PRELIMINARY SUBSURFACE INVESTIGATION AND GEOTECHNICAL REPORT

FOR

GOOSE CREEK SUBSTATION DD
LOUDOUN COUNTY, VIRGINIA

GEOLOGIC PROJECT 10484

GeoLogic

SUBMITTED TO:

MS ALAXANDRIA vonHELL
CLEAN GREEN DATA CENTERS CG-DC
P.O. BOX 58
39207 JOHN MOSBY HIGHWAY
ALDIE, VA 20105

OCTOBER 4, 2021

GeoLogic Consultants, LLC
14301 Sullyfield Circle, Suite I
Chantilly, VA 20151

October 4, 2021

Ms. Alaxandria vonHell
Clean Green Data Centers CG-DC
P.O. Box 58
39207 John Mosby Highway
Aldie, VA 20105

Re: Goose Creek Substation
Loudoun County, Virginia
Preliminary Subsurface Investigation and Geotechnical Report
GeoLogic Project No. 10484

Dear Ms. vonHell:

GeoLogic Consultants, LLC has completed the authorized preliminary subsurface investigation and geotechnical report for the above referenced site.

The recommendations presented in this report are intended for use by your office and for the use of other design professionals involved with the design and implementation for the specific project described herein.

GeoLogic appreciates the opportunity to be of professional service during this phase of the project, and we look forward to working with you during construction. Should you have any questions concerning this geotechnical report, please contact us at (571) 356-3176.

Respectfully Submitted,

GeoLogic Consultants, LLC

Tiffany H. Harlow, P.E.
Project Engineer

Mark Hood, P.E.
Principal Engineer

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1.0 INTRODUCTION

GeoLogic Consultants, LLC has completed the subsurface exploration and geotechnical engineering study for the "Goose Creek Substation DD" project located in Loudoun County, Virginia. The scope of our services was authorized by Ms. Alaxandria vonHell of Clean Greek Data Centers, as an assessment of the subsurface conditions across the site to aid in the development of a future electric power substation.

1.1 Scope of Work

Our scope of services for this project included 6 soil test borings performed in the 3 parcels identified as PIN # 153370418, 153374519, and 153376062 to characterize subsurface conditions for the proposed development, review of laboratory testing of recovered soil samples, preliminary engineering analysis, and preparation of this geotechnical report.

1.2 Site Location and Description

The site consists of 3 parcels identified by Loudoun County with PIN 153370418, 153374519, and 153376062 located on the south side of Hearford Lane and north of an existing residential development. The parcels are heavily wooded with hardwood and some pine trees. A small intermittent stream runs through parcel #15884519 and into Goose Creek located west of the site.

The topography at the site may be described as moderately sloping at a 10H:1V gradient or flatter at the east half of the site to steeply sloping at the west half of the site down to Goose Creek. Drainage is generally east to west into Goose Creek. Site grades range from approximately EL 340.0 at the east end to EL 240.0 feet above mean sea level at Goose Creek. Elevations were estimated from the Loudoun County on-line mapping system with 4-foot contours.

1.3 Project Description

We anticipate the project will consist of constructing an electric power substation, with deep foundations for support of power infrastructure, towers, and security fences. Slab on grade to support transformers and other structures. Excavation of the near surface soils to install a gravel base to at least 18 inches and grounding systems or grid may also be planned.

2.0 METHODOLOGY

2.1 Subsurface Investigation

GeoLogic Consultants performed a subsurface exploration that included 6 soil test borings across the site. Three (3) Borings were performed in Parcel #153370418, two (2) borings were performed in parcel #153374519, and one (1) boring was performed in parcel #153376062. Each boring was planned to 15 feet below grade. However, due to the presence of shallow rock and weathered rock, each boring was terminated prior to reaching the planned depth. The boring locations were GPS located by a GeoLogic engineer. Elevations were not provided as site plan topography with at least 2-foot contours was not available to provide an accurate estimation of elevation. The locations of the test borings are shown on the Boring Location Plan presented in Appendix I of this report.

The test borings were drilled with an all-terrain Diedrich D50 drill rig utilizing 2-1/4 inch inside diameter hollow-stem augers. The soil borings included performing the Standard Penetration Tests (SPT) at pre-determined intervals in general accordance with ASTM D1586-84. The Standard Penetration Test employs a two-inch outside diameter, split-barrel sampler driven 18-inches into the ground by a 140-pound hammer with a free fall of 30 inches. The number of blows required to drive the sampler the second and third six-inch intervals is recognized as the standard penetration resistance or the N-value of the soil at the specified depth of sampling and is indicated for each sample on the boring logs. This value can be used to provide a quantitative indication of the in-place relative density of non-cohesive soils or the consistency of cohesive soils. This indication is qualitative, since many factors can significantly affect the standard penetration resistance value and prevent a direct correlation between drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies.

Soil samples were recovered from the test borings using the split spoon sampler in conjunction with performing the Standard Penetration Test. The soils encountered were visually classified in the field in general accordance with the ASTM D2488 procedures. The soil samples were placed in sealed jars and transported to our office in Chantilly, Virginia for further examination by a GeoLogic geotechnical engineer and laboratory testing purposes.

Groundwater observations were made during the drilling of the test borings by a visual examination of recovered samples from the standard penetration tests, auger cuttings,

and water marks on the split-barrel sampler and drill rods. Further, groundwater readings were made upon the completion of each boring and prior to backfilling. Specific observations and soil descriptions recorded during the subsurface exploration are detailed on the individual field logs that are presented in Appendix I of this report.

2.2 Laboratory Testing

The purpose of the laboratory testing program was to evaluate the mechanical and index properties of the subsurface soils encountered and to assist in soil classification and relative strength evaluations. Representative soil samples were obtained at various depth intervals within each of the test borings for laboratory testing and analysis. These samples were divided into groups of similar samples according to color and visual classification. Representative soil samples from each group were then classified according to the Unified Soil Classification System (USCS) described in ASTM D2487, based on the laboratory test results.

The laboratory-testing program was performed in general accordance with applicable American Society of Testing and Materials (ASTM) Standard Test Procedures. The laboratory test program included the test methods listed below.

- Moisture Content of Soils — ASTM D2216
- Grain Size Distribution — ASTM D422
- Atterberg limits (Liquid Limit, Plastic Limit, and Plasticity Index) — ASTM D4318

Moisture content determinations were performed in order to verify the in-situ moisture contents of the subsurface soils encountered. The grain size distribution tests were performed to assist in soil classification (i.e., whether gravel, sand, silt or clay). Atterberg Limit tests were performed in order to evaluate the plasticity characteristics of the encountered subsurface soils and to assist in soil classification. The results of the laboratory classification test reports are provided in Appendix II.

3.0 RESULTS

3.1 Site Geology and Soil Mapping

A review of published geological and soil information for the region indicates that the project site is geologically mapped as part of the Culpeper Basin. The Culpeper Basin is a structural trough filled with Mesozoic sedimentary and igneous rocks of the late

Triassic age, ending from Madison Hills, Virginia to Frederick, Maryland. At this location, the principal rock type is a thermally metaphorized sedimentary rock (Hornfelds) and igneous rock (Diabase). Hornfels and Diabase rock are noted for moderate to high plasticity surface soils overlying residual soils derived from weathering of the underlying bedrock. Many areas of the Culpeper Basin are noted for seasonal high groundwater due to relatively shallow bedrock and low permeability soils.

According to the *Interpretive Guide to the Use of Soils Maps* in Loudoun County the residual soils are mapped as Catlett-Rock outcrop complex (60E Class IV-RS), Kelly-Sycoline complex (62B-Class IIIWP), Legore loam (64C-Class IIR), and Albano silt loam (79A-Class IV). The Class II soils are generally suitable for building and development but may have some rock outcrops; however, the Class III & IV soils are generally characterized by shallow depth to rock, steep slopes, and rock outcrops, high seasonal water tables, high plasticity shrink/swell soil, and perched water tables.

3.2 Subsurface Observations

Based on the results of our subsurface investigation, the soils encountered appear to be generally consistent with the published geologic data for the region. The presented stratification of the different layers is based on our visual observations, laboratory analysis, and geologic origin. Existing fill was encountered in most borings and topsoil was generally 2 to 3 inches thick across the site. Underlying organic topsoil, the onsite soils can be generally summarized as follows:

Stratum I: Residual Soils

The natural residual soils consist predominantly of brown high plasticity Elastic SILT (MH) and Fat CLAY (CH) with varying amounts of sand. The low plasticity soils consist of fine grain Lean CLAY (CL) and SILT (ML) with varying amounts of sand. Course grained Clayey SAND (SC) was encountered in Boring B-3 between 5 and 6 feet below grade. These soils extended to depth ranging between 6 inches and 9.5 feet below the ground surface. These soils were typically stiff to dense based on Standard Penetration Test (SPT) results between 7 and 49 plows per split spoon penetration.

Stratum II: Weathered Rock

Stratum II consists predominantly of both Weathered Diabase and Hornfels ROCK. This weathered rock stratum was encountered in each boring location. This stratum is characterized as very dense weathered rock with SPT N-values recorded over 60 blows per foot (bpf) of split spoon penetration.

Competent rock is defined as N-values of 50 bpf with a penetration of 1 inch or less or auger refusal and was encountered in each boring except Boring B-3.

It should be noted that the stratigraphy inferred from the test borings is approximate. Soil strata and groundwater conditions between the borings may vary from conditions observed at each location.

3.3 Groundwater Conditions

Groundwater readings were performed at all boring locations during and at the completion of each soil boring; all borings were dry. Long term water level readings indicated all borings were dry. The groundwater readings and associated cave-in depths are recorded on the Boring Logs in Appendix I.

3.4 Laboratory Test Results

The results of the laboratory tests indicate that the natural soils tested classify as Lean CLAY (CL) and SILT (ML). These samples are considered as having moderate liquid limit and plasticity index values. The individual laboratory test data sheets are presented in Appendix II of this report. A summary of the laboratory test results is listed in the following table.

Test Boring	*Depth (ft.)*	*USCS Classification*	*Percent Passing #200 Sieve*	*Natural Moisture (%)*	*Liquid Limit (LL)*	*Plasticity Index (PI)*
B-2	0.0-1.5’	MH	83.7	31.3	62	29
B-3	2.5-4.0’	CL	59.3	16.9	40	17
B-17	5.0-6.5’	MH	83.9	22.8	50	18

4.0 GEOTECHNICAL RECOMMENDATIONS

The following geotechnical recommendations are based on the findings of the subsurface exploration and laboratory testing analysis, as well as the information provided to us regarding the potential type of site development.

We believe that the project site is generally suitable for the construction of the proposed substation and the associated site improvements. However, the presence of

high plasticity soils and very shallow depth to rock may increase the site construction expenses and/or required specific engineering design measures.

The following sections provide general construction guidelines for site grading and earthwork activities which include excavations for underground site utilities and the preparation of subgrades for paved travelways and the building pads.

4.1 Suitability of on-Site Materials and Existing Fill

Residual Soils

The low to moderate plasticity residual soils of Stratum I, Lean CLAY (CL), SILT (ML) and Clayey SAND (SC) soils are generally suitable for use as structural fill for the building pads, below grade walls, pavement areas and backfill over site utilities. However these soils are limited to the east end of the site in the vicinity of Borings B-5 and B-6.

The High plasticity elastic SILT (MH) and Fat CLAY (CH) soils encountered across most of the site are not suitable for use as structural fill or backfill and for support of foundations at nominal footing or slab depth. Unsuitable soils having a liquid limit value greater than 40 and plasticity index value greater than 15 to include Elastic SILT (MH) and Fat CLAY (CH) are known to exhibit high shrink-swell and plastic behavior. When encountered during site grading, these high plasticity materials should be excavated from the remaining suitable soils.

Weathered Rock

We anticipate Weathered ROCK will be excavated for general grading procedures, underground utility excavations and deep foundations. The weathered rock materials may be broken down and used as structural fill provided that the rock sizes are less than 4 inches in diameter and the soil-rock mixture contains at least 50 percent passing the #4 sieve and 20 percent passing the #200 sieve. Moisture conditioning of the weathered rock should be expected when used as structural fill.

All borrow materials shall be tested for classification and shrink/swell characteristics prior to their use as structural fill or backfill material.

Some soils may be wet or dry of the optimum moisture required for compaction; therefore, scarifying and drying by spreading and aerating or the use of a water truck during construction and prior to their reuse as compacted structural fill or backfill should be expected.

4.2 Earthwork

4.2.1 Stripping of Topsoil and Existing Fill

All areas proposed for cut or fill shall be cleared, grubbed and stripped of all topsoil, root mat layer, and existing fill to the proposed limits of construction as shown on the approved plans for this project. The depth of the organic topsoil encountered at the boring locations was estimated to be 2-3 inches. However, we estimate approximately 12 inches of stripping to remove topsoil, rootballs from trees and soft, near surface soils across the site.

4.2.2 Proof-rolling

After stripping of the topsoil and existing fill, all areas delineated and surveyed in the field to receive structural fill shall be proof-rolled with a fully-loaded rubber-tired dump truck with a minimum axle weight of 10 tons to identify all soft or unstable areas to be undercut. The geotechnical engineer or his assigned representative shall decide on the depth of undercut in order to avoid the removal of suitable or otherwise firm soils.

4.2.3 Borrow Material

All borrow material, whether on-site or imported from an off-site source, shall be tested for suitability and quality prior to its use as fill or backfill. We recommend that the material be tested to determine particle gradation, plasticity and maximum dry density. The following standard tests shall be performed to determine the above properties of all structural fill material:

Particle Gradation	ASTM D422
Plasticity	ASTM D4318
Standard Proctor	VTM-1, ASTM D698

Structural fill material shall consist of quality, low plasticity, non-organic soils that classify as GW, GP, GM, GC, SW, SP, SC, or SM in accordance with ASTM D-2487 and shall have a maximum of 30% retained on a standard ¾ inch sieve. Structural fill may consist of soils that classify as ML or CL, provided that the material has a liquid limit and plasticity index value less than or equal to 40 and 15, respectively as determined in accordance with ASTM D-4318, with more than 10% of soil particles passing the #200

sieve as determined in accordance with ASTM D-422, and with more than 10% of the soil particles are less than 5 micrometers in size as determined in accordance with ASTM D-422, or an Expansion Index value less than 20 per ASTM D-4829, are considered suitable for use as compacted structural fill for the support of building foundations in the Active Zone, per the 2009 International Residential Code (IRC), Section R 403.1.8.1: Expansive Soils Classifications.

All fill material shall be free of ice, snow, organic material, construction debris, rock sizes greater than 4 inches, expansive soils, or other deleterious material.

4.2.4 Fill Placement and Testing

Fill material for the *building pads* shall be placed in no greater than 8-inch loose lifts and compacted to at least 95% of the maximum dry density as determined in accordance with specifications set forth in ASTM D698 (Standard Proctor). Where fill depths are in excess of 8 feet, we recommend that the compaction criteria be increased to 98% of the maximum dry density obtained in accordance with ASTM D698 the Standard Method for the full depth of fill. The moisture content of the compacted fill shall be within 2 percentage points of the optimum moisture of the material. The controlled fill for the building pads shall extend a minimum of 5 feet laterally outside the building pad plus 1 foot for every 1 foot of fill above the existing subgrade.

Granular soils (i.e. SM or more granular soils) shall be compacted with a smooth drum vibratory roller or rubber-tired compactors. Rock fill and cohesive soils should be compacted with a sheepsfoot roller.

Fill placed on proposed slopes shall be placed in no greater than 8-inch loose lifts and compacted to at least 95% of the maximum dry density; and shall be properly benched into existing grades with a maximum bench height of 4 feet.

Fill material placed in the *roadway or paved areas* shall be placed in no greater than 8-inch loose lifts and compacted to at least 95% of the maximum dry density as determined per VTM-1 method. However, the final lift shall be compacted to 100% of the maximum dry density as determined per VTM-1 method. The controlled fill shall extend a minimum of 2 feet laterally outside the curb line plus 1 foot for every 1 foot of fill above the subgrade. All VDOT roadways and frontage improvements shall be constructed in accordance with VDOT Road and Bridge Specifications. Fill material placed in pavement areas shall be placed in no greater than 8-inch loose lifts and

compacted to at least 95% of the maximum dry density as determined per VTM-1 method.

To ensure proper compaction efforts, field density determinations shall be performed in accordance with specifications set forth in ASTM D6938 (nuclear method) or D1556 (sand cone method). Compaction tests shall be performed on every lift of fill placed. The moisture content of the fill being placed shall be within 2 percentage points of the optimum moisture content of the material.

Fill materials shall not be placed on frozen soils, or frost-heaved soils. Borrow fill materials shall not contain frozen materials at the time of placement, and all frozen or frost-heaved soils shall be removed prior to placement of structural materials.

All earthwork shall be monitored on a full-time basis by a qualified inspector, acting under the guidance of a Professional Engineer, registered in the Commonwealth of Virginia.

4.3 Site Excavations and Underground Site Utilities

We anticipate that conventional earth-moving equipment will be suitable for the excavation of the on-site soils to the depths indicated in the boring logs at auger and spoon refusal. However, due to shallow depths to bedrock, the use of controlled blasting or pneumatic hammers may be necessary where utility invert elevations are below the refusal depth indicated on the boring logs in Appendix I. It should be noted that auger refusal was encountered between 2 and 6 feet below grade in borings B-1, B-2, B-5, & B-6.

We do not anticipate significant problems associated with perched groundwater during typical trench excavations. However, perched groundwater may be encountered above restrictive shallow clay layers and rock strata as seepage from side slopes of open trenches. Temporary dewatering measures should consist of sump pits and continuous pumping.

Temporary excavations greater than 4 feet shall be properly shored or sloped away from the excavation with a minimum grade of 1.5H:1V. If sloping of temporary trenches and pits are not desired, then trench boxes should be utilized. All excavations shall be performed in accordance with the current OSHA and VOSHA regulations.

4.4 Foundation Support

Any proposed buildings or other structures may be supported on conventional shallow foundations consisting of continuous wall or column spread footings.

Footings for the buildings may be designed for an allowable soil bearing pressure of 3,000 psf when founded on structural fill or natural soils with and SPT N-Value of 12 or greater. High bearing capacities up to 8,000psf may be used for design when founded on the Weathered Rock of Stratum II.

The design of deep foundations should consider the shallow depth to rock. The diabase rock is very hard and will require air drilling holes to honeycomb out the rock if drilled - caissons are considered to support the towers and other infrastructure over the diabase rock. Causing a significant cost increase to the project.

The seismic site class definitions for the weighted average of shear wave velocity in the upper 100 feet of the soil profile are presented in Table 1613.5.2 of the IBC Code. Based on the SPT-N values obtained from drilling the Seismic Site Class is “B”.

4.5 Ground-supported Slabs

The subgrade for the ground-supported floor slabs is expected to consist of high plasticity natural soils or newly placed and compacted structural fill material. A subgrade reaction modulus of 120 pci may be used for the design of floor slabs-on-grade supported on the low plasticity natural soils or structural fill material. High plasticity soils as defined in Section 4.2.3 are expected at slab subgrade in limited quantity. Where encountered these soils shall be undercut a minimum of 2 feet below the slab subgrade and replaced with properly compacted structural fill.

We recommend that the grade slabs be allowed to float, i.e. be discontinuous at walls and piers. The slab shall rest upon a minimum of 6 inches of free draining granular base. A 6-mm (min) polyethylene liner or similar vapor barrier should be provided between the underside of interior slabs and the granular base to limit moisture migration. Vapor barriers are not recommended for exterior slabs.

4.6 Pavement Subgrade Preparation

The subgrade for paved areas within the right-of-way of roadways and parking areas, including curbs and sidewalks, shall consist of natural low plasticity type soils or new structural fill.

If Silt and Clay type soils having liquid limit value of 45 and plasticity index value greater than 20 are encountered at proposed pavement subgrade elevations for roadways, curbs, and sidewalks, these materials shall be undercut to a minimum depth of 2 feet below pavement subgrade and replaced with properly compacted structural fill.

Prior to placement of subbase stone, the subgrade shall be proof-rolled with a loaded dump truck to detect any soft, yielding or high plasticity soils. Unstable areas shall be undercut and replaced with controlled-compacted fill. The fill shall be compacted per requirements mentioned in Section 4.2.4, "Fill Placement and Testing".

As the engineering characteristics of the on-site soils vary throughout the site, CBR tests should be performed within the proposed pavement areas at the time of construction in order to permit proper pavement design. However, for preliminary design purposes, an average CBR value of 4 to 6 may be realized from the onsite fine-grained soils. All pavement materials and construction methods shall comply with the current VDOT specifications, when in the VDOT right-of-way.

5.0 CLOSING REMARKS

5.1 Additional Services

We recommend that GeoLogic Consultants, LLC be retained to monitor the construction activities and to verify that the field conditions are consistent with the findings of our investigation. If significant variations are encountered or if the design is altered, GeoLogic Consultants, LLC should be notified and given the opportunity to evaluate potential impacts to the geotechnical recommendations of this report.

The quality control testing and geotechnical engineering consulting services provided during the construction phase of this project shall include:

1. Observing and documenting undercutting of unsuitable soils and inspect the subgrade for building foundation and paved areas;

2. Performing laboratory testing of material proposed for use as structural fill;

3. Performing compaction testing during the placement of approved structural fill material;

4. Verifying soil bearing capacity and foundation inspections.

5.2 Limitations

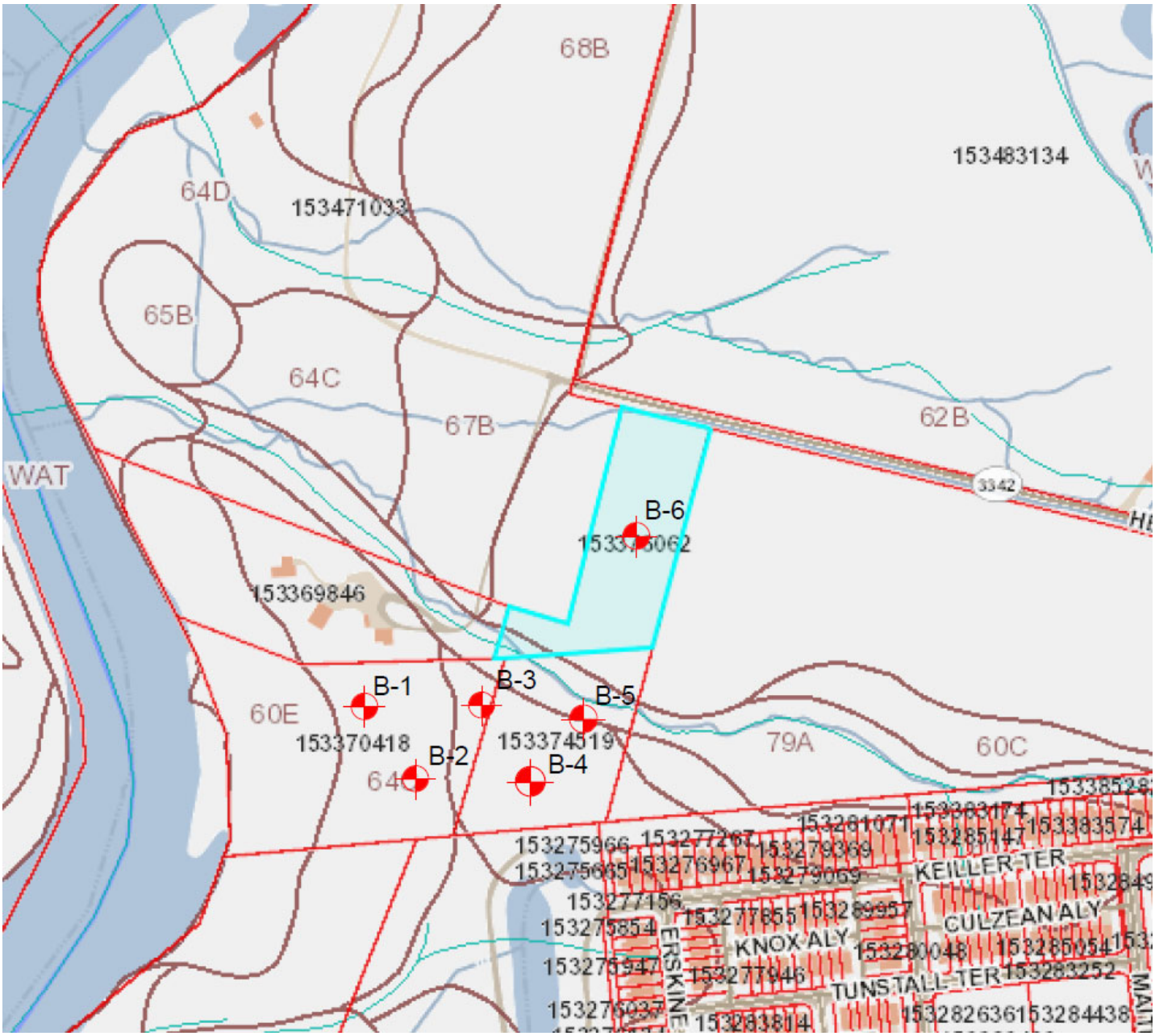
This report has been prepared by GeoLogic Consultants, LLC, exclusively for the specific subject project. The work has been performed in accordance with generally accepted engineering principles and practices. No other warranty, expressed or implied, is made.

The interpretations and recommendations submitted in this report are based in part upon the subsurface data obtained from the borings. The nature and extent of variations between the field test locations may not become evident until construction begins. Any changes in the nature or design of the proposed development should be reviewed against the conclusions and recommendations contained herein and the conclusions modified or verified in writing. We recommend that we be provided an opportunity to review the geotechnical aspects of the final design and specifications for compliance with our report. If significant variations are encountered or if the design is altered, GeoLogic Consultants, LLC should be notified and given the opportunity to evaluate potential impacts to the geotechnical recommendations of this report. In no case can we assume responsibility for misinterpretation of our recommendations.

FIGURES

GeoLogic Consultants, LLC 1012 Stringtown Road Berryville, VA 22611 (571) 356-3176	**GOOSE CREEK SUBSTATION DD** **LOUDOUN COUNTY, VIRGINIA**	**FIGURE 1** **PROJ. #10484**
	SITE VICINITY MAP	**NOT TO SCALE**

APPENDIX I
Boring Location Plan
Soil Boring Logs



GeoLogic Consultants, LLC 1012 Stringtown Road Berryville, VA 22611 (571) 356-3176	**GOOSE CREEK SUBSTATION DD** **LOUDOUN COUNTY, VIRGINIA**	**FIGURE 2** **PROJ. #10484**
	BORING LOCATION PLAN AND SOILS MAP	**NOT TO SCALE**

BORING LOG

	PROJECT NAME: Goose Creek Substation DD	**BORING NUMBER:** B-1
	PROJECT NUMBER: 10484	**SHEET** 1 **OF** 1
DRILLER: Recon	**LOCATION:** See Boring Location Plan	**ELEVATION:** N/A

WATER LEVELS	**DATE**	**TIME**	**DEPTH**	**CAVED**	**DRILL DATE:** 09-30-2021
ENCOUNTERED:					**DRILL MTHD.:** 2-1/4"
SHORT TERM:	12:17	9-30-2021	Dry		**DRILL RIG:** D50 ATV
LONG TERM:	12:20	9-30-2021	Dry	1.2	**REVIEWER:** T. Harlow

ELEVATION	LEGEND	USCS	CLASSIFICATION AND DESCRIPTION OF MATERIALS	DEPTH (FEET)	BLOWS PER 6"	N-VALUE	SAMPLE #	TYPE	LL	PI	NM	COMMENTS
		OL	Topsoil 1"	0	7		1	p				
		CH	Dark Brown, Fat CLAY, trace sand, stiff, moist.		50/3"							
		W	Gray brown, Weathered Diabase ROCK, very dense, dry.		50/0"	50/0"	2	p				
			Bottom of boring at 2.0 ft. Spoon & Auger refusal.	4								
				8								
				12								
				16								
				20								
				24								

Notes: Boring offset 3 times in various directions and still encountered refusal at 2 feet.

BORING LOG

GEOLOGIC Consultants, LLC

	PROJECT NAME: Goose Creek Substation DD	**BORING NUMBER:** B-2
	PROJECT NUMBER: 10484	**SHEET** 1 **OF** 1
DRILLER: Recon	**LOCATION:** See Boring Location Plan	**ELEVATION:** N/A

WATER LEVELS	**DATE**	**TIME**	**DEPTH**	**CAVED**	**DRILL DATE:** 09-30-2021
ENCOUNTERED:					**DRILL MTHD.:** 2-1/4"
SHORT TERM:	10:20	9-30-2021	Dry		**DRILL RIG:** D50 ATV
LONG TERM:	10:25	9-30-2021	Dry	2.6	**REVIEWER:** T. Harlow

ELEVATION	LEGEND	USCS	CLASSIFICATION AND DESCRIPTION OF MATERIALS	DEPTH (FEET)	BLOWS PER 6"	N-VALUE	SAMPLE #	TYPE	LL	PI	NM	COMMENTS
		OL	Topsoil 2"	0	4							
		MH	Dark Brown, Elastic SILT with sand, stiff, moist.		5 7	12	1	p	62	29	31.3	
					38 50/6"		2	p				
		W	Gray brown, Weathered Diabase ROCK, very dense, dry.	4								
					50/6"	50/6"	3	p				
			Bottom of Boring at 6.0 ft Spoon & Auger refusal.		50/0"	50/0"	4	p				
				8								
				12								
				16								
				20								
				24								

Notes:

BORING LOG

GEOLOGIC Consultants, LLC

	PROJECT NAME: Goose Creek Substation DD	**BORING NUMBER:** B-3
	PROJECT NUMBER: 10484	**SHEET** 1 **OF** 1
DRILLER: Recon	**LOCATION:** See Boring Location Plan	**ELEVATION:** N/A

WATER LEVELS	**DATE**	**TIME**	**DEPTH**	**CAVED**	**DRILL DATE:** 09-29-2021
ENCOUNTERED:					**DRILL MTHD.:** 2-1/4"
SHORT TERM:	4:00	9-29-2021	Dry		**DRILL RIG:** D50 ATV
LONG TERM:	4:30	9-29-2021	Dry	6.2'	**REVIEWER:** T. Harlow

ELEVATION	LEGEND	USCS	CLASSIFICATION AND DESCRIPTION OF MATERIALS	DEPTH (FEET)	BLOWS PER 6"	N-VALUE	SAMPLE #	TYPE	LL	PI	NM	COMMENTS
		OL	Topsoil 2"	0	2							
		CL	Brown, Lean CLAY, trace sand, medium stiff, moist.		3 4	7	1	p				
		ML	Grayish brown, Sandy Lean CLAY, dense moist to dry.	4	8 15 17	32	2	p	40	17	16.9	
		SC	Brown and black, Clayey SAND, (diabase sand), dense, moist to dry.	8	10 19 28	47	3	p				
		W	Brown, Weathered ROCK, very dense, moist to dry.	12	26 27 40	67	4	p				grades to gray at 8.5 ft.
					50/6"	50/6"	5	p				
			Bottom of Boring at 14.0 ft.	16								
				20								
				24								

Notes:

GEOLOGIC Consultants, LLC

	PROJECT NAME: Goose Creek Substation DD	**BORING NUMBER:** B-4
	PROJECT NUMBER: 10484	**SHEET** 1 **OF** 1
DRILLER: Recon	**LOCATION:** See Boring Location Plan	**ELEVATION:** N/A

WATER LEVELS	**DATE**	**TIME**	**DEPTH**	**CAVED**	**DRILL DATE:** 09-29-2021
ENCOUNTERED:					**DRILL MTHD.:** 2-1/4"
SHORT TERM:	10:35	9-29-2021	Dry	5.4'	**DRILL RIG:** D50 ATV
LONG TERM:	4:10	9-29-2021	Dry	5.4'	**REVIEWER:** T. Harlow

ELEVATION	LEGEND	USCS	CLASSIFICATION AND DESCRIPTION OF MATERIALS	DEPTH (FEET)	BLOWS PER 6"	N-VALUE	SAMPLE #	TYPE	LL	PI	NM	COMMENTS
		OL	Topsoil 3"	0								
		CL	Brown, Lean CLAY, trace sand, medium stiff, moist.		4 6 9	12	1	p				
		CH	Light brown, Fat CLAY, very stiff, dry.	4	7 12 19	31	2	p				
		MH	Brown, Elastic SILT, with sand, dense, dry.		12 19 30	49	3	p	50	18	22.8	
		W	Light gray, Weathered Diabase ROCK, very dense, dry.	8	50/1"	50/1"	4	p				
			Bottom of Boring at 9.0 ft. Auger and Spoon refusal.		50/0"	50/0"	5	p				
				12								
				16								
				20								
				24								

Notes:

BORING LOG

GEOLOGIC Consultants, LLC

	PROJECT NAME: Goose Creek Substation DD	**BORING NUMBER:** B-5
	PROJECT NUMBER: 10484	**SHEET** 1 **OF** 1
DRILLER: Recon	**LOCATION:** See Boring Location Plan	**ELEVATION:** N/A

WATER LEVELS	**DATE**	**TIME**	**DEPTH**	**CAVED**	**DRILL DATE:** 09-29-2021
ENCOUNTERED:					**DRILL MTHD.:** 2-1/4"
SHORT TERM:	11:35	9-29-2021	Dry	1.6'	**DRILL RIG:** D50 ATV
LONG TERM:					**REVIEWER:** T. Harlow

ELEVATION	LEGEND	USCS	CLASSIFICATION AND DESCRIPTION OF MATERIALS	DEPTH (FEET)	BLOWS PER 6"	N-VALUE	SAMPLE #	TYPE	LL	PI	NM	COMMENTS
		OL	Topsoil 4"	0	2							
		CL	Dark brown, Lean CLAY, with roots, trace sand, medium stiff, very moist.		2 5	7	1	p				
			Bottom of Boring at 2.0 ft on Hornfels ROCK Auger and Spoon refusal.		50/0"	50/0"	2	p				
				4								
				8								
				12								
				16								
				20								
				24								

Notes:

BORING LOG

GEOLOGIC Consultants, LLC

	PROJECT NAME: Goose Creek Substation DD	**BORING NUMBER:** B-5A
	PROJECT NUMBER: 10484	**SHEET** 1 **OF** 1
DRILLER: Recon	**LOCATION:** See Boring Location Plan	**ELEVATION:** N/A

WATER LEVELS	**DATE**	**TIME**	**DEPTH**	**CAVED**	**DRILL DATE:** 09-29-2021
ENCOUNTERED:					**DRILL MTHD.:** 2-1/4"
SHORT TERM:	11:55	9-29-2021	Dry	3.7'	**DRILL RIG:** D50 ATV
LONG TERM:					**REVIEWER:** T. Harlow

ELEVATION	LEGEND	USCS	CLASSIFICATION AND DESCRIPTION OF MATERIALS	DEPTH (FEET)	BLOWS PER 6"	N-VALUE	SAMPLE #	TYPE	LL	PI	NM	COMMENTS
			Augered to 2.5 ft	0								
		W	Light brown and gray Weathered Hornfels ROCK, very dense, moist.	4	50/3"	50/3"	1	p				
					50/1"	50/1"	2	p				
			Bottom of Boring at 5.5 ft. Auger and Spoon refusal.	8	50/0"	50/0"	3	p				
				12								
				16								
				20								
				24								

Notes: Boring offset 5 feet north of B-5

BORING LOG

GEOLOGIC Consultants, LLC

	PROJECT NAME: Goose Creek Substation DD	**BORING NUMBER:** B-6
	PROJECT NUMBER: 10484	**SHEET** 1 **OF** 1
DRILLER: Recon	**LOCATION:** See Boring Location Plan	**ELEVATION:** N/A

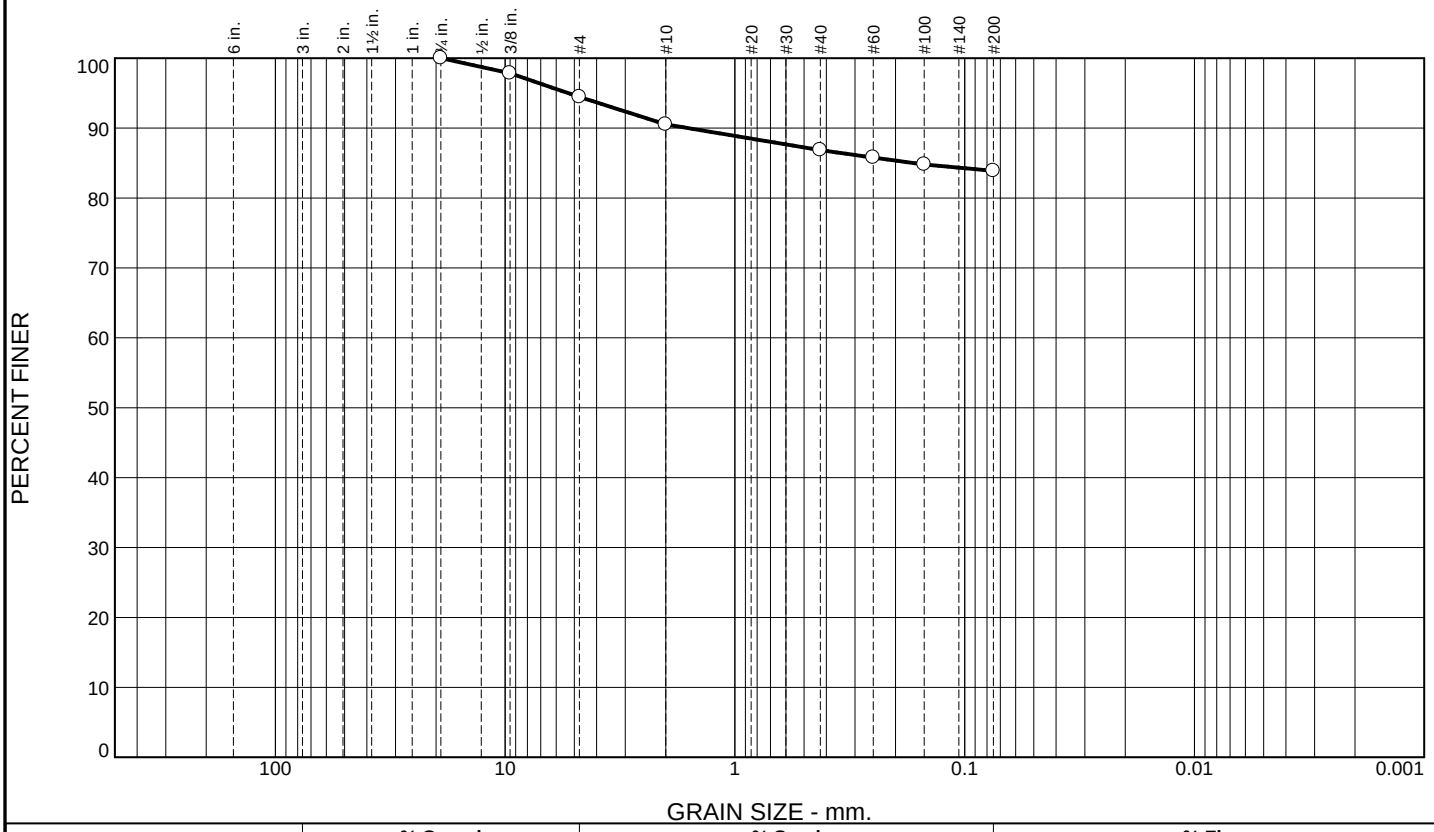
WATER LEVELS	**DATE**	**TIME**	**DEPTH**	**CAVED**	**DRILL DATE:** 09-29-2021
ENCOUNTERED:					**DRILL MTHD.:** 2-1/4"
SHORT TERM:	8:55	9-29-2021	Dry	3.5'	**DRILL RIG:** D50 ATV
LONG TERM:	4:00	9-29-2021	Dry	3.5'	**REVIEWER:** T. Harlow

ELEVATION	LEGEND	USCS	CLASSIFICATION AND DESCRIPTION OF MATERIALS	DEPTH (FEET)	BLOWS PER 6"	N-VALUE	SAMPLE #	TYPE	LL	PI	NM	COMMENTS
		OL	Topsoil 2"	0	2							
		CL	Light brown, Lean CLAY, with rock fragments, stiff, dry.		4 7	11	1	p				
		W	Light brown and gray, Weathered Hornfels ROCK, very dense, dry.	4	30 50/4"	50/4"	2	p				
			Bottom of Boring at 5.0 ft. Auger and Spoon refusal.		50 0"	50/0"	3	p				
				8								
				12								
				16								
				20								
				24								

Notes:

APPENDIX II
Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.5	4.0	3.6	3.0	83.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
3/8	97.8		
#4	94.5		
#10	90.5		
#40	86.9		
#60	85.8		
#100	84.8		
#200	83.9		

* (no specification provided)

Material Description

Brown, Elastic Silt with Sand

Atterberg Limits

PL= 32 LL= 50 PI= 18

Coefficients

D_{90}= 1.6016 D_{85}= 0.1668 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= MH AASHTO= A-7-5(18)

Remarks

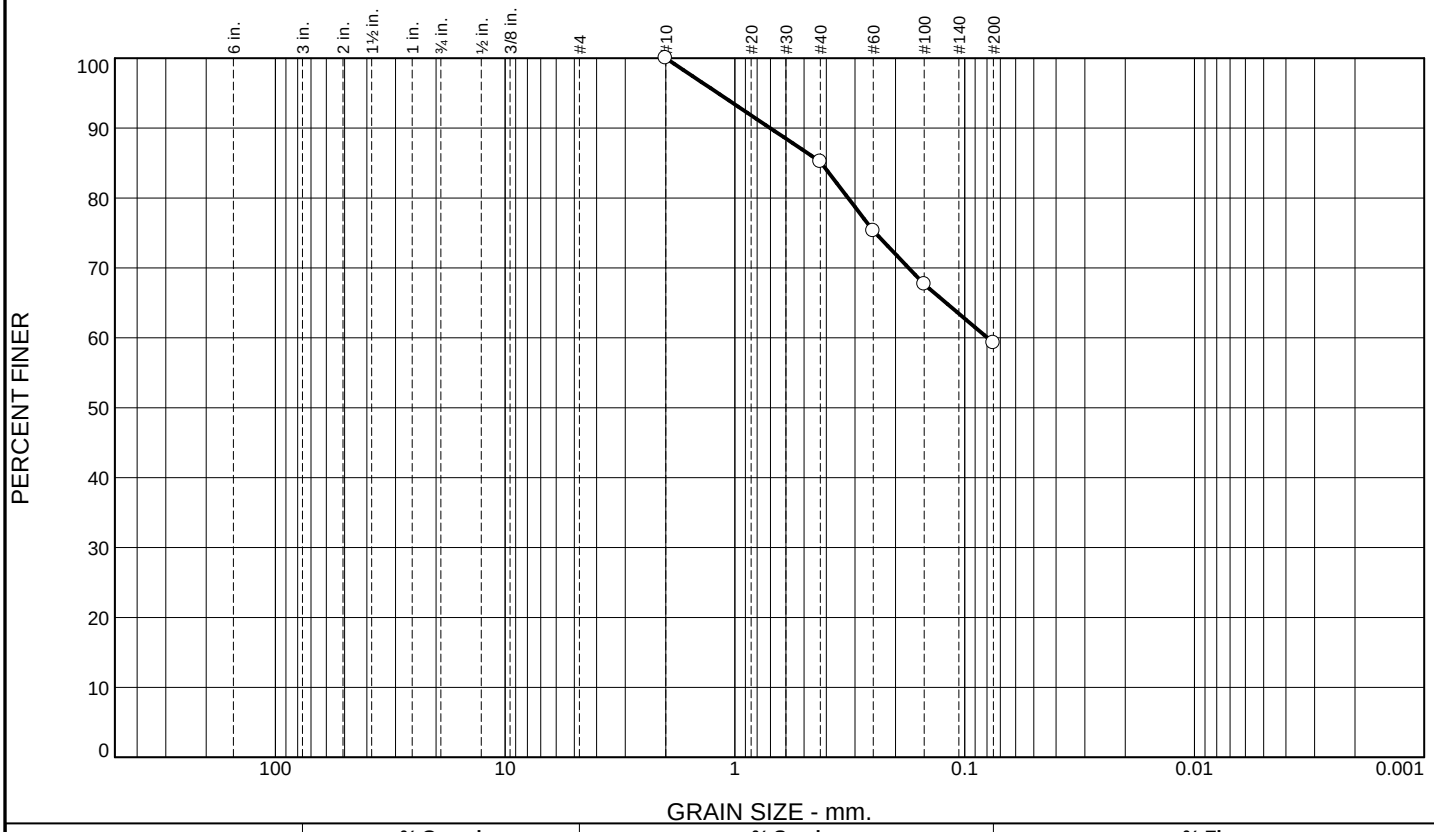
Natural moisture content: 22.8%

Location: B-4
Sample Number: S-3 **Depth:** 5.0-6.5' **Date:** 10-01-2021

Geotechnical Solutions, Inc.
Chantilly, Virginia

Client: Geologic Consultants, LLC
Project: Goose Creek Substation DD
Project No: 10484 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	14.8	25.9	59.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	85.2		
#60	75.3		
#100	67.7		
#200	59.3		

* (no specification provided)

Material Description

Grayish Brown, Sandy Lean Clay

Atterberg Limits

PL= 23 LL= 40 PI= 17

Coefficients

D_{90}= 0.7023 D_{85}= 0.4205 D_{60}= 0.0795
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(8)

Remarks

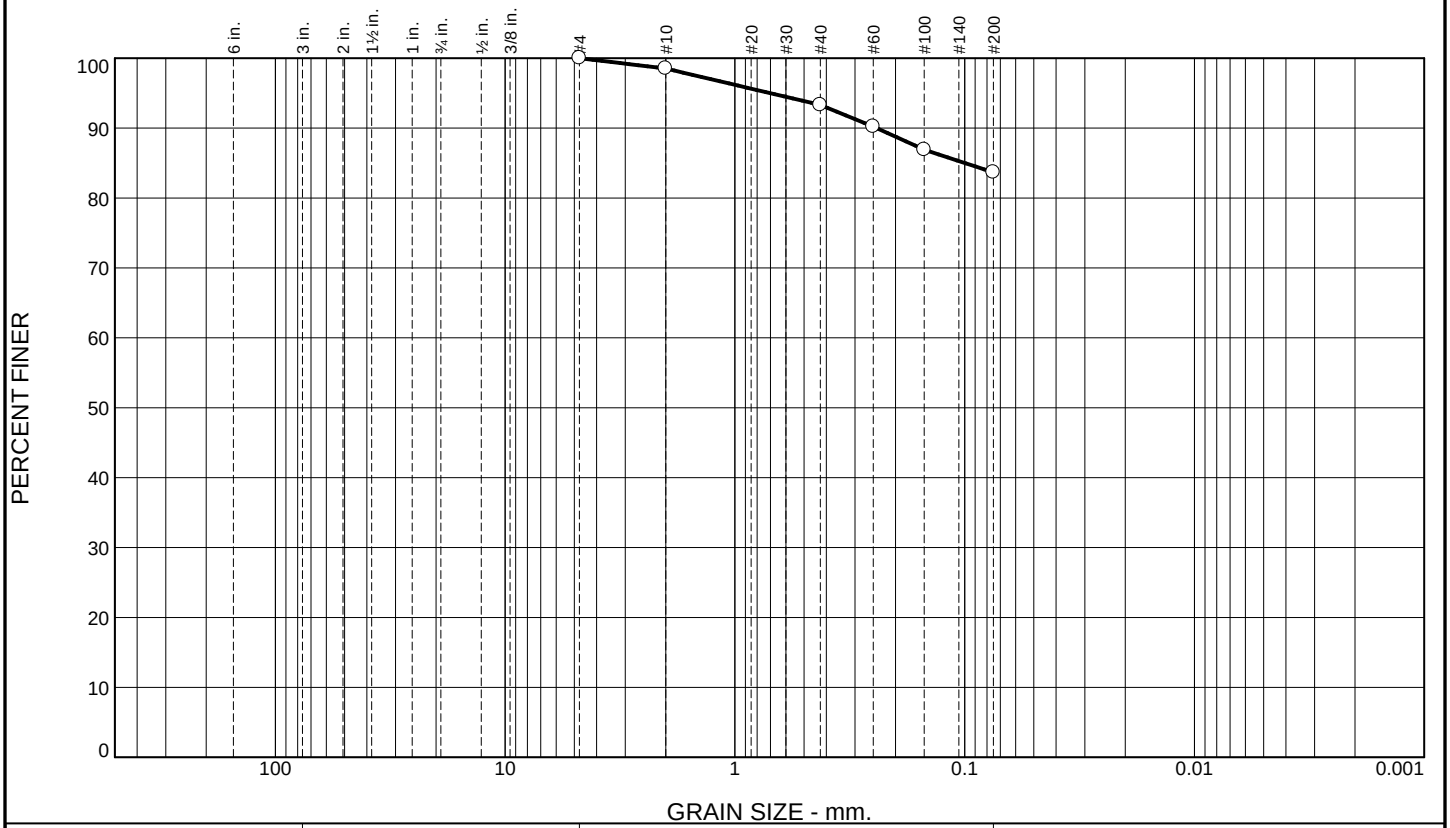
Natural moisture content: 16.9%

Location: B-3
Sample Number: S-2 **Depth:** 2.5-4.0' **Date:** 10-01-2021

Geotechnical Solutions, Inc.
Chantilly, Virginia

Client: Geologic Consultants, LLC
Project: Goose Creek Substation DD
Project No: 10484 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.5	5.2	9.6	83.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.5		
#40	93.3		
#60	90.2		
#100	86.9		
#200	83.7		

* (no specification provided)

Material Description

Dark Brown, Elastic Silt with Sand

Atterberg Limits

PL= 33 LL= 62 PI= 29

Coefficients

D_{90}= 0.2420 D_{85}= 0.0997 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= MH AASHTO= A-7-5(28)

Remarks

Natural moisture content: 31.3%

Location: B-2
Sample Number: S-1 **Depth:** 0-1.5' **Date:** 10-01-2021

Geotechnical Solutions, Inc.
Chantilly, Virginia

Client: Geologic Consultants, LLC
Project: Goose Creek Substation DD
Project No: 10484 **Figure**