GEOTECHNICAL DATA REPORT

SOE Geotechnical Exploration
Water Pollution Control Plant
Arlington County, Virginia

Schnabel Reference 22230023.000
January 18, 2023

Prepared For:

Schnabel ENGINEERING
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January 18, 2023

Ms. LaTasha Peele, PE LEED Green Associate
Senior Water/Wastewater Project Manager
HDR, Inc.
8115 Maple Lawn Blvd, Suite 360
Fulton, Maryland 20759

Subject: **Geotechnical Data Report, SOE Geotechnical Exploration, Water Pollution Control Plant, Arlington County, Virginia (Schnabel Reference No. 22230023.000)**

Dear Ms. Peele:

SCHNABEL ENGINEERING, LLC (Schnabel) is pleased to submit our geotechnical data report (GDR) for this project. This study was performed in accordance with our proposal dated April 4, 2022 and in general accordance with our Professional Services Subcontract with HDR dated May 17, 2022.

1.0 SITE AND PROJECT DESCRIPTION

The project site is located at the existing Arlington County Water Pollution Control Plant (WPCP) located within the Crystal City area of Arlington, Virginia. The WPCP It is located between South Eads Street and 31st Street, immediately to the west of 32nd Street. Within the WPCP the specific area of the site being considered for temporary excavation support is located to the west of the existing biological solids processing building and to the north of Sludge Storage Tank No. 1 and No. 2. The project site is generally asphalt paved with a small grass area along the southern portion of the site, north of the sludge storage tanks. The on-site grade near the planned excavation is gently sloping south with elevation between EL 39 ft and EL 45 ft.

We understand the project is a part of the Arlington Re-Gen Biosolids Upgrade Program planned to construct the next generation of biosolids management facilities. As part of the proposed construction, the project will require the demolition of existing structures and retaining walls and construction of new planned structures. We also understand that temporary excavation support will be required to facilitate the proposed construction. Based on the provided site drawings, the proposed temporary excavation support system may extend approximately 150 ft immediately north of the existing biological solids processing building into the asphalt paved area. The plan drawing provided by your office, indicates a proposed site elevation of EL 24 ft, indicating an excavation depth approximately 18 ft based on the existing site grades.

A site vicinity map is included as Figure 1 at the end of this report. We obtained the site information through our subsurface exploration, site visits, and review of readily available aerial images of the project site. Project information was obtained from the provided site drawings and our conversation with your office.

2.0 SUBSURFACE EXPLORATION AND LABORATORY TESTING PROGRAM

We performed a subsurface exploration and field-testing program to identify the subsurface conditions underlying the site and to provide geotechnical data for the existing soils encountered. This program included test borings with Standard Penetration Testing (SPT). The exploration methods used are discussed below. The appendices contain the results of our exploration.

2.1 Subsurface Exploration Methods

2.1.1 Test Borings

Our subcontractor, Connelly & Associates, Inc., drilled three test borings under our observation from December 12, 2022 to December 14, 2022. The SPT test was performed at selected depths within the borings. Appendix A includes specific observations, remarks, and logs for the borings; classification criteria; drilling methods; and sampling protocols. Figure A1, included at the end of this report, indicates the approximate test boring locations. We will retain soil samples up to 45 days beyond the issuance of this report, unless you request other disposition.

The SPT samples were obtained using an automatic trip hammer (ATH) rather than the standard safety hammer. The energy applied to the split-spoon sampler using the ATH is about 33 percent greater than that applied using the standard safety hammer. The hammer blows shown on the boring logs are uncorrected for the higher energy. Additionally, the uncorrected N-values were also considered while describing the relative density/consistency of the soils in the generalized subsurface stratigraphy section of this report.

2.1.2 Temporary Water Observation Well

Groundwater level measurements were obtained in all the test borings during drilling and upon completion. One temporary water observation well (TOW) was installed in boring SB-01 to obtain 24 and 48-hr groundwater levels. The temporary well consisted of 1-1/4-inch PVC standpipe extending to a depth of 75 ft below the ground surface. The PVC standpipe was screened the entire length in the boring.

2.2 Soil Laboratory Testing

Our laboratory performed geotechnical laboratory tests on soil samples obtained during our subsurface exploration. This laboratory testing specifically included the following tests and methodologies:

- 9 Moisture Content, ASTM D2216
- 6 Grain Size Distribution, ASTM D422
- 6 Liquid Limit, Plastic Limit, and Plasticity Index of Soils, ASTM D4318

The testing aided in the classification of materials encountered in the subsurface exploration which are summarized on our boring logs. The results of the laboratory tests are included in Appendix B and are summarized in the Site Geology and Subsurface Conditions Sections of this report. Select test results are also shown on the boring logs in Appendix A.

3.0 SITE GEOLOGY AND SUBSURFACE CONDITIONS

3.1 Site Geology

Review of existing geologic data in our files and our subsurface exploration indicate that the site is located within the Atlantic Coastal Plain Physiographic Province of Virginia. The Coastal Plain generally consists of a seaward thickening wedge of semi- to unlithified sedimentary deposits of Cretaceous and younger Geologic Age. Coastal Plain sediments were deposited in the early Atlantic Ocean and its tributaries during several cycles of ocean advance and retreat. The Coastal Plain extends eastward to the Atlantic Ocean and is bounded to the west by the Piedmont Physiographic Province. The transition between the Coastal Plain and the Piedmont is referred to as "The Fall Line", where waterfalls are present on rivers that cross this interface. The Fall Line in Virginia generally extends from Washington, DC to Emporia, Virginia, and includes the cities of Fredericksburg, Richmond, and Petersburg. A geologic Map is included as Figure 2 at the end of this report.

During our subsurface exploration, we encountered the existing fill soils of Stratum A, and the fine and coarse-grained Potomac Formation Soils of Strata B1 and B2, respectively. The existing fill soils are believed to related to the past development of the WPCP, while the Potomac Formation soils are Cretaceous Age deposits by the historic movements of the Potomac River. One subsurface profile depicting the encountered subsurface conditions of the project site is included as Figure A2 in Appendix A of this report.

3.2 Generalized Subsurface Stratigraphy

We characterized the following generalized subsurface stratigraphy based on the exploration and laboratory test data included in the appendices.

3.2.1 Ground Cover

Topsoil

Boring SB-01 was drilled within the grass area along the southern portion of the site, north of the sludge storage tanks. This boring encountered about 3 inches of topsoil below the ground surface.

Asphalt Concrete

Boring SB-02 and SB-03 were drilled in the existing parking west of the existing biological solids processing building. These borings encountered about 7 to 8 inches of asphalt concrete underlain by about 4 to 5 inches of dense graded aggregate. The thicknesses of the asphalt concrete and aggregate materials and the subgrade materials encountered below the pavement at these boring locations are summarized in the table below.

Table 3-1: Summary of Pavement Sections

Boring ID	Asphalt Thickness (inches)	Dense-Graded Aggregate Thickness (inches)	Stratum*	Subgrade Material
SB-02	7.0	5.0	A	GC
SB-03	8.0	4.0	A	CL

*Strata descriptions are provided below.

3.2.2 Stratum A: Existing Fill

Below the ground cover, existing fill soils of Stratum A were encountered in all borings. The existing fill soils of Stratum A extended to depths of up to 18.5 ft below the ground surface. The lowest elevation at which these soils were present was approximately EL 21.5 ft in boring SB-02. The soils of Stratum A consisted of SANDY FAT CLAY (CH), SANDY LEAN CLAY (CL), CLAYEY SAND (SC), CLAYEY GRAVEL (GC), and POORLY GRADED GRAVEL (GP) with varying amounts of gravel, sand, and asphalt fragments. Standard Penetration Test (SPT) N-values recorded in this stratum varied from 3 to 35 blows per foot (bpf), indicating firm to hard consistencies and very loose to dense relative densities.

One sample from this stratum was tested for index properties. The sample classified as SANDY FAT CLAY (CH) with a Liquid Limit of 56 and a Plasticity Index of 33. The amount of material passing a No. 200 sieve was measured to be 63.6 percent. This sample and an additional jar sample from this stratum were also tested for natural moisture content. The natural moisture contents varied from 6.5 to 29.2 percent.

3.2.3 Stratum B1: Fine-Grained Potomac Formation Soils

Underneath the existing fill soils of Stratum A or interlayered with the coarse-grained soils of Stratum B2, the fine-grained Potomac Formation soils of Stratum B1 were encountered in all boring locations. The soils of Stratum B1 extended to depths of up 75 ft below the ground surface, the maximum depth explored. These soils consisted of FAT CLAY WITH SAND (CH), SANDY FAT CLAY (CH), and SANDY LEAN CLAY (CL). The SPT N-values measured within this stratum ranged from 6 to 100+ bpf, indicating stiff to hard consistencies.

Laboratory tests performed on two samples collected from Stratum B1 measured Liquid Limits of 56 and 60 and Plasticity Indices of 30 and 35. The percentage passing a No. 200 sieve was measured as 98.3 and 98.5 percent. These samples and an additional jar sample from this stratum were also tested for natural moisture content. The natural moisture contents varied from 21.0 to 26.6 percent.

3.2.4 Stratum B2: Coarse -Grained Potomac Formation Soils

The coarse-grained Potomac Formation soils of Stratum B2 were encountered interlayered with the fine-grained soils of Stratum B1. The soils from this Stratum extended to depths of up to 53.5 ft below the ground surface. Stratum B2 soils classified as CLAYEY SAND (SC). SPT N-values recorded within this stratum varied from 27 to 50 bpf, indicating medium to dense relative densities.

Laboratory tests performed on three samples collected from Stratum B2 measured Liquid Limits ranging from 28 to 48 and Plasticity Indices ranging from 8 to 30. The percentage passing a No. 200 sieve was measured between 22.9 and 23.8 percent. The natural moisture content of the samples tested ranged from 13.7 to 21.8 percent.

3.3 Groundwater

Groundwater was encountered during drilling in all borings at depths ranging from 13.5 to 48.0 ft below the ground surface. This corresponds to approximate elevations of EL 26.7 ft and EL -3.0 ft, respectively. Upon completion of drilling, before pulling augers, groundwater was observed within the borings at depths ranging from 32.0 to 39.0 ft below the ground surface. This corresponds to approximate elevations of EL 13.0 ft and EL 1 ft, respectively.

A temporary, hand-slotted PVC pipe was also installed in boring SB-01 to obtain longer term groundwater readings. The groundwater elevation measured within the observation well varied between EL 10.0 ft and EL 12.0 ft. A summary of the water level readings is presented in the table below.

Table 3-2: Summary of Observed Groundwater Levels

Boring ID	Approximate Ground Surface Elevation (ft)	Approximate Groundwater Elevation (ft)			
		Encountered Day of Drilling	Completion of Drilling	24 hours After Completion	48 hours After Completion
SB-01	41.0	2.5	3.0	10.0	12.0
SB-02	40.0	26.5[1]	1.0	-	-
SB-03	45.0	-3.0	13.0	-	-

[1] Based on the groundwater measurements collected during our exploration we consider this reading to likely be perched groundwater.

The groundwater levels on the boring logs indicate our estimate of the hydrostatic water table at the time of our subsurface exploration. The final design should anticipate the fluctuation of the hydrostatic water table depending on variations in precipitation, surface runoff, pumping, tidal action, evaporation, leaking utilities, and similar factors.

4.0 LIMITATIONS

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this report, or other instrument of service.

We appreciate the opportunity to be of service for this project. Please call us if you have any questions regarding this report.

Sincerely,

SCHNABEL ENGINEERING, LLC

Lucas Hoyos, EIT
Senior Staff Engineer

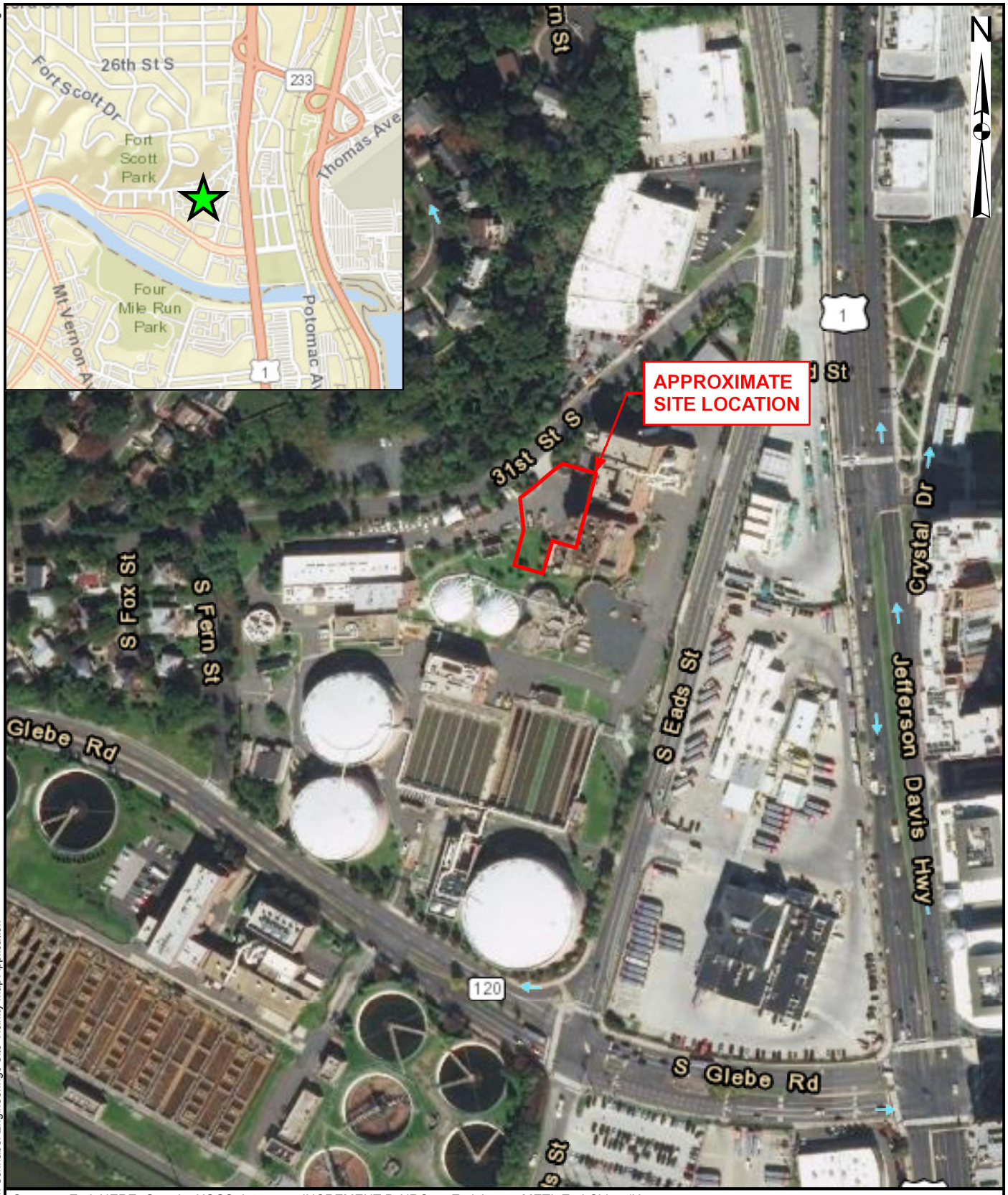
Samer Hassan, PE
Senior Engineer

Bill Khouri, PE
Principal

LH:SH;BK;jdb

Figures
Appendix A: Subsurface Exploration Data
Appendix B: Soil Laboratory Test Data

FIGURES



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Projection: WGS 1984 Web Mercator Auxiliary Sphere

NOT TO SCALE

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SOE GEOTECHNICAL EXPLORATION
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ARLINGTON COUNTY, VIRGINIA
PROJECT NO. 22230023.000

SITE VICINITY MAP

FIGURE 1

arcgis

12/30/2022 This Map was Created In Schnabel Engineerings Site Vicinity Map Application

af — **Artificial fill**—Sandy and gravelly materials in areas filled for construction of roads, highways, bridges, and dams

Qal — **Alluvium (Holocene and Pleistocene)**—Fine to coarse gravelly sand and sandy gravel, silt, and clay, light- to medium-gray and yellowish-gray; clasts consist mainly of vein quartz, quartzite, and other metamorphic rocks. Beds along the Potomac River and its tributaries south of the District of Columbia contain sparse brackish water clam shells as well as rare lenses of shells reworked from units as old as Paleocene.

Qbc — **Bacons Castle Formation (lower Pleistocene)**—Sandy gravel and feldspathic quartz sand. Basal beds are commonly cobble and gravel composed mainly of quartz, quartzite, and lesser amounts of chert and sandstone. The unit is extensive in northern Mason Neck State Park, lower Pohick Creek and Accotink Creek drainage basin, and the vicinity of Fort Belvoir Military Reservation in Virginia. Surface elevation of the top of the terrace deposits is commonly 44 to 50 m (144 to 164 ft) in elevation. The base of deposits ranges from 37 to 43 m (121 to 141 ft) in elevation

Qchow — **Chowan River Formation (lower Pleistocene)**—Sandy gravel and quartz to feldspathic sand; pebble- to cobble-size clasts are mainly quartz, quartzite, sandstone, and chert. Generally, the top of the unit is land surfaces from 58 to 65.5 m (190 to 215 ft) in elevation. It is interpreted to have been deposited about 2.4 million years ago (Blackwelder, 1981)

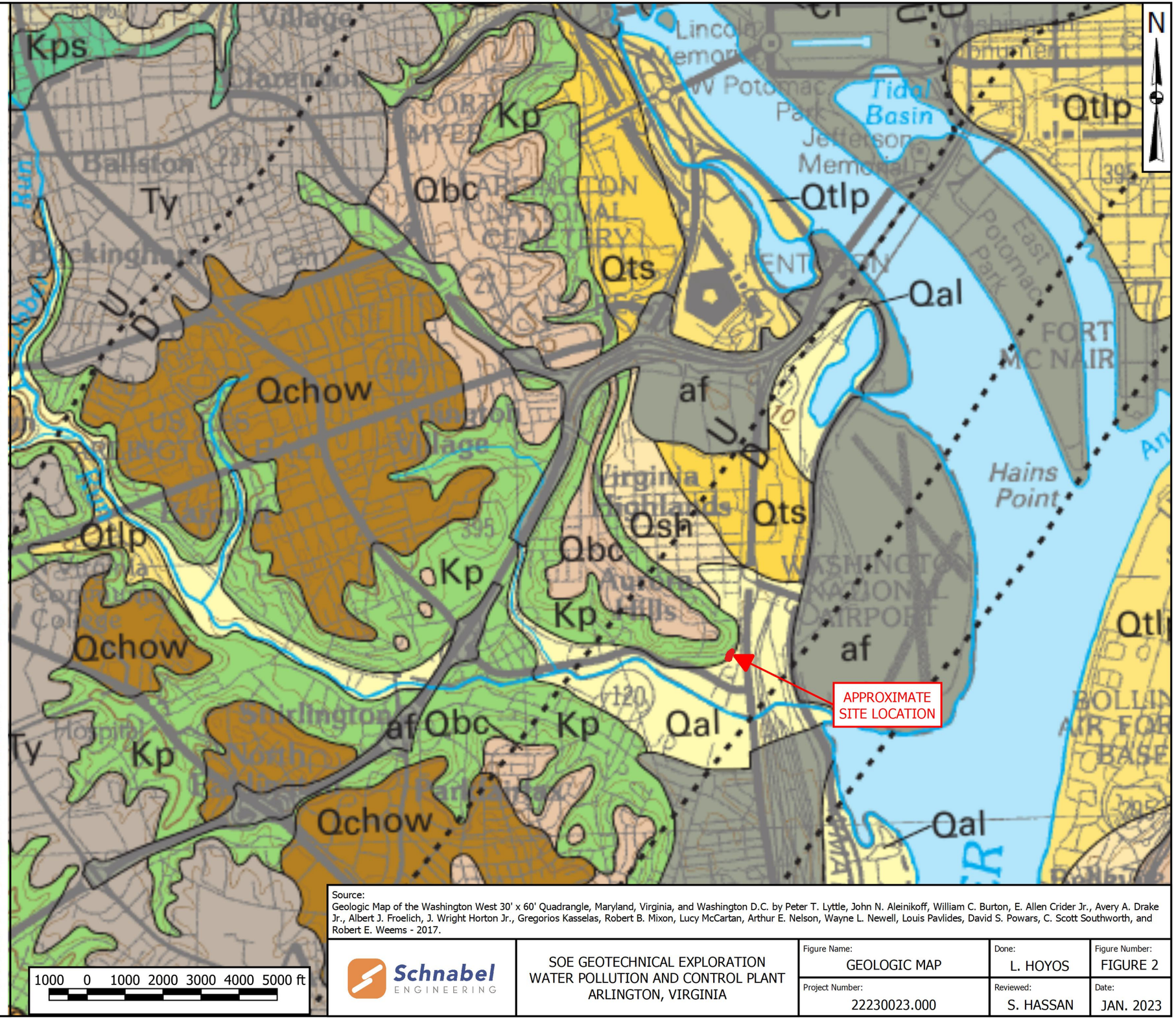
Qsh — **Shirley Formation (middle Pleistocene)**—The sequence generally includes, from bottom to top, at least three of the following sediment types: (1) medium to coarse, light-gray to white sand, thick-bedded and coarsely cross-stratified, commonly oxidized bright yellow or orange, in units as much as 3 m (10 ft) thick; (2) light- to medium-gray sand, thin-bedded, interbedded with thin silt and clay beds, which locally contain abundant wood fragments; the unit weathers yellowish brown to pale red, thin beds of limonite are common; (3) massive, light-gray or green-ish-gray, sandy clay and silt in units 1.5 to 3 m (5 to 10 ft) thick; contains scattered pebbles, cobbles, and limonite-filled root tubes; weathers pale red and forms vertical faces in natural exposures; and (4) fine to coarse, massive, orange-brown sand as much as 2 m (6.5 ft) thick, which locally forms the uppermost part of the terrace.

Qtlp — Lynnhaven and Poquoson Members, undivided (upper Pleistocene)—Muddy, fine to coarse sand and sandy silt underlying low terraces ranging in elevation from sea level to about 6 m (20 ft) and paralleling tidal creeks and bays tributary to the Potomac River. Thickness varies from a feather edge to 14 m (40 ft) and as much as 30 m (100 ft) in paleochannels beneath the Potomac River

Qts — Sedgefield Member (upper Pleistocene)—Upward fining sequence of gravelly sand, silt, and clay; primarily fine to coarse sand, well to poorly sorted, tan to orange in the upper one-third; poorly sorted, gray to olive silty clay in most of the lower two-thirds; and olive-gray pebbly sand at the base. Underlies terraces at elevations of 6 to 11 m (20 to 36 ft) along the Potomac River and is typically 1.5 to 14 m (5 to 46 ft) thick and as much as 30 m (100 ft) thick in paleochannels beneath the Potomac River.

Ty — **Yorktown Formation (Pliocene)**—Sandy gravel and feldspathic sand; pebble- to cobble-size clasts are mainly quartz, quartzite, sandstone, and chert. The base of unit ranges from about 73 to 77 m (240 to 253 ft) in elevation. North of Occoquan River, remnants of relatively undissected flats (inferred to be depositional surfaces at top of the unit), slope gently southeastward from elevations of about 80 m (262 ft) at the toe of a highly eroded and poorly defined scarp that extends from Dale City northeastward.

Kpc / Kp / Kps — **Potomac Formation (Upper and Lower Cretaceous)**—Very light gray to pinkish-gray, medium to very coarse, feldspathic quartz sand; green montmorillonite-illite clay and clayey sand; and dark-yellowish-brown to olive-gray, lignitic sandy silt and clay containing abundant poorly preserved leaf and stem impressions of ferns, cycads, and gymnosperms and rare silicified tree trunks. The highest elevation of this unit is 100 m (328 ft), located in the District of Columbia. The unit reaches 245 m (804 ft) of thickness in the southeastern corner of the map area. Mostly north and east of Hybla Valley, Virginia, the Potomac Formation is divided into 2 units: **Kpc** (clay-dominated lithofacies) and **Kps** (sand-dominated lithofacies). **Kpc** is distinguished by cross fractures that give a blocky structure not generally found in younger units. Clay is found as lenses in the sand at all scales. **Kps** commonly contains medium-scale trough and planar crossbeds, with most dips to the south, southeast, and east. Sedimentary structures and a lack of marine fossils indicate a fluvial depositional environment for this unit. The Potomac Formation is unconformably overlain by units ranging in age from Late Cretaceous to Holocene. This contact is sharp and commonly marked by phosphate and quartz pebbles at the base of the overlying unit.



Source:
Geologic Map of the Washington West 30' x 60' Quadrangle, Maryland, Virginia, and Washington D.C. by Peter T. Lyttle, John N. Aleinikoff, William C. Burton, E. Allen Crider Jr., Avery A. Drake Jr., Albert J. Froelich, J. Wright Horton Jr., Gregorios Kasselas, Robert B. Mixon, Lucy McCartan, Arthur E. Nelson, Wayne L. Newell, Louis Pavlides, David S. Powars, C. Scott Southworth, and Robert E. Weems - 2017.

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WATER POLLUTION AND CONTROL PLANT
ARLINGTON, VIRGINIA

Figure Name:	Done:	Figure Number:
GEOLOGIC MAP	L. HOYOS	FIGURE 2
Project Number:	**Reviewed:**	**Date:**
22230023.000	S. HASSAN	JAN. 2023

APPENDIX A
SUBSURFACE EXPLORATION DATA

SUBSURFACE EXPLORATION PROCEDURES

Test Borings – Hollow Stem Augers

The borings are advanced by turning an auger with a center opening of 3¼ inches. A plug device blocks off the center opening while augers are advanced. Cuttings are brought to the surface by the auger flights. Sampling is performed through the center opening in the hollow stem auger by standard methods after removal of the plug. No water is introduced into the boring using this procedure.

Standard Penetration Test Results

The Standard Penetration Test (SPT) is performed in the borings at regular depth intervals to collect soil samples. The numbers in the Sampling Data column of the boring logs represent SPT results. Each number represents the blows needed to drive a 2-inch O.D., 1⅜-inch I.D. split-spoon sampler 6 inches, using a 140-pound hammer falling 30 inches. The sampler is driven a total of 18 inches. The first 6 inches are considered a seating interval. The total of the number of blows for the second and third 6-inch intervals is the SPT "N-value." The Standard Penetration Test is performed according to ASTM D1586.

The SPT samples were obtained using a hydraulically driven automatic trip hammer (ATH). Most correlations with SPT data are based on N-values collected with a safety hammer. The energy applied to the split-spoon sampler using the ATH is about 33 percent greater than that applied using the safety hammer, resulting in lower N-values. The hammer blows shown on the boring logs are uncorrected for the higher energy.

Soil Classification Criteria

The group symbols on the logs represent the Unified Soil Classification System Group Symbols (ASTM D2487) based on visual observation and limited laboratory testing of the samples. Criteria for visual identification of soil samples are included in this appendix. Some variation can be expected between samples visually classified, and samples classified in the laboratory.

Pocket Penetrometer Results

The values following "PP=" in the sampling data column of the logs represent pocket penetrometer readings. Pocket penetrometer readings provide an estimate of the unconfined compressive strength of fine-grained soils.

Boring Locations and Elevations

The borings were located in the field by Schnabel Engineering personnel by measuring off the existing site features. Approximate boring locations are shown on Figure A1 at the end of this report. Ground surface elevations at the boring locations were obtained from publicly available imagery and are indicated on the boring logs. Locations and elevations should be considered no more accurate than the methods used to determine them.

GENERAL NOTES FOR SUBSURFACE EXPLORATION LOGS

1. Numbers in sampling data column next to Standard Penetration Test (SPT) symbols indicate blows required to drive a 2-inch O.D., 1⅜-inch I.D. sampling spoon 6 inches using a 140-pound hammer falling 30 inches. The Standard Penetration Test (SPT) N value is the number of blows required to drive the sampler 12 inches, after a 6-inch seating interval. The Standard Penetration Test is performed in general accordance with ASTM D1586.
2. Visual classification of soil is in accordance with terminology set forth in "Identification of Soil." The ASTM D2487 group symbols (e.g., CL) shown in the classification column are based on visual observations.
3. Estimated water levels indicated on the logs are only estimates from available data and may vary with precipitation, porosity of the soil, site topography, and other factors.
4. Refusal at the surface of rock, boulder, or other obstruction is defined as an SPT resistance of 50 blows for 1 inch or less of penetration.
5. The logs and related information depict subsurface conditions only at the specific locations and at the particular time when drilled or excavated. Soil conditions at other locations may differ from conditions occurring at these locations. Also, the passage of time may result in a change in the subsurface soil and water level conditions at the subsurface exploration location.
6. The stratification lines represent the approximate boundary between soil and rock types as obtained from the subsurface exploration. Some variation may also be expected vertically between samples taken. The soil profile, water level observations and penetration resistances presented on these logs have been made with reasonable care and accuracy and must be considered only an approximate representation of subsurface conditions to be encountered at the particular location.
7. Key to symbols and abbreviations:

S-1, SPT	Sample No., Standard Penetration Test
5+10+1	Number of blows in each 6-inch increment

LL	Liquid Limit
MC	Moisture Content (percent)
PL	Plastic Limit
PP	Pocket Penetrometer Reading (tsf)
%Passing#200	Percent by weight passing a No. 200 Sieve

IDENTIFICATION OF SOIL

I. DEFINITION OF SOIL GROUP NAMES (ASTM D2487)

			SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels – More than 50% of coarse fraction retained on No. 4 sieve Coarse, ¾" to 3" Fine, No. 4 to ¾"	Clean Gravels Less than 5% fines	GW	WELL GRADED GRAVEL
			GP	POORLY GRADED GRAVEL
		Gravels with fines More than 12% fines	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	Sands – 50% or more of coarse Fraction passes No. 4 sieve Coarse, No. 10 to No. 4 Medium, No. 40 to No. 10 Fine, No. 200 to No. 40	Clean Sands Less than 5% fines	SW	WELL GRADED SAND
			SP	POORLY GRADED SAND
		Sands with fines More than 12% fines	SM	SILTY SAND
			SC	CLAYEY SAND
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays – Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL	LEAN CLAY
			ML	SILT
		Organic	OL	ORGANIC CLAY
				ORGANIC SILT
	Silts and Clays – Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH	FAT CLAY
			MH	ELASTIC SILT
		Organic	OH	ORGANIC CLAY
				ORGANIC SILT
Highly Organic Soils	Primarily organic matter, dark in color and organic odor		PT	PEAT

II. DEFINITION OF SOIL COMPONENT PROPORTIONS (ASTM D2487)

			Examples
Adjective Form	GRAVELLY SANDY	>30% to <50% coarse grained component in a fine-grained soil	GRAVELLY LEAN CLAY
	CLAYEY SILTY	>12% to <50% fine grained component in a coarse-grained soil	SILTY SAND
"With"	WITH GRAVEL WITH SAND	>15% to <30% coarse grained component in a fine-grained soil	FAT CLAY WITH GRAVEL
	WITH GRAVEL WITH SAND	>15% to <50% coarse grained component in a coarse-grained soil	POORLY GRADED GRAVEL WITH SAND
	WITH SILT WITH CLAY	>5% to <12% fine grained component in a coarse-grained soil	POORLY GRADED SAND WITH SILT

III. GLOSSARY OF MISCELLANEOUS TERMS

SYMBOLS ..... Unified Soil Classification Symbols are shown above as group symbols. A dual symbol "-" indicates the soil belongs to two groups. A borderline symbol "/" indicates the soil belongs to two possible groups.

FILL ..... Man-made deposit containing soil, rock and often foreign matter.

PROBABLE FILL ..... Soils that contain no visually detected foreign matter, but which are suspect with regard to origin.

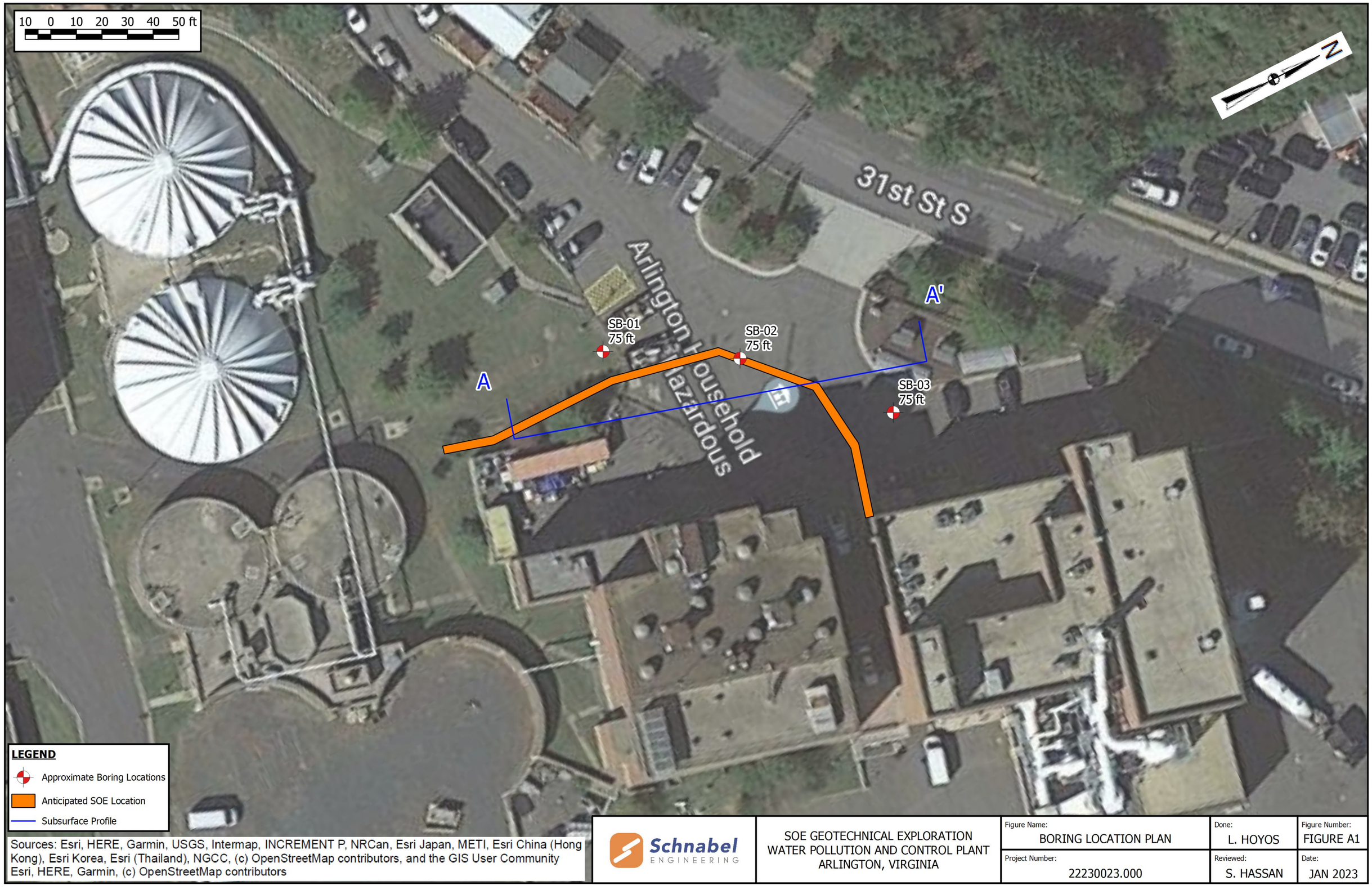
LENSES..... 0 to ½-inch seam within a material in a test pit.

LAYERS ..... ½ to 12-inch seam within a material in a test pit.

POCKET..... Discontinuous body within a material in a test pit.

MOISTURE CONDITIONS..... Saturated, moist or dry to indicate visual appearance of specimen.

COLOR..... Overall color, with modifiers such as light to dark or variation in coloration.



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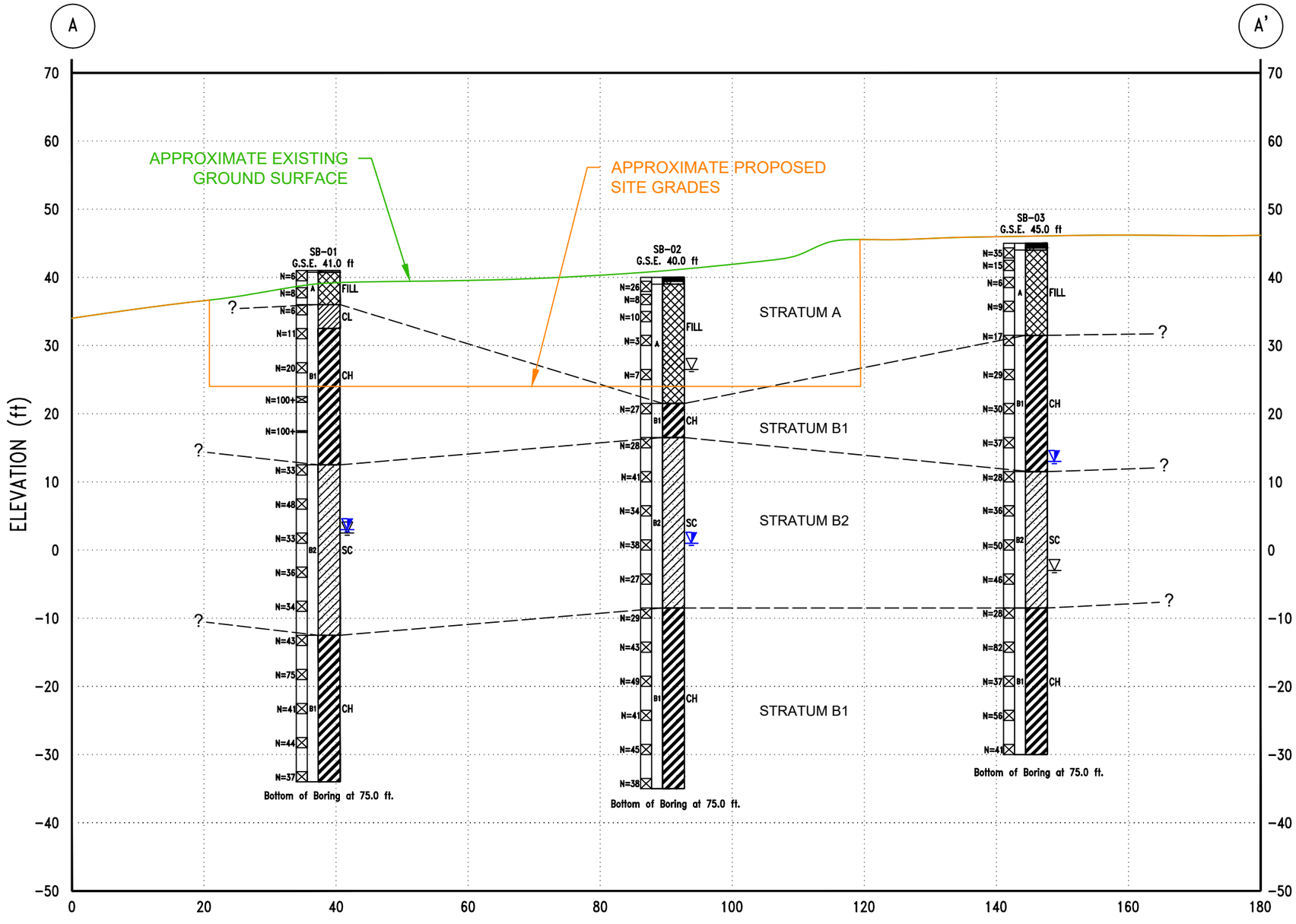
SOE GEOTECHNICAL EXPLORATION
WATER POLLUTION AND CONTROL PLANT
ARLINGTON, VIRGINIA

Figure Name:	Done:	Figure Number:
BORING LOCATION PLAN	L. HOYOS	FIGURE A1
Project Number:	Reviewed:	Date:
22230023.000	S. HASSAN	JAN 2023



GENERAL NOTES

1. THE NUMBER TO THE LEFT OF BORING COLUMNS INDICATES THE NUMBER OF BLOWS REQUIRED TO DRIVE A 2 INCH O.D. 1-3/8 INCH I.D. SAMPLING SPOON ONE FOOT USING A 140 POUND HAMMER FALLING 30 INCHES PER ASTM D1586.

2. A DESCRIPTION OF THE STRATUM DESIGNATIONS IS PROVIDED IN THE BODY OF THE REPORT.

3. A PLAN INDITICATING THE LOCATION OF THE SUBSURFACE PROFILE IS INCLUDED AS FIGURE A1.

4. ESTIMATED GROUNDWATER LEVELS INDICATED, ▽ , ARE ONLY ESTIMATES FROM AVAILABLE DATA AND MAY VARY WITH PRECIPITATION, POROSITY OF THE SOIL, SITE TOPOGRAPHY, ETC.

5. G.S.E. = GROUND SURFACE.

6. THIS DRAWING CONTAINS INTERPRETATIONS OF TEST BORING DATA AND SHOULD NOT BE USED AS A PART OF THE CONTRACT DOCUMENTS.

7. THIS PROFILE WAS DEVELOPED BY INTERPOLATION BETWEEN WIDELY SPACED BORINGS. ONLY AT THE BORING LOCATIONS SHOULD IT BE CONSIDERED AS AN APPROXIMATE REPRESENTATION AND THEN ONLY TO THE DEGREE IMPLIED BY THE NOTES ON THE BORING LOGS.

LEGEND

Fill | CH | SC | Asphalt | Approximate Existing Ground Surface | Subsurface Stratigraphy Break Line

Topsoil | CL | Crushed Stone | Approximate Proposed Grade | Groundwater Measurement | SPT N-Value

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WATER POLLUTION AND CONTROL PLANT
ARLINGTON, VIRGINIA

Figure Name: SUBSURFACE PROFILE A-A'	Done: L. HOYOS	Figure Number: FIGURE A2
Project Number: 22230023.000	Reviewed: S. HASSAN	Date: JAN 2023

Schnabel ENGINEERING **TEST BORING LOG**

Project: WPCP - SOE Exploration
Arlington County, Virginia

Boring Number: **SB-01**
Contract Number: 22230023.000
Sheet: 1 of 3

Contractor: Connelly and Associates, Inc.
Frederick, Maryland
Contractor Foreman: A. Moore
Schnabel Representative: L. Hoyos
Equipment: CME-55 (Track)
Method: 3-1/4" ID Hollow Stem Auger
Hammer Type: Auto Hammer (140 lb)
Dates Started: 12/12/22 **Finished:** 12/12/22
Location: See Location Plan

Ground Surface Elevation: 41.0 (ft) **Total Depth:** 75.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	12/12	---	38.5'	---	---
Casing Pulled ▼	12/12	---	38.0'	---	---
24 hr Reading	12/13	---	31.0'	---	---
48 hr Reading	12/14	---	29.0'	---	---

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	0.0 - 0.3 ft: Topsoil; 3 inches		40.8					
	0.3 - 5.0 ft: FILL, sampled as sandy lean clay; moist, dark bluish gray, estimated 5 - 10% gravel	FILL		A		S-01, SPT 2+3+3 REC=8", 44%	PP = 3.00 tsf	
						S-02, SPT 3+5+3 REC=14", 78%	PP = 3.00 tsf	
5.0	5.0 - 8.5 ft: SANDY LEAN CLAY; moist, greenish gray with streaks of brown	CL	36.0		5	S-03, SPT 4+4+2 REC=15", 83%	PP = 3.25 tsf	
8.5	8.5 - 28.5 ft: FAT CLAY; moist, bluish gray		32.5			S-04, SPT 3+5+6 REC=16", 89%	PP = 4.00 tsf	
					10			
	13.5 ft: Change: bluish gray with reddish brown					S-05, SPT 4+8+12 REC=18", 100%	LL = 56 PI = 30 MC = 26.6% % Passing #200 = 98.3 PP = 4.25 tsf	
				B1	15			
	18.5 ft: Change: reddish brown	CH				S-06, SPT 47+50/4" REC=6", 60%	PP = 4.25 tsf	
					20			
						S-07, SPT 50/3" REC=3", 100%	PP = 4.25 tsf	
					25			
28.5	28.5 - 53.5 ft: CLAYEY SAND, fine to medium grained sand; light bluish gray	SC	12.5	B2		S-08, SPT 17+16+17 REC=18", 100%	MC = 14.2%	

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: WPCP - SOE Exploration
Arlington County, Virginia

Boring Number: **SB-01**
Contract Number: 22230023.000
Sheet: 2 of 3

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	28.5 - 53.5 ft: CLAYEY SAND, fine to medium grained sand; light bluish gray *(continued)*							
					35	S-09, SPT 45+26+22 REC=2", 11%		
	38.5 ft: Change: fine to coarse grained sand; light greenish gray							
		SC		B2	40	S-10, SPT 10+12+21 REC=18", 100%		
					45	S-11, SPT 12+15+21 REC=18", 100%		
	48.5 ft: Change: fine to medium grained sand; light greenish gray with streaks of yellowish brown				50	S-12, SPT 10+12+22 REC=18", 100%	LL = 28 PI = 8 MC = 21.8% % Passing #200 = 23.8	
53.5	53.5 - 75.0 ft: SANDY FAT CLAY; moist, greenish gray with streaks of orangish brown		-12.5		55	S-13, SPT 11+20+23 REC=18", 100%	PP >4.50 tsf	
					60	S-14, SPT 19+33+42 REC=18", 100%	PP >4.50 tsf	
		CH		B1				
	63.5 ft: Change: greenish gray with streaks of brown				65	S-15, SPT 10+18+23 REC=18", 100%	PP >4.50 tsf	
					70	S-16, SPT 12+19+25 REC=18", 100%	PP >4.50 tsf	

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: WPCP - SOE Exploration
Arlington County, Virginia

Boring Number: **SB-01**
Contract Number: 22230023.000
Sheet: 3 of 3

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
75.0	53.5 - 75.0 ft: SANDY FAT CLAY; moist, greenish gray with streaks of orangish brown *(continued)*	CH	-34.0	B1	75	S-17, SPT 9+14+23 REC=18", 100%	PP >4.50 tsf	

Bottom of Boring at 75.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings after last groundwater measurement.
Installed 1-1/4 inch diameter temporary standpipe in borehole upon completion to a depth of 75.0 ft. Groundwater temporary Well was screened for 75 ft.

Schnabel ENGINEERING **TEST BORING LOG**

Project: WPCP - SOE Exploration
Arlington County, Virginia

Boring Number: **SB-02**
Contract Number: 22230023.000
Sheet: 1 of 3

Contractor: Connelly and Associates, Inc.
Frederick, Maryland
Contractor Foreman: A. Moore
Schnabel Representative: L. Hoyos
Equipment: CME-55 (Track)
Method: 3-1/4" ID Hollow Stem Auger
Hammer Type: Auto Hammer (140 lb)
Dates Started: 12/13/22 **Finished:** 12/13/22
Location: See Location Plan

Ground Surface Elevation: 40.0 (ft) **Total Depth:** 75.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	12/13	---	13.5'	---	---
Completion ▼	12/13	---	39.0'	---	---
Casing Pulled ▼	12/13	---	Dry	---	9.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.6	0.0 - 0.6 ft: Asphalt; 7 inches		39.4					
1.0	0.6 - 1.0 ft: DENSE GRADED AGGREGATE; 5 inches		39.0					
	1.0 - 13.5 ft: FILL, sampled as clayey gravel, fine to medium grained sand; moist, yellowish brown, contains asphalt fragments	FILL		A		S-01, SPT 5+14+12 REC=8", 44%		
						S-02, SPT 6+5+3 REC=10", 56%		
					5	S-03, SPT 5+5+5 REC=10", 56%	MC = 6.5%	
						S-04, SPT 2+2+1 REC=2", 11%		
					10			
13.5	13.5 - 18.5 ft: FILL, sampled as poorly graded gravel, fine to medium grained sand; wet, gray	FILL	26.5			S-05, SPT 5+4+3 REC=2", 11%		
					15			
18.5	18.5 - 23.5 ft: SANDY FAT CLAY; moist, reddish brown with streaks of greenish gray	CH	21.5	B1		S-06, SPT 9+12+15 REC=17", 94%	PP = 2.75 tsf	
					20			
23.5	23.5 - 48.5 ft: CLAYEY SAND, fine to medium grained sand; moist, greenish gray	SC	16.5	B2		S-07, SPT 6+12+16 REC=18", 100%		
					25			
	28.5 ft: Change: greenish gray with streaks of yellowish brown					S-08, SPT 8+19+22 REC=18", 100%		

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: WPCP - SOE Exploration
Arlington County, Virginia

Boring Number: **SB-02**
Contract Number: 22230023.000
Sheet: 2 of 3

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	23.5 - 48.5 ft: CLAYEY SAND, fine to medium grained sand; moist, greenish gray *(continued)*	SC		B2	35	S-09, SPT 10+15+19 REC=18", 100%	LL = 48 PI = 30 MC = 14.0% % Passing #200 = 22.9	
					40	S-10, SPT 11+17+21 REC=18", 100%		
					45	S-11, SPT 6+12+15 REC=18", 100%		
48.5	48.5 - 75.0 ft: FAT CLAY; moist, greenish gray		-8.5		50	S-12, SPT 6+13+16 REC=18", 100%	PP = 3.75 tsf	
	53.5 ft: Change: bluish gray with streaks of orangish brown	CH		B1	55	S-13, SPT 12+17+26 REC=18", 100%	PP >4.50 tsf	
					60	S-14, SPT 13+20+29 REC=18", 100%	PP >4.50 tsf	
					65	S-15, SPT 12+18+23 REC=18", 100%	PP >4.50 tsf	
					70	S-16, SPT 14+17+28 REC=18", 100%	LL = 60 PI = 35 MC = 24.0%	

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: WPCP - SOE Exploration
Arlington County, Virginia

Boring Number: **SB-02**
Contract Number: 22230023.000
Sheet: 3 of 3

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	48.5 - 75.0 ft: FAT CLAY; moist, greenish gray *(continued)*	CH		B1			% Passing #200 = 98.5 PP >4.50 tsf	
75.0			-35.0		75	S-17, SPT 16+15+23 REC=18", 100%	PP >4.50 tsf	

Bottom of Boring at 75.0 ft.
Boring terminated at selected depth.

Schnabel ENGINEERING **TEST BORING LOG**

Project: WPCP - SOE Exploration
Arlington County, Virginia

Boring Number: **SB-03**
Contract Number: 22230023.000
Sheet: 1 of 3

Contractor: Connelly and Associates, Inc.
Frederick, Maryland
Contractor Foreman: A. Moore
Schnabel Representative: L. Hoyos
Equipment: CME-55 (Track)
Method: 3-1/4" ID Hollow Stem Auger
Hammer Type: Auto Hammer (140 lb)
Dates Started: 12/14/22 **Finished:** 12/14/22
Location: See Location Plan

Ground Surface Elevation: 45.0 (ft) **Total Depth:** 75.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	12/14	---	48.0'	---	---
Completion ▼	12/14	---	32.0'	---	---
Casing Pulled ▼	12/14	---	Dry	---	23.5'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.7	0.0 - 0.7 ft: Asphalt; 8 inches		44.3					
1.0	0.7 - 1.0 ft: DENSE GRADED AGGREGATE; 4 inches		44.0			S-01, SPT 11+15+20 REC=8", 44%		
	1.0 - 8.5 ft: FILL, sampled as sandy fat clay; moist, yellowish brown with gray, est 15 -25% gravel	FILL				S-02, SPT 7+8+7 REC=10", 56%		
					5	S-03, SPT 5+3+3 REC=12", 67%	LL = 56 PI = 33 MC = 29.2% % Passing #200 = 63.6	
8.5	8.5 - 13.5 ft: FILL, sampled as clayey sand, fine to medium grained sand; moist, yellowish brown, estimated 5 - 10% gravel	FILL	36.5	A		S-04, SPT 5+4+5 REC=9", 50%		
					10			
13.5	13.5 - 33.5 ft: SANDY FAT CLAY; moist, bluish gray		31.5			S-05, SPT 6+8+9 REC=18", 100%	PP = 4.00 tsf	
					15			
	18.5 ft: Change: reddish brown	CH		B1		S-06, SPT 7+12+17 REC=18", 100%	PP = 4.00 tsf	
					20			
	23.5 ft: Change: reddish brown with streaks of bluish gray					S-07, SPT 8+11+19 REC=18", 100%	PP = 3.50 tsf	
					25			
						S-08, SPT 10+16+21 REC=18", 100%	PP = 4.25 tsf	

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: WPCP - SOE Exploration
Arlington County, Virginia

Boring Number: **SB-03**
Contract Number: 22230023.000
Sheet: 2 of 3

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	13.5 - 33.5 ft: SANDY FAT CLAY; moist, bluish gray *(continued)*	CH		B1				
33.5	33.5 - 53.5 ft: CLAYEY SAND, fine to medium grained sand; moist, greenish gray	SC	11.5	B2	35	S-09, SPT 4+11+17 REC=18", 100%		
	38.5 ft: Change: greenish gray with streaks of orangish brown				40	S-10, SPT 4+15+21 REC=18", 100%	LL = 33 PI = 11 MC = 13.7% % Passing #200 = 22.9	
					45	S-11, SPT 15+25+25 REC=18", 100%		
					50	S-12, SPT 13+20+26 REC=18", 100%		
53.5	53.5 - 58.5 ft: SANDY FAT CLAY; moist, greenish gray	CH	-8.5		55	S-13, SPT 7+10+18 REC=18", 100%	MC = 21.0% PP = 4.25 tsf	
58.5	58.5 - 75.0 ft: FAT CLAY WITH SAND, fine; moist, bluish gray with purplish gray	CH	-13.5	B1	60	S-14, SPT 10+32+50 REC=18", 100%	PP = 4.50 tsf	
					65	S-15, SPT 14+16+21 REC=18", 100%	PP >4.50 tsf	
	68.5 ft: Change: reddish brown with streaks of bluish gray				70	S-16, SPT 13+22+34 REC=18", 100%	PP >4.50 tsf	

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: WPCP - SOE Exploration
Arlington County, Virginia

Boring Number: **SB-03**
Contract Number: 22230023.000
Sheet: 3 of 3

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	58.5 - 75.0 ft: FAT CLAY WITH SAND, fine; moist, bluish gray with purplish gray *(continued)*	CH		B1				
75.0			-30.0		75	S-17, SPT 11+17+24 REC=18", 100%	PP >4.50 tsf	

Bottom of Boring at 75.0 ft.
Boring terminated at selected depth.

APPENDIX B
SOIL LABORATORY TEST DATA

Summary of Laboratory Tests Results
Atterberg Limits
Gradation Curves

Summary of Laboratory Tests

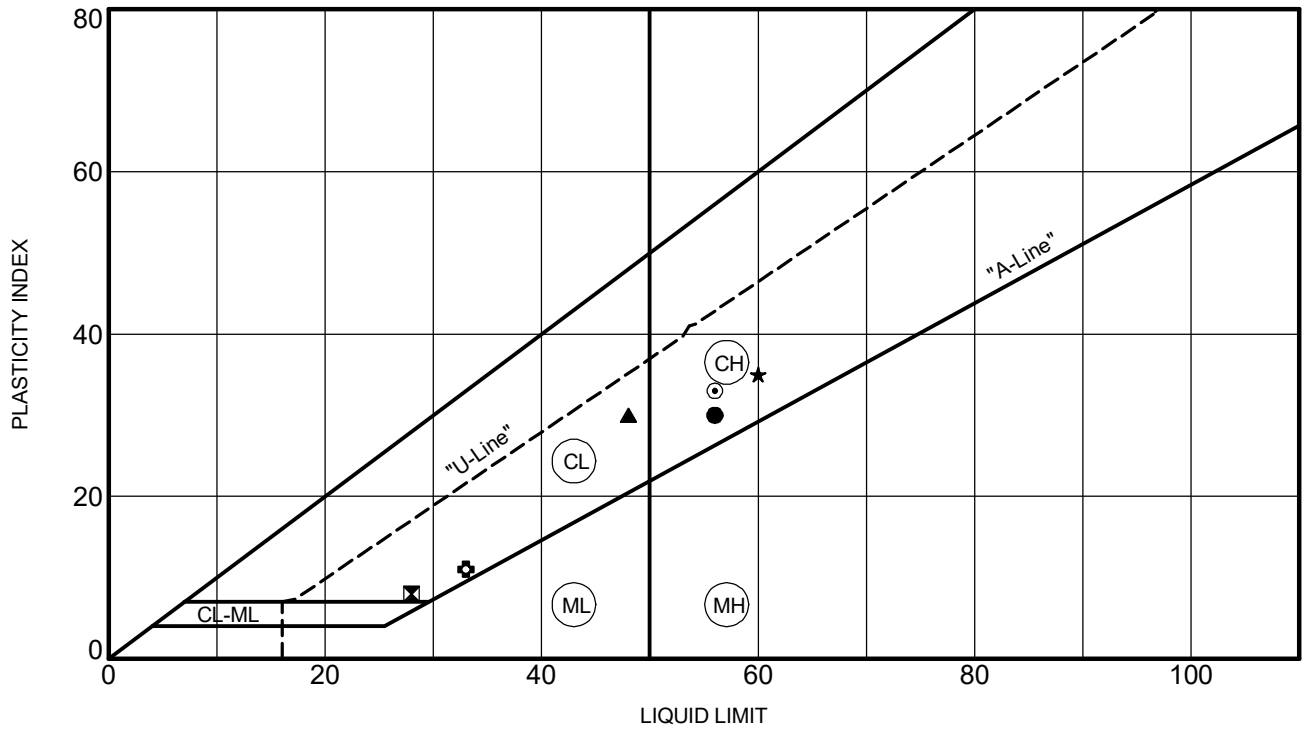
Project Number: 22230023.000

Boring No.	Sample Depth ft / Elevation ft	Sample Type	Description of Soil Specimen	Stratum	Natural Moisture (%)	Liquid Limit	Plastic Limit	Plasticity Index	Percent Gravel	Percent Sand	Percent Fines
SB-01	13.5 - 15.0 27.5 - 26.0	Jar	FAT CLAY (CH), trace sand, bluish gray with reddish brown.	B1	26.6	56	26	30	0.0	1.7	98.3
SB-01	48.5 - 50.0 -7.5 - -9.0	Jar	CLAYEY SAND (SC), fine to medium grained sand, light greenish with yellowish brown.	B2	21.8	28	20	8	0.0	76.2	23.8
SB-02	33.5 - 35.0 6.5 - 5.0	Jar	CLAYEY SAND (SC), fine to coarse grained sand, greenish gray.	B2	14.0	48	18	30	0.0	77.1	22.9
SB-02	68.5 - 70.0 -28.5 - -30.0	Jar	FAT CLAY (CH), trace sand, bluish gray with orangish brown.	B1	24.0	60	25	35	0.0	1.5	98.5
SB-03	5.0 - 6.5 40.0 - 38.5	Jar	FILL, sampled as, SANDY FAT CLAY (CH), yellowish brown with gray.	A	29.2	56	23	33	2.6	33.8	63.6
SB-03	38.5 - 40.0 6.5 - 5.0	Jar	CLAYEY SAND (SC), fine to coarse grained sand, greenish gray with orangish brown.	B2	13.7	33	22	11	0.0	77.1	22.9

Notes:
1. Soil tests in general accordance with ASTM standards.
2. Soil classifications are in general accordance with ASTM D2487(as applicable), based on testing indicated and visual classification.
3. Key to abbreviations: NP=Non-Plastic; ND=Not Detected; ; P=Present; T=Trace; -- indicates no test performed

Schnabel ENGINEERING

Project: WPCP - SOE Exploration
Arlington County, Virginia



PLOTTED DATA REPRESENTS SOIL PASSING NO. 40 SIEVE

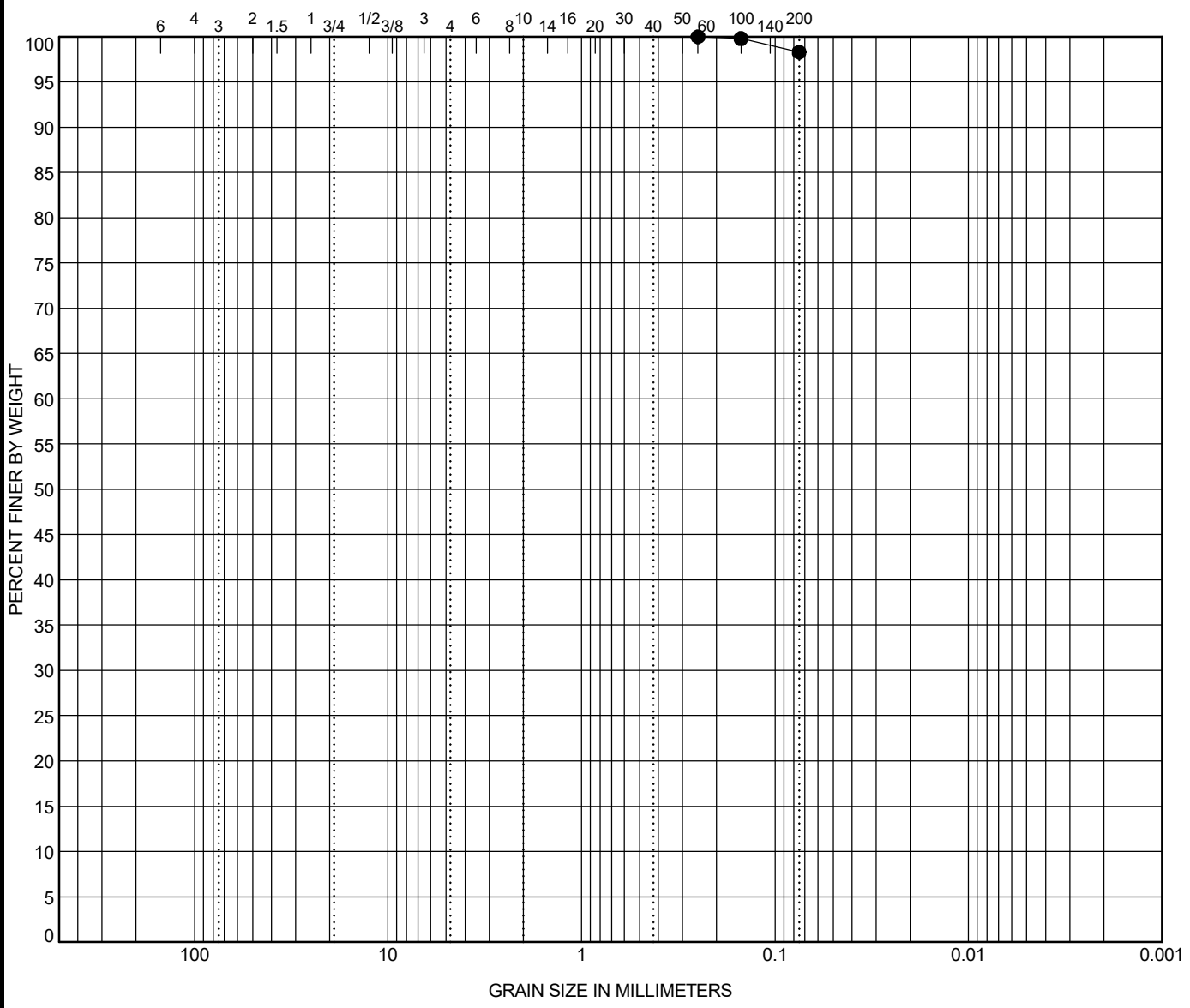
	Specimen		LL	PL	PI	Fines	Description
●	SB-01	13.5 ft	56	26	30	98	FAT CLAY (CH), trace sand, bluish gray with reddish brown.
⧓	SB-01	48.5 ft	28	20	8	24	CLAYEY SAND (SC), fine to medium grained sand, light greenish with yellowish brown.
▲	SB-02	33.5 ft	48	18	30	23	CLAYEY SAND (SC), fine to coarse grained sand, greenish gray.
★	SB-02	68.5 ft	60	25	35	99	FAT CLAY (CH), trace sand, bluish gray with orangish brown.
⊙	SB-03	5.0 ft	56	23	33	64	FILL, sampled as, SANDY FAT CLAY (CH), yellowish brown with gray.
✿	SB-03	38.5 ft	33	22	11	23	CLAYEY SAND (SC), fine to coarse grained sand, greenish gray with orangish brown.

Schnabel ENGINEERING

ATTERBERG LIMITS

Project: WPCP - SOE Exploration
Arlington County, Virginia

Contract: 22230023.000



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen	Sample Description	LL	PL	PI		
● SB-01 13.5 ft	**FAT CLAY (CH), trace sand, bluish gray with reddish brown.**	**56**	**26**	**30**		

Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
ASTM D6913	**0.25**	**--**	**--**	**--**	**0.0**	**1.7**	**98.3**	

Percent Finer

Sieve Size	No. 200	No. 100	No. 60
% Finer	98.3	99.8	100.0

Tested By	Tested Date	Reviewed By	Calc By
MH	1/3/23		

Schnabel ENGINEERING

GRADATION CURVE

Project: WPCP - SOE Exploration
Arlington County, Virginia

Contract: 22230023.000

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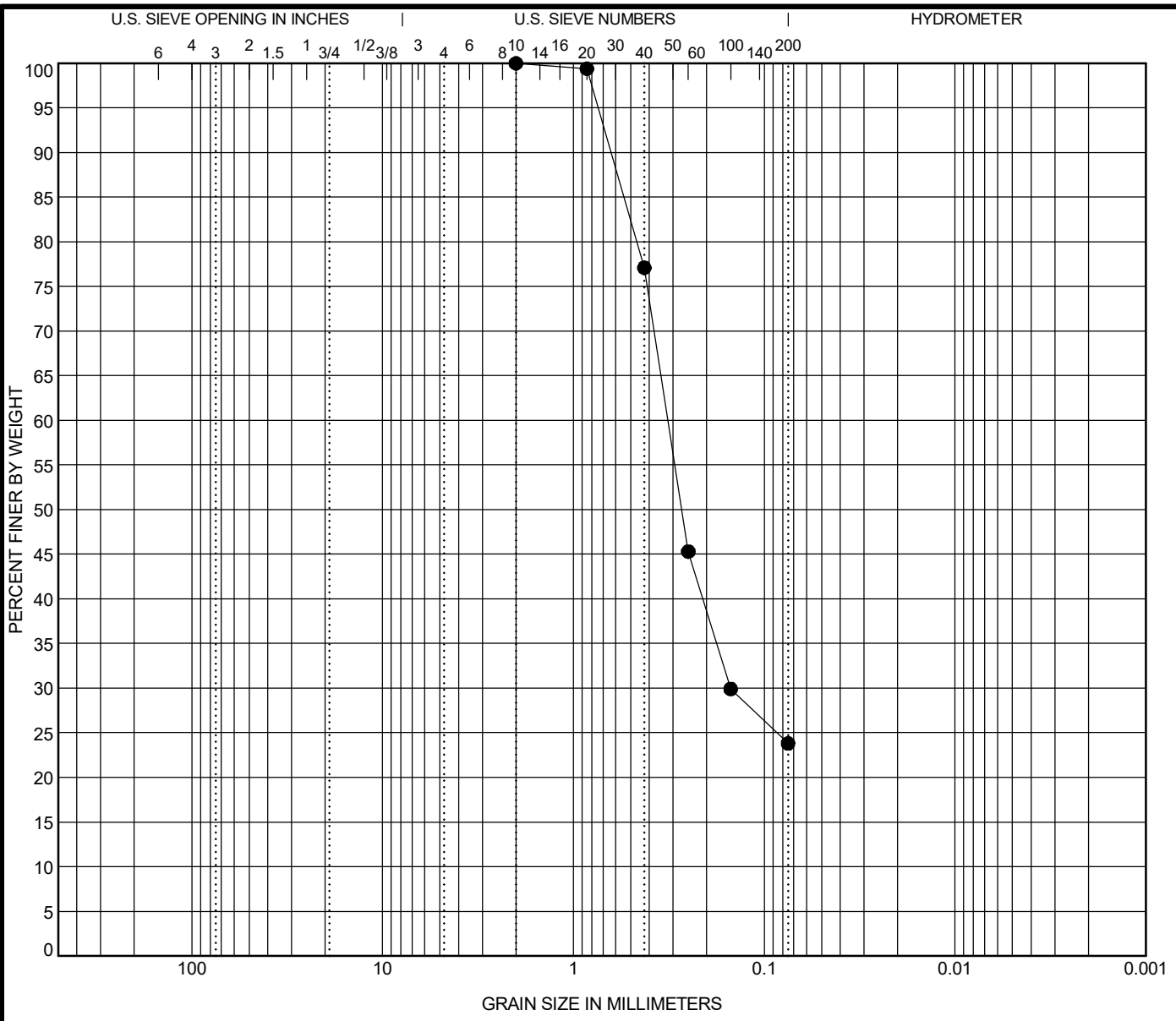


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI		
● SB-01	48.5 ft	**CLAYEY SAND (SC), fine to medium grained sand, light greenish with yellowish brown.**	**28**	**20**	**8**		

Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
ASTM D6913	**2**	**0.319**	**0.15**	**--**	**0.0**	**76.2**	**23.8**	

Percent Finer

Sieve Size	No. 200	No. 100	No. 60	No. 40	No. 20	No. 10
% Finer	23.8	29.9	45.3	77.1	99.4	100.0

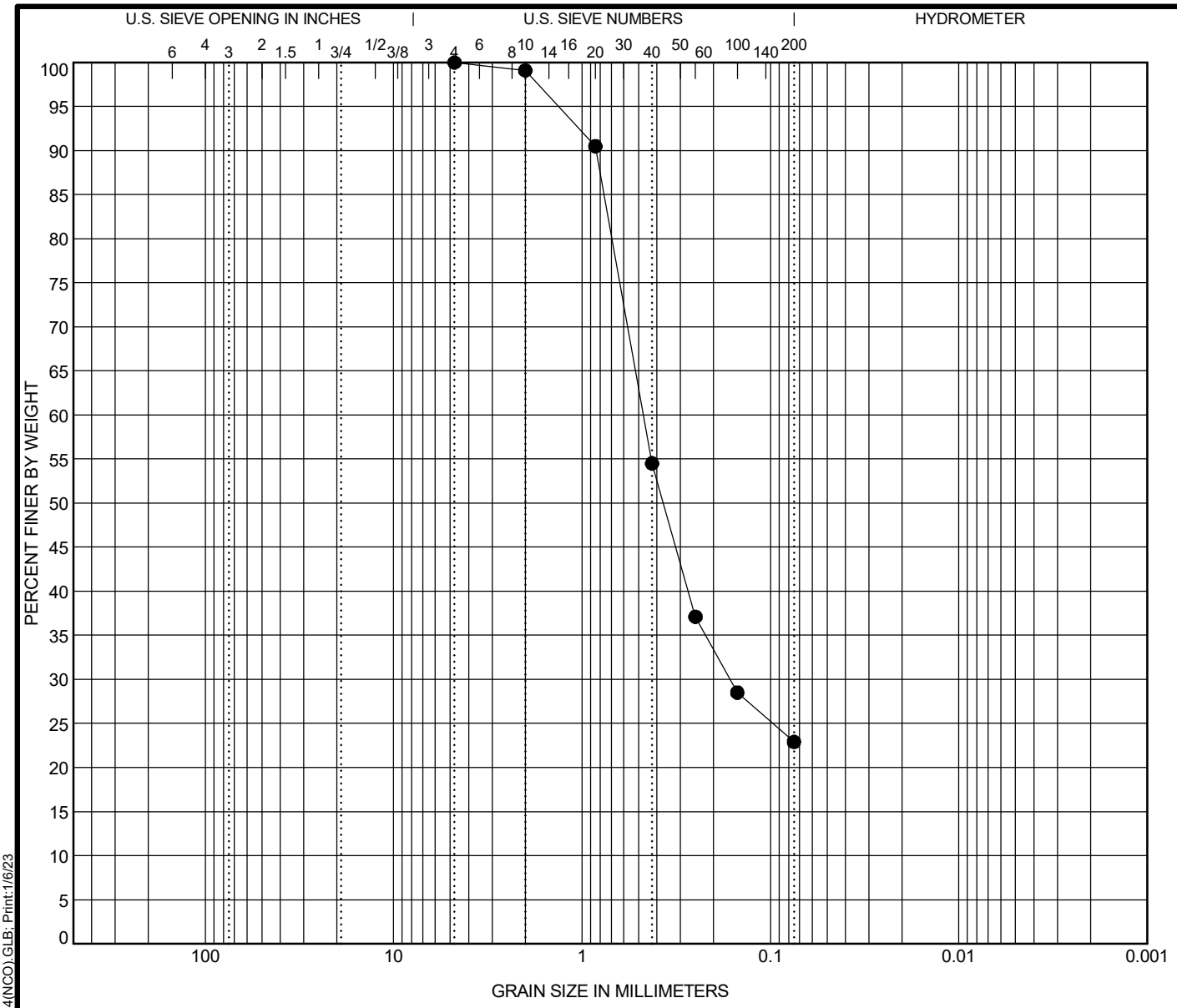
Tested By	Tested Date	Reviewed By	Calc By
MH	1/3/23		

Schnabel ENGINEERING

GRADATION CURVE

Project: WPCP - SOE Exploration
Arlington County, Virginia

Contract: 22230023.000



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI		
● SB-02	33.5 ft	**CLAYEY SAND (SC), fine to coarse grained sand, greenish gray.**	**48**	**18**	**30**		

Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
ASTM D6913	**4.75**	**0.472**	**0.164**	**--**	**0.0**	**77.1**	**22.9**	

Percent Finer

Sieve Size	No. 200	No. 100	No. 60	No. 40	No. 20	No. 10	No. 4
% Finer	22.9	28.5	37.1	54.5	90.5	99.1	100.0

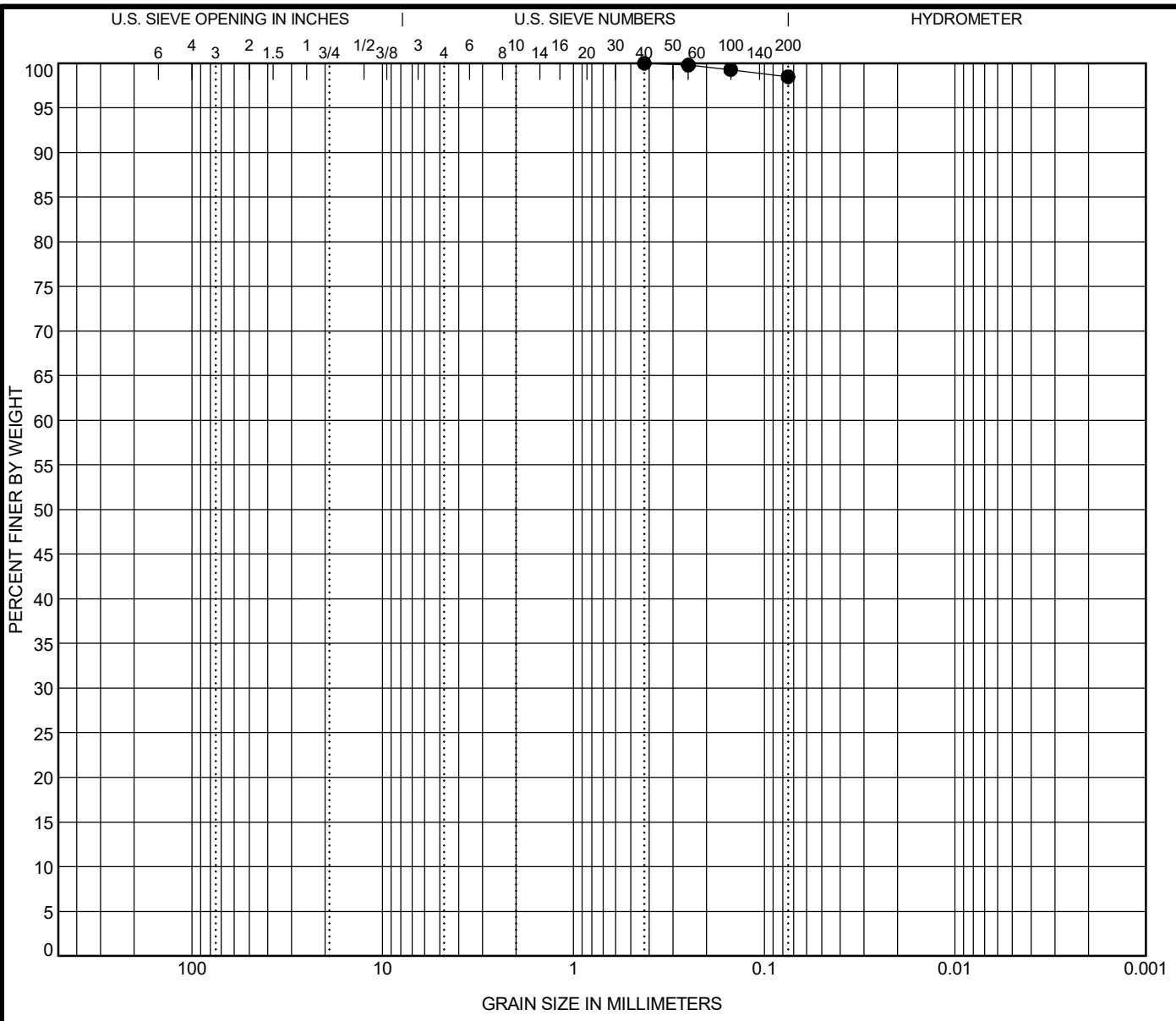
Tested By	Tested Date	Reviewed By	Calc By
MH	1/3/23		

Schnabel ENGINEERING

GRADATION CURVE

Project: WPCP - SOE Exploration
Arlington County, Virginia

Contract: 22230023.000



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen	Sample Description	LL	PL	PI		
● SB-02 68.5 ft	**FAT CLAY (CH), trace sand, bluish gray with orangish brown.**	**60**	**25**	**35**		

Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
ASTM D6913	**0.425**	**--**	**--**	**--**	**0.0**	**1.5**	**98.5**	

Percent Finer

Sieve Size	No. 200	No. 100	No. 60	No. 40
% Finer	98.5	99.3	99.8	100.0

Tested By	Tested Date	Reviewed By	Calc By
MH	1/3/23		

Schnabel ENGINEERING

GRADATION CURVE

Project: WPCP - SOE Exploration
Arlington County, Virginia

Contract: 22230023.000

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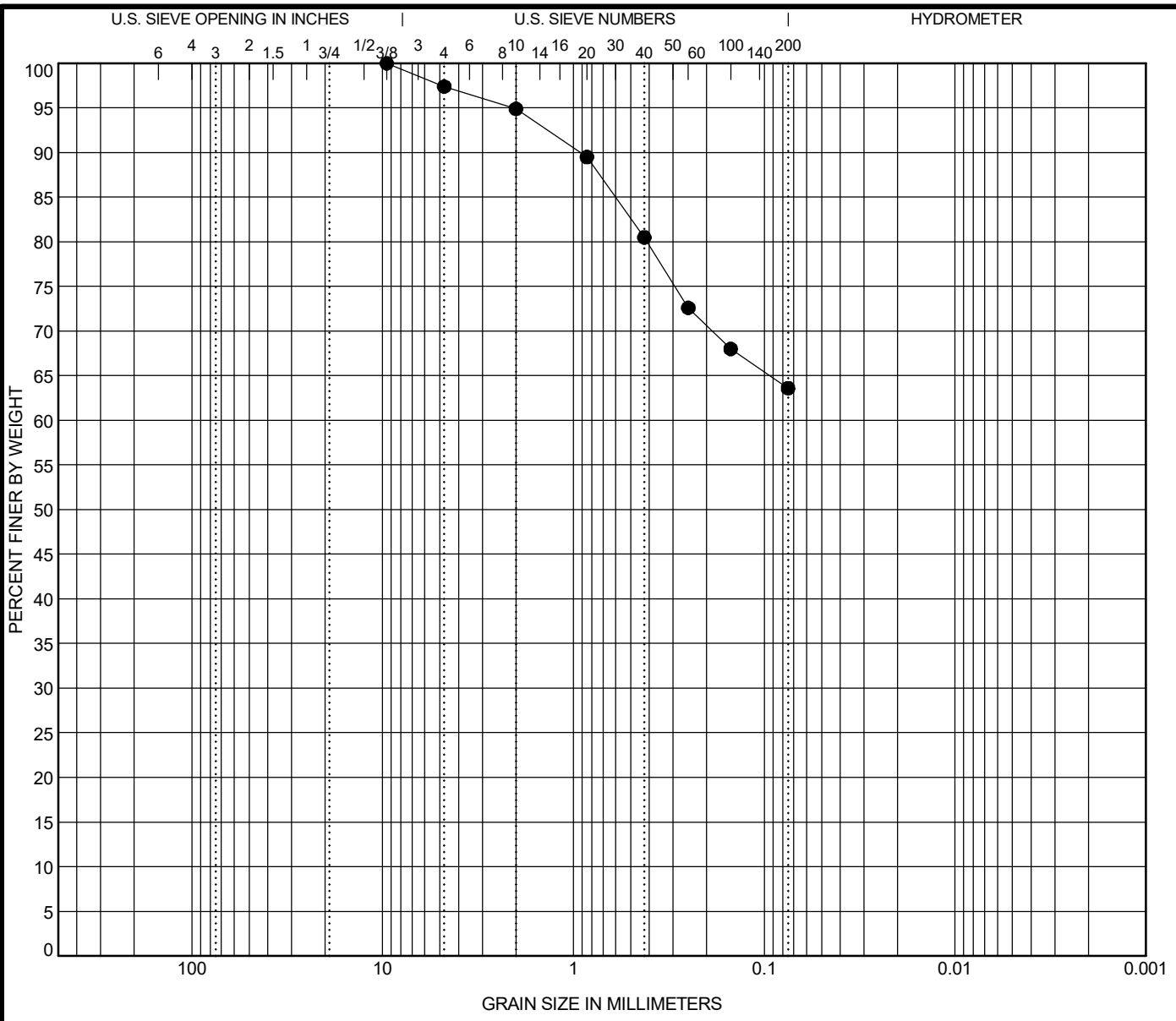

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI		
● SB-03	5.0 ft	**FILL, sampled as, SANDY FAT CLAY (CH), yellowish brown with gray.**	**56**	**23**	**33**		

Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
ASTM D6913	**9.5**	**--**	**--**	**--**	**2.6**	**33.8**	**63.6**	

Percent Finer

Sieve Size	No. 200	No. 100	No. 60	No. 40	No. 20	No. 10	No. 4	3/8"
% Finer	63.6	68.0	72.6	80.5	89.5	94.9	97.4	100.0

Tested By	Tested Date	Reviewed By	Calc By
MH	1/3/23		

Schnabel ENGINEERING

GRADATION CURVE

Project: WPCP - SOE Exploration
Arlington County, Virginia

Contract: 22230023.000

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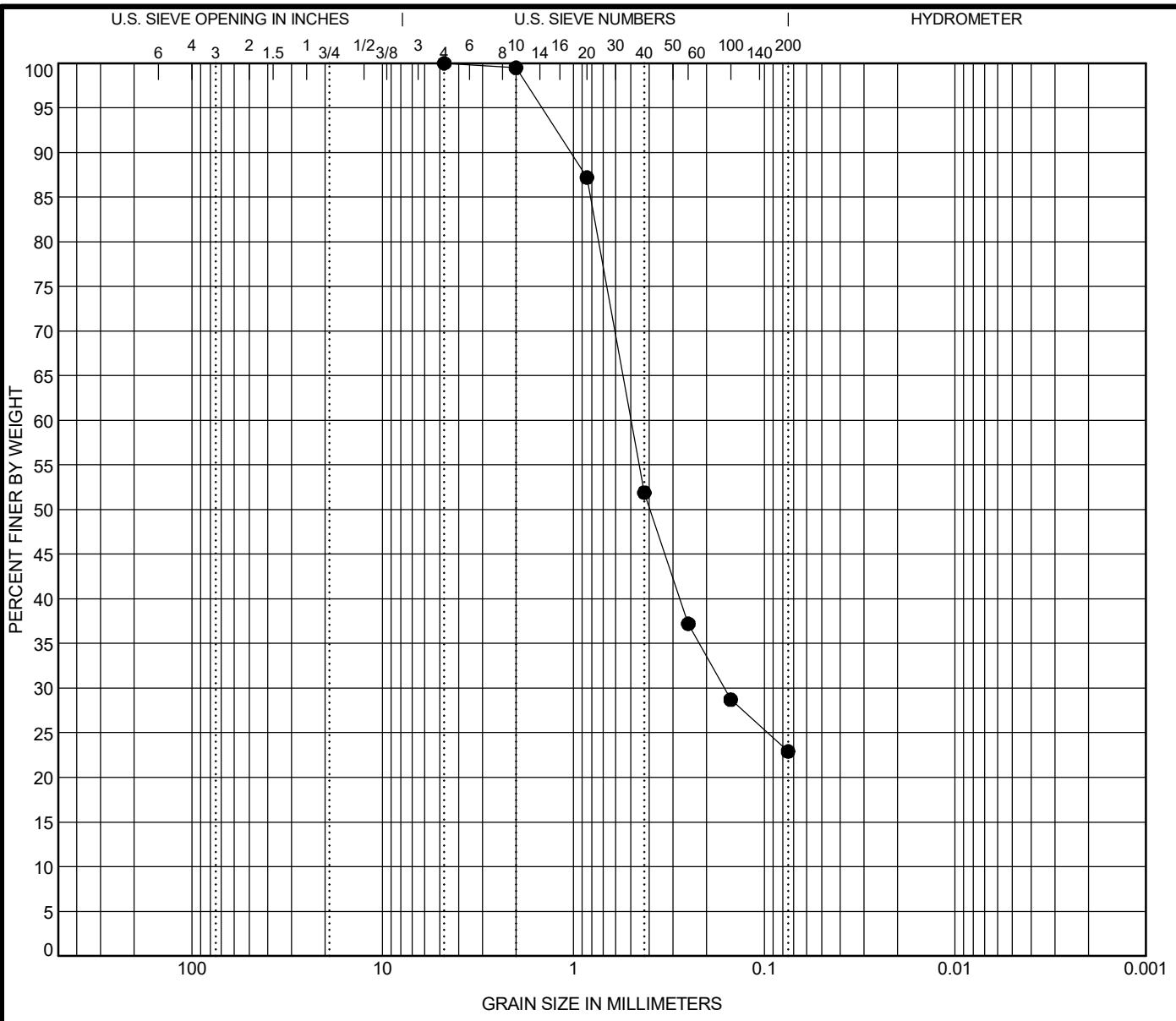

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI		
● SB-03	38.5 ft	**CLAYEY SAND (SC), fine to coarse grained sand, greenish gray with orangish brown.**	**33**	**22**	**11**		

Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
ASTM D6913	**4.75**	**0.498**	**0.162**	**--**	**0.0**	**77.1**	**22.9**	

Percent Finer

Sieve Size	No. 200	No. 100	No. 60	No. 40	No. 20	No. 10	No. 4
% Finer	22.9	28.7	37.2	51.9	87.2	99.5	100.0

Tested By	Tested Date	Reviewed By	Calc By
MH	1/3/23		

Schnabel ENGINEERING

GRADATION CURVE

Project: WPCP - SOE Exploration
Arlington County, Virginia

Contract: 22230023.000