

Basis of Design Report (30%) Design Stage Operable Unit Two (OU2) Standard Chlorine of Delaware Superfund Site New Castle, New Castle County, Delaware

APPENDIX E: Geotechnical Engineering Report

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1 Introduction

It is our understanding that the Environmental Protection Agency (EPA) plans to facilitate the cleanup of contaminants in the soils surrounding the old Standard Chlorine Plant located at 755 Governor Lea Road, New Castle, Delaware. The main area of the plant has been closed with a liner on top and containment walls along the boundary of the property. However, contaminants have been identified in the wetland areas located to the north and west of the old plant. The goal of the project is to excavate these materials and backfill them after treating the soils for the contamination.

2 Scope of Work

The objective of this geotechnical investigation is to provide site-specific geotechnical recommendations for the proposed cleanup in the wetland areas. The scope of work consisted of field work that included the drilling of a total of nine soil borings, performing limited soil laboratory testing, and preparing a geotechnical engineering report. This geotechnical engineering report contains the following information:

- Description of our geotechnical investigation.
- A soil boring location plan.
- Soil boring logs.
- Results of geotechnical soil laboratory testing.
- Recommendations for geotechnical parameters to be used for the temporary support of excavation (SOE) design by the Contractor.
- Recommendations for design lateral earth pressures, and design bearing pressure for the design of the thermal pile cell perimeter walls.

3 Existing Site Conditions and Proposed Construction

The project site is bordered by Governor Lea Road to the south, River Road to the east, Red Lion Creek to the north, and a wooded area to the west. The general site location is shown in Figure 6-1 of this report.

The project site consists of a graded upland area (about 40 acres) in the central-southern portion of the site, a drainage gully at the western boundary of the site, and wetland areas on the northern portion of the site bounded by Red Lion Creek to the north. Based on the available public topographic information, the existing grades at the site generally range from EL 0 to EL 50, sloping upward from Red Lion Creek and the wetland areas, through the western drainage gully, towards the graded upland area. Most of the site is either wooded or wetland, except the graded upland area and the developed area in the southwestern corner of the project site. Existing site conditions are also generally shown on Figure 2.

The proposed cleanup includes excavation of contaminated materials in the affected wetland and gully areas. It is our understanding that sheet piles will be constructed for the temporary SOE and the excavated soils will be treated onsite at the graded upland area and placed back into the excavated areas. It is also our understanding that the proposed surface grades after the proposed cleanup and backfiling will be similar to the existing grades.

4 Field Exploration

AECOM performed a field exploration program that included nine geotechnical soil borings, GT-01 to GT-10. It is noted that boring GT-09 was canceled due to an access issue. The exploration program was completed between December 5, 2023, and January 3, 2024. The approximate soil boring locations are shown in Figure 2. Soil borings were drilled to depths of 16 feet to 47 feet below the ground surface (bgs), except for boring GT-03 which was terminated at 12 feet bgs due to a drill rig equipment issue. GT-03A was drilled at an offset to a depth of 47 feet bgs. GT-07 and GT-010 were relocated to facilitate drill rig access. The boring logs are included in Attachment A.

4.1 Boring Stakeout and Subsurface Utility Clearance

The boring locations were selected and staked by AECOM. "Miss Utility" was called by AECOM's drilling subcontractor to clear/mark public utilities around the proposed borings. The ground surface elevations at the soil boring locations were approximated based on the publicly available topographic information so the elevation information shown on the boring logs should be considered approximate.

4.2 Drilling Methodology and Sampling of Soil Borings

The soil borings were drilled by AECOM's drilling subcontractor Active Environmental Technologies, Inc., from Mt. Holly, New Jersey. The borings were advanced using a Geoprobe 7822DT track-mounted drill rig, using 3-1/2-inch hollow stem augers.

At each boring location, representative soil samples were obtained using a 2-inch outside diameter split-barrel spoon sampler in general accordance with ASTM D1586 standards. Standard penetration tests (SPTs) were performed by driving the split-spoon sampler into the soil a distance of 24 inches over four six-inch intervals by means of a 140-pound automatic hammer falling 30 inches. The number of hammer blows required to drive the sampler through the second and third 6-inch intervals (i.e., the N-values) for each sample are indicated on the soil test boring logs included in Attachment A. Soil samples were obtained continuously in the borings from the ground surface to a depth of 20 feet bgs or to the termination depths. Where required due to low recovery, a 3-inch catcher was used to collect soil samples. The N-values provide an indication of the in-place density and stiffness of the soils. Portable photoionization detector (PID) measurements were recorded for each split spoon sample. Rock coring was not performed at the boring locations since auger refusal was not encountered within the termination depths.

Composite bulk samples were collected from the soil cuttings from 0 to 5 feet bgs at borings GT-01, GT-03, GT-04, GT-06, GT-07, GT-08, and GT-10. Relatively undisturbed soil samples

were also collected using a 24-inch Shelby tube sampler at the boring GT-02, GT-03A, GT-04, GT-06, and GT-08 locations. Groundwater was measured during and at completion of drilling. The soil borings were backfilled with the soil cuttings at boring completion.

5 Subsurface Exploration Results

5.1 Site Geology

According to *Geologic map of the Elkton, Saint Georges, and Delaware City quadrangles, Delaware* by Tomlinson, J.L., and Ramsey, K.W., published in 2023 by the Delaware Geologic Survey, the site is generally underlain by Marsh Deposits (Qm) along Red Lion Creek and Columbia Formation deposits (Qcl) on the landside. According to the geologic map, Marsh deposits are described as "gray to brown to yellow clayey silt with laminae of organic fragments commonly overlain by dark-brown peat" and the Columbia Formation is described as "yellowish-to reddish-brown fine to coarse, slightly silty, felspathic quarts sand with gravel and common to abundant mica".

5.2 Subsurface Conditions

The subsurface materials reported in the soil borings advanced at the site are stratified below for the purposes of our discussions in this report. The approximate soil boring locations are shown on Figure 2. The boring logs are presented in Attachment A. It should be noted that these stratum designations do not imply the continuity of the materials encountered in the borings. Stratum designations have been established to characterize similar subsurface conditions based on material gradations and parent geology. The subsurface materials encountered in the borings along with the range of Standard Penetration Test (SPT) N-Values in blows per foot (bpf) have been assigned to the strata in Table 5-1.

Ground Cover / Stratum	Encounter Location	Description
Ground Cover		Approximately 4 inches of topsoil was noted at the surface of boring GT-05 which was drilled in the wooded area. In other borings drilled in the wetland, western gully, or graded areas, topsoil was not noted. However, type and thickness of ground cover can vary across the project site due to existing structures and trees on the site.
		It should be noted that the topsoil depths mentioned herein should not be considered as stripping depths as there may be locations around the site that may have larger or smaller thicknesses of topsoil.
Stratum A - Fill	_	Fill material was not noted in the borings. However, considering the previous construction and earthworks at the site, fill materials may be encountered in other locations of the site.

Table 5-1: Summary of Subsurface Stratigraphy Based on the Geotechnical Investigation

Ground Cover / Stratum	Encounter Location	Description
Stratum B - Marsh Deposits (Organic-rich, peaty soils)	Borings drilled in wetlands and western gully: GT-01, GT-02, GT-03, GT-03A, GT- 04, GT-06, and GT-08	Very soft to soft, Organic Silt (OH), Organic Clay (OH), Elastic Silt (MH), Sandy Elastic Silt (MH), Silt, (ML), Lean Clay (CL), Lean Clay with Sand (CL) with varying organic contents and interlayered fibrous peat soils. Very loose Clayey Sand with Gravel (SC) in GT-04.
		Range of N-Values: 24-inch penetration with Weight of Rod (WOR/24") to 2 blows per foot (bpf)
Stratum C - Columbia Formation	Borings drilled outside of wetlands and western gully: GT-05, GT-07, and GT-10	Very loose to medium dense, Poorly Graded Sand with Clay (SP-SC), Poorly Graded Sand with Silt (SP- SM), Poorly Graded Sand with Gravel (SP), Silty Sand (SM), Silty Sand with Gravel (SM). Sandy Lean Clay (CL) and Lean Clay (CL) at the surface of GT-07 and GT-10.
		Range of N-Values: 3 bpf to 23 bpf
Stratum D – Potomac Group (Lean Clay with higher consistency)	Only in GT-03A at the depth of 38 feet bgs.	Medium stiff to stiff, Lean Clay (CL), with reduced organics and interlayered Clayey Sand (SC) and Fat Clay (CH).
		Range of N-Values: 5 bpf to 16 bpf

Auger refusal or competent bedrock was not encountered within the depths of subsurface investigation.

5.3 Groundwater

Groundwater observations were performed in the borings during drilling and at completion of the borings. Groundwater was encountered at the ground surface of borings GT-01, GT-02, GT-03, GT-03A, GT-04, GT-06, and GT-08 which were drilled in the wetlands and drainage gully. Groundwater was encountered in boring GT-10 at a depth of 14 feet during drilling, while no ground water was encountered in borings GT-05 and GT-07. It is noted that borings GT-05, GT-07 and GT-10 were drilled outside of the wetland and gully areas. The groundwater observations are as indicated on the soil test boring logs included in Attachment A.

It should be noted that fluctuations in groundwater levels may occur because of seasonal variations in rainfall, proximity of the site to large bodies of water, evaporation, construction activity, pump tests, surface runoff, and other site-specific factors. Perched water conditions may be encountered at different depths during construction, especially after periods of heavy rainfall. The contractor should be prepared to install temporary dewatering systems during construction such as shallow sump pits, deep wells, well points, etc.

5.4 Soil Engineering Property Test Results

Selected soil samples were transported to the GeoTesting Express, Inc. laboratory in Acton, Massachusetts to determine the engineering properties of the on-site soils. The soil laboratory tests were conducted in accordance with applicable ASTM standards and specifications. Selected soil samples were submitted for moisture content determination (ASTM D2216), grain size analysis (ASTM D6913), Percent Passing No. 200 Sieve (ASTM D1140), Atterberg limits (ASTM D4318), Standard Proctor test (ASTM D698), Organic Content test (ASTM D2974), and USCS Soil classification (ASTM D2487). In addition, the relatively undisturbed soil samples collected using thin-walled Shelby tubes were submitted for Triaxial Unconsolidated Undrained Shear Strength testing (ASTM D2850) and Incremental Consolidation testing (ASTM D2435) to determine the undrained shear strength and consolidation properties of the collected cohesive soils.

A summary of the soil laboratory tests performed, and their results are included in Attachment B. Selected soil laboratory test results are also presented on the soil test boring logs in Attachment A.

6 Geotechnical Engineering Recommendations

The geotechnical engineering recommendations in this section are based on the soil boring data, soil laboratory test results, review of available site plans, and a preliminary cleanup excavation plan provided to us by the Environmental Engineer (AECOM). The provided cleanup areas to be excavated are summarized as shown below:

- West and north wetland areas
- Western Drainage Gully area (two locations)

It is our understanding from the preliminary contaminated soil information that the excavations may be needed to EL -30 in the west and north wetland areas and EL -20 in the western gully area.

6.1 Soil Parameter Recommendations for Temporary SOE Design

It is our understanding that sheet piles are being preliminarily considered for temporary SOE. Based on the soil boring data, it is estimated that sheet pile SOEs will typically retain Marsh Deposit materials with varying amounts of organic material and interlayered peat soils (Stratum B). The borings indicated very low SPT N values of Weight of Rod penetrating 24 inches (WOR/24 inches) to 2 within Stratum B. Stratum D, which consists of stiff lean clay soils, was encountered only in boring ATS-03A at EL –32 to El –41, which was the termination elevation of the boring. It is noted that Stratum C soils are not expected in the areas where SOE's will be constructed and soil parameters for Stratum C soils have not been provided for this reason. Actual soil strata changes should be expected at different depths or more gradually than shown on the borings.

The parameters in Table 6-1 can be used for the temporary SOE design.

	Estimated		Buovant Unit	Effective Stre	ss Condition ⁽¹⁾	Total Stress C	ondition ⁽²⁾	
Subsurface Stratum	Bottom Elevation	Saturated Unit Weight, γ _{sat} (pcf)	Weight γ _{buoy} (pcf)	Effective Phi Angle, ϕ ' (degs)	Effective Cohesion, c' (psf)	Undrained Shear Strength, c or S _u (pf)	Total Phi Angle, ϕ (degs)	
В	EL –35 ⁽³⁾	84	21.6	21	0	130	0	
D	N/A ⁽⁴⁾	130	67.6	23	0	1000	0	

Table 6-1: Design Soil Parameters for Temporary SOE Design

(1) Hydrostatic pressure from groundwater should be considered separately for effective stress design.

(2) Undrained shear strength values were recommended based on the unconsolidated-undrained triaxial compression tests (UU) and correlation with plasticity index per Virginia Tech Center for Geotechnical Practice and Research (CGPR) Report #4 Shear Strength Correlations for Geotechnical Engineering Figure 32 (Reprint Stroud, 1974).

(3) Bottom elevation of B will vary across the site.

(4) Not available; borings were not drilled deep enough to encounter the bottom of Stratum D.

If braced SOE systems are to be used, braced SOE systems may be designed with the apparent pressure envelope developed by Terzaghi and Peck (1967) as discussed Federal Highway Administration (FHWA) Geotechnical Engineering Circular No. 4 *Ground Anchors and Anchored Systems*, dated June 1999 (FHWA Publication No. FHWA-IF-99-015), and shown in Figure 6-1.



igure 6-1: Terzaghi and Peck Apparent pressure envelope (Figure 23 in the above referenced FHWA manual)

Any surcharge placed within a horizontal distance from the top of the wall equal to the wall height may be assumed to act as a uniform horizontal pressure over the entire height of the wall. Global stability of the temporary SOE should be evaluated during the design by the Contractor, and the temporary SOE should be designed to achieve proper factors of safety.

Due to the deep excavations potentially required, cantilever sheet pile SOEs may not be feasible. Temporary sheet pile SOEs may need to be designed to be braced or anchored for stability considerations.

6.2 Thermal Pile Cell Perimeter Wall Recommendations

It is our understanding that the contaminated soils will be excavated from the wetland and gully areas and treated onsite at the graded upland area. Contaminated soils will be placed in thermal pile cells for high heat treatment. Preliminarily, two thermal piles with the following dimensions are anticipated to be constructed on-site.

• Width: 200 feet

- Length: 300 feet
- Maximum soil height within the cell: 15 feet

Thermal pile cells will require perimeter walls to contain contaminated soils up to 15 feet high. A precast segmental block wall system or gabion wall system may be used to construct the perimeter walls. One potential precast segmental block wall system is the Magnumstone[™] system although many other systems are available. Gabion walls should be covered with geotextile cloth to avoid erosion of contaminated soils into gabion walls. Cast-in-place (CIP) reinforced concrete walls are not recommended due to the potential for excessive settlement. It is assumed that sufficient measures will be taken to allow for drainage of water against retaining walls so that hydrostatic pressures do not develop against the walls. Also, it is anticipated that the thermal pile cells will have a proper internal drainage system so that no standing water will be present during the treatment.

Preliminarily, the following design parameters can be considered for the perimeter wall design by the wall designer.

- The perimeter wall can be designed using an allowable soil bearing pressure of up to 2,500 psf.
- It is recommended that the perimeter precast segmental block wall be constructed on at least 6 inches of No. 57 stone base placed on top of the compacted subgrade.
- The following lateral earth pressures can be used for the design of perimeter walls by the specialty wall contractor or structural engineer:

for Thermal Pil	e Cell Perimeter Walls
Active Pressure Coefficient, Ka	Active Equivalent Fluid Pressure (psf/sf)
0.47	50

Table 6-2: Design Lateral Farth Pressures

The above-recommended active pressure coefficient for thermal pile cell perimeter walls assumes that the soils to be treated may be heavily disturbed during excavation and placement within thermal piles. Therefore, cohesion of the in-situ Stratum B soil was ignored, and mobilized shear strength in terms of residual internal friction angle was considered per the CGPR Report #4 Figure 44 (reprint from Bovis, 1985). Active pressure coefficient was estimated per Equation 3-12 of USACE Engineer Manual 1110-2-2502 Retaining and Flood Walls.

Due to the temporary soil fill, 2 to 4 inches of settlement is expected at the base of the perimeter walls at the time contaminated soils are filled up to the maximum height. Maximum settlement is anticipated to occur when both cells are filled. It is recommended that thermal pile cells and the associated treatment system be constructed with flexible utility and equipment connections to

minimize impacts from potential soil settlement. Potential settlement should also be considered during the perimeter wall design.

6.3 Future Thermal Pile Cell Related Slope Stability Evaluations

Existing slopes at the boundaries of the upland area are as steep as about 1.7H:1V (horizontal to vertical). It is our understanding that the thermal pile cells might be constructed near the existing steep slopes. It is possible that stockpiling of contaminated soils near the existing steep slopes could result in slope failures. It is recommended that the stability of the existing slopes near the thermal pile cells be evaluated once the layout of thermal pile cells is finalized. It would also be prudent to evaluate the stability of excavated areas at the toes of the steep existing slopes.

7 Construction Consideration Recommendations

7.1 Thermal Pile Cell Perimeter Wall Subgrade Preparation

Thermal pile cell perimeter wall subgrades should be observed and approved by a geotechnical engineer prior to wall construction to verify their suitability to provide foundation support, as recommended herein. Where existing fill materials or native weak soils are encountered at the wall subgrade, any localized weak or unsuitable material at the subgrade should be removed and replaced with compacted structural fill, geotextile wrapped washed gravel or crushed stone, such as American Association of State Highway and Transportation Officials (AASHTO) No. 57 stone, or lean concrete. The undercut trenches should extend at least 6 inches on either side of the wall base layout. The geotechnical engineer should monitor and document all undercuts. The final soil subgrade surfaces should be scarified, and the moisture content adjusted prior to compacting, as needed. Once the subgrade is properly prepared and approved, it is recommended that at least 6 inches of No. 57 stone be placed on the compacted subgrade below the wall base.

7.2 Treated Soil Placement and Compaction

Once the contaminated soils are treated and approved for backfilling the excavated areas, wetland, and gully aera backfills should be placed in loose lifts not exceeding 8 inches in thickness and should be compacted to about 90 percent of the maximum dry density at moisture content within 4% of the optimum moisture content, in accordance with ASTM D698, Standard Proctor.

7.3 Safe Temporary Excavations and Groundwater

Any grading at the site should be performed according to the Occupational Safety and Health Administration (OSHA) guidelines and local code requirements. Plastic covering may be used to cover the temporary slopes to prevent moisture changes and to maintain stability.

Where any deep excavation is required for the proposed cleanup, the contractor should provide adequate bracing or shoring systems for safe work conditions. The actual means and methods of excavation support should be selected and designed by the contractor. All excavations should be performed in accordance with OSHA and local requirements. The contractor should also be prepared to provide temporary dewatering measures consisting of well points, submersible pumps in gravel sumps, collector trenches, etc. for safe work conditions.

7.4 Construction Monitoring

A qualified geotechnical engineer or soils engineering technician should monitor all aspects of foundation construction and earthworks. The geotechnical engineer or field representative should be familiar with the foundation design and construction requirements and address project quality assurance issues. Items to be monitored include quality control testing, fill placement, fill compaction, subgrade preparation, foundation installations, and other related activities.

8 Limitations

Interpretation of general subsurface soil conditions presented herein is based on the soil and groundwater conditions encountered in the limited number of soil borings and assumptions made at the time of this writing. Although representative portions of the samples taken were tested, subsurface conditions may vary between exploration locations. This report does not reflect any variations that may occur between boring locations or across the site in areas not sampled. The nature and extent of such variations may not become evident until construction. Due to the presence of cohesive onsite soils, groundwater conditions during construction may be different from the observations made in the borings.

This report has been prepared for the specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranty, express or implied, is provided. If any changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed, and the conclusions of this report are modified or verified in writing by AECOM.

ΑΞϹΟΜ

IDENTIFICATION OF SOIL

I. DEFINITION OF SOIL GROUP NAMES (ASTM D-2487)

Ma	ajor Component	Minor Component	Group/Graphic Symbol		Group Name
		Clean Gravels	GW	X	WELL GRADED GRAVEL
		< 5% fines	GP	24	POORLY GRADED GRAVEL
	Gravels –		GW-GM	2-1	WELL GRADED GRAVEL WITH SILT
	> 50% of coarse fraction retained on No. 4 sieve	Gravels with fines	GW-GC		WELL GRADED GRAVEL WITH CLAY
	Fine No 4 to $3/3$	5 - 12% fines	GP-GM	eri	POORLY GRADED GRAVEL WITH SILT
	Coarse, $\frac{3}{4}$ " to 3"		GP-GC		POORLYGRADED GRAVEL WITH CLAY
Coarse- Grained Soils		Gravels with fines	GM	গমুহ	SILTY GRAVEL
More than 50%		> 12% fines	GC		CLAYEY GRAVEL
retained on No.		Clean Sands	SW	5 - 5 - 5 - 5 - 5 - 5 - 5	WELL GRADED SAND
200 sieve	Sands – > = 50% 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	< 5% fines	SP		POORLY GRADED SAND
			SW-SM		WELL GRADED SAND WITH SILT
		Sands with fines	SW-SC	Ň	WELL GRADED SAND WITH CLAY
		5 - 12% fines	SP-SM		POORLY GRADED SAND WITH SILT
			SP-SC		POORLYGRADED SAND WITH CLAY
		Sands with fines	SM	583	SILTY SAND
		> 12% fines	SC		CLAYEY SAND
	Silks and Class	Increase	CL		LEAN CLAY
Fine-Grained	Liquid Limit < 50	morganic	ML		SILT
Soils	Low to medium plasticity	Organic	OL	23	ORGANIC CLAY ORGANIC SILT
50% or more			СН		FAT CLAY
200 sieve	Silts and Clays – Liquid Limit >= 50	Inorganic	MH		ELASTIC SILT
	Medium to high plasticity	Organic	ОН	<u>5-3</u>	ORGANIC CLAY
		Ŭ			ORGANIC SILT
Organic Soils	Primarily organic matter, dark in	color and organic odor	PT	629	PEAT

Other Symbol

FILL

II. DEFINITION OF SOIL COMPONENT PROPORTIONS (ASTM D-2487)

Adjective	Criteria	Example
GRAVELLY SANDY	>30% to <50% coarse grained component in a fine-grained soil	SANDY FAT CLAY
CLAYEY SILTY	>12% to <50% fine grained component in a coarse-grained soil	CLAYEY GRAVEL
WITH GRAVEL WITH SAND	>15% to <30% coarse grained component in a fine-grained soil	SILT WITH SAND
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. RELATIVE DENSITY OR CONSISTENCY

Granular Soils		Cohesive Soils (N Value	es/Pocket Penetrometer Values, tsf)
N = 0 to 4	Very Loose	N = 0 to $1 / < 0.25$	Very Soft
N = 5 to 10	Loose	N = 2 to 4 / 0.25 to 0.5	Soft
N = 11 to 30	Medium Dense	N = 5 to 8 / 0.5 to 1	Medium Stiff
N = 31 to 50	Dense	N = 9 to 15 / 1 to 2	Stiff
N = >50	Very Dense	N = 16 to 30 / 2 to 4	Very Stiff
		N = >30 / > 4	Hard

IV. GLOSSARY OF MISCELLANEOUS TERMS

Moisture: Dry, moist or wet to indicate visual appearance of specimen.

Color: Overall color, with modifiers such as light to dark or variation in coloration such as mottled, streaks etc.

Symbols: Based on Unified Soil Classification System (USCS). 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 which contain no visually detected foreign matter but which are suspect with regard to origin.

Disintegrated Rock (DR): Residual materials with a SPT resistance between 60 blows per foot (bpf) and refusal.

Partially Weathered Rock (PWR): Residual materials with a SPT resistance between 100 bpf and refusal.

Refusal: Refusal is defined as a SPT of 100 blows for 2" or less penetration.

Boulders: Rounded pieces of rock larger than 12 inches.

Cobbles: Rounded pieces of rock ranging from 3 to 12 inch.

Lenses: 0 to $\frac{1}{2}$ inch seam within a material in a test pit.

Layers: $\frac{1}{2}$ to 12 inch seam within a material in a test pit.

Pocket: Discontinuous body within a material in a test pit.

V. SAMPLE TYPE/SYMBOL

Description	Name	Symbol
BULK SAMPLE/HAND AUGER	В	
AUGER CUTTINGS	AU	
DENISON BARREL PISTON SAMPLE SHELBY TUBE	D PS T	
GEOPROBE	G	
PITCHER BARREL	Р	PB
ROCK CORE	RC	
SPLIT SPOON	S	
SONIC CORE	SC	

VI. OTHER ABBREVIATIONS

- Moisture Content MC
- Liquid Limit LL PL.
- Plastic Limit PI
- Plasticity Index

				_								Lo	og o	of I	Bori	inę	g G	T-01	
			ΛΞΓΟΝ			PROJECT: Standard Chlorine Site Cleanup													
					PROJECT LOCATION: 755 Governor Lea Road, New Castle, DE														
					PROJECT NUMBER: 60707136 COORDINATES: N 584740 E 594068														
ľ	DAT	E ST	ARTED: 12/5/2023	DRILL N	1ETH	IOD:	3-1/4	4" I.D	. Ho	llow Stem Aug	jer			Gro	oundwa	ater	Obser	vations	
	DAT	E CC	DMPLETED: 12/5/2023	RΤ	PE/V	VEIG	HT: A	Auto	matic/140lbs		E	vent		Date		Time	Depth	Cave in	
	LOG	LOGGED BY: P. Mahato CASING T CHECKED BY: S. An CASING S DRILLING CONTRACTOR: Active Environm BIT TYPE					ISA					Encount	ered ₇	7		+			
	CHE						1/4"						-	¥- 1	2-05-202	23	13:00	0.0	-
	DRIL						NA/N	A 											
			G: Geoprobe 7822D1	BOREH				16.0 H	-1 67	⊥ /									
ŀ				SURFA				v. o	гі	+/-									
	DЕРТН (FT	ELEV. (FT)	DESCRIPTION		USCS	GRAPHIC	STRATUM	UMBER	TYPE	BLOWS	EC (IN)	Moisture (%)	iquid Limit (%	lastic Limit (%	Organic Content (%)	PID (ppm)		REMARI AND TES	KS TS
	∇		0.0 - 16.0 ft [.] Wet verv soft dark green	nish				Z		4	œ			₽.			0.0ft·B	ulk sample F	2-1 was
	-	-	gray, medium plasticity, ORGANIC SIL organics and roots	T, few				S-1		WOH/24" (N=WOH/24")	2 (8%)				0.0		d from 0 to s	5 ft bgs.
	-	5						S-2		WOH/12"- 1- 1 (N=WOH/12"+ 1)	6 (25%	6)				0.16	3" catch	her.	olou using
	5	-						S-3		1/12"- 1/12" (N=1/12")	8 (33%	6) 237.8	198	135	19.6	0.65			
	-	٩	- 1		он		в	S-4		1/12"- WOH/12" (N=1/12")	5 (21%	6)				0.34			
REV-0	10	_	10.0 ft: changes to dark brown, trace			()()()()()		S-5		WOH/24" (N=WOH/24")	3 (13%	6)				0.68			
SDT 3/13/24	-	-	organics and roots					S-6		WOH/24" (N=WOH/24")	6 (25%	6)				1.32			
CT-DESIGN.(-	-5						S-7		WOH/24" (N=WOH/24")	5 (21%	6) 81.5				4.5			
ECH_PROJE	15	-	Paring terminated at 16.0 ET on 12/5/	2023 at			-	S-8	$\left \right\rangle$	WOH/24" (N=WOH/24")	10 (42%	6)				7.1			
IL ROCK STANDARD CHLORINE EPA.GPJ AECOM-GEOTE			Boring terminated at 16.0 F1 on 12/5/2 16:00. Boring backfilled with cuttings upon completion.	2UZ3 at															
AECOM SO	AE 124 Ger	20 Mi mant	DM TECHNICAL SERVICES ilestone Center Drive, Suite 150 town, MD 20876	6, INC.	B G PS	= Bull = Geo 6 = Pis	c Sam probe	iple 9 Sample	S = T = 9 H =	Split Spoon San Shelby Tube Sa Hand Auger Sar	nple mple nple	P = Pito RC = Roo SC = Sor	cher San ck Core nic Core	nple			SHEE	T 1 of 1	

ſ				_								Lo	og o	f E	Bori	inę	g G	T-02	
			ΔΞΓΟΝ			PR	OJE	CT:	S	tandard Ch	loriı	ne Site	Cleanu	цр					
						PR	OJE	CT L	.00	ATION: 75	5 Gov	ernor Le	a Road,	New	Castle,	DE			
						PR	OJE	CTN	IUN	/BER: 607	0713	6	COC	ORD	INATE	S: N	584662	E 594297	
	DAT	E SI	TARTED: 12/7/2023			IOD:	3-1/4	4" I.D	. Ho	llow Stem Aug	ger		vont	Gro	undwa	ater	Obser\	/ations	Cave in
			DMPLETED: 12/7/2023				VEIG ISA	iht: A	uto	matic/140lbs			vent		Date		Time	(ft)	Depth (ft)
	CHE		ED BY: S. An	CASING	SIZ	E: 3-	1/4"					Encount	ered <u>V</u>	- 1:	2-07-202	23	09:20	0.0	-
	DRI	LLIN	G CONTRACTOR: Active Environm	BIT TYP	E/SI	ZE: N	NA/N	A											
	DRI	LL R	IG: Geoprobe 7822DT	BOREH	OLE	DEP	TH: :	30.0 F	т							-			
	DRI	LLEF	R: Doug Turner	SURFAC		LEVA T		N: 2	FT	+/-									
ĹŁ,		. (FT)			S	ЯC	IUM	2		SAMPLES	Î	ure t (%)	nit (%)	nit (%	nic t (%)	(mq			Γ C
		2 ELEV	DESCRIPTION		nsc	GRAP	STRAI	NUMBE	TYPE	BLOWS	REC (IN	(%) Moist Conten	Liquid Lir	Plastic Lir	Orgal	d) OIA		AND TES	TS
	_		0.0 - 2.0 ft: No recovery					C 1	M	WOR/24"	0						0.0ft: 3-i for split	inch catcher spoon samp	was used ling.
								3-1	\mathbb{N}	(N=WOR/24")	(NF	R)							
		-	2.0 - 16.0 ft: Wet, very soft, light gray, medium plasticity, ORGANIC CLAY, fe organics	ew.		00000		S-2		WOR/24" (N=WOR/24")	2 (8%	b)				0.63			
4	5	_	4.0 ft: changes to grayish green					S-3		WOH/24" (N=WOH/24")	2 (8%	b)				3.06			
		-5	6.0 ft: changes to dark gray and light g little organics	gray,				S-4		WOH/24" (N=WOH/24")	24 (100	(%) (117.8)				2.06			
	10	_			он			S-5		WOH/24" (N=WOH/24")	0 (NF	۶)				10	8.0ft: No Samples catcher.	o recovery in s collected u	spoon. sing 3"
DT 3/13/24 RE		- -10						S-6		WOH/24" (N=WOH/24")	0 (NF	R)							
CT-DESIGN.G		-	14.0 ft changes to dark brown some				В	S-7		WOH/24" (N=WOH/24")	0 (NF	۶)							
ECH_PROJE	15	-	16.0 30.0 ft: Wet very coff dark brow	4/0				S-8	$\left \right\rangle$	WOH/24" (N=WOH/24")	8 (339	%)				10.94	10.0#.0	Vuitabad ta a	alit on oan
ECOM-GEOT		-1 <u>5</u>	medium plasticity, ORGANIC SILT, littl organics	e				T-1			24 (100	91.74	90	66		3.29	sampline	g.	piit spoon
RINE EPA.GPJ A	20	_			он			S-9	X	WOH/24" (N=WOH/24")	10 (429) %)				8.48			
ROCK STANDARD CHLO	25	- 20 -	23.0 ft: changes to few organics			<u>(202020000)</u>		S-10		WOH/24" (N=WOH/24")	24 (100	66.3	128	85	10.6				
AECOM SOIL	A 124 Ge	EC(420 M rman	OM TECHNICAL SERVICES illestone Center Drive, Suite 150 town, MD 20876	6, INC.	B G PS	= Bull = Geo S = Pis	c Sam probe	iple e Sample	S = T = H =	Split Spoon Sar Shelby Tube Sa Hand Auger Sar	nple mple mple	P = Pito RC = Roo SC = Sor	her Samp k Core ic Core	ple		<u> </u>	SHEE	T 1 of 2	

										Lo	og o	of B	Bori	ng	g GT-02
			ΔΞϹΟΜ	Р	ROJI	ECT	Γ: S	tandard	Chlorin	e Site	Clean	up			
				P	ROJI	ЕСТ	r loo	CATION:	755 Gov	ernor Le	a Road	, New (Castle,	DE	
ŀ				P	ROJI		r NUI	MBER:	60707130	3	00	ORDI	NATE	S: N	584662 E 594297
		ELEV. (FT)	DESCRIPTION	USCS	STRATUM		TYPF	BLOW		Moisture Content (%)	Liquid Limit (%	Plastic Limit (%	Organic Content (%)	PID (ppm)	REMARKS AND TESTS
	30	- -25 -		د	ر) ر) B	S-	-11	WOH/2 (N=WOH/2	4" 24 24") (1009	6)				0.94	
			Boring terminated at 30.0 FT on 12/7/2023 at 12:30. Boring backfilled with cuttings upon completion.				<u> </u>	Y			1		1	<u> </u>	
N.GDT 3/13/24 REV-0															
COM-GEOTECH_PROJECT-DESIG															
OCK STANDARD CHLORINE EPA.GPJ AE(
AECOM SOIL R	A 124 Ger	ECC 120 M rman	DM TECHNICAL SERVICES, INC. ilestone Center Drive, Suite 150 town, MD 20876	B = B G = G PS =	ulk Sa eoprol Piston	mple be Sam	S T Nple H	= Split Spoon = Shelby Tub = Hand Auger	Sample e Sample [.] Sample	P = Pito RC = Roo SC = Sor	cher San ck Core nic Core	nple			SHEET 2 of 2

				_								Lc	og c	of	Bori	ing	g G	T-03	
			ΛΞϹϽΝ			PR	OJE	CT:	St	andard Ch	lorir	ne Site	Clean	up					
						PR	OJE	CTL	.00	ATION: 75	i Gov	vernor Le	a Road	, Nev	v Castle,	DE			
						PR	OJE	ст м	NUN	IBER: 607	0713	6	СС	ORI	DINATE	S: N	N 584436	E 594232	
ľ	DAT	E ST	ARTED: 12/21/2023	DRILL M	ETH	IOD:	3-1/4	4" I.D	. Ho	llow Stem Aug	jer			Gr	oundwa	ater	Observ	/ations	
	DAT	E CC	OMPLETED: 12/21/2023	HAMME	R TY	PE/V	VEIG	HT: A	Auto	matic/140lbs		E	vent		Date		Time	Depth (ft)	Cave in Depth (ft)
	LOG	GED	BY: P. Mahato	CASING	TYF	PE: H	ISA					Encount	ered <u></u>	Z.	12-21-20'	23	08.00	0.0	
			DBY: S. AN	BIT TYP	SIZE E/SIZ	=: 3- Ze: 1	1/4" JA/N	Δ						-	12-21-20		00.00	0.0	
	DRIL	L RI	G: Geoprobe 7822DT	BOREHO	DLE	DEP	TH: '	12.0 F	т							_			
	DRIL	LER	: Doug Turner	SURFAC	E E	LEVA		N: 6	FT	+/-									
	(L	(L				0	Σ			SAMPLES		()	(%)	(%)	()	<u> </u>			
	DEPTH (I	ELEV. (F	DESCRIPTION		NSCS	GRAPHIC	STRATU	NUMBER	ТҮРЕ	BLOWS	REC (IN)	(%) Moisture Content (%	Liquid Limit	Plastic Limit	Organic Content (%	PID (ppm		REMARK AND TES	KS TS
ľ	<u> </u>		0.0 - 4.0 ft: No recovery						\mathbb{N}								0.0ft: Bu	ulk sample B	-6 was
	-	5						S-1		WOH/24" (N=WOH/24")	0 (NF	R)					(PID rea 0.0ft: Sa 3" catch	ading 89.78 p amples collecter.	opm). cted using
	-	-						S-2		WOH/24" (N=WOH/24")	0 (NF	R)							
	5	_	4.0 - 10.0 ft: Moist, very soft, greenish medium plasticity, ORGANIC CLAY, tr organics	gray, ace				S-3		WOH/24" (N=WOH/24")	2 (8%	b)				12.34	1		
	-	-	6.0 ft: changes to light greenish gray		ОН		В	S-4		WOH/24" (N=WOH/24")	14 (58%	92.2				32.97	7		
q	- -	-	8.0 ft: changes to little organics and ro	oots				S-5		WOH/24" (N=WOH/24")	9 (38%	6)				4.56	;		
V13/24 REV	-	-5	10.0 - 12.0 ft: soft, reddish brown, ELA SILT	STIC	МН	Ĭ		S-6	$\left[\right]$	1- 1- 1- WOH/6" (N=2)	17 (719	46.7	53	40	7.8	22.24	4		
Ц		_	11.5 ft: Contains 6-inch peat layer. Boring terminated at 12.0 FT on 12/21	/2023					/ \	()	(,	•/					12 Oft: F	Pia broke do	wp. at 11.00
L ROCK STANDARD CHLORINE EPA.GPJ AECOM-GEOTECH_PROJECT-DESIGN.GD			Boring terminated at 12.0 FT on 12/21 at 11:00. Boring backfilled with cuttings upon completion.	/2023													12.0ft: F am. Bor augers v	tig broke do ing was term were pulled α	wn at 11:00 innated and but.
AECOM SOI	AE 124 Ger	ECC 20 Mi rmant	DM TECHNICAL SERVICES ilestone Center Drive, Suite 150 iown, MD 20876	6, INC.	B : G : PS	= Bull = Geo 5 = Pis	s Sam probe	iple e Sample	S = T = Ə H =	Split Spoon San Shelby Tube Sa Hand Auger Sar	nple mple nple	P = Pite RC = Ro SC = Soi	cher San ck Core nic Core	nple			SHEE	T 1 of 1	

								Lo	og o	of E	Bori	inę	g G	T-034	4
		PR	OJE	CT:	St	andard Ch	orir	ne Site	Clean	up					
		PR	OJE	CT L	OC.	ATION: 755	Gov	ernor Le	a Road,	New	Castle,	DE			
		PR	OJE	CT N	IUM	IBER: 607	0713	6	со	ORD	INATE	S: N	I 584439	E 594235	
DATE STARTED: 1/3/2024	ORILL MET	HOD:	3-1/4	4" I.D.	Hol	low Stem Aug	jer			Gro	undwa	ater	Obser	vations	Causa in
DATE COMPLETED: 1/3/2024	HAMMER T	YPE/\	NEIG	HT: A	utor	matic/140lbs		E	vent		Date		Time	Depth (ft)	Depth (ft)
LOGGED BY: S. Cheema	CASING TY	PE: F						Encount	ered <u>J</u>	Ζlo	1-03-202	24	08.00	0.0	-
DRILLING CONTRACTOR: Active Environm	BIT TYPE/S	IZE: 3-	NA/N	A										0.0	
DRILL RIG: Geoprobe 7822DT	BOREHOLE	DEP	TH: 4	47.0 F	т							_			
DRILLER: Doug Turner	SURFACE I	ELEVA		N: 6	FT	+/-									
		0	Μ			SAMPLES		(%)	(%)	(%)	(9				
C 4) H A∃ B B D ESCRIPTION B B C D	nscs	GRAPHIC	STRATU	NUMBER	ТҮРЕ	BLOWS	REC (IN)	(%) Moisture Content (%	Liquid Limit	Plastic Limit	Organic Content (%	PID (ppm		REMARK AND TES	IS TS
	ay, bled ins M		В	S-1 T-5 S-2 S-3		WOH/12"- 1- 1 (N=WOH/12"+ 1) WOH/24" (N=WOH/24") WOH/18"- 1 (N=WOH/18"- 1 (N=WOH/18")	24 (100' 16 (679 24 (100' 24 (100'	28.28 %) %)	38	26		61.57 98.92 61.53 71.39	2		
AECOM TECHNICAL SERVICES, 12420 Milestone Center Drive, Suite 150 Germantown, MD 20876		= Bull i = Geo S = Pis	k Sam oprobe ston S	ple ample	S = T = H =	Split Spoon Sam Shelby Tube San Hand Auger Sam	nple mple nple	P = Pito RC = Roo SC = Sor	cher Sam ck Core nic Core	nple		<u> </u>	SHEE	T 1 of 2	

											Lo	g c	of B	Bori	ing	GT-03A
			ΔΞϹΟΜ		PR	OJE	CT:	St	andard Ch	lorine	Site 0	Clean	up			
					PR				ATION: 755	Gover	nor Lea	Road,		Castle,	DE	594420 E 504225
í	-	Ê			PR				SAMPLES	07130		<u>(%</u>				364439 E 394233
	иемия (г	ELEV. (F	DESCRIPTION	USCS	GRAPHIC	STRATUN	NUMBER	ТҮРЕ	BLOWS	REC (IN) (%)	Moisture Content (%	Liquid Limit (⁹	Plastic Limit (Organic Content (%	PID (ppm)	REMARKS AND TESTS
		-20	12.0 - 38.0 ft: Wet, very soft, greenish gray, medium plasticity, SILT, few organics(<i>continued)</i>													
-	<u>3</u> 0	-	28.0 ft: changes to clay and peat interlayered				S-5	X	WOH/12"- 1- 1 (N=WOH/12"+ 1)	24 (100%)					30.58	
-	35	- 25 - - -		ML		В	S-6	X	WOH/24" (N=WOH/24")	24 (100%)					52.43	
3/13/24 REV-0	40	-30 - - - -35	38.0 - 47.0 ft: Wet, medium stiff, greenish gray, LEAN CLAY, Contains 6-inch peat layer 39.5 ft: Contains wet, tan to brown, clayey sand with gravel at bottom of split spoon				S-7	X	2- 2- 3- 4 (N=5)	24 (100%)					5.20	
I-GEOTECH_PROJECT-DESIGN.GDT	45	- - - -40	 43.0 ft: changes to very stiff, gray 44.5 ft: Contains 6" of gray, fat clay at bottom of split spoon 46.5 ft: Contains fat clay at bottom of tube 	CL		D	S-8 T-6	X	4- 7- 9- 9 (N=16)	24 (100%) 24 (100%)	21.78	36	19		5.49 44.72	
SOIL ROCK STANDARD CHLORINE EPA.GPJ AECOM	A	EC	Sampling Boring terminated at 47.0 FT on 1/3/2024 at 14:30. Boring backfilled with bentonite upon completion.	B = Bulk Sample S = Split Spoon Sample P = Pitcher Sample												
AECOM	12 Ge	420 M erman	town, MD 20876	G = PS	Geo = Pis	oprobe ston S	ample	т = н =	Shelby Tube San Hand Auger Sar	mple R nple S	C = Roc C = Son	k Core ic Core				SHEET 2 of 2

				_								Lo	g c	of	Bori	inę	g G	T-04	
			ΛΞΓΟΝ			PR	OJE	CT:	St	tandard Ch	lorin	e Site	Clean	up					
						PR	OJE	CTL	.00	ATION: 75	6 Gov	ernor Le	a Road	, Nev	w Castle,	DE			
						PR	OJE		IUN	/BER: 607	0713	6	CC	OR		S: N	N 583962	E 594031	
C	ATI	E ST	ARTED: 12/20/2023	DRILL N	1ETH	OD:	3-1/4	4" I.D	. Ho	llow Stem Aug	jer			Gr	roundwa	ater	Observ	/ations	
C	DATI	E CC	DMPLETED: 12/20/2023	HAMME	RTY	ΡΕ/\	VEIG	GHT: A	uto	matic/140lbs		E	vent		Date		Time	Depth (ft)	Cave in
L	OG	GED	BY: P. Mahato	CASING	6 TYF	'E: H	ISA					Encount	ered ₇	7					
0	HE	CKE	D BY: S. An			: 3 -	1/4"	•						¥	12-20-202	23	08:40	0.0	-
)RIL)RIL		G: Geoprobe 7822DT		~E/312		NAVIN. T⊟···	A 16 0 F	т			Comple	tion <u></u>	Z	12-20-202	23	12:00	0.0	4.0
		LER	: Doug Turner	SURFA		_EVA		N: 8	FT	+/-									
1		Ē	-				_			SAMPLES			(%	(%					
DEPTH (F		ELEV. (F	DESCRIPTION		NSCS	GRAPHIC	STRATUN	NUMBER	ТҮРЕ	BLOWS	REC (IN)	Moisture Content (%)	Liquid Limit (Plastic Limit (Organic Content (%	PID (ppm)		REMARH AND TES	(S TS
-	ž -	_	0.0 - 2.0 ft: Wet, very soft, dark gray, r plasticity, LEAN CLAY, little organics a roots	nedium nd tree	CL			S-1		WOH/12"- 1- 1 (N=WOH/12"+ 1)	5 (21%	b)				0.47	0.0ft: Bu collected 0.0ft: Sa 3" catch	ulk sample B d from 0 to 5 amples colle ler.	-4 was 5 ft bgs. cted using
-		5	2.0 - 6.0 ft: Wet, very loose, dark gray, coarse, CLAYEY SAND WITH GRAVE oraganics, fine gravel	fine to L, few	SC			S-2		WOH/12"- 1/12" (N=WOH/12")	1 (4%)				1.79			
5		-	60 160 ft: Wat you off dark grou					S-3		WOH/24" (N=WOH/24")	2 (8%)				103.3	3		
-		٩	medium plasticity, ELASTIC SILT, few organics				в	S-4	\setminus	WOH/18"- 1 (N=WOH/18")	8 (33%	b)				133.3	3		
24 REV-0	D	_	10.0 ft: changes to trace organics					T-2	$\backslash/$	1_ 1_ 1_ 1	24 (1009	39.33	52	30	0				
N.GDT 3/13/		-			MH			S-5	\bigwedge	(N=2)	18 (75%	b)				40.8	12.0ft: S samplin	Switched to s	split spoon
	F	-						S-6	\bigwedge	(N=WOH/24")	12 (50%	()				32.33	3		
H PRO		-						S-7	M	WOH/24" (N=WOH/24")	7 (29%	b)				28.14	1		
L ROCK STANDARD CHLORINE EPA.GPJ AECOM-GEOTECI			Boring terminated at 16.0 FT on 12/20 at 12:00. Boring backfilled with cuttings upon completion.	/2023	1					1									
AECOM SOI	AE 124 Ger	ECC 20 Mi mant	DM TECHNICAL SERVICES ilestone Center Drive, Suite 150 town, MD 20876	6, INC.	B : G : PS	= Bul = Geo = Pis	k Sam oprobe ston S	nple e Sample	S = T = H =	Split Spoon San Shelby Tube Sa Hand Auger Sar	nple mple nple	P = Pito RC = Roo SC = Sor	ther San k Core ic Core	nple			SHEE	T 1 of 1	

				_								Lo	og o	of	Bori	inę	g G	T-05	
			ΛΞΓΟΝ			PR	OJE	CT:	St	andard Ch	lorir	ne Site	Clean	nup					
						PR	OJE	CT L	.00	ATION: 75	5 Gov	ernor Le	a Road	, Nev	v Castle,	DE			
						PR	OJE		NUM	1BER: 607	0713	6	СС	OR	DINATE	S: N	1 583779	E 594065	
ľ	DAT	E ST	ARTED: 12/14/2023	DRILL M	IETH	IOD:	3-1/	4" I.D	. Ho	llow Stem Aug	ger			Gr	oundwa	ater	Observ	ations	
	DAT	ECC	OMPLETED: 12/14/2023	HAMME	RΤ	′PE/\	WEIG	GHT: A	Auto	matic/140lbs			Event		Date		Time	Depth (ft)	Cave in Depth (ft)
	LOG	GED	BY: P. Mahato	CASING	TYF	PE: H	ISA					Comple	etion		10 14 00	22	12.20		7.0
			D BY: S. An	CASING	SIZI F/SI	E:3- 7⊑·∣	-1/4" ΝΔ/Ν	Δ						_	12-14-202	23	13.30	Diy	7.0
	DRI		IG: Geoprobe 7822DT	BOREH	DLE	DEP	TH:	16.0 F	т			Encoun	tered		12-14-202	23	10:30	Dry	-
	DRI	LLEF	R: Doug Turner	SURFAC	E E	LEVA		N: 3	6 FT	+/-									
		Ĥ.				0	Σ			SAMPLES		(9	(%)	(%)	. (9				
		ELEV. (F	DESCRIPTION		nscs	GRAPHIC	STRATUI	NUMBER	ТҮРЕ	BLOWS	REC (IN)	Moisture Content (%)	Liquid Limit	Plastic Limit	Organic Content (%	PID (ppm		REMARK AND TES	(S TS
		35	0.0 - 0.3 ft: TOPSOIL, 4-inch topsoil 0.3 - 2.0 ft: Moist, very loose, light redd brown, fine to coarse, POORLY GRAE SAND WITH CLAY, trace organics and roots	dish DED d tree	Top soil SP- SC			S-1	$\left \right $	1- 1- 2- 2 (N=3)	10 (42%	(6) 19.9				0.12			
		-	2.0 - 4.0 ft: Moist, medium dense, light fine to coarse, POORLY GRADED SA WITH GRAVEL	: gray, ND	SP		· · · ·	S-2		4- 6- 6- 5 (N=12)	14 (58%	6)				0.11			
	5	30	4.0 - 16.0 ft: Moist, loose, yellowish bro fine to coarse, SILTY SAND	own,				S-3		4- 4- 4- 3 (N=8)	16 (67%	6)				0.54			
		-	6.0 ft: changes to trace organics					S-4	\mathbb{N}	2- 2- 3- 2 (N=5)	14 (58%	6) 12.2				1.48			
-1	10	-	8.0 ft: changes to no organics				С	S-5	\mathbb{N}	5- 6- 3- 3 (N=9)	16 (67%	6)				0.5			
3/13/24 RE		25	10.0 ft: changes to very loose		SM			S-6	$\left \right $	2- 2- 2- 2 (N=4)	14 (58%	6)							
-DESIGN.GDT		-	12.0 ft: changes to loose					S-7		3- 5- 5- 4 (N=10)	18 (75%	6)				0.79			
CH_PROJECT	15	20	14.0 ft: changes to medium dense					S-8	$\left \right $	11- 15- 8- 4 (N=23)	14 (58%	6)				0.84			
TOCK STANDARD CHLORINE EPA.GPJ AECOM-GEOTE			Boring terminated at 16.0 FT on 12/14 at 13:30. Boring backfilled with cuttings upon completion.	/2023															
AECOM SOIL	A 124 Ge	ECC 420 M rman	OM TECHNICAL SERVICES illestone Center Drive, Suite 150 town, MD 20876	6, INC.	B G PS	= Bul = Geo 6 = Pi:	k San oprob ston S	nple e Sample	S = T = 9 H =	Split Spoon Sar Shelby Tube Sa Hand Auger Sar	nple mple mple	P = Pit RC = Rc SC = Sc	tcher San ock Core nic Core	nple			SHEE	T 1 of 1	

				_								Lo	og o	of	Bori	inę	g G	T-06	
			ΔΞΓΩΝ			PR	OJE	CT:	S	tandard Ch	lorir	ne Site	Clear	nup					
						PR	OJE	CTL	.00	ATION: 75	5 Gov	ernor L	ea Road	l, Nev	w Castle,	DE			
						PR	OJE	CTN	NUN	/IBER: 607	0713	6	CC	OOR	DINATE	S: N	N 583694	E 593874	
1	DATI	E ST	ARTED: 12/20/2023	DRILL N	1ETH	IOD:	3-1/	4" I.D	. Ho	llow Stem Aug	ger			Gr	oundwa	ater	Obser	ations	Caucalia
		E CC	DMPLETED: 12/20/2023	HAMME	R T	PE/V	VEIG	GHT: A	Auto	matic/140lbs			zvent		Date		Time	(ft)	Depth (ft)
		CKE	DBY: P. Manato DBY: S. An	CASING		E: H E·3	15A 1/4"					Encoun	tered T	Z	12-20-202	23	12:19	0.0	-
			G CONTRACTOR: Active Environm	BIT TYF	E/SI	ZE: N	NA/N	A				Compl	etion V						
	DRIL	L RI	G: Geoprobe 7822DT	BOREH	OLE	DEP	TH:	16.0 F	т					<u>¥</u>	12-20-202	23	15:30	0.0	6.0
	DRIL	LER	: Doug Turner	SURFA	CE E	LEVA		N: 9	FT	+/-									
CEDTH (ET)		ELEV. (FT)	DESCRIPTION		USCS	GRAPHIC	STRATUM	IMBER	YPE	SAMPLES BLOWS	EC (IN)	(%) Moisture Content (%)	quid Limit (%)	astic Limit (%)	Organic Content (%)	PID (ppm)		REMARK AND TES	KS TS
		,					0	Z			R		Lic	Pla					
-		-	0.0 - 2.0 ft: Wet, very soft, dark gray, r plasticity, LEAN CLAY, little organics a roots	nedium Ind	CL			S-1		WOH/24" (N=WOH/24")	1 (4%))				1.76	0.0ft: Bu collected 0.0ft: Sv sampling	ulk sample B d from 0 to 5 vitched to sp g.	-5 was 6 ft bgs. 9 lit spoon
-		5	2.0 - 10.0 ft: Wet, very soft, dark gray, medium plasticity, LEAN CLAY WITH few organics and roots	SAND,				S-2		1/24" (N=1/24")	10 (42%	6)				0.27			
5	5	-			CI			S-3		1/24" (N=1/24")	1 (4%))				1.09			
-		-	6.0 ft: changes to soft					S-4		WOH/6"- 1- 1- 1 (N=2)	12 (50%	6)				0.89			
- - -	0	٥					в	S-5		WOH/12"- 1- 1 (N=WOH/12"+ 1)	2 (8%))				1.03			
T 3/13/24 RE		_	10.0 - 16.0 ft: Wet, very soft, dark gree gray, SANDY ORGANIC SILT, trace of	enish rganics				S-6	$\left \right\rangle$	WOH/12"- 1- 1 (N=WOH/12"+ 1)	6 (25%	6)				6.15	;		
CT-DESIGN.GD		-5	14.0.ft: changes to some organics		он		-	T-3			24 (100	555.3 %)	3 152	95	5	3.70			
ECH_PROJE	5	_		10000				S-7	$\left \right\rangle$	WOH/6"- 1- 1- 1 (N=2)	24 (100	165.9 %)	9			5.53	6		
K STANDARD CHLORINE EPA.GPJ AECOM-GEOTE			Boring terminated at 16.0 FT on 12/20 at 15:30. Boring backfilled with cuttings upon completion.	/2023															
AECOM SOIL ROC	AE 124 Ger	ECC 20 Mi mant	DM TECHNICAL SERVICES ilestone Center Drive, Suite 150 iown, MD 20876	6, INC.	B G PS	= Bull = Geo 6 = Pis	< Sam oprobe	nple e Sample	S = T = H =	Split Spoon San Shelby Tube Sa Hand Auger San	nple mple nple	P = Pi RC = Ro SC = So	tcher Sar ock Core onic Core	nple			SHEE	T 1 of 1	

				_								Lc	og o	of	Bor	ing	g G	T-07	
			ΛΞϹϽΝ		T	PR	OJE	CT:	St	andard Ch	lorir	ne Site	Clean	up					
			MELO II			PR	OJE	CT L	.00	ATION: 75	5 Gov	ernor Le	a Road	, Ne	w Castle,	DE			
						PR	OJE		NUN	IBER: 607	0713	6	CC	OR		S: N	I 583656	E 594106	
	DAT	E ST	ARTED: 12/18/2023	DRILL M	1ETH	IOD:	3-1/-	4" I.D	. Ho	low Stem Au	ger			G	roundwa	ater	Observ	/ations	
	DAT	ECC	OMPLETED: 12/18/2023	HAMME	R TY	ΈΕ/\	VEIG	GHT: A	Autor	matic/140lbs		E	vent		Date		Time	Depth (ft)	Cave in Depth (ft)
	LOC	GEE	BY: P. Mahato	CASING	TYF	PE: F	ISA					Encount	ered		10 10 00	22	11.20		
			D BY: S. An	CASING	SIZE E/SIZE	E:3- 7⊏·I	1/4" NA/N	^							12-10-202	23	11.30	Diy	-
	DRI		IG: Geoprobe 7822DT	BOREH			TH:	- 16.0 F	т			Comple	tion		12-18-202	23	14:30	Dry	10.0
	DRI	LLEF	C Doug Turner	SURFAC	CE El	LEVA		N: 4	6 FT	+/-									
	Ê	Ê					~			SAMPLES			(%	(%)		Γ		1	
	DEPTH (F	ELEV. (F	DESCRIPTION		NSCS	GRAPHIC	STRATUN	NUMBER	ТҮРЕ	BLOWS	REC (IN)	Moisture Content (%	Liquid Limit (Plactic Limit (Organic Content (%	PID (ppm)		REMARK AND TES	(S TS
	-	45	0.0 - 0.8 ft: Moist, dark gray, medium plasticity, SANDY LEAN CLAY, trace of 0.8 - 2.0 ft: Moist, very loose, light brow SILTY SAND, trace organics	organics wn,	CL SM			S-1	$\left \right $	1- 1- 3- 4 (N=4)	16 (67%	6)				0.05	0.0ft: Bu collected	Ik sample B d from 0 to 5	-3 was 5 ft bgs.
	-	-	2.0 - 16.0 ft: Moist, loose, light brown, SAND WITH GRAVEL, trace organics	SILTY				S-2	\mathbb{X}	4- 5- 5- 6 (N=10)	20 (83%	9.5	NP	N	P 2.3	0.11			
	5	-	4.0 ft: changes to light brown and darl brown, trace fine gravel	K			- - - - - - - -	S-3	\mathbb{X}	3- 4- 4- 4 (N=8)	18 (75%	6)				0.12			
	-	-	6.0 ft: changes to reddish brown, no g	ravel			с	S-4		4- 5- 5- 6 (N=10)	11 (46%	6) 11.8				0.14			
REV-0	<u>1</u> 0	-			SM			S-5		3- 3- 4- 4 (N=7)	9 (38%	6)				0.16			
GDT 3/13/24	-	35	12.0 ft: changes to medium dense, lig	ht			•	S-6	$\left \right\rangle$	3- 4- 5- 7 (N=9)	15 (63%	6)				0.19			
ECT-DESIGN.	-	-	brown					S-7	\mathbb{A}	4- 6- 8- 9 (N=14)	17 (719	6)				0.20			
ECH_PROJE	15	30	Paring terminated at 16.0 ET on 12/19	/2022				S-8	$\left \right\rangle$	4- 6- 10- 8 (N=16)	17 (719	6)				0.20			
ROCK STANDARD CHLORINE EPA.GPJ AECOM-GEOTE			Boring terminated at 16.0 FT on 12/18 at 14:30. Boring backfilled with cuttings upon completion.	/2023															
AECOM SOIL	A 124 Ge	ECC 420 M rman	DM TECHNICAL SERVICES illestone Center Drive, Suite 150 town, MD 20876	6, INC.	B : G : PS	= Bull = Gec 5 = Pis	k Sam oprob ston S	iple e Sample	S = T = 9 H =	Split Spoon Sar Shelby Tube Sa Hand Auger Sa	nple mple mple	P = Pite RC = Roc SC = Sor	cher San ck Core nic Core	nple			SHEE	T 1 of 1	

ſ												Lc	og o	of	Bori	ing	g G	T-08	
			ΛΞϚΟΝ			PR	OJE	CT:	S	tandard Ch	loriı	ne Site	Clean	up					
			HELUN			PR	OJE	CTL	_00	ATION: 75	5 Gov	vernor Le	a Road	, Nev	v Castle,	DE			
						PR	OJE		NUN	/BER: 607	0713	6	CC	OR	DINATE	S: N	N 583509	E 593761	
-	DAT	E ST	ARTED: 1/2/2024	DRILL N	/ETH	IOD:	3-1/4	4" I.D	. Ho	llow Stem Aug	ger			Gr	oundwa	ater	Observ	vations	
	DAT	ECC	DMPLETED: 1/2/2024	HAMME	RTY	PE/V	VEIG	GHT: /	Auto	matic/140lbs		E	vent		Date		Time	Depth (ft)	Depth (ft)
		GEL	D BY: S. Cheema	CASING		יב: ד ר. ס						Encount	ered <u>T</u>	Z	01-02-202	24	09:30	0.0	_
			G CONTRACTOR: Active Environm	BIT TYP	PE/SIZ	E: 3- ZE: 1	1/4 NA/N	A							0.02.20				
	DRII	LL RI	G: Geoprobe 7822DT	BOREH	OLE	DEP	TH: ·	16.0 I	FT							_			
	DRII	LLER	C Doug Turner	SURFA	CE E	LEVA		N: 6	FT	+/-									
Í	(FT)				U	Σ			SAMPLES		(%	(%)	(%)	() ()	(
		ELEV. (DESCRIPTION		nscs	GRAPHI	STRATU	NUMBER	ТҮРЕ	BLOWS	REC (IN)	(%) Moisture Content (⁹	Liquid Limit	Plastic Limit	Organic Content (⁹	PID (ppm		REMARK AND TES	(S TS
-	_	5	0.0 - 2.0 ft: Wet, very soft, greenish gr medium plasticity, LEAN CLAY, trace r	ay, roots	CL			S-1		WOH/12"- 1- 1 (N=WOH/12"+ 1)	8 (339	%)				0.19	0.0ft: Bu collecte	ulk sample B d from 0 to 5	-7 was 5 ft bgs.
		-	2.0 - 6.0 ft: Wet, very soft, grayish gray medium plasticity, SILT, trace roots	y,				S-2		1/12"- 1/12" (N=1/12")	24 (100	%)				0.41			
ł	5	-	4.0 ft: changes to gray, some roots		ML			S-3		WOH/18"- 1 (N=WOH/18")	14 (589	42.7	34	26	3	3.03	5		
-		-	6.0 - 16.0 ft: Wet, very soft, gray, med plasticity, SANDY ORGANIC SILT, tra- organics and roots	ium ce		00000	-	S-4		WOH/12"- 1- 2 (N=WOH/12"+ 1)	16 (679	5 %)				10.69	9		
	0	-	7.8 ft: Contains 3-inch peat layer at bo split spoon 8.0 ft: changes to trace peat and roots	ttom of		<u>())))))))))))))))))))))))))))))))))))</u>	В	S-5		WOH/12"- 1- 1 (N=WOH/12"+ 1)	19 (799) %)				3.21			
GDT 3/13/24 RI		-5	12.0 ft: Contains 6-inch peat layer		он		-	T-4			24 (100	429.6 %)	438	294	4	14.79	9		
CT-DESIGN.		-	14.0 ft: Conains 12-inch of brown peat	layer		()()()()()	-	S-6		WOH/18"- 1 (N=WOH/18")	24 (100	32.9 %)				49.24	4		
ECH_PROJE	5	_ _10	Paring terminated at 40.0 FT an 4/0/0	2				S-7	$\left \right\rangle$	WOH/24" (N=WOH/24")	22 (92	<u>2</u> %)				62.03	3		
IL ROCK STANDARD CHLORINE EPA.GPJ AECOM-GEOT			Boring backfilled with cuttings upon completion.																
AECOM SO	Al 124 Ger	ECC 420 M rman	DM TECHNICAL SERVICES ilestone Center Drive, Suite 150 town, MD 20876	5, INC.	B G PS	= Bull = Geo 6 = Pis	k Sam oprobe ston S	nple e Sample	S= T= H=	Split Spoon Sar Shelby Tube Sa Hand Auger Sar	nple mple mple	P = Pite RC = Roo SC = Sor	cher San ck Core nic Core	nple			SHEE	T 1 of 1	

			_								Lo	og c	of E	Bori	'n	g G	T-10	
		VECUN			PRC	DJE	CT:	St	andard Ch	lorir	e Site	Clean	up					
					PRC	DJE	CT L	OC.	ATION: 75	5 Gov	ernor Le	a Road	New	Castle,	DE			
					PRC	DJE	CT N	UМ	IBER: 607	0713	6	CC	ORE	DINATE	S: N	583323	E 594069	
C	DATE S	TARTED: 12/15/2023	DRILL M	1ETH	OD: 3	3-1/4	" I.D.	Hol	low Stem Aug	jer			Gro	oundwa	ater	Observ	ations	
C	DATE C	OMPLETED: 12/15/2023	HAMME	R TY	PE/W	/EIG	HT: A	utor	matic/140lbs		E	Event		Date		Time	Depth (ft)	Cave in Depth (ft)
L	OGGE	D BY: P. Mahato	CASING	TYP	E: H	SA					Encount	tered 7	7 1	2 15 201	22	10.40	14.0	
		ED BY: S. An		SIZE	E:3-1 ″⊏·N	1/4" 14/N/	^							2-10-202	23	10.40	14.0	-
	ORILLIN	RIG: Geoprobe 7822DT	BOREH			FH: 3	¬ 30.0 F	т			Comple	etion	1	2-15-202	23	15:40	Dry	12.0
0	RILLE	R: Doug Turner	SURFAC	CE EL	EVA	TION	l: 47	FT	+/-									
Ĺ	Ê					٧			SAMPLES			(%	(%	_			1	
DEPTH (F	, ELEV. (F	DESCRIPTION		NSCS	GRAPHIC	STRATUN	NUMBER	TYPE	BLOWS	REC (IN)	Moisture Content (%	Liquid Limit (Plastic Limit (Organic Content (%	PID (ppm)		REMARK AND TES	IS TS
-	-	0.0 - 6.0 ft: Moist, soft, dark gray, med plasticity, SANDY LEAN CLAY, trace c	um rganics				S-1	\mathbb{N}	1- 1- 2- 6 (N=3)	8 (33%	6)				0.1	0.0ft: Bu collected	ilk sample B d from 0 to 5	-2 was ft bgs.
		2.0 ft: changes to stiff		CL			S-2	\mathbb{N}	7- 6- 5- 6 (N=11)	20 (83%	6)				0.1			
5	-	4.0 ft: changes to soft, trace gravel					S-3	\mathbb{N}	1- 1- 3- 3 (N=4)	10 (42%	(6) 14.8				0.12	1		
-	40	6.0 - 23.0 ft: Moist, loose, light brown, SAND, trace organics	SILTY				S-4	\mathbb{N}	3- 4- 4- 3 (N=8)	20 (83%	6)				0.16			
-	- - D	8.0 ft: changes to dark gray and light t trace mica	prown,				S-5	\mathbb{N}	4- 3- 4- 4 (N=7)	19 (79%	6) 16.3				0.24			
	35						S-6	\square	3- 5- 5- 5 (N=10)	16 (67%	6)				0.12			
	- 	12.0 π: changes to yellowish brown				С	S-7	X	2- 4- 4- 4 (N=8)	22.9 (94%	5 6)				0.18			
	5			SM			S-8	X	3- 6- 4- 6 (N=10)	16 (67%	6)				0.50			
	3 <u>0</u> - - - -	18.0 ft: changes to medium dense, tra gravel	ce fine				S-9		5- 5- 6- 6 (N=11)	17.! (73%	5 6)				0.38			
	25 5	23.0 - 30.0 ft: Moist, loose, light gray, f coarse, POORLY GRADED SAND WI SILT, trace fine gravel	ine to FH	SP- SM		90	S-10		3- 4- 4- 5 (N=8)	24 (100 ⁰	10.5 %)	chor P			0.42			
	AEC 12420 I Germa	UIVI I EUMNICAL SERVICES Milestone Center Drive, Suite 150 ntown, MD 20876	, INC.	G = PS	= Geop = Pist	probe	ample	З= Т= Н=	Shelby Tube Sa Hand Auger Sar	mple mple	RC = Ro SC = So	ck Core	ihie			SHEE	T 1 of 2	

										Lo	g o	of B	Bori	ng	g GT-10
			ΔΞΓΟΜ	PR	OJE	CT:	St	andard Ch	orine	Site 0	Clean	up			
				PR	OJE	CT L	OC.	ATION: 755	Gover	nor Lea	Road,	New C	Castle,	DE	
				PR	OJE		IUM	IBER: 607	07136		СО	ORDI	NATE	S: N	583323 E 594069
	иемім (м.)	ELEV. (FT)	DESCRIPTION	USCS GRAPHIC	STRATUM	NUMBER	ТҮРЕ	SAMPLES BLOWS	REC (IN) (%)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Organic Content (%)	PID (ppm)	REMARKS AND TESTS
-	30	- 20 -	Boring terminated at 30.0 FT on 12/15/2023 at 15:40. Boring backfilled with cuttings upon	SP- SM	С	S-11	X	3- 4- 6- 6 (N=10)	24 (100%)					0.22	
REV-0			completion.												
PJ AECOM-GEOTECH_PROJECT-DESIGN.GDT 3/13/24															
VECOM SOIL ROCK STANDARD CHLORINE EPA.G	AE 124 Ger	EC(120 Mrman	OM TECHNICAL SERVICES, INC. ilestone Center Drive, Suite 150 town, MD 20876	B = Bul G = Geo PS = Pi	k Sam oprobe ston S	nple e Sample	S= T= H=	Split Spoon San Shelby Tube Sa Hand Auger Sar	nple P mple R nple S) = Pitc C = Roc C = Soni	her Sam k Core ic Core	ple		;	SHEET 2 of 2

Attachment B – Soil Laboratory Test Results



Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
GT-01	Bulk Sample B- 1	0-5'	Moist, black clay	90.5
GT-01	S- 3	4-6'	Wet, grayish brown silt with organics	237.8
GT-01	S- 7	12-14'	Moist, very dark gray clay with organics	81.5
GT-02	S- 10	23-25'	Moist, dark grayish brown silt	66.3
GT-02	S- 4	6-8'	Moist, dark brown clay with organics	117.8
GT-03	S- 4	6-8'	Moist, brownish gray clay with organics	92.2
GT-03	S- 6	10-12'	Moist, grayish brown silt with organics	46.7
GT-03	Bulk Sample B- 1	0-5'	Wet, olive brown clay	80.0
GT-04	Bulk Sample B- 1	0-5'	Wet, brown silt	40.7
GT-05	S- 1	0-2'	Moist, brown clay with organics	19.9

Notes: Temperature of Drying : 60° Celsius


Client: AECOM Project: Std Chlorine Site Cleanup Location: New Castle, DE Project No: GTX-318486 Boring ID: ---Sample Type: ---Tested By: ckg Sample ID: ---Test Date: 02/02/24 Checked By: ank Test Id: Depth : 756105 ---

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
GT-05	S- 4	6-8'	Moist, yellowish red clay with sand	12.2
GT-06	S- 7	14-16'	Moist, brown silt with organics	165.9
GT-06	Bulk Sample B- 1	0-5'	Wet, dark olive gray silty sand	58.8
GT-07	Bulk Sample B- 1	0-5'	Moist, dark yellowish brown silty sand with gravel	28.1
GT-07	S- 4	6-8'	Moist, reddish brown sand with silt and gravel	11.8
GT-07	S- 2	2-4'	Moist, brown silty sand with gravel	9.5
GT-08	S- 3	4-6'	Wet, light olive brown silt	42.7
GT-08	S- 6	12-14'	Moist, brown silt	32.9
GT-10	S- 5	8-10'	Moist, yellowish brown sandy clay with gravel	16.3
GT-10	Bulk Sample B- 1	0-5'	Moist, brown clay	27.8

Notes: Temperature of Drying : 110° Celsius



Client:	AECOM				
Project:	Std Chlorine Site Cleanup	1			
Location:	New Castle, DE			Project No:	GTX-318486
Boring ID:		Sample Type:		Tested By:	ckg
Sample ID:		Test Date:	02/09/24	Checked By:	ank
Depth :		Test Id:	757222		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
GT-10	S- 10	23-25'	Moist, brownish yellow sand	10.5
GT-10	S- 3	4-6'	Moist, reddish brown clay with gravel	14.8

Notes: Temperature of Drying : 110° Celsius



Client:	AECOM				
Project:	Std Chlorine Site Cleanup	I			
Location:	New Castle, DE			Project No:	GTX-318486
Boring ID:		Sample Type:		Tested By:	cam
Sample ID:		Test Date:	02/05/24	Checked By:	ank
Depth :		Test Id:	757217		

Moisture, Ash, and Organic Matter - ASTM D2974

Boring ID	Sample ID	Depth	Description	Moisture Content,%	Ash Content,%	Organic Matter,%
GT-01	S-3	4-6'	Wet, grayish brown silt with organics	238	80.4	19.6
GT-02	S-10	23-25'	Moist, dark grayish brown silt	142	89.4	10.6
GT-03	S-6	10-12'	Moist, grayish brown silt with organics	64	92.2	7.8
GT-07	S-2	2-4'	Moist, brown silty sand with gravel	9	97.7	2.3

Notes: Moisture content determined by Method A and reported as a percentage of oven-dried mass; dried to a constant mass at temperature of 105° C Ash content and organic matter determined by Method C; dried to constant mass at temperature 440° C



Laboratory Determination of Density (Unit Weight) of Soil Specimens by ASTM D7263

Boring ID	Sample ID	Depth	Visual Description	Bulk Density pcf	Moisture Content %	Dry Density pcf	*
GT-02	Shelby Tube T- 1	16-18'	Moist, olive silt	87.29	91.74	45.53	(1)
GT-03A	Shelby Tube T- 1 (5)	14-16'	Moist, olive silt	113.9	28.28	88.82	(2)
GT-03A	Shelby Tube T- 2 (6)	45-47'	Moist, olive clay	130.2	21.78	106.9	(3)
GT-04	Shelby Tube T- 2	8-10'	Moist, olive green silt	106.4	39.33	76.36	(4)
GT-06	Shelby Tube T- 3	12-14'	Moist, olive silt with organics	60.63	555.3	9.252	(5)
GT-08	Shelby Tube T- 1 (4)	10-12'	Moist, dark brown gUbXmsilt	68.65	429.6	12.96	(6)

* Sample Comments

(1): Method B-Cylinder, Intact

(2): Method B-Cylinder, Intact

(3): Method B-Cylinder, Intact

(4): Method B-Cylinder, Intact

(5): Method B-Cylinder, Intact

(6): Method B-Cylinder, Intact

Notes: Moisture Content determined by ASTM D2216.



Client:	AECOM				
Project:	Std Chlorine Site Cleanup	1			
Location:	New Castle, DE			Project No:	GTX-318486
Boring ID:		Sample Type:		Tested By:	ckg
Sample ID:		Test Date:	02/02/24	Checked By:	ank
Depth :		Test Id:	757219		

Amount of Material Passing #200 Sieve - ASTM D1140

Boring ID	Sample ID	Depth	Visual Description	Fines, %
GT-01	Bulk Sample B-1	0-5'	Moist, black clay	98.1
GT-02	S-4	6-8'	Moist, dark brown clay with organics	94.2
GT-03	Bulk Sample B-1	0-5'	Wet, olive brown clay	99.5
GT-03	S-6	10-12'	Moist, grayish brown silt with organics	95.2
GT-04	Bulk Sample B-1	0-5'	Wet, brown silt	78.8
GT-05	S-1	0-2'	Moist, brown clay with organics	66.7
GT-06	Bulk Sample B-1	0-5'	Wet, dark olive gray silty sand	67.3
GT-07	Bulk Sample B-1	0-5'	Moist, dark yellowish brown silty sand with gravel	31.0
GT-07	S-4	6-8'	Moist, reddish brown sand with silt and gravel	22.2
GT-08	S-3	4-6'	Wet, light olive brown silt	91.1

Notes: Tests performed using Method B - washing using a wetting agent

Dry mass of test specimen was determined directly



Client:	AECOM				
Project:	Std Chlorine Site Cleanup				
Location:	New Castle, DE			Project No:	GTX-318486
Boring ID:		Sample Type:		Tested By:	ckg
Sample ID:		Test Date:	02/06/24	Checked By:	ank
Depth :		Test Id:	756133		

Amount of Material Passing #200 Sieve - ASTM D1140

Boring ID	Sample ID	Depth	Visual Description	Fines, %
GT-10	Bulk Sample B-1	0-5'	Moist, brown clay	43.0
GT-10	S-10	23-25'	Moist, brownish yellow sand	13.9

Notes: Tests performed using Method B - washing using a wetting agent Dry mass of test specimen was determined directly



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup				
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-02		Sample Type:	tube	Tested By:	ckg
Sample ID:	Shelby Tub	e T-1	Test Date:	02/12/24	Checked By:	ank
Depth :	16-18'		Test Id:	756169		
Test Comm	ent:					
Visual Desc	ription:	Moist, olive sil	t			
Sample Cor	nment:					

Particle Size Analysis - ASTM D6913/D7928





Client:	AECOM					
Project:	Std Chlori	ne Site Cleanu	р			
Location:	New Castl	le, DE			Project No:	GTX-318486
Boring ID:	GT-02		Sample Type:	tube	Tested By:	ckg
Sample ID	: S-10		Test Date:	02/09/24	Checked By:	ank
Depth :	23-25'		Test Id:	756141		
Test Comm	nent:					
Visual Des	cription:	Moist, dark gi	rayish brown si	lt		
Sample Co	mment:					

Particle Size Analysis - ASTM D6913





	Client:	AECOM						
	Project:	Std Chlorin	ne Site	Cleanup				
D	Location:	New Castle	e, DE				Project No:	GTX-318486
9	Boring ID:	GT-03A			Sample Type:	tube	Tested By:	ckg
	Sample ID:	Shelby Tub	be T-1	(5)	Test Date:	02/12/24	Checked By:	ank
	Depth :	14-16'			Test Id:	756172		
	Test Comm	ent:						
	Visual Desc	ription:	Moist	, olive sil	t			
	Sample Cor	nment:						
	<u> </u>	-						
		~	-				· · · · · · · · · · · · · · · · · · ·	



Sample/Test Description
Sand/Gravel Particle Shape : ---Sand/Gravel Hardness : ---Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

AASHTO Clayey Soils (A-6 (14))

0.0307

0.0201

0.0122

0.0089

0.0063

0.0045

0.0032

0.0014

Percent Finer

91

71

51

38

31

26

20

14

Spec. Percent

Hydromete



	Client:	AECOM						
	Project:	Std Chlorii	ne Site Cleanup)				
Ň	Location:	New Castle	e, DE			Project No:	GTX-318486	
5	Boring ID:	GT-03A		Sample Type:	tube	Tested By:	ckg	
	Sample ID:	: Shelby Tul	pe T-2 (6)	Test Date:	02/09/24	Checked By:	ank	
	Depth :	45-47'		Test Id:	756173			
	Test Comm	ent:						
	Visual Desc	cription:	Moist, olive cla	ау				
	Sample Co	mment:						

Particle Size Analysis - ASTM D6913/D7928



0.0113

0.0083

0.0060

0.0043

0.0031

0.0013

62

54

47

42

36

24



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup)			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-04		Sample Type:	tube	Tested By:	ckg
Sample ID:	Shelby Tub	be T-2	Test Date:	02/12/24	Checked By:	ank
Depth :	8-10'		Test Id:	756170		
Test Comm	ent:					
Visual Desc	ription:	Moist, olive gr	een silt			
Sample Cor	nment:					





	Client:	AECOM					
	Project:	Std Chlorir	ne Site Cleanup	1			
	Location:	New Castle	e, DE			Project No:	GTX-318486
1	Boring ID:	GT-06		Sample Type:	tube	Tested By:	ckg
	Sample ID:	Shelby Tub	be T-3	Test Date:	02/12/24	Checked By:	ank
	Depth :	12-14'		Test Id:	756171		
	Test Comm	ent:					
	Visual Desc	ription:	Moist, olive sa	ndy silt with or	ganics		
	Sample Cor	mment:					



Separation of Sample: #200 Sieve



	Client:	AECOM						
	Project:	Std Chlorin	ne Site Cleanup)				
	Location:	New Castle	e, DE			Project No:	GTX-318486	
Ī	Boring ID:	GT-07		Sample Type:	tube	Tested By:	ckg	
	Sample ID:	S-2		Test Date:	02/07/24	Checked By:	ank	
	Depth :	2-4'		Test Id:	757215			
	Test Comm	ent:						
	Visual Desc	ription:	Moist, brown s	silty sand with g	gravel			
	Sample Cor	mment:						
ิล	rticle	Size	Analys	is - AS	TM D	6913		
~								



Sample/Test Description Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD



	Client:	AECOM					
	Project:	Std Chlorin	ne Site Cleanup	I			
à	Location:	New Castle	e, DE			Project No:	GTX-318486
9	Boring ID:	GT-08		Sample Type:	tube	Tested By:	ckg
	Sample ID:	Shelby Tub	oe T-1 (4)	Test Date:	02/12/24	Checked By:	ank
	Depth :	10-12'		Test Id:	756174		
	Test Comm	ent:					
	Visual Desc	ription:	Moist, dark br	own sandy silt			
	Sample Cor	nment:					

Particle Size Analysis - ASTM D6913/D7928 #100 #140 #200 #40 #60 #10 #20 4 100 90 80 70 60 Percent Finer 50 40 30 20 10 0 1000 100 10 1 0.1 0.01 0.001 Grain Size (mm) % Sand % Gravel % Silt & Clay Size % Cobble 0.0 39.2 60.8 Sieve Name Sieve Size, mm Percent Finer Spec. Percent Complies **Coefficients** D₈₅ = 2.8371 mm D₃₀ = 0.0093 mm 4.75 100 #4 $D_{60} = 0.0640 \text{ mm}$ D₁₅=0.0039 mm 75 #10 2.00 D₅₀ = 0.0253 mm $D_{10} = N/A$ #20 0.85 67 #40 0.42 64 $C_u = N/A$ $C_c = N/A$ 0.25 63 #60 Classification Sandy Elastic SILT (MH) #100 0.15 61 ASTM #140 0.11 61 #200 0.075 61 Particle Size (mm) Hydromete Percent Finer Spec. Percent Complies AASHTO Clayey Soils (A-7-5 (118)) 0.0358 57 0.0234 48 ----0.0135 40 0.0095 31

Sample/Test Description Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD Dispersion Device : Apparatus A - Mech Mixer Dispersion Period : 1 minute Est. Specific Gravity : 2.65 Separation of Sample: #200 Sieve

0.0068

0.0047

0.0034

0.0014

22

18

13

13



Client:	AECOM					
Project:	Std Chlorii	ne Site Cleanup)			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-01		Sample Type:	tube	Tested By:	cam
Sample ID:	Bulk Samp	ole B-1	Test Date:	02/08/24	Checked By:	ank
Depth :	0-5'		Test Id:	756090		
Test Comm	ent:					
Visual Desc	cription:	Moist, black c	lay			
Sample Co	mment:	Percent Passir	ng No. 200 Siev	/e= 98.5%		

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Bulk Sample B-1	GT-01	0-5'	91	n/a	n/a	n/a	n/a	

Dry Strength: LOW Dilatancy: RAPID Toughness: n/a The sample was determined to be Non-Plastic



Client:	AECOM					
Project:	Std Chlori	ne Site Cleanup)			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-01		Sample Type:	tube	Tested By:	cam
Sample ID	: S-3		Test Date:	02/06/24	Checked By:	ank
Depth :	4-6'		Test Id:	756136		
Test Comm	ient:					
Visual Desc	cription:	Wet, grayish b	prown silt with	organics		
Sample Co	mment:					



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	S-3	GT-01	4-6'	238	198	135	63	1.6	

Sample Prepared using the WET method



Client:	AECOM					
Project:	Std Chlorir	ne Site Cleanup	0			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-02		Sample Type:	tube	Tested By:	cam
Sample ID:	S-4		Test Date:	03/04/24	Checked By:	ank
Depth :	6-8'		Test Id:	759683		
Test Comm	ent:					
Visual Desc	cription:	Wet, dark bro	wn clay			
Sample Co	mment:					

Atterberg Limits - ASTM D4318/D2487



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
	S-4	GT-02	6-8'	118	95	45	50	1.5	
									Organic Silt (OH)

Sample Prepared using the WET metho	nd
Dry Strength: VERY HIGH	
Dilatancy: SLOW	
Toughness: LOW	
In order to properly describe the soil a The Oven Dried Liquid Limit was 53	n Oven Dried Liquid Limit test was performed. $53/95 = 0.56 < 0.75$



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup				
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-02		Sample Type:	tube	Tested By:	cam
Sample ID:	S-10		Test Date:	02/05/24	Checked By:	ank
Depth :	23-25'		Test Id:	756137		
Test Comm	ent:					
Visual Desc	ription:	Moist, dark gra	ayish brown sil	t		
Sample Cor	nment:					



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	S-10	GT-02	23-25'	66	128	85	43	-0.4	Elastic SILT (MH)

Sample Prepared using the WET method 2% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	AECOM					
Project:	Std Chlori	ne Site Cleanu	р			
Location:	New Castl	e, DE			Project No:	GTX-318486
Boring ID:	GT-02		Sample Type:	tube	Tested By:	cam
Sample ID	: Shelby Tul	be T-1	Test Date:	03/04/24	Checked By:	ank
Depth :	16-18'		Test Id:	759569		
Test Comm	ent:					
Visual Desc	cription:	Moist, olive s	ilt			
Sample Co	mment:					

Atterberg Limits - ASTM D4318/D2487



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Shelby Tube T-1	GT-02	16-18'	61	90	66	24	-0.2	Organic Silt (OH)

Sample Prepared using the WET method 2% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW

In order to properly describe the soil an Oven Dried Liquid Limit test was performed. The Oven Dried Liquid Limit was 59

59/90 = 0.66 < 0.75



Client:	AECOM					
Project:	Std Chlorii	ne Site Cleanup)			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-03		Sample Type:	tube	Tested By:	cam
Sample ID	: Bulk Samp	ole B-1	Test Date:	02/09/24	Checked By:	ank
Depth :	0-5'		Test Id:	756095		
Test Comm	nent:					
Visual Des	cription:	Wet, olive bro	wn clay			
Sample Co	mment:	Percent Passir	ng No. 200 Siev	/e= 99.5%		



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Bulk Sample B-1	GT-03	0-5'	80	48	31	17	2.9	

Sample Prepared using the WET method



Client:	AECOM					
Project:	Std Chlorir	ne Site Cleanup	I			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-03		Sample Type:	tube	Tested By:	cam
Sample ID:	S-4		Test Date:	03/04/24	Checked By:	ank
Depth :	6-8'		Test Id:	759570		
Test Comm	ent:					
Visual Desc	ription:	Wet, brownish	gray clay			
Sample Cor	nment:					

Atterberg Limits - ASTM D4318/D2487



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
	S-4	GT-03	6-8'	92	71	32	39	1.5	
									Organic Clay (OH)

Sample Prepared using the WET method Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW In order to properly describe the soil an Oven Dried Liquid Limit test was performed. The Oven Dried Liquid Limit was 43 43/71 = 0.61 < 0.75



	Client:	AECOM					
	Project:	Std Chlorin	ne Site Cleanup	1			
	Location:	New Castle	e, DE			Project No:	GTX-318486
)	Boring ID:	GT-03		Sample Type:	tube	Tested By:	cam
	Sample ID:	S-6		Test Date:	02/06/24	Checked By:	ank
	Depth :	10-12'		Test Id:	756125		
	Test Comm	ent:					
	Visual Desc	ription:	Moist, grayish	brown silt with	n organics		
	Sample Cor	mment:	Percent Passin	g No.200 Sieve	e= 92.4%		



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	S-6	GT-03	10-12'	47	53	40	13	0.5	

Sample Prepared using the WET method



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup				
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-03A		Sample Type:	tube	Tested By:	cam
Sample ID:	Shelby Tub	e T-1 (5)	Test Date:	02/09/24	Checked By:	ank
Depth :	14-16'		Test Id:	756166		
Test Comm	ent:					
Visual Desc	ription:	Moist, olive sil	t			
Sample Cor	mment:					



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Shelby Tube T-1 (5)	GT-03A	14-16'	37	38	26	12	0.9	SILT (ML)

Sample Prepared using the WET method 0% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	AECOM					
Project:	Std Chlorin	e Site Cleanup				
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-03A		Sample Type:	tube	Tested By:	cam
Sample ID:	Shelby Tub	e T-2 (6)	Test Date:	02/09/24	Checked By:	ank
Depth :	45-47'		Test Id:	756167		
Test Comm	ent:					
Visual Desc	ription:	Moist, olive cla	у			
Sample Cor	nment:					



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Shelby Tube T-2 (6)	GT-03A	45-47'	23	36	19	17	0.2	Lean CLAY (CL)

Sample Prepared using the WET method 0% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	AECOM									
Project:	Std Chlori	Std Chlorine Site Cleanup								
Location:	New Castl	e, DE			Project No:	GTX-318486				
Boring ID:	GT-04		Sample Type:	tube	Tested By:	cam				
Sample ID	: Bulk Sam	ple B-1	Test Date:	02/06/24	Checked By:	ank				
Depth :	0-5'		Test Id:	756091						
Test Comm	nent:									
Visual Desc	cription:	Wet, brown si	lt							
Sample Co	mment:	Percent Passir	ng No. 200 Siev	ve = 78.6%						
-										



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Bulk Sample B-1	GT-04	0-5'	41	35	26	9	1.6	

Sample Prepared using the WET method



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup				
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-04		Sample Type:	tube	Tested By:	cam
Sample ID:	Shelby Tub	e T-2	Test Date:	02/09/24	Checked By:	ank
Depth :	8-10'		Test Id:	756164		
Test Comm	ent:					
Visual Desc	ription:	Moist, olive gr	een silt			
Sample Cor	nment:					



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Shelby Tube T-2	GT-04	8-10'	22	52	30	22	-0.4	Elastic SILT (MH)

Sample Prepared using the WET method 5% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup	1			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-06		Sample Type:	tube	Tested By:	cam
Sample ID:	Bulk Samp	le B-1	Test Date:	02/09/24	Checked By:	ank
Depth :	0-5'		Test Id:	756092		
Test Comm	ent:					
Visual Desc	ription:	Wet, dark olive	e gray silty san	d		
Sample Cor	mment:	Percent passin	ig no. 200 siev	e = 68.4%		



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Bulk Sample B-1	GT-06	0-5'	59	39	29	10	З	

Sample Prepared using the WET method

Dry Strength: n/a Dilatancy: SLOW Toughness: LOW



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup	1			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-06		Sample Type:	tube	Tested By:	cam
Sample ID:	Shelby Tub	be T-3	Test Date:	03/04/24	Checked By:	ank
Depth :	12-14'		Test Id:	759567		
Test Comm	ent:					
Visual Desc	ription:	Moist, olive sa	ndy silt with or	ganics		
Sample Cor	nment:					

Atterberg Limits - ASTM D4318/D2487



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Shelby Tube T-3	GT-06	12-14'	534	152	95	57	7.7	Sandy Organic Silt (OH)

Sample Prepared using the WET method 27% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW

In order to properly describe the soil an Oven Dried Liquid Limit test was performed. The Oven Dried Liquid Limit was 76

76/152 = 0.5 < 0.75



	Client:	AECOM					
	Project:	Std Chlorin	ne Site Cleanup				
	Location:	New Castle	e, DE			Project No:	GTX-318486
1	Boring ID:	GT-07		Sample Type:	tube	Tested By:	cam
	Sample ID:	Bulk Samp	le B-1	Test Date:	02/09/24	Checked By:	ank
	Depth :	0-5'		Test Id:	756093		
	Test Comm	ent:					
	Visual Desc	ription:	Moist, dark ye	llowish brown s	silty sand w	ith gravel	
	Sample Cor	nment:	Percent Passin	g No.200 Sieve	e= 40.4%		



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Bulk Sample B-1	GT-07	0-5'	28	35	24	11	0.4	

Sample Prepared using the WET method



Client:	AECOM						
Project:	Std Chlorir	ne Site Cleanup	2				
Location:	New Castle	e, DE			Project No:	GTX-318486	
Boring ID:	GT-07		Sample Type:	tube	Tested By:	cam	
Sample ID:	: S-2		Test Date:	02/08/24	Checked By:	ank	
Depth :	2-4'		Test Id:	757214			
Test Comm	ent:						
Visual Description: Moist, brown			silty sand with gravel				
Sample Cor	mment:						

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	S-2	GT-07	2-4'	9	n/a	n/a	n/a	n/a	Silty SAND with Gravel (SM)

53% Retained on #40 Sieve Dry Strength: LOW Dilatancy: RAPID Toughness: n/a The sample was determined to be Non-Plastic



Client:	AECOM					
Project:	Std Chlori	ne Site Cleanup	0			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-08		Sample Type:	tube	Tested By:	cam
Sample ID:	: S-3		Test Date:	02/05/24	Checked By:	ank
Depth :	4-6'		Test Id:	757218		
Test Comm	ient:					
Visual Desc	cription:	Wet, light oliv	e brown silt			
Sample Co	mment:	Percent Passir	ng No. 200 Siev	/e= 90.7%		



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	S-3	GT-08	4-6'	43	34	26	8	2.1	

Sample Prepared using the WET method



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup				
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-08		Sample Type:	tube	Tested By:	cam
Sample ID:	Shelby Tub	be T-1 (4)	Test Date:	02/09/24	Checked By:	ank
Depth :	10-12'		Test Id:	756168		
Test Comm	ent:					
Visual Desc	ription:	Moist, dark bro	own gUbXmsilt			
Sample Cor	nment:					



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Shelby Tube T-1 (4)	GT-08	10-12'	430	438	294	144	0.9	

Sample Prepared using the WET method



Client:	AECOM					
Project:	Std Chlori	ne Site Cleanup)			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-10		Sample Type:	tube	Tested By:	cam
Sample ID:	: Bulk Samp	ole B-1	Test Date:	02/06/24	Checked By:	ank
Depth :	0-5'		Test Id:	756094		
Test Comm	ent:					
Visual Desc	cription:	Moist, brown o	clay			
Sample Co	mment:	Percent Passir	ng No. 200 Siev	/e = 42.8%		



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	Bulk Sample B-1	GT-10	0-5'	28	29	19	10	0.9	

Sample Prepared using the WET method



Phase calculations based on start of test.



Phase calculations based on start of test.



Phase calculations based on start of test.


Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup	I			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-01		Sample Type:	tube	Tested By:	cwd
Sample ID:	Bulk Samp	le B-1	Test Date:	02/13/24	Checked By:	ank
Depth :	0-5'		Test Id:	756107		
Test Comm	ent:					
Visual Desc	ription:	Moist, black cl	ау			
Sample Cor	nment:					



Method : A

Preparation : DRY

As received Moisture :91 %

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.55

84.5 pcf Maximum Dry Density= Optimum Moisture= 23.0 %



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup	I			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-03		Sample Type:	tube	Tested By:	cwd
Sample ID:	Bulk Samp	le B-1	Test Date:	02/13/24	Checked By:	ank
Depth :	0-5'		Test Id:	756112		
Test Comm	ent:					
Visual Desc	ription:	Wet, olive brow	wn clay			
Sample Cor	nment:					



Method : A

Preparation : DRY

As received Moisture :80 %

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.45

Maximum Dry Density=	92.2 pcf
Optimum Moisture=	19.9 %



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup	I			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-04		Sample Type:	tube	Tested By:	cwd
Sample ID:	Bulk Samp	le B-1	Test Date:	02/09/24	Checked By:	ank
Depth :	0-5'		Test Id:	756108		
Test Comm	ent:					
Visual Desc	ription:	Wet, brown sil	lt			
Sample Cor	nment:					



Data Points	Point 1	Point 2	Point 3	Point 4
Dry density, pcf	99.4	102.1	102.9	99.2
Moisture Content, %	14.1	15.9	17.7	19.9

Method : A

Preparation : DRY

As received Moisture :41 %

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.65

103.0 pcf Maximum Dry Density= . 17.2 % Optimum Moisture=



Client:	AECOM					
Project:	Std Chlorin	ne Site Cleanup	I			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-06		Sample Type:	tube	Tested By:	cwd
Sample ID:	Bulk Samp	le B-1	Test Date:	02/13/24	Checked By:	ank
Depth :	0-5'		Test Id:	756109		
Test Comm	ent:					
Visual Desc	ription:	Wet, dark oliv	e gray silty sar	nd		
Sample Cor	nment:					



Method : A

Preparation : DRY

As received Moisture :59 %

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.45

Maximum Dry Density=	99.4 pcf
Optimum Moisture=	16.8 %



Client:	AECOM					
Project:	Std Chlorin	ie Site Cleanup				
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-07		Sample Type:	tube	Tested By:	cwd
Sample ID:	Bulk Samp	le B-1	Test Date:	02/13/24	Checked By:	ank
Depth :	0-5'		Test Id:	756110		
Test Comm	ent:					
Visual Description: Moist, dark ye			ellowish brown silty sand with gravel			
Sample Cor	nment:					



Method : C		
Preparation : DRY		
As received Moisture :28 %		
Rammer : Manual		
Zero voids line based on assumed specific gravity of 2.65		
Maximum Dry Density=	109.2 pcf	
Optimum Moisture=	16.5 %	
<u>Oversize Correction (9% > 3/4</u>	<u>inch Sieve)</u>	
Corrected Maximum Dry Density=	112.3 pcf	
Corrected Optimum Moisture=	15.0 %	
Assumed Average Bulk Specific Gravity =	2.55	



Client:	AECOM					
Project:	Std Chlorin	ie Site Cleanup	1			
Location:	New Castle	e, DE			Project No:	GTX-318486
Boring ID:	GT-10		Sample Type:	tube	Tested By:	cwd
Sample ID:	Bulk Samp	le B-1	Test Date:	02/06/24	Checked By:	ank
Depth :	0-5'		Test Id:	756111		
Test Comm	ent:					
Visual Desc	ription:	Moist, brown o	lay			
Sample Cor	nment:					



Method : B

Preparation : DRY

As received Moisture :28 %

Rammer : Manual

Zero voids line based on assumed specific gravity of 3.5

139.9 pcf Maximum Dry Density= Optimum Moisture= 11.3 %

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report



Project Name: Std Chlorine Cleanup Location: New Castle, DE Project Number: GTX-318486 Boring Number: GT-04 Checker: njh Tester: sjt Sample Number: Shelby Tube T-2 Test Date: 02/07/24 Depth: 8-10' GeoTesting Test Number: IP-1 Preparation: intact Elevation: ---Client: AECOM EXPRESS Classification: Elastic SILT Group Symbol: MH Description: Moist, olive brown silt Remarks: TX-011, Swell Pressure = 0.0655 tsf Displacement at End of Increment

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15 Constant Volume Step Stress: 0.0655 tsf



Project Name: Std Chlorine Cleanup Location: New Castle, DE Project Number: GTX-318486 Boring Number: GT-04 Tester: sjt Checker: njh Sample Number: Shelby Tube T-2 Test Date: 02/07/24 Depth: 8-10' GeoTesting Test Number: IP-1 Elevation: ---Preparation: intact EXPRESS Client: AECOM Classification: Elastic SILT Group Symbol: MH Description: Moist, olive brown silt Remarks: TX-011, Swell Pressure = 0.0655 tsf

One-Dimensional Consolidation by ASTM D2435 - Method B Time Curve 2 of 15 Constant Load Step Stress: 0.125 tsf 1.0 1.5 ₽₽ ٦, 2.0 Strain, % 2.5 3.0 3.5 4.0 0.01 0.1 10 100 1000 1 Log of Time, min 1.0 1.5 ۳_۲ 2.0 Strain, % 2.5 3.0 3.5 4.0 0 5 10 15 20 25 30 Sqrt of Time, \sqrt{min}

	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486			
	Boring Number: GT-04	Tester: sjt	Checker: njh			
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'			
GeoTesting	Test Number: IP-1	Preparation: intact	Elevation:			
EXPRESS	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH			
	Description: Moist, olive brown silt					
	Remarks: TX-011, Swell Pressure = 0.0655 tsf					



2024-02-19 14:05:44 V 3.0.19.300

2024-02-07 10:14:08 V 3.0.19.300

4

Remarks: TX-011, Swell Pressure = 0.0655 tsf



	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486			
	Boring Number: GT-04	Tester: sjt	Checker: njh			
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'			
GeoTesting	Test Number: IP-1	Preparation: intact	Elevation:			
EXPRESS	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH			
	Description: Moist, olive brown silt					
	Remarks: TX-011, Swell Pressure = 0.0655 tsf					

One-Dimensional Consolidation by ASTM D2435 - Method B Time Curve 5 of 15 Constant Load Step Stress: 1 tsf 5.5 6.0 6.5 Strain, % 7.0 ήĥ, 7.5 8.0 8.5 0.01 0.1 10 100 1000 1 Log of Time, min 5.5 6.0 6.5 Strain, % 7.0 BQ BQ BBBB <u>ال</u> 7.5 8.0 8.5 0 5 10 15 20 25 30 Sqrt of Time, √min

GeoTesting EXPRESS	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
	Test Number: IP-1	Preparation: intact	Elevation:	
	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			

One-Dimensional Consolidation by ASTM D2435 - Method B Time Curve 6 of 15 **Constant Load Step** Stress: 2 tsf 7.5 8.0 8.5 Strain, % 9.0 **1**-1 9.5 -**m** 10.0 10.5 0.01 0.1 10 100 1000 1 Log of Time, min 7.5 8.0 8.5 Strain, % 9.0 9.5 10.0 10.5 0 5 10 15 20 25 30 Sqrt of Time, √min

	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
GeoTesting EXPRESS	Test Number: IP-1	Preparation: intact	Elevation:	
	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15 Constant Load Step Stress: 4 tsf



	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
GeoTesting	Test Number: IP-1	Preparation: intact	Elevation:	
EXPRESS	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			



GeoTesting E X P R E S S	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
	Test Number: IP-1	Preparation: intact	Elevation:	
	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			



Remarks: TX-011, Swell Pressure = 0.0655 tsf

One-Dimensional Consolidation by ASTM D2435 - Method B Time Curve 10 of 15 Constant Load Step

Stress: 32 tsf



GeoTesting EXPRESS	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486
	Boring Number: GT-04	Tester: sjt	Checker: njh
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'
	Test Number: IP-1	Preparation: intact	Elevation:
	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH
	Description: Moist, olive brown silt		
	Remarks: TX-011, Swell Pressure = 0.0655 tsf		



GeoTesting EXPRESS	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
	Test Number: IP-1	Preparation: intact	Elevation:	
	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			

12



County			
s s	Client: AECOM	Classification: Elastic SILT	
	Description: Moist, olive brown silt		
	Remarks: TX-011, Swell Pressure = 0.0655 tsf		

EXPRE

Group Symbol: MH



	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
GeoTesting	Test Number: IP-1	Preparation: intact	Elevation:	
EXPRESS	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			

One-Dimensional Consolidation by ASTM D2435 - Method B Time Curve 14 of 15 **Constant Load Step** Stress: 0.125 tsf 17.5 18.0 0-0-⁰⁻ 18.5 Strain, % 19.0 19.5 20.0 20.5 0.01 0.1 10 100 1000 1 Log of Time, min 17.5 18.0 18.5 ď Strain, % ų 19.0 19.5 20.0 20.5 0 5 10 15 20 25 30 Sqrt of Time, \sqrt{min}

GeoTesting EXPRESS	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
	Test Number: IP-1	Preparation: intact	Elevation:	
	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15 Constant Load Step Stress: 0.0625 tsf



GeoTesting EXPRESS	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
	Test Number: IP-1	Preparation: intact	Elevation:	
	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter, in: 2.50	Specific Gravity: 2.66 (Estimated)	Liquid Limit: 52
Specimen Height, in: 1.00	Initial Void Ratio: 0.978	Plastic Limit: 30
Final Height, in: 0.83	Final Void Ratio: 0.642	Plasticity Index: 22

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	Z0940			E7330
Mass Container, kg	0.00873	0.11005	0.11005	0.0087
Mass Container + Wet Soil, kg	0.30076	0.25763	0.24444	0.14127
Mass Container + Dry Soil, kg	0.22424	0.21835	0.21835	0.11553
Mass Dry Soil, kg	0.21551	0.1083	0.1083	0.10683
Water Content, %	35.51	36.27	24.09	24.09
Void Ratio		0.98	0.64	
Degree of Saturation, %		98.78	100.00	
Dry Unit Weight, pcf		84.047	101.26	

Preconsolidation Stress, tsf	
Compression Ratio	
Rebound Ratio	
Compression Index	
Rebound Index	

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
GeoTesting EXPRESS	Test Number: IP-1	Preparation: intact	Elevation:	
	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			

One-Dimensional Consolidation by ASTM D2435 - Method B

Sqrt of Time Coefficients

Step	Applied Stress tsf	EOI Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv in²/lb	k in/s
1	0.0655	0.01101	0.956	1.10	43.664	8.00e-05	1.21e-02	3.50e-08
2	0.125	0.02226	0.934	2.23	23.201	1.47e-04	1.36e-02	7.24e-08
3	0.250	0.03799	0.903	3.80	25.837	1.29e-04	9.06e-03	4.21e-08
4	0.500	0.05567	0.868	5.57	10.407	3.08e-04	5.09e-03	5.68e-08
5	1.00	0.07619	0.827	7.62	17.228	1.79e-04	2.95e-03	1.91e-08
6	2.00	0.09899	0.782	9.90	5.116	5.75e-04	1.64e-03	3.41e-08
7	4.00	0.1232	0.734	12.3	8.406	3.32e-04	8.71e-04	1.05e-08
8	8.00	0.1541	0.673	15.4	8.641	3.03e-04	5.56e-04	6.09e-09
9	16.0	0.1804	0.621	18.0	5.479	4.47e-04	2.37e-04	3.83e-09
10	32.0	0.2094	0.564	20.9	11.010	2.08e-04	1.30e-04	9.80e-10
11	8.00	0.2013	0.580	20.1	8.868	2.52e-04	2.43e-05	2.21e-10
12	2.00	0.1962	0.590	19.6	4.725	4.80e-04	6.11e-05	1.06e-09
13	0.500	0.1882	0.606	18.8	65.984	3.49e-05	3.82e-04	4.82e-10
14	0.125	0.1772	0.627	17.7	45.867	5.15e-05	2.12e-03	3.94e-09
15	0.0625	0.1709	0.640	17.1	71.279	3.38e-05	7.26e-03	8.87e-09

	Project Name: Std Chlorine Cleanup	Location: New Castle, DE	Project Number: GTX-318486	
	Boring Number: GT-04	Tester: sjt	Checker: njh	
	Sample Number: Shelby Tube T-2	Test Date: 02/07/24	Depth: 8-10'	
GeoTesting EXPRESS	Test Number: IP-1	Preparation: intact	Elevation:	
	Client: AECOM	Classification: Elastic SILT	Group Symbol: MH	
	Description: Moist, olive brown silt			
	Remarks: TX-011, Swell Pressure = 0.0655 tsf			
	Displacement at End of Increment			

One-Dimensional Consolidation by ASTM D2435 - Method A

Summary Report



	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486	
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm	
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'	
Geolesting EXPRESS	Test No.: IP-2	Sample Type: intact	Elevation:	
	Description: Wet, olive sandy organic silt			
	Remarks: TX-030 - Swell Pressure =0.0668 tsf			
	Displacement at End of Increment			

One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 1 of 15 Constant Volume Step Stress: 0.0668 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486	
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm	
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'	
	Test No.: IP-2	Sample Type: intact	Elevation:	
	Description: Wet, olive sandy organic silt			
	Remarks: TX-030 - Swell Pressure =0.0668	3 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 2 of 15 Constant Load Step Stress: 0.125 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Wet, olive sandy organic silt		
	Remarks: TX-030 - Swell Pressure =0.0668	3 tsf	

One-Dimensional Consolidation by ASTM D2435 - Method A Time Curve 3 of 15 Constant Load Step Stress: 0.25 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Wet, olive sandy organic silt		
	Remarks: TX-030 - Swell Pressure =0.0668	3 tsf	

One-Dimensional Consolidation by ASTM D2435 - Method A Time Curve 4 of 15 Constant Load Step Stress: 0.5 tsf Ē Strain, % 0.01 0.1 Time, min Strain, %

Square Root of Time, \sqrt{min}

GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486	
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm	
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'	
	Test No.: IP-2	Sample Type: intact	Elevation:	
	Description: Wet, olive sandy organic silt			
	Remarks: TX-030 - Swell Pressure =0.0668	tsf		

One-Dimensional Consolidation by ASTM D2435 - Method A Time Curve 5 of 15 Constant Load Step Stress: 1 tsf ጡ ÷ Strain, % 0.01 0.1 Time, min Strain, %

Square Root of Time, \sqrt{min}

GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Wet, olive sandy organic silt		
	Remarks: TX-030 - Swell Pressure =0.0668	3 tsf	

One-Dimensional Consolidation by ASTM D2435 - Method A Time Curve 6 of 15 Constant Load Step Stress: 2 tsf ÷ n Ē Strain, % 0.01 0.1 Time, min Strain, % 52

Square Root of Time, \sqrt{min}

GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Wet, olive sandy organic silt		
	Remarks: TX-030 - Swell Pressure =0.0668	tsf	

One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 7 of 15 Constant Load Step Stress: 4 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486	
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm	
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'	
	Test No.: IP-2	Sample Type: intact	Elevation:	
	Description: Wet, olive sandy organic silt			
	Remarks: TX-030 - Swell Pressure =0.0668	tsf		

One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 8 of 15 Constant Load Step Stress: 8 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Wet, olive sandy organic silt		
	Remarks: TX-030 - Swell Pressure =0.0668 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method A Time Curve 9 of 15 Constant Load Step Stress: 16 tsf Π, °°°° Strain, % 82 0.1 0.01 Time, min Strain, %

Square Root of Time, √mir	n
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GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Wet, olive sandy organic silt		
	Remarks: TX-030 - Swell Pressure =0.0668 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 10 of 15 Constant Load Step Stress: 32 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Wet, olive sandy organic silt		
	Remarks: TX-030 - Swell Pressure =0.0668 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 11 of 15 Constant Load Step Stress: 8 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Wet, olive sandy organic silt		
	Remarks: TX-030 - Swell Pressure =0.0668 tsf		
One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 12 of 15 Constant Load Step Stress: 2 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486		
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm		
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'		
	Test No.: IP-2	Sample Type: intact	Elevation:		
	Description: Wet, olive sandy organic silt				
	Remarks: TX-030 - Swell Pressure =0.0668 tsf				

One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 13 of 15 Constant Load Step Stress: 0.5 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486		
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm		
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'		
	Test No.: IP-2	Sample Type: intact	Elevation:		
	Description: Wet, olive sandy organic silt				
	Remarks: TX-030 - Swell Pressure =0.0668 tsf				

One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 14 of 15 Constant Load Step Stress: 0.125 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486		
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm		
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'		
	Test No.: IP-2 Sample Type: intact		Elevation:		
	Description: Wet, olive sandy organic silt				
	Remarks: TX-030 - Swell Pressure =0.0668 tsf				

One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 15 of 15 Constant Load Step Stress: 0.0625 tsf



GeoTesting EXPRESS	Project: Std Chlorine Clean Up	Location: New Castle, DE	Project No.: GTX-318486		
	Boring No.: GT-06	Tested By: jlw	Checked By: mcm		
	Sample No.: Shelby Tube T-3	Test Date: 2/15/24	Depth: 12-14'		
	Test No.: IP-2	Sample Type: intact	Elevation:		
	Description: Wet, olive sandy organic silt				
	Remarks: TX-030 - Swell Pressure =0.0668 tsf				

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Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.71	Liquid Limit: 152
Initial Height: 1.00 in	Initial Void Ratio: 18.6	Plastic Limit: 95
Final Height: 0.24 in	Final Void Ratio: 3.75	Plasticity Index: 57

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E9939	RING		E828
Mass Container, gm	8.26	108.79	108.79	8.33
Mass Container + Wet Soil, gm	123.21	183.42	135.25	34.7
Mass Container + Dry Soil, gm	26.39	119.89	119.89	19.39
Mass Dry Soil, gm	18.13	11.098	11.098	11.06
Water Content, %	534.03	572.48	138.43	138.43
Void Ratio		18.65	3.75	
Degree of Saturation, %		83.22	100.00	
Dry Unit Weight, pcf		8.6128	35.609	

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

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Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0668	0.02624	18.1	2.62	143.726	1.66e-07	3.93e-01	1.76e-04
2	0.125	0.04259	17.8	4.26	1134.368	2.02e-08	2.81e-01	1.53e-05
3	0.250	0.1718	15.3	17.2	189.110	1.03e-07	1.03e+00	2.88e-04
4	0.500	0.2841	13.1	28.4	204.634	7.15e-08	4.49e-01	8.66e-05
5	1.00	0.4076	10.6	40.8	162.615	6.46e-08	2.47e-01	4.30e-05
6	2.00	0.5291	8.25	52.9	143.254	4.84e-08	1.21e-01	1.59e-05
7	4.00	0.6364	6.15	63.6	139.023	3.07e-08	5.36e-02	4.45e-06
8	8.00	0.7229	4.45	72.3	145.853	1.73e-08	2.16e-02	1.01e-06
9	16.0	0.7850	3.22	78.5	155.369	9.56e-09	7.77e-03	2.00e-07
10	32.0	0.8285	2.37	82.8	172.232	5.32e-09	2.72e-03	3.90e-08
11	8.00	0.8131	2.67	81.3	169.959	4.64e-09	6.41e-04	8.01e-09
12	2.00	0.7950	3.03	79.5	466.047	2.02e-09	3.01e-03	1.64e-08
13	0.500	0.7800	3.32	78.0	1089.206	1.02e-09	1.00e-02	2.75e-08
14	0.125	0.7653	3.61	76.5	0.000	0.00e+00	3.92e-02	0.00e+00
15	0.0625	0.7581	3.75	75.8	0.000	0.00e+00	1.14e-01	0.00e+00

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	Displacement at End of Increment				