computed allowable load in tension. Neglecting the above depth is not necessary when estimating the resistance to uplift.

Using the appropriate resistance factors, a combination of the above soil resistance values shall not exceed the structural capacity of the piles as shown in Table IV. A pile drivability and pile driving acceptance criteria should be established.

The center-to-center spacing should be 2.5 times the maximum pile width or 30 inches, whichever is greater. The distance from the side of any pile to the nearest edge of the pile cap should not be less than 9 inches.

Axial capacities of driven piles must be verified through load testing, and we recommend that theoretical capacities be limited to 30 percent of their yield strengths. Therefore, the following capacities can be used as the upper bound for each pile type:

Table IV – Allowable Pile Structural Capacities

Pile Type	Axial Capacity (tons)
HP14X89	141
HP14X73	116
HP12X84	133
HP12X74	118
HP12X63	100
HP 12X53	70
HP 10X42	56
All piles are assumed to be Grade 50 steel. Properly installed and tested piles are expected to experience negligeable impact due to downdrag.	

6.3 Pile Caps

Pile caps should extend at least 5 feet below adjacent grades. If extending less than 5 feet below adjacent grades, they should be supported on non-frost susceptible crushed stone, commonly known as Item B12 – an equal blend of NYSDOT Type 1 and Type 2 crushed stone as specified in Section 733-23, Tables 733-23A and 733-23B of the May 1, 2024, NYSDOT Standard Specifications for Construction Materials. Constructed pile caps should be backfilled, in 12-inch loose thickness lifts, with Structural Fill meeting the gradation requirements of Table V below.

Table V – Select Granular Fill

Sieve Size Designation	Percent Passing by Weight
4-inch	100
No. 40	0 – 70
No. 200	0 – 15

Compaction of the Select Granular Fill should be to 95 percent of the material maximum dry density in accordance with ASTM D-1557, Modified Proctor, with a moisture content within 2 percent of the optimum moisture content.

6.4 Lateral Load Analysis of Deep Foundations

Lateral load analysis of the pile foundations can be performed using Ensoft, Inc's computer program, L-Pile or other acceptable software programs. Soil input parameters for lateral load analysis using L-Pile are provided in the following tables.

Table VIA – L-Pile Soil Input Parameters for Lateral Load Analysis (B-1)

Thickness (feet)	Material Description	γ' (pcf)	ϕ (degrees)	k (pci)	c (psf)	ε_{50}
0 – 27	Sand (Reese et al.)	111	31	60	-	-
27 – 32	Sand (Reese et al.)	119	34	90	-	-
32 – 36	Stiff Clay without free water	121	-	-	3,000	0.005
36 – 48	Sand (Reese et al)	66.6	41	125	-	-
48 – 56.5	Stiff Clay with free water	62.6	-	-	4,500	0.004
56.5 – 59	Sand (Reese et al)	65.6	41	125	-	-

Table VIB – L-Pile Soil Input Parameters for Lateral Load Analysis (B-2)

Thickness (feet)	Material Description	γ' (pcf)	ϕ (degrees)	k (pci)	c (psf)	ε_{50}
0 – 29	Sand (Reese et al.)	113	31	60	-	-
29 – 36	Stiff Clay without free water	118	-	-	3,500	0.005
36 – 81	Stiff Clay with free water	55.6	-	-	3,500	0.005
81 – 88	Sand (Reese et al)	59.6	35	125	-	-

Table VIC – L-Pile Soil Input Parameters for Lateral Load Analysis (B-3)

Thickness (feet)	Material Description	γ' (pcf)	ϕ (degrees)	k (pci)	c (psf)	ε_{50}
0 – 9	Sand (Reese et al.)	110	29	60	-	-
9 – 12.5	Stiff Clay with free water	60.6	-	-	2,500	0.005
12.5 – 18	Sand (Reese et al.)	71.6	40	175	-	-
18 – 22.5	Stiff Clay with free water	62.6	-	-	3,000	0.005
22.5 – 35.5	Sand (Reese et al.)	67.6	39	175	-	-
35.5 – 54	Stiff Clay with free water	67.6	-	-	5,000	0.004
54 – 60	Sand (Reese et al.)	66.6	40	175	-	-

6.5 Lateral Earth Pressures

The lateral forces on retaining walls depend upon the wall's ability to rotate, the type and density of the backfill material behind the wall, the inclination of the backfill behind the wall, and the influence of surface loads imposed behind the walls. To account for potential live loads near the walls, we recommend using an additional 250 psf pressure for surcharge loading. To help prevent hydrostatic loading on the wall, a perforated, rigid plastic or metal drain line should be installed at the base of the walls. The drain line should be sloped to provide positive gravity drainage to a suitable collection point. A procedure should be used to discharge the water from the outlet point, which would not allow reverse flow into the drain system. Free draining granular fill from a NYSDOT approved source should be used to backfill above the drains and should extend behind the wall a minimum width of 12 inches. The granular material should consist of an equal blend of NYSDOT Type 1 and Type 2 crushed stone as specified in Section 6.3. The following design parameters were estimated based on Rankine's theory of horizontal backfill along a vertical wall face.

Table VII: Lateral Earth Pressure Parameters

Material	At Rest, k_o	Active, k_a	Passive, k_p
Backfill Material (50/50 Blend of Type 1 and Type 2)	0.37	0.23	4.20
Earth Pressure Coefficients (level backfill) – $\phi = 29$	0.52	0.35	2.88
Earth Pressure Coefficients (level backfill) – $\phi = 31$	0.48	0.32	3.12
Unit Weight of Soil Backfill (lbs./ft^3)	See Tables IA, IB, and IC		
Unit Weight – 50/50 blend Type 1 and Type 2 (lbs./ft^3)	$\gamma = 138$		

6.6 Excavation Considerations

Most excavation at the site will primarily be for new utilities and structure foundations. Most excavation will occur within the native alluvial soils or fill materials. We recommend classifying these materials as "Type C" soils according to the Occupational Safety and Health Administration (OSHA). These types of soils will require allowable slopes no steeper than 1.5H:1V (about 34° from the horizontal) for excavations shallower than 20 feet. We recommend that excavations at the site be performed by experienced personnel, and that OSHA guidelines for excavations be closely followed. All excavations should be monitored for ground movements; if any signs of distress are observed, the Geotechnical Engineer of record should be notified.

6.7 Construction Dewatering

Dewatering should be expected for excavations deeper than 35 feet near borings B-1 and B-2, 7 feet near boring B-3. During periods of rain, perched water conditions may develop. It shall be the responsibility of the contractor to keep and restore foundation excavation subgrades to a dry condition, and preparing subgrades that are free of mud, water, and disturbed soils.

7.0 CONSTRUCTION MONITORING

This report provides geotechnical recommendations based on the subsurface conditions encountered. It is not practical or economical to perform enough subsurface investigation borings to identify all conditions at the site. Subsurface conditions may vary with distance away from the test borings completed for this report. Conditions that may affect the recommendations contained within the geotechnical report may exist and may not become known until construction. If variations appear during construction, it may be necessary to revise the recommendations contained in this report. In general accordance with the State of New York Building Code, NYSDOT and LRFD, monitoring of subsurface conditions during construction should be performed by a geotechnical engineer registered in the State of New York or his/her representative to verify that conditions are consistent with the geotechnical report.

8.0 GENERAL

The findings and recommendations contained in this geotechnical report have been made with generally accepted professional geotechnical practices in the local area. No other warranties are implied or expressed. The scope of services and recommendations contained in this report do not include any environmental assessment or identification of contaminated or hazardous materials. Any statements in this report or in the boring logs concerning suspicious odors, colors, irregular textures or abnormal conditions are for informational purposes only and have not been verified by the geotechnical engineer, drilling or testing companies.

Appendix A

Resume of Onsite Geotechnical Engineer, Laboratory Accreditations

Certified MBE in NY and NYPA. DBE Certified in NY, RI, OK, and TX

RENAISSANCE GEOTECHNICAL ENGINEERING™

P.O. Box 2503
Glenville, NY 12302
Phone: 518-902-9222 | Fax: 518-630-6757
Email: info@renaissancegeo.com

Alseny Diop, P.E., Civil/Geotechnical Engineer

Professional Background:
Professional Engineer in the States of NY, NJ, MA, PA, DC, CT, RI, MD, OK, TX, and CO.

Certified Prince2 Foundation in Project Management

Education:
Master of Civil Engineering with Concentration in Geotechnical Engineering – University of Oklahoma, 2011

Bachelor of Science in Civil Engineering; University of Oklahoma, 2002

Professional Affiliations:
- American Society of Civil Engineers
- American Concrete Institute
- Capital Region Chapter of the Geo-Institute.
- ASCE Engineer without Borders

Mr. Diop is the Owner and Principal Geotechnical Engineer of RENAISSANCE GEOTECHICAL ENGINEERING, PLLC (RENAISSANC). Mr. Diop is a registered Professional Engineer in NY, NJ, MA, CT, PA, DC, RI, MD, OK, TX, and CO. With 20 years of experience in geotechnical engineering, construction material inspection and testing, Mr. Diop obtained a bachelor's degree in civil engineering in 2002, and a master's degree with geotechnical concentration in 2011 from the University of Oklahoma. Over the years, Mr. Diop has served as the lead geotechnical engineer in completing a variety of projects for foundation design to support single- and multi-span bridges, water tanks, single and multi-family residences, commercial projects including airport hangars, parking garages, compressor stations, sub-stations, high voltage transmission lines, cell towers, wind turbines, retaining walls, etc. Mr. Diop also completed numerous airport pavement evaluation and design in general accordance with the Federal Aviation Administration (FAA) Circular 150/5320-6F including the operation of FAARFIELD, a software published by the FAA. Prior to starting RENAISSANCE, Mr. Diop worked as the Senior Geotechnical Engineer & Department Manager for C.T. Male, a New York State based company and EST, Inc., an Oklahoma based company. Mr. Diop's experience also expands into the inspection and maintenance of dams, the evaluation and design of wastewater lagoon liners, the structural design of pavements to support both heavy duty and light duty traffic, as well as the analysis of the stability of embankment slopes. Early in his career, Mr. Diop completed numerous pedological and geological surveys in accordance with NRCS for the Oklahoma Department of Transportation (ODOT).

Project Related Experience:

- Taborton Road Bridge & Culvert Replacements Over Horse Heaven Creek – Rensselaer County
- Hudson River Shoreline Stabilization – City of Albany
- Covanta Span Bridge (Pedestrian bridge – Nassau County, NY)
- Irony Alliance Suspension Bridge for George Story – Saratoga County, New York
- Single-Span Bridge Replacement over Tributary of Coeymans Creek, Albany County, New York
- County Road 65 Bridge Replacement over Hunns Lake Creek, Dutchess County, New York
- Bridge Replacement, L-29, CR21 (Noxon Road) Over Jackson Creek, Dutchess County, New York
- County Road 412 (Airport Road) Over Hannacrois Creek (2 Sites) Culvert Replacements
- Saratoga Greenbelt Trail (SGT), Bog Meadow Trail, Single-Span Bridge Replacement
- South Shore Road, Bridge Replacement over Oswegatchie River – St. Lawrence County, New York
- Single-Span Bridge Replacements – Sullivan County, New York
- Sanford Road, Single-Span Bridge Replacement over Oquaga Creek – Broome County, New York
- Bard College Student Residences and Performance Art Lab – Annandale-on-Hudson, New York
- St. Peter's Eddy Memorial Hospital Slope stability and Drainage Design – Troy, New York
- Woodstock Residential Building including rock anchoring system design – Ulster County, New York
- Beverwyck Slope Stability Evaluation – Slingerlands, New York
- Ridge Road Bridge Replacement – Orange County, New York
- Residential Building, Slope Stability and Retaining Wall Design, Keene Valley, New York
- 23043-NY National Grid CLCPA Phase 1 East, across New York State

AASHTO ACCREDITED

Certificate of Accreditation

American Association of State Highway and Transportation Officials
AASHTO

EINCK, Corp.

in

Timonium, Maryland, USA

has demonstrated proficiency for the testing of construction materials and has conformed to the requirements established in AASHTO R 18 and the AASHTO Accreditation policies established by the AASHTO Committee on Materials and Pavements.

The scope of accreditation can be viewed on the Directory of AASHTO Accredited Laboratories (aashtoresource.org).

Jim Tymon,
AASHTO Executive Director

Matt Linneman,
AASHTO COMP Chair

This certificate was generated on 08/04/2024 at 7:40 PM Eastern Time. Please confirm the current accreditation status of this laboratory at aashtoresource.org/aap/accreditation-directory

SCOPE OF AASHTO ACCREDITATION FOR:

EINCK, Corp.

in Timonium, Maryland, USA

Quality Management System

Standard:	Accredited Since:
R18 Establishing and Implementing a Quality System for Construction Materials Testing Laboratories	03/14/2022

SCOPE OF AASHTO ACCREDITATION FOR:

EINCK, Corp.

in Timonium, Maryland, USA

Soil

Standard:		Accredited Since:
R58	Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test	03/14/2022
T88	Particle Size Analysis of Soils by Hydrometer	03/14/2022
T89	Determining the Liquid Limit of Soils (Atterberg Limits)	03/14/2022
T90	Plastic Limit of Soils (Atterberg Limits)	03/14/2022
T99	The Moisture-Density Relations of Soils Using a 5.5 lb [2.5 kg] Rammer and a 12 in. [305 mm] Drop	03/14/2022
T100	Specific Gravity of Soils	03/14/2022
T180	Moisture-Density Relations of Soils Using a 10 lb [4.54 kg] Rammer and an 18 in. [457 mm] Drop	07/12/2024
T193	The California Bearing Ratio	07/12/2024
T216	One-Dimensional Consolidation Properties of Soils Using Incremental Loading	07/12/2024
T265	Laboratory Determination of Moisture Content of Soils	03/14/2022
T296	Unconsolidated, Undrained Compressive Strength of Cohesive Soils in Triaxial Compression	07/12/2024
T297	Consolidated-Undrained Triaxial Compression Test on Cohesive Soils	07/12/2024
D421	Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test	03/14/2022
D422	Particle Size Analysis of Soils by Hydrometer	03/14/2022
D698	The Moisture-Density Relations of Soils Using a 5.5 lb [2.5 kg] Rammer and a 12 in. [305 mm] Drop	03/14/2022
D854	Specific Gravity of Soils	03/14/2022
D1140	Amount of Material in Soils Finer than the No. 200 (75-μm) Sieve	03/14/2022
D1557	Moisture-Density Relations of Soils Using a 10 lb [4.54 kg] Rammer and an 18 in. [457 mm] Drop	07/12/2024
D1883	The California Bearing Ratio	07/12/2024
D2216	Laboratory Determination of Moisture Content of Soils	03/14/2022
D2435	One-Dimensional Consolidation Properties of Soils Using Incremental Loading	07/12/2024
D2487	Classification of Soils for Engineering Purposes (Unified Soil Classification System)	03/14/2022
D2850	Unconsolidated, Undrained Compressive Strength of Cohesive Soils in Triaxial Compression	07/12/2024

Soil (Continued)

Standard:	Accredited Since:
D4318 Determining the Liquid Limit of Soils (Atterberg Limits)	03/14/2022
D4318 Plastic Limit of Soils (Atterberg Limits)	03/14/2022
D4767 Consolidated-Undrained Triaxial Compression Test on Cohesive Soils	07/12/2024
D5084 Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter	07/12/2024

NEW YORK STATE OF OPPORTUNITY. | Thruway Authority

REQUEST TO ACCESS AUTHORITY PROPERTY

Purpose: This Request is used to obtain authorization from the appropriate Division prior to accessing Thruway Authority (Authority) property. The Request is required when access/work is regulated by an existing contract or agreement and the access/work will not be monitored and/or supervised by Authority staff. The Request is not required: (i) for existing construction contracts or construction inspection agreements, or (ii) for existing contracts or agreements where access/work will be supervised by Authority staff, or (iii) when it is more appropriate to obtain a Work Permit.

INSTRUCTIONS:

- *Applicant:* Complete and sign Section I and send to appropriate Division Permit Office listed on page 2 of this Request. Submit this Request two (2) weeks in advance of any scheduled access if Division assistance is required (e.g., traffic control) or one (1) week in advance of any scheduled access if Division assistance is not required. Once approved, the Request must be available at the work site and provided upon request to confirm the applicant's authorization to access the specified property.
- *Division:* Review Request, complete Section II and send Request back to the applicant. Send copies of approved Request to:
  - Division Traffic Operations (for notification to State Police, and when necessary, for coordination of traffic control)
  - Appropriate Division Program Manager
  - Office of Real Property Management

Section I Applicant Information

Contract No.: D214887
Project Description: N. Main Street Bridge Replacement

Firm Name: Renaissance Geotechnical Engineering
Email Address: al@renaissancegeo.com

Street Address: 6 Olde Coach Road
City: Glenville
State: NY
Zip Code: 1 2 3 0 2

Representative Name: Alseny Diop, PE
Phone No.: (518) 902 - 9222
Fax No.: (518) 630 - 6757
Cell Phone No.: (518) 902 - 9222

HQ/Division Contact: Aaron Estabrooks
Phone No.: (518) 471 - 4259

Names of persons entering Authority Property (attach additional sheets if necessary)	Phone No.	Cell Phone/Pager No.
Alseny Diop, P.E.	(518) 902 - 9222	(518) 902 - 9222
Donald J. Sipher, P.E.	(518) 390 - 5931	(518) 390 - 5931
Marc Cheney	(315) 439 - 1155	( ) -
Zackery Cheney	(315) 439 - 9856	( ) -

Location (e.g., milepost(s), GPS coordinates, tax map parcel numbers, etc.): MP 257.09

Duration of scheduled access: From: 04/01/2024 To: 04/05/2024

What is the purpose of the access? (attach additional sheets if necessary):

Soil boring field work.

What consultant equipment will be used?

Drill rig and equipment truck.

Will traffic control be required? ☒ Yes ☐ No

What support from Authority Division staff is being requested?

No support from Authority Division staff is requested.

Applicant Affirmation: The undersigned certifies that the above information is correct.

Signed by: [signature] Date: 02/12/2024
Firm Representative

Section II Division Approval

Authorization for the firm named above to access Authority property as defined in this Request is:

☒ Approved ☐ Disapproved If Approved, is Work Permit required? ☐ Yes ☒ No

Jerrin George	Jerrin George	02/23/24
Reviewed by (print name)	Signature	Date

Division Comments/Conditions (attach additional sheets if necessary): See attached conditions.

REQUEST TO ACCESS AUTHORITY PROPERTY

DIVISION PERMIT OFFICES

THRUWAY DIVISION LIMITS

New York

- New York (Mainline) - Mileposts: 0.00 - 76.50
- Garden State Parkway Connection: GS 0.00 - GS 2.40
- New England Section: NE 0.17 - NE 15.01
- I-287 Cross Westchester: CWE 0.00 - CWE 10.90

Syracuse

- Syracuse (Mainline) - Mileposts: 197.90 - 350.60

Albany

- Albany (Mainline) - Mileposts: 76.50 - 197.90
- Berkshire Section: B 0.00 - B 24.28

Buffalo

- Buffalo (Mainline) - Mileposts: 350.60 - 496.00
- Niagara Section: N 0.00 - N 21.50

Addresses and Phone Numbers

NYS Thruway Authority
New York Division
Division Permit Coordinator
Suite 400
4 Executive Blvd.
Suffern, NY 10901
Phone: (845) 918-2510
Fax: (845) 918-2596

NYS Thruway Authority
Albany Division
Division Permit Coordinator
P.O. Box 861
Albany, NY 12201-0861
Phone: (518) 436-2710
Fax: (518) 436-2932

NYS Thruway Authority
Syracuse Division
Division Permit Coordinator
Suite 250
290 Elwood Davis Rd.
Liverpool, NY 13088-2103
Phone: (315) 438-2420
Fax: (315) 461-0765

NYS Thruway Authority
Buffalo Division
Division Permit Coordinator
Suite 800
455 Cayuga Rd.
Cheektowaga, NY 14225
Phone: (716) 631-9017
Fax: (716) 626-5362

All regulations as specified in our Rules Governing Occupancy and Work Permits shall apply. Additionally, the following shall be conditions of this Access Authorization:

1. **All work will require notification to and approval by the Division Permit Coordinator at (315) 438-2391 at least 2 business days prior to the start of work. Specific operations may require site and/or operation plans prior to approval.**

2. **All contractor personnel working on our right-of-way shall observe all Authority rules and regulations and are required to wear a hard hat and High Visibility Safety apparel that meets Performance Class 3 requirements of the ANSI/ISEA 107-2004 publication entitled "American National Standard for High-Visibility Safety Apparel and Headwear".**

3. **Appropriate Work Zone Traffic Control (WZTC) is to be utilized when necessary. Encroachment of a travel lane is not allowed. Our Traffic Operations Department must approve any traffic control. Call the Division Traffic Supervisor, Paul LaForce at (315) 438-2326 to discuss WZTC at least one week prior to work being performed, for approval.**

4. **No lane/shoulder closure is permitted with this access. All work within 30 ft. from the edge of shoulder pavement requires WZTC. Follow NYSTA WZTC standard sheets found in the link:**
   Standard Sheets Book - New York State Thruway (ny.gov)

5. **All vehicles used on our system must be equipped with a rotating amber light, which is to be used when parked. Vehicles must be parked off the pavement.**

6. **All work is dependent upon weather conditions. No work is to be performed during periods of adverse weather.**

7. **No other contract work, demolition, destruction, or construction work is authorized by the Permit.**

8. **Call before you Dig!! 1-800-962-7962 before any excavating work.**

9. **Overnight parking of equipment or staged material within 30 ft. from the edge of travel lane shall not be permitted. No unprotected exposed excavation or drop-offs will be allowed.**

10. **Toll free use or U-turns on the Thruway System are not authorized by this Permit. A written request must be submitted to our Traffic and Safety Department to obtain authorization for U-turns (p. 17, section 6, of the NYSTA Occupancy and Work Permit Accommodation Policy booklet).**

11. **Any violation of Authority regulations or the Permit conditions shall constitute grounds for the immediate revocation of this Permit.**

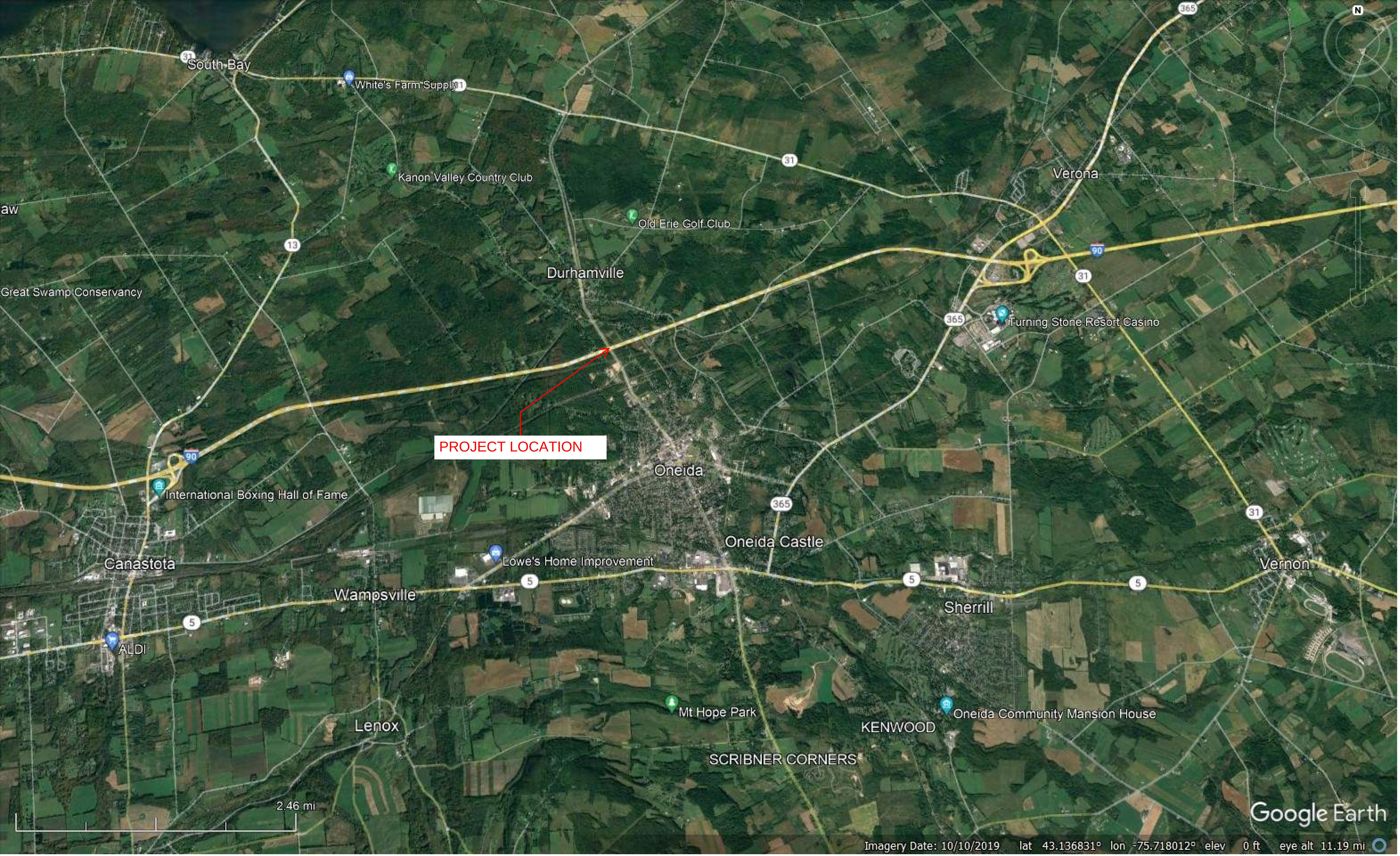
12. **All areas of Authority right-of-way disturbed by your operations are to be restored to the Authority's satisfaction (original condition or better). Use only approved materials to replace in kind those materials removed or damaged.**

13. **Follow NYSDOT Spec Section 610 – Ground Vegetation – Preparation, Establishment and Management for site restoration.**

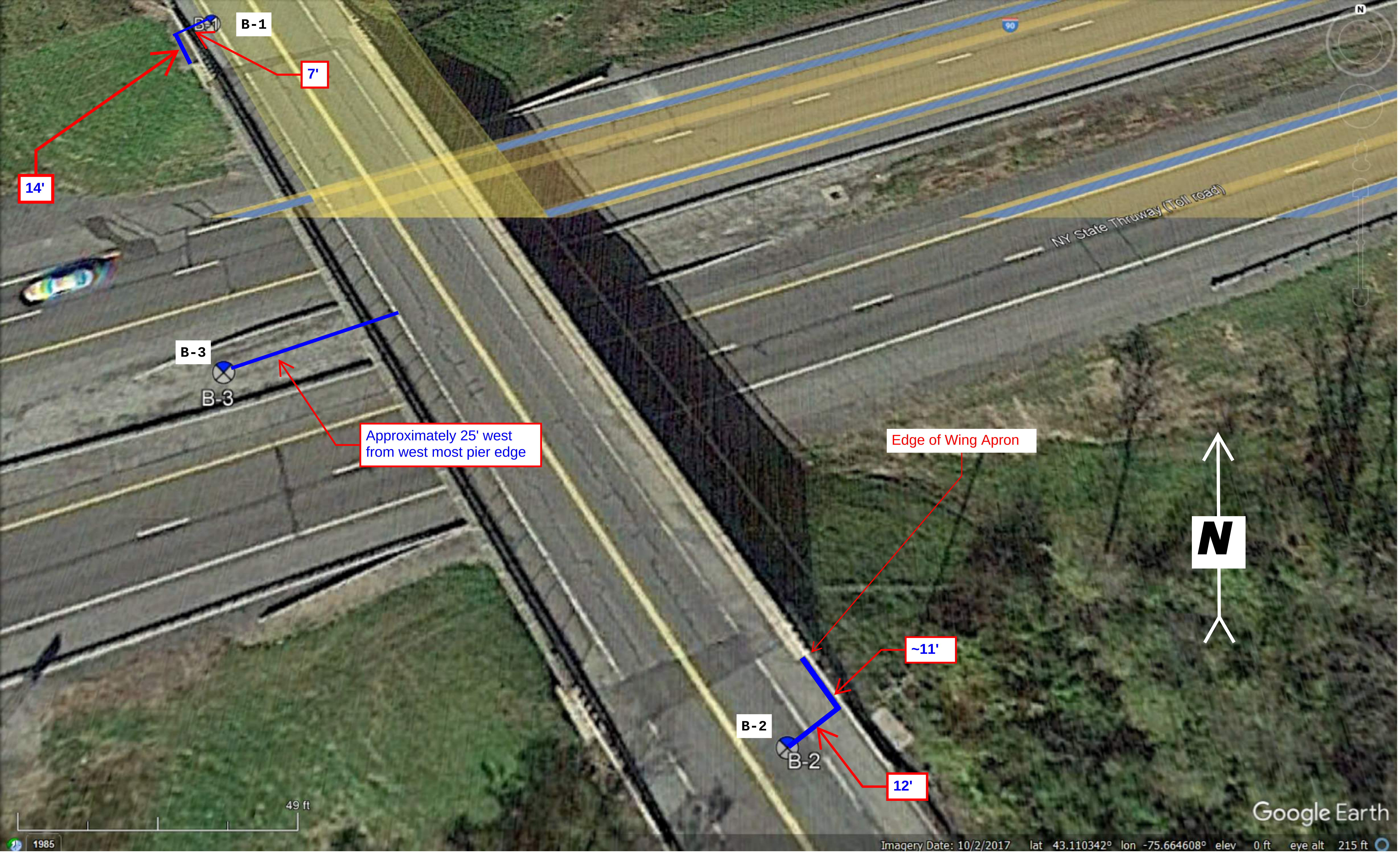
14. **All contractors and/or sub-contractors must obtain their own Thruway Access Permit.**

Appendix B

Vicinity Map & Boring Location Diagram



PROJECT LOCATION
South Bay
White's Farm Supply
Kanon Valley Country Club
Old Erie Golf Club
Verona
Durhamville
Great Swamp Conservancy
Turning Stone Resort Casino
Oneida
International Boxing Hall of Fame
Oneida Castle
Canastota
Lowe's Home Improvement
Wampsville
Sherrill
Vernon
ALDI
Mt Hope Park
Oneida Community Mansion House
Lenox
KENWOOD
SCRIBNER CORNERS
2.46 mi
Google Earth
Imagery Date: 10/10/2019 lat 43.136831° lon -75.718012° elev 0 ft eye alt 11.19 mi


B-1
7'
14'
90
NY State Thruway (Toll road)
B-3
B-3
Approximately 25' west
from west most pier edge
Edge of Wing Apron
N
~11'
B-2
B-2
12'
49 ft
1985
Google Earth
Imagery Date: 10/2/2017 lat 43.110342° lon -75.664608° elev 0 ft eye alt 215 ft

Appendix C

General Notes, Boring Acronym, Boring Logs

Phone: 518-902-9222
405-215-9367
info@renaissancegeo.com

BORING LOG ACRONYM LIBRARY

- SPT-N: Blow or strike count for the Standard Penetration Test or the Texas Cone Penetrometer Test. In general, the Standard Penetration Test "N" is the numbers of strikes required to advance a standard 2-inch outside diameter split-spoon a distance of 1-foot, or portion thereof, with a 140-pound hammer falling 30 inches.

  In general, the Texas Cone Penetrometer Test (TCP) "N" is the numbers of strikes with penetration depths required to advance a solid steel three-inch diameter cone of standard dimensions with a170-pound weight falling 24-inches. Two 50 strike intervals or two 6-inch penetration intervals is recorded.

- WOH: Weight of Hammer
- WOR: Weight of Drilling Rod
- USCS Symbol: The Unified Soil Classification System Identification Symbol
- ATV: All-Terrain Vehicle Mounted Drill Rig
- EL: Elevation
- Lt: Left
- Rt: Right
- LL, PL, PI: Atterberg Limits (Liquid Limit, Plastic Limit, Plasticity Index)
- -#200: Percent Passing Standard No. 200 Sieve
- NP – Non-Plastic
- MC: Moisture Content
- AS: Auger Sample
- BS: Bucket Sample
- DB: Diamond Drilling Bit (Truck Rotary Drilling using air or water to remove cuttings)
- DCD: Diamond Core Barrel Drilling
- HA: Hand Auger
- HS: Hollow Stem Auger (Truck Rotary Drilling)
- PA: Power Auger (Truck Rotary Drilling)
- NR: No Recovery
- PMT: Pressure Meter
- DMT: Dilatometer
- CPT: Cone Penetration Test
- BHS: Borehole Shear
- FV: Field Vane Shear
- TV: Torvane
- PP: Pocket Penetrometer
- RB: Rock/Roller Bit (Truck Rotary Drilling using air or water to remove cuttings)
- RC: Rock Core using
- RQD: Rock Quality Designation
- SS/SPT: Standard Penetration Test (Split-Spoon)
- ST: Thin-Wall Tube Sample (Shelby Tube): a 3" O.D. tube, unless noted otherwise
- TCP: Texas Cone Penetrometer Test
- DCP: Dynamic Cone Penetrometer
- WS: Wash Sample
- WB: Wash Bore
- AB: After Boring Complete
- DCI: Dry Cave In
- WCI: Wet Cave In
- WD: While Drilling
- WS: While Sampling
- WL: Water Level Depth from Boring Surface Elevation
- CME: Central Mine Equipment
- GP: Geoprobe
- AHS: After Hollow Stem
- BHS: Before Hollow Stem

RENAISSANCE GEOTECHNICAL ENGINEERING TM

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405-215-9367
info@renaissancegeo.com

GENERAL INFORMATION & KEY TO THE SUBSURFACE EXPLORATION LOGS

The Subsurface Logs attached to this report present the general observations and mechanical data collected by the drillers at the site, supplemented by classification of the material removed from the borings as determined through visual identification by engineers in the field, and by technicians in the laboratory. The materials removed from the borings represent only a small fraction of the soils at the site and may not be representative of subsurface conditions between and/or away from the boring locations or the sampled intervals. The data presented on the Subsurface Logs along with the recovered samples provide a basis for estimating the engineering characteristics of the soils at the site. The evaluation must consider all the recorded details and their relative significance to the project. It is common that evaluation of standard subsurface data indicates the need for additional testing and/or sampling to evaluate the subsurface conditions more accurately. Any evaluation of the data presented on the Subsurface Logs must be performed by qualified professionals. The following information defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered. Water levels measured in low permeability soils (clays & unfractured rock) may require long term observations and therefore, the depths shown may not be accurate.

Soil Classification and Descriptions

- Soil Classification: The soil description and classification is based on the Unified Soil Classification System (USCS) unless noted otherwise

- *Consistency/Relative Density*

Cohesionless Materials		Cohesive Materials		
N-blows/ft	Relative Density	N-blows/ft	Consistency	Est. UCS-q_u (psf)
0 – 4	very loose	0 – 2	Very Soft	< 500
5 – 10	loose	2 – 5	Soft	500 – 1,000
11 – 24	medium dense	5 – 10	Medium	1,001 – 2,000
25 – 50	dense	10 – 20	Stiff	2,001 – 4,000
51 – 80	very dense	20 – 30	Very Stiff	4,001 – 8,000
81+	extremely dense	30 – 60	Hard	8,001 – 16,000
		>60	Very Hard	> 16,000

Particle Size

Particle Size	Material Type
Boulders	>12 inches
Cobbles	3 inches to 12 inches
Gravel	coarse: ¾" to 3"
	fine: #4 to ¾"
Sand	coarse: #10 to #4
	medium: #40 to #10
	fine: #200 to #40
Silt/Clay	<#200

- Description Modifier: The following terms may be used as qualifiers for mixed soils

Term Used	Estimated Percent Total	Component	Particle Shape – Applicable to Coarse
Primary	More than 50	Noun – GRAVEL, SAND, SILT or CLAY	*Angular:* sharp edges and relatively plain sides with unpolished surfaces
and or &	35 – 50	Gravelly, sandy, silty, clayey, with	*Subangular:* similar to angular but with rounded edges
Some	20 – 35	**MOISTURE CONTENT DESCRIPTION** Dry: absent of moisture, dusty, dry to touch	*Subrounded:* nearly plane sides but with well rounded corners and edges
little	10 – 20	Moist: damp but no visible water	Rounded: smoothly curved sides and no edges
trace	less than 10	Wet: visible free water	

Varved: Horizontal uniform layers or seams of soil(s)
Seam: Soil deposit less than 6" thick
Laminated - Irregular, horizontal and angled seams and partings of soil

Layer: Soil deposit more than 6"thick.
Parting: Soil deposit less than 1/8" thick

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

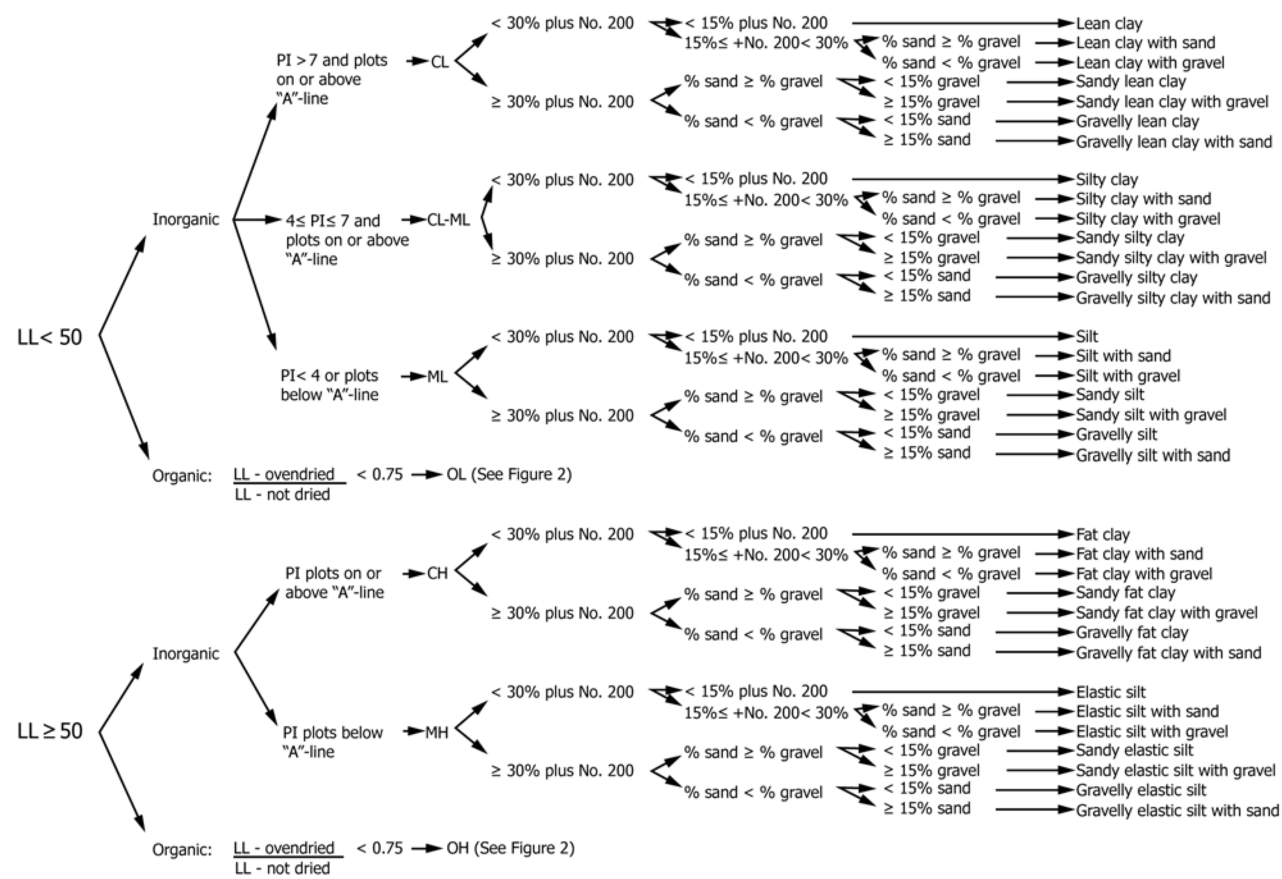

FIG. 1 Flow Chart for Classifying Fine-Grained Soil (50 % or More Passes No. 200 Sieve)

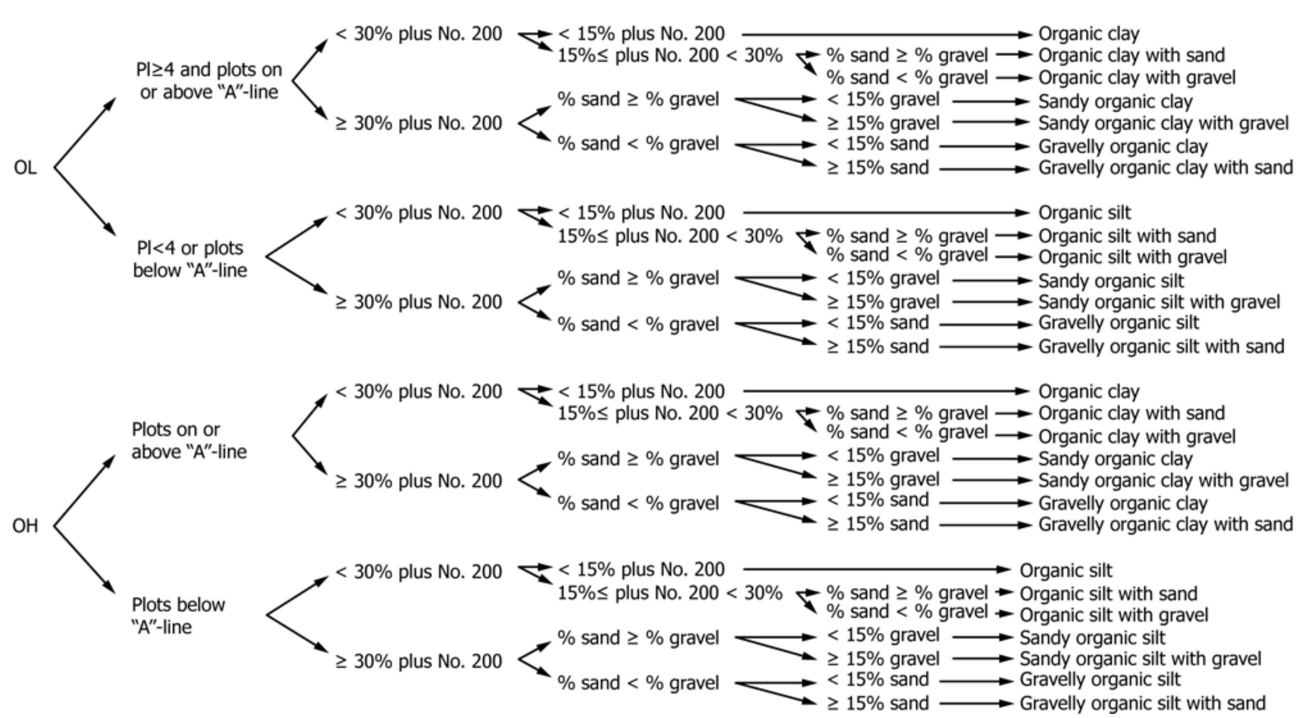

FIG. 2 Flow Chart for Classifying Organic Fine-Grained Soil (50 % or More Passes No. 200 Sieve)

Source ASTM D2487

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

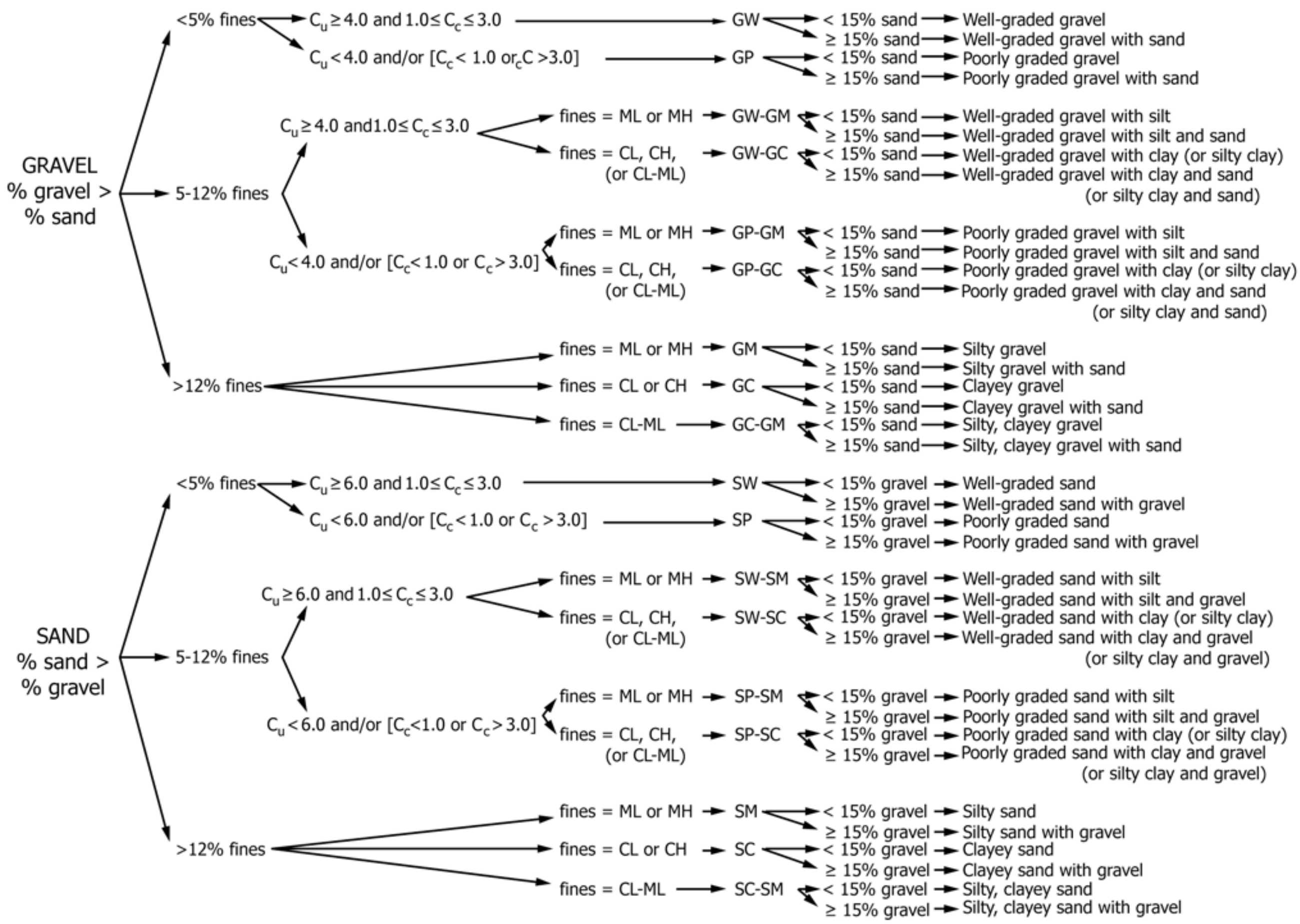

FIG. 3 Flow Chart for Classifying Coarse-Grained Soils (More Than 50 % Retained on No. 200 Sieve)

Source ASTM D2487

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

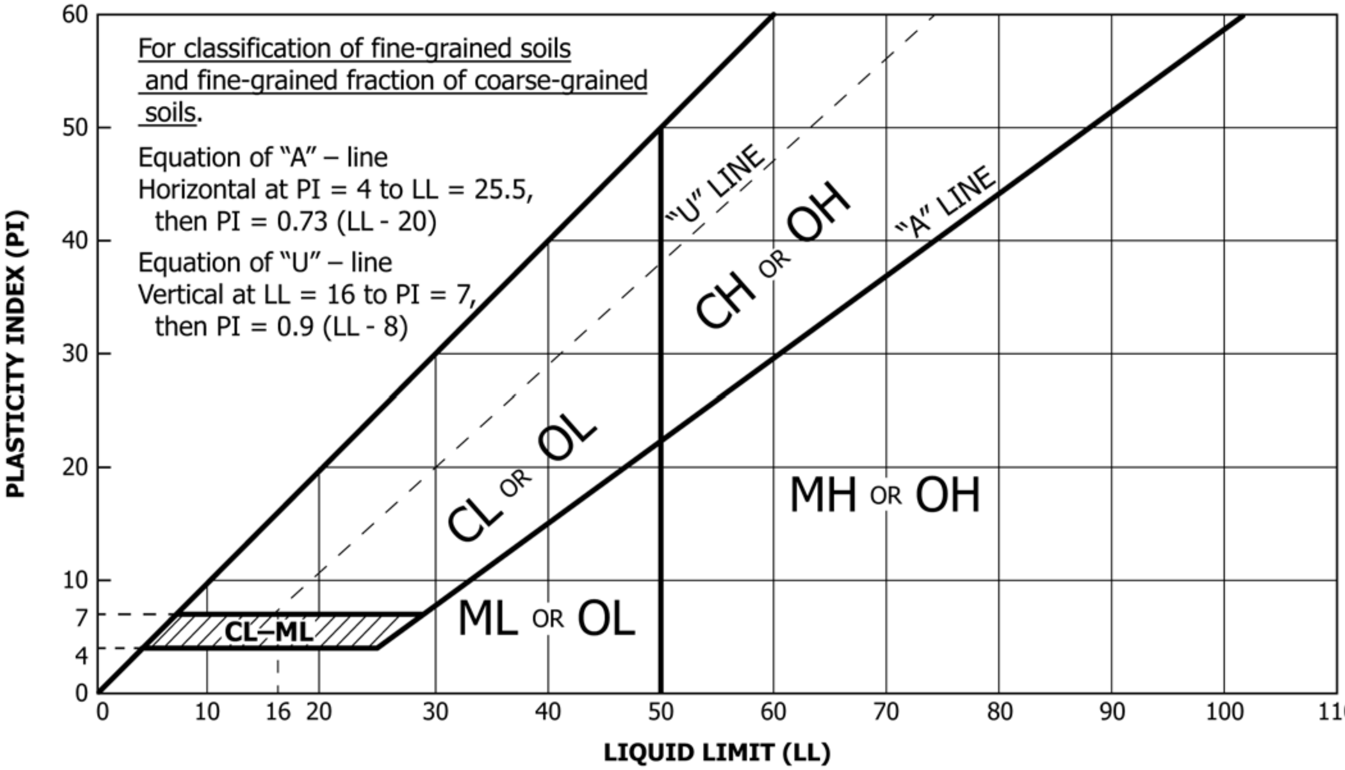

FIG. 4 Plasticity Chart

Source ASTM D2487

Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

KEY TO SYMBOLS

CLIENT GREENMAN-PEDERSEN, INC (GPI)
PROJECT NAME PIN S53076 D214887 Assignment 3
PROJECT NUMBER 23.0050
PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- ASPHALT: Asphalt
- CL: USCS Low Plasticity Clay
- COBBLES: Cobbles
- CONCRETE: Concrete
- CR: Crusher Run
- FILL: Fill (made ground)
- ML-CL: Clayey SILT
- MLS: USCS Sandy Silt
- SA ML-CL: Clayey SILT with Sand
- SC-SM: Silty, Clayey SAND
- SM: Silty SAND
- TILL: Glacial Till

SAMPLER SYMBOLS

- HS: Hollow Stem Auger
- Power Auger
- RB: Roller Bit
- Split Spoon
- Shelby Tube

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION
▽ Water Level at Time Drilling, or as Shown
▼ Water Level at End of Drilling, or as Shown
▼ Water Level After 24 Hours, or as Shown

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 8/4/24 09:56 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2023\23.0050 - D214887 ASSIGNMENT 3_MP257.09_PIN S53076_ N MAIN ST BRIDGE

Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

BORING NUMBER B-1

CLIENT GREENMAN-PEDERSEN, INC (GPI)
PROJECT NAME PIN S53076 D214887 Assignment 3
PROJECT NUMBER 23.0050
PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY
DATE STARTED 4/29/24 **COMPLETED** 4/29/24
GROUND ELEVATION **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR Northeast Specialized Drilling , Inc. (NSD)
GROUND WATER LEVELS:
DRILLING METHOD CME 55
AT TIME OF DRILLING 35.00 ft While Drilling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- Not Recorded
NOTES Onsite Geotechnical Engineer: Alseny Diop, PE - RGE
AFTER DRILLING --- Not Recorded

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0	PA					0.3	**Approximately 4 inches of ASPHALT**
	SS 1	67	3-5-5 (10)	MC = 13% LL = 17 PL = 13 Fines = 41% SAND = 39%, Gravel = 20%	SC-SM		(SC-SM) **(FILL) Silty, Clayey SAND with Gravel** loose, light brown
	SS 2	38	5-3-6-7 (9)				- frequent cobbles from 2 feet
5	SS 3	4	5-4-4-3 (8)			6.0	
	SS 4	50	2-2-3-4 (5)		SC-SM		(SC-SM) **(FILL) Silty, Clayey SAND with Gravel** loose to compact, reddish-purple, damp, calcareous
	SS 5	79	3-4-7-5 (11)				
10	SS 6	67	3-5-6-8 (11)	MC = 15% LL = 17 PL = 13 Fines = 33% SAND = 49%, Gravel = 18%			
	SS 7	73	8-9-11-11 (20)				- increased gravel content from 12 feet
15	SS 8	29	8-4-4-11 (8)				
	SS 9	63	7-9-4-3 (13)				
	SS 10	50	4-4-5-6 (9)			19.0	- wet at bottom of spoon shoe at 18 feet
					SM		(SM) **(FILL) Silty SAND with Gravel** well compact, red, wet
20	SS 11	67	3-8-8-12 (16)	LL = NP PL = NP Fines = 22% SAND = 42%, Gravel = 36%			
	SS 12	21	9-9-14-12 (23)				
25	SS 13	0	7-8-7-11 (15)				
	SS 14	71	5-4-13-17 (17)			27.0	
					SM		(SM) **Silty f. SAND** medium dense to dense, little clay, very fine, dark grayish-brown, wet
30	SS 15	67	7-13-14-9 (27)				

(Continued Next Page)

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BORING NUMBER B-1

CLIENT GREENMAN-PEDERSEN, INC (GPI)
PROJECT NAME PIN S53076 D214887 Assignment 3
PROJECT NUMBER 23.0050
PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
30	SS 16	79	4-10-10-14 (20)		SM	32.0	(SM) **Silty f. SAND** medium dense to dense, little clay, very fine, dark grayish-brown, wet *(continued)*
	SS 17	100	7-12-16-20 (28)	MC = 26% LL = 35 PL = 19 Fines = 100% SILT=55%, Clay=45%	CL-ML	36.0	(CL-ML) **Clayey SILT** very stiff, dark brownish-gray, cemented, cohesive ∇
35	ST 18	100		Qu = 10 ksf			
	SS 19	88	6-13-25-18 (38)		SM	48.0	(SM) **Silty f. SAND** dense to very dense, dark grayish-brown, wet
	HS						
40	SS 20	100	17-26-28-44 (54)				
	HS						
45	SS 21	63	17-28-32-47 (60)				
	HS				CL-ML	56.5	(CL-ML) **Clayey SILT** hard, trace sand, dark grayish-brown, wet, cohesive
50	SS 22	100	12-20-24-31 (44)	LL = 29 PL = 18 Fines = 100%			
	HS						
55	SS 23	79	9-10-13-18 (23)				- grades to very stiff at 55 feet
	SS 24	100	19-33-43-63 (76)		SM	59.0	(SM) **Silty f. SAND** extremely dense, dark brown, wet

Bottom of borehole at 59.0 feet.

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BORING NUMBER B-2

CLIENT GREENMAN-PEDERSEN, INC (GPI)
PROJECT NAME PIN S53076 D214887 Assignment 3
PROJECT NUMBER 23.0050
PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY
DATE STARTED 4/30/24 **COMPLETED** 5/2/24
GROUND ELEVATION **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR Northeast Specialized Drilling , Inc. (NSD)
GROUND WATER LEVELS:
DRILLING METHOD CME 55
∇ **AT TIME OF DRILLING** 35.00 ft While Sampling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING ---
NOTES Onsite Geotechnical Engineer: Alseny Diop, PE - RGE
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0	PA					0.3	**Approximately 4 inches of ASPHALT over**
						1.0	**Approximately 8 inches of Portland Cement CONCRETE**
	SS 1	50	16-17-17-13 (34)				**Approximately 24 inches of Crusher Run GRAVEL**
	SS 2	29	6-3-4-7 (7)	MC = 11% Fines = 23% SAND = 58%, Gravel = 19%	SC-SM	3.0	(SC-SM) **(FILL) Silty, Clayey SAND with Gravel** loose, reddish-purple, damp, calcareous
5	SS 3	42	4-4-5-10 (9)				- trace silt, very moist from 6 feet
	SS 4	50	2-4-2-4 (6)				
10	SS 5	33	6-3-3-3 (6)				
	SS 6	71	9-11-7-10 (18)	MC = 10% LL = 22 PL = 15 Fines = 28% SAND = 44%, Gravel = 28%			
	SS 7	50	5-6-6-9 (12)				
15	SS 8	33	11-12-12-10 (24)				
	SS 9	58	8-11-11-13 (22)				- dry, well compact from 17 feet
20	SS 10	50	10-8-18-13 (26)				
	SS 11	50	8-13-10-8 (23)				
	SS 12	67	7-10-13-10 (23)				
25	SS 13	58	7-7-8-4 (15)				
	SS 14	63	3-4-9-11 (13)	MC = 18% LL = 20 PL = 14 Fines = 71% SILT=52%, Clay=19%,		29.0	
30	SS		7-14-15-18		CL-ML		(CL-ML) **Clayey SILT with Sand** very stiff to hard, trace gravel, grayish-brown, wet, cohesive

(Continued Next Page)

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BORING NUMBER B-2

CLIENT GREENMAN-PEDERSEN, INC (GPI)
PROJECT NAME PIN S53076 D214887 Assignment 3
PROJECT NUMBER 23.0050
PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	MATERIAL DESCRIPTION
30	15	56	(29)	Sand=19%, gravel=10%		(CL-ML) **Clayey SILT with Sand** very stiff to hard, trace gravel, grayish-brown, wet, cohesive *(continued)* - dry from 31 feet
	SS 16	79	9-13-14-22 (27)			
35	SS 17	79	6-13-17-17 (30)			∇
	SS 18	67	9-22-24-27 (46)			- grades to hard, wet with sand layers from 35 feet
	SS 19	88	9-15-22-33 (37)			
40	SS 20	92	7-14-22-29 (36)			
	SS 21	71	8-11-14-20 (25)			
45	SS 22	100	9-19-27-31 (46)			
	ST 23	89				
	SS 24	100	12-21-16-20 (37)		CL-ML	
	RB					
50	SS 25	21	13-15-24-29 (39)			- trace rounded gravel at 48 feet
	RB					
55	SS 26	69	10-13-21-24 (34)			
	RB					
60	SS 27	71	22-15-17-22 (32)			
	RB					
	SS	100	9-11-15-16			- trace fine gravel at 64 feet

(Continued Next Page)

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BORING NUMBER B-2

CLIENT GREENMAN-PEDERSEN, INC (GPI) **PROJECT NAME** PIN S53076 D214887 Assignment 3

PROJECT NUMBER 23.0050 **PROJECT LOCATION** MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
65	28		(26)		CL-ML		(CL-ML) **Clayey SILT with Sand** very stiff to hard, trace gravel, grayish-brown, wet, cohesive *(continued)*
	RB						
70	SS 29	100	7-11-13-16 (24)				
	RB						
75	SS 30	25	9-11-14-14 (25)			75.0	
	RB				CL-ML		(CL-ML) **Clayey SILT** stiff, brown, wet, cohesive
80	SS 31	100	5-6-6-9 (12)	MC = 25% LL = 29 PL = 18 Fines = 100% SILT=61%, Clay=39%		81.0	
	RB				GM		(GM) **(TILL) Silty GRAVEL with Sand and Decomposed Shale Rock Cobbles** dense, scrachy while drilling
85	SS 32	38	29-19-25-32 (44)				
	RB					88.0	

Bottom of borehole at 88.0 feet.

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BORING NUMBER B-3

CLIENT GREENMAN-PEDERSEN, INC (GPI)
PROJECT NAME PIN S53076 D214887 Assignment 3
PROJECT NUMBER 23.0050
PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY
DATE STARTED 4/1/24 **COMPLETED** 4/2/24
GROUND ELEVATION **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR Northeast Specialized Drilling , Inc. (NSD)
GROUND WATER LEVELS:
DRILLING METHOD CME 55
▽ **AT TIME OF DRILLING** 7.00 ft While Sampling
LOGGED BY A.Diop **CHECKED BY** A.Diop
▼ **AT END OF DRILLING** 12.00 ft Dry Cave-In
NOTES Onsite Geotechnical Engineer: Alseny Diop, PE - RGE
AFTER DRILLING --- N/A - Water Injected

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0	SS 1	25	4-5-7-9 (12)			2.0	**CRUSHED STONE**
	SS 2	42	6-9-4-3 (13)		SC-SM		(SC-SM) **Silty, Clayey SAND with Gravel** medium dense, little gravel, light brown, wet
5	SS 3	50	3-1-2-1 (3)	MC = 16% LL = 17 PL = 13 Fines = 30% SAND=48%, Gravel=22%			- grades to loose to very loose, very wet, redox from 4 feet, possibility for seasonal high water levels
	SS 4	54	3-2-2-4 (4)				▽
	SS 5	71	4-7-6-10 (13)	MC = 30% LL = 31 PL = 17 Fines = 100%		9.0	
10	SS 6	67	11-11-17-22 (28)		CL		(CL) **Lean CLAY** stiff to very stiff, brown ▼
	SS 7	67	7-11-17-24 (28)		ML	12.5	(ML) **Sandy SILT and Silty SAND, Interlayering** dense to very dense, trave clay, dark brown, moist, non-plastic
15	SS 8	79	17-21-26-24 (47)	LL = NP PL = NP Fines = 58% Sand = 42%, gravel = 0%			
	SS 9	83	16-23-25-30 (48)			18.0	
	SS 10	58	10-10-16-21 (26)	LL = 38 PL = 20 Fines = 100%	CL		(CL) **Lean CLAY** very stiff to hard, trace sand, dark brown, very moist
20	SS 11	88	7-15-15-20 (30)				
	SS 12	71	12-22-22-31 (44)	LL = NP PL = NP Fines = 51% Sand=49%, gravel=0%	ML	22.5	(ML) **Sandy SILT** very dense, trace clay, dark brown, very moist, non-plastic
25	SS 13	71	17-29-29-34 (58)				
	SS 14	67	18-21-25-30 (46)	LL = NP PL = NP Fines = 100%			- grades to SILT at 27 feet
30	SS 15	79	17-19-21-23 (40)	MC = 20%			

(Continued Next Page)

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BORING NUMBER B-3

CLIENT GREENMAN-PEDERSEN, INC (GPI)
PROJECT NAME PIN S53076 D214887 Assignment 3
PROJECT NUMBER 23.0050
PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
30	SS 16	88	11-14-18-28 (32)		ML		(ML) **Sandy SILT** very dense, trace clay, dark brown, very moist, non-plastic *(continued)*
	SS 17	100	8-12-19-24 (31)				
35	SS 18	100	11-26-29-38 (55)	MC = 20% LL = NP PL = NP Fines = 51% Sand=49%, gravel=0%		35.5	
	SS 19	67	15-26-33-39 (59)		CL-ML		(CL-ML) **Clayey SILT** hard, trace sand, dark brown, cohesive
40	SS 20	75	14-21-28-34 (49)				
	HS						
45	SS 21	100	13-16-21-22 (37)	LL = 30 PL = 19 Fines = 100%			
	HS						
50	SS 22	100	14-16-18-32 (34)				
	HS						
55	SS 23	92	17-17-37-37 (54)	LL = NP PL = NP Fines = 52% Sand = 38%, gravel = 10%		54.0	
					GM		(GM) **(TILL) Silty GRAVEL with Sand** very dense, reddish-brown
	HS						- **grades to extremely dense with frequent cobbles from 57.5 feet**
60	SS 24	58	38-42-31-34 (73)	LL = NP PL = NP Fines = 24% Sand=38%, GRAVEL=38%		60.0	

Bottom of borehole at 60.0 feet.

Appendix D

Expanded and/or Additional Laboratory

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SUMMARY OF LABORATORY RESULTS

CLIENT GREENMAN-PEDERSEN, INC (GPI) **PROJECT NAME** PIN S53076 D214887 Assignment 3

PROJECT NUMBER 23.0050 **PROJECT LOCATION** MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	0.5	17	13	4	25	41	SC-SM	13.2			
B-1	10.0	17	13	4	25	33	SC-SM	15.4			
B-1	20.0	NP	NP	NP	25	22	SM				
B-1	32.0	35	19	16	0.075	100	CL	26.0			
B-1	50.0	29	18	11	0.075	100	CL				
B-2	3.0				50	23		11.5			
B-2	11.0	22	15	7	25	28	SC-SM	9.7			
B-2	27.0	20	14	6	50	71	CL-ML	17.9			
B-2	78.0	29	18	11	0.075	100	CL	25.0			
B-3	4.0	17	13	4	25	30	SC-SM	16.5			
B-3	8.0	31	17	14	0.075	100	CL	29.7			
B-3	14.0	NP	NP	NP	0.85	58	ML				
B-3	18.0	38	20	18	0.075	100	CL				
B-3	22.0	NP	NP	NP	4.75	51	ML				
B-3	26.0	NP	NP	NP	0.075	100	ML				
B-3	28.0							19.6			
B-3	34.0	NP	NP	NP	2	51	ML	20.1			
B-3	43.0	30	19	11	0.075	100	CL				
B-3	53.0	NP	NP	NP	19	52	ML				
B-3	58.0	NP	NP	NP	50	24	GM				

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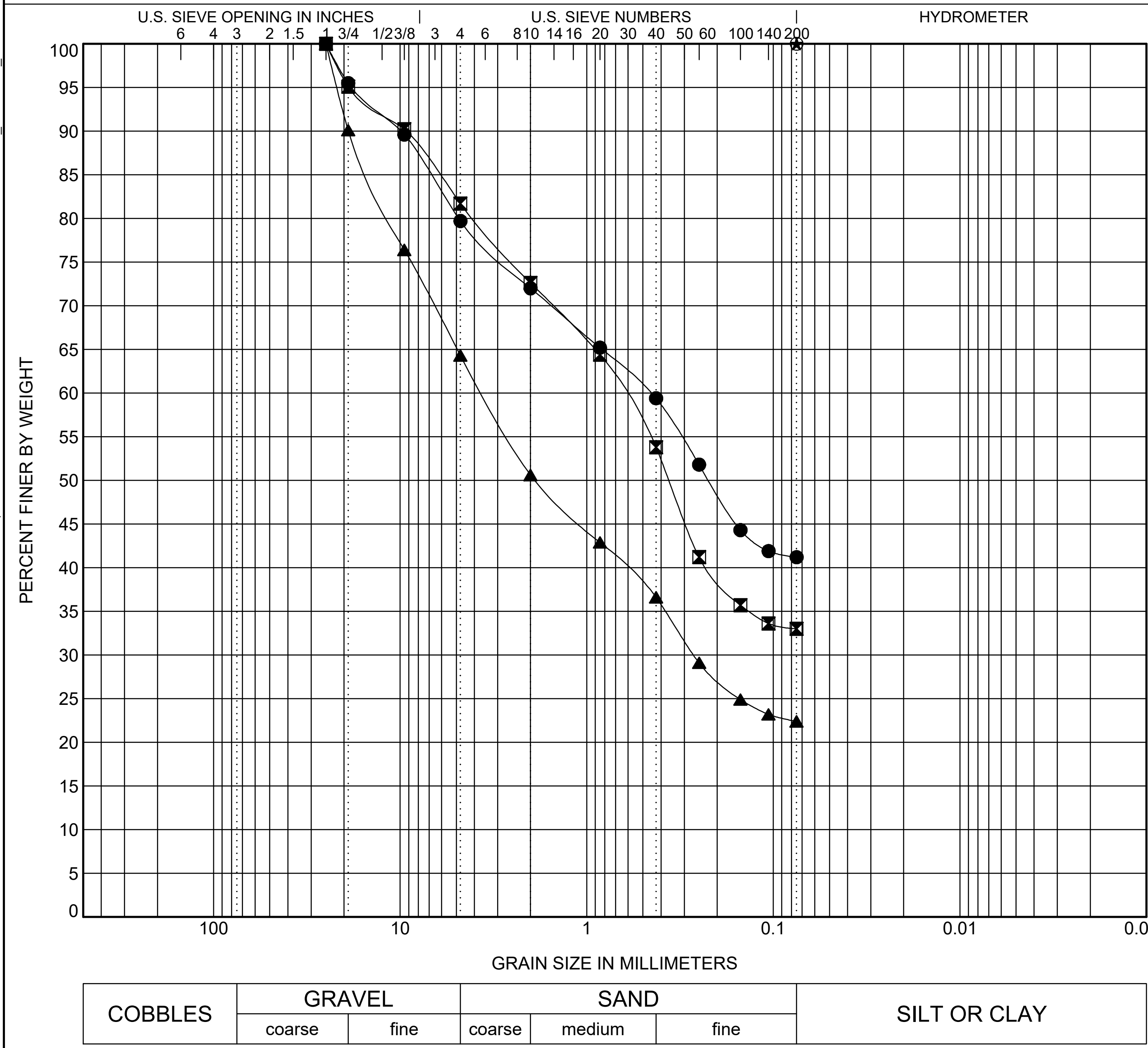
GRAIN SIZE DISTRIBUTION

CLIENT GREENMAN-PEDERSEN, INC (GPI)

PROJECT NAME PIN S53076 D214887 Assignment 3

PROJECT NUMBER 23.0050

PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY



	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-1	0.5	**SILTY, CLAYEY SAND with GRAVEL(SC-SM)**	17	13	4		
⌧	B-1	10.0	**SILTY, CLAYEY SAND with GRAVEL(SC-SM)**	17	13	4		
▲	B-1	20.0	**SILTY SAND with GRAVEL(SM)**	NP	NP	NP		
★	B-1	32.0	**LEAN CLAY(CL)**	35	19	16		
⊙	B-1	50.0	**LEAN CLAY(CL)**	29	18	11		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1	0.5	25	0.457			20.3	38.5	41.2	
⌧	B-1	10.0	25	0.637			18.3	48.7	33.0	
▲	B-1	20.0	25	3.621	0.266		35.7	41.9	22.4	
★	B-1	32.0	0.075				0.0	0.0	100.0	
⊙	B-1	50.0	0.075				0.0	0.0	100.0	

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GRAIN SIZE DISTRIBUTION

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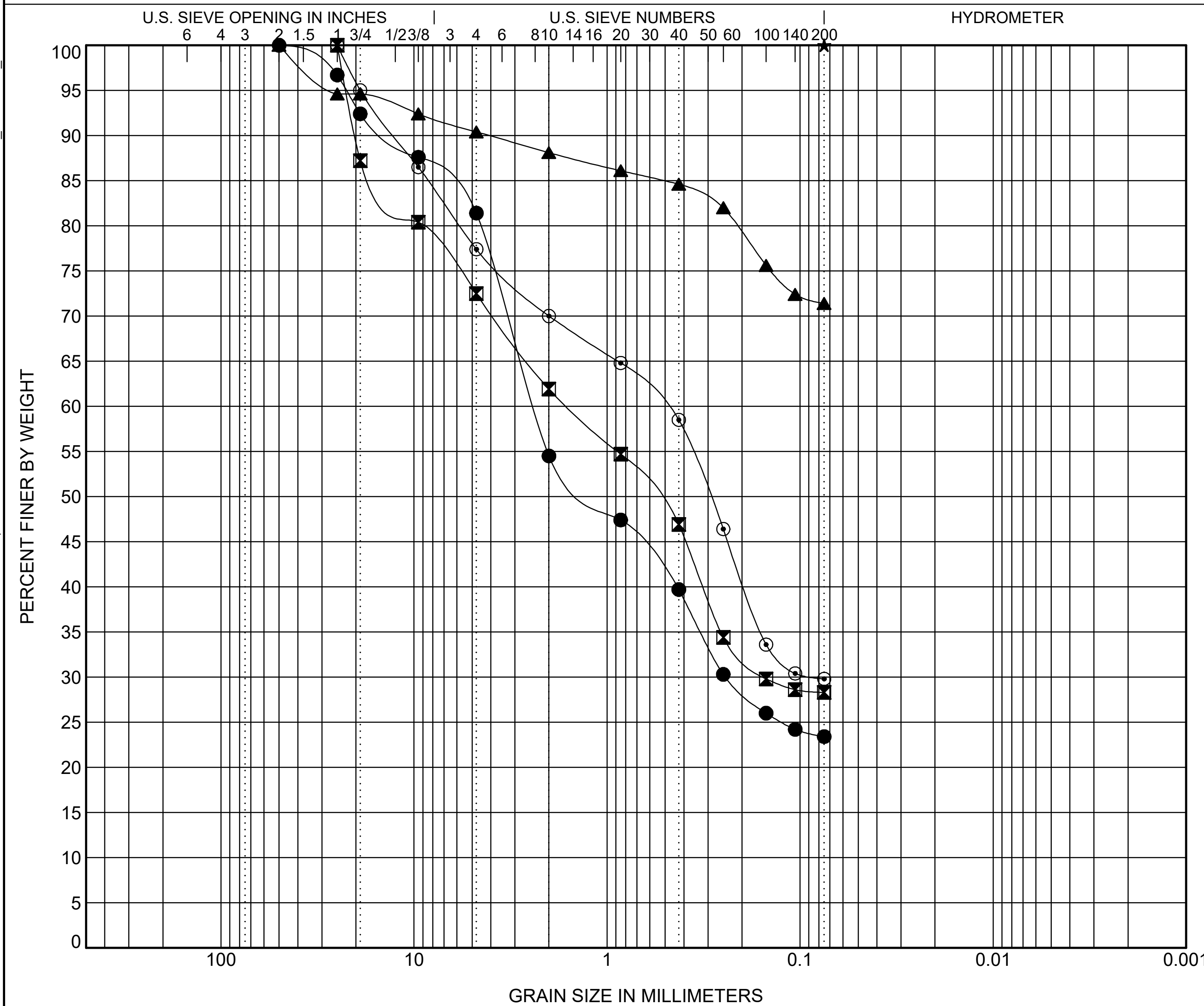
PROJECT NUMBER 23.0050 **PROJECT LOCATION** MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-2	3.0						
⧗	B-2	11.0	SILTY, CLAYEY SAND with GRAVEL(SC-SM)	22	15	7		
▲	B-2	27.0	SILTY CLAY with SAND(CL-ML)	20	14	6		
★	B-2	78.0	LEAN CLAY(CL)	29	18	11		
⊙	B-3	4.0	SILTY, CLAYEY SAND with GRAVEL(SC-SM)	17	13	4		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2	3.0	50	2.387	0.241		18.6	58.0	23.4	
⧗	B-2	11.0	25	1.596	0.153		27.5	44.2	28.3	
▲	B-2	27.0	50				9.6	19.0	71.4	
★	B-2	78.0	0.075				0.0	0.0	100.0	
⊙	B-3	4.0	25	0.501	0.084		22.6	47.6	29.8	

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GRAIN SIZE DISTRIBUTION

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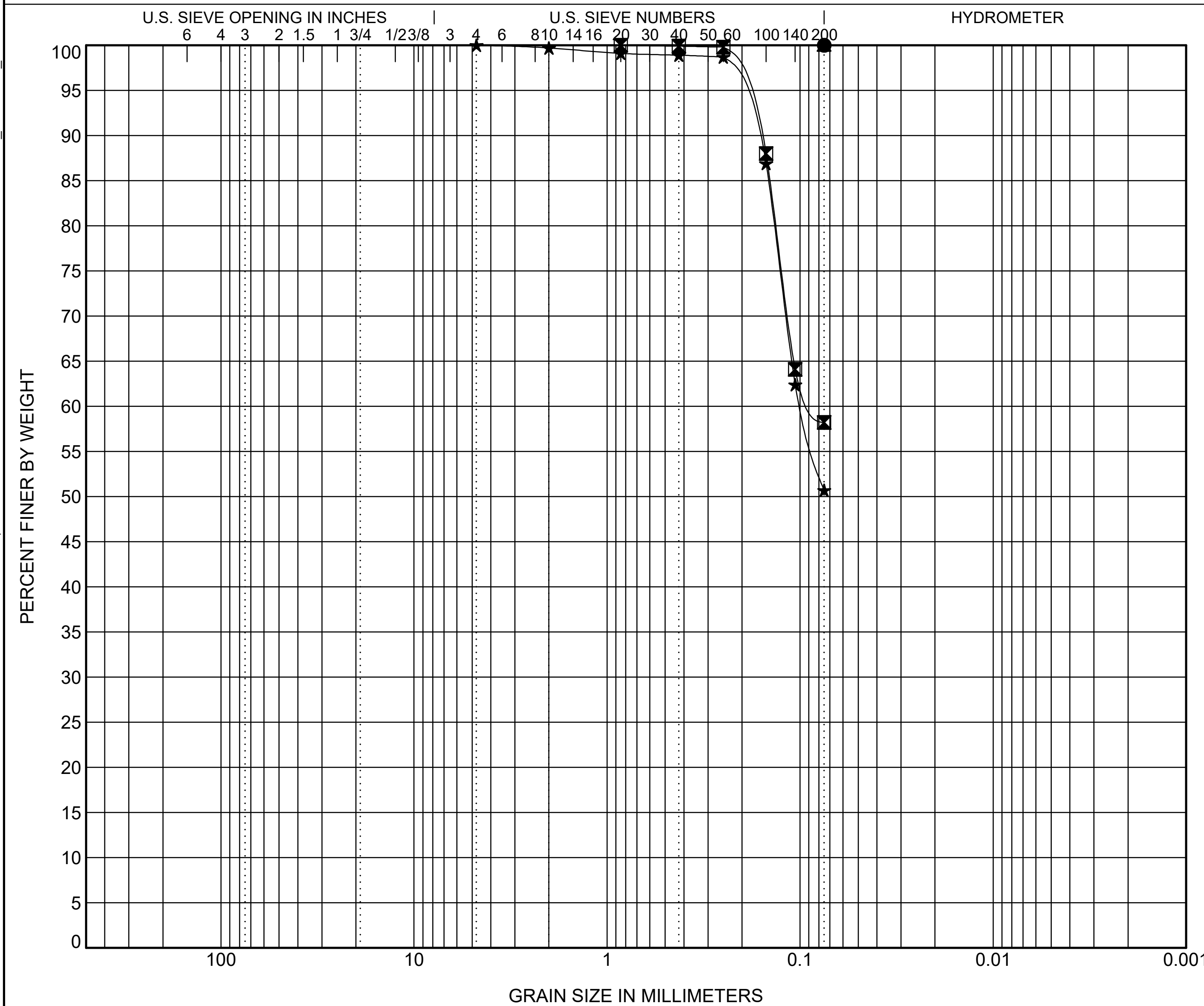
PROJECT NAME PIN S53076 D214887 Assignment 3
PROJECT NUMBER 23.0050
PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-3**	**8.0**	**LEAN CLAY(CL)**	**31**	**17**	**14**		
⧗	**B-3**	**14.0**	**SANDY SILT(ML)**	**NP**	**NP**	**NP**		
▲	**B-3**	**18.0**	**LEAN CLAY(CL)**	**38**	**20**	**18**		
★	**B-3**	**22.0**	**SANDY SILT(ML)**	**NP**	**NP**	**NP**		
⊙	**B-3**	**26.0**	**SILT(ML)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-3**	**8.0**	**0.075**				**0.0**	**0.0**	**100.0**	
⧗	**B-3**	**14.0**	**0.85**	**0.083**			**0.0**	**41.8**	**58.2**	
▲	**B-3**	**18.0**	**0.075**				**0.0**	**0.0**	**100.0**	
★	**B-3**	**22.0**	**4.75**	**0.099**			**0.0**	**49.3**	**50.7**	
⊙	**B-3**	**26.0**	**0.075**				**0.0**	**0.0**	**100.0**	

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GRAIN SIZE DISTRIBUTION

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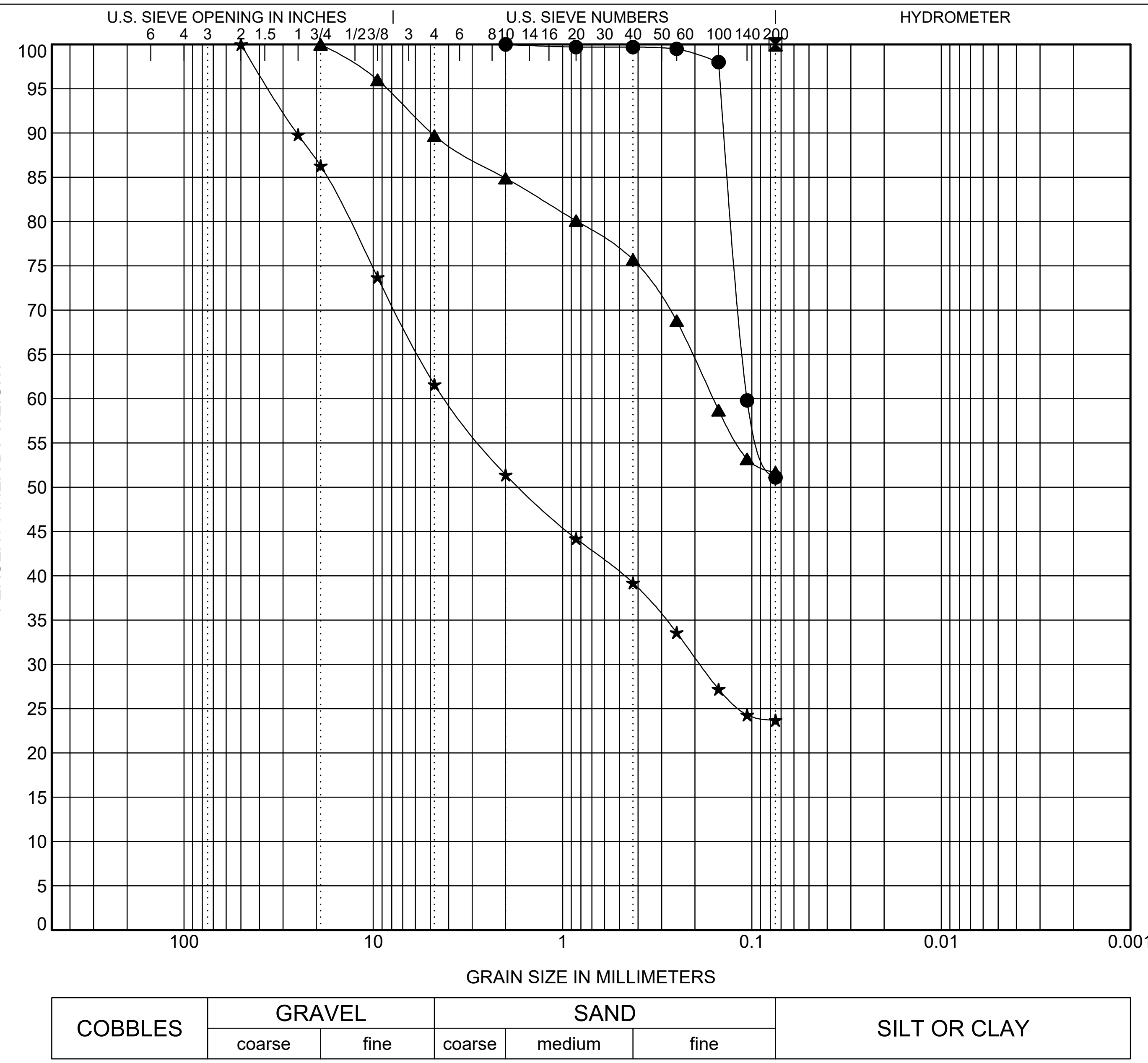
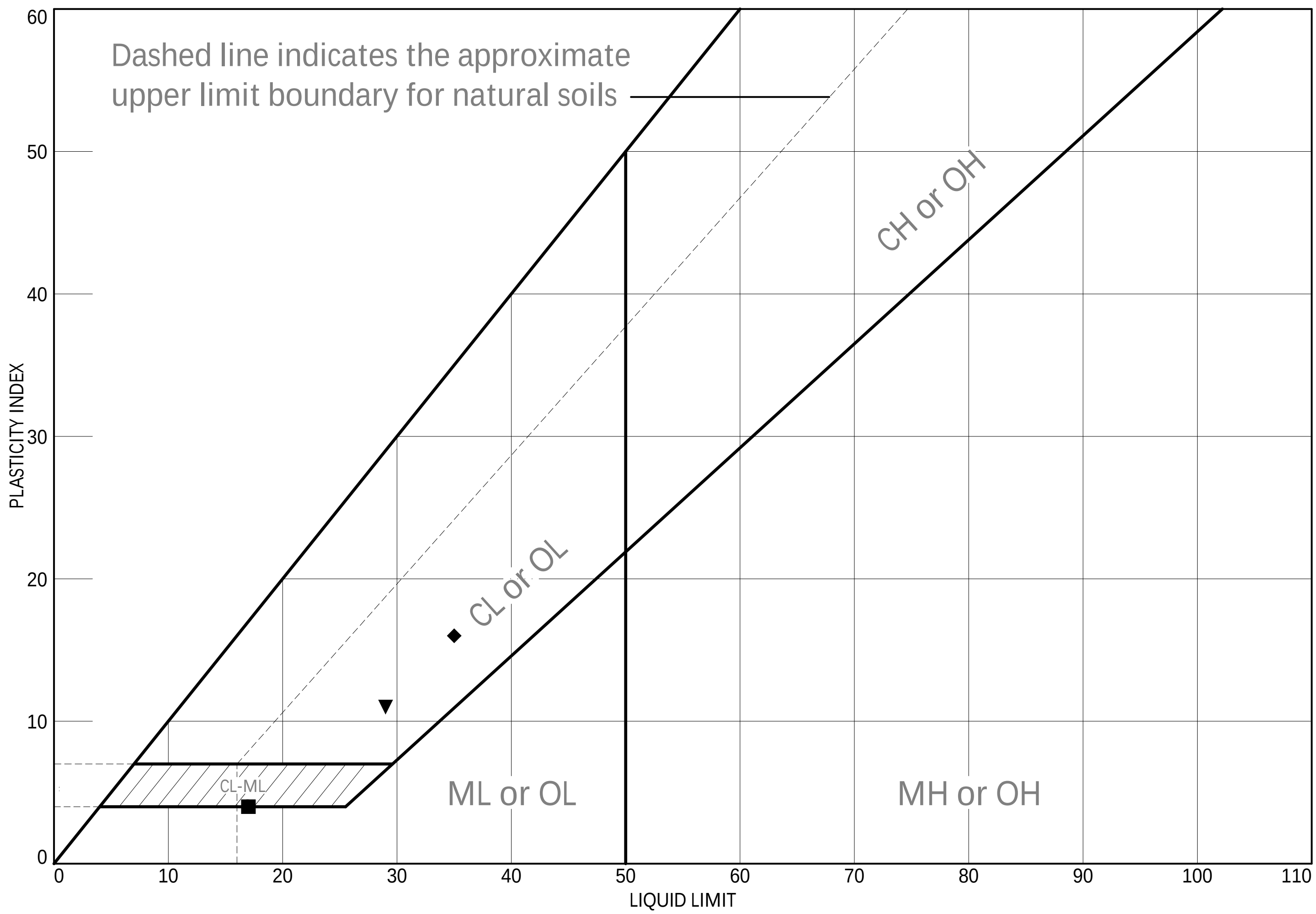
PROJECT NAME PIN S53076 D214887 Assignment 3
PROJECT NUMBER 23.0050
PROJECT LOCATION MP257.09 N MAIN ST. BRIDGE, ONEIDA, NY



	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-3**	**34.0**	**SANDY SILT(ML)**	**NP**	**NP**	**NP**		
⊠	**B-3**	**43.0**	**LEAN CLAY(CL)**	**30**	**19**	**11**		
▲	**B-3**	**53.0**	**SANDY SILT(ML)**	**NP**	**NP**	**NP**		
★	**B-3**	**58.0**	**SILTY GRAVEL with SAND(GM)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-3**	**34.0**	**2**	**0.106**			**0.0**	**48.9**	**51.1**	
⊠	**B-3**	**43.0**	**0.075**				**0.0**	**0.0**	**100.0**	
▲	**B-3**	**53.0**	**19**	**0.16**			**10.3**	**38.0**	**51.7**	
★	**B-3**	**58.0**	**50**	**4.147**	**0.188**		**38.4**	**37.9**	**23.7**	

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty, Clayey SAND with Gravel	17	13	4	59.4	41.2	SC-SM
■	Silty, Clayey SAND with Gravel	17	13	4	53.8	33.0	SC-SM
▲	Silty SAND with Gravel	NV	NP	NP	36.6	22.7	SM
◆	Lean CLAY	35	19	16	100.0	100.0	CL
▼	Lean CLAY	29	18	11	100.0	100.0	CL

Project No. 23.0050 Client: Renaissance Geotechnical Engineering

Project:

●Location: B-1 Sample Number: S1
■Location: B-1 Sample Number: S6
▲Location: B-1 Sample Number: S11
◆Location: B-1 Sample Number: S17
▼Location: B-1 Sample Number: S22

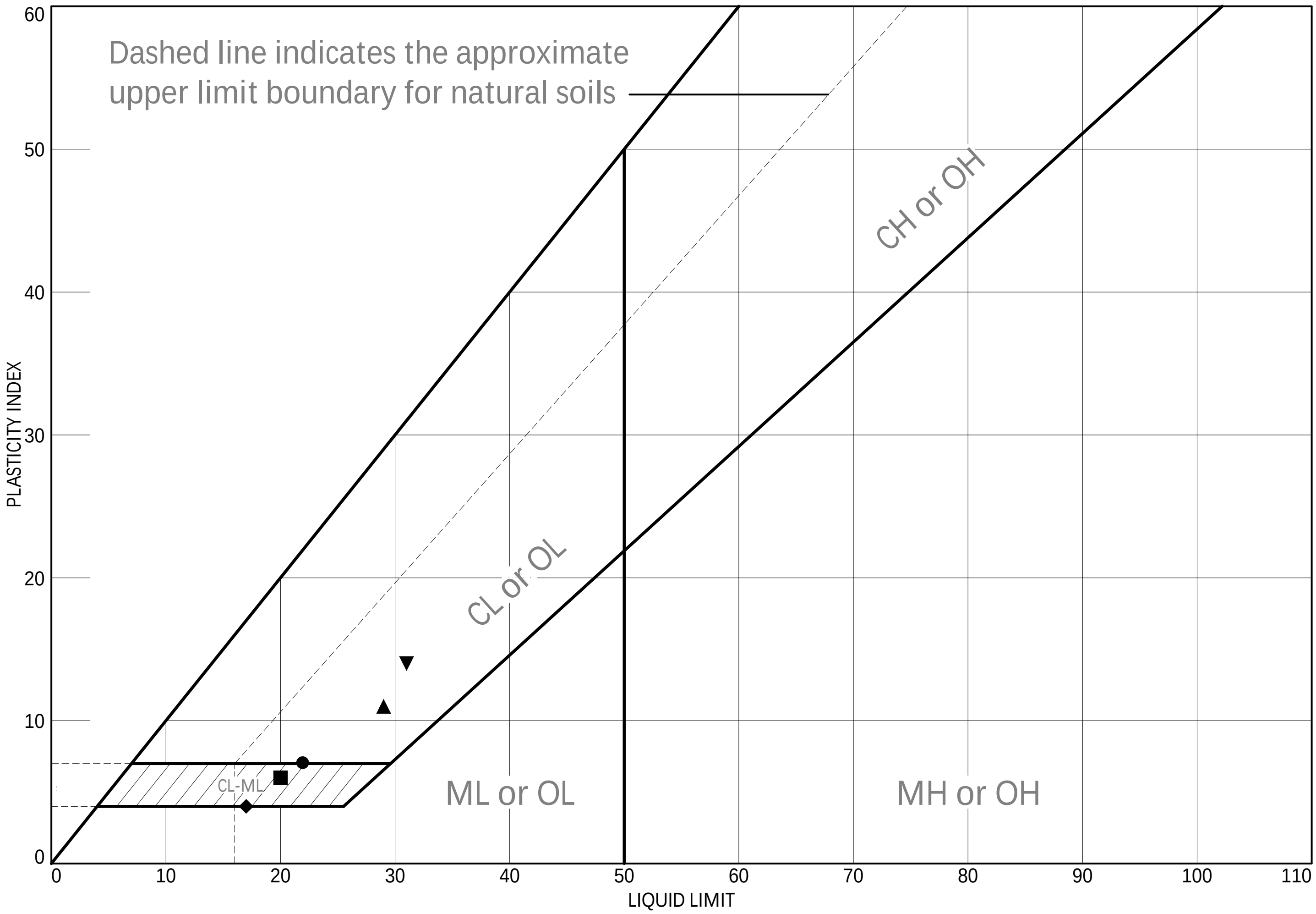
EINCK, Corp.

Timonium, MD

Remarks:

Figure 1

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty, Clayey SAND with Gravel	22	15	7	46.9	28.3	SC-SM
■	Silty CLAY with SAND	20	14	6	84.6	71.5	CL-ML
▲	Lean CLAY	29	18	11	100.0	100.0	CL
◆	Silty, Clayey SAND with Gravel	17	13	4	58.5	29.8	SC-SM
▼	Lean CLAY	31	17	14	100.0	100.0	CL

Project No. 23.0050 Client: Renaissance Geotechnical Engineering

Remarks:

Project:

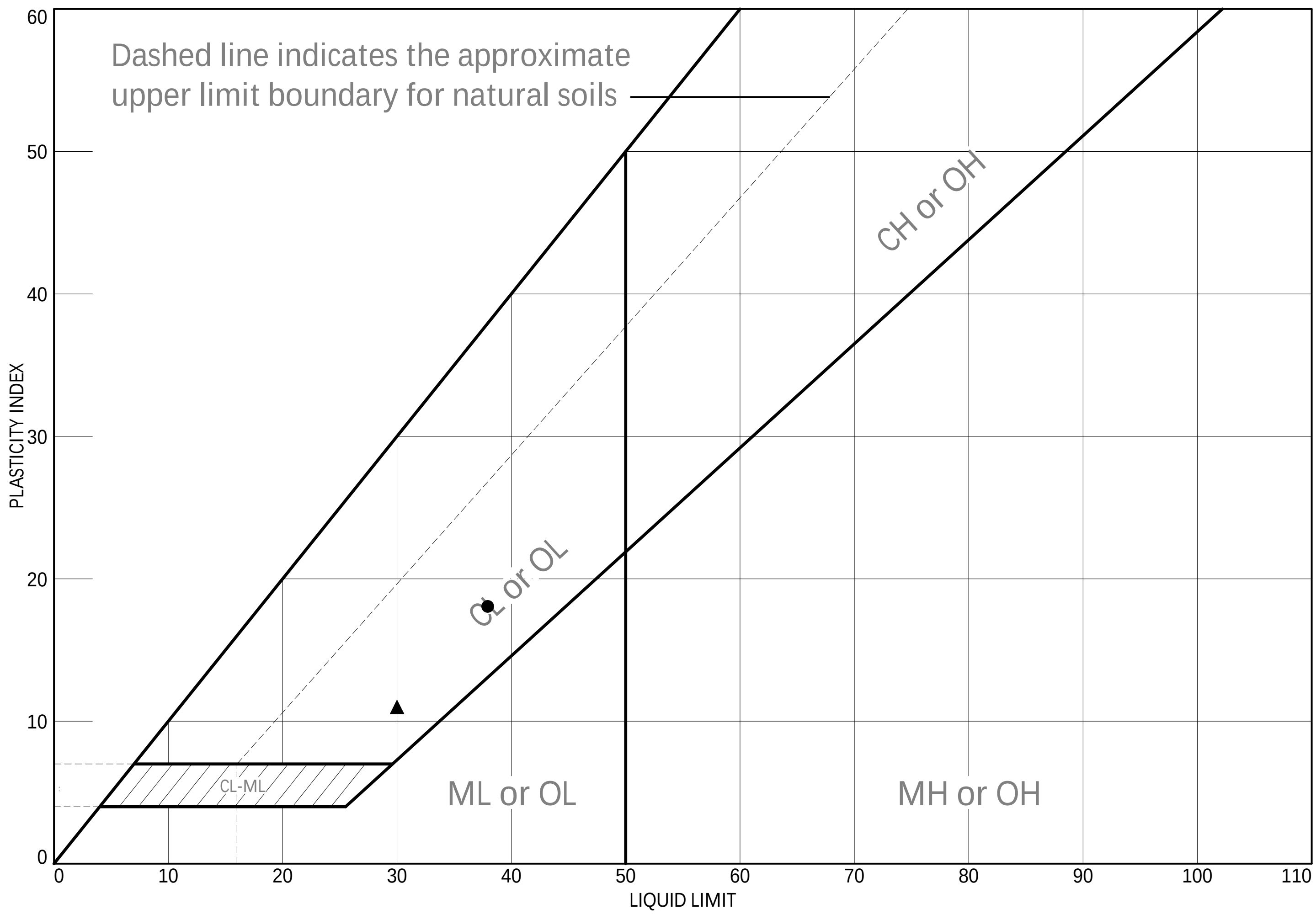
●Location: B-2 Sample Number: S6
■Location: B-2 Sample Number: S14
▲Location: B-2 Sample Number: S31
◆Location: B-3 Sample Number: S3
▼Location: B-3 Sample Number: S5

EINCK, Corp.

Timonium, MD

Figure 2

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean CLAY	38	20	18	100.0	100.0	CL
■	SILT	NV	NP	NP	100.0	100.0	ML
▲	Lean CLAY	30	19	11	100.0	100.0	CL
◆	Sandy SILT	NV	NP	NP	75.7	51.7	ML

Project No. 23.0050 Client: Renaissance Geotechnical Engineering

Project:

●Location: B-3 Sample Number: S10
■Location: B-3 Sample Number: S14
▲Location: B-3 Sample Number: S21
◆Location: B-3 Sample Number: S23

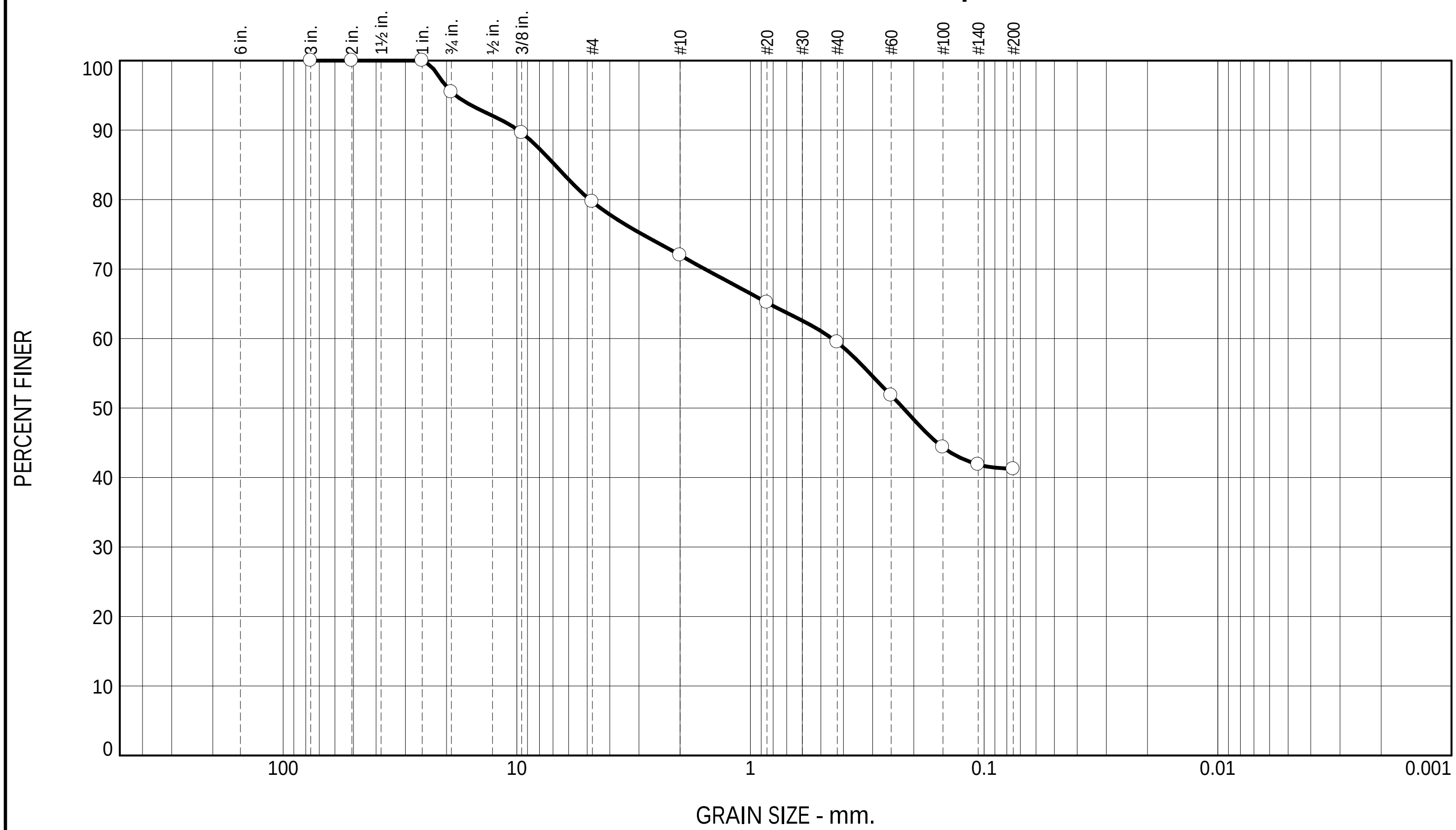
EINCK, Corp.

Timonium, MD

Remarks:

Figure 3

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	20.3	38.5	41.2		SC-SM	A-4(0)	13	17

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	95.5		
.375	89.6		
	GRAIN SIZE		
D_{60}	0.4471		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	79.7		
#10	72.0		
#20	65.2		
#40	59.4		
#60	51.8		
#100	44.3		
#140	41.9		
#200	41.2		

Material Description
○ Silty, Clayey SAND with Gravel

REMARKS:
○

○ Location: B-1 Sample Number: S1

EINCK, Corp.

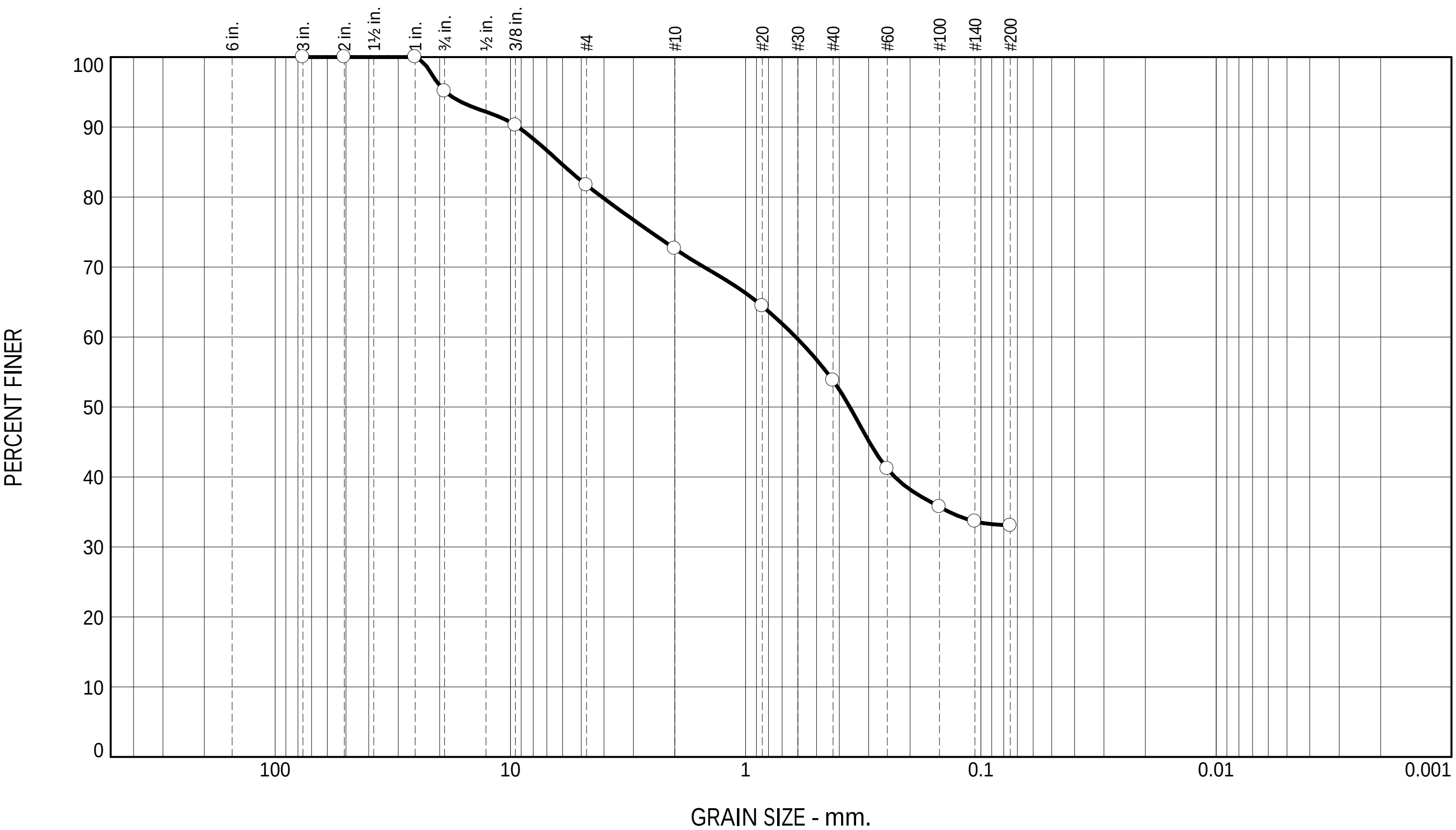
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	18.3	48.7	33.0		SC-SM	A-2-4(0)	13	17

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	95.1		
.375	90.2		
	GRAIN SIZE		
D_{60}	0.6124		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	81.7		
#10	72.6		
#20	64.4		
#40	53.8		
#60	41.2		
#100	35.7		
#140	33.6		
#200	33.0		

Material Description
○ Silty, Clayey SAND with Gravel

REMARKS:
○

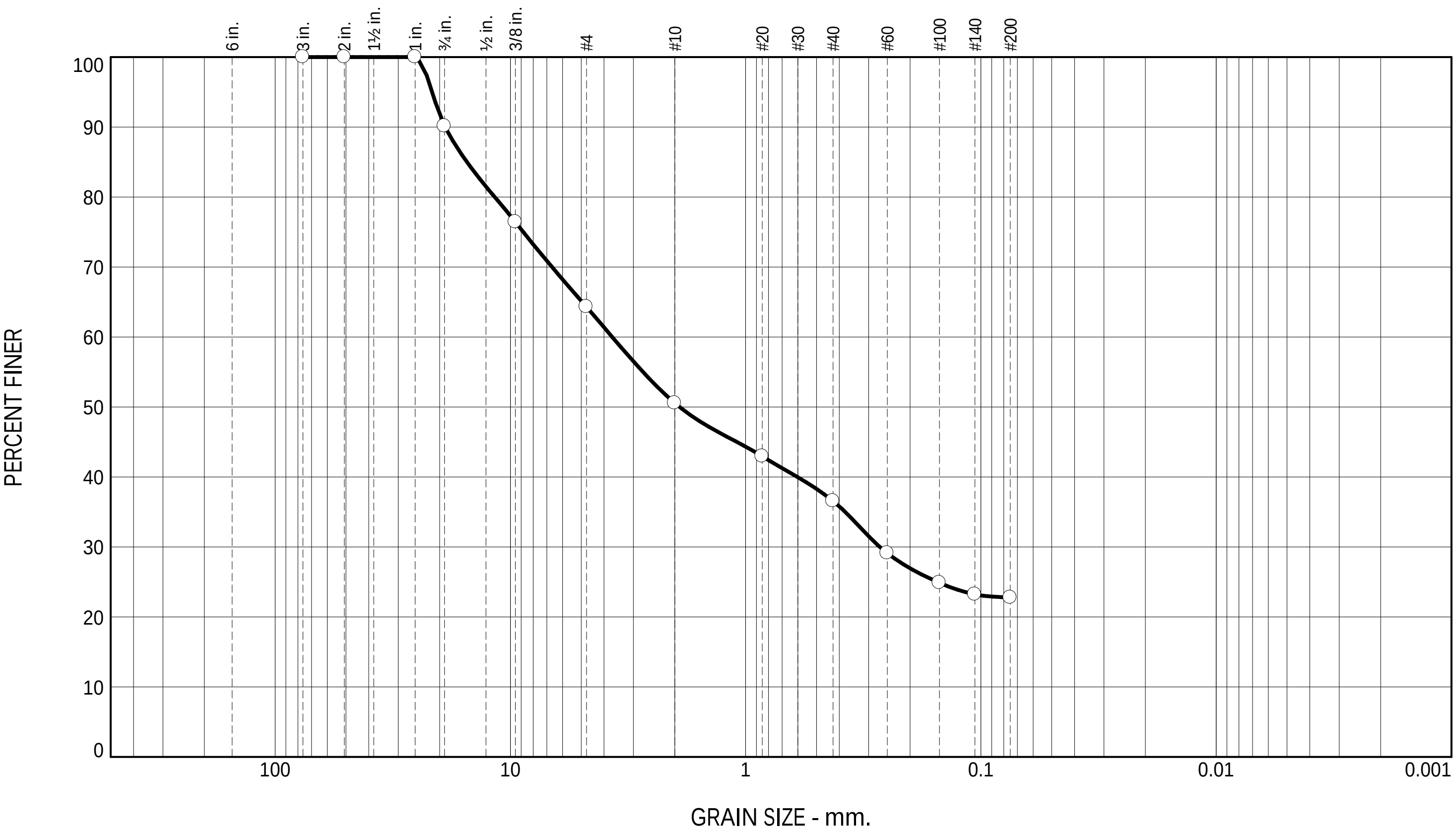
○ Location: B-1 Sample Number: S6

EINCK, Corp.

Timonium, MD

Client: Renaissance Geotechnical Engineering
Project:
Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	35.7	41.6	22.7		SM	A-1-b	NP	NV

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	90.1		
.375	76.4		
	GRAIN SIZE		
D_{60}	3.6904		
D_{30}	0.2692		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	64.3		
#10	50.6		
#20	42.9		
#40	36.6		
#60	29.1		
#100	24.9		
#140	23.2		
#200	22.7		

Material Description

○ Silty SAND with Gravel

REMARKS:

○

○ Location: B-1 Sample Number: S11

EINCK, Corp.

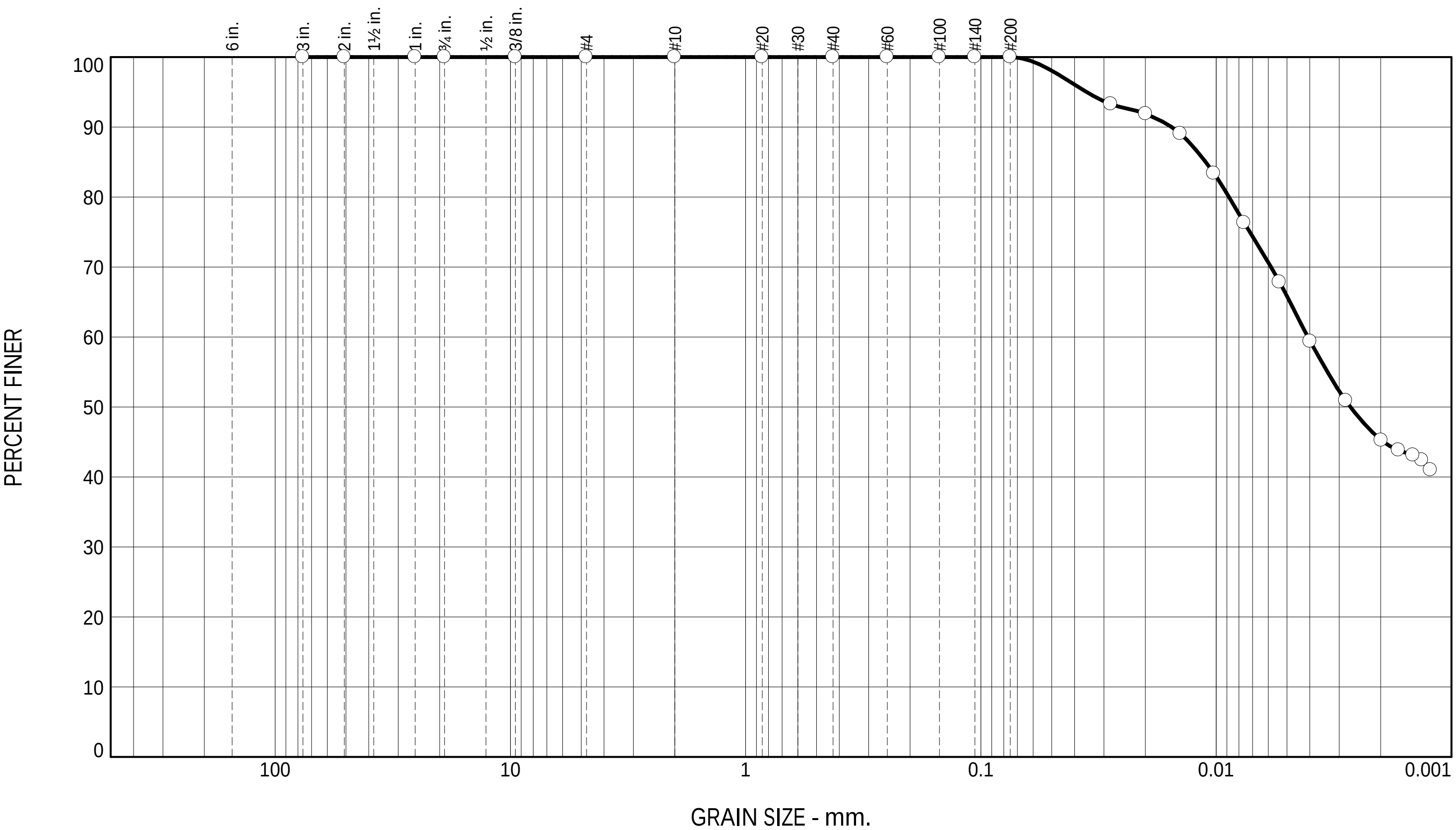
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	0.0	54.7	45.3	CL	A-6(16)	19	35

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}	0.0041		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	100.0		
#100	100.0		
#140	100.0		
#200	100.0		

Material Description
○ Lean CLAY

REMARKS:
○

○ Location: B-1 Sample Number: S17

EINCK, Corp.

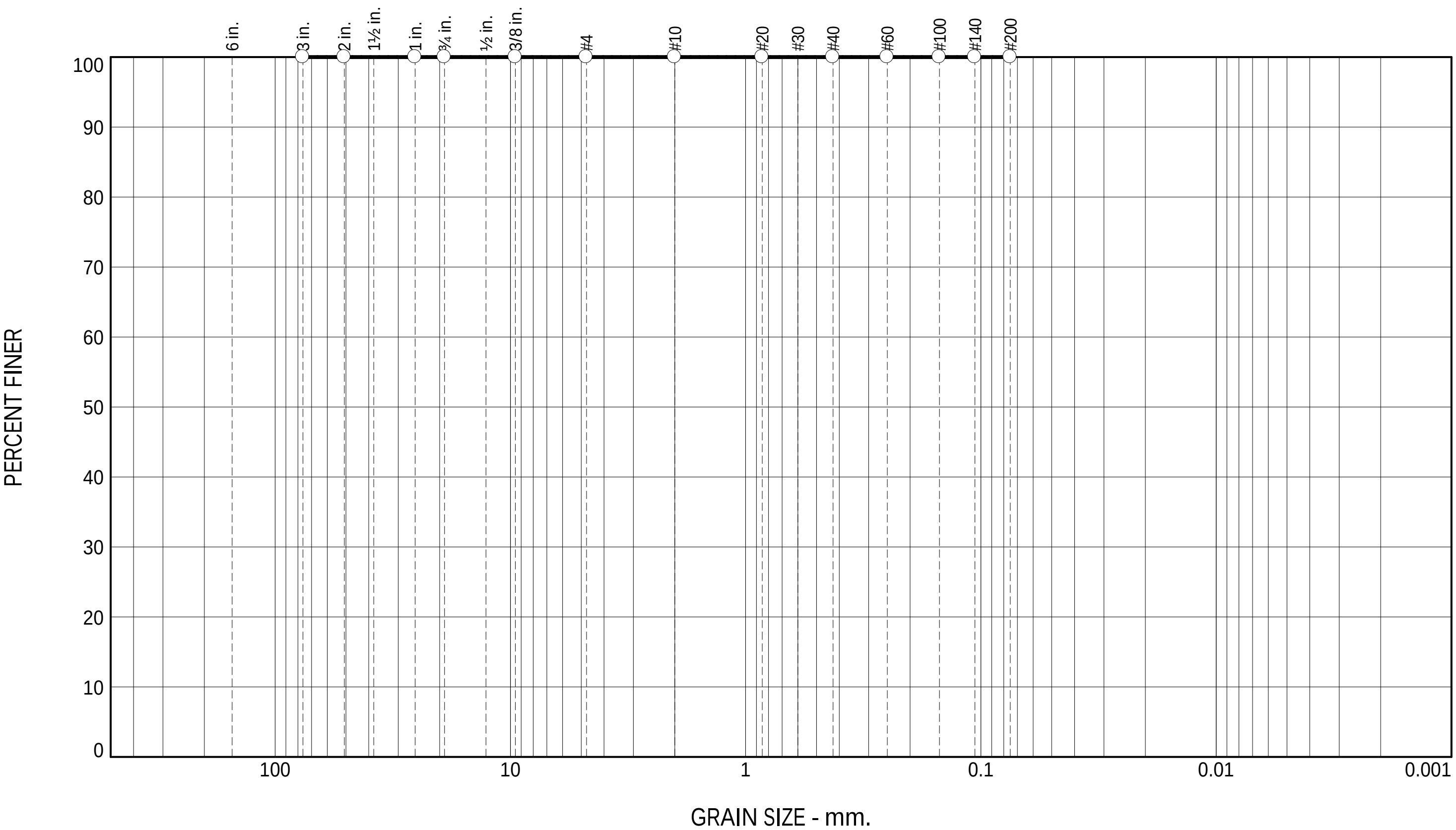
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	0.0	100.0		CL	A-6(10)	18	29

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}			
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	100.0		
#100	100.0		
#140	100.0		
#200	100.0		

Material Description

○ Lean CLAY

REMARKS:

○

○ Location: B-1 Sample Number: S22

EINCK, Corp.

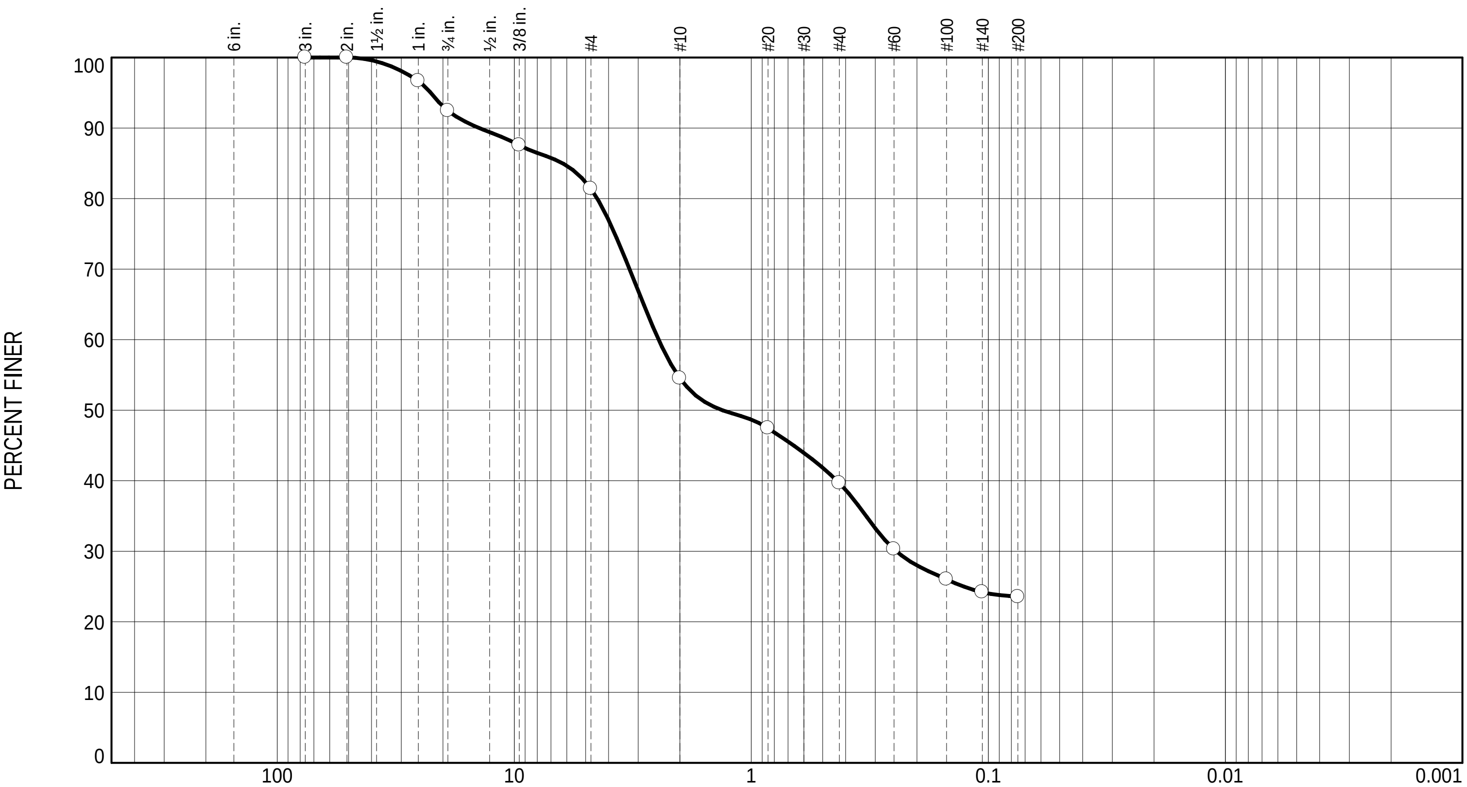
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	18.6	57.9	23.5					

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	96.7		
.75	92.4		
.375	87.6		
	GRAIN SIZE		
D_{60}	2.4611		
D_{30}	0.2447		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	81.4		
#10	54.5		
#20	47.4		
#40	39.7		
#60	30.3		
#100	26.0		
#140	24.2		
#200	23.5		

Material Description
○

REMARKS:
○

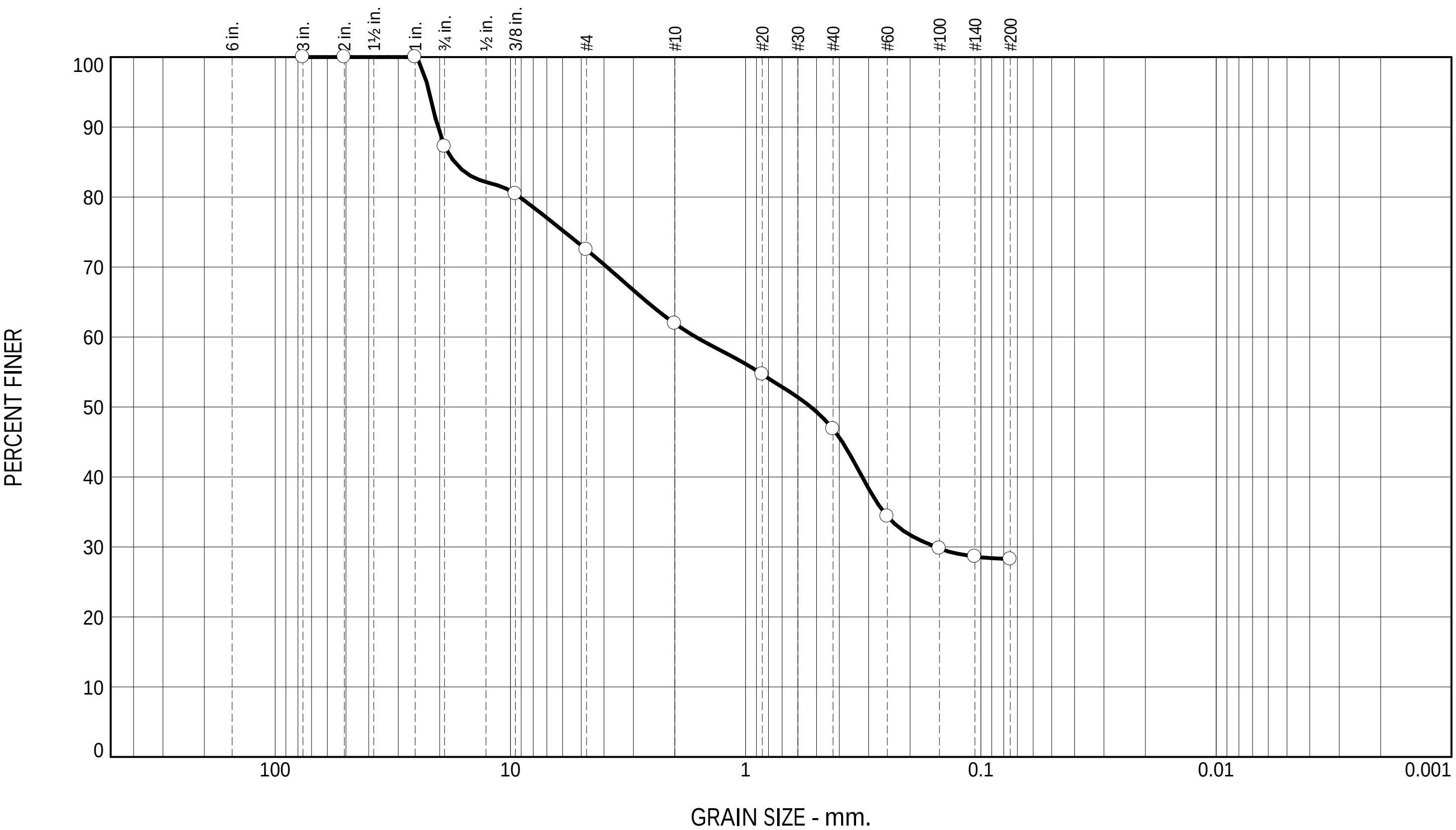
○ Location: B-2 Sample Number: S2

EINCK, Corp.

Timonium, MD

Client: Renaissance Geotechnical Engineering
Project:
Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	27.5	44.2	28.3		SC-SM	A-2-4(0)	15	22

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	87.2		
.375	80.4		
	GRAIN SIZE		
D_{60}	1.6276		
D_{30}	0.1552		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	72.5		
#10	61.9		
#20	54.7		
#40	46.9		
#60	34.4		
#100	29.8		
#140	28.6		
#200	28.3		

Material Description

○ Silty, Clayey SAND with Gravel

REMARKS:

○

○ Location: B-2 Sample Number: S6

EINCK, Corp.

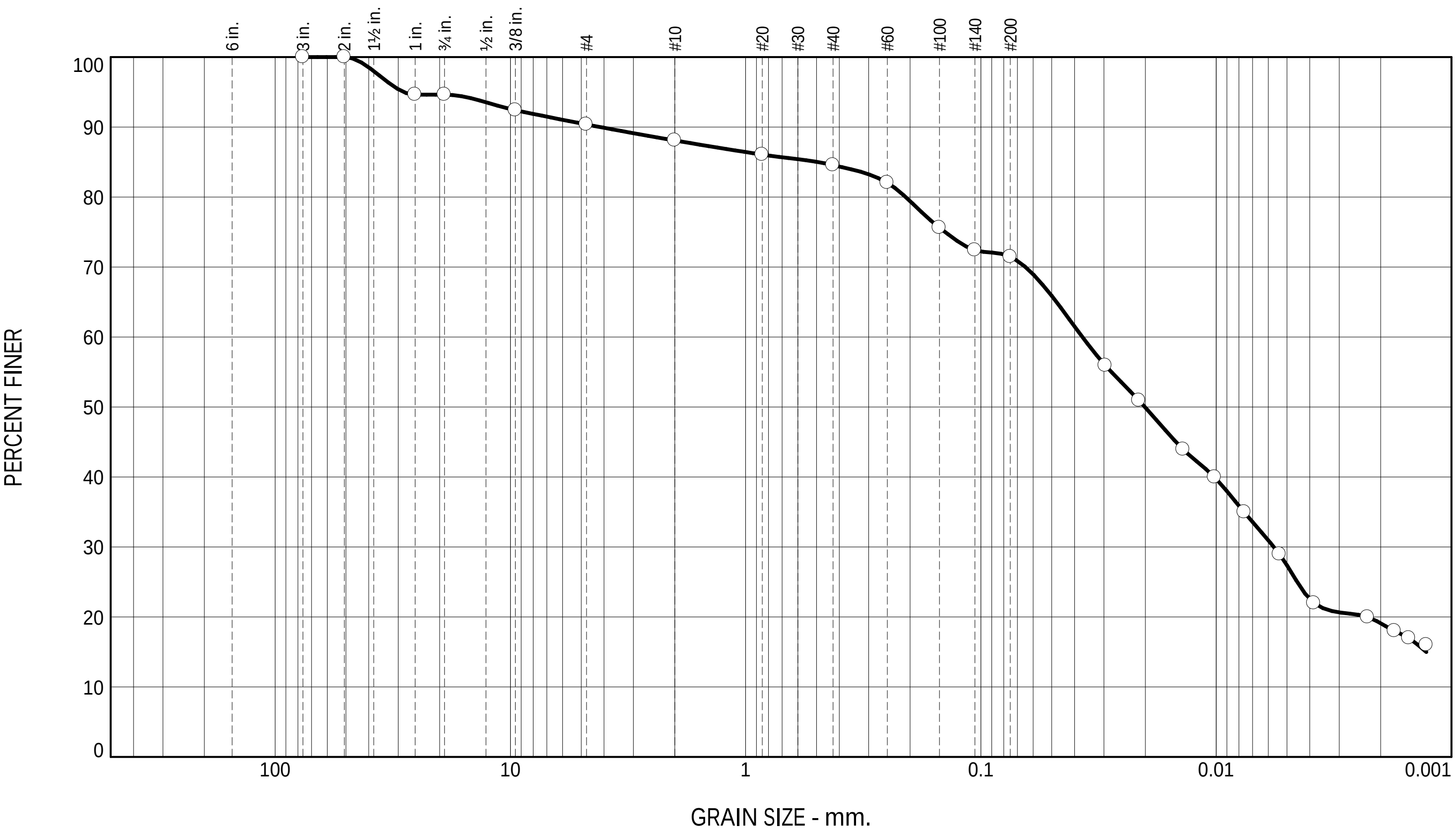
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	9.6	18.9	52.4	19.1	CL-ML	A-4(1)	14	20

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	94.6		
.75	94.6		
.375	92.4		
	GRAIN SIZE		
D_{60}	0.0371		
D_{30}	0.0057		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	90.4		
#10	88.1		
#20	86.1		
#40	84.6		
#60	82.0		
#100	75.6		
#140	72.4		
#200	71.5		

Material Description
○ Silty CLAY with SAND

REMARKS:
○

○ Location: B-2 Sample Number: S14

EINCK, Corp.

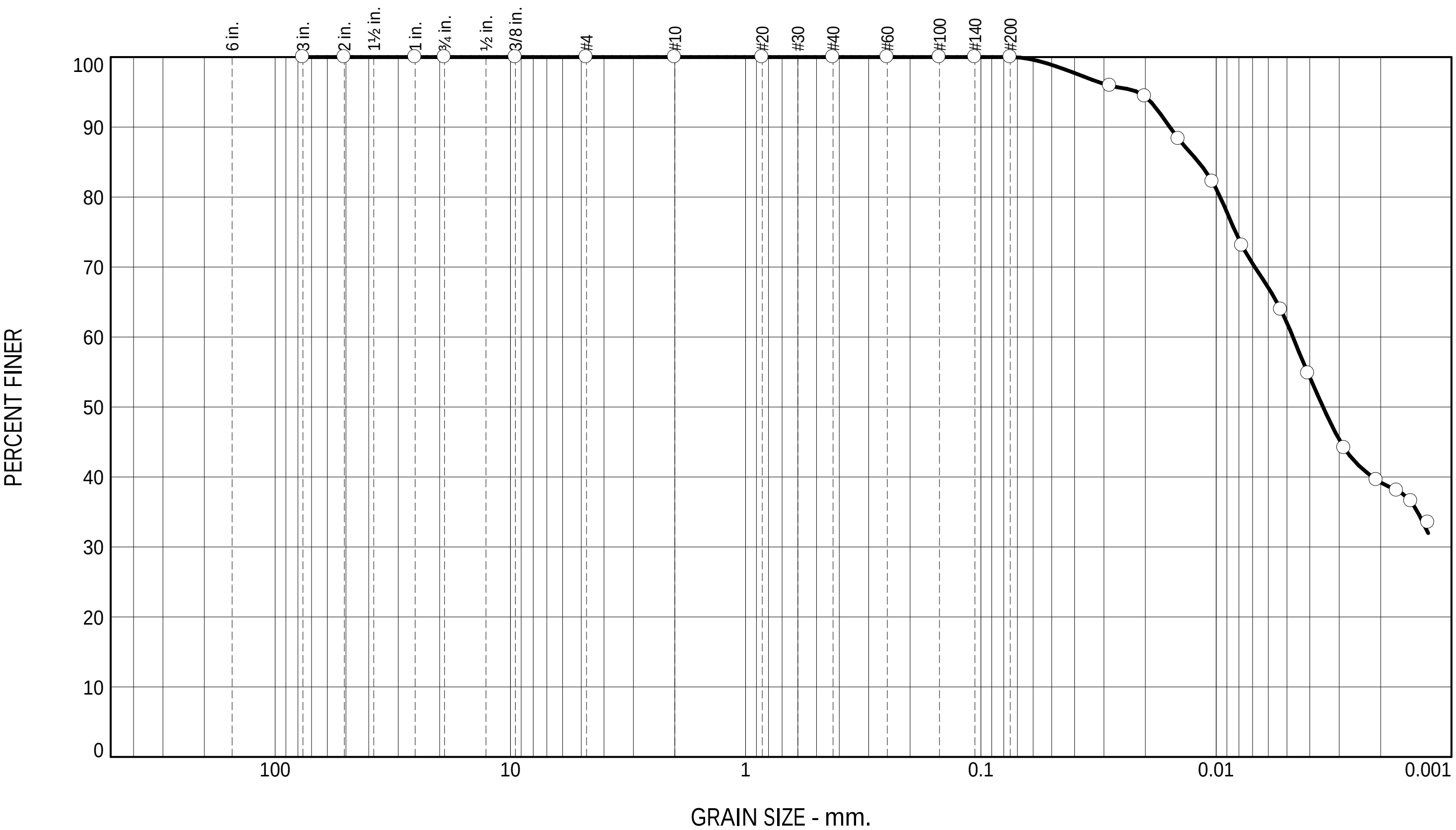
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	0.0	60.8	39.2	CL	A-6(10)	18	29

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}	0.0047		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	100.0		
#100	100.0		
#140	100.0		
#200	100.0		

Material Description

○ Lean CLAY

REMARKS:

○

○ Location: B-2 Sample Number: S31

EINCK, Corp.

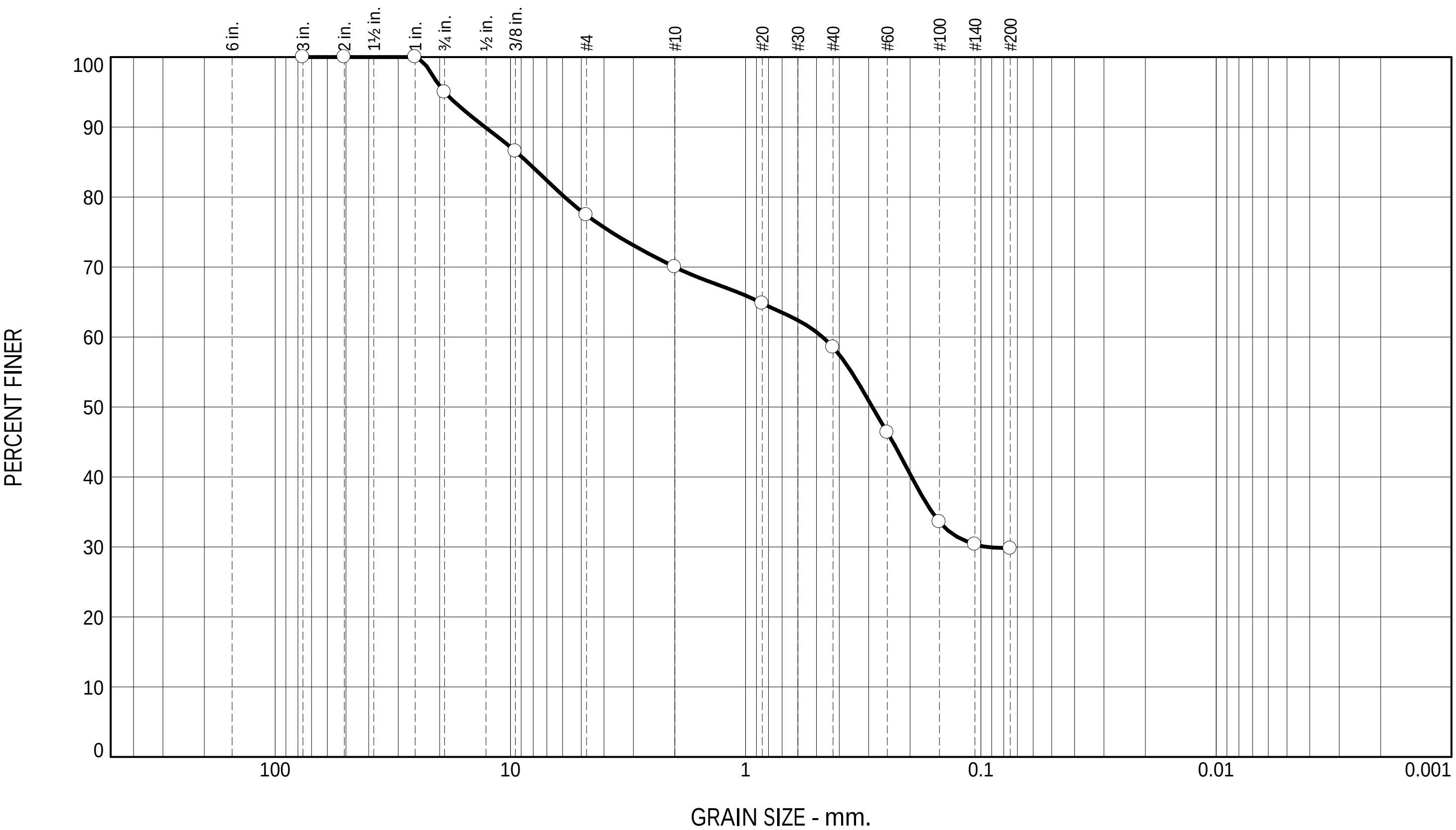
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	22.6	47.6	29.8		SC-SM	A-2-4(0)	13	17

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	95.0		
.375	86.5		
	GRAIN SIZE		
D_{60}	0.4708		
D_{30}	0.0946		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	77.4		
#10	70.0		
#20	64.8		
#40	58.5		
#60	46.4		
#100	33.6		
#140	30.4		
#200	29.8		

Material Description
○ Silty, Clayey SAND with Gravel

REMARKS:
○

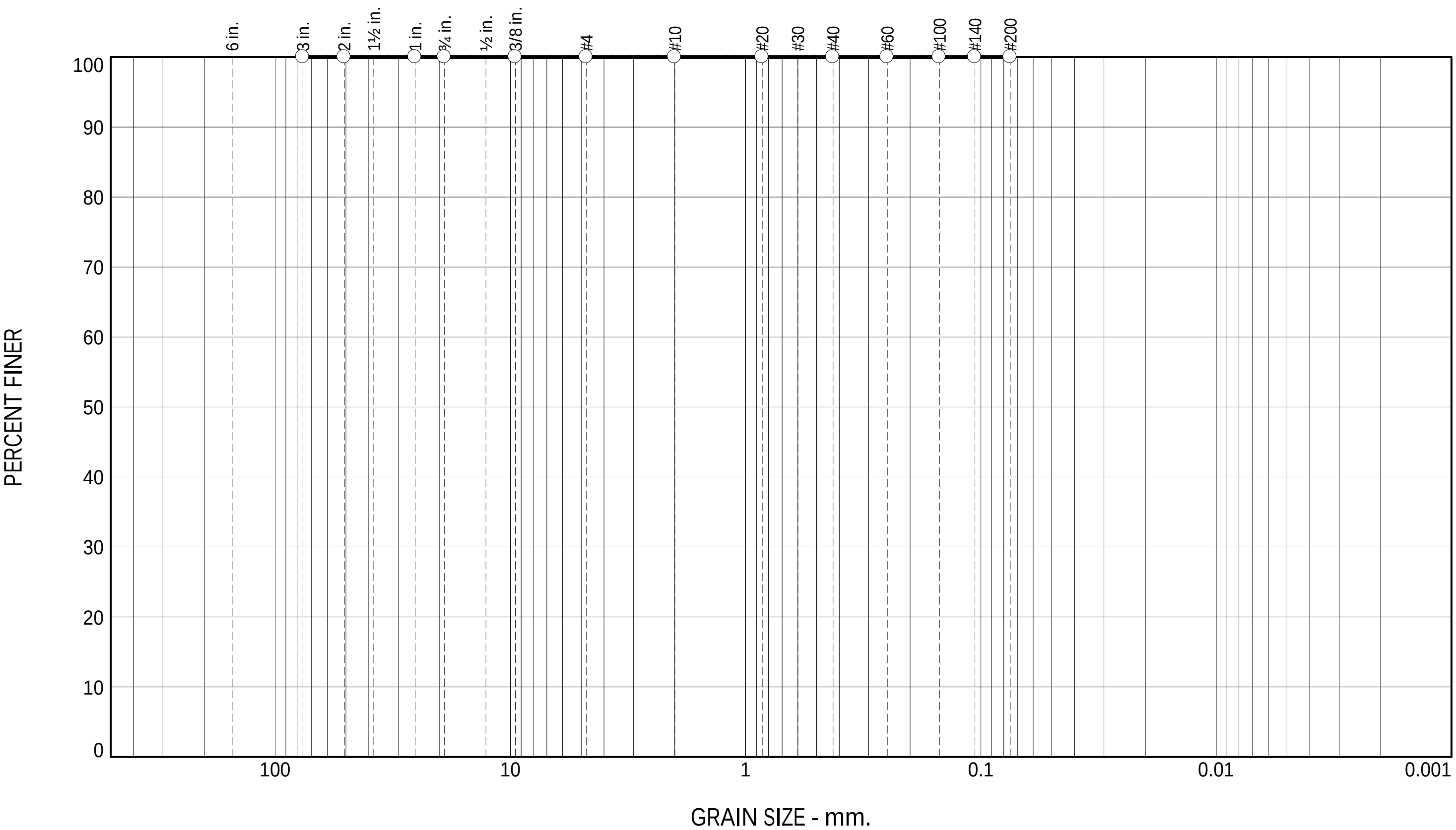
○ Location: B-3 Sample Number: S3

EINCK, Corp.

Timonium, MD

Client: Renaissance Geotechnical Engineering
Project:
Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	0.0	100.0		CL	A-6(13)	17	31

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}			
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	100.0		
#100	100.0		
#140	100.0		
#200	100.0		

Material Description

○ Lean CLAY

REMARKS:

○

○ Location: B-3 Sample Number: S5

EINCK, Corp.

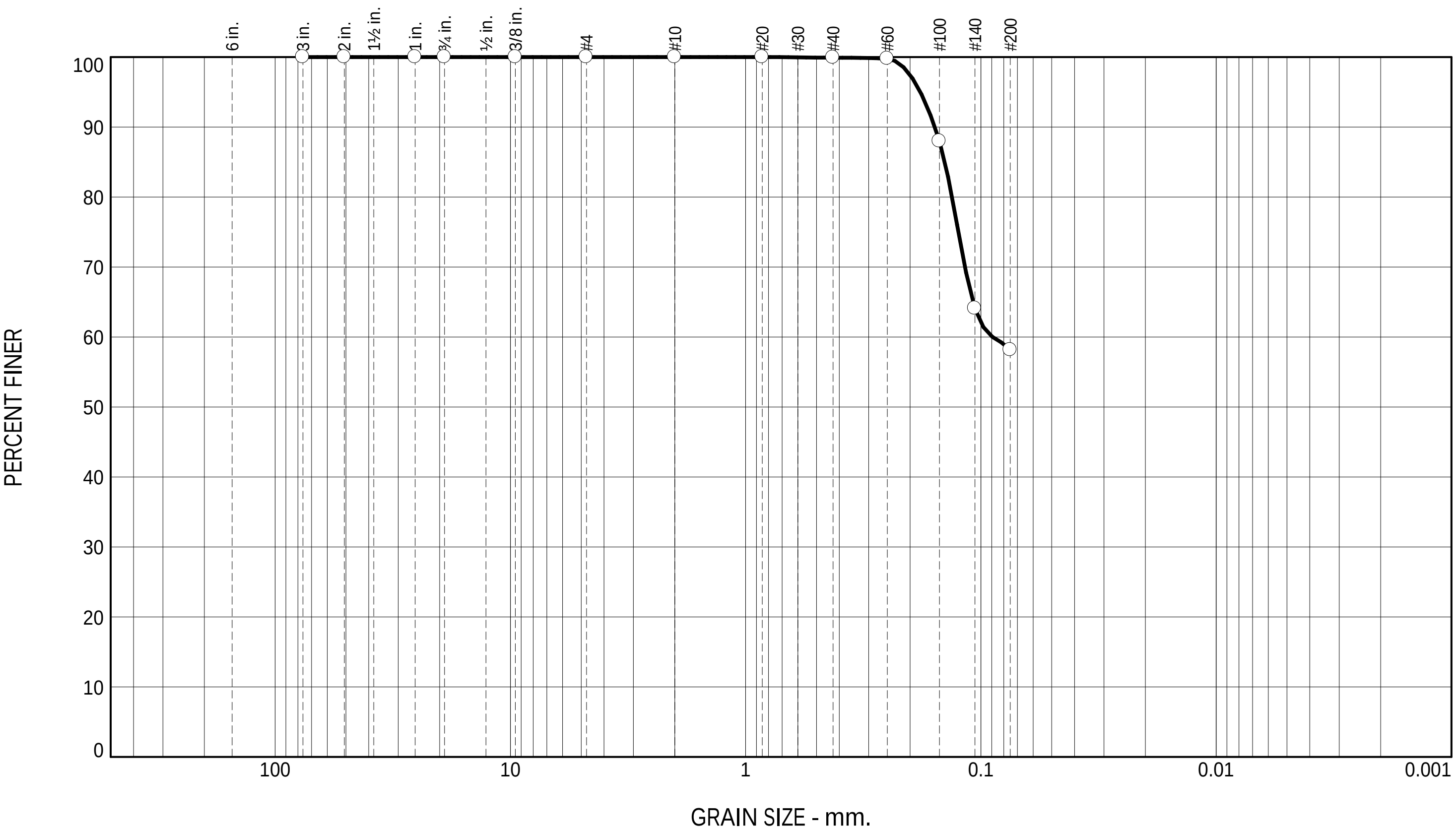
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	41.8	58.2					

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}	0.0893		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	100.0		
#20	100.0		
#40	99.9		
#60	99.8		
#100	88.0		
#140	64.1		
#200	58.2		

Material Description
○

REMARKS:
○

○ Location: B-3 Sample Number: S8

EINCK, Corp.

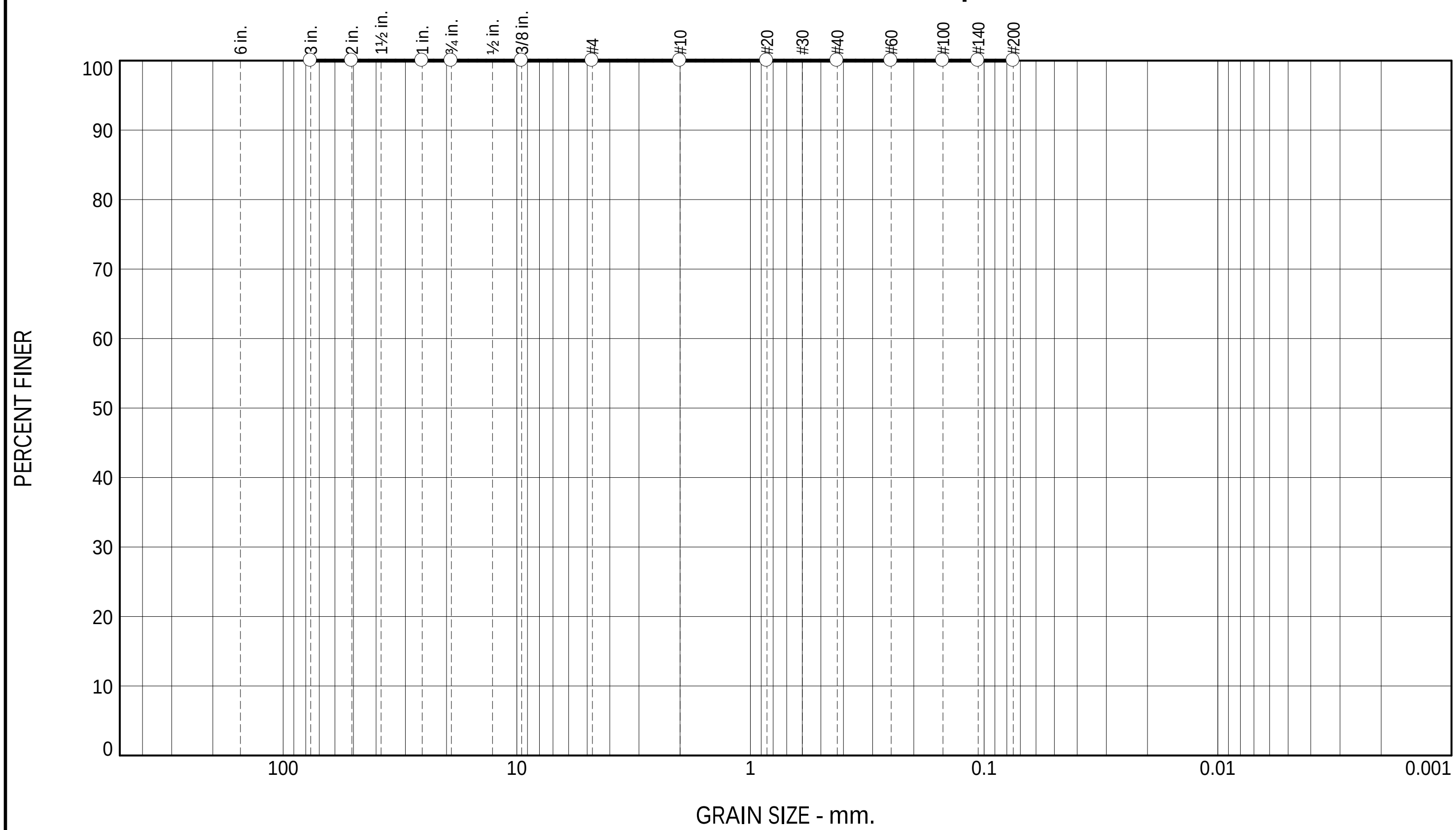
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	0.0	100.0		CL	A-6(19)	20	38

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}			
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	100.0		
#100	100.0		
#140	100.0		
#200	100.0		

Material Description
○ Lean CLAY

REMARKS:
○

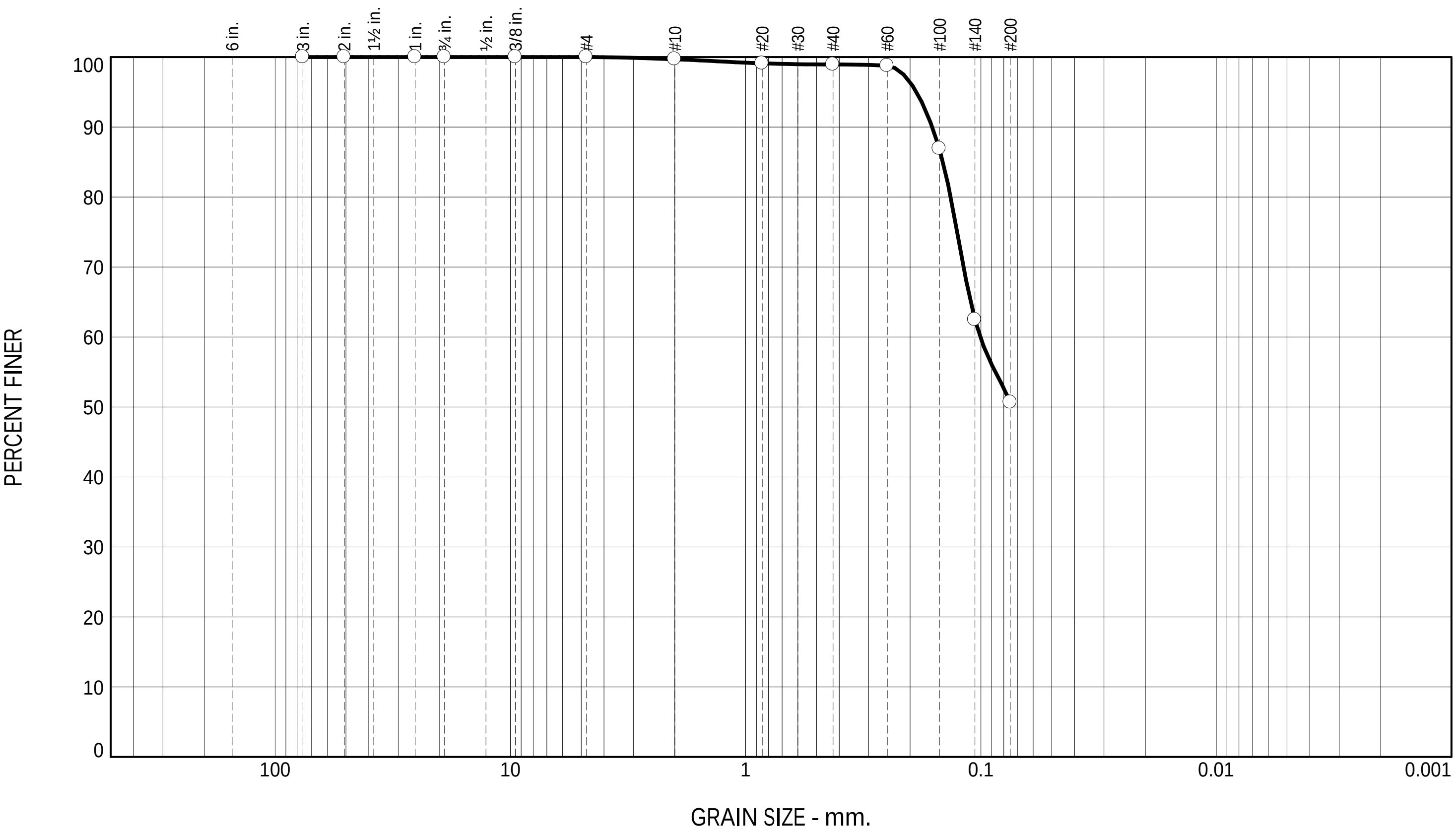
○ Location: B-3 Sample Number: S10

EINCK, Corp.

Timonium, MD

Client: Renaissance Geotechnical Engineering
Project:
Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	49.3	50.7					

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}	0.1007		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	99.7		
#20	99.1		
#40	98.9		
#60	98.7		
#100	86.9		
#140	62.4		
#200	50.7		

Material Description
○

REMARKS:
○

○ Location: B-3 Sample Number: S12

EINCK, Corp.

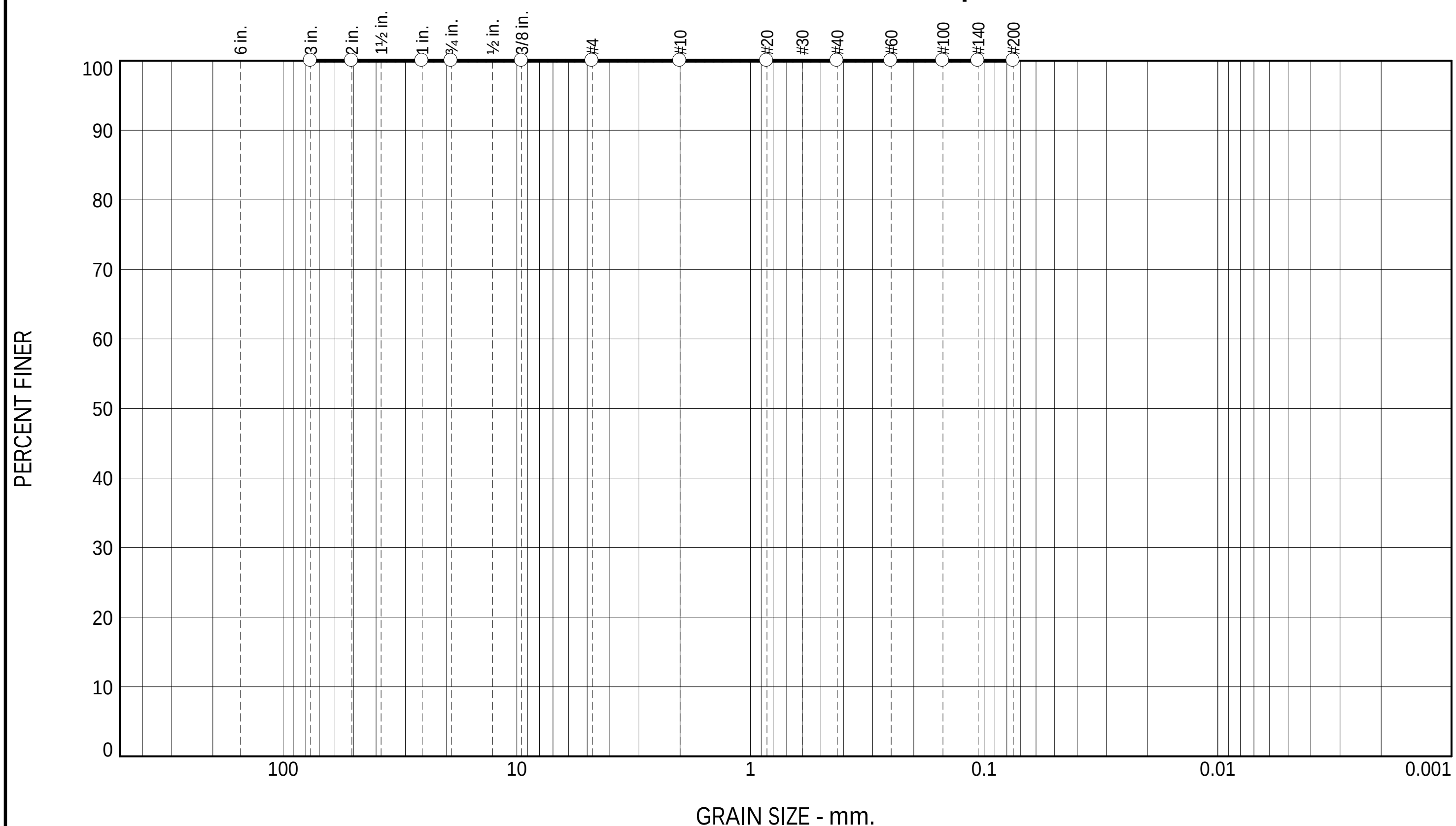
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	0.0	100.0		ML	A-4(0)	NP	NV

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}			
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	100.0		
#100	100.0		
#140	100.0		
#200	100.0		

Material Description

○ SILT

REMARKS:

○

○ Location: B-3 Sample Number: S14

EINCK, Corp.

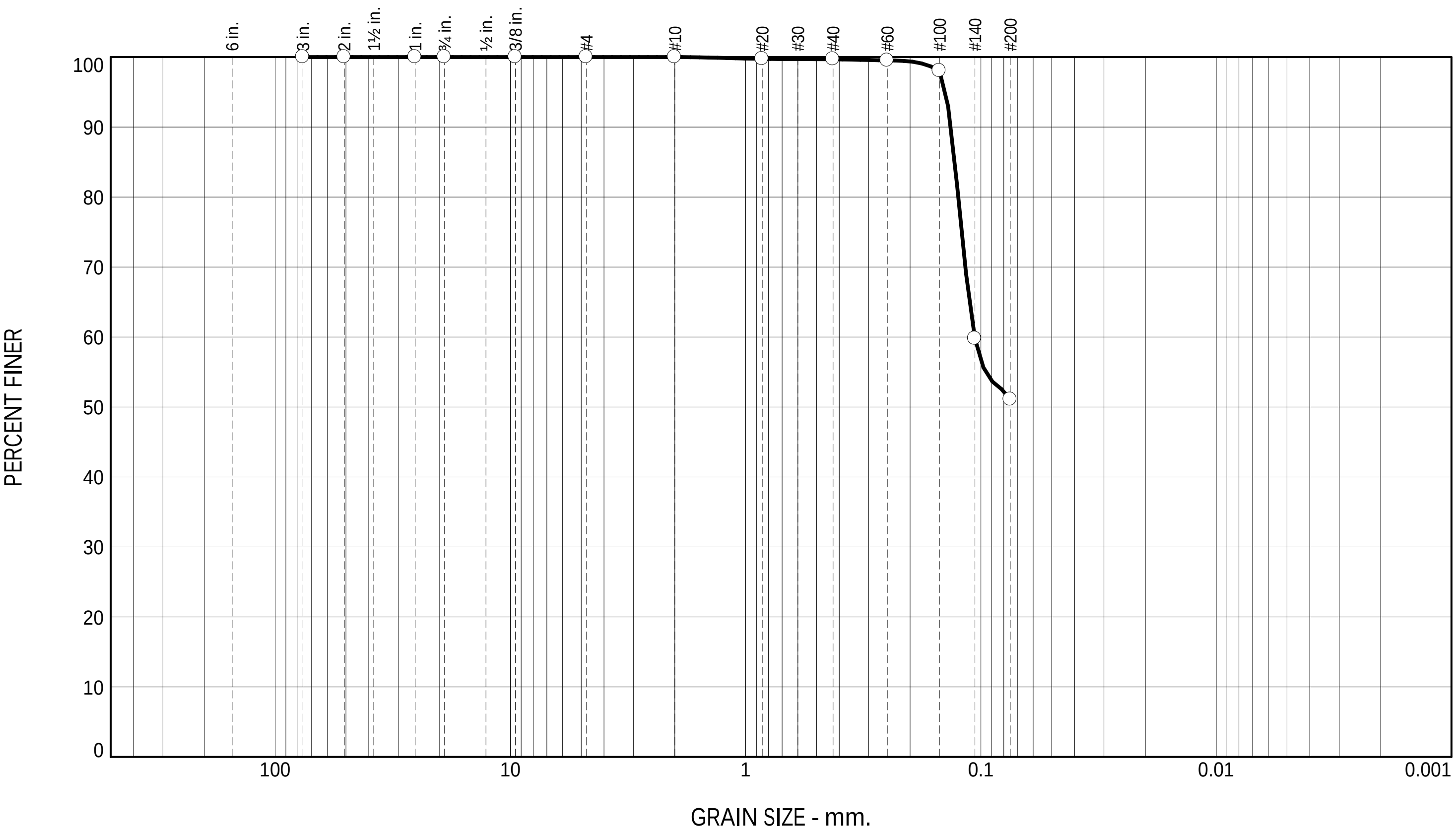
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	48.9	51.1					

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}	0.1064		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	100.0		
#20	99.7		
#40	99.7		
#60	99.5		
#100	98.0		
#140	59.8		
#200	51.1		

Material Description
○

REMARKS:
○

○ Location: B-3 Sample Number: S18

EINCK, Corp.

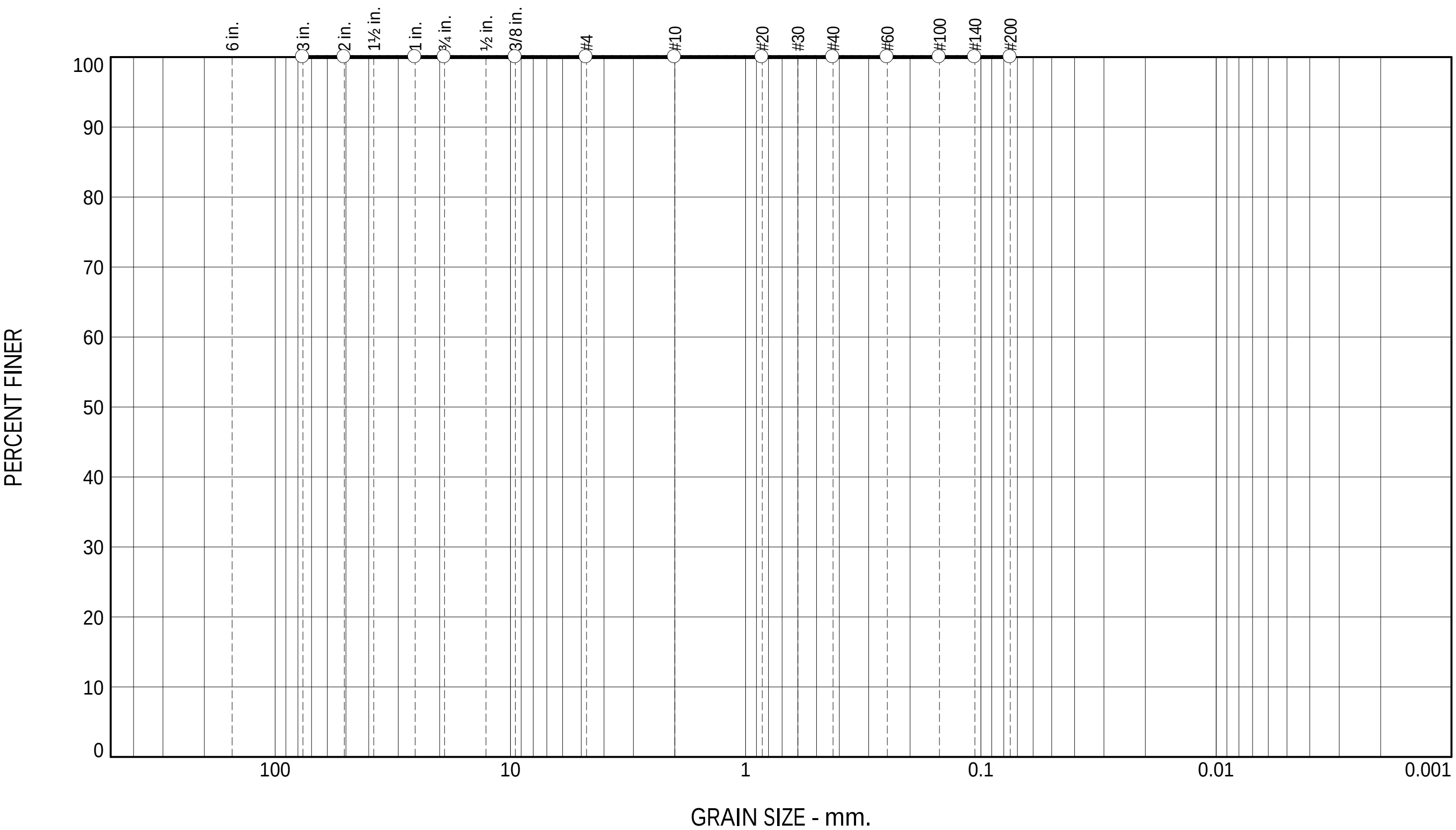
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	0.0	100.0		CL	A-6(11)	19	30

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}			
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	100.0		
#100	100.0		
#140	100.0		
#200	100.0		

Material Description
○ Lean CLAY

REMARKS:
○

○ Location: B-3 Sample Number: S21

EINCK, Corp.

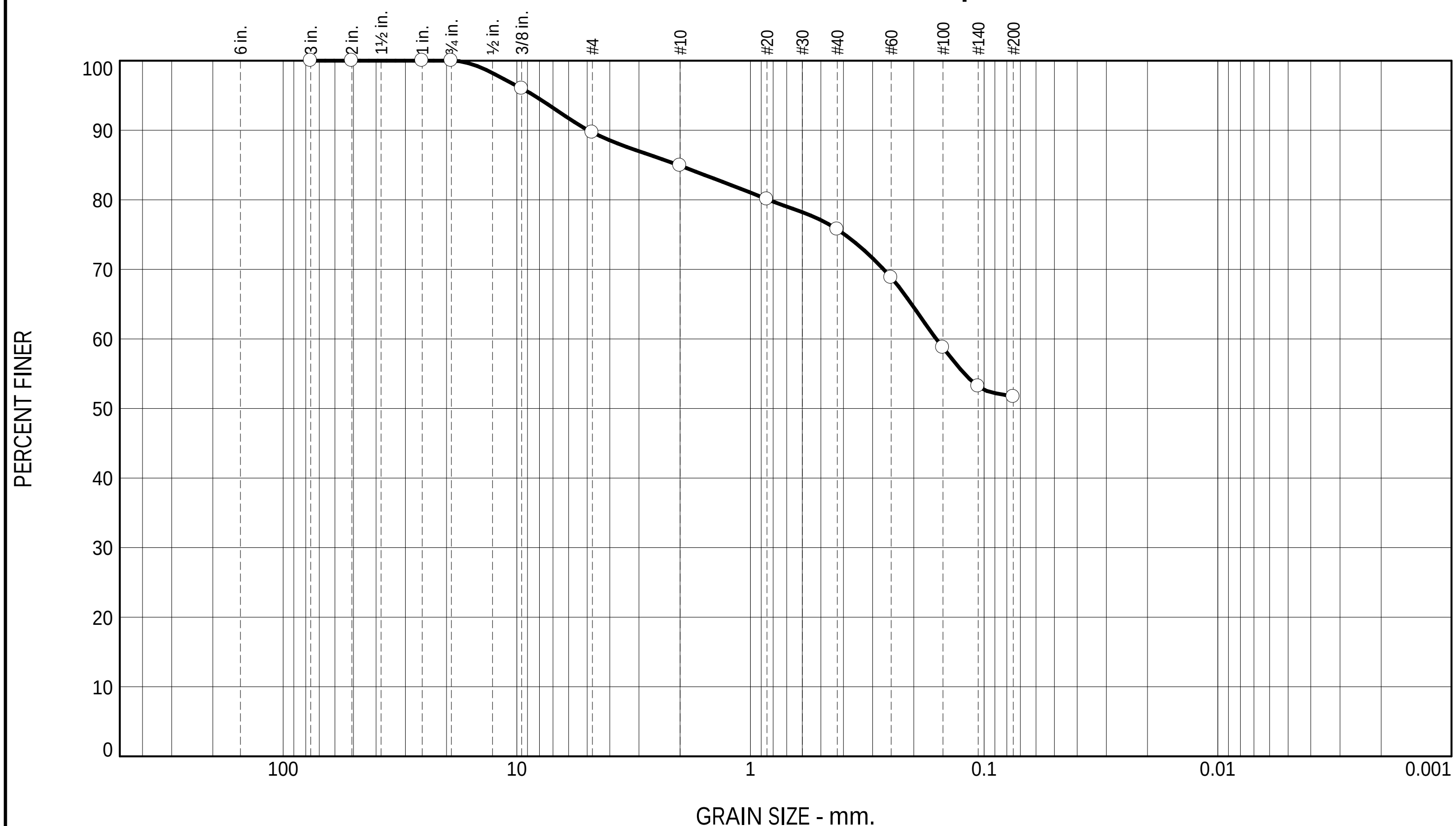
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	10.3	38.0	51.7		ML	A-4(0)	NP	NV

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	96.0		
	GRAIN SIZE		
D_{60}	0.1605		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	89.7		
#10	84.9		
#20	80.1		
#40	75.7		
#60	68.8		
#100	58.7		
#140	53.2		
#200	51.7		

Material Description
○ Sandy SILT

REMARKS:
○

○ Location: B-3 Sample Number: S23

EINCK, Corp.

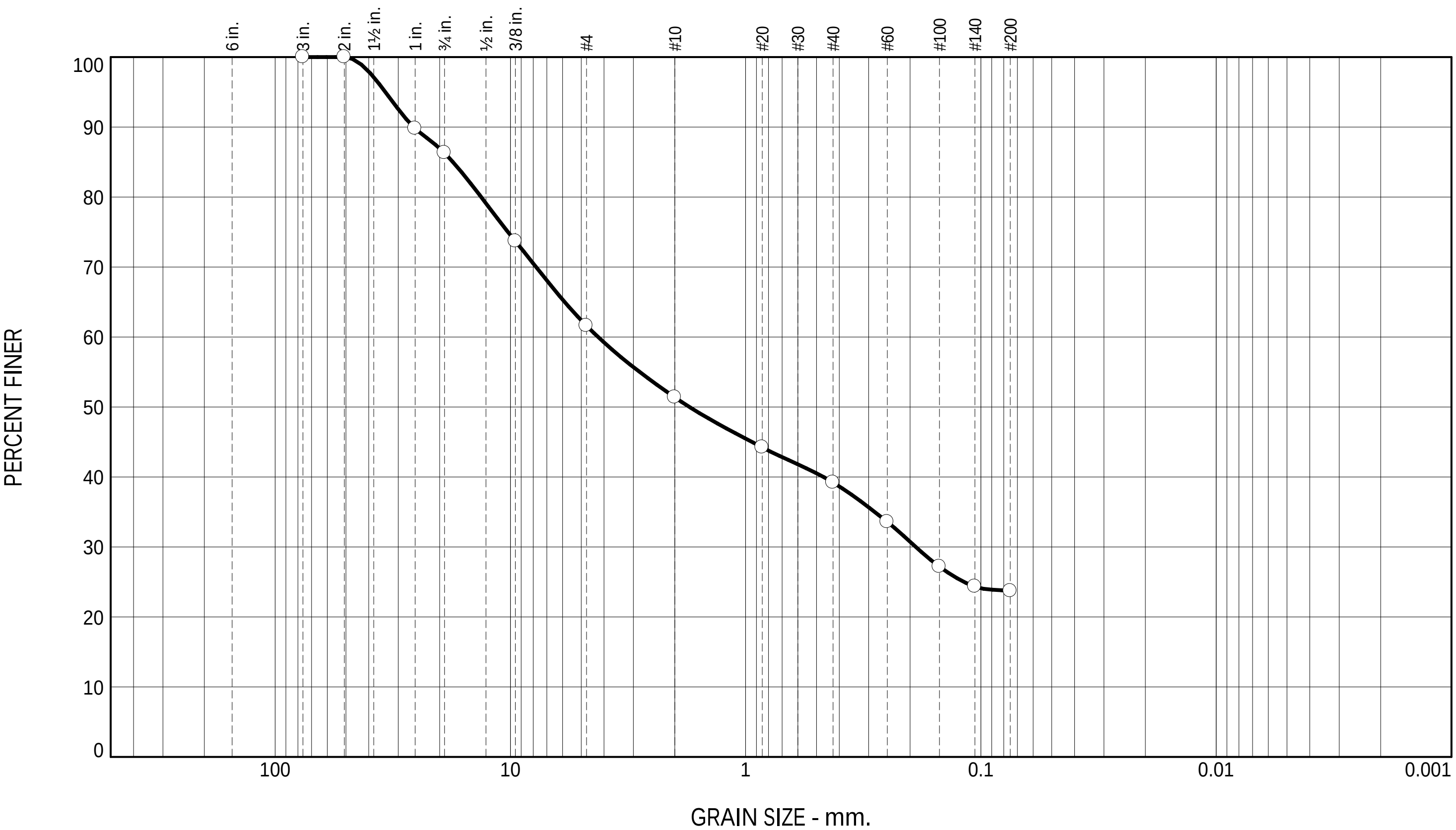
Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

Project No.: 23.0050 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	38.4	37.9	23.7					

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	89.8		
.75	86.3		
.375	73.7		
	GRAIN SIZE		
D_{60}	4.2403		
D_{30}	0.1893		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	61.6		
#10	51.4		
#20	44.2		
#40	39.2		
#60	33.6		
#100	27.2		
#140	24.3		
#200	23.7		

Material Description
○

REMARKS:
○

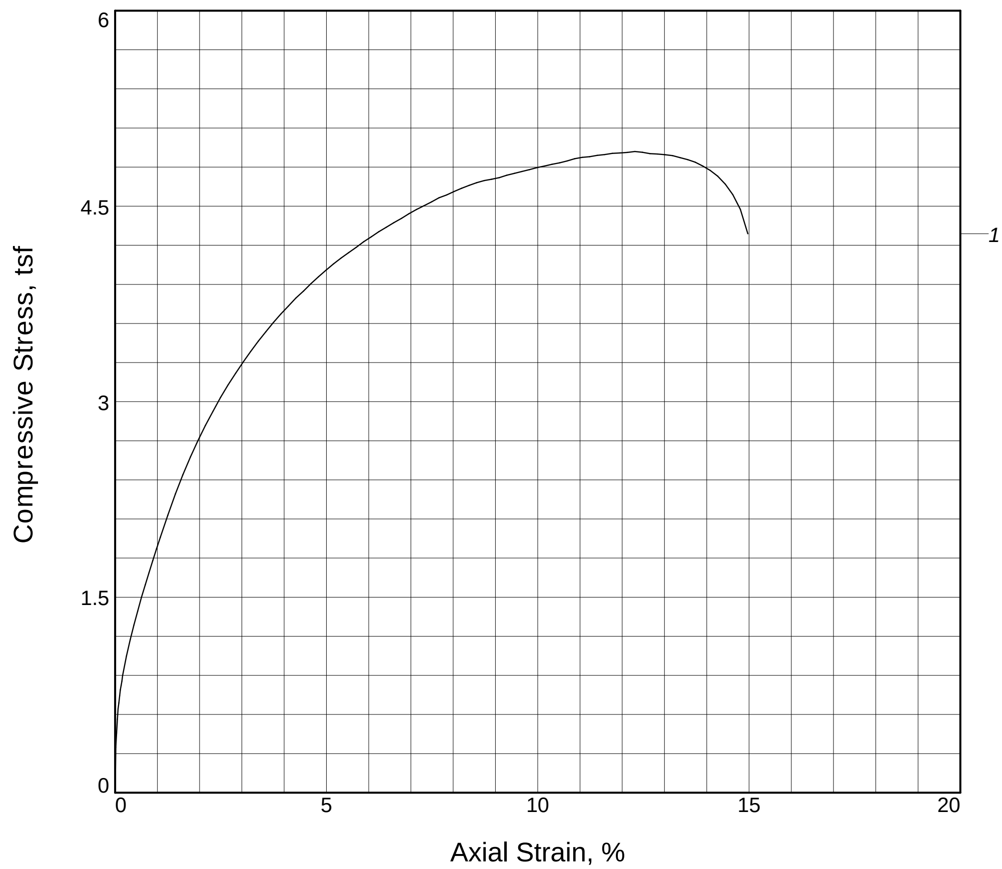
○ Location: B-3 Sample Number: S24

EINCK, Corp.

Timonium, MD

Client: Renaissance Geotechnical Engineering
Project:
Project No.: 23.0050 Figure

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	4.919			
Undrained shear strength, tsf	2.460			
Failure strain, %	12.3			
Strain rate, in./min.	0.056			
Water content, %	17.1			
Wet density, pcf	134.5			
Dry density, pcf	114.9			
Saturation, %	100.4			
Void ratio	0.4557			
Specimen diameter, in.	2.85			
Specimen height, in.	5.61			
Height/diameter ratio	1.97			

Description:

LL =	**PL =**	**PI =**	**Assumed GS=** 2.68	**Type:** Shelby Tube

Project No.: 23.0050
Date Sampled:
Remarks:

Figure ________

Client: Renaissance Geotechnical Engineering

Project:

Location: B-1
Sample Number: S18

UNCONFINED COMPRESSION TEST
EINCK, Corp.
Timonium, MD

Appendix E

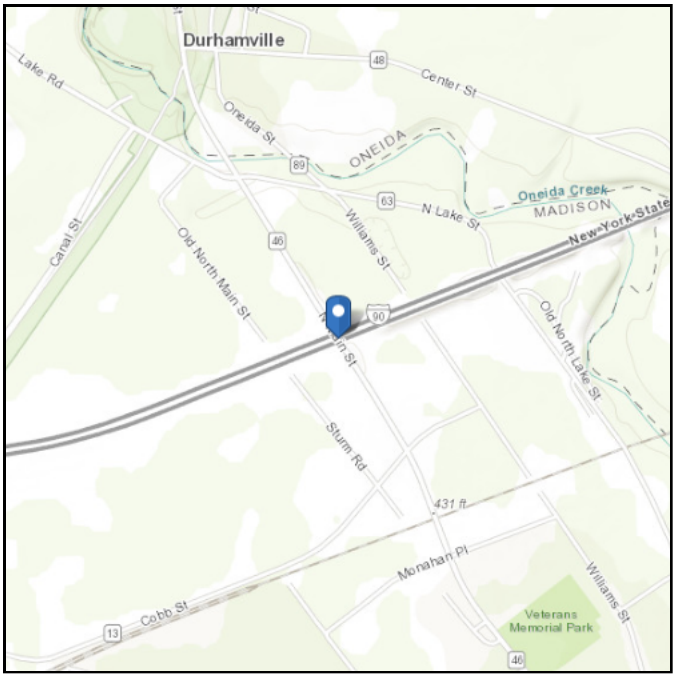
Test Results Seismic Output Parameters

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: IV
Soil Class: D - Stiff Soil

Latitude: 43.110375
Longitude: -75.66478
Elevation: 435.4854032235902 ft (NAVD 88)



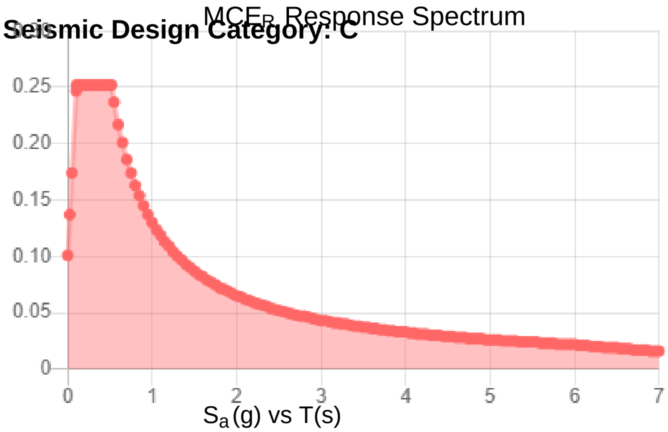
Seismic

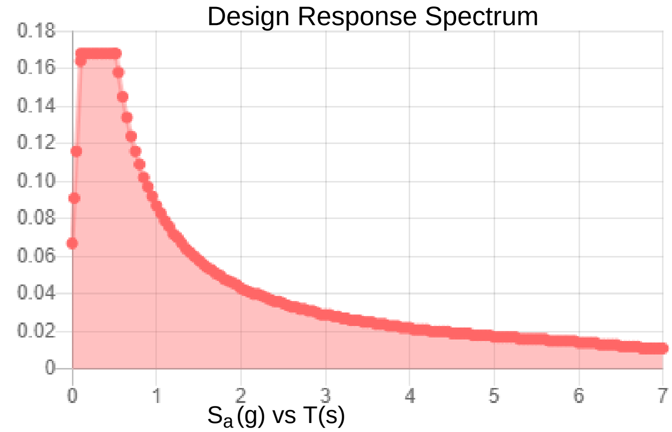
Site Soil Class: D - Stiff Soil

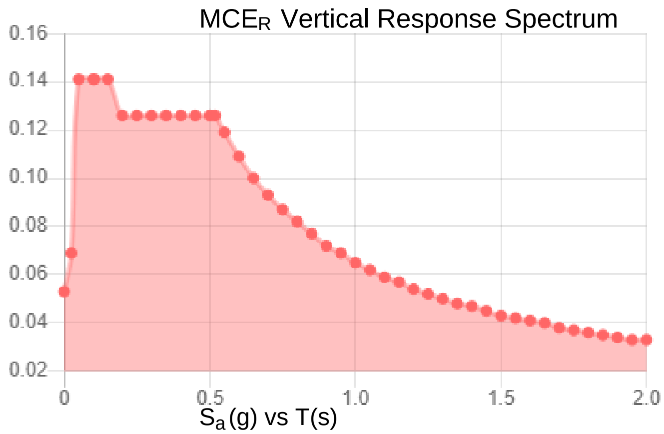
Results:

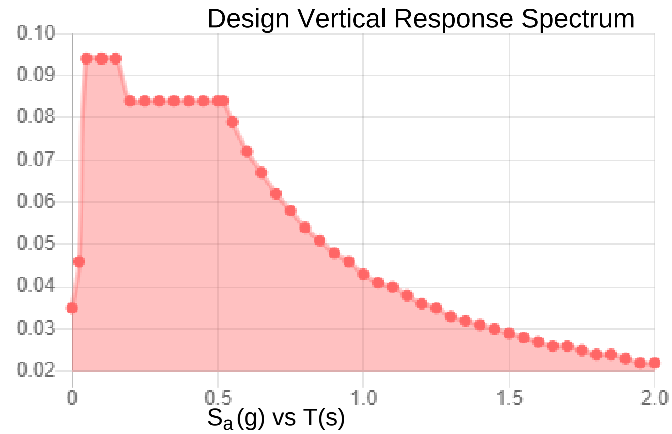
S_S :	0.157	S_{D1} :	0.087
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.08
F_v :	2.4	PGA_M :	0.128
S_{MS} :	0.252	F_{PGA} :	1.6
S_{M1} :	0.13	I_e :	1.5
S_{DS} :	0.168	C_v :	0.7

Seismic Design Category: C









Data Accessed: **Fri Aug 02 2024**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.