USACE Contract No.:
W912DQ-15-D-3013

100% Specifications

US Army Corps of Engineers
Kansas City District

Eighteen Mile Creek Superfund Site
Operable Units 1 & 2

Pre-Design Investigations/Remedial Design

Niagara County, New York

Task Order No. W912DQ17F3019

June 2022

CDM Smith

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.1 SITE DESCRIPTION

The Eighteen Mile Creek Superfund Site (the Site) consists of contaminated sediments, soil, and groundwater in and around Eighteen Mile Creek (the Creek); the creek extends from the New York State Erie Canal (the Canal) downstream for approximately 15 miles and discharges to Lake Ontario in Olcott, New York. Because of the nature and complexity of the contamination detected at the Site, it has been divided into four Operable Units (OUs) as described below.

OU1 addresses the risks associated with soil contamination at the nine residential properties located on Water Street and the threats posed from the deteriorating building at the former Flintkote Plant property. EPA issued a ROD for OU1 in September 2013.

OU2 addresses the contaminated soil and sediments located within the OU2 creek corridor, which includes the 4,000-foot length of the Creek from the Canal downstream to Harwood Street in the City of Lockport, New York, and the adjacent upland properties from north to south including the former Flintkote Plant property (Flintkote), the former United Paperboard Company (UPB) property, White Transportation and Upson Park. OU2 also addresses removal of two dilapidated dams (permitted Clinton Street Dam and unpermitted William Street Dam). EPA issued the OU2 ROD in January 2017.

OU3 addresses the groundwater within the creek corridor and contamination in downstream creek sediments from the north end of the creek corridor in Lockport to its location of discharge in Lake Ontario in Olcott, New York. Work under OU3 is not included under this project and is being addressed by others.

OU4 addresses lead contaminated soils at residential properties adjacent to the former Flintkote Plant property. Work under OU4 is not included under this project and is being addressed by others.

1.2 SITE HISTORY

The Site has a long history of industrial use dating to the 19th century, when the Creek was used as a source of hydropower. Various manufacturing facilities operated at the properties located along the creek corridor. Polychlorinated biphenyls (PCBs) and metals (particularly lead) were identified as the primary contaminants of concern (COCs) during the remedial investigation (RI). Other COCs (i.e., mercury, polycyclic aromatic hydrocarbons [PAHs], antimony, and copper) also were identified. The COCs were detected in sediments throughout the entire length of the Creek, with PCBs and lead concentrations being the highest in the creek corridor. Investigations showed PCB loading into Lake Ontario from the Creek, indicating PCBs are being mobilized in the water column throughout the Creek and may pose a significant bioaccumulation risk (CH2M Hill 2015).

Several investigations and remedial action (RA) activities were conducted

by EPA and NYSDEC between 1983 and 2016. Details of these investigations and RA activities are provided in the OU1 and OU2 RODs. The investigations and RA activities are summarized chronologically as follows:

1983-1984: A portion of the former Flintkote Plant property (Building A) was listed on NYSDEC's Registry of Inactive Hazardous Waste Sites. As part of a Phase 1 investigation conducted by NYSDEC, multiple 55-gallon drums were found containing solid material and PCB transformer oil; however, testing of these drums did not reveal the presence of PCBs. Subsequently, the former property owner arranged for offsite disposal of the drums, and the property was removed from NYSDEC's Registry of Inactive Hazardous Waste Sites.

1989: The City of Lockport's building inspection department reported the presence of multiple drums throughout the buildings at 300 Mill Street within the former Flintkote Plant property. Testing of these drums revealed they contained hazardous substances. NYSDEC disposed of these drums at an off-site location in 1991.

1999: NYSDEC investigated the former Flintkote Plant property and discovered the property received various wastes, refuse, and debris over the years of operation. Much of the waste material was visible at the ground surface and along the embankments of the Creek, consisting mainly of ash containing glass, coal, coke, slag, ceramic, bottles, brick, buttons, and wood.

2002: EPA conducted removal action within the Flintkote building at 300 Mill Street; 170 cubic yards (CY) of friable asbestos-containing materials within the building and debris from the property were removed and disposed offsite.

2002-2009: NYSDEC conducted multiple RIs for the Creek and properties located along the creek corridor. Approximately 46,500 CY of ash fill at the former Flintkote Plant property were identified. PCBs, metals, and PAHs were identified in surface and subsurface soils and sediments exceeding their respective NYSDEC Technical and Administrative Guidance Memorandum 4046 criteria.

2006: NYSDEC selected a remedy to address contamination at the former Flintkote Plant property (NYSDEC 2006).

2008: To delineate boundaries between sediment and upland soil within OU2, the bankfull width of the Creek was field delineated by NYSDEC (Ecology and Environment, Inc. [E&E] 2009a, 2009b). The bankfull width is commonly known as the width at which water begins to leave the channel and discharge to the floodplain.

2010: NYSDEC selected the remedies to address areas of contamination in the Creek, Water Street residential properties, Upson Park, the former UPB property, and the White Transportation property (NYSDEC 2010).

2011-2012: NYSDEC requested the Site be included on the National Priorities List; EPA subsequently listed the Site in 2012.

2012: EPA sent information request letters to eight companies, the City of Lockport, Niagara County, the New York State Canal Corporation (NYSCC), and two private individuals regarding potential activities that may have resulted in contamination in and around the Site. To date, no potentially responsible parties have been identified for the Site.

2013: EPA conducted a removal action at OU1, the Water Street residential properties, to mitigate the threat of direct contact with contaminated soil to current residents. This removal action consisted of placing gravel or clean topsoil (approximately 4 to 6 inches) with vegetation in areas where residents may come into direct contact with contaminated soil.

2013: EPA issued a ROD in September 2013 for OU1. This ROD superseded the one published by NYSDEC (EPA 2013).

2014-2016: EPA's Emergency and Rapid Response Service conducted a removal action to address portions of the OU1 ROD by demolishing the buildings at the former Flintkote Plant property. Contaminated demolition debris was transported for offsite disposal, whereas noncontaminated debris was used on-site as fill material. In addition, EPA acquired six privately owned residential properties on Water Street, permanently relocated the property owners/tenants, demolished the houses, and installed security fencing around the Water Street properties (EPA 2016).

2014-2016: EPA collected additional soil, fill, sediment, groundwater, and fish tissue samples to further characterize the nature and extent of contamination, fill identified data gaps, and complete a risk assessment for OU2.

2014-2016: Phase 1A cultural resources investigations were completed for OU1 and OU2, and a Phase 1B cultural resources survey and an investigation were recommended to be performed during the design phase of the remedy (E&E 2016).

2017: EPA issued a ROD in January 2017 for OU2. This ROD superseded the ROD published by NYSDEC (EPA 2017).

1.3 SUMMARY OF AVAILABLE DATA

1.3.1 Soils

Contract Drawings, including Upson Park, White Transportation, former UPB property, Water Street Properties, former Flintkote property, and the downstream areas. Lead and polychlorinated biphenyls (PCBs) are the contaminants of concern (COCs) specified in the OU1 and OU2 RODs for remediation. The remediation goals are presented in Table 01 11 00 - 1. Validated results collected from remedial investigation and pre-design investigation are provided in Attachment A to this specifications package. These data are used for developing the extent of upland soil excavation. Selected soil samples were also analyzed for lead using toxicity characteristic leaching procedure. Those results are also included in Attachment A to this section. All boring logs are included in Attachment B to this section.

Soil contaminations are generally found within the fill materials in the above upland areas. Lead concentrations as high as 12,000 milligram per kilogram (mg/kg), 13,000 mg/kg, 16,000 mg/kg were detected at Upson Park, the former UPB property, and the former Flintkote property, respectively. Toxicity characteristic leaching procedure (TCLP) results for lead of selected soil samples exceeded the criterion of 5 milligram per liter (mg/L), indicating the presence of hazardous waste. PCB results at selected area, Upson Park, the former UPB property, the former Flintkote property, exceeded 50 mg/kg, indicating the presence of Toxic Substance Control Act (TSCA) waste.

1.3.2 Sediment

PCBs are the COCs specified in the OU2 ROD. The sediment remedial action level is presented in Table 01 11 00 - 1. Because lead is a COC for soil at this site, it was also analyzed. Validated sediment results for PCBs and lead are included in Attachment A to this specifications package. Selected sediment samples were analyzed for lead using TCLP. Those results are also included in Attachment A to this specifications package. PCBs greater than 50 mg/kg were detected in sediment samples between the Clinton Street Dam and Olcott Street and in Mill Race, indicating the presence of TSCA waste.

1.3.3 Surface water and Groundwater

Surface water and groundwater samples were collected during the 2018 pre-design investigation at various locations, the results are included in Attachment A to this Section. These results are used to support the development of an onsite temporary water treatment system.

1.3.4 Suspected Underground Storage Tanks

Four borings were advanced around a suspected underground storage tank (UST) on UPB property. Results of these borings are included in Attachment A to this Section.

1.3.5 Geotechnical Investigation Results

Results of geotechnical investigation are included Attachment C to this specifications package. A treatability study was performed to evaluate sediment treatment options. The treatability study report is also included in Attachment D to this Section.

1.4 PROJECT OBJECTIVES

1.4.1 Remedial Action Objectives

The RAOs for OU1 Water Street properties and Former Flintkote property are:

a. Reduce or eliminate exposure (via ingestion and dermal contract) to PCBs and metals in soils at concentrations in excess of the preliminary remediation goals. The preliminary remediation goal for PCBs and lead is 1 and 400 parts per million (ppm), respectively

b. Reduce or eliminate the potential for migration of contaminants from the residential properties to the Creek.

The RAOs for OU2 are:

Reduce the cancer risks and noncancer health hazards for people eating fish from the Creek by reducing the concentration of PCBs and other site-related contaminants in fish.

b. Reduce and/or eliminate risks to ecological receptors by reducing exposure to contaminated soil/fill and sediments.

c. Reduce or eliminate potential human exposure to contaminated soil/fill at the Flintkote property, the White Transportation property, and UPB property to levels that are protective of commercial/industrial use

and protective of the environment.

d. Prevent or minimize exposure to contaminated soil/fill at Upson Park to levels that are protective of recreational use and protective of the environment.

e. Reduce or eliminate the migration of contamination in soil/fill from the Flintkote property, the White Transportation property, the UPB property, and Upson Park to adjacent properties, the Creek, and groundwater.

f. Reduce or eliminate the potential for migration of contaminants from the Creek to adjacent properties.

f. Reduce or eliminate the potential for migration of contaminants from the Creek to adjacent properties.

1.4.2 Remediation Goals

The remediation goals for surface soil, subsurface soil at each contaminated property and remedial action level for sediment as specified in the OU1 and OU2 RODs are listed below in Table 01 11 00 - 1 and are included in SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL. In addition, EPA Region 2 developed a lead policy for properties zoned for residential use - it requires that at no point in an exposure area can lead concentration in surface soil exceed 400 parts per million (ppm) following cleanup, and the composite lead concentration across the exposure area should be at or below 200 ppm following cleanup. This policy is applicable to Upson Park and the Water Street Properties and the requirements are included in SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL for backfill material.

Table 01 11 00 - 1 Remediation Goals

Property	PCB (ppm)	Lead (ppm)
Soil		
Upson Park	1	400
White Transportation - Surface	1	1,000
White Transportation - Sub-Surface	10	1,000
United Paperboard - Surface	1	1,000
United Paperboard - Sub-Surface	10	1,000
Water Street Residential	1	400
Flintkote - Surface	1	1,000
Flintkote - Sub-Surface	10	1,000
Sediment		

Property	PCB (ppm)	Lead (ppm)
Creek Channel	1	Not Established

Notes:
1. Surface is defined as soil from ground surface to 2 feet below ground surface. Subsurface is defined as soil deeper than 2 feet.
2. Remediation goals for surface and subsurface soil are the same for Upson Park and the Water Street Properties

1.5 WORK COVERED BY CONTRACT DOCUMENTS

The Contract Documents (specifications and drawings) were prepared using a combination of performance and prescriptive design. The prescriptive design includes the excavation boundaries and depths, backfill compaction, final grading plan, material specifications, selected vegetation for site restoration, gravity flow diversion pipe, creek restoration. The Contractor shall develop the means and methods to complete the work; a list of the definable features of work is listed below. The Contractor shall submit plans for approval prior to start of construction activities. The purpose of this format is to encourage the Contractor to add value to the project based on previous experience.

a. Temporary construction facilities and utilities

b. Soil erosion and sediment control during construction

c. Site preparation, including clearing, grubbing, and demolition

d. Handling, waste characterization, transportation and off-site disposal of debris and waste; materials shall be recycled to the extent practical

e. Structural/geotechnical inspection and evaluation of UPB building/vault

f. Excavation of upland contaminated soils and archaeological monitoring

g. Management/diversion of Creek flow (including the installation of a permanent gravity flow bypass line, which will be transferred to the City of Lockport)

h. Temporary bridge construction

i. Stormwater management and onsite water treatment

j. Bank to bank sediment removal, dewatering, and control of suspended sediment

k. Monitoring well abandonment/removal and re-installation

l. Removal of William Street Dam and Clinton Street Dam

m. Soil and sediment processing/solidification

n. l. Waste Characterization, and transportation and disposal of TSCA, mixed waste (both TSCA and hazardous), hazardous, and non-hazardous wastes.

o. Stream and wetland restoration

p. Upland restoration

q. Maintenance and monitoring of restored site

1.5.1 Permits and Approvals

The Contractor shall obtain the necessary permits and approvals from applicable federal, state, and local regulatory agencies to execute the project. The Contractor shall be responsible for all fees related to permits/authorizations issued with regards to the work completed and waste transportation by the Contractor.

Below is a summary of permit equivalencies and approvals that have been identified as being required for the work at the site.

Table 01 11 00 - 2 Permit Equivalencies and Approvals

Authority	Permits/Approval	Responsibility
Niagara County Soil and Water Conservation District	Approvals for soil erosion and sediment control (SESC) plan	Contractor
New York Department of Environmental Conservation	401 Water Quality Certification	EPA
	Dam Safety Permit	EPA
	State Pollutant Discharge Elimination System Permit	Contractor
USACE Buffalo District	Nationwide Permit 38 - Cleanup of Hazardous and Toxic Waste	EPA
City of Lockport	Removal of Olcott Street Bridge	Contractor
	Construction/Excavation/Demol permit	Contractor
	Removal of stormwater or sanitary sewer pipe and installation of flow diversion pipe	Contractor
	Wastewater Discharge Permit (only if effluent from onsite water treatment system can be discharged to the municipal wastewater treatment plant	EPA/Contractor
	Local floodplan permiyt	EPA/Contractors

1.5.2 Notification

Provide notification and coordinate with the agencies and stakeholders as provided on the Contract Drawing. The Stakeholders include but may not be limited to: The City of Lockport Town Engineer, Police Department, Department of Public Works, and the New York State Canal Corporation. At the time of the design, the contact person is:

Richard P. Manns
Deputy Western Division Canal Engineer
4950 Genesee Street, Suite 190
Cheektowaga, NY 14225
(716) 686-4401 office
(716) 200-3843 mobile

1.5.3 Submittals

Provide all submittals identified in the specifications and summarized in the submittal register in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

1.5.4 Performance

Provide all materials, labor, equipment, and facilities required to perform the work in accordance with the Contract Documents.

1.5.5 Health and Safety

Comply with health and safety requirements as specified in SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and SECTION 01 35 55 - PERIMETER AIR MONITORING.

1.5.6 Traffic Control and Security

Perform traffic control and provide site security in accordance with approved plans and as specified in SECTION 01 35 53 - SECURITY and SECTION 01 55 26 - TRAFFIC CONTROL.

1.5.7 Structural Evaluation

Perform structural evaluation for UPB building and the dilapidated wall to develop and determine structural support necessary for performing excavation and sediment removal around that area without impacting the UPB Building and any section of wall to remain in place in accordance with SECTION 02 41 00 - DEMOLITION and SECTION 31 00 00 - EARTHWORK.

1.5.8 Staging Area

Constructing the staging area in accordance with the approved plan and as directed by government.

1.5.9 Signs

Install project and safety signs as specified in SECTION 01 58 13 - SIGNS.

1.5.10 Temporary Facilities

Establish the temporary facilities as shown on the Contract Drawings and in accordance with SECTION 01 50 00 - TEMPORARY CONSTRUCTION FACILITIES

AND UTILITIES.

1.5.11 Erosion Controls and Stormwater Management

Install and maintain erosion and stormwater management controls including silt fences and diversions in accordance with SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

1.5.12 Site Preparation

Perform site preparation including clearing and grubbing, installation of decontamination pad; removal of debris; monitoring well abandonment; as shown on the Contract Drawings and in accordance with SECTION 02 10 00 - SITE PREPARATION, SECTION 02 41 00 - DEMOLITION, SECTION 31 11 00 - CLEARING AND GRUBBING, and SECTION 33 51 39 - MONITORING WELLS.

1.5.13 Survey

Perform surveying in accordance with SECTION 01 71 23 - SURVEYING.

1.5.14 Utilities

Mark out all utilities, perform geophysical survey, field verify underground utilities, and identify buried anomalies (e.g., UST) within demolition and construction limits

1.5.15 Upland Excavation, Sediment Removal, and Backfill

Perform upland excavation and bank to bank sediment removal as specified on the contract drawings, in accordance with SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL and SECTION 31 00 00 - EARTHWORK, and in accordance with the approved excavation and sediment removal plan.

1.5.16 Management of Stormwater and Dewatering

Perform stormwater management in accordance with SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL, SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER, and SECTION 31 23 19 - DEWATERING.

1.5.17 Management and Diversion of Creek Flow

Manage and divert flow in Eighteen Mile Creek in accordance with the approved plan and SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER.

1.5.18 Post-Excavation Sampling

Perform post-excavation sampling in accordance with SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL and analyzed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL and as shown on Contract Drawings.

1.5.19 Waste Characterization, Handling, and Disposal or Consolidation

Perform waste characterization in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL and SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

1.5.20 Temporary Water Treatment System and Discharge

Water generated from sediment dewatering, decontamination, and stormwater in direct contact with contaminated soil and sediment at the staging area will be temporarily stored, filtered and discharged to the Eighteen Mile Creek in accordance with the approved plan and the general state pollutant discharge elimination system permit requirements. Because the creek corridor is class D water, there is no turbidity standard. The Contractor shall make visual inspection of the discharged water periodically to make sure it is clear. The Contractor may also consider discharge of the treated water to the wastewater treatment plant of the City of Lockport per City and Government approval.

1.5.21 Site Restoration

Perform site restoration as shown on the Contract Drawings, in accordance with SECTION 02 91 00 - SITE RESTORATION, SECTION 32 72 00 - STREAM RESTORATION, SECTION 32 92 19 - LOAMING AND SEEDING, SECTION 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING and the approved plans. Two monitoring wells shall be re-installed in accordance with SECTION 33 51 39 - MONITORING WELLS. Demobilize from the site after government approval.

1.5.22 Monitoring, Inspection, and Maintenance

Perform restoration maintenance, monitoring, and inspection activities in accordance with SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

1.5.23 Project Closeout

Complete closeout and project documentation in accordance with SECTION 01 78 00 - PROJECT CLOSEOUT.

1.6 GREEN REMEDIATION

The Contractor shall perform green remediation in accordance with federal requirements and SECTION 01 33 29 - SUSTAINABILITY REPORTING.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

Attachment A

Analytical Data

Table A-1
Analytical Results – Upson Park
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample	Sample	Soil Criteria	400		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-L01W-S04	18MC-L01W-S04-Z1	0	0.167	SO	N	4/18/2007	18.8		NA		0.137	0.019	U	0.019	U	0.019	U	0.019	U	0.034		0.045		0.058		0.019	U	0.019	U
18MC-L01W-S04	18MC-L01W-S04-Z2	0.9	2	SO	N	4/18/2007	36.3		NA		0.023	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.023		0.02	U	0.02	U	0.02	U
18MC-L01W-S04	18MC-L01W-S04-Z3	2	3	SO	N	4/18/2007	36		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L01W-S05	18MC-L01W-S05-Z1	0	0.167	SO	N	4/18/2007	362		NA		0.037	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.037		0.02	U	0.02	U	0.02	U
18MC-L01W-S05	18MC-L01W-S05-Z2	1	2	SO	N	4/18/2007	47.8		NA		0.034	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.034		0.022	U	0.022	U	0.022	U
18MC-L01W-S05	18MC-L01W-S05-Z3	2	3	SO	N	4/18/2007	122		NA		0.077	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021		0.056		0.021	U	0.021	U
18MC-L01W-S06	18MC-L01W-S06-Z1	0	0.167	SO	N	4/18/2007	**884**		NA		0.18	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.18		0.022	U	0.022	U	0.022	U
18MC-L01W-S06	18MC-L01W-S06-Z2	1	2	SO	N	4/18/2007	268		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L02W-S04	18MC-L02W-S04-Z1	0	0.167	SO	N	4/18/2007	97.9	J	NA		0.52	0.021	U	0.021	U	0.021	U	0.021	U	0.3		0.22		0.021	U	0.021	U	0.021	U
18MC-L02W-S04	18MC-L02W-S04-Z2	1.5	2	SO	N	4/18/2007	160	J	NA		0.32	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.24		0.02	U	0.02	U	0.08	
18MC-L02W-S04	18MC-L02W-S04-Z3	2.5	3	SO	N	4/18/2007	**1390**	J	NA		**4**	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	**2.8**		0.23	U	0.23	U	**1.2**	
18MC-L02W-S04A	18MC-L02W-S04A-3-5	3	5	SO	N	10/18/2018	**2700**		2.1	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L02W-S04A	18MC-L02W-S904A-3-5	3	5	SO	FD	10/18/2018	NA		2.2	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L02W-S04A	18MC-L02W-S04A-4.5-5	4.5	5	SO	N	10/18/2018	NA		NA		**1.3**	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	**1.3**	J+	0.037	U	0.037	U
18MC-L02W-S04A	18MC-L02W-S04A-5-7	5	7	SO	N	10/18/2018	270		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L02W-S04A	18MC-L02W-S04A-NAT	6	6.5	SO	N	10/18/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
18MC-L02W-S04A	18MC-L02W-S04A-7-9	7	8.4	SO	N	10/18/2018	66		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L02W-S05	18MC-L02W-S05-Z1	0	0.167	SO	N	4/18/2007	**921**	J	NA		0.182	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.095		0.022	U	0.022	U	0.087	
18MC-L02W-S05	18MC-L02W-S05-Z2	0.2	1	SO	N	4/18/2007	**1150**	J	NA		0.11	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.11	
18MC-L02W-S05	18MC-L02W-S05-Z3	1	2	SO	N	4/18/2007	**407**	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L02W-S05A	18MC-L02W-S05A-0-2	0	1.9	SO	N	10/18/2018	**810**		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L02W-S06	18MC-L02W-S06-Z1	0	0.167	SO	N	4/18/2007	308	J	NA		ND	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U
18MC-L02W-S06	18MC-L02W-S06-Z2	1	2	SO	N	4/18/2007	**980**	J	NA		0.16	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.16	J	0.021	U	0.021	U
18MC-L02W-S06	18MC-L02W-S06-Z3	2	2.5	SO	N	4/18/2007	98.4	J	NA		0.012	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.012	J	0.02	U	0.02	U	0.02	U
18MC-L03W-S04	18MC-L03W-S04-Z1	0	0.167	SO	N	4/19/2007	**597**	J	NA		0.222	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.18		0.023	U	0.042	
18MC-L03W-S04	18MC-L03W-S04-Z2	2	3	SO	N	4/19/2007	82.5	J	NA		0.058	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.045		0.024	U	0.013	J
18MC-L03W-S05	18MC-L03W-S05-Z1	0	0.167	SO	N	4/19/2007	**3480**	J	NA		ND	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U
18MC-L03W-S05	18MC-L03W-S05-Z2	2	3	SO	N	4/19/2007	**2320**	J	NA		0.0093	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.0093	J
18MC-L03W-S05A	18MC-L03W-S05A-3-5	1	3	SO	N	9/18/2018	**2500**		0.17	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L03W-S06	18MC-L03W-S06-Z1	0	0.167	SO	N	4/19/2007	160	J	NA		0.038	0.022	U	0.022	U	0.022	U	0.022	U	0.012	J	0.026		0.022	U	0.022	U	0.022	U
18MC-L03W-S06	18MC-L03W-S06-Z2	1.5	2.5	SO	N	4/19/2007	103	J	NA		0.029	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.029		0.02	U	0.02	U	0.02	U
18MC-L04W-S04	18MC-L04W-S04-Z1	0	0.167	SO	N	4/20/2007	169	J	NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-L04W-S04	18MC-L04W-S04-Z2	1.5	2.3	SO	N	4/20/2007	11.3	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L04W-S05	18MC-L04W-S05-Z1	0	0.167	SO	N	4/20/2007	24	J	NA		0.016	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.016	J	0.02	U	0.02	U	0.02	U
18MC-L04W-S05	18MC-L04W-S05-Z2	0.7	1.5	SO	N	4/20/2007	14.7	J	NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-L05W-S04	18MC-L05W-S04-Z1	0	0.167	SO	N	4/20/2007	22.3	J	NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-L05W-S04	18MC-L05W-S04-Z2	0.7	1.5	SO	N	4/20/2007	25.5	J	NA		ND	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U
18MC-MW14	18MC-MW14-Z1	12	14	SO	N	6/19/2007	17.4	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-MW15	18MC-MW15-Z1	10	12	SO	N	6/12/2007	26.1	J	NA		0.01	0.022	U	0.022	U	0.022	U	0.022	U	0.01	J	0.022	U	0.022	U	0.022	U	0.022	U
18MC-MW16	18MC-MW16-Z1	8	10	SO	N	6/12/2007	7.9	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-MW17	18MC-MW17-Z1	16	18	SO	N	6/5/2007	14.6		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U

Table A-1
Analytical Results – Upson Park
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample	Sample	Soil Criteria	400		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-SB11	18MC-SB11-Z1	3	4	SO	N	6/25/2007	274		NA		0.0187	0.023	U	0.023	U	0.023	U	0.023	U	0.012	J	0.023	U	0.0067	J	0.023	U	0.023	U
18MC-SB12	18MC-SB12-Z1	6	6.8	SO	N	4/26/2007	64.2	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-SB12	18MC-SB12-Z2	8.5	11.6	SO	N	4/26/2007	8.9	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-SB13	18MC-SB13-Z1	0.5	2	SO	N	4/26/2007	19.8	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-SB13	18MC-SB13-Z2	4	6	SO	N	4/26/2007	15.9	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-SB14	18MC-SB14-Z1	8	10.2	SO	N	4/26/2007	**946**	J	NA		0.09	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.09		0.024	U	0.024	U	0.024	U
18MC-SB14	18MC-SB14-Z2	10.2	11.5	SO	N	4/26/2007	**77300**	J	NA		ND	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U
18MC-SB14A	18MC-SB14A-0-2	0	2	SO	N	10/2/2018	41		0.0069	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB14A	18MC-SB14A-2-4	2	4	SO	N	10/2/2018	**2600**		2	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB14A	18MC-SB14A-4-6	4	6	SO	N	10/2/2018	**1800**		**5.4**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB14A	18MC-SB914A-0-2	4	6	SO	FD	10/2/2018	93		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB14A	18MC-SB14A-6-8	6	8	SO	N	10/2/2018	**12000**		**69.6**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB14A	18MC-SB14A-8-10	8	10	SO	N	10/2/2018	**3500**		3.8	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB14A	18MC-SB14A-10-12	10	12	SO	N	10/2/2018	**12000**		**14.1**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB14A	18MC-SB14A-12-14	12	14	SO	N	10/2/2018	28		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB14A	18MC-SB14A-14-15	14	15	SO	N	10/2/2018	29		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SS14	18MC-SS14-Z1	0	0.167	SO	N	4/16/2007	22.1	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-SS15	18MC-SS15-Z1	0	0.167	SO	N	4/16/2007	151	J	NA		0.66	0.023	U	0.023	U	0.023	U	0.023	U	0.15		0.22		0.29		0.023	U	0.023	U
18MC-SS16	18MC-SS16-Z1	0	0.167	SO	N	4/16/2007	177	J	NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-SS17	18MC-SS17-Z1	0	0.167	SO	N	4/16/2007	93.3	J	NA		0.0063	0.02	U	0.02	U	0.02	U	0.02	U	0.0063	J	0.02	U	0.02	U	0.02	U	0.02	U
18MC-SS17	18MC-SS17-Z1/D	0	0.167	SO	FD	4/16/2007	69.6	J	NA		0.0097	0.02	U	0.02	U	0.02	U	0.02	U	0.0097	J	0.02	U	0.02	U	0.02	U	0.02	U
DEC-UPSON-1	UPSON-1	0	0.17	SO	N	9/22/2005	**3090**		NA		**1.6**	1	U	1	U	1	U	1	U	1	U	1	U	**1.6**		NA		NA	
DEC-UPSON-1	UPSON-1B	0.67	0.83	SO	N	9/22/2005	**1770**		NA		0.49	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	0.49	J	NA		NA	
DEC-UPSON-1B-A	DEC-UPSON-1B-A-1-2	1	2	SO	N	10/22/2018	**640**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-UPSON-1B-A	DEC-UPSON-901B-A-1-2	1	2	SO	FD	10/22/2018	**1200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-UPSON-1B-A	DEC-UPSON-1B-A-2-4	2	4	SO	N	10/22/2018	**1000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-UPSON-1B-A	DEC-UPSON-1B-A-2-5	2	5	SO	N	10/22/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
DEC-UPSON-1B-A	DEC-UPSON-1B-A-4-6	4	6	SO	N	10/22/2018	38		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-UPSON-1B-A	DEC-UPSON-1B-A-NAT	5	6	SO	N	10/22/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
DEC-UPSON-2	UPSON-2	0	0.17	SO	N	9/22/2005	**2740**		NA		**23**	11	U	11	U	11	U	11	U	11	U	**23**		11	U	NA		NA	
DEC-UPSON-2	UPSON-2B	0.17	0.83	SO	N	9/22/2005	**2930**		NA		**80**	20	U	20	U	20	U	20	U	20	U	**80**		20	U	NA		NA	
DEC-UPSON-2B-A	DEC-UPSON-2B-A-0-4	0	4	SO	N	10/18/2018	**5700**		**7.7**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-UPSON-2B-A	DEC-UPSON-2B-A-2-8	2	8	SO	N	10/18/2018	NA		NA		0.76	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.76	J+	0.043	U	0.043	U
DEC-UPSON-2B-A	DEC-UPSON-2B-A-4-8	4	8	SO	N	10/18/2018	**8500**		**26**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-UPSON-2B-A	DEC-UPSON-2B-A-8-10	8	10	SO	N	10/18/2018	**6700**		**22.6**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-UPSON-2B-A	DEC-UPSON-2B-A-8-11	8	11	SO	N	10/18/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
DEC-UPSON-2B-A	DEC-UPSON-2B-A-NAT	11	11.5	SO	N	10/18/2018	NA		NA		ND	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
OU2-SS01	OU2-SS01-Z1	0	0.5	SO	N	12/1/2014	146		NA		ND	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
OU2-SS01	OU2-SS01-Z2	0.5	2	SO	N	12/1/2014	226		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
OU2-SS02	OU2-SS02-Z1	0	0.5	SO	N	12/1/2014	117		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
OU2-SS02	OU2-SS02-Z2	0.5	2	SO	N	12/1/2014	157		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
OU2-SS03	OU2-SS03-Z1	0	0.5	SO	N	12/1/2014	300		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
OU2-SS03	OU2-SS03-Z1/D	0	0.5	SO	FD	12/1/2014	278		NA		ND	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
OU2-SS03	OU2-SS03-Z2	0.5	2	SO	N	12/1/2014	185		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
OU2-SS04	OU2-SS04-Z1	0	0.5	SO	N	12/1/2014	112		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-SS04	OU2-SS04-Z2	0.5	2	SO	N	12/1/2014	**424**		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-SS05	OU2-SS05-Z1	0	0.5	SO	N	12/1/2014	139		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
OU2-SS05	OU2-SS05-Z2	0.5	2	SO	N	12/1/2014	162		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-SS06	OU2-SS06-Z1	0	0.5	SO	N	12/1/2014	49.2		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
OU2-SS06	OU2-SS06-Z2	0.5	2	SO	N	12/1/2014	23		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
OU2-SS07	OU2-SS07-Z1	0	0.5	SO	N	12/1/2014	123		NA		ND	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
OU2-SS07	OU2-SS07-Z2	0.5	2	SO	N	12/1/2014	156		NA		0.26	0.26		0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
OU2-SS08	OU2-SS08-Z1	0	0.5	SO	N	12/1/2014	111		NA		ND	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
OU2-SS08	OU2-SS08-Z2	0.5	2	SO	N	12/1/2014	291		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
OU2-SS09	OU2-SS09-Z1	0	0.5	SO	N	12/1/2014	201		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
OU2-SS09	OU2-SS09-Z2	0.5	2	SO	N	12/1/2014	175		NA		**390**	3.9	U	3.9	U	3.9	U	3.9	U	**250**	J	**140**		3.9	U	3.9	U	3.9	U
OU2-SS09A	OU2-SS09A-2-5	2	5	SO	N	10/19/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-SS09A	OU2-SS09A-5-8	5	8	SO	N	10/19/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-SS09A	OU2-SS09A-8-10 OR NAT	6	7.8	SO	N	10/19/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-SS09A	OU2-SS909A-8-10 OR NAT	6	7.8	SO	FD	10/19/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-SS10	OU2-SS10-Z1	0	0.5	SO	N	12/1/2014	106		NA		0.16	0.039	U	0.039	U	0.039	U	0.039	U	0.16	JN	0.039	U	0.039	U	0.039	U	0.039	U
OU2-SS10	OU2-SS10-Z2	0.5	2	SO	N	12/1/2014	332		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U

Table A-1
Analytical Results – Upson Park
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample	Sample	Soil Criteria	400		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
OU2-SS11	OU2-SS11-Z1	0	0.5	SO	N	5/18/2015	NA		NA		0.226	0.00099	U	0.00099	U	0.00099	U	0.00099	U	0.00099	U	0.13	J	0.063		0.00099	U	0.033	J
OU2-SS11	OU2-SS11-Z1-Q	0	0.5	SO	FD	5/18/2015	NA		NA		0.22	0.001	U	0.001	U	0.001	U	0.001	U	0.038	J	0.1	J	0.055		0.001	U	0.027	J
OU2-SS11	OU2-SS11-Z2	1	1.5	SO	N	5/18/2015	NA		NA		0.0436	0.0009	U	0.0009	U	0.0009	U	0.0009	U	0.0009	U	0.022		0.012		0.0009	U	0.0096	
OU2-SS11	OU2-SS11-Z3	1.5	2.8	SO	N	5/18/2015	NA		NA		0.568	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.29	J	0.21		0.001	U	0.068	J
OU2-SS12	OU2-SS12-Z1	0	0.5	SO	N	5/18/2015	NA		NA		0.417	0.001	U	0.001	U	0.001	U	0.001	U	0.14	J	0.16	J	0.079		0.001	U	0.038	J
OU2-SS12	OU2-SS12-Z2	1	2	SO	N	5/18/2015	NA		NA		**2.94**	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	**2**	J	0.63		0.01	U	0.31	J
OU2-SS12	OU2-SS12-Z3	2	2.9	SO	N	5/18/2015	NA		NA		**180**	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	**180**		1.2	U	1.2	U
OU2-SS12A	OU2-SS12A-0-2	0	2	SO	N	10/18/2018	**1600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS12A	OU2-SS12A-2-4	2	4	SO	N	10/18/2018	**3300**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS12A	OU2-SS12A-2-5	2	5	SO	N	10/18/2018	NA		NA		0.7	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.7	J+	0.041	U	0.041	U
OU2-SS12A	OU2-SS12A-4-6	4	6	SO	N	10/18/2018	**4200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS12A	OU2-SS12A-5-8	5	8	SO	N	10/18/2018	NA		NA		**68**	0.53	U	0.53	U	0.53	U	0.53	U	0.53	U	0.53	U	**68**		0.53	U	0.53	U
OU2-SS12A	OU2-SS12A-6-8	6	8	SO	N	10/18/2018	**2900**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS12A	OU2-SS12A-8-10	8	10	SO	N	10/18/2018	**3800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS12A	OU2-SS12A-8-11 OR NAT	8	10	SO	N	10/18/2018	NA		NA		**1.2**	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	**1.2**	J+	0.041	U	0.041	U
OU2-SS13	OU2-SS13-Z1	0	0.5	SO	N	5/18/2015	NA		NA		0.344	0.00098	U	0.00098	U	0.00098	U	0.00098	U	0.08	J	0.14	J	0.091		0.00098	U	0.033	J
OU2-SS13	OU2-SS13-Z2	0.5	2	SO	N	5/18/2015	NA		NA		**3.6**	0.051	U	0.051	U	0.051	U	0.051	U	**3.5**	J	0.051	U	0.1		0.051	U	0.051	U
OU2-SS13	OU2-SS13-Z3	2	3	SO	N	5/18/2015	NA		NA		**28.9**	0.14	U	0.14	U	0.14	U	0.14	U	**5.2**	J	**8.5**	J	**8.5**		0.14	U	**6.7**	J
OU2-SS13A	OU2-SS13A-0-2	0	2	SO	N	10/19/2018	**1500**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS13A	OU2-SS13A-2-4	2	4	SO	N	10/19/2018	330		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS13A	OU2-SS13A-3-6	3	6	SO	N	10/19/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
OU2-SS13A	OU2-SS913A-3-6	3	6	SO	FD	10/19/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
OU2-SS13A	OU2-SS13A-4-6	4	6	SO	N	10/19/2018	40		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS13A	OU2-SS13A-6-8	6	8	SO	N	10/19/2018	72		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS13A	OU2-SS13A-6-9	6	9.8	SO	N	10/19/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-SS13A	OU2-SS13A-9-11 OR NAT	7	8	SO	N	10/19/2018	NA		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
OU2-SS13A	OU2-SS13A-8-10	8	9.8	SO	N	10/19/2018	12		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS14	OU2-SS14-Z1	0	0.5	SO	N	5/18/2015	NA		NA		0.194	0.00099	U	0.00099	U	0.00099	U	0.00099	U	0.00099	U	0.097	J	0.065		0.00099	U	0.032	J
OU2-SS14	OU2-SS14-Z2	1.5	2	SO	N	5/18/2015	NA		NA		**28.4**	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	**2.4**	J	0.7	U	**26**	J
OU2-SS14	OU2-SS14-Z3	2	2.9	SO	N	5/18/2015	NA		NA		0.71	0.0051	U	0.0051	U	0.0051	U	0.0051	U	0.0051	U	0.13	J	0.14	J	0.0051	U	0.44	J
OU2-SS14A	OU2-SS14A-0-2	0	2	SO	N	10/19/2018	14		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS14A	OU2-SS14A-2-4	2	4	SO	N	10/19/2018	73		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS14A	OU2-SS14A-2-5	2	5	SO	N	10/19/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
OU2-SS14A	OU2-SS14A-4-6	4	6	SO	N	10/19/2018	77		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS14A	OU2-SS14A-5-9 OR NAT	6	7	SO	N	10/19/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
OU2-SS14A	OU2-SS14A-6-8	6	8	SO	N	10/19/2018	31		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS22	OU2-SS22-Z1	0	1	SO	N	1/25/2016	169		NA		0.0293	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
							1.19					0.0099	U	0.02	U	0.0099	U	0.0099	U	0.012	J	0.0092	J	0.0081	J			0.0099	U
OU2-SS23	OU2-SS23-Z1	0	1	SO	N	1/25/2016	210		NA		0.025	0.045	UJ	0.045	UJ	0.045	UJ	0.045	UJ	0.045	UJ	0.045	UJ	0.045	UJ	0.045	UJ	0.045	UJ
							0.856					0.01	U	0.02	U	0.01	U	0.01	U	0.01	U	0.022	J	0.025				0.01	U
OU2-SS24	OU2-SS24-Z1	0	1	SO	N	1/25/2016	**2080**		NA		0.82	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.4	J+	0.054	U	0.054	U
							34.8					0.0099	U	0.02	U	0.0099	U	0.0099	U	0.0099	U	0.3	J	0.4	J			0.12	J
UP-SB01	UP-SB01-0-2	0	2	SO	N	10/19/2018	240		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
UP-SB01	UP-SB01-2-4	2	4	SO	N	10/19/2018	98		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB01	UP-SB01-2-5	2	5	SO	N	10/19/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
UP-SB01	UP-SB01-4-6	4	6	SO	N	10/19/2018	59		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB01	UP-SB01-5-9 OR NAT	5	6.8	SO	N	10/19/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
UP-SB01	UP-SB01-6-8	6	6.8	SO	N	10/19/2018	20		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB02	UP-SB02-0-2	0	2	SO	N	10/19/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB02	UP-SB02-2-4	2	4	SO	N	10/19/2018	**1100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB02	UP-SB02-2-5	2	5	SO	N	10/19/2018	NA		NA		0.85	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.85	J+	0.042	U	0.042	U
UP-SB02	UP-SB02-4-6	4	6	SO	N	10/19/2018	**4600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB02	UP-SB02-5-8	5	8	SO	N	10/19/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UP-SB02	UP-SB02-6-8	6	8	SO	N	10/19/2018	**1300**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB02	UP-SB02-8-10	8	10	SO	N	10/19/2018	**1200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB02	UP-SB02-8-11	8	11	SO	N	10/19/2018	NA		NA		ND	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U
UP-SB02	UP-SB02-10-12	10	12	SO	N	10/19/2018	24	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB02	UP-SB02-11-15 OR NAT	12	13	SO	N	10/19/2018	NA		NA		ND	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U
UP-SB02	UP-SB02-12-14	12	14	SO	N	10/19/2018	32		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB02	UP-SB02-14-15	14	14.5	SO	N	10/19/2018	21		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB03	UP-SB03-0-2	0	2	SO	N	10/19/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB03	UP-SB903-0-2	0	2	SO	FD	10/19/2018	170		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

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City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample	Sample	Soil Criteria	400		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
UP-SB03	UP-SB03-2-4	2	4	SO	N	10/19/2018	1800		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB03	UP-SB03-2-5	2	5	SO	N	10/19/2018	NA		NA		4.4	0.046	U	0.046	U	0.046	U	0.046	U	2.6	J+	0.046	U	0.046	U	0.046	U	1.8	J+
UP-SB03	UP-SB903-2-5	2	5	SO	FD	10/19/2018	NA		NA		7	0.049	U	0.049	U	0.049	U	0.049	U	5.1	J+	0.049	U	0.049	U	0.049	U	1.9	J+
UP-SB03	UP-SB03-4-6	4	6	SO	N	10/19/2018	11000		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB03	UP-SB03-5-8	5	8	SO	N	10/19/2018	NA		NA		2.5	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	2.5	J
UP-SB03	UP-SB03-6-8	6	8	SO	N	10/19/2018	2600		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB03	UP-SB03-8-10	8	10	SO	N	10/19/2018	3100		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB03	UP-SB03-8-11	8	11	SO	N	10/19/2018	NA		NA		0.67	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.67	J+
UP-SB03	UP-SB03-10-12	10	12	SO	N	10/19/2018	91		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB03	UP-SB03-11-16 OR NAT	11	12.6	SO	N	10/19/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
UP-SB03	UP-SB03-12-14	12	12.6	SO	N	10/19/2018	6.4	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB04	UP-SB04-0-2	0	2	SO	N	10/22/2018	230		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UP-SB04	UP-SB04-2-4	2	4	SO	N	10/22/2018	2500		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB04	UP-SB04-2-5	2	5	SO	N	10/22/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
UP-SB04	UP-SB04-4-6	4	6	SO	N	10/22/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB04	UP-SB04-5-8	5	8	SO	N	10/22/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UP-SB04	UP-SB04-6-8	6	8	SO	N	10/22/2018	100		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB04	UP-SB04-8-10	8	9.8	SO	N	10/22/2018	200		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB04	UP-SB04-8-12 OR NAT	8	9.8	SO	N	10/22/2018	NA		NA		ND	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
UP-SB05	UP-SB05-0-2	0	2	SO	N	10/19/2018	320		NA		ND	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
UP-SB05	UP-SB05-2-4	2	4	SO	N	10/19/2018	88		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB05	UP-SB05-2-5	2	5	SO	N	10/19/2018	NA		NA		0.086	0.037	U	0.037	U	0.037	U	0.037	U	0.086	J+	0.037	U	0.037	U	0.037	U	0.037	U
UP-SB05	UP-SB05-4-6	4	6	SO	N	10/19/2018	33		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB05	UP-SB05-5-8	5	8	SO	N	10/19/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
UP-SB05	UP-SB05-8-11 OR NAT	5	6	SO	N	10/19/2018	NA		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
UP-SB05	UP-SB05-6-8	6	8	SO	N	10/19/2018	6.7	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB05	UP-SB05-8-10	8	8.8	SO	N	10/19/2018	6.1	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB06	UP-SB06-0-2	0	2	SO	N	10/12/2018	210		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB06	UP-SB06-2-4	2	4	SO	N	10/12/2018	330		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB06	UP-SB906-2-4	2	4	SO	FD	10/12/2018	310		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB06	UP-SB06-4-6	4	6	SO	N	10/12/2018	21		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB06	UP-SB06-6-8	6	8	SO	N	10/12/2018	11		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB07	UP-SB07-0-2	0	2	SO	N	10/15/2018	3200		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
UP-SB08	UP-SB08-0-2	0	2	SO	N	10/17/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
UP-SB08	UP-SB08-2-5	2	5	SO	N	10/17/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UP-SB08	UP-SB08-5-7 OR NAT	5	7	SO	N	10/17/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
UP-SB09	UP-SB09-0-2	0	2	SO	N	10/17/2018	540		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
UP-SB09	UP-SB09-2-4	2	4	SO	N	10/17/2018	1600		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB09	UP-SB09-2-5	2	5	SO	N	10/17/2018	NA		NA		0.74	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.74	J+	0.041	U	0.041	U
UP-SB09	UP-SB09-4-6	4	6	SO	N	10/17/2018	2000		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB09	UP-SB09-5-8	5	8	SO	N	10/17/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
UP-SB09	UP-SB09-6-8	6	8	SO	N	10/17/2018	3400		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB09	UP-SB09-8-10	8	10	SO	N	10/17/2018	370		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB09	UP-SB09-8-11	8	11	SO	N	10/17/2018	NA		NA		ND	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U
UP-SB09	UP-SB09-10-12	10	12	SO	N	10/17/2018	72		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB09	UP-SB09-11-13 OR NAT	11	13	SO	N	10/17/2018	NA		NA		ND	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
UP-SB09	UP-SB09-12-13	12	13	SO	N	10/17/2018	15		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB10	UP-SB10-0-2	0	2	SO	N	10/19/2018	110		NA		0.15	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.15	J+	0.038	U	0.038	U	0.038	U
UP-SB10	UP-SB10-2-4	2	4	SO	N	10/19/2018	2600		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB10	UP-SB10-2-5	2	5	SO	N	10/19/2018	NA		NA		5.8	0.077	U	0.077	U	0.077	U	0.077	U	0.077	U	5.8		0.077	U	0.077	U	0.077	U
UP-SB10	UP-SB10-4-6	4	6	SO	N	10/19/2018	870		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB10	UP-SB910-4-6	4	6	SO	FD	10/19/2018	1300		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB10	UP-SB10-5-8	5	8	SO	N	10/19/2018	NA		NA		0.28	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.28	J+	0.04	U	0.04	U	0.04	U
UP-SB10	UP-SB10-6-8	6	8	SO	N	10/19/2018	190	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB10	UP-SB10-8-10	8	10	SO	N	10/19/2018	85		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB10	UP-SB10-8-11	8	11	SO	N	10/19/2018	NA		NA		ND	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U
UP-SB10	UP-SB910-8-11	8	11	SO	FD	10/19/2018	NA		NA		ND	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U
UP-SB10	UP-SB10-11-13 OR NAT	9	10	SO	N	10/19/2018	NA		NA		ND	0.12	UJ	0.12	UJ	0.12	UJ	0.12	UJ	0.12	UJ	0.12	UJ	0.12	UJ	0.12	UJ	0.12	UJ
UP-SB10	UP-SB10-10-12	10	11.5	SO	N	10/19/2018	48		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB11	UP-SB11-0-2	0	2	SO	N	10/18/2018	400		NA		0.21	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.21	J+	0.039	U	0.039	U	0.039	U
UP-SB11	UP-SB11-2-4	2	4	SO	N	10/18/2018	950		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB11	UP-SB11-2-6 OR NAT	2	6	SO	N	10/18/2018	NA		NA		0.17	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.17	J+	0.051	U	0.051	U	0.051	U

Table A-1
Analytical Results – Upson Park
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample	Sample	Soil Criteria	400		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
UP-SB11	UP-SB11-4-6	4	6	SO	N	10/18/2018	**1800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB12	UP-SB12-0-2	0	2	SO	N	9/19/2018	**2700**		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
UP-SB12	UP-SB12-2-4	2	4	SO	N	9/19/2018	**6100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB12	UP-SB12-2-5 OR NAT	4	4.5	SO	N	9/19/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
UP-SB12	UP-SB12-4-5	4	5	SO	N	9/19/2018	130		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB13	UP-SB13-0-2	0	2	SO	N	10/22/2018	65		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UP-SB13	UP-SB13-2-4	2	4	SO	N	10/22/2018	370		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB13	UP-SB13-2-5 OR NAT	2	5	SO	N	10/22/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
UP-SB13	UP-SB13-4-5	4	5	SO	N	10/22/2018	190		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB14	UP-SB14-0-2	0	2	SO	N	10/22/2018	**5000**		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
UP-SB14	UP-SB14-2-4	2	4	SO	N	10/22/2018	**590**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB14	UP-SB14-2-5	2	4	SO	N	10/22/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
UP-SB14	UP-SB14-4-6	4	6	SO	N	10/22/2018	**1900**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB14	UP-SB14-5-8	5	8	SO	N	10/22/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
UP-SB14	UP-SB14-6-8	6	8	SO	N	10/22/2018	37		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB14	UP-SB14-8-10	8	10	SO	N	10/22/2018	22		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB14	UP-SB14-8-11 OR NAT	8	10	SO	N	10/22/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
UP-SB15	UP-SB15-0-2	0	2	SO	N	10/22/2018	**1000**		NA		**3**	0.043	U	0.043	U	0.043	U	0.043	U	**3**		0.043	U	0.043	U	0.043	U	0.043	U
UP-SB15	UP-SB15-2-4	2	4	SO	N	10/22/2018	**780**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB15	UP-SB15-2-6 OR NAT	2	6	SO	N	10/22/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
UP-SB15	UP-SB15-4-6	4	6	SO	N	10/22/2018	**910**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB20	UP-SB20-0-2	0	2	SO	N	9/19/2018	**430**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB20	UP-SB920-0-2	0	2	SO	FD	9/19/2018	**530**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB20	UP-SB20-2-4	2	4	SO	N	9/19/2018	170		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB20	UP-SB20-4-6	4	4.5	SO	N	9/19/2018	230		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB21	UP-SB21-0-2	0	2	SO	N	9/19/2018	340		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB21	UP-SB21-2-4	2	4	SO	N	9/19/2018	230		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB21	UP-SB21-4-6	4	5	SO	N	9/19/2018	150		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB22	UP-SB22-0-2	0	2	SO	N	10/18/2018	22		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB22	UP-SB22-2-4	2	4	SO	N	10/18/2018	**1600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB22	UP-SB22-4-6	4	6	SO	N	10/18/2018	**1800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB22	UP-SB22-6-8	6	8	SO	N	10/18/2018	140		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB22	UP-SB22-8-10	8	10	SO	N	10/18/2018	140		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB22	UP-SB22-10-12	10	12	SO	N	10/18/2018	19		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB22	UP-SB22-12-14	12	14	SO	N	10/18/2018	25		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB22	UP-SB22-14-16	14	16	SO	N	10/18/2018	18		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB23	UP-SB23-0-2	0	2	SO	N	10/2/2018	20		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB23	UP-SB23-2-4	2	4	SO	N	10/2/2018	73		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB23	UP-SB23-4-6	4	6	SO	N	10/2/2018	**900**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB23	UP-SB23-6-8	6	8	SO	N	10/2/2018	**3700**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB23	UP-SB23-8-10	8	10	SO	N	10/2/2018	**5100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB23	UP-SB23-10-12	10	12	SO	N	10/2/2018	**7800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB23	UP-SB23-12-14	12	14	SO	N	10/2/2018	60		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB23	UP-SB23-14-16	14	16	SO	N	10/2/2018	49		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB23	UP-SB923-14-16	14	16	SO	FD	10/2/2018	40		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB24	UP-SB24-0-2	0	2	SO	N	10/12/2018	**2400**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB24	UP-SB24-2-4	2	4	SO	N	10/12/2018	**6200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB24	UP-SB24-4-6	4	6	SO	N	10/12/2018	130		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB25	UP-SB25-0-2	0	2	SO	N	10/12/2018	**6500**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB25	UP-SB25-2-3	2	4	SO	N	10/12/2018	**1100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB26	UP-SB26-0-2	0	2	SO	N	10/12/2018	74		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB26	UP-SB26-2-3	2	3	SO	N	10/12/2018	34		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB27	UP-SB27-0-2	0	2	SO	N	10/12/2018	**3600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB27	UP-SB27-2-4	2	4	SO	N	10/12/2018	**480**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB27	UP-SB27-4-5	4	5	SO	N	10/12/2018	**8700**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB28	UP-SB28-0-2	0	2	SO	N	9/18/2018	**2800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB29	UP-SB29-0-2	0	2	SO	N	9/18/2018	**4200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB29	UP-SB29-2-4	2	4	SO	N	9/18/2018	38		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB29	UP-SB29-4-5	4	5	SO	N	9/18/2018	**670**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UP-SB12	UP-SB12-0-4	0	4	SO	N	8/12/2020	NA		**1.9**	J	0.68	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	**0.21**	J+	0.041	U	**0.47**	J+
UP-SB12	UP-SB12-0-4-R	0	4	SO	N	9/9/2020	NA		**7.7**		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB30	UP-SB30-0-2	0	2	SO	N	8/4/2020	**329**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	

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						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample	Sample	Soil Criteria	400		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
UP-SB30	UP-SB30-2-4	2	4	SO	N	8/4/2020	216		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB31	UP-SB31-0-2	0	2	SO	N	8/4/2020	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB31	UP-SB31-2-4	2	4	SO	N	8/4/2020	129		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB31	UP-SB31-4-6	4	6	SO	N	8/4/2020	43.6		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB31	UP-SB931-4-6	4	6	SO	FD	8/4/2020	35.4		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB32	UP-SB32-0-2	0	2	SO	N	8/4/2020	51.9		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB32	UP-SB32-2-4	2	4	SO	N	8/4/2020	75.5		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB32	UP-SB932-2-4	2	4	SO	N	8/4/2020	80.8		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB32	UP-SB32-4-6	4	6	SO	N	8/4/2020	2260		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB32	UP-SB32-6-8	6	8	SO	N	8/4/2020	99		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB33	UP-SB33-0-2	0	2	SO	N	8/13/2020	476		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB33	UP-SB33-2-4	2	4	SO	N	8/13/2020	85.7		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB34	UP-SB34-0-2	0	2	SO	N	8/13/2020	173		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB34	UP-SB34-2-4	2	4	SO	N	8/13/2020	112		0.0098	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB34	UP-SB34-4-6	4	6	SO	N	8/13/2020	41.8		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB35	UP-SB35-0-2	0	2	SO	N	8/4/2020	95		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB35	UP-SB35-2-4	2	4	SO	N	8/4/2020	128		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB35	UP-SB35-4-6	4	6	SO	N	8/4/2020	95.4		0.008	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB35	UP-SB35-6-8	6	8	SO	N	8/4/2020	29.5		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB36	UP-SB36-0-2	0	2	SO	N	8/4/2020	6.5		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB36	UP-SB36-2-4	2	4	SO	N	8/4/2020	269		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB36	UP-SB936-2-4	2	4	SO	FD	8/4/2020	229		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB36	UP-SB36-4-6	4	6	SO	N	8/4/2020	84	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB36	UP-SB36-6-8	6	8	SO	N	8/4/2020	26.4		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB36	UP-SB36-8-10	8	10	SO	N	8/4/2020	47.1		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB36	UP-SB36-10-12	10	12	SO	N	8/4/2020	28.7		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB37	UP-SB37-0-2	0	2	SO	N	8/12/2020	1490		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB37	UP-SB37-2-4	2	4	SO	N	8/12/2020	488		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB38	UP-SB38-0-2	0	2	SO	N	8/12/2020	101		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB38	UP-SB38-2-4	2	4	SO	N	8/12/2020	29.2		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB39	UP-SB39-0-2	0	2	SO	N	8/4/2020	86		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB39	UP-SB39-2-4	2	4	SO	N	8/4/2020	15.9		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB39	UP-SB39-4-6	4	6	SO	N	8/4/2020	3140		49.8		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB39	UP-SB39-6-8	6	8	SO	N	8/4/2020	377		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB40	UP-SB40-0-2	0	2	SO	N	8/4/2020	6.9		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB40	UP-SB40-2-4	2	4	SO	N	8/4/2020	444		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB40	UP-SB40-4-6	4	6	SO	N	8/4/2020	76.7		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB40	UP-SB40-6-8	6	8	SO	N	8/4/2020	26.4		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB40	UP-SB40-8-10	8	10	SO	N	8/4/2020	22.3		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB40	UP-SB40-10-12	10	12	SO	N	8/4/2020	14.3		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB41	UP-SB41-0-2	0	2	SO	N	8/4/2020	6.1		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB41	UP-SB41-2-4	2	4	SO	N	8/4/2020	425		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB41	UP-SB41-4-6	4	6	SO	N	8/4/2020	59.8	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB41	UP-SB41-6-8	6	8	SO	N	8/4/2020	27.3		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB41	UP-SB41-8-10	8	10	SO	N	8/4/2020	65.6		0.012	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB41	UP-SB41-10-12	10	12	SO	N	8/4/2020	55.3		0.22	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB42	UP-SB42-0-2	0	2	SO	N	8/4/2020	NA		NA		0.091	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.091		0.038	U	0.038	U
UP-SB42	UP-SB42-2-4	2	4	SO	N	8/4/2020	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
UP-SB43	UP-SB43-0-2	0	2	SO	N	8/4/2020	130		0.014	J	0.042	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.02	J	0.037	U	0.037	U	0.022	J
UP-SB43	UP-SB43-2-4	2	4	SO	N	8/4/2020	159		NA		1.3	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	1.3	
UP-SB43	UP-SB943-2-4	2	4	SO	FD	8/4/2020	309		NA		1.4	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	1.4	J
UP-SB43	UP-SB43-4-7	4	7	SO	N	8/4/2020	17.1		NA		0.051	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.051	J
UP-SB44	UP-SB44-0-2	0	2	SO	N	8/4/2020	148		0.0097	J	0.102	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.055	J	0.037	U	0.037	U	0.047	J
UP-SB44	UP-SB44-2-4	2	4	SO	N	8/4/2020	132		NA		0.018	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.018	J
UP-SB44	UP-SB44-4-5	4	5	SO	N	8/4/2020	2.3		NA		ND	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U
UP-SB45	UP-SB45-0-2	0	2	SO	N	8/5/2020	2220		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB45	UP-SB45-2-4	2	4	SO	N	8/5/2020	4.2		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	

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						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample	Sample	Soil Criteria	400		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
UP-SB46	UP-SB46-0-2	0	2	SO	N	8/5/2020	**1940**		**1.3**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB46	UP-SB946-0-2	0	2	SO	FD	8/5/2020	NA		**3.4**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB47	UP-SB47-0-2	0	2	SO	N	8/12/2020	**1000**		**0.39**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB47	UP-SB47-2-4	2	4	SO	N	8/12/2020	**608**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB47	UP-SB947-2-4	2	4	SO	FD	8/12/2020	**1010**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB47	UP-SB47-4-6	4	6	SO	N	8/12/2020	**1210**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB47	UP-SB47-6-8	6	8	SO	N	8/12/2020	**515**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB47	UP-SB47-8-10	8	10	SO	N	8/12/2020	**1920**	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB47	UP-SB947-8-10	8	10	SO	FD	8/12/2020	**295**	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB48	UP-SB48-0-2	0	2	SO	N	8/5/2020	**356**		**0.4**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB48	UP-SB48-2-4	2	4	SO	N	8/5/2020	**74.9**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB48	UP-SB48-4-6	4	6	SO	N	8/5/2020	**115**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB49	UP-SB49-0-2	0	2	SO	N	8/5/2020	**85.2**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB49	UP-SB49-2-4	2	4	SO	N	8/5/2020	**54.1**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB49	UP-SB49-4-6	4	6	SO	N	8/5/2020	**48.6**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB49	UP-SB49-6-8	6	8	SO	N	8/5/2020	**183**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB49	UP-SB49-8-11	8	11	SO	N	8/5/2020	**234**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB50	UP-SB50-0-2	0	2	SO	N	8/12/2020	**326**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB50	UP-SB50-2-4	2	4	SO	N	8/12/2020	**412**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB50	UP-SB50-4-6	4	6	SO	N	8/12/2020	**216**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB50	UP-SB50-6-8	6	8	SO	N	8/12/2020	**37.8**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB50	UP-SB50-8-10	8	10	SO	N	8/12/2020	**48.3**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB50	UP-SB950-8-10	8	10	SO	FD	8/12/2020	**409**	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
UP-SB50	UP-SB50-10-12	10	12	SO	N	8/12/2020	**12.3**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		0	
18MC-L01W-S01	18MC-L01W-S01-Z1	0	0.167	SE	N	4/18/2007	**411**		NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L01W-S01	18MC-L01W-S01-Z2	0.5	1	SE	N	4/18/2007	127		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L01W-S02	18MC-L01W-S02-Z1	0	0.167	SE	N	4/18/2007	**412**		NA		0.045	0.02	U	0.02	U	0.02	U	0.02	U	0.045		0.02	U	0.02	U	0.02	U	0.02	U
18MC-L01W-S02	18MC-L01W-S02-Z2	1	2	SE	N	4/18/2007	**1660**		NA		0.0069	0.021	U	0.021	U	0.021	U	0.021	U	0.0069	J	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L01W-S03	18MC-L01W-S03-Z1	0.3	1	SE	N	4/18/2007	227		NA		0.1	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.1		0.019	U	0.019	U	0.019	U
18MC-L02W-S01	18MC-L02W-S01-Z1	1	2	SE	N	4/18/2007	88.8		NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-L02W-S01	18MC-L02W-S01-Z2	2	3.2	SE	N	4/18/2007	204		NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-L02W-S02	18MC-L02W-S02-Z1	0	2	SE	N	4/18/2007	**951**	J	NA		0.013	0.019	U	0.019	U	0.019	U	0.019	U	0.013	J	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L02W-S02	18MC-L02W-S02-Z2	1	2	SE	N	4/18/2007	62.6	J	NA		ND	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U
18MC-L02W-S02	18MC-L02W-S02-Z2/D	1	2	SE	FD	4/18/2007	138	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L02W-S03	18MC-L02W-S03-Z1	0	2	SE	N	4/18/2007	87		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L02W-S03	18MC-L02W-S03-Z2	3.2	4	SE	N	4/18/2007	28.9		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L03W-S01	18MC-L03W-S01-Z1	0.8	1.8	SE	N	4/19/2007	**552**	J	NA		0.73	0.049	U	0.049	U	0.049	U	0.049	U	0.73		0.049	U	0.049	U	0.049	U	0.049	U
18MC-L03W-S02	18MC-L03W-S02-Z1	0	2	SE	N	4/19/2007	75.1	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L03W-S03	18MC-L03W-S03-Z1	2	3	SE	N	4/19/2007	232	J	NA		0.153	0.024	U	0.024	U	0.024	U	0.024	U	0.034		0.048		0.071		0.024	U	0.024	U
18MC-L04W-S01	18MC-L04W-S01-Z1	0.5	1.5	SE	N	4/19/2007	220	J	NA		0.061	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.061		0.028	U	0.028	U	0.028	U
18MC-L04W-S02	18MC-L04W-S02-Z1	0	2	SE	N	4/20/2007	292	J	NA		0.146	0.024	U	0.024	U	0.024	U	0.024	U	0.055		0.045		0.046		0.024	U	0.024	U
18MC-L04W-S02	18MC-L04W-S02-Z2	1	2	SE	N	4/20/2007	79.6	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L04W-S03	18MC-L04W-S03-Z1	1	2	SE	N	4/20/2007	46.7	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L05W-S01	18MC-L05W-S01-Z1	1	2	SE	N	4/19/2007	198	J	NA		0.126	0.026	U	0.026	U	0.026	U	0.026	U	0.064		0.062		0.026	U	0.026	U	0.026	U
18MC-L05W-S02	18MC-L05W-S02-Z1	0	2	SE	N	4/19/2007	159	J	NA		0.07	0.021	U	0.021	U	0.021	U	0.021	U	0.042		0.028		0.021	U	0.021	U	0.021	U
18MC-L05W-S02	18MC-L05W-S02-Z2	1.5	3	SE	N	4/19/2007	183	J	NA		0.34	0.025	U	0.025	U	0.025	U	0.025	U	0.18		0.16		0.025	U	0.025	U	0.025	U
18MC-L05W-S03	18MC-L05W-S03-Z1	0	0.5	SE	N	4/19/2007	**857**	J	NA		0.33	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.33		0.028	U	0.028	U	0.028	U
18MC-L05W-S03	18MC-L05W-S03-Z2	1	1.5	SE	N	4/19/2007	**459**	J	NA		0.14	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.14		0.027	U	0.027	U	0.027	U
18MC-L05W-S03	18MC-L05W-S03-Z3	2	2.5	SE	N	4/19/2007	173	J	NA		0.034	0.028	U	0.028	U	0.028	U	0.028	U	0.011	J	0.023	J	0.028	U	0.028	U	0.028	U
DEC-SED-10	SED-10	0	0.17	SE	N	9/13/2005	**483**		NA		0.103	0.11	U	0.11	U	0.11	U	0.11	U	0.05	J	0.041	J	0.012	J	NA		NA	
DEC-SED-10	SED-10B	0.17	0.58	SE	N	9/13/2005	392		NA		0.07	0.12	U	0.12	U	0.12	U	0.12	U	0.017	J	0.021	J	0.032	J	NA		NA	
DEC-SED-11	SED-11	0	0.17	SE	N	4/14/2005	**462**	J	NA		0.194	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.11	J	0.065	J	0.019	J	NA		NA	
DEC-SED-11	SED-11B	0.17	0.58	SE	N	9/13/2005	**418**		NA		0.339	0.14	U	0.14	U	0.14	U	0.14	U	0.091	J	0.2		0.048	J	NA		NA	
DEC-SED-12	SED-12	0	0.17	SE	N	9/13/2005	226	J	NA		0.061	0.13	U	0.13	U	0.13	U	0.13	U	0.022	J	0.022	J	0.017	J	NA		NA	
DEC-SED-12	SED-12B	0.17	0.5	SE	N	9/13/2005	130		NA		0.037	0.13	U	0.13	U	0.13	U	0.13	U	0.014	J	0.023	J	0.13	U	NA		NA	
OU2-SED05	OU2-SED05-Z1	0	6	SE	N	1/26/2016	58.7		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U

Notes:
All depths are in feet below ground surface
Highlighted and bolded values exceeded the remediation goals
Soil criteria come from the record of decision

Abbreviations:
CAS No. - Chemical Abstracts Service number
FD - field duplicate
mg/L - milligram/liter
mg/kg - milligram/kilogram
N - normal/field sample
NA - not analyzed
PCBs - polychlorinated biphenyls
SO- soil
SE - sediment
TCLP - Toxicity Characteristic Leaching Procedure
Q - qualifier
J - The analyte was detected; however, the reported contract required quantitation limit (CRQL) is approximate and may be inaccurate or imprecise.
J+ - The identification of the analyte is acceptable; the reported value may be biased high.
U - The analyte was not detected at or above the reporting limit.
UJ - The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

CDM Smith

Table A-2
Analytical Results – Former White Transportation Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)			Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L		Total PCBs mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
		Start	End	Sample	Sample	Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-L02E-S04	18MC-L02E-S04-Z1	0	0.167	SO	N	4/20/2007	96.8	J	NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-L02E-S04	18MC-L02E-S04-Z2	1	1.5	SO	N	4/20/2007	75.1	J	NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-L02E-S04A	18MC-L02E-S04A-2-4	2	4	SO	N	10/15/2018	87		0.035	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L02E-S04A	18MC-L02E-S04A-4-6	4	6	SO	N	10/15/2018	65		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L02E-S04A	18MC-L02E-S04A-6-8	6	8	SO	N	10/15/2018	110		0.012	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L02E-S04A	18MC-L02E-S04A-8-10	8	10	SO	N	10/15/2018	52		0.0055	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L02E-S05	18MC-L02E-S05-Z1	0	2	SO	N	4/20/2007	**3750**	J	NA		0.23	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.23		0.021	U	0.021	U
18MC-L02E-S05	18MC-L02E-S05-Z2	0.8	1.5	SO	N	4/20/2007	**2590**	J	NA		0.46	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.46		0.018	U	0.018	U
18MC-L02E-S05	18MC-L02E-S05-Z2/D	0.8	1.5	SO	FD	4/20/2007	**1030**	J	NA		0.43	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.43		0.021	U	0.021	U
18MC-L03E-S04	18MC-L03E-S04-Z1	0	0.167	SO	N	4/20/2007	38.4	J	NA		0.0078	0.019	U	0.019	U	0.019	U	0.019	U	0.0078	J	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L03E-S04	18MC-L03E-S04-Z2	0.5	2	SO	N	4/20/2007	37.5	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L03E-S05	18MC-L03E-S05-Z1	0	0.167	SO	N	4/20/2007	9.7	J	NA		0.033	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.015	J	0.018	J	0.022	U	0.022	U
18MC-L03E-S05	18MC-L03E-S05-Z2	0.5	1.2	SO	N	4/20/2007	20.7	J	NA		0.012	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.012	J	0.02	U	0.02	U	0.02	U
18MC-L03E-S05	18MC-L03E-S05-Z3	1.3	2	SO	N	4/20/2007	123	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-MW10	18MC-MW10-Z1	10	11	SO	N	6/20/2007	113	J	NA		ND	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U
18MC-MW10	18MC-MW10-Z2	12	13	SO	N	6/20/2007	66.1	J	NA		ND	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
18MC-MW11	18MC-MW11-Z1	8	10	SO	N	6/8/2007	13.1		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-MW12	18MC-MW12-Z1	10	14	SO	N	6/6/2007	6.9		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-MW12	18MC-MW12-Z2	12	16	SO	N	6/7/2007	96.3		NA		0.017	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.017	J	0.02	U	0.02	U
18MC-MW13	18MC-MW13-Z1	6	10	SO	N	6/7/2007	836		NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-SB06	18MC-SB06-Z1	1.5	2	SO	N	4/26/2007	18.9	J	NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-SB06	18MC-SB06-Z2	14	14.5	SO	N	4/26/2007	59.2	J	NA		ND	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U
18MC-SB07	18MC-SB07-Z1	1	1.7	SO	N	4/26/2007	312	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-SB07	18MC-SB07-Z2	10	10.5	SO	N	4/26/2007	1.7	J	NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-SB08	18MC-SB08-Z1	0.5	1.2	SO	N	4/26/2007	31.1	J	NA		0.0477	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.039		0.0087	J	0.019	U	0.019	U
18MC-SB08	18MC-SB08-Z2	6.5	7.2	SO	N	4/26/2007	23	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-SB09	18MC-SB09-Z1	0.5	1.5	SO	N	4/26/2007	60.3	J	NA		0.48	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.48		0.019	U	0.019	U
18MC-SB09	18MC-SB09-Z2	3	3.5	SO	N	4/26/2007	91.6	J	NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-SB10	18MC-SB10-Z1	1.5	2	SO	N	4/26/2007	3.1	J	NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-SB10	18MC-SB10-Z1/D	1.5	2	SO	FD	4/26/2007	3.1	J	NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-SB10	18MC-SB10-Z2	10.5	11.5	SO	N	4/26/2007	62.3	J	NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-SS10	18MC-SS10-Z1	0	0.167	SO	N	4/16/2007	716	J	NA		ND	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U
18MC-SS11	18MC-SS11-Z1	0	0.167	SO	N	4/16/2007	265	J	NA		0.02	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.02		0.018	U	0.018	U
18MC-SS12	18MC-SS12-Z1	0	0.167	SO	N	4/16/2007	182	J	NA		0.19	0.077	U	0.077	U	0.077	U	0.077	U	0.077	U	0.077	U	0.19		0.077	U	0.077	U
18MC-SS13	18MC-SS13-Z1	0	0.167	SO	N	4/16/2007	117	J	NA		0.67	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.67		0.041	U	0.041	U
DEC-WHITE-1	WHITE-1	0	0.17	SO	N	9/22/2005	68.9		NA		ND	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	NA		NA	
DEC-WHITE-1	WHITE-1B	0.17	0.75	SO	N	9/22/2005	109		NA		0.058	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.058	J	NA		NA	
DEC-WHITE-2	WHITE-2	0	0.17	SO	N	9/22/2005	350		NA		0.041	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.041	J	NA		NA	
DEC-WHITE-2	WHITE-2B	0.17	0.58	SO	N	9/22/2005	4.8		NA		ND	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	NA		NA	
WT-SB-01	WT-SB-01-0-2	0	2	SO	N	10/12/2018	**1200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-01	WT-SB-01-2-4	2	4	SO	N	10/12/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-01	WT-SB-01-4-6	4	6	SO	N	10/12/2018	57		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-01	WT-SB-01-6-8	6	8	SO	N	10/12/2018	54		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-02	WT-SB-02-0-2	0	2	SO	N	10/12/2018	480		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-02	WT-SB-02-2-4	2	4	SO	N	10/12/2018	81		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-02	WT-SB-02-4-6	4	6	SO	N	10/12/2018	330		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-02	WT-SB-902-4-6	4	6	SO	FD	10/12/2018	310		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-02	WT-SB-02-6-8	6	8	SO	N	10/12/2018	72		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-02	WT-SB-02-8-10	8	9.7	SO	N	10/12/2018	27		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-03	WT-SB-03-0-2	0	2	SO	N	10/12/2018	12		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-03	WT-SB-903-0-2	0	2	SO	FD	10/12/2018	11		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-03	WT-SB-03-2-4	2	4	SO	N	10/12/2018	80		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-03	WT-SB-03-4-6	4	6	SO	N	10/12/2018	220		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-2
Analytical Results – Former White Transportation Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)			Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L		Total PCBs mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
		Start	End	Sample	Sample	Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
WT-SB-03	WT-SB-03-6-8	6	8	SO	N	10/12/2018	56		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB-03	WT-SB-03-8-10	8	8.7	SO	N	10/12/2018	25		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB04	WT-SB04-0-2	0	2	SO	N	8/3/2020	**822**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB04	WT-SB04-2-4	2	4	SO	N	8/3/2020	**321**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB05	WT-SB05-0-2	0	2	SO	N	8/3/2020	**3060**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WT-SB05	WT-SB05-2-4	2	4	SO	N	8/3/2020	**2590**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-AS-S01	18MC-AS-S01-Z1	0	0.167	SE	N	4/25/2007	148		NA		0.051	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.051		0.02	U	0.02	U	0.02	U
18MC-AS-S01	18MC-AS-S01-Z2	0.8	1.5	SE	N	4/25/2007	62.8		NA		0.012	0.021	U	0.021	U	0.021	U	0.021	U	0.012	J	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L01E-S01	18MC-L01E-S01-Z1	0	0.167	SE	N	4/20/2007	145	J	NA		0.035	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.035		0.02	U	0.02	U	0.02	U
18MC-L01E-S03	18MC-L01E-S03-Z1	0	0.167	SE	N	4/20/2007	113	J	NA		0.026	0.021	U	0.021	U	0.021	U	0.021	U	0.026		0.021	U	0.021	U	0.021	U	0.021	U
18MC-L01E-S03	18MC-L01E-S03-Z2	0.5	1.2	SE	N	4/20/2007	170	J	NA		0.183	0.018	U	0.018	U	0.018	U	0.018	U	0.053		0.13		0.018	U	0.018	U	0.018	U
18MC-L02E-S01	18MC-L02E-S01-Z1	0.8	1.5	SE	N	4/20/2007	807	J	NA		**3.8**	0.11	U	0.11	U	0.11	U	0.11	U	**1.5**		**2.3**		0.11	U	0.11	U	0.11	U
18MC-L02E-S02	18MC-L02E-S02-Z1	0	0.5	SE	N	4/20/2007	176	J	NA		0.032	0.017	U	0.017	U	0.017	U	0.017	U	0.016	J	0.016	J	0.017	U	0.017	U	0.017	U
18MC-L02E-S03	18MC-L02E-S03-Z1	0.5	1	SE	N	4/20/2007	166	J	NA		0.034	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.01	J	0.024		0.018	U	0.018	U
18MC-L03E-S01	18MC-L03E-S01-Z1	0.5	1.5	SE	N	4/20/2007	175	J	NA		0.235	0.02	U	0.02	U	0.02	U	0.02	U	0.039		0.096		0.1		0.02	U	0.02	U
18MC-L03E-S02	18MC-L03E-S02-Z1	0	2	SE	N	4/20/2007	592	J	NA		0.72	0.023	U	0.023	U	0.023	U	0.023	U	0.32		0.28		0.12		0.023	U	0.023	U
18MC-L03E-S03	18MC-L03E-S03-Z1	0.7	1.7	SE	N	4/20/2007	202	J	NA		0.098	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.067		0.031		0.021	U	0.021	U
18MC-L03E-S03	18MC-L03E-S03-Z1/D	0.7	1.7	SE	FD	4/20/2007	165	J	NA		0.091	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.052		0.039		0.021	U	0.021	U
DEC-SED-13	SED-13	0	0.17	SE	N	9/13/2005	183	J	NA		0.249	0.27	UJ	0.27	UJ	0.27	UJ	0.27	UJ	0.087	J	0.12	J	0.042	J	NA		NA	
DEC-SED-13	SED-13B	0.25	0.75	SE	N	9/13/2005	116	J	NA		0.231	0.18	UJ	0.18	UJ	0.18	UJ	0.18	UJ	0.12	J	0.088	J	0.023	J	NA		NA	
DEC-SED-44	SED-44	0	0.17	SE	N	9/13/2005	60		NA		0.0696	0.12	U	0.12	U	0.12	U	0.12	U	0.032	J	0.031	J	0.0066	J	NA		NA	
OU2-SED04	OU2-SED04-Z1	0	6	SE	N	1/25/2016	194		NA		ND	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U
OU2-SED04	OU2-SED04-Z1/D	0	6	SE	FD	1/25/2016	256		NA		ND	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U

Notes:
All depths are in feet below ground surface
Highlighted and bolded values exceeded the remediation goals
Surface soil have depths less than 2 feet bgs
Subsurface soil have depths greater than 2 feet bgs
Surface and subsurface criteria come from the record of decision

Abbreviations:
CAS No. - Chemical Abstracts Service number
FD - field duplicate
mg/L - milligram/liter
mg/kg - milligram/kilogram
N - normal/field sample
NA - not analyzed
PCBs - polychlorinated biphenyls
SO- soil
SE - sediment
TCLP - Toxicity Characteristic Leaching Procedure
Q - qualifier
J - The identification of the analyte is acceptable; the reported value is an estimate.
U - The analyte was not detected at or above the Reporting Limit.

Table A-3a
Analytical Results – Former United Paperboard Company Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)			Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5		Total PCBs mg/kg	1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-L06-S04	18MC-L06-S04-Z1	0	0.167	SO	N	4/23/2007	202		NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L06-S04	18MC-L06-S04-Z2	0.5	1.2	SO	N	4/23/2007	216		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L06-S05	18MC-L06-S05-Z1	0	0.167	SO	N	4/23/2007	161		NA		0.099	0.022	U	0.022	U	0.022	U	0.022	U	0.046		0.053		0.022	U	0.022	U	0.022	U
18MC-L06-S05	18MC-L06-S05-Z2	1	2	SO	N	4/23/2007	126		NA		0.116	0.02	U	0.02	U	0.02	U	0.02	U	0.073		0.043		0.02	U	0.02	U	0.02	U
18MC-L07-S04	18MC-L07-S04-Z1	0	0.167	SO	N	4/23/2007	124		NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-L07-S04	18MC-L07-S04-Z2	2	3	SO	N	4/23/2007	414		NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-L07-S05	18MC-L07-S05-Z1	0	0.167	SO	N	4/23/2007	180		NA		**4.3**	0.39	U	0.39	U	0.39	U	0.39	U	4.3		0.39	U	0.39	U	0.39	U	0.39	U
18MC-L07-S05	18MC-L07-S05-Z2	1.8	2.5	SO	N	4/23/2007	144		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L08-S04	18MC-L08-S04-Z1	0	0.167	SO	N	4/23/2007	434		NA		0.26	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.26		0.022	U	0.022	U	0.022	U
18MC-L08-S04	18MC-L08-S04-Z2	1.8	2.5	SO	N	4/23/2007	894		NA		ND	0.07	U	0.07	U	0.07	U	0.07	U	0.07	U	0.07	U	0.07	U	0.07	U	0.07	U
18MC-L08-S05	18MC-L08-S05-Z1	0	0.167	SO	N	4/23/2007	281		NA		0.87	0.093	U	0.093	U	0.093	U	0.093	U	0.87		0.093	U	0.093	U	0.093	U	0.093	U
18MC-L08-S05	18MC-L08-S05-Z2	0.9	1.5	SO	N	4/23/2007	176		NA		**12**	1	U	1	U	1	U	1	U	**12**		1	U	1	U	1	U	1	U
18MC-L08-S05A	18MC-L08-S05A-2-5	2	5	SO	N	10/11/2018	NA		NA		ND	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U
18MC-L08-S05A	18MC-L08-S05A-5-8 OR NAT	5	8	SO	N	10/11/2018	NA		NA		ND	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U
18MC-L09-S01A	18MC-L09-S01A-1-2	1	2	SO	N	10/5/2018	**1200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S01A	18MC-L09-S01A-2-4	2	4	SO	N	10/5/2018	39		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S01A	18MC-L09-S01A-2-6 OR NAT	2	5.3	SO	N	10/5/2018	NA		NA		ND	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U
18MC-L09-S01A	18MC-L09-S01A-4-6	4	5.3	SO	N	10/5/2018	17		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S04	18MC-L09-S04-Z1	0	2	SO	N	4/23/2007	**3600**		NA		ND	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U
18MC-L09-S04	18MC-L09-S04-Z2	1.5	2.5	SO	N	4/23/2007	**7430**		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L09-S04A	18MC-L09-S04A-2-4	2	4	SO	N	10/8/2018	240		0.09	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S04A	18MC-L09-S04A-2-5	2	5	SO	N	10/8/2018	NA		NA		ND	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
18MC-L09-S04A	18MC-L09-S04A-4-6	4	6	SO	N	10/8/2018	79		0.0069	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S04A	18MC-L09-S904A-4-6	4	6	SO	FD	10/8/2018	150		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S04A	18MC-L09-S04A-5-8	5	8	SO	N	10/8/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
18MC-L09-S04A	18MC-L09-S04A-6-8	6	8	SO	N	10/8/2018	33		0.0057	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S04A	18MC-L09-S04A-8-10	8	10	SO	N	10/8/2018	6.9	U	0.0032	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S04A	18MC-L09-S04A-8-12 OR NAT	8	12	SO	N	10/8/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
18MC-L09-S04A	18MC-L09-S04A-10-12	10	12	SO	N	10/8/2018	6.9	U	5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S05	18MC-L09-S05-Z1	0	0.167	SO	N	4/23/2007	**2120**		NA		0.193	0.027	U	0.027	U	0.027	U	0.027	U	0.073		0.12		0.027	U	0.027	U	0.027	U
18MC-L09-S05	18MC-L09-S05-Z2	1	2	SO	N	4/23/2007	**3450**		NA		**7.4**	0.22	U	0.22	U	0.22	U	0.22	U	**4.6**		**2.8**		0.22	U	0.22	U	0.22	U
18MC-L09-S05A	18MC-L09-S05A-2-4	2	4	SO	N	10/9/2018	180		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S05A	18MC-L09-S05A-2-5	2	5	SO	N	10/9/2018	NA		NA		0.57	0.038	U	0.038	U	0.038	U	0.038	U	0.57	J+	0.038	U	0.038	U	0.038	U	0.038	U
18MC-L09-S05A	18MC-L09-S05A-4-6	4	6	SO	N	10/9/2018	**10000**		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S05A	18MC-L09-S05A-5-8	5	8	SO	N	10/9/2018	NA		NA		2.1	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	2.1	J+	0.042	U	0.042	U	0.042	U
18MC-L09-S05A	18MC-L09-S05A-6-8	6	8	SO	N	10/9/2018	190		**6.7**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S05A	18MC-L09-S05A-8-10	8	10	SO	N	10/9/2018	69		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L09-S05A	18MC-L09-S05A-8-10 OR NAT	8	10	SO	N	10/9/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
18MC-L10-S04	18MC-L10-S04-Z1	0	0.167	SO	N	4/23/2007	32		NA		0.0247	0.022	U	0.022	U	0.022	U	0.022	U	0.0087	J	0.016	J	0.022	U	0.022	U	0.022	U
18MC-L10-S04	18MC-L10-S04-Z2	1	2	SO	N	4/23/2007	49.4		NA		0.014	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.014	J	0.02	U	0.02	U	0.02	U
18MC-L10-S05	18MC-L10-S05-Z1	0	0.167	SO	N	4/23/2007	59.4		NA		0.014	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.014	J	0.021	U	0.021	U	0.021	U
18MC-L10-S05	18MC-L10-S05-Z2	1	2	SO	N	4/23/2007	61.7		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L11-S04	18MC-L11-S04-Z1	0	0.167	SO	N	4/24/2007	173	J	NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-L11-S04	18MC-L11-S04-Z2	0.5	1.5	SO	N	4/24/2007	20.4	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L11-S05	18MC-L11-S05-Z1	0	0.167	SO	N	4/24/2007	404	J	NA		0.041	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.041		0.021	U	0.021	U	0.021	U
18MC-L11-S05	18MC-L11-S05-Z2	0.6	1.4	SO	N	4/24/2007	60.5		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-MW01	18MC-MW01-Z1	3	4	SO	N	6/21/2007	5.5		NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-MW01	18MC-MW01-Z1	3	4	SO	N	6/21/2007	5.5		NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-MW01	18MC-MW01-Z2	12	14	SO	N	6/21/2007	83.3		NA		ND	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U
18MC-MW01	18MC-MW01-Z2	12	14	SO	N	6/21/2007	83.3		NA		ND	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U

Table A-3a
Analytical Results – Former United Paperboard Company Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)			Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5		Total PCBs mg/kg	1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-MW02	18MC-MW02-Z1	6	10	SO	N	6/12/2007	41	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-MW02	18MC-MW02-Z2	20	22	SO	N	6/25/2007	3.9		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-MW04	18MC-MW04-Z1	16	18	SO	N	6/22/2007	1.7		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-MW04	18MC-MW04-Z2	24	26	SO	N	6/22/2007	3.3		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-MW05	18MC-MW05-Z1	4	6	SO	N	6/15/2007	**2540**	J	NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-MW05	18MC-MW05-Z2	12	14	SO	N	6/15/2007	6	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-MW05A	18MC-MW05A-0-2	0	2	SO	N	10/5/2018	**11000**		**6**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-MW05A	18MC-MW05A-2-4	2	4	SO	N	10/5/2018	**5000**		1.9	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-MW05A	18MC-MW05A-4-6	4	6	SO	N	10/5/2018	**4400**		0.72	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-MW05A	18MC-MW05A-6-8	6	8	SO	N	10/5/2018	51		0.0041	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-MW05A	18MC-MW905A-6-8	6	8	SO	FD	10/5/2018	NA		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-MW05A	18MC-MW05A-8-10	8	10	SO	N	10/5/2018	**5400**		**16.1**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-MW05A	18MC-MW05A-10-12	10	10.8	SO	N	10/5/2018	70		0.071	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-MW06	18MC-MW06-Z1	8	10	SO	N	6/20/2007	30.2	J	NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-MW06	18MC-MW06-Z2	18	22	SO	N	6/20/2007	8.7	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-MW06	18MC-MW06-Z2/D	18	22	SO	FD	6/20/2007	10	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-MW08	18MC-MW08-Z1	6	10	SO	N	6/11/2007	129	J	NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-MW08	18MC-MW08-Z2	10	14	SO	N	6/11/2007	76.5	J	NA		ND	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U
18MC-MW08	18MC-MW08-Z2/D	10	14	SO	FD	6/11/2007	79.9	J	NA		ND	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
18MC-MW09	18MC-MW09-Z1	8	9	SO	N	6/18/2007	33.1	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-SB01	18MC-SB01-Z1	6	10	SO	N	6/8/2007	59.7		NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-SB01	18MC-SB01-Z1/D	6	10	SO	FD	6/8/2007	29.7		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-SB01	18MC-SB01-Z2	16	18	SO	N	6/8/2007	6		NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-SB02	18MC-SB02-Z1	6	8	SO	N	6/8/2007	33.1		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-SB02	18MC-SB02-Z2	12	16	SO	N	6/8/2007	14.2		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-SB03	18MC-SB03-Z1	2.4	2.9	SO	N	4/27/2007	21.5	J	NA		0.0047	0.018	U	0.018	U	0.018	U	0.018	U	0.0047	J	0.018	U	0.018	U	0.018	U	0.018	U
18MC-SB03	18MC-SB03-Z2	8	8.6	SO	N	4/27/2007	69.3	J	NA		0.098	0.019	U	0.019	U	0.019	U	0.019	U	0.064		0.034		0.019	U	0.019	U	0.019	U
18MC-SB04	18MC-SB04-Z1	2	2.5	SO	N	4/27/2007	230	J	NA		0.033	0.026	U	0.026	U	0.026	U	0.026	U	0.013	J	0.02	J	0.026	U	0.026	U	0.026	U
18MC-SB05	18MC-SB05-Z1	0.5	1.5	SO	N	4/27/2007	72.6	J	NA		0.97	0.099	U	0.099	U	0.099	U	0.099	U	0.8		0.099	U	0.17		0.099	U	0.099	U
18MC-SB05	18MC-SB05-Z2	5.5	6.5	SO	N	4/27/2007	116	J	NA		0.014	0.023	U	0.023	U	0.023	U	0.023	U	0.014	J	0.023	U	0.023	U	0.023	U	0.023	U
18MC-SB05	18MC-SB05-Z3	14	14.5	SO	N	4/27/2007	148	J	NA		ND	0.026	UJ	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	UJ	0.026	U	0.026	U
18MC-SB15	18MC-SB15-Z1	1.5	2	SO	N	4/27/2007	**1150**	J	NA		**626**	93	U	93	U	93	U	93	U	**550**		93	U	**76**	J	93	U	93	U
18MC-SB15	18MC-SB15-Z2	10	11	SO	N	4/27/2007	779	J	NA		0.019	0.025	U	0.025	U	0.025	U	0.025	U	0.019	J	0.025	U	0.025	U	0.025	U	0.025	U
18MC-SB15	18MC-SB15-Z2/D	10	11	SO	FD	4/27/2007	396	J	NA		0.027	0.026	U	0.026	U	0.026	U	0.026	U	0.027		0.026	U	0.026	U	0.026	U	0.026	U
18MC-SB15A	18MC-SB15A-0-2	0	2	SO	N	8/3/2020	**211**		NA		0.023	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	**0.01**	**NJ**	0.037	U	0.037	U	**0.013**	**J**
18MC-SB15A	18MC-SB15A-2-4	2	4	SO	N	10/15/2018	14		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB15A	18MC-SB15A-2-5	2	5	SO	N	10/15/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
18MC-SB15A	18MC-SB15A-4-6	4	6	SO	N	10/15/2018	20		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB15A	18MC-SB15A-5-8	5	8	SO	N	10/15/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
18MC-SB15A	18MC-SB15A-6-8	6	8	SO	N	10/15/2018	48		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB15A	18MC-SB915A-6-8	6	8	SO	FD	10/15/2018	53		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB15A	18MC-SB15A-8-10	8	10	SO	N	10/15/2018	84		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB15A	18MC-SB15A-8-11	8	11	SO	N	10/15/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
18MC-SB15A	18MC-SB915A-8-11	8	11	SO	FD	10/15/2018	NA		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
18MC-SB15A	18MC-SB15A-10-12	10	12	SO	N	10/15/2018	91		0.012	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB15A	18MC-SB915A-10-12	10	12	SO	FD	10/15/2018	NA		0.022	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SB15A	18MC-SB15A-11-16 OR NAT	11	14	SO	N	10/15/2018	NA		NA		ND	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U
18MC-SB15A	18MC-SB15A-12-14	12	14	SO	N	10/15/2018	71		0.0048	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-SS01	18MC-SS01-Z1	0	0.167	SO	N	4/16/2007	271	J	NA		0.34	0.025	U	0.025	U	0.025	U	0.025	U	0.2		0.14		0.025	U	0.025	U	0.025	U
18MC-SS02	18MC-SS02-Z1	0	0.167	SO	N	4/16/2007	42.2	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-SS03	18MC-SS03-Z1	0	0.167	SO	N	4/16/2007	308	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U

Table A-3a
Analytical Results – Former United Paperboard Company Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)			Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5		Total PCBs mg/kg	1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-SS04	18MC-SS04-Z1	0	0.167	SO	N	4/16/2007	51.3	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-SS05	18MC-SS05-Z1	0	0.167	SO	N	4/16/2007	384	J	NA		0.076	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.076		0.026	U	0.026	U	0.026	U
18MC-SS06	18MC-SS06-Z1	0	0.167	SO	N	4/16/2007	152	J	NA		0.058	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.058		0.022	U	0.022	U	0.022	U
18MC-SS07	18MC-SS07-Z1	0	0.167	SO	N	4/16/2007	303	J	NA		0.09	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.09		0.023	U	0.023	U
18MC-SS08	18MC-SS08-Z1	0	0.167	SO	N	4/16/2007	133	J	NA		0.14	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.14	J	0.21	U	0.21	U
18MC-SS09	18MC-SS09-Z1	0	0.167	SO	N	4/16/2007	158	J	NA		0.13	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.13		0.024	U	0.024	U	0.024	U
CS-SB-01	CS-SB-01-0-2	0	2	SO	N	10/11/2018	170		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
CS-SB-01	CS-SB-01-2-4	2	4	SO	N	10/11/2018	12		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-01	CS-SB-01-2-5	2	5	SO	N	10/11/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
CS-SB-01	CS-SB-01-4-6	4	6	SO	N	10/11/2018	33		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-01	CS-SB-01-5-8	5	8	SO	N	10/11/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
CS-SB-01	CS-SB-01-6-8	6	8	SO	N	10/11/2018	23		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-01	CS-SB-01-8-10	8	10	SO	N	10/11/2018	41		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
CS-SB-01	CS-SB-01-10-12	10	12	SO	N	10/11/2018	64		NA		ND	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U
CS-SB-02	CS-SB-02-0-2	0	2	SO	N	10/15/2018	220		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
CS-SB-02	CS-SB-02-2-4	2	4	SO	N	10/15/2018	28		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-02	CS-SB-02-2-5	2	5	SO	N	10/15/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
CS-SB-02	CS-SB-02-4-6	4	6	SO	N	10/15/2018	36		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-02	CS-SB-02-5-8	5	8	SO	N	10/15/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
CS-SB-02	CS-SB-02-6-8	6	8	SO	N	10/15/2018	54		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-02	CS-SB-02-8-10	8	10	SO	N	10/15/2018	29		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-02	CS-SB-02-8-11	8	11	SO	N	10/15/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
CS-SB-02	CS-SB-02-10-12	10	12	SO	N	10/15/2018	170		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-02	CS-SB-02-11-16 OR NAT	11	12	SO	N	10/15/2018	NA		NA		ND	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U
CS-SB-03	CS-SB-03-0-2	0	2	SO	N	10/15/2018	110		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
CS-SB-03	CS-SB-03-2-4	2	4	SO	N	10/15/2018	64		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-03	CS-SB-03-2-5	2	5	SO	N	10/15/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
CS-SB-03	CS-SB-03-4-6	4	6	SO	N	10/15/2018	67		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-03	CS-SB-03-5-8	5	8	SO	N	10/15/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
CS-SB-03	CS-SB-03-6-8	6	8	SO	N	10/15/2018	28		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-03	CS-SB-903-6-8	6	8	SO	FD	10/15/2018	81		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-03	CS-SB-03-8-10	8	10	SO	N	10/15/2018	24		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-03	CS-SB-03-8-11	8	11	SO	N	10/15/2018	NA		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
CS-SB-03	CS-SB-03-10-12	10	12	SO	N	10/15/2018	65		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
CS-SB-03	CS-SB-03-11-16 OR NAT	11	16	SO	N	10/15/2018	NA		NA		ND	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
CS-SB-03	CS-SB-03-12-14	12	14	SO	N	10/15/2018	43		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-1	SB-1	0	1.1	SO	N	9/27/2005	193		NA		ND	0.093	UJ	0.093	UJ	0.093	UJ	0.093	UJ	0.093	UJ	0.093	UJ	0.093	UJ	NA		NA	
DEC-SB-2	SB-2	0.9	2.4	SO	N	9/27/2005	22.2		NA		ND	0.099	UJ	0.099	UJ	0.099	UJ	0.099	UJ	0.099	UJ	0.099	UJ	0.099	UJ	NA		NA	
DEC-SB-24	SB-24	1.8	2.8	SO	N	10/6/2005	190		NA		0.015	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.015	J	NA		NA	
DEC-SB-3	SB-3	0	4	SO	N	9/27/2005	**4340**		NA		ND	0.12	UJ	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	UJ	NA		NA	
DEC-SB-3A	DEC-SB-3A-2-5	2	5	SO	N	10/8/2018	NA		NA		5.8	0.041	U	0.041	U	0.041	U	0.041	U	5.8	J	0.041	U	0.041	U	0.041	U	0.041	U
DEC-SB-3A	DEC-SB-3A-4-6	4	6	SO	N	10/8/2018	62		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-3A	DEC-SB-903A-4-6	4	6	SO	FD	10/8/2018	140		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-3A	DEC-SB-3A-5-8 OR NAT	5	8	SO	N	10/8/2018	NA		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
DEC-SB-3A	DEC-SB-3A-6-8	6	8	SO	N	10/8/2018	13		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-22	SS-22	0	0.17	SO	N	11/26/2002	**1060**	J	NA		0.499	0.36	UJ	0.36	UJ	0.36	UJ	0.36	UJ	0.099	J	0.24	J	0.16	J	NA		NA	
DEC-SS-24	SS-24	0	0.17	SO	N	11/26/2002	344		NA		**1.21**	0.27	U	0.27	U	0.27	U	0.27	U	0.52		0.49		0.2	J	NA		NA	
DEC-SS-6	SS-6	0	0.17	SO	N	7/23/2002	4.5		NA		ND	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	NA		NA	
DEC-SS-7	SS-7	0	0.17	SO	N	7/23/2002	226		NA		ND	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	NA		NA	
DEC-TP-1	TP-1	0	4	SO	N	9/28/2005	404		NA		ND	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	NA		NA	
DEC-TP-2	TP-2	0	1	SO	N	9/28/2005	**1060**	J	NA		0.02	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.02	J	0.13	U	NA		NA	

Table A-3a
Analytical Results – Former United Paperboard Company Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
DEC-TP-2	TP-2B	2.8	3.3	SO	N	9/28/2005	70.8	J	NA		0.038	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.038	J	0.11	U	NA		NA	
DEC-TP-3	TP-3	0	0.3	SO	N	9/28/2005	**1430**	J	NA		ND	0.87	U	0.87	U	0.87	U	0.87	U	0.87	U	0.87	U	0.87	U	NA		NA	
OU2-SS18	OU2-SS18-Z1	0	1	SO	N	1/25/2016	30.5		NA		ND	0.053	UJ	0.053	UJ	0.053	UJ	0.053	UJ	0.053	UJ	0.053	UJ	0.053	UJ	0.053	UJ	0.053	UJ
							0.327					0.01	U	0.02	U	0.01	U	0.01	U	0.01	U	0.0078	J	0.011	U			0.01	U
OU2-SS19	OU2-SS19-Z1	0	1	SO	N	1/25/2016	152	J	NA		0.0092	0.04	U	0.04	U	0.04	U	0.01	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
							0.527					0.01	U	0.02	U	0.01	U	0.04	U	0.01	U	0.0039	J	0.0053	J			0.01	U
OU2-SS19	OU2-SS19-Z1/D	0	1	SO	FD	1/25/2016	217	J	NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
OU2-SS20	OU2-SS20-Z1	0	1	SO	N	1/25/2016	386		NA		**38**	0.054	U	0.054	U	0.054	U	0.054	U	**22**	J	**16**	J	0.054	U	0.054	U	0.054	U
							12					0.2	U	0.4	U	0.2	U	0.2	U	**4.9**		**4**		0.2	U			0.2	U
OU2-SS21	OU2-SS21-Z1	0	1	SO	N	1/25/2016	335		NA		0.0127	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U
							2.54					0.01	U	0.02	U	0.01	U	0.01	U	0.01	U	0.0045	J	0.0082	J			0.01	U
UPB-SB01	UPB-SB01-0-2	0	2	SO	N	10/11/2018	NA		NA		**24**	0.4	U	0.4	U	0.4	U	0.4	U	**24**		0.4	U	0.4	U	0.4	U	0.4	U
UPB-SB01	UPB-SB01-2-5	2	5	SO	N	10/11/2018	NA		NA		5.8	0.084	U	0.084	U	0.084	U	0.084	U	5.8		0.084	U	0.084	U	0.084	U	0.084	U
UPB-SB01	UPB-SB01-5-8 OR NAT	5	6.5	SO	N	10/11/2018	NA		NA		ND	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U
UPB-SB02	UPB-SB02-0-2	0	2	SO	N	10/11/2018	NA		NA		**31**	0.41	U	0.41	U	0.41	U	0.41	U	**31**		0.41	U	0.41	U	0.41	U	0.41	U
UPB-SB02	UPB-SB02-2-5	2	5	SO	N	10/11/2018	NA		NA		4.3	0.052	U	0.052	U	0.052	U	0.052	U	4.3		0.052	U	0.052	U	0.052	U	0.052	U
UPB-SB02	UPB-SB02-5-8 OR NAT	5	8	SO	N	10/11/2018	NA		NA		ND	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U
UPB-SB03	UPB-SB03-0-2	0	2	SO	N	10/11/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UPB-SB03	UPB-SB03-2-5 OR NAT	2	5	SO	N	10/11/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
UPB-SB03	UPB-SB03-5-8	5	8	SO	N	10/11/2018	NA		NA		ND	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U
UPB-SB03	UPB-SB03-8-11 OR NAT	8	12	SO	N	10/11/2018	NA		NA		ND	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U
UPB-SB05	UPB-SB05-0-2	0	2	SO	N	10/8/2018	110		0.0093	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB05	UPB-SB05-2-4	2	4	SO	N	10/8/2018	210		0.17	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB05	UPB-SB05-4-6	4	6	SO	N	10/8/2018	220		0.057	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB05	UPB-SB05-6-8	6	8	SO	N	10/8/2018	140		0.034	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB06	UPB-SB06-0-2	0	2	SO	N	9/18/2018	430		0.013	J	ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
UPB-SB07	UPB-SB07-0-2	0	2	SO	N	10/8/2018	**1200**		NA		ND	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U
UPB-SB07	UPB-SB07-2-4	2	3	SO	N	10/8/2018	90		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB07	UPB-SB07-2-5	2	3	SO	N	10/8/2018	NA		NA		ND	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
UPB-SB08	UPB-SB08-0-2	0	2	SO	N	10/8/2018	**1200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB08	UPB-SB08-0-2-PCBS	0	2	SO	N	10/24/2018	NA		NA		ND	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
UPB-SB08	UPB-SB908-0-2-PCBS	0	2	SO	FD	10/24/2018	NA		NA		ND	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
UPB-SB08	UPB-SB08-2-4	2	4	SO	N	10/8/2018	340		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB08	UPB-SB08-2-5	2	5	SO	N	10/8/2018	NA		NA		ND	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ
UPB-SB08	UPB-SB08-4-6	4	6.3	SO	N	10/8/2018	410		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB08	UPB-SB08-5-8 OR NAT	5	6.3	SO	N	10/8/2018	NA		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
UPB-SB09	UPB-SB09-0-2	0	2	SO	N	10/9/2018	**13000**		NA		**360**	4	U	4	U	4	U	4	U	**360**		4	U	4	U	4	U	4	U
UPB-SB09	UPB-SB09-2-4	2	4	SO	N	10/9/2018	**7000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB09	UPB-SB09-2-5	2	5	SO	N	10/9/2018	NA		NA		**690**	5.9	U	5.9	U	5.9	U	5.9	U	**690**		5.9	U	5.9	U	5.9	U	5.9	U
UPB-SB09	UPB-SB09-4-6	4	6	SO	N	10/9/2018	960		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB09	UPB-SB09-5-8	5	8	SO	N	10/9/2018	NA		NA		**17**	0.42	U	0.42	U	0.42	U	0.42	U	**17**		0.42	U	0.42	U	0.42	U	0.42	U
UPB-SB09	UPB-SB09-6-8	6	8	SO	N	10/9/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB09	UPB-SB09-8-10	8	10	SO	N	10/9/2018	28		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB09	UPB-SB09-8-11	8	11	SO	N	10/9/2018	NA		NA		0.11	0.045	U	0.045	U	0.045	U	0.045	U	0.11	JN	0.045	U	0.045	U	0.045	U	0.045	U
UPB-SB09	UPB-SB09-10-12	10	12	SO	N	10/9/2018	9.8		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB09	UPB-SB09-11-15 OR NAT	11	15	SO	N	10/9/2018	NA		NA		2.5	0.043	U	0.043	U	0.043	U	0.043	U	2.5		0.043	U	0.043	U	0.043	U	0.043	U
UPB-SB09	UPB-SB09-12-14	12	14	SO	N	10/9/2018	8.5		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB09	UPB-SB09-14-15	14	15	SO	N	10/9/2018	7.3		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB09	UPB-SB909-14-15	14	15	SO	FD	10/9/2018	6.6	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB10	UPB-SB10-0-2	0	2	SO	N	10/9/2018	130		5	U	ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
UPB-SB10	UPB-SB10-2-4	2	4	SO	N	10/9/2018	60		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-3a
Analytical Results – Former United Paperboard Company Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)			Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5		Total PCBs mg/kg	1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
UPB-SB10	UPB-SB10-2-5	2	5	SO	N	10/9/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
UPB-SB10	UPB-SB10-4-6	4	6	SO	N	10/9/2018	28		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB10	UPB-SB10-5-8	5	8	SO	N	10/9/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
UPB-SB10	UPB-SB10-6-8	6	8	SO	N	10/9/2018	92		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB10	UPB-SB10-8-10	8	10	SO	N	10/9/2018	160		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB10	UPB-SB10-8-11	8	11	SO	N	10/9/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
UPB-SB10	UPB-SB10-10-12	10	12	SO	N	10/9/2018	140		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB10	UPB-SB10-11-16	11	16	SO	N	10/9/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
UPB-SB10	UPB-SB10-12-14	12	14	SO	N	10/9/2018	120		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB10	UPB-SB10-14-16	14	16	SO	N	10/9/2018	94		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB10	UPB-SB10-16-18	16	18	SO	N	10/9/2018	480		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB10	UPB-SB10-16-18 OR NAT	16	18	SO	N	10/9/2018	NA		NA		ND	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U
UPB-SB13	UPB-SB13-0-2	0	2	SO	N	10/9/2018	79		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UPB-SB13	UPB-SB13-2-4	2	4	SO	N	10/9/2018	11		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB13	UPB-SB13-2-5	2	5	SO	N	10/9/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
UPB-SB13	UPB-SB13-4-6	4	6	SO	N	10/9/2018	640		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB13	UPB-SB13-5-8	5	8	SO	N	10/9/2018	NA		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
UPB-SB13	UPB-SB13-6-8	6	8	SO	N	10/9/2018	65		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB13	UPB-SB13-8-10	8	10	SO	N	10/9/2018	75		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB13	UPB-SB13-8-10 OR NAT	8	10	SO	N	10/9/2018	NA		NA		ND	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
UPB-SB14	UPB-SB14-0-2	0	2	SO	N	10/5/2018	560		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB14	UPB-SB14-2-4	2	4	SO	N	10/5/2018	480		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB14	UPB-SB14-4-6	4	6	SO	N	10/5/2018	55		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB14	UPB-SB14-6-8	6	8	SO	N	10/5/2018	36		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB14	UPB-SB14-8-10	8	8.8	SO	N	10/5/2018	17		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB16	UPB-SB16-0-2	0	2	SO	N	10/5/2018	**6000**		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
UPB-SB16	UPB-SB16-2-4	2	4	SO	N	10/5/2018	880		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB16	UPB-SB16-2-5	2	5	SO	N	10/5/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
UPB-SB16	UPB-SB16-4-6	4	6	SO	N	10/5/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB16	UPB-SB16-5-8	5	8	SO	N	10/5/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
UPB-SB16	UPB-SB16-6-8	6	8	SO	N	10/5/2018	**2700**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB16	UPB-SB16-8-10	8	10	SO	N	10/5/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB16	UPB-SB16-8-11	8	11	SO	N	10/5/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
UPB-SB16	UPB-SB16-10-12	10	12	SO	N	10/5/2018	330		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB16	UPB-SB916-10-12	10	12	SO	FD	10/5/2018	190		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB16	UPB-SB16-11-14 OR NAT	11	14	SO	N	10/5/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
UPB-SB16	UPB-SB16-12-14	12	14	SO	N	10/5/2018	11		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB17	UPB-SB17-0-2	0	2	SO	N	10/5/2018	520		NA		ND	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
UPB-SB17	UPB-SB17-2-4	2	4	SO	N	10/5/2018	33		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB17	UPB-SB17-2-5	2	5	SO	N	10/5/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UPB-SB17	UPB-SB17-4-6	4	6	SO	N	10/5/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB17	UPB-SB17-5-8	6	8	SO	N	10/5/2018	NA		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
UPB-SB17	UPB-SB17-6-8	6	8	SO	N	10/5/2018	39		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB17	UPB-SB17-8-10	8	10	SO	N	10/5/2018	51		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB17	UPB-SB17-8-12 OR NAT	8	12	SO	N	10/5/2018	NA		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
UPB-SB17	UPB-SB17-10-12	10	12	SO	N	10/5/2018	21		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB19	UPB-SB19-0-2	0	2	SO	N	10/5/2018	**7100**		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
UPB-SB19	UPB-SB19-2-4	2	4	SO	N	10/5/2018	**6100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB19	UPB-SB19-2-5	2	5	SO	N	10/5/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
UPB-SB19	UPB-SB19-4-6	4	6	SO	N	10/5/2018	**9400**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB19	UPB-SB19-5-8 OR NAT	5	8	SO	N	10/5/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U

Table A-3a
Analytical Results – Former United Paperboard Company Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)			Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5		Total PCBs mg/kg	1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
UPB-SB19	UPB-SB919-5-8 OR NAT	5	8	SO	FD	10/5/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
UPB-SB19	UPB-SB19-6-8	6	8	SO	N	10/5/2018	160		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB19	UPB-SB19-8-10	8	10	SO	N	10/5/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB19	UPB-SB19-8-11	8	11	SO	N	10/5/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UPB-SB19	UPB-SB19-10-12	10	12	SO	N	10/5/2018	11		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB19	UPB-SB19-11-14 OR NAT	12	13	SO	N	10/5/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
UPB-SB19	UPB-SB19-12-14	12	14	SO	N	10/5/2018	6.8	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB20	UPB-SB20-0-2	0	2	SO	N	10/9/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
UPB-SB20	UPB-SB20-2-5	2	5	SO	N	10/9/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
UPB-SB20	UPB-SB20-5-8	5	8	SO	N	10/9/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
UPB-SB20	UPB-SB20-8-11 OR NAT	8	11	SO	N	10/9/2018	NA		NA		ND	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U
UPB-SB21	UPB-SB21-0-2	0	2	SO	N	10/9/2018	NA		NA		0.82	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.82	J+	0.038	U	0.038	U	0.038	U
UPB-SB21	UPB-SB21-2-5	2	5	SO	N	10/9/2018	NA		NA		0.82	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.82	J+	0.036	U	0.036	U	0.036	U
UPB-SB21	UPB-SB21-5-8 OR NAT	5	8	SO	N	10/9/2018	NA		NA		ND	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U
UPB-SB22	UPB-SB22-0-2	0	2	SO	N	10/8/2018	150		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
UPB-SB22	UPB-SB22-2-4	2	4	SO	N	10/8/2018	320		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB22	UPB-SB22-2-5	2	5	SO	N	10/8/2018	NA		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
UPB-SB22	UPB-SB22-4-6	4	6	SO	N	10/8/2018	160		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB22	UPB-SB22-5-8	5	8	SO	N	10/8/2018	NA		NA		ND	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U
UPB-SB22	UPB-SB22-6-8	6	8	SO	N	10/8/2018	**1400**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB22	UPB-SB22-8-10	8	8.6	SO	N	10/8/2018	35		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB22	UPB-SB22-8-11	8	8.6	SO	N	10/8/2018	NA		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
UPB-SB09	UPB-SB09-0-8	0	8	SO	N	8/6/2020	NA		**1.1**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB23	UPB-SB23-0-2	0	2	SO	N	8/10/2020	NA		NA		0.8	0.034	U	0.034	U	0.034	U	0.034	U	**0.47**		**0.33**		0.034	U	0.034	U	0.034	U
UPB-SB23	UPB-SB23-2-4	2	4	SO	N	8/10/2020	NA		NA		0.0045	0.035	U	0.035	U	0.035	U	0.035	U	**0.0045**	J	0.035	U	0.035	U	0.035	U	0.035	U
UPB-SB24	UPB-SB24-0-2	0	2	SO	N	8/10/2020	NA		NA		2.42	0.037	U	0.037	U	0.037	U	0.037	U	**1.6**		**0.82**		0.037	U	0.037	U	0.037	U
UPB-SB24	UPB-SB24-2-4	2	4	SO	N	8/10/2020	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
UPB-SB25	UPB-SB25-0-2	0	2	SO	N	8/10/2020	NA		NA		6.7	0.074	U	0.074	U	0.074	U	0.074	U	**6.7**		0.074	U	0.074	U	0.074	U	0.074	U
UPB-SB25	UPB-SB25-2-4	2	4	SO	N	8/10/2020	NA		NA		0.69	0.039	U	0.039	U	0.039	U	0.039	U	**0.28**	J	**0.41**		0.039	U	0.039	U	0.039	U
UPB-SB25	UPB-SB925-2-4	2	4	SO	FD	8/10/2020	NA		NA		2.4	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	**2.4**		0.039	U	0.039	U	0.039	U
UPB-SB26	UPB-SB26-0-2	0	2	SO	N	8/6/2020	**285**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB26	UPB-SB26-2-4	2	4	SO	N	8/6/2020	**572**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB27	UPB-SB27-0-2	0	2	SO	N	8/6/2020	**113**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB27	UPB-SB27-2-4	2	4	SO	N	8/6/2020	**19**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB27	UPB-SB27-4-6	4	6	SO	N	8/6/2020	**70.6**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB27	UPB-SB27-6-8	6	8	SO	N	8/6/2020	**76.2**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB28	UPB-SB28-0-2	0	2	SO	N	8/6/2020	**159**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB28	UPB-SB28-2-4	2	4	SO	N	8/6/2020	**99.1**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB28	UPB-SB28-4-7.5	4	7.5	SO	N	8/6/2020	**392**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB28	UPB-SB28-7.5-8	7.5	8	SO	N	8/6/2020	**787**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB29	UPB-SB29-0-2	0	2	SO	N	8/6/2020	**346**		**1.3**	J	0.016	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	**0.016**	J	0.036	U	0.036	U	0.036	U
UPB-SB29	UPB-SB29-2-4	2	4	SO	N	8/6/2020	**148**		NA		0.0208	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	**0.016**	J	0.034	U	0.034	U	**0.0048**	J
UPB-SB29	UPB-SB29-4-6	4	6	SO	N	8/6/2020	**663**		**0.62**	J	0.0304	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	**0.022**	J	0.037	U	0.037	U	**0.0084**	J
UPB-SB29	UPB-SB29-6-8	6	8	SO	N	8/6/2020	**234**		NA		0.0039	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	**0.0039**	J	0.044	U	0.044	U	0.044	U
UPB-SB29	UPB-SB29-8-10	8	10	SO	N	8/6/2020	**32**		NA		ND	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
UPB-SB30	UPB-SB30-0-2	0	2	SO	N	8/6/2020	**266**		**0.057**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB30	UPB-SB30-2-4	2	4	SO	N	8/6/2020	**7.8**		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB30	UPB-SB30-4-6	4	6	SO	N	8/6/2020	**715**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB30	UPB-SB30-6-8	6	8	SO	N	8/6/2020	**60.7**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB30	UPB-SB30-8-10	8	10	SO	N	8/6/2020	**27.9**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB31 [1]	UPB-SB31-0-2	0	2	SO	N	8/6/2020	**3020**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-3a
Analytical Results – Former United Paperboard Company Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
UPB-SB31 [1]	UPB-SB31-2-4	2	4	SO	N	8/6/2020	**166**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB31 [1]	UPB-SB31-4-6	4	6	SO	N	8/6/2020	**592**	[1]	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB31 [1]	UPB-SB31-6-8	6	8	SO	N	8/6/2020	**17.4**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB31 [1]	UPB-SB31-8-10	8	10	SO	N	8/6/2020	**7**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB32 [1]	UPB-SB32-0-2	0	2	SO	N	8/6/2020	**820**	[1]	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB32 [1]	UPB-SB32-2-4	2	4	SO	N	8/6/2020	**126**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB32 [1]	UPB-SB932-2-4	2	4	SO	N	8/6/2020	**161**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB32 [1]	UPB-SB32-4-6	4	6	SO	N	8/6/2020	**85.1**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB37	UPB-SB37-0-2	0	2	SO	N	8/3/2020	**129**		**0.03**	**J**	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB37	UPB-SB937-0-2	0	2	SO	FD	8/3/2020	NA		**0.019**	**J**	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB37	UPB-SB37-2-4	2	4	SO	N	8/3/2020	**1.1**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB37	UPB-SB37-4-6	4	6	SO	N	8/3/2020	**51.7**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB37	UPB-SB37-6-8	6	8	SO	N	8/3/2020	**96.3**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB37	UPB-SB37-8-10	8	10	SO	N	8/3/2020	**76.1**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB37	UPB-SB37-10-12	10	12	SO	N	8/3/2020	**20**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB38-0-2	0	2	SO	N	8/3/2020	**127**		**0.019**	**J**	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB38-2-4	2	4	SO	N	8/3/2020	**198**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB38-4-6	4	6	SO	N	8/3/2020	**290**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB38-6-8	6	8	SO	N	8/3/2020	**15.7**		**0.0075**	**J**	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB38-8-10	8	10	SO	N	8/3/2020	**82.2**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB38-10-12	10	12	SO	N	8/3/2020	**11.4**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB38-12-14	12	14	SO	N	8/3/2020	**85**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB38-14-16	14	16	SO	N	8/3/2020	**37.1**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB938-14-16	14	16	SO	FD	8/3/2020	**38.5**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB38	UPB-SB38-16-16.4	16	16.4	SO	N	8/3/2020	**72.8**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB39	UPB-SB39-0-2	0	2	SO	N	8/3/2020	**429**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB39	UPB-SB39-2-4	2	4	SO	N	8/3/2020	**277**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB39	UPB-SB39-4-6	4	6	SO	N	8/3/2020	**6.2**	**J**	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
UPB-SB40	UPB-SB40-0-2	0	2	SO	N	8/11/2020	**65.9**		NA		0.0046	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	**0.0046**	**NJ**	0.036	U	0.036	U	0.036	U
UPB-SB40	UPB-SB40-2-4	2	4	SO	N	8/11/2020	**49.8**		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
UPB-SB40	UPB-SB40-4-6	4	6	SO	N	8/11/2020	**46.3**		NA		0.0042	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	**0.0042**	**NJ**	0.034	U	0.034	U	0.034	U
UPB-SB40	UPB-SB40-6-8	6	8	SO	N	8/11/2020	**31.8**		NA		0.0042	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	**0.0042**	**NJ**	0.034	U	0.034	U	0.034	U
UPB-SB40	UPB-SB40-8-10	8	10	SO	N	8/11/2020	**35.1**		NA		0.0066	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	**0.0066**	**NJ**	0.035	U	0.035	U	0.035	U
UPB-SB40	UPB-SB40-10-12	10	12	SO	N	8/11/2020	**54.6**		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
UPB-SB41	UPB-SB41-0-2	0	2	SO	N	8/11/2020	**86.8**		NA		0.052	0.035	U	0.035	U	0.035	U	0.035	U	**0.038**		**0.014**	**J**	0.035	U	0.035	U	0.035	U
UPB-SB41	UPB-SB41-2-4	2	4	SO	N	8/11/2020	**112**		NA		0.049	0.034	U	0.034	U	0.034	U	0.034	U	**0.032**	**J**	**0.017**	**J**	0.034	U	0.034	U	0.034	U
UPB-SB41	UPB-SB41-4-6	4	6	SO	N	8/11/2020	**100**		NA		0.047	0.034	U	0.034	U	0.034	U	0.034	U	**0.031**	**J**	**0.016**	**J**	0.034	U	0.034	U	0.034	U
UPB-SB41	UPB-SB41-6-8	6	8	SO	N	8/11/2020	**60.5**		NA		0.01	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	**0.01**	**J**	0.035	U	0.035	U	0.035	U
UPB-SB41	UPB-SB41-8-10	8	10	SO	N	8/11/2020	**66.4**		NA		0.012	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	**0.012**	**NJ**	0.034	U	0.034	U	0.034	U
UPB-SB41	UPB-SB41-10-12	10	12	SO	N	8/11/2020	**64.7**		NA		0.0081	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	**0.0081**	**NJ**	0.034	U	0.034	U	0.034	U
UPB-SB41	UPB-SB41-12-14	12	14	SO	N	8/11/2020	**111**		NA		0.017	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	**0.017**	**NJ**	0.034	U	0.034	U	0.034	U
UPB-SB41	UPB-SB41-14-16	14	16	SO	N	8/11/2020	**423**		**0.063**	**J**	0.0096	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	**0.0096**	**NJ**	0.034	U	0.034	U	0.034	U
UST-East	UST-EAST-0-2	0	2	SO	N	8/10/2020	**1100**		NA		200	3.5	U	3.5	U	3.5	U	3.5	U	**200**		3.5	U	3.5	U	3.5	U	3.5	U
UST-East	UST-EAST-2-4	2	4	SO	N	8/10/2020	**1020**		NA		0.076	0.036	U	0.036	U	0.036	U	0.036	U	**0.076**		0.036	U	0.036	U	0.036	U	0.036	U
UST-East	UST-EAST-4-6	4	6	SO	N	8/10/2020	**972**		NA		42	0.42	U	0.42	U	0.42	U	0.42	U	**42**		0.42	U	0.42	U	0.42	U	0.42	U
UST-East	UST-EAST-6-8	6	8	SO	N	8/10/2020	**199**		NA		0.12	0.051	U	0.051	U	0.051	U	0.051	U	**0.12**		0.051	U	0.051	U	0.051	U	0.051	U
UST-East	UST-EAST-8-10	8	10	SO	N	8/10/2020	**166**		NA		0.14	0.053	U	0.053	U	0.053	U	0.053	U	**0.14**		0.053	U	0.053	U	0.053	U	0.053	U
UST-North	UST-NORTH-0-2	0	2	SO	N	8/10/2020	**695**		NA		40	0.36	U	0.36	U	0.36	U	0.36	U	**40**		0.36	U	0.36	U	0.36	U	0.36	U
UST-North	UST-NORTH-2-4	2	4	SO	N	8/10/2020	**3570**		NA		0.146	0.038	U	0.038	U	0.038	U	0.038	U	**0.1**	**J**	0.038	U	0.038	U	0.038	U	**0.046**	**J**

Table A-3a
Analytical Results – Former United Paperboard Company Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)			Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5		Total PCBs mg/kg	1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
UST-North	UST-NORTH-4-6	4	6	SO	N	8/10/2020	**245**		NA		2.1	0.041	U	0.041	U	0.041	U	0.041	U	**2.1**		0.041	U	0.041	U	0.041	U	0.041	U
UST-North	UST-NORTH-6-8	6	8	SO	N	8/10/2020	**192**		NA		0.056	0.049	U	0.049	U	0.049	U	0.049	U	**0.056**		0.049	U	0.049	U	0.049	U	0.049	U
UST-North	UST-NORTH-8-10	8	10	SO	N	8/10/2020	**139**		NA		0.11	0.049	U	0.049	U	0.049	U	0.049	U	**0.11**		0.049	U	0.049	U	0.049	U	0.049	U
UST-South	UST-SOUTH-0-2	0	2	SO	N	8/10/2020	**3360**	J	NA		110	1.8	U	1.8	U	1.8	U	1.8	U	**110**		1.8	U	1.8	U	1.8	U	1.8	U
UST-South	UST-SOUTH-2-4	2	4	SO	N	8/10/2020	**1010**		NA		6.3	0.076	U	0.076	U	0.076	U	0.076	U	**6.3**		0.076	U	0.076	U	0.076	U	0.076	U
UST-South	UST-SOUTH-4-6	4	6	SO	N	8/10/2020	**985**		NA		8.1	0.076	U	0.076	U	0.076	U	0.076	U	**8.1**		0.076	U	0.076	U	0.076	U	0.076	U
UST-South	UST-SOUTH-6-8	6	8	SO	N	8/10/2020	**1270**		NA		ND	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U
UST-South	UST-SOUTH-8-10	8	10	SO	N	8/10/2020	**230**		NA		1.2	0.056	U	0.056	U	0.056	U	0.056	U	**1.2**		0.056	U	0.056	U	0.056	U	0.056	U
UST-South	UST-SOUTH-98-10	8	10	SO	FD	8/10/2020	**173**		NA		0.11	0.056	U	0.056	U	0.056	U	0.056	U	**0.11**		0.056	U	0.056	U	0.056	U	0.056	U
UST-West	UST-WEST-0-2	0	2	SO	N	8/10/2020	**588**		NA		150	3.5	U	3.5	U	3.5	U	3.5	U	**150**		3.5	U	3.5	U	3.5	U	3.5	U
UST-West	UST-WEST-2-4	2	4	SO	N	8/10/2020	**3020**		NA		33	0.35	U	0.35	U	0.35	U	0.35	U	**33**		0.35	U	0.35	U	0.35	U	0.35	U
UST-West	UST-WEST-4-6	4	6	SO	N	8/10/2020	**3480**		NA		110	3.7	U	3.7	U	3.7	U	3.7	U	**110**		3.7	U	3.7	U	3.7	U	3.7	U
UST-West	UST-WEST-6-8	6	8	SO	N	8/10/2020	**182**		NA		0.079	0.046	U	0.046	U	0.046	U	0.046	U	**0.079**		0.046	U	0.046	U	0.046	U	0.046	U
UST-West	UST-WEST-8-10	8	10	SO	N	8/10/2020	**271**		NA		0.077	0.054	U	0.054	U	0.054	U	0.054	U	**0.077**		0.054	U	54	U	0.054	U	0.054	U
18MC-L06-S01	18MC-L06-S01-Z1	1	1.5	SE	N	4/23/2007	368		NA		ND	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U
18MC-L06-S02	18MC-L06-S02-Z1	0	2	SE	N	4/19/2007	31.9	J	NA		0.047	0.024	U	0.024	U	0.024	U	0.024	U	0.027		0.02	J	0.024	U	0.024	U	0.024	U
18MC-L06-S02	18MC-L06-S02-Z2	1	2	SE	N	4/19/2007	61.3	J	NA		0.87	0.02	U	0.02	U	0.02	U	0.02	U	0.22		0.02	U	0.65		0.02	U	0.02	U
18MC-L06-S03	18MC-L06-S03-Z1	0.5	1.2	SE	N	4/19/2007	88.5	J	NA		0.084	0.02	U	0.02	U	0.02	U	0.02	U	0.049		0.035		0.02	U	0.02	U	0.02	U
18MC-L06-S03	18MC-L06-S03-Z1/D	0.5	1.2	SE	FD	4/19/2007	170	J	NA		0.071	0.021	U	0.021	U	0.021	U	0.021	U	0.037		0.034		0.021	U	0.021	U	0.021	U
18MC-L06-S03	18MC-L06-S03-Z2	1.5	2.5	SE	N	4/19/2007	125	J	NA		0.09	0.022	U	0.022	U	0.022	U	0.022	U	0.056		0.034		0.022	U	0.022	U	0.022	U
18MC-L07-S01	18MC-L07-S01-Z1	3	3.5	SE	N	4/23/2007	323		NA		0.33	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.1		0.23		0.026	U	0.026	U
18MC-L07-S01	18MC-L07-S01-Z1/D	3	3.5	SE	FD	4/23/2007	280		NA		0.234	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.074		0.16		0.025	U	0.025	U
18MC-L07-S02	18MC-L07-S02-Z1	0	0.8	SE	N	4/23/2007	408		NA		**23**	3.2	U	3.2	U	3.2	U	3.2	U	**23**		3.2	U	3.2	U	3.2	U	3.2	U
18MC-L07-S03	18MC-L07-S03-Z1	1.5	2.5	SE	N	4/23/2007	628		NA		0.76	0.036	U	0.036	U	0.036	U	0.036	U	0.37		0.39		0.036	U	0.036	U	0.036	U
18MC-L08-S01	18MC-L08-S01-Z1	0.5	1.5	SE	N	4/23/2007	658		NA		ND	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U
18MC-L08-S02	18MC-L08-S02-Z1	0.4	1	SE	N	4/23/2007	46.4		NA		0.04	0.026	U	0.026	U	0.026	U	0.026	U	0.024	J	0.016	J	0.026	U	0.026	U	0.026	U
18MC-L08-S03	18MC-L08-S03-Z1	0.5	1.5	SE	N	4/23/2007	284		NA		**35**	1.3	U	1.3	U	1.3	U	1.3	U	**35**		1.3	U	1.3	U	1.3	U	1.3	U
18MC-L09-S01	18MC-L09-S01-Z1	0.5	1.2	SE	N	4/23/2007	**1470**		NA		**33**	2.1	U	2.1	U	2.1	U	**33**		2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
18MC-L09-S02	18MC-L09-S02-Z1	0	2	SE	N	4/23/2007	526		NA		**10.9**	1.3	U	1.3	U	1.3	U	**8.8**		1.3	U	**2.1**		1.3	U	1.3	U	1.3	U
18MC-L09-S02	18MC-L09-S02-Z2	0.8	1.5	SE	N	4/23/2007	213		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L09-S03	18MC-L09-S03-Z1	1.5	2.5	SE	N	4/23/2007	**15000**		NA		**61**	2.3	U	2.3	U	2.3	U	2.3	U	**41**		**20**		2.3	U	2.3	U	2.3	U
18MC-L10-S01	18MC-L10-S01-Z1	0.5	1.5	SE	N	4/23/2007	**1070**		NA		**2.75**	0.14	U	0.14	U	0.14	U	0.14	U	**1.9**		0.85		0.14	U	0.14	U	0.14	U
18MC-L10-S01	18MC-L10-S01-Z1/D	0.5	1.5	SE	FD	4/23/2007	792		NA		**1.83**	0.049	U	0.049	U	0.049	U	0.049	U	**1.2**		0.63		0.049	U	0.049	U	0.049	U
18MC-L10-S03	18MC-L10-S03-Z1	0.5	0.9	SE	N	4/23/2007	737		NA		0.56	0.027	U	0.027	U	0.027	U	0.027	U	0.26		0.3		0.027	U	0.027	U	0.027	U
18MC-L11-S01	18MC-L11-S01-Z1	1	1.6	SE	N	4/24/2007	920	J	NA		**1.65**	0.14	U	0.14	U	0.14	U	0.14	U	1		0.65		0.14	U	0.14	U	0.14	U
18MC-L11-S02	18MC-L11-S02-Z1	0.5	0.9	SE	N	4/24/2007	**2530**	J	NA		0.377	0.029	U	0.029	U	0.029	U	0.029	U	0.28		0.097		0.029	U	0.029	U	0.029	U
18MC-L11-S03	18MC-L11-S03-Z1	0.5	0.8	SE	N	4/24/2007	98.3	J	NA		0.592	0.024	U	0.024	U	0.024	U	0.024	U	0.5		0.092		0.024	U	0.024	U	0.024	U
DEC-SED-14	SED-14	0	0.17	SE	N	4/14/2005	71.6		NA		0.119	0.11	U	0.11	U	0.11	U	0.11	U	0.054	J	0.05	J	0.015	J	NA		NA	
DEC-SED-14	SED-14B	0.25	0.5	SE	N	9/13/2005	231		NA		0.306	0.1	U	0.1	U	0.1	U	0.1	U	0.14		0.13		0.036	J	NA		NA	
DEC-SED-14	SED-14C	0.58	0.75	SE	N	9/13/2005	15.3		NA		0.007	0.1	U	0.1	U	0.1	U	0.1	U	0.0036	J	0.0034	J	0.1	U	NA		NA	
DEC-SED-15	SED-15	0	0.17	SE	N	9/13/2005	997	J	NA		**8.6**	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	**5.7**	J	**2.9**	J	1.6	UJ	NA		NA	
DEC-SED-15	SED-15B	0.5	0.75	SE	N	9/13/2005	**2720**	J	NA		**1.53**	0.8	UJ	0.8	UJ	0.8	UJ	0.8	UJ	0.78	J	0.53	J	0.22	J	NA		NA	
DEC-SED-16	SED-16	0	0.17	SE	N	9/13/2005	169	J	NA		0.326	0.21	UJ	0.21	UJ	0.21	UJ	0.21	UJ	0.15	J	0.12	J	0.056	J	NA		NA	
DEC-SED-16	SED-16B	0.25	0.5	SE	N	9/13/2005	229	J	NA		0.506	0.21	UJ	0.21	UJ	0.21	UJ	0.21	UJ	0.24	J	0.19	J	0.076	J	NA		NA	
DEC-SED-17	SED-17	0	0.17	SE	N	9/13/2005	405	J	NA		**1.6**	0.63	UJ	0.63	UJ	0.63	UJ	0.63	UJ	0.85	J	0.46	J	0.29	J	NA		NA	
DEC-SED-17	SED-17B	0.25	0.75	SE	N	9/13/2005	**1020**		NA		0.73	0.16	U	0.16	U	0.16	U	0.16	U	0.32		0.31		0.1	J	NA		NA	
DEC-SED-18	SED-18	0	0.17	SE	N	9/13/2005	275	J	NA		0.87	0.16	UJ	0.16	UJ	0.16	UJ	0.16	UJ	0.49	J	0.38	J	0.16	UJ	NA		NA	
DEC-SED-18	SED-18B	0.25	0.5	SE	N	9/13/2005	484		NA		**7.1**	7.4	U	7.4	U	7.4	U	7.4	U	**3**	J	**4.1**	J	7.4	U	NA		NA	
DEC-SED-20	SED-20	0	0.17	SE	N	9/15/2005	149	J	NA		**1.82**	0.64	UJ	0.64	UJ	0.64	UJ	**1.1**	J	0.64	UJ	0.59	J	0.13	J	NA		NA	
DEC-SED-20	SED-20B	0.25	0.5	SE	N	9/15/2005	324		NA		**3.74**	2.7	U	2.7	U	2.7	U	**3**		2.7	U	0.74	J	2.7	U	NA		NA	
DEC-SED-21	SED-21	0	0.17	SE	N	9/15/2005	369		NA		**12.3**	2.9	U	2.9	U	2.9	U	2.9	U	**8.2**		**4.1**		2.9	U	NA		NA	

Table A-3a
Analytical Results – Former United Paperboard Company Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
DEC-SED-22	SED-22	0	0.17	SE	N	4/19/2005	**3170**		NA		**201**	51	U	51	U	51	U	51	U	**71**		**130**		51	U	NA		NA	
DEC-SED-23	SED-23	0	0.17	SE	N	9/15/2005	136		NA		0.78	0.58	UJ	0.58	UJ	0.58	UJ	0.58	UJ	0.57	J	0.21	J	0.58	UJ	NA		NA	
DEC-SED-23	SED-23B	0.17	0.42	SE	N	9/15/2005	213		NA		**16.8**	2.3	U	2.3	U	2.3	U	2.3	U	**12**		**4.8**		2.3	U	NA		NA	
DEC-SED-25	SED-25	0	0.17	SE	N	9/15/2005	251	J	NA		**4**	2	UJ	2	UJ	2	UJ	2	UJ	**2.5**	J	**1.5**	J	2	UJ	NA		NA	
DEC-SED-25	SED-25B	0.42	0.58	SE	N	9/15/2005	211		NA		0.9	0.15	U	0.15	U	0.15	U	0.15	U	0.37		0.53		0.15	U	NA		NA	
DEC-SED-6	SED-6	0	0.17	SE	N	7/23/2002	NA		NA		**3.5**	1.2	U	1.2	U	1.2	U	1.2	U	**1.8**		**1.7**		1.2	U	NA		NA	
DEC-SED-7	SED-7	0	0.17	SE	N	11/26/2002	**25400**		NA		0.84	0.21	U	0.21	U	0.21	U	0.6		0.21	U	0.24		0.21	U	NA		NA	
DEC-SED-8	SED-8	0.17	0.33	SE	N	11/26/2002	449		NA		**1.94**	0.26	U	0.26	U	0.26	U	0.26	U	0.83		0.76		0.35		NA		NA	
DEC-SED-9	SED-9	0	0.17	SE	N	11/26/2002	146		NA		ND	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	NA		NA	
OU2-SED02	OU2-SED02-Z1	0	0.5	SE	N	5/21/2015	510		NA		0.549	0.003	U	0.003	U	0.003	U	0.003	U	0.46	J	0.003	U	0.089		0.003	U	0.003	U
OU2-SED03	OU2-SED03-Z1	0	0.5	SE	N	5/26/2015	510	J	NA		**84.7**	0.56	UJ	0.56	UJ	0.56	UJ	0.56	UJ	**56**	J	**25**	J	**3.7**	J	0.56	UJ	0.56	UJ
OU2-SED04	OU2-SED04-Z1	0	0.5	SE	N	1/25/2016	194		NA		ND	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U
OU2-SED04	OU2-SED04-Z1/D	0	0.5	SE	FD	1/25/2016	256		NA		ND	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
OU2-SED09	OU2-SED09-Z1	0	0.5	SE	N	1/26/2016	715		NA		0.063	0.087	U	0.087	U	0.087	U	0.087	U	0.063	J	0.087	U	0.087	U	0.087	U	0.087	U

Notes:
All depths are in feet below ground surface
Highlighted and bolded values exceeded the remediation goals
Surface soil have depths less than 2 feet bgs
Subsurface soil have depths greater than 2 feet bgs
Surface and subsurface criteria come from the record of decision

Abbreviations:
CAS No. - Chemical Abstracts Service number
FD - field duplicate
mg/L - milligram/liter
mg/kg - milligram/kilogram
N - normal/field sample
NA - not analyzed
PCBs - polychlorinated biphenyls
SO- soil
SE - sediment
TCLP - Toxicity Characteristic Leaching Procedure
Q - qualifier

J - The analyte was detected; however, the reported contract required quantitation limit (CRQL) is approximate and may be inaccurate or imprecise.
JN - There is presumptive evidence that the analyte is present; the analyte is reported as a tentative identification.
J+ - The identification of the analyte is acceptable; the reported value may be biased high.
U - The analyte was not detected at or above the reporting limit.
UJ - The analyte was not detected at or above the Reporting Limit. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table A-3b
Analytical Results – Suspected UST
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

				Location ID	UST-East		UST-East		UST-East		UST-East		UST-East	
				Sample ID	UST-EAST-0-2		UST-EAST-2-4		UST-EAST-4-6		UST-EAST-6-8		UST-EAST-8-10	
				Sample Date	8/10/2020		8/10/2020		8/10/2020		8/10/2020		8/10/2020	
				Sample Type	N		N		N		N		N	
				Parent Sample Code										
				Depth	0 -2 ft		2-4 ft		4-6 ft		6-8 ft		8-10 ft	
				CLP ID	MBFWD9		MBFWE0		MBFWE1		MBFWE2		MBFWE3	
Method Group	**Chemical Name**	**CAS No.**	**PAL**	**Unit**	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Cyanide	Cyanide	57-12-5	27	mg/kg	0.67		0.77		0.98		0.14	J	0.065	J
Metals	Antimony	7440-36-0	#N/A	mg/kg	30.3		7.1		10.2		1.4	U	1.4	U
Metals	Arsenic	7440-38-2	16	mg/kg	20.2		26.5		31.1		14.7		15.9	
Metals	Barium	7440-39-3	400	mg/kg	89.7		108		187		112		78.6	
Metals	Beryllium	7440-41-7	590	mg/kg	0.21	J	0.42	J	0.27	J	0.22	J	0.2	J
Metals	Cadmium	7440-43-9	9.3	mg/kg	2.7		1.6		4.4		0.88		0.58	J
Metals	Chromium	7440-47-3	1500	mg/kg	32.6		23.9		46.6		25.1		22	
Metals	Cobalt	7440-48-4	#N/A	mg/kg	5.7		6.6		9.1		11.6		11	
Metals	Copper	7440-50-8	270	mg/kg	254		178		274		104		69	
Metals	Lead	7439-92-1	1000	mg/kg	1100		1020		972		199		166	
Metals	Manganese	7439-96-5	10000	mg/kg	220		200		486		338		245	
Metals	Mercury	7439-97-6	2.8	mg/kg	12.1		0.58		1.2		1.5		1.1	
Metals	Nickel	7440-02-0	310	mg/kg	30.5		24		38.6		30.6		26.5	
Metals	Selenium	7782-49-2	1500	mg/kg	2.6	U	2.6	U	1.6	J	3.6	U	1.4	J
Metals	Silver	7440-22-4	1500	mg/kg	2.4		0.59		0.98		1.2		1.1	
Metals	Thallium	7440-28-0	#N/A	mg/kg	0.53	U	0.12	J	0.16	J	0.26	J	0.2	J
Metals	Vanadium	7440-62-2	#N/A	mg/kg	8.1		16.5		22.3		26.4		20	
Metals	Zinc	7440-66-6	10000	mg/kg	413		687		1590		277		205	
PCB Aroclors	Aroclor 1016	12674-11-2	1000	ug/kg	3500	U	36	U	420	U	51	U	53	U
PCB Aroclors	Aroclor 1221	11104-28-2	1000	ug/kg	3500	U	36	U	420	U	51	U	53	U
PCB Aroclors	Aroclor 1232	11141-16-5	1000	ug/kg	3500	U	36	U	420	U	51	U	53	U
PCB Aroclors	Aroclor 1242	53469-21-9	1000	ug/kg	3500	U	36	U	420	U	51	U	53	U
PCB Aroclors	Aroclor 1248	12672-29-6	1000	ug/kg	200000		76		42000		120		140	
PCB Aroclors	Aroclor 1254	11097-69-1	1000	ug/kg	3500	U	36	U	420	U	51	U	53	U
PCB Aroclors	Aroclor 1260	11096-82-5	1000	ug/kg	3500	U	36	U	420	U	51	U	53	U
PCB Aroclors	Aroclor 1262	37324-23-5	1000	ug/kg	3500	U	36	U	420	U	51	U	53	U
PCB Aroclors	Aroclor 1268	11100-14-4	1000	ug/kg	3500	U	36	U	420	U	51	U	53	U
Pesticides (CLP)	4,4'-Ddd	72-54-8	92000	ug/kg	36	NJ	1.3	NJ	26	J+	51	UJ	0.29	J
Pesticides (CLP)	4,4'-Dde	72-55-9	62000	ug/kg	1800		0.62	NJ	180	J+	51	UJ	0.76	J
Pesticides (CLP)	4,4'-Ddt	50-29-3	47000	ug/kg	64	NJ	1.5	J-	150	J+	51	UJ	0.49	J
Pesticides (CLP)	Aldrin	309-00-2	680	ug/kg	2000	J	0.18	NJ	330	J+	26	UJ	1.5	J
Pesticides (CLP)	Alpha-Bhc	319-84-6	3400	ug/kg	90	U	1.9	UJ	0.48	NJ	26	UJ	2.7	U
Pesticides (CLP)	Beta-Bhc	319-85-7	3000	ug/kg	90	U	1.9	UJ	6.9	NJ	26	UJ	2.7	U
Pesticides (CLP)	Cis-Chlordane	5103-71-9	24000	ug/kg	340	J	1.5	NJ	7.6	NJ	26	UJ	1.1	NJ
Pesticides (CLP)	Delta-Bhc	319-86-8	500000	ug/kg	230	J	1.9	UJ	24	J+	26	UJ	2.7	U
Pesticides (CLP)	Dieldrin	60-57-1	1400	ug/kg	110	NJ	4.6	NJ	570	J+	51	UJ	0.48	NJ
Pesticides (CLP)	Endosulfan I	959-98-8	200000	ug/kg	220	NJ	0.89	NJ	51	NJ	11	J-	2.7	U
Pesticides (CLP)	Endosulfan Ii	33213-65-9	200000	ug/kg	100	NJ	2.6	NJ	1.9	NJ	51	UJ	0.54	NJ
Pesticides (CLP)	Endosulfan Sulfate	1031-07-8	200000	ug/kg	9.1	NJ	0.62	J-	27	NJ	51	UJ	0.53	J
Pesticides (CLP)	Endrin	72-20-8	89000	ug/kg	330		5.3	NJ	120	J+	51	UJ	0.25	J
Pesticides (CLP)	Endrin Aldehyde	7421-93-4	#N/A	ug/kg	12	J	1.5	J-	45	J+	51	UJ	5.3	U
Pesticides (CLP)	Endrin Ketone	53494-70-5	#N/A	ug/kg	210	NJ	11	NJ	18	NJ	2.1	J-	1	J
Pesticides (CLP)	Gamma-Bhc (Lindane)	58-89-9	9200	ug/kg	90	U	5.5	NJ	270	J+	26	UJ	2.7	U
Pesticides (CLP)	Heptachlor	76-44-8	15000	ug/kg	490	NJ	1.1	NJ	75	J+	26	UJ	0.57	NJ
Pesticides (CLP)	Heptachlor Epoxide	1024-57-3	#N/A	ug/kg	2300	J	1	J-	32	NJ	26	UJ	2.7	U
Pesticides (CLP)	Methoxychlor	72-43-5	#N/A	ug/kg	11	J	2.4	J-	1200		3.1	NJ	27	U
Pesticides (CLP)	Toxaphene	8001-35-2	#N/A	ug/kg	9000	U	190	UJ	440	U	2600	UJ	270	U
Pesticides (CLP)	Trans-Chlordane	5103-74-2	#N/A	ug/kg	1100	J	0.78	NJ	230	J+	26	UJ	0.53	NJ
SVOCs	1,1'-Biphenyl	92-52-4	#N/A	ug/kg	1800	U	1700	J	6600		1300	U	110	J
SVOCs	1,2,4,5-Tetrachlorobenzene	95-94-3	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	1,4-Dioxane	123-91-1	130000	ug/kg	720	U	1900	U	2200	U	510	U	110	UJ
SVOCs	2,3,4,6-Tetrachlorophenol	58-90-2	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	2,4,5-Trichlorophenol	95-95-4	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	2,4,6-Trichlorophenol	88-06-2	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	2,4-Dichlorophenol	120-83-2	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	2,4-Dimethylphenol	105-67-9	#N/A	ug/kg	1800	U	4800	U	1900	J	1300	U	270	U
SVOCs	2,4-Dinitrophenol	51-28-5	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	2,4-Dinitrotoluene	121-14-2	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	2,6-Dinitrotoluene	606-20-2	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	2-Chloronaphthalene	91-58-7	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	2-Chlorophenol	95-57-8	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	2-Methylnaphthalene	91-57-6	#N/A	ug/kg	290	J	6900		30000		300	J	470	
SVOCs	2-Methylphenol	95-48-7	500000	ug/kg	3500	U	9300	U	1100	J	2500	U	520	U
SVOCs	2-Nitroaniline	88-74-4	#N/A	ug/kg	1800	UJ	4800	U	5500	U	1300	UJ	270	U
SVOCs	2-Nitrophenol	88-75-5	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	3,3'-Dichlorobenzidine	91-94-1	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	3-Nitroaniline	99-09-2	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	4,6-Dinitro-2-Methylphenol	534-52-1	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	4-Bromophenyl Phenyl Ether	101-55-3	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	4-Chloro-3-Methylphenol	59-50-7	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	4-Chloroaniline	106-47-8	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	4-Chlorophenyl Phenyl Ether	7005-72-3	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	4-Methylphenol	106-44-5	500000	ug/kg	3500	U	9300	U	3200	J	2500	U	87	J
SVOCs	4-Nitroaniline	100-01-6	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	4-Nitrophenol	100-02-7	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	Acenaphthene	83-32-9	500000	ug/kg	280	J	14000		65000		800	J	750	
SVOCs	Acenaphthylene	208-96-8	500000	ug/kg	1800	U	2500	J	9200		400	J	150	J
SVOCs	Acetophenone	98-86-2	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	Anthracene	120-12-7	500000	ug/kg	770	J	31000		71000	J	1500		1900	
SVOCs	Atrazine	1912-24-9	#N/A	ug/kg	3500	U	9300	U	1900	J	2500	U	520	U
SVOCs	Benzaldehyde	100-52-7	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	Benzo(A)Anthracene	56-55-3	5600	ug/kg	2800		61000		180000		3100		3600	
SVOCs	Benzo(A)Pyrene	50-32-8	1000	ug/kg	2200		51000		130000		2700		2900	
SVOCs	Benzo(B)Fluoranthene	205-99-2	5600	ug/kg	2900		59000		170000		2500		3300	
SVOCs	Benzo(G,H,I)Perylene	191-24-2	500000	ug/kg	1000	J	22000		72000	J-	1200	J	1200	
SVOCs	Benzo(K)Fluoranthene	207-08-9	56000	ug/kg	1100	J	20000		52000	J	1000	J	1000	
SVOCs	Benzyl Butyl Phthalate	85-68-7	#N/A	ug/kg	1800	U	2400	J	5500	U	1300	U	270	U
SVOCs	Bis(2-Chloroethoxy)Methane	111-91-1	#N/A	ug/kg	1800	U	4800	U	5500	U	1300	U	270	U
SVOCs	Bis(2-Chloroethyl) Ether	111-44-4	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	Bis(2-Ethylhexyl)Phthalate	117-81-7	#N/A	ug/kg	2100		4800	U	5500	U	1300	U	270	U
SVOCs	Bis-Chloroisopropyl Ether	108-60-1	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	Caprolactam	105-60-2	#N/A	ug/kg	3500	U	9300	U	11000	U	2500	U	520	U
SVOCs	Carbazole	86-74-8	#N/A	ug/kg	3500	U	13000		60000		470	J	610	

Location ID	UST-North		UST-North		UST-North		UST-North		UST-North	
Sample ID	UST-NORTH-0-2		UST-NORTH-2-4		UST-NORTH-4-6		UST-NORTH-6-8		UST-NORTH-8-10	
Sample Date	8/10/2020		8/10/2020		8/10/2020		8/10/2020		8/10/2020	
Sample Type	N		N		N		N		N	
Parent Sample Code										
Depth	0-2 ft		2-4 ft		4-6 ft		6-8 ft		8-10 ft	
CLP ID	MBFWD4		MBFWD5		MBFWD6		MBFWD7		MBFWD8	
Chemical Name	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Cyanide	0.9		0.81		0.26	J	0.41	J	0.029	J
Antimony	38.3		4.4		1.1	U	1.3	U	1.3	U
Arsenic	36.4		37.5		9		15		8.8	
Barium	111		159		81.2		69.6		106	
Beryllium	0.38	J	0.32	J	0.2	J	0.2	J	0.17	J
Cadmium	2		3.4		1.8		14		0.52	J
Chromium	41.8		32.5		25.9		21.5		16.8	
Cobalt	8.4		5.4		8.2		9.1		8.2	
Copper	417		383		131		95.9		52.5	
Lead	695		3570		245		192		139	
Manganese	250		174		692		539		311	
Mercury	1.1		0.71		0.36		1.3		1.4	
Nickel	38.2		26.7		30.4		24.9		18.9	
Selenium	1.2	J	1.4	J	2.8	U	3.3	U	3.2	U
Silver	3.1		0.75		0.72		0.93		0.86	
Thallium	0.12	J	0.099	J	0.093	J	0.14	J	0.19	J
Vanadium	15		17.3		15.2		18.9		16.5	
Zinc	867		683		689		2670		167	
Aroclor 1016	360	U	38	U	41	U	49	U	49	U
Aroclor 1221	360	U	38	U	41	U	49	U	49	U
Aroclor 1232	360	U	38	U	41	U	49	U	49	U
Aroclor 1242	360	U	38	U	41	U	49	U	49	U
Aroclor 1248	40000		100	J	2100		56		110	
Aroclor 1254	360	U	38	U	41	U	49	U	49	U
Aroclor 1260	360	U	38	U	41	U	49	U	49	U
Aroclor 1262	360	U	38	U	41	U	49	U	49	U
Aroclor 1268	360	U	46	J	41	U	49	U	49	U
4,4'-Ddd	7.1	NJ	0.82	NJ	2.1	J-	1.4	J+	4.9	U
4,4'-Dde	400	J+	0.73	J+	25	J-	0.3	NJ	0.54	J
4,4'-Ddt	28	J+	3.1	J+	0.59	NJ	1.6	J+	0.32	J
Aldrin	640	J	1.1	J+	20	J-	0.3	NJ	1.3	J
Alpha-Bhc	19	U	2	U	2.1	UJ	2.5	U	2.5	U
Beta-Bhc	19	U	2	U	2.1	UJ	2.5	U	2.5	U
Cis-Chlordane	82	NJ	1.3	J+	3.7	NJ	0.33	J+	0.71	J
Delta-Bhc	61	NJ	0.89	J+	0.55	J-	0.86	J+	2.5	U
Dieldrin	39	NJ	3.8	U	0.41	NJ	4.9	U	0.82	J
Endosulfan I	58	NJ	0.93	NJ	1.1	NJ	1.9	J+	0.79	J
Endosulfan Ii	35	NJ	1.1	J+	2.8	NJ	0.38	NJ	0.56	J
Endosulfan Sulfate	6	NJ	1	J+	1.1	J-	0.56	J+	4.9	U
Endrin	74	J+	4.5	J+	1.9	NJ	5.7	J+	4.9	U
Endrin Aldehyde	36	U	0.39	NJ	1.2	NJ	1.3	NJ	4.9	U
Endrin Ketone	79	J+	0.66	NJ	3.1	NJ	5.7	NJ	0.52	NJ
Gamma-Bhc (Lindane)	26	J+	2	U	2.6	NJ	5.1	NJ	2.5	U
Heptachlor	140	NJ	1.4	J+	7.5	NJ	2.5	U	0.64	NJ
Heptachlor Epoxide	1000		1.4	J+	44		0.72	NJ	0.87	J
Methoxychlor	2.1	NJ	4	NJ	0.83	NJ	2.8	NJ	0.42	NJ
Toxaphene	1900	U	200	U	210	UJ	250	U	250	U
Trans-Chlordane	280	J+	0.27	NJ	4.7	J-	0.23	NJ	0.21	J
1,1'-Biphenyl	940	U	2000	U	2100	U	2500	U	250	U
1,2,4,5-Tetrachlorobenzene	940	U	2000	U	2100	U	2500	U	250	U
1,4-Dioxane	370	R	780	U	830	U	990	U	98	UJ
2,3,4,6-Tetrachlorophenol	940	U	2000	U	2100	U	2500	U	250	U
2,4,5-Trichlorophenol	940	U	2000	U	2100	U	2500	U	250	U
2,4,6-Trichlorophenol	940	U	2000	U	2100	U	2500	U	250	U
2,4-Dichlorophenol	940	U	2000	U	2100	U	2500	U	250	U
2,4-Dimethylphenol	940	U	2000	U	2100	U	2500	U	250	U
2,4-Dinitrophenol	1800	U	3800	U	4100	U	4900	U	480	U
2,4-Dinitrotoluene	940	U	2000	U	2100	U	2500	U	250	U
2,6-Dinitrotoluene	940	U	2000	U	2100	U	2500	U	250	U
2-Chloronaphthalene	940	U	2000	U	2100	U	2500	U	250	U
2-Chlorophenol	940	U	2000	U	2100	U	2500	U	250	U
2-Methylnaphthalene	400	J	690	J	500	J	820	J	250	U
2-Methylphenol	1800	U	3800	U	4100	U	4900	U	480	U
2-Nitroaniline	940	UJ	2000	UJ	2100	UJ	2500	UJ	250	U
2-Nitrophenol	940	U	2000	U	2100	U	2500	U	250	U
3,3'-Dichlorobenzidine	1800	UJ	3800	U	4100	U	4900	U	480	U
3-Nitroaniline	1800	U	3800	U	4100	U	4900	U	480	U
4,6-Dinitro-2-Methylphenol	1800	U	3800	U	4100	U	4900	U	480	U
4-Bromophenyl Phenyl Ether	940	U	2000	U	2100	U	2500	U	250	U
4-Chloro-3-Methylphenol	940	U	2000	U	2100	U	2500	U	250	U
4-Chloroaniline	1800	UJ	3800	U	4100	U	4900	U	480	U
4-Chlorophenyl Phenyl Ether	940	U	2000	U	2100	U	2500	U	250	U
4-Methylphenol	1800	U	3800	U	4100	U	4900	U	480	U
4-Nitroaniline	1800	U	3800	U	4100	U	4900	U	480	U
4-Nitrophenol	1800	U	3800	U	4100	U	4900	U	480	U
Acenaphthene	940	U	1200	J	1100	J	2200	J	42	J
Acenaphthylene	940	U	570	J	500	J	530	J	250	U
Acetophenone	1800	U	3800	U	4100	U	4900	U	480	U
Anthracene	140	J	3000		2600		4300		79	J
Atrazine	1800	U	3800	U	4100	U	4900	U	480	U
Benzaldehyde	1800	U	3800	U	4100	U	4900	U	480	U
Benzo(A)Anthracene	540	J	7400		6700		7600		230	J
Benzo(A)Pyrene	520	J	6000		5400		6200		240	J
Benzo(B)Fluoranthene	680	J	6700		6600		6800		280	
Benzo(G,H,I)Perylene	350	J	3200		2500		2400	J	130	J
Benzo(K)Fluoranthene	270	J	2600		2300		2500		110	J
Benzyl Butyl Phthalate	940	U	2000	U	2100	U	2500	U	250	U
Bis(2-Chloroethoxy)Methane	940	U	2000	U	2100	U	2500	U	250	U
Bis(2-Chloroethyl) Ether	1800	U	3800	U	4100	U	4900	U	480	U
Bis(2-Ethylhexyl)Phthalate	6000		2000	U	2100	U	2500	U	250	U
Bis-Chloroisopropyl Ether	1800	U	3800	U	4100	U	4900	U	480	U
Caprolactam	1800	U	3800	U	4100	U	4900	U	480	U
Carbazole	1800	U	1200	J	930	J	1700	J	480	U

Location ID	UST-South		UST-South		UST-South		UST-South		UST-South		UST-South	
Sample ID	UST-SOUTH-0-2		UST-SOUTH-2-4		UST-SOUTH-4-6		UST-SOUTH-6-8		UST-SOUTH-8-10		UST-SOUTH-98-10	
Sample Date	8/10/2020		8/10/2020		8/10/2020		8/10/2020		8/10/2020		8/10/2020	
Sample Type	N		N		N		N		N		FD	
Parent Sample Code											UST-SOUTH-8-10	
Depth	0-2 ft		2-4 ft		4-6 ft		6-8 ft		8-10 ft		8-10 ft	
CLP ID	MBFWE4		MBFWE5		MBFWE6		MBFWE7		MBFWE8		MBFWJ3	
Chemical Name	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Cyanide	1.6	J	1.9		1.3		0.85		0.17	J	0.12	J
Antimony	138	J	11.7		17		29.8		1.6	U	1.6	UJ
Arsenic	25.8		35		34.8		86.8		23.4		17	J
Barium	137		322		208		156		113		98.7	
Beryllium	0.13	J-	0.39	J	0.42	J	0.22	J	0.28	J	0.21	J-
Cadmium	10.8	J-	6.2		3.9		5.3		0.98		0.73	J
Chromium	69.8	J	79.7		34.2		135		20.1		20.3	
Cobalt	17.1		9.4		8.3		14.8		9.5		8.9	
Copper	1590	J	951		372		762		105		77.9	
Lead	3360	J	1010		985		1270		230		173	
Manganese	1010		346		284		397		291		288	
Mercury	1.2	J+	1.6		1.3		2		3.3		2.3	
Nickel	172	J	65.9		44.2		86.7		26.1		25.4	
Selenium	2.5	UJ	1.4	J	2.7	U	3.9	U	3.9	U	3.9	U
Silver	3.8		36.1		4.1		1.3		1.5		1.2	
Thallium	0.1	J	0.17	J	0.14	J	0.12	J	0.28	J	0.29	J
Vanadium	8.4		18.3		15		25.3		17.7		19.5	
Zinc	1040		1870		1320		3200		293		300	
Aroclor 1016	1800	U	76	U	76	U	55	U	56	U	56	U
Aroclor 1221	1800	U	76	U	76	U	55	U	56	U	56	U
Aroclor 1232	1800	U	76	U	76	U	55	U	56	U	56	U
Aroclor 1242	1800	U	76	U	76	U	55	U	56	U	56	U
Aroclor 1248	110000		6300		8100		55	U	1200		110	
Aroclor 1254	1800	U	76	U	76	U	55	U	56	U	56	U
Aroclor 1260	1800	U	76	U	76	U	55	U	56	U	56	U
Aroclor 1262	1800	U	76	U	76	U	55	U	56	U	56	U
Aroclor 1268	1800	U	76	U	76	U	55	U	56	U	56	U
4,4'-Ddd	10	NJ	0.66	NJ	19	NJ	2.2	NJ	0.83	NJ	1.1	NJ
4,4'-Dde	1200		12	NJ	18	NJ	1.6	NJ	11	J-	0.8	J
4,4'-Ddt	130	J	9.2	J+	62	J-	14	NJ	0.56	J-	1.1	J
Aldrin	1300	J	58	J+	76	J-	10	NJ	11	J-	2.4	J
Alpha-Bhc	18	U	1.4	NJ	0.62	NJ	3.3	J-	2.9	R	0.25	J
Beta-Bhc	24	NJ	3.9	U	4	NJ	5.3	NJ	2.9	R	2.9	UJ
Cis-Chlordane	24	NJ	15	J+	31	J-	1.1	NJ	2.1	J-	1.6	J
Delta-Bhc	92	NJ	3.9	U	6.1	NJ	11	J-	2.9	R	0.7	NJ
Dieldrin	27	NJ	12	NJ	200	J-	3.4	NJ	0.54	NJ	3	J
Endosulfan I	6.8	NJ	31	J+	11	NJ	1.1	NJ	2.9	R	2.9	U
Endosulfan Ii	77	NJ	11	NJ	230		190		1.1	NJ	2.5	J
Endosulfan Sulfate	8.2	NJ	2.2	NJ	17	NJ	28	NJ	5.6	R	5.6	U
Endrin	350	J	19	NJ	16	J-	16	J-	1.5	NJ	0.67	J
Endrin Aldehyde	150	J	9.4	J+	0.92	NJ	0.79	J-	0.78	NJ	0.79	J
Endrin Ketone	32	NJ	23	J+	6.9	NJ	1.7	NJ	1.8	J-	0.25	NJ
Gamma-Bhc (Lindane)	41	NJ	3.9	U	3.2	J-	340	J-	3.1	J-	0.49	J
Heptachlor	890	NJ	41	NJ	29	NJ	42	J-	2.8	NJ	2.9	UJ
Heptachlor Epoxide	270	NJ	220		1.1	NJ	4.2	J-	25	J-	2.9	U
Methoxychlor	20	NJ	2.1	J+	1700		2000		0.96	NJ	14	J
Toxaphene	1800	U	390	U	1900	U	280	UJ	290	R	290	U
Trans-Chlordane	760	J	76	J+	50	J-	2	NJ	6.2	J-	0.96	J
1,1'-Biphenyl	910	U	1900	U	2900	J	8400		1400	U	1400	U
1,2,4,5-Tetrachlorobenzene	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
1,4-Dioxane	360	R	760	U	1900	U	2800	U	560	R	570	UJ
2,3,4,6-Tetrachlorophenol	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
2,4,5-Trichlorophenol	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
2,4,6-Trichlorophenol	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
2,4-Dichlorophenol	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
2,4-Dimethylphenol	910	U	1900	U	880	J	1800	J	1400	U	1400	U
2,4-Dinitrophenol	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
2,4-Dinitrotoluene	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
2,6-Dinitrotoluene	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
2-Chloronaphthalene	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
2-Chlorophenol	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
2-Methylnaphthalene	300	J	280	J	12000		39000		260	J	760	J
2-Methylphenol	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
2-Nitroaniline	910	UJ	1900	UJ	4800	U	7000	U	1400	UJ	1400	UJ
2-Nitrophenol	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
3,3'-Dichlorobenzidine	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
3-Nitroaniline	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
4,6-Dinitro-2-Methylphenol	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
4-Bromophenyl Phenyl Ether	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
4-Chloro-3-Methylphenol	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
4-Chloroaniline	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
4-Chlorophenyl Phenyl Ether	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
4-Methylphenol	1800	U	3800	U	1400	J	3100	J	2800	U	2800	U
4-Nitroaniline	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
4-Nitrophenol	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
Acenaphthene	910	U	310	J	30000		94000		600	J	240	J
Acenaphthylene	910	U	310	J	8400		12000		230	J	1400	U
Acetophenone	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
Anthracene	910	U	850	J	88000	J	160000		1200	J	290	J
Atrazine	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
Benzaldehyde	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
Benzo(A)Anthracene	370	J	2700		180000		240000		1700		330	J
Benzo(A)Pyrene	320	J	2400		120000		160000		1200	J	360	J
Benzo(B)Fluoranthene	220	J	2900		150000		210000		1400		420	J
Benzo(G,H,I)Perylene	180	J	2200		58000		72000		610	J	1400	U
Benzo(K)Fluoranthene	300	J	990	J	68000		100000		530	J	1400	U
Benzyl Butyl Phthalate	790	J	1900	U	4800	U	7000	U	1400	U	1400	UJ
Bis(2-Chloroethoxy)Methane	910	U	1900	U	4800	U	7000	U	1400	U	1400	U
Bis(2-Chloroethyl) Ether	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
Bis(2-Ethylhexyl)Phthalate	1400		1900	U	4800	U	7000	U	1400	U	1400	J
Bis-Chloroisopropyl Ether	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
Caprolactam	1800	U	3800	U	9400	U	14000	U	2800	U	2800	U
Carbazole	1800	U	3800	U	37000		83000	J	560	J	2800	U

Location ID	UST-West		UST-West		UST-West		UST-West		UST-West	
Sample ID	UST-WEST-0-2		UST-WEST-2-4		UST-WEST-4-6		UST-WEST-6-8		UST-WEST-8-10	
Sample Date	8/10/2020		8/10/2020		8/10/2020		8/10/2020		8/10/2020	
Sample Type	N		N		N		N		N	
Parent Sample Code										
Depth	0-2 ft		2-4 ft		4-6 ft		6-8 ft		8-10 ft	
CLP ID	MBFWE9		MBFWF0		MBFWF1		MBFWF2		MBFWF3	
Chemical Name	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Cyanide	1.2		1.6		1.1		0.25	J	0.18	J
Antimony	11.2		67.5		13.9		1.4	U	1.5	U
Arsenic	17.4		73.6		25		39.3		23.9	
Barium	153		296		344		56.1		169	
Beryllium	0.26	J	0.36	J	0.31	J	0.33	J	0.26	J
Cadmium	3.7		8.8		4.5		5.2		0.97	
Chromium	29.6		93.6		55.3		15.2		21.6	
Cobalt	5.7		11.8		10.6		15.5		10.7	
Copper	250		1200		5530		86.3		115	
Lead	588		3020		3480		182		271	
Manganese	356		592		494		515		392	
Mercury	1.2		8		6.6		0.32		2.9	
Nickel	48.2		170		73.2		32.9		28.4	
Selenium	2.4	U	0.99	J	2.8	U	3.4	U	1.4	J
Silver	1.3		30		4.4		0.28	J	2	
Thallium	0.14	J	0.27	J	0.13	J	0.77		0.32	J
Vanadium	12.5		16.6		15.7		15.7		19.9	
Zinc	446		2200		1530		2660		284	
Aroclor 1016	3500	U	350	U	3700	U	46	U	54	U
Aroclor 1221	3500	U	350	U	3700	U	46	U	54	U
Aroclor 1232	3500	U	350	U	3700	U	46	U	54	U
Aroclor 1242	3500	U	350	U	3700	U	46	U	54	U
Aroclor 1248	150000		33000		110000		79		77	
Aroclor 1254	3500	U	350	U	3700	U	46	U	54	U
Aroclor 1260	3500	U	350	U	3700	U	46	U	54	U
Aroclor 1262	3500	U	350	U	3700	U	46	U	54	U
Aroclor 1268	3500	U	350	U	3700	U	46	U	54	U
4,4'-Ddd	20	NJ	3.7	NJ	12	NJ	1.3	NJ	0.42	J
4,4'-Dde	1500	J	53	NJ	110	NJ	0.18	NJ	5.4	U
4,4'-Ddt	180	J	31	J-	96	J+	2.2	J-	0.35	J
Aldrin	1200	J	390	J-	1500	J+	0.47	NJ	0.63	NJ
Alpha-Bhc	18	U	9	UJ	38	U	2.4	UJ	2.8	U
Beta-Bhc	20	NJ	280		62	J+	2.4	UJ	2.8	U
Cis-Chlordane	300	J	82	J-	340	J+	0.18	NJ	0.32	NJ
Delta-Bhc	140	J	100	J-	180	J+	1.5	J-	2.8	U
Dieldrin	170	NJ	56	NJ	120	NJ	0.44	J-	5.4	U
Endosulfan I	170	NJ	94	J-	250	NJ	2	J-	0.28	NJ
Endosulfan Ii	130	NJ	32	NJ	110	NJ	3.7	NJ	1.4	J
Endosulfan Sulfate	3.6	NJ	3.2	NJ	6.7	NJ	1.6	NJ	0.37	J
Endrin	310	J	58	J-	340	J+	11	J-	5.4	U
Endrin Aldehyde	12	NJ	14	NJ	11	NJ	2.3	NJ	0.31	J
Endrin Ketone	360	J	86	J-	200	J+	9	NJ	1.7	J
Gamma-Bhc (Lindane)	44		16	J-	42	J+	2.4	UJ	2.8	U
Heptachlor	320	NJ	270	J-	460	J+	0.3	NJ	0.34	NJ
Heptachlor Epoxide	2300	J	590	J-	2100	J+	1.1	J-	1.1	J
Methoxychlor	12	J	3.7	J-	4.5	NJ	24	UJ	0.27	NJ
Toxaphene	1800	U	900	UJ	3800	U	240	UJ	280	U
Trans-Chlordane	890	J	5.5	NJ	1100	J+	0.64	NJ	0.47	NJ
1,1'-Biphenyl	920	U	1800	U	1900	U	1600	UJ	1400	U
1,2,4,5-Tetrachlorobenzene	920	U	1800	U	1900	U	5800	UJ	1400	U
1,4-Dioxane	360	R	710	U	760	U	2300	UJ	550	UJ
2,3,4,6-Tetrachlorophenol	920	U	1800	U	1900	U	5800	UJ	1400	U
2,4,5-Trichlorophenol	920	U	1800	U	1900	U	5800	UJ	1400	U
2,4,6-Trichlorophenol	920	U	1800	U	1900	U	5800	UJ	1400	U
2,4-Dichlorophenol	920	U	1800	U	1900	U	5800	UJ	1400	U
2,4-Dimethylphenol	920	U	1800	U	1900	U	5800	UJ	1400	U
2,4-Dinitrophenol	1800	U	3500	U	3800	U	11000	UJ	2700	U
2,4-Dinitrotoluene	920	U	1800	U	1900	U	5800	UJ	1400	U
2,6-Dinitrotoluene	920	U	1800	U	1900	U	5800	UJ	1400	U
2-Chloronaphthalene	920	U	1800	U	1900	U	5800	UJ	1400	U
2-Chlorophenol	920	U	1800	U	1900	U	5800	UJ	1400	U
2-Methylnaphthalene	410	J	1800	U	310	J	4900	UJ	1400	U
2-Methylphenol	1800	U	3500	U	3800	U	11000	UJ	2700	U
2-Nitroaniline	920	UJ	1800	UJ	1900	UJ	5800	UJ	1400	UJ
2-Nitrophenol	920	U	1800	U	1900	U	5800	UJ	1400	U
3,3'-Dichlorobenzidine	1800	U	3500	U	3800	U	11000	UJ	2700	U
3-Nitroaniline	1800	U	3500	U	3800	U	11000	UJ	2700	U
4,6-Dinitro-2-Methylphenol	1800	U	3500	U	3800	U	11000	UJ	2700	U
4-Bromophenyl Phenyl Ether	920	U	1800	U	1900	U	5800	UJ	1400	U
4-Chloro-3-Methylphenol	920	U	1800	U	1900	U	5800	UJ	1400	U
4-Chloroaniline	1800	U	3500	U	3800	U	11000	UJ	2700	U
4-Chlorophenyl Phenyl Ether	920	U	1800	U	1900	U	5800	UJ	1400	U
4-Methylphenol	1800	U	3500	U	3800	U	11000	UJ	2700	U
4-Nitroaniline	1800	U	3500	U	3800	U	11000	UJ	2700	U
4-Nitrophenol	1800	U	3500	U	3800	U	11000	UJ	2700	U
Acenaphthene	140	J	1800	U	340	J	13000	UJ	420	J
Acenaphthylene	920	U	320	J	1900	U	5100	UJ	310	J
Acetophenone	1800	U	3500	U	3800	U	11000	UJ	2700	U
Anthracene	270	J	1200	J	910	J	50000	UJ	530	J
Atrazine	1800	U	3500	U	3800	U	11000	UJ	2700	U
Benzaldehyde	1800	U	3500	U	3800	U	11000	UJ	2700	U
Benzo(A)Anthracene	850	J	3700		2200		76000	UJ	1500	
Benzo(A)Pyrene	760	J	3100		1900		53000	UJ	1300	J
Benzo(B)Fluoranthene	830	J	3500		2100		70000	UJ	1600	
Benzo(G,H,I)Perylene	450	J	1600	J	1500	J	22000	UJ	670	J
Benzo(K)Fluoranthene	280	J	1500	J	980	J	21000	UJ	640	J
Benzyl Butyl Phthalate	920	U	1800	U	1900	U	5800	UJ	1400	U
Bis(2-Chloroethoxy)Methane	920	U	1800	U	1900	U	5800	UJ	1400	U
Bis(2-Chloroethyl) Ether	1800	U	3500	U	3800	U	11000	UJ	2700	U
Bis(2-Ethylhexyl)Phthalate	1800		9600		580	J	5800	UJ	1400	U
Bis-Chloroisopropyl Ether	1800	U	3500	U	3800	U	11000	UJ	2700	U
Caprolactam	1800	U	3500	U	3800	U	11000	UJ	2700	U
Carbazole	1800	U	3500	U	3800	U	20000	UJ	2700	U

Table A-3b
Analytical Results – Suspected UST
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

				Location ID	UST-East	UST-East	UST-East	UST-East	UST-East	UST-North	UST-North	UST-North	UST-North	UST-North	UST-South	UST-South	UST-South	UST-South	UST-South	UST-South	UST-West	UST-West	UST-West	UST-West	UST-West
				Sample ID	UST-EAST-0-2	UST-EAST-2-4	UST-EAST-4-6	UST-EAST-6-8	UST-EAST-8-10	UST-NORTH-0-2	UST-NORTH-2-4	UST-NORTH-4-6	UST-NORTH-6-8	UST-NORTH-8-10	UST-SOUTH-0-2	UST-SOUTH-2-4	UST-SOUTH-4-6	UST-SOUTH-6-8	UST-SOUTH-8-10	UST-SOUTH-98-10	UST-WEST-0-2	UST-WEST-2-4	UST-WEST-4-6	UST-WEST-6-8	UST-WEST-8-10
				Sample Date	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020	8/10/2020
				Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
				Parent Sample Code																UST-SOUTH-8-10					
				Depth	0 -2 ft	2-4 ft	4-6 ft	6-8 ft	8-10 ft	0-2 ft	2-4 ft	4-6 ft	6-8 ft	8-10 ft	0-2 ft	2-4 ft	4-6 ft	6-8 ft	8-10 ft	8-10 ft	0-2 ft	2-4 ft	4-6 ft	6-8 ft	8-10 ft
				CLP ID	MBFWD9	MBFWE0	MBFWE1	MBFWE2	MBFWE3	MBFWD4	MBFWD5	MBFWD6	MBFWD7	MBFWD8	MBFWE4	MBFWE5	MBFWE6	MBFWE7	MBFWE8	MBFWI3	MBFWE9	MBFWF0	MBFWF1	MBFWF2	MBFWF3
Method Group	**Chemical Name**	**CAS No.**	**PAL**	**Unit**	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q	Result Q
SVOCs	Chrysene	218-01-9	56000	ug/kg	2300	51000	160000	2900	3100	500 J	6600	5900	6700	210 J	320 J	2800	140000	190000	1700	340 J	710 J	3300	2200	63000 UJ	1400
SVOCs	Dibenzo(A,H)Anthracene	53-70-3	560	ug/kg	1800 U	8000	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	33000	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	Dibenzofuran	132-64-9	350000	ug/kg	1800 U	11000	61000	610 J	640	940 U	850 J	860 J	1700 J	250 U	910 U	1900 U	30000	100000	310 J	1400 U	160 J	1800 U	1900 U	19000 UJ	1400 U
SVOCs	Diethyl Phthalate	84-66-2	#N/A	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	7000 U	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	Dimethyl Phthalate	131-11-3	#N/A	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	7000 U	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	Di-N-Butylphthalate	84-74-2	#N/A	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	500 J	1900 U	4800 U	7000 U	1400 U	210 J	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	Di-N-Octylphthalate	117-84-0	#N/A	ug/kg	3500 UJ	9300 U	11000 U	2500 UJ	520 U	1800 UJ	3800 UJ	4100 UJ	4900 UJ	480 U	1800 UJ	3800 UJ	9400 U	14000 U	2800 UJ	2800 U	1800 UJ	3500 UJ	3800 UJ	11000 UJ	2700 UJ
SVOCs	Fluoranthene	206-44-0	500000	ug/kg	4100	100000	320000	5200	4600	750 J	15000	13000	16000	480	460 J	4200	300000	440000	3100	440 J	1500 J	7000	3500 J	150000 UJ	2400 J
SVOCs	Fluorene	86-73-7	500000	ug/kg	1800 U	17000	68000 J	1000 J	1100	940 U	1300 J	1400 J	2900	34 J	910 U	290 J	56000	120000 J	750 J	200 J	120 J	300 J	350 J	37000 UJ	330 J
SVOCs	Hexachloro-1,3-Butadiene	87-68-3	#N/A	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	7000 U	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	Hexachlorobenzene	118-74-1	6000	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	7000 U	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	Hexachlorocyclopentadiene	77-47-4	#N/A	ug/kg	3500 U	9300 UJ	11000 UJ	2500 U	520 UJ	1800 UJ	3800 U	4100 U	4900 U	480 UJ	1800 U	3800 U	9400 UJ	14000 UJ	2800 U	2800 U	1800 U	3500 U	3800 U	11000 UJ	2700 U
SVOCs	Hexachloroethane	67-72-1	#N/A	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	7000 U	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	Indeno(1,2,3-Cd)Pyrene	193-39-5	5600	ug/kg	1100 J	22000	78000	1100 J	1200	310 J	2700	2500	2500	140 J	150 J	2000	66000	83000	510 J	230 J	400 J	1600 J	1300 J	24000 UJ	550 J
SVOCs	Isophorone	78-59-1	#N/A	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	7000 U	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	Naphthalene	91-20-3	500000	ug/kg	1800 U	15000	65000	490 J	880	180 J	1200 J	780 J	1400 J	88 J	160 J	310 J	20000	100000	400 J	2300	240 J	1800 U	1900 U	3900 UJ	1400 U
SVOCs	Nitrobenzene	98-95-3	#N/A	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	7000 U	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	N-Nitroso-Di-N-Propylamine	621-64-7	#N/A	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	7000 U	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	N-Nitrosodiphenylamine	86-30-6	#N/A	ug/kg	1800 U	4800 U	5500 U	1300 U	270 U	940 U	2000 U	2100 U	2500 U	250 U	910 U	1900 U	4800 U	7000 U	1400 U	1400 U	920 U	1800 U	1900 U	5800 UJ	1400 U
SVOCs	Pentachlorophenol	87-86-5	6700	ug/kg	3500 U	9300 U	11000 U	2500 U	520 U	1800 U	3800 U	4100 U	4900 U	480 U	1800 U	3800 U	9400 U	14000 U	2800 U	2800 U	1800 U	3500 U	3800 U	11000 UJ	2700 U
SVOCs	Phenanthrene	85-01-8	500000	ug/kg	2700	120000	400000	4500	4400	550 J	12000	9300	15000	230 J	370 J	3400	320000	660000	3200	320 J	1300	5600	3600	200000 UJ	1300 J
SVOCs	Phenol	108-95-2	500000	ug/kg	3500 U	9300 U	1400 J	2500 U	520 U	1800 U	3800 U	4100 U	4900 U	480 U	1800 U	3800 U	9400 U	14000 U	2800 U	2800 U	1800 U	3500 U	3800 U	11000 UJ	2700 U
SVOCs	Pyrene	129-00-0	500000	ug/kg	4400	100000	330000	5100	5200	760 J	12000	9100	13000	350	490 J	4300	290000	410000	3700	370 J	1400	6700	3600	130000 UJ	2800
VOCs	1,1,1-Trichloroethane	71-55-6	500000	ug/kg	6.3 U	12 UJ	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 UJ	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 UJ	8.3 UJ	6 U	7.8 UJ
VOCs	1,1,2,2-Tetrachloroethane	79-34-5	#N/A	ug/kg	8.5 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	1,1,2-Trichloroethane	79-00-5	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	#N/A	ug/kg	6.3 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.7 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 UJ	8.3 UJ	6 U	8.7 U
VOCs	1,1-Dichloroethane	75-34-3	240000	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	1,1-Dichloroethene	75-35-4	500000	ug/kg	6.3 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 U	8.3 U	6 U	8.7 U
VOCs	1,2,3-Trichlorobenzene	87-61-6	#N/A	ug/kg	8.5 UJ	12 UJ	8.2 UJ	7.6 U	12 UJ	7.4 UJ	9.1 UJ	9.2 UJ	6.7 UJ	7.6 UJ	8.1 R	8.2 UJ	9 UJ	8.7 UJ	9.4 UJ	9.3 UJ	9 UJ	9.1 UJ	8.3 UJ	6 UJ	7.8 UJ
VOCs	1,2,4-Trichlorobenzene	120-82-1	#N/A	ug/kg	8.5 UJ	12 UJ	8.2 UJ	7.6 U	12 UJ	7.4 UJ	9.1 UJ	9.2 UJ	6.7 UJ	7.6 UJ	8.1 R	8.2 UJ	9 UJ	8.7 UJ	9.4 UJ	9.3 UJ	9 UJ	9.1 UJ	8.3 UJ	6 UJ	7.8 UJ
VOCs	1,2,4-Trimethylbenzene	95-63-6	190000	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	2.4 J	6.7 U	7.6 U	2.3 J+	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	1.7 J
VOCs	1,2-Dibromo-3-Chloropropan	96-12-8	#N/A	ug/kg	8.5 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 UJ	6.7 U	7.6 U	8.1 R	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	1,2-Dibromoethane	106-93-4	#N/A	ug/kg	6.3 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.7 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 UJ	8.3 UJ	6 U	7.8 UJ
VOCs	1,2-Dichlorobenzene	95-50-1	500000	ug/kg	8.5 UJ	12 UJ	8.2 UJ	7.6 U	12 UJ	7.4 UJ	9.1 UJ	9.2 UJ	6.7 UJ	7.6 UJ	8.1 R	8.2 UJ	9 UJ	8.7 UJ	9.4 UJ	9.3 UJ	9 UJ	9.1 UJ	8.3 UJ	6 UJ	7.8 UJ
VOCs	1,2-Dichloroethane	107-06-2	30000	ug/kg	6.3 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.7 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 UJ	8.3 UJ	6 U	8.7 U
VOCs	1,2-Dichloropropane	78-87-5	#N/A	ug/kg	8.5 U	12 U	8.2 UJ	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 UJ	9.3 U	9 U	9.1 U	8.3 U	6 UJ	7.8 UJ
VOCs	1,3,5-Trimethylbenzene	108-67-8	190000	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	1.5 J
VOCs	1,3-Dichlorobenzene	541-73-1	280000	ug/kg	8.5 UJ	12 UJ	8.2 UJ	7.6 U	12 UJ	7.4 UJ	9.1 UJ	9.2 UJ	6.7 UJ	7.6 UJ	8.1 R	8.2 UJ	9 UJ	8.7 UJ	9.4 UJ	9.3 UJ	9 UJ	9.1 UJ	8.3 UJ	6 UJ	7.8 UJ
VOCs	1,4-Dichlorobenzene	106-46-7	130000	ug/kg	8.5 UJ	12 UJ	8.2 UJ	7.6 U	12 UJ	7.4 UJ	9.1 UJ	9.2 UJ	6.7 UJ	7.6 UJ	8.1 R	8.2 UJ	9 UJ	8.7 UJ	9.4 UJ	9.3 UJ	9 UJ	9.1 UJ	8.3 UJ	6 UJ	7.8 UJ
VOCs	2-Butanone (MEK)	78-93-3	500000	ug/kg	17 U	55	34	34	23 U	15 U	18 U	18 U	28	55	16 UJ	16 U	18 U	43	39	31	16 J	46	17 U	12 U	34
VOCs	2-Hexanone	591-78-6	#N/A	ug/kg	9.9 J	46	44	15 U	15 J	5.4 J	7.2 J	18 U	13 U	15 U	6.9 J+	26	18 U	17 U	19 U	19 U	24	53	13 J	6 J	16 U
VOCs	4-Methyl-2-Pentanone (MIBK	108-10-1	#N/A	ug/kg	17 U	25 U	16 U	15 U	23 U	15 U	18 U	18 U	13 U	15 U	16 UJ	16 U	18 U	17 U	19 U	19 U	18 U	18 U	17 U	12 U	16 U
VOCs	Acetone	67-64-1	500000	ug/kg	17 U	25 U	33	86	23 U	15 U	18 U	18 U	66	150	57 J+	16 U	18 U	96	110	77	18 U	46	17 U	12 U	89
VOCs	Benzene	71-43-2	44000	ug/kg	6.3 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	4.2 J+	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Bromochloromethane	74-97-5	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Bromodichloromethane	75-27-4	#N/A	ug/kg	6.3 U	12 U	8.2 UJ	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 UJ	9.3 U	9 U	9.1 UJ	8.3 U	6 UJ	7.8 UJ
VOCs	Bromoform	75-25-2	#N/A	ug/kg	8.5 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 UJ	6.7 U	7.6 U	8.1 R	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Bromomethane	74-83-9	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Carbon Disulfide	75-15-0	#N/A	ug/kg	2.7 J	12 U	8.2 U	4.2 J	12 U	2.8 J	9.1 U	5.3 J	6.7 U	7.6 U	5.4 J+	8.2 U	9 U	3.5 J	5.4 J	3.1 J	9 U	9.1 U	8.3 U	6 U	2.7 J
VOCs	Carbon Tetrachloride	56-23-5	22000	ug/kg	6.3 U	12 UJ	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 UJ	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 UJ	8.3 UJ	6 U	7.8 UJ
VOCs	Chlorobenzene	108-90-7	500000	ug/kg	8.5 UJ	12 UJ	8.2 UJ	7.6 U	12 UJ	8.1 U	9.1 UJ	9.2 UJ	6.7 UJ	7.6 UJ	8.1 UJ	8.2 UJ	9 UJ	8.7 UJ	9.4 UJ	9.3 UJ	9 UJ	9.1 UJ	8.3 UJ	6 UJ	7.8 UJ
VOCs	Chloroethane	75-00-3	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Chloroform	67-66-3	350000	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Chloromethane	74-87-3	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Cis-1,2-Dichloroethene	156-59-2	500000	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 U	8.3 U	6 U	8.7 U
VOCs	Cis-1,3-Dichloropropene	10061-01-5	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Cyclohexane	110-82-7	#N/A	ug/kg	8.5 U	12 U	8.2 UJ	7.6 U	12 U	7.4 U	9.1 U	24	6.7 U	7.6 U	2 J+	8.2 U	9 U	8.7 U	9.4 UJ	9.3 U	9 U	9.1 UJ	3.1 J	6 UJ	7.8 UJ
VOCs	Dibromochloromethane	124-48-1	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Dichlorodifluoromethane	75-71-8	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Ethylbenzene	100-41-4	390000	ug/kg	6.3 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Isopropylbenzene	98-82-8	2300	ug/kg	6.3 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	M,P-Xylene	179601-23-1	500000	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Methyl Acetate	79-20-9	#N/A	ug/kg	6.3 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.7 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	2.5 J-	9.1 UJ	8.3 UJ	6 U	8.7 U
VOCs	Methyl Tert-Butyl Ether	1634-04-4	500000	ug/kg	6.3 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.7 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 UJ	8.3 UJ	6 U	8.7 U
VOCs	Methylcylohexane	108-87-2	#N/A	ug/kg	8.5 U	12 U	8.2 UJ	7.6 U	3.2 J	3.2 J	9.1 U	48	6.7 U	7.6 U	5.2 J+	8.2 U	9 U	8.7 U	9.4 UJ	9.3 U	9 U	9.1 UJ	6.1 J	6 UJ	7.8 UJ
VOCs	Methylene Chloride	75-09-2	500000	ug/kg	6.3 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.7 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 UJ	8.3 UJ	6 U	8.7 U
VOCs	N-Propylbenzene	103-65-1	500000	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	O-Xylene	95-47-6	500000	ug/kg	6.3 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Styrene	100-42-5	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Tetrachloroethene	127-18-4	150000	ug/kg	6.3 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Toluene	108-88-3	500000	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	12	6.7 U	7.6 U	12 J+	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Trans-1,2-Dichloroethene	156-60-5	500000	ug/kg	6.3 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 U	8.3 U	6 U	8.7 U
VOCs	Trans-1,3-Dichloropropene	10061-02-6	#N/A	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Trichloroethene	79-01-6	200000	ug/kg	6.3 U	12 U	8.2 U	7.6 U	12 U	8.1 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U
VOCs	Trichlorofluoromethane	75-69-4	#N/A	ug/kg	6.3 U	12 UJ	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.7 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 UJ	8.7 U	9.4 U	9.3 U	9 UJ	9.1 UJ	8.3 UJ	6 U	8.7 U
VOCs	Vinyl Chloride	75-01-4	13000	ug/kg	8.5 U	12 U	8.2 U	7.6 U	12 U	7.4 U	9.1 U	9.2 U	6.7 U	7.6 U	8.1 UJ	8.2 U	9 U	8.7 U	9.4 U	9.3 U	9 U	9.1 U	8.3 U	6 U	7.8 U

Notes:
PALs are Commercial Restricted Use SCOs for per 6NYCRR 375-6.8(b).

Table A-4
Analytical Results – Water Street Properties
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Chromium		Hexavalent Chromium		Total PCBs	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1		16065-83-1		18540-29-9			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L		mg/kg		mg/kg		mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start	End	Sample	Sample	Soil Criteria	400		5		30		1			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-L10-S01A	18MC-L10-S01A-0.5-2	0.5	2	SO	N	10/4/2018	NA		NA		NA		NA		ND	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
18MC-L10-S01A	18MC-L10-S01A-2-5	2	5	SO	N	10/4/2018	NA		NA		NA		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
18MC-L10-S01A	18MC-L10-S01A-5-6 OR NAT	5	6	SO	N	10/4/2018	NA		NA		NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
18MC-L11-S01A	18MC-L11-S01A-0.5-2	0.5	2	SO	N	10/4/2018	NA		NA		NA		NA		9.1	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	9.1		0.097	U	0.097	U	0.097	U
18MC-L11-S01A	18MC-L11-S01A-2-5	2	5	SO	N	10/4/2018	NA		NA		NA		NA		ND	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U
18MC-L11-S01A	18MC-L11-S01A-5-6 OR NAT	5	6	SO	N	10/4/2018	NA		NA		NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
18MC-L13-S04	18MC-L13-S04-Z1	0	0.167	SO	N	4/24/2007	255	J	NA		14.7		NA		0.25	0.022	U	0.022	U	0.022	U	0.022	U	0.12		0.13		0.022	U	0.022	U	0.022	U
18MC-L13-S04	18MC-L13-S04-Z2	1	1.5	SO	N	4/24/2007	7.3	J	NA		9.6		NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
DEC-SB-10	DEC-SB-10-0.5-1.5	0.5	1.5	SO	N	10/3/2018	NA		NA		25.5		0.24	UJ	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-10	SB-10	0.1	0.9	SO	N	9/27/2005	898		NA		262		NA		0.16	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.16		0.11	U	NA		NA	
DEC-SB-10	DEC-SB-910-0.5-1.5	0.5	1.5	SO	N	10/3/2018	NA		NA		33.8		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-11	SB-11	0	1.1	SO	N	9/27/2005	1030		NA		22.3		NA		ND	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA	
DEC-SB-12	SB-12	0	0.9	SO	N	10/3/2005	334		NA		16.3		NA		0.039	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.015	J	0.024	J	NA		NA	
DEC-SB-13	DEC-SB-13-0.5-1.5	0.5	1.5	SO	N	10/3/2018	NA		NA		281		0.24	UJ	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-13	DEC-SB-913-0.5-1.5	0.5	1.5	SO	N	10/3/2018	NA		NA		NA		1.5	J-	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-13	SB-13A	0.2	0.9	SO	N	10/3/2005	71		NA		7.7		NA		0.195	0.1	U	0.1	U	0.1	U	0.1	U	0.044	J	0.11		0.041	J	NA		NA	
DEC-SB-13	SB-13B	0.9	1.7	SO	N	10/3/2005	672		NA		157		NA		4.16	0.74	U	0.74	U	0.74	U	0.74	U	1.6		1.7		0.86		NA		NA	
DEC-SB-13	SB-13C	4	4.3	SO	N	10/3/2005	319		NA		34.3		NA		0.65	0.11	U	0.11	U	0.11	U	0.11	U	0.29		0.25		0.11		NA		NA	
DEC-SB-14	SB-14	0.5	1	SO	N	10/3/2005	200		NA		13.7		NA		0.044	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.044	J	NA		NA	
DEC-SB-14	SB-14B	1	1.6	SO	N	10/3/2005	245		NA		20.3		NA		ND	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	NA		NA	
DEC-SB-15	SB-15	0	1.3	SO	N	10/3/2005	142	J	NA		22.2		NA		0.032	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.032	J	NA		NA	
DEC-SB-17	SB-17	0.1	2.1	SO	N	10/3/2005	10.7		NA		5.8		NA		ND	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	NA		NA	
DEC-SB-19	SB-19	0.3	5	SO	N	10/3/2005	149		NA		9.1		NA		ND	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	NA		NA	
DEC-SB-20	OU1-SB-20	0.2	4	SO	N	10/6/2005	70.2		NA		5.1		NA		ND	0.099	U	0.099	U	0.099	U	0.099	U	0.099	U	0.099	U	0.099	U	NA		NA	
DEC-SB-23	OU1-SB-23	0	0.6	SO	N	10/6/2005	169		NA		6.6		NA		ND	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA	
DEC-SB-4	SB-4	0	1.2	SO	N	9/27/2005	757		NA		16.4		NA		ND	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA	
DEC-SB-5	SB-5	0	1.2	SO	N	9/27/2005	888		NA		27.3		NA		ND	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA	
DEC-SB-5A	DEC-SB-5A-0.5-2	0.5	2	SO	N	10/4/2018	160		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-5A	DEC-SB-5A-2-4	2	4	SO	N	10/4/2018	6.9	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-5A	DEC-SB-5A-4-6	4	6	SO	N	10/4/2018	6.9	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-7	SB-7	0	0.6	SO	N	9/27/2005	587		NA		23.1		NA		ND	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	NA		NA	
DEC-SB-7A	DEC-SB-7A-0.5-2	0.5	2	SO	N	10/4/2018	390		0.019	J	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
DEC-SB-7A	DEC-SB-7A-2-4	2	4	SO	N	10/4/2018	7.5	U	5	U	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-7A	DEC-SB-7A-2-6 OR NAT	2	6	SO	N	10/4/2018	NA		NA		NA		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
DEC-SB-7A	DEC-SB-7A-4-6	4	6	SO	N	10/4/2018	7.7		5	U	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-9	SB-9	0	1.6	SO	N	9/27/2005	975		NA		25		NA		ND	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	NA		NA	
DEC-SB-9A	DEC-SB-9A-0.5-2	0.5	2	SO	N	10/4/2018	400		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-9A	DEC-SB-9A-2-4	2	4	SO	N	10/4/2018	9.6		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SB-9A	DEC-SB-9A-4-6	4	6	SO	N	10/4/2018	6.9	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-10	OU1-SS-10	0	0.17	SO	N	7/23/2002	4630		NA		NA		NA		0.46	0.59	U	0.59	U	0.59	U	0.59	U	0.22	J	0.24	J	0.59	U	NA		NA	
DEC-SS-10A	DEC-SS-10A-0.5-2	0.5	2	SO	N	10/1/2018	650		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-10A	DEC-SS-10A-2-4	2	4	SO	N	10/1/2018	86		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-10A	DEC-SS-10A-4-6	4	6	SO	N	10/1/2018	83		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-11	OU1-SS-11	0	0.17	SO	N	7/23/2002	913		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-11A	DEC-SS-11A-0.5-2	0.5	2	SO	N	10/1/2018	44		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-11A	DEC-SS-11A-2-4	2	4	SO	N	10/1/2018	760		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-11A	DEC-SS-11A-4-6	4	6	SO	N	10/1/2018	37		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-12	OU1-SS-12	0	0.17	SO	N	7/23/2002	1330		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-13	OU1-SS-13	0	0.17	SO	N	7/23/2002	140		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-14	OU1-SS-14	0	0.17	SO	N	7/23/2002	172		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-15	OU1-SS-15	0	0.17	SO	N	7/23/2002	1110		NA				NA		ND															NA		NA	
DEC-SS-15A	DEC-SS-15A-0.5-2	0.5	2	SO	N	10/3/2018	100		NA		NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
DEC-SS-15A	DEC-SS-15A-2-4	2	4	SO	N	10/3/2018	430		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-4
Analytical Results – Water Street Properties
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Chromium		Hexavalent Chromium		Total PCBs	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1		16065-83-1		18540-29-9		mg/kg	12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L		mg/kg		mg/kg			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start	End	Sample	Sample	Soil Criteria	400		5		30		1			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
DEC-SS-15A	DEC-SS-15A-2-5 OR NAT	2	5	SO	N	10/3/2018	NA		NA		NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
DEC-SS-15A	DEC-SS-915A-2-5 OR NAT	2	5	SO	FD	10/3/2018	NA		NA		NA		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
DEC-SS-15A	DEC-SS-15A-4-6	4	6	SO	N	10/3/2018	68		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-16	OU1-SS-16	0	0.17	SO	N	7/23/2002	**438**		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-17	OU1-SS-17	0	0.17	SO	N	7/23/2002	56.2		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-18	OU1-SS-18	0	0.17	SO	N	7/23/2002	227		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-19	OU1-SS-19	0	0.17	SO	N	7/23/2002	**549**		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-20	OU1-SS-20	0	0.17	SO	N	7/23/2002	**936**		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-21	OU1-SS-21	0	0.17	SO	N	7/23/2002	**3680**		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-25	SS-25	0	0.17	SO	N	11/1/2005	349		NA		**39.1**		NA		ND	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	NA		NA	
DEC-SS-25	DEC-SS-25-0.5-1	0.5	1.5	SO	N	10/3/2018	NA		NA		**36.7**		0.26	J-	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-26	SS-26	0	0.17	SO	N	11/1/2005	254		NA		12.6		NA		ND	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	NA		NA	
DEC-SS-27	SS-27	0	0.17	SO	N	11/1/2005	214		NA		15.7		NA		ND	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	NA		NA	
DEC-SS-28	SS-28	0	0.17	SO	N	11/1/2005	311		NA		14.4		NA		ND	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA	
DEC-SS-29	SS-29	0	0.17	SO	N	11/1/2005	**1470**		NA		**164**		NA		**27**	6.3	U	6.3	U	6.3	U	6.3	U	**14**		**13**		6.3	U	NA		NA	
DEC-SS-29A	DEC-SS-29A-0.5-1	0.5	1	SO	N	10/3/2018	NA		NA		**86.9**		0.24	UJ	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-29A	DEC-SS-29A-0.5-2	0.5	2	SO	N	10/3/2018	280		NA		NA		NA		ND	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U
DEC-SS-29A	DEC-SS-29A-2-4	2	4	SO	N	10/3/2018	190		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-29A	DEC-SS-29A-2-6 OR NAT	2	6	SO	N	10/3/2018	NA		NA		NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
DEC-SS-29A	DEC-SS-929A-2-4	2	4	SO	FD	10/3/2018	190		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-29A	DEC-SS-29A-4-6	4	6	SO	N	10/3/2018	54		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-30	SS-30	0	0.17	SO	N	11/2/2005	**1160**		NA		25.6		NA		0.18	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.18		0.13	U	NA		NA	
DEC-SS-31	SS-31	0	0.17	SO	N	11/2/2005	101		NA		14.5		NA		0.073	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.073	J	0.11	U	NA		NA	
DEC-SS-32	SS-32	0	0.17	SO	N	11/2/2005	184		NA		16.8		NA		0.1	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.1	J	0.11	U	NA		NA	
DEC-SS-33	SS-33	0	0.17	SO	N	11/2/2005	226		NA		13.1		NA		ND	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	NA		NA	
DEC-SS-34	SS-34	0	0.17	SO	N	11/2/2005	342	J	NA		18	J	NA		0.26	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.26		0.11	U	NA		NA	
DEC-SS-35	SS-35	0	0.17	SO	N	11/2/2005	387		NA		15.1		NA		0.15	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.15		0.1	U	NA		NA	
DEC-SS-36	SS-36	0	0.17	SO	N	11/2/2005	**603**		NA		20.5		NA		0.07	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.07	J	0.12	U	NA		NA	
DEC-SS-36A	DEC-SS-36A-2-4	2	4	SO	N	10/4/2018	44		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-36A	DEC-SS-36A-4-6	4	6	SO	N	10/4/2018	6.6	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-37	SS-37	0	0.17	SO	N	11/2/2005	**666**		NA		22.6		NA		**1.06**	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.7		0.36		NA		NA	
DEC-SS-38	SS-38	0	0.17	SO	N	11/2/2005	**901**		NA		16.2		NA		0.068	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.068	J	NA		NA	
DEC-SS-39	SS-39	0	0.17	SO	N	11/3/2005	**662**		NA		19.4		NA		0.176	0.14	U	0.14	U	0.14	U	0.14	U	0.056	J	0.12	J	0.14	U	NA		NA	
DEC-SS-40	SS-40	0	0.17	SO	N	11/3/2005	158		NA		10.7		NA		0.08	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.08	J	0.13	U	NA		NA	
DEC-SS-41	SS-41	0	0.17	SO	N	11/3/2005	**1420**		NA		**30.6**		NA		0.092	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.092	J	NA		NA	
DEC-SS-42	SS-42	0	0.17	SO	N	11/3/2005	**653**		NA		21.5		NA		ND	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	NA		NA	
DEC-SS-42A	DEC-SS-42A-0.5-2	0.5	2	SO	N	10/4/2018	28		NA		NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
DEC-SS-42A	DEC-SS-42A-2-4	2	4	SO	N	10/4/2018	13	K	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-42A	DEC-SS-42A-2-6 OR NAT	2	6	SO	N	10/4/2018	NA		NA		NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
DEC-SS-42A	DEC-SS-42A-4-6	4	6	SO	N	10/4/2018	7.1	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-43	SS-43	0	0.17	SO	N	11/3/2005	380	J	NA		14.5	J	NA		0.266	0.2	U	0.2	U	0.2	U	0.2	U	0.066	J	0.2	U	0.2		NA		NA	
DEC-SS-44	SS-44	0	0.17	SO	N	11/3/2005	344	J	NA		25.6	J	NA		0.74	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.4		0.34		NA		NA	
DEC-SS-5	OU1-SS-5	0	0.17	SO	N	7/23/2002	29.8		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-8	OU1-SS-8	0	0.17	SO	N	7/23/2002	**1100**		NA		NA		NA		**6.3**	2.5	U	2.5	U	2.5	U	2.5	U	**2.8**		**3.5**		2.5	U	NA		NA	
DEC-SS-9	OU1-SS-9	0	0.17	SO	N	7/23/2002	**1360**		NA				NA		**8**	2.2	U	2.2	U	2.2	U	2.2	U	**3.7**		**4.3**		2.2	U	NA		NA	
DEC-SS-9A	DEC-SS-909A-0.5-2	0.5	2	SO	FD	10/1/2018	NA		NA		NA		NA		ND	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U
DEC-SS-9A	DEC-SS-9A-0.5-2	0.5	2	SO	N	10/1/2018	130		NA		NA		NA		ND	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U
DEC-SS-9A	DEC-SS-9A-2-4	2	4	SO	N	10/1/2018	230		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SS-9A	DEC-SS-9A-2-6 OR NAT	2	6	SO	N	10/1/2018	NA		NA		NA		NA		ND	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U
DEC-SS-9A	DEC-SS-9A-4-6	4	6	SO	N	10/1/2018	58		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-6	FS-SP06-D24-S-O	2	4	SO	N	9/10/2003	5.4		NA		5.8	J	NA		ND	0.037	U	0.075	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	NA		NA	
FS-SP-7	FS-SP07-D24-S-O	2	4	SO	N	9/10/2003	25.7		NA		9.3		NA		ND	0.038	U	0.078	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	NA		NA	
FS-SP-9	FS-SP09-D14-S-O	1	4	SO	N	9/10/2003	**3230**		NA		**41.6**		NA		ND	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	NA		NA	

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Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Chromium		Hexavalent Chromium		Total PCBs	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1		16065-83-1		18540-29-9			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L		mg/kg		mg/kg		mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start	End	Sample	Sample	Soil Criteria	400		5		30		1			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
FS-SS-10	FS-SS10-S-O	0	0.167	SO	N	9/15/2003	1140		NA		40.8		NA		ND	0.18	U	0.36	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	NA		NA	
FS-SS-11	FS-SS11-S-O	0	0.167	SO	N	9/18/2003	80.9		NA		11.3		NA		ND	0.037	U	0.074	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	NA		NA	
FS-SS-12	FS-SS12-S-O	0	0.167	SO	N	9/18/2003	25.3		NA		16.7		NA		ND	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	NA		NA	
WS-SB02	WS-SB02-0.5-2	0.5	2	SO	N	10/4/2018	740		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB02	WS-SB02-2-4	2	4	SO	N	10/4/2018	4200		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB02	WS-SB02-4-6	4	6	SO	N	10/4/2018	150		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB02	WS-SB02-6-8	6	8	SO	N	10/4/2018	21		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB02	WS-SB902-6-8	6	8	SO	FD	10/4/2018	28		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB10	WS-SB10-0.5-2	0.5	2	SO	N	10/3/2018	300		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB10	WS-SB10-2-4	2	4	SO	N	10/3/2018	67		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB10	WS-SB10-4-6	4	6	SO	N	10/3/2018	17		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB10	WS-SB10-6-7	6	6.6	SO	N	10/3/2018	6.9	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB11	WS-SB11-0.5-2	0.5	2	SO	N	10/4/2018	220		NA		NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
WS-SB11	WS-SB11-2-4	2	4	SO	N	10/4/2018	87		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB11	WS-SB11-2-5	2	5	SO	N	10/4/2018	NA		NA		NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
WS-SB11	WS-SB11-4-6	4	6	SO	N	10/4/2018	6.6	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB11	WS-SB11-5-9 OR NAT	5	9	SO	N	10/4/2018	NA		NA		NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
WS-SB11	WS-SB11-6-8	6	8	SO	N	10/4/2018	6.5	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB11	WS-SB11-8-9	8	9	SO	N	10/4/2018	6.7	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB13	WS-SB13-0.5-2	0.5	2	SO	N	10/4/2018	380		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB13	WS-SB13-2-4	2	4	SO	N	10/4/2018	54		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB13	WS-SB13-4-6	4	6	SO	N	10/4/2018	18		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB13	WS-SB13-6-8	6	8	SO	N	10/4/2018	27		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB13	WS-SB13-8-9	8	9	SO	N	10/4/2018	7	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB14	WS-SB14-0.5-2	0.5	2	SO	N	10/3/2018	810		0.031	J	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
WS-SB14	WS-SB14-2-4	2	4	SO	N	10/3/2018	79		5	U	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB14	WS-SB14-2-5	2	5	SO	N	10/3/2018	NA		NA		NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
WS-SB14	WS-SB14-4-6	4	6	SO	N	10/3/2018	6.7	U	5	U	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB14	WS-SB14-5-9 OR NAT	5	9	SO	N	10/3/2018	NA		NA		NA		NA		ND	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U
WS-SB14	WS-SB14-6-8	6	8	SO	N	10/3/2018	7.3	U	5	U	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB14	WS-SB14-8-9	8	9	SO	N	10/3/2018	7.3	U	5	U	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB15	WS-SB15-0.5-2	0.5	2	SO	N	10/3/2018	86		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB15	WS-SB915-0.5-2	0.5	2	SO	FD	10/3/2018	54		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB15	WS-SB15-2-4	2	4	SO	N	10/3/2018	26		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB15	WS-SB15-4-6	4	6	SO	N	10/3/2018	40		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB15	WS-SB15-6-8	6	8	SO	N	10/3/2018	49		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB15	WS-SB15-8-10	8	9.8	SO	N	10/3/2018	6.7	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB18	WS-SB18-0.5-2	0.5	2	SO	N	10/3/2018	43		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB18	WS-SB18-2-4	2	4	SO	N	10/3/2018	780		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB18	WS-SB18-4-6	4	6	SO	N	10/3/2018	84		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB18	WS-SB18-6-8	6	8	SO	N	10/3/2018	9.7		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB18	WS-SB18-8-10	8	10	SO	N	10/3/2018	6.6	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB18	WS-SB18-10-12	10	10.5	SO	N	10/3/2018	6.6	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB19	WS-SB19-0.5-2	0.5	2	SO	N	10/1/2018	150		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB19	WS-SB19-2-4	2	4	SO	N	10/1/2018	36		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB19	WS-SB19-4-6	4	6	SO	N	10/1/2018	13		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB19	WS-SB19-6-8	6	8	SO	N	10/1/2018	12		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB19	WS-SB19-8-10	8	10	SO	N	10/1/2018	13		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB20	WS-SB20-0.5-2	0.5	2	SO	N	10/1/2018	2000		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB20	WS-SB20-2-4	2	4	SO	N	10/1/2018	130		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB20	WS-SB20-4-6	4	6	SO	N	10/1/2018	14		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB20	WS-SB20-6-8	6	8	SO	N	10/1/2018	15		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB20	WS-SB20-8-10	8	10	SO	N	10/1/2018	11		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-4
Analytical Results – Water Street Properties
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Chromium		Hexavalent Chromium		Total PCBs	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1		16065-83-1		18540-29-9		mg/kg	12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L		mg/kg		mg/kg			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start	End	Sample	Sample	Soil Criteria	400		5		30		1			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
WS-SB21	WS-SB21-0.5-2	0.5	2	SO	N	10/3/2018	98		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB21	WS-SB21-2-4	2	4	SO	N	10/3/2018	560		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB21	WS-SB21-4-6	4	6	SO	N	10/3/2018	45		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB21	WS-SB21-6-8	6	8	SO	N	10/3/2018	32		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB21	WS-SB21-8-10	8	10	SO	N	10/3/2018	40		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB21	WS-SB21-10-12	10	11.2	SO	N	10/3/2018	21		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB23	WS-SB23-0.5-2	0.5	2	SO	N	10/1/2018	290		NA		NA		NA		ND	0.072	U	0.072	U	0.072	U	0.072	U	0.072	U	0.072	U	0.072	U	0.072	U	0.072	U
WS-SB23	WS-SB23-2-4	2	4	SO	N	10/1/2018	150		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB23	WS-SB23-2-5 OR NAT	2	5	SO	N	10/1/2018	NA		NA		NA		NA		ND	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U
WS-SB23	WS-SB923-2-4	2	4	SO	FD	10/1/2018	180		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB23	WS-SB23-4-5	4	5	SO	N	10/1/2018	48		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB24	WS-SB24-0.5-2	0.5	2	SO	N	10/1/2018	280		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB24	WS-SB24-2-4	2	4	SO	N	10/1/2018	190		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB24	WS-SB24-4-6	4	6	SO	N	10/1/2018	18		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB28	WS-SB28-0.5-2	0.5	2	SO	N	10/1/2018	370		0.26	J	NA		NA		0.52	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.52	J+	0.056	U	0.056	U	0.056	U
WS-SB28	WS-SB28-2-4	2	4	SO	N	10/1/2018	320		0.055	J	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB28	WS-SB28-2-6 OR NAT	2	6	SO	N	10/1/2018	NA		NA		NA		NA		ND	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U
WS-SB28	WS-SB28-4-6	4	6	SO	N	10/1/2018	26		0.0094	J	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB29	WS-SB29-0.5-2	0.5	2	SO	N	9/28/2018	1000		0.035	J	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB29	WS-SB29-2-4	2	4	SO	N	9/28/2018	66		0.0036	J	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB29	WS-SB29-4-5	4	5	SO	N	9/28/2018	30		5	U	NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB31	WS-SB31-0.5-2	0.5	2	SO	N	10/1/2018	240		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB31	WS-SB31-2-4	2	4	SO	N	10/1/2018	81		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB31	WS-SB931-2-4	2	4	SO	FD	10/1/2018	130		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB31	WS-SB31-4-6	4	6	SO	N	10/1/2018	34		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB31	WS-SB31-6-8	6	8	SO	N	10/1/2018	19		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB32	WS-SB32-0-2	0	2	SO	N	8/6/2020	636		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB32	WS-SB32-2-4	2	4	SO	N	8/6/2020	78.9		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB32	WS-SB32-4-6	4	6	SO	N	8/6/2020	5.3		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB33	WS-SB33-0-2	0	2	SO	N	8/6/2020	206		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB33	WS-SB33-2-4	2	4	SO	N	8/6/2020	68.4		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB33	WS-SB33-4-6	4	6	SO	N	8/6/2020	25.9		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB34	WS-SB34-0-2	0	2	SO	N	8/6/2020	122		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB34	WS-SB34-2-4	2	4	SO	N	8/6/2020	45.6		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB34	WS-SB934-2-4	2	4	SO	FD	8/6/2020	57.1		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB34	WS-SB34-4-6	4	6	SO	N	8/6/2020	37		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB35	WS-SB35-0-2	0	2	SO	N	8/6/2020	151		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB35	WS-SB35-2-4	2	4	SO	N	8/6/2020	35.1		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
WS-SB35	WS-SB35-4-6	4	6	SO	N	8/6/2020	37.3		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L12-S01	18MC-L12-S01-Z1	1	1.6	SE	N	4/24/2007	513	J	NA		86.7		NA		0.042	0.026	U	0.026	U	0.026	U	0.026	U	0.023	J	0.019	J	0.026	U	0.026	U	0.026	U
18MC-L12-S02	18MC-L12-S02-Z1	0.5	0.9	SE	N	4/24/2007	84	J	NA		5.5		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
18MC-L12-S03	18MC-L12-S03-Z1	0.8	1.7	SE	N	4/24/2007	1110		NA		26.9	J	NA		0.22	0.029	U	0.029	U	0.029	U	0.029	U	0.12		0.1		0.029	U	0.029	U	0.029	U
18MC-L13-S01	18MC-L13-S01-Z1	0.8	1.5	SE	N	4/24/2007	155	J	NA		6.6		NA		ND	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
18MC-L13-S02	18MC-L13-S02-Z1	0.5	1	SE	N	4/24/2007	176	J	NA		24.7		NA		0.117	0.036	U	0.036	U	0.036	U	0.036	U	0.076		0.041		0.036	U	0.036	U	0.036	U
18MC-L13-S03	18MC-L13-S03-Z1	0.5	1	SE	N	4/24/2007	3990		NA		114	J	NA		46	3.4	U	3.4	U	3.4	U	46		3.4	U	3.4	U	3.4	U	3.4	U	3.4	U
18MC-L14E-S01	18MC-L14E-S01-Z1	0.5	0.8	SE	N	4/24/2007	18.2	J	NA		5.9		NA		0.196	0.021	U	0.021	U	0.021	U	0.021	U	0.096		0.1		0.021	U	0.021	U	0.021	U
18MC-L14E-S02	18MC-L14E-S02-Z1	0	2	SE	N	4/24/2007	1430	J	NA		40.6		NA		237	31	U	31	U	31	U	31	U	180		57		31	U	31	U	31	U
18MC-L14E-S02	18MC-L14E-S02-Z2	1	1.5	SE	N	4/24/2007	709	J	NA		1200		NA		142	5.3	U	5.3	U	5.3	U	5.3	U	57		85		5.3	U	5.3	U	5.3	U
18MC-L14E-S03	18MC-L14E-S03-Z1	0.8	1.2	SE	N	4/24/2007	1000	J	NA		43.4		NA		59	2.6	U	2.6	U	2.6	U	2.6	U	41		18		2.6	U	2.6	U	2.6	U
18MC-L14W-S01	18MC-L14W-S01-Z1	0.9	2	SE	N	4/24/2007	73.8	J	NA		12		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L14W-S02	18MC-L14W-S02-Z1	0	2	SE	N	4/24/2007	11.3	J	NA		10.5		NA		0.006	0.018	U	0.018	U	0.018	U	0.018	U	0.006	J	0.018	U	0.018	U	0.018	U	0.018	U
18MC-L14W-S03	18MC-L14W-S03-Z1	0.5	1.2	SE	N	4/24/2007	1780	J	NA		88.4		NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-L14W-S03	18MC-L14W-S03-Z2	1.8	2.3	SE	N	4/24/2007	1690	J	NA		466		NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U

Table A-4
Analytical Results – Water Street Properties
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Chromium		Hexavalent Chromium		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1		16065-83-1		18540-29-9			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L		mg/kg		mg/kg			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start	End	Sample	Sample	Soil Criteria	400		5		30		1			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-L15E-S01	18MC-L15E-S01-Z1	0.5	0.9	SE	N	4/24/2007	1370		NA		54.6	J	NA		29	0.77	U	0.77	U	0.77	U	0.77	U	19	J	10	J	0.77	U	0.77	U	0.77	U
18MC-L15E-S01	18MC-L15E-S01-Z1/D	0.5	0.9	SE	FD	4/24/2007	999		NA		47.3	J	NA		12.7	0.55	U	0.55	U	0.55	U	0.55	U	7.5	J	5.2	J	0.55	U	0.55	U	0.55	U
18MC-L15E-S02	18MC-L15E-S02-Z1	0	2	SE	N	4/24/2007	568		NA		27.8	J	NA		4.8	0.13	U	0.13	U	0.13	U	0.13	U	3.7		1.1		0.13	U	0.13	U	0.13	U
18MC-L15E-S03	18MC-L15E-S03-Z1	0.5	1	SE	N	4/24/2007	1850		NA		63.2	J	NA		17.1	0.57	U	0.57	U	0.57	U	0.57	U	14		3.1		0.57	U	0.57	U	0.57	U
18MC-L15W-S01	18MC-L15W-S01-Z1	0.3	1.2	SE	N	4/24/2007	356		NA		131	J	NA		1.4	0.033	U	0.033	U	0.033	U	0.033	U	0.73		0.67		0.033	U	0.033	U	0.033	U
18MC-L15W-S03	18MC-L15W-S03-Z1	0.3	0.8	SE	N	4/24/2007	54.9		NA		8.7	J	NA		0.118	0.021	U	0.021	U	0.021	U	0.021	U	0.032		0.086		0.021	U	0.021	U	0.021	U
18MC-L16E-S01	18MC-L16E-S01-Z1	0.4	1	SE	N	4/24/2007	1140		NA		68.5	J	NA		37.7	1.6	U	1.6	U	1.6	U	31		1.6	U	6.7		1.6	U	1.6	U	1.6	U
18MC-L16E-S02	18MC-L16E-S02-Z1	0	0.5	SE	N	4/24/2007	323		NA		42.5	J	NA		5.8	0.18	U	0.18	U	0.18	U	0.18	U	4.3		1.5		0.18	U	0.18	U	0.18	U
18MC-L16E-S03	18MC-L16E-S03-Z1	0.5	1	SE	N	4/24/2007	2040		NA		196	J	NA		8.7	0.41	U	0.41	U	0.41	U	0.41	U	5.9		2.8		0.41	U	0.41	U	0.41	U
18MC-L16W-S01	18MC-L16W-S01-Z1	0.2	0.8	SE	N	4/24/2007	206		NA		75.8	J	NA		10.3	0.65	U	0.65	U	0.65	U	0.65	U	5.8		4.5		0.65	U	0.65	U	0.65	U
18MC-L16W-S03	18MC-L16W-S03-Z1	0.5	1	SE	N	4/25/2007	62.7		NA		11	J	NA		0.044	0.028	U	0.028	U	0.028	U	0.028	U	0.013	J	0.031		0.028	U	0.028	U	0.028	U
18MC-L17-S01	18MC-L17-S01-Z1	0.4	0.8	SE	N	4/25/2007	410	J	NA		46.2	J	NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
18MC-L17-S02	18MC-L17-S02-Z1	0.5	1	SE	N	4/25/2007	235	J	NA		26.8	J	NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
18MC-L17-S03	18MC-L17-S03-Z1	0.5	1	SE	N	4/25/2007	320		NA		22.1	J	NA		0.41	0.022	U	0.022	U	0.022	U	0.022	U	0.14		0.13		0.14		0.022	U	0.022	U
18MC-L18-S01	18MC-L18-S01-Z1	0.3	0.9	SE	N	4/25/2007	43.9	J	NA		9	J	NA		0.112	0.04	U	0.04	U	0.04	U	0.04	U	0.078		0.034	J	0.04	U	0.04	U	0.04	U
18MC-L18-S02	18MC-L18-S02-Z1	0.2	0.9	SE	N	4/25/2007	576	J	NA		21.8	J	NA		1.43	0.061	U	0.061	U	0.061	U	1.2		0.061	U	0.23		0.061	U	0.061	U	0.061	U
18MC-L18-S02	18MC-L18-S02-Z2	1.2	1.8	SE	N	4/25/2007	32.6	J	NA		10.2	J	NA		0.02	0.031	U	0.031	U	0.031	U	0.02	J	0.031	U	0.031	U	0.031	U	0.031	U	0.031	U
DEC-SED-27	SED-27	0	0.17	SE	N	9/15/2005	148	J	NA		22.8	J	NA		0.672	0.19	UJ	0.19	UJ	0.19	UJ	0.19	UJ	0.4	J	0.24	J	0.032	J	NA		NA	
DEC-SED-27	SED-27B	0.25	0.75	SE	N	4/21/2005	229		NA		19.8		NA		0.273	0.16	U	0.16	U	0.16	U	0.16	U	0.18		0.093	J	0.16	U	NA		NA	
DEC-SED-28	SED-28	0	0.17	SE	N	9/21/2005	3040		NA		58.6	J	NA		10.4	5.9	U	5.9	U	5.9	U	5.9	U	6.8		3.6	J	5.9	U	NA		NA	
DEC-SED-28	SED-28B	0.67	0.92	SE	N	9/21/2005	1240	J	NA		82.1	J	NA		150	68	U	68	U	68	U	68	U	96		54	J	68	U	NA		NA	
DEC-SED-29	SED-29	0	0.17	SE	N	9/21/2005	581	J	NA		26.4	J	NA		2.02	0.5	U	0.5	U	0.5	U	0.5	U	1.4		0.62		0.5	U	NA		NA	
DEC-SED-29	SED-29B	0.25	0.5	SE	N	9/21/2005	6840		NA		121		NA		1.42	0.61	U	0.61	U	0.61	U	0.61	U	1		0.42	J	0.61	U	NA		NA	
DEC-SED-30	SED-30	0	0.17	SE	N	9/15/2005	143		NA		19		NA		0.168	0.15	U	0.15	U	0.15	U	0.15	U	0.1	J	0.068	J	0.15	U	NA		NA	
DEC-SED-30	SED-30B	0.17	0.58	SE	N	9/15/2005	43.7		NA		2.8		NA		ND	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	NA		NA	
DEC-SED-32	SED-32	0	0.17	SE	N	9/15/2005	169	J	NA		29.6	J	NA		0.42	0.19	UJ	0.19	UJ	0.19	UJ	0.19	UJ	0.27	J	0.15	J	0.19	UJ	NA		NA	
DEC-SED-32	SED-32B	0.25	0.42	SE	N	9/15/2005	171	J	NA		24.6	J	NA		0.639	0.17	UJ	0.17	UJ	0.17	UJ	0.17	UJ	0.38	J	0.23	J	0.029	J	NA		NA	
DEC-SED-34	SED-34	0	0.17	SE	N	9/21/2005	146		NA		9.2		NA		49	12	U	12	U	12	U	12	U	25		24		12	U	NA		NA	
DEC-SED-34	SED-34B	0.17	0.58	SE	N	9/21/2005	1150	J	NA		16.9	J	NA		390	370	U	370	U	370	U	370	U	280	J	110	J	370	U	NA		NA	
DEC-SED-35	SED-35	0	0.17	SE	N	9/21/2005	94.2		NA		4.9		NA		6.5	5.5	U	5.5	U	5.5	U	5.5	U	6.5		5.5	U	5.5	U	NA		NA	
DEC-SED-35	SED-35B	0.25	0.67	SE	N	9/21/2005	247		NA		24.3		NA		11.6	14	U	14	U	14	U	14	U	4.1	J	7.5	J	14	U	NA		NA	
DEC-SED-37	SED-37	0	0.17	SE	N	9/21/2005	214		NA		23.9		NA		9	2.9	U	2.9	U	2.9	U	2.9	U	5.8		3.2		2.9	U	NA		NA	
DEC-SED-37	SED-37BB	0.17	0.58	SE	N	9/21/2005	1190	J	NA		74.4	J	NA		66	17	U	17	U	17	U	17	U	35		31		17	U	NA		NA	
DEC-SED-37	SED-37B	0.8	1	SE	N	4/26/2005	428	J	NA		50.2	J	NA		234	82	UJ	82	UJ	82	UJ	82	UJ	150	J	84	J	82	UJ	NA		NA	
DEC-SED-38	SED-38	0	0.17	SE	N	9/22/2005	164	J	NA		20.9	J	NA		8.3	3.5	U	3.5	U	3.5	U	3.5	U	5.7		2.6	J	3.5	U	NA		NA	
DEC-SED-38	SED-38B	0.25	0.75	SE	N	9/22/2005	291	J	NA		35.8	J	NA		8	8.2	U	8.2	U	8.2	U	8.2	U	8	J	8.2	U	8.2	U	NA		NA	
DEC-SED-39	SED-39	0	0.17	SE	N	9/22/2005	179	J	NA		24.3	J	NA		0.058	0.18	U	0.18	U	0.18	U	0.18	U	0.058	J	0.18	U	0.18	U	NA		NA	
DEC-SED-39	SED-39B	0.25	0.58	SE	N	9/22/2005	166		NA		16.6		NA		0.51	0.28	U	0.28	U	0.28	U	0.51		0.28	U	0.28	U	0.28	U	NA		NA	
DEC-SED-40	SED-40	0	0.17	SE	N	9/22/2005	224		NA		16.5		NA		2.2	0.53	UJ	0.53	UJ	0.53	UJ	0.53	UJ	1.4	J	0.8	J	0.53	UJ	NA		NA	
DEC-SED-40	SED-40B	0.17	0.5	SE	N	9/22/2005	951		NA		55		NA		24.3	11	U	11	U	11	U	11	U	15		9.3	J	11	U	NA		NA	
DEC-SED-42	SED-42	0	0.17	SE	N	9/15/2005	291		NA		25.6		NA		0.196	0.15	U	0.15	U	0.15	U	0.15	U	0.13	J	0.066	J	0.15	U	NA		NA	
DEC-SED-43	SED-43	0	0.17	SE	N	9/15/2005	434	J	NA		31.6	J	NA		1.665	0.2	UJ	0.2	UJ	0.2	UJ	1.1	J	0.2	UJ	0.47	J	0.095	J	NA		NA	
DEC-SED-43	SED-43B	0.25	0.75	SE	N	9/15/2005	582	J	NA		31.7	J	NA		7.49	3.4	UJ	3.4	UJ	3.4	UJ	6.5	J	3.4	UJ	0.99	J	3.4	UJ	NA		NA	
FS-SED-1	FS-EMC01-SED-O	0	0.167	SE	N	9/11/2003	199		NA		17.7		NA		ND	6.1	U	12	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	NA		NA	
FS-SS02-SED	FS-SS02-SED-O			SE	N	9/11/2003	NA		NA		NA		NA		0.51	0.34	U	0.34	U	0.34	U	0.24	J	0.34	U	0.16	J	0.11	J	NA		NA	
OU2-SED01	OU2-SED01-Z1	0	0.5	SE	N	5/26/2015	450	J	NA		14	J	NA		14.6	0.024	U	0.024	UJ	0.024	UJ	0.024	UJ	5.5		7.6		1.5	J	0.024	UJ	0.024	UJ
OU2-SED06	OU2-SED06-Z1	0	6	SE	N	1/26/2016	333		NA		32.2		NA		ND	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U
OU2-SED07	OU2-SED07-Z1	0	6	SE	N	1/26/2016	792		NA		35.2		NA		0.206	0.063	U	0.063	U	0.063	U	0.063	U	0.096		0.063	U	0.11		0.063	U	0.063	U
OU2-SED08	OU2-SED08-Z1	0	6	SE	N	1/26/2016	399		NA		41		NA		1.8	0.082	U	0.082	U	0.082	U	0.082	U	0.83		0.66		0.31		0.082	U	0.082	U
TRK-C-06-SD	TRK-C-06-SD-A	0	0.4	SE	N	8/24/2006	246		NA		21		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	NA		NA	
TRK-C-06-SD	TRK-C-06-SD-B	0.42	0.83	SE	N	8/24/2006	NA		NA		NA		NA		0.91	0.039	U	0.039	U	0.039	U	0.039	U	0.47		0.44		0.039	U	NA		NA	
TRK-C-06-SD	TRK-C-06-SD-C	0.83	1.25	SE	N	8/24/2006	NA		NA		NA		NA		0.012	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.012	J	0.022	U	NA		NA	

Table A-4
Analytical Results – Water Street Properties
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Chromium		Hexavalent Chromium		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1		16065-83-1		18540-29-9			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L		mg/kg		mg/kg			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start	End	Sample	Sample	Soil Criteria	400		5		30		1			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
TRK-C-07-SD	TRK-C-07-SD-A	0	0.4	SE	N	8/24/2006	**531**		NA		**84**		NA		**14.3**	2.3	U	2.3	U	2.3	U	2.3	U	**6**		**7.3**		1	J	NA		NA	
TRK-C-07-SD	TRK-C-07-SD-B	0.42	0.83	SE	N	8/24/2006	NA		NA		NA		NA		**25.9**	1.2	U	1.2	U	1.2	U	1.2	U	**9.9**		**16**		1.2	U	NA		NA	
TRK-C-07-SD	TRK-C-07-SD-C	0.83	1.25	SE	N	8/24/2006	NA		NA		NA		NA		**50**	3.1	U	3.1	U	3.1	U	3.1	U	**17**		**33**		3.1	U	NA		NA	
TRK-S01-SD	TRK-S01-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		0.17	0.3	U	0.3	U	0.3	U	0.3	U	0.17	J	0.3	U	0.3	U	NA		NA	
TRK-S02-SD	TRK-S02-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		0.23	0.19	U	0.19	U	0.19	U	0.19	U	0.23		0.19	U	0.19	U	NA		NA	
TRK-S03-SD	TRK-S03-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		ND	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	NA		NA	
TRK-S04-SD	TRK-S04-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		ND	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	NA		NA	
TRK-S05-SD	TRK-S05-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		ND	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	NA		NA	
TRK-S06-SD	TRK-S06-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		0.51	0.15	U	0.15	U	0.15	U	0.15	U	0.37		0.14	J	0.15	U	NA		NA	
TRK-S07-SD	TRK-S07-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		0.5	0.12	U	0.12	U	0.12	U	0.12	U	0.3		0.2		0.12	U	NA		NA	
TRK-S08-SD	TRK-S08-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		0.12	0.11	U	0.11	U	0.11	U	0.11	U	0.12		0.11	U	0.11	U	NA		NA	
TRK-S09-SD	TRK-S09-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		0.272	0.14	U	0.14	U	0.14	U	0.14	U	0.19		0.082	J	0.14	U	NA		NA	
TRK-S10-SD	TRK-S10-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		0.83	0.13	U	0.13	U	0.13	U	0.13	U	0.58		0.25		0.13	U	NA		NA	
TRK-S11-SD	TRK-S11-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		NA		NA		1	0.16	U	0.16	U	0.16	U	0.16	U	1		0.16	U	0.16	U	NA		NA	
TRK-S74-SD	TRK-S74-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		NA		NA		ND	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	NA		NA	
TRK-S75-SD	TRK-S75-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		NA		NA		1	0.15	U	0.15	U	0.15	U	0.15	U	1		0.15	U	0.15	U	NA		NA	
TRK-S76-SD	TRK-S76-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		NA		NA		0.33	0.13	U	0.13	U	0.13	U	0.13	U	0.33		0.13	U	0.13	U	NA		NA	
TRK-S77-SD	TRK-S77-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		NA		NA		0.274	0.11	U	0.11	U	0.11	U	0.11	U	0.22		0.054	J	0.11	U	NA		NA	

Notes:
All depths are in feet below ground surface
Highlighted and bolded values exceeded the remediation goals
Soil criteria come from the record of decision
Total chromium surface and subsurface soil criteria is the unrestricted use soil clean up criteria for *Chromium, trivalent* in Table 6.8 of the 6 NYCRR Part 375 Environmental Remediation Programs
Abbreviations:
CAS No. - Chemical Abstracts Service number
FD - field duplicate
mg/L - milligram/liter
mg/kg - milligram/kilogram
N - normal/field sample
NA - not analyzed
ND - not detected
PCBs - polychlorinated biphenyls
SO- soil
TCLP - Toxicity Characteristic Leaching Procedure
Q - qualifier
K - The identification of the analyte is acceptable; the reported value may be biased high.
J - The identification of the analyte is acceptable; the reported value is an estimate.
J+ - The identification of the analyte is acceptable; the reported value may be biased high.
U - The analyte was not detected at or above the Reporting Limit.
UJ - The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-L16E-S03 [1]	18MC-L16E-S03-Z1	0.5	1	SE	N	4/24/2007	**2040**		NA		**8.7**	0.41	U	0.41	U	0.41	U	0.41	U	**5.9**		**2.8**		0.41	U	0.41	U	0.41	U
18MC-L16E-S03A [1]	18MC-L16E-S03A-2-3	2	3	SO	N	9/13/2018	NA		NA		ND	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U
18MC-L16E-S03A [1]	18MC-L16E-S03A-2-3 OR NAT	2	3	SO	N	9/13/2018	**2900**		1.4	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L16W-S01	18MC-L16W-S01-Z1	0.2	0.8	SE	N	4/24/2007	206		NA		**10.3**	0.65	U	0.65	U	0.65	U	0.65	U	**5.8**		**4.5**		0.65	U	0.65	U	0.65	U
18MC-L16W-S01A	18MC-L16W-S01A-2-3 OR NAT	2	3	SO	N	10/17/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
18MC-L16W-S04	18MC-L16W-S04-Z1	0	0.167	SO	N	4/24/2007	341		NA		0.13	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.13		0.02	U
18MC-L16W-S04	18MC-L16W-S04-Z2	0.7	1.5	SO	N	4/25/2007	**1240**	J	NA		0.016	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.016	J	0.024	U
18MC-L16W-S05	18MC-L16W-S05-Z1	0	0.167	SO	N	4/24/2007	20.9		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L16W-S05	18MC-L16W-S05-Z2	0.5	1.4	SO	N	4/24/2007	15.7		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L17-S04	18MC-L17-S04-Z1	0	0.167	SO	N	4/25/2007	186	J	NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-L17-S04	18MC-L17-S04-Z2	0.5	1.3	SO	N	4/25/2007	29.2	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L17-S05	18MC-L17-S05-Z1	0	0.167	SO	N	4/25/2007	344	J	NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
18MC-L17-S05	18MC-L17-S05-Z2	0.5	1.5	SO	N	4/25/2007	287	J	NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-L17-S06	18MC-L17-S06-Z1	0	0.167	SO	N	4/25/2007	175		NA		ND	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
18MC-L17-S07	18MC-L17-S07-Z1	0	0.167	SO	N	4/25/2007	23.8		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L18-S04	18MC-L18-S04-Z1	0	0.167	SO	N	4/25/2007	153	J	NA		ND	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U
18MC-L18-S04	18MC-L18-S04-Z2	0.5	1	SO	N	4/25/2007	49.1	J	NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-L18-S05	18MC-L18-S05-Z1	0	0.167	SO	N	4/25/2007	603	J	NA		ND	0.032	U	0.032	U	0.032	U	0.032	U	0.032	U	0.032	U	0.032	U	0.032	U	0.032	U
18MC-L18-S05	18MC-L18-S05-Z2	0.5	1.5	SO	N	4/25/2007	278	J	NA		ND	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U
18MC-L18-S05	18MC-L18-S05-Z2/D	0.5	1.5	SO	FD	4/25/2007	430	J	NA		ND	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U
18MC-L18-S06	18MC-L18-S06-Z1	0	0.167	SO	N	4/25/2007	356	J	NA		0.1	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.1		0.023	U
18MC-L18-S06	18MC-L18-S06-Z2	0.7	1.3	SO	N	4/25/2007	108	J	NA		0.53	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.53		0.039	U
18MC-L18-S07	18MC-L18-S07-Z1	0	0.167	SO	N	4/25/2007	122		NA		0.83	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.59		0.24	J	0.021	U	0.021	U
18MC-L18-S07	18MC-L18-S07-Z2	0.8	1.6	SO	N	4/25/2007	8.5	J	NA		0.031	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.031		0.021	U	0.021	U	0.021	U
198-D-A	198-9D-A-0-2	0	2	SO	FD	10/23/2018	NA		**113**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-0-2	0	2	SO	N	10/23/2018	**8100**		**52**	J	ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-D-A	198-D-A-2-4	2	4	SO	N	10/23/2018	**3800**		**7.1**	J	5.4	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	5.4	J+	0.04	U	0.04	U	0.04	U
198-D-A	198-D-A-4-8	4	8	SO	N	10/23/2018	**3200**		4.8	J	ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-D-A	198-9D-A-8-11	8	11	SO	FD	10/23/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-D-A	198-D-A-8-10	8	10	SO	N	10/23/2018	**8100**		3.1	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-8-11	8	11	SO	N	10/23/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-D-A	198-D-A-10-12	10	12	SO	N	10/23/2018	1000		2.1	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-11-16	11	16	SO	N	10/23/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-D-A	198-9D-A-12-14	12	14	SO	FD	10/23/2018	NA		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-12-14	12	14	SO	N	10/23/2018	**2300**		1.1	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-9D-A-14-16	14	16	SO	FD	10/23/2018	NA		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-14-16	14	16	SO	N	10/23/2018	20		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-16-18	16	18	SO	N	10/23/2018	46		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-16-21	16	21	SO	N	10/23/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
198-D-A	198-9D-A-18-20	18	20	SO	FD	10/23/2018	NA		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-18-20	18	20	SO	N	10/23/2018	16		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-20-22	20	22	SO	N	10/23/2018	21		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-21-26 OR NAT	21	26	SO	N	10/23/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
198-D-A	198-D-A-22-24	22	24	SO	N	10/23/2018	27		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-D-A	198-D-A-24-26 OR NAT	24	26	SO	N	10/23/2018	22		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-E-A	198-E-A-0-2	0	2	SO	N	10/22/2018	**10000**		**9.3**	J	ND	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
198-E-A	198-E-A-2-4	2	4	SO	N	10/22/2018	**8000**		5	U	ND	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U
198-E-A	198-E-A-4-8	4	8	SO	N	10/22/2018	**6100**		5	U	**13**	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	**13**	J+	0.16	U	0.16	U	0.16	U
198-E-A	198-9E-A-8-10	8	10	SO	FD	10/22/2018	NA		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-E-A	198-E-A-8-10	8	10	SO	N	10/22/2018	190		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-E-A	198-E-A-8-11	8	11	SO	N	10/22/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-E-A	198-E-A-10-12	10	12	SO	N	10/22/2018	11		**9.6**	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-E-A	198-9E-A-11-16 OR NAT	11	16	SO	FD	10/22/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
198-E-A	198-E-A-11-16 OR NAT	11	16	SO	N	10/22/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-E-A	198-E-A-12-14	12	14	SO	N	10/22/2018	12		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-E-A	198-9E-A-14-16	14	16	SO	FD	10/22/2018	NA		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-E-A	198-E-A-14-16	14	16	SO	N	10/22/2018	6.1	U	5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB01	198-SB01-0-2	0	2	SO	N	10/24/2018	240		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
198-SB01	198-SB01-2-4	2	4	SO	N	10/24/2018	**1800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB01	198-SB01-2-5	2	5	SO	N	10/24/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB01	198-SB01-4-6	4	6	SO	N	10/24/2018	42		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB01	198-SB01-5-8	5	8	SO	N	10/24/2018	NA		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
198-SB01	198-SB01-6-8	6	8	SO	N	10/24/2018	150		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB01	198-SB01-21-25 OR NAT	7	8	SO	N	10/24/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB01	198-SB01-8-10	8	10	SO	N	10/24/2018	29		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB01	198-SB01-8-11	8	11	SO	N	10/24/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB01	198-SB01-10-12	10	12	SO	N	10/24/2018	130		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB01	198-SB01-11-16	11	16	SO	N	10/24/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
198-SB01	198-SB901-11-16	11	16	SO	FD	10/24/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
198-SB01	198-SB01-12-14	12	14	SO	N	10/24/2018	180		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB01	198-SB01-14-16	14	16	SO	N	10/24/2018	170		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB01	198-SB01-16-18	16	18	SO	N	10/24/2018	39		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB01	198-SB01-16-21	16	19.4	SO	N	10/24/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
198-SB01	198-SB01-18-20	18	19.4	SO	N	10/24/2018	7.2	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB03-0-2	0	2	SO	N	10/24/2018	**4100**		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
198-SB03	198-SB03-2-4	2	4	SO	N	10/24/2018	**4700**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB03-2-5	2	5	SO	N	10/24/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-SB03	198-SB03-4-6	4	6	SO	N	10/24/2018	**3700**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB03-5-8	5	8	SO	N	10/24/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-SB03	198-SB03-6-8	6	8	SO	N	10/24/2018	**4100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB903-6-8	6	8	SO	FD	10/24/2018	**10000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB03-8-10	8	10	SO	N	10/24/2018	**4000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB03-8-11	8	11	SO	N	10/24/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
198-SB03	198-SB03-10-12	10	12	SO	N	10/24/2018	**8400**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB03-11-16	11	16	SO	N	10/24/2018	NA		NA		ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
198-SB03	198-SB03-12-14	12	14	SO	N	10/24/2018	280		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB03-14-16	14	16	SO	N	10/24/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB03-21-25 OR NAT	14	15	SO	N	10/24/2018	NA		NA		ND	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U
198-SB03	198-SB03-16-18	16	18	SO	N	10/24/2018	490		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB03	198-SB03-16-21	16	19.9	SO	N	10/24/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-SB03	198-SB03-18-20	18	19.9	SO	N	10/24/2018	24		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB05	198-SB05-0-2	0	2	SO	N	10/23/2018	**1800**		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
198-SB05	198-SB05-2-4	2	4	SO	N	10/23/2018	**4400**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB05	198-SB05-2-5	2	5	SO	N	10/23/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB05	198-SB905-2-5	2	5	SO	FD	10/23/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB05	198-SB05-4-6	4	6	SO	N	10/23/2018	450		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB05	198-SB05-21-25 OR NAT	5	6	SO	N	10/23/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB05	198-SB05-24-25 OR NAT	5	6	SO	N	10/23/2018	51		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB05	198-SB05-5-8	5	8	SO	N	10/23/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB05	198-SB05-6-8	6	8	SO	N	10/23/2018	37		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB05	198-SB905-6-8	6	8	SO	FD	10/23/2018	59		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB05	198-SB05-8-10	8	10	SO	N	10/23/2018	6.3	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB05	198-SB05-8-11	8	11	SO	N	10/23/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-SB05	198-SB05-10-12	10	12	SO	N	10/23/2018	6.2	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB05	198-SB05-11-16	11	15.2	SO	N	10/23/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB05	198-SB905-11-16	11	15.2	SO	FD	10/23/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
198-SB05	198-SB05-12-14	12	14	SO	N	10/23/2018	6.7	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB05	198-SB05-14-16	14	15.2	SO	N	10/23/2018	8.7		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-0-2	0	2	SO	N	10/23/2018	**10000**		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-SB06	198-SB06-2-4	2	4	SO	N	10/23/2018	**7700**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-2-5	2	5	SO	N	10/23/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
198-SB06	198-SB06-4-6	4	6	SO	N	10/23/2018	**3000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-5-8	5	8	SO	N	10/23/2018	NA		NA		1.5	0.037	U	0.037	U	0.037	U	0.037	U	1.5	J+	0.037	U	0.037	U	0.037	U	0.037	U
198-SB06	198-SB06-6-8	6	8	SO	N	10/23/2018	**5100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB906-6-8	6	8	SO	FD	10/23/2018	**5700**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-8-10	8	10	SO	N	10/23/2018	**4900**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-8-11	8	11	SO	N	10/23/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
198-SB06	198-SB06-10-12	10	12	SO	N	10/23/2018	15		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-11-16	11	16	SO	N	10/23/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-SB06	198-SB06-12-14	12	14	SO	N	10/23/2018	78		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-14-16	14	16	SO	N	10/23/2018	20		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-16-18	16	18	SO	N	10/23/2018	**1100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-16-21	16	21	SO	N	10/23/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
198-SB06	198-SB06-18-20	18	20	SO	N	10/23/2018	55		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-20-22	20	22	SO	N	10/23/2018	8.4		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-21-25 OR NAT	21	25	SO	N	10/23/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
198-SB06	198-SB906-21-25 OR NAT	21	25	SO	FD	10/23/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
198-SB06	198-SB06-22-24	22	24	SO	N	10/23/2018	8.3	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB06	198-SB06-24-25 OR NAT	24	25	SO	N	10/23/2018	500		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB08	198-SB08-0-2	0	2	SO	N	9/27/2018	**2700**		NA		**4.6**	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	**4.6**		0.042	U	0.042	U	0.042	U
198-SB08	198-SB08-2-4	2	4	SO	N	9/27/2018	**16000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB08	198-SB08-2-5	2	5	SO	N	9/27/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB08	198-SB908-2-5	2	5	SO	FD	9/27/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB08	198-SB08-4-6	4	6	SO	N	9/27/2018	730		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB08	198-SB08-21-25 OR NAT	5	6	SO	N	9/27/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB08	198-SB08-24-25 OR NAT	5	6	SO	N	9/27/2018	100		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB08	198-SB08-5-8	5	8	SO	N	9/27/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB08	198-SB08-6-8	6	8	SO	N	9/27/2018	90		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB08	198-SB08-8-10	8	10	SO	N	9/27/2018	30		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB08	198-SB08-8-11	8	11	SO	N	9/27/2018	NA		NA		ND	0.035	UJ	0.035	UJ	0.035	UJ	0.035	UJ	0.035	UJ	0.035	UJ	0.035	UJ	0.035	UJ	0.035	UJ
198-SB08	198-SB08-10-12	10	12	SO	N	9/27/2018	31		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB08	198-SB08-11-16	11	12	SO	N	9/27/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB09	198-SB09-0-2	0	2	SO	N	9/27/2018	**8000**		NA		**1.6**	0.042	UJ	0.042	UJ	0.042	UJ	0.042	UJ	0.042	UJ	**1.6**	J+	0.042	UJ	0.042	UJ	0.042	UJ
198-SB09	198-SB09-2-4	2	4	SO	N	9/27/2018	**2800**	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-2-5	2	5	SO	N	9/27/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
198-SB09	198-SB09-4-6	4	6	SO	N	9/27/2018	**3300**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-5-8	5	8	SO	N	9/27/2018	NA		NA		ND	0.037	UJ	0.037	UJ	0.037	UJ	0.037	UJ	0.037	UJ	0.037	UJ	0.037	UJ	0.037	UJ	0.037	UJ
198-SB09	198-SB09-6-8	6	8	SO	N	9/27/2018	520		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-8-10	8	10	SO	N	9/27/2018	**4100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-8-11	8	11	SO	N	9/27/2018	NA		NA		ND	0.038	UJ	0.038	UJ	0.038	UJ	0.038	UJ	0.038	UJ	0.038	UJ	0.038	UJ	0.038	UJ	0.038	UJ
198-SB09	198-SB09-10-12	10	12	SO	N	9/27/2018	**2700**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-11-16	11	16	SO	N	9/27/2018	NA		NA		ND	0.044	UJ	0.044	UJ	0.044	UJ	0.044	UJ	0.044	UJ	0.044	UJ	0.044	UJ	0.044	UJ	0.044	UJ
198-SB09	198-SB09-12-14	12	14	SO	N	9/27/2018	**3500**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-14-16	14	16	SO	N	9/27/2018	150		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-21-25 OR NAT	14	15	SO	N	9/27/2018	NA		NA		ND	0.048	UJ	0.048	UJ	0.048	UJ	0.048	UJ	0.048	UJ	0.048	UJ	0.048	UJ	0.048	UJ	0.048	UJ
198-SB09	198-SB09-24-25 OR NAT	14	15	SO	N	9/27/2018	200		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-16-18	16	18	SO	N	9/27/2018	47		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-16-21	16	21	SO	N	9/27/2018	NA		NA		ND	0.04	UJ	0.04	UJ	0.04	UJ	0.04	UJ	0.04	UJ	0.04	UJ	0.04	UJ	0.04	UJ	0.04	UJ
198-SB09	198-SB09-18-20	18	20	SO	N	9/27/2018	63		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
198-SB09	198-SB09-20-22	20	22	SO	N	9/27/2018	33		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB09-22-24	22	23.5	SO	N	9/27/2018	30		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB09	198-SB909-22-24	22	23.5	SO	FD	9/27/2018	30		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-0-2	0	2	SO	N	9/27/2018	**9900**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-2-4	2	4	SO	N	9/27/2018	**8300**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-2-5	2	5	SO	N	9/27/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
198-SB10	198-SB10-4-6	4	6	SO	N	9/27/2018	**9100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-5-8	5	8	SO	N	9/27/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB10	198-SB10-6-8	6	8	SO	N	9/27/2018	**5300**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-8-10	8	10	SO	N	9/27/2018	**7800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-8-11	8	11	SO	N	9/27/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB10	198-SB10-10-12	10	12	SO	N	9/27/2018	130		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-11-16	11	16	SO	N	9/27/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB10	198-SB10-21-25 OR NAT	11.5	12.5	SO	N	9/27/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB10	198-SB10-24-25 OR NAT	11.5	12.5	SO	N	9/27/2018	38		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-12-14	12	14	SO	N	9/27/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-14-16	14	16	SO	N	9/27/2018	82		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-16-18	16	18	SO	N	9/27/2018	38		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-16-21	16	21	SO	N	9/27/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
198-SB10	198-SB10-18-20	18	20	SO	N	9/27/2018	33		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB10	198-SB10-20-22	20	21.8	SO	N	9/27/2018	30		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB11	198-SB11-0-2	0	2	SO	N	9/27/2018	**1500**		NA		ND	0.039	UJ	0.039	UJ	0.039	UJ	0.039	UJ	0.039	UJ	0.039	UJ	0.039	UJ	0.039	UJ	0.039	UJ
198-SB11	198-SB911-0-2	0	2	SO	FD	9/27/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB11	198-SB11-2-4	2	4	SO	N	9/27/2018	630		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB11	198-SB11-2-5	2	5	SO	N	9/27/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB11	198-SB11-4-6	4	6	SO	N	9/27/2018	380		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB11	198-SB11-5-8 OR NAT	5.5	6.5	SO	N	9/27/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB11	198-SB11-6-8	6	8	SO	N	9/27/2018	33		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-0-2	0	2	SO	N	9/26/2018	920		NA		**1.2**	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	**1.2**	J+	0.05	U	0.05	U
198-SB12	198-SB12-2-4	2	4	SO	N	9/26/2018	**11000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-2-5	2	5	SO	N	9/26/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB12	198-SB912-2-4	2	4	SO	FD	9/26/2018	**5200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-4-6	4	6	SO	N	9/26/2018	**1100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-5-8	5	8	SO	N	9/26/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB12	198-SB12-6-8	6	8	SO	N	9/26/2018	**1800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-8-10	8	10	SO	N	9/26/2018	**1700**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-8-11	8	11	SO	N	9/26/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB12	198-SB12-10-12	10	12	SO	N	9/26/2018	160		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-11-16	11	16	SO	N	9/26/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
198-SB12	198-SB12-21-25 OR NAT	11	12	SO	N	9/26/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB12	198-SB12-24-25 OR NAT	11	12	SO	N	9/26/2018	86		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-12-14	12	14	SO	N	9/26/2018	**1800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-14-16	14	16	SO	N	9/26/2018	67		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-16-18	16	18	SO	N	9/26/2018	72		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-16-21	16	21	SO	N	9/26/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB12	198-SB12-18-20	18	20	SO	N	9/26/2018	62		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-20-22	20	22	SO	N	9/26/2018	49		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB12	198-SB12-22-24	22	22.7	SO	N	9/26/2018	52		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB15	198-SB15-0-2	0	2	SO	N	10/22/2018	41		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB15	198-SB15-2-4	2	4	SO	N	10/22/2018	9.1		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB15	198-SB15-2-5	2	5	SO	N	10/22/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
198-SB15	198-SB915-2-5	2	5	SO	FD	10/22/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
198-SB15	198-SB15-4-6	4	6	SO	N	10/22/2018	6.1	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
198-SB15	198-SB15-5-8	5	8	SO	N	10/22/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
198-SB15	198-SB915-5-8	5	8	SO	FD	10/22/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
198-SB15	198-SB15-6-8	6	8	SO	N	10/22/2018	7.5		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB15	198-SB15-8-10	8	10	SO	N	10/22/2018	7	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB15	198-SB15-8-11	8	11	SO	N	10/22/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB15	198-SB15-10-12	10	12	SO	N	10/22/2018	7.2		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB15	198-SB15-11-16 OR NAT	11	12.2	SO	N	10/22/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
198-SB16	198-SB16-0-2	0	2	SO	N	10/2/2018	**6400**		NA		ND	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U
198-SB16	198-SB16-2-4	2	4	SO	N	10/2/2018	**8600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB16	198-SB16-2-5	2	5	SO	N	10/2/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-SB16	198-SB16-4-6	4	6	SO	N	10/2/2018	**13000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB16	198-SB916-4-6	4	6	SO	FD	10/22/2018	**7800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB16	198-SB16-5-8	5	8	SO	N	10/2/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB16	198-SB16-6-8	6	8	SO	N	10/2/2018	**6800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB16	198-SB16-8-10	8	10	SO	N	10/2/2018	**8100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB16	198-SB16-8-11	8	11	SO	N	10/2/2018	NA		NA		4.5	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	4.5		0.038	U	0.038	U	0.038	U
198-SB16	198-SB16-10-12	10	12	SO	N	10/2/2018	**4000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB16	198-SB16-11-16 OR NAT	11	15.7	SO	N	10/2/2018	NA		NA		ND	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U
198-SB16	198-SB16-12-14	12	14	SO	N	10/2/2018	660		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB16	198-SB16-14-16	14	15.7	SO	N	10/2/2018	150		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB17	198-SB17-0-2	0	2	SO	N	10/22/2018	110		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB17	198-SB17-2-4	2	4	SO	N	10/22/2018	630		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB17	198-SB17-2-5	2	5	SO	N	10/22/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB17	198-SB17-4-6	4	6	SO	N	10/22/2018	76		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB17	198-SB17-5-8	5	8	SO	N	10/22/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB17	198-SB17-21-23 OR NAT	6	8	SO	N	10/22/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB17	198-SB17-6-8	6	8	SO	N	10/22/2018	6.4	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB17	198-SB17-8-10	8	10	SO	N	10/22/2018	6.4	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB17	198-SB17-8-11	8	11	SO	N	10/22/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB17	198-SB17-10-12	10	12	SO	N	10/22/2018	6.9	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB18	198-SB18-0-4	0	4	SO	N	10/10/2018	**3500**		NA		ND	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U
198-SB18	198-SB18-4-6	4	6	SO	N	10/10/2018	**9200**		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB18	198-SB18-6-8	6	8	SO	N	10/10/2018	**1700**		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB18	198-SB18-8-10	8	10	SO	N	10/10/2018	24		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB18	198-SB18-8-11	8	11	SO	N	10/10/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB18	198-SB918-8-10	8	10	SO	FD	10/10/2018	58		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB18	198-SB18-21-23 OR NAT	9	10	SO	N	10/10/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB18	198-SB18-10-12	10	12	SO	N	10/10/2018	6.4	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB18	198-SB18-11-16	11	16	SO	N	10/10/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB18	198-SB918-11-16	11	16	SO	FD	10/10/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB18	198-SB18-12-14	12	14	SO	N	10/10/2018	6.6	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB18	198-SB18-14-16	14	16	SO	N	10/10/2018	6.9	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB19 [1]	198-SB19-0-2	0	2	SO	N	9/18/2018	**2800**		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
198-SB19 [1]	198-SB19-2-4	2	4	SO	N	9/18/2018	810		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB19 [1]	198-SB19-2-5	2	5	SO	N	9/18/2018	NA		NA		ND	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U
198-SB19 [1]	198-SB19-4-5	4	5	SO	N	9/18/2018	**2600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB22	198-SB22-0-2	0	2	SO	N	10/10/2018	56		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB22	198-SB22-2-4	2	4	SO	N	10/10/2018	130		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB22	198-SB22-2-5	2	5	SO	N	10/10/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
198-SB22	198-SB22-4-6	4	6	SO	N	10/10/2018	24		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB22	198-SB22-5-8	5	8	SO	N	10/10/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB22	198-SB22-6-8	6	8	SO	N	10/10/2018	8.2		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
		Start	End	Sample	Sample	Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
198-SB22	198-SB922-6-8	6	8	SO	FD	10/10/2018	6.6		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB22	198-SB22-8-10	8	10	SO	N	10/10/2018	6.5	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB22	198-SB22-8-11	8	11	SO	N	10/10/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB22	198-SB22-21-23 OR NAT	9	10	SO	N	10/10/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB22	198-SB22-10-12	10	12	SO	N	10/10/2018	6.4	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB22	198-SB22-11-16	11	13.8	SO	N	10/10/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB22	198-SB22-12-14	12	13.8	SO	N	10/10/2018	7.1	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB23 [1]	198-SB23-0-2	0	2	SO	N	9/18/2018	**4300**		NA		ND	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U
198-SB23 [1]	198-SB23-2-4	2	4	SO	N	9/18/2018	320		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB23 [1]	198-SB23-2-5	2	5	SO	N	9/18/2018	NA		NA		ND	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U
198-SB23 [1]	198-SB23-4-5	4	5	SO	N	9/18/2018	170		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB24	198-SB24-0-2	0	2	SO	N	10/10/2018	110		5	U	ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB24	198-SB24-2-4	2	4	SO	N	10/10/2018	350		0.24	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB24	198-SB24-2-5	2	5	SO	N	10/10/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB24	198-SB924-2-5	2	5	SO	FD	10/10/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB24	198-SB24-21-23 OR NAT	4	5	SO	N	10/10/2018	NA		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
198-SB24	198-SB24-4-6	4	6	SO	N	10/10/2018	11		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB24	198-SB24-5-8	5	8	SO	N	10/10/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
198-SB24	198-SB24-6-8	6	8	SO	N	10/10/2018	62		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB24	198-SB24-8-10	8	10	SO	N	10/10/2018	10		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB24	198-SB24-8-11	8	11	SO	N	10/10/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
198-SB24	198-SB24-10-12	10	11.5	SO	N	10/10/2018	6.7	U	5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB26	198-SB26-0-2	0	2	SO	N	10/10/2018	130		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-SB26	198-SB26-21-23 OR NAT	1	2	SO	N	10/10/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
198-SB26	198-SB26-2-4	2	4	SO	N	10/10/2018	42		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB26	198-SB26-2-5	2	5	SO	N	10/10/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
198-SB26	198-SB26-4-6	4	6	SO	N	10/10/2018	8.1		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB26	198-SB26-5-8	5	8	SO	N	10/10/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
198-SB26	198-SB26-6-8	6	8	SO	N	10/10/2018	6.5	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB26	198-SB26-8-10	8	10	SO	N	10/10/2018	7.3	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB26	198-SB26-8-11	8	10	SO	N	10/10/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
300-B-A	300-B-A-0-2	0	2	SO	N	9/21/2018	300		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-B-A	300-B-A-2-4	2	4	SO	N	9/21/2018	420		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-B-A	300-B-A-4-6	4	6	SO	N	9/21/2018	54		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-0-2	0	2	SO	N	9/20/2018	240		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-2-4	2	4	SO	N	9/20/2018	95		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-4-6	4	6	SO	N	9/20/2018	240		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-6-8	6	8	SO	N	9/20/2018	**5400**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-8-10	8	10	SO	N	9/20/2018	280		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-10-12	10	12	SO	N	9/20/2018	20		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-12-14	12	14	SO	N	9/20/2018	560		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-14-16	14	16	SO	N	9/20/2018	570		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-16-18	16	18	SO	N	9/20/2018	1000		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-18-20	18	20	SO	N	9/20/2018	300		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-90E-A-20-22	20	22	SO	FD	9/20/2018	580		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-20-22	20	22	SO	N	9/20/2018	530		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-22-24	22	24	SO	N	9/20/2018	77		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-E-A	300-E-A-24-25 OR NAT	26	27	SO	N	9/20/2018	10		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB02	300-SB02-0.5-2	0.5	2	SO	N	9/21/2018	770		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB02	300-SB02-2-4	2	4	SO	N	9/21/2018	47		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB02	300-SB02-4-6	4	6	SO	N	9/21/2018	12		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB05	300-SB05-0-2	0	2	SO	N	9/17/2018	**5700**		NA		0.37	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.37	J+	0.045	U	0.045	U	0.045	U

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
		Start	End	Sample	Sample	Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
300-SB05	300-SB05-2-3	2	3	SO	N	9/17/2018	4100		NA		0.22	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.22	J+	0.041	U	0.041	U	0.041	U
300-SB6A	300-SB6A-0-2	0	2	SO	N	9/25/2018	7000		NA		0.52	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.52	J+	0.041	U	0.041	U	0.041	U
300-SB6A	300-SB6A-2-4	2	4	SO	N	9/25/2018	8000		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB6A	300-SB6A-2-5	2	5	SO	N	9/25/2018	NA		NA		1	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	1	J+	0.039	U	0.039	U	0.039	U
300-SB6A	300-SB6A-4-6	4	6	SO	N	9/25/2018	6400		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB6A	300-SB6A-5-8	5	8	SO	N	9/25/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB6A	300-SB6A-6-8	6	8	SO	N	9/25/2018	130		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB6A	300-SB6A-8-10 OR NAT	6	7	SO	N	9/25/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
300-SB6A	300-SB6A-8-10	8	10	SO	N	9/25/2018	63		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB08	300-SB08-0-2	0	2	SO	N	9/25/2018	7600		7.8	J	ND	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U
300-SB08	300-SB08-2-4	2	4	SO	N	9/25/2018	17000		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB08	300-SB08-2-5	2	5	SO	N	9/25/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
300-SB08	300-SB08-4-6	4	6	SO	N	9/25/2018	6300		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB08	300-SB08-5-8	5	8	SO	N	9/25/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB08	300-SB08-6-8	6	8	SO	N	9/25/2018	8200		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB08	300-SB08-8-9	8	9.7	SO	N	9/25/2018	9700		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB08	300-SB08-8-9 OR NAT	8	9.7	SO	N	9/25/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
300-SB09	300-SB09-0-2	0	2	SO	N	9/25/2018	560		NA		0.6	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.6	J+	0.042	U	0.042	U	0.042	U
300-SB09	300-SB909-0-2	0	2	SO	FD	9/25/2018	NA		NA		1.1	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	1.1	J+	0.043	U	0.043	U	0.043	U
300-SB09	300-SB09-2-4	2	4	SO	N	9/25/2018	7900		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB09	300-SB09-2-5	2	5	SO	N	9/25/2018	NA		NA		4.4	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	4.4		0.045	U	0.045	U	0.045	U
300-SB09	300-SB09-4-6	4	6	SO	N	9/25/2018	1700		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB09	300-SB09-5-8	5	8	SO	N	9/25/2018	NA		NA		3.3	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	3.3		0.044	U	0.044	U	0.044	U
300-SB09	300-SB09-6-8	6	8	SO	N	9/25/2018	2600		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB09	300-SB09-8-10	8	10	SO	N	9/25/2018	1400		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB09	300-SB09-8-11	8	10	SO	N	9/25/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
300-SB11	300-SB11-0-2	0	2	SO	N	9/25/2018	1500		NA		110	1.5	UJ	1.5	UJ	1.5	UJ	1.5	UJ	110	J	1.5	UJ	1.5	UJ	1.5	UJ	1.5	UJ
300-SB11	300-SB11-2-4	2	4	SO	N	9/25/2018	5000		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB11	300-SB11-2-5	2	5	SO	N	9/25/2018	NA		NA		5.6	0.055	UJ	0.055	UJ	0.055	UJ	0.055	UJ	5.6	J	0.055	UJ	0.055	UJ	0.055	UJ	0.055	UJ
300-SB11	300-SB911-2-4	2	4	SO	FD	9/25/2018	4900		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB11	300-SB11-4-6	4	6	SO	N	9/25/2018	2100		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB11	300-SB11-5-7 OR NAT	5	7	SO	N	9/25/2018	NA		NA		0.27	0.039	UJ	0.039	UJ	0.039	UJ	0.039	UJ	0.27	JN	0.039	UJ	0.039	UJ	0.039	UJ	0.039	UJ
300-SB11	300-SB11-6-7	6	7	SO	N	9/25/2018	83		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB13	300-SB13-0-2	0	2	SO	N	9/28/2018	810		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB13	300-SB13-2-4	2	4	SO	N	9/28/2018	8500		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB13	300-SB913-2-4	2	4	SO	FD	9/28/2018	NA		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB13	300-SB13-4-6	4	6	SO	N	9/28/2018	760		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB13	300-SB13-6-8	6	8	SO	N	9/28/2018	31		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB13	300-SB913-6-8	6	8	SO	FD	9/28/2018	32		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB13	300-SB13-8-10	8	8.5	SO	N	9/28/2018	38		0.03	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB14	300-SB14-0-2	0	2	SO	N	9/28/2018	5200		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB14	300-SB14-2-4	2	4	SO	N	9/28/2018	36		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB14	300-SB14-4-6	4	4.5	SO	N	9/28/2018	31		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB15	300-SB15-0-2	0	2	SO	N	9/28/2018	460		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB15	300-SB915-0-2	0	2	SO	FD	9/28/2018	1000		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB15	300-SB15-2-4	2	3	SO	N	9/28/2018	30		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB16	300-SB16-0.5-2	0.5	2	SO	N	9/28/2018	41		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB16	300-SB16-2-4	2	4	SO	N	9/28/2018	53		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB17 [1]	300-SB17-0-2	0	2	SO	N	9/13/2018	1300		NA		11	0.12	U	0.12	U	0.12	U	0.12	U	11		0.12	U	0.12	U	0.12	U	0.12	U
300-SB17 [1]	300-SB17-2-3	2	3	SO	N	9/13/2018	7000		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB17 [1]	300-SB17-2-3 OR NAT	2	3	SO	N	9/13/2018	NA		NA		3.4	0.047	U	0.047	U	0.047	U	0.047	U	3.4		0.047	U	0.047	U	0.047	U	0.047	U
300-SB18	300-SB18-0-0.5	0	0.5	SO	N	9/26/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
300-SB18	300-SB18-0-2	0	2	SO	N	9/26/2018	260	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
300-SB18	300-SB18-0.5-2	0.5	2	SO	N	9/26/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
300-SB18	300-SB18-2-3	2	3	SO	N	9/26/2018	35		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB18	300-SB18-2-3 OR NAT	2	3	SO	N	9/26/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB18	300-SB918-2-3	2	3	SO	FD	9/26/2018	36		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB19	300-SB19-0-0.5	0	0.5	SO	N	9/26/2018	NA		NA		ND	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U
300-SB19	300-SB19-0-2	0	2	SO	N	9/26/2018	**3500**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB19	300-SB19-0.5-2	0.5	2	SO	N	9/26/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB19	300-SB919-0.5-2	0.5	2	SO	FD	9/26/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB19	300-SB19-2-3	2	3	SO	N	9/26/2018	36		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB19	300-SB19-2-3 OR NAT	2	3	SO	N	9/26/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
300-SB20	300-SB20-0-2	0	2	SO	N	9/13/2018	**1300**		NA		**12**	0.79	U	0.79	U	0.79	U	0.79	U	**12**		0.79	U	0.79	U	0.79	U	0.79	U
300-SB20	300-SB20-2-3	2	3	SO	N	9/13/2018	**1200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB20	300-SB20-2-3 OR NAT	2	3	SO	N	9/13/2018	NA		NA		**63**	0.7	U	0.7	U	0.7	U	0.7	U	**63**		0.7	U	0.7	U	0.7	U	0.7	U
300-SB21 [1]	300-SB21-0-2	0	1.5	SO	N	9/13/2018	**1300**		NA		**19**	0.38	U	0.38	U	0.38	U	0.38	U	**19**		0.38	U	0.38	U	0.38	U	0.38	U
300-SB22	300-SB22-0-0.5	0	0.5	SO	N	9/26/2018	NA		NA		ND	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U	0.059	U
300-SB22	300-SB22-0-2	0	2	SO	N	9/26/2018	330		0.37	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB22	300-SB22-0.5-2	0.5	2	SO	N	9/26/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
300-SB22	300-SB22-2-3	2	3	SO	N	9/26/2018	160		0.13	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB22	300-SB22-2-3 OR NAT	2	3	SO	N	9/26/2018	NA		NA		ND	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U	0.054	U
300-SB23	300-SB23-0-0.5	0	0.5	SO	N	9/26/2018	NA		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
300-SB23	300-SB23-0-2	0	2	SO	N	9/26/2018	720		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB23	300-SB23-0.5-2	0.5	2	SO	N	9/26/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
300-SB23	300-SB23-2-3	2	3	SO	N	9/26/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB23	300-SB23-2-3 OR NAT	2	3	SO	N	9/26/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
300-SB24	300-SB24-0-0.5	0	0.5	SO	N	10/17/2018	NA		NA		**10**	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	**10**		0.14	U	0.14	U	0.14	U
300-SB24	300-SB24-0-2	0	2	SO	N	10/17/2018	**1200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB24	300-SB24-0.5-2	0.5	2	SO	N	10/17/2018	NA		NA		**56**	0.77	U	0.77	U	0.77	U	0.77	U	0.77	U	**56**		0.77	U	0.77	U	0.77	U
300-SB25	300-SB25-0-0.5	0	0.5	SO	N	10/17/2018	NA		NA		**5.7**	0.068	U	0.068	U	0.068	U	0.068	U	0.068	U	**5.7**	J	0.068	U	0.068	U	0.068	U
300-SB25	300-SB25-0-2	0	2	SO	N	10/17/2018	**2000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB25	300-SB25-0.5-2	0.5	2	SO	N	10/17/2018	NA		NA		ND	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U
300-SB25	300-SB25-2-3	2	3	SO	N	10/17/2018	**2400**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB25	300-SB25-2-3 OR NAT	2	3	SO	N	10/17/2018	NA		NA		ND	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U	0.076	U
300-SB27	300-SB27-0-2	0	2	SO	N	9/20/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB27	300-SB27-2-4	2	4	SO	N	9/20/2018	150		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB28	300-SB28-0-2	0	2	SO	N	9/20/2018	610		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB28	300-SB28-2-4	2	4	SO	N	9/20/2018	160		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB29	300-SB29-0-2	0	1	SO	N	9/17/2018	**3500**		NA		**140**	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U	5.1	U	**140**	J
300-SB30	300-SB30-0-2	0	2	SO	N	9/14/2018	**4800**		NA		**19**	0.41	U	0.41	U	0.41	U	0.41	U	0.41	U	**19**		0.41	U	0.41	U	0.41	U
300-SB30	300-SB30-2-3	2	3	SO	N	9/14/2018	**2600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB30	300-SB30-2-3 OR NAT	2	3	SO	N	9/14/2018	NA		NA		**54**	0.81	U	0.81	U	0.81	U	0.81	U	0.81	U	**54**		0.81	U	0.81	U	0.81	U
300-SB31	300-SB31-0-2	0	2	SO	N	9/21/2018	690		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-2-4	2	4	SO	N	9/21/2018	83		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-4-6	4	6	SO	N	9/21/2018	42		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-6-8	6	8	SO	N	9/21/2018	20		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-8-10	8	10	SO	N	9/21/2018	**2600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-10-12	10	12	SO	N	9/21/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-12-14	12	14	SO	N	9/21/2018	280		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB931-12-14	12	14	SO	FD	9/21/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-14-16	14	16	SO	N	9/21/2018	9.7		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-16-18	16	18	SO	N	9/21/2018	210		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-18-20	18	20	SO	N	9/21/2018	51		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-20-22	20	22	SO	N	9/21/2018	150		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB31	300-SB31-22-24	22.5	23.5	SO	N	9/21/2018	30		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
300-SB32	300-SB32-0-2	0	2	SO	N	9/20/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB32	300-SB32-2-4	2	4	SO	N	9/20/2018	190		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB32	300-SB32-4-6	4	6	SO	N	9/20/2018	11	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB32	300-SB932-4-6	4	6	SO	FD	9/20/2018	8.7		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB32	300-SB32-6-7	6	6.4	SO	N	9/20/2018	q	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB33	300-SB33-0-2	0	2	SO	N	9/21/2018	16		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB33	300-SB33-2-4	2	3.3	SO	N	9/21/2018	66		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB34	300-SB34-0-2	0	2	SO	N	9/21/2018	18		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB34	300-SB34-2-4	2	4	SO	N	9/21/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB34	300-SB34-4-6	4	6	SO	N	9/21/2018	610		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB35	300-SB35-0-2	0	2	SO	N	9/21/2018	660		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB35	300-SB35-2-4	2	4	SO	N	9/21/2018	440		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB35	300-SB35-4-6	4	6	SO	N	9/21/2018	190		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB35	300-SB35-6-8	6	8	SO	N	9/21/2018	26		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB35	300-SB35-8-10	8	10	SO	N	9/21/2018	48		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB36	300-SB36-0-2	0	2	SO	N	9/21/2018	**3400**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB36	300-SB36-2-4	2	4	SO	N	9/21/2018	630		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB36	300-SB36-4-6	4	6	SO	N	9/21/2018	**3500**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB37	300-SB37-0-2	0	2	SO	N	9/21/2018	220		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB37	300-SB37-2-4	2	4	SO	N	9/21/2018	220		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB37	300-SB37-4-6	4	6	SO	N	9/21/2018	890		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB38	300-SB38-0-2	0	2	SO	N	9/24/2018	270		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
300-SB38	300-SB38-2-4	2	4	SO	N	9/24/2018	90		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB38	300-SB38-2-5	2	5	SO	N	9/24/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
300-SB38	300-SB38-4-6	4	6	SO	N	9/24/2018	480		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB38	300-SB38-5-8	5	8	SO	N	9/24/2018	NA		NA		ND	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U
300-SB38	300-SB38-6-8	6	8	SO	N	9/24/2018	560		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB38	300-SB38-8-10	8	10	SO	N	9/24/2018	**1600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB38	300-SB38-8-11	8	11	SO	N	9/24/2018	NA		NA		ND	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U
300-SB38	300-SB938-8-11	8	11	SO	FD	9/24/2018	NA		NA		ND	0.062	U	0.062	U	0.062	U	0.062	U	0.062	U	0.062	U	0.062	U	0.062	U	0.062	U
300-SB38	300-SB38-10-12	10	12	SO	N	9/24/2018	1000		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB38	300-SB38-11-15 OR NAT	11	14	SO	N	9/24/2018	NA		NA		ND	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U
300-SB38	300-SB38-12-14	12	14	SO	N	9/24/2018	430		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB39	300-SB39-0-2	0	2	SO	N	9/24/2018	430		5	U	ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
300-SB39	300-SB39-2-4	2	4	SO	N	9/24/2018	300		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB39	300-SB39-2-5	2	5	SO	N	9/24/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB39	300-SB39-4-6	4	6	SO	N	9/24/2018	72		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB39	300-SB39-5-8	5	8	SO	N	9/24/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB39	300-SB39-6-8	6	8	SO	N	9/24/2018	**2100**		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB39	300-SB39-8-10	8	10	SO	N	9/24/2018	**1400**		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB39	300-SB39-8-10 OR NAT	8	10	SO	N	9/24/2018	NA		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
300-SB39	300-SB39-14-16	14	16	SO	N	9/24/2018	**2800**		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB39	300-SB39-14-17	14	17	SO	N	9/24/2018	NA		NA		ND	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
300-SB39	300-SB39-16-18	16	17.8	SO	N	9/24/2018	**6100**		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB40	300-SB40-0-2	0	2	SO	N	9/24/2018	320		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB40	300-SB40-2-4	2	4	SO	N	9/24/2018	6.9	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB40	300-SB40-2-5	2	5	SO	N	9/24/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB40	300-SB40-4-6	4	6	SO	N	9/24/2018	86		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB40	300-SB40-5-8	5	8	SO	N	9/24/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
300-SB40	300-SB40-6-8	6	8	SO	N	9/24/2018	91		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB40	300-SB40-8-10	8	10	SO	N	9/24/2018	81		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB40	300-SB40-8-11	8	11	SO	N	9/24/2018	NA		NA		ND	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U
300-SB40	300-SB40-10-12	10	12	SO	N	9/24/2018	93		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
		Start	End	Sample	Sample	Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
300-SB40	300-SB40-11-15 OR NAT	11	15	SO	N	9/24/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
300-SB40	300-SB40-12-14	12	14	SO	N	9/24/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB40	300-SB40-14-15	14	15	SO	N	9/24/2018	100		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L16WS04A	18MC-L16WS04A-0-2	0	2	SO	N	9/9/2020	302		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L16WS04A	18MC-L16WS04A-2-4	2	4	SO	N	9/9/2020	133		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L16WS04A	18MC-L16WS04A-4-6	4	6	SO	N	9/9/2020	365		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB27	198-SB-27-0-2	0	2	SO	N	8/3/2020	228		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB27	198-SB27-2-4	2	4	SO	N	8/3/2020	36		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB41	300-SB41-0-2	0	2	SO	N	8/11/2020	16.4		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB41	300-SB941-0-2	0	2	SO	N	8/11/2020	14.5		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB41	300-SB41-2-4	2	4	SO	N	8/11/2020	36.1		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB41	300-SB941-2-4	2	4	SO	FD	8/11/2020	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB41	300-SB41-8-10	8	10	SO	N	8/11/2020	674		NA		0.44	0.039	U	0.039	U	0.039	U	0.039	U	**0.3**	**J+**	**0.14**	**J+**	0.039	U	0.039	U	0.039	U
300-SB41	300-SB41-10-12	10	12	SO	N	8/11/2020	285		NA		2.16	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	**1.9**	**J+**	0.04	U	0.04	U	**0.26**	**J+**
300-SB41	300-SB41-12-14	12	14	SO	N	8/11/2020	256		NA		0.512	0.043	U	0.043	U	0.043	U	0.043	U	**0.23**	**J+**	**0.21**	**J+**	0.043	U	0.043	U	**0.072**	**J+**
300-SB41	300-SB41-14-16	14	16	SO	N	8/11/2020	**5510**		NA		3.07	0.042	U	0.042	U	0.042	U	0.042	U	**1.5**	**J+**	**1.2**	**J+**	0.042	U	0.042	U	**0.37**	**J+**
300-SB41	300-SB41-16-18	16	18	SO	N	8/11/2020	486		NA		11.67	0.46	U	0.46	U	0.46	U	0.46	U	**9**		**2.2**		0.46	U	0.46	U	**0.47**	**J**
300-SB41	300-SB41-18-20	18	20	SO	N	8/11/2020	**6540**	**J**	NA		2.1	0.57	U	0.57	U	0.57	U	0.57	U	**0.42**	**J+**	**0.48**	**J+**	0.57	U	0.57	U	**1.2**	**J+**
300-SB41	300-SB941-18-20	18	20	SO	FD	8/11/2020	**2780**	**J**	NA		NA	NA		NA		NA		NA		NA		0		NA		NA		NA	
300-SB41	300-SB41-20-22	20	22	SO	N	8/11/2020	**3220**		NA		1.18	0.24	U	0.24	U	0.24	U	0.24	U	**0.92**	**J+**	0.24	U	0.24	U	0.24	U	**0.26**	**J+**
300-SB41	300-SB41-22-24	22	24	SO	N	8/11/2020	**7670**		NA		0.075	0.042	U	0.042	U	0.042	U	0.042	U	**0.075**	**J**	0.042	U	0.042	U	0.042	U	0.042	U
300-SB42	300-SB42-0-2	0	2	SO	N	8/11/2020	14.8		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB42	300-SB42-2-4	2	4	SO	N	8/11/2020	58.9		**0.029**	**J**	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB42	300-SB42-4-6	4	6	SO	N	8/11/2020	101		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB42	300-SB42-6-8	6	8	SO	N	8/11/2020	87.9		**0.076**	**J**	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB43	300-SB43-0-2	0	2	SO	N	8/11/2020	13.3	**J**	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB43	300-SB43-2-4	2	4	SO	N	8/11/2020	53.9		**0.16**	**J**	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB43	300-SB43-4-6	4	6	SO	N	8/11/2020	37.5		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB43	300-SB43-6-8	6	8	SO	N	8/11/2020	90.6		**0.11**	**J**	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB44	300-SB44-0-2	0	2	SO	N	8/12/2020	**1770**	**J**	NA		2	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	**2**	**J**	0.04	U	0.04	U	0.04	U
300-SB44	300-SB44-2-4	2	4	SO	N	8/12/2020	**1030**		NA		0.004	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	**0.004**	**J**
300-SB44	300-SB44-4-6	4	6	SO	N	8/12/2020	814		NA		0.25	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	**0.24**		0.039	U	0.039	U	**0.01**	**J**
300-SB44	300-SB44-6-8	6	8	SO	N	8/12/2020	**1610**		**0.37**	**J**	ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
300-SB44	300-SB44-8-10	8	10	SO	N	8/12/2020	**1140**		NA		0.1985	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	**0.19**	**J**	0.039	U	0.039	U	**0.0085**	**J**
300-SB44	300-SB44-10-12	10	12	SO	N	8/12/2020	21.3		NA		0.0028	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	**0.0028**	**J**	0.041	U	0.041	U	0.041	U
300-SB45	300-SB45-0-2	0	2	SO	N	9/9/2020	215		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB45	300-SB45-2-4	2	4	SO	N	9/9/2020	229		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB45	300-SB45-4-5	4	5	SO	N	9/9/2020	198		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB46	300-SB46-0-2	0	2	SO	N	9/9/2020	591		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB46	300-SB46-2-4	2	4	SO	N	9/9/2020	155		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB46	300-SB46-4-6	4	6	SO	N	9/9/2020	469		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB47	300-SB47-0-2	0	2	SO	N	8/7/2020	307		**0.13**	**J**	0.105	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	**0.039**	**NJ**	0.041	U	0.041	U	**0.066**	**J**
300-SB47	300-SB47-2-4	2	4	SO	N	8/7/2020	15.3		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB47	300-SB47-4-6	4	6	SO	N	8/7/2020	11.1		NA		0.0021	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	**0.0021**	**J**
300-SB48	300-SB48-0-2	0	2	SO	N	8/7/2020	**4430**		**2.2**	**J**	1.48	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	**0.7**	**J**	0.047	U	0.047	U	**0.78**	**J**
300-SB48	300-SB48-2-4	2	4	SO	N	8/7/2020	**1300**		NA		2.5	0.082	UJ	0.082	UJ	0.082	UJ	0.082	UJ	0.082	UJ	0.082	UJ	0.082	UJ	0.082	UJ	**2.5**	**J**
300-SB49	300-SB49-0-2	0	2	SO	N	8/7/2020	412		**0.25**	**J**	0.224	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	**0.014**	**NJ**	0.04	U	0.04	U	**0.21**	**J+**
300-SB49	300-SB49-2-4	2	4	SO	N	8/7/2020	60.7		NA		0.0097	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	**0.0097**	**J**
300-SB49	300-SB49-4-6	4	6	SO	N	8/7/2020	780		NA		0.034	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	**0.034**	**J**
300-SB49	300-SB49-6-8	6	8	SO	N	8/7/2020	967		NA		0.023	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	**0.023**	**J**
300-SB49	300-SB49-8-10	8	10	SO	N	8/7/2020	594		NA		0.389	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	**0.089**	**J+**	0.035	U	0.035	U	**0.3**	**J+**
300-SB49	300-SB49-10-12	10	12	SO	N	8/7/2020	153		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
300-SB49	300-SB49-12-16	12	16	SO	N	8/7/2020	521		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U

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						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
		Start	End	Sample	Sample	Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
300-SB49	300-SB49-16-20	16	20	SO	N	8/7/2020	**1480**		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
300-SB49	300-SB49-20-23	20	23	SO	N	8/7/2020	73.8		NA		ND	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U	0.046	U
300-SB50	300-SB50-0-2	0	2	SO	N	8/3/2020	107		NA		0.0036	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	**0.0036**	**J**	0.037	U	0.037	U	0.037	U
300-SB50	300-SB50-2-4	2	4	SO	N	8/3/2020	126		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB50	300-SB50-4-6	4	6	SO	N	8/3/2020	25.1		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
300-SB50	300-SB50-6-8	6	8	SO	N	8/3/2020	6.9		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
300-SB50	300-SB50-8-10	8	10	SO	N	8/3/2020	25.5		NA		0.0022	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	**0.0022**	**J**	0.04	U	0.04	U	0.04	U
300-SB50	300-SB50-10-12	10	12	SO	N	8/3/2020	**1110**		NA		ND	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
300-SB50	300-SB50-12-14	12	14	SO	N	8/3/2020	28.4		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
300-SB51	300-SB51-0-2	0	2	SO	N	8/7/2020	110		NA		0.063	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	**0.031**	**NJ**	0.039	U	0.039	U	**0.032**	**J**
300-SB51	300-SB51-2-4	2	4	SO	N	8/7/2020	28.7		NA		0.0065	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	**0.0065**	**NJ**	0.039	U	0.039	U	0.039	U
300-SB51	300-SB51-4-6	4	6	SO	N	8/7/2020	6.1		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
300-SB52	300-SB52-0-2	0	2	SO	N	8/7/2020	**1170**		**0.76**	**J**	0.94	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	**0.1**	**J+**	0.038	U	0.038	U	**0.84**	**J+**
300-SB52	300-SB52-2-4	2	4	SO	N	8/7/2020	**1120**		NA		0.85	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	**0.19**	**J+**	0.051	U	0.051	U	**0.66**	**J+**
300-SB52	300-SB952-2-4	2	4	SO	N	8/7/2020	**1450**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB52	300-SB52-4-6	4	6	SO	N	8/7/2020	203		NA		0.144	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	**0.024**	**J+**	0.036	U	0.036	U	**0.12**	**J+**
300-SB52	300-SB52-6-12	6	12	SO	N	8/7/2020	**1440**		NA		0.018	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	**0.018**	**J**
300-SB53	300-SB53-0-2	0	2	SO	N	8/7/2020	480		NA		0.146	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	**0.046**	**NJ**	0.044	U	0.044	U	**0.1**	**J+**
300-SB53	300-SB53-2-4	2	4	SO	N	8/7/2020	417		NA		0.057	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	**0.021**	**NJ**	0.034	U	0.034	U	**0.036**	**J**
300-SB53	300-SB53-4-6	4	6	SO	N	8/7/2020	227		NA		0.051	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	**0.051**	**J+**
300-SB53	300-SB53-6-8	6	8	SO	N	8/7/2020	**1210**		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
300-SB53	300-SB953-6-8	6	8	SO	N	8/7/2020	NA		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
300-SB53	300-SB53-8-10	8	10	SO	N	8/7/2020	480		NA		0.075	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	**0.024**	**NJ**	0.036	U	0.036	U	**0.051**	**J+**
300-SB53	300-SB53-12-16	12	16	SO	N	8/7/2020	214		NA		0.093	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	**0.031**	**NJ**	0.045	U	0.045	U	**0.062**	**J+**
300-SB53	300-SB53-16-20	16	20	SO	N	8/7/2020	64.4		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
300-SB53	300-SB53-20-21	20	21	SO	N	8/7/2020	48.5		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
300-SB54	300-SB54-0-2	0	2	SO	N	8/7/2020	84.4		NA		0.212	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	**0.18**	**J**	0.038	U	0.038	U	**0.032**	**J**
300-SB54	300-SB954-0-2	0	2	SO	FD	8/7/2020	NA		NA		0.45	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	**0.45**	**J**	0.037	U	0.037	U	0.037	U
300-SB54	300-SB54-2-4	2	4	SO	N	8/7/2020	105		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
300-SB54	300-SB54-4-6	4	6	SO	N	8/7/2020	108		NA		0.17	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	**0.17**	**J**	0.038	U	0.038	U	0.038	U
300-SB54	300-SB54-6-8	6	8	SO	N	8/7/2020	257	**J**	NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
300-SB54	300-SB54-8-10	8	10	SO	N	8/7/2020	333		NA		0.065	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	**0.065**	**J**	0.037	U	0.037	U	0.037	U
300-SB54	300-SB54-10-12	10	12	SO	N	8/7/2020	150		NA		0.013	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	**0.013**	**J**	0.036	U	0.036	U	0.036	U
300-SB54	300-SB54-12-14	12	14	SO	N	8/7/2020	3.2		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
300-SB62	300-SB62-0-2	0	2	SO	N	9/9/2020	252		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB62	300-SB962-0-2	0	2	SO	FD	9/9/2020	330		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB62	300-SB62-2-4	2	4	SO	N	9/9/2020	131		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB62	300-SB62-4-6	4	6	SO	N	9/9/2020	391		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB63	300-SB63-0-2	0	2	SO	N	9/9/2020	238		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB63	300-SB63-2-4	2	4	SO	N	9/9/2020	152		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB63	300-SB63-4-6	4	6	SO	N	9/9/2020	146		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB6A	300-SB6A-0-6	0	6	SO	N	8/11/2020	NA		**5.5**		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB6A	300-SB6A-0-6-R	0	6	SO	N	9/9/2020	NA		**42.8**		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB55[1]	300-SB55-0-2	0	2	SO	ft	7/22/2021	140		NA		ND	0.04	U	0.08	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
300-SB55[1]	300-SB955-0-2	0	2	SO	ft	7/22/2021	232		NA		ND	0.0438	U	0.0876	U	0.0438	U	0.0438	U	0.0438	U	0.0438	U	0.0438	U	0.0438	U	0.0438	U
300-SB55[1]	300-SB55-2-4	2	4	SO	ft	7/22/2021	**1060**		NA		**43.27**	0.0525	U	0.105	U	0.0525	U	**42.6**		0.0525	U	0.0525	U	0.673		0.0525	U	0.0525	U
300-SB55[1]	300-SB55-4-6	4	5.5	SO	ft	7/22/2021	99.3		NA		5.05	0.0467	U	0.0934	U	0.0467	U	5.05		0.0467	U	0.0467	U	0.0467	U	0.0467	U	0.0467	U
300-SB56	300-SB56-0-2	0	2	SO	ft	7/22/2021	35.9		NA		ND	0.0358	U	0.0717	U	0.0358	U	0.0358	U	0.0358	U	0.0358	U	0.0358	U	0.0358	U	0.0358	U
300-SB57	300-SB57-0-2	0	2	SO	ft	7/22/2021	602		NA		ND	0.0348	U	0.0696	U	0.0348	U	0.0348	U	0.0348	U	0.0348	U	0.0348	U	0.0348	U	0.0348	U
300-SB57	300-SB57-2-4	2	3.5	SO	ft	7/22/2021	43.6		NA		ND	0.0346	U	0.0692	U	0.0346	U	0.0346	U	0.0346	U	0.0346	U	0.0346	U	0.0346	U	0.0346	U
300-SB58	300-SB58-0-2	0	2	SO	ft	7/22/2021	NA		NA		ND	0.0373	U	0.0747	U	0.0373	U	0.0373	U	0.0373	U	0.0373	U	0.0373	U	0.0373	U	0.0373	U
300-SB58	300-SB58-2-4	2	4	SO	ft	7/22/2021	NA		NA		ND	0.0382	U	0.0764	U	0.0382	U	0.0382	U	0.0382	U	0.0382	U	0.0382	U	0.0382	U	0.0382	U

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
300-SB59	300-SB59-0-2	0	2	SO	ft	7/22/2021	NA		NA		ND	0.0374	U	0.0748	U	0.0374	U	0.0374	U	0.0374	U	0.0374	U	0.0374	U	0.0374	U	0.0374	U
300-SB59	300-SB59-2-4	2	4	SO	ft	7/22/2021	NA		NA		ND	0.0347	U	0.0694	U	0.0347	U	0.0347	U	0.0347	U	0.0347	U	0.0347	U	0.0347	U	0.0347	U
300-SB60	300-SB60-0-2	0	2	SO	ft	7/22/2021	NA		NA		ND	0.0381	U	0.0761	U	0.0381	U	0.0381	U	0.0381	U	0.0381	U	0.0381	U	0.0381	U	0.0381	U
300-SB60	300-SB60-2-4	2	4	SO	ft	7/22/2021	NA		NA		ND	0.0363	U	0.0725	U	0.0363	U	0.0363	U	0.0363	U	0.0363	U	0.0363	U	0.0363	U	0.0363	U
DEC-SED-28A	DEC-SED-28A-1-2	1	2	SO	N	9/18/2018	NA		NA		ND	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U
DEC-SED-28A	DEC-SED-28A-2-5	2	5	SO	N	9/18/2018	NA		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
DEC-SED-28A	DEC-SED-28A-3-5	3	5	SO	N	9/18/2018	720		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SED-35A	DEC-SED-35A-0-2	0	2	SO	N	9/25/2018	**1200**		NA		**24**	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U	**24**		0.27	U	0.27	U	0.27	U
DEC-SED-35A	DEC-SED-35A-2-4	2	4	SO	N	9/25/2018	260		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SED-35A	DEC-SED-35A-2-5	2	5	SO	N	9/25/2018	NA		NA		0.47	0.047	UJ	0.047	UJ	0.047	UJ	0.047	UJ	0.047	UJ	0.47	J+	0.047	UJ	0.047	UJ	0.047	UJ
DEC-SED-35A	DEC-SED-35A-4-6	4	6	SO	N	9/25/2018	130		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SED-35A	DEC-SED-35A-5-8	5	8	SO	N	9/25/2018	NA		NA		0.084	0.042	UJ	0.042	UJ	0.042	UJ	0.042	UJ	0.084	J	0.042	UJ	0.042	UJ	0.042	UJ	0.042	UJ
DEC-SED-35A	DEC-SED-35A-6-8	6	8	SO	N	9/25/2018	90		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SED-35A	DEC-SED-935A-6-8	6	8	SO	FD	9/25/2018	100		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SED-35A	DEC-SED-35A-8-10	8	10	SO	N	9/25/2018	120		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SED-35A	DEC-SED-35A-8-10 OR NAT	8	10	SO	N	9/25/2018	NA		NA		0.07	0.044	UJ	0.044	UJ	0.044	UJ	0.044	UJ	0.07	J	0.044	UJ	0.044	UJ	0.044	UJ	0.044	UJ
DEC-SED-37A	DEC-SED-37A-2-3	2	3	SO	N	9/13/2018	**1800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
DEC-SED-37A	DEC-SED-37A-2-3 OR NAT	2	3	SO	N	9/13/2018	NA		NA		**120**	5.3	U	5.3	U	5.3	U	5.3	U	**120**		5.3	U	5.3	U	5.3	U	5.3	U
DEC-SED-38A	DEC-SED-38A-2-3 OR NAT	2	3	SO	N	9/11/2018	NA		NA		0.26	0.046	U	0.046	U	0.046	U	0.046	U	0.26	J+	0.046	U	0.046	U	0.046	U	0.046	U
DEC-SED-40A	DEC-SED-40A-2-3 OR NAT	4	5.6	SO	N	10/16/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
DS-SB-02 [1]	DS-SB-02-0-2	0	2	SO	N	9/13/2018	NA		NA		**180**	6.8	U	6.8	U	6.8	U	6.8	U	**180**		6.8	U	6.8	U	6.8	U	6.8	U
DS-SB-02 [1]	DS-SB-02-2-3 OR NAT	2	3	SO	N	9/13/2018	NA		NA		**28**	0.65	U	0.65	U	0.65	U	0.65	U	**28**		0.65	U	0.65	U	0.65	U	0.65	U
DS-SB-04 [1]	DS-SB-04-0-2	0	2	SO	N	9/13/2018	NA		NA		**25**	0.48	U	0.48	U	0.48	U	0.48	U	**25**		0.48	U	0.48	U	0.48	U	0.48	U
DS-SB-04 [1]	DS-SB-04-2-3 OR NAT	2	3	SO	N	9/11/2018	NA		NA		**37**	0.69	U	0.69	U	0.69	U	0.69	U	**37**		0.69	U	0.69	U	0.69	U	0.69	U
DS-SB-05 [1]	DS-SB-05-0-2	0	2	SO	N	9/13/2018	NA		NA		**130**	5.4	U	5.4	U	5.4	U	5.4	U	**130**		5.4	U	5.4	U	5.4	U	5.4	U
DS-SB-05 [1]	DS-SB-05-2-3 OR NAT	2	3	SO	N	9/11/2018	NA		NA		1.1	0.04	U	0.04	U	0.04	U	0.04	U	1.1	J+	0.04	U	0.04	U	0.04	U	0.04	U
DS-SB31	DS-SB31-0-2	0	2	SO	N	10/24/2018	NA		NA		1	0.045	U	0.045	U	0.045	U	0.045	U	1	J+	0.045	U	0.045	U	0.045	U	0.045	U
DS-SB31	DS-SB31-2-3 OR NAT	2	3	SO	N	10/24/2018	NA		NA		ND	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U	0.041	U
DS-SB32	DS-SB32-0-2	0	2	SO	N	10/24/2018	NA		NA		ND	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U
DS-SB32	DS-SB32-2-3 OR NAT	2	3	SO	N	10/17/2018	NA		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
DS-SED-46	DS-SED-46-0-2	0	2	SO	N	10/25/2018	NA		NA		**5.1**	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	**5.1**		0.044	U	0.044	U
DS-SED-46	DS-SED-46-2-3	2	3	SO	N	10/16/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
DS-SED-46	DS-SED-46-3-5 OR NAT	4	5	SO	N	10/16/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
DS-SED-47	DS-SED-47-0-2	0	2	SO	N	10/25/2018	NA		NA		**1.6**	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	**1.6**	J+	0.055	U	0.055	U	0.055	U
DS-SED-47	DS-SED-47-2-3	2	3	SO	N	10/16/2018	NA		NA		ND	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U
DS-SED-47	DS-SED-47-3-5 OR NAT	3	4.2	SO	N	10/16/2018	NA		NA		ND	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U
FS-MCW-1	FS-MICRO01-D610-S-O	6	10	SO	N	9/9/2003	90.5		NA		ND	0.037	U	0.076	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	NA		NA	
FS-MW-02OB	FS-MW02OB-D2428-S-O	24	28	SO	N	9/24/2003	6.3		NA		ND	0.037	U	0.075	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	NA		NA	
FS-MW04RK	FS-MW04RK-D35-S-O	3	5	SO	N	9/16/2003	**1060**		NA		0.48	0.45	U	0.92	U	0.45	U	0.45	U	0.45	U	0.48		0.45	U	NA		NA	
FS-MW04RK	FS-MW04RK-D68-S-O	6	8	SO	N	9/16/2003	41.1		NA		ND	0.038	U	0.077	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	NA		NA	
FS-MW06RK	FS-MW06RK-D810-S-O	8	10	SO	N	9/25/2003	7.6		NA		ND	0.045	U	0.091	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	NA		NA	
FS-SP-2	FS-SP02-D26-S-O	2	6	SO	N	9/9/2003	914		NA		ND	0.48	U	0.97	U	0.48	U	0.48	U	0.48	U	0.48	U	0.48	U	NA		NA	
FS-SP-3	FS-SP03-D04-S-O	0	4	SO	N	9/8/2003	2.7		NA		ND	0.38	U	0.76	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	NA		NA	
FS-SP-7	FS-SP07-D24-S-O	2	4	SO	N	9/10/2003	25.7		NA		ND	0.038	U	0.078	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	NA		NA	
FS-SP-9	FS-SP09-D14-S-O	1	4	SO	N	9/10/2003	**3230**		NA		ND	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	NA		NA	
FS-SP-9A	FS-SP-9A-2-4	2	4	SO	N	9/28/2018	**3200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-9A	FS-SP-9A-4-6	4	6	SO	N	9/28/2018	57		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-9A	FS-SP-909A-4-6	4	6	SO	FD	9/28/2018	45		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-9A	FS-SP-9A-6-7	6	7	SO	N	9/28/2018	49		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-11	FS-SP11-D410-S-O	4	10	SO	N	9/9/2003	**10000**		NA		6.6	0.38	U	0.78	U	0.38	U	0.38	U	0.38	U	4	J	2.6	J	NA		NA	
FS-SP-11	FS-SP11-D1012-S-O	10	12	SO	N	9/9/2003	12.1		NA		ND	0.057	U	0.057	U	0.057	U	0.057	U	0.057	U	0.057	U	0.057	U	NA		NA	
FS-SP-11A	FS-SP-11A-0-2	0	2	SO	N	9/25/2018	**1400**		NA		**3.5**	0.04	UJ	0.04	UJ	0.04	UJ	0.04	UJ	0.04	UJ	**3.5**	J	0.04	UJ	0.04	UJ	0.04	UJ

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
FS-SP-11A	FS-SP-11A-2-4	2	4	SO	N	9/25/2018	**5600**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-11A	FS-SP-11A-2-5	2	5	SO	N	9/25/2018	NA		NA		5.4	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	5.4		0.043	U	0.043	U	0.043	U
FS-SP-11A	FS-SP-11A-4-6	4	6	SO	N	9/25/2018	**3100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-11A	FS-SP-11A-5-8	5	8	SO	N	9/25/2018	NA		NA		1.7	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	1.7	J+	0.042	U	0.042	U	0.042	U
FS-SP-11A	FS-SP-11A-6-8	6	8	SO	N	9/25/2018	**5800**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-11A	FS-SP-11A-8-10	8	10	SO	N	9/25/2018	**4400**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-11A	FS-SP-11A-8-11	8	11	SO	N	9/25/2018	NA		NA		0.33	0.037	UJ	0.037	UJ	0.037	UJ	0.037	UJ	0.037	UJ	0.33	J+	0.037	UJ	0.037	UJ	0.037	UJ
FS-SP-11A	FS-SP-11A-10-11	10	11	SO	N	9/25/2018	850		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-12	FS-SP12-D02-S-O	0	2	SO	N	9/9/2003	**8600**		NA		ND	0.36	U	0.73	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	NA		NA	
FS-SP-12A	FS-SP-12A-0-2	0	2	SO	N	9/28/2018	720		4.8	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-12A	FS-SP-912A-0-2	0	2	SO	FD	9/28/2018	**5000**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-12A	FS-SP-12A-2-4	2	3.2	SO	N	9/28/2018	53		0.11	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-13	FS-SP13-D0.53.5-S-O	0.5	3.5	SO	N	9/9/2003	7.5		NA		ND	0.037	U	0.075	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	NA		NA	
FS-SP-16	FS-SP16-D812-S-O	8	12	SO	N	9/8/2003	38.4		NA		ND	0.037	U	0.074	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	NA		NA	
FS-SP-19	FS-SP19-D48-S-O	4	8	SO	N	9/8/2003	53.9		NA		0.022	0.035	U	0.072	U	0.035	U	0.035	U	0.035	U	0.022	J	0.035	U	NA		NA	
FS-SP-21	FS-SP21-D45-S-O	4	5	SO	N	9/10/2003	71.1		NA		ND	0.14	U	0.28	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	NA		NA	
FS-SP-23	FS-SP23-D14-S-O	1	4	SO	N	9/10/2003	**2250**		NA		ND	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	NA		NA	
FS-SP-23A	FS-SP-23A-2-4	2	4	SO	N	9/28/2018	32		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-23A	FS-SP-23A-4-6	4	6	SO	N	9/28/2018	31		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SP-23A	FS-SP-23A-6-7	6	7	SO	N	9/28/2018	30		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1	FS-SS01-S-O	0	0.167	SO	N	9/15/2003	**7240**		NA		**1.9**	0.37	U	0.75	U	0.37	U	0.37	U	0.37	U	**1.9**	J	0.37	U	NA		NA	
FS-SS-1A	FS-SS-1A-0-2	0	2	SO	N	10/24/2018	**1400**		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
FS-SS-1A	FS-SS-1A-2-4	2	4	SO	N	10/24/2018	**2500**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1A	FS-SS-1A-2-5	2	5	SO	N	10/24/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
FS-SS-1A	FS-SS-901A-2-5	2	5	SO	FD	10/24/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
FS-SS-1A	FS-SS-1A-4-6	4	6	SO	N	10/24/2018	590		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1A	FS-SS-1A-5-8	5	8	SO	N	10/24/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
FS-SS-1A	FS-SS-1A-6-8	6	8	SO	N	10/24/2018	180		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1A	FS-SS-1A-8-10	8	10	SO	N	10/24/2018	72		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1A	FS-SS-1A-8-11	8	11	SO	N	10/24/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
FS-SS-1A	FS-SS-1A-10-12	10	12	SO	N	10/24/2018	48		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1A	FS-SS-1A-21-25 OR NAT	10	11	SO	N	10/24/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
FS-SS-1A	FS-SS-1A-24-25 OR NAT	10	11	SO	N	10/24/2018	41		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1A	FS-SS-1A-11-16	11	16	SO	N	10/24/2018	NA		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
FS-SS-1A	FS-SS-1A-12-14	12	14	SO	N	10/24/2018	30		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1A	FS-SS-1A-14-16	14	16	SO	N	10/24/2018	11		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1A	FS-SS-1A-16-18	16	18	SO	N	10/24/2018	10		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-1A	FS-SS-1A-16-21	16	18	SO	N	10/24/2018	NA		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
FS-SS-2	FS-SS02-S-O	0	0.167	SO	N	9/15/2003	**7610**		NA		**2.1**	0.44	U	0.88	U	0.44	U	0.44	U	0.44	U	**2.1**		0.44	U	NA		NA	
FS-SS-3	FS-SS03-S-O	0	0.167	SO	N	9/15/2003	**2390**		NA		ND	0.037	U	0.076	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	NA		NA	
FS-SS-3A	FS-SS-3A-0-2	0	2	SO	N	9/21/2018	**4100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-3A	FS-SS-3A-2-4	2	4	SO	N	9/21/2018	**8500**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-3A	FS-SS-3A-4-6	4	6	SO	N	9/21/2018	**5100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-3A	FS-SS-903A-4-6	4	6	SO	FD	9/21/2018	**5900**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-3A	FS-SS-3A-6-8	6	8	SO	N	9/25/2018	450		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-4	FS-SS04-S-O	0	0.167	SO	N	9/15/2003	319		NA		ND	0.17	U	0.34	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	NA		NA	
FS-SS-5	FS-SS05-S-O	0	0.167	SO	N	9/17/2003	**2860**		NA		**4.7**	0.39	U	0.8	U	0.39	U	0.39	U	0.39	U	**4.7**		0.39	U	NA		NA	
FS-SS-6	FS-SS06-S-O	0	0.167	SO	N	9/15/2003	68.7		NA		ND	0.36	U	0.74	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	NA		NA	
FS-SS-7	FS-SS07-S-O	0	0.167	SO	N	9/15/2003	138		NA		ND	0.37	U	0.75	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	NA		NA	
FS-SS-8	FS-SS08-S-O	0	0.167	SO	N	9/15/2003	57.6		NA		ND	0.36	U	0.73	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	NA		NA	
FS-SS-9	FS-SS09-S-O	0	0.167	SO	N	9/15/2003	**1780**		NA		ND	0.22	U	0.44	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	NA		NA	
FS-SS-9A	FS-SS-9A-2-4	2	4	SO	N	9/28/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-9A	FS-SS-9A-4-6	4	6	SO	N	9/28/2018	52		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
		Start	End	Sample	Sample	Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Depth	Depth	Matrix	Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
FS-SS-9A	FS-SS-9A-6-7	6	7	SO	N	9/28/2018	28		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
FS-SS-10	FS-SS10-S-O	0	0.167	SO	N	9/15/2003	**1140**		NA		ND	0.18	U	0.36	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	NA		NA	
FS-SS-11	FS-SS11-S-O	0	0.167	SO	N	9/18/2003	80.9		NA		ND	0.037	U	0.074	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	NA		NA	
FS-SS-12	FS-SS12-S-O	0	0.167	SO	N	9/18/2003	25.3		NA		ND	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	NA		NA	
OU2-SB01	OU2-SB01-Z1	2	3	SO	N	12/4/2014	64.2		NA		ND	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U
OU2-SB01	OU2-SB01-Z1/D	2	3	SO	FD	12/4/2014	66.5		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-SB01	OU2-SB01-Z2	2	10	SO	N	12/4/2014	36.6		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
OU2-SB01	OU2-SB01-Z3	6.8	7.2	SO	N	12/4/2014	6.3		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
OU2-SB02	OU2-SB02-Z1	2	3	SO	N	12/4/2014	57.2		NA		ND	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U
OU2-SB02	OU2-SB02-Z2	1	1.5	SO	N	12/4/2014	115		NA		ND	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U	0.037	U
OU2-SB02	OU2-SB02-Z3	5.4	5.9	SO	N	12/4/2014	2.9		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
OU2-SB03	OU2-SB03-Z1	4.5	5	SO	N	12/4/2014	341		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
OU2-SB03	OU2-SB03-Z2	2	2.5	SO	N	12/4/2014	**2050**		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
OU2-SB03	OU2-SB03-Z3	4.5	5	SO	N	12/4/2014	195		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
OU2-SS15	OU2-SS15-Z1	0	1	SO	N	1/25/2016	165		NA		0.0146	0.05	UJ	0.05	UJ	0.05	UJ	0.05	UJ	0.05	UJ	0.05	UJ	0.05	UJ	0.05	UJ	0.05	UJ
							2.37					0.01	U	0.02	U	0.01	U	0.01	U	0.01	U	0.01	U	0.011				0.0036	J
OU2-SS16	OU2-SS16-Z1	0	1	SO	N	1/26/2016	123		NA		0.0669	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.043	U	0.033	J	0.043	U	0.043	U
							1.01					0.01	U	0.02	U	0.01	U	0.01	U	0.01	U	0.015	J	0.043				0.0089	J
OU2-SS17	OU2-SS17-Z1	0	1	SO	N	1/26/2016	**2480**		NA		**6.65**	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	0.063	U	**4.3**	J+
							4.66					0.05	U	0.1	U	0.05	U	0.05	U	0.62	J	0.98	J	0.75	J			**0.17**	J
OU2-SS17A	OU2-SS17A-0-2	0	2	SO	N	10/16/2018	**2200**		NA		**1.5**	0.048	U	0.048	U	0.048	U	0.048	U	0.048	U	**1.5**	J+	0.048	U	0.048	U	0.048	U
OU2-SS17A	OU2-SS17A-2-4	2	4	SO	N	10/16/2018	**4100**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS17A	OU2-SS17A-2-5	2	5	SO	N	10/16/2018	NA		NA		1.4	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	1.4	J+	0.042	U	0.042	U	0.042	U
OU2-SS17A	OU2-SS17A-4-6	4	6	SO	N	10/16/2018	**5200**		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-SS17A	OU2-SS17A-10-12 OR NAT	5	6	SO	N	10/16/2018	NA		NA		0.067	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.067	J+	0.036	U	0.036	U	0.036	U
OU2-SS17A	OU2-SS17A-5-8	5	8	SO	N	10/16/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
OU2-SS17A	OU2-SS17A-6-8	6	8	SO	N	10/16/2018	9.3		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP01	OU2-TP01-01	2	3	SO	N	5/19/2015	10		NA		0.0039	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0026		0.0013		0.0011	U	0.0011	U
OU2-TP01	OU2-TP01-02	2	4	SO	N	5/19/2015	1		NA		ND	0.00094	U	0.00094	U	0.00094	U	0.00094	U	0.00094	U	0.00094	U	0.00094	U	0.00094	U	0.00094	U
OU2-TP02	OU2-TP02-01	2	7	SO	N	6/29/2015	340		NA		0.081	0.014	U	0.014	U	0.014	U	0.014	U	0.017	J	0.014	U	0.032		0.014	U	0.032	J
OU2-TP03	OU2-TP03-01	2	2.5	SO	N	6/29/2015	740		NA		0.0494	0.013	U	0.013	U	0.013	U	0.013	U	0.034	J	0.013	U	0.011	J	0.013	U	0.0044	J
OU2-TP03	OU2-TP03-02	2	5	SO	N	6/29/2015	290		NA		0.0626	0.011	U	0.011	U	0.011	U	0.011	U	0.045	J	0.011	U	0.011		0.011	U	0.0066	J
OU2-TP05	OU2-TP05-01	2	4	SO	N	6/29/2015	**10000**		NA		2.58	0.011	U	0.011	U	0.011	U	0.011	U	2	J	0.011	U	0.48	J	0.011	U	0.1	J
OU2-TP05-A	OU2-TP05-A-0-2	0	2	SO	N	9/24/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
OU2-TP05-A	OU2-TP05-A-2-4	2	4	SO	N	9/24/2018	94		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP05-A	OU2-TP05-A-2-5	2	5	SO	N	9/24/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-TP05-A	OU2-TP05-A-16-20 OR NAT	3.4	4.4	SO	N	9/24/2018	NA		NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
OU2-TP05-A	OU2-TP05-A-4-6	4	6	SO	N	9/24/2018	8.9		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP05-A	OU2-TP905-A-4-6	4	6	SO	FD	9/24/2018	9.9		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP05-A	OU2-TP05-A-5-8	5	8	SO	N	9/24/2018	NA		NA		ND	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
OU2-TP05-A	OU2-TP05-A-6-8	6	8	SO	N	9/24/2018	7.1	U	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP05-A	OU2-TP05-A-8-10	8	10	SO	N	9/24/2018	7.9		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP05-A	OU2-TP05-A-8-11	8	11	SO	N	9/24/2018	NA		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U
OU2-TP05-A	OU2-TP05-A-10-12	10	12	SO	N	9/24/2018	66	J	NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP05-A	OU2-TP05-A-11-16	11	16	SO	N	9/24/2018	NA		NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
OU2-TP05-A	OU2-TP05-A-12-14	12	14	SO	N	9/24/2018	29		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP05-A	OU2-TP05-A-14-16	14	16	SO	N	9/24/2018	24		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP05-A	OU2-TP05-A-16-18	16	17.7	SO	N	9/24/2018	59		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OU2-TP06	OU2-TP06-01	2	3.5	SO	N	6/29/2015	**46000**		NA		0.0793	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.033	J	0.0096	U	0.037		0.0096	U	0.0093	J
OU2-TP07	OU2-TP07-Z1	2	2.5	SO	N	7/14/2015	600		NA		2.69	0.011	U	0.011	U	0.011	U	1.1	J	0.011	U	1.1	J	0.33	J	0.011	U	0.16	J
OU2-TP07	OU2-TP07-Z2	2	4	SO	N	7/14/2015	580		NA		2.038	0.011	U	0.011	U	0.011	U	1.2	J	0.011	U	0.57	J	0.19		0.011	U	0.078	J
OU2-TP08	OU2-TP08-Z1	2	4.5	SO	N	7/14/2015	520		NA		0.442	0.002	U	0.002	U	0.002	U	0.26	J	0.002	U	0.11	J	0.044	J	0.002	U	0.028	J
OU2-TP09	OU2-TP09-Z1	2	3	SO	N	7/14/2015	760		NA		1.017	0.0026	U	0.0026	U	0.0026	U	0.53	J	0.0026	U	0.25	J	0.14	J	0.0026	U	0.097	J

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
OU2-TP09	OU2-TP09-Z2	2	6	SO	N	7/14/2015	650		NA		0.2887	0.0015	U	0.0015	U	0.0015	U	0.21	J	0.0015	U	0.059	J	0.012	J	0.0015	U	0.0077	J
SB-2A	SB-2A-8-10	8	10	SO	N	9/28/2018	24		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SB-2A	SB-2A-10-12	10	10.7	SO	N	9/28/2018	25		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L12-S01	18MC-L12-S01-Z1	1	1.6	SE	N	4/24/2007	513	J	NA		0.042	0.026	U	0.026	U	0.026	U	0.026	U	0.023	J	0.019	J	0.026	U	0.026	U	0.026	U
18MC-L12-S02	18MC-L12-S02-Z1	0.5	0.9	SE	N	4/24/2007	84	J	NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
18MC-L12-S03	18MC-L12-S03-Z1	0.8	1.7	SE	N	4/24/2007	**1110**		NA		0.22	0.029	U	0.029	U	0.029	U	0.029	U	0.12		0.1		0.029	U	0.029	U	0.029	U
18MC-L13-S01	18MC-L13-S01-Z1	0.8	1.5	SE	N	4/24/2007	155	J	NA		ND	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
18MC-L13-S02	18MC-L13-S02-Z1	0.5	1	SE	N	4/24/2007	176	J	NA		0.117	0.036	U	0.036	U	0.036	U	0.036	U	0.076		0.041		0.036	U	0.036	U	0.036	U
18MC-L13-S03	18MC-L13-S03-Z1	0.5	1	SE	N	4/24/2007	**3990**		NA		**46**	3.4	U	3.4	U	3.4	U	**46**		3.4	U	3.4	U	3.4	U	3.4	U	3.4	U
18MC-L14E-S01	18MC-L14E-S01-Z1	0.5	0.8	SE	N	4/24/2007	18.2	J	NA		0.196	0.021	U	0.021	U	0.021	U	0.021	U	0.096		0.1		0.021	U	0.021	U	0.021	U
18MC-L14E-S02	18MC-L14E-S02-Z1	0	2	SE	N	4/24/2007	**1430**	J	NA		**237**	31	U	31	U	31	U	31	U	**180**		**57**		31	U	31	U	31	U
18MC-L14E-S02	18MC-L14E-S02-Z2	1	1.5	SE	N	4/24/2007	709	J	NA		**142**	5.3	U	5.3	U	5.3	U	5.3	U	**57**		**85**		5.3	U	5.3	U	5.3	U
18MC-L14E-S03	18MC-L14E-S03-Z1	0.8	1.2	SE	N	4/24/2007	1000	J	NA		**59**	2.6	U	2.6	U	2.6	U	2.6	U	**41**		**18**		2.6	U	2.6	U	2.6	U
18MC-L14W-S01	18MC-L14W-S01-Z1	0.9	2	SE	N	4/24/2007	73.8	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L14W-S02	18MC-L14W-S02-Z1	0	2	SE	N	4/24/2007	11.3	J	NA		0.006	0.018	U	0.018	U	0.018	U	0.018	U	0.006	J	0.018	U	0.018	U	0.018	U	0.018	U
18MC-L14W-S03	18MC-L14W-S03-Z1	0.5	1.2	SE	N	4/24/2007	**1780**	J	NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-L14W-S03	18MC-L14W-S03-Z2	1.8	2.3	SE	N	4/24/2007	**1690**	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L15E-S01	18MC-L15E-S01-Z1	0.5	0.9	SE	N	4/24/2007	**1370**		NA		**29**	0.77	U	0.77	U	0.77	U	0.77	U	19	J	10	J	0.77	U	0.77	U	0.77	U
18MC-L15E-S01	18MC-L15E-S01-Z1/D	0.5	0.9	SE	FD	4/24/2007	999		NA		**12.7**	0.55	U	0.55	U	0.55	U	0.55	U	**7.5**	J	**5.2**	J	0.55	U	0.55	U	0.55	U
18MC-L15E-S02	18MC-L15E-S02-Z1	0	2	SE	N	4/24/2007	568		NA		**4.8**	0.13	U	0.13	U	0.13	U	0.13	U	**3.7**		**1.1**		0.13	U	0.13	U	0.13	U
18MC-L15E-S03	18MC-L15E-S03-Z1	0.5	1	SE	N	4/24/2007	**1850**		NA		**17.1**	0.57	U	0.57	U	0.57	U	0.57	U	**14**		**3.1**		0.57	U	0.57	U	0.57	U
18MC-L15W-S01	18MC-L15W-S01-Z1	0.3	1.2	SE	N	4/24/2007	356		NA		**1.4**	0.033	U	0.033	U	0.033	U	0.033	U	0.73		0.67		0.033	U	0.033	U	0.033	U
18MC-L15W-S03	18MC-L15W-S03-Z1	0.3	0.8	SE	N	4/24/2007	54.9		NA		0.118	0.021	U	0.021	U	0.021	U	0.021	U	0.032		0.086		0.021	U	0.021	U	0.021	U
18MC-L16E-S01	18MC-L16E-S01-Z1	0.4	1	SE	N	4/24/2007	**1140**		NA		**37.7**	1.6	U	1.6	U	1.6	U	**31**		1.6	U	**6.7**		1.6	U	1.6	U	1.6	U
18MC-L16E-S02	18MC-L16E-S02-Z1	0	0.5	SE	N	4/24/2007	323		NA		**5.8**	0.18	U	0.18	U	0.18	U	0.18	U	**4.3**		**1.5**		0.18	U	0.18	U	0.18	U
18MC-L16E-S03	18MC-L16E-S03-Z1	0.5	1	SE	N	4/24/2007	**2040**		NA		**8.7**	0.41	U	0.41	U	0.41	U	0.41	U	**5.9**		**2.8**		0.41	U	0.41	U	0.41	U
18MC-L16W-S01	18MC-L16W-S01-Z1	0.2	0.8	SE	N	4/24/2007	206		NA		**10.3**	0.65	U	0.65	U	0.65	U	0.65	U	**5.8**		**4.5**		0.65	U	0.65	U	0.65	U
18MC-L16W-S03	18MC-L16W-S03-Z1	0.5	1	SE	N	4/25/2007	62.7		NA		0.044	0.028	U	0.028	U	0.028	U	0.028	U	0.013	J	0.031		0.028	U	0.028	U	0.028	U
18MC-L17-S01	18MC-L17-S01-Z1	0.4	0.8	SE	N	4/25/2007	410	J	NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
18MC-L17-S02	18MC-L17-S02-Z1	0.5	1	SE	N	4/25/2007	235	J	NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
18MC-L17-S03	18MC-L17-S03-Z1	0.5	1	SE	N	4/25/2007	320		NA		0.41	0.022	U	0.022	U	0.022	U	0.022	U	0.14		0.13		0.14		0.022	U	0.022	U
18MC-L18-S01	18MC-L18-S01-Z1	0.3	0.9	SE	N	4/25/2007	43.9	J	NA		0.112	0.04	U	0.04	U	0.04	U	0.04	U	0.078		0.034	J	0.04	U	0.04	U	0.04	U
18MC-L18-S02	18MC-L18-S02-Z1	0.2	0.9	SE	N	4/25/2007	576	J	NA		**1.43**	0.061	U	0.061	U	0.061	U	**1.2**		0.061	U	0.23		0.061	U	0.061	U	0.061	U
18MC-L18-S02	18MC-L18-S02-Z2	1.2	1.8	SE	N	4/25/2007	32.6	J	NA		0.02	0.031	U	0.031	U	0.031	U	0.02	J	0.031	U	0.031	U	0.031	U	0.031	U	0.031	U
DEC-SED-27	SED-27	0	0.17	SE	N	9/15/2005	148	J	NA		0.672	0.19	UJ	0.19	UJ	0.19	UJ	0.19	UJ	0.4	J	0.24	J	0.032	J	NA		NA	
DEC-SED-27	SED-27B	0.25	0.75	SE	N	4/21/2005	229		NA		0.273	0.16	U	0.16	U	0.16	U	0.16	U	0.18		0.093	J	0.16	U	NA		NA	
DEC-SED-28	SED-28	0	0.17	SE	N	9/21/2005	**3040**		NA		**10.4**	5.9	U	5.9	U	5.9	U	5.9	U	**6.8**		**3.6**	J	5.9	U	NA		NA	
DEC-SED-28	SED-28B	0.67	0.92	SE	N	9/21/2005	**1240**	J	NA		**150**	68	U	68	U	68	U	68	U	**96**		**54**	J	68	U	NA		NA	
DEC-SED-29	SED-29	0	0.17	SE	N	9/21/2005	581	J	NA		**2.02**	0.5	U	0.5	U	0.5	U	0.5	U	**1.4**		0.62		0.5	U	NA		NA	
DEC-SED-29	SED-29B	0.25	0.5	SE	N	9/21/2005	**6840**		NA		**1.42**	0.61	U	0.61	U	0.61	U	0.61	U	1		0.42	J	0.61	U	NA		NA	
DEC-SED-30	SED-30	0	0.17	SE	N	9/15/2005	143		NA		0.168	0.15	U	0.15	U	0.15	U	0.15	U	0.1	J	0.068	J	0.15	U	NA		NA	
DEC-SED-30	SED-30B	0.17	0.58	SE	N	9/15/2005	43.7		NA		ND	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	NA		NA	
DEC-SED-32	SED-32	0	0.17	SE	N	9/15/2005	169	J	NA		0.42	0.19	UJ	0.19	UJ	0.19	UJ	0.19	UJ	0.27	J	0.15	J	0.19	UJ	NA		NA	
DEC-SED-32	SED-32B	0.25	0.42	SE	N	9/15/2005	171	J	NA		0.639	0.17	UJ	0.17	UJ	0.17	UJ	0.17	UJ	0.38	J	0.23	J	0.029	J	NA		NA	
DEC-SED-34	SED-34	0	0.17	SE	N	9/21/2005	146		NA		**49**	12	U	12	U	12	U	12	U	**25**		**24**		12	U	NA		NA	
DEC-SED-34	SED-34B	0.17	0.58	SE	N	9/21/2005	**1150**	J	NA		**390**	370	U	370	U	370	U	370	U	**280**	J	**110**	J	370	U	NA		NA	
DEC-SED-35	SED-35	0	0.17	SE	N	9/21/2005	94.2		NA		**6.5**	5.5	U	5.5	U	5.5	U	5.5	U	**6.5**		5.5	U	5.5	U	NA		NA	
DEC-SED-35	SED-35B	0.25	0.67	SE	N	9/21/2005	247		NA		**11.6**	14	U	14	U	14	U	14	U	**4.1**	J	**7.5**	J	14	U	NA		NA	
DEC-SED-37	SED-37	0	0.17	SE	N	9/21/2005	214		NA		**9**	2.9	U	2.9	U	2.9	U	2.9	U	**5.8**		**3.2**		2.9	U	NA		NA	
DEC-SED-37	SED-37BB	0.17	0.58	SE	N	9/21/2005	**1190**	J	NA		**66**	17	U	17	U	17	U	17	U	**35**		**31**		17	U	NA		NA	
DEC-SED-37	SED-37B	0.8	1	SE	N	4/26/2005	428	J	NA		**234**	82	UJ	82	UJ	82	UJ	82	UJ	**150**	J	**84**	J	82	UJ	NA		NA	
DEC-SED-38	SED-38	0	0.17	SE	N	9/22/2005	164	J	NA		**8.3**	3.5	U	3.5	U	3.5	U	3.5	U	**5.7**		**2.6**	J	3.5	U	NA		NA	
DEC-SED-38	SED-38B	0.25	0.75	SE	N	9/22/2005	291	J	NA		**8**	8.2	U	8.2	U	8.2	U	8.2	U	**8**	J	8.2	U	8.2	U	NA		NA	

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
DEC-SED-39	SED-39	0	0.17	SE	N	9/22/2005	179	J	NA		0.058	0.18	U	0.18	U	0.18	U	0.18	U	0.058	J	0.18	U	0.18	U	NA		NA	
DEC-SED-39	SED-39B	0.25	0.58	SE	N	9/22/2005	166		NA		0.51	0.28	U	0.28	U	0.28	U	0.51		0.28	U	0.28	U	0.28	U	NA		NA	
DEC-SED-40	SED-40	0	0.17	SE	N	9/22/2005	224		NA		2.2	0.53	UJ	0.53	UJ	0.53	UJ	0.53	UJ	1.4	J	0.8	J	0.53	UJ	NA		NA	
DEC-SED-40	SED-40B	0.17	0.5	SE	N	9/22/2005	951		NA		24.3	11	U	11	U	11	U	11	U	15		9.3	J	11	U	NA		NA	
DEC-SED-42	SED-42	0	0.17	SE	N	9/15/2005	291		NA		0.196	0.15	U	0.15	U	0.15	U	0.15	U	0.13	J	0.066	J	0.15	U	NA		NA	
DEC-SED-43	SED-43	0	0.17	SE	N	9/15/2005	434	J	NA		1.665	0.2	UJ	0.2	UJ	0.2	UJ	1.1	J	0.2	UJ	0.47	J	0.095	J	NA		NA	
DEC-SED-43	SED-43B	0.25	0.75	SE	N	9/15/2005	582	J	NA		7.49	3.4	UJ	3.4	UJ	3.4	UJ	6.5	J	3.4	UJ	0.99	J	3.4	UJ	NA		NA	
DEC-SED-6	SED-6	0	0.17	SE	N	7/23/2002	2860		NA		3.5	1.2	U	1.2	U	1.2	U	1.2	U	1.8		1.7		1.2	U	NA		NA	
FS-SED-1	FS-EMC01-SED-O	0	0.167	SE	N	9/11/2003	199		NA		ND	6.1	U	12	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	NA		NA	
FS-SS02-SED	FS-SS02-SED-O			SE	N	9/11/2003	NA		NA		0.51	0.34	U	0.34	U	0.34	U	0.24	J	0.34	U	0.16	J	0.11	J	NA		NA	
OU2-SED01	OU2-SED01-Z1	0	0.5	SE	N	5/26/2015	450 310	J J	NA		14.6	0.024	U	0.024	UJ	0.024	UJ	0.024	UJ	5.5		7.6		1.5	J	0.024	UJ	0.024	UJ
OU2-SED06	OU2-SED06-Z1	0	6	SE	N	1/26/2016	333		NA		ND	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U
OU2-SED07	OU2-SED07-Z1	0	6	SE	N	1/26/2016	792		NA		0.206	0.063	U	0.063	U	0.063	U	0.063	U	0.096		0.063	U	0.11		0.063	U	0.063	U
OU2-SED08	OU2-SED08-Z1	0	0.5	SE	N	1/26/2016	399		NA		1.8	0.082	U	0.082	U	0.082	U	0.082	U	0.83		0.66		0.31		0.082	U	0.082	U
TRK-C-06-SD	TRK-C-06-SD-A	0	0.4	SE	N	8/24/2006	246		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	NA		NA	
TRK-C-06-SD	TRK-C-06-SD-B	0.42	0.83	SE	N	8/24/2006	NA		NA		0.91	0.039	U	0.039	U	0.039	U	0.039	U	0.47		0.44		0.039	U	NA		NA	
TRK-C-06-SD	TRK-C-06-SD-C	0.83	1.25	SE	N	8/24/2006	NA		NA		0.012	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.012	J	0.022	U	NA		NA	
TRK-C-07-SD	TRK-C-07-SD-A	0	0.4	SE	N	8/24/2006	531		NA		14.3	2.3	U	2.3	U	2.3	U	2.3	U	6		7.3		1	J	NA		NA	
TRK-C-07-SD	TRK-C-07-SD-B	0.42	0.83	SE	N	8/24/2006	NA		NA		25.9	1.2	U	1.2	U	1.2	U	1.2	U	9.9		16		1.2	U	NA		NA	
TRK-C-07-SD	TRK-C-07-SD-C	0.83	1.25	SE	N	8/24/2006	NA		NA		50	3.1	U	3.1	U	3.1	U	3.1	U	17		33		3.1	U	NA		NA	
TRK-S01-SD	TRK-S01-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.17	0.3	U	0.3	U	0.3	U	0.3	U	0.17	J	0.3	U	0.3	U	NA		NA	
TRK-S02-SD	TRK-S02-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.23	0.19	U	0.19	U	0.19	U	0.19	U	0.23		0.19	U	0.19	U	NA		NA	
TRK-S03-SD	TRK-S03-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		ND	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	NA		NA	
TRK-S04-SD	TRK-S04-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		ND	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	NA		NA	
TRK-S05-SD	TRK-S05-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		ND	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	NA		NA	
TRK-S06-SD	TRK-S06-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.51	0.15	U	0.15	U	0.15	U	0.15	U	0.37		0.14	J	0.15	U	NA		NA	
TRK-S07-SD	TRK-S07-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.5	0.12	U	0.12	U	0.12	U	0.12	U	0.3		0.2		0.12	U	NA		NA	
TRK-S08-SD	TRK-S08-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.12	0.11	U	0.11	U	0.11	U	0.11	U	0.12		0.11	U	0.11	U	NA		NA	
TRK-S09-SD	TRK-S09-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.272	0.14	U	0.14	U	0.14	U	0.14	U	0.19		0.082	J	0.14	U	NA		NA	
TRK-S10-SD	TRK-S10-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.83	0.13	U	0.13	U	0.13	U	0.13	U	0.58		0.25		0.13	U	NA		NA	

Table A-5
Analytical Results – Former Flintkote Plant Property
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	LEAD		LEAD (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Criteria	1000		5			1		1		1		1		1		1		1		1		1	
						Subsurface Soil Criteria	1000		5			10		10		10		10		10		10		10		10		10	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
TRK-S11-SD	TRK-S11-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		1	0.16	U	0.16	U	0.16	U	0.16	U	1		0.16	U	0.16	U	NA		NA	
TRK-S74-SD	TRK-S74-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		ND	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	NA		NA	
TRK-S75-SD	TRK-S75-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		1	0.15	U	0.15	U	0.15	U	0.15	U	1		0.15	U	0.15	U	NA		NA	
TRK-S76-SD	TRK-S76-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		0.33	0.13	U	0.13	U	0.13	U	0.13	U	0.33		0.13	U	0.13	U	NA		NA	
TRK-S77-SD	TRK-S77-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		0.274	0.11	U	0.11	U	0.11	U	0.11	U	0.22		0.054	J	0.11	U	NA		NA	

Notes:
All depths are in feet below ground surface
Highlighted and bolded values exceeded the remediation goals
Surface soil have depths less than 2 feet bgs
Subsurface soil have depths greater than 2 feet bgs
Surface and subsurface criteria come from the record of decision
1. sample is considered as sediment
Abbreviations:
CAS No. - Chemical Abstracts Service number
FD - field duplicate
mg/L - milligram/liter
mg/kg - milligram/kilogram
N - normal/field sample
NA - not analyzed
ND - not detected
PCBs - polychlorinated biphenyls
SO- soil
SE - sediment
TCLP - Toxicity Characteristic Leaching Procedure
Q - qualifier
J - The analyte was detected; however, the reported contract required quantitation limit (CRQL) is approximate and may be inaccurate or imprecise.

JN - There is presumptive evidence that the analyte is present; the analyte is reported as a tentative identification.
J+ - The identification of the analyte is acceptable; the reported value may be biased high.
U - The analyte was not detected at or above the reporting limit.
UJ - The analyte was not detected at or above the Reporting Limit. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table A-6
Analytical Results – Sediment
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample		Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-AS-S01	18MC-AS-S01-Z1	0	0.167	SE	N	4/25/2007	148		NA		0.051	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.051		0.02	U	0.02	U	0.02	U
18MC-AS-S01	18MC-AS-S01-Z2	0.8	1.5	SE	N	4/25/2007	62.8		NA		0.012	0.021	U	0.021	U	0.021	U	0.021	U	0.012	J	0.021	U	0.021	U	0.021	U	0.021	U
18MC-BC01	18MC-BC01-Z1	0	0.167	SE	N	6/14/2007	33.1	J	NA		0.0066	0.022	U	0.022	U	0.022	U	0.022	U	0.0066	J	0.022	U	0.022	U	0.022	U	0.022	U
18MC-BC02	18MC-BC02-Z1	0	0.167	SE	N	6/14/2007	38.6	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-BC03	18MC-BC03-Z1	0	0.167	SE	N	6/15/2007	169	J	NA		0.76	0.05	U	0.05	U	0.05	U	0.05	U	0.76	J	0.05	U	0.05	U	0.05	U	0.05	U
18MC-BC03	18MC-BC03-Z1/D	0	0.167	SE	FD	6/15/2007	67.9	J	NA		**1.7**	1	U	1	U	1	U	1	U	**1.7**	J	1	U	1	U	1	U	1	U
18MC-BC04	18MC-BC04-Z1	0	0.167	SE	N	6/14/2007	64.7	J	NA		**2.63**	0.38	U	0.38	U	0.38	U	0.38	U	**2.5**		0.38	U	0.13	J	0.38	U	0.38	U
18MC-BC05	18MC-BC05-Z1	0	0.167	SE	N	6/15/2007	38.2	J	NA		0.015	0.021	U	0.021	U	0.021	U	0.021	U	0.015	J	0.021	U	0.021	U	0.021	U	0.021	U
18MC-BC06	18MC-BC06-Z1	0	0.167	SE	N	6/13/2007	190	J	NA		0.84	0.11	U	0.11	U	0.11	U	0.11	U	0.84		0.11	U	0.11	U	0.11	U	0.11	U
18MC-L01E-S01	18MC-L01E-S01-Z1	0	0.167	SE	N	4/20/2007	145	J	NA		0.035	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.035		0.02	U	0.02	U	0.02	U
18MC-L01E-S03	18MC-L01E-S03-Z1	0	0.167	SE	N	4/20/2007	113	J	NA		0.026	0.021	U	0.021	U	0.021	U	0.021	U	0.026		0.021	U	0.021	U	0.021	U	0.021	U
18MC-L01E-S03	18MC-L01E-S03-Z2	0.5	1.2	SE	N	4/20/2007	170	J	NA		0.183	0.018	U	0.018	U	0.018	U	0.018	U	0.053		0.13		0.018	U	0.018	U	0.018	U
18MC-L01W-S01	18MC-L01W-S01-Z1	0	0.167	SE	N	4/18/2007	411		NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L01W-S01	18MC-L01W-S01-Z2	0.5	1	SE	N	4/18/2007	127		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L01W-S02	18MC-L01W-S02-Z1	0	0.167	SE	N	4/18/2007	412		NA		0.045	0.02	U	0.02	U	0.02	U	0.02	U	0.045		0.02	U	0.02	U	0.02	U	0.02	U
18MC-L01W-S02	18MC-L01W-S02-Z2	1	2	SE	N	4/18/2007	1660		NA		0.0069	0.021	U	0.021	U	0.021	U	0.021	U	0.0069	J	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L01W-S03	18MC-L01W-S03-Z1	0.3	1	SE	N	4/18/2007	227		NA		0.1	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.1		0.019	U	0.019	U	0.019	U
18MC-L02E-S01	18MC-L02E-S01-Z1	0.8	1.5	SE	N	4/20/2007	807	J	NA		**3.8**	0.11	U	0.11	U	0.11	U	0.11	U	**1.5**		**2.3**		0.11	U	0.11	U	0.11	U
18MC-L02E-S02	18MC-L02E-S02-Z1	0	0.5	SE	N	4/20/2007	176	J	NA		0.032	0.017	U	0.017	U	0.017	U	0.017	U	0.016	J	0.016	J	0.017	U	0.017	U	0.017	U
18MC-L02E-S03	18MC-L02E-S03-Z1	0.5	1	SE	N	4/20/2007	166	J	NA		0.034	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.01	J	0.024		0.018	U	0.018	U
18MC-L02W-S01	18MC-L02W-S01-Z1	1	2	SE	N	4/18/2007	88.8		NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-L02W-S01	18MC-L02W-S01-Z2	2	3.2	SE	N	4/18/2007	204		NA		ND	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U
18MC-L02W-S02	18MC-L02W-S02-Z1	0	2	SE	N	4/18/2007	951	J	NA		0.013	0.019	U	0.019	U	0.019	U	0.019	U	0.013	J	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L02W-S02	18MC-L02W-S02-Z2	1	2	SE	N	4/18/2007	62.6	J	NA		ND	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U
18MC-L02W-S02	18MC-L02W-S02-Z2/D	1	2	SE	FD	4/18/2007	138	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L02W-S03	18MC-L02W-S03-Z1	0	2	SE	N	4/18/2007	87		NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L02W-S03	18MC-L02W-S03-Z2	3.2	4	SE	N	4/18/2007	28.9		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L03E-S01	18MC-L03E-S01-Z1	0.5	1.5	SE	N	4/20/2007	175	J	NA		0.235	0.02	U	0.02	U	0.02	U	0.02	U	0.039		0.096		0.1		0.02	U	0.02	U
18MC-L03E-S02	18MC-L03E-S02-Z1	0	2	SE	N	4/20/2007	592	J	NA		0.72	0.023	U	0.023	U	0.023	U	0.023	U	0.32		0.28		0.12		0.023	U	0.023	U
18MC-L03E-S03	18MC-L03E-S03-Z1	0.7	1.7	SE	N	4/20/2007	202	J	NA		0.098	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.067		0.031		0.021	U	0.021	U
18MC-L03E-S03	18MC-L03E-S03-Z1/D	0.7	1.7	SE	FD	4/20/2007	165	J	NA		0.091	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.052		0.039		0.021	U	0.021	U
18MC-L03W-S01	18MC-L03W-S01-Z1	0.8	1.8	SE	N	4/19/2007	552	J	NA		0.73	0.049	U	0.049	U	0.049	U	0.049	U	0.73		0.049	U	0.049	U	0.049	U	0.049	U
18MC-L03W-S02	18MC-L03W-S02-Z1	0	2	SE	N	4/19/2007	75.1	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L03W-S03	18MC-L03W-S03-Z1	2	3	SE	N	4/19/2007	232	J	NA		0.153	0.024	U	0.024	U	0.024	U	0.024	U	0.034		0.048		0.071		0.024	U	0.024	U
18MC-L04W-S01	18MC-L04W-S01-Z1	0.5	1.5	SE	N	4/19/2007	220	J	NA		0.061	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.061		0.028	U	0.028	U	0.028	U
18MC-L04W-S02	18MC-L04W-S02-Z1	0	2	SE	N	4/20/2007	292	J	NA		0.146	0.024	U	0.024	U	0.024	U	0.024	U	0.055		0.045		0.046		0.024	U	0.024	U
18MC-L04W-S02	18MC-L04W-S02-Z2	1	2	SE	N	4/20/2007	79.6	J	NA		ND	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
18MC-L04W-S03	18MC-L04W-S03-Z1	1	2	SE	N	4/20/2007	46.7	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L05W-S01	18MC-L05W-S01-Z1	1	2	SE	N	4/19/2007	198	J	NA		0.126	0.026	U	0.026	U	0.026	U	0.026	U	0.064		0.062		0.026	U	0.026	U	0.026	U
18MC-L05W-S02	18MC-L05W-S02-Z1	0	2	SE	N	4/19/2007	159	J	NA		0.07	0.021	U	0.021	U	0.021	U	0.021	U	0.042		0.028		0.021	U	0.021	U	0.021	U
18MC-L05W-S02	18MC-L05W-S02-Z2	1.5	3	SE	N	4/19/2007	183	J	NA		0.34	0.025	U	0.025	U	0.025	U	0.025	U	0.18		0.16		0.025	U	0.025	U	0.025	U
18MC-L05W-S03	18MC-L05W-S03-Z1	0	0.5	SE	N	4/19/2007	857	J	NA		0.33	0.028	U	0.028	U	0.028	U	0.028	U	0.028	U	0.33		0.028	U	0.028	U	0.028	U
18MC-L05W-S03	18MC-L05W-S03-Z2	1	1.5	SE	N	4/19/2007	459	J	NA		0.14	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.14		0.027	U	0.027	U	0.027	U
18MC-L05W-S03	18MC-L05W-S03-Z3	2	2.5	SE	N	4/19/2007	173	J	NA		0.034	0.028	U	0.028	U	0.028	U	0.028	U	0.011	J	0.023	J	0.028	U	0.028	U	0.028	U
18MC-L06-S01	18MC-L06-S01-Z1	1	1.5	SE	N	4/23/2007	368		NA		ND	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U
18MC-L06-S02	18MC-L06-S02-Z1	0	2	SE	N	4/19/2007	31.9	J	NA		0.047	0.024	U	0.024	U	0.024	U	0.024	U	0.027		0.02	J	0.024	U	0.024	U	0.024	U
18MC-L06-S02	18MC-L06-S02-Z2	1	2	SE	N	4/19/2007	61.3	J	NA		0.87	0.02	U	0.02	U	0.02	U	0.02	U	0.22		0.02	U	0.65		0.02	U	0.02	U
18MC-L06-S03	18MC-L06-S03-Z1	0.5	1.2	SE	N	4/19/2007	88.5	J	NA		0.084	0.02	U	0.02	U	0.02	U	0.02	U	0.049		0.035		0.02	U	0.02	U	0.02	U
18MC-L06-S03	18MC-L06-S03-Z1/D	0.5	1.2	SE	FD	4/19/2007	170	J	NA		0.071	0.021	U	0.021	U	0.021	U	0.021	U	0.037		0.034		0.021	U	0.021	U	0.021	U
18MC-L06-S03	18MC-L06-S03-Z2	1.5	2.5	SE	N	4/19/2007	125	J	NA		0.09	0.022	U	0.022	U	0.022	U	0.022	U	0.056		0.034		0.022	U	0.022	U	0.022	U
18MC-L07-S01	18MC-L07-S01-Z1	3	3.5	SE	N	4/23/2007	323		NA		0.33	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.1		0.23		0.026	U	0.026	U
18MC-L07-S01	18MC-L07-S01-Z1/D	3	3.5	SE	FD	4/23/2007	280		NA		0.234	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U	0.074		0.16		0.025	U	0.025	U
18MC-L07-S02	18MC-L07-S02-Z1	0	0.8	SE	N	4/23/2007	408		NA		**23**	3.2	U	3.2	U	3.2	U	3.2	U	**23**		3.2	U	3.2	U	3.2	U	3.2	U

Table A-6
Analytical Results – Sediment
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample		Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
18MC-L07-S03	18MC-L07-S03-Z1	1.5	2.5	SE	N	4/23/2007	628		NA		0.76	0.036	U	0.036	U	0.036	U	0.036	U	0.37		0.39		0.036	U	0.036	U	0.036	U
18MC-L08-S01	18MC-L08-S01-Z1	0.5	1.5	SE	N	4/23/2007	658		NA		ND	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U
18MC-L08-S02	18MC-L08-S02-Z1	0.4	1	SE	N	4/23/2007	46.4		NA		0.04	0.026	U	0.026	U	0.026	U	0.026	U	0.024	J	0.016	J	0.026	U	0.026	U	0.026	U
18MC-L08-S03	18MC-L08-S03-Z1	0.5	1.5	SE	N	4/23/2007	284		NA		**35**	1.3	U	1.3	U	1.3	U	1.3	U	**35**		1.3	U	1.3	U	1.3	U	1.3	U
18MC-L09-S01	18MC-L09-S01-Z1	0.5	1.2	SE	N	4/23/2007	1470		NA		**33**	2.1	U	2.1	U	2.1	U	**33**		2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
18MC-L09-S02	18MC-L09-S02-Z1	0	2	SE	N	4/23/2007	526		NA		**10.9**	1.3	U	1.3	U	1.3	U	**8.8**		1.3	U	**2.1**		1.3	U	1.3	U	1.3	U
18MC-L09-S02	18MC-L09-S02-Z2	0.8	1.5	SE	N	4/23/2007	213		NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L09-S03	18MC-L09-S03-Z1	1.5	2.5	SE	N	4/23/2007	15000		NA		**61**	2.3	U	2.3	U	2.3	U	2.3	U	**41**		**20**		2.3	U	2.3	U	2.3	U
18MC-L10-S01	18MC-L10-S01-Z1	0.5	1.5	SE	N	4/23/2007	1070		NA		**2.75**	0.14	U	0.14	U	0.14	U	0.14	U	**1.9**		0.85		0.14	U	0.14	U	0.14	U
18MC-L10-S01	18MC-L10-S01-Z1/D	0.5	1.5	SE	FD	4/23/2007	792		NA		**1.83**	0.049	U	0.049	U	0.049	U	0.049	U	**1.2**		0.63		0.049	U	0.049	U	0.049	U
18MC-L10-S03	18MC-L10-S03-Z1	0.5	0.9	SE	N	4/23/2007	737		NA		0.56	0.027	U	0.027	U	0.027	U	0.027	U	0.26		0.3		0.027	U	0.027	U	0.027	U
18MC-L11-S01	18MC-L11-S01-Z1	1	1.6	SE	N	4/24/2007	920	J	NA		**1.65**	0.14	U	0.14	U	0.14	U	0.14	U	1		0.65		0.14	U	0.14	U	0.14	U
18MC-L11-S02	18MC-L11-S02-Z1	0.5	0.9	SE	N	4/24/2007	2530	J	NA		0.377	0.029	U	0.029	U	0.029	U	0.029	U	0.28		0.097		0.029	U	0.029	U	0.029	U
18MC-L11-S03	18MC-L11-S03-Z1	0.5	0.8	SE	N	4/24/2007	98.3	J	NA		0.592	0.024	U	0.024	U	0.024	U	0.024	U	0.5		0.092		0.024	U	0.024	U	0.024	U
18MC-L12-S01	18MC-L12-S01-Z1	1	1.6	SE	N	4/24/2007	513	J	NA		0.042	0.026	U	0.026	U	0.026	U	0.026	U	0.023	J	0.019	J	0.026	U	0.026	U	0.026	U
18MC-L12-S02	18MC-L12-S02-Z1	0.5	0.9	SE	N	4/24/2007	84	J	NA		ND	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
18MC-L12-S03	18MC-L12-S03-Z1	0.8	1.7	SE	N	4/24/2007	1110		NA		0.22	0.029	U	0.029	U	0.029	U	0.029	U	0.12		0.1		0.029	U	0.029	U	0.029	U
18MC-L13-S01	18MC-L13-S01-Z1	0.8	1.5	SE	N	4/24/2007	155	J	NA		ND	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
18MC-L13-S02	18MC-L13-S02-Z1	0.5	1	SE	N	4/24/2007	176	J	NA		0.117	0.036	U	0.036	U	0.036	U	0.036	U	0.076		0.041		0.036	U	0.036	U	0.036	U
18MC-L13-S03	18MC-L13-S03-Z1	0.5	1	SE	N	4/24/2007	3990		NA		**46**	3.4	U	3.4	U	3.4	U	**46**		3.4	U	3.4	U	3.4	U	3.4	U	3.4	U
18MC-L14E-S01	18MC-L14E-S01-Z1	0.5	0.8	SE	N	4/24/2007	18.2	J	NA		0.196	0.021	U	0.021	U	0.021	U	0.021	U	0.096		0.1		0.021	U	0.021	U	0.021	U
18MC-L14E-S02	18MC-L14E-S02-Z1	0	2	SE	N	4/24/2007	1430	J	NA		**237**	31	U	31	U	31	U	31	U	**180**		**57**		31	U	31	U	31	U
18MC-L14E-S02	18MC-L14E-S02-Z2	1	1.5	SE	N	4/24/2007	709	J	NA		**142**	5.3	U	5.3	U	5.3	U	5.3	U	**57**		**85**		5.3	U	5.3	U	5.3	U
18MC-L14E-S03	18MC-L14E-S03-Z1	0.8	1.2	SE	N	4/24/2007	1000	J	NA		**59**	2.6	U	2.6	U	2.6	U	2.6	U	**41**		**18**		2.6	U	2.6	U	2.6	U
18MC-L14W-S01	18MC-L14W-S01-Z1	0.9	2	SE	N	4/24/2007	73.8	J	NA		ND	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
18MC-L14W-S02	18MC-L14W-S02-Z1	0	2	SE	N	4/24/2007	11.3	J	NA		0.006	0.018	U	0.018	U	0.018	U	0.018	U	0.006	J	0.018	U	0.018	U	0.018	U	0.018	U
18MC-L14W-S03	18MC-L14W-S03-Z1	0.5	1.2	SE	N	4/24/2007	1780	J	NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-L14W-S03	18MC-L14W-S03-Z2	1.8	2.3	SE	N	4/24/2007	1690	J	NA		ND	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
18MC-L15E-S01	18MC-L15E-S01-Z1	0.5	0.9	SE	N	4/24/2007	1370		NA		**29**	0.77	U	0.77	U	0.77	U	0.77	U	**19**	J	**10**	J	0.77	U	0.77	U	0.77	U
18MC-L15E-S01	18MC-L15E-S01-Z1/D	0.5	0.9	SE	FD	4/24/2007	999		NA		**12.7**	0.55	U	0.55	U	0.55	U	0.55	U	**7.5**	J	**5.2**	J	0.55	U	0.55	U	0.55	U
18MC-L15E-S02	18MC-L15E-S02-Z1	0	2	SE	N	4/24/2007	568		NA		**4.8**	0.13	U	0.13	U	0.13	U	0.13	U	**3.7**		**1.1**		0.13	U	0.13	U	0.13	U
18MC-L15E-S03	18MC-L15E-S03-Z1	0.5	1	SE	N	4/24/2007	1850		NA		**17.1**	0.57	U	0.57	U	0.57	U	0.57	U	**14**		**3.1**		0.57	U	0.57	U	0.57	U
18MC-L15W-S01	18MC-L15W-S01-Z1	0.3	1.2	SE	N	4/24/2007	356		NA		**1.4**	0.033	U	0.033	U	0.033	U	0.033	U	0.73		0.67		0.033	U	0.033	U	0.033	U
18MC-L15W-S03	18MC-L15W-S03-Z1	0.3	0.8	SE	N	4/24/2007	54.9		NA		0.118	0.021	U	0.021	U	0.021	U	0.021	U	0.032		0.086		0.021	U	0.021	U	0.021	U
18MC-L16E-S01	18MC-L16E-S01-Z1	0.4	1	SE	N	4/24/2007	1140		NA		**37.7**	1.6	U	1.6	U	1.6	U	**31**		1.6	U	**6.7**		1.6	U	1.6	U	1.6	U
18MC-L16E-S02	18MC-L16E-S02-Z1	0	0.5	SE	N	4/24/2007	323		NA		**5.8**	0.18	U	0.18	U	0.18	U	0.18	U	**4.3**		**1.5**		0.18	U	0.18	U	0.18	U
18MC-L16E-S03	18MC-L16E-S03-Z1	0.5	1	SE	N	4/24/2007	2040		NA		**8.7**	0.41	U	0.41	U	0.41	U	0.41	U	**5.9**		**2.8**		0.41	U	0.41	U	0.41	U
18MC-L16E-S03A	18MC-L16E-S03A-2-3	2	3	SO	N	9/13/2018	NA		NA		ND	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U	0.073	U
18MC-L16E-S03A	18MC-L16E-S03A-2-3 OR	2	3	SO	N	9/13/2018	2900		1.4	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
18MC-L16W-S01	18MC-L16W-S01-Z1	0.2	0.8	SE	N	4/24/2007	206		NA		**10.3**	0.65	U	0.65	U	0.65	U	0.65	U	**5.8**		**4.5**		0.65	U	0.65	U	0.65	U
18MC-L16W-S03	18MC-L16W-S03-Z1	0.5	1	SE	N	4/25/2007	62.7		NA		0.044	0.028	U	0.028	U	0.028	U	0.028	U	0.013	J	0.031		0.028	U	0.028	U	0.028	U
18MC-L17-S01	18MC-L17-S01-Z1	0.4	0.8	SE	N	4/25/2007	410	J	NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
18MC-L17-S02	18MC-L17-S02-Z1	0.5	1	SE	N	4/25/2007	235	J	NA		ND	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
18MC-L17-S03	18MC-L17-S03-Z1	0.5	1	SE	N	4/25/2007	320		NA		0.41	0.022	U	0.022	U	0.022	U	0.022	U	0.14		0.13		0.14		0.022	U	0.022	U
18MC-L18-S01	18MC-L18-S01-Z1	0.3	0.9	SE	N	4/25/2007	43.9	J	NA		0.112	0.04	U	0.04	U	0.04	U	0.04	U	0.078		0.034	J	0.04	U	0.04	U	0.04	U
18MC-L18-S02	18MC-L18-S02-Z1	0.2	0.9	SE	N	4/25/2007	576	J	NA		**1.43**	0.061	U	0.061	U	0.061	U	**1.2**		0.061	U	0.23		0.061	U	0.061	U	0.061	U
18MC-L18-S02	18MC-L18-S02-Z2	1.2	1.8	SE	N	4/25/2007	32.6	J	NA		0.02	0.031	U	0.031	U	0.031	U	0.02	J	0.031	U	0.031	U	0.031	U	0.031	U	0.031	U
18MC-UP-S01	18MC-UP-S01-Z1	0.1	0.8	SE	N	4/25/2007	33.5		NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
18MC-UP-S01	18MC-UP-S01-Z2	1.1	1.8	SE	N	4/25/2007	8.6		NA		ND	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
BC-L02-S01	BC-L02-S01-Z1	0	0.167	SE	N	12/6/2008	387	J	NA		**27.5**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**25**		0.0035	U	**2.5**	J	0.0035	U	0.0035	U
BC-L02-S01	BC-L02-S01-Z2	0.167	0.333	SE	N	12/6/2008	204	J	NA		**2.41**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**1.6**		0.81		0.0035	U	0.0035	U	0.0035	U
BC-L02-S02	BC-L02-S02-Z1	0	0.167	SE	N	12/6/2008	242	J	NA		**8.1**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**2.5**		**4.2**		**1.4**		0.0035	U	0.0035	U
BC-L02-S02	BC-L02-S02-Z2	0.167	0.5	SE	N	12/6/2008	121	J	NA		**1.4**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**1.2**		0.0035	U	0.2		0.0035	U	0.0035	U
BC-L02-S02	BC-L02-S02-Z2/D	0.167	0.5	SE	FD	12/6/2008	149	J	NA		**4.97**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**2.8**	J	**1.8**	J	0.37	J	0.0035	U	0.0035	U
BC-L02-S03	BC-L02-S03-Z1	0	0.167	SE	N	12/6/2008	40.3	J	NA		0.42	0.0033	U	0.0033	U	0.0033	U	0.0036	U	0.3		0.12		0.0035	U	0.0035	U	0.0035	U

Table A-6
Analytical Results – Sediment
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample		Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
BC-L02-S03	BC-L02-S03-Z2	0.167	1	SE	N	12/6/2008	34.1	J	NA		0.323	0.0033	U	0.0033	U	0.0033	U	0.0036	U	0.19		0.09		0.043		0.0035	U	0.0035	U
BC-L03-S01	BC-L03-S01-Z1	0	0.167	SE	N	12/6/2008	149	J	NA		0.0674	0.0033	U	0.0033	U	0.0033	U	0.0036	U	0.04		0.022		0.0054	J	0.0035	U	0.0035	U
BC-L03-S01	BC-L03-S01-Z2	0.167	3.167	SE	N	12/6/2008	38.9	J	NA		0.202	0.0033	U	0.0033	U	0.0033	U	0.0036	U	0.16		0.042		0.0035	U	0.0035	U	0.0035	U
BC-L03-S02	BC-L03-S02-Z1	0	0.167	SE	N	12/6/2008	88	J	NA		0.44	0.0033	U	0.0033	U	0.0033	U	0.0036	U	0.28		0.16		0.0035	U	0.0035	U	0.0035	U
BC-L03-S02	BC-L03-S02-Z2	0.167	1.583	SE	N	12/6/2008	51.6	J	NA		0.42	0.0033	U	0.0033	U	0.0033	U	0.0036	U	0.3		0.12		0.0035	U	0.0035	U	0.0035	U
BC-L03-S03	BC-L03-S03-Z1	0	0.167	SE	N	12/6/2008	68.3	J	NA		**1.2**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**1.2**		0.0035	U	0.0035	U	0.0035	U	0.0035	U
BC-L03-S03	BC-L03-S03-Z2	0.167	2.917	SE	N	12/6/2008	165	J	NA		**6.2**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**4**		**2.2**		0.0035	U	0.0035	U	0.0035	U
BC-L04-S01	BC-L04-S01-Z1	0	0.167	SE	N	12/6/2008	106	J	NA		**15.3**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**6**		**9.3**		0.0035	U	0.0035	U	0.0035	U
BC-L04-S01	BC-L04-S01-Z2	0.167	0.417	SE	N	12/6/2008	88.2	J	NA		0.81	0.0033	U	0.0033	U	0.0033	U	0.0036	U	0.54		0.27		0.0035	U	0.0035	U	0.0035	U
BC-L04-S02	BC-L04-S02-Z1	0	0.167	SE	N	12/5/2008	69.5		NA		**108.6**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**56**		**47**		**5.6**	J	0.0035	U	0.0035	U
BC-L04-S02	BC-L04-S02-Z1A	0	0.167	SE	N	12/5/2008	50.6		NA		**8.06**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**5.1**		**2.3**		0.66	J	0.0035	U	0.0035	U
BC-L04-S02	BC-L04-S02-Z1B	0	0.167	SE	N	12/5/2008	97		NA		**17**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**9.6**		**6.2**		**1.2**	J	0.0035	U	0.0035	U
BC-L04-S02	BC-L04-S02-Z1C	0	0.167	SE	N	12/5/2008	72.2		NA		**64**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**30**		**29**		**5**	J	0.0035	U	0.0035	U
BC-L04-S02	BC-L04-S02-Z1D	0	0.167	SE	N	12/5/2008	3.3	J	NA		0.096	0.0033	U	0.0033	U	0.0033	U	0.0036	U	0.074		0.022		0.0035	U	0.0035	U	0.0035	U
BC-L04-S02	BC-L04-S02-Z2	0.167	0.417	SE	N	12/6/2008	161	J	NA		**16.6**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**10**		**6.6**		0.0035	U	0.0035	U	0.0035	U
BC-L04-S02	BC-L04-S02-Z2/D	0.167	0.417	SE	FD	12/6/2008	149	J	NA		**4.97**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**2.8**		**1.8**		0.37	J	0.0035	U	0.0035	U
BC-L04-S03	BC-L04-S03-Z1	0	0.167	SE	N	12/6/2008	123	J	NA		**5.28**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**2.7**		**2**		0.58		0.0035	U	0.0035	U
BC-L04-S03	BC-L04-S03-Z2	0.167	0.167	SE	N	12/6/2008	138	J	NA		**41**	0.0033	U	0.0033	U	0.0033	U	0.0036	U	**19**		**17**		**5**		0.0035	U	0.0035	U
BG1-SED01	BG1-SED01_5/21/2015	0	0.5	SE	N	5/21/2015	2930		NA		0.0366	0.0061	U	0.0061	U	0.0061	U	0.0061	U	0.027	J	0.0061	U	0.0096		0.0061	U	0.0061	U
BG1-SED02	BG1-SED02_5/22/2015	0	0.5	SE	N	5/22/2015	27	J	NA		0.047	0.0063	U	0.0063	U	0.0063	UJ	0.0063	U	0.026	J	0.021	J	0.0063	UJ	0.0063	UJ	0.0063	UJ
BG1-SED03	BG1-SED03_5/22/2015	0	0.5	SE	N	5/22/2015	25	J	NA		0.0504	0.0051	UJ	0.0051	U	0.0051	UJ	0.0051	U	0.029	J	0.02	J	0.0051	UJ	0.0051	UJ	0.0014	J
BG1-SED04	BG1-SED04_5/22/2015	0	0.5	SE	N	5/22/2015	54	J	NA		0.3449	0.0051	UJ	0.0051	U	0.0051	UJ	0.0051	U	0.23	J	0.11	J	0.0051	UJ	0.0051	UJ	0.0049	J
BG1-SED05	BG1-SED05_5/22/2015	0	0.5	SE	N	5/22/2015	92	J	NA		0.0883	0.0046	UJ	0.0046	U	0.0046	UJ	0.0046	U	0.044	J+	0.036	J+	0.0046	UJ	0.0046	UJ	0.0083	J+
BG1-SED06	BG1-SED06_5/22/2015	0	0.5	SE	N	5/22/2015	27		NA		ND	0.0039	UJ	0.0039	U	0.0039	UJ	0.0039	U	0.0039	UJ	0.0039	UJ	0.0039	UJ	0.0039	UJ	0.0039	UJ
BG1-SED07	BG1-SED07_5/22/2015	0	0.5	SE	N	5/22/2015	28	J	NA		0.0177	0.006	UJ	0.006	U	0.006	UJ	0.006	U	0.01	J	0.0077	J	0.006	UJ	0.006	UJ	0.006	UJ
DEC-SED-10	SED-10	0	0.17	SE	N	9/13/2005	483		NA		0.103	0.11	U	0.11	U	0.11	U	0.11	U	0.05	J	0.041	J	0.012	J	NA		NA	
DEC-SED-10	SED-10B	0.17	0.58	SE	N	9/13/2005	392		NA		0.07	0.12	U	0.12	U	0.12	U	0.12	U	0.017	J	0.021	J	0.032	J	NA		NA	
DEC-SED-11	SED-11	0	0.17	SE	N	4/14/2005	462	J	NA		0.194	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.11	J	0.065	J	0.019	J	NA		NA	
DEC-SED-11	SED-11B	0.17	0.58	SE	N	9/13/2005	418		NA		0.339	0.14	U	0.14	U	0.14	U	0.14	U	0.091	J	0.2		0.048	J	NA		NA	
DEC-SED-12	SED-12	0	0.17	SE	N	9/13/2005	226	J	NA		0.061	0.13	U	0.13	U	0.13	U	0.13	U	0.022	J	0.022	J	0.017	J	NA		NA	
DEC-SED-12	SED-12B	0.17	0.5	SE	N	9/13/2005	130		NA		0.037	0.13	U	0.13	U	0.13	U	0.13	U	0.014	J	0.023	J	0.13	U	NA		NA	
DEC-SED-13	SED-13	0	0.17	SE	N	9/13/2005	183	J	NA		0.249	0.27	UJ	0.27	UJ	0.27	UJ	0.27	UJ	0.087	J	0.12	J	0.042	J	NA		NA	
DEC-SED-13	SED-13B	0.25	0.75	SE	N	9/13/2005	116	J	NA		0.231	0.18	UJ	0.18	UJ	0.18	UJ	0.18	UJ	0.12	J	0.088	J	0.023	J	NA		NA	
DEC-SED-14	SED-14	0	0.17	SE	N	4/14/2005	71.6		NA		0.119	0.11	U	0.11	U	0.11	U	0.11	U	0.054	J	0.05	J	0.015	J	NA		NA	
DEC-SED-14	SED-14B	0.25	0.5	SE	N	9/13/2005	231		NA		0.306	0.1	U	0.1	U	0.1	U	0.1	U	0.14		0.13		0.036	J	NA		NA	
DEC-SED-14	SED-14C	0.58	0.75	SE	N	9/13/2005	15.3		NA		0.007	0.1	U	0.1	U	0.1	U	0.1	U	0.0036	J	0.0034	J	0.1	U	NA		NA	
DEC-SED-15	SED-15	0	0.17	SE	N	9/13/2005	997	J	NA		**8.6**	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	**5.7**	J	**2.9**	J	1.6	UJ	NA		NA	
DEC-SED-15	SED-15B	0.5	0.75	SE	N	9/13/2005	2720	J	NA		**1.53**	0.8	UJ	0.8	UJ	0.8	UJ	0.8	UJ	0.78	J	0.53	J	0.22	J	NA		NA	
DEC-SED-16	SED-16	0	0.17	SE	N	9/13/2005	169	J	NA		0.326	0.21	UJ	0.21	UJ	0.21	UJ	0.21	UJ	0.15	J	0.12	J	0.056	J	NA		NA	
DEC-SED-16	SED-16B	0.25	0.5	SE	N	9/13/2005	229	J	NA		0.506	0.21	UJ	0.21	UJ	0.21	UJ	0.21	UJ	0.24	J	0.19	J	0.076	J	NA		NA	
DEC-SED-17	SED-17	0	0.17	SE	N	9/13/2005	405	J	NA		**1.6**	0.63	UJ	0.63	UJ	0.63	UJ	0.63	UJ	0.85	J	0.46	J	0.29	J	NA		NA	
DEC-SED-17	SED-17B	0.25	0.75	SE	N	9/13/2005	1020		NA		0.73	0.16	U	0.16	U	0.16	U	0.16	U	0.32		0.31		0.1	J	NA		NA	
DEC-SED-18	SED-18	0	0.17	SE	N	9/13/2005	275	J	NA		0.87	0.16	UJ	0.16	UJ	0.16	UJ	0.16	UJ	0.49	J	0.38	J	0.16	UJ	NA		NA	
DEC-SED-18	SED-18B	0.25	0.5	SE	N	9/13/2005	484		NA		**7.1**	7.4	U	7.4	U	7.4	U	7.4	U	**3**	J	**4.1**	J	7.4	U	NA		NA	
DEC-SED-20	SED-20	0	0.17	SE	N	9/15/2005	149	J	NA		**1.82**	0.64	UJ	0.64	UJ	0.64	UJ	**1.1**	J	0.64	UJ	0.59	J	0.13	J	NA		NA	
DEC-SED-20	SED-20B	0.25	0.5	SE	N	9/15/2005	324		NA		**3.74**	2.7	U	2.7	U	2.7	U	**3**		2.7	U	0.74	J	2.7	U	NA		NA	
DEC-SED-21	SED-21	0	0.17	SE	N	9/15/2005	369		NA		**12.3**	2.9	U	2.9	U	2.9	U	2.9	U	**8.2**		**4.1**		2.9	U	NA		NA	
DEC-SED-22	SED-22	0	0.17	SE	N	4/19/2005	3170		NA		**201**	51	U	51	U	51	U	51	U	**71**		**130**		51	U	NA		NA	
DEC-SED-23	SED-23	0	0.17	SE	N	9/15/2005	136		NA		0.78	0.58	UJ	0.58	UJ	0.58	UJ	0.58	UJ	0.57	J	0.21	J	0.58	UJ	NA		NA	
DEC-SED-23	SED-23B	0.17	0.42	SE	N	9/15/2005	213		NA		**16.8**	2.3	U	2.3	U	2.3	U	2.3	U	**12**		**4.8**		2.3	U	NA		NA	
DEC-SED-25	SED-25	0	0.17	SE	N	9/15/2005	251	J	NA		**4**	2	UJ	2	UJ	2	UJ	2	UJ	**2.5**	J	**1.5**	J	2	UJ	NA		NA	
DEC-SED-25	SED-25B	0.42	0.58	SE	N	9/15/2005	211		NA		0.9	0.15	U	0.15	U	0.15	U	0.15	U	0.37		0.53		0.15	U	NA		NA	
DEC-SED-27	SED-27	0	0.17	SE	N	9/15/2005	148	J	NA		0.672	0.19	UJ	0.19	UJ	0.19	UJ	0.19	UJ	0.4	J	0.24	J	0.032	J	NA		NA	

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						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample		Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
DEC-SED-27	SED-27B	0.25	0.75	SE	N	4/21/2005	229		NA		0.273	0.16	U	0.16	U	0.16	U	0.16	U	0.18		0.093	J	0.16	U	NA		NA	
DEC-SED-28	SED-28	0	0.17	SE	N	9/21/2005	3040		NA		10.4	5.9	U	5.9	U	5.9	U	5.9	U	6.8		3.6	J	5.9	U	NA		NA	
DEC-SED-28	SED-28B	0.67	0.92	SE	N	9/21/2005	1240	J	NA		150	68	U	68	U	68	U	68	U	96		54	J	68	U	NA		NA	
DEC-SED-29	SED-29	0	0.17	SE	N	9/21/2005	581	J	NA		2.02	0.5	U	0.5	U	0.5	U	0.5	U	1.4		0.62		0.5	U	NA		NA	
DEC-SED-29	SED-29B	0.25	0.5	SE	N	9/21/2005	6840		NA		1.42	0.61	U	0.61	U	0.61	U	0.61	U	1		0.42	J	0.61	U	NA		NA	
DEC-SED-30	SED-30	0	0.17	SE	N	9/15/2005	143		NA		0.168	0.15	U	0.15	U	0.15	U	0.15	U	0.1	J	0.068	J	0.15	U	NA		NA	
DEC-SED-30	SED-30B	0.17	0.58	SE	N	9/15/2005	43.7		NA		ND	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	NA		NA	
DEC-SED-32	SED-32	0	0.17	SE	N	9/15/2005	169	J	NA		0.42	0.19	UJ	0.19	UJ	0.19	UJ	0.19	UJ	0.27	J	0.15	J	0.19	UJ	NA		NA	
DEC-SED-32	SED-32B	0.25	0.42	SE	N	9/15/2005	171	J	NA		0.639	0.17	UJ	0.17	UJ	0.17	UJ	0.17	UJ	0.38	J	0.23	J	0.029	J	NA		NA	
DEC-SED-34	SED-34	0	0.17	SE	N	9/21/2005	146		NA		49	12	U	12	U	12	U	12	U	25		24		12	U	NA		NA	
DEC-SED-34	SED-34B	0.17	0.58	SE	N	9/21/2005	1150	J	NA		390	370	U	370	U	370	U	370	U	280	J	110	J	370	U	NA		NA	
DEC-SED-35	SED-35	0	0.17	SE	N	9/21/2005	94.2		NA		6.5	5.5	U	5.5	U	5.5	U	5.5	U	6.5		5.5	U	5.5	U	NA		NA	
DEC-SED-35	SED-35B	0.25	0.67	SE	N	9/21/2005	247		NA		11.6	14	U	14	U	14	U	14	U	4.1	J	7.5	J	14	U	NA		NA	
DEC-SED-37	SED-37	0	0.17	SE	N	9/21/2005	214		NA		9	2.9	U	2.9	U	2.9	U	2.9	U	5.8		3.2		2.9	U	NA		NA	
DEC-SED-37	SED-37BB	0.17	0.58	SE	N	9/21/2005	1190	J	NA		66	17	U	17	U	17	U	17	U	35		31		17	U	NA		NA	
DEC-SED-37	SED-37B	0.8	1	SE	N	4/26/2005	428	J	NA		234	82	UJ	82	UJ	82	UJ	82	UJ	150	J	84	J	82	UJ	NA		NA	
DEC-SED-38	SED-38	0	0.17	SE	N	9/22/2005	164	J	NA		8.3	3.5	U	3.5	U	3.5	U	3.5	U	5.7		2.6	J	3.5	U	NA		NA	
DEC-SED-38	SED-38B	0.25	0.75	SE	N	9/22/2005	291	J	NA		8	8.2	U	8.2	U	8.2	U	8.2	U	8	J	8.2	U	8.2	U	NA		NA	
DEC-SED-39	SED-39	0	0.17	SE	N	9/22/2005	179	J	NA		0.058	0.18	U	0.18	U	0.18	U	0.18	U	0.058	J	0.18	U	0.18	U	NA		NA	
DEC-SED-39	SED-39B	0.25	0.58	SE	N	9/22/2005	166		NA		0.51	0.28	U	0.28	U	0.28	U	0.51		0.28	U	0.28	U	0.28	U	NA		NA	
DEC-SED-40	SED-40	0	0.17	SE	N	9/22/2005	224		NA		2.2	0.53	UJ	0.53	UJ	0.53	UJ	0.53	UJ	1.4	J	0.8	J	0.53	UJ	NA		NA	
DEC-SED-40	SED-40B	0.17	0.5	SE	N	9/22/2005	951		NA		24.3	11	U	11	U	11	U	11	U	15		9.3	J	11	U	NA		NA	
DEC-SED-42	SED-42	0	0.17	SE	N	9/15/2005	291		NA		0.196	0.15	U	0.15	U	0.15	U	0.15	U	0.13	J	0.066	J	0.15	U	NA		NA	
DEC-SED-43	SED-43	0	0.17	SE	N	9/15/2005	434	J	NA		1.665	0.2	UJ	0.2	UJ	0.2	UJ	1.1	J	0.2	UJ	0.47	J	0.095	J	NA		NA	
DEC-SED-43	SED-43B	0.25	0.75	SE	N	9/15/2005	582	J	NA		7.49	3.4	UJ	3.4	UJ	3.4	UJ	6.5	J	3.4	UJ	0.99	J	3.4	UJ	NA		NA	
DEC-SED-44	SED-44	0	0.17	SE	N	9/13/2005	60		NA		0.0696	0.12	U	0.12	U	0.12	U	0.12	U	0.032	J	0.031	J	0.0066	J	NA		NA	
DEC-SED-6	SED-6	0	0.17	SE	N	7/23/2002	NA		NA		3.5	1.2	U	1.2	U	1.2	U	1.2	U	1.8		1.7		1.2	U	NA		NA	
DEC-SED-7	SED-7	0	0.17	SE	N	11/26/2002	25400		NA		0.84	0.21	U	0.21	U	0.21	U	0.6		0.21	U	0.24		0.21	U	NA		NA	
DEC-SED-8	SED-8	0.17	0.33	SE	N	11/26/2002	449		NA		1.94	0.26	U	0.26	U	0.26	U	0.26	U	0.83		0.76		0.35		NA		NA	
DEC-SED-9	SED-9	0	0.17	SE	N	11/26/2002	146		NA		ND	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	NA		NA	
FS-SED-1	FS-EMC01-SED-O	0	0.167	SE	N	9/11/2003	199		NA		ND	6.1	U	12	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	NA		NA	
FS-SS02-SED	FS-SS02-SED-O			SE	N	9/11/2003	NA		NA		0.51	0.34	U	0.34	U	0.34	U	0.24	J	0.34	U	0.16	J	0.11	J	NA		NA	
OU2-SED01	OU2-SED01-Z1	0	0.5	SE	N	5/26/2015	310 450	J J	NA		14.6	0.024	U	0.024	UJ	0.024	UJ	0.024	UJ	5.5		7.6		1.5	J	0.024	UJ	0.024	UJ
OU2-SED02	OU2-SED02-Z1	0	0.5	SE	N	5/21/2015	370 510		NA		0.549	0.003	U	0.003	U	0.003	U	0.003	U	0.46	J	0.003	U	0.089		0.003	U	0.003	U
OU2-SED03	OU2-SED03-Z1	0	0.5	SE	N	5/26/2015	510 560	J J	NA		84.7	0.56	UJ	0.56	UJ	0.56	UJ	0.56	UJ	56	J	25	J	3.7	J	0.56	UJ	0.56	UJ
OU2-SED04	OU2-SED04-Z1	0	0.5	SE	N	1/25/2016	194		NA		ND	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U
OU2-SED04	OU2-SED04-Z1/D	0	0.5	SE	FD	1/25/2016	256		NA		ND	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
OU2-SED05	OU2-SED05-Z1	0	0.5	SE	N	1/26/2016	58.7		NA		ND	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
OU2-SED06	OU2-SED06-Z1	0	0.5	SE	N	1/26/2016	333		NA		ND	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U
OU2-SED07	OU2-SED07-Z1	0	0.5	SE	N	1/26/2016	792		NA		0.206	0.063	U	0.063	U	0.063	U	0.063	U	0.096		0.063	U	0.11		0.063	U	0.063	U
OU2-SED08	OU2-SED08-Z1	0	0.5	SE	N	1/26/2016	399		NA		1.8	0.082	U	0.082	U	0.082	U	0.082	U	0.83		0.66		0.31		0.082	U	0.082	U
OU2-SED09	OU2-SED09-Z1	0	0.5	SE	N	1/26/2016	715		NA		0.063	0.087	U	0.087	U	0.087	U	0.087	U	0.063	J	0.087	U	0.087	U	0.087	U	0.087	U
SED-01-A	SED-01-A-0-0.5	0	0.5	SE	N	9/20/2018	NA		NA		32	0.42	U	0.42	U	0.42	U	0.42	U	32		0.42	U	0.42	U	0.42	U	0.42	U
SED-01-A	SED-01-A-0.5-2	0.5	2	SE	N	9/20/2018	NA		NA		180	4.3	U	4.3	U	4.3	U	4.3	U	180		4.3	U	4.3	U	4.3	U	4.3	U
SED-01-B	SED-01-B-0-0.5	0	0.5	SE	N	9/20/2018	NA		NA		140	4.4	U	4.4	U	4.4	U	4.4	U	140	J	4.4	U	4.4	U	4.4	U	4.4	U
SED-01-B	SED-901-B-0-0.5	0	0.5	SE	FD	9/20/2018	NA		NA		100	0.83	U	0.83	U	0.83	U	0.83	U	100		0.83	U	0.83	U	0.83	U	0.83	U
SED-01-B	SED-01-B-0.5-2	0.5	2	SE	N	9/20/2018	NA		NA		12	0.17	U	0.17	U	0.17	U	0.17	U	12		0.17	U	0.17	U	0.17	U	0.17	U
SED-01-B	SED-01-B-BED	2	3	SE	N	9/20/2018	NA		NA		3.7	0.044	U	0.044	U	0.044	U	0.044	U	3.7		0.044	U	0.044	U	0.044	U	0.044	U
SED-02-A	SED-02-A-0-0.5	0	0.5	SE	N	9/20/2018	NA		NA		24	0.43	U	0.43	U	0.43	U	0.43	U	24		0.43	U	0.43	U	0.43	U	0.43	U
SED-02-A	SED-02-A-0.5-2	0.5	1	SE	N	9/20/2018	NA		NA		19	0.47	U	0.47	U	0.47	U	0.47	U	19		0.47	U	0.47	U	0.47	U	0.47	U

Table A-6
Analytical Results – Sediment
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
		Start		Sample		Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Depth	End Depth	Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
SED-03-A	SED-03-A-0-2	0	2	SE	N	9/19/2018	220		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-03-A	SED-03-A-BED	1.5	2.5	SE	N	9/19/2018	7	U	5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-03-B	SED-03-B-0-0.5	0	0.5	SE	N	9/19/2018	NA		NA		57	0.44	U	0.44	U	0.44	U	0.44	U	0.44	U	57		0.44	U	0.44	U	0.44	U
SED-03-B	SED-03-B-0-2	0	1.5	SE	N	9/19/2018	6700		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-03-B	SED-03-B-0.5-2	0.5	1.5	SE	N	9/19/2018	NA		NA		7.5	0.09	U	0.09	U	0.09	U	0.09	U	7.5		0.09	U	0.09	U	0.09	U	0.09	U
SED-03-B	SED-03-B-BED	0.5	1.5	SE	N	9/19/2018	6200		5	U	5.3	0.086	U	0.086	U	0.086	U	0.086	U	5.3		0.086	U	0.086	U	0.086	U	0.086	U
SED-03-C	SED-03-C-0-0.5	0	0.5	SE	N	9/20/2018	NA		NA		8.5	0.092	U	0.092	U	0.092	U	0.092	U	8.5		0.092	U	0.092	U	0.092	U	0.092	U
SED-03-C	SED-03-C-0-2	0	1.5	SE	N	9/19/2018	13000		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-03-C	SED-903-C-0-2	0	1.5	SE	FD	9/19/2018	NA		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-03-C	SED-03-C-0.5-2	0.5	1.5	SE	N	9/19/2018	NA		NA		22	0.41	U	0.41	U	0.41	U	0.41	U	0.41	U	22		0.41	U	0.41	U	0.41	U
SED-03-C	SED-03-C-BED	0.5	1.5	SE	N	9/19/2018	16000		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-03-C	SED-903-C-BED	0.5	1.5	SE	FD	9/19/2018	8300		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-05-A	SED-05-A-0-0.5	0	0.5	SE	N	9/17/2018	NA		NA		0.99	0.042	U	0.042	U	0.042	U	0.042	U	0.042	U	0.99	J+	0.042	U	0.042	U	0.042	U
SED-05-A	SED-05-A-0-2	0	2	SE	N	9/17/2018	1400		3.5	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-05-A	SED-05-A-0.5-2	0.5	2	SE	N	9/17/2018	NA		NA		34	0.46	U	0.46	U	0.46	U	34	J	0.46	U	0.46	U	0.46	U	0.46	U	0.46	U
SED-05-A	SED-05-A-2-4	2	4	SE	N	9/17/2018	880		10	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-05-A	SED-05-A-BED	4.5	5.5	SE	N	9/17/2018	1700		0.62	J	1.3	0.07	U	0.07	U	0.07	U	0.07	U	0.07	U	1.3	J+	0.07	U	0.07	U	0.07	U
SED-06-A	SED-06-A-0-2	0	2	SE	N	9/17/2018	1400		0.78	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-06-A	SED-06-A-2-4	2	4	SE	N	9/17/2018	33		13.1	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-06-A	SED-06-A-BED	6	6.5	SE	N	9/17/2018	39		0.043	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-06-B	SED-06-B-0-2	0	2	SE	N	9/17/2018	6700		1.3	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-06-B	SED-06-B-2-4	2	4	SE	N	9/17/2018	2000		0.76	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-06-B	SED-06-B-6-8	6	8	SE	N	9/17/2018	34		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-06-B	SED-06-B-BED-A	6.5	7	SE	N	9/17/2018	110		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-06-B	SED-06-B-BED-B	8.5	9	SE	N	9/17/2018	NA		0.78	J	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-07-A	SED-07-A-0-0.5	0	0.5	SE	N	9/14/2018	NA		NA		1.6	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	1.6	J+	0.039	U	0.039	U	0.039	U
SED-07-A	SED-07-A-0.5-2	0.5	2	SE	N	9/14/2018	NA		NA		2.8	0.074	U	0.074	U	0.074	U	0.074	U	0.074	U	2.8	J+	0.074	U	0.074	U	0.074	U
SED-07-A	SED-907-A-0.5-2	0.5	2	SE	FD	9/14/2018	NA		NA		22	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	22		0.6	U	0.6	U	0.6	U
SED-07-A	SED-07-A-BED	4.5	5.5	SE	N	9/14/2018	NA		NA		20	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U	20		0.55	U	0.55	U	0.55	U
SED-08-B	SED-08-B-0-2	0	1	SE	N	9/17/2018	1600		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-09-A	SED-09-A-0-2	0	2	SE	N	9/14/2018	3800		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-09-A	SED-909-A-0-2	0	2	SE	FD	9/14/2018	1400		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-09-A	SED-09-A-2-4	2	4	SE	N	9/14/2018	6200		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-09-A	SED-09-A-BED	3.5	4	SE	N	9/14/2018	4100		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-09-B	SED-09-B-0-2	0	2	SE	N	9/14/2018	720		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-09-B	SED-09-B-2-4	2	3	SE	N	9/14/2018	1300		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-09-B	SED-09-B-BED	2	3	SE	N	9/14/2018	1200		5	U	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
SED-10-A	SED-10-A-0-0.5	0	0.5	SE	N	9/14/2018	NA		NA		5.2	0.053	U	0.053	U	0.053	U	0.053	U	0.053	U	5.2		0.053	U	0.053	U	0.053	U
SED-10-A	SED-10-A-0.5-2	0.5	2	SE	N	9/14/2018	NA		NA		13	0.07	U	0.07	U	0.07	U	0.07	U	0.07	U	13		0.07	U	0.07	U	0.07	U
SED-10-A	SED-10-A-BED	2	2.5	SE	N	9/14/2018	NA		NA		4.5	0.58	U	0.58	U	0.58	U	0.58	U	0.58	U	4.5		0.58	U	0.58	U	0.58	U
SED-10-B	SED-10-B-0-0.5	0	0.5	SE	N	9/14/2018	NA		NA		16	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	16		0.15	U	0.15	U	0.15	U
SED-10-B	SED-10-B-0.5-2	0.5	1.5	SE	N	9/14/2018	NA		NA		28	0.76	U	0.76	U	0.76	U	0.76	U	0.76	U	28		0.76	U	0.76	U	0.76	U
SED-10-B	SED-10-B-BED	0.5	1.5	SE	N	9/14/2018	NA		NA		31	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	31		0.7	U	0.7	U	0.7	U
300-SB55[1]	300-SB55-0-2	0	2	SO	ft	7/22/2021	140		NA		ND	0.04	U	0.08	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
300-SB55[1]	300-SB955-0-2	0	2	SO	ft	7/22/2021	232		NA		ND	0.0438	U	0.0876	U	0.0438	U	0.0438	U	0.0438	U	0.0438	U	0.0438	U	0.0438	U	0.0438	U
300-SB55[1]	300-SB55-2-4	2	4	SO	ft	7/22/2021	1060		NA		43.27	0.0525	U	0.105	U	0.0525	U	42.6		0.0525	U	0.0525	U	0.673		0.0525	U	0.0525	U
300-SB55[1]	300-SB55-4-6	4	5.5	SO	ft	7/22/2021	99.3		NA		5.05	0.0467	U	0.0934	U	0.0467	U	5.05		0.0467	U	0.0467	U	0.0467	U	0.0467	U	0.0467	U
DS-SB-02	DS-SB-02-0-2	0	2	SO	N	9/13/2018	NA		NA		180	6.8	U	6.8	U	6.8	U	6.8	U	180		6.8	U	6.8	U	6.8	U	6.8	U
DS-SB-02	DS-SB-02-2-3 OR NAT	2	3	SO	N	9/13/2018	NA		NA		28	0.65	U	0.65	U	0.65	U	0.65	U	28		0.65	U	0.65	U	0.65	U	0.65	U
DS-SB-04	DS-SB-04-0-2	0	2	SO	N	9/13/2018	NA		NA		25	0.48	U	0.48	U	0.48	U	0.48	U	25		0.48	U	0.48	U	0.48	U	0.48	U
DS-SB-04	DS-SB-04-2-3 OR NAT	2	3	SO	N	9/11/2018	NA		NA		37	0.69	U	0.69	U	0.69	U	0.69	U	37		0.69	U	0.69	U	0.69	U	0.69	U
DS-SB-05	DS-SB-05-0-2	0	2	SO	N	9/13/2018	NA		NA		130	5.4	U	5.4	U	5.4	U	5.4	U	130		5.4	U	5.4	U	5.4	U	5.4	U
DS-SB-05	DS-SB-05-2-3 OR NAT	2	3	SO	N	9/11/2018	NA		NA		1.1	0.04	U	0.04	U	0.04	U	0.04	U	1.1	J+	0.04	U	0.04	U	0.04	U	0.04	U
300-SB17	300-SB17-0-2	0	2	SO	N	9/13/2018	1300		NA		11	0.12	U	0.12	U	0.12	U	0.12	U	11		0.12	U	0.12	U	0.12	U	0.12	U
300-SB17	300-SB17-2-3	2	3	SO	N	9/13/2018	7000		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
300-SB17	300-SB17-2-3 OR NAT	2	3	SO	N	9/13/2018	NA		NA		3.4	0.047	U	0.047	U	0.047	U	0.047	U	3.4		0.047	U	0.047	U	0.047	U	0.047	U
300-SB21	300-SB21-0-2	0	1.5	SO	N	9/13/2018	1300		NA		19	0.38	U	0.38	U	0.38	U	0.38	U	19		0.38	U	0.38	U	0.38	U	0.38	U
198-SB19	198-SB19-0-2	0	2	SO	N	9/18/2018	2800		NA		ND	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U	0.034	U
198-SB19	198-SB19-2-4	2	4	SO	N	9/18/2018	810		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB19	198-SB19-2-5	2	5	SO	N	9/18/2018	NA		NA		ND	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U	0.052	U
198-SB19	198-SB19-4-5	4	5	SO	N	9/18/2018	2600		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB23	198-SB23-0-2	0	2	SO	N	9/18/2018	4300		NA		ND	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U
198-SB23	198-SB23-2-4	2	4	SO	N	9/18/2018	320		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
198-SB23	198-SB23-2-5	2	5	SO	N	9/18/2018	NA		NA		ND	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U	0.033	U
198-SB23	198-SB23-4-5	4	5	SO	N	9/18/2018	170		NA		NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
TRK-C-06-SD	TRK-C-06-SD-A	0	0.4	SE	N	8/24/2006	246		NA		ND	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	0.044	U	NA		NA	
TRK-C-06-SD	TRK-C-06-SD-B	0.42	0.83	SE	N	8/24/2006	NA		NA		0.91	0.039	U	0.039	U	0.039	U	0.039	U	0.47		0.44		0.039	U	NA		NA	
TRK-C-06-SD	TRK-C-06-SD-C	0.83	1.25	SE	N	8/24/2006	NA		NA		0.012	0.022	U	0.022	U	0.022	U	0.022	U	0.022	U	0.012	J	0.022	U	NA		NA	
TRK-C-07-SD	TRK-C-07-SD-A	0	0.4	SE	N	8/24/2006	531		NA		14.3	2.3	U	2.3	U	2.3	U	2.3	U	6		7.3		1	J	NA		NA	
TRK-C-07-SD	TRK-C-07-SD-B	0.42	0.83	SE	N	8/24/2006	NA		NA		25.9	1.2	U	1.2	U	1.2	U	1.2	U	9.9		16		1.2	U	NA		NA	
TRK-C-07-SD	TRK-C-07-SD-C	0.83	1.25	SE	N	8/24/2006	NA		NA		50	3.1	U	3.1	U	3.1	U	3.1	U	17		33		3.1	U	NA		NA	
TRK-S01-SD	TRK-S01-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.17	0.3	U	0.3	U	0.3	U	0.3	U	0.17	J	0.3	U	0.3	U	NA		NA	
TRK-S02-SD	TRK-S02-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.23	0.19	U	0.19	U	0.19	U	0.19	U	0.23		0.19	U	0.19	U	NA		NA	
TRK-S03-SD	TRK-S03-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		ND	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	NA		NA	
TRK-S04-SD	TRK-S04-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		ND	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	NA		NA	

Table A-6
Analytical Results – Sediment
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

						Analyte	Lead		Lead (TCLP)		Total PCBs mg/kg	Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Aroclor 1262		Aroclor 1268	
						CAS No.	7439-92-1		7439-92-1			12674-11-2		11104-28-2		11141-16-5		53469-21-9		12672-29-6		11097-69-1		11096-82-5		37324-23-5		11100-14-4	
						Units	mg/kg		mg/L			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
						Surface Soil Criteria	1000		5			1		1		1		1		1		1		1		1		1	
Sample Location	Sample Name	Start Depth	End Depth	Sample Matrix	Sample Type	Sample Date	Result	Q	Result	Q		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
TRK-S05-SD	TRK-S05-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		ND	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	NA		NA	
TRK-S06-SD	TRK-S06-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.51	0.15	U	0.15	U	0.15	U	0.15	U	0.37		0.14	J	0.15	U	NA		NA	
TRK-S07-SD	TRK-S07-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.5	0.12	U	0.12	U	0.12	U	0.12	U	0.3		0.2		0.12	U	NA		NA	
TRK-S08-SD	TRK-S08-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.12	0.11	U	0.11	U	0.11	U	0.11	U	0.12		0.11	U	0.11	U	NA		NA	
TRK-S09-SD	TRK-S09-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.272	0.14	U	0.14	U	0.14	U	0.14	U	0.19		0.082	J	0.14	U	NA		NA	
TRK-S10-SD	TRK-S10-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		0.83	0.13	U	0.13	U	0.13	U	0.13	U	0.58		0.25		0.13	U	NA		NA	
TRK-S11-SD	TRK-S11-SD_7/6/2006	0	0.5	SE	N	7/6/2006	NA		NA		1	0.16	U	0.16	U	0.16	U	0.16	U	1		0.16	U	0.16	U	NA		NA	
TRK-S74-SD	TRK-S74-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		ND	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	NA		NA	
TRK-S75-SD	TRK-S75-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		1	0.15	U	0.15	U	0.15	U	0.15	U	1		0.15	U	0.15	U	NA		NA	
TRK-S76-SD	TRK-S76-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		0.33	0.13	U	0.13	U	0.13	U	0.13	U	0.33		0.13	U	0.13	U	NA		NA	
TRK-S77-SD	TRK-S77-SD_7/28/2006	0	0.5	SE	N	7/28/2006	NA		NA		0.274	0.11	U	0.11	U	0.11	U	0.11	U	0.22		0.054	J	0.11	U	NA		NA	

Notes:
All depths are in feet below ground surface
Highlighted and bolded values exceeded the sediment action level for PCBs or exceed the TCLP criterion for lead
Surface soil have depths less than 2 feet bgs
Subsurface soil have depths greater than 2 feet bgs
Surface and subsurface criteria come from the record of decision
sample in grey is at the border between upland and sediment and is also included in the tables for respective upland area.
Abbreviations:
CAS No. - Chemical Abstracts Service number
FD - field duplicate
mg/L - milligram/liter
mg/kg - milligram/kilogram
N - normal/field sample
NA - not analyzed
ND - not detected
SE - sediment
TCLP - Toxicity Characteristic Leaching Procedure
Q - qualifier
J - The identification of the analyte is acceptable; the reported value is an estimate.
J+ - The identification of the analyte is acceptable; the reported value may be biased high.
U - The analyte was not detected at or above the Reporting Limit.

UJ - The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table A-7
Analytical Results – Surface Water
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

Method Group	Chemical Name	CAS No.	Surfacewater Criteria	D-Class Criteria (FC)	Sample Location	SW-01		SW-01		SW-01		SW-02		SW-02		SW-03		SW-03		SW-03		SW-03		SW-04		SW-04		SW-05		SW-05	
					Sample Name	SW-01-F-PDI		SW-01-PDI		SW-02-F-PDI		SW-02-PDI		SW-02-R		SW-03-F-PDI		SW-03-PDI		SW-903-F-PDI		SW-903-PDI		SW-04-F-PDI		SW-04-PDI		SW-05-F-PDI		SW-05-PDI	
					Sample Date	10/4/2018		10/4/2018		10/5/2018		10/5/2018		10/8/2018		10/5/2018		10/5/2018		10/5/2018		10/5/2018		10/8/2018		10/8/2018		10/8/2018		10/8/2018	
					Sample Type	N		N		N		N		N		N		N		FD		FD		N		N		N		N	
					Parent Sample															SW-03-F-PDI		SW-03-PDI									
					Unit	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALK	Alkalinity, Carbonate (As Caco3)	ALKC	NL	NL	mg/L	NA		120		NA		150		NA		NA		150		NA		150		NA		120		NA		130	
Anions, Sulfate	Chloride	16887-00-6	250	NL	mg/L	NA		49		NA		51		NA		NA		49		NA		48		NA		51		NA		54	
Anions, Sulfate	Sulfate	14808-79-8	250	NL	mg/L	NA		69		NA		110		NA		NA		98		NA		98		NA		74		NA		80	
Cyanide, Total	Cyanide	57-12-5	200	22	µg/L	NA		10	U	NA		10	U	NA		NA		10	U	NA		10	U	NA		10	U	NA		10	U
Hydrocarbons	Gasoline Range Hydrocarbons	8006-61-9	NL	NL	µg/L	NA		100	U	NA		100	U	NA		NA		100	U	NA		100	U	NA		100	U	NA		100	U
Hydrocarbons	Total Petroleum Hydrocarbons As Diesel	68334-30-5	NL	NL	µg/L	NA		95	U	NA		110	U	NA		NA		97	U	NA		98	U	NA		100	U	NA		100	U
TDS	Total Dissolved Solids	TDS	1000	NL	mg/L	NA		370		NA		NA		460		NA		460		NA		480		NA		440		NA		480	
TOC	Total Organic Carbon	TOC	NL	NL	mg/L	NA		3.4		NA		3.7		NA		NA		3.3		NA		3.4		NA		5.1		NA		5.2	
TSS	Total Suspended Solids	TSS	NL	NL	mg/L	NA		16		NA		NA		20		NA		11		NA		11		NA		15		NA		13	
Metals	Aluminum	7429-90-5	NL	NL	µg/L	20	U	270		20	U	240		NA		20	U	220		20	U	200		20	U	350		20	U	300	
Metals	Antimony	7440-36-0	3	NL	µg/L	1	U	1	U	1	U	1	U	NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Arsenic	7440-38-2	25	340	µg/L	1	U	1	U	1	U	1	U	NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Barium	7440-39-3	1000	NL	µg/L	26		29		47		49		NA		43		43		41		44		33		36		36		39	
Metals	Beryllium	7440-41-7	3	NL	µg/L	1	U	1	U	1	U	1	U	NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Cadmium	7440-43-9	5	NL	µg/L	1	U	1	U	1	U	1	U	NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Calcium	7440-70-2	NL	NL	µg/L	55000		56000		89000		87000		NA		77000		74000		75000		76000		58000		58000		61000		63000	
Metals	Chromium	7440-47-3	50	NL	µg/L	1	U	1	U	1	U	1	U	NA		1	U	1	U	1	U	1	U	1	U	1		1	U	1	
Metals	Cobalt	7440-48-4	NL	110*	µg/L	1	U	1	U	1	U	1	U	NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Copper	7440-50-8	200	NL	µg/L	1.3		2		1.5		1.9		NA		1.7		1.9		1.5		2		4		6.2		4.3		8.6	
Metals	Iron	7439-89-6	300	300	µg/L	20	U	**550**		20	U	**460**		NA		20	U	**430**		20	U	**390**		39		**640**		44		**590**	
Metals	Lead	7439-92-1	25	NL	µg/L	1	U	1.2		1	U	1.2		NA		1	U	1.6		1	U	1.9		1	U	2.8		1	U	5.4	
Metals	Magnesium	7439-95-4	35000	NL	µg/L	11000		12000		14000		15000		NA		14000		14000		14000		14000		11000		11000		11000		12000	
Metals	Manganese	7439-96-5	300	NL	µg/L	9.8		27		10		28		NA		7.8		24		6.5		24		5		25		16		29	
Metals	Mercury	7439-97-6	0.7	0.0007	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	NA		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	UJ	0.2	U	0.2	UJ
Metals	Nickel	7440-02-0	100	NL	µg/L	1	U	1.3		1	U	1.2		NA		1	U	1.1		1	U	1.1		1	U	1.5		1.3		1.7	
Metals	Potassium	7440-09-7	NL	NL	µg/L	2500		2600		3100		3100		NA		2900		2900		2800		3000		3200		3200		3300		3400	
Metals	Selenium	7782-49-2	10	NL	µg/L	1	U	1	U	1	U	1	U	NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Silver	7440-22-4	50	NL	µg/L	1	U	1	U	1	U	1	U	NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Sodium	7440-23-5	20000	NL	µg/L	**34000**		**35000**		**35000**		**35000**		NA		**33000**		**33000**		**33000**		**34000**		**36000**		**36000**		**38000**		**39000**	
Metals	Thallium	7440-28-0	0.5	20	µg/L	1	U	1	U	1	U	1	U	NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Vanadium	7440-62-2	NL	190	µg/L	1	U	1.1		1	U	1		NA		1	U	1	U	1	U	1	U	1	U	1.3		1	U	1.1	
Metals	Zinc	7440-66-6	2000	NL	µg/L	7.6		5.4		2.4		3.9		NA		2.8		3.8		2	U	4		7.5		15		14		24	
Nitrogen	Nitrate/Nitrite	7727-37-9	10	NL	mg/L	NA		1.2		NA		0.59		NA		NA		0.64		NA		0.63		NA		1.2		NA		1.2	
PCB Aroclors	Aroclor 1016	12674-11-2	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		0.4	U
PCB Aroclors	Aroclor 1221	11104-28-2	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		0.4	U
PCB Aroclors	Aroclor 1232	11141-16-5	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		0.4	U
PCB Aroclors	Aroclor 1242	53469-21-9	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		0.4	U
PCB Aroclors	Aroclor 1248	12672-29-6	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		**0.17**	J
PCB Aroclors	Aroclor 1254	11097-69-1	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		0.4	U
PCB Aroclors	Aroclor 1260	11096-82-5	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		0.4	U
PCB Aroclors	Aroclor 1262	37324-23-5	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		0.4	U
PCB Aroclors	Aroclor 1268	11100-14-4	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		0.4	U
PCB Aroclors	PCB-Aroclors (Unspecified)	12767-79-2	0.09	NL	µg/L	NA		0.38	U	NA		0.4	U	NA		NA		0.4	U	NA		0.4	U	NA		0.39	U	NA		**0.17**	J
Pesticides (CLP)	4,4'-DDD	72-54-8	0.2	0.00008	µg/L	NA		0.1	U	NA		0.11	U	NA		NA		0.11	U	NA		0.11	U	NA		0.1	U	NA		0.095	UJ
Pesticides (CLP)	4,4'-DDE	72-55-9	0.2	0.000007	µg/L	NA		0.1	U	NA		0.11	U	NA		NA		0.11	U	NA		0.11	U	NA		0.1	U	NA		0.095	UJ
Pesticides (CLP)	4,4'-DDT	50-29-3	0.2	0.00001	µg/L	NA		0.1	U	NA		0.11	U	NA		NA		0.11	U	NA		0.11	U	NA		0.1	U	NA		0.095	UJ
Pesticides (CLP)	Aldrin	309-00-2	NL	0.001	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.048	UJ
Pesticides (CLP)	Alpha-BHC	319-84-6	0.01	0.002	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.048	UJ
Pesticides (CLP)	Beta-BHC	319-85-7	0.04	0.007	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.0064	J-
Pesticides (CLP)	cis-Chlordane	5103-71-9	0.05	NL	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.048	UJ
Pesticides (CLP)	Delta-Bhc	319-86-8	0.05	0.008	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.048	UJ

Table A-7
Analytical Results – Surface Water
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

					Sample Location	SW-01		SW-01		SW-01		SW-02		SW-02		SW-03		SW-03		SW-03		SW-03		SW-04		SW-04		SW-05		SW-05	
					Sample Name	SW-01-F-PDI		SW-01-PDI		SW-02-F-PDI		SW-02-PDI		SW-02-R		SW-03-F-PDI		SW-03-PDI		SW-903-F-PDI		SW-903-PDI		SW-04-F-PDI		SW-04-PDI		SW-05-F-PDI		SW-05-PDI	
					Sample Date	10/4/2018		10/4/2018		10/5/2018		10/5/2018		10/8/2018		10/5/2018		10/5/2018		10/5/2018		10/5/2018		10/8/2018		10/8/2018		10/8/2018		10/8/2018	
					Sample Type	N		N		N		N		N		N		N		FD		FD		N		N		N		N	
			Surfacewater	D-Class Criteria	Parent Sample															SW-03-F-PDI		SW-03-PDI									
Method Group	Chemical Name	CAS No.	Criteria	(FC)	Unit	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Pesticides (CLP)	Dieldrin	60-57-1	0.004	0.001	µg/L	NA		0.1	U	NA		0.11	U	NA		NA		0.11	U	NA		0.11	U	NA		0.1	U	NA		0.095	UJ
Pesticides (CLP)	Endosulfan I	959-98-8	5	NL	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.048	UJ
Pesticides (CLP)	Endosulfan II	33213-65-9	5	NL	µg/L	NA		0.1	U	NA		0.11	U	NA		NA		0.11	U	NA		0.11	U	NA		0.1	U	NA		0.095	UJ
Pesticides (CLP)	Endosulfan Sulfate	1031-07-8	5	NL	µg/L	NA		0.1	U	NA		0.11	U	NA		NA		0.11	U	NA		0.11	U	NA		0.1	U	NA		0.095	UJ
Pesticides (CLP)	Endrin	72-20-8	NL	0.002	µg/L	NA		0.1	U	NA		0.11	U	NA		NA		0.11	U	NA		0.11	U	NA		0.1	U	NA		0.095	UJ
Pesticides (CLP)	Endrin Aldehyde	7421-93-4	5	NL	µg/L	NA		0.1	U	NA		0.11	U	NA		NA		0.11	U	NA		0.11	U	NA		0.1	U	NA		0.095	UJ
Pesticides (CLP)	Endrin Ketone	53494-70-5	5	NL	µg/L	NA		0.1	U	NA		0.11	U	NA		NA		0.11	U	NA		0.11	U	NA		0.1	U	NA		0.095	UJ
Pesticides (CLP)	Gamma-Bhc (Lindane)	58-89-9	0.05	0.008	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.048	UJ
Pesticides (CLP)	Heptachlor	76-44-8	0.04	0.0002	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.048	UJ
Pesticides (CLP)	Heptachlor Epoxide	1024-57-3	0.03	0.0003	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.048	UJ
Pesticides (CLP)	Methoxychlor	72-43-5	35	NL	µg/L	NA		0.51	U	NA		0.53	U	NA		NA		0.53	U	NA		0.56	U	NA		0.52	U	NA		0.48	UJ
Pesticides (CLP)	Toxaphene	8001-35-2	0.06	0.000006	µg/L	NA		5.1	U	NA		5.3	U	NA		NA		5.3	U	NA		5.6	U	NA		5.2	U	NA		4.8	UJ
Pesticides (CLP)	Trans-Chlordane	5103-74-2	0.05	NL	µg/L	NA		0.051	U	NA		0.053	U	NA		NA		0.053	U	NA		0.056	U	NA		0.052	U	NA		0.048	UJ
SVOCs	1,1'-Biphenyl	92-52-4	5	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	1,2,4,5-Tetrachlorobenzene	95-94-3	5	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	1,4-Dioxane	123-91-1	NL	NL	µg/L	NA		2.1	U	NA		2.1	U	NA		NA		2.2	U	NA		2.1	U	NA		2	U	NA		2	U
SVOCs	2,3,4,6-Tetrachlorophenol	58-90-2	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2,4,5-Trichlorophenol	95-95-4	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2,4,6-Trichlorophenol	88-06-2	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2,4-Dichlorophenol	120-83-2	1	1	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2,4-Dimethylphenol	105-67-9	50	1000	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2,4-Dinitrophenol	51-28-5	10	400	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	2,4-Dinitrotoluene	121-14-2	5	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2,6-Dinitrotoluene	606-20-2	5	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2-Chloronaphthalene	91-58-7	10	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2-Chlorophenol	95-57-8	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2-Methylnaphthalene	91-57-6	NL	42	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2-Methylphenol	95-48-7	NL	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	2-Nitroaniline	88-74-4	5	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	2-Nitrophenol	88-75-5	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	3,3'-Dichlorobenzidine	91-94-1	5	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	3-Nitroaniline	99-09-2	5	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4,6-Dinitro-2-Methylphenol	534-52-1	NL	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4-Bromophenyl Phenyl Ether	101-55-3	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	4-Chloro-3-Methylphenol	59-50-7	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	4-Chloroaniline	106-47-8	5	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4-Chlorophenyl Phenyl Ether	7005-72-3	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	4-Methylphenol	106-44-5	NL	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4-Nitroaniline	100-01-6	5	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4-Nitrophenol	100-02-7	NL	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Acenaphthene	83-32-9	20	48*	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Acenaphthylene	208-96-8	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Acetophenone	98-86-2	NL	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Anthracene	120-12-7	50	35*	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Atrazine	1912-24-9	7.5	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Benzaldehyde	100-52-7	NL	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Benzo(A)Anthracene	56-55-3	0.002	0.23*	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Benzo(A)Pyrene	50-32-8	NL	0.0012*	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Benzo(B)Fluoranthene	205-99-2	0.002	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Benzo(G,H,I)Perylene	191-24-2	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Benzo(K)Fluoranthene	207-08-9	0.002	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U

Table A-7
Analytical Results – Surface Water
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

Method Group	Chemical Name	CAS No.	Surfacewater Criteria	D-Class Criteria (FC)	Sample Location	SW-01		SW-01		SW-01		SW-02		SW-02		SW-03		SW-03		SW-03		SW-03		SW-04		SW-04		SW-05		SW-05	
					Sample Name	SW-01-F-PDI		SW-01-PDI		SW-02-F-PDI		SW-02-PDI		SW-02-R		SW-03-F-PDI		SW-03-PDI		SW-903-F-PDI		SW-903-PDI		SW-04-F-PDI		SW-04-PDI		SW-05-F-PDI		SW-05-PDI	
					Sample Date	10/4/2018		10/4/2018		10/5/2018		10/5/2018		10/8/2018		10/5/2018		10/5/2018		10/5/2018		10/5/2018		10/8/2018		10/8/2018		10/8/2018		10/8/2018	
					Sample Type	N		N		N		N		N		N		N		FD		FD		N		N		N		N	
					Parent Sample															SW-03-F-PDI		SW-03-PDI									
					Unit	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
SVOCs	Benzyl Butyl Phthalate	85-68-7	50	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Bis(2-Chloroethoxy)Methane	111-91-1	5	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Bis(2-Chloroethyl) Ether	111-44-4	1	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Bis(2-Ethylhexyl)Phthalate	117-81-7	5	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Bis-Chloroisopropyl Ether	108-60-1	5	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Caprolactam	105-60-2	NL	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Carbazole	86-74-8	NL	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Chrysene	218-01-9	0.002	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Dibenzo(A,H)Anthracene	53-70-3	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Dibenzofuran	132-64-9	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Diethyl Phthalate	84-66-2	50	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Dimethyl Phthalate	131-11-3	50	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Di-N-Butylphthalate	84-74-2	50	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Di-N-Octylphthalate	117-84-0	50	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Fluoranthene	206-44-0	50	NL	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Fluorene	86-73-7	50	4.8	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Hexachloro-1,3-Butadiene	87-68-3	0.5	0.01	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Hexachlorobenzene	118-74-1	0.04	0.00003	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Hexachlorocyclopentadiene	77-47-4	5	4.5	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Hexachloroethane	67-72-1	5	0.6	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Indeno(1,2,3-Cd)Pyrene	193-39-5	0.002	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Isophorone	78-59-1	50	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Naphthalene	91-20-3	10	110	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Nitrobenzene	98-95-3	0.4	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	N-Nitroso-Di-N-Propylamine	621-64-7	NL	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	N-Nitrosodiphenylamine	86-30-6	50	NL	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Pentachlorophenol	87-86-5	1	1	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Phenanthrene	85-01-8	50	45*	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
SVOCs	Phenol	108-95-2	1	1	µg/L	NA		10	U	NA		10	U	NA		NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Pyrene	129-00-0	50	42*	µg/L	NA		5.1	U	NA		5.2	U	NA		NA		5.6	U	NA		5.3	U	NA		5.1	U	NA		5	U
VOCs	1,1,1-Trichloroethane	71-55-6	5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1,2-Trichloroethane	79-00-5	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1-Dichloroethane	75-34-3	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1-Dichloroethene	75-35-4	0.5	NL	µg/L	NA		0.5	UL	NA		0.5	UL	NA		NA		0.5	UL	NA		0.5	UL	NA		0.5	UL	NA		0.5	UL
VOCs	1,2,3-Trichlorobenzene	87-61-6	0.5	50	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2,4-Trichlorobenzene	120-82-1	0.5	50	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dibromo-3-Chloropropane	96-12-8	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dibromoethane	106-93-4	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dichlorobenzene	95-50-1	0.5	50	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dichloroethane	107-06-2	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dichloropropane	78-87-5	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,3-Dichlorobenzene	541-73-1	0.5	50	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,4-Dichlorobenzene	106-46-7	0.5	50	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	2-Butanone (MEK)	78-93-3	5	NL	µg/L	NA		5	U	NA		5	U	NA		NA		5	U	NA		5	U	NA		5	U	NA		5	U
VOCs	2-Hexanone	591-78-6	5	NL	µg/L	NA		5	U	NA		5	U	NA		NA		5	U	NA		5	U	NA		5	U	NA		5	U
VOCs	4-Methyl-2-Pentanone (MIBK)	108-10-1	5	NL	µg/L	NA		5	U	NA		5	U	NA		NA		5	U	NA		5	U	NA		5	U	NA		5	U
VOCs	Acetone	67-64-1	5	NL	µg/L	NA		5	U	NA		5	U	NA		NA		5	U	NA		5	U	NA		5	U	NA		5	U
VOCs	Benzene	71-43-2	0.5	10	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U

Table A-7
Analytical Results – Surface Water
Eighteen Mile Creek Superfund Site
Operable Units 1 2 – Remedial Design
City of Lockport, New York

					Sample Location	SW-01		SW-01		SW-01		SW-02		SW-02		SW-03		SW-03		SW-03		SW-03		SW-04		SW-04		SW-05		SW-05	
					Sample Name	SW-01-F-PDI		SW-01-PDI		SW-02-F-PDI		SW-02-PDI		SW-02-R		SW-03-F-PDI		SW-03-PDI		SW-903-F-PDI		SW-903-PDI		SW-04-F-PDI		SW-04-PDI		SW-05-F-PDI		SW-05-PDI	
					Sample Date	10/4/2018		10/4/2018		10/5/2018		10/5/2018		10/8/2018		10/5/2018		10/5/2018		10/5/2018		10/5/2018		10/8/2018		10/8/2018		10/8/2018		10/8/2018	
					Sample Type	N		N		N		N		N		N		N		FD		FD		N		N		N		N	
			Surfacewater	D-Class	Parent Sample															SW-03-F-PDI		SW-03-PDI									
Method Group	Chemical Name	CAS No.	Criteria	Criteria (FC)	Unit	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
VOCs	Bromochloromethane	74-97-5	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Bromodichloromethane	75-27-4	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Bromoform	75-25-2	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Bromomethane	74-83-9	0.5	NL	µg/L	NA		1	U	NA		1	U	NA		NA		1	U	NA		1	U	NA		1	U	NA		1	U
VOCs	Carbon Disulfide	75-15-0	0.5	NL	µg/L	NA		0.5	UL	NA		0.5	UL	NA		NA		0.5	UL	NA		0.5	UL	NA		0.5	UL	NA		0.5	UL
VOCs	Carbon Tetrachloride	56-23-5	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Chlorobenzene	108-90-7	0.5	400	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Chloroethane	75-00-3	0.5	NL	µg/L	NA		1	U	NA		1	U	NA		NA		1	U	NA		1	U	NA		1	U	NA		1	U
VOCs	Chloroform	67-66-3	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Chloromethane	74-87-3	0.5	NL	µg/L	NA		**1.2**		NA		**1.3**		NA		NA		**1.3**		NA		**1.2**		NA		**1.1**		NA		**1.2**	
VOCs	Cis-1,2-Dichloroethene	156-59-2	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Cis-1,3-Dichloropropene	10061-01-5	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Cyclohexane	110-82-7	0.5	NL	µg/L	NA		0.5	UL	NA		0.5	UL	NA		NA		0.5	UL	NA		0.5	UL	NA		0.5	UL	NA		0.5	UL
VOCs	Dibromochloromethane	124-48-1	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Dichlorodifluoromethane	75-71-8	0.5	NL	µg/L	NA		0.5	UL	NA		0.5	UL	NA		NA		0.5	UL	NA		0.5	UL	NA		0.5	UL	NA		0.5	UL
VOCs	Ethylbenzene	100-41-4	0.5	150*	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Isopropylbenzene	98-82-8	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	M,P-Xylene	179601-23-1	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Methyl Acetate	79-20-9	0.5	NL	µg/L	NA		1	U	NA		1	U	NA		NA		1	U	NA		1	U	NA		1	U	NA		1	U
VOCs	Methyl Tert-Butyl Ether	1634-04-4	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Methylcylohexane	108-87-2	0.5	NL	µg/L	NA		0.5	UL	NA		0.5	UL	NA		NA		0.5	UL	NA		0.5	UL	NA		0.5	UL	NA		0.5	UL
VOCs	Methylene Chloride	75-09-2	0.5	200	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	O-Xylene	95-47-6	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Styrene	100-42-5	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Tetrachloroethene	127-18-4	0.5	1*	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Toluene	108-88-3	0.5	6000	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Trans-1,2-Dichloroethene	156-60-5	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Trans-1,3-Dichloropropene	10061-02-6	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Trichloroethene	79-01-6	0.5	40	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Trichlorofluoromethane	75-69-4	0.5	NL	µg/L	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Vinyl Chloride	75-01-4	0.5	NL	µg/L	NA		0.5	UJ	NA		0.5	UJ	NA		NA		0.5	UJ	NA		0.5	UJ	NA		0.5	UJ	NA		0.5	UJ

Notes:
1. Surface water criteria from NYSDEC TOGS 1.1.1 (2011)
2. The more stringent between class D and GA selected as a criteria.
* Guidance Value (µg/L)
All depths are in feet below ground surface
Highlighted and bolded values exceeded the surface water criteria

Abbreviations:
µg/L - microgram/liter
ALK - alkalinity
CAS No. - Chemical Abstracts Service number
CLP - Superfund Contract Laboratory Program
FD - field duplicate
GW - groundwater
N - normal/field sample
NL - not listed
mg/L - milligram/liter
PCB - polychlorinated biphenyls
Q - qualifier
SVOCs - semivolatile organic compounds
TDS - total dissolved solids
TSS - total suspended solids
TOC - total organic carbon
VOCs - volatile organic compounds
J - The identification of the analyte is acceptable; the reported value is an estimate.
U - The analyte was not detected at or above the Reporting Limit.
UL - The analyte was not detected at or above the Reporting Limit. The identification of the analyte is acceptable; the reported value may be biased low.
UJ - The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table A-8
Analytical Results – Groundwater
Eighteen Mile Creek Superfund Site
Operable Units 1 and 2
Niagara County, NY

				Sample Location	MW-01		MW-01		MW-05		MW-05		MW-05		MW-05		TWP-02		TWP-02	
				Sample Name	MW-01-F-PDI		MW-01-PDI		MW-05-F-PDI		MW-05-PDI		MW-905-F-PDI		MW-905-PDI		TWP-02-F-PDI		TWP-02-PDI	
				Sample Date	10/10/2018		10/10/2018		10/11/2018		10/11/2018		10/11/2018		10/11/2018		10/10/2018		10/10/2018	
				Sample Type	N		N		N		N		FD		FD		N		N	
				Parent Sample Name									MW-05-F-PDI		MW-05-PDI					
Method Group	**Chemical Name**	**CAS No.**	**Groundwater Criteria**	**Unit**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
ALK	Alkalinity, Carbonate (As $CaCO_3$)	ALKC	NL	mg/L	NA		440		NA		370		NA		360		NA		240	
Anions, Sulfate	Chloride	16887-00-6	250	mg/L	NA		220		NA		**350**		NA		**380**		NA		78	
Anions, Sulfate	Sulfate	14808-79-8	250	mg/L	NA		200		NA		**270**		NA		200		NA		110	
Cyanide, Total	Cyanide	57-12-5	200	µg/L	NA		10	U	NA		10	U	NA		10	U	NA		10	U
Hydrocarbons	Gasoline Range Hydrocarbons	8006-61-9	NL	µg/L	NA		100	U	NA		100	U	NA		100	U	NA		100	U
Hydrocarbons	Total Petroleum Hydrocarbons As Diesel	68334-30-5	NL	µg/L	NA		100	U	NA		95	U	NA		95	U	NA		96	
TDS	Total Dissolved Solids	TDS	1000	mg/L	NA		**1100**		NA		**1600**		NA		**1600**		NA		580	
TOC	Total Organic Carbon	TOC	NL	mg/L	NA		1.6		NA		3.8		NA		2.8		NA		3.4	
TSS	Total Suspended Solids	TSS	NL	mg/L	NA		10	U	NA		39		NA		13		NA		10	U
Metals	Aluminum	7429-90-5	NL	µg/L	20	U	140		20	U	50		20	U	2900		20	U	20	
Metals	Antimony	7440-36-0	3	µg/L	1	U	1	U	1.6		1.5		1.5		1.4		1	U	1	U
Metals	Arsenic	7440-38-2	25	µg/L	1	U	1	U	1.9		2.2		1.9		5.2		1	U	1	U
Metals	Barium	7440-39-3	1000	µg/L	46		48		160		200		180		160		71		71	
Metals	Beryllium	7440-41-7	3	µg/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Cadmium	7440-43-9	5	µg/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Calcium	7440-70-2	NL	µg/L	170000		170000		220000		210000		220000		210000		100000		100000	
Metals	Chromium	7440-47-3	50	µg/L	1	U	1	U	1	U	1	U	1	U	3.7		1	U	1	U
Metals	Cobalt	7440-48-4	NL	µg/L	1	U	1	U	3		3.8		3.3		2.3		1	U	1	U
Metals	Copper	7440-50-8	200	µg/L	1	U	1.2		1	U	1	U	1	U	5.9		1	U	3.7	
Metals	Iron	7439-89-6	300	µg/L	20	U	**310**		**690**		**1300**		**900**		**4100**		**3500**		**3600**	
Metals	Lead	7439-92-1	25	µg/L	1	U	1.1		1	U	2.1		1	U	**150**		1	U	1.7	
Metals	Magnesium	7439-95-4	35000	µg/L	**37000**		**39000**		**74000**		**61000**		**68000**		**65000**		20000		21000	
Metals	Manganese	7439-96-5	300	µg/L	13		150		**340**		**360**		**360**		**470**		260		270	
Metals	Mercury	7439-97-6	0.7	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Metals	Nickel	7440-02-0	100	µg/L	1	U	1	U	12		14		6.8		6		2.6		3.3	
Metals	Potassium	7440-09-7	NL	µg/L	5400		5500		5200		5100		5100		5300		3200		3300	
Metals	Selenium	7782-49-2	10	µg/L	4.5		4.8		1	U	1	U	1	U	1	U	1	U	1	U
Metals	Silver	7440-22-4	50	µg/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Sodium	7440-23-5	20000	µg/L	**140000**		**150000**		**95000**		**100000**		**97000**		**97000**		**43000**		**46000**	
Metals	Thallium	7440-28-0	0.5	µg/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Metals	Vanadium	7440-62-2	NL	µg/L	1	U	1	U	1.6		1.2		1.3		5		1	U	1	U
Metals	Zinc	7440-66-6	2000	µg/L	2	U	2	U	2	U	2.8		2.3		66		28		74	
Nitrogen	Nitrate/Nitrite	7727-37-9	10	mg/L	NA		1		NA		0.05	U	NA		0.05	U	NA		0.05	U
PCB Aroclors	Aroclor 1016	12674-11-2	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
PCB Aroclors	Aroclor 1221	11104-28-2	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
PCB Aroclors	Aroclor 1232	11141-16-5	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
PCB Aroclors	Aroclor 1242	53469-21-9	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
PCB Aroclors	Aroclor 1248	12672-29-6	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
PCB Aroclors	Aroclor 1254	11097-69-1	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
PCB Aroclors	Aroclor 1260	11096-82-5	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
PCB Aroclors	Aroclor 1262	37324-23-5	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
PCB Aroclors	Aroclor 1268	11100-14-4	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
PCB Aroclors	PCB-Aroclors (Unspecified)	12767-79-2	0.09	µg/L	NA		0.4	U	NA		0.4	U	NA		0.4	U	NA		0.4	U
Pesticides (CLP)	4,4'-DDD	72-54-8	0.2	µg/L	NA		0.1	U	NA		0.1	UJ	NA		0.1	U	NA		0.1	U
Pesticides (CLP)	4,4'-DDE	72-55-9	0.2	µg/L	NA		0.1	U	NA		0.1	UJ	NA		0.1	U	NA		0.1	U
Pesticides (CLP)	4,4'-DDT	50-29-3	0.2	µg/L	NA		0.1	U	NA		0.1	UJ	NA		0.1	U	NA		0.1	U
Pesticides (CLP)	Aldrin	309-00-2	NL	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U
Pesticides (CLP)	Alpha-BHC	319-84-6	0.01	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U
Pesticides (CLP)	Beta-BHC	319-85-7	0.04	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U
Pesticides (CLP)	Cis-Chlordane	5103-71-9	0.05	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U
Pesticides (CLP)	Delta-BHC	319-86-8	0.05	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U
Pesticides (CLP)	Dieldrin	60-57-1	0.004	µg/L	NA		0.1	U	NA		0.1	UJ	NA		0.1	U	NA		0.1	U
Pesticides (CLP)	Endosulfan I	959-98-8	5	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U

Table A-8
Analytical Results – Groundwater
Eighteen Mile Creek Superfund Site
Operable Units 1 and 2
Niagara County, NY

				Sample Location	MW-01		MW-01		MW-05		MW-05		MW-05		MW-05		TWP-02		TWP-02	
				Sample Name	MW-01-F-PDI		MW-01-PDI		MW-05-F-PDI		MW-05-PDI		MW-905-F-PDI		MW-905-PDI		TWP-02-F-PDI		TWP-02-PDI	
				Sample Date	10/10/2018		10/10/2018		10/11/2018		10/11/2018		10/11/2018		10/11/2018		10/10/2018		10/10/2018	
				Sample Type	N		N		N		N		FD		FD		N		N	
				Parent Sample Name									MW-05-F-PDI		MW-05-PDI					
Method Group	**Chemical Name**	**CAS No.**	**Groundwater Criteria**	**Unit**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Pesticides (CLP)	Endosulfan II	33213-65-9	5	µg/L	NA		0.1	U	NA		0.1	UJ	NA		0.1	U	NA		0.1	U
Pesticides (CLP)	Endosulfan Sulfate	1031-07-8	5	µg/L	NA		0.1	U	NA		0.1	UJ	NA		0.1	U	NA		0.1	U
Pesticides (CLP)	Endrin	72-20-8	NL	µg/L	NA		0.1	U	NA		0.1	UJ	NA		0.1	U	NA		0.1	U
Pesticides (CLP)	Endrin Aldehyde	7421-93-4	5	µg/L	NA		0.1	U	NA		0.1	UJ	NA		0.1	U	NA		0.1	U
Pesticides (CLP)	Endrin Ketone	53494-70-5	5	µg/L	NA		0.1	U	NA		0.1	UJ	NA		0.1	U	NA		0.1	U
Pesticides (CLP)	Gamma-Bhc (Lindane)	58-89-9	0.05	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U
Pesticides (CLP)	Heptachlor	76-44-8	0.04	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U
Pesticides (CLP)	Heptachlor Epoxide	1024-57-3	0.03	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U
Pesticides (CLP)	Methoxychlor	72-43-5	35	µg/L	NA		0.52	U	NA		0.51	UJ	NA		0.52	U	NA		0.52	U
Pesticides (CLP)	Toxaphene	8001-35-2	0.06	µg/L	NA		5.2	U	NA		5.1	UJ	NA		5.2	U	NA		5.2	U
Pesticides (CLP)	Trans-Chlordane	5103-74-2	0.05	µg/L	NA		0.052	U	NA		0.051	UJ	NA		0.052	U	NA		0.052	U
SVOCs	1,1'-Biphenyl	92-52-4	5	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	1,2,4,5-Tetrachlorobenzene	95-94-3	5	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	1,4-Dioxane	123-91-1	NL	µg/L	NA		2.1	U	NA		2.1	UJ	NA		2.1	UJ	NA		2	U
SVOCs	2,3,4,6-Tetrachlorophenol	58-90-2	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2,4,5-Trichlorophenol	95-95-4	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2,4,6-Trichlorophenol	88-06-2	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2,4-Dichlorophenol	120-83-2	1	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2,4-Dimethylphenol	105-67-9	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2,4-Dinitrophenol	51-28-5	10	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	2,4-Dinitrotoluene	121-14-2	5	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2,6-Dinitrotoluene	606-20-2	5	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2-Chloronaphthalene	91-58-7	10	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2-Chlorophenol	95-57-8	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2-Methylnaphthalene	91-57-6	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2-Methylphenol	95-48-7	NL	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	2-Nitroaniline	88-74-4	5	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	2-Nitrophenol	88-75-5	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	3,3'-Dichlorobenzidine	91-94-1	5	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	3-Nitroaniline	99-09-2	5	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4,6-Dinitro-2-Methylphenol	534-52-1	NL	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4-Bromophenyl Phenyl Ether	101-55-3	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	4-Chloro-3-Methylphenol	59-50-7	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	4-Chloroaniline	106-47-8	5	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4-Chlorophenyl Phenyl Ether	7005-72-3	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	4-Methylphenol	106-44-5	NL	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4-Nitroaniline	100-01-6	5	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	4-Nitrophenol	100-02-7	NL	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Acenaphthene	83-32-9	20	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Acenaphthylene	208-96-8	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Acetophenone	98-86-2	NL	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Anthracene	120-12-7	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Atrazine	1912-24-9	7.5	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Benzaldehyde	100-52-7	NL	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Benzo(A)Anthracene	56-55-3	0.002	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Benzo(A)Pyrene	50-32-8	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Benzo(B)Fluoranthene	205-99-2	0.002	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Benzo(G,H,I)Perylene	191-24-2	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Benzo(K)Fluoranthene	207-08-9	0.002	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Benzyl Butyl Phthalate	85-68-7	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Bis(2-Chloroethoxy)Methane	111-91-1	5	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Bis(2-Chloroethyl) Ether	111-44-4	1	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Bis(2-Ethylhexyl)Phthalate	117-81-7	5	µg/L	NA		5.3	U	NA		1.2	J	NA		5.2	U	NA		5.1	U

Table A-8
Analytical Results – Groundwater
Eighteen Mile Creek Superfund Site
Operable Units 1 and 2
Niagara County, NY

				Sample Location	MW-01		MW-01		MW-05		MW-05		MW-05		MW-05		TWP-02		TWP-02	
				Sample Name	MW-01-F-PDI		MW-01-PDI		MW-05-F-PDI		MW-05-PDI		MW-905-F-PDI		MW-905-PDI		TWP-02-F-PDI		TWP-02-PDI	
				Sample Date	10/10/2018		10/10/2018		10/11/2018		10/11/2018		10/11/2018		10/11/2018		10/10/2018		10/10/2018	
				Sample Type	N		N		N		N		FD		FD		N		N	
				Parent Sample Name									MW-05-F-PDI		MW-05-PDI					
Method Group	**Chemical Name**	**CAS No.**	**Groundwater Criteria**	**Unit**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
SVOCs	Bis-Chloroisopropyl Ether	108-60-1	5	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Caprolactam	105-60-2	NL	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Carbazole	86-74-8	NL	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Chrysene	218-01-9	0.002	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Dibenzo(A,H)Anthracene	53-70-3	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Dibenzofuran	132-64-9	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Diethyl Phthalate	84-66-2	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Dimethyl Phthalate	131-11-3	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Di-N-Butylphthalate	84-74-2	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Di-N-Octylphthalate	117-84-0	50	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Fluoranthene	206-44-0	50	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Fluorene	86-73-7	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Hexachloro-1,3-Butadiene	87-68-3	0.5	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Hexachlorobenzene	118-74-1	0.04	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Hexachlorocyclopentadiene	77-47-4	5	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Hexachloroethane	67-72-1	5	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Indeno(1,2,3-Cd)Pyrene	193-39-5	0.002	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Isophorone	78-59-1	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Naphthalene	91-20-3	10	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Nitrobenzene	98-95-3	0.4	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	N-Nitroso-Di-N-Propylamine	621-64-7	NL	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	N-Nitrosodiphenylamine	86-30-6	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Pentachlorophenol	87-86-5	1	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Phenanthrene	85-01-8	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
SVOCs	Phenol	108-95-2	1	µg/L	NA		11	U	NA		11	U	NA		10	U	NA		10	U
SVOCs	Pyrene	129-00-0	50	µg/L	NA		5.3	U	NA		5.3	U	NA		5.2	U	NA		5.1	U
VOCs	1,1,1-Trichloroethane	71-55-6	5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1,2-Trichloroethane	79-00-5	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1-Dichloroethane	75-34-3	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,1-Dichloroethene	75-35-4	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2,3-Trichlorobenzene	87-61-6	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2,4-Trichlorobenzene	120-82-1	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dibromo-3-Chloropropane	96-12-8	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dibromoethane	106-93-4	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dichlorobenzene	95-50-1	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dichloroethane	107-06-2	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,2-Dichloropropane	78-87-5	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,3-Dichlorobenzene	541-73-1	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	1,4-Dichlorobenzene	106-46-7	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	2-Butanone (MEK)	78-93-3	5	µg/L	NA		5	UJ	NA		5	U	NA		5	U	NA		5	UJ
VOCs	2-Hexanone	591-78-6	5	µg/L	NA		5	U	NA		5	U	NA		5	U	NA		5	U
VOCs	4-Methyl-2-Pentanone (MIBK)	108-10-1	5	µg/L	NA		5	U	NA		5	U	NA		5	U	NA		5	U
VOCs	Acetone	67-64-1	5	µg/L	NA		5	U	NA		5	U	NA		5	U	NA		5	U
VOCs	Benzene	71-43-2	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Bromochloromethane	74-97-5	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Bromodichloromethane	75-27-4	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Bromoform	75-25-2	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Bromomethane	74-83-9	0.5	µg/L	NA		1	U	NA		1	U	NA		1	U	NA		1	U
VOCs	Carbon Disulfide	75-15-0	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Carbon Tetrachloride	56-23-5	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Chlorobenzene	108-90-7	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U

Table A-8
Analytical Results – Groundwater
Eighteen Mile Creek Superfund Site
Operable Units 1 and 2
Niagara County, NY

				Sample Location	MW-01		MW-01		MW-05		MW-05		MW-05		MW-05		TWP-02		TWP-02	
				Sample Name	MW-01-F-PDI		MW-01-PDI		MW-05-F-PDI		MW-05-PDI		MW-905-F-PDI		MW-905-PDI		TWP-02-F-PDI		TWP-02-PDI	
				Sample Date	10/10/2018		10/10/2018		10/11/2018		10/11/2018		10/11/2018		10/11/2018		10/10/2018		10/10/2018	
				Sample Type	N		N		N		N		FD		FD		N		N	
				Parent Sample Name									MW-05-F-PDI		MW-05-PDI					
Method Group	**Chemical Name**	**CAS No.**	**Groundwater Criteria**	**Unit**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
VOCs	Chloroethane	75-00-3	0.5	µg/L	NA		1	U	NA		1	U	NA		1	U	NA		1	U
VOCs	Chloroform	67-66-3	0.5	µg/L	NA		**0.86**		NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Chloromethane	74-87-3	0.5	µg/L	NA		1	U	NA		**1**		NA		**1.1**		NA		1	U
VOCs	Cis-1,2-Dichloroethene	156-59-2	0.5	µg/L	NA		0.5	U	NA		**11**		NA		**8.9**		NA		0.5	U
VOCs	Cis-1,3-Dichloropropene	10061-01-5	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Cyclohexane	110-82-7	0.5	µg/L	NA		0.5	UL	NA		0.5	UL	NA		0.5	UL	NA		0.5	UL
VOCs	Dibromochloromethane	124-48-1	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Dichlorodifluoromethane	75-71-8	0.5	µg/L	NA		0.5	UL	NA		0.5	UL	NA		0.5	UL	NA		0.5	UL
VOCs	Ethylbenzene	100-41-4	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Isopropylbenzene	98-82-8	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	M,P-Xylene	179601-23-1	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Methyl Acetate	79-20-9	0.5	µg/L	NA		1	U	NA		1	U	NA		1	U	NA		1	U
VOCs	Methyl Tert-Butyl Ether	1634-04-4	0.5	µg/L	NA		0.5	UJ	NA		0.5	U	NA		0.5	U	NA		0.5	UJ
VOCs	Methylcylohexane	108-87-2	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Methylene Chloride	75-09-2	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	O-Xylene	95-47-6	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Styrene	100-42-5	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Tetrachloroethene	127-18-4	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Toluene	108-88-3	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Trans-1,2-Dichloroethene	156-60-5	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Trans-1,3-Dichloropropene	10061-02-6	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Trichloroethene	79-01-6	0.5	µg/L	NA		0.5	U	NA		0.5	U	NA		0.5	U	NA		0.5	U
VOCs	Trichlorofluoromethane	75-69-4	0.5	µg/L	NA		0.5	UL	NA		0.5	U	NA		0.5	U	NA		0.5	UL
VOCs	Vinyl Chloride	75-01-4	0.5	µg/L	NA		0.5	UJ	NA		**1.1**	J	NA		**0.91**	J	NA		0.5	UJ

Notes:
All depths are in feet below ground surface
Highlighted and bolded values exceeded the groundwater criteria

Abbreviations:
µg/L - microgram/liter
ALK - alkalinity
CAS No. - chemical abstracts service number
CLP - Superfund Contract Laboratory Program
FD - field duplicate
GW - groundwater
mg/L - milligram/liter
N - normal/field sample
NA - not analyzed
NL - not listed
PCB - polychlorinated biphenyls
Q - qualifier
SVOCs - semivolatile organic compounds
TDS - total dissolved solids
TSS - total suspended solids
TOC - total organic carbon
J - The identification of the analyte is acceptable; the reported value is an estimate.
U - The analyte was not detected at or above the Reporting Limit.
UL - The analyte was not detected at or above the Reporting Limit. The identification of the analyte is acceptable; the reported value may be biased low.
UJ - The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
VOCs - volatile organic compounds

Attachment B

Soil and Sediment Logs

PDI Soil and Sediment Logs

Boring Number: 18MC-L02E-S04A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: White Transportation Property
N: 1157560 **E:** 1120552
Drilling Date: Start: 10/15/2018 **End:** 10/15/2018

Surface Elevation (ft.): 492.9
Total Borehole Depth (ft.): 11.9
Depth to Initial Water Level (ft):

Depth	Date	Time
NR	10/15/2018	1300

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
492.9 / 0	GP	1	48	24		Fill	Moist, black, fine to coarse SAND and fine GRAVEL (cinders), trace silt (SP-GP)	ENV: 2-4' Lead, TCLP Lead at 1300
							Dry, black, fine to medium SAND and SILT, some fine gravel (SM)	
487.9 / 5	GP	2	48	41			Dry, brown, fine to medium SAND and SILT, trace fine gravel (SM)	ENV: 4-6' Lead, TCLP Lead at 1300
							Dry, brown, fine to medium SAND and SILT, trace fine gravel, trace slag (SM)	ENV: 6-8' Lead, TCLP Lead at 1300
							Dry, white and brown, fine to coarse GRAVEL and fine to medium SAND, some silt (GM-SM)	
							Dry, brown, fine to coarse SAND and fine to coarse GRAVEL (cinders and slag) (SP-GP)	ENV: 8-10' Lead, TCLP Lead at 1300
482.9 / 10	GP	3	47	30		SM	Dry, light brown, fine SAND and SILT, trace fine gravel (SM)	ENV: 6-8' Lead, TCLP Lead x2 at 1300
						WR	Dry, white, fine to coarse GRAVEL, little fine to medium sand, little silt (Pulverized Dolostone) (GP)	
477.9 / 15							Exploration terminated at 11.9 ft bgs (refusal).	
472.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L02E-S04A**

CDM Smith

Boring Number: 18MC-L02W-S04A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157188 **E:** 1120018
Drilling Date: Start: 10/18/2018 **End:** 10/18/2018

Surface Elevation (ft.): 506
Total Borehole Depth (ft.): 8.4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/18/2018	1245

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
506.0 / 0	GP	1	48	27		Fill	Moist, brown, fine to coarse SAND, little clayey silt, little fine to coarse gravel, trace roots (SP-SM)	
							Dry, brown-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace metal, trace debris (SP)	ENV: 3-5' Lead, TCLP Lead x2 at 1220; 4.5-5' PCBs at 1220
501.0 / 5	GP	2	48	30				ENV: 5-7' Lead, TCLP Lead x2 at 1220; 6-6.5' PCBs at 1220
						Silt	Dry, light brown Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML)	
	GP	3	4	4		WR	Dry, light brown, fine to coarse GRAVEL, little clayey silt, little fine to medium sand (Crushed Dolostone Fragments) (GP)	ENV: 7-8.4 Lead at 1220
496.0 / 10							Exploration terminated at 8.4 ft bgs (refusal).	Refusal at 7.3 ft bgs on first attempt.
491.0 / 15								
486.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L02W-S04A**

CDM Smith

Boring Number: 18MC-L02W-S05A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157171 **E:** 1120062
Drilling Date: Start: 10/18/2018 **End:** 10/18/2018

Surface Elevation (ft.): 497.2
Total Borehole Depth (ft.): 1.9
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/18/2018	1310

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
497.2 / 0	GP	1	23	18		Sand	Moist, brown, fine to medium SAND, some silt, little fine to coarse gravel, trace debris, trace roots (SP)	ENV: 0-2' Lead, TCLP Lead at 1300
							Moist, red-brown, fine to coarse SAND, some fine to coarse gravel, little silt (SP)	
						WR	Dry, white, fine to coarse GRAVEL and SILT, little fine to medium sand (Crushed Dolostone) (GM)	HCl reaction with WR material.
							Exploration terminated at 1.9 ft bgs (refusal).	Refusal at 1.4 ft bgs on first attempt.
492.2 / 5								
487.2 / 10								
482.2 / 15								
477.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L02W-S05A**

CDM Smith

Boring Number: 18MC-L03W-S05A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157356 **E:** 1120137
Drilling Date: Start: 9/18/2018 **End:** 9/18/2018

Surface Elevation (ft.): 495.3
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/18/2018	1320

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
495.3 / 0	SH	1	36	26		SP-GP	Top 16": Dry, red-brown-white, fine to medium SAND and fine to coarse GRAVEL, little silt, trace roots (SP-GP)	Effort: Moderate ENV: 1-3' Lead, TCLP Lead at 1320 Effort: Difficult
						WR	Bottom 10": Dry, light brown-white, fine to coarse GRAVEL, some silt, little fine to medium sand (GM) (Weathered Dolostone)	Effort: Difficult
							Exploration terminated at 3 ft bgs.	
490.3 / 5								
485.3 / 10								
480.3 / 15								
475.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L03W-S05A**

CDM Smith

Boring Number: 18MC-L08-S05A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158150 **E:** 1120326
Drilling Date: Start: 10/11/2018 **End:** 10/11/2018

Surface Elevation (ft.): 479.9
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NR	10/11/2018	1215

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
479.9 / 0	GP	1	48	26		Fill	Dry, black, fine to coarse SAND, some fine to coarse gravel, trace cinders, trace concrete (SP)	ENV: 2-5' PCBs at 1215
474.9 / 5	GP	2	48	32		Silt	Moist, brown, Clayey SILT, trace fine sand, trace wood (ML)	ENV: 5-8' PCBs at 1215
						Clay	Wet, black, Silty CLAY, trace fine sand, trace wood (CL)	
							Exploration terminated at 8 ft bgs.	
469.9 / 10								
464.9 / 15								
459.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L08-S05A**

CDM Smith

Boring Number: 18MC-L09-S01A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158349 **E:** 1120237
Drilling Date: Start: 10/5/2018 **End:** 10/5/2018

Surface Elevation (ft.): 470
Total Borehole Depth (ft.): 5.3
Depth to Initial Water Level (ft):

Depth	Date	Time
2.2	10/5/2018	1245

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.0 / 0	GP	1	48	30		Fill	Dry to moist, brown, fine to coarse SAND, little clayey silt, little fine to coarse gravel, trace roots, trace wood, trace brick, trace debris (SP)	ENV: 1-2' Lead at 1230 ENV: 2-4' Lead at 1230; 2-6' Or Nat, PCB at 1230
465.0 / 5	GP	2	15	10		Gravel	Wet, brown to red-light brown, fine to coarse GRAVEL, some clayey silt, trace fine to coarse gravel (GM)	ENV: 4-6' Lead at 1230
							Exploration terminated at 5.3 ft bgs.	Gray Siltstone fragments in tip.
460.0 / 10								
455.0 / 15								
450.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L09-S01A**

CDM Smith

Boring Number: 18MC-L09-S04A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158343 **E:** 1120211
Drilling Date: Start: 10/8/2018 **End:** 10/8/2018

Surface Elevation (ft.): 476.6
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
8	10/8/2018	1015

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
476.6 0	GP	1	48	28		Fill	2" Topsoil Dry, dark brown-black, fine to coarse SAND, little fine to coarse gravel (slag), little silt, trace roots, trace debris (SP)	ENV: 2-4' Lead, TCLP Lead at 1030 2-5' PCBs at 1030 Wood fragments 3.7-4'.
471.6 5	GP	2	48	22		Silt and Clay	Moist, gray-green, Silty CLAY, little fine to coarse gravel, little fine to coarse sand (CL)	ENV: 4-6' Lead x2, TCLP Lead at 1030 Material 4 to 6.5 ft bgs mottled red-brown and light brown. ENV: 5-8' PCBs at 1030 6-8' Lead, TCLP Lead at 1030
▼							Moist to wet, red-brown, Clayey SILT, little fine to medium sand, little fine to coarse gravel (ML)	
466.6 10	GP	3	48	45				Material becomes wet at 8 ft bgs. ENV: 8-10' Lead, TCLP Lead at 1030 8-12' PCBs at 1030 ENV: 10-12' Lead, TCLP Lead at 1030
							Moist, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	Gray, SILTSTONE fragments at 11.5 ft bgs.
461.6 15							Exploration terminated at 12 ft bgs (no refusal).	
456.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L09-S04A**

CDM Smith

Boring Number: 18MC-L09-S05A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158370 **E:** 1120283
Drilling Date: Start: 10/9/2018 **End:** 10/9/2018

Surface Elevation (ft.): 473.5
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
6	10/9/2018	1030

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
473.5 / 0	GP	1	48	42		Fill	Dry, brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace debris (SP)	Boulder encountered 1 to 2 ft bgs. ENV: 2-4' Lead, TCLP Lead at 1030 2-5' PCBs at 1030 ENV: 4-6' Lead, TCLP Lead at 1030
468.5 / 5 ▼	GP	2	48	18		Organic Silty Sand	Wet, black, Slightly Organic fine to coarse SAND, some clayey silt, little fine to coarse gravel (OL/SM)	ENV: 5-8' PCBs at 1030 ENV: 6-8' Lead, TCLP Lead at 1030
	GP	3	24	12		Clay	Wet, gray, Silty CLAY, trace fine sand, trace fine gravel (CL)	Material 8 to 10 ft bgs mottled with red-brown. ENV: 8-10' Lead, TCLP Lead, PCBs at 1030
463.5 / 10							Exploration terminated at 10 ft bgs (no refusal).	
458.5 / 15								
453.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L09-S05A**

CDM Smith

Boring Number: 18MC-L10-S01A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158537 **E:** 1120179
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 468
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
1.5	10/4/2018	1350

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
468.0 / 0						Fill	Moist, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace roots (SM)	ENV: 0.5-2' PCB at 1400
▼							Moist, light brown, Clayey SILT, little fine to medium sand, little fine to coarse gravel (ML-CL) [Silt and Clay]	
	GP	1	48	32		Sand and Silt	Moist, red-brown, SILT and fine to medium SAND, little fine to coarse gravel (SM)	ENV: 2-5' PCB at 1400 ENV: 5-6' PCB at 1400
463.0 / 5	GP	2	24	22				
							Exploration terminated at 6 ft bgs (no refusal).	
458.0 / 10								
453.0 / 15								
448.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L10-S01A**

CDM Smith

Boring Number: 18MC-L11-S01A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158744 **E:** 1120134
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 467.3
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
3	10/4/2018	1230

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
467.3 0	GP	1	48	24		Fill	Moist, brown, fine to coarse GRAVEL, some clayey silt, some fine to coarse sand (GM-SM)	ENV: 0.5-2' PCB at 1240 ENV: 2-5' PCB at 1240
▼							Wet, gray-brown, Organic Clayey SILT, little fine to coarse gravel, trace fine to coarse sand, trace roots (OL)	
462.3 5	GP	2	24	17			Wet, black, fine to coarse GRAVEL, some fine to coarse sand, little silt, trace brick, trace debris (GP)	ENV: 5-6' PCB at 1240
							Exploration terminated at 6 ft bgs (no refusal).	
457.3 10								
452.3 15								
447.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L11-S01A**

CDM Smith

Boring Number: 18MC-L16E-S03A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159586 **E:** 1119668
Drilling Date: Start: 9/13/2018 **End:** 9/13/2018

Surface Elevation (ft.): 454.9
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
1.2	9/13/2018	1130

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
454.9 0	SH	1	36	16		Organic Silt & Clay	Top 2": Moist, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace roots (SM) Bottom 14": Moist, brown, Slightly Organic SILT & CLAY, little fine to medium sand, little fine gravel (OL)	Effort: Easy ENV: 2-3' PCB, TCLP Lead, Lead at 1130
449.9 5							Exploration terminated at 3 ft bgs.	
444.9 10								
439.9 15								
434.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-L16E-S03A**

CDM Smith

Boring Number: 18MC-L16W-S01A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159510 **E:** 1119562
Drilling Date: Start: 10/17/2018 **End:** 10/17/2018

Surface Elevation (ft.): 455.2
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
455.2 / 0						OL	Moist, brown, Organic SILT and fine SAND, trace fine gravel (OL)	
						Peat	Wet, black, PEAT, some fine sand, some silt (Pt)	
	GP	1	48	29		WR	Wet, brown, fine to coarse GRAVEL, trace fine to coarse sand, trace silt (Shale) (GP)	ENV: 2-3' PCBs at 1030
450.2 / 5							Exploration terminated at 4.0 ft bgs.	
445.2 / 10								
440.2 / 15								
435.2								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: 18MC-L16W-S01A**

CDM Smith

Boring Number: 18MC-MW05A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158384 **E:** 1120201
Drilling Date: Start: 10/5/2018 **End:** 10/5/2018

Surface Elevation (ft.): 478.7
Total Borehole Depth (ft.): 10.8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/5/2018	1050

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
478.7 / 0	GP	1	48	26		Fill	6" Topsoil Dry, brown-black-tan, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace concrete, trace debris, trace brick (SP)	ENV: 0-2' Lead, TCLP Lead at 1040 ENV: 2-4' Lead, TCLP Lead at 1040 ENV: 4-6' Lead, TCLP Lead at 1040
473.7 / 5	GP	2	48	32			Dry, brown-black-tan, fine to coarse SAND, some clayey silt (SM)	ENV: 6-8' Leadx2, TCLP Leadx2 at 1040
							Dry, brown-black-tan, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace concrete, trace debris, trace brick (SP)	ENV: 8-10' Lead, TCLP Lead at 1040
468.7 / 10	GP	3	33	33		Silt and Clay	Completely weathered, gray, SILTSTONE fragments (boulder)	
							Moist, gray, Silty CLAY, trace fine sand, trace fine gravel (CL)	ENV: 10-12' Lead, TCLP Lead at 1040
							Moist, red-brown, Silty CLAY, little fine to coarse gravel, trace fine sand (CL)	
463.7 / 15							Exploration terminated at 10.8 ft bgs (refusal).	
458.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-MW05A**

Boring Number: 18MC-SB14A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157075 **E:** 1119967
Drilling Date: Start: 10/2/2018 **End:** 10/2/2018

Surface Elevation (ft.): 513
Total Borehole Depth (ft.): 15.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/2/2018	1330

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
513.0 0	GP	1	48	20		Fill	Moist, dark brown-gray, fine to coarse SAND and fine to coarse GRAVEL, little silt (SP-GP) Brick	ENV: 0-2' Lead, TCLP Lead at 1330 ENV: 2-4' Lead, TCLP Lead at 1330 ENV: 4-6' Leadx2, TCLP Lead at 1330 ENV: 6-8' Lead, TCLP Lead at 1330 ENV: 8-10' Lead, TCLP Lead at 1330 ENV: 10-12' Lead, TCLP Lead at 1330
508.0 5	GP	2	48	30			Dry, brown to red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick, trace glass, trace debris (SP)	
503.0 10	GP	3	48	34			Dry, brown to red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick, trace glass, trace debris (SP)	
498.0 15	GP	4	42	24		Sand and Silt	Dry, light brown, SILT and fine to medium SAND, little fine to coarse gravel (SM)	ENV: 12-14' Lead, TCLP Lead at 1330 ENV: 14-15' Lead, TCLP Lead at 1330
493.0							Exploration terminated at 15.5 ft bgs (refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-SB14A**

CDM Smith

Boring Number: 18MC-SB15A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Clinton Street
N: 1157760 **E:** 1120320
Drilling Date: Start: 10/15/2018 **End:** 10/15/2018

Surface Elevation (ft.): 491.2
Total Borehole Depth (ft.): 14
Depth to Initial Water Level (ft):

Depth	Date	Time
11.5	10/15/2018	1130

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
491.2 / 0	GP	1	48	42		Fill	Dry, brown, SILT, some fine sand, trace fine to coarse gravel (ML) Dry, gray, fine to coarse GRAVEL, some fine to coarse sand, some silt (GP-SM)	ENV: 0-2' Lead, TCLP Lead, PCBs at 1130;
							Moist, red and white, fine to medium SAND and fine to coarse GRAVEL, little silt (SP-GP)	ENV: 2-4' Lead, TCLP Lead at 1130; 2-5' PCBs at 1130;
486.2 / 5	GP	2	48	46			Moist, red and white, fine to medium SAND and fine to coarse GRAVEL, little silt (SP-GP) Moist, brown and black, fine to medium SAND and SILT, some fine to coarse gravel, trace cinders (SM) Moist, brown, fine SAND and SILT, little fine to coarse gravel (SM)	ENV: 4-6' Lead, TCLP Lead at 1130; 5-8' PCBs at 1130; ENV: 6-8' Lead, TCLP Lead at 1130; 8-11' PCBs at 1130;
481.2 / 10	GP	3	48	41			Moist, light brown, SILT, some fine to coarse gravel, little fine to coarse sand (ML) Moist, black, fine to coarse SAND and fine GRAVEL (cinders), trace silt (SP-GP)	ENV: 8-10' Lead, TCLP Lead at 1130 ENV: 10-12' Lead, TCLP Lead at 1130; 11-16 PCBs at 1130
	GP	4	24	22		Organic Silt & Clay	Wet, black, Organic Silty CLAY, trace fine sand, trace wood (OL/OH)	ENV: 12-14' Lead, TCLP Lead at 1130
476.2 / 15							Exploration terminated at 14 ft bgs.	
471.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 18MC-SB15A**

CDM Smith

Boring Number: 198-D-A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1158944 **E:** 1120160
Drilling Date: Start: 10/23/2018 **End:** 10/23/2018

Surface Elevation (ft.): 482.9
Total Borehole Depth (ft.): 26
Depth to Initial Water Level (ft):

Depth	Date	Time
20	10/23/2018	1120

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.9 0	GP	1	48	28		Fill	Dry, brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace brick, trace debris (SP)	ENV: 0-2' Lead, TCLP Lead x2, PCBs at 1000 ENV: 2-4' Lead x2, TCLP Lead, PCBs at 1000
477.9 5	GP	2	48	12		Fill	Dry, brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace brick, trace debris (SP)	ENV: 4-8' Lead, TCLP Lead, PCBs at 1000 Brick obstruction estimated at 5 ft bgs.
472.9 10	GP	3	48	12		Fill	Dry, brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace brick, trace debris (SP)	ENV: 8-10' Lead, TCLP Lead at 1000; 8-11' PCBs x2 at 1000 ENV: 10-12' Lead, TCLP Lead at 1000; 11-16' PCBs at 1000
467.9 15	GP	4	48	40		Fill / Sand and Silt	Dry, brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace brick, trace debris (SP) Dry, red-brown to light brown, SILT, some fine to coarse sand, some fine to coarse gravel (ML)	ENV: 12-14' Lead, TCLP Lead x2 at 1000 ENV: 14-16' Lead, TCLP Lead x2 at 1000
462.9	GP	5	48	34		Sand and Silt	Dry, red-brown to light brown, SILT, some fine to coarse sand, some fine to coarse gravel (ML) Moist, dark brown, Slightly Organic Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML/OL) [Organics Silt and Clay] Moist, red-brown, CLAY & SILT, little fine to medium sand, trace fine gravel (CL-ML)	ENV: 16-18' Lead, TCLP Lead x2 at 1000; 16-21' PCBs at 1000 ENV: 18-20' Lead, TCLP Lead x2 at 1000 Cobble 18.2 to 18.5 ft bgs

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-D-A**

Boring Number: 198-D-A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
462.9 / 20	GP	6	48	20		Silt and Clay	Wet, red-brown, fine to coarse SAND, little fine to coarse gravel, little clayey silt (SP)	ENV: 20-22' Lead, TCLP Lead at 1000; 21-26' PCBs at 1000
							Wet, red-brown, fine to coarse SAND and fine to coarse GRAVEL, little clayey silt (SP-GP)	ENV: 22-24' Lead, TCLP Lead at 1000
457.9 / 25	GP	7	24	13			Wet, red-brown, fine to coarse SAND and fine to coarse GRAVEL, little clayey silt (SP-GP)	
							Moist, red-brown, SILT, some fine to medium SAND, little fine to coarse gravel (ML)	ENV: 24-26' Lead, TCLP Lead at 1000
							Exploration terminated at 26 ft bgs (no refusal).	

452.9 / 30

447.9 / 35

442.9 / 40

437.9 / 45

CDM Smith

Boring Number: 198-E-A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159037 **E:** 1120107
Drilling Date: Start: 10/22/2018 **End:** 10/22/2018

Surface Elevation (ft.): 478
Total Borehole Depth (ft.): 16.4
Depth to Initial Water Level (ft):

Depth	Date	Time
11	10/22/2018	1440

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
478.0 0	GP	1	48	34		Fill	Moist, brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, little slag, trace debris (SP-GP)	ENV: 0-2' Lead, TCLP Lead, PCBs at 1400 ENV: 2-4' Lead x2, TCLP Lead, PCBs at 1400
473.0 5	GP	2	48	12			Moist, brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, little slag, trace debris (SP-GP)	ENV: 4-8' Lead, TCLP Lead, PCBs at 1400 Poor recovery 4 to 8 ft bgs after 3 attempts. Composite material 4-8 for sufficient sampling.
	GP	3	48	36			Moist, brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, little slag, trace debris (SP-GP)	ENV: 8-10' Lead, TCLP Lead x3 at 1400; 8-11' PCBs at 1400
468.0 10	GP	4	48	40		Sand and Silt	Moist to wet, red-brown to light brown, fine to medium SAND and SILT, little fine gravel (SM)	ENV: 10-12' Lead x2, TCLP Lead at 1400 Material becomes wet at 10.5 ft bgs. ENV: 11-16' PCBs x3 at 1400 ENV: 12-14' Lead, TCLP Lead at 1400 ENV: 14-16' Lead, TCLP Lead x2 at 1400
463.0 15	GP	5	4	4			Dry, light brown-gray, SILT, little fine sand, little fine to coarse gravel (ML)	DPT becomes slow at 14.5 ft bgs.
458.0							Exploration terminated at 16.4 ft bgs (refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-E-A**

CDM Smith

Boring Number: 198-SB01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1158891 **E:** 1120231
Drilling Date: Start: 10/24/2018 **End:** 10/24/2018

Surface Elevation (ft.): 484.3
Total Borehole Depth (ft.): 19.4
Depth to Initial Water Level (ft):

Depth	Date	Time
17	10/24/2018	1120

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.3 0	GP	1	48	36		Fill	Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace metal, trace debris (SP)	ENV: 0-2' Lead, PCBs at 1130 ENV: 2-4' Lead at 1130; 2-5' PCBs x2 at 1130
479.3 5	GP	2	48	36		Fill	Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace metal, trace debris (SP) Dry, red-brown, fine to medium SAND, some silt, little fine to coarse gravel, trace roots, trace slag (SM)	ENV: 4-6' Lead x2 at 1130; 5-8' PCBs at 1130 ENV: 6-8' Lead at 1130
474.3 10	GP	3	48	36		Sand and Silt	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML) Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	Gravel is Dolostone fragments. ENV: 8-10' Lead at 1130; 8-11' PCBs at 1130 ENV: 10-12' Lead at 1130; 11-16' PCBs x2 at 1130
469.3 15	GP	4	48	39		Sand and Silt	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 12-14' Lead x2 at 1130 ENV: 14-16' Lead at 1130
▼	GP	5	48	34		Org. Silt & Clay	Dry, dark brown, Slightly Organic SILT & CLAY, little fine sand, trace fine gravel, trace wood (ML-CL)	ENV: 16-18' Lead at 1130; 16-19.4' PCBs at 1130
						SM	Moist, light brown, fine to medium SAND and SILT, little fine gravel (SM)	Residual Dolostone in tip. ENV: 18-19.4' Lead at 1130
464.3							Exploration terminated at 19.4 ft bgs (refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB01**

CDM Smith

Boring Number: 198-SB03

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1158873 **E:** 1120157
Drilling Date: Start: 10/24/2018 **End:** 10/24/2018

Surface Elevation (ft.): 478.2
Total Borehole Depth (ft.): 19.9
Depth to Initial Water Level (ft):

Depth	Date	Time
16	10/24/2018	1030

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
478.2 0	GP	1	48	24		Fill	Moist, dark brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace slag, trace debris, trace glass (SP-GP)	ENV: 0-2' Lead, PCBs at 1030 ENV: 2-4' Lead at 1030; 2-5' PCBs at 1030
473.2 5	GP	2	48	28		Fill	Moist, dark brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace slag, trace debris, trace glass (SP-GP)	ENV: 4-6' Lead at 1030; 5-8' PCBs at 1030 ENV: 6-8' Lead x2 at 1030
468.2 10	GP	3	48	32		Fill	Moist, dark brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace slag, trace debris, trace glass (SP-GP)	ENV: 8-10' Lead at 1030; 8-11' PCBs at 1030 ENV: 10-12' Lead at 1030; 11-16' PCBs at 1030
	GP	4	48	24		Fill	Moist, dark brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace slag, trace debris, trace glass (SP-GP)	ENV: 12-14' Lead at 1030
463.2 15						Peat	Wet, brown-gray, Slightly Organic fine to medium SAND and Clayey SILT, trace fine gravel (OL/SM) [Organic Sand and Silt] Wet, brown to red-brown, PEAT, some fine to medium sand, some clayey silt, trace fine gravel (Pt)	Wood fragments at 14.8 ft bgs. ENV: 14-16' Lead at 1030; 14-15' PCBs at 1030
	GP	5	47	20		Silt and Clay	Wet, red-brown, Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML)	ENV: 16-18' Lead at 1030; 16-19.9' PCBs at 1030 ENV: 18-19.9' Lead at 1030
458.2						WR	Wet, gray, fine to coarse GRAVEL, little silt, trace fine	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB03**

Boring Number: 198-SB03

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
458.2 / 20							sand (Dolostone Fragments) (GP)	
							Exploration terminated at 19.9 ft bgs (refusal).	
453.2 / 25								
448.2 / 30								
443.2 / 35								
438.2 / 40								
433.2 / 45								

CDM Smith

Boring Number: 198-SB05

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1158950 **E:** 1120211
Drilling Date: Start: 10/23/2018 **End:** 10/23/2018

Surface Elevation (ft.): 485.1
Total Borehole Depth (ft.): 15.2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/23/2018	940

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
485.1 0							6" Topsoil	ENV: 0-2' Lead x2, PCBs at 0830
	GP	1	48	32		Fill	Dry, gray to brown, fine to coarse SAND, some fine to coarse gravel, trace silt, trace slag, trace debris (SP)	ENV: 2-4' Lead x2 at 0830; 2-5' PCBs x2 at 0830
480.1 5	GP	2	48	28			Dry, gray to brown, fine to coarse SAND, some fine to coarse gravel, trace silt, trace slag, trace debris (SP)	ENV: 4-6' Lead at 0830; 5-8' PCBs at 0830; 5-6' PCBs at 0830
						Sand and Silt	Dry, light brown-red brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 6-8' Lead x2 at 0830
475.1 10	GP	3	48	36			Dry, light brown, fine to medium SAND, some silt, trace fine gravel (SM)	ENV: 8-10' Lead at 0830; 8-11' PCBs at 0830
							Dry, light brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	Gravel-sized, gray, Dolostone fragments. ENV: 10-12' Lead at 0830; 11-15.2' PCBs x2 at 0830 DPT becomes slow at 10 ft bgs. ENV: 12-14' Lead at 0830
	GP	4	38	36			Dry, light brown-white, SILT and fine to coarse GRAVEL, some fien to medium sand (SM)	Gravel is crushed Dolostone. ENV: 14-15.2' Lead at 0830
470.1 15							Exploration is terminated at 15.2 ft bgs (refusal).	Refusal at 3.7 ft bgs on first attempt. Refusal at 15.2 ft bgs on third attempt.
465.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB05**

CDM Smith

Boring Number: 198-SB06

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1158915 **E:** 1120165
Drilling Date: Start: 10/23/2018 **End:** 10/23/2018

Surface Elevation (ft.): 482.1
Total Borehole Depth (ft.): 25
Depth to Initial Water Level (ft):

Depth	Date	Time
19	10/23/2018	1340

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.1 0	GP	1	48	22		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace roots, trace debris (SP)	ENV: 0-2' Lead, PCBs at 1300 ENV: 2-4' Lead at 1300; 2-5' PCBs at 1300
477.1 5	GP	2	48	18			Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace roots, trace debris (SP)	ENV: 4-6' Lead at 1300; 5-8' PCBs at 1300 ENV: 6-8' Lead x2 at 1300 2" concrete at 6.5 ft bgs.
472.1 10	GP	3	48	28			Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace roots, trace debris (SP) Dry, black, fine to coarse SAND and fine GRAVEL (slag), trace silt, trace debris (SP-GP)	ENV: 8-10' Lead x2 at 1300; 8-11' PCBs at 1300 ENV: 10-12' Lead at 1300; 11-16' PCBs at 1300
467.1 15	GP	4	48	36			Dry, red-brown-black, SILT, little fine to coarse sand, little fine to coarse gravel, trace slag, trace debris (ML)	ENV: 12-14' Lead x2 at 1300 ENV: 14-16' Lead at 1300
	GP	5	48	16			Dry, red-brown-black, SILT, little fine to coarse sand, little fine to coarse gravel, trace slag, trace debris (ML) Dry, black, fine to coarse SAND and fine GRAVEL (slag), trace silt (SP-GP)	ENV: 16-18' Lead at 1300; 16-21' PCBs at 1300 ENV: 18-20' Lead at 1300
▼ 462.1						S&C	Wet, red-brown, Clayey SILT, some fine to coarse gravel, trace fine to medium sand, trace roots (ML)	S&C - Silt and Clay Stratum DPT becomes slow at 19 ft

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB06**

Boring Number: 198-SB06

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
462.1 / 20								bgs.
	GP	6	48	24		Sand and Silt	Wet, red-brown/light brown, fine to medium SAND, some silt, little fine to coarse gravel (SM)	ENV: 20-22' Lead at 1300; 21-25' PCBs x2 at 1300 ENV: 22-24' Lead at 1300
457.1 / 25	GP	7	12	12			Wet, red-brown/light brown, fine to medium SAND, some silt, little fine to coarse gravel (SM)	ENV: 24-25' Lead at 1300
							Exploration terminated at 25 ft bgs (no refusal).	
452.1 / 30								
447.1 / 35								
442.1 / 40								
437.1 / 45								

CDM Smith

Boring Number: 198-SB08

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1158953 **E:** 1120188
Drilling Date: Start: 9/27/2018 **End:** 9/27/2018

Surface Elevation (ft.): 485.3
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/27/2018	1250

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
485.3 0	GP	GP-1	48	36		Fill	2" Topsoil Dry, brown-dark brown to red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace glass, trace metal, trace brick, trace debris (SM)	ENV: 0-2' Leadx2, PCB at 1300 ENV: 2-4' Lead at 1300; 2-5' PCBx2 at 1300 ENV: 4-6' Lead at 1300
							6" Concrete	
480.3 5	GP	GP-2	48	42		Sand and Silt	Dry, brown-dark brown to red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace glass, trace metal, trace brick, trace debris (SM) Dry, light brown to red-brown, SILT, little fine sand, little fine to coarse gravel (ML)	ENV: 5-6' PCB, Lead at 1300 ENV: 5-8' PCB at 1300; 6-8' Lead at 1300
475.3 10	GP	GP-3	48	36			Dry, light brown, SILT, some fine sand, little fine to coarse gravel (SM) Dry, light brown, SILT and fine SAND, little fine to coarse gravel (SM)	ENV: 8-10' Lead at 1300; 8-11' PCB at 1300 Dolostone fragments. ENV: 10-12' Lead at 1300 ENV: 11-12' PCB at 1300 Dolostone fragments.
470.3 15							Exploration terminated at 12 ft bgs (no refusal).	
465.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB08**

CDM Smith

Boring Number: 198-SB09

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1158923 **E:** 1120132
Drilling Date: Start: 9/27/2018 **End:** 9/27/2018

Surface Elevation (ft.): 473.5
Total Borehole Depth (ft.): 23.5
Depth to Initial Water Level (ft):

Depth	Date	Time
14	9/27/2018	1440

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
473.5 0	GP	GP-1	48	20		Fill	Dry, brown to dark brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace glass, trace metal, trace debris (SM)	ENV: 0-2' Lead, PCBx2 at 1400 ENV: 2-4' Leadx2 at 1400; 2-5' PCB at 1400
468.5 5	GP	GP-2	48	24		Fill	Dry, brown to dark brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace glass, trace metal, trace debris (SM)	ENV: 4-6' Lead at 1400; 5-8' PCB at 1400 ENV: 6-8' Lead at 1400
463.5 10	GP	GP-3	48	12		Fill	Dry, brown to dark brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace glass, trace metal, trace debris (SM)	ENV: 8-10' Lead at 1400; 8-11' PCB at 1400 ENV: 10-12' Lead at 1400; 11-16' PCB at 1400
▼	GP	GP-4	48	48		Fill	Dry, brown to dark brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace glass, trace metal, trace debris (SM)	ENV: 12-14' Lead at 1400
458.5 15						Organic Soils	Moist, gray, Organic Clayey SILT, little fine to coarse sand, trace fine to coarse gravel (OL)	ENV: 14-15' Lead, PCB at 1400; 14-16' Lead at 1400
						Organic Soils	Wet, gray, PEAT, some fine to coarse sand, little clayey silt, trace fine gravel (Pt)	Strong organic odor from 14 to 15.5 ft bgs. ENV: 14-16' Lead at 1400
						Silt and Clay	Wet, red-brown, Clayey SILT, little fine sand, little fine gravel (ML)	ENV: 16-18' Lead at 1400; 16-21' PCB at 1400
	GP	GP-5	48	36		Silt and Clay	Wet, light brown, Clayey SILT, some fine sand, little fine gravel (ML)	ENV: 18-20' Lead at 1400
453.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB09**

Boring Number: 198-SB09

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
453.5 / 20	GP	GP-6	42	32			Wet, light brown, Clayey SILT, some fine sand, little fine gravel (ML) Wet, light brown, Clayey SILT and fine SAND, little fine gravel (ML)	ENV: 20-22' Lead at 1400
						WR	Extremely weathered, light gray, medium-grained, DOLOSTONE	ENV: 22-23.5' Leadx2 at 1400 HCl reaction.
							Exploration terminated at 23.5 ft bgs (refusal).	
448.5 / 25								
443.5 / 30								
438.5 / 35								
433.5 / 40								
428.5 / 45								

CDM Smith

Boring Number: 198-SB10

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1158971 **E:** 1120147
Drilling Date: Start: 9/27/2018 **End:** 9/27/2018

Surface Elevation (ft.): 481.1
Total Borehole Depth (ft.): 21.8
Depth to Initial Water Level (ft):

Depth	Date	Time
16	9/27/2018	1030

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
481.1 0	GP	1	48	24		Fill	2" Topsoil Dry, brown to dark brown to red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace debris (SM)	ENV: 0-2' Lead, PCBx3 at 1020 ENV: 2-4' Lead at 1020; 2-5' PCB at 102
476.1 5	GP	2	48	24		Fill	Dry, brown to dark brown to red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace debris (SM)	ENV: 4-6' Lead at 1020; 5-8' PCBx3 at 1020 ENV: 6-8' Lead at 1020
471.1 10	GP	3	48	36		Fill	Dry, brown to dark brown to red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace debris (SM)	ENV: 8-10' Lead at 1020; 8-11' PCB at 1020 ENV: 10-12' Lead at 1020 ENV: 11-16' PCB at 1020; 11.5-12.5' PCB, Lead at 1020
466.1 15	GP	4	48	24		Silt	Dry, red-brown, SILT, little fine to coarse gravel, little fine sand (ML)	ENV: 12-14' Lead at 1020 ENV: 14-16' Lead at 1020 Burnt wood at 15 ft bgs Becomes moist at 16 ft bgs.
461.1	GP	5	48	32		Silt and Clay	Moist to wet, light brown, Clayey SILT, some fine sand, little fine to coarse gravel (ML)	ENV: 16-18' Lead at 1020; 16-21' PCB at 1020 ENV: 18-20' Lead at 1020 Dolostone fragments present.

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB10**

Boring Number: 198-SB10

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
461.1 / 20	GP	6	21	18		Sand and Silt	Moist to wet, light brown, SILT and fine SAND, little fine to coarse gravel (SM)	ENV: 20-22' Lead at 1020 Gray Dolostone in tip. Strong HCl reation.
							Exploration terminated at 21.8 ft bgs (refusal).	
456.1 / 25								
451.1 / 30								
446.1 / 35								
441.1 / 40								
436.1 / 45								

CDM Smith

Boring Number: 198-SB11

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159022 **E:** 1120206
Drilling Date: Start: 9/27/2018 **End:** 9/27/2018

Surface Elevation (ft.): 485
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/27/2018	850

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
485.0 / 0	GP	1	48	34		Fill	Dry, dark brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace debris (SM)	ENV: 0-2' Lead, PCBx2 at 0840 ENV: 2-4' Lead at 0840; 2-5' PCB at 0840
480.0 / 5	GP	2	48	48		Fill Sand and Silt	Dry, brown to red-brown, BRICK and fine to coarse SAND, some silt, little fine to coarse gravel, trace debris (BRICK/SM) Dry, light brown, SILT and fine SAND, little fine to coarse gravel (SM)	ENV: 4-6' Lead at 0840; 5-6.5' PCB at 0840 ENV: 6-8' Lead at 0840
475.0 / 10							Exploration terminated at 8 ft bgs (no refusal).	
470.0 / 15								
465.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB11**

CDM Smith

Boring Number: 198-SB12

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159003 **E:** 1120160
Drilling Date: Start: 9/26/2018 **End:** 9/26/2018

Surface Elevation (ft.): 486.9
Total Borehole Depth (ft.): 22.7
Depth to Initial Water Level (ft):

Depth	Date	Time
20	9/26/2018	1430

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
486.9 0	GP	1	48	40		Fill	Moist, dark brown, fine to medium SAND and SILT, little fine to coarse gravel, trace roots, trace debris (SM)	ENV: 0-2' Lead, PCB at 1400
							12" CONCRETE	
							Dry, brown-dark brown red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace debris (SP-SM)	ENV: 2-4' Lead at 1400; 2-5' PCB at 1400
481.9 5	GP	2	48	32			Dry, brown-dark brown red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace debris (SP-SM)	ENV: 4-6' Lead at 1400; 5-8' PCBx3 at 1400 ENV: 6-8' Lead at 1400
476.9 10	GP	3	48	48			Dry, brown-dark brown red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace debris (SP-SM)	ENV: 8-10' Lead at 1400; 8-11' PCB at 1400 ENV: 10-12' Lead at 1400; 11-12' PCB at 1400
	GP	4	48	36		Sand and Silt	Dry, brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 12-14' Lead at 1400 ENV: 14-16' Lead at 1400
471.9 15	GP	5	48	36			Dry, brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 16-18' Lead at 1400; 16-21' PCB at 1400 ENV: 18-20' Lead at 1400
468.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB12**

Boring Number: 198-SB12

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
466.9 / 20	GP	6	32	32		Sand and Silt	Moist, brown-light brown, SILT and fine to medium SAND, trace fine to coarse gravel	ENV: 20-22' Lead at 1400 ENV: 22-22.7 Lead at 1400
							Weathered rock fragments (Dolostone) recovered in tip. [WR] Exploration terminated at 22.7 ft bgs (refusal).	Strong HCl reaction in WR.
461.9 / 25								
456.9 / 30								
451.9 / 35								
446.9 / 40								
441.9 / 45								

CDM Smith

Boring Number: 198-SB15

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159052 **E:** 1120125
Drilling Date: Start: 10/22/2018 **End:** 10/22/2018

Surface Elevation (ft.): 476
Total Borehole Depth (ft.): 12.2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/22/2018	1315

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
476.0 / 0	GP	1	48	4		Fill	6" Concrete Dry, red-brown to brown, fine to medium SAND, some silt, little fine to coarse gravel, trace slag (SP) Dry, red-brown to brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace roots (SP)	ENV: 0-2' Lead x2, PCBs at 1300 ENV: 2-4' Lead at 1300; 2-5' PCBs x2 at 1300
471.0 / 5	GP	2	48	20		Fill	Dry, red-brown, fine to medium SAND and SILT, trace fine gravel (SM) Dry, red-brown, fine to medium SAND and SILT, little fine to coarse gravel (SM)	Material 3 to 10 ft bgs is possible native fill material. ENV: 4-6' Lead at 1300; 5-8' PCBs x2 at 1300 ENV: 6-8' Lead at 1300
466.0 / 10	GP	3	48	34		Fill	Dry, red-brown, fine to medium SAND and SILT, little fine to coarse gravel (SP-SM)	ENV: 8-10' Lead x2 at 1300; 8-11' PCBs at 1300
	GP	4	2	2		Silt	Dry, red-brown, SILT, some fine to medum sand, little fine to coarse gravel (ML)	Crushed Dolostone 11.2 to 11.4 ft bgs. ENV: 10-12' Lead at 1300; 11-12.2' PCBs at 1300 Dolostone fragments in tip.
461.0 / 15							Exploration terminated at 12.2 ft bgs (refusal).	
456.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB15**

CDM Smith

Boring Number: 198-SB16

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159018 **E:** 1120080
Drilling Date: Start: 10/2/2018 **End:** 10/2/2018

Surface Elevation (ft.): 467.5
Total Borehole Depth (ft.): 16
Depth to Initial Water Level (ft):

Depth	Date	Time
10.3	10/2/2018	1115

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
467.5 / 0	GP	1	48	14		Fill	2" Topsoil Dry, brown to red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace wood, trace brick (SP) trace glass	ENV: 0-2' Lead, PCB at 1100 ENV: 2-4' Lead at 1100' 2-5' PCB at 1100
462.5 / 5	GP	2	48	24		Fill	Dry, brown to red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace wood, trace brick (SP) trace glass	ENV: 4-6' Leadx2 at 1100; 5-8' PCB at 1100 ENV: 6-8' Lead at 1100
457.5 / 10	GP	3	48	34		Fill	Dry, brown to red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace wood, trace brick, trace glass (SP)	ENV: 8-10' Lead at 1100; 8-11' PCBx2 at 1100 ENV: 10-12' Lead at 1100; 11-16' PCB at 1100 FeO staining at 11 ft bgs.
	GP	4	48	30		Silt and Clay	Wet, gray, Clayey SILT, little fine to medium sand, trace fine gravel (ML)	ENV: 12-14' Lead at 1100 Organic odor.
							Wet, black, Organic Clayey SILT, trace fine sand, trace fine gravel (OL) (Organics- spongey)	
452.5 / 15							Wet, gray, Clayey SILT, little fine to medium sand, trace fine gravel (ML)	
447.5							Exploration terminated at 16.0 ft bgs (no refusal).	Refusal at 13.7 ft bgs on 1st attempt.

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB16**

CDM Smith

Boring Number: 198-SB17

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159079 **E:** 1120095
Drilling Date: Start: 10/22/2018 **End:** 10/22/2018

Surface Elevation (ft.): 475
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/22/2018	1220

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.0 / 0	GP	1	48	27		Fill	2" Concrete Dry, brown-black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag, trace debris (SP)	ENV: 0-2' Lead, PCBs at 1200 ENV: 2-4' Lead at 1200; 2-5' PCBs at 1200
470.0 / 5	GP	2	48	36			Dry, brown-black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag, trace debris (SP)	ENV: 4-6' Lead at 1200; 5-8' PCBs at 1200
465.0 / 10	GP	3	48	30		Sand and Silt	Dry, red-brown, SILT, little fine to medium sand, trace fine to coarse gravel (ML) Dry, red-brown, SILT, little fine to medium sand, trace fine to coarse gravel (ML) Dry, red-brown, SILT and fine to medium SAND, trace fine to coarse gravel (SM)	ENV: 6-8' Lead x2, PCBs at 1200 ENV: 8-10' Lead at 1200; 8-11' PCBs at 1200 ENV: 10-12' Lead at 1200 Gray Dolostone fragments in tip.
460.0 / 15							Exploration terminated at 12 ft bgs (refusal).	
455.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB17**

CDM Smith

Boring Number: 198-SB18

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159057 **E:** 1120080
Drilling Date: Start: 10/10/2018 **End:** 10/10/2018

Surface Elevation (ft.): 471.7
Total Borehole Depth (ft.): 16
Depth to Initial Water Level (ft):

Depth	Date	Time
10	10/10/2018	1330

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.7 0	GP	1	48	10		Fill	DEBRIS and dry, brown, fine to coarse SAND, little silt, trace fine gravel (SP)	Stacked fiber boards at ground surface. Not sufficient material for analytical samples 0-2 and 2-4 ft. 0-4 ft combined for sampling. ENV: 0-4' Lead, PCBs at 1330
466.7 5	GP	2	48	24		Fill	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag, trace debris, trace brick (SP-SM)	ENV: 4-6' Lead, PCBs at 1330 ENV: 6-8' Lead, PCBs at 1330 ENV: 8-10 x2 Lead at 1330; 8-11' PCBs at 1330
461.7 10	GP	3	48	36		Sand and Silt	Moist, light brown, fine to medium SAND and SILT, little fine to coarse gravel (SM)	ENV: 9-10' PCBs at 1030 ENV: 10-12' Lead at 1330; 11-16 PCBs x2 at 1330 Red-brown, SILTSTONE in tip of Sample 3.
456.7 15	GP	4	48	20		Sand and Silt	Moist, light brown, fine to medium SAND and Clayey SILT, some fine to coarse gravel (SM)	ENV: 12-14' Lead at 1330 ENV: 14-16' Lead at 1330 ENV: 16-18' Lead at 1330
451.7							Exploration terminated at 16.0 ft bgs (refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB18**

CDM Smith

Boring Number: 198-SB19

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159028 **E:** 1120049
Drilling Date: Start: 9/18/2018 **End:** 9/18/2018

Surface Elevation (ft.): 464.4
Total Borehole Depth (ft.): 7.5
Depth to Initial Water Level (ft):

Depth	Date	Time
0	10/10/2018	915

Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
464.4 / 0	SH	1	48	24		CGS	Top 14": Wet, dark brown, fine to coarse GRAVEL and SILT, little fine to coarse sand, trace wood, trace debris (GM)	Effort: Easy 0 to 6.7 ft bml. ENV: 0-2' PCB, Lead at 0915
						Peat	Middle 10": Wet, brown, PEAT, some silt, little fine to medium sand, trace fine gravel, fibrous (PT) Bottom 2": Wet, brown, fine to coarse SAND, little fine gravel, trace silt (SP)	ENV: 2-4' Lead at 0915 ENV: 2-5' PCB at 0915
	SH	2	42	36		CGS	Top 8": Wet, light brown, fine to coarse SAND, little fine gravel, trace silt (SP)	ENV: 4-5' Lead at 0915
459.4 / 5						Peat	Middle 24": Wet, brown, PEAT, some silt, little fine to medium sand, trace fine gravel (Pt)	
						GC	Bottom 4": Wet, brown to red brown, Silty CLAY and fine to coarse GRAVEL, trace fine sand (GC)	Effort: Difficult 6.7 to 7 ft bml.
454.4 / 10							Exploration terminated at 7.5 ft bml (refusal).	GMC- Clayey Gravel Stratum
449.4 / 15								
444.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB19**

CDM Smith

Boring Number: 198-SB22

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159083 **E:** 1120057
Drilling Date: Start: 10/10/2018 **End:** 10/10/2018

Surface Elevation (ft.): 465.3
Total Borehole Depth (ft.): 13.8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/10/2018	1230

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
465.3 0	GP	1	48	32		Fill	4" Concrete Dry, red-brown to dark brown/black, fine to coarse SAND and SILT, little fine to coarse gravel, trace slag (SM)	ENV: 0-2' Lead, PCBs at 1130 ENV: 2-4' Lead at 1130, 2-5' PCBs at 1130
460.3 5	GP	2	48	36		Fill	Dry, light brown/red-brown, fine to coarse SAND, some fine to medium silt, little fine to coarse gravel, trace slag (SP-SM)	ENV: 4-6' Lead at 1130; 5-8 PCBs x2 at 1130 ENV: 6-8': Lead x2 at 1130 Coarse-grained obstruction encountered 7.5 to 8 ft bgs. ENV: 8-10' Lead at 1130; 8-11 PCBs at 1130
455.3 10	GP	3	48	32		Silt and Sand	Moist to wet, light brown, SILT and fine to medium SAND, little fine to coarse gravel (SM)	ENV: 9-10' PCBs at 1130 ENV: 10-12' Lead at 1130
	GP	4	22	18		Silt & Clay	Moist to wet, red-brown, Clayey SILT and fine to medium SAND, some fine to coarse gravel (ML)	Gray, SILTSTONE chips 11.5 to 11.7 ft bgs. ENV: 11-13.8' PCB at 1120; 12-13.8 Lead at 1130
450.3 15							Weathered Rock fragments recovered in tip; gray-green, extremely weathered, SILTSTONE [WR] Exploration terminated at 13.8 ft bgs (refusal).	
445.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB22**

CDM Smith

Boring Number: 198-SB23

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159074 **E:** 1120019
Drilling Date: Start: 9/18/2018 **End:** 9/18/2018

Surface Elevation (ft.): 463.5
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
0	9/18/2018	820

Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
463.5 / 0	SH	1	48	28		Org. GM	Top 14": Wet, dark brown, Slighty Organic fine to coarse GRAVEL and Clayey SILT, little fine to coarse gravel, trace wood, trace brick (OL/GM) [Organic Silty Gravel]	Effort: Easy 0 to 6.5 ft bml. ENV: 0-2' PCB, Lead at 0820
						Peat	Bot 14": Wet, brown to light brown, PEAT, some clayey silt, little fine to medium sand, trace fine to coarse gravel (Pt) (Peat- fibrous)	ENV: 2-4' Lead at 0820 ENV: 2-5' PCB at 0820
458.5 / 5	SH	2	48	36			Top 24": Wet, brown to light brown, PEAT, some clayey silt, little fine to medium sand, trace fine to coarse gravel (Pt) (Peat- fibrous)	ENV: 4-5' Lead at 0820
						Silty Gravel	Middle 10": Wet, dark brown, Slighty Organic SILT and fine to medium SAND, little fine to coarse gravel, trace wood (OL/SM) [Organic Sand and Silt]	Effort: Moderate 6.5 to 8 ft bml.
							Bottom 2": Wet, brown (mottled red-brown), fine to coarse GRAVEL, some clayey silt, little fine to coarse sand (GM)	
453.5 / 10							Exploration terminated at 8.0 ft bml (refusal).	
448.5 / 15								
443.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB23**

Boring Number: 198-SB24

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Surface Elevation (ft.): 475
Drilling Method: DPT
Total Borehole Depth (ft.): 11.5
Core Size: 2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/10/2018	1020

Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159140 **E:** 1120056
Abandonment Method: Backfilled with bentonite chips
Drilling Date: Start: 10/10/2018 **End:** 10/10/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.0 0	GP	1	48	28		Fill	2" Topsoil 4" Crushed Stone Dry, dark brown-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace wood (SP)	ENV: 0-2' Lead, TCLP Lead, PCBs at 1010 ENV: 2-4' Lead, TCLP Lead at 1010; 2-5' PCBs x2 at 1010
470.0 5	GP	2	48	28		Sand and Silt	Dry, light-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-5' PCBs at 1010; 4-6' Lead, TCLP Lead at 1010; 5-8' PCBs at 1010 ENV: 6-8' Lead, TCLP Lead at 1010
	GP	3	40	28		Sand and Silt	Dry, light-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 8-10' Lead, TCLP Lead at 1010; 8-11 PCBs x2 at 1010
465.0 10						Silt and Clay	Dry, red-brown, Clayey SILT, some fine to medium sand, some fine to coarse gravel (ML)	ENV: 10-11.5' Lead, TCLP Lead at 1010
							Weathered Rock recovered in tip; gray, extremely weathered SILTSTONE [WR] Exploration terminated at 11.5 ft bgs (refusal).	Refusal at 9.1 ft bgs on first attempt.
460.0 15								
455.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB24**

CDM Smith

Boring Number: 198-SB26

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159169 **E:** 1120035
Drilling Date: Start: 10/10/2018 **End:** 10/10/2018

Surface Elevation (ft.): 473
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/10/2018	930

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
473.0 / 0	GP	1	48	32		Fill	Dry, brown-gray/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris (SP)	ENV: 0-2' Lead, PCBs at 0920 ENV: 1-2' PCBs at 0920 ENV: 2-4' Lead at 0920; 2-5' PCBs at 0920
468.0 / 5	GP	2	48	42		Sand and Silt	Dry, red-brown, Clayey SILT, little fine to medium sand, little fine to coarse gravel (ML)	Obstruction 2.5 ft to 3.0 ft bgs. ENV: 4-6' Lead at 0920; 5-8' PCBs at 0920 ENV: 6-8' Lead at 0920
	GP	3	24	16			Wet, red-brown, SILT and fine to medium SAND, little fine to coarse gravel (ML)	ENV: 8-10' Lead, PCBs at 0920
463.0 / 10						WR	Dry, extremely weathered, red-brown, SILTSTONE	Gray-green SILTSTONE chips in tip.
458.0 / 15							Exploration terminated at 10 ft bgs (refusal).	Refusal at 10 ft on first attempt.
453.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 198-SB26**

CDM Smith

Boring Number: 300-B-A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske, R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159503 **E:** 1119960
Drilling Date: Start: 9/21/2018 **End:** 9/21/2018

Surface Elevation (ft.): 483.8
Total Borehole Depth (ft.): 6.2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/21/2018	845

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
483.8 / 0	GP	1	48	36		Fill	Dry, light brown, fine to coarse SAND and fine to coarse GRAVEL, little silt (SP-GP) Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace debris (SP)	ENV: 0-2' Lead at 0840 ENV: 2-4' Lead at 0840
478.8 / 5	GP	2	26	24		Silt and Gravel	Dry, red-brown-white, SILT, some fine to coarse gravel, little fine to medium sand (ML) Dry, light brown-white, SILT and fine to coarse GRAVEL, little fine sand (GM)	Siltstone fragments at 3.5 ft bgs. ENV: 4-6' Lead at 0840
473.8 / 10							Exploration terminated at 6.2 ft bgs (refusal).	
468.8 / 15								
463.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-B-A**

CDM Smith

Boring Number: 300-E-A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159538 **E:** 1119794
Drilling Date: Start: 9/20/2018 **End:** 9/20/2018

Surface Elevation (ft.): 482.2
Total Borehole Depth (ft.): 27.4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/20/2018	1430

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.2 0	GP	1	48	30		Fill	2" Topsoil Dry, brown, fine to medium SAND, little fine to coarse gravel, little silt (SP) Dry, brown-gray, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick (SP-GP)	ENV: 0-2' Lead at 1400 ENV: 2-4' Lead at 1400
477.2 5	GP	2	48	16			Dry, brown-gray, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick (SP-GP) Dry, gray, fine to medium SAND, some silt, trace fine gravel (SM) Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel (SP)	ENV: 4-6' Lead at 1400 ENV: 6-8' Lead at 1400
472.2 10	GP	3	48	10			Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace metal, trace debris (SP)	ENV: 8-10' Lead at 1400 ENV: 10-12' Lead at 1400 ENV: 12-14' Lead at 1400
467.2 15	GP	4	48	32			Dry, dark brown to brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick (SP)	ENV: 14-16' Lead at 1400
462.2	GP	5	48	22			Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick (SP)	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-E-A**

Boring Number: 300-E-A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
462.2 / 20	GP	6	48	36		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick (SP)	ENV: 22-24' Lead at 1400
							Dry, dark brown to black, fine to coarse SAND, little fine to coarse gravel, little silt (SP)	
457.2 / 25	GP	7	40	40			Dry, dark brown to black, fine to coarse SAND, little fine to coarse gravel, little silt (SP)	
						Silt	Dry to moist, light brown to brown, SILT, little fine to coarse gravel, little fine to medium sand (ML)	ENV: 26-27' Lead at 1400 Siltstone chips at 26.5 ft. Siltstone fragments in tip.
452.2 / 30							Exploration terminated at 27.4 ft bgs (refusal).	
447.2 / 35								
442.2 / 40								
437.2 / 45								

CDM Smith

Boring Number: 300-SB02

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159193 **E:** 1119866
Drilling Date: Start: 9/21/2018 **End:** 9/21/2018

Surface Elevation (ft.): 471
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/12/2018	1420

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.0 / 0	GP	1	48	34		Fill	Dry, brown, fine to coarse SAND, some silt, litle fine to coarse gravel, trace roots (SP)	ENV: 0.5-2 Lead at 1415
							7" Concrete	
							Dry, dark brown to brown, fine to coarse SAND and SILT, some fine to coarse gravel (SM-GM)	
							Dry, red-brown, SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 2-4' Lead at 1415 ENV: 4-6' Lead at 1415
466.0 / 5	GP	2	24	24				
461.0 / 10							Exploration terminated at 6 ft bgs (no refusal).	
456.0 / 15								
451.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB02**

CDM Smith

Boring Number: 300-SB05

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159172 **E:** 1119760
Drilling Date: Start: 9/17/2018 **End:** 9/17/2018

Surface Elevation (ft.): 460.8
Total Borehole Depth (ft.): 5.5
Depth to Initial Water Level (ft):

Depth	Date	Time
4	9/17/2018	830

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
460.8 0	SH	1	48	8		Fill	Moist to wet, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick, trace plastic, trace roots (SP) Moist to wet, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick, trace plastic, trace roots (SP)	Effort: Easy 0 to 3.5 ft bgs. ENV: 0-2' PCBx3, Lead at 0830 ENV: 2-3 PCB, Lead at 0830
▼	SH	2	18	14		Silt and Clay	Top 6": Wet, red-brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt, trace metal, trace debris (GP-SP) Bottom 8": Wet, red-light brown, Clayey SILT, little fine gravel, trace fine to medium sand (ML) Excavation terminated at 5.5 ft bgs (refusal).	Effort: Moderate 3.5 to 4.5 ft bgs. Effort: Difficult 4.5 to 5.5 ft bgs.
455.8 5								
450.8 10								
445.8 15								
440.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB05**

CDM Smith

Boring Number: 300-SB06A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159184 **E:** 1119795
Drilling Date: Start: 9/25/2018 **End:** 9/25/2018

Surface Elevation (ft.): 469.6
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/25/2018	915

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.6 / 0	GP	1	48	24		Fill	Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace roots, trace brick, trace glasws, trace metal, trace debris, trace slag (SM)	ENV: 0-2' Lead, PCB at 0900 ENV: 2-4' Lead at 0900; 2-5' PCBs at 0900
464.6 / 5	GP	2	48	36		Fill	Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace roots, trace brick, trace glasws, trace metal, trace debris, trace slag (SM)	ENV: 4-6' Lead at 0900; 5-8' PCBs at 0900
	GP	3	24	24		Sand and Silt	Dry, light brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 6-8' Lead at 0900
459.6 / 10						Sand and Silt	Dry, light brown, SILT and fine SAND, little fine to coarse gravel (SM)	
454.6 / 15							Exploration terminated at 1 ft bgs (no refusal).	
449.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB06A**

CDM Smith

Boring Number: 300-SB08

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159253 **E:** 1119853
Drilling Date: Start: 9/25/2018 **End:** 9/25/2018

Surface Elevation (ft.): 471.4
Total Borehole Depth (ft.): 9.7
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/25/2018	950

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.4 / 0	GP	1	48	12		Fill	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace roots, trace metal, trace slag, trace glass, trace debris (SM)	ENV: 0-2' Lead, TCLP Lead, PCB at 1000 ENV: 2-4' Lead, TCLP Lead at 1000; 2-5' PCB at 1000
466.4 / 5	GP	2	48	14		Fill	Dry, brown to light brown-pink, fine to coarse SAND, some silt, little fine to coarse gravel, trace debris (SM)	ENV: 4-6' Lead, TCLP Lead at 1000; 5-8' PCB at 1000 Sample 2 pink color was stratified, possibly paper. ENV: 6-8' Lead, TCLP Lead at 1000
	GP	3	20	20		Fill	Dry, light brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace debris (SM)	ENV: 8-9.7' Lead, TCLP Lead, PCB at 1000
						Silt	Dry, red-brown, SILT, little fine to medium sand, little fine to coarse gravel	Reddish Siltstone chips in tip.
461.4 / 10							Exploration terminated at 9.7 ft bgs (refusal).	
456.4 / 15								
451.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB08**

CDM Smith

Boring Number: 300-SB09

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159248 **E:** 1119737
Drilling Date: Start: 9/25/2018 **End:** 9/25/2018

Surface Elevation (ft.): 466
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/25/2018	1100

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
466.0 / 0	GP	1	48	28		Fill	Dry, dark brown-black, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace slag, trace glass, trace debris (SM)	ENV: 0-2' Lead, PCBx2 at 1100 ENV: 2-4' Leadx3 at 1100; 2-5' PCB at 1100
461.0 / 5	GP	2	24	24		Fill	Dry, dark brown-black, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace slag, trace glass, trace debris (SM)	ENV: 4-6' Lead at 1100; 5-8' PCB at 1100
	GP	3	48	26		Fill	Dry, dark brown-black, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace slag, trace glass, trace debris (SM)	ENV: 6-8' Lead at 1100 ENV: 8-10' Lead, PCB at 1100
456.0 / 10						Silt	Dry, red-brown, SILT, little fine to medium sand, little fine gravel (ML) [Silt] Exploration terminated at 10 ft bgs (no refusal).	
451.0 / 15								
446.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB09**

CDM Smith

Boring Number: 300-SB11

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159320 **E:** 1119848
Drilling Date: Start: 9/25/2018 **End:** 9/25/2018

Surface Elevation (ft.): 458.4
Total Borehole Depth (ft.): 7
Depth to Initial Water Level (ft):

Depth	Date	Time
0.5	9/25/2018	1440

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
458.4								
0	GP	1	48	26		Fill	Moist, brown, Slightly Organic fine to medium SAND, some silt, trace fine gravel, trace roots, trace debris (SM) Wet, black, fine to coarse SAND, some fine to coarse gravel, little silt, trace metal, trace brick, trace debris (SP-GP)	ENV: 0-2' Lead, PCB at 1430 ENV: 2-4; Leadx2 at 1430; 2-5' PCB at 1430 ENV: 4-6' Lead at 1430 ENV: 5-7' PCB at 1430
453.4 / 5	GP	2	36	22		Clayey Gravel	Wet, light brown, fine to coarse GRAVEL and Silty CLAY, trace fine sand (GC)	ENV: 6-7' Lead at 1430
448.4 / 10							Exploration terminated at 7 ft bgs (refusal).	
443.4 / 15								
438.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB11**

CDM Smith

Boring Number: 300-SB13

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159325 **E:** 1119764
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 471.1
Total Borehole Depth (ft.): 8.6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/28/2018	1045

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.1 0	GP	1	48	24		Fill	Dry, dark brown-brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace glass, trace brick, trace debris (SP)	ENV: 0-2' Lead, TCLP Lead at 1030 ENV: 2-4' Lead, TCLP Lead x2 at 1030 FeO Staining ENV: 4-6' Lead, TCLP Lead x2 at 1030
466.1 5	GP	2	48	32		Sand and Silt	Dry, light brown, fine to medium SAND, some silt, trace fine to coarse gravel (SM)	Gray Siltstone chips at 5 ft bgs. ENV: 6-8' Leadx2, TCLP Lead at 1030
	GP	3	6	6			Dry, red-brown, fine to medium SAND, some silt, trace fine to coarse gravel (SM)	ENV: 8-10' Lead, TCLP Lead at 1030
461.1 10							Exploration terminated at 8.6 ft bgs (refusal).	ENV: 8-8.5' Lead, TCLP Lead at 1030 Siltstone chips in tip.
456.1 15								
451.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB13**

CDM Smith

Boring Number: 300-SB14

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159315 **E:** 1119710
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 458.3
Total Borehole Depth (ft.): 4.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/28/2018	945

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
458.3 / 0						Fill	Moist, dark brown, fine to medium SAND, little silt, trace fine to coarse gravel, trace roots, trace debris (SP)	ENV: 0-2' Lead at 1000
	GP	1	48	36		Sand and Silt	Dry, light brown to brown, fine to medium SAND and SILT, little fine to coarse gravel (SM)	ENV: 2-4' Lead at 1000
						Sand and Silt	Dry, red-brown, SILT, some fine sand, little fine to coarse gravel (ML)	ENV: 4-6' Lead at 1000 Siltstone chips at 3.7 to 4.0 ft bgs.
	GP	2	6	6				
453.3 / 5							Exploration terminated at 4.5 ft bgs (refusal).	
448.3 / 10								
443.3 / 15								
438.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB14**

Boring Number: 300-SB15

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159382 **E:** 1119700
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 460
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/28/2018	840

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
460.0 / 0	GP	1	36	36		Fill	Moist, dark brown, fine to medium SAND, some silt, trace fine gravel, trace roots (SM)	ENV: 0-2' Leadx2 at 0850
						Sand and Silt	Dry, red-brown, SILT, some fine sand, little fine to coarse gravel (ML)	ENV: 2-3' Lead at 0854 Siltstone chips throughout, very thin bedding
						WR	Extremely weathered, white to gray, extremely weathered SILTSTONE	
							Exploration terminated at 3.0 ft bgs (refusal).	
455.0 / 5								
450.0 / 10								
445.0 / 15								
440.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: 300-SB15**

CDM Smith

Boring Number: 300-SB16

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M/ Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159415 **E:** 1119740
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 460
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/28/2018	910

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
460.0 / 0						Fill	Moist, dark brown, fine to medium SAND and SILT, trace fine gravel, trace roots, trace debris (SM)	
	GP	1	48	44		Sand and Silt	Dry, red-brown, SILT, some fine sand, little fine to coarse gravel (ML)	ENV: 0.5-2' Lead at 0915 ENV: 2-4' Leadx2 at 0915 Siltstone (red-brown) chips throughout, very thinly bedded
455.0 / 5							Exploration terminated at 4 ft bgs (no refusal).	
450.0 / 10								
445.0 / 15								
440.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: 300-SB16**

CDM Smith

Boring Number: 300-SB17

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159482 **E:** 1119736
Drilling Date: Start: 9/13/2018 **End:** 9/13/2018

Surface Elevation (ft.): 453.2
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
0.2	9/13/20018	1515

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
453.2 / 0	SH	1	36	24		Fill	Top 14": Wet, brown-gray, Slightly Organic Clayey SILT, trace fine to coarse sand, trace fine gravel (ML) Bottom 10": Wet, black, fine to coarse GRAVEL and Clayey SILT, little fine to coarse sand, trace brick, trace debris (GM)	Effort: Easy 0 to 1 ft bgs ENV: 0-2' PCB, Lead at 1515 Wood fragments 3" from the top, spongey Effort: Moderate 1 to 2 ft bgs
448.2 / 5							Exploration terminated at 3.0 ft bgs (slide hammer refusal imminent).	Effort: Difficult 2 to 3 ft bgs ENV: 2-3' PCB, Lead at 1515
443.2 / 10								
438.2 / 15								
433.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB17**

CDM Smith

Boring Number: 300-SB18

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159459 **E:** 1119662
Drilling Date: Start: 9/26/2018 **End:** 9/26/2018

Surface Elevation (ft.): 460.5
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/26/2018	1100

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
460.5 0	GP	1	36	26		Silty Gravel	3" Topsoil Moist to dry, red-down, SILT and fine to coarse GRAVEL, little fine to medium sand (GM)	ENV: 0-0.5' PCB at 1115; 0-2' Lead x3 at 1115 ENV: 0.5-2' PCB at 1115 ENV: 2-3' Lead x2, PCB at 1115 Siltstone chips in the bottom 2"
							Exploration terminated at 3 ft bgs (no refusal).	
455.5 5								
450.5 10								
445.5 15								
440.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB18**

CDM Smith

Boring Number: 300-SB19

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159488 **E:** 1119699
Drilling Date: Start: 9/26/2018 **End:** 9/26/2018

Surface Elevation (ft.): 455.7
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/26/2018	920

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
455.7 / 0							2" Topsoil	
						Fill	Moist, brown, fine to medium SAND, some silt, little fine to coarse gravel, trace wood, trace debris (SM)	ENV: 0-0.5' PCB at 0915; 0-2' Lead at 0915 ~~ENV: 0.5-2' PCBx2 at 0915~~
	GP	1	36	30		Silty Gravel	Dry to moist, brown to red-brown, fine to coarse GRAVEL, some silt, little fine to coarse sand (GM)	ENV: 2-3' Lead, PCB at 0915 Siltstone fragments in tip
							Exploration terminated at 3 ft bgs (no refusal).	
450.7 / 5								
445.7 / 10								
440.7 / 15								
435.7								

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB19**

CDM Smith

Boring Number: 300-SB20

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159514 **E:** 1119729
Drilling Date: Start: 9/13/2018 **End:** 9/13/2018

Surface Elevation (ft.): 457.4
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
0.2	9/13/2018	1435

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
457.4 / 0	SH	1	36	24		Fill	Top 10": Wet, brown, Clayey SILT, little fine to coarse sand, little gravel, trace debris (ML)	Effort: Moderate 0 to 2 ft bgs. ENV: 0-2' PCB, Lead at 1435
							Middle 4" Wet, gray-brown, Organic Clayey SILT, little fine to coarse sand, trace fine to coarse gravel (OL)	ENV: 2-3' PCB, Lead at 1435
							Bottom 10": Wet, black, fine to coarse SAND and fine to coarse GRAVEL, trace silt, trace metal, trace glass (SP-GP)	Effort: Difficult 2 to 3 ft bgs. Strong petroleum odor.
							Exploration terminated at 3.0 ft bgs	
452.4 / 5								
447.4 / 10								
442.4 / 15								
437.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB20**

CDM Smith

Boring Number: 300-SB21

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159526 **E:** 1119706
Drilling Date: Start: 9/13/2018 **End:** 9/13/2018

Surface Elevation (ft.): 453.4
Total Borehole Depth (ft.): 1.5
Depth to Initial Water Level (ft):

Depth	Date	Time
0.1	9/13/20018	1300

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
453.4 / 0	SH	1	18	12		Fill	Top 4": Wet, dark gray, Slightly Organic Clayey SILT, trace fine to medium sand, trace fine gravel (ML/OL) Bottom 8": Wet, dark gray, fine to coarse GRAVEL and fine to coarse sand, little silt, trace shells, trace glass, trace brick, trace metal Exploration terminated at 1.5 ft bgs (refusal imminent).	Effort: Easy ENV: 0-1.5' PCB, Lead at 1300 Effort: Difficult
448.4 / 5								
443.4 / 10								
438.4 / 15								
433.4								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: 300-SB21**

CDM Smith

Boring Number: 300-SB22

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159525 **E:** 1119649
Drilling Date: Start: 9/26/2018 **End:** 9/26/2018

Surface Elevation (ft.): 456.2
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
1.5	9/26/2018	950

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
456.2 0						Fill	2" Topsoil Moist, brown, fine to coarse SAND, some silt, trace fine gravel, trace roots (SM)	ENV: 0-0.5' PCB at 1000; 0-2' Lead, TCLP Lead at 1000
▼	GP	1	36	24		Silty Gravel	Wet, brown to red-brown, fine to coarse GRAVEL, little silt, trace fine to coarse sand (GM)	ENV: 0.5-2' PCB at 1000 ENV: 2-3' Lead, TCLP Lead, PCB at 1000
							Exploration terminated at 3 ft bgs (no refusal).	
451.2 5								
446.2 10								
441.2 15								
436.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB22**

CDM Smith

Boring Number: 300-SB23

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159502 **E:** 1119629
Drilling Date: Start: 9/26/2018 **End:** 9/26/2018

Surface Elevation (ft.): 460.1
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/26/2018	1145

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
460.1 0	GP	1	36	34		Sand and Silt	Dry to moist, brown to red-brown, fine to coarse SAND, some silt, some fine to coarse gravel, trace roots (SM-GM)	ENV: 0-0.5' PCB at 1200; 0-2' Lead at 1200
							Dry, red-brown, SILT, some fine to coarse gravel, little fine sand (ML)	ENV: 0.5-2' PCB at 1200 ENV: 2-3' Lead, PCB at 1200
						WR	Completely weathered, red-brown, SILTSTONE	
							Exploration terminated at 3 ft bgs (no refusal).	
455.1 5								
450.1 10								
445.1 15								
440.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: 300-SB23**

CDM Smith

Boring Number: 300-SB24

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159562 **E:** 1119610
Drilling Date: Start: 10/17/2018 **End:** 10/17/2018

Surface Elevation (ft.): 455
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
2	10/17/2018	920

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
455.0 / 0						Peat	Wet, brown, Silty PEAT, some silt, some fine to medium sand (Pt)	ENV: 0-2' Lead at 0920; 0-0.5' PCBs at 0920; 0.5-2' PCBs at 0920
▼	GP	1	48	36		WR	Dry to wet, red, fine to coarse GRAVEL, trace fine to coarse sand, trace silt (SILTSTONE)	
450.0 / 5							Exploration terminated at 4.0 ft bgs.	
445.0 / 10								
440.0 / 15								
435.0								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: 300-SB24**

CDM Smith

Boring Number: 300-SB25

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159572 **E:** 1119577
Drilling Date: Start: 10/17/2018 **End:** 10/17/2018

Surface Elevation (ft.): 454.7
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
454.7 / 0	GP	1	48	42		Peat	Moist, brown, PEAT, some silt, trace fine to medium sand (Pt)	ENV: 0-2' Lead at 0840; 0-0.5; PCBs at 0840; 0.5-2' PCBs at 0840
							Wet, brown-gray, Organic Silty CLAY, little fine to medium sand, trace roots (OL/CL) [Organic Silt and Clay]	
						WR	Wet, brown, fine to coarse GRAVEL, trace fine to coarse sand, trace silt (SILTSTONE)	ENV: 2-3' Lead, PCBs at 0840
449.7 / 5							Exploration terminated at 4 ft bgs.	
444.7 / 10								
439.7 / 15								
434.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB25**

CDM Smith

Boring Number: 300-SB27

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159600 **E:** 1119870
Drilling Date: Start: 9/20/2018 **End:** 9/20/2018

Surface Elevation (ft.): 484.5
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/20/2018	1213

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.5 0	GP	1	48	26		Fill	Top 2": Crushed stone Middle 8": Dry, gray, fine to coarse SAND, some fine to coarse gravel, trace silt (SP-GP) Midle 6": Dry, light brown, fine to medium SAND, some fine to coarse gravel, little silt (SP-GP) Bottom 10": Dry, black, fine to coarse GRAVEL (slag), some fine to coarse sand, trace silt (GP-SP)	ENV: 0-2' Lead at 1220 PID= 0 ppm ENV: 2-4' Lead at 1220 PID= 0 ppm
479.5 5							Exploration terminated at 4 ft bgs.	
474.5 10								
469.5 15								
464.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB27**

CDM Smith

Boring Number: 300-SB28

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159619 **E:** 1119817
Drilling Date: Start: 9/20/2018 **End:** 9/20/2018

Surface Elevation (ft.): 484
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/20/2018	1240

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.0 / 0	GP	1	48	36		Fill	Top 1": Crushed stone Middle 24": Dry, black, brown, fine to coarse SAND, little fine to coarse gravel, little silt (SP-GP)	ENV: 0-2' Lead at 1240 ENV: 2-4' Lead at 1240
						Sand and Silt	Bottom 11": Dry, red-brown, fine to medium SAND, little silt, trace fine gravel, trace brick, trace debris (SP)	
479.0 / 5							Exploration terminated at 4 ft bgs.	
474.0 / 10								
469.0 / 15								
464.0								

Sample Types		Consistency vs Blowcount/Foot				Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Loose: 4-10 M. Dense: 10-30 Dense: 30-50 V. Dense: >50		Fine Grained (Clay): V. Soft: <2 Soft: 2-4 M. Stiff: 4-8 Stiff: 8-15 V. Stiff: 15-30 Hard: >30		and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: 300-SB28**

CDM Smith

Boring Number: 300-SB29

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / NA
Drilling Method: Auger/Grab
Core Size: NA in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159596 **E:** 1119676
Drilling Date: Start: 9/17/2018 **End:** 9/17/2018

Surface Elevation (ft.): 459.9
Total Borehole Depth (ft.): 1
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/17/2018	1200

Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
459.9 / 0	AS	1				Fill	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace glass, trace brick, trace debris (SM)	ENV: 0-1' PCB, Lead at 1200
							Exploration terminated at 1 ft bgs.	
454.9 / 5								
449.9 / 10								
444.9 / 15								
439.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB29**

CDM Smith

Boring Number: 300-SB30

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159618 **E:** 1119693
Drilling Date: Start: 9/14/2018 **End:** 9/14/2018

Surface Elevation (ft.): 476
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/14/2018	830

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
476.0 / 0	SH	1	36	12		Fill	Dry, brown-red, fine to medium SAND and fine to coarse GRAVEL, little silt, trace roots, trace brick, trace plastic (SP-GP)	Effort: Easy 0 to 3 ft bgs ENV: 0-2' PCB, Lead at 0830 ENV: 2-3' PCB. Lead at 0830
							Exploration terminated at 3 ft bgs.	
471.0 / 5								
466.0 / 10								
461.0 / 15								
456.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB30**

CDM Smith

Boring Number: 300-SB31

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159599 **E:** 1119781
Drilling Date: Start: 9/21/2018 **End:** 9/21/2018

Surface Elevation (ft.): 484.1
Total Borehole Depth (ft.): 23.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/21/2018	930

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.1 0	GP	1	48	34		Fill	Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace roots (SP) Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace debris, trace glass (SP-GP)	ENV: 0-2' Lead at 0930 ENV: 2-4' Lead at 0930
479.1 5	GP	2	48	29			Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace debris, trace glass (SP-GP)	ENV: 4-6' Lead at 0930 ENV: 6-8' Lead at 0930
474.1 10	GP	3	48	36				ENV: 8-10' Lead at 0930 Brick at 10 ft bgs ENV: 10-12' Lead at 0930
	GP	4	48	44			Dry, black, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace debris, trace glass (SP-GP)	ENV: 12-14' Leadx2 at 0930 ENV: 14-16' Lead at 0930
469.1 15	GP	5	48	48			Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace debris, trace glass (SP-GP)	ENV: 16-18' Lead at 0930 ENV: 18-20' Lead at 0930 Brick at 18.5 to 19 ft bgs
464.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB31**

Boring Number: 300-SB31

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
464.1 / 20	GP	6	42	42		Fill	Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace debris, trace glass (SP-GP)	ENV: 20-22' Lead at 0930
						Silty Gravel	Dry, red-brown, SILT and fine to coarse GRAVEL, little fine sand (GM)	ENV: 22-24' Lead at 0930 Siltstone chips in tip
							Eploration terminated at 23.5 ft bgs (refusal).	
459.1 / 25								
454.1 / 30								
449.1 / 35								
444.1 / 40								
439.1 / 45								

CDM Smith

Boring Number: 300-SB32

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159634 **E:** 1119922
Drilling Date: Start: 9/20/2018 **End:** 9/20/2018

Surface Elevation (ft.): 487.3
Total Borehole Depth (ft.): 6.4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/20/2018	1255

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
487.3 / 0	GP	1	48	40		Fill	Top 1": Crushed stone Dry, gray, fine to coarse GRAVEL, some fine to coarse sand, little silt (GP-SP) Dry, black, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick (SP)	ENV: 0-2' Lead at 1300 ENV: 2-4' Lead at 1300
482.3 / 5	GP	2	28	28		Silt	Dry, red brown, SILT, little fine to coarse gravel, little fine sand (ML)	ENV: 4-6' Leadx2 at 1300 ENV: 4-6.4' Lead at 1300 Gray-white Siltstone fragment in tip.
							Exploration terminated at 6.4 ft bgs.	
477.3 / 10								
472.3 / 15								
467.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB32**

CDM Smith

Boring Number: 300-SB33

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159402 **E:** 1120053
Drilling Date: Start: 9/21/2018 **End:** 9/21/2018

Surface Elevation (ft.): 482.1
Total Borehole Depth (ft.): 3.3
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/21/2018	1015

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.1 0	GP	1	39	27		Fill	4" Crushed Stone Moist, brown, SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 0-2' Lead at 1015
						WR	Dry, gray-white, SILT, little fine to coarse gravel, little fine sand (ML) Moist, dark brown to red-brown, fine to coarse SAND, little fine to coarse gravel, little silt (SP-GP) Exploration terminated at 3.3 ft bgs (refusal).	ENV: 2-4' Lead at 1015 Red-brown Siltstone fragments and chips in tip Encountered refusal at 3.3 ft bgs on three attempts.
477.1 5								
472.1 10								
467.1 15								
462.1								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB33**

CDM Smith

Boring Number: 300-SB34

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159249 **E:** 1120096
Drilling Date: Start: 9/21/2018 **End:** 9/21/2018

Surface Elevation (ft.): 477.3
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/21/2018	1050

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
477.3 0	GP	1	48	24		Fill	1" Crushed Stone Dry, light brown-gray, fine to coarse GRAVEL, some fine to coarse sand, little silt (GP-SP)	ENV: 0-2' Lead at 1045
							Dry, red-brown, fine to coarse GRAVEL, some silt, little fine to medium sand (GP)	ENV: 2-4' Lead at 1045
472.3 5	GP	2	24	18			Dry, red-brown, fine to coarse SAND and fine to coarse GRAVEL, little silt (SP-GP)	ENV: 4-6' Lead at 1045 Red-brown Siltstone gravel and chips throughout.
467.3 10							Exploration terminated at 6 ft bgs (refusal).	Encountered refusal at 2 ft bgs on first attempt.
462.3 15								
457.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB34**

CDM Smith

Boring Number: 300-SB35

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159213 **E:** 1119990
Drilling Date: Start: 9/21/2018 **End:** 9/21/2018

Surface Elevation (ft.): 472.1
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/21/2018	1140

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
472.1 0	GP	1	48	46		Fill	2" Crushed stone Dry, red-brown to dark-brown, SILT and fine to coarse GRAVEL, some fine to coarse sand (GM-SM)	ENV: 0-2' Lead at 1130 ENV: 2-4' Lead at 1130
467.1 5	GP	2	48	24			Dry, red-brown to dark-brown, SILT and fine to coarse GRAVEL, some fine to coarse sand (GM-SM) Moist, red-brown, fine to coarse GRAVEL, some clayey silt, trace fine sand (GM)	ENV: 4-6' Leadx3 at 1130 Brick encountered at 5.5 ft bgs. ENV: 6-8' Lead at 1130 Red-brown Siltstone chips in tip at 7.3 ft bgs
462.1 10	GP	3	48	24			Moist, brown, fine to coarse SAND, some fine to coarse gravel, trace silt (SP) Moist, red-brown, CLAY & SILT, little fine to coarse gravel, trace fine sand (CL-ML)	ENV: 8-10' Lead at 1130
457.1 15 452.1							Exploration terminated at 12 ft bgs (no refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB35**

CDM Smith

Boring Number: 300-SB36

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159153 **E:** 1119846
Drilling Date: Start: 9/21/2018 **End:** 9/21/2018

Surface Elevation (ft.): 471
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/21/2018	1305

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.0 / 0	GP	1	48	28		Fill	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace roots (SM)	ENV: 0-2' Lead at 1315
							Dry, brown to red-brown, SILT and fine to coarse GRAVEL, some fine to medium sand, trace brick, trace roots (GM-SM)	ENV: 2-4' Lead at 1315
466.0 / 5	GP	1	24	16			Dry, brown to red-brown, SILT and fine to coarse GRAVEL, some fine to medium sand, trace brick, trace roots (GM-SM)	ENV: 4-6' Lead at 1315
							Exploration terminated at 6 ft bgs.	
461.0 / 10								
456.0 / 15								
451.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB36**

CDM Smith

Boring Number: 300-SB37

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159140 **E:** 1119791
Drilling Date: Start: 9/21/2018 **End:** 9/21/2018

Surface Elevation (ft.): 471
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/21/2018	1340

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.0 / 0	GP	1	48	40		Fill	Dry, dark brown, fine to coarse SAND, little silt, little fine to coarse gravel (SP) Dry, red-brown to brown, SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 0-2' Lead at 1340 ENV: 2-4' Lead at 1340
466.0 / 5	GP	2	24	18			Dry, red-brown to brown, SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 4-6' Lead at 1340
461.0 / 10							Exploration terminated at 6 ft bgs (no refusal).	
456.0 / 15								
451.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB37**

CDM Smith

Boring Number: 300-SB38

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159237 **E:** 1119928
Drilling Date: Start: 9/24/2018 **End:** 9/24/2018

Surface Elevation (ft.): 465.7
Total Borehole Depth (ft.): 14
Depth to Initial Water Level (ft):

Depth	Date	Time
6.5	9/24/2018	1430

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
465.7 0	GP	1	48	36		Fill	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace roots (SM)	ENV: 0-2' PCB, Lead at 1415
							Dry, brown and red-brown and gray, SILT and fine to medium SAND, some fine to coarse gravel, trace debris (SM-GM)	ENV: 2-4' Lead at 1415; 2-5' PCBs at 1415
460.7 5	GP	2	48	24			Dry, brown and red-brown and gray, SILT and fine to medium SAND, some fine to coarse gravel, trace debris (SM-GM)	ENV: 4-6' Lead at 1415; 5-8' PCBs at 1415
▼							Wet, light brown, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP)	ENV: 6-8' Lead at 1415
455.7 10	GP	3	48	30			Wet, light brown, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP)	ENV: 8-10' Lead at 1415; 8-11' PCBx2 at 1415
							Wet, black, fine to coarse SAND and fine to coarse GRAVEL, some slag, little silt, trace debris (SP-GP)	ENV: 10-12' Lead at 1415; 11-15' PCB at 1415 ENV: 12-14' Lead at 1415
	GP	4	24	17				
450.7 15							Exploration terminated at 14 ft bgs (refusal).	
445.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB38**

CDM Smith

Boring Number: 300-SB39

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159257 **E:** 1119927
Drilling Date: Start: 9/24/2018 **End:** 9/24/2018

Surface Elevation (ft.): 463.8
Total Borehole Depth (ft.): 17.8
Depth to Initial Water Level (ft):

Depth	Date	Time
9	9/24/2018	1200

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
463.8 / 0	GP	1	48	36		Fill	2" Crushed stone Dry, brown to dark brown, fine to medium SAND, some silt, little fine to coarse gravel, trace brick (SM)	ENV: 0-2' Lead, TCLP Lead, PCBx3 at 1200 ENV: 2-4' Lead, TCLp Lead at 1200; 2-5' PCB at 1200
458.8 / 5	GP	2	48	28			Dry, brown to dark brown, fine to medium SAND, some silt, little fine to coarse gravel, trace brick (SM)	ENV= 4-6' Lead, TCLP Lead at 1200; 5-8' PCB at 1200 ENV: 6-8' Lead, TCLP Lead at 1200
▼	GP	3	24	16			Wet, brown to black, fine to coarse GRAVEL, little clayey silt, little fine to coarse sand, trace brick, trace slag (GP)	ENV: 8-10' Lead, TCLP Lead, PCB at 1200
453.8 / 10	GP	4	48	24			Wet, black, fine to coarse GRAVEL, some slag, little fine to coarse sand, trace silt, trace brick (GP)	Oil sheen Material at 10 to 14 ft bgs too coarse for environmental sampling
448.8 / 15	GP	5	45	35			Wet, black, fine to coarse GRAVEL and fine to coarse SAND, some slag, trace silt, trace copper wire, trace debris (GP-SP)	ENV: 14-16' Lead, TCLP Lead at 1300; 14-17' PCB at 1300 ENV: 16-18' Lead, TCLP Lead at 1300
						WR	Dry, red-brown, SILT, little fine to coarse gravel, little fine sand (SILTSTONE fragments) Exploration terminated at 17.8 ft bgs (refusal).	
443.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB39**

CDM Smith

Boring Number: 300-SB40

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159303 **E:** 1119914
Drilling Date: Start: 9/24/2018 **End:** 9/24/2018

Surface Elevation (ft.): 468.1
Total Borehole Depth (ft.): 15
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/24/2018	1100

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
468.1 0	GP	1	48	48		Fill	Dry, brown, fine to medium SAND and SILT, little fine to coarse gravel, trace brick (SM)	ENV: 0-2' PCB, Lead at 1100
							Dry, red-brown, SILT, little fine to coarse gravel, little fine to medium sand (ML)	ENV: 2-4' Leadx3 at 1100; 2-5' PCBs at 1100 Possible fill material with native soils.
463.1 5	GP	2	48	30			Dry, gray to red-brown, SILT, little fine to coarse gravel, little fine sand (GM)	ENV: 4-6' Lead at 1100
								ENV: 8-10' Lead at 1100; 8-11' PCB at 1100
458.1 10	GP	3	48	48		Silt and Clay	Dry, red-brown, Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML)	ENV: 10-12' Lead at 1100; 11-15' PCBs at 1100
	GP	4	36	28			Dry, red-brown, Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML)	ENV: 12-14' Lead at 1100
								ENV: 14-15' Lead at 1100
453.1 15							Exploration terminated at 15 ft bgs (no refusal).	
448.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: 300-SB40**

CDM Smith

Boring Number: CS-SB-01

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Clinton Street
N: 1157781 **E:** 1120342
Drilling Date: Start: 10/11/2018 **End:** 10/11/2018

Surface Elevation (ft.): 491
Total Borehole Depth (ft.): 14
Depth to Initial Water Level (ft):

Depth	Date	Time
NR	10/11/2018	1350

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
491.0 0	GP	1	48	42		Fill	Moist, dark brown, fine SAND and SILT (SM) 3" Crushed Cement Moist, brown, fine SAND and SILT, trace fine gravel, trace brick (SM) 7" Crushed Boulder Dry, red-brown, SILT, little fine sand, little fine to coarse gravel (ML)	ENV: 0-2' Lead, PCBs at 1350 ENV: 2-4' Lead at 1350; 2-5' PCBs at 1350 Possible fill material with native soils.
486.0 5	GP	2	48	42			8" Crushed Boulder Dry, red-brown, SILT, little fine sand, little fine to coarse gravel (ML)	ENV: 4-6' Lead at 1350; 5-8' PCBs at 1350 ENV: 6-8' Lead at 1350
	GP	3	24	24		Sand	Dry, light brown, fine to coarse SAND, some fine to coarse gravel, trace silt (SP) Dry, light brown, fine to coarse SAND, some fine to coarse gravel, trace silt (SP)	ENV: 8-10' Lead x2, PCBs at 1350
481.0 10	GP	4	48	19				ENV: 10-12' Lead, PCBs at 1350
							Wet, black, Slightly Organic Silty CLAY, little fine to coarse gravel, little silt (OL/CL) [Organic Clay]	
						Clay	Wet, black, Silty CLAY, little fine to coarse gravel, little silt (CL)	
476.0 15 471.0							Exploration terminated at 14 ft bgs.	Refusal at 5.8 ft on first attempt.

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: CS-SB-01**

CDM Smith

Boring Number: CS-SB-02

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Clinton Street
N: 1157774 **E:** 1120306
Drilling Date: Start: 10/15/2018 **End:** 10/15/2018

Surface Elevation (ft.): 487.9
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NR	10/15/2018	845

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
487.9 0	GP	1	48	35		Fill	3" Topsoil: Moist, dark brown, SILT, some fine to medium sand, trace organic matter Dry, red, fine to coarse GRAVEL (Shale) (GP) Dry, brown-gray and red-brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt (SP)	ENV: 0-2' Lead, PCBs at 0845
							Dry, white, fine to coarse GRAVEL (Crushed Dolostone) (GP)	ENV: 2-4' Lead at 0845; 2-5' PCBs at 0845 Possible fill material with native soils.
482.9 5	GP	2	48	31			Dry, white-gray-brown, fine to coarse GRAVEL (Crushed Dolostone), some fine to coarse sand (GP)	ENV: 4-6' Lead at 0845 ENV: 6-8' Lead at 0845
477.9 10	GP	3	48	48			Dry, light brown, fine to coarse SAND, trace fine gravel, trace silt, trace slag (SP) Dry, light brown, fine to coarse SAND, trace fine gravel, trace silt, trace slag (SP)	ENV: 8-10' Lead at 0845; 8-11' PCBs at 0845 ENV: 10-12' Lead at 0845; 11-12' PCBs at 0845
						Organic Silt and Clay	Wet, black, Organic Silty CLAY, trace shells, trace grass, trace roots (OL/OH)	Petroleum odor 10.5 to 12 ft bgs.
472.9 15							Exploration terminated at 12.0 ft bgs.	
467.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: CS-SB-02**

CDM Smith

Boring Number: CS-SB-03

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Clinton Street
N: 1157739 **E:** 1120299
Drilling Date: Start: 10/15/2018 **End:** 10/15/2018

Surface Elevation (ft.): 491.3
Total Borehole Depth (ft.): 16
Depth to Initial Water Level (ft):

Depth	Date	Time
NR	10/15/2018	1030

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
491.3 0	GP	1	48	29		Fill	5" Topsoil Dry, brown, fine to coarse GRAVEL, some fine to coarse sand, some silt (GP)	ENV: 0-2' Lead, PCBs at 1030 ENV: 2-4' Lead at 1030; 2-5' PCBs at 1030
							Dry, red, fine to coarse GRAVEL (Broken/Pulverized Shale) (GP)	Possible fill material with native soils.
486.3 5	GP	2	48	41			Dry, red, fine to coarse GRAVEL (Broken/Pulverized Shale) (GP) Dry, white and gray, fine to coarse GRAVEL (Pulverized Dolostone) (GP) Dry, brown, fine to medium SAND and SILT, some fine to coarse gravel (SM)	ENV: 4-6' Lead at 1030; 5-8' PCBs at 1030 ENV: 6-8' Leadx2 at 1030
481.3 10	GP	3	48	36			Dry, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt (SP-GP) Moist, black, fine to coarse GRAVEL (Cinders), some fine to coarse sand, trace silt (GP)	ENV: 8-10' Lead at 1030; 8-11' PCBs at 1030 ENV: 10-12' Lead at 1030; 11-16' PCBs at 1030
						Organic Clay	Moist, gray, Slightly Organic Silty CLAY, trace fine to medium sand (OL/OH)	
476.3 15	GP	4	48	38		Clay	Wet, dark gray, Silty CLAY, trace fine to medium sand (CL)	ENV: 12-14' Lead at 1030
471.3							Exploration terminated at 16 ft bgs.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: CS-SB-03**

CDM Smith

Boring Number: DEC-SB-10

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158692 **E:** 1120141
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 468
Total Borehole Depth (ft.): 1.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/3/2018	1230

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
468.0 / 0	GP	1	18	10		Fill	Moist, dark-brown, fine to coarse SAND and fine to coarse GRAVEL, some silt, trace fabric, trace debris, trace slag (SP-GP)	ENV: 0.5-1.5' Total Cr x2, Cr 6+ at 1230
							Exploration terminated at 1.5 ft bgs (no refusal).	
463.0 / 5								
458.0 / 10								
453.0 / 15								
448.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SB-10**

CDM Smith

Boring Number: DEC-SB-13

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / S. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158808 **E:** 1120106
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 467.7
Total Borehole Depth (ft.): 1.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/3/2018	1300

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
467.7 / 0	GP	1	18	10		Fill	Moist, brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace roots, trace debris (SP)	ENV: 0.5-1.5' Total Cr, Cr 6+ x2 at 1300
							Exploration terminated at 1.5 ft bgs (no refusal).	
462.7 / 5								
457.7 / 10								
452.7 / 15								
447.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SB-13**

CDM Smith

Boring Number: DEC-SB-3A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158325 **E:** 1120234
Drilling Date: Start: 10/8/2018 **End:** 10/8/2018

Surface Elevation (ft.): 471.3
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
4.5	10/8/2018	900

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.3 0	GP	1	48	32		Fill	Dry, brown to gray, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace roots, trace debris (SP)	ENV: 2-5' PCBs x2 at 0900
▼ 466.3 5	GP	2	48	27		Silt and Clay	Moist, brown-gray, SILT & CLAY, little fine to coarse gravel, trace fine sand (ML-CL)	ENV: 4-6' Lead x2 at 0900 5-8' PCBs at 0900 ENV: 6-8' Lead at 0900
							Wet, gray to red-brown, SILT & CLAY and fine to coarse GRAVEL (siltstone fragments), trace fine sand (GM)	Material becomes red-brown in tip.
461.3 10							Exploration terminated at 8 ft bgs (no refusal).	Refusal at 6.1 ft bgs on first attempt.
456.3 15								
451.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SB-3A**

CDM Smith

Boring Number: DEC-SB-5A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158487 **E:** 1120154
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 470.7
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/4/2018	1415

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.7 0						Fill	Moist, brown, fine to coarse SAND and Clayey SILT, little fine to coarse gravel, trace roots (SM)	ENV: 0.5-2' Lead at 1420
	GP	1	48	40		Silt and Clay	Moist, light brown, Clayey SILT, some fine to medium sand, trace fine to coarse gravel (ML)	ENV: 2-4' Lead at 1420
						Sand and Silt	Moist, light brown, SILT and fine to medium SAND, little fine to coarse gravel (ML)	ENV: 4-6' Lead at 1420
465.7 5	GP	2	24	24				
							Exploration terminated at 6 ft bgs (no refusal).	
460.7 10								
455.7 15								
450.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SB-5A**

CDM Smith

Boring Number: DEC-SB-7A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158601 **E:** 1120139
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 469
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/4/2018	1320

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.0 / 0	GP	1	48	36		Fill	Moist, light brown, Clayey SILT, little fine to coarse gravel, little fine to coarse sand, trace grass (ML) Moist, brown, fine to coarse SAND, some silt, little fine to coarse gravel (SM)	ENV: 0.5-2' Lead, TCLP, PCB at 1320 ENV: 2-4' Lead, TCLP at 1320; 2-6' PCB at 1320
464.0 / 5	GP	2	24	24		Sand and Silt	Moist to wet, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-6' Leadx2, TCLP Lead at 1320
459.0 / 10							Exploration terminated at 6 ft bgs (no refusal).	
454.0 / 15								
449.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SB-7A**

CDM Smith

Boring Number: DEC-SB-9A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158650 **E:** 1120142
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 469
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NR	10/4/2018	1250

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.0 / 0	GP	1	48	30		Fill	4" Topsoil Dry, dark brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace concrete, trace slag (SP-GP)	ENV: 0.5-2' Lead at 1300 ENV: 2-4' Lead at 1300
464.0 / 5	GP	2	24	16		Silt and Clay	Moist, light brown, Clayey SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-6' Lead at 1300
459.0 / 10							Exploration terminated at 6 ft bgs (no refusal).	
454.0 / 15								
449.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SB-9A**

CDM Smith

Boring Number: DEC-SED-28A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Surface Elevation (ft.): 463.9
Drilling Method: Slide Hammer
Total Borehole Depth (ft.): 8
Core Size: 2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
0	9/18/2018	845

Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159052 **E:** 1120035
Abandonment Method: NA
Drilling Date: Start: 9/18/2018 **End:** 9/18/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
463.9 / 0	SH	1	48	24		Silty Gravel	Top 12": Wet, dark brown, SILT, some fine to coarse gravel, trace fine to coarse sand (ML) trace wood, trace grass	Effort: Easy 0 to 7.8 ft bgs ENV: 1-2' PCB at 0845
							Bottom 12": Wet, brown, fine to coarse GRAVEL, little fine to coarse sand, little silt (GP)	ENV: 2-5' PCB at 0845 ENV: 3-5' Lead at 0845
458.9 / 5	SH	2	48	24		Peat	Top 4" Wet, dark brown, SILT, some fine to coarse gravel, trace fine to coarse sand, little silt (GP) Middle 18": Wet, brown, PEAT, some silt, little fine to medium sand, trace fine to coarse gravel (fibrous), (PT)	
						WR	Bottom 2": Wet, gray-brown, Silty CLAY, trace fine gravel, trace fine sand (CL) Exploration terminated at 8 ft bgs (refusal).	Effort: Difficult 7.8 to 8 ft bgs
453.9 / 10								
448.9 / 15								
443.9								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: DEC-SED-28A**

CDM Smith

Boring Number: DEC-SED-35A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159339 **E:** 1119817
Drilling Date: Start: 9/25/2018 **End:** 9/25/2018

Surface Elevation (ft.): 459
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
1.2	9/25/2018	1320

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
459.0 0						Fill	2" Topsoil Moist, brown, Slightly Organic Clayey SILT, little fine sand, trace fine gravel, trace wood, trace debris (ML) (Organics- roots)	ENV: 0-2' Lead, PCB at 1330
	GP	1	48	30		Clayey Gravel	Wet, light brown-red brown, fine to coarse GRAVEL and Silty CLAY, little fine sand (GC)	ENV: 2-4' Lead at 1330; 2-5' PCB at 1330 Siltstone fragments
454.0 5	GP	2	48	24			Wet, light brown, fine to coarse GRAVEL and Silty CLAY, trace fine sand (GC)	ENV: 4-6' Lead at 1330; 5-8' PCB at 1330 ENV: 6-8' Leadx2 at 1330
	GP	2	24	12			Wet, light brown-gray, fine to coarse GRAVEL and Silty CLAY, trace fine sand (GM)	ENV: 8-10' Lead, PCB at 1330
449.0 10							Exploration terminated at 10 ft bgs (no refusal).	
444.0 15								
439.0								

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: DEC-SED-35A**

CDM Smith

Boring Number: DEC-SED-37A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159503 **E:** 1119722
Drilling Date: Start: 9/13/2018 **End:** 9/13/2018

Surface Elevation (ft.): 453.1
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
0.3	9/13/2018	1400

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
453.1	SH	1	36	14		Fill	Wet, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace roots (SM) Bottom 2": Wet, black, fine to coarse SAND and fine to coarse GRAVEL, trace silt, trace metal/nails, trace brick, trace glass (SP-GP)	Effort: Moderate 0 to 2 ft bgs. ENV: 2-3' PCB, Lead at 1400 Excavation Effort: Difficult 2 to 3 ft bgs.
448.1 / 5							Exploration terminated at 3 ft bgs.	
443.1 / 10								
438.1 / 15								
433.1								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SED-37A**

CDM Smith

Boring Number: DEC-SED-38A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159598 **E:** 1119600
Drilling Date: Start: 9/11/2018 **End:** 9/11/2018

Surface Elevation (ft.): 454.5
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
0.3	9/11/2018	1515

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
454.5 / 0							Wet, gray, Organic CLAY, trace fine sand (fibrous organics) (OH)	Effort: Easy 0 to 1 ft bgs.
	SH	1	36	30		Fill	Wet, black, fine to coarse GRAVEL, little fine to coarse sand, little metal/nails, trace silt (GP)	Effort: Difficult 1 to 3 ft bgs. ENV: 2-3' PCB at 1515
							Exploration terminated at 3 ft bgs (refusal).	
449.5 / 5								
444.5 / 10								
439.5 / 15								
434.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SED-38A**

CDM Smith

Boring Number: DEC-SED-40A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159679 **E:** 1119497
Drilling Date: Start: 10/16/2018 **End:** 10/16/2018

Surface Elevation (ft.): 452.2
Total Borehole Depth (ft.): 5.6
Depth to Initial Water Level (ft):

Depth	Date	Time
0.3	10/16/2018	1300

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
452.2							Wet, brown, Slightly Organic CLAY and fine SAND (SC)	
	SH	1	48	22		Fill	Wet, black, fine to coarse SAND, little fine to coarse gravel, little clay, trace metal, trace glass, trace organic matter (SP)	
447.2 / 5	SH	2	19	14			Wet, black, fine to coarse SAND, little fine to coarse gravel, little clay, trace metal, trace glass, trace organic matter (SP)	ENV: 4-5.6' PCBs at 1300
							Exploration terminated at 5.6 ft bgs (refusal).	Refusal at 3.8 ft bgs on first attempt.
442.2 / 10								
437.2 / 15								
432.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SED-40A**

CDM Smith

Boring Number: DEC-SS-10A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158915 **E:** 1120044
Drilling Date: Start: 10/1/2018 **End:** 10/1/2018

Surface Elevation (ft.): 464
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
1.8	10/1/2018	1345

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
464.0 / 0	GP	1	48	30		Organic Silt & Clay	Moist, brown-gray, Slightly Organic Clayey SILT, little fine to medium sand, trace fine gravel, trace roots (OL/ML)	ENV: 0.5-2' Lead at 1345
							Wet, gray, Organic Silty CLAY, trace fine sand (OL)	ENV: 2-4' Lead at 1345
						Peat	Wet, gray-brown, PEAT, some silty clay, little fine to coarse sand, trace wood (Pt) (fibrous peat)	ENV: 4-6' Lead at 1345
459.0 / 5	GP	2	24	16		Clay	Wet, gray-brown, Silty CLAY, little fine to coarse sand, trace wood (CL)	
							Exploration terminated at 6 ft bgs (no refusal).	
454.0 / 10								
449.0 / 15								
444.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SS-10A**

CDM Smith

Boring Number: DEC-SS-11A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1159008 **E:** 1119861
Drilling Date: Start: 10/1/2018 **End:** 10/1/2018

Surface Elevation (ft.): 466.7
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
5	10/1/2018	1040

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
466.7 / 0	GP	1	48	36		Fill	Wet, light brown, Clayey SILT, little fine to coarse sand, little fine to coarse gravel, trace glass (ML)	ENV: 0.5-2' Lead at 1030
							Moist, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace roots (SM)	ENV: 2-4' Lead at 1030
461.7 / 5	GP	2	24	16		Silty Gravel	Dry, red-brown, Clayey SILT and fine to coarse GRAVEL, little fine to medium sand (GM)	ENV: 4-6' Lead at 1030 Gravel is red-brown, Siltstone fragments
456.7 / 10							Exploration terminated at 6 ft bgs (no refusal).	Driller notes refusal imminent.
451.7 / 15								
446.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SS-11A**

CDM Smith

Boring Number: DEC-SS-15A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158864 **E:** 1120071
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 466
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
3	10/3/2018	1015

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
466.0 / 0						Fill	Moist, dark brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag, trace roots (SM)	ENV: 0.5-2' Lead, PCB at 1015
						Silt	Dry, red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	
	GP	1	48	36		Org. Silt & Clay	Moist to wet, light brown-gray, Organic SILT & CLAY, trace fine sand, trace fine gravel (MH/OL) (Organics-fibrous)	ENV: 2-4' Lead at 1015; 2-5' PCBx2 at 1015
461.0 / 5	GP	2	24	24		Org. Silt & Clay	Wet, gray-light brown, Organic fine to coarse SAND, some fine to coarse gravel, some silt & clay, trace wood (OL) (Organics- fibrous)	ENV: 4-6' Lead at 1015
						Peat	Wet, gray-light brown, PEAT, some silt & clay, trace fine sand, trace fine gravel (PT)	
							Exploration terminated at 6 ft bgs (no refusal).	
456.0 / 10								
451.0 / 15								
446.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SS-15A**

CDM Smith

Boring Number: DEC-SS-25

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158917 **E:** 1119937
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 470.2
Total Borehole Depth (ft.): 1
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/3/2018	1315

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.2 / 0	GP	1	12	10		Fill	Moist, light brown, Clayey SILT, some fine to medium sand, trace fine to coarse gravel (ML)	ENV: 0.5-1' Cr, Cr 6 at 1330
							Moist, brown, fine to coarse SAND, some silt, little fine to coarse gravel (SP)	
							Exploration terminated at 1 ft bgs (no refusal).	
465.2 / 5								
460.2 / 10								
455.2 / 15								
450.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SS-25**

CDM Smith

Boring Number: DEC-SS-29A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1159065 **E:** 1119964
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 464
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
2	10/3/2018	1345

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
464.0 0	GP	1	48	22		Organic Silt & Clay	Dry, brown-gray, fine to coarse GRAVEL, some clayey silt, little fine to coarse sand (GM) Moist, brown-gray, Slightly Organic Clayey SILT, trace fine to medium sand, trace fine gravel, trace roots (OL/ML)	ENV: 0.5-1' Cr, Cr-6 at 1345; 0.5-2' Lead, PCB at 1345 ENV: 2-4' Leadx2 at 1345; 2-6' PCB at 1345 ENV: 4-6' Lead at 1345
459.0 5	GP	2	24	24			Wet, brown-gray, PEAT, some clayey silt, little fine to coarse sand, trace fine gravel (Pt) [PEAT]	Peat is fibrous, spongey
						S&C	Wet, brown-gray, SILT & CLAY, trace fine sand, trace fine gravel (ML-CL)	S&C - Silt and Clay Stratum
							Exploration terminated at 6 ft bgs (no refusal).	
454.0 10								
449.0 15								
444.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: DEC-SS-29A**

CDM Smith

Boring Number: DEC-SS-36A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R.Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158657 **E:** 1120084
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 469.9
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/4/2018	1150

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.9 0	GP	1	48	33		Fill	Moist, gray, fine to coarse SAND and fine to coarse GRAVEL, some clayey silt, trace roots (SM-GM) Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag (SP-SM)	ENV: 2-4' Lead at 1150
							Concrete	
464.9 5	GP	2	24	24		Sand and Silt	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-6' Lead at 1150
459.9 10							Exploration terminated at 6 ft bgs (no refusal).	
454.9 15								
449.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: DEC-SS-36A**

CDM Smith

Boring Number: DEC-SS-42A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158549 **E:** 1120125
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 469
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/4/2018	1330

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.0 / 0						Fill	Moist, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace grass (SM)	ENV: 0.5-2' Lead, PCB at 1330
	GP	1	48	36		S&C	Dry, red-brown, Clayey SILT, some fine to coarse gravel, little fine to coarse sand (ML)	ENV: 2-4' Lead at 1330; 2-6' PCB at 1330
						Sand and Silt	Moist, light brown, SILT, some fine to coarse gravel, some fine to medium sand (ML)	S&C - Silt and Clay Stratum Gray Siltstone chips at 3.1 to 3.2 and 3.5 to 3.8 ft bgs. ENV: 4-6' Lead at 1330
464.0 / 5	GP	2	24	24				
							Exploration terminated at 6 ft bgs (no refusal).	
459.0 / 10								
454.0 / 15								
449.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SS-42A**

CDM Smith

Boring Number: DEC-SS-9A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158969 **E:** 1120004
Drilling Date: Start: 10/1/2018 **End:** 10/1/2018

Surface Elevation (ft.): 465.4
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
1.7	10/1/2018	1320

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
465.4 0	GP	1	48	29		Org. Silt & Clay	2" Topsoil, trace glass Moist, brown-gray, Slightly Organic Clayey SILT, little fine to coarse sand, trace fine gravel, trace wood (ML)	ENV: 0.5-2' Lead, PCB x2 at 1315 ENV: 2-4' Lead at 1315; 2-6' PCB at 1315
						Peat	Moist, gray, PEAT, little fine sand, trace fine gravel (Pt) (Organics- fibrous)	
460.4 5	GP	2	24	24		Silt and Clay	Wet, gray-brown, Silty CLAY, little fine gravel, trace fine sand (CL) Wet, red-brown, SILT & CLAY, some fine to medium sand, trace fine gravel (ML-CL)	ENV: 4-6' Lead at 1315
455.4 10							Exploration terminated at 6 ft bgs (no refusal).	
450.4 15								
445.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-SS-9A**

Boring Number: DEC-UPSON-1B-A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157320 **E:** 1120075
Drilling Date: Start: 10/22/2018 **End:** 10/22/2018

Surface Elevation (ft.): 503.4
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/22/2018	1020

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
503.4 0	GP	1	48	34		Fill	Moist, brown, Clayey SILT, little fine to medium sand, trace fine gravel (ML) Dry, brown-dark brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace metal, trace debris (SP)	ENV: 1-2' Lead x2 at 1020 ENV: 2-4' Lead x2 at 1020; 2-5' PCBs at 1020
498.4 5	GP	2	24	16		Gravel	Dry, brown-dark brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace metal, trace debris (SP) Dry, gray-white, fine to coarse GRAVEL, trace fine to coarse sand, trace silt (Dolostone Fragments) (GP)	ENV: 4-6' Lead at 1020 ENV: 5-6' PCB at 1020
493.4 10							Exploration terminated at 6.0 ft bgs (no refusal).	
488.4 15								
483.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-UPSON-1B-A**

CDM Smith

Boring Number: DEC-UPSON-2B-A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157101 **E:** 1120010
Drilling Date: Start: 10/18/2018 **End:** 10/18/2018

Surface Elevation (ft.): 503.9
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/18/2018	1500

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
503.9 0	GP	1	48	6		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick, trace glass, trace debris (SP)	ENV: 0-4' Lead, TCLP Lead at 1430
498.9 5	GP	2	48	12		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick, trace glass, trace debris (SP)	ENV: 4-8' Lead, TCLP Lead, PCBs at 1430 Poor recovery 0 to 8 ft bgs. Material composited over 4 ft for sufficient samples.
493.9 10	GP	3	48	24		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick, trace glass, trace debris (SP)	ENV: 8-10' Lead, TCLP Lead; 8-11' PCBs at 1430
						WR	Moist, brown, Slightly Organic Clayey SILT, some fine to coarse gravel, trace fine to medium sand, trace wood (ML) [Organic Silt and Clay]	ENV: 11-11.5' PCBs at 1430
							SILTSTONE cobbles (GP)	
							Terminated at 12.0 ft bgs (no refusal).	
488.9 15								
483.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DEC-UPSON-2B-A**

CDM Smith

Boring Number: DS-300-SB31

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159487 **E:** 1119573
Drilling Date: Start: 10/17/2018 **End:** 10/17/2018

Surface Elevation (ft.): 456.2
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
2.5	10/17/2018	1045

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
456.2 0							Wet, brown, CLAY and fine SAND, trace fine gravel (SC)	ENV: 0-2' PCBs
							Dry, red, fine to coarse GRAVEL (Shale) (GP)	
							Wet, brown, Silty CLAY, little fine sand, little fine to coarse gravel (CL)	
▼	GP	1	48	29		Fill	Wet, black, fine to coarse SAND and fine to coarse GRAVEL, trace silt (SP-GP)	ENV: 2-3' PCBs at 1045
451.2 5							Exploration terminated at 4 ft bgs.	
446.2 10								
441.2 15								
436.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DS-300-SB31**

CDM Smith

Boring Number: DS-300-SB32

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159530 **E:** 1119552
Drilling Date: Start: 10/17/2018 **End:** 10/17/2018

Surface Elevation (ft.): 454.2
Total Borehole Depth (ft.): 3.2
Depth to Initial Water Level (ft):

Depth	Date	Time
1.3	10/172018	950

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
454.2 / 0	GP	1	38	24		Fill	Wet, brown, CLAY and fine SAND, trace fine gravel (SC)	ENV: 0-2' PCBs at 0950
▼							Wet, black, fine to coarse GRAVEL and fine to medium SAND, some silt, trace metal (GP-SM)	Oil sheen 1 to 1.5 ft bgs.
						Gravel	Wet, brown, fine to coarse GRAVEL, trace fine to coarse sand, trace silt (Shale) (GP)	
							Exploration terminated at 3.2 ft bgs.	Refusal at 3.0 on first attempt.
449.2 / 5								
444.2 / 10								
439.2 / 15								
434.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DS-300-SB32**

CDM Smith

Boring Number: DS-SB-02

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159590 **E:** 1119639
Drilling Date: Start: 9/13/2018 **End:** 9/13/2018

Surface Elevation (ft.): 454.2
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
0.4	9/13/2018	1100

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
454.2	SH	1	36	20		Fill	Top 4": Moist, brown, fine to corase SAND and clayey SILT, little fine to coarse gravel, trace roots (Topsoil) (SM) Middle 10": Moist, brown, Organic Clayey SILT, little fine to coarse sand, trace fine to coarse gravel (OL)	Effort: Easy 0 to 3 ft bgs. ENV: 0-2' PCB at 1210
							Bottom 6": Wet, red-brown and brown, fine to coarse GRAVEL, some fine to coarse sand, some clayey silt, trace brick	ENV: 2-3' PCB at 1100
							Exploration terminated at 3 ft bgs.	
449.2 / 5								
444.2 / 10								
439.2 / 15								
434.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DS-SB-02**

CDM Smith

Boring Number: DS-SB-04

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159613 **E:** 1119587
Drilling Date: Start: 9/11/2018 **End:** 9/11/2018

Surface Elevation (ft.): 455.9
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
1.5	9/11/2018	1115

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
455.9 0	SH	1	36	24		Fill	Dry, dark brown, fine to coarse SAND and SILT, trace roots (SM)	Effort: Easy 0 to 1 ftbgs. ENV: 0-2' PCB at 1115
							Dry, red-brown, fine to coarse GRAVEL, some fine to coarse sand, little silt. (GP-SP)	Effort: Difficult 1 to 3 ft bgs. Roots @ 1.5 ft bgs
							Moist, gray-brown, Organic SILT and CLAY, trace fine sand (organics fibrous) (OL)	ENV: 2-3' PCB at 1600
							Wet, black, fine to coarse GRAVEL and fine to coarse SAND, some metal/nails/glass	Effort: Medium 3 to 5 ft bgs
450.9 5							Exploration terminated at 5 ft bgs (no refusal).	
445.9 10								
440.9 15								
435.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DS-SB-04**

CDM Smith

Boring Number: DS-SB-05

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159598 **E:** 1119570
Drilling Date: Start: 9/11/2018 **End:** 9/11/2018

Surface Elevation (ft.): 454.3
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
1.0	9/11/2018	1200

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
454.3 / 0	SH	1	36	12		Fill	Moist, brown, fine to coarse SAND and SILT, little roots (SM)	Effort: Medium 0 to 1 ft bgs. ENV:0-2' PCB at 1200 Effort: Difficult 1 to 3 ft bgs.
							Wet, black, fine to coarse GRAVEL, little clayey silt, little fine to coarse sand, little metal/nails (Industrial Fill)	ENV: 2-3' PCB at 1420
449.3 / 5							Exploration terminated at 3 ft bgs (refusal).	2" gravel in slide hammer tip.
444.3 / 10								
439.3 / 15								
434.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DS-SB-05**

CDM Smith

Boring Number: DS-SED-46

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159695 **E:** 1119517
Drilling Date: Start: 10/16/2018 **End:** 10/16/2018

Surface Elevation (ft.): 466.6
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
466.6 / 0							Moist, brown, Slightly Organic fine to medium SAND, trace fine to coarse gravel, trace silt (SP)	ENV: 0-2' PCB at 0900
	SH	1	48	31		Fill	Moist, brown, fine SAND and CLAY, trace fine to coarse gravel, trace concrete, trace cinders (SC)	ENV: 2-3' PCBs at 1410
	SH	2	12	12		Fill	Moist, brown, fine SAND and CLAY, trace fine to coarse gravel, trace concrete, trace cinders (SC)	ENV: 4-5' PCBs at 1410
461.6 / 5						Sand	Moist, light brown, fine to medium SAND, some fine to coarse gravel, trace silt (SP)	
							Exploration terminated at 5.0 ft bgs (refusal).	
456.6 / 10								
451.6 / 15								
446.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: DS-SED-46**

CDM Smith

Boring Number: DS-SED-47

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location:
N: 1159692 **E:** 1119479
Drilling Date: Start: 10/16/2018 **End:** 10/16/2018

Surface Elevation (ft.): 450.1
Total Borehole Depth (ft.): 4.2
Depth to Initial Water Level (ft):

Depth	Date	Time
1.0	10/16/2018	1120

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
450.1 / 0							Wet, brown, CLAY and fine SAND, trace roots (SC)	ENV: 0-2' PCBs at 0830
▼							Wet, brown, PEAT, some fine sand, some silt, trace plastic (Pt)	
	SH	1	48	33		Fill	Wet, black, Slightly Organic Clayey SILT, some fine sand (ML)	Petroleum odor 2 to 4.2 ft bgs ENV: 2-3' PCBs at 1120 ENV: 3-4.2' PCBs at 1120
	SH	2	2	2			Wet, black, fine to coarse SAND, some fine to coarse gravel, trace glass, trace metal (SP)	Oil sheen 4 to 4.2 ft bgs.
445.1 / 5							Exploration terminated at 4.2 ft bgs (refusal).	
440.1 / 10								
435.1 / 15								
430.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: DS-SED-47**

CDM Smith

Boring Number: FS-SP-11A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159243 **E:** 1119777
Drilling Date: Start: 9/25/2018 **End:** 9/25/2018

Surface Elevation (ft.): 472
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/25/2018	1140

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
472.0 0	GP	1	48	32		Fill	Dry, dark brown to black, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag, trace debris, trace glass (SM)	ENV: 0-2' Lead, PCB at 1145 ENV: 2-4' Lead at 1145; 2-5' PCB at 1145
467.0 5	GP	2	48	24		Fill	Dry, dark brown to black, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag, trace debris, trace glass (SM)	ENV: 4-6' Lead at 1145; 5-8' PCBs at 1145 ENV: 6-8' Lead at 1145
462.0 10	GP	3	48	36		Fill Silt	Dry, gray-light red-brown, SILT, some fine to coarse gravel, little fine sand (ML)	ENV: 8-10' Lead at 1145; 8-11' PCB at 1145 ~~Wood chips at 8.0 ft bgs.~~ Siltstone chips at 9-9.5 and 11-11.5 ft bgs. ENV: 10-11' Lead at 1145
457.0 15 452.0							Exploration terminated at 12 ft bgs (no refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: FS-SP-11A**

CDM Smith

Boring Number: FS-SP-12A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159398 **E:** 1119720
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 460.8
Total Borehole Depth (ft.): 3.2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/28/2018	1150

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
460.8 / 0						Fill	Dry, dark brown, fine to medium SAND, some silt, little fine to coarse gravel, trace roots (SM)	ENV: 0-2' Leadx2, TCLP Leadx2 at 1200
	GP	1	38	34		Silt	Dry, red-brown, SILT, some fine sand, little fine to coarse gravel (ML)	ENV: 2-3.2' Leadx2, TCLP Lead at 1200 Siltstone (red-brown) chips throughout.
							Exploration terminated at 3.2 ft bgs (refusal)	
455.8 / 5								
450.8 / 10								
445.8 / 15								
440.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: FS-SP-12A**

CDM Smith

Boring Number: FS-SP-23A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1159076 **E:** 1119885
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 467.6
Total Borehole Depth (ft.): 7
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/28/2018	1410

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
467.6 0	GP	1	48	32		Fill	Dry, gray to brown, fine to coarse GRAVEL, some silt, little fine to coarse sand, trace roots, trace debris (GP)	Crushed rock from 1.5 to 2.0 ft bgs
						Silt and Clay	Dry to moist, light brown to red-brown, Clayey SILT, some fine to coarse gravel, little fine sand (ML)	ENV: 2-4' Lead at 1415
462.6 5	GP	2	36	30			Dry to moist, light brown to red-brown, Clayey SILT, some fine to coarse gravel, little fine sand (ML)	ENV: 4-6' Lead at 1415 ENV: 6-7' Lead at 1415
457.6 10							Exploration terminated at 7 ft bgs (no refusal).	
452.6 15								
447.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: FS-SP-23A**

CDM Smith

Boring Number: FS-SP-9A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1159057 **E:** 1119797
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 469.6
Total Borehole Depth (ft.): 7
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/28/2018	1320

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.6 0	GP	1	48	34		Fill	Dry, gray, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP) Dry, dark brown, fine to medium SAND, some silt, little fine to coarse gravel, trace brick (SM)	ENV: 2-4' Lead at 1320
464.6 5	GP	2	36	32		Silty Gravel	Moist, red-brown, fine to coarse GRAVEL, some clayey silt, little fine sand (GM)	ENV: 4-6' Leadx2 at 1320 Siltstone (gray-white) from 5 to 6 ft bgs. ENV: 6-7' Lead at 1320
459.6 10							Exploration terminated at 7 ft bgs (no refusal).	
454.6 15								
449.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: FS-SP-9A**

CDM Smith

Boring Number: FS-SS-1A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Surface Elevation (ft.): 484.8
Drilling Method: DPT
Total Borehole Depth (ft.): 18
Core Size: 2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/24/2018	930

Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1158933 **E:** 1120196
Abandonment Method: Backfilled with bentonite chips
Drilling Date: Start: 10/24/2018 **End:** 10/24/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.8 / 0							1" Topsoil, 6" Concrete	ENV: 0-2' Lead x2, PCBs at 0830
	GP	1	48	25		Fill	Dry, black-gray, fine to coarse SAND, some fine to coarse gravel, little slag, trace silt, trace debris (SP)	ENV: 2-4' Lead at 0830; 2-5' PCBs x2 at 0830
479.8 / 5	GP	2	48	36		Fill	Dry, black-gray, fine to coarse SAND, some fine to coarse gravel, little slag, trace silt, trace debris (SP)	ENV: 4-6' Lead at 0830; 5-8' PCBs at 0830
						Fill	Dry, red-brown-black, SILT, som efine to medium SAND, little fine to coarse gravel, trace slag, trace debris (ML)	ENV: 6-8' Lead at 0830
474.8 / 10	GP	3	48	36		Fill	Dry, red-brown-black, SILT, som efine to medium SAND, little fine to coarse gravel, trace slag, trace debris (ML)	ENV: 8-10' Lead at 0830; 8-11 PCBs at 0830
						Sand and Silt	Dry, red-brown SILT, some fine ot medum sand, little fine to coarse gravel (ML)	ENV: 10-12' Lead at 0830; 11-16' PCBs at 0830
469.8 / 15	GP	4	48	40		Sand and Silt	Dry, light brown/red-brown SILT, some fine to medium sand, little fine to coarse gravel (ML)	Slough residue on outer surface of sample. ENV: 12-14' Lead x2 at 0830 ENV: 14-16' Lead at 0830
	GP	5	24	24		Silt	Dry, light brown, SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 16-18' Lead, PCBs at 0830
464.8						WR	Dry, gray-white, weathered, DOLOSTONE Exploration terminated at 18.0 ft bgs (refusal).	Offset boring 5 ft west to confirm refusal. Refusal at 16.5 ft bgs on second attempt.

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: FS-SS-1A**

CDM Smith

Boring Number: FS-SS-3A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159180 **E:** 1119838
Drilling Date: Start: 9/21/2018 **End:** 9/25/2018

Surface Elevation (ft.): 470.8
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/21/2018	1450

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.8 / 0								
	GP	1	48	18		Fill	Dry, brown, fine to coarse SAND, some silt, trace fine gravel, trace roots (SP)	ENV: 0-2' Lead at 1420
							Dry, brown to dark red-brown, fine to coarse SAND and SILT, some fine to coarse gravel, trace wood, trace metal (SM-GM)	ENV: 2-4' Lead at 1420
465.8 / 5	GP	2	48	24				ENV: 4-6' Lead at 1420 FeO Staining
						Sand and Silt	Dry, red-brown, SILT and fine to medium SAND, little fine to coarse gravel (ML)	ENV: 6-8' Lead at 0815 Siltstone chips in tip.
460.8 / 10							Exploration terminated at 8 ft bgs (no refusal).	
455.8 / 15								
450.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: FS-SS-3A**

CDM Smith

Boring Number: FS-SS-9A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1159061 **E:** 1119844
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 466
Total Borehole Depth (ft.): 7
Depth to Initial Water Level (ft):

Depth	Date	Time
3.5	9/28/2018	1345

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
466.0 0	GP	1	48	34		Fill	Dry, gray, fine to coarse GRAVEL, little silt, little fine to coarse sand (SP) Moist, brown, fine to medium SAND and SILT, little fine to coarse gravel, trace debris (SM)	ENV: 2-4' Lead at 1350 Crushed rock from 3 to 3.5 ft bgs
▼								
461.0 5	GP	2	36	28		Silty Gravel	Moist, red-brown, fine to coarse GRAVEL and Clayey SILT, little fine sand (GM)	ENV: 4-6' Lead at 1350 ENV: 6-7' Lead at 1350
456.0 10							Exploration terminated at 7 ft bgs (no refusal).	
451.0 15								
446.0								

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: FS-SS-9A**

CDM Smith

Boring Number: OU2-SS09A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157182 **E:** 1119949
Drilling Date: Start: 10/19/2018 **End:** 10/19/2018

Surface Elevation (ft.): 510.9
Total Borehole Depth (ft.): 9.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/19/2018	1010

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
510.9 0	GP	1	48	36		Fill	Moist, gray-brown, fine to coarse SAND and Clayey SILT, little fine to coarse gravel, trace roots, trace slag (SM) Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace glass (SP)	ENV: 2-5' PCBs at 1010
505.9 5	GP	2	48	38		Fill	Dry, red-brown/light brown, fine to medium SAND, some silt, little fine to coarse gravel, trace brick (SP-SM)	ENV: 5-8' PCBs at 1010
						Silt and Clay	Dry, red-brown, Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML)	ENV: 6-7.8'; PCBs at 1010
	GP	3	18	18		WR	Dry, white, fine to coarse GRAVEL, little fine to coarse sand, little silt (Crushed Dolostone fragments) (GP)	
500.9 10							Exploration terminated at 9.5 ft bgs (refusal).	
495.9 15								
490.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: OU2-SS09A**

CDM Smith

Boring Number: OU2-SS12A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157130 **E:** 1119990
Drilling Date: Start: 10/18/2018 **End:** 10/18/2018

Surface Elevation (ft.): 508.2
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/18/2018	1410

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
508.2 / 0	GP	1	48	24		Fill	Dry, brown-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace glass, trace slag, trace debris (SP)	ENV: 0-2' Lead at 1400 ENV: 2-4' Lead at 1400; 2-5' PCBs at 1400
503.2 / 5	GP	2	48	18		Fill	Dry, brown-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace glass, trace slag, trace debris (SP)	ENV: 4-6' Lead at 1400; 5-8' PCBs at 1400 ENV: 6-8' Lead at 1400
	GP	3	24	12		Fill		ENV: 8-10' Lead x2, PCBs x2 at 1400
498.2 / 10						WR	Dry, white, fine to coarse GRAVEL, little fine to coarse sand, little silt (Crushed Dolostone) (GP) Exploration terminated at 10 ft bgs (refusal).	Refusal at 9.9 ft bgs on 1st attempt.
493.2 / 15								
488.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: OU2-SS12A**

CDM Smith

Boring Number: OU2-SS13A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157163 **E:** 1119944
Drilling Date: Start: 10/19/2018 **End:** 10/19/2018

Surface Elevation (ft.): 511.2
Total Borehole Depth (ft.): 9.8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/19/2018	945

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
511.2 / 0	GP	1	48	34		Fill	Moist, dark brown-gray, fine to coarse SAND, little fine to coarse gravel, little clayey silt, trace wood, trace slag (SP)	ENV: 0-2' Lead at 0930 ENV: 2-4' Lead at 0930; 3-6' PCBs x2 at 0930
506.2 / 5	GP	2	48	36		Fill	Moist, red-brown/light brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag (SP-GP)	ENV: 4-6' Lead at 0930 ENV: 6-8' Lead at 0930; 6-9.8' PCBs at 0930; 7-8' PCBs at 0930
						Org. S&C	Moist, brown, Slightly Organic Clayey SILT, little fine to medium sand, trace fine gravel (OL/ML)	Org. S&C - Organic Silt and Clay Stratum
	GP	3	11	11		WR	Dry, white, fine to coarse GRAVEL, little fine to coarse sand, trace silt (Crushed Dolostone Fragments) (GP)	ENV: 8-9.8' Lead at 0930
501.2 / 10							Exploration terminated at 9.8 ft bgs (refusal).	
496.2 / 15								
491.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: OU2-SS13A**

CDM Smith

Boring Number: OU2-SS14A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157202 **E:** 1119955
Drilling Date: Start: 10/19/2018 **End:** 10/19/2018

Surface Elevation (ft.): 510.2
Total Borehole Depth (ft.): 8.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/19/2018	1040

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
510.2 / 0	GP	1	48	36		Fill	Moist, dark brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace roots, trace debris, trace slag (SP)	ENV: 0-2' Lead, at 1040
								ENV: 2-4' Lead at 1040; 2-5' PCBs at 1040
							Dry, red-brown to gray-brown, Clayey SILT and fine to coarse GRAVEL, little fine to medium sand (GM)	Gray, angular SILTSTONE fragments 3 to 6 ft bgs.
505.2 / 5	GP	2	48	36			Dry, red-brown to gray-brown, Clayey SILT and fine to coarse GRAVEL, little fine to medium sand (GM)	ENV: 4-6' Lead at 1040
						WRSilt and Clay	Dry, red-brown, Clayey SILT, some fine to coarse gravel (dolostone), little fine to medium sand (ML)	ENV: 6-8' Lead at 1040; 6-7' PCBs at 1040
	GP	3	6	4			Dry, white, fine to coarse GRAVEL, little fine to medium sand, little silt (Crushed Dolostone Fragments) (GP)	
500.2 / 10							Exploration terminated at 8.5 ft bgs (refusal).	
495.2 / 15								
490.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: OU2-SS14A**

CDM Smith

Boring Number: OU2-SS17A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159287 **E:** 1119817
Drilling Date: Start: 10/16/2018 **End:** 10/16/2018

Surface Elevation (ft.): 471
Total Borehole Depth (ft.): 8.2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/16/2018	840

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.0 / 0							Dry, black, PEAT, some silt, trace fine to coarse sand (Pt)	ENV: 0-2' Lead, PCBs at 0840
	GP	1	48	20		Fill	Dry, brown, fine SAND and SILT, little fine to coarse gravel, trace glass, trace metal, trace slag (SM)	ENV: 2-4' Lead at 0840; 2-5' PCBs at 0840
							Dry, brown, fine SAND and SILT, little fine to coarse gravel, trace glass, trace metal, trace slag (SM)	ENV: 4-6' Lead at 0840
466.0 / 5	GP	2	48	42		Sand and Silt	Dry, white-light brown, fine SAND and SILT and fine to coarse GRAVEL (SM-GM)	ENV: 5-8' PCBs at 0840; 5-6' PCBs at 0840 ENV: 6-8' Lead at 0840
							Dry, light brown, fine SAND and SILT, trace fine to coarse gravel (SM)	
	GP	3	2	2		WR	Dry, red-brown, fine to coarse GRAVEL (Shale) (GP)	Refusal at 8.2 on on two attempts.
							Exploration terminated at 8.2 ft bgs (refusal).	
461.0 / 10								
456.0 / 15								
451.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: OU2-SS17A**

CDM Smith

Boring Number: OU2-TP05-A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159346 **E:** 1119903
Drilling Date: Start: 9/24/2018 **End:** 9/24/2018

Surface Elevation (ft.): 471.1
Total Borehole Depth (ft.): 17.7
Depth to Initial Water Level (ft):

Depth	Date	Time
15	9/24/2018	850

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.1 0	GP	1	48	48		Fill	Dry, light brown, fine to medium SAND and SILT, little fine to coarse gravel, trace roots (SM) Dry, dark brown to red-brown, fine to coarse SAND and fine to coarse GRAVEL, some silt, trace brick, trace slag (SM-GM)	ENV: 0-2' PCBs at 0900 ENV: 2-4' Leadx2 at 0900; 2-5' PCBs at 0900
466.1 5	GP	2	48	48		Fill	Dry to moist, red-brown, Clayey SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 4-6' Lead at 0900; 5-8' PCBs at 0900 Possible fill material with native soils. ENV: 6-8' Lead at 0900
461.1 10	GP	3	48	24		Fill		ENV: 8-10' Lead at 0900; 8-11' PCBs at 0900 ENV: 10-12' Lead at 0900
						Fill	Dry, brown, fine to medium SAND, some clayey silt, little gravel (SM)	
456.1 15	GP	4	48	36		Silt and Clay	Dry to moist, red-brown, Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML)	ENV: 12-14' Lead at 0900; 11-16' PCBs at 0900 Gray-white Siltstone chips in tip. ENV: 14-16' Lead 0900
	GP	5	20	0		Silt and Clay	Wet, dark brown to red-brown, SILT & CLAY, some fine to coarse gravel, trace fine sand (GC)	Sample 5: sheen on water, gas odor. ENV: 16-17.7' Lead at 0900
451.1							Exploration terminated at 17.7 ft bgs (refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: OU2-TP05-A**

CDM Smith

Boring Number: SB-2A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159336 **E:** 1119797
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 466.2
Total Borehole Depth (ft.): 10.7
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/28/2018	1130

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
466.2 / 0						Fill	Dry, brown, fine to coarse SAND, little silt, trace fine to coarse gravel, trace brick, trace debris (SP)	
	GP	1	48	26		Sand and Silt	Dry, light brown, fine SAND and SILT, little fine to coarse gravel (SM)	Possible fill material with native soils.
461.2 / 5	GP	2	48	24		Sand and Silt		
	GP	3	32	32		Sand and Silt	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 8-10' Lead at 1120 Siltstone chips (red-brown) throughout, very thin bedding. ENV: 10-10.7' Lead at 1120
456.2 / 10						WR	Extremely weathered, gray, SILTSTONE Exploration terminated at 10.7 ft bgs (refusal).	
451.2 / 15								
446.2								

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: SB-2A**

CDM Smith

Boring Number: TWP-3

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159184 **E:** 1119795
Drilling Date: Start: 10/2/2018 **End:** 10/2/2018

Surface Elevation (ft.): 469.6
Total Borehole Depth (ft.): 10.8
Depth to Initial Water Level (ft):

Depth	Date	Time
8.5	10/2/2018	910

Abandonment Method: Temporary well point installed.
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.6 / 0	GP	1	48	20		Fill	Dry to moist, brown to red-brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace brick, trace debris (SP)	
464.6 / 5	GP	2	48	30		Fill	Dry to moist, brown to red-brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace brick, trace debris (SP)	
▼ 459.6 / 10	GP	3	33	20		Sand and Silt	Dry to moist, light brown, SILT, little fine to medium sand, little fine to coarse gravel (ML) Dry to moist, light brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	Gray Siltstone fragments
454.6 / 15							Exploration terminated at 10.8 ft bgs (refusal).	
449.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: TWP-3**

CDM Smith

Boring Number: UPB-SB01

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Hand Auger
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158088 **E:** 1120348
Drilling Date: Start: 10/11/2018 **End:** 10/11/2018

Surface Elevation (ft.): 484.5
Total Borehole Depth (ft.): 6.5
Depth to Initial Water Level (ft):

Depth	Date	Time
5.5	10/11/2018	1130

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.5 / 0	AS	1	24	--		Fill	Moist, black, fine to coarse SAND, some fine to coarse gravel, trace silt, trace cinders, trace glass (SP)	ENV: 0-2' PCBs at 1130
	AS	2	24	--		Fill	Dry, light brown and white, CONCRETE and fine to medium SAND, little fine to coarse gravel, trace silt, trace metal, trace wire (SP)	ENV: 2-5' PCBs at 1130
479.5 / 5	AS	3	18	--		Fill	Moist, brown, Slightly Organic fine to coarse SAND, trace silt, trace wood, trace metal (SP) (Organics- peat)	
	AS	4	12	--		Clay	Wet, brown, CLAY, trace fine sand (CL)	ENV: 5-6.5' PCBs at 1130
							Exploration termianted at 6.5 ft bgs.	
474.5 / 10								
469.5 / 15								
464.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB01**

CDM Smith

Boring Number: UPB-SB02

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158129 **E:** 1120343
Drilling Date: Start: 10/11/2018 **End:** 10/11/2018

Surface Elevation (ft.): 484.3
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
5.5	10/11/2018	1000

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.3 0	GP	1	48	38		Fill	Top 33" (A): Dry, black, fine to coarse SAND, some fine to coarse gravel, little silt, trace cinders, trace glass, trace roots, trace slag (SM) Bottom 5" (B): Moist, light brown, fine to medium SAND, some silt, some fine to coarse gravel (SM)	ENV: 0-2' PCBs at 1000 ENV: 2-5' PCBS at 1000 8" Concrete at 4.2 ft bgs.
479.3 5	GP	2	48	23		Organic Clay	Wet, black, Organic Silty CLAY, trace fine to medium sand (OH)	ENV: 5-8' PCBs at 1000
474.3 10	GP	3	48	30			Wet, black, Slightly Organic Silty CLAY, trace fine to medium sand (OH)	Oil sheen observed at 8 ft bgs.
469.3 15							Exploration terminated at 12 ft bgs. Location substituted for test pit location UPB-TP-01 due to subsurface obstructions indicated on GPR survey.	
464.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB02**

CDM Smith

Boring Number: UPB-SB03

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158156 **E:** 1120328
Drilling Date: Start: 10/11/2018 **End:** 10/11/2018

Surface Elevation (ft.): 481
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
5	10/11/2018	900

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
481.0 / 0	GP	1	48	30		Fill	Moist, black and brown, fine to medium SAND, some fine to coarse gravel, trace cinders, trace debris, trace cement (SP)	ENV: 0-2' PCBs at 0900 ENV: 2-5' PCBs at 0900
	GP	2	12	12			Dry, brown, fine to coarse GRAVEL, little sand, trace silt (GP)	
476.0 / 5	GP	3	36	12			Wet, light brown, fine to coarse GRAVEL, little fine to medium sand, trace silt, trace cement (GP)	ENV: 5-8' PCBs at 0900
	GP	4	48	40		Organic Silt and Clay	Wet, light brown, fine to coarse GRAVEL, little silty clay, little fine to medium sand (GP) Wet, black, Organic Silty CLAY, trace fine sand (OL/OH)	ENV: 8-12' PCBs at 0900
471.0 / 10							Exploration terminated at 12.0 ft bgs.	
466.0 / 15								
461.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB03**

CDM Smith

Boring Number: UPB-SB05

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158131 **E:** 1120222
Drilling Date: Start: 10/8/2018 **End:** 10/8/2018

Surface Elevation (ft.): 483
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
3.5	10/8/2018	1350

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
483.0 / 0	GP	1	48	28		Fill	Dry, brown/red-brown, Clayey SILT, little fine to coarse gravel, trace fine to medium sand (ML) Dry to wet, brown-black, fine to coarse SAND, little fine to ocarse gravel (slag), little silt, trace brick, trace debris (SP)	ENV: 0-2' Lead x2, TCLP Lead x2 at 1350 ENV: 2-4' Lead, TCLP Lead at 1350 ENV: 4-6' Lead, TCLP Lead at 1350
478.0 / 5	GP	2	48	36		Peat	Wet, brown, PEAT, some clayey silt, trace fine to coarse sand (Pt) (Peat- fibrous)	Wood 4.5 to 5 ft bgs. Wood/peat 6 to 6.5 ft bgs. ENV: 6-8' Lead, TCLP Lead at 1350
						Clay	Wet, gray, Silty CLAY, trace fine sand, trace fine gravel (CL)	
473.0 / 10							Exploration terminated at 8 ft bgs (no refusal).	
468.0 / 15								
463.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB05**

CDM Smith

Boring Number: UPB-SB06

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158211 **E:** 1120250
Drilling Date: Start: 9/18/2018 **End:** 9/18/2018

Surface Elevation (ft.): 471.4
Total Borehole Depth (ft.): 2
Depth to Initial Water Level (ft):

Depth	Date	Time
0.2	9/18/2018	1030

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.4 / 0	SH	1	24	12		Organic Silt and Clay	Moist, brown, Slightly Organic SILT & CLAY, little fine to coarse gravel, little fine to coarse sand (ML-CL)	Effort: Moderate 0 to 0.5 ft bgs. ENV: 0-2' Lead, PCB, TCLP Lead at 1030 Effort: Difficult 0.5 to 2 ft bgs. Bottom 2" mottled red-brown Refusal at 1.5 ft bgs on second and third attempts.
466.4 / 5							Exploration terminated at 2 ft bgs (refusal). General Remarks: Location adjacent to concrete transformer pad.	
461.4 / 10								
456.4 / 15								
451.4								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: UPB-SB06**

CDM Smith

Boring Number: UPB-SB07

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158214 **E:** 1120232
Drilling Date: Start: 10/8/2018 **End:** 10/8/2018

Surface Elevation (ft.): 472.4
Total Borehole Depth (ft.): 3
Depth to Initial Water Level (ft):

Depth	Date	Time
0	10/8/2018	1310

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
472.4 / 0	GP	1	36	20		Org. S&C	Wet, brown, Organic Clayey SILT, some fine to coarse sand, little fine to coarse gravel (OL)	Org. S&C - Organic Silt and Clay Stratum NV: 0-2' Lead, PCBs at 1310
						GC	Wet, brown, CLAY & SILT and fine to coarse GRAVEL, little fine to coarse sand (GC)	GC - Clayey Gravel Stratum ENV: 2-3' Lead, PCBs at 1310
							Gray-white, extremely weathered, SILTSTONE [WR] Exploration terminated at 3.0 ft bgs (refusal).	Refusal encountered at 3.0 ft bgs for 3 attempts.
467.4 / 5								
462.4 / 10								
457.4 / 15								
452.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB07**

CDM Smith

Boring Number: UPB-SB08

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158296 **E:** 1120235
Drilling Date: Start: 10/8/2018 **End:** 10/8/2018

Surface Elevation (ft.): 472.6
Total Borehole Depth (ft.): 6.3
Depth to Initial Water Level (ft):

Depth	Date	Time
4	10/8/2018	945

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
472.6 0	GP	1	48	18		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace concrete, trace brick (SP)	ENV: 0-2' Lead at 0940; 0-2' PCBs x2 at 1400 ENV: 2-4' Lead at 0940 2-5' PCBs at 0940
▼ 467.6 5	GP	2	27	18		Silty Gravel	Moist to wet, red-brown to light brown, fine to coarse GRAVEL, some clayey silt, little fine to coarse sand (GM)	SILTSTONE fragments throughout material 3.7 to 6.3 ft bgs. ENV: 4-6.3' Lead at 0940 5-6.3' PCBs at 0940
462.6 10							Exploration terminated at 6.3 ft bgs (refusal).	Refusal at 3.9 ft bgs on first attempt. Refusal at 5.5 ft bgs on second attempt.
457.6 15								
452.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB08**

CDM Smith

Boring Number: UPB-SB09

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158337 **E:** 1120299
Drilling Date: Start: 10/9/2018 **End:** 10/9/2018

Surface Elevation (ft.): 475.4
Total Borehole Depth (ft.): 15
Depth to Initial Water Level (ft):

Depth	Date	Time
5.5	10/9/2018	850

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.4 0	GP	1	48	28		Fill	Dry, brown to gray to black, fine to coarse SAND, some fine to coarse gravel, little silt, little slag, trace debris (SP)	ENV: 0-2' Lead, PCBs at 0900 ENV: 2-4' Lead at 0900; 2-5' PCBs at 0900
470.4 5	GP	2	48	24			Dry, brown to gray to black, fine to coarse SAND, some fine to coarse gravel, little silt, little slag, trace debris (SP)	ENV: 4-6' Lead at 0900; 5-8' PCBs at 0900 Material becomes wet at 6 ft bgs. ~~ENV: 6-8' Lead at 0900~~
							Wet, gray-brown, Slightly Organic fine to coarse GRAVEL and SILT, little fine sand, trace slag (GP-GM)	
465.4 10	GP	3	48	22			Wet, brown, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP)	ENV: 8-10' Lead at 0900; 8-11' PCBs at 0900
	GP	4	36	28		Sand and Silt	Wet, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 10-12' Lead x2 at 0900; 11-15' PCBS at 0900 ENV: 12-14' Lead at 0900 ENV: 14-15' Lead x2 at 0900
460.4 15							Exploration terminated at 15.0 ft bgs (no refusal).	
455.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB09**

CDM Smith

Boring Number: UPB-SB10

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158390 **E:** 1120300
Drilling Date: Start: 10/9/2018 **End:** 10/9/2018

Surface Elevation (ft.): 486.6
Total Borehole Depth (ft.): 18
Depth to Initial Water Level (ft):

Depth	Date	Time
16	10/9/2018	1320

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
486.6 0	GP	1	48	40		Fill	Dry, brown, fine to coarse SAND, some clayey silt, little fine to coarse gravel, trace roots, trace slag, trace debris (SP-SM)	ENV: 0-2' Lead, TCLP Lead x2, PCBs at 1330 ENV: 2-4' Lead, TCLP Lead at 1330; 2-5' PCBs x2 at 1330
481.6 5	GP	2	48	36			Dry, light brown, fine to coarse SAND and SILT, little fine to coarse gravel (SM)	ENV: 4-6' Lead, TCLP Lead at 1330; 5-8' PCBs at 1330 ENV: 6-8' Lead x2, TCLP Lead at 1330 ENV: 8-10' Lead, TCLP Lead at 1330; 8-11' PCBs at 1330
476.6 10	GP	3	48	36			Dry, brown to gray/black, fine to coarse SAND, some clayey silt, little fine to coarse gravel, trace slag, trace concrete (SP-SM)	ENV: 10-12' Lead, TCLP Lead at 1330; 11-16' PCBs at 1330 ENV: 12-14' Lead, TCLP Lead at 1330
							6" Concrete	
471.6 15	GP	4	48	17			Moist, dark brown-black, fine to coarse SAND and fine to coarse GRAVEL, trace silt, trace slag (SP-GP)	ENV: 14-16' Lead, TCLP Lead at 1330 ENV: 16-18' Lead, TCLP Lead, PCBs at 1330
	GP	5	24	17		Clay	Wet, gray, CLAY & SILT, little fine to coarse gravel, trace fine to coarse sand (CL-ML)	
466.6							Exploration terminated at 18 ft bgs (no refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: UPB-SB10**

CDM Smith

Boring Number: UPB-SB13

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158401 **E:** 1120269
Drilling Date: Start: 10/9/2018 **End:** 10/9/2018

Surface Elevation (ft.): 472.5
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
5	10/9/2018	1115

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
472.5 / 0	GP	1	48	32		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt (SP)	ENV: 0-2' Lead, PCBs at 1100 ENV: 2-4' Lead at 1100; 2-5' PCBs at 1100
467.5 / 5	GP	2	48	12		Fill		ENV: 4-6' Lead at 1100; 5-8' PCBs at 1100
							Wet, dark brown-black, Slightly Organic fine to coarse SAND, some clayey silt (SM)	ENV: 6-8' Lead at 1100
						Clay	Wet, gray, Silty CLAY, little fine gravel, trace fine to coarse sand (CL)	
	GP	3	24	12		Clay	Wet, gray-brown to dark brown, Slightly Organic Clayey SILT, some fine to coarse sand, little fine to coarse gravel (OL/ML) [Organic Silt and Clay]	ENV: 8-10 Lead, PCBs at 1100 Material 8.5 to 9.8 ft bgs is slightly spongey.
462.5 / 10						Clay	Wet, gray, Silty CLAY, little fine to coarse gravel, little fine to coarse sand (CL)	
							Exploration terminated at 10.0 ft bgs (no refusal).	
457.5 / 15								
452.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB13**

Boring Number: UPB-SB14

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158307 **E:** 1120196
Drilling Date: Start: 10/5/2018 **End:** 10/5/2018

Surface Elevation (ft.): 474.1
Total Borehole Depth (ft.): 8.8
Depth to Initial Water Level (ft):

Depth	Date	Time
7	10/5/2018	1314

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
474.1 / 0	GP	1	48	34		Fill	Moist, brown, fine to coarse SAND and Clayey SILT, little fine to coarse gravel, trace slag, trace wood, trace debris (SM)	ENV: 0-2' Lead at 1320 ENV: 2-4' Lead at 1320
						Peat	Dry to wet, brown, PEAT, little clayey silt, little fine to coarse sand (Pt)	Organics- fibrous, spongey.
469.1 / 5	GP	2	48	32		Silt and Clay	Moist, light brown-green, Silty CLAY, little fine to coarse sand, trace fine gravel (CL)	ENV: 4-6' Lead at 1320 ENV: 6-8' Lead at 1320
	GP	3	9	9			Moist, red-brown, Clayey SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 8-8.8' Lead at 1320
464.1 / 10							Extremely weathered, red-brown, SILTSTONE [Weathered Rock] Exploration terminated at 8.8 ft bgs (refusal).	
459.1 / 15								
454.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB14**

CDM Smith

Boring Number: UPB-SB16

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158406 **E:** 1120194
Drilling Date: Start: 10/5/2018 **End:** 10/5/2018

Surface Elevation (ft.): 479.1
Total Borehole Depth (ft.): 14
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/5/2018	840

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
479.1 0	GP	1	48	30		Fill	2" Topsoil Dry, brown-gray-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace concrete, trace slag (SP)	ENV: 0-2' Lead, PCB at 0840 ENV: 2-4' Lead at 0840; 2-5' PCB at 0840
474.1 5	GP	2	48	32		Fill	Dry, brown-gray-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace concrete, trace slag (SP)	ENV: 4-6' Lead at 0940; 5-8' PCB at 0840 ENV: 6-8' Lead at 0840 FeO staining at 7.5 ft bgs
469.1 10	GP	3	48	34		Fill	Dry, brown-gray-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace concrete, trace slag (SP)	ENV: 8-10' Lead at 0840; 8-11' PCB at 0840 ENV: 10-12' Leadx2 at 0840
						S&C	Dry, light brown, Clayey SILT, little fine to coarse gravel (dolostone), little fine to medium sand (ML)	S&C - Silt and Clay Stratum
	GP	4	24	12		Sand and Silt	Moist, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 12-14' Lead at 0840
464.1 15 459.1							Exploration terminated at 14 ft bgs (no refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB16**

CDM Smith

Boring Number: UPB-SB17

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158369 **E:** 1120174
Drilling Date: Start: 10/5/2018 **End:** 10/5/2018

Surface Elevation (ft.): 476.5
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/5/2018	1120

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
476.5 0	GP	1	48	28		Fill	Topsoil Dry, brown-black-white, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris (SP)	ENV: 0-2' Lead at 1130; PCB at 1030 ENV: 2-4' Lead at 1130; 2-5' PCBx2 at 1130 ENV: 4-6' Lead at 1130
471.5 5	GP	2	48	36		S&C	Moist, light brown-brown, Clayey SILT, little fine to medium sand, little fine to coarse gravel (ML)	S&C - Silt and Clay Stratum ENV: 6-8' Lead, PCB at 1130
						Silt and Clay	Moist, dark gray, Slightly Organic Silty CLAY, trace fine sand, trace fine gravel (OL/CL) [Organic Silt and Clay] Moist, green-gray, CLAY & SILT, little fine to coarse gravel, trace fine sand (CL-ML)	Crushed rock at 7.8 and 9.5 ft bgs ENV: 8-10' Lead at 1130; 8-12' Or Nat at 1130
466.5 10	GP	3	48	24			Moist, red-brown, Clayey SILT and fine to coarse GRAVEL, little fine to medium sand (GM)	Mottled tan, green gray ENV: 10-12' Lead at 1130
461.5 15							Exploration terminated at 12 ft bgs (no refusal).	
456.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: UPB-SB17**

CDM Smith

Boring Number: UPB-SB19

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158414 **E:** 1120213
Drilling Date: Start: 10/5/2018 **End:** 10/5/2018

Surface Elevation (ft.): 478.5
Total Borehole Depth (ft.): 14
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/5/2018	940

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
478.5 0	GP	1	48	21		Fill	Dry, brown-black-gray, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris (SP)	ENV: 0-2' Lead, PCB at 0930 ENV: 2-4' Lead at 0930; 2-5' PCB at 0930
473.5 5	GP	2	48	36			Dry, brown-black-gray, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris (SP) Dry, brown-gray, fine to coarse SAND and Clayey SILT, some fine to coarse gravel, trace slag, trace wood (SM)	ENV: 4-6' Lead at 0940; 5-8' PCB at 0940 ENV: 6-8' Lead at 0940
468.5 10	GP	3	48	14				ENV: 8-10' Lead at 0930; 8-11' PCB at 0930 ENV: 10-12' Lead at 0930 Slag observed at 10 ft bgs.
	GP	4	24	24		Silt and Clay	Moist, red-brown, Clayey SILT and fine to medium SAND, little fine to coarse grael (ML)	ENV: 12-13' PCB at 0930; 12-14' Leadx2 at 0930
463.5 15 458.5							Exploration terminated at 14 ft bgs (no refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB19**

CDM Smith

Boring Number: UPB-SB20

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1157932 **E:** 1120342
Drilling Date: Start: 10/9/2018 **End:** 10/9/2018

Surface Elevation (ft.): 487.1
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
8	10/9/2018	1440

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
487.1 0	GP	1	48	42		Fill	3" Crushed Gravel Dry, light brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace slag, trace brick (SP-SM)	ENV: 0-2' PCBs at 1440 Fine to coarse gravel (slag) 1 to 1.5 ft bgs. ENV: 2-5' PCBs at 1440
482.1 5	GP	2	48	36			Dry, light brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace slag, trace brick (SP-SM)	ENV: 5-8' PCBs at 1440 Fine to coarse gravel (slag) 7 to 7.8 ft bgs. Material becomes wet at 8 ft bgs.
▼ 477.1 10	GP	3	48	34		Organic Silt and Clay	Wet, dark gray, Slightly Organic Silty CLAY, trace fine sand (OL/CL)	ENV: 8-11' PCBs at 1440
472.1 15 467.1							Exploration terminated at 12 ft bgs (no refusal).	

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: UPB-SB20**

CDM Smith

Boring Number: UPB-SB21

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A, Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1157896 **E:** 1120314
Drilling Date: Start: 10/9/2018 **End:** 10/9/2018

Surface Elevation (ft.): 485.7
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/9/2018	1500

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
485.7 0	GP	1	48	32		Fill	Dry, brown to gray/white, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick, trace concrete (SP)	ENV: 0-2' PCBs at 1500 ENV: 2-5': PCBs at 1500
480.7 5	GP	2	48	24		Fill	Dry, brown to gray/white, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick, trace concrete (SP)	FeO staining 5 to 6 ft bgs. ENV: 5-8' PCBs at 1500
						Organic Silt and Clay	Moist, gray, Slightly Organic Silty CLAY, trace fine sand, trace fine gravel (OL/CL)	
475.7 10						Organic Silt and Clay	Exploration terminated at 8 ft bgs (no refusal).	
470.7 15								
465.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UPB-SB21**

CDM Smith

Boring Number: UPB-SB22

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158283 **E:** 1120162
Drilling Date: Start: 10/8/2018 **End:** 10/8/2018

Surface Elevation (ft.): 477.4
Total Borehole Depth (ft.): 8.6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/8/2018	1120

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
477.4 0	GP	1	48	34		Fill	2" Topsoil Dry, brown-gray, fine to coarse SAND, little clayey silt, little fine to coarse gravel, trace brick, trace concrete, trace slag (SP)	ENV: 0-2 Lead, PCBs at 1120 ENV: 2-4' Lead at 1120 2-5' PCBs at 1120
472.4 5	GP	2	48	30		Fill	Dry, brown-gray, fine to coarse SAND, little clayey silt, little fine to coarse gravel, trace brick, trace concrete, trace slag (SP)	ENV: 4-6' Lead at 1120 5-8' PCBs at 1120 ENV: 6-8' Lead at 1120
						Peat	Moist, brown-gray, PEAT, little clayey silt, little fine to medium sand, trace fine gravel (Pt) (peat - fibrous, spongey)	
	GP	3	7	7		Clay	Moist, gray-light brown, CLAY & SILT, little fine to coarse gravel, trace fine sand (CL-ML)	ENV: 8-8.6' Lead, PCBs at 1120
467.4 10							Exploration terminated at 8.6 ft bgs (refusal).	Gray, SILTSTONE chips in sample 3 tip. Refusal at 8.5 ft bgs in first attempt.
462.4 15								
457.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: UPB-SB22**

CDM Smith

Boring Number: UP-SB01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157239 **E:** 1119974
Drilling Date: Start: 10/19/2018 **End:** 10/19/2018

Surface Elevation (ft.): 509.1
Total Borehole Depth (ft.): 6.8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/19/2018	1120

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
509.1 / 0	GP	1	48	36		Fill	Moist, dark brown-black, fine to coarse SAND, little fine to coarse gravel, little clayey silt, trace slag, trace debris (SP)	ENV: 0-2' Lead, PCB at 1100 ENV: 2-4' Lead at 1100; 2-5' PCBs at 1100
						Silty Gravel	Dry, gray-brown, Clayey SILT and fine to coarse GRAVEL, little fine to medium sand (GM)	ENV: 4-6' Lead at 1100; 5-6.8' PCBs at 1100
504.1 / 5	GP	2	34	26		Silt	Dry, red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 6-6.8' Lead at 1100
						WR	Dry, white, fine to coarse GRAVEL, little fine to coarse sand, little silt (Crushed Dolostone Fragments) (GP) Exploration terminated at 6.8 ft bgs (refusal).	Refusal at 6.7 encountered on second attempt.
499.1 / 10								
494.1 / 15								
489.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB01**

CDM Smith

Boring Number: UP-SB02

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157168 **E:** 1119976
Drilling Date: Start: 10/19/2018 **End:** 10/19/2018

Surface Elevation (ft.): 508.5
Total Borehole Depth (ft.): 14.5
Depth to Initial Water Level (ft):

Depth	Date	Time
12.5	10/19/2018	1230

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
508.5 0	GP	1	48	24		Fill	Moist, brown, Clayey SILT, some fine to medium sand, little fine to coarse gravel, trace wood, trace brick, trace slag (ML)	ENV: 0-2' Lead, PCB at 1230 ENV: 2-4' Lead at 1230; 2-5' PCBs at 1230
503.5 5	GP	2	48	30		Fill	Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace brick, trace slag, trace glass, trace concrete (SP)	ENV: 4-6' Lead at 1230; 5-8' PCBs at 1230 ENV: 6-8' Lead at 1230 ENV: 8-10' Lead at 1230; 8-11' PCBs at 1230
498.5 10	GP	3	48	36		Peat	Moist, brown, PEAT, little fine to coarse sand, trace fine to coarse gravel, trace silt (Pt) (Peat - fibrous)	ENV: 10-12' Lead at 1230
▼	GP	4	30	18		Silty Gravel	Wet, gray, Organic CLAY & SILT, little fine to medium sand, little fine to coarse gravel (OL) [Organic Silt and Clay]	ENV: 12-14' Lead at 1230; 12-13' PCBs at 1230
						Silty Gravel	Wet, gray, fine to coarse GRAVEL and SILT & CLAY, little fine to medium sand (GM)	ENV: 14-14.5 Lead at 1230 Residual white/light brown Dolostone at 14.5 ft bgs. FeO staining.
493.5 15							Exploration terminated at 14.5 ft bgs (refusal).	
488.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB02**

CDM Smith

Boring Number: UP-SB03

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157140 **E:** 1119957
Drilling Date: Start: 10/19/2018 **End:** 10/19/2018

Surface Elevation (ft.): 510.9
Total Borehole Depth (ft.): 12.6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/19/2018	1330

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
510.9 0							Moist, gray-brown, Clayey SILT, little fine to medium sand, trace fine to coarse gravel, trace roots, trace wood (ML)	ENV: 0-2' Lead x2 at 1300
	GP	1	48	28		Fill	Dry, black, fine to coarse SAND and fine to coarse GRAVEL (slag) (SP-GP) Dry, red-brown/black/brown, fine to coarse SAND, some fine to coarse gravel, little clayey silt, trace brick, trace glass, trace slag, trace wood (SP)	ENV: 2-4' Lead at 1300; 2-5' PCBs x2 at 1300
505.9 5	GP	2	48	12				ENV: 4-6' Lead at 1300; 5-8' PCBs at 1300 ENV: 6-8' Lead at 1300
500.9 10	GP	3	48	26			Dry, red-brown/black/brown, fine to coarse SAND, some fine to coarse gravel, little clayey silt, trace brick, trace glass, trace slag, trace wood (SP)	ENV: 8-10' Lead at 1300; 8-11' PCBs at 1300 ENV: 10-12' Lead at 1300; 11-12.6' PCBs at 1300
							Moist, gray-brown, fine to coarse GRAVEL, little clayey silt, trace fine to coarse sand (GP) [Silty Gravel]	Gravel pieces are dolostone fragments.
	GP	4	7	7		WR	Dry, white/light brown, fine to coarse GRAVEL, some fine to medium sand, little silt (Crushed Dolostone) (GP)	ENV: 12-12.6' Lead at 1300
495.9 15							Exploration terminated at 12.6 ft bgs (refusal).	Refusal at 4.0 ft bgs on first attempt.
490.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB03**

CDM Smith

Boring Number: UP-SB04

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157135 **E:** 1119927
Drilling Date: Start: 10/22/2018 **End:** 10/22/2018

Surface Elevation (ft.): 512.7
Total Borehole Depth (ft.): 9.8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/22/2018	825

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
512.7 0	GP	1	48	36		Fill	Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace debris, trace glass (SP)	ENV: 0-2' Lead, PCBs at 0815 ENV: 2-4' Lead at 0815; 2-5' PCBs at 0815
507.7 5	GP	2	48	20			Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace debris, trace glass (SP)	ENV: 4-6' Lead at 0815; 5-8' PCBs at 0815 ENV: 6-8' Lead at 0815
	GP	3	22	10		Organic Silt and Clay	Moist, brown, Slightly Organic Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML) Moist, brown, Slightly Organic Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML)	ENV: 8-9.8' Lead, PCBs at 0815
502.7 10							Dry, gray-white, fine to coarse GRAVEL, trace silt, trace fine sand (Dolostone Pieces) (GP) Exploration terminated at 9.8 ft bgs (refusal).	
497.7 15								
492.7								

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: UP-SB04**

CDM Smith

Boring Number: UP-SB05

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157171 **E:** 1119913
Drilling Date: Start: 10/19/2018 **End:** 10/19/2018

Surface Elevation (ft.): 513.4
Total Borehole Depth (ft.): 8.8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/19/2018	1400

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
513.4 / 0	GP	1	48	36		Fill	Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag, trace debris, trace glass (SP)	ENV: 0-2' Lead, PCBs at 1400
							Dry, light brown, fine to medium SAND and SILT, little fine to coarse gravel, trace roots (SM)	ENV: 2-4' Lead at 1400; 2-5' PCBs at 1400
							Dry, light brown, fine to medium SAND and SILT, little fine to coarse gravel, trace roots (SM)	ENV: 4-6' Lead at 1400; 5-8' PCBs at 1400; 5-6' PCBs at 1400
508.4 / 5	GP	2	48	38		Sand and Silt	Dry, red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 6-8' Lead at 1400
	GP	3	10	6		WR	Dry, white/light brown, fine to coarse GRAVEL, little fine to coarse sand, little silt (Crushed Dolostone) (GP)	ENV: 8-8.8' Lead at 1400
							Exploration terminated at 8.8 ft bgs (refusal).	
503.4 / 10								
498.4 / 15								
493.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB05**

CDM Smith

Boring Number: UP-SB06

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157348 **E:** 1120057
Drilling Date: Start: 10/12/2018 **End:** 10/12/2018

Surface Elevation (ft.): 504.6
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/12/2018	1120

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
504.6 0	GP	1	48	36		Fill	Dry, brown, fine SAND and SILT, little fine to coarse gravel (SM) Dry, black, fine to medium SAND, little fine to coarse gravel, trace silt, trace cinders, trace wood (SP)	ENV: 0-2' Lead at 1120 ENV: 2-4' Lead x2 at 1120
499.6 5	GP	2	48	24		Weathered Rock	Dry, brown, fine to coarse SAND, some fine to coarse gravel, little silt (SP) Dry, brown and white, fine to coarse GRAVEL, some fine to medium sand, some silt (GP)	Gravel is pulverized dolostone. ENV: 4-6' Lead at 1120 ENV: 6-8' Lead at 1120
494.6 10							Exploration terminated at 8 ft bgs.	
489.6 15								
484.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB06**

CDM Smith

Boring Number: UP-SB07

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157220 **E:** 1120031
Drilling Date: Start: 10/15/2018 **End:** 10/15/2018

Surface Elevation (ft.): 504.8
Total Borehole Depth (ft.): 7
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/15/2018	1500

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
504.8 0						Fill	Moist, brown, Silty CLAY, litte fine to gravel, little fine to coarse sand (CL)	ENV: 0-2' Lead, PCBs at 1500
	GP	1	48	37		Fill	Moist, brown-black, fine to coarse SAND, some wood, little fine to coarse gravel, trace silt, trace cinders, trace glass, trace metal (SP)	
						Weathered Rock	Dry, white, fine to coarse GRAVEL, little fine to medium sand, little silt (Pulverized Dolostone) (GP)	ENV: 2-4' Lead at 1500; 2-5' PCBs at 1500
499.8 5	GP	2	36	36		Weathered Rock	Dry, white, fine to coarse GRAVEL, little fine to medium sand, little silt (Pulverized Dolostone) (GP)	ENV: 4-6' Lead at 1500; 5-7' PCBs at 1500 ENV: 6-7' Lead at 1500
494.8 10							Exploration terminated at 7 ft bgs.	Refusal at 5.7 and 3.1 ft bgs on the first and third attempts, respectively.
489.8 15								
484.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB07**

Boring Number: UP-SB08

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157176 **E:** 1120040
Drilling Date: Start: 10/17/2018 **End:** 10/17/2018

Surface Elevation (ft.): 502.9
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/17/2018	1400

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
502.9 0	GP	1	48	30		Fill	Moist, brown, Clayey SILT, little fine sand, trace glass (ML) Dry, black-brown-tan, SILT and fine SAND, trace fine gravel, trace plastic (SM)	ENV: 0-2' PCBs x2 at 1400 ENV: 2-5' PCBs at 1400
497.9 5	GP	2	48	35		Silty Gravel	Dry, brown, fine GRAVEL and fine SAND, trace silt, trace slag (GP-SP) Dry, light brown fine GRAVEL, some fine to medium sand, trace silt (GP) Dry, brown-white, fine to coarse GRAVEL (Dolostone), little fine to medium sand, little silt, trace shells (GP)	ENV: 5-7' PCBs at 1400
492.9 10	GP	3	48	30		Weathered Rock	Dry, light brown-white, fine to coarse GRAVEL (Dolostone), little fine to medium sand, trace silt (GP)	Red-brown silt seams.
487.9 15							Exploration terminated at 12.0 ft bgs	
482.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB08**

CDM Smith

Boring Number: UP-SB09

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157160 **E:** 1120005
Drilling Date: Start: 10/17/2018 **End:** 10/17/2018

Surface Elevation (ft.): 506.4
Total Borehole Depth (ft.): 13
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
506.4 0	GP	1	48	14		Fill	Moist, brown, SILT, trace fine sand, trace roots (ML)	ENV: 0-2' Lead, PCBs at 1230
							Moist, brown, fine SAND and SILT, some fine gravel, trace debris, trace glass, trace metal, trace plastic (SM)	ENV: 2-4' Lead at 1230; 2-5' PCBs at 1230
501.4 5	GP	2	48	26			Dry, light brown, fine to medium SAND, trace fine to coarse gravel, trace silt, trace glass, trace wood (SP)	ENV: 4-6' Lead at 1230; 5-8' PCBs at 1230
							Dry, gray-black, fine to coarse GRAVEL, some fine to medium sand, little silt, trace cinders, trace slag (GP)	ENV: 6-8' Lead at 1230 Crushed Dolostone 6 to 6.2 ft bgs.
496.4 10	GP	3	48	45			Dry, light brown, fine to medium SAND, trace fine to coarse gravel, trace silt, trace glass, trace plastic, trace metal (SP)	ENV: 8-10' Lead at 1230; 8-11' PCBs at 1230
							Dry, light gray, fine to coarse SAND and fine GRAVEL, trace silt, trace glass (SP-GP)	
						Peat	Moist, gray, PEAT and Clayey SILT, little fine sand (Pt)	ENV: 10-12' Lead at 1230; 11-13' PCBs at 1230
						Clay	Moist, light gray, Silty CLAY, little fine sand (CL)	
	GP	4	12	12				ENV: 12-13' Lead at 1230
						WR	Wet, light gray, fine to coarse GRAVEL (Dolostone), some silty clay, little fine sand, trace wood (GP)	
							Exploration terminated at 13.0 ft bgs.	
491.4 15								
486.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: UP-SB09**

CDM Smith

Boring Number: UP-SB10

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157203 **E:** 1120000
Drilling Date: Start: 10/19/2018 **End:** 10/19/2018

Surface Elevation (ft.): 507
Total Borehole Depth (ft.): 11.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/19/2018	840

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
507.0 0	GP	1	48	36		Fill	Moist, light brown, fine to coarse SAND and Clayey SILT, little fine to coarse gravel, trace slag, trace roots (SM)	ENV: 0-2' Lead, PCBs at 0830 ENV: 2-4' Lead at 0830; 2-5' PCBs at 0830
502.0 5	GP	2	48	30		Fill	Dry, brown/gray/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris, trace concrete (SP)	ENV: 4-6' Lead x2 at 0830; 5-8' PCBs at 0830 ENV: 6-8' Lead x2 at 0830
497.0 10	GP	3	42	24		Fill Peat WR	Dry, brown/gray/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris, trace concrete (SP) Dry brown, PEAT, some fine to coarse sand, trace fine gravel (Pt) (Peat - fibrous) Moist, gray, fine to coarse GRAVEL and CLAY & SILT, little fine to coarse sand, trace roots (GC) [Clayey Gravel] Dry, white, fine to coarse GRAVEL, little fine to coarse sand, trace silt (Dolostone Fragments) (GP) Exploration terminated at 11.5 ft bgs (refusal).	ENV: 8-10' Lead at 0830; 8-11' PCB x2 at 0830 Wood 9.7 to 10 ft bgs. ENV: 9-10' PCBs at 0830 ENV: 10-11.5' Lead x2 at 0830
492.0 15								
487.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB10**

CDM Smith

Boring Number: UP-SB11

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157088 **E:** 1120038
Drilling Date: Start: 10/18/2018 **End:** 10/18/2018

Surface Elevation (ft.): 488.1
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
3	10/18/2018	1320

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
488.1 0	GP	1	48	22		Fill	2" Topsoil Moist to wet, light brown-gray, fine to coarse SAND and fine to coarse GRAVEL, little clayey silt, trace terracota (SP-GP)	ENV: 0-2' Lead, PCBs at 1325 ENV: 2-4' Lead at 1325, 2-6' PCBs at 1325
▼						Organic Silt and Clay	Wet, black, Organic SILT, some fine sand, trace fine gravel (OL)	Organic odor 3 to 6 ft bgs.
483.1 5	GP	2	24	14				ENV: 4-6' Lead at 1325
478.1 10							Exploration terminated at 6.0 ft bgs (no refusal).	
473.1 15								
468.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB11**

CDM Smith

Boring Number: UP-SB12

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157047 **E:** 1119996
Drilling Date: Start: 9/19/2018 **End:** 9/19/2018

Surface Elevation (ft.): 503.9
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/19/2018	830

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
503.9 0	SH	1	60	30		Fill	Top 12": Dry, brown, fine to coarse SAND, some silt, little fine to coarse grave, trace roots, trace metal, trace debris (SM)- Fill	Effort: Moderate 0 to 4 ft bgs. ENV: 0-2' PCB, Lead at 0830 ENV: 2-4' Lead at 0830
498.9 5						Silty Gravel	Bottom 18": Dry, light brown, SILT and fine to coarse GRAVEL, little fine to coarse sand (GM)	Effort: Difficult 4 to 5 ft bgs. ENV: 4-4.5' PCB at 0830 ENV: 4-5' Lead at 0830 FeO Staining bottom 6".
							Exploration terminated at 5.0 ft bgs.	
493.9 10								
488.9 15								
483.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB12**

CDM Smith

Boring Number: UP-SB13

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157342 **E:** 1120081
Drilling Date: Start: 10/22/2018 **End:** 10/22/2018

Surface Elevation (ft.): 502.6
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/22/2018	1040

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
502.6 0							2" Topsoil Moist, brown, Clayey SILT, little fine to medium sand, trace fine gravel (ML)	ENV: 0-2' Lead x2, PCBs at 1030
	GP	1	48	28		Fill	Dry, brown-black, fine to coarse SAND, little silt, little ifne to coarse gravel, trace slag, trace debris (SP)	ENV: 2-4' Lead x2 at 1030; 2-5' PCBs at 1030
	GP	2	12	8		Silty Gravel	Dry, gray-brown, fine to coarse GRAVEL, little fine to coarse sand, little silt (Dolostone Fragments) (GP)	ENV: 4-5' Lead at 1030
497.6 5							Exploration terminated at 5.0 ft bgs (no refusal).	
492.6 10								
487.6 15								
482.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB13**

CDM Smith

Boring Number: UP-SB14

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157302 **E:** 1120090
Drilling Date: Start: 10/22/2018 **End:** 10/22/2018

Surface Elevation (ft.): 502.1
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/22/2018	920

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
502.1 0	GP	1	48	36		Fill	Moist, brown, Clayey SILT, little fine to coarse sand, little fine gravel (ML) Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, trace silt, trace slag, trace concrete, trace brick (SP)	ENV: 0-2' Lead, PCBs at 0915 ENV: 2-4' Lead at 0915; 2-5' PCBs at 0915
497.1 5	GP	2	48	24		Fill	Dry, dark brown-black, fine to coarse SAND, some fine to coarse gravel, trace silt, trace slag, trace concrete, trace brick (SP) Dry, light brown-gray, fine to coarse GRAVEL and SILT, little fine to medium sand, trace slag (GM)	ENV: 4-6' Lead at 0915; 5-8' PCBs at 0915 ENV: 6-8' Lead at 0915
492.1 10	GP	3	48	30		Weathered Rock	Dry, light brown, fine to coarse GRAVEL, little silt, little fine to medium sand (Completely Weathered Dolostone Fragments) (GP)	ENV: 8-10' Lead, PCBs at 0915
487.1 15							Exploration terminated at 12.0 ft bgs (no refusal).	
482.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB14**

CDM Smith

Boring Number: UP-SB15

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157303 **E:** 1120066
Drilling Date: Start: 10/22/2018 **End:** 10/22/2018

Surface Elevation (ft.): 503.9
Total Borehole Depth (ft.): 6.3
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/22/2018	1000

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
503.9 / 0							Moist, brown, Clayey SILT, little fine to coarse sand, little fine gravel (ML)	ENV: 0-2' Lead, PCBs at 0945
	GP	1	48	36		Fill	Dry, dark brown-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris (SP)	ENV: 2-4' Lead at 0945; 2-6' PCBs x2 at 0945
498.9 / 5	GP	2	24	18			Dry, dark brown-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris (SP)	ENV: 4-6' Lead at 0945
							Dry, white, fine to coarse SAND and fine to coarse GRAVEL, trace silt (Completely Weathered Dolostone) (SP-GP)	
	GP	3	3	3		WR	Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace roots (SP)	
							Dry, gray-white, fine to coarse GRAVEL, trace fine to coarse sand, trace silt (Dolostone Fragments) (GP)	
							Exploration terminated at 6.3 ft bgs (refusal).	
493.9 / 10								
488.9 / 15								
483.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB15**

CDM Smith

Boring Number: UP-SB20

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1156989 **E:** 1120087
Drilling Date: Start: 9/19/2018 **End:** 9/19/2018

Surface Elevation (ft.): 501.3
Total Borehole Depth (ft.): 4.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/19/2018	1020

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
501.3 0						Fill	Top 4": Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace roots, trace debris (SP)	Effort: Moderate 0 to 4 ft bgs.
	SH	1	48	30		Silty Gravel	Bottom 26": Dry, brown-gray, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP-GM), Dolostone fragments in the tip of 1st attempt.	ENV: 0-2' Leadx2 at 1020 ENV: 2-4' Lead at 1020
	SH	2	6	6		WR	Dry, brown-gray, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP-GM) (Dolostone Fragments)	Effort: Difficult 4 to 4.5 ft bgs.
496.3 5							Exploration terminated at 4.5 ft bgs	ENV: 4-4.5' Lead at 1020 Auger refusal. Possible boulder.
491.3 10								
486.3 15								
481.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB20**

CDM Smith

Boring Number: UP-SB21

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1156978 **E:** 1120069
Drilling Date: Start: 9/19/2018 **End:** 9/19/2018

Surface Elevation (ft.): 495.2
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
4.5	9/19/2018	920

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
495.2 / 0						Fill	Top 4": Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace roots, trace wood (SM)	Effort: Moderate 0 to 2 ft bgs.
	SH	1	48	30		Silty Gravel	Middle 22": Dry, gray-brown, fine to coarse GRAVEL, some silt, little fine to coarse sand (GP-GM)	ENV: 0-2' Lead at 0920 Effort: Difficult 2 to 5 ft bgs. ENV: 2-4' Lead at 0920
							Bottom 4": Dry, light brown, fine to coarse SAND, some fine to coarse gravel, little silt, concrete fragments	
▼ 490.2 / 5	SH	2	12	10			Dry to wet, gray-brown, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP-GM)	ENV: 4-5' Lead at 0920
							Exploration terminated at 5.0 ft bgs (refusal).	
485.2 / 10								
480.2 / 15								
475.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB21**

CDM Smith

Boring Number: UP-SB22

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157047 **E:** 1119956
Drilling Date: Start: 10/18/2018 **End:** 10/18/2018

Surface Elevation (ft.): 514.5
Total Borehole Depth (ft.): 17.2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/18/2018	1120

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
514.5 0	GP	1	48	24		Fill	Dry, dark brown-black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag (SP)	ENV: 0-2' Lead at 1100 FeO Staining at 4 ft bgs. ENV: 2-4' Lead at 1100
509.5 5	GP	2	48	24		Fill	Dry, dark brown-black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag (SP)	ENV: 4-6' Lead at 1100
						Sand and Silt	Dry, brown-gray, Clayey SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 6-8' Lead at 1100
						Sand and Silt	Dry, light brown-gray, SILT, some fine to medium sand, little fine to coarse gravel (ML)	
504.5 10	GP	3	48	24		Sand and Silt	Dry, light brown-gray, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 8-10' Lead at 1100 Various red-brown staining throughout sample 3. ENV: 10-12' Lead at 1100
499.5 15	GP	4	48	30		Sand and Silt	Dry, light brown-gray, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 12-14' Lead at 1100 ENV: 14-16' Lead at 1100
	GP	5	14	8		Sand and Silt	Moist, light brown-gray, SILT, some fine to coarse gravel, little fine to medium sand (ML)	
						WR	Bottom 5": Weathered Dolostone Fragments	
494.5							Exploration terminated at 17.2 ft bgs (refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB22**

CDM Smith

Boring Number: UP-SB23

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157103 **E:** 1119943
Drilling Date: Start: 10/2/2018 **End:** 10/2/2018

Surface Elevation (ft.): 513
Total Borehole Depth (ft.): 16
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/2/2018	1445

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
513.0 0	GP	1	48	34		Fill	Moist, dark brown-black, fine to coarse GRAVEL and fine to coarse SAND, some silt (GP-SP) Dry, dark brown to red-brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace wood, trace debris (SP)	ENV: 0-2' Lead at 1445 ENV: 2-4' Lead at 1445
508.0 5	GP	2	48	18		Fill	Dry, dark brown to red-brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace wood, trace debris (SP)	ENV: 4-6' Lead at 1445 ENV: 6-8' Lead at 1445
503.0 10	GP	3	48	3		Fill	Dry, dark brown to red-brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace wood, trace debris (SP)	ENV: 8-10' Lead at 1445 ENV: 10-12' Lead at 1445
	GP	4	48	24		Sand and Silt	Dry, light brown, fine to coarse SAND and clayey SILT, some fine to coarse gravel (SM)	ENV: 12-14' Lead at 1445
498.0 15						Clay	Mosit, gray to light brown, CLAY, trace fine to coarse gravel, trace fine sand (CH)	ENV: 14-16' Leadx2 at 1445
493.0							Exploration terminated at 16.0 ft bgs (refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB23**

CDM Smith

Boring Number: UP-SB24

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157189 **E:** 1120073
Drilling Date: Start: 10/12/2018 **End:** 10/12/2018

Surface Elevation (ft.): 497.1
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/12/2018	1340

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
497.1 0	GP	1	48	32		Fill	Moist, brown, fine SAND, some silt, trace fine gravel, trace organics (SP) Moist, black, fine to medium SAND, some silt, trace fine to coarse gravel, trace cinders, trace glass (SP) Moist, red, fine to medium SAND, some silt, trace fine to coarse gravel (SP)	ENV: 0-2' Lead at 1340 ENV: 2-4' Lead at 1340
492.1 5	GP	2	48	46		Sand and Silt	Dry, white, fine to coarse SAND and fine to coarse GRAVEL, some silt (Crushed Dolostone) (SP-GP) Dry, light brown, SILT, little fine sand, trace fine gravel (ML)	ENV: 4-6' Lead at 1340
487.1 10							Exploration terminated at 8.0 ft bgs.	
482.1 15								
477.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB24**

CDM Smith

Boring Number: UP-SB25

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157182 **E:** 1120108
Drilling Date: Start: 10/12/2018 **End:** 10/12/2018

Surface Elevation (ft.): 488.3
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
488.3 / 0	GP	1	48	20		Fill	3" Topsoil: Moist, dark brown, SILT, trace fine sand, trace fine gravel, trace organics (ML) Moist, brown, fine to medium SAND and SILT, trace fine gravel (SM)	ENV: 0-2' Lead x2 at 1310 ENV: 2-4' Lead at 1310
							Moist, light brown, fine to medium SAND and SILT, some fine gravel (SM) [Sand and Silt] Exploration terminated at 4.0 ft bgs.	
483.3 / 5								
478.3 / 10								
473.3 / 15								
468.3								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB25**

CDM Smith

Boring Number: UP-SB26

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157136 **E:** 1120090
Drilling Date: Start: 10/12/2108 **End:** 10/12/2018

Surface Elevation (ft.): 486.1
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
486.1 / 0						Fill	Moist, brown and gray, Clayey SILT, trace fine sand, trace fine gravel (ML)	ENV: 0-2' Lead x2 at 1245
	GP	1	48	40		Clayey Gravel	Moist, brown, Silty CLAY and fine to coarse GRAVEL, trace fine to coarse sand (GC)	Gravel is Dolostone fragments. ENV: 2-3' Lead at 1245
						Wood	Wet, dark brown, WOOD	
481.1 / 5							Exploration terminated at 4.0 ft bgs.	
476.1 / 10								
471.1 / 15								
466.1								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: UP-SB26**

CDM Smith

Boring Number: UP-SB27

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157146 **E:** 1120053
Drilling Date: Start: 10/12/2018 **End:** 10/12/2018

Surface Elevation (ft.): 497.4
Total Borehole Depth (ft.): 7.3
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/12/2018	1430

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
497.4 0	GP	1	48	24		Fill	Dry, dark brown, SILT, trace fine to coarse sand, trace fine to coarse gravel, trace organics, trace glass (Topsoil) (ML) Dry, black and white, fine to coarse SAND and SILT (ash and cinder) (SM) Dry, tan, fine to coarse SAND, little fine to coarse gravel, little concrete, trace silt (SP) Dry, red-gray, fine to coarse GRAVEL, little silt, little fine sand (GP)	ENV: 0-2' Lead at 1430 ENV: 2-4' Lead at 1430
492.4 5	GP	2	39	21		Fill WR	Dry, orange-black, fine to coarse SAND, some fine to coarse gravel (slag), little silt, trace metal (SP) Dry, white, SILT and fine to medium SAND, some fine to coarse gravel (Crushed Dolostone) (SM)	ENV: 4-5' Lead at 1430
487.4 10							Exploration terminated at 7.3 ft bgs (refusal).	
482.4 15								
477.4								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB27**

CDM Smith

Boring Number: UP-SB28

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157367 **E:** 1120150
Drilling Date: Start: 9/18/2018 **End:** 9/18/2018

Surface Elevation (ft.): 490.1
Total Borehole Depth (ft.): 2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/18/2018	1230

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
490.1 / 0	SH	1	24	20		Fill	Top 12": Dry, brown, fine to medium SAND, some silt, little fine gravel (SM) trace metal, debris	Effort: Moderate 0 to 1.5 ft bgs. ENV: 0-2' Lead at 1230
						WR	Bottom 8": Dry, light brown-white, SILT and fine to coarse GRAVEL, little fine to coarse sand (GM) rock fragments, gravel sized pieces in tip of Dolostone	Effort: Difficult 1.5 to 2 ft bgs.
							Exploration terminated at 2 ft bgs (refusal).	
485.1 / 5								
480.1 / 10								
475.1 / 15								
470.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB28**

CDM Smith

Boring Number: UP-SB29

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157328 **E:** 1120132
Drilling Date: Start: 9/18/2018 **End:** 9/18/2018

Surface Elevation (ft.): 492.5
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/18/2018	1345

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
492.5 / 0						Fill	Top 10": Dry, brown, fine to medium SAND, little silt, trace fine gravel, trace glass, trace plastic, trace roots (SP)	ENV: 0-2' Lead at 1345
	SH	1	48	24		Silty Gravel	Bottom 14": Dry, light brown-white, SILT, some fine to coarse gravel, little fine to medium sand (SM)	ENV: 2-4' Lead at 1345
487.5 / 5	SH	2	12	10		Silty Gravel	Dry, light brown-white, SILT, some fine to coarse gravel, little fine to medium sand (SM)	ENV: 4-5' Lead at 1345 FeO staining.
							Exploration terminated at 5.0 ft bgs (refusal).	
482.5 / 10								
477.5 / 15								
472.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: UP-SB29**

CDM Smith

Boring Number: WS-SB02

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158473 **E:** 1120125
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 471
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/4/2018	1100

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.0 / 0	GP	1	48	33		Fill	3" Topsoil Moist, dark brown to black, fine to coarse SAND, some clayey silt, little fine to coarse gravel, trace brick, trace slag (SP)	ENV: 0.5-2' Lead at 1100 ENV: 2-4' Lead at 1100
							Moist, gray-brown, Slightly Organic SILT & CLAY, little fine to coarse sand, trace fine gravel (OL) [Organic Silt and Clay]	
466.0 / 5	GP	2	48	18		Silt and Clay	Dry, red-brown, Clayey SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-6' Lead at 1100 ENV: 6-8' Lead x2 at 1100 Siltstone chips and fragments throughout.
461.0 / 10							Exploration terminated at 8 ft bgs (no refusal).	
456.0 / 15								
451.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: WS-SB02**

CDM Smith

Boring Number: WS-SB10

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158681 **E:** 1120065
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 469.8
Total Borehole Depth (ft.): 6.6
Depth to Initial Water Level (ft):

Depth	Date	Time
4	10/3/2018	1500

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.8 0						Fill	Moist, brown-gray, fine to coarse GRAVEL and fine to coarse SAND, little silt, trace debris, trace fabric (GP-SP)	ENV: 0.5-2' Lead at 1500
	GP	1	48	42		Silt and Clay	Dry to moist, red-brown, Clayey SILT, little fine to medium sand, little fine to coarse gravel (ML-CL)	ENV: 2-4' Lead at 1500
▼ 464.8 5	GP	2	31	15		Silt	Moist, red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-6' Lead at 1500 ENV: 6-6.6' Lead at 1500 Gray Siltstone chips in tip
							Exploration terminated at 6.6 ft bgs (refusal).	
459.8 10								
454.8 15								
449.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB10**

CDM Smith

Boring Number: WS-SB11

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158737 **E:** 1120106
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 468.1
Total Borehole Depth (ft.): 9
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/4/2018	930

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
468.1 / 0								
	GP	1	48	34		Fill	Moist, light brown, clayey SILT, little fine to coarse sand, little fine to coarse gravel, trace grass (ML) Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace brick (SM)	ENV: 0.5-2' Lead, PCB at 0900
						Silt and Clay	Dry, light brown to red-brown, Clayey SILT, some fine to medium sand, little fine to coarse gravel (ML-CL)	ENV: 2-4' Lead at 0940; 2-5' PCB at 0940
						Sand and Silt	Dry, gray-white, fine to coarse GRAVEL, trace silt (GP) (Siltstone fragments)	
463.1 / 5	GP	2	48	16			Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-6' Leadx2 at 0940; 5-9' PCB at 0940 Gravel piece blocking sample from 4 to 8 ft bgs, 6 to 8 ft bgs sample likely recovered in 8 to 9 ft bgs sample. ENV: 6-8' Lead at 0940
	GP	3	12	12				ENV: 8-9' Lead at 0940
458.1 / 10							Exploration terminated at 9 ft bgs (no refusal).	
453.1 / 15								
448.1								

Sample Types

AS - Auger/Grab Sample	SH - Slide Hammer
CS - California Sampler	SS - Split Spoon
BQ - 1.5" Rock Core	ST - Shelby Tube
NQ - 2" Rock Core	WS - Wash Sample
	GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):				Fine Grained (Clay):			
V. Loose:	0-4	Dense:	30-50	V. Soft:	<2	Stiff:	8-15
Loose:	4-10	V. Dense:	>50	Soft:	2-4	V. Stiff:	15-30
M. Dense:	10-30			M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%
moisture, density, color	

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB11**

CDM Smith

Boring Number: WS-SB13

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158622 **E:** 1120034
Drilling Date: Start: 10/4/2018 **End:** 10/4/2018

Surface Elevation (ft.): 471.6
Total Borehole Depth (ft.): 9
Depth to Initial Water Level (ft):

Depth	Date	Time
7.5	10/4/2018	1020

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.6 0	GP	1	48	34		Fill	Moist, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace roots, trace debris (SM)	ENV: 0.5-2' Lead, SVOC x2 at 1020
						Silt and Clay	Moist, light brown, Clayey SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 2-4' Lead, SVOC x2 at 1020
466.6 5	GP	2	48	24		Sand and Silt	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel (SM)	ENV: 4-6' Lead, SVOC x2 at 1020 ENV: 6-8' Lead at 1020
▼							Wet, red-brown, fine to coarse GRAVEL and Clayey SILT, little fine to coarse sand (GM)	ENV: 8-9' Lead at 1020 Gray Siltstone chips at 7.5 ft bgs.
	GP	3	12	12			Wet, red-brown, SILT, some fine to medium sand, little fine to coarse gravel	
461.6 10							Exploration terminated at 9 ft bgs (no refusal).	
456.6 15								
451.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: WS-SB13**

CDM Smith

Boring Number: WS-SB14

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158797 **E:** 1220076
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 469
Total Borehole Depth (ft.): 9
Depth to Initial Water Level (ft):

Depth	Date	Time
5	10/3/2018	1430

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.0 / 0	GP	1	48	29		Fill	Moist, light brown, Clayey SILT, little fine to coarse gravel, little fine to coarse sand, trace grass (ML) Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris (SP)	ENV: 0.5-2' Lead, TCLP Lead at 1420
464.0 / 5	GP	2	48	36		Sand and Silt	Dry, light brown to red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	Siltstone chips from 3.5 to 4.5 ft bgs ENV: 4-6' Leadx2, TCLP Lead at 1420 Becomes moist at 5 ft bgs. ENV: 6-8' Lead, TCLP Lead at 1420; 5-9' PCB at 1420
	GP	3	12	12			Dry, light brown to red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 8-9' Lead, TCLP Lead at 1420
459.0 / 10							Exploration terminated at 9.0 ft bgs (no refusal).	
454.0 / 15								
449.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB14**

CDM Smith

Boring Number: WS-SB15

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158718 **E:** 1119969
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 471.9
Total Borehole Depth (ft.): 9.8
Depth to Initial Water Level (ft):

Depth	Date	Time
8	10/3/2018	1050

Abandonment Method: Backfilled with bentonite chips
Logged By: M,. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.9 / 0						Fill	Moist, gray-brown, fine to coarse SAND and fine to coarse GRAVEL, some silt, trace debris (SP-GP)	ENV: 0.5-2' Lead x2, SVOC at 1040
	GP	1	48	38		Sand and Silt	Dry, red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 2-4' Lead, SVOC at 1400 Gray-white Siltstone chips at 3.2 to 3.5 ft bgs
466.9 / 5	GP	2	48	30			Dry, red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-6' Lead, SVOC at 1400 ENV: 6-8' Lead at 1400 Gray-white Siltstone chips at 7.5 to 8 ft bgs, very thin bedding
▼	GP	3	22	22			Dry, red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 8-9.8' Lead at 1400
461.9 / 10							Extremely weathered, gray-green SILTSTONE Exploration terminated at 9.8 ft bgs (refusal).	
456.9 / 15								
451.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB15**

CDM Smith

Boring Number: WS-SB18

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158792 **E:** 1119928
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 471.6
Total Borehole Depth (ft.): 10.5
Depth to Initial Water Level (ft):

Depth	Date	Time
7	10/3/2018	915

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.6 0	GP	1	48	21		Fill	Moist, light brown, Clayey SILT, little fine to medium sand, little fine to coarse gravel, trace grass (ML) Dry, brown to dark brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace roots, trace slag, trace concrete (SP-GP)	ENV: 0.5-2' Lead, SVOC at 0920 ENV: 2-4' Lead, SVOC at 0920 ENV: 4-6' Lead, SVOC at 0920
466.6 5	GP	2	48	42		Sand and Silt	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	
▼						Silt and Clay	Dry, red-brown, Clayey SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 6-8' Lead at 0920 ENV: 8-10' Lead at 0920
461.6 10	GP	3	30	18				ENV: 10-10.5' Lead at 0920
456.6 15							Exploration terminated at 10.5 ft bgs (refusal).	Gray Siltstone in tip Refusal at 5.5 ft bgs on first attempt.
451.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB18**

CDM Smith

Boring Number: WS-SB19

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158862 **E:** 1119986
Drilling Date: Start: 10/1/2018 **End:** 10/1/2018

Surface Elevation (ft.): 469
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/1/2018	1500

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.0 / 0	GP	1	48	40		Fill	Moist, light brown, Clayey SILT, little fine to coarse sand, little fine to coarse gravel, trace grass Moist, brown, fine to coarse SAND, some clayey silt, little fine to coarse gravel, trace brick (SM)	ENV: 0.5-2' Lead x2, SVOC at 1450
							Rock fragments	ENV: 2-4' Lead, SVOC at 1450
464.0 / 5	GP	2	48	48		Sand and Silt	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-6' Lead, SVOC at 1450 ENV: 6-8' Lead at 1450
459.0 / 10	GP	3	24	12		Silt and Clay	Dry, red-brown, Clayey SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 8-10' Lead at 1450 Gray rock fragments in tip
454.0 / 15							Exploration terminated at 10 ft bgs (no refusal).	
449.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB19**

CDM Smith

Boring Number: WS-SB20

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158903 **E:** 1119994
Drilling Date: Start: 10/1/2018 **End:** 10/1/2018

Surface Elevation (ft.): 470
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/1/2018	1415

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.0 / 0	GP	1	48	38		Fill	Moist, light brown, clayey SILT, little fine to coarse sand, little fine to coarse gravel, trace grass (ML) Dry, dark brown-brown-black, fine to coarse SAND, some fine to coarse gravel, little silt, trace glass, trace brick, trace debris (SP-GP)	ENV: 0.5-2' Lead at 1415 ENV: 2-4' Lead at 1415 ENV: 4-6' Lead at 1415
465.0 / 5	GP	2	48	40		Sand and Silt	Dry to moist, light brown to red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 6-8' Lead at 1415
	GP	3	24	24			Dry to moist, light brown to red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 8-10' Lead at 1415 Gravel sized Siltstone fragments from 9.5 to 10 ft bgs.
460.0 / 10							Exploration terminated at 10 ft bgs (no refusal).	
455.0 / 15								
450.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB20**

CDM Smith

Boring Number: WS-SB21

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158875 **E:** 1119884
Drilling Date: Start: 10/3/2018 **End:** 10/3/2018

Surface Elevation (ft.): 471.8
Total Borehole Depth (ft.): 11.2
Depth to Initial Water Level (ft):

Depth	Date	Time
10.5	10/3/2018	840

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.8 0	GP	1	48	28		Fill	Moist, brown to light brown, Clayey SILT, little fine to medium sand, little fine to coarse gravel, trace grass (ML) Dry, dark brown to brown, fine to coarse SAND, trace fine to coarse gravel, little silt, trace brick, trace debris, trace slag (SP)	ENV: 0.5-2' Lead, SVOC at 0840 ENV: 2-4' Lead, SVOC at 0840 ENV: 4-6' Lead, SVOC at 0840
466.8 5	GP	2	48	42		Sand and Silt	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 6-8' Leadx2 at 0840 Red-brown Siltstone chips and fragments throughout sample 2.
461.8 10	GP	3	38	27			Dry to moist, red-brown, SILT, little fine to medium sand, little fine to coarse gravel (ML)	ENV: 8-10' Lead at 0840 ENV: 10-11.2 Lead at 0840 Gray Siltstone chips in tip.
456.8 15							Exploration terminated at 11.2 ft bgs (refusal).	
451.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB21**

CDM Smith

Boring Number: WS-SB23

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1159048 **E:** 1119955
Drilling Date: Start: 10/1/2018 **End:** 10/1/2018

Surface Elevation (ft.): 465.9
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
1.5	10/1/2018	910

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
465.9 0	GP	1	48	24		Org. Silt & Clay	Moist, brown, Organic SILT & CLAY, little fine to medium sand, trace fine gravel (OL) (Organics- roots/wood)	ENV: 0.5-2' Lead, PCBx2 at 0900
						Clay	Wet, brown-gray, Silty CLAY, trace fine to medium sand, trace fine gravel, trace roots (CL)	ENV: 2-4' Lead x2 at 0900; 2-5' PCB at 0900 Wood from 3.5 to 3.8 ft bgs
460.9 5	GP	2	24	24			Wet, brown, SILT & CLAY and fine to coarse SAND, trace fine gravel (SM-SC)	ENV: 4-5' Lead at 0900
455.9 10							Exploration terminated at 6.0 ft bgs (no refusal).	
450.9 15								
445.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB23**

CDM Smith

Boring Number: WS-SB24

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158997 **E:** 1119895
Drilling Date: Start: 10/1/2018 **End:** 10/1/2018

Surface Elevation (ft.): 467
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/1/2018	1000

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
467.0 / 0							Wet, light brown, Clayey SILT, little fine to coarse sand, trace fine to coarse gravel, trace roots (ML)	
						Fill	Moist, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace roots (SM)	ENV: 0.5-2' Lead, SVOC at 1000
	GP	1	48	32		Silt and Clay	Dry to moist, light brown to red-brown, Clayey SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 2-4' Lead, SVOC at 1000
462.0 / 5	GP	2	24	12				ENV: 4-6' Lead, SVOC at 1000 Rock fragments
							Exploration terminated at 6.0 ft bgs (no refusal).	
457.0 / 10								
452.0 / 15								
447.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: WS-SB24**

CDM Smith

Boring Number: WS-SB28

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1159078 **E:** 1119956
Drilling Date: Start: 10/1/2018 **End:** 10/1/2018

Surface Elevation (ft.): 465.7
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
1.6	10/1/2018	1140

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
465.7 0	GP	1	48	36		Fill	4" Topsoil Moist, dark brown to gray, slightly organic clayey SILT and fine to medium SAND, trace fine gravel, trace wood (SM)	ENV: 0.5-2' Lead, TCLP Lead, PCB at 1200
							Wet, gray, Organic fine to coarse SAND and CLAY & SILT, trace fine to coarse gravel (OL) (Organics- fibrous) [Organic Sand and Silt]	ENV: 2-4' Lead, TCLP Lead at 1200; 2-6' PCB at 1200
						Peat	Wet, dark brown-gray, PEAT, some silty clay, trace fine to medium sand (Pt)	
	GP	2	24	24		Clay	Wet, gray, Silty CLAY, trace fine to medium sand, trace fine gravel (CL)	ENV: 4-6' Lead, TCLP Lead at 1200
460.7 5						S&S	Dry, light brown, SILT, little fine to medium sand, trace gravel (ML)	S&S - Silt and Sand Stratum
							Exploration terminated at 6.0 ft bgs (no refusal).	Siltstone chips throughout.
455.7 10								
450.7 15								
445.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB28**

CDM Smith

Boring Number: WS-SB29

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner/ M. Mathies
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1159049 **E:** 1119864
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018

Surface Elevation (ft.): 466.3
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
3	9/28/2018	1435

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
466.3 / 0	GP	1	48	34		Silt	1" Grass Moist, brown, SILT and fine to coarse GRAVEL, little fine sand, trace roots (GM)	ENV: 0.5-2' Lead, TCLP Lead at 1440
▼						S&C	Most, red-brown, Clayey SILT, little fine to coarse gravel, little fine sand (ML)	S&C - Silt and Clay Stratum ENV: 2-4' Leadx2, TCLP Lead at 1440
461.3 / 5	GP	2	12	8		Silty Gravel	Wet, light brown, fine to coarse GRAVEL and Clayey SILT, little fine to coarse sand (GM)	ENV: 4-5 Lead at 1440
							Exploration terminated at 5.0 ft bgs (no refusal).	
456.3 / 10								
451.3 / 15								
446.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WS-SB29**

CDM Smith

Boring Number: WS-SB31

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street Properties
N: 1158984 **E:** 1119820
Drilling Date: Start: 10/1/2018 **End:** 10/1/2018

Surface Elevation (ft.): 469.9
Total Borehole Depth (ft.): 8.2
Depth to Initial Water Level (ft):

Depth	Date	Time
8	10/1/2018	1115

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.9 / 0	GP	1	48	24		Fill	Wet, light brown, clayey SILT, some fine to medium sand, little fine to coarse gravel, trace grass (ML)	ENV: 0.5-2' Lead, SVOC at 1100
							Moist, brown, fine to coarse SAND and clayey SILT, little fine to coarse gravel (SM)	ENV: 2-4' Lead x2, SVOC at 1100
464.9 / 5	GP	2	48	30		Silty Gravel	Dry, red-brown, fine to coarse GRAVEL and Clayey SILT, some fine to coarse sand (GM)	ENV: 4-6' Lead at 1100 ENV: 6-8' Lead, SVOC at 1100 Gravel is Siltstone fragments
▼	GP	3	2	2		WR	Red-brown, SILTSTONE (fragments)	
							Exploration terminated at 8.2 ft bgs (refusal).	
459.9 / 10								
454.9 / 15								
449.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: WS-SB31**

CDM Smith

Boring Number: WT-SB-01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: White Transportation Property
N: 1157577 **E:** 1120531
Drilling Date: Start: 10/12/2018 **End:** 10/12/2018

Surface Elevation (ft.): 491.4
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/12/2018	1030

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
491.4 0	GP	1	48	24		Fill	Dry, black, fine to coarse SAND and fine GRAVEL, trace silt (SP-GP) Dry, brown, fine to medium SAND, some fine gravel, trace silt (SP)	ENV: 0-2' Lead at 1030 ENV: 2-4' Lead at 1030
486.4 5	GP	2	48	30		Silty Gravel	Dry, white and brown, fine to coarse GRAVEL, some fine sand, some silt (GP)	Gravel material is dolostone. ENV: 4-6' Lead at 1030 ENV: 6-8' Lead at 1030
481.4 10							Exploration terminated at 8.0 ft bgs (no refusal).	
476.4 15								
471.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: WT-SB-01**

CDM Smith

Boring Number: WT-SB-02

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: White Transportation Property
N: 1157534 **E:** 1120569
Drilling Date: Start: 10/12/2018 **End:** 10/12/2018

Surface Elevation (ft.): 491.1
Total Borehole Depth (ft.): 9.7
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
491.1 0	GP	1	48	20		Fill	Dry, black, fine to coarse SAND and fine to coarse GRAVEL, trace silt, trace cinders (SP-GP)	ENV: 0-2' Lead x2 at 0945 ENV: 2-4' Lead at 0945
486.1 5	GP	2	48	46		Silty Gravel	Dry, black, fine to coarse SAND and fine to coarse GRAVEL, trace cinders (SP-GP) Dry, white-gray-brown, fine to coarse SAND and fine to coarse GRAVEL, some silt (SM-GM)	ENV: 4-6' Lead x2 at 0945 ENV: 6-8' Lead at 0945
	GP	3	20	13		WR	Moist, black, Silty CLAY, trace fine to coarse sand, trace fine gravel, trace brick (CL) [Clay] Dry, white, fine to coarse GRAVEL (Stone) (GP) Wet, red, fine to coarse GRAVEL (Shale) (GP)	7.5 to 8 ft bgs gravel material is shale fragments ENV: 8-9.7' Lead at 0945
481.1 10							Exploration terminated at 9.7 ft bgs.	
476.1 15								
471.1								

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: WT-SB-02**

CDM Smith

Boring Number: WT-SB-03

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: White Transportation Property
N: 1157560 **E:** 1120562
Drilling Date: Start: 10/12/2018 **End:** 10/12/2018

Surface Elevation (ft.): 492.2
Total Borehole Depth (ft.): 8.7
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
492.2 / 0	GP	1	48	31		Fill	Dry, black, fine to medium SAND and fine GRAVEL, trace silt, trace cinders, trace brick (SP-GP)	ENV: 0-2' Lead x2 at 0900
								ENV: 2-4' Lead at 0900
487.2 / 5	GP	2	48	34		Fill	Dry, gray, fine to coarse GRAVEL (GP)	ENV: 4-6' Lead at 0900
							Wet, brown, fine to medium SAND and fine to coarse GRAVEL (GP)	
						WR Silty Gravel	Dry, light brown, fine to coarse GRAVEL, little fine sand, little silt (GP)	ENV: 6-8' Lead at 0900
							Moist, black, fine to coarse GRAVEL and fine to medium SAND, some silt (GP-SM)	
	GP	3	8	8			Moist, brown, fine to medium SAND and Silty CLAY, some fine to coarse gravel (SC)	ENV: 8-8.7' Lead at 0900
							Dry, red, fine to coarse GRAVEL, some fine to coarse sand, little silt (Shale) (GP)	
482.2 / 10							Exploration terminated at 8.7 ft bgs (refusal).	
477.2 / 15								
472.2								

Sample Types

AS - Auger/Grab Sample	SH - Slide Hammer
CS - California Sampler	SS - Split Spoon
BQ - 1.5" Rock Core	ST - Shelby Tube
NQ - 2" Rock Core	WS - Wash Sample
	GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: WT-SB-03**

CDM Smith

Boring Number: SED-01A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158267 **E:** 1120266
Drilling Date: Start: 9/20/2018 **End:** 9/20/2018

River Elevation (ft.): 471.8
Mudline Elevation (ft.): 469.6
Total Borehole Depth (ft.): 2
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.8 0	SH	1	24	20		CGS	Top 4": Wet, brown, fine to coarse GRAVEL, some fine to coarse sand, little silt, trace shells, trace debris Bot 16": Wet, black, fine to coarse GRAVEL, some fine to coarse sand, trace silt, trace metal, trace debris (GP-SP)	Fabric layer encountered at mudline. CGS - Coarse-Grained Sediment Effort: Difficult ~~ENV: 0-0.5' PCB at 1030~~ ENV: 0.5-2' PCB at 1030 Oil sheen on bottom 16" of sample.
							Exploration terminated at 2.0 ft bml.	
466.8 5								
461.8 10								
456.8 15								
451.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-01A**

CDM Smith

Boring Number: SED-01B

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 115829 **E:** 1120247
Drilling Date: Start: 9/20/2018 **End:** 9/20/2018

River Elevation (ft.): 471.1
Mudline Elevation (ft.): 471.5
Total Borehole Depth (ft.): 3
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.1 0	SH	1	36	18		CGS	Top 5": Wet, black-brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt, trace glass, trace shells, trace debris (GP-SP) Middle 10": Wet, red-brown, CLAY and SILT, trace fine gravel, trace fine sand (CL-ML)	CGS - Coarse-Grained Sediment Effort: Moderate 0 to 2' bgs ENV: 0-0.5' PCBx2 at 0945 ENV: 0.5-2' PCB at 0945 Effort: Difficult (2-3' bml) ENV: 2-3' PCB at 0945
						WR	Bottom 3": Wet, red-brown to light brown, SILT, some fine to coarse gravel, trace fine sand (ML) [Weathered Rock] Exploration terminated at 3.0 ft bml (refusal).	
466.1 5								
461.1 10								
456.1 15								
451.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-01B**

CDM Smith

Boring Number: SED-02A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158328 **E:** 1120275
Drilling Date: Start: 9/20/2018 **End:** 9/20/2018

River Elevation (ft.): 472.1
Mudline Elevation (ft.): 471.1
Total Borehole Depth (ft.): 1
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
472.1 / 0	SH	1	12	12		CGS	Wet, brown-black, fine to coarse GRAVEL, some fine to coarse sand, trace silt, trace shells, trace metal, trace glass, trace debris (GP-SP)	CGS - Coarse-Grained Sediment ~~Effort: Difficult~~
							Exploration terminated at 1.0 ft bml.	ENV: 0-0.5' PCB at 0900 ENV= 0.5-1' PCB at 0900
467.1 / 5								
462.1 / 10								
457.1 / 15								
452.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-02A**

CDM Smith

Boring Number: SED-03A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158374 **E:** 1120238
Drilling Date: Start: 9/19/2018 **End:** 9/19/2018

River Elevation (ft.): 470.4
Mudline Elevation (ft.): 468.4
Total Borehole Depth (ft.): 2.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.4 0			30	20		CGS FGS	Top 6": Wet, gray, fine to coarse GRAVEL and SILT, little fine to coarse sand, trace brick, trace shells, trace debris (GM) Middle 10": Wet, red-brown, fine to coarse SAND and SILT, little fine gravel (SM)	CGS - Coarse-Grained Sediment Effort: Difficult ENV: 0-2' Leadx3, TCLP Lead at 1415
							Bottom 4": Wet, red-brown, SILT, little fine to medium sand, trace fine gravel (SM) Exploration terminated at 2.5 ft bml (refusal).	ENV: 1.5-2.5' Lead, TCLP Lead at 1415 (Bed)
465.4 5								
460.4 10								
455.4 15								
450.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-03A**

CDM Smith

Boring Number: SED-03B

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158430 **E:** 1120257
Drilling Date: Start: 9/19/2018 **End:** 9/19/2018

River Elevation (ft.): 470.4
Mudline Elevation (ft.): 468.4
Total Borehole Depth (ft.): 1.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.4 0	SH	1	18	12		CGS	Top 2": Wet, gray, fine to coarse GRAVEL, some silt, litle fine to coarse sand, trace brick, wood (GP) Bottom 10": Wet, black, fine to coarse GRAVEL, some silt, little fine to coarse sand, trace glass, trace metal, trace debris (GP) Exploration terminated at 1.5 ft bml (refusal).	~~CGS - Coarse-Grained~~ Sediment Effort: Difficult ENV: 0-0.5' PCB at 1340 ENV: 0.5-1.5' PCB at 1340 ENV: 0-1.5' Lead, TCLP Lead at 1340 ENV: 0.5-1.5' (Bed Sample) PCB, Lead, TCLP Lead at 1340 Debris visible on creek banks at ground surface
465.4 5								
460.4 10								
455.4 15								
450.4								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: SED-03B**

Boring Number: SED-03C

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158439 **E:** 1120229
Drilling Date: Start: 9/19/2018 **End:** 9/19/2018

River Elevation (ft.): 469.5
Mudline Elevation (ft.): 467
Total Borehole Depth (ft.): 1.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.5 0	SH	1	18	12		CGS	Top 6": Wet, brown, fine to coarse GRAVEL, trace shells Wet, black-brown, fine to coarse GRAVEL, little fine to coarse sand, trace silt, trace glass (GP) Wet, black-brown, fine to coarse GRAVEL, little fine to coarse sand, trace silt, trace glass (GP) Exploration terminated at 1.5 ft bml (refusal).	CGS - Coarse-Grained Sediment Effort: Difficult ENV: 0-1.5' TCLPx2, Leadx1 at 1215 ENV: 0.5-1.5' PCBx2, Leadx2, TCLP Leadx1 at 1215 Debris visible on crack banks at ground surface
464.5 5								
459.5 10								
454.5 15								
449.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-03C**

CDM Smith

Boring Number: SED-05A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159015 **E:** 1120019
Drilling Date: Start: 9/17/2018 **End:** 9/17/2018

River Elevation (ft.): 463
Mudline Elevation (ft.): 463.5
Total Borehole Depth (ft.): 5.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
463.0 0	SH	1	48	8		CGS	Top 4": Wet, brown, fine to coarse SAND, some fine to coarse gravel, trace silt, trace brick (SP-GP) Bottom 4": Wet, dark brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick (SP-GP)	CGS - Coarse-Grained Sediment Effort: Easy (0-5' bml) ENV: 0-0.5' PCB at 1500 ENV: 0.5-2' PCBx3 at 1500 ENV: 0-2' Lead, TCLP Lead at 1500 ENV: 2-4' TCLP Lead, Lead at 1500
458.0 5	SH	2	18	18		Org. FGS	Top 16": Wet, gray-brown, PEAT, some clayey silt, trace fine sand (Pt) Bottom 2": Wet, gray to red-brown, Silty CLAY, some fine to coarse gravel, trace fine to coarse sand (CL) Exploration terminated at 5.5 ft bml (refusal).	Org. FGS - Organic Fine-Grained Sediment ENV: 4.5-5.5' (BED) PCB, Lead, TCLP Lead at 1500 Effort: Moderate to difficult (5-5.5' bml)
453.0 10								
448.0 15								
443.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-05A**

CDM Smith

Boring Number: SED-06A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159091 **E:** 1120015
Drilling Date: Start: 9/17/2018 **End:** 9/17/2018

River Elevation (ft.): 464.6
Mudline Elevation (ft.): 463.9
Total Borehole Depth (ft.): 6.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
464.6 0	SH	1	48	20		Organic FGS	Top 4": Wet, dark brown, fine to coarse GRAVEL and fine to coarse SAND, little silt (GP-SP) Bottom 16": Wet, brown-green, PEAT, some silt, trace fine sand (organics fibrous) (Pt)	CGS - Coarse-Grained Sediment Effort: Easy (0-3' bml) ENV: 0-2' Lead, TCLP Lead at 1400 ENV: 2-4' Lead, TCLP Lead at 1400 Effort: Moderate (3-6' bml)
459.6 5	SH	2	30	24		CGS	Top 10": Wet, dark brown, fine to coarse SAND, some fine to coarse gravel, trace silt, trace shellls (SP) Middle 10": Wet, gray, Silty CLAY, trace fine sand, (mottled red-brown) (ML-CL) Bottom 4": Wet, red-brown, fine to coarse GRAVEL, some silt, little fine to coarse sand (GM)	ENV: 6-6.5' Lead, TCLP Lead at 1400 Effort: Difficult (6-6.5' bml)
454.6 10							Exploration terminated at 6.5 ft bml (refusal).	
449.6 15								
444.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-06A**

CDM Smith

Boring Number: SED-06B

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159139 **E:** 1120012
Drilling Date: Start: 9/17/2018 **End:** 9/17/2018

River Elevation (ft.): 464.3
Mudline Elevation (ft.): 463.9
Total Borehole Depth (ft.): 9
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
464.3 0	SH	1	48	24		Organic FGS	Top 12": Wet, dark brown, Slightly Organic Clayey SILT, little fine to medium sand, trace fine gravel (ML)	FGS - Fine-Grained Sediment Effort: Easy (0-4' bml) ENV: 0-2' TCLP Lead, lead at 1400 ENV: 2-4' TCLP Lead, Lead at 1400
						CGS	Bottom 6": Wet, gray, fine to coarse SAND and fine to coarse GRAVEL, little clayey silt, trace brick (SM-GM)	
459.3 5	SH	2	48	36		CGS	Top 12": Wet, gray, fine to coarse SAND and fine to coarse GRAVEL, little clayeysilt (SM-GM) trace brick	Effort: Moderate (4-7.5' bml)
						Organic FGS	Middle 22": Wet, dark brown-gray, Organic Clayey SILT, trace fine sand, trace fine gravel (Organics fibrous spongey Peat) (OL)	ENV: 6-6.5' (BED) Lead, TCLP Lead at 1400
	SH	3	12	10		CGS	Bottom 2": Wet, gray-brown, SILT & CLAY, trace fine sand (ML-CL) Top 4": Wet, gray-brown, SILT & CLAY, trace fine sand (ML-CL) Bottom 6": Wet, red-brown, fine to coarse GRAVEL, some clayey silt, trace fine sand (GM)	Effort: Difficult (7.5-9' bml) ENV: 8.5-9 TCLP Lead at 1200
454.3 10							Exploration terminated at 9.0 ft bml (refusal).	
449.3 15								
444.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-06B**

CDM Smith

Boring Number: SED-07A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer/Hand Auger
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159261 **E:** 1119884
Drilling Date: Start: 9/14/2018 **End:** 9/14/2018

River Elevation (ft.): NR
Mudline Elevation (ft.): 455.5
Total Borehole Depth (ft.): 5.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
0	SH	1	36	10		Organic FGS	Top 6": Wet, brown, Organic SILT, some fine to coarse gravel, little fine to coarse sand, trace brick, trace debris (SM) Wet, black-gray, Organic SILT, some fine to coarse gravel, little fine to coarse sand, trace brick, trace debris (SM)	FGS - Fine-Grained Sediment Effort: Easy (0-5.5' bml) ENV: 0-0.5' PCB at 1315 ENV: 0.5-2 PCBx2 at 1315
	AS	2	24	--			Wet, black-gray, Organic SILT, some fine to coarse gravel, little fine to coarse sand, trace brick, trace debris (SM)	ENV: 4.5-5.5' PCB at 1315
5	SH	3	6	0			Exploration terminated at 5.5 ft bml (refusal).	
10								
15								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-07A**

CDM Smith

Boring Number: SED-08A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: None
Core Size: NA in O.D.
Bore Hole Location: Creek Corridor
N: 1159150 **E:** 1119754
Drilling Date: Start: 9/17/2018 **End:** 9/17/2018

River Elevation (ft.): 461.9
Mudline Elevation (ft.): 459.4
Total Borehole Depth (ft.): 0
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
461.9 / 0							Turbulent waters. Unsafe to perform slide hammer exploration. Approximately 10'x10' slick, smooth area not penetrable. Possible exposed bedrock.	No ENV samples collected.
456.9 / 5								
451.9 / 10								
446.9 / 15								
441.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-08A**

CDM Smith

Boring Number: SED-08B

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159173 **E:** 1119744
Drilling Date: Start: 9/17/2018 **End:** 9/17/2018

River Elevation (ft.): 461.8
Mudline Elevation (ft.): 459.3
Total Borehole Depth (ft.): 1
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
461.8 / 0	SH	1	12	6		CGS	Wet, brown-dark brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt, trace brick, trace shells, trace glass (GP)	CGS - Coarse-Grained Sediment ~~Effort: Difficult~~
							Exploration terminated at 1.0 ft bml (refusal).	END: 0-1' Lead and LCLP Lead at 1000
456.8 / 5								
451.8 / 10								
446.8 / 15								
441.8								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: A. White | **Date: 2/15/2019** | **Boring Number: SED-08B**

CDM Smith

Boring Number: SED-09A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159381 **E:** 1119827
Drilling Date: Start: 9/14/2018 **End:** 9/14/2018

River Elevation (ft.): 454.3
Mudline Elevation (ft.): 454
Total Borehole Depth (ft.): 4
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
454.3 0	SH	1	36	24		CGS	Top 6": Wet, black, Slighly Organic SILT, some fine to medium sand, trace fine gravel (OL/ML) Bottom 16": Wet, black, fine to coarse GRAVEL and fine to coarse SAND, trace silt, trace metal/nails, trace debris (GP-SP)	Effort: Easy (0-0.5' bml) CGS- Coarse-Grained Sediment 2" Wood fragment 6" from top ENV: 0-2' TCLP Lead, Lead x2 at 1150 Effort: Moderate to difficult (0.5-4' bml)
	AS	2	12	--			Wet, gray-black, SILT & CLAY, little fine to coarse gravel, little fine to coarse sand (ML-CL) Exploration terminated at 4.0 ft bml.	ENV: 2-4' TCLP Lead, Lead at 1150 HA 3-4 ft ENV: 3.5-4 (BED) Lead, TCLP Lead at 1150
449.3 5								
444.3 10								
439.3 15								
434.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-09A**

CDM Smith

Boring Number: SED-09B

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159398 **E:** 1119795
Drilling Date: Start: 9/14/2018 **End:** 9/14/2018

River Elevation (ft.): 454.3
Mudline Elevation (ft.): 454.1
Total Borehole Depth (ft.): 3
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
454.3 0	SH	1	36	12		Organic CGS	Wet, gray-black, Slightly Organic fine to coarse GRAVEL, some silt, little fine to coarse sand, trace metal, trace debris (GM)	CGS - Coarse-Grained Sediment ENV: 0-2' Lead, TCLP Lead at 1100 ENV: 2-3' Leadx2, TCLP Leadx2 at 1100
							Exploration terminated at 3.0 ft bml.	
449.3 5								
444.3 10								
439.3 15								
434.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-09B**

CDM Smith

Boring Number: SED-10A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159478 **E:** 1119728
Drilling Date: Start: 9/14/2018 **End:** 9/14/2018

River Elevation (ft.): 454
Mudline Elevation (ft.): 453.9
Total Borehole Depth (ft.): 2.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
454.0 / 0	SH	1	30	21		Organic FGS	Top 14": Wet, gray-black, Slightly Organic SILT, little fine to medium sand, trace fine gravel, trace organic matter (ML/OL)	FGS- Fine-Grained Sediment Effort: Easy (0-2' bml) ENV: 0-0.5' PCB at 1030 ENV: 0.5-2' PCB at 1030
							Bottom 4": Wet, black, fine to coarse SAND and fine to coarse GRAVEL, trace silt, trace metal/nails, trace glass, trace debris (SP-GP)	ENV: 2-2.5 (BED) PCBx3 at 1030 Effort: Difficult (2-2.5' bml)
							Exploration terminated at 2.5 ft bml (refusal).	
449.0 / 5								
444.0 / 10								
439.0 / 15								
434.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-10A**

CDM Smith

Boring Number: SED-10B

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159510 **E:** 1119703
Drilling Date: Start: 9/14/2018 **End:** 9/14/2018

River Elevation (ft.): 453.4
Mudline Elevation (ft.): 453
Total Borehole Depth (ft.): 1.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
453.4 0	SH	1	18	10		Org. CGS	Top 5": Wet, black, Slightly Organic SILT, little fine to medium sand, trace fine gravel, trace wood (OL) Bottom 5": Wet, black, fine to coarse SAND and fine to coarse GRAVEL, trace silt, trace metal, trace brick, trace glass (SP-GP) Exploration terminated at 1.5 ft bml.	Effort: Easy (0-1' bml) ENV: 0-0.5' PCB at 1000 ENV: 0.5-1.5' PCBx2 (BED) at 1000 Effort: Difficult (1-1.5' bml) Petroleum odor CGS - Coarse-Grained Sediment
448.4 5								
443.4 10								
438.4 15								
433.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-10B**

CDM Smith

Boring Number: SED-G-01

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. Delude
Drilling Method: Hand Auger
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1157149 **E:** 1120118
Drilling Date: Start: 9/10/2018 **End:** 9/10/2018

River Elevation (ft.): 482.7
Mudline Elevation (ft.): 482.4
Total Borehole Depth (ft.): 4.9
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.7 0	AS	--				Fine-Grained Sediment	2" Shells Wet, gray-brown, fine to coarse GRAVEL and fine to coarse SAND, little silt, trace shells, (GP-SP) Wet, gray-brown, fine to coarse SAND and Clayey SILT, some fine to medium gravel, trace shells (SM) Wet, gray, Clayey SILT, little fine gravel, trace fine to medium sand, trace shells (ML-CL) Wet, gray-brown, fine to coarse SAND and Clayey SILT, some fine to medium gravel, trace shells (SM) Wet, gray, Clayey SILT, some fine to medium gravel, little fine to coarse sand, trace shells (ML-CL)	Effort: Easy (0-2.5' bml) Effort: Difficult (2.5-3.5' bml) Slight Organic Odor Effort: Very Easy (3.5-4.9' bml)
477.7 5							Exploration terminated at 4.9 ft bml.	Refusal at 2.7' bml on first attempt
472.7 10								
467.7 15								
462.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-01**

Boring Number: SED-G-02

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. Delude
Drilling Method: Hand Auger
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1157255 **E:** 1120152
Drilling Date: Start: 9/10/2018 **End:** 9/10/2018

River Elevation (ft.): 484.5
Mudline Elevation (ft.): 482
Total Borehole Depth (ft.): 3
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.5 0	AS	--				FGS	Wet, light brown, fine to coarse GRAVEL, some silt, little fine to medium sand, trace organics Wet, light brown, Clayey silt and fine to coarse GRAVEL, little fine to coarse sand, trace brick (GM) Wet, light brown, fine to coarse GRAVEL and Clayey SILT, trace fine to coarse sand (GM)	FGS - Fine-Grained Sediment Effort: Easy (0-3' bml)
479.5 5							Exploration terminated at 3.0 ft bml.	Hand auger at maximum depth due to higher creek elevation
474.5 10								
469.5 15								
464.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-02**

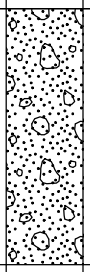
CDM Smith

Boring Number: SED-G-03

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. Delude
Drilling Method: Hand Auger
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1157335 **E:** 1120179
Drilling Date: Start: 9/10/2018 **End:** 9/10/2018

River Elevation (ft.): 481.4
Mudline Elevation (ft.): 481
Total Borehole Depth (ft.): 4.6
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
481.4 0	AS	--				Coarse-Grained Sediment	4" Cobbles and Brick Wet, gray-brown, fine to coarse GRAVEL and fine to coarse SAND, little silt, trace shells (GP-SP) Wet, gray-brown, fine to coarse GRAVEL and fine to coarse SAND, some silt (GP-SP)	Effort: Moderate (0-2.5' bml)
							Wet, gray-brown, fine to coarse GRAVEL, some silt, some fine to coarse sand (GM-SM)	Effort: Difficult (2.5-4.6' bml)
476.4 5							Exploration terminated at 4.6 ft bml (refusal).	
471.4 10								
466.4 15								
461.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-03**

CDM Smith

Boring Number: SED-G-04

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1157436 **E:** 1120225
Drilling Date: Start: 9/11/2018 **End:** 9/11/2018

River Elevation (ft.): 480.3
Mudline Elevation (ft.): 480
Total Borehole Depth (ft.): 5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
480.3 0	SH	1	48	--		Coarse-Grained Sediment	Wet, gray-brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt, trace shells, trace brick (GP) Wet, light brown, fine to coarse GRAVEL and fine to coarse SAND, little silt (GP-SP) Wet, light brown, fine to coarse GRAVEL, some fine to coarse sand, some clayey silt (GP-SM) Wet, gray-brown, fine to coarse GRAVEL and fine to coarse SAND, trace silts, trace shells, trace brick (GP-SP)	Effort: Moderate to difficult (0-5' bml)
475.3 5	SH	2	12	--			Exploration terminated at 5 ft bml.	
470.3 10								
465.3 15								
460.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-04**

CDM Smith

Boring Number: SED-G-05

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1157517 **E:** 1120256
Drilling Date: Start: 9/11/2018 **End:** 9/11/2018

River Elevation (ft.): 480.7
Mudline Elevation (ft.): 480
Total Borehole Depth (ft.): 5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
480.7 0	SH	1	48	--		CGS	Wet, gray-brown, fine to corase GRAVEL, some fine to coarse sand, trace silt, trace shells, trace brick (GP)	CGS - Coarse-Grained Sediment Effort: Easy (0-1' bml)
						FGS	Wet, light brown, Clayey SILT and fine to coarse gravel, little fine to coarse sand (GM)	FGS - Fine-Grained Sediment Effort : Medium (1-5' bml)
						Organic FGS	Wet, gray-brown, Slightly Organic Silty CLAY, trace fine to coarse sand (CL/OL) Wet, dark gray, Organic CLAY, trace fine sand (OH)	
	SH	2	12	--				
475.7 5							Exploration terminated at 5 feet bml.	Wood in shoe
470.7 10								
465.7 15								
460.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-05**

CDM Smith

Boring Number: SED-G-06

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1157661 **E:** 1120347
Drilling Date: Start: 9/11/2018 **End:** 9/11/2018

River Elevation (ft.): 480
Mudline Elevation (ft.): 479
Total Borehole Depth (ft.): 6
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
480.0 0	SH	1	48	--		CGS	Wet, light brown, fine-coarse GRAVEL, some fine to coarse sand, little shells, little silt, trace brick (GP) Wet, gray-brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt, trace shells (GP) Wet, gray-brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt, trace shells (GP)	CGS - Coarse-Grained Sediment Effort: Moderate (0-6' bml)
475.0 5	SH	2	24	--		FGS	Wet, dark gray, Organic Silty CLAY, trace fine sand (OL) [Organic Sediment] Wet, light brown, Silty CLAY, some fine to coarse gravel (CL) Exploration terminated at 6 ft bml (refusal).	FGS- FIne-Grained Sediment Effort: Difficult (at 6' bml) Rock fragments in spoon tip, red-brown, gray-brown
470.0 10								
465.0 15								
460.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-06**

CDM Smith

Boring Number: SED-G-07

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1157590 **E:** 1120485
Drilling Date: Start: 9/11/2018 **End:** 9/11/2018

River Elevation (ft.): 482
Mudline Elevation (ft.): 480.5
Total Borehole Depth (ft.): 5.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.0 0	SH	1	48	--		CGS	Wet, gray-brown, fine to coarse GRAVEL and SHELLS, little fine to coarse sand, trace silt, trace wood fragments, trace brick (GP)	CGS - Coarse-Grained Sediment Effort: Moderate (0-5.5' bml)
477.0 5	SH	2	18	--		Org. FGS	Wet, dark gray-brown, Slightly Organic fine to coarse GRAVEL and Silty CLAY, trace fine to coarse sand (OL/GC) Wet, dark gray-brown, Slightly Organic Silty Clay, some fine to coarse gravel, trace fine to coarse sand (OL/OH) Wet, gray-brown, Silty CLAY and fine to coarse GRAVEL, frag red-brown (CL) Exploration terminated at 5.5 feet bml (refusal).	FGS - Fine-Grained Sediment 2" rock fragment in tip (moderate HCl reaction) Effort: Difficult (at 5.5' bml)
472.0 10								
467.0 15								
462.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-07**

CDM Smith

Boring Number: SED-G-08

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1157772 **E:** 1120248
Drilling Date: Start: 9/12/2018 **End:** 9/12/2018

River Elevation (ft.): 478
Mudline Elevation (ft.): 477
Total Borehole Depth (ft.): 6.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
478.0 0	SH	1	48	--		CGS	Wet, gray-brown, fine to coarse GRAVEL and SHELLS, little fine to coarse sand, trace silt (GP) Wet, gray-black, fine to coarse GRAVEL and SHELLS, little fine to coarse sand, trace silt, trace debris (GP) Wet, red-brown-gray, fine to coarse GRAVEL, little clayey silt, little fine to coarse sand (GM) Wet, red-brown-gray, fine to coarse GRAVEL, little clayey silt, little fine to coarse sand (GM)	CGS - Coarse-Grained Sediment Effort: Moderate (0-1' bml) Effort: Difficult (1-4' bml)
473.0 5	SH	2	30	--		FGS	Wet, red-brown-gray, fine to coarse GRAVEL, little silty clay (GM) Wet, red-brown, Silty CLAY, trace fine sand, trace fine gravel (CH) Dry, red-brown, CLAY Exploration terminated at 6.5 ft bml (refusal).	Effort: Moderate (4-6' bml) Effort: Difficult (6-6.5' bml) Gray rock fragments in tip Refusal at 3.5' bml on first attempt
468.0 10								
463.0 15								
458.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-08**

CDM Smith

Boring Number: SED-G-10

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. Delude
Drilling Method: Tripod Drive
Core Size: 3 in O.D.
Bore Hole Location: Creek Corridor
N: 1157993 **E:** 1120267
Drilling Date: Start: 10/10/2018 **End:** 10/10/2018

River Elevation (ft.): 480.3
Mudline Elevation (ft.): 477.6
Total Borehole Depth (ft.): 3
Abandonment Method: NA
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
480.3 0	SS	S-1	33	10		Org. FGS	Wet, very soft, dark gray to black, Organic SILT, some fine to coarse sand, trace small shells and wood fragments (OL)	FGS - Fine-Grained Sediment Sample S-1 blow count: WOR/33" Sample S-1 settled to 2.7 ft bml under weight of rod. PID: 3.5 ppm
	SS	S-2	4	NR		WR	Wet, red-brown SILTSTONE chips in sampler tip Exploration terminated at 3.0 ft bml (refusal).	Granular material in upper 10 in predominantly as slag fragments. Sample S-2 blow count: 50/4" See SED-G-10A for additional descriptions.
475.3 5								
470.3 10								
465.3 15								
460.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-10**

CDM Smith

Boring Number: SED-G-10A

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. Delude
Drilling Method: Tripod Drive
Core Size: 3 in O.D.
Bore Hole Location: Creek Corridor
N: **E:**
Drilling Date: Start: 10/10/2018 **End:** 10/10/2018

River Elevation (ft.): 480.3
Mudline Elevation (ft.): 477.6
Total Borehole Depth (ft.): 3.1
Abandonment Method: NA
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
480.3 0	SS	S-1	33	10		Org. FGS	Wet, very soft, dark gray and black, Organic SILT, some fine to coarse sand, trace small shells, trace wood (OL) [Organic Sediment]	FGS - Fine-Grained Sediment Sample S-1 blow count: WOR/33" PID: 4.7 ppm Coarse sand in upper 10 in is predominately slag.
	SS	S-2	4	NR		WR	Moderately hard, red-brown, moderately weathered, fine-grained, SILTSTONE	Sample S-2 blow count: 50/4"
▼							Exploration terminated at 3.1 ft bgs (refusal).	
475.3 5								
470.3 10								
465.3 15								
460.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-10A**

CDM Smith

Boring Number: SED-G-13

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158357 **E:** 1120254
Drilling Date: Start: 9/19/2018 **End:** 9/19/2018

River Elevation (ft.): 468.9
Mudline Elevation (ft.): 466.9
Total Borehole Depth (ft.): 1.5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
468.9 0	SH	1	18	12		FGS CGS	Top 8": Wet, gray-brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt, trace shells (GP-SP) Bot 8": Wet, red-brown, Clayey SILT, some fine to coarse gravel, trace fine to medium sand (GM) Exploration terminated at 1.5 ft bgs (refusal).	CGS - Coarse-Grained Sediment Effort: Difficult (0-1.5' bml) FGS - Fine-Grained Sediment Dolostone fragments in tip, white-red-brown.
463.9 5								
458.9 10								
453.9 15								
448.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-13**

CDM Smith

Boring Number: SED-G-14

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158456 **E:** 1120238
Drilling Date: Start: 9/13/2018 **End:** 9/13/2018

River Elevation (ft.): 467.4
Mudline Elevation (ft.): 466.4
Total Borehole Depth (ft.): 5.6
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
467.4 0	SH	1	48	--		CGS	Wet, brown-black-gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt, trace glass, trace concrete (GP) Wet, black, fine to coarse GRAVEL and fine to coarse SAND, little slag, trace silt, trace glass, trace concrete (GP)	CGS - Coarse-Grained Sediment Effort: Difficult (0-5.6' bml)
						Org. FGS	Wet, gray, Slightly Organic Clayey SILT, some fine to coarse gravel, trace fine sand (ML)	FGS - Fine-Grained Sediment
462.4 5	SH	2	19	--		FGS	Wet, red-brown, SILT and fine to coarse GRAVEL, some fine to coarse sand (GM-SM)	
							Exploration terminated at 5.6 ft bml (refusal).	Refusal at 1' bml on first and second attempts
457.4 10								
452.4 15								
447.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-14**

CDM Smith

Boring Number: SED-G-15

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158551 **E:** 1120203
Drilling Date: Start: 9/12/2018 **End:** 9/12/2018

River Elevation (ft.): 465.8
Mudline Elevation (ft.): 465.1
Total Borehole Depth (ft.): 5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
465.8 / 0	SH	1	48	--		Coarse-Grained Sediment	Wet, gray-blackm fine to coarse GRAVEL, little fine to coarse sand, little fine to coarse silt, trace brick, trace glass (GP)	Effort: Moderate (0-2.5' bml)
							Wet, gray, fine to coarse GRAVEL, little clayey silt, little fine to coarse sand (GP-GM)	Effort: Difficult (2.5-5' bml) 1" Gravel piece in tip
460.8 / 5	SH	2	12	--			Wet, gray, fine to coarse GRAVEL, little clayey silt, little fine to coarse sand (GP-GM)	2" rock in tip, red-brown
							Exploration terminated at 5 ft bml (refusal).	
455.8 / 10								
450.8 / 15								
445.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-15**

CDM Smith

Boring Number: SED-G-16

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158614 **E:** 1120188
Drilling Date: Start: 9/12/2018 **End:** 9/12/2018

River Elevation (ft.): 465.1
Mudline Elevation (ft.): 464.1
Total Borehole Depth (ft.): 5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
465.1 0	SH	1	48	--		Coarse-Grained Sediment	Wet, black, fine to coarse GRAVEL, some fine to coarse sand, little silt, trace brick, trace concrete, trace shells, little slag (GP) Wet, gray, fine to coarse GRAVEL, little clayey silt, little fine to coarse sand (GP)	Effort: Moderate (0-2' bml)
	SH	2	12	--			Wet, gray, fine to coarse GRAVEL, some clayey silt, little fine to coarse sand, trace wood (GM) Wet, gray, fine to coarse GRAVEL, some clayey silt, little fine to coarse sand (GM)	Effort: Difficult (2-5' bml) Mottled red-brown clayey silt at ~3.5-4 ft
460.1 5							Exploration terminated at 5.0 ft bml (refusal).	Refusal at 3' bml on first attempt
455.1 10								
450.1 15								
445.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-16**

CDM Smith

Boring Number: SED-G-17

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158842 **E:** 1120119
Drilling Date: Start: 9/12/2018 **End:** 9/12/2018

River Elevation (ft.): 465
Mudline Elevation (ft.): 463
Total Borehole Depth (ft.): 5
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
465.0 / 0	SH	1	48	--		CGS	Wet, dark brown-black, fine to coarse SAND and fine to coarse GRAVEL, trace silt, trace shells, trace wood, trace slag (SP-GP)	CGS - Coarse-Grained Sediment ~~Effort: Difficult (0-1' bml)~~
						Org. FGS	Wet, gray-brown, PEAT, some silty clay, trace fine sand (Pt) (organics, fibrous/spongey)	Effort: Moderate (1-5' bml) strong organic odor
							Wet, gray, Slightly Organic, fine to coarse SAND, some fine to coarse gravel, some clayey silt, trace wood, trace brick (SM-GM)	FGS - Fine Grained Sediment
	SH	2	12	--		CGS	Wet, gray, fine to coarse GRAVEL and fine to coarse SAND, some clayey silt (GM-SM)	
460.0 / 5							Wet, gray-red-brown, fine to coarse GRAVEL and CLAY	~~Effort: Difficult (at 5' bml)~~
							Terminated at 5.0 ft bml (refusal)	Auger refusal
455.0 / 10								
450.0 / 15								
445.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-17**

CDM Smith

Boring Number: SED-G-18

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1158937 **E:** 1120065
Drilling Date: Start: 9/12/2018 **End:** 9/12/2018

River Elevation (ft.): 464
Mudline Elevation (ft.): 463
Total Borehole Depth (ft.): 7
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
464.0 / 0						CGS	Wet, gray-brown, fine to coarse SAND and fine to coarse GRAVEL, some shells, trace silt, trace glass, trace birck (GP-SP)	CGS- Coarse-Grianed Sediment ~~Effort: Moderate (0-1' bml)~~
	SH	1	36	--		Organic FGS	Wet, dark gray-gray, PEAT, some silt and clay, trace fine sands (Pt)	FGS - Fine-Grained Sediment Effort: Easy (1-5' bml)
							Wet, dark gray-gray, PEAT, some silt and clay, trace fine sand (Pt)	
459.0 / 5	SH	2	36	--		FGS	Wet, gray mottled red-brown, Silty CLAY, trace fine sand (CH)	Effort: Moderate (5-6.5' bml)
							Dry, red-brown, Clayey SILT, some fine to coarse gravel, trace fine to medium sand (ML)	Effort: Difficult (6.5-7' bml) ~~Rock fragments found in tip~~
							Terminated at 7.0 ft bml (refusal)	Auger refusal
454.0 / 10								
449.0 / 15								
444.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-18**

CDM Smith

Boring Number: SED-G-19

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159094 **E:** 1119967
Drilling Date: Start: 9/12/2018 **End:** 9/12/2018

River Elevation (ft.): 464.1
Mudline Elevation (ft.): 463.1
Total Borehole Depth (ft.): 7
Abandonment Method: NA
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
464.1 0	SH	1	48	--		Organic FGS	Wet, gray, Organic CLAY, trace fine sand, trace fine gravel (OH) (organics-slightly fibrous) Wet, gray, Organic CLAY, trace fine sand, trace fine gravel, wood fragments (OH) (organics-slightly fibrous) Wet, gray, Organic CLAY, little fine to medium sand (OH) (organics-fibrous, spongey)	Effort: Easy (0-5.5' bml) FGS - Fine-Grained Sediment
459.1 5	SH	2	36	--		Organic FGS FGS	Wet, gray, Organic CLAY, little fine to medium sand (OH) (organics-fibrous, spongey) Wet, gray-red-brown, CLAY, trace fine gravel, trace fine sand (CH) Wet, red-brown, CLAY, little fine to coarse gravel, trace sand (CH)	Effort: Moderate to difficult (5.5-7' bml) Rock fragments in the tip, red-brown
454.1 10							Terminated at 7.0 ft bml (refusal)	
449.1 15								
444.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: A. White **Date: 2/15/2019** **Boring Number: SED-G-19**

CDM Smith

Boring Number: 198-GEO-01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 481
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 23.6
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):
Bore Hole Location: Former Flintkote Property - 198 Parcel

Depth	Date	Time
NE		

N: 1158971 **E:** 1120146
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/24/2018 **End:** 9/24/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
481.0 0	SS	S-1	24	4 8 8 9	18	16		Upper Sand & Silt	Moist, medium dense, dark brown, fine to medium SAND, some silt, some fine to coarse gravel, trace brick, trace slag fragments, trace organics (roots) (SM)	PID= <0.1 ppm
	SS	S-2	24	6 5 5 5	10	10			Moist, medium dense, dark brown, fine to coarse SAND, some silt, some fine to coarse gravel, trace brick, trace slag fragments (SM)	PID= <0.1 ppm
476.0 5	SS	S-3	24	6 6 8 3	7	14			Moist, medium dense, dark brown, fine to coarse SAND, some silt, some fine to coarse gravel, trace brick, trace slag fragments (SM)	PID= 0.2 ppm Sample S-3 slight HCl reaction, Collected 3" split spoon sample for soil classification.
	SS	S-4	24	3 2 4 4	16	6			Moist, loose, red-brown to brown, fine to coarse SAND and fine GRAVEL, trace brick, trace silt (SP-SM)	PID= <0.1 ppm
	SS	S-5	24	1 1 WOH 3	9	1			Moist, very loose, red-brown to brown, fine to coarse SAND and fine GRAVEL, trace silt, abundant slag fragments (SP-SM)	PID= <0.1 ppm Sample S-5 collected 3" split spoon sample for soil classification.
471.0 10	SS	S-6	24	1 1 2 3	8	3			Moist, very loose, brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace brick fragments (SM)	PID= <0.1 ppm
	SS	S-7	24	6 10 10 12	21	20			Top 14": Moist, medium dense, brown, fine to medium SAND, little gravel, trace brick (SP) Bottom 7": Moist, medium dense, red-brown, fine to medium SAND, some silt, some fine to coarse gravel (SM)	PID= 4.5 ppm Sample S-7 moderate HCl reaction. Inconsistent rig chatter from 12 to 16 ft bgs.
466.0 15	SS	S-8	24	12 6 6 6	11	12			Top 5": Moist, medium dense, red-brown, fine to medium SAND, some silt, some fine to coarse gravel (SM) Bottom 6": Moist, stiff, red-brown, SILT and fine SAND, little fine gravel (ML)	PID= <0.1 ppm Sample S-8 bottom Gravel rounded to subrounded
								Lower Silt & Clay		
461.0	SS	S-9	24	6 12	17	37			Moist, hard, red-brown, SILT, little fine to coarse gravel, little fine to coarse sand (ML)	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: 198-GEO-01**

CDM Smith

Boring Number: 198-GEO-01

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
461.0 / 20	SS	S-9	24	25 50	17	37				PID= <0.1 ppm Sample S-9 moderate HCl reaction. Rig chatter from 22 to 23 ft bgs.
								WR	No recovery	
	SS	S-10	1	50/1"	0	>50				
456.0 / 25									Exploration terminated at 23.6 ft bgs.	Auger refusal at 23.5 ft bgs at 1000 psi (max down pressure).
451.0 / 30										
446.0 / 35										
441.0 / 40										
436.0 / 45										

BL 18 MILE CREEK UPLAND BORINGS.GPJ - 8/30/19

CDM Smith

Boring Number: 300-GEO-01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 470.9
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 19.1
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
11.5	9/13/2018	1330

Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159190 **E:** 1119926
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/13/2018 **End:** 9/13/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
470.9 0	SS	S-1	24	2 3 5 5	18	8		Upper Sand & Silt	Moist, loose, brown and gray-brown, fine to medium SAND, some silt, little fine to coarse gravel, trace medium sand sized slag, trace small shells (SM)	PID= 0 ppm
	SS	S-2	24	5 5 4 4	12	9			Moist, loose, brown to red-brown, fine to coarse SAND, some silt, some fine to coarse gravel, trace slag (SM)	PID= 0 ppm
465.9 5	SS	S-3	24	5 4 5 5	10	9			Top 8": Moist, loose, light red-brown to light brown, fine SAND and SILT, trace fine gravel (SM) Bottom 2": Dry, light red-brown to brown , fine to coarse GRAVEL, little fine to coarse sand, trace silt (GP-GM)	PID= 0.1 ppm PID= 0.1 ppm
	SS	S-4	24	9 7 9 6	7	16			Dry, medium dense, red-brown, fine to coarse GRAVEL, little fine to coarse sand, trace silt (GP-GM)	Heavy rig chatter 6 to 7 ft bgs. PID= 0.1 ppm
	SS	S-5	24	2 5 7 5	9	12		Lower Silt & Clay	Moist to wet, stiff, brown to red-brown, CLAY & SILT, some fine to coarse sand, little fine to coarse gravel (CL)	
460.9 10	SS	S-6	24	1 4 5 3	12	9			Wet, stiff, brown and light brown, CLAY & SILT, some fine to coarse sand, little fine to coarse gravel (CL)	PID= 0.1 ppm
	SS	S-7	24	1 1 2 9	11	3			Wet, soft, gray-brown, CLAY & SILT, some fine to coarse sand, little fine to coarse gravel (CL)	PID= 0.1 ppm
455.9 15	SS	S-8	24	1 1 1 3	18	2			Top 6": Wet, soft, gray-brown, CLAY & SILT, some fine to coarse sand, little fine to coarse gravel (CL) Middle 6": Wet, soft, dark gray-brown, Organic SILT and fine to medium SAND, trace fine gravel (SC/OL) [Organic Soils]	PID= 0.5 ppm Heavy rig chatter 15.5 to 19.1 ft bgs.
								Lower Silt & Clay	Bottom 6": Wet, soft, red-brown, CLAY & SILT, some fine sand (CL)	
	SS	S-9	1	50/1"	1	>50		WR	Moderately hard to hard, slightly weathered, red-brown, fine-grained, SILTSTONE; bedding thin to very thin	PID= 0.1 ppm
450.9										Auger refusal at

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: 300-GEO-01**

Boring Number: 300-GEO-01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
450.9 / 20									Exploration terminated at 19.1 ft bgs.	19.1 bgs.
445.9 / 25										
440.9 / 30										
435.9 / 35										
430.9 / 40										
425.9 / 45										

BL 18 MILE CREEK UPLAND BORINGS.GPJ - 8/30/19

CDM Smith

Boring Number: 300-GEO-02

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 472.1
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 10.25
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/12/2018	1545

Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159272 **E:** 1119788
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/12/2018 **End:** 9/12/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
472.1 0	SS	S-1	24	2 2 4 5	14	6		Topsoil	12" Topsoil	PID= <0.1 ppm
								Upper Sand & Silt	Moist, loose, brown, fine to coarse SAND and SILT, some fine to coarse gravel, some slag (SM)	Sample S-1 gravel is angular and subangular. PID= <0.1 ppm
	SS	S-2	24	4 5 5 5	16	10			Top 11": Moist, loose, brown, fine to coarse SAND, some fine to coarse gravel, some slag, some coal (SP) Bottom 5": Black, fine to coarse sand-sized COAL (SP)	
467.1 5	SS	S-3	24	4 3 4 5	14	7			Moist, loose, brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace organics (roots) (SM)	PID= 0.1 ppm
	SS	S-4	24	5 12 10 11	15	22			Top 10": Moist, medium dense, fine to coarse SAND, little silt, little fine to coarse gravel, trace slag (SM)	PID= <0.1 ppm Slight HCl reaction.
	SS	S-5	15	6 10 50/3"	15	>50			Bottom 5": Moist, hard, red-brown, SILT and fine to coarse SAND, little fine gravel (SC) Moist, hard, red-brown, SILT and fine to coarse SAND, little fine to coarse gravel (SC) [Lower Silt & Clay]	PID= <0.1 ppm Sample S-5 slight HCl reaction. Rig chatter 8.75-9.25 ft bgs.
462.1 10	SS	S-6	3	50/3"	1	>50		WR	Moderately hard to hard, slightly weathered, red-brown, fine-grained, SILTSTONE; bedding thin to very thin Exploration terminated at 10.25 ft bgs.	PID= <0.1 ppm Max drilling down pressure in S-6 was 1000psi; grinding on flat surface. No HCl reaction with S-6 material. Siltstone fractures as disks along bedding. Auger refusal at 10.25 ft bgs.
457.1 15										
452.1										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: 300-GEO-02**

CDM Smith

Boring Number: 300-GEO-03

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 471.5
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 11.5
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):
Bore Hole Location: Former Flintkote Property - 300 Parcel

Depth	Date	Time
NE		

N: 1159315 **E:** 1119932
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/18/2018 **End:** 9/18/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
471.5 0	SS	S-1	24	6 6 8 6	13	14		Upper Sand & Silt	Moist, medium dense, brown, fine to medium SAND, some silt, little fine to coarse gravel (SM)	PID= <0.1 ppm Samples S-1 through S-3 gravel is angular.
	SS	S-2	24	15 21 32 21	18	53			Moist, very dense, gray and brown, fine to coarse GRAVEL, some fine to coarse sand, some silt, trace brick fragments (GM)	PID= 0.2 ppm
466.5 5	SS	S-3	24	18 21 22 18	20	43			Moist, dense, brown, fine to coarse GRAVEL, some fine to coarse sand, some silt, trace brick (GM)	PID= <0.1 ppm
	SS	S-4	24	17 14 11 8	5	25			Moist, medium dense, brown, fine to coarse SAND, some fine to coarse gravel (as concrete fragments) (SP)	PID= <0.1 ppm (Heavy chatter).
	SS	S-5	24	7 10 18 13	4	28			Moist, medium dense, red-brown, fine to coarse SAND and SILT, some fine to coarse gravel, trace brick (SM)	PID= <0.1 ppm Drilling becomes smoother at 9 ft bgs.
461.5 10	SS	S-6	14	13 49 50/2"	14	>50		WR	Moist, very dense, light red-brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt (GP-GM)	PID= <0.1 ppm Sample S-6 gravel sub-rounded.
									Moderately hard, moderately weathered, red-brown, fine-grained, SILTSTONE; bedding very thin Exploration terminated at 11.5 ft bgs.	Auger refusal at 11.5 ft bgs. Driller stated auger grinding on a flat surface with max down-pressure of 1000 psi.
456.5 15										
451.5										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: M. Passaro
Date: 2/14/2019
Boring Number: 300-GEO-03

CDM Smith

Boring Number: 300-GEO-04

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 465.5
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 7.5
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/12/2018	1050

Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159377 **E:** 1119744
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/12/2018 **End:** 9/12/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
465.5 0	SS	S-1	24	1 3 4 9	9	7		Upper Sand & Silt	Moist, slightly loose, brown, fine to coarse SAND and fine to coarse GRAVEL, some silt, little organics (roots, wood chips) (SP-GP)	PID= <0.1 ppm
	SS	S-2	24	10 8 14 10	13	22			Moist, medium dense, red-brown, fine to coarse GRAVEL, some fine to coarse sand, little silt, trace slag (GM)	PID= <0.1 ppm Heavy rig chatter 3 to 4 ft bgs. Sample S-2 gravel is angular.
460.5 5	SS	S-3	24	18 32 6 3	20	38			Moist, dense, red-brown, fine to coarse SAND, some silt, some fine to coarse gravel (SM)	PID= 0.3 ppm Sample S-3 gravel is angular slag and siltstone.
	SS	S-4	15	5 7 50/3"	12	>50		WR	Moist, very dense, red-brown, fine to coarse GRAVEL, some fine to medium sand, little silt, trace coarse sand-sized slag (GM)	PID= 0.1 ppm
									Moderately hard to hard, slightly weathered, red-brown, fine-grained, SILTSTONE; extremely thin to very thin bedding Exploration terminated at 7.5 ft bgs and offset 6 ft to 300-GEO-04A.	Auger refusal at 7.5 ft bgs. At 7.25-7.5 ft heavy rig chatter, driller used full down pressure at auger refusal (1000psi). Driller stated grinding on a flat surface.
455.5 10										
450.5 15										
445.5										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: 300-GEO-04**

CDM Smith

Boring Number: 300-GEO-04A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 465.9
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 10.1
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/12/2018	1220

Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159373 **E:** 1119748
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/12/2018 **End:** 9/12/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
465.9 0									Drilled ahead to 8.0 ft bgs. See 300-GEO-04 log for descriptions 0 to 7.5 ft bgs.	
460.9 5										
	SS	S-1	2	50/2"	2	>50		Weathered Rock	Moderately hard to hard, slightly weathered, red-brown, fine-grained, SILTSTONE, bedding thin to very thin	PID= <0.1 ppm Rig down pressure at 1000psi. Samples S-1 and S-2 none to slight HCl reaction.
455.9 10	SS	S-2	1	50/1"	1	>50			Moderately hard to hard, slightly weathered, red-brown, fine-grained, SILTSTONE; bedding thin to very thin Exploration terminated at 10.1 ft bgs.	PID= <0.1 ppm Auger refusal at 10.1 ft bgs.
450.9 15										
445.9										

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	HP - Hydro Punch SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: M. Passaro | **Date: 2/14/2019** | **Boring Number: 300-GEO-04A**

CDM Smith

Boring Number: 300-GEO-05

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 484.5
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 26.1
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/18/2018	

Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159604 **E:** 1119761
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/18/2018 **End:** 9/18/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
484.5 0	SS	S-1	24	2 2 3 7	17	5		Upper Sand & Silt	Moist, loose, dark brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, little slag, trace roots (SM)	PID= <0.1 ppm
	SS	S-2	24	3 2 3 1	18	5			Moist, loose, dark brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, little slag, trace roots (SM)	PID= <0.1 ppm
479.5 5	SS	S-3	24	2 2 2 1	NR	4			Moist, loose, dark brown, fine to coarse SAND, some slag, little silt, little fine to coarse gravel, trace brick(SM)	PID= <0.1 ppm
	SS	S-4	24	1 1 1 1	19	2			Moist, very loose, dark brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace roots (SP-SM)	PID= <0.1 ppm NR - not recorded
	SS	S-5	24	1 1 1 2	19	2			Moist, very loose, dark brown, fine to coarse SAND, some fine to coarse gravel, little fine silt, trace roots (SP-SM)	PID= <0.1 ppm
474.5 10	SS	S-6	24	4 3 1 1	17	4			Moist, loose, dark brown, fine to coarse SAND, some fine to coarse gravel, some slag, trace brick (SP-SM)	PID= <0.1 ppm
	SS	S-7	24	1 1 1 1	14	2			Moist, very loose, dark brown, fine to coarse SAND and fine GRAVEL, some slag, little silt, trace roots, trace brick (SP-SM)	PID= <0.1 ppm
469.5 15	SS	S-8	24	1 1 1 1	10	2			Moist, very loose, dark brown, fine to coarse SAND and fine GRAVEL, some slag, little silt, trace roots, trace brick (SP-SM)	PID= <0.1 ppm
	SS	S-9	24	2 1 1 1	10	2			Moist, very loose, dark brown, fine to coarse SAND and fine GRAVEL, some slag, litlle silt, trace roots, trace brick (SP-SM)	PID= <0.1 ppm
464.5	SS	S-10	24	2 3 2 1	14	5			Moist, loose, dark brown, fine to coarse SAND and fine GRAVEL, little slag, little silt, trace roots, trace dolostone fragments (SP)	PID= <0.1 ppm Sample S-10 Slight HCl reaction

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: 300-GEO-05**

CDM Smith

Boring Number: 300-GEO-05

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
464.5 / 20										
	SS	S-11	14	3 8 50/2"	12	>50		WR	Moist, very dense, red-brown, fine to coarse GRAVEL, some clay & silt, little fine to coarse sand (GC)	Increased drilling resistance, driller states bit grinding. PID= <0.1 ppm Sample S-11 slight HCl reaction.
459.5 / 25										
	SS	S-12	1	50/1"	1	>50			Medium hard, moderately weathered, red-brown, fine-grained, SILTSTONE; bedding thin	Sample S-12 no HCl reaction.
									Exploration terminated at 26.1 ft bgs.	
454.5 / 30										
449.5 / 35										
444.5 / 40										
439.5 / 45										

BL 18 MILE CREEK UPLAND BORINGS.GPJ - 8/30/19

CDM Smith

Boring Number: UPB-GEO-01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 483
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 12.5
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
6.5	9/17/2018	1000

Bore Hole Location: Former United Paperboard Property
N: 1158132 **E:** 1120224
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/14/2018 **End:** 9/14/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
483.0 0	SS	S-1	24	2 1 1 1	14	2		Upper Sand & Silt	Moist, very loose, brown, fine to medium SAND, some silt, some fine to coarse gravel, some organics (roots), trace slag, trace small shells (SM)	PID= <0.1 ppm
	SS	S-2	24	2 1 1 4	13	2			Moist, very loose, brown, fine to medium SAND, some silt, some fine to coarse gravel, some organics (roots), trace slag, trace small shells (SM)	PID= 0.1 ppm
478.0 5	SS	S-3	24	2 2 2 2	7	4		Peat	Wet, soft, brown, PEAT, some fine to coarse sand, some silt, trace fine gravel (Pt)	PID= 1.3 ppm
▼	SS	S-4	24	1 1 1 1	24	2			Top 14": Wet, soft, brown, PEAT, some fine to coarse sand, some silt, trace fine gravel (Pt)	PID= 1.3 ppm
								Organic Clay	Bottom 10": Wet, soft, gray, Organic Silty CLAY, some fine to medium sand (OH)	
	SS	S-5	24	WOH WOH WOH WOH	22	0			Wet, very soft, gray, Organic Silty CLAY, some fine to medium sand (OH)	PID= 1.3 ppm
473.0 10	SS	S-6	24	WOH WOH 3 8	8	3		Peat	Wet, soft, brown, PEAT, some silt, some fine to coarse sand (Pt- fibrous)	PID= 0.1 ppm Organic odor.
									Wet, soft, gray, Organic SILT, some fine to medium sand (OL) [Organic Clay]	
	SS	S-7	6	25 50/0"	6	>50		WR	Bottom 2": Moderately hard to hard, red-brown, fine-grained SILTSTONE, bedding very thin.	PID= 0.1 ppm No HCl reaction.
468.0 15									Exploration terminated at 12.5 ft bgs. Boring location offset 3.8 feet northeast to retrieve undisturbed sample. Refer to UPB-GEO-01A for additional information.	Auger refusal at 12.5 ft bgs. Auger down pressure at refusal was 1000 psi.
463.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: UPB-GEO-01**

CDM Smith

Boring Number: UPB-GEO-01A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 483
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 9.5
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
6.5	9/17/2018	1000

Bore Hole Location: Former United Paperboard Property
N: 1158130 **E:** 1120222
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/17/2018 **End:** 9/17/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
483.0 0									See UPB-GEO-01 log for description from 0 to 7 ft bgs. Drilled ahead to 7 ft bgs.	Water level measured in adjacent borehole UPB-GEO-01. Borehole conducted for shelby tube collection.
478.0 5										
	ST	U-1	30	PUSH	21	NA		Organic Clay	Moist, brown-gray to gray, Organic Silty CLAY, little fine to medium sand, trace roots (OH)	PID= <0.1 ppm Pocket penetrometer: 0.16 tsf Torvane: 0.11 tsf
473.0 10									Exploration terminated at 9.5 ft bgs.	
468.0 15										
463.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: UPB-GEO-01A**

CDM Smith

Boring Number: UPB-GEO-02

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 474
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 9.5
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
5.8	9/14/2018	950

Bore Hole Location: Former United Paperboard Property
N: 1158304 **E:** 1120196
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/14/2018 **End:** 9/14/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
474.0 0	SS	S-1	24	2 1 1 3	--	2		Upper Sand & Silt	Top 11": Topsoil Middle 10": Moist, very loose, brown, fine to medium SAND, some silt, little organics roots (SM) Bottom 2": Moist, very loose, brown, fine to coarse SAND, little silt, little slag, little metal fragments (SM)	PID= <0.1 ppm
	SS	S-2	24	2 2 2 2	14	4			Top 2": Moist, loose, brown, fine to coarse SAND, little silt, little slag, little metal fragments (SM)	PID= <0.1 ppm
469.0 5	SS	S-3	24	2 3 9 28	19	12		Lower Silt & Clay	Bottom 2": Moist, brown, Silty CLAY, little fine sand, trace fine gravel (CL) Moist, stiff, brown and gray brown, CLAY, little fine to coarse sand, trace gravel (CH)	PID= <0.1 ppm Sample S-3 Siltstone fragments in shoe.
	SS	S-4	24	7 5 3 6	12	8			Wet to moist, stiff, red-brown, SILT & CLAY, some fine to medium sand, trace fine gravel (CL)	PID= 0.1 ppm Weathered siltstone
	SS	S-5	14	8 16 50/2"	12	>50			Moist, hard, red-brown, SILT & CLAY, little fine to medium sand, little fine gravel (weathered angular to sub-angular gravel) (CL)	PID= <0.1 ppm
								WR	Hard, moderately to slightly weathered, red-brown, fine-grained, SILTSTONE; bedding very thin	
464.0 10									Exploration terminated at 9.5 ft bgs.	Auger refusal at 9.5 ft bgs with 1000 psi down pressure.
459.0 15										
454.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: UPB-GEO-02**

CDM Smith

Boring Number: UPB-GEO-03

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 487
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 38.1
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
37	9/19/2018	1400

Bore Hole Location: Former United Paperboard Property
N: 1158394 **E:** 1120307
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/19/2018 **End:** 9/19/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
487.0 0	SS	S-1	24	6 10 11 11	19	21		Upper Sand & Silt	Moist, very stiff, brown, SILT, some fine to coarse sand, some fine to coarse gravel, trace organics (roots), trace brick (ML)	PID= <0.1 ppm
	SS	S-2	24	17 14 11 11	21	25			Moist, very stiff, brown to dark brown, SILT, some fine to coarse sand, some fine to coarse gravel, trace organics (roots), trace brick, trace slag (ML)	PID= <0.1 ppm
482.0 5	SS	S-3	24	7 9 7 8	24	16			Moist, very stiff, stratified brown to dark brown, SILT, some fine to coarse sand, some fine to coarse gravel, trace organics (roots), trace brick, trace slag (ML)	PID= <0.1 ppm
	SS	S-4	24	31 21 17 15	24	38			Moist, hard, brown, SILT, some fine to coarse sand, some fine to coarse gravel (ML)	PID= <0.1 ppm Sample S-4 slight HCl reaction.
	SS	S-5	24	11 13 14 15	16	27			Moist, very stiff, brown, SILT, some fine to coarse sand, some fine to coarse gravel, trace slag (ML)	
477.0 10	SS	S-6	24	29 17 19 22	22	36			Top 10" (A): Moist, hard, brown, SILT, some fine to coarse sand, some fine to coarse gravel (angular to sub-angular), trace slag (ML) Bottom 12"(B): Moist, dense, brown, fine to coarse SAND, some fine to coarse gravel, trace slag (SP)	PID= <0.1 ppm
	SS	S-7	24	22 15 13 12	11	28			Moist, medium dense, brown, fine to coarse SAND, some fine to coarse gravel, trace slag (SP)	PID= <0.1 ppm
472.0 15	SS	S-8	24	6 1 2 14	17	3			Moist, very loose, brown and gray-brown, fine to coarse SAND, some silt, some fine to coarse gravel, trace slag, trace brick (SP)	PID= <0.1 ppm
467.0	SS	S-9	24	WOH WOH	9	0			Wet, very soft, brown, CLAY & SILT, some fine to coarse sand, little fine gravel (CL)	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: UPB-GEO-03**

CDM Smith

Boring Number: UPB-GEO-03

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
467.0 / 20	SS	S-9	24	WOH 2	9	0		Lower Silt & Clay		PID= <0.1 ppm Collected 3" spoon at S-9; rock blocked SPT shoe.
462.0 / 25	SS	S-10	24	11 13 18 22	18	31		Lower Silt & Clay	Top 10" (A): Wet, hard, brown, CLAY & SILT, some fine to coarse sand, little fine gravel (CL)	PID= <0.1 ppm
								Lower Sand & Silt	Bottom 8" (B): Moist, dense, brown, fine to medium SAND, trace silt (SP)	
457.0 / 30	SS	S-11	24	8 18 24 43	24	42		Lower Sand & Silt	Wet, dense, brown to red-brown, fine to medium SAND and SILT, trace fine gravel (SM)	PID= <0.1 ppm Iron oxidation bands at 30.5 ft bgs, moderate HCl reaction at 30.5 ft bgs.
452.0 / 35	SS	S-12	15	38 50 50/3"	15	>50		WR	Top 1": Wet, very dense, brown to red-brown, fine to medium SAND and SILT, trace fine gravel (SM) Bottom 14": Moist, hard, red-brown, SILT and fine to coarse SAND, trace fine to coarse gravel (sub-angular) (SM)	PID= <0.1 ppm Moderate HCl reaction.
▼										
	SS	S-13	1	50/1"	1	>50			Hard, slightly weathered to fresh (unoxidized to slightly oxidized), light gray, fine-grained SILTSTONE; bedding very thin Exploration terminated at 38.1 ft bgs.	PID= <0.1 ppm No HCl reaction. Heavy rig chatter contact. Becomes smooth grinding at 38 ft bgs. At 38.1 ft auger refusal; driller using 900 psi down pressure.
447.0 / 40										
442.0 / 45										

BL 18 MILE CREEK UPLAND BORINGS.GPJ - 8/30/19

CDM Smith

Boring Number: UP-GEO-01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 513
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 19.1
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/21/2018	

Bore Hole Location: Upson Park
N: 1157075 **E:** 1119967
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/21/2018 **End:** 9/21/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
513.0 0	SS	S-1	24	2 2 4 4	15	6		Upper Sand & Silt	Moist, loose, dark brown to brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick, trace wood (SM)	PID= <0.1 ppm
	SS	S-2	24	4 2 2 2	7	4			Moist, loose, brown, fine to coarse SAND, some fine gravel, little silt, trace brick trace wood, trace slag, trace glass	PID= <0.1 ppm
508.0 5	SS	S-3	24	2 1 2 3	12	3			Moist, very loose, brown, fine to coarse SAND, some fine gravel, little silt, trace brick, trace wood, trace metal, trace slag, trace glass (SM)	PID= <0.1 ppm
	SS	S-4	24	3 2 1 3	6	3			Top 5": Moist, very loose, brown, fine to coarse SAND, some fine gravel, little silt, trace brick, trace wood, trace metal, trace slag, trace glass (SM) Bottom 1": Moist, very loose, dark brown, fine to coarse SAND, some fine gravel, little silt, trace brick, trace wood, trace metal, trace slag, trace glass (SM)	PID= <0.1 ppm for SPT sample. Sample S-4 collected 3" split spoon sample for classification.
	SS	S-5	24	3 2 3 2	5	5			Moist, loose, red-brown to dark brown, fine to coarse SAND, some fine gravel, little silt, trace brick, trace wood, trace metal, trace slag, trace glass (SM)	PID= <0.1 ppm
503.0 10	SS	S-6	24	2 2 2 4	10	4			Top 4": Moist, loose, red-brown to dark brown, fine to coarse SAND, some fine gravel, little silt, trace brick, trace wood, trace metal, trace slag, trace glass (SM) Bottom 6": Moist, brown and red-brown, mottled (FeO Stains) fine to medium SAND and SILT, some fine gravel (SM)	Metal fragments in shoe.
	SS	S-7	24	5 10 10 10	NR	20		Weathered Rock	No recovery Moist, hard, light brown, CLAY & SILT, some fine to coarse gravel, trace fine to coarse sand (CL)	Sample S-7 no recovery. Collected 3" split spoon for classification.
498.0 15	SS	S-8	15	13 7 50/3"	14	>50			Moist, hard, light brown, CLAY & SILT, some fine to coarse gravel, trace fine to coarse sand (CL) (Completely weathered CLAYSTONE; bedding very thin to thin. FeO staining in joints.)	PID= <0.1 ppm Strong HCl reaction. Grinding at 15.3 ft bgs at 600 psi down pressure. Heavy grinding at 17 ft bgs. Very slow drilling below 17 ft bgs.
	SS	S-9	4	50/4"	4	>50			Hard, white to very light gray, slightly weathered, medium-grained, DOLOSTONE (Dolomite); trace gravel inclusions, fossiliferous	PID= <0.1 ppm Sample S-9 Dolostone observed
493.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: UP-GEO-01**

CDM Smith

Boring Number: UP-GEO-01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
493.0 / 20									Exploration terminated at 19.1 ft bgs.	as chips. Vigorous HCl reaction. Auger refusal at 18.8 ft bgs.
488.0 / 25										
483.0 / 30										
478.0 / 35										
473.0 / 40										
468.0 / 45										

BL 18 MILE CREEK UPLAND BORINGS.GPJ - 8/30/19

CDM Smith

Boring Number: UP-GEO-02

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / J. Frudman
Surface Elevation (ft.): 515.2
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 43
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
18	5/14/2018	1400

Bore Hole Location: Upson Park
N: 1156894 **E:** 1120007
Abandonment Method: Monitoring Well Installed
Drilling Date: Start: 5/14/2018 **End:** 5/15/2018
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
515.2 0	SS	S-1	24	9 10 6 6	15	16			Top 11": Crushed stone	
								Upper Sand & Silt	Bottom 4": Moist, very stiff, brown, CLAY & SILT, some fine to coarse sand, some fine gravel (SC)	
	SS	S-2	24	4 8 18 6	12	26			Moist, very stiff, brown, CLAY & SILT, some fine to coarse sand, some fine gravel, little slag (SC)	
510.2 5	SS	S-3	24	1 2 3 2	8	5			Wet, loose, brown, fine to medium SAND and CLAY & SILT, some fine to coarse gravel (SC)	
	SS	S-4	24	3 3 3 4	16	6			Top 6": Moist, medium stiff, dark brown, CLAY & SILT, some fine to coarse sand, some fine to coarse gravel (CL) Bottom 10": Wet, medium stiff, brown, CLAY & SILT, some fine to coarse gravel, little fine to medium sand (CL)	
	SS	S-5	24	2 2 4 4	13	6			Top 6": Wet, medium stiff, brown and black, CLAY & SILT, some fine to coarse sand, some fine to coarse gravel (CL) Bottom 7": Wet, medium stiff, brown, CLAY & SILT, little fine gravel, some fine to medium sand, trace ceramic pieces (CL)	Top 6" of sample S-5 granular material is slag.
505.2 10	SS	S-6	24	3 3 4 3	9	7			Wet, loose, brown, fine to medium SAND and CLAY & SILT, some fine to coarse gravel (SC) Dry, medium stiff, gray-brown, CLAY & SILT, some fine to coarse gravel, trace fine to medium sand (CL)	Bottom 6" of sample S-6 gravel is siltstone fragments.
	SS	S-7	24	5 5 5 4	24	10		Lower Silt & Clay	Dry, stiff, brown, fine to medium CLAY & SILT, some fine to coarse gravel, little fine to coarse sand (CL)	
500.2 15	SS	S-8	24	2 3 3 4	16	6			Dry, medium stiff, gray-brown, CLAY & SILT, some fine to coarse gravel, little fine to medium sand (CL)	Sample S-8 gravel is siltstone fragments.
	SS	S-9	24	8 11 11 10	17	22			Top 9": Moist, very stiff, light brown, CLAY & SILT and fine to medium SAND, little fine to coarse gravel (SC) Bottom 8": Dry, medium dense, gray, fine to coarse GRAVEL, some fine to medium sand, little silty clay (GP)	
▼	SS	S-10	24	4 6 6 2	11	12			Wet, stiff, brown, fine SAND and CLAY & SILT, some coarse gravel (SC)	
495.2										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: UP-GEO-02**

CDM Smith

Boring Number: UP-GEO-02

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
495.2 / 20	SS	S-11	24	4 5 6 8	18	11		Lower Silt & Clay	Moist, stiff, light brown, Clayey SILT, little fine to coarse gravel (CL)	Sample S-11 becomes wet at 21.2 ft bgs.
	SS	S-12	24	8 9 10 9	24	19			Wet, very stiff, gray, CLAY & SILT, little fine sand, trace fine gravel (CL)	
490.2 / 25	SS	S-13	24	4 5 10 6	18	15			Wet, stiff, gray, CLAY & SILT, little fine to coarse sand, trace fine gravel (CL)	Sample S-13 Red-brown mottling.
	SS	S-14	24	4 7 11 8	24	18			Wet, very stiff, gray, CLAY & SILT, some fine to coarse gravel, little fine to medium sand (CL)	
	SS	S-15	24	5 7 11 7	14	18		Weathered Rock	Wet, medium dense, gray, coarse GRAVEL and CLAY, little fine to coarse sand (GC)	Sample S-15 and S-16A gravel pieces are siltstone or shale.
485.2 / 30	SS	S-16	24	4 5 4 5	9	9			Top 3" (A): Wet, loose, gray, GRAVEL and CLAY, little fine to coarse sand (GC); horizontal bedding Bottom 6" (B): Wet, stiff, gray, CLAY & SILT, some fine to coarse sand, little fine gravel (CL)	
	SS	S-17	24	7 5 19 22	15	24			Wet, medium dense, gray, CLAY & SILT, some fine to coarse sand, little fine to coarse gravel	Stiff, 5" clay layers between rock.
480.2 / 35	SS	S-18	24	5 3 6 4	14	9			Top 7" (A): Wet, loose, gray, fine to coarse GRAVEL, little clay & silt (GP) Bottom 7" (B): Wet, stiff, gray, Silty CLAY, little fine to coarse gravel (CH)	Sample S-18B gravel pieces are shale fragments.
	SS	S-19	10	8 50/4"	10	>50			Wet, hard, gray, Silty CLAY, little fine to coarse gravel, little fine to coarse sand (CH)	
	SS	S-20	16	15 18 50/4"	15	>50			Wet, very dense, gray, fine to coarse GRAVEL and Silty CLAY, little fine to coarse sand (GP-GC)	Siltstone in spoon tip of sample S-20.
475.2 / 40	SS	S-21	24	10 11 12 21	16	23			Wet, very stiff, gray, Silty CLAY, little fine to coarse gravel, little fine to coarse sand (CH)	Gravel is subangular pieces of shale.
	SS	S-22	12	24 18	3	42			Wet, hard, gray, Silty CLAY, little fine to coarse gravel, little fine to coarse sand (CH)	Gravel is angular pieces of shale.
470.2 / 45									Exploration terminated at 43.0 ft bgs.	

CDM Smith

Boring Number: UP-GEO-03

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / J. Frudman
Surface Elevation (ft.): 516.4
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 51.7
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
34	5/17/2018	1000

Bore Hole Location: Upson Park
N: 1157319 **E:** 1120297
Abandonment Method: Monitoring Well Installed
Drilling Date: Start: 5/17/2018 **End:** 5/17/2018
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
516.4 0	SS	S-1	24	8 14 14 17	19	28		Upper Gravel & Silt	Top 12" (A): Dry, medium dense, dark brown, fine to medium SAND, little fine gravel, little silt (SP) Bottom 7" (B): Dry, very stiff, gray, Clayey SILT, little fine sand, little fine gravel (ML)	Gravel is angular.
	SS	S-2	24	11 8 7 11	14	15			Dry, stiff, gray, Clayey SILT, some fine to medium sand, little fine gravel (ML)	Gravel is angular.
511.4 5	SS	S-3	24	3 3 4 3	9	7			Dry, loose, gray, fine GRAVEL and fine to coarse SAND, trace silt (GP-SP)	Gravel is angular to subangular.
	SS	S-4	24	3 3 4 8	6	7			Dry, loose, gray, fine GRAVEL, little fine to coarse sand, little silt (GM)	Gravel is angular to subangular.
	SS	S-5	24	5 5 4 6	15	9			Dry, loose, gray, fine to coarse SAND and fine to coarse GRAVEL, little silt (SP-GP)	Gravel is angular, broken pieces of Shale.
506.4 10	SS	S-6	24	7 10 14 9	12	24			Dry, medium dense, gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt (SP-GP)	Dolostone in spoon tip.
	SS	S-7	24	5 8 7 5	13	15			Moist, medium dense, brown, fine SAND, some fine to coarse gravel, little clayey silt (SP)	Gravel is broken Shale.
501.4 15	SS	S-8	24	4 4 5 6	11	9			Moist, loose, brown, fine to coarse GRAVEL and CLAY & SILT, some fine to coarse sand (GC)	Dolostone in tip with coarse sand-sized crystals and grains.
	SS	S-9	24	9 18 20 12	13	38			Top 3" (A): Moist, dense, brown, fine to coarse GRAVEL and CLAY & SILT, some fine to coarse sand (GC) Bottom 10" (B): Dry, dense, gray, fine to coarse GRAVEL, some fine to coarse sand, trace silt (GP)	Gravel is angular, broken Shale.
496.4	SS	S-10	24	5 6 14 6	11	20			Dry, medium dense, gray, fine to coarse GRAVEL, some fine to coarse sand, trace silt (GP)	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: UP-GEO-03**

CDM Smith

Boring Number: UP-GEO-03

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
496.4 / 20	SS	S-11	24	3 6 7 10	9	13		Upper Gravel & Silt	Dry, medium dense, gray, fine to coarse GRAVEL, some fine to coarse sand, trace silt (GP)	Pieces of Shale throughout sample. Brick in tip.
	SS	S-12	24	9 6 6 11	13	12			Moist, medium dense, gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt (GP-SP)	Gravel is angular to subangular.
491.4 / 25	SS	S-13	24	8 6 3 4	8	9			Dry, loose, gray, fine to coarse GRAVEL, some fine to coarse sand, trace silt (GM)	Gravel is angular to subangular
	SS	S-14	24	9 6 8 7	11	14			Dry, medium dense, gray, fine to coarse GRAVEL, some fine to coarse sand, trace silt (GM)	Gravel is angular to subangular shale.
	SS	S-15	24	6 7 7 14	10	14			Dry to moist, medium dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt (GP-SP)	Gravel is angular to subangular with non-native appearance.
486.4 / 30	SS	S-16	24	6 8 10 14	5	18			Moist, medium dense, brown, fine to coarse GRAVEL, some silty clay, little fine to coarse sand (GP)	
	SS	S-17	24	6 4 6 6	16	10			Moist, stiff, brown, Clayey SILT and fine to coarse GRAVEL, little fine to coarse sand (GM)	
▼ 481.4 / 35	SS	S-18	24	3 4 8 10	11	12			Wet, medium dense, brown, fine to coarse GRAVEL, some silty clay, little fine to coarse sand (GC-GM)	
	SS	S-19	24	22 10 7 6	11	17			Wet, medium dense, brown, fine to coarse GRAVEL, some silty clay, little fine to coarse sand (GM)	Extremely weathered Shale. Slight petroleum odor.
476.4 / 40	SS	S-20	24	4 5 7 8	20	12		Organic Clay	Wet, stiff, black, Organic Sllty CLAY, little fine to coarse sand, trace fine gravel, trace roots, trace shells (OH)	Down pressure (lbs/in2 per 6 in interval) observed 500, 800, 100, 1200).
	ST	U-1	24	P U S H	17	--				
	SS	S-21	24	8 12 15 17	12	27		Weathered Rock	Moist, medium dense, gray and brown, fine to coarse GRAVEL, some clay & silt, some fine to coarse sand (GC)	Gravel contains angular shale pieces.
471.4 / 45	SS	S-22	24	15 30 14 12	16	44			Wet, dense, gray and brown, GRAVEL, some clay & silt, some fine to coarse sand (GC)	Gravel is weathered Shale.
	SS	S-23	20	13 27	17	75			Wet, hard, brown, CLAY & SILT and fine to coarse SAND, some fine to coarse gravel (SC)	

BL 18 MILE CREEK UPLAND BORINGS.GPJ - 8/30/19

Boring Number: UP-GEO-03

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
	SS	S-23	20	48 50/2"	17	75		Weathered Rock	Moist, very dense, brown, fine to coarse GRAVEL, some silt, some fine to coarse sand (GM)	Red-brown mottling.
	SS	S-24	15	15 19 50/3"	10	>50				
466.4 / 50										
									Prior to installation of monitoring well, borehole cleared to auger refusal at 51.7 ft bgs. Exploration terminated at 51.7 ft bgs.	
461.4 / 55										
456.4 / 60										
451.4 / 65										
446.4 / 70										

BL 18 MILE CREEK UPLAND BORINGS.GPJ - 8/30/19

CDM Smith

Boring Number: UP-GEO-04

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / J. Frudman
Surface Elevation (ft.): 513.9
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 44
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
32.5	5/22/2018	1100

Bore Hole Location: Upson Park
N: 1157522 **E:** 1120396
Abandonment Method: Monitoring Well Installed
Drilling Date: Start: 5/22/2018 **End:** 5/22/2018
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
513.9 0	SS	S-1	24	4 8 13 7	14	21		Upper Gravel & Silt	Moist, medium dense, brown, fine to coarse GRAVEL, some fine to coarse sand, some silt & clay (GC-GM)	Gravel in Upper Gravel & Silt material is angular to subangular.
	SS	S-2	24	15 4 4 5	8	8			Moist, loose, brown, fine to coarse GRAVEL, some fine to coarse sand, some silt & clay (GC-GM)	
508.9 5	SS	S-3	24	10 10 3 5	6	13			Dry, medium dense, brown, fine to medium SAND, some silty clay, some fine to coarse gravel (SC)	
	SS	S-4	24	10 9 3 4	6	12			Moist, medium dense, brown, fine to coarse GRAVEL, some fine to coarse sand, some clay (GP-SC)	
	SS	S-5	24	5 16 25 5	6	41			Dry, dense, brown, fine to coarse GRAVEL, little fine to coarse sand, little silt (GP)	
503.9 10	SS	S-6	24	11 6 3 21	6	9			Moist, loose, brown, fine to coarse GRAVEL, some fine to coarse sand, some silt (GM)	
	SS	S-7	24	10 5 12 10	14	17			Dry, medium dense, brown and gray, fine to coarse GRAVEL, some fine to coarse sand, some silt (GM)	
498.9 15	SS	S-8	24	6 8 9 15	14	17			Dry, medium dense, brown and gray, fine to coarse GRAVEL, some fine to coarse sand, some silt (GM)	
	SS	S-9	24	6 10 6 11	19	16			Dry, medium dense, brown, fine to coarse SAND and fine GRAVEL, some silt, trace brick (SM-GM)	
493.9	SS	S-10	24	7 8 12 22	12	20			Dry, medium dense, brown, fine to coarse GRAVEL, some fine to coarse sand, some silt (GM)	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: UP-GEO-04**

CDM Smith

Boring Number: UP-GEO-04

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
493.9 / 20	SS	S-11	24	5 7 10 40	14	17		Upper Gravel & Silt	Dry, medium dense, brown, fine to coarse GRAVEL, some fine to coarse sand, some silt (GM)	
	SS	S-12	24	15 10 11 10	8	21			Dry, very stiff, gray, SILT and fine to coarse GRAVEL, some fine to coarse sand (GM)	
488.9 / 25	SS	S-13	24	6 5 25 33	12	30			Dry, medium dense, brown, fine to coarse GRAVEL, some fine to coarse sand, little silt (GP-SM)	
	SS	S-14	24	24 34 11 11	15	45			Dry, dense, gray, fine to coarse GRAVEL, some fine to coarse sand, little silt (GP-SM)	
	SS	S-15	24	8 10 7 12	8	17			Dry, medium dense, gray, fine to coarse GRAVEL, some fine to coarse sand, some silt (GP-GM)	
483.9 / 30	SS	S-16	24	6 8 10 12	15	18			Dry, medium dense, brown, fine to coarse GRAVEL, some fine to coarse sand, some silt (GP-GM)	
▼	SS	S-17	24	29 22 8 11	12	30		Weathered Rock	Wet, medium dense, brown, fine to coarse GRAVEL, some fine to coarse sand, little clay (GC)	Gravel is angular, broken shale. Odor is present.
478.9 / 35	SS	S-18	13	8 9 50/1"	8	>50			Wet, very dense, brown, fine to coarse GRAVEL, some fine to coarse sand, little clay (GC)	Gravel is angular, broken shale Petrolum odor. Slight FeO staining.
	SS	S-19	24	15 8 6 5	14	14			Wet, medium dense, black, fine to coarse SAND, some silt, trace fine to coarse gravel (SP)	Slight FeO staining.
	SS	S-20	24	8 11 11 17	20	22			Wet, medium dense, gray, fine to coarse GRAVEL, some clay & silt, some fine to coarse sand (GC)	Gravel is angular, broken shale.
473.9 / 40	SS	S-21	24	8 15 27 32	11	42			Wet, dense, gray, fine to coarse GRAVEL, some clay & silt, some fine to coarse sand (GC)	Gravel is angular to subangular.
	SS	S-22	24	32 20 18 26	22	38			Top 12" (A): Wet, dense, gray, fine to medium SAND and fine to coarse GRAVEL, some clay (SC-GC) Bottom 10" (B): Wet, dense, red, fine to coarse GRAVEL, some silt & clay, some fine to coarse sand (GC)	Gravel is angular. Gravel is angular.
468.9 / 45									Exploration terminated at 44 ft bgs.	

BL 18 MILE CREEK UPLAND BORINGS.GPJ - 8/30/19

CDM Smith

Boring Number: WT-GEO-01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
Surface Elevation (ft.): 513.4
Drilling Method/Casing/Core Barrel Size: HSA / 4.25 in / NA
Total Borehole Depth (ft.): 36.7
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
35.8	9/20/2018	1530

Bore Hole Location: White Transportation Property
N: 1157332 **E:** 1120604
Abandonment Method: Backfilled with grout
Drilling Date: Start: 9/20/2018 **End:** 9/20/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
513.4 0									7" Topsoil	Gravel in Fill material is angular to subangular.
	SS	S-1	24	3 8 23 27	24	31		Upper Sand & Silt	Moist, dense, brown-gray and gray-brown, fine to coarse SAND and SILT, some fine to coarse gravel (SM)	PID= <0.1 ppm Sample S-1 Strong HCl reaction
	SS	S-2	24	30 22 22 15	18	44			Moist, dense, brown-gray and gray-brown, fine to coarse SAND and SILT, some fine to coarse gravel, trace brick (SM)	PID= <0.1 ppm Sample S-2 mottled oxidation observed
508.4 5	SS	S-3	24	9 13 6 8	15	19			Moist, medium dense, brown-gray and gray-brown, fine to coarse SAND and SILT, some fine to coarse gravel, trace brick (SM)	PID= <0.1 ppm Sample S-3 variable HCl reactivity.
	SS	S-4	24	11 9 9 10	20	18			Moist, medium dense, olive brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace slag (SM)	PID= <0.1 ppm
	SS	S-5	24	17 4 3 4	13	7			Moist, loose, brown and olive brown, fine to coarse SAND and SILT, some fine to coarse gravel, trace organics (roots) (SM)	PID= 0.2 ppm
503.4 10	SS	S-6	24	5 6 10 14	18	16			Moist, very stiff, brown to olive brown, SILT and fine to medium SAND, some fine to coarse gravel (ML)	PID= <0.1 ppm Sample S-6 moderately strong HCl reaction.
	SS	S-7	24	22 10 10 8	6	20			Moist, medium dense, brown to olive brown, fine to medium SAND and SILT, some fine to coarse gravel, trace slag, trace wood, trace brick (SM)	S-7 collected w/ 3" split spoon PID= 0.2 ppm (SPT sample) PID= 4.0 ppm (3" sample)
498.4 15	SS	S-8	24	14 10 6 8	17	16			Moist, very stiff, brown to olive brown, CLAY & SILT, little fine to coarse gravel, little fine to medium sand (CL)	PID= <0.1 ppm Sample S-8 strong HCl reaction, mottled with FeO stains.
493.4	SS	S-9	24	2 5	21	12			Top 15": Moist, medium dense, gray, fine to coarse SAND, little silt, trace fine gravel, trace slag (SP)	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/14/2019** **Boring Number: WT-GEO-01**

CDM Smith

Boring Number: WT-GEO-01

Client: USACE
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
493.4 / 20	SS	S-9	24	7 11	21	12		Upper Silt & Clay	Bottom 6": Moist, stiff, gray, SILT, some fine to medium sand, little fine gravel, trace slag (ML)	PID= <0.1 ppm Increased difficulty in drilling below 20 ft. Sample S-9B strong HCl reaction, mottled FeO stains.
488.4 / 25	SS	S-10	24	2 2 2 4	15	4			Moist, medium stiff, gray, SILT & CLAY, little fine to coarse gravel, little fine to medium sand, trace small shells (CL)	PID= <0.1 ppm Sample S-10 Gravel is highly weathered, angular to subangular, strong HCl reaction.
483.4 / 30	SS	S-11	24	5 12 8 8	13	20			Moist, very stiff, gray, SILT & CLAY, little fine to coarse gravel, little fine to coarse sand (CL)	PID= <0.1 ppm Sample S-11 angular to subangular gravel.
478.4 / 35 ▼	SS	S-12	21	5 5 14 50/3"	13	19		WR	Wet, very stiff, light brown, CLAY & SILT, some fine gravel, little fine to coarse sand	PID= <0.1 ppm Moderate HCl reaction.
473.4 / 40									Exploration terminated at 36.7 ft bgs.	Auger refusal at 36.7 ft bgs; siltstone fragments observed in tip of spoon
468.4 / 45										

BL 18 MILE CREEK UPLAND BORINGS.GPJ - 8/30/19

CDM Smith

Boring Number: SED-GEO-01

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 486.7
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 486.4
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 2
Bore Hole Location: Creek Corridor

N: 1157018.532 **E:** 1120043.671
Abandonment Method: NA
Drilling Date: Start: 10/8/2018 **End:** 10/8/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
486.4 0	SS	S-1	24	6 15 27 50	16	42		CGS	Top 4": Wet, hard, brown, SILT and fine to coarse SAND, some fine to coarse gravel (SM) Bottom 12": Wet, dense, brown to light brown, fine to coarse SAND and GRAVEL, some clayey silt (GM)	PID= <0.1 ppm CGS - Coarse-Grained Sediment Gravel rounded to sub-angular.
481.4 5									Exploration terminated at 2 ft bml. Boring location offset to SED-GEO-01A; issues observed with driller not maintaining the drilling rod plumb.	
476.4 10										
471.4 15										
466.4										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-01**

CDM Smith

Boring Number: SED-GEO-01A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 486.2
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 485.9
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 9.75
Bore Hole Location: Creek Corridor

N: 1157033.257 **E:** 1120046.607
Abandonment Method: NA
Drilling Date: Start: 10/8/2018 **End:** 10/8/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
485.9 0	SS	S-1	24	3 6 8 12	6	14		CGS	Top 18": No Recovery Middle 4": Wet, medium dense, brown to light brown, fine to coarse SAND and fine to coarse GRAVEL, some clayey silt (GM) Bottom 2": Wet, medium dense, brown to light brown, fine to coarse GRAVEL and fine to coarse SAND (GP)	PID= <0.1 ppm Gravel as round to subrounded CGS - Coarse-Gravel Sediment PID< 0.1 ppm
	SS	S-2	24	6 4 7 8	21	11			Top 12": Wet, medium dense, brown to light brown, fine to coarse GRAVEL and fine to coarse SAND (GP)	
								FGS	Bottom 9": Moist, stiff, gray, CLAY & SILT, little fine to coarse sand, trace fine gravel (CL)	Fine grained sediment (FGS)
480.9 5	SS	S-3	24	8 12 4 6	12	16			Top 10": Moist, stiff, gray, CLAY & SILT, little fine to coarse sand, trace fine gravel (CL) Bottom 2": Moist, very stiff, olive-brown and gray, CLAY & SILT, little fine to coarse sand (CL)	PID= <0.1 ppm FeO staining in top 10" of S-3.
	SS	S-4	24	6 8 8 9	12	16			Moist, very stiff, olive-brown and gray, CLAY & SILT, little fine to coarse sand (CL)	PID= <0.1 ppm
	SS	S-5	21	26 36 26 50/3"	15	>50		WR	Moist, hard, olive-brown and gray, CLAY & SILT, trace fine sand (CL) Rock fragment in spoon (6"): Moderately hard to soft, highly weathered, tan and olive, fine to medium-grained, DOLOSTONE; no bedding observed	PID= <0.1 ppm Strong HCl reaction, prominent FeO oxidation
475.9 10									Exploration terminated at 9.75 ft bml.	
470.9 15										
465.9										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-01A**

CDM Smith

Boring Number: SED-GEO-02

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 480.5
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 480.0
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 10.1
Bore Hole Location: Creek Corridor

N: 1157587.94 **E:** 1120279.56
Abandonment Method: NA
Drilling Date: Start: 10/17/2018 **End:** 10/17/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
480.0 0	SS	SS-1	24	1 1 WOH WOH	4	1		CGS	Wet, very loose, brown-black, fine to coarse SAND, some fine to coarse gravel, little silt (SM)	Coarse-Grained Sediment (CGS)
	SS	SS-2	24	4 1 2 1	8	3			Wet, very loose, brown-black, fine to coarse SAND, some fine to coarse gravel, little silt (SM)	
475.0 5	SS	SS-3	24	3 1 1 WOH	6	2			Top 3": Wet, very loose, brown-black, fine to coarse SAND, some fine to coarse gravel, little silt (SM) Bottom 3": Wet, soft, gray, SILT & CLAY and fine to coarse SAND, some fine to coarse gravel(SM-GM)	
	SS	SS-4	24	2 2 3 5	2	5			Wet, medium stiff, gray to light brown, SILT & CLAY and fine to coarse SAND, some fine to coarse gravel (SM-GM)	Coarse gravel (2") blocking spoon from catching material; No recovery with 3" spoon.
	SS	SS-5	24	12 6 4 7	8	10			Wet, stiff, light brown, SILT & CLAY and fine to coarse GRAVEL, little fine to coarse sand (GM)	
470.0 10	SS	SS-6	1	50/1"	1	>50			Wet, hard, light brown, SILT & CLAY and fine to coarse GRAVEL, little fine to coarse sand (GM) Exploration terminated at 10.1 ft bml.	Coarse gravel-sized Dolostone fragments.
465.0 15										
460.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-02**

CDM Smith

Boring Number: SED-GEO-03

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 487.9
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 487.0
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 2.25
Bore Hole Location: Creek Corridor

N: 1157439.753 **E:** 1120671.99
Abandonment Method: NA
Drilling Date: Start: 10/5/2018 **End:** 10/5/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
487.0 0	SS	S-1	24	2 2 7 8	6	9		CGS	Wet, loose, dark gray to brown, fine to coarse SAND and fine to coarse GRAVEL, some silt, little shells (SM)	PID= <0.1 ppm CGS - Coarse-Grained Sediment
	SS	S-2	3	50/3"	3	>50			Wet, very dense, dark gray to brown, fine to coarse SAND, some clayey silt (SM)	PID= <0.1 ppm
									Exploration terminated at 2.25 ft bml. Boring location offset 4 ft northeast to SED-GEO-03A.	
482.0 5										
477.0 10										
472.0 15										
467.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-03**

CDM Smith

Boring Number: SED-GEO-03A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 488.4
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 487.0
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 2.8
Bore Hole Location: Creek Corridor

N: 1157443.516 **E:** 1120674.41
Abandonment Method: NA
Drilling Date: Start: 10/5/2018 **End:** 10/5/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
487.0 0									See SED-GEO-03 log for soil description. Borehole cleared to 2 ft bml.	
	SS	S-3	9	15 50/3"	8	>50		CGS	Wet, very dense, dark gray to brown, fine to coarse GRAVEL and fine to coarse SAND, little clayey silt, trace shells (GM)	PID= <0.1 ppm CGS - Coarse-Grained Sediment
									Exploration terminated at 2.8 ft bml.	
482.0 5										
477.0 10										
472.0 15										
467.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4
Loose: 4-10
M. Dense: 10-30
Dense: 30-50
V. Dense: >50

Fine Grained (Clay):
V. Soft: <2
Soft: 2-4
M. Stiff: 4-8
Stiff: 8-15
V. Stiff: 15-30
Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-03A**

CDM Smith

Boring Number: SED-GEO-04

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 479.2
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 477.9
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 2.5
Bore Hole Location: Creek Corridor

N: 1157893.695 **E:** 1120239.497
Abandonment Method: NA
Drilling Date: Start: 10/10/2018 **End:** 10/10/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
477.9 0	SS	S-1	24	WOH 1 3 46	5	4		CGS	Wet, loose, black, fine to coarse SAND, some fine to coarse gravel, little silt, little shells (SP-SM)	PID= 0.6 ppm
	SS	S-2	3	50/3"	3	>50		WR	Moist, hard, red-brown, SILT, some fine sand, some fine gravel Rock fragment in spoon: Moderately weathered, moderately hard to hard, red-brown, fine-grained, SILTSTONE Exploration terminated at 2.5 ft bml.	3" spoon retrieved sample 2 to 2.5 ft bml. Moderate HCl reaction. PID= <0.1 ppm
472.9 5										
467.9 10										
462.9 15										
457.9										

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	HP - Hydro Punch SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-04**

CDM Smith

Boring Number: SED-GEO-05

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 479.6
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 475.1
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 5.3
Bore Hole Location: Creek Corridor

N: 1158138.89 **E:** 1120290.166
Abandonment Method: NA
Drilling Date: Start: 10/9/2018 **End:** 10/9/2018
Logged By: A. Harding

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
475.1 / 0	SS	S-1	24	WOR WOR WOR WOR	2	0		Organic FGS	Wet, very soft, dark brown, Organic SILT, trace fine sand, trace roots (OL)	FGS - Fine-Grained Sediment Moderate organic odor and strong petrochemical odor
	SS	S-2	9	3/3" 6	9	--		Organic FGS	Wet, dark brown, Organic SILT, some fine to medium sand, trace fine gravel (OL)	Strong petrochemical odor
470.1 / 5	SS	S-3	16	8 4 50/4"	11	>50		Organic FGS / WR	Top 9": Wet, medium stiff, dark brown, Organic SILT, some fine to medium sand, trace fine gravel (OL)	Strong petrochemical odor
								WR	Bottom 2": Moist, hard, red-brown and olive-gray, CLAY & SILT, some fine to coarse sand, some fine to coarse gravel	Bottom 2" of Sample S-3 coloring is mottled Moderate HCl reaction Gravel (rounded to subrounded)
									Exploration terminated at 5.3 ft bml.	
465.1 / 10										
460.1 / 15										
455.1										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-05**

CDM Smith

Boring Number: SED-GEO-06

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 472.2
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 469.2
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 4
Bore Hole Location: Creek Corridor

N: 1158240.842 **E:** 1120303.768
Abandonment Method: NA
Drilling Date: Start: 10/11/2018 **End:** 10/11/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
469.2 0	SS	S-1	24	4 18 33 20	6	51		CGS	Wet, very dense, gray-black, fine to coarse GRAVEL, little fine to coarse sand, trace silt, trace shells (GP)	CGS - Coarse-Grained Sediment Sample S-1 2" gravel-sized pieces in tip. Oil sheen observed Tip of sample 1" wet, brown, fine to coarse SAND, some silt (SM)
	SS	S-2	24	18 25 18 15	12	43			Wet, dense, gray-black, fine to coarse GRAVEL, little fine to coarse sand, trace silt, trace shells (GP)	
464.2 5									Exploration terminated at 4 ft bml. General remarks: Attempt to install casing to 4 ft bml. Casing would not advance beyond 2 ft. Offset 3 ft upstream, see SED-GEO-06A.	
459.2 10										
454.2 15										
449.2										

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core HP - Hydro Punch SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-06**

CDM Smith

Boring Number: SED-GEO-06A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 472.2
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 468.3
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 2.5
Bore Hole Location: Creek Corridor

N: 1158236.976 **E:** 1120296.597
Abandonment Method: NA
Drilling Date: Start: 10/11/2018 **End:** 10/11/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
468.3 0	SS	S-3	30	>50 >50 >50 >50	14	>50		CGS	Wet, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt, trace shells (GP-SP) Wet, black, fine to coarse GRAVEL, little fine to coarse sand, trace silt (GP)	CGS - Coarse-Grained Sediment S-3 advanced 30" with 3" spoon
									Exploration terminated at 2.5 ft bml. General remarks: Attempt to advance boring with 3-inch split spoon 0 to 2 ft bml (See SPT data). Location offset 15 ft to sandy area for third attempt. See SED-GEO-06B.	3" Cobbles in spoon tip.
463.3 5										
458.3 10										
453.3 15										
448.3										

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	HP - Hydro Punch SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-06A**

CDM Smith

Boring Number: SED-GEO-06B

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 472.2
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 467.0
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 6
Bore Hole Location: Creek Corridor

N: 1158223.538 **E:** 1120287.208
Abandonment Method: NA
Drilling Date: Start: 10/12/2018 **End:** 10/12/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
467.0 0	SS	S-4	24	1 1 WOH 4	1	1		CGS	Wet, very loose, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, little shells (SW-SM)	CGS - Coarse-Grained Sediment
	SS	S-5	24	15 8 14 7	4	22		CGS	Wet, medium dense, black, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace shells (SW-SM)	
462.0 5	SS	S-6	24	20 14 20 18	7	34		CGS WR	Top 2": Wet, dense, black, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace shells (SW-SM) Bottom 5": Wet, dense, red-brown, SILT and fine to coarse GRAVEL, some fine to coarse sand (GM)	Siltstone fragments in tip. Not able to get 2" split spoon back in hole to continue boring
457.0 10									Exploration terminated at 6 ft bml.	
452.0 15										
447.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-06B**

CDM Smith

Boring Number: SED-GEO-07

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 465.5
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 464.0
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 8
Bore Hole Location: Creek Corridor

N: 1158675.026 **E:** 1120165.648
Abandonment Method: NA
Drilling Date: Start: 10/12/2018 **End:** 10/12/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
464.0 0	SS	S-1	24	5 4 2 1	4	6		CGS	Top 3": Wet, loose, brown, fine to coarse GRAVEL, trace fine to coarse sand (GP) Bottom 1": Wet, very loose, black, fine to coarse GRAVEL and fine to coarse SAND, trace silt (GP-SP)	CGS - Coarse-Grained Sediment
	SS	S-2	24	1 1 WOH WOH	0	1			No Recovery	Attempt 3" spoon. No recovery.
459.0 5	SS	S-3	24	1 WOH 4 8	5	4			Top 2": Wet, very loose, brown, fine to coarse SAND, some fine to coarse gravel, little silt (SP-GP) Bottom 3": Wet, stiff, red-brown, Clayey SILT and fine to coarse SAND, little fine gravel (SC-SM)	
	SS	S-4	24	13 48 45 52	19	93		WR	Moist, hard, red-brown, SILT, some fine to coarse sand, little fine gravel (ML)	Siltstone fragments in Bottom 3" Gray Siltstone, small gravel sized pieces throughout (smooth)
454.0 10									Driller not able to advance split spoon back to 8 ft bml to continue. Exploration terminated at 8 ft bml.	
449.0 15										
444.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-07**

CDM Smith

Boring Number: SED-GEO-08

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 463.7
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 462.7
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 8.4
Bore Hole Location: Creek Corridor

N: 1159143.234 **E:** 1119955.653
Abandonment Method: NA
Drilling Date: Start: 10/15/2018 **End:** 10/15/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
462.7 0	SS	S-1	24	WOR WOH 1 1	6	1		CGS	Wet, very loose, dark brown, fine to coarse SAND. some fine to coarse gravel, little clayey silt, trace brick, trace slag (SP)	CGS - Coarse-Grained Sediment
	SS	S-2	24	WOR WOR WOR WOH	7	0		Organic FGS	Wet, very soft, brown, Organic Clayey SILT, some medium sand, trace fine to coarse gravel (organics- Peat) (OL)	FGS - Fine-Grained Sediment
457.7 5	SS	S-3	24	1 1 WOH 1	13	1			Wet, very soft, gray-brown, Organic SILT and fine to medium SAND, trace fine gravel, trace debris, trace wood (OL)	
	SS	S-4	24	WOH WOH WOH 1	12	0			Top 6": Wet, very soft, Organic Clayey SILT, some medium sand, trace fine to coarse gravel (Organics- Peat) (OL) Middle 4": Wet, very soft, gray-brown, Organic SILT and fine to medium SAND, trace fine gravel (OL)	
	SS	S-5	5	50/5"	5	>50		WR	Bottom 2": Wet, hard, brown, fine to coarse GRAVEL, little silt & clay, little fine to coarse sand (GC) Wet, hard, brown, fine to coarse GRAVEL, little silt & clay, little fine to coarse sand (GC) Exploration terminated at 8.4 ft bml.	Siltstone fragments in spoon tip.
452.7 10										
447.7 15										
442.7										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-08**

CDM Smith

Boring Number: SED-GEO-09

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 463.0
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 461.8
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 3.9
Bore Hole Location: Creek Corridor

N: 1159099.486 **E:** 1119815.723
Abandonment Method: NA
Drilling Date: Start: 10/15/2018 **End:** 10/15/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
461.8 0	SS	S-1	24	2 4 10 30	12	14		CGS	Top 11": Wet, medium dense, black, fine to coarse GRAVEL, little fine to coarse sand, trace silt, trace brick, trace slag, trace metal (GP)	CGS - Coarse-Grained Sediment
	SS	S-2	23	20 23 30 50/5"	14	53		FGS	Bottom 1": Wet, hard, red-brown, SILT, some fine to coarse sand, trace fine gravel (ML) Top 13": Wet, hard, red-brown, SILT, some fine to coarse sand, trace fine gravel (ML)	FGS - Fine-Grained Sediment Possibile Weathered Rock in spoon tip.
456.8 5									Bottom 1": Hard, completely weathered, red-brown, SILTSTONE Exploration terminated at 3.9 ft bml.	
451.8 10										
446.8 15										
441.8										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-09**

CDM Smith

Boring Number: SED-GEO-10

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 459.1
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 458.5
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 4.3
Bore Hole Location: Creek Corridor

N: 1159261.681 **E:** 1119704.426
Abandonment Method: NA
Drilling Date: Start: 10/16/2018 **End:** 10/16/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
458.5 0	SS	S-1	24	7 13 11 7	5	24		CGS	Wet, medium dense, brown-black, fine to coarse SAND and fine to coarse GRAVEL, little silt, little brick (SP-SM)	CGS - Coarse-Grained Sediment
	SS	S-2	24	4 3 1 1	2	4			Wet, very loose, brown-black, fine to coarse SAND and fine to coarse GRAVEL, little silt, little brick (SP-SM)	
	SS	S-3	3	50/3"	3	>50		WR	Wet, very loose, brown-black, fine to coarse SAND and fine to coarse GRAVEL, little silt, little brick (GM)	SS-3: Spoon bounces 2" with each blow. Rock Fragment (weathered Siltstone in tip)
453.5 5									Exploration terminated at 4.3 ft bml.	
448.5 10										
443.5 15										
438.5										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-10**

CDM Smith

Boring Number: SED-GEO-11

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 455.5
Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA
Mudline Elevation (ft): 455.0
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 24 in / 2 in O.D.
Total Borehole Depth (ft.): 2.8
Bore Hole Location: Creek Corridor

N: 1159279.579 **E:** 1119886.014
Abandonment Method: NA
Drilling Date: Start: 9/27/2018 **End:** 9/27/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
455.0 0	SS	S-1	24	2 3 5 6	8	8		CGS	Wet, medium stiff, dark gray to black, Clayey SILT and fine to coarse SAND and fine to coarse GRAVEL, some slag, trace bricks (SM-GM)	Between 0 to 2 ft bml driving spoon at angle. CGS- Coarse-Grained Sediment some slag observed in spoon
	SS	S-2	10	22 50/4"	10	>50			Wet, very dense, dark gray to black, fine to coarse SAND, some fine to coarse gravel, little silt (SP-SM)	
450.0 5									Exploration terminated at 2.8 ft bml. General remarks: Location revisited due to concerns of compliance with ASTM Standards. See SED-GEO-11A.	Spoon refusal at 2.8 ft bml.
445.0 10										
440.0 15										
435.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-11**

CDM Smith

Boring Number: SED-GEO-11A

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 455.5
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 455.0
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 2.2
Bore Hole Location: Creek Corridor

N: 1159284.167 **E:** 1119886.812
Abandonment Method: NA
Drilling Date: Start: 10/16/2018 **End:** 10/16/2018
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
455.0 0	SS	S-1	24	1 WOH 1 6	5	1		FGS	Wet, very soft, brown-gray, SILT and fine to coarse SAND, little fine to coarse gravel, trace wood, trace brick, trace debris (SM)	
	SS	S-2	2	50/2"	0	>50			Wet, very dense, black, fine to coarse SAND and fine to coarse GRAVEL, little silt (SP-GP)	S-2: Spoon bouncing
									Exploration terminated at 2.2 ft bml. General remarks: Offset 5 ft upstream to SED-GEO-11B for additional attempt to penetrate beneath 2.2 ft bml. Fill obstructions visible at mudline and along side slope in vicinity.	Slag and metal fragments observed in sample
450.0 5										
445.0 10										
440.0 15										
435.0										

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	HP - Hydro Punch SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: M. Passaro | **Date: 2/13/2019** | **Boring Number: SED-GEO-11A**

CDM Smith

Boring Number: SED-GEO-11B

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 455.5
Drilling Method/Casing/Core Barrel Size: Tripod / 3 in / NA
Mudline Elevation (ft): 455.0
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 & 3 in O.D.
Total Borehole Depth (ft.): 1.9
Bore Hole Location: Creek Corridor

N: 1159276.054 **E:** 1119883.49
Abandonment Method: NA
Drilling Date: Start: 10/16/2018 **End:** 10/16/2018
Logged By: M. Cherchia

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
455.0 / 0	SS	S-1	22	1 WOH WOH 50/4"	5	0		FGS	Top 4": Wet, very soft, SILT and fine to coarse SAND, little fine to coarse gravel, trace wood (SM)	FGS - Fine-Grained Sediment
									Bottom 1": Wet, very dense, black, fine to coarse GRAVEL, some fine to coarse sand, little silt (GP)	Slag and debris observed in sample.
									Exploration terminated at 1.9 ft bml.	
450.0 / 5										
445.0 / 10										
440.0 / 15										
435.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-11B**

CDM Smith

Boring Number: SED-GEO-12

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): NR
Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA
Mudline Elevation (ft): 453.0
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 in O.D.
Total Borehole Depth (ft.): 7
Bore Hole Location: Creek Corridor

N: 1159542.704 **E:** 1119672.439
Abandonment Method: NA
Drilling Date: Start: 9/26/2018 **End:** 9/26/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
453.0 0	SS	S-1	24	3 6 10 8	11	16			Top 13": No recovery; Observed organic silt at mudline; sample not obtained in sampler (OL)	Observed organic silt at mudline; sample not obtained in sampler.
	SS	S-2	24	3 10 12 12	8	22		CGS	Bottom 11": Wet, medium dense, dark gray to black, fine to coarse SAND, some silt, some fine to coarse gravel, some slag, trace silt (SP) Wet, medium dense, dark brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt (GP)	Gravel in shoe blocking spoon
448.0 5	SS	S-3	24	13 30 15 15	12	45			Top 6": Wet, dense, dark brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt (GP)	
	SS	S-4	12	12 13 50/0"	9	>50		WR	Bottom 6": Wet, dense, red-brown, fine to coarse GRAVEL, little fine to coarse sand, little silt (GM) Wet, dense, red-brown, fine to coarse GRAVEL, little fine to coarse sand, little silt (GM) Rock Fragment in spoon (3"): Hard, slightly weathered, red-brown, fine grained SILTSTONE; bedding very thin	Moderate HCl reaction. Moderate HCl reaction. Medium HCl reaction.
443.0 10									Exploration terminated at 7.0 ft bml.	
438.0 15										
433.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-12**

CDM Smith

Boring Number: SED-GEO-13

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): NR
Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA
Mudline Elevation (ft): 454.3
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 in O.D.
Total Borehole Depth (ft.): 6.3
Bore Hole Location: Creek Corridor

N: 1159493.466 **E:** 1119603.122
Abandonment Method: NA
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
454.3 0	SS	S-1	24	3 3 10 10	12	13		CGS	Wet, medium dense, red-brown to gray brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt (GP-GM)	PID= <0.1 ppm Round to subrounded gravel with cobbles CGS - Coarse-Grained Sediment
	SS	S-2	24	10 6 6 15	13	12			Wet, medium dense, red-brown to gray brown, fine to coarse GRAVEL, some fine to coarse sand, some silt, trace shells, trace slag (GP-GM)	PID= <0.1 ppm
449.3 5	SS	S-3	24	18 24 8 17	20	32			Top 12" (A): Wet, dense, dark gray to black, fine to coarse SAND and GRAVEL, little silt (SM-GM)	PID= <0.1 ppm
								WR	Bottom 8" (B): Moist, hard, red-brown to light gray, SILT, some fine sand, some fine to coarse gravel (ML)	Till material contains trace CaCO3 at contact.
	SS	S-4	3	50/3"	3	>50			Moist, hard, red-brown to light gray, SILT, some fine sand, some fine to coarse gravel (ML) Rock fragment in spoon (0.6"): Hard, medium weathered, red-brown, fine-grained, SILTSTONE Exploration terminated at 6.25 ft bml.	PID= <0.1 ppm No HCl reaction
444.3 10										
439.3 15										
434.3										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-13**

CDM Smith

Boring Number: SED-GEO-14

Client: USACE
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / D. DeLude
River Elevation (ft.): 452.0
Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA
Mudline Elevation (ft): 451.3
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in / 2 in O.D.
Total Borehole Depth (ft.): 2.7
Bore Hole Location: Creek Corridor

N: 1159636.481 **E:** 1119486.681
Abandonment Method: NA
Drilling Date: Start: 9/28/2018 **End:** 9/28/2018
Logged By: A. Harding

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N Value	Graphic Log	Strata	Material Description	Remarks
451.3 0	SS	S-1	24	1 2 5 3	6	7		CGS	Wet, loose, gray, fine to coarse GRAVEL, some fine to coarse sand, little silt, trace glass (GM)	PID= <0.1 ppm Angular to rounded gravel. CGS-Coarse-Grained Sediment
	SS	S-2	8	18 50/2"	8	>50		WR	Top 2": Wet, very dense, gray, fine to coarse GRAVEL, some fine to coarse sand, little silt, trace glass (GM) Bottom 6": Moist, hard, red-brown, Silty CLAY, some fine to coarse sand, some fine gravel (SC) Rock fragment in spoon (1.2"): hard, moderately weathered, red-brown, fine-grained, SILTSTONE [Weathered Rock] Exploration terminated at 2.7 ft bml.	PID= <0.1 ppm No HCl reaction. SPT refusal at 2.7 ft bml.
446.3 5										
441.3 10										
436.3 15										
431.3										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/13/2019** **Boring Number: SED-GEO-14**

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	198-TP-01
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	5 ft bgs	Date:	10/2/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 466	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	0-3.5': Moist, brown, fine to medium SAND and fine to coarse GRAVEL (angular); some silt, some cobbles, some boulders (GM)	Upper Gravel & Silt	E
2			
3			
4	3.5-4.5': Moist, gray and red-brown, fine to coarse GRAVEL (rounded to subrounded) some fine to coarse sand, some clay & silt (GC) Sample: G-1 (4.3-4.5)		E
5	4.5-6.5': Moist, red-brown, SILT, some fine to coarse sand, some fine to coarse gravel (rounded to subrounded), trace cobbles (SC) Sample: G-2 (6.2-6.3')	Weathered Rock	E-M
6	Weathered rock from 4.5-5.0 ft.		
7	End of test pit 6.5 ft bgs.		
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	5.5
Length (ft):	11
Depth (ft):	6.5
Vol (ft^3):	393.25

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT	
6 in-12 in:	55
12 in-18 in:	5
18 in-24 in:	6
24 in-30 in:	5

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: **M. Passaro** **2/12/2019**

Remarks: Test Pit Location: N: 1159065.852 E: 1119838.737
Backfilled with spoils

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	300-TP-01
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	NE	Date:	10/3/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 471	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2, 4	0-3.5': Moist, brown to red-brown, Slightly Organic fine to coarse GRAVEL and fine to coarse SAND, little silt, trace brick, trace glass, trace slag, trace metal (GP-GM) Sample: G-1 (2.5-2.8') (PID @1' = 4.3 ppm)	**Upper Gravel & Silt**	**E**
	Decreasing amounts of glass, slag, and metal observed in soil from 3.5 to 5 ft.		**M-D**
6	5-7.5': Moist, red-brown, SILT, some fine to coarse sand, some fine to coarse gravel (rounded to sub-rounded), Slight HCl reaction. (SM) Sample: G-2 (5.5-5.7')		
8, 10	7.5': Weathered rock observed: moderate hard to hard, slightly to moderately weathered, red-brown, fine-grained, SILTSTONE; bedding thin	**Weathered Rock**	**D**
	End of test pit 7.5 ft bgs; bucket refusal		
12, 14, 16, 18, 20, 22, 24			

T.P. DIMENSIONS	
Width (ft):	3.5
Length (ft):	13.5
Depth (ft):	7.5
Vol (ft^3):	354.375

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT	
6 in-12 in:	25
12 in-18 in:	1
18 in-24 in:	0
24 in-30 in:	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: **M. Passaro** **2/12/2019**

Remarks: Test Pit Location: N: 1159152.629 E: 1119795.725
Backfilled with spoils

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	300-TP-02
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	NE	Date:	10/3/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 469	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	0-8': Moist, brown, fine GRAVEL (angular) and fine to coarse SAND, little silt, trace cobbles, trace slag, trace brick, trace building stone, trace metal, trace woody debris and refuse (GM) Sample: G-1 (2-2.3') (PID @ 3' = 0.2 ppm)		E
4	3': Stone column observe, extends from 3' to 10' bgs		
6	5': Same as above, soil observed contain concrete fragments, metal, wire, with decreasing amounts of slag and brick. Sample: G-2 (6-8')	**Upper Gravel & Silt**	E
8			
10	8-12.5': Moist, brown to light brown, fine to coarse GRAVEL and fine to coarse SAND, little silt, trace building materials (cut stone) (GM) Sample: G-3 (12.3-12.5')		**M-D**
12	12.5': Boulder (>24")		
14	End of test pit 12.5 ft bgs.		
16			
18			
20			
22			
24			

T.P. DIMENSIONS	
Width (ft):	3.4
Length (ft):	16
Depth (ft):	12.5
Vol (ft^3):	680

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT*	
6 in-12 in:	120
12 in-18 in:	20
18 in-24 in:	3
24 in-30 in:	2

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: **M. Passaro** **2/12/2019**

Remarks: Test Pit Location: N: 1159204.004 E: 1119878.925

* Boulder count consists of mainly brick and building stone. Backfilled with spoils.

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	300-TP-03
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	NE	Date:	10/2/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 464	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	0-2.8': Moist, brown, CLAY & SILT, some fine to coarse sand, little fine to coarse gravel (angular), little cobbles (ML) Sample: G-1 (0-2.8')	Upper Sand & Silt	E
4	2.8-5.8': Moist, red-brown, CLAY & SILT, some fine to coarse gravel (rounded to subrounded), little fine to medium sand, trace cobbles (ML)		E
6	Sample: G-2 (2.8-5.8')		M
8	End of test pit 5.8 ft bgs.		
10			
12			
14			
16			
18			
20			
22			
24			

T.P. DIMENSIONS	
Width (ft):	3.6
Length (ft):	10
Depth (ft):	5.8
Vol (ft^3):	208.8

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT*	
6 in-12 in:	25
12 in-18 in:	3
18 in-24 in:	1
24 in-30 in:	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: M. Passaro 2/12/2019

Remarks: Test Pit Location: N: 1159219.178 E: 1119688.212

*Cobble/Boulder count predominately in upper 2.8 ft. Backfilled with spoils.

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	300-TP-04
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	NE	Date:	10/2/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 478	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	0-0.25': 1" gravel	**Bedding Stone**	
2	0.25-6': Moist, brown to red-brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, little cobbles, little brick, trace metal, trace slag, trace glass, trace debris		**E**
4	(SM)		
6	Sample: G-1 (5-6')	**Upper Sand & Silt**	
	6-11.5': Moist, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt,		
8	little debris, trace brick, trace metal, trace slag, trace glass (SM); slight refuse odor.		**M**
10	Sample: G-2 (9-9.2')		
12	11.5-12.5': Moist, red-brown (mottling), Clayey SILT, some fine to coarse gravel, little to some fine sand (GC-GM); trace gravel-sized Siltstone fragments (Slight HCl reaction)	**Weathered Rock**	**D**
14	Sample: G-3 (11.8-12')		
	End of test pit 12.5 ft bgs.		
16			
18			
20			
22			
24			

T.P. DIMENSIONS	
Width (ft):	15
Length (ft):	3.2
Depth (ft):	12.5
Vol (ft^3):	600

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT*	
6 in-12 in:	290
12 in-18 in:	8
18 in-24 in:	3
24 in-30 in:	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: **M. Passaro** **2/12/2019**

Remarks: Test Pit Location: N: 1159448.483 E: 1119856.446

*Cobble/Boulder count predominately in Fill as bricks. Backfilled with spoils.

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	300-TP-05
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	2.5' bgs	Date:	10/2/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 457	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	0-2.5': Moist, brown to dark brown, fine to coarse GRAVEL, some silt, little fine to coarse sand, little cobbles (GM) Sample: G1 (1-2')	Upper Gravel & Silt	E
2			
3	2.5': Wet, brown to red-brown, fine to coarse GRAVEL, some silt, little fine to coarse sand, little cobbles (GM)		D
4	3': Weathered rock observed: slightly weathered, red-brown, fine-grained, SILTSTONE, bedding thin	Weathered Rock	
5	End of test pit 3' bgs. Bucket refusal		
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	5.3
Length (ft):	11
Depth (ft):	3
Vol (ft^3):	174.9

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT	
6 in-12 in:	20
12 in-18 in:	9
18 in-24 in:	1
24 in-30 in:	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: **M. Passaro** **2/12/2019**

Remarks: Test Pit Location: N: 1159444.529 E: 1119611.028
Backfilled with spoils

CDM Smith

Boring Number: 300-TP-06

Client: United States Army Corp.
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flint Kote Property- 300 Parcel
N: 1159756 **E:** 1119402
Drilling Date: Start: 10/16/2018 **End:** 10/16/2018

River Elevation (ft.): 448.6
Mudline Elevation (ft.):
Total Borehole Depth (ft.): 8
Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
448.6 0	SH	SH-1	48	35		Organic Clay	Top 23" (A): Moist, black, Slightly Organic SILT and fine to coarse SAND, little fine to coarse gravel (OL) Bottom 14" (B): Wet, brown, Organic Clayey SILT, some fine to medium sand (OL)	
443.6 5	SH	SH-2	48	26		Upper Sand & Silt	Top 22" (A): Wet, brown, fine to coarse SAND, trace silt, trace metal pieces (SP) Bottom 4" (B): Wet, brown, fine to coarse SAND, some fine gravel, little silt & clay (SM)	
							Exploration terminated at 8 ft bgs.	
438.6 10								
433.6 15								
428.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/12/2019** **Boring Number: 300-TP-06**

Boring Number: UPB-SB02

Client: United States Army Corp.
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske/ R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: United Paperboard Property
N: 1158129 **E:** 1120343
Drilling Date: Start: 10/11/2018 **End:** 10/11/2018

River Elevation (ft.): 484.3
Mudline Elevation (ft.):
Total Borehole Depth (ft.): 12
Abandonment Method: Backfilled with bentonite chips
Logged By: A. Eisberg

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.3 0	GP	GP-1	48	38		Upper Sand & Silt	Top 33" (A): Dry, black, fine to coarse SAND, some fine to coarse gravel, little silt, trace cinders, trace glass, trace roots, trace slag (SM) Bottom 5" (B): Moist, light brown, fine to medium SAND, some silt, some fine to coarse gravel (SM)	ENV: 0-2' PCBs at 1000 ENV: 2-5' PCBS at 1000 8" Concrete at 4.2 ft bgs.
479.3 5	GP	GP-2	48	23		Organic Clay	Wet, black, Organic Silty CLAY, trace fine to medium sand (OH)	ENV: 5-8' PCBs at 1000
474.3 10	GP	GP-3	48	30			Wet, black, Organic Silty CLAY, trace fine to medium sand (OH)	Oil sheen observed at 8 ft bgs.
469.3 15							Exploration terminated at 12 ft bgs.	Geoprobe investigation substituted for original test pit location UPB-TP-01 due to subsurface obstructions indicated on GPR survey.
464.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/12/2019** **Boring Number: UPB-SB02**

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	UPB-TP-02
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	3 ft bgs	Date:	10/4/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 473	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	0-1': Moist, dark brown, fine to medium SAND and SILT, trace fine to coarse gravel, trace slag (SM)	**Upper Sand & Silt**	**E**
2	1-2.8': Moist, dark brown, PEAT, some silt, some fine to coarse sand, trace fine gravel (Pt) (Organics- roots) Sample: G-1 (2.5-2.6')	**Peat**	**E**
3	2.8-3.1': Moist to wet, brown to red-brown and olive (olive mottling), Silty CLAY, trace fine to coarse sand, trace fine to coarse gravel (rounded to sub-rounded) (CH)	**Weathered Rock**	**D**
4	FeO staining. Sample: G-2 (2.9-3') 3.1-3.2': Weathered rock observed: hard, moderately weathered, red-brown and gray, fine-grained, SILTSTONE; bedding thin, fine gravel inclusions End of test pit 3.2' bgs, Bucket refusal		
5			
6			

T.P. DIMENSIONS	
Width (ft):	3.2
Length (ft):	9
Depth (ft):	3.2
Vol (ft^3):	92.16

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT	
6 in-12 in:	11
12 in-18 in:	5
18 in-24 in:	6
24 in-30 in:	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: **M. Passaro** **2/12/2019**

Remarks: Test Pit Location: N: 1158245.421 E: 1120229.238
Backfilled with spoils

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	UP-TP-01
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	NE	Date:	10/4/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 501	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	0-1': Moist, loose, dark brown, fine to medium SAND, some silt, trace fine to coarse gravel, trace slag (SM)		E
4	1.2-12.5': Moist, light brown, SILT, some fine to coarse gravel, some fine to coarse sand, trace cobbles, trace brick (GM) Sample: G-1 (2.8-3')		M
6		Upper Gravel & Silt	
8			
10	Rusted rebar fragment observed at 8 ft bgs. Sample: G-2 (8-10')		D
12			
14	End of test pit 12.5' bgs		
16			
18			
20			
22			
24			

T.P. DIMENSIONS	
Width (ft):	3.2
Length (ft):	12
Depth (ft):	12.5
Vol (ft^3):	480

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT	
6 in-12 in:	65
12 in-18 in:	18
18 in-24 in:	2
24 in-30 in:	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: **M. Passaro** **2/12/2019**

Remarks: Test Pit Location: N: 1157409.189 E: 1120136.418
Backfilled with spoils

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	WT-TP-01
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	10.5 ft bgs	Date:	10/4/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 492	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	0-1.5': Moist, dark brown, Slightly Organic fine to coarse SAND, some silt, some fine to coarse gravel (Organics-roots) (SM)		E
2	1.5-8': Moist, light brown, fine to coarse SAND, some silt, some fine to coarse gravel, trace brick (SM) Sample: G-1 (2.3-2.5')		
3	(Dolostone cobbles observed)		M
	3': Scraping on cobbles observed		
4			
5		Upper Sand & Silt	D
6			
7			
8			M-D
	8': Moist, light brown, fine to medium SAND and SILT, some fine to coarse gravel		
9	(SM) (Cobbles and boulders are predominantly flat and Dolostone) Sample: G-2 (8.3-8.4')		
10			D
11	10.5-12': Wet, light brown to brown, CLAY & SILT, some fine to coarse gravel	Weathered Rock	M
	(rounded to sub-angular), some fine to coarse sand, trace cobbles (GC)		
12	Sample: G-3 (10.5'10.8')		
	End of test pit 12 ft bgs.		

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	16
Depth (ft):	12
Vol (ft^3):	576

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT*	
6 in-12 in:	100
12 in-18 in:	18
18 in-24 in:	3
24 in-30 in:	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: M. Passaro 2/12/2019

Remarks: Test Pit Location: N: 1157695.177 E: 1120425.968

*Cobbles/Boulders are predominately broken Dolostone. Backfilled with spoils.

CDM Smith

Boring Number: WT-TP-02

Client: United States Army Corp.
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / A. Koske
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: White Transportation Property
N: 1157453 **E:** 1120483
Drilling Date: Start: 10/18/2018 **End:** 10/18/2018

River Elevation (ft.): 513.1
Mudline Elevation (ft.):
Total Borehole Depth (ft.): 36
Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
513.1 0	GP	GP-1	48	26		Upper Gravel & Silt	Top 8" (A): Dry, gray, fine to coarse SAND, some fine to coarse gravel, little silt (SP) Bottom 18" (B): Dry, gray, fine to coarse GRAVEL, little fine to coarse sand, little silt (GP)	
508.1 5	GP	GP-2	48	18			Dry, gray, fine to coarse GRAVEL, little fine to coarse sand, little silt (GP)	
503.1 10	GP	GP-3	48	12			Top 6": Dry, gray, fine to coarse GRAVEL, little fine to coarse sand, little silt (GP) Bottom 6": Dry, gray, fine to coarse GRAVEL and fine to coarse SAND, little silt (GP-GM)	
498.1 15	GP	GP-4	48	42			Dry, gray, fine to coarse GRAVEL and fine to coarse SAND, little silt (GP-GM)	Siltstone boulder encountered 15.3 to 15.6 ft bgs.
493.1	GP	GP-5	48	20			Dry, gray, fine to coarse GRAVEL, some fine to coarse sand, little silt (GP)	Discrete interval sampling below 16 ft.

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 2/12/2019** **Boring Number: WT-TP-02**

CDM Smith

Boring Number: WT-TP-02

Client: United States Army Corp.
Project Name: Eighteen Mile Creek PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
493.1 / 20	GP	GP-6	48	18		Upper Gravel & Silt	Dry, gray, fine to coarse GRAVEL, some fine to coarse sand, little silt (GP)	
488.1 / 25	GP	GP-7	48	30		Upper Gravel & Silt	Top 24" (A): Dry, gray, fine to coarse SAND, some fine to coarse gravel, some silt (SP) Bottom 6" (B): Dry, pink-brown/gray-brown, fine to coarse SAND, and fine to coarse GRAVEL, little clayey silt, trace roots, trace shells (SP-GP)	Gravel-sized siltstone fragments, very thin bedding.
483.1 / 30	GP	GP-8	48	24		Upper Gravel & Silt	Dry, gray, fine to coarse GRAVEL and fine to coarse SAND, little silt (GP-SP) Top 6": Dry, gray, fine to coarse GRAVEL and fine to coarse SAND, little silt (GP-SP)	Bottom 3" contains light brown fine to coarse sand (possible crushed Dolomite cobble).
▼ 478.1 / 35	GP	GP-9	48	24		Weathered Rock	Middle 9" (A): Wet, brown, fine to coarse GRAVEL, some clayey silt, some fine to medium sand, trace shells (GC) Bottom 9" (B): Wet, dark brown-black, fine to coarse GRAVEL, some fine to coarse sand, little clayey silt (GM)	Slight organic odor.
473.1 / 40							Exploration terminated at 36 ft bgs (no refusal).	
468.1 / 45								

CREEK (NO SPT) 18 MILE CREEK UPLAND NO SPT.GPJ - 6/25/19

CDM Smith

Test Pit Log

14 Wall Street
Suite 1702
New York, NY 10005

Client:	USACE-KC	Contractor:	SJB	Test Pit No.	WT-TP-03
Project Name:	18- Mile Creek Superfund Site	Equipment:	Ford 555E Backhoe	Logged By:	A. Harding
Project Location:	Lockport, NY	Depth to Water:	9 ft bgs	Date:	10/4/2018
Project Numbe	51147- 223203	Ground Surface EL (ft):	Approx. 492	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	0-1.7': Moist, black, fine to coarse SAND, little silt, little fine to coarse gravel (SP) (slag observed)	Upper Gravel & Silt	E
2			
3	1.7-4': Moist, brown, Slightly Organic fine to coarse GRAVEL, some fine to coarse sand, some silt, trace cobbles, trace bricks, trace concrete fragments (Organics-roots) (OL)		E
4			
5	4-8': Moist, brown, fine to coarse GRAVEL, some fine to coarse sand, some silt, trace brick, trace building stone fragments (GM) Sample: G-1 (4-4.2')		E-M
6			
7			
8	Sample: G-2 (8-8.1')		
9	8-9': Moist, red-brown, Silty CLAY, some fine to coarse sand, some fine to coarse gravel (SC-GC); Sample: G-3 (8.9-9')	Weathered Rock	M
10	9-10': Moist, red-brown, Silty CLAY, some fine to coarse sand, some fine to coarse gravel (rounded)(GC)		D
11	10': Weathered rock observed: hard, moderately weathered fine-grained, SILTSTONE, thinly bedded		
12	End of test pit 10 ft bgs; Bucket refusal		

T.P. DIMENSIONS	
Width (ft):	3.2
Length (ft):	12
Depth (ft):	10
Vol (ft^3):	384

TEST PIT PLAN

Please refer to Figure 2-1 and Figure 2-5 for test pit location.

COBBLE/BOULDER COUNT	
6 in-12 in:	72
12 in-18 in:	20
18 in-24 in:	5
24 in-30 in:	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Reviewed By: M. Passaro 2/12/2019

Remarks: Test Pit Location: N: 1157560.045 E: 1120562.427
Backfilled with spoils

SPDI Soil Logs

Boring Number: 18MC-L16W-SB04A

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: CSX Property
N: 1159461 **E:** 1119511
Drilling Date: Start: 9/9/2020 **End:** 9/9/2020

Surface Elevation (ft.): 479.3
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/9/2020	1150

Abandonment Method: Backfilled with bentonite chips
Logged By: E. Kulkusky

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
479.3 / 0							Top 2": TOPSOIL	ENV: 0-2' Lead at 1140.
	SH	SH-1	48	34		Fill	Dry, light brown, fine to medium SAND and SILT, little fine to coarse gravel (SM)	
							Dry, gray-brown, fine to medium SAND and SILT, trace fine to coarse gravel, trace brick (SM)	ENV: 2-4' Lead at 1145.
474.3 / 5	SH	SH-2	24	8				ENV: 4-6' Lead at 1150.
							Exploration terminated at 6.0 ft bgs.	
469.3 / 10								
464.3 / 15								
459.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 11/17/2020** **Boring Number: 18MC-L16W-SB04A**

CDM Smith

Boring Number: 18MC-SB15A

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Hand Auger
Core Size: 2 in O.D.
Bore Hole Location: Clinton Street
N: 1157760 **E:** 1120320
Drilling Date: Start: 8/3/2020 **End:** 8/3/2020

Surface Elevation (ft.): 491.2
Total Borehole Depth (ft.): 2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/3/2020	1350

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
491.2 / 0	HA	HA-1	24	NA		Fill	Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel (SP)	ENV: 0-2' Lead, PCBs (MS/MSD) at 1335.
							Exploration terminated at 2.0 ft bgs.	
486.2 / 5								
481.2 / 10								
476.2 / 15								
471.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: 18MC-SB15A**

CDM Smith

Boring Number: 198-SB27

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 198 Parcel
N: 1159057 **E:** 1120198
Drilling Date: Start: 8/3/2020 **End:** 8/3/2020

Surface Elevation (ft.): 484.6
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/3/2020	920

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.6 0							Top 4": TOPSOIL	
	GP	GP-1	48	28		Fill	Dry, black/brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-2' Lead at 0905. ENV: 2-4' Lead at 0910.
479.6 5	GP	GP-2	48	24		Silt	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	GP-2 gravel as dolostone fragments.
474.6 10							Exploration terminated at 8.0 ft bgs.	
469.6 15								
464.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: 198-SB27**

CDM Smith

Boring Number: 300-SB41

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159277 **E:** 1119945
Drilling Date: Start: 8/11/2020 **End:** 8/11/2020

Surface Elevation (ft.): 469.2
Total Borehole Depth (ft.): 24.2
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.2 0	GP	GP-1	48	32		Fill	Dry, brown, fine to medium SAND and SILT, little fine to coarse gravel (SM)	ENV: 0-2' Lead x2 (Dup), PCB at 1235 ENV: 2-4' Lead, PCB x2 (DUP) at 1235
464.2 5	GP	GP-2	48	18			Dry, red-brown, fine to coarse GRAVEL, little fine to medium sand, little silt, trace brick, trace slag (GP)	No ENV samples collected due to excessive amounts of gravel.
459.2 10	GP	GP-3	48	24			Moist, brown, fine to coarse GRAVEL and fine to medium SAND, little silt, trace wood, trace brick (GP-SP)	ENV: 8-10' Lead, PCB at 1250 ENV': 10-12' Lead, PCB x2 (MS/MSD) at 1255 Petroleum odor in sample GP-3.
454.2 15	GP	GP-4	48	30			Moist, brown, fine to coarse GRAVEL and fine to medium SAND, little silt, trace brick (GP-SP) Wet, brown, fine to coarse GRAVEL and fine to medium SAND, little silt, trace brick (GP-SP) Wet, brown, fine to coarse GRAVEL and fine to medium SAND, little silt, trace brick (GP-SP)	ENV: 12-14' Lead, PCB at 1300 ENV: 14-16' Lead, PCB at 1305 ENV: 16-18' Lead, PCB at 1310
449.2	GP	GP-5	48	14			Wet, black, fine to coarse SAND, some fine to coarse gravel, little silt & clay, trace glass (SP)	Strong Petroleum odor in sample GP-5 at 17 ft bgs. ENV: 18-20' Lead x2 (MS/MSD), PCB at 1315

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: 300-SB41**

Boring Number: 300-SB41

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
449.2 / 20	GP	GP-6	48	26		Fill	Wet, black, fine to coarse SAND and fine to coarse GRAVEL, trace silt, trace glass (SP-GP)	ENV: 20-22' Lead, PCB at 1320 ENV: 22-24' Lead, PCB at 1325 Petroleum odor in sample GP-6.
	GP	GP-7	2	0				
444.2 / 25							Exploration terminated at 24.2 ft bgs (Refusal).	
439.2 / 30								
434.2 / 35								
429.2 / 40								
424.2 / 45								

DPT 18 MILE CREEK SUPPLEMENTAL PDI.GPJ - 9/22/21

CDM Smith

Boring Number: 300-SB42

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159343 **E:** 1119993
Drilling Date: Start: 8/11/2020 **End:** 8/11/2020

Surface Elevation (ft.): 478
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/11/2020	1225

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
478.0 0	GP	GP-1	48	24		Fill	Dry, light brown, fine to coarse SAND, little fine to coarse gravel, trace silt (SP) Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag, trace brick (SP)	ENV: 0-2' Lead at 1210 ENV: 2-4' Lead, TCLP at 1215
473.0 5	GP	GP-2	48	16			Dry, red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick (SP-SM)	ENV: 4-6' Lead at 1220 ENV: 6-8' Lead, TCLP at 1225
468.0 10							Exploration terminated at 8.0 ft bgs.	
463.0 15								
458.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: 300-SB42**

CDM Smith

Boring Number: 300-SB43

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159356 **E:** 1119934
Drilling Date: Start: 8/11/2020 **End:** 8/11/2020

Surface Elevation (ft.): 474.4
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/11/2020	1420

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
474.4 0	GP	GP-1	48	32		Fill	Dry, brown, fine to coarse SAND, some silt, some fine to coarse gravel, trace brick (SP-SM)	ENV: 0-2' Lead x2 (MS/MSD), PCB at 1410 ENV: 2-4' Lead, PCB, TCLP at 1415
469.4 5	GP	GP-2	48	28			Dry, red-brown, fine to coarse SAND and SILT, some fine to coarse gravel, trace brick (SM)	ENV: 4-6' Lead, PCB at 1420 ENV: 6-8' Lead, PCB, TCLP at 1425
464.4 10							Exploration terminated at 8.0 ft bgs.	
459.4 15								
454.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: 300-SB43**

CDM Smith

Boring Number: 300-SB44

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159553 **E:** 1119822
Drilling Date: Start: 8/12/2020 **End:** 8/12/2020

Surface Elevation (ft.): 482.7
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/12/2020	810

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.7 0	GP	GP-1	48	40		Fill	Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 0-2' Lead x2 (Dup), PCB at 0750 ENV: 2-4' Lead, PCB at 0755
477.7 5	GP	GP-2	48	38			Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 4-6' Lead, PCB at 0800 ENV: 6-8' Lead, PCB, TCLP at 0805
472.7 10	GP	GP-3	48	28			Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 8-10' Lead, PCB at 0810 ENV: 10-12' Lead, PCB at 0815
467.7 15							Exploration terminated at 12.0 ft bgs.	
462.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: 300-SB44**

CDM Smith

Boring Number: 300-SB45

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 58
N: 1159456 **E:** 1119525
Drilling Date: Start: 9/9/2020 **End:** 9/9/2020

Surface Elevation (ft.): 475.1
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/9/2020	1025

Abandonment Method: Backfilled with bentonite chips
Logged By: E. Kulkusky

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.1 / 0	SH	SH-1	48	33		Fill	Dry, tan-gray, fine to medium SAND and SILT, some fine to coarse gravel (SM)	ENV: 0-2' Lead x2 (MS/MSD) at 1015.
							Dry, tan, fine to medium SAND and SILT, some fine to coarse gravel (SM)	ENV: 2-4' Lead at 1020.
470.1 / 5	SH	SH-2	24	8			Dry, gray, fine to medium SAND and SILT, little fine to coarse gravel (SM)	ENV: 4-5' Lead at 1025.
							Exploration terminated at 5.0 ft bgs (Refusal).	
465.1 / 10								
460.1 / 15								
455.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 11/17/2020** **Boring Number: 300-SB45**

CDM Smith

Boring Number: 300-SB46

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 58
N: 1159474 **E:** 1119506
Drilling Date: Start: 9/9/2020 **End:** 9/9/2020

Surface Elevation (ft.): 475.1
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/9/2020	1300

Abandonment Method: Backfilled with bentonite chips
Logged By: E. Kulkusky

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.1 0	SH	SH-1	48	38		Fill	Dry, light brown, fine to medium SAND and SILT, little fine to coarse gravel (SM) Dry, gray-brown, fine to medium SAND and SILT, some fine to coarse gravel (SM)	ENV: 0-2' Lead at 1250. ENV: 2-4' Lead at 1255.
470.1 5	SH	SH-2	24	24			Dry, gray-brown, fine to medium SAND and SILT, some fine to coarse gravel (SM)	ENV: 4-6' Lead at 1300.
465.1 10							Exploration terminated at 6.0 ft bgs.	
460.1 15								
455.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4
Loose: 4-10
M. Dense: 10-30
Dense: 30-50
V. Dense: >50

Fine Grained (Clay):
V. Soft: <2
Soft: 2-4
M. Stiff: 4-8
Stiff: 8-15
V. Stiff: 15-30
Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 11/17/2020** **Boring Number: 300-SB46**

CDM Smith

Boring Number: 300-SB47

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159636 **E:** 1119643
Drilling Date: Start: 8/7/2020 **End:** 8/7/2020

Surface Elevation (ft.): 456.7
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
4.5	8/7/2020	1255

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
456.7 0						Gravel	Dry, brown, fine to coarse GRAVEL and fine to coarse SAND, some silt, trace roots (GP-SP)	ENV: 0-2' Lead, PCB, TCLP at 1245
	GP	GP-1	48	24		Silt Sandy Gravel	Dry, red-brown, SILT, some fine to coarse gravel, little fine to coarse sand (ML)	ENV: 2-4' Lead, PCB at 1250
▼ 451.7 5	GP	GP-2	24	24		Silty Gravel	Moist, red-brown, SILT, some fine to coarse gravel, little fine to coarse sand (ML) Wet, red-brown, SILT and fine to coarse GRAVEL, little fine to coarse sand (GM)	ENV: 4-6' Lead at 1255
							Exploration terminated at 6.0 ft bgs.	
446.7 10								
441.7 15								
436.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: 300-SB47**

CDM Smith

Boring Number: 300-SB48

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159638 **E:** 1119680
Drilling Date: Start: 8/7/2020 **End:** 8/7/2020

Surface Elevation (ft.): 469.3
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/7/2020	1215

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.3 0	SH	SH-1	48	30		Sand	Dry, brown/black, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag (SP)	ENV: 0-2' Lead, PCB, TCLP at 1145 ENV: 2-4' Lead, PCB, TCLP at 1150
464.3 5	SH	SH-2	24	0			No recovery	
459.3 10							Exploration terminated at 6.0 ft bgs.	
454.3 15								
449.3								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: 300-SB48**

CDM Smith

Boring Number: 300-SB49

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Surface Elevation (ft.): 483.1
Drilling Method: DPT
Total Borehole Depth (ft.): 24
Core Size: 2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159636 **E:** 1119709
Abandonment Method: Backfilled with bentonite chips
Drilling Date: Start: 8/7/2020 **End:** 8/7/2020
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
483.1 0	GP	GP-1	48	28		Fill	Dry, brown/black/red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 0-2' Lead, PCB at 1000 ENV: 2-4' Lead, PCB at 1005
478.1 5	GP	GP-2	48	24			Dry, brown/black/red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 4-6' Lead, PCB at 1010 ENV: 6-8' Lead, PCB at 1015
473.1 10	GP	GP-3	48	36			Dry, brown/black/red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 8-10' Lead, PCB at 1020 ENV: 10-12' Lead, PCB at 1025 Tar waste from 11 to 12 ft bgs.
468.1 15	GP	GP-4	48	36			Dry, brown/black/red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 12-16' Lead, PCB at 1030
463.1	GP	GP-5	48	32			Dry, black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 16-20' Lead, PCB at 1035

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: 300-SB49**

Boring Number: 300-SB49

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
463.1 / 20	GP	GP-6	48	36		Fill	Dry, black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 20-23' Lead, PCB at 1040
						Silt	Wet, red-brown, SILT, some fine to coarse gravel, trace fine sand (ML)	No sample at 23 ft bgs due to insufficient material.
458.1 / 25							Exploration terminated at 24 ft bgs.	
453.1 / 30								
448.1 / 35								
443.1 / 40								
438.1 / 45								

CDM Smith

Boring Number: 300-SB50

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Surface Elevation (ft.): 484.9
Drilling Method: DPT
Total Borehole Depth (ft.): 16
Core Size: 2 in O.D.
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/3/2020	1430

Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159644 **E:** 1119772
Abandonment Method: Backfilled with bentonite chips
Drilling Date: Start: 8/3/2020 **End:** 8/3/2020
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.9 0							Top 2": CRUSHED GRAVEL	
	GP	GP-1	48	28		Fill	Dry, dark brown/black, fine to coarse SAND, litte fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-2' Lead, PCBs at 1410. ENV: 2-4' Lead, PCBs at 1415.
479.9 5	GP	GP-2	48	24			Dry, dark brown/black, fine to coarse SAND, litte fine to coarse gravel, little silt, trace slag (SP)	ENV: 4-6' Lead, PCBs at 1420. ENV: 6-8' Lead, PCBs at 1425.
474.9 10	GP	GP-3	48	30			Dry, dark brown/black, fine to coarse SAND, litte fine to coarse gravel, little silt, trace brick, trace slag (SP)	ENV: 8-10' Lead, PCBs at 1430. ENV: 10-12' Lead, PCBs at 1435.
	GP	GP-4	48	48			Dry, dark brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick, trace slag (SP)	ENV: 12-14' Lead, PCBs at 1440.
469.9 15						Silt and Gravel	Dry, red-brown, SILT and fine to coarse GRAVEL (siltstone fragments), little fine to medium sand (GM)	
464.9							Exploration terminated at 16.0 ft bgs.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: 300-SB50**

CDM Smith

Boring Number: 300-SB51

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159665 **E:** 1119659
Drilling Date: Start: 8/7/2020 **End:** 8/7/2020

Surface Elevation (ft.): 460.2
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/7/2020	1235

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
460.2 0	GP	GP-1	48	36		Silt and Gravel	Dry, red-brown, SILT and fine to coarse GRAVEL, some fine to coarse sand (GM)	ENV: 0-2' Lead, PCB at 1225 ENV: 2-4' Lead, PCB at 1230
455.2 5	GP	GP-2	24	24			Dry, red-brown, SILT and fine to coarse GRAVEL, some fine to coarse sand (GM)	ENV: 4-6' Lead, PCB at 1235
450.2 10							Exploration terminated at 6.0 ft bgs.	
445.2 15								
440.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: 300-SB51**

CDM Smith

Boring Number: 300-SB52

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159666 **E:** 1119694
Drilling Date: Start: 8/7/2020 **End:** 8/7/2020

Surface Elevation (ft.): 474.7
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/7/2020	1115

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
474.7 0	GP	GP-1	48	18		Fill	Dry, brown-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-2' Lead, PCB, TCLP at 1105 ENV: 2-4' Lead x2 (Dup), PCB at 1110
469.7 5	GP	GP-2	48	30			Dry, brown/black/red-brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP) Dry, brown/black/gray, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 4-6' Lead, PCB at 1115 ENV: 6-12' Lead, PCB at 1120
464.7 10	GP	GP-3	48	48				
459.7 15							Exploration terminated at 12.0 ft bgs.	
454.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: 300-SB52**

CDM Smith

Boring Number: 300-SB53

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Surface Elevation (ft.): 483.1
Drilling Method: DPT
Total Borehole Depth (ft.): 21
Core Size: 2 in O.D.
Depth to Initial Water Level (ft):
Bore Hole Location: Former Flintkote Property - 300 Parcel

Depth	Date	Time
NR		

N: 1159663 **E:** 1119720
Abandonment Method: Backfilled with bentonite chips
Drilling Date: Start: 8/7/2020 **End:** 8/7/2020
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
483.1 0	GP	GP-1	48	24		Fill	Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-2' Lead, PCB at 0840 ENV: 2-4' Lead, PCB at 0845
478.1 5	GP	GP-2	48	36			Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 4-6' Lead, PCB at 0850 ENV: 6-8' Lead, PCB x2 (DUP) at 0855
473.1 10	GP	GP-3	48	48			Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick (SP)	ENV: 8-10' Lead, PCB x2 (MS/MSD) at 0900 10.5-12': Black solidified tar. No sample collected.
468.1 15	GP	GP-4	48	32			Wet, brown, fine to coarse SAND, some fine to coarse gravel, trace silt, trace slag, trace brick, trace debris (SP) Dry, red-brown to brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace brick (SP)	ENV: 12-16' Lead, PCB at 0910 14.5-15.5': Black solidified tar and metal waste.
463.1	GP	GP-5	48	24			Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag, trace brick (SP)	ENV: 16-20' Lead, PCB at 0915

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: 300-SB53**

Boring Number: 300-SB53

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Elev. / Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
463.1 / 20	GP	GP-6	12	12		Silt	Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag, trace brick (SP)	ENV: 20-21' Lead, PCB at 0920
							Moist, red-brown, SILT, some fine to coarse gravel, little fine to coarse sand (ML)	~~Weathered Siltstone chips~~ in tip.
							Exploration termianted at 21.0 ft bgs (Refusal).	
458.1 / 25								
453.1 / 30								
448.1 / 35								
443.1 / 40								
438.1 / 45								

CDM Smith

Boring Number: 300-SB54

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159685 **E:** 1119740
Drilling Date: Start: 8/7/2020 **End:** 8/7/2020

Surface Elevation (ft.): 484.8
Total Borehole Depth (ft.): 16
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.8 0	GP	GP-1	48	26		Fill	Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace brick, trace wood (SP)	ENV: 0-2' Lead, PCB x2 (MS/MSD) at 0805 ENV: 2-4' Lead, PCB at 0810
479.8 5	GP	GP-2	48	34			Dry, black, fine to coarse SAND, little silt, little fine to coarse gravel, trace brick, trace wood, trace slag (SP)	ENV: 4-6' Lead, PCB at 0815 Fibrous debris (tar) at 4 to 6 ft bgs. ENV: 6-8' Lead x2, PCB x2 (DUP) at 0820
474.8 10	GP	GP-3	48	24			Dry, black, fine to coarse SAND, little silt, little fine to coarse gravel, trace brick, trace wood, trace slag (SP)	ENV: 8-10' Lead, PCB at 0825 ENV: 10-12' Lead, PCB at 0830
						Sand and Silt	Dry, red-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace roots (SP-SM)	
469.8 15	GP	GP-4	48	28			Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 12-14' Lead, PCB at 0835 Siltstone fragments in tip.
464.8							Exploration terminated at 16.0 ft bgs.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: 300-SB54**

CDM Smith

Boring Number: 300-SB55

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 6
N: 1159639 **E:** 1119605
Drilling Date: Start: 7/22/2021 **End:** 7/22/2021

Surface Elevation (ft.): 456
Total Borehole Depth (ft.): 5.5
Depth to Initial Water Level (ft):

Depth	Date	Time
0.2	7/22/2021	1015

Abandonment Method: Backfilled with cuttings
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
456.0 / 0								
	SH	SH-1	48	24		OL	Wet, dark brown, Organic Clayey SILT, little fine to coarse gravel, trace fine to coarse sand (ML/OL)	ENV: 0-2' Lead x2 (Dup), PCBs x2 (Dup) at 1010.
						Fill	Wet, red-brown, fine to coarse GRAVEL and SILT, little fine to coarse sand, trace wood debris (GM)	ENV: 2-4' Lead, PCBs at 1015.
							Wet, brown, fine to coarse GRAVEL, some silt, trace fine sand (GM)	
451.0 / 5	SH	SH-2	18	4				ENV: 4-5.5' Lead, PCBs at 1020.
							Exploration terminated at 5.5 ft bgs (Refusal).	
446.0 / 10								
441.0 / 15								
436.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/2/2020** **Boring Number: 300-SB55**

CDM Smith

Boring Number: 300-SB56

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 6
N: 1159655 **E:** 1119557
Drilling Date: Start: 7/22/2021 **End:** 7/22/2021

Surface Elevation (ft.): 457
Total Borehole Depth (ft.): 2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	7/22/2021	1200

Abandonment Method: Backfilled with cuttings
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
457.0 / 0	SH	SH-1	24	18		Fill	Dry to moist, red-brown, SILT, some fine to medium sand, little fine to coarse gravel, trace brick, trace wood, trace slag (ML)	ENV: 0-2' Lead, PCBs at 1150
							Exploration terminated at 2.0 ft bgs (Refusal).	
452.0 / 5								
447.0 / 10								
442.0 / 15								
437.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/2/2020** **Boring Number: 300-SB56**

CDM Smith

Boring Number: 300-SB57

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 6
N: 1159662 **E:** 1119582
Drilling Date: Start: 7/22/2021 **End:** 7/22/2021

Surface Elevation (ft.): 462.3
Total Borehole Depth (ft.): 3.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	7/22/2021	1130

Abandonment Method: Backfilled with cuttings
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
462.3 0	SH	SH-1	44	24		Silty Sand	Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace roots (SM) Dry, red-brown, SILT and fine to coarse SAND, little fine to coarse gravel (SM)	ENV: 0-2' Lead x2 (MS/MSD), PCBs x2 (MS/MSD) at 1100. ENV: 2-3.5' Lead, PCBs at 1110.
457.3 5							Exploration terminated at 3.5 ft bgs (Refusal).	
452.3 10								
447.3 15								
442.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/2/2020** **Boring Number: 300-SB57**

CDM Smith

Boring Number: 300-SB58

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 6
N: 1159711 **E:** 1119529
Drilling Date: Start: 7/22/2021 **End:** 7/22/2021

Surface Elevation (ft.): 475.6
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	7/22/2021	1320

Abandonment Method: Backfilled with cuttings
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.6 0	SH	SH-1	48	24		Fill	Dry to moist, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace brick (SM)	ENV: 0-2' PCBs at 1310. ENV: 2-4' PCBs at 1315.
470.6 5							Terminated exploration at 4.0 ft bgs (No refusal).	
465.6 10								
460.6 15								
455.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/2/2020** **Boring Number: 300-SB58**

CDM Smith

Boring Number: 300-SB59

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 6
N: 1159715 **E:** 1119502
Drilling Date: Start: 7/22/2021 **End:** 7/22/2021

Surface Elevation (ft.): 463.5
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	7/22/2021	1330

Abandonment Method: Backfilled with cuttings
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
463.5 0	SH	SH-1	48	20		Fill	Dry, brown to red-brown, SILT and fine to coarse SAND, little fine to coarse gravel, trace brick (SM)	ENV: 0-2' PCBs at 1320. ENV: 2-4' PCBs at 1325.
458.5 5							Exploration terminated at 4.0 ft bgs (No refusal).	
453.5 10								
448.5 15								
443.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/2/2020** **Boring Number: 300-SB59**

CDM Smith

Boring Number: 300-SB62

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer/Hand Auger
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 58
N: 1159431 **E:** 1119538
Drilling Date: Start: 9/9/2020 **End:** 9/9/2020

Surface Elevation (ft.): 475
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/9/2020	945

Abandonment Method: Backfilled with bentonite chips
Logged By: E. Kulkusky

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.0 0	SH	SH-1	48	18		Fill	Dry, light brown, fine to medium SAND and SILT, little fine to coarse gravel (SM)	ENV: 0-2' Lead x2 (Dup) at 0935. ENV: 2-4' Lead at 0940.
470.0 5	SH	SH-2	24	9			Dry, light brown, fine to medium SAND and SILT, little fine to coarse gravel (SM)	ENV: 4-6' Lead at 0945.
465.0 10							Exploration terminated at 6.0 ft bgs.	
460.0 15								
455.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 11/17/2020** **Boring Number: 300-SB62**

CDM Smith

Boring Number: 300-SB63

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 58
N: 1159485 **E:** 1119475
Drilling Date: Start: 9/9/2020 **End:** 9/9/2020

Surface Elevation (ft.): 475
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	9/9/2020	1325

Abandonment Method: Backfilled with bentonite chips
Logged By: E. Kulkusky

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.0 / 0	SH	SH-1	48	33		Fill	Dry, brown-gray, fine to medium SAND and SILT, some fine to coarse gravel (SM)	ENV: 0-2' Lead at 1315.
							Dry, light brown-gray, fine to medium SAND and SILT, some fine to coarse gravel (SM)	ENV: 2-4' Lead at 1320.
470.0 / 5	SH	SH-2	24	18			Dry, light brown, SILT and fine to medium SAND, little fine to coarse gravel (SM)	ENV: 4-6' Lead at 1325.
							Exploration terminated at 6.0 ft bgs.	
465.0 / 10								
460.0 / 15								
455.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 11/17/2020** **Boring Number: 300-SB63**

CDM Smith

Boring Number: 300-SB6A

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former Flintkote Property - 300 Parcel
N: 1159184 **E:** 1119795
Drilling Date: Start: 8/11/2020 **End:** 8/11/2020

Surface Elevation (ft.): 469.6
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/11/2020	1110

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.6 0	GP	1	48	22		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-6' TCLP, Pesticides, Metals, VOA, SVOC, MC at 1045
464.6 5	GP	2	24	24		Sand and Silt	Dry, brown/red-brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris (SP)	
							Dry, light brown, fine to coarse SAND and SILT, little fine to coarse gravel (SM)	
459.6 10							Exploration terminated at 6.0 ft bgs.	
454.6 15								
449.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: 300-SB6A**

CDM Smith

Boring Number: UPB-SB09

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158337 **E:** 1120299
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 475.4
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/6/2020	1105

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.4 0	GP	1	48	32		Fill	Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace brick, trace debris (SM) Dry, red-brown, SILT, some fine to medium sand, trace fine to coarse gravel (ML)	ENV: 0-8' TCLP, Pesticides, metals, SVOC, MC, VOCs at 1100
							Dry, white/brown, fine to coarse GRAVEL, little silt, little fine to medium sand (GP) Dry, white/brown, fine to coarse GRAVEL, some silt, little fine to medium sand (GM)	
470.4 5	GP	2	48	30		Silty Clay	Wet, gray, Silty CLAY, little fine to coarse gravel, trace fine to medium sand (CL)	
465.4 10							Exploration terminated at 8.0 ft bgs.	
460.4 15								
455.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB09**

CDM Smith

Boring Number: UPB-SB23

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1157992 **E:** 1120327
Drilling Date: Start: 8/10/2020 **End:** 8/10/2020

Surface Elevation (ft.): 486.1
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/10/2020	1315

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
486.1 0	GP	GP-1	48	30		Fill	Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag, trace brick (SP)	ENV: 0-2' PCB at 1305 ENV: 2-4' PCB at 1310
481.1 5							Exploration terminated at 4.0 ft bgs.	
476.1 10								
471.1 15								
466.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4
Loose: 4-10
M. Dense: 10-30
Dense: 30-50
V. Dense: >50

Fine Grained (Clay):
V. Soft: <2
Soft: 2-4
M. Stiff: 4-8
Stiff: 8-15
V. Stiff: 15-30
Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB23**

CDM Smith

Boring Number: UPB-SB24

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158022 **E:** 1120339
Drilling Date: Start: 8/10/2020 **End:** 8/10/2020

Surface Elevation (ft.): 485.9
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/10/2020	1305

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
485.9 0	GP	GP-1	48	36		Fill	Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag, trace brick (SP)	ENV: 0-2' PCB 2x (MS/MSD) at 1255 ENV: 2-4' PCB at 1300
						Gravel	Dry, white/gray, fine to coarse GRAVEL, trace fine sand, trace silt (GP)	Possible boulder.
480.9 5							Exploration terminated at 4.0 ft bgs.	
475.9 10								
470.9 15								
465.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB24**

CDM Smith

Boring Number: UPB-SB25

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158046 **E:** 1120359
Drilling Date: Start: 8/10/2020 **End:** 8/10/2020

Surface Elevation (ft.): 485.4
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/10/2020	1250

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
485.4 0	GP	GP-1	48	36		Fill	Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, trace silt, trace slag, trace brick (SP)	ENV: 0-2' PCB at 1245 ENV: 2-4' PCB x2 (Dup) at 1250
480.4 5							Exploration terminated at 4.0 ft bgs.	
475.4 10								
470.4 15								
465.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4
Loose: 4-10
M. Dense: 10-30
Dense: 30-50
V. Dense: >50

Fine Grained (Clay):
V. Soft: <2
Soft: 2-4
M. Stiff: 4-8
Stiff: 8-15
V. Stiff: 15-30
Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB25**

CDM Smith

Boring Number: UPB-SB26

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158215 **E:** 1120211
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 475.7
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/6/2020	1455

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.7 0	GP	GP-1	48	22		Gravel	Dry, white, fine to coarse GRAVEL, little silt, trace fine to coarse sand (GP)	ENV: 0-2' Lead at 1445
						Silt	Dry, red-brown, SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 2-4' Lead at 1450
							Moist, brown, slightly Organic SILT, little fine to medium sand, trace fine gravel (ML)	
470.7 5							Exploration terminated at 4.0 ft bgs.	
465.7 10								
460.7 15								
455.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB26**

CDM Smith

Boring Number: UPB-SB27

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158260 **E:** 1120211
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 475
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
475.0 0	GP	GP-1	48	28		Gravel	Dry, red-brown, fine to coarse GRAVEL, little fine to coarse sand, little silt (GP)	ENV: 0-2' Lead at 1425
						Sand	Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 2-4' Lead at 1430
470.0 5	GP	GP-2	48	30		Sand	Dry, brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 4-6' Lead x2 (MS/MSD) at 1435
						Gravel Clay	Wet, light brown, Silty CLAY, trace fine to coarse gravel, trace fine to coarse sand (CL)	ENV: 6-8' Lead at 1440
						Gravel	Wet, light brown, fine to coarse GRAVEL, little silty clay, trace fine sand (GP)	
465.0 10							Exploration terminated at 8.0 ft bgs.	
460.0 15								
455.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UPB-SB27**

CDM Smith

Boring Number: UPB-SB28

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158252 **E:** 1120167
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 478.9
Total Borehole Depth (ft.): 8.2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/6/2020	1420

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
478.9 0	GP	GP-1	48	22		Fill	Moist, red-brown to brown, SILT, little fine to coarse gravel, little fine to medium sand, trace roots (ML)	ENV: 0-2' Lead at 1405
							Dry, red-brown, fine to coarse GRAVEL, little silt, trace fine to medium sand (GP)	ENV: 2-4' Lead at 1410
473.9 5	GP	GP-2	48	26		Fill	Dry, black, fine to coarse SAND, little fine to coarse gravel, trace silt [SLAG] (SP) Dry, black, fine to coarse SAND, little fine to coarse gravel, trace silt [SLAG] (SP)	ENV: 4-7.5' at 1415
	GP	GP-3	2	2		WRCL	Moist, dark brown, Silty CLAY, trace fine sand, trace fine to coarse gravel	ENV: 7.5-8' Lead at 1420
							Siltstone Fragments (Weathered Rock)	
							Exploration terminated at 8.2 ft bgs (refusal).	
468.9 10								
463.9 15								
458.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB28**

CDM Smith

Boring Number: UPB-SB29

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158298 **E:** 1120302
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 473.7
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
7.2	8/6/2020	1020

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
473.7 0	GP	GP-1	48	24		Fill	Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace brick, trace debris (SM) Dry, red-brown, fine to medium SAND and SILT, little fine to coarse gravel, trace debris, trace wood (SM)	ENV: 0-2' Lead, TCLP, PCB x2 (Dup) at 1005 ENV: 2-4' Lead, PCB at 1010
468.7 5	GP	GP-2	48	24		Fill	Dry, red-brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace brick (ML)	ENV: 4-6' Lead, TCLP, PCB at 1015 ENV: 6-8' Lead, PCB at 1020
							Wet, brown, fine to coarse GRAVEL, some silt, trace fine to medium sand (GM)	
	GP	GP-3	24	24			Wet, brown, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP)	ENV: 8-10' Lead, PCB at 1025
463.7 10						Gravel	Wet, red-brown, fine to coarse GRAVEL, some silt, little fine to coarse sand (GM) Exploration terminated at 10.0 ft bgs.	
458.7 15								
453.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UPB-SB29**

CDM Smith

Boring Number: UPB-SB30

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158333 **E:** 1120171
Drilling Date: Start: 8/7/2020 **End:** 8/7/2020

Surface Elevation (ft.): 477.4
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
8.5	8/6/2020	1350

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
477.4 0	GP	GP-1	48	30		Sand	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag (SP)	ENV: 0-2' Lead, TCLP at 1340
							Dry, white, fine to coarse SAND, some silt, some fine gravel (SP)	ENV: 2-4' Lead, TCLP at 1345 Possible Fill from 0-4 ft bgs.
472.4 5	GP	GP-2	48	34		Clayey Silt	Moist, red-brown, Clayey SILT, little fine to coarse gravel, trace fine to medium sand (ML-CL)	ENV: 4-6' Lead at 1350
						GP	Crushed SILTSTONE	ENV: 6-8' Lead at 1355
						Silty Clay	Moist, dark brown, Silty CLAY, trace fine to coarse gravel, trace fine sand (CL)	
▼	GP	GP-3	24	24			Moist, green brown mottled red-brown, Silty CLAY, trace fine to coarse gravel, trace fine sand (CL)	ENV: 8-10' Lead at 1400 Crushed Siltstone chips at 8.4-9.0 ft and 9.0-9.7 ft.
467.4 10							Exploration terminated at 10.0 ft bgs.	
462.4 15								
457.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UPB-SB30**

CDM Smith

Boring Number: UPB-SB31

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158435 **E:** 1120185
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 473.8
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/6/2020	1305

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
473.8 0	GP	GP-1	48	32		Fill	Dry, dark brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-2' Lead at 1250 ENV: 2-4' Lead at 1255
468.8 5	GP	GP-2	48	27		Fill	Dry, brown, fine to coarse SAND, little silt, trace fine to coarse gravel, trace slag, trace debris (SP) Dry, brown, fine to coarse SAND, little silt, trace fine to coarse gravel, trace slag, trace wood (SP)	ENV: 4-6' Lead at 1300 ENV: 6-8' Lead at 1305
						Gravel & Silt	Dry, red-brown, fine to coarse GRAVEL and SILT, little fine to medium sand (GM)	
	GP	GP-3	24	18		Gravel & Silt	Moist, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 8-10' Lead at 1310
463.8 10						WR	Dry, white, fine to coarse GRAVEL, little silt, trace fine to coarse sand (GP) [Weathered Rock]	Gravel as crushed Dolostone
458.8 15							Exploration terminated at 10.0 ft bgs.	
453.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB31**

CDM Smith

Boring Number: UPB-SB32

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158420 **E:** 1120150
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 473.3
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/6/2020	1325

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
473.3 0	GP	GP-1	48	34		Fill	Dry, brown-black, fine to coarse SAND, little silt, little fine to coarse gravel, trace slag, trace brick (SP)	ENV: 0-2' Lead at 1315 ENV: 2-4' Lead x2 (Dup) at 1320
							Moist, red-brown, SILT and fine to medium SAND, little fine to coarse gravel, trace brick (SM)	
468.3 5	GP	GP-2	24	24		Silt	Moist, brown, SILT, some fine to medium sand, little fine to coarse gravel (rounded) (ML)	ENV: 4-6' Lead x2 (MS/MSD) at 1325
						WR	Dry, white, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP) [WEATHERED ROCK]	Gravel as crushed Dolostone
463.3 10							Exploration terminated at 6.0 ft bgs (Refusal).	
458.3 15								
453.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UPB-SB32**

CDM Smith

Boring Number: UPB-SB37

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158828 **E:** 1120155
Drilling Date: Start: 8/3/2020 **End:** 8/3/2020

Surface Elevation (ft.): 470.1
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
8	8/3/2020	1130

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.1 / 0							Top 3": TOPSOIL	
	GP	GP-1	48	16		Fill	Dry, red-brown, fine to coarse SAND and fine to coarse GRAVEL, little silt (SP-GP)	ENV: 0-2' Lead, TCLP x2 (Dup) at 1100. ENV: 2-4' Lead at 1105.
465.1 / 5	GP	GP-2	48	12		Fill	Dry, red-brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace brick, trace slag (SP)	ENV: 4-6' Lead at 1110. ENV: 6-8' Lead at 1115.
▼						Fill	Wet, red-brown, fine to coarse SAND, little silt, little fine to coarse gravel, trace slag (SP)	ENV: 8-10' Lead at 1120.
460.1 / 10	GP	GP-3	48	34		Org. Clay	Wet, gray-brown, Organic Silty CLAY, trace fine sand, trace fine gravel, trace roots (OL)	ENV: 10-12' Lead at 1125 Organic odor. Wood 10 to 10.4 ft bgs. PID = 0.7ppm
455.1 / 15							Exploration terminated at 12.0 ft bgs.	
450.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB37**

CDM Smith

Boring Number: UPB-SB38

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158845 **E:** 1120213
Drilling Date: Start: 8/3/2020 **End:** 8/3/2020

Surface Elevation (ft.): 480.1
Total Borehole Depth (ft.): 16.4
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
480.1 0	GP	GP-1	48	24		Fill	Dry, black/dark brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-2' Lead, TCLP at 1015. ENV: 2-4' Lead at 1020.
475.1 5	GP	GP-2	48	24		Fill	Dry, black/dark brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 4-6' Lead at 1025. ENV: 6-8' Lead, TCLP at 1030.
470.1 10	GP	GP-3	48	30		Fill	Dry, black/dark brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick, trace slag (SP)	ENV: 8-10' Lead at 1035. ENV: 10-12' Lead at 1040.
	GP	GP-4	48	48		Fill	Dry, black/dark brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP) Wet, brown and black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 12-14' Lead at 1045.
465.1 15						Silty Clay	Wet, red-brown, Silty CLAY, little fine sand, trace fine gravel (CL)	ENV: 14-16' Lead at 1050.
	GP	GP-5	5	5		Silty Clay	Wet, red-brown, Silty CLAY, little fine sand, trace fine gravel (CL)	ENV: 16-16.4' Lead at 1055.
460.1							Exploration terminated at 16.4 ft bgs (refusal).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UPB-SB38**

CDM Smith

Boring Number: UPB-SB39

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158853 **E:** 1120262
Drilling Date: Start: 8/3/2020 **End:** 8/3/2020

Surface Elevation (ft.): 485
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/3/2020	1000

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
485.0 0	GP	GP-1	48	24		Fill	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trave slag (SP)	ENV: 0-2' Lead at 0940. ENV: 2-4' Lead at 0945.
480.0 5	GP	GP-2	24	24		Silt	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 4-6' Lead (MS/MSD) at 0950.
475.0 10							Exploration terminated at 6.0 ft bgs.	
470.0 15								
465.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB39**

CDM Smith

Boring Number: UPB-SB40

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158308 **E:** 1120326
Drilling Date: Start: 8/11/2020 **End:** 8/11/2020

Surface Elevation (ft.): 491.1
Total Borehole Depth (ft.): 14.5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/11/2020	910

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
491.1 0	GP	GP-1	48	30		Fill	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 0-2' Lead, PCB at 0805 ENV: 2-4' Lead, PCB at 0810
486.1 5	GP	GP-2	48	38			Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel, trace brick, trace slag (ML)	ENV: 4-6' Lead, PCB at 0815 ENV: 6-8' Lead, PCB at 0820
481.1 10	GP	GP-3	48	40			Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel, trace brick, trace slag (ML)	ENV: 8-10' Lead, PCB at 0825 ENV: 10-12' Lead, PCB at 0830
	GP	GP-4	30	0			No recovery	
476.1 15							Exploration terminated at 14.5 ft bgs (Refusal-obstruction)	
471.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB40**

CDM Smith

Boring Number: UPB-SB41

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158345 **E:** 1120321
Drilling Date: Start: 8/11/2020 **End:** 8/11/2020

Surface Elevation (ft.): 490.3
Total Borehole Depth (ft.): 17.2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/11/2020	1010

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
490.3 0	GP	GP-1	48	32		Fill	Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 0-2' Lead, PCB at 0915 ENV: 2-4' Lead, PCB at 0920
485.3 5	GP	GP-2	48	34			Dry, red-brown, SILT, some fine to medium sand, little fine to coarse gravel, trace slag, trace brick (ML)	ENV: 4-6' Lead, PCB at 0925 ENV: 6-8' Lead, PCB at 0930
480.3 10	GP	GP-3	48	48			Dry, light brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace slag (SM)	ENV: 8-10' Lead, PCB at 0935 ENV: 10-12' Lead, PCB at 0940
475.3 15	GP	GP-4	48	32			Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace slag (SM)	ENV: 12-14' Lead, PCB at 0945 ENV: 14-16' Lead, PCB, TCLP at 0950
	GP	GP-5	14	9			Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace slag (SM) Crushed concrete	
470.3							Exploration terminated at 17.2 ft bgs (Refusal-obstruction).	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UPB-SB41**

CDM Smith

Boring Number: UP-SB12

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157047 **E:** 1119996
Drilling Date: Start: 8/12/2020 **End:** 8/12/2020

Surface Elevation (ft.): 503.9
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/12/2020	1230

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
503.9 0	GP	GP-1	48	20		Fill	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace brick, trace slag (SP-SM) Dry, light brown-gray, fine to coarse GRAVEL, some fine to coarse sand, little silt (GP-SM)	ENV: 0-4' TCLP, MC, VOA, SVOC, Pesticidies, Metals at 1215
498.9 5							Exploration terminated at 4.0 ft bgs.	
493.9 10								
488.9 15								
483.9								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB12**

CDM Smith

Boring Number: UP-SB30

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1156984 **E:** 1120096
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 509.5
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	1120

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
509.5 / 0							Top 2": TOPSOIL	
	SH	SH-1	48	28		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel , little silt, trace brick (SP)	ENV: 0-2' Lead at 1110.
						Gravel and Silt	Dry, light brown, fine to coarse GRAVEL and SILT, little fine to medium sand (GM)	ENV: 2-4' Lead at 1115.
504.5 / 5							Exploration terminated at 4.0 ft bgs.	
499.5 / 10								
494.5 / 15								
489.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB30**

CDM Smith

Boring Number: UP-SB31

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1156957 **E:** 1120010
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 501
Total Borehole Depth (ft.): 6.8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	1015

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
501.0 / 0							Top 2": TOPSOIL	
	SH	SH-1	48	24		Fill	Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel (SP)	ENV: 0-2' Lead x2 (MS/MSD) at 0850.
							Dry, light brown, fine to coarse SAND, some silt, trace roots (SM)	ENV: 2-4' Lead at 0855.
496.0 / 5	SH	SH-2	24	14			Dry, dark brown, fine to coarse SAND, some silt, trace fine gravel, trace glass, trace debris	ENV: 4-6' Lead x2 (Dup) at 1015.
	SH	SH-3	8	0		WR	Weathered Rock (GP)	
491.0 / 10							Exploration terminated at 6.8 ft bgs (Refusal).	
486.0 / 15								
481.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB31**

CDM Smith

Boring Number: UP-SB32

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1156939 **E:** 1119993
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 512.5
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	835

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
512.5 0	GP	1	48	30		Fill	Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel (SP)	ENV: 0-2' Lead at 0825. ENV: 2-4' Lead x2 (Dup) at 0830.
507.5 5	GP	2	48	34		Fill	Dry, brown, fine to coarse SAND, little silt, little fine to coarse gravel (SP)	ENV: 4-6' Lead at 0835.
						Sand and Silt	Dry, red-brown, fine to coarse SAND and SILT, little fine to coarse gravel (SM)	ENV: 6-8' Lead at 0840.
502.5 10							Exploration terminated at 8.0 ft bgs.	
497.5 15								
492.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB32**

CDM Smith

Boring Number: UP-SB33

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1156986 **E:** 1120019
Drilling Date: Start: 8/13/2020 **End:** 8/13/2020

Surface Elevation (ft.): 489.8
Total Borehole Depth (ft.): 4.4
Depth to Initial Water Level (ft):

Depth	Date	Time
0.5	8/13/2020	945

Abandonment Method:
Logged By: E. Kulkusky

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
489.8								
0	SH	SH-1	48	18		Silty Sand	Top 6": Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel (SM) Bottom 12": Wet, gray, fine to coarse SAND and SILT, some fine to coarse gravel (SM)	ENV: 0-2' Lead ENV: 2-4' Lead
	SH	SH-2	3	0			No recovery	
484.8 / 5							Exploration terminated at 4.4 ft bgs (Refusal).	
479.8 / 10								
474.8 / 15								
469.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UP-SB33**

CDM Smith

Boring Number: UP-SB34

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1156982 **E:** 1119997
Drilling Date: Start: 8/13/2020 **End:** 8/13/2020

Surface Elevation (ft.): 500.6
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/13/2020	845

Abandonment Method:
Logged By: E. Kulkusky

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
500.6 0	SH	SH-1	48	24		Silty Sand and Gravel	Top 12": Dry, light brown, fine to coarse SAND and SILT, some fine gravel Bottom 12": Dry, gray, fine GRAVEL, some silt, some fine to coarse sand	ENV: 0-2' Lead ENV: 2-4' Lead, TCLP
495.6 5	SH	SH-2	24	24			Top 18": Dry, gray, SILT and fine to coarse SAND, some fine to coarse gravel Bottom 6": Moist, brown, fine to coarse SAND and SILT, trace gravel	ENV: 4-6' Lead
490.6 10							Exploration terminated at 6.0 ft bgs.	
485.6 15								
480.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB34**

CDM Smith

Boring Number: UP-SB35

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1156972 **E:** 1119974
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 514.2
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	1040

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
514.2 0							Top 3": TOPSOIL	
	GP	GP-1	48	26		Fill	Dry, brown, fine to coarse SAND, little silt, trace fine to coarse gravel, trace brick, trace slag (SP)	ENV: 0-2' Lead at 1025. ENV: 2-4' Lead at 1030.
509.2 5	GP	GP-2	48	36		Gravel	Dry, light brown, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP) Dry, gray-brown, fine to coarse GRAVEL, some silt, little fine to coarse sand (GP)	ENV: 4-6' Lead, TCLP Lead at 1035. ENV: 6-8' Lead at 1040.
504.2 10							Exploration terminated at 8.0 ft bgs.	
499.2 15								
494.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB35**

CDM Smith

Boring Number: UP-SB36

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1156956 **E:** 1119941
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 516
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	1105

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
516.0 0	GP	GP-1	48	42		Fill	Dry, black/dark brown, fine to coarse SAND, some fine to coarse gravel, little silt, trace glass, trace slag (SP)	ENV: 0-2' Lead at 1045.
							Moist, brown, SILT & CLAY and fine to coarse SAND, little fine to coarse gravel, trace slag (SM)	ENV: 2-4' Lead x2 (Dup) at 1050.
511.0 5	GP	GP-2	48	40		OL	Moist, dark brown, Organic Clayey SILT, trace fine sand, trace wood (OL)	ENV: 4-6' Lead x2 (MS/MSD) at 1055.
						Gravel	Dry, gray-brown, fine to coarse GRAVEL, some silt, little fine to medium sand (GM)	ENV: 6-8' Lead at 1100.
							Dry, gray-brown, fine to coarse GRAVEL, some silt, little fine to medium sand (GM)	ENV: 8-10' Lead 1105.
506.0 10	GP	GP-3	48	42		Silt and Clay	Moist, light brown, SILT & CLAY, little fine to medium sand, little fine to coarse gravel (CL-ML)	ENV: 10-12' Lead at 1110.
							Exploration terminated at 12.0 ft bgs.	
501.0 15								
496.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UP-SB36**

CDM Smith

Boring Number: UP-SB37

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157011 **E:** 1120018
Drilling Date: Start: 8/12/2020 **End:** 8/12/2020

Surface Elevation (ft.): 490
Total Borehole Depth (ft.): 3.3
Depth to Initial Water Level (ft):

Depth	Date	Time
2.7	8/12/2020	1340

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
490.0 / 0	SH	SH-1	39	22		Sand and Silt	Dry, brown, fine to coarse SAND and SILT, little fine to coarse gravel (SM)	ENV: 0-2' Lead at 1325 ENV: 2-3.2' Lead at 1330
							Wet, brown, fine to coarse SAND and SILT, little fine to coarse gravel (SM)	
							Exploration terminated at 3.3 ft bgs (Refusal).	
485.0 / 5								
480.0 / 10								
475.0 / 15								
470.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4
Loose: 4-10
M. Dense: 10-30
Dense: 30-50
V. Dense: >50

Fine Grained (Clay):
V. Soft: <2
Soft: 2-4
M. Stiff: 4-8
Stiff: 8-15
V. Stiff: 15-30
Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UP-SB37**

CDM Smith

Boring Number: UP-SB38

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157013 **E:** 1119994
Drilling Date: Start: 8/12/2020 **End:** 8/12/2020

Surface Elevation (ft.): 500.8
Total Borehole Depth (ft.): 4.4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/12/2020	1315

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
500.8 0	SH	SH-1	48	32		Gravel	Dry, gray, fine to coarse GRAVEL, little fine to coarse sand, little silt (GP)	ENV: 0-2' Lead at 1240 ENV: 2-4' Lead, TCLP at 1245
	SH	SH-2	5	5		Silt	Dry, gray, SILT, some fine to coarse gravel, little fine to coarse sand (ML)	
495.8 5							Exploration terminated at 4.4 ft bgs (Refusal).	
490.8 10								
485.8 15								
480.8								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UP-SB38**

CDM Smith

Boring Number: UP-SB39

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157008 **E:** 1119953
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 515.5
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
NR		

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
515.5 / 0							Top 2": TOPSOIL	
	GP	GP-1	48	30		Fill	Dry, dark brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-2' Lead at 1125. ENV: 2-4' Lead at 1130.
510.5 / 5	GP	GP-2	48	36		Fill	Dry, dark brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 4-6' Lead, TCLP at 1135.
						Silt and Gravel	Moist, light brown, SILT and fine to coarse GRAVEL, little fine to medium sand (GM)	ENV: 6-8' Lead at 1140.
505.5 / 10							Exploration terminated at 8.0 ft bgs.	
500.5 / 15								
495.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB39**

CDM Smith

Boring Number: UP-SB40

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157024 **E:** 1119915
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 516.3
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	1255

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
516.3 0	GP	GP-1	48	42		Fill	Dry, dark brown/black, fine to coarse SAND, little silt, little fine to coarse gravel, trace debris (SP)	ENV: 0-2' Lead at 1235. ENV: 2-4' Lead x2 (DUP) at 1240.
511.3 5	GP	GP-2	48	36		Silt and Clay	Moist, brown, SILT & CLAY, little fine to coarse gravel, little fine to medium sand, trace slag (ML) Moist, brown, SILT & CLAY, little fine to coarse gravel, little fine to medium sand, trace slag (ML) Dry to moist, light brown, Clayey SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 4-6' Lead at 1245. ENV: 6-8' Lead, TCLP Lead at 1250.
506.3 10	GP	GP-3	48	24		Gravel and Silt	Dry, gray-light brown, fine to coarse GRAVEL and SILT, little fine to medium sand (GM)	ENV: 8-10' Lead at 1255. ENV: 10-12' Lead at 1300.
501.3 15							Exploration terminated at 12.0 ft bgs.	
496.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB40**

CDM Smith

Boring Number: UP-SB41

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157099 **E:** 1119914
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 514.7
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	1320

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
514.7 0	GP	GP-1	48	34		Fill	Dry, dark brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace wood, trace slag (SP)	ENV: 0-2' Lead at 1305. ENV: 2-4' Lead at 1310.
509.7 5	GP	GP-2	48	48		Fill	Dry, dark brown/black, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace wood, trace slag (SP) Moist, light brown, SILT & CLAY, little fine to coarse gravel, little fine to medium sand, trace slag (ML) Dry, light brown, SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 4-6' Lead x2 (MS/MSD) at 1315. ENV: 6-8' Lead at 1320.
504.7 10	GP	GP-3	48	42		Fill Clay & Silt and Gravel	Dry, light brown, SILT, some fine to coarse gravel, little fine to medium sand, trace slag (ML) Moist, red-brown, CLAY & SILT and fine to coarse GRAVEL, trace fine to coarse sand (GM)	ENV: 8-10' Lead, TCLP Lead at 1325. ENV: 10-12' Lead, TCLP Lead at 1330
499.7 15 494.7						Clay & Silt and Gravel	Exploration terminated at 12.0 ft bgs.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB41**

CDM Smith

Boring Number: UP-SB42

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157219 **E:** 1119937
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 510.8
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	1340

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
510.8 0							Top 5": TOPSOIL	
	GP	GP-1	48	36		Fill	Dry, brown/black/light brown, SILT and fine to medium SAND, little fine to coarse gravel, trace slag (SM)	ENV: 0-2' PCBs at 1335. ENV: 2-4' PCBs at 1340.
						ML	Dry, red-brown, Clayey SILT, little fine to coarse gravel, trace fine sand (ML)	
505.8 5							Exploration terminated at 4.0 ft bgs.	
500.8 10								
495.8 15								
490.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB42**

CDM Smith

Boring Number: UP-SB43

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157254 **E:** 1120012
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 507.1
Total Borehole Depth (ft.): 7
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	1410

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
507.1 0							Top 2": TOPSOIL	
	GP	GP-1	48	36		Fill	Dry, brown/dark brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-2' Lead, PCBs, TCLP at 1345. ENV: 2-4' Lead, PCBs x2 (Dup) at 1350.
502.1 5	GP	GP-2	36	28		WR	Dry, white, fine to coarse GRAVEL, little silt, trace fine sand (gravel as dolostone) [Weathered Rock] (GP)	ENV: 4-7' Lead, PCBs at 1355.
497.1 10							Exploration terminated at 7.0 ft bgs (Refusal).	
492.1 15								
487.1								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UP-SB43**

CDM Smith

Boring Number: UP-SB44

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157303 **E:** 1120035
Drilling Date: Start: 8/4/2020 **End:** 8/4/2020

Surface Elevation (ft.): 506.1
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/4/2020	1425

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
506.1 0	GP	1	48	34		Sand	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt (SP) Dry, dark brown, fine to coarse SAND, little fine to coarse gravel, little silt (SP)	ENV: 0-2' Lead, PCBs at 1415. ENV: 2-4' Lead, PCBs at 1420.
501.1 5	GP	2	12	12		WR	Dry, white, fine to coarse GRAVEL, little silt, trace fine sand (gravel as dolostone) [Weathered Rock] (GP) Exploration terminated at 5.0 ft bgs (Refusal).	ENV: 4-5' Lead, PCBs at 1425.
496.1 10								
491.1 15								
486.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB44**

CDM Smith

Boring Number: UP-SB45

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157409 **E:** 1120195
Drilling Date: Start: 8/5/2020 **End:** 8/5/2020

Surface Elevation (ft.): 482.1
Total Borehole Depth (ft.): 4.1
Depth to Initial Water Level (ft):

Depth	Date	Time
1.4	8/5/2020	1025

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.1 / 0	SH	SH-1	48	28		Fill	Moist to wet, brown, Organic Silty CLAY, little fine to coarse sand, little fine to coarse gravel (OL)	ENV: 0-2' Lead at 1000. ENV: 2-4' Lead at 1005.
						WR	Moist, light brown, fine to coarse GRAVEL, some fine to coarse sand, little silty clay (GP)	
	SH	SH-2	1	0			NO RECOVERY	Rock fragments in tip.
477.1 / 5							Exploration terminated at 4.1 ft bgs (Refusal).	
472.1 / 10								
467.1 / 15								
462.1								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB45**

CDM Smith

Boring Number: UP-SB46

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157420 **E:** 1120171
Drilling Date: Start: 8/5/2020 **End:** 8/5/2020

Surface Elevation (ft.): 492.4
Total Borehole Depth (ft.): 2
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/5/2020	1100

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
492.4 0	SH	SH-1	24	12		Fill	Dry, brown, fine to coarse SAND, little silt, little fine gravel, trace roots, trace debris (SP) Dry, light brown, fine to coarse SAND and fine to coarse GRAVEL, some silt (SP-GP)	ENV: 0-2' Lead, TCLP x2 (Dup) at 1030.
							Exploration terminated at 2.0 ft bgs (Refusal).	
487.4 5								
482.4 10								
477.4 15								
472.4								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB46**

CDM Smith

Boring Number: UP-SB47

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157436 **E:** 1120138
Drilling Date: Start: 8/12/2020 **End:** 8/12/2020

Surface Elevation (ft.): 501.7
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/12/2020	1055

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
501.7 0	GP	GP-1	48	28		Fill	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag (SP-SM)	ENV: 0-2' Lead, TCLP at 1035 ENV: 2-4' Lead x2 (Dup) at 1040
496.7 5	GP	GP-2	48	18		Fill	Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag (SP-SM) Dry, brown-white, fine to coarse gravel, little fine to coarse sand, trace silt, trace debris (GP)	ENV: 4-6' Lead at 1045 ENV: 6-8' Lead at 1050
	GP	GP-3	24	24		Fill	Dry, brown-white, fine to coarse gravel, little fine to coarse sand, trace silt, trace debris (GP)	ENV: 8-10' Lead x2 (MS/MSD) at 1055
491.7 10						Silt	Dry, light brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	
486.7 15							Exploration terminated at 10.0 ft bgs.	
481.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB47**

CDM Smith

Boring Number: UP-SB48

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157464 **E:** 1120223
Drilling Date: Start: 8/5/2020 **End:** 8/5/2020

Surface Elevation (ft.): 482.8
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
1.3	8/5/2020	940

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.8 0	SH	SH-1	48	34		Org. Silt & Clay	Moist, brown, slightly Organic Silty CLAY, trace fine sand, trace fine gravel (CL)	ENV: 0-2' Lead, TLCP at 0900
							Wet, brown, Organic SILT & CLAY, some fine to coarse sand, trace fine to coarse gravel, trace shells (OL)	ENV: 2-4' Lead at 0905
477.8 5	SH	SH-2	24	10		Silty Clay & Gravel	Wet, red-brown, Silty CLAY, some fine to coarse gravel, trace fine sand (CL) Wet, red-brown, Silty CLAY and fine to coarse GRAVEL, trace fine sand (GM)	ENV: 4-6' Lead at 0910
472.8 10							Exploration terminated at 6.0 ft bgs.	
467.8 15								
462.8								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB48**

CDM Smith

Boring Number: UP-SB49

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157475 **E:** 1120199
Drilling Date: Start: 8/5/2020 **End:** 8/5/2020

Surface Elevation (ft.): 491
Total Borehole Depth (ft.): 11
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/5/2020	1425

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
491.0 / 0							Topsoil	
	GP	GP-1	48	36		Gravel and Silt	Dry, light brown, fine to coarse GRAVEL and SILT, little fine to medium sand (GM)	ENV: 0-2' Lead at 1400 ENV: 2-4' Lead at 1405
486.0 / 5	GP	GP-2	48	30		Gravel and Silt	Dry, light brown, SILT, some fine to coarse gravel, little fine to medium sand (ML) Dry, brown, SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 4-6' Lead at 1410 ENV: 6-8' Lead at 1415
481.0 / 10	GP	GP-3	36	32		Gravel and Silt	Dry, brown, SILT, some fine to coarse gravel, little fine to medium sand (ML) Dry, light brown, fine to coarse GRAVEL, little silt, little fine to medium sand (GP)	ENV: 8-11' Lead at 1420 Gravel as Dolostone fragments.
476.0 / 15							Exploration terminated at 11.0 ft bgs.	
471.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB49**

CDM Smith

Boring Number: UP-SB50

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157491 **E:** 1120166
Drilling Date: Start: 8/12/2020 **End:** 8/12/2020

Surface Elevation (ft.): 500.4
Total Borehole Depth (ft.): 12
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/12/2020	1030

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
500.4 0	GP	GP-1	48	28		Fill	Moist, dark brown, fine to coarse SAND and SILT, little fine to coarse gravel, trace roots (SM) Dry, light brown, fine to coarse SAND, some silt, little fine to coarse gravel (SP-SM)	ENV: 0-2' Lead at 1004 ENV: 2-4' Lead x2 (MS/MSD) at 1010
495.4 5	GP	GP-2	48	28			Dry, white/brown, fine to coarse GRAVEL, little fine to coarse sand, little silt	ENV: 4-6' Lead at 1015 Gravel as Dolostone. ENV: 6-8' Lead at 1020
							Dry, gray-brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace slag, trace brick (SP-SM)	ENV: 8-10' Lead x2 (Dup) at 1025
490.4 10	GP	GP-3	48	48		Silt	Dry, light brown, SILT, some fine to medium sand, little fine to coarse gravel (ML)	ENV: 10-12' Lead at 1030
485.4 15							Exploration terminated at 12.0 ft bgs.	
480.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UP-SB50**

CDM Smith

Boring Number: UST-E

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158127 **E:** 1120349
Drilling Date: Start: 8/10/2020 **End:** 8/10/2020

Surface Elevation (ft.): 484.7
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/10/2020	1140

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.7 0	GP	GP-1	48	30		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick, trace debris (SP)	ENV: 0-2' Full Suite at 1115 ENV: 2-4' Full Suite at 1120
479.7 5	GP	GP-2	48	38		Organic Silt & Clay	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace brick, trace debris (SP) Moist, gray, Organic Silty CLAY, trace fine gravel, trace fine sand (OL)	ENV: 4-6' Full Suite at 1125 ENV: 6-8' Full Suite at 1130
474.7 10	GP	GP-3	24	24			Wet, gray, Organic Silty CLAY, some fine to coarse gravel, trace fine sand Exploration terminated at 10.0 ft bgs.	Borehole caved at 7.5 ft bgs. ENV: 8-10' Full Suite at 1135
469.7 15								
464.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UST-E**

CDM Smith

Boring Number: UST-N

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158138 **E:** 1120342
Drilling Date: Start: 8/10/2020 **End:** 8/10/2020

Surface Elevation (ft.): 484.5
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/10/2020	915

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.5 0	GP	GP-1	48	32		Fill	Dry-moist, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris (SP)	ENV: 0-2' Full Suite at 0820 ENV: 2-4' Full Suite at 0825
479.5 5	GP	GP-2	48	30			Dry-moist, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris (SP)	ENV: 4-6' Full Suite at 0830 White crushed gravel at 5-6 ft bgs
	GP	GP-3	24	6		Organic Silt & Clay	Wet, gray, Organic Silty CLAY, trace fine gravel, trace fine sand (OL) Wet, gray, Organic Silty CLAY, trace fine gravel, trace fine sand (OL)	ENV: 6-8' Full Suite at 0835 ENV: 8-10' Full Suite at 0840
474.5 10							Exploration terminated at 10.0 ft bgs.	
469.5 15								
464.5								

Sample Types		Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core	SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: UST-N**

CDM Smith

Boring Number: UST-S

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158116 **E:** 1120345
Drilling Date: Start: 8/10/2020 **End:** 8/10/2020

Surface Elevation (ft.): 484.8
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/10/2020	1030

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.8 0	GP	1	48	40		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace slag, trace glass (SP)	ENV: 0-2' Full Suite x2 (MS/MSD) at 0920 ENV: 2-4' Full Suite at 0925
479.8 5	GP	2	48	34		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace debris, trace slag, trace glass (SP)	ENV: 4-6' Full Suite at 0930 ENV: 6-8' Full Suite at 0935
474.8 10	GP	3	24	18		Org. Silt & Clay	Wet, gray, Organic Silty CLAY, trace fine to coarse gravel, trace fine sand (OL)	Petroleum odor at 7.5 ft bgs. ENV: 8-10' Full Suite x2 (Dup) at 0940
469.8 15							Exploration terminated at 10.0 ft bgs.	
464.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UST-S**

CDM Smith

Boring Number: UST-W

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158121 **E:** 1120337
Drilling Date: Start: 8/10/2020 **End:** 8/10/2020

Surface Elevation (ft.): 484.4
Total Borehole Depth (ft.): 10
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/10/2020	1110

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.4 0	GP	GP-1	48	24		Fill	Dry, brown-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris (SP)	ENV: 0-2' Full Suite at 1040 ENV: 2-4' Full Suite at 1045
479.4 5	GP	GP-2	48	34		Fill	Dry, brown-black, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag, trace debris (SP)	ENV: 4-6' Full Suite at 1050 ENV: 6-8' Full Suite at 1055
474.4 10	GP	GP-3	24	24		Silty Clay	Wet, gray-black, Organic Silty CLAY, trace fine gravel, trace fine sand (OL) Wet, gray, Organic Silty CLAY, trace fine gravel, trace fine sand (OL)	Petroleum odor. ENV: 8-10' Full Suite at 1100
469.4 15							Exploration terminated at 10.0 ft bgs.	
464.4								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: UST-W**

CDM Smith

Boring Number: WS-SB32

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street
N: 1158506 **E:** 1120109
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 470.3
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/6/2020	855

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.3 0	GP	GP-1	48	42		Clayey Silt	Moist, brown, SILT, little fine to coarse sand, trace fine gravel, trace brick, trace wood Moist, red-brown, Clayey SILT, little fine to medium sand, trace fine to coarse gravel	ENV: 0-2' Lead x2 (MS/MSD) at 0845 ENV: 2-4' Lead at 0850
465.3 5	GP	GP-2	24	24			Moist, red-brown, Clayey SILT, little fine to medium sand, trace fine to coarse gravel	ENV: 4-6' Lead at 0855 Crushed rock fragments at 5.0 ft bgs. Sample GP-2 gravel as rounded siltstone.
460.3 10							Exploration terminated at 6.0 ft bgs.	
455.3 15								
450.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: WS-SB32**

CDM Smith

Boring Number: WS-SB33

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street
N: 1158562 **E:** 1120109
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 469.5
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
5.2	8/6/2020	915

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
469.5 0	GP	GP-1	48	34		Clayey Silt	Moist, red-brown to brown, Clayey SILT, little fine to coarse gravel, little fine to medium sand, trace wood, trace roots (ML)	ENV: 0-2' Lead at 0900
							Moist, red-brown to brown, Clayey SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 2-4' Lead at 0905
464.5 5	GP	GP-2	24	20			Moist, red-brown to brown, Clayey SILT, some fine to coarse gravel, little fine to medium sand (ML)	ENV: 4-6' Lead at 0910 Gravel as dolostone chips.
459.5 10							Exploration terminated at 6.0 ft bgs.	
454.5 15								
449.5								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: WS-SB33**

CDM Smith

Boring Number: WS-SB34

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street
N: 1158605 **E:** 1120087
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 470.2
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
5.5	8/6/2020	935

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
470.2 0						Clayey Silt	Moist, red-brown, Clayey SILT, little fine to coarse sand, little fine to coarse gravel, trace roots (ML)	ENV: 0-2' Lead at 0915
	GP	GP-1	48	36		Silty Gravel	Dry, white-brown, fine to coarse GRAVEL, some silt, little fine to coarse sand (GM)	Gravel as crushed dolostone. ENV: 2-4' Lead x2 (Dup) at 0920
465.2 5	GP	GP-2	24	24			Dry, white-brown, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP) Wet, white-brown, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP)	ENV: 4-6' Lead at 0925
							Exploration terminated at 6.0 ft bgs.	
460.2 10								
455.2 15								
450.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: WS-SB34**

CDM Smith

Boring Number: WS-SB35

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: Water Street
N: 1158931 **E:** 1119856
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 471.3
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/6/2020	830

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
471.3 0	GP	GP-1	48	40		Fill	Top 1": TOPSOIL Dry, gray-brown to brown, SILT, little fine to coarse gravel, little fine to coarse sand, trace slag, trace brick (ML)	ENV: 0-2' Lead at 0820 ENV: 2-4' Lead at 0825
						Clayey Silt	Dry, red-brown, Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML)	
466.3 5	GP	GP-2	24	16			Dry, red-brown, Clayey SILT, little fine to coarse gravel, little fine to medium sand (ML)	ENV: 4-6' Lead at 0830
						WR	Dry, red-brown to white, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP) [WEATHERED ROCK] Exploration terminated at 6.0 ft bgs.	Dolostone and Siltstone fragments.
461.3 10								
456.3 15								
451.3								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: WS-SB35**

CDM Smith

Boring Number: WT-SB04

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: White Transportation Property
N: 1157596 **E:** 1120554
Drilling Date: Start: 8/3/2020 **End:** 8/3/2020

Surface Elevation (ft.): 492.5
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/3/2020	1255

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
492.5 / 0	GP	GP-1	48	36		Fill	Top 1": TOPSOIL Dry, black/dark brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace brick, trace slag (SP)	ENV: 0-2' Lead at 1250 ENV: 2-4' Lead at 1255.
						Gravel	Dry, gray-brown, fine to coarse GRAVEL, little silt, little fine sand (GP)	
487.5 / 5							Exploration terminated at 4.0 ft bgs.	
482.5 / 10								
477.5 / 15								
472.5								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: C. Whitton | **Date: 9/18/2020** | **Boring Number: WT-SB04**

CDM Smith

Boring Number: WT-SB05

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: DPT
Core Size: 2 in O.D.
Bore Hole Location: White Transportation Property
N: 1157605 **E:** 1120520
Drilling Date: Start: 8/3/2020 **End:** 8/3/2020

Surface Elevation (ft.): 493.2
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	8/3/2020	1310

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
493.2 / 0							Top 4": TOPSOIL	
	GP	GP-1	48	32		Fill	Dry, brown, fine to coarse SAND, little fine to coarse gravel, little silt, trace slag (SP)	ENV: 0-2' Lead at 1300 ENV: 2-4' Lead at 1305
						Sand and Silt	Dry, brown, fine to coarse SAND and SILT, trace fine to coarse gravel, trace roots (SM)	
488.2 / 5							Exploration terminated at 4.0 ft bgs.	
483.2 / 10								
478.2 / 15								
473.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/18/2020** **Boring Number: WT-SB05**

CDM Smith

Boring Number: 300-SB60

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 6
N: 1159721 **E:** 1119493
Drilling Date: Start: 7/22/2021 **End:** 7/22/2021

Surface Elevation (ft.): 452.7
Total Borehole Depth (ft.): 4
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	7/22/2021	1400

Abandonment Method: Backfilled with cuttings
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
452.7 0	SH	SH-1	48	34		Upper Sand and Silt	2" Topsoil Moist, brown, fine to medium SAND and SILT, trace fine to coarse gravel, trace slag (SM)	~~ENV: 0-2' PCBs at 1340.~~ ENV: 2-4' PCBs at 1345.
447.7 5							Exploration terminated at 4.0 ft bgs (No refusal).	
442.7 10								
437.7 15								
432.7								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: C. Whitton **Date: 9/2/2020** **Boring Number: 300-SB60**

CDM Smith

Boring Number: 300-SB61

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Block 1/Lot 6
N: 1159706 **E:** 1119387
Drilling Date: Start: 7/23/2021 **End:** 7/23/2021

Surface Elevation (ft.): 468.2
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
2.3	7/23/2021	915

Abandonment Method: Backfilled with cuttings
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
468.2 / 0						US&S	2" Topsoil Top 12" (A): Moist, brown, SILT, trace fine to medium sand, trace fine gravel, trace roots (ML)	US&S: Upper Sand and Silt
▼	SH	SH-1	48	20		Organic Silt	Bottom 8" (B): Moist, light brown, Organic Clayey SILT, little fine to medium sand (OL)	Slide hammer penetration becomes difficult at 2.5 ft bgs.
463.2 / 5	SH	SH-2	12	0			No recovery	Potential obstruction blocking sampler.
							Exploration terminated at 5 ft bgs (Refusal).	
458.2 / 10								
453.2 / 15								
448.2								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: M. Passaro | **Date: 9/20/2021** | **Boring Number: 300-SB61**

CDM Smith

Boring Number: SED-G-20

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Creek Corridor
N: 1159728 **E:** 1119406
Drilling Date: Start: 7/23/2021 **End:** 7/23/2021

River Elevation (ft.): 449.6
Mudline Elevation (ft.): 448.6
Total Borehole Depth (ft.): 4
Abandonment Method: Backfilled with cuttings
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
449.6 0	SH	SH-1	48	20		CGS	Top 10" (A): Wet, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt (SP-GP)	CGS: Coarse-grained sediment
						LS&C	Bottom 10" (B): Wet, red-brown,Silty CLAY and fine to coarse GRAVEL, little fine to coarse sand (GC)	Slide hammer effort becomes difficult at 2.5 ft bgs. LS&C: Lower Silt and Clay
444.6 5							Exploration terminated at 4.0 ft bgs (Refusal).	
439.6 10								
434.6 15								
429.6								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 9/20/2021** **Boring Number: SED-G-20**

CDM Smith

Boring Number: UPB-SB35

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Former United Paperboard Property
N: 1158563 **E:** 1120232
Drilling Date: Start: 8/6/2020 **End:** 8/6/2020

Surface Elevation (ft.): 468.2
Total Borehole Depth (ft.): 7.5
Depth to Initial Water Level (ft):

Depth	Date	Time
1.2	8/6/2020	1150

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
468.2 0	SH	SH-1	48	16		Upper Gravel and Silt	Top 7" (A): Dry, brown, fine to coarse GRAVEL, some silt, some fine to coarse sand, trace organics (GM) Bottom 9" (B): Wet, gray, fine to coarse GRAVEL, some silt, trace fine to coarse sand (GP)	Organic matter - roots.
463.2 5	SH	SH-2	42	22		Upper Gravel and Silt	Top 10": Wet, gray, fine to coarse GRAVEL, some silt, trace fine to coarse sand (GP)	
						LSC	Bottom 12": Moist, gray-brown, CLAY & SILT, some fine to coarse gravel, trace fine to coarse sand (CL)	LSC - Lower Silt and Clay
458.2 10							Exploration terminated at 7.5 ft bgs (Refusal).	
453.2 15								
448.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 1/5/2021** **Boring Number: UPB-SB35**

CDM Smith

Boring Number: UP-SB51

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157060 **E:** 1120080
Drilling Date: Start: 8/5/2020 **End:** 8/5/2020

Surface Elevation (ft.): 485.8
Total Borehole Depth (ft.): 5
Depth to Initial Water Level (ft):

Depth	Date	Time
3.5	8/5/2020	1320

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
485.8 0							Top 8" (A) Topsoil: Dry, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace organics (SP-SM)	Organic matter - roots
	SH	SH-1	48	36		Upper Silt & Clay	Bottom 28" (B): Dry, light brown, CLAY & SILT, little fine to medium sand, little fine gravel, trace wood (CL)	
	SH	SH-2	12	12			Top 8": Dry, light brown, CLAY & SILT, little fine to medium sand, little fine gravel, trace organics (CL)	Organic matter - wood
480.8 5						WR	Bottom 4": Wet, gray, fine to coarse GRAVEL, little fine to coarse sand, little clayey silt (GP) Exploration terminated at 5.0 ft bgs (Refusal).	WR - Weathered Rock
475.8 10								
470.8 15								
465.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: M. Passaro | **Date: 1/5/2021** | **Boring Number: UP-SB51**

CDM Smith

Boring Number: UP-SB52

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157354 **E:** 1120213
Drilling Date: Start: 8/5/2020 **End:** 8/5/2020

Surface Elevation (ft.): 482.8
Total Borehole Depth (ft.): 8
Depth to Initial Water Level (ft):

Depth	Date	Time
1	8/5/2020	1200

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
482.8 0	SH	SH-1	48	20		USC	Top 10" (A): Moist, brown, Slightly Organic CLAY & SILT, some fine to coarse gravel, trace fine to coarse sand (CL-ML)	USC - Upper Silt and Clay
						Upper Sand & Silt	Bottom 10" (B): Wet, brown, fine to coarse SAND, some fine to coarse gravel, some clay & silt (SM)	
477.8 5	SH	SH-2	48	24			Top 20": Wet, brown, fine to coarse SAND, some fine to coarse gravel, some clay & silt (SM)	
						OSC	Bottom 4": Wet, dark brown, Organic Silty CLAY, little fine to coarse sand, trace wood (OL)	OSC - Organic Silt/Clay
472.8 10							Exploration terminated at 8.0 ft bgs.	Borehole caved. Could not return sampler to 8.0 ft bgs.
467.8 15								
462.8								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: M. Passaro | **Date: 1/5/2021** | **Boring Number: UP-SB52**

CDM Smith

Boring Number: UP-SB53

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157515 **E:** 1120232
Drilling Date: Start: 8/5/2020 **End:** 8/5/2020

Surface Elevation (ft.): 481.8
Total Borehole Depth (ft.): 6
Depth to Initial Water Level (ft):

Depth	Date	Time
1.3	8/5/2020	850

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
481.8 0	SH	SH-1	48	24		Organic Silt/Clay	Top 18" (A): Moist, brown, Slightly Organic CLAY & SILT, trace fine to medium sand, trace fine gravel, trace brick (CL-ML)	
							Bottom 6" (B): Wet, brown- dark brown, Organic SILT & CLAY, little fine to medium sand, trace fine gravel (ML)	
							Top 12": Wet, brown-dark brown, Organic SILT & CLAY, little fine to medium sand, trace fine gravel (ML)	
476.8 5	SH	SH-2	24	16		LSC	Bottom 5": Wet, red-brown, Silty CLAY, little fine to coarse gravel, trace fine sand, trace organics (CL)	LSC - Lower Silt and Clay Organic matter - wood Rock fragment (SILTSTONE) in tip of sampler.
							Exploration terminated at 6.0 ft bgs (Refusal).	
471.8 10								
466.8 15								
461.8								

Sample Types	Consistency vs Blowcount/Foot		Burmister Classification
AS - Auger/Grab Sample CS - California Sampler BQ - 1.5" Rock Core NQ - 2" Rock Core SH - Slide Hammer SS - Split Spoon ST - Shelby Tube WS - Wash Sample GP - Geoprobe	Granular (Sand): V. Loose: 0-4 Dense: 30-50 Loose: 4-10 V. Dense: >50 M. Dense: 10-30	Fine Grained (Clay): V. Soft: <2 Stiff: 8-15 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color

Reviewed by: M. Passaro | **Date: 1/5/2021** | **Boring Number: UP-SB53**

CDM Smith

Boring Number: UP-SB54

Client: USACE - KC District
Project Name: Eighteen Mile Creek Supplemental PDI
Project Location: Lockport, New York
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: Upson Park
N: 1157561 **E:** 1120287
Drilling Date: Start: 8/5/2020 **End:** 8/5/2020

Surface Elevation (ft.): 481.2
Total Borehole Depth (ft.): 6.5
Depth to Initial Water Level (ft):

Depth	Date	Time
0.5	8/5/2020	1345

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
481.2	SH	SH-1	48	22		Organic Silt/Clay	Wet, dark brown, Organic SILT, some fine to coarse gravel, some fine to coarse sand (GM)	
476.2 / 5	SH	SH-2	30	18			Wet, dark brown, Slightly Organic SILT, some fine to coarse gravel, some fine to coarse sand (GM)	
471.2 / 10							Exploration terminated at 6.5 ft bgs (Refusal).	2" Rock fragments in shoe of sampler
466.2 / 15								
461.2								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Dense: 30-50
Loose: 4-10 V. Dense: >50
M. Dense: 10-30

Fine Grained (Clay):
V. Soft: <2 Stiff: 8-15
Soft: 2-4 V. Stiff: 15-30
M. Stiff: 4-8 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: M. Passaro **Date: 1/5/2021** **Boring Number: UP-SB54**

CDM Smith

Boring Number: WT-SB07

Client: USACE - KC District
Project Location: Lockport, New York
Project Name: Eighteen Mile Creek Supplemental PDI
Project Number: 51147-223203

Drilling Contractor/Driller: SJB / R. Steiner
Drilling Method: Slide Hammer
Core Size: 2 in O.D.
Bore Hole Location: White Transportation Property
N: 1157507 **E:** 1120518
Drilling Date: Start: 8/12/2020 **End:** 8/12/2020

Surface Elevation (ft.): 484
Total Borehole Depth (ft.): 6.5
Depth to Initial Water Level (ft):

Depth	Date	Time
3	8/12/2020	920

Abandonment Method: Backfilled with bentonite chips
Logged By: M. Cherchia

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Sample Recovery (in)	Graphic Log	Strata	Material Description	Remarks
484.0 / 0	SH	SH-1	48	32		USC	Top 12" (A): Moist, brown, Clayey SILT, little fine to coarse sand, trace fine to coarse gravel, trace organics (ML)	USC - Upper Silt and Clay Organic matter - roots
						OSC	Middle 12" (B): Wet, brown, Organic SILT & CLAY, trace fine sand, trace fine gravel (ML-CL)	OSC - Organic Silt/Clay
						Lower Silt & Clay	Bottom 8" (C): Wet, brown, fine to coarse GRAVEL, little silt, little fine to coarse sand (GP)	
479.0 / 5	SH	SH-2	30	12		Lower Silt & Clay	Wet, light brown-gray, Silty CLAY, some fine to medium sand, trace fine to coarse gravel (CH)	
474.0 / 10							Exploration terminated at 6.5 ft bgs (Refusal).	
469.0 / 15								
464.0								

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
SH - Slide Hammer
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

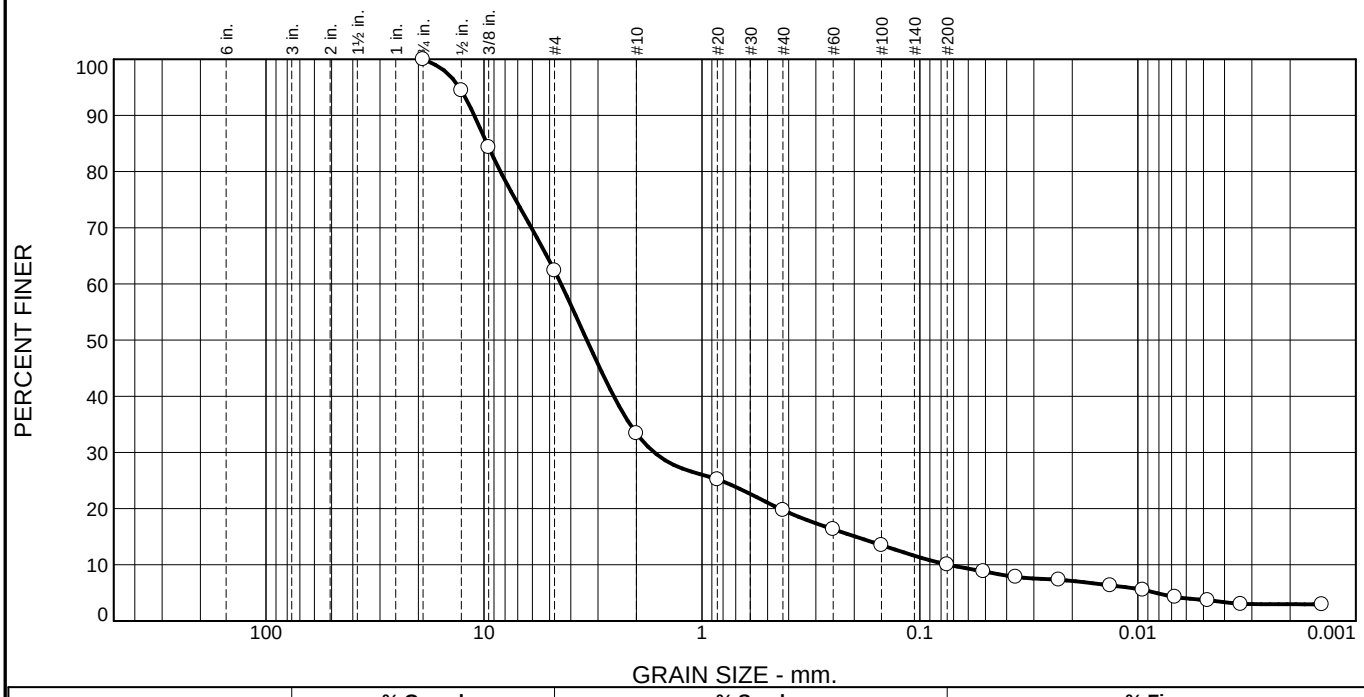
moisture, density, color

Reviewed by: M. Passaro | **Date: 1/5/2021** | **Boring Number: WT-SB07**

Attachment C

Geotechnical Laboratory Data

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	37.6	29.0	13.7	9.7	6.2	3.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	94.5		
.375"	84.3		
#4	62.4		
#10	33.4		
#20	25.2		
#40	19.7		
#60	16.3		
#100	13.5		
#200	10.0		
0.0511 mm.	8.8		
0.0364 mm.	7.8		
0.0231 mm.	7.3		
0.0134 mm.	6.3		
0.0095 mm.	5.5		
0.0068 mm.	4.3		
0.0048 mm.	3.7		
0.0034 mm.	3.0		
0.0014 mm.	3.0		

* (no specification provided)

Material Description

Brown poorly graded sand with silt and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 11.0772 D_{85}= 9.6955 D_{60}= 4.4326
D_{50}= 3.3728 D_{30}= 1.6554 D_{15}= 0.1970
D_{10}= 0.0740 C_u= 59.87 C_c= 8.35

Remarks

As received MC = 10.2%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

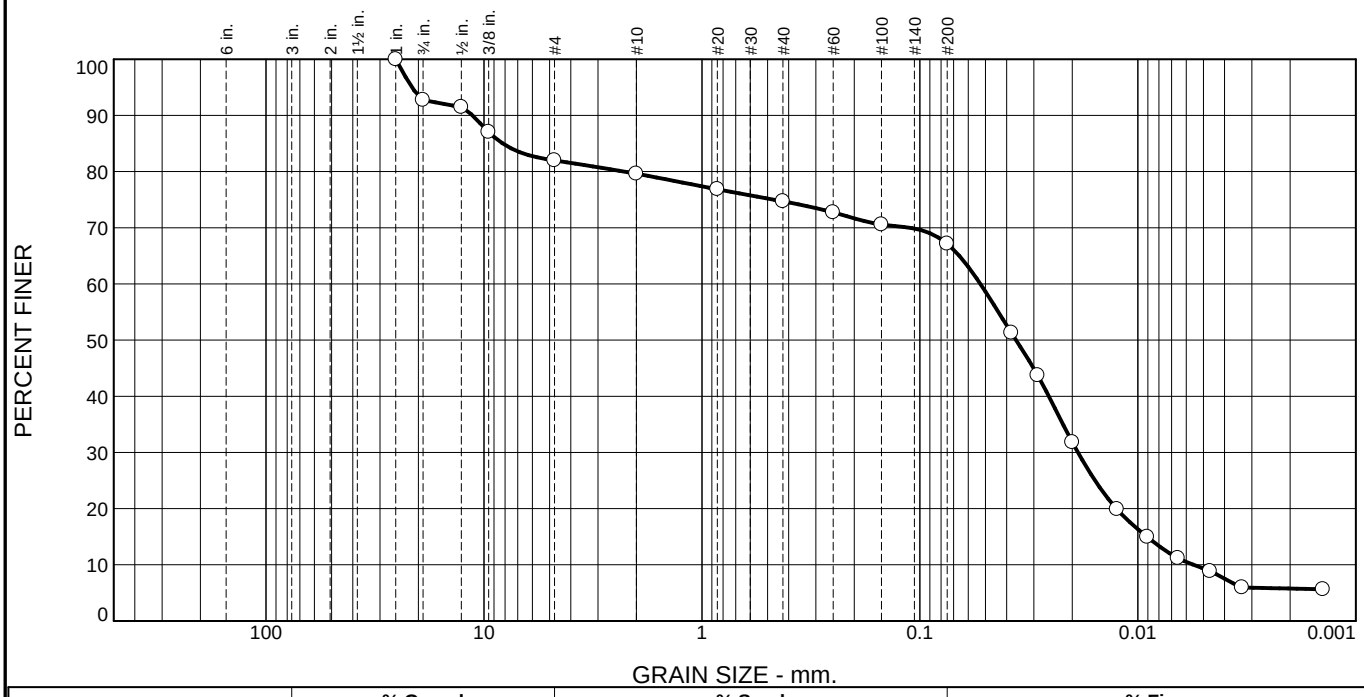
Source of Sample: 198-GEO-01 **Depth:** 8-10' **Date Sampled:** 9/24/18
Sample Number: S-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.3	10.7	2.4	4.9	7.5	57.8	9.4

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	92.7		
.5"	91.5		
.375"	87.0		
#4	82.0		
#10	79.6		
#20	76.9		
#40	74.7		
#60	72.7		
#100	70.6		
#200	67.2		
0.0380 mm.	51.3		
0.0288 mm.	43.7		
0.0200 mm.	31.8		
0.0125 mm.	19.9		
0.0091 mm.	15.0		
0.0065 mm.	11.2		
0.0047 mm.	8.9		
0.0033 mm.	6.0		
0.0014 mm.	5.6		

* (no specification provided)

Material Description

Brown gravelly silt

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 11.2839 D_{85}= 8.1960 D_{60}= 0.0528
D_{50}= 0.0362 D_{30}= 0.0188 D_{15}= 0.0091
D_{10}= 0.0055 C_u= 9.52 C_c= 1.21

Remarks

As received MC = 11.7%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

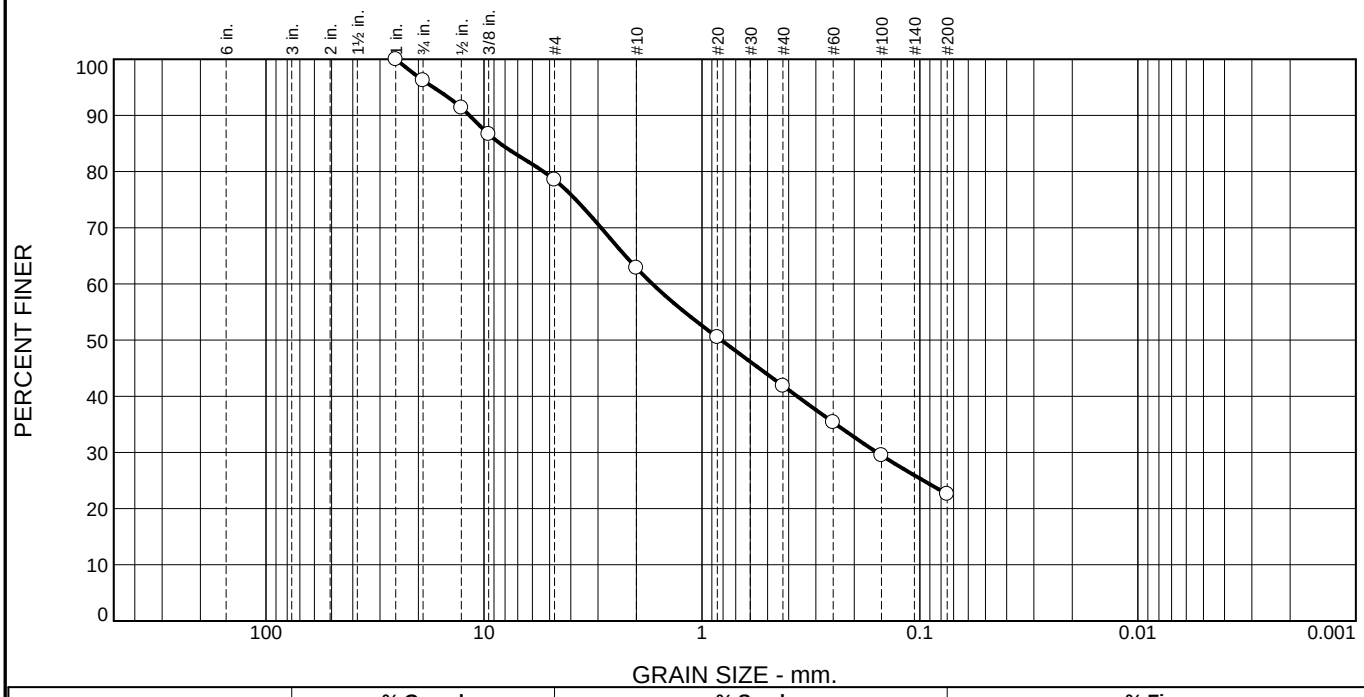
Source of Sample: 198-GEO-01 **Depth:** 19-21' **Date Sampled:** 9/24/18
Sample Number: S-9

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.8	17.6	15.7	21.0	19.3	22.6	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	96.2		
.5"	91.4		
.375"	86.7		
#4	78.6		
#10	62.9		
#20	50.5		
#40	41.9		
#60	35.4		
#100	29.5		
#200	22.6		

* (no specification provided)

Material Description

Brown silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 11.6482 D_{85}= 8.4335 D_{60}= 1.6883
D_{50}= 0.8159 D_{30}= 0.1573 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 10.2%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

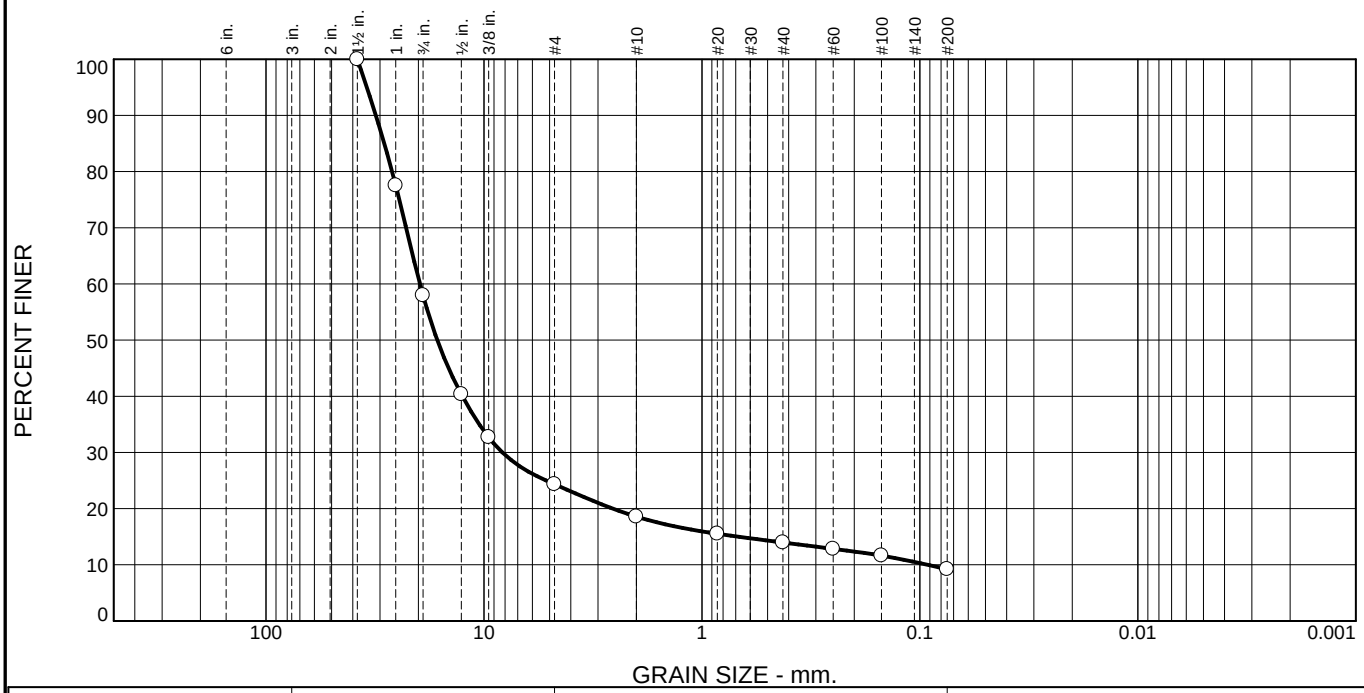
Source of Sample: 300-GEO-01 **Depth:** 2-4' **Date Sampled:** 9/13/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	42.0	33.7	5.7	4.6	4.8	9.2	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	77.5		
.75"	58.0		
.5"	40.4		
.375"	32.7		
#4	24.3		
#10	18.6		
#20	15.5		
#40	14.0		
#60	12.8		
#100	11.6		
#200	9.2		

* (no specification provided)

Material Description

Brown poorly graded gravel with silt and sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP-GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 31.3592 D_{85}= 28.6678 D_{60}= 19.6750
D_{50}= 16.3935 D_{30}= 8.2288 D_{15}= 0.6838
D_{10}= 0.0925 C_u= 212.76 C_c= 37.22

Remarks

As received MC = 5.3%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

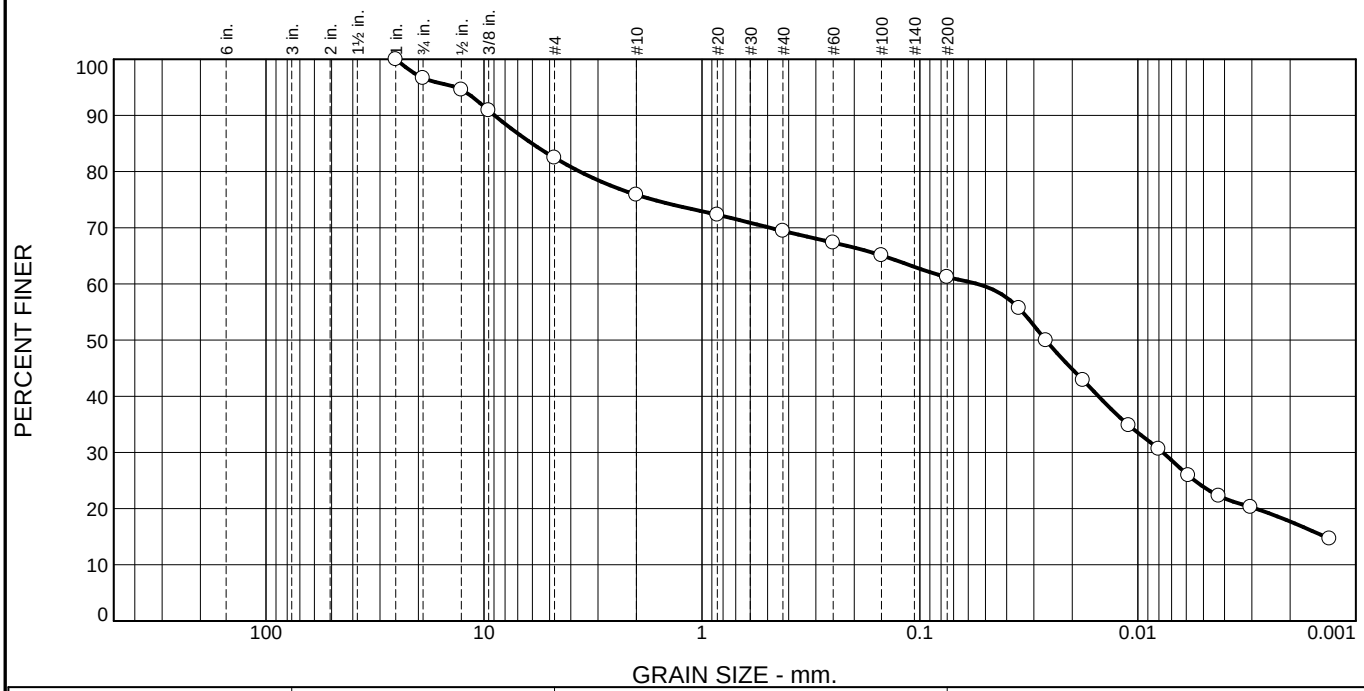
Source of Sample: 300-GEO-01 **Depth:** 6-8' **Date Sampled:** 9/13/18
Sample Number: S-4

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.4	14.1	6.6	6.5	8.2	37.3	23.9

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	96.6		
.5"	94.6		
.375"	90.9		
#4	82.5		
#10	75.9		
#20	72.3		
#40	69.4		
#60	67.4		
#100	65.1		
#200	61.2		
0.0351 mm.	55.7		
0.0264 mm.	49.9		
0.0179 mm.	42.9		
0.0110 mm.	34.8		
0.0080 mm.	30.6		
0.0059 mm.	25.9		
0.0043 mm.	22.3		
0.0030 mm.	20.3		
0.0013 mm.	14.7		

* (no specification provided)

Material Description

Brown sandy lean clay with gravel

Atterberg Limits (ASTM D 4318)

PL= 21 **LL=** 38 **PI=** 17

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(8)

Coefficients

D_{90}= 8.9382 D_{85}= 6.0174 D_{60}= 0.0545
D_{50}= 0.0265 D_{30}= 0.0077 D_{15}= 0.0014
D_{10}= C_u= C_c=

Remarks

As received MC = 40.7%

Date Received: 11/1/18 **Date Tested:** 11/12/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

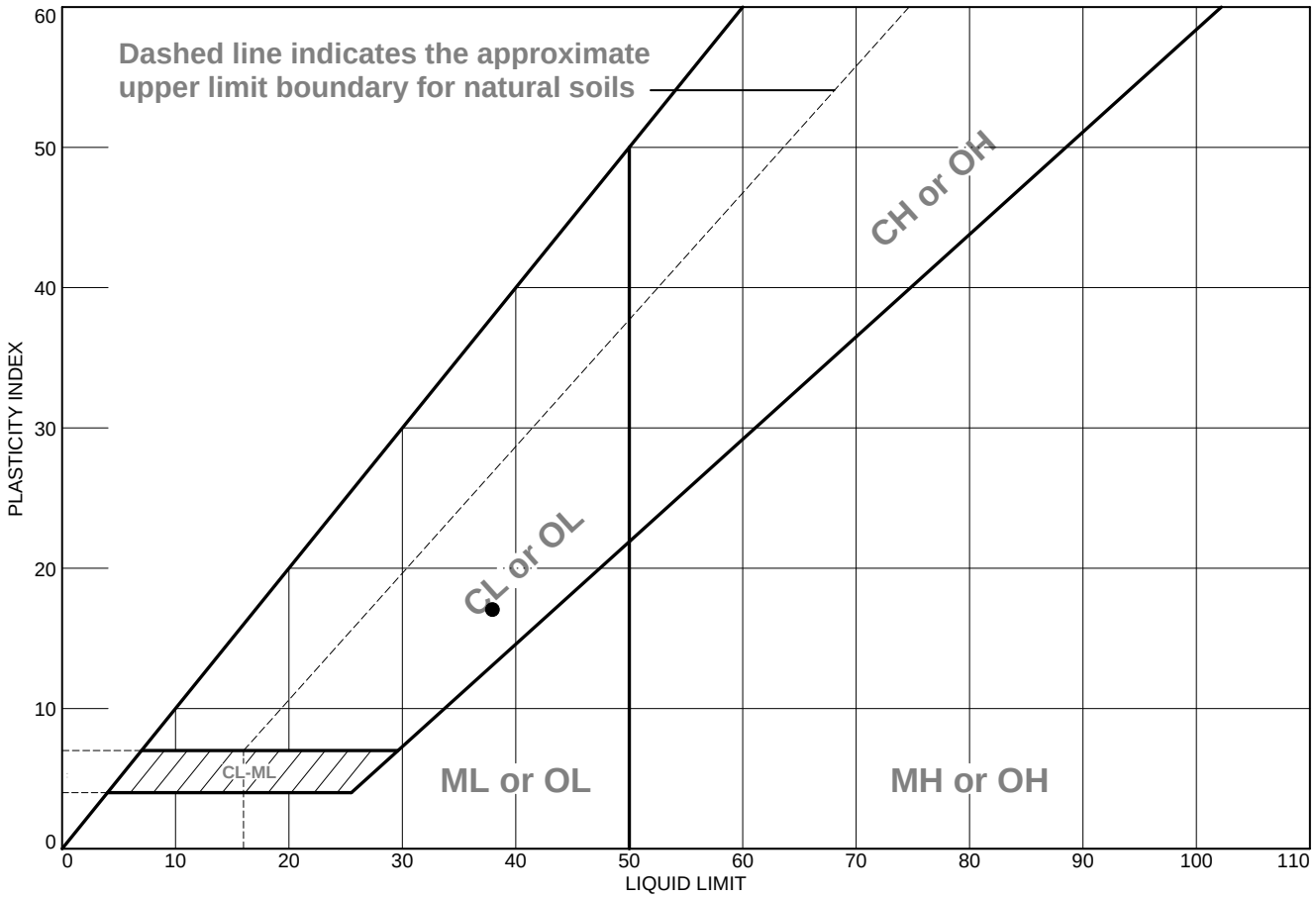
Source of Sample: 300-GEO-01 **Depth:** 12-14' **Date Sampled:** 9/13/18
Sample Number: S-7

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown sandy lean clay with gravel	9/13/18	11/9/18	AS	38	21	17	69.4	CL

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek

Lockport, NY

○**Source of Sample:** 300-GEO-01 **Depth:** 12-14' **Sample Number:** S-7

CDM Smith

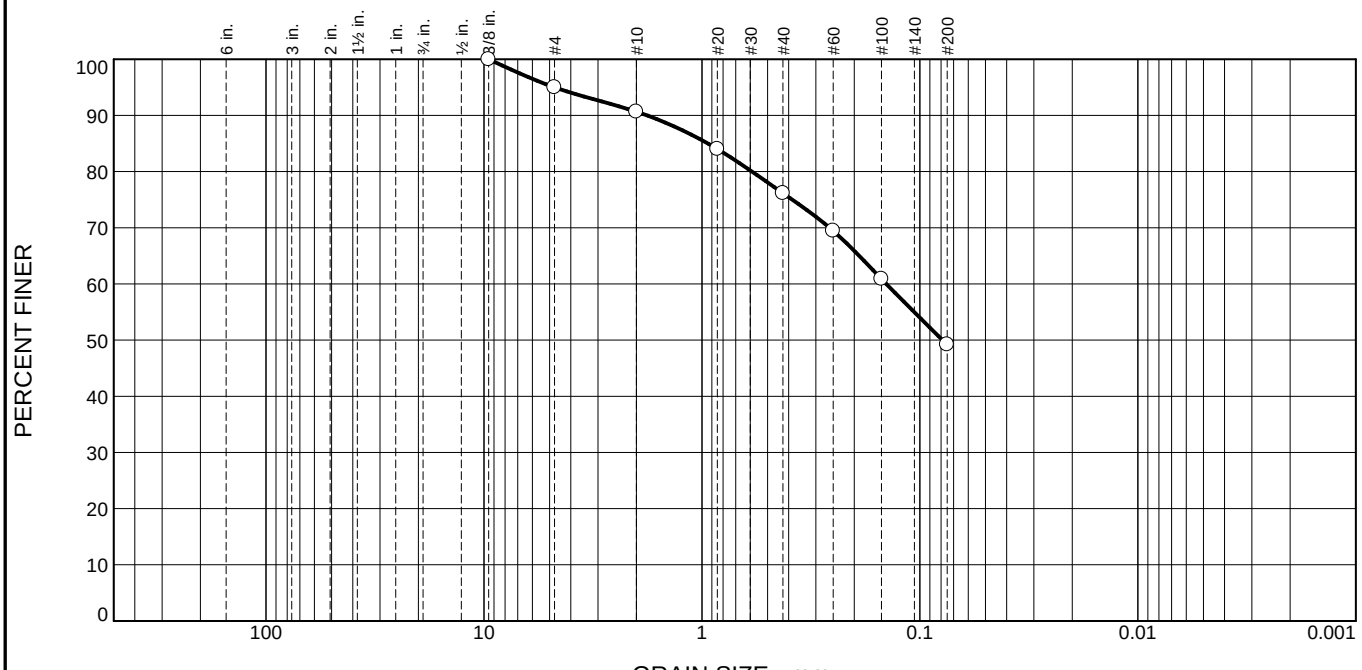
Boston, Massachusetts

Checked by: MP

Title: Laboratory Manager

Tested By: AS **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.0	4.3	14.5	27.0	49.2	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	95.0		
#10	90.7		
#20	84.0		
#40	76.2		
#60	69.5		
#100	60.9		
#200	49.2		

* (no specification provided)

Material Description

Dark brown clayey sand with fibers and roots

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SC/OL **AASHTO (M 145)=** A-6(4)

Coefficients

D_{90}= 1.7871 D_{85}= 0.9398 D_{60}= 0.1425
D_{50}= 0.0787 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 62.0%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

Source of Sample: 300-GEO-01 **Depth:** 15-15.5' **Date Sampled:** 9/13/18
Sample Number: S-8

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

CDM Smith

Geotechnical Engineering Laboratory

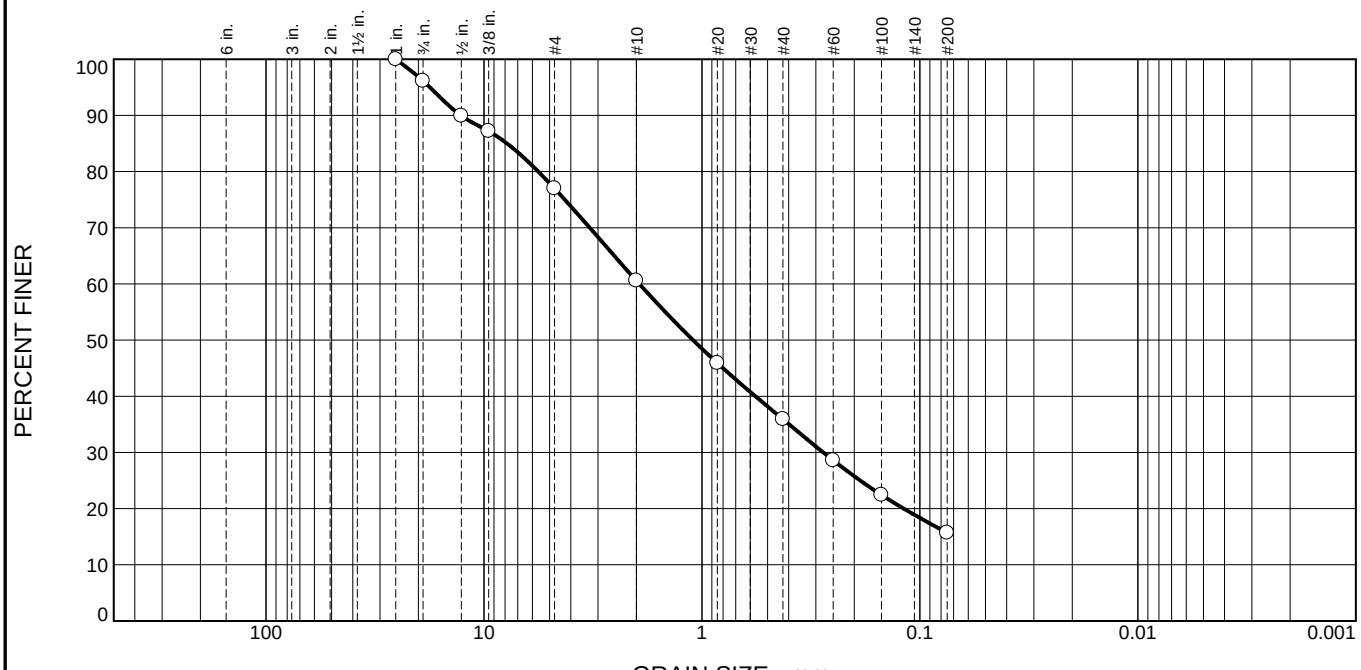
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/7/2018
Project Number:	51147-223203		
Boring Number:	300-GEO-01	Procedure:	C
Sample Number:	S-8	Temperature:	440° C
Sample Depth (ft):	15-15.5'		
Sample Date:	9/13/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	105.33
Wet Mass of Sample & Tin (g)	170.65
Dry Mass of Sample & Tin (g)	139.61
Mass of Water (g)	31.04
Mass of Dry Soil (g)	34.28
Moisture Content (%)	**90.5**

ASH CONTENT	
Porcelain Dish Mass (g)	105.33
Porcelain Dish + Oven Dried Soil (g)	139.61
Mass of Oven Dried Soil (g)	34.28
Mass of Dish & Burned Soil (g)	134.88
Mass of Burned Soil (g)	29.55
Mass of Organic Material (g)	4.73
Ash Content (%)	86.2
Organic Content (%)	**13.8**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.9	19.1	16.4	24.7	20.2	15.7	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	96.1		
.5"	89.9		
.375"	87.2		
#4	77.0		
#10	60.6		
#20	45.9		
#40	35.9		
#60	28.6		
#100	22.4		
#200	15.7		

* (no specification provided)

Material Description

Dark brown silty sand with gravel
Sample contains wood, glass and slag.

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 12.7853 D_{85}= 7.8313 D_{60}= 1.9390
D_{50}= 1.0986 D_{30}= 0.2777 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 17.8%

Date Received: 11/1/18 **Date Tested:** 11/7/18
Tested By: AS
Checked By: MP
Title: Laboratory Manager

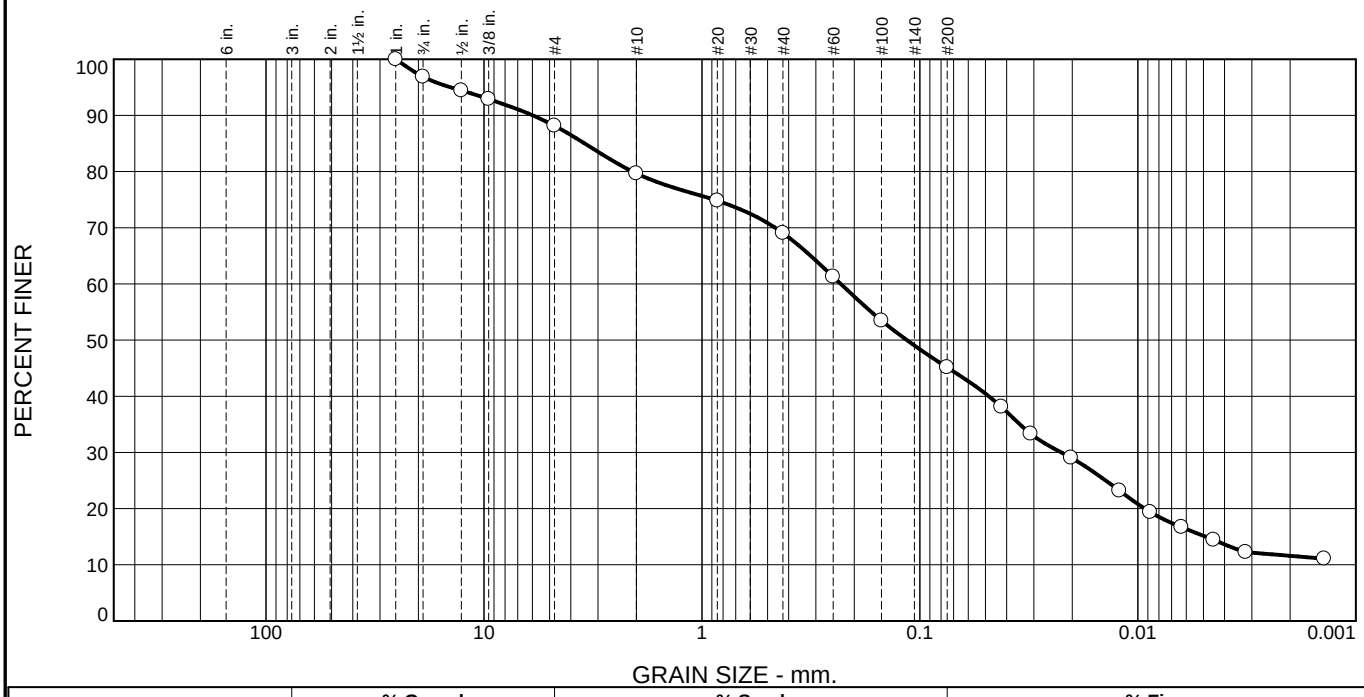
Source of Sample: 300-GEO-02 **Depth:** 4-6' **Date Sampled:** 9/12/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.1	8.7	8.5	10.6	24.0	29.9	15.2

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	96.9		
.5"	94.4		
.375"	92.9		
#4	88.2		
#10	79.7		
#20	74.8		
#40	69.1		
#60	61.3		
#100	53.5		
#200	45.1		
0.0423 mm.	38.1		
0.0310 mm.	33.3		
0.0202 mm.	29.1		
0.0121 mm.	23.2		
0.0088 mm.	19.4		
0.0063 mm.	16.7		
0.0045 mm.	14.4		
0.0032 mm.	12.3		
0.0014 mm.	11.1		

* (no specification provided)

Material Description

Brown clayey sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-4(1)

Coefficients

D_{90}= 5.9726 D_{85}= 3.4501 D_{60}= 0.2306
D_{50}= 0.1149 D_{30}= 0.0224 D_{15}= 0.0049
D_{10}= C_u= C_c=

Remarks

As received MC = 7.2%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

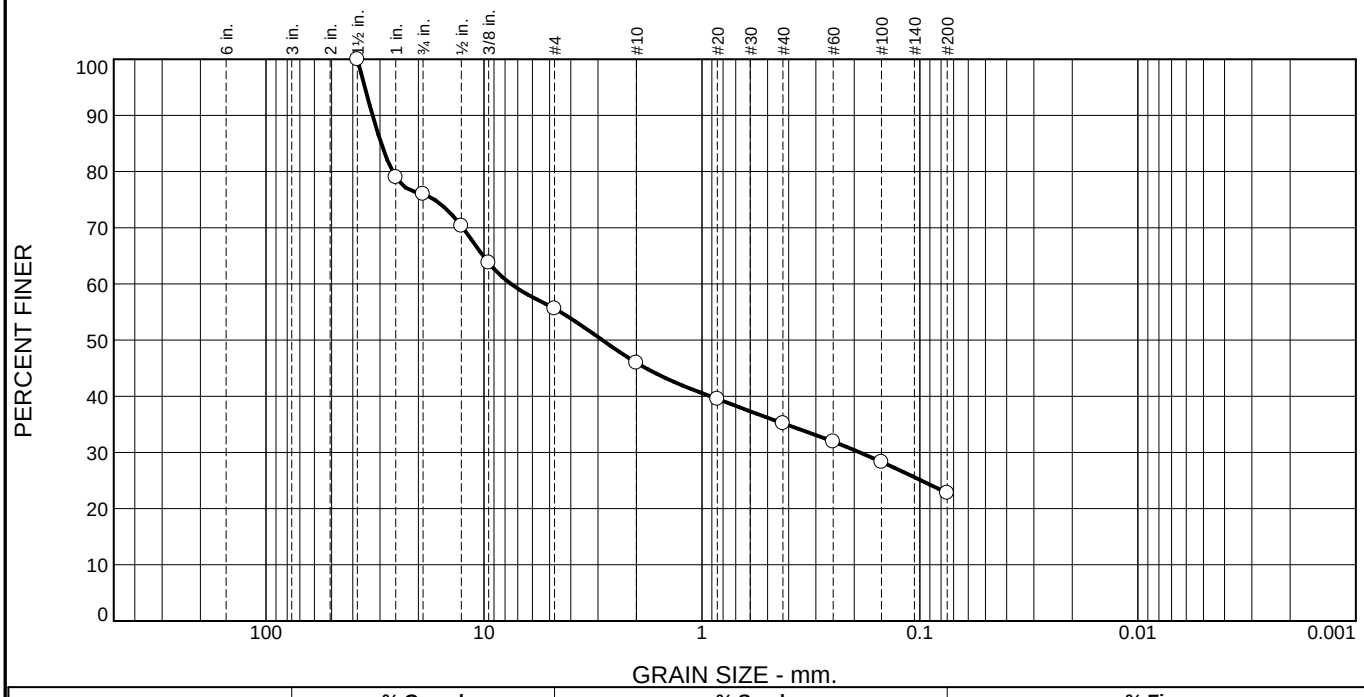
Source of Sample: 300-GEO-02 **Depth:** 8-9.5' **Date Sampled:** 9/12/18
Sample Number: S-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	24.0	20.4	9.6	10.8	12.4	22.8	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	79.0		
.75"	76.0		
.5"	70.3		
.375"	63.8		
#4	55.6		
#10	46.0		
#20	39.5		
#40	35.2		
#60	31.9		
#100	28.3		
#200	22.8		

* (no specification provided)

Material Description

Gray-brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 32.4704 D_{85}= 29.6255 D_{60}= 7.5226
D_{50}= 2.8632 D_{30}= 0.1885 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 8.4%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

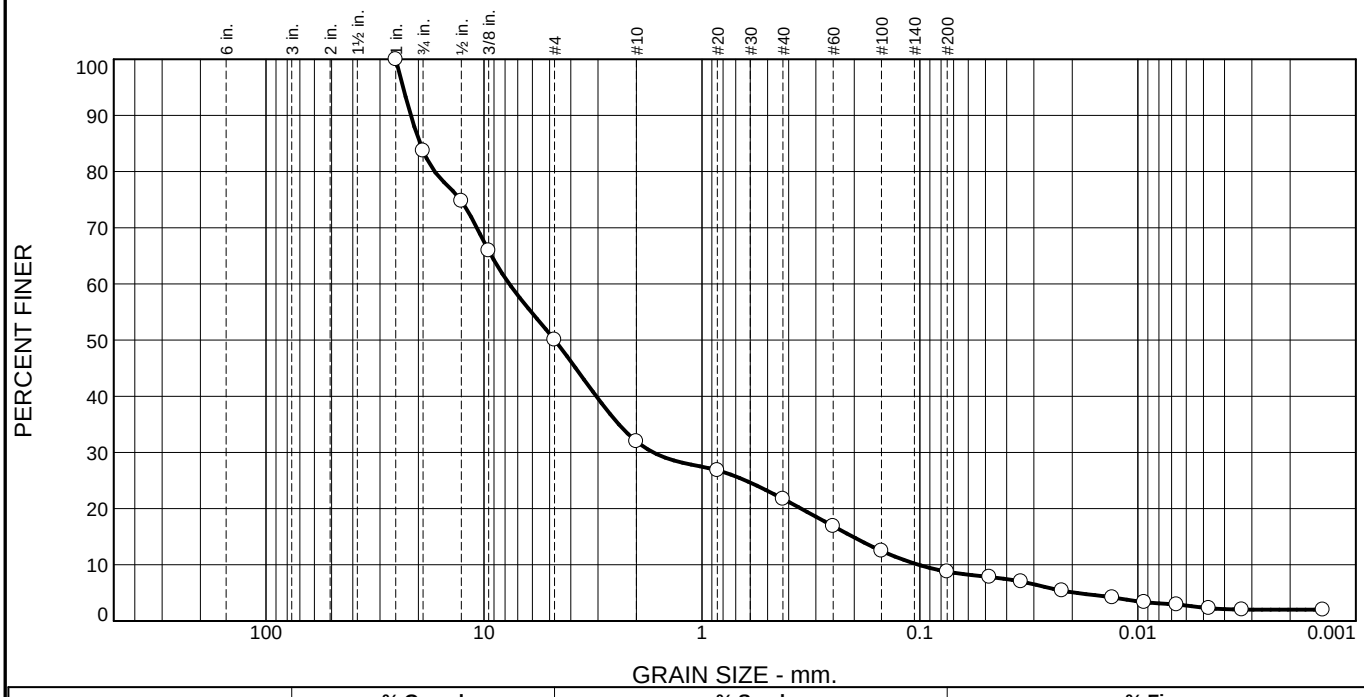
Source of Sample: 300-GEO-03 **Depth:** 2-4' **Date Sampled:** 9/18/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.3	33.6	18.1	10.3	12.9	6.4	2.4

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	83.7		
.5"	74.8		
.375"	65.9		
#4	50.1		
#10	32.0		
#20	26.8		
#40	21.7		
#60	16.9		
#100	12.5		
#200	8.8		
0.0480 mm.	7.8		
0.0344 mm.	7.0		
0.0223 mm.	5.4		
0.0131 mm.	4.2		
0.0094 mm.	3.3		
0.0066 mm.	2.9		
0.0047 mm.	2.3		
0.0033 mm.	2.0		
0.0014 mm.	2.0		

* (no specification provided)

Material Description

Red-brown poorly graded gravel with silt and sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP-GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 21.6447 D_{85}= 19.6383 D_{60}= 7.6546
D_{50}= 4.7366 D_{30}= 1.6718 D_{15}= 0.2032
D_{10}= 0.1014 C_u= 75.49 C_c= 3.60

Remarks

As received MC = 17.6%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

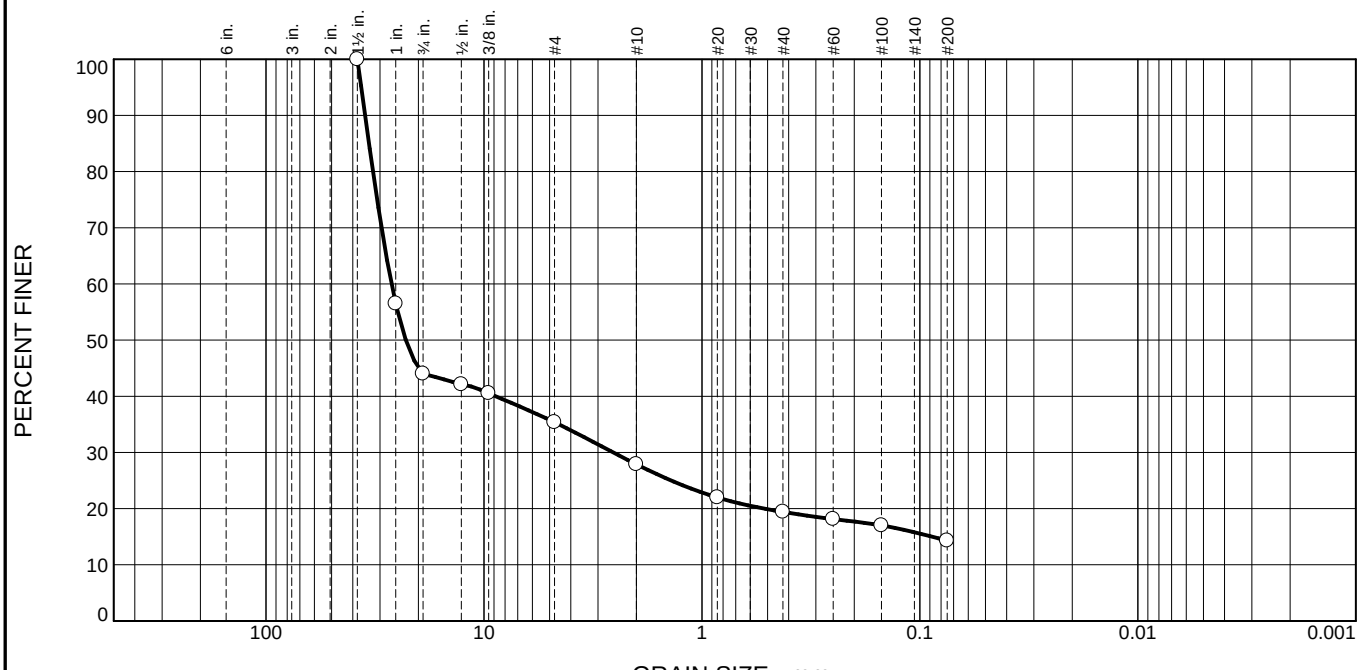
Source of Sample: 300-GEO-03 **Depth:** 10-11.5' **Date Sampled:** 9/18/18
Sample Number: S-6

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	56.0	8.6	7.5	8.5	5.1	14.3	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	56.5		
.75"	44.0		
.5"	42.1		
.375"	40.5		
#4	35.4		
#10	27.9		
#20	22.0		
#40	19.4		
#60	18.1		
#100	17.0		
#200	14.3		

* (no specification provided)

Material Description

Red-brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 35.1377 D_{85}= 33.7152 D_{60}= 26.5566
D_{50}= 22.8370 D_{30}= 2.5536 D_{15}= 0.0880
D_{10}= C_u= C_c=

Remarks

As received MC = 4.7%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

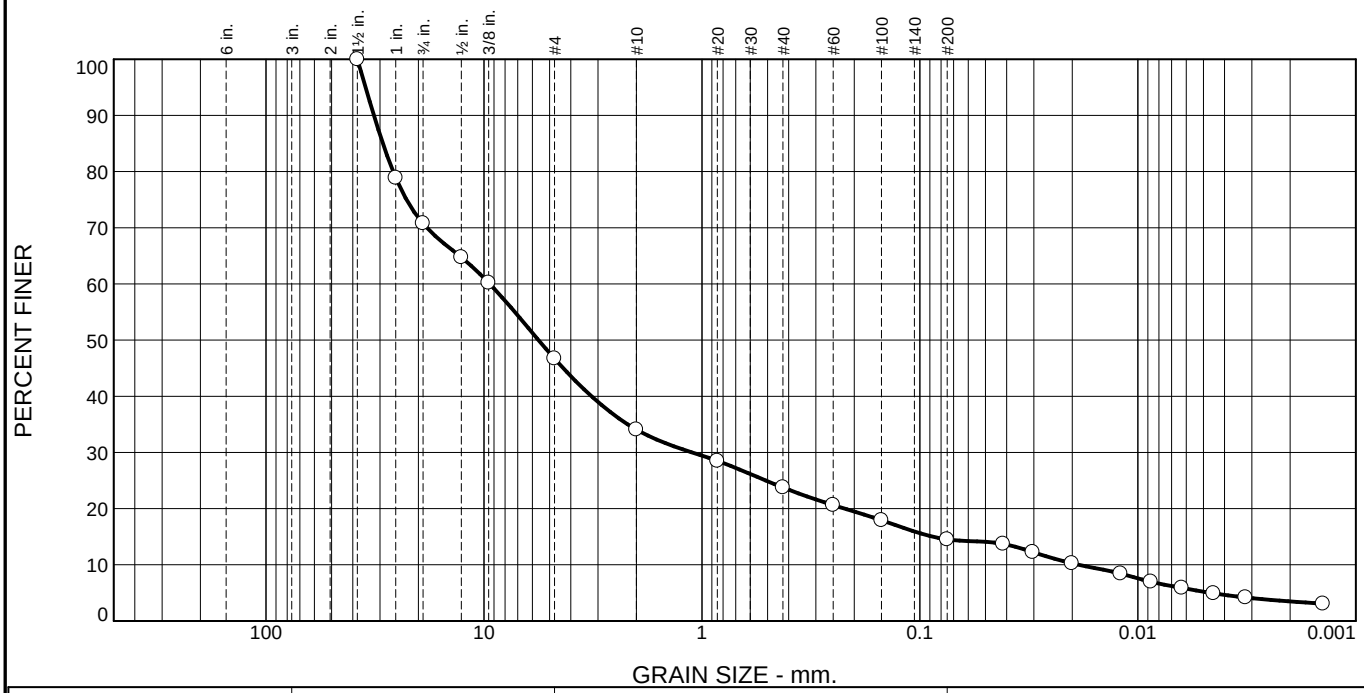
Source of Sample: 300-GEO-04 **Depth:** 2-4' **Date Sampled:** 9/12/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	29.2	24.1	12.6	10.3	9.3	9.3	5.2

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	78.9		
.75"	70.8		
.5"	64.7		
.375"	60.2		
#4	46.7		
#10	34.1		
#20	28.5		
#40	23.8		
#60	20.6		
#100	17.9		
#200	14.5		
0.0415 mm.	13.7		
0.0304 mm.	12.3		
0.0201 mm.	10.3		
0.0120 mm.	8.4		
0.0087 mm.	7.0		
0.0063 mm.	5.9		
0.0045 mm.	4.9		
0.0032 mm.	4.2		
0.0014 mm.	3.1		

* (no specification provided)

Material Description

Gray-brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 31.9989 D_{85}= 29.0992 D_{60}= 9.4109
D_{50}= 5.6229 D_{30}= 1.1087 D_{15}= 0.0873
D_{10}= 0.0187 C_u= 503.28 C_c= 6.99

Remarks

As received MC = 16.6%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

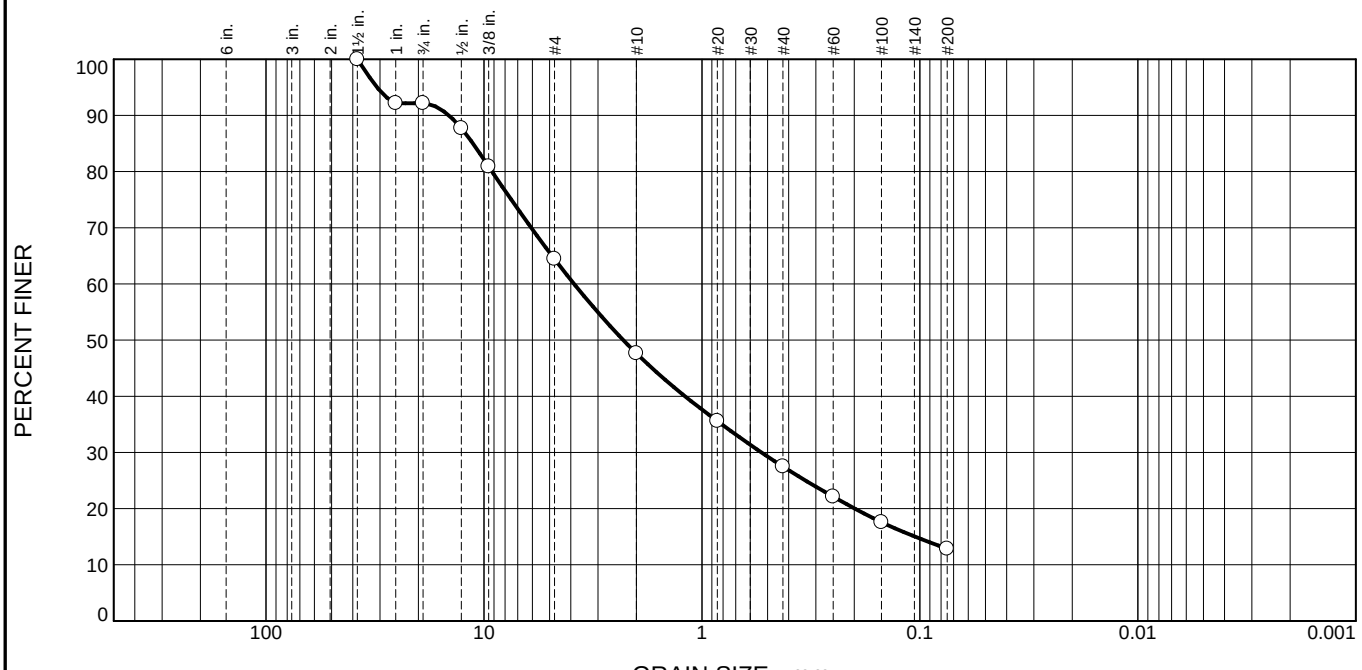
Source of Sample: 300-GEO-04 **Depth:** 6-7.5' **Date Sampled:** 9/12/18
Sample Number: S-4

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.8	27.8	16.7	20.2	14.7	12.8	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	92.2		
.75"	92.2		
.5"	87.7		
.375"	80.9		
#4	64.4		
#10	47.7		
#20	35.6		
#40	27.5		
#60	22.1		
#100	17.6		
#200	12.8		

* (no specification provided)

Material Description

Gray silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 14.4814 D_{85}= 11.2299 D_{60}= 3.8603
D_{50}= 2.2959 D_{30}= 0.5335 D_{15}= 0.1051
D_{10}= C_u= C_c=

Remarks

As received MC = 24.2%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

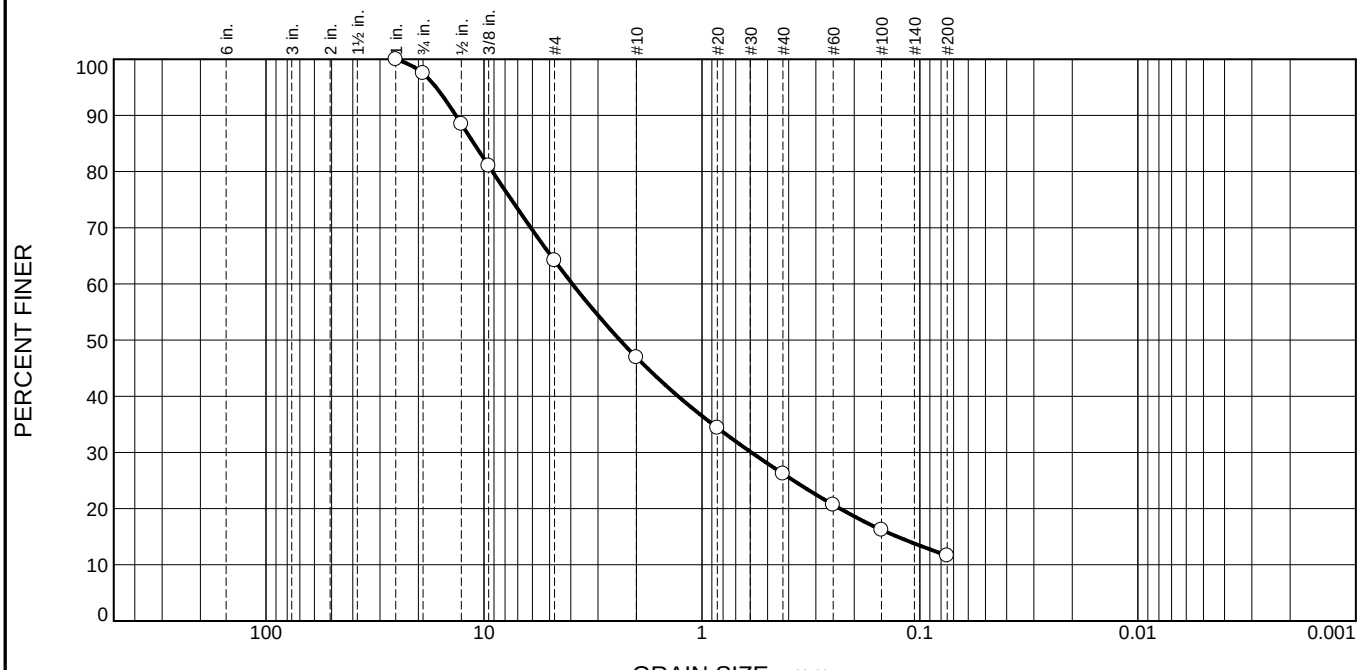
Source of Sample: 300-GEO-05 **Depth:** 3.25-4' **Date Sampled:** 9/18/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.5	33.3	17.3	20.7	14.6	11.6	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	97.5		
.5"	88.5		
.375"	81.0		
#4	64.2		
#10	46.9		
#20	34.4		
#40	26.2		
#60	20.7		
#100	16.2		
#200	11.6		

* (no specification provided)

Material Description

Black poorly graded sand with silt and gravel.
Sample contains slag and brick.

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 13.4705 D_{85}= 11.1123 D_{60}= 3.9302
D_{50}= 2.3779 D_{30}= 0.5932 D_{15}= 0.1270
D_{10}= C_u= C_c=

Remarks

As received MC = 22.4%

Date Received: 11/1/18 **Date Tested:** 11/7/18
Tested By: AS
Checked By: MP
Title: Laboratory Manager

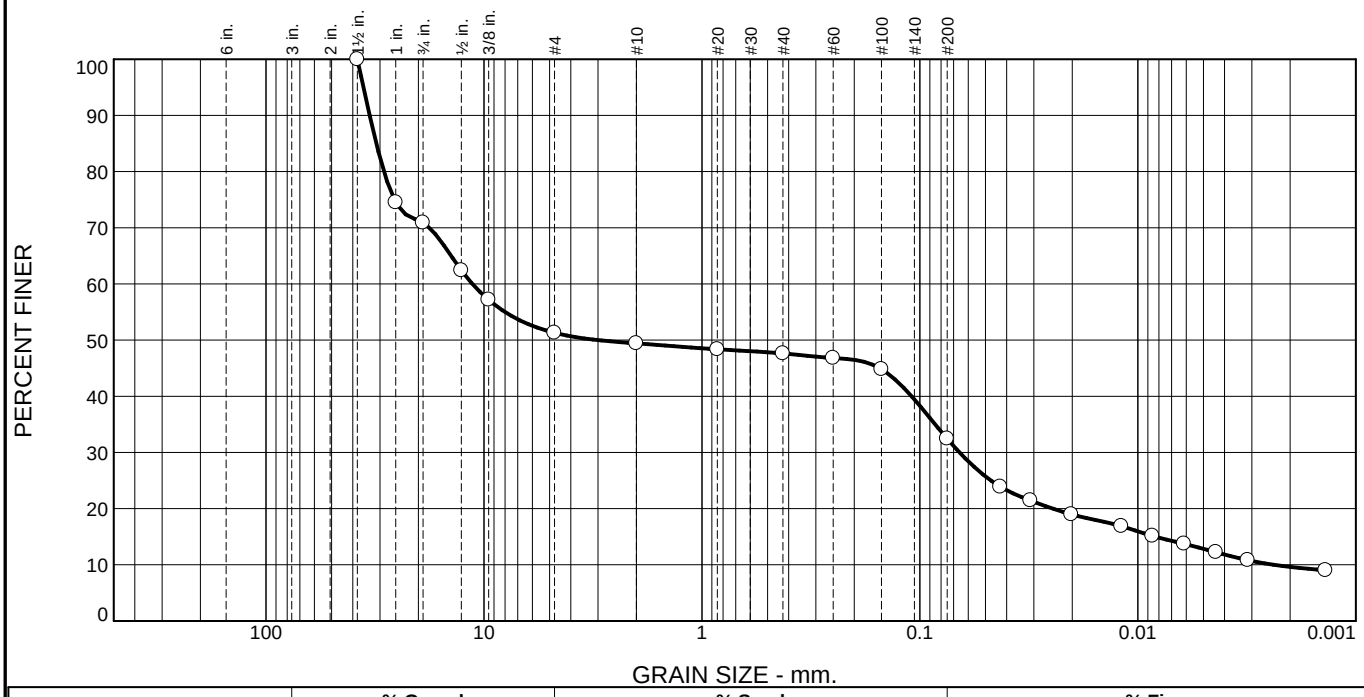
Source of Sample: 300-GEO-05 **Depth:** 16-18' **Date Sampled:** 9/18/18
Sample Number: S-9

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	29.1	19.6	1.9	1.8	15.1	19.7	12.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	74.5		
.75"	70.9		
.5"	62.4		
.375"	57.2		
#4	51.3		
#10	49.4		
#20	48.4		
#40	47.6		
#60	46.8		
#100	44.8		
#200	32.5		
0.0428 mm.	23.9		
0.0311 mm.	21.4		
0.0202 mm.	19.0		
0.0119 mm.	16.9		
0.0086 mm.	15.1		
0.0061 mm.	13.7		
0.0044 mm.	12.2		
0.0031 mm.	10.8		
0.0014 mm.	9.0		

* (no specification provided)

Material Description

Red-brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 14 **LL=** 25 **PI=** 11

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-2-6(0)

Coefficients

D_{90}= 33.4778 D_{85}= 31.1977 D_{60}= 11.3025
D_{50}= 3.0084 D_{30}= 0.0658 D_{15}= 0.0083
D_{10}= 0.0024 C_u= 4751.02 C_c= 0.16

Remarks

As received MC = 13.8%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

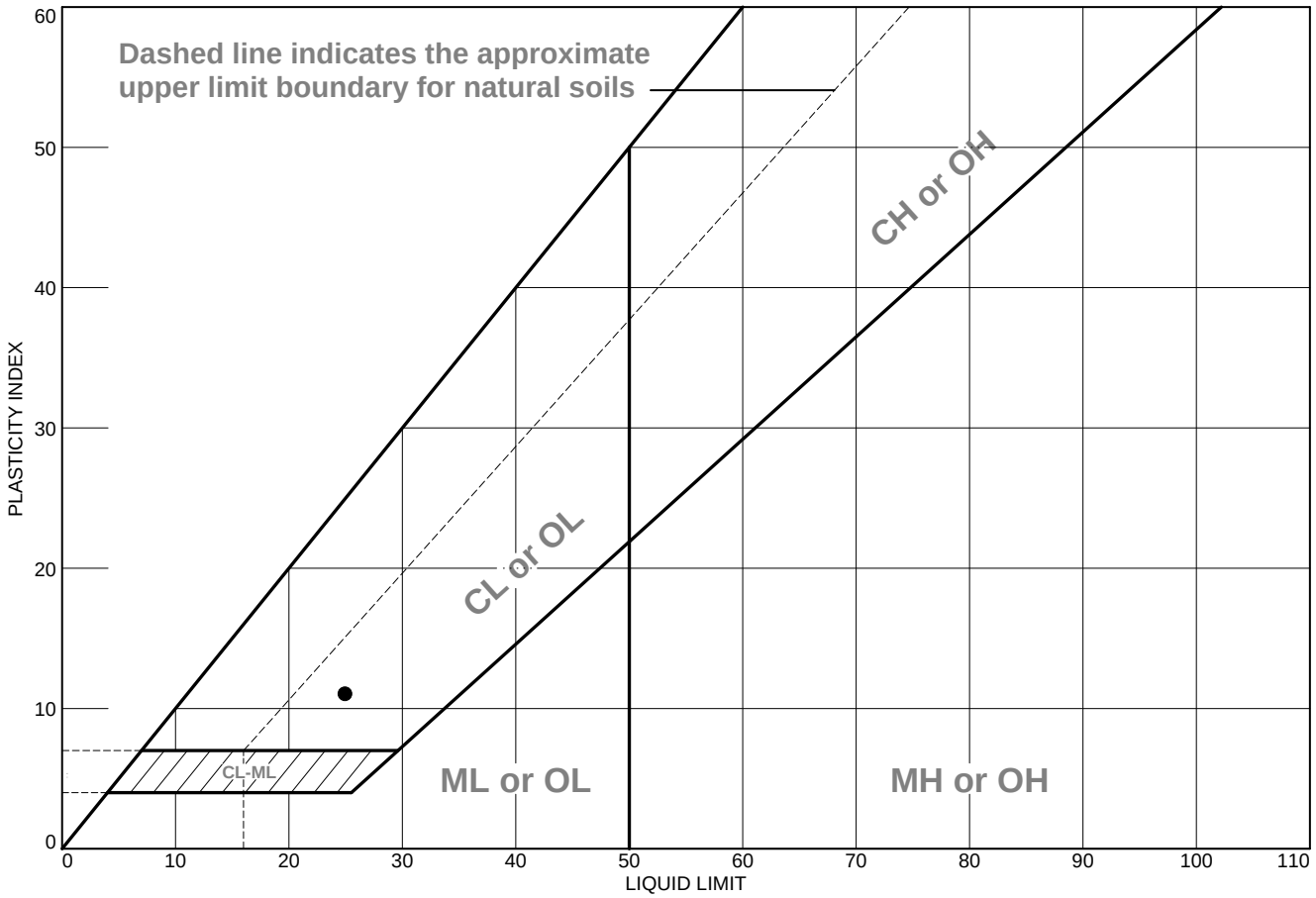
Source of Sample: 300-GEO-05 **Depth:** 23-24.25' **Date Sampled:** 9/18/18
Sample Number: S-11

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Red-brown clayey gravel with sand	9/18/18	11/7/18	AS	25	14	11	47.6	GC

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** 300-GEO-05 **Depth:** 23-24.25' **Sample Number:** S-11

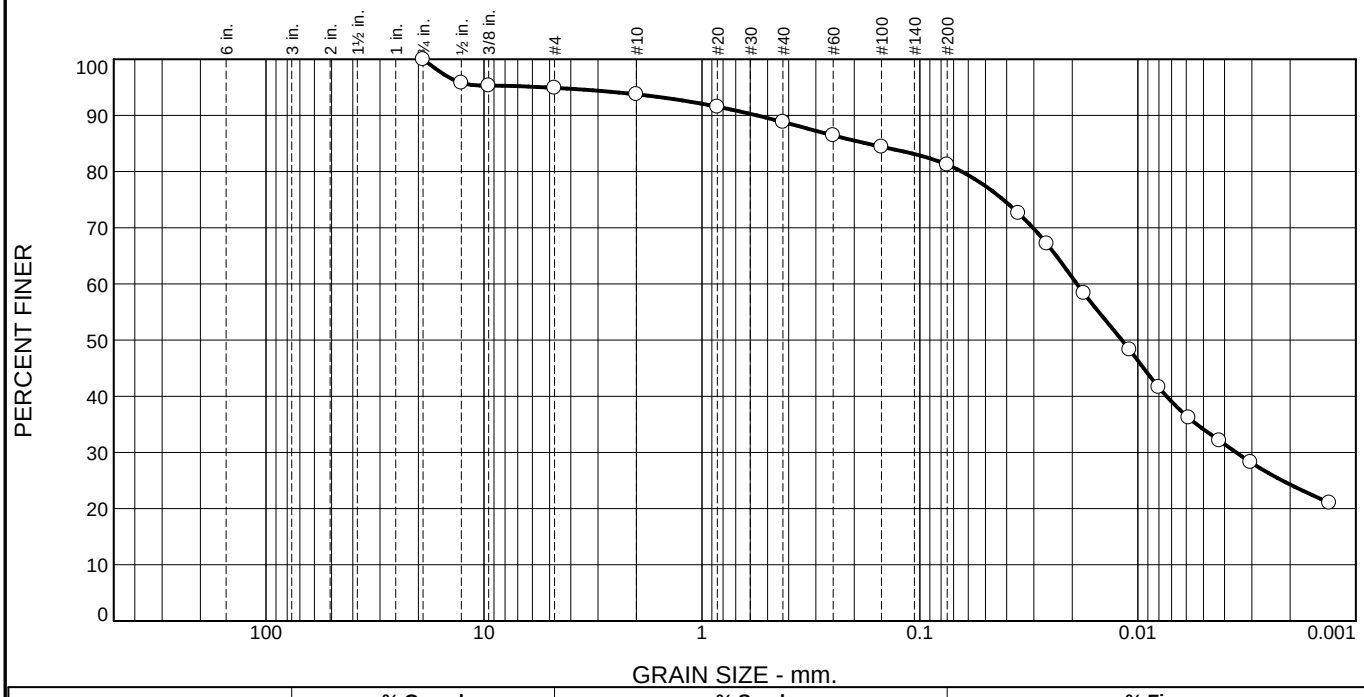
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: AS **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.1	1.1	5.0	7.6	47.1	34.1

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	95.8		
.375"	95.3		
#4	94.9		
#10	93.8		
#20	91.5		
#40	88.8		
#60	86.4		
#100	84.4		
#200	81.2		
0.0354 mm.	72.6		
0.0262 mm.	67.2		
0.0177 mm.	58.4		
0.0109 mm.	48.3		
0.0080 mm.	41.6		
0.0059 mm.	36.2		
0.0042 mm.	32.1		
0.0030 mm.	28.3		
0.0013 mm.	21.0		

* (no specification provided)

Material Description

Gray-brown lean clay with sand

Atterberg Limits (ASTM D 4318)

PL= 21 **LL=** 35 **PI=** 14

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(11)

Coefficients

D_{90}= 0.5600 D_{85}= 0.1754 D_{60}= 0.0190
D_{50}= 0.0118 D_{30}= 0.0035 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 22.7%

Date Received: 11/1/18 **Date Tested:** 11/9/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

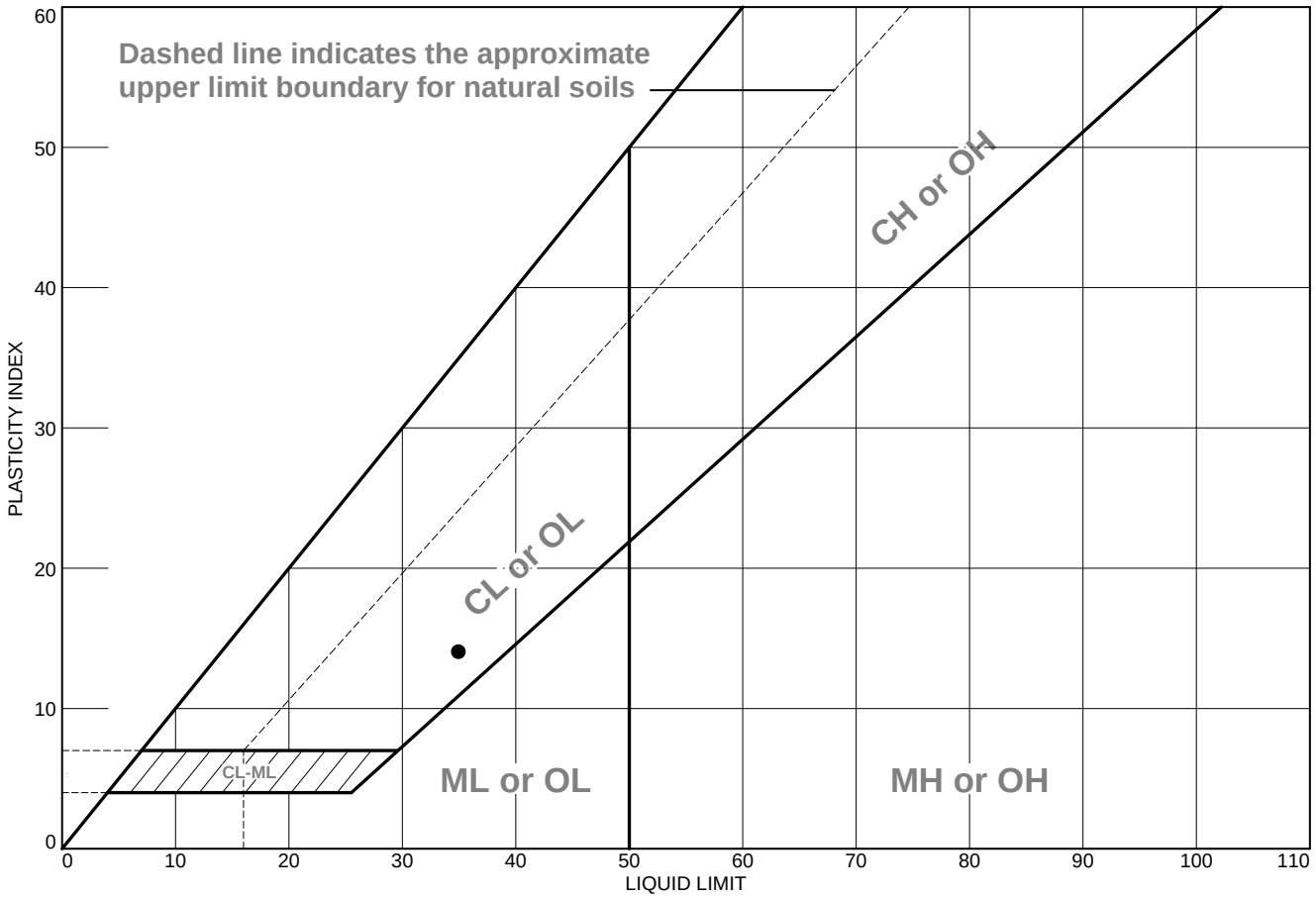
Source of Sample: SED-GEO-01A **Depth:** 4-6' **Date Sampled:** 10/8/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Gray-brown lean clay with sand	10/8/18	11/12/18	AS	35	21	14	88.8	CL

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek

Lockport, NY

○**Source of Sample:** SED-GEO-01A **Depth:** 4-6' **Sample Number:** S-3

CDM Smith

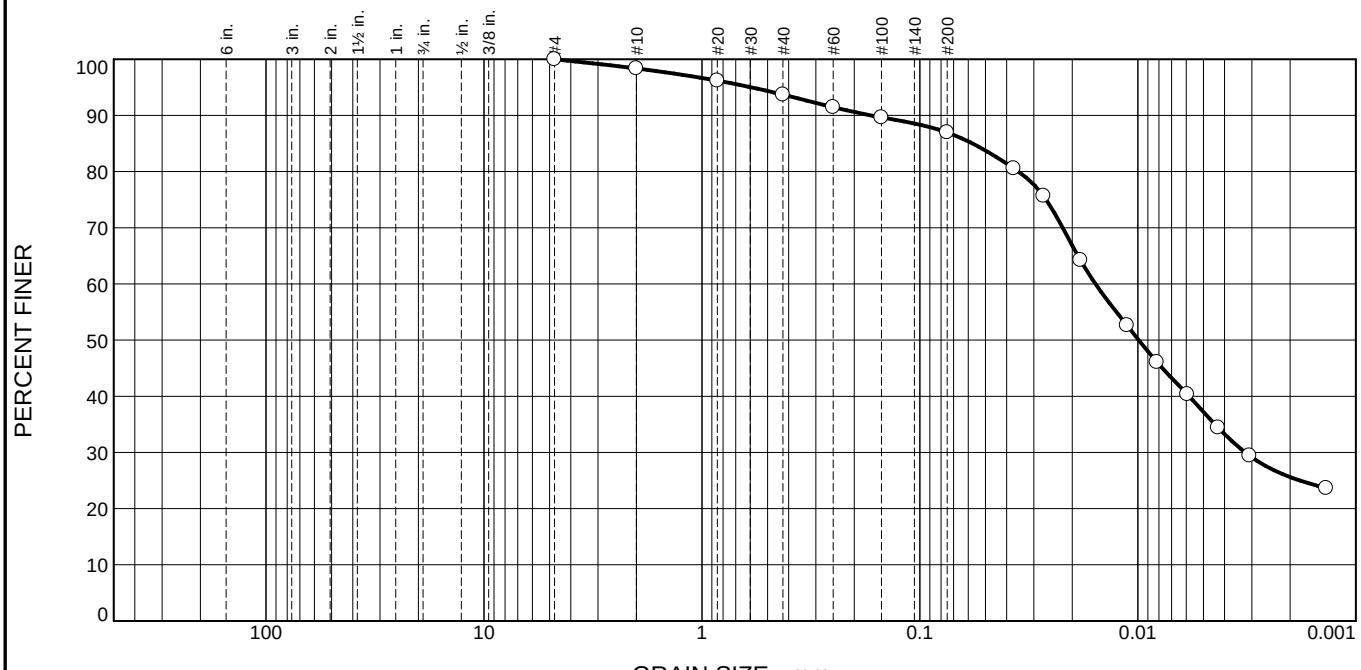
Boston, Massachusetts

Checked by: MP

Title: Laboratory Manager

Tested By: AS **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.6	4.7	6.7	49.8	37.2

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	98.4		
#20	96.2		
#40	93.7		
#60	91.5		
#100	89.6		
#200	87.0		
0.0371 mm.	80.6		
0.0271 mm.	75.7		
0.0183 mm.	64.2		
0.0112 mm.	52.6		
0.0082 mm.	46.1		
0.0059 mm.	40.4		
0.0043 mm.	34.4		
0.0031 mm.	29.4		
0.0014 mm.	23.6		

* (no specification provided)

Material Description

Gray-brown lean clay

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(7)

Coefficients

D_{90}= 0.1675 D_{85}= 0.0574 D_{60}= 0.0156
D_{50}= 0.0099 D_{30}= 0.0032 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 24.3%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

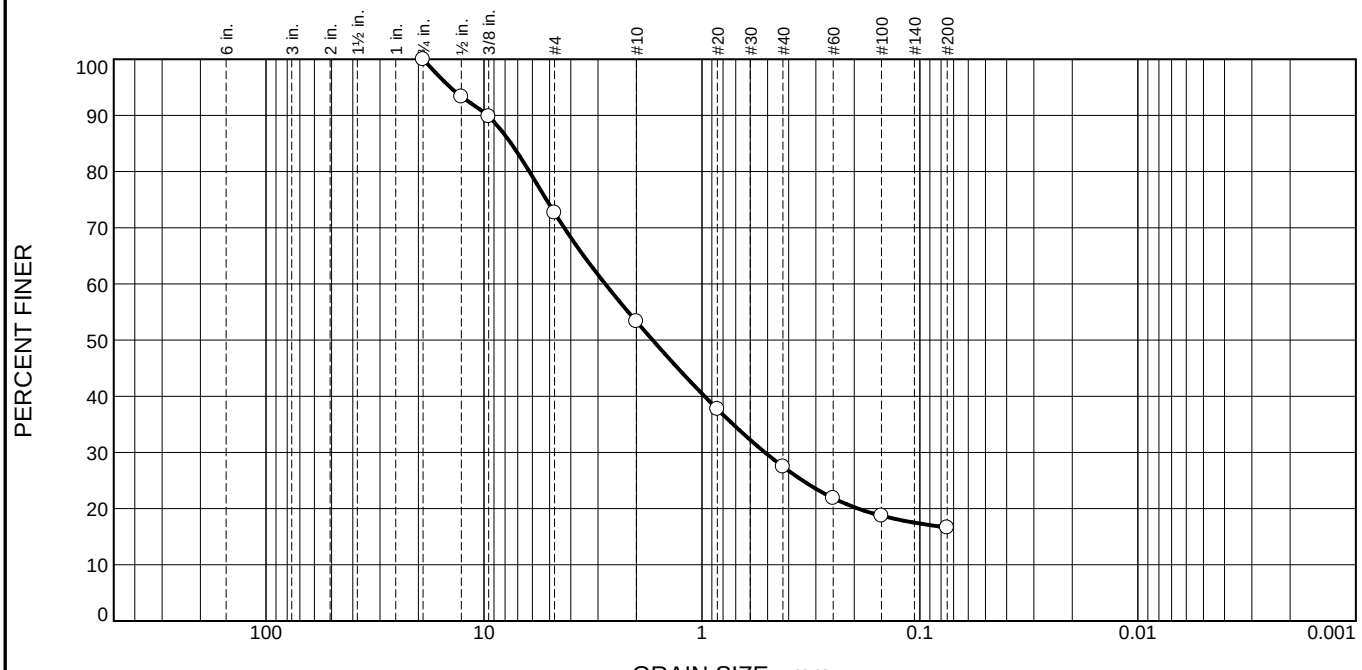
Source of Sample: SED-GEO-01A **Depth:** 6-8' **Date Sampled:** 10/8/18
Sample Number: S-4

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	27.3	19.4	25.8	10.9	16.6	

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	93.3		
.375"	89.8		
#4	72.7		
#10	53.3		
#20	37.7		
#40	27.5		
#60	21.9		
#100	18.7		
#200	16.6		

* (no specification provided)

Material Description

Dark brown silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 9.6400 D_{85}= 7.5017 D_{60}= 2.7793
D_{50}= 1.6839 D_{30}= 0.5140 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 17.0%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

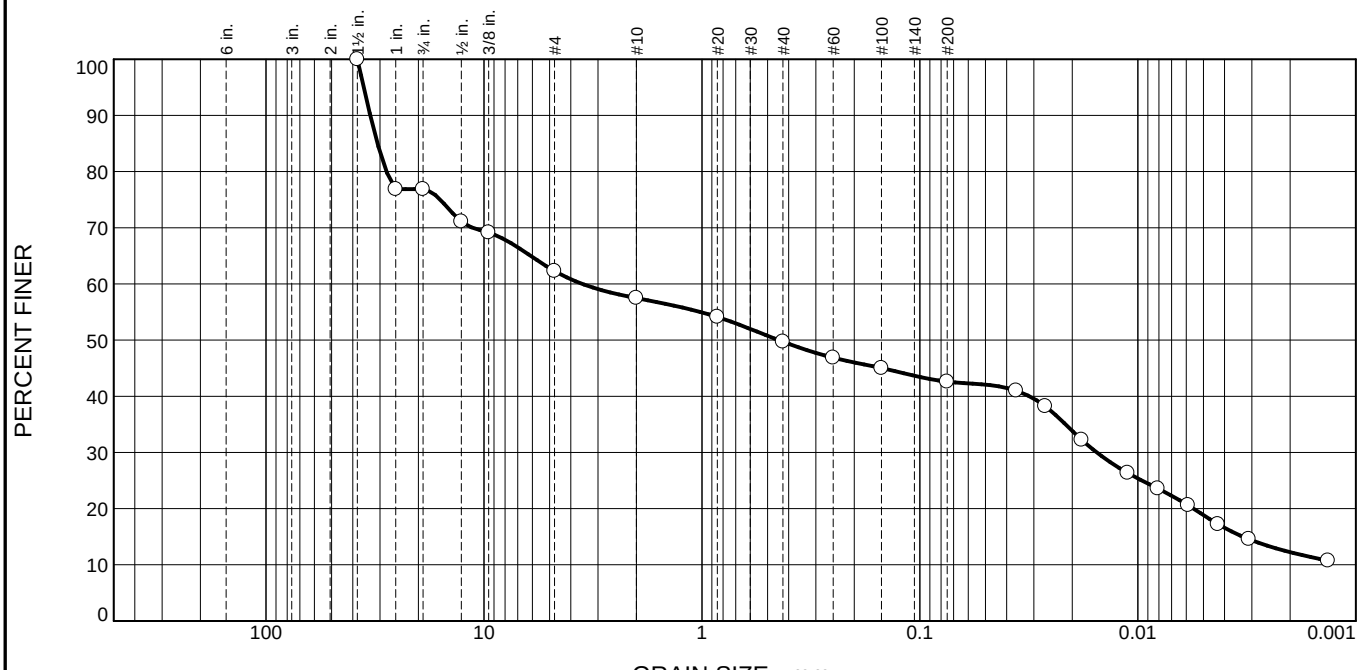
Source of Sample: SED-GEO-02 **Depth:** 2-4' **Date Sampled:** 10/17/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	23.1	14.6	4.8	7.8	7.1	23.8	18.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	76.9		
.75"	76.9		
.5"	71.1		
.375"	69.1		
#4	62.3		
#10	57.5		
#20	54.1		
#40	49.7		
#60	46.9		
#100	45.0		
#200	42.6		
0.0362 mm.	41.0		
0.0266 mm.	38.2		
0.0181 mm.	32.3		
0.0111 mm.	26.4		
0.0081 mm.	23.6		
0.0059 mm.	20.6		
0.0043 mm.	17.2		
0.0031 mm.	14.6		
0.0013 mm.	10.7		

* (no specification provided)

Material Description

Brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 33.2614 D_{85}= 30.8068 D_{60}= 3.5423
D_{50}= 0.4446 D_{30}= 0.0154 D_{15}= 0.0033
D_{10}= C_u= C_c=

Remarks

As received MC = 26.7%

Date Received: 11/1/18 **Date Tested:** 11/9/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

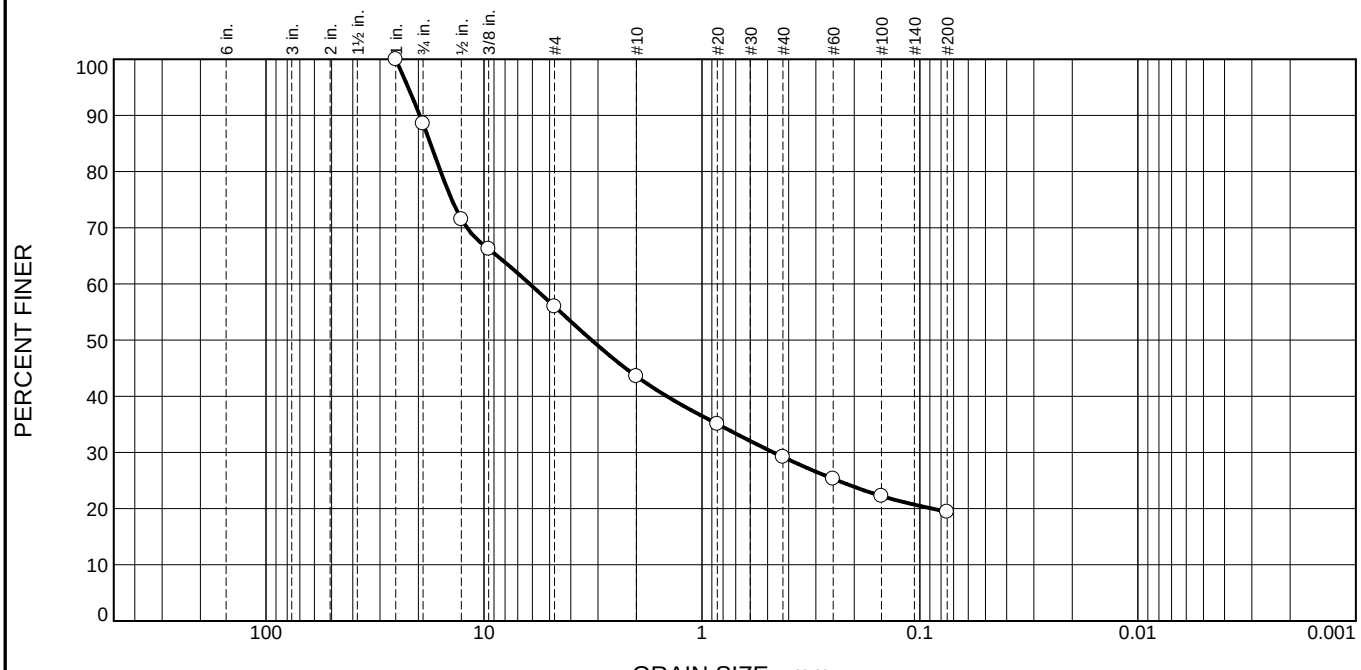
Source of Sample: SED-GEO-02 **Depth:** 8-10' **Date Sampled:** 10/17/18
Sample Number: S-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.5	32.5	12.4	14.4	9.8	19.4	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	88.5		
.5"	71.5		
.375"	66.2		
#4	56.0		
#10	43.6		
#20	35.1		
#40	29.2		
#60	25.3		
#100	22.2		
#200	19.4		

* (no specification provided)

Material Description

Dark brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 19.7027 D_{85}= 17.6185 D_{60}= 6.1682
D_{50}= 3.2080 D_{30}= 0.4702 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 27.4%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

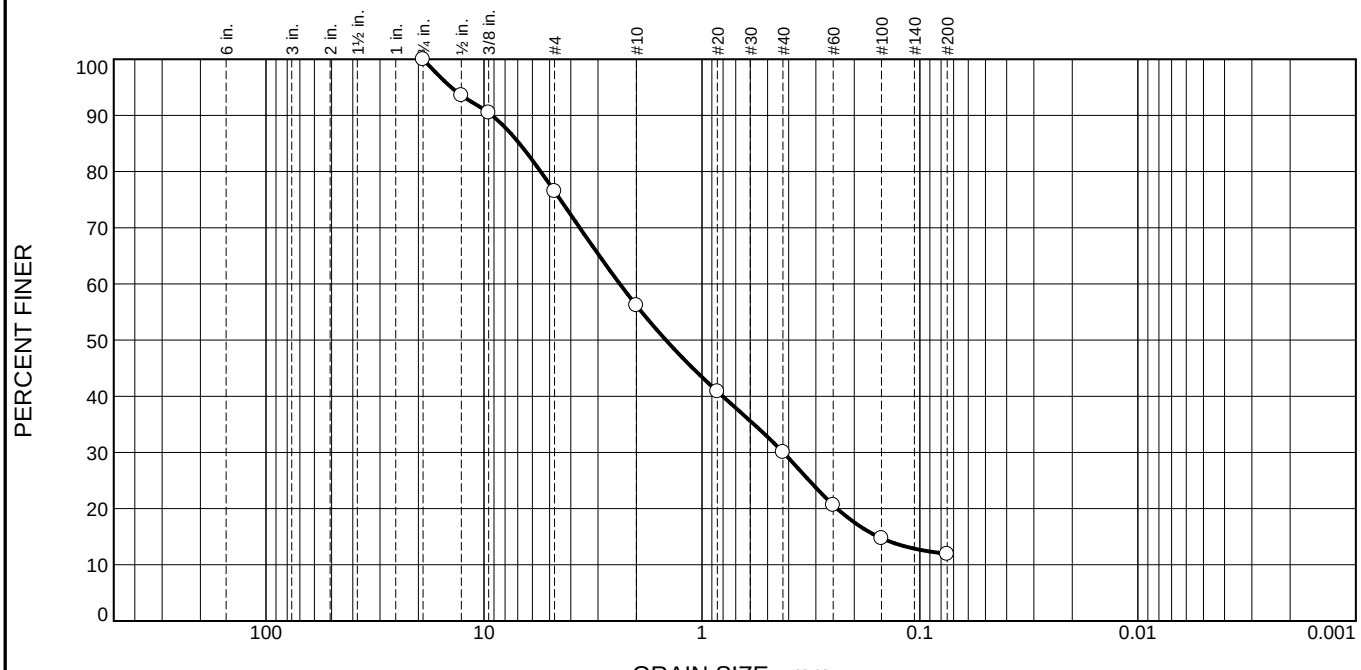
Source of Sample: SED-GEO-03A **Depth:** 2-2.8' **Date Sampled:** 10/5/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	23.5	20.3	26.1	18.2	11.9	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	93.6		
.375"	90.5		
#4	76.5		
#10	56.2		
#20	40.9		
#40	30.1		
#60	20.6		
#100	14.7		
#200	11.9		

* (no specification provided)

Material Description

Brown and black poorly graded sand with silt and gravel
Sample contains many shells.

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 9.1750 D_{85}= 6.8803 D_{60}= 2.3809
D_{50}= 1.4633 D_{30}= 0.4238 D_{15}= 0.1553
D_{10}= C_u= C_c=

Remarks

As received MC = 32.4%

Date Received: 11/1/18 **Date Tested:** 11/8/18
Tested By: MP
Checked By: MP
Title: Laboratory Manager

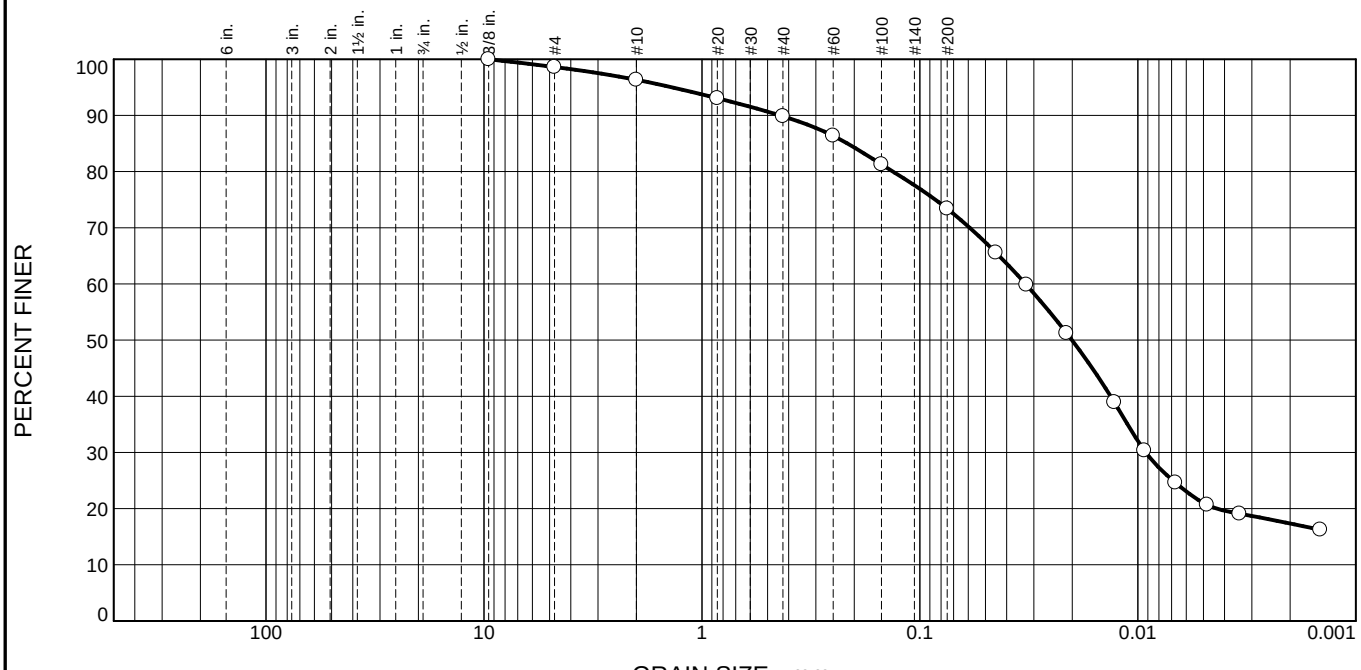
Source of Sample: SED-GEO-04 **Depth:** 0-2' **Date Sampled:** 10/10/18
Sample Number: S-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.4	2.3	6.5	16.4	52.4	21.0

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	98.6		
#10	96.3		
#20	93.1		
#40	89.8		
#60	86.4		
#100	81.3		
#200	73.4		
0.0448 mm.	65.6		
0.0325 mm.	59.8		
0.0212 mm.	51.2		
0.0128 mm.	38.9		
0.0093 mm.	30.3		
0.0067 mm.	24.6		
0.0048 mm.	20.7		
0.0034 mm.	19.1		
0.0015 mm.	16.2		

* (no specification provided)

Material Description

Black silt with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML/OL **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.4375 D_{85}= 0.2148 D_{60}= 0.0327
D_{50}= 0.0201 D_{30}= 0.0092 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 107.4%

Date Received: 11/1/18 **Date Tested:** 11/9/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

Source of Sample: SED-GEO-05 **Depth:** 3.25-4' **Date Sampled:** 10/9/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

CDM Smith

Geotechnical Engineering Laboratory

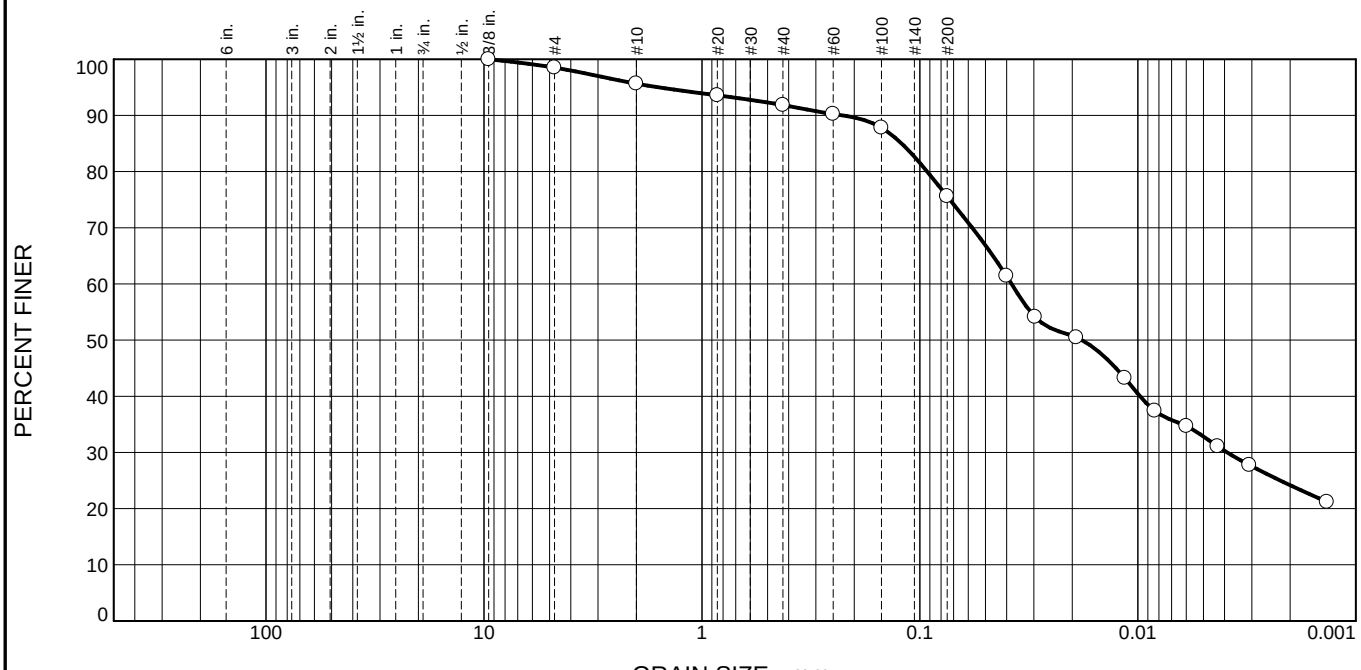
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/8/2018
Project Number:	51147-223203		
Boring Number:	SED-GEO-05	Procedure:	C
Sample Number:	S-2	Temperature:	440° C
Sample Depth (ft):	3.25-4'		
Sample Date:	10/9/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	126.74
Wet Mass of Sample & Tin (g)	228.88
Dry Mass of Sample & Tin (g)	176.00
Mass of Water (g)	52.88
Mass of Dry Soil (g)	49.26
Moisture Content (%)	**107.3**

ASH CONTENT	
Porcelain Dish Mass (g)	126.74
Porcelain Dish + Oven Dried Soil (g)	176.00
Mass of Oven Dried Soil (g)	49.26
Mass of Dish & Burned Soil (g)	172.06
Mass of Burned Soil (g)	45.32
Mass of Organic Material (g)	3.94
Ash Content (%)	92.0
Organic Content (%)	**8.0**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.5	2.8	3.9	16.2	42.8	32.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	98.5		
#10	95.7		
#20	93.6		
#40	91.8		
#60	90.2		
#100	87.8		
#200	75.6		
0.0401 mm.	61.4		
0.0296 mm.	54.1		
0.0192 mm.	50.5		
0.0115 mm.	43.3		
0.0084 mm.	37.4		
0.0060 mm.	34.7		
0.0043 mm.	31.1		
0.0031 mm.	27.8		
0.0014 mm.	21.2		

* (no specification provided)

Material Description

Red-brown silty clay with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL-ML **AASHTO (M 145)=** A-4(1)

Coefficients

D_{90}= 0.2267 D_{85}= 0.1214 D_{60}= 0.0380
D_{50}= 0.0181 D_{30}= 0.0039 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 23.2%

Date Received: 11/1/18 **Date Tested:** 11/9/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

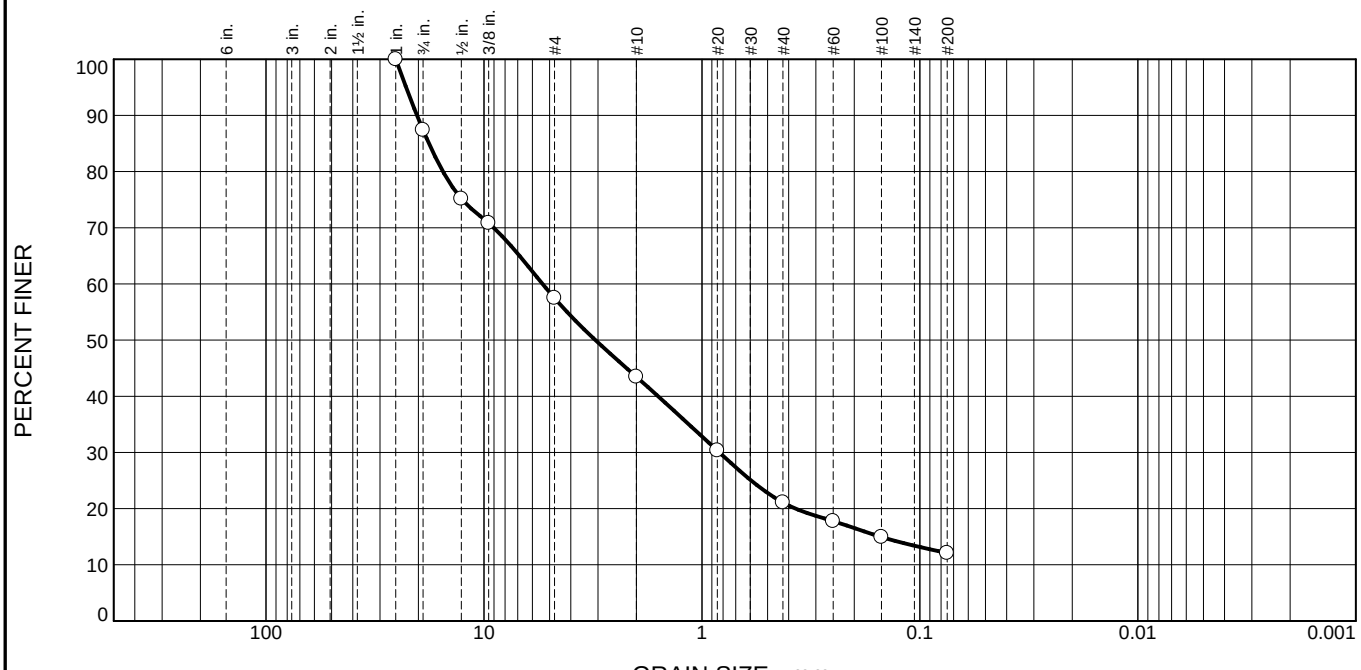
Source of Sample: SED-GEO-05 **Depth:** 5-5.3' **Date Sampled:** 10/9/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.6	29.9	14.0	22.4	9.0	12.1	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	87.4		
.5"	75.2		
.375"	70.8		
#4	57.5		
#10	43.5		
#20	30.3		
#40	21.1		
#60	17.8		
#100	14.9		
#200	12.1		

* (no specification provided)

Material Description

Brown & black silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 20.2976 D_{85}= 17.8978 D_{60}= 5.3857
D_{50}= 3.0822 D_{30}= 0.8318 D_{15}= 0.1517
D_{10}= C_u= C_c=

Remarks

As received MC = 19.3%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

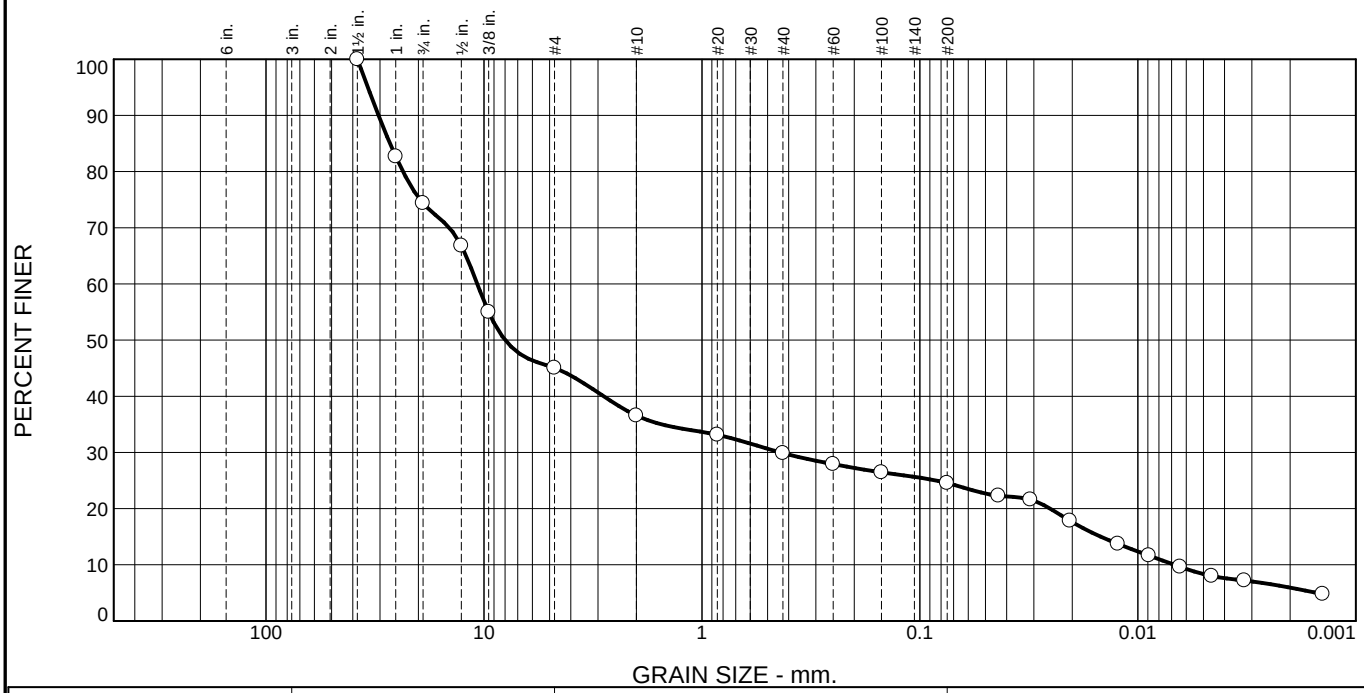
Source of Sample: SED-GEO-06 **Depth:** 2-4' **Date Sampled:** 10/11/18
Sample Number: S-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	25.6	29.3	8.5	6.7	5.4	16.2	8.3

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	82.7		
.75"	74.4		
.5"	66.8		
.375"	55.0		
#4	45.1		
#10	36.6		
#20	33.1		
#40	29.9		
#60	27.9		
#100	26.5		
#200	24.5		
0.0436 mm.	22.3		
0.0311 mm.	21.6		
0.0205 mm.	17.8		
0.0123 mm.	13.7		
0.0089 mm.	11.7		
0.0064 mm.	9.6		
0.0046 mm.	8.0		
0.0032 mm.	7.2		
0.0014 mm.	4.8		

* (no specification provided)

Material Description

Red-brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-2-6(0)

Coefficients

D_{90}= 30.4687 D_{85}= 26.9893 D_{60}= 10.7329
D_{50}= 7.9991 D_{30}= 0.4373 D_{15}= 0.0148
D_{10}= 0.0068 C_u= 1578.66 C_c= 2.62

Remarks

As received MC = 17.5%

Date Received: 11/1/18 **Date Tested:** 11/9/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

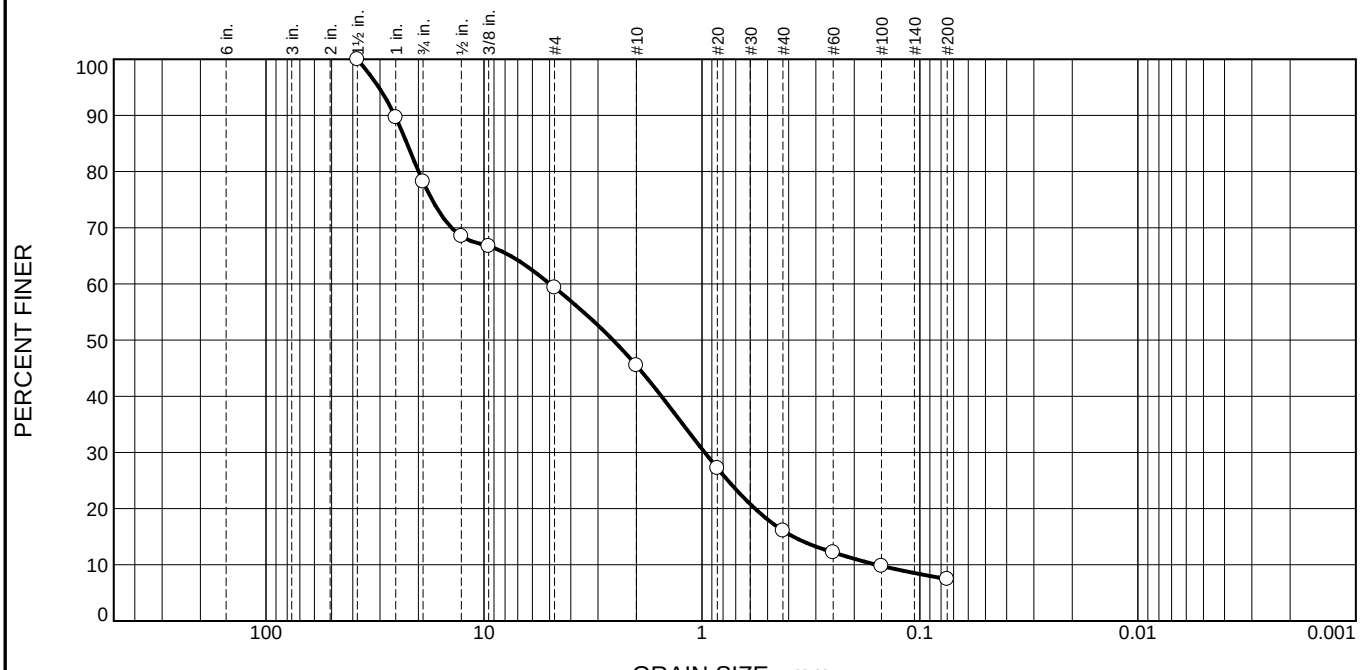
Source of Sample: SED-GEO-06 **Depth:** 4-6' **Date Sampled:** 10/12/18
Sample Number: S-6

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	21.8	18.8	13.9	29.4	8.6	7.5	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	89.7		
.75"	78.2		
.5"	68.5		
.375"	66.7		
#4	59.4		
#10	45.5		
#20	27.2		
#40	16.1		
#60	12.2		
#100	9.8		
#200	7.5		

* (no specification provided)

Material Description

Brown & black well-graded sand with silt and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 25.6522 D_{85}= 22.5446 D_{60}= 4.9781
D_{50}= 2.5576 D_{30}= 0.9716 D_{15}= 0.3805
D_{10}= 0.1579 C_u= 31.54 C_c= 1.20

Remarks

As received MC = 14.7%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

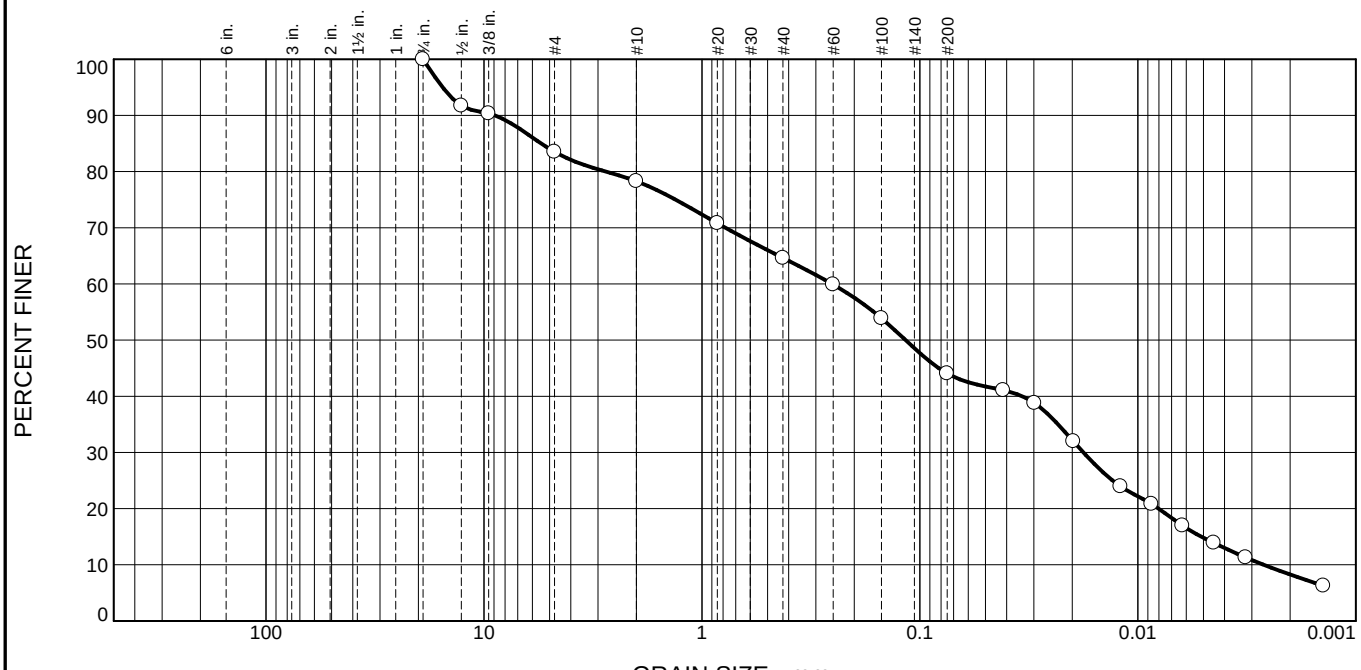
Source of Sample: SED-GEO-06B **Depth:** 2-4' **Date Sampled:** 10/12/18
Sample Number: S-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	16.5	5.2	13.7	20.5	29.3	14.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	91.7		
.375"	90.4		
#4	83.5		
#10	78.3		
#20	70.8		
#40	64.6		
#60	59.9		
#100	53.9		
#200	44.1		
0.0414 mm.	41.1		
0.0298 mm.	38.8		
0.0198 mm.	32.0		
0.0120 mm.	24.0		
0.0086 mm.	20.8		
0.0062 mm.	17.0		
0.0045 mm.	13.9		
0.0032 mm.	11.3		
0.0014 mm.	6.3		

* (no specification provided)

Material Description

Brown silty, clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SC-SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 8.9034 D_{85}= 5.4620 D_{60}= 0.2529
D_{50}= 0.1164 D_{30}= 0.0178 D_{15}= 0.0051
D_{10}= 0.0026 C_u= 95.71 C_c= 0.47

Remarks

As received MC = 38.7%

Date Received: 11/1/18 **Date Tested:** 11/9/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

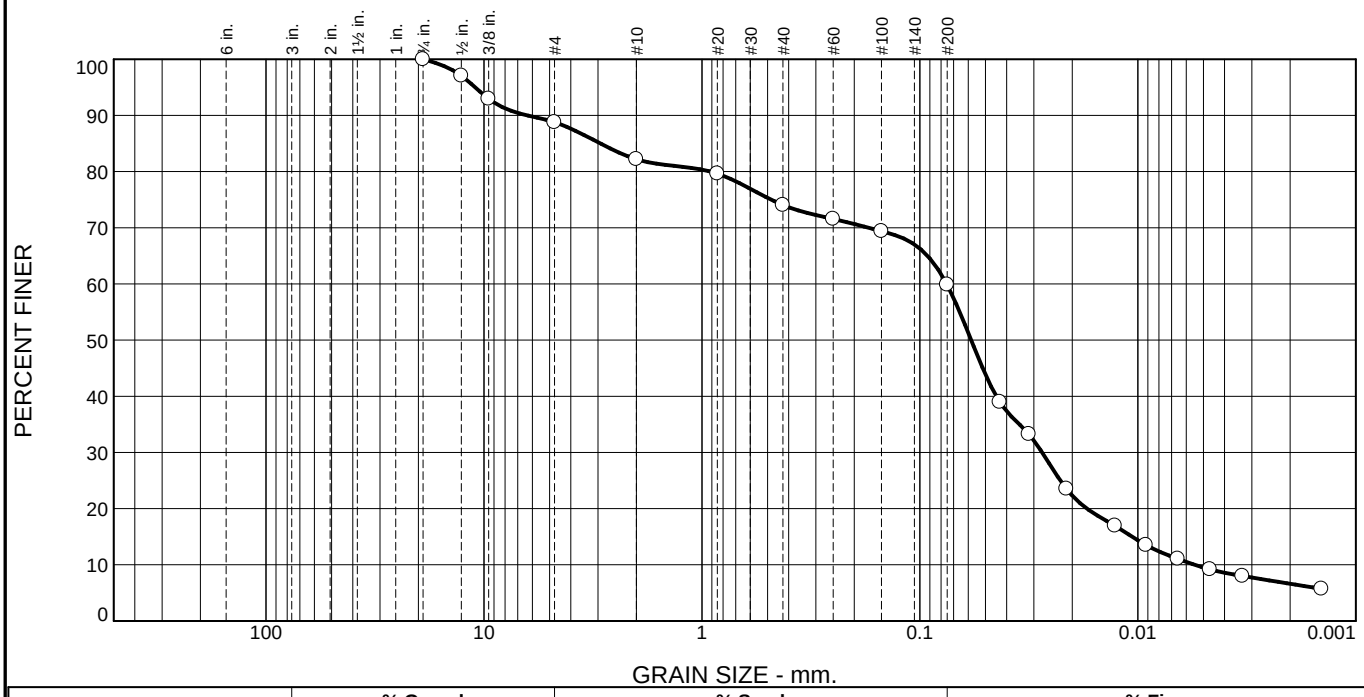
Source of Sample: SED-GEO-07 **Depth:** 4-6' **Date Sampled:** 10/12/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.2	6.6	8.2	14.1	50.4	9.5

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	97.1		
.375"	93.0		
#4	88.8		
#10	82.2		
#20	79.6		
#40	74.0		
#60	71.6		
#100	69.4		
#200	59.9		
0.0430 mm.	39.0		
0.0316 mm.	33.3		
0.0213 mm.	23.5		
0.0127 mm.	16.9		
0.0092 mm.	13.5		
0.0066 mm.	11.1		
0.0047 mm.	9.2		
0.0033 mm.	8.0		
0.0014 mm.	5.7		

* (no specification provided)

Material Description

Red-brown sandy silt

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 6.3280 D_{85}= 2.9224 D_{60}= 0.0753
D_{50}= 0.0582 D_{30}= 0.0275 D_{15}= 0.0106
D_{10}= 0.0055 C_u= 13.73 C_c= 1.83

Remarks

As received MC = 12.2%

Date Received: 11/1/18 **Date Tested:** 11/9/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

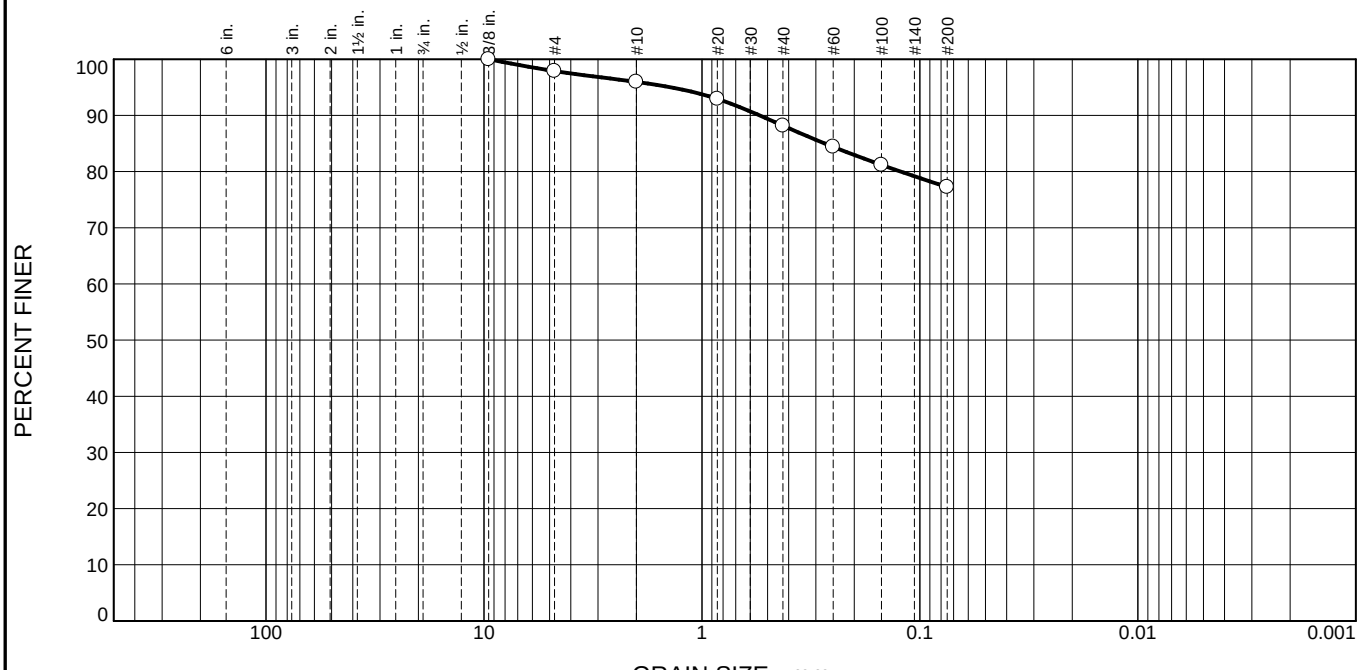
Source of Sample: SED-GEO-07 **Depth:** 6-8' **Date Sampled:** 10/12/18
Sample Number: S-4

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.1	1.9	7.8	11.0	77.2	

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	97.9		
#10	96.0		
#20	92.9		
#40	88.2		
#60	84.4		
#100	81.2		
#200	77.2		

* (no specification provided)

Material Description

Dark brown silt with sand with organic fines

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML/OL **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.5438 D_{85}= 0.2729 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 106.4%

Date Received: 11/1/18 **Date Tested:** 11/9/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

Source of Sample: SED-GEO-08 **Depth:** 2-4' **Date Sampled:** 10/15/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

CDM Smith

Geotechnical Engineering Laboratory

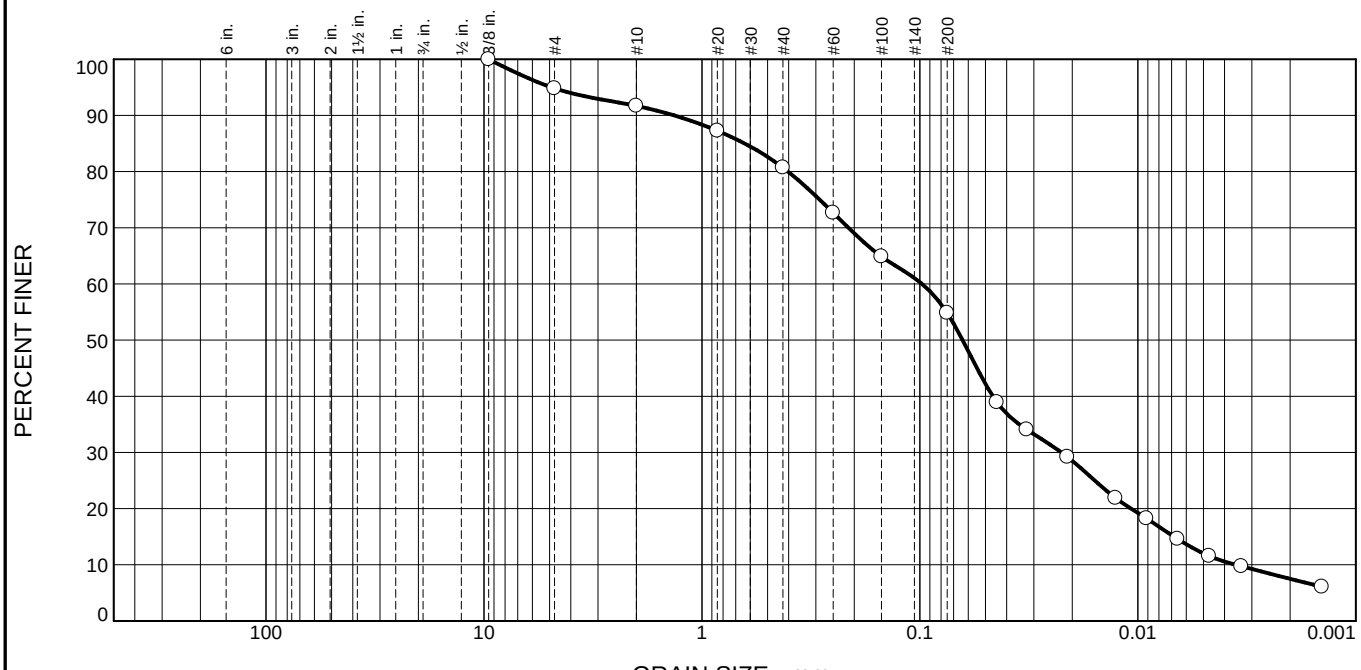
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/8/2018
Project Number:	51147-223203		
Boring Number:	SED-GEO-08	Procedure:	C
Sample Number:	S-2	Temperature:	440° C
Sample Depth (ft):	2-4'		
Sample Date:	10/15/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	64.48
Wet Mass of Sample & Tin (g)	142.00
Dry Mass of Sample & Tin (g)	100.40
Mass of Water (g)	41.60
Mass of Dry Soil (g)	35.92
Moisture Content (%)	**115.8**

ASH CONTENT	
Porcelain Dish Mass (g)	64.48
Porcelain Dish + Oven Dried Soil (g)	100.40
Mass of Oven Dried Soil (g)	35.92
Mass of Dish & Burned Soil (g)	95.97
Mass of Burned Soil (g)	31.49
Mass of Organic Material (g)	4.43
Ash Content (%)	87.7
Organic Content (%)	**12.3**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.2	3.1	11.0	25.8	42.9	12.0

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	94.8		
#10	91.7		
#20	87.3		
#40	80.7		
#60	72.7		
#100	64.9		
#200	54.9		
0.0443 mm.	38.9		
0.0323 mm.	34.1		
0.0211 mm.	29.2		
0.0127 mm.	21.9		
0.0091 mm.	18.3		
0.0066 mm.	14.6		
0.0047 mm.	11.6		
0.0033 mm.	9.7		
0.0014 mm.	6.1		

* (no specification provided)

Material Description

Dark brown sandy silt with organic fines

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 1.3406 D_{85}= 0.6364 D_{60}= 0.0978
D_{50}= 0.0637 D_{30}= 0.0224 D_{15}= 0.0068
D_{10}= 0.0036 C_u= 27.53 C_c= 1.45

Remarks

As received MC = 55.7%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

Source of Sample: SED-GEO-08 **Depth:** 4-6' **Date Sampled:** 10/15/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

CDM Smith

Geotechnical Engineering Laboratory

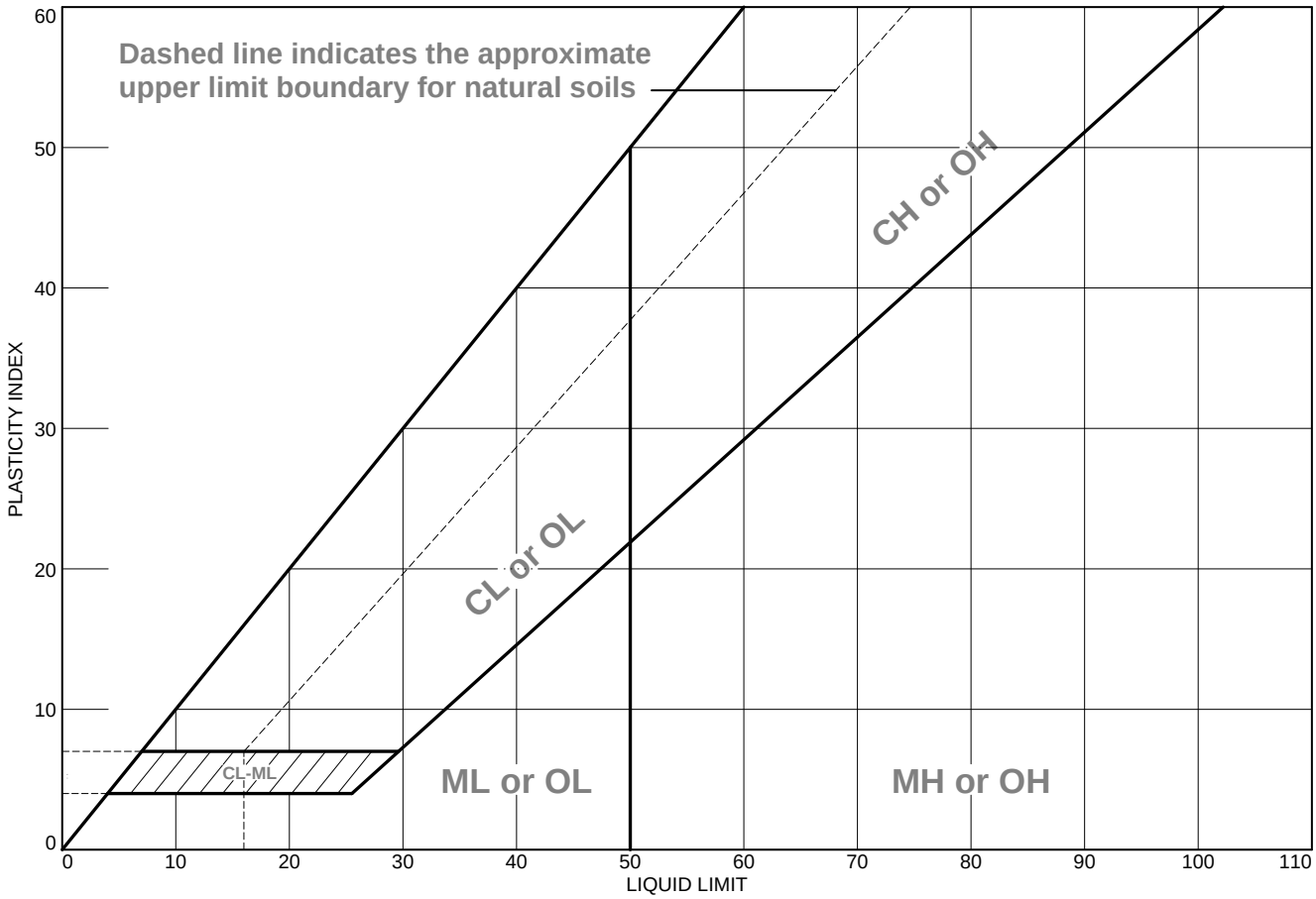
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/12/2018
Project Number:	51147-223203		
Boring Number:	SED-GEO-08	Procedure:	C
Sample Number:	S-3	Temperature:	440° C
Sample Depth (ft):	4-6'		
Sample Date:	10/15/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	96.96
Wet Mass of Sample & Tin (g)	203.22
Dry Mass of Sample & Tin (g)	165.19
Mass of Water (g)	38.03
Mass of Dry Soil (g)	68.23
Moisture Content (%)	**55.7**

ASH CONTENT	
Porcelain Dish Mass (g)	96.96
Porcelain Dish + Oven Dried Soil (g)	165.19
Mass of Oven Dried Soil (g)	68.23
Mass of Dish & Burned Soil (g)	161.00
Mass of Burned Soil (g)	64.04
Mass of Organic Material (g)	4.19
Ash Content (%)	93.9
Organic Content (%)	**6.1**

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Dark brown sandy silt with organic fines	10/15/18	11/9/18	AS	NV	NP	NP	80.7	ML

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** SED-GEO-08 **Depth:** 4-6' **Sample Number:** S-3

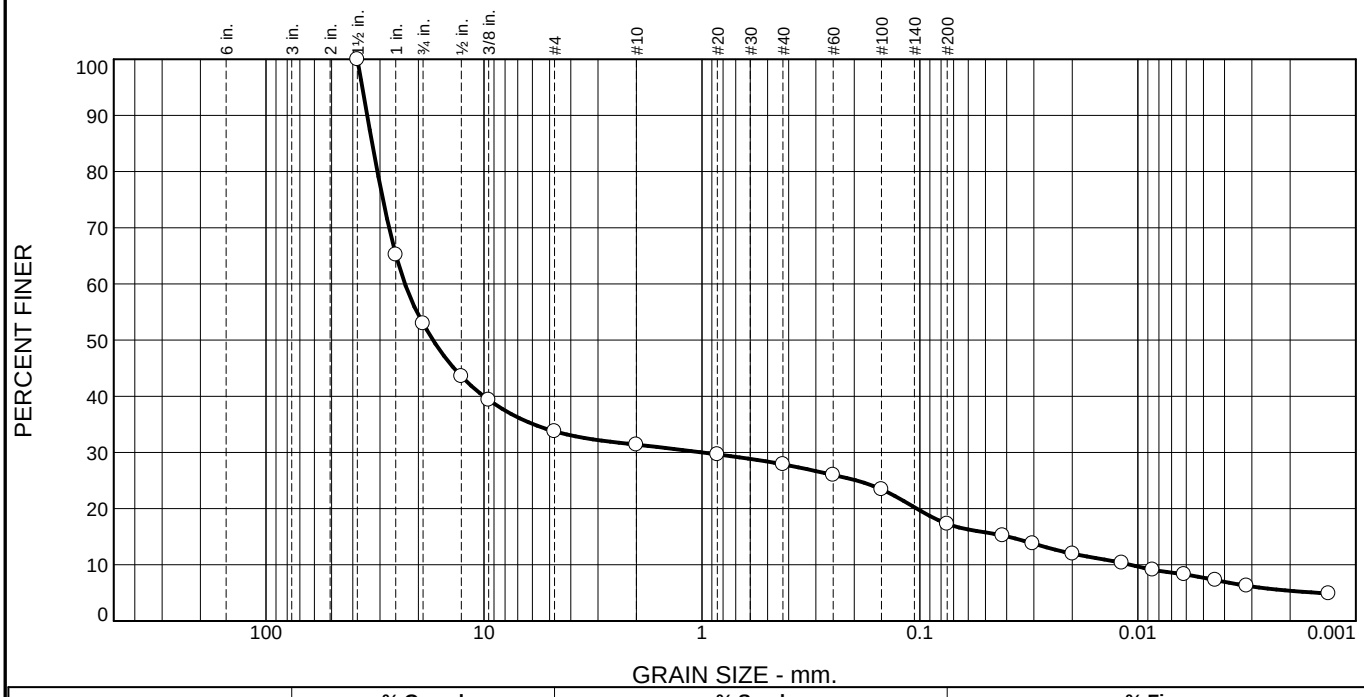
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: AS **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	47.0	19.2	2.4	3.5	10.6	9.6	7.7

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	65.2		
.75"	53.0		
.5"	43.6		
.375"	39.4		
#4	33.8		
#10	31.4		
#20	29.7		
#40	27.9		
#60	26.0		
#100	23.4		
#200	17.3		
0.0417 mm.	15.2		
0.0304 mm.	13.8		
0.0199 mm.	12.0		
0.0119 mm.	10.3		
0.0086 mm.	9.1		
0.0061 mm.	8.3		
0.0044 mm.	7.3		
0.0032 mm.	6.3		
0.0013 mm.	4.9		

* (no specification provided)

Material Description

Brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 34.3706 D_{85}= 32.5920 D_{60}= 23.0488
D_{50}= 17.1404 D_{30}= 0.9985 D_{15}= 0.0393
D_{10}= 0.0108 C_u= 2125.09 C_c= 3.99

Remarks

As received MC = 35.8%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

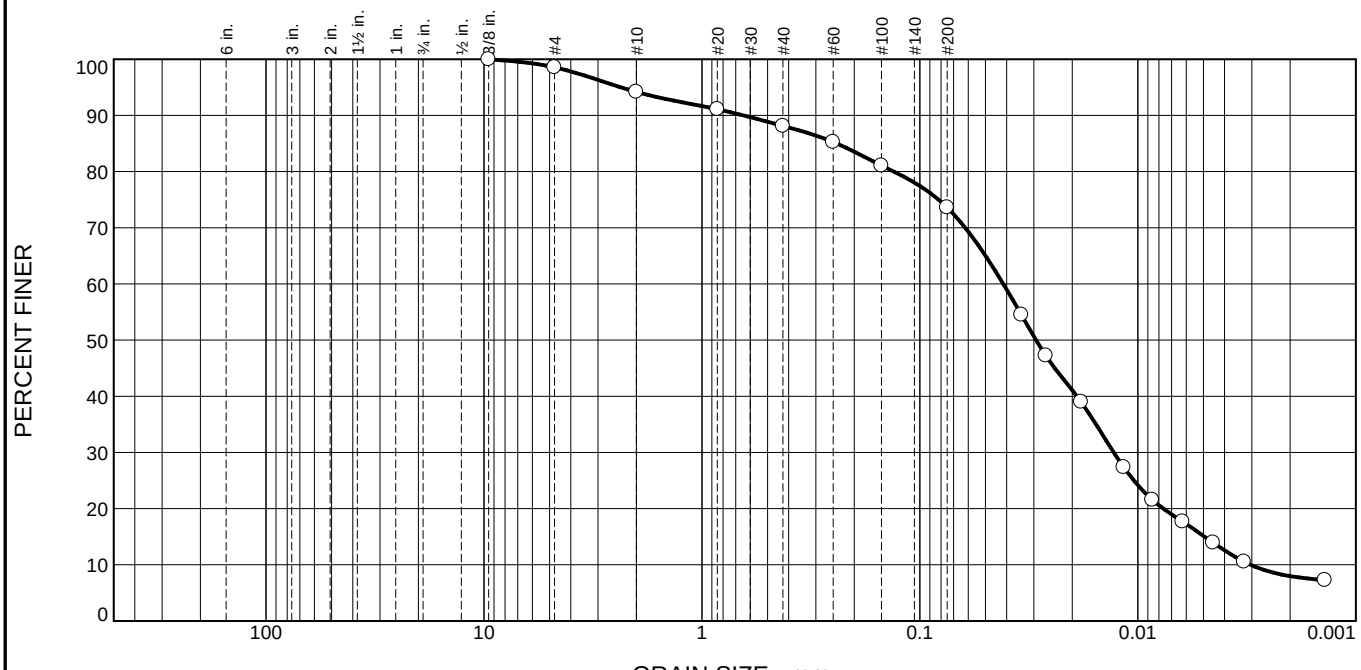
Source of Sample: SED-GEO-08 **Depth:** 8-8.5' **Date Sampled:** 10/15/18
Sample Number: S-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.4	4.4	6.1	14.5	58.5	15.1

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	98.6		
#10	94.2		
#20	91.1		
#40	88.1		
#60	85.3		
#100	81.1		
#200	73.6		
0.0342 mm.	54.5		
0.0265 mm.	47.2		
0.0182 mm.	39.0		
0.0116 mm.	27.4		
0.0086 mm.	21.6		
0.0062 mm.	17.7		
0.0045 mm.	13.9		
0.0033 mm.	10.5		
0.0014 mm.	7.3		

* (no specification provided)

Material Description

Brown silt with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.6458 D_{85}= 0.2405 D_{60}= 0.0414
D_{50}= 0.0293 D_{30}= 0.0129 D_{15}= 0.0049
D_{10}= 0.0030 C_u= 13.61 C_c= 1.32

Remarks

As received MC = 14.6%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

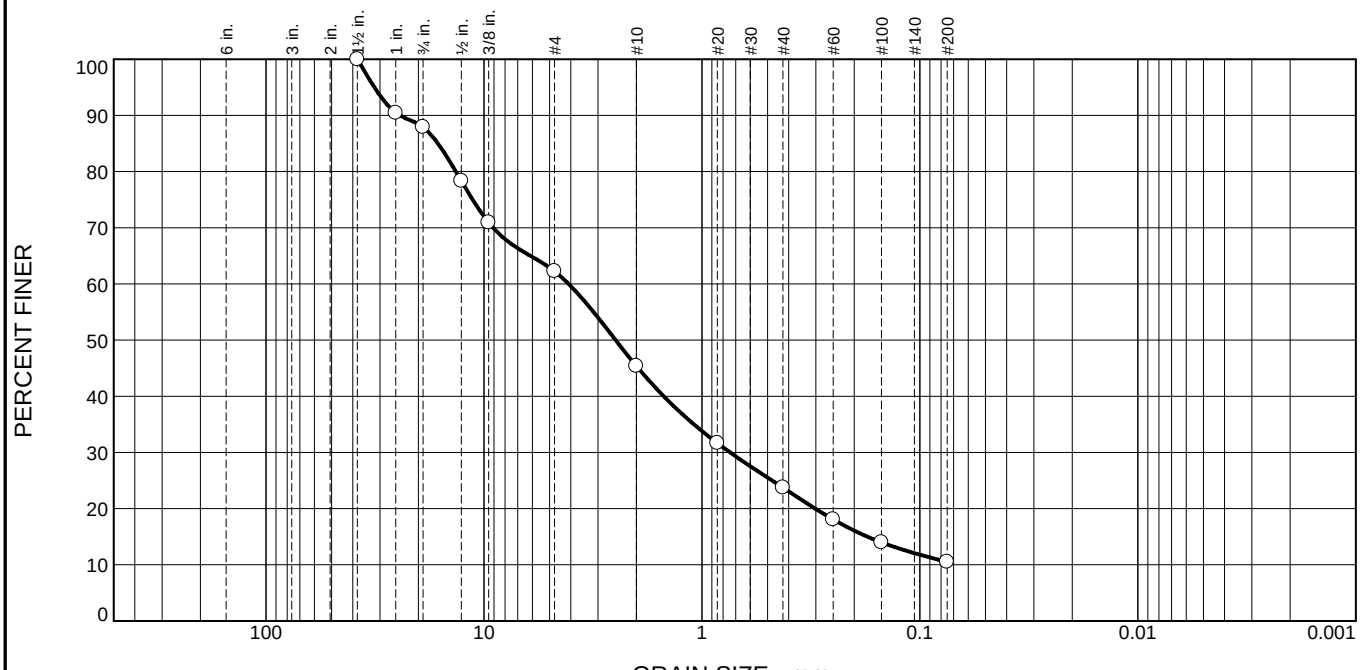
Source of Sample: SED-GEO-09 **Depth:** 2-4' **Date Sampled:** 10/15/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.1	25.6	16.9	21.7	13.2	10.5	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	90.5		
.75"	87.9		
.5"	78.3		
.375"	70.9		
#4	62.3		
#10	45.4		
#20	31.7		
#40	23.7		
#60	18.1		
#100	14.0		
#200	10.5		

* (no specification provided)

Material Description

Brown & black poorly graded sand with silt and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 24.3798 D_{85}= 16.2528 D_{60}= 4.0873
D_{50}= 2.4886 D_{30}= 0.7426 D_{15}= 0.1740
D_{10}= C_u= C_c=

Remarks

As received MC = 20.4%

Date Received: 11/1/18 **Date Tested:** 11/12/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

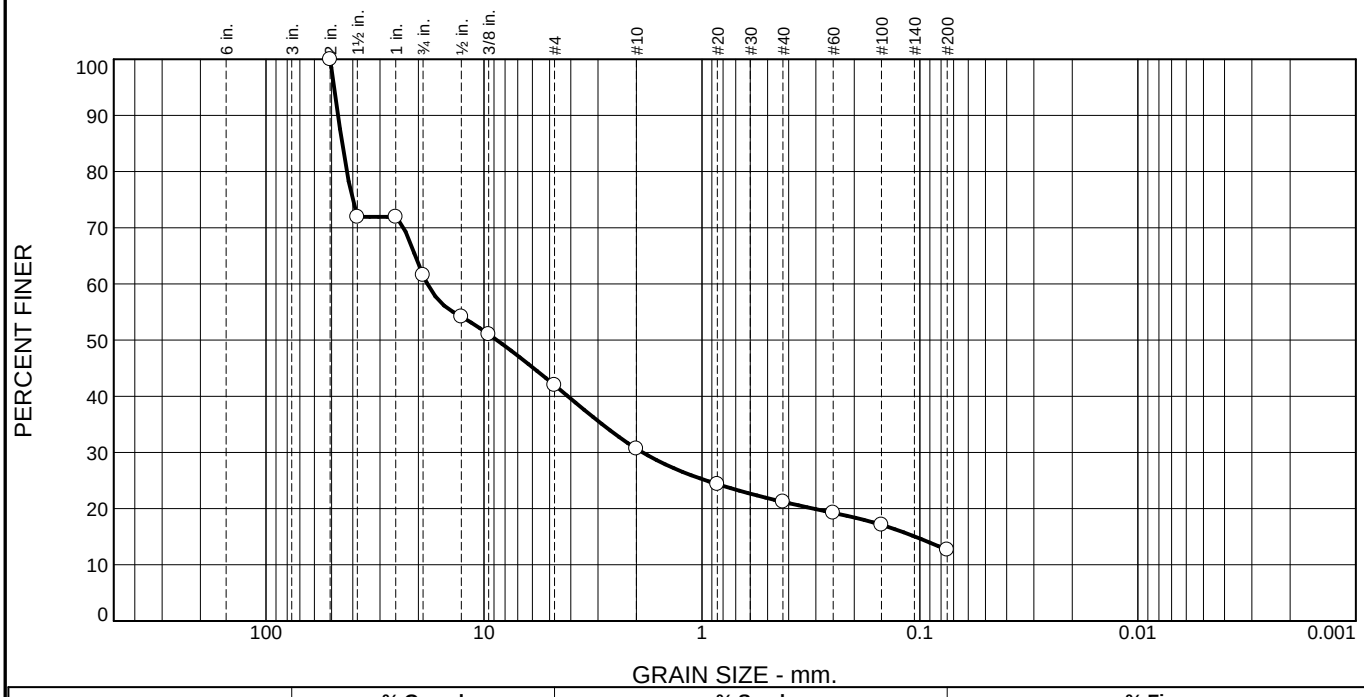
Source of Sample: SED-GEO-10 **Depth:** 0-2' **Date Sampled:** 10/16/18
Sample Number: S-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	38.4	19.6	11.3	9.5	8.5	12.7	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1.5"	71.9		
1"	71.9		
.75"	61.6		
.5"	54.2		
.375"	51.0		
#4	42.0		
#10	30.7		
#20	24.4		
#40	21.2		
#60	19.3		
#100	17.1		
#200	12.7		

* (no specification provided)

Material Description

Brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 46.7546 D_{85}= 44.7203 D_{60}= 18.2007
D_{50}= 8.7326 D_{30}= 1.8702 D_{15}= 0.1051
D_{10}= C_u= C_c=

Remarks

As received MC = 10.2%

Date Received: 11/1/18 **Date Tested:** 11/12/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

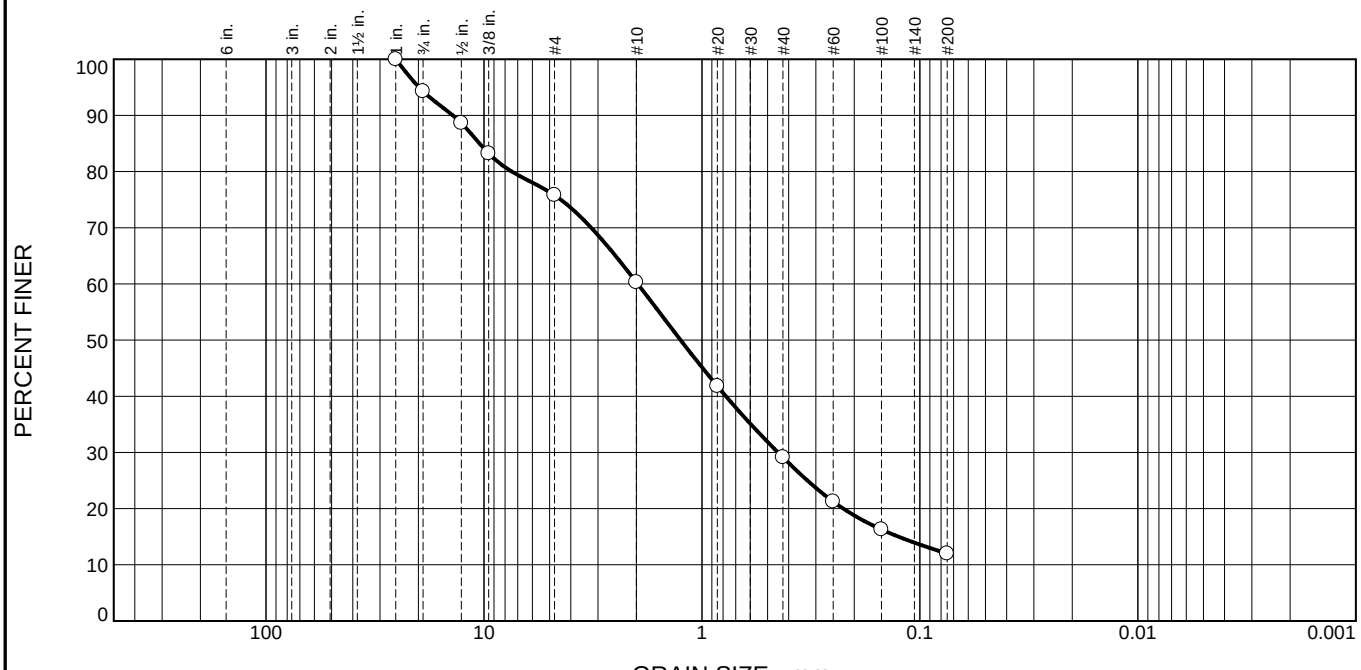
Source of Sample: SED-GEO-10 **Depth:** 4.2-4.3' **Date Sampled:** 10/16/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.7	18.5	15.5	31.2	17.1	12.0	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	94.3		
.5"	88.6		
.375"	83.2		
#4	75.8		
#10	60.3		
#20	41.8		
#40	29.1		
#60	21.2		
#100	16.3		
#200	12.0		

* (no specification provided)

Material Description

Black poorly graded sand with silt and gravel
Sample contains slag.

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 13.8814 D_{85}= 10.4834 D_{60}= 1.9721
D_{50}= 1.2523 D_{30}= 0.4479 D_{15}= 0.1253
D_{10}= C_u= C_c=

Remarks

As received MC = 28.3%

Date Received: 11/1/18 **Date Tested:** 11/13/18
Tested By: AS/MP
Checked By: MP
Title: Laboratory Manager

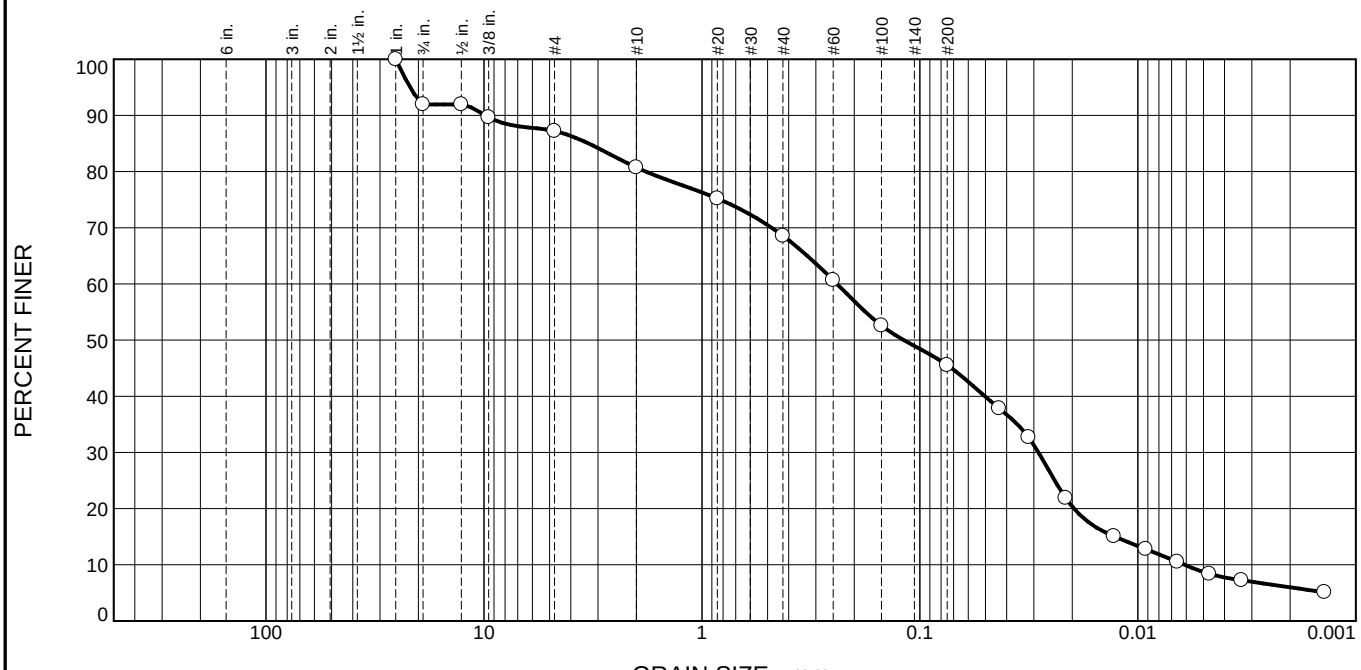
Source of Sample: SED-GEO-11 **Depth:** 2-3' **Date Sampled:** 9/27/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.0	4.8	6.5	12.1	23.1	36.8	8.7

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	92.0		
.5"	92.0		
.375"	89.7		
#4	87.2		
#10	80.7		
#20	75.2		
#40	68.6		
#60	60.7		
#100	52.6		
#200	45.5		
0.0433 mm.	37.8		
0.0317 mm.	32.7		
0.0215 mm.	21.9		
0.0129 mm.	15.1		
0.0092 mm.	12.8		
0.0066 mm.	10.5		
0.0047 mm.	8.4		
0.0033 mm.	7.3		
0.0014 mm.	5.1		

* (no specification provided)

Material Description

Dark brown silty sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 9.8694 D_{85}= 3.3112 D_{60}= 0.2401
D_{50}= 0.1185 D_{30}= 0.0285 D_{15}= 0.0127
D_{10}= 0.0061 C_u= 39.28 C_c= 0.56

Remarks

As received MC = 34.0%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

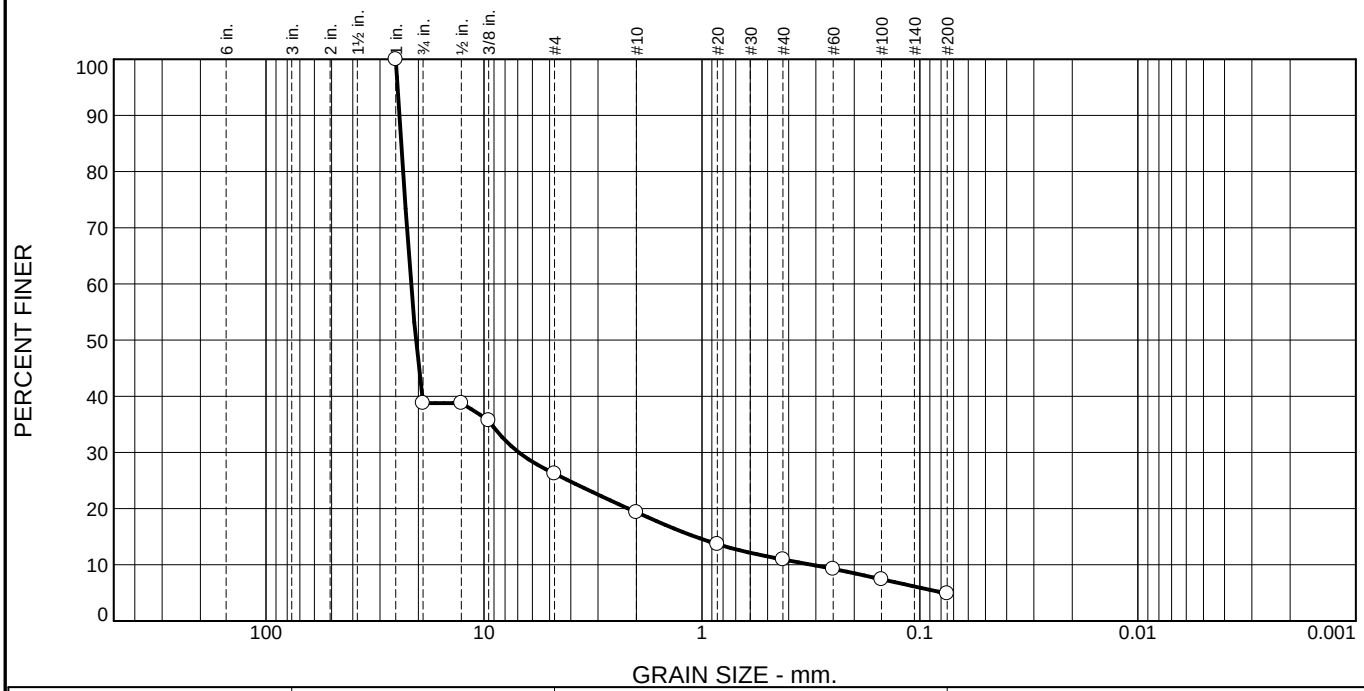
Source of Sample: SED-GEO-11A **Depth:** 0-2' **Date Sampled:** 9/27/18
Sample Number: S-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	61.2	12.6	6.8	8.5	6.0	4.9	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	38.8		
.5"	38.8		
.375"	35.7		
#4	26.2		
#10	19.4		
#20	13.7		
#40	10.9		
#60	9.3		
#100	7.4		
#200	4.9		

* (no specification provided)

Material Description

Black poorly graded gravel with sand
Sample contains wood and slag.

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 24.4455 D_{85}= 23.9759 D_{60}= 21.5922
D_{50}= 20.5335 D_{30}= 6.9217 D_{15}= 1.0735
D_{10}= 0.3135 C_u= 68.87 C_c= 7.08

Remarks

As received MC = 71.2%

Date Received: 11/1/18 **Date Tested:** 11/13/18
Tested By: AS/MP
Checked By: MP
Title: Laboratory Manager

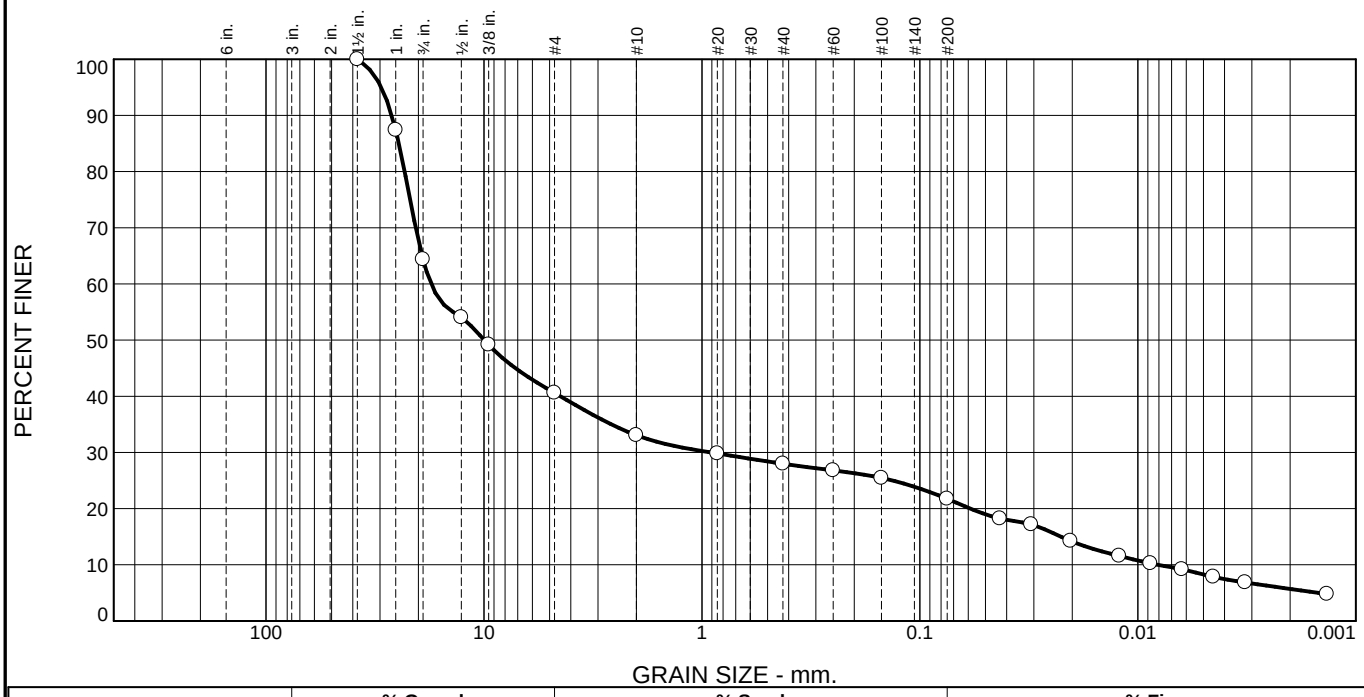
Source of Sample: SED-GEO-12 **Depth:** 2-4' **Date Sampled:** 9/26/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	35.6	23.8	7.5	5.1	6.3	13.4	8.3

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	87.4		
.75"	64.4		
.5"	54.1		
.375"	49.2		
#4	40.6		
#10	33.1		
#20	29.8		
#40	28.0		
#60	26.8		
#100	25.5		
#200	21.7		
0.0429 mm.	18.2		
0.0309 mm.	17.2		
0.0204 mm.	14.3		
0.0122 mm.	11.6		
0.0088 mm.	10.3		
0.0063 mm.	9.2		
0.0045 mm.	7.9		
0.0032 mm.	6.9		
0.0014 mm.	4.8		

* (no specification provided)

Material Description

Dark brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 26.4747 D_{85}= 24.5765 D_{60}= 17.4954
D_{50}= 9.9689 D_{30}= 0.9086 D_{15}= 0.0225
D_{10}= 0.0081 C_u= 2160.02 C_c= 5.83

Remarks

As received MC = 17.9%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

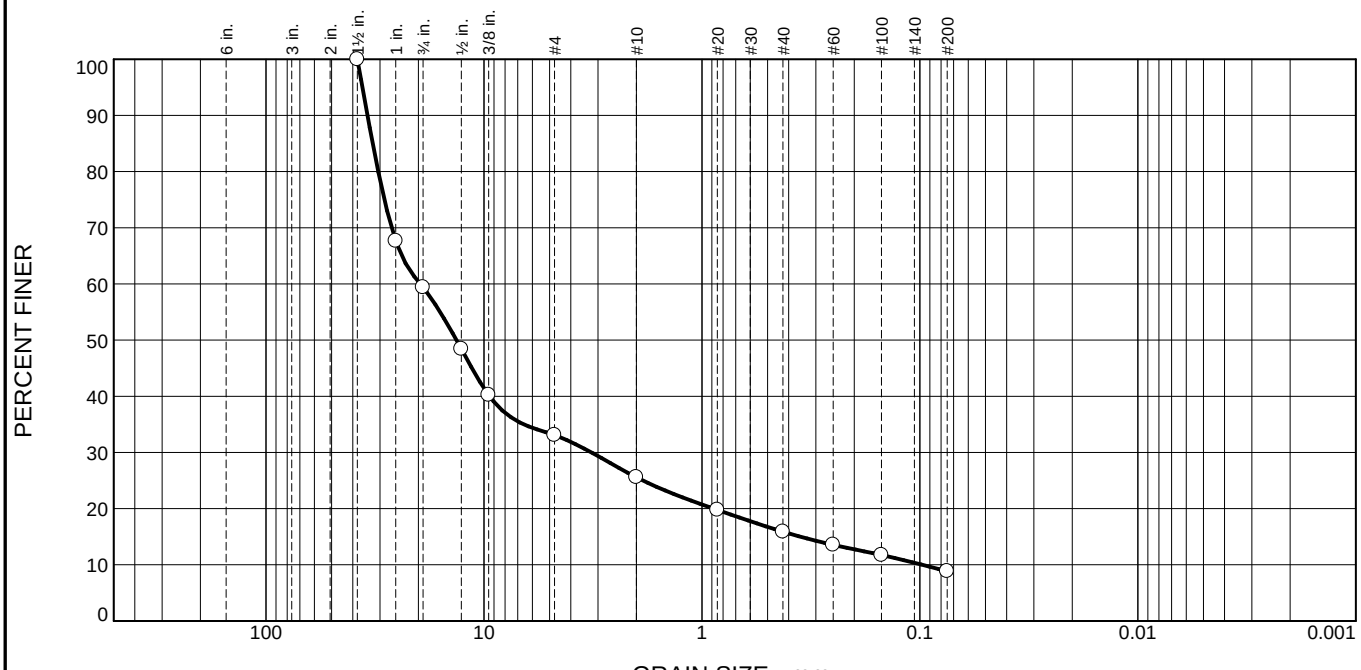
Source of Sample: SED-GEO-12 **Depth:** 6-7' **Date Sampled:** 9/26/18
Sample Number: S-4

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	40.6	26.3	7.5	9.7	7.0	8.9	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	67.7		
.75"	59.4		
.5"	48.4		
.375"	40.2		
#4	33.1		
#10	25.6		
#20	19.8		
#40	15.9		
#60	13.6		
#100	11.7		
#200	8.9		

* (no specification provided)

Material Description

Brown & black poorly graded gravel with silt and sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP-GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 34.2616 D_{85}= 32.4120 D_{60}= 19.5973
D_{50}= 13.3699 D_{30}= 3.2153 D_{15}= 0.3532
D_{10}= 0.0977 C_u= 200.61 C_c= 5.40

Remarks

As received MC = 15.7%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

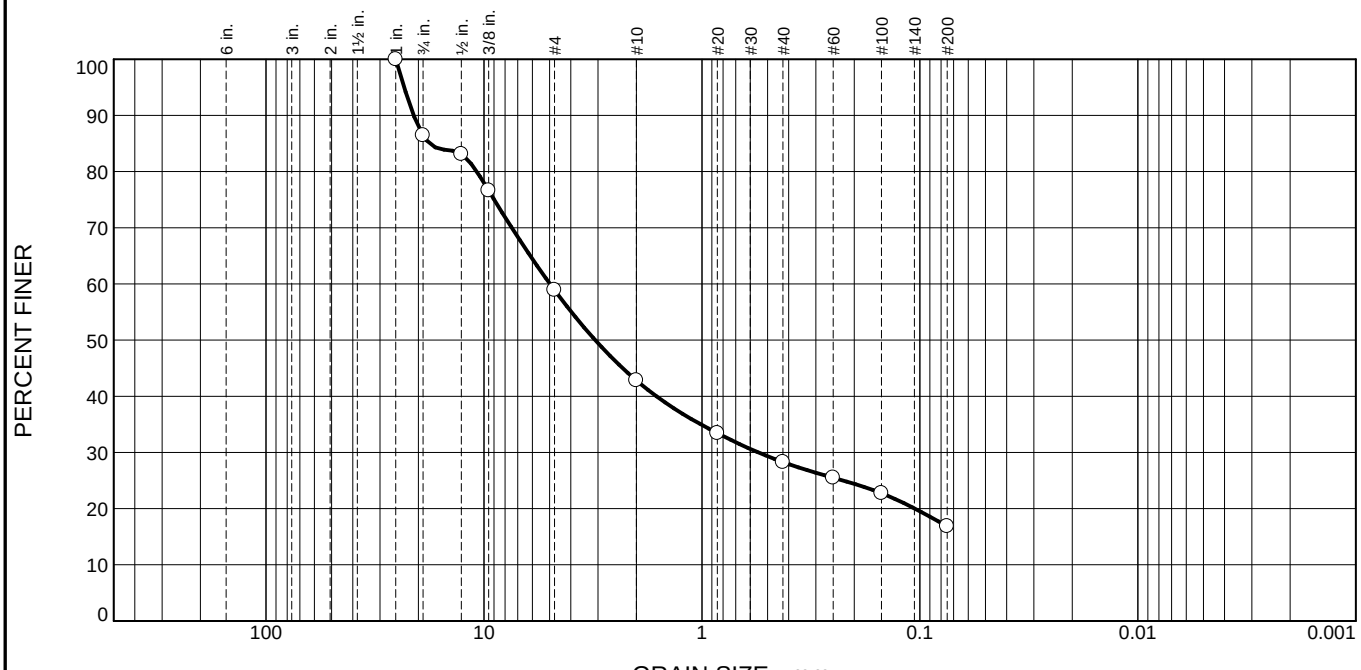
Source of Sample: SED-GEO-13 **Depth:** 0-2' **Date Sampled:** 9/28/18
Sample Number: S-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.5	27.6	16.1	14.5	11.4	16.9	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	86.5		
.5"	83.1		
.375"	76.6		
#4	58.9		
#10	42.8		
#20	33.4		
#40	28.3		
#60	25.5		
#100	22.7		
#200	16.9		

* (no specification provided)

Material Description

Brown & black silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 21.0029 D_{85}= 17.7862 D_{60}= 4.9792
D_{50}= 3.0874 D_{30}= 0.5512 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 12.1%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

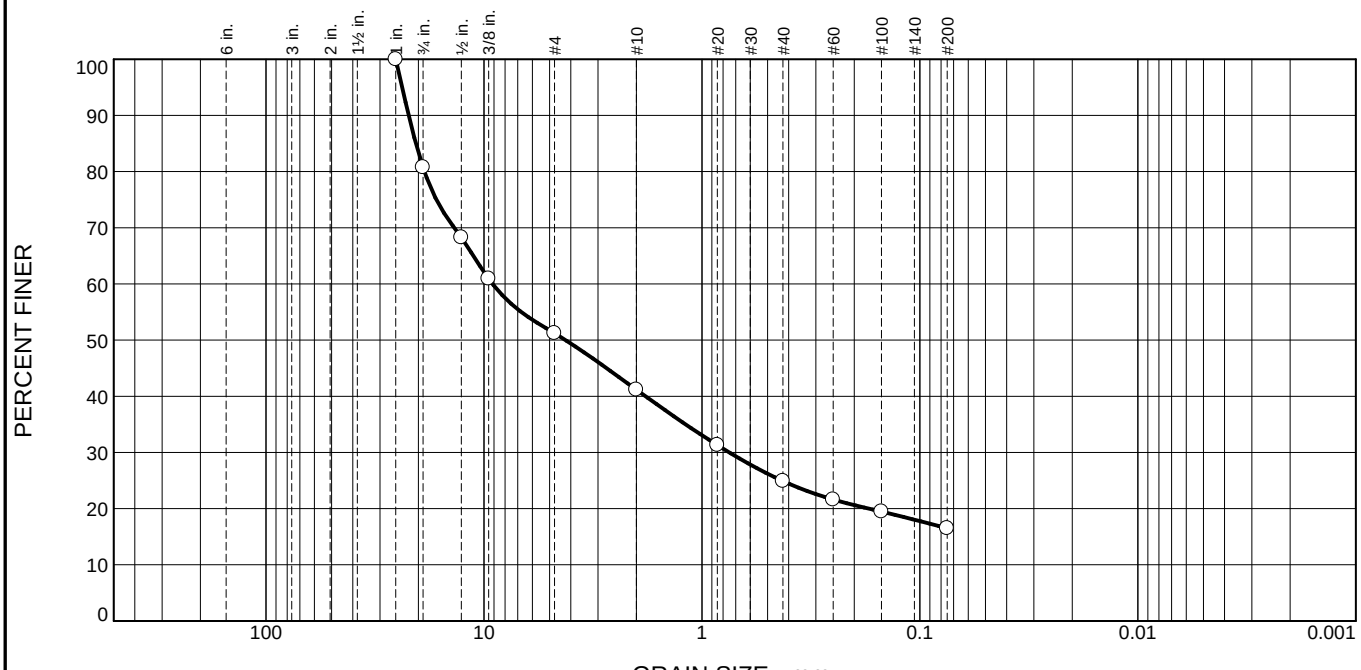
Source of Sample: SED-GEO-13 **Depth:** 4-6' **Date Sampled:** 9/28/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	19.2	29.6	10.0	16.3	8.4	16.5	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	80.8		
.5"	68.3		
.375"	60.9		
#4	51.2		
#10	41.2		
#20	31.3		
#40	24.9		
#60	21.6		
#100	19.5		
#200	16.5		

* (no specification provided)

Material Description

Brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 22.1506 D_{85}= 20.5320 D_{60}= 9.1331
D_{50}= 4.2275 D_{30}= 0.7496 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 19.1%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

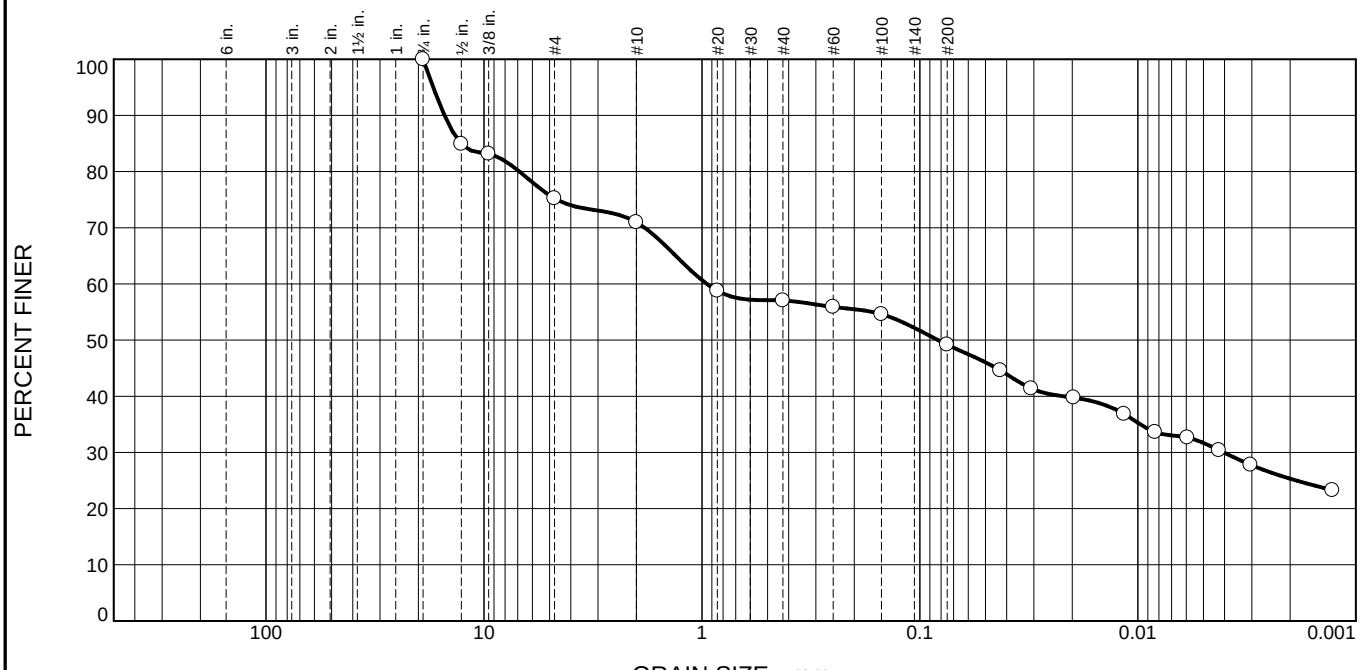
Source of Sample: SED-GEO-14 **Depth:** 0-2' **Date Sampled:** 9/28/18
Sample Number: S-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	24.8	4.2	13.9	7.9	17.5	31.7

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	84.9		
.375"	83.2		
#4	75.2		
#10	71.0		
#20	58.8		
#40	57.1		
#60	55.9		
#100	54.6		
#200	49.2		
0.0427 mm.	44.6		
0.0308 mm.	41.4		
0.0197 mm.	39.8		
0.0116 mm.	36.9		
0.0083 mm.	33.6		
0.0059 mm.	32.7		
0.0042 mm.	30.4		
0.0030 mm.	27.8		
0.0013 mm.	23.3		

* (no specification provided)

Material Description

Red-brown clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= 20 **LL=** 51 **PI=** 31

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-7-6(11)

Coefficients

D_{90}= 15.1687 D_{85}= 12.7564 D_{60}= 0.9506
D_{50}= 0.0826 D_{30}= 0.0040 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 24.4%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

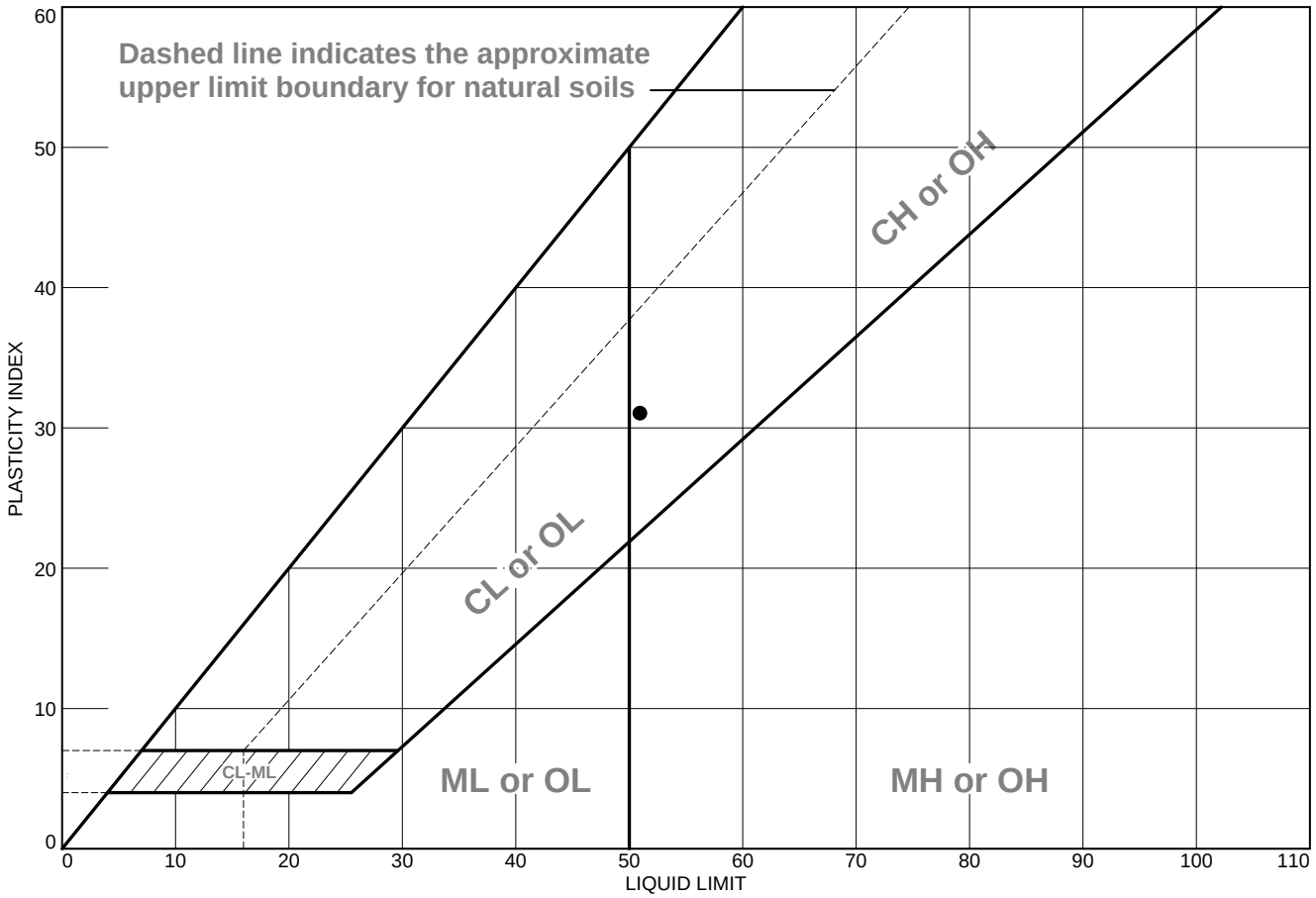
Source of Sample: SED-GEO-14 **Depth:** 2-2.75' **Date Sampled:** 9/28/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Red-brown clayey sand with gravel	9/28/18	11/12/18	AS	51	20	31	57.1	SC

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** SED-GEO-14 **Depth:** 2-2.75' **Sample Number:** S-2

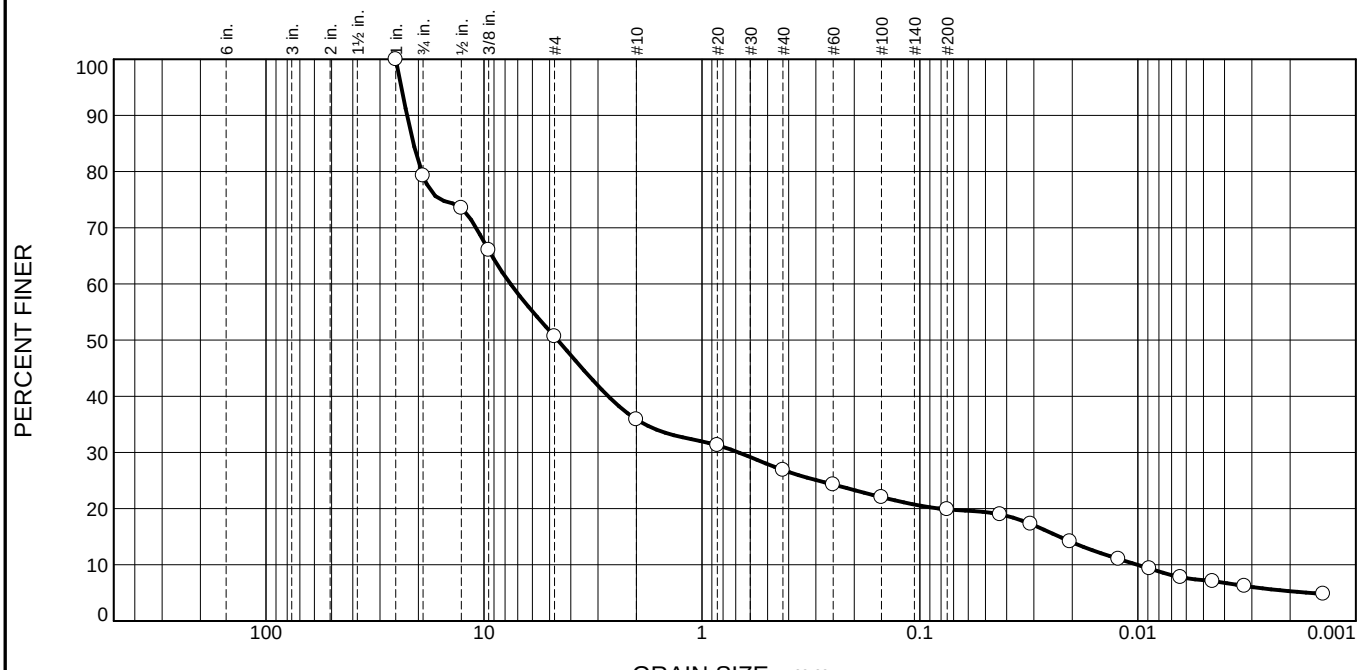
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: AS **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.7	28.6	14.8	9.0	7.0	12.6	7.3

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	79.3		
.5"	73.5		
.375"	66.0		
#4	50.7		
#10	35.9		
#20	31.3		
#40	26.9		
#60	24.3		
#100	22.0		
#200	19.9		
0.0429 mm.	19.0		
0.0311 mm.	17.3		
0.0205 mm.	14.2		
0.0123 mm.	11.0		
0.0089 mm.	9.3		
0.0064 mm.	7.8		
0.0045 mm.	7.1		
0.0032 mm.	6.2		
0.0014 mm.	4.8		

* (no specification provided)

Material Description

Dark brown silty gravel with sand and organic fines

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 22.5363 D_{85}= 21.0613 D_{60}= 7.5599
D_{50}= 4.5892 D_{30}= 0.6797 D_{15}= 0.0229
D_{10}= 0.0100 C_u= 752.85 C_c= 6.09

Remarks

As received MC = 15.9%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

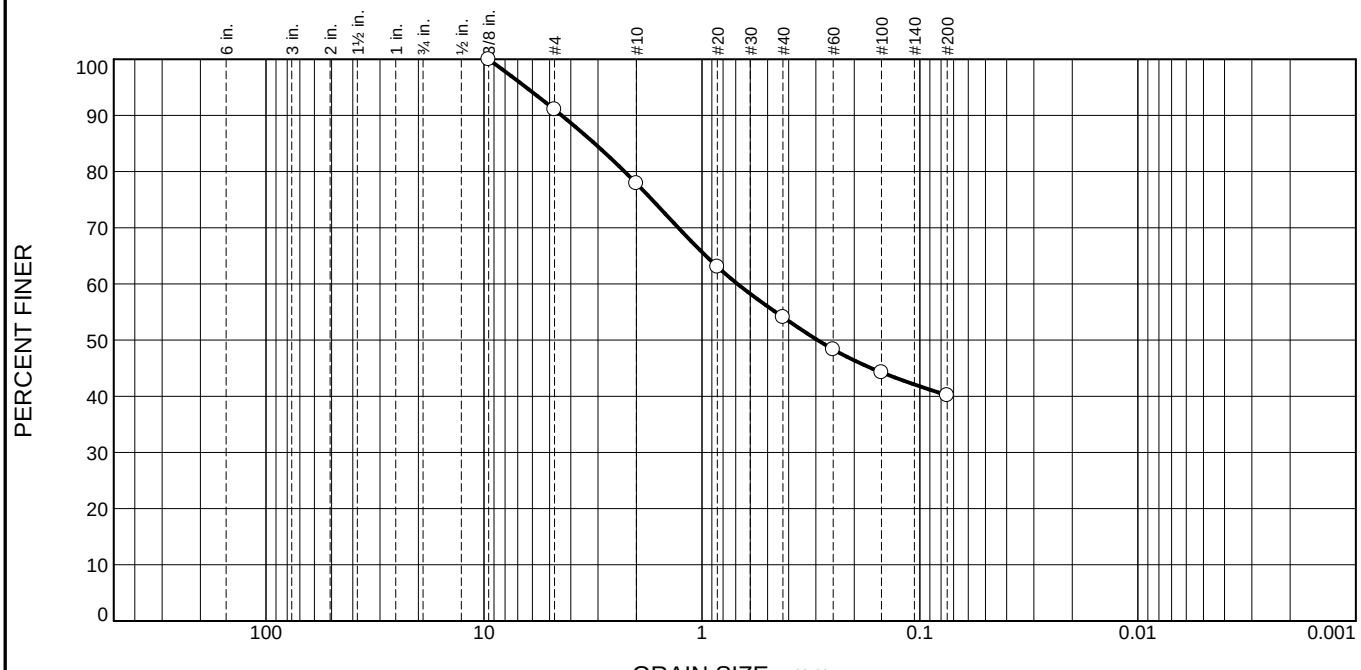
Source of Sample: UPB-GEO-01 **Depth:** 0-2' **Date Sampled:** 9/14/18
Sample Number: S-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.0	13.1	23.8	13.9	40.2	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	91.0		
#10	77.9		
#20	63.1		
#40	54.1		
#60	48.3		
#100	44.3		
#200	40.2		

* (no specification provided)

Material Description

Dark brown peat

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM/PT **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 4.3991 D_{85}= 3.1086 D_{60}= 0.6867
D_{50}= 0.2951 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 150.6%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

Source of Sample: UPB-GEO-01 **Depth:** 4-6' **Date Sampled:** 9/14/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

CDM Smith

Geotechnical Engineering Laboratory

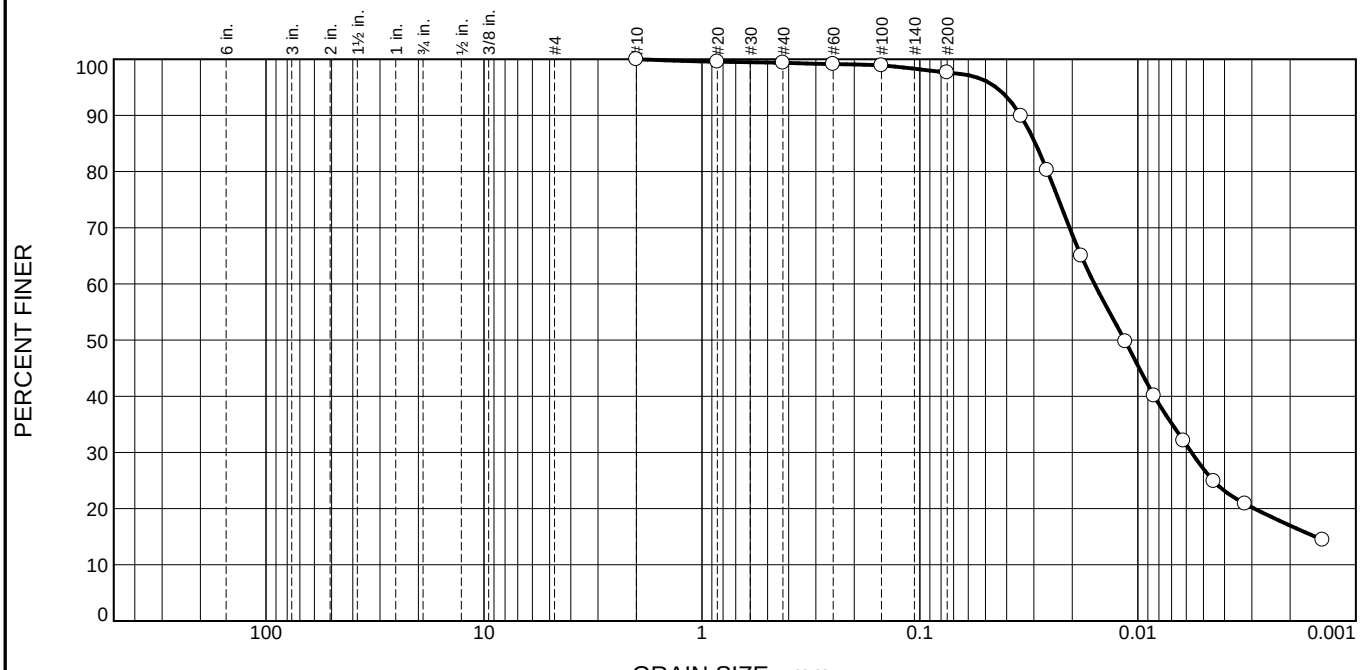
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/6/2018
Project Number:	51147-223203		
Boring Number:	UPB-GEO-01	Procedure:	C
Sample Number:	S-3	Temperature:	440° C
Sample Depth (ft):	4-6'		
Sample Date:	9/14/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	126.88
Wet Mass of Sample & Tin (g)	165.30
Dry Mass of Sample & Tin (g)	141.88
Mass of Water (g)	23.42
Mass of Dry Soil (g)	15.00
Moisture Content (%)	**156.1**

ASH CONTENT	
Porcelain Dish Mass (g)	126.88
Porcelain Dish + Oven Dried Soil (g)	141.88
Mass of Oven Dried Soil (g)	15.00
Mass of Dish & Burned Soil (g)	134.68
Mass of Burned Soil (g)	7.80
Mass of Organic Material (g)	7.20
Ash Content (%)	52.0
Organic Content (%)	**48.0**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.6	1.8	70.5	27.1

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	99.6		
#40	99.4		
#60	99.1		
#100	98.9		
#200	97.6		
0.0344 mm.	89.9		
0.0261 mm.	80.3		
0.0182 mm.	65.0		
0.0114 mm.	49.8		
0.0084 mm.	40.1		
0.0062 mm.	32.1		
0.0045 mm.	24.9		
0.0032 mm.	20.9		
0.0014 mm.	14.4		

* (no specification provided)

Material Description

Brown & black organic silt

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= OL **AASHTO (M 145)=** A-7-5(22)

Coefficients

D_{90}= 0.0345 D_{85}= 0.0295 D_{60}= 0.0158
D_{50}= 0.0115 D_{30}= 0.0057 D_{15}= 0.0015
D_{10}= C_u= C_c=

Remarks

As received MC = 42.7%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

Source of Sample: UPB-GEO-01 **Depth:** 8-10' **Date Sampled:** 9/14/18
Sample Number: S-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

CDM Smith

Geotechnical Engineering Laboratory

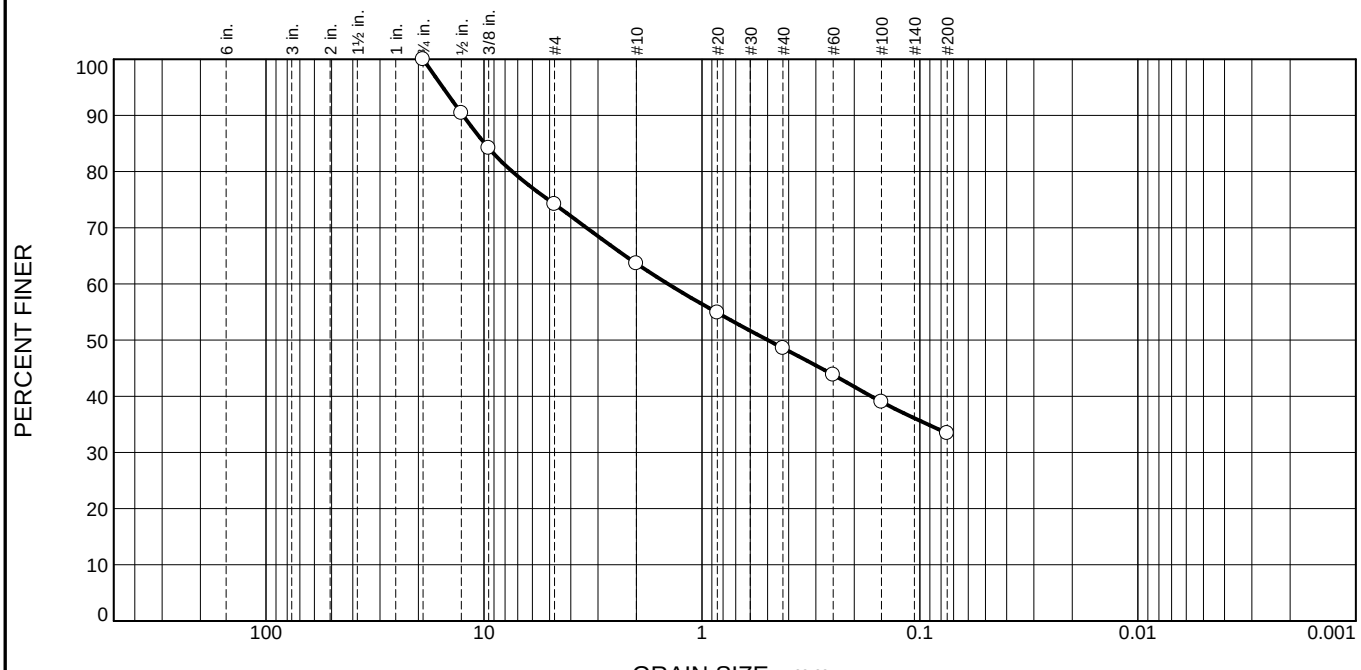
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/6/2018
Project Number:	51147-223203		
Boring Number:	UPB-GEO-01	Procedure:	C
Sample Number:	S-5	Temperature:	440° C
Sample Depth (ft):	8-10'		
Sample Date:	9/14/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	97.00
Wet Mass of Sample & Tin (g)	196.81
Dry Mass of Sample & Tin (g)	166.96
Mass of Water (g)	29.85
Mass of Dry Soil (g)	69.96
Moisture Content (%)	**42.7**

ASH CONTENT	
Porcelain Dish Mass (g)	97.00
Porcelain Dish + Oven Dried Soil (g)	166.96
Mass of Oven Dried Soil (g)	69.96
Mass of Dish & Burned Soil (g)	162.76
Mass of Burned Soil (g)	65.76
Mass of Organic Material (g)	4.20
Ash Content (%)	94.0
Organic Content (%)	**6.0**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	25.8	10.6	15.0	15.2	33.4	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	90.4		
.375"	84.2		
#4	74.2		
#10	63.6		
#20	54.9		
#40	48.6		
#60	43.8		
#100	39.0		
#200	33.4		

* (no specification provided)

Material Description

Dark brown silty sand with gravel with organic fines

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 12.4741 D_{85}= 9.9159 D_{60}= 1.4313
D_{50}= 0.4989 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 28.9%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

Source of Sample: UBP-GEO-02 **Depth:** 2-4' **Date Sampled:** 9/14/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

CDM Smith

Geotechnical Engineering Laboratory

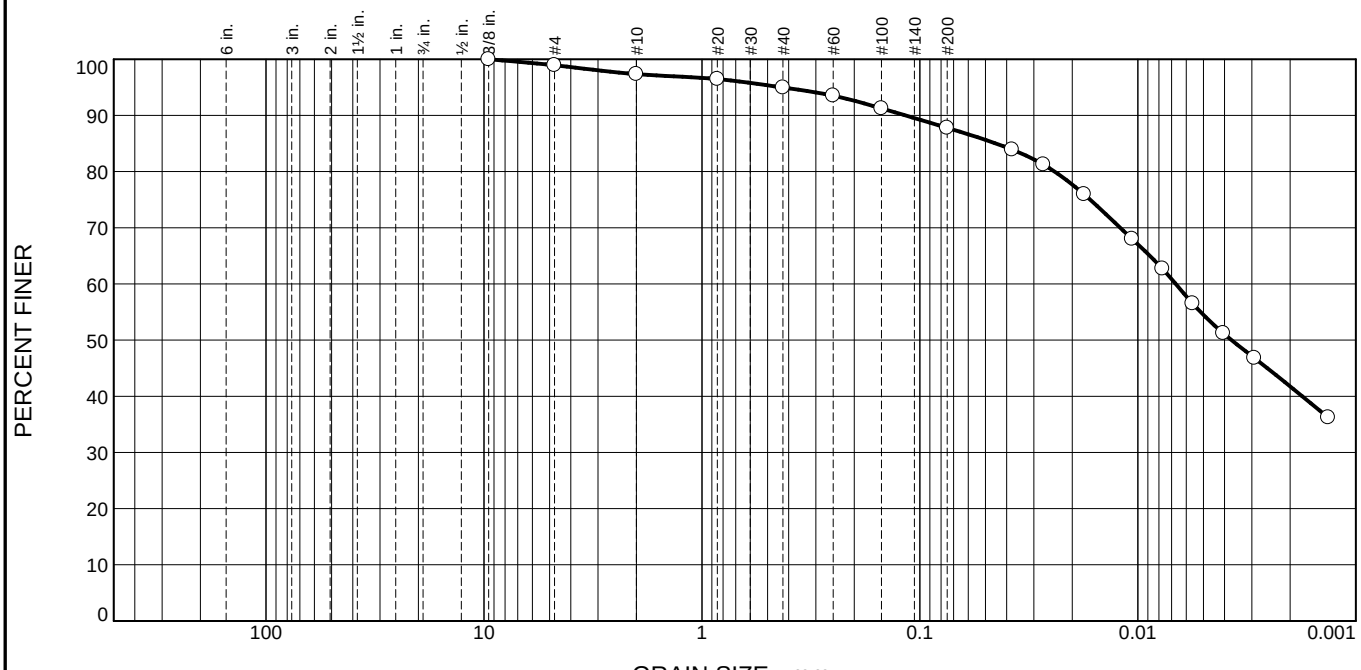
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/6/2018
Project Number:	51147-223203		
Boring Number:	UPB-GEO-02	Procedure:	C
Sample Number:	S-2	Temperature:	440° C
Sample Depth (ft):	2-4'		
Sample Date:	9/17/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	80.77
Wet Mass of Sample & Tin (g)	149.25
Dry Mass of Sample & Tin (g)	131.16
Mass of Water (g)	18.09
Mass of Dry Soil (g)	50.39
Moisture Content (%)	**35.9**

ASH CONTENT	
Porcelain Dish Mass (g)	80.77
Porcelain Dish + Oven Dried Soil (g)	131.16
Mass of Oven Dried Soil (g)	50.39
Mass of Dish & Burned Soil (g)	125.27
Mass of Burned Soil (g)	44.50
Mass of Organic Material (g)	5.89
Ash Content (%)	88.3
Organic Content (%)	**11.7**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.1	1.5	2.4	7.2	33.3	54.5

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	98.9		
#10	97.4		
#20	96.5		
#40	95.0		
#60	93.5		
#100	91.2		
#200	87.8		
0.0378 mm.	83.9		
0.0271 mm.	81.3		
0.0177 mm.	76.0		
0.0106 mm.	68.0		
0.0077 mm.	62.7		
0.0056 mm.	56.5		
0.0041 mm.	51.2		
0.0029 mm.	46.8		
0.0013 mm.	36.2		

* (no specification provided)

Material Description

Brown fat clay

Atterberg Limits (ASTM D 4318)

PL= 37 **LL=** 86 **PI=** 49

Classification

USCS (D 2487)= CH **AASHTO (M 145)=** A-7-5(51)

Coefficients

D_{90}= 0.1165 D_{85}= 0.0448 D_{60}= 0.0067
D_{50}= 0.0037 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 48.7%

Date Received: 11/1/18 **Date Tested:** 11/6/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

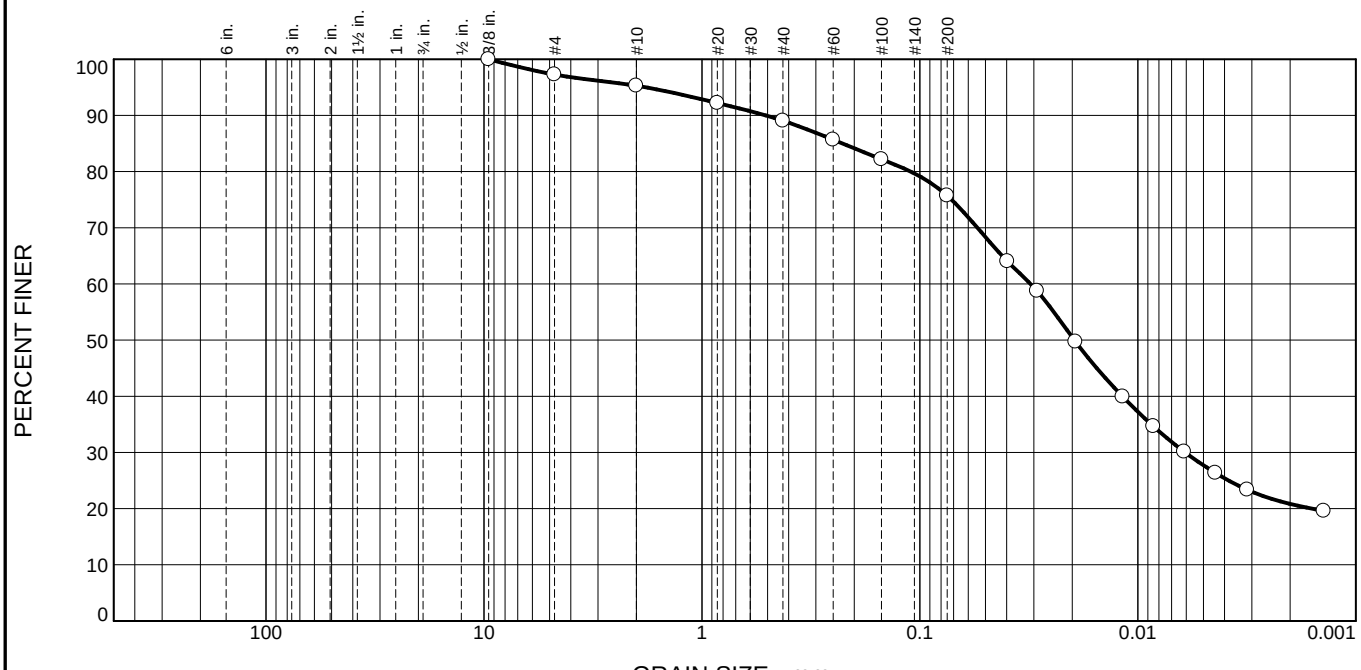
Source of Sample: UBP-GEO-02 **Depth:** 4-6' **Date Sampled:** 9/14/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.7	2.0	6.2	13.4	48.0	27.7

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	97.3		
#10	95.3		
#20	92.2		
#40	89.1		
#60	85.7		
#100	82.2		
#200	75.7		
0.0397 mm.	64.0		
0.0290 mm.	58.8		
0.0193 mm.	49.7		
0.0117 mm.	39.9		
0.0085 mm.	34.6		
0.0061 mm.	30.1		
0.0044 mm.	26.4		
0.0031 mm.	23.4		
0.0014 mm.	19.6		

* (no specification provided)

Material Description

Brown lean clay with sand

Atterberg Limits (ASTM D 4318)

PL= 16 **LL=** 24 **PI=** 8

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-4(4)

Coefficients

D_{90}= 0.5102 D_{85}= 0.2265 D_{60}= 0.0311
D_{50}= 0.0196 D_{30}= 0.0061 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 24.6%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

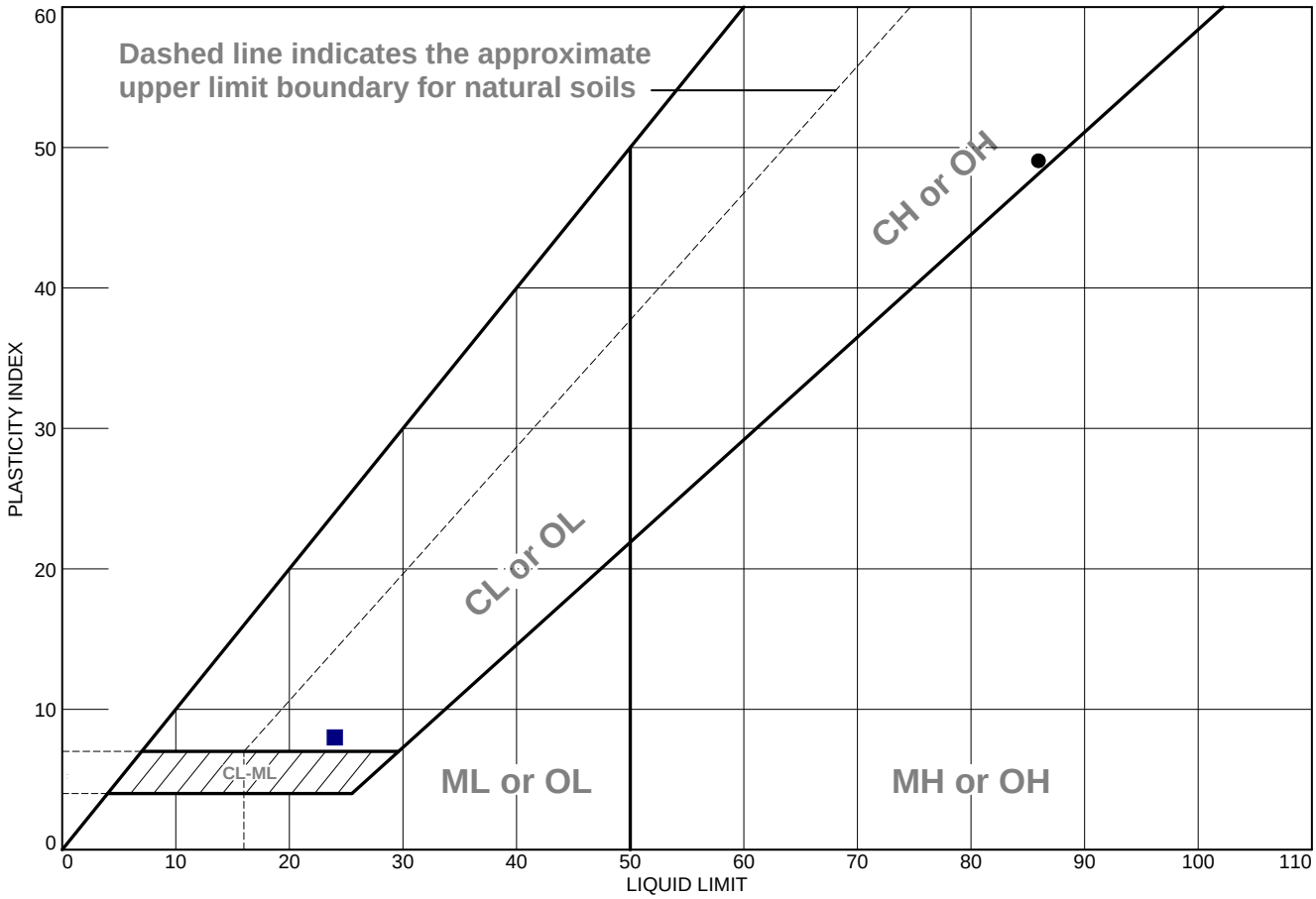
Source of Sample: UBP-GEO-02 **Depth:** 6-8' **Date Sampled:** 9/14/18
Sample Number: S-4

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown fat clay	9/14/18	11/8/18	AS	86	37	49	95.0	CH
■	Brown lean clay with sand	9/14/18	11/8/18	AS	24	16	8	89.1	CL

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○ **Source of Sample:** UBP-GEO-02 **Depth:** 4-6' **Sample Number:** S-3

□ **Source of Sample:** UBP-GEO-02 **Depth:** 6-8' **Sample Number:** S-4

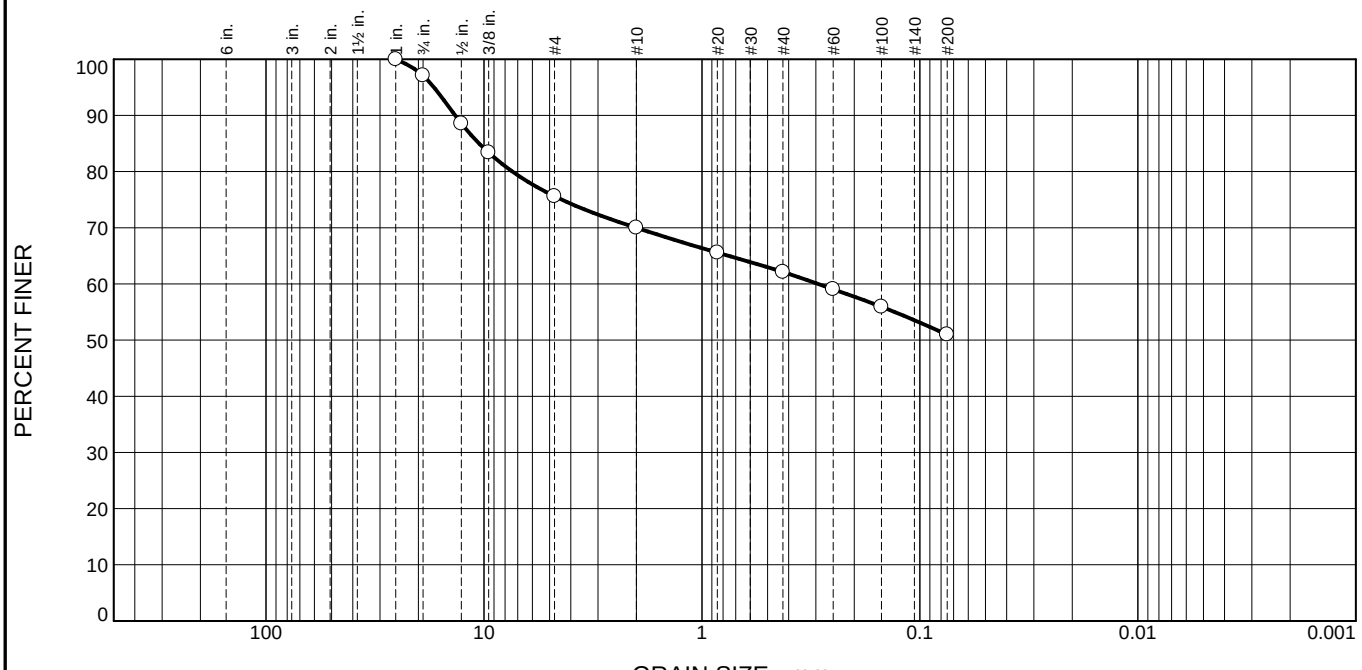
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: AS **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.9	21.5	5.6	7.9	11.1	51.0	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	97.1		
.5"	88.6		
.375"	83.4		
#4	75.6		
#10	70.0		
#20	65.6		
#40	62.1		
#60	59.1		
#100	55.9		
#200	51.0		

* (no specification provided)

Material Description

Brown sandy silt with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 13.5638 D_{85}= 10.5255 D_{60}= 0.2929
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 8.1%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

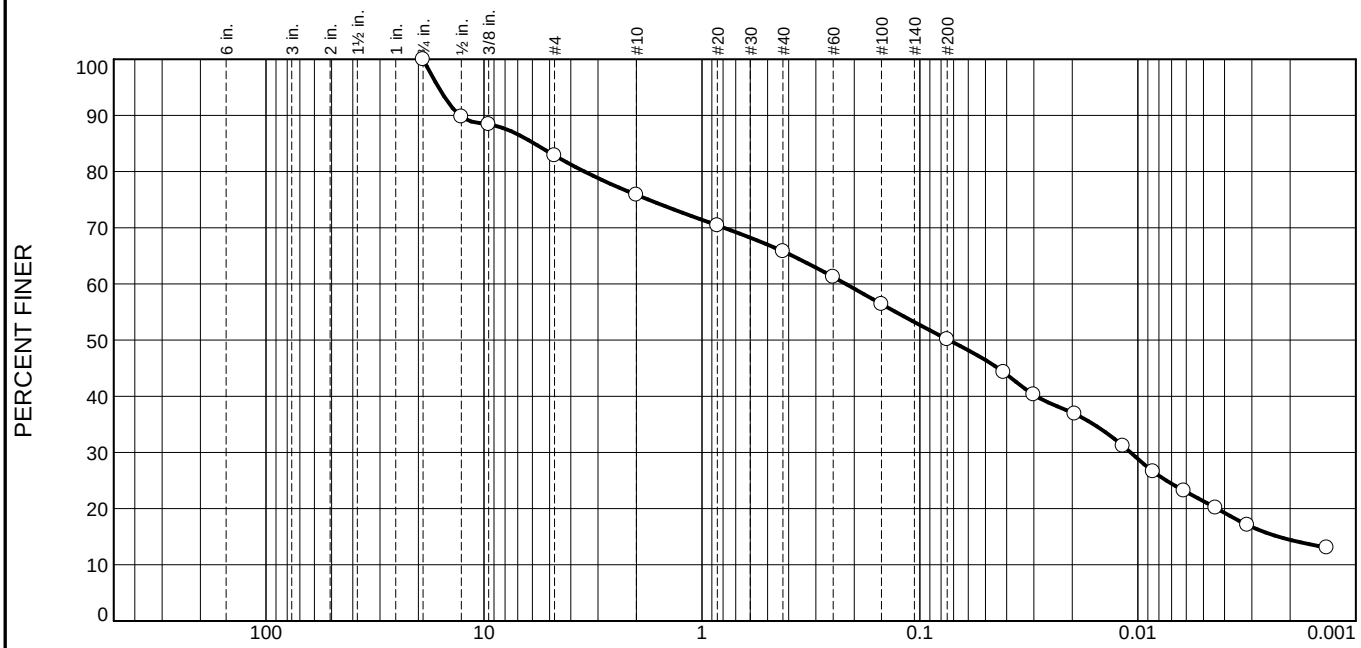
Source of Sample: UBP-GEO-03 **Depth:** 8-10' **Date Sampled:** 9/19/18
Sample Number: S-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	17.1	7.0	10.1	15.7	28.8	21.3

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	89.8		
.375"	88.4		
#4	82.9		
#10	75.9		
#20	70.4		
#40	65.8		
#60	61.2		
#100	56.4		
#200	50.1		
0.0413 mm.	44.3		
0.0301 mm.	40.3		
0.0195 mm.	36.9		
0.0117 mm.	31.2		
0.0085 mm.	26.6		
0.0062 mm.	23.2		
0.0044 mm.	20.1		
0.0031 mm.	17.1		
0.0014 mm.	13.1		

* (no specification provided)

Material Description

Brown sandy lean clay with gravel

Atterberg Limits (ASTM D 4318)

PL= 15 **LL=** 28 **PI=** 13

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(3)

Coefficients

D_{90}= 12.9150 D_{85}= 5.8709 D_{60}= 0.2188
D_{50}= 0.0737 D_{30}= 0.0108 D_{15}= 0.0023
D_{10}= C_u= C_c=

Remarks

As received MC = 18.5%

Date Received: 11/1/18 **Date Tested:** 11/8/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

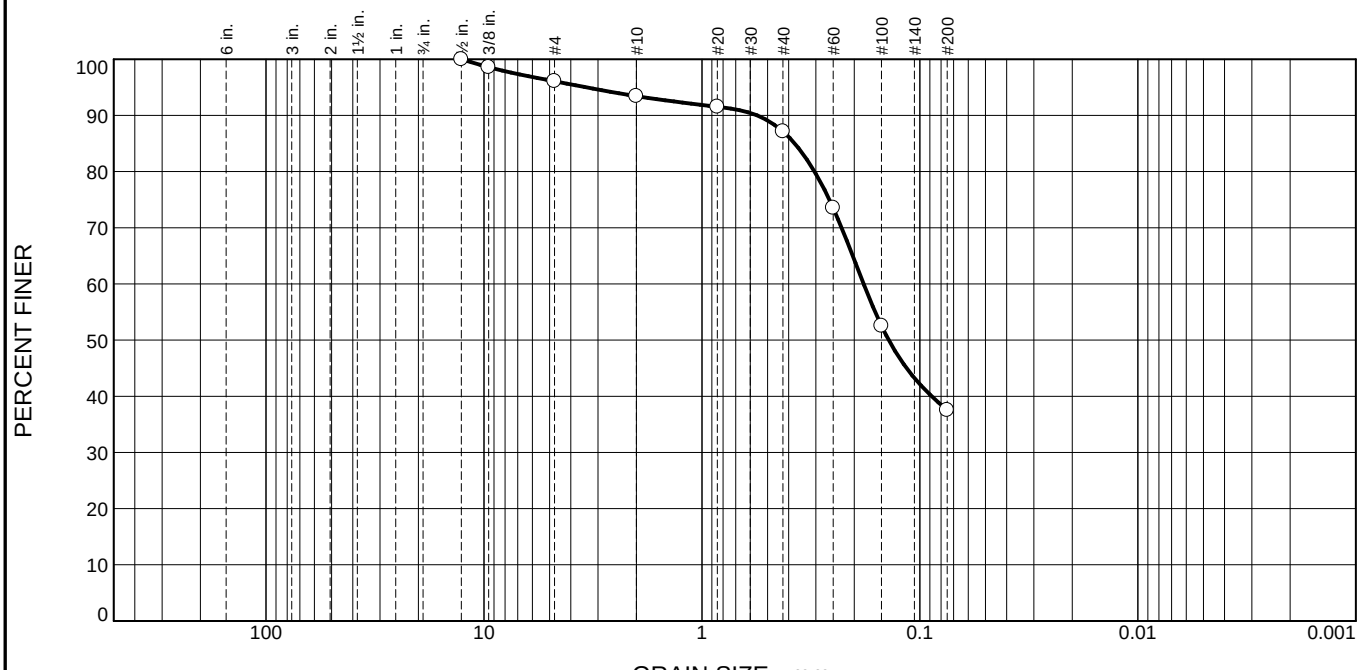
Source of Sample: UBP-GEO-03 **Depth:** 19-21' **Date Sampled:** 9/19/18
Sample Number: S-9

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.9	2.7	6.3	49.6	37.5	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.5"	100.0		
.375"	98.6		
#4	96.1		
#10	93.4		
#20	91.5		
#40	87.1		
#60	73.5		
#100	52.5		
#200	37.5		

* (no specification provided)

Material Description

Brown silty sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.5584 D_{85}= 0.3751 D_{60}= 0.1811
D_{50}= 0.1389 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 15.0%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

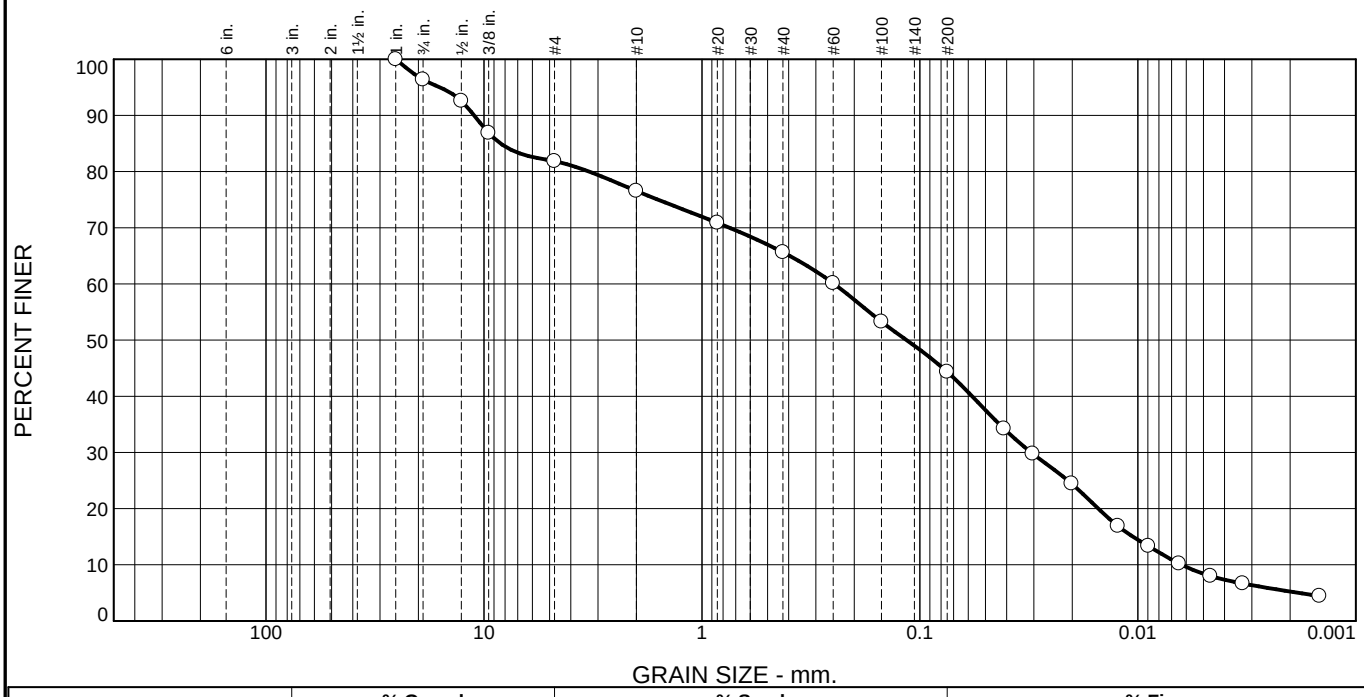
Source of Sample: UBP-GEO-03 **Depth:** 29-31' **Date Sampled:** 9/19/18
Sample Number: S-11

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.6	14.5	5.3	11.0	21.2	36.0	8.4

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	96.4		
.5"	92.6		
.375"	86.9		
#4	81.9		
#10	76.6		
#20	70.9		
#40	65.6		
#60	60.1		
#100	53.3		
#200	44.4		
0.0411 mm.	34.2		
0.0304 mm.	29.8		
0.0201 mm.	24.4		
0.0123 mm.	16.9		
0.0090 mm.	13.3		
0.0065 mm.	10.2		
0.0046 mm.	8.0		
0.0033 mm.	6.7		
0.0015 mm.	4.4		

* (no specification provided)

Material Description

Brown silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 11.0964 D_{85}= 8.3919 D_{60}= 0.2475
D_{50}= 0.1151 D_{30}= 0.0309 D_{15}= 0.0105
D_{10}= 0.0063 C_u= 39.30 C_c= 0.61

Remarks

As received MC = 8.6%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

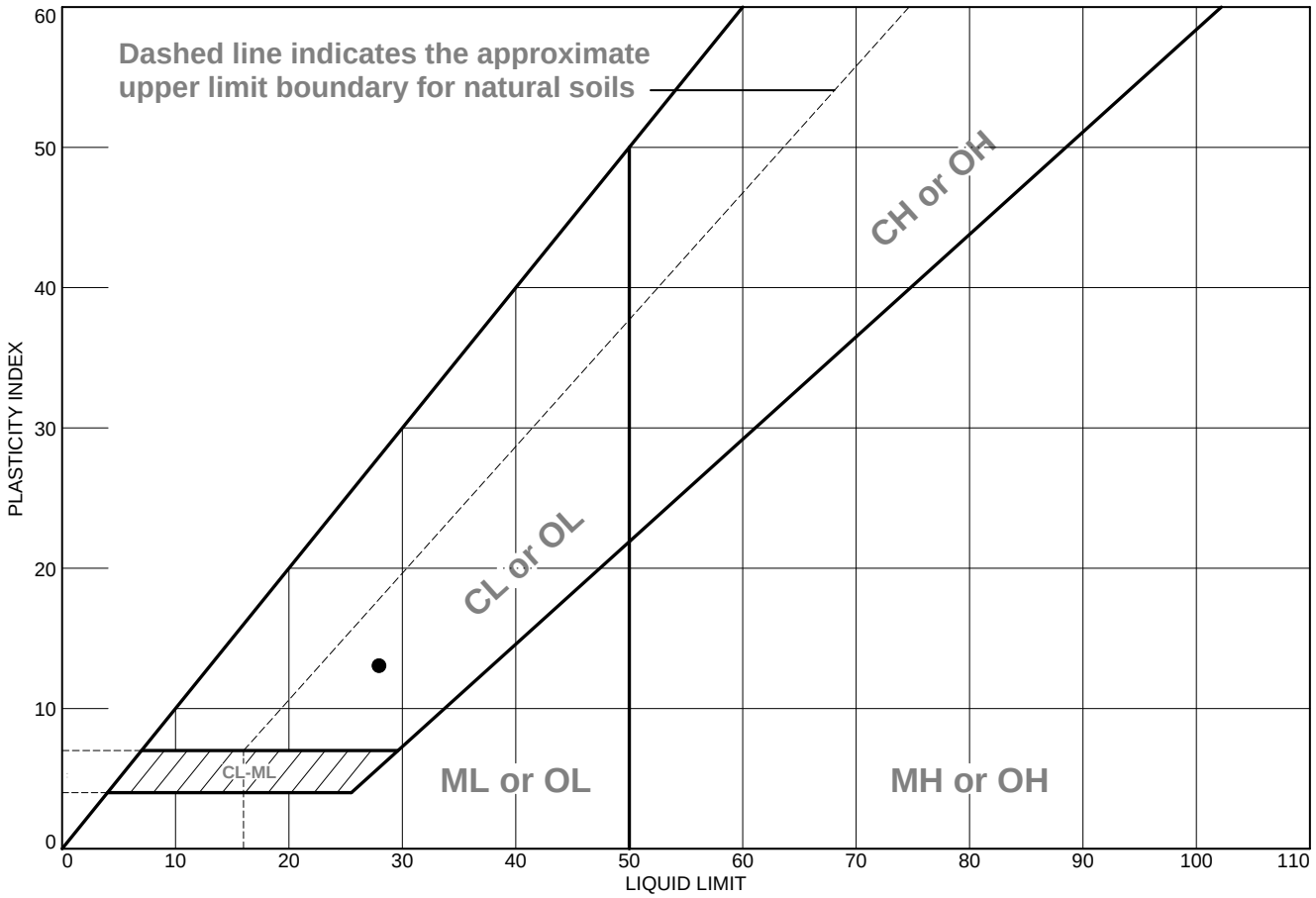
Source of Sample: UBP-GEO-03 **Depth:** 34-36' **Date Sampled:** 9/19/18
Sample Number: S-12

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown sandy lean clay with gravel	9/19/18	11/6/18	AS	28	15	13	65.8	CL

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** UBP-GEO-03 **Depth:** 19-21' **Sample Number:** S-9

CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: AS **Checked By:** MP

CDM Smith

Geotechnical Engineering Laboratory

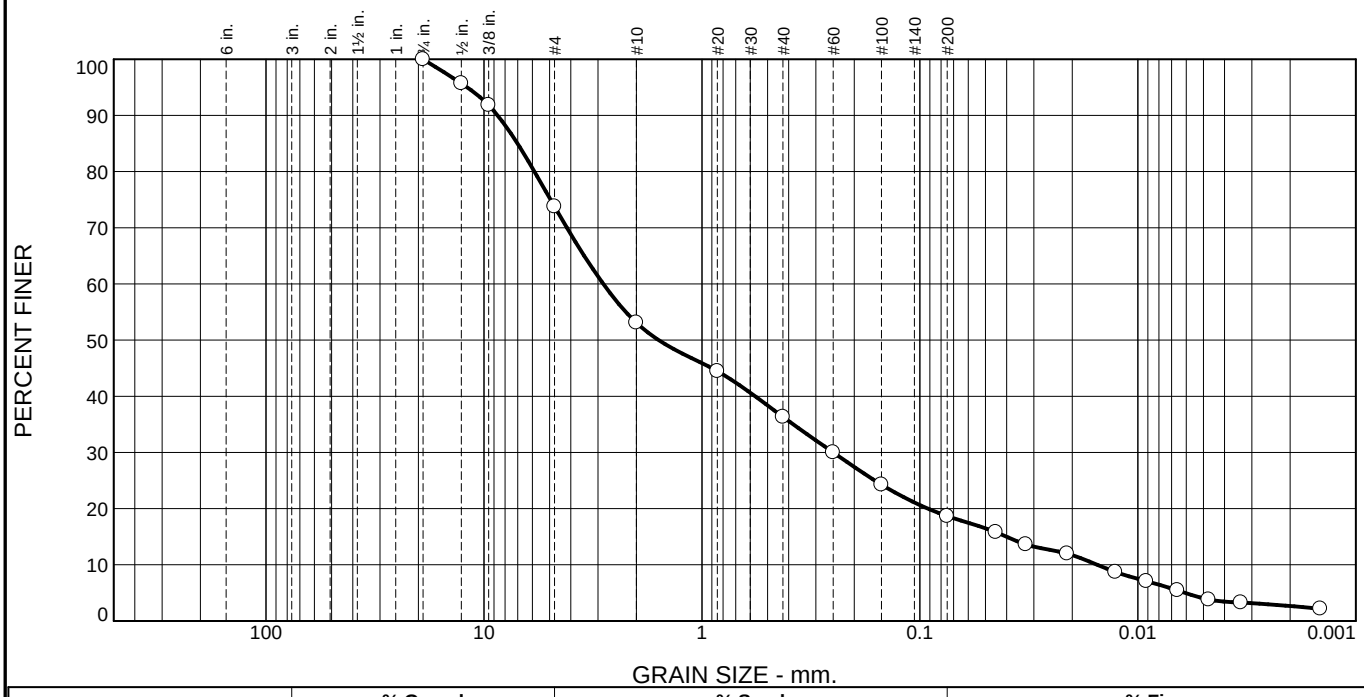
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/14/2018
Project Number:	51147-223203		
Boring Number:	UP-GEO-03	Procedure:	C
Sample Number:	S-20	Temperature:	440° C
Sample Depth (ft):	38-40'		
Sample Date:	5/17/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	64.51
Wet Mass of Sample & Tin (g)	122.40
Dry Mass of Sample & Tin (g)	101.12
Mass of Water (g)	21.28
Mass of Dry Soil (g)	36.61
Moisture Content (%)	**58.1**

ASH CONTENT	
Porcelain Dish Mass (g)	64.51
Porcelain Dish + Oven Dried Soil (g)	101.12
Mass of Oven Dried Soil (g)	36.61
Mass of Dish & Burned Soil (g)	96.10
Mass of Burned Soil (g)	31.59
Mass of Organic Material (g)	5.02
Ash Content (%)	86.3
Organic Content (%)	**13.7**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	26.2	20.7	16.8	17.6	14.7	4.0

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	95.7		
.375"	91.8		
#4	73.8		
#10	53.1		
#20	44.5		
#40	36.3		
#60	30.0		
#100	24.3		
#200	18.7		
0.0449 mm.	15.8		
0.0327 mm.	13.6		
0.0211 mm.	12.0		
0.0127 mm.	8.7		
0.0091 mm.	7.1		
0.0066 mm.	5.5		
0.0047 mm.	3.8		
0.0034 mm.	3.3		
0.0015 mm.	2.2		

* (no specification provided)

Material Description

Dark brown silty sand with gravel and organic fines

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 8.6522 D_{85}= 7.0213 D_{60}= 2.8363
D_{50}= 1.5812 D_{30}= 0.2498 D_{15}= 0.0401
D_{10}= 0.0154 C_u= 184.69 C_c= 1.43

Remarks

As received MC = 12.1%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

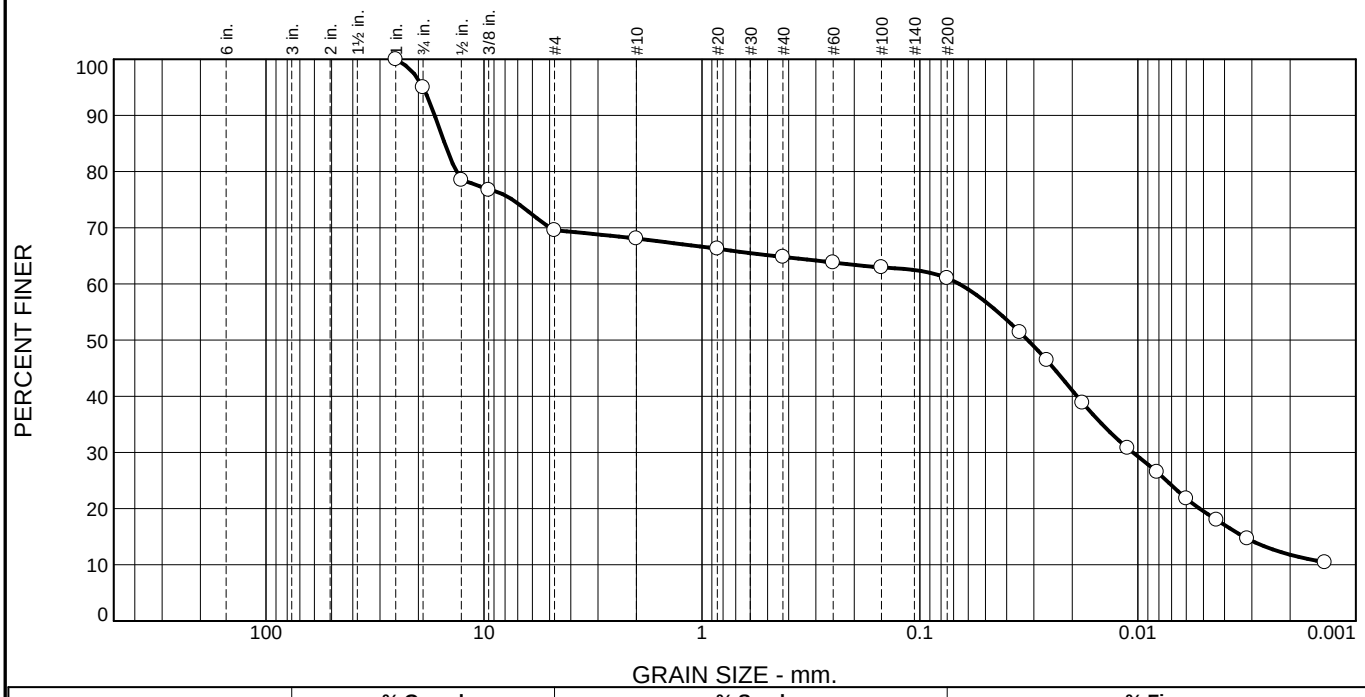
Source of Sample: UP-GEO-01 **Depth:** 4-6' **Date Sampled:** 9/21/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.0	25.4	1.5	3.3	3.8	41.5	19.5

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	95.0		
.5"	78.5		
.375"	76.7		
#4	69.6		
#10	68.1		
#20	66.3		
#40	64.8		
#60	63.8		
#100	62.9		
#200	61.0		
0.0348 mm.	51.4		
0.0262 mm.	46.4		
0.0179 mm.	38.8		
0.0112 mm.	30.8		
0.0082 mm.	26.5		
0.0060 mm.	21.8		
0.0044 mm.	18.0		
0.0031 mm.	14.7		
0.0014 mm.	10.4		

* (no specification provided)

Material Description

Brown gravelly lean clay

Atterberg Limits (ASTM D 4318)

PL= 21 **LL=** 35 **PI=** 14

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(6)

Coefficients

D_{90}= 16.8416 D_{85}= 15.1350 D_{60}= 0.0660
D_{50}= 0.0320 D_{30}= 0.0105 D_{15}= 0.0033
D_{10}= C_u= C_c=

Remarks

As received MC = 11.4%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

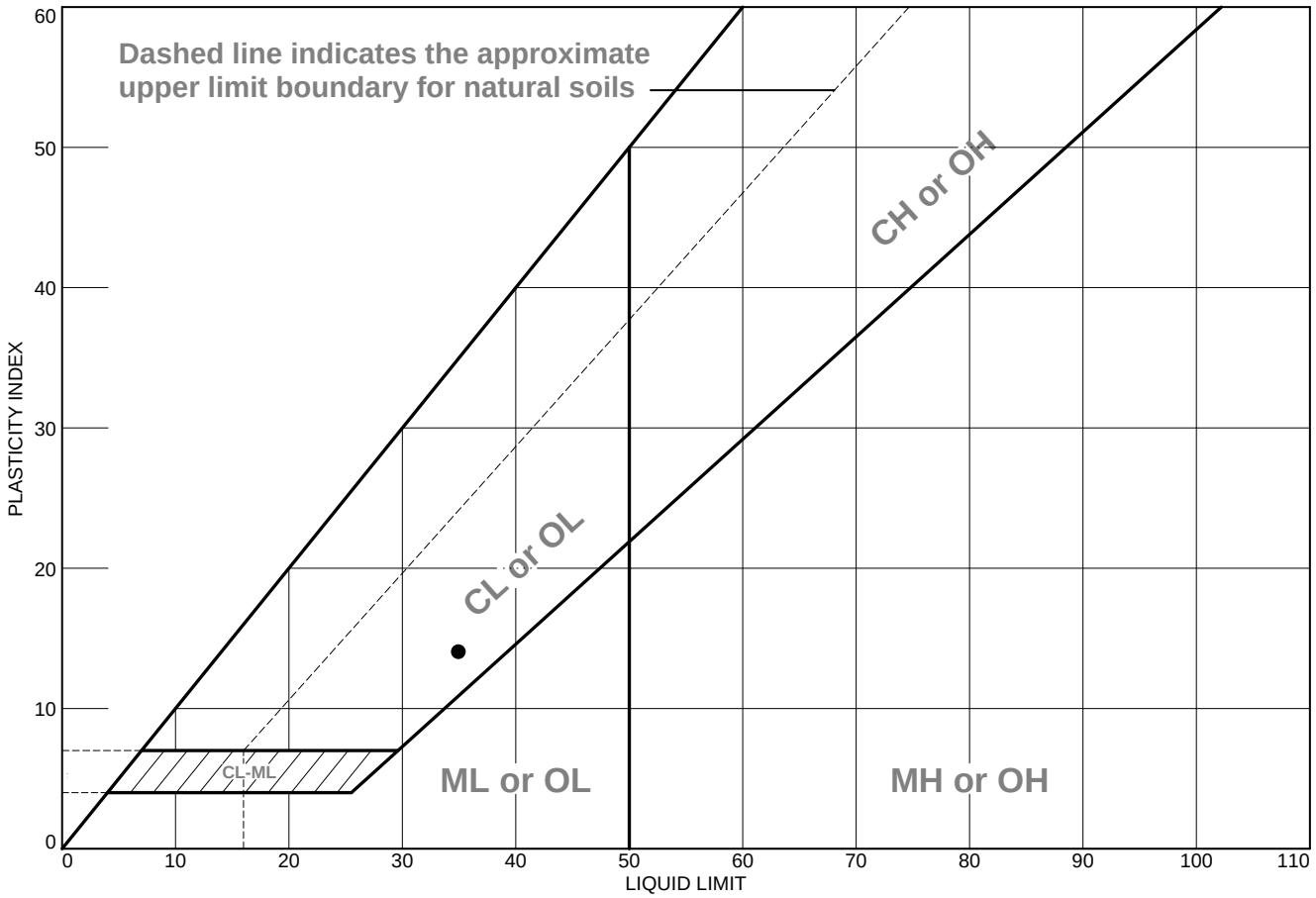
Source of Sample: UP-GEO-01 **Depth:** 14-15.3' **Date Sampled:** 9/21/18
Sample Number: S-8

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown gravelly lean clay	9/21/18	11/9/18	AS	35	21	14	64.8	CL

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** UP-GEO-01 **Depth:** 14-15.3' **Sample Number:** S-8

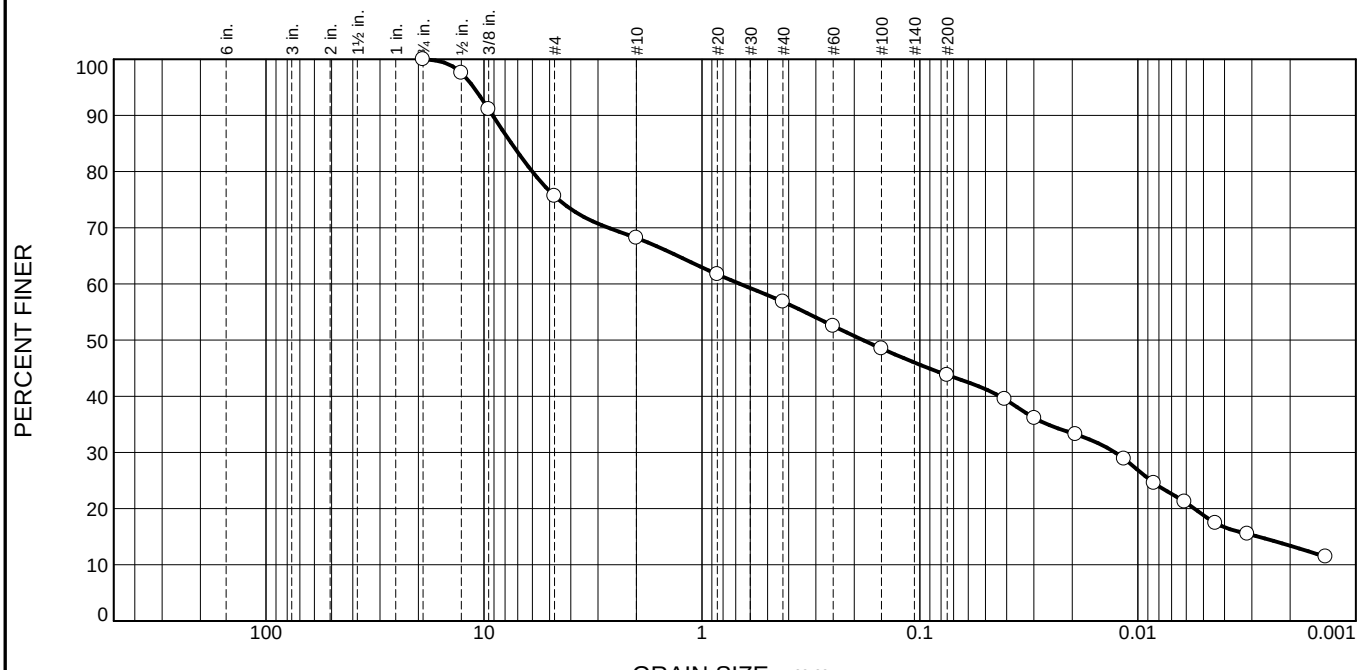
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: AS **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	24.3	7.5	11.4	13.0	25.0	18.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	97.6		
.375"	91.1		
#4	75.7		
#10	68.2		
#20	61.7		
#40	56.8		
#60	52.5		
#100	48.5		
#200	43.8		
0.0408 mm.	39.5		
0.0298 mm.	36.1		
0.0193 mm.	33.2		
0.0116 mm.	28.9		
0.0084 mm.	24.6		
0.0061 mm.	21.2		
0.0044 mm.	17.4		
0.0031 mm.	15.5		
0.0014 mm.	11.4		

* (no specification provided)

Material Description

Gray-brown clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= 16 **LL=** 27 **PI=** 11

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-6(2)

Coefficients

D_{90}= 9.1197 D_{85}= 7.4716 D_{60}= 0.6681
D_{50}= 0.1824 D_{30}= 0.0127 D_{15}= 0.0028
D_{10}= C_u= C_c=

Remarks

As received MC = 16.8%

Date Received: 11/6/18 **Date Tested:** 11/14/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

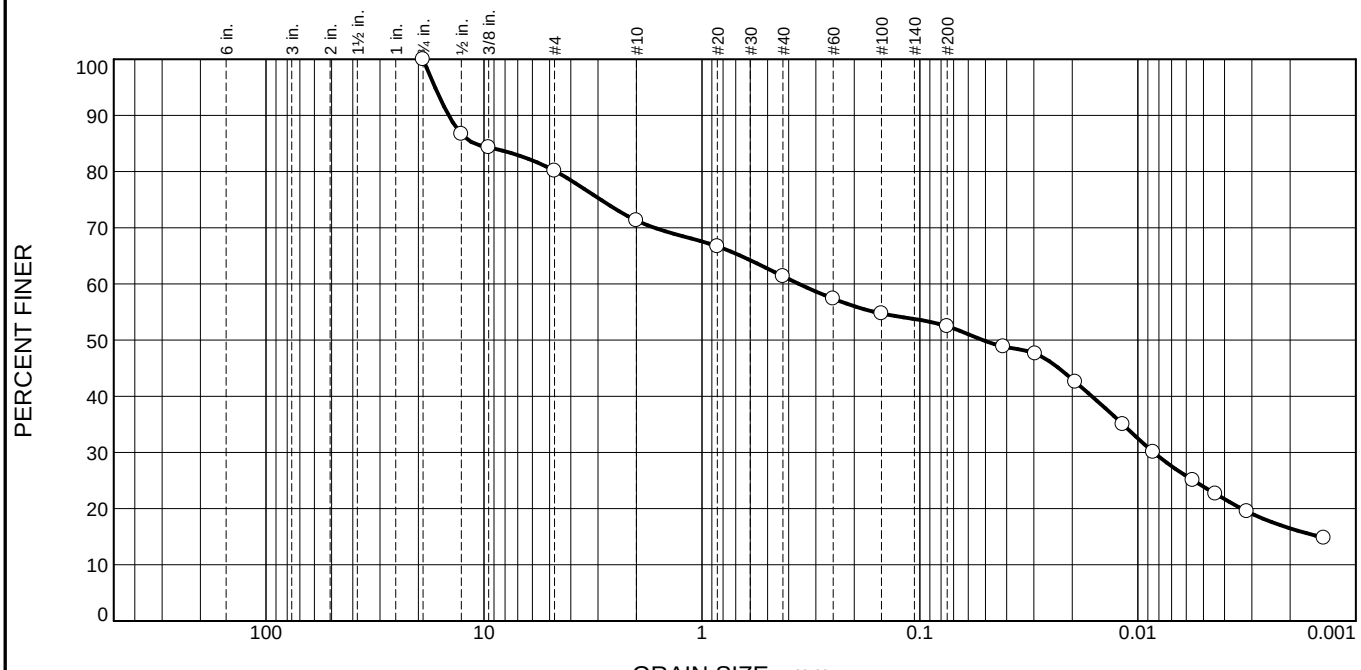
Source of Sample: UP-GEO-02 **Depth:** 2-4' **Date Sampled:** 5/14/18
Sample Number: S-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.8	8.9	9.9	8.9	28.6	23.9

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	86.7		
.375"	84.3		
#4	80.2		
#10	71.3		
#20	66.7		
#40	61.4		
#60	57.4		
#100	54.7		
#200	52.5		
0.0415 mm.	48.9		
0.0296 mm.	47.6		
0.0194 mm.	42.6		
0.0117 mm.	35.0		
0.0085 mm.	30.1		
0.0056 mm.	25.1		
0.0044 mm.	22.7		
0.0032 mm.	19.5		
0.0014 mm.	14.8		

* (no specification provided)

Material Description

Brown sandy lean clay with gravel

Atterberg Limits (ASTM D 4318)

PL= 17 **LL=** 27 **PI=** 10

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-4(2)

Coefficients

D_{90}= 14.5187 D_{85}= 11.0452 D_{60}= 0.3588
D_{50}= 0.0514 D_{30}= 0.0085 D_{15}= 0.0015
D_{10}= C_u= C_c=

Remarks

As received MC = 17.8%

Date Received: 11/6/18 **Date Tested:** 11/14/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

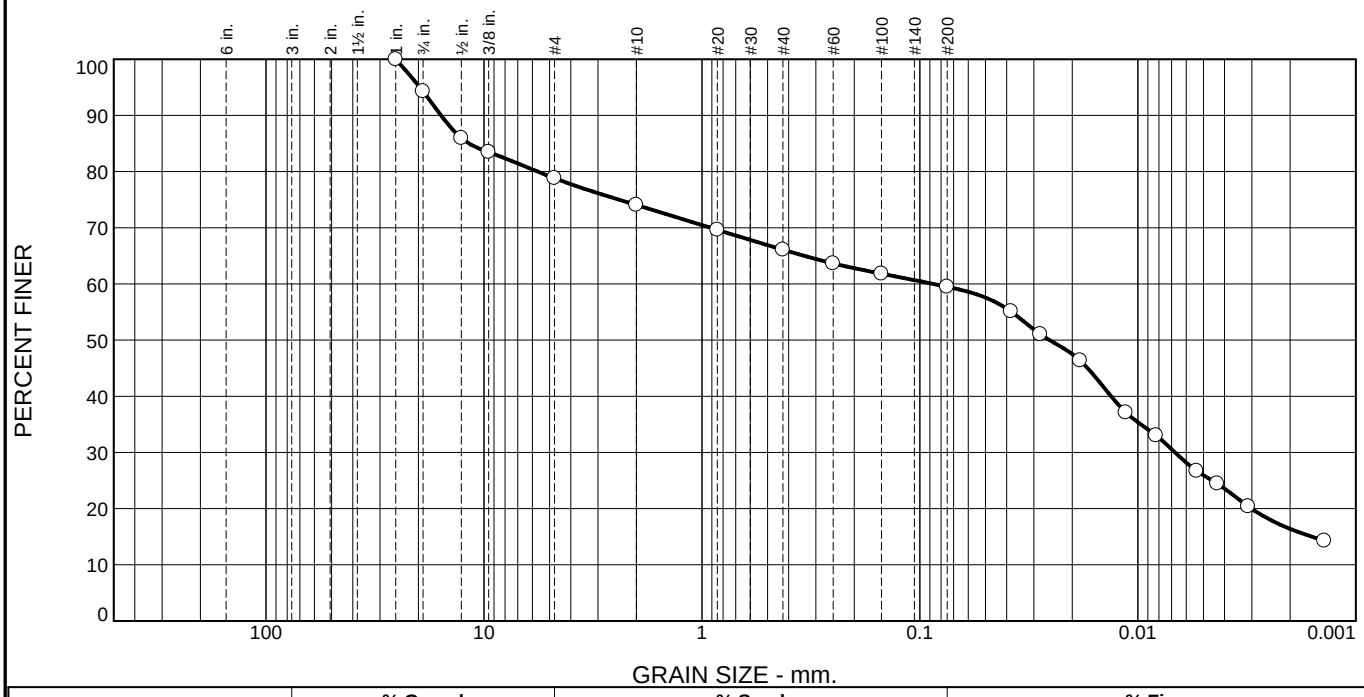
Source of Sample: UP-GEO-02 **Depth:** 9-10' **Date Sampled:** 5/14/18
Sample Number: S-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.7	15.5	4.7	8.0	6.6	33.6	25.9

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	94.3		
.5"	86.0		
.375"	83.5		
#4	78.8		
#10	74.1		
#20	69.6		
#40	66.1		
#60	63.6		
#100	61.8		
#200	59.5		
0.0382 mm.	55.1		
0.0280 mm.	51.0		
0.0184 mm.	46.4		
0.0114 mm.	37.1		
0.0082 mm.	33.0		
0.0054 mm.	26.7		
0.0043 mm.	24.5		
0.0031 mm.	20.4		
0.0014 mm.	14.3		

* (no specification provided)

Material Description

Brown gravelly lean clay with sand

Atterberg Limits (ASTM D 4318)

PL= 18 **LL=** 29 **PI=** 11

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(4)

Coefficients

D_{90}= 15.7427 D_{85}= 11.7266 D_{60}= 0.0868
D_{50}= 0.0254 D_{30}= 0.0067 D_{15}= 0.0016
D_{10}= C_u= C_c=

Remarks

As received MC = 18.2%

Date Received: 11/6/18 **Date Tested:** 11/14/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

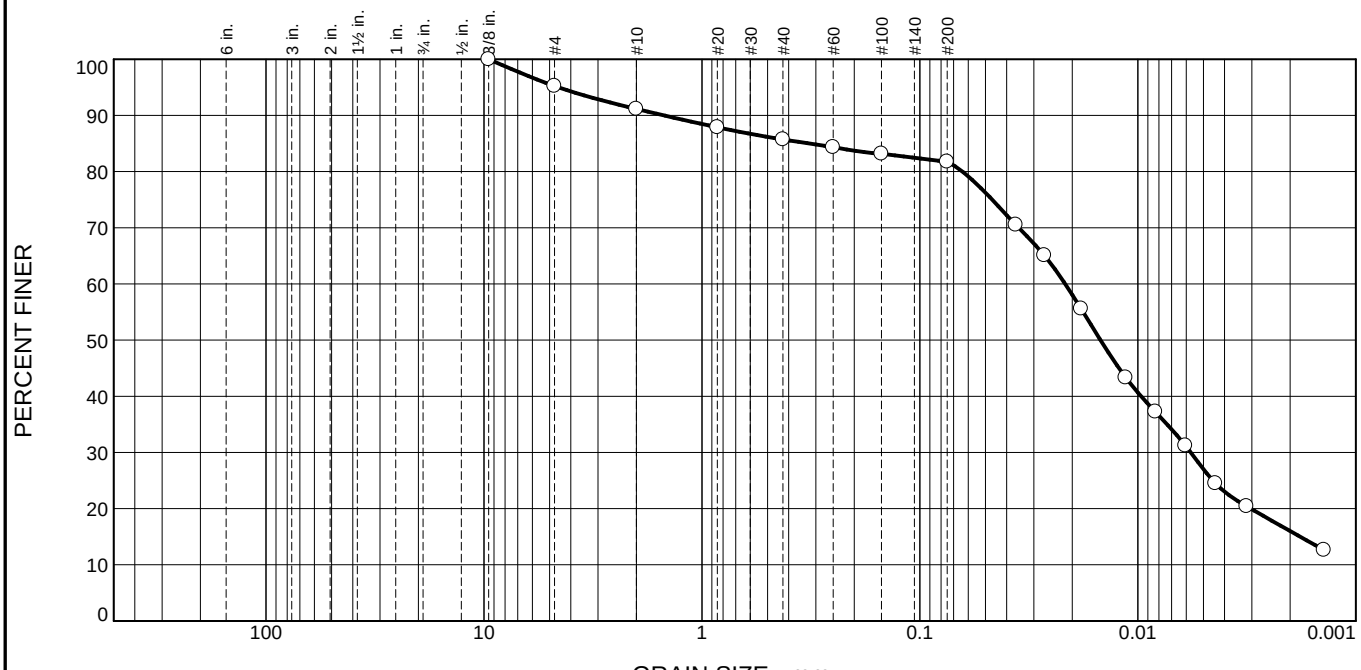
Source of Sample: UP-GEO-02 **Depth:** 12-14' **Date Sampled:** 5/14/18
Sample Number: S-7

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.8	4.0	5.5	3.9	54.8	27.0

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	95.2		
#10	91.2		
#20	87.9		
#40	85.7		
#60	84.4		
#100	83.2		
#200	81.8		
0.0363 mm.	70.5		
0.0269 mm.	65.1		
0.0182 mm.	55.6		
0.0114 mm.	43.3		
0.0083 mm.	37.2		
0.0060 mm.	31.2		
0.0044 mm.	24.5		
0.0032 mm.	20.4		
0.0014 mm.	12.6		

* (no specification provided)

Material Description

Brown lean clay with sand

Atterberg Limits (ASTM D 4318)

PL= 21 **LL=** 36 **PI=** 15

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(12)

Coefficients

D_{90}= 1.4953 D_{85}= 0.3208 D_{60}= 0.0215
D_{50}= 0.0148 D_{30}= 0.0057 D_{15}= 0.0018
D_{10}= C_u= C_c=

Remarks

As received MC = 15.1%

Date Received: 11/6/18 **Date Tested:** 11/14/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

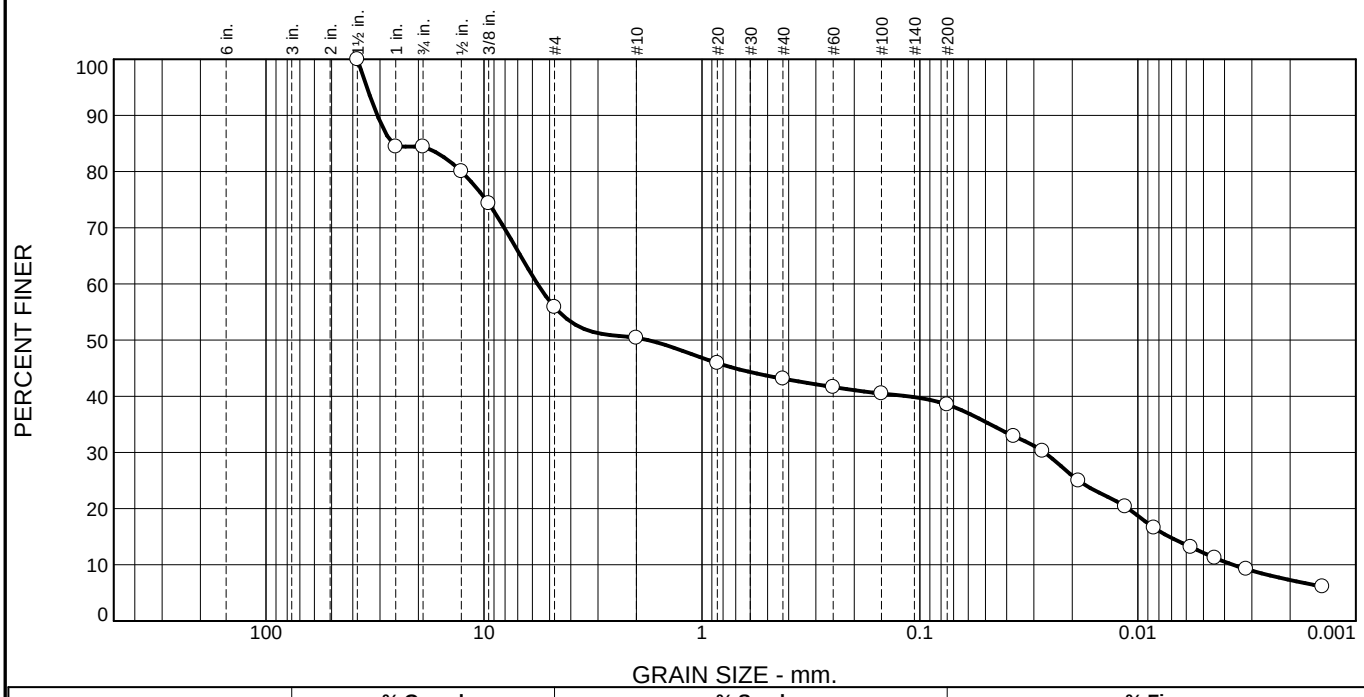
Source of Sample: UP-GEO-02 **Depth:** 24-26' **Date Sampled:** 5/14/18
Sample Number: S-13

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.6	28.5	5.5	7.3	4.6	26.4	12.1

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	84.4		
.75"	84.4		
.5"	80.0		
.375"	74.3		
#4	55.9		
#10	50.4		
#20	45.9		
#40	43.1		
#60	41.6		
#100	40.5		
#200	38.5		
0.0371 mm.	32.9		
0.0274 mm.	30.3		
0.0187 mm.	25.0		
0.0114 mm.	20.4		
0.0084 mm.	16.6		
0.0057 mm.	13.2		
0.0044 mm.	11.2		
0.0032 mm.	9.2		
0.0014 mm.	6.1		

* (no specification provided)

Material Description

Gray-brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-6(1)

Coefficients

D_{90}= 30.8522 D_{85}= 26.2636 D_{60}= 5.6819
D_{50}= 1.7705 D_{30}= 0.0268 D_{15}= 0.0072
D_{10}= 0.0037 C_u= 1552.14 C_c= 0.03

Remarks

As received MC = 13.8%

Date Received: 11/6/18 **Date Tested:** 11/14/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

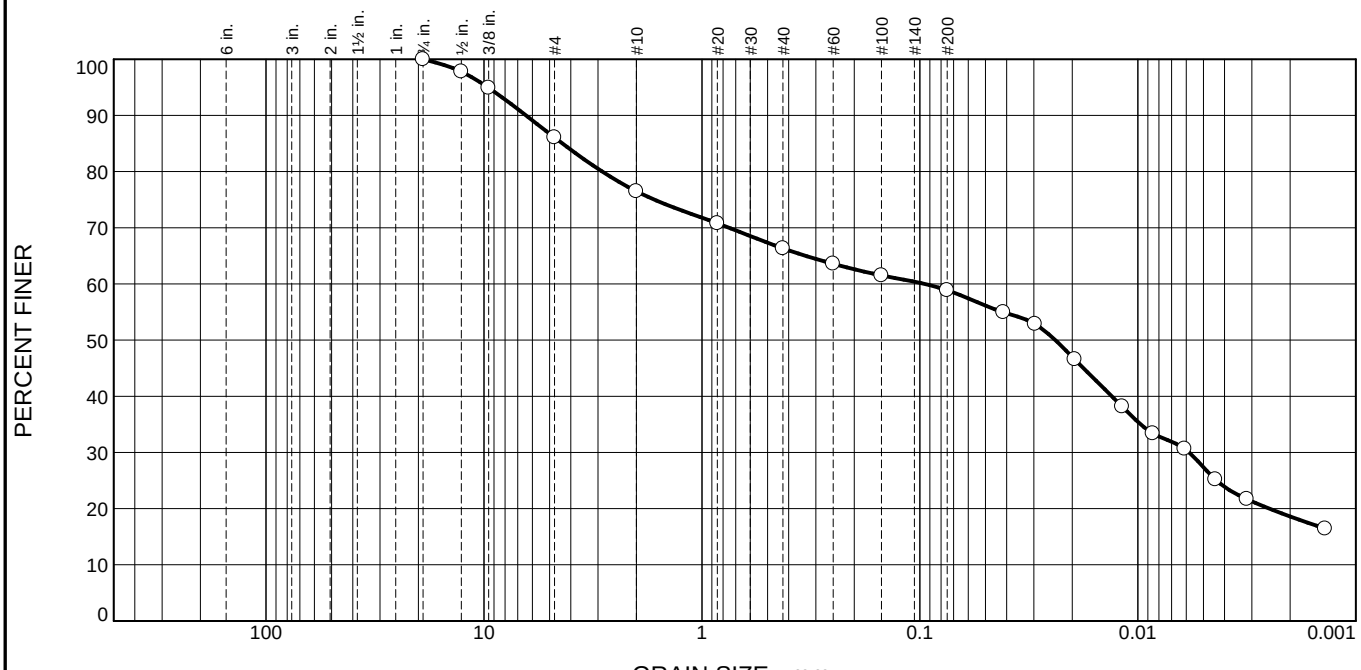
Source of Sample: UP-GEO-02 **Depth:** 28-30' **Date Sampled:** 5/14/18
Sample Number: S-15

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.9	9.6	10.2	7.4	31.5	27.4

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	97.8		
.375"	94.9		
#4	86.1		
#10	76.5		
#20	70.8		
#40	66.3		
#60	63.6		
#100	61.5		
#200	58.9		
0.0414 mm.	55.0		
0.0297 mm.	52.9		
0.0195 mm.	46.6		
0.0118 mm.	38.2		
0.0085 mm.	33.4		
0.0061 mm.	30.6		
0.0044 mm.	25.2		
0.0032 mm.	21.7		
0.0014 mm.	16.4		

* (no specification provided)

Material Description

Brown sandy lean clay

Atterberg Limits (ASTM D 4318)

PL= 15 **LL=** 26 **PI=** 11

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(4)

Coefficients

D_{90}= 6.4173 D_{85}= 4.3664 D_{60}= 0.0952
D_{50}= 0.0239 D_{30}= 0.0058 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 17.6%

Date Received: 11/6/18 **Date Tested:** 11/14/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

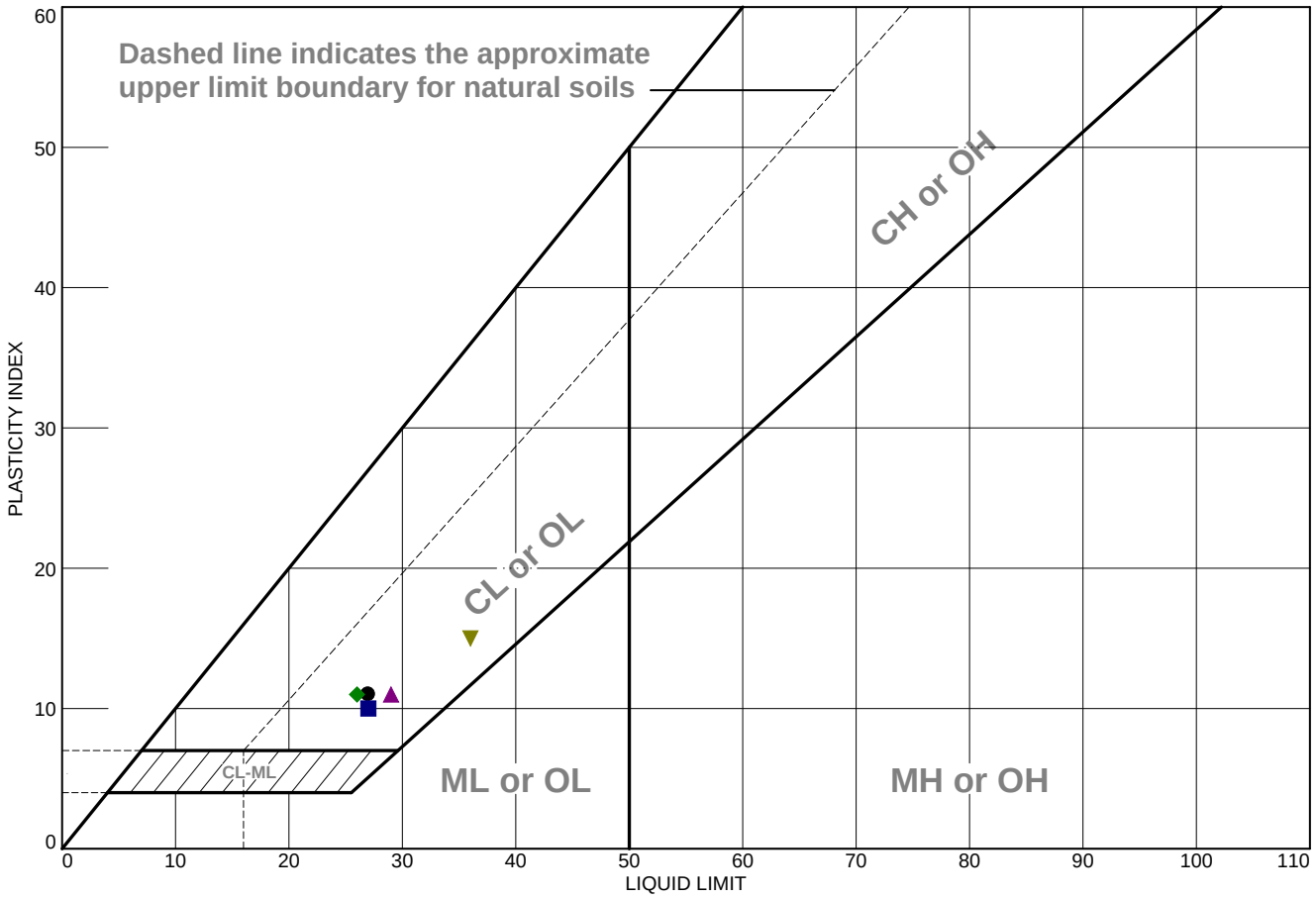
Source of Sample: UP-GEO-02 **Depth:** 30.3-32' **Date Sampled:** 5/14/18
Sample Number: S-16B

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Gray-brown clayey sand with gravel	5/14/18	11/13/18	AS	27	16	11	56.8	SC
■	Brown sandy lean clay with gravel	5/14/18	11/13/18	AS	27	17	10	61.4	CL
▲	Brown gravelly lean clay with sand	5/14/18	11/13/18	AS	29	18	11	66.1	CL
◆	Brown sandy lean clay	5/14/18	11/13/18	AS	26	15	11	66.3	CL
▼	Brown lean clay with sand	5/14/18	11/14/18	AS	36	21	15	85.7	CL

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek

Lockport, NY

○ **Source of Sample:** UP-GEO-02 **Depth:** 2-4' **Sample Number:** S-2

□ **Source of Sample:** UP-GEO-02 **Depth:** 9-10' **Sample Number:** S-5

△ **Source of Sample:** UP-GEO-02 **Depth:** 12-14' **Sample Number:** S-7

◇ **Source of Sample:** UP-GEO-02 **Depth:** 30.3-32' **Sample Number:** S-16B

▽ **Source of Sample:** UP-GEO-02 **Depth:** 24-26' **Sample Number:** S-13

CDM Smith

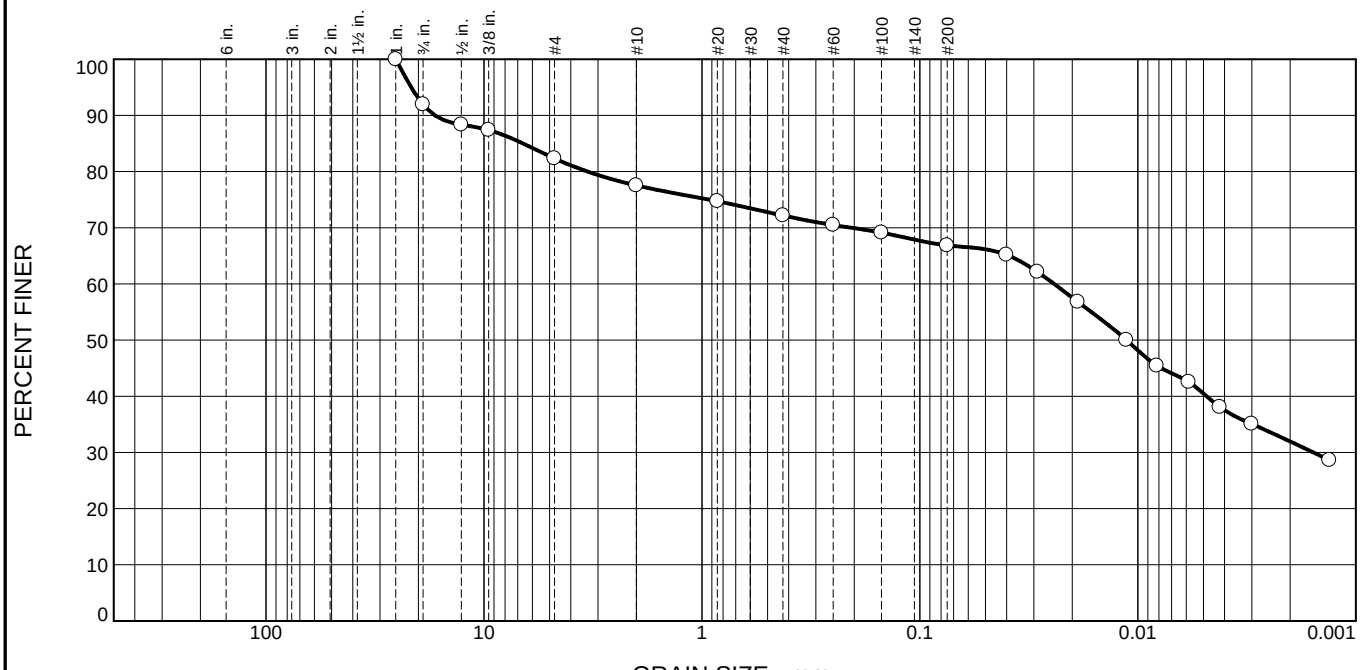
Boston, Massachusetts

Checked by: MP

Title: Laboratory Manager

Tested By: AS MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.0	9.7	4.8	5.3	5.3	26.4	40.5

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	92.0		
.5"	88.4		
.375"	87.4		
#4	82.3		
#10	77.5		
#20	74.7		
#40	72.2		
#60	70.5		
#100	69.1		
#200	66.9		
0.0401 mm.	65.2		
0.0289 mm.	62.1		
0.0189 mm.	56.8		
0.0113 mm.	50.0		
0.0082 mm.	45.4		
0.0058 mm.	42.6		
0.0042 mm.	38.1		
0.0030 mm.	35.1		
0.0013 mm.	28.6		

* (no specification provided)

Material Description

Gray-brown gravelly fat clay with sand

Atterberg Limits (ASTM D 4318)

PL= 27 **LL=** 62 **PI=** 35

Classification

USCS (D 2487)= CH **AASHTO (M 145)=** A-7-6(23)

Coefficients

D_{90}= 16.7792 D_{85}= 6.6143 D_{60}= 0.0242
D_{50}= 0.0113 D_{30}= 0.0016 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 38.3%

Date Received: 11/6/18 **Date Tested:** 11/14/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

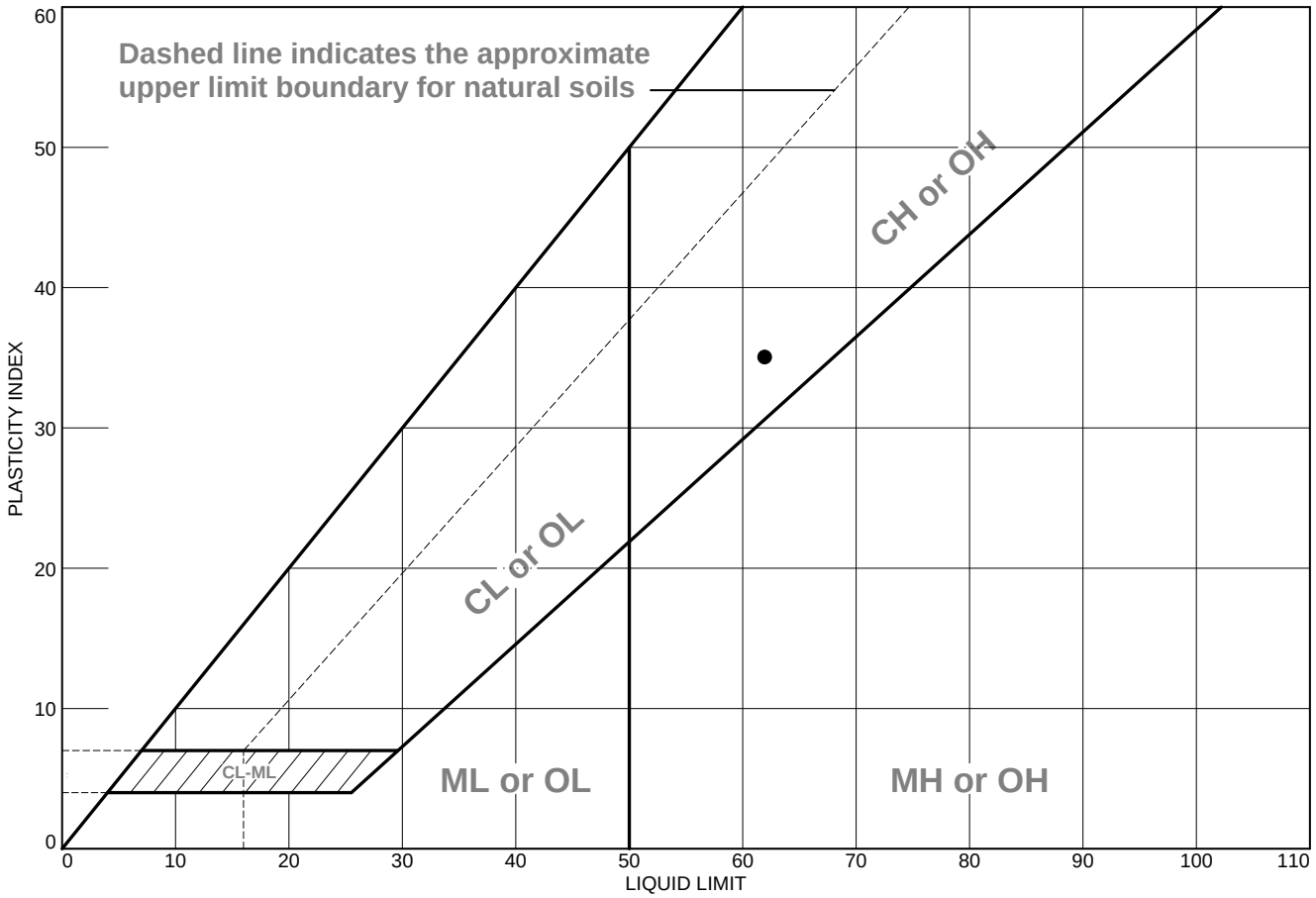
Source of Sample: UP-GEO-02 **Depth:** 36-38' **Date Sampled:** 5/14/18
Sample Number: S-19

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Gray-brown gravelly fat clay with sand	5/14/18	11/14/18	AS	62	27	35	72.2	CH

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** UP-GEO-02 **Depth:** 36-38' **Sample Number:** S-19

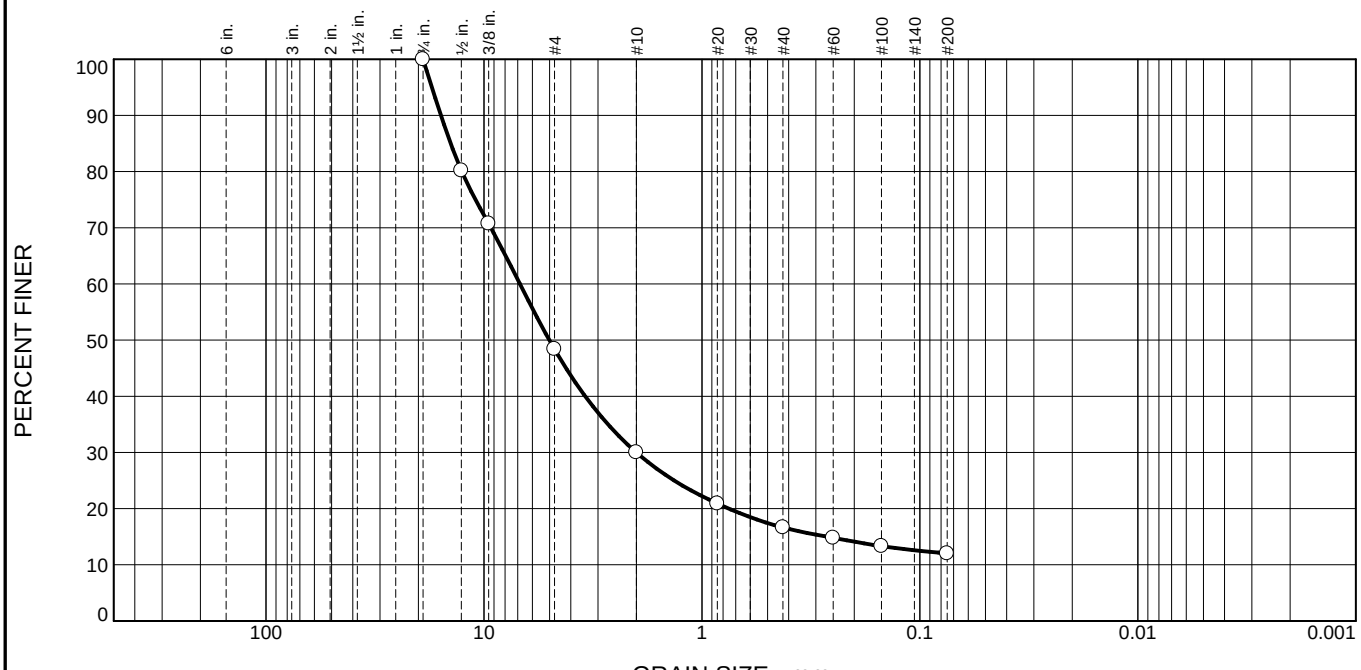
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: AS **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	51.6	18.4	13.4	4.6	12.0	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	80.2		
.375"	70.8		
#4	48.4		
#10	30.0		
#20	20.9		
#40	16.6		
#60	14.8		
#100	13.3		
#200	12.0		

* (no specification provided)

Material Description

Gray poorly graded gravel with silt and sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP-GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 15.7589 D_{85}= 14.2148 D_{60}= 6.8435
D_{50}= 5.0139 D_{30}= 1.9998 D_{15}= 0.2672
D_{10}= C_u= C_c=

Remarks

As received MC = 2.8%

Date Received: 11/6/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

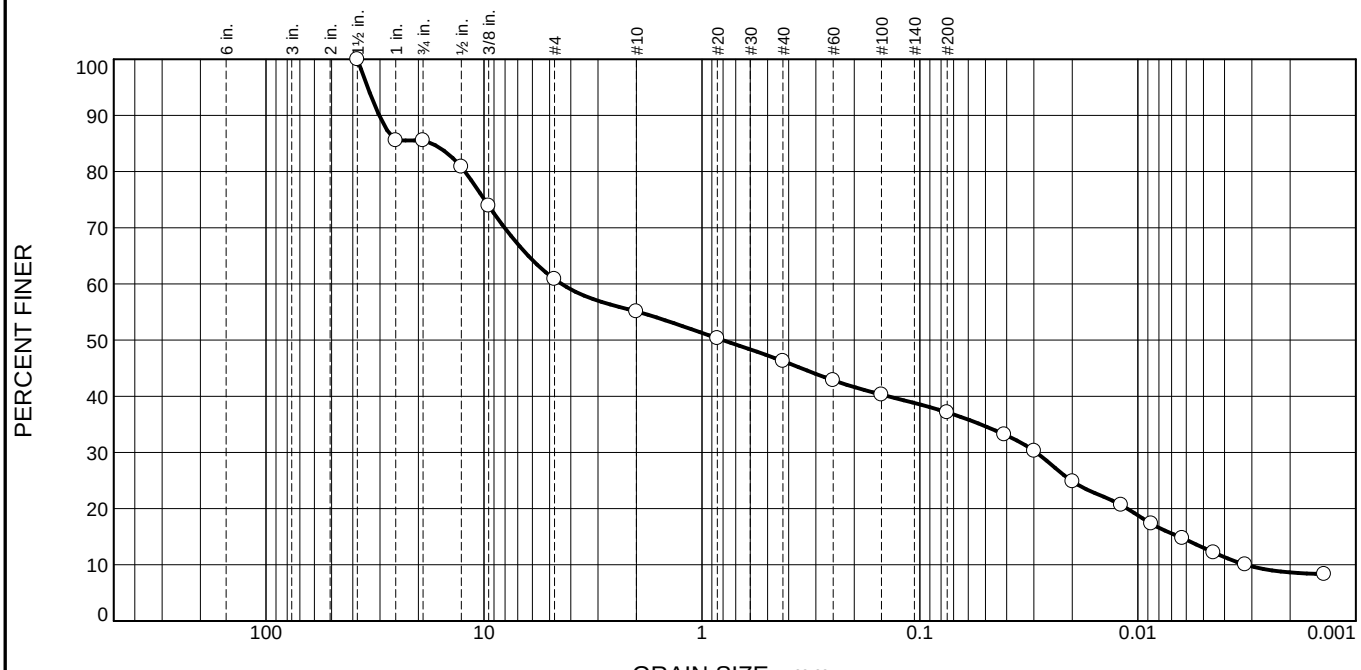
Source of Sample: UP-GEO-03 **Depth:** 6-8' **Date Sampled:** 5/17/18
Sample Number: S-4

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.4	24.7	5.8	8.8	9.2	24.1	13.0

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	85.6		
.75"	85.6		
.5"	80.9		
.375"	73.9		
#4	60.9		
#10	55.1		
#20	50.3		
#40	46.3		
#60	42.8		
#100	40.3		
#200	37.1		
0.0410 mm.	33.2		
0.0299 mm.	30.3		
0.0199 mm.	24.8		
0.0119 mm.	20.7		
0.0087 mm.	17.3		
0.0062 mm.	14.8		
0.0045 mm.	12.2		
0.0032 mm.	10.0		
0.0014 mm.	8.3		

* (no specification provided)

Material Description

Brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 19 **LL=** 31 **PI=** 12

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-6(1)

Coefficients

D_{90}= 30.2601 D_{85}= 17.3598 D_{60}= 4.4090
D_{50}= 0.8037 D_{30}= 0.0292 D_{15}= 0.0065
D_{10}= 0.0032 C_u= 1380.23 C_c= 0.06

Remarks

As received MC = 17.4%

Date Received: 11/6/18 **Date Tested:** 11/15/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

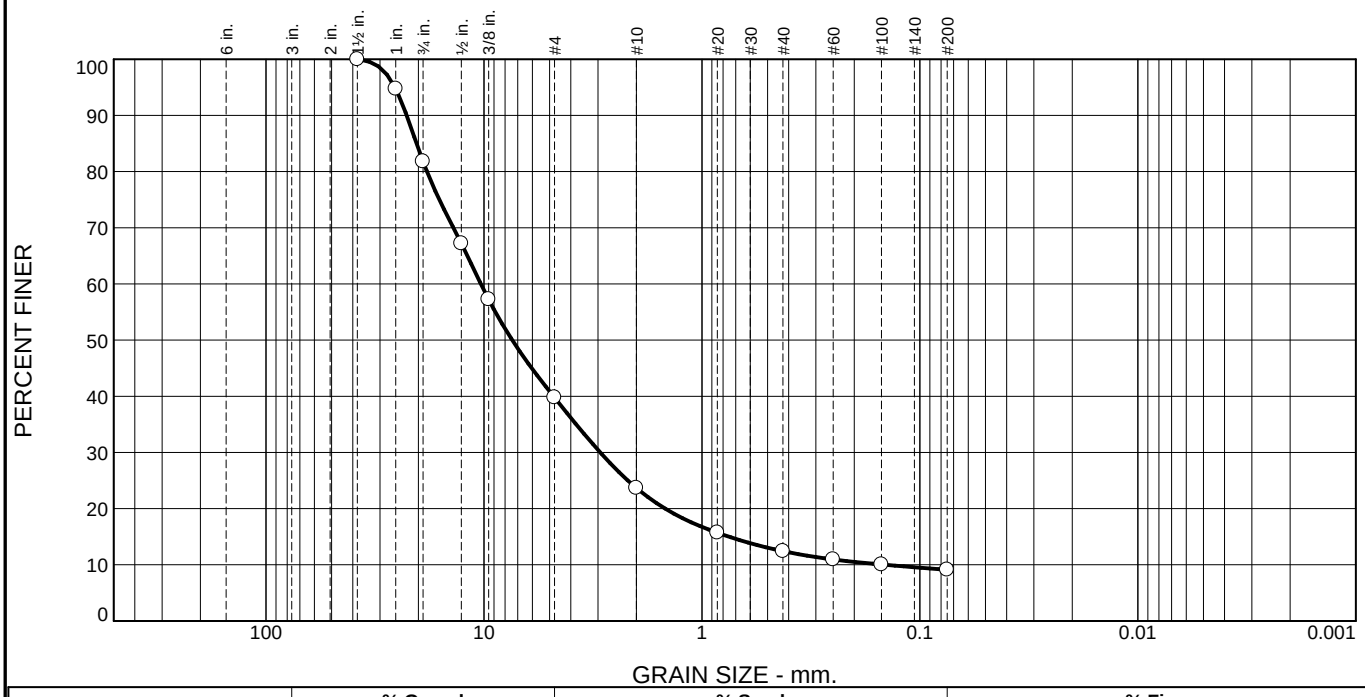
Source of Sample: UP-GEO-03 **Depth:** 14-16' **Date Sampled:** 5/17/18
Sample Number: S-8

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.2	42.0	16.1	11.3	3.3	9.1	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	94.7		
.75"	81.8		
.5"	67.2		
.375"	57.3		
#4	39.8		
#10	23.7		
#20	15.7		
#40	12.4		
#60	11.0		
#100	10.0		
#200	9.1		

* (no specification provided)

Material Description

Gray poorly graded gravel with silt and sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP-GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 22.6250 D_{85}= 20.3885 D_{60}= 10.3332
D_{50}= 7.4232 D_{30}= 2.9275 D_{15}= 0.7525
D_{10}= 0.1452 C_u= 71.17 C_c= 5.71

Remarks

As received MC = 3.1%

Date Received: 11/6/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

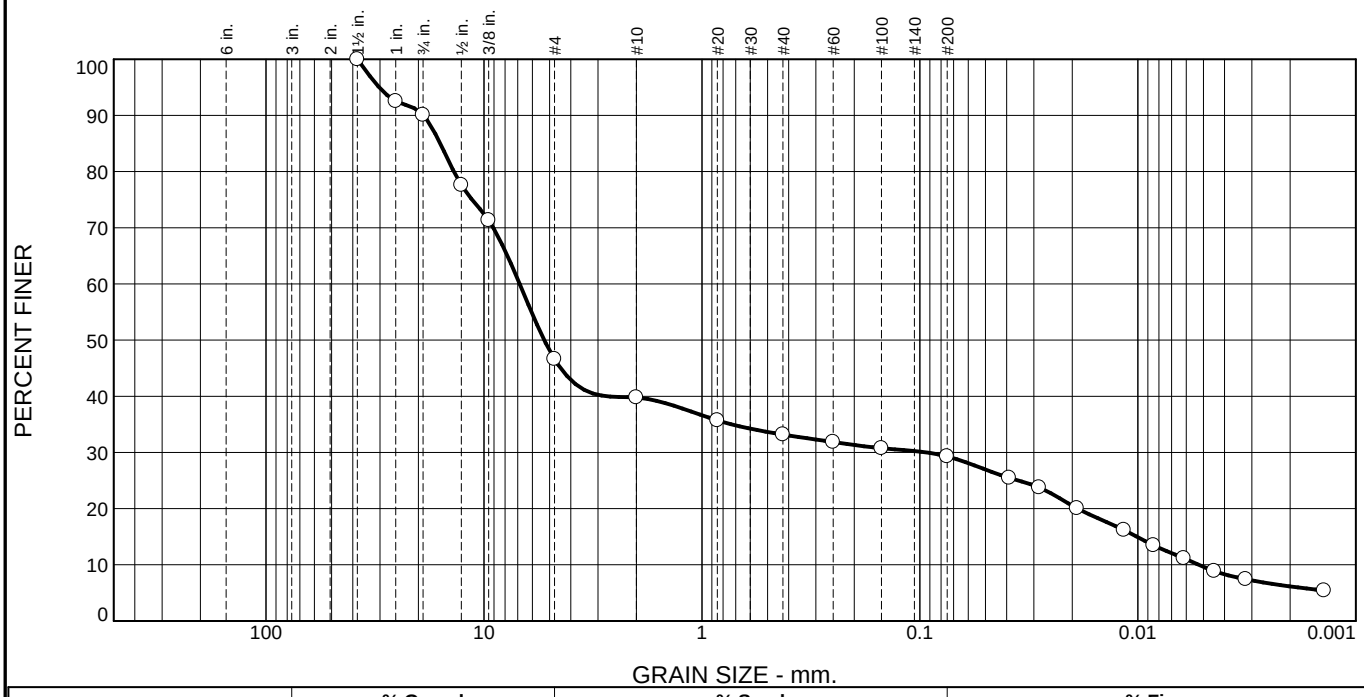
Source of Sample: UP-GEO-03 **Depth:** 26-28' **Date Sampled:** 5/17/18
Sample Number: S-14

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.9	43.5	6.8	6.6	3.9	19.7	9.6

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	92.5		
.75"	90.1		
.5"	77.6		
.375"	71.3		
#4	46.6		
#10	39.8		
#20	35.7		
#40	33.2		
#60	31.9		
#100	30.8		
#200	29.3		
0.0390 mm.	25.5		
0.0284 mm.	23.8		
0.0190 mm.	20.1		
0.0116 mm.	16.2		
0.0085 mm.	13.5		
0.0062 mm.	11.2		
0.0045 mm.	8.9		
0.0032 mm.	7.4		
0.0014 mm.	5.4		

* (no specification provided)

Material Description

Gray-brown silty clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GC-GM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 18.9605 D_{85}= 15.8806 D_{60}= 6.8609
D_{50}= 5.2915 D_{30}= 0.0933 D_{15}= 0.0101
D_{10}= 0.0053 C_u= 1306.27 C_c= 0.24

Remarks

As received MC = 11.1%

Date Received: 11/6/18 **Date Tested:** 11/15/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

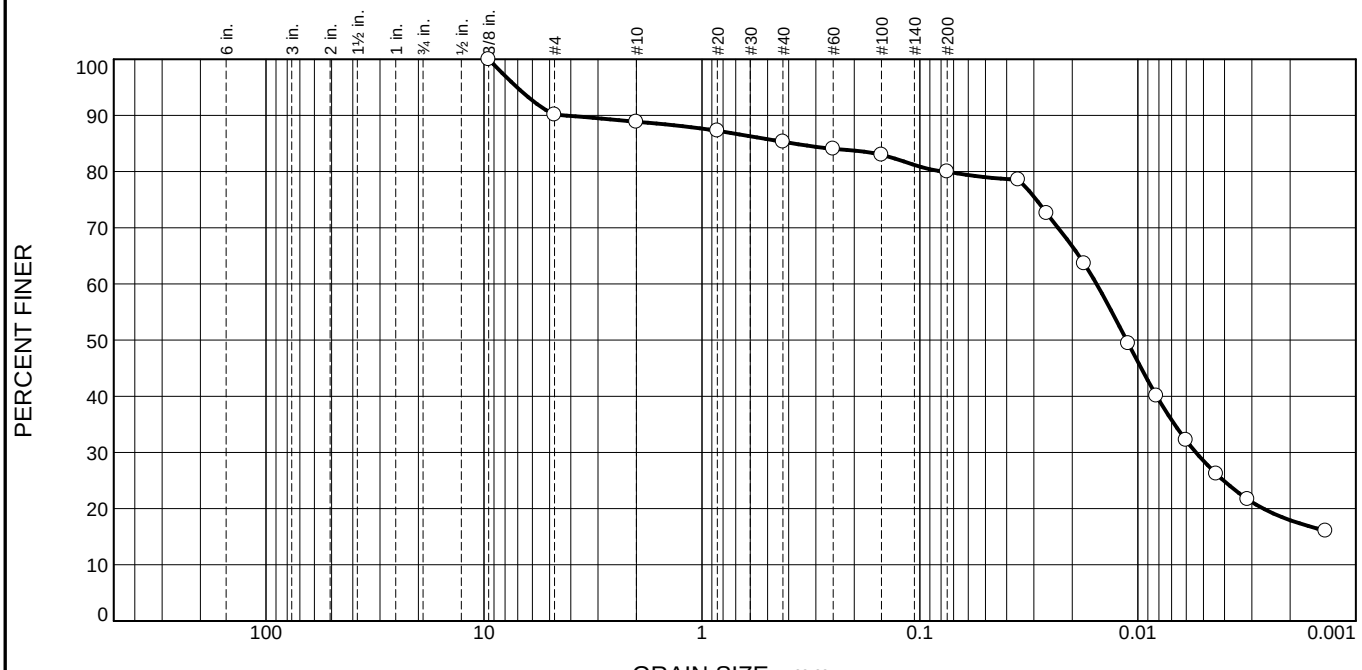
Source of Sample: UP-GEO-03 **Depth:** 34-36' **Date Sampled:** 5/17/18
Sample Number: S-18

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.9	1.2	3.6	5.3	51.5	28.5

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	90.1		
#10	88.9		
#20	87.3		
#40	85.3		
#60	84.1		
#100	83.0		
#200	80.0		
0.0354 mm.	78.6		
0.0262 mm.	72.6		
0.0176 mm.	63.6		
0.0111 mm.	49.4		
0.0082 mm.	40.1		
0.0060 mm.	32.2		
0.0044 mm.	26.2		
0.0031 mm.	21.7		
0.0014 mm.	16.0		

* (no specification provided)

Material Description

Brown and black organic silt with sand

Atterberg Limits (ASTM D 4318)

PL= 39 **LL=** 67 **PI=** 28

Classification

USCS (D 2487)= MH **AASHTO (M 145)=** A-7-5(27)

Coefficients

D_{90}= 4.2729 D_{85}= 0.3803 D_{60}= 0.0155
D_{50}= 0.0113 D_{30}= 0.0054 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 58.1%

Date Received: 11/6/18 **Date Tested:** 11/15/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

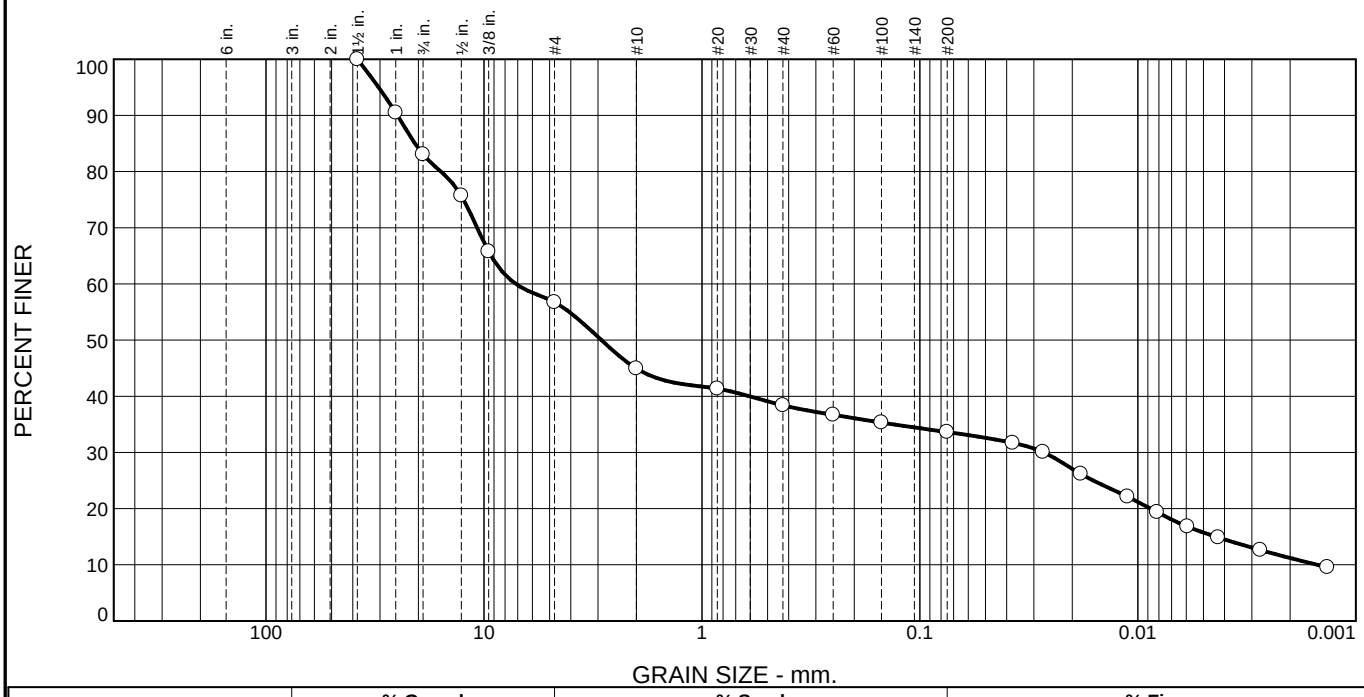
Source of Sample: UP-GEO-03 **Depth:** 38-40' **Date Sampled:** 5/17/18
Sample Number: S-20

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.9	26.4	11.8	6.5	4.8	17.9	15.7

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	90.5		
.75"	83.1		
.5"	75.7		
.375"	65.8		
#4	56.7		
#10	44.9		
#20	41.3		
#40	38.4		
#60	36.7		
#100	35.3		
#200	33.6		
0.0375 mm.	31.7		
0.0272 mm.	30.1		
0.0183 mm.	26.2		
0.0111 mm.	22.1		
0.0082 mm.	19.4		
0.0059 mm.	16.8		
0.0043 mm.	14.9		
0.0027 mm.	12.6		
0.0014 mm.	9.6		

* (no specification provided)

Material Description

Brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 20 **LL=** 38 **PI=** 18

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-2-6(2)

Coefficients

D_{90}= 24.9396 D_{85}= 20.7376 D_{60}= 7.1510
D_{50}= 2.8921 D_{30}= 0.0270 D_{15}= 0.0044
D_{10}= 0.0015 C_u= 4768.75 C_c= 0.07

Remarks

As received MC = 19.2%

Date Received: 11/6/18 **Date Tested:** 11/16/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

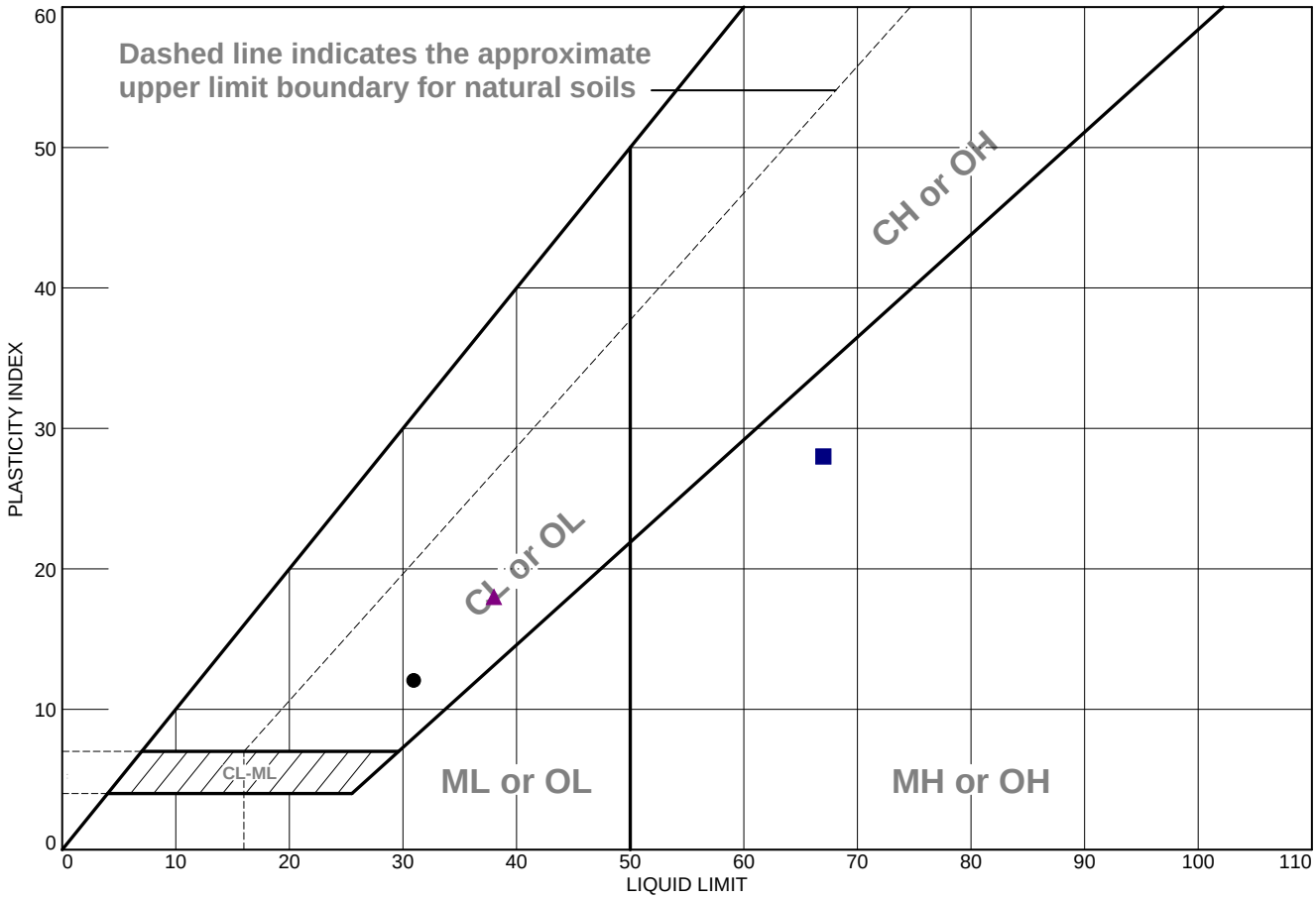
Source of Sample: UP-GEO-03 **Depth:** 42-44' **Date Sampled:** 5/17/18
Sample Number: S-21

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown clayey gravel with sand	5/17/18	11/14/18	AS	31	19	12	46.3	GC
■	Brown and black organic silt with sand	5/17/18	11/14/18	AS	67	39	28	85.3	MH
▲	Brown clayey gravel with sand	5/17/18	11/15/18	AS	38	20	18	38.4	GC

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○ **Source of Sample:** UP-GEO-03 **Depth:** 14-16' **Sample Number:** S-8
□ **Source of Sample:** UP-GEO-03 **Depth:** 38-40' **Sample Number:** S-20
△ **Source of Sample:** UP-GEO-03 **Depth:** 42-44' **Sample Number:** S-21

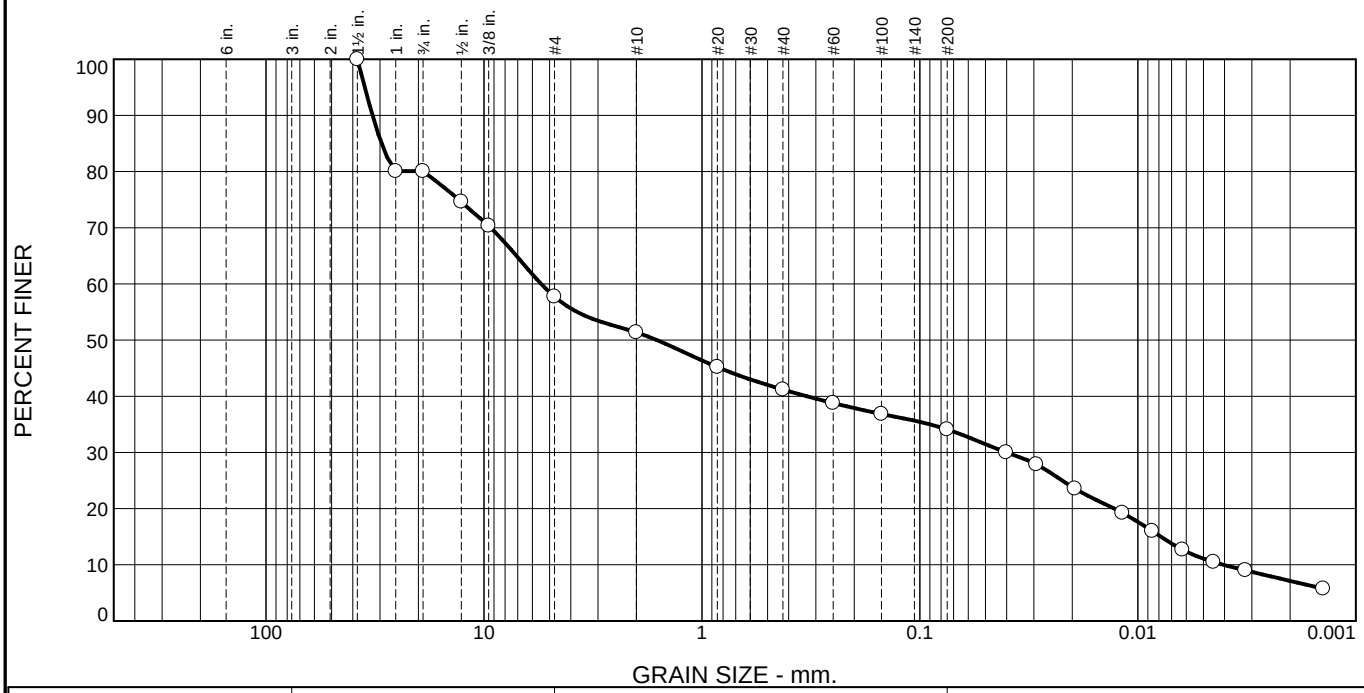
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: AS **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	19.9	22.4	6.3	10.2	7.1	23.0	11.1

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	80.1		
.75"	80.1		
.5"	74.6		
.375"	70.4		
#4	57.7		
#10	51.4		
#20	45.2		
#40	41.2		
#60	38.8		
#100	36.8		
#200	34.1		
0.0402 mm.	30.0		
0.0292 mm.	27.9		
0.0195 mm.	23.6		
0.0118 mm.	19.2		
0.0086 mm.	16.0		
0.0062 mm.	12.7		
0.0045 mm.	10.5		
0.0032 mm.	9.0		
0.0014 mm.	5.7		

* (no specification provided)

Material Description

Gray & red silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 32.4817 D_{85}= 29.5248 D_{60}= 5.4669
D_{50}= 1.6092 D_{30}= 0.0401 D_{15}= 0.0078
D_{10}= 0.0040 C_u= 1350.17 C_c= 0.07

Remarks

As received MC = 10.7%

Date Received: 11/6/18 **Date Tested:** 11/15/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

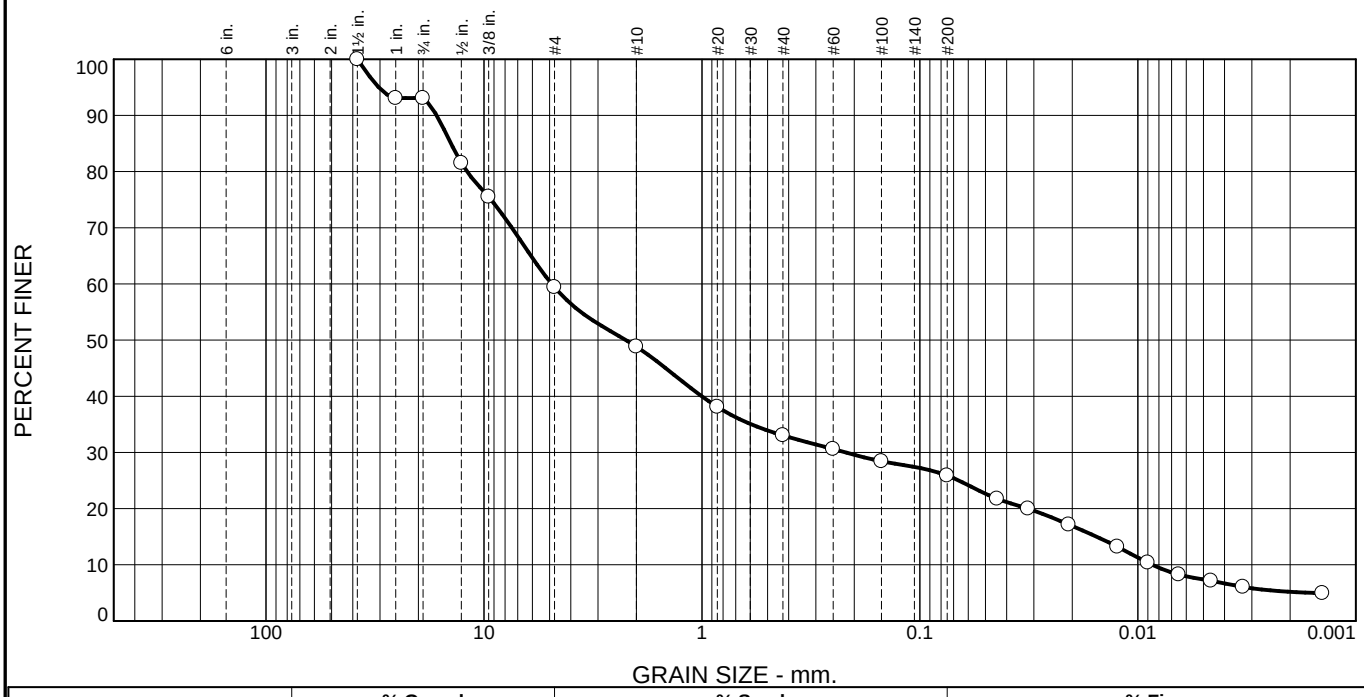
Source of Sample: UP-GEO-03 **Depth:** 48-49.3' **Date Sampled:** 5/17/18
Sample Number: S-24

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.9	33.7	10.6	15.8	7.1	18.5	7.4

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	93.1		
.75"	93.1		
.5"	81.5		
.375"	75.5		
#4	59.4		
#10	48.8		
#20	38.1		
#40	33.0		
#60	30.6		
#100	28.4		
#200	25.9		
0.0442 mm.	21.8		
0.0319 mm.	20.0		
0.0208 mm.	17.2		
0.0124 mm.	13.2		
0.0090 mm.	10.4		
0.0065 mm.	8.3		
0.0046 mm.	7.2		
0.0033 mm.	6.1		
0.0014 mm.	4.9		

* (no specification provided)

Material Description

Gray-brown silty clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 16 **LL=** 22 **PI=** 6

Classification

USCS (D 2487)= GC-GM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 16.4985 D_{85}= 14.1739 D_{60}= 4.8897
D_{50}= 2.2330 D_{30}= 0.2193 D_{15}= 0.0155
D_{10}= 0.0086 C_u= 569.71 C_c= 1.15

Remarks

As received MC = 8.4%

Date Received: 11/6/18 **Date Tested:** 11/15/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

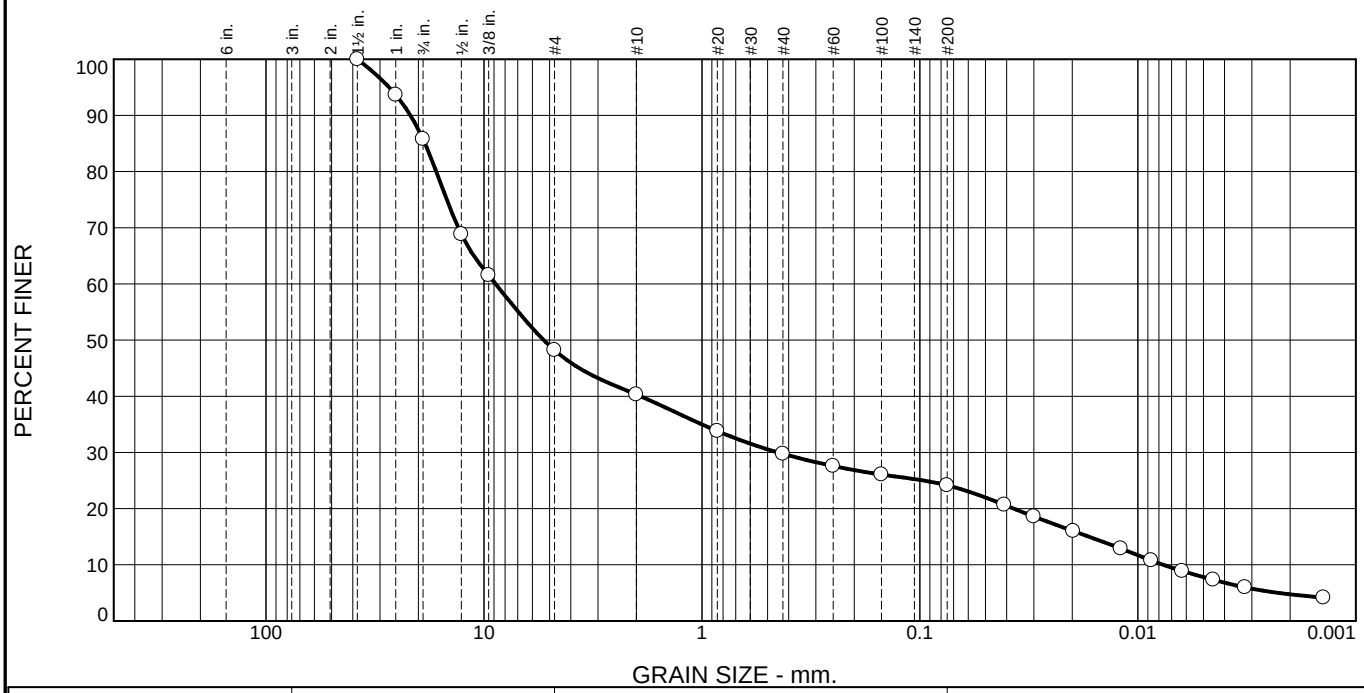
Source of Sample: UP-GEO-04 **Depth:** 0-2' **Date Sampled:** 5/22/18
Sample Number: S-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.2	37.6	7.9	10.6	5.5	16.4	7.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	93.7		
.75"	85.8		
.5"	68.8		
.375"	61.6		
#4	48.2		
#10	40.3		
#20	33.8		
#40	29.7		
#60	27.6		
#100	26.1		
#200	24.2		
0.0410 mm.	20.7		
0.0300 mm.	18.6		
0.0198 mm.	16.0		
0.0120 mm.	12.9		
0.0087 mm.	10.8		
0.0063 mm.	8.9		
0.0045 mm.	7.3		
0.0032 mm.	6.0		
0.0014 mm.	4.2		

* (no specification provided)

Material Description

Gray silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 21.7178 D_{85}= 18.6505 D_{60}= 8.8451
D_{50}= 5.3203 D_{30}= 0.4478 D_{15}= 0.0168
D_{10}= 0.0076 C_u= 1156.47 C_c= 2.96

Remarks

As received MC = 7.3%

Date Received: 11/6/18 **Date Tested:** 11/15/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

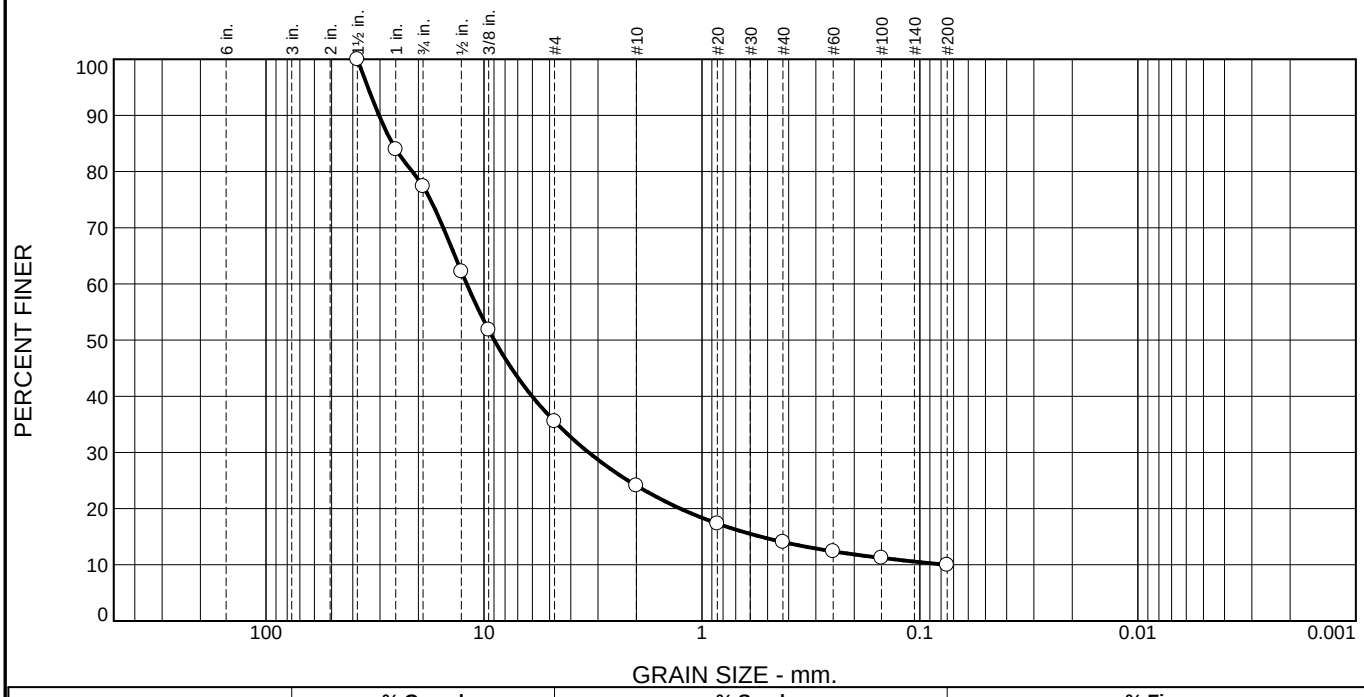
Source of Sample: UP-GEO-04 **Depth:** 18-20' **Date Sampled:** 5/22/18
Sample Number: S-10

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	22.6	41.9	11.4	10.0	4.1	10.0	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	84.0		
.75"	77.4		
.5"	62.2		
.375"	51.8		
#4	35.5		
#10	24.1		
#20	17.3		
#40	14.1		
#60	12.4		
#100	11.2		
#200	10.0		

* (no specification provided)

Material Description

Gray poorly graded gravel with silt and sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP-GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 30.3136 D_{85}= 26.3307 D_{60}= 11.9994
D_{50}= 8.9746 D_{30}= 3.3119 D_{15}= 0.5379
D_{10}= 0.0764 C_u= 156.99 C_c= 11.96

Remarks

As received MC = 2.7%

Date Received: 11/6/18 **Date Tested:** 11/14/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

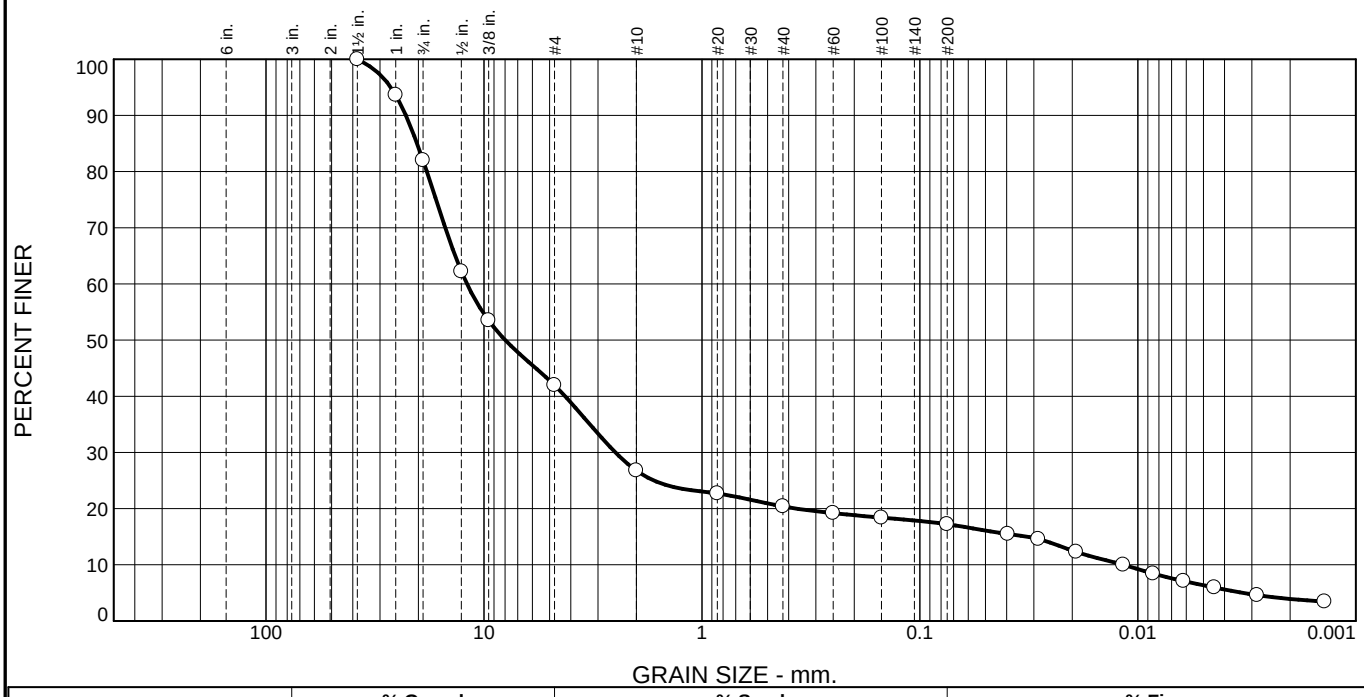
Source of Sample: UP-GEO-04 **Depth:** 26-28' **Date Sampled:** 5/22/18
Sample Number: S-14

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.0	40.0	15.2	6.4	3.2	10.8	6.4

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	93.6		
.75"	82.0		
.5"	62.2		
.375"	53.5		
#4	42.0		
#10	26.8		
#20	22.7		
#40	20.4		
#60	19.2		
#100	18.4		
#200	17.2		
0.0395 mm.	15.5		
0.0286 mm.	14.6		
0.0192 mm.	12.3		
0.0117 mm.	10.0		
0.0085 mm.	8.4		
0.0062 mm.	7.1		
0.0045 mm.	6.0		
0.0028 mm.	4.6		
0.0014 mm.	3.4		

* (no specification provided)

Material Description

Gray clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 22.8109 D_{85}= 20.2802 D_{60}= 11.9755
D_{50}= 7.9900 D_{30}= 2.4939 D_{15}= 0.0323
D_{10}= 0.0117 C_u= 1026.83 C_c= 44.53

Remarks

As received MC = 17.7%

Date Received: 11/6/18 **Date Tested:** 11/16/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

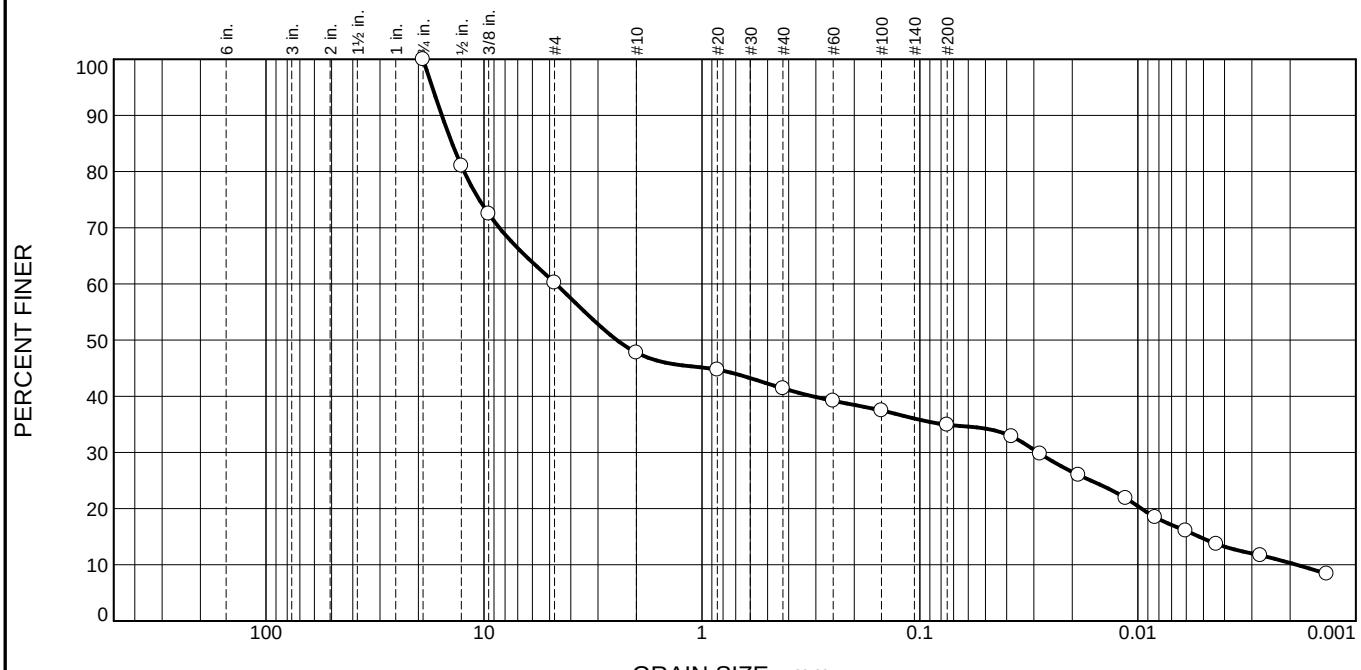
Source of Sample: UP-GEO-04 **Depth:** 32-34' **Date Sampled:** 5/22/18
Sample Number: S-17

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	39.8	12.4	6.4	6.5	20.2	14.7

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	81.0		
.375"	72.5		
#4	60.2		
#10	47.8		
#20	44.7		
#40	41.4		
#60	39.2		
#100	37.5		
#200	34.9		
0.0380 mm.	32.9		
0.0281 mm.	29.8		
0.0187 mm.	26.0		
0.0114 mm.	21.9		
0.0083 mm.	18.5		
0.0060 mm.	16.1		
0.0044 mm.	13.7		
0.0027 mm.	11.7		
0.0014 mm.	8.4		

* (no specification provided)

Material Description

Brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 21 **LL=** 37 **PI=** 16

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-2-6(1)

Coefficients

D_{90}= 15.6113 D_{85}= 13.9992 D_{60}= 4.6802
D_{50}= 2.4547 D_{30}= 0.0287 D_{15}= 0.0052
D_{10}= 0.0019 C_u= 2503.69 C_c= 0.09

Remarks

As received MC = 18.6%

Date Received: 11/6/18 **Date Tested:** 11/16/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

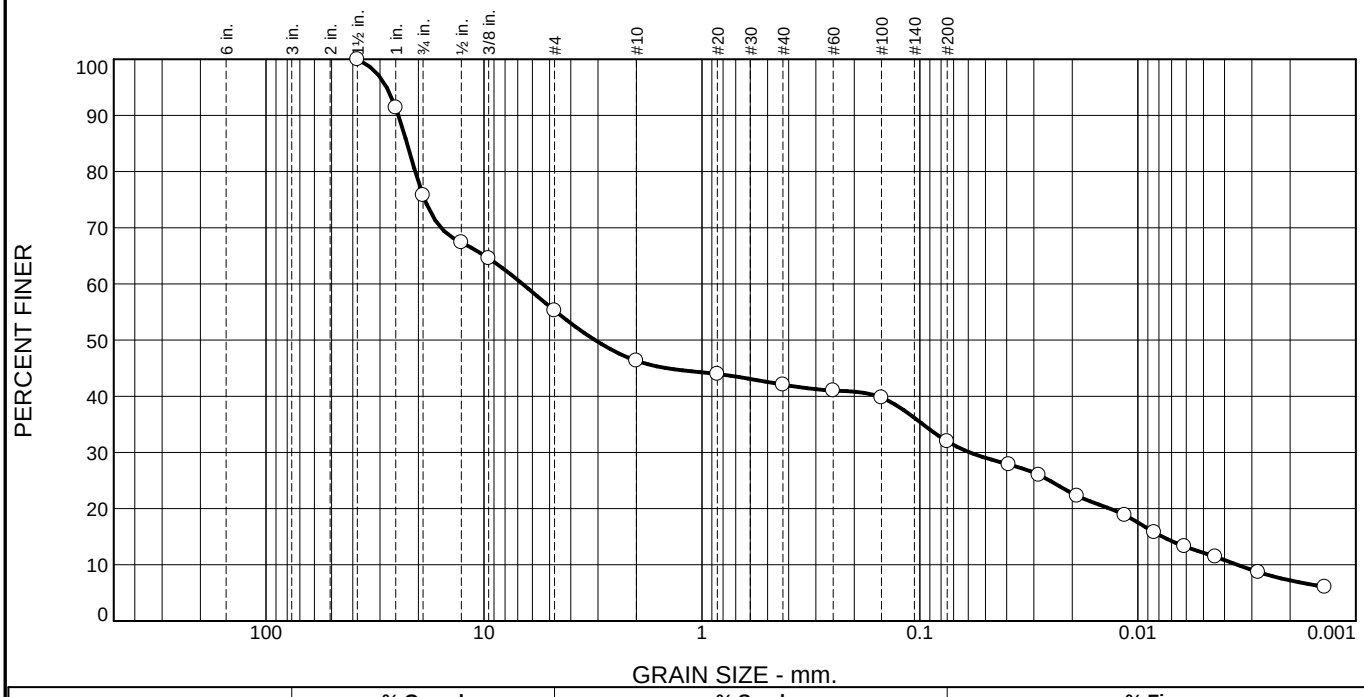
Source of Sample: UP-GEO-04 **Depth:** 38-40' **Date Sampled:** 5/22/18
Sample Number: S-20

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	24.2	20.5	9.0	4.2	10.1	19.9	12.1

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	91.4		
.75"	75.8		
.5"	67.4		
.375"	64.6		
#4	55.3		
#10	46.3		
#20	44.0		
#40	42.1		
#60	41.0		
#100	39.8		
#200	32.0		
0.0391 mm.	27.9		
0.0285 mm.	26.0		
0.0190 mm.	22.3		
0.0115 mm.	18.9		
0.0084 mm.	15.8		
0.0061 mm.	13.3		
0.0044 mm.	11.4		
0.0028 mm.	8.7		
0.0014 mm.	6.1		

* (no specification provided)

Material Description

Red-brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 15 **LL=** 25 **PI=** 10

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 24.6777 D_{85}= 22.5394 D_{60}= 6.6559
D_{50}= 3.0923 D_{30}= 0.0590 D_{15}= 0.0077
D_{10}= 0.0035 C_u= 1903.88 C_c= 0.15

Remarks

As received MC = 9.3%

Date Received: 11/6/18 **Date Tested:** 11/16/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

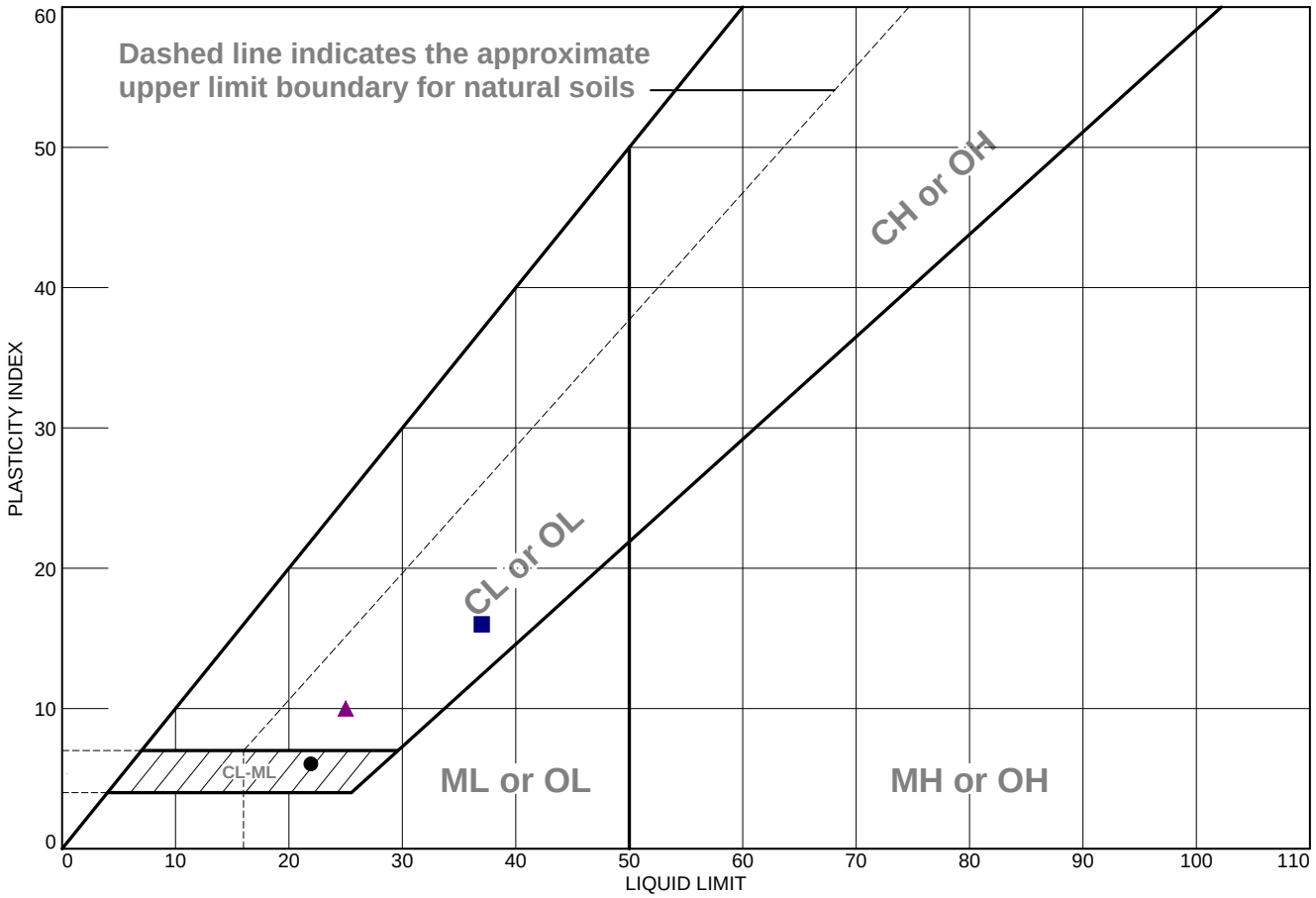
Source of Sample: UP-GEO-04 **Depth:** 43-44' **Date Sampled:** 5/22/18
Sample Number: S-22B

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Gray-brown silty clayey gravel with sand	5/22/18	11/14/18	AS	22	16	6	33.0	GC-GM
■	Brown clayey gravel with sand	5/22/18	11/15/18	AS	37	21	16	41.4	GC
▲	Red-brown clayey gravel with sand	5/22/18	11/15/18	AS	25	15	10	42.1	GC

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek

Lockport, NY

○ **Source of Sample:** UP-GEO-04 **Depth:** 0-2' **Sample Number:** S-1

□ **Source of Sample:** UP-GEO-04 **Depth:** 38-40' **Sample Number:** S-20

△ **Source of Sample:** UP-GEO-04 **Depth:** 43-44' **Sample Number:** S-22B

CDM Smith

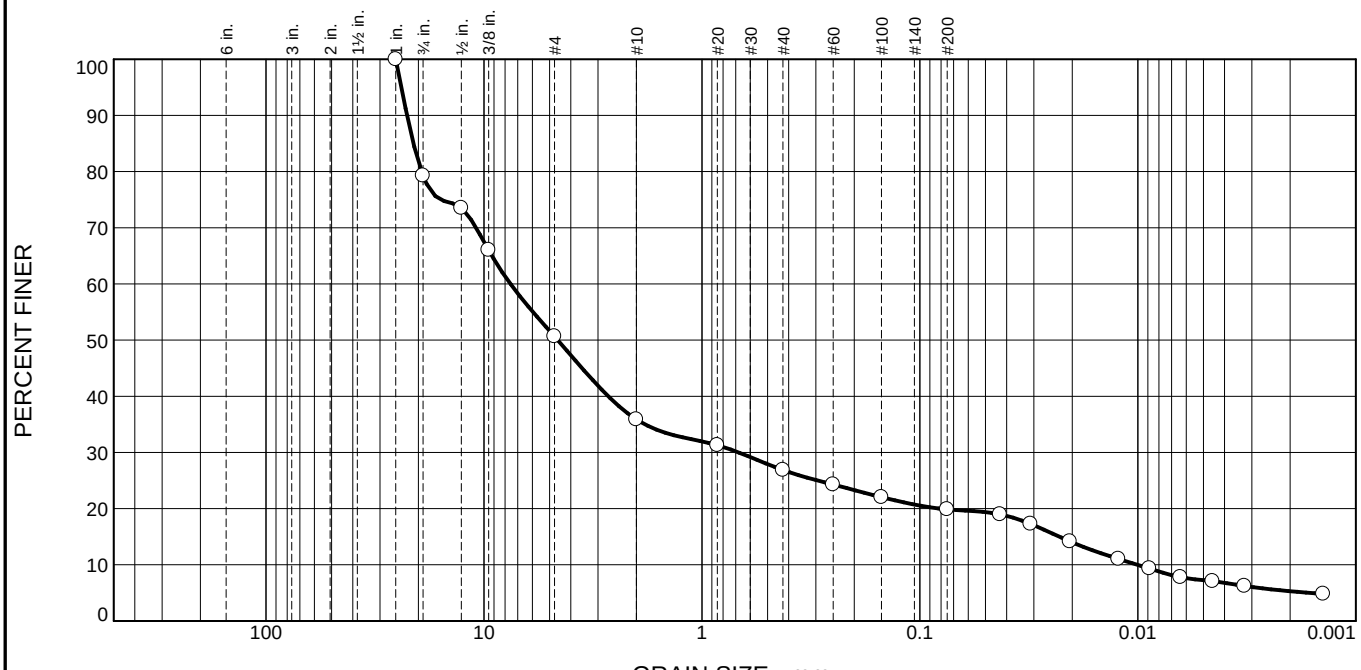
Boston, Massachusetts

Checked by: MP

Title: Laboratory Manager

Tested By: AS MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.7	28.6	14.8	9.0	7.0	12.6	7.3

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	79.3		
.5"	73.5		
.375"	66.0		
#4	50.7		
#10	35.9		
#20	31.3		
#40	26.9		
#60	24.3		
#100	22.0		
#200	19.9		
0.0429 mm.	19.0		
0.0311 mm.	17.3		
0.0205 mm.	14.2		
0.0123 mm.	11.0		
0.0089 mm.	9.3		
0.0064 mm.	7.8		
0.0045 mm.	7.1		
0.0032 mm.	6.2		
0.0014 mm.	4.8		

* (no specification provided)

Material Description

Dark brown silty gravel with sand and organic fines

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 22.5363 D_{85}= 21.0613 D_{60}= 7.5599
D_{50}= 4.5892 D_{30}= 0.6797 D_{15}= 0.0229
D_{10}= 0.0100 C_u= 752.85 C_c= 6.09

Remarks

As received MC = 15.9%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

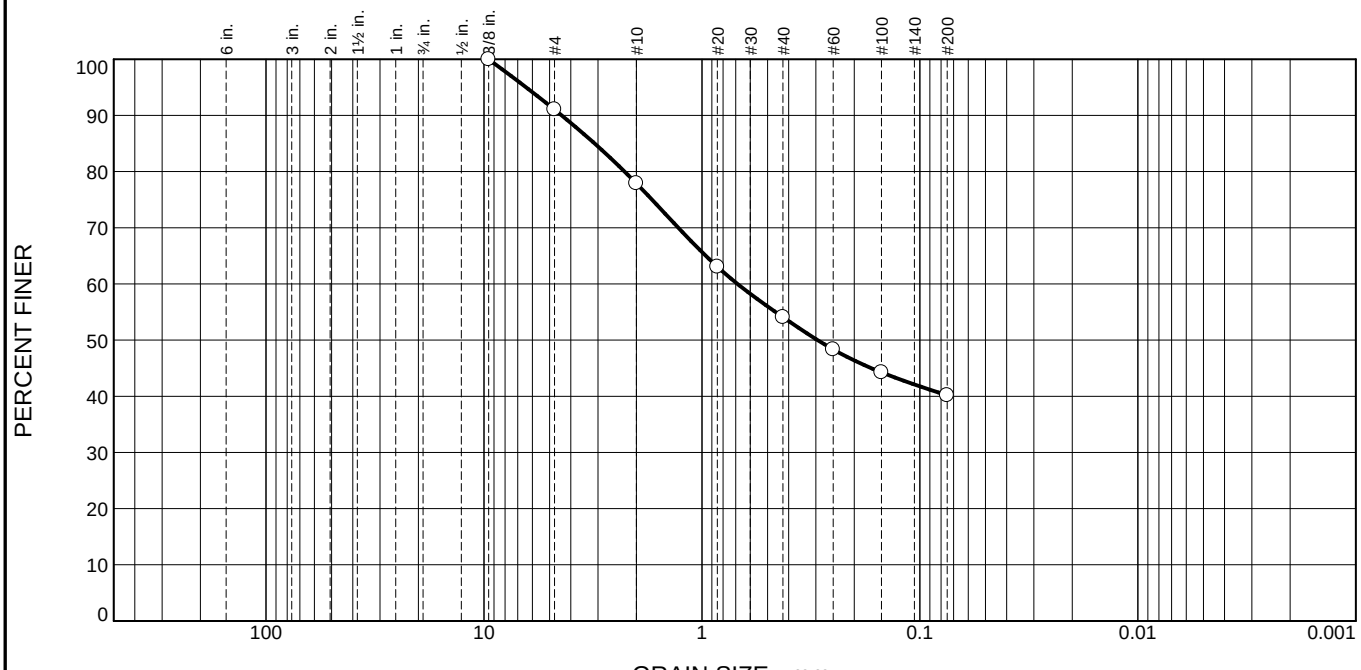
Source of Sample: UPB-GEO-01 **Depth:** 0-2' **Date Sampled:** 9/14/18
Sample Number: S-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.0	13.1	23.8	13.9	40.2	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375"	100.0		
#4	91.0		
#10	77.9		
#20	63.1		
#40	54.1		
#60	48.3		
#100	44.3		
#200	40.2		

* (no specification provided)

Material Description

Dark brown peat

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM/PT **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 4.3991 D_{85}= 3.1086 D_{60}= 0.6867
D_{50}= 0.2951 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 150.6%

Date Received: 11/1/18 **Date Tested:** 11/7/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

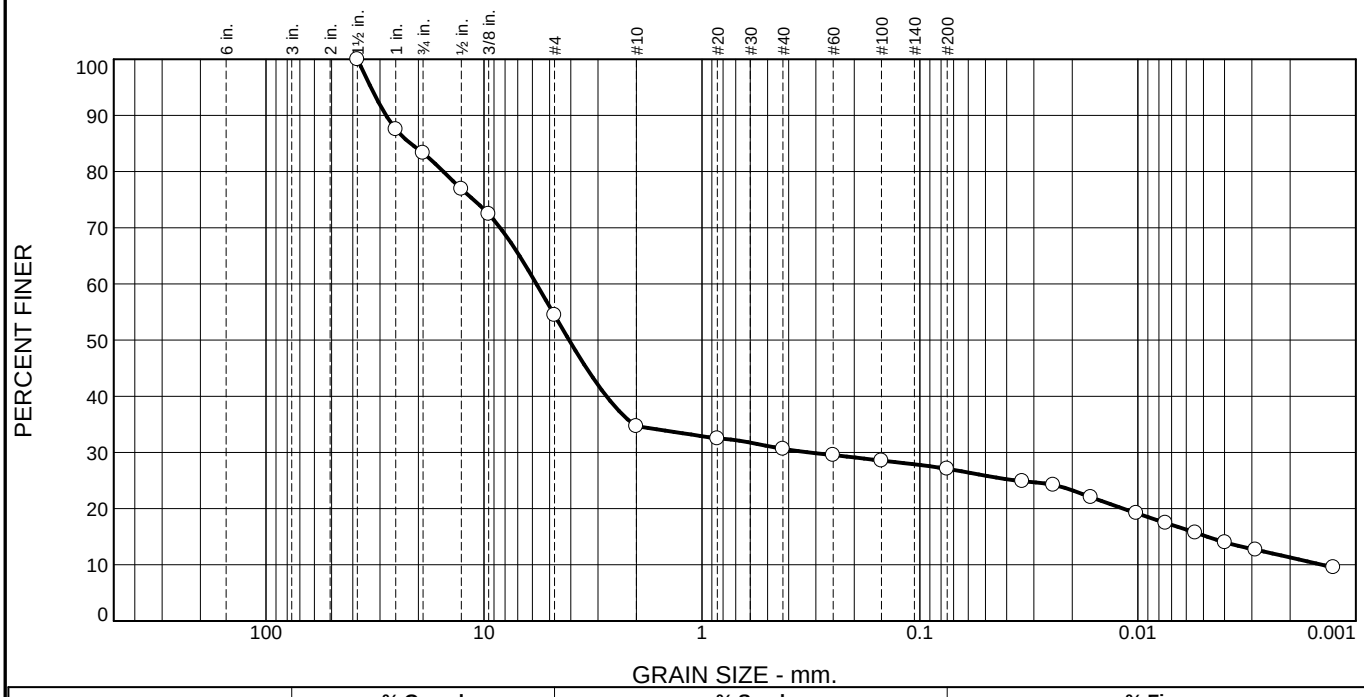
Source of Sample: UPB-GEO-01 **Depth:** 4-6' **Date Sampled:** 9/14/18
Sample Number: S-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.7	28.8	19.8	4.1	3.5	11.9	15.2

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	87.5		
.75"	83.3		
.5"	76.9		
.375"	72.4		
#4	54.5		
#10	34.7		
#20	32.5		
#40	30.6		
#60	29.5		
#100	28.5		
#200	27.1		
0.0339 mm.	24.9		
0.0244 mm.	24.2		
0.0164 mm.	22.0		
0.0102 mm.	19.2		
0.0075 mm.	17.5		
0.0055 mm.	15.7		
0.0040 mm.	14.0		
0.0029 mm.	12.7		
0.0013 mm.	9.5		

* (no specification provided)

Material Description

Brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 22 **LL=** 40 **PI=** 18

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-2-6(1)

Coefficients

D_{90}= 28.1380 D_{85}= 21.7119 D_{60}= 5.7435
D_{50}= 4.0680 D_{30}= 0.3235 D_{15}= 0.0048
D_{10}= 0.0014 C_u= 4019.99 C_c= 12.75

Remarks

As received MC = 24.9%

Date Received: 11/16/18 **Date Tested:** 11/21/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

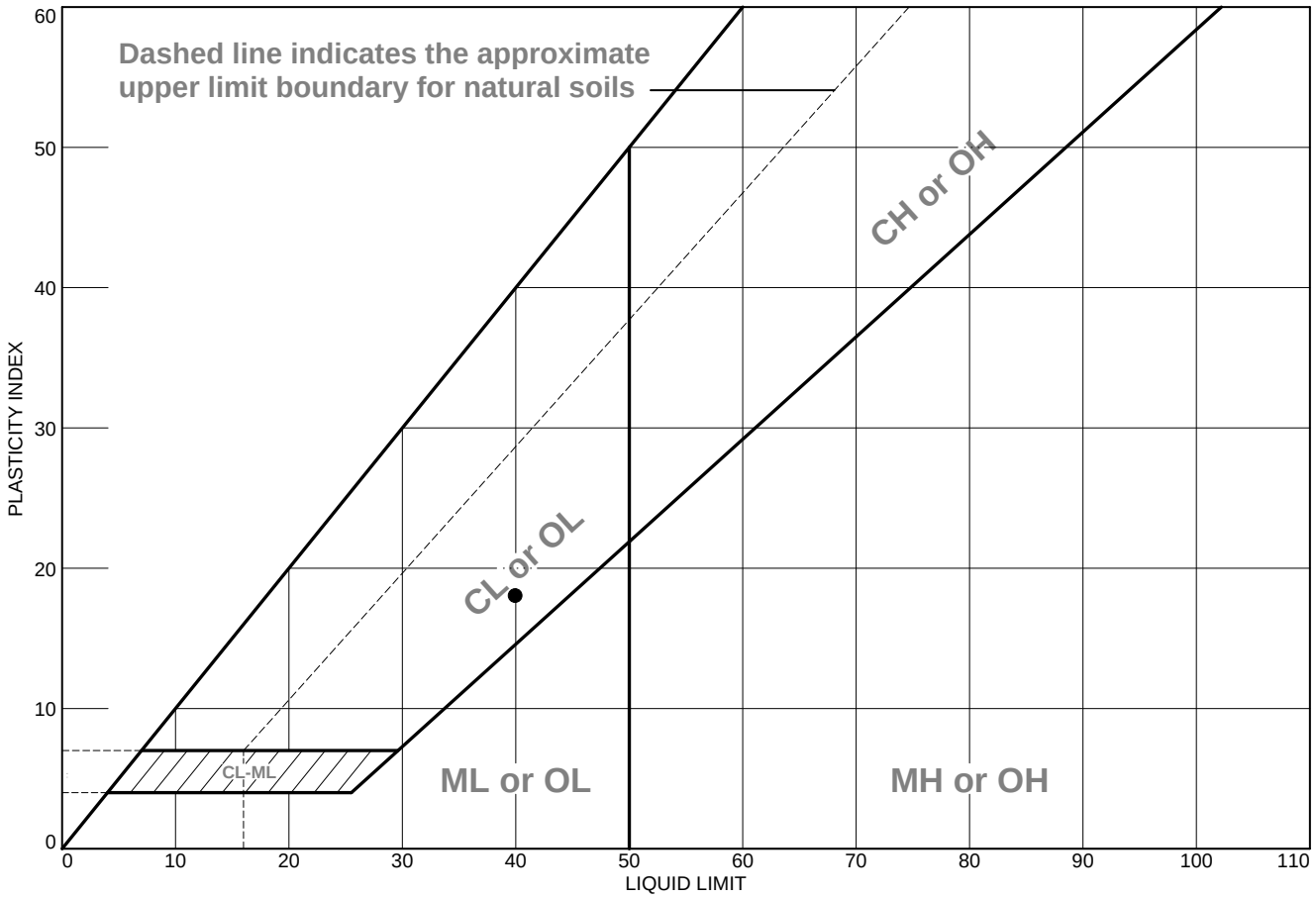
Source of Sample: 198-TP-01 **Depth:** 4.3-4.5' **Date Sampled:** 10/2/18
Sample Number: G-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown clayey gravel with sand	10/2/18	11/27/18	MP	40	22	18	30.6	GC

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek

Lockport, NY

○**Source of Sample:** 198-TP-01 **Depth:** 4.3-4.5' **Sample Number:** G-1

CDM Smith

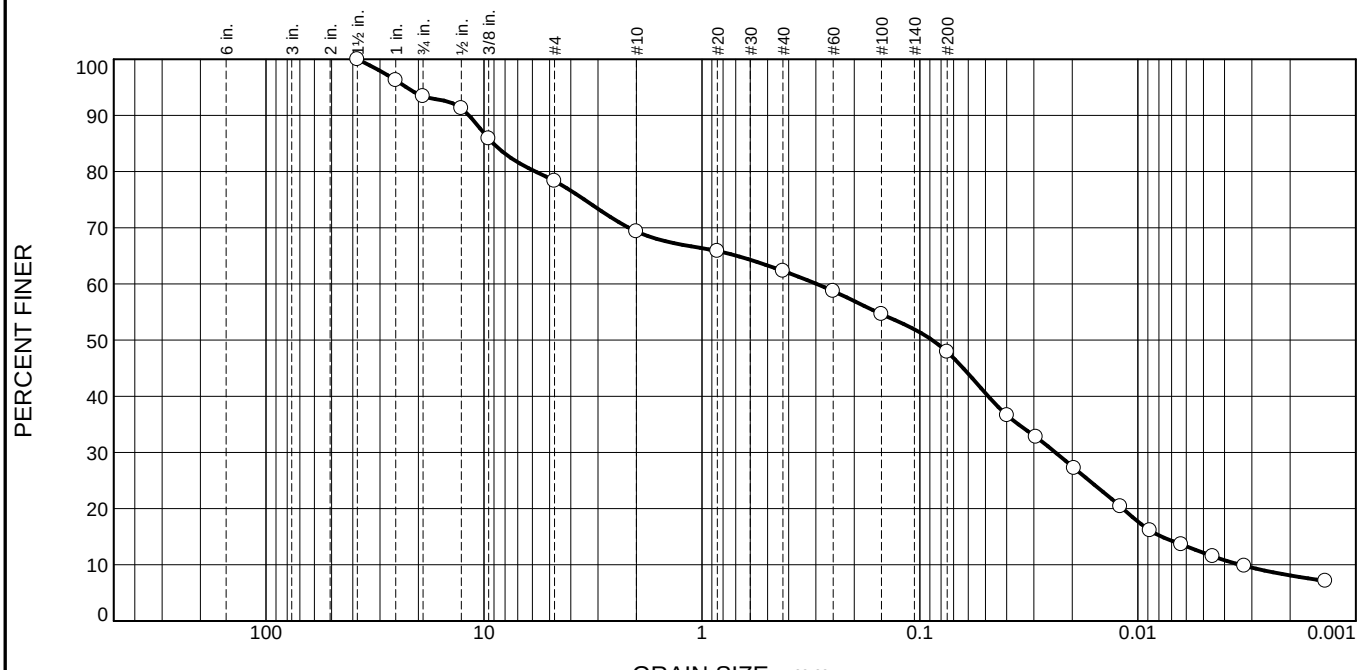
Boston, Massachusetts

Checked by: MP

Title: Laboratory Manager

Tested By: MP **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.6	15.1	9.0	7.0	14.4	35.8	12.1

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	96.3		
.75"	93.4		
.5"	91.3		
.375"	85.9		
#4	78.3		
#10	69.3		
#20	65.9		
#40	62.3		
#60	58.7		
#100	54.6		
#200	47.9		
0.0398 mm.	36.6		
0.0293 mm.	32.8		
0.0196 mm.	27.2		
0.0120 mm.	20.4		
0.0088 mm.	16.1		
0.0063 mm.	13.6		
0.0045 mm.	11.5		
0.0032 mm.	9.8		
0.0014 mm.	7.1		

* (no specification provided)

Material Description

Red-brown clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-6(4)

Coefficients

D_{90}= 11.7115 D_{85}= 9.0595 D_{60}= 0.2976
D_{50}= 0.0877 D_{30}= 0.0239 D_{15}= 0.0078
D_{10}= 0.0034 C_u= 87.87 C_c= 0.57

Remarks

As received MC = 13.3%

Date Received: 11/16/18 **Date Tested:** 11/21/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

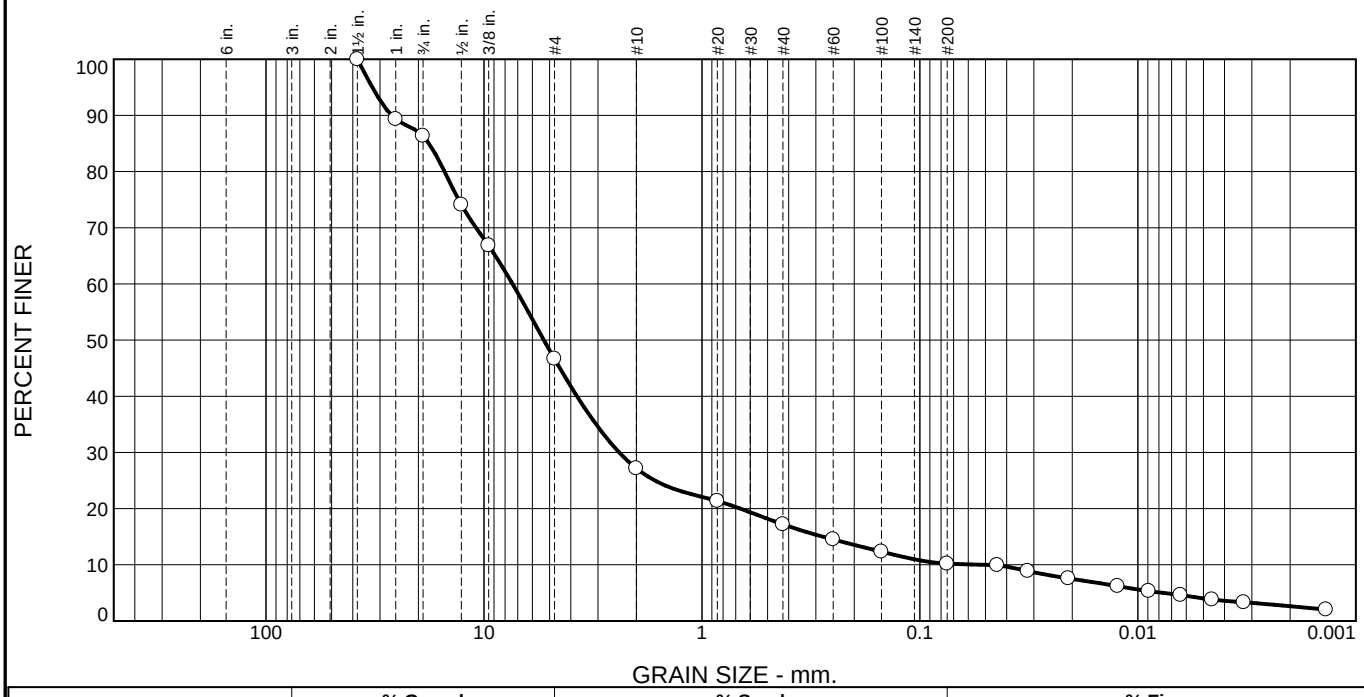
Source of Sample: 198-TP-01 **Depth:** 6.2-6.3' **Date Sampled:** 10/2/18
Sample Number: G-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.7	39.6	19.5	10.0	7.0	6.2	4.0

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	89.3		
.75"	86.3		
.5"	74.1		
.375"	66.8		
#4	46.7		
#10	27.2		
#20	21.3		
#40	17.2		
#60	14.5		
#100	12.3		
#200	10.2		
0.0442 mm.	9.9		
0.0320 mm.	8.9		
0.0208 mm.	7.6		
0.0124 mm.	6.2		
0.0089 mm.	5.3		
0.0064 mm.	4.6		
0.0046 mm.	3.8		
0.0033 mm.	3.3		
0.0014 mm.	2.0		

* (no specification provided)

Material Description

Brown poorly graded gravel with silt and sand
Sample contains metal and rubbish.

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP-GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 26.5410 D_{85}= 17.8836 D_{60}= 7.3996
D_{50}= 5.3111 D_{30}= 2.3977 D_{15}= 0.2787
D_{10}= 0.0509 C_u= 145.25 C_c= 15.25

Remarks

As received MC = 21.1%

Date Received: 11/16/18 **Date Tested:** 11/20/18
Tested By: AS/MP
Checked By: MP
Title: Laboratory Manager

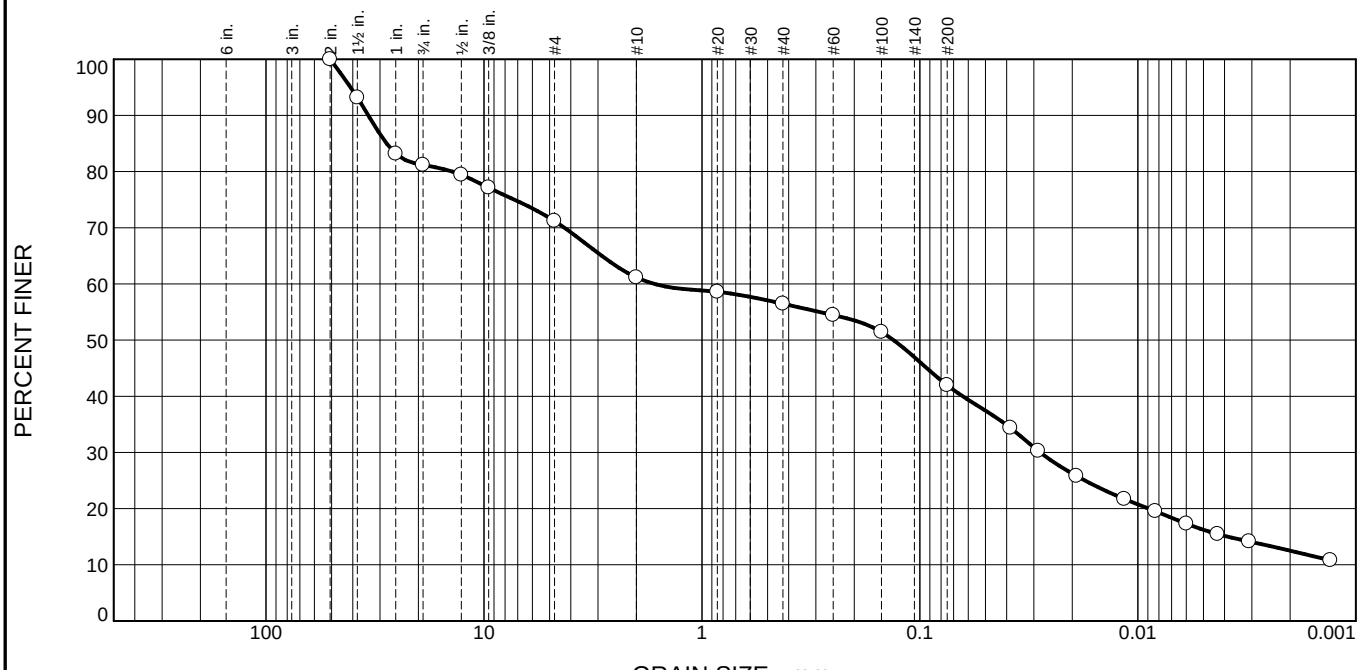
Source of Sample: 300-TP-01 **Depth:** 2.5-2.8' **Date Sampled:** 10/3/18
Sample Number: G-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.8	10.0	10.0	4.7	14.5	25.8	16.2

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1.5"	93.2		
1"	83.2		
.75"	81.2		
.5"	79.4		
.375"	77.1		
#4	71.2		
#10	61.2		
#20	58.6		
#40	56.5		
#60	54.5		
#100	51.4		
#200	42.0		
0.0384 mm.	34.4		
0.0287 mm.	30.3		
0.0191 mm.	25.8		
0.0115 mm.	21.7		
0.0083 mm.	19.5		
0.0060 mm.	17.3		
0.0043 mm.	15.5		
0.0031 mm.	14.2		
0.0013 mm.	10.8		

* (no specification provided)

Material Description

Red-brown silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 33.9557 D_{85}= 27.9752 D_{60}= 1.6550
D_{50}= 0.1320 D_{30}= 0.0281 D_{15}= 0.0039
D_{10}= C_u= C_c=

Remarks

As received MC = 12.5%

Date Received: 11/16/18 **Date Tested:** 11/20/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

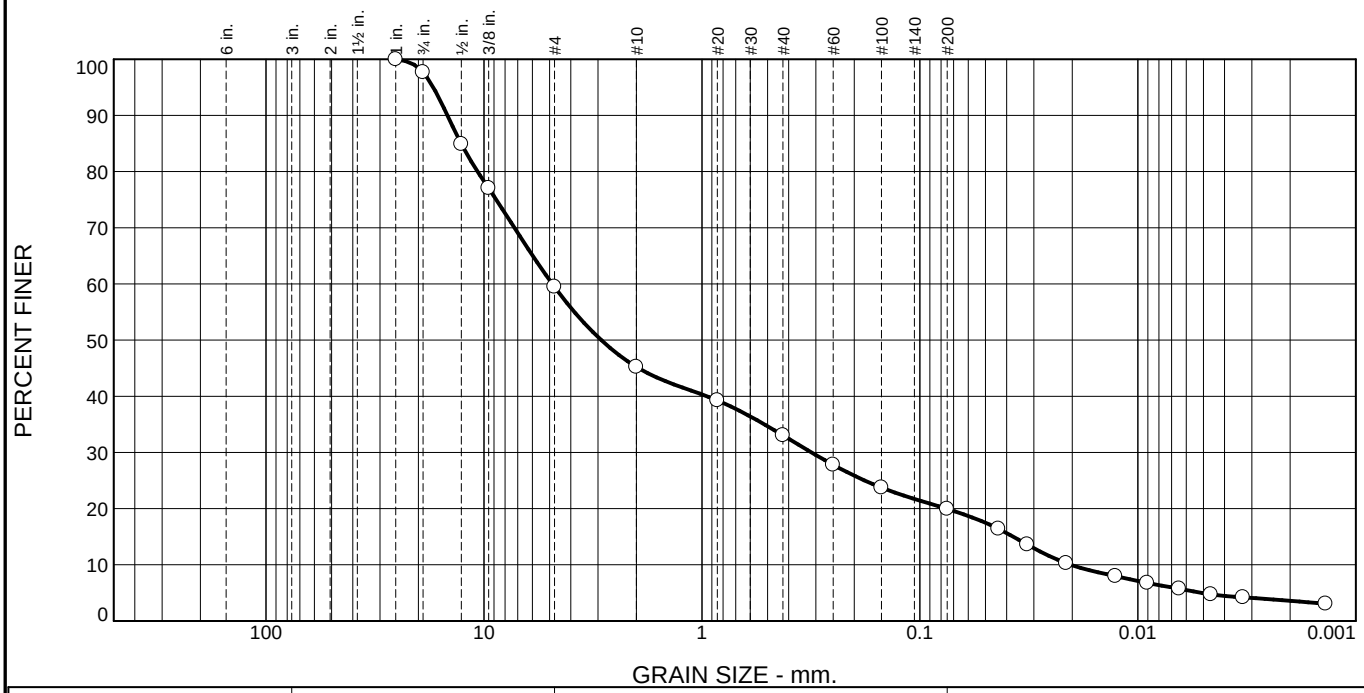
Source of Sample: 300-TP-01 **Depth:** 5.5-5.7' **Date Sampled:** 10/3/18
Sample Number: G-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.3	38.2	14.3	12.2	13.1	15.0	4.9

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	97.7		
.5"	84.9		
.375"	77.1		
#4	59.5		
#10	45.2		
#20	39.3		
#40	33.0		
#60	27.8		
#100	23.7		
#200	19.9		
0.0436 mm.	16.4		
0.0322 mm.	13.6		
0.0213 mm.	10.3		
0.0127 mm.	8.0		
0.0091 mm.	6.8		
0.0065 mm.	5.7		
0.0046 mm.	4.7		
0.0033 mm.	4.2		
0.0014 mm.	3.1		

* (no specification provided)

Material Description

Dark brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 14.7154 D_{85}= 12.7386 D_{60}= 4.8584
D_{50}= 2.8970 D_{30}= 0.3145 D_{15}= 0.0373
D_{10}= 0.0203 C_u= 239.05 C_c= 1.00

Remarks

As received MC = 18.7%

Date Received: 11/16/18 **Date Tested:** 11/20/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

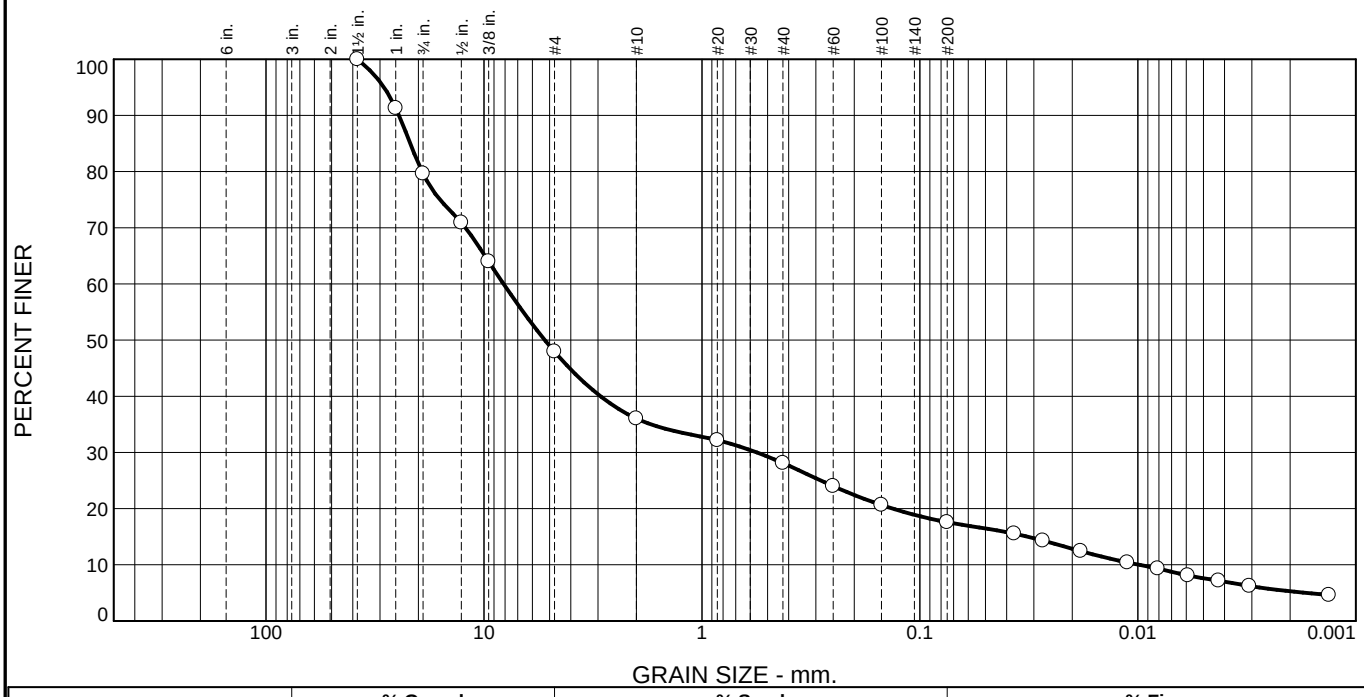
Source of Sample: 300-TP-02 **Depth:** 2-2.3' **Date Sampled:** 10/3/18
Sample Number: G-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.3	31.8	11.9	7.9	10.5	10.0	7.6

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	91.3		
.75"	79.7		
.5"	70.9		
.375"	64.0		
#4	47.9		
#10	36.0		
#20	32.2		
#40	28.1		
#60	24.0		
#100	20.6		
#200	17.6		
0.0369 mm.	15.6		
0.0273 mm.	14.3		
0.0183 mm.	12.4		
0.0112 mm.	10.4		
0.0081 mm.	9.3		
0.0059 mm.	8.1		
0.0043 mm.	7.2		
0.0031 mm.	6.2		
0.0013 mm.	4.6		

* (no specification provided)

Material Description

Brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 24.5306 D_{85}= 21.7813 D_{60}= 8.1332
D_{50}= 5.2599 D_{30}= 0.5606 D_{15}= 0.0320
D_{10}= 0.0099 C_u= 824.79 C_c= 3.92

Remarks

As received MC = 17.1%

Date Received: 11/16/18 **Date Tested:** 11/21/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

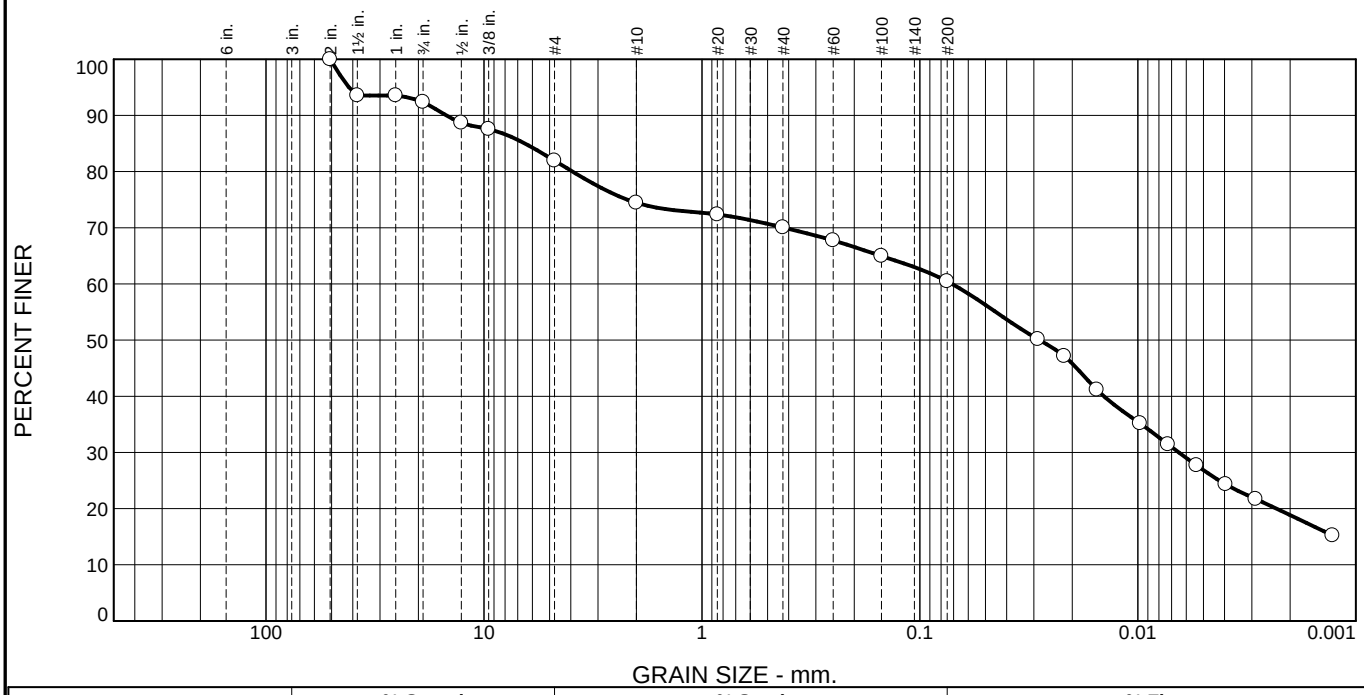
Source of Sample: 300-TP-02 **Depth:** 12.3-12.5' **Date Sampled:** 10/3/18
Sample Number: G-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.6	10.4	7.5	4.5	9.5	33.7	26.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1.5"	93.6		
1"	93.6		
.75"	92.4		
.5"	88.7		
.375"	87.6		
#4	82.0		
#10	74.5		
#20	72.4		
#40	70.0		
#60	67.7		
#100	65.0		
#200	60.5		
0.0288 mm.	50.2		
0.0218 mm.	47.2		
0.0154 mm.	41.2		
0.0098 mm.	35.2		
0.0073 mm.	31.4		
0.0054 mm.	27.7		
0.0040 mm.	24.3		
0.0029 mm.	21.7		
0.0013 mm.	15.2		

* (no specification provided)

Material Description

Dark brown sandy silt with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 14.8929 D_{85}= 6.4926 D_{60}= 0.0712
D_{50}= 0.0283 D_{30}= 0.0065 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 31.7%

Date Received: 11/16/18 **Date Tested:** 11/21/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

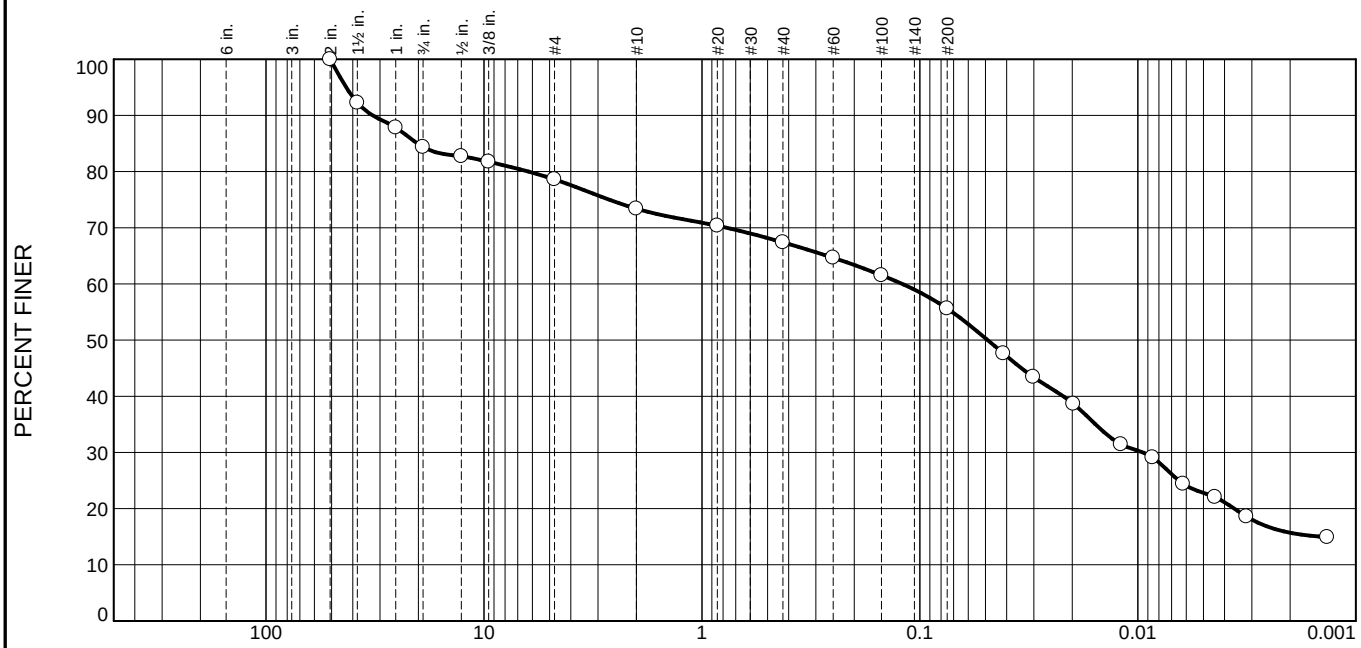
Source of Sample: 300-TP-03 **Depth:** 0-2.8' **Date Sampled:** 10/2/18
Sample Number: G-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.6	5.8	5.2	6.0	11.8	32.8	22.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1.5"	92.2		
1"	87.8		
.75"	84.4		
.5"	82.7		
.375"	81.8		
#4	78.6		
#10	73.4		
#20	70.4		
#40	67.4		
#60	64.7		
#100	61.5		
#200	55.6		
0.0414 mm.	47.6		
0.0302 mm.	43.4		
0.0198 mm.	38.6		
0.0119 mm.	31.4		
0.0086 mm.	29.1		
0.0062 mm.	24.4		
0.0044 mm.	22.1		
0.0032 mm.	18.6		
0.0014 mm.	14.9		

* (no specification provided)

Material Description

Red-brown sandy lean clay with gravel

Atterberg Limits (ASTM D 4318)

PL= 24 **LL=** 39 **PI=** 15

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(6)

Coefficients

D_{90}= 32.4474 D_{85}= 20.2035 D_{60}= 0.1206
D_{50}= 0.0489 D_{30}= 0.0095 D_{15}= 0.0015
D_{10}= C_u= C_c=

Remarks

As received MC = 21.1%

Date Received: 11/16/18 **Date Tested:** 11/27/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

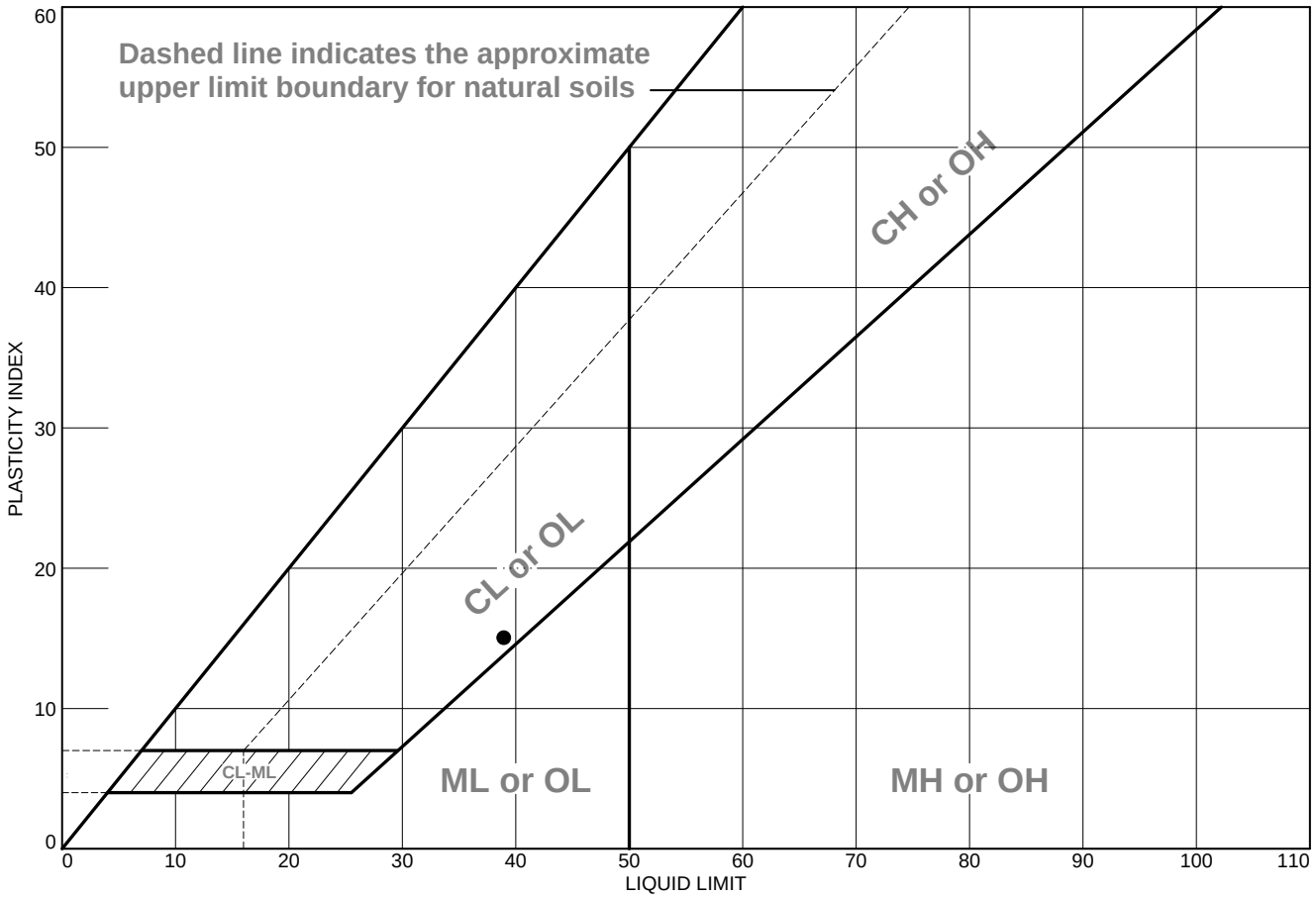
Source of Sample: 300-TP-03 **Depth:** 2.8-5.8' **Date Sampled:** 10/2/18
Sample Number: G-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Red-brown sandy lean clay with gravel	10/2/18	11/27/18	MP	39	24	15	67.4	CL

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** 300-TP-03 **Depth:** 2.8-5.8' **Sample Number:** G-2

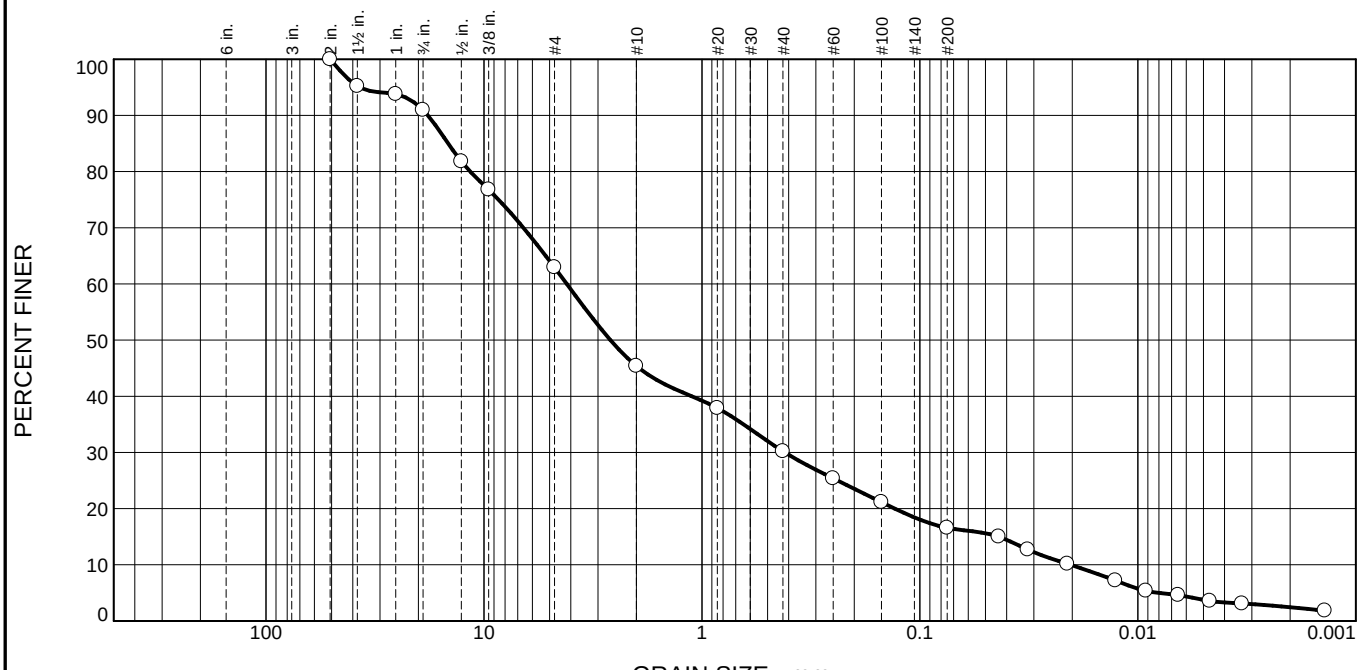
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: MP **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.0	28.1	17.5	15.2	13.6	12.8	3.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1.5"	95.2		
1"	93.8		
.75"	91.0		
.5"	81.8		
.375"	76.8		
#4	62.9		
#10	45.4		
#20	37.9		
#40	30.2		
#60	25.4		
#100	21.1		
#200	16.6		
0.0435 mm.	15.0		
0.0320 mm.	12.7		
0.0210 mm.	10.2		
0.0127 mm.	7.2		
0.0092 mm.	5.4		
0.0065 mm.	4.6		
0.0047 mm.	3.6		
0.0033 mm.	3.1		
0.0014 mm.	1.8		

* (no specification provided)

Material Description

Dark brown silty sand with gravel
Sample contains slag, glass and metal.

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 18.0942 D_{85}= 14.5913 D_{60}= 4.1713
D_{50}= 2.6286 D_{30}= 0.4168 D_{15}= 0.0435
D_{10}= 0.0204 C_u= 204.48 C_c= 2.04

Remarks

As received MC = 14.5%

Date Received: 11/16/18 **Date Tested:** 11/20/18
Tested By: AS/MP
Checked By: MP
Title: Laboratory Manager

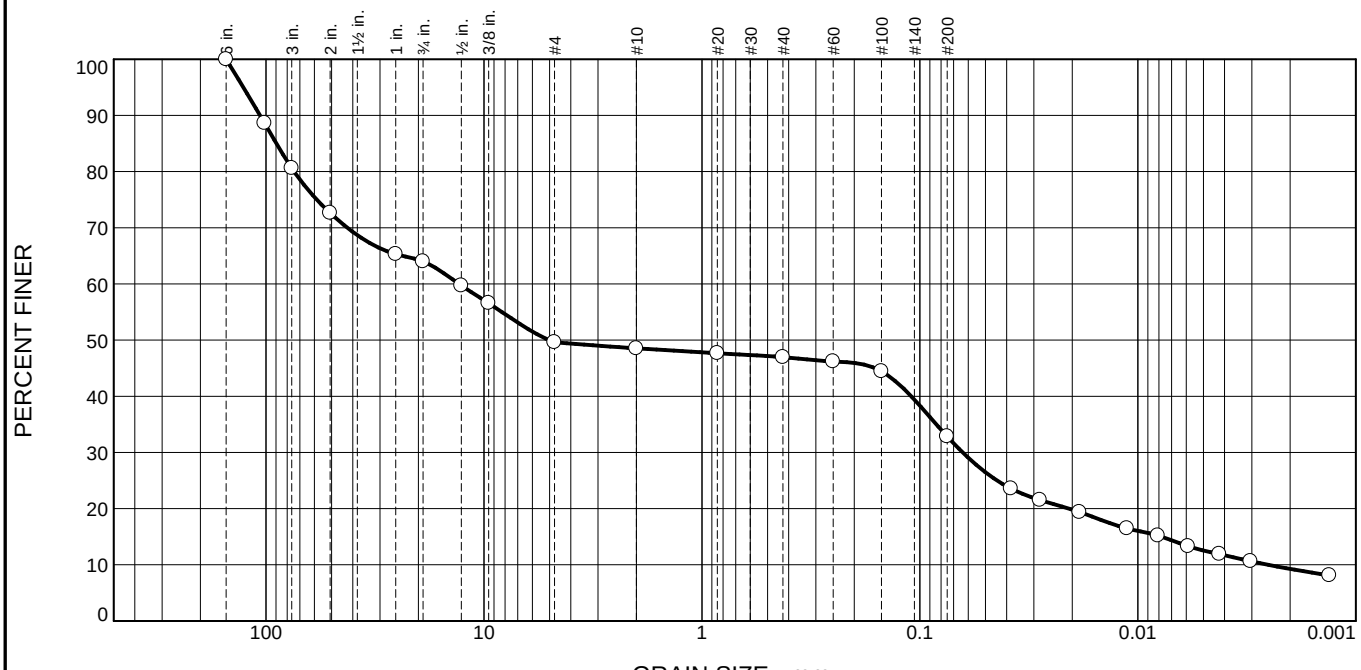
Source of Sample: 300-TP-04 **Depth:** 9-9.2' **Date Sampled:** 10/2/18
Sample Number: G-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
19.4	16.6	14.4	1.1	1.5	14.2	20.3	12.5

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
6"	100.0		
4"	88.6		
3"	80.6		
2"	72.6		
1"	65.3		
.75"	64.0		
.5"	59.7		
.375"	56.6		
#4	49.6		
#10	48.5		
#20	47.7		
#40	47.0		
#60	46.2		
#100	44.4		
#200	32.8		
0.0382 mm.	23.6		
0.0281 mm.	21.5		
0.0185 mm.	19.4		
0.0112 mm.	16.5		
0.0081 mm.	15.2		
0.0059 mm.	13.3		
0.0042 mm.	11.9		
0.0030 mm.	10.6		
0.0013 mm.	8.1		

* (no specification provided)

Material Description

Red-brown silty clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 18 **LL=** 22 **PI=** 4

Classification

USCS (D 2487)= GC-GM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 106.5684 D_{85}= 89.6190 D_{60}= 13.0211
D_{50}= 5.0276 D_{30}= 0.0636 D_{15}= 0.0078
D_{10}= 0.0025 C_u= 5146.07 C_c= 0.12

Remarks

As received MC = 11.2%

Date Received: 11/16/18 **Date Tested:** 11/29/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

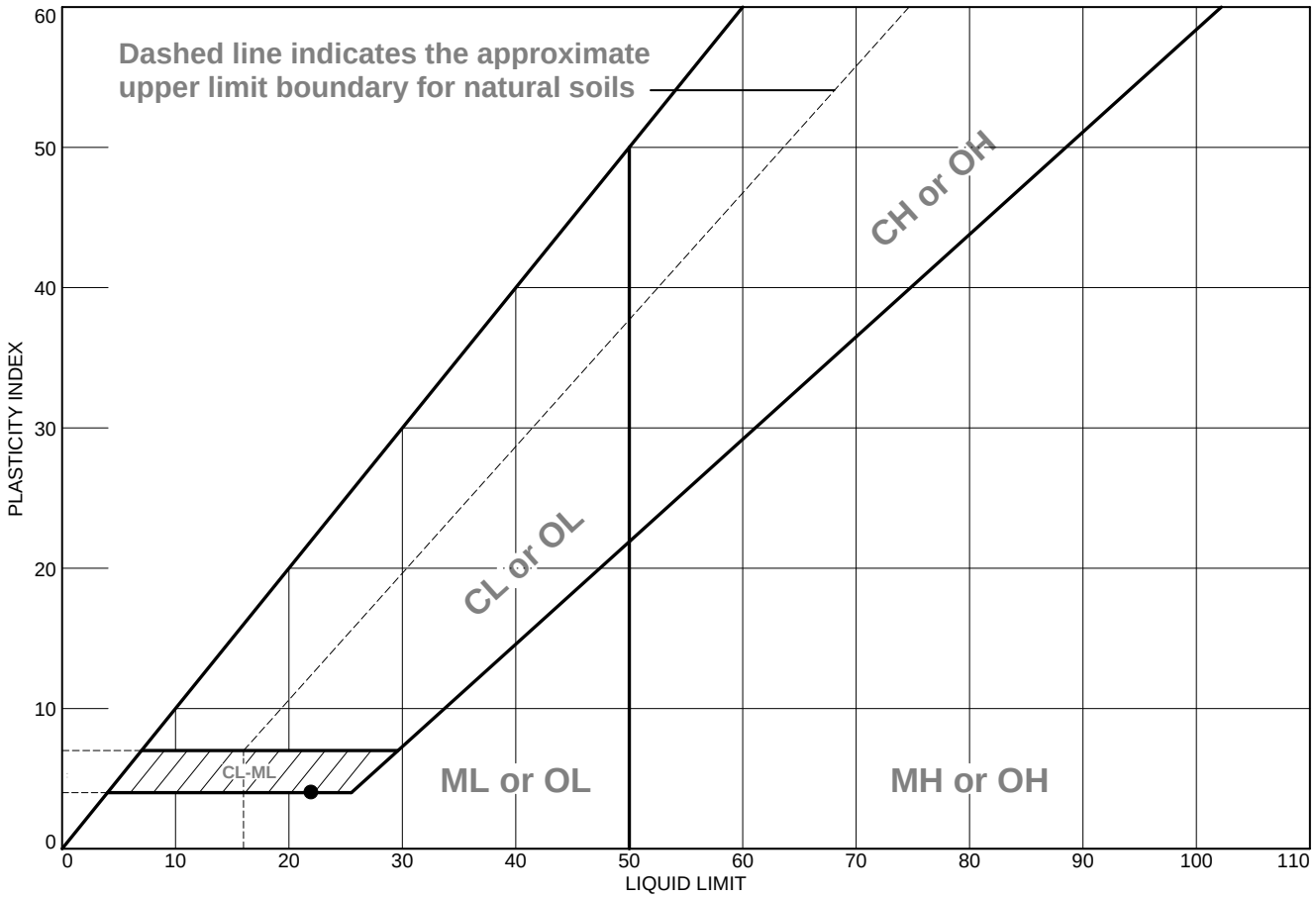
Source of Sample: 300-TP-04 **Depth:** 11.8-12' **Date Sampled:** 10/2/18
Sample Number: G-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Red-brown silty clayey gravel with sand	10/2/18	11/29/18	MP	22	18	4	47.0	GC-GM

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** 300-TP-04 **Depth:** 11.8-12' **Sample Number:** G-3

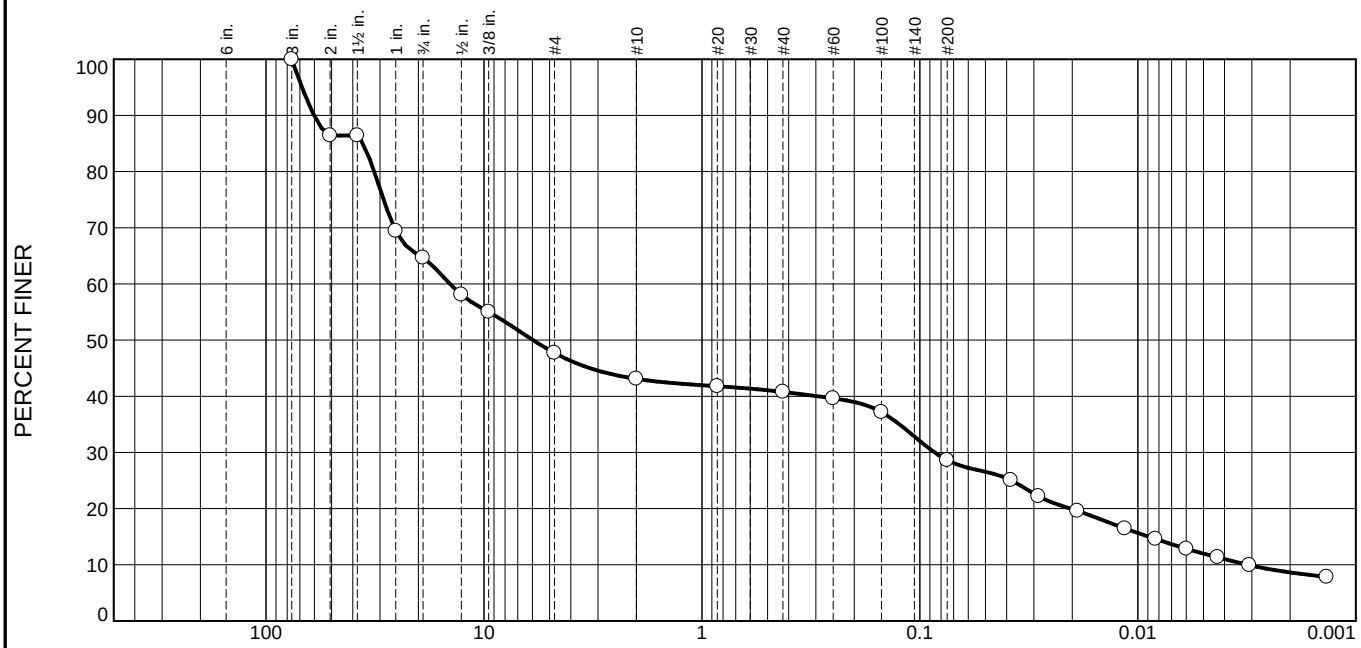
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: MP **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	35.3	17.0	4.6	2.3	12.2	16.6	12.0

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	86.4		
1.5"	86.4		
1"	69.4		
.75"	64.7		
.5"	58.1		
.375"	55.0		
#4	47.7		
#10	43.1		
#20	41.8		
#40	40.8		
#60	39.6		
#100	37.2		
#200	28.6		
0.0383 mm.	25.1		
0.0286 mm.	22.2		
0.0189 mm.	19.6		
0.0115 mm.	16.5		
0.0083 mm.	14.6		
0.0060 mm.	12.8		
0.0043 mm.	11.3		
0.0031 mm.	9.9		
0.0014 mm.	7.8		

* (no specification provided)

Material Description

Dark brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 60.2654 D_{85}= 35.9717 D_{60}= 14.3060
D_{50}= 5.9558 D_{30}= 0.0856 D_{15}= 0.0089
D_{10}= 0.0031 C_u= 4559.29 C_c= 0.16

Remarks

As received MC = 28.5%

Date Received: 11/16/18 **Date Tested:** 11/28/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

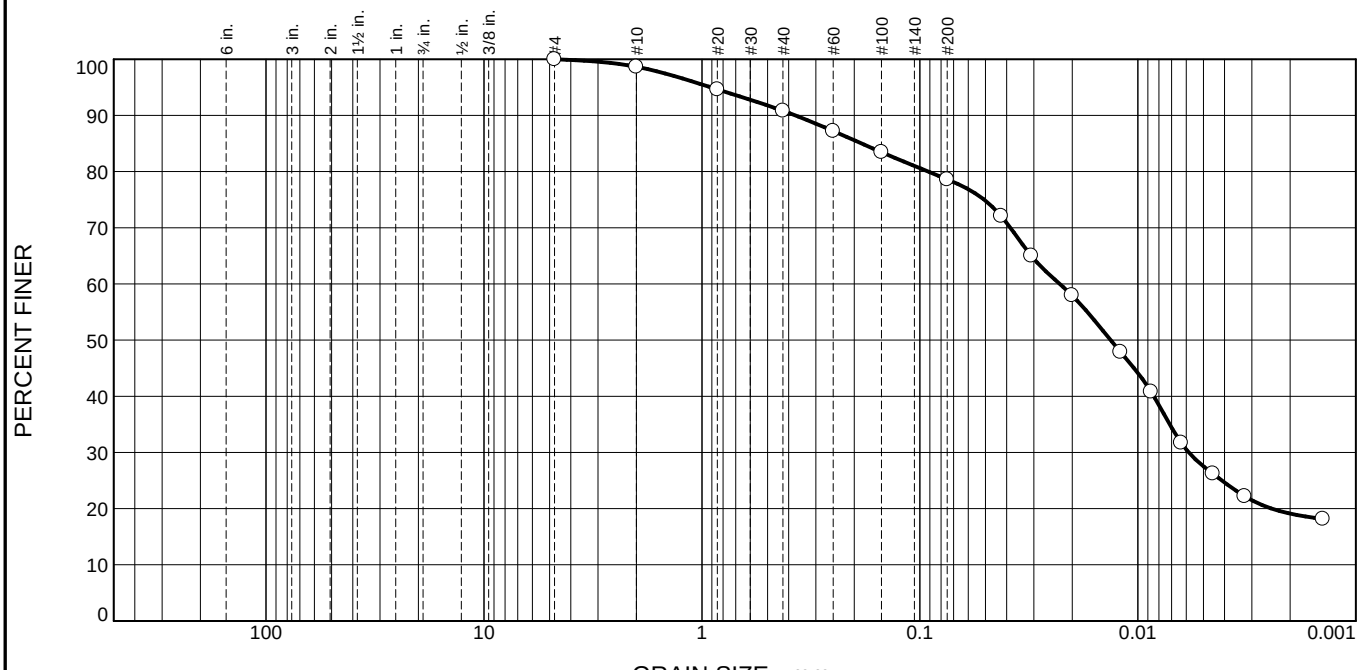
Source of Sample: 300-TP-05 **Depth:** 1-2' **Date Sampled:** 10/2/18
Sample Number: G-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.3	7.9	12.2	51.1	27.5

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	98.7		
#20	94.6		
#40	90.8		
#60	87.2		
#100	83.5		
#200	78.6		
0.0424 mm.	72.1		
0.0309 mm.	65.0		
0.0201 mm.	58.0		
0.0120 mm.	47.9		
0.0087 mm.	40.8		
0.0063 mm.	31.7		
0.0045 mm.	26.2		
0.0032 mm.	22.2		
0.0014 mm.	18.2		

* (no specification provided)

Material Description

Dark brown organic silt with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.3733 D_{85}= 0.1852 D_{60}= 0.0228
D_{50}= 0.0133 D_{30}= 0.0058 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 95.5%

Date Received: 11/16/18 **Date Tested:** 11/28/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

Source of Sample: 300-TP-06 **Depth:** 2.5-4' **Date Sampled:** 10/16/18
Sample Number: SH-5

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

CDM Smith

Geotechnical Engineering Laboratory

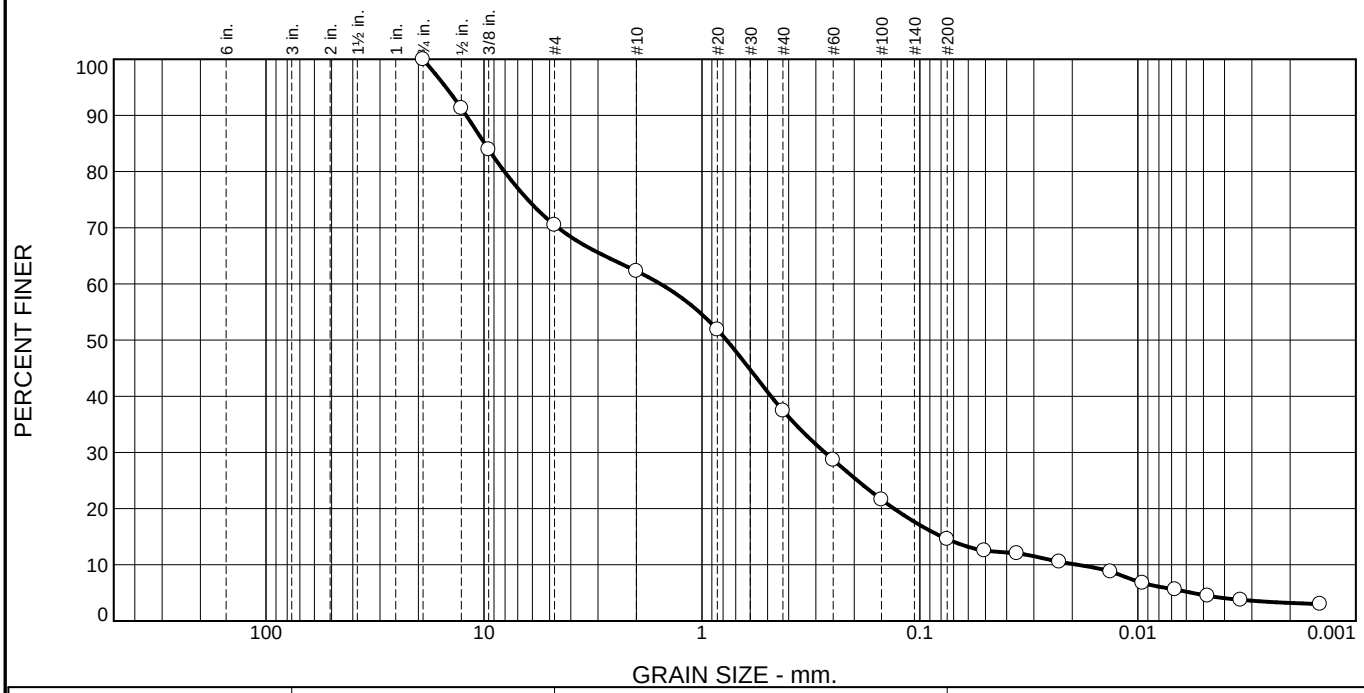
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	MP
Project Location:	Lockport, NY	Test Date:	11/27/2018
Project Number:	51147-223203		
Boring Number:	300-TP-06	Procedure:	C
Sample Number:	SH-5	Temperature:	440° C
Sample Depth (ft):	2.5-4'		
Sample Date:	10/16/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	85.08
Wet Mass of Sample & Tin (g)	170.84
Dry Mass of Sample & Tin (g)	128.94
Mass of Water (g)	41.90
Mass of Dry Soil (g)	43.86
Moisture Content (%)	**95.5**

ASH CONTENT	
Porcelain Dish Mass (g)	85.08
Porcelain Dish + Oven Dried Soil (g)	128.94
Mass of Oven Dried Soil (g)	43.86
Mass of Dish & Burned Soil (g)	119.90
Mass of Burned Soil (g)	34.82
Mass of Organic Material (g)	9.04
Ash Content (%)	79.4
Organic Content (%)	**20.6**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	29.5	8.2	24.9	22.8	10.0	4.6

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	91.3		
.375"	83.9		
#4	70.5		
#10	62.3		
#20	51.9		
#40	37.4		
#60	28.7		
#100	21.6		
#200	14.6		
0.0507 mm.	12.5		
0.0359 mm.	12.0		
0.0229 mm.	10.5		
0.0134 mm.	8.8		
0.0095 mm.	6.8		
0.0068 mm.	5.6		
0.0048 mm.	4.5		
0.0034 mm.	3.8		
0.0015 mm.	3.0		

* (no specification provided)

Material Description

Brown silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 12.0527 D_{85}= 9.9294 D_{60}= 1.5500
D_{50}= 0.7708 D_{30}= 0.2731 D_{15}= 0.0792
D_{10}= 0.0189 C_u= 81.90 C_c= 2.54

Remarks

As received MC = 26.9%

Date Received: 11/16/18 **Date Tested:** 11/28/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

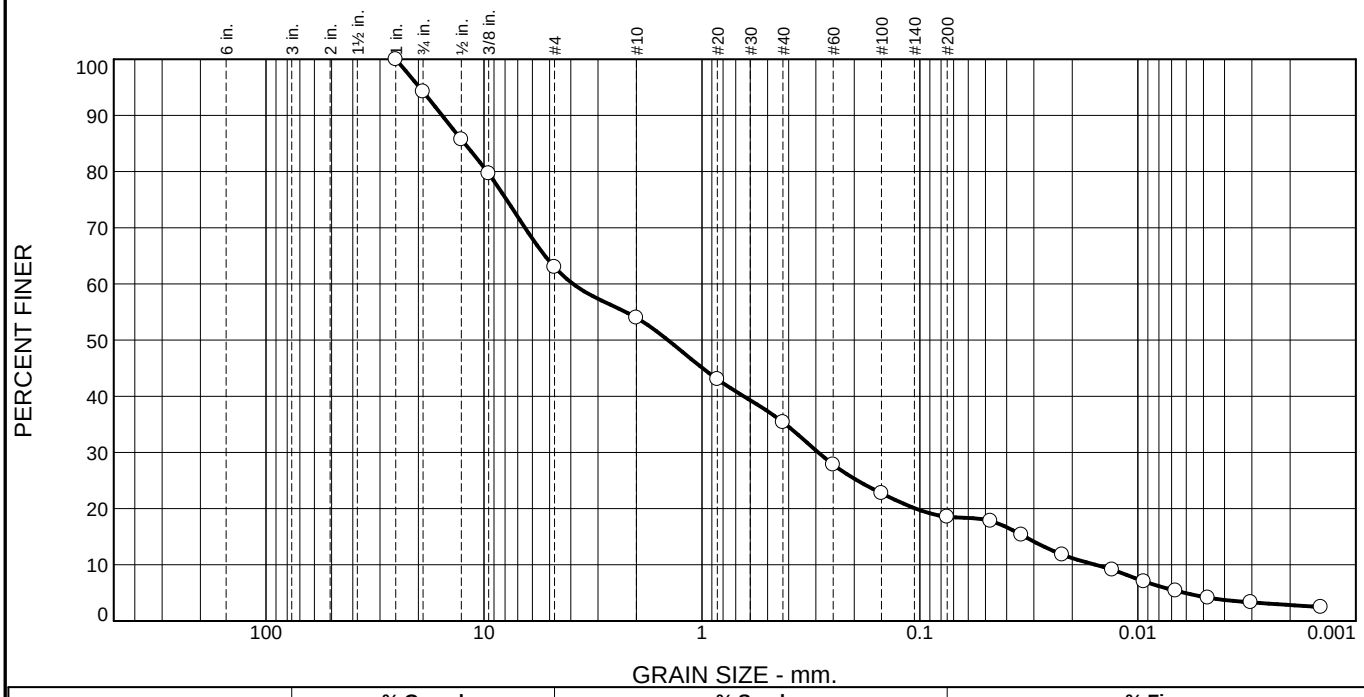
Source of Sample: 300-TP-06 **Depth:** 7.5-8' **Date Sampled:** 10/16/18
Sample Number: SH-8

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.8	31.2	9.0	18.6	16.8	14.3	4.3

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	94.2		
.5"	85.7		
.375"	79.7		
#4	63.0		
#10	54.0		
#20	43.0		
#40	35.4		
#60	27.8		
#100	22.7		
#200	18.6		
0.0475 mm.	17.8		
0.0342 mm.	15.3		
0.0223 mm.	11.8		
0.0131 mm.	9.1		
0.0094 mm.	7.0		
0.0067 mm.	5.4		
0.0048 mm.	4.1		
0.0030 mm.	3.3		
0.0014 mm.	2.5		

* (no specification provided)

Material Description

Dark brown silty sand with gravel
Sample contains slag.

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 15.5696 D_{85}= 12.2656 D_{60}= 3.9005
D_{50}= 1.4317 D_{30}= 0.2926 D_{15}= 0.0330
D_{10}= 0.0156 C_u= 249.39 C_c= 1.40

Remarks

As received MC = 31.5%

Date Received: 11/16/18 **Date Tested:** 11/19/18
Tested By: AS/MP
Checked By: MP
Title: Laboratory Manager

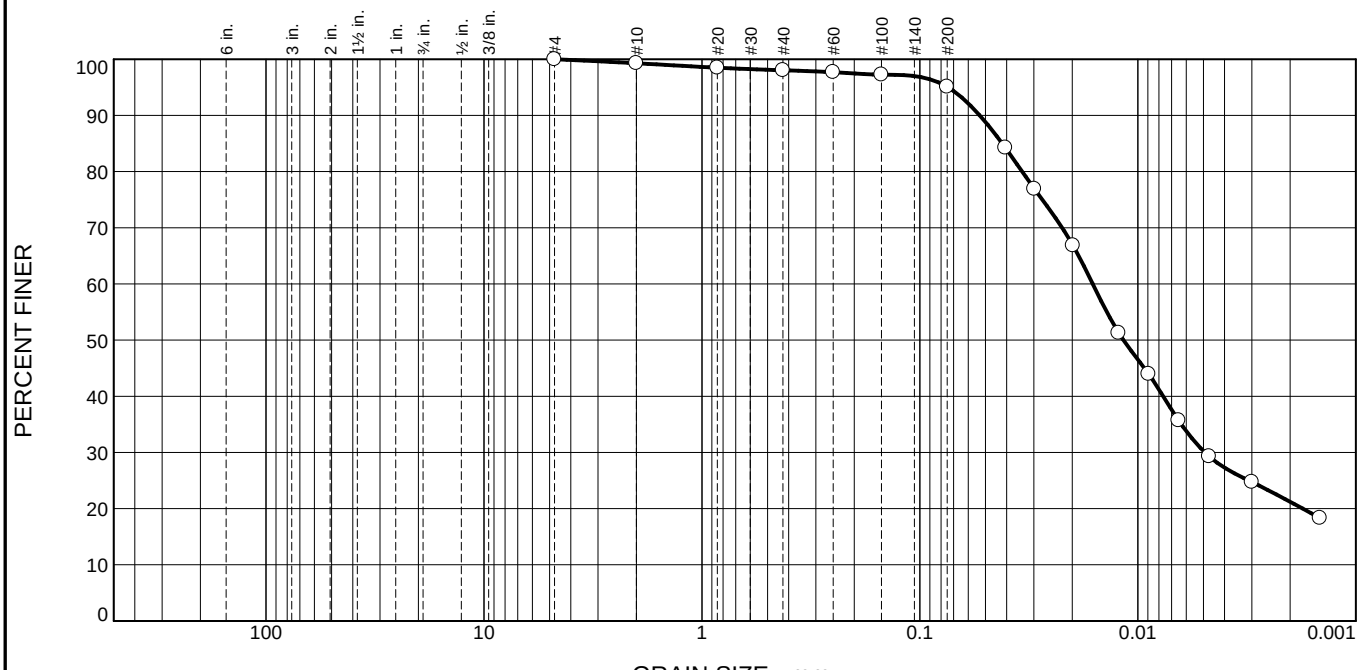
Source of Sample: UBP-SB02 **Depth:** 0-2.75' **Date Sampled:** 10/11/18
Sample Number: GP-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.7	1.3	2.9	64.8	30.3

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.3		
#20	98.5		
#40	98.0		
#60	97.7		
#100	97.3		
#200	95.1		
0.0406 mm.	84.3		
0.0298 mm.	76.9		
0.0198 mm.	66.9		
0.0123 mm.	51.3		
0.0089 mm.	44.0		
0.0065 mm.	35.7		
0.0047 mm.	29.3		
0.0030 mm.	24.7		
0.0015 mm.	18.3		

* (no specification provided)

Material Description

Dark brown organic clay

Atterberg Limits (ASTM D 4318)

PL= 31 **LL=** 65 **PI=** 34

Classification

USCS (D 2487)= OH **AASHTO (M 145)=** A-7-5(39)

Coefficients

D_{90}= 0.0531 D_{85}= 0.0419 D_{60}= 0.0161
D_{50}= 0.0117 D_{30}= 0.0049 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 61.7%

Date Received: 11/16/18 **Date Tested:** 11/16/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

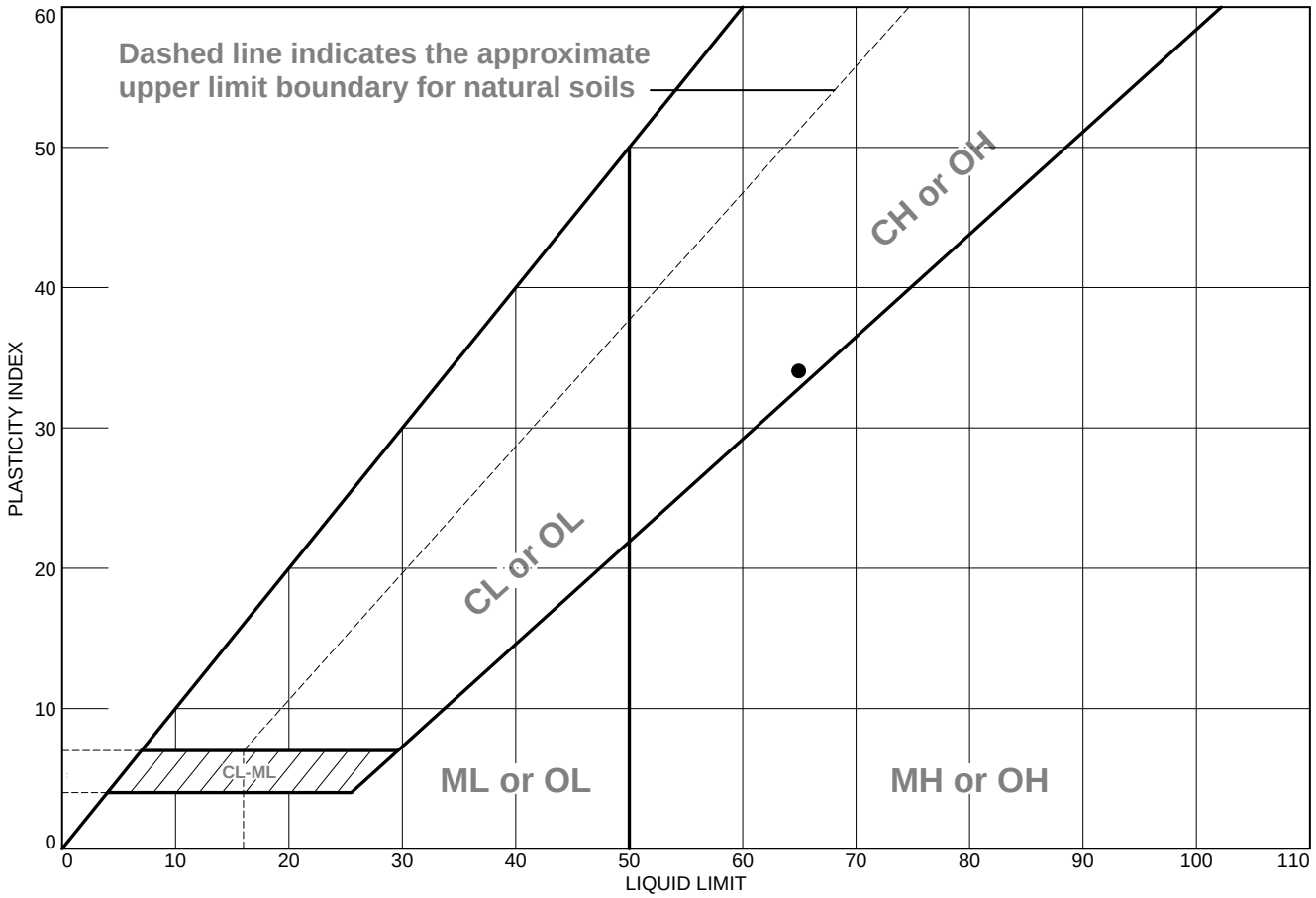
Source of Sample: UBP-SB02 **Depth:** 4.75-10.5' **Date Sampled:** 10/11/18
Sample Number: GP-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Dark brown organic clay	10/11/18	11/15/18	AS	65	31	34	98.0	OH

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** UBP-SB02 **Depth:** 4.75-10.5' **Sample Number:** GP-3

CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: AS **Checked By:** MP

CDM Smith

Geotechnical Engineering Laboratory

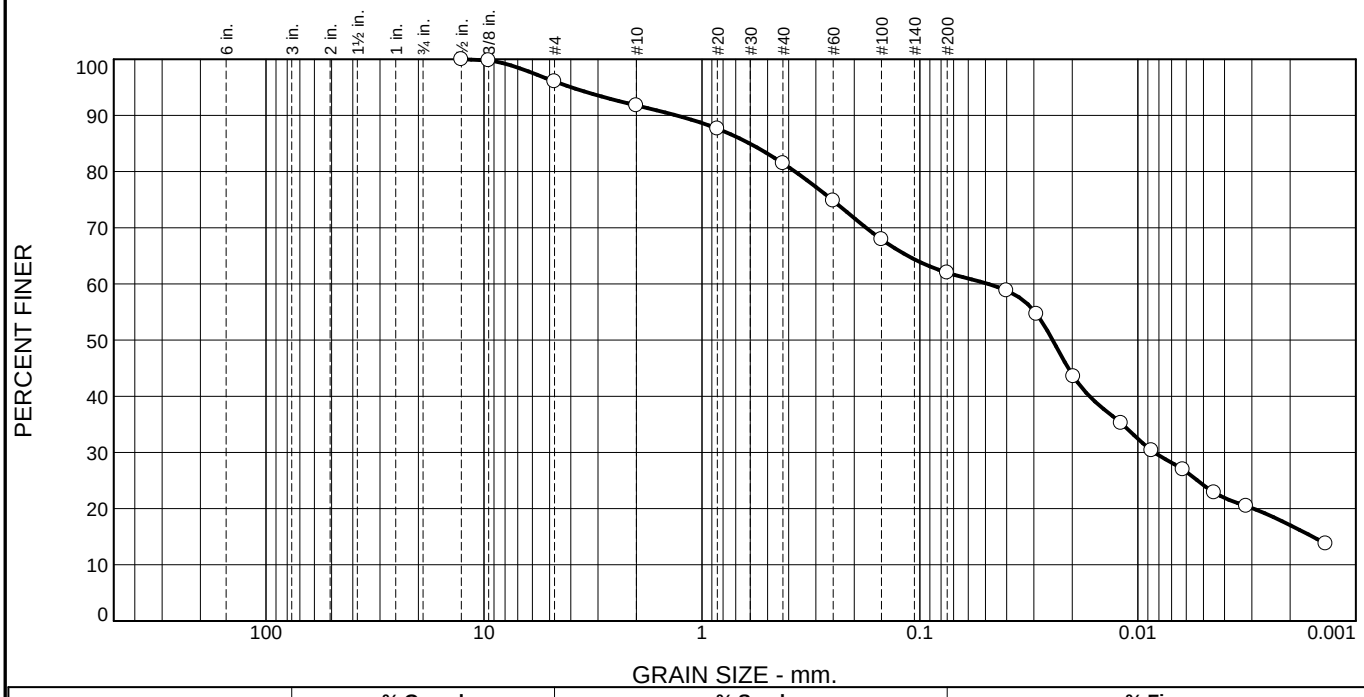
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/15/2018
Project Number:	51147-223203		
Boring Number:	UBP-SB02	Procedure:	C
Sample Number:	GP-3	Temperature:	440° C
Sample Depth (ft):	4.75-10.5'		
Sample Date:	10/11/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	126.74
Wet Mass of Sample & Tin (g)	218.68
Dry Mass of Sample & Tin (g)	183.61
Mass of Water (g)	35.07
Mass of Dry Soil (g)	56.87
Moisture Content (%)	**61.7**

ASH CONTENT	
Porcelain Dish Mass (g)	126.74
Porcelain Dish + Oven Dried Soil (g)	183.61
Mass of Oven Dried Soil (g)	56.87
Mass of Dish & Burned Soil (g)	179.90
Mass of Burned Soil (g)	53.16
Mass of Organic Material (g)	3.71
Ash Content (%)	93.5
Organic Content (%)	**6.5**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.0	4.2	10.3	19.5	37.8	24.2

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.5"	100.0		
.375"	99.8		
#4	96.0		
#10	91.8		
#20	87.7		
#40	81.5		
#60	74.8		
#100	67.9		
#200	62.0		
0.0401 mm.	58.8		
0.0292 mm.	54.7		
0.0198 mm.	43.5		
0.0119 mm.	35.2		
0.0087 mm.	30.4		
0.0062 mm.	27.0		
0.0045 mm.	22.9		
0.0032 mm.	20.5		
0.0014 mm.	13.8		

* (no specification provided)

Material Description

Dark brown peat

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML/PT **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 1.3083 D_{85}= 0.6045 D_{60}= 0.0487
D_{50}= 0.0246 D_{30}= 0.0084 D_{15}= 0.0016
D_{10}= C_u= C_c=

Remarks

As received MC = 93.4%

Date Received: 11/16/18 **Date Tested:** 11/27/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

Source of Sample: UBP-TP-02 **Depth:** 2.5-2.6' **Date Sampled:** 10/4/18
Sample Number: G-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

CDM Smith

Geotechnical Engineering Laboratory

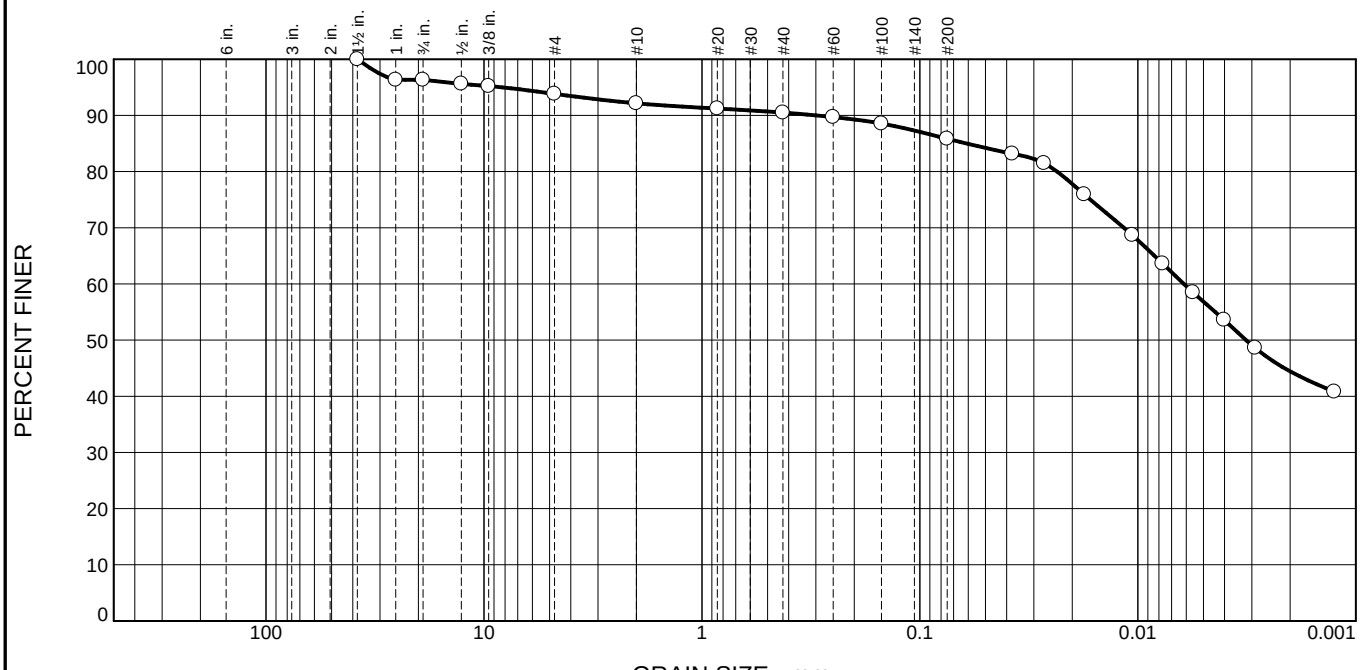
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/21/2018
Project Number:	51147-223203		
Boring Number:	UBP-TP-02	Procedure:	C
Sample Number:	G-1	Temperature:	440° C
Sample Depth (ft):	2.5-2.6'		
Sample Date:	10/4/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	85.05
Wet Mass of Sample & Tin (g)	178.00
Dry Mass of Sample & Tin (g)	133.12
Mass of Water (g)	44.88
Mass of Dry Soil (g)	48.07
Moisture Content (%)	**93.4**

ASH CONTENT	
Porcelain Dish Mass (g)	85.05
Porcelain Dish + Oven Dried Soil (g)	133.12
Mass of Oven Dried Soil (g)	48.07
Mass of Dish & Burned Soil (g)	118.55
Mass of Burned Soil (g)	33.50
Mass of Organic Material (g)	14.57
Ash Content (%)	69.7
Organic Content (%)	**30.3**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.7	2.5	1.6	1.7	4.7	29.0	56.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	96.3		
.75"	96.3		
.5"	95.6		
.375"	95.2		
#4	93.8		
#10	92.2		
#20	91.2		
#40	90.5		
#60	89.7		
#100	88.6		
#200	85.8		
0.0377 mm.	83.2		
0.0269 mm.	81.5		
0.0176 mm.	75.9		
0.0106 mm.	68.7		
0.0077 mm.	63.6		
0.0056 mm.	58.5		
0.0040 mm.	53.6		
0.0029 mm.	48.6		
0.0013 mm.	40.8		

* (no specification provided)

Material Description

Brown fat clay

Atterberg Limits (ASTM D 4318)

PL= 33 **LL=** 67 **PI=** 34

Classification

USCS (D 2487)= CH **AASHTO (M 145)=** A-7-5(34)

Coefficients

D_{90}= 0.2993 D_{85}= 0.0611 D_{60}= 0.0062
D_{50}= 0.0032 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 34.9%

Date Received: 11/16/18 **Date Tested:** 11/27/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

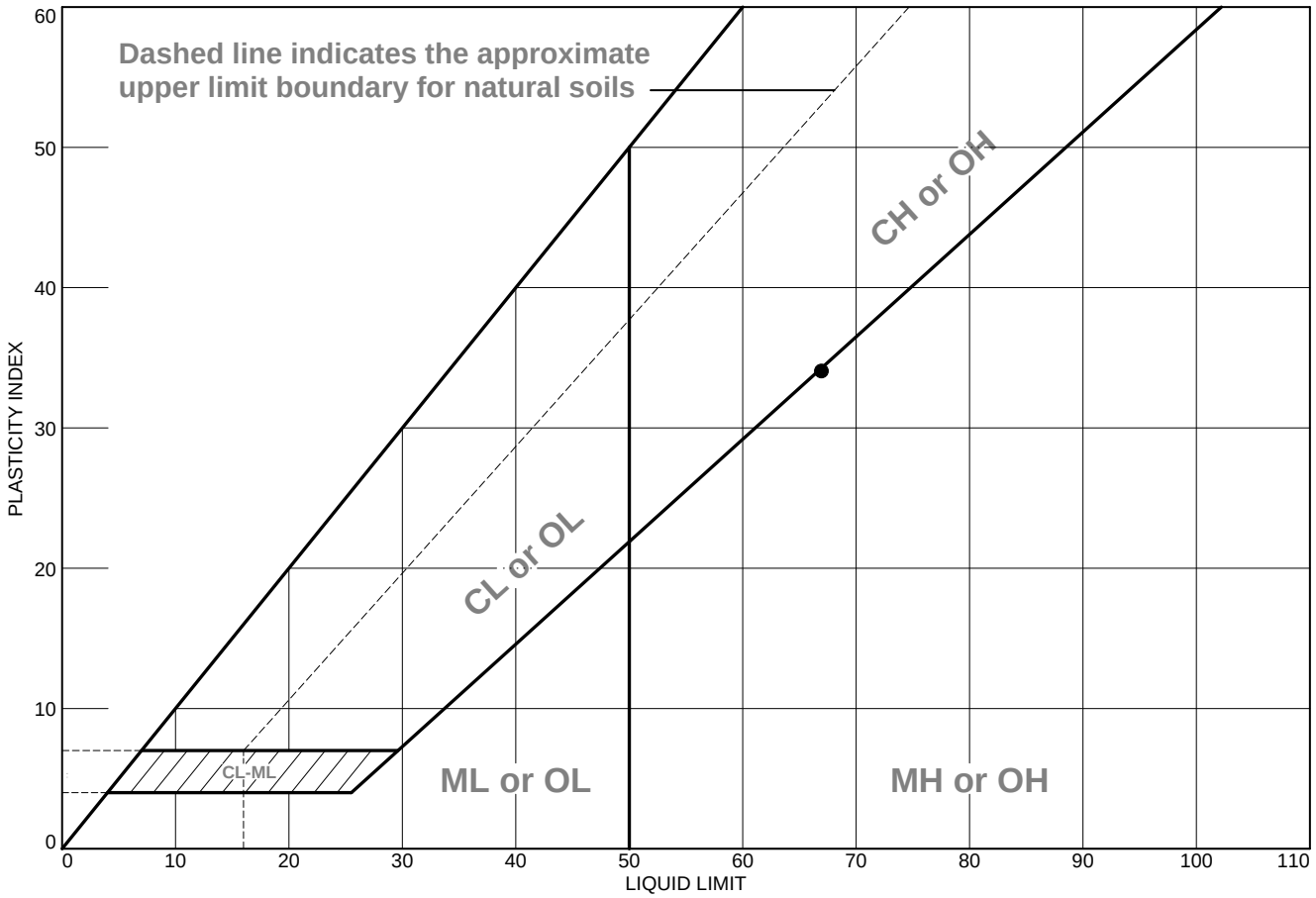
Source of Sample: UBP-TP-02 **Depth:** 2.9-3' **Date Sampled:** 10/4/18
Sample Number: G-2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown fat clay	10/4/18	11/27/18	MP	67	33	34	90.5	CH

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** UBP-TP-02 **Depth:** 2.9-3' **Sample Number:** G-2

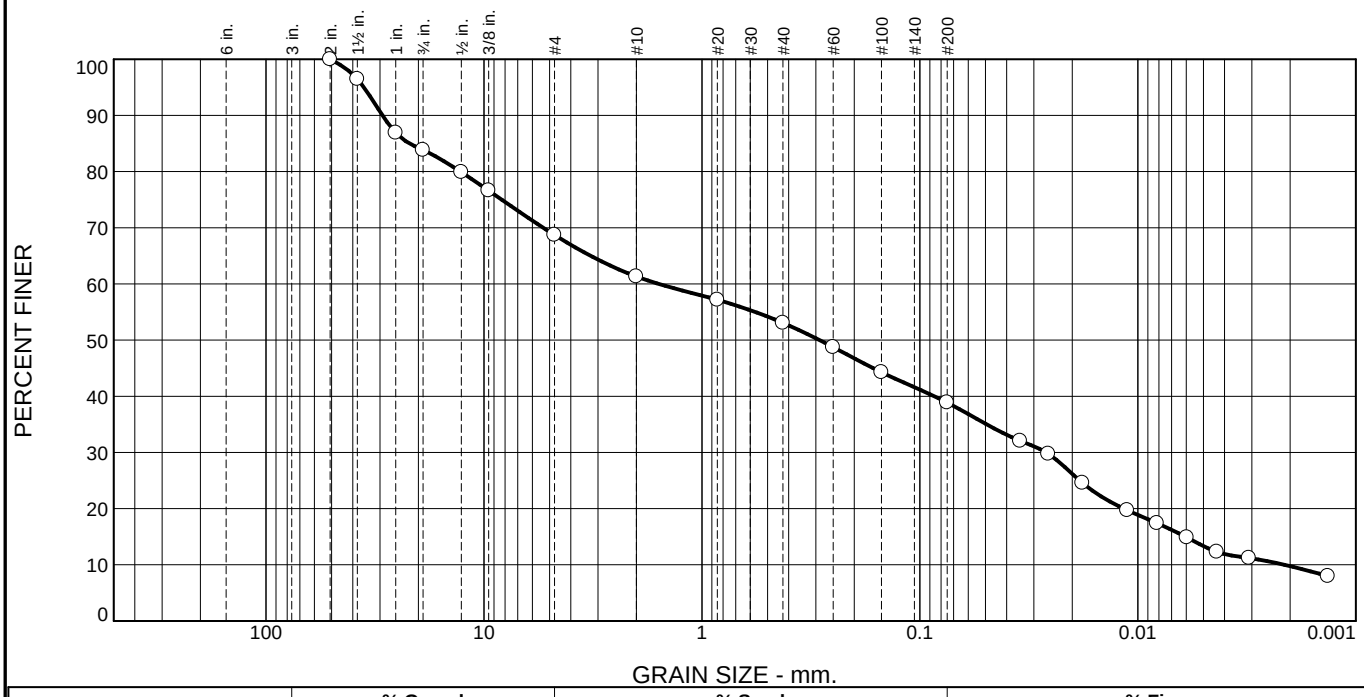
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: MP **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.2	15.1	7.4	8.2	14.2	25.6	13.3

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1.5"	96.5		
1"	86.9		
.75"	83.8		
.5"	79.9		
.375"	76.6		
#4	68.7		
#10	61.3		
#20	57.2		
#40	53.1		
#60	48.7		
#100	44.3		
#200	38.9		
0.0346 mm.	32.1		
0.0258 mm.	29.8		
0.0180 mm.	24.6		
0.0112 mm.	19.7		
0.0082 mm.	17.4		
0.0060 mm.	14.9		
0.0043 mm.	12.3		
0.0031 mm.	11.2		
0.0013 mm.	8.0		

* (no specification provided)

Material Description

Brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 29.2264 D_{85}= 21.9424 D_{60}= 1.5774
D_{50}= 0.2889 D_{30}= 0.0264 D_{15}= 0.0061
D_{10}= 0.0021 C_u= 741.89 C_c= 0.21

Remarks

As received MC = %

Date Received: 11/16/18 **Date Tested:** 11/27/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

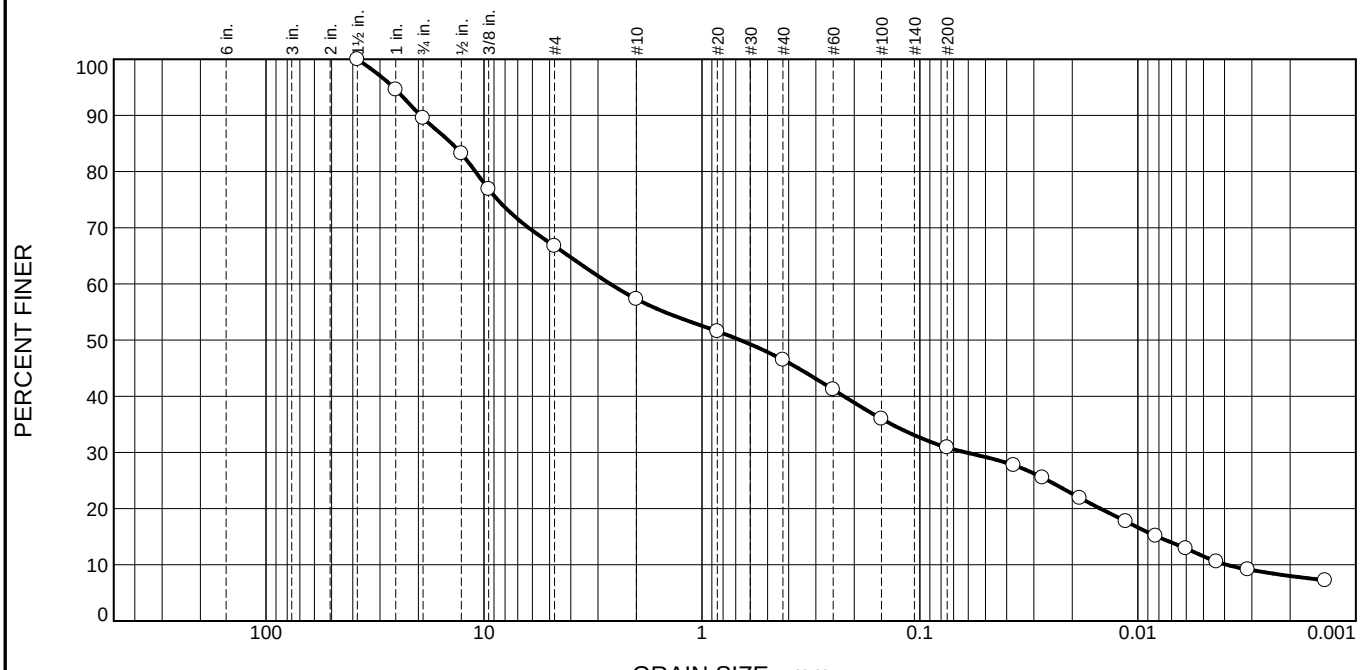
Source of Sample: UP-TP-01 **Depth:** 2.8-3' **Date Sampled:** 10/4/18
Sample Number: G-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.5	22.7	9.5	10.8	15.6	19.4	11.5

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	94.6		
.75"	89.5		
.5"	83.2		
.375"	76.9		
#4	66.8		
#10	57.3		
#20	51.6		
#40	46.5		
#60	41.2		
#100	36.0		
#200	30.9		
0.0371 mm.	27.7		
0.0274 mm.	25.5		
0.0185 mm.	21.9		
0.0114 mm.	17.7		
0.0083 mm.	15.1		
0.0060 mm.	12.9		
0.0044 mm.	10.6		
0.0031 mm.	9.2		
0.0014 mm.	7.2		

* (no specification provided)

Material Description

Brown silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 19.5824 D_{85}= 14.0432 D_{60}= 2.6343
D_{50}= 0.6675 D_{30}= 0.0615 D_{15}= 0.0081
D_{10}= 0.0039 C_u= 673.22 C_c= 0.37

Remarks

As received MC = 10.8%

Date Received: 11/16/18 **Date Tested:** 11/28/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

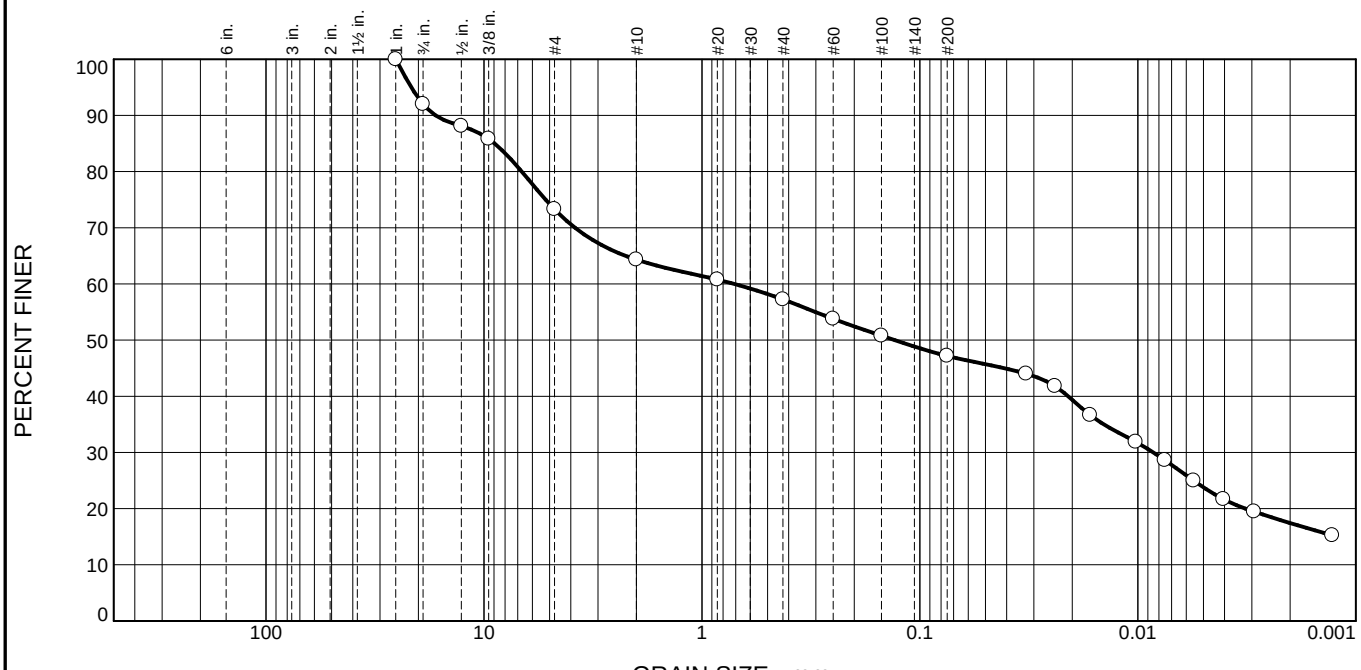
Source of Sample: WT-TP-01 **Depth:** 2.3-2.5' **Date Sampled:** 10/4/18
Sample Number: G-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.0	18.7	9.0	7.1	10.0	23.4	23.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	92.0		
.5"	88.1		
.375"	85.8		
#4	73.3		
#10	64.3		
#20	60.8		
#40	57.2		
#60	53.8		
#100	50.8		
#200	47.2		
0.0326 mm.	44.0		
0.0240 mm.	41.8		
0.0165 mm.	36.7		
0.0102 mm.	31.9		
0.0075 mm.	28.6		
0.0055 mm.	25.0		
0.0041 mm.	21.7		
0.0029 mm.	19.5		
0.0013 mm.	15.2		

* (no specification provided)

Material Description

Brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 24 **LL=** 41 **PI=** 17

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-7-6(5)

Coefficients

D_{90}= 16.7010 D_{85}= 8.9355 D_{60}= 0.7121
D_{50}= 0.1307 D_{30}= 0.0085 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 36.6%

Date Received: 11/16/18 **Date Tested:** 11/29/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

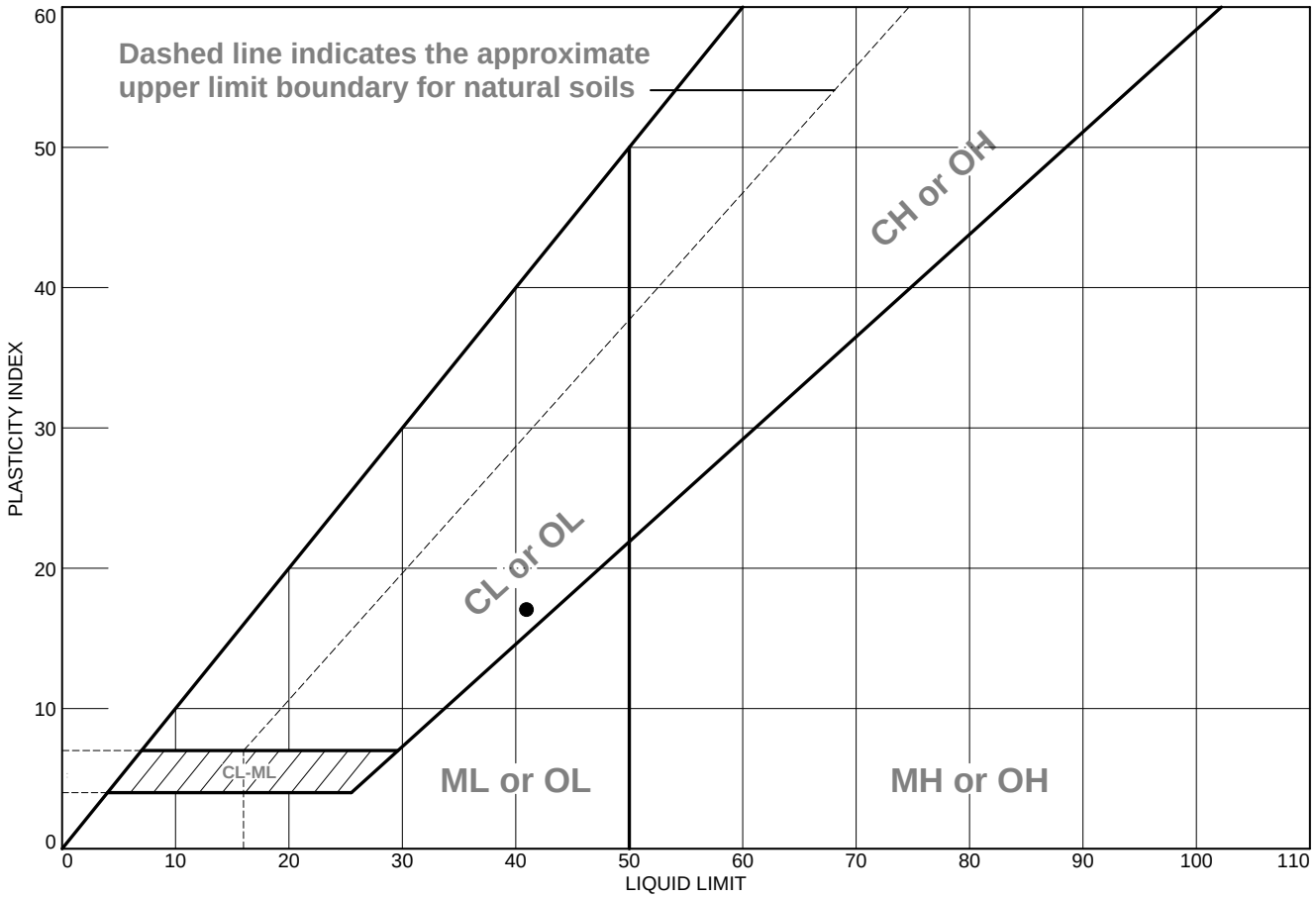
Source of Sample: WT-TP-01 **Depth:** 10.5-10.8' **Date Sampled:** 10/4/18
Sample Number: G-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown clayey gravel with sand	10/4/18	11/28/18	MP	41	24	17	57.2	GC

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek

Lockport, NY

○**Source of Sample:** WT-TP-01 **Depth:** 10.5-10.8' **Sample Number:** G-3

CDM Smith

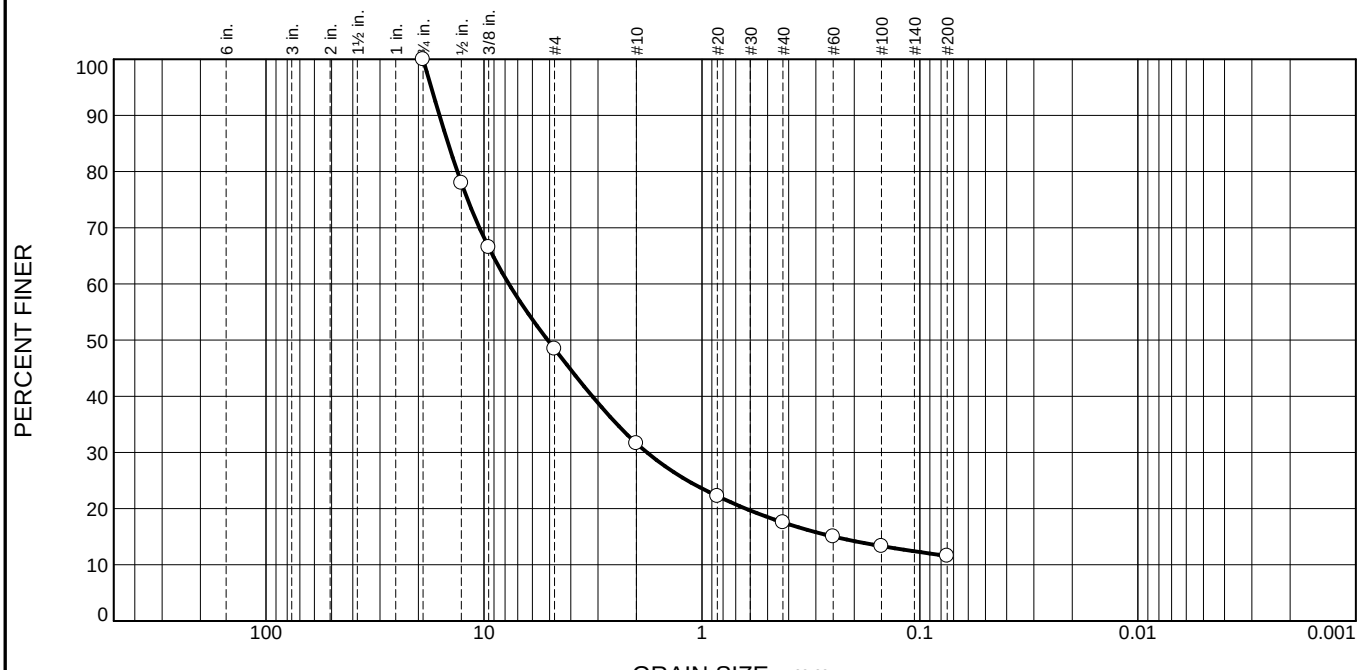
Boston, Massachusetts

Checked by: MP

Title: Laboratory Manager

Tested By: MP **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	51.5	16.9	14.1	5.9	11.6	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
.5"	78.0		
.375"	66.5		
#4	48.5		
#10	31.6		
#20	22.2		
#40	17.5		
#60	15.0		
#100	13.3		
#200	11.6		

* (no specification provided)

Material Description

Gray poorly graded gravel with silt and sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP-GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 16.0031 D_{85}= 14.6049 D_{60}= 7.6958
D_{50}= 5.0975 D_{30}= 1.7892 D_{15}= 0.2482
D_{10}= C_u= C_c=

Remarks

As received MC = 4.9%

Date Received: 11/16/18 **Date Tested:** 11/17/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

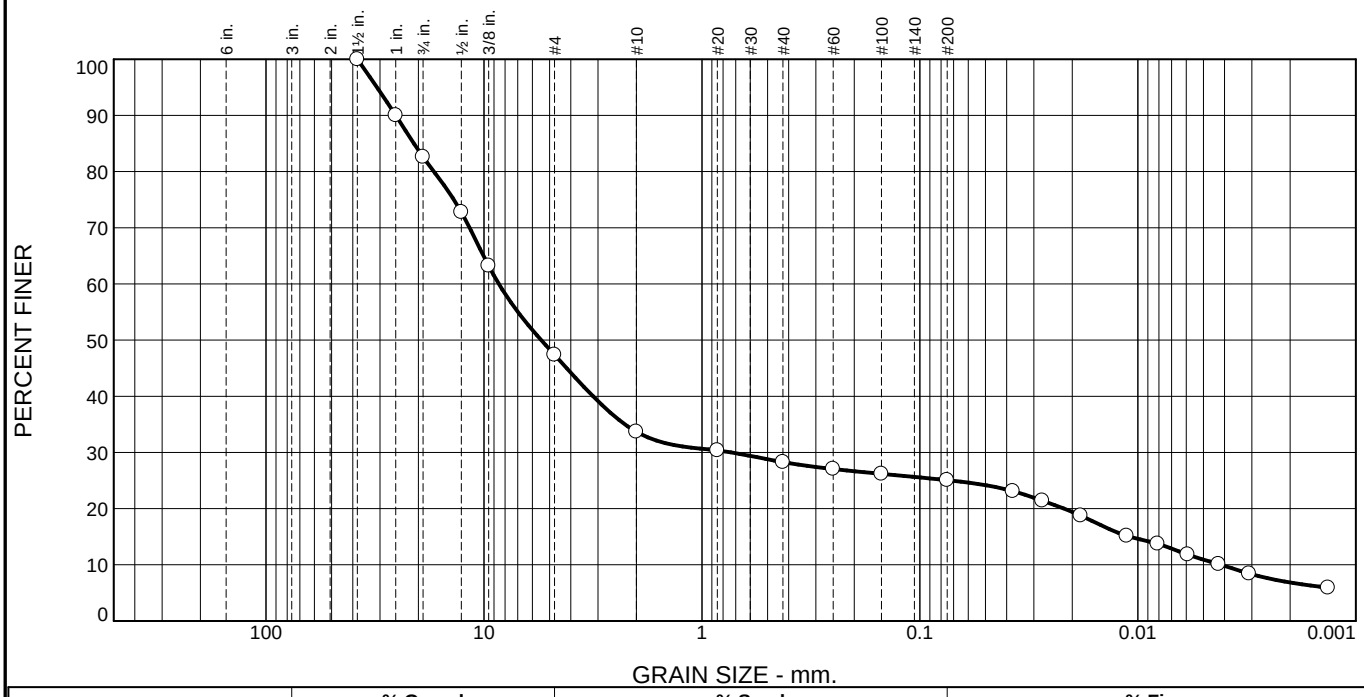
Source of Sample: WT-TP-02 **Depth:** 12-16' **Date Sampled:** 10/18/18
Sample Number: GP-4

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.4	35.2	13.7	5.4	3.2	14.2	10.9

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	90.0		
.75"	82.6		
.5"	72.8		
.375"	63.2		
#4	47.4		
#10	33.7		
#20	30.4		
#40	28.3		
#60	27.1		
#100	26.2		
#200	25.1		
0.0374 mm.	23.1		
0.0274 mm.	21.4		
0.0183 mm.	18.8		
0.0113 mm.	15.1		
0.0081 mm.	13.7		
0.0059 mm.	11.8		
0.0043 mm.	10.1		
0.0031 mm.	8.4		
0.0013 mm.	5.9		

* (no specification provided)

Material Description

Brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-2-7(1)

Coefficients

D_{90}= 25.3929 D_{85}= 20.9661 D_{60}= 8.5489
D_{50}= 5.4643 D_{30}= 0.7352 D_{15}= 0.0109
D_{10}= 0.0042 C_u= 2055.75 C_c= 15.20

Remarks

As received MC = 26.8%

Date Received: 11/16/18 **Date Tested:** 11/29/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

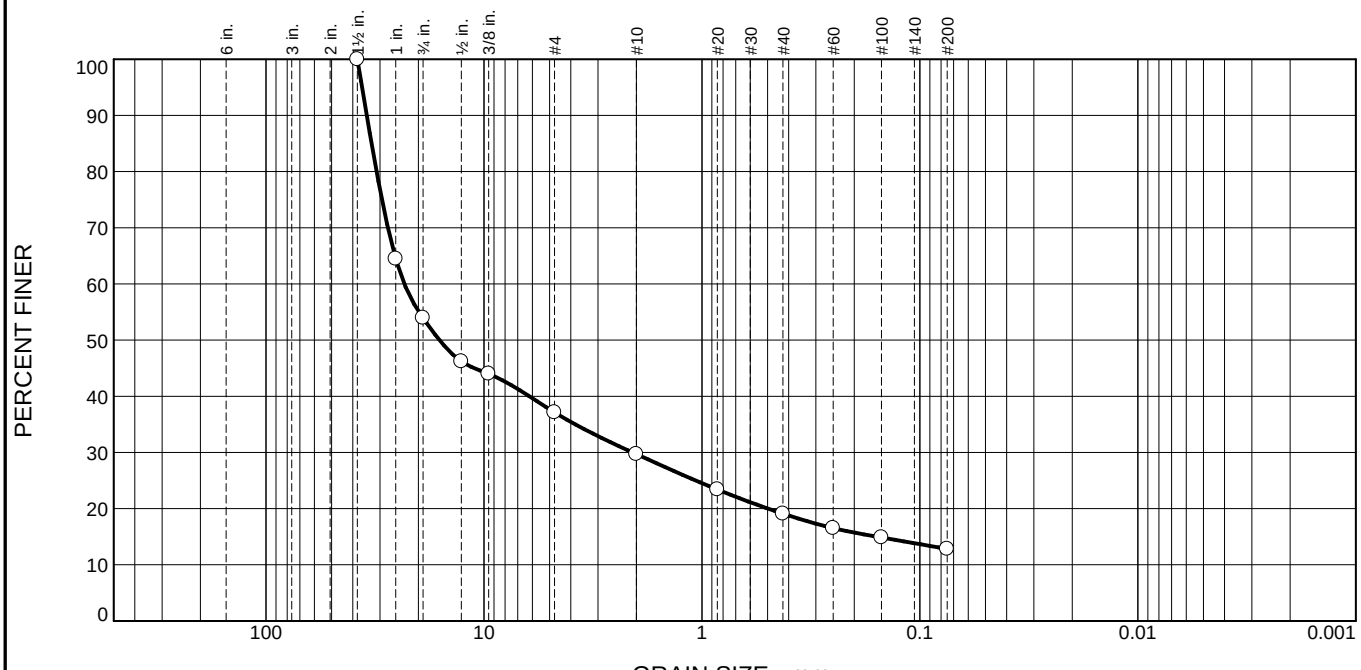
Source of Sample: WT-TP-02 **Depth:** 33-34.5' **Date Sampled:** 10/18/18
Sample Number: GP-9A

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	46.0	16.9	7.4	10.6	6.3	12.8	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	64.5		
.75"	54.0		
.5"	46.2		
.375"	44.0		
#4	37.1		
#10	29.7		
#20	23.4		
#40	19.1		
#60	16.5		
#100	14.9		
#200	12.8		

* (no specification provided)

Material Description

Gray-brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 34.5244 D_{85}= 32.8098 D_{60}= 23.1972
D_{50}= 16.0124 D_{30}= 2.0788 D_{15}= 0.1572
D_{10}= C_u= C_c=

Remarks

As received MC = 8.3%

Date Received: 11/16/18 **Date Tested:** 11/21/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

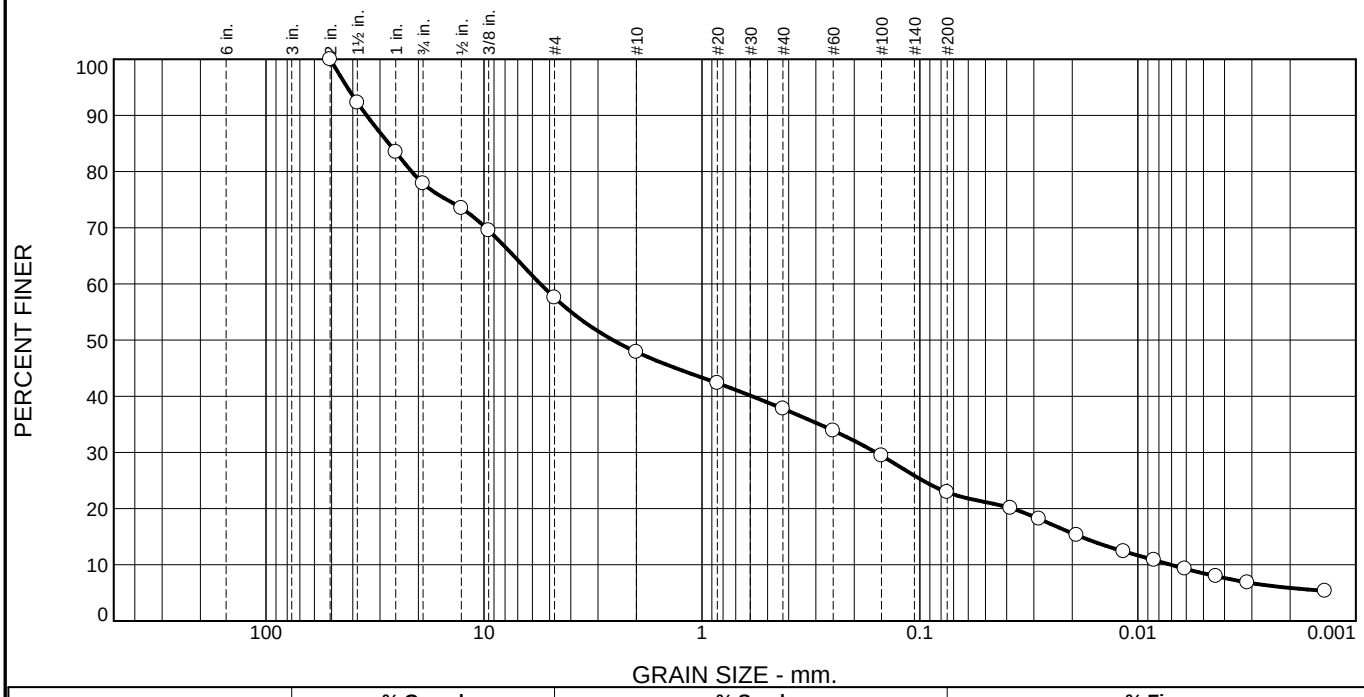
Source of Sample: WT-TP-02 **Depth:** 34.5-36' **Date Sampled:** 10/18/18
Sample Number: GP-9B

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	22.1	20.3	9.7	10.1	14.9	14.4	8.5

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1.5"	92.3		
1"	83.5		
.75"	77.9		
.5"	73.5		
.375"	69.5		
#4	57.6		
#10	47.9		
#20	42.4		
#40	37.8		
#60	33.9		
#100	29.4		
#200	22.9		
0.0384 mm.	20.1		
0.0284 mm.	18.2		
0.0191 mm.	15.3		
0.0116 mm.	12.4		
0.0084 mm.	10.8		
0.0061 mm.	9.3		
0.0044 mm.	8.0		
0.0031 mm.	6.9		
0.0014 mm.	5.4		

* (no specification provided)

Material Description

Dark brown silty gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 34.5808 D_{85}= 27.3238 D_{60}= 5.5110
D_{50}= 2.5601 D_{30}= 0.1591 D_{15}= 0.0183
D_{10}= 0.0071 C_u= 779.61 C_c= 0.65

Remarks

As received MC = 20.5%

Date Received: 11/16/18 **Date Tested:** 11/28/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

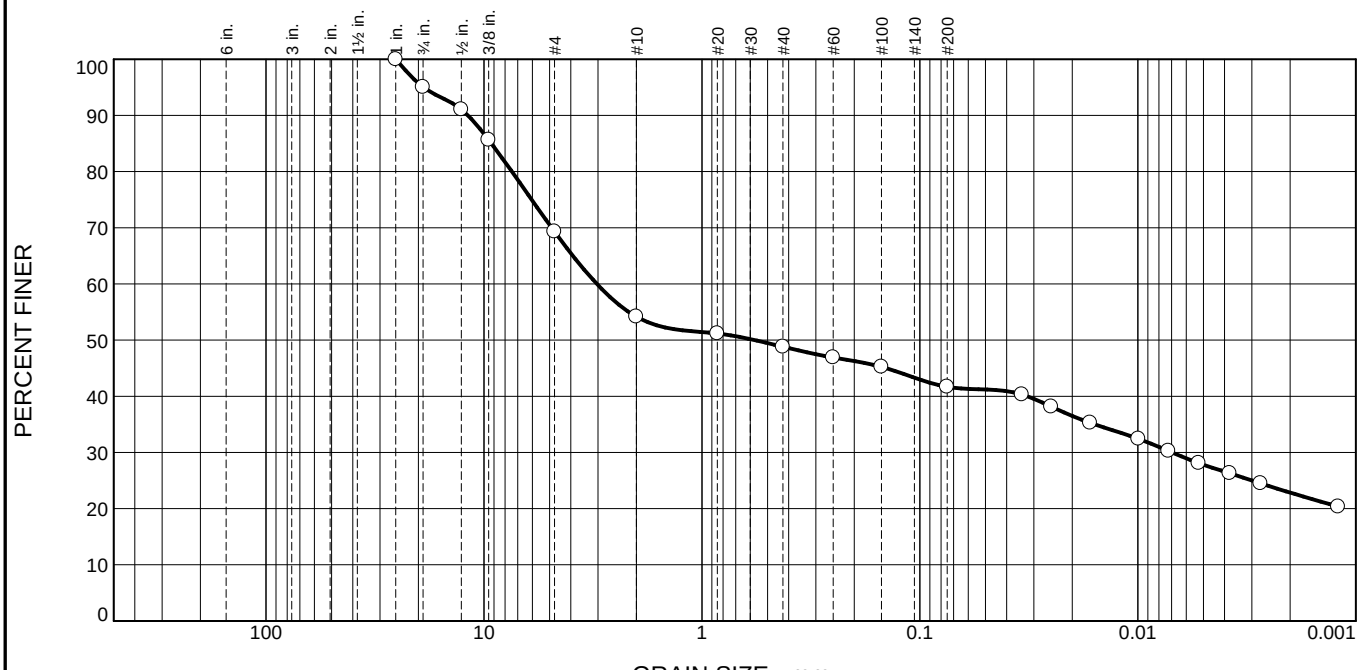
Source of Sample: WT-TP-03 **Depth:** 4-4.2' **Date Sampled:** 10/4/18
Sample Number: G-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.9	25.8	15.1	5.4	7.1	13.9	27.8

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	95.1		
.5"	91.1		
.375"	85.7		
#4	69.3		
#10	54.2		
#20	51.2		
#40	48.8		
#60	46.9		
#100	45.2		
#200	41.7		
0.0340 mm.	40.3		
0.0250 mm.	38.1		
0.0165 mm.	35.3		
0.0099 mm.	32.4		
0.0072 mm.	30.3		
0.0053 mm.	28.1		
0.0038 mm.	26.3		
0.0027 mm.	24.5		
0.0012 mm.	20.4		

* (no specification provided)

Material Description

Brown clayey gravel with sand

Atterberg Limits (ASTM D 4318)

PL= 26 **LL=** 54 **PI=** 28

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-7-6(7)

Coefficients

D_{90}= 11.8335 D_{85}= 9.2483 D_{60}= 3.0340
D_{50}= 0.5733 D_{30}= 0.0070 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 28.1%

Date Received: 11/16/18 **Date Tested:** 11/29/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

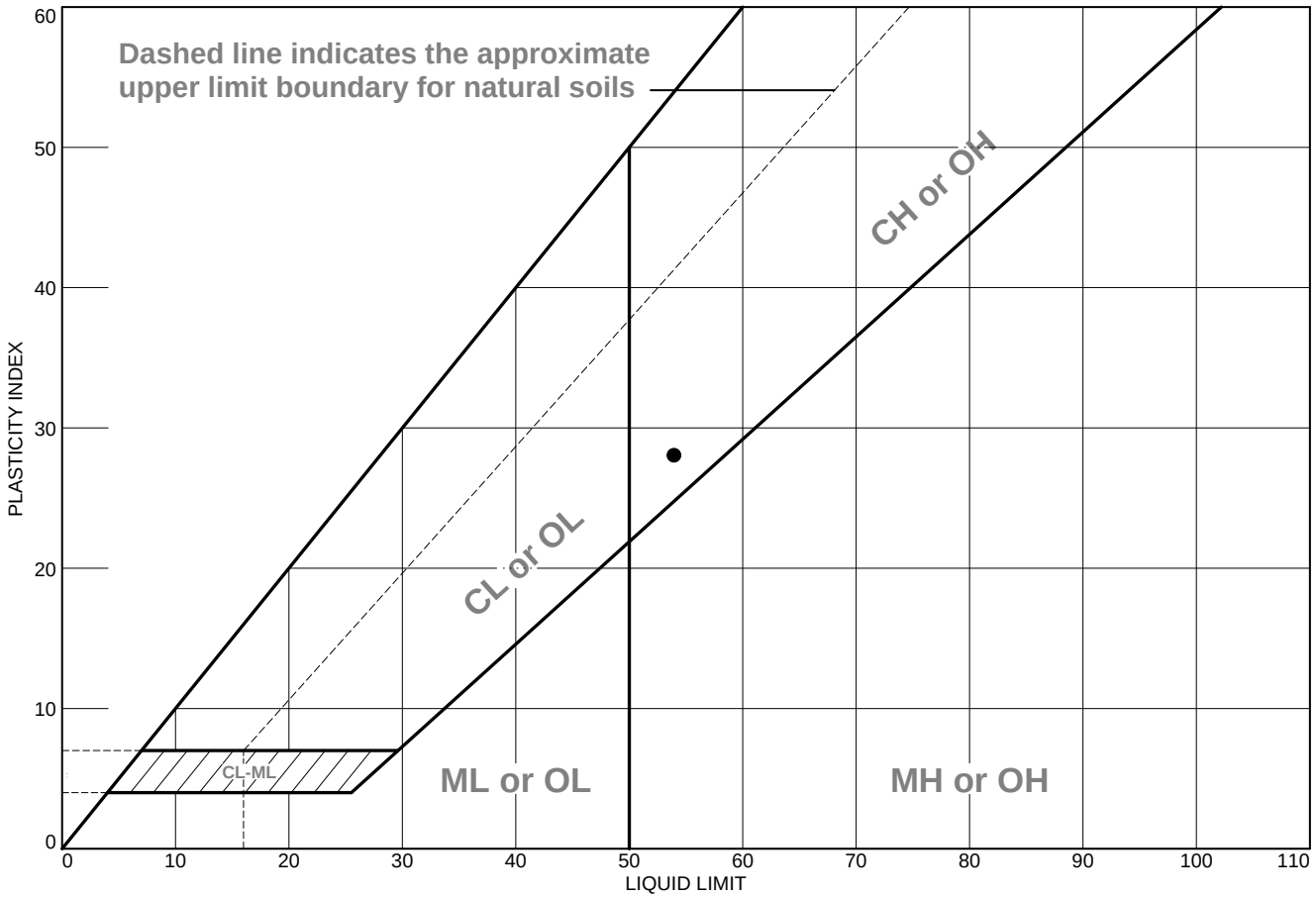
Source of Sample: WT-TP-03 **Depth:** 8.9-9' **Date Sampled:** 10/4/18
Sample Number: G-3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown clayey gravel with sand	10/4/18	11/28/18	MP	54	26	28	48.8	GC

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** WT-TP-03 **Depth:** 8.9-9' **Sample Number:** G-3

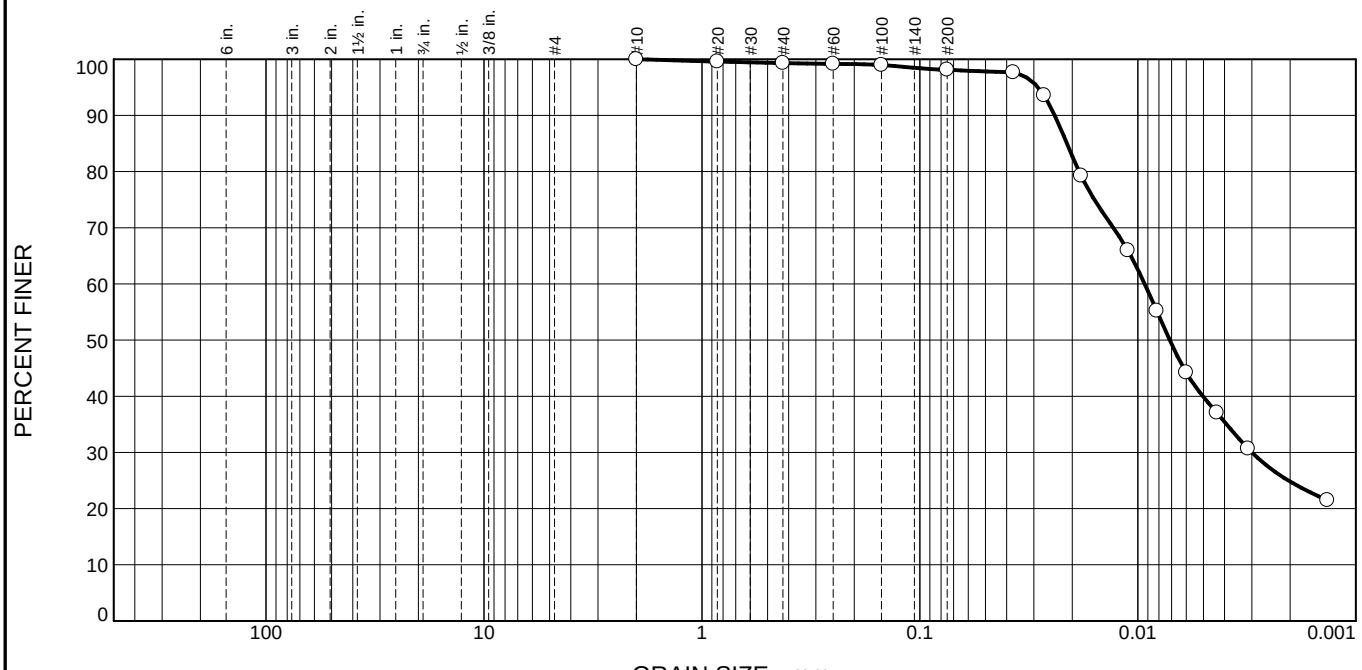
CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: MP **Checked By:** MP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.7	1.2	58.2	39.9

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	99.6		
#40	99.3		
#60	99.2		
#100	99.0		
#200	98.1		
0.0373 mm.	97.7		
0.0269 mm.	93.6		
0.0182 mm.	79.3		
0.0111 mm.	66.0		
0.0082 mm.	55.2		
0.0060 mm.	44.2		
0.0043 mm.	37.1		
0.0031 mm.	30.7		
0.0014 mm.	21.5		

* (no specification provided)

Material Description

Brown & black fat clay

Atterberg Limits (ASTM D 4318)

PL= 29 **LL=** 65 **PI=** 36

Classification

USCS (D 2487)= CH **AASHTO (M 145)=** A-7-6(42)

Coefficients

D_{90}= 0.0241 D_{85}= 0.0212 D_{60}= 0.0093
D_{50}= 0.0071 D_{30}= 0.0030 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 66.2%

Date Received: 11/1/18 **Date Tested:** 11/13/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

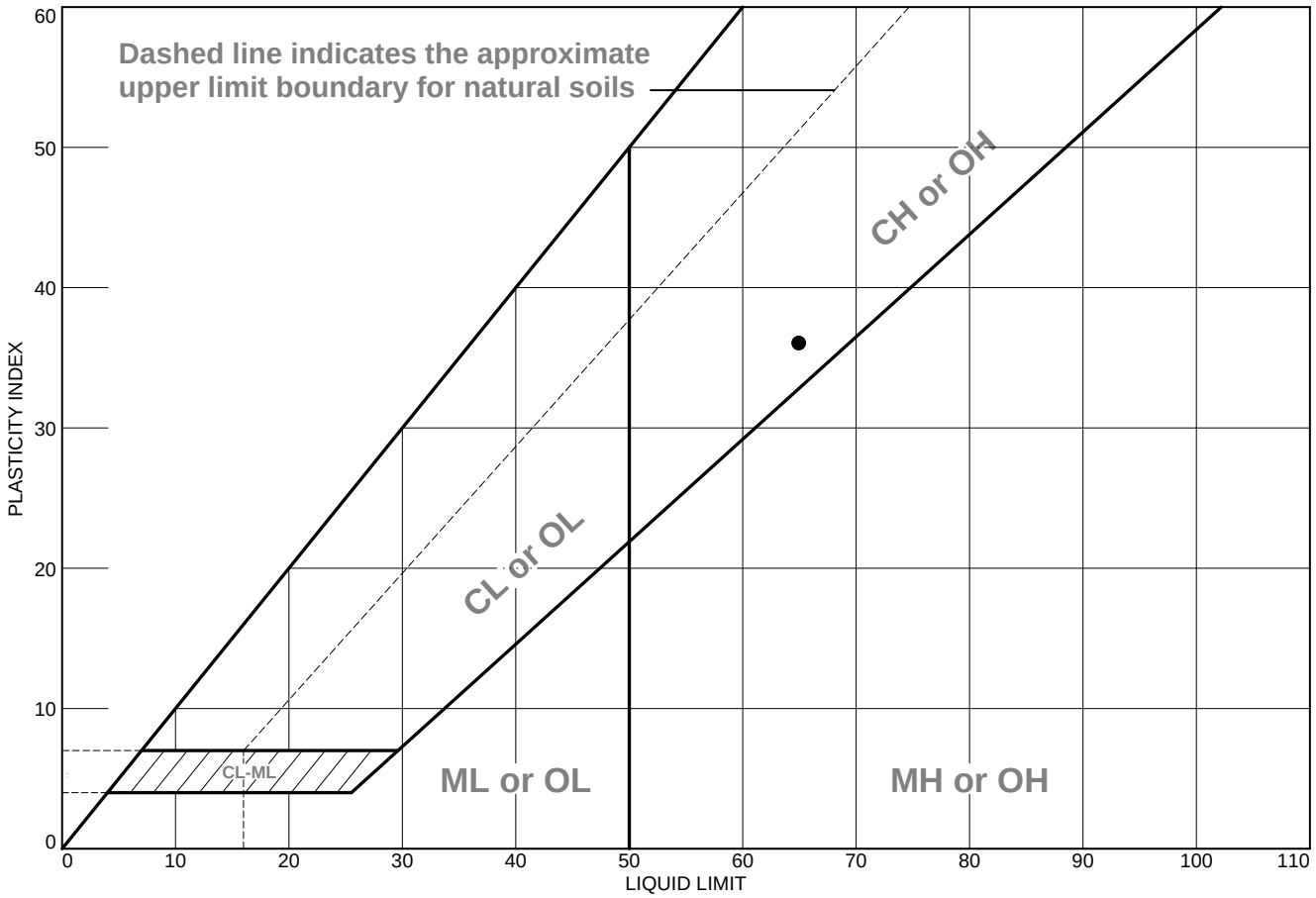
Source of Sample: UPB-GEO-01 **Depth:** 7-9' **Date Sampled:** 9/17/18
Sample Number: U-1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown & black fat clay	9/17/18	11/12/18	AS	65	29	36	99.3	CH

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek

Lockport, NY

○**Source of Sample:** UPB-GEO-01 **Depth:** 7-9' **Sample Number:** U-1

CDM Smith

Boston, Massachusetts

Checked by: MP

Title: Laboratory Manager

Tested By: AS **Checked By:** MP

CDM Smith

Geotechnical Engineering Laboratory

Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	AS
Project Location:	Lockport, NY	Test Date:	11/12/2018
Project Number:	51147-223203		
Boring Number:	UPB-GEO-01A	Procedure:	C
Sample Number:	U-1	Temperature:	440° C
Sample Depth (ft):	7-9'		
Sample Date:	9/17/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	126.75
Wet Mass of Sample & Tin (g)	197.18
Dry Mass of Sample & Tin (g)	169.13
Mass of Water (g)	28.05
Mass of Dry Soil (g)	42.38
Moisture Content (%)	**66.2**

ASH CONTENT	
Porcelain Dish Mass (g)	126.75
Porcelain Dish + Oven Dried Soil (g)	169.13
Mass of Oven Dried Soil (g)	42.38
Mass of Dish & Burned Soil (g)	166.33
Mass of Burned Soil (g)	39.58
Mass of Organic Material (g)	2.80
Ash Content (%)	93.4
Organic Content (%)	**6.6**

Geotechnical Engineering Laboratory

ISOTROPICALLY CONSOLIDATED UNDRAINED TRIAXIAL TEST SUMMARY - ASTM D4767

Client:	USACE	**Test Date:**	11/9/2018	**LL :**	65
Project:	Eighteen Mile Creek	**Exploration No:**	UPB-GEO-01A	**PL :**	29
Location:	Lockport, NY	**Sample No:**	U-1	**PI :**	36
Project No:	51147-223203	**Depth (ft):**	7-9	**USCS:**	CH

Initial

Moisture Content (%):	48.6%
Dry Unit Weight (pcf):	71.2
Diameter (in):	2.863
Height (in):	5.752
Void Ratio (-):	1.24
Saturation (%):	100.2
Moisture Content (Trim.%):	48.6%
Cross Sectional Area (in^2):	6.438

Final

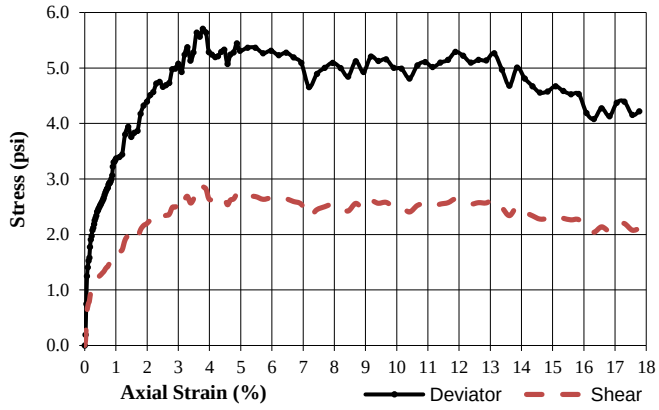
Moisture Content (%):	45.3%
Dry Unit Weight (pcf):	73.8
Height (in):	4.706
Void Ratio (-):	1.157
Saturation (%):	99.9
Cross Sectional Area (in^2):	8.317

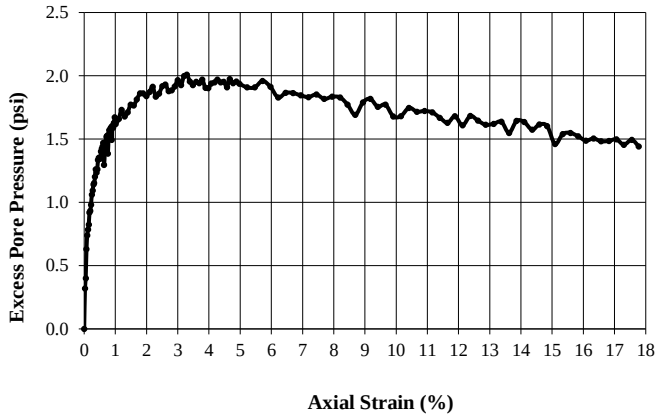
End of Consolidation Data

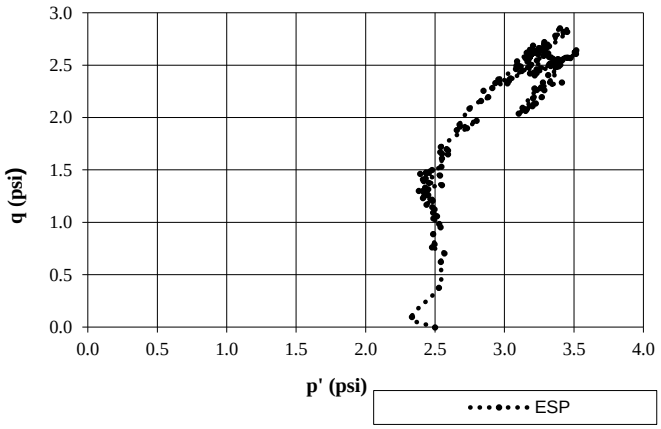
A_c Evaluated using Method	B
Sample Saturated using Method	B
Moisture Content (%):	45.3%
Dry Unit Weight (pcf):	73.8
Height (in):	5.723
Void Ratio (-):	1.157
Saturation (%):	99.9
Cross Sectional Area (in^2):	6.258
Pore Pressure Parameter B (-):	1.00
Final Back Pressure (psi):	80.0
Consolidation Pressure (psi):	2.5

Shear Data

Shear Strain Rate (%/hr):	0.98
Max. Deviator Stress(*) (psi):	5.7
Strain at Failure (%):	3.8
Minor Eff. Pr. Stress(*) (psi):	0.5
Major Eff. Pr. Stress(*) (psi):	6.3
Undrained Strength Ratio (-):	1.14







Notes:

(*) Failure criterion: max. deviator stress or max deviator stress at strain = 15%, whichever is obtained first.

Remarks:

Attachment D

Sediment Bench-Scale Treatability Study Memorandum

Memorandum

To: Thomas Mathew, P.E., B.C.E.E.

From: Meryl Cherchia
Meredith Passaro, P.E.
Jagrut Jathal

Date: July 19, 2019

Subject: Eighteen Mile Creek Superfund Site Operable Units 1 and 2
Sediment Bench-Scale Treatability Study Memorandum
Lockport, New York

Introduction

CDM Federal Programs Corporation (CDM Smith) has prepared this memorandum detailing the geotechnical treatability bench-scale study as part of the pre-design investigation (PDI) and remedial design for the Eighteen Mile Creek Superfund Site Operable Units (OUs) 1 and 2 located in Niagara County, New York. The study was conducted in accordance with the Treatability Study Work Plan prepared by CDM Smith in December 2018. The work plan was submitted to the United States Army Corp. of Engineers (USACE) as Field Change Order (FCR) No. 06 on December 5, 2018 and approved on December 11, 2018.

The study was performed to evaluate the creek sediment's dewatering potential and identify sediment solidification additives to meet general landfill disposal criteria. The following sections in this memorandum provide a summary of the regulatory program, sediment treatability study field sampling activities, laboratory testing, and results.

Regulatory Program

The properties of the treated samples were compared to the regulatory requirements presented in the Eighteen Mile Creek Quality Assurance Project Plan (QAPP) dated August 27, 2018. The specific regulatory criteria that treated samples need to meet for disposal are:

1. Disposal material shall not contain "free standing" water and must be able to pass the paint filter test.

2. Disposal material shall be stable and meet a minimum compressive strength of 50 pounds per square inch (psi).

Field Investigation Summary

Field investigations were performed between September and October 2018 as part of the PDI. Sediment samples were collected throughout the creek corridor using slide hammer, tripod, and drive and wash drilling methods. Samples were collected from the acetate sleeve liners and split

spoons and logged by CDM Smith field personnel in accordance with the final Quality Assurance Project Plan (QAPP). Excess sediment that was not sampled for analytical or physical purposes was collected in 5-gallon buckets throughout the creek corridor. Sediment collected in 5-gallon buckets was kept separated based on visual soil classification.

By the end of the field effort, a total of four different composite samples were collected with a total volume of 8-gallons per composite. A summary of the composite samples collected during the field effort is presented in **Table 1**. After the field effort was complete, composite sediment samples were transported to the CDM Smith Geotechnical Laboratory in Somerville, Massachusetts, for further evaluation. In addition to the sediment samples, a total of ten 5-gallon buckets of site water were collected from the creek and transported to the CDM Smith Geotechnical Laboratory for the dewatering testing.

Table 1: Composite Sample Summary

ID	USCS	Sample Description
C1	OH	Organic (8.0 percent) silty CLAY, trace fine sand
C2	GP-GM	Fine to coarse GRAVEL, some fine to coarse sand, trace clayey silt
C3	OH	Organic (15.0 percent) CLAY, some fine to medium sand
C4	SW-SM	Fine to coarse SAND, some fine to coarse gravel, trace clayey silt

Abbreviations:

C1: Composite 1
C2: Composite 2
C3: Composite 3
C4: Composite 4

OH: organic, highly plastic clay and silt
GP-GM: poorly graded gravel with silt
SW-SM: well-graded sand with silt
USCS: United Soil Classification System

ID: identification

Initial Index Testing and Sample Compositing

Geotechnical testing was conducted on composite sediment samples at the CDM Smith laboratory. A summary of the index testing conducted is provided below:

- Grain size analysis (ASTM International [ASTM] D6913 and D7928),
- Moisture content (ASTM D2216),
- Organic content (ASTM D2974),
- Classification per the Unified Soil Classification System (ASTM D2487), and
- Specific gravity testing (ASTM D854).

Results of the index testing are presented in **Table 2** and the laboratory test results are included in **Attachment A.** Testing confirmed what was observed in the field: composites C1 and C3 contained high percentages of organic, fine-grained sediments and required dewatering evaluations to meet regulatory disposal requirements. Composites C2 and C4 predominantly consisted of granular sediments and did not require further dewatering evaluations.

Upon further evaluation, it was decided to create composite C5 in the CDM Smith Laboratory. Composite C5 is intended to be representative of a homogenized sample of the observed subsurface conditions throughout the creek corridor. It comprises approximately 30.0 percent C1/C3 sediment, 35.0 percent C2 sediment, and 35.0 percent C4 sediment. Composite C5 was included as part of the dewatering evaluation to determine if the organic, fine-grained sediments could be mixed with the granular sediments on-site to effectively dewater.

Dewatering Test Procedures

The dewatering study took place at the CDM Smith Geotechnical Laboratory the week of December 17, 2018. Water from the creek was collected and used in the sediment slurries. This section presents an overall summary of the dewatering study that was performed. All procedures were conducted in accordance with the Treatability Study Work Plan (CDM Smith 2018). The following study activities are described herein:

- Use and Selection of Polymers
- Preparation of Sediment Slurry
- Dewatering Testing

Use and Selection of Polymers

Polymers are often used in dewatering sediments as additives to enhance the liquid and particulate separation during sediment processing. Polymers are also used in the water treatment process for removal of suspended solids. The purpose of using polymers during the dewatering studies is to determine if the use of a polymer is effective in achieving dewatering of the Eighteen Mile Creek fine-grained sediments.

Prior to running the dewatering studies, a polymer screening evaluation was conducted on composite samples C1 and C3 to identify the most effective polymer to use in the dewatering studies. Both C1 and C3 consist of organic, fine-grained sediments that will not effectively dewater within 24-hours without the addition of a polymer. For the polymer screening evaluation, a total of two 2.5-gallon samples was submitted to WaterSolve, LLC of Caledonia, Michigan for identification of polymer flocculants and dosing rates for Geotube dewatering applications. WaterSolve develops polymers that are specifically used in water, wastewater, and sediment and sludge dewatering applications.

Methods, materials, and results for the polymer screening are detailed in **Attachment B.** It was determined that Solve 426 and Solve 216B polymers, at dosage rates of 1.5 pounds per dry ton were the most compatible to use for the dewatering study.

Preparation of Sediment Slurry

The amount of sediment needed for each dewatering test was determined based on the dewatered sediment needed to conduct the solidification/stabilization study (summarized in the following sections). From this evaluation, it was determined that approximately 7.5 pounds (lbs) of dewatered sediment from each slurry-mix application would be required to conduct the proposed solidification/stabilization mixing.

Hydraulically dredged sediments are generally conveyed to a processing facility by creating a slurry of the sediment solids with the surrounding creek/river water. Typical dredge slurry solids content is approximately 10 percent solids. The amount of sediment (at 43.0 percent solids) and additional water needed to prepare a slurry at 10 percent solids is presented in **Table 3.** This slurry design yielded the required amount of sediment needed to conduct the solidification/stabilization mixing (approximately 7.5 lbs).

The dewatering test slurries were named to identify the sediment composite ID, the USCS ID, percent organics, and if a polymer was added to the dewatering slurry. Before the 10 percent slurry was prepared, the following data parameters were collected:

1. The moisture content of each sediment composite was measured, and appropriate adjustments were made to the slurry quantities to account for the moisture contained within the sediment.

2. The water quality parameters were collected from the Eighteen Mile Creek surface water until water quality parameters were stabilized. A YSI multimeter was used to collect readings for temperature, pH, specific conductance, dissolved oxygen (DO), and oxidation reduction potential (ORP). A Hach meter was used to collect turbidity readings.

A total of five slurries were created for the dewatering assessment and are summarized in **Table 3**.

Polymer Preparation and Application

The selected polymers required dilution before being added to the sediment slurry for each dewatering test. Polymer dosages were determined as part of the polymer screening evaluation. After the sediment slurry was prepared, the polymers were added to the recommended applications and mixed until a floc is formed.

Dewatering Testing

For the dewatering assessment, two test methods were used: the geotextile dewatering test (GDT) and the rapid dewatering test (RDT). The GDT is a three-dimensional test that is representative of a sediment slurry dewatering through a Geotube over a 24-hour period of time. This test was also used to produce the required volume of sediment needed to perform the solidification mixing. The GDT's were performed accordance with ASTM D7880/D7880M – 13 (**Attachment B**). Geotube bags fitted with polyvinyl chloride standpipe connecters were provided by TenCate and WaterSolve, LLC. The homogenized slurries were funneled into the bag through a standpipe, with the expelled water collecting in a plastic tote beneath the suspended Geotube bag. The expelled water was measured and recorded at various time intervals throughout the 24-hour test period. Upon completion of the GDT test, samples of the solids retained in the Geotube bag were extracted for moisture content analysis and a paint filter test.

The RDT test is a two-dimensional test that was used to evaluate the overall effectiveness of the sediment to dewater. The RDT is performed on small-scale samples (500 milliliters) over a period of 300 seconds, it is a smaller and shorter test than the GDT and helps to evaluate which sediment slurries will successfully dewater prior to running the GDTs. The RDT apparatus was constructed using laboratory materials available, in general accordance with the standard procedures

developed by TenCate and WaterSolve, LLC and presented in **Attachment C**. Geotextile (opening size #40) samples provided by TenCate and WaterSolve, LLC were fitted to the RDT setup and the device was secured and sealed to prevent leaking and ensure that the slurry flow path was restricted to passing through the geotextile sample.

Both the GDT and the RDT were completed for each composite sample, with the RDT being used as a supplemental tool in the lab to the GDT. The data collected from both tests will be useful for future remedial design. A summary of the dewatering testing performed is provided in **Table 4**.

Table 4: Dewatering Test Summary

Slurry ID	RDT	GDT
C1-OH8	X	X
C1-OH8P	X	X
C3-OH15	X	X
C3-OH15P	X	X
C5	X	X

Dewatering tests were considered successful if the composite samples can pass the paint filter test after 24 hours. A total of ten paint filter tests were completed, one for each dewatering test. Water quality parameters were collected from the leachate water after each test is complete. Readings were collected until water quality parameters are stabilized. Turbidity measurements were taken using a Hach 2100Q turbidimeter, and water quality measurements were taken using a YSI 6920 multiparameter water quality meter. Data recorded during the RDT and GDT is presented in **Attachment D**.

Solidification/Stabilization Procedures

Solidification/stabilization mixing was performed at the CDM Smith Geotechnical Laboratory in accordance with the Geotechnical Treatability Study Work Plan. Solidification/stabilization was only performed on dewatered samples that successfully passed the paint filter test of C1-OH8P and C3-OH15P. Samples C2, C4, and C5 were not selected for soil solidification and UCS testing due to a higher granular content of the dewatered sediment.

Sediment mixes were prepared in accordance with the mix design summary, as presented in **Table 5**. The mix design summary provides ratios of dewatered samples and additive that was mixed for each evaluation. The following additive was chosen based on locally available material with the target end goal being for disposal:

- Type I/II Portland Cement (PC): A sample was obtained from a local hardware store or a local building materials supplier.

The additive was mixed into the dewatered sediment using a spatula until fully homogenized. Once a fully homogenized mixture was achieved, the mixtures were cast into 2-inch by 4-inch molds in three equal lifts such that air pockets were not formed. Four cylinders were prepared for each mix. Each cylinder was weighed, capped, labeled, sealed, and placed in a 5-gallon bucket with sufficient water to create a humid environment when closed for curing. Soil mixing data sheets are included in **Attachment E**.

The sample molds were set to cure for 3 days, 14 days, and 28 days prior to physical testing. Physical testing of the sediment mixes was performed to characterize the engineering properties of the treated soil mixture and included the following:

- Unconfined Compression Strength (UCS) Testing (ASTM D2166)
- Pocket Penetrometer (ASTM WK27337)

Table 5: Mix Design Summary and Testing

Composite ID	Additive	Dosage – By Weight (%)	Unconfined Compression Testing		
			3-Day	14-Day	28-Day
C1-OH8	PC	5	X	X	X
		10	X	X	X
		15	X	X	X
C1-OH8P	PC	5	X	X	X
		10	X	X	X
		15	X	X	X
C3-OH15	PC	5	X	X	X
		10	X	X	X
		15	X	X	X
C3-OH15P	PC	5	X	X	X
		10	X	X	X
		15	X	X	X
Total Mixes			**36**		

Mix Design and Sample Identification

The solidified sediment mixes were named to identify the composite ID, additive used, additive dosage, and cylinder cast number. For example, sample C1-OH8-PC5-1 indicates the sample came from composite sample C1-OH8, the additive used is Portland Cement, the additive dosage is 5.0 percent, and the cylinder cast identification is 1.

Summary of Findings

A summary of the GDT, RDT, and paint filter test results is presented in **Figure 1**, **Figure 2** and **Table 6**. A summary of the unconfined compressive strength test results is presented in **Figure 3** and **Table 7.** The laboratory test results are included in **Attachment F.** Photologs from the treatability study are included in **Attachment G**.

Dewatering Testing

The following general results were observed during the dewatering study:

- Composite sediment sample C5, containing significant proportions of granular sediment, was able to effectively dewater without the addition of a polymer and pass the paint filter test after 24-hours of dewatering.

- Composite sediment samples C1-OH8 and C3-OH15, where the GDT was conducted without a polymer addition, both failed the paint filter test after 24 hours of dewatering.
- Composite sediment samples C1-OH8P and C3-OH15P, where the GDT was conducted with a polymer addition, both passed the paint filter test after 24 hours of dewatering.

Sediment Solidification Testing

The following general results were observed during the soil solidification study:

- Portland Cement generally solidified the dewatered sediments enough to conduct unconfined compressive strength tests on each of the molds prepared. A summary of the general range in results is provided below:
    - C1-OH8P samples mixed with cement at dosages of 5, 10, and 15 percent set to cure for 3 days reached unconfined compressive strengths ranging from 4.2 psi to 22.8 psi.
    - C3-OH15P samples mixed with cement at dosages of 5, 10, and 15 percent set to cure for 3 days reached unconfined compressive strengths ranging from 4.3 psi to 22.9 psi.
    - C1-OH8P and samples mixed with cement at dosages of 5, 10, and 15 percent set to cure for 14 days reached unconfined compressive strengths ranging from 6.1 psi to 49.6 psi.
    - C3-OH15P samples mixed with cement at dosages of 5, 10, and 15 percent set to cure for 14 days reached unconfined compressive strengths ranging from 5.6 psi to 44.3 psi.
    - C1-OH8P samples mixed with cement at dosages of 5, 10, and 15 percent set to cure for 28 days reached unconfined compressive strengths ranging from 6.5 psi to 47.8 psi.
    - C3-OH15P samples mixed with cement at dosages of 5, 10, and 15 percent set to cure for 28 days reached unconfined compressive strengths ranging from 6.1 psi to 49.4 psi.

Conclusions and Recommendations

Based on the results of the Geotechnical Treatability bench-scale study, the following conclusions have been made:

- Granular sediments as observed in composite samples C2 and C4, may be used to mix and help dewater fine-grained sediments within the Eighteen Mile Creek, as observed by C5 successfully passing the paint filter test after 24-hours of dewatering.

- Fine-grained sediments that are not mixed with either granular sediments or a polymer did not readily dewater and were not able to pass the paint filter test after dewatering for 24-hours, as observed by the GDT's performed for C1-OH8 and C3-OH15.
- Fine-grained sediments that were not mixed with granular sediments were able to effectively dewater if mixed with a polymer, as indicated by GDTS's C1-OH8P and C3-OH15P both passing the paint filter test after a 24-hour period of time.
- None of the solidified samples met the compressive strength disposal criteria of 50 psi.

Based on the conclusions summarized above, the following recommendations have been made:

- To meet the regulatory criteria that no disposal material shall contain "free-standing" water, it is recommended that the fine-grained sediment within the Eighteen Mile Creek either be treated with a polymer or bulked with granular material to effectively dewater.
- To meet the regulatory criteria that the disposal material be stable and meet a minimum compressive strength of 50 psi, it is recommended that additional bench scale studies be performed to identify the right type of additive and dosage to effectively stabilized the sediment.

Closing Statement

This study was performed to assess the creek corridor sediments for disposal of the waste to meet landfill criteria for the Eighteen Mile Creek Superfund Site OUs 1 and 2. The natural dewatering behavior of the creek corridor sediment and dewatering properties of the material with polymer additives were evaluated for design of Geotube dewatering. Additionally, cement mixing doses were investigated for solidification of fine-grained sediments to meet strength requirements for landfill disposal.

Figures

Figure 1 – Summary of RDT Results
Figure 2 – Summary GDT Results
Figure 3 – Summary of UCS Test Results

Tables

Table 1 – Composite Sample Summary
Table 2 – Summary of Sediment Treatability Study Index Test Results
Table 3 – Summary of Sediment Treatability Study Slurry Make-Down
Table 4 – Dewatering Test Summary
Table 5 – Mix Design Summary and Testing
Table 6 – Summary of Sediment Treatability Study Dewatering Test Results
Table 7 – Summary of Sediment Treatability Study UCS Test Results

Attachments

Attachment A – Laboratory Index Test Results
Attachment B – Polymer Screening Report

Attachment C – Dewatering Test Procedures
Attachment D – Dewatering Test Data Sheets
Attachment E – Soil Mixing Data Sheets
Attachment F – Unconfined Compressive Strength Test Results
Attachment G – Treatability Study Photographs

Figures

United States Army Corps of Engineers - Kansas City District
18 Mile Creek Superfund Site - OU 1 2
Lockport, Niagara County, NY

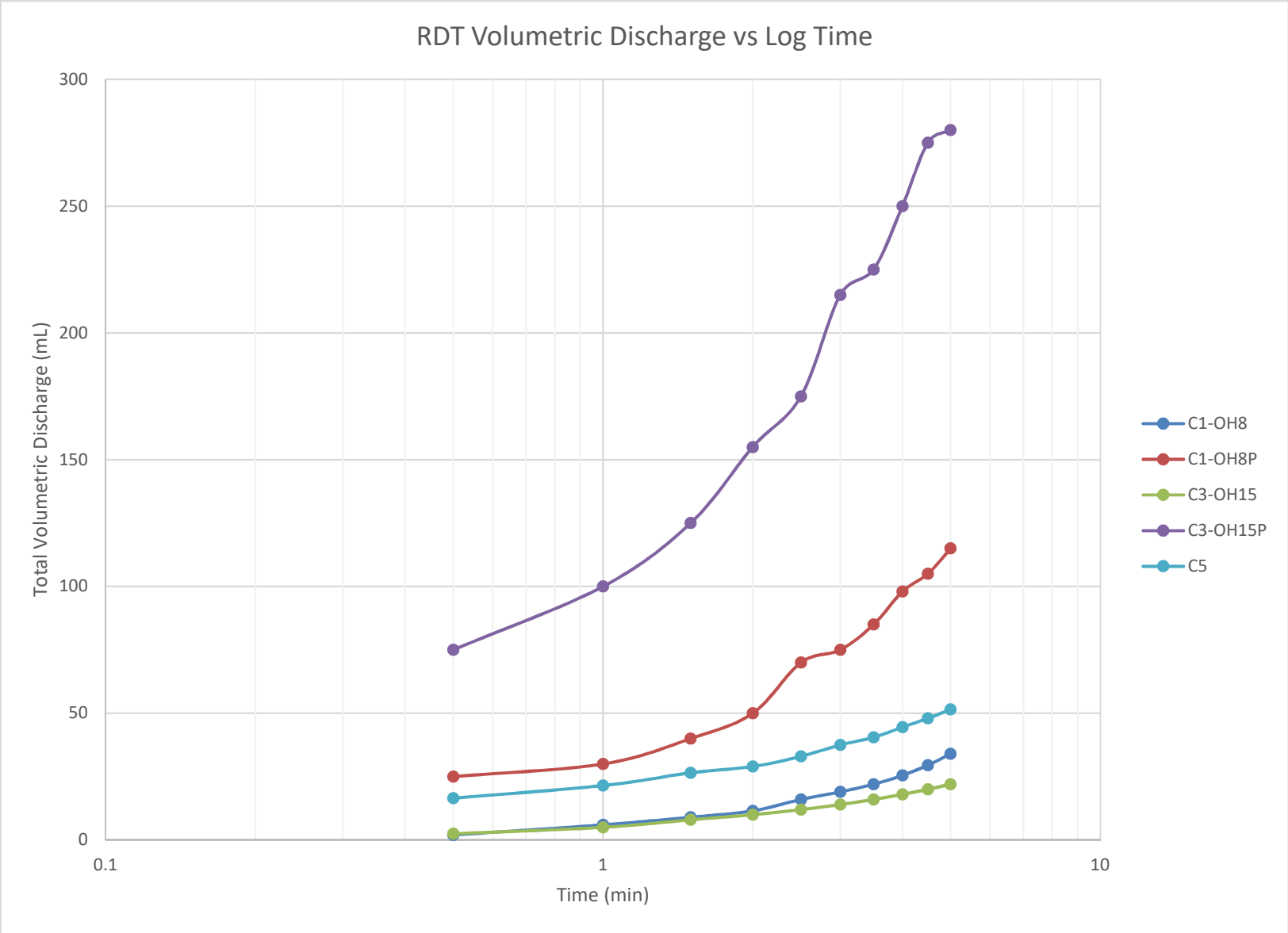


Figure 1
Summary of RDT Results

United States Army Corps of Engineers - Kansas City District
18 Mile Creek Superfund Site - OU 1 2
Lockport, Niagara County, NY

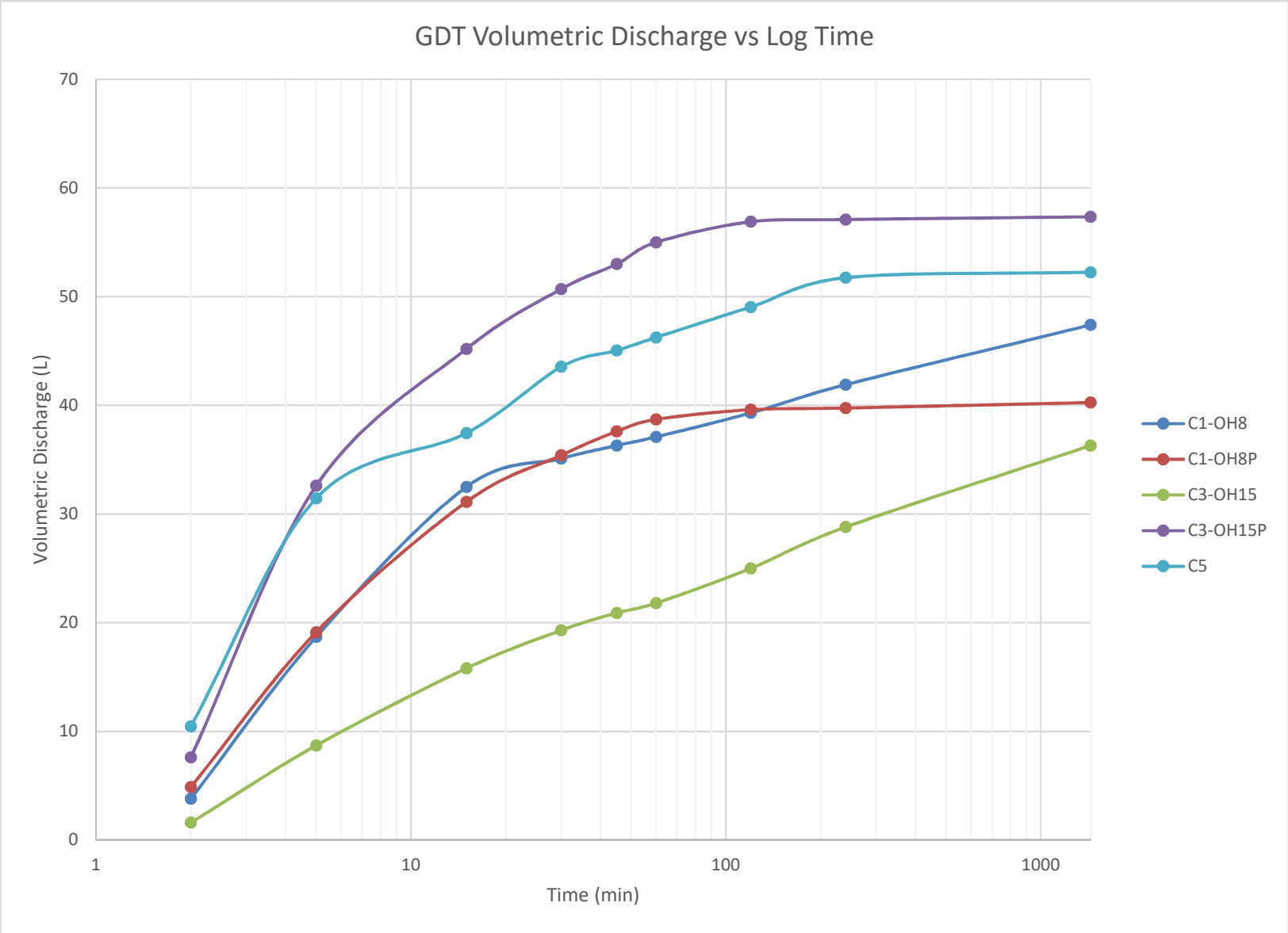


Figure 2
Summary of GDT Results

United States Army Corps of Engineers - Kansas City District
18 Mile Creek Superfund Site - OU 1 2
Lockport, Niagara County, NY

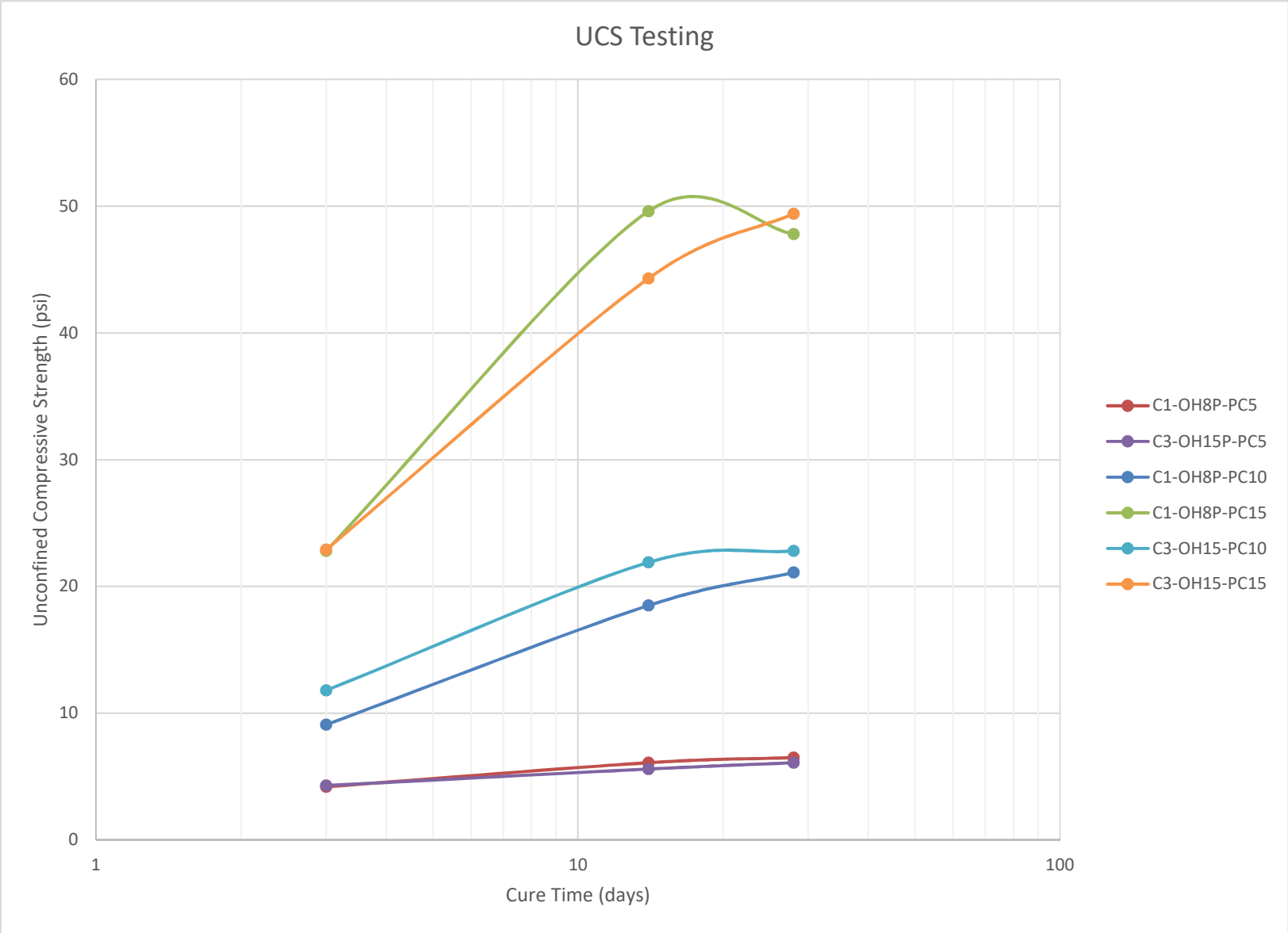


Figure 3
Summary of UCS Test Results

Tables

United States Army Corps of Engineers - Kansas City District
18 Mile Creek Superfund Site - OU 1 & 2
Lockport, Niagara County, NY

Table 1
Summary of Sediment Treatability Study Index Test Results

Sample Number	USCS Classification [1]	Grain Size Analysis [2]							Atterberg Limits [3]			Moisture Content (%) [4]	Organic Content (%) [5]	Specific Gravity, G_s [6]
		Gravel (%)		Sand (%)			Fines (%)							
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	LL (%)	PL (%)	PI (%)			
C1	OH	0.0	0.0	1.1	1.6	3.4	60.2	33.7	71	34	37	87.0	8.3	2.54
C2	GP-GM	12.3	34.8	14.7	22.3	9.8	4.2	1.9	--	--	--	18.9	--	2.68
C3	OH	0.0	0.0	1.1	5.2	29.0	45.5	19.2	76	35	41	107.6	15.0	2.54
C4	SW-SM	9.3	26.1	13.4	30.1	12.4	7.0	1.7	--	--	--	23.0	--	2.67
C5	SM	9.5	29.2	16.4	19.8	9.7	10.1	5.3	NP	NV	NP	45.9	5.7	

Notes:

1. USCS classifications were performed in accordance with ASTM D-2488.
2. Grain size analysis tests performed in accordance with ASTM D-6913 and ASTM D-7928.
3. Atterberg Limit tests performed in accordance with ASTM D-4318.
4. Moisture content analysis performed in accordance with ASTM D-2216.
5. Organic content analysis performed in accordance with ASTM D-2974.
6. Specific gravity analysis performed in accordance with ASTM D-854.

Abbreviations:

OH: Organic Highly Plastic Clay
GP-GM: Poorly Graded Gravel with Silt
SW-SM Well Graded Sand with Silt
SM: Silty Sand
--: No Value

CDM Smith

United States Army Corps of Engineers - Kansas City District
18 Mile Creek Superfund Site - OU 1 & 2
Lockport, Niagara County, NY

Table 2
Summary of Slurry Make-Down

Sample	USCS Classification	Initial Moisture Content (%)	Sediment Solids (%)	Required Slurry Solids (%)	Water Added (lbs)	Total Slurry (lbs)	Polymer Additions	
							Solve 426 (g)	Solve 216B (g)
C1-OH8P	OH	77.0	56.0	10.0	93.9	114.1	3.9	3.9
C1-OH8	OH	77.0	56.0	10.0	93.6	113.7	--	--
C3-OH15P	OH	70.0	59.0	10.0	122.4	147.4	5.0	5.0
C3-OH15	OH	70.0	59.0	10.0	104.3	125.6	--	--
C5	SM	43.0	70.0	10.0	117.4	137.0	--	--

Abbreviations:

OH: Organic Highly Plastic Clay

SM: Silty Sand

United States Army Corps of Engineers - Kansas City District
18 Mile Creek Superfund Site - OU 1 & 2
Lockport, Niagara County, NY

Table 3
Summary of Dewatering Test Results

Sample	USCS Classification	Sediment Initial Moisture Content (%)	RDT Total Collected Volume [1] (mL)	GDT Total Collected Volume[2] (L)	Sediment Final Moisture Content[3] (%)	Paint Filter Test (Pass/Fail)
C1-OH8P	OH	77.0	115.0	40.3	172.0	Pass
C1-OH8	OH	77.0	34.0	47.4	80.6	Fail
C3-OH15P	OH	70.0	280.0	57.4	120.0	Pass
C3-OH15	OH	70.0	22.0	36.3	55.3	Fail
C5	SM	43.0	51.5	52.3	55.0	Pass

Notes:

1. Rapid Dewatering Test (RDT) duration is 5 minutes.
2. Geotube® Dewater Test (GDT) duration is 24-hours.
3. Final moisture content collected from sediment retained in the GDT bag.

United States Army Corps of Engineers - Kansas City District
18 Mile Creek Superfund Site - OU 1 & 2
Lockport, Niagara County, NY

Table 4
Summary of Unconfined Compressive Strength Laboratory Test Results

Sample	% Cement	Cure Time (Days)	Dry Density (pcf)	Pocket Penetrometer Reading (tsf)	Unconfined Compressive Strength[1] (psi)	Shear Strength[1] (psi)
C1-OH8P	5	3	42.3	0.25	4.2	2.1
C1-OH8P	5	14	42.2	0.25	6.1	3.1
C1-OH8P	5	28	42.8	1.00	6.5	3.2
C1-OH8P	10	3	43.3	0.80	9.1	4.6
C1-OH8P	10	14	43.4	2.7	18.5	9.2
C1-OH8P	10	28	43.8	2.8	21.1	10.5
C1-OH8P	15	3	47.8	2.4	22.8	11.4
C1-OH8P	15	14	48.9	>4.5	49.6	24.8
C1-OH8P	15	28	49.8	>4.5	47.8	23.9
C3-OH15P	5	3	46.8	<0.25	4.3	2.1
C3-OH15P	5	14	47.3	0.4	5.6	2.8
C3-OH15P	5	28	47.0	1.0	6.1	3.1
C3-OH15P	10	3	48.7	1.7	11.8	5.9
C3-OH15P	10	14	49.4	3.1	21.9	10.9
C3-OH15P	10	28	50.8	3.1	22.8	11.4
C3-OH15P	15	3	52.0	3.9	22.9	11.5
C3-OH15P	15	14	52.2	>4.5	44.3	22.2
C3-OH15P	15	28	53.3	>4.5	49.4	24.7

Notes:

1. Unconfined Compressive Strength tests preformed in accordance with ASTM D-1633.

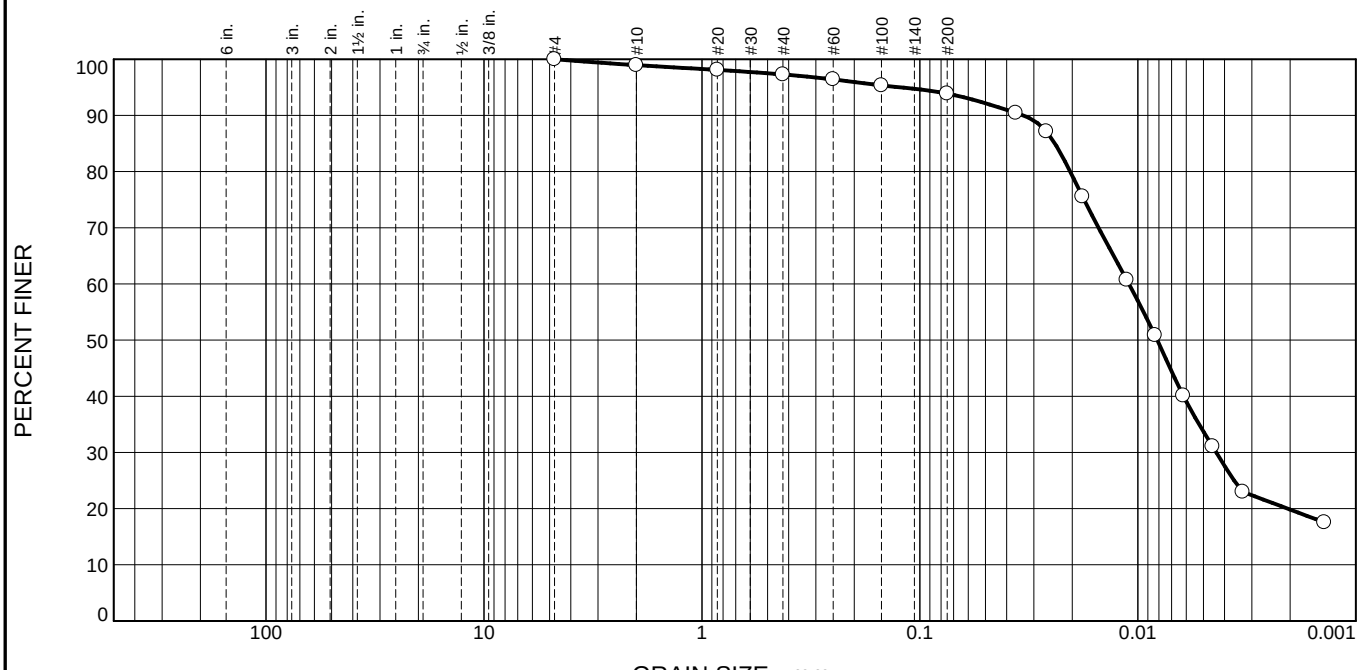
Abbreviations:

pcf: pounds per cubic foot
psi: pounds per square inch
tsf: tons per square foot

Attachment A

Laboratory Index Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.1	1.6	3.4	60.2	33.7

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	98.9		
#20	98.1		
#40	97.3		
#60	96.4		
#100	95.3		
#200	93.9		
0.0363 mm.	90.5		
0.0263 mm.	87.1		
0.0179 mm.	75.6		
0.0113 mm.	60.7		
0.0083 mm.	50.9		
0.0062 mm.	40.1		
0.0045 mm.	31.1		
0.0033 mm.	23.0		
0.0014 mm.	17.5		

* (no specification provided)

Material Description

Brown fat clay with organic fines

Atterberg Limits (ASTM D 4318)

PL= 34 **LL=** 71 **PI=** 37

Classification

USCS (D 2487)= OH **AASHTO (M 145)=** A-7-5(42)

Coefficients

D_{90}= 0.0335 D_{85}= 0.0240 D_{60}= 0.0110
D_{50}= 0.0081 D_{30}= 0.0044 D_{15}=
D_{10}= C_u= C_c=

Remarks

As received MC = 87.0%
No gravel observed in samples. Glass and twigs were not included in gradation sample.

Date Received: 10/31/18 **Date Tested:** 11/2/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

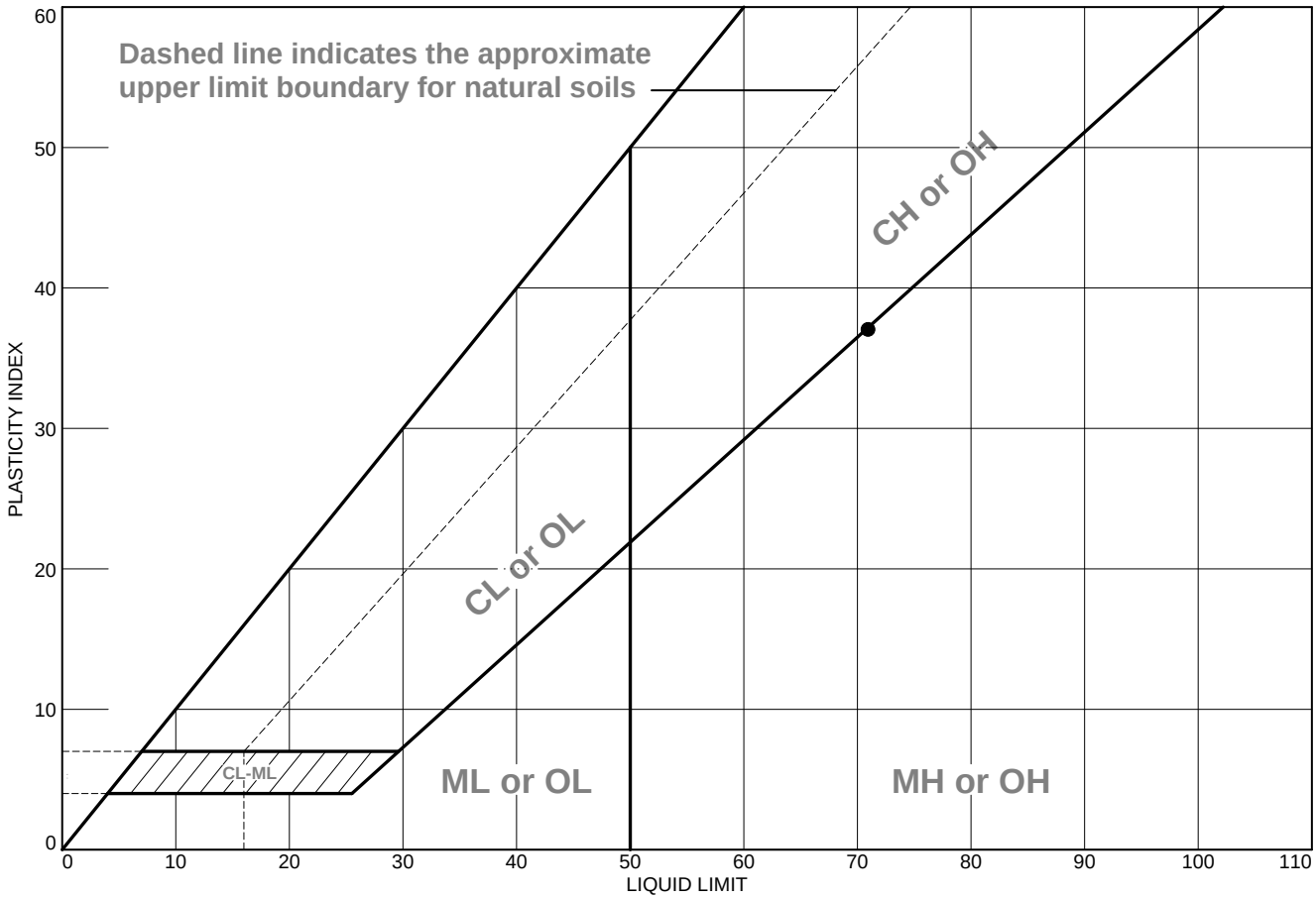
Source of Sample: C1 **Depth:** Grab **Date Sampled:** 10/8/18
Sample Number: C1

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Brown fat clay with organic fines	10/8/18	11/1/18	MP/AS	71	34	37	97.3	OH

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** C1 **Depth:** Grab **Sample Number:** C1

CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: MP/AS **Checked By:** MP

CDM Smith

Geotechnical Engineering Laboratory

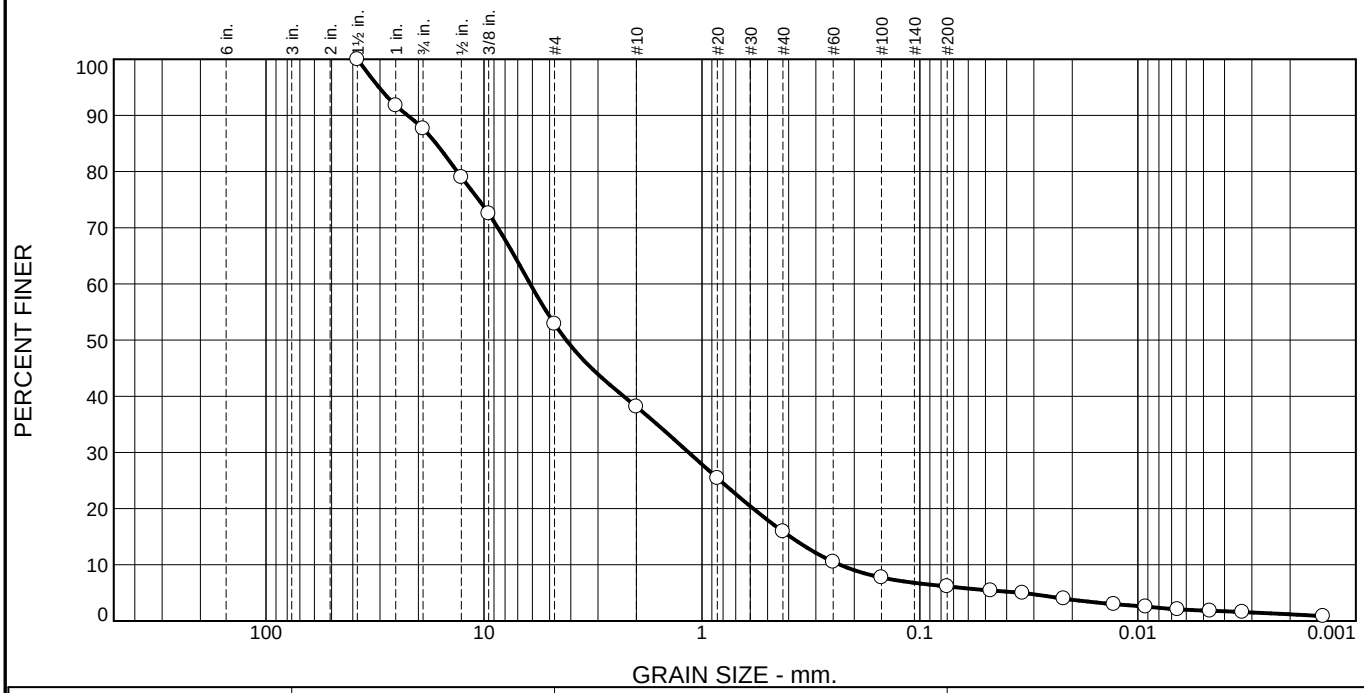
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	MP
Project Location:	Lockport, NY	Test Date:	10/31/2018
Project Number:	51147-223203		
Boring Number:	C1	Procedure:	C
Sample Number:	C1	Temperature:	440° C
Sample Depth (ft):	Grab		
Sample Date:	10/8/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	126.75
Wet Mass of Sample & Tin (g)	234.55
Dry Mass of Sample & Tin (g)	184.84
Mass of Water (g)	49.71
Mass of Dry Soil (g)	58.09
Moisture Content (%)	**85.6**

ASH CONTENT	
Porcelain Dish Mass (g)	126.75
Porcelain Dish + Oven Dried Soil (g)	184.84
Mass of Oven Dried Soil (g)	58.09
Mass of Dish & Burned Soil (g)	180.00
Mass of Burned Soil (g)	53.25
Mass of Organic Material (g)	4.84
Ash Content (%)	91.7
Organic Content (%)	**8.3**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.3	34.8	14.7	22.3	9.8	4.2	1.9

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	91.8		
.75"	87.7		
.5"	79.0		
.375"	72.6		
#4	52.9		
#10	38.2		
#20	25.4		
#40	15.9		
#60	10.5		
#100	7.7		
#200	6.1		
0.0474 mm.	5.4		
0.0339 mm.	5.0		
0.0219 mm.	4.0		
0.0129 mm.	3.0		
0.0092 mm.	2.5		
0.0066 mm.	2.1		
0.0047 mm.	1.8		
0.0033 mm.	1.6		
0.0014 mm.	0.9		

* (no specification provided)

Material Description

Dark brown poorly graded gravel with silt and sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GP-GM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 22.4111 D_{85}= 16.5739 D_{60}= 6.1369
D_{50}= 4.1943 D_{30}= 1.1509 D_{15}= 0.3932
D_{10}= 0.2328 C_u= 26.36 C_c= 0.93

Remarks

As received MC = 18.9%

Date Received: 10/31/18 **Date Tested:** 11/6/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

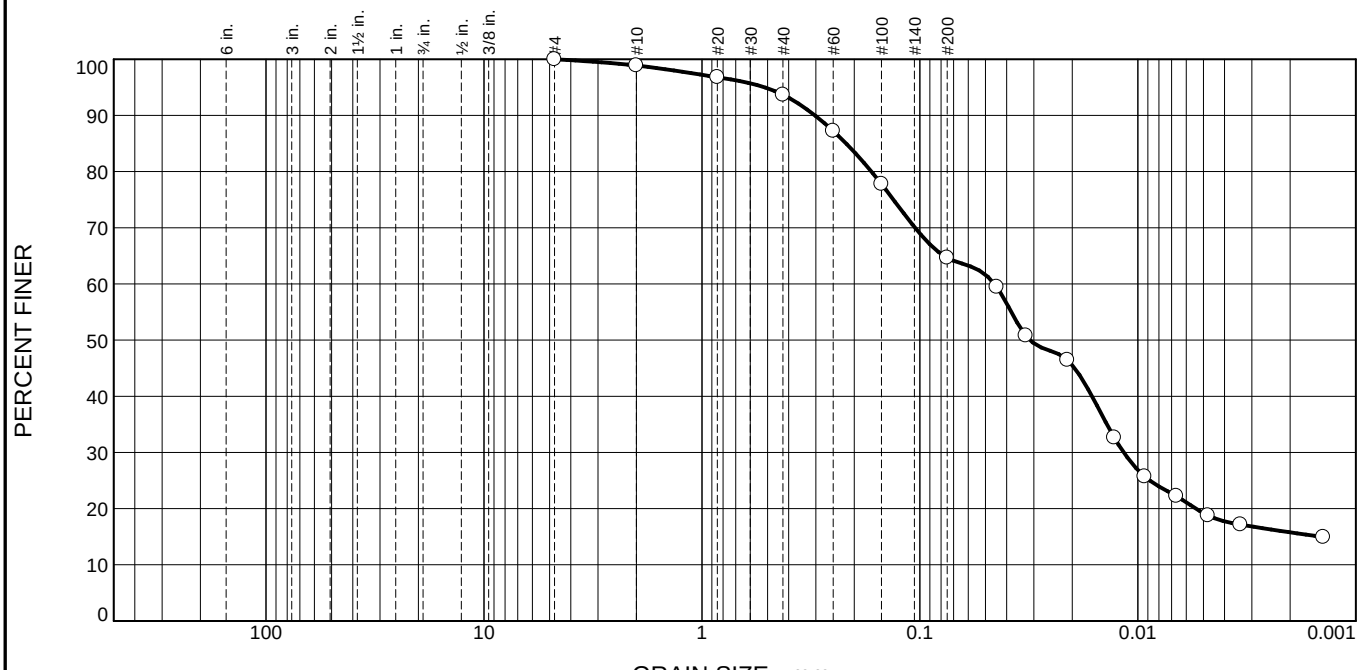
Source of Sample: C2 **Depth:** Grab **Date Sampled:** 10/8/18
Sample Number: C2

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.1	5.2	29.0	45.5	19.2

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	98.9		
#20	96.8		
#40	93.7		
#60	87.2		
#100	77.8		
#200	64.7		
0.0444 mm.	59.5		
0.0327 mm.	50.8		
0.0211 mm.	46.5		
0.0128 mm.	32.6		
0.0093 mm.	25.7		
0.0067 mm.	22.2		
0.0048 mm.	18.8		
0.0034 mm.	17.2		
0.0014 mm.	14.9		

* (no specification provided)

Material Description

Dark brown sandy fat clay with organic fines

Atterberg Limits (ASTM D 4318)

PL= 35 **LL=** 76 **PI=** 41

Classification

USCS (D 2487)= OH **AASHTO (M 145)=** A-7-5(27)

Coefficients

D_{90}= 0.3029 D_{85}= 0.2180 D_{60}= 0.0455
D_{50}= 0.0313 D_{30}= 0.0116 D_{15}= 0.0015
D_{10}= C_u= C_c=

Remarks

As received MC = 107.6%
No gravel observed in samples. Glass and twigs were not included in gradation sample.

Date Received: 10/31/18 **Date Tested:** 11/2/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

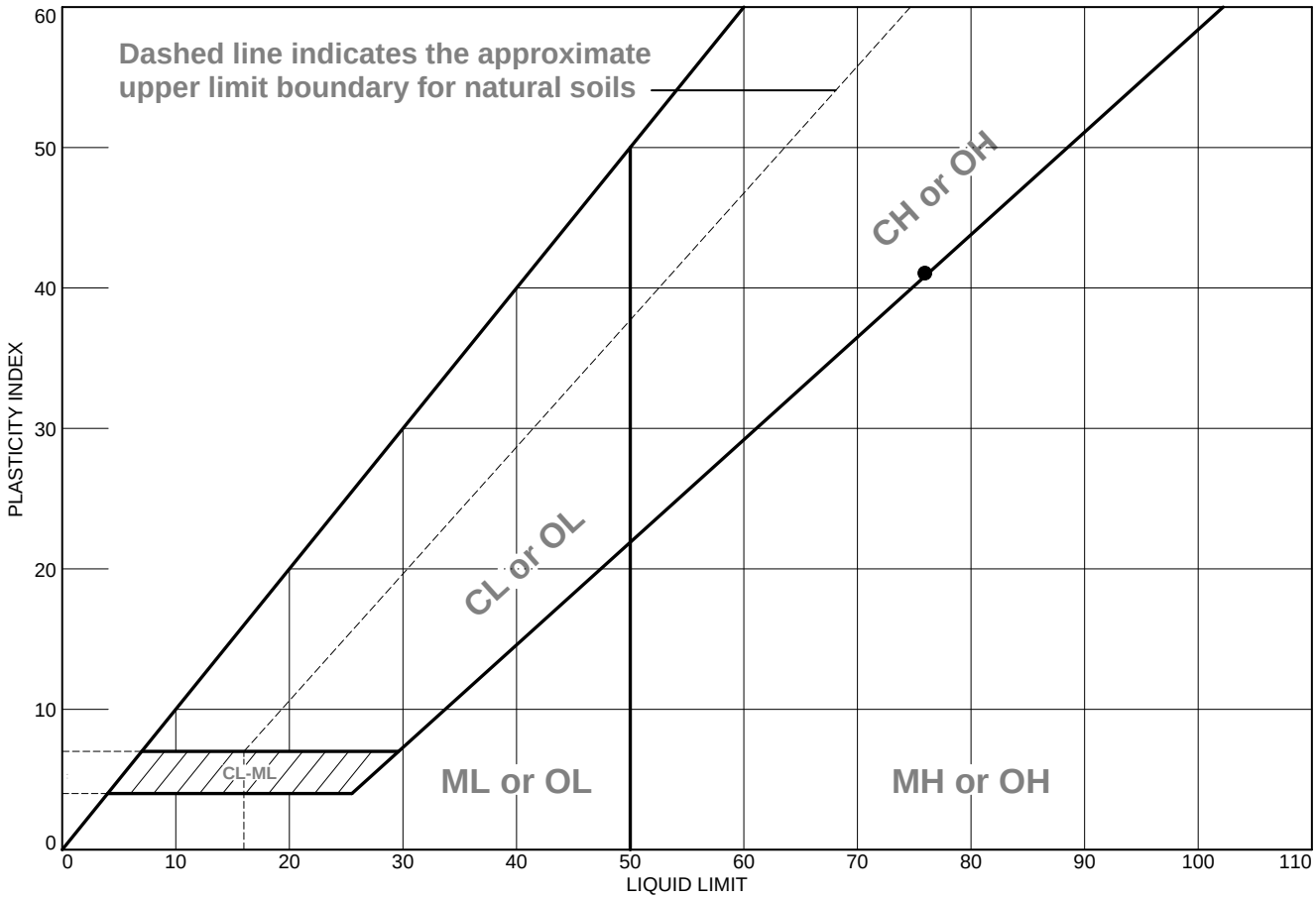
Source of Sample: C3 **Depth:** Grab **Date Sampled:** 10/8/18
Sample Number: C3

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Dark brown sandy fat clay with organic fines	10/8/18	11/2/18	AS	76	35	41	93.7	OH

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek

Lockport, NY

○**Source of Sample:** C3 **Depth:** Grab **Sample Number:** C3

CDM Smith

Boston, Massachusetts

Checked by: MP

Title: Laboratory Manager

Tested By: AS **Checked By:** MP

CDM Smith

Geotechnical Engineering Laboratory

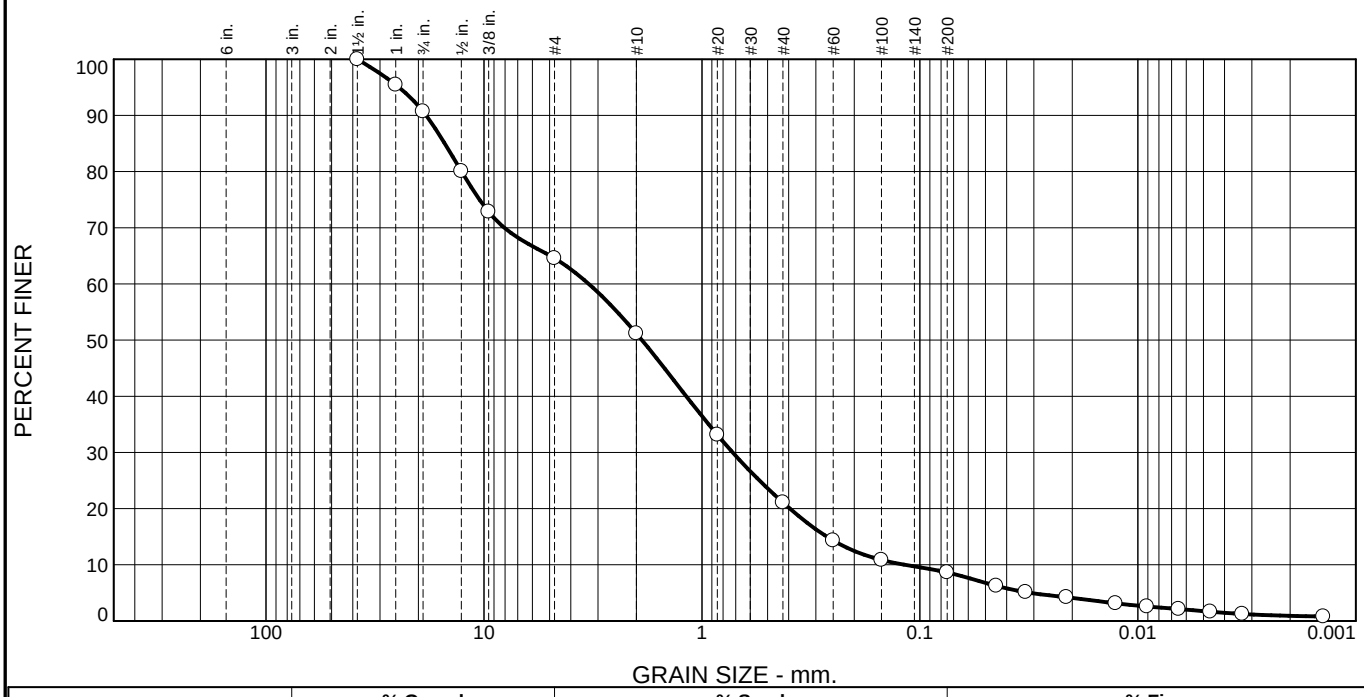
Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	MP
Project Location:	Lockport, NY	Test Date:	11/1/2018
Project Number:	51147-223203		
Boring Number:	C3	Procedure:	C
Sample Number:	C3	Temperature:	440° C
Sample Depth (ft):	Grab		
Sample Date:	10/8/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	96.97
Wet Mass of Sample & Tin (g)	224.44
Dry Mass of Sample & Tin (g)	153.00
Mass of Water (g)	71.44
Mass of Dry Soil (g)	56.03
Moisture Content (%)	**127.5**

ASH CONTENT	
Porcelain Dish Mass (g)	96.97
Porcelain Dish + Oven Dried Soil (g)	153.00
Mass of Oven Dried Soil (g)	56.03
Mass of Dish & Burned Soil (g)	144.60
Mass of Burned Soil (g)	47.63
Mass of Organic Material (g)	8.40
Ash Content (%)	85.0
Organic Content (%)	**15.0**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.3	26.1	13.4	30.1	12.4	7.0	1.7

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	95.5		
.75"	90.7		
.5"	80.1		
.375"	72.9		
#4	64.6		
#10	51.2		
#20	33.1		
#40	21.1		
#60	14.3		
#100	10.9		
#200	8.7		
0.0446 mm.	6.3		
0.0327 mm.	5.1		
0.0212 mm.	4.2		
0.0126 mm.	3.1		
0.0091 mm.	2.6		
0.0065 mm.	2.1		
0.0047 mm.	1.6		
0.0033 mm.	1.2		
0.0014 mm.	0.8		

* (no specification provided)

Material Description

Brown well-graded sand with silt and gravel with shells, glass and metal

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 18.4366 D_{85}= 15.1396 D_{60}= 3.3050
D_{50}= 1.8860 D_{30}= 0.7227 D_{15}= 0.2673
D_{10}= 0.1173 C_u= 28.18 C_c= 1.35

Remarks

As received MC = 23.0%

Date Received: 10/31/18 **Date Tested:** 11/6/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

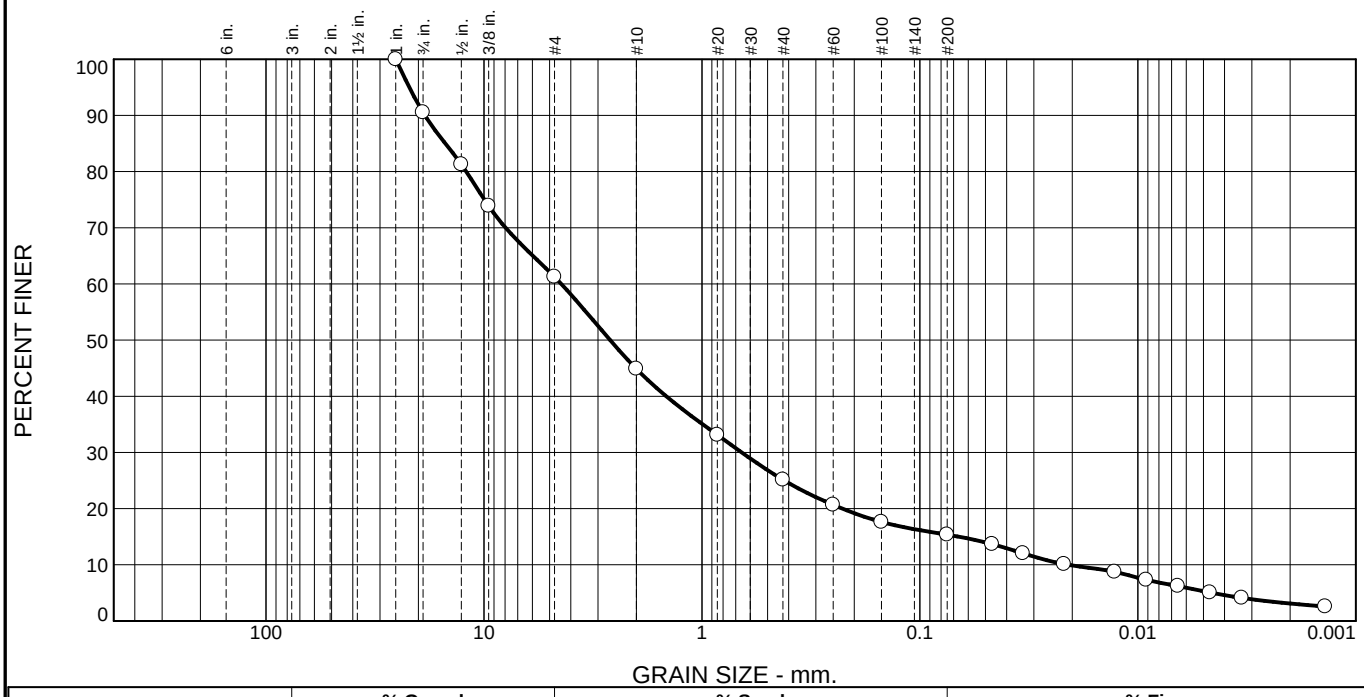
Source of Sample: C4 **Depth:** Grab **Date Sampled:** 10/8/18
Sample Number: C4

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.5	29.2	16.4	19.8	9.7	10.1	5.3

Test Results (ASTM D6913 & D7928 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
.75"	90.5		
.5"	81.3		
.375"	73.9		
#4	61.3		
#10	44.9		
#20	33.1		
#40	25.1		
#60	20.7		
#100	17.6		
#200	15.4		
0.0466 mm.	13.7		
0.0337 mm.	12.0		
0.0218 mm.	10.1		
0.0128 mm.	8.7		
0.0092 mm.	7.3		
0.0065 mm.	6.2		
0.0047 mm.	5.1		
0.0033 mm.	4.1		
0.0014 mm.	2.6		

* (no specification provided)

Material Description

Dark brown silty sand with gravel, trace organics

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 18.6849 D_{85}= 15.0468 D_{60}= 4.4216
D_{50}= 2.6378 D_{30}= 0.6572 D_{15}= 0.0665
D_{10}= 0.0210 C_u= 211.05 C_c= 4.66

Remarks

As received MC = 45.9%

Date Received: 10/31/18 **Date Tested:** 12/6/18

Tested By: AS/MP

Checked By: MP

Title: Laboratory Manager

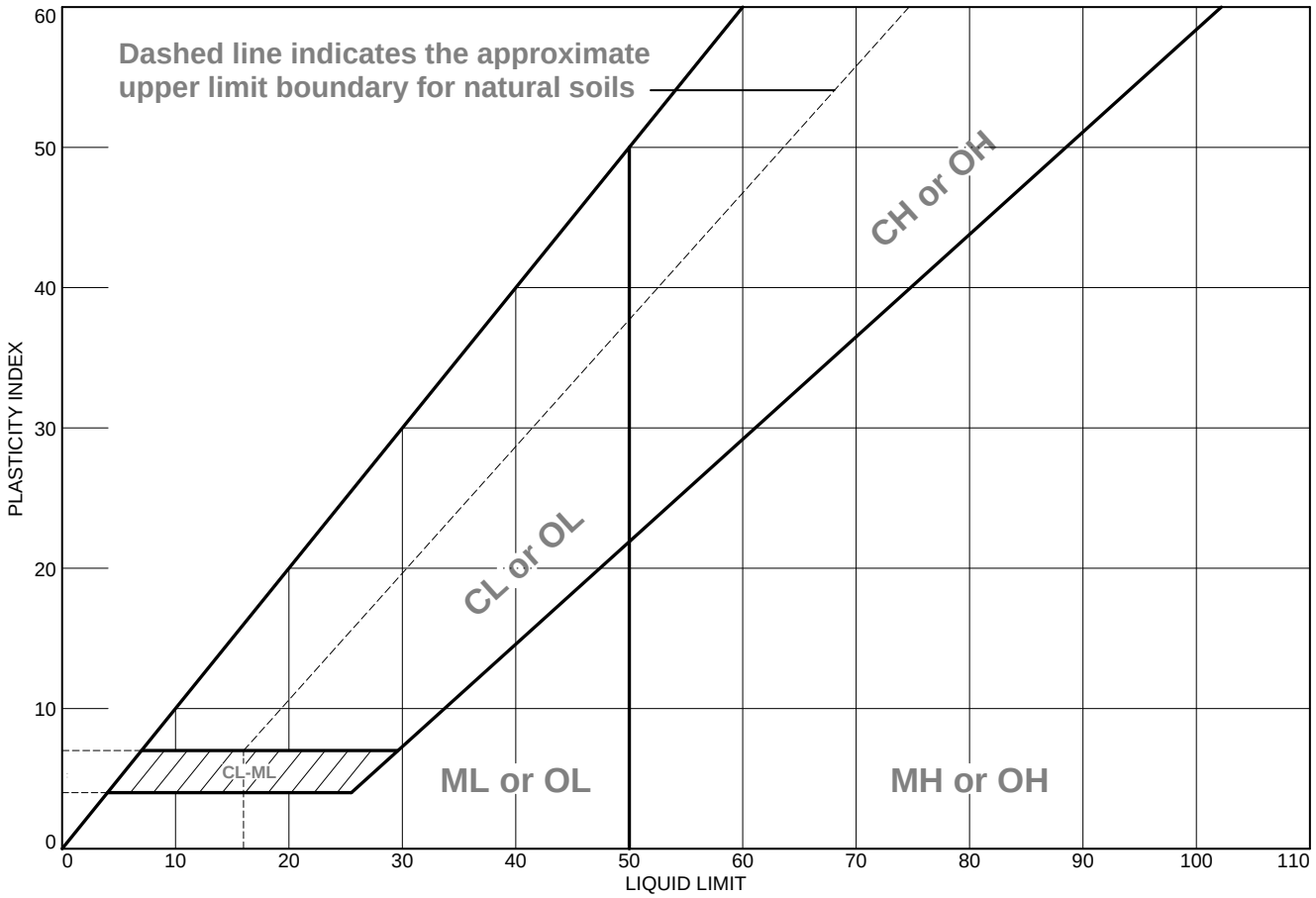
Source of Sample: C5 **Depth:** C1-C4 **Date Sampled:** 10/8/18
Sample Number: Composite

CDM Smith

Boston, Massachusetts

Client: USACE
Project: Eighteen Mile Creek
Lockport, NY
Project No: 51147.223203

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Dark brown silty sand with gravel, trace organics	10/8/18	12/6/18	MP	NV	NP	NP	25.1	SM

Project No. 51147.223203 **Client:** USACE

Project: Eighteen Mile Creek
Lockport, NY

○**Source of Sample:** C5 **Depth:** C1-C4 **Sample Number:** Composite

CDM Smith

Boston, Massachusetts

Checked by: MP
Title: Laboratory Manager

Tested By: MP **Checked By:** MP

CDM Smith

Geotechnical Engineering Laboratory

Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils(ASTM D2974)

Client:	USACE		
Project Name:	Eighteen Mile Creek	Tested By:	MP
Project Location:	Lockport, NY	Test Date:	12/6/2018
Project Number:	51147-223203		
Boring Number:	C5	Procedure:	C
Sample Number:	Composite	Temperature:	440° C
Sample Depth (ft):	C1-C4		
Sample Date:	12/5/2018		

AS RECEIVED MOISTURE CONTENT	
Tin Mass (g)	85.06
Wet Mass of Sample & Tin (g)	249.76
Dry Mass of Sample & Tin (g)	197.98
Mass of Water (g)	51.78
Mass of Dry Soil (g)	112.92
Moisture Content (%)	**45.9**

ASH CONTENT	
Porcelain Dish Mass (g)	85.06
Porcelain Dish + Oven Dried Soil (g)	197.98
Mass of Oven Dried Soil (g)	112.92
Mass of Dish & Burned Soil (g)	191.60
Mass of Burned Soil (g)	106.54
Mass of Organic Material (g)	6.38
Ash Content (%)	94.3
Organic Content (%)	**5.7**

CDM Smith
Geotechnical Laboratory

SPECIFIC GRAVITY DETERMINATION

Project:	Eighteen Mile Creek	File #	51147-223203
Visual Classification		Date	11/1/18
Boring #	CC-1	Tested by:	MP/AS
Sample #	S-1	Checked by:	MP
Depth	Grab		

Run#	1	2	3	4	5
Bottle #	B				
Wt Wet Soil	83.48				
Temp	20.7				
Wt bottle+water+soil	680.80				
Wt bottle+water	653.75				
wt soil	44.65				
K of water at temp	0.99985				
Gs of SOIL	**2.536**				

Average Gs **2.536**

Hydroscopic Water Content Adjustment

Wt. Pan (g)	53.60
Wt. Pan+Wet soil (g)	267.36
Wt. Pan+Dry Soil (g)	167.94
Wt. Water (g)	99.42
Wt. Dry Soil (g)	114.34
Water Content %	86.95%

CDM Smith
Geotechnical Laboratory

SPECIFIC GRAVITY DETERMINATION

Project:	Eighteen Mile Creek	File #	51147-223203
Visual Classification		Date	11/5/18
Boring #	CC-2	Tested by:	MP/AS
Sample #	S-1	Checked by:	MP
Depth	Grab		

Run#	1	2	3	4	5
Bottle #	B				
Wt Wet Soil	70.56				
Temp	20.3				
Wt bottle+water+soil	694.04				
Wt bottle+water	653.79				
wt soil	64.25				
K of water at temp	0.99994				
Gs of SOIL	**2.677**				

Average Gs **2.677**

Hydroscopic Water Content Adjustment

Wt. Pan (g)	53.06
Wt. Pan+Wet soil (g)	264.71
Wt. Pan+Dry Soil (g)	245.79
Wt. Water (g)	18.92
Wt. Dry Soil (g)	192.73
Water Content %	9.82%

CDM Smith
Geotechnical Laboratory

SPECIFIC GRAVITY DETERMINATION

Project:	Eighteen Mile Creek	File #	51147-223203
Visual Classification		Date	11/1/18
Boring #	CC-3	Tested by:	MP/AS
Sample #	S-1	Checked by:	MP
Depth	Grab		

Run#	1	2	3	4	5
Bottle #	B				
Wt Wet Soil	83.13				
Temp	21.0				
Wt bottle+water+soil	677.95				
Wt bottle+water	653.70				
wt soil	40.04				
K of water at temp	0.99979				
Gs of SOIL	**2.535**				

Average Gs **2.535**

Hydroscopic Water Content Adjustment

Wt. Pan (g)	52.82
Wt. Pan+Wet soil (g)	294.55
Wt. Pan+Dry Soil (g)	169.25
Wt. Water (g)	125.30
Wt. Dry Soil (g)	116.43
Water Content %	107.62%

CDM Smith
Geotechnical Laboratory

SPECIFIC GRAVITY DETERMINATION

Project:	Eighteen Mile Creek	File #	51147-223203
Visual Classification		Date	11/2/18
Boring #	CC-4	Tested by:	MP/AS
Sample #	S-1	Checked by:	MP
Depth	Grab		

Run#	1	2	3	4	5
Bottle #	B				
Wt Wet Soil	74.48				
Temp	20.8				
Wt bottle+water+soil	700.34				
Wt bottle+water	653.71				
wt soil	74.48				
K of water at temp	0.99994				
Gs of SOIL	**2.674**				

Average Gs **2.674**

Hydroscopic Water Content Adjustment

Wt. Pan (g)	53.06
Wt. Pan+Wet soil (g)	264.71
Wt. Pan+Dry Soil (g)	264.71
Wt. Water (g)	0.00
Wt. Dry Soil (g)	211.65
Water Content %	0.00%

Attachment B

Polymer Screening Report

DEWATERING TRIAL PERFORMANCE
18 Mile Creek Superfund Site

For:
CDM Smith, Inc.
Meredith Passaro
14 Wall Street, Suite 1702
New York, New York 10005

From:
Peter Kaye
435 Country Club Road
Phoenixville, PA 19460

By:
WaterSolve, LLC
5031 68th St., SE
Caledonia, MI 49316
www.gowatersolve.com
616-575-8693

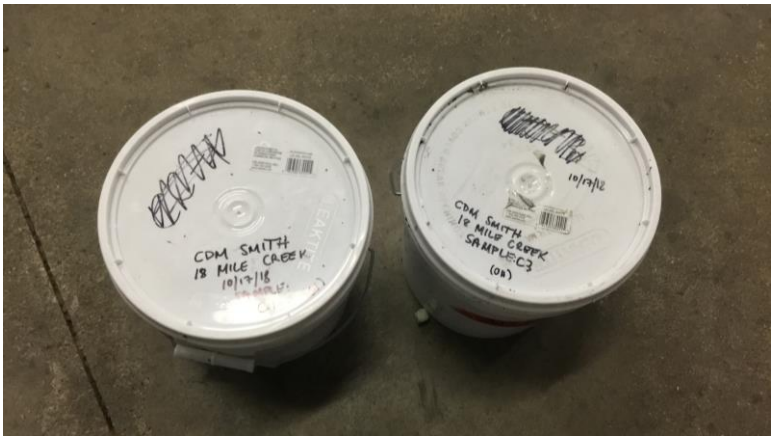
December 7, 2018

1. Scope of Work

WaterSolve, LLC was tasked to perform a Geotube® dewatering performance trial on river sediment samples provided by CDM Smith Inc. The objectives of these dewatering trials were to identify chemical conditioning program(s), identify polymer flocculent(s), and dosing rate(s) for a potential Geotube® dewatering application. The objectives of subsequent Cone test were to measure total solids (TS) of the flocculated, contained, and dewatered residual cake after passage of a chemically conditioned sample through GT500D Geotube® fabric.

2. Materials & Methods

Two one-gallon sample buckets were received at WaterSolve's Laboratory (Caledonia, MI) December 04, 2018. Both samples were of sediment with no site water provided. Preliminary testing determined that dilution would be necessary. The sediment was diluted 1:3 (sample: water) with potable water (v/v), homogenized, and 150-mL samples were placed in graduated, glass jars.



Several cationic and anionic polymers and organic coagulants were "made-down" (200-mL) at a 0.5% concentration for this dewatering trial. Polymer and coagulant (1 to 10-mL; 33 to 333-ppm) was added to a sample with a 10-mL plastic syringe and moderately tumbled five to seven times. Observations of water release rate, water clarity, and flocculent appearance were recorded on appropriate data sheets (Appendix A). Polymer(s) that flocculated and dewatered these residuals most effectively were re-evaluated with lower doses in order to isolate the most efficient dewatering and flocculating polymer(s). Dual polymer conditioning programs were also evaluated for this Geotube® dewatering application in order to improve water clarity and release volume compared to single product applications.

Percent total solids (dry weight) of the initial residual sample, test samples, dewatered cake samples (captured on GT500D Geotube® filters) were measured according to U.S. EPA Methods 160.2 and 160.3. The total suspended solids and turbidity of the river water and filtrate sample (passed through the filter) were measured using a HACH DR 2800 and HACH 2100 P Turbidimeter. The specific gravity of the sediment sample was measured in accordance with the SOP found in Appendix D.

3.1 Results C1

Chemical conditioning with Solve 426 followed by a subsequent application of Solve 216B was determined to flocculate and dewater the C1 river sediments most effectively compared to the other chemical conditioning programs (Appendix A). Water release volume and flocculent appearance were good to excellent in 150-mL sample when a 3-mL (100-ppm, 1.5-lbs/DT) dose of Solve 426 followed by a 3-mL (100-ppm, 1.5-lbs/DT) dose of Solve 216B was added.

The raw sediment sample was 51.4 percent dry weight solids and had a specific gravity of 2.6. The diluted (1:3, sediment: water) test sample was 13.4-percent dry weight solids. After passing a 1,000-mL conditioned test sample through a GT500D Geotube filter, percent solids increased to 32.8-percent after sixty minutes drying time. From this 1,000-mL conditioned sample 440-mL and 595-mL of filtrate water was collected in a graduated cylinder in a one minute and sixty minutes, respectively.

3.2 Results C3

Chemical conditioning with Solve 426 followed by a subsequent application of Solve 216B was determined to flocculate and dewater the C3 river sediment mot effectively compared to the other chemical conditioning programs (Appendix A). Water release volume and flocculent appearance were good to excellent in 150-mL sample when a 3-mL (100-ppm, 1.5-lbs/DT) dose of Solve 426 followed by a 3-ml (100-ppm, 1.5/DT) dose of solve 216B was added.

The raw sediment sample was 46.7-percent dry weight solids and had a specific gravity between 2.5 (Appendix D). The diluted (1:3, sediment: water) test sample was 7.4-percent dry weight solids. After passing a 1,000-mL conditioned test sample through a GT500D Geotube® filter, percent solids increased to 33.1-percent after sixty minutes drying time. From this 1,000-mL conditioned sample, 425-mL and 590mL of filtrate water was collected in a graduated cylinder in one minute and sixty minutes, respectively.

4. Recommendations

We recommend a dual product application of Solve 426 (100-ppm) followed by Solve 216B (100-ppm) for dewatering sediments in a Geotube® application in order to pass a paint filter test for subsequent removal. The doses will vary based on the in-line solids concentration, but we anticipate that the doses will be approximately 1.5-lbs./dry ton Solve 426 and 1.5-lbs./dry ton Solve 216B

Solve 216B is required to be made-down at 0.5% with a polymer make-down unit or aged in batch/feed tanks prior to injection into the residual line. Solve 426 should be fed neat prior to Solve216B injection. Low mixing energy is required between the polymer introduction points and between the final injection point and the Geotube® containers (e.g., one to two bends in the discharge line and/or inline static mixers).

Due to potential variability of the material, daily on-site testing and chemical conditioning verification are recommended during dredging operations.

WaterSolve LLC does not make any implied warranty of any kind. Customer is solely responsible for determining the means and methods of the Product(s) use and whether or not Product(s) is suitable or desirable for Customer's intended uses. Customer agrees not to make any claim against Watersolve LLC based upon, or arising out of or relating to any advice or any technical information given to the Customer by Watersolve LLC for information purposes only and shall indemnify and hold Watersolve LLC harmless from any and all claims asserted by any third party arising out of or related to the Customer's use of Watersolve LLC's Product(s). Any technical information if given by Watersolve LLC to the Customer is without any consideration and use of such information by Customer be at consumer's own risk and shall not relieve the Customer from ultimate liability to ensure Product(s) are used properly per Project and Product(s) specifications.

Page 1 of 2

WaterSolve, LLC

Clearly thinking about your water treatment!

Date:
Analyst:

Customer: CDM Smith, Inc.
Location: 18 mile Creek Boston, MA
Equipment in Service: Geotubes

1=Best 6=Worst

Jar Number	Polymer Name	Polymer Dosage (mL)	Sample Size (mL)	Water Rel. Rate (1 - 6)	Water Clarity (1 - 6)	Floc Appearance (1 - 6)	Comments
	Polymer make-down concentration = _____ %						
	Dilution of test sample =						
1	137	3ml	150	5	5	3	
2	137/426	3ml / 3ml	150	3	1	3	
3	216D7	3ml	150	1	2	3	
4	9233	3ml	150	2	2	3	
5	137/426	2ml / 3ml	150	4	5	4	
6	9330/426	3ml / 3ml	150	2	3	2	
7	137/426	4ml / 4ml	150	1	1	1	
8	162	3ml	150	3	3	2	
9	162/426	3ml / 3ml	150	1	3	2	
10	162/426	3.5ml / 2ml	150	1	2	2	
11	162/426	3.5ml / 4ml	150	1	2	1	
12	161/426	3ml / 3ml	150	1	2	2	
13	161	3ml	150	1	4	2	
14	161/426	4ml / 4ml	150	1	3	3	
15	163	3ml	150	3	3	1	
16	162/426	3ml / 3ml	150	2	2	2	
17	163/426	4ml / 4ml	150	2	2	2	
18	426	4ml	150	5	4	5	
19	7118	4ml	150	5	4	5	
20	9119	4ml	150	5	5	5	
21	416	4ml	150	5	5	5	
22	426/162	4ml / 2ml	150	1	3	2	
23	7118/162	4ml / 2ml	150	1	2	2	
24	9119/162	4ml / 2ml	150	2	4	2	
25	416/162	4ml / 2ml	150	2	3	2	
26	426/162	4ml / 3ml	150	2	2	2	Possibly operated more Mixing Does better
27	7118/162	4ml / 3ml	150	2	2	2	Possibly operated 7118 - is clearer than 426
28	7118/162	3ml / 3ml		2	3	1	Same time injection

C1

Cone Test / RDT: 1000 mL sample conditioned with 20/20 mL of 426/216B poured thru GT500D Geotube® filter.

Filtrate Quality: TSS- 6 mg/L 3 mg/L Turbidity 6.59 NTU C3 3.73 NTU C1

Filtrate collected@ 1min: 490 ml 60min: 595 ml C2

C3 1 ml 425 ml 60 min 590 ml

WaterSolve, LLC

Clearly thinking about your water treatment

Date:
Analyst:

Customer: CDM Smith, Inc
Location: Mile Creek Boston, MA
Equipment in Service: Geotube

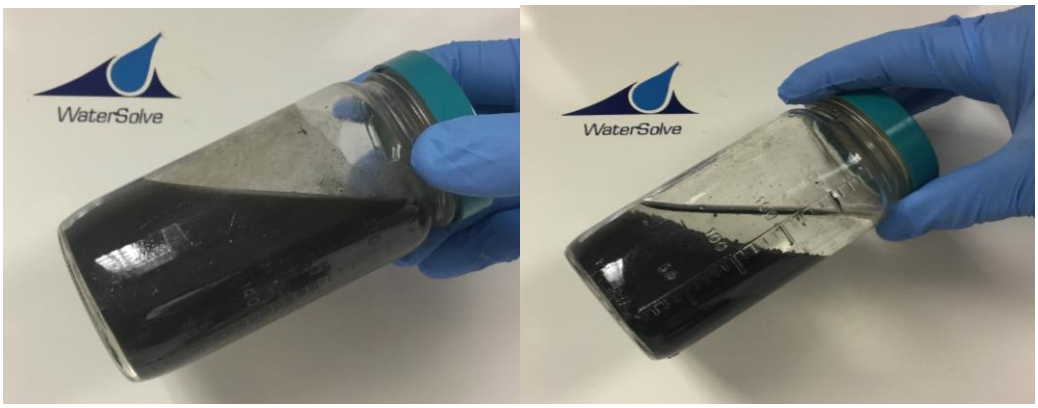
1=Best 6=Worst

Jar Number	Polymer Name	Polymer Dosage (mL)	Sample Size (mL)	Water Rel. Rate (1 - 6)	Water Clarity (1 - 6)	Floc Appearance (1 - 6)	Comments
1	216/162	4ml / 3ml	150	1	2	1	
2	~~426/162~~	~~3ml~~	~~150~~				
3	426/137	3ml / 3ml	150	2	1	3	
4	426/137	3ml / 4ml	150	2	1	2	
5	426/137	4ml / 4ml	150	1	1	1	Longer time mixing
6	426/216B	4ml / 2ml	150	2	1	3	
7	426/216B	3ml / 3ml	150	1	1	2	Smaller Floc. Clear water
8	426/216B	3ml / 4ml	150	1	2	1	Water Not as Clear / Large Floc
9	426/216B	4ml / 3ml	150	1	1	2	Same time mix.
10							
11							
12							
13							
14							
15	Verifying C3 Sample						
16							
17	426/137	4ml / 4ml	150	1	1	1	
18	426/162	4ml / 2.5ml	150	1	1	2	
19	426/216B	3ml / 3ml	150	1	1	1	Same time mixing
20							
21							
22							
23							
24							
25							
26							
27							
28							

Polymer make-down concentration = _____%
Dilution of test sample =

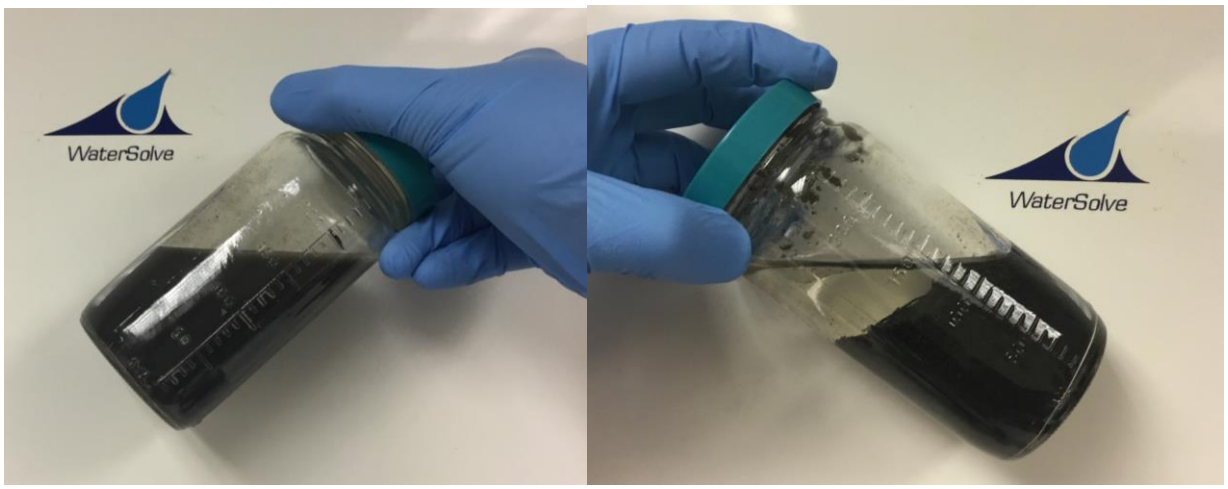
Cone Test / RDT: _____mL sample conditioned with _____ mL of _____ poured thru GT500D Geotubes® filter.
Filtrate Quality: TSS-_____ mg/L Turbidity _____ NTU Filtrate collected @ 1min:_____ 60min:_____

Appendix B- Photographs

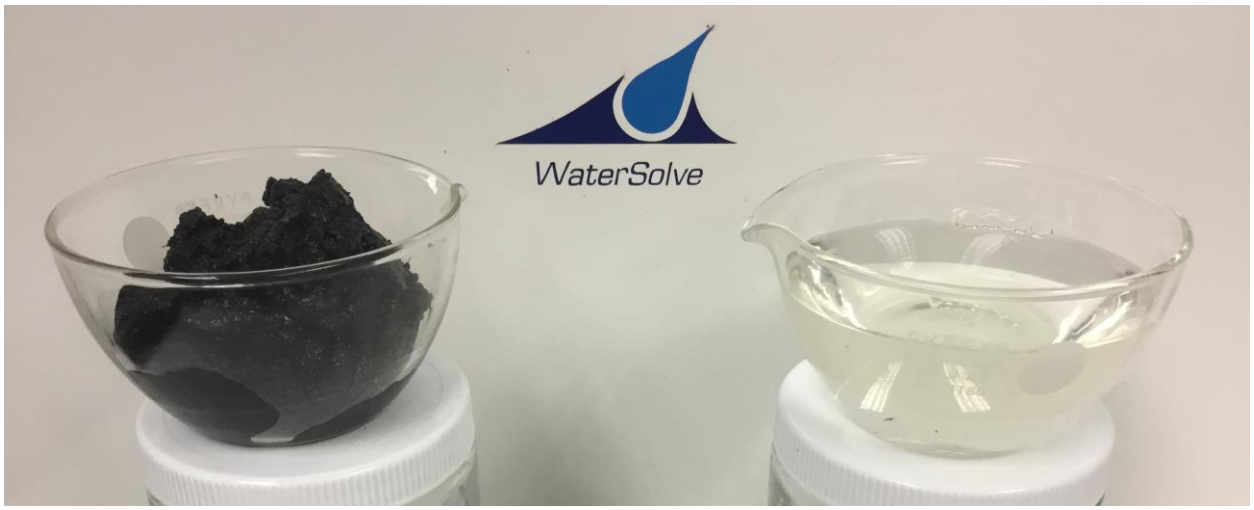


Sediment samples from C1 diluted 1:3 (sediment: water) prior to polymer addition (left). One hundred fifty milliliter diluted sediment sample conditioned with Solve 426 (100-ppm) followed by Solve 216B (100-ppm) (right).

One thousand milliliter of conditioned and diluted sample poured through GT500D Geotube® filter (left). Cone test cake and filtrate after sixty minutes of drying time (right). The cake is 32.8-percent dry weight solids and the filtrate has a TSS of 3-mg/L.



Sediment samples from C3 diluted 1:3 (sediment: water) prior to polymer addition (left). One hundred fifty milliliter diluted sediment sample conditioned with Solve 426 (100-ppm) followed by Solve 216B (100-ppm) (right).



One thousand milliliter of conditioned and diluted sample poured through GT500D Geotube® filter (left). Cone test cake and filtrate after sixty minutes of drying time (right). The cake is 33.1-percent dry weight solids and the filtrate has a TSS of 6-mg/L.

Appendix C -

Total Solids Determination - Percent Dry Weight

Customer Name/Application CDM SMITH / 11 MILE CREEK

Date 12/3/18 Technician [illegible] Oven Temperature 105°C

Sample ID CDM C1 RAW Dish Number 1 Dilution Ø

Dish (dry) = 48.965 g Dish, Sample (wet) = 161.357 g Dish, Sample (dry) = 107.210 g

Dish, sample (wet) - Dish (dry) = 111.391 (A) Dish, sample (dry) - Dish (dry) = 57.245 (B)

Total Solids B ÷ A x 100 = 51.4 % Dry Weight Solids

Sample ID CDM C1 RAW Dish Number 2 Dilution Ø

Dish (dry) = 48.235 g Dish, Sample (wet) = 175.659 g Dish, Sample (dry) 107.715 g

Dish, sample (wet) - Dish (dry) = 127.424 (A) Dish, sample (dry) - Dish (dry) = 59.48 (B)

Total Solids B ÷ A x 100 = 46.7 % Dry Weight Solids

Sample ID CDM C1 TEST DILUTION Dish Number 3 Dilution 1:3

Dish (dry) = 46.908 g Dish, Sample (wet) = 129.721 g Dish, Sample (dry) = 58.037 g

Dish, sample (wet) - Dish (dry) = 82.813 (A) Dish, sample (dry) - Dish (dry) = 11.129 (B)

Total Solids B ÷ A x 100 = 13.4 % Dry Weight Solids

Sample ID CDM C3 TEST DILUTION Dish Number 4 Dilution 1:3

Dish (dry) = 46.843 g Dish, Sample (wet) = 121.851 g Dish, Sample (dry) = 52.405 g

Dish, sample (wet) – Dish (dry) = 75.008 (A) Dish, sample (dry) – Dish (dry) = 5.562 (B)

Total Solids B ÷ A x 100 = 7.4 % Dry Weight Solids

Sample ID CDM C1 CAKE LINER Dish Number 1 Dilution Ø

Dish (dry) 47.771 g Dish, Sample (wet) = 141.669 g Dish, Sample (dry) = 78.555 g

Dish, sample (wet) Dish (dry) = 93.898 (A) Dish, sample (dry) Dish (dry) = 30.784 (B)

Total Solids B ÷ A x 100 = 32.8 % Dry Weight Solids

Total Solids Determination - Percent Dry Weight

Customer Name/Application CDM Smith Inc 18 Mile Creek

Date 12/03/18 Technician ML / DCW Oven Temperature 105 °C

Sample ID CDM C.S. CAKE (1 Rect) Dish Number 2 Dilution

Dish (dry) = 50.456 g Dish, Sample (wet) = 136.33 g Dish, Sample (dry) = 78.863 g

Dish, sample (wet) – Dish (dry) 85.863 (A) Dish, sample (dry) – Dish (dry) = 28.413 (B)

Total Solids B ÷ A x 100 = 33.1 % Dry Weight Solids

Sample ID _____ Dish Number _____ Dilution _____

Dish (dry) = _____ g Dish, Sample (wet) = _____ g Dish, Sample (dry) = _____ g

Dish, sample (wet) – Dish (dry) = _____ (A) Dish, sample (dry) – Dish (dry) = _____ (B)

Total Solids B ÷ A x 100 = _____ % Dry Weight Solids

Sample ID _____ Dish Number _____ Dilution _____

Dish (dry) = _____ g Dish, Sample (wet) = _____ g Dish, Sample (dry) = _____ g

Dish, sample (wet) – Dish (dry) = _____ (A) Dish, sample (dry) – Dish (dry) = _____ (B)

Total Solids B ÷ A x 100 = _____ % Dry Weight Solids

Sample ID _____ Dish Number _____ Dilution _____

Dish (dry) = _____ g Dish, Sample (wet) = _____ g Dish, Sample (dry) = _____ g

Dish, sample (wet) – Dish (dry) = _____ (A) Dish, sample (dry) – Dish (dry) = _____ (B)

Total Solids B ÷ A x 100 = _____ % Dry Weight Solids

Sample ID _____ Dish Number _____ Dilution _____

Dish (dry) = _____ g Dish, Sample (wet) = _____ g Dish, Sample (dry) = _____ g

Dish, sample (wet) – Dish (dry) = _____ (A) Dish, sample (dry) – Dish (dry) = _____ (B)

Total Solids B ÷ A x 100 = _____ % Dry Weight Solids

Appendix D

WaterSolve LLC

Specific Gravity SOP

Test Procedure:

1) Determine and record the weight of the empty, clean, and dry pycnometer, W_P.
2) Place 10 grams of dry sample (passed through the sieve No.10) in the pycnometer. Determine and record the weight of the pycnometer containing the dry soil, W_{PS}.
3) Add distilled water to fill approximately ½ - ¾ of the pycnometer. Soak the sample for 10 minutes.
4) Apply a partial vacuum to the contents for 10 minutes, to remove the entrapped air.
5) Stop the vacuum, and carefully remove the vacuum line from the pycnometer.
6) Fill the pycnometer with distilled water (to the mark), clean the exterior surface of the pycnometer with a clean, dry cloth. Determine and record the weight of the pycnometer and its contents, W_B.
7) Empty the pycnometer and clean it with distilled water. Then fill it with distilled water only (to the mark). Clean the exterior surface of the pycnometer with a clean, dry cloth. Determine and record the weight of the pycnometer and its contents, W_A.
8) Empty the pycnometer and clean it.

Data Analysis:

Calculate the specific gravity of the sample solids using the following formula:

$$\text{Specific Gravity, } G_S = \frac{W_0}{W_0 + (W_A - W_B)}$$

Where:

W_0 = weight of the oven-dry sample, (grams) = W_{PS} - W_P

W_A = weight of pycnometer filled with water

W_B = weight of pycnometer filled with water and sample

WaterSolve

Date Tested: 12/5/18

Tested By: ML / DLW

Project Name: CDM SMITH / 18 MILE

Sample Number: C1 + C3

Sample Description: RIVER SEDIMENT

Equations:

$W_D = W_{DS} - W_S$

$$\text{Specific Gravity } (G_s) = \frac{W_D}{W_D + (W_A - W_B)}$$

Trial 1		Trial 2	
Pycnometer Bottle Number CDM C1	1	Pycnometer Bottle Number CDM C3	2
W_S = Mass of empty, clean, pycnometer (grams)	41.266	W_S = Mass of Empty, Clean, Pycnomcer (grams)	41.300
W_{DS} = Mass of empty pycnometer + dry soil (grams)	48.836	W_{DS} = Mass of empty pycnometer + dry soil (grams)	50.863
W_B = Mass of pycnometer + dry soil + water (grams)	95.734	W_B = Mass of pycnometer + dry soil + water (grams)	96.908
W_A = Mass of pycnometer + water (grams)	91.067	W_A = Mass of pycnometer + water (grams)	91.222
Specific Gravity (G_s)	2.16	Specific Gravity (G_s)	2.5

Calculations:

$W_D = 48.836 - 41.266 = 7.570$

$$(G_s) = \frac{7.57}{7.57 + (91.067 - 95.734)}$$

$$= \frac{7.57}{2.905} = 2.6$$

Calculations:

$W_D = 50.863 - 41.300 = 9.563$

$$(G_s) = \frac{9.563}{9.563 + (91.222 - 96.908)}$$

$$= \frac{9.563}{3.877} = 2.5$$

WaterSolve

5031 68th Street SE
Caledonia, MI 49316
Phone (616)575-8693
www.gowatersolve.com

Chain of Custody Record

Pg. ___ of ___

COC# ___

For Lab Use Only
Received By
Date Received
Lab Bottle #
WS Job #
Project Lab Tech

Client Name: [illegible]
Address: [illegible] Street, Suite [illegible]
City, State Zip: Boston, Massachusetts, 02108
Phone/Email: 617-[illegible]

Project Name: [illegible] Mile Creek Superfund Site
Project Number: [illegible]
Project Manager: [illegible]
Contact/Report To: [illegible]
Invoice To: [illegible]

Analysis Requested: Grab/Bed Sediment; Settling Approximation; Other* (comments); Total Suspended Solids; Turbidity; pH; Other* (comments); Other* (comments)

Please note any known hazardous material contained in the samples or any other helpful information about the samples below.

Sample Date	Matrix Code	Sample Number	Field Sample ID	Container Type	Sample Date	Sample Time	Grab	Comp	Matrix								Sample Comments
		1	C1	1 Gallon	mm/dd/yy	15:00		X	GH		X						Polymer Screening
		2	C3	1 Gallon	mm/dd/yy	15:00		X	GH		X						Polymer Screening
		3															
		4															
		5															

Sampled by (print): [illegible]
Sampler's Signature: [illegible]
Company: [illegible]
Relinquished by: [illegible] Date: [illegible] Time: [illegible]

Is this sample designated as hazardous waste per RCRA? ( ) No ( ) Yes (complete below) Lead: ___ lbs

How Shipped? Hand Courier Tracking No.
Received by: Date: Time:

Sample Comments

Project Information

Briefly describe the project, project objectives, and to what extent the required pre-treatment of sediment to meet project specific requirements. This is a preliminary assessment for a proceeding investigation report.

Typical Sediment/Feedstock: ___ Municipal Wastewater ___ Municipal Water Treatment X Lake/Pond/River Sediment (circle one) ___ Industrial/Process ___ Mine Drainage ___ Other ___

Application: X Gravity Dewatering, Settling, Clarification, Mechanical Dewatering, Thickening, Other ___

How was the sample obtained? ___ Individual Grab (Each sample collected on behalf of one location only and represents only that location, depicting what specific water, quantity and quality of sediment was present at that location at the time of sampling. Does not indicate average treatment performance, it does not indicate pockets of concern for treatment effectiveness or areas that may require a higher or lower dose or other variables, or contain higher or lower solids than the average. Results may be misleading or fail to meet discharge limits.) X Composite (PLEASE NOTE: while a composite sample may give a good indication of an average treatment performance, it does not indicate pockets of concern for treatment effectiveness or areas that may require a higher or lower dose or other variables, or contain higher or lower solids than the average. Results may be misleading or fail to meet discharge limits.) X Other ___

Are there specific requirements or permit limitations (i.e. Nitrate turbidity, TSS, or other parameters)?
The parameters have not been established. We will be doing testing on our feedstock water prior to [illegible] the laboratory

Where will the filtrate/supernatant effluent be discharged?
The treated sediment will be placed back on [illegible] land [illegible] to the [illegible] where the effluent will be discharged to

Expected Solids Content: Known 35-50 % Actual ___ %

Please draw a diagram of the body of water and identify where the samples were collected.

Project Comments
Confirmation of [illegible] Health and Safety Plan can be provided upon request

Solve 216B

Safety Data Sheet

Date Issued: 08/22/2017
Date Revised: 08/22/2017

1. IDENTIFCATION OF SUBSTANCE/MIXTURE AND THE COMPANY/UNDERTAKING

PRODUCT NAME: **SOLVE 216B**
TYPE OF PRODUCT: Mixture
IDENTIFIED USES: Processing aid for industrial applications
USES ADVISED AGAINST: None.
COMPANY: WaterSolve, LLC, 5031 68TH Street Caledonia, Michigan 49316, USA
For Product information call 616-575-8693. www.gowatersolve.com
For Chemical Emergency Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: +1 703-527-3887 (collect calls accepted)

2 HAZARDS IDENTIFICATION

U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication

2.1 Classification of the substance or mixture
Classification according to paragraph (d) of Regulation 29 CFR 1910.1200.
Not classified.

2.2 Label elements
Labeling according to paragraph (f) of Regulation 29 CFR 1910.1200:
Hazard symbol(s): None
Signal word: None
Hazard statement(s): None
Precautionary statement(s): None

2.3 Other hazards
Spills produce extremely slippery surfaces.
For explanation of abbreviations see Section 16.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances:
Not applicable, this product is a mixture.

3.2 Mixtures
Hazardous components: Distillates (petroleum), hydrotreated light
Concentration/gamme: 20 ï 30%
CAS Number: 64742-47-8
Classification according to paragraph (d) of Regulation 29 CFR 1910.1200: Asp. Tox. 1;H304
Notes:
Does not result in classification of the mixture if the kinematic viscosity is greater than 20.5 mm^2 /s measured at 40ºC.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched
Concentration/gamme: < 5%
CAS Number: 69011-36-5
Classification according to paragraph (d) of Regulation 29 CFR 1910.1200: Acute Tox. 4; H302
Eye Dam. 1;H318
For explanation of abbreviations see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation: Move to fresh air. No hazards which require special first aid measures.

Skin Contact: Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. In case of persistent skin irritation, consult a physician.

Eye Contact: Rinse immediately and thoroughly with plenty of water, also under the eyelids for at least 15 minutes. Get medical attention immediately.

Ingestion: Rinse mouth with water. Do NOT induce vomiting. Call a physician or poison control center immediately.

4.2 Most important symptoms and effects, both acute and delayed.

None under normal use.

4.3 Indication of any immediate medical attention and special treatment needed.

None reasonably foreseeable.

Other information: None

5. FIRE FIGHTING MEASURES

5.1 Extinguished media

Suitable extinguishing media: Water, water spray, foam, carbon dioxide (CO_2), dry powder.

Unsuitable extinguishing media: None

5.2 Special hazards arising from the substance or mixture: Spills produce extremely slippery surfaces.

Hazardous decomposition products:

Ammonia, carbon oxides, nitrogen oxides, hydrogen chloride, hydrogen cyanide (hydrocyanic acid) may be produced in the event of combustion in an oxygen deficient atmosphere.

5.3 Advice for fire-fighters

Protective measures: Wear self-contained breathing apparatus and protective suit.

Other information: Spills produce extremely slippery surfaces.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures.

Personal precautions: Do not touch or walk through spilled material. Spills produce extremely slippery surfaces.

Protective equipment: Wear adequate personal protective equipment (see Section 8 Exposure Controls/Personal Protection).

Emergency procedures: Keep people away from spill/leak. Prevent further leakage or spillage if safe to do so.

6.2 Environmental precautions: As with all chemical products, do not flush leakage or spillage if safe to do so. Do not contaminate water.

6.3 Methods and material for containment and cleaning up

Small spills: Do not flush with water. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

Large spills: Do not flush with water. Dam up. Clean up promptly by scoop or vacuum.

Residues: Soak up with inert absorbent material. After cleaning, flush away traces with water.

6.4 Reference to other sections

Section 7: Handling and storage; Section 8: Exposure controls/personal protection; Section 13: Disposal considerations

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Renders surfaces extremely slippery when spilled. When using do not smoke, drink or eat.

7.2 Conditions for safe storage, including any incompatibilities.

Keep away from heat and sources of ignition. Freezing will affect the physical condition and may damage the material. Incompatible with oxidizing agents.

7.3 Specific end uses

None.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Occupational exposure limits:

Distillates (petroleum), hydrotreated light

ACGIH: 200mg/m^3 (8-hour)

8.2 Exposure controls

Appropriate engineering controls:

Ensure adequate ventilation, especially in confined areas. Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.

Individual protection measures, such as personal protective equipment:

a) **Eye/face protection:** safety glasses with side-shields.
b) **Skin protection:** Wear coveralls and/or chemical apron and rubber footwear where physical contact can occur.
c) **Hand protection:** PVC or other plastic material gloves.
d) **Respiratory protection:** No personal respiratory protective equipment normally required.
e) **Additional advice:** Wash hands and face before breaks and immediately after handling the product. Wash hands before breaks and at the end of workday.

Environmental exposure controls: Do not allow uncontrolled discharge of product into the environment.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance:	Viscous liquid, Milky
b) Odor:	Aliphatic
c) odor threshold:	No data available
d) pH:	4 ï 6 @ 5g/L
e) Melting point/freezing point:	< 5ºC
f) Initial boiling point /boiling range:	> 100ºC
g) Flash point:	Does not flash.
h) Evaporation rate:	No data available.
i) Flammability (solid, gas):	Not applicable
j) Upper/lower flammability/explosive limits:	Not expected to create explosive atmospheres.
k) Vapor pressure:	2.3 kPa @ 20ºC
l) Vapor density:	0.804 g/litre @ 20ºC
m) Relative density:	1.0 ï 1.1
n) Solubility:	Completely miscible
o) Partition coefficient:	Not applicable
p) Autoignition temperature:	Not applicable
q) Decomposition temperature:	>150ºC
r) Viscosity:	> 20.5 mm^2/s @ 40ºC
s) Explosive properties:	Not expected to be explosive based on the chemical structure.
t) Oxidizing properties:	Not expected to be oxidizing based on the chemical structure.
9.2 Other information:	None.

10. STABILITY AND REACTIVITY

10.1 Reactivity: Stable under recommended storage conditions.
10.2 Chemical Stability: Product is stable under recommended storage conditions.
10.3 Possibility of Hazardous reactions: Oxidizing agents may cause exothermic reactions.
10.4 Conditions to avoid: Protect from frost, heat and sunlight.
10.5 Incompatible materials: Oxidizing agents.
10.6 Hazardous decomposition products: Thermal decomposition may produce: hydrogen chloride gas, nitrogen oxides, carbon oxides, ammonia, hydrogen cyanide (hydrocyanic acid).

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Information on the product as supplied:

Acute Oral toxicity:	LD50/oral/rat > 5,000 mg/kg
Acute Dermal toxicity:	LD50/dermal/rat > 5,000 mg/kg
Acute Inhalation toxicity:	The product is not expected to be toxic by inhalation.
Skin corrosion/irritation:	Non-irritating to skin.
Serious Eye damage/ irritation:	Not irritating (OECD 437)
Respiratory/skin Sensitization:	Not sensitizing.
Mutagenicity:	Not mutagenic.
Carcinogenicity:	Not carcinogenic.
Reproductive Effects:	Not toxic for reproduction.
STOT single exposure:	No known effects.
STOT- repeated exposure:	No known effects.
Aspiration hazard:	Due to the viscosity, this product does not present an aspiration hazard.

Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light

Acute toxicity:	
Oral:	LD50/oral/rat> 5000 mg/kg (OECD 401)
Dermal:	LD50/dermal/rabbit > 5000 mg/kg (OECD 402)
Inhalation:	LC50/inhalation/4 h/rat = 4951 mg/m³ (OECD 403)
Skin corrosion/irritation:	Non-irritating. (OECD 404). Repeated exposure may cause skin dryness or cracking.
Serious Eye damage/ irritation:	Non irritating (OECD 405).
Respiratory/skin Sensitization:	By analogy with similar products, this product is not expected to be sensitizing. (OECD 406).
Mutagenicity:	Not mutagenic. (OECD 471,473,474,476,478,479).
Carcinogenicity:	Carcinogenicity study in rats (OECD 451): Negative
Reproductive toxicity:	By analogy with similar substances, this substance is not expected to be toxic for reproduction. NOAEL/rat=300 ppm (OECD 421).
STOT single exposure:	No known effects.
STOT- repeated exposure:	NOAEL/oral/rat/90 days >= 3000 mg/kg/day (OECD 408) (Based on results obtained from tests on analogous products).
Aspiration hazard:	May be fatal if swallowed and enters airways.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched

Acute toxicity	
Acute Oral Toxicity:	LD50/oral/rat = 500 ï 2000 mg/kg
Dermal:	LD50/dermal/rabbit > 2000 mg/kg
Inhalation:	Not data available.
Skin Corrosion/Irritation:	Not irritating. (OECD 404)
Serious eye damage/eye irritation:	Causes serious eye irritation. (OECD 405).

Respiratory /skin Sensitization: The results of testing on guinea pigs showed this material to be non-sensitizing.
Mutagenicity: Not mutagenic.
Carcinogenicity: Not carcinogenic.
Reproductive toxicity: Two-Generation Reproduction Toxicity (OECD 416)
NOAEL/rat >250 mg/kg/day
Prenatal Development Toxicity Study (OECD 414)
NOAEL/Maternal toxicity/rat >50 mg/kg/day
NOAEL/Developmental toxicity/rat > 50 mg/kg/day
STOT – single exposure: No known effects.
STOT –repeated exposure: NOAEL/oral/rat/600 days = 50 mg/kg/day
Aspiration hazard: No known effects.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Information on the product as supplied:

Aquatic Toxicity

Acute toxicity Fish: 96 hour Toxicity/Pimephales promelas/EPA 821-R-02-012 Method 2000.0 and conducting acute toxicity tests on test materials with fishes, macroinvertebrates, and amphibians ASTM E-729-96 Test results: 96hr/LC50 6.8 mg/L

Acute toxicity to invertebrates: 48 hour Toxicity/Daphnid, Daphnia magna/EPA 821-R-02-012 Method 2021.0 and conducting acute toxicity tests on test materials with fishes, macroinvertebrates, and amphibians ASTM E-729-96 Test results: 48hr/LC50 1.3 mg/L

Toxicity to Algae: Algal inhibitions tests are not appropriate. The flocculation characteristics of the product interfere directly in the test medium preventing homogenous distribution which invalidates the test.
Chronic toxicity to fish: No data available
Chronic toxicity to invertebrates: No data available
Toxicity to microorganisms: No data available
Effects on terrestrial organisms: No data available.
Sediment toxicity: No data available.

Relevant information on the hazardous components:

Distillates (petroleum), hydrotreated light
Acute Toxicity to Fish: LC0/Oncorhynchus mykiss/ 96hr. > 1000 mg/L (OECD 203)
Acute Toxicity to Algae: IC0/Pseudokirchneriella subcapitata/ 72 hr. > 1000 mg/L (OECD 201)
Acute Toxicity to invertebrates: EC0/Daphnia magna/48 hr = > 1000 mg/L (OECD 202)
Chronic toxicity to fish: NOEC/oncorhybchus mykiss/28days>1000mg/l
Chronic toxicity to invertebrates: NOEC/Daphnia magna/21 days >1000 mg/l
Toxicity to microorganisms: EC50/Tetrahymena pyriformis/48 h >1000 mg/l
Effects on terrestrial organisms: No data available
Sediment toxicity: No data available. Readily biodegradable, exposure to sediment is unlikely.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched
Acute Toxicity to Fish: LC50/Cyprinus carpio/ 96hr. = 1 - 10 mg/L (OECD 203)
Acute Toxicity to Algae: IC50/Desmodesmus subspicatus/ 72 hr= 1 - 10 mg/L (OECD 201)
Acute Toxicity to invertebrates: EC50/Daphnia /48 hr = 1 - 10 mg/L (OECD 202)
Chronic toxicity to fish: No data available
Chronic toxicity to invertebrates: No data available
Toxicity to microorganisms: EC10/activated sludge/17h > 10000 mg/L (DIN 38412-8)
Effects on terrestrial organisms: No data available
Sediment toxicity: No data available.

12.2 Persistence and degradability
Information on the product as supplied:
Degradation: Readily biodegradable.
Hydrolysis: At natural pHs (>6) the polymer degrades due to hydrolysis to more than 70% in 28 days. The hydrolysis products are not harmful to aquatic organisms.
Photolysis: No data available

Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light
Degradation: Readily biodegradable. 67.6% /28 days (OECD 301F); 68.8 % /28days (OECD 306); 61.2 % / 61 days (OECD 304A)

Hydrolysis: Does not hydrolyse.
Photolysis: No data available

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched
Degradation: Readily biodegradable. > 60% / 28days (OECD 301B)
Hydrolysis: Does not hydrolyse.
Photolysis: No data available

12.3 Bioaccumulative potential
Information on the product as supplied:
The product is not expected to bioaccumulate.
Partition co-efficient LogPow: Not applicable
Bioconcentration factor (BCF): No data available

Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light
Partition co-efficient LogPow: 3 - 6
Bioconcentration factor (BCF): No data available

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched
Partition co-efficient LogPow: >3
Bioconcentration factor (BCF): No data available

12.4 Mobility in soil
Information on the product as supplied: No data available

Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light: Koc: No data available

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched: Koc: >5000

12.5 Other adverse effects: none

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Waste from residues /unused products: Dispose of in accordance with local, state, national and international regulations.
Contaminated packaging: Rinse empty containers with water and use the rinse-water to prepare the working solution. If recycling is not practicable, dispose of in compliance with local regulations.
Recycling: Store containers and offer for recycling of material when in accordance with the local regulations.

14. TRANSPORT INFORMATION

Land Transport (DOT)	Not classified.
Sea Transport (IMDG)	Not classified.
Air Transport (IATA)	Not classified.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for substances or mixture
Information on the product as supplied:
USA (TSCA): All components of this product are either listed on the inventory or are exempt from listings.

US SARA Reporting requirements:
SARA (SECTION 311/312) hazard class: Not concerned
SARA Title lll Sections:
Section 302 (TPQ)- Reportable Quantity: Not concerned
Section 304 – Reportable Quantity: Not concerned
Section 313 (De minimis concentration): Not concerned
Clean Water Act
Section 311 Hazardous Substances (40 CFR 117.3)- Reportable Quantity: Not concerned

Clean Air Act
Section 112(r) Accidental release prevention requirements (40CFR 68)- Reportable Quantity:
Not concerned
CERCLA
Hazardous Substances List (40 CFR 302.4)- Reportable Quantity: Not concerned
RCRA Status: Not RCRA hazardous.
California Proposition 65 Information:
WARNING! This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm, Acrylamide.

16. OTHER IN FORMATION

HMIS & NFPA Rating	HMIS	NFPA
Health:	0	0
Flammability:	1	1
Reactivity:	0	0
Personal Protection Special:	B	

Key or legend to abbreviations and acronyms used in the safety data sheet:
Abbreviations
Acute Tox. 4= Acute toxicity Category Code 4
Asp. Tox. 1=Aspiration hazard Category Code 1
Eye Dam 1 = Serious eye damage/eye irritation Category Code 1

H-Phrases
H302-Harmful if swallowed
H304-May be fatal if swallowed and enters airways
H318-Causes serious eye damage

This SDS was prepared in accordance with the following:
Federal Regulation 29 CFR 1910.1200

DATE ISSUED: 08/22/2017
DATE REVISED: 08/22/2017 **Revision number: 17.01 a**

OTHER INFORMATION

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This information is for the specific material described only and may not be valid if the material is used in combination with any other materials or in any process. The user is responsible to determine the completeness of the information and suitability for the userôs own particular use. The knowledge and belief of the company, the information is accurate and reliable as of the date indicated but the company makes no express or implied warranty of merchantability for the material or the information. The company makes no express or implied warranty of fitness for a purpose for the material or for the information. Users of any chemical should educate themselves on all aspects of its use by independent investigation of current scientific and medical knowledge that the material can be used safely. Both the supplier and manufacturer make no representations and assume no liability for any direct, incidental or consequential damages resulting from its use. Both the supplier and manufacturer make no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This information is for the specific material described only and may not be valid if the material is used in combination with any other materials or in any process. The user is responsible to determine the completeness of the information and suitability for the userôs own particular use. Users of any chemical should educate themselves on all aspects of its use by independent investigation of current scientific and medical knowledge that the material can be used safely. The buyer assumes all responsibility for using and handling the product in accordance with applicable federal, state and local regulations.

List of abbreviations and acronyms that could be, but not necessarily are, used in the safety data sheet:

ACGIH: American Conference of Industrial Hygienists
BEI: Biological Exposure Index
CAS Chemical: Abstracts Service (Division of the American Chemical Society)
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CMR: Carcinogenic, Mutagenic or Toxic for Reproduction
DOT: Department of Transportation
FG: Food grade
FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act
GHS: Globally Harmonized System of Classification and Labeling of Chemicals
H-statement: Hazard Statement
HMIRC: Hazardous Materials Information Review Commission
HMIS: Hazardous Materials Identification System
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulation by the ñInternational Air Transport Associationò (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI (ICAO): Technical Instructions by the ñInternational Civil Aviation Organizationò
IMDG: International Maritime Code for Dangerous Goods
ISO: International Organization for Standardization
logPow: octanol-water partition coefficient
LCxx: Lethal Concentration, for xx percent of test population
LDxx: Lethal Dose, for xx percent of test population
ICxx: Inhibitory Concentration for xx of a substance
ECxx: Effective Concentration of xx
N.O.S.: Not otherwise specified
NFPA: National Fire Protection Association
NIOSH: National Institute for Occupational Safety and Health
OECD: Organization for Economic Co-operation and Development
OEL: Occupational Exposure Limit
OSHA: Occupational Safety and Health Administration
P-Statement: Precautionary Statement
PBT: Persistent, Bioaccumulative and Toxic
PMRA: Health Canada Pest Management Regulatory Agency
PPE: Personal Protective Equipment
RTK: Right to Know
SDS: Safety Data Sheet
STEL: Short-term exposure limit
STOT: Specific Target Organ Toxicity
TLV: Threshold Limit Value
TWA: Time-weighted average
VPVB: Very Persistent and Very Bioaccumulative
WEL: Workplace Exposure Level
WHMIS: Workplace Hazardous Materials Information System

Solve 426

Safety Data Sheet

Date Issued: 05/17/2017
Date Revised: 09/15/2017

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND THE COMPANY/UNDERTAKING

PRODUCT NAME: **SOLVE 426**
Use of the Substance/mixture: Coagulant
Recommended restrictions on use: none
COMPANY: WaterSolve, LLC, 5031 68th St. S.E. Caledonia, MI 49316, USA
For Product information call 616-575-8693. www.gowatersolve.com
For Chemical Emergency Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: +1 703-527-3887 (collect calls accepted)

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

The material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard's (29CFR 1910.1200) implementation of the Globally Harmonized System (GHS), i.e., material is not a dangerous substance or mixture requiring GHS classification according to the US GHS regulations.

GHS-Labeling: Product is not hazardous under US GHS.

Other hazards which do not result in classification

Advice: Contaminated surfaces will be extremely slippery.

Potential environmental effects: This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances/Mixtures

Chemical nature Aqueous solution of Polymeric Quaternary Amine

No hazardous ingredients

Further Information

This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1900.1200.

4. FIRST AID MEASURES

Description of first aid measures

General Advice: Show this safety data sheet to the doctor in attendance.

Ingestion: If a person feels unwell or symptoms of skin irritation appear, consult a physician. Do not induce vomiting without medical advice.

Skin contact: Wash off immediately with soap and plenty of water.

Eye contact: Rinse immediately with plenty of water for at least 15 minutes.

Inhalation: Move to fresh air. No hazards which require special first aid measures.

Most important symptoms and effects, both acute and delayed.
Symptoms No information available

Hazards No information available

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media: Use water mist, carbon dioxide (CO2) or dry powder.

Unsuitable Extinguishing Media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special protective actions for fire-fighters: In the event of fire, wear self-contained breathing apparatus. Use NIOSH/MSHA approved respiratory protections.

Further information: In the event of fire, cool tanks with water spray.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
For personal protection, see section 8. Use rubber boots.

Environmental precautions
Should not be released into the environment.

Methods and materials for containment and cleaning up
Soak up with inert absorbent material. Sweep up and shovel into suitable container for disposal. Remove residues by scrubbing. Prevent product from entering drains.

Additional advice:
If the product contaminates river and lakes or drains inform respective authorities. Contaminated surfaces will be extremely slippery.

7. HANDLING AND STORAGE

Precautions for safe handling
Handle in accordance with good industrial hygiene and safety practice.
For personal protection see Section 8.

Conditions for safe storage, including any incompatibilities
Store at room temperature in the original container.

Materials for packaging
Unsuitable material: To avoid product degradation and equipment corrosion, do not use iron, copper or aluminum containers or equipment.

Material to avoid:
Strong oxidizing agents, iron copper, aluminum, acids
Storage stability:
Storage temperature: 41-77 ºF
Other data: Stable under recommended storage conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	From of exposure	Control parameters	Update	Basis
Contains no substances with occupational exposure limit values.						

Appropriate Engineering controls:
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and immediately after handling the product. Avoid contact with skin and eyes. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation.

Individual protection measures, such as personal protective equipment
Respiratory protection: None under normal use.

Hand protection
Glove material: Imperious gloves. Permeability tests are not available for this product. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

Eye protection:
Tightly fitting safety goggles.

Skin and body protection:
Long sleeved clothing. No special requirements.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state:	liquid, aqueous solution
Color:	clear, colorless, or amber
Odour:	Amine-like
Melting Point/Range:	Melting point/range -18 ºC
Initial boiling point/range:	Boiling point/boiling range ca. 212 ºF
Flash point:	> 212 ºF (closed cup) Does not flash
Explosive properties	
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapor pressure:	No data available
Density:	1.1 – 1.2g/cm^3
Water solubility (ies):	completely soluble
Partition coefficient:	
n-octanol/water:	Not applicable
Auto-ignition temperature:	No data available
Decomposition temperature:	> 212 ºF
Viscosity	
Viscosity, dynamic:	ca. 5,000 mPa.s
Surface tension:	Not applicable

10. STABILITY AND REACTIVITY

Reactivity
Chemical stability
Possibility of hazardous reactions

Hazardous reactions:	Hazardous polymerization does not occur.

Conditions to avoid

Conditions to avoid:	None known

Incompatible materials

Material to avoid:	Strong oxidizing agents, iron, copper, aluminum, acids

Hazardous decomposition products

Hazardous decomposition Products:	Carbon dioxide (CO2) Carbon monoxide Ammonia Nitrogen oxides (NOx) Hydrogen chloride (HCl)
Thermal decomposition:	>212 ºF

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute oral toxicity:	Conclusion: The acute toxicological results displayed may not be the results of actual testing of this material but based on a similar tested material. Remarks: estimated Rat/6,160 mg/kg/LD50
Acute inhalation toxicity:	LC50/Rat/4 h/20mg/Remarks: estimated
Acute dermal toxicity:	LD50/Rabbit/>/10,000 mg/kg Remarks: estimated
Skin corrosion/irritation:	Conclusion: No skin irritation.
Serious eye damage /eye irritation	Conclusion: No eye irritation.

Respiratory or skin sensitization

Skin sensitization:	Conclusion: Not sensitizing.

Germ cell mutagenicity

Genotoxicity in vivo	Based on available data, the classification criteria are not met.

Reproductive toxicity

Toxicity for reproduction	Conclusion: Based on available data, the classification criteria are not met.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Invertebrate Test Results

Duration: 48 hr
Species: Water flea (*Daphnia magna*)
LC50 0.32 mg/L
48 hour Toxicity/Daphnid, Daphnia magna/EPA 821-R-02-012 Method 2021.0
and Conduction Acute toxicity tests on the test materials with fishes, macroinvertebrates, and amphibians ASTM E-729-96

Fish Test Results

Duration: 96 hr
Species: Fathead Minnow (*Pimephales promelas*)
LC50 0.97 mg/L
96 hour Toxicity/Pimephales promelas/EPA 821-R-02-012 Method: 2000.0 and Conduction Acute toxicity tests on the test materials with fishes, macroinvertebrates, and amphibians ASTM-E-729-96

Toxicity to other organisms:

Persistence and degradability:

Biological degradability:
Remarks: Ecotoxicological information provided is based on a structurally or compositionally similar product.

Modified Strum Test/OECD Test Guideline 301B/28d: < 70%

Not readily biodegradable.

Bioaccumulative potential

The product is not expected to bioaccumulate. Because of the high molecular weight of the polymer diffusion through biological membranes is very small.
Partition coefficient: n-octanol/water: Not applicable

Mobility in soil

Water solubility: completely soluble.
Surface tension: applicable

Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

Product

Where possible recycling is preferred to disposal or incineration. In accordance with local and national regulations. EPA Hazardous Waste- NO

Contaminated packaging

Must be disposed of in accordance with local and national regulations.

14. TRANSPORT INFORMATION

Land transport

Not classified as dangerous in the meaning of transport regulations.

Sea Transport

Not classified as dangerous in the meaning of transport regulations.

Air transport
Not classified as dangerous in the meaning of transport regulations.

Special precautions for user

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
SARA Title III Section 311 Categories:

Immediate (Acute) Health Effects: No
Delayed (Chronic) Health Effects: No
Fire Hazard: No
Sudden Release of Pressure Hazard: No
Reactivity Hazard: No

SARA 302 Extremely Hazardous Substances
No chemicals in this material are subject to the reporting requirements of SARA Title lll, Section 302.
Not present

SARA 313 – Specific Toxic Chemical Listings
The material does not contain any chemical components with known CAS numbers that exceed the threshold (DeMinimis) reporting levels established by SARA Title lll, Section 313.
None present

CERCLA Hazardous substance (Reportable Quantities)
None Present
0 kg

California Proposition 65
Epichlorohydrin (106-89-8) < 0.0005%
1,3-dichloropropan-2-ol (96-23-1) <0.049%
3-Chloropropane-1,2-diol (96-24-2)< 0.0099%
Glycidol (556-52-5) < 0.0009%
Remarks: This product contains a chemical or chemicals known to the state of California to cause cancer, birth defects or other reproduction harm.

Notification status:
TSCA: All components of this product are included in the United States TSCA Chemical Inventory or are not required to be listed on the United States TSCA Chemical Inventory.

DAL: All components of this product are included in the Canada Domestic Substances List (DSL) or are not required to be listed on the Canada Domestic Substance List (DSL).
.
EINECS: All components of this product are included on the European Inventory of Existing Chemical Substances (EINECS) or are not required to be listed on the EINECS.

AICS: All components of this product are included in the Australian Inventory of Chemical Substances (AICS) or are not required to be listed on the Australian Inventory of Chemical Substances (AICS).

IECSC: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.

ENCS: All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese (ENCS) inventory.

KECI: All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean (ECL) inventory.

NZIoC: All components of this product are included in the New Zealand Inventory (NZIoC) or are not required to be listed on the New Zealand Inventory (NZIoC).

PICCS: All components of this product are included on the Philippine (PICCS) inventory or are not required to be listed on the Philippine (PICCS) inventory..

TCSI: All components of this product are included on the Taiwan Toxic Chemical Substances Control Act Inventory.

16. OTHER INFORMATION

NFPA Rating

Health: 1
Flammability: 0
Reactivity: 0

HMIS Rating:

Health: 1
Flammability: 0
Reactivity: 0

Training advice
Read the safety data sheet before using this product.

Sources of key data used to compile the Safety Data Sheet
Regulations, databases, literature, own tests.

DATE REVISED: 09/15/2017
DATE ISSUED: 02/13/2018

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This information is for the specific material described only and may not be valid if the material is used in combination with any other materials or in any process. The user is responsible to determine the completeness of the information and suitability for the user's own particular use. The knowledge and belief of the company, the information is accurate and reliable as of the date indicated but the company makes no express or implied warranty of merchantability for the material or the information. The company makes no express or implied warranty of fitness for a purpose for the material or for the information. Users of any chemical should educate themselves on all aspects of its use by independent investigation of current scientific and medical knowledge that the material can be used safely. Both the supplier and manufacturer make no representations and assume no liability for any direct, incidental or consequential damages resulting from its use. Both the supplier and manufacturer make no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. Recipients are advised to confirm in advance of need

that the information is current, applicable, and suitable to their circumstances. This information is for the specific material described only and may not be valid if the material is used in combination with any other materials or in any process. The user is responsible to determine the completeness of the information and suitability for the user's own particular use. Users of any chemical should educate themselves on all aspects of its use by independent investigation of current scientific and medical knowledge that the material can be used safely. The buyer assumes all responsibility for using and handling the product in accordance with applicable federal, state and local regulations.

List of abbreviations and acronyms that could be, but not necessarily are, used in the safety data sheet:

ACGIH: American Conference of Industrial Hygienists
BEI: Biological Exposure Index
CAS Chemical: Abstracts Service (Division of the American Chemical Society)
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CMR: Carcinogenic, Mutagenic or Toxic for Reproduction
DOT: Department of Transportation
FG: Food grade
FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act
GHS: Globally Harmonized System of Classification and Labeling of Chemicals
H-statement: Hazard Statement
HMIRC: Hazardous Materials Information Review Commission
HMIS: Hazardous Materials Identification System
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulation by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI (ICAO): Technical Instructions by the "International Civil Aviation Organization"
IMDG: International Maritime Code for Dangerous Goods
ISO: International Organization for Standardization
logPow: octanol-water partition coefficient
LCxx: Lethal Concentration, for xx percent of test population
LDxx: Lethal Dose, for xx percent of test population
ICxx: Inhibitory Concentration for xx of a substance
ECxx: Effective Concentration of xx
N.O.S.: Not otherwise specified
NFPA: National Fire Protection Association
NIOSH: National Institute for Occupational Safety and Health
OECD: Organization for Economic Co-operation and Development
OEL: Occupational Exposure Limit
OSHA: Occupational Safety and Health Administration
P-Statement: Precautionary Statement
PBT: Persistent, Bioaccumulative and Toxic
PMRA: Health Canada Pest Management Regulatory Agency
PPE: Personal Protective Equipment
RTK: Right to Know
SDS: Safety Data Sheet
STEL: Short-term exposure limit
STOT: Specific Target Organ Toxicity
TLV: Threshold Limit Value
TWA: Time-weighted average
VPVB: Very Persistent and Very Bioaccumulative
WEL: Workplace Exposure Level
WHMIS: Workplace Hazardous Materials Information System

Attachment C

Dewatering Test Procedures

TENCATE
Geotube®

Geotube® RDT Test
A Fast And Easy Way To Measure Dewatering Efficiency and Polymer Selection

Prueba Geotube® RDT
Un medio rápido y fácil de medir la Eficiencia en el desagüe y la selección del polímero

Test de Déshydratation Rapide (TDR) de Geotube®
Une méthode simple et rapide pour choisir le polymère et évaluer l'efficacité de la déshydratation

Geotube® RDT Teste
Uma maneira simples e rápida de medir Eficiência de desaguamento e Seleção do Polímero

Protective & Outdoor Fabrics
Aerospace Composites
Armour Composites
Geosynthetics
Industrial Fabrics
Synthetic Grass

TENCATE™
materials that make a difference

Geotube
Disposable Latex Gloves
Publix

Required Equipment for the Geotube® RDT

1. One five-gallon (20L) plastic bucket
2. Plastic cups
3. Two 500ml clear beakers
4. 100ml graduated cylinder
5. 3.75" (9.5cm) diameter Geotube® GT 500 fabric
6. RDT Test Kit
7. Hand mixer (to make down neat polymer to solution)
8. Syringes
9. Latex gloves
10. Hand sanitizer
11. Stopwatch

Equipo requerido para la prueba Geotube® RDT

1. Una cubeta plástica de 20 litros (5 galones)
2. Tazas plásticas
3. Dos vaso graduados transparentes de 500ml
4. Un cilindro graduado de 100ml
5. Círculos de Geotube® GT500 de 9.5 cm de diámetro (3.75")
6. El Prueba RDT el kit
7. Mezcladores manuales (para diluir polímero puro a solución)
8. Jeringas
9. Guantes de látex
10. Limpiador para desinfeccion de manos
11. Cronómetro

Matériel requis pour le TDR de Geotube®

1. Un seau en plastique de 20 litres (5 gallons)
2. Récipients en plastique
3. Deux béchers de 500 ml
4. Un cylindre gradué de 100 ml
5. Un morceau de membrane Geotube® GT500 de 9.5 cm de diamètre (3.75 pouces)
6. Kit de test TDR
7. Un mixer (pour mettre le polymère en solution)
8. Seringues
9. Gants de latex
10. Désinfectant pour les mains
11. Un chronomètre

Equipamentos necessários para a realização do teste Geotube® RDT

1. 1 balde plástico de 20L
2. Recipientes plásticos
3. 2 beckers transparentes de 500ml
4. Cilindro graduado de 100ml
5. Amostra cilíndrica de geotêxtil Geotube® GT500 com diâmetro de 9.5cm
6. Kit de teste RDT
7. Misturador manual para o preparo da solução de polímero
8. Seringas
9. Luvas de látex
10. Desinfetante para as mãos
11. Cronômetro

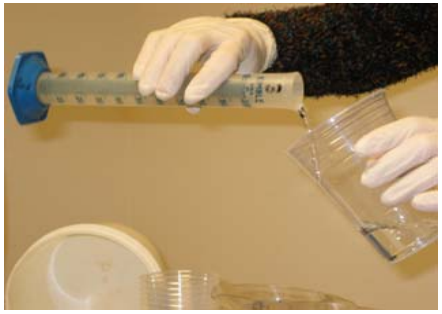
A Fast and Easy Way to Evaluate Sludge Dewatering and Polymer Selection

The Geotube® RDT (Rapid Dewatering Test) is a fast and easy test to determine how well a sludge sample dewaters through the Geotube® GT500 textile. The test is designed to:

- Evaluate the efficiency of the candidate polymers
- Measure the volume of effluent filtered from the sludge
- Record the time for filtration
- Analyze the quality of effluent water

Step 1

Measure 100ml of water into cups in which to make down polymer solution. This is usually an ample amount to conduct several 1-liter sludge tests. If sludge sample is high in solids by weight, a higher dose of polymer will be required.



Step 2

Make down neat polymer into 1.0%, 0.5%, 0.3%, or 0.25% solution by adding neat polymer to each cup of 100ml of water. Make down charts are available from TenCate™. Vigorous shaking or mechanical mixing is required to invert the neat polymer into solution. If using an electric hand mixer, mix for about 10-15 seconds only. Allow the polymer solution to age for 15-20 minutes before adding polymer solution to the sludge samples. Repeat this make down procedure with other candidate polymers being tested.

Step 3

Assemble the RDT test kit by inserting a 3.75 in. (9.5 cm) diameter piece of Geotube® GT500 fabric into the plastic funnel. Assemble funnel and place on top of the collection beaker.

Step 4

Fill a 500ml beaker with the sludge to be tested. Determine a starting point for the polymer dosage in PPM and draw the required amount of polymer into a syringe. Example: Start with 40 PPM. If this dosage creates a good floc, test a lower dosage until the optimum dose is determined. A chart of dosages is available from TenCate™. Add the polymer solution to the 500ml of sludge and begin to pour the sample back and forth between the two beakers until a floc forms.

Step 5

Slowly pour the 500ml of conditioned sludge into the RDT funnel.

Step 6

Using a stopwatch, time the free water flow through the funnel. Record the effluent volume at 30-second intervals up to 5 minutes.

Step 7

Examine the filtrate for clarity and suspended solids. Remove the RDT from the beaker, and unscrew the top of the funnel.

Slowly remove the Geotube® GT500 fabric from the plastic funnel and collect the dewatered sludge. Examine how the cake releases from the fabric.

Repeat this procedure for all the candidate polymers to determine the most efficient polymer in terms of time to dewater, volume of filtrate, and clarity of filtrate.

Step 8

Collect a sample of dewatered sludge. Conduct a moisture content test to determine percent dewatered solids.

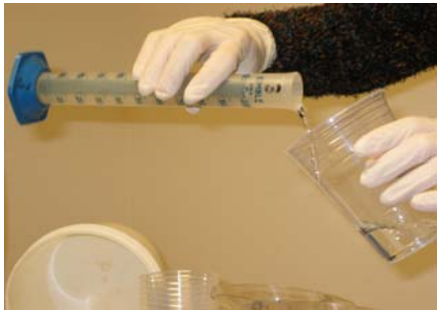
Una manera rápida y fácil de evaluar el desagüe de lodos y la selección de polímero

La prueba Geotube® RDT (Rapid Dewatering Test) es una prueba rápida y fácil para determinar que tan bien una muestra de lodo desagua a través del geotextil GT500. La prueba esta diseñada para:

- Evaluar la eficiencia de los polímeros seleccionados
- Medir el volumen del liquido drenado del lodo
- Medir el tiempo requerido para la filtración
- Analizar la calidad del agua drenada

Paso 1

Mida 100ml de agua en las tazas en donde se diluirá la solución de polímero. Esto es normalmente una cantidad suficiente para conducir varias pruebas con 1 litro de lodo. Si el contenido de sólidos (por peso) es alto en la muestra del lodo, una dosis mas elevada de polímero será requerida.



Paso 2

Diluya el polímero puro en soluciones de 1.0%, 0.5%, 0.3%, o 0.25%, añadiendo el polímero puro a las tazas de 100 ml con agua. Tablas de dilución están disponibles en TenCate™. Se requiere de mezclado vigoroso o mezclado mecánico para incorporar el polímero puro a la solución. Si se esta usando un mezclador manual eléctrico, mezcle únicamente 10-15 segundos. Permita asentar a la solución por 15-20 minutos antes de añadir la solución de polímero a las muestras de lodo. Repita esta dilución con los otros polímeros que se están evaluando.

Paso 3

Ensamble el equipo de prueba RDT insertando una muestra de textil GT500 de 9.5 cm de diámetro en el embudo plástico. Ensamble el embudo y coloque en la parte superior del vaso colector.

Paso 4

Llene un vaso de 500ml con el lodo a ser evaluado. Determine un punto de arranque para la dosificación del polímero en PPM y tome la cantidad del polímero requerido con una jeringa. Ejemplo: Empiece por 40 PPM. Si esta dosificación crea un buen floculo, pruebe con una dosis menor hasta que la dosis optima sea determinada. Una tabla de dosis esta disponible de TenCate™. Añada la solución de polímero al lodo de 500ml y empiece a mezclar la muestra con dos vasos hasta que se forme un floculo.

Paso 5

Lentamente vacié los 500ml de lodo acondicionado en el embudo RDT.

Paso 6

Usando un cronometro, tome el tiempo que le toma al agua para pasar a través del embudo. Mida el volumen desaguado a intervalos de 30 segundos hasta 5 minutos.

Paso 7

Examine la claridad y sólidos suspendidos del filtrado. Remueva el RDT del vaso y destornille la parte superior del embudo.

Lentamente remueva el geotextil Geotube® GT500 del embudo plástico y recolecte el lodo desaguado. Examine como se despega la torta de la tela.

Repita este procedimiento con todos los polímeros a ser evaluados, para determinar el polímero mas eficiente, en términos de tiempo de desagüe, volumen filtrado y claridad del filtrado.

Paso 8

Colecte una muestra del lodo desaguado. Realice una prueba de contenido de humedad para determinar el porcentaje de sólidos desaguados.

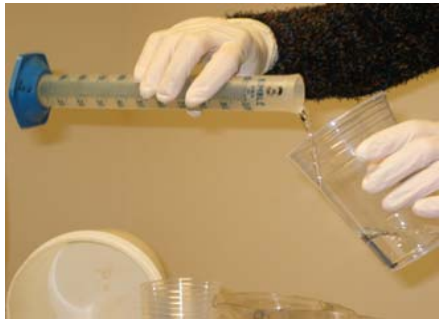
Une méthode simple et rapide pour effectuer le choix de polymères et évaluer l'efficacité de la déshydratation

Le Test de Déshydratation Rapide (TDR) de TenCate™ est une méthode simple et rapide pour valider l'aptitude d'une boue conditionnée par un polymère à s'égoutter au travers d'une membrane GT500. Ce test est conçu pour:

- Évaluer l'efficacité des polymères potentiels
- Mesurer le volume de l'effluent exfiltré par la membrane
- Chronométrer le temps de filtration
- Analyser la qualité de l'effluent

Étape 1

Mesurer 100 ml d'eau dans des récipients qui serviront à préparer les solutions de polymères. Pour chaque solution de polymère, la quantité ainsi produite est suffisante pour réaliser plusieurs tests sur différents échantillons d'un litre de boues. Si la boue présente une forte concentration en solide, une dose plus importante de polymères sera requise.



Étape 2

Diluer le polymère pur pour obtenir des solutions de concentration 1.0%, .5%, .3% ou .25% en ajoutant du polymère pur dans chacune des tasses de 100 ml d'eau. Des chartes de dilution sont disponibles auprès de TenCate™. Un brassage vigoureux, à la main ou mécanique, est nécessaire pour bien mettre en solution le polymère pur. Si vous utilisez un mixer de cuisine, mélanger pendant 10 à 15 secondes seulement. Laisser reposer la solution de polymère pendant 15 à 20 minutes avant de l'ajouter à l'échantillon de boues. Répéter cette procédure de dilution avec les autres polymères potentiels que vous souhaitez tester.

Étape 3

Assembler le kit de test TDR en insérant un morceau de membrane Geotube® GT500 de 9.5 cm de diamètre (3.75 pouces) au sommet l'entonnoir en plastique. Assembler la partie supérieure de l'entonnoir et placer l'ensemble sur le dessus d'un bécher.

Étape 4

Remplir un bécher de 500 ml avec la boue à déshydrater. Déterminer une concentration de polymère de départ et prendre le volume nécessaire de polymère dans une seringue. Exemple: Démarrez avec 40 ppm. Si cette concentration permet de créer un bon floc, tester une concentration inférieure, jusqu'à trouver la concentration optimale. Une charte de référence des concentrations est disponible auprès de TenCate™. Ajoutez la solution de polymère aux 500 ml de boues et commencer à verser et reverser l'échantillon dans les deux béchers pour bien mélanger la boue et la solution de polymère jusqu'à ce que les flocs se forment.

Étape 5

Verser doucement les 500 ml de boues conditionnées dans l'entonnoir.

Étape 6

En utilisant un chronomètre, mesurer le temps pendant lequel l'eau libre s'écoule à travers l'entonnoir. Noter le volume de l'effluent toutes les 30 secondes pendant 5 minutes.

Étape 7

Examiner la turbidité ainsi que les matières en suspension dans l'effluent. Enlever le kit TDR du bécher et dévisser la partie supérieure de l'entonnoir.

Retirer doucement la membrane Geotube® GT500 de l'entonnoir en plastique et récupérer la boue déshydratée. Examiner la manière avec laquelle la boue déshydratée se détache de la membrane.

Répéter la procédure avec chacun des polymères potentiels afin de déterminer le polymère le plus efficace en termes de temps d'égouttage, de volume et de transparence de l'effluent.

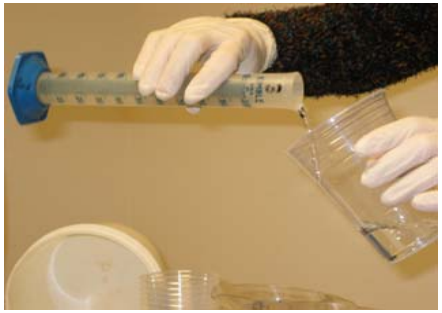
Étape 8

Prendre un échantillon de boues déshydratées. Faire un test de siccité pour déterminer le pourcentage d'humidité dans l'échantillon.

Um modo rápido e fácil e avaliar o desaguamento do lodo e a seleção do polímero

O Geotube® RDT (Teste de Desaguamento Rápido) é um teste simples e rápido para determinar a eficiência do desafuamento de uma amostra através da trama do geotêxtil GT500. O teste é projetado para:

- Avaliar a eficiência do políemro selecionado
- Medir o volume de percolado filtrado do lodo
- Registrar o tempo de filtração
- Analisar a qualidade do percolado



Passo 1:

Medir 100ml de água em vários recipientes para preparo da solução de polímero. Esta quantidade é suficiente para se realizar vários testes com 1 litro de lodo. Se a amostra de lodo apresentar um teor de sólidos muito elevado em massa, uma dose maior de polímero deve ser requerida.

Passo 2:

Preparar soluções de polímero em concentração de 1.0%, 0.5%, 0.3% ou 0.25% adicionando polímero em cada recipiente de 100 ml de água. Gráficos para este procedimento estão disponibilizados pela TenCate™. Agitar vigorosamente de forma manual ou mecânica é necessário para que o polímero abra suas cadeias e forme a solução. Se for usado um misturador elétrico manual, misturar por aproximadamente 15 a 20 segundos apenas. Permitir que a solução de polímero descanse por 15 a 20 minutos antes que seja adicionada a amostra do lodo. Repetir este procedimento para todos os polímeros que serão testados.

Passo 3:

Montar o kit do teste RDT inserindo a peça de Geotube® GT500 no funil de plástico. Montar o funil e posicionar acima do becker de coleta do percolado.

Passo 4:

Encher um becker de 500 ml com o lodo a ser testado. Determinar um ponto de partida para a dosagem em PPM do polímero e carregue uma seringa com a quantidade requerida. Exemplo: Ponto de partida 40 PPM. Se a dosagem permitir a formação de bons flocos, teste uma dosagem menor até alcançar um ponto ótimo para a dosagem ser determinado. Gráficos para este procedimento estão disponibilizados pela TenCate™. Adicionar a solução de polímero aos 500 ml de lodo e utilizando 2 beckers transfira a mistura de um para o outro até a formação dos flocos.

Passo 5:

Lentamente despeje os 500 ml de lodo floculado para o funil RDT.

Passo 6:

Utilizando um cronômetro, marcar o tempo da água livre fluir através do funil. Registrar o volume de percolado a cada 30 segundo durante 5 minutos.

Passo 7:

Examinar o percolado quanto a sua turbidez e percentual de sólidos. Remover o RDT do becker e desatarraxe o topo do funil.

Remova lentamente o geotêxtil Geotube® GT500 do funil de plástico e coletar o lodo desaguado. Examinar como o lodo se desprende do geotêxtil.

Repetir este procedimento para todos os polímeros candidatos e determinar o mais eficiente em termos de tempo de desaguamento, volume de percolado e turbidez do percolado.

Passo 8:

Coletar amostra do lodo desaguado e analisar esta amostra quanto ao seu teor de sólidos.

CAUTION!

Do Not Exceed Fill Height Printed On Geotube® Unit.
Always Install Geotube® Containers On A Flat, Level Surface.
If any questions, contact your TenCate™ Representative.

¡PRECAUCION!

No exceda la altura de llenado impresa en el Geotube®
Siempre instale el Geotube® en una superficie plana y nivelada
Para cualquier duda o ampliación contacte a su representante de TenCate™.

ATTENTION!

Ne pas dépasser la hauteur limite de remplissage imprimée sur chaque Geotube®.
Toujours installer les containers Geotube® sur une surface plane et au niveau.
Pour toute question, contacter votre représentant TenCate™.

Atenção!

Não exceda a altura máximas de enchimento impressa nas unidades Geotube®.
Sempre instale as unidades Geotube® em superfície plana.
Para quaisquer esclarecimentos, contate seu representante TenCate™.

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Designation: D7880/D7880M – 13

Standard Test Method for Determining Flow Rate of Water and Suspended Solids Retention from a Closed Geosynthetic Bag[1]

This standard is issued under the fixed designation ; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method is used to determine the flow rate of water and suspended solids through a geosynthetic permeable closed bag used to contain high water content slurry such as dredged material.

1.2 The results for the water and sediment that pass through the geotextile bag are shown as liters of water per time period, and the percent total suspended solids in milligrams per liter or parts per million.

1.3 The flow rate is the average rate of passage of a quantity of solids and water through the bag over a specific time period.

1.4 This test method requires several pieces of specified equipment such as an integrated water sampler, analytical balance, geotextile bag, stand clear PVC pipes, testing frame, and clean containers to collect the decant water and a representative sample of high water content material from the proposed dredge area or slurry source.

1.5 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D123 Terminology Relating to Textiles

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D4354 Practice for Sampling of Geosynthetics and Rolled Erosion Control Products(RECPs) for Testing

D4439 Terminology for Geosynthetics

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of other terms relating to geosynthetics, refer to Terminology D4439.

3.1.2 For definitions of textile terms, refer to Terminology D123.

3.1.3 For definitions of soil terms, refer to Terminology D653.

3.1.4 *high water content material, n*—a slurry of water and solids exhibiting the properties of a liquid, typically having a percent solids by weight smaller than 50 % (water content greater than 100 %), and the size of the solid particles tend to be very fine grained (<0.064 mm).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *flow rate, n*—volume of fluid per unit time, expressed as an average, that passes through a geotextile hanging bag.

3.2.2 *geotextile hanging bag, n*—bag, tube, sock, or container designed and fabricated from a single or a combination of layers of permeable geosynthetic to retain finegrained particles such as found in dredged material, for subsequent dewatering of the contained semi fluid materials.

4. Summary of Test Method

4.1 A geotextile bag is constructed by sewing one or more layers of geotextiles together to form a closed container with an entry clear PVC pipe providing entry to the bag. The bag will support and contain a measured amount of saturated dredged material or other high water content material.

4.2 The amount of water and sediment that flows through the geotextile container is collected at given time intervals and measured. The amount of sediment passing the geotextile container is determined as the total suspended solids.

4.3 Use material from the designated area to be dredged at the estimated initial percent solids as the actual field conditions, or the source of the high water content material.

[1] This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.03 on Permeability and Filtration.

Current edition approved July 1, 2013. Published July 2013. DOI: 10.1520/D7880_D7880M–13

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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5. Significance and Use

5.1 This test method may be used as an aid to design geotextile container systems that contain fine-grained, high water content slurries such as dredged materials to meet special environmental or operational requirements. This test is often used to demonstrate the efficacy of geotextile dewatering to regulatory agencies in determining the amount of dredged material sediment passing through a geotextile and the flow rate for specific high water content materials.

5.2 The designer can use this test method to assess the quantity of fine-grained dredged material sediment that may pass through the geotextile container into the environment.

5.3 This test method is intended for evaluation of a specific material, as the results will depend on the specific high water content slurry and geotextile evaluated and the location of the geotextile container below or above water. It is recommended that the user or a design representative perform the test because geotextile manufacturers are not typically equipped to handle or test fine-grained slurries.

5.4 This test method provides a means of evaluating geotextile containers with different dredged materials or high water content materials under various conditions. The number of times this test is repeated depends on the users and the test conditions.

5.5 This test method may not simulate site conditions and the user is cautioned to carefully evaluate how the results are applied.

6. Apparatus

6.1 Frame. Shown in Fig. 1.

6.2 Geosynthetic Bag (container), unfilled bag dimensions shall be approximately 53 cm [21 in.] length × approximately 53 cm [21 in.] width to produce a filled bag capacity of 1 ft^3. Bag shall have all the sides sawed using the same stitch pattern and seam along the entire edge.

6.2.1 The Geosynthetic Bag (container) shall have a 50.8 mm [2.0 in.] diameter female adaptor coarse threaded PVC flange installed at the top side of the bag. The center of the

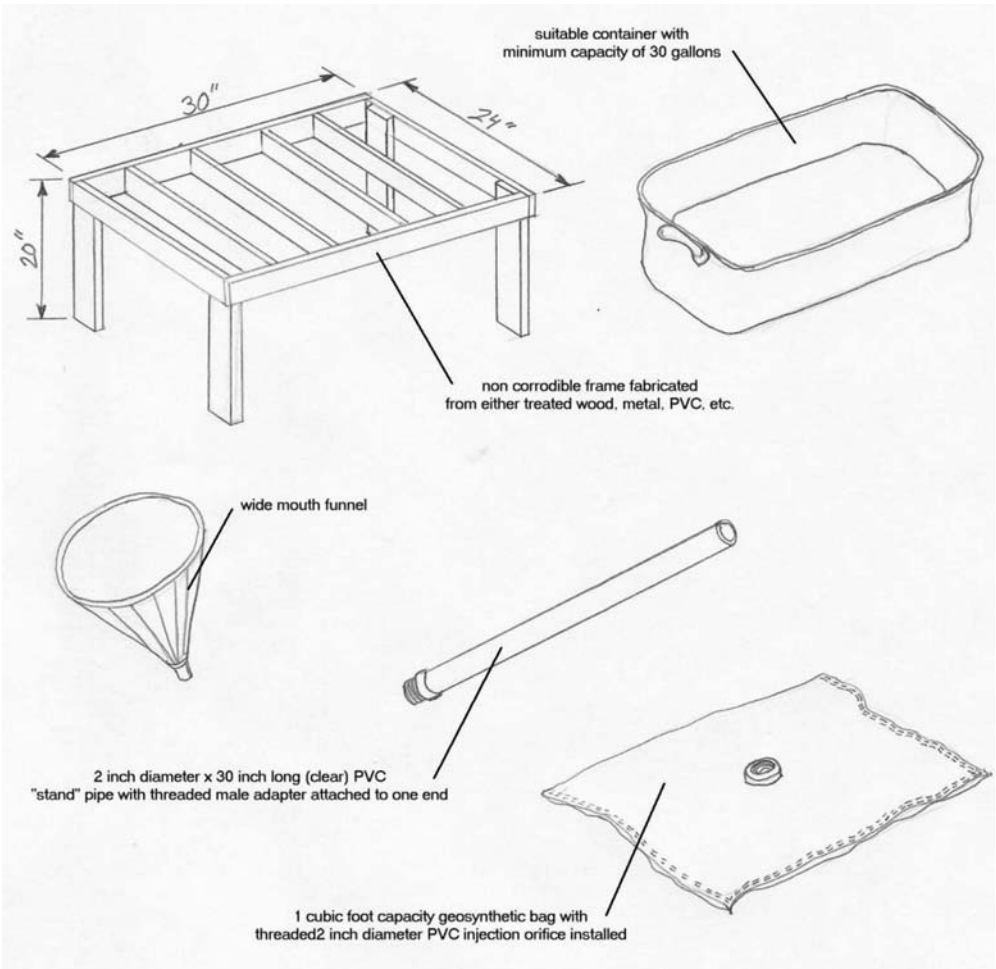

FIG. 1 Test Equipment, Bag and Frame

adapter should be located at the center of the two transversal axis of the bag. Shown in Fig. 1.

6.3 Collection Container approximate capacity filled about 75 L [20 gal], suitable to capture filtrate and proportionately sized to allow placement under the testing frame. Shown in Fig. 1.

6.4 "Stand" Pipe made from 50.8 mm [2.0 in.] diameter and at least 1.10 m [43.30 in.] in length clear PVC or other suitable plastic. "Stand" Pipe shall include a threaded male adapter to facilitate connection the female PVC flange.

6.5 Funnel.

6.6 Integrated Water Sampler, a 0.5-L [0.13-gal] device used to collect integrated samples of water.

6.7 Stopwatch.

6.8 Stirrer, such as a stirring rod on a portable electric drill.

6.9 Dredged Material, from the proposed dredge area.

6.10 Gooch Crucible.

6.11 Membrane Filter Apparatus.

6.12 Vacuum Pump.

7. Sampling

7.1 *Geotextile Container:*

7.1.1 *Lot Sample for Geotextile Container*—Divide the product into lots and take the lot samples as directed in Practice D4354.

7.1.2 *Geotextile Container Sample*—After first discarding a minimum of 1 m [3.3 ft] of geotextile from the end of the roll, cut sufficient lengths to fabricate the number of containers for the appropriate number of tests. If holes or damaged areas are evident, then damaged areas should be discarded and additional material used. No fabric should be used within 0.2 m [6 in.] of a selvedge edge.

7.2 *Dredged Material or High Water Content Material*—Obtain representative samples significant to the design of geotextile containers. The size and number of samples required is dependent upon the number of tests to be performed. Samples should be representative of the wet bulk density, water content, and consistency obtained from the dredge, pump, or other source to be placed in the geotextile tube for dewatering. In some cases, this may mean adding source water to replicate field conditions.

8. Procedure

8.1 When appropriate, pre-wet the geotextile container by soaking the geotextile in prefiltered water from the proposed dredge area until fabric is fully soaked and saturated. Do not use distilled de-ionized or water from any other source.

8.2 Place the geotextile container on top of the frame capable of safely holding 50 lb. There should be a clearance of about 20 cm [8 in.] for the bottom of the container above the floor of the platform to accommodate removal of the collection pans as they fill with sediment and water. Insert and secure the clear stand pipe in the threaded adaptor.

8.3 After the soaked geotextile container has drained of free water, place a dry shallow collector pan as described in 6.3 under the geotextile container to collect water and sediment by gravity flow.

8.4 Collect approximately 55 to 95 L [15 to 25 gal] of sludge into a suitable container and mix to ensure uniformity.

NOTE 1—A larger sample of sludge may be required if a low percentage of solids is present.

8.5 Assemble the testing frame if necessary and place a suitable collection container or under the frame to catch the effluent during testing.

8.6 Fill the geosynthetic bag by pouring the sludge into the top of the "stand" pipe. A smaller bucket and funnel can be utilized to facilitate this process. The "stand" pipe should be lifted off of the bottom of the geosynthetic bag; otherwise, the introduced sludge may back up in the pipe and overflow. This should no longer be of concern once the test bag has accumulated some volume of sludge.

8.7 Fill the geosynthetic bag with sludge as rapidly as possible until the sludge rises in the "stand" pipe to a pre-determined height corresponding to an agreed head pressure.

8.8 Collect effluent samples from the bag. The effluent should be examined for clarity and samples may be taken for testing.

8.9 If samples are to be collected for testing, carefully place the water sample with all visible sediment in approved clean glass containers marked with the time, quantity, and order in which they were collected and recorded. A stopwatch should be utilized to determine the elapsed time that each sample was collected.

8.10 Empty the collection container and collect the water and sediment for sampling in approved clean glass containers marked with the time, quantity, and order in which they were collected and recorded.

8.11 Continue to collect the water and sediment for sampling from the collection container for about one week or until drainage has slowed to less than a 25.4-mm [1-in.] depth in the container per 24 h. This completes the filtrate sample collection phase of the test.

8.12 At the completion of the sample collection, agitate the collected filtrate in each of the glass containers with a stirrer until the mixture is uniformly mixed, After 1 min of mixing, obtain a depth-integrated suspended solids sample from the mixture while continuing the agitation.

NOTE 2—With the sampler specified in 6.3, a rate of sampling that requires 30 s to reach the bottom of the container and 30 s to return to the surface is ideal. This sampling procedure allows collection of a sample over the full depth of the mixture.

8.13 Place a pre-weighted filter disk either on a membrane filter apparatus or in the bottom of a suitable Gooch crucible. Apply a vacuum and wash the disk with three successive 20-mL portion of distilled water. Continue suction to remove all traces of water from the disk.

8.14 Carefully remove the filter disk from the membrane filter apparatus and transfer to an aluminum or stainless steel planchet. If a Gooch crucible is used, remove the crucible and filter disk combination.

8.15 Dry the filter disk for at least 1 h in an oven at 104°C ± 1°C.

8.16 Store in a desiccator until cooled to room temperature.

9. Calculation

9.1 Calculate total suspended solids:

$$s_S = \frac{(A - B) \times 1000}{C} \quad (1)$$

where:

S_s = suspended solids, ppm;
A = weight of dry filter plus dry residue;
B = weight of dry filter; and
C = sample volume of suspended material, millilitres.

9.2 Calculate the flow rate, F_{DM}, of the dredged material sediment and water for each sample collected for the geotextile container using Eq 2:

$$F_{DM} = \frac{Q_P}{t_p} \quad (2)$$

where:

Q_P = quantity of dredged material sediment and water collected in the aluminum pans for each sample.
t_p = time is measured in minutes for each sample collected.

9.2.1 Correct the flow rate to 20°C using Eq 3:

$$F_{20°C} = \frac{F_{DM} U_T}{U_{20°C}} \quad (3)$$

where:

U_T = ratio of viscosity of water at temperature T to viscosity of water at 20°C (see Fig. 2).

10. Report

10.1 In the report of total suspended solids and flow rate, include the following information:

10.1.1 State that the specimens were tested as directed in this test method. Describe the type of geotextile and seam tested and the sampling method used.

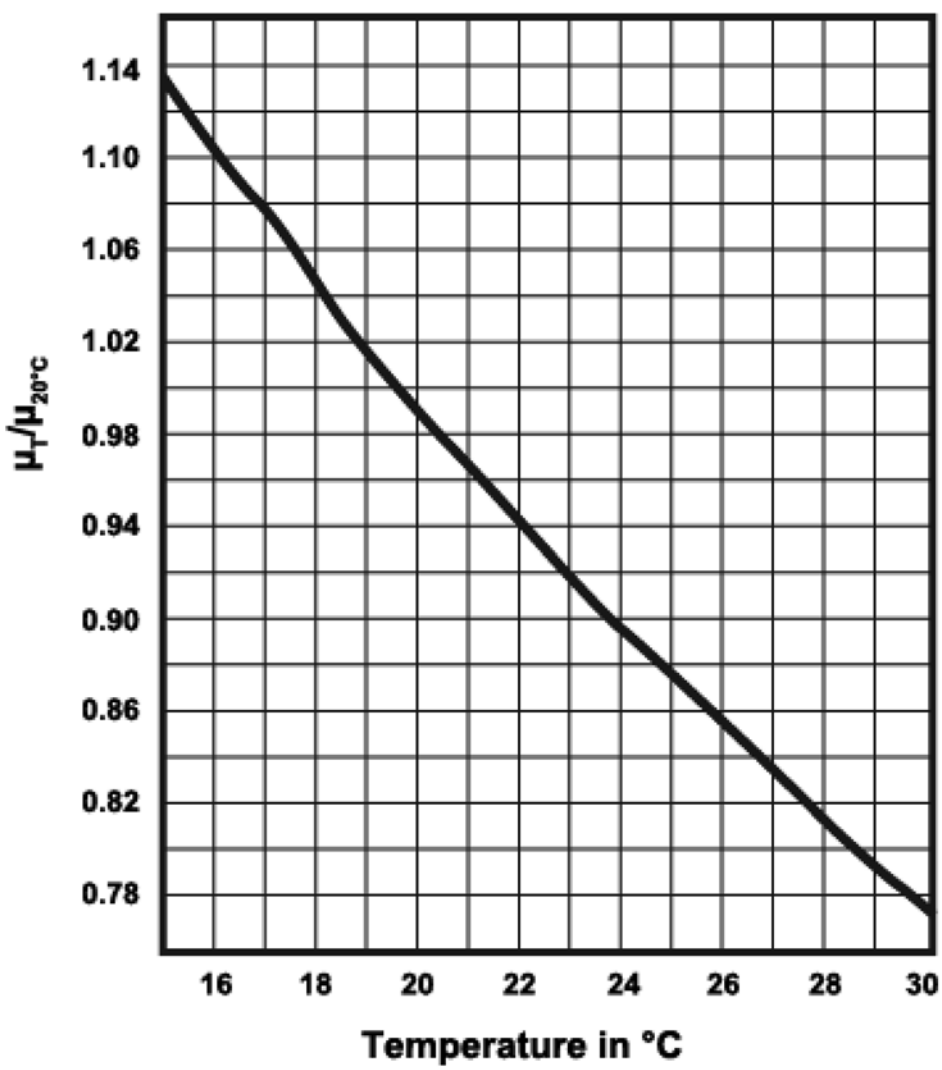

FIG. 2 Flow Rate to 20°C

10.1.2 Report the number of specimens tested and the direction(s) tested (if applicable).

10.1.3 Report the type of dredged material, initial volume, weight, and height of material used and any data showing pertinent physical properties of the dredged material soil.

10.1.4 Report mass of sediment collected in pan.

10.1.5 Report complete test data including temperature of the water, recorded flow rates, length of test, and suspended solids content for each dredged material and water sample collected and total average values for all tests.

10.1.6 Give a statement of any deviation from the described test method.

11. Precision and Bias

11.1 *Precision*—The precision of the procedure in this test method for measuring suspended solids and flow rates for geotextile containers for dredged material containment systems will be established within five years.

11.2 *Bias*—The procedure in this test method for measuring suspended solids and flow rate of a geotextile container system may be biased because of different geotextile container geometries, container surface area, container volume, type of dredged material, or whether the container is submerged or not submerged. The test method described is simply an index test to determine the relative difference in flow rate and suspended solids with the use of various geotextile systems and various types of dredged materials. The sediments determined for submerged containers would be much less than for non-submerged containers because the pressure gradient and flow rate is very small for submerged containers and is caused only by the slow release of pore water pressure during sedimentation and consolidation of the dredged material.

12. Keywords

12.1 contaminated dredged materials; dredged materials; flow rates; geotextile containers; suspended solids

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Paint Filter Test	Project Specific SOP 18MC 1-9 Revision: 0 Date: April 4, 2018

Prepared:	Meryl Cherchia	**Technical Review:**	Jagrut Jathal
PM Approval:	Thomas Mathew	**Editorial Review:**	Traci Mordell
Project Name:	Eighteen Mile Creek, Superfund Site		

1.0 Objective

The protocol set forth in this standard operating procedure (SOP) outlines the procedures to be used for performing the paint filter test (PFT). Details regarding the sampling objectives, design, and quality assurance requirements are provided in the quality assurance project plan (QAPP). The procedures outlined here will be performed in compliance with the QAPP.

2.0 Background

The Eighteen Mile Creek Superfund Site is in the City of Lockport, NY. The site has a long history of industrial use dating to the 19th century when the creek was used as a source of hydropower. Various manufacturing facilities operated at the properties located within the creek corridor. Due to the nature and complexity of the contamination detected at the site, it has been divided into three operable units (OUs). Records of Decision (RODs) were issues for OU 1 in September 2013 and for OU 2 in January 2017. Polychlorinated biphenyls (PCBs) and metals (particularly lead) were identified as the primary contaminants of potential concern (COPCs). The COPCs were detected in sediments throughout the entire length of the creek, but PCBs and total lead concentrations were highest in the creek corridor. Based on the RODs, remedial action for OU 1 and OU 2 includes excavation of creek corridor sediments, excavation of contaminated soils in select areas adjacent to the creek corridor, capping of select areas adjacent to the creek corridor, and removal of the Clinton and William Street Dams. This SOP addresses the required field procedures for conducting the PFT for determining the presence of free liquids in a representative sample of sediment in general accordance with EPA Method 9095B.

2.1 General Terms and Definitions

None

2.2 Associated Procedures

- Project-Specific SOP 18MC 1-3, Land-Based Geotechnical Field Investigations
- Project-Specific SOP 18MC 1-4, Overwater Geotechnical Drilling and Sampling
- Project-Specific SOP 18MC 1-8, Geotube® Dewatering Test
- OP 2-2, Handling Investigation-Derived Waste

3.0 General Responsibilities

Field Engineer – The field engineer is responsible for ensuring the standard procedures for the PFT are properly followed and for recording the results and observations of each test.

4.0 Project Planning

This section provides a list of general equipment used during collection of subsurface data and soil samples.

4.1 General Equipment

- Conical paint filter – Mesh number 60 +/- 5% (fine meshed sized). Available at local paint supply stores or from mail-order vendors
- Ring stand and ring or tripod
- Glass funnel – If the paint filter, with the waste, cannot sustain its weight on the ring stand, then a fluted glass funnel or glass funnel with a mouth large enough to allow at least 1 inch of the filter mesh to protrude should be used to support the filter. The funnel should be fluted or have a large open mouth to support the paint filter yet not interfere with the movement to the graduated cylinder of the liquid that passes through the filter mesh.
- 100-milliliter (mL) graduated cylinder
- 100-mL graduated beaker
- Composited dewatered sediment

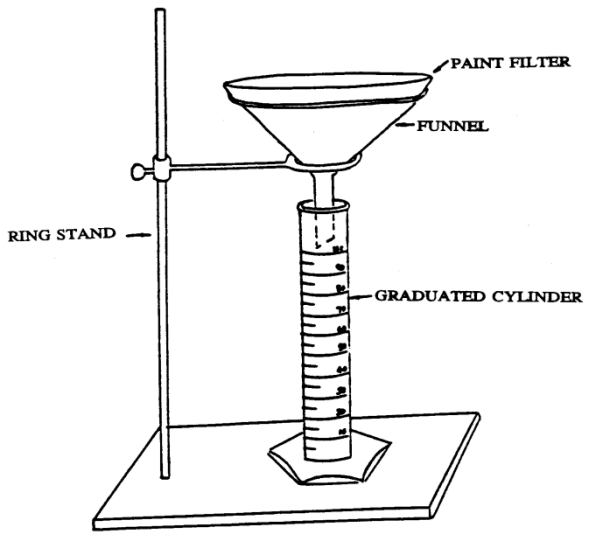

Figure 1 - Typical Paint Filter Test Setup

5.0 Procedure

Bulk sediment and creek water samples will be collected in accordance with Project-Specific SOP 18MC 1-3, Land-Based Geotechnical Field Investigations, and Project-Specific SOP 18MC 1-4, Overwater Geotechnical Drilling and Sampling, tested in accordance with Project-Specific SOP 18MC 1-8, Geotube® Dewatering Test, and will be collected at designated locations. The procedures for the PFT are presented in the following:

1. Don health and safety equipment per the Health and Safety Plan (HASP).
2. Assemble test apparatus as shown on Figure 1.
3. Collect a representative sample for the test in a 100-mL beaker.
4. Place sample in the filter. A glass funnel may be used to provide support for the paint filter. Settling the sample into the paint filter may be facilitated by lightly tapping the side of the filter as it is being filled.
5. Allow sample to drain for 5 minutes into the graduated cylinder.
6. If any portion of the test material collects in the graduated cylinder in the 5-minute period, then the material is deemed to contain free liquids according to Title 40 of the Code of Federal Regulations, Sections 264.314 and 265.314, per EPA Test Method 9095B. If the material is deemed to contain free liquids the test may be stopped and not observed for the full 5 minutes.

7. Upon completion of the test, the material may be removed from the paint filter and introduced and mixed back into the larger volume of sediment.

6.0 Equipment Cleaning/Decontamination

Disposable equipment will be used when available. In addition, plastic, Teflon, epoxy-coated or Teflon-coated equipment will be used to prevent mercury amalgamation with metal components. To ensure that samples are not contaminated by equipment or containers, it is necessary to follow certain procedures for cleaning or decontaminating equipment. All equipment in direct contact with the sample must be cleaned between each sample. Decontamination procedures will be in accordance with the HASP, and equipment disposal will be in accordance with SOP 2-2, Guide to Handling Investigation-Derived Waste.

7.0 Quality Assurance

Duplicate samples should be analyzed on a routine basis (e.g., at a frequency of 1 duplicate for every 10 tests). The field engineer will supervise the PFT to ensure compliance with the procedures established in the QAPP and this SOP.

8.0 Documentation

Field data sheets and field notebooks shall be used for the maintenance of field records. All aspects of work, such as sample observations, deviations to procedures, and decontamination, shall be documented in the field data sheets and/or field notebooks. The logs documenting the preparation sequence shall be documented daily.

All entries in field logs and field notebooks should be legibly recorded and contain accurate and inclusive documentation of an individual's activities. Corrections to logbook entries will be accomplished by a single cross out with the date and initials of the person making the entry. White out or correction tape is not permitted.

9.0 References

SW-846 Method 9095B – Paint Filter Liquids Test

Attachment D

Dewatering Test Data Sheets

Rapid Dewatering Test Results
18-MC Treatability Study
CDM Smith Geotechnical Lab

C1-OH8P		12:10 PM
Time (s)	Total Pore Water Collected (mL)	Estimated Total Pore Water Flow Rate (mL/s)
30	25	0.83
60	30	0.50
90	40	0.44
120	50	0.42
150	70	0.47
180	75	0.42
210	85	0.40
240	98	0.41
270	105	0.39
300	115	0.38

C1-OH8	Start Time	8:40 AM
Time (s)	Total Pore Water Collected (mL)	Estimated Total Pore Water Flow Rate (mL/s)
30	2	0.07
60	6	0.10
90	9	0.10
120	11.5	0.10
150	16	0.11
180	19	0.11
210	22	0.10
240	25.5	0.11
270	29.5	0.11
300	34	0.11

C3-OH15P	Start Time	15:02
Time (s)	Total Pore Water Collected (mL)	Estimated Total Pore Water Flow Rate (mL/s)
30	75	2.50
60	100	1.67
90	125	1.39
120	155	1.29
150	175	1.17
180	215	1.19
210	225	1.07
240	250	1.04
270	275	1.02
300	280	0.93

Rapid Dewatering Test Results
18-MC Treatability Study
CDM Smith Geotechnical Lab

C3-OH15	Start Time	9:12 AM
Time (s)	Total Pore Water Collected (mL)	Estimated Total Pore Water Flow Rate (mL/s)
30	2.5	0.08
60	5	0.08
90	8	0.09
120	10	0.08
150	12	0.08
180	14	0.08
210	16	0.08
240	18	0.08
270	20	0.07
300	22	0.07

C5	Start Time	16:44
Time (s)	Total Pore Water Collected (mL)	Estimated Total Pore Water Flow Rate (mL/s)
30	16.5	0.55
60	21.5	0.36
90	26.5	0.29
120	29	0.24
150	33	0.22
180	37.5	0.21
210	40.5	0.19
240	44.5	0.19
270	48	0.18
300	51.5	0.17

Field Standard Operation Procedure #4: Geotube® Dewatering Test

Geotube® Dewatering Test

Field Data Sheet

Test ID: C1-OH8P

Polymer Type: Solve 426/Solve 216B

Polymer Dosages: 3 mL / 3 mL

Geotextile: Opening Size No. 40

Date: 12/18/2018

Time Started: 1326

Water Added (L): 42.5

Sediment Added (L): 6.81

Pass Paint Filter Test: PASS

Tested By: M. Passaro / M. Cherchia

Time (Minute)	Pore Water Collected (L)	Estimated Pore Water Flow Rate (L/min)	Turb. (NTU)	T (C°)	Specific Cond.		Sal	DO		pH	ORP
					µS/cm	µS/cm		%	Mg/L		
0-2	4.875	2.4375	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-5	14.25	4.7500	110	18.15	564	649	0.32	38.4	3.62	7.37	136.7
5-15	12	1.2000	35	17.89	566	655	0.32	26.9	2.54	7.40	101.9
15-30	4.28	0.2853	9.28	17.69	568	659	0.32	35.6	3.37	7.38	65.5
30-45	2.20	0.1467	6.41	17.41	566	662	0.32	34.5	3.30	7.55	51.9
45-60	1.10	0.0733	4.51	17.47	574	670	0.33	33.5	3.19	7.57	43.9
60-120	0.90	0.0150	2.34	16.91	565	669	0.33	49.4	4.75	7.72	13.6
120-240	0.15	0.0013	3.79	16.90	593	702	0.34	41.1	3.95	8.00	83.6
240-1440	0.5	0.00042	91.9	16.30	665	797	0.39	64.7	6.30	7.59	295.7
TOTALS	40.255	--	--	--	--	--	--	--	--	--	--

Comments:

1. 24-hour Moisture Content Data
   Pan ID: RGIII; Pan Tare: 127.53; Pan + Wet: 229.76 g; Pan + Dry: 165.11 g

Field Standard Operation Procedure #4: Geotube® Dewatering Test

Geotube® Dewatering Test

Field Data Sheet

Test ID: C1-OH8

Polymer Type: None

Polymer Dosages: None

Geotextile: Opening Size No. 40

Date: 12/20/2018

Time Started: 1330

Water Added (L): 51.0

Sediment Added (L): 6.81

Pass Paint Filter Test: FAIL

Tested By: M. Passaro / M. Cherchia

Time (Minute)	Pore Water Collected (L)	Estimated Pore Water Flow Rate (L/min)	Turb. (NTU)	T (C°)	Specific Cond.		Sal	DO		pH	ORP
					µS/cm	µS/cm		%	Mg/L		
0-2	3.8	1.900	Too High	17.47	482	563	0.27	49.8	4.78	7.76	95.7
2-5	14.9	4.967	Too High	17.51	477	557	0.27	62.1	5.91	7.74	90.5
5-15	13.8	1.380	Too High	17.43	473	552	0.27	61.1	5.81	7.71	92.8
15-30	2.6	0.173	Too High	16.98	480	567	0.28	64.5	6.81	7.76	90.1
30-45	1.2	0.080	822	16.76	485	575	0.28	48.8	4.73	7.76	99.0
45-60	0.8	0.053	357	16.83	490	580	0.28	63.2	6.10	7.81	103.9
60-120	2.2	0.037	144	17.21	506	594	0.29	53.8	5.17	7.93	105.9
120-240	2.6	0.022	22.4	16.79	619	522	0.30	58.5	5.67	8.10	92.9
240-1440	5.5	0.005	2.43	16.56	656	550	0.32	56.9	5.54	8.08	135.7
TOTALS	47.4	--	--	--	--	--	--	--	--	--	--

Comments:

1. 24-hour Moisture Content Data
   Pan ID: RGIII; Pan Tare: 127.49 g; Pan + Wet: 306.50 g; Pan + Dry: 226.60 g

CDM Smith

Field Standard Operation Procedure #4: Geotube® Dewatering Test

Geotube® Dewatering Test

Field Data Sheet

Test ID: C3-OH15P

Polymer Type: Solve 426/Solve 216B

Polymer Dosages: 5 mL / 5 mL

Geotextile: Opening Size No. 40

Date: 12/18/2018

Time Started: 1522

Water Added (L): 55.3

Sediment Added (L): 8.32

Pass Paint Filter Test: PASS

Tested By: M. Passaro / M. Cherchia

Time (Minute)	Pore Water Collected (L)	Estimated Pore Water Flow Rate (L/min)	Turb. (NTU)	T (C°)	Specific Cond.		Sal	DO		pH	ORP
					µS/cm	µS/cm		%	Mg/L		
0-2	7.6	3.8000	207	17.84	589	508	0.29	30.8	2.92	7.62	0.4
2-5	25.0	8.3333	188	17.66	584	503	0.28	39.0	3.70	7.62	-2.4
5-15	12.6	1.2600	31.8	17.44	590	505	0.29	28.6	2.73	7.66	-11.2
15-30	5.5	0.3667	27.2	17.43	586	501	0.29	33.7	3.22	7.74	-4.5
30-45	2.3	0.1533	4.88	17.43	586	502	0.29	33.4	3.19	7.74	0.7
45-60	2.0	0.1333	3.32	18.41	599	524	0.29	35.6	3.33	7.96	70.6
60-120	1.9	0.0317	7.18	17.79	610	526	0.30	47.1	4.43	8.01	92.1
120-240	0.2	0.0017	4.24	17.33	625	533	0.31	46.8	4.49	8.17	112.5
240-1440	0.25	0.00021	34.7	18.40	912	797	0.45	69.9	6.44	7.25	280.1
TOTALS	57.35	--	--	--	--	--	--	--	--	--	--

Comments:

1. 24-hour Moisture Content Data
   Pan ID: RG4; Pan Tare: 129.42 g; Pan + Wet: 275 g ; Pan + Dry: 195.6 g

Field Standard Operation Procedure #4: Geotube® Dewatering Test

Geotube® Dewatering Test

Field Data Sheet

Test ID: C3-OH15

Polymer Type: None

Polymer Dosages: None

Geotextile: Opening Size No. 40

Date: 12/20/2018

Time Started: 1223

Water Added (L): 44.93

Sediment Added (L): 5.67

Pass Paint Filter Test: FAIL

Tested By: M. Passaro/ M. Cherchia

Time (Minute)	Pore Water Collected (L)	Estimated Pore Water Flow Rate (L/min)	Turb. (NTU)	T (C°)	Specific Cond.		Sal	DO		pH	ORP
					µS/cm	µS/cm		%	Mg/L		
0-2	1.6	0.800	Too High	18.88	536	607	0.30	55.4	5.01	7.93	158.1
2-5	7.1	2.367	Too High	18.14	520	598	0.29	45.1	4.22	7.90	141.8
5-15	7.1	0.710	Too High	18.07	519	598	0.29	51.2	4.84	7.88	107.4
15-30	3.5	0.233	961	18.09	522	602	0.29	59.5	5.56	8.11	108.4
30-45	1.6	0.107	294	17.86	519	601	0.29	78.4	7.31	8.13	108.1
45-60	0.9	0.060	177	17.86	525	610	0.30	70.0	6.61	8.04	106.8
60-120	3.2	0.053	92.1	17.40	516	603	0.29	64.9	6.15	7.86	102.4
120-240	3.8	0.032	18.2	17.79	528	613	0.30	67.7	6.39	8.04	95.5
240-1440	7.5	0.006	3.11	17.10	537	632	0.31	59.9	5.75	8.14	135.0
TOTALS	36.3	--	--	--	--	--	--	--	--	--	--

Comments:

1. 24-hour Moisture Content Data
   Pan ID: MP1; Pan Tare: 131.59 g; Pan + Wet: 269.85 g; Pan + Dry: 220.59 g

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Field Standard Operation Procedure #4: Geotube® Dewatering Test

Geotube® Dewatering Test

Field Data Sheet

Test ID: C5

Polymer Type: None

Polymer Dosages: None

Geotextile: Opening Size No. 40

Date: 12/19/2018

Time Started: 0910

Water Added (L): 52.0

Sediment Added (L): 4.54

Pass Paint Filter Test: PASS

Tested By: M. Passaro / M. Cherchia

Time (Minute)	Pore Water Collected (L)	Estimated Pore Water Flow Rate (L/min)	Turb. (NTU)	T (C°)	Specific Cond.		Sal	DO		pH	ORP
					µS/cm	µS/c cm		%	Mg/L		
0-2	10.45	5.23	Too High	15.58	627	514	.31	68	6.75	7.47	187.4
2-5	21.0	7.00	Too High	15.05	490	397	.24	71.8	7.10	7.52	174.5
5-15	6.0	0.6	Too High	14.94	485	392	.24	62	6.20	7.45	195.3
15-30	6.1	0.41	Too High	15.20	488	397	.24	63	6.30	7.46	201.7
30-45	1.5	0.10	998	15.52	500	409	.24	70	6.89	7.59	241.9
45-60	1.2	0.08	477	16.06	516	428	.25	66	6.43	7.57	259.9
60-120	2.8	0.047	120	15.87	524	433	.25	60	5.95	7.50	169.6
120-240	2.7	0.023	11.1	17.02	557	472	.27	61	5.84	7.50	230.3
240-1440	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTALS	52.25	--	--	--	--	--	--	--	--	--	--

Comments:

1. 24-hour Hach 2100W Turbidimeter and YSI 6920 Multiparameter Water Quality Meter readings not available due to factors regarding other laboratory testing.

2. 24-hour Moisture Content Data
   Pan ID: RG7; Pan Tare: 130.21 g; Pan + Wet: 338.85 g; Pan + Dry: 264.79 g

Attachment E

Soil Mixing Data Sheets

Mix Design ID: C1-OH8P-PC5
Project: 18-Mile Creek

Dimensions

Small Mold Dimensions (D/H) (in)	2	4
Volume of Small Mold (in3, ft3)	12.56637061	0.007272205

Calculations

Unit Weight of Sediment (pcf)	85
Sediment per Mold (lb)	0.618137443
Sediment per Mold (g)	280.5849483
Number of Molds	4
Sediment Needed (g)	1122.339793

Mix Design

Bucket	513.04	g
Sediment Used	1400	g
Bucket + Sediment	1913.04	g

Bulking Additions

% Portland Cement	5%	70	g

Pass 1 *2:00:00 PM* 12/19/2018

Paint Filter Test: PASS

Mold	Tare -Dry g	Tare w/ Mix g	Bulk Density pcf	
1	28.48	316.69	87.4	
2	28.02	316.19	87.4	
3	27.88	314.71	87.0	
4	28.5	317.02	87.5	*EXTRA MOLD*
5	28.09	315.68	87.2	*EXTRA MOLD*
Average	28.22	316.1525	87.3	

Mix Design ID: C1-OH8P-PC10
Project: 18-Mile Creek

Dimensions

Small Mold Dimensions (D/H) (in)	2	4
Volume of Small Mold (in3, ft3)	12.56637061	0.0072722

Calculations

Unit Weight of Sediment (pcf)	85
Sediment per Mold (lb)	0.618137443
Sediment per Mold (g)	280.5849483
Number of Molds	4
Sediment Needed (g)	1122.339793

Mix Design

Bucket	513.04	g
Sediment Used	1400	g
Bucket + Sediment	1913.04	g

Bulking Additions

% Portland Cement	10%	140	g

Pass 1 *2:30:00 PM* 12/19/2018

Paint Filter Test: PASS

Mold	Tare -Dry g	Tare w/ Mix g	Bulk Density pcf	
1	28.57	319.83	88.3	
2	28.04	319.34	88.3	
3	28.63	321.51	88.8	
4	28.59	319.99	88.3	*EXTRA MOLD*
5	28.17	319.63	88.4	*EXTRA MOLD*
Average	28.4575	320.1675	88.4	

Mix Design ID: C1-OH8P-PC15
Project: 18-Mile Creek

Dimensions

Small Mold Dimensions (D/H) (in)	2	4
Volume of Small Mold (in3, ft3)	12.56637061	0.0072722

Calculations

Unit Weight of Sediment (pcf)	85
Sediment per Mold (lb)	0.618137443
Sediment per Mold (g)	280.5849483
Number of Molds	4
Sediment Needed (g)	1122.339793

Mix Design

Bucket	513.04	g
Sediment Used	1400	g
Bucket + Sediment	1913.04	g

Bulking Additions

% Portland Cement	15%	210	g

Pass 1 *2:45:00 PM* 12/19/2018

Paint Filter Test: PASS

Mold	Tare -Dry g	Tare w/ Mix g	Bulk Density pcf	
1	28.59	329.13	91.1	
2	28.23	329.66	91.4	
3	28.16	333.94	92.7	
4	27.38	326.17	90.6	*EXTRA MOLD*
5	28.12	329.13	91.3	*EXTRA MOLD*
Average	28.09	329.725	91.4	

Mix Design ID: C3-OH15P-PC5
Project: 18-Mile Creek

Dimensions

Small Mold Dimensions (D/H) (in)	2	4
Volume of Small Mold (in3, ft3)	12.56637061	0.0072722

Calculations

Unit Weight of Sediment (pcf)	85
Sediment per Mold (lb)	0.618137443
Sediment per Mold (g)	280.5849483
Number of Molds	4
Sediment Needed (g)	1122.339793

Mix Design

Bucket	513.04	g
Sediment Used	1400	g
Bucket + Sediment	1913.04	g

Bulking Additions

% Portland Cement	5%	70	g

Pass 1 *3:35:00 PM* 12/19/2018

Paint Filter Test: PASS

Mold	Tare -Dry g	Tare w/ Mix g	Bulk Density pcf	
1	28.81	327.79	90.6	
2	28.26	326.24	90.3	
3	28.71	326.24	90.2	
4	28.07	329.41	91.4	*EXTRA MOLD*
5	26.78	263.68	71.8	*EXTRA MOLD*
Average	28.4625	327.42	90.6	

Mix Design ID: C3-OH15P-PC10
Project: 18-Mile Creek

Dimensions

Small Mold Dimensions (D/H) (in)	2	4
Volume of Small Mold (in3, ft3)	12.56637061	0.007272

Calculations

Unit Weight of Sediment (pcf)	85
Sediment per Mold (lb)	0.618137443
Sediment per Mold (g)	280.5849483
Number of Molds	4
Sediment Needed (g)	1122.339793

Mix Design

Bucket	513.04	g
Sediment Used	1400	g
Bucket + Sediment	1913.04	g

Bulking Additions

% Portland Cement	10%	140	g

Pass 1 *4:00:00 PM* 12/19/20148

Paint Filter Test: PASS

Mold	Tare -Dry g	Tare w/ Mix g	Bulk Density pcf	
1	28.71	331.44	91.8	
2	28.04	330.93	91.8	
3	28.64	330.58	91.5	
4	28.59	328.7	91.0	*EXTRA MOLD*
5	27.67	329.22	91.4	*EXTRA MOLD*
Average	28.495	330.4125	91.5	

Mix Design ID: C3-OH15P-PC15
Project: 18-Mile Creek

Dimensions

Small Mold Dimensions (D/H) (in)	2	4
Volume of Small Mold (in3, ft3)	12.56637061	0.0072722

Calculations

Unit Weight of Sediment (pcf)	85
Sediment per Mold (lb)	0.618137443
Sediment per Mold (g)	280.5849483
Number of Molds	4
Sediment Needed (g)	1122.339793

Mix Design

Bucket	513.04	g
Sediment Used	1400	g
Bucket + Sediment	1913.04	g

Bulking Additions

% Portland Cement	15%	210	g

Pass 1 *4:25:00 PM* 12/19/2018

Paint Filter Test: PASS

Mold	Tare -Dry g	Tare w/ Mix g	Bulk Density pcf	
1	28.7	330.91	91.6	
2	28.38	334.4	92.8	
3	28.69	334.5	92.7	
4	28.29	332.22	92.1	EXTRA MOLD
5	27.66	334.53	93.0	EXTRA MOLD
Average	28.515	333.0075	92.3	

Attachment F

Unconfined Compressive Strength Test Results

CDM SMITH
Geotechnical Laboratory

Summary of Unconfined Compressive Strength Tests

Client: USACE

Project: 18 Mile Creek

File No.: 51147-223203

C1-OH8P	3 Day Unconfined Compressive Strength (psi)	3 Day Dry Density (pcf)	14 Day Unconfined Compressive Strength (psi)	14 Day Dry Density (pcf)	28 Day Unconfined Compressive Strength (psi)	28 Day Dry Density (pcf)
5% cement	4.2	42.3	6.1	42.2	6.5	42.8
10% cement	9.1	43.3	18.5	43.4	21.1	43.8
15% cement	22.8	47.8	49.6	48.9	47.8	49.8

C3-OH15P	3 Day Unconfined Compressive Strength (psi)	3 Day Dry Density (pcf)	14 Day Unconfined Compressive Strength (psi)	14 Day Dry Density (pcf)	28 Day Unconfined Compressive Strength (psi)	28 Day Dry Density (pcf)
5% cement	4.3	46.8	5.6	47.3	6.1	47.0
10% cement	11.8	48.7	21.9	49.4	22.8	50.8
15% cement	22.9	52.0	44.3	52.2	49.4	53.3

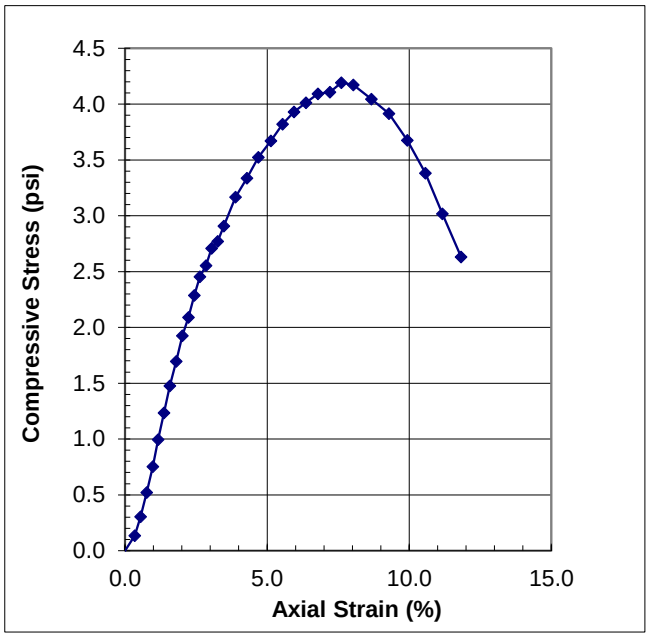
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

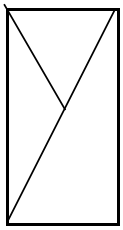
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	5% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	0.25

Water Content (%):	106.5		
Mass (g):	278.2	Loading Rate (in/min) :	0.05
Area (sq in) :	3.07	Dial Rate :	5.8
Diameter (in) :	1.98	Strain Rate (%/min)	1.24
Height (in) :	3.95	Strain at Failure (%):	7.61
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	4.2
Wet Density (pcf) :	87.4	Shear Strength (psi):	2.1
Dry Density (pcf) :	42.3		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.07	0.00	0.00
16	0.014	0.4	3.07	0.34	0.14
26	0.021	0.9	3.07	0.54	0.30
36	0.030	1.6	3.07	0.77	0.52
46	0.039	2.3	3.07	0.98	0.75
56	0.046	3.1	3.07	1.16	0.99
66	0.054	3.8	3.07	1.37	1.23
76	0.062	4.5	3.07	1.58	1.48
86	0.071	5.2	3.07	1.80	1.70
96	0.080	5.9	3.07	2.02	1.93
106	0.088	6.4	3.07	2.23	2.09
116	0.096	7.0	3.07	2.44	2.29
126	0.104	7.5	3.07	2.64	2.45
136	0.112	7.8	3.07	2.85	2.56
146	0.120	8.3	3.07	3.04	2.71
156	0.129	8.5	3.07	3.26	2.77
166	0.137	8.9	3.07	3.48	2.91
186	0.154	9.7	3.07	3.89	3.17
206	0.169	10.3	3.07	4.29	3.34
226	0.185	10.8	3.07	4.70	3.53
246	0.203	11.3	3.07	5.13	3.67
266	0.219	11.7	3.07	5.54	3.82
286	0.235	12.1	3.07	5.95	3.93
306	0.251	12.3	3.07	6.37	4.01
326	0.268	12.6	3.07	6.79	4.09
346	0.285	12.6	3.07	7.21	4.11
366	0.301	12.9	3.07	7.61	4.19
386	0.317	12.8	3.07	8.03	4.17
416	0.342	12.4	3.07	8.67	4.04
446	0.367	12.0	3.07	9.28	3.92
476	0.392	11.3	3.07	9.93	3.68
506	0.417	10.4	3.07	10.57	3.38
536	0.441	9.3	3.07	11.16	3.02
566	0.467	8.1	3.07	11.82	2.63



Failure Sketch



Remarks: None.

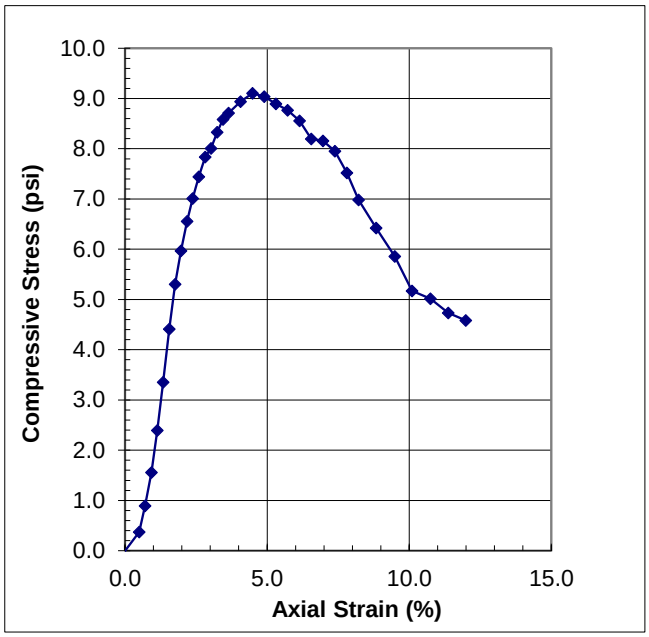
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

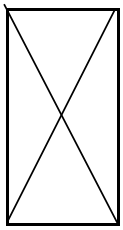
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	10% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	0.80

Water Content (%):	100.6		
Mass (g):	283.7	Loading Rate (in/min) :	0.05
Area (sq in) :	3.11	Dial Rate :	5.8
Diameter (in) :	1.99	Strain Rate (%/min)	1.26
Height (in) :	3.99	Strain at Failure (%):	4.48
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	9.1
Wet Density (pcf) :	86.9	Shear Strength (psi):	4.6
Dry Density (pcf) :	43.3		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.11	0.00	0.00
24	0.020	1.2	3.11	0.49	0.37
34	0.028	2.8	3.11	0.70	0.89
44	0.037	4.9	3.11	0.93	1.56
54	0.045	7.5	3.11	1.14	2.39
64	0.054	10.4	3.11	1.34	3.35
74	0.062	13.7	3.11	1.56	4.41
84	0.070	16.5	3.11	1.77	5.30
94	0.079	18.6	3.11	1.97	5.97
104	0.087	20.4	3.11	2.18	6.55
114	0.095	21.8	3.11	2.38	7.01
124	0.103	23.2	3.11	2.59	7.44
134	0.113	24.4	3.11	2.82	7.84
144	0.121	24.9	3.11	3.03	8.01
154	0.129	25.9	3.11	3.24	8.33
164	0.138	26.7	3.11	3.44	8.58
174	0.145	27.1	3.11	3.64	8.71
194	0.162	27.8	3.11	4.06	8.94
214	0.179	28.3	3.11	4.48	9.10
234	0.196	28.1	3.11	4.90	9.04
254	0.212	27.7	3.11	5.31	8.89
274	0.228	27.3	3.11	5.72	8.77
294	0.245	26.6	3.11	6.14	8.56
314	0.262	25.5	3.11	6.55	8.20
334	0.278	25.4	3.11	6.97	8.16
354	0.295	24.8	3.11	7.38	7.95
374	0.312	23.4	3.11	7.80	7.52
394	0.328	21.7	3.11	8.22	6.98
424	0.353	20.0	3.11	8.83	6.42
454	0.379	18.2	3.11	9.49	5.86
484	0.403	16.1	3.11	10.10	5.17
514	0.429	15.6	3.11	10.74	5.02
544	0.454	14.7	3.11	11.37	4.73
574	0.479	14.3	3.11	11.99	4.58



Failure Sketch



Remarks: None.

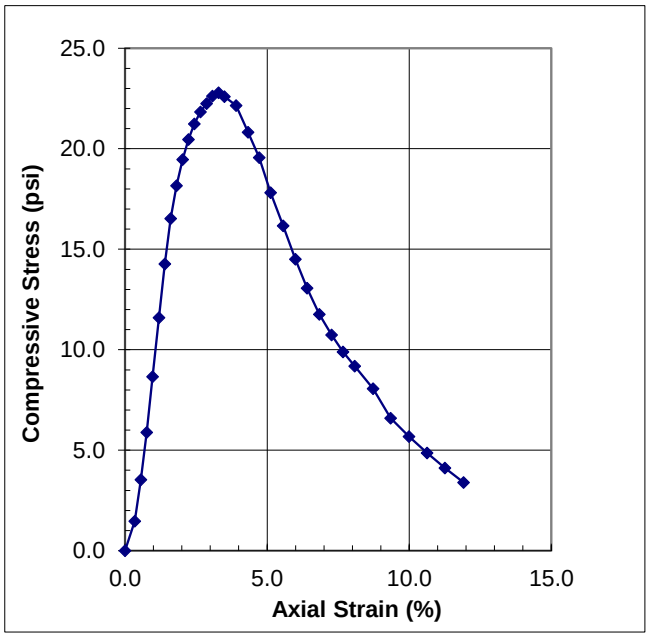
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

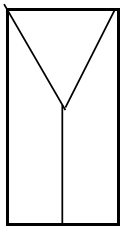
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	15% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	2.40

Water Content (%):	87.6		
Mass (g):	292.6	Loading Rate (in/min) :	0.05
Area (sq in) :	3.13	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.26
Height (in) :	3.97	Strain at Failure (%):	3.29
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	22.8
Wet Density (pcf) :	89.7	Shear Strength (psi):	11.4
Dry Density (pcf) :	47.8		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.13	0.00	0.00
16	0.014	4.6	3.13	0.34	1.47
26	0.022	11.1	3.13	0.55	3.54
36	0.030	18.4	3.13	0.77	5.89
46	0.039	27.1	3.13	0.97	8.66
56	0.047	36.3	3.13	1.20	11.59
66	0.056	44.7	3.13	1.40	14.27
76	0.064	51.7	3.13	1.60	16.52
86	0.072	56.9	3.13	1.81	18.16
96	0.081	61.0	3.13	2.03	19.47
106	0.089	64.1	3.13	2.23	20.46
116	0.097	66.5	3.13	2.44	21.23
126	0.105	68.4	3.13	2.66	21.84
136	0.114	69.7	3.13	2.87	22.25
146	0.122	70.8	3.13	3.08	22.62
156	0.130	71.4	3.13	3.29	22.79
166	0.139	70.8	3.13	3.49	22.60
186	0.155	69.4	3.13	3.91	22.15
206	0.172	65.2	3.13	4.33	20.82
226	0.187	61.3	3.13	4.72	19.56
246	0.203	55.8	3.13	5.13	17.82
266	0.221	50.6	3.13	5.56	16.16
286	0.238	45.4	3.13	5.99	14.51
306	0.254	40.9	3.13	6.40	13.07
326	0.271	36.8	3.13	6.84	11.76
346	0.288	33.6	3.13	7.27	10.74
366	0.304	31.0	3.13	7.67	9.90
386	0.321	28.8	3.13	8.08	9.19
416	0.346	25.3	3.13	8.73	8.07
446	0.371	20.7	3.13	9.34	6.59
476	0.397	17.8	3.13	9.99	5.68
506	0.422	15.3	3.13	10.63	4.87
536	0.447	12.9	3.13	11.25	4.12
566	0.473	10.6	3.13	11.91	3.39



Failure Sketch



Remarks: None.

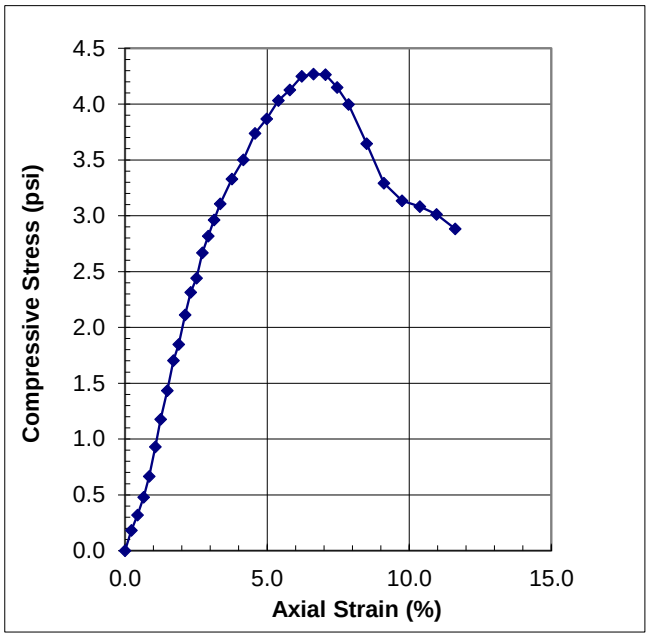
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

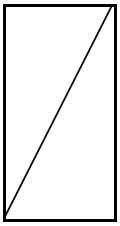
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	5% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	<0.25

Water Content (%):	91.2		
Mass (g):	289.7	Loading Rate (in/min) :	0.05
Area (sq in) :	3.12	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.24
Height (in) :	3.95	Strain at Failure (%):	6.63
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	4.3
Wet Density (pcf) :	89.4	Shear Strength (psi):	2.1
Dry Density (pcf) :	46.8		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.12	0.00	0.00
11	0.009	0.6	3.12	0.22	0.18
21	0.017	1.0	3.12	0.44	0.32
31	0.026	1.5	3.12	0.66	0.48
41	0.034	2.1	3.12	0.85	0.67
51	0.042	2.9	3.12	1.07	0.93
61	0.050	3.7	3.12	1.25	1.18
71	0.059	4.5	3.12	1.48	1.43
81	0.067	5.3	3.12	1.70	1.70
91	0.075	5.8	3.12	1.89	1.85
101	0.083	6.6	3.12	2.11	2.11
111	0.091	7.2	3.12	2.32	2.31
121	0.099	7.6	3.12	2.52	2.44
131	0.108	8.3	3.12	2.72	2.67
141	0.116	8.8	3.12	2.93	2.82
151	0.124	9.3	3.12	3.14	2.96
161	0.132	9.7	3.12	3.35	3.11
181	0.149	10.4	3.12	3.76	3.33
201	0.165	10.9	3.12	4.16	3.50
221	0.181	11.7	3.12	4.58	3.74
241	0.197	12.1	3.12	4.99	3.87
261	0.213	12.6	3.12	5.40	4.03
281	0.229	12.9	3.12	5.80	4.13
301	0.246	13.3	3.12	6.22	4.25
321	0.262	13.3	3.12	6.63	4.27
341	0.279	13.3	3.12	7.05	4.26
361	0.295	13.0	3.12	7.46	4.15
381	0.311	12.5	3.12	7.86	4.00
411	0.336	11.4	3.12	8.50	3.65
441	0.360	10.3	3.12	9.11	3.29
471	0.385	9.8	3.12	9.75	3.13
501	0.410	9.6	3.12	10.37	3.08
531	0.433	9.4	3.12	10.96	3.01
561	0.459	9.0	3.12	11.61	2.88



Failure Sketch



Remarks: None.

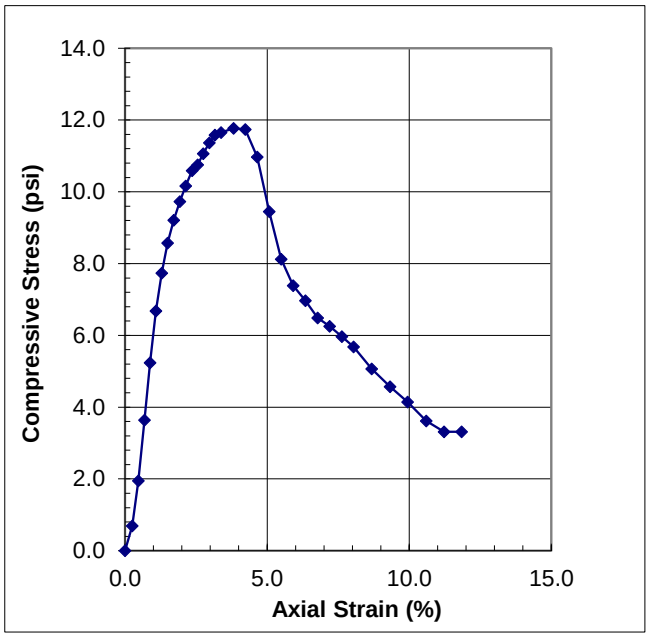
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

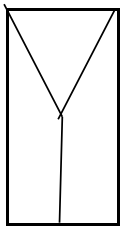
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	10% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	1.70

Water Content (%):	84.5		
Mass (g):	290.8	Loading Rate (in/min) :	0.05
Area (sq in) :	3.14	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.23
Height (in) :	3.92	Strain at Failure (%):	3.82
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	11.8
Wet Density (pcf) :	89.9	Shear Strength (psi):	5.9
Dry Density (pcf) :	48.7		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.14	0.00	0.00
11	0.010	2.2	3.14	0.25	0.69
21	0.018	6.1	3.14	0.47	1.95
31	0.027	11.4	3.14	0.68	3.64
41	0.034	16.5	3.14	0.88	5.24
51	0.043	21.0	3.14	1.09	6.68
61	0.051	24.3	3.14	1.30	7.74
71	0.059	26.9	3.14	1.50	8.58
81	0.067	28.9	3.14	1.72	9.21
91	0.076	30.6	3.14	1.93	9.73
101	0.084	31.9	3.14	2.14	10.17
111	0.092	33.3	3.14	2.36	10.59
121	0.100	33.8	3.14	2.55	10.75
131	0.108	34.8	3.14	2.75	11.07
141	0.116	35.7	3.14	2.97	11.37
151	0.124	36.4	3.14	3.17	11.58
161	0.133	36.6	3.14	3.38	11.65
181	0.150	37.0	3.14	3.82	11.77
201	0.166	36.9	3.14	4.23	11.74
221	0.182	34.5	3.14	4.65	10.97
241	0.199	29.7	3.14	5.07	9.45
261	0.215	25.5	3.14	5.49	8.12
281	0.232	23.2	3.14	5.92	7.39
301	0.249	21.9	3.14	6.35	6.97
321	0.266	20.4	3.14	6.77	6.49
341	0.282	19.6	3.14	7.19	6.25
361	0.299	18.7	3.14	7.63	5.97
381	0.315	17.9	3.14	8.04	5.68
411	0.340	15.9	3.14	8.68	5.07
441	0.366	14.3	3.14	9.32	4.57
471	0.390	13.0	3.14	9.94	4.14
501	0.416	11.4	3.14	10.60	3.62
531	0.440	10.4	3.14	11.23	3.31
561	0.464	10.4	3.14	11.85	3.31



Failure Sketch



Remarks: None.

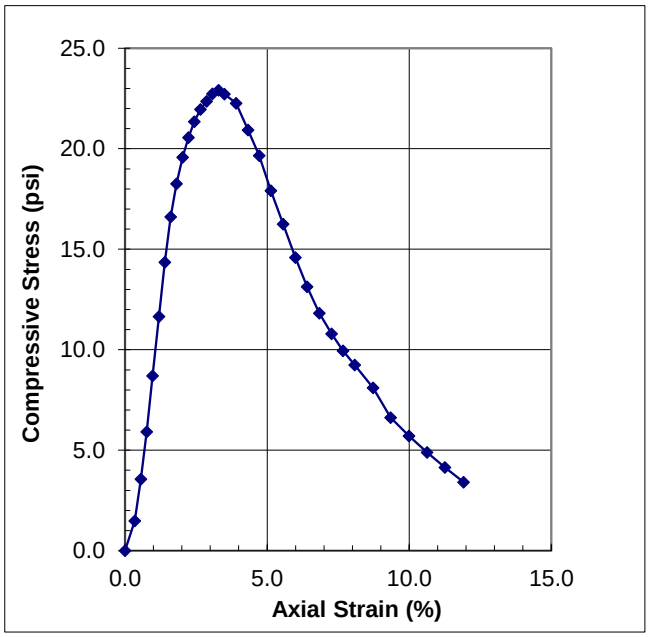
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

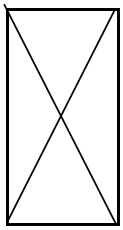
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	15% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	3.90

Water Content (%):	77.5		
Mass (g):	299.7	Loading Rate (in/min) :	0.05
Area (sq in) :	3.11	Dial Rate :	5.8
Diameter (in) :	1.99	Strain Rate (%/min)	1.26
Height (in) :	3.97	Strain at Failure (%):	3.29
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	22.9
Wet Density (pcf) :	92.4	Shear Strength (psi):	11.5
Dry Density (pcf) :	52.0		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.11	0.00	0.00
16	0.014	4.6	3.11	0.34	1.48
26	0.022	11.1	3.11	0.55	3.56
36	0.030	18.4	3.11	0.77	5.92
46	0.039	27.1	3.11	0.97	8.71
56	0.047	36.3	3.11	1.20	11.66
66	0.056	44.7	3.11	1.40	14.35
76	0.064	51.7	3.11	1.60	16.61
86	0.072	56.9	3.11	1.81	18.26
96	0.081	61.0	3.11	2.03	19.57
106	0.089	64.1	3.11	2.23	20.57
116	0.097	66.5	3.11	2.44	21.35
126	0.105	68.4	3.11	2.66	21.96
136	0.114	69.7	3.11	2.87	22.37
146	0.122	70.8	3.11	3.08	22.74
156	0.130	71.4	3.11	3.29	22.91
166	0.139	70.8	3.11	3.49	22.72
186	0.155	69.4	3.11	3.91	22.27
206	0.172	65.2	3.11	4.33	20.93
226	0.187	61.3	3.11	4.72	19.66
246	0.203	55.8	3.11	5.13	17.92
266	0.221	50.6	3.11	5.56	16.25
286	0.238	45.4	3.11	5.99	14.59
306	0.254	40.9	3.11	6.40	13.14
326	0.271	36.8	3.11	6.84	11.82
346	0.288	33.6	3.11	7.27	10.80
366	0.304	31.0	3.11	7.67	9.95
386	0.321	28.8	3.11	8.08	9.24
416	0.346	25.3	3.11	8.73	8.11
446	0.371	20.7	3.11	9.35	6.63
476	0.397	17.8	3.11	9.99	5.71
506	0.422	15.3	3.11	10.63	4.90
536	0.447	12.9	3.11	11.26	4.15
566	0.473	10.6	3.11	11.91	3.41



Failure Sketch



Remarks: None.

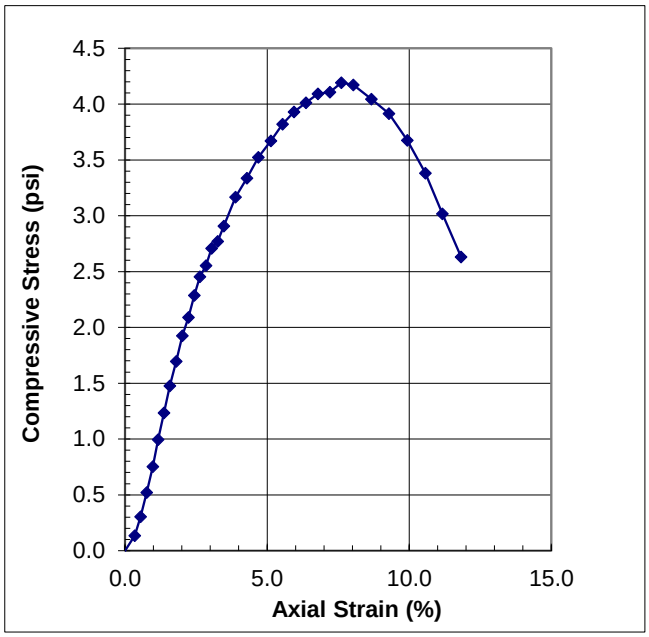
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

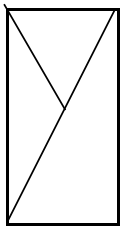
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	5% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	0.25

Water Content (%):	106.5		
Mass (g):	278.2	Loading Rate (in/min) :	0.05
Area (sq in) :	3.07	Dial Rate :	5.8
Diameter (in) :	1.98	Strain Rate (%/min)	1.24
Height (in) :	3.95	Strain at Failure (%):	7.61
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	4.2
Wet Density (pcf) :	87.4	Shear Strength (psi):	2.1
Dry Density (pcf) :	42.3		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.07	0.00	0.00
16	0.014	0.4	3.07	0.34	0.14
26	0.021	0.9	3.07	0.54	0.30
36	0.030	1.6	3.07	0.77	0.52
46	0.039	2.3	3.07	0.98	0.75
56	0.046	3.1	3.07	1.16	0.99
66	0.054	3.8	3.07	1.37	1.23
76	0.062	4.5	3.07	1.58	1.48
86	0.071	5.2	3.07	1.80	1.70
96	0.080	5.9	3.07	2.02	1.93
106	0.088	6.4	3.07	2.23	2.09
116	0.096	7.0	3.07	2.44	2.29
126	0.104	7.5	3.07	2.64	2.45
136	0.112	7.8	3.07	2.85	2.56
146	0.120	8.3	3.07	3.04	2.71
156	0.129	8.5	3.07	3.26	2.77
166	0.137	8.9	3.07	3.48	2.91
186	0.154	9.7	3.07	3.89	3.17
206	0.169	10.3	3.07	4.29	3.34
226	0.185	10.8	3.07	4.70	3.53
246	0.203	11.3	3.07	5.13	3.67
266	0.219	11.7	3.07	5.54	3.82
286	0.235	12.1	3.07	5.95	3.93
306	0.251	12.3	3.07	6.37	4.01
326	0.268	12.6	3.07	6.79	4.09
346	0.285	12.6	3.07	7.21	4.11
366	0.301	12.9	3.07	7.61	4.19
386	0.317	12.8	3.07	8.03	4.17
416	0.342	12.4	3.07	8.67	4.04
446	0.367	12.0	3.07	9.28	3.92
476	0.392	11.3	3.07	9.93	3.68
506	0.417	10.4	3.07	10.57	3.38
536	0.441	9.3	3.07	11.16	3.02
566	0.467	8.1	3.07	11.82	2.63



Failure Sketch



Remarks: None.

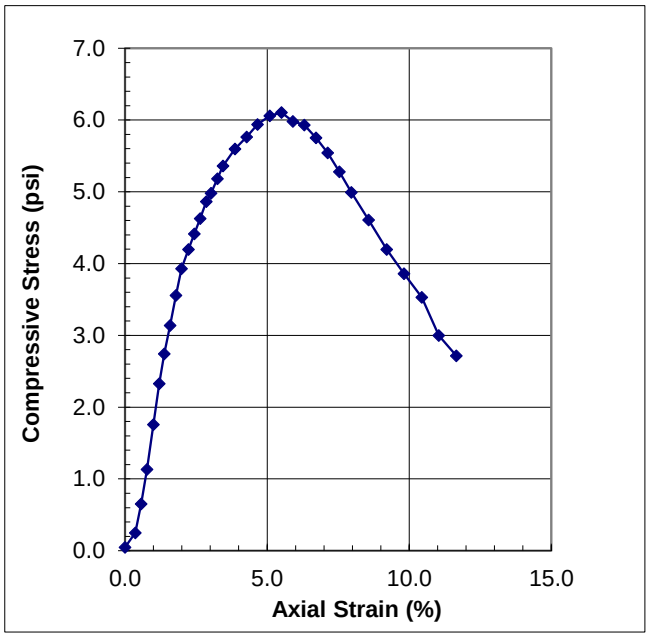
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

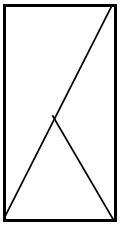
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/2/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	5% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	14 days		
		Pocket Penetrometer:	0.25

Water Content (%):	105.5		
Mass (g):	279.4	Loading Rate (in/min) :	0.05
Area (sq in) :	3.09	Dial Rate :	5.8
Diameter (in) :	1.98	Strain Rate (%/min)	1.21
Height (in) :	3.97	Strain at Failure (%):	5.50
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	6.1
Wet Density (pcf) :	86.8	Shear Strength (psi):	3.1
Dry Density (pcf) :	42.2		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.1	3.09	0.00	0.05
16	0.014	0.8	3.09	0.36	0.25
26	0.023	2.0	3.09	0.57	0.65
36	0.031	3.5	3.09	0.77	1.13
46	0.040	5.4	3.09	1.00	1.76
56	0.048	7.2	3.09	1.20	2.33
66	0.055	8.5	3.09	1.38	2.74
76	0.063	9.7	3.09	1.59	3.14
86	0.071	11.0	3.09	1.79	3.56
96	0.079	12.1	3.09	1.99	3.93
106	0.089	13.0	3.09	2.24	4.20
116	0.097	13.6	3.09	2.44	4.41
126	0.105	14.3	3.09	2.64	4.63
136	0.113	15.0	3.09	2.86	4.86
146	0.120	15.4	3.09	3.03	4.98
156	0.129	16.0	3.09	3.25	5.18
166	0.137	16.6	3.09	3.45	5.36
186	0.154	17.3	3.09	3.87	5.60
206	0.170	17.8	3.09	4.28	5.77
226	0.185	18.4	3.09	4.66	5.94
246	0.202	18.7	3.09	5.09	6.06
266	0.218	18.9	3.09	5.50	6.10
286	0.235	18.5	3.09	5.91	5.98
306	0.250	18.3	3.09	6.31	5.93
326	0.267	17.8	3.09	6.72	5.75
346	0.283	17.1	3.09	7.13	5.54
366	0.300	16.3	3.09	7.55	5.28
386	0.316	15.4	3.09	7.96	4.99
416	0.340	14.2	3.09	8.58	4.61
446	0.366	13.0	3.09	9.21	4.20
476	0.390	11.9	3.09	9.82	3.86
506	0.414	10.9	3.09	10.44	3.53
536	0.438	9.3	3.09	11.04	3.00
566	0.463	8.4	3.09	11.66	2.71



Failure Sketch



Remarks: None.

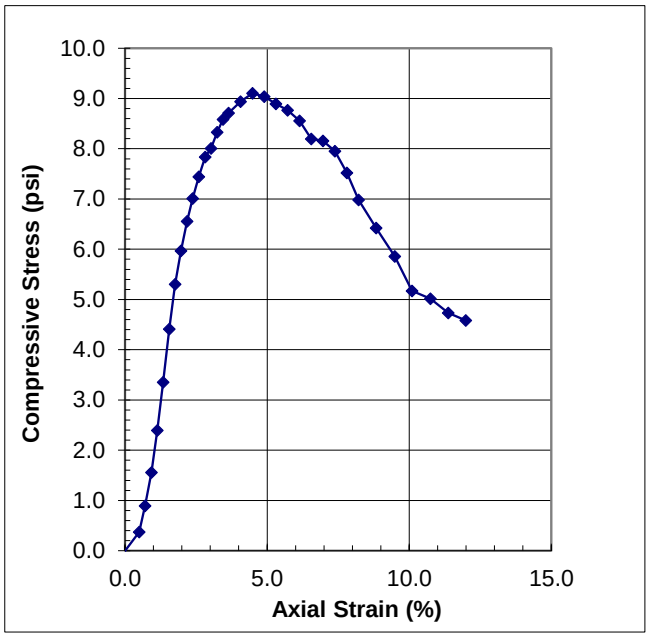
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

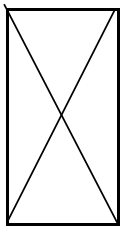
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	10% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	0.80

Water Content (%):	100.6		
Mass (g):	283.7	Loading Rate (in/min) :	0.05
Area (sq in) :	3.11	Dial Rate :	5.8
Diameter (in) :	1.99	Strain Rate (%/min)	1.26
Height (in) :	3.99	Strain at Failure (%):	4.48
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	9.1
Wet Density (pcf) :	86.9	Shear Strength (psi):	4.6
Dry Density (pcf) :	43.3		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.11	0.00	0.00
24	0.020	1.2	3.11	0.49	0.37
34	0.028	2.8	3.11	0.70	0.89
44	0.037	4.9	3.11	0.93	1.56
54	0.045	7.5	3.11	1.14	2.39
64	0.054	10.4	3.11	1.34	3.35
74	0.062	13.7	3.11	1.56	4.41
84	0.070	16.5	3.11	1.77	5.30
94	0.079	18.6	3.11	1.97	5.97
104	0.087	20.4	3.11	2.18	6.55
114	0.095	21.8	3.11	2.38	7.01
124	0.103	23.2	3.11	2.59	7.44
134	0.113	24.4	3.11	2.82	7.84
144	0.121	24.9	3.11	3.03	8.01
154	0.129	25.9	3.11	3.24	8.33
164	0.138	26.7	3.11	3.44	8.58
174	0.145	27.1	3.11	3.64	8.71
194	0.162	27.8	3.11	4.06	8.94
214	0.179	28.3	3.11	4.48	9.10
234	0.196	28.1	3.11	4.90	9.04
254	0.212	27.7	3.11	5.31	8.89
274	0.228	27.3	3.11	5.72	8.77
294	0.245	26.6	3.11	6.14	8.56
314	0.262	25.5	3.11	6.55	8.20
334	0.278	25.4	3.11	6.97	8.16
354	0.295	24.8	3.11	7.38	7.95
374	0.312	23.4	3.11	7.80	7.52
394	0.328	21.7	3.11	8.22	6.98
424	0.353	20.0	3.11	8.83	6.42
454	0.379	18.2	3.11	9.49	5.86
484	0.403	16.1	3.11	10.10	5.17
514	0.429	15.6	3.11	10.74	5.02
544	0.454	14.7	3.11	11.37	4.73
574	0.479	14.3	3.11	11.99	4.58



Failure Sketch



Remarks: None.

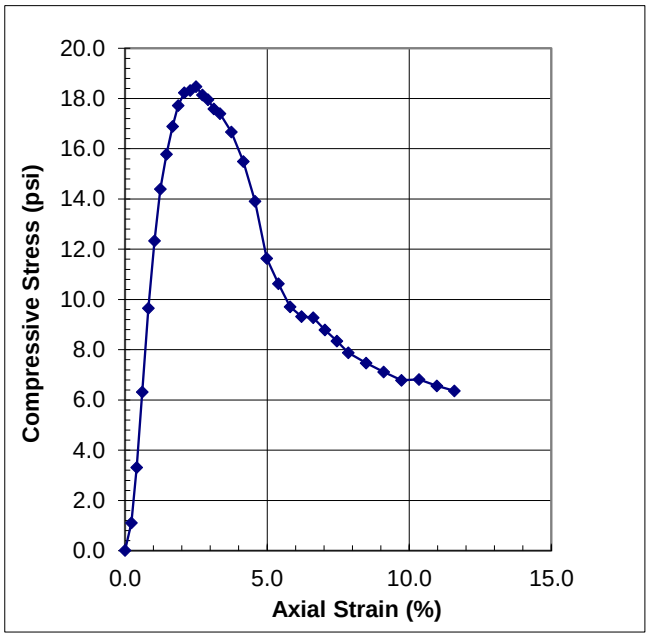
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

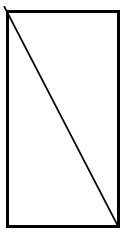
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/2/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	10% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	14 days		
		Pocket Penetrometer:	2.70

Water Content (%):	100.1		
Mass (g):	284.7	Loading Rate (in/min) :	0.05
Area (sq in) :	3.12	Dial Rate :	5.8
Diameter (in) :	1.99	Strain Rate (%/min)	1.26
Height (in) :	4.01	Strain at Failure (%):	2.50
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	18.5
Wet Density (pcf) :	86.8	Shear Strength (psi):	9.2
Dry Density (pcf) :	43.4		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.12	0.00	0.01
14	0.009	3.5	3.12	0.22	1.11
24	0.016	10.4	3.12	0.41	3.32
34	0.024	19.7	3.12	0.61	6.32
44	0.033	30.1	3.12	0.82	9.65
54	0.041	38.5	3.12	1.03	12.33
64	0.050	44.9	3.12	1.24	14.40
74	0.058	49.2	3.12	1.46	15.79
84	0.067	52.7	3.12	1.67	16.90
94	0.075	55.3	3.12	1.87	17.73
104	0.084	56.9	3.12	2.09	18.23
114	0.092	57.1	3.12	2.29	18.32
124	0.100	57.6	3.12	2.50	18.47
134	0.109	56.6	3.12	2.72	18.14
144	0.117	56.0	3.12	2.92	17.95
154	0.125	54.9	3.12	3.12	17.59
164	0.134	54.3	3.12	3.34	17.40
184	0.150	52.0	3.12	3.75	16.68
204	0.167	48.3	3.12	4.16	15.50
224	0.183	43.4	3.12	4.57	13.91
244	0.200	36.3	3.12	4.99	11.64
264	0.216	33.1	3.12	5.40	10.63
284	0.233	30.3	3.12	5.81	9.71
304	0.249	29.1	3.12	6.21	9.32
324	0.265	28.9	3.12	6.63	9.27
344	0.282	27.4	3.12	7.03	8.79
364	0.298	26.0	3.12	7.45	8.34
384	0.315	24.6	3.12	7.86	7.88
414	0.340	23.3	3.12	8.48	7.48
444	0.365	22.2	3.12	9.10	7.11
474	0.390	21.2	3.12	9.72	6.79
504	0.414	21.3	3.12	10.34	6.82
534	0.439	20.5	3.12	10.97	6.57
564	0.464	19.9	3.12	11.59	6.37



Failure Sketch



Remarks: None.

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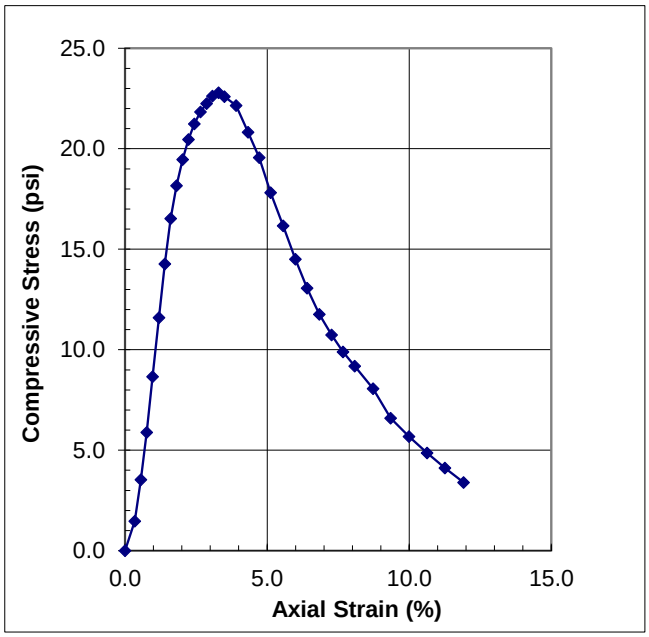
Unconfined Compressive Strength (ASTM D1633)

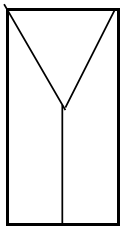
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	15% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	2.40

Water Content (%):	87.6		
Mass (g):	292.6	Loading Rate (in/min) :	0.05
Area (sq in) :	3.13	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.26
Height (in) :	3.97	Strain at Failure (%):	3.29
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	22.8
Wet Density (pcf) :	89.7	Shear Strength (psi):	11.4
Dry Density (pcf) :	47.8		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.13	0.00	0.00
16	0.014	4.6	3.13	0.34	1.47
26	0.022	11.1	3.13	0.55	3.54
36	0.030	18.4	3.13	0.77	5.89
46	0.039	27.1	3.13	0.97	8.66
56	0.047	36.3	3.13	1.20	11.59
66	0.056	44.7	3.13	1.40	14.27
76	0.064	51.7	3.13	1.60	16.52
86	0.072	56.9	3.13	1.81	18.16
96	0.081	61.0	3.13	2.03	19.47
106	0.089	64.1	3.13	2.23	20.46
116	0.097	66.5	3.13	2.44	21.23
126	0.105	68.4	3.13	2.66	21.84
136	0.114	69.7	3.13	2.87	22.25
146	0.122	70.8	3.13	3.08	22.62
156	0.130	71.4	3.13	3.29	22.79
166	0.139	70.8	3.13	3.49	22.60
186	0.155	69.4	3.13	3.91	22.15
206	0.172	65.2	3.13	4.33	20.82
226	0.187	61.3	3.13	4.72	19.56
246	0.203	55.8	3.13	5.13	17.82
266	0.221	50.6	3.13	5.56	16.16
286	0.238	45.4	3.13	5.99	14.51
306	0.254	40.9	3.13	6.40	13.07
326	0.271	36.8	3.13	6.84	11.76
346	0.288	33.6	3.13	7.27	10.74
366	0.304	31.0	3.13	7.67	9.90
386	0.321	28.8	3.13	8.08	9.19
416	0.346	25.3	3.13	8.73	8.07
446	0.371	20.7	3.13	9.34	6.59
476	0.397	17.8	3.13	9.99	5.68
506	0.422	15.3	3.13	10.63	4.87
536	0.447	12.9	3.13	11.25	4.12
566	0.473	10.6	3.13	11.91	3.39



Failure Sketch



Remarks: None.

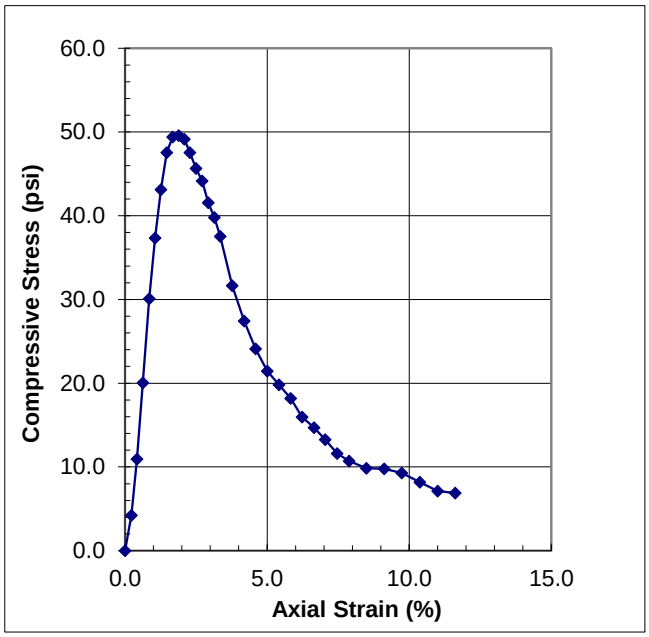
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

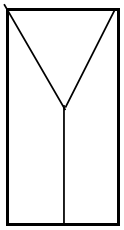
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/2/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	15% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	14 days		
		Pocket Penetrometer:	+4.5

Water Content (%):	82.4		
Mass (g):	296.4	Loading Rate (in/min) :	0.05
Area (sq in) :	3.15	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.27
Height (in) :	4.02	Strain at Failure (%):	1.89
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	49.6
Wet Density (pcf) :	89.2	Shear Strength (psi):	24.8
Dry Density (pcf) :	48.9		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.15	0.00	0.00
11	0.009	13.3	3.15	0.22	4.22
21	0.017	34.6	3.15	0.42	10.96
31	0.025	63.2	3.15	0.63	20.04
41	0.034	94.8	3.15	0.85	30.09
51	0.042	117.8	3.15	1.06	37.35
61	0.050	136.0	3.15	1.26	43.14
71	0.059	149.9	3.15	1.47	47.55
81	0.067	155.8	3.15	1.67	49.42
91	0.076	156.3	3.15	1.89	49.56
101	0.084	154.9	3.15	2.09	49.15
111	0.092	150.0	3.15	2.29	47.57
121	0.100	143.9	3.15	2.49	45.64
131	0.109	139.2	3.15	2.72	44.17
141	0.117	131.0	3.15	2.92	41.57
151	0.126	125.5	3.15	3.14	39.82
161	0.134	118.3	3.15	3.35	37.53
181	0.151	99.8	3.15	3.77	31.65
201	0.168	86.5	3.15	4.19	27.44
221	0.184	76.0	3.15	4.59	24.10
241	0.201	67.6	3.15	5.00	21.45
261	0.217	62.5	3.15	5.41	19.81
281	0.234	57.4	3.15	5.82	18.19
301	0.250	50.4	3.15	6.23	15.97
321	0.267	46.4	3.15	6.65	14.71
341	0.283	41.9	3.15	7.04	13.28
361	0.300	36.6	3.15	7.47	11.60
381	0.316	33.8	3.15	7.88	10.71
411	0.341	31.0	3.15	8.49	9.83
441	0.366	30.9	3.15	9.12	9.79
471	0.391	29.3	3.15	9.74	9.28
501	0.416	25.8	3.15	10.37	8.18
531	0.442	22.5	3.15	11.00	7.13
561	0.466	21.7	3.15	11.62	6.89



Failure Sketch



Remarks: None.

CDM Smith
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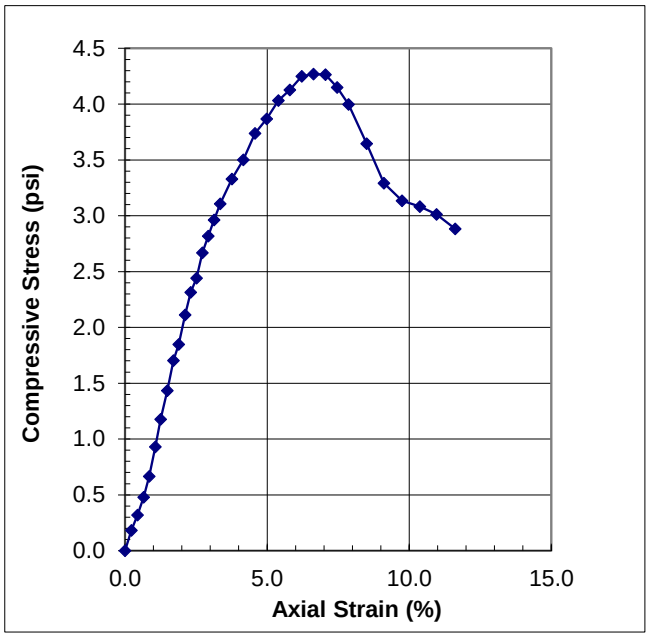
Unconfined Compressive Strength (ASTM D1633)

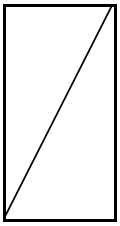
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	5% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	<0.25

Water Content (%):	91.2		
Mass (g):	289.7	Loading Rate (in/min) :	0.05
Area (sq in) :	3.12	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.24
Height (in) :	3.95	Strain at Failure (%):	6.63
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	4.3
Wet Density (pcf) :	89.4	Shear Strength (psi):	2.1
Dry Density (pcf) :	46.8		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.12	0.00	0.00
11	0.009	0.6	3.12	0.22	0.18
21	0.017	1.0	3.12	0.44	0.32
31	0.026	1.5	3.12	0.66	0.48
41	0.034	2.1	3.12	0.85	0.67
51	0.042	2.9	3.12	1.07	0.93
61	0.050	3.7	3.12	1.25	1.18
71	0.059	4.5	3.12	1.48	1.43
81	0.067	5.3	3.12	1.70	1.70
91	0.075	5.8	3.12	1.89	1.85
101	0.083	6.6	3.12	2.11	2.11
111	0.091	7.2	3.12	2.32	2.31
121	0.099	7.6	3.12	2.52	2.44
131	0.108	8.3	3.12	2.72	2.67
141	0.116	8.8	3.12	2.93	2.82
151	0.124	9.3	3.12	3.14	2.96
161	0.132	9.7	3.12	3.35	3.11
181	0.149	10.4	3.12	3.76	3.33
201	0.165	10.9	3.12	4.16	3.50
221	0.181	11.7	3.12	4.58	3.74
241	0.197	12.1	3.12	4.99	3.87
261	0.213	12.6	3.12	5.40	4.03
281	0.229	12.9	3.12	5.80	4.13
301	0.246	13.3	3.12	6.22	4.25
321	0.262	13.3	3.12	6.63	4.27
341	0.279	13.3	3.12	7.05	4.26
361	0.295	13.0	3.12	7.46	4.15
381	0.311	12.5	3.12	7.86	4.00
411	0.336	11.4	3.12	8.50	3.65
441	0.360	10.3	3.12	9.11	3.29
471	0.385	9.8	3.12	9.75	3.13
501	0.410	9.6	3.12	10.37	3.08
531	0.433	9.4	3.12	10.96	3.01
561	0.459	9.0	3.12	11.61	2.88



Failure Sketch



Remarks: None.

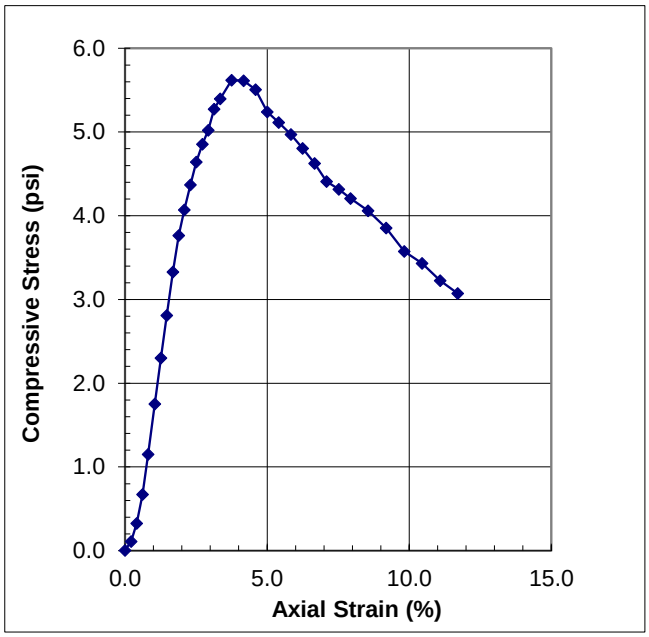
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

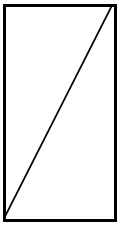
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/2/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	5% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	14 days		
		Pocket Penetrometer:	0.40

Water Content (%):	89.0		
Mass (g):	289.0	Loading Rate (in/min) :	0.05
Area (sq in) :	3.13	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.26
Height (in) :	3.93	Strain at Failure (%):	3.75
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	5.6
Wet Density (pcf) :	89.5	Shear Strength (psi):	2.8
Dry Density (pcf) :	47.3		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.13	0.00	0.00
10	0.009	0.3	3.13	0.22	0.11
20	0.016	1.0	3.13	0.41	0.33
30	0.024	2.1	3.13	0.61	0.67
40	0.032	3.6	3.13	0.81	1.15
50	0.041	5.5	3.13	1.04	1.75
60	0.050	7.2	3.13	1.26	2.30
70	0.058	8.8	3.13	1.47	2.81
80	0.066	10.4	3.13	1.68	3.33
90	0.074	11.8	3.13	1.89	3.76
100	0.082	12.7	3.13	2.08	4.07
110	0.090	13.7	3.13	2.30	4.37
120	0.099	14.5	3.13	2.51	4.64
130	0.107	15.2	3.13	2.72	4.85
140	0.115	15.7	3.13	2.93	5.02
150	0.123	16.5	3.13	3.14	5.27
160	0.132	16.9	3.13	3.35	5.40
180	0.148	17.6	3.13	3.75	5.62
200	0.164	17.6	3.13	4.17	5.61
220	0.181	17.2	3.13	4.59	5.51
240	0.197	16.4	3.13	5.01	5.24
260	0.213	16.0	3.13	5.41	5.12
280	0.230	15.5	3.13	5.84	4.97
300	0.246	15.0	3.13	6.25	4.81
320	0.263	14.5	3.13	6.67	4.63
340	0.279	13.8	3.13	7.09	4.41
360	0.296	13.5	3.13	7.52	4.32
380	0.312	13.2	3.13	7.93	4.21
410	0.337	12.7	3.13	8.56	4.06
440	0.362	12.1	3.13	9.19	3.85
470	0.386	11.2	3.13	9.82	3.57
500	0.411	10.7	3.13	10.45	3.43
530	0.436	10.1	3.13	11.09	3.22
560	0.460	9.6	3.13	11.70	3.07



Failure Sketch



Remarks: None.

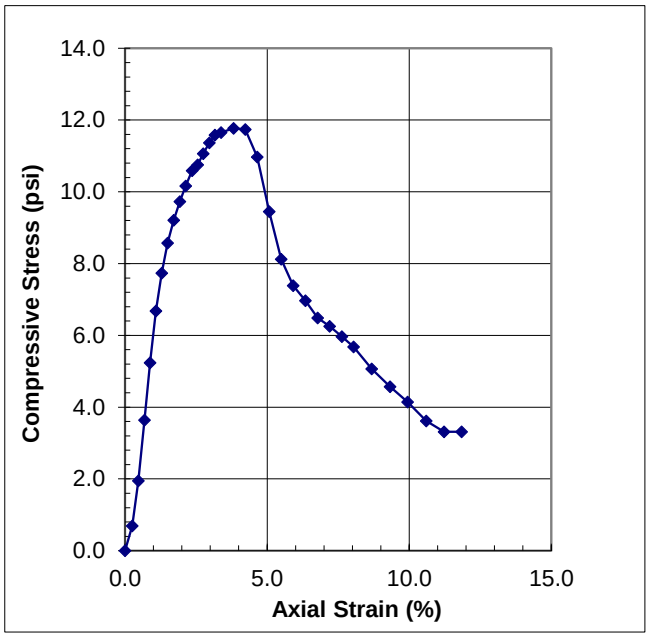
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

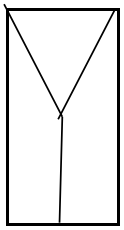
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	10% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	1.70

Water Content (%):	84.5		
Mass (g):	290.8	Loading Rate (in/min) :	0.05
Area (sq in) :	3.14	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.23
Height (in) :	3.92	Strain at Failure (%):	3.82
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	11.8
Wet Density (pcf) :	89.9	Shear Strength (psi):	5.9
Dry Density (pcf) :	48.7		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.14	0.00	0.00
11	0.010	2.2	3.14	0.25	0.69
21	0.018	6.1	3.14	0.47	1.95
31	0.027	11.4	3.14	0.68	3.64
41	0.034	16.5	3.14	0.88	5.24
51	0.043	21.0	3.14	1.09	6.68
61	0.051	24.3	3.14	1.30	7.74
71	0.059	26.9	3.14	1.50	8.58
81	0.067	28.9	3.14	1.72	9.21
91	0.076	30.6	3.14	1.93	9.73
101	0.084	31.9	3.14	2.14	10.17
111	0.092	33.3	3.14	2.36	10.59
121	0.100	33.8	3.14	2.55	10.75
131	0.108	34.8	3.14	2.75	11.07
141	0.116	35.7	3.14	2.97	11.37
151	0.124	36.4	3.14	3.17	11.58
161	0.133	36.6	3.14	3.38	11.65
181	0.150	37.0	3.14	3.82	11.77
201	0.166	36.9	3.14	4.23	11.74
221	0.182	34.5	3.14	4.65	10.97
241	0.199	29.7	3.14	5.07	9.45
261	0.215	25.5	3.14	5.49	8.12
281	0.232	23.2	3.14	5.92	7.39
301	0.249	21.9	3.14	6.35	6.97
321	0.266	20.4	3.14	6.77	6.49
341	0.282	19.6	3.14	7.19	6.25
361	0.299	18.7	3.14	7.63	5.97
381	0.315	17.9	3.14	8.04	5.68
411	0.340	15.9	3.14	8.68	5.07
441	0.366	14.3	3.14	9.32	4.57
471	0.390	13.0	3.14	9.94	4.14
501	0.416	11.4	3.14	10.60	3.62
531	0.440	10.4	3.14	11.23	3.31
561	0.464	10.4	3.14	11.85	3.31



Failure Sketch



Remarks: None.

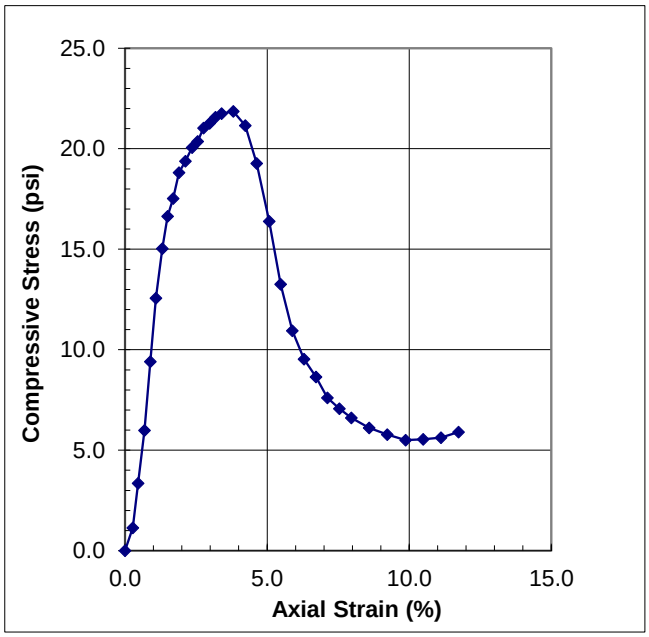
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

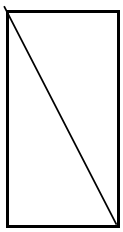
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/2/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	10% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	14 days		
		Pocket Penetrometer:	3.10

Water Content (%):	83.6		
Mass (g):	295.4	Loading Rate (in/min) :	0.05
Area (sq in) :	3.13	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.24
Height (in) :	3.97	Strain at Failure (%):	3.81
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	21.9
Wet Density (pcf) :	90.6	Shear Strength (psi):	10.9
Dry Density (pcf) :	49.4		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.13	0.00	0.01
12	0.011	3.6	3.13	0.27	1.14
22	0.018	10.5	3.13	0.46	3.35
32	0.027	18.7	3.13	0.68	5.99
42	0.035	29.4	3.13	0.89	9.41
52	0.043	39.3	3.13	1.09	12.57
62	0.052	47.0	3.13	1.31	15.03
72	0.059	52.1	3.13	1.49	16.65
82	0.067	54.8	3.13	1.70	17.52
92	0.075	58.9	3.13	1.89	18.82
102	0.085	60.6	3.13	2.13	19.39
112	0.094	62.7	3.13	2.36	20.06
122	0.102	63.7	3.13	2.56	20.37
132	0.110	65.8	3.13	2.76	21.03
142	0.118	66.5	3.13	2.98	21.27
152	0.126	67.5	3.13	3.18	21.58
162	0.135	68.0	3.13	3.40	21.75
182	0.151	68.4	3.13	3.81	21.86
202	0.168	66.2	3.13	4.23	21.15
222	0.184	60.3	3.13	4.63	19.28
242	0.201	51.3	3.13	5.07	16.39
262	0.217	41.5	3.13	5.47	13.26
282	0.234	34.2	3.13	5.88	10.94
302	0.250	29.8	3.13	6.29	9.54
322	0.267	27.0	3.13	6.72	8.64
342	0.283	23.8	3.13	7.12	7.61
362	0.300	22.1	3.13	7.55	7.07
382	0.316	20.7	3.13	7.97	6.62
412	0.341	19.1	3.13	8.59	6.11
442	0.366	18.1	3.13	9.23	5.78
472	0.392	17.2	3.13	9.87	5.51
502	0.417	17.3	3.13	10.49	5.54
532	0.442	17.6	3.13	11.12	5.63
562	0.466	18.5	3.13	11.73	5.90



Failure Sketch



Remarks: None.

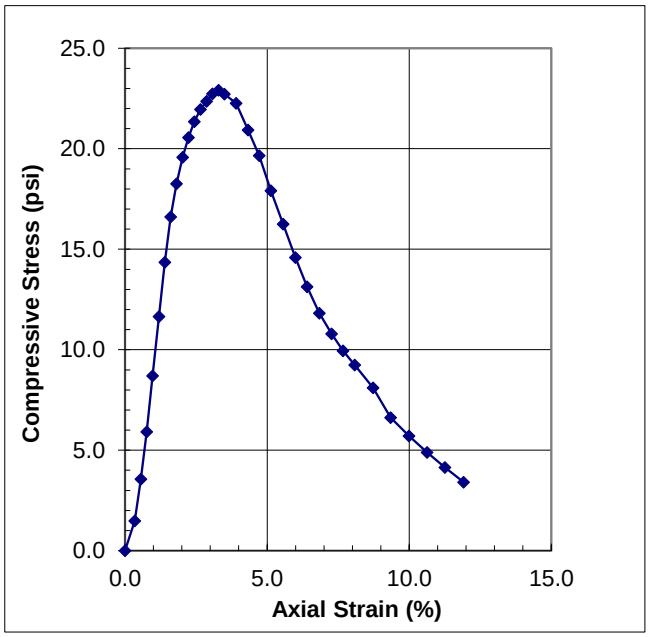
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

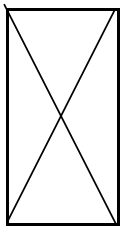
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	12/22/18
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	15% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	3 days		
		Pocket Penetrometer:	3.90

Water Content (%):	77.5		
Mass (g):	299.7	Loading Rate (in/min) :	0.05
Area (sq in) :	3.11	Dial Rate :	5.8
Diameter (in) :	1.99	Strain Rate (%/min)	1.26
Height (in) :	3.97	Strain at Failure (%):	3.29
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	22.9
Wet Density (pcf) :	92.4	Shear Strength (psi):	11.5
Dry Density (pcf) :	52.0		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.11	0.00	0.00
16	0.014	4.6	3.11	0.34	1.48
26	0.022	11.1	3.11	0.55	3.56
36	0.030	18.4	3.11	0.77	5.92
46	0.039	27.1	3.11	0.97	8.71
56	0.047	36.3	3.11	1.20	11.66
66	0.056	44.7	3.11	1.40	14.35
76	0.064	51.7	3.11	1.60	16.61
86	0.072	56.9	3.11	1.81	18.26
96	0.081	61.0	3.11	2.03	19.57
106	0.089	64.1	3.11	2.23	20.57
116	0.097	66.5	3.11	2.44	21.35
126	0.105	68.4	3.11	2.66	21.96
136	0.114	69.7	3.11	2.87	22.37
146	0.122	70.8	3.11	3.08	22.74
156	0.130	71.4	3.11	3.29	22.91
166	0.139	70.8	3.11	3.49	22.72
186	0.155	69.4	3.11	3.91	22.27
206	0.172	65.2	3.11	4.33	20.93
226	0.187	61.3	3.11	4.72	19.66
246	0.203	55.8	3.11	5.13	17.92
266	0.221	50.6	3.11	5.56	16.25
286	0.238	45.4	3.11	5.99	14.59
306	0.254	40.9	3.11	6.40	13.14
326	0.271	36.8	3.11	6.84	11.82
346	0.288	33.6	3.11	7.27	10.80
366	0.304	31.0	3.11	7.67	9.95
386	0.321	28.8	3.11	8.08	9.24
416	0.346	25.3	3.11	8.73	8.11
446	0.371	20.7	3.11	9.35	6.63
476	0.397	17.8	3.11	9.99	5.71
506	0.422	15.3	3.11	10.63	4.90
536	0.447	12.9	3.11	11.26	4.15
566	0.473	10.6	3.11	11.91	3.41



Failure Sketch



Remarks: None.

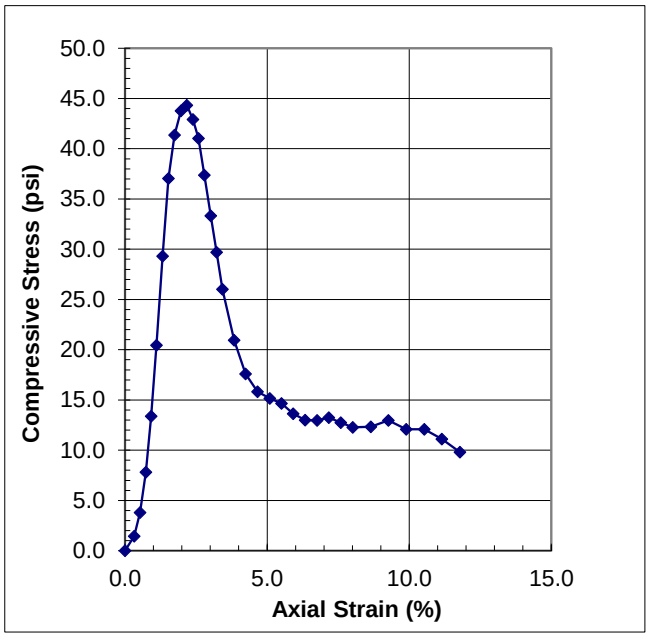
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

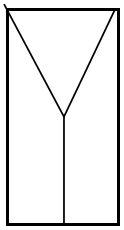
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/2/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	15% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	14 days		
		Pocket Penetrometer:	+4.5

Water Content (%):	75.3		
Mass (g):	302.5	Loading Rate (in/min) :	0.05
Area (sq in) :	3.17	Dial Rate :	5.8
Diameter (in) :	2.01	Strain Rate (%/min)	1.25
Height (in) :	3.97	Strain at Failure (%):	2.17
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	44.3
Wet Density (pcf) :	91.6	Shear Strength (psi):	22.2
Dry Density (pcf) :	52.2		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.17	0.00	0.00
16	0.013	4.6	3.17	0.32	1.44
26	0.021	12.0	3.17	0.53	3.79
36	0.029	24.8	3.17	0.73	7.81
46	0.037	42.5	3.17	0.92	13.40
56	0.044	64.8	3.17	1.11	20.44
66	0.052	93.0	3.17	1.32	29.33
76	0.061	117.5	3.17	1.53	37.05
86	0.069	131.2	3.17	1.75	41.37
96	0.078	138.8	3.17	1.97	43.79
106	0.086	140.6	3.17	2.17	44.34
116	0.095	136.1	3.17	2.39	42.93
126	0.103	130.1	3.17	2.59	41.04
136	0.111	118.5	3.17	2.79	37.38
146	0.120	105.7	3.17	3.01	33.34
156	0.128	94.2	3.17	3.22	29.71
166	0.136	82.5	3.17	3.43	26.02
186	0.153	66.4	3.17	3.84	20.94
206	0.168	55.8	3.17	4.24	17.61
226	0.185	50.2	3.17	4.67	15.84
246	0.202	48.1	3.17	5.09	15.16
266	0.218	46.5	3.17	5.50	14.66
286	0.235	43.2	3.17	5.91	13.62
306	0.251	41.2	3.17	6.34	12.99
326	0.268	41.1	3.17	6.75	12.97
346	0.285	42.0	3.17	7.17	13.24
366	0.301	40.4	3.17	7.59	12.75
386	0.318	39.0	3.17	8.02	12.29
416	0.343	39.1	3.17	8.65	12.33
446	0.368	41.1	3.17	9.26	12.96
476	0.393	38.3	3.17	9.89	12.09
506	0.418	38.4	3.17	10.53	12.10
536	0.442	35.2	3.17	11.15	11.11
566	0.468	31.1	3.17	11.78	9.82



Failure Sketch



Remarks: None.

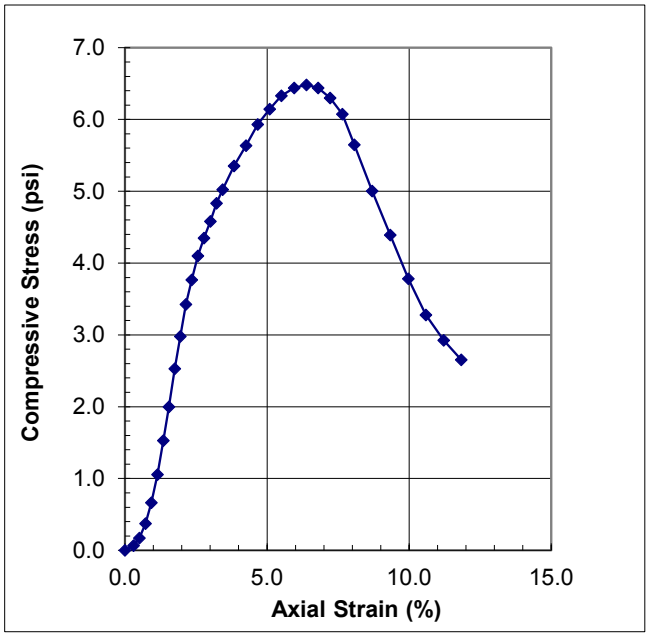
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

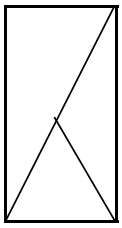
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/16/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	5% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	28 days		
		Pocket Penetrometer:	1.00

Water Content (%):	104.0		
Mass (g):	273.5	Loading Rate (in/min) :	0.05
Area (sq in) :	3.09	Dial Rate :	5.8
Diameter (in) :	1.98	Strain Rate (%/min)	1.30
Height (in) :	3.87	Strain at Failure (%):	6.38
Height to Dia. Ratio :	1.9	U. C. Strength (psi) :	6.5
Wet Density (pcf) :	87.3	Shear Strength (psi):	3.2
Dry Density (pcf) :	42.8		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.09	0.00	0.00
15	0.012	0.2	3.09	0.30	0.07
25	0.020	0.5	3.09	0.51	0.17
35	0.028	1.2	3.09	0.72	0.37
45	0.036	2.0	3.09	0.93	0.66
55	0.044	3.3	3.09	1.14	1.06
65	0.052	4.7	3.09	1.35	1.53
75	0.060	6.2	3.09	1.55	2.00
85	0.068	7.8	3.09	1.75	2.53
95	0.075	9.2	3.09	1.95	2.98
105	0.083	10.6	3.09	2.15	3.43
115	0.091	11.6	3.09	2.35	3.77
125	0.099	12.7	3.09	2.56	4.10
135	0.108	13.4	3.09	2.78	4.35
145	0.116	14.1	3.09	3.01	4.58
155	0.125	14.9	3.09	3.22	4.84
165	0.133	15.5	3.09	3.44	5.02
185	0.148	16.5	3.09	3.83	5.35
205	0.165	17.4	3.09	4.26	5.64
225	0.181	18.3	3.09	4.68	5.93
245	0.197	19.0	3.09	5.09	6.15
265	0.213	19.5	3.09	5.50	6.33
285	0.230	19.9	3.09	5.96	6.44
305	0.247	20.0	3.09	6.38	6.48
325	0.263	19.9	3.09	6.80	6.44
345	0.279	19.5	3.09	7.21	6.30
365	0.296	18.8	3.09	7.65	6.08
385	0.312	17.4	3.09	8.07	5.65
415	0.336	15.5	3.09	8.70	5.00
445	0.361	13.6	3.09	9.33	4.39
475	0.385	11.7	3.09	9.97	3.78
505	0.409	10.1	3.09	10.59	3.28
535	0.434	9.0	3.09	11.22	2.93
565	0.457	8.2	3.09	11.83	2.65



Failure Sketch



Remarks: None.

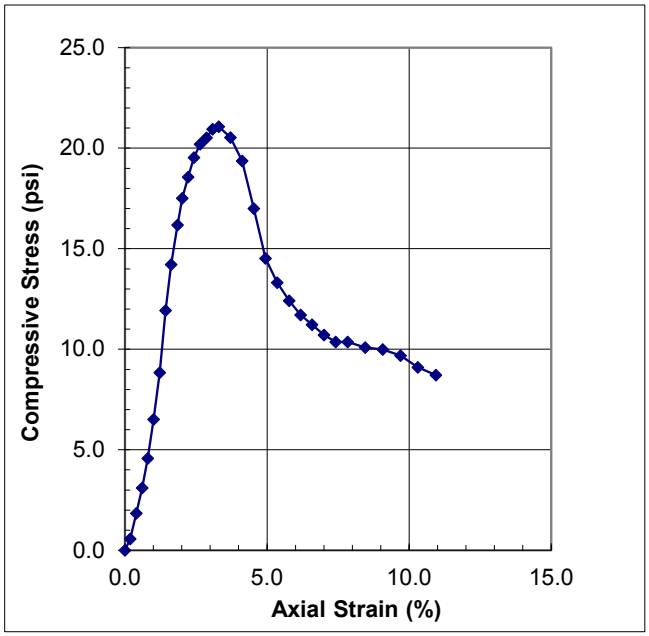
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

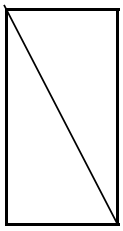
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/16/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	10% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	28 days		
		Pocket Penetrometer:	2.75

Water Content (%):	98.3		
Mass (g):	283.9	Loading Rate (in/min) :	0.05
Area (sq in) :	3.11	Dial Rate :	5.8
Diameter (in) :	1.99	Strain Rate (%/min)	1.29
Height (in) :	4.00	Strain at Failure (%):	3.30
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	21.1
Wet Density (pcf) :	86.8	Shear Strength (psi):	10.5
Dry Density (pcf) :	43.8		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.11	0.00	0.00
13	0.007	1.8	3.11	0.19	0.57
23	0.016	5.7	3.11	0.40	1.84
33	0.024	9.7	3.11	0.60	3.10
43	0.032	14.2	3.11	0.80	4.57
53	0.040	20.3	3.11	1.00	6.51
63	0.049	27.5	3.11	1.22	8.84
73	0.057	37.2	3.11	1.43	11.93
83	0.065	44.3	3.11	1.62	14.22
93	0.074	50.4	3.11	1.85	16.18
103	0.081	54.6	3.11	2.02	17.52
113	0.089	57.8	3.11	2.22	18.56
123	0.097	60.9	3.11	2.43	19.54
133	0.106	62.9	3.11	2.65	20.21
143	0.115	63.9	3.11	2.87	20.52
153	0.123	65.3	3.11	3.09	20.95
163	0.132	65.7	3.11	3.30	21.08
183	0.148	64.0	3.11	3.71	20.54
203	0.165	60.3	3.11	4.12	19.37
223	0.181	53.0	3.11	4.53	17.00
243	0.198	45.2	3.11	4.95	14.52
263	0.214	41.5	3.11	5.36	13.32
283	0.231	38.7	3.11	5.78	12.42
303	0.247	36.5	3.11	6.18	11.70
323	0.263	35.0	3.11	6.58	11.22
343	0.280	33.4	3.11	7.00	10.71
363	0.296	32.3	3.11	7.42	10.36
383	0.313	32.3	3.11	7.83	10.37
413	0.338	31.4	3.11	8.45	10.09
443	0.363	31.1	3.11	9.07	9.99
473	0.387	30.2	3.11	9.69	9.69
503	0.412	28.4	3.11	10.31	9.11
533	0.437	27.1	3.11	10.94	8.72



Failure Sketch



Remarks: None.

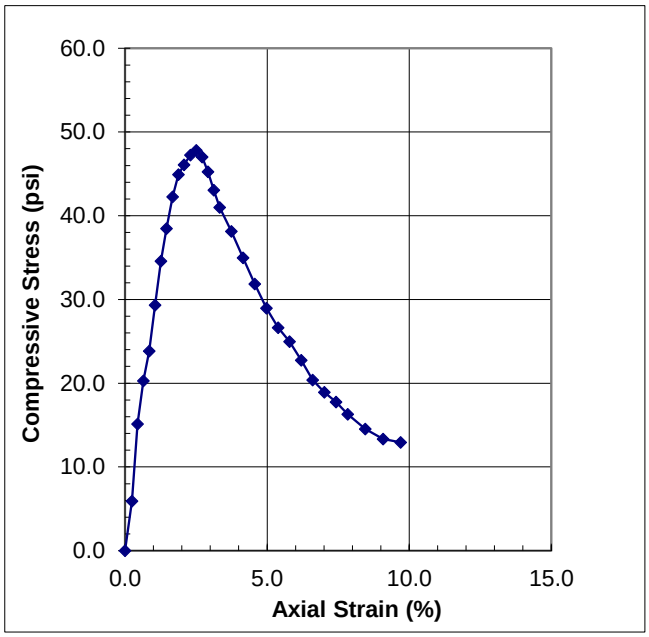
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

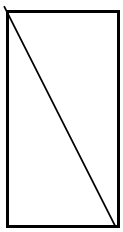
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/16/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C1-OH8P	Soil Type :	Soil - Cement
Sample Mix:	15% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	28 days		
		Pocket Penetrometer:	+4.5

Water Content (%):	77.4		
Mass (g):	291.6	Loading Rate (in/min) :	0.05
Area (sq in) :	3.13	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.24
Height (in) :	4.03	Strain at Failure (%):	2.51
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	47.8
Wet Density (pcf) :	88.3	Shear Strength (psi):	23.9
Dry Density (pcf) :	49.8		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.13	0.00	0.00
17	0.010	18.5	3.13	0.25	5.93
27	0.018	47.3	3.13	0.44	15.15
37	0.026	63.4	3.13	0.65	20.28
47	0.034	74.5	3.13	0.85	23.85
57	0.043	91.7	3.13	1.06	29.33
67	0.051	108.1	3.13	1.26	34.58
77	0.059	120.3	3.13	1.46	38.48
87	0.067	132.1	3.13	1.67	42.26
97	0.076	140.4	3.13	1.88	44.93
107	0.084	144.0	3.13	2.08	46.08
117	0.093	147.7	3.13	2.30	47.26
127	0.101	149.4	3.13	2.51	47.81
137	0.109	146.9	3.13	2.71	47.01
147	0.118	141.5	3.13	2.92	45.26
157	0.126	134.6	3.13	3.12	43.07
167	0.134	128.1	3.13	3.33	40.99
187	0.151	119.2	3.13	3.74	38.13
207	0.167	109.4	3.13	4.15	35.00
227	0.184	99.5	3.13	4.56	31.84
247	0.200	90.5	3.13	4.98	28.96
267	0.217	83.3	3.13	5.38	26.64
287	0.233	78.1	3.13	5.79	24.98
307	0.250	71.1	3.13	6.20	22.76
327	0.266	63.7	3.13	6.60	20.39
347	0.282	59.2	3.13	7.02	18.94
367	0.299	55.5	3.13	7.43	17.76
387	0.316	51.0	3.13	7.84	16.31
417	0.340	45.5	3.13	8.45	14.55
447	0.365	41.7	3.13	9.08	13.35
477	0.390	40.4	3.13	9.70	12.94



Failure Sketch



Remarks: None.

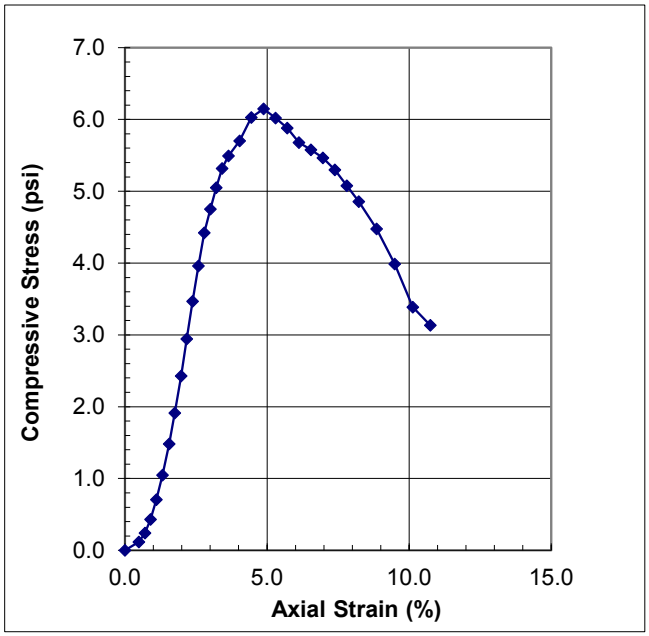
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

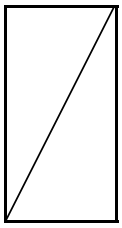
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/16/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	5% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	28 days		
		Pocket Penetrometer:	1.00

Water Content (%):	90.7		
Mass (g):	289.7	Loading Rate (in/min) :	0.05
Area (sq in) :	3.13	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.27
Height (in) :	3.93	Strain at Failure (%):	4.88
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	6.1
Wet Density (pcf) :	89.6	Shear Strength (psi):	3.1
Dry Density (pcf) :	47.0		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.13	0.00	0.00
23	0.019	0.4	3.13	0.49	0.12
33	0.028	0.8	3.13	0.70	0.24
43	0.035	1.3	3.13	0.90	0.43
53	0.043	2.2	3.13	1.10	0.71
63	0.052	3.3	3.13	1.32	1.05
73	0.061	4.6	3.13	1.55	1.48
83	0.069	6.0	3.13	1.75	1.91
93	0.078	7.6	3.13	1.97	2.43
103	0.085	9.2	3.13	2.17	2.95
113	0.093	10.9	3.13	2.38	3.47
123	0.102	12.4	3.13	2.58	3.96
133	0.110	13.9	3.13	2.79	4.42
143	0.118	14.9	3.13	3.00	4.75
153	0.126	15.8	3.13	3.21	5.05
163	0.134	16.7	3.13	3.42	5.32
173	0.143	17.2	3.13	3.64	5.49
193	0.159	17.9	3.13	4.04	5.70
213	0.175	18.9	3.13	4.44	6.03
233	0.192	19.3	3.13	4.88	6.15
253	0.208	18.9	3.13	5.30	6.02
273	0.224	18.4	3.13	5.71	5.88
293	0.240	17.8	3.13	6.12	5.68
313	0.257	17.5	3.13	6.54	5.58
333	0.273	17.1	3.13	6.96	5.46
353	0.290	16.6	3.13	7.38	5.30
373	0.307	15.9	3.13	7.80	5.08
393	0.323	15.2	3.13	8.23	4.86
423	0.348	14.0	3.13	8.85	4.48
453	0.373	12.5	3.13	9.49	3.99
483	0.398	10.6	3.13	10.13	3.39
513	0.422	9.8	3.13	10.74	3.14



Failure Sketch



Remarks: None.

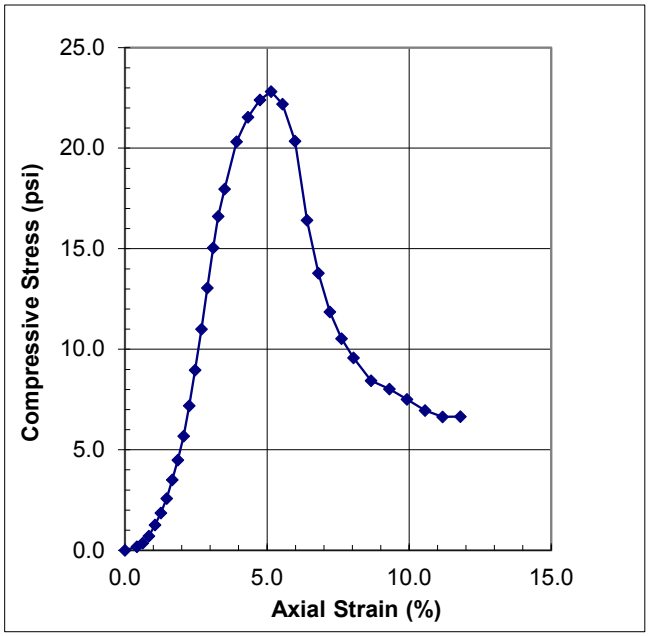
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

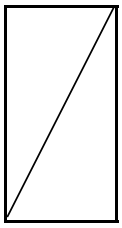
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/16/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	10% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	28 days		
		Pocket Penetrometer:	3.10

Water Content (%):	82.4		
Mass (g):	291.3	Loading Rate (in/min) :	0.05
Area (sq in) :	3.02	Dial Rate :	5.8
Diameter (in) :	1.96	Strain Rate (%/min)	1.24
Height (in) :	3.97	Strain at Failure (%):	5.14
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	22.8
Wet Density (pcf) :	92.7	Shear Strength (psi):	11.4
Dry Density (pcf) :	50.8		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.02	0.00	0.00
20	0.017	0.6	3.02	0.42	0.18
30	0.025	1.1	3.02	0.63	0.36
40	0.034	2.2	3.02	0.84	0.71
50	0.042	3.8	3.02	1.06	1.27
60	0.050	5.6	3.02	1.26	1.86
70	0.058	7.8	3.02	1.47	2.58
80	0.066	10.6	3.02	1.66	3.51
90	0.074	13.6	3.02	1.86	4.50
100	0.082	17.1	3.02	2.06	5.69
110	0.090	21.7	3.02	2.26	7.20
120	0.098	27.0	3.02	2.47	8.96
130	0.107	33.2	3.02	2.69	11.00
140	0.115	39.4	3.02	2.89	13.06
150	0.123	45.4	3.02	3.11	15.05
160	0.130	50.1	3.02	3.28	16.62
170	0.139	54.2	3.02	3.51	17.97
190	0.156	61.3	3.02	3.92	20.33
210	0.172	64.9	3.02	4.33	21.54
230	0.189	67.6	3.02	4.75	22.40
250	0.204	68.8	3.02	5.14	22.82
270	0.220	66.9	3.02	5.54	22.19
290	0.238	61.4	3.02	5.98	20.35
310	0.254	49.5	3.02	6.40	16.42
330	0.270	41.6	3.02	6.80	13.78
350	0.286	35.8	3.02	7.21	11.86
370	0.303	31.8	3.02	7.62	10.53
390	0.319	28.9	3.02	8.04	9.58
420	0.344	25.5	3.02	8.66	8.44
450	0.369	24.2	3.02	9.30	8.02
480	0.394	22.7	3.02	9.93	7.52
510	0.419	21.0	3.02	10.56	6.96
540	0.444	20.0	3.02	11.18	6.64
570	0.469	20.1	3.02	11.80	6.66



Failure Sketch



Remarks: None.

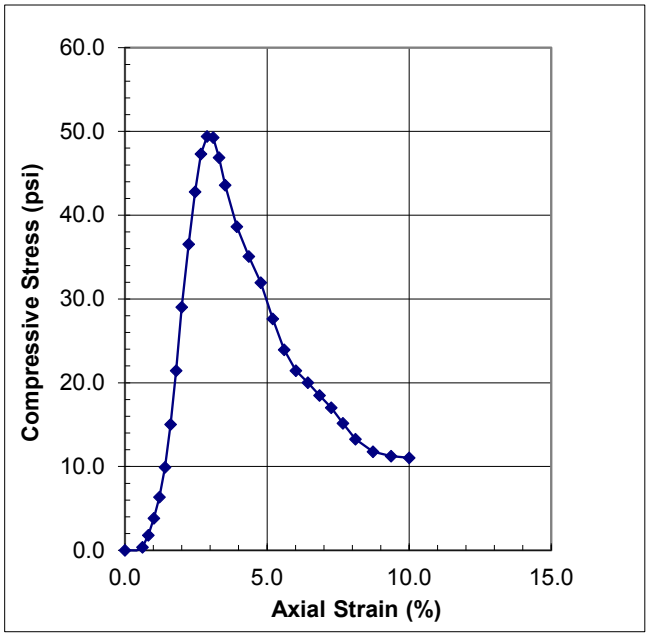
CDM Smith
Geotechnical Engineering Laboratory

Unconfined Compressive Strength (ASTM D1633)

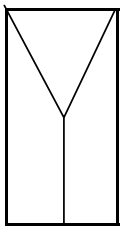
Client:	USACE	Test Performed by :	AS
Project Name :	Eighteen Mile Creek	Test Date :	1/16/19
Project Location:	Lockport, NY		
Project Number:	51147-223203		
Sample Material :	C3-OH15P	Soil Type :	Soil - Cement
Sample Mix:	15% cement		
Sample Date:	12/19/2018	Preparation Method:	Smoothed ends
Sample Age:	28 days		
		Pocket Penetrometer:	+4.5

Water Content (%):	72.9		
Mass (g):	301.6	Loading Rate (in/min) :	0.05
Area (sq in) :	3.15	Dial Rate :	5.8
Diameter (in) :	2.00	Strain Rate (%/min)	1.27
Height (in) :	3.97	Strain at Failure (%):	2.89
Height to Dia. Ratio :	2.0	U. C. Strength (psi) :	49.4
Wet Density (pcf) :	92.1	Shear Strength (psi):	24.7
Dry Density (pcf) :	53.3		

Time (sec)	Displ. (in)	Load (lbs)	Cross Sectional Area (in^2)	Axial Strain (%)	Compress Strength (psi)
0	0.000	0.0	3.15	0.00	0.00
19	0.016	-0.1	3.15	0.41	-0.02
29	0.024	1.2	3.15	0.62	0.38
39	0.033	5.7	3.15	0.82	1.80
49	0.040	12.1	3.15	1.02	3.84
59	0.048	20.0	3.15	1.21	6.34
69	0.056	31.3	3.15	1.41	9.93
79	0.064	47.3	3.15	1.60	15.02
89	0.072	67.5	3.15	1.80	21.45
99	0.079	91.3	3.15	2.00	29.02
109	0.089	115.0	3.15	2.24	36.53
119	0.098	134.7	3.15	2.47	42.79
129	0.106	148.9	3.15	2.67	47.31
139	0.115	155.5	3.15	2.89	49.40
149	0.123	155.1	3.15	3.10	49.28
159	0.131	147.6	3.15	3.31	46.89
169	0.140	137.2	3.15	3.52	43.59
189	0.156	121.7	3.15	3.94	38.65
209	0.173	110.4	3.15	4.36	35.07
229	0.190	100.6	3.15	4.78	31.97
249	0.206	87.0	3.15	5.20	27.64
269	0.222	75.3	3.15	5.61	23.93
289	0.238	67.5	3.15	6.01	21.46
309	0.255	63.0	3.15	6.43	20.03
329	0.272	58.2	3.15	6.85	18.48
349	0.288	53.6	3.15	7.25	17.02
369	0.304	47.7	3.15	7.67	15.17
389	0.322	41.8	3.15	8.11	13.27
419	0.346	37.0	3.15	8.73	11.77
449	0.371	35.4	3.15	9.36	11.25
479	0.396	34.8	3.15	10.00	11.05
0	0.000	0.0	0.00	0.00	0.00
0	0.000	0.0	0.00	0.00	0.00
0	0.000	0.0	0.00	0.00	0.00



Failure Sketch



Remarks: None.

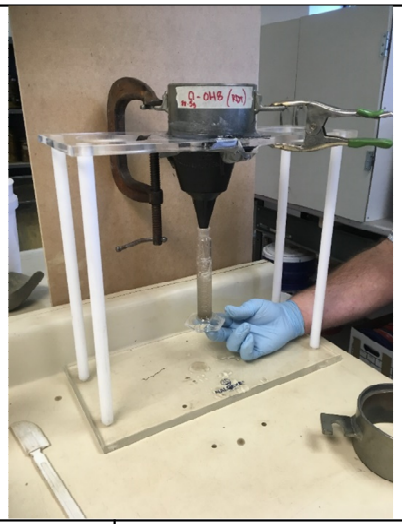
Attachment G

Sediment Treatability Study Photolog

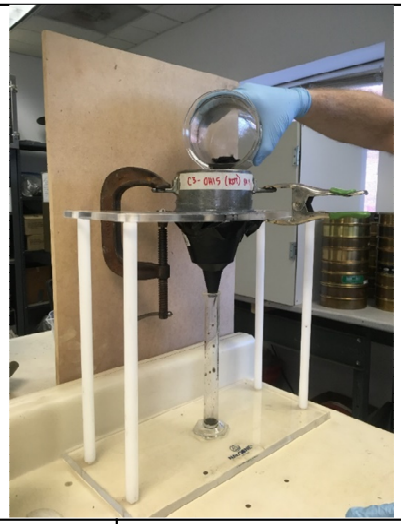
Rapid Dewater Tests

Picture Date:	Monday 12/17/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Rapid Dewater Test (RDT) setup.

Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C1-OH8 RDT



Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C1-OH8 RDT

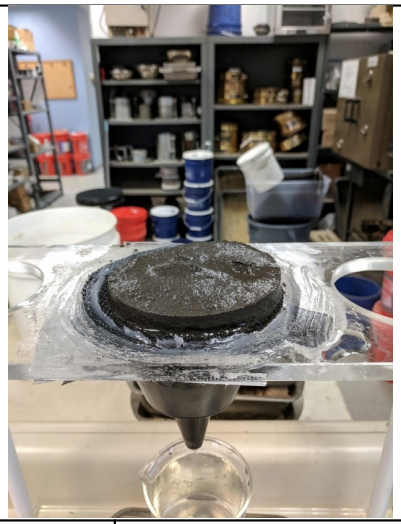


Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C3-OH15 RDT

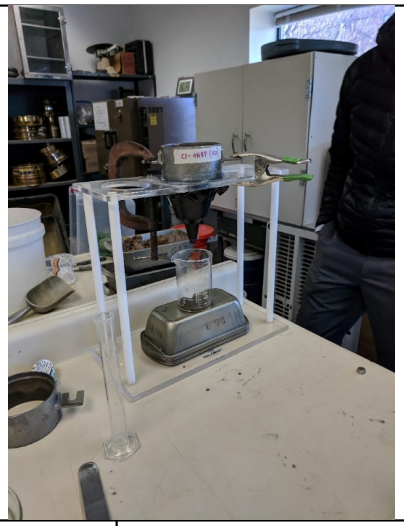
Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Water discharge from C3-OH15 RDT.

Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Filter cake from C3-OH15 RDT.

Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C3-OH15P (contains polymer) RDT



Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Filter cake from C3-OH15P RDT.



Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C1-OH8P (contains polymer) RDT

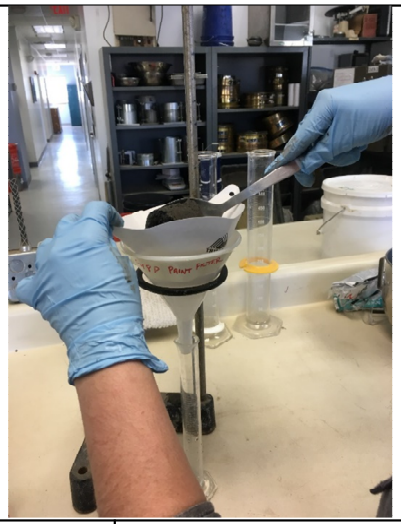
Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C5 Composite RDT

Geotube® Dewatering Tests

Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C1-0H8P Geotube® Dewatering Test (GDT)

Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Mixing C1-OH8P for GDT

Picture Date:	Wednesday 12/19/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Sediment retained in bag for C1-OH8P GDT



Picture Date:	Wednesday 12/19/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C1-OH8P Paint Filter Test (PFT)

Picture Date:	Tuesday 12/18/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C3-OH15P GDT

Picture Date:	Wednesday 12/19/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Sediment retained in bag for C3-OH15P GDT

Picture Date:	Wednesday 12/19/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C3-OH15P PFT

Picture Date:	Wednesday 12/19/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C5 GDT

Picture Date:	Wednesday 12/19/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Mixing C5 for GDT

Picture Date:	Thursday 12/20/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Sediment retained in bag for C5 GDT

Picture Date:	Thursday 12/20/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C5 PFT

Picture Date:	Thursday 12/20/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C3-OH15 GDT

Picture Date:	Friday 12/21/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Sediment retained in bag for C3-OH15 GDT

Picture Date:	Friday 12/21/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C3-OH15 PFT

Picture Date:	Friday 12/21/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Sediment retained in bag for C1-OH8 GDT

Picture Date:	Friday 12/21/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	C1-OH8 PFT

Soil Solidification Mixing

Picture Date:	Wednesday 12/19/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Homogenizing soil-cement mixture

Picture Date:	Wednesday 12/19/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Completed molds for Unconfined Compressive Strength (UCS) Testing

Picture Date:	Wednesday 12/19/2018
Picture Taken By:	Meredith Passaro
Picture Location:	Somerville, MA
Project Name:	Eighteen Mile Creek Superfund Site OU 1&2 – Sediment Treatability Study
Picture Description:	Storage for completed molds for UCS Testing.

SECTION 01 31 10

JOB SITE ADMINISTRATION

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall provide all services required to ensure site safety, site security, site communication, project management, recordkeeping, and individual additional task performance. These services shall include the provision of qualified personnel, to be accepted by the Government, and all equipment necessary to perform such tasks.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Project Organizational Chart; G

The Contractor shall submit an organizational chart including all personnel to be employed on the project.

Project Manager Name and Experience; G

Within 14 calendar days following the Task Order Award, the Contractor shall submit in writing to the Government the name and experience of the Project Manager.

Data Retrieval Recordkeeping System; G

The Contractor shall submit a description of the proposed data retrieval recordkeeping system.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 SITE SAFETY

The Contractor shall be responsible for the safe operation of the work at the Site and shall employ a Safety and Health Manager (SHM) and a Site Safety and Health Officer (SSHO). These individuals shall be responsible for the administration of site health and safety and shall have responsibilities as defined in SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

3.2 QUALITY CONTROL

The Contractor shall be responsible for the overall management of quality control and shall employ a Contractor Quality Control System Manager (CQCSM) who shall have the authority to act in all quality control matters

for the Contractor. The CQCSM shall be responsible for quality control as defined in SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL.

3.3 PROJECT MANAGEMENT AND RECORDKEEPING

The Contractor shall provide a project management team including a Project Manager and administrative personnel qualified and capable to manage the project, including supervising construction, expediting labor relations, staffing, and recordkeeping. The Contractor shall submit a detailed Project Organizational Chart showing the individuals directly involved in the project.

The Project Manager shall have overall responsibility for conducting the work and for ensuring that the work is conducted in accordance with the requirements of the Contract Documents. The Project Manager shall be responsible for communication with the Government and shall officially represent the Contractor in all project-related activities. The Project Manager shall have the authority to sign payments and change orders. The Contractor shall provide the name and experience of the Project Manager.

The Contractor shall provide a data retrieval recordkeeping system approved by the Government, which will make available in a timely manner records of all site activity, quantities of materials delivered to the Site, quantities of materials utilized, quantities of materials excavated, quantities of treated water discharged, quantities of waste produced, laboratory results, waste transportation information, and all other information required to support requests for payment.

Prior to initiating the work, the Project Manager may be required to meet with representatives from the City of Lockport and other project stakeholders with permission from the Government, and, in the presence of the Environmental Protection Agency (EPA), to discuss the planned construction approach and phasing of work. The Contractor shall record the minutes of the meeting(s) and include all significant proceedings and decisions. Items to be discussed shall include, but are not limited to:

a. Planned construction methods and sequence.

b. Type and size of equipment and operating procedures, including heavy equipment operations and mechanical equipment operations.

c. Community protection requirements.

d. Temporary traffic control patterns.

e. Planned work hours.

f. Emergency contact procedures.

3.4 WORKING HOURS

Working hours shall be scheduled by the Contractor to occur between 7:00 am to 5:00 pm, Monday through Friday. Work shall not be permitted before 7:00 am or after 5:00 pm unless approved by the Government field representative and EPA.

The Contractor may be permitted to conduct construction activities six days per week, Monday through Saturday, with the approval of the Government.

Written notification of any changes to the normal work schedule, including work before 7:00 am, after 5:00 pm, or on Saturdays, shall be submitted to the Government at least one (1) week in advance of proposed changes.

-- End of Section --

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SECTION 01 31 17

PRE-CONSTRUCTION AND PRE-WORK CONFERENCES

PART 1 GENERAL

1.1 SCOPE OF WORK

This work shall include the requirements for a pre-construction and pre-work conference to be conducted prior to the start of construction.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-03 Product Data

Conference Meeting Minutes; G

The Contractor shall record the minutes of the meetings, including significant proceedings and decisions arising from the four conferences, and within five calendar days after each meeting, shall furnish 10 copies of the minutes to the Government. After the Government's review and approval, the Contractor shall distribute copies of the minutes to each participant in the meeting and to parties affected by decisions made at the meeting.

1.3 PRE-CONSTRUCTION CONFERENCE

Within 15 calendar days after Task Order Award, the Contractor shall meet with the Government representatives for a Pre-Construction Conference. The purpose of this conference is to discuss the contract clauses (Division 0) and project schedules.

1.4 PRE-WORK CONFERENCE

Within 30 calendar days after the Pre-Construction Conference and prior to mobilization, a Pre-Work Conference shall be held between the Contractor and the Government. Attendance by the Contractor's superintendent, quality control personnel, safety personnel, and any major subcontractor's superintendents shall be required. The purpose of this conference is to review submittals, safety, payrolls and labor relations, environmental protection, project schedules and payment, procurement of materials, and work plans.

Unless otherwise specified, the Contractor shall submit for review five copies of the following at least 14 calendar days prior to the Pre-Work Conference:

a. Project Organizational Chart, Project Manager Name and Experience, and Data Retrieval Record Keeping System, in accordance with SECTION 01 31 10 - JOB SITE ADMINISTRATION.

b. Project Scheduler Qualification and Preliminary and Initial Project

Schedules, in accordance with SECTION 01 32 01 - PROJECT SCHEDULE..

c. Submittal Register, in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

d. Accident Prevention Plan/Site Safety and Health Plan (APP/SSHP), in accordance with SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES..

e. Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP), in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

f. Perimeter Air Monitoring Plan, in accordance with SECTION 01 35 55 - PERIMETER AIR MONITORING.

g. Contractor Quality Control (CQC) Plan, in accordance with SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL.

h. Traffic Control Plan, in accordance with SECTION 01 55 26 - TRAFFIC CONTROL.

i. Soil Erosion and Sediment Control Plan, permits, and product data in accordance with SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

j. Environmental Protection Plan, in accordance with SECTION 01 57 19 - ENVIRONMENTAL PROTECTION.

k. Dust Control Plan, in accordance with SECTION 01 35 55 - PERIMETER AIR MONITORING.

l. Site Preparation Plan, in accordance with SECTION 02 10 00 - SITE PREPARATION

m. Demolition Plan, in accordance with SECTION 02 41 00 - DEMOLITION.

n. Excavation and Sediment Removal Handling Plan, in accordance with SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

o. Temporary Water Treatment Plan, in accordance with SECTION 02 71 00 - TEMPORARY WATER TREATMENT SYSTEM.

p. Waste Management and Transportation Plan including disposal and recycling facility names and permits, in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

q. Installation Plan and Schedule and Preconstruction Structural Evaluation and Survey, in accordance with SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING.

r. Excavation Support System design in accordance with SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION, Soil Technician Qualifications in accordance with SECTION 31 00 00 - EARTHWORK.

s. Dewatering and Drainage System Design Plan and Qualification Data, in accordance with SECTION 31 23 19 - DEWATERING.

t. Security Plan in accordance with SECTION 01 35 53 - SECURITY.

u. Water Diversion Plan in accordance with SECTION 01 57 33 - DIVERSION

AND CONTROL OF WATER.

During the Pre-Work Conference, these submittals will be briefly reviewed to provide the Government with a general understanding of the Contractor's plans for working at the site. The Contractor's schedule, particularly for the initial startup period, will be discussed. Questions concerning the administrative requirements outlined during the Pre-Construction Conference or any other aspect of the project may also be addressed.

1.5 PRE-CONSTRUCTION QUALITY CONTROL CONFERENCE (MUTUAL UNDERSTANDING MEETING

After the Pre-Work Conference and before start of construction, a Pre-Construction Quality Control Conference shall be held between the Contractor and the Government. The purpose of this conference is to discuss the quality control procedures to be used for all onsite work, and to define the interrelationship of the Contractor's Management and the Government's Quality Assurance.

1.6 PRE-CONSTRUCTION SAFETY CONFERENCE

The Contractor shall meet with the Government representatives for a Pre-Construction Safety Conference before the start of construction. The purpose of this conference is to discuss how work will be safely executed, including, but not limited to, work procedures, safety considerations associated with those work procedures, heavy equipment to be used, training required to operate this equipment, and other safety requirements, such as training to be conducted and safety equipment to be used.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall schedule and administer the Pre-Construction Conference, Pre-Work Conference, Pre-Construction Quality Control Conference (Mutual Understanding Meeting), and Pre-Construction Safety Conference, as specified in Paragraphs 1.3 through 1.6 herein.

Only a warranted Procuring Contracting Officer (PCO) or Administrative Contracting Officer (ACO), acting within his or her delegated limits, has the authority to issue modifications or otherwise change the terms and conditions of this contract. If another individual attempts to make changes to the terms and conditions of this contract, the Contractor shall not proceed with the change and shall immediately notify the Contracting Officer.

The Contractor shall record the minutes of the meetings including significant proceedings and decisions arising from the four (4) conferences (Pre-Construction Conference Meeting Minutes, Pre-Work Conference Meeting Minutes, Pre-Construction Quality Control Conference Meeting Minutes, and Pre-Construction Safety Conference Meeting Minutes), and within five (5) calendar days after each meeting furnish 10 copies of the minutes to the Government. After the Contracting Officer's review and approval, the Contractor shall distribute copies to each participant in the meeting and to parties affected by decisions made at the meeting.

3.2 GENERAL CONFERENCE MEETING REQUIREMENTS

The Contractor shall administer the following general requirements for the conference meetings:

a. Prepare agendas for the conferences.

b. Make physical arrangements for the conferences.

c. Preside at the conferences.

d. Record the minutes, including a detailed description of proceedings and decisions..

e. Record action items and designate responsible parties for each action item

-- End of Section --

SECTION 01 31 19

PROJECT PROGRESS MEETINGS

PART 1 GENERAL

1.1 SCOPE OF WORK

This section describes the minimum requirements for conducting Project Progress Meetings during execution of the work.

The Contractor shall schedule and administer Project Progress Meetings a minimum of once per week, as well as any additional meetings requested by either the Government or the Contractor during any stage of this project when it is deemed necessary to raise any significant questions, establish new guidelines, introduce a new aspect of the project, or discuss any other items that will affect the progress of work. The Contractor and all necessary personnel, as determined by the Government, shall attend these meetings for the duration of this contract. A suggested meeting agenda is provided in Paragraph 3.3 of this section.

Meetings and conferences shall take place at the project site or some other location that is satisfactory to both the Government representatives and the Contractor. The Contractor shall provide a conference call-in option for meeting participants calling in remotely, with the approval of the Government.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-03 Product Data

Project Progress Meeting Minutes; G

The Contractor shall be responsible for recording the minutes of all Project Progress Meetings and including any significant proceedings and decisions. The Contractor shall reproduce and submit to the Government, within two calendar days after each meeting, one electronic and three hard copies of the minutes of the meeting. After the Government's review and approval, the Contractor shall distribute copies to each participant in the meeting and to parties affected by decisions made at the meeting.

Project Cost Summary Report; G

On a weekly basis, the Contractor shall submit to the Government two copies of the Project Cost Summary Report for review and approval.

1.3 ATTENDANCE

The following persons shall attend the Project Progress Meetings:

a. EPA's remedial project manager.

b. The USACE and NYSDEC project personnel.

c. The Contractor's site superintendent.

d. The Contractor's project manager.

e. The Contractor's quality control manager and/or key quality control staff.

f. The Contractor's safety and health manager and/or site safety and health officer.

g. Subcontractors as appropriate to the agenda.

h. Suppliers as appropriate to the agenda.

i. Others as requested by the Contracting Officer or as appropriate to the agenda.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall schedule and administer Project Progress Meetings a minimum of once per week, as well as additional meetings as required and if requested by the Government.

3.2 GENERAL MEETING REQUIREMENTS

The Contractor shall administer the following general requirements for the Project Progress Meetings:

a. Prepare the agenda for meetings.

b. Make physical arrangements for meetings.

c. Preside at meetings.

d. Record the minutes, including a detailed description of proceedings and decisions.

3.3 SUGGESTED AGENDA

The following is a suggested agenda for Project Progress Meetings::

a. Review and approval of the minutes and status of action items from the previous meeting.

b. Review of health and safety issues.

c. Review of work progress.

d. Permit activities.

e. Field observations, problems, and conflicts.

f. Problems which impede the schedule and proposed corrective actions.

g. Review and revision of the project schedule, including:

1) Review of problems and proposed changes for their effect on construction, completion date, and other contracts of the project, and corrective actions proposed to regain the projected schedule.

2) Review of offsite delivery schedules.

3) Coordination of schedules, including review and expedition, as required, of submittal schedules.

4) Planned progress during the succeeding work period based on the current project schedule.

5) Milestone dates.

h. Review of transmittals submitted to the Government, submittals returned from the Government, transmittals pending re-submittal, and requests for information RFIs.

i. Review of quality control, including all completed inspections (Preparatory Phase, Initial Phase, Follow-Up Phase, Pre-Final, and Final), scheduled inspections, and the deficiency tracking system..

j. Pending and proposed changes and substitutions.

k. Progress payment and cost tracking.

l. Community relations issues.

m. Review of old business.

n. Review of new business.

o. Assignment of action items.

p. Decision of other business, as appropriate.

-- End of Section --

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SECTION 01 32 01

PROJECT SCHEDULE

PART 1 GENERAL

1.1 SCOPE OF WORK

Furnish all labor, materials, equipment, and incidentals required to prepare and update critical path method project schedules and prepare the weekly progress reports for review at the Pre-Construction Conference and subsequent progress meetings.

Prepare and update the Contractor's Project Schedule using a computer software system that produces legible, easily updated critical path schedules. The software shall be capable of providing a bar chart type schedule for use by the Government in interactions with the public and for discussion at progress meetings.

1.2 QUALITY ASSURANCE

Designate an authorized representative who shall be responsible for the preparation of all required project schedule reports. The authorized representative shall be experienced in scheduling projects similar in nature to this project and shall be experienced in the use of the scheduling software that meets the requirements of this specification.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

The Contractor shall provide the project schedule submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in Paragraph 3.4.

SD-01 Preconstruction Submittals

Project Scheduler Qualifications; G

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The authorized representative must have a minimum of 2-years experience scheduling construction projects similar in size and nature to this project with scheduling software that meets the requirements of this specification. Representative must have a comprehensive knowledge of CPM scheduling principles and application.

Preliminary Project Schedule; G

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 90 calendar days, shall be submitted for approval within 14 calendar days after Task Order Award is acknowledged. The Contractor shall completely cost load the Preliminary Project Schedule to balance the contract award Bid Item

shown on the Price Schedule. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required Plan and Program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan), permitting activities, and other non-construction activities intended to occur within the first 90 calendar days. Any construction activities planned for the first 90 calendar days shall be scheduled after Task Order Award. Government acceptance of other specified Program and Plan approvals shall constrain planned construction activities.

Initial Project Schedule; G

The Initial Project Schedule shall be submitted for approval at least 14 calendar days prior to the Pre-Work Conference. The schedule shall provide a reasonable sequence of activities, which represent work through the entire project and shall be at a reasonable level of detail.

SD-03 Product Data

Periodic Schedule Update; G

Based on the results of progress meetings, specified in Paragraph 3.5 - PERIODIC PROGRESS MEETINGS, the Contractor shall submit periodic schedule updates. These submissions shall enable the Government to assess the Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgment of the Government or authorized representative are necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A project schedule as described herein shall be prepared. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of design and construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Designers, Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule.

The approved Project Schedule shall be used to measure the progress of the work and aid in evaluating time extensions.

3.1.1 Approved Project Schedule

The Contractor shall use the approved Project Schedule to measure the progress of the work and to aid in evaluating time extensions. The schedule shall be cost loaded and activity coded. The schedule will provide the basis for all progress payments. If the Contractor fails to submit any schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits

the required schedule.

3.1.2 Schedule Status Report

Provide a Schedule Status Report on at least a monthly basis. If, in the opinion of the Government, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Government. In this circumstance, the Government may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction planned, and to submit for approval any supplementary schedule or schedules as the Government deems necessary to demonstrate how the approved rate of progress will be regained.

3.1.3 Default Terms

Failure of the Contractor to comply with the requirements of the Government shall be grounds for a determination by the Government that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Government may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of the contract.

3.2 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of meeting all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Government.

3.2.1 Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in the Precedence Diagram Method (PDM).

3.2.2 Level of Detail Required

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities may have Original Durations (OD) greater than 20 work days or 30 calendar days.

3.2.2.1 Activity Durations

Contractor submissions shall follow the direction of the Government regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations are greater than 20 work days or 30 calendar days).

3.2.2.2 Permit Activities

Permitting activities, including necessary conferences and follow-up

actions, shall be integrated into the schedule.

3.2.2.3 Mandatory Tasks

Include the following activities/tasks in the initial project schedule and all updates.

a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each)

b. Permitting

c. Mobilization

d. Installation of temporary facilities

e. Construction of staging area

f. Demolition

g. Perimeter air monitoring

h. Monitoring well abandonment

i. Erosion control and stormwater management

j. Geotechnical and structural evaluation of UPB Building/Vault and dilapidated wall

k. Site preparation including but not limited to clearing, grubbing, fencing

l. Diversion of creek flow

m. Excavation of soils and sediment

n. Removal of Clinton Street Dam and William Street Dam

o. Waste characterization, offsite transportation, and disposal of non-hazardous waste and hazardous/TSCA waste

p. Temporary water treatment system

q. Site restoration

r. Stream restoration

s. Installation of monitoring wells

t. Contractor's pre-final inspection

u. Correction of punch list from Contractor's pre-final inspection

v. Final inspection

w. Construction complete submittal and demobilization

x. Operation and maintenance

y. Final Project close-out

3.2.2.4 Government Activities

Government and other agency activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, permit application reviews, permit approvals by State/local regulators, inspections, utility tie-in, Government Furnished Equipment (GFE) and Task Order Award for phasing requirements.

3.2.2.5 Responsibility

All activities shall be identified in the Project Schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

3.2.2.6 Work Areas

All activities shall be identified in the Project Schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

3.2.2.7 Contract Changes/Request for Equitable Adjustment (REA) Coding

Assign activity code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by the Government, with a Contract Changes/REA Code. Key all Code values to the Government's modification numbering system. Any activity or sequence of activities added to the schedule as a result of alleged constructive changes made by the Government may be added to a copy of the current schedule, subject to Government approval. Assign activity codes for these activities with a Contract Changes/REA Code. Key the code values to the Contractor's numbering system. Approval to add these activities does not necessarily mean the Government accepts responsibility and therefore liability for such activities and any associated impacts to the schedule, but rather the Government recognizes such activities are appropriately added to the schedule for the purposes of maintaining a realistic and meaningful schedule. Such activities shall not be Responsibility Coded to the Government unless approved. An activity shall not have more than one Contract Changes/REA Code.

3.2.2.8 Bid Item

All activities shall be identified in the Project Schedule by the Bid Item to which the activity belongs. An activity shall not contain work in more than one Bid Item. The Bid Item for each appropriate activity shall be identified by the Bid Item Code.

3.2.2.9 Phase of Work

All activities shall be identified in the Project Schedule by the phase of work in which each activity occurs. Activities shall not contain work in more than one phase of work. The project phase of each activity shall be identified by the unique Phase of Work Code.

3.2.2.10 Category of Work

All activities shall be identified in the Project Schedule according to the category of work which best describes the activity. The category of work for each activity shall be identified by the Category of Work Code.

3.2.2.11 Feature of Work

All activities shall be identified in the Project Schedule according to the feature of work to which the activity belongs. "Definable Feature of Work" is defined in SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL. The feature of work for each activity shall be identified by the Feature of Work Code.

3.2.3 Scheduled Project Completion and Activity Completion

The schedule interval shall extend from the Task Order Award date to the contract completion date. The contract completion activity (End Project) shall finish based on the required contract duration in the accepted contract proposal, as adjusted for any approved contract time extensions. The first scheduled work period shall be the day after Task Order Award is acknowledged by the Contractor. Schedule activities on a calendar to which the activity logically belongs. Activities may be assigned to a 7-day calendar when the contract assigns calendar day durations for the activity, such as a Government Acceptance activity. If the Contractor intends to perform physical work less than seven days per week, schedule the associated activities on a calendar with non-work periods identified, including weekends and holidays. Assign the Category of Work Code - Weather Sensitive Installation to those activities that are weather sensitive. Original durations must account for anticipated normal adverse weather. The Government will interpret all work periods not identified as non-work periods on each calendar as meaning the Contractor intends to perform work during those periods.

3.2.3.1 Project Start Date

The schedule shall start no earlier than the date on which the Task Order Award was acknowledged. The Contractor shall include as the first activity in the Project Schedule an activity called "Start Project". The "Start Project" activity shall have an "Early Start" constraint date equal to the date that the Task Order Award was acknowledged, and a zero-day duration.

3.2.3.2 Schedule Constraints and Open-Ended Logic

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation of project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the Project Schedule an activity called "End Project". The "End Project" activity shall have a "Late Finish" constraint date equal to the completion date for the project, and a zero-day duration. The schedule shall have no constrained dates other than those specified in the contract. The use of artificial float constraints such as "zero fee float" or "zero total float" are typically prohibited. There shall only be two open-ended activities: Start Project (or Task Order Award) with no predecessor logic and End Project with no successor logic.

3.2.3.3 Early Project Completion

In the event that the Project Schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. The last activity shall have a late finish constraint equal to the contract completion date and the schedule will calculate positive float. The Government will not approve an early completion schedule with zero float on the longest path. The Government is under no obligation to accelerate activities for which it is responsible to support a proposed early contract completion.

3.2.4 Interim Completion Dates

Contractually-specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

3.2.4.1 Start Phase

The Contractor shall include as the first activity for a project phase an activity called "Start Phase X", where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint date equal to the date on which the Task Order Award was acknowledged, and a zero-day duration.

3.2.4.2 End Phase

The Contractor shall include as the last activity in a project phase an activity called "End Phase X", where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the completion date for the project phase, and a zero-day duration

3.2.4.3 Phase "X" Hammock

The Contractor shall include a hammock-type activity for each project phase called "Phase X", where "X" refers to the phase of work. The "Phase X" hammock activity shall be logically tied to the earliest and latest activities in the phase.

3.2.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided by Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control Report for every in-progress or completed activity, and failure to ensure that the data contained in the Daily Quality Control Reports are the sole basis for schedule updating, shall result in the disapproval of the Contractor's schedule and the inability of the Government to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Program features which calculate one of these parameters from the other shall be disabled.

3.2.6 Out-of-Sequence Progress

Activities that have posted progress without all preceding logic being satisfied will be allowed only on a case-by-case basis approved by the Government. The Contractor shall propose logic corrections to eliminate all out-of-sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule.

3.2.7 Negative Lags and Start to Finish Relationship

Lag durations contained in the Project Schedule shall not have a negative value. The Contractor shall not use Start to Finish relationships.

3.2.8 Calculation Mode

Schedule calculations shall retain the logic between predecessors and successors even when the successor activity starts, and the predecessor activity has not finished. Software features that in effect sever the tie between predecessor and successor activities when the successor has started, and the predecessor logic is not satisfied ("progress override") will not be allowed.

3.2.9 Milestones

The schedule must include milestone activities for each significant project event including but not limited to: permitting, site preparation, asbestos abatement, hazardous materials buildings removal, building demolition, transportation and disposal of materials, backfilling, and site restoration.

3.3 PROJECT SCHEDULE STANDARD ACTIVITY CODING DICTIONARY

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in Engineer Regulation (ER) 1-1-11. This exact structure is mandatory. Develop and assign all Activity Codes to activities as detailed herein. A template SDEF compatible schedule backup file is available on the QCS web site: http://rms.usace.army.mil. The SDEF format is as follows:

SDEF Format			
Field	Activity Code	Length	Description
1	WRKP	3	Workers per day
2	RESP	4	Responsible party
3	AREA	4	Area of work
4	MODF	6	Modification Number
5	BIDI	6	Bid Item (CLIN)
6	PHAS	2	Phase of work
7	CATW	1	Category of work

SDEF Format			
8	FOW1	10	Feature of work (used up to 10 characters in length)
9	FOW2	10	Feature of work (used up to 20 characters in length)
10	FOW3	10	Feature of work (used up to 30 characters in length)

3.4 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the preliminary submission, initial submission, and every periodic project schedule update throughout the duration of the project.

3.4.1 Data CDs

Provide two sets of data CDs containing the project schedule in the backup format. Each CD shall also contain all previous update backup files. File medium shall be CD. Label each CD indicating the type of schedule (Preliminary, Initial, Update), full contract number, project name, data date and file name. Each schedule shall have a unique file name as determined by the Contractor.

3.4.2 Narrative Report

A Narrative Report shall be provided with the preliminary, initial, and each update of the Project Schedule. The Narrative Report shall include a description of activities along the two most critical paths where the total float is less than or equal to 20 work days, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to relay to the Government the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis.

3.4.3 Approved Changes Verification

Only project schedule changes that have been previously approved by the Government shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity-by-activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

3.4.4 Schedule Reports

Only project schedule changes that have been previously approved by the Government shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity-by-activity basis, all changes made since the previous period and relate each change to

documented, approved schedule changes.

3.4.4.1 Activity Report

A list of all activities sorted according to activity number.

3.4.4.2 Logic Report

A list of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.4.4.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.4.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the Task Order Award until the most recent Monthly Progress Meeting. This report shall reflect the earnings of specific activities based on the agreements made in the field and approved between the Contractor and Government at the most recent Monthly Progress Meeting. Activities shall be grouped by bid item and sorted by activity numbers. This report shall sum all activities in a bid item and provide a bid item percent, and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity, the following: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

3.4.5 Network Diagram

The network diagram shall be required on the initial schedule submission and on monthly schedule update submissions. The network diagram shall depict the order and interdependence of activities and the sequence in which the work is to be accomplished. The Government will use, but is not limited to, the following conditions to review compliance with this paragraph.

3.4.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity number, description, duration, and estimated earned value shall be shown on the diagram.

3.4.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract-required interim completion dates, and contract completion date.

3.4.5.3 Critical Path

The critical path shall be clearly shown.

3.4.5.4 Banding

Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

3.4.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

3.5 PERIODIC PROGRESS MEETINGS

Periodic progress meetings/project cost tracking meetings to discuss payment shall include onsite meetings conducted monthly or at other regular intervals mutually agreed to at the Pre-Construction Conference. During this meeting the Contractor shall describe, on an activity-by-activity basis, all proposed revisions and adjustments to the Project Schedule required to reflect the current status of the project. The Government will approve activity progress, proposed revisions, and adjustments as appropriate.

3.5.1 Meeting Attendance

The Contractor's Project Manager, Scheduler, and Project Cost Account shall attend the periodic progress/project cost tracking meeting.

3.5.2 Update Submission Following Progress Meeting

A complete update of the Project Schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than four business days after the monthly progress meeting.

3.5.3 Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost-to-Date shall be subject to Government approval. At a minimum, the Contractor shall address the following items on an activity-by-activity basis during each progress meeting.

3.5.3.1 Actual Start and Finish Dates

The Actual Start and Actual Finish Dates for each activity currently in progress or completed. The Contracting Officer may allow an Actual Finish Date to be assigned with the percent complete less than 100% to account for the value of work remaining but not restraining successor activities. Only assign Actual Start dates when actual progress occurs on an activity.

3.5.3.2 Remaining Duration

The estimated Remaining Duration for each activity in progress. Time-based progress calculations shall be based on Remaining Duration for each activity.

3.5.3.3 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but

for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete. To allow for proper schedule management, cost load the correction of punch list items from the Government's pre-final inspection activities not less than 1 percent of the total contract value, which activities may be declared 100 percent complete and correction of all punch list work identified during the Government's pre-final inspection.

3.5.3.4 Logic Changes

All logic changes pertaining to Task Order Award on change orders, change orders to be incorporated into the schedule, Contractor-proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

3.5.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include:

a. Delays due to conditions beyond the Contractor's control, such as strikes and unusual weather

b. Delays encountered due to submittals, Government activities, deliveries or work stoppages which make re-planning the work necessary

c. Changes required to correct a schedule which does not represent the actual or planned progress of the work

3.6 REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval within 10 days of a delay occurring. Also prepare a time impact analysis for each Government request for proposal (RFP) to justify time extensions.

3.6.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Show that the event that caused the delay/impact was the responsibility of the Government. Provide a time impact analysis that demonstrates the effects of the delay or impact on the project completion date or interim completion date(s). Evaluate multiple impacts chronologically, each with its own justification of delay. With multiple impacts consider any concurrency of delay. A time extension and the schedule fragnet becomes part of the project schedule and all future schedule updates upon approval by the Contracting Officer.

The Project Schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Government's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, shall not be a cause for a time extension to the performance period, contract completion date, or other interim milestone date.

3.6.2 Submission Requirements

The Contractor shall submit a justification for each request for a change in the contract completion date of under 14 calendar days based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, at a minimum:

a. A list of affected activities, with their associated project schedule activity number

b. A brief explanation of the causes of the change

c. An analysis of the overall impact of the changes proposed

d. A sub-network of the affected area

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

3.6.3 Additional Submission Requirements

For any requested time, extension of over 14 calendar days, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this information on a disk within four calendar days of the Contracting Officer's request.

3.7 DIRECTED CHANGES

For directed changes, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 14 days of directed change. The proposed revisions to the schedule will be approved by the Government prior to inclusion of those changes within the Project Schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the Project Schedule. The Contractor shall include these revisions in the Project Schedule until revisions are submitted and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 14 calendar days of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement regarding the revisions is reached. If the Contractor fails to submit alternative revisions within 14 calendar days of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions.

3.8 CONSTRUCTION PROGRESS MEETINGS

3.8.1 Progress Review

The Contractor shall discuss the project schedule during the construction progress meetings for the purpose of jointly reviewing the actual progress of the project as compared to the planned progress and to review planned activities for the upcoming two weeks. The current and approved schedule

update shall be used for the purposes of this meeting and for the production and review of reports. The Contractor's Project Manager and the Authorized Representative of the Government shall attend. The progress meeting will address the status of RFIs and Submittals.

3.8.2 Bar Chart

Provide a bar chart produced by the scheduling software, organized by Total Float and sorted by Early Start Date, and a two-week "look-ahead" schedule by filtering all schedule activities to show only current ongoing activities and activities scheduled to start during the upcoming two weeks, sorted by Early Start Date.

3.8.3 Corrective Action

The Government and the Contractor shall jointly review the reports. If it appears that activities on the longest path(s) which are currently driving the calculated completion date (driving activities) are not progressing satisfactorily and therefore could jeopardize timely project completion, corrective action must be taken immediately. Corrective action includes but is not limited to: increasing the number of work crews; increasing the number of work shifts; increasing the number of hours worked per shift; and determining if Government responsibility-coded activities require Government corrective action.

3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

3.10 TRANSFER OF SCHEDULE DATA INTO RMS/QCS

Download and upload the schedule data into the Resident Management System (RMS) prior to RMS databases being transferred to the Government and is considered to be additional supporting data in a form and detail required by the Government.

-- End of Section --

SECTION 01 32 33

PROJECT PHOTOGRAPHS

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, equipment, materials, and incidentals required to provide photographic documentation of construction activities.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-11 Closeout Submittals

Pre-Construction, Progress, and Post-Construction Photographs; FIO

The Contractor shall submit pre-construction and post-construction project photographs as specified in Paragraph 3.2 herein.

Monthly Progress Photographs; FIO

The Contractor shall submit monthly progress project photographs as specified in Paragraph 3.2 herein.

PART 2 PRODUCTS

2.1 DIGITAL CAMERA

The Contractor shall supply a minimum of one digital camera to produce project photographs as described in this Section.

2.2 PHOTOGRAPHIC LOGBOOK

The Contractor shall keep all written documentation concerning project photographs in a photographic logbook. The logbook shall be constructed of water-resistant paper and bound along the left edge.

PART 3 EXECUTION

3.1 PROJECT PHOTOGRAPHS

3.1.1 General

The Contractor shall furnish digital photographs in an electronic file format approved by the Government, taken with a digital camera by an experienced photographer using suitable equipment, to record the important features of the Site prior to the commencement of work, during construction, and after the work has been completed.

3.1.2 Pre-Construction Photographs

Before work begins, the Contractor shall take digital photographs depicting existing site conditions. Coverage shall include, but not be limited to, property boundary lines, all existing roadways and haul roads, aboveground utilities, structures, landscaping, trees, signage and other physical features located within the zone of influence of the construction. The coverage may be expanded if directed by the Government.

3.1.3 Progress Photographs

After construction operations have been started at the Site, the Contractor shall photographically record the project. Each progress photograph shall be a separate electronic file. Progress photographs shall include coverage of the following:

a. Site preparation activities.

b. Clearing of vegetation and debris.

c. Post-excavation sampling events.

d. Erosion and stormwater control measures.

e. Flintkote turbine excavation, inspection, and removal.

f. Monitoring well abandonment.

g. Perimeter air monitoring activities.

h. Waste characterization sampling.

i. Dam demolition activities.

j. Demolition debris handling and transportation for offsite disposal.

k. Excavation of soils and sediments..

l. Implementation of flow diversion controls..

m. Archaeological monitoring.

n. Sediment drying operation..

o. Construction and operation of sediment processing system.

p. Installation of monitoring wells.

q. Decontamination of equipment and personnel.

r. Wetland and general site restoration.

s. Site or task-specific employee respiratory and personnel protection.

t. Unanticipated events such as spillage of container contents or related accidents.

u. Excavation and construction near UPB Building/Vault and the dilapidated wall.

3.1.4 Post-Construction Photographs

After completion of work, the Contractor shall take digital photographs of the Site. The Government will designate the locations.

3.1.5 Number of Views Taken

The actual number and location of views to be taken for the entire project will be as directed by the Government.

3.2 ELECTRONIC FILES FOR DIGITAL PHOTOGRAPHS

At a minimum, the Contractor shall download digital photographs from the digital camera to a personal computer daily during photographic sessions for transfer to an electronic file format. The electronic file shall be in JPEG format, with minimum compression applied.

The Contractor shall rename each downloaded electronic file at the time of download with a distinct filename that corresponds to the photographic logbook specified in Paragraph 3.3 herein. The filename shall have the following format as defined below:

yyyy-mm-dd_hhnn_xxx

a. "yyyy" is the year the photograph was taken

b. "mm" is the month the photograph was taken

c. "dd" is the day the photograph was taken

d. "hh" is the hour the photograph was taken using military time

e. "nn" is the minute the photograph was taken using military time

f. "xxx" is a three-digit sequential number, starting with 001, for each photograph taken during a given time period

   An example of the above filename format is 2012-07-15_1845_002. This example photograph filename would have been applied to the second photo taken at 6:45 p.m. on July 15, 2012.

The Contractor shall copy the electronic files to a compact disc after renaming each file as described in the paragraph above. The compact disc shall be "CD-R" format.

a. The Contractor shall submit two sets of digital photographs, each on a separate "CD-R" format compact disc..

b. The copy process shall be completed the same day the photographs are downloaded, except as approved by the Government.

c. If the Government allows the copy process to be delayed, the Contractor shall backup the electronic files on at least one storage device other than the hard drive of the personal computer storing the electronic files until the copy process is completed.

The Contractor shall submit compact discs containing electronic files of digital photographs a minimum of once weekly during photographic sessions.

All digital photographs and related electronic files are U. S. Government property and shall not be released by the Contractor to the public or news media.

3.3 LOGBOOK DOCUMENTATION OF DIGITAL PHOTOGRAPHS

The Contractor shall record pertinent information concerning digital photographs in a photographic logbook as specified in Paragraph 2.2 herein. Writing shall be done using waterproof ink.

The following information shall be recorded on the front cover of the logbook:

a. Project name.

b. Contract number.

c. Contractor name.

The following information shall be included for each photographic entry, at a minimum:

a. Date.

b. Time.

c. Photograph filename.

d. Location.

e. Direction.

f. Description.

3.4 VIEWS REQUIRED

Photographs shall illustrate condition and location of work and the state of progress.

During successive periods of photography, the Contractor shall take at least one photograph from the same reference point as previously required.

The Contractor shall consult with the Government during each period of photography for recommendations concerning views required.

-- End of Section --

SECTION 01 32 36

VIDEO MONITORING AND DOCUMENTATION

PART 1 GENERAL

1.1 SCOPE OF WORK

This specification defines the requirements for video recording of the site premises. The Contractor shall furnish all labor, materials and equipment required to provide color, high-quality video/audio of the project site, recording the site features prior to the commencement of work and after the work has been completed and any important site features during construction. Under no circumstances shall construction begin until the Government has received and accepted the pre-construction video recording. This recording will be used for reference during restoration and as a record of pre-existing conditions should disputes or litigation arise.

The Government reserves the right to reject the recording because of poor quality, unintelligible audio, or uncontrolled pan or zoom. Any recording rejected by the Government shall be re-recorded.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-11 Closeout Submittals

Pre-Construction, Progress, and Post-Construction Video; FIO

The Contractor shall furnish to the Government two copies of each recording. Each recording shall be continuous, in color, and recorded in a digital format stored on Digital Video Disc (DVD) media. The disks shall be written in accordance with the ISO-9660 Level 2 specification. Each disk shall be labeled with the appropriate identification of its content.

1.3 VIDEO QUALITY

At a minimum, the video recording camera should be able to produce a resolution of 1,280 (pixel) x 720 (pixel) with a frame rate of 60 frames per second. Video files shall be stored in an industry standard Moving Pictures Expert Group (MPEG) format transferable to a DVD or to an external computer capable of playing MPEG files.

Video recording shall be performed by a qualified, established video recording firm knowledgeable in construction practices and experienced in the implementation of established inspection procedures.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 VIDEO SURVEY

Furnish a continuous, color videotape recording along the construction limits.

Coverage shall include, but not be limited to, all existing roadways and sidewalks, structures, aboveground utilities, landscaping, trees, signage, fencing, and other physical features located within the construction limits and any other adjacent properties. Video coverage shall extend a minimum of 500 feet in each direction from the site entrance. The coverage may be expanded if directed by the Government.

The Contractor shall accompany the videographer during recording sessions to indicate the adjacent areas of potential construction activity and identify items and conditions to be recorded. The construction limits shall be flagged for identification with survey stakes and/or high-visibility paint, prior to production of audio/video recordings.

All recordings shall be done during daylight hours. No recording shall be performed if weather is not acceptable to the Government.

To produce the proper detail and perspective, artificial lighting shall be required where it is necessary to illuminate the shaded area caused by trees, utility poles, road signs, adjacent buildings, and other such objects.

3.2 AUDIO AND VIDEO

Audio/video media shall be professional-grade DVD in National Television Standards Committee (NTSC) format.

Each DVD shall be labeled with the contract name and number, Contractor's name, date, and location information such as street name, direction of travel, viewing side, etc.

Information appearing on the DVD must be continuous and no editing or overlaying of information at a later date will be acceptable.

The following information shall appear on each video recording:

a. Upper left portion:

1) Name of Contractor.

2) Day, date, and time.

3) Name of project.

b. Lower left portion:

1) Route of travel.

2) Viewing side.

3) Direction of travel.

Time must be accurate to within 1/10 of a second and continuously generated.

Written documentation must coincide with the information on each DVD to facilitate easy retrieval of information.

Audio shall be recorded in a clear, professional and concise manner at the same time as the video recording and shall include the same information as displayed on the screen. Special commentary shall be given for unusual conditions of streets, sidewalks, structures, fencing, trees, etc.

All DVDs and their containers shall bear labels with the following information:

a. DVD Number.

b. Project Name and Number.

c. Project Site.

d. Date of Recording.

e. Location and Standing Limit of DVD.

-- End of Section --

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

The Government may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals are to be the same as those used in the Contract Drawings. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

The Contractor's Quality Control (CQC) System Manager and the Designer of Record, if applicable, are to check and approve all items prior to submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

Submittals requiring Government approval are to be scheduled and made prior to the acquisition of the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with the manufacturer's Safety Data Sheets (SDS) and in compliance with existing laws and regulations.

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Pre-construction submittals are required prior to commencing work on site or the start of the next major phase of the construction.

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work. Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work. Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those that will be removed at conclusion of the work.

SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.

Report that includes findings of a test required to be performed on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report that includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the product, system, or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier,

installer or Subcontractor through Contractor. The document purpose is to further promote the orderly progression of a portion of the work by documenting procedures, acceptability of methods, or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and SDSs concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data provided by the manufacturer, or the system provider, including manufacturer's help and product line documentation, necessary to maintain and install equipment, for operating and maintenance use by facility personnel. Data required by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item. Data incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

1.2.2 Work

As used in this section, onsite and offsite construction required by the Contract Documents, including labor necessary to produce submittals, except those noted in SD-01 Pre-Construction Submittals above, and materials, products, equipment, and systems incorporated or to be incorporated into each construction.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with this section.

SD-01 Pre-Construction Submittals

Submittal Register; G

The Contractor shall prepare, maintain, and submit the Submittal Register as detailed in Paragraph 1.8.

1.4 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.4.1 Government Approved (G)

Governmental approval is required for extensions of design, critical

materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Government.

1.4.2 For Information Only (FIO)

All submittals not requiring Government approval will be for information only.

1.5 PREPARATION

1.5.1 Transmittal Form

The sample transmittal forms (ENG Form 4025) attached to this section shall be used for submitting both G and FIO submittals in accordance with the instructions on the reverse side of the form. ENG Form 4025 is included in the QCS software that the Contractor is required to use for this contract. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care will be exercised to ensure proper listing of the specification paragraph and/or sheet number of the Contract Drawings pertinent to the data submitted for each item.

1.5.2 Identifying Submittals

When submittals are provided by a subcontractor, the Prime Contractor is to prepare, review and stamp with the Contractor's approval all specified submittals prior to submitting for Government approval.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate component of each submittal and noted on each transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Date of the drawings and revisions.

d. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other subcontractor associated with the submittal.

e. Specification section number by which submittal is required.

f. Submittal description (SD) number of each component of submittal.

g. When a resubmission, add alphabetic suffix to the submittal description; for example, submittal 18 would become 18A to indicate resubmission.

h. Product identification and location in project.

1.5.3 Marking

Prepare, review and stamp with the Contractor's approval all specified submittals. Permanently mark each submittal to identify it by contract number; transmittal date; Contractor's, subcontractor's, and supplier's name, address(es) and telephone number(s); submittal name; specification or drawing reference; and similar information to distinguish it from other

submittals. Submittal identification shall include space to receive the review action by the Government.

1.5.4 Drawing Format

Drawing submittals shall be prepared on translucent, reproducible sheets, not less than 8-½ by 11 inches nor larger than 30 by 42 inches in size, except for full-size patterns or templates. Drawings shall be prepared to accurate size, with scale indicated, unless another form is required. Drawings are to be suitable for reproduction and of a quality to produce clear, distinct lines and letters with dark lines on a white background.

Submit 8-½ by 11 inches sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

Copies of each drawing shall have the following information clearly marked thereon:

a. Job name, which shall be the general title of the Contract Drawings.

b. Date of the drawings and revisions.

c. Name of Contractor.

d. Name of subcontractor.

e. Name of the item, material, or equipment detailed thereon.

f. Submittal number (e.g., first submittal to last submittal) in a uniform location adjacent to the title block.

g. Specification section to which the submittal applies.

h. Government contract number in the margin, immediately below the title block.

Drawings shall be numbered in a logical sequence. The Contractor may use his own number system.

A blank space, no smaller than 4 inches square, shall be reserved on the right hand side of each sheet for the Government disposition stamp.

1.5.5 Data Format

Present product data submittals for each section as a complete, bound volume. Include table of contents, listing page and catalog item numbers for product data. Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

Supplement product data with material prepared for the project to satisfy submittal requirements for which product data do not exist. Identify this material as developed specifically for the project, with information and format as required for submission of SD-07 Certificates.

Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable Federal, military, industry and technical society publication references. Should manufacturer's data require supplemental information for clarification,

submit as specified for SD-07 Certificates.

Where equipment or materials are specified to conform to industry and technical society reference standards of organizations such as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), and Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing and approved by the Government. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of the construction effort.

1.5.6 Samples

Samples shall be physically identical to the proposed material or product to be incorporated in the work, fully fabricated and finished in the specified manner, and full-scale. Where variations in color, finish, pattern, or texture are inherent in the material or product represented by the sample, multiple units of the sample, showing the near limits of the variations and the "average" of the whole range (not less than three), shall be submitted. Each unit shall be marked to describe its relation to the range of the variation. Where samples are specified for selection of color, finish, pattern, or texture, the full set of available choices shall be submitted for the material or product specified. Sizes and quantities of samples shall represent their respective standard unit.

1.6 APPROVED SUBMITTALS

The Government's approval of submittals shall not be construed as a complete check but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval shall not relieve the Contractor of the responsibility for any error that may exist, as the Contractor, under the Contractor's Quality Control (CQC) requirements of this contract, is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Government, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.7 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Government and promptly furnish a corrected submittal, in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause, "Changes", shall be given promptly to the Government.

1.8 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Forms 4288 listing work plans and items of equipment and materials for which submittals are required by the specifications; this list may not be all-inclusive and additional submittals may be required. The Contractor shall maintain a submittal register for the project in accordance with SECTION 01 45 00 - RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM).

1.9 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 21 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval.

The Government will review the submittal register for approval action.

The approved register will become a part of the contract and the Contractor shall be subject to the requirements thereof. The Contractor shall revise and/or update the register monthly to take into account all changes in the contract. Each such addition and/or revision to the register shall be submitted to the Government for approval. This register and the progress schedules shall be coordinated.

1.10 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

1.10.1 Procedures

The Contractor shall submit five (5) copies, each with separate transmittal, to the Government in accordance with the submittal register. The mailing address for these submittals shall be obtained at the Pre-Construction Conference. Items not to be submitted in quintuplicate, such as samples and test cylinders, shall be submitted along with five (5) copies of ENG Form 4025.

1.10.2 Deviations

For submittals that include proposed deviations requested by the Contractor, the column "Variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind approval of submittals containing unnoted deviations.

1.11 CONTROL OF SUBMITTALS

The Contractor shall carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor-scheduled submittal date shown on the approved submittal register.

1.12 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being stamped

and dated. Three (3) copies of each submittal will be retained by the Government and two (2) copies of each submittal will be returned to the Contractor.

1.13 INFORMATION ONLY SUBMITTALS

Normally, submittals for information only will not be returned. Government approval is not required for FIO submittals. This shall not relieve the Contractor from the obligation to furnish material conforming to the Contract Documents and will not prevent the Government from requiring removal and replacement of nonconforming material that has been incorporated into the work. Additionally, this shall not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract.

1.14 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR (FIRM NAME)

_____Approved

_____Approved with corrections as noted on submittal data and/or attached sheet(s).

SIGNATURE:_____

TITLE:_____

DATE:_____

1.15 RESUBMISSION REQUIREMENTS

Resubmission requirements shall include the following:

a. Make any corrections or changes to the submittals required by the Government and resubmit until approved.

b. Revise initial drawings or data and resubmit as specified for the initial submittal.

c. Indicate any changes that have been made other than those requested by the Government.

1.16 CONTRACTOR'S RESPONSIBILITIES

The Contractor shall review shop drawings, product data and samples prior to submission to determine and verify the following:

a. Field measurements

b. Field construction criteria

The review and approval of shop drawings or samples by the Government shall not relieve the Contractor from its responsibility with regard to the fulfillment of the terms of the contract. The Contractor assumes all risks of error and omission, and the Government will have no responsibility thereof.

No portion of the work requiring shop drawings, working drawings, samples, or catalog data shall be started nor shall any materials be fabricated, installed, or used on the Site prior to Government approval.

Project work, materials, fabrication and installation shall conform to approved shop drawings, working drawings, applicable samples, and catalog data.

1.17 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

If specifically required in other sections of these specifications, the Contractor shall submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

1.18 GOVERNMENT'S REVIEW

1.18.1 Review Notations

The Government will review submittals and provide pertinent notation within 21 calendar days after date of submission. Submittals will be returned to the Contractor with the following notations:

a. Submittals marked "A - Approved as submitted" authorize the Contractor to proceed with the work covered.

b. Submittals marked "B - Approved, except as noted" authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections. Notes shall be incorporated prior to submission of the final submittal.

c. Submittals marked "C - Resubmission required" require the Contractor to make the necessary corrections and revisions and to re-submit them for approval in the same routine as before, prior to proceeding with any of the work depicted by the submittal.

d. Submittals marked "E - Not approved or Disapproved", or "X - Does not comply" indicate noncompliance with the contract requirements and shall be re-submitted with appropriate changes. No item requiring a submittal shall be accomplished until the submittals are approved or approved as noted.

e. Submittals marked "G - Other action required" require the Contractor to take additional action, as specified by the Government, before the submittal will be approved. The Contractor shall take the necessary

action and re-submit the item for approval.

f. Submittals marked "F - Receipt acknowledged" meet submittal requirements "for information only".

g. Submittals marked "D" shall be returned to the Contractor by separate correspondence.

1.18.2 Corrections

The Contractor shall make corrections required by the Government. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the Contract Drawings or specifications, notice as required under the Contract Clause entitled "Changes" shall be given to the Government. Approval of the submittals by the Government shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. The Contractor shall be responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work.

1.18.3 Resubmittals

If changes are necessary to approved submittals, the Contractor shall make such revisions and resubmit the submittals in accordance with the procedures above. No item of work requiring a submittal change shall be accomplished until the changed submittals are approved.

1.18.4 Sample Approval

Furnish, for the approval of the Government, samples required by the specifications or by the Government. Shipping charges shall be paid by the Contractor. Materials or equipment requiring sample approval shall not be delivered to the Site or used in the work until approved in writing by the Government.

Each sample shall have a label indicating:

a. Name of project

b. Name of Contractor

c. Material or equipment

d. Place of origin

e. Name of producer and brand

f. Specification section to which sample applies

g. Samples of furnished material shall have additional markings that will identify them under the finished schedules

The Contractor shall submit to the Government two samples of materials where samples are requested. Transmit to the Government with each sample a letter, original and two copies, containing the above information.

Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any contract

requirements. Before submitting samples, the Contractor shall ensure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Materials and equipment incorporated in the work shall match the approved samples. If requested, approved samples, including those which may be damaged in testing, will be returned to the Contractor upon completion of the contract. Samples not approved will also be returned to the Contractor if requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. The Government reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service.

Variations from contract requirements shall be specifically pointed out in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work.

Samples of various materials or equipment delivered on the Site or in place may be taken by the Government for testing. Samples failing to meet contract requirements will automatically void previous approvals. The Contractor shall replace such materials or equipment to meet contract requirements.

Approval of the Contractor's samples by the Government shall not relieve the Contractor of his responsibilities under the Contract.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

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P. E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a Professional Engineer registered in the State

of _____New York_____and that he/she has been employed by

_____ to design _____
(Name of Contractor) (Insert P.E. Responsibilities)

in accordance with Specification Section _____

for the

_____ .
(Name of Project)

The undersigned further certifies that he/she has performed the design of the

_____,
(Name of Project)

that said design is in conformance with all applicable local, State, and Federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the Government within seven days following written request by the Government.

_____P.E. Name

_____Signature

_____Address

_____Contractor's Name

_____Signature

_____Title

_____Address

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

For use of this form, see ER 415-1-10; the proponent agency is CECW-CE.

DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (*This section will be initiated by the contractor*)

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL _____

SPECIFICATION SEC. NO. (*Cover only one section with each transmittal*)	PROJECT TITLE AND LOCATION	THIS TRANSMITTAL IS FOR: (*Check one*) ☐ FIO ☐ GA ☐ DA ☐ CR ☐ DA/CR ☐ DA/GA

ITEM NO. (*See Note 3*) a.	DESCRIPTION OF SUBMITTAL ITEM (*Type size, model number/etc.*) b.	SUBMITTAL TYPE CODE (*See Note 8*) c.	NO. OF COPIES d.	CONTRACT DOCUMENT REFERENCE		CONTRACTOR REVIEW CODE g.	VARIATION Enter "Y" if requesting a variation (*See Note 6*) h.	USACE ACTION CODE (*Note 9*) i.
				SPEC. PARA. NO. e.	DRAWING SHEET NO. f.			

REMARKS

I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.

NAME OF CONTRACTOR	SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (*List by item No.*)	NAME AND TITLE OF APPROVING AUTHORITY	SIGNATURE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each Transmittal shall be numbered consecutively. The Transmittal Number typically includes two parts separated by a dash (-). The first part is the specification section number. The second part is a sequential number for the submittals under that spec section. If the Transmittal is a resubmittal, then add a decimal point to the end of the original Transmittal Number and begin numbering the resubmittal packages sequentially after the decimal.

3. The "Item No." for each entry on this form will be the same "Item No." as indicated on ENG FORM 4288-R.

4. Submittals requiring expeditious handling will be submitted on a separate ENG Form 4025-R.

5. Items transmitted on each transmittal form will be from the same specification section. Do not combine submittal information from different specification sections in a single transmittal.

6. If the data submitted are intentionally in variance with the contract requirements, indicate a variation in column h, and enter a statement in the Remarks block describing he detailed reason for the variation.

7. ENG Form 4025-R is self-transmitting - a letter of transmittal is not required.

8. When submittal items are transmitted, indicate the "Submittal Type" (*SD-01 through SD-11*) in column c of Section I.
   Submittal types are the following:
   SD-01 - Preconstruction SD-02 - Shop Drawings SD-03 - Product Data SD-04 - Samples SD-05 - Design Data SD-06 - Test Reports
   SD-07 - Certificates SD-08 - Manufacturer's Instructions SD-09 - Manufacturer's Field Reports SD-10 - O&M Data SD-11 - Closeout

9. For each submittal item, the Contractor will assign Submittal Action Codes in column g of Section I. The U.S. Army Corps of Engineers approving authority will assign Submittal Action Codes in column i of Section I. The Submittal Action Codes are:
   A -- Approved as submitted.
   B -- Approved, except as noted on drawings. Resubmission not required.
   C -- Approved, except as noted on drawings. Refer to attached comments. Resubmission required.
   D -- Will be returned by separate correspondence.
   E -- Disapproved. Refer to attached comments.
   F -- Receipt acknowledged.
   X -- Receipt acknowledged, does not comply with contract requirements, as noted.
   G -- Other action required *(Specify)*
   K -- Government concurs with intermediate design. (*For D-B contracts*)
   R -- Design submittal is acceptable for release for construction. (*For D-B contracts*)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract.

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
18 Mile Creek

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 31 10	SD-01 Preconstruction Submittals															
			Project Organizational Chart		G													
			Project Manager Name and		G													
			Experience															
			Data Retrieval Recordkeeping		G													
			System															
		01 31 17	SD-03 Product Data															
			Conference Meeting Minutes		G													
		01 31 19	SD-03 Product Data															
			Project Progress Meeting Minutes		G													
			Project Cost Summary Report		G													
		01 32 01	SD-01 Preconstruction Submittals															
			Project Scheduler Qualifications		G													
			Preliminary Project Schedule		G													
			Initial Project Schedule		G													
			SD-03 Product Data															
			Periodic Schedule Update		G													
		01 32 33	SD-11 Closeout Submittals															
			Pre-Construction, Progress, and															
			Post-Construction Photographs															
			Monthly Progress Photographs															
		01 32 36	SD-11 Closeout Submittals															
			Pre-Construction, Progress, and															
			Post-Construction Video															
		01 33 00	SD-01 Preconstruction Submittals															
			Submittal Register		G													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
18 Mile Creek

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 33 29	SD-03 Product Data															
			Renewable Energy Program		G													
			Fuel		G													
			Paper Product Literature		G													
			SD-07 Certificates															
			Green Remediation															
			Documentation															
		01 35 29	SD-01 Preconstruction Submittals															
			Accident Prevention Plan/Site		G													
			Safety and Health Plan															
			(APP/SSHP)															
			SD-02 Shop Drawings															
			Work Zone and Decontamination		G													
			Facility Drawings															
			SD-03 Product Data															
			Weekly Safety and Accident															
			Reports															
			Activity Hazard Analysis		G													
			Exposure and Air Monitoring Data		G													
			SD-07 Certificates															
			Personnel Health and Safety															
			Certificates															
			Certificate of Worker/Visitor															
			Acknowledgement															
			SD-11 Closeout Submittals															

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		01 35 29	Project Safety and Health															
			Phase-Out Report															
		01 35 45	SD-01 Preconstruction Submittals															
			UFP-QAPP		G													
			SD-06 Test Reports															
			ANSETS Data Requirement															
			Forms and Trip Reports															
			Waste Disposal Characterization		G													
			Sample Results															
			Pre-Remedial Action and		G													
			Post-Excavation Analytical Results															
			Backfill, Structural Fill, and		G													
			Topsoil Material Sample Results															
			Temporary Water Treatment		G													
			System Analytical Results															
			Analytical Data															
			Chemical Data Final Report		G													
			(CDFR)															
		01 35 53	SD-01 Preconstruction Submittals															
			Security Plan		G													
		01 35 55	SD-01 Preconstruction Submittals															
			Perimeter Air Monitoring Plan		G													
			Dust Control Plan		G													
			SD-03 Product Data															
			Air Monitoring Results		G													
			SD-11 Closeout Submittals															

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		01 35 55	Monthly Air Monitoring Reports		G													
		01 45 16	SD-01 Preconstruction Submittals															
			CQC Plan		G													
			SD-03 Product Data															
			CQC Organizational Changes		G													
			CQC Report															
		01 50 00	SD-02 Shop Drawings															
			Temporary Site Facility Layout		G													
			Plan															
		01 53 13	SD-02 Shop Drawings															
			Temporary Bridges		G													
			Structural Drawings and		G													
			Specifications															
			Erection Drawings		G													
			SD-07 Certificates															
			P.E. Certification															
		01 55 26	SD-01 Preconstruction Submittals															
			Traffic Control Plan		G													
		01 57 13	SD-01 Preconstruction Submittals															
			Soil Erosion and Sediment		G													
			Control Plan															
			Permits															
			SD-03 Product Data															
			Products		G													
			Soil Erosion and Sediment		G													
			Control Plan Updates															

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		01 57 13	SD-04 Samples															
			Samples		G													
			SD-07 Certificates															
			Erosion and Sediment Control															
			Inspector Qualifications															
		01 57 19	SD-01 Preconstruction Submittals															
			Preconstruction Survey															
			Regulatory Notifications		G													
			Environmental Protection Plan		G													
			Employee Training Records		G													
			Environmental Manager		G													
			Qualifications															
			SD-06 Test Reports															
			Laboratory Analysis															
			Inspection Reports															
			Solid Waste Management Report		G													
			SD-07 Certificates															
			Employee Training Records		G													
			Certificate of Competency															
			SD-11 Closeout Submittals															
			Stormwater Pollution Prevention		G													
			Plan Compliance Notebook															
			Waste Determination		G													
			Documentation															
			Disposal Documentation for		G													
			Hazardous and Regulated Waste															

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		01 57 19	Assembled Employee Training		G													
			Records															
			Contractor Certification															
		01 57 33	SD-01 Preconstruction Submittals															
			Water Diversion Plan		G													
			Temporary Creek Crossing Plan		G													
		01 71 23	SD-03 Product Data															
			Surveyor Qualifications															
			Survey Accuracy Documentation															
			Surveyor Field Notes															
			Survey Quantities															
			SD-11 Closeout Submittals															
			Compliance Surveys															
			As-Built Drawings		G													
		01 78 00	SD-11 Closeout Submittals															
			Narrative Report and Data															
		02 10 00	SD-01 Preconstruction Submittals															
			Site Preparation Plan		G													
			SD-06 Test Reports															
			Geophysical Survey Report		G													
			SD-07 Certificates															
			Permits															
		02 41 00	SD-01 Preconstruction Submittals															
			Demolition Plan		G													
			Former United Paperboard															
			Building Structural Evaluation															

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		02 61 13	SD-01 Preconstruction Submittals															
			Excavation and Handling Plan		G													
		02 71 00	SD-01 Preconstruction Submittals															
			Temporary Water Treatment Plan		G													
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance		G													
			Manual															
		02 81 00	SD-01 Preconstruction Submittals															
			Waste Management and		G													
			Transportation Plan															
			SD-03 Product Data															
			Notices of Non-Compliance and		G													
			Notices of Violation															
			Contaminated Material Stockpile		G													
			Reports															
			SD-06 Test Reports															
			Spill Response		G													
			SD-07 Certificates															
			Transportation and Disposal		G													
			Coordinator															
			Training		G													
			EPA Offsite Policy		G													
			Transport Certification															
			Certificates of Disposal		G													
			Shipping Documents		G													

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		02 81 00	Solidification Additive		G													
		31 00 00	SD-01 Preconstruction Submittals															
			Samples		G													
			Soil Technician Qualifications		G													
		31 05 19.16	SD-01 Preconstruction Submittals															
			HDPE Liner schedule		G													
			SD-02 Shop Drawings															
			HDPE liner shop drawings		G													
			SD-04 Samples															
			HDPE Membrane samples		G													
			SD-07 Certificates															
			HDPE liner certificates															
			SD-08 Manufacturer’s Instructions															
			Maintenance and Repair															
			Requirements															
			Manufacturer's Standard															
			Guarantee															
		31 05 19.19	SD-01 Preconstruction Submittals															
			Geogrid schedule		G													
			Quality Control Manual		G													
			SD-02 Shop Drawings															
			Geogrid Shop Drawing		G													
			SD-04 Samples															
			Geogrid samples		G													
			SD-07 Certificates															
			Geogrid certificates															

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		31 05 19.19	SD-08 Manufacturer’s Instructions															
			Maintenance and repair															
			requirements															
			Manufacturer's standard															
			guarantee															
		31 05 19.26	SD-02 Shop Drawings															
			Installation schedule		G													
			SD-03 Product Data															
			Long-Term Creep (GRI GC8)		G													
			Insitu Transmissivity		G													
		31 09 00	SD-01 Preconstruction Submittals															
			Installation Plan and Schedule		G													
			SD-02 Shop Drawings															
			Installations Records															
			SD-06 Test Reports															
			Reports and Records		G													
			SD-07 Certificates															
			Certificates															
		31 23 19	SD-01 Preconstruction Submittals															
			Dewatering and Drainage System															
			Plan;															
			Qualification Data		G													
			SD-02 Shop Drawings															
			Shop Drawings		G													
			Record Drawings															
			SD-06 Test Reports															

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		31 23 19	Quality Control Reports		G													
		31 50 00	SD-01 Preconstruction Submittals															
			Quality Control Measures															
			Welder Qualifications															
			Contingency Plan for Reaching		G													
			Threshold Values															
			SD-02 Shop Drawings															
			Excavation Support and		G													
			Protection Shop Drawings															
			SD-05 Design Data															
			Design Calculations		G													
			SD-06 Test Reports															
			Inspection Documentation;		G													
		32 31 13	SD-03 Product Data															
			Fencing		G													
			SD-07 Certificates															
			Material Certificates															
		32 72 00	SD-01 Preconstruction Submittals															
			Water Control Plan;		G													
			Woody Material Management		G													
			Plan															
			Site Restoration Plan		G													
			SD-03 Product Data															
			Material Data		G													
			Grout Data		G													
			SD-11 Closeout Submittals															

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		32 72 00	Streambed Installation Record		G													
			Documents															
		32 80 00	SD-01 Preconstruction Submittals															
			Wetland Restoration Plan		G													
			SD-04 Samples															
			Material Samples		G													
			SD-07 Certificates															
			State Nursery Inspection		G													
			Certificates and Samples															
			Plant Stock Certifications															
			Seed Certification		G													
			Wetland Soil and SAV Substrate		G													
			Soil Amendments		G													
			Wetland Scientist Certification		G													
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Instructions		G													
			As-Built Documentation		G													
		32 92 19	SD-03 Product Data															
			Seeding Schedule															
			SD-07 Certificates															
			Seed Certification		G													
			Topsoil		G													
			Soil Amendments		G													
			SD-11 Closeout Submittals															
			Maintenance Record															

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		32 93 00	SD-01 Preconstruction Submittals															
			Forested Slope and Riparian		G													
			Forest Planting Plan															
			SD-04 Samples															
			Material Samples		G													
			SD-07 Certificates															
			tate Nursery Inspection		G													
			Certificates and Samples															
			Plant Stock Certifications															
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Instructions		G													
			As-Built Documentation		G													
		32 93 10	SD-01 Preconstruction Submittals															
			Restoration Maintenance and		G													
			Monitoring Plan															
			SD-10 Operation and Maintenance															
			Data															
			Restoration Maintenance and		G													
			Monitoring Report															
			Long-Term Restoration		G													
			Maintenance Instructions															
		33 05 16	SD-01 Preconstruction Submittals															
			Pre-Cast Structure Package		G													
		33 40 00	SD-02 Shop Drawings															
			Shop Drawings		G													

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		33 40 00	SD-03 Product Data															
			Product Data		G													
			SD-04 Samples															
			Samples		G													
			SD-06 Test Reports															
			Leakage Test															
			Determination of Density															
			Post-Installation Inspection		G													
			Report															
			SD-07 Certificates															
			Pipe and pipe accessories															
			Resin Certification															
			Oil Resistant Gasket															
			SD-08 Manufacturer’s Instructions															
			Instructions															
		33 51 39	SD-03 Product Data															
			Catalog Data															
			Drilling Logs		G													
			SD-05 Design Data															
			Daily Driller's Report		G													
			Well Completion, Modification,		G													
			and Abandonment Reports															
			Drilling Permits and licenses		G													
			SD-07 Certificates															
			Qualifications															
			Drilling Rig Inspection															

SECTION 01 33 29

SUSTAINABILITY REPORTING

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall incorporate green remediation practices during construction activities whenever feasible in accordance with the EPA Region 2 "Clean & Green" Policy, issued on March 11, 2010. This section covers the requirements for performing green remediation practices at the Site, including furnishing all labor, materials, equipment and incidentals required to complete the work described herein.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-03 Product Data

Renewable Energy Program; G

The Contractor shall submit details regarding the renewable energy program that will be used to purchase renewable energy through the local energy supplier for all site activities, including name of the renewable energy supplier; type and percentage of renewable energy to be used (solar, wind, etc.); and method of supply (direct or Renewable Energy Certificates [RECs]).

Fuel; G

The Contractor shall submit details regarding the fuel providers and types of fuel, including sulfur content, to be purchased during the construction activities.

Paper Product Literature; G

The Contractor shall submit product literature for all copy papers, file folders, and other paper office supplies indicating that the supplies meet the minimum requirements for recycled content as specified herein.

SD-07 Certificates

Green Remediation Documentation; FIO

The Contractor shall submit documentation to support the green remediation activities implemented, including, but not limited to:

a. Receipts for energy purchased.

b. Receipts for fuel purchased.

c. Disposal certificates for waste sent to recycling and regeneration facilities.

d. Receipts for paper products purchased.

e. Manufacturers' documentation for recycled content for select products in compliance with EPA Comprehensive Procurement Guidelines 40 CFR 247.

f. Manufacturers' documentation for bio-based products in compliance with USDA's BioPreferred program.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 RENEWABLE ENERGY

The Contractor shall purchase 100 percent renewable energy through the local utility provider, Public Service Electric and Gas Company (PSE&G), for all electricity used during the remedial construction and during operation of the groundwater collection and conveyance system.

The Contractor shall submit receipts to document that 100 percent renewable energy was used for all electricity consumed during the remedial construction and operation of the groundwater collection system.

3.2 FUEL

Only ultra-low sulfur diesel (ULSD) fuel shall be used during the remedial construction. The Contractor and its subcontractors shall supply receipts for purchase of all fuel to document that only ULSD fuel was consumed.

Vehicle idling shall not be allowed for longer than 5 minutes during remedial construction, including, but not limited to, drill rigs and earth moving equipment.

3.3 MATERIAL REUSE, REDUCTION, AND RECYCLING

All demolished non-porous material shall be decontaminated in accordance with SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and SECTION 01 50 00 - TEMPORARY CONSTRUCTION FACILITIES AND UTILITIES and sent to an approved recycling facility. The Contractor shall submit disposal certificates documenting that the waste was sent to a recycling facility.

One hundred percent of the copy papers, file folders, and other paper office supplies shall come from recycled sources. Required recovered materials content ranges shall be as recommended by EPA's Comprehensive Procurement Guidelines (CPGs). The Contractor shall submit receipts indicating that the purchased products contain the required recycled content.

-- End of Section --

SECTION 01 35 29

HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

This section specifies the requirements for submission of the Accident Prevention Plan/Site Safety and Health Plan (APP) as required by EM 385 1 1 for occupational and non-occupational exposure protection during demolition, clearing/grubbing, excavation, trenching, well abandonment, creek flow diversion-cofferdam installation; on-water work, sampling, confined space entry, backfilling, planting, and handling of contaminated materials. The requirements shall apply to work performed in both "contaminated" and "clean" areas. EM 385-1-1 and all updates are available for reference on the USACE website: http://www.publications.usace.army.mil/USACEPublications/EngineerManuals.aspx

This section describes the responsibilities of the Contractor for safety, health, and emergency response and specifies the requirements for safety and occupational health for the protection of the Contractor and Government personnel, property, and resources. The Government is committed that the work performed under these specifications will be actively managed to:

a. Prevent injuries to employees or other persons;

b. Maintain employee exposures to health hazards below the occupational limits established by the Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH);

c. Keep the exposure of area residents to air contaminants below the established levels for general public exposure by OSHA, the United States Environmental Protection Agency (EPA), or the New York State Department of Environmental Conservation (NYSDEC); and

d. Prevent increasing contaminant levels in soil, water, or sediment near the Site.

Any disregard for the provisions of these safety and health requirements shall be deemed just and sufficient cause for termination of the contract without compromise or prejudice to the rights of the Contractor.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH

Threshold Limit Values and Biological Exposure Indices
Limit Values Threshold Limit Values for Chemical Substances and Physical Agents and

	Biological Exposure Indices

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z87.1	Practice for Occupational and Educational Eye and Face Protection
ANSI Z88.2	Standard Practice for Respiratory Protection
ANSI Z89.1	Safety Requirements for Industrial Head Protection
ANSI Z358.1	Emergency Eyewash and Shower Equipment
ANSI Z590.3	Prevention through Design

ASTM INTERNATIONAL (ASTM)

ASTM F2412	CStandard Test Methods for Foot Protection
ASTM F2413	Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear

CODE OF FEDERAL REGULATIONS (CFR)

10 CFR 19	Notices, Instructions and Reports to Workers: Inspection and Investigations
29 CFR 1904	Recording and Reporting Occupational Injuries and Illnesses
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA

NAAQS	National Ambient Air Quality Standards
EPA PSD	Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)
TO-10A	Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air

ENGINEERING MANUALS (EM)

EM 385 1 1	US Army Corps of Engineers (USACE) Safety and Health Requirements Manual

ENGINEERING REGULATIONS (ER)

ER 385-1-92	Safety and Occupational Health Requirements for Hazardous, Toxic and Radioactive Waste (HTRW) Activities

OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA

TED 01-00-015	OSHA Technical Manual

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 85-115	Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities

NEW YORK STATE DEPARTMENT OF LABOR. DIVISION OF SAFETY & HEALTH CODE RULES(NYSDOL)

NYSDOL 12	Control of Air Contaminants
NYSDOL 23	Protection in Construction, Demolition and Excavation Operations
NYSDOL 57	High Voltage Proximity
NYSDOL 61-3	Special Provisions for Crane Operators

NEW YORK CODES RULES AND REGULATIONS(NYCRR)

6 NYCRR, Parts 370-374	Hazardous Waste
6 NYCRR, Parts 37	Environmental Remediation Programs
6 NYCRR, Part 450	Noise from Heavy Motor Vehicles
6 NYCRR, Part 502	Floodplain Management Criteria for State Projects

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION(NYSDEC)

Erosion and Sediment Control	New York State Standards and Specifications for Erosion and Sediment Control

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Accident Prevention Plan/Site Safety and Health Plan (APP/SSHP); G

The Contractor shall submit the Accident Prevention Plan (APP) to the Government at least 14 calendar days prior to the Pre-Construction Conference. The Site Safety and Health Plan (SSHP) shall be attached to the APP as an appendix. The APP must be approved by the Government prior to commencement of field activities.

The APP shall be authored in accordance with Paragraph 1.6 of this specification.

SD-02 Shop Drawings

Work Zone and Decontamination Facility Drawings; G

The Contractor shall submit the drawings showing the Exclusion Zone, Contamination Reduction Zone and Support Zone boundaries and decontamination facility area for the Government's approval prior to commencement of field activities..

SD-03 Product Data

Weekly Safety and Accident Reports; FIO

The Contractor shall submit the following documents to the Government during project site work:

a. Weekly Safety Report (within one week)

b. Mishap Notification

The USACE representative shall be notified within 8 hours of the affected employee's notification to the employer and supervisor, after any Mishap as defined in EM-385-1-1. Information shall include Contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known; and brief description of accident (to include type of construction equipment used, PPE used, etc.), cause and training history related to the work. Preserve the conditions and evidence on the accident site until the Government investigation team arrives onsite and Government investigation is conducted.

c. Mishap Report

In addition to mishap notification within 8 hours of each occurrence, the following mishaps also require the Prime Contractor to conduct an accident investigation to establish the root cause(s) of the mishap, complete the USACE Accident Report Form 3394 and provide the report to the Government within 7 calendar days of the accident: property damage of $5,000 to $500,000, one or more days away from work, medical treatment greater than first aid, restricted work, hearing loss, uncontrolled release of hazardous energy (includes electrical and non-electrical), load handling equipment or rigging; fall-from-height. The Government will provide copies of any required or special forms.

Activity Hazard Analysis; G

The Contractor shall submit an Activity Hazard Analysis for each major phase of work.

Exposure and Air Monitoring Data; G

The Contractor shall submit the Exposure and Air Monitoring Data required by this section.

SD-07 Certificates

Personnel Health and Safety Certificates; FIO

The Contractor shall submit the following information to the Government for approval at or prior to the Pre Construction Conference:

a. Initial medical certifications for all field personnel.

b. b. A statement of the number of the Contractor's employees and training certificates for all field personnel who have completed the safety and health course required by OSHA 29 CFR 1910.120

c. Respirator fit test certificates for all field personnel.

Certificate of Worker/Visitor Acknowledgement; FIO

The Contractor shall submit a Certificate of Worker/Visitor Acknowledgement for each worker or visitor onsite in accordance with the requirements of this section.

SD-11 Closeout Submittals

Project Safety and Health Phase-Out Report; FIO

The Project Safety and Health Phase-Out Report shall be signed by the project SHM and submitted to the Government after completing project site work. The report shall conform to the requirements of Paragraph 1.45 - SAFETY AND HEALTH PHASE-OUT REPORT.

1.4 REGULATORY REQUIREMENTS

Work performed under this contract shall comply with EM 385-1-1, OSHA requirements in 29 CFR 1910 and 29 CFR 1926, especially OSHA's Standards 29 CFR 1926.65 and 29 CFR 1910.120, and state-specific OSHA requirements where applicable in NYSDOL 12, NYSDOL 23, NYSDOL 57 and NYSDOL 61-3 and all applicable Federal, State, and local safety and occupational health laws and regulations.

Matters of interpretation of standards shall be submitted to the Government or appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply

1.5 MEETINGS

1.5.1 Pre-Construction Safety Conference

Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the Pre-Construction Conference. This includes the project superintendent, safety and health manager, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP including the SSHP, Activity Hazard Analyses (AHAs) and special plans, programs and procedures associated with the APP.

The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that shall be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Government's representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.

Deficiencies in the submitted APP will be brought to the attention of the Contractor at the Pre-Construction Conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.

1.5.2 Safety Meetings

Safety meetings shall be conducted and documented as required by EM 385-1-1. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractor's Daily Quality Control Report.

1.6 ACCIDENT PREVENTION PLAN

The Contractor shall develop and implement an APP that addresses all occupational safety and health hazards associated with the remedial action work. The APP shall cover each element in Appendix A of EM 385-1-1 and each SSHP element in Section 33.B of EM 385-1-1 as required per ER-385 1-92. The APP is a dynamic document, subject to change as project operations and execution change. The APP will require modification to address changing and previously unidentified health and safety conditions. It is the Contractor's responsibility to ensure that the APP is updated accordingly. Amendments to the APP shall be submitted to the Government as the APP is updated. For long duration projects, the APP shall be resubmitted to the Government annually for review. The APP shall contain all updates.

The Government considers the Prime Contractor to be the "controlling authority" for site safety and health for all work performed by the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.

1.6.1 Acceptance and Modifications

Prior to submittal, the APP shall be signed and dated by the SHM. The APP shall be submitted to the Government for approval. Deficiencies in the APP will be discussed at the Pre-Construction Conference, and the APP shall be revised to correct the deficiencies and resubmitted for acceptance. Onsite work shall not begin until the plan has been approved and accepted by the Government. A copy of the written APP shall be maintained onsite. As work proceeds, the APP shall be adapted to new situations and new conditions. Changes and modifications to the accepted APP shall be made with the knowledge and concurrence of the SHM, the Site Superintendent, and the Government. Should any unforeseen hazard become evident during the performance of the work, the Site Safety and Health Officer (SSHO) shall bring such hazard to the attention of the SHM, the Site Superintendent, and the Government, both verbally and in writing, for resolution as soon as possible. In the interim, necessary action shall be taken to re establish and maintain safe working conditions to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted APP shall be cause for stopping of work until the matter has been rectified.

1.6.2 Availability

The APP shall be made available in accordance with 29 CFR 1910, Section 120 (b)(1)(v) and 29 CFR 1926, Section 65 (b)(1)(v).

1.7 DISPLAY OF SAFETY INFORMATION

Within 5 calendar days after Task Order Award, erect a safety bulletin board at the job site. The safety bulletin board shall include information and be maintained as required by EM 385-1-1, Section 01.A.07.

1.8 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

1.8.1 Project Site Conditions

Project site conditions are detailed in SECTION 01 11 00 - SUMMARY OF WORK.

1.8.2 Plan Requirements

The APP/SSHP shall include a site description and contamination characterization section that addresses the following elements:

a. Description of site location, topography, size and past uses of the Site.

b. A list of contaminants that may present occupational safety and health hazards. This list shall be created by evaluating the analytical results in this section and by researching sources of information from past site investigation activities. Chemical names, concentration ranges, affected media, locations onsite and estimated quantities/volumes to be impacted by site work shall be included if known. The contamination characterization shall be reviewed and revised if new chemicals are identified as work progresses.

1.9 HAZARD/RISK ANALYSIS

The APP shall include a systematic safety and health hazard/risk analysis for each site task and operation to be performed. The hazard/risk analysis

shall, as described in ANSI Z590.3, Prevention through Design, provide information necessary for determining safety and health procedures, equipment, and training to protect onsite personnel, the environment, and the public. Available site information shall be reviewed when preparing the "Hazard/Risk Analysis" section of the APP. The following elements, at a minimum, shall be addressed.

The Contractor shall provide all equipment, materials, and personnel necessary to protect onsite personnel and members of the general public from injury or exposure to physical, chemical, and biological hazards. The Contractor shall operate a program of protective equipment maintenance in accordance with the manufacturer's specifications. All protective equipment shall be NIOSH-approved, if applicable. The Government, or designee, will reject the use of equipment if, in their opinion, it provides less protection than that specified in the APP.

1.9.1 Site Tasks and Operations

The APP shall include a comprehensive section that addresses the tasks and objectives of the site operations and the logistics and resources required to complete those tasks and objectives. Based on the type of remediation required, a list of anticipated major site tasks and operations to be performed and the initial levels of protection required for activities listed in Section 1.1 of this specification

1.9.2 Hazards

The following potential hazards may be encountered during site work. These are not complete lists; therefore, they shall be expanded and/or revised as necessary during preparation of the APP.

1.9.2.1 Physical Hazards

The Hazard/Risk Analysis section of the APP shall describe the physical hazards associated with anticipated site operations. These include, but are not limited to heavy equipment operations; trenching; excavating; contaminant handling; pressurized containers and equipment; slips, trips, and falls; etc.

1.9.2.2 Chemical Hazards

The Hazard/Risk Analysis section of the APP shall describe the chemical, physical and toxicological properties of contaminant sources and pathways of employee exposure, anticipated onsite and offsite exposure levels, and regulatory (including Federal, State and local) or recommended protective exposure standards.

1.9.2.3 Physical Agents

The APP shall evaluate hazards associated with noise and heat/cold stress.

1.9.2.4 Biological Hazards

Potential hazards associated with poisonous plants, insects, animals and disease shall also be evaluated in the APP. Planning and procedures for the Coronavirus Disease of 2019 (COVID-19) shall include, but not be limited to adherence to federal and state executive orders, sanitation practices, use of cloth face coverings, social distancing and worker health screenings.

1.9.3 Action Levels

Action levels shall be established for the situations listed below, at a minimum. Current OSHA, EPA air quality guidelines (NAAQS), or other applicable exposure standards and guidelines, shall be utilized in developing the action levels. The action levels and required actions (engineering controls, changes in PPE, etc.) shall be presented in the APP in both text and tabular form. Minimum acceptable action levels and actions to be taken in the event of exceedance appear in Table 01 35 29-1.

a. Implementation of engineering controls and work practices.

b. Upgrade or downgrade in level of personal protective equipment.

c. Work stoppage and/or emergency evacuation of onsite personnel.

d. Prevention and/or minimization of public exposures to hazards created by site activities.

Entry into and work in a confined space will not be allowed when the oxygen reading is less than 19.5% or greater than 23.5% or if the Lower Explosive Limit (LEL) reading is 10% or greater, unless these conditions are adequately addressed in the confined space entry program. In addition, action levels for toxic atmospheres shall be determined.

CONTAMINANT	LEVEL	ACTION TO BE TAKENa
ACTIVE WORK AREA		
Dust in air (total, above background) at non-TSCA areas	0.5 mg/ m3	Evaluate dust suppression and work practices if readings meet or exceed action level above background, over a time weighted average of 5 minutes.
Dust in air (total, above background) at TSCA areas	0.3 mg/ m3	Evaluate dust suppression and work practices if readings meet or exceed action level above background, over a time weighted average of 5 minutes
Polychlorinated biphenyl (PCB) Aroclors	0.25 g/m^3	Evaluate dust suppression and work practices if analytical results meet or exceed action level over a work shift. Increase analytical sampling frequency to every other day or as directed by the Government. Onsite workers wearing modified Level D protection shall upgrade to Level C protection until analytical sample results are below the action level over two separate work shifts.
Volatile Organic Compounds (VOCs)	5 ppm above bkg	Onsite workers wearing modified Level D protection shall upgrade to Level C protection if readings meet or exceed 5 ppm above background, over a time weighted average of 5 minutes.
Confined Space Entry		

CONTAMINANT	LEVEL	ACTION TO BE TAKENa
LEL, H2S	>10% LEL, >10ppm	Stop work immediately and leave exclusion zone. Move to assigned muster location. Notify the SSHO. The SSHO will contact the SHM and evaluate the situation.
OXYGEN	<19.5% or >23.5%	
VOCs	Same as above level and action to be taken.	
Not Work		
LEL	Same as above level and action to be taken.	
SITE PERIMETER		
Refer to SECTION 01 35 55 - PERIMETER AIR MONITORING for perimeter air monitoring/sampling requirements, action level and required action.		

Notes:
a Changes in these initial action levels may be required during the course of this project but will only occur with the written approval of the Contracting Officer.

Abbreviations:
mg/m^3 - milligrams per cubic meter
$\mu g/m^3$ - micrograms per cubic meter
bkg - background
dBA - decibels (A-weighted)
H2S - hydrogen sulfide
LEL - lower explosive level
ppm - parts per million

1.10 ACTIVITY HAZARD ANALYSIS

Prior to beginning each major phase of work, an Activity Hazard Analysis (AHA) shall be prepared by the Contractor performing that work and submitted for review and acceptance. The AHA shall be developed using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The format shall be in accordance with EM 385-1-1, Section 1. A major phase of work is defined as an operation involving a type of work presenting hazards not experienced in previous operations or where a new subcontractor or work crew is to perform. The analysis shall define the activities to be performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work shall not proceed on that phase until the activity hazard analysis has been accepted and a preparatory meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activities, including the onsite Government representatives. The activity hazard analyses shall be continuously

reviewed and, when appropriate, modified to address changing site conditions or operations, with the concurrence of the SHM, the Site Superintendent, and the Government. Activity hazard analyses shall be attached to and become a part of the APP. Each Activity Hazard Analysis shall comply with 29 CFR 1910, Subpart I, "Personal Protective Equipment".

1.11 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

An organizational structure shall be developed that sets forth lines of authority, responsibilities, and communication procedures concerning site safety, health, and emergency response. This organizational structure shall cover management, supervisors and employees of the Contractor and subcontractors. The structure shall include the means for coordinating and controlling work activities of subcontractors and suppliers. The APP shall include a description of this organizational structure as well as qualifications and responsibilities of each of the individuals listed below. The Contractor shall obtain the Government's acceptance before replacing any member of the Safety and Health Staff.

The safety and health organization shall be identified separately from the project's operations organizations to maintain the appropriate degree of independence from day-to-day activities. This independence is necessary to ensure proper implementation of the safety and health plan. The project manager shall be responsible for safety and health on the project including providing the proper and adequate personnel, materials, and resources to implement the safety and health program. Requests for replacement of any member of the Safety and Health Staff shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

1.11.1 Site Superintendent

A Site Superintendent, who has responsibility to implement the APP and the authority to direct work performed under this contract and verify compliance, shall be designated.

1.11.2 Safety and Health Manager

1.11.2.1 Qualifications

The services of a Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene or Certified Safety Professional (CSP) certified by the Board of Certified Safety Professionals shall be utilized. The name, qualifications (education summary and documentation), and work experience summary shall be included in the APP. The SHM shall have the following additional qualifications:

a. A minimum of three years of experience in developing and implementing safety and health programs at hazardous waste sites

b. Documented experience in supervising professional and technician-level personnel

c. c. Documented experience in developing worker exposure assessment programs and air monitoring programs and techniques

d. d. Documented experience in the development of PPE programs and conducting PPE hazard evaluations for the types of activities and hazards likely to be encountered on this project

e. e. Documented experience in health and safety oversight and knowledge of demolition, excavation, trenching, working on/in water, confined space entry, lead, and PCBs.

f. Working knowledge of State and Federal occupational safety and health regulations

1.11.2.2 Responsibilities

The SHM shall:

a. Be responsible for the development, implementation, oversight, and enforcement of the APP/SSHP

b. Sign and date the APP/SSHP prior to submittal

c. Conduct initial site specific training

d. Be present onsite during the first day of remedial activities and at the startup of each new major phase of work

e. Visit the Site as needed and at least once per month for the duration of activities to audit the effectiveness of the APP/SSHP. Any safety and health deficiencies shall be noted in writing with action items identified and assigned so as to resolve deficiencies.

f. Be available for emergencies

g. Provide onsite consultation as needed to ensure the APP/SSHP is fully implemented

h. Coordinate any modifications to the APP with the Site Superintendent, the SSHO, and the Government

i. Provide continued support for upgrading/downgrading of the level of personal protection

j. Be responsible for evaluating air monitoring data and recommending changes to engineering controls, work practices, and PPE

k. Review accident reports and results of daily inspections

l. Serve as a member of the Contractor's quality control staff

1.11.3 Site Safety and Health Officer (SSHO)

1.11.3.1 Qualifications

An individual and one alternate shall be designated the SSHO. The name, qualifications (education and training summary and documentation), and work experience of the SSHO and alternate shall be included in the APP. The SSHO shall have the following qualifications:

a. A minimum of two years of experience in implementing safety and health programs at hazardous waste sites where level C PPE was required

b. A minimum of five years of general or construction industry in managing safety or 4 years plus a safety certification (i.e. certified

safety professional).

c. Documented experience in construction techniques and construction safety procedures

d. Working knowledge of Federal and State occupational safety and health regulations

e. Specific training in personal and respiratory protective equipment, confined space entry, and in the proper use of air monitoring instruments and air sampling methods

f. Completion of 30 Hour Construction Safety and Health course compliant with OSHA Training Institute Guidelines

1.11.3.2 Responsibilities

The SSHO shall:

a. Assist and represent the SHM in onsite training and the day-to-day onsite implementation and enforcement of the accepted APP. The SSHO shall report directly to the SHM.

b. Be assigned to the Site on a full-time basis for the duration of field activities. The SSHO shall have no duties other than safety- and health-related duties. If operations are performed during more than one work shift per day, a site SSHO shall be present for each shift.

c. c. Have authority to ensure site compliance with specified safety and health requirements, Federal, State and OSHA regulations and all aspects of the APP including, but not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, spill containment program, and preparation of records by performing a daily safety and health inspection and documenting results on the Daily Safety Inspection Log in accordance with 29 CFR 1904.

d. Have authority to stop work if unacceptable health or safety conditions exist and take necessary action to re establish and maintain safe working conditions.

e. Consult with and coordinate any modifications to the APP with the SHM, the Site Superintendent, and the Government.

f. Serve as a member of the Contractor's quality control staff on matters relating to safety and health

g. Conduct accident investigations and prepare accident reports

h. Conduct daily safety inspections and document safety and health findings in the Daily Safety Inspection Log. Track noted safety and health deficiencies to ensure that they are corrected.

i. Recommend corrective actions for identified deficiencies and oversee the corrective actions in coordination with site management and the SHM

1.11.4 Occupational Physician

1.11.4.1 Qualifications

The services of a licensed physician, who is certified in occupational medicine by the American Board of Preventive Medicine, or who by necessary training and experience is Board-eligible, shall be utilized. The physician shall be familiar with this site's hazards and the scope of this project. The medical consultant's name, qualifications, and knowledge of the Site's conditions and proposed activities shall be included in the APP.

1.11.4.2 Responsibilities

The physician shall be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1910, Section 120 (f); 29 CFR 1926, Section 65 (f); and Paragraph 1.14 - MEDICAL SURVEILLANCE.

1.11.5 Persons Certified in First Aid and CPR

At least two persons who are currently certified in first aid, CPR, and use of an automated external defibrillator by the American Red Cross or other approved agency shall be onsite, at all times, during site operations. They shall be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard of 29 CFR 1910, Section 1030. These persons may perform other duties but shall be immediately available to render first aid when needed.

1.11.6 Safety and Health Technician

For each work crew in the Exclusion Zone, one person, designated as a Safety and Health Technician, shall perform activities such as air monitoring, decontamination, and safety oversight on behalf of the SSHO. The Safety and Health Technician shall have appropriate training equivalent to the SSHO in each specific area for which they are responsible and shall report to and be under the supervision of the SSHO.

1.12 TRAINING

The Contractor's training program for workers performing cleanup operations and who will be exposed to contaminants shall meet the following requirements.

1.12.1 General Hazardous Waste Operations Training

All personnel performing duties with potential for exposure to onsite contaminants shall meet and maintain the following 29 CFR 1910.120 and 29 CFR 1926.65 (e) training requirements.

a. 40 hours of offsite hazardous waste instruction.

b. Three days actual field experience under the direct supervision of a trained, experienced supervisor.

c. Eight hours refresher training annually.

Onsite supervisors shall have an additional eight hour management and supervisor training as specified in 29 CFR 1910.120/29 CFR 1926.65 (e) (4).

The Contractor shall maintain, at the work site, documentation that shows that each onsite employee or subcontractor has completed a safety and health training course appropriate for their job function and responsibility. The training certificates shall be current within 12 months of the start of work and remain up to date during work performance.

1.12.2 Lead Abatement Training

All personnel performing duties with potential for lead exposure shall meet and maintain the 29 CFR 1926.62 training requirements.

1.12.3 Pre-entry Briefing

Prior to commencement of onsite field activities, all site employees, including those assigned only to the Support Zone, shall attend a site-specific safety and health training session. This session shall be conducted by the SHM and the SSHO to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment. Procedures and contents of the accepted APP and relevant sections of EM 385-1-1 shall be thoroughly discussed. Each employee shall sign a training log to acknowledge attendance and understanding of the training. The Government shall be notified at least five days prior to the initial site-specific training session so that Government personnel involved in the project may attend.

1.12.4 Periodic Sessions

Periodic onsite training shall be conducted by the SSHO at least weekly for personnel assigned to work at the Site during the following week. The training shall address safety and health procedures, work practices, any changes in the APP, activity hazard analyses, work tasks, or schedule, results of the previous week's air monitoring, and review of safety discrepancies and accidents. Should an operational change affecting onsite field work be made, a meeting prior to implementation of the change shall be convened to explain safety and health procedures. Site-specific training sessions for new personnel, visitors, and subcontractors shall be conducted by the SSHO using the training curriculum outlines developed by the SHM. Each employee shall sign a training log to acknowledge attendance and understanding of the training.

1.12.5 Site Specific Training

Site specific training sessions shall be documented in accordance with Section 01.B.02 of EM 385 1 1.

The Contractor's SHM shall approve a site-specific training session for the Contractor and Government personnel scheduled to work onsite. This training may be given by the SSHO. This site-specific training shall consist of an initial safety and health briefing on the following information:

a. Names of personnel and alternates responsible for site safety and health

b. Hazards present on the Site

c. Hazard communications training

d. Safe use of engineering controls and equipment onsite

e. Selection, use, care, and maintenance of PPE

f. Site control procedures, including log-in and log-out

g. Site decontamination procedures

h. Standard operating safety procedures

i. Site emergency response contingency plan

The SHM shall provide training as specified in 29 CFR 1910.146 for employees who are required to supervise, standby, or enter permit-required confined spaces. Persons involved in any aspect of the transportation of hazardous materials shall be trained in accordance with 49 CFR 172 Subpart H.

1.13 PERSONAL PROTECTIVE EQUIPMENT

1.13.1 Site-Specific PPE Program

The Contractor's PPE Program shall comply with 29 CFR Part 1910.132 and 29 CFR Part 1910.120. Onsite personnel exposed to contaminants shall be provided with appropriate PPE. Components of levels of protection (C, D and modifications) must be relevant to site-specific conditions, including heat and cold stress potential and safety hazards. Only respirators approved by NIOSH shall be used. Protective equipment and clothing shall be kept clean and well-maintained. The PPE section of the APP shall include site-specific procedures to determine PPE program effectiveness and for onsite fit testing of respirators and cleaning, maintenance, inspection, and storage of PPE.

1.13.2 Levels of Protection

Operations under this contract may require work exposure to potentially hazardous materials. The Contractor shall, therefore, provide and ensure the wearing of all necessary PPE for all personnel onsite. All personnel entering the Work Zones shall don, at a minimum, level D PPE.

The SHM shall establish and evaluate, as the work progresses, the levels of protection for each work activity. The SHM shall also establish action levels for upgrade or downgrade in levels of PPE. Protocols and the communication network for changing the level of protection shall be described in the SSHP. The PPE evaluation protocol shall address air monitoring results, potential for exposure, changes in site conditions, work phases, job tasks, weather, temperature extremes, individual medical considerations, etc.

1.13.2.1 Initial PPE Components

The following constitute the anticipated levels of protective clothing (Level D and Modified Level D) and equipment ensembles to be utilized during this project and potential upgrade (Level C):

a. Level D - Work clothing, as dictated by the weather

i. Safety (safety toe/shank) shoes or boots

ii. Hard hat
iii. Safety glasses, goggles, or face shield
iv. Hearing protection (where required)
v. Nitrile, neoprene or natural rubber gloves (when handling contaminated soils or water)
vi. Gloves with cotton liners

b. Modified Level D - Same as Level D, and:

i. Disposable, hooded, one piece, full body coveralls constructed of spun bonded olefin or polypropylene fabrics (e.g. Tyvek or equivalent)
ii. Disposable boot covers of (minimum) 60 mil rubberized PVC
iii. USCG approved Personal Flotation Device for activities that occur over or near water

c. Level C - Modified Level D PPE and full facepiece, air purifying respirator equipped with filter cartridges approved by NIOSH for lead, mercury vapors, organic vapors, with a HEPA pre-filter.

*Note that cloth face coverings shall be worn in accordance with federal and state executive orders.

1.13.2.2 Initial Minimum Levels of PPE by Task

Available site information shall be reviewed, and the list of tasks and operations and corresponding levels of protection shall be identified during preparation of the APP.

The Contractor shall downgrade its level of protection only when:

a. The SSHO makes the change based on site activity, air monitoring of contaminant levels, and work place practices as specified in the SSHP; and

b. The SHM approves the change, with the knowledge and approval of the Government.

1.13.3 PPE for Government Personnel

Five clean sets of PPE and clothing (excluding air purifying negative pressure respirators and safety shoes, which will be provided by individual visitors), as required for entry into the Exclusion Zone and/or Contamination Reduction Zone, shall be available for use by the Government or official visitors. The items shall be cleaned, maintained and stored by the Contractor and clearly marked: "FOR USE BY GOVERNMENT ONLY." The Contractor shall provide basic training in the use and limitations of the PPE provided.

1.14 MEDICAL SURVEILLANCE

The Contractor's medical surveillance program for workers performing cleanup operations and who will be exposed to contaminants shall meet 29 CFR 1910.120 (f), 29 CFR 1926.65 (f), and the following requirements. The Contractor shall ensure that the Occupational Physician or the physician's designee performs the physical examinations and reviews examination results. Participation in the medical surveillance program shall be without cost to employees, without loss of pay and at a reasonable time and place.

1.14.1 Frequency of Examinations

Medical surveillance program participants shall receive medical examinations and consultations on the following schedule:

a. Every 12 months.

b. When the participant develops signs and symptoms indicating a possible overexposure due to an uncontrolled release of a hazardous substance on the Site.

c. Upon termination or reassignment to a job where medical surveillance program participation is not required, unless his/her previous annual examination/consultation was less than 6 months prior to reassignment or termination..

d. On a schedule specified by the Occupational Physician.

1.14.2 Content of Examinations

The physical examination/consultation shall verify the following information about the medical surveillance program participants:

a. Baseline health conditions and exposure history

b. Allergies, sensitivity and susceptibility to hazardous substances exposure

c. Ability to wear PPE inclusive of NIOSH-certified respirators under extreme temperature conditions

d. Fitness to perform assigned duties

1.14.3 Information Provided to the Occupational Physician

The Contractor shall provide the Occupational Physician with the following information for each medical surveillance program participant:

a. Information on the employee's anticipated or measured exposure

b. A description of any PPE used or to be used

c. A description of the employee's duties as they relate to the employee's exposures (including physical demands on the employee and heat/cold stress)

d. A copy of 29 CFR 1910, Section 120, or 29 CFR 1926, Section 65

e. Information from previous examinations not readily available to the examining physician

f. A copy of Section 5 of NIOSH Pub No. 85 115

g. Information required by 29 CFR 1910, Section 134

1.14.4 Physician's Written Opinion

Before work begins, a copy of the physician's written opinion for each

employee shall be obtained and furnished to the SHM and the employee. The opinion shall address the employee's ability to perform hazardous remediation work and shall contain the following:

a. The physician's verification of the employee's fitness to perform duties as well as recommended limitations upon the employee's assigned work and/or PPE usage.

b. The physician's opinion about increased risk to the employee's health resulting from work.

c. A statement that the employee has been informed and advised about the results of the examination.

1.14.5 Employee Certificates

Employee certificates shall be provided for each worker performing cleanup operations with potential for contaminant-related occupational exposure. Employee certificates shall be signed by the SHM and the Occupational Physician indicating that the workers meet the contract requirements for training and medical surveillance.

TABLE 01351-3 OSHA STANDARDS FOR USE OF PPE

Type of Protection	Regulation	Source
General	29 CFR Part 1910.132	41 CFR Part 50-204.7 General Requirements for Personal Protective Equipment
	29 CFR Part 1910.1000	41 CFR Part 50-204.50 except for Table Z-2, the source of which is ANSI Z3 Series (*)
	29 CFR Part 1910.1001 – 1045	OSHA Rulemaking
Hazard Communication	29 CFR Part 1910.1200	OSHA
	29 CFR Part 1910.133	ANSI Z87.1(*) Eye and Face Protection
Noise	29 CFR Part 1910.95	41 CFR Part 50-204.10 and OSHA Rulemaking
Respiratory	29 CFR Part 1910.134	ANSI Z88.2 (*) Standard Practice for Respiratory Protection
Head	29 CFR Part 1910.135	ANSI Z89.1(*) Safety Requirement for Industrial Head Protection
Foot	29 CFR Part 1910.136	ASTM F2412 (*) ASTM F2413 (*)
Electrical Protective	29 CFR Part 1910.137	ANSI Z9.4(*) Men’s Safe Practices Devices of Abrasive Blasting Operations

(*) = Latest version.

1.15 EXPOSURE MONITORING AND AIR SAMPLING PROGRAM

1.15.1 General

The SHM shall prepare and implement an exposure monitoring program to identify safety and health hazards and airborne levels of hazardous substances to ensure proper selection of engineering controls, work practices and PPE for affected site personnel. Include action levels for upgrading/downgrading PPE in the program.

The Contractor shall monitor air for:

a. Total dust and VOCs during demolition, excavation, unloading, and handling of excavated materials will be monitored at least hourly per shift daily (or at the discretion of the SSHO

b. H2S, LEL, O2 and VOCs before and during confined space entry.

c. LEL before and during hot work.

The types of measurements to be collected shall be listed in the APP with examples of the instruments to be used. After the initial phase of monitoring, if the SHM determines that a reduced level of monitoring is appropriate, the SHM shall decrease the monitoring requirements in consultation with the Government.

The Contractor shall document, in the site log or site files, the regular calibration of each instrument used. Only individuals trained to operate this equipment will do so.

The following publications define terms and establish procedures discussed in this specification. These publications are incorporated into this specification by reference:

a. Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists (ACGIH) (current edition)

b. OSHA Technical Manual, U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), TED 01-00-015

c. Air Contaminants Permissible Exposure Levels, 29 CFR 1910.1000

Equipment utilized for air monitoring or sampling in accordance with this section shall be calibrated before and after each use and maintained as per specified methods, manufacturer's recommendations, and good industrial hygiene practices.

1.15.2 Meteorological Monitoring

The Contractor shall furnish and maintain a portable meteorological station for the continuous observation and recording of wind speed, wind direction, ambient air temperature, atmospheric pressure, atmospheric humidity, solar insulation, atmospheric precipitation, and lightning strike detection. The equipment and its placement shall be in conformance with EPA PSD. The station shall also include a continuous readout temperature gauge and a rainfall gauge.

The meteorological station shall be positioned by the SSHO to provide representative data on the overall atmospheric diffusion conditions at the Site. Visual wind direction indicators shall be established in a central location at each active work area. The meteorological station shall be installed in an area relatively free of trees and houses, at the office trailer or in the Support Zone of the Site. The station shall be able to produce a 24-hour average figure for each parameter so that the weather influences on the air samples can be characterized. Meteorological monitoring results shall be documented in the Daily Safety Log by the SSHO.

The calibration, audit, data reduction, and document control of meteorological equipment and meteorological data shall be specified by the Contractor. For the purposes of this document, it is assumed that hourly averages of all meteorological parameters during the entire air monitoring program shall be collected, tabulated, and verified. Meteorological data shall be submitted with air monitoring data.

1.15.3 Real-Time Air Monitoring

1.15.3.1 Air Monitoring Equipment

The Contractor shall furnish and maintain real-time air monitoring equipment and all necessary calibration/audit equipment and supplies to detect and monitor for the contaminants listed in TABLE 01 35 29-1. All equipment shall be intrinsically safe.

1.15.3.2 Real Time Air Monitoring Requirements

The Contractor shall perform real-time air monitoring prior to commencement of work to establish baseline conditions for total dust and VOCs. Monitoring of these baseline conditions shall be performed within the exclusion zones. Baseline conditions shall be established based on an 8-hour sample.

Monitoring of total dust and VOCs shall be performed in the breathing zone of the highest-risk employees in both the sediment/soil staging area and the active excavation Exclusion Zones on an hourly basis or less during active operations (1 worker in each area).

Continuous monitoring shall be performed prior to and during Confined Space Entry and hot work.

The Contractor shall provide real-time air monitoring for the activities and contaminants listed in TABLE 01 35 29-1.

1.15.3.3 Action Levels

See Table 01 35 29-1 for minimum acceptable action levels under the Contractor's SSHP and responses to their exceedance. The Contractor is responsible for analyzing specific project circumstances and requirements and developing appropriate action levels and responses. Action levels must be approved by the Government. Further detail is provided below:

During Demolition, Excavation, Unloading and Handling of Excavated Materials

Total dust of 0.5 mg/m3 or more above background over a 5-minute weighted average shall require immediate evaluation of dust suppression and work practices. Actions such as increased wet suppression shall be instituted.

Volatile organic compound levels of 5 parts per million (ppm) or more above background at any active work area shall require a second sample be taken within 5-minutes but not more than 15-minutes. If VOC levels do not fall below the action level an upgrade in level of respiratory protection and/or site evacuation shall be required. Should VOCs in the Support Zone exceed the ambient levels designated previously, the Contractor's SSHO shall stop work and evaluate. If volatile organic compound levels are 5 ppm or more above background in the Support Zone, personnel shall be notified and all personnel within this area shall don respiratory protective equipment as described by the SSHP.

During Confined Space Entry

Volatile organic compound monitoring shall be performed as detailed in the previous paragraph.

H2S shall be monitored prior to and during entry. If H2S is equal or greater than 10ppm entry is not permitted or worker will leave the space

until H_2S remains under 10ppm.

Oxygen shall be monitored prior to and during entry. If oxygen is less than 19.5% or greater than 23.5% entry is not permitted, or worker will leave the space until oxygen levels are at or between 19.5% and 23.5%.

Should the combustible gas meter indicate over 10 percent of the lower explosive limit on any single reading, that work location shall be shut down and personnel evacuated, and the Government shall be notified immediately. Work shall not resume until:

a. Appropriate corrective measures are implemented; and

b. Authorization to continue work is given by the SHM based on lower air contamination levels.

During Hot Work
LEL monitoring shall be performed as detailed in previous paragraph.

1.15.3.4 Air Monitoring Results

A data sheet shall be developed and implemented by the SHM upon which the following real-time monitoring data will be recorded:

a. Date and time of monitoring
b. Air monitoring location

c. Instrument, model number, serial number

d. Calibration/background levels

e. Results of monitoring

f. Safety and Health Specialist/Industrial Hygienist Technician signature

g. Interpretation of the data and any further recommendations by the SHM or the SSHO in consultation with the SHM

The person obtaining the sample or conducting the monitoring must sign and date the data sheets as they are filled in. The SSHO, as appropriate, shall sign and date the data sheets weekly after their review. All measured air concentrations of particulates and exposure durations shall be recorded. Records of these exposures shall be placed in the employee's permanent medical files.

Monitoring and exposure results shall be given verbally to the Government following each site scan that indicates concentrations that meet or exceed action levels and documented in writing by the end of each workday with three copies provided.

1.15.4 PCB Aroclors Analytical Air Sampling

1.15.4.1 Air Sampling Equipment

The Contractor shall furnish and maintain air sampling equipment and all necessary calibration/audit equipment and supplies to sample for PCB Aroclors. All equipment shall be intrinsically safe.

1.15.4.2 Air Sampling Requirements

The Contractor shall collect and analyze PCB Aroclor air samples in accordance with USEPA Method TO-10A (Low Volume Sampling). The target air flow rate shall be 5 liters per minute.

PCB Aroclor samples shall be collected from the breathing zone of the workers most exposed to intrusive activities in both the sediment/soil staging and sediment dewatering operation area (1 sample) and the active excavation Exclusion Zones (1 sample). The samples shall be collected throughout the work shift (8-10 hours).

PCB Aroclor samples shall be collected at the following frequencies for each excavation area:

- Twice per week during weeks 1 through 4 (2 workers x 2/week = 4 samples/week).
- Once per week during weeks 5 through completion of the excavation area (2 workers x 1/week = 2 samples/week).

The sampling frequency shall only be reduced upon government approval.

Samples shall be analyzed by a laboratory with an Environmental Approval Program Certification through the New York State Department of Health. Samples shall be analyzed with a fast turnaround time (TAT) in the same manner as specified in SECTION 01 35 55 - PERIMTER AIR MONITORING, subsection 1.9.5.

1.15.4.2.1 Additional Air Sampling at TSCA Excavations

The Contractor shall collect and analyze additional PCB Aroclor air samples while excavating TSCA material from the TSCA excavation areas. These additional samples shall be collected a rate of 1 sample per 2 days of excavation. Samples shall be analyzed with a fast turnaround time (TAT) in the same manner as specified in SECTION 01 35 55 - PERIMETER AIR MONITORING, subsection 1.9.5. The TSCA areas are identified on the Contract Drawings and listed below:

Upland Soil:

- Upson Park
- UPB property, Potential UST area
- UPB Property, in front of dilapidated wall
- Flintkote 300 Parcel, on slope

Sediment:

- Mill Pond (approximate Station 9+15)
- North of Clinton Street Dam (approximate Station 13+85)
- Mill Race north of William Street Dam (approximate Station 801+25)

1.15.4.2.2 Additional Air Sampling During High Temperature Conditions

The Contractor shall collect and analyze additional PCB Aroclor air samples while excavating any area (TSCA and non-TSCA) when temperatures at the Site are greater or equal to 82 degrees Fahrenheit. These additional samples shall be collected a rate of 1 sample per 2 days of excavation. Samples shall be analyzed with a fast turnaround time (TAT) in the same manner as specified in SECTION 01 35 55 - PERIMTER AIR MONITORING, subsection 1.9.5.

1.15.4.3 Action Levels

See TABLE 01 35 29-1.

1.15.4.4 Air Sampling Results

The same procedures shall be followed, documented and submitted as detailed in Section 1.15.3.4 (Air Monitoring Results).

1.16 HEAT AND COLD STRESS MONITORING AND MANAGEMENT

The Contractor shall document in the APP and implement the procedures and practices in Section 6.J in EM 385-1-1 to monitor and manage heat and cold stress, respectively..

1.17 SPILL AND DISCHARGE CONTROL

Written spill and discharge containment/control procedures shall be developed and implemented by the Contractor as part of the APP. These procedures shall address hazardous wastes, material handling equipment, and appropriate procedures for drum and container handling, opening, sampling, shipping, and transport. These procedures shall describe prevention measures, such as building berms or dikes, spill control measures and material to be used (e.g., booms, absorbents), location of the spill control material, PPE required to clean up spills, disposal of contaminated material, and who is responsible to report the spill. Storage of contaminated material or hazardous materials shall be appropriately bermed, diked and/or contained to prevent any spillage of material on uncontaminated soil.

The Contractor shall respond to any spill of hazardous substances (as designated in 40 CFR 302), or pollutant or contaminant that is in custody or care of the Contractor, pursuant to this contract. Response shall be implemented within one hour, or as soon as practicable, following any accident or release of debris, as directed by the Government. Any direction from the Government concerning a spill or release shall not be considered a change under the contract. The Contractor shall comply with all applicable requirements of Federal, State, or local laws or regulations regarding any spill incident.

If the spill or discharge is reportable, and/or human health or the environment is threatened, the National Response Center, the State, and the federal Government shall be notified as soon as possible. Notification of the accident shall include location of the accident, resultant damage or injury, person(s) involved, probable cause, amount of waste spilled, and any other pertinent information concerning the accident.

1.18 DRUM AND CONTAINER HANDLING

Procedures and precautions for the handling, storage, and disposal of encountered drums and containers, which may be pressurized, shall be specified in the APP and shall comply with NYSDEC requirements.

1.19 CONFINED SPACE ENTRY PROCEDURES

All trench excavations over 4 feet in depth shall be considered confined spaces as defined by OSHA 29 CFR 1926. The Contractor shall be required to

provide confined space entry procedures in compliance with 29 CFR 1910.146, "Permit-Required Confined Spaces." for entrance into trenches and building vaults.

1.20 IGNITION SOURCES

Refer to Paragraph 1.21, Fire Protection and Prevention, NFPA 241 and EM 385-1-1, Section 9. A list of ignition sources shall be made, and procedures documented to prevent fire as part of the pre-emergency planning. All sources of ignition shall be prohibited within 50 feet of operations with a potential fire hazard. Such areas shall be conspicuously and legibly posted: "NO SMOKING, MATCHES, OR OPEN FLAME." Sufficient clearance and shielding shall be provided around heat sources to avoid ignition of combustible materials

1.21 FIRE PROTECTION AND PREVENTION

Every member of the site team shall be responsible to observe and report fires and conditions that could lead to fires. The Contractor shall observe the fire prevention and protection requirements described in EM-385-1-1. Those requirements include:

a. The Contractor shall not use fires or open flame devices.

b. The Contractor shall prohibit smoking within the Exclusion Zone.

c. The Contractor shall place at least two fire extinguishers, rated at least 2-A:40-B:C, within the Exclusion Zone. Another fire extinguisher shall be placed in the Support Zone.

d. The Contractor shall inspect and tag all fire extinguishers monthly per the requirements of NFPA 10.

e. Contractor personnel shall fight fires onsite that can be controlled with the use of fire extinguisher.

1.22 ELECTRICAL SAFETY

Electrical installations and appliances used by the Contractor shall meet updated, applicable, NFPA National Electrical Code specifications. All electrical devices utilized by the Contractor or subcontractors on this project shall be grounded and utilize ground fault circuit interrupter (GFCI) protected outlets.

1.23 EXCAVATION

The Contractor shall identify buried utility lines at the Site prior to excavation and trenching.

During active excavation, the Contractor shall shore or slope the walls of open excavations as required by OSHA 29 CFR 1926.650 through 1926.652. Where employees may be expected to enter excavations over four feet in depth, stairs, ladders, or ramps shall be provided.

The Contractor shall erect a visible barrier or fence at the edge of any open excavation. Members of the public shall be kept away from the excavation. Neither heavy equipment nor excavated material may be placed within two feet of an open excavation. All mobile equipment shall be equipped with working back-up alarms, brakes, and shut-off switches.

Operators shall not leave their equipment while it is running.

1.24 GUARDING OF MACHINERY AND EQUIPMENTY

The Contractor shall secure their equipment onsite at the end of each workday. The Site shall have 24-hour security in accordance with SECTION 01 35 53 - SECURITY.

1.25 LOCKDOWN/TAGOUT

This shall be performed by competent employees only. Before an employee performs any servicing or maintenance on a system where the unexpected energizing, start up, or release of kinetic or stored energy could occur and cause injury or damage, the system shall be isolated in accordance with the requirements of EM 385-1-1, Section 12. Hazardous energy control procedures shall be implemented for the protection of personnel and resources.

1.26 FALL PROTECTION

The Contractor shall provide fall protection measures in accordance with EM 385-1-1, Section 21.

1.27 PERSONAL FLOATATION DEVICES

Inherently buoyant Type III, Type V work vests or better USCG approved personal floatation devices are required when working over or near water, in accordance with EM 385-1-1. 05.J.01. This includes wearing a personal floatation device when on a water vessel.

1.28 COFFERDAMS

The Contractor shall control flooding if overtopping of the cofferdam by high waters is possible. Warning signals for emergency evacuation of employees shall be developed and posted. Two means of rapid exit shall be provided with guardrails. Cofferdam use shall be in accordance with 29 CFR 1926 Subpart S.

1.29 HAZARD COMMUNICATION

Refer to subsection 1.37.3 of this section. A hazard communication plan shall be prepared as part of pre-emergency planning.

1.30 ILLUMINATION

Illumination levels in the working zone shall be maintained at a minimum of 10 foot-candles. If necessary, supplementary lighting shall be provided by the Contractor.

1.31 SANITATION

The Contractor shall provide the following items to maintain a sanitary work environment:

a. Portable toilet facilities with hand sanitizer.

b. A source of potable water for employee consumption.

c. A source of water and a location at which employees may wash up.

d. Clean locations for food storage and consumption if food is consumed at the work site.

1.32 HEARING CONSERVATION

The Contractor shall measure and document the noise exposure of onsite personnel, at a minimum. If necessary, the Contractor shall make hearing protection available to all personnel involved with equipment operation.

1.33 SIGNS AND LABELS

Refer to SECTION 01 58 13 - SIGNS.

1.34 DUST CONTROL

Dust control shall be used throughout the work at the Site and offsite and no visible dust emission shall be present. The Contractor's Dust Control Plan in accordance with SECTION 01 35 55 - PERIMETER AIR MONITORING shall appear or be referenced in the APP. The SSHO shall ensure that dust suppression practices are effective and being utilized. Periodic and frequent visual surveillance shall be conducted at the active work site along transportation routes. No visible dust emission shall be present.

1.35 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

a. Secure outside equipment and materials and place materials that could be damaged in protected areas.

b. Check the surrounding area for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.

c. Ensure that temporary erosion controls are adequate.

1.36 DEMOLITION

Structures shall be demolished in accordance with SECTION 02 41 00 - DEMOLITION. Air monitoring shall be performed in accordance with this section. Plans and procedures, including a list of materials and supplies, for safely and effectively demolishing the buildings shall be submitted in the APP.

1.37 SITE CONTROL MEASURES

To prevent the spread of contamination and control the flow of personnel, vehicles, and materials into and out of work areas, site control measures shall be established and described in the APP. The APP shall describe site control measures similar to those described in the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH Pub No. 85-115. The APP shall describe the methodology to be used by the SHM and SSHO in determining work zone designations and their modifications, and procedures to limit the spread of contamination. The APP shall include procedures for the implementation and enforcement of safety and health rules for all persons on the Site, including employers, employees, outside contractors, Government representatives, and visitors.

1.37.1 Work Zones

Initial anticipated work zone boundaries (Exclusion Zone including restricted area; Contamination Reduction Zone; and Support Zone) and access points shall be established, and the boundary delineations shall be included on the site drawings as a part of the APP. Delineation of work zone boundaries shall be based on the contamination characterization data and the hazard/risk analysis to be performed as described in Paragraph 1.9 - HAZARD/RISK ANALYSIS. As work progresses and field conditions are monitored, work zone boundaries may be modified with approval from the Government. Work zones shall be clearly identified and marked in the field (using fences, tape, signs, etc.). A site map, showing work zone boundaries and locations of decontamination facilities, shall be posted in the onsite office. Work zones shall consist of the following:

Exclusion Zone (EZ): The EZ is the area where hazardous contamination is either known or expected to occur and the greatest potential for exposure exists. Entry into this area shall be controlled and exit may only be made through the Contamination Reduction Zone.

Contamination Reduction Zone (CRZ): The CRZ is the transition area between the Exclusion Zone and the Support Zone. The personnel and equipment decontamination areas shall be separate and unique areas located in the CRZ.

Support Zone (SZ): The SZ is defined as areas of the Site where workers do not have the potential to be exposed to hazardous substances or dangerous conditions resulting from hazardous waste operations. The SZ shall be secured against active or passive contamination. Site offices, parking areas, and other support facilities shall be in the SZ.

1.37.2 Site Control Log

A log of personnel visiting, entering, or working on the Site shall be maintained. The log shall include the following: date, name, agency or company, time entering and exiting the Site, time entering and exiting the EZ (if applicable), and PPE utilized. Before visitors are allowed to enter the CRZ or EZ, they shall show proof of current training, medical surveillance and respirator fit testing (if respirators are required for the tasks to be performed) and shall fill out the Certificate of Worker or Visitor Acknowledgment. This visitor information, including date, shall be recorded in the log.

1.37.3 Communications

The APP shall identify the method by which Contractor personnel will communicate in the event of an emergency. Communications with the office trailer, if it is outside vocal range, will be by radio. Two-way radio communication shall be required during construction activity. Communications between the Contractor and other organizations (e.g., the Government or the emergency response contractor) will be over the telephone. The Government shall direct safety and health correspondence to the SHM through the Contractor's Project Manager. At least the following emergency telephone numbers and information must appear in the APP.

a. Name, address, and phone number of medical treatment facility and physician

b. Ambulance service's telephone number

c. Fire department's telephone number

d. Police department's telephone number

e. EPA Region 2's telephone number

f. EPA and NYSDEC spill control telephone numbers

g. Government's telephone number

h. City of Lockport's telephone number

i. National Response Center's telephone number

1.38 SEVERE STORM PLAN

Refer to SECTION 01 35 53 - SECURITY.

1.39 TANK PURGING FOR PERMIT-REQUIRED CONFINED SPACE ENTRIES

Personnel entering the EZ or CRZ or otherwise exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids shall adhere to the following personal hygiene and decontamination provisions. Decontamination shall be performed in the CRZ prior to entering the SZ from the EZ. Chapter 10 of NIOSH Pub No. 85 115 shall be consulted when preparing decontamination procedures. A detailed discussion of personal hygiene and decontamination facilities and procedures to be followed by site workers shall be submitted as part of the APP. Employees shall be trained in the procedures, and the procedures shall be enforced throughout site operations.

1.39.1 Decontamination Facilitiess

A personnel decontamination facility shall be provided within the CRZ. This facility shall be used by both Contractor personnel and Government representatives.

1.39.2 Procedures

The APP shall outline procedures to be used for decontamination of site personnel. Personnel performing or supervising remedial work within the EZ or CRZ or those workers exposed (or subject to exposure) to the contaminants of concern, soil, sludge, or water at the Site shall be instructed by the Contractor in the requirements of, and advised to observe and adhere to, the personal hygiene-related provisions of this paragraph. A detailed discussion of personnel decontamination and sanitation protocols to be followed by site workers shall be submitted as part of the APP. Any personnel found to be disregarding the personal hygiene-related provisions of the APP shall be barred from the Site.

The following facilities shall be made available to all onsite personnel:

a. Contained storage and legal disposal of used disposable outerwear

b. Hand and face washing facilities

c. A facility for changing into and out of and storing work clothing separate from street clothing

d. A lunch and/or break room

e. A smoking area

f. Shower facilities

The following procedures shall be followed by all onsite personnel:

a. Disposable outerwear shall not be reused, and, when removed, shall be placed inside disposal containers provided for that purpose located in the CRZ.

b. Smoking and chewing of tobacco or chewing gum shall be prohibited except in the designated smoking area, provided by the Contractor, in the SZ.

c. Eating and drinking shall be prohibited except in the designated lunch or break area, provided by the Contractor, in the SZ.

d. All outerwear shall be removed prior to entering the lunch area or smoking area, and prior to washing hands.

e. Contractor personnel shall be required to thoroughly cleanse their hands and other exposed areas before entering the smoking or lunch area.

The Contractor shall establish decontamination and sanitation procedures and areas appropriate for each level of PPE currently in use onsite. The procedures must include the stations and equipment necessary for personnel decontamination and sanitation. The following guidelines are minimum requirements for the Contractor's personnel decontamination procedures:

Level C Decontamination		
Station 1	Equipment Drop	Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboard, etc.) on plastic drop cloths. During hot weather operations, cool down station may be set up within this area.
Station 2	Outer Garment, Boots, and Gloves Wash and Rinse	Scrub outer boots, outer gloves, and splash suit with either decontamination solution or detergent water as appropriate. Rinse off using copious amounts of water.

Level C Decontamination		
Station 3	Outer Boot and Glove Removal	Remove outer boots and gloves. Deposit in container with plastic liners.
Station 4	Canister or Mask Change	If worker leaves EZ to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5	Boot and Outer Garment Removal	Remove and deposit in separate containers lined with plastic.
Station 6	Facepiece Removal	Remove facepiece. Avoid touching face with fingers. Deposit facepiece on plastic sheets.
Station 7	Gloves	Remove and deposit inner gloves in the container lined with plastic.
Station 8	Field Wash	Thoroughly wash hands and face.
Modified Level D Decontamination		
Station 1	Equipment Drop	Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboard, etc.) on plastic drop cloths. During hot weather operations, cool down station may be set up within this area.
Station 2	Outer Garment, Boots, and Gloves Wash and Rinse	Scrub outer boots and gloves with either decontamination solution or detergent water as appropriate. Rinse off using copious amounts of water.
Station 3	Outer Boot and Glove Removal	Remove outer boots and gloves. Deposit in container with plastic liner.

Level C Decontamination		
Station 4	Boot, Gloves, and Outer Garment Removal	Remove and deposit boots, chemical-resistant splash suit, and inner gloves in separate containers lined with plastic.
Station 5	Field Wash	Thoroughly wash hands and face.

Level C Decontamination

Station 1:
Equipment Drop
Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboard, etc.) on plastic drop cloths. During hot weather operations, cool down station may be set up within this area.

Station 2: Outer Garment, Boots, and Gloves Wash and Rinse Scrub outer boots, outer gloves, and splash suit with either decontamination solution or detergent water as appropriate. Rinse off using copious amounts of water.

Station 3:
Outer Boot and Glove Removal
Remove outer boots and gloves. Deposit in container with plastic liners.

Station 4:
Canister or Mask Change
If worker leaves EZ to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.

Station 5:
Boot and Outer Garment Removal
Remove and deposit in separate containers lined with plastic.

Station 6:
Facepiece Removal
Remove facepiece. Avoid touching face with fingers. Deposit facepiece on plastic sheets.

Station 7:

Gloves

Remove and deposit inner gloves in the container lined with plastic.

Station 8:
Field Wash
Thoroughly wash hands and face.

Modified Level D Decontamination

Station 1:
Equipment Drop
Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboard, etc.) on plastic drop cloths. During hot weather operations, cool down station may be set up within this area.

Station 2:
Boots and Gloves Wash and Rinse
Scrub outer boots and gloves with either decontamination solution or detergent water as appropriate. Rinse off using copious amounts of water.

Station 3:
Outer Boot and Glove Removal
Remove outer boots and gloves. Deposit in container with plastic liner.

Station 4: Boot, Gloves, and Outer Garment Removal Remove and deposit boots, chemical-resistant splash suit, and inner gloves in separate containers lined with plastic.

Station 5:
Field Wash
Thoroughly wash hands and face.

All personnel shall enter the decontamination facility from the EZ through the inner or contaminated side of the CRZ. All contaminated materials shall be left in the CRZ. Contaminated material shall remain in this area until it is removed for proper disposal. All wash water and decontamination solutions shall be collected in appropriate containers for disposal. Decontamination fluids shall be disposed of in accordance with applicable Federal, State or local requirements.

All PPE worn onsite shall be decontaminated or properly stored or disposed of at the end of the workday. The Site Superintendent shall be responsible for ensuring all PPE is decontaminated before being reissued, and the SSHO shall verify that this task is performed.

Non-disposable PPE shall be washed with a low-sudsing detergent, rinsed with warm water, and then wiped dry with a disposable cloth. The Contractor shall evaluate the use of a qualified service to launder PPE. Decontaminated PPE shall be stored in a secure area of the SZ.

1.40 TANK INERTING (NO ENTRY)

Vehicles and equipment used in the EZ shall be decontaminated in the CRZ prior to leaving the Site. The procedures for decontamination of vehicles and equipment shall be addressed in the APP.

A special "clean area" shall be established for performing equipment maintenance. This area shall be used when personnel are required by normal practices to expose themselves to contact with soil, i.e., crawling under a vehicle to change engine oil. All equipment shall be decontaminated by washdown in the CRZ prior to maintenance work. Maintenance such as greasing heavy equipment will not necessitate decontamination unless the job requires body contact with soil.

Seats of equipment and vehicles used in the EZ shall not be cloth-covered. They shall be free from cracks or holes that would allow dust to enter seat padding or shall be covered with a temporary sheet vinyl covering.

1.40.1 Decontamination Facilities

A decontamination station shall be provided within the CRZ for decontaminating vehicles and equipment leaving the EZ. At a minimum, this facility shall include a high-pressure wash area for equipment and vehicles and a steam cleaning system for use after the mud and/or site material has been cleaned from the equipment. The pad shall be constructed to capture decontamination water, including over-spray, and shall allow for collection and removal of the decontamination water using sumps, dikes and ditches as required. Spray water from these washing procedures shall be handled as provided elsewhere in these specifications.

1.40.2 Procedures

Procedures for equipment decontamination shall be developed and utilized to prevent the spread of contamination into the SZ and offsite areas. These procedures shall address disposal of contaminated products and spent materials used on the Site, including containers, fluids, oils, etc. Any item taken into the EZ shall be assumed to be contaminated and shall be inspected and/or decontaminated before the item leaves the area. Vehicles, equipment, and materials shall be cleaned and decontaminated prior to leaving the Site. Construction material shall be handled in such a way as to minimize the potential for contaminants being spread and/or carried offsite. Prior to exiting the Site, vehicles and equipment shall be monitored to ensure the adequacy of decontamination. Personnel engaged in vehicle decontamination shall wear protective equipment including protective clothing and respiratory protection consistent with the requirements of this specification and the APP.

1.41 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

The APP shall describe the emergency and first aid equipment to be available onsite. The following items, at a minimum, shall be maintained onsite and available for immediate use:

a. First aid equipment and supplies approved by the consulting physician.

b. Emergency eyewashes and showers which comply with ANSI Z358.1.

c. Emergency use respirators. For escape purposes, 5 to 15 minute emergency escape masks shall be supplied. For rescue purposes, two positive pressure self contained breathing apparatus (SCBA) shall be supplied. These shall be dedicated for emergency use only and maintained onsite in the CRZ.

d. Fire extinguishers with a minimum rating of 20-A:120-B:C shall be provided at site facilities and in all vehicles, and at any other site locations where flammable or combustible materials present a fire risk.

1.42 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

An Emergency Response Plan that meets the requirements of 29 CFR 1910, Section 120 (l) and 29 CFR 1926, Section 65 (l) shall be developed and implemented as a section of the APP. This plan must present procedures the Contractor shall follow in the case of an injury or gross chemical exposure or in case the Contractor observes an emergency unrelated to the field work. In the event of any emergency associated with remedial action, the Contractor shall, without delay, alert all onsite employees that there

is an emergency; take action to remove or otherwise minimize the cause of the emergency; alert the Government; and institute measures necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. Employees that are required to respond to hazardous emergency situations shall be trained in how to respond to such emergencies. The plan shall be rehearsed regularly as part of the overall training program for site operations. The plan shall be reviewed periodically and revised as necessary to reflect new or changing site conditions or information. Copies of the accepted APP and any revisions shall be provided to the affected local emergency response agencies. The following elements, at a minimum, shall be addressed in the plan:

1.42.1 Pre-Emergency Planning

The local emergency response agencies shall be contacted and met with during the preparation of the Emergency Response Plan. Involvement of local fire, police, and rescue authorities is necessary to ensure better coordination and proper implementation of the plan. In all cases the site-specific Emergency Response Plan must be consistent with the community contingency plan regardless of whether local responders are used during remedial action. Coordination and scheduling of these activities is the Contractor's responsibility. The Contractor is required to conduct a site visit for the appropriate response agencies. This visit and kick-off meeting should provide the agencies with the following information:

a. Site Layout

b. Nature and Scope of Work

c. Schedule for Construction Activities

d. Hazard Potentials of Materials Associated with Site Activities

e. Onsite Personnel Locations

f. Location of Utility Lines

g. Entrance and Egress Routes

h. Emergency Communications

i. Decontamination Procedures

j. Response Times

k. Evacuation Routes

l. Site-Specific Safety and Health Plan

m. Response Restraints

n. Emergency Response Plan Components

The Contractor must notify, in writing, through the USACE Project Office, the local emergency responders and the EPA of any changes to the Emergency Response Plan. Responders' participation in the Contractor's emergency drills is encouraged. The form at the end of this section entitled "Agreement for Emergency Response Services" shall be used by the Contractor to develop an individual agreement between the Contractor, a local emergency

responder, USACE (EPA's Contracting Party), and EPA.

1.42.2 Emergency Response Plan Contents

The emergency response plan shall address the following:

a. Personnel roles, lines of authority, and communications for emergencies and training.

b. Emergency recognition and prevention.

c. Site topography, layout, and prevailing weather conditions.

d. Criteria and procedures for site evacuation (emergency alerting procedures, employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control).

e. Specific procedures for decontamination and medical treatment of injured personnel.

f. Route maps to nearest pre-notified medical facility. Site support vehicles shall be equipped with maps. The Contractor shall visit the hospital designated in the SSHP to determine whether they can handle the types of injury that might occur at the Site. At the beginning of project operations, drivers of the support vehicles shall become familiar with the emergency route and the travel time required.

g. Emergency alerting and response procedures including posted instructions and a list of names and telephone numbers of emergency contacts (physician, nearby medical facility, fire and police departments, ambulance service, Federal, State, and local environmental agencies, as well as the SHM, the Site Superintendent, the Government and/or their alternates).

h. Criteria for initiating community alert program, contacts, and responsibilities.

i. Procedures for reporting incidents to appropriate government agencies. If an incident such as an explosion, fire, or a spill or release of toxic materials occurs during the project, the appropriate government agencies shall be immediately notified. In addition, the Government shall be verbally notified immediately and receive a written notification within 24 hours. The report shall include the following items:

1. Name, organization, telephone number, and location of the Contractor.

2. Name and title of the person(s) reporting.

3. Date and time of the incident.

4. Location of the incident, i.e., site location, facility name.

5. Summary of the incident giving pertinent details including type of operation ongoing at the time of the incident.

6. Cause of the incident, if known.

7. Casualties (fatalities, disabling injuries).

8. Details of any existing chemical hazard or contamination.

9. Estimated property damage, if applicable.

10. Nature of damage and effect on contract schedule.

11. Action taken to ensure safety and security.

12. Other damage or injuries sustained, public or private.

j. Procedures for critique of emergency response and follow up.

k. Site security and control for incidents.

l. Procedures to monitor and respond to severe weather, flooding and blizzards.

m. Procedures for dealing with fires, explosives and spills.

n. Procedures for decontaminating emergency response vehicles and equipment.

1.42.3 Injury or Illness

In the event of an injury or illness among the site personnel, the certified first aid practitioner shall take control. The injured or ill person shall be transferred to the medical facility designated in the Contractor's APP. Decontamination of personnel shall be accomplished prior to transfer if the time and situation permits and shall be conducted under the direction of the SSHO. If contaminated persons are sent to the medical facility, they shall be accompanied by the SSHO or Safety and Health Technician.

The Contractor shall immediately inform the Government and SHM of any accidents, injuries, illnesses, or environmental releases associated with this contract. Paragraph 1.3.3 lists the information that must be provided in the report. Contractors will arrange for their own emergency medical treatment. The Government has no responsibility to provide emergency medical treatment.

1.42.4 Evacuation

When an evacuation is necessary, all field team members shall go to the muster point for that study area. The Emergency Response Plan shall identify the muster points for Contractor personnel in the event of any evacuation.

1.42.5 Contingency Planning Procedures

Contingency planning procedures and Contractor personnel responsibilities for potential emergencies shall be identified in the APP. Emphasis in the contingency planning section shall be placed on procedures. Contingency planning shall include situations that will involve mobilization of the surrounding community. A meeting with the local emergency preparedness agency shall be scheduled by the Contractor to discuss the contingency

measures that will be followed in the event of a major emergency that may affect offsite areas. A representative of the EPA, the Government or their representative, the Contractor, the SHM, and the CIH will all be required to attend. It shall be the responsibility of the Contractor to prepare an agenda and chair this meeting. This agenda shall be sent to all participating parties prior to the scheduled meeting. At this meeting, the Contractor's suggested guidelines and requirements shall be presented for protecting local residents in the event of major fires and explosions and the offsite migration of releases from the Site. Contingency procedures shall be confirmed by consensus of the attending parties. Elements of the discussion shall include:

a. Names, responsibilities, and authority of personnel assigned to implement emergency actions and the contingency plan

b. Procedures for detecting and monitoring levels of airborne contamination that may migrate offsite in addition to air monitoring as required

c. Site security in the event of an emergency

d. Recordkeeping and reporting requirements

e. Criteria for initiating the community contingency plan

f. Emergency response procedures contained in the SSHP

The conclusions reached during the meeting discussion shall be formally documented.

1.43 CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGMENT

A copy of a Contractor generated certificate of worker/visitor acknowledgment shall be completed and submitted for each visitor allowed to enter the CRZ or EZ, and for each employee, following the example certificate at the end of this section.

1.44 INSPECTIONS

The SSHO's daily inspection logs shall be attached to and submitted with the Daily Quality Control reports. Each entry shall include the following: date, work area checked, employees present in work area, PPE and work equipment being used in each area, special safety and health issues and notes, and signature of preparer.

1.45 SAFETY AND HEALTH PHASE-OUT REPORT

A Safety and Health Phase-Out Report shall be submitted in conjunction with the project closeout report and will be received prior to final acceptance of the work. The following information shall be included, at a minimum:

a. Summary of the overall safety and health performance (accidents or incidents including near misses, unusual events, lessons learned, etc.)

b. Final decontamination documentation including procedures and techniques used to decontaminate equipment, vehicles, and onsite facilities

c. Summary of exposure monitoring and air sampling conducted during the project

d. Signatures of the SHM and SSHO

e. Copies of hazardous waste manifest forms indicating that proper disposal of hazardous wastes was accomplished

f. Final physical/medical certifications

g. Daily Safety Inspection Reports

h. Weekly Safety Reports

i. Training Logs

j. Accident Reports

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

EXAMPLE CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGMENT

PROJECT NAME:
CONTRACT NO.:
PROJECT ADDRESS:
CONTRACTOR'S NAME:
EMPLOYEE'S NAME:

The contract for the above project requires the following: that you be provided with and complete formal and site specific training; that you be supplied with proper personal protective equipment including respirators; that you be trained in its use; and that you receive a medical examination to evaluate your physical capacity to perform your assigned work tasks, under the environmental conditions expected, while wearing the required personal protective equipment. These items are to be provided at no cost to you. By signing this certification, you are acknowledging that your employer has met these obligations to you.

I HAVE READ, UNDERSTAND AND AGREE TO FOLLOW THE SITE SAFETY AND HEALTH PLAN FOR THIS SITE.

Name: Date:

FORMAL TRAINING: I have completed the following formal training courses that meet the OSHA requirements:

Date Completed
40 hour:
8 hour supervisory:
8 hour refresher:

SITE SPECIFIC TRAINING: I have been provided and have completed the site specific training required by this Contract. The Site Safety and Health Officer conducted the training.

RESPIRATORY PROTECTION: I have been trained in accordance with the criteria in the Contractor's Respiratory Protection program. I have been trained in the proper work procedures and use and limitations of the respirator(s) I will wear. I have been trained in and will abide by the facial hair policy.

RESPIRATOR FIT TEST TRAINING: I have been trained in the proper selection, fit, use, care, cleaning, maintenance, and storage of the respirator(s) that I will wear. I have been fit tested in accordance with the criteria in the Contractor's Respiratory Program and have received a satisfactory fit. I have been assigned my individual respirator. I have been taught how to properly perform positive and negative pressure fit check upon donning negative pressure respirators each time.

MEDICAL EXAMINATION: I have had a medical examination within the last twelve months that was paid for by my employer. The examination included health history, pulmonary function tests, and may have included an evaluation of a chest x ray. A physician made a determination regarding my physical capacity to perform work tasks on the project while wearing protective equipment including a respirator. I was personally provided a copy and informed of the results of that examination. My employer's industrial hygienist evaluated the medical certification provided by the physician and checked the appropriate blank below. The physician determined that there:

_____were no limitations to performing the required work tasks.

_____were identified physical limitations to performing the required work tasks.

Date medical exam completed:

Employee's Signature:

Date:

Printed Name:

Social Security Number:

Contractor's Site Safety and Health Officer
Signature:

Date:

Printed Name:

Social Security Number:

TASK HAZARD AND CONTROL REQUIREMENTS CHECKLIST

Task: _____

Initial Anticipated Hazard: _____

Initial PPE: _____

Initial Controls: _____

Initial Exposure Monitoring: _____

HAZWOPER Medical Surveillance Required yes no

HAZWOPER Training Required yes no

FIELD SAFETY CHECKLIST

Work
Location:_____

1. Reviewed work plans with project engineer: _____
(initial/date)

2. Requested maps of aboveground and underground utilities:
_____
(initial/date)

3. Reviewed utility maps: _____
(initial/date)

(water supply, firewater, sewer, process sewer, electric, gas, telephone, other underground utilities)

4. Met with utilities representative to review utility locations and asked each representative the following questions: _____
(initial/date)

a. Any underground utilities at work site location?
b. Any ongoing construction that would affect field activities?
c. Any chemical releases associated with utilities?
d. Any other hazards associated with utilities?
e. Any special requirements?

Names of utilities and their representatives:

Utility Company	Representative

FIELD SAFETY CHECKLIST (CONT'D)

5. Determine if any permits are required:_____
(initial/date)
Type(s):_____

6. Obtain necessary permits:_____
(yes or no)

Permit expiration date(s):_____

7. Requested SDS for any known or expected onsite chemical:
_____
(initial/date)

8. Client's established protocol, if any:
_____
_____
_____
_____
_____

9. Obtained final approval for commencement of work:_____
_____

Comments:

EXCAVATION SAFETY SIGNOFF SHEET
(TO BE COMPLETED BEFORE EXCAVATION COMMENCES)

Field locations of borings/excavations/trenches at the 18 Mile Creek Superfund Site have been evaluated for clearance of underground utilities (i.e., electrical, sewers, firewater, and other piping) as well as 10 feet clearance from overhead powerlines. Additionally, clearance has been received from client, property owner, and other affected parties.

In addition, the Contractor's Site Safety Supervisor and the drilling/excavation foreman have familiarized themselves with the Site's safety and special considerations:

	Printed Name	Signature
Project Engineer	_____	_____
Excavation Foreman	_____	_____
Drilling Contractor	_____	_____
City Engineer	_____	_____
Gas & Water	_____	_____
Electric	_____	_____
Telephone	_____	_____
TV Cable	_____	_____

Note: Drilling/excavation will commence after all affected parties have signed off.

UTILITY CLEARANCE FOR FIELD ACTIVITIES

Action: All utilities for the Site are to be cleared by the appropriate parties prior to initiating any intrusive activity.

Utilities: Power lines and electrical duct banks, telephone lines, light circuits, data lines, cable television lines, fiber optic lines, fire water pipes, potable water pipes, industrial water supply pipes, sewers, drainage pipes, storage tank piping and ventilation pipes, steam pipes, natural gas pipelines, vaults, sump pits, etc.

Where: Every location where intrusive work is scheduled.

Who: Any person having responsibility for the intrusive work or who participates in the intrusive work, and the property owner and utility representatives.

When: Before work in the target area begins.

How: "ONE CALL" agencies, property owner information, tools, eyes, and common sense. Make records based on a "MEET" or a "LOCATE".

Why: The minimum effort needed to protect life and property; there is no excuse not to.

Contacts: New York State "One Call" System - 1-800-962-7962.

Applications:
" Gas Stations
" Refineries
" Power Plants
" Factories
" Wall and Ceiling Installation
" Abandoned Warehouses
" Vacant City Block

Attachment to Emergency Response Plan

AGREEMENT FOR EMERGENCY RESPONSE SERVICES

This agreement certifies:

That the (local HAZMAT team, fire fighting, police, emergency medical responder, health care providers, etc., organization responding at the Site) department received and reviewed the Emergency Response Plan for the 18 Mile Creek Superfund Site, located in the City Lockport, Niagara County, New York.

That on [date], the representative from the [Department] participated in an onsite visit (or conducted a meeting, depending on the organization). During the visit, [Prime Contractor] explained the details of the Site's Emergency Response Plan, including but not limited to: roads and evacuation routes, properties of hazardous materials handled at the Site, locations where site personnel would normally be working [add any other special provision], and expectations for emergency response support.

The [Prime Contractor] will notify in writing the [Department and EPA] (through the USACE Project Office) of any amendment or significant change in the Emergency Response Plan.
If applicable:

That the U.S. Environmental Protection Agency (EPA) Region 2 provided (or will provide) the following:

" Description of any site-specific training.

" Description of equipment and serial numbers, with their specific location.

" The aforementioned equipment will be fully available to the [Department] for training and familiarization but will remain EPA's property in accordance with SARA Title I Section 123 (b)(2).

" Location of information repository.

" Reference material to be kept onsite.)

That through the aforementioned provisions the [Department] agrees to provide [service] in the event of an emergency or threat of an emergency at the 18 Mile Creek Superfund Site. This agreement will remain in effect for the duration of [Prime Contractor] contract or until 90 days after written notice is given by either party justifying cancellation.

_____	_____
Department	Prime Contractor
_____	_____
EPA (concurrence)	EPA's Contracting Party (concurrence)

-- End of Section --

SECTION 01 35 45

CHEMICAL DATA QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

This section covers requirements for the Contractor's Chemical Data Quality Control (CDQC) for remedial action at the Eighteen Mile Creek Superfund Site Operable Units 1 and 2. This section must be used in preparing a Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP), laboratory booking, monitoring of subcontract laboratory performance, data validating, data reporting, and preparing a chemical data final report, as defined in this section. The UFP-QAPP must contain the necessary technical detail and directions for all sampling and field measurements and specify all quality assurance (QA) and quality control (QC) procedures required for planning, implementation, and assessment of the remedial action.

The Contractor must collect field measurements and samples to characterize backfill materials and loam; to obtain pre-remedial action sample data and post-excavation confirmation data; to characterize excavated sediment and soil for disposal; to characterize demolition debris for recycling and disposal; and to monitor and control the temporary water treatment system effluent discharge to Eighteen Mile Creek.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award will apply.

ASTM INTERNATIONAL (ASTM)

ASTM D5268	Standard Specification for Topsoil Used for Landscaping Purposes

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 261	Identification and Listing of Hazardous Waste

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA Region 2 SOP HW-3a	Inductively coupled plasma-atomic emission spectra (ICP-AES) Data Validation
EPA Region 2 SOP HW-3b	ICP-Mass Spectrophotometer (MS) Data Validation
EPA Region 2 SOP HW-3c	Mercury and Cyanide Data Validation
EPA Region 2 SOP HW-32	Policy for Implementing the National Strategy for Procuring Analytical Services for all OSWER Programs

EPA Region 2 SOP HW-33A	Low/Medium Volatile Data Validation
EPA Region 2 SOP HW-35A	Semivolatile Data Validation
EPA Region 2 SOP HW-36A	Pesticide Data Validation
EPA Region 2 SOP HW-37A	Polychlorinated Biphenyl (PCB) Aroclor Data Validation
EPA SW-846	Revision December 2018; updates I, II, IIA, IIB, III, IIIA, IIIB, IV, V and VI) and Volumes IA, IB, IC, II, Test Methods for Evaluating Solid Waste
EPA/240/B-06/001	Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4, February 2006
EPA/240/R-02/009	Guidance for Quality Assurance Project Plans, EPA QA/G-5, December 2002
EPA 505-B-04-900A	Intergovernmental Data Quality Task Force IDQTF), Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) Part 1 - Evaluating, Assessing, and Documenting Environmental Data Collection and Use Programs, March 2005
EPA 505-B-04-900B	Intergovernmental Data Quality Task Force (IDQTF), Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) Part 2B - Quality Assurance/Quality Control Compendium: Minimum QA/QC Activities, March 2005
EPA 505-B-04-900C	Intergovernmental Data Quality Task Force (IDQTF), Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) Part 2A - Workbook for UFP for QAPP, March 2005. Revised as Optimized UFP-QAPP Worksheets, March 2012
EPA/540/P-87/001B	A Compendium of Superfund Field Operations Methods
EPA 540-R-20-005	National Functional Guidelines for Organic Superfund Methods Data Review (SFAM01.1)
EPA 540-R-20-005	Contract Laboratory Program Guidance for Field Samplers
EPA 542-R-20-006	National Functional Guidelines for Inorganic Superfund Methods Data Review (SFAM01.1)
EPA/600/R-04/003	National Environmental Laboratory Accreditation Conference (NELAC) Standard, Chapter 5 - Quality Systems

EPA/600/R-04/003	National Environmental Laboratory Accreditation Conference (NELAC) Standard, Chapter 5 - Quality Systems, June 2003 (or the 2009 NELAC Institute standards if already implemented by the applicable state accrediting body)
EPA/600/4-79/020	Methods for Chemical Analysis of Water and Wastes, March 1983
EPA/821-D-21-001	Draft Method 1633, Analysis of Per-and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC MS/MS
Directive 9240.0-2C	Analytical Services Tracking System (ANSETS) directive for reporting non-CLP analytical services, November 2002
Directive 9240.0-05A	EPA Specifications and Guidance for Contaminant-Free Sample Containers, EPA/540/R-93/051, December 1992, Office of Solid Waste and Emergency Response
Directive 9200.1-103	Inclusion of Scribe into the Role of Tracking Superfund Sampling Data, November 2010, http://www.epa.gov/superfund/programs/clp/download/sam
EPA Region 2 EDD	EPA Region 2 Electronic Data Deliverable Comprehensive Specification Manual (current edition), http://www.epa.gov/superfund/region-2-superfund-electr

NEW YORK STATE DEPEARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC)

DER-10	Technical Guidance for Site Investigation and Remediation
6 NYCRR IV B 375	Environmental Remediation Programs Sampling, Analysis, and Assessment off Per- and Polyfluoroalkyl Substances (PFAS)
6 NYCRR X A 750	State Pollutant Discharge Elimination System (SPDES)rules

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD QSM	Quality Systems Manual (QSM) for Environmental Laboratories (version 5.4)
Memorandum	Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program, September 15, 2021

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 200-1-6	Environmental Quality -- Chemical Quality Assurance for Hazardous, Toxic And Radioactive Waste (HTRW) Projects
EM 200-1-10	EM 200-1-10
ER 1110-1-12	Engineering and Design -- Quality Management

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

UFP-QAPP; G

The UFP-QAPP must be submitted to the Government at least 30 calendar days prior to the Pre-Work Conference for approval in accordance with Paragraph 3.3.

SD-06 Test Reports

ANSETS Data Requirement Forms and Trip Reports; FIO

Waste Disposal Characterization Sample Results; G

The Contractor shall submit analytical results for waste disposal characterization sampling to the Contracting Officer as described in Paragraphs 1.5.3.1 and 1.5.3.2.

Pre-Remedial Action and Post-Excavation Analytical Results; G

The Contractor must submit analytical results for pre-remedial action and post-excavation sampling to the Government as described in Paragraph 1.5.3.3.

The Contractor must also submit results of samples collected beneath clean soil operation area, including but not limited to, the haul roads, soil stockpile area, temporary water treatment system area, and decontamination areas in accordance with Paragraph 1.5.3.3, prior to restoring these areas to final grade.

Backfill, Structural Fill, and Topsoil Material Sample Results; G

The Contractor must submit sample results for backfill and loam sampling, prior to material being delivered to the site. The results will be sent to the Government as described in Paragraph 1.5.3.4.

Temporary Water Treatment System Analytical Results; G

The Contractor must submit analytical results for the temporary water treatment system to the Government as described in Paragraph 1.5.3.5.

Analytical Data; FIO

Hard copy and electronic copy of all analytical data collected at the Site must be submitted to the Government in accordance with Paragraph 1.7.

Chemical Data Final Report (CDFR); G

The CDFR must be submitted to the Government within 30 calendar days of completing work at the Site and before final payment in accordance with Paragraph 3.6. The report must be labeled with the contract number, project name and location.

1.4 ACRONYMS

Acronyms used by the Contractor that pertain to CDQC must be clearly defined for all contract-related products and communications.

1.5 CHEMISTRY REQUIREMENTS

CDQC will be as defined in ER 1110-1-12. This ER, which integrates U.S. Army Corps of Engineers (USACE) guidance on the subject, must be supplemented by EM 200-1-6 for detailed technical guidance on CDQC.

1.5.1 Site History

Project site history is detailed in SECTION 01 11 00 - SUMMARY OF WORK.

1.5.2 Data Quality Objectives (DQO)

1.5.2.1 Project Objective

The overall project objective is to excavate contaminated sediment from Eighteen Mile Creek; excavate contaminated soils from upland areas including the Upson Park, former United Paperboard property, and former Flintkote properties; demolish two dams; demolish other aboveground and subterranean site structures required to complete excavation of contaminated material; transport contaminated material for off-site disposal; and restore the Site in accordance with the contract documents.

1.5.2.2 Sampling Objectives

Samples must be acquired, and chemical parameter measurements must be performed in such a manner that the resulting data meet and support data use requirements. Both definitive and field screening data are anticipated for this project, as defined by the EPA Guidance for Systematic Planning (EPA/240/B-06/001) and USACE Chemical QA for HTRW Projects (EM 200-1-6). Field screening quality data must be generated for health and safety purposes but can be used to identify media or samples that may be subject to further analysis. Definitive level quality data must be used to characterize the waste materials, demonstrate backfill and loam quality, verify that the temporary water treatment system effluent samples meet surface water discharge requirements, and verify that site cleanup criteria have been met. Definitive level quality data must be acquired,

documented, verified and reported to ensure that specified data quality indicators (DQIs) (precision, accuracy, completeness, comparability and representativeness) measurement performance requirements are achieved. Sampling objectives are discussed in detail to ensure that data obtained will be of sufficient quality and quantity to meet DQOs.

a. Waste disposal characterization samples from excavated soil and sediment must be analyzed in accordance with the disposal facility sampling requirements. Analytical results obtained by the Contractor must be sufficient to address all requirements of the selected disposal facility. Sampling objectives to be contained in the Contractor's UFP-QAPP must include specific disposal facility requirements for sampling, analysis, and reporting.

b. Waste disposal characterization samples from demolition debris, must be analyzed in accordance with disposal or recycling facility sampling requirements. Analytical results obtained by the Contractor must be sufficient to address any and all requirements of the selected disposal facility. Sampling objectives to be contained in the Contractor's UFP-QAPP must include specific disposal facility requirements for sampling, analysis, and reporting.

c. Samples of loam and backfill materials from each offsite source must be collected and analyzed for parameters listed in Paragraph 1.5.3.4. Sample data must be sufficient to demonstrate that loam and backfill materials do not contain contaminant levels that are hazardous to human health or the environment. Sample results exceeding criteria specified herein, where those numbers are not below method detection levels, will be unacceptable as loam or backfill. No backfill or loam must be brought to the Site without written approval from the Government.

    1. Backfill for use in all properties must meet the Unrestricted Use Allowable Constituent Levels for Imported Fill or Soil listed in DER-10.

    2. Loam must also meet restoration pH, nutrient, gradation, and physical requirements as specified in SECTION 32 92 19 - LOAMING AND SEEDING.

    3. Organic rich loam for stream restoration must also meet restoration pH, nutrient, gradation, and physical requirements as specified in SECTION 32 72 00 - STREAM RESTORATION.

    4. Backfill materials must also meet gradation and physical requirements as specified in SECTION 31 00 00 - EARTHWORK.

d. Water samples from the temporary water treatment system must be collected and analyzed to conform with requirements of the surface water discharge permit. Effluent samples (water) must be collected and analyzed in accordance with requirements of 6 NYCRR for surface water discharges. Sampling objectives to be contained in the Contractor's UFP-QAPP must include effluent limits for all compounds required under the State Pollutant Discharge Elimination System (SPDES) permit equivalency.

e. Work zone and perimeter air samples must be analyzed, and conditions must be monitored in accordance with SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and SECTION 01 35 55 -

PERIMETER AIR MONITORING. Analytical results obtained by the Contractor must be sufficient to assess worker and resident health risks associated with site activities. Sampling objectives to be contained in the Contractor's Safety and Health Plan must include specific compound concentrations for upgrading levels of protection and stopping work, and specific reporting requirements.

f. Mobilization and demobilization samples collected as part of the temporary staging area(s) must be collected in accordance with SECTION 02 10 00 - SITE PREPARATION. Staging area sample results must be analyzed against soil remediation goals (Table 01 35 45-1).

g. Pre-remedial action samples must be collected from the creek in accordance with SECTION 02 10 00 - SITE PREPARATION. Results must be compared to the sediment remediation goals (Table 01 35 45-1).

h. Post-excavation soil samples must be collected from upland soil excavation bottoms and sidewalls to confirm achievement of remediation goals in accordance with SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL. Results must be compared to the soil remediation goals (Table 01 35 45-1).

1.5.2.3 Chemical DQO

Chemical data must be acquired, documented, verified, and reported in a manner that ensures that precision, accuracy, and completeness requirements provided in Table 01 35 45 - 3 are achieved. The UFP-QAPP must comply with the DQO process requirements as specified in EPA/240/B-06/001.

1.5.3 Sampling, Analysis, and Measurement Requirements

Sampling, analysis, and measurement requirements listed in the following subsections must be included in the UFP-QAPP.

1.5.3.1 Soil and Sediment Waste Disposal Characterization Sampling Requirements

Waste samples must be collected and analyzed in accordance with the Contractor's approved disposal facility requirements. Samples must be analyzed for waste characteristics to determine handling, transportation, and disposal requirements. The number and volume of samples are determined by the disposal facility. Standard analysis required for waste disposal characterization samples are listed below:

a. Paint Filter Liquid Test

b. Corrosivity

c. Ignitability

d. Reactivity - Hydrogen Cyanide

e. Reactivity - Hydrogen Sulfide

f. Toxicity Characteristic Leaching Procedure (TCLP) - Metals

g. TCLP - Volatile Organic Compounds (VOCs)

h. TCLP - Semi-volatile Organic Compounds (SVOCs)

i. TCLP - Pesticides

j. TCLP - Herbicides

k. Polychlorinated Biphenyls (PCBs)

l. Moisture Content

Analytical methods for above parameters are included in Table 01 35 45 - 4..

The Contractor must ensure that all disposal facility requirements are met prior to shipment of waste. EPA approval will be required to utilize a disposal facility for hazardous/non-hazardous waste generated from the Site.

1.5.3.2 Demolition Debris Materials Waste Disposal Characterization Sampling Requirements

Samples from demolition debris materials must be collected and analyzed in accordance with the Contractor's approved disposal facility requirements. Samples must be analyzed for waste characteristics to determine handling, transportation, and disposal requirements. The number and volume of samples are determined by the disposal facility. Standard analysis required for waste disposal characterization samples are listed below:

a. TCLP - Metals

b. TCLP Organic Compounds

1.5.3.3 Pre-Remedial Action and Post-excavation Sampling Requirements

Pre-remedial action samples must be collected as per SECTION 02 10 00 - SITE PREPARATION. Post-excavation samples must be collected as per SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL. The samples must be sent to an offsite laboratory to verify achievement of the site cleanup criteria listed in Table 01 35 45 - 1. The same requirements apply to samples collected from beneath temporary facilities in accordance with SECTION 02 91 00 - SITE RESTORATION.

Standard analytical requirements for soil and sediment samples are listed below:

a. Lead

b. PCBs

Analytical methods for above parameters are included in Table 01 35 45 - 4.

1.5.3.4 Backfill, Structural Fill, and Loam Sampling Requirements

Fill material samples are to be collected as stated in SECTION 31 00 00 - EARTHWORK and DER-10 to ensure that they are free of chemical contamination and meet the applicable soil remediation standards. A sample for chemical analysis of each source must be collected at a minimum frequency of one per 5,000 cubic yards.

Analytical parameters to verify that backfill, structural fill, and loam are free of chemical contamination include:

a. Metals, mercury, and cyanide

b. VOCs, SVOCs, pesticides, and PCBs

c. 2,4,5-TP Acid (Silvex)

d. Soil pH (using method EPA SW-846 9045D)

e. PFAS

Analytical methods for the above parameters are included in Table 01 35 45 - 4.

Analytical parameters for loam must include, at a minimum, total organic carbon, pH and nutrients (nitrogen, phosphate, and potassium). Sample data must be sufficient to demonstrate that loam materials meet the DER-10 and ASTM D5268 requirements.

1.5.3.5 Temporary Water Treatment System Sample Requirements

The Contractor must collect and analyze samples from the temporary water treatment system in accordance with the SPDES permit equivalency. The Contractor must prepare a table that shows effluent criteria for each chemical analyte/compound/test parameter included in the water testing program.

1.6 QUALITY ASSURANCE /QUALITY CONTROL ELEMENTS

The Contractor shall be responsible for the following quality assurance (QA)/quality control (QC) elements necessary to monitor and ensure the quality of chemical data produced.

1.6.1 Analytical Testing Laboratories

1.6.1.1 General

The Contractor must comply with the Superfund Field and Analytical Services Teaming Advisory Committee (FASTAC) policy as detailed in EPA Region 2 SOP HW-32 in selecting and implementing analytical services for this project. This policy requires use of the tiered decision tree for procuring Superfund analytical services for all non-time-critical data collection projects. The Contractor must pursue the use of the EPA's DESA or CLP laboratories before engaging a subcontract laboratory.

The decision tree tiers are as follows:

Tier 1: EPA Region II Laboratory Services and Applied Sciences Division (LSASD) including Environmental Services Assessment Team (ESAT) support

Tier 2: EPA National Contract Laboratory Program (CLP) Analytical Services

Tier 3: Region Specific Analytical Services (SAS) Contract laboratories

Tier 4: Contractor, Interagency Agreement (IAG) and Field Contractor Subcontract laboratories

The Contractor must submit an analytical service request form to EPA Regional Sample Control Center (RSCC) a minimum of four weeks (six weeks for special requests) prior to mobilization of the sampling event.

The Contractor must propose analytical subcontract laboratories in the UFP-QAPP for analytical services that cannot be accommodated through the LSASD and/or CLP. The use of subcontract laboratories must be approved by the EPA's Task Order Contract Officer Representative (TOCOR) and RSCC. The Contractor shall provide justification for use of a subcontract laboratory to the EPA TOCOR along with the analytical services request indicating the required analyses, turnaround times, reporting limits, special requests, etc. The subcontract laboratory must meet the certification requirements listed in Paragraph 1.6.1.3.

1.6.1.2 Subcontracted Laboratory Analytical Requirements

The Contractor must provide chemical analyses for all parameters by the methods specified in Table 01 35 45 - 4 or UFP-QAPP to achieve the project DQOs.

1.6.1.3 Subcontract Laboratory Certification

Environmental laboratory services are to be provided only by laboratories compliant with the most recently published version of the DOD Quality Systems Manual (DOD QSM) or current version, including the National Environmental Laboratory Accreditation Conference (NELAC) Standard Chapter 5 and Appendix requirements (EPA/600/R-04/003), holding a current National Environmental Laboratory Accreditation Program (NELAP) accreditation for all appropriate fields-of-testing, and certified by the State of New York. Before testing services can be performed by the laboratory, the Contractor shall verify the candidate laboratory's acceptability by reviewing their certifications. NELAP accreditation information is to be provided annually. The Contractor shall notify the Government immediately of any change in status of laboratory operations that may affect ongoing compliance with these requirements. The USACE/EPA may, at any time, conduct audits (including requests for pertinent data or information) that support an environmental laboratory's self-declaration of compliance with this policy. If the USACE/EPA finds the laboratory is in non-compliance, the Contractor shall utilize alternate, compliant laboratory services until such time as compliance is again demonstrated. Before performing environmental testing, the laboratory shall have access to the approved UFP-QAPP.

1.6.1.4 Subcontracted Laboratory Performance

The Contractor must provide oversight to ensure continued acceptable analytical performance and establish procedures to address data deficiencies noted by review and/or quality control sample results. The Contractor must provide and implement a mechanism for providing analytical laboratories with the UFP-QAPP, for monitoring analytical performance, and for ensuring corrective action procedures are implemented. The Contractor must acquire analytical services with NELAP-accredited and State of New York-certified laboratories.

1.6.2 Contractor QC Sample Collection and Analysis

Quality control samples must be collected and handled by the Contractor in accordance with EPA's Contract Laboratory Program Guidance for Field

Samplers (EPA/540/R/014/013), other guidance documents and the Contractor's approved UFP-QAPP. The following are the minimum QC sampling requirements:

a. Field duplicates shall be collected at a rate of at least one per every 20 samples per matrix to assess the overall precision of the field sampling and analytical technique.

b. One trip blank shall be included with each daily shipment that contains aqueous samples collected for VOC analysis to verify the presence or absence of cross-contamination in VOC samples from handling and shipment from the field to the laboratory.

c. Field (or equipment/rinsate) blanks shall be collected at a frequency of one per decontamination event, not to exceed one per day, for each equipment type and for each sample matrix to assess the effectiveness of equipment decontamination.

d. One cooler temperature indicator or "temperature blank" shall be placed in each cooler containing samples (solid and aqueous) for analysis to verify that samples have been maintained at 0-6° Celsius (C).

e. OOne matrix spike/matrix spike duplicate (MS/MSD) shall be collected at a rate of one per sample delivery group (SDG), as defined by EPA's Contract Laboratory Program Guidance for Field Samplers (EPA 540-R-20-005) to demonstrate the accuracy of laboratory analysis. MS/MSDs are not required for CLP analysis of VOC and SVOC in EPA Region 2..

1.6.3 Documentation of Sample Collection and Analysis

1.6.3.1 CLP Laboratory

The Contractor shall submit a trip report to the EPA RSCC within seven days of collection of the final sample in a CLP case for samples analyzed by a CLP laboratory. The trip report shall include sample locations, dates of collection and shipment, identification of QC samples, and names of laboratories to which samples were submitted. The trip report shall be submitted via email or hardcopy mail to the RSCC coordinator, Ms. Christina Leung, USEPA Facilities Raritan Depot, 2890 Woodbridge Avenue Mailcode: MS103, Edison, New Jersey 08837-3679.

1.6.3.2 Subcontract Laboratory

The Contractor shall submit an ANSETS Data Requirement Form documenting analytical services provided by any subcontracted laboratory (Attachment 5 of EPA Region 2 SOP HW-32). The form shall include the laboratory name and location, number of samples, analytical methods, and costs. The ANSETS Form shall be submitted to the EPA RSCC at the beginning of the next month following sample collection. The form must be emailed to Jennifer Feranda, Christina Leung, Adly Michael, and Robert Toth. Prior to submission to the EPA RSCC, the ANSETS Form shall be submitted to the USACE PM for review.

1.6.4 Review of Primary Laboratory Data

The Contractor shall be responsible for the independent review of the entire data set.

1.6.5 Data Validation

The Contractor shall validate analytical data for samples analyzed by the Contractor's subcontract laboratory. The data shall be evaluated in accordance with EPA Region 2 SOP HW-3a, EPA Region 2 SOP HW-3b, E PA Region 2 SOP HW-3c, EPA Region 2 SOP HW-33A, EPA Region 2 SOP HW-35A, EPA Region 2 SOP HW-36A, and EPA Region 2 SOP HW-37A, as appropriate. If standard operating procedures (SOPs) are not available, data validation shall be performed in accordance with the EPA Contract Laboratory Program National Functional Guidelines for Inorganics (EPA 540-R-20-006) or Organics (EPA 540-R-20-005), as appropriate. Items listed below must be assessed as part of the data validation. Data validation criteria must be consistent with project DQOs and discussed in the approved UFP-QAPP. The Contractor must prepare a data validation report, including a summary of the independent data reviewer's findings. The summary must include a table listing each QC result outside of established criteria, the established criteria, and the validation actions (data qualifiers used). Comments must include how these outlier data affect the validity of analytical sample results. The data validation report must include, but not be limited to, the following parameters:

a. Data completeness

b. Method blanks and field blanks

c. Holding time including sample integrity

d. Surrogate recovery

e. Instrument calibration

f. Matrix spikes

g. Initial and continuing calibration verification

h. Laboratory and field duplicate results

i. Laboratory control samples

j. Verification of sample results

1.7 ANALYTICAL DATA

1.7.1 Hard Copy or PDF

Analytical data packages must be provided to the Government no later than 4 weeks after receipt of analytical data packages from the subcontract laboratory. Analytical data packages shall contain information to demonstrate that project's DQOs have been fulfilled.

1.7.2 Electronic Data Deliverables (EDDs)

The Contractor must submit all laboratory data to EPA in the Staged Electronic Data Deliverable (SEDD) format. Details on the SEDD format are provided in the SEDD Version 5.0 (or most recent version) specification located at https://www.epa.gov/clp/staged-electronic-data-deliverable-sedd.

The Contractor must prepare and submit to EPA a final EDD for all data collected during the remedial action including, but not limited to, all samples listed in Paragraph 1.5.3. The EDD shall also contain monitoring well information, sampling location information, and other information as required EPA Region 2 EDD guidance. The EDD shall be prepared in accordance with the procedures and requirements set forth in the Comprehensive Specification Manual (current edition) and as described at the following website: https://www.epa.gov/superfund/region-2-superfund-electronic-data-submission-documents

The EDD must include all sample information including sample locations (horizontal coordinates and surface elevation) and sample results. The EDD must also include an updated geo-referenced electronic base map in AutoCAD drawing exchange (DXF) format showing site features, and updated site grades following the soil remediation program.

The Contractor must provide the Government with a copy of the transmittal letter for all EDD submissions, identifying the data provided in the EDD. The Contractor must also provide the Government with a copy of the EPA notice indicating that the EDD submittal was successfully uploaded.

1.8 QUALIFICATIONS

1.8.1 Chemical Quality Control Officer

At a minimum, the Contractor's Chemical Quality Control Officer must have a bachelor's degree (B.A. or B.S.) in chemistry, and three years of experience with HTRW quality control including hazardous waste manifesting. The Chemical Quality Control Officer must ensure that all chemistry-related objectives including responsibilities for DQO definitions, sampling and analysis, project requirements for data documentation and validation, and final project reports are attained. The Chemical Quality Control Officer need not be present on site during routine sampling but shall be available for consultation with Government and Contractor personnel.

1.8.2 Project Chemist

At a minimum, the Contractor's Project Chemist must have: a (B.A. or B.S.) degree in chemistry; three years of experience related to investigations, studies, design and remedial actions at HTRW sites; two field seasons of experience in calibrating and operating various field monitoring devices; and two years of experience in the operation of an HTRW commercial laboratory with standard analytical chemistry methods common for analyzing soil, water, air and other materials for chemical contamination assessment, including data for hazardous waste manifesting. The Project Chemist must ensure that the program's chemistry-related goals are attained.

1.8.3 Environmental Sampler

At a minimum, the Contractor's Environmental Sampler must have a B.A. or B.S. degree in chemistry or closely related scientific/technical field, three years of experience in the development and preparation of UFP-QAPPs, one year of experience in and knowledge of EPA methods for collecting environmental and hazardous waste samples, and one year of experience in calibration and operation of field screening equipment, e.g. photo-ionization detector (PID), flame ionization detector (FID). The Environmental Sampler must collect all onsite samples and perform all

field screening tests. The Environmental Sampler must review the sampling results and provide recommendations for the Contractor's sampling program. The Environmental Sampler shall be on site during demolition, excavation and stockpiling operations involving materials to be checked for contamination.

1.9 COORDINATION MEETING

After the Pre-Construction Conference, before any sampling or testing, the Contractor must meet with the Government at the construction site to discuss the Contractor Quality Control (CQC) Plan and the UFP-QAPP. The coordination meeting will be simultaneous with any CQC coordination meeting required by SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL unless otherwise indicated or directed. A list of definable features of work that involve chemical measurements shall be agreed upon. At a minimum, each matrix (soil, water, instrumental chemical parameter measurement, etc.) shall be a definable feature of work. Management of the chemical data quality system including project DQOs, project submittals, chemical data documentation, chemical data assessment, required sampling and analysis protocols, and minimum data reporting requirements shall be agreed upon. The meeting will serve to establish an interrelationship between the Contractor's chemical data quality management and Government chemical quality assurance requirements. The Contractor must document meeting minutes which will be signed by both the Contractor and the Government. Minutes must include all unresolved chemical issues along with conditions for resolution and shall become a part of the contract file. There may be occasions when additional conferences may be called by either party to reconfirm mutual understandings and/or to address deficiencies in the CQC system or procedures that may require corrective action by the Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor shall be responsible for chemical sample acquisition, sample analysis, measurements of chemical parameters, and CDQC. An effective CDQC system that meets the requirements for the chemical measurement DQOs applicable to the project must be established. The CDQC system will consist of chemical data quality management staff responsible for the UFP-QAPP, analytical procedures, minimum data reporting requirements and the organization necessary to produce the required chemical data. The system must cover chemical measurements pertaining to and required for Contractor- and subcontractor-produced chemical data. The Contractor must control field screening, sampling, and testing in conjunction with remedial activities to meet all DQOs, minimize the amount of excavated material requiring temporary storage, prevent dilution of contaminated soils with clean soils, and ensure completion of work within the required time.

3.2 CONTRACTOR QUALITY CONTROL PLAN

3.2.1 General

IIn addition to the quality control requirements specified in SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL, the CQC Plan must incorporate qualifications, authority and responsibilities of all chemical quality management and support personnel.

3.2.2 Chemistry Elements of the CQC Plan

To cover contract-related chemical measurements by the Contractor and all subcontractors, the CQC Plan shall include the following, at a minimum:

3.2.2.1 Qualifications

Names, education, experience qualifications, authorities, and decision-making responsibilities of all chemical quality management and support personnel. The CQC Plan must contain a copy of a letter from the project QC manager designating and authorizing a Chemical Quality Control Officer and chemical quality control organization staff.

3.2.2.2 Authority and Responsibility

A diagram, flow chart, or figure clearly depicting the chemical data quality management and support staff, and the authority and responsibility of each of the staff for chemical sampling and analysis, procedures for corrective actions, deliverables and submittals, deviations and changes, chemical quality documentation, and data validation by the Contractor and subcontractors. The contents of this section of the CQC Plan must be included in the applicable "Project Organization" elements of the UFP-QAPP.

3.3 UNIFORM FEDERAL POLICY QUALITY ASSURANCE PROJECT PLAN(UFP-QAPP)

3.3.1 General

The UFP-QAPP must describe all chemical parameter measurements for all phases of the remedial action. The Contractor must provide sufficient detail for the project team to obtain data that meet DQOs of the project. The Contractor's QAPP must be in accordance with UFP-QAPP Manuals and quality assurance/quality control standards referenced in Paragraph 1.2.

3.3.2 Level of Detail

The UFP-QAPP must contain necessary technical detail and direction such that field and laboratory personnel understand all sampling and field measurement requirements. It must document all aspects of the project, planning, implementation, assessment, corrective actions and reconciliation of completed tasks with documented planned objectives. It must contain sufficient direction and detail that onsite personnel can perform all activities required to attain project DQOs, including collection of samples for offsite chemical analysis, shipment of samples for offsite analyses, and performance of onsite instrumental parameter measurements, data documentation and reporting requirements. The level of detail in the UFP-QAPP must be such that any technically competent personnel unfamiliar with the Site can follow the plan and perform all required work. It must contain sufficient direction and detail that analytical laboratory personnel understand the analytical methods required and the project-required reporting limits, project DQIs measurement performance criteria, and project data validation and reporting requirements.

3.3.3 Appendices

The Appendices section of the UFP-QAPP must contain all Contractor standard forms, project figures and tables, and SOPs, and all references pertaining to the project requirements included in the UFP-QAPP relating

to project DQOs, standard and non-standard measurement methods, equivalency data, U.S. Government and regional agency guidance and regulatory documents, existing site-related documents, and other contract-related chemical analysis documents. Reference to all applicable SOPs from EPA/540/P-87/001B, Compendium of Superfund Field Operations Methods, or Contractor SOPs, where applicable, shall be included.

3.3.4 Content

The UFP-QAPP shall meet the requirements of the UFP-QAPP Manual and shall cover, at a minimum, the following topics:

a. Distribution List

b. Title and Approval Page

c. Project Description

d. Introduction, including Summary of Scope and Objectives, Site History and Contaminants

e. Existing Site Data Summary - Evaluation of Secondary Data and Use Limitations

f. Project Description/Problem Definition/Site-Specific Analysis Problems

g. Project Objectives/Systematic Planning Documentation/Data Quality Objectives

h. Sampling Design and Rationale

i. Scope and Objectives

j. Project Schedule and Timelines

k. Project Organization and Responsibility

l. Personnel Responsibilities, Qualifications and Special Training Requirements

m. Field Activities and Standard Operation Procedures (SOPs)

n. Field and Laboratory QC Samples

o. Sampling Procedures and Container/Preservation Requirements

p. Sample Custody, Chain-of-Custody/Sample Documentation

q. Sample Handling/Identification

r. Field Logbooks and Contents; Documentation Procedures

s. Sample Packaging and Shipping

t. Equipment Decontamination

u. Contractor Quality Control

v. Daily Quality Control Reports

w. Field Quality Control and Corrective Actions

x. Sampling Apparatus and Field Instrumentation

y. Data Quality Objectives and Measurement Performance Criteria

z. Sample Custody and Holding Times

aa. Analytical Procedures and QC Samples

bb. Reference Limits and Evaluation of Quantitation Limit Goals

cc. Laboratory Calibration Procedures and Frequency

dd. Internal QC Checks

ee. Calculation of Data Quality Indicators

ff. Laboratory Corrective Actions

gg. Data Reduction, Review, Validation and Reporting

hh. Laboratory Reporting Requirements

ii. Preventive Maintenance (Field and Laboratory)

jj. Performance and System Audits

kk. QC Reports to Management

ll. Appendices

The UFP-QAPP shall include a table of contents; crosswalk showing that all UFP-QAPP elements have been addressed; definitions, acronyms, and references pertaining to the project; and other related chemical analysis documents such as the data validation SOPs for parameters not included in the National Functional Guidelines or Regional Validation SOPs.

3.3.5 CLP/LSASD Laboratory

Contract Laboratory Program Guidance for Field Samplers (EPA 540-R-20-005), November 2020 procedures shall be followed for sample packing and shipment.

3.3.6 Department of Transportation

All Department of Transportation (DOT) regulations under 40 CFR 261 shall be followed regarding shipment of the samples.

3.4 CONTROL OF DATA QUALITY

3.4.1 General

The Contractor's CDQC program must ensure that sampling and analytical activities and the resulting chemical parameter measurement data comply with the DQOs and the requirements of the UFP-QAPP. The Contractor must utilize the three-phase control system that includes a preparatory, initial and follow-up phase for each definable feature of work. The

Contractor's three-phase chemical data control process shall ensure that data reporting requirements are achieved and must be implemented according to SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL. When possible, the three-phase chemical data control process should be combined with that under SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL.

3.4.2 Three-Phase Process

The preparatory phase shall include a review of the relevant specification, UFP-QAPP, and all relevant SOPs for the chemical parameter measurement and/or chemical sample acquisition and shipment. It must include a physical examination of all required forms, materials and equipment to ensure conformance with the UFP-QAPP and that all materials are on site. It must include a demonstration of sampling procedures by the Contractor's field sampling personnel.

The initial phase must be performed at the initiation of each definable feature of work by the CQC Representative to confirm compliance with the UFP-QAPP, including instrument calibration, operation and performance checks, sample acquisition, labeling, and shipment in accordance with required SOPs, sampling equipment decontamination, and completion of all required documentation.

The follow-up phase shall require daily inspections to ensure compliance with the UFP-QAPP.

3.5 ANALYTICAL TESTING LABORATORIES

3.5.1 General

If EPA or LSASD cannot accommodate the analyses, the Contractor should propose analytical laboratories to be used for the primary sample analyses. Laboratory certification requirements shall be in accordance with Paragraph 1.6.1. The Contractor may utilize its own laboratory or utilize subcontract laboratories to achieve the required sample analyses.

3.5.2 Laboratory Analytical Requirements

The Contractor must provide the chemical analyses specified in this contract through the Contractor's and/or subcontractor's laboratory. The Contractor must provide chemical analyses for all parameters by the methods specified in the project specifications or UFP-QAPP to achieve the project DQOs..

3.6 CHEMICAL DATA FINAL REPORT

The Contractor must produce a Chemical Data Final Report (CDFR) after project completion; it must include a summary of quality control practices employed and all chemical parameter measurement activities. This includes, but is not limited to, all data analyzed by LSASD, CLP and the Contractor's subcontract laboratories, and shall include all definitive data. At a minimum, the CDFR shall contain the following:

a. Summary of project scope and project description.

b. Summary of any deviations from the UFP-QAPP or the design specifications.

c. Summary of chemical parameter measurements performed as contingent

measurements.

d. Summary discussion of resulting data including achievement of data reporting requirements.

e. Summary of DQO parameters including achievement of project DQOs.

f. Presentation and evaluation of the data to include an overall assessment of the quality of the data for each method and matrix.

g. Internal QC data generated during the project, including tabular summaries correlating sample identifiers with all blanks, duplicates, other QC samples, and batch identifiers.

h. A list of the affected sample results for each analyte (indexed by method and matrix), including the appropriate data qualifier flag (J, U, R, etc.), where sample results are negatively impacted by adverse quality control criteria.

i. Summary of field and laboratory oversight activities, providing a discussion of the reliability of the data, QC problems encountered, and a summary of the evaluation of data quality as indicated by the laboratory QC data and any other relevant findings.

j. Conclusions and recommendations.

k. Appendices containing chemistry data packages for all subcontract laboratory data (hardcopy and electronic copy) and data validation reports.

3.7 NOTIFICATION OF NON-COMPLIANCE

The Government will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice.

Table 01 35 45 - 1
Remediation Goals

Property	**PCBs (ppm)**	**Lead (ppm)**
Soil		
Upson Park *	1	400
White Transportation - Surface	1	1,000
White Transportation - Sub-Surface	10	1,000
United Paperboard - Surface	1	1,000
United Paperboard - Sub-Surface	10	1,000

Property	**PCBs (ppm)**	**Lead (ppm)**
Water Street Residential *	1	400
Flintkote - Surface **	1	1,000
Flintkote - Sub-Surface **	10	1,000
Sediment		
Creek Channel	1	N/A

Notes:
PCBs - polychlorinated biphenyls
ppm - part per million (milligram per kilogram)
N/A - Not applicable
Surface is defined as a depth of 0-2 feet below ground surface
Sub-Surface is defined as a depth greater than 2 feet below ground surface
*: To achieve the risk reduction goal established for the Site, the average lead concentration within the top two feet across Upson Park and each residential property must be at or below 200 mg/kg once the remedial action targeting detections above the cleanup goal of 400 mg/kg is complete.
**: For former Flintkote property, all lead contamination exceeding 1,000 ppm will be excavated. Page 23 of OU2 Record of Decision indicates that contaminated soil/fill containing PCBs greater than 50 ppm will be excavated; soil/fill containing PCBs above the remediation goal but less than 50 ppm will be capped.

TABLE 01 35 45 - 2
Fill Criteria

Constituent	Unrestricted Use (ppm)
Metals	
Arsenic	13
Barium	350
Beryllium	7.2
Cadmium	2.5
Chromium, Hexavalent1	1
Chromium, Trivalent1	30
Copper	50
Cyanide	27

Lead	63
Manganese	1600
Mercury (total)	0.18
Nickel	30
Selenium	3.9
Silver	2
Zinc	109
PCBs/Pesticides	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	0.0033
4,4'-DDT	0.0033
4,4'-DDD	0.0033
Aldrin	0.005
Alpha-BHC	0.02
Beta-BHC	0.036
Chlordane (alpha)	0.094
Delta-BHC	0.04
Dibenzofuran	7
Dieldrin	0.005
Endosulfan I	2.42
Endosulfan II	2.42
Endosulfan sulfate	2.42
Endrin	0.014
Heptachlor	0.042
Lindane	0.1
Polychlorinated biphenyls	0.1
Semi-volatile Organic Compounds	

Acenaphthene	20
Acenaphthylene	100
Anthracene	100
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(g,h,i)perylene	100
Benzo(k)fluoranthene	0.8
Chrysene	1
Dibenz(a,h)anthracene	0.33
Fluoranthene	100
Fluorene	30
Indeno(1,2,3-cd)pyrene	0.5
m-Cresol(s)	0.33
Naphthalene	12
o-Cresol(s)	0.33
p-Cresol(s)	0.33
Pentachlorophenol	0.8
Phenanthrene	100
Phenol	0.33
Pyrene	100
Volatile Organic Compounds	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02

1,2-Dichloroethene(cis)	0.25
1,2-Dichloroethene(trans)	0.19
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
Acetone	0.05
Benzene	0.06
Butylbenzene	12
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethylbenzene	1
Hexachlorobenzene	0.33
Methyl ethyl ketone	0.12
Methyl tert-butyl ether	0.93
Methylene chloride	0.05
Propylbenzene-n	3.9
Sec-Butylbenzene	11
Tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
Trichloroethene	0.47
Trimethylbenzene-1,2,4	3.6
Trimethylbenzene-1,3,5	8.4
Vinyl chloride	0.02
Xylene (mixed)	0.26
Per- and Polyfluroalkyl Substances (PFAS)	

Perfluorobutanesulfonic acid (PFBS)	N/A
Perfluorohexanesulfonic acid (PFHxS)	N/A
Perfluoroheptanesulfonic acid (PFHpS)	N/A
Perfluorooctanesulfonic acid (PFOS)	0.00088
Perfluorodecanesulfonic acid (PFDS)	N/A
Perfluorobutanoic acid (PFBA)	N/A
Perfluoropentanoic acid (PFPeA)	N/A
Perfluorohexanoic acid (PFHxA)	N/A
Perfluoroheptanoic acid (PFHpA)	N/A
Perfluorononanoic acid (PFNA)	N/A
Perfluorodecanoic acid (PFDA)	N/A
Perfluoroundecanoic acid (PFUA/PFUdA)	N/A
Perfluorododecanoic acid (PFDoA)	N/A
Perfluorotridecanoic acid (PFTriA/PFTrDA)	N/A
Perfluorotetradecanoic acid (PFTA/PFTeDA)	N/A
6:2 Fluorotelomer sulfonate (6:2 FTS)	N/A
8:2 Fluorotelomer sulfonate (8:2 FTS)	N/A
Perflurooctanesulfonamide (FOSA)	N/A
N-methyl perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	N/A
N-ethyl perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	N/A

Notes:

1. The soil cleanup objective (SCO) for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.
2. Fill criteria are based on unrestricted use criteria listed in DER-10, Appendix 5, Allowable Constituent Levels for Imported Fill or Soil
3. Criteria for PFOA and PFOS are based on the NYSDEC guidance document titled "Sampling, Analysis, and Assessment of Per- And Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs" issued June 2021. Samples shall be analyzed for all PFAS analytes listed. If PFOA or PFOS is detected at or above the criteria, an exemption may be sought for by SPLP testing or other method accepted by NYSDEC in accordance with the

guidance document. These criteria shall be superseded by the most recently published version of this document or by new SCOs included in the revision to 6 NYCRR Part 375 anticipated to be in effect in 2022.

4. PFAS compounds shall be evaluated in accordance with EPA 821-D-21-001 and the September 15, 2021 ASD(S) Memorandum "Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program".

TABLE 01 35 45 - 3 Data Quality Objectives for Chemical Parameters

Data Use	Parameters	Precision (% RPD)		Precision (% RPD)		Completenes %
		Field Duplicate	Laboratory Duplicate	LCS1	MS2	90%
Waste Characteriza - Soil and Sediment	TCLP Analytes	NA	<25	80-120%	75-125%	
	PCBs	<100	<25	50-130%	40-140%	
	Waste Characterist	NA	<25	NA	NA	
Waste Characteriza - Demolition Debris	TCLP Analytes PCBs	NA <100	<25 <25	80-120% 50-130%	75-125% 40-140%	
	Waste Characterist	NA	<25	NA	NA	
	TCLP Analytes	NA	<25	80-120%	75-125%	
Pre-Remedial Action and Post-Excavat	Lead	<100	<25	90-110%	75-125%	
	TCL PCBs	<50	<25	50-130%	40-140%	
Backfill, Structural Fill and Loam Characteriza	TCL VOC	<50	<25	90-110%	75-125%	
	TCL SVOC	<50	<25	50-130%	30-150%	
	TCL Pesticide/PC	<50	<25	50-130%	40-140%	
	TAL Metals Mercury and Cyanide	<100	<25	90-110%	75-125%	
	2,4,5-TP Acid (Silvex)	<50	<25	50-130%	40-140%	
	PFAS	<30	NA	70-130%	70-130%	
Loam Characteriza	Nutrients	<100	<25	NA	NA	
Air Monitoring	PCBs	<30	<20	65-125%	65-125%	

Footnotes:

Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, EPA SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2014), and VI

(various).

1. Laboratory established control limits or DoD QSM listed limits may be used in place of the listed control limits.
2. Limits are advisory. The laboratory must calculate and document the precision (laboratory duplicate) and accuracy of the sample matrix spike results from this site.

CN	Cyanide
LCS	Laboratory Control Sample
MS	Matrix Spike
NA	Not Applicable
PCBs	Polychlorinated Biphenyls
RPD	relative percent difference
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List of the EPA Contract Laboratory Program
TCL	Target Compound List of the EPA Contract Laboratory Program
TCLP	Toxicity Characteristics Leaching Procedure
VOC	Volatile Organic Compound

TABLE 01 35 45 - 4
Analytical Methods for Chemical Parameters

Data Use	Parameters	Analytical Method (All methods are based on EPA SW-846 except as noted)	
		Extraction	Analysis
Waste Characterization - Soil and Sediment	TCLP VOC	1311, 5030B	8260D
	TCLP SVOC	1311, 3510C/ 3520C	8270D
	TCLP Pesticide	1311, 3510C/ 3520C	8081B
	TCLP Herbicide	1311, 8151A	8151A
	TCLP Metals	1311, 3010A	6010C, 7471A
	PCBs	PCBs: 3540C/3541	PCBs - 8082A
	Paint Filter Test	NA	9095B
	Reactivity, Corrosivity, and Ignitability	NA	Reactivity-Cyanide - 9014 Reactivity-Sulfide - 9034 Corrosivity -1110A/9040C Ignitability - 1010A
	Moisture Content	NA	ASTM D 2216 - 10
Waste Characterization - Demolition Debris	TCLP VOC	1311, 5030B	8260D
	TCLP SVOC	1311, 3510C/ 3520C	8270D
	TCLP Pesticide	1311, 3510C/ 3520C	8081B
	TCLP Herbicide	1311, 8151A	8151A
	TCLP Metals	1311, 3010A	6010C, 7471A
	PCBs	PCBs: 3540C/3541	PCBs - 8082A
	Paint Filter Test	NA	9095B

TABLE 01 35 45 - 4
Analytical Methods for Chemical Parameters

Waste Characterization - Demolition Debris	Reactivity, Corrosivity, and Ignitability	NA	Reactivity-Cyanide - 9014 Reactivity-Sulfide - 9034 Corrosivity -1110A/9040C Ignitability - 1010A
	Moisture Content	NA	ASTM D 2216
Post-Excavation	Lead	3050B	6010C
	TCL PCBs	3540C/3541	8082A
Backfill, Structural Fill and Loam Characterization	TCL VOC	5030B/5031	8260D
	TCL SVOC	3540C	8270D
	TCL Pesticide/PCBs	Pesticides: 3510C/3520C PCBs: 3540C/3541	Pesticides - 8081B PCBs - 8082A
	TAL Metals, Mercury and Cyanide	Metals:3050B Cyanide:9013	Metals - 6010C, Mercury - 7471B; Cyanide - 9012B/ 9010C
	2,4,5-TP Acid (Silvex)	3510C	8151A
	pH	NA	9045D, ASTM D4972
Backfill, Structural Fill and Loam Characterization	PFAS	NA	Draft EPA Method 1633 or most current revision, with minimum Reporting Limit of 0.5 g/kg
Loam Characterization	Nutrients	Potassium and phosphate - 3050B or Mehlich Nitorgen - KCl	Potassium and phosphate - 6010D Nitrogen - KCl-extraction/Cd-red or other approved method
Air Monitoring	PCBs	NA	TO-4A and TO-10A

TABLE 01 35 45 - 5
Water Quality Criteria

Constituent	Standard	Reference
pH	6.0 - 9.5 SU	6 CRR-NY 703.3
Dissolved Oxygen	>= 3.0	6 CRR-NY 703.3
Acetaldehyde	8	6 CRR-NY 703.6
Alachlor	0.5	6 CRR-NY 703.6
Aldicarb and Methomyl	0.35	6 CRR-NY 703.6
Aldrin	Not Detectable	6 CRR-NY 703.6
Aluminum	2000	6 CRR-NY 703.6
Antimony	6	6 CRR-NY 703.6
Arsenic	50	6 CRR-NY 703.6
Asbestos (fibers>10um)	1.4 x 10^7(fibers/L)	6 CRR-NY 703.6
Atrazine	7.5	6 CRR-NY 703.6
Azinphosmethy (note l)	4.4	6 CRR-NY 703.6
Barium	2000	6 CRR-NY 703.6
Benefin	35	6 CRR-NY 703.6
Benzene	1	6 CRR-NY 703.6
Benzo(a)pyrene	Not Detectable	6 CRR-NY 703.6
Bis(2-chloroethyl)ether	1	6 CRR-NY 703.6
bis(2-ethylhexyl)phthalate	5	6 CRR-NY 703.6
Bromacil	4.4	6 CRR-NY 703.6
Butachlor	3.5	6 CRR-NY 703.6
Cadmium	10	6 CRR-NY 703.6
Captan	18	6 CRR-NY 703.6

Carbaryl	29	6 CRR-NY 703.6
Carbon disulfide	120	6 CRR-NY 703.6
Carbon tetrachloride	5	6 CRR-NY 703.6
Chloramben1	50	6 CRR-NY 703.6
Chlordane	0.05	6 CRR-NY 703.6
Chloride	500000	6 CRR-NY 703.6
Chlorinated dibenzo-p-dioxins and Chlorinated dibenzofurans7	7 x 10^-7 equivalents of 2,3,7,8-TCDD	6 CRR-NY 703.6
Chloroform	7	6 CRR-NY 703.6
Chromium (Hexavalent)	100	6 CRR-NY 703.6
Copper	400	6 CRR-NY 703.6
Cyanide	400	6 CRR-NY 703.6
p,p'-DDD	0.3	6 CRR-NY 703.6
p,p'-DDE	0.2	6 CRR-NY 703.6
p,p'-DDT	0.2	6 CRR-NY 703.6
Diazinon	0.7	6 CRR-NY 703.6
1,2-Dibromo-3-chloropropane	0.04	6 CRR-NY 703.6
Di-n-butylphthalate	50	6 CRR-NY 703.6
Dicamba	0.44	6 CRR-NY 703.6
1,2-Dichlorobenzene	3	6 CRR-NY 703.6
1,3-Dichlorobenzene	3	6 CRR-NY 703.6
1,4-Dichlorobenzene	3	6 CRR-NY 703.6
1,2-Dichloroethane	0.6	6 CRR-NY 703.6
2,4-Dichlorophenoxyacetic acid (2,4-D)	50	6 CRR-NY 703.6
1,2-Dichloropropane	1	6 CRR-NY 703.6
1,3-Dichloropropene (sum of cis- and trans- isomers)	0.4	6 CRR-NY 703.6
Dieldrin	0.004	6 CRR-NY 703.6
Di(2-ethylhexyl)adipate	20	6 CRR-NY 703.6

N,N-Dimethylaniline	1	6 CRR-NY 703.6
Diphenylhydrazine	Not Detectable	6 CRR-NY 703.6
Diquat	20	6 CRR-NY 703.6
Endrin	Not Detectable	6 CRR-NY 703.6
Ethylene dibromide	6 x 10^-4	6 CRR-NY 703.6
Ethylenethiourea	Not Detectable	6 CRR-NY 703.6
Ferbam	4.2	6 CRR-NY 703.6
Fluoride	3000	6 CRR-NY 703.6
Foaming agents (note 2)	1000	6 CRR-NY 703.6
Folpet	50	6 CRR-NY 703.6
Formaldehyde	8	6 CRR-NY 703.6
Heptachlor	0.04	6 CRR-NY 703.6
Heptachlor epoxide	0.03	6 CRR-NY 703.6
Hexachlorobenzene	0.04	6 CRR-NY 703.6
Hexachlorobutadiene	0.5	6 CRR-NY 703.6
alpha-Hexachlorocyclohexane	0.01	6 CRR-NY 703.6
beta-Hexachlorocyclohexane	0.04	6 CRR-NY 703.6
delta-Hexachlorocyclohexane	0.04	6 CRR-NY 703.6
epsilon-Hexachlorocyclohexane	0.04	6 CRR-NY 703.6
gamma-Hexachlorocyclohexane	0.05	6 CRR-NY 703.6
Hexachlorophene	See Note 3	6 CRR-NY 703.6
Iron (note 4)	600	6 CRR-NY 703.6
Kepone	Not Detectable	6 CRR-NY 703.6
Lead	50	6 CRR-NY 703.6
Malathion	7	6 CRR-NY 703.6
Mancozeb	1.8	6 CRR-NY 703.6
Maneb	1.8	6 CRR-NY 703.6

Manganese (note 4)	600	6 CRR-NY 703.6
Mercury	1.4	6 CRR-NY 703.6
Methoxychlor	35	6 CRR-NY 703.6
2-Methyl-4-chlorophenoxyacetic acid	0.44	6 CRR-NY 703.6
Methylene chloride (Dichloromethane)	5	6 CRR-NY 703.6
Methyl methacrylate	50	6 CRR-NY 703.6
Metolachlor	10	6 CRR-NY 703.6
Mirex	0.03	6 CRR-NY 703.6
Nabam	1.8	6 CRR-NY 703.6
Nickel	200	6 CRR-NY 703.6
Nitralin	35	6 CRR-NY 703.6
Nitrate (expressed as N)	20000	6 CRR-NY 703.6
Nitrate and Nitrite (expressed as N)	20000	6 CRR-NY 703.6
Nitrilotriacetic acid (note 5)	3	6 CRR-NY 703.6
Nitrite (expressed as N)	2000	6 CRR-NY 703.6
Nitrobenzene	0.4	6 CRR-NY 703.6
Octachlorostyrene	0.2	6 CRR-NY 703.6
Oil and Grease	15000	6 CRR-NY 703.6
Paraquat	3	6 CRR-NY 703.6
Parathion and Methyl parathion	1.5	6 CRR-NY 703.6
Pentachloronitrobenzene	Not Detectable	6 CRR-NY 703.6
Phenolic compounds (total phenols)	2	6 CRR-NY 703.6
Phorate and Disulfoton	Not Detectable	6 CRR-NY 703.6
Polychlorinated biphenyls	0.09	6 CRR-NY 703.6
Propachlor	35	6 CRR-NY 703.6
Propanil	7	6 CRR-NY 703.6
Propazine	16	6 CRR-NY 703.6

Selenium	C	6 CRR-NY 703.6
Silver	100	6 CRR-NY 703.6
Simazine	0.5	6 CRR-NY 703.6
Styrene	5	6 CRR-NY 703.6
Sulfate	500000	6 CRR-NY 703.6
Sulfide	1000	6 CRR-NY 703.6
Thiram	1.8	6 CRR-NY 703.6
Toxaphene	0.06	6 CRR-NY 703.6
1,1,2-Trichloroethane	1	6 CRR-NY 703.6
Trichloroethene	5	6 CRR-NY 703.6
2,4,5-Trichlorophenoxyacetic acid	35	6 CRR-NY 703.6
,4,5-Trichlorophenoxypropioni acid	0.26	6 CRR-NY 703.6
1,2,3-Trichloropropane	0.04	6 CRR-NY 703.6
Trifluralin	35	6 CRR-NY 703.6
Vinyl chloride	2	6 CRR-NY 703.6
Zinc	5000	6 CRR-NY 703.6
Zineb	1.8	6 CRR-NY 703.6
Ziram	4.2	6 CRR-NY 703.6

Notes:
1. Includes related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.
2. Foaming agents determined as methylene blue active substances (MBAS) or other tests as specified by the commissioner.
3. Refer to groundwater effluent limitation for "Phenolic compounds (total phenols)".
4. Combined concentration of iron and manganese shall not exceed 1000 ug/L.
5. Includes related forms that convert to nitrilotriacetic acid upon acidification to a pH of 2.3 or less.
6. pH shall not be lower than 6.5 or the pH of the natural groundwater, whichever is lower, nor shall be greater than 8.5 or the pH of the natural groundwater, whichever is greater.
7. Value is for the total of the chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans as equivalents of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) as specified by the Class GA H(WS) standard in Table 1 of section 703.5 of this Part.
8. pH and dissolved oxygen criteria are for Class D surface waters as defined in 6 CRR-NY 703.6.

9. Chemical criteria are groundwater effluent limitations per 6 CRR-NY 703.6.

-- End of Section --

SECTION 01 35 53

SECURITY

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals necessary to provide security for the duration of the project. Work shall be performed as specified herein and in the approved Contractor's Security Plan.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Security Plan; G

The Contractor shall submit five copies of the Security Plan at least 14 calendar days prior to the Pre-Work Conference. The Security Plan shall describe the procedures for site access and traffic control to be implemented.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall responsible for the following:

a. The Contractor shall be responsible for maintaining site security and furnishing all labor, materials, equipment and incidentals to provide security for the project site, 24 hours a day, seven days a week, including holidays, throughout the duration of the contract.

b. The Contractor shall establish a security program prior to any field construction activities.

c. The Contractor shall be both responsible and liable for site security.

d. Maintain/erect warning and security signs around the site perimeter.

e. The Contractor shall provide control of all persons and vehicles entering and leaving the Site..

f. The Contractor shall provide security identification specific to the Site, for all on-site personnel and Contractor personnel authorized to enter the Site.

3.2 SECURITY PROGRAM

3.2.1 Security Program Objectives

The principal objectives of the Security Program are:

a. Deter, restrict, and/or control financial losses to the Government and the Contractor. This includes prevention or detection of theft, vandalism, sabotage, and arson.

b. To keep unauthorized people from entering the Site and receiving any injuries.

c. To keep unauthorized people from entering the Site and removing equipment or hazardous substances.

d. To keep unauthorized people from taking action on the Site that might exacerbate the environmental problem or interfere with its remediation.

3.3 SECURITY PERSONNEL

Conditions of employment for all site Security Officers shall include the following:

a. Detailed pre-employment history establishing moral character and dependability.

b. Applicant shall submit to a current physical examination conducted by the Contractor's designated physician. This physical shall include drug testing, and a list of all medicines applicant is currently taking or has taken during the last year. Physical shall also include vital statistics and tests to ensure the capability of the applicant to function on-site without health restrictions.

c. Investigation that clears applicant of felony convictions.

d. Failure to maintain attentive and alert status in performance of duties, which includes sleeping while on duty, intoxication on the job, and bringing unauthorized personnel on-site, is completely unacceptable and shall be grounds for not employing or for terminating employment.

e. In general, Site Security Officers shall be physically fit, literate in the English language, experienced, stable, reliable, and possess the physical and psychological skills that are necessary to control unauthorized persons on the Site.

f. If the Security Officer carries a weapon consisting of side arms and/or shotgun or rifle, weapon(s) shall be catalogued, including type, model, caliber, and serial number and inspected by the security firm. The Security Officer shall have proficiency training and maintain proficiency rating with the particular type of weapon carried, as required by state law.

3.4 SITE SECURITY REQUIREMENTS

A Security Officer shall be on the Site during non-working hours (4:00 pm to 7:00 am) on weekdays and 24 hours per day during holidays, weekends, and days when no activities are in progress for the entire duration of the

construction activities. A Security Officer shall patrol the Support, Contamination Reduction, and Exclusion Zones. The Contractor shall be responsible for establishing security from 7:00 am to 4:00 pm during workdays.

A Security Center Office shall be established in the Support Zone. A small, temporary trailer or office building shall be equipped with a telephone, two-way radios, lights, and a desk. The office shall be established for the purposes of record-keeping and administering security.

Maintain a log of all security incidents. This log shall be furnished to the Government upon request.

The Government will have the right of approval and rejection of any and all security-assigned personnel of the Contractor for the duration of the contract. If approved by the Government, the Contractor may designate a member of its staff as Site Security Officer during normal working hours. The Government may revoke this approval without cause or justification, at which time the Contractor shall immediately provide independent site security.

Gates in all fences shall remain closed, except when in use by authorized personnel.

Security Officers shall be responsible for touring the perimeter of the Site on an hourly basis when there is no construction activity being performed for the entire contract duration. The exact timing of the hourly tours shall be varied as to not allow a definable routine to develop. There shall be a log of the tours, with observed conditions recorded, maintained at the Security Center Office.

Security Officers shall be responsible for controlling conditions to ensure against any unauthorized entry. Should persons attempt unauthorized entry, the Security Officer shall be responsible for warning the individuals. If unauthorized persons ignore the warnings, the Security Officer shall notify appropriate law enforcement personnel to remove the persons.

The Government will maintain a list of personnel approved to be present on the job site. A copy of the list will be provided to the Contractor. Only authorized personnel may make changes to the job site list.

A copy of the emergency checklist, providing all emergency numbers for hospitals, ambulance service, law enforcement, paramedics, and fire departments, shall be posted in all on-site offices and at the designated project information board.

Temporary lighting shall be provided to ensure effective surveillance at night at active construction areas.

3.5 PERSONNEL IDENTIFICATION

Provide security identification specific to the Site for all on-site personnel and Contractor personnel entering the Site, showing:

a. Name of individual

b. Occupation

c. Name of employer

The Contractor shall be responsible for and guarantee that security identification is worn by each individual and visible at all times while the individual is on site. Badge assignments shall be based on criteria included in the Contractor's Accident Prevention Plan/Site Safety and Health Plan (APP/SSHP) or as established by the Government.

Improperly identified personnel shall be excluded from the Site.

3.6 ENTRANCE CONTROL

Provide control of all persons, equipment, and vehicles entering and leaving the Site as follows:

a. Require each person to display proper identification.

b. Require all personnel and visitors having access to the Site to sign in and sign out, and maintain a log of all site access.

c. Vehicular access within the Site shall be restricted to authorized vehicles only. Use of site-designated parking areas shall be restricted to vehicles of the Government, Contractor, subcontractors, on-duty service personnel assigned to the Site and visitors approved by the Government.

d. The Contractor shall accommodate and coordinate visits with local law enforcement agencies, including police, sheriff, highway patrol, emergency medical care units, fire department, and utility emergency teams.

e. Site visitors shall not be permitted to enter active work areas unless approved by the Government.

f. The Contractor shall maintain a list of persons authorized for site entry and submit a copy of the list to the Government on request.

3.7 BONDING AND UNIFORM REQUIREMENTS

The security firm shall be bonded.

Each Security Officer shall wear a uniform that displays the name of the security firm. These uniforms are to be complete, including hat, shirt, trousers, belt, and boots. Each officer shall present a neat, professional appearance.

During patrols, security personnel shall be in proper safety attire, including steel-toe boots and additional PPE as required by site conditions/activities.

3.8 VISITOR CONTROL

All visitors must be approved by the Government.

All visitors shall be required to read and sign an approved synopsis of the SSHP prior to entering the Site.

Visitors shall be escorted at all times, except EPA, USACE, and NYSDEC employees and representatives.

3.9 TRAFFIC CONTROL

The Contractor shall be responsible for controlling vehicular traffic on and through the Site in order to ensure safe and efficient operations. Traffic control shall be performed in accordance with SECTION 01 55 26 - TRAFFIC CONTROL.

Parking areas shall be regulated to ensure free entry and egress to and from the Site.

3.10 NON-PERMITTED PROCEDURES

The Security Officer shall remain on the Site until the next shift replacement arrives. The Site shall not be left unsecured.

Security personnel shall, in general, monitor, authorize entry to, and inspect all areas of the project on a continuing basis and shall not serve any production work effort of the project.

In scheduling the site security personnel, the same employee shall not be scheduled for consecutive shifts.

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SECTION 01 35 55

PERIMETER AIR MONITORING

PART 1 GENERAL

1.1 SCOPE OF WORK

This section describes the responsibilities of the Contractor for monitoring potentially contaminated particulates at the site perimeter fence line. This section is to be used in the preparation of a Perimeter Air Monitoring Plan (PAMP). The Contracting Officer shall ensure that the work performed under these specifications will be actively managed so that noise, airborne dust, and contaminants generated by site activities are maintained below the applicable allowable levels established for general public exposure.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

OTHER PUBLICATIONS

ANSI S12.9	American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound
EPA Method TO-4A	Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using High Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detection (GC/MD)
6 NYCRR 450	New York State Department of Environmental Conservation. Chapter IV Quality Services. Subchapter E: Noise. Part 450: Noise from Heavy Motor Vehicles
Noise Control Act of 1972	Noise Control Act of 1972. Federal: 42 U.S. Code 4901 et seq.

Matters of interpretation of these standards associated with perimeter air monitoring shall be identified and submitted to the Contracting Officer. All matters of interpretation shall be resolved before starting work. Where the requirements of this specification, applicable laws, ordinances, and regulations, vary, the most stringent requirements shall apply.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Perimeter Air Monitoring Plan; G

The Contractor shall submit the PAMP to the Contracting Officer for approval in accordance with Paragraph 1.5 of this section.

Dust Control Plan; G

The Contractor shall submit the Dust Control Plan to the Contracting officer for approval in accordance with Paragraph 1.13 of this section.

SD-03 Product Data

Air Monitoring Results; G

The Contractor shall submit the exposure and air monitoring data weekly at the beginning of the project as required by this section when the sampling is performed more frequent than monthly or per direction from Government

SD-11 Closeout Submittals

Monthly Air Monitoring Reports; G

The Contractor shall submit the following documents to the Contracting Officer monthly during the project site work:

a. Air Monitoring Logs

Air monitoring logs shall include, at a minimum, the following information:

i. Monitoring dates and times

ii. Monitoring dates and times

ii. Monitoring equipment

iii. Results of direct-reading instruments

iv. Results of sensory (odor) surveys

v. Summary printouts for instrumentation using automatic data logging

vi. Documentation of action level exceedances and corrective actions

b. Air Sample Analysis Results

Air sample analysis results submittals shall include analytical results and accompanying laboratory QC data/information.

c. Meteorological Readings

Meteorological readings shall be tabulated in accordance with the requirements of Paragraph 1.9.2.

d. Sound Level Monitoring Log

Sound level monitoring logs shall include, at a minimum, the following information:

i. Reading dates and times

ii. Monitoring equipment and calibration

iii. Results of direct-reading instruments

iv. Summary printouts for instrumentation using automatic data logging

v. Documentation of action level exceedances and corrective actions

1.4 REGULATORY REQUIREMENTS

Work performed under this contract shall comply with all applicable Federal, State, and local safety and occupational health laws and regulations.

1.5 PERIMETER AIR MONITORING PLAN (PAMP)

The Contractor shall develop, submit for Government review and implement after Government acceptance a written PAMP for remedial action operations.

1.5.1 Contents

A PAMP shall be prepared covering remediation activities to be performed by the Contractor and all subcontractors in accordance with this specification. The PAMP shall establish, in detail, the protocols necessary for the anticipation, recognition, evaluation, and control of emissions associated with each task performed based upon site-specific conditions.

The PAMP shall be a stand-alone plan and shall include, but not be limited to, the following:

a. Control of airborne contaminant emissions.

b. Air quality monitoring and sampling procedures.

c. Collection of meteorological data.

d. Detailed descriptions of equipment, O&M procedures, and calibration schedules.

e. Organizational structure indicating personnel responsibilities.

f. The qualifications of the Air Quality Monitoring Specialist.

g. Action levels

h. Plans for response if action levels are exceeded.

1.5.2 Acceptance and Modification

The PAMP shall be submitted to the Contracting Officer for review and approval. Any deficiencies in the PAMP will be discussed at the Pre-Construction Safety Conference, and the PAMP shall be revised to correct the deficiencies and resubmitted for acceptance. Onsite work shall not begin until the plan has been accepted by the Contracting Officer.

The Contractor shall keep a copy of the written PAMP on site for review by the USACE and its representatives. As work proceeds, the PAMP shall be adapted to new situations and new conditions. Changes and modifications to the accepted PAMP shall be made with the knowledge and concurrence of the Air Quality Specialist (AQS), the Site Superintendent, and the Contracting Officer. The requested modifications shall not be implemented until authorized in writing by the Contracting Officer. Should the Contracting Officer require a modification of any portion or provision of the PAMP, the Contracting Officer will notify the Contractor in writing of such a modification.

The Contracting Officer may stop all site work at any point if the Contractor shows any disregard for the provisions of this specification or the accepted PAMP.

1.6 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

Project site conditions are detailed in SECTION 01 11 00 - SUMMARY OF WORK.

1.7 AIR QUALITY PROTECTION PRINCIPLES

The Contractor shall provide all equipment, materials, and personnel necessary to monitor (for real time PM10 dust and volatile organic compounds) and analyze (for PCB Aroclors) contaminants and monitor noise at the site perimeter fence line in compliance with the PAMP. The PAMP shall describe procedures, equipment, action levels, and training needed for site activities. The Contractor shall operate a program of equipment maintenance in accordance with the manufacturer's specifications. The Contracting Officer may reject the use of equipment if it provides less protection than that specified in the PAMP.

1.7.1 Action Levels

The Contractor shall perform remediation in a manner such that ambient air quality objectives at the site perimeter are achieved in accordance with the action levels presented in Table 01 35 55-1. The action levels and required actions shall be presented in the PAMP in both text and tabular form in accordance with Table 01 35 55-1.

TABLE 01 35 55-1 – Perimeter Air Monitoring/Sampling Requirements

Analyte	Action Level	Frequency per location	Analytical or Monitoring Method	Action Required
[1]Real Time Respirable Dust (PM10)	150 µg/m^3 (15 minute) above background (AB) 100 µg/m^3 (work shift) AB	Continuously during the work day, and for 1 hour before and after. Log 15-minute averages.	Direct-reading dust meter with data logger, e.g., Dustrak DRX	15 minutes: Evaluate engineering controls, implement dust contro 60 minutes: Stop dust- generating activities and notify Contracting Officer. Increase dust control measures.
Volatile Organic Compounds	.5 ppm AB	Continuously during the work day, and for 1 hour before and after. Log 15-minute; averages.	Photoionization detector, e.g., miniRAE	15 minutes: Evaluate engineering controls, implement vapor control. 60 minutes: Stop vapor-generating activities and notify Contracting Officer. Increase vapor control measures.
Noise (7:00 AM to 6:00 PM)	80 dBA on impact	At least once an hour at the fence line closest to the work	ANSI Type 1 or 2 sound level meter. e.g. Extech 407732	15 minutes: Evaluate engineering controls, implement noise controls. 60 minutes: Stop noise- generating activities and notify Contracting Officer.
Noise (6:00 PM to 7:00 AM and all time on weekends)	65 dBA			

Analyte	Action Level	Frequency per location	Analytical or Monitoring Method	Action Required
Odors	Objectionable	At least once every two hours at the fence line downwind of the work	Sensory	Evaluate odor controls. Notify Contracting Officer.
Analytical Air Sampling				
PCB (Aroclors)	0.1 µg/m^3	Over a 24-hour period. Collect samples twice per week at 8 locations for 4 weeks with fast TAT[2] for analysis. If concentrations remain below action level, reduce frequency to once per week and 7-day TAT for analysis. When handling TSCA waste or temperatures are greater or equal to 82F, sample every other day with fast TAT[2].	EPA method TO-4A (high volume sampling)	Investigate and recommend corrective action. Increase sampling frequency regardless of temperature or location within/outside a TSCA area. As deemed necessary, modify real-time air monitoring action levels to achieve contaminant compliance.

[1]PM 10 action levels are in accordance with NAAQS.
[2]Fast TAT shall be the fastest available at the time of the construction.
[3]Sample frequency will be adjusted based on field conditions.
Abbreviations:
µg/m - micrograms per cubic meter
AB - above background
dBA - decibels (A-weighted)
ppm - parts per million
TAT - turnaround time

1.8 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

The Contractor's project team shall include:

1.8.1 Air Quality Specialis

The services of an Air Quality Specialist (AQS), who is experienced in air monitoring and sampling, shall be utilized. The Safety and Health Manager (SHM) or Certified Industrial Hygienist (CIH) can also serve as the AQS if he/she meets the qualification requirements of an AQS listed in Paragraph 1.8.1.1. This specialist shall be familiar with the Site's hazards and the scope of this project.

1.8.1.1 Qualifications

The Contractor shall demonstrate to the Contracting Officer that the AQS has the following credentials:

a. At least three years of experience in air monitoring or sampling, including the following:

   i. Serving in responsible professional charge on at least one project in which the impacts of site work on community air were measured.

   ii. At least 100 hours each of hands-on experience in taking ambient air measurements and samples by EPA or NIOSH methods.

b. A scientific or engineering college degree that included the study of air quality issues. The Contracting Officer may accept equivalent training at his or her sole discretion.

c. Professional certification appropriate to this effort.

   i. Although the Contracting Officer may accept other credentials, the Certified Industrial Hygienist credential offered by the American Board of Industrial Hygiene and the Qualified Environmental Professional credential offered by the Institute of Professional Environmental Practice are both deemed appropriate.

The Contractor shall document the specialist's name and qualifications in the PAMP.

1.8.1.2 Responsibilities

The AQS shall be responsible for:

a. Preparation of the air monitoring protocols for the site work

b. Selecting the equipment to be used for air monitoring

c. Determining the times, durations, and locations of air measurements

d. Adjusting for the effect of the adjacent highways on monitoring results

e. Approving the qualifications of any technicians that will collect air measurements

f. Interpreting the results of air monitoring

g. Approving and signing reports of air quality that the Contractor provides to the Contracting Officer or his/her representatives

h. Periodically evaluating if the selected equipment and protocols are adequately representing perimeter conditions

i. Periodically auditing the implementation of the PAMP, and taking corrective action when necessary

1.8.2 Air Monitoring and Sampling Technician (AM&ST)

During intrusive activities conducted by the Contractor, an AM&ST shall

perform the air monitoring activities as specified in the PAMP. The SHM or CIH can also serve as the AM&ST if the AQS approves. The AM&ST shall have appropriate training approved by the AQS.

1.9 AIR QUALITY MONITORING AND SAMPLING

1.9.1 General

1.9.1.1 Perimeter Air Monitoring Plan

The monitoring specified in the PAMP shall detect real time PM10 dust, volatile organic compounds, noise measurements and PCB Aroclor air sampling.

1.9.1.2 Minimum Air Quality Measurements and Samples

The Contractor shall collect, at a minimum, the number of air quality measurements necessary to meet the frequencies shown in Table 01 35 55-1. The Contractor shall use monitoring methods that accurately measure at detection limits consistent with the action levels listed in Table 01 35 55-1.

1.9.1.3 Air Monitoring Equipment

The continuous air monitoring equipment shall be capable of providing the following:

a. Downloadable data capable of providing a continuous graph of readings.

b. Auto-Dialer, emergency lights or other alerting systems to promptly and effectively notify the Contractor if action levels have been exceeded.

The AQS shall certify that the air monitoring equipment proposed is consistent with perimeter air monitoring objectives and associated action levels presented in Table 01 35 55-1. Air monitoring methods and equipment locations shall be proposed by the Contractor in the PAMP.

Equipment utilized for air monitoring in accordance with this section shall be calibrated before and after each use, as required, and maintained as per specified methods, manufacturer's recommendations, and good industrial hygiene practices.

The Contractor shall document, in the site log or site files, the regular calibration of each instrument used. Only individuals trained to operate this equipment shall do so.

1.9.2 Meteorological Monitoring

Refer to SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES, subsection 1.15.2.

1.9.3 Real-Time Air Monitoring

The Contractor shall collect each air measurement over a duration that the AQS determines will yield an accurate representation of the air quality at that time and location. Real-time air monitoring for PM10 and VOCs shall be performed from a total of eight perimeter air monitoring locations (four surrounding the sediment/soil staging area and four surrounding the

active excavation area) at the rate described in Table 01 35 55-1.

1.9.4 Real-Time Noise Monitoring

The Contractor shall collect each noise measurement over a duration that the AQS determines will yield an accurate representation of the sound level at that time and location. One noise meter will be placed at the sediment/soil staging area's perimeter monitoring station closest to active work, and one noise meter will be placed at the perimeter of active excavation at the monitoring station closest to active excavation, for two meters in total.

1.9.5 Air Sampling

PCB Aroclor air samples shall be collected from the perimeter air monitoring locations (see Section 1.9.3) at the rate described in Table 01 35 55-1.

The sampling and analytical procedures to be followed for the collection, handling, and analysis of air samples are those prescribed by EPA method TO-4A. Air samples shall be collected by drawing a known volume of air into a collector as specified in the EPA sampling guide. A qualified laboratory shall perform analysis by EPA methods described on Table 01 35 55-1. A laboratory is "qualified" if it holds an Environmental Approval Program Certification through the New York State Department of Health for PCB Aroclors.

Fast turnaround time (TAT) samples shall be analyzed by the fastest TAT available at the time of construction. Contractor shall attempt to procure analytical services with a 24-hour TAT for PCB air samples. If a laboratory with this capability cannot be identified, the Government will accept the best TAT available in the region. Weekly samples shall be analyzed with a 7-day TAT.

The analytical results shall be compared to action levels established in Table 01 35 55-1 and, if appropriate, action shall be undertaken (i.e., evaluation of work practices). The calibration protocols described in the EPA methods shall be followed.

1.9.5.1 Baseline PCB Sampling

Baseline PCB Aroclor air samples shall be collected from three locations in sediment excavation areas prior to excavation. The samples shall be collected from above the undisturbed sediment bed after creek flow has been diverted from the excavation area. The baseline samples shall be collected from the following two areas:

a. Mill Pond (approximate Station 9+15)
b. North of Clinton Street Dam (approximate Station 13+85)
c. Mill Race north of William Street Dam (approximate Station 801+25)

1.9.6 Air Sampling and Monitoring Results Reporting

1.9.6.1 Air Sampling Log

The Contractor shall maintain an up-to-date log for all sampling activities. A copy of the log shall be submitted to the Contracting Officer weekly throughout the project site work. The log shall contain sufficient information to verify that proper procedures were followed and

confirm the accuracy of results.

1.9.6.2 Noise Monitoring Results Reporting

The Contractor shall maintain an up-to-date log for all noise monitoring activities. A copy of the log shall be submitted to the Contracting Officer weekly during the project site work. The log shall contain sufficient information to verify that proper procedures in accordance with ANSI S12.9 were followed and confirm the accuracy of results.

1.9.6.3 Daily Monitoring Summary Report

The Daily Monitoring Summary Report shall discuss calibration, calibration check, general observations, weather conditions, and all required corrective action. The report shall contain additional information where real-time monitoring is utilized.

A summary of real-time monitoring results shall be presented in tabular form. The table shall include results from all monitoring locations, including background, and at a minimum shall contain the following:

a. For dust and volatile organic compounds, peak 15-minute average and daily time-weighted average with all results exceeding action levels clearly delineated and associated corrective action described.

b. Comparison of results corrected for background to peak 15-minute average and time-weighted average action levels.

c. For noise, instantaneous readings and daily time-weighted average with all results exceeding action levels clearly delineated and associated corrective action described.

d. For each odor observation, record the strength of the odor (e.g. strong, moderate, weak, or absent), its hedonic characteristic (e.g. pleasant, innocuous, unpleasant, or sickening), and anything about its chemical nature (e.g. fecal, petroleum, solvent, sulfide, earthy, perfume) with all results exceeding action levels clearly delineated and associated corrective action described.

e. Meteorological conditions.

The Contractor shall compile and submit copies of each Daily Air Sampling/Monitoring Summary Report as a part of the Progress Report.

1.10 RESPONSE TO AIR EMISSIONS

When and if the ambient air monitoring system reveals that an action level has been exceeded for 15 minutes or more, the Contractor shall evaluate its engineering controls and implement emission controls. The Contractor shall report the exceedance and the associated corrective action taken in its Daily Air Monitoring Summary Report as described in Paragraph 1.9.6.3.

When and if the air monitoring system reveals that an action level has been exceeded for an hour or more or analytical results have been exceeded, the Contractor shall temporarily suspend intrusive activities, notify the Contracting Officer, and implement corrective action to reduce site-related emissions to below required action levels. The adequacy of these controls is subject to acceptance by the Contracting Officer's representative prior to restarting intrusive activities.

Site emissions control measures that may be needed to reduce the emissions to below action levels may include, but are not limited to:

a. Adding moisture to the soil

b. Applying a vapor barrier (plastic) to the soil or soil piles

c. Using a misting system with an odor-neutralizing additive

d. Applying alkaline or oxidizing chemicals to the soil before excavation starts

e. Applying foam to the soil or soil piles

f. Reducing the speed of equipment that disturbs the soil

g. Installing barriers to reduce wind speed

h. Limiting the rate of excavation

1.11 RESPONSE TO NOISE LEVELS

When and if the noise monitoring system reveals that an action level has been exceeded for 15 minutes or more, the Contractor shall evaluate its engineering controls and implement noise level controls. The Contractor shall report the exceedance and the associated corrective action taken in its Daily Air Monitoring Summary Report as described in Paragraph 1.9.6.3.

When and if the noise monitoring system reveals that an action level has been exceeded for an hour or more, the Contractor shall temporarily suspend noisy activities and notify the Contracting Officer. The adequacy of noise controls is subject to acceptance by the Contracting Officer's representative prior to restarting noisy activities.

Noise control measures that may be needed to reduce noise to below action levels may include, but are not limited to:

a. Reducing the speed of equipment that disturbs the soil

b. Installing barriers to reduce noise transmission

c. Limiting the rate of excavation

d. Application of foam to hard surfaces that radiate sound

e. Use of alternate tooling that causes lower-energy impacts on hard surfaces

f. Use of mufflers on engines and air-powered tools

Noise control shall be performed in accordance with the Noise Control Act of 1972, 6 NYCRR 450, and local noise ordinance requirements.

1.12 INSPECTIONS

The Contractor shall perform daily inspections of the job site and the surrounding work in progress in accordance with Paragraph 1.44 in SECTION

01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES to ensure compliance with the PAMP. The Contracting Officer may stop all site work at any point if the Contractor shows any disregard for the provisions of this specification or the accepted PAMP.

1.13 DUST AND EMISSION CONTROL

Dust control shall be used throughout the work at the Site and offsite in accordance with the Contractor's approved Dust Control Plan. The Dust Control Plan will identify materials, equipment, and methods to be used to control dust during project operations. The AQS shall ensure that dust suppression practices are effective and being utilized. At a minimum, the following provisions shall be incorporated into the Dust Control Plan:

a. The Contractor may use water-based dust suppressing agent to reduce chemical emissions. The Contractor shall avoid methods that generate slippery conditions or sticky mud.

b. Trucks in which the rubble and contaminated debris are carried shall be covered to reduce emissions with a double, positive-locking mechanism on the tailgates.

c. Haul roads will be treated as necessary to minimize dusty conditions.

d. Trucks wheels will go through a wheel wash prior to exiting the site.

e. The AQS shall ensure that effective emission reduction practices are utilized. Visual surveillance shall be conducted over the first two miles of transportation routes at least once a day.

PART 2 PRODUCTS

The Contractor shall provide all necessary monitoring devices and support equipment to perform the monitoring per the approved PAMP

PART 3 EXECUTION (NOT USED)

-- End of Section --

SECTION 01 45 00

RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM)

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 Safety and Health Requirements Manual

1.2 CONTRACT ADMINISTRATION

The Government will use the Resident Management System (RMS) to assist in its monitoring and administration of this contract. The Government accesses the system using the Government Mode of RMS (RMS GM) and the Contractor accesses the system using the Contractor Mode (RMS CM). The term RMS will be used in the remainder of this section for both RMS GM and RMS CM. The joint Government-Contractor use of RMS facilitates electronic exchange of information and overall management of the contract. The Contractor accesses RMS to record, maintain, input, track, and electronically share information with the Government throughout the contract period in the following areas:

Administration
Finances
Quality Control
Submittal Monitoring
Scheduling
Closeout
Import/Export of Data

1.2.1 Correspondence and Electronic Communications

For ease and speed of communications, exchange correspondence and other documents in electronic format to the maximum extent feasible. Some correspondence, including pay requests and payrolls, are also to be provided in paper format with original signatures. Paper documents will govern, in the event of discrepancy with the electronic version.

1.2.2 Other Factors

Other portions of this document have a direct relationship to the reporting accomplished through RMS. Particular attention is directed to SECTION 01 32 01 - PROJECT SCHEDULE; SECTION 01 33 00 - SUBMITTAL PROCEDURES; SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES; and SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL.

1.3 RMS SOFTWARE

RMS is a Windows-based program that can be run on a Windows-based PC meeting the requirements as specified in paragraph SYSTEM REQUIREMENTS.

Download, install and be able to utilize the latest version of the RMS software within 7 calendar days of receipt of the Task Order Award. RMS software, user manuals, access and installation instructions, program updates and training information are available from the RMS website (http://rms.usace.army.mil). The Government and the Contractor will have different access authorities to the same contract database through RMS. The common database will be updated automatically each time a user finalizes an entry or change.

1.4 SYSTEM REQUIREMENTS

The following is the recommended system configuration to run the Contractor Mode RMS for full utilization of all features for all types and sizes of contracts. Smaller, less complicated, projects may not require the configuration levels described below. Required configuration also noted below.

Recommended RMS System Requirements	
Hardware	
Windows-based PC	1.7 GHz i3; AMD A6 3650 GHz or higher processor (REQUIRED)
RAM	8 GB
Hard drive disk	100 GB space for sole use by RMS system
Monitor	Screen resolution 1366 x 768
Mouse or other pointing device	
Windows compatible printer	Laser printer must have 4 MB+ of RAM
Connection to the Internet	minimum 4 Mbs per user
Software	
MS Windows	Windows 7 x 64 bit (RMS requires 64 bit O/S) or newer (REQUIRED)
Word Processing software	Viewer for MS Word 2013, MS Excel 2013 or newer (REQUIRED)
E-mail	MAPI compatible (REQUIRED)
Virus protection software	Regularly upgraded with all issued Manufacturer's updates and is able to detect most zero day viruses (REQUIRED)

1.5 CONTRACT DATABASE - GOVERNMENT

The Government will enter the basic contract award data in RMS prior to granting the Contractor access. The Government entries into RMS will generally be related to submittal reviews, correspondence status, and Quality Assurance (QA) comments, as well as other miscellaneous administrative information.

1.6 CONTRACT DATABASE - CONTRACTOR

Contractor entries into RMS establish, maintain, and update data throughout the duration of the contract. Contractor entries generally include prime and subcontractor information, daily reports, submittals, Requests for Information (RFIs), schedule updates and payment requests. RMS includes the ability to import attachments and export reports in many of the modules, including submittals. The Contractor responsibilities for entries in RMS typically include the following items: :

1.6.1 Administration

1.6.1.1 Contractor Information

Enter all current Contractor administrative data and information into RMS within 7 calendar days of receiving access to the contract in RMS. This includes, but is not limited to, Contractor's name, address, telephone numbers, management staff, and other required items.

1.6.1.2 Subcontractor Information

Enter all missing subcontractor administrative data and information into RMS CM within 7 calendar days of receiving access to the contract in RMS or within 7 calendar days of the signing of the subcontractor agreement for agreements signed at a later date. This includes name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor is listed separately for each trade to be performed.

1.6.1.3 Correspondence

Identify all Contractor correspondence to the Government with a serial number. Prefix correspondence initiated by the Contractor's site office with "S". Prefix letters initiated by the Contractor's home (main) office with "H". Letters are numbered starting from 0001, (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C" or "RFP".

1.6.1.4 Equipment

Enter and maintain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.6.1.5 Reports

Track the status of the project utilizing the reports available in RMS. The value of these reports is reflective of the quality of the data input. These reports include the Quality Control (QC) comments, Submittal Register Status, and Three-Phase Control worksheets.

1.6.1.6 Request For Information (RFI)

Create and track all RFI in the RMS Administration Module for Government review and response.

1.6.2 Finances

1.6.2.1 Pay Activity Data

Develop and enter a list of pay activities in conjunction with the project schedule. The sum of pay activities equals the total contract amount, including modifications. Each pay activity must be assigned to a Contract Line Item Number (CLIN). The sum of the activities assigned to a CLIN equals the amount of each CLIN.

1.6.2.2 Payment Requests

Generate a payment request and prompt payment certification using RMS. Submit the signed prompt payment certification and payment request as well as supporting data either electronically or by hard copy. Unless waived by the Contracting Officer, a signed paper copy of the approved payment certification and request is also required and will govern in the event of discrepancy with the electronic version.

1.6.3 Quality Control (QC)

Enter and track implementation of the 3-phase QC Control System, QC testing, transferred and installed property and warranties in RMS. Prepare daily reports, identify and track deficiencies, document progress of work, and support other Contractor QC requirements in RMS. Maintain all data on a daily basis. Ensure that RMS reflects all quality control methods, tests and actions contained within the Contractor Quality Control (CQC) Plan and Government review comments of same within 7 calendar days of Government acceptance of the CQC Plan.

1.6.3.1 Quality Control (QC) Reports

The Contractor's QC Daily Report in RMS is the official report. The Contractor can use other supplemental formats to record QC data, but information from any supplemental formats are to be consolidated and entered into the RMS QC Daily Report. Any supplemental information may be entered into RMS as an attachment to the report. QC Daily Reports must be finalized and signed in RMS within 24 hours after the date covered by the report. Provide the Government a printed signed copy of the QC Daily Report, unless waived by the Government.

1.6.3.2 Deficiency Tracking.

Use the QC Daily Report Module to enter and track deficiencies. Deficiencies identified and entered into RMS by the Contractor or the Government will be sequentially numbered with a QC or QA prefix for tracking purposes. Enter each deficiency into RMS the same day that the deficiency is identified. Monitor, track and resolve all QC and QA entered deficiencies. A deficiency is not considered to be corrected until the Government indicates concurrence in RMS.

1.6.3.3 Three-Phase Control Meetings

Maintain scheduled and actual dates and times of preparatory and initial control meetings in RMS. Worksheets for the three-phase control meetings are generated within RMS.

1.6.3.4 Labor and Equipment Hours

Enter labor and equipment exposure hours on a daily basis. Roll up the labor and equipment exposure data into a monthly exposure report.

1.6.3.5 Accident/Safety Reporting

Both the Contractor and the Government enter safety related comments in RMS as a deficiency. The Contractor must monitor, track and show resolution for safety issues in the QC Daily Report area of the RMS QC Module. In addition, follow all reporting requirements for accidents and incidents as required in EM 385-1-1, SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and as required by any other applicable Federal, State or local agencies..

1.6.3.6 Definable Features of Work

Enter each feature of work, as defined in the approved CQC Plan, into the RMS QC Module. A feature of work may be associated with a single or multiple pay activities; however, a pay activity is only to be linked to a single feature of work.

1.6.3.7 Activity Hazard Analysis

Import activity hazard analysis electronic document files into the RMS QC Module utilizing the document package manager..

1.6.4 Submittal Management

Enter all current submittal register data and information into RMS within 7 calendar days of receiving access to the contract in RMS. The information shown on the submittal register following the specification SECTION 01 33 00 - SUBMITTAL PROCEDURES will already be entered into the RMS database when access is granted. Group electronic submittal documents into transmittal packages to send to the Government, except very large electronic files, samples, spare parts, mock ups, color boards, or where hard copies are specifically required. Track transmittals and update the submittal register in RMS on a daily basis throughout the duration of the contract. Submit hard copies of all submittals unless waived by the Government.

1.6.5 Schedule

Enter and update the contract project schedule in RMS by either manually entering all schedule data or by importing the Standard Data Exchange Format (SDEF) file, based on the requirements in SECTION 01 32 01 - PROJECT SCHEDULE.

1.6.6 Closeout

Closeout documents, processes and forms are managed and tracked in RMS by both the Contractor and the Government. Ensure that all closeout documents are entered, completed, and documented within RMS.

1.7 IMPLEMENTATION

Use of RMS as described in the preceding paragraphs is mandatory. Ensure that sufficient resources are available to maintain contract data within the RMS system. RMS is an integral part of the Contractor's required

management of quality control.

1.8 NOTIFICATION OF NONCOMPLIANCE

Take corrective action within 7 calendar days after receipt of notice of RMS non-compliance by the Government.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

SECTION 01 45 16

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

Furnish the labor, supervision, materials, equipment and services required to prepare a Contractor Quality Control (CQC) Plan for approval by the Government and to perform Contractor quality control in accordance with the approved CQC Plan.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

ASTM INTERNATIONAL (ASTM)

ASTM D3740	Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E329	Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	Safety and Health Requirements Manual

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

The CQC organization shall be responsible for certifying that all submittals comply with the contract requirements and are submitted in accordance with the date on the submittal register. CQC personnel shall also make physical checks of materials and equipment before installation to ensure compliance with approved submittals.

SD-01 Pre-Construction Submittals

CQC Plan; G

The Contractor shall develop and submit to the Government for approval, at least 14 calendar days prior to the Pre-Construction Quality Control Conference, a detailed CQC Plan.

SD-03 Product Data

CQC Organizational Changes; G

Any CQC organizational changes made during the contract period shall be submitted to the Government for acceptance.

CQC Report; FIO

The Contractor shall submit a CQC Report as specified in Paragraph 3.8. The reports shall be generated by the Resident Management System (RMS) in accordance with SECTION 01 45 00 - RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with FAR 52.246-5 Inspection of Services - Cost Reimbursement. The CQC system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the contract requirements. The system shall cover all construction operations, both on and off site, and shall be keyed to the proposed construction sequence. In this section the term "construction" shall include all items of work, activities, materials, and equipment as indicated in the Contract Documents. Other sections of the Contract Documents may also require separate, specially qualified individuals in such areas as chemical data acquisition, sampling and analysis, medical monitoring, industrial hygiene, safety, etc. The CQC organization shall coordinate the activities of these individuals. The Project Superintendent in this context shall mean the onsite individual with the responsibility for the overall management of the project including logistics, quality, and production. The site superintendent shall maintain a physical presence at the Site at all times when work is being performed, except as otherwise acceptable to the Government, and shall be responsible for all construction and construction-related activities at the Site.

3.2 QUALITY CONTROL PLAN

Submit no later than 14 days prior to the Pre-Construction Quality Control Conference, the Contractor Quality Control (CQC) Plan proposed to implement the requirements FAR 52.246-5 Inspection of Service. Work will be permitted to begin only after acceptance of the CQC Plan.

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 30 calendar days after receipt of Task Order Award, the CQC Plan proposed to implement the requirements of FAR 52.246-5 Inspection of Services - Cost Reimbursement. The plan shall also be submitted for approval 14 days prior to the Pre-Work Conference. The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 90 calendar days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the

definable features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, at a minimum, the following to cover all construction operations, both on and off site, including work by subcontractors, fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three-phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to an officer in the Contractor's organization above the Project Superintendent. The CQC System Manager is responsible for both quality and production.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Clear indication that CQC System Manager will have no duties other than quality control.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authority to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. Laboratory facilities will be approved by the Government. The Contractor shall incorporate all tests required by the Contract Documents (including systems commissioning and operating tests) to derive the above list of testing information which shall be presented in matrix form as part of the CQC Plan. This matrix shall be suitable for use by the Contractor and the Government as a checklist to control testing to be done on the contract. Coordinate any additional test submission or plan requirements for Mechanical and Electrical Systems with the appropriate specialized specification section if applicable.

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation. Provide matrix of Preparatory and Initial Inspections including specification reference paragraph, the name of the Definable Feature of Work (DFW), and spaces for date performed, results, and names of attendees.

g. Procedures for tracking construction deficiencies from identification

through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task that is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there is frequently more than one definable feature under a particular section. This list shall cover all features of work on the project and shall be agreed upon during the coordination meeting.

j. A brief explanation of the duties of the CQC organization with respect to safety. A separate Accident Prevention Plan and Hazards Analysis is required for submission and acceptance.

k. The Contractor's plan for training all CQC personnel in the CQC System.

l. Blank copies of QC checklists that will be used to check the work in the field.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on ability to achieve satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in its CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Government in writing of any proposed changes. Proposed changes are subject to acceptance by the Government.

3.3 COORDINATION MEETING (MUTUAL UNDERSTANDING MEETING)

After the Pre-Work Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Government and discuss the CQC System. The initial plan submitted must be found acceptable by the Government before the Coordination Meeting can be held. During the meeting, a mutual understanding of the system details will be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of the Contractor's management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Contractor and signed by both the Contractor and the Government. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC System or procedures that may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Safety and Health Manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. The number of CQC personnel shall be increased as required during times of high construction workload. The Contractor shall provide a CQC organization that shall be at the Site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Government. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the Site at all times, except as otherwise acceptable to the Government.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within its organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, or shall hold a state Professional Engineer's license, with a minimum of 2 years construction experience on construction similar to this contract, including one year as a QC representative. The CQC System Manager may also be a construction person with a minimum of 4 years in related work, including one year as a QC representative. This CQC System Manager shall be on the Site at all times during construction and shall be employed by the Contractor. An alternate for the CQC System Manager shall be identified in the CQC Plan to serve in the event of the CQC System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager. The CQC System Manager shall be assigned no duties other than Quality Control.

3.4.3 Organizational Expertise

The CQC organization, which includes the CQC System Manager and additional qualified personnel, must at a minimum possess general corporate technical knowledge of all aspects of the project, and must successfully execute the CQC System on all aspects of the project. Individuals possessing experience in specialized areas shall be added to the organization as required during periods when such specialty areas are being executed. Examples of such specialized areas would include HVAC, electrical distribution and substations, roofing, telecommunication systems, fire protection and alarm systems, computer installations, specialized welding, specialized finishes, precast concrete installation, modular housing, specialized geotechnical work, surveying, chemical data acquisition, hazardous material removal and disposal, medical monitoring, etc., depending on the nature of the particular project. The Contractor must demonstrate that such additional qualified personnel have received sufficient training and indoctrination into the CQC System, and that these personnel properly execute the requirements of the CQC System within their areas of expertise.

3.4.4 Additional Requirement

In addition to the above experience and education requirements, the CQC System Manager shall have completed within the last five years the course titled "Construction Quality Management for Contractors". This two-day course is given by Government personnel. The Government will provide one instruction manual for the course.

3.4.5 Organizational Changes

The Contractor shall maintain the CQC Organization at full strength at all times. When it is necessary to make changes to the organization, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Government for acceptance.

3.5 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.5.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work after all required plans/documents/materials are approved/accepted, and after copies are at the work site, and shall include:

a. A review of each paragraph of applicable specifications, references, codes and standards. A copy of those sections of referenced codes and standards applicable to the portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.

b. A review of the Contract Drawings.

c. A check to ensure that all materials and/or equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the work area to ensure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to ensure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to ensure safety requirements are met per EM 385-1-1, "Safety and Health Requirements Manual".

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and

workmanship standards for that feature of work.

i. A check to ensure that the portion of the plan for the work to be performed has been approved by the Government.

j. Discussion of the initial control phase.

k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase meeting. This phase shall include a meeting conducted by the CQC System Manager and attended by the Superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall clearly indicate its intent and plan for communication of the results of the preparatory phase to applicable workers, to include materials, construction methods, workmanship standards, safety considerations and procedures, and preparatory phase meeting minutes.

3.5.2 Initial Phase

This phase shall be accomplished at the beginning of a DFW when the accomplishment of a representative sample of the work is impending. The following shall be accomplished:

a. A check of the portion of work done to ensure that it is in full compliance with contract requirements.

b. Verify adequacy of controls to ensure full contract compliance.

c. Verify required control inspection and testing.

d. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate

e. Resolve all differences

f. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity hazard analysis with each worker.

g. The Government shall be notified at least 48 hours in advance of beginning the initial phase meeting. This phase shall include a meeting conducted by the CQC System Manager and attended by the Superintendent, other CQC personnel (as applicable), the foreman responsible for the definable feature and the work crew(s) for the DFW. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location (i.e., CQC Report number) of initial phase shall be indicated for future reference and comparison with follow up phases.

3.5.3 Follow-Up Phase

Daily checks shall be performed to ensure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular DFW. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks

shall be conducted, and all deficiencies corrected prior to the start of additional DFWs that may be affected by deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.5.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same DFW if the quality of ongoing work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a DFW is resumed after a substantial period of inactivity, or if other problems develop.

3.5.5 Definable Feature of Work: Definition and Discussion

A DFW is a portion of work consisting of materials, equipment, supplies, and procedures that are closely related to each other, have the same control, and shall be accomplished by the same work crew to completion. A DFW must be sufficiently small so that control of the work (i.e., communication of requirements to workers, inspection of materials and workmanship and correction of deficiencies) will be easily accomplished. Some examples of DFWs are:

a. Excavation of upland soil

b. Excavation/removal of the Flintkote turbine

c. Temporary staging areas and facilities

d. Demolition and debris removal

e. Soil erosion and stormwater management

f. Clearing and grubbing

g. Construction of soil and sediment staging and processing areas

h. Temporary water treatment system installation and operation

i. Excavation of creek sediment

j. Excavation of contaminated soil outside the containment wall alignment

k. Demolition of dams

l. Post-excavation sampling

m. Monitoring well modification and installation

m. Transportation and disposal

n. Wetland and site restoration

3.5.6 Tracking and Correcting Deficiencies

CQC personnel shall be responsible for tracking and promptly correcting deficiencies. The Construction Contractor Module of the Resident Management System for Windows, QCS, shall be used to track deficiencies in accordance with SECTION 01 45 00 - RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM). The "List of Outstanding Deficiencies" form provided at the

end of this specification shall be used as a supplement to document deficiencies not available in QCS and shall be kept current.

3.5.7 Daily CQC Reports

CQC personnel shall be responsible for preparing daily CQC reports in accordance with Paragraph 3.8 and SECTION 01 45 00 - RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM). Daily CQC reports shall be submitted to the Government no more than 24 hours after the date for which they are prepared. Reports shall indicate factual evidence of CQC activities including the preparatory meetings, initial phase meetings, and follow-up inspections including location of inspections and deficiencies found, tests performed and results, submittals reviewed, health and safety, etc.

3.6 TESTS

3.6.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product that conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a laboratory that has been assurance inspected by USACE within the last two years. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests performed, both passing and failing, shall be recorded on the CQC report for the date performed. Specification paragraph reference, location where tests were performed, and the sequential control number identifying the test will be given. If approved by the Government, actual test reports may be submitted later with a reference to the test number and date performed. An informational copy of results of tests performed by an offsite or commercial test facility shall be provided directly to the Government.

3.6.2 Testing Laboratories

3.6.2.1 Capability Check

The Government reserves the right to check laboratory equipment and calibration in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, aggregate, and steel shall meet criteria detailed in ASTM D3740 and ASTM E329. The Government requires a USACE capability check of the laboratory that the Contractor proposes to perform

tests on soils, concrete, asphalt, aggregate and steel. If the laboratory proposed has not had the required USACE capability check within the last two years, the check will be performed by USACE at a cost of $7,200 to the Contractor. This cost shall be paid by the Contractor via check directly to the USACE Laboratory performing the inspection and report.

3.6.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor shall be assessed a charge of $7,200 to reimburse the Government for each succeeding recheck of the laboratory or the check of a subsequently selected laboratory.

3.6.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results.

3.6.4 Furnishing or Transportation of Samples for Testing

Samples of materials for test verification and acceptance testing by the Government shall be delivered to the USACE-designated Quality Assurance (QA) laboratories.

Coordination of each specific test, exact delivery location, and dates will be made through the Buffalo District, USACE. The Contractor shall ensure sufficient notice is given to USACE prior to sample delivery.

3.7 COMPLETION INSPECTION

Completion inspections will be performed at two stages during the construction.

a. The first set of inspections shall be conducted after all pre-excavation site construction work necessary for Phase 1 activities (Flintkote 300 parcel upland soil excavation and William Street Dam demolition) is complete, including construction of soil erosion and sediment controls, stormwater diversion features, temporary haul roads, and staging areas. Excavation/dam demolition operations shall not commence until all testing and inspection of site construction has been completed to the satisfaction of the Government.

b. The second set of inspections will be conducted after remediation of the rest of the site and site restoration activities are complete and prior to demobilization.

3.7.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Clause titled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation as required herein, and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the

Contractor shall notify the Government that the facility is ready for the Government's "Pre-Final" inspection.

3.7.2 Pre-Final Inspection

The Government will perform this inspection to verify that the requirements detailed in the Contract Documents have been met. A Government "Pre-Final Punch List" will be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected and so notify the Government so that a "Final" inspection with the U.S. Environmental Protection Agency (EPA) can be scheduled. Any items noted on the "Pre-Final Punch List" shall be corrected in a timely manner. These inspections and any deficiency corrections required shall be accomplished within the time slated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.7.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the Superintendent or other primary management person and the Government, will attend this inspection. Government personnel including, but not limited to, those from EPA, USACE and State and local officials may be in attendance. The Final Acceptance Inspection will be formally scheduled by the Government based upon results of the Pre-Final Inspection. Notice shall be given to the Government at least 14 calendar days prior to the Final Acceptance Inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, shall be complete and acceptable by the date scheduled for the Final Acceptance Inspection.

3.8 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on the applicable forms, CQC Report in accordance with SECTION 01 45 00 - RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM), List of Outstanding Deficiencies, CQC Test Report List, and Record of Preparatory and Initial Inspections that includes, at a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and/or control activities performed with results and references to Contract Document requirements. The control phase should be identified (Preparatory, Initial, or Follow-Up). List deficiencies noted along with corrective action.

e. Quantity of materials received at the Site with statement as to acceptability, storage, and reference to Contract Document

requirements.

f. Submittals reviewed, with contract reference, by whom, and action taken.

g. Offsite surveillance activities, including actions taken

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in the Contract Documents.

j. Contractor's verification statement.

These records shall include a description of trades working on the project, the number of personnel working, weather conditions encountered, and any delays encountered. "N/A" shall be entered into any field for which no entry is intended. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. At a minimum, one report shall be prepared and submitted for every seven days of no work and on the last day of a non-work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. All documentation is expected to be legible and complete.

3.9 SAMPLE FORMS

The CQC report shall be generated by RMS in accordance with SECTION 01 45 00 - RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM). Preparatory and Initial Inspections, when performed, shall be indicated on the basic CQC Report and minutes for each inspection shall be attached. Minutes shall consist of a list of specific requirements for materials, procedures or equipment to be employed and shall also include any understandings reached or items of special importance discussed.

In addition, outstanding deficiencies shall be listed on the form "List of Outstanding Deficiencies" at the end of this section and shall be attached to each CQC Report. As deficiencies are corrected, they are to be acknowledged on the basic CQC Report and shall be deleted from the list.

The form at the end of this section titled "CQC Test Report List" shall be used by the Contractor to track testing to be done as the project progresses, and also to summarize the Contractor's Quality Control testing to be reported on the CQC Plan.

The form "Record of Preparatory and Initial Inspections" at the end of this section shall be used by the Contractor to track Preparatory and Initial Inspections as the project progresses and also to summarize these required inspections as part of the CQC Plan.

Additional reporting forms pertaining to specialized activities may be

included herein or elsewhere in the contract and shall be used for reporting as indicated. If the Resident Management System (RMS) is required to be used by the Contractor for the QC System as indicated elsewhere in the contract, the Contractor will generate all reports in the RMS System, and attached forms will serve as guidance only. Otherwise, forms contained herein will be used by the CQC staff for CQC System reporting.

3.10 NOTIFICATION OF NONCOMPLIANCE

The Government will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Government may issue an order stopping all or part of the work until satisfactory corrective action has been taken. Deficiencies cited and verbal instructions given to the Contractor by the Government shall be entered into that day's CQC Report.

-- End of Section --

CQC REPORT #_____ Date:_____

1. Project Title:_____

Location: _____Contract No.:_____

2. List Contractors and Subs Working This Day and Areas of Responsibility of Each:

_____

_____

_____

_____

3. Weather:

_____

_____

4. Description and Location of Work of the Project (Also indicate days of no work and reasons for delay)

_____

_____

_____

_____

_____

_____

5. Labor and Equipment Breakdown by Trade (Attach Continuation)

_____

_____

_____

_____

6. Preparatory Phase Inspections Held (See attached minutes)

_____

_____

_____

_____

_____

7. Initial Phase Inspections Held (See attached minutes)

_____

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_____

_____

_____

8. Follow-Up Phase Inspections Performed, Results and Corrective Actions Taken

_____

_____

_____

_____

_____

9. Job Safety. Indicate What Was Checked, Results, Instructions Received and Corrective Actions Taken

_____

_____

_____

_____

_____

_____

10. Additional Activities and Remarks (Check Appropriate Box)

[ ] a. Testing Performed. Attach Results.
[ ] b. Verbal Instructions Received.
[ ] c. Submittal Actions.
[ ] d. Outstanding Deficiencies. See Attached List.
[ ] e. Delivery of Equipment and Materials.
[ ] f. Misc/Remarks.

(Use Space Below To Describe Checked Items)

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11. Contractor's Verification: "The above report and attachments are complete and all supplies, materials, equipment and workmanship incorporated into the work are in full compliance with the contract except as noted."

Signed_____ Date_____

CQC Representative

CENAN-CO 5/99

LIST OF OUTSTANDING DEFICIENCIES

Page_____ of _____ DATE:_____

PROJECT TITLE:_____ CONTRACTOR:_____

LOCATION:_____ CQC REPORT#:_____ CONTRACT #:_____

SPEC REF OR DWG#	LOCATION ON PROJECT	DESCRIPTION OF DEFICIENCY	DATE FOUND	DATE TO BE CORRECTED	DATE CORRECTED	REMARKS

NOTE: THIS FORM SHALL BE USED BY THE CONTRACTOR TO TRACK OUTSTANDING CONSTRUCTION DEFICIENCIES

CQC TEST REPORT LIST

CQC REPORT#_____ Page_____ of _____ DATE:_____

CONTRACTOR:_____ CONTRACT #:_____

PROJECT TITLE:_____ LOCATION:_____

SPEC REF OR DWG#	TYPE OF TEST	DATE PERFORMED	RESULTS	REMARKS

NOTE: THIS FORM SHALL BE USED BY THE CONTRACTOR TO TRACK CQC TESTING. PROVIDE ATTACHMENTS AS REQUIRED.

RECORD OF PREPARATORY AND INITIAL INSPECTIONS

DATE OF INSP	TYPE OF INSP	DEFINABLE FEATURE OF WORK (DESCRIBE)	REPORT NOS		PERSONS ATTENDING INSP	WAS MAT'L AND/OR EQUIPMENT PHYSICALLY INSPECTED ?
			QA	QC		
NAD FORM 826 22 JULY 86		NOTE:THIS FORM SHALL BE USED BY THE CONTRACTOR TO TRACK PREP/INIT INSP'S ATTACH ADDITIONAL RESULTS OR COMMENTS AS REQUIRED				

END OF SECTION

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND UTILITIES

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish temporary construction facilities at the locations indicated on the Contract Drawings and of the size and performance requirements specified herein.

The Contractor shall budget for potentially obtaining office items (such as desks, chairs, tables, printers, copiers, fax machines, bulletin board, filing cabinets, etc.) from other USACE/EPA Sites. Coordinate furniture/equipment procurement with USACE prior to purchase.

The Contractor shall not procure office equipment until a thorough review of the Government's inventory of available equipment is performed with the Government.

Facilities shall consist of the following:

a. USACE/EPA field office

b. Safety, security, communications, and Contractor's offices

c. Emergency medical facility

d. Personnel hygiene and decontamination facilities

e. Equipment storage and lunch area

f. Onsite contaminated equipment area

g. Parking area

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-02 Shop Drawings

Temporary Site Facility Layout Plan; G

The Contractor shall submit a Temporary Site Facility Layout Plan to the Government for approval at least 14 calendar days prior to the Pre-Work Conference and no later than 30 days after the Task Order Award. At a minimum, the Contractor's Site Layout drawing shall include the following information:

a. General layouts of temporary facilities including trailers, shower trailers, emergency medical facilities, equipment storage area, decontamination areas, and other staging areas. A total of four

trailers are anticipated.

b. Electrical Supply and Lighting Shop Drawings.

c. Water Supply, Contaminated Washwater Handling and Sanitary Facilities.

d. Identify any areas which may have to be graveled or covered with construction mats to prevent the tracking of mud.

e. Indicate if the use of a supplemental or other staging areas are desired.

1.3 DOD CONDITION OF READINESS (COR)

DOD will set the Condition of Readiness (COR) based on the weather forecast for sustained winds 50 knots (60mph or 95 km/hr) or greater. Contact the Government for the current COR setting. Monitor weather conditions a minimum of twice a day and take appropriate actions according to the approved Emergency Plan in the accepted Accident Prevention Plan, EM-385-1-1 Section 01 Emergency Planning and the instructions below.

Unless otherwise directed by the Contracting Officer, comply with:

a. Condition FOUR (Sustained winds of 93 km/hr [50 knots] or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles or containers scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 4 feet high. Remove all debris, trash, or objects that could become missile hazards..

b. Condition THREE (Sustained winds of 93 km/hr [50 knots] or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness.

c. Condition TWO (Sustained winds of 93 km/hr [50 knots] or greater expected within 24 hours): Curtail or cease routine activities until securing operation is complete. Reinforce or remove form work and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas.

d. Condition ONE. (Sustained winds of 93 km/hr [50 knots] or greater expected within 12 hours): Secure the jobsite, and leave Government premises.

1.4 REGULATORY REQUIREMENTS

The Contractor shall obtain all necessary construction, building, zoning, and soil erosion and sediment control permits required by local authorities

The Contractor shall provide notification to the Government regarding all permits required by the local authorities prior to pursuing and obtaining such permits. Permits and approvals from local regulatory agencies are summarized in SECTION 01 11 00 - SUMMARY OF WORK.

1.5 MINIMIZE ACCUMULATION OF INVENTORY

During the contract period, the Contractor shall minimize the accumulation of government inventory to prevent a build-up of inventory the Government must manage at the end of the contract.

PART 2 PRODUCTS

2.1 GENERAL

All structures other than storage sheds installed under this section shall be provided with, at a minimum, the following services:

a. Lighting. Electric light, non-glare type luminaries to provide a minimum illumination level of 50 footcandles at desk height level

b. Heating and Cooling. Adequate equipment to maintain an ambient air temperature of 70 degrees Fahrenheit (F) ± 3 degrees.

c. Potable bottled water.

d. Fire Extinguisher. Non-toxic, dry chemical fire extinguisher with a minimum rating of 2A: 10B: 10C.

e. First Aid Kit. At a minimum, the first aid kit shall include antiseptic kit, eyewash solution, bandages, insect sting medication, aspirin and acetaminophen, and cold pack.

f. Automated external defibrillator approved by the United States Food and Drug Administration.

g. Janitorial services on a daily basis including but not limited to sweeping, emptying wastebaskets/recycling bins, servicing of toilets, weekly mopping of floors, sanitizing toilet seats, providing towels and soap to the lavatories and monthly washing of floors and windows (inside and out). The time of the cleaning shall be coordinated with the Government.

h. Sufficient supply of electrical outlets..

All parking areas shall be provided with adequate outdoor lighting as specified herein.

All structures and facilities shall be designed for year-round operation.

The trailers shall be installed higher than the 100-year flood elevation.

2.2 TEMPORARY SIGNAGE

2.2.1 Bulletin Board

Within 14 calendar days of mobilization on site and prior to commencement of field activities, provide a clear weatherproof covered bulletin board

not less than 915 by 1220 mm 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, Safety and Health Information as required by EM 385-1-1 Section 01 and other information approved by the Government.

2.2.2 Project Identification Signs

The requirements for the signs, their content, and location are as specified in Section 01 58 13 - SIGNS. Erect signs within 15 days after Task Order Award. Correct the data required by the safety sign daily, with light colored metallic or non-metallic numerals.

2.2.3 Warning Signs

Post temporary signs, tags, and labels to give workers and the public adequate warning and caution of construction hazards according to the EM 385-1-1 Section 04. Attach signs to the perimeter fencing every 150 feet warning the public of the presence of construction hazards. Signs must require unauthorized persons to keep out of the construction site. Correct the data required by safety signs daily.

2.3 TEMPORARY TRAFFIC CONTROLS

The Contractor shall furnish temporary traffic controls in accordance with SECTION 01 55 26 - TRAFFIC CONTROL.

2.4 FENCING

2.4.1 Polyethylene Mesh Safety Fencing

Temporary safety fencing must be a high visibility orange colored, high density polyethylene grid, a minimum of 48 inches high and maximum mesh size of 2 inches. Fencing must extend from the grade to a minimum of 48 inches above the grade and be tightly secured to T-posts spaced as necessary to maintain a rigid and taut fence. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.4.2 Chain Link Fencing

The Contractor shall furnish the materials and labor for the installation, maintenance, and removal of fencing in accordance with 32 31 13 - CHAIN LINK FENCES AND GATES.

2.5 TEMPORARY WIRING

Provide temporary wiring in accordance with EM 385-1-1 Section 11, NFPA 241 and NFPA 70. Include monthly inspection and testing of all equipment and apparatus.

2.6 USACE/EPA FIELD OFFICE

The Contractor shall furnish at the job site, prior to the start of work, a 60-foot by 24-foot field office for use by USACE and EPA for the duration of the contract. Field office and contents will remain the property of the Contractor. The exact location will be designated by the

Government. The office trailer shall be well constructed and properly ventilated and shall contain a closet, door, and windows capable of being locked. The office trailer shall be outfitted with office furniture and items, as directed by the Government, from other USACE/EPA sites. The Contractor shall also provide adequate electric lighting, a minimum of six duplex electrical receptacles, drinking water, heat, toilet facilities, air conditioning, janitorial services and maintenance services. In addition, the Contractor shall make arrangements and pay connection fees and monthly usage charges for electrical service, two telephone lines, and one dedicated fax line. The Contractor shall also provide and pay for a teleconferencing phone number for participants to call into the weekly construction meetings or any additional meetings requested by the Government. Additionally, a high-speed internet connection shall be provided for exclusive use by USACE and EPA. The field office shall be removed from the project site when and as directed by the Government.

The office trailer shall have four offices and one partitioned meeting area with a minimum of 480 square feet of floor area. The meeting area shall contain the following equipment, to be installed by the Contractor:

a. Two (2) office conference tables, 3.5 feet by 8 feet, with laminated tops.

b. Eighteen (18) straight-backed office chairs.

c. One (1) bulletin board, 4 feet by 6 feet.

d. Ten (10) wastebaskets.

e. One (1) recycling bin.

f. One (1) vertical filing plan rack for twelve sets of 30-inch by 48-inch plans.

g. Ten (10) four-drawer lockable filing cabinets, legal size.

h. One (1) coat rack and twelve (12) coat hangers.

i. Two (2) paper towel dispensers with sufficient supply of towels for the contract duration.

j. One (1) paper cup dispenser with cups.

k. One (1) water cooler/heater with sufficient supply of water for the contract duration.

l. One (1) refrigerator.

m. Toilet facilities, cold/hot water, with sufficient supply of toilet paper for the contract duration.

n. One (1) conference telephone with extension and intercom connection.

o. One (1) desktop color copy machine/fax machine/scanner/printer with dedicated telephone line and auto-feed, reduction, enlargement, sorting, stapling, and monochrome functions, capable of producing a minimum of ten copies per minute. The machine shall be equipped with individual trays for 8.5-inch by 11-inch, 8.5-inch by 14-inch, and 11-inch by 17-inch plain paper. The supply of paper and toner shall be

replenished by the Contractor as required by the Contracting Officer. The Contractor shall also provide copier service as required for the contract duration.

p. Nine (9) two-line telephones with conferencing and speakerphone capabilities compatible with phone service. Telephones shall be installed on each of the eight (8) desks, and one (1) on top of the filing cabinet.

q. One (1) first aid kit. At a minimum, the kit shall include antiseptic, eyewash solution, bandages, insect sting medication, aspirin, acetaminophen, and a cold pack.

r. One (1) fire extinguisher, of the type required for a trailer.

s. One (1) digital camera meeting the following minimum requirements:

1) Minimum sensor size 12.0 megapixels or better.

2) 48-bit color depth.

3) Flash card with 64 MB of memory or greater.

4) 3X optical zoom.

5) 1.8-inch TFT LCD monitor.

6) 3 built-in flash modes.

7) Wide aperture setting (f-stop).

8) Vibration reduction technology.

t. Eight (8) 24-inch or larger LCD monitors and eight (8) mice.

u. DSL business internet connection with dedicated IP address, preferably cable, with eight (8) connections and a Linksys, Cisco Cable, or DSL router with a 4- to 8-port network switch.

v. Eight (8) laser printers with scanning capability, preferably with built-in network capability.

w. All required cables, plugs, and wrist pads for keyboards and mice.

x. Eight (8) four-drawer lockable desks.

2.7 SAFETY, SECURITY, COMMUNICATIONS, AND CONTRACTOR'S OFFICES

A partitioned area shall be provided for safety, security and communications personnel. This area shall contain, at a minimum, the following equipment:

a. Two (2) office desks with lockable drawers, and three (3) office chairs.

b. One (1) telephone.

c. One (1) office table.

d. Two (2) lockable, fire-resistant, four-drawer filing cabinets.

e. A minimum of two (2) windows providing visibility of the Site.

f. One (1) base and six (6) portable two-way radios. All sets shall be intrinsically safe, and capable of transmitting to and receiving from any other set at any point within the Site and areas within the influence of the work. All portable units shall be rechargeable, and shall be capable of operating continuously without recharge for three hours.

A partitioned office shall be provided for the use of the Contractor. The office shall contain at least two operable windows with screens and shall be supplied with the following equipment:

a. One (1) office desk with lockable drawers and chair.

b. One (1) telephone.

c. One (1) fire-resistant, four-drawer, lockable filing cabinet.

2.8 EMERGENCY MEDICAL FACILITY

The emergency medical facility shall have a minimum floor space of 96 square feet. The facility shall contain, at a minimum, the following equipment and supplies:

a. Two (2) stretchers.

b. One (1) set of crutches.

c. Two (2) self-contained air respiratory devices.

d. One (1) cot.

e. Three (3) blankets.

f. First aid medications appropriate for the initial treatment of burns, abrasions, fractures, and ingestion or dermal contact with onsite hazardous waste.

2.9 PERSONNEL HYGIENE FACILITIES (SHOWER TRAILER)

The Contractor shall provide the equipment and fixtures specified below in order to provide for the proper hygiene and decontamination of all onsite personnel.

a. Shower facilities with at least one shower dedicated for onsite personnel of each sex.

b. Locker room for onsite personnel.

c. An area where all personnel safety equipment and protective clothing can be stored.

d. Toilet facilities with at least one toilet and sink for every six onsite personnel of each sex.

e. Sanitary waste holding tank and piping from Personnel Hygiene Facility

and site offices.

f. All equipment and fixtures shall be properly supplied and maintained in a clean condition. Drain water from all washing facilities shall be conveyed to an onsite holding tank for subsequent disposal at an approved sewage receiving facility.

2.10 EQUIPMENT STORAGE/LUNCH AREA

The Contractor shall provide a separate, uncontaminated lunch area of sufficient size for all Contractor onsite personnel. Such an area may be combined with equipment storage, as specified below. The Contractor shall furnish all the furniture required in the lunch room to accommodate the maximum number of Contractor personnel working on any single day.

A separate or partitioned equipment storage area shall also be provided and shall have access through a lockable door. The area for equipment storage shall not be less than 96 square feet. Sufficient shelving shall be installed for storage and inventory control of small items. In addition, this area shall contain one four-drawer lockable filing cabinet and a wooden lockable locker sufficient for the storage of surveying and testing instruments.

2.11 ONSITE CONTAMINATED EQUIPMENT AREA

The Contractor shall provide an onsite contaminated equipment storage area at the entrance point to each Contamination Reduction Zone facility area (lined with polyethylene). Equipment and personnel decontamination facility specifications are included in SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

Each contaminated equipment storage area shall include but not necessarily be limited to the following:

a. Boot rack for washing and storage.

b. Drums for the disposal of protective clothing.

c. A 10-foot by 10-foot temporary structure for the storage of contaminated materials with equipment used daily.

d. Emergency eyewash and shower and fire extinguisher.

2.12 PARKING

2.12.1 EMPLOYEE PARKING

Construction contractor employees will park privately owned vehicles in an area designated by the Government. This area will be within reasonable walking distance of the site.

2.12.2 GOVERNMENT PARKING

At least five parking spaces shall be reserved for the use of the Government and its visitors.

2.13 OUTDOOR LIGHTING

The Contractor shall determine the extent of existing outdoor lighting

within the Support Zone. If there is no lighting or existing lighting does not meet the requirements below, the Contractor shall furnish and install a complete operating outdoor lighting system throughout the designated Support Zone..

The lighting system shall include wood-pole-mounted 400-watt high-pressure sodium luminaries supported on 4-foot steel arms with 30-foot mounting height above grade. Provide one pole at or adjacent to the Support Zone. The system shall include all equipment and materials (such as transformers and circuit protective devices) and conductors.

Shop drawings shall be submitted showing the layout, equipment and material details, and circuits prior to furnishing the equipment.

2.14 SANITARY WASTE SYSTEM

The Contractor shall provide a sanitary waste system for the USACE/EPA trailer and pay monthly usage charges for the contract duration. Onsite sanitary facilities shall consist of chemical type toilets. No toilet facilities shall be provided in the Exclusion Zones. The Contractor shall provide a portable wash unit and collection system for the Equipment Decontamination Facility, hand washing, and as specified elsewhere.

2.15 FLAG POLES

The Contractor shall provide two 20-foot aluminum flag poles meeting the American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM) FP 1001-97, 5th Ed., Guide Specifications for Design of Metal Flagpoles or equal and all of the standard hardware to fly the U.S. Flag and U.S. Army Corps of Engineers Flag. The flag poles will be installed in the Support Zone at a location to be determined by the Government.

PART 3 EXECUTION

3.1 LOCATION

The Contractor shall utilize the Contractor's Support Zone shown on the Contract Drawings for all temporary facilities. Use of areas outside the Contractor's Support Zone shall be pre-approved by the Government.

3.2 MAINTENANCE

The Contractor shall maintain all temporary construction facilities and shall perform all necessary repairs, replacement, cleaning and any other maintenance required as directed by the Government. Included in this maintenance shall be sweeping and any other cleaning necessary to keep the facilities free of soil, dust and debris.

3.3 TEMPORARY BULLETIN BOARD

Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Government.

3.4 AVAILABILITY AND USE OF UTILITY SERVICES

3.4.1 Temporary Utilities

Provide temporary utilities required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

3.4.2 Meters and Temporary Connections

The Contractor shall be responsible for coordinating and paying fees for all temporary utility connections. Provide and maintain necessary temporary connections and meter bases required to measure the amount of each utility used for the purpose of determining charges.

-- End of Section --

SECTION 01 53 13

TEMPORARY BRIDGES FOR CONSTRUCTION

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment, and incidentals required to design, fabricate, deliver, and install temporary bridges to span the Eighteen Mile Creek completed as shown on the Contract Drawings and specified herein.

This Section is written as a Performance Specification. It is not the intent of this Section to specify all details of design, fabrication, construction, and operation. The Contractor shall have the ultimate responsibility for obtaining the engineering and design by a Professional Engineer registered in the State of New York, workmanship, materials, construction, installation, satisfactory testing and operational performance for all of the items and accessories under this and related Technical Specifications and Drawings. All required equipment and incidentals shall be furnished, whether specified herein or not, to produce three fully functional temporary bridges. The Government's approval of manufacturer's design and other submittals shall not relieve the Contractor of the above responsibilities. It is the intent of this Section that the system consists of a combination of standard units with refinements as required.

A geotechnical investigation was not performed for the temporary road bridge. The Contractor must engage the services of a New York licensed Professional Engineer to investigate and report the findings for the temporary road bridge over the Eighteen Mile Creek.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO HB-17	Standard Specifications for Highway Bridges
AASHTO LRFD	Bridge Design Specifications
AASHTO M111	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
AASHTO M164	Standard Specification for High-Strength Bolts for Structural Steel Joints
AASHTO M223	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 325-11	Steel Construction Manual

ASTM INTERNATIONAL (ASTM)

ASTM A36	Standard Specification for Carbon Structural Steel
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	Structural Welding Code - Steel
AWS D1.5	Bridge Welding Code

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 9000	Quality Control

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-02 Shop Drawings

Temporary Bridges; G

Within 90 days after Task Order Award, submit to-scale drawings with plans, elevations, cross sections, and details as necessary to show the layout of the bridges. The drawings shall show the position, size, and arrangement of, but not be limited to, foundation and bridge design drawings.

Structural Drawings and Specifications; G

The drawings shall include Structural Drawings, signed and sealed by the Professional Engineer (PE) licensed in New York. The PE shall be responsible for the foundation and bridge design in accordance with the codes. Submit calculations including foundation reactions identifying all applied loads, load factors, and load combinations.

A project- and site-specific Geotechnical Report, signed and sealed by a New York Professional Engineer will be required for the temporary bridge over the 18 Mile Creek.

Erection Drawings; G

Submit complete erection drawings and installation instructions, showing anchor bolt and base plate settings; bracing; and sections and details of openings, covering, and trim.

Details for diversion of flow in the main tributary and erosion

protection within the diversion channel shall also be provided.

SD-07 Certificates

P.E. Certification; FIO

Records shall be submitted as follows:

An original and three copies of a completed P.E. Certification Form, signed and sealed by a professional engineer registered in the State of New York shall be submitted prior to installation.

1.4 QUALITY ASSURANCE

All bridge components shall be provided by a single manufacturer continuously engaged in providing similar structures for the last five years.

Temporary Road Bridge Structures shall be an Acrow Beam Bridge by Acrow Corporation of America or approved equal.

1.5 DELIVERY, STORAGE, AND HANDLING

The Contractor shall deliver, store, and handle bridge structure components.

1.6 DESIGN CRITERIA

The road bridge structures shall consist of three longitudinal beams spaced at 10-foot centers connected together with diaphragms and have decks bolted to the tops of the beams. The bridge shall have an overall length of 45 feet and a roadway width of 21 feet. Bearings shall be located outside of the dredging limits.

The foundation shall be designed for the reactions from the temporary bridge structures.

The temporary structures shall be designed in accordance with AASHTO HB-17 Standard Specification for Highway Bridges to meet live load requirements of (HS-25), for ASD.

Deflections: The design of the structure shall be based on minimum deflection criteria due to live load plus impact not to exceed 1/600 of the span length.

Fatigue Stress: The Bridge shall be designed to a minimum of 500,000 cycles.

1.7 DESIGN CALCULATIONS

The Contractor shall submit the following the project's Engineer-of-Record (EOR): geotechnical report, bridge calculations, and foundation design calculations all miscellaneous structural items. All calculations shall be signed and sealed by a professional engineered licensed in the State of New York.

1.8 WARRANTY

Provide Manufacturer's written one-year limited warranty providing bridge

structures to be free from defects in materials and workmanship, beginning from the date of acceptance by Government.

PART 2 PRODUCTS

2.1 GENERAL

All material to be of recent manufacture. Certificates of compliance for each shipment must be submitted identifying the manufacture date.

2.2 LONGITUDINAL BEAMS - TEMPORARY ROAD BRIDGE

These members are fabricated from wide flanged sections, and utilize material listed in Paragraph 2.4. Vertical cross-bracing is incorporated between floor beams in every other bay. This bracing is at each end of the floorbeams and prevents horizontal loads from being transferred from the floorbeam into the truss members.

2.3 ORTHOTROPIC STEEL DECKS- TEMPORARY ROAD BRIDGE

The deck system shall be comprised of orthotropic units. Each unit is 6 feet long and 10 feet wide has a steel deck plate welded to stringers. The deck shall be supplied with a factory applied product which shall consist of a 2 parts epoxy and a broadcast basalt aggregate for an anti-skid surface.

2.4 TECHNICAL SPECIFICATIONS

Materials for the temporary road bridge structures shall meet or exceed the following:

a. Deck Stringers, Longitudinal beams

   1) AASHTO M223 Grade 50

   2) Ultimate tensile strength 70,000/90,000 p.s.i.

   3) Yield 50,000 p.s.i.

   4) Elongation 18% of 8 inch Gauge Length

b. All other parts

   1) ASTM A36: Grade 36

   2) Ultimate tensile strength 63,000/75,000 p.s.i.

   3) Yield 36,000 p.s.i.

   4) Elongation 20% of 8 inch Gauge Length

c. Bolts - AASHTO M164

2.5 FABRICATION - FOR THE TEMPORARY ROAD BRIDGE STRUCTURES

Workmanship, fabrication, and shop connections are in accordance with the AISC 325-11 Manual of Steel Construction, AWS D1.1 and AWS D1.5 Bridge welding codes, AASHTO LRFD Bridge Design Code, and ISO 9000.

Welding is performed by properly certified operators.

Bridge shall be fabricated by a fabricator who is currently certified by the American Institute of Steel Construction to have the personnel, organization, experience, capability, and commitment to produce fabricated structural steel for the category "Simple Steel Bridge Structures".

2.6 FINISHING - FOR THE TEMPORARY ROAD BRIDGE STRUCTURES

All major components are hot-dipped galvanized to AASHTO M111 and ASTM A123 specification or equivalent.

ll bolts, pins, etc., are galvanized or spun galvanized.

PART 3 EXECUTION

3.1 GENERAL

Bridge Structure erection shall conform to AASHTO, the approved erection drawings, and the bridge manufacturer's installation instructions.

The bridge structures shall not be erected until:

a. Foundation design has been submitted to the Government.

b. The foundation design and details have been approved by the Government for the selected building system..

c. In addition, the rail bridge structures have been approved by Conrail.

3.2 PREPARATION

The Contractor shall be responsible for final coordination of the Contract Documents with the information provided by the bridge manufacturer including, but not limited, to the following:

Coordination of foundation dimensions, both horizontal and vertical, including: overall dimensions, connections to foundation, and anchor bolt locations and quantities..

3.3 ERECTION

The Contractor is responsible for ensuring that all safety procedures for the erection of the bridge structures are strictly enforced and that any required ties, stays, and temporary supports are positioned as necessary to keep the structure stable and secure at all times.

The Contractor shall install erosion control measures in the channel in accordance with the approved erosion and sediment control plan.

On completion of the project, the Contractor shall remove the temporary structures. The approach surfaces shall be broken up, the surplus material removed and legally disposed of, and the areas trimmed and graded as specified.

-- End of Section --

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SECTION 01 55 26

TRAFFIC CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to provide traffic control during the remediation. Traffic control shall include, but not be limited to: notification and coordination with local police, fire, and emergency response authorities; traffic control signage and devices to maintain safe traffic around the Site.

The Contractor shall provide additional traffic control signage and flagmen along Clinton Street, Water Street, and Mill Street during excavation and restoration activities in the respective areas.

Where a conflict between this specification and the NYSDOT Standard Specifications exists, the more stringent requirement shall apply.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	Safety and Health Requirements Manual

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

23 CFR 655F	Traffic Control Devices on Federal-Aid and Other Streets and Highways
DOT D-6.1	Manual on Uniform Traffic Control Devices

NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYSDOT)

SECTION 619	Work Zone Traffic Control - Standard Specifications

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Traffic Control Plan; G

Prior to the commencement of construction operations, the Contractor

shall submit for approval a Traffic Control Plan, detailing the proposed traffic control details for the maintenance of traffic and access around the Site. The plan shall be provided to the City of Lockport.

PART 2 PRODUCTS

All traffic control devices shall conform to DOT D-6.1.

PART 3 EXECUTION

Traffic control shall be accomplished in accordance with Section 8, Paragraph C of EM 385-1-1, 23 CFR 655F, DOT D-6.1, WZTC, and all other local and state regulations

The Contractor shall provide traffic control during mobilization, excavation, restoration, and demobilization operations at Upson Park, Clinton Street, the Water Street properties, the Site properties along Mill Street, and as otherwise necessary to meet the local requirements.

The Contractor shall maintain a minimum of two flagmen at any entrance to Site property during all periods when trucks are entering or exiting the site.

The Contractor shall coordinate with, notify, and obtain written approval from City of Lockport and all local emergency response authorities (police, fire, etc.) prior to the remediation or restricting traffic on any roads..

The Contractor shall conduct construction operations in such a manner as to offer the least possible obstruction to the safe and satisfactory movement of traffic over the existing roads during the life of the contract.

The Contractor shall be responsible for providing, erecting, maintaining, and removal of all traffic signs, barricades, and other traffic control devices necessary for maintenance of traffic.

All barricades, warning signs, lights, temporary signals, other devices, flagmen, and signaling devices shall meet or exceed the minimum requirements of the state and federal DOT requirements.

-- End of Section --

SECTION 01 57 13

EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform erosion and sedimentation control for the duration of the project. Work shall be performed as shown on the Contract Drawings, specified herein and identified in the Contractor's approved Soil Erosion and Sediment Control Plan.

The Contractor shall furnish all labor, materials, equipment, and incidentals required and perform all installation maintenance, removal, and area cleanup related to sedimentation control work in accordance with the Drawings. The work shall include, but not necessarily be limited to, installation of temporary access ways and staging areas, silt fences, stone filter berms, temporary cofferdams, sediment removal and disposal, device maintenance, removal of temporary devices, temporary mulching, excelsior matting installation, and final cleanup.

Erosion and sedimentation control measures shall be installed in accordance with the requirements of the New York Standards and Specifications for Erosion and Sediment Control (latest edition) and General Permit 0-20-001.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Soil Erosion and Sediment Control Plan; G

The Contractor shall prepare and submit a Soil Erosion and Sediment Control Plan for approval by the Government at least 14 days prior to the Pre-Work Conference. The Government will review the Soil Erosion and Sediment Control Plan and return it to the Contractor with comments. Deficiencies in the Soil Erosion and Sediment Control Plan will be discussed at the Pre-Work Conference. The Contractor shall make all necessary amendments required by the Government and resubmit it for approval. This procedure shall continue until the Government gives final written approval. The Contractor shall make necessary effort so that only one resubmittal is required.

Permits; FIO

The Contractor shall be responsible for acquiring all permits prior to construction unless otherwise directed by the government.

SD-03 Product Data

Products; G

The Contractor shall submit technical product literature for all commercial products, including but not limited to straw mulch, tackifier, turbidity curtain, silt fence, hay bales, silt socks, etc. to be used for sedimentation and erosion control.

Soil Erosion and Sediment Control Plan Updates; G

The Contractor shall prepare and submit Soil Erosion and Sediment Control Plan Updates for approval by the Government at least 14 days prior to the commencement of construction at a new area as the project progresses. The Government will review the Soil Erosion and Sediment Control Plan and return it to the Contractor with comments. Deficiencies in the Soil Erosion and Sediment Control Plan Updates will be discussed at project progress meetings. The Contractor shall not process construction at a new area until the Government gives final written approval. The Contractor shall make necessary effort so that only one submittal is required.

SD-04 Samples

Samples; G

Samples of all materials shall be submitted for inspection and approval upon the Government's request.

SD-07 Certificates

Erosion and Sediment Control Inspector Qualifications; FIO

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

ASTM INTERNATIONAL (ASTM)

ASTM D4632/ D4632M	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
ASTM D3786/ D3796M	Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
ASTM D4833/ D4833M	Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
ASTM D4533/ D4533M	Standard Test Method for Trapezoid Tearing Strength of Geotextiles
ASTM D4491/ D4491M	Standard Test Methods for Water Permeability of Geotextiles by Permittivity

ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4533/ D4533M	Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc-Type Apparatus

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SSERC	New York State Standards and Specifications for Erosion and Sediment Control (Blue Book)

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

Section 703-02	Standards and Specifications, Section 703-02, Coarse Aggregate

Matters of interpretation of these standards shall be identified and submitted to the Government. All matters of interpretation shall be resolved before starting work. Where the requirements of this specification, applicable laws, ordinances, and regulations, vary, the most stringent requirements shall apply.

1.4 QUALITY ASSURANCE

The Contractor shall be responsible for the timely installation and maintenance of all erosion and sedimentation control devices necessary to prevent the movement of sediment from the construction site to offsite areas or into water bodies via surface runoff or underground drainage systems. Measures in addition to those shown on the Contract Drawings necessary to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up.

Sedimentation and erosion control measures shall conform to the requirements of the New York SSERC and General Permit 0-20-001.

PART 2 PRODUCTS

2.1 TEMPORARY SILT FENCE

Silt fence filter fabric shall be a woven, polypropylene, ultraviolent resistant material meeting minimum requirements below:

Fabric Properties	**Minimum Acceptable Value**	**Test Method**
Grab Tensile Strength (lbs)	110	ASTM D4632/ D4632M
Elongation at Failure (%)	20	ASTM D4632/ D4632M
Mullen Burst Strength	300 psi	ASTM D3786/ D3796M

Fabric Properties	**Minimum Acceptable Value**	**Test Method**
Puncture Strength (lbs)	60	ASTM D4833/ D4833M
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D4533/ D4533M
Flow through Rate (gal/min/sf)	25	ASTM D4491/ D4491M
Equivalent Opening Size	40 - 80	US Std Sieve ASTM D4751
Minimum UV Residual (%)	70	ASTM D4355/ D4355M

Products: Provide one of the following:

1. "Mirafi FW402," by TenCate Geosynthetics

2. "Carthage 15%," by Carthage Mills

3. "HSP2." by ACF Environmental, Inc.

4. Or equal.

2.2 SEDIMENT CONTROL BAG

Sediment control bags shall be used during dewatering activities to collect sediment from within the excavation areas.

The bag shall be sewn with a double needle machine using high strength thread, double stitched "joe" type capable of minimum roll strength of 100 lbs/inch (ASTM D4884). The geotextile material shall meet the following standards:

Minimum Grab Tensile Strength	200 lbs.
Minimum Grab Tensile Elongation	50%
Minimum Trapezoid Tear Strength	80 lbs.
Mullen Burst Strength	380 psi
Minimum Puncture Strength	130 lbs.
Apparent Opening Size	40-80 US Sieve
Minimum UV Resistance	70%
Minimum Flow Thru Rate	70 gpm/sqft

2.3 STRAW MULCH

Straw mulch shall be utilized on all newly graded areas to protect areas against washouts and erosion at a rate of 2 to 2.5 tons/acre. Straw mulch shall be comprised of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold, or other objectionable material. The

straw mulch shall contain at least 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.

2.4 MULCH ANCHORING

Mulch anchoring should be accomplished immediately after placement to minimize loss due to wind or water. This may be done according to the following methods:

a. Wood-fiber or paper-fiber mulch at the rate of 1,500 lbs/acre applied by the hydroseeder. Use is limited to only the optimum seeding season.

b. Synthetic or Organic Binders.

c. Peg and twine, mulch netting, and mechanical crimping.

d. Crimping requires a higher mulch rate (3 tons/acre).

2.5 TACKIFIER

Latex acrylic copolymer or organic tackifier shall be a commercial product specifically manufactured for use as straw mulch tackifier.

2.6 TURBIDITY CURTAIN

Turbidity curtain shall consist of flexible polyester reinforced vinyl filter fabric dielectrically welded to provide an upper hem for enclosing flotation material and a lower hem for enclosing ballast material. Adequate flotation and ballast shall be provided for each installation. Each curtain shall be made up of one or more sections run from shoreline at an arc around the work area back to shoreline, length as required per each installation. Multiple sections shall be connected using shackled and bolted load lines with reinforced PVC pipe for watertight fabric closure. Appropriate depth of fabric, flotation material, and ballast shall be used for each installation. Height shall be 20 percent greater than the depth of water.

The curtain shall be constructed in accordance with the SSERC.

2.7 EROSION CONTROL BLANKET

The double-net Erosion Control Blanket shall be a 100% biodegradable, machine-produced mat fabricated in the U.S.A. of coconut (coir) fiber with a functional longevity of greater than 36 months and permissible shear stress exceeding 2.25 psf. The blanket shall be of consistent thickness with the coconut fiber evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a 60 x 50 woven coir fiber netting with mesh openings not to exceed .75 in. x .75 in. (1.90 x 1.90 cm). The blanket shall be covered on the bottom side with 100% biodegradable woven natural fiber jute netting. The jute netting shall form an approximate 0.50 in. x 1.0 in. (1.27 x 2.54 cm) mesh. The blanket shall be sewn together on 1.50 in. (3.81 cm) centers with degradable thread, such as Model C700BN long term blanket by North American Green or equivalent.

Photodegradable erosion control fabric is unacceptable.

Erosion control fabric that contains polypropylene netting or other

non-biodegradable material is unacceptable.

Provide either "T" shaped hardwood stakes or biodegradable pins for anchoring seams and edges of erosion control blankets. Stakes must be 6" long for compacted soils and 12"- 24" long for looser soils with a 1" x 1" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat. If using wood stakes, use only ones that are solid, that will not split or crack, and are free of rot. Contractor may fabricate stakes or may purchase commercially available ones made specifically for the purpose of securing erosion control blankets.

2.8 COMPOST SOCKS

A mesh tube, oval to round in cross section, 12 inches in diameter. Sock shall have a minimum durability of one year after installation. Sock shall be composed of biodegradable jute, sisal, burlap, or coir fabric. Fabric shall be clean, evenly woven, and free of encrusted concrete or other contaminating materials and free from cuts, tears, broken or missing yarns and thin, open, or weak places.

Securely anchored by wood stakes. Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber, and shall be straight and free of loose or unsound knots and other defects which would render the stakes unfit for use. Stake shall be pointed on the end to be driven into the ground, and at least 1" x 1" x 36" in size.

Compost sock shall be filled with compost derived from any single, or mixture of the following feedstock material: green material consisting of chipped, shredded, or ground vegetation, or clean recycled wood products, biosolids, manure, or mixed food waste. Compost feedstock material to reduce weed seeds, pathogens, and deleterious materials to comply with state and local regulations. Compost shall not be derived from mixed municipal solid waste and be reasonably free of visible contaminants. Compost shall not contain paint, petroleum products, pesticides, or any other chemical residues harmful to animal life or plant growth. Compost shall not possess objectionable odors.

2.9 TEMPORARY SEEDING

Temporary Seed Mix shall be in accordance with SECTION 32 92 19 - LOAMING AND SEEDING.

2.10 TEMPORARY COFFERDAMS

Temporary cofferdam barriers shall be manufactured by AquaDams, Aqua-Barrier, Portadam, or be constructed of sandbags or other approved materials. The temporary cofferdam systems shall be designed by the Contractor to retain water and remain stable with a water loading equal to the full height of the temporary cofferdam. The temporary cofferdam shall be designed to be installed, perform, and remain stable to provide dry conditions for the duration of soil removal work.

2.11 TEMPORARY SLOPE PROTECTION

Temporary slope protection riprap shall be sound, durable rock which is roughly rectangular shape and of suitable quality to ensure permanence in

the condition in which it is to be used. Rounded stones, boulders, sandstone, or similar soft stone will not be acceptable. Material shall be free from overburden, soil, shale, and organic material, meet the Government's approval, be well graded, and conform to the New York Standards and Specifications for Erosion and Sediment Control (latest edition).

2.12 CRUSHED STONE

Crushed stone for sediment filtration devices, access ways, and staging areas shall conform to New York State Department of Transportation "Standards and Specifications" Section 703-02, and SSERC.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

The Government has the authority to limit the surface area of erodible earth material exposed by grubbing, as well as the surface of erodible earth material exposed by excavation and fill operations, and to direct the Contractor to provide immediate, permanent, and/or temporary pollution control measures to prevent contamination of adjacent properties, streams, or other watercourses. Such work may involve the use of temporary mulches, mats, seeding, or other control devices or methods as necessary to control erosion. Cut and fill slopes shall be seeded and mulched as the excavation proceeds, to the extent directed by the Government.

The Contractor shall be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in its accepted schedule. Temporary pollution control measures shall be used to correct conditions that develop during construction, prior to installation of permanent pollution control features, or temporarily to control erosion that develops during normal construction practices.

The Government has the authority to limit the area of excavation and fill operations in progress commensurate with the Contractor's capability and progress in keeping the finished grading, mulching, seeding and other such temporary or permanent pollution control measures current, in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

In the event of conflict between these requirements and pollution control laws, rules, or regulations, or other Federal, State, or local agencies, the more restrictive laws, rules, or regulations shall apply.

3.2 INSTALLATION OF SEDIMENT AND EROSION CONTROLS

3.2.1 Sediment Fence Installation

Sediment fences shall be positioned as indicated on the Contract Drawings and as necessary to prevent off site movement of sediment produced by construction activities as directed by the Government.

Dig trench approximately 6-in wide and 6-in deep along proposed fence lines. Drive stakes, 8-ft on center (maximum) at back edge of trenches. Stakes shall be driven 2-ft (minimum) into ground.

Hang filter fabric on posts carrying to bottom of trench with about 6-in of fabric laid across bottom of trench. Stretch fabric fairly taut along fence length and maintain secure both ways.

Backfill trench with excavated material and tamp.

Install pre-fabricated silt fence according to manufacturer's instructions.

3.2.2 Turbidity Curtain

Turbidity curtain shall be installed prior to commencing any sediment excavation work and excavation at creek or tributary edge. Turbidity curtain shall be used during the entire sediment excavation operation to minimize increases in turbidity outside the area of excavation and shall remain in place until the connection of the creek is stabilized.

Temporary turbidity curtain shall also be installed adjacent to wetlands replacement areas to prevent siltation of newly planted areas.
The turbidity curtain shall extend the full depth of the creek.
The turbidity curtain shall be maintained in good operating condition during the entire period of excavation or excavation at creek or tributary edge work.

3.2.3 Erosion Control Blanket

Erosion control blanket shall be installed on all exposed slopes to be loamed and seeded that are 3:1 or steeper. Install erosion control blanket as recommended by the manufacturer. Erosion control blanket shall be installed immediately after final grading and application of permanent seed mixes. Final grading shall ensure that the erosion control blanket is in contact with the soil surface in all areas to be protected.

The area to be covered shall be properly prepared, fertilized and seeded with permanent vegetation before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. The blankets shall be applied in the direction of water flow and stapled.

3.2.4 Compost Socks/Fiber Rolls

To ensure optimum performance, cut down or remove heavy vegetation, and level uneven surfaces to ensure that the compost sock uniformly contacts the ground surface.

Prior to installation, clear the bedding area of obstructions including rocks, clods, and debris greater than one inch.

Fill socks uniformly with compost to the desired length such that the logs do not deform and secure ends. When more than one compost sock is required to achieve desired length, join socks longitudinally with a minimum 12-inch overlap. Stakes shall be installed 4 feet apart along the length of the compost socks and stopped at 6 inches from each end of the sock. Stakes shall be driven to a maximum of 2 inches above, or flush with the top of the sock.

Installation:

a. Place directly on the ground with good contact with the finish grade.

b. Secure with wood stakes every 4 feet along the length of the compost sock.

c. Secure the ends of the compost sock by placing a stake 6 inches from the end of the compost sock.

d. Drive the stakes into the soil so that the top of the stake is less than 2 inches above the top of the compost sock.

e. Where the compost sock manufacturer's recommended installation differs from these specifications, Contractor shall be allowed to install the compost socks as recommended by the manufacturer only if it meets the intent of the detail and prior, written authorization is obtained from the Government.

3.2.5 Temporary Cofferdams

The Contractor shall comply with all applicable regulations for installation of the temporary cofferdams.

Materials shall be delivered to the site with load lists clearly identifying product components and manufacturer. Materials shall be stored in accordance with manufacturer's instructions, and shall be protected during handling, installation, and removal to prevent damage.

Temporary cofferdams shall be installed in accordance with manufacturer's instructions and approved submittals.

3.2.6 Dust Control

Control dust on exposed areas of temporary accessways, construction routes or other construction areas subject to surface dust movement and blowing dust.

Respray areas as necessary to keep dust to a minimum and as directed by the Government

3.3 MAINTENANCE AND INSPECTIONS

The temporary erosion control features installed by the Contractor shall be acceptably maintained by the Contractor until no longer needed or until permanent erosion control methods are installed. The erosion control features shall be inspected daily and after each runoff event. Required repairs shall be performed in a timely manner. Any related materials removed shall become the property of the Contractor.

3.4 TEMPORARY MULCHING

Apply temporary mulch to areas where rough grading has been completed but final grading is not anticipated to begin within 14 days of the completion of rough grading.

Straw mulch shall be applied at a rate stated herein and tackified with latex acrylic copolymer at a rate and diluted in a ratio per manufacturer's instructions.

3.5 TEMPORARY SEEDING

Apply temporary seed and mulch in areas where construction activity ceases

for more than 14 days. Seed application shall be in accordance with the New York Standards and Specifications for Erosion and Sediment Control (latest edition) and approved by the Government.

3.6 REMOVAL AND FINAL CLEANUP

Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner. Regrade all areas disturbed during this process and stabilize against erosion with surfacing materials as indicated on the Contract Drawings.

When work is completed and with the written authorization of the Government, remove all sediment and erosion control devices and restore areas to original conditions or proposed conditions as shown on the Contract Drawings.

-- End of Section --

SECTION 01 57 19

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 SCOPE OF WORK

This section covers the requirements for protection of the human and natural environment during site preparation; soil and sediment excavation; demolition; creek diversion; handling and transport of contaminated materials; site restoration; and other construction activities specified in the Contract Documents. This includes furnishing all labor, materials, equipment and incidentals required to provide environmental pollution and damage control.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 273	Standards for Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 300.125	National Oil and Hazardous Substances Pollution Contingency Plan - Notification and Communications
40 CFR 355	Emergency Planning and Notification
40 CFR 50	National Primary and Secondary Ambient Air

	Quality Standards
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 64	Compliance Assurance Monitoring
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings

1.3 DEFINITIONS

1.3.1 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act. A list of Class I ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

Class II ODS is defined in Section 602(s) of The Clean Air Act. A list of Class II ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

1.3.2 Contractor Generated Hazardous Waste

Contractor generated hazardous waste is materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene), waste thinners, excess paints, excess solvents, waste solvents.

1.3.3 Electronics Waste

Electronics waste is discarded electronic devices intended for salvage, recycling, or disposal.

1.3.4 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally or historically.

1.3.5 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.3.6 Hazardous Debris

As defined in paragraph SOLID WASTE, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) in accordance with 40 CFR 261. Hazardous debris also includes debris that exhibits a characteristic of hazardous waste in accordance with 40 CFR 261.

1.3.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that: Is regulated as a hazardous material in accordance with 49 CFR 173; or requires a Safety Data Sheet (SDS) in accordance with 29 CFR 1910.120; or during end use, treatment, handling, packaging, storage, transportation, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D. Designation of a material by this definition, when separately regulated or controlled by other sections or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this section for "control" purposes. Such material includes ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs).

1.3.8 Hazardous Waste

Hazardous Waste is any material that meets the definition of a solid waste and exhibit a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity) as specified in 40 CFR 261, Subpart C, or contains a listed hazardous waste as identified in 40 CFR 261, Subpart D.

1.3.9 Land Application

Land Application means spreading or spraying discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Comply with federal, state, and local laws and regulations.

1.3.10 National Pollutant Discharge Elimination System (NPDES)

The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States

1.3.11 Oily Waste

Oily waste are those materials that are, or were, mixed with Petroleum, Oils, and Lubricants (POLs) and have become separated from that POLs. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, POLs and may be appropriately tested and discarded in a manner which is in compliance with other state and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that: It is not prohibited in other state regulations or local ordinances; the amount generated is "de minimus" (a small amount); it is the result of minor leaks or spills resulting from normal process operations; and free-flowing oil has been removed to the practicable extent possible. Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, perform a hazardous waste determination prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.3.12 Regulated Waste

Regulated waste are solid wastes that have specific additional federal, state, or local controls for handling, storage, or disposal.

1.3.13 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

1.3.14 Solid Waste

Solid waste is a solid, liquid, semi-solid or contained gaseous waste. A solid waste can be a hazardous waste, non-hazardous waste, or non-Resource Conservation and Recovery Act (RCRA) regulated waste. Types of solid waste typically generated at construction sites may include:

1.3.14.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2.5-inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (for example, cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

1.3.14.2 Non-Hazardous Waste

Non-hazardous waste is waste that is excluded from, or does not meet, hazardous waste criteria in accordance with 40 CFR 263.

1.3.14.3 Recyclables

Recyclable materials identified as part of the work are detailed in SECTION 02 41 00 - DEMOLITION and shall be disposed of in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL. Materials recycled shall be documented in accordance with SECTION 01 33 29 - SUSTAINABILITY REPORTING.

1.3.15 Surface Discharge

Surface discharge means discharge of water into drainage ditches, storm sewers, creeks or "waters of the United States". Surface discharges are discrete, identifiable sources and require a permit from the governing agency. Comply with federal, state, and local laws and regulations.

1.3.16 Wastewater

Wastewater is the used water and solids from a community that flow to a treatment plant.

1.3.17 Stormwater

Stormwater is any precipitation in an urban or suburban area that does not evaporate or soak into the ground, but instead collects and flows into storm drains, rivers, and streams.

1.3.18 Waters of the United States

Waters of the United States means Federally jurisdictional waters, including wetlands, that are subject to regulation under Section 404 of the Clean Water Act or navigable waters, as defined under the Rivers and Harbors Act.

1.3.19 Wetlands

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

1.3.20 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (for example, thermostats), and lamps (for example, fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 - SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey; FIO

Regulatory Notifications; G

Environmental Protection Plan; G

Employee Training Records; G

Environmental Manager Qualifications; G

SD-06 Test Reports

Laboratory Analysis; FIO

Inspection Reports; FIO

Solid Waste Management Report; G

SD-07 Certificates

Employee Training Records; G

Certificate of Competency; FIO

SD-11 Closeout Submittals

Stormwater Pollution Prevention Plan Compliance Notebook; G

Waste Determination Documentation; G

Disposal Documentation for Hazardous and Regulated Waste; G

Assembled Employee Training Records; G

Contractor Certification; FIO

1.5 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. Comply with federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Analytical work must be performed by qualified laboratories; and where required by law, the laboratories must be certified.

1.6 QUALITY ASSURANCE

1.6.1 Preconstruction Survey and Protection of Features

Prior to start of any onsite construction activities, perform a Preconstruction Survey of the project site with the Government, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record. Include in the report a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. The Contractor and the Government will sign this survey report upon mutual agreement regarding its accuracy and completeness. Protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference that their preservation may cause to the work under the Contract.

1.6.2 Environmental Brief

Attend an environmental brief to be included in the pre-construction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be handled onsite; and types and quantities of wastes/wastewater that may be generated during the Contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Government to discuss the proposed Environmental Protection Plan (EPP). Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural and cultural resources, required reports, required permits, permit requirements (such as mitigation measures), and other measures to be taken.

1.6.3 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager is directly responsible for coordinating contractor compliance with federal, state, local, and site requirements. The Environmental Manager must ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the EPP; ensure environmental permits are obtained, maintained, and closed out; ensure compliance with Stormwater Program requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; and coordinate any remediation of hazardous material. This can be a collateral position; however, the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out. Submit Environmental Manager Qualifications to the Government.

1.6.4 Employee Training Records

Prepare and maintain Employee Training Records throughout the term of the

contract meeting applicable 40 CFR requirements. Provide Employee Training Records in the Environmental Records Binder. Submit these Assembled Employee Training Records to the Government at the conclusion of the project, unless otherwise directed.

Train personnel to meet EPA and state requirements. Conduct environmental protection/pollution control meetings for personnel prior to commencing construction activities. Contact additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, waters of the United States, and endangered species and their habitat that are known to be in the area.

1.6.5 Non-Compliance Notifications

The Government will notify the Contractor in writing of any observed noncompliance with federal, state or local environmental laws or regulations, permits, and other elements of the Contractor's EPP. After receipt of such notice, inform the Government of the proposed corrective action and take such action when approved by the Government. The Government may issue an order stopping all or part of the work until satisfactory corrective action has been taken. This is in addition to any other actions the Government may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

1.7 ENVIRONMENTAL PROTECTION PLAN

The purpose of the Environmental Protection Plan (EPP) is to present an overview of known or potential environmental issues that must be considered and addressed during construction. Include in the EPP measures for protecting natural and cultural resources, required reports, and other measures to be taken. Meet with the Government or Government Representative to discuss the EPP and develop a mutual understanding relative to the details for environmental protection including measures for protecting natural resources, required reports, and other measures to be taken. Submit the EPP within 15 days before the preconstruction meeting. Revise the EPP throughout the project to include any reporting requirements, changes in site conditions, or contract modifications that change the project scope of work in a way that could have an environmental impact. No requirement in this section will relieve the Contractor of any applicable federal, state, and local environmental protection laws and regulations. During Construction, identify, implement, and submit for approval any additional requirements to be included in the EPP. Maintain the current version onsite.

The EPP includes, but is not limited to, the following elements:

1.7.1 General Overview and Purpose

1.7.1.1 Descriptions

A brief description of each specific plan required by environmental permits or elsewhere in this Contract including, but not limited to, the following.

a. Soil Erosion and Sediment Control Plan

b. Herbicide Application Plan

c. Temporary Site Facility Plan

d. Traffic Control Plan

e. Site Preparation Plan

f. Waste Management and Transportation Plan

g. Dewatering and Drainage System Design Plan

1.7.1.2 Duties

The duties and level of authority assigned to the person(s) on the job site who oversee environmental compliance, such as who is responsible for adherence to the EPP, who is responsible for spill cleanup and training personnel on spill response procedures, who is responsible for manifesting hazardous waste to be removed from the site (if applicable), and who is responsible for training the Contractor's environmental protection personnel.

1.7.1.3 Procedures

A copy of any standard or project-specific operating procedures that will be used to effectively manage and protect the environment on the project site.

1.7.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and subcontractors.

1.7.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

1.7.2 General Site Information

1.7.2.1 Drawings

Drawings showing locations of proposed excavations, haul roads, flow diversion structures, stream crossings, wetlands, material storage areas, structures, sanitary facilities, storm drains and conveyances, and contaminated soil and sediment processing area.

1.7.2.2 Work Area

Work area plan showing the proposed activity in each portion of the area and identify the areas of limited use or nonuse. Include measures for marking the limits of use areas, including methods for protection of features to be preserved within authorized work areas and methods to control runoff and to contain materials on site, and a traffic control plan.

1.7.2.3 Documentation

A letter signed by an officer of the firm appointing the Environmental Manager and stating that person is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of non-conforming work.

1.7.3 Management of Natural Resources

a. Land resources

b. Tree protection

c. Replacement of damaged landscape features

d. Temporary construction

e. Culvert

f. Wetland areas

1.7.4 Archaeological Monitoring

1.7.5 Stormwater Management and Control

This item is considered as part of the Soil Erosion and Sediment Control Plan developed in accordance with SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

1.7.6 Protection of the Environment from Waste Derived from Contractor Operations

a. Used oil management procedures in accordance with 40 CFR 279; Hazardous waste minimization proceduress

b. Plans for the handling and disposal of hazardous waste is covered as part of the Waste Management and Disposal Plan developed in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

1.7.7 Prevention of Releases to the Environment

a. Procedures to prevent releases to the environment

b. Notifications in the event of a release to the environment

1.7.8 Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 180 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of applicable environmental permits. The EPP will not be approved until the permits have been obtained.

1.7.9 Clean Air Act Compliance

1.7.9.1 Haul Route

Submit truck and material haul routes along with the Traffic Control Plan for controlling dirt, debris, and dust on site haul routes. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from haul routes.

1.7.9.2 Pollution Generating Equipment

Identify air pollution generating equipment or processes that may require federal, state, or local permits under the Clean Air Act. Provide a list of all fixed or mobile equipment, machinery or operations that could generate air emissions during the project to the Government.

1.7.9.3 Stationary Internal Combustion Engines

Identify portable and stationary internal combustion engines that will be supplied, used or serviced. Comply with 40 CFR 60 Subpart IIII, 40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine brake horsepower), and EPA emission certification status of each engine. Maintain applicable records and log hours of operation and fuel use. Logs must include reasons for operation and delineate between emergency and non-emergency operation.

1.7.9.4 Air Pollution-engineering Processes

Identify planned air pollution-generating processes and management control measures (including, but not limited to, demolition, excavation, material handling, fugitive dust, fugitive emissions and spray painting, abrasive blasting,). Log hours of operations and track quantities of materials used.

1.7.9.5 Monitoring

For the protection of public health, monitor and control contaminant emissions to the air from Hazardous, Toxic, and Radioactive Waste remedial action area sources to minimize short-term risks that might be posed to the community during implementation of the remedial alternative in accordance with the SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and SECTION 01 35 55 - PERIMETER AIR MONITORING.

1.7.9.6 Compliant Materials

Provide the Government a list of and SDSs for all hazardous materials proposed for use on site. Materials must be compliant with all Clean Air Act regulations for emissions including solvent and volatile organic compound contents, and applicable National Emission Standards for Hazardous Air Pollutants requirements. The Government may alter, or limit use of specific materials as needed to meet permit requirements for emissions.

1.8 LICENSES AND PERMITS

Obtain licenses and permits required for the construction of the project and in accordance with FAR 52.236-7 Permits and Responsibilities. Notify the Government of all general use permitted equipment the Contractor plans

to use on site. This paragraph supplements the Contractor's responsibility under FAR 52.236-7 Permits and Responsibilities. A list of permits is detailed in SECTION 01 11 00 - SUMMARY OF WORK.

The EPP includes, but is not limited to, the following elements:

1.9 ENVIRONMENTAL RECORDS BINDER

Maintain on-site a separate three-ring Environmental Records Binder and submit at the completion of the project. Make separate parts within the binder that correspond to each submittal listed under paragraph CLOSEOUT SUBMITTALS in this section.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work that is consistent with the requirements of federal and state agencies. Confine construction activities to within the limits of the work indicated or specified.

3.1.1 Flow Ways

Prevent contaminated sediment from migrating to creek downstream of Harwood Street.

3.1.2 Vegetation

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Government's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Government. Where such use of attached ropes, cables, or guys is authorized, the Contractor is responsible for any resultant damage.

Protect existing trees that are to remain to ensure they are not injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. Coordinate with the Government and state agencies to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

3.2 STORMWATER

Stormwater management shall be performed in accordance with federal, state, and local regulations and as specified in SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

3.2.1 Erosion and Sediment Control Measures

Provide erosion and sediment control measures in accordance with state and local laws and regulations. Soil erosion and sediment control is specified in SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

3.2.2 Work Area Limits

Fence the work area as the limit of disturbance. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers must be visible in the dark. Personnel must be knowledgeable of the purpose for marking and protecting particular objects

3.2.3 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Government. Move or relocate the Contractor facilities only when approved by the Government. Provide erosion and sediment controls for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant or work areas to protect adjacent areas.

3.3 SURFACE AND GROUNDWATER

3.3.1 Cofferdams, Diversions, and Dewatering

Construction operations for dewatering, diversions, and use of cofferdams is specified in SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

3.4 PROTECTION OF CULTURAL RESOURCES

3.4.1 Archaeological Resources

Perform archaeological monitoring in accordance with the approved archaeological monitoring plan.

3.5 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with 40 CFR 64 and state air emission and performance laws and standards.

3.5.1 Burning

Burning is prohibited on the site.

3.5.2 Dust Control

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, plaster, or bentonite.

3.5.2.1 Particulates

Dust particles, aerosols and gaseous by-products from construction activities, and processing and preparation of materials (such as from asphaltic batch plants) must be controlled at all times, including weekends, holidays, and hours when work is not in progress. Maintain

excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates that would exceed 40 CFR 50, state, and local air pollution standards or that would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators, or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with state and local visibility regulations.

3.5.2.2 Abrasive Blasting

Abrasive blasting shall not be performed.

Blasting operations cannot be performed without prior approval of the Government. The use of silica sand is prohibited in sandblasting.

Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive agent, paint chips, and other debris.

3.6 WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the EPP.

3.6.1 Salvage, Reuse and Recycle

Identify anticipated materials and waste for salvage, reuse, and recycling. Describe actions to promote material reuse, resale or recycling. To the extent practicable, all scrap metal must be sent for reuse or recycling and will not be disposed of in a landfill.

Include the name, physical address, and telephone number of the hauler, if transported by a franchised solid waste hauler. Include the destination and, unless exempted, provide a copy of the state or local permit (cover) or license for recycling.

3.6.2 Nonhazardous Solid Waste Diversion Report

Maintain an inventory of nonhazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to the Government on the first working day after each fiscal year quarter, starting the first quarter that nonhazardous solid waste has been generated. Include the following in the report:

Table 01 57 19 - 1 Nonhazardous Waste Generated	
Waste Category	Volume
Construction and Demolition (C&D) Debris Disposed	Tons as appropriate
C&D Debris Recycled	Tons as appropriate
Total C&D Debris Generated	Tons as appropriate

3.7 WASTE MANAGEMENT AND DISPOSAL

3.7.1 Waste Determination Documentation

Waste handling and disposal is specified in SECTION 02 81 00 - TRANSPORTATION AND DISPOSAL.

3.7.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers that are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, in accordance with 49 CFR 173.

3.7.3 Control and Management of Hazardous Waste

Do not dispose of hazardous waste on the site. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government property without written approval of the Government.

3.7.3.1 Hazardous Waste Disposal

Hazardous waste disposal shall be performed in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

3.7.4 Releases/Spills of Oil and Hazardous Substances

3.7.4.1 Response and Notifications

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated in accordance with 40 CFR 300. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount,

duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Government and the state or local authority.

Submit verbal and written notifications as required by the federal (40 CFR 300.125 and 40 CFR 355), state, local regulations and instructions. Provide copies of the written notification and documentation that a verbal notification was made within 20 days. Spill response must be in accordance with 40 CFR 300 and applicable state and local regulations. Contain and clean up these spills.

3.7.5 Wastewaters

The handling of wastewater generated as part of dewatering and decontamination efforts at the site is specified in SECTION 31 23 19 - DEWATERING and SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

3.8 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Site Safety and Health Plan, in accordance with SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Do not bring hazardous material onto Government property that does not directly relate to requirements for the performance of this contract. Submit an SDS and estimated quantities to be used for each hazardous material to the Government prior to bringing the material on the site. Typical materials requiring SDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Use hazardous materials in a manner that minimizes the amount of hazardous waste generated. Containers of hazardous materials must have National Fire Protection Association labels or their equivalent. Certify that hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste, in accordance with 40 CFR 261.

3.9 PREVIOUSLY USED EQUIPMENT

Clean previously used construction equipment prior to bringing it onto the project site. Equipment must be free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the U.S. Department of Agriculture jurisdictional office for additional cleaning requirements.

3.10 PETROLEUM, OIL, LUBRICANT (POL) STORAGE AND FUELING

POL products include flammable or combustible liquids, such as gasoline, diesel, lubricating oil, used engine oil, hydraulic oil, mineral oil, and cooking oil. Store POL products and fuel equipment and motor vehicles in a manner that affords the maximum protection against spills into the environment. Manage and store POL products in accordance with EPA 40 CFR 112, and other federal, state, regional, and local laws and regulations. Use secondary containments, dikes, curbs, and other barriers, to prevent POL products from spilling and entering the ground, storm or sewer drains, stormwater ditches or canals, or navigable waters of the United States. Describe in the EPP (see paragraph ENVIRONMENTAL PROTECTION PLAN) how POL tanks and containers must be stored, managed, and inspected and what protections must be provided. Storage of fuel on the project site must be

in accordance with EPA, state, and local laws and regulations and paragraph OIL STORAGE INCLUDING FUEL TANKS.

3.10.1 Used Oil Management

Manage used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while onsite exhibits a characteristic of hazardous waste. Used oil containing 1,000 parts per million of solvents is considered a hazardous waste and disposed of. Used oil mixed with a hazardous waste is also considered a hazardous waste. Dispose in accordance with paragraph HAZARDOUS WASTE DISPOSAL.

3.10.2 Oil Storage Including Fuel Tanks

Provide secondary containment and overfill protection for oil storage tanks. A berm used to provide secondary containment must be of sufficient size and strength to contain the contents of the tanks plus 5 inches freeboard for precipitation. Construct the berm to be impervious to oil for 72 hours that no discharge will permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Use drip pans during oil transfer operations; adequate absorbent material must be onsite to clean up any spills and prevent releases to the environment. Cover tanks and drip pans during inclement weather. Provide procedures and equipment to prevent overfilling of tanks. If tanks and containers with an aggregate aboveground capacity greater than 1320 gallons will be used onsite (only containers with a capacity of 55 gallons or greater are counted), provide and implement a SPCC plan meeting the requirements of 40 CFR 112. Do not bring underground storage tanks to the site for Contractor use during a project. Submit the SPCC plan to the Government for approval.

Monitor and remove any rainwater that accumulates in open containment dikes or berms. Inspect the accumulated rainwater prior to draining from a containment dike to the environment, to determine there is no oil sheen present.

3.11 INADVERTENT DISCOVERY OF PETROLEUM-CONTAMINATED SOIL OR HAZARDOUS WASTES

If petroleum-contaminated soil, or suspected hazardous waste is found during construction that was not identified in the Contract documents, immediately notify the Government. Do not disturb this material until authorized by the Government.

3.12 SOUND INTRUSION

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives are prohibited at the site.

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State and local rules.

3.13 POST CONSTRUCTION CLEANUP

Clean up areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing by the Government, remove traces of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to

final acceptance of the work. Grade parking area and similar temporarily used areas to conform with surrounding contours.

-- End of Section --

SECTION 01 57 33

DIVERSION AND CONTROL OF WATER

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, supervision, engineering, design, construction necessary to divert and control water. This section covers diversion and control of water required to complete the work in this Contract. The Contractor shall control water in the construction area regardless of its source or quantity. Sediment excavations are below water levels and portions of the upland excavation may be below groundwater levels, as observed during the pre-design investigations performed on the site at the former Flintkote 198 Parcel, where a few inches of water was observed in a piezometer.

The Canal releases water into the Eastern Headwater at approximately 47 cubic feet per second (cfs) during its operation from April/May to October/November. The Eastern Headwater also receives overflow from the combined sewer to the south of the Canal and natural flow from its watershed. The regular flow in the Eastern Headwater is estimated to be approximately 50 cfs. The western Headwater receives water leaking from the Canal at approximately 5 cfs. The Canal also release water after boat repair at the dry dock a few times each year. Each year, at the end of navigation season, the Canal is drained to the Eastern Headwater in two to three weeks, during which the flow can increase to approximately 200 cfs. The Contractor shall coordinate with the Canal Corporation regularly for managing creek flow diversion with the government approval.

The Contractor shall perform due diligence and monitor stream flow and weather. The Contractor is required to divert flow at all times during active excavation operation. The Contractor shall plan and install erosion control measures to minimize sediment migration downstream with stormwater and flood water.

The Contractor cannot remove, dam, or use the water from Eighteen Mile Creek for any purpose without approval from the Government or the Government's designated representative.

All construction, haul routes, and excavations shall be carried on in areas free from water. Any flow diversion, stormwater and flood water control measures shall be constructed and designed in a manner that has minimum impact to the upstream surface elevation and does not impact upstream water conveying system, stormwater and flood water control structure functions.

The Contractor shall be responsible for providing, maintaining, monitoring, and removing all diversion and water control facilities. The Contractor shall protect work against streamflow as specified in Paragraph 1.6.

Diversion and control of water shall also include details for erosion control and bank stabilization during construction.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Water Diversion Plan; G

The Contractor shall submit detailed plans for control of water and a dewatering plan in accordance with Paragraph 1.3.

Temporary Creek Crossing Plan; G

The Contractor shall submit detailed plans by a licensed professional engineer in the State of New York for the temporary creek crossing in accordance with Paragraph 1.5.

1.3 WATER DIVERSION PLAN

The Contractor shall develop and submit detailed plans for control of water for all activities during construction not limited to stripping, clearing, grubbing, temporary river crossing, soil and sediment excavation, backfilling, channel grading, placement of geotextile, rock infill, and riprap placement for each area of construction for review and approval by the Government at least 14 days prior to the Pre-Construction Conference.

Review by the Government or Government's Designated Representative is to determine the general suitability of the plans and shall not relieve the Contractor of maintaining and operating the system to assure the work is performed in the dry.

If, during the course of the work, it is determined that the diversion and dewatering system or other item is inadequate, or the Contractor's plan of construction is inoperative, the Contractor shall furnish, install, construct and operate such additional pumps, temporary water conveyance systems, and dewatering equipment and make such changes in other features of the plan of construction and operation as may be necessary to perform the work.

The plan shall describe the planned sequence and method of construction operations and shall include drawings, narrative, calculations (if required to support plan) and proposed water handling features necessary to control both surface and ground water.

Construction operations shall provide for positive drainage at all times. Protection of utilities and compliance with environmental regulations shall be considered when planning the water diversion plan.

Upon completion of each portion of the contract work, all temporary construction shall be removed as approved. Care shall be taken during removal operations for protection of the permanent work (e.g. plantings) and any damage to permanent construction shall be repaired.

The water diversion plan shall include a monitoring plan for water quality downstream of the water diversion structure. Water quality to be monitored

shall in compliance with NYSDEC requirements. At a minimum, the turbidity in the downstream section of the water diversion structure shall be visually inspected.

1.4 DISTURBED AND STOCKPILE AREAS

Surface drainage from the disturbed and stockpile areas shall be controlled by dikes, ditches, drainage pipes, etc. Suitable drainage facilities shall be provided to protect the site and existing facilities which are to remain in place per SECTION 01 57 19 - ENVIRONMENTAL PROTECTION and SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

1.5 TEMPORARY RIVER CROSSING PLAN

A Temporary Creek Crossing Plan shall include the following:

a. A temporary haul route may be installed on Olcott Street across the creek to transport excavated material from the creek, Western Former United Paperboard Property, and Water Street Properties to the staging area. A temporary bridge per SECTION 01 53 13 - TEMPORARY BRIDGES FOR CONSTRUCTION is proposed as a means to cross the stream. Refer to the Drawings and General Notes for additional river crossing requirements.

b. Contractor is responsible for developing and maintaining an environmentally and hydraulically compliant temporary river crossing method. Minimum river crossing requirements are provided below.

c. Temporary river crossings are to be used by construction traffic to maintain access across the creek while preventing damage to the existing concrete pipes, minimizing erosion of the banks of the creek and minimizing continuous introduction of sediments and other pollutants into Eighteen Mile Creek flow. An acceptable stream crossing method is indicated on the drawings for consideration.

d. The temporary crossing may be designed in various configurations. However, the materials used to construct the temporary crossing must be able to withstand the anticipated loading of the construction traffic and resistant to erosion. It is the Contractor's responsibility to determine the appropriate sizing for culverts placed in the temporary river crossing(s) for low flow. Any damage done during storm flows to temporary or partially completed crossings and/or work or resulting from the Contractor's operations shall be repaired by the Contractor..

e. The Contractor is responsible for removing the temporary river crossing in its entirety after completion of the hauling operation.

1.6 DAMAGE TO WORK

Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment and plantings shall be repaired to the satisfaction of the Government.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 GENERAL

All permanent work shall be constructed in areas continuously maintained generally free of surface water, groundwater, and storm drainage. Construction and backfilling shall proceed in-the-dry. The Contractor shall construct protective works as necessary to dewater and direct surface water away from his work area. The intent of these protective works is to provide a work area that is dry enough to permit the operation of equipment and activities for constructing the permanent works in accordance with the plans and specifications. These protective works shall include dikes, ditches, pumps, sumps, conduits, and all supporting features as required, but not shown on the drawings. The protective system shall be of sufficient size and capacity to divert flows and prevent damage to the work during construction without restricting drainage flow. Any material needed for the construction of the protective system shall be obtained from outside sources or from other areas which are approved by the Government or Government's Designated Representative. No excavation shall be allowed outside the area shown on the drawings unless previously approved by the Government or Government's Designated Representative.

3.2 SURFACE WATER CONTROL

Construct surface water control measures, including dikes, ditches, sumps, diversion fence, cofferdam, Portadam, AquaDam, and other methods to prevent flow of surface water into excavations in accordance with SECTION 01 57 19 - ENVIRONMENTAL PROTECTION and SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

3.3 EXCAVATION DEWATERING

Excavation dewatering shall be performed in accordance with SECTION 31 23 19 - DEWATERING.

3.4 TEMPORARY RIVER CROSSING

a. All crossings shall have sufficient width to allow hauling operations to occur in a safe manner in accordance with SECTION 01 53 13 - TEMPORARY BRIDGES FOR CONSTRUCTION..

b. When the crossing has served its purpose, all structures shall be removed. Removal of the structure and clean-up of the area shall be accomplished without construction equipment working in the waterway channel and shall occur during periods of low flow.

-- End of Section --

SECTION 01 58 13

SIGNS

PART 1 GENERAL

1.1 SCOPE OF WORK

Furnish all labor, equipment, materials and incidentals required to provide and erect a U.S. Environmental Protection Agency (EPA)/U.S. Army Corps of Engineers (USACE) project site sign, safety signs and a bulletin board.

The Contractor shall provide and erect an EPA/USACE project site sign and safety signs meeting the requirements of this Section at a location to be determined by the Government. The sign requirements are shown at the end of this Section. Wording to be included on each sign shall be provided by the Government after contract award.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1903	Inspections, Citations, and Proposed Penalties

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 310-1-6a	Sign Standards Manual

PART 2 PRODUCTS

2.1 MATERIALS

Materials shall conform to the requirements as shown on the drawings at the end of this section and shall be suitable for use in an unprotected exterior environment.

The Contractor may modify and reuse existing signs from previous project phases. Dollar amounts and wording changes will be provided by the Government after award.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall place signs on the work area fence that bear the legend, in letters at least four inches high:

WARNING
HAZARDOUS WORK AREA
DO NOT ENTER UNLESS AUTHORIZED

The Contractor shall post hazard warning banners at areas of special hazard including, but not limited to, the perimeter of the Exclusion Zone. The Contractor shall provide all signs required on the Contract Documents. Letters shall be at least four inches high.

The Contractor shall post appropriate hazard warning banners for working near active railroads, unsafe buildings, active overhead power lines, active petroleum and nitrogen lines, and soils contaminated with elemental mercury.

3.2 INSTALLATION REQUIREMENTS

The EPA/USACE project site sign and the safety signs are to be mounted on 4-inch by 4-inch by 12-foot treated timbers and set firmly into the ground above prevailing grade to permit public viewing. Signs shall be installed during site mobilization in accordance with the requirements of EP 310-1-6a included at the end of this Section.

3.3 BULLETIN BOARD

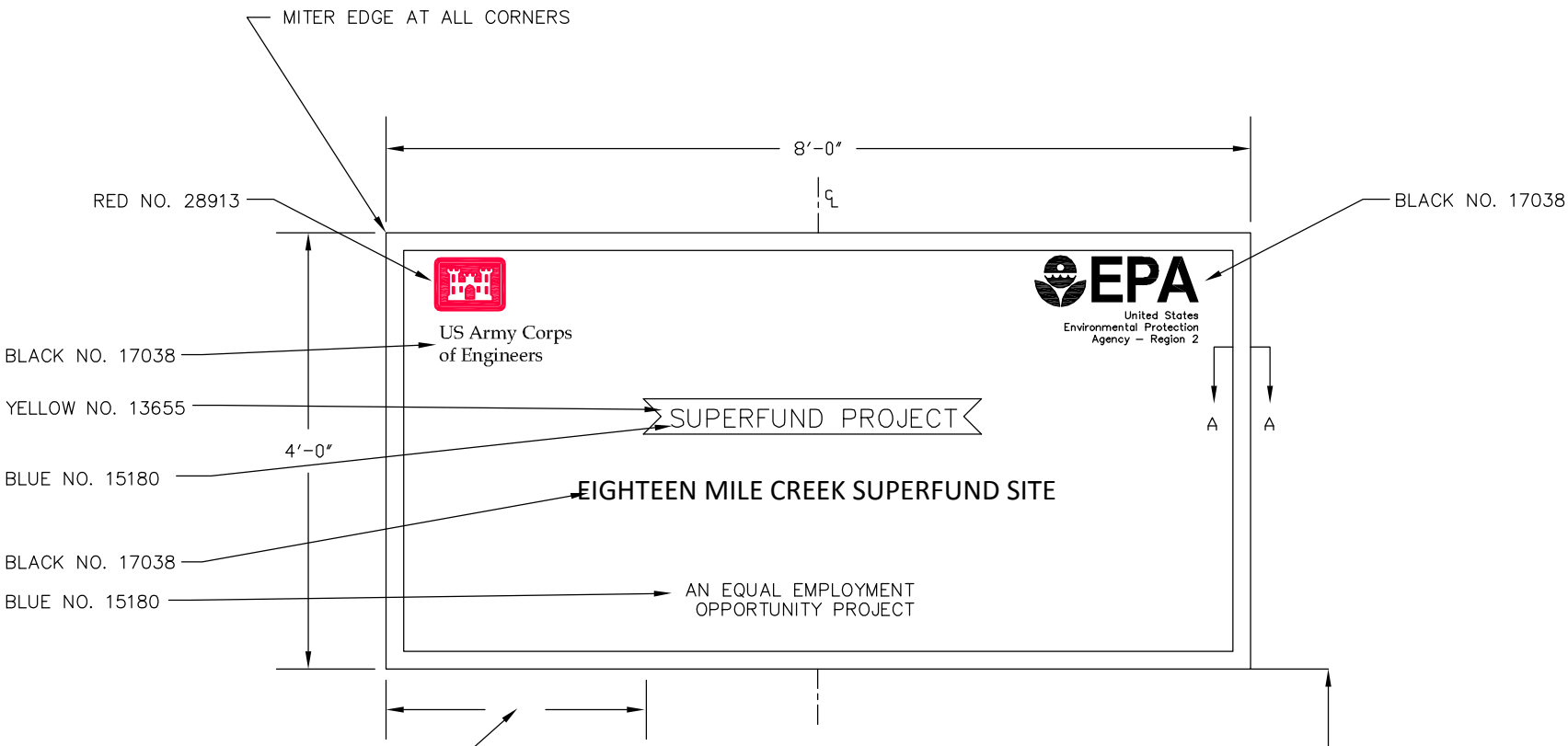
Immediately upon starting work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 inches by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the Contract, the Wage Rate Information poster and other information approved by the Government. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Government. Legible copies of the aforementioned information shall be displayed until work is completed. Upon completion of work, the bulletin board shall be removed by and remain the property of the Contractor.

The Contractor shall post and maintain a notice or notices, to be furnished by the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, informing employees of the protections and obligations provided for in the Occupational Safety and Health Act as per OSHA 29 Code of Federal Regulations 1903.2(a)(1)(29 CFR 1903). The Contractor shall post such notice or notices in a conspicuous place or places where notices to employees are customarily posted. The Contractor shall take steps to ensure that such notices are not altered, defaced, or covered by other material.

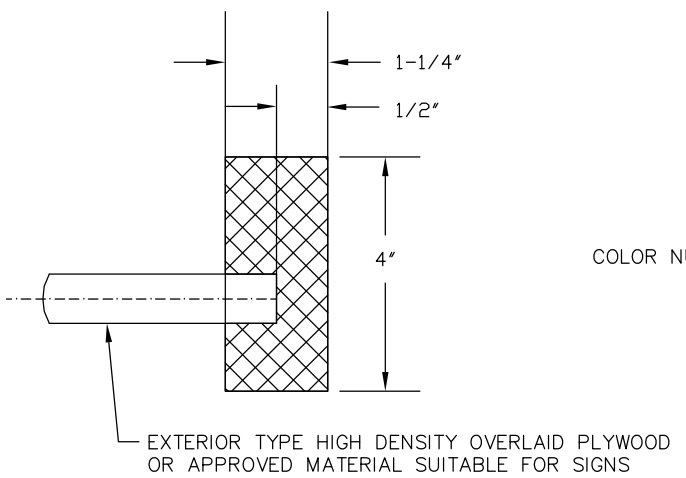
3.4 CLOSURE REQUIREMENTS

The EPA/USACE project site sign, bulletin board and the safety signs are to be removed from the Site after contract completion.

-- End of Section --



PROVIDE ADEQUATE SUPPORTS FOR SIGN AS SITE CONDITIONS MAY REQUIRE AND KEEP SIGN A PROPER DISTANCE ABOVE PREVAILING GRADE TO PERMIT PUBLIC VIEWING.



SECTION "A-A"

COLOR NUMBERS REFER TO FEDERAL COLOR STANDARDS NO . 595a (1-68), WHICH ARE AVAILABLE FROM GSA SUPPLIES.

BACKGROUND AND ALL OTHER
SIGN COMPONENTS NOT DESIGNATED
ARE PAINTED WHITE NO. 17886.

Each contractor's safety record is to be posted on Corps managed or supervised construction projects and mounted with the Construction Project Identification sign specified on page 16-2.

The graphic format, color, size and typefaces used on the sign are to be reproduced exactly as specified below. The title with First Aid logo in the top section of the sign, and the performance record captions are standard for all signs of this type. Legend groups 2 and 3 below identify the project and the contractor and are to be placed on the sign as shown.

Safety record numbers are mounted on individual metal plates and are screw-mounted to the background to allow for daily revisions to posted safety performance record.

Special applications or situations not covered in these guidelines should be referred to the district Sign Program Manager.

Legend Group 1: Standard two-line title "Safety is a Job Requirement" with 8" (outside diameter) Safety Green first aid logo.
Color: To match Pantone system 347
Typeface: 3" Helvetica Bold
Color: Black

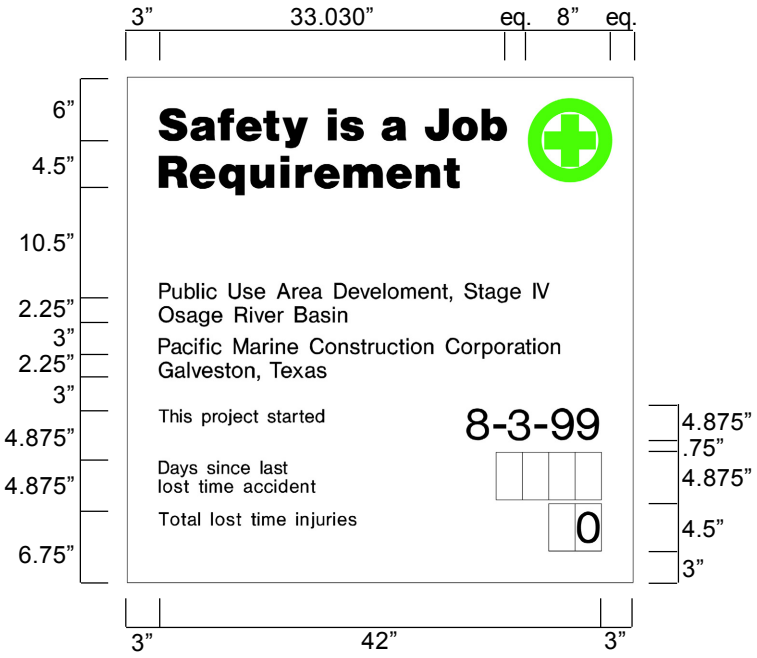
Legend Group 2: One- to two-line project title legend describes the work being done under this contract and name of host project.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 3: One- to two-line identification: name of prime contractor and city, state address. Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

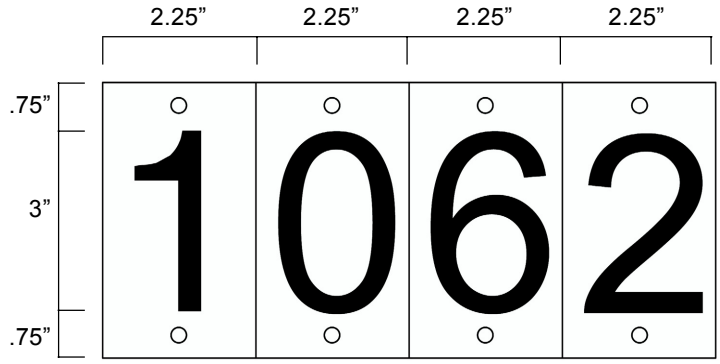
Legend Group 4: Standard safety record captions as shown.
Color: Black
Typeface: 1.25" Helvetica Regular

Replaceable numbers are to be mounted on white .060 aluminum plates and screw-mounted to background.
Color: Black
Typeface: 3" Helvetica Regular
Plate size: 2.5" x 4.5"

All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards as specified in Appendix D.



Sign Type	Legend Size (A)	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-02	various	4'x4'	4"x4"	HDO-3	48"	WH/BK-SG



Fabrication and Mounting Guidelines

All Construction Project Identification signs and Safety Performance signs are to be fabricated and installed as described below. The signs are to be erected at a location designated by the contracting officer representative and shall conform to the size, format, and typographic standards shown on pages16-2 and 16-3. Detailed specifications for HDO plywood panel preparation are provided in Appendix B.

Shown below the mounting diagram is a panel layout grid with spaces provided for project information. Photocopy this page and use as a worksheet when preparing sign legend orders.

For additional information on the proper method to prepare sign panel graphics, contact the district Sign Program Manager.

The sign panels are to be fabricated from .75" High Density Overlay Plywood. Panel preparation to follow HDO specifications provided in Appendix B.

Sign graphics to be prepared on a white nonreflective vinyl film with positionable adhesive backing.

All graphics except for the Communication Red background with Corps Signature on the project sign are to be die-cut or computer-cut nonreflective vinyl, prespaced legends prepared in the sizes and typefaces specified and applied to the background panel following the graphic formats shown on pages 16-2 and 16-3.

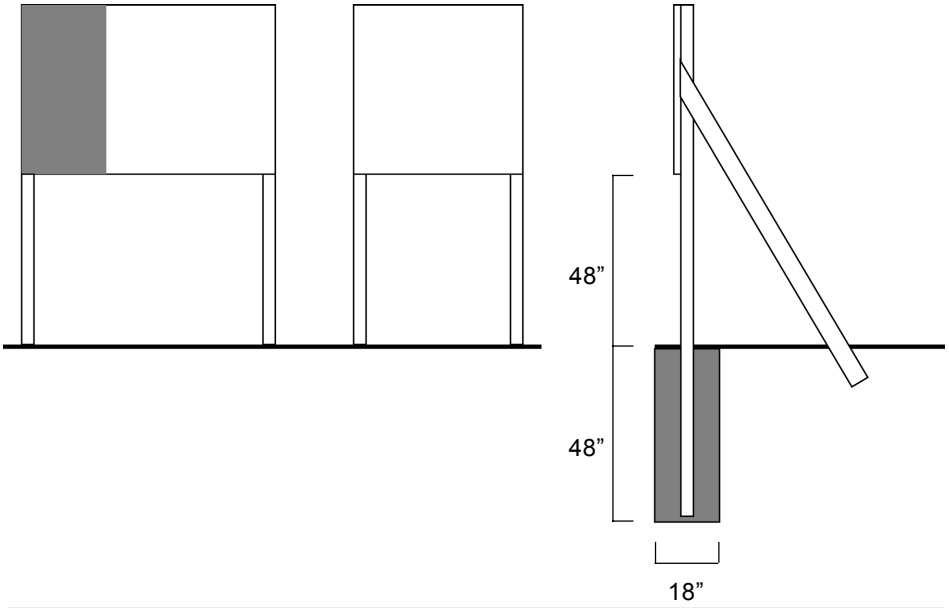
The 2'x 4' Communication Red panel (to match Pantone system 032) with full Corps Signature (reverse version) is to be screen-printed on the white background. Identification of the district or division may be applied under the signature with white cut vinyl letters prepared to Corps standards.

Drill and insert six (6) .375" T-nuts from the front face of the HDO sign panel. Position holes as shown. Flange of T-nut to be flush with sign face.

Apply graphic panel to prepared HDO plywood panel following manufacturers' instructions.

Sign uprights to be structural grade 4" x 4" treated Douglas Fir or Southern Yellow Pine, No.1 or better. Post to be 12' long. Drill six (6) .375" mounting holes in uprights to align with T-nuts in sign panel. Countersink (.5") back of hole to accept socket head cap screw (4" x .375").

Assemble sign panel and uprights. Imbed assembled sign panel and uprights in 4' hole. Local soil conditions and/or wind loading may require bolting additional 2" x 4" struts on inside face of uprights to reinforce installation as shown.



Construction Project Identification Sign
Legend Group 1: Corps Relationship

1. _____
2. _____

Legend Group 2: Division/District Name

1. _____
2. _____

Legend Group 2a: Military/Civil Works Sponsor

1. _____
2. _____

Legend Group 3: Project Title

1. _____
2. _____
3. _____

Legend Group 4: Facility Name

1. _____
2. _____

Legend Group 5: Contractor/A&E

1. _____
2. _____
3. _____
4. _____
5. _____

Legend Group 5b: Contractor/A&E

1. _____
2. _____
3. _____
4. _____
5. _____

Safety Performance Sign
Legend Group 2: Project Title

1. _____
2. _____

Legend Group 3: Contractor/A&E

1. _____
2. _____

SECTION 01 71 23

SURVEYING

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to provide surveying services prior to remedial activities, after remedial activities, and as measurement during remediation activities.

The Contractor will be provided with the Design AutoCAD file after the contract award.

The Contractor shall verify the existing conditions and topographic contours, within the construction limits defined on the Contract Drawings.

The Contractor shall establish the exact position or location of all work control points provided by the Government during the Pre-Construction Conference. All work shall be referenced to and established from the control points, re-established where necessary and maintained throughout the life of the contract. One of the control points shall be protected permanent site benchmark. Any error or apparent discrepancies found on the Contract Drawings or Specifications shall be called to the Contract Officer's attention for interpretation prior to proceeding with the work.

The Contractor shall be responsible to protect or re-establish the existing property pins.

The Contractor shall prepare As-Built Drawings detailing the actual conditions of surface and subsurface construction upon the completion of work. The as-built drawings must conform to USACE ERDC/ITL TR-12-6 A/E/C CAD Standards and ERDC/ITL TR-12-1 A/E/C Graphics Standards using template files USACE workspace AEC_WS_001 files.

All horizontal coordinates shall be referenced to the New York State Plane Coordinate System, North American Datum (NAD) 1983. All elevations shall be referenced to the North American Vertical Datum (NAVD) 1988.

Vibration monitoring and geotechnical instrumentation is specified in SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 1110-1-1005	Control and Topographic Surveying

UNITED STATES FEDERAL GEODETIC CONTROL COMMITTEE (FGCC)

FGCC	Standards and Specifications for Geodetic Control Networks

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-03 Product Data

Surveyor Qualifications; FIO

The Contractor shall submit the name, address, New York Land Surveyor registration number, and telephone number of the surveyor to the Government before starting survey work.

Survey Accuracy Documentation; FIO

On request, documentation verifying accuracy of survey work shall be submitted to the Government by the Contractor.

Certificates signed by the surveyor stating that elevations and locations of site construction features are in conformance, or nonconformance, with Contract Documents shall be submitted to the Government at the completion of each phase of work requiring services of the surveyor.

Surveyor Field Notes; FIO

Copies of the surveyor's field notes, calculations, and graphical layouts shall be submitted to the Government as requested.

Survey Quantities; FIO

Certificates signed by the surveyor stating the accuracy of quantities submitted for payment purposes shall be submitted to the Government as requested.

SD-11 Closeout Submittals

Compliance Surveys; FIO

Submit compliance surveys of all excavation, backfill, and wetland restoration operations.

As-Built Drawings; G

As-Built Drawings shall be submitted for the Site and any areas within adjacent properties disturbed by the Contractor as specified in Paragraph 3.3. For each map, the surveyor shall submit one (1) electronic copy and two (2) paper copies. The submittal shall include the Contractor's standard title block with the surveyor's subtitle block, signature and Land Surveyor's seal. The drawing size shall be ANSI F (28-inch by 40-inch) or ANSI E (34-inch by 44-inch). The cut lines shall be discussed with the Contractor prior to performing the

work. The paper copies shall be exact duplicates of the electronic files. All survey data shall be compiled and digitized for use with AutoCAD 2020 or newer version. A tabulated delimited text or excel file of the survey points shall also be submitted. The file shall include the description, horizontal and vertical coordinates, Z elevation (when applicable) and unique point number for each point.

1.4 QUALITY CONTROL

The Contractor shall be responsible for all of the surveying done at the site. The surveyor shall be a qualified and Registered Land Surveyor in the State of New York. The Contractor's surveyor shall also have a minimum of 2 years of experience in construction surveying, and layout and maintenance of As-Built Construction Drawings, with a record of performing horizontal and vertical control requirements as stated in this section.

The surveyor shall check all equipment including, but not limited to electronic survey instruments, compasses, transits, and levels for accuracy and maintain records of such checks. The surveyor shall make records of the checks available to the Contractor upon request.

All survey work will be according to third-order accuracy standards as specified by the FGCC in the "Standards and Specifications for Geodetic Control Networks", published September 1984. The units of measure shall be U.S. Survey Feet.

1.5 PROJECT RECORD DOCUMENTS

A complete, accurate log of control and survey work as it progresses shall be maintained at the work site by the Contractor.

Upon completion of the work, all record documents must be submitted to the Government.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 INSPECTION

The Contractor shall verify locations of site reference and survey control points prior to starting work. The Government must be promptly notified of any discrepancies discovered.

3.2 SURVEY REFERENCE POINTS

The Government will provide the Contractor with all site reference points during the Pre-Construction Conference.

The Contractor shall take all reasonable measures to protect site reference points prior to starting site work. Reference points shall not be relocated without prior written approval of the Government.

The Government will be immediately notified of loss, damage, or destruction of any reference point, or any relocation required because of changes in grade or other reasons.

Temporary monuments shall be set as necessary to perform the surveying. They may be wood, metal or marks scribed on permanent site features. All

monuments shall be described in the field notes and marked on site maps for future reference.

X, Y, and Z coordinates of benchmarks and survey control points shall be determined and recorded with a maximum permissible error of 0.10 feet in any coordinate direction.

3.3 SURVEY REQUIREMENTS

3.3.1 Control Points

The Contractor shall establish the exact position or location of all work control points. All work shall be referenced to and established from the control points, re-established where necessary and maintained throughout the life of the contract. Any error or apparent discrepancies found in the Contract Documents shall be called to the Government's attention for interpretation prior to proceeding with the work. The Contractor shall ensure the survey work performed meets the requirements below:

a. All horizontal coordinates shall be referenced to the New York State Plane Coordinate System, NAD 1983. All elevations shall be referenced to the NAVD 1988.

b. The survey shall be sufficient to generate digital topographic mapping on 1-foot contour intervals with a map scale at one inch equal to forty feet.

c. The topographic map accuracy shall meet the U.S. National Map Accuracy Standards.

d. All survey work shall be performed in accordance with EM 1110-1-1005.

e. X, Y, and Z coordinates of survey measurements shall be determined and recorded with a maximum permissible error of 0.10 feet in any coordinate direction.

3.3.2 Pre-Construction Civil Survey

The Contractor shall verify the existing conditions, contours, and locations of structures within the limits of disturbance defined on the Contract Drawings.

3.3.3 Pre-Remedial Action Sampling Survey

The Contractor shall locate all pre-remedial action sampling locations prior to sample collection and verify or update pre-remedial action sampling locations after borings are installed.

3.3.4 Site Features

The Contractor shall establish lines and levels and locate and layout by instrumentation and similar appropriate means, all site features to be constructed or executed. These include, but are not limited to, the following:

a. Staging areas and temporary facilities layout.

b. Existing sanitary sewer and monitoring wells to be removed.

c. Monitoring wells to be installed.

d. Haul roads.

e. Fence lines.

f. Utilities.

g. Clinton Street culvert.

h. Clinton Street Dam, UPB Building/Vault, dilapidated wall.

i. William Street Dam, turbine structure.

j. Surface water diversion and control.

k. Initial site grading.

l. Clearing and grubbing limits (different types restoration areas).

m. Excavation limits including post-excavation confirmation sample locations.

n. Interim grading and final grading.

o. Flow diversion gravity pipe location and elevations.

p. Equipment and material decontamination area.

3.3.5 As-Built Drawings

The Contractor shall prepare as-built drawings that update the design drawings, including cross-sections, establishing the as-built conditions of the definable features of work and exact site restoration conditions and details upon completion of remediation, including, but not limited to the list below. The Contractor shall also prepare new as-built drawings for definable features of work that are not presented in the design drawings.

a. Topography

b. Creek channel (including grade control structure)

c. Flow diverison pipe cross-sections and details

d. Final conditions of UPB Building/vault area

e. Monitoring well details

h. Abandoned and relocated utilities

i. Site restoration

1. Vegetation and other cover materials

2. Creek and upland restoration cross-sections and details

3. Gates and other points of entry

4. Fence lines

5. Access roads

-- End of Section --

SECTION 01 78 00

PROJECT CLOSEOUT

PART 1 GENERAL

1.1 SCOPE OF WORK

This specification outlines the project closeout activities for which the Contractor shall be responsible. The work activities shall include, but not be limited to, the following:

a. Decontamination and removal of all equipment operated by the Contractor.

b. Cleaning the project site.

c. Disconnection and removal of temporary utilities and facilities.

d. Collection and disposal of all Contractor-generated contaminated materials on the Site for which decontamination is inappropriate.

e. Restoration of any disturbed areas outside of the Exclusion Zone.

f. Submittal of the construction narrative report and all documentation required by the Government to prepare the Remedial Action Report. The Remedial Action Report will be prepared by others.

g. Submittal project record documents in accordance with Section 01 78 39 - PROJECT RECORD DOCUMENTS.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-11 Closeout Submittals

Narrative Report and Data; FIO

The Contractor shall submit the Narrative Report and Data to the Government within 60 calendar days of substantial completion of each activity, as specified in Paragraph 3.5.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 DECONTAMINATION

All contaminated material and equipment shall be decontaminated by the Contractor prior to final removal from the Site.

Tools and items for which decontamination is difficult or unachievable shall remain on site until completion of the work for subsequent packing

and disposal by the Contractor at an approved disposal facility. Examples of such items are wire, rope, lumber, PPE and apparel.

Prior to removal from the Site, all decontaminated equipment and material shall be inspected and approved by the Site Safety and Health Officer (SSHO) and the Government.

Certification of decontamination shall be attested to by the SSHO.

A copy of each decontamination certificate shall be provided to the Government..

3.2 TEMPORARY FACILITIES AND UTILITIES

The Contractor shall remove all temporary facilities and associated utilities from the Site within 30 days of completion of the project or as directed by the Government.

The Contractor shall coordinate with the appropriate utility owners to disconnect the temporary telephone cable and electric service and remove all associated aboveground wires.

3.3 SITE CLOSURE

At the completion of the work, the Contractor shall restore all areas affected by the construction activities to conditions equivalent to or better than the original conditions or as indicated on the Contract Drawings.

3.4 FINAL ACCEPTANCE INSPECTION

Prior to final inspection, the Contractor shall submit a list of completed final clean-up activities to the Government. The Contractor and the Government shall jointly perform a Final Acceptance Inspection, which shall include an inspection of the Site to ensure that all work was completed as outlined in the Contractor's list of final clean-up activities, SECTION 01 11 00 - SUMMARY OF WORK, SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL, and the Contract Drawings. The Contractor shall address any deficiencies immediately.

3.5 NARRATIVE REPORT AND DATA

The Contractor shall provide a narrative report and data to the Government, including, but not limited to, the following, within 60 calendar days of completion of each activity, for preparation of the Remedial Action Report.

a. Site preparation activities, including:

    1. Temporary facilities

    2. Equipment and material decontamination facilities

    3. Site security

    4. Fencing

    5. Existing utility protection and relocation

6. Clearing and grubbing

7. Haul roads and temporary crossings

8. Handling, transportation, off-site disposal of debris and waste

9. Monitoring well protection and abandonment

10. Pre-excavation sampling, if required

11. Structural/geotechnical inspection and evaluation of UPB building/vault

b. Construction activities, including:

1. Excavation of upland contaminated soils

2. Management/diversion of Creek flow

3. Stormwater management and excavation dewatering and discharge

4. Back to bank sediment removal, dewatering, and control of suspended sediment

5. Removal of William Street Dam and Clinton Street Dam

6. Waste Characterization, hazardous and non-hazardous waste transportation and disposal

7. Post-excavation samplingn

8. Odor control, if deemed necessary, and dust control

9. Work zone and perimeter air monitoring and sampling

10. Monitoring wells installation and development

11. Stream restoration

12. Upland restoration

c. Off-site disposal of all waste types including copies of all manifests and land disposal restriction notifications, copies of all certifications of final disposal signed by the responsible disposal facility official, and copies of waste profile sheets.

d. Soil, sediment, air, and water sampling results, including collection data such as date and time of collection, and sample chain-of-custody forms.

e. Site restoration including source of backfill material and quantity including physical and chemical tests performed and results; removal of temporary facilities; final site grading, seeding, and wetland restoration; and fence installation.

f. Copies of all decontamination certifications.

g. Progress photographs in accordance with SECTION 01 32 33 - PROJECT PHOTOGRAPHS and progress videos in accordance with SECTION 01 32 36 -

VIDEO MONITORING AND DOCUMENTATION.

h. Copies of all permits.

i. List of chronological events.

j. All inspection and certification reports including punch list items for pre-final and final inspections.

k. As-built drawings.

l. Construction logs.

m. List of subcontractors with subcontract value.

n. Copies of executed work variation notifications

o. Summary of sustainability practices including quantity, facilities, etc.

p. Observations and lessons learned.

-- End of Section --

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to maintain accurate and comprehensive records of all site activities.

The Contractor shall maintain accurate and comprehensive records of all site activities as well as all additions, substitutions of materials, variations in work and any other revisions to the Contract Documents.

The Contractor shall maintain at the Site for the Government one record copy suitable for electronic archiving of:

a. Record drawings showing progress of work.

b. Technical specifications.

c. Addenda.

d. Modifications to the contract.

e. Government's directives.

f. Written reports of any significant quality assurance problems.

g. Progress meeting minutes.

h. Final as-built drawings.

i. Daily work activity summary reports, including:

1) Photographs.

2) Reports on any emergency response actions.

3) Reports on all daily site activities.

4) Chain-of-custody documents.

5) Construction schedule and progress chart of work.

6) Change orders and other modifications to the contract.

7) All laboratory analytical results.

8) Meteorological records.

9) Air monitoring data.

10) All safety and accident reports.

11) All spill incident reports.

12) Daily construction quality control reports.

13) Truck load tickets.

14) Records of quantity of contaminated and uncontaminated material removed from the Site.

15) All waste disposal manifests.

16) Other items as required by the Government.

Where appropriate, one copy of all project record documents shall be maintained on hard disk compatible with the Contract Officer's software.

1.2 MAINTENANCE OF DOCUMENTS

The Contractor shall store record documents and samples in the Contractor's Field Office apart from documents used for construction work.

The Contractor shall provide files and racks for the storage of documents; storage space that can be secured and locked; and a storage area that is clean and dry. Documents and samples should be filed to facilitate retrieval.

Make documents available at all times for inspection by the Government.

The Contractor shall keep up-to-date a complete record set of redline drawings, which shall be corrected daily to show every change, and the approved shop drawings. This set shall be legibly marked.

The Contractor shall keep up-to-date a complete set of specifications and addenda to record changes made by directive from the Government or by change order. This set shall be legibly marked.

The sets of marked drawings and specifications shall be submitted to the Government at the completion of construction.

The Contractor shall be responsible for final handling and storage of project record documents, including boxing, labeling, and shipping to a final destination as determined by the Government. If approved by the Government, the Contractor may instead scan project record documents for electronic storage to eliminate physical storage costs.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

SECTION 02 10 00

SITE PREPARATION

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials and equipment required to perform all site preparation activities included in this Section and shown on the Contract Drawings.

The Contractor shall obtain all required permits for site preparation activities prior to start of the work in accordance with SECTION 01 11 00 - SUMMARY OF WORK. All local permit requirements shall be coordinated in advance with the Government.

The Contractor shall field verify the existing conditions at the site prior to commencing the work, in accordance the SECTION 01 71 23 - SURVEYING. Prior to performing site preparation activities, the Contractor shall document existing site conditions via photographs and video, in accordance with SECTION 01 32 33 - PROJECT PHOTOGRAPHS and SECTION 01 32 36 - VIDEO MONITORING AND DOCUMENTATION and shall report in writing to the Government prior to the commencement of any site preparation work. Any significant difference between the assumed existing conditions and actual conditions at the time of construction shall be discussed with the Government prior to the work.

The Contractor shall collect pre-remedial action samples as specified herein and on contract drawings and perform the analysis in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Site Preparation Plan; G

The Site Preparation Plan shall be submitted at least 14 calendar days prior to Pre-Construction conference for Government approval. The Site Preparation Plan shall address in detail all the work listed under PART 3 of this specification section. In addition, it shall include a drawing showing decontamination pads, access points, staging areas including office trailer and parking. Proposed locations for the staging area are shown on the Contract Drawings.

SD-06 Test Reports

Geophysical Survey Report; G

The Contractor shall submit a report summarizing the findings of the geophysical survey performed to locate the potential underground

storage tank (UST) in the area identified on the Contract Drawings. The report shall include proposed procedures for removal of the UST.

SD-07 Certificates

Permits; FIO

Copies of all permits not submitted under another section.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TEMPORARY FACILITIES

The temporary facilities including the staging areas, signs, construction fencing and barriers, and decontamination facilities shall be constructed in accordance with the Contractor's approved Temporary Site Facility Layout Plan and in accordance with SECTION 01 50 00 - TEMPORARY CONSTRUCTION FACILITIES AND UTILITIES.

All above grade features within the trailer, equipment, and material staging areas and Phase 1 soil/sediment stockpile areas shall be demolished and graded prior to constructing the temporary facilities in these areas. The staging area shall be constructed as shown on the Contract Drawings.

3.2 CLEARING AND GRUBBING

Clearing and grubbing shall be performed as shown on the Contract Drawings and in accordance with SECTION 31 11 00 - CLEARING AND GRUBBING.

3.3 EROSION CONTROL AND STORMWATER MANAGEMENT

The Contractor shall install erosion and stormwater management controls in accordance with the Contractor's approved Soil Erosion Control and Sediment Control Plan and with SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

3.4 COORDINATION WITH UTILITY OWNERS AND CITY OF LOCKPORT

The Contractor shall coordinate with utility owners and City of Lockport to field-verify the locations and elevations of utility lines and to complete all required utility work to connect temporary facilities, relocate utilities, and protect existing pipelines and utilities. A list of utility owners is provided on the Contract Drawings. The Contractor shall consult with the City of Lockport prior to starting any work, including the review of work plans for work that is in the immediate vicinity of the active sewers as specified in the Contract Documents..

3.5 UTILITY POLE RELOCATIONS

The Contractor shall coordinate with the local electric provider, New York State Electric and Gas (NYSEG), to relocate active utility poles to allow for excavation as shown on the Contract Drawings.

3.6 GEOPHYSICAL SURVEY

The Contractor shall complete a geophysical survey near the UPB building

as shown on the drawings to confirm the location of an underground storage tank to be removed. The geophysical survey shall utilize ground penetrating radar, electromagnetic induction, magnetic method or electrical resistivity. The geophysical survey procedures shall be included in the Site Preparation Plan. A Geophysical Survey Report shall be produced and submitted in advance of excavation within the UPB site.

3.7 DEMOLITION

The Contractor shall perform demolition in accordance with SECTION 02 41 00 - DEMOLITION. The demolition debris shall be segregated, temporarily stored, and sampled at the approved staging area.

3.8 SOIL/SEDIMENT PROCESSING AND STOCKPILE AREAS

A soil/sediment processing and stockpile area shall be constructed to drain water from excavated material prior to offsite transportation and disposal. The stockpile area shall be constructed in accordance with the Contract Drawings in two phases or the Contractor's approved plan. The Phase 1 soil/sediment processing and stockpile shall be made fully operational prior to commencement of excavation activities.

The soil/sediment processing and stockpile areas shall be contained with concrete highway barriers. The inner side of the wall shall be lined with a geotextile fabric to prevent migration of contaminated materials to the clean soils. The Contractor may propose alternative methods for construction of the stockpile area for approval by the Government.

Multiple stockpile containment cells should be constructed to allow waste segregation.

3.9 FENCING

The Contractor shall remove and install fences to secure the site in accordance with the Contract Drawings and SECTION 32 31 13 - CHAIN LINK FENCES AND GATES.

3.10 EXISTING MONITORING WELL ABANDONMENT

Existing monitoring wells within the excavation limits or construction limits shall be abandoned as indicated on the Contract Drawings. Well abandonment shall be performed in accordance with SECTION 33 51 39 - MONITORING WELLS.

3.11 TEMPORARY WATER TREATMENT AREA

Water generated from sediment dewatering and stormwater in direct contact with the contaminated materials at the sediment processing and stockpile area shall be pumped into temporary storage tanks, filtered, then discharged into the creek per SPDES permit requirements. The temporary water treatment area shall be constructed and made fully operational prior to the commencement of excavation activities.

3.12 PRE-REMEDIAL ACTION SAMPLING AND ANALYSIS

The Contractor shall collect pre-remedial action samples as shown on the Contract Drawings and in accordance with the approved Quality Assurance Project Plan.

The pre-remedial action sample locations shown on the Contract Drawings for investigating potential contamination in the native sediment material are based on the pre-design investigation data. The Contractor shall probe the extent of native material and select additional sample locations as necessary and obtain government approval. Native material is defined as sediment free from debris. Samples shall be collected from area with native material at or greater than 1 foot thick or per direction from the Government.

-- End of Section --

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to remove debris, dilapidated walls or structures, guide rails, fences, and above ground and underground utilities as indicated in the Contract Drawings and specified herein.

Demolition work shall include removal of all structures that would create an obstacle to excavation including, but not limited to, removal of debris, removal of Clinton and William Street Dams, dilapidated walls or structures, guide rails, fences, above ground utilities, concrete slabs, and rubble within the site.

A structural evaluation by a licensed professional engineer shall be performed for the Former United Paperboard Building (including the vault) and the dilapidated wall as indicated herein and on the Contract Drawings prior to structural demolition, adjacent excavation, and adjacent regrading to prevent deterioration of the Former United Paperboard Building during construction. The structural evaluation shall include assessment of the integrity of the vault structure and adjacent dilapidated walls and extents of the existing foundations. The Contractor shall submit a report summarizing the structural evaluation and providing recommendations for potential repairs and/or modifications to existing structures.

The Contractor shall not begin demolition until 10 days after the Contractor submits a notification of the demolition activities to the New York Department of Labor and Workforce Development and authorization from the Government is received. The Contractor shall not demolish any structures until the structural evaluation required in this section is complete and the Structural Evaluation Report has been submitted and approved by the Government.

The Contractor shall ensure that all demolition work is performed safely in accordance with the safety requirements of SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES; EM 385-1-1; ANSI/ASSE A10.6; OSHA regulations including but not limited to 29 CFR 1926; and the respective codes and ordinances from the City of Lockport, New York. All void spaces and other hazardous openings shall be temporarily filled and/or clearly marked to prevent personal injury. The Contractor shall be responsible for the implementation of the Accident Prevention Plan/Site Safety and Health Plan (APP/SSHP).

The Contractor shall perform dust control and mitigation during demolition activities, include material segregation, crushing, and stockpiling, to avoid the creation of a hazard and to prevent a nuisance for the neighboring properties and areas. The Contractor shall be responsible for the performance of airborne dust suppression and perimeter air monitoring in accordance with SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES, and SECTION 01 35 55 - PERIMETER AIR MONITORING, respectively during all demolition and handling of contaminated materials.

Demolition waste segregation, characterization, and offsite transport for recycling shall be conducted in accordance with Paragraph 3.8 herein, the approved Waste Management and Transportation Plan, and SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

The Contractor shall refer to SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL for the analytical testing requirements for the waste characterization of demolition wastes to be disposed offsite.

Vibration monitoring and geotechnical instrumentation is specified in SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE/AMERICAN SOCIETY OF SAFETY ENGINEERS (ANSI/ASSE)

ANSI/ASSE A10.6	Safety & Health Program Requirements for Demolition Operations

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 61	National Emission Standards for Hazardous Air Pollutants

1.3 ITEMS TO PROTECT

The Contractor shall take necessary precautions to avoid damage to items to remain in place including, but not limited to, monitoring wells, former UPB Building, Duraline Abrasives Building, and structures as shown on the Contract Drawings and in accordance with SECTION 01 57 19 - ENVIRONMENTAL PROTECTION. The Contractor shall coordinate the work of this section with all other work indicated. Monitoring of existing structures is required and shall be performed in accordance with SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Demolition Plan; G

The Contractor shall prepare a Demolition Plan and submit to the Government for approval prior to the Pre-Work Conference. The Demolition Plan shall include procedures for coordination with

other work which may be in progress including clearing, demolition, debris characterization and offsite transportation and disposal. The plan shall include a detailed description of methods and equipment to be used for each operation and of the sequence of operations, providing contingencies for changes that may be required during work based on safety requirements or unexpected conditions encountered.

The Demolition Plan shall be coordinated with the Structural Evaluation Report. The plan shall provide details on activities, methods and testing to be performed for structural evaluation. The Demolition Plan shall also include recommendations for structural support of critical elements identified as part of the Structural Evaluation Report.

The Demolition Plan shall include details on activities and methods for removal of the Clinton and William Street Dams in accordance with all local, state, and federal permitting regulations.

The plan shall identify components and materials to be salvaged for recycling with reference to Section 3. The Contractor shall append tracking forms for all removed materials indicating type, quantities, condition, destination, and end use.

The plan shall state provisions for securing the safety of the workers throughout the performance of the work. The plan shall coordinate with other plans as necessary including but not limited to the Waste Management and Transportation Plan and the APP/SSHP.

Former United Paperboard Building Structural Evaluation; FIO

The Contractor shall perform a structural evaluation by a licensed professional engineer of the Former United Paperboard Building and of existing dilapidated walls and submit a summary report to the Government prior to Demolition on the property.

1.5 QUALITY ASSURANCE

The Contractor shall submit timely notification of demolition projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M..

The Contractor shall notify the Region 2 Office of the EPA (in accordance with 40 CFR 61, Subpart M) in writing 10 working days prior to the commencement of work. At all times during demolition and disposal of materials, the Contractor shall comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ANSI/ASSE A10.6. Comply with EPA and other federal requirements as required. Explosives shall not be permitted.

1.5.1 Dust and Debris Control

Prevent the spread of dust and debris and avoid the creation of a nuisance in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution

1.6 PROTECTION

1.6.1 Protection of Personnel

Before, during, and after the demolition work, continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the project site. No area, section, or component of structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area. The Contractor shall make the determination of the order of demolition steps to be followed with primary consideration given to the continuous protection of personnel during demolition.

1.6.2 Protection of Wildlife

Inspect structures for bats and bat roosts prior to entering. Notify the Government of any identified bats and/or bat roosts. It is illegal to kill bats. Refer to NYSDEC for dealing with bats and for safe dates for bat exclusion.

1.7 EXISTING CONDITIONS

Before beginning any demolition, the Contractor shall perform a structural evaluation by a licensed professional engineer of the Former United Paperboard Building (including the vault) and of existing dilapidated walls and submit a summary report to the Government prior to Demolition on the property. The structural evaluation shall identify the bottom of existing dilapidated walls and the limits of the vault structure (including the bottom of structure) at the north end and western side of the United Paperboard Building. Confined space entry (CSE) will be required to enter the vault, and removal of construction debris may be required. The structural evaluation shall determine the nature of the vault structure, including the type of structural systems present and sizes of structural elements, as well as the condition of the vault structure. Test pits shall be performed to identify bottom of structures at locations shown on the Contract Drawings and in accordance with the approved demolition plan. The Contractor may use a combination of both non-destructive testing (NDT) and selective destructive testing (such as core samples, exploratory openings, or drill holes) to determine sizes and reinforcement of structural elements, where required. The Contractor shall not perform any destructive testing prior to the Government's approval.

The Contractor shall submit a report summarizing the results of the structural evaluation; the report shall include a detailed description of exploratory methods used (i.e. test pits, NDT methods, destructive testing, etc.), the results of any tests performed, the locations of bottom of structures, and recommendations for either modifying the existing vault structure such that the removal of adjacent dilapidated walls will have no adverse effect on the strength or stability of the vault structure, or a method of stabilizing or modifying the adjacent dilapidated walls such that they can safely and adequately support the vault structure.

The report should include figures or sketches identifying conceptual methods to modify existing structures, where necessary, prior to demolition. The report should include recommendations of any repairs to the vault structure or dilapidated walls which may be necessary; where repairs are recommended, provide conceptual sketches outlining the details

and requirements for the methods and materials of each repair. No structural demolition may occur until the Structural Evaluation Report is reviewed and approved by the Government.

The Contractor shall record existing conditions showing the condition of structures and other facilities adjacent to areas of alteration or removal prior to performing any demolition work. Photographs taken in accordance with SECTION 01 32 33 - PROJECT PHOTOGRAPHS and video taken in accordance with SECTION 01 32 36 - VIDEO MONITORING AND DOCUMENTATION will be acceptable as a record of existing conditions. The Contractor shall perform additional survey of the existing conditions of the vault and the former United Paperboard Building as necessary.

1.8 PERMIT REQUIREMENTS

The Contractor shall be responsible for obtaining any and all permits necessary to complete demolition work in accordance with applicable Federal, State, and local regulatory requirements. The Contractor shall be responsible for all fines related to permits/authorizations issued with regard to the work completed. Permits and approvals from local regulatory agencies are summarized in SECTION 01 11 00 - SUMMARY OF WORK.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

Demolition work shall be performed in accordance with the Contractor's approved Demolition Plan, the approved Structural Evaluation Report, the Contract Drawings and as specified herein. The Contractor is responsible for the sequence and method of demolition utilized to maintain personnel safety at all times. The Contractor shall not demolish any concrete slabs or foundations unless otherwise indicated on the Contract Drawings or in the Structural Evaluation Report.

As part of site preparation, a demolition debris segregation and stockpile area shall be designated in accordance with SECTION 02 10 00 - SITE PREPARATION.

Demolition waste including concrete, brick, and other masonry shall be referred to as "concrete" herein and throughout Contract Documents.

Dust control measures shall be implemented during demolition activities to minimize airborne dust generated from such activities in accordance with the Contractor's approved Accident Prevention Plan.

3.2 EXISTING CONSTRUCTION LIMITS AND PROTECTION

The Contractor shall not disturb existing construction beyond the extent indicated on the Contract Drawings and in accordance to SECTION 01 57 19 - ENVIRONMENTAL PROTECTION. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove dust, dirt, and debris from work areas daily.

3.3 EXISTING STRUCTURES

The Contractor shall perform controlled demolition of structures as shown

on the Contract Drawings and as approved in the Structural Evaluation Report. Existing structures shall be demolished in such a manner as to prevent personal injury and other objects to remain such as the perimeter site fencing and temporary facilities. The use of explosives shall not be permitted.

3.4 DAM REMOVAL

The Contractor shall perform controlled decommissioning of the Clinton Street and William Street Dams to the extent as shown on the Contract Drawings. The Clinton Street Dam is a regulated (State ID: 016-0282) concrete gravity dam located adjacent to the former UPB Building. The William Street Dam is an unregulated earthen dam located adjacent to William Street on the Flintkote 300 Parcel. The existing dam structures shall be demolished in such a manner as to prevent personal injury. The use of explosives shall not be permitted unless used in accordance with all local, state, and federal permitting regulations.

Removal of the Clinton Street Dam and William Street Dam shall be conducted in accordance with the New York State Department of Environmental Conservation (NYSDEC) Dam Removal Regulations and in accordance with all local, state, and federal permitting regulations.

3.5 CONCRETE AND ASPHALT

The Contractor shall demolish concrete slabs and walls on the Contract Drawings. Concrete and asphalt site features to be demolished but not specified for demolition in the Contract Documents require the approval of the Government prior to demolition.

3.6 CLEANUP

The Contractor shall remove rubbish daily from the active work area, unless otherwise directed. The Contractor shall store materials that cannot be removed daily in areas specified by the Government. No rubbish of any kind shall be buried on the project site.

3.7 SEGREGATION OF SOLID WASTE MATERIALS

3.7.1 General)

Demolition shall be performed as indicated on the Contract Drawings.

3.7.2 Storage

Debris and any other wastes for disposal shall not be stored at the site unless the storage is solely for the purpose of accumulating sufficient quantities of the waste to facilitate proper disposal. If temporary storage is required, storage must be accomplished in accordance with New York Solid Wastes codes and applicable Federal regulations.:

3.7.3 Sections

The Contractor shall break up all demolished construction debris into manageable sections, crush, and stockpile in accordance with the disposal facility's requirements.

3.8 DISPOSAL

All demolition debris shall be consolidated or disposed offsite in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

-- End of Section --

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SECTION 02 61 13

EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL

PART 1 GENERAL

1.1 SCOPE OF WORK

The purpose of this section is to provide the Contractor with the minimum requirements and constraints for excavation and handling of contaminated soil and sediment.

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform contaminated material excavation and handling as shown on the Contract Drawings, as specified herein, and in accordance with the Contractor's approved Excavation and Sediment Removal Handling Plan.

The work shall include, without limitation, upland excavation, trenching, sediment excavation, post-excavation confirmatory sampling, and temporary storage of contaminated soil and sediment.

Sediment will require dewatering and treatment post-excavation at the staging area. Sediment processing is specified in SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

Dewatering during excavation and backfill and surface water control are specified in SECTION 31 23 19 - DEWATERING. Water treatment is specified in SECTION 02 71 00 - TEMPORARY WATER TREATMENT SYSTEM.

Backfill, compaction, and grading is specified in SECTION 31 00 00 - EARTHWORK.

Vibration monitoring and geotechnical instrumentation is specified in SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING.

A visual pre-construction survey shall be completed in addition to the geotechnical instrumentation and monitoring and is specified in SECTION 01 71 23 - SURVEY.

All excavation, trenching and related sheeting, bracing, etc. shall comply with requirements of Occupational Safety and Health Administration (OSHA) excavation safety standards 29 CFR 1926.650 Subpart P, United States Army Corps of Engineers Engineer Manual EM 385-1-1 Section 25, New York State requirements and in accordance with the approved Accident Prevention Plan as specified in SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

The Contractor shall obtain the services of a New York-licensed Professional Surveyor to document the limits of excavation for the purposes of measurement and payment, and for preparation of as-built drawings in accordance with SECTION 01 71 23 - SURVEYING.

Soil excavated beyond the limit of contamination for construction support shall be reused onsite per approval from the government. Soil testing may be required.

The Contractor shall provide the necessary equipment and piping to dewater and divert water away from excavation areas as specified in SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER and SECTION 31 23 19 - DEWATERING.

The Contractor shall restore areas as shown on the Contract Drawings and in accordance with approved site restoration plan.

The Contractor shall procure an archaeological service, train personnel and perform archaeological monitoring as specified herein.

The Contractor shall be responsible for compliance with all Federal, State, and local laws and regulations.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.652	Safety and Health Regulations for Construction; Subpart P, Excavations; Requirements for Protective Systems
PL 107-295	Maritime Transportation Security Act of 2002

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Excavation and Handling Plan; G

The Contractor shall submit an Excavation and Sediment Removal Handling Plan at least 14 calendar days prior to the Pre-Construction Conference. The Contractor should note that adverse conditions (such as heavy rain or snow) may be encountered during excavation operations, and provisions should be made for such an event. No work at the site, with the exception of site inspections and surveys shall be performed until the plan is approved. The Contractor shall allow 30 calendar days in the schedule for the Government's review. At a minimum, the Excavation and Handling Plan shall include all elements listed below:

a. Upland and sediment excavation approach.

b. Personnel requirements.

c. Post-excavation confirmation sampling.

d. Equipment and methods of excavation and backfill, including

excavation support system.

e. Excavation and backfill sequence.

f. Overall construction sequencing.

g. Coordination with site dewatering and surface water diversion activities.

h. Storage methods and locations for liquid and solid contaminated material. This shall include methods for prevention of cross-contamination at soil containment areas to be built in uncontaminated areas.

i. Handling of contaminated material within and outside the Site boundary.

j. Surveying of excavated areas and determination of excavation quantities.

k. Grading of excavated areas prior to backfill to support the overall site restoration of wetland and upland areas, if required.

l. Archaeological monitoring plan for areas as shown in the Contract Drawings, including chain of command, points of contact for the EPA, USACE, Office of Parks and Recreation and Historic Preservation (OPRHP), Contractor, and archaeological consultant.

1.4 REGULATORY REQUIREMENTS

1.4.1 Permits and Licenses

The requirements governing transportation, administration, and methods of disposal, and all other applicable Federal, State, and local laws, codes, and ordinances that govern or regulate contaminated wastes, shall apply to the work of this section. The Contractor shall be responsible for obtaining all permits necessary for excavation, stockpiling, and dewatering of soils, all associated utility work, and any other features of work associated with the excavation of contaminated material. Permits and approvals from local regulatory agencies are summarized in SECTION 01 11 00 - SUMMARY OF WORK.

1.4.2 Air Emissions

Air emissions shall be monitored and controlled in accordance with SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES and SECTION 01 35 55 - PERIMETER AIR MONITORING.

1.4.3 Erosion and Sedimentation Control

Erosion control and stormwater management, including the diversion and control of water, shall be administered in accordance with in accordance with SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

1.5 SITE REMEDIATION GOALS

Site remediation goals for soil and sediment are detailed in SECTION 01 11 00 - SUMMARY OF WORK and SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

1.6 WASTE CHARACTERIZATION SAMPLING AND ANALYSIS

Available data show that the excavated soil and sediment can be characterized into four types of waste:

TSCA Waste: Soil and sediment that have total PCBs greater than 50 ppm. Locations with total PCBs greater than 50 ppm are shown on Contract Drawings.

Mixed Waste: Soil and sediment that have total PCBs greater than 50 ppm and are characteristic hazardous waste.

Hazardous Waste: Soil and sediment that meet criteria established in RCRA or specified by EPA in 40 CFR 261. Based on available data, excavated soils can fail the TCLP lead test and be characteristic hazardous waste. The Contractor shall segregate the excavated soils and sediments that fail the TCLP test.

Non-Hazardous Waste: Soil and sediment that have total PCBs equaling or below 50 ppm and TCLP results below the criteria.

Waste characterization samples shall be collected in accordance with the requirements of the approved disposal facilities. Sample analyses shall be conducted in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

1.7 POST-EXCAVATION CONFIRMATION SAMPLES

The Contractor shall collect post-excavation confirmation samples for lead and total PCBs analyses to confirm that contaminated soil exceeding the remediation goals are removed. Samples shall be collected as detailed here-in and analyzed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL. Upon review of the sample results and Government approval, the Contractor shall proceed with backfill or perform secondary excavation.

In areas where sediment is to be removed to the bedrock, post-excavation confirmation samples are not required in sediment excavation areas. In areas where sediment is to be removed to native soils, sample collection shall be performed before sediment excavation activities and shall not require post-excavation confirmation samples.

1.7.1 SURVEYS

Surveys shall be performed immediately prior to and after excavation of contaminated material to determine the volume of material removed and after backfilling to verify final grades. Surveys shall be performed in accordance with SECTION 01 71 23 - SURVEYING.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXISTING STRUCTURES AND UTILITIES

3.1.1 General

The Contractor shall take the necessary precautions to ensure that no damage occurs to existing structures (such as existing fences, public roads, electric poles, manhole, sewers, and adjacent properties deemed to be protected) and utilities outside the excavation limits.

The Contractor shall coordinate with the utility owners to field-verify the locations of utility lines and to complete all required utility work to perform the remediation.

Unexpected active utilities encountered during excavation shall not be disturbed without written approval from the Government and the utility owner.

All buried utilities, confirmed inactive by the utility owner or by investigation as approved by the Government, encountered during excavation shall be removed to the limits of the excavation. Removed utility structures shall be decontaminated and properly disposed offsite.

Support of excavations shall be performed in accordance with SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION.

3.1.2 Active Electric Poles

The relocation of active electric poles and lines is specified in SECTION 02 10 00 - SITE PREPARATION and is shown on the Contract Drawings. All work involving or adjacent to active power lines shall be performed as approved by the electric utility company, NYSEG.

3.1.3 Sewer and Stormwater Discharge

Excavation at Upson Park, at UPB property along Water Street, and for William Street Dam Removal will require removal of inactive sewers and diversion of stormwater discharge. These activities shall be performed as approved by the City of Lockport Engineering Department and in accordance with the Drawings.

3.2 ARCHAEOLOGICAL MONITORING

Archaeological monitoring shall be included in the Contractor's approved Excavation and Sediment Removal Handling Plan for the two areas identified on the Contract Drawings (one at Upson Park and the other at the southern portions of the Mill Race Island and William Street).

The purpose of archaeological monitoring is to identify and document potential, buried industrial-related features during soil remediation activities. The Phase 1B Archaeological Survey report was approved by NYSHPO in a letter dated February 3, 2020. The Phase 1B Archaeological Survey Report (RGA 2020) provided recommendations of an archaeological monitoring plan, which includes the following steps:

1. A below grade stone foundation was exposed in the southern portion of OU2 Area B (southern portion of Mill Race Island) during environmental test pit excavation. William Street is expected to

contain wooden and/or stone internal structural elements associated with its former use as an early mill dam. Extant stone foundations are presently exposed on the ground surface within the western portion of OU 2 Area I (Upson Park). Archaeological monitoring is recommended at and near these resources.

2. During soil remediation excavations, the soil remediation contractor staff and supervisors will carefully observe excavations within the recommended monitoring areas. The Contractor's supervisor will notify the government field representative(s) in the event that structural features consisting of intact buried stone, brick, or wooden foundations are identified. The government field representative(s) will notify USACE and EPA, and NYSHPO of the findings. With approval from the government field representative(s), the Contractor's supervisor will notify the archaeological consultant of the finding. If necessary, prior to the commencement of remediation activities, the soil remediation staff, supervisor, and government field representative(s) may be provided with an educational packet with photographic examples of the types of features that may be encountered to better enable and educate staff to properly identify such features if encountered during soil remediation excavation activities.

3. A chain of command with points of contact for the EPA, USACE, OPRHP, Contractor Supervisor and Project Manager, and Archaeological Consultant Project Manager should be supplied to all parties prior to the commencement of soil remediation activities.

4. Upon notification of identified cultural/structural features and cultural deposits, the archaeological consultant shall record the location of the identified artifact(s) and cultural/structural feature(s) and monitor the remaining excavations in the vicinity to the extent of proposed horizontal and vertical excavations necessary for the project. Documentation of the excavations and cultural/structural features shall be conducted through digital photography and scaled line drawings (profile and plan views) of the exposed portion of the feature or artifact deposit. Artifact sampling may be necessary to determine the age and function of the feature/artifact deposit. Soil-based cultural features, such as artifact-rich refuse pits, privies and wells, shall be bisected and a sample of artifacts shall be retained sufficient to assess feature integrity, age, cultural affiliation, and function. All artifacts shall be recorded and left on-site owing to contamination issues. Once documented by the archaeologist, all structural remains and cultural features within the excavation area shall be removed as part of the remediation process.

5. The identified archaeological resource will be registered with the OPRHP, or an updated site registration form will be prepared, if necessary, and submitted to the OPRHP.

6. Additional background research may be necessary to assess function, age and cultural affiliation of the identified resources.

7. Following the completion of archaeological monitoring, an archaeological monitoring report shall be completed that documents the monitoring results and assesses the significance of the identified archaeological resource(s). The draft monitoring report will be submitted to the government for review and comment. EPA, as the lead

federal agency, will submit the monitoring report to NYSHPO.

3.3 EXCAVATION

3.3.1 General

Clearing shall be performed to the excavation limits shown on the Contract Drawings in accordance with SECTIONS 31 11 00 - CLEARING AND GRUBBING and 02 10 00 - SITE PREPARATION, prior to excavation as shown on Contract Drawings.

The Contractor shall procure the services of a New York State Licensed Surveyor to lay out the limits of the excavation shown on the Contract Drawings. The Contractor shall perform all excavations to the lines and depths shown on the Contract Drawings. The survey work to measure excavated quantities shall be performed by the Contractor prior to backfilling the excavation and shall be accurate to the nearest 0.1 feet and in accordance with SECTION 01 71 23 - SURVEYING.

The contaminant concentrations in the soils varies; the Contractor shall excavate at a rate and manner that achieves compliance with the ambient air quality action levels in accordance with SECTION 01 35 55 - PERIMETER AIR MONITORING.

If areas of metal (such as buried drums or tanks) are encountered during excavation, a ground-penetrating radar (GPR) survey and test pitting shall be performed to delineate the extent of metal. Excavation shall proceed per the direction of the Government.

No excavation shall be performed until site utilities have been field-located, as described in Paragraph 3.1. Existing structures, buried or overhead utilities, and property survey monuments adjacent to or within excavation areas that have not been specified for removal on the Contract Drawings shall be protected and supported to prevent settlement and damage. Any damage to structures, utilities, or property survey monuments resulting from excavation shall be repaired or replaced immediately by the Contractor. The Contractor may perform test pitting to locate utilities with a utility representative present.

Excavated soils and sediments shall be transported to the soil and sediment stockpile areas constructed as shown on the Contract Drawings or Contractor's approved plan.

Dust control and mitigation and air monitoring shall be performed in accordance with the Contractor's approved Accident Prevention Plan, as specified in SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

Areas being excavated shall be maintained in a clean condition, free from leaves, brush, sticks, trash, and other debris. Organic materials including stumps, roots, and debris encountered during excavation shall be considered grubbed material and shall be disposed of as contaminated material in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

Where directed by the Government, salvageable materials recovered during excavation shall become the property of the Government. Decontamination shall be performed in accordance with SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

The Contractor shall be responsible for installing measures to control the migration of contaminated soils and sediment, as specified in SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

An electronic copy of the Contract Drawings will be provided to the Contractor to establish the corners of all primary excavation areas, as shown on the Contract Drawings. The Contractor shall perform surveying activities in accordance with SECTION 01 71 23 - SURVEYING.

The Government shall be notified as soon as possible, but no more than 48 hours later, if visible contamination is discovered that has not been identified on the Contract Documents. Any area of visibly contaminated material encountered during excavation shall be maintained until the Government notifies the Contractor whether this material shall be excavated.

3.3.2 UPB Building/Vault and Dilapidated Wall

Prior to execution of the contaminated soil excavation adjacent to the UPB Building and Dilapidated Wall, The Contractor shall perform a geotechnical and structural evaluation of the UPB Building/vault in accordance with SECTION 02 41 00 - DEMOLITION. The Contractor is responsible for developing excavation support to protect the UPB Building/Vault during soil and sediment excavation in accordance with SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION.

3.3.3 Turbine Excavation

The condition of the turbine buried in construction debris is unknown.

Available photos of the turbine area are included in Attachment A to SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

3.3.4 Upland Soil Excavation and Sediment Removal

The Contractor is responsible for execution of contaminated upland soil excavation and sediment removal in accordance with SECTION 31 00 00 - EARTHWORK.

3.4 POST-EXCAVATION CONFIRMATION SAMPLING

Post-excavation soil sampling is required for upland excavation areas prior to the placement of backfill to determine if additional excavation is required to remove the contamination. The Contractor shall layout the post-excavation sampling grid in the frequency of one bottom sample in every 30 feet by 30 feet area of the bottom of excavation and one sidewall sample in every 30 feet of sidewall greater than 2 feet high. Each post-excavation confirmation sample shall be a composite sample collected from 5 spots evenly distributed within the sampling grid. Confirmation sample results exceed the remediation goals will trigger secondary excavation.

Post-excavation sample for sediment excavation is not anticipated because the excavation will be conducted bank to bank and to the top of bedrock.

Post-excavation samples shall be sampled and analyzed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL. The Contractor shall not proceed with backfilling until the results of post-excavation sampling

have been reviewed and approved by the government field representative.

3.5 EQUIPMENT AND VEHICLE DECONTAMINATION

A decontamination pad and wheel wash area shall be provided for each of the excavation areas at the entrance/exit to public road. Vehicles shall be cleaned before leaving the excavation staging areas to avoid carrying contaminated materials and dirt onto public roads.

The Contractor shall wash the wheels and decontaminate equipment and vehicles exiting the contaminated areas within the excavation areas. The Contractor shall be responsible for the operation and maintenance of the decontamination station (including the decontamination pad and wash-down equipment) throughout the duration of the work activities.

All soils washed off equipment during decontamination shall be collected at the temporary decontamination pads and consolidated onsite to the soil or sediment stockpile for waste characterization and offsite disposal.

All vehicles and equipment used for excavation shall be decontaminated in accordance with the Contractor's approved Site Safety and Health Plan prior to entering clean areas, in accordance to SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

3.6 WASTE HANDLING

All contaminated sediment and soil excavated will be temporarily stored in the sediment and soil stockpile cells at the staging area. All excavated material shall be handled as in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

Haul routes to the staging area from the various Site properties shall be utilized as detailed in the Contractor's approved Traffic Control Plan developed in accordance with SECTION 01 55 26 - TRAFFIC CONTROL.

Prevention of tracking soils and sediment offsite shall be performed as detailed in the Contractor's approved Environmental Protection Plan developed in accordance with SECTION 01 57 19 - ENVIRONMENTAL PROTECTION.

3.7 REMOVAL OF WATER IN EXCAVATION AREA AND DIVERSION OF WATER

Surface water and stormwater runoff shall be directed away from the excavation and construction areas to prevent erosion, prevent surface water runoff from becoming contaminated through contact with contaminated materials, and to minimize additional pumping that would be required to remove the water from the excavation areas. Care shall be taken to ensure that all diverted water is directed to existing drainage paths and not discharged onto, or caused to flooded, adjacent structures or properties. Diversion fence, diversion ditches, dikes, and grading may be provided and maintained as necessary during construction in accordance with SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL and SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER.

The Contractor shall stop work and reduce the exposed surface area of the excavation when heavy rain is predicted. The Contractor shall provide control measures to prevent contaminated sediment and soil transport outside the excavation areas and prevent debris within the excavation areas from flowing out during storm events.

Slopes shall be excavated so that the site and the area immediately surrounding the site can be effectively drained and the operations at the site shall be continuous.

The Contractor shall pump water accumulating in the excavation areas through filters and discharge the filtered water to downstream side of excavation in compliance with the SPDES permit. All filters with solids shall be consolidated with the soil/sediment stockpile and properly disposed with the contaminated soil or sediment.

Anticipated subsurface soil and water conditions shall be considered when selecting methods of excavation. All surface water that contacts contaminated soil shall be treated on site prior to ultimate discharge.

The Contractor shall install the water conveyance piping in accordance with the manufacturer's recommendations.

If the water conveyance piping is installed above ground, or above the frost line below ground, the Contractor shall take measures to prevent the pipes from freezing.

The Contractor shall periodically monitor the water conveyance piping for leaks. If a leak is discovered, the Contractor shall immediately make the necessary repairs. The Government shall be notified within 24 hours of the leak detection and shall be notified again upon completion of the repair work.

-- End of Section --

SECTION 02 61 13
ATTACHMENT A
PHOTOGRAPHS RELATED TO TURBINE

Photo 5 2015 Flintkote Arch-02 0620 075

RICHARD GRUBB & ASSOCIATES

Photograph 17: View of the exposed Flintkote turbine (Feature 1) after removal of clean fill, Operable Unit 2 – Area A.

Photo view: West

Photographer: Alex Flick

Date: October 8, 2018

Photograph 18: Close-up view of the exposed surface of the Flintkote turbine (Feature 1), Operable Unit 2 – Area A.

Photo view: West

Photographer: Alex Flick

Date: October 8, 2018

SECTION 02 71 00

TEMPORARY WATER TREATMENT SYSTEM

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, supervision, engineering, design, construction, erection, equipment, tools, necessary fabrication, materials, installation, startup testing, and other services as specified for the completion and proper operation of the temporary water treatment system.

The Contractor shall ensure that treated water, which shall be discharged to Eighteen Mile Creek, meets the treatment objectives specified in the NY Construction State Pollutant Discharge Elimination System (SPDES) permit and herein. Discharge of treated water to a manhole of the combined sewer may also be considered and implemented with the City of Lockport and government approval.

This section is written as a performance-based specification. The purpose of the treatment system specified herein is to remove total suspended solids. Only basic equipment requirements, such as pumps, tanks, filtration systems, and piping are specified. Minimum treatment criteria are included. It shall be the Contractor's responsibility to provide a system to consistently treat the influent water and produce the required effluent water quality. All required equipment and incidentals, including electrical and instrumentation shall be provided, whether specified herein or not, to produce a fully operational system.

After contract award, the Contractor shall determine the anticipated flow and best approach for water treatment and sludge handling, which may include treatment methods other than the conceptual design proposed herein. The Contractor shall provide a complete and functional treatment system to meet the objectives of this specification.

The Contractor shall be responsible for the design, operation and maintenance (O&M) of the temporary water treatment system in a manner that accomplishes the required treatment standards and is in accordance with all Federal, State and local laws. The Contractor shall also be required to monitor system performance and maintain operating records of system performance that adequately document the required treatment.

The system should be fully operable at all times needed and should not delay the construction progress.

The system shall be designed and installed to be protected from a 100-year flood event.

The temporary water treatment system, including all influent and effluent piping, shall be designed to be operational between April and November, or as required per the Contractor's construction schedule.

1.2 REFERENCES

The publications listed below form a part of this specification to the

extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

ASTM INTERNATIONAL (ASTM)

ASTM C582	Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment
ASTM D3299	Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
ASTM D4097	Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
ASTM A283/A283M	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA D100	Welded Steel Tanks for Water Storage

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	National Electrical Code
NFPA 70, Section 110.16	Arc-Flash Hazard Warning

NEW YORK CODES RULES AND REGULATIONS (NYCRR)

6NYCRR PART 750	State Pollutant Discharge Elimination System (SPDES) Permits
6NYCRR PART 703.2	Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations - Narrative water quality standards
6NYCRR PART 703.3	Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations - Water quality standards for pH, dissolved oxygen, dissolved solids, odor, color, and turbidity

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC)

NYSDEC GP-0-20-001	Stormwater Permit for Construction Activity

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Temporary Water Treatment Plan; G

Within 30 days after the Notice to Proceed, the Contractor shall submit a temporary water treatment plan, which shall include estimated flow or volume based on the design of soil/sediment processing area, sediment dewatering, and other processes that may generate contaminated water at the staging area, temporary water treatment system layout drawings, and details as required for the Contractor to install, maintain, and operate the temporary water treatment system. The plan shall be prepared and stamped by a Professional Engineer in the State of New York. At a minimum, the plan shall include the following components:

a. Temporary Water Treatment Equipment

The complete list of equipment and materials used in the temporary water treatment system. The list shall include, but not be limited to primary process equipment, pumps, tanks, filtration system, control valves, flow measure instruments, level control instruments, and other similar items of equipment. Information for each piece of equipment shall include the following, as applicable:

1) Manufacturer literature and model number

2) Equipment size and dimensions

3) Design capacity

4) Utility requirements

5) Materials of construction and weight

6) Manufacturer's certified rating curves showing pump characteristics of head, brake horsepower, discharge, efficiency.

7) Provisions for standby equipment and standby power supply.

b. Process Flow and Instrumentation Diagrams

A process flow and instrumentation diagram (PID) showing all major pieces of process equipment with controls. The PID shall contain complete piping, schematic diagrams and any other details required to demonstrate that the system has been coordinated and will properly function as a unit..

c. Calculations

Provide calculations supporting the sizing for all equipment and piping.

SD-10 Operation and Maintenance Data

Operation and Maintenance Manual; G

The Contractor shall provide a comprehensive operation and maintenance manual for the temporary water treatment system. The manual shall include detailed procedures for installation, start-up, operation, troubleshooting, and maintenance.

1.4 QUALITY ASSURANCE

The Contractor shall provide standard equipment modified as required and manufactured by companies whose products have commercially available replacement parts and have had similar units in service for not less than 5 years.

Analytical sampling shall be performed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

1.5 PERMITS

The Contractor shall be responsible for obtaining all necessary permits, for the construction, operation, maintenance of the temporary water treatment system. Discharge of treated water shall be conducted in accordance with all applicable Federal, State and local regulatory requirements. Permits and approvals from local regulatory agencies are summarized in SECTION 01 11 00 - SUMMARY OF WORK.

1.6 SYSTEM DESCRIPTION

This section describes the functions, configuration, and operating parameters of the system. It is intended to provide basic information necessary for the Contractor's design, selection of equipment, installation and operation of the system.

The Contractor shall design the temporary water treatment system to operate as required for treatment of:

a. Stormwater that falls within the excavation areas.

b. Decontamination water from equipment decontamination, personnel decontamination, and decontamination showers.

c. Water generated from sediment processing.

Treated water shall meet the effluent criteria specified in the site SPDES permit equivalency, which will be obtained by the Contractor. Surface water and groundwater sampling data are provided in SECTION 01 11 00 - SUMMARY OF WORK. Effluent criteria is provided in SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL, Table 01 35 45-5.

It is anticipated that the temporary water treatment system will include settling tanks, transfer pumps, bag filters, flow control values, total and instantaneous flow measurement instrumentation, water quality sampling ports, and effluent discharge piping, properly sized for the anticipated flows and capable of treating the anticipated contaminant loading.

The Contractor shall provide means to clean out the soil accumulated in the tanks as necessary. Soils and sediment shall be disposed of in accordance with SECTION 31 00 00 - EARTHWORK and SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

Instrumentation and controls shall be furnished to provide both automatic and manual operation of the system. The Contractor shall provide process parameters necessary to monitor system performance including flow, pressure, and tank levels.

System controls shall be completely automatic. A licensed operator shall

be present onsite during operation of the system. Operators shall inspect the system at minimum weekly and be on-call at all other times of operation. Visual and/or audible alarms shall be provided to alert or warn operators of abnormal conditions. Malfunction sensor shall be maintained at critical points in the treatment train to automatically provide a safe shutdown of the system in case of loss of power and during emergency conditions. The system shall have fail-safe features including preventing overflow of secondary containment. Control of operation and shutdown shall be based on automated feedback loops on pressure, flow, and/or and tank levels.

1.7 EQUIPMENT/PROCESS LAYOUT

a. All equipment shall be arranged to allow unobstructed access to components requiring operation and maintenance.

b. The Contractor shall provide removable couplings on piping between each component.

c. The equipment shall be located such that additional treatment units may be added if necessary, to meet the required discharge criteria.

d. All piping shall be labeled with arrows indicating the direction of the flow.

e. Where applicable, equipment shall be labeled in accordance with NFPA 70, Section 110.16.

1.8 DELIVERY, STORAGE, AND HANDLING

a. The Contractor shall arrange for the freight to the site and for on- and off-loading of all system equipment shipped to the site.

b. To the extent possible, all component equipment of the system shall be delivered on transportable structural steel skids to the site, pre-piped and pre-wired, and ready for hookup.

c. The equipment shall be shipped, delivered, handled, stored, and installed in ways that will prevent damage to the items. The equipment shall be shipped with suitable in-transit protection and shall be outfitted with lifting lugs, cleats, or other suitable means for unloading and erecting.

1.9 TEMPORARY ELECTRICITY

a. The Contractor shall provide, maintain, and pay for temporary utility power service for operation of the temporary water treatment system. Electricians shall have a minimum of 4 years demonstrated experience providing similar type of work required. .

b. Provide power outlets for construction operations, with branch wiring and distribution boxes, as required. Provide flexible cords as required.

c. Provide main service disconnect and overcurrent protection at convenient location.

d. Comply with Federal, State, and local regulations, local utility company requirements, and NFPA 70.

1.10 LABORATORY ANALYSIS OF WASTEWATER

The Contactor shall collect samples and provide field screening and/or laboratory analysis of influent to treatment system and/or effluent, as required by SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

All laboratory testing shall be performed by a NELAP certified laboratory and in accordance with the latest versions of the appropriate EPA test methods required for proper characterization.

1.11 REGULATIONS AND CODES

The Contractor shall comply with all the laws, ordinances, codes, rules, and regulations of the Federal, State, and local authorities having jurisdiction over any of the work specified herein.

PART 2 PRODUCTS

2.1 GENERAL

The Contractor shall furnish and install a complete system ready for operation..

Parts shall be amply portioned for stress, which may occur during fabrication, transportation, unloading, erection, and operation. All units and/or parts of the same size shall be identical and interchangeable. The Contractor shall be responsible for all mechanical, instrumentation, process and electrical design, as well as assembly and related work.

The material of construction or surface coating and paint of all wetted parts of all equipment shall be suitable for the intended purpose.

All units shall be suitable for outdoor use and shall be constructed of corrosion-resistant material.

2.2 SETTLING TANK

a. The setting tank shall be properly coated to prevent rust from contacting contaminated water and exposure to rain and sun.

b. The tank shall have a manway for operator access.

c. The tank shall be equipped with a safe work platform on the top and staircase or ladder.

d. The side of the tank shall be equipped with an appropriately sized flange and/or valve to facilitate pipe connections. The tanks with a cover, vacuum breaker, and vent may be used as appropriate.

e. The tank construction material shall be compatible with the material stored. Tanks constructed of polyethylene, polypropylene, and fiberglass reinforced plastic shall conform to applicable material and construction provisions of ASTM C582, ASTM D3299, and ASTM D4097. Steel tanks shall conform to AWWA D100. Carbon steel tank shall be ASTM A283/A283M carbon steel Grade C or D and shall be protected with an interior coating appropriate for the intended service in accordance with the manufacturer's written instruction. Exterior painting shall be performed in accordance with the manufacturer's instructions.

f. The Contractor shall have provisions to allow for accurate tank water level measurements..

2.3 TRANSFER PUMPS

a. For each set of transfer pumps, the pumps shall be designed so the system can handle the design flow with one unit out of service.

b. Centrifugal pumps shall be provided as required for transferring fluid within the temporary water treatment system as described herein.

c. The centrifugal pumps shall be a horizontal, ANSI type, single stage, end suction, water pump coupled to an electric motor by means of a spacer type coupling with coupling guard.

d. The pump casing shall be one piece with a side cover and shall be designed to permit replacement of wearing parts. A minimum of ½-inch plugged drains and vents on the pump casing shall be provided.

e. Pumps shall be capable of pumping the required flow rate at the required head conditions and shall be capable of providing sufficient outlet pressure at the effluent flanges.

f. The impeller shall be of the type designed for the specific application.

g. Replaceable mechanical seals shall be rated for the temperature, pressure, and water quality to be pumped in the system. Seals shall prevent leakage of air into the pump, or leakage of water out of the pump.

h. The motor shall be continuous duty electric totally enclosed fan cooled (TEFC) squirrel-cage induction type. Motor shall be sized so that when operating at rated speed, motor cannot be overloaded despite variation in pumping head.

i. The bearing shall be the manufacturer's standard ball or roller type suitable for the service intended. Bearing shall be oil or grease lubricated and provided with all necessary piping and fittings for lubrication and/or cooling.

2.4 BAG FILTERS

a. The bag filters shall be designed so the system can handle the design flow with one filter out of service.

b. The bag filtration system shall be equipped with an automatic controller to shut down the system to allow for the changing of the filter bags. The frequency of the changing of the filter bags shall be conducted in accordance with the manufacturer's specifications and site conditions..

2.5 SURFACE WATER DISCHARGE

The Contractor shall provide an effluent discharge line capable of discharging treated effluent from the temporary water treatment system to surface water. The effluent will flow to the discharge point by gravity or pump.

The Contractor shall construct an outfall protection structure at the discharge pipe outlet to prevent erosion. Outfall protection shall be provided as necessary to dissipate the flow energy and prevent erosion at the discharge point. Outfall protection shall be constructed of riprap or other suitable material and shall be inspected and maintained daily during the temporary water treatment operations period. If erosion is observed, the Contractor shall enhance the outfall protection measures to the satisfaction of the Government.

The discharge line shall be protected from damage from vehicle traffic and be operational in the cold weather of the construction period.

A sample port shall be provided on the effluent discharge line to obtain samples for compliance. Compliance sampling shall be as required by the SPDES permit.

2.6 SYSTEM PIPING, VALVES AND FITTINGS

The Contractor shall furnish all piping, valves, hoses and fittings for a complete operational temporary water treatment system. All system piping shall be installed in place with proper supports and anchoring.

Influent and effluent connections shall be terminated as ANSI flanges approximately 12 inches above grade. Valve on water and air lines 3 inches and smaller shall be ball valves; valve on lines greater than 3 inches shall be butterfly valves. Valves on sludge lines shall be plug valves.

PART 3 EXECUTION

3.1 INSTALLATION AND ERECTION

The installation of the system equipment shall be in strict accordance with the manufacturer's technical data and printed instructions. Anchor bolts, guy-wires, and supporting incidentals shall be furnished as required for proper installation of each component. If required to distribute weight, ship components separately for field installation.

The tanks shall be installed in accordance with the manufacturer provided instructions. Tank mounting and tie down devices shall be provided as recommended by manufacturer.

The temporary water treatment system shall be installed within an impermeable containment area capable of containing spills or leaks, in the proposed location as shown on the Contract Drawings or as approved by the Government. Equipment pads shall be provided for system equipment as required.

The Contractor shall install heat tracing/insulation on piping and equipment as necessary to prevent freezing.

3.2 START-UP TESTING

The Contractor shall conduct hydraulic tests on the system once all relevant systems have been documented and accepted by the Government as mechanically complete. The Contractor shall perform hydraulic testing at the maximum design flow rate for at least two continuous hours. Potable water or creek water shall be used for the test, unless otherwise approved by the Government. During the testing the Contractor shall inspect all

temporary water treatment system components, including tanks, pumps, piping, valves, meters, level controls, and connections, to confirm that no system components leak and that all temporary water treatment system components perform correctly. Any leaks or other deficiencies observed during the testing shall be repaired and the temporary water treatment system shall be retested after repairs. The hydraulic testing shall not be deemed complete until the entire temporary water treatment system has operated under normal operating conditions without any leaks or other related deficiencies for at least 2 consecutive hours.

Readings from pressure indicators shall be recorded at regular intervals throughout the system to aid in determining the limits of the system prior to failure of any system component due to system loading.

Once the system has been determined to be operating to the satisfaction of the Government, testing shall be performed with water generated from excavation dewatering to confirm that the system is capable of consistently meeting the effluent discharge criteria under normal operations. This will be performed through the collection and analysis of effluent samples from the sample port on the effluent discharge line which will be analyzed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL. System effluent shall not be discharged to the surface water body until approved by the Government.

3.3 OPERATION AND MAINTENANCE

The Contractor shall provide and maintain on site all personnel, equipment, and materials necessary for the operation and maintenance of the temporary water treatment system. The system shall be operated in strict accordance with the equipment manufacturers' specifications and in accordance with Contractor's approved Temporary Water Treatment Plan. The Contractor shall provide an operation and maintenance manual for the temporary water treatment system in accordance with Paragraph 1.3 and shall maintain detailed operation and maintenance records.

The Contractor shall have spare parts and equipment to ensure continued operation when necessary. At no time should the operation of the temporary water treatment system limit the progress of excavation unless otherwise directed by the Government.

3.4 SAMPLE AND ANALYSIS

Sampling during startup testing shall be performed daily. During full operation, sampling shall be performed weekly or as specified in the SPDES/DSW permit equivalency. All samples shall be analyzed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL. Additional effluent samples shall be collected during processing of soils with high contaminant concentrations to ensure the effluent discharge criteria are being met during processing of these materials.

3.5 HANDLING OF RESIDUES

All process-derived wastes (e.g., tank sediments) shall be consolidated with the excavated soil and sediment and disposed of offsite at an approved facility.

-- End of Section --

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SECTION 02 81 00

MATERIAL HANDLING, TRANSPORTATION AND DISPOSAL

PART 1 GENERAL

1.1 SCOPE OF WORK

The purpose of this section is to provide the Contractor with the minimum requirements for the handling, transportation and disposal of waste materials.

The Contractor shall be responsible for obtaining all permits required for offsite transportation of waste in accordance with applicable Federal, State and local regulations.

Material generated from the excavations is expected to be classified as Toxic Substance Control Act (TSCA), mixed waste, hazardous waste and non-hazardous waste for disposal at TSCA permitted or Resource Conservation and Recovery Act (RCRA) Subtitle C and Subtitle D landfill(s) respectively.

The work in this Section also includes processing of waste and debris including, but not limited to, wood logs, vegetation, metals, bricks, stones, rubber and plastics encountered during site clearing, grubbing, demolition, and excavation of soil and sediment. Waste and debris shall be properly characterized for recycling and disposal in accordance with waste acceptance criteria.

At a minimum, the Contractor shall be required to furnish all labor, material, equipment including screens, hoppers, conveyers, weigh scales, silos, and pugmills, and incidentals necessary for on-site material handling/preparation and offsite transportation, treatment, and disposal of materials from the remediation and associated activities. Waste generated shall be disposed of at approved landfill(s), depending on waste characteristics. No excavated material above the cleanup criteria shall remain or be reused on-site.

Fine-grained sediments and soils may require solidification. Solidification shall be performed by mixing cement, quick lime, or any other reagent approved by the New York State Department of Environmental Conservation (NYSDEC) for disposal with contaminated sediments and/or soil.

The Contractor shall prepare an area within the site, if needed, for processing facility setup and operation. This work shall include, but not be limited to, clearing, fencing or other barricades, grading, linear placement, crushed stone pavement, electric power for operation, and preparation of area for setup and operation. Power for the solidification/processing equipment shall be provided on-site. The Contractor shall be responsible to restore the area, including confirmation of no contamination of the subsurface soils. Surface water collected in the material processing area will be considered impacted and shall be collected and treated prior to discharge.

The Contractor shall prepare and maintain waste shipment records and manifests required by RCRA, U.S. Federal Department of Transportation (DOT), and New York State Department of Transportation (NYSDOT).

The Contractor shall be required to perform all sampling required for landfill acceptance of excavated soil and debris. The Contractor shall also be required to provide all waste profile information to the landfill, per the landfill's requirements. Information related to hazardous waste is included in this specification in case hazardous waste is encountered.

The Contractor shall ensure that all operations for loading and hauling of wastes comply with Federal and State Department of Transportation (DOT) regulations, and all other applicable Federal, State, and local requirements.

The Contractor shall propose onsite treatment of soil and sediment that are characteristic hazardous waste to non-hazardous waste if it provides cost saving to the Government. The proposed onsite treatment plan shall include but not limited to reagent to be used, equipment, staging area, permit requirements to be met and cost comparison between onsite treatment and offsite disposal of hazardous soil and sediment.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply

ASTM INTERNATIONAL (ASTM)

ASTM C150	Standard Specification for Portland Cement
ASTM C25	Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions (LDR)
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 300.440	Procedures for Planning and Implementing Offsite Response Actions
40 CFR 300.440	Designation, Reportable Quantities, and Notification

40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
49 CFR 171	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
49 CFR 172	General Information, Regulations, and Definitions
49 CFR 172.101	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 1'72.102	Purpose and Use of Hazardous Materials Table - Special Provisions
49 CFR 172.604	Emergency Response Telephone Number
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 177	Carriage by Public Highway
49 CFR 178	Specifications for Packagings

U.S. CODE (USC)

10 U.S.C. 2692	Storage, Treatment, and Disposal of Nondefense Toxic and Hazardous Materials
15 U.S.C. 2601 et seq.	Control of Toxic Substances
33 U.S.C. 2701 et seq.	Oil Pollution Act (OPA)
42 U.S.C. 6901 et seq.	Resource Conservation and Recovery Act (RCRA)
42 U.S.C. 9601 et seq.	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
49 U.S.C. 1801 et seq.	Hazardous Materials Transportation Act (HMTA)

New York State Department of Environmental Conservation

6 NYCRR Part 360	Solid Waste Management Facilities General Requirements
6 NYCCR Part 361	Material Recovery Facilities
6 NYCCR Part 363	Landfills

6 NYCCR Part 364	Waste Transporters
6 NYRCC IV B 370	Hazardous Waste Management System - General
6 NYCCR Part 371	Identification and Listing of Hazardous Wastes
6 NYCCR Part 372	Hazardous Wastes Manifest System and Related Standards for Generators, Transporters and Facilities
6 NYCCR Part 373-1	Hazardous Waste Treatment, Storage and Disposal Facility Permitting Requirements
6 NYCCR Part 376	Land Disposal Restriction
40 CFR 300.440	Designation, Reportable Quantities, and Notification

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Waste Management and Transportation Plan; G

The Contractor shall prepare and submit to the Government for approval a Waste Management and Transportation Plan, which shall include, at a minimum, the following:

a. Procedures for onsite management of contaminated material and the management practices to be utilized.

b. Waste minimization methods.

c. Soil containment where contaminated material is to be handled.

d. Waste processing/solidification layout and description of procedures including dewatering methods, proposed reagents, dosage, method of mixing, curing times, and other details as appropriate to enable proper review of proposed methods by the Engineer.

e. Analytical characterization of proposed solidification reagents.

f. Daily schedule and expected duration including starting and completion dates of operation and expected treatment production rate.

g. Quality assurance/quality control procedures.

h. Dust control measures.

i. Proposed methods for collection, routing, treatment and

disposal of impacted water generated from solidification and storm water collected at the material processing area.

j. Proposed landfill facilities for waste disposal, including alternate facilities in the event that the primary facility cannot accept the waste.

k. Certificates, permits, licenses, and EPA identification (ID) numbers for the proposed disposal facility/facilities and waste haulers.

l. RCRA waste classification and volume estimates for the waste types, if existing sample results are sufficient for landfill acceptance. Otherwise, the Contractor shall conduct waste characterization sampling to meet landfill acceptance requirements.

m. Letters of commitment from the proposed waste haulers and disposal facilities, certifying acceptance of the Eighteen Mile Creek Site waste.

n. Methods and equipment to be used to ensure accurate weight measurements of waste material.

o. Waste manifesting procedures.

p. Proposed haul routes from the worksite to the disposal facility(s). The route(s) to and from the disposal facility(s) shall be in accordance with the disposal facility(s) requirements and all Federal, State and local regulations, laws, ordinances, and weight restrictions.

SD-03 Product Data

Notices of Non-Compliance and Notices of Violation; G

Notices of non-compliance or notices of violation issued by a Federal, State, or local regulatory agency to the Contractor in relation to any work performed under this contract. The Contractor shall immediately provide copies of such notices to the Government. The Contractor shall also furnish all relevant documents regarding the incident and any information requested by the Government, and shall coordinate its response to the notice with the Government prior to submission to the notifying authority. The Contractor shall also furnish a copy to the Government of all documents submitted to the regulatory authority, including the final reply to the notice, and all other materials, until the matter is resolved.

Contaminated Material Stockpile Reports; G

When contaminated materials are in interim storage, submit on a weekly basis, an inventory of the types, quantity, and locations of all contaminated materials in interim storage, and a record of the date, quantity, source and disposition of all contaminated materials placed into or taken out of interim storage. Report all test results from sampling of stored material.

SD-06 Test Reports

Spill Response; G

In the event of a spill or release of a pollutant, contaminant, hazardous substance (as designated in 40 CFR 302), or oil (as governed by 33 U.S.C. 2701 et seq.), the Contractor shall notify the Government immediately. If the spill exceeds a reporting threshold, the Contractor shall follow the pre-established procedures for immediate reporting to the Government.

Manifest Exception Reports; G

In the event that a manifest copy documenting receipt of waste at the disposal facility is not received within 35 days of shipment initiation, the Contractor shall prepare and submit an exception report to the Government within 37 days of shipment initiation.

SD-07 Certificates

Transportation and Disposal Coordinator; G

Transportation and Disposal Coordinator qualifications including proof of at least one year specialized experience in management and transportation of hazardous wastes and proof of current Department of Transportation Hazardous Materials Training Certification.

Training; G

Documentation that employees preparing or transporting hazardous materials have been trained, tested, and certified per 49 CFR 172, Subpart H, including general security awareness requirements and, where applicable, site-specific security plan requirements.

EPA Offsite Policy; G

A letter certifying that EPA considers the facilities to be used for all offsite disposal to be acceptable in accordance with the Offsite Policy in 40 CFR 300.440. This certification shall be provided for wastes from sites governed by 42 U.S.C. 6901 et seq. or 42 U.S.C. 9601 et seq. A sample Offsite Policy certification memo is provided in Attachment A.

Transport Certification; FIO

The Contractor shall submit certification that all operators and used to transport contaminated material meet all existing Federal, State and local regulations for vehicle operations.

Certificates of Disposal; G

Certificates documenting the ultimate disposal of CERCLA remediation wastes are required within 180 days of initial shipment. Receipt of these certificates will be required for final payment.

Shipping Documents; G

Submit all transportation-related shipping documents to the Government for review a minimum of 14 days prior to anticipated

pickup. "Receipt copies" of waste manifests at the designated disposal facility shall be furnished no later than 35 days after acceptance of the shipment.

Solidification Additive; G

If Portland cement is chosen as the reagent to be used in solidification it shall conform to the specifications set out in ASTM C150. Cement material shall be Type I/II Portland cement. The Contractor shall provide millsheets from the cement supplier certifying compliance with these standards. Cement shall be delivered in pneumatic tankers and shall be stored in completely enclosed silos or containers.

If quick lime is chosen for the solidification of all sediments, it shall conform to the specifications set form in ASTM C25. The Contractor shall provide millsheets from the quicklime supplier certifying compliance with these standards.

If alternative reagents or polymers are proposed by the Contractor, detailed analytical characterization of the product must be submitted to the Government for approval. The Government may request additional product information for review and approval. The product will also require approval by the New York State Department of Environmental Conservation based on waste disposal criteria for the landfill.

The Contractor shall obtain one 250 ml sample of cement for approximately every 100 tons of cement or quick lime delivered to the site. Samples shall be taken and stored in airtight 250 ml glass sampling jars. Contractor shall retain the samples on-site until directed by the Government.

Potable water shall be used for solidification

1.4 QUALIFICATIONS

1.4.1 Transportation and Disposal Coordinator

The Contractor shall designate, by position and title, one person to act as the Transportation and Disposal Coordinator (TDC) for this contract. The TDC shall serve as the single point of contact for all environmental regulatory matters and shall have overall responsibility for total environmental compliance at the site including, but not limited to, accurate identification and classification of hazardous waste and hazardous materials; determination of proper shipping names; identification of marking, labeling, packaging and placarding requirements; completion of waste profiles, hazardous waste manifests, bill of ladings, exception and discrepancy reports; and all other environmental documentation. The TDC shall have, at a minimum, one year of specialized experience in the management and transportation of hazardous waste and have been DOT-certified under 49 CFR 172, Subpart H.

1.4.2 Training

The Contractor's hazardous materials employees shall be trained, tested, and certified to safely and effectively carry out their assigned duties in accordance with SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES. The Contractor's employees transporting hazardous materials or

preparing hazardous materials for transportation, including samples, shall be trained, tested, and certified in accordance with 49 CFR 172, Subpart H, including security awareness and any applicable security plans. Contractor employees making determinations that shipments do not constitute DOT regulated hazardous materials shall also be trained, tested, and certified in accordance with 49 CFR 172, Subpart H.

1.5 DEFINITIONS

1.5.1 TSCA Waste

TSCA waste is an individual chemical waste (both liquid and solid) regulated by the Toxic Substances Control Act (TSCA). For this Site, soils, sediments and debris with total PCBs greater than or equal to 50 mg/kg is TSCA waste.

1.5.2 Hazardous Material

A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated pursuant to 49 U.S.C. 1801 et seq. The term includes materials designated as hazardous materials under the provisions of 49 CFR 172.101 and 49 CFR 172.102, and materials that meet the defining criteria for hazard classes and divisions in 49 CFR 173. EPA-designated hazardous wastes are also hazardous materials. Materials that meet the criteria established in the Toxic Substances Control Act (TSCA) in 15 U.S.C. 2601 et seq. may also be hazardous materials.

1.5.3 Hazardous Waste

A waste that meets criteria established in RCRA or specified by the EPA in 40 CFR 261 or meets criteria for hazardous by a RCRA authorized state program. For this site, soils, sediments, and debris that exceed the toxicity characteristic leaching procedure criteria, such as lead greater than 5 milligram per liter, will be characteristic hazardous waste.

1.5.4 Mixed Waste

A waste that has PCBs at or exceeding 50 mg/kg and is characteristic hazardous waste.

1.5.5 Non-Hazardous Waste

Any waste that is contaminated and does not meet the criteria of hazardous waste. For this Site, it includes soils and debris that contain PCBs greater than or equal to 1 mg/kg but less than 50 mg/kg.

1.5.6 Large Debris

Any disposal waste that is too large in diameter to be disposed with soil and debris according to disposal facility requirements

1.5.7 Debris

Any soil and debris mixed waste for disposal that contains less than fifty percent debris by analytical analysis or as otherwise defined by designated disposal facility. Debris may be TSCA, Hazardous or Non-Hazardous.

1.5.8 Soil

Any soil and debris mixed waste for disposal that is less fifty percent debris by analytical analysis or as otherwise defined by designated disposal facility. Soil may be TSCA, Mixed Waste, Hazardous or Non-Hazardous.

PART 2 PRODUCTS

2.1 MATERIALS

The Contractor shall provide all of the materials required for the packaging, labeling, marking, placarding and transportation of TSCA, mixed waste, hazardous, and non-hazardous wastes in conformance with DOT standards. Details in this specification shall not be construed as establishing the limits of the Contractor's responsibility.

2.1.1 Spill Response Materials

The Contractor shall provide spill response materials in accordance with the spill response plan including, but not limited to, containers, adsorbent, shovels, and personal protective equipment. Spill response materials shall be available at all times during which wastes are being handled or transported. Spill response materials shall be compatible with the type of material being handled.

2.2 EQUIPMENT AND TOOLS

The Contractor shall provide miscellaneous equipment and tools necessary to handle wastes in a safe and environmentally sound manner.

2.3 FACILITIES

The Contractor shall provide, install, and maintain any temporary loading facilities as required for the material handling operations as show on the Contract Drawings.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall ensure that all lined hauling vehicles containing waste are covered before leaving the site.

The Contractor shall coordinate the schedule for hauling vehicle arrival and departure. The schedule shall be coordinated with the progress of excavation and be compatible with the availability of equipment and personnel for material handling operations. No claims shall be made by the Contractor for additional compensation due to a delay in the schedule related to hauling vehicle arrival or departure.

The Contractor shall organize and maintain the material shipment records required by the Federal and the State of New York regulations.

The Contractor is responsible for obtaining and filling out waste profile sheets required by the disposal facility. The quantity of sheets per contained waste shall be in accordance with Federal, State or local regulations. The Contractor shall submit each profile sheet to the

Government.

The Contractor shall notify the Government immediately upon learning that a job-related accident has occurred. Notification of the accident shall include location of the accident, resultant damage or injury, person(s) involved, probable cause, amount of waste spilled, and any other pertinent information concerning the accident.

Accident cleanup operations shall be performed as directed by the Government. Cleanup shall be performed immediately.

The Contractor shall provide transportation of the waste directly to the disposal facility/facilities.

The Contractor shall provide all sampling and analytical services necessary for disposal in accordance with disposal facility requirements, and all applicable Federal, State, and local regulations, and as specified in SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

The Contractor shall coordinate recording quantities of waste leaving the site with the Government. Certified weights are required for materials disposed off-site.

3.2 CHARACTERIZATION OF WASTE MATERIALS

The Contractor shall perform all waste characterization sampling and testing required by the landfill for acceptance.

3.3 WASTE MANAGEMENT

Waste from the Site shall be disposed of offsite in an approved landfill in accordance with the approved Waste Management Plan.

Solid waste material other than mixed soil/debris, including vegetative debris and large debris encountered in clearing and grubbing and in excavations, shall be stockpiled, covered, and properly disposed. All waste materials shall be stored within containment areas as shown on the Contract Drawings.

Contaminated soils and vegetative or construction debris with PCBs less than 50 mg/kg that passes TCLP testing shall be considered non-hazardous and disposed of at an approved Subtitle D landfill as specified in SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

The following wastes are expected from the Eighteen Mile Creek Site:

a. Dewatered soil and sediment: TSCA, mixed waste, hazardous and non-hazardous

b. Dewatered debris

c. Vegetative debris

d. Water treatment residuals

e. Demolition debris

f. Debris from removal of temporary facilities and access routes

3.3.1 Soil and Sediment Processing

Processing operations shall not produce excessive dust emissions.

The Contractor shall provide and operate machinery sufficient to produce a completely mixed composite consisting of sediment and additive in proportions sufficient to achieve the specified landfill strength criteria.

Contractor shall be responsible for selecting cement, quick lime or other approved reagent dosages to meet the solidification design criteria for measured water contents (e.g., bulk solids content), paint filter test and/or field index strength results, as approved by the Engineer.

If necessary, the sediment or soil shall be solidified as to prevent the free drainage of liquid from the solidified materials. Elimination of free water is a prerequisite for disposal into the Secure Landfill and shall be confirmed by the paint filter test.

3.3.2 Curing of Processed Material

The Contractor shall keep records of the date of mixing, the depth of mixing, and the rate of cement, quicklime or other approved reagent addition.

Performance testing on soils and sediments shall be conducted in accordance with the approved disposal facility's requirements.

Material shall not contain free water as determined by the paint filter test. If a truckload of material does not meet the free water criteria, the material shall be reprocessed by blending cement, quicklime or other approved reagent to the material as necessary.

3.4 HAZARDOUS WASTE MANAGEMENT

3.4.1 Stockpiles

Stockpiles of hazardous material shall be allowed to dewater within soil containment areas, prior to moving to the hauling vehicle loading area, as discussed in SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL. If multiple stockpiles are required, each unit shall be clearly labeled with an identification number.

The combined volume of all stockpiles shall be a size that is manageable and not create excess odors.

Stockpiles of excessive size shall be subject to approval of the Government.

The stockpiles shall meet the regulation defined in 40 CFR 264.

Creation and maintenance of stockpiles shall not interfere with the excavation, dewatering, and other onsite activities.

When a vapor barrier or plastic tarp/materials are used to cover PCB-contaminated soil/sediment stockpiles (especially if exposed to sun for extended periods), the cover shall be removed slowly or in segments to prevent potential short-term exposure to elevated amounts of vapor accumulated under the cover.

3.4.2 Liquid Storage

Liquid collected from stockpiles shall be contained and piped to the onsite water treatment system for treatment described in SECTION 02 71 00 - TEMPORARY WATER TREATMENT SYSTEM prior to discharge.

3.4.3 Sampling of Stored Material

Samples of contaminated soil shall be collected at a frequency consistent with the requirements of the offsite disposal facility. The Contractor shall analyze the stored material for disposal purposes. Analytical levels for soil to be shipped to the offsite disposal facility shall conform to Federal, State and local criteria as well as to the requirements of the offsite disposal facility as specified in SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL. Documentation of all analyses performed shall be furnished to the Government.

3.4.4 On-Site Hazardous Waste Management

Contractors are prohibited by 10 U.S.C. 2692 from storing Contractor-owned waste on site for any length of time. The Contractor shall be responsible for ensuring compliance with all Federal, State, and local hazardous waste laws and regulations and shall verify those requirements when preparing reports, waste shipment records, hazardous waste manifests, or other documents.

Identify hazardous wastes using criteria set forth in 40 CFR 261 or all applicable state and local laws, regulations, and ordinances.

When accumulating hazardous waste on site, comply with generator requirements in 40 CFR 262 and any applicable state or local laws or regulations. On-site accumulation times shall be restricted to applicable time frames referenced in 40 CFR 262, and any applicable state or local law or regulation. Accumulation start dates shall commence when waste is first generated (i.e., soil is excavated).

Immediately mark all hazardous waste containers with the words "hazardous waste" and other information required by 40 CFR 262, and any applicable state or local laws or regulations as soon as the waste is containerized. Only use containers in good condition and compatible with the waste to be stored. Ensure containers are closed except when adding or removing waste. Inspect containers for signs of deterioration and respond to any spills or leaks. Inspect all hazardous waste areas weekly and provide written documentation of the inspection. Inspection logs shall contain date and time of inspection, name of individual conducting the inspection, problems noted, and corrective actions taken.

3.4.5 Hazardous Waste Management Plan

As part of the Waste Management Plan, the Contractor shall prepare a plan detailing the manner in which hazardous wastes will be managed and describing the types and volumes of hazardous wastes anticipated to be managed as well as the management practices to be utilized. The plan shall identify the method to be used to ensure accurate piece counts and/or weights of shipments; shall identify waste minimization methods; shall propose facilities to be utilized for treatment, storage, and/or disposal; shall identify areas on-site where hazardous wastes are to be handled; shall identify whether transfer facilities are to be utilized; and if so, how the wastes will be tracked to ultimate disposal.

3.4.6 Disposal Facility and Transporter

The Contractor shall provide the Government with EPA ID numbers, names, locations, and telephone numbers of disposal facilities and transporters. This information shall be contained in the Waste Management Plan and shall be approved by the Government prior to waste disposal.

3.4.7 Status of the Facility

Facilities receiving hazardous waste must be permitted in accordance with 40 CFR 270 or operating under interim status in accordance with 40 CFR 265 requirements, or must be permitted by a state authorized by the Environmental Protection Agency to administer the RCRA permit program. Additionally, prior to using a treatment, storage, and disposal (TSD) Facility, the Contractor shall contact the EPA Regional Offsite Coordinator specified in 40 CFR 300.440 to determine the facility's status, and document all information necessary to satisfy the requirements of the EPA Offsite policy and furnish this information to the Government.

3.4.8 Shipping Documents and Packaging Certification

The Contractor shall be responsible for obtaining all permits and shipping documents to ship contaminated soil offsite.

3.4.9 Transportation

The Contractor shall use manifests for transporting wastes as required by applicable Federal, State or local law or regulations. Transportation shall comply with all requirements in the Department of Transportation reference regulations in the 49 CFR series.

Manifests requiring shipper's certification number shall be signed by the EPA Region II representative. Copies of all manifests and waste profiles shall be submitted to the Government within five days following shipment, and within five days after notification of receipt at the permitted disposal facility. Any manifest discrepancies shall be reported immediately to the Government and resolved by the Contractor. A detailed report documenting the final disposal of all materials removed from the site shall be submitted to the Government.

Prior to shipment of waste offsite, the Contractor shall inspect each hauling vehicle, at ground level, for required markings, labels, placards, securement of closures and leakage.

The Contractor shall be responsible for any and all actions necessary to remedy situations involving material spilled or leaked in transit on or off site.

Transportation routes to and from project areas shall be in accordance with the approved Transportation Plan. No deviation from transportation routes shall be allowed without prior written approval from the Government.

The Contractor shall be responsible for all repair costs for damages to structures, roads, bridges and any other features affected by the Contractor's offsite transportation and disposal operations.

The Contractor shall inspect and document hauling vehicles for proper operation, liner, and cover. Liner shall be properly sized and rated for

the transportation of waste materials found at the site. The cover shall be capable keeping precipitation from coming in contact with the waste materials.

Each hauling vehicle shall be monitored for external contamination by the Contractor prior to leaving the worksite. The Contractor shall perform and document decontamination procedures prior to leaving the worksite and again before leaving the disposal site.

Codes 49 CFR 171, 49 CFR 172, 49 CFR 173, 49 CFR 177, and 49 CFR 178 apply to the transportation of PCB-contaminated soils. PCB-contaminated soils shall be transported in vehicles designed to carry PCB contaminated soils in accordance with Federal and State requirements.

The Contractor shall provide written notice, including the quantity to be shipped and highest concentration of PCBs at least 15 days before the first shipment of PCB contaminated soils to each off-site facility where the waste is destined for an area not subject to a TSCA PCB Disposal Approval.

3.4.10 S Treatment and Disposal of TSCA and/or Hazardous Wastes

The Contractor shall ship TSCA wastes only to facilities that are properly permitted to accept the TSCA waste or operating under interim status. The Contractor shall propose the TSD facilities via submission of the Waste Management Plan, subject to the approval of the Government.

RCRA Subtitle C permitted facilities and permitted thermal facilities shall meet the requirements of 40 CFR 264 or facilities operating under interim status which meet the requirements of 40 CFR 265. TSCA permitted facilities shall meet the requirements of 40 CFR 761. Subtitle D facility shall meet the requirements for Subpart D waste. All TSD facilities must be accepted by the Government. Offsite treatment, storage, and/or disposal facilities with significant RCRA violations or compliance problems (such as facilities known to be releasing hazardous constituents into groundwater, surface water, soil or air) shall not be used.

The Contractor shall not deliver waste to any facility other than those listed on the shipping manifest.

In the event that an identified and approved facility ceases to accept the stated materials or ceases operations, it is the Contractor's responsibility to locate an alternate facility and make the necessary arrangements to utilize the alternate facility. The alternate facility must be approved in writing by the Government in the same manner and with the same requirements as the original facility.

3.5 APPLICATION

The Contractor shall ensure that each shipment of waste sent offsite is accompanied by properly completed shipping documents as specified in Paragraph 3.4.8. This includes shipments of samples that may potentially meet the definition of a Department of Transportation regulated hazardous material.

3.6 EPA ID NUMBERS

EPA Region 2 will provide waste generator identification number for use on the manifest.

3.7 RECORDKEEPING

The Contractor shall organize and maintain the material shipment records/manifests required by 42 U.S.C. 6901 et seq., the State of New Jersey, and the state in which the disposal facility is located.

3.8 SPILL RESPONSE

The Contractor shall respond to any spills of hazardous material or hazardous waste which are in the custody or care of the Contractor, pursuant to this contract. Any direction from the Government concerning a spill or release shall not be considered a change under the contract. The Contractor shall comply with all applicable requirements of Federal, State, or local laws or regulations regarding any spill incident.

3.9 EMERGENCY CONTACTS

The Contractor shall be responsible for complying with the emergency contact provisions in 49 CFR 172.604. Whenever the Contractor ships hazardous materials, the Contractor shall provide a 24-hour, 7-day a week monitoring telephone service emergency response contact. The person must be knowledgeable about the hazardous materials being shipped and who has comprehensive emergency response and incident mitigation information for that material, or has immediate access to a person who possesses such knowledge and information.

The phone must be monitored on a 24-hour basis at all times when the hazardous materials are in transportation, including during storage incidental to transportation.

The Contractor shall ensure that information regarding this emergency contact and phone number are placed on all hazardous material shipping documents. The Contractor shall designate an emergency coordinator and post the following information at areas in which hazardous wastes are managed:

a. Emergency coordinator's name

b. Emergency coordinator's phone number

c. Local fire department phone number

d. Fire extinguishers and spill control materials location

Attachment A

SAMPLE OFFSITE POLICY CERTIFICATION MEMO

Project/Contract #: _____

Waste Stream: _____

Primary TSD Facility, EPA ID # and Location: _____
Alter. TSD Facility, EPA ID # and Location: _____

EPA Region Contact

1	(617) 918-1752
2	(212) 637-4130
3	(214) 814-5267
4	(404) 562-8591
5	(312) 353-8207
6	(214) 665-2282
7	(913) 551-7154
8	(303) 312-6419
9	(415) 972-3304
10	(206) 553-2859

EPA representative contacted:_____

EPA representative phone number:_____

Date contacted:_____

Comment:_____

The above EPA representative was contacted on _____. As of that date, the above sites were considered acceptable in accordance with the Offsite Policy in 40 CFR 300.440.

Signature: _____ Date:_____

Phone number: _____

-- End of Section --

SECTION 02 91 00

SITE RESTORATION

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, equipment, material, and incidentals necessary to restore the Site as specified herein, as shown on the Contract Drawings, and/or as directed by the Government.

1.2 RELATED WORK

The Contractor shall perform backfill and planting in accordance with SECTION 31 00 00 - EARTHWORK, SECTION 32 72 00 - STREAM RESTORATION, SECTION 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING, SECTION 32 92 19 - LOAMING AND SEEDING, 32 93 00 FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING, and SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 REMOVAL OF EQUIPMENT AND MATERIALS

The Contractor shall remove all equipment and materials used during the project operation including, but not limited to, construction fencing, water treatment system, trailers, soil containment area, temporary bridges, haul roads, silt fence and diversion fence, electrical wiring, decontamination pad, etc., prior to demobilization from the site.

All materials removed during the site restoration activities shall be disposed of at an approved off-site disposal facility by the Contractor in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

Prior to demobilization, all equipment shall be decontaminated in accordance with SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

The Contractor shall remove or leave in place excavation support in accordance with SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION.

3.2 SOIL SAMPLING BENEATH TEMPORARY FACILITIES

The Contractor shall collect samples from beneath temporary facilities where contaminated material was handled, including, but not limited to: the soil and sediment processing/containment areas, water treatment system area, and the haul roads. Samples shall be collected after removal of temporary facilities to verify that no cross-contamination has occurred in the area. Samples shall be collected at a frequency of one per 14,400 square feet of disturbed area, from a depth interval of 0 to 0.5 feet. Samples shall be biased toward areas with visible leaks or potential leaks.

Samples shall be analyzed in accordance with the requirements of SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

3.3 SITE RESTORATION

The Contractor shall restore all areas in accordance with SECTION 32 72 00 - STREAM RESTORATION, SECTION 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING, SECTION 32 92 19 - LOAMING AND SEEDING, SECTION 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING, and SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

-- End of Section --

SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.1 SCOPE OF WORK

incidentals necessary to conduct all Earthwork, as indicated on the Contract Drawings and specified herein. The purpose of this section is to provide the Contractor with the minimum requirements and constraints for excavation, backfill, compaction, and grading. Earthwork includes stripping, procurement of on-site and imported fill material, excavating, placing, and compacting fill and backfill, structural excavating and backfilling, transportation and storage of excess earthwork materials; disposal of unsuitable, waste, and surplus materials; restoration of excavation and trench surfaces; and subsidiary work necessary to complete the grading of developed areas to conform with required lines, grades, and slopes.

Upland excavation, sediment excavation, post-excavation confirmatory sampling, and temporary storage of contaminated soil and sediment are specified in SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

No site personnel shall be allowed to enter the excavated area unless the excavation is performed in accordance with Occupational Safety and Health Administration (OSHA) regulations as specified in 29 CFR 1926.652 and in accordance with the approved accident prevention plan as specified in SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

Where a temporary excavation system is utilized, backfill and compaction shall be conducted prior to the removal of temporary excavation support systems (including sheeting, shoring, and bracing) to ensure the safety of personnel and protect adjacent structures, piping, and other materials in accordance with Federal, State and local laws, regulations, and requirements. Temporary excavation support systems are specified in SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION. Protect existing structures and utilities that remain.

Provide and operate temporary dewatering and surface water control systems to maintain excavations in a dry condition for backfill and compaction. Control drainage into excavations and remove seepage water and rainwater. Dewatering and surface water control are specified in SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER and SECTION 31 23 19 - DEWATERING.

Examine site and review available geotechnical report prior to submitting a proposal, taking into consideration project conditions that may affect the work. The Government does not assume responsibility for variations of subsurface conditions at locations other than places shown and at the time investigations were made. Do not initiate extra work without written notification to the Contracting Officer and receiving the Government's written approval in response.

Vibration monitoring and geotechnical instrumentation is specified in SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING.

Dewatering, surface water collection, and temporary water treatment is specified in SECTION 31 23 19 - DEWATERING.

The Contractor shall obtain the services of a New York-licensed Professional Surveyor to document the limits of work for the purposes of measurement and payment, and for preparation of as-built drawings in accordance with SECTION 01 71 23 - SURVEYING.

Dam removal is specified in SECTION 02 41 00 - DEMOLITION.

Fill materials to support plantings and restoration activities is specified in SECTION 32 92 19 - LOAMING AND SEEDING, SECTION 32 72 00 - STREAM RESTORATION, and SECTION 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING.

The Contractor shall restore areas as shown on the Contract Drawings and in accordance with approved site restoration plan.

The Contractor shall be responsible for compliance with all Federal, State, and local laws and regulations.

Other related requirements:

a. SECTION 01 32 33 - PROJECT PHOTOGRAPHS
b. SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL
c. SECTION 02 10 00 - SITE PREPARATION
d. SECTION 31 05 19.16 - GEOMEMBRANE
e. SECTION 31 05 19.19 - GEOGRID
f. SECTION 31 05 19.26 - NONWOVEN GEOTEXTILE FABRIC
g. SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION

1.2 REFERENCES STANDARD

ASTM INTERNATIONAL (ASTM)

ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
ASTM D2216	Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Classification System).
ASTM D3740	Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.
ASTM D4318	Standard Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
ASTM D6913	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.

ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods.

Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Samples; G

Prior to use on the site, submit quality control material conformance test results on soil materials as specified in Paragraph 2.2. The Contractor shall submit to a geotechnical laboratory specified by the Government, a sample of each type of imported fill material, weighing approximately 50 pounds. Test results must be submitted to the Government at least one week prior to the date of anticipated use of such material. Costs of testing and evaluation are to be borne by the Contractor.

Soil Technician Qualifications; G

Have minimum three years demonstrated experience in earthwork and grading operations and satisfy certification requirements of agency having local jurisdiction.

The Government reserves right to request substitution of soil technicians assigned to field work. Do not substitute assigned soil technicians without prior approval of the Government.

1.4 QUALITY ASSURANCE

Excavation, trenching, sheeting, bracing, and similar work shall comply with requirements of OSHA excavation safety standards, 29 CFR Part 1926 Subpart P and State and local authorities having jurisdiction. Where conflict between OSHA, State and local regulations exists, apply most stringent requirements.

At least three working days prior to starting any excavation, notify the appropriate regional notification center for underground utilities and underground utility owners who are not members of notification center.

1.4.1 Utility Locate

To obtain utility location specific information for project site, refer to https://udigny.org

1.4.2 Control Testing for Off-site Borrow Materials

Quality control testing of all borrow materials shall be performed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

1.5 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.6 DEFINITIONS

1.6.1 Backfill

Soil material or controlled low-strength material used to fill an excavation.

1.6.2 Initial Backfill

Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

1.6.3 Final Backfill

Backfill placed over initial backfill to fill a trench.

1.6.4 Borrow Soil

Satisfactory soil imported from off-site for use as fill or backfill.

1.6.5 Coverage

Pass of compaction equipment over the complete surface area of exposed lift or subgrade to receive compaction.

1.6.6 Excavation

Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1.6.7 Authorized Additional Excavation

Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by the Government. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

1.6.8 Unauthorized Additional Excavation

Excavation as directed by the Government to correct Contractor's work not in compliance with Contract Documents, which will be performed without additional compensation.

1.6.9 Unauthorized Excavation

Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by the Government. Unauthorized excavation, as well as remedial work directed by the Government, shall be provided without additional compensation.

1.6.10 Finished Grade

Required final grade elevation indicated on Drawings. Spot elevations take

precedent over proposed contours.

1.6.11 In-the-Dry

An excavation subgrade where groundwater level: has been lowered to at least 2 feet below lowest level of excavation; is stable with no ponded water, mud, or muck; is able to support construction equipment without rutting or disturbance; and is suitable for placement and compaction of fill material, pipe, or concrete foundations.

1.6.12 Objectionable Material

Includes topsoil, organic matter, contaminated soil, construction debris, perishable materials, snow, ice, frozen earth, and rocks or lumps of cemented soils over 6 inches in maximum dimension.

1.6.13 Optimum Moisture Content

Moisture content (percent by dry weight) corresponding to maximum dry density of the same material as determined by ASTM Test Method D1557.

1.6.14 Over Excavation

Removal of unsuitable soil or objectionable material at or below the normal grade of excavation or subgrade as indicated on Drawings.

1.6.15 Percent Compaction

Required in-place dry density of the material, expressed as a percentage of the maximum dry density of the same material, as determined in the laboratory by ASTM Test Method D1557.

1.6.16 Structures

Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, manholes and vaults, canal infrastructure, or other man-made stationary features constructed above or below the ground surface.

1.6.17 Subgrade

Required surface of subsoil, borrow fill, or compacted fill that is immediately beneath site improvements, especially dimensioned fill, paving, or other surfacing material.

1.6.18 Unsuitable Soil

Includes existing fill materials, organic soils, weak native soils, or clays with a plasticity index of greater than 30, and any materials that cannot be properly placed and compacted as specified.

1.6.19 Utilities

On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.6.20 Zone of Influence

A line extending at least 2 feet beyond foundation or pipeline edge, then

outward and downward at a slope of 1 horizontal to 1 vertical. Do no excavation below foundation of existing structures or pipeline.

1.6.21 Professional Engineer

Registered Professional Engineer meeting project qualifications and who is hired by Contractor.

1.7 PREINSTALLATION MEETINGS

Conduct pre-excavation conference at Project site.

Review methods and procedures related to earthmoving, including, but not limited to, the following:

a. Personnel and equipment needed to make progress and avoid delays.

b. Coordination of Work with utility locator service.

c. Extent of trenching by hand or with air spade.

d. Field quality control.

1.8 FIELD CONDITIONS

Be responsible for construction layout and reference staking necessary for proper control and satisfactory completion of structures, cutting, filling, grading, drainage, fencing, embankment improvements, curbing, and other appurtenances.

1.8.1 Construction Layout

Perform construction layout and staking by a Professional Surveyor registered in the State of New York where project occurs, experienced and skilled in construction layout and staking requirements.

1.8.2 Traffic

Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earthwork operations.

Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Government and authorities having jurisdiction.

Provide alternate routes around closed or obstructed traffic ways if required by the Government or authorities having jurisdiction.

1.8.3 Utility Locator Service

Notify utility locator service for area where Project is located before beginning earthwork operations.

1.8.4 Temporary Control Measures

Do not commence earthwork operations until temporary construction fencing and erosion- and sedimentation control measures specified in SECTION 02 10 00 - SITE PREPARATION and SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL are in place.

1.9 PROTECTION

1.9.1 Excavation Bracing and Support (if required)

If excavation bracing and support is required, construct as specified in SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION.

1.9.2 Pumping and Drainage

At all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills or structures to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels. The Contractor shall comply with SECTION 31 23 19 - DEWATERING and SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER.

Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils. Well or sump installations shall be constructed with proper sand filters to prevent drawing of finer grained soil from the surrounding ground.
Water entering the excavation or subgrade from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water. All water removed from the excavation must be considered as potentially contaminated and treatment shall be performed as required.

Take all additional precautions to prevent uplift of any structure during construction.

Drainage shall be controlled so that flow or seepage back into the excavated area will be prevented.

Flotation shall be prevented by maintaining a positive and continuous operation (24/7) of the dewatering system as necessary. The Contractor shall be fully responsible and liable for all damages which may result from failure of this system.

Remove the dewatering equipment after the system is no longer required.

Take all necessary precautions to preclude the accidental discharge of fuel, oil, etc. in order to prevent adverse effects on groundwater quality.

All dewatered water must be handled in accordance with SECTION 31 23 19 - DEWATERING.

1.10 SOIL TESTING

Prior to the general placement of the fill and during such placement, the Government may select areas within the limits of the fill for testing the degree of compaction obtained as stated in this specification. The Contractor shall cooperate fully in obtaining the information desired. If test results are unsatisfactory, the Contractor shall correct deficiencies in compacted materials and re-perform acceptance testing to the satisfaction of the Government.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Reuse of Excavated Soils

Excavated soils shall be temporarily stockpiled on site and may be reused as backfill at the discretion of the Government based on visual indicators or analytical sampling and testing. Analytical sampling and testing of the excavated soils shall be performed by the Contractor.

2.1.2 Structural Fill

Structural Fill shall be gravel, sandy gravel, or gravelly sand free of organic material, loam, wood, trash, snow, ice, frozen soil and other objectionable material and shall be well graded within the following limits:

Sieve Size	Percent Finer by Weight
4-in	100
2-in	90 to 100
1/2-in	50 to 70
No.4	25 to 60
No.10	20 to 55
No.40	10 to 40
No.200	0 to 10

Soils containing more than 1% by weight of organic materials shall not be used. The required Plasticity Index of the material passing the No. 40 sieve is 5 or less.

Contractor to perform any screening that may be required to meet these specifications, including to 4-in maximum size.

2.1.3 Common Fill

Common fill shall consist of mineral soil substantially free from organic materials, loam, wood, trash and other objectionable materials which may be compressible or which cannot be properly compacted. Common fill shall not contain stones larger than 4-in in largest diameter and shall have a maximum of 75 percent passing the No. 40 sieve and a maximum of 20 percent passing No. 200 Sieve. Common fill shall not contain granite blocks, broken concrete, masonry rubble or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling. Snow, ice and frozen soil shall not be permitted.

2.1.4 SSelect Fill

Select fill shall be as specified above for Common Fill except that the

material shall contain no stones larger than 2-in in largest dimension. Sources for select fill shall not be from underwater areas consisting of dredged or mined soils or sediments.

2.1.5 Granular Fill

Granular Fill shall consist of hard, durable, rounded, or subangular particles of proper size and gradation, and shall be free from sand, loam, clay, excess fines, and other deleterious materials. Granular fill shall be graded within the following limits:

Sieve Size	Percent Finer by Weight
5/8 in	100
1/2 in	40 to 100
3/8 in	15 to 45
No.10	0 to 5

2.1.6 Sand

Sand for pipe bedding material shall consist of clean, well-graded sand, free of organic material, loam, wood, trash, snow, ice, frozen soil, and other objectionable material and shall be graded within the following limits. The Contractor can submit alternative material for Government's review and approval.

Sieve Size	Percent Finer by Weight
3/8 in	100
#4	95-100
#40	15-50
#200	<10

2.1.7 Riprap

Riprap for erosion protection on side slopes, swales and pipe ends shall be hard, durable, angular in shape, resistant to weathering and may be naturally occurring particles or fragments of natural stone. Riprap shall be well-graded mixtures of stones with D50 sizes as indicated on the Contract Drawings. Control of gradation shall be by visible inspection. Rounded stones, boulders, sandstone, or similar soft stone or relatively thin plated slabs will not be acceptable. Stone shall be free from overburden, spoil, shale rock fragments, and organic material.

2.1.8 Creek Restoration Fill Material

Restoration fill materials for the creek corridor are specified in SECTIONS 32 72 00 - STREAM RESTORATION, 32 92 19 - LOAMING AND SEEDING,

and 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING.

2.2 CONFORMANCE TESTING

The Contractor's Quality Control Laboratory shall conduct initial conformance tests to show that the Structural Fill, Granular Bedding, Common Fill, and Select fill materials meet the specification requirements and to identify the compaction properties of the soils. As a minimum the tests listed below shall be conducted for each material and submitted as initial conformance test results. In addition, periodic conformance testing shall be conducted by the Contractor's Quality Control Laboratory on Structural fill, Common fill, Select fill, Granular Bedding, Sand, and Restoration fill soils prior to their use on the project. Unless otherwise specified, the following tests shall be at the indicated frequencies:

Test	Method	Frequency
Grain Size	ASTM D6913	Every 1,000 cy
Atterberg Limits	ASTM D4313N	Every 1,000 cy
Moisture/Density	ASTM D1557	Every 5,000 cy or change in materials
Natural Moisture	ASTM D2216	Every 1,000 cy
Organic Content	ASTM D2974	Every 1,000 cy

Results of the tests shall be submitted to the Government within 24 hours of test completion and prior to material use on the project. The Government reserves the right to reject material based on the results of these conformance tests and/or independent quality assurance testing conducted by the Government. Rejected materials shall be removed from the site.

2.3 IMPORTED MATERIAL ACCEPTANCE

Testing of imported material shall be performed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL. The presence of any compound above acceptable limits shall be reason to reject the source, regardless of other test results.

If tests by the Subcontractor or the Contractor indicated that the material does not meet Specification requirements, material placement shall be terminated until corrective actions are taken. Material that does not conform to the Specification requirements and is placed in the work shall be removed and replaced.

PART 3 EXECUTION

3.1 GENERAL EXCAVATION

Excavation shall be made to the grades shown on the Drawings and to such widths as will give suitable room for bracing and supporting, pumping and draining. The bottom of the excavations shall be rendered firm and dry and, in all respects, acceptable to the Government.

Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of subgrade soils. Dewatering shall be such as to prevent loss of subgrade support at the base of the excavation as specified herein. Refer to Specification SECTION 31 23 19 - DEWATERING for additional dewatering requirements.

Exposed subgrades shall be compacted to the requirements presented in this Section. Subgrade soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures as a result of inadequate excavation, dewatering, proofrolling, or other construction methods shall be removed and replaced as required by the Government.

Earthwork equipment shall be satisfactory for carrying out the work in accordance with the Specifications. In no case shall the earth be ploughed, scraped, or dug with machinery so near to the finished subgrade as to result in excavation of, or disturbance of material below grade.

When excavation for foundations, or final subgrade elevations have reached prescribed depths, the Government shall be notified and will inspect conditions. If materials and conditions are not satisfactory to the Government, the Government shall issue instructions as to the procedures.

During final excavation to subgrade level, take whatever precautions are required to prevent disturbance and remolding. Material which has become softened and mixed with water shall be removed. The Government shall be the sole judge as to whether the work has been accomplished satisfactorily.

Compaction in open areas may be accomplished by any of the following methods: compaction equipment, fully loaded 10-wheel trucks, tractor dozers weighing at least 30,000 pounds and operated at full speed, heavy vibratory roller, or otherwise approved by the Government prior to placing general site fill. Compaction in confined areas (including areas within a 45 degree angle extending upward and outward from the base of a wall) and in areas where the use of large equipment is impractical shall be accomplished by hand-operated vibratory equipment or mechanical tampers. Lift thickness shall not exceed 6 inches (measured before compaction) when hand-operated equipment is used.

All compaction work shall be conducted in the presence of the Government. The Contractor shall notify the Government in advance of compaction activities and make prepared subgrade surfaces available for observation and testing. The method and degree of compaction will be governed by the type of material to be compacted.

Areas that appear to be rutting, weaving or otherwise appear unstable while proofrolling may require additional compaction before general filling or cap construction.

All Contractor-designed sloping shall comply with the requirements of 29 CFR 1926.652. The Contractor shall maintain a slope along the periphery of the excavation or in accordance with OSHA requirements for safety and to minimize sloughing of adjacent material into the newly excavated area. The Contractor shall be responsible for benching, sloping, or supporting the excavation as necessary. Excavations requiring additional support shall be designed and constructed in accordance with SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION.

If, in the opinion of the Government, the material, in its undisturbed

natural condition, at or below the normal grade of the excavation as indicated on the Drawings is unsuitable for foundations or subgrade, it shall be removed to such depth and width as he/she may direct and be replaced with suitable material as approved by the Government.

3.2 CONTAMINATED UPLAND SOIL EXCAVATION

The Contractor shall conduct upland soil excavation in accordance with SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIALS and the approved Excavation and Sediment Removal Handling Plan to the limits and depths shown on the Contract Drawings.

If bucket refusal is encountered during excavation, as defined by the inability to advance the excavation equipment 6-inches below grade, the excavation shall be terminated at refusal depth.

3.3 CONTAMINATED SEDIMENT EXCAVATION

The Contractor shall conduct sediment excavation in accordance with SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIALS and the approved Excavation and Sediment Removal Handling Plan to the limits and depths shown on the Contract Drawings.

If bucket refusal is encountered during excavation, as defined by the inability to advance the excavation equipment 6-inches below grade, the excavation shall be terminated at refusal depth.

3.3.1 Sediment Excavation Procedures where Slotted Removal will be Conducted

The Contractor shall conduct slotted excavation in areas shown on the Contract Drawings. Slotted excavation, surveying, verification sampling, and backfill shall be conducted in accordance with the Contractor's approved work plans.

Total duration from the completion of slotted excavation to the completion of backfill placement within a given slot shall not exceed 48 hours. Slots shall not exceed widths between 8 to 15 feet. Slotted Excavation shall be conducted from upstream to downstream. The Contractor shall monitor surrounding conditions to avoid destabilization of adjacent slopes and structures.

The Contractor shall provide notification to the Government 2 days prior to commencing slotted excavations in the areas identified on the Contractor Drawings. Following survey and upon receipt of the Government's approval, the Contractor shall immediately backfill the excavated slots with appropriate backfill materials identified on the Contract Drawings. The Contractor shall not commence sediment excavation in the next slot until approval has been received from the Government.

3.4 UTILITY TRENCH EXCAVATION

Excavation for all trenches required for the installation of pipes shall be made to the depths indicated on the Contract Drawings and in such a manner and to such widths as will give suitable room for laying the pipe or installing the ducts within the trenches, for bracing and supporting, and for pumping and drainage facilities. The Contractor shall render the bottom of the excavations firm and dry and in all respects acceptable to the Government.

The trench may be excavated by machinery to the designated subgrade provided that the material remaining in the bottom of the trench is not disturbed.

Where pipe is to be installed in fill, the fill shall be placed and compacted to proposed grades and then the trench excavated through the fill for pipe installation.

3.5 CREEK EXCAVATION WORK PLATFORM PREPARATION, BACKFILLING, AND COMPACTION

The creek excavation work platform embankment shall be constructed as a part of the interim grading plan, in accordance with the Contract Drawings. The subgrade preparation, backfilling, and compaction requirements presented in this section are applicable to the interim grading preparation.
For all earth embankments constructed as part of the interim grade, all organic materials, including peat loam, and inorganic silt material shall be removed from areas beneath new embankments. If unsatisfactory soils or sediments are observed below the required excavation depth in the Contract Drawings, the Contractor shall continue to remove unsatisfactory material until competent soils are encountered. Competent soils will be determined by the Government in the field, but generally includes the dense silty sands and weathered rock encountered on site.

As soon as practicable after excavation of unsatisfactory soils and/or sediment, backfilling shall begin and thereafter be prosecuted expeditiously. A geomembrane and geotextile shall be placed at the bottom of the excavation to ensure material is separated from the underlying soils and or sediments. Unsatisfactory soils shall be replaced with Structural Fill, or equivalent self-compacting material.

From the subgrade base to approximately the elevation of the water table, granular fill shall be placed in lifts having a maximum thickness of 8-inches and compacted by tamping with the excavator bucket until equivalent or above the estimated water level elevation. The Government shall waive this requirement, if, in his/her opinion, the subgrade will be rendered unstable by such compaction. The prepared subgrade shall be inspected and approved by the Government prior to continued placement of the common fill above the water table to build up the embankment.

From above the water table to finished grade of the embankment, common fill shall be brought up evenly on all sides in 12-inch lifts. Compaction methods shall be presented in the Excavation and Sediment Removal Handling Plan and approved by the Government. If visual observations of the subgrade indicate that the embankment fill is not stable, subsequent passes shall be required to further compact that material.

3.6 CUT AND FILL

After all clearing, grubbing and stripping is complete the site shall be cut and filled to the lines and grades shown on the Drawings. Fill shall be placed only on properly prepared surfaces, which have been inspected and approved by the Government.

Fill shall be brought up in level lifts. The entire surface of the work shall be maintained free from ruts, and in such condition that construction equipment can readily travel over any section.

Fill shall be dumped and spread in layers by a bulldozer or other approved method. During the process of dumping and spreading all roots, debris, and stones greater in size than specified for common fill, shall be removed from the fill areas unless otherwise approved by the Government, and the Contractor shall assign a sufficient number of men to this work to ensure satisfactory compliance with these requirements.

All fill materials shall be placed and compacted "in the dry" unless otherwise noted herein or on the Drawings. The Contractor shall dewater excavated areas as required to perform the work and in such manner as to preserve the undisturbed state of the natural inorganic soils.

Stones or rock fragments larger than 2 inches in their greatest dimensions will not be permitted in the top 12 inches of the finished grade of all fills or graded areas.

3.7 BACKFILLING - COMMON FILL

Common fill may be used as the foundation layer and the common fill layer of the backfill, embankment fill, or in other areas as designated by the Government. Material conforming to the requirements of common fill shall be placed in layers having a maximum thickness of 12-inches measured before compaction.

Materials placed in fill areas shall be deposited to the lines and grades shown on the Contract Drawings, making due allowance for settlement of the material.

Common fill shall be compacted as specified.

3.8 UTILITY TRENCH BACKFILL

Sand shall be placed around the lower half of the pipe and compacted by machine tamping until firm and stable below the pipe. Geotextile filter fabric shall be placed in accordance with the Contract Drawings, prior to placing sand to separate the sand from adjacent soils.

The remainder of the trench shall be backfilled with select fill placed in loose layers not to exceed 8-inches and thoroughly compacted with mechanical tampers as required to obtain 95% of the maximum dry density as determined by ASTM D1557.

Backfilling under haunches shall be performed manually by tamping rods or similar hand equipment to eliminate voids underneath sides of the pipe or haunch.

Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed, and inspected. All backfilling shall be performed expeditiously.

Quality assurance field density testing shall be conducted at a minimum testing frequency of one test per lift per 50 linear feet of trench for all material types.

3.9 DISPOSAL OF SURPLUS MATERIAL

Surplus fill shall become the property of the Government and shall be disposed on site by Contractor in an approved location.

Any unsuitable excavation material or other material not suitable for use as fill shall be disposed of in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

3.10 GENERAL COMPACTION

Common fill used as general backfill shall be placed in layers not to exceed 12 inches in depth and compacted to at least 95% of Modified Proctor maximum density as determined by ASTM D1557, unless otherwise specified.

Granular fill and structural fill shall be placed in layers not to exceed 6 inches in depth and compacted to at least 95% of Modified Proctor maximum density as determined by ASTM D1557, unless otherwise specified.

It is the intention that the fill materials with respect to moisture be used in the condition they are excavated insofar as this is practicable. Material which is too wet shall be spread on the fill area and permitted to dry, assisted by harrowing if necessary, until the moisture content is reduced to allowable limits.

If, in the opinion of the Government added moisture is required, the Contractor apply water by sprinkler tanks or other sprinkler systems, which shall ensure uniform distribution of the moisture over the area to be treated, and give complete and accurate control of the amount of water to be used. If too much water is added, the area shall be permitted to dry before compaction is continued.

The Contractor shall supply all hose, piping, valves, sprinklers, pumps, sprinkler tanks, hauling equipment, and all other materials and equipment necessary to place the water in the fill in the manner specified.

3.11 GRADING

Grading shall be performed to the lines, grades and elevations shown on the Contract Drawings and in accordance with the Contractor's approved submittal of final site grades. During the process of grading, the area to be graded shall be maintained in such condition that it shall be well drained at all times. When directed by the Government, the Contractor shall install temporary drains and drainage ditches to intercept or divert surface water that may affect the completion or condition of the work.

If at the time of grading it is not possible to place any material in its final location, it shall be stockpiled in approved areas for later use.

The Government reserves the right to make minor adjustments or revisions in lines or grades if found necessary as the work progresses, in order to obtain satisfactory construction.

Grading of final site shall be done in accordance with the Contract Drawings. Final site grading shall be performed to promote drainage to the proposed stormwater drainage system. The Contractor shall submit topographic survey of final site grades for review by the Government prior to project completion.

3.12 QUALITY CONTROL PROGRAM

An independent soils testing laboratory shall be retained by the Contractor and approved by the Government to provide fill materials

conformance and compaction testing as indicated herein. All fill materials, unless otherwise specified, shall be subject to the Quality Control Program in this section.

Field density and moisture content shall be determined at a rate of one test per 10,000 square feet per lift of installed material. Small areas shall be tested as directed by the Government.

Field moisture-density testing may be performed with nuclear density gauges (ASTM D2922 and ASTM D3017). However, confirmation testing with drive cylinders (ASTM D2937) or other approved method and moisture testing (ASTM D2216) shall be required at a rate of one test for every 10 nuclear density gauge tests.

For trenches, field density and moisture content shall be determined for at every 150 linear feet of installed lift.

-- End of Section --

SECTION 31 05 19.16

GEOMEMBRANE

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to install the geomembrane, as indicated on the Contract Drawings and specified herein.

1.2 REFERENCES STANDARDS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D638 (NSF Modified)	Standard Test Method for Tensile Properties of Plastics
ASTM D792	Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D1004	Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting
ASTM 1238	Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer
ASTM D1505	Test Method for Density of Plastics by the Density-Gradient Technique
ASTM D1603	Test Method for Carbon Black in Olefin Plastics
ASTM D3895	Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
ASTM D4218	Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
ASTM D4833	Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
ASTM D5199	Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
ASTM D5321	Standard Test for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by

	the Direct Shear Method
ASTM D5397	Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
ASTM D5596	Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
ASTM D5721	Standard Practice for Air-Oven Aging of Polyolefin Geomembranes
ASTM D5885	Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry
ASTM D6392	Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
ASTM D6693	Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
ASTM D7007	Standard Practices for Electrical Methods for Locating Leaks in Geomembranes Covered with Water or Earthen Materials

GEOSYNTHETIC RESEARCH INSTITUTE (GRI)

GM10	Specification for the Stress Crack Resistance of Geomembrane Sheet
GM11	Accelerated Weathering of Geomembranes using a Fluorescent UVA-Condensation Exposure Device
GM13	Test Methods, Test Properties and Test Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes
GM19	Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes

Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

HDPE Liner schedule; G

Installation and erection data and schedule, including a detailed schedule for covering the liner.

SD-02 Shop Drawings

HDPE liner shop drawings; G

Shop drawings showing the following:

a. Proposed layout of the HDPE liner system.

b. Details of overlapping or jointing the HDPE liner, anchoring, connections, penetrations and other construction details..

SD-04 Samples

HDPE Membrane samples; G

Samples of HDPE membrane material and field seams (if required) for visual inspection and testing.

SD-07 Certificates

HDPE liner certificates; FIO

Certificates of compliance with the requirements of standards specified herein for the HDPE liner and its installation.

SD-08 Manufacturer's Instructions

Maintenance and Repair Requirements; FIO

Manufacturer's Standard Guarantee; FIO

1.4 QUALITY ASSURANCE

1.4.1 Qualifications

The manufacturer and installer of the High Density Polyethylene (HDPE) liner shall have demonstrated by previous experience their ability to do the work. The required previous experience for the manufacturer and/or the installer shall consist of having successfully installed not less than five comparable installations now giving satisfactory service in the United States.

1.4.2 Material Guarantee

The materials specified herein shall be first quality products designed and manufactured specifically for the purposes of this work as specified herein and which have been satisfactorily demonstrated by prior use to be suitable and durable for such purposes. Prior to furnishing and installing the HDPE liner, supply the Government with the name of the lining fabricator and shall submit to the Government an affidavit from the manufacturer that guarantees that the HDPE liner material meets the performance requirements specified herein.

1.4.3 Vegetation Guarantee

Guarantee that at no time vegetation under the HDPE liner shall cause the HDPE liner to be punctured. Submit to the Government for approval, the method by which this guarantee shall be met. Under no circumstances shall herbicides be allowed for vegetation control.

1.4.4 Technical Assistance

A representative of the manufacturer shall provide technical assistance for the installation and anchoring of the HDPE liner.

1.5 RELATED DOCUMENTS

Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.6 SUMMARY

1.6.1 General

Furnish all labor, materials, equipment and incidentals required to install and secure the Geomembrane (HDPE Liner) as shown on the Contract Drawings and as specified herein on prepared site grades. The work shall include placement, overlapping of edges, and anchoring of the liner as specified herein.

1.7 RELATED REQUIREMENTS

a. SECTION 01 57 13 - EROSION CONTROL AND STORMWATER MANAGEMENT

b. SECTION 31 20 00 - EARTHWORK

c. SECTION 31 05 19.26 - NONWOVEN GEOTEXTILE FABRIC

1.8 PROJECT/SITE REQUIREMENTS

1.8.1 Site Preparation

The HDPE liner shall be placed over prepared surfaces of existing and newly-placed fills and on-site materials as described in the Contract Documents. The surface of the subgrade shall be smooth, uniform, free from sudden changes in grade, permitting drainage and shall be prepared in accordance with the Contract Drawings.

The prepared subgrade shall be approved by the Government prior to installation of the HDPE liner. The subgrade shall be maintained in a smooth, uniform and compacted condition during installation of the HDPE liner.

1.8.2 HDPE Liner Protection

No liner material shall be installed when the temperature is lower than 40 degrees F or greater than 100 degrees F.

All areas of the liner damaged during installation as determined by the Government shall be repaired as specified herein.

The liner shall be stored and handled according to the manufacturer's recommendations in such a way that it is protected from prolonged exposure to ultraviolet radiation.

1.9 MATERIAL WARRANTY

The HDPE liner manufacturer shall warrant the liner against manufacturing defects and material degradation in the outdoor exposure for a period of 5 years from the date of installation. The manufacturer shall replace at no expense any material which fails from the above causes within the warranty period. The manufacturer shall furnish a written warranty covering the requirements of this paragraph.

1.10 GUARANTEE

The Contractor shall guarantee the HDPE liner against defects in installation and workmanship for the period of 5 years commencing with the date of final acceptance. The guarantee shall include the services of qualified service technicians and all materials required for the repairs.

1.11 EXTRA STOCK

The following shall be furnished to the Government.

1. Five 100 sq ft sections of liner identical to that installed under this section.

2. Five rolls of gum tape.

PART 2 PRODUCTS

2.1 MATERIALS

HDPE liner will be furnished by the Contractor.

2.1.1 General

The HDPE liner shall be manufactured of new, first quality products designed and manufactured specifically for the purpose of providing a separation barrier between the clean subgrade soils and ongoing excavation and transportation of impacted soils.

The resin from which the HDPE liner is made shall be in the density range of 0.932 g/ml or higher and have a melt index value per ASTM D1238 of less than 1.0g/10 min. Formulated sheet density shall be 0.940 g/ml or higher.

The blended resin shall contain two to three percent carbon black, anti-oxidants and heat stabilizer, but no fillers or extenders. The resin shall be virgin material, with no more than two percent rework. If rework is used, it shall be of the same formulation as the parent material. No post-consumer resin of any type shall be added to the formulation.

The liner material shall be so produced as to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter. Any such defect shall be repaired using the extrusion fusion welding technique in accordance with the manufacturer's recommendations.

2.1.2 Other Materials

All welding material (if required) shall be of a type recommended and supplied by the manufacturer and shall be delivered in the original sealed containers each with an indelible label bearing the brand name, manufacturer's mark number, and complete directions as to proper storage and shelf life.

2.2 QUALITY CONTROL DOCUMENTATION

Prior to installation commencement of any HDPE liner material, the Contractor shall provide the following information certified by the manufacturer for the delivered HDPE liner material.

1. Origin, identification and production of the resin (supplier's name, brand name, and production plan).

2. Copies of Quality Control certificates issued by the resin supplier.

3. Manufacturer's certification verifying that the quality of the resin used to manufacture the HDPE liner meets the requirements specified in Paragraph 2.1.

4. Each roll delivered to the project site shall have identification information including Manufacturer's name, product identification, thickness, roll number, roll dimensions, and lot number.

5. Quality Control certificates, signed by the manufacturer's quality assurance manager, shall be submitted for each roll delivered to the site. Each certificate shall have roll identification number, sampling procedures, frequency and test results. At a minimum, test results shall be provided for each roll delivered to the site in accordance with test requirements specified in GRI GM13.

2.3 CONFORMANCE TESTING

Conformance testing shall be performed by a GRI accredited independent Quality Assurance Lab (QAL). A qualified technician from the QAL shall obtain the samples from the roll, mark the machine direction and identification number. The following conformance tests shall be conducted at the laboratory in accordance with GRI GM13:

1. Thickness

2. Asperity Height

3. Density

4. Tensile Properties

5. Tear Resistance

6. Carbon Black Content

7. Carbon Black Dispersion

These conformance tests shall be performed in accordance with Table A1 in GRI GM13, at a frequency of one sample per lot or one sample per 100,000 square feet, whichever results in the greater number of conformance tests.

A lot number is defined as a continuous production process without changes to raw material or manufacturing methods. For every change in lot number, the Contractor shall perform conformance testing on the initial roll.

All conformance test results shall be reviewed by the Contracting Officer and accepted or rejected, prior to the placement of the HDPE liner. All test results shall meet or exceed the property values listed in the latest version of GRI GM13. The course of action implemented for retesting failing tests shall be approved by the Contracting Officer. In case of failing test results, the manufacturer may request that other sample be retested by the independent laboratory with manufacturer's technical representative present during the testing procedures. The manufacturer may also have the sample retested at two different laboratories approved by the Contracting Officer. If both laboratories report passing results, the material shall be accepted. If both laboratories do no report passing results, all HDPE liner material from the lot representing the failing sample shall be considered out of specification and rejected.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

Subgrade preparation of the subgrade is specified in SECTION 31 00 00 - EARTHWORK.

Anchoring of liner shall be as shown on an approved shop drawing.

Before the HDPE liner installation begins, the Contracting Officer's representative, Contractor and installer shall verify in writing and submit to the Contracting Officer that:

1. The subgrade has been properly installed and approved by the Contracting Officer.

2. The surface is free from irregularities and abrupt changes in grade.

3. The surface is free from any objectionable material capable of damaging the HDPE liner.

During actual placing and seaming of the liner, the soil base surface shall be kept free of all standing water. If the soil base surface below the liner becomes wet and unstable, it shall be dried and re-compacted to the Contracting Officer's satisfaction. If drying and re-compacting the material is insufficient, the unstable material must be removed and replaced with approved material.

The installed geosynthetic fabric surface shall be free of wrinkles and folds, rocks, stones, debris, and deleterious materials.

Contractor shall use all necessary means to control impacts from stormwater runoff in accordance with SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER.

3.2 PREPARATION AND INSTALLATION OF HDPE LINER

3.2.1 General

The HDPE liner shall be cleaned of all debris and materials which may negatively affect the performance of the system.

HDPE liner placement shall not proceed at an ambient temperature below 32 degrees F or above 104 degrees F unless otherwise authorized in writing, by the Contracting Officer or his/her field representative. HDPE liner placement shall not be performed during precipitation, excessive moisture, in an area of ponded water, or excessive winds that adversely affect the HDPE liner placement.

3.2.2 Installation

Each panel of the HDPE liner shall be laid out and installed in accordance with the approved shop drawings. The layout shall be designed to keep field jointing of the HDPE liner to a minimum and consistent with proper methods of HDPE liner installation.

For HDPE liner placed on 4 horizontal to 1 vertical (4H:1V) or steeper slopes, the seams shall be oriented in the direction of the slope (i.e., perpendicular to top of slope). Horizontal seams across the slope are not permitted, unless approved by the Contracting Officer.

Each HDPE liner panel shall be identified by panel number, roll number, and date of deployment. The HDPE liner panel number shall be placed on the ends of each panel.

The equipment used to deploy the HDPE liner shall not cause damage to the subgrade layer. If damage occurs, the Contractor shall suspend all HDPE liner placement activities and repair the damages and immediately employ an alternative method for HDPE liner deployment. HDPE liner rolls shall be placed using proper spreader and rolling bars so that the HDPE liner would not be stretched during deployment. If a sheet must be replaced a distance greater than its width, a slip sheet shall be used.

The Contracting Officer shall inspect each panel, after placement and prior to seaming, for damage and/or defects. Defective or damaged panels shall be replaced or repaired in accordance with Paragraph 3.3.3.6.

The installer shall avoid dragging the liner sheets on rough soil subgrade.

All liner sections shall be anchored as shown on the Drawings and consistent with manufacturer's recommendations.

Persons working on the HDPE liner shall not smoke, wear damaging shoes or involve themselves in any activity that may damage the liner.

All edges of the HPDE liner shall be properly weighted to avoid uplift due to wind.

Vehicular traffic across the HDPE liner shall not be allowed, except as specified herein. Rubber-tired ATV's and trucks are acceptable if wheel contact is less than 6 psi. Any vehicle used prior to or after liner placement shall be first approved by the Contracting Officer. All vehicles are restricted from traveling on the liner material unless a temporary access is constructed. Vehicles, machinery, and equipment shall be operated to avoid abrupt stops, starts or turns.

Construction equipment or vehicles with steel tracks shall not be permitted on the HDPE liner.

After installation any and all areas damaged shall be repaired and the

area and repairs are to be recorded and shown on the as-built drawings.

When tying into existing HDPE liner, all excavation of previously installed liner shall be performed by hand to prevent damage

The HDPE liner shall be kept free of debris, unnecessary tools and materials. In general, the HDPE liner area shall remain neat in appearance.

Equipment necessary to perform the installation (generators, compressors, etc.) shall have a scrap HDPE liner sheet placed underneath to protect the installed HDPE liner from possible damage. Care shall be taken to prevent leaking lubricants from damaging the HDPE liner.

No welder or testing equipment shall be allowed to remain on top of the installed HDPE liner overnight. All equipment must be removed and stored away from the installed HDPE liner.

No fueling of installer's equipment shall be allowed on top of the installed HDPE liner. No fuel containers shall be allowed on the HDPE liner.

To minimize liner slack, the liner shall be deployed during cool time of the day (early in the morning) such that expansion of the liner occurs after placement. Sand bags shall be placed on the liner in areas where liner contraction may cause trampolining.

3.2.3 Field Seaming

3.2.3.1 General

Individual panels of liner material shall be laid out and overlapped by a minimum of 4 in prior to welding. Extreme care shall be taken in the preparation of the areas to be welded. The area to be welded shall be cleaned and prepared in accordance with the quality control welding procedures approved by the Contracting Officer.

Double track hot wedge fusion welds shall be used for straight welding. Care shall be taken during welding to prevent damage to the underlying layer(s).

Extrusion welds shall be used for patches, repairs and penetration boots, and detailed work.

The welding equipment used shall be capable of continuously monitoring and controlling the temperatures and pressures in the zone of contact where the machine is actually fusing the lining material so as to ensure that changes in environmental conditions shall not affect the integrity of the weld.

No "fish mouths" shall be allowed within the seam area. Where "fish mouths" occur, the material shall be cut, overlapped and an overlap fusion weld shall be applied. All welds on completion of the work shall be tightly bonded. Any liner area showing injury due to excessive scuffing, puncture, or distress from any cause shall be replaced or repaired with an additional piece of HDPE liner.

All seams shall have a seam number that corresponds with the panel numbers. The numbering system shall be used in the development of the as built drawings. Seam numbers shall be derived from the combination of the

two panel numbers that are to be welded together.

All fusion "T" seams (i.e., the result of liner panels placed perpendicular to each other) shall be double welded two feet beyond the panel overlap. The extrusion process shall be used for the second weld.

All extrudate shall be free of dirt, dry, and protected from damage.

If an extrusion welder is stopped for longer than one minute, it shall be purged and heat-degraded extrudate removed.

The liner shall remain packaged or rolled and dry until ready to use. The material shall be unrolled if the material temperatures are lower than -10 degrees C (14 degrees F) due to the possibility of cracking. If the panel is stored in a warm place, e.g. 10 degrees C (50 degrees F) or above, prior to being unrolled on site, then it can be placed at -18 degrees C (0 degrees F) or below temperatures providing the time between removing the liner from storage and deployment does not exceed one-half working day.

The sheets which are overlapped for seaming shall be completely free of moisture in the area of the seam. In the case of moisture, air blowers shall be used to lift the seam and for drying the liner.

In general seams should be oriented parallel to the line of maximum slope. In corners and odd-shaped geometric locations, the number of seams should be minimized. No horizontal seam should be less than 5-ft from the toe or crest of the slope, or from areas of potential stress concentrations, unless otherwise authorized by the Contracting Officer. Horizontal seams shall be offset in adjacent panels by at least one panel width and seams shall be "shingled" downhill.

All panels placed on sloped surfaces shall extend 10-ft inward (on the flat) from the toe of slope or edge of trench.

All end seams shall be staggered a minimum of 10-ft in length between contiguous panels. No end seams shall be made on slopes 25 percent (4 horizontal and 1 vertical) or greater, unless otherwise approved by the Contracting Officer.

To prevent moisture buildup during fusion welding, it may be necessary to place a movable protective layer (skid sheet) directly below each overlap of HDPE liner that is to be welded.

All seams that are to be extrusion-welded shall be cleaned of oxidation. This shall be done by using a hand grinder with sanding discs of a grit recommended by the manufacturer to match ambient conditions. The direction of grinding shall be perpendicular relative to the edge of the liner. Care shall be taken not to damage the liner.

If required, a firm substrate shall be provided by using a flat board or similar hard surface directly under the seam overlap to achieve proper support.

All seam welds shall extend the full extent into the anchor trench.

All factory seams, field seams, and repair welds shall meet seam strength requirements specified in GRI GM19.

3.2.3.2 Normal Weather Seaming Conditions

Normal seaming weather conditions are:

a. Ambient temperature higher than 40 degrees F and lower than 100 degrees

b. No precipitation or other excessive moisture, such as fog or dew.

c. No excessive winds that impact proper placement of the HDPE Liner in accordance with the Contract Drawings.

These weather conditions shall be fulfilled during seaming process.

3.2.3.3 Cold Weather Seaming Conditions

If the ambient air temperature is below 40 degrees F, the following procedures shall be implemented:

a. Preheating the surface of the HDPE liner to achieve normal temperature range.

b. Preheating may be waived by the Contracting Officer if the installer demonstrates that satisfactory welds of equivalent quality may be obtained without preheating at the expected temperature of installation.

c. Preheating devices shall be approved by the manufacturer.

d. Care shall be taken to assure that surface temperatures are not lowered below the minimum required surface temperature for welding due to winds.

e. Additional destructive tests samples shall be taken at the discretion of the Contracting Officer.

f. Test seams, as described in Paragraph 3.3, shall be performed under the same ambient temperature conditions as the actual seams

3.2.3.4 Warm Weather Seaming Conditions

If the ambient air temperature is above 100 degrees F, no seaming of HDPE liner shall be permitted unless the installer can demonstrate to the satisfaction of the Contracting Officer that HDPE liner seam quality is not adversely impacted.

Test seams shall be performed under the same ambient air temperature conditions as the actual seams.

Additional destructive tests shall be taken at the discretion of the Contracting Officer.

3.2.3.5 Strength Requirements

All general welds, repair welds, patches and factory weld shall meet the strength requirements specified in Table A2 of GRI GM19.

3.3 FIELD QUALITY CONTROL

The Contractor shall provide quality control measures as necessary to assure that the HDPE liner is constructed in a manner that satisfies the performance requirements set forth in these Specifications. The Contractor shall implement quality control measures during the construction sequence to avoid defects in the finished placement that would impair the purpose and effectiveness of the liner. These measures shall include but are not limited to visual observations and measurements by the Contractor's experienced personnel and liner manufacture's personnel to provide a liner meeting these Specifications. The Contractor is required to perform all quality control testing in accordance with the manufacturer's requirements, and to provide the Government with the results of all quality control testing, measurements and documentation of observations on a daily basis.

3.3.1 Start-up Testing

A test weld 3 ft long from each welding machine shall be made at the beginning each shift and every four hours thereafter, under the same conditions as exist for the HDPE liner welding. The test weld shall be marked with date, time of day, Seamer's initials, temperature and speed settings (for fusion welds) or temperature and preheat settings (for extrusion welds), and machine number. A tensiometer shall be required to be on-site before and during HDPE liner installation for the purpose of testing samples. Six 1-in wide specimens shall be cut from the test weld and tested on-site in the presence of the Contracting Officer for shear and peel strength in accordance with Table A2 in GRI GM19. No welder may start work until the sample weld has been approved by the Contracting Officer.

Test seams shall be performed under the same conditions as the actual seams and shall be at least 3-ft long after seaming. Material for test seams shall be cut out of the approved HDPE liner rolls.

3.3.2 Nondestructive Seam Testing

The installer shall perform nondestructive test on all field seams over their full length. The purpose of this test is to assure continuity and integrity of the seams. Vacuum and air pressure tests shall be used for nondestructive testing. The vacuum test shall be used for extrusion welds. The air pressure test shall be used for double track hot wedge welds.

3.3.2.1 Vacuum Testing

Equipment for testing single fusion seams and extrusion welds shall be comprised of the following:

a. A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the bottom, port hole or valve assembly and a vacuum gauge.

b. A vacuum tank and pump assembly equipped with a pressure controller and pipe connections

c. A rubber pressure/vacuum hose with fittings and connections.

d. A plastic bucket and wide paint brush.

e. A soapy solution

The following procedures shall be followed by the installer:

a. Excess sheet overlap shall be trimmed away.

b. Clean the window, gasket surfaces and check for leaks.

c. Energize the vacuum pump and reduce the tank pressure to approximately 5 psi.

d. Wet a strip of geomembrane approximately 12-in by 48-in (length of box) with the soapy solution.

e. Place the box over the wetted area and compress.

f. Close the bleed valve and open the vacuum valve.

g. Ensure that a leak-tight seal is created.

h. For a minimum period of 10 seconds, examine the HDPE liner through the viewing window for the presence of soap bubbles.

i. If no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum of 3-in overlap and repeat the process..

j. All areas where soap bubbles appear shall be marked and repaired in accordance with Section 3.3.3.6 and then retested.

k. All test location which have passed vacuum testing shall be marked with the test date and individual performing the test.

If the seam is not accessible to vacuum box equipment, the seam cannot be tested prior to final installation. The seaming operations shall be observed by the Contracting Officer for uniformity and completeness.

3.3.2.2 Air Pressure Testing (for double track hot wedge welds only)

The following procedures are applicable to those processes which produce a double seam with an enclosed space.

Equipment for testing double fusion seams shall be comprised of the following:

a. An air pump equipped with pressure gauge capable of generating and sustaining a pressure between 25 and 30 psi and mounted on a cushion to protect the HDPE liner.

b. A manometer equipped with a sharp hollow needle, or other approved pressure feed device

The following shall be followed by the installer:

a. Seal both ends of the seam to be tested. The length of seam shall not exceed 500-ft without approval by the Contracting Officer.

b. Insert needle or other approved pressure feed device into the tunnel created by the double wedge fusion weld.

c. Energize the air pump to a pressure between 25 and 30 psi. After allowing two minutes for relaxation, the pressure shall be monitored over a test period not less than five minutes.

d. If the loss of pressure exceeds 4-psi, or the pressure does not stabilize, the weld shall be considered faulty (unless the installer can demonstrate that monitoring for an additional five minutes does not cause an additional loss in pressure in excess of 1 psi, and that the pressure stabilizes within the second monitoring period). Locate the faulty area, repair in accordance with Paragraph 3.3.3.6 and retest.

e. If the faulty area cannot be isolated and repaired, the length of seam which cannot be tested shall be capped with HDPE liner strip, extrusion welded, and vacuum tested. The seam shall be documented as a failed seam indicating the corrective measure.

f. If the pressure loss is less than 4 psi after 5 minutes, cut the air channel on the opposite end the pressure device to confirm there is no blockage and verify the length of the seam tested. Remove needle of other approved pressured feed device and seal with an extrusion weld

g. Remove needle or other approved pressure feed device and seal.

h. All test locations which have passed air pressure testing shall be marked with the test date and individual performing the test.

3.3.3 Destructive Seam Testing

The purpose of the destructive testing is to evaluate seam strength properties. Unless otherwise approved by the Contracting Officer, a minimum of one destructive test sample shall be obtained per 500-ft of performed seam length or one sample per crew per day, whichever yields the largest number of samples. If an electrical leak location survey method, or other equivalent non-destructive test method, is used to locate and repair leaks in the installed liner system, then one destructive test sample shall be collected every 1,000 feet along the total length of the seams in the areas where this method is used as approved by the Contracting Officer. The location of samples shall be determined by the Contracting Officer. Selection of such locations may be prompted by suspicion of overheating, contamination, or other potential cause that may adversely impact the welds. Location at samples shall not be revealed to installer in advance. Sampling shall be performed by the installer. Testing of field samples shall be performed by installer's qualified technicians.

3.3.3.1 Sampling Procedures

Samples shall be cut by the installer at locations chosen by the Contracting Officer as the welding progresses.

The seams shall not be covered by another material before they have been tested and accepted by Contracting Officer.

Upon obtaining each sample, assign a number to the sample and mark it accordingly.

Record sample location on layout drawing.

Record purpose of the sample, statistical routine or suspicious weld area.

Holes in the HDPE liner resulting from destructive seam testing shall be immediately repaired in accordance with Paragraph 3.3.3.6.

3.3.3.2 Size and Disposition of Samples

Two samples shall be cut with a 1-in wide die, with the seam centered parallel to the width. The distance between these two samples shall be no less than 36-in. If the samples pass the field test described in Paragraph 3.3.3.3, a sample for laboratory testing shall be taken.

The sample for laboratory testing shall be located between the samples for field testing. The sample for laboratory testing shall be 12-in wide by 36-in long with the seam centered lengthwise. The sample shall be cut into three parts and distributed as follows:

a. One portion to the installer for optional field testing, 12-in by 12-in.

b. One portion for the geosynthetic laboratory quality assurance testing, 12-in by 12-in.

c. One portion to the Contracting Officer for archive storage, 12-in by 12-in.

3.3.3.3 Field Testing

The following shall be performed by the installer's qualified technician in the presence of the Contracting Officer:

a. The installer shall cut six 1-in wide replicate specimens from the field testing samples to be tested for shear and peel strength, in accordance with the criteria set in GRI GM19.

b. The installer shall test three specimens for shear seam strength and three for peel strength. All replicate test specimens shall pass for the seam to be acceptable.

c. Samples shall be tested with a tensiometer equipped with a drive/pull apparatus adjusted to a pull rate of 2-in per minute for both peel and sheer testing. Each sample shall be tested until film tearing bond (FTB) is achieved. At a minimum, the required pass criteria for peel shall be as specified in GRI GM19.

d. Any specimen that fails through the weld or through the fusion at the weld sheet interface is a non-FTB (Film Tearing Bond) break and shall be considered a failure even if it achieves the acceptable strengths. The following are unacceptable locus-of-break patterns (codes):

   1) Double track hot wedge fusion welds - AD & AD-BRK > 25%

   2) Extrusion Welds - AD1, AD2 & AD-WLD*
      *unless strength is achieved.

3.3.3.4 Quality Assurance Laboratory Testing

The Contracting Officer shall package and ship destructive test samples to

the GRI accredited independent QAL approved by the Contracting Officer by overnight delivery service.

Laboratory test shall include shear and peel strength tests performed in accordance with ASTM D6392. The minimum acceptable values obtained in these tests shall be in accordance with A2 and GRI GM19.

At least five specimens shall be tested each for shear and peel strength. A passing test shall meet the minimum required values in all five specimens tested for each method.

The QAL shall provide verbal test results to the Contracting Officer no more than 24 hours after they receive the samples. The Contracting Officer shall review the laboratory results as soon as they become available.

3.3.3.5 Procedures for Destructive Test Failure

The following procedures shall apply whenever a sample fails a destructive test, whether that test is conducted in the field or by the QAL. The installer has two options.

a. The installer can repair the seam between any two passing test locations in accordance with Paragraph 3.3.3.6.

b. The installer can retrace the welding path to an intermediate location a minimum of 10-ft on each side of the failed sample. The sample shall be tested in the field. Subsequent failure of test samples shall cause the testing to move further down the seam until the extent of faulty seam has been determined. Costs for shipping and retesting destructive samples shall be borne by the Contractor.

In the event the whole seam is determined to be faulty the Contracting Officer may request samples to be taken from the previous seam welded by the same machine and welder, until two passing tests are obtained.

All acceptable repaired seams shall be bound by two conservative passing locations on each side of the original sample. In cases where repaired seam exceeds 150-ft, a sample taken from the zone in which the seam has been repaired must pass destructive testing. Repairs shall be made in accordance with Paragraph 3.3.3.6.

The Contractor shall document all actions taken in conjunction with destructive test failures.

3.3.3.6 Repair Procedures

Any portion of the HDPE liner exhibiting signs of any kind of defect, or failing a destructive or a nondestructive test, shall be repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure shall be approved by Contracting Officer.

The repair procedures available include:

a. Patching, used to repair large holes, tears, undispersed raw materials and contamination by foreign matter.

b. Spot welding or seaming used to repair small tears, pinholes, or other minor, localized defects.

c. Capping is used to repair large lengths of failed seams.

d. Removing bad seam and replacing with a strip of new material welded in place.

e. For small lengths of failed seam (less than 3 feet), extrusion welding can be used to repair provided there is sufficient overlap between the two HDPE liner panels.

For any repair method, the following provisions shall be satisfied:

a. Surfaces of the HDPE liner which are to be repaired using extrusion methods shall be abraded no more than one hour prior to the repair.

b. All surfaces shall be clean and dry at the time of the repair.

c. All seaming equipment used in repairing procedures shall be qualified.

d. All patches and caps shall extend at least 4-in beyond the edge of the defect.

e. All patches shall have rounded corners.

3.3.3.7 Repair Verification

Each repair shall be numbered and logged by the installer. Each repair shall be nondestructively tested using the methods described in Paragraph 3.3.2 as appropriate. Repairs, which pass the nondestructive test, shall be taken as an indication of an adequate repair. Repairs more than 150-ft long may be of sufficient length to require destructive test sampling at the discretion of the Contracting Officer. Failed test of the repaired section indicates that the repair shall be redone and retested until passing test results are achieved. The Contracting Officer shall observe all nondestructive testing of repairs. The installer shall record the number of each repair, date, and test outcome.

3.3.3.8 Wrinkles

Large wrinkles that remain in the sheet as result of temperature expansion or uneven surface preparation may need removal as determined by the Contracting Officer in consideration of applied loads on the wrinkle. Should the wrinkle need removing, the lower down-slope edge of the wrinkle shall be cut, overlapped and repaired as described in Paragraph 3.3.3.6. Both ends of the wrinkle repair shall be patched. Caution shall be taken in removing any wrinkles. Wrinkles are needed to allow for future contraction of the HDPE liner, especially in cold weather.

3.4 DISPOSAL OF WASTE MATERIAL

On completion of installation, Contractor shall dispose of all trash, waste, material, and equipment used in connection with the work herein and shall leave the premises in a neat and acceptable condition.

3.5 DISPOSAL OF WASTE MATERIAL

On completion of installation, Contractor shall dispose of all trash, waste, material and equipment used in connection with the work herein and shall leave the premises in a neat and acceptable condition.

3.6 AS-BUILT DRAWINGS

The installer shall prepare and submit to the Contracting Officer an as-built drawing reflecting the actual installation of HDPE liner, including the location of all seams, the location of destructive samples, and the location of all repair work. The as-built drawing shall be submitted to the Contracting Officer within 21 days of job completion. In addition, a copy of the complete documentation package shall accompany the as-built drawing.

-- End of Section --

SECTION 31 05 19.19

GEOGRID

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to install the Geogrid, as indicated on the Contract Drawings and specified herein.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only

ASTM International (ASTM)

ASTM D1388	Standard Test Method for Stiffness of Fabrics
ASTM D1777	Standard Test Method for Thickness of Textile Materials
ASTM D4101	Standard Specification for Propylene Plastic Injection and Extrusion Materials.
ASTM D4218	Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
ASTM D4759	Standard Practice for Determining the Specification Conformance of Geosynthetics
ASTM D5261	Standard Test Method for Measuring Mass per Unit Area of Geotextiles
ASTM D5818	Standard Practice for Exposure and Retrieval of Samples to Evaluate Installation Damage of Geosynthetics
ASTM D6637	Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method
ASTM D7737	Standard Test Method for Individual Geogrid Junction Strength
ASTM D7748	Standard Test Method for Flexural Rigidity of Geogrids, Geotextiles, and Related Products

Geosynthetic Research Institute (GRI)

GRI GG9-Test	Test Method for Torsional Behavior of

Bidirectional Geogrids When Subjecte to
In-Plane Rotation

Where references are made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Geogrid schedule; G

Installation and erection data and schedule, including a detailed schedule for covering the geogrid.

Quality Control Manual; G

A quality control manual that specifically defines the quality assurance program. Included in the manual shall be daily procedure, welding technique, field testing procedure, lab testing procedure, specific steps that are to be taken in the event of a failure or defect, personnel requirements, levels of authority, and all other information necessary to ensure a high-quality geogrid installation.

SD-02 Shop Drawing

Geogrid Shop Drawing; G

Contractor shall submit a shop drawing showing the geogrid type, physical and mechanical properties, and layout plan with the location of splices and overlaps fourteen calendar days prior to beginning construction for approval by the Government.

SD-04 Samples

Geogrid samples; G

Samples of geogrid material and field seams (if required) for visual inspection and testing.

SD-07 Certificates

Geogrid certificates; FIO

Certificates of compliance with the requirements of standards specified herein for the geogrid and its installation.

SD-08 Manufacturer's Instructions

Maintenance and repair requirements; FIO

Manufacturer's standard guarantee; FIO

1.4 QUALITY ASSURANCE

1.4.1 General

The quality control and quality assurance consist of conformance testing of material delivered to the site and field quality control during installation.

Conformance testing requirements are specified in Paragraph 2.4. The purpose of conformance testing is to assure that the supplied material conforms to the Specifications and to the manufacturer's quality control certificates.

1.4.2 Field Quality Control

Field quality control requirements are specified in Paragraph 3.3. The purpose of field quality control procedures is to assure that the geogrid material has been installed in accordance with the Specifications and manufacturer's recommendations.

1.5 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.6 SUMMARY

1.6.1 General

Furnish all labor, materials, equipment and incidentals required and install polypropylene geogrid as shown on the Drawings and as specified herein.

1.7 RELATED REQUIREMENTS

a. SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER

b. SECTION 02 10 00 - SITE PREPARATION

c. SECTION 31 05 19.16 - GEOMEMBRANE

d. SECTION 31 05 19.26 - NONWOVEN GEOTEXTILE FABRIC

e. SECTION 31 00 00 - EARTHWORK

f. SECTION 31 23 19 - DEWATERING

g. SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION

1.8 DELIVERY, STORAGE AND HANDLING

The geogrid shall be shipped, stored and handled in accordance with manufacturer's recommendations and as specified herein.

No mechanical equipment shall be driven directly on top of the geogrid.

The geogrid shall be stored in such a way that is protected from prolonged

exposure to ultraviolet radiation (i.e., maximum exposure period as recommended by the manufacturer) and shall be elevated from the ground (a minimum of 3 in) to protect the geogrid from standing water.

1.9 PROJECT/SITE REQUIREMENTS

The subgrade shall be inspected and approved by the Government prior to installation of the geogrid. The subgrade shall be maintained in a smooth, uniform and compacted condition during the installation of the geogrid.

1.10 MATERIAL WARRANTY

The geogrid manufacturer shall warrant the material against manufacturing defects and material degradation for a period of 20 years from the date of installation. The manufacturer shall replace any material which fails from the above causes within the warranty period. The manufacturer shall furnish a written warranty covering the requirements of this Paragraph.

1.11 GUARANTEE

The Contractor shall guarantee the geogrid against defects in installation and workmanship for the period of two years commencing with the date of Final Acceptance. The guarantee shall include the services of qualified service technicians and all materials required for the repairs.

PART 2 PRODUCTS

2.1 GENERAL

The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration.

2.2 PROPERTIES

Biaxial geogrid materials shall be manufactured by drawing a continuous sheet of select polypropylene material having aperture geometry and rib and junction (node) cross-sections sufficient to permit mechanical interlock with the material being reinforced. The geogrid material shall meet the requirements listed in Table 1.

TABLE 1		
PROPERTIES	MINIMUM AVERAGE VALUES	TEST METHOD
DOUBLE-SIDED GEOCOMPOSITE		
Insitu Transmissivity: Soil/Geocomposite/Geomembrane gradient = 0.02 @ 15,000 psf 100 hr seat time	2.2x10-3 m2/sec	ASTM D 4716
Polymer Composition	97 percent polyethylene by weight	
Density	0.940 g/cc	ASTM D 792
Melt Index (Max.)	1.0 g/10 minutes	ASTM D 1238

TABLE 1		
condition 190/2.16		
Carbon Black Content	2-3 percent	ASTM D 4218
Nominal Thickness	300 mil +/- 10 percent	ASTM D 5199
Tensile Strength Ratio (Tensile Strength of XMD/MD)	1.0	ASTM D 7179
Thickness Retained (After 10,000 hour creep test under 15,000psf, and 40C temperature)	75 percent	GRI-GC8
Long-Term Creep (GRI GC8) (From 10,000 hour creep test under 15,000psf, and 40C temperature)	1.2	GRI-GC8

The geogrid shall contain stabilizers to prevent ultraviolet light degradation..

The geogrid shall have high flexural rigidity and high tensile modulus in relation to the material being reinforced.

The geogrid shall have high continuity of tensile strength through all ribs and junctions of the grid structure.

The geogrid shall maintain its reinforcement and interlock capabilities under repeated dynamic loads while in service.

The geogrid material shall be resistant to all forms of biological and chemical degradation normally encountered in the material being reinforced.

2.3 QUALITY CONTROL DOCUMENTATION

Prior to installation commencement of any geogrid material, the Contractor shall provide to the Government the following information certified by the manufacturer for the delivered geogrid material.

Each roll delivered to the Project site shall have the following identification information:

a. Manufacturer's name

b. Product identification

c. Thickness

d. Roll number

e. Roll dimensions

Quality control certificates signed by the manufacturer's quality assurance manager shall be provided. Each certificate shall have roll

identification number, sampling procedures, frequency and test results. At a minimum the following test results shall be provided every 200,000 square feet of manufactured geogrid in accordance with test requirements specified in Paragraph 2.2.

2.4 CONFORMANCE TESTING

At the discretion of the Government, conformance testing may be performed by an independent Quality Assurance Laboratory (QAL) approved by the Government. The Government will obtain samples from the delivered material and identification number. One sample shall be taken per 200,000 square feet or one sample per lot, whichever is the greater number of tests. The following conformance tests shall be conducted at the laboratory.

These conformance tests shall be performed in accordance with test requirements specified in Paragraph 2.2.

All conformance test results shall be reviewed by the Government and accepted or rejected, prior to the deployment of the geogrid. All test results shall meet, or exceed, the property values referred to in Paragraph 2.2. In case of failing test results, the Contractor may request that another sample be retested by the QAL with manufacturer's technical representative present during the test procedures. This retesting shall be paid for by the Contractor. The Contractor may also have the sample retested at two different laboratories approved by the Government. If both laboratories report passing results, the material shall be accepted. If both laboratories do not report passing results, all geogrid material from the lot representing the failing sample will be considered out of specification and rejected. The manufacturer reserves the right to obtain additional samples from rolls immediately before and after the failing roll or as directed by the Government and have them tested by the QAL. If these rolls pass, then only the failing roll will be rejected. If they fail, then the entire lot will be rejected.

PART 3 EXECUTION

3.1 PREPARATION

Preparation of the subgrade shall be in accordance with the applicable Section.

The subgrade shall be inspected and approved by the Government prior to installation of the geogrid.

3.2 INSTALLATION

3.2.1 Geogrid Placement

Deploy and place geogrid directly on the prepared subgrade as specified. Overlap all edges of geogrid a minimum of 20 inches.

Take all necessary precautions to prevent damage to underlying materials during placement of the geogrid. Cut geogrid using scissors only. Protect other materials from damage when cutting of the geogrid.

Anchor geogrid using sandbags as necessary to prevent displacement by wind. Repair any damage to the geogrid due to improper anchoring, as

approved by the Government prior to backfilling.

Place fill over geogrid as indicated in Paragraph 3.2.2.

3.2.2 Backfilling over Geogrid

Backfill shall be placed, spread, and compacted in such a manner that minimizes the development of wrinkles in and/or movement of the geogrid.

Place fill materials in accordance with Contract Drawings in 8-inch thick lifts. Compact each lift to 95% of the Modified Proctor maximum dry density, unless indicated otherwise. Place the first lift of fill materials with low contact pressure (less than 5 psi) tracked equipment to prevent rutting and damage to the geogrid.

Tracked construction equipment shall not be operated directly upon the geogrid. A minimum fill thickness of 8 inches is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

Rubber tired equipment may pass over geogrid reinforcement at slow speeds, less than 10 MPH (16 KPH). Sudden braking and sharp turning shall be avoided.

3.3 FIELD QUALITY CONTROL

Two duplicate documentation files for panel placement shall be maintained. One shall be maintained by the Contractors and the other by Government. At the end of each workweek the files shall be updated and checked to assure that all copies of pertinent project information are included in each file. The Contractor shall submit daily copies of the documentation to the Government.

Any damaged roll shall be discarded. No repairs shall be allowed.

Cover material shall be placed in such a manner to ensure that the geogrid and underlying materials are not damaged.

3.4 DISPOSAL OF WASTE MATERIAL

Upon completion of installation, dispose of all trash, waste material and equipment used in connection with the performed work and shall leave the premises in a neat and acceptable condition.

-- End of Section --

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SECTION 31 05 19.26

NONWOVEN GEOTEXTILE FABRIC

PART 1 GENERAL

1.1 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required and install nonwoven geotextile fabric complete as shown on the Contract Drawings and as specified herein.

1.2 REFERENCES STANDARDS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D4355	Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
ASTM D 4491	Water Permeability of Geotextiles by Permittivity
ASTM D4533	Standard Test Method for Trapezoid Tearing Strength of Geotextiles
ASTM D4632	Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	Determining Apparent Opening Size of a Geotextile
ASTM D 5199	Measuring Nominal Thickness of Geosynthetics
ASTM D 5261	Measuring Mass Per Unit Area of Geotextiles
ASTM D 6241	Standard Test method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
ASTM D 792	Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D 7005	Standard Test Method for Determining the Bond Strength (Ply Adhesion) of Geocomposites
ASTM D 7179	Standard Test Method for Determining Geonet Breaking force

Where reference is made to one of the above standards, the revision in

effect at the time of bid opening shall apply.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 - SUBMITTAL PROCEDURES.

SD-02 Shop Drawings

A list of ten completed facilities where the geocomposite drainage net is used including:

1. Name of owner, purpose of facility, its location and date of installation.

2. Name of project manager, design engineer and installer.

3. Geocomposite thickness and surface area.

4. Information on performance of the facility.

Shop Drawing, providing details of overlap and seaming of the drainage net, anchoring, connections, and other reconstruction details including any variance or additional details which deviate from the Contract Drawings.

Installation schedule; G

A list of ten completed facilities totaling for which the Installer has installed geocomposite drainage net. The following information shall be provided for each facility:

1. Name and purpose of facility, its location and date of installation.

2. Name of owner, design engineer, manufacturer and name and telephone number of contact at the facility who can discuss the project.

Resume of the installation supervisor to be assigned to the project, demonstrating the supervision of at least one similarly completed facility incorporating geocomposite drainage net.

SD-03 Product Data

Information on factory size, equipment, personnel, number of shifts per day and production capacity per shift.

Manufacturer's quality control program and manual including description of laboratory facilities.

A manual that specifically defines the quality control and quality assurance program during installation including Manufacturer's installation instructions.

Long-Term Creep (GRI GC8); G indicating that the creep reduction factor for the product is a maximum of 1.2 at 10,000 hours, under

15,000 psf loading, and 40°C temperature.

Insitu Transmissivity; G for the product specified.

SD-04 Samples

Samples of Geocomposite Drainage Net; G with attached certified test results.

SD-07 Certificates

Manufacturer's Accreditation Certificates shall be submitted showing the geonet manufacturer's quality control laboratory is currently and have maintained a minimum of 3 years consecutive accreditation via the Geosynthetics Accreditation Institute's laboratory accreditation program (GAI-LAP).

Quality Control Certificates in conformance with Paragraph 2.3.

1.4 QUALITY ASSURANCE

The quality control and quality assurance consists of conformance testing of the material delivered to the site and field quality control during installation.

a. Conformance testing requirements are specified in Paragraph 2.3. The purpose of conformance testing is to assure that the supplied material conforms to this Section and to the Manufacturer's quality control certificates.

b. Field quality control requirements are specified in Paragraph 3.3. The purpose of field quality control procedures is to assure that the drainage net material has been installed in accordance with this Section and the Manufacturer's recommendations.

1.5 DELIVERY, STORAGE, AND HANDLING

The geocomposite drainage net shall be shipped, stored and handled in accordance with manufacturer's recommendations as specified herein.

Product labels shall clearly show the manufacturer or supplier name, style name and roll number.

Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.

The geocomposite drainage net shall be stored with a cover so that it is protected from exposure to sunlight and shall be elevated from the ground (a minimum of 3 inches) to protect the geotextile from standing water and of intrusion of soil particles.

Rolls shall be stacked in pyramid configuration with a maximum of four rolls high.

The lowest rolls should be held off the ground by means of pallets or other similar methods.

Weeds should not be allowed to grow into the stored geocomposite drainage net.

1.6 RELATED REQUIREMENTS

Contract Documents include, but are not limited to, the following related sections:

a. Section 31 20 00 - EARTHWORK

b. Section 31 05 19.16 - GEOMEMBRANE

1.7 PROJECT/SITE REQUIREMENTS

The underlying subgrade shall be inspected and approved by the Contracting Officer and any unsuitable areas shall be addressed by the Contractor prior to installation of the geocomposite drainage net.

1.8 WARRANTY

The Manufacturer shall warrant that the geocomposite drainage net shall be of merchantable quality (as defined by the Uniform Commercial Code). The Manufacturer shall guarantee that the geocomposite drainage net furnished is suitable for the purpose intended and free from defects of material and workmanship. In the event the geocomposite drainage net fails to perform as specified, the Manufacturer shall promptly replace defective materials without any cost to the Government

1.9 GUARANTEE

The Contractor shall guarantee the drainage net against defects in installation and workmanship for the period of 2 years commencing with the date of Final Acceptance. The guarantee shall include the services of qualified service technicians and all materials required for the repairs at no additional cost to the Government.

PART 2 PRODUCTS

2.1 MATERIALS

The geocomposite drainage net shall be provided by the Contractor. The use of a Manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration.

2.1.1 General

Geocomposite drainage net shall be manufactured from high density polyethylene forming a three-dimensional structure to provide planar water flow.

Geocomposite drainage net shall be formed by heat bonding of a nonwoven geotextile to the geonet. The geonet must meet each of the property values listed below. Heat bonding shall be performed by the manufacturer prior to shipping to the site.

The geocomposite drainage net shall contain UV inhibitors to prevent ultraviolet light degradation.

The drainage net shall be manufactured from high density polyethylene containing not less than 97 percent base polymer and not less than 2 percent carbon black and shall conform to the following properties in

Table 1.

2.1.2 Properties

Double-sided geocomposite drainage net shall meet the requirements listed in Table 1 and be GSE FabriNet TRxH, SKAPS Transnet 330-2-6, Tenax Tendrain II 770-2 or equal.

Table 1		
PROPERTIES	MINIMUM AVERAGE VALUES	TEST METHOD
DOUBLE-SIDED GEOCOMPOSITE		
Insitu Transmissivity: Soil/Geocomposite/Geomembran gradient = 0.02 @ 15,000 psf 100 hr seat time	2.2x10-3 m^2/sec	ASTM D 4716
Peel Adhesion	0 Peel Adhesion	ASTM D 4716
GEONET Portion		
Polymer Composition	97 percent polyethylene by weight	
Density	0.940 g/cc	ASTM D 792
Melt Index (Max.)	1.0 g/10 minutes	ASTM D 1238
condition 190/2.16		
Carbon Black Content	2-3 percent	ASTM D 4218
Nominal Thickness	300 mil +/- 10 percent	ASTM D 5199
Tensile Strength Ratio (Tensile Strength of XMD/MD) Thickness Retained (After 10,000 hour creep test under 15,000psf, and 40C temperature) Long-Term Creep (GRI GC8) (From 10,000 hour creep test under 15,000 psf, and 40C temperature)	1.0 75 percent 1.2	ASTM D 7179 GRI-GC8 GRI-GC8
GEOTEXTILE Portion		

Unit weight	6 oz/yd^2	ASTM D 5261
Grab Tensile	160 lbs	ASTM D 4632
Puncture Strength Resistance	400 lbs	ASTM D 6241
AOS	70 sieve	ASTM D 4751
Flow Rate	110 gal/min-ft^2	ASTM D 4491

The geotextile shall be nonbiodegradable, nonreactive within a pH range of three to eleven, resistant to ultraviolet light exposure, and resistant to insects and rodents. The geotextile shall be a nonwoven needle punched polypropylene fabric consisting of filaments formed into a stable network, such as Nicolon Mirafi, TNS Mills, or equal.

2.2 QUALITY CONTROL DOCUMENTATION

Prior to installation commencement of any drainage net material, the Contractor shall provide to the Contracting Officer the following information certified by the Manufacturer for the delivered drainage net.

a. Each roll delivered to the Project site shall have the following identification information:

   1. Manufacturer's name

   2. Product identification

   3. Thickness

   4. Roll number

   5. Roll dimensions

b. Quality control certificates, signed by the Manufacturer's quality assurance manager. Each certificate shall have roll identification number, sampling procedures, frequency and test results. At a minimum the following test results shall be provided every 100,000 square feet of manufactured drainage net and at least once per lot in accordance with test requirements specified in Paragraph 2.2.

   1. Density

   2. Thickness

   3. Carbon Black Content

   4. Insitu Transmissivity

   5. Tensile Strength

   6. Mass Per Unit Area

2.3 CONFORMANCE TESTING

Conformance testing shall be performed by a GRI accredited independent Quality Assurance Laboratory (QAL) retained by the Contractor and approved by the Contracting Officer. A Quality Assurance Technician (QAT) will obtain samples from the delivered material, mark the machine direction and identification number. Samples shall be taken at a rate of one per 100,000 square feet of installed material and at least once per lot whichever is greater. A lot shall be defined as a group of consecutively numbered rolls from the same manufacturing line. This sampling frequency may be increased as deemed necessary by the Contracting Officer. The samples shall be taken across the entire roll width and shall not include the first 3 ft. The following conformance tests shall be conducted at the laboratory:

1.	Density	(ASTM D 792)	every 100,000 square feet
2.	Carbon Black Content	(ASTM D 4218)	every 100,000 square feet
3.	Thickness	(ASTM D 5199)	every 100,000 square feet
4.	Insitu Transmissivity	(ASTM D 4716)	every 500,000 square feet
5.	Tensile Strength	(ASTM D 7179)	every 100,000 square feet
6.	Mass Per Unit Area	(ASTM D 5261)	every 100,000 square feet

Determination of the allowable flow rate for the drainage geocomposite shall be performed in accordance with GRI GC8.

All conformance test results shall be reviewed by the Contracting Officer and accepted or rejected, prior to the deployment of the drainage net. All test results shall meet, or exceed, the property values listed in Paragraph 2.02. In case of failing test results, the Contractor may request that other samples be tested by the QAL with the Manufacturer's technical representative present during the testing procedures. All testing and retesting shall be paid for by the Contractor. The Manufacturer may obtain additional samples from rolls immediately before and after the failing roll or as directed by the Contracting Officer and have them tested by the QAL at his/her own expense. If these rolls pass, then only the failing roll will be rejected. If they fail, then the entire lot will be rejected.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 General

Preparation of the subgrade shall be in accordance SECTION 31 20 00 - EARTHWORK of the Specifications.

The subgrade shall be inspected by the Contracting Officer prior to installation of the geomembrane and geocomposite drainage nets.

3.2 INSTALLATION

The geocomposite drainage net shall be installed per the manufacturer's recommendations and in accordance with the approved installation

schedule. The geocomposite drainage net shall bear on undisturbed native soils, or acceptably placed and compacted fill. In the event that it is necessary to remove material or place fill below the excavation or fill lines shown on the Contract Drawings, or not otherwise provided for in the contract, the Contracting Officer shall be notified prior to work and an adjustment in the contract price will be considered in accordance with the contract. Additional work not authorized by the Contracting Officer shall be at the Contractor's expense.

3.2.1 Panel Placement

Care shall be taken to keep the geocomposite drainage net clean and free from debris prior to installation. If the geocomposite drainage net is not clean, it shall be washed prior to installation.

The geocomposite drainage net shall be installed in such a manner as to ensure that it is not damaged in any way, and the following shall be complied with during installation.

a. Geocomposite drainage net shall be anchored into the augmented clay cap with the geomembrane liner, as shown on the Contract Drawings.

b. On slopes, the geocomposite drainage net shall be secured and rolled down the slope in such a manner as to continually keep the geocomposite drainage net sheet in tension. If necessary, the geocomposite drainage net shall be positioned by hand after being unrolled to minimize wrinkles.

c. In the presence of wind, all geocomposite drainage net shall be weighted with sandbags or by other means. Such sandbags shall be installed during placement and shall remain until replaced with cover material.

d. Geocomposite drainage net shall not be welded to geomembrane.

e. Geocomposite drainage net shall only be cut using cutting tools approved by the Manufacturer that will not damage the underlying geosynthetics. Care shall be taken not to leave tools on the geocomposite drainage net.

f. Necessary precautions shall be taken to prevent damage to underlying layers during placement of the geocomposite drainage net.

g. During placement of geocomposite drainage net, care shall be taken not to entrap in the geocomposite drainage net dirt or excessive dust that could cause clogging of the drainage system and/or stones that could damage the adjacent geomembrane. If dirt or excessive dust is entrapped in the geocomposite drainage net, it shall be hosed clean prior to placement of the next material on top of it. In this regard, care shall be taken in handling the sandbags, to prevent rupture or damage of the sandbag. Contractor shall cover geocomposite drainage net within one week of geocomposite drainage net installation to prevent dirt or rocks from washing/blowing into the geonet.

3.2.2 Field Seams and Overlaps

The following requirements shall be met during installation of the geocomposite drainage net:

a. Adjacent rolls shall be overlapped by at least 4 in.

b. Overlaps shall be secured by tying. Tying can be achieved by plastic fasteners or polymer braid approved by the Contracting Officer. Tying devices shall be white or yellow for easy inspection. Metallic devices are not allowed.

c. Tying shall be every 5 ft along the slope, every 6 in the anchor trench and every 6 in along end-to-end seams on the base of the landfill.

d. No horizontal seams shall be allowed on side slopes.

e. In the corners of the side slopes where overlaps between perpendicular geocomposite drainage net strips are required, an extra layer of geocomposite drainage net, of at least one roll width, shall be unrolled along the slope, on top of the previously installed geocomposite drainage net from top to bottom of the slope. In no case there shall be piercing of material to cover areas designated on the Contract Drawings in less than full roll widths.

f. When more than one layer of geocomposite drainage net is installed, joints shall be staggered.

g. The geotextile panels shall be sewn together, or other method as approved by Contracting Officer. The thread used to sew the panels shall be of the same composition as the geotextile and as recommended by the Manufacturer. The amount of overlap and type of stitch used to join geotextile panels shall be as recommended by the Manufacturer and approved by the Contracting Officer.

3.3 FIELD QUALITY CONTROL

Any holes or tears in the geocomposite drainage net shall be repaired by placing a patch extending 1 foot beyond the edges of the hole or tear. The patch shall be secured to the original geocomposite drainage net by placing ties every 6 in. Tying devices shall be as specified in Paragraph 3.02B. All repairs and patches shall be approved by the Contracting Officer.

Damage to the geocomposite drainage net occurring during the placement of the material overlying the geocomposite drainage net shall be repaired immediately at no additional expense to the Government.

3.4 DISPOSAL OF WASTE MATERIAL

Upon completion of installation, the Contractor shall remove and dispose in appropriate manner approved by the Contracting Officer of all trash, waste material and equipment used in connection with the performed work and shall leave the premises in a neat and acceptable condition.

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SECTION 31 09 00

GEOTECHNICAL INSTRUMENTATION AND MONITORING

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to install geotechnical instrumentation, as indicated on the Contract Drawings and specified herein.

Geotechnical instrumentation shall be installed to continually monitor settlements and deformations near all permanent structures and critical infrastructure for the duration of the remedial action at the Eighteen Mile Creek OU1 and OU2 Superfund Site. Structures requiring geotechnical instrumentation and monitoring include, but are not limited to, the Clinton Street Crossing, the former White Transportation Building, the Former United Paperboard Building, the Duraline Abrasives Building, all active utility lines, and any additional structures deemed necessary by the Contractor and Government. If the Contractor provides excavation support structures, geotechnical instrumentation and monitoring shall also implemented for those structures.

Geotechnical instrumentation shall be set up prior to any mobilization to the site by the Contractor and a pre-construction survey shall be completed to serve as the baseline data set

The Former United Paperboard Building Structural Evaluation shall be completed in addition to the monitoring schedule for the United Paperboard Building and is specified in SECTION 02 41 00 - DEMOLITION.

Instrumentation monitoring shall be conducted throughout the duration of the remedial action. After the remedial action is complete, a post construction survey shall be completed.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Installation Plan and Schedule; G

Full details and plan/layout of proposed instruments/points, schedule for installing and monitoring instruments/points, equipment types, installation methods, reference points, and monitoring and data reporting schedule for instruments/points, and instrumentation protection.

Description of methods for installing and protecting all instrumentation including but not limited to seismographs, crack gauges, monitoring points, and reference points.

Submit names, qualifications, and experience of personnel who will install instruments, perform optical level survey and vibration monitoring, read instruments, and report data to the Government demonstrating compliance with "Quality Assurance" Article in this Section.

SD-02 Shop Drawings

Installations Records; FIO

Within five working days of installing each instrument, submit to the Government, specified as built instrument location and its corresponding installation record sheet.

Include in installation record sheet, location with instrument identification numbers, established elevations, initial elevations and coordinates (baseline readings), boring log, installation, and monitoring date and time.

Furnish details of installed instruments showing dimensions, materials used, and as built drawings of each instrument.

Submit field calibrations.

SD-06 Test Reports

Reports and Records; G

Provide reports of monitoring data to the Government. include following minimum information:

a. Monitoring data for instruments with plots against threshold values.

b. Weekly records of crack monitors and including photographs with readings.

c. Event reports and summary from vibration monitoring.

d. Discussion and associated action related to results exceeding threshold values.

e. Submit proposed remedial measures to the Contracting Officer of action to be taken in event that instrument Threshold Values are reached.

SD-07 Certificates

Certificates; FIO

Submit for each seismograph or other necessary instrument that manufacturer has inspected and tested each instrument before it leaves the factory confirming that it is working correctly without defects or missing parts and current calibration records.

1.3 QUALITY ASSURANCE

Perform instrument installations in presence of the Government or

representative. The Contractor shall be responsible for installation, maintenance, and monitoring of geotechnical instrumentation.

1.3.1 Geotechnical Instrumentation Engineer Qualification

Geotechnical Engineer Qualifications: Professional Engineer registered in the State of New York in which the work is performed with at least 5 years' experience in installation of specified instrumentation and will supervise and direct technicians and be responsible for instrument installation. Be present at installation sites to direct and supervise installations, oversee instrumentation reading, and supervise geotechnical instrumentation data interpretations.

1.3.2 Surveyor Qualifications

Surveyor qualifications shall be in accordance with SECTION 01 71 23 - SURVEYING.

1.3.3 Manufacturer Qualifications

Provide instruments and components from an approved manufacturer currently engaged in manufacturing specified geotechnical instrumentation hardware.

1.3.4 Monitoring Technicians Qualifications

Minimum 3 years' experience for personnel responsible for optical level surveys, instrument readings, and report data.

Vibration Monitoring Qualifications: Persons trained in use of a seismograph along with reporting results of analyzing and reporting frequency content of a seismograph record.

1.3.5 Instrument Installation Technicians

Experienced in installation and reading of specified geotechnical instrumentation and equipment.

1.3.6 Factory Calibration

Conduct factory calibration on instruments prior to shipment with certification submitted to indicate that test equipment used for this purpose is calibrated and maintained in accordance with test equipment manufacturer's calibration requirements and that, where applicable, calibrations are traceable to U.S. National Institute of Standards and Technology.

Include a calibration curve with data points clearly indicated and a tabulation of data. Mark each instrument with a unique identification number.

1.4 SUMMARY

1.4.1 General

Section includes performing pre-construction surveys and installing and monitoring geotechnical instrumentation and survey markers to measure:

a. Performance of excavation support systems.

b. Vertical deformation of ground surface adjacent to and directly over the Work.

c. Vertical and horizontal deformation of existing utilities and structures adjacent to and over the Work.

d. Ground vibration levels at adjacent facilities due to Contractor activities, including but not limited to demolition and soil excavation.

1.5 RELATED REQUIREMENTS

a. Section 01 32 26 - VIDEO MONITORING AND DOCUMENTATION

b. Section 01 32 33 - PROJECT PHOTOGRAPHS

c. Section 01 71 23 - SURVEYING

d. Section 31 00 00 - EARTHWORK

e. Section 31 23 19 - DEWATERING

f. Section 31 50 00 - EXCAVATION SUPPORT AND PROTECTION

g. Section 02 41 00 - DEMOLITION

1.6 DEFINITIONS

1.6.1 Deformation Monitoring Points (DMPs)

Fixed markers placed on existing utilities and structures to measure both vertical and horizontal movement. Initial coordinate locations and vertical controls are determined by optical survey methods.

1.6.2 Excavation Support Monitoring Points (ESMPs)

Inscribed marking or fixed makers placed on excavation support systems to measure horizontal movement of the excavation support system.

1.6.3 Seismographs

Electronic recording device with vibration transducer capable of monitoring and recording ground vibrations induced by construction activity.

1.6.4 Surface Monitoring Points (SMPs)

Inscribed marking or approved surveyor's nail installed to measure vertical (elevation) movement.

1.6.5 Utility Monitoring Points (UMPs)

Steel rod inside fully cased hole that is resting on existing utilities or underground structures to measure movement of the existing underground structure or utility.

PART 2 PRODUCTS

2.1 DESIGN AND PERFORMANCE REQUIREMENTS

2.1.1 Project Requirements

Install geotechnical instrumentation to monitor ground conditions, ground response, and facilities to achieve specified project requirements and prevent damage to facilities potentially affected.

2.1.2 Access to Instrumentation

Provide and facilitate safe access to the instruments at all times. The Government may perform additional monitoring in a manner that will minimize unnecessary work delays. Allow and facilitate instrument monitoring as required by the Government. No claim for lost production time due to this activity will be allowed.

2.1.3 Maintain Instrumentation

Report damaged or non functional instrumentation to the Government within 24 hours. Replace damaged instruments within 24 hours.

2.1.4 Collected Data

Instrumentation readings shall be collected by the Contractor's Geotechnical Instrumentation Monitoring Firm. Contractor may take their own supplementary readings in addition to those specified.

Monitoring data is the property of the Government and is not to be disclosed or published to third parties without the Government's written permission.

Contractor is expected to make their own interpretations for their own purposes without additional compensation.

Coordinate with the Contracting Officer to verify consistency of collected data.

2.2 INSTRUMENTATION

2.2.1 General

Instruments and materials, including readout units, installation tools, materials, and miscellaneous instrumentation components.

Provide surface protection for instruments flush with surface in paved or other ground surface areas at the time that work is completed.

2.2.2 Minimum Quantity of Instruments

While quantities in following Paragraph are considered minimums, obtain data from instrumentation in quantity to monitor construction, performance, and safety aspects of the Work.

Following subparagraphs identify instrument type, minimum number to be provided for the overall project, and approximate installed depth from below bottom of excavation:

Instrument Type:	Number:	Depth:
Seismographs:	5	N/A
Surface Monitoring Points:	40	N/A
Deformation Monitoring Points:	40	N/A
Utility Monitoring Points:	25	N/A
Excavation Support Monitoring Points:	5	N/A

Locate instruments and obtain approval from the Government.

2.3 MONITORING POINTS

2.3.1 Surface Monitoring Points (SMPs)

Use to monitor vertical deformation at or near ground surface, clearly identifying points with permanent easily readable letters and numbers as approved by the Government.

For paved areas, 2-inch long masonry nail shall be used, manufactured from hardened zinc-plated steel and driven into an asphalt covered surface. Identify each nail individually with an identification tag or surface marking.

For non-paved areas, 3 feet by 3/4-inch diameter steel rod shall be used driven into ground or set in concrete such that no more than 3 inches of rod is exposed above ground surface. Round top of rod and punch-mark it at its center. Identify each rod with a surface marking.

For utility manholes, use observable cross mark or welded bead on top horizontal surface of manhole rim. Clean surface within 3 inches of point and mark it using fluorescent spray paint adjacent to point to permit easy identification of exact location.

2.3.2 Deformation Monitoring Points (DMPs)

Use to monitor vertical and horizontal movement of adjacent utilities and structures with following approved by the Government.
Suitable materials include nails, screws, reinforcing bars, bolts, and similar materials with well-defined measurement points.

Firmly attach and protect from damage and vandalism. Remove or cover points protruding more than 1/4 inch with a protective box or cap.

Clearly identify with permanent easily readable letters and numbers.

2.3.3 Utility Monitoring Points (UMPs)

Use to monitor vertical and horizontal deformation of selected utilities and underground structures. Include following at a minimum:

a. Steel Pipe: ASTM A 53/A 53M Grade B, 3-1/2 inch extra strong steel sleeve and 1 inch extra strong steel riser, threaded and coupled..

b. PVC Centralizers: ASTM D 1785, Schedule 40 PVC pipe, sized to provide a tight fit on riser pipe, and spring-formed to a larger diameter to provide a loose fit in sleeve pipe..

Install to top of utility or underground structure by vacuum excavation method. Set monitoring rod with centralizers on top of the utility or underground structure and extending to within 1 foot of ground surface.

Install with a flush mount roadbox casing at grade, clearly identified by surface marking.

2.3.4 Excavation Support Monitoring Points (ESMPs)

Use as fixed markers on vertical elements of excavation support system and to monitor horizontal deformation of excavation support system designed by Contractor.

Clearly identified points with permanent easily readable letters and numbers as approved by the Government.

Clean surface within 3 inches of each point and clearly identify using fluorescent spray paint adjacent to point.

2.4 SEISMOGRAPHS

Portable for monitoring ground vibrations velocities resulting from construction activities, calibrated within the previous six months.

Provide for full-time use on the project during vibration causing construction activities.

2.4.1 Particle Velocity Component Measurements

Measure three mutually perpendicular components of particle velocity in directions vertical, radial, and perpendicular to vibration source.

2.4.2 Maximum Peak Particle Velocity

Measure and display maximum peak particle velocity continuously during vibration-generating activities.

2.4.3 Air Blast Measurements

Have a low frequency omnidirectional transducer for measuring air blast overpressure with a flat frequency response within the limits of 2 Hertz to 200 Hertz with a tolerance equal to or better than plus or minus 10 percent.

2.4.4 Seismic Range

0.01 inch to 4 inches per second with an accuracy of plus or minus 5 percent of measured peak particle velocity or better at frequencies between 10 Hertz and 100 Hertz, and with a resolution of 0.01 inch per second or less.

2.4.5 Acoustic Range

110 dB to 140 dB with an accuracy and resolution of plus or minus 1 dB.

2.4.6 Frequency Response (plus or minus 3 dB)

2 Hertz to 200 Hertz.

2.4.7 Power Sources

Two Power Sources including an internal rechargeable battery and charger capable of supplying power to monitor vibrations continuously for up to 24

hours at 115 volts AC.

2.4.8 Self-Triggering Wave Form

Self-triggering wave form capture mode that provides plot of wave forms, peak particle velocities, peak overpressure, and frequencies of peaks.

2.4.9 Continuous Monitoring Mode

Continuous monitoring mode capable of recording single-component peak particle velocities and frequency of peaks with an interval of 1 minute or less.

2.5 CRACK MONITORS

2.5.1 Threaded Anchors

Include ball joints which can be grouted to each side of crack in any orientation.

2.5.2 Transducer

Range of at least 1 inch and an accuracy of less than 0.1 percent and a non-linearity of no more than 0.5 percent.

2.5.3 Gauge

Capable of operating in temperatures ranging from minus 68 degrees F to 176 degrees F.

Provide a solid steel cover over each gauge which does not touch or otherwise interfere with gage operation.

2.5.4 Basis-of-Design Manufacturer - Crack Gauges

Provide Model 4420 as manufactured by Geokon, Inc., or approved equal for monitoring width of existing cracks and joints.

PART 3 EXECUTION

3.1 EXAMINATION

Examine areas and conditions, with the Government present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

3.2.1 Existing Conditions

Locate vaults, structures, conduits and underground utilities in areas where any monitoring instrumentation are to be drilled and installed. Conduct utility clearance in accordance with SECTION 31 00 00 - EARTHWORK.

Modify instrument locations, as approved by the Government, to avoid interference with existing vaults, structures, conduits and utilities.

Repair damage to existing facilities resulting from instrument installations without additional compensation.

Prior to commencing installation of demolition, excavation support, excavation for open trench, and dewatering work, furnish instrumentation and related components that are to be installed during construction and conduct pre-construction surveys.

Protect from damage and maintain instruments. Repair or replace damaged instruments.

When drilling from ground surface, obtain necessary permits for each instrument and conform to permit requirements during drilling and installation.

Implement remedial measures based on interpretations of monitoring data program.

3.3 GENERAL REQUIREMENTS

3.3.1 Pre-Construction Survey

Perform a pre-construction survey prior to any dewatering, excavation, demolition, or installation of excavation support to establish baseline conditions in the area where work will be performed. A visual pre-construction structural assessment and survey of the United Paperboard Building shall also be conducted in accordance with SECTION 02 41 00 - DEMOLITION.

3.3.2 Instrumentation Installation

Install instruments at the Government approved locations in accordance with approved installation procedures. Government may modify instrument locations depending on field conditions and monitoring objectives. Install instrumentation in accordance with approved installation schedule. Install instruments and obtain baseline data before construction starts.

Allow the Government access to instrument locations and assistance required in obtaining monitoring data.

3.3.3 Instrumentation Labeling

Clearly mark and label instruments and protected to avoid being obstructed or otherwise damaged by construction operations or general public. Immediately following installation, survey location and top of instruments to provide horizontal and vertical coordinates. Resurvey if the Government questions instrument locations.

Assign a unique identification number to each instrument and each point that is clearly marked in a non-destructible manner.

3.3.4 Initial Readings

Immediately following instrument installation take two sets of initial readings in the Government or representative's presence to provide baseline readings and to demonstrate adequacy of completed installation.

3.4 MONITORING POINTS

3.4.1 General

Includes but not be limited to SMPs, DMPs, UMPs and ESMPs. Monitor these control points using surveying methods. Modify locations to meet site constraints with the Government's approval.

3.4.2 SMPs, DMPs and UMPs

nstall as described below near excavations and open trench locations. Additional SMPs, DMPs, and UMPs may be required by the Government.

3.4.3 Additional SMPs

Install in pavement or ground surface within 10 feet along each side of trench excavations that is over 12 feet deep or within 50 feet of structures. Install at spacing not exceeding 50 feet.

Install on rim of utility manhole covers located within 50 feet within 30 feet of open excavations.

3.4.4 DMPs

Install on exterior walls of buildings, structures, or active utilities located within 30 feet of open excavations. Preferred installations are on supporting walls or columns. Avoid installation in brick, unless no other option exists.

As a minimum, install on exterior wall corners of buildings, structures, utlities, or property boundary walls at not more than 25 feet spacing. Install additional DMPs to monitor building movement at other locations when determined by the Government.

Install DMPs in cooperation with property Owners so that installations are inconspicuous and acceptable to them. Existing features of building foundations that are permanent and can be repeatedly surveyed may be substituted for DMPs, if approved by the Government.

3.4.5 UMPs

Install on existing utility over 36 inch in diameter and located within 15 feet from excavation. Locate at a spacing of not more than 50 feet.

3.4.6 ESMPs

Install on excavation support systems other than trench box along support walls at spacing not more than 25 feet.

Install prior to excavation within exaction support system.

Read results at least daily during associated excavation and twice a week until backfill is completed.

3.4.7 SMPs, UMPs, and DMPs

Obtain two sets of measurements for each monitoring point to establish baseline data within three days of installation. Make them at least 24 hours apart, but not more than 48 hours.

Check monitoring points with initial surveyed elevations differing by more than 0.08 inch for secure installation and resurvey.

Read monitoring points prior to installing excavation support, beginning demolition, excavation, operation of groundwater control system, or start of installation of excavation support at the site.

Read daily during demolition, excavation, dewatering, filling and backfilling, and excavation support installation located within 50 feet of the work, then at least twice a week until excavation, dewatering, and backfill has been completed.

3.4.8 Crack Gauges

Install on exterior walls of buildings or structures with existing cracks located within 30 feet of open excavations.

Install DMPs in accordance with manufacturer's recommendations and in cooperation with property Owners so that installations are inconspicuous and acceptable to them.

3.5 VIBRATION MONITORING

3.5.1 Seismograph Readings

Take seismograph readings during demolition and excavation support installation or other activities causing ground vibrations within 50 feet of existing structures to document that peak particle velocities do not exceed specified limit criteria.

3.5.2 Seismograph Installation

Install seismographs near existing structures when vibratory or impact hammers are used for the installation of excavation support within 50 feet of existing structures, and as directed by the Government.

3.6 INSTRUMENT PROTECTION, MAINTENANCE AND REPAIR

Protect instruments from damage. Replace damaged or destroyed instruments within 27 hours of damage, without additional compensation. If necessary, suspend work in areas being monitored by damaged instrument and take remedial action.

Maintain instruments by draining water and flushing debris from under protective covers and keeping covers locked and sealed at all times.

3.7 MONITORING

3.7.1 Data Collection

Collect, tabulate, plot, and interpret survey monitoring data and provide the Government with tabulated and plotted data. Report status of demolition, excavation, bracing, and backfilling at time of data collection with each report.

3.7.2 Monitoring Frequency

Vibration monitoring measurement collection frequency may be modified as

directed and approved by the Government.

3.7.3 Data Submittal

Submit data from readings of monitoring points to the Government within 24 hours of reading. Communicate verbally with the Government immediately after visual observations or data collection if excessive movements or other anomalies are indicated.

3.7.4 Seismograph Summary Report

For seismograph data, submit a summary report with event summary of peak particle velocity and frequency. Submit a strip chart indicating time and magnitude of maximum single-component peak particle velocity measured during each 5-minute interval of monitoring period. List a summary of vibration producing activities for that week along with specific events causing anomalous readings.

3.7.5 Visual Observation of Ground and Structure Conditions

Make visual observations of ground conditions and building conditions in site vicinity and communicate immediately with the Government if signs of ground or building movements are observed.

3.7.6 Independent Measurements by Government

The Government may take independent instrumentation measurements. Cooperate with the Government during instrumentation monitoring by providing access to instrumentation locations in a timely manner and by providing and maintaining safe means of access to instrumentation locations for data collection. Data acquired by the Government will be made available to Contractor in a timely manner.

3.7.7 Independent Data Interpretation by Contractor

Contractor may make their own interpretations of monitoring data for their own purposes. Do not publish or disclose data or interpretations shall to other parties without advance written permission from the Government.

3.7.8 Data Collected from Replacement Instrument

For data collected from an instrument that has been installed to replace a damaged instrument, use formal initial reading as an initial reading for replacement instrument so that data are continuously plotted, without an offset at time of damage. Note time of damage and replacement on plot.

3.8 INTERPRETATION AND RESPONSE VALUES

3.8.1 Threshold Values

Make interpretations of data resulting from monitoring programs. Threshold and Limiting Values for Instruments:

Instrument	Threshold Value	Limiting Value
Seismographs:	1.0 in/sec over 40 Hz 0.75 in/sec at 30 to 40 Hz 0.50 in/sec at 20 to 30 Hz 0.25 in/sec under 20 Hz	2.0 in/sec over 40 Hz 1.5 in/sec at 30 to 40 Hz 1.0 in/sec at 20 to 30 Hz 0.5 in/sec under 20 Hz
Surface Monitoring Points:	0.50 inch	1.0 inch
Deformation Monitoring Points:	0.25 inch	0.50 inch
Utility Monitoring Points:	0.25 inch	0.50 inch
Excavation Support:	1.0 inch	2.0 inches

Values are subject to adjustment by the Government as indicated by prevailing conditions or project circumstances. Crack Gauge criteria will be established based upon existing conditions identified during preconstruction survey.

3.8.2 Reaching/Exceeding Threshold Value

If a Threshold Value is reached, Government and Contractor will meet to discuss remedial measures.

Increase instrument monitoring frequency as directed by the Government.

Install and monitor additional instruments as directed by the Government.

Implement remedial measures in event Threshold Value is reached, so Limiting Value is not reached.

Take necessary steps so Limiting Value is not exceeded. Government may direct Contractor to suspend activities in affected area with exception of those actions necessary to avoid exceeding Limiting Value.

3.9 TOLERANCES

3.9.1 Survey Measurements

Initial location of each instrumentation elements consisting of determining elevation and horizontal positions with respect to the Government approved benchmarks.

3.9.2 All Monitoring Points (SMPs, DMPs, UMPs and ESMPs)

Determine instrumentation elevations to accuracy of plus/minus 0.01 foot.

3.9.3 Horizontal Position of SMPs

Determine horizontal position of Surface Monitoring Points to accuracy of plus/minus 0.1 foot.

3.9.4 Horizontal Position of DMPs and ESMPs

Determine horizontal position of deformation monitoring points and

excavation support monitoring points to accuracy of plus/minus 0.01 foot.

If actual field conditions prohibit installation at location and specified elevations, obtain prior acceptance from the Government for new instrument location and elevations.

3.10 DISPOSING OF INSTRUMENTS

3.10.1 Monitoring Points and Crack Gauges

Remove monitoring points and crack gauges during cleanup and restoration work, unless directed otherwise by the Government.

3.10.2 Utility Monitoring Points

Abandon and remove protective housings and caps in accordance with required permits. Restore surfaces affected by installation of instruments to their original condition prior to completion of work.

Where casings are pulled, fill holes with sand. Where left in place, fill casings with non-shrink cement grout and cut off a minimum of 3 feet below finished ground level or 1 foot below foundation level so as not to interfere with finished structures or pipelines.

Following backfilling, remove precast boxes or vaults and reconstruct pavement in paved areas. Restore surface to conditions existing prior to instrument installation.

3.10.3 Seismographs

Remove units following completion of demolition, installation of excavation support and excavation.

-- End of Section --

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, equipment, materials and incidentals required to complete the work described herein and shown on the Contract Drawings.

This work consists of clearing and grubbing the site as required for construction activities, and removing and disposing of all trees, bushes, shrubs, stumps, roots, buried logs, grass, and all other vegetation within designated site work areas, except for objects that the Government designates to remain. The demolition and removal of structures other than vegetation is covered under SECTION 02 41 00 - DEMOLITION.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYSDOT)

NYSDOT 201	Clearing and Grubbing

NEW YORK STATE CODE, RULES AND REGULATIONS

6 NYCRR Part 360 Series	Solid Waste Management Regulations
6 NYCRR Part 370 Series	Hazardous Waste Management Regulations

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

All clearing and grubbing shall be performed in accordance with the requirements of NYSDOT 201 unless otherwise indicated herein.

The Contractor shall perform clearing and grubbing in multiple stages based on the construction progress to minimize erosion.

3.1 PROTECTION

3.1.1 Roads and Walks

Keep roads and accessway free of dirt and debris at all times.

3.1.2 Trees, Shrubs, and Existing Site Features

The Contractor shall not destroy or damage trees and shrubs outside the limits of construction without the authorization of the Government.

Protect existing site features in accordance with SECTION 01 57 19 - ENVIRONMENTAL PROTECTION.

3.1.3 Utilities

Protect existing utilities that are indicated to remain from damage. Notify the Government immediately of damage to or an encounter with an unknown existing utility line. When utilities that are to be removed are encountered within the area of operations, notify the Government field representative in ample time to minimize interruption of the service.

3.2 CLEARING

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish in the areas to be cleared. Trees, stumps, roots, brush, and other vegetation to be cleared shall be cut 6 inches above ground surface. Trees and vegetation designated to remain shall be protected from damage incident to clearing, grubbing, demolition, and construction operations.

Trees shall be felled in such a manner as to avoid damage to trees left standing, and with due regard for the safety of employees and others.

During site clearing, the Contractor may save clean tree trunks 12 inches or greater in diameter and cut into lengths of no less than 8 feet long, for use in the wetland restoration areas. The salvaged trees shall be placed flat in the restored wetland areas to help promote habitat restoration, in accordance with SECTION 32 72 00 - STREAM RESTORATION.

3.3 GRUBBING

Grubbing shall consist of the removal and disposal of stumps, roots, buried logs, and all tap roots, lateral roots, or other projections over 1.5 inches in diameter within the area of excavation. Material to be grubbed shall not be removed below the depth of excavation indicated on the Contract Drawings, or as otherwise directed by the Government.

Grubbing shall be done in phases incidental to the remedial excavation phase to reduce the potential for soil erosion.

The Contractor shall not destroy or damage trees and shrubs outside the limits of construction without the authorization of the Government.

3.4 DISPOSAL OF MATERIALS

3.4.1 Cleared Material

Cleared material shall be considered uncontaminated and disposed of at an approved landfill facility pursuant to 6 NYCRR Part 360 Series.

3.4.2 Grubbed Material

Grubbed material within the limits of excavation shall be assumed to be contaminated and shall be chipped to a maximum size of 2 inches by 2 inches. The chippings shall be consolidated and containerized with other contaminated material, or otherwise handled and sampled as required by the receiving disposal facility.

Grubbed material outside the limits of excavation shall be considered uncontaminated and disposed of at an approved landfill facility.

-- End of Section --

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SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.1 SCOPE OF WORK

Dewatering shall be conducted for all upland and sediment excavations and site restoration below the groundwater table. Groundwater table is generally in bedrock for the upland areas and above the bedrock in the creek channel. At a minimum, dewatering is expected for excavation and restoration to be conducted below surface water elevation in both the upland and creek channel even with surface water diversion measures in place. Dewatering will be required after storm events.

Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of water and permit excavation and construction to proceed in-the-dry in accordance with the requirements herein and elsewhere.

Design dewatering system, including comprehensive engineering analysis by the Contractor's Design Engineer.

All dewatering operations shall be designed and implemented prior to active excavation.

Continuously monitor and maintain dewatering operations to ensure required groundwater lowering, erosion control, stability of excavations, excavation support, and constructed slopes, prevention of flooding in excavation, and prevention of damage to subgrades and permanent structures.

Prevent surface water from entering excavations by grading, dikes, or other means.

Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.

Remove dewatering system when no longer required for construction.

Preserve natural undisturbed condition of subgrade soils in areas of proposed excavations.

Prior to excavation, lower groundwater to at least 2 feet below lowest excavation subgrade elevation. Additional groundwater lowering may be necessary beyond the 2-foot requirement, depending on construction methods, equipment used, and prevailing groundwater and soil conditions. Lower groundwater as necessary to complete construction in accordance with Contract Documents.

Design deep wells, well points and sumps, and other groundwater control system components to prevent loss of fines from surrounding soils. Use sand filters with dewatering installations, unless screens are properly sized to prevent passage of fines from surrounding soils.

Maintain standby pumping systems and sources of standby power at various

sites.

Design dewatering system to prevent damage to adjacent properties, buildings, structures, utilities, and facilities from dewatering operations. Be responsible for damage to properties, buildings or structures, sewers and other utility installations, pavements, and work that may result from dewatering or surface water control operations.

All dewatering shall be done in accordance with Local, State, and Federal requirements. Water generated from dewatering operation shall be treated in accordance with the State Pollutant Discharge Elimination System (SPDES) permit requirements.

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. Related work includes:

a. SECTION 01 32 33 - PROJECT PHOTOGRAPHS

b. SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL

c. SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER

d. SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING

e. SECTION 31 00 00 - EARTHWORK

f. SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION

g. SECTION 32 72 00 - STREAM RESTORATION

h. SECTION 32 92 19 - LOAMING AND SEEDING

i. SECTION 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING

j. SECTION 33 51 39 - MONITORING WELLS

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Dewatering and Drainage System Plan; ; FIO

Submit written dewatering and drainage system plan, prepared by a qualified Professional Engineer licensed in the State of New York, that includes:

a. Description of proposed dewatering system and installation methods to be used for system elements and observation wells.

b. Description of equipment, drilling methods, holes sizes, filter sand placement techniques, sealing materials, development techniques, number and location of dewatering points and

observations wells.

c. Dewatering system design calculations demonstrating that the proposed system meets all requirements herein and elsewhere.

d. Sequence of well and well-point placement coordinated with support of excavation system installation and control procedures to be adopted, if dewatering problems arise.

e. Identification of anticipated area influenced by dewatering system and address impacts to adjacent existing and proposed structures. Include detailed plans for pre-construction surveys of existing structures in vicinity of dewatering system, settlement monitoring of existing structures during construction, and provisions to address settlement of existing structures resulting from dewatering activities.

f. Coordinate dewatering and drainage submittals with excavation and support of excavation submittals.

g. Do not proceed with any excavation or dewatering activities until the dewatering submittals have been accepted by the Government.

Qualification Data; G.

Submit qualifications for installer, land surveyor, and Professional Engineer.

SD-02 Shop Drawings

Shop Drawings; G

Submit shop drawings for dewatering system, prepared by a qualified Professional Engineer licensed in the State of New York that includes the following:

a. Include plans, elevations, sections, and details.

b. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.

c. Include pump capacity and anticipated discharge rate.

d. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.

e. Show areas and depths of excavation to be dewatered and adjacent structures or facilities within the anticipated area influence.

Record Drawings; FIO

Identify locations and depths of capped wells and well points and other abandoned-in-place dewatering equipment.

SD-06 Test Reports

Quality Control Reports; G

The Contractor shall submit field quality-control reports during construction.

1.3 QUALITY ASSURANCE

Comply with authorities having jurisdiction for the following:

a. Drilling and abandoning of wells used for dewatering systems.

b. Water discharge and disposal from dewatering operations.

c. Obtain permit from NYSDEC under the SPDES for storm water discharge from construction sites.

1.3.1 Installer Qualifications

An experienced installer that has specialized in installation of dewatering systems and dewatering work and having a minimum of 5 years' experience.

1.3.2 Professional Engineer Qualifications

Professional Engineer licensed in the State of New York; having a minimum of 5 years' experience in design and construction of dewatering and drainage systems; and having completed not less than 5 successful dewatering and drainage projects of equal type, size, and complexity to that required for the work.

1.4 DEFINITONS

1.4.1 In-the-Dry

An excavation subgrade where all of the following are met:

a. Groundwater has been lowered to at least 2 feet below lowest excavation level.

b. Subgrade is stable with no ponded water, mud or muck.

c. Subgrade is able to support construction equipment without rutting or disturbance.

d. Subgrade is suitable for placement and compaction of fill material, pipe, or concrete foundations.

1.4.2 Contractor's Engineered Design

Design prepared on behalf of Contractor by a Professional Engineer licensed in the State of New York.

1.4.3 Professional Engineer

Professional Engineer licensed in the State of New York meeting project qualifications and who is hired by the Contractor.

1.4.4 Pre-installation Conference

Conduct conference at the project site that should include, but not

limited to, the following topics:

a. Verify availability of Installer's personnel, equipment, and facilities needed to perform the work, make progress and avoid delays.

b. Review condition of site to be dewatered including coordination with temporary erosion-control measures, excavation support systems, and temporary controls and protections.

c. Review geotechnical data.

d. Review proposed site clearing and excavations.

e. Review existing utilities and subsurface conditions.

f. Review observation and monitoring of dewatering system.

g. Review pretreatment requirements prior to discharge, discharge location(s), and flow rate requirements.

1.5 FIELD CONDITIONS

1.5.1 Project Site Information

Geotechnical data has been prepared for this Project and is available for information only. The Government is not responsible for interpretations or conclusions drawn from this data. The geotechnical data is included in SECTION 01 11 00 - SUMMARY OF WORK.

Make additional test borings and conduct other exploratory operations necessary for dewatering according to the performance requirements.

Groundwater levels may vary during the work and should not be assumed to be accurately represented by groundwater level readings reported in the geotechnical data.

1.5.2 Survey Work

Survey work shall be conducted in accordance with SECTION 01 71 23 - SURVEYING.

PART 2 PRODUCTS

2.1 OBSERVATIONS WELLS

Observation wells shall be installed in accordance with SECTION 33 51 39 - MONITORING WELLS.

2.2 EQUIPMMENT

Piping, pumping, and other equipment and materials to provide control of surface water and groundwater in excavations.

2.3 GROUT

Mixture of Portland cement and bentonite clay or sand suitable for sealing abandoned wells and piping.

PART 3 EXECUTION

3.1 GENERAL

Control surface water and groundwater such that:

a. Upland excavation to final grade is made in-the-dry.

b. Natural undisturbed conditions of subgrade soils are maintained.

c. Softening, instability, or disturbance due to presence or seepage of water does not occur.

d. Construction and backfilling in upland excavations proceeds in-the-dry.

e. Floatation of completed portions of work shall be prohibited.

Methods of groundwater control may include but are not limited to perimeter trenches and sump pumping, perimeter groundwater cutoff, well points, ejectors, deep wells, or any combination.

Where groundwater levels are above proposed bottom of excavation level, provide a pumped dewatering system for pre-drainage of soils prior to excavation and for maintaining lowered groundwater level until construction has been completed such that structure, pipeline, or fill will not be floated or otherwise damaged..

Vary type of system, spacing of dewatering units, and other details of the work depending on soil and water conditions at each location.

Do work in a manner to protect adjacent structures and utilities without causing loss of ground or disturbance to pipe bearing soils or soils supporting overlying or adjacent structures.

Install, monitor, and report data from observation wells. Evaluate collected data relative to groundwater control system performance and modify systems necessary to dewater site.

Locate groundwater control system components where they will not interfere with construction activities or interfere with installation and monitoring of geotechnical instrumentation including observation wells. Do not make excavations for sumps or drainage ditches within or below 1H:1V slopes extending downward and out from edges of existing or proposed foundation elements or from downward vertical footprint of pipe without approval by the Government.

3.2 PREPARATION

Protect existing structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

Prevent surface water or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.

Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

Install dewatering system to ensure minimum interference with roads,

streets, walks, and other adjacent occupied and used facilities.

Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Government and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways, if required by authorities having jurisdiction.

Provide temporary grading to facilitate dewatering and control of surface water.

Protect and maintain temporary erosion and sedimentation controls, which are specified in SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL during dewatering operations.

3.3 INSTALLATION

Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface water controls.

Space well points or wells at intervals required to provide sufficient dewatering.

Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

Place dewatering system into operation to lower water to specified levels before excavating below groundwater level.

Provide sumps, sedimentation tanks, filtration system, and other flow-control devices as required by authorities having jurisdiction.

Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails

3.4 SURFACE WATER CONTROL

Construct surface water control measures, including dikes, ditches, sumps and other methods to prevent flow of surface water into excavations and to allow construction to proceed without delay.

Grade excavation to divert surface water and groundwater within excavation areas into sumps and dewatering wells.

3.5 EXCAVATION DEWATERING

Provide and maintain equipment and facilities to promptly remove and properly dispose of water entering excavations. Maintain excavations in-the-dry.

Excavation dewatering shall maintain the subgrade in a natural undisturbed condition and be in operation until the fill, structure or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.

Do not place pipe, masonry, and concrete in water or submerge within 24

hours after being installed. Prevent water from flowing over new masonry or concrete within four days after placement.

Prevent water from rising to cause unbalanced pressure on structures until concrete or mortar has set at least 24 hours. Prevent pipe flotation by promptly placing backfill.

Conduct dewatering to preserve natural undisturbed condition of subgrade soils at bottom of excavation.

If trench subgrade or excavation bottom becomes disturbed due to inadequate dewatering or drainage, excavate below normal grade as directed and refill with structural fill or other material as approved by the Government.

It is expected that initial dewatering plan may be modified to suit variable soil and water conditions encountered. Dewater and excavate in a manner without causing loss of ground or disturbance to pipe bearing soils, soil that supports overlying or adjacent structures or instability of excavation.

If methods do not properly dewater excavation, modify dewatering system to achieve required dewatering. Do not place pipe or structure until readings obtained from observation wells indicate that groundwater has been lowered to specified minimum below bottom of final excavation.

Surround dewatering units with suitable filter sand with no fines being removed by pumping. Pump continuously from dewatering system until pipe or structure is adequately backfilled. Provide stand-by pumps.

Collect water entering excavations from precipitation or surface runoff in shallow ditches around excavation perimeter, drained to a sump, and pump from excavation to maintain a bottom free from standing water.

Dispose of drainage to an approved area as specified in SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER. Do not use existing or new sanitary sewers to dispose of drainage.

3.6 WELL-POINT SYSTEMS

Where necessary, install a vacuum well-point system around excavation for dewatering purposes. Surround each well-point and riser pipe by a sand filter. Use sand of gradation that after initial development of well-points, quantity and size of soil particles discharged shall be negligible. Provide well-point systems capable of operating continuously under highest possible vacuum. Include sufficient valves and gauges to accurately monitor and control the system. Develop and redevelop well-points to provide reliable performance throughout the duration of the work.

Install well-point systems in the Government's presence according with approved submittal.

3.7 DEEP WELLS

Where necessary, install a deep well system around an excavation to dewater it. Surround each well with a sand filter having adequate gradation so quantity and size of soil particles discharged are negligible. Install sufficient number of wells to lower groundwater level

allowing excavation to proceed in-the-dry. Develop and redevelop wells as necessary to provide reliable performance throughout the duration of the work.

Install deep wells in the Government's presence according with approved submittal.

3.8 REMOVAL OF SYSTEMS

At the completion of the excavation and backfilling work, and when approved by the Government, all pipe, deep wells, wellpoints, pumps, generators, observation wells, other equipment and accessories used for the groundwater and surface water control systems shall be removed from the area or site. All materials and equipment shall become the property of the Contractor. All areas disturbed by the installation and removal of groundwater control systems and observation wells shall be restored to their original condition.

Where casings are pulled, holes shall be filled with sand. Where left in place, casings should be filled with cement grout and cut off a minimum of 3 feet below finished ground level or 1 foot below foundation level so as not to interfere with finished structures or pipelines.

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SECTION 31 50 00

EXCAVATION SUPPORT AND PROTECTION

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to install excavation support and protection, as indicated on the Contract Drawings and specified herein.

Dewatering during excavation and backfill; and post-excavation confirmation sampling, surface water collection, and temporary water treatment as defined in SECTION 31 23 19 - DEWATERING.

Backfill, compaction, and grading is specified in SECTION 31 00 00 - EARTHWORK.

Upland excavation, sediment excavation, post-excavation confirmatory sampling, temporary storage of contaminated soil and sediment, and sediment treatment is specified in SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL.

A pre-construction survey, vibration monitoring and geotechnical instrumentation and shall be completed as specified in SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING.

No site personnel shall be allowed to enter the excavated area unless the excavation is performed in accordance with Occupational Safety and Health Administration (OSHA) regulations as specified in 29 CFR 1926.652 and in accordance with the approved accident prevention plan as specified in SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.

The Contractor shall provide the necessary equipment and piping to dewater and divert water away from excavation areas as specified in SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER.

The Contractor shall restore areas as shown on the Contract Drawings and in accordance with approved site restoration plan.

The Contractor shall be responsible for compliance with all Federal, State, and local laws and regulations.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	Structural Welding Code - Steel

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Quality Control Measures; FIO

Submit quality control measures to ensure that performance of excavation support system complies with project requirements.

Welder Qualifications; FIO

Submit welder qualifications and weld procedures in accordance with AWS D1.1.

Contingency Plan for Reaching Threshold Values, G

Submit a plan of action to be implemented in the event any deformation threshold value is reached as specified in SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING. Identify positive measures in action plan to further limit wall movement, including but not limited to trenching for struts and wales, placement of granular earth berms against the wall, installation of additional struts, or combinations thereof.

Include description and details of mitigating measures, work schedule, location and availability of materials, and structural details for connections to wall and support elements.

Be prepared to work 24 hours per day to implement such measures.

SD-02 Show Drawings

Excavation Support and Protection Shop Drawings; G

For excavation support and protection system, prepared by or under the supervision of a qualified Professional Engineer, meeting the minimum performance requirements in Part 2 of this Section.

Include overall system plan, indicating clearances, dimensions, material properties, member sizes, locations, spacing and member penetrations depths, and locations of various types of lateral supports.

Show details, layout, arrangement, equipment requirements, and method of construction of proposed excavation support system.

Indicate existing and proposed utilities, structures or other obstructions.

Show wall elevations and locations of bracing.

Show overall installation sequence and removal of bracing. Indicate work levels to be performed before bracing is installed or removed.

Method of preloading bracing, if required, including preload for each member, and method of locking-off the preload. Submit detailed drawings of connections, jacking supports, and method of shimming.

Include procedures for resolving difficulties arising from misalignment of members exposed during excavation and criteria for implementing those procedures.

SD-05 Design Data

Design Calculations; G

For excavation support and protection system. Include analysis data prepared, signed, and sealed by Professional Engineer responsible for their preparation.

Include loads on excavation support system for all stages of excavation, bracing removal, and concrete placement, including material and equipment loads on adjacent ground during construction.

Include design of wall and bracing members including details for all construction stages.

Include theoretical deflections of excavation support system and deformation of structures, pipelines, and other improvements located within areas influencing excavations.

SD-06 Test Reports

Inspection Documentation; G

Inspection documentation submittals should include:

a. On-site inspections of excavation support system as the systems are constructed.

b. Review of quality control measures and performance data.

c. Certification that excavation support system is constructed per applicable design following completion of each support system and following Contractor modifications during construction.

1.4 QUALITY ASSURANCE

1.4.1 Contractor Qualifications

Minimum 5 years' experience compatible to indicated Work, and who employs labor and supervisory personnel similarly experienced in Work of this Section.

1.4.2 Contractor's Design Engineer

Registered Professional Engineer in the State of New York with at least 5 years' professional experience in design and construction of support of excavation systems and having completed a minimum of 5 successful excavation support projects of equal type, size, and complexity to

specified work.

1.4.3 Existing Conditions

Using photographs and video recordings, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by inadequate performance of excavation support and protection systems. Submit before Work begins.

1.4.4 Regulatory Requirements

Comply with authorities having jurisdiction, including OSHA requirements.

1.4.5 Record Drawings

Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

1.4.6 Maintaining Copies of Design at Job Site

Maintain at least one copy of design at job site during excavation that includes a plan indicating sizes, types, and configurations of the materials to be used in protective system. Identify registered Contractor's Design Engineer who stamped the design.

1.5 SUMMARY

1.5.1 General

Section includes temporary excavation, trench support and protection systems.

1.6 RELATED REQUIREMENTS

a. SECTION 01 32 26 - VIDEO MONITORING AND DOCUMENTATION

b. SECTION 01 32 33 - PROJECT PHOTOGRAPHS

c. SECTION 01 71 23 - SURVEYING

d. SECTION 02 61 13 - EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL

e. SECTION 01 45 16 - CONTRACTOR QUALITY CONTROL

f. SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING

g. SECTION 31 00 00 - EARTHWORK

h. SECTION 31 23 19 - DEWATERING

i. SECTION 33 51 39 - MONITORING WELLS

j. SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES

1.7 FIELD CONDITIONS

1.7.1 Interruption of Existing Utilities

Do not interrupt any utility serving facilities occupied by the Government or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

a. Contact utility companies and other responsible authorities to locate and mark underground utilities.

b. Notify the Government no fewer than two days in advance of proposed interruption of utility.

c. Do not proceed with interruption of utility without the Government's written permission.

1.7.2 Project-Site Information

Geotechnical data is included in SECTION 01 11 00 - SUMMARY OF WORK. The Government is not responsible for interpretations or conclusions drawn from the data.

Make additional test borings and conduct other exploratory operations necessary for excavation support and protection according to the performance requirements.

1.7.3 Survey Work

Survey work shall be conducted in accordance with SECTION 01 71 23 - SURVEYING.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

Provide, design, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting earth and hydrostatic pressures and superimposed and construction loads within specified movement criteria (SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING).

Design review and field monitoring activities by the Government does not relieve Contractor of its work responsibilities.

2.1.1 Contractor Design

Design excavation support and protection system, including comprehensive engineering analysis by a qualified Professional Engineer. The Contractor shall collect additional data necessary for design, as the engineer requires.

2.1.2 Excavations Near Adjacent Structures

Do not permit excavations below the level of the base of adjacent existing foundations or retaining walls, unless excavation design and bracing includes an analysis of stability of structure supported by foundation and if necessary, incorporates required bracing or underpinning of foundation.

2.1.3 Bracing

For support systems in which bracing is installed between opposite sides of the excavation, design excavation support of both sides to be nearly the same as feasible.

2.1.4 Resisting Point Loads

Where necessary to resist point loads, fill pipe piles used as soldier piles with concrete. Do not consider concrete strength in design of pipe pile for bending stress.

2.1.5 Groundwater Control

Design, install, operate, and maintain ground water control system to control ground water inflows, prevent piping or loss of ground, and maintain stability of the excavation. Refer to the requirements of SECTION 31 23 19 - DEWATERING.

2.2 MATERIALS

2.2.1 General

Provide materials that are either new or in serviceable condition.

2.2.2 Structural Steel

ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

2.2.3 Steel Pipe Used as Soldier Piling

ASTM A 252, Grade 45 or better.

2.2.4 Steel Sheet Piling

ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks. Steel sheet piling shall conform to conforming to ASTM A 572, Grade 50 or better. Corners shall be site-fabricated mechanical interlock.

2.2.5 Wood Lagging

Lumber, mixed hardwood, nominal rough thickness of 3 inches with minimum allowable flexural strength of 1,100 psi.

2.2.6 Cast-in-Place Concrete

ACI 301, with minimum compressive strength of 3,000 psi, unless a higher strength is required for application.

2.2.7 Reinforcing Bars

ASTM A 615/A 615M, Grade 60, deformed.

PART 3 EXECUTION

3.1 EXAMINATION

Verify that instrumentation required under SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING is installed and initialized prior to start of work required by this Section.

Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

3.2.1 Permitting

Obtain permits from local authority having jurisdiction prior to initiating excavation work.

3.2.2 Protection of Existing Structures and Utilities

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

Shore, support, and protect utilities encountered.

Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Government and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

3.2.3 Safety Measures around Excavation and Staging Areas

Install fencing, gates, lights, and signs around excavations and staging areas to provide for public safety.

3.2.4 Location of Excavation Support and Protection Systems

Locate excavation support and protection systems clear of permanent construction so that construction and finishing of other work is not impacted.

3.3 GENERAL

Furnish, install, and maintain such excavation support systems as may be required: by Federal, State and local safety requirements; to support the sides of excavations; to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction; and to protect adjacent structures from undermining or other damage. If the Government is of the opinion that at any point sufficient or proper supports have not been provided, the Government may require the Contractor to install additional supports be installed. Installation of excavation support systems shall be in accordance with the shop drawings and applicable permits.

Care shall be taken to prevent voids outside of the excavation support system, but if voids are formed, they shall be immediately filled and compacted. Where soil cannot be properly compacted to fill a void, lean concrete shall be used as backfill. Fill voids between excavation support system and earth with materials acceptable to the Government.

Excavation support shall be plumb and securely braced and tied in position and shall be adequate to withstand all pressures to which the structure or trench will be subjected. Any movement or bulging which may occur shall be corrected to provide the necessary clearances and dimensions. Construct the excavation support system, unless indicated otherwise, to the extent deemed desirable for the method of operation.

If unstable material is encountered during excavation, take immediate measures to contain it in place and prevent ground displacement. If settlement or deflections of supports indicate that the support system requires modification to prevent excessive movements, redesign and resubmit revised shop drawings and calculations to the Government without additional compensation. Maintain sufficient quantity of material on site for protection of work and for use in case of accident or emergency.

Contractor shall engage a Professional Engineer, licensed in the State of New York, to design the sheeting and bracing. The sheeting and bracing installed shall be in conformity with the design and certification of this shall be provided by the Professional Engineer. Contractor shall submit P.E. Certification Form contained in SECTION 01 33 00 - SUBMITTAL PROCEDURES to show compliance with this requirement.

Leave in place to be embedded in the backfill all excavation support not shown on the Drawings but which the Government may direct in writing to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities, or property, whether public or private. The Government may require that timber used for excavation support be cut off at any specified elevation.

All excavation support not left in place shall be carefully removed in such manner as not to endanger the construction or other structures, utilities, or property. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by compacting with tools especially adapted to that purpose, or otherwise as may be directed.

The right of the Government to require excavation support left in place shall not be construed as creating any obligation on his/her part to issue such orders and his/her failure to exercise his/her right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

Prevent surface water from entering excavations by grading, dikes, or other means. Install excavation support and protection systems to minimize horizontal and vertical movements without damaging existing buildings, structures, and site improvements adjacent to excavation. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

3.4 PORTABLE TRENCH BOXES

Use portable trench boxes or sliding trench shields only for worker protection.

Additional excavation, backfilling, and surface restoration required as result of trench box use shall be provided without additional compensation.

Design, construct, and maintain trench boxes or shields to meet acceptable engineering and industry standards.

Install shields in a manner to restrict lateral or other hazardous movement of the shield in the event of sudden lateral loads.

Maintain a written copy of trench box manufacturer's specifications, recommendations, and limitations at job site during excavation work.

3.5 SOLDIER PILES AND LAGGING

Install steel soldier piles before starting excavation. Install using impact hammer or vibratory hammer in predrilled holes.

3.5.1 Soldier Piles in Predrilled Holes

Provide casing or other methods of support to prevent caving of holes and loss of ground.

3.5.2 Backfill

Backfill with concrete from elevation of bottom excavation to pile tip elevation. Backfill remainder of predrilled hole with lean concrete or sand.

3.5.3 Predrill Hole Size

Predrilled hole of sufficient diameter allowing for proper alignment and concrete backfilling of pile.

3.5.4 Driving Shoes

Install driven piles with driving shoes where hard driving is anticipated. Advance driven soldier piles without aid of a water jet.

3.5.5 Installation Depth

Extend soldier piles below excavation grade level to depths shown on reviewed Shop Drawings. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

3.5.6 Wood Lagging

Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Install lagging so ground loss does not occur between adjacent or below lowest board. As excavation proceeds, do not maximum height of 4 feet for unlagged face of excavation.

Do not exceed unlagged face of 2 feet, if water seeps or flows from excavation face or excavation face becomes unstable.

As installation progresses, fill voids behind lagging with soil, and compact.

3.5.7 Wales

Install wales at locations indicated on Drawings and secure to soldier piles.

3.6 STEEL SHEET PILING

3.6.1 Inspection of Sheet Piles

Thoroughly clean and inspect sheet piles for defects and proper interlock dimensions prior to installation. Provide a tool for checking interlock dimensions.

3.6.2 Prior to Installation

Before starting excavation, drive one-piece sheet piling lengths in plumb position and tightly interlock vertical edges for its entire length to form a continuous barrier. Form a continuous diaphragm throughout length of each run of wall, bearing tightly against original ground.

Exercise care in driving so interlocking members can be extracted without damaging adjacent structures or utilities.

Use driving, cutting, and splicing methods conforming to approved Shop Drawings.

Use templates or other temporary alignment facilities to maintain piling line.

3.6.3 Templates and Guide Frames

Accurately place piling, using templates and guide frames unless otherwise recommended in writing by sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 5 feet. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

3.6.4 Installation

Install each sheet pile having sufficient clearance in interlocks to slide under its own weight into interlock of previously placed sheet pile.
Do not excavate in advance of steel sheet piling installation. Payment for sheeting to be left in place shall be included in the Base Bid.

3.6.5 Obstructions

Where obstructions are anticipated, pre-excavate or pre-drill along sheet pile wall alignment without additional compensation. Do not extend pre-excavation and pre-drilling below lowest excavation level or into bearing soils for existing or future structures.

Remove obstructions encountered before the specified embedment for piles.

Where obstructions cannot be removed, re-evaluate sheet pile system by Contractor's Design Engineer show reduced embedment and additional toe stability measures to be implemented for sheet pile wall realignment. Submittal proposed design measures to the Government for review.

3.6.6 Damaged or Faulty Piles

Withdraw damaged or faulty aligned pilings with provide new piling, driven properly in its place without additional compensation.

3.6.7 Cutting Top of Piles

Cut tops of sheet piling to uniform elevation at top of excavation.

3.7 INTERNAL BRACING

3.7.1 General

Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary, to move brace, install new bracing before removing original brace.

Do not place bracing where it will be cast into or included in permanent concrete work, unless otherwise approved by the Government.

Install internal bracing if required to prevent spreading or distortion of braced frames.

Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.7.2 Internal Bracing Design

Provide internal bracing to carry maximum design load without distortion or buckling.

Include web stiffeners, plates, or angles required to prevent rotation, crippling, or buckling of connections and points of bearing between structural steel members. Allow for eccentricities caused by field fabrication and assembly

3.7.3 Installation

Install and maintain bracing support members in tight contact with each other and with the surface being supported. Do not use wood shims.

Use procedures that produce uniform loading of bracing member without eccentricities, overstressing, or distortion of system members.

3.7.4 Coordination of Work

Coordinate excavation work with installation of bracing. Extend excavation no more than 2 feet below any brace level prior to installation of the bracing.

3.8 FIELD QUALITY CONTROL

3.8.1 Survey-Work Benchmarks

Resurvey benchmarks and monitor installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open in accordance with SECTION 31 09 00 - GEOTECHNICAL INSTRUMENTATION AND MONITORING.

Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.

3.8.2 Damages or Faulty Performance

Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

3.9 REMOVAL

3.9.1 General

Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.

Begin removal at excavation bottom and progress upward. Slowly release members noting indication of possible failure of remaining members or possible cave-in of excavation sides.

Progress backfilling together with removal of support systems from excavations.

Remove all portions of excavation support, unless otherwise indicated by approved Shop Drawings.

Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.

Fill voids immediately with lean concrete or well-graded cohesionless sand or as directed by the Government.

3.9.2 Damages and Repairs

Repair or replace, as approved by Government, adjacent work damaged or displaced by removing excavation support and protection systems.

3.9.3 Support Members Installed Within Zone of Influence

Do not remove vertical support members that were installed within zone of influence of new or existing structures. The zone of influence is defined as the zone extending down and away from the outer edge of the structure at a 1 horizontal to 1 vertical slope. Cut off support members installed within this zone at 5 feet below finished grade and abandon in place.

3.9.4 Permanent Structures

Do not remove internal bracing or transfer loads to permanent structure without prior acceptance of the Government.

3.9.5 Untreated Wood

Do not leave untreated wood as part of abandoned portion of the work.

3.9.6 Removal from Site

Immediately remove excavation support system material from site.

-- End of Section --

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SECTION 32 12 16

ASPHALT PAVING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

a. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY

a. Section Includes:

1. Asphalt materials.
2. Aggregate materials.
3. Aggregate subbase.
4. Asphalt paving base course, binder course, and wearing course.

1.3 SUBMITTALS

Product Data; G

1. Submit product information for asphalt and aggregate materials.

2. Submit mix design with laboratory test results supporting design.

1.4 QUALITY ASSURANCE

a. Mixing Plant: Conform to requirements of the New York State Department of Transportation (NYSDOT), Standard Specifications.

1.5 QUALIFICATIONS

a. Installer: Company specializing in performing work of this section with minimum five years documented experience.

1.6 AMBIENT CONDITIONS

a. Comply with ambient conditions control facilities for product storage and installation.

b. Do not place asphalt mixture between November 1 and March 1.

c. Do not place asphalt mixture when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

d. Place asphalt mixture when temperature is not more than 15 degrees F less than initial mixing temperature.SUBMITTALS

PART 2 PRODUCTS

2.1 ASPHALT PAVING

a. Asphalt Materials:

1. Paving: Design for movement of trucks up to 60,000 lbs.

2. Primer: In accordance with State of New York Department of Transportation standards.

3. Tack Coat: ASTM D977; diluted emulsified asphalt, or ASTM D2397, diluted cationic emulsified asphalt, slow setting type.

4. Reclaimed Asphalt Pavement (RAP): Processed material obtained by milling or full depth removal of existing asphalt paving.

b. Aggregate Materials:

1. Fine and Coarse Aggregate: in accordance with New York State Department of Transportation standards.

c. Subbase Materials:

1. In accordance with NYSDOT Standard Specifications, Section 304-Subbase Course, Gradation Type 4.

2.2 MIXES

a. Use dry material to avoid foaming. Mix uniformly.

b. Asphalt Paving Mixtures: Designed in accordance with New York State Department of Transportation standards.

1. Base Course: 37.5 F9 Base Course HMA, 60 Series Compaction.

2. Binder Course: 19 F9 Binder Course HMA, 60 Series Compaction.

3. Wearing Course: 12.5 F2 Top Course HMA, 60 Series Compaction.

2.3 ACCESSORIES

a. Geotextile Fabric: AASHTO M288; non-woven, polypropylene.

b. Sealant: ASTM D6690, Type IV; hot applied type.

2.4 SOURCE QUALITY CONTROL

a. Submit proposed mix design of each class of mix for review prior to beginning of Work.

b. Test samples in accordance with New York State Department of Transportation Standards.

PART 3 EXECUTION

3.1 EXAMINATION

a. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.

b. Verify compacted subbase is dry and ready to support paving and imposed loads.

c. Verify gradients and elevations of base are correct.

d. Verify valve boxes are installed in correct position and elevation.

e. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

a. Prepare subbase in accordance with New York State Department of Transportation Standards.

3.3 DEMOLITION

a. Saw cut and notch existing paving as indicted on Drawings.

b. Clean existing paving to remove foreign material, excess joint sealant and crack filler from paving surface.

c. Repair surface defects in existing paving to provide uniform surface to receive new paving.

3.4 INSTALLATION

a. Subbase:

1. Prepare subbase in accordance with New York State Department of Transportation Standards

b. Primer:

1. Apply primer in accordance with New York State Department of Transportation Standards

2. Use clean sand to blot excess primer.

c. Tack Coat:

1. Apply tack coat in accordance with New York State Department of Transportation Standards

2. Apply tack coat to contact surfaces of curbs and concrete pads.

3. Coat surfaces of valve boxes with oil to prevent bond with asphalt paving. Do not tack coat these surfaces.

d. Double Course Asphalt Paving:

1. Place asphalt binder course within 24 hours of applying primer or tack coat.

2. Place binder course to thickness indicated on Contract Drawings.

3. Place wearing course within 24 hours of placing and compacting binder course. When binder course is placed more than 24 hours before placing wearing course, clean surface and apply tack coat before placing wearing course.

4. Place wearing course to thickness indicated on Contract Drawings.

5. Compact each course by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.

6. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.5 TOLERANCES

a. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

b. Scheduled Compacted Thickness: Within 1/4 inch.

c. Variation from Indicated Elevation: Within 1/2 inch.

3.6 FIELD QUALITY CONTROL

a. Take samples and perform tests in accordance with New York State Department of Transportation Standards

b. Asphalt Paving Mix Temperature: Measure temperature at time of placement.

c. Asphalt Paving Thickness: ASTM D3549; test one core sample from every 1000 square yards compacted paving.

d. Asphalt Paving Density: ASTM D2950 nuclear method; test one location for every 1000 square yards compacted paving.

3.7 PROTECTION

a. Immediately after placement, protect paving from mechanical injury for 24 hours or until surface temperature is less than 140 degrees F.

-- End of Section --

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, equipment, materials, and incidentals necessary to remove/salvage and install fences and gates for construction and site restoration, as shown on the Contract Drawings and specified herein.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

ASTM INTERNATIONAL (ASTM)

ASTM ASTM A392	Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM C94	AStandard Specification for Ready Mixed Concrete
ASTM F626	Standard Specification for Fence Fittings
ASTM F883	Padlocks
AASTM F900	(Standard Specification for Industrial and Commercial Swing Gates
ASTM F1043	Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework
ASTM F1083	Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded, for Fence Structures
ASTM F1184	Standard Specification for Industrial and Commercial Horizontal Slide Gates

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-03 Product Data

Fencing; G

Manufacturer's product data shall be submitted for each type of fence to be used. These data shall demonstrate conformance to the

requirements listed in PART 2 - PRODUCTS in this specification.

SD-07 Certificates

Material Certificates; FIO

The Contractor shall submit to the Government a statement, signed by an official authorized to certify on behalf of the manufacturer, attesting that the fencing and related components meet the specified requirements.

PART 2 PRODUCTS

2.1 CHAIN-LINK FENCE

Chain-link fence shall meet the requirements of this specification and the Contract Drawings.

2.1.1 Fabric

New chain-link fence fabric shall conform to the requirements of ASTM A392 for Class 1 zinc-coated steel wire. Fabric shall have a minimum coating weight of 1.2 ounces of zinc per square foot of coated surface. Fabric shall be 9-gauge wire woven in 2-inch mesh. Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage. Fabric height shall be as shown on the Contract Drawings.

2.1.2 Posts

Line posts and terminal (corner, gate, and pull) posts shall be hot-dipped galvanized conforming to ASTM F1083. Line posts and terminal posts shall be NPS 2 inches and NPS 3 inches, respectively. Posts shall meet the strength and coating requirements of ASTM F1043 for Group IC posts, with Type A external coating. Line posts and terminal posts selected shall be of the same designation throughout the fence. Gate post shall be for the gate type specified subject to the requirements in ASTM F900 or ASTM F1184.

2.1.3 Braces and Top Rails

Braces and top rails shall be hot-dipped galvanized steel pipe, NPS 1.25 inches, conforming to ASTM F1043, Group IA.

Aluminum Coating: Type A.
Zinc Coating: Type Z, Class 3.

2.1.4 Barbed Wire

Steel Barbed Wire: ASTM A121, two-strand barbed wire, 0.099-inch diameter line wire with 0.080-inch- diameter, four-point round barbs spaced not more than 5 inches o.c.

2.1.5 Accessories

Fence accessories shall conform to the requirements of ASTM F626. Ferrous accessories shall be hot-dipped galvanized steel. Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment.

2.1.6 Gates

Gates shall be of the type, size, and swing shown on the Contract Drawings, and shall meet the requirements of ASTM F900 or ASTM F1184. Gate frames shall conform to the strength and coating requirements of either ASTM F1043 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) of 1.5 inches. Gate fabric shall be as specified for chain-link fence fabric. Gate leaves more than 8 feet wide shall have either intermediate members or diagonal truss rods to provide rigid construction, free from sag or twist. Gate leaves less than 8 feet wide shall have truss rods or intermediate braces. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding shall not be permitted. Gates shall be furnished with all latches, hinges, stops, keepers, rollers, and other hardware required for proper operation. Latches shall be arranged for padlocking, when so required, so that the padlock will be accessible from both sides of the gate regardless of the latching arrangement. Stops shall be provided for holding the gates in the open position.

2.2 CONCRETE

Concrete shall be mixed in accordance with ASTM C94. The concrete shall have a minimum compressive strength of 3,000 pounds per square inch (psi) at 28 days and shall have a maximum aggregate size of 3/4 inch. Grout shall consist of one part Portland cement to three parts clean, well graded sand and the minimum amount of water required to produce a workable mix.

2.3 PADLOCKS

Padlocks shall be keyed alike. Each lock shall be furnished with two keys and meet ASTM F883, Type P01, Grade 2, 1-3/4 inch.

2.4 GATE HARDWARE AND ACCESSORIES

Provide gate hardware and accessories that conforms to ASTM A392 and ASTM F626, and be as specified:

Provide malleable iron hinges to suit gate size, non-lift-off type, offset to permit 180-degree opening.

Provide latch that permits operation from either side of the gate, with a padlock eye provided as an integral part of the latch.

Provide stops and holders of malleable iron for vehicular gates. Provide stops that automatically engage the gate and hold it in the open position until manually released.

Provide double gates with a cane bolt and ground-set keeper, with latch or locking device and padlock eye designed as an integral part.

Provide manufacturer's standard heavy-duty track ball bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, and accessories as required for easy operation of manual sliding gates.

PART 3 EXECUTION

3.1 GENERAL

Fence shall be installed in accordance with the dimensions, lines, and grades shown on the Contract Drawings..

3.2 EXCAVATION

Post holes shall be cleared of loose material. Ground surface irregularities along the fence line shall be eliminated to the extent necessary to maintain a 2-inch clearance between the bottom of the fence and finished grade.

3.3 INSTALLATION

Line posts shall be spaced equidistant at intervals not exceeding 10 feet. Terminal posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts.

Posts shall be set plumb and in alignment. Chain-link fence posts shall be set in concrete to the depth shown on the Contract Drawings. Terminal posts set in concrete shall be set in holes not less than 12 inches in diameter. Line posts set in concrete shall be set in holes not less than 10 inches in diameter. Concrete and grout shall be thoroughly consolidated around each post, free of voids, and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Group II line posts may be mechanically driven for temporary fence construction only. Driven posts shall be set to a minimum depth of 3 feet and shall be protected with drive caps when being set.

3.3.1 Posts

Line posts shall be spaced equidistant at intervals not exceeding 10 feet. Terminal posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts.

Posts shall be set plumb and in alignment. Chain-link fence posts shall be set in concrete to the depth shown on the Contract Drawings. Terminal posts set in concrete shall be set in holes not less than 12 inches in diameter. Line posts set in concrete shall be set in holes not less than 10 inches in diameter. Concrete and grout shall be thoroughly consolidated around each post, free of voids, and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Group II line posts may be mechanically driven for temporary fence construction only. Driven posts shall be set to a minimum depth of 3 feet and shall be protected with drive caps when being set.

3.3.2 Rails

Top rails shall be supported at each post to form a continuous brace between terminal posts. Where required, sections of top rail shall be joined using sleeves or couplings that allow expansion and contraction of the rail.

3.3.3 Braces and Truss Rods

Braces and truss rods shall be installed as indicated and in conformance with the standard practice for the fence furnished. Horizontal braces and

diagonal truss rods shall be installed on fences over 6 feet in height. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences up to 6 feet tall if a top rail is installed.

3.3.4 Chain-Link Fabric

Salvaged or new chain-link fabric shall be installed on the side of the post indicated on the Contract Drawings. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 12-inch intervals. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fabric shall be fastened to line posts at approximately 15-inch intervals and fastened to all rails and tension wires at approximately 24-inch intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 2 inches, plus or minus 1/2 inch, above the ground.

3.3.5 Gates

Gates shall be installed at the locations shown on the Contract Drawings. Hinged gates shall be mounted to swing as indicated on the Contract Drawings. Latches, stops, and keepers shall be installed as required. Padlocks shall be attached to gates or gate posts with chains. Hinge pins and other hardware shall be secured to prevent removal.

-- End of Section --

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SECTION 32 72 00

STREAM RESTORATION

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to restore Eighteen Mile Creek, as indicated on the Contract Drawings and specified herein. The purpose of this section is to provide the Contractor with the minimum requirements and constraints for channel reconstruction.

Stream restoration includes procurement of on-site and imported fill material, channel and overbank shaping by excavating, placing, and compacting fill and backfill, construction of in-channel structures, transportation and disposal of excess materials; and placement of materials to conform to required lines, grades, and slopes.

No site personnel shall be allowed to enter the stream restoration area unless all associated work is performed in accordance with Occupational Safety and Health Administration (OSHA) regulations as specified in 29 CFR 1926.652 and in accordance with the approved accident prevention plan as specified in SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES. Excavation, backfill, placement of channel structures and other stream channel work contained in the drawings shall comply with requirements of OSHA excavation safety standards, 29 CFR Part 1926 Subpart P and State and local authorities having jurisdiction. Where conflict between OSHA, State and local regulations exists, apply most stringent requirements.

Stream restoration also includes temporary dewatering, surface water control and maintaining the work area in a dry condition for backfill and compaction. Contractor is responsible for control of all flows that enter the work area from the Eighteen Mile Creek upstream reaches as well as tributary storm drain and combined sewer overflows that may also enter the work area and the proper release of controlled flows into the Eighteen Mile Creek channel downstream of the work area. Dewatering and surface water control are specified in SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER and SECTION 31 23 19 - DEWATERING.

Contractor shall examine site and review available geotechnical report prior to submitting a proposal, taking into consideration project conditions that may affect the work. The Government does not assume responsibility for variations of subsurface conditions at locations other than places shown and at the time investigations were made. Contractor shall not initiate extra work without written notification to the Contracting Officer and receiving the Government's written approval in response.

Contractor shall complete a pre-construction survey in SECTION 01 71 23 - SURVEYING. The Contractor shall obtain the services of a New York-licensed Professional Surveyor to document the limits of work for the purposes of measurement and payment, and for preparation of as-built drawings in accordance with SECTION 01 71 23 - SURVEYING.

Dam removal is specified in SECTION 02 41 00 - DEMOLITION.

Fill materials to support plantings and upland restoration activities are specified in SECTION 32 92 19 - LOAMING AND SEEDING and SECTION 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING.

Wetland restoration is specified in SECTION 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING.

The Contractor shall restore areas as shown on the Contract Drawings.

The Contractor shall be responsible for compliance with all Federal, State, and local laws and regulations.

Other related requirements:

a. SECTION 01 32 33 - PROJECT PHOTOGRAPHS
b. SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL
c. SECTION 02 10 00 - SITE PREPARATION
d. SECTION 31 00 00 - EARTHWORK
e. SECTION 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING

1.2 REFERENCES

ASTM INTERNATIONAL (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3))
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Classification System).
ASTM D3740	Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.
ASTM D6913	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO Test T103	AASHTO Test T103 for ledge rock, procedure A
AASHTO Test T104	AASHTO Test T104 for ledge rock using

	sodium sulfate
AASHTO T85	Determination of specific gravity and absorption of coarse aggregate

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 306	Recommended Practice for Cold Weather Concreting

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC)

STREAM CORRIDOR MMANAGEMENT	A BASIC REFERNCE MANUAL 1986
POST-FLOOD EMERGENCY STREAM	POST-FLOOD EMERGENCY STREAM INTERVENTION TRAINING MANUAL 2014

NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYSDOT)

STANDARD SPECIFICATIONS	STANDARD SPECIFICATIONS (US CUSTOMARY UNITS) VOLUME 3 SECTION 600 CONSTRUCTION AND MATERIALS 2022

UNITED STATES ARMY CORPS OF ENGINEERS (USACE)

USACE ETL 1110-2-334	CONSTRUCTION WITH LARGE STONE 24 October 1990
USACE EM 1110-2-2302	CONSTRUCTION WITH LARGE STONE 24 October 1990
SACE EM 1110-2-1601	HYDRAULIC DESIGN OF FLOOD CONTROL CHANNELS 1 July 1991/30 June 1994

Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Water Control Plan; G

Submit a plan for managing Eighteen Mile Creek flows through the work area at all times. The Water Control Plan shall address both maintenance of safe and non-damaging management and maintain water quality during all times of the work.

Woody Material Management Plan; G

Submit a plan for the treatment, storage, and placement of woody material.

Site Restoration Plan; G

Submit a plan for completion of restoration activities following excavation of contaminated material and dam removal. Site Restoration Plan shall include sequencing for establishing design creek and mill race channel geometries, placement of soil lifts and riprap and boulder structures, placement of woody material and revegetation or wetlands, floodplain and uplands.

SD-03 Product Data

Material Data; G

Submit gradation and size data on streambed gravels, cobbles, granular filter bedding, riprap, and boulders to be delivered to the site.

Grout Data; G

Submit grout mix design to be used for work in accordance with this Section.

SD-11 Closeout Submittals

Streambed Installation Record Documents; G

Project record documents including the actual locations of streambed mix installation. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities. Identify and describe unexpected variations to bank treatments and channel structures.

1.4 QUALITY ASSURANCE

1.4.1 Control Testing for Off-site Borrow Materials

Quality control testing of all borrow materials shall be performed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

1.5 RELATED DOCUMENTS

Drawings and general provisions of the Contract apply to this Section.

1.6 DEFINITIONS

Natural Rock" is defined as on-site salvageable rock.

"Riprap" is defined as angular quarry stone obtained off-site and transported on-site.

"Boulders" are defined as large rock or angular quarry stone meeting the specifications contained herein.

"Granular Bedding Material" is defined as imported material meeting the specifications contained herein and intended to provide a foundation for riprap and boulders.

"Streambed Material" is defined as channel fill material to be placed within the limits of the channel as shown on the Contract Drawings and in accordance with the specifications herein. Streambed material is intended to provide a stable channel bed under reasonable flow conditions.

1.7 QUALITY CONTROL

Conduct pre-construction conference at Project site.

Review methods and procedures related to earthmoving, including, but not limited to, the following:

a. Personnel and equipment needed to make progress and avoid delays.

b. Coordination of Work with utility locator service.

c. Extent of work by hand or with air spade.

d. Field quality control.

1.8 FIELD CONDITIONS

Contractor shall be responsible for construction layout and reference staking necessary for proper control and satisfactory completion of structures, cutting, filling, grading, drainage, fencing, embankment improvements, curbing, and other appurtenances.

1.8.1 Construction Layout

Perform construction layout and staking by a Professional Surveyor registered in the State of New York where project occurs, experienced and skilled in construction layout and staking requirements.

1.8.2 Traffic

Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earthwork operations.

Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Government and authorities having jurisdiction.

Provide alternate routes around closed or obstructed traffic ways if required by the Government or authorities having jurisdiction.

1.8.3 Utility Locator Service

Notify utility locator service for area where Project is located before beginning earthwork operations.

1.8.4 Temporary Control Measures

Do not commence earthwork operations until temporary site fencing and erosion and sedimentation control measures specified in SECTION 02 10 00 - SITE PREPARATION and SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL are in place.

1.9 PROTECTION

1.9.1 Sheeting and Bracing (if required)

If sheeting and bracing is required, construct as specified in SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION.

1.9.2 Pumping and Drainage

At all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills or structures to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels. Contractor shall comply with SECTION 31 23 19 - DEWATERING and SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER.

Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils. Well or sump installations shall be constructed with proper sand filters to prevent drawing of finer grained soil from the surrounding ground.
Water entering the excavation or subgrade from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water. All water removed from the excavation must be considered as potentially contaminated and treatment shall be performed as required.

Take all additional precautions to prevent uplift of any structure during construction.

Drainage shall be controlled so that flow or seepage back into the excavated area will be prevented.

Flotation shall be prevented by maintaining a positive and continuous operation (24/7) of the dewatering system as necessary.

Remove the dewatering equipment after the system is no longer required.

Take all necessary precautions to preclude the accidental discharge of fuel, oil, etc. in order to prevent adverse effects on groundwater quality.

1.10 SOIL TESTING

Prior to the general placement of the fill and during such placement, the Government may select areas within the limits of the fill for testing the degree of compaction obtained as stated in this specification. The Contractor shall cooperate fully in obtaining the information desired.

1.11 WATER CONTROL

Contractor is fully responsible for the control of Eighteen Mile Creek flows at all times in accordance with SECTION 01 57 33 - DIVERSION AND CONTROL OF WATER. Control should be conducted in a manner that minimizes damage to completed work. Water control shall prevent the excessive downstream transportation of sediment generated at the work site.

1.12 STORAGE OF EQUIPMENT AND MATERIALS

At no time shall equipment or materials be stored in the stream channel or adjacent overbanks outside of working hours. Equipment and material shall be stored in a location that is free of flood hazard. Any equipment or materials lost due to Eighteen Mile Creek or tributary stormwater flows shall be replaced by the Contractor at the Contractor's expense. The

Government will not approve schedule extensions to the Contractor for time lost in recovering or replacing materials lost to stream or stormwater flows.

PART 2 PRODUCTS

2.1 STREAMBED MATERIAL

Channel Bed Material shall be a well-graded material comprised of clean gravels, sands that free of trash, snow, ice, frozen soil, and other objectionable material are in conformance with the NYSDOT Type 2 size designation as modified within the following limits:

Sieve Size	Percent Finer by Weight
1-1/2-in	100
1-in	80 to 90
3/4-in	75 to 80
1/2-in	50 to 75
No.4	30 to 50
No.10	15 to 30
No.40	0 to 15

Contractor shall perform any screening that may be required to meet these specifications, including to 1-1/2-inch maximum size

2.2 RIPRAP AND BOULDERS

Riprap and boulders for grade control structures or channel bank erosion protection shall be hard, durable, angular in shape, resistant to weathering and may be naturally occurring particles or fragments of natural stone. Riprap shall be well-graded mixtures of stones with D50 sizes as indicated on the Contract Drawings and gradation specified herein. Control of gradation shall be by visible inspection. However, in the event the Government suspects riprap delivered to site may not meet the size specified herein, Government shall pick two (2) random truckloads to be dumped and checked for gradation by measuring the nominal dimension of each piece of riprap in the dumped load. Mechanical equipment and labor needed to assist in checking gradation shall be provided by the Contractor.

Riprap gradation shall be as follows:

FHWA Class III Riprap	
% Finer by Weight	Nominal Dimension (inches

FHWA Class III Riprap	
D15	9
D50	12
D85	18
D100	24

Riprap bed thickness shall be minimum 24 inches or as shown on the Drawings.

At Government direction, Contractor may use boulders and other natural rock salvaged on site. The Government may inspect candidate natural rock and boulders to be reused on site. Natural rock and boulders that the Government determines are not suitable for reuse in stream structures will be retained on site and reused as non-structural channel and floodplain features. Natural rock and boulders deemed acceptable for reuse in stream structures will be stockpiled by the Contractor until needed in the work. Salvaged on-site boulders and natural rock to be reused on site shall meet size gradations as specified herein.

Boulders that are imported from off-site for use in stream structures shall conform to the following:

a. The specific gravity of the boulders and riprap shall be 2.65 or greater. The specific gravity shall be according to the bulk-saturated, surface-dry basis, AASHTO T85.

b. Neither breadth nor thickness of a single boulder shall be less than 2/3 of its length.

c. The color of the boulders shall be gray with gray/blue hues or other approved color and match the color of the grout. The color of boulders and riprap shall be the same.

d. Riprap shall have a percentage loss of not more than 10 percent after 5 cycles when tested in accordance with AASHTO Test T104 for ledge rock using sodium sulfate.

e. Riprap shall have a percentage loss of not more than 10 percent after 12 cycles of freezing and thawing when tested in accordance with AASHTO Test T103 for ledge rock, procedure A.

f. Each load of boulders shall conform from the smallest to the largest size specified. Boulder lengths for grouted boulder edge may vary from 36 inches to 60 inches, depending on the application. Boulder lengths for grouted boulder drop structures may vary from 30 inches to 48 inches, depending on the application. Rhyolite rock shall not be used for any grouted boulders.

g. In the event the Government suspects the size of boulders to be unacceptable, the Government shall pick 2 random truckloads to be dumped and checked for gradation. Mechanical equipment and labor needed to assist in checking gradation shall be provided by Contractor.

h. Riprap and boulders shall be free of calcite intrusions.

2.3 RIPRAP AND BOULDER GRANULAR BEDDING MATERIAL

Granular bedding material for riprap and boulders shall be similar to Structural Fill as follows:

Sieve Size	Percent Finer by Weight
4 inch	100
2 inch	90 to 100
1/2 inch	50 to 75
No.4	25 to 60
No. 10	20 to 55
No. 40	10 to 40
No. 200	0 to 10

a. Granular bedding designation and total thickness of bedding shall be as shown on the Drawings.

b. Granular bedding shall meet the same requirements for specific gravity, absorption, abrasion, sodium sulfate soundness, calcite intrusion, and freeze-thaw durability as required for riprap.

c. Broken concrete, asphalt pavement or sledge, shall not be acceptable for use as granular bedding. Rounded river rock is not acceptable for use as granular bedding unless specifically designated on the DRAWINGS or as approved and directed by the Government.

2.4 GROUT

Grout: Concrete for the grout shall be an approved batch meeting the following requirements: All concrete shall develop 4,000 psi compressive strength within 28 days; the cement shall be Type IIA or V; the stone aggregate shall have a maximum diameter of ½ inch; and the slump shall be within a range of 3 inches to 6 inches. Use of a stiffer mix or other measures as approved by the Contracting Officer for steeper slopes or for vertical joints. The water/cement ratio shall not exceed 0.48. Add 1.5 pounds per cubic yard of synthetic fiber reinforcement per manufacturer's instructions. Contractor shall submit a mix design in writing to the Government for approval prior to placement of any grout.

2.5 ADDITIONAL UPLAND AND STREAM RESTORATION FILL MATERIAL

Additional restoration fill materials for the creek corridor are specified in SECTIONS 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING and 32 92 19 - LOAMING AND SEEDING.

Large wood, slash and salvaged natural rock and boulder material shall also be placed in upland floodplain, wetland, and stream channel locations

as approved or directed by the Government.

2.6 SOIL LIFTS

Soil lifts, as shown on the Contract Drawings, shall be constructed of lifts consisting of soil encapsulated by a fabric attached coir block system with the following properties:

Unit weight:	4.2 lbs/ft
Block size	
Height	12 in
Thickness	5 in
Length	10 in
Fabric length	
Top	47 in
bottom	47 in
Tensile strength of fabric	
MD	1,740 lbs/ft
CD	1,740 lbs/ft
Fabric length at female end:	6 in

a. Wooden wedges shall be cut diagonally with a large head and tapering point at the end. Wooden wedges to fasten erosion mats shall be 1-in x 1.25-in x 12-in. Wooden wedges to fasten coir wattles and coir rolls shall be 15in x 2-in x 18-in, 1.5-in x 2-in x 24-in, 2-in x 4-in x 36-in, or 2-in x 4-in x 48-in. These wedges shall come with a drilled hole near the top of diagonal side to fasten a nail.

b. Water absorbing polymer shall be cross-linked potassium polyacrylate/ polyacrylamide copolymer with a bulk density of about 540 kg/m3 and moisture content of 5%. The pH value of polymer shall be within the range of 5.5 to 6.0. Size of the polymer shall be 800 - 3000 microns.

c. Topsoil imported for inclusion in the soil lifts will consist of a mix of one (1) part streambed material and one (1) part wetland soil as specified in SECTION 32 92 19 - LOAMING AND SEEDING.

d. Soil lift live staking will consist of live stakes as specified in SECTION 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING.

2.7 WOODY MATERIAL

Woody material, consisting of large wood and slash shall be used in the channel and on the floodplain to provide roughness, habitat geomorphic stability. Woody material is to be obtained from on-site trees and shrubs

that are removed during clearing and grubbing operations. Woody material is to be free of any contaminated materials and consist of large limbs and trunks greater than six (6) inches in diameter and at least four (4) feet in length. Non-native invasive species are not to be used. Trees that contain woody material to be used in stream restoration shall have their root wads and small branches and limbs removed and be stockpiled in a suitable location until used.

Slash is defined as woody material less than 6 inches in diameter that is a product of clearing and grubbing. Slash shall be used primarily in the construction of large wood structures or as a roughness element distributed across the floodplain per details contained in the Contract Drawings.

2.8 CONFORMANCE TESTING

Contractor shall submit material data documentation to the Government for review that Riprap, Boulders and Granular Filter Bedding meet the material and size specifications contained herein per Paragraph 1.3.

2.9 IMPORTED MATERIAL ACCEPTANCE

Testing of imported material shall be performed in accordance with SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL and SECTION 31 00 00 - EARTHWORK.

PART 3 EXECUTION

3.1 EXCAVATION

All excavation shall be in conformance with SECTION 31 00 00 - EARTHWORK.

3.1.1 SBoulder Excavation

Boulder excavation shall be understood to mean only boulders in any kind of excavation exceeding 1 cubic yard in volume, which can be excavated without resorting to blasting, or by using a hammer to size or remove a boulder. All excavated boulders shall be stored and reused on-site as directed by the Government.

3.1.2 Stream Channel Cut and Fill

Cut and fill within the stream channel shall be in conformance with SECTION 31 00 00 - EARTHWORK.

3.1.3 Backfilling - Streambed Material

Streambed material shall be used as the stream channel foundation layer as shown on the Contract Drawings or in other areas as designated by the Government. Streambed material shall be placed in layers having a maximum thickness of 6-inches measured before compaction.

Materials placed in fill areas shall be deposited to the lines and grades shown on the Contract Drawings or in Submittals, with due allowance for settlement of the material.

3.1.4 Disposal of Surplus Material

Surplus fill shall become the property of the Contractor and shall be disposed on site by Contractor in an approved location. If on-site

disposal is deemed unacceptable by the Government, then the Contractor shall dispose of surplus fill at an off-site location approved by the Government.

Any unsuitable excavation material or other material not suitable for use as fill shall be disposed of in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

3.1.5 Grading

Grading shall be performed to the lines, grades and elevations shown on the Contract Drawings. During the process of grading, the area to be graded shall be maintained in such condition that it shall be well drained at all times. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the prosecution or condition of the work.

If at the time of grading it is not possible to place any material in its final location, it shall be stockpiled in approved areas for later use.

The right is reserved to make minor adjustments or revisions in lines or grades if found necessary as the work progresses, in order to obtain satisfactory construction.

The Contractor shall submit topographic survey of final site grades for review by the Government prior to project completion in accordance with Section 01 71 23 - SURVEYING.

3.1.6 Floodplain Microtopography

Floodplain microtopography shall be constructed of low and high features consisting of ridges and furrows as shown on the details of the Contract Drawings. Maximum height of ridges and depth of furrows shall be no greater than 0.5 foot relative to final grade.

3.2 NATURAL ROCK, RIPRAP AND BOULDERS

3.2.1 Salvaged Rock

Salvaged naturally occurring on-site boulders and rocks not considered suitable for stream structure installations shall be stockpiled by the Contractor at locations approved by the Government. These boulders and rocks may be placed in large wood structures, side channels, alcoves, or the stream channel, floodplain, or wetlands at the direction of the Government.

Placement of salvaged boulders serve as an aesthetic function and as such shall be placed and rotated into final position as directed by the Government in order to achieve the desired result.

Boulders placed in this manner should be placed with the longest dimension along the ground and shortest dimension vertical to the ground. Boulders shall be embedded to one-third of their height.

3.2.2 Channel Preparation

Channel slopes, bottoms, or other areas that are to be protected with riprap and boulders shall be free of brush, trees, stumps, and other objectionable material and be graded to a smooth compacted surface. The

Contractor shall excavate areas to receive riprap and/or boulders to the subgrade for granular bedding. The subgrade for bedding materials shall be stable. If unsuitable materials are encountered, they shall be removed and replaced. After an acceptable subgrade for granular bedding material is established, the bedding shall be immediately placed and leveled to the subgrade elevation. Immediately following this, riprap and/or boulders shall be placed. If bedding material is disturbed for any reason, it shall be replaced and graded at the Contractor's expense. In-place bedding materials shall not be contaminated with soils, debris, or vegetation before the riprap and/or boulders are placed. If contaminated, the bedding material shall be removed and replaced at the Contractor's expense.

Following acceptable placement of granular bedding, riprap placement shall commence as follows:

a. Machine Placed Riprap: Riprap shall be placed on the prepared slope or channel bottom areas in a manner which will produce a reasonably well-graded mass of stone with the minimum practicable percentage of voids. Riprap shall be machine placed, unless otherwise stipulated in the Contract Drawings or Specifications.

When riprap is placed on slopes, placement shall commence at the bottom of the slopes working up the slope. Place the riprap in a stepped fashion with the bottom of the uphill riprap below the top of the downhill riprap by half of the height of the riprap minimum.

Riprap used on side slopes, swales and pipe ends outside of the channel as shown on the Contract Drawings shall conform to SECTION 31 00 00 - EARTHWORK requirements.

The entire mass of riprap shall be placed on either channel slopes or bottoms so as to be in conformance with the required gradation mixtures and to lines, grades, and thickness shown on the Drawings. Riprap shall be placed to its full course thickness at one operation and in such a manner as to avoid displacing the underlying bedding material. Placing of riprap in layers, or by dumping into chutes, or by similar methods shall not be permitted.

All material going into riprap protection for channel slopes or bottoms shall be so placed and distributed that there will be no large accumulations of either the larger or smaller sizes of stone. Some hand placement may be required to achieve this distribution.

It is the intent of these Specifications to produce a compact riprap protection in which all sizes of material are placed in their proper proportions. Unless otherwise authorized by the Government, boulder and/or riprap protection shall be placed in conjunction with the construction of embankments or channel bottoms with only sufficient delay in construction of the boulder and/or riprap protection, as may be necessary, to allow for proper construction of the portion of the embankment and channel bottom which is to be protected. The Contractor shall maintain the boulder and/or riprap protection until accepted by the Government. Any material displaced for any reason shall be replaced by the Contractor to the lines and grades shown on the Contract Drawings.

b. Hand Placed Riprap: Hand placed riprap shall be performed during machine placement of boulder and/or riprap and shall conform to all the requirements of this Section. Hand placed riprap shall also be

required when the depth of riprap is less than 2 times the nominal stone size, or when required by the Contract Drawings.

After the riprap has been placed, hand placing or rearranging of individual stones by mechanical equipment shall be required to the extent necessary to secure a flat uniform surface and the specified depth of riprap, to the lines and grades as shown on the Contract Drawings.

c. Soil Replacement In and Over Boulder and/or Riprap: Where boulder and/or riprap is designated to be buried, place onsite excavated material that is free from trash and organic matter in riprap voids by washing and rodding and verified free of contamination. If insufficient clean material is unavailable on-site, Contractor shall import clean material that matches the topsoil specification contained in SECTION 32 92 19 - LOAMING AND SEEDING. Prevent excessive washing of material into stream. When voids are filled and the surface accepted by the Government, place a nominal six (6) inches of soil over the area, or as designated on the Contract Drawings. Fine grade, seed, and mulch per SECTION 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING, SECTION 32 92 19 - LOAMING AND SEEDING, and SECTION 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING.

e. Rejection of Work and Materials: The Government shall reject placed riprap which does not conform to this Section and the Contractor shall immediately remove and replace the boulders and/or riprap to conform with said sections.

3.2.3 Boulder Placement

Boulders shall be placed at the locations as shown on the Contract Drawings and installed with the following requirements:

a. The subgrade to receive each boulder shall be excavated and any unstable material shall be removed. Granular Bedding Material shall be placed and compacted in a maximum of 6-inch lifts to 95% of Maximum Standard Proctor Density (ASTM D698) to re-establish the subgrade of each boulder. Unstable material shall be removed from the project site and disposed of by the Contractor. Backfill behind boulders shall be compacted to 95% Maximum Standard Proctor Density (ASTM D698). Care shall be taken during compaction to avoid disturbing and/or damaging the integrity of the boulder channel edge.

b. The top of all boulders shall be as indicated on the Contract Drawings. Finished grades and subgrades for boulders will be determined from the height of each boulder used.

c. Boulders shall be carefully picked and arranged so that adjacent rock surfaces match within 2 inches in top elevation and 2 inches along the vertical exposed face or channel side of rock. Boulders shall be placed such that adjacent boulders "touch" each other and voids do not exceed 4 inches. It is the intent of construction to minimize voids and grout placed between boulders.

d. Smaller rocks shall be "chinked in" to fill all voids behind the boulders. Placement shall be approved by the Government prior to grouting.

e. Prior to placing the grout, any noticeable surface debris, fines,

smaller rock, or silt shall be removed from around the placed boulders.

f. Dewatering shall be implemented to guarantee that the grout will not be placed in water and for a period of 24 hours after the grout has been placed.

g. Keep boulders receiving grout wet at all times prior to receiving grout. The concrete grout shall be placed by injection methods by pumping under low pressure, through a 2-inch maximum diameter hose to ensure complete penetration of the grout into the void area as detailed on the Drawings. Grout shall be placed up to 6 inches from the top of boulders, or as directed by the Government. The equipment operator shall be able to stop the flow and shall place grout in the voids and not on exposed visual surface of the boulders. Any grout placed on exposed surfaces of the boulders shall be cleaned off.

h. Grout should be troweled out and finished to minimize visibility. Clean and wash any spillage before the grout sets. The exposed visual surfaces of boulders shall be free of grout to provide a clean natural appearance. If washing does not clean off grout residue, Contractor shall wash off any grout residue with muriatic acid and water, using a brush to scrub off the residue. A "pencil" vibrator shall be used to make sure all voids are filled between the boulders. The intent is to fill all voids from the subgrade level around the boulders to a depth of 6-inches from the top of rock. The "pencil" vibrator may be used to smooth the appearance of the surface, but Contractor shall use a wood float to smooth and grade the grout around the boulders. The grout mix shall be stiffened and other measures taken to retain the grout between the boulders.

i. Contractor shall, if deemed necessary, support the boulders from falling over before and during the placement of riprap, grout, backfill, and compaction work on either side of the boulder.

j. Grout shall receive cold weather protection in accordance with ACI 306 RECOMMENDED PRACTICE FOR COLD WEATHER CONCRETING.

3.3 SOIL LIFT PLACEMENT

Soil lifts shall be placed along stream channel banks at a cross-slope of 3H:1V. Each lift shall consist of a 10-ft long, 12-in tall and 5-thick densely packed mattress coir block with a woven coir fabric attached that is used to encapsulate granular streambank material. Three sides of the coir fiber block shall consist of a woven coir fabric and free ends of woven coir fabric is extended from top and bottom of the coir fiber block. The coir logs comprising the face end of the soil lift system shall include holes placed in the middle of the coir block face at 12-in spacing through the entire fiber block. Each hole shall be covered with a coir plug that can be removed to allow placement of live plant cuttings intended to provide additional stability to the soil mass through the development and maturation of a dense streambank root mass and act as long-term anchors for the coir blocks. Soil lifts shall be constructed and placed per details included in the Contract Drawings.

3.4 WOODY MATERIAL PLACEMENT

3.4.1 Large Wood Placement

Contractor shall store woody material salvaged during clearing and grubbing operations in locations reviewed and approved by the Government. Contractor shall notify the Government at least two (2) weeks before installing large wood and slash. Contractor shall provide an excavator operator with a minimum of 3 years' experience in placing and building large wood structures for river restoration habitat and geomorphic stabilization purposes who is capable of working independently with minimal direction and oversight. All large wood must be anchored below grade to withstand, at a minimum, bankfull flow velocity conditions. Contractor must schedule wood installation into the overall work schedule. Placement of large wood shall be as indicated in the Contract Drawings; however, the Government reserves the ability to direct the Contractor to install large wood at locations not shown on the Contract Drawings or in a manner not indicated by details contained in the Contract Drawings.

Large wood shall be exposed one-half of its length and one-half buried to a depth of two (2) feet. Large wood placement will be based on the availability of salvageable tree trunks and limbs that can be placed in the floodplain to provide additional roughness and scour protection during high flows prior to maturity of planted vegetation. Large wood placement shall be as shown on the Contract Drawings and at the direction of the Government.

3.4.2 Slash Placement

Slash shall be placed both as a filler within large wood placements and as a roughness and habitat element on the floodplain and within wetlands. Slash placement in these features shall be as shown in the Contract Drawings.

3.5 QUALITY CONTROL PROGRAM

Acceptance of work performed:

a. The final walk-through shall be performed at the completion of all stream restoration work as contracted.

b. At the time of the final walk-through, the Contractor and any subcontractors used on the work shall be present.

c. All work areas associated with stream restoration shall be free of debris, leftover woody plant materials and trimmings. All work areas shall be cleaned up and cleared of soil and debris. Acceptance of work performed shall not occur until these conditions are met.

d. The Government will identify any deficiencies to be described in the form of a punch list.

e. The Contractor shall be correct all work deficiencies within the first ten (10) days of the final walk-through.

f. Final acceptance will not be given by the Government until all deficiencies are corrected.

g. The Contractor shall maintain the site until final acceptance.

h. The Government will give written notice of final acceptance when it is fully satisfied that the Work has been performed in compliance with the Contract.

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SECTION 32 80 00

WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING

PART 1 GENERAL

1.1 SCOPE OF WORK

Wetland restoration refers to those wetland restoration areas identified on the Contract Drawings, including forested wetlands, scrub-shrub wetlands, emergent wetlands, submerged aquatic vegetation. These areas shall be collectively referred to herein as "wetlands". Wetland restoration is required for wetlands altered by construction activities and if the Contractor infringes upon freshwater wetland areas beyond the identified limit of work.

Submerged aquatic vegetation (SAV) restoration refers to those areas identified on the Contract Drawings within the stream channel. SAV restoration consists of placement of SAV substrate and planting aquatic plants.

Streambank planting refers to those areas within 10 feet of the restored stream channel, as indicated on the contract drawings. Streambank planting consists of the use of woody and herbaceous material to stabilize the stream bank in combination with coir logs, matting, riprap, natural rocks, boulders, and/or other stabilization materials.

Aquatic habitat restoration refers to any and all components of wetland restoration, SAV restoration, and/or streambank plantings.

Furnish all labor, materials, equipment, and incidentals required to install erosion control measures, place organic rich loam and SAV substrate, finish grade, apply soil amendments, install plant stock, apply seed and maintain the restoration areas as specified herein and depicted on the Contract Drawings.

Restore all wetland areas that are indicated to be restored or are temporarily altered by construction activities including herbicide application, clearing, excavation, and trenching of wetlands during the course of construction to equal or better than that condition which existed previous to construction, using only species native to the region. At a minimum, wetland restoration areas shall achieve 85% cover by native wetland plant species one year after construction. All restoration work shall be as indicated in the Contract Documents.

The work includes:

a. Supply wetland soil and SAV substrate as specified in Paragraph 2.1 for all wetland restoration areas and SAV planting areas, and all other soils or substrates as indicated in the Contract Documents, including all soil/substrate preparation, testing, amending, conditioning, fertilization, and insurance of the overall quality of the material.

b. Soil preparation and fine grading as depicted on the Contract Drawings.

c. Furnish and install all plant materials and erosion control blanket as shown on the Contract Drawings and specified herein.

d. Prune plant materials as specified.

e. Maintain and warranty all wetland grading, materials, and plantings, including control of exotic species.

f. Final cleanup and all other work required to complete the requirements of this section.

1.2 RELATED WORK

SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL

SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL

SECTION 01 57 19 - ENVIRONMENTAL PROTECTION

SECTION 02 91 00 - SITE RESTORATION

SECTION 31 00 00 - EARTHWORK

SECTION 31 11 00 - CLEARING AND GRUBBING

SECTION 32 72 00 - STREAM RESTORATION

SECTION 32 92 19 - LOAMING AND SEEDING

SECTION 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING

SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z60.1	American Standard for Nursery Stock

ASTM INTERNATIONAL (ASTM)

ASTM D6913/D6913M	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
ASTM D7928	Standard Test Methods for Particle-Size Distribution (Gradation) of Fine-Grain Soils Using the Sedimentation (Hydrometer) Analysis

THE BIOTA OF NORTH AMERICA PROGRAM

BONAP MAPPING	Kartesz, J.T., The Biota of North America Program (BONAP). 2015. North American Plant Atlas. (http://bonap.net/napa). Chapel Hill, N.C.

CODE OF FEDERAL REGULATIONS (CFR

7 CFR 201	Federal Seed Act Regulations

CONSOLIDATED LAWS OF NEW YORK

NY Agric & Mkts L § 137	Agriculture and Markets Chapter 69, Article 9,Section 137. Label Requirements of all seeds, including lawn-seeding mixtures

NEW YORK CODES, RULES, AND REGULATIONS (NYCRR)

6 CRR-NY 575	Prohibited and Regulated Invasive Species

UNITED STATES COMPOSTING COUNCIL (USCC)

TMECC	Test Method for the Examination of Composting and Compost

UNITED STATES ARMY CORPS OF ENGINEERS TECHNICAL REPORTS (TR)

TR-Y-87-1	Corps of Engineers Wetlands Delineation Manual

.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER ENVIRONMENTAL LABORATORY (ERDC/EL) TECHNICAL REPORTS (TR

ERDC/EL TR-12-	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)

UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)

USDA Natural Resources Conservation Service (NRCS) Soil Texture Calculator: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils

1.4 CHANGES AND VARIATION

The Contractor, only with written permission from the Contracting Officer, may alter the density, species, and location of plantings as required by unanticipated changes in the site.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Wetland Restoration Plan; G

The Contractor shall submit a Wetland Restoration Plan at least 90 calendar days prior to the start of planting. No wetland restoration work shall be performed until the Wetland Restoration Plan is approved. At a minimum, the Plan shall include all elements listed below:

a. Planting schedule tied into the overall construction schedule.

b. Personnel requirements.

c. Wetland soil and SAV substrate laboratory analyses to demonstrate conformity with requirements herein.

d. Planting stock: a table listing all planting stock (Latin and common names, size, quantity) based on the Contract Documents, along with the name, address and contact phone number of the nursery/nurseries supplying the plant materials. Certification by the landscaping contractor that all plant stock obtained for this work is the plant indicated and of quality as specified. Latin binomials shall be used in all communications to ensure the proper plant species are used.

e. Seed mixes: A table listing all seed stock (Latin and common names, percent pure live seed (PLS), seed sources, and documentation that seed has been reserved.

f. Seed mix labels: Labels compliant with the requirements of NY Agric & Mkts L § 137.

g. Restoration Maintenance and Monitoring Plan, as specified in SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

h. Delivery schedule of live stakes, plants, and seed for the wetland restoration.

i. Calendar time period for the wetland plant and seed establishment periods. When there is more than one establishment period, the boundaries of the planted areas covered for each period shall be described.

j. Figure showing planting locations of individual trees, shrubs, and herbaceous plantings.

k. Maintenance plan and schedule for the wetland, SAV, and streambank maintenance period.

SD-04 Samples

Material Samples; G

Samples of all materials to be used in the wetland restoration, SAV restoration, and streambank planting shall be submitted for inspection and approval upon the Contracting Officer's request.

SD-07 Certificates

State Nursery Inspection Certificates and Samples; G

State Nursery Inspection Certificates and samples of material for all plantings shall be submitted for inspection and approval.

Plant Stock Certifications; FIO

Certification by the landscaping contractor that all plant stock obtained for this Work is the plant indicated and of quality as specified.

Seed Certification; G

Prior to the delivery of materials, provide certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following: classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.

Wetland Soil and SAV Substrate; G

Prior to the delivery of materials, submit certificates of compliance attesting that wetland soil and SAV substrate meet the specified requirements. Submit certified copies of laboratory analyses, including laboratory visual observations and amendment recommendations.

Soil Amendments; G

Prior to the delivery of materials, provide certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

a. pH Adjuster. Calcium carbonate equivalent and sieve analysis.

b. Fertilizer. Chemical analysis and composition percent.

c. Soil Conditioner. Composition and source.

Wetland Scientist Certification; G

Documentation showing the certification of the proposed Wetland Scientist assigned to the project has at least 5 years of experience designing and/or monitoring wetland restoration and replication projects.

SD-10 Operation and Maintenance Data

Maintenance Instructions; G

Complete written instructions to maintain the wetland and streambank plants, SAV, seeded areas, and restoration materials, for Contracting Officer use after the Contractor's two-year maintenance period expires.

As-Built Documentation; G

Documentation of the plantings as follows:

a. Complete survey of the different planting areas as installed.

b. Complete accounting of substitutions made, species, size and quantity of installed plants per restoration type.

1.6 CERTIFIED WETLAND SCIENTIST

The Contractor shall provide the services of a Wetland Scientist (WS) to supervise wetland restoration work.

1.7 PERMITS

The Contractor shall be responsible for complying with all substantive requirements of permits from federal, state, and local regulatory agencies, including, but not limited to, USACE, NYSDEC, and the City of Lockport, and any other applicable permits that are required in the restoration of wetlands, SAVs and streambanks.

1.8 INSPECTION, STORAGE, AND HANDLING

1.8.1 Inspection

Plant materials and seed shall be inspected upon arrival at the job site for conformance to species and quality. Plants that are not as specified or do not show vigor will be rejected. Seed that is wet, moldy, or bears a test date 5 months or older, shall be rejected. Other materials shall be inspected for compliance with specified requirements. Unacceptable materials shall be removed from the job site.

1.8.2 Storage

Materials shall be stored in designated areas away from contaminants. Live plants not installed on the day of arrival at the job site shall be stored upright and protected until installation. Unless otherwise specified, all live plant materials will be used within 48 hours after delivery to the job site. Outside storage locations shall be continually shaded and protected from the wind. Live cut plant material shall be kept in water and covered with wet burlap. Live cut materials shall be protected from drying at all times. Seed shall be stored in cool, dry locations

1.8.3 Handling

Materials shall not be dropped or dumped from vehicles.

PART 2 PRODUCTS

Wetland restoration, SAV restoration, and streambank planting shall include the following material product specifications:

2.1 WETLAND SOIL AND SAV SUBSTRATE

All soils, substrates, and amendments used therein shall be tested to ensure they are free from chemical and radiological contamination as specified in SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

Wetland soil and SAV substrate shall be friable and capable of promoting

and supporting healthy plant growth when mixed with soil conditioners as specified herein. These substrates shall be manufactured by mixing soil and amendments as specified herein, to meet specified organic content criteria.

Wetland soil and SAV substrate shall be imported material free of slag, cinders, stones 1-inch or greater in largest dimension, plants or their roots, sticks, clay clods, trash, invasive species listed in 6 CRR-NY 575, toxic substances or any material or substances and concentrations harmful to plant growth.

Samples of the soils/substrates shall be tested for soil texture, nitrate, nitrogen, ammonium nitrogen, phosphorus, potassium, calcium, aluminum, soluble salts, pH, and total sulfur by a public extension service/state agricultural laboratory or a certified private agricultural testing laboratory, subject to approval by the Contracting Officer, in accordance with the current standards of the Association of Official Agricultural Chemists. The soil test report shall include laboratory recommendations for pH adjustment, fertilization, and any other amendments. Copies of test results and recommendations shall be submitted at least 60 days prior to anticipated soil delivery and placement.

The organic matter content for soils/substrates shall be by weight as determined by loss on ignition of moisture free test samples oven dried to a constant weight at a temperature of 100 degrees Centigrade. To adjust organic matter content, the soil may be amended with organic amendments as specified herein.

Soil/substrate texture analysis shall be performed using the following USDA textural classification system based on the percentage of clay (<0.002 millimeter [mm]), silt (0.05 to 0.002 millimeters [mm]) and sand (2 mm-0.05 mm) in the fine earth fraction. The percentage of sand, silt, and clay shall be compared against the USDA soil triangle available from the USDA NRCS at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_054167 to demonstrate conformance with the requirements of this specification.

2.1.1 Wetland Soil - Organic Rich Loam

Organic rich loam shall have the following characteristics:

a. Texture shall be sandy loam (with no more than 65% sand), loam, or sandy clay loam (with no more than 65% sand)

b. Mineral soil content above 2 mm (gravel) shall be less than 5%

c. pH between 6.0 and 7.0. The soil may be amended to correct pH prior to delivery to the site; however, the original loam must not have a pH lower than 5.5 or higher than 7.5

d. Soluble salts less than 320 parts per million (ppm) / Electrical conductivity less than 0.5 millimhos per centimeter (mmhos/cm)

e. Total sulfur not more than 0.2%

f. Total Phosphorus not more than 80 ppm

g. Organic matter between 8% and 10%

2.1.2 SAV Substrate

SAV substrate shall have the following characteristics:

a. Texture shall be sandy loam (with no more than 65% sand)

b. Mineral soil content above 2 mm (gravel) shall be less than 10 %

c. pH between 6.0 and 7.0. The soil may be amended to correct pH prior to delivery to the site; however, the original loam must not have a pH lower than 5.5 or higher than 7.5

d. Soluble salts less than 320 ppm / Electrical conductivity less than 0.5 mmhos/cm

e. Total sulfur not more than 0.2%

f. Total Phosphorus not more than 80 ppm

g. Organic matter between 0.5 and 4%

2.1.3 Organic Amendments

Compost material shall be as specified in SECTION 32 92 19 - LOAMING AND SEEDING.

Finished organic rich loam must meet all required characteristics herein after any amendments are added. Compost containing high levels of gravel, sand, silt, or clay, or high soluble salts, phosphorus, or any other material, must be used with care to ensure the finished product meets requirements.

2.1.4 Other Amendments

Other amendments shall be as specified in SECTION 32 92 19 - LOAMING AND SEEDING.

2.2 WATER

Water used in this work shall be furnished by the Contractor and shall be suitable for irrigation and free from ingredients harmful to plant life. Hose, labor, materials, and other watering equipment required for the work shall be furnished by the Contractor.

Watering volumes should be based upon delivery of 1 inch of moisture per week to the tree if precipitation does not meet that amount during the active growing season defined as April 15th through November 1st until trees are established.

All mandatory water restrictions apply & non-municipal waters shall be used if at all possible.

2.3 EROSION CONTROL BLANKET

Erosion control blanket shall be as specified in SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

2.4 PLANT MATERIALS

The Contractor shall coordinate with nurseries prior to the start of the project to determine the general availability of the species and quantities to be used. Plants that are not expected to be available in the quantities needed shall be contract grown. The Contractor shall submit a list of each species showing quantities and the method of procurement prior to the start of the project. Plants shall be grown in saturated conditions in full sun. Seed or stock used for propagation shall be from areas within the USDA hardiness zone 5b through 7a. Plants shall be nursery grown under climatic conditions similar to those in the locality of the project and shall conform to the variety and sizes indicated.

All plant stock shall be furnished in the condition required herein and as accepted by the Contracting Officer. All plant stock shall be labeled by common name and Latin binomial and certified as the correct species by the plant supplier. All plant stock shall conform to standards specified herein.

2.4.1 Wetland Plants

a. A complete list of plants and seed for the scrub-shrub wetlands is provided on the Drawings.

b. Furnish plants in quantities required to complete the work as indicated on the Drawings.

c. Nomenclature is in conformance with standard horticultural practice in the area. Plants are to be delivered to the site with tags bearing the Latin binomial name as indicated by the plant list. In all cases, Latin binomial names take precedence over common names.

d. All plants shall be typical of their species or variety and shall have a normal habit of growth. All plants shall be freshly dug or container grown. No heeled-in plants or plants from cold storage shall be used. Plants shall be sound, healthy and vigorous, well-branched, and densely foliated when in leaf; shall be free of disease, insect pests, eggs, or larvae, and shall have healthy, well-developed root systems. All parts of the plant shall be moist and shall show active green cambium when cut to demonstrate plants are healthy and vigorous. Plants shall be prepared for shipment in a manner that will not cause damage to branches, shape, and future development after planting.

e. Plants must conform to the requirements of ANSI Z60.1. All plants are subject to inspection.

f. Container-grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole. No plants shall be loose in the container.

g. If larger plants than indicated on the plans are used, upon acceptance by the Contracting Officer, the spread of roots or ball of earth shall be increased in proportion to the size of the plant.

h. Plants smaller than indicated on the plans will not be accepted.

i. Plants shall be handled so that roots are adequately protected at all

times from drying out and from other injury. Plants must be stored in the shade after delivery. Keep all plant roots moist before, during, and after planting.

2.4.2 Live Stakes

a. Live stake species and sizes shall be as shown on the Contract Drawings, harvested during dormancy when no leaves are present. If the construction/planting sequence allows, the cuttings may be propagated at a nursery over winter to develop roots before planting.

b. The live stakes shall be trimmed and cut to length for this construction technique and shall meet the length and diameter shown on the Contract Drawings. Each stake shall be free from all side branches.

c. Live cut plant materials shall be taken from approved, existing, natural, native growing sites of the same ecotype as the project area. No more than one-third of the total branches of any shrub may be harvested for use as live stakes unless otherwise authorized by the Contracting Officer and source site owner. The Contractor shall be responsible for purchasing live stakes from a reputable vendor or identifying source locations and obtaining permission for harvesting stakes. All source areas shall be approved by the Contracting Officer.

d. The use of chainsaws, weed whips with metal blades, loppers, and pruners shall be permitted, provided that they are used in such a manner that they leave clean cuts. Live plant materials shall be cut and handled with care to avoid bark stripping and trunk wood splitting. Cuts shall be made 8-in to 10-in from the ground when cutting from the approved, natural growing, source sites. Cuts shall be made flat or at a blunt angle to ensure that the source sites regenerate rapidly.

e. The harvesting site must be left clean and tidy. Large unused material shall be cut up into 16-in lengths and evenly distributed around the site.

f. Live stake cuttings shall be bound together securely with twine at the collection site, in groups, for easy handling and for protection during transport. Live stake cuttings shall be grouped in such a manner that they stay together when handled. Five cuttings shall be allowed per bundle.

g. During transportation, the live cut branch groups shall be placed on the transport vehicles in an orderly fashion, to prevent damage and to facilitate handling. The live cut plant materials shall be covered with a wet tarp or burlap material during transportation.

h. Upon arrival at the construction site, live branch cuttings shall be inspected for acceptability. Live cut material shall be collected from sources that shall be approved by the Contracting Officer prior to the commencement of cutting operations. Only healthy, well-branched, and disease-free stock shall be acceptable.

i. Prior to installation, live stakes must be soaked in water for 8 hours.

2.4.3 Inspection of Plant Materials

a. Inspection of plants before digging or shipment from the nursery shall be at the option of the Government. The Contractor shall be present, if requested by the Government, for inspection of plants at nursery.

b. Plants shall be subjected to inspection and approval upon delivery for conformity to specified requirements as to quality, size and variety. Such approval shall not impair the right of inspection and rejection during the progress of the work.

c. Plants shall be accompanied by State Nursery inspection certificates.

d. No plants will be accepted with plastic burlap or if the ball is cracked or broken.

2.5 WETLAND SEED

Wetland seed shall be received in the manufacturer's original unopened container bearing the date of the last germination test, which date shall be within a period of six months prior to commencement of seeding operations. Seed shall be from same or previous year's crop; each variety of seed shall have a purity of not less than 85 percent, a percentage of germination not less than 90 percent, shall have a weed content of not more than 1 percent and contain no noxious weeds. The wetland seed mixtures shall be as indicated in the Contract Drawings

Any proposed substitutions, if needed due to lack of availability, must be native to the region of the Site. If seed cannot be sourced from these areas, then it shall be sourced from as close to the Site as practicable. Substitutions will not be allowed without written request and approval from the Contracting Officer.

Seed mixing: Seed shall be mixed by the seed supplier prior to delivery, or on site as directed by the Contracting Officer.

The seed mix shall contain none of the following:

a. Reed Canary grass (Phalaris arundinacea)

b. Common Reed (Phragmites australis)

c. Purple Loosestrife (Lythrum salicaria)

d. Any invasive species listed IN 6 CRR-NY 575: Prohibited and Regulated Invasive Species

The seed shall be furnished and delivered premixed. A manufacturer's certificate of compliance to the specified mixes shall be submitted by the manufacturer for each seed type. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed and also the net weight and date of shipment. No seed may be sown until the certificates have been submitted and approved.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall restore the wetlands and SAV areas as indicated on the Contract Documents. Restoration shall include restoring disturbed soils to pre-construction contours or as indicated on the Contract Drawings, placement of organic rich loam and SAV substrate to restore final grades, application of soil amendments as necessary to specifications, the planting of trees, shrubs, and SAV as shown on the Contract Drawings, the application of wetland seed mix throughout the wetland restoration areas, maintenance of the wetland and SAV restoration for two years.

After contaminated soil removal is completed, the subgrade shall be restored with clean fill to 1 foot below final grades in accordance with SECTION 31 00 00 - EARTHWORK. The subgrade shall be restored such that a minimum of 12 inches of organic rich loam may be placed in wetland areas, and 6 inches of SAV substrate in SAV restoration areas, without exceeding existing grades or as indicated in the Contract Drawings, where final grades differ from existing grades. The clean backfill subgrade shall be covered by biodegradable erosion cover netting if it will remain exposed for 7 or more consecutive days to prevent subgrade erosion prior to wetland soil or SAV substrate placement and the finished grade establishment, in accordance with SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

The Contractor shall not utilize equipment in the wetland OR SAV areas that will damage any final restored surfaces.

3.2 WETLAND SOIL AND SAV SUBSTRATE PLACEMENT

The finished grade shall be established using organic rich loam in wetland restoration areas and SAV substrate in SAV restoration areas, as shown on the Contract Drawings and specified herein. Organic rich loam/SAV substrate shall be used as soil to achieve final contours. The final grades shall be achieved using 12 inches of organic rich loam in all wetland areas and 6 inches of SAV substrate in SAV restoration areas. Organic rich loam installation shall be timed so that seeding and live stake installation occur during the specified date ranges.

Prior to placing organic rich loam, biodegradable temporary erosion cover netting and any other biodegradable erosion control materials shall be thoroughly incorporated into the subgrade by discing.

Finished areas shall be rolled with a hand roller weighing not more than 100 pounds per foot of width and then raked smooth. The finish grades shall match pre-construction contours except as shown on the Contract Drawings and transition smoothly to the surrounding undisturbed wetland and/or upland contours with a maximum vertical:horizontal slope of 1:3. The loam shall be placed over prepared areas so that after natural settlement and light rolling, the completed work shall conform said pre-construction contours.

No soil or substrate shall be spread in water or while frozen or muddy.

After soils/substrate has been spread, it shall be prepared by scarifying or harrowing and hand raking. Remove and dispose of all stiff clods, lumps, roots, litter, and other foreign material. The area shall also be

free of stones 1-inch or greater in largest dimension.

Previously established grades (such as in areas where work has been completed) shall be maintained in a true and even condition throughout the wetland restoration process.

3.3 WETLAND SEEDING AND PLANTING SCHEDULE

Seeding shall be done within ten days following wetland organic rich loam placement, unless otherwise approved by the Contracting Officer.

Submit schedules to the Contracting Officer for approval 30 days prior to wetland planting and seeding. The wetland restoration areas shall be seeded between March 15 and May 15 or September 1 to September 15 unless otherwise approved by the Government. Seeding of any wetland area during the dry season between May 15 and September 1 will require Government approval and additional watering and irrigation. SAV material shall be planted from June 15 to July 15. In all cases, plant material must be planted at least 30 days before the average first frost date of October 15.

Planting and seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the planting and seeding operations, proposed alternate times shall be submitted for approval.

3.4 WETLAND AND STREAMBANK SEEDING

STREAM RESTORATION) shall be stabilized with the seed mixes as indicated on the Contract Drawings. The seed shall meet all standards of purity and packaging requirements as specified above. Seed shall be spread at the rate indicated on the Contract Drawings. Where erosion control blanket is to be placed, seed prior to installing blanket.

Prior to seeding, the wetland seeded areas shall be prepared by scarifying or harrowing the wetland soil surface by hand raking.

Seed shall be applied at the rate indicted on the Contract Drawings. Seed application may be accomplished by broadcast seeding or hydroseeding. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved. Tar tack shall not be used in the wetlands.

If broadcast seeding is used, seed shall be uniformly spread by broadcasting half the total rate of seed application in one (1) direction, and then broadcasting the remainder of the seed at 90 degrees from the first direction. The entire area shall then be firmed with a roller not exceeding 90 pounds per foot of roller width. Steep slopes shall not be rolled.

If hydroseeding is used, then the seed and fertilizer shall be added to water and thoroughly mixed. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled. Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation, in accordance with the

manufacturer's recommendations.

Any washouts which occur shall be regraded and reseeded until a stabilized slope is established.

3.5 EROSION CONTROL BLANKET

Wetlands shall be seeded immediately prior to placement of the erosion control blanket. SAV restoration areas do not receive erosion control blanket.

Immediately after final grading protect with erosion control blanket as specified herein.

Erosion control blanket shall be installed in accordance with manufacturer's instructions and as per the Contract Drawings. The Contractor shall provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. The blankets shall be unrolled and applied in the direction of water flow, without stretching such that it will lie smoothly but loosely on the soil surface. Blankets shall be placed parallel to the stream flow within the stream channel and low marsh area and staked together in accordance with manufacturer's instructions. Side overlaps shall be 4 inches minimum. The biodegradable stakes shall be driven vertically into the ground, spaced according to the manufacturer's recommended most dense pattern, at least approximately two linear feet apart, on each side, and one row in the center alternately spaced between each side. Upper and lower ends of the matting shall be buried to a depth of 6 inches in a trench if not wrapped under a coir log. The bottom of the fold shall be 6 inches below the ground surface. Stake on both sides of fold. Where the matting must be cut or more than one roll length is required in the channel, turn down upper end of downstream roll into a slit trench to a depth of 6 inches. Overlap lower end of upstream roll 4 inches past edge of downstream roll and stake.

3.6 WETLAND AND STREAMBANK SEEDING

Wetlands and stream bank soil lifts (as specified in SECTION 32 72 00 - STREAM RESTORATION) shall be stabilized with the seed mixes as indicated on the Contract Drawings. The seed shall meet all standards of purity and packaging requirements as specified above. Seed shall be spread at the rate indicated on the Contract Drawings. Where erosion control blanket or is to be placed, seed prior to installing blanket.

Prior to seeding, the wetland seeded areas shall be prepared by scarifying or harrowing the wetland soil surface by hand raking.

Seed shall be applied at the rate indicted on the Contract Drawings. Seed application may be accomplished by broadcast seeding or hydroseeding. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved. Tar tack shall not be used in the wetlands.

If broadcast seeding is used, seed shall be uniformly spread by broadcasting half the total rate of seed application in one (1) direction, and then broadcasting the remainder of the seed at 90 degrees from the first direction. The entire area shall then be firmed with a roller not exceeding 90 pounds per foot of roller width. Steep slopes shall not be rolled.

If hydroseeding is used, then the seed and fertilizer shall be added to water and thoroughly mixed. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled. Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation, in accordance with the manufacturer's recommendations.

Any washouts which occur shall be regraded and reseeded until a stabilized slope is established.

3.7 HANDLING AND PROTECTION OF PLANTS

Plants shall be handled so as to not damage stems, roots, root balls, leaves, or any other living part except for appropriate pruning before or after planting. Plants shall be kept moist and in good condition at all times. Plants that have wilted, been subject to drying, overwatering, sunscorch, or drying/damaging winds, or otherwise damaged after delivery from the nursery may be rejected at any time.

Plants must be installed within five days of arrival to the site. Plants which cannot be planted immediately upon delivery shall be set on the ground in the shade and be protected with soil, bark mulch, or other acceptable material. Shrubs shall be provided with irrigation to keep root balls moist. At no times may the root balls dry out.

No plant shall be bound with wire or rope at any time so as to damage the bark, plant tissue, or break branches.

3.8 ADJUSTING AND CLEANING

Stake out locations in the field as indicated on the Contract Drawings and secure the Government's approval before excavating plant pits. Contractor will locate and install all plant material according to the Contract Drawings. Actual planting locations may vary due to in-field conditions and as directed by the Government.

3.8.1 Planting

a. Planting pits will be circular in outline with roughened, sloped sides. Remove an area of the erosion control mat equal to the size of the planting pit. Dig a hole equal to the depth and three times the diameter of the root ball. Planting pits will be dug so that the top of the root ball is level or approximately 1- to 2-in above final grade to account for settling. Backfill material for all pits shall consist of the existing material (loam) as excavated from the pit.

b. Plants shall be set in center of pits plumb and straight and at such a level that after settlement, the crown of the plant ball will be at the surrounding finished grade. Crowns may not be planted below finished grade.

c. Remove and dispose of containers prior to planting. To encourage immediate root development, the outer one-half inch of the root ball shall be gently loosened. Prune away any circling roots.

d. All burlap, rope, wire and similar materials shall be removed from all plants and disposed of off-site.

3.8.2 Backfilling Plants and Fertilizing

a. Backfill the plant pits halfway and place one fertilizer tablet in each hole, about 1 to 2 inches away from the root tips. Do not place fertilizer tablet in the bottom of the hole. After placement of fertilizer, continue backfilling plant pits.

b. When plants are set, loam shall be tamped lightly. Loam shall not be packed so firmly as to drive out all the fine air spaces needed for a well aerated soil.

c. To complete backfilling, ensure that plant crown is level with the surrounding grades and that the top of the root ball is not covered with loam. Immediately after the plant pit is backfilled, a saucer or shallow basin slightly larger than pit shall be formed with a ridge of soil to facilitate and contain watering.

d. Directly after backfilling/planting, each plant will be deep watered to thoroughly saturate the entire planting pit.

3.9 PRUNING

Each plant shall be pruned at the time of planting in accordance with ANLA standards to remove dead or broken branches and to preserve the natural character of the plant and as directed by the Contracting Officer.

Pruning shall be done with clean, sharp tools.

3.10 STREAMBANK PLANTING - LIVE STAKE INSTALLATION SCHEDULE

Live stakes shall be installed within 7 days following completion of the soil lifts per SECTION 32 72 00 - STREAM RESTORATION. Submit schedules to the Government for approval 30 days prior to streambank planting and seeding. Prior to the placement of live stakes and planting, the Contractor's work should not be deemed complete until the Government has approved of the stone portion of the slope protection/stabilization.

Live stakes shall be installed while dormant, between February 1 and April 15. Live staking operations shall be performed only during periods when beneficial results can be obtained. When flooding, ice, snow, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the live staking operations, proposed alternate times shall be submitted for approval.

3.11 STREAMBANK PLANTING - LIVE STAKES

Live stakes shall be installed in the configuration, spacing, and areas shown on the Contract Drawings as follows:

a. Live stakes shall be cut to a point on the basal end for insertion in the ground.

b. A dibble, iron bar, or similar tool shall be used to make a pilot hole to prevent damaging the material during installation.

c. Live cuttings shall be inserted by hand into pilot holes.

d. Use a dead blow hammer to gently drive live stakes into the ground via the pilot hole.

e. The stakes shall be tamped into the ground at right angles to the slope to a minimum depth of 24-inches for a firm hold.

f. When possible, tamp soil around stakes

g. Care shall be taken not to damage the stakes during installation. Those damaged at the top during installation shall be trimmed back to undamaged condition.

3.12 OBSTRUCTIONS BELOW GROUND

In the event that underground boulders or obstructions are encountered in any pit excavation work under this Contract, alternate locations may be selected by the Government and plants shall be installed therein.

3.13 WATERING

The Contractor shall water the wetland areas as necessary for establishment during the wetland maintenance period, in accordance with their approved Wetland Restoration Plan.

Watering shall be started immediately after completing the seeding of an area. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum depth of 1 inch. Run-off shall be prevented. Watering trucks shall not be driven in the marsh, unless otherwise directed by the Contracting Officer.

Irrigation water for planting and maintenance shall be provided by the Contractor and shall be free from contaminants or any ingredients harmful to plant life. The Contractor shall furnish his/her own equipment, hoses, connections, or other watering equipment. Water from the surrounding wetlands or open water areas may not be used for irrigation.

3.14 MAINTENANCE PERIOD

The Contractor shall perform maintenance and monitoring of the restored wetland areas as described in SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

The Contractor shall provide at least 85 percent cover of all restored wetland and SAV areas with indigenous wetland plant species within the establishment period as described in SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY. Bare spots may not be larger than 10 square feet. Areas not achieving the above requirement within the initial maintenance period shall be renovated.

The Contractor shall ensure that the wetland and SAV areas continue to develop in such that they will achieve at least 85 percent cover by the end of the 5-year monitoring period or as required by NYSDEC, with bare spots no larger than 10 square feet.

The growing season for freshwater wetland restoration areas shall be between May 1 and October 15. The initial maintenance period shall encompass at least one complete growing season, to include one full winter through the beginning of the next growing season.

3.15 INSPECTIONS

3.15.1 Restoration Monitoring Plan

The Contractor's wetland scientist shall develop a Wetland Monitoring Plan in accordance with this section and SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

3.15.2 Initial, Interim, and Final Inspections

Initial, Interim, and Final Inspections shall be performed in accordance with SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

3.15.3 Restoration Inspection Reports

Inspection reports shall be submitted in accordance with SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

3.16 WARRANTY

All wetland, stream, and SAV plantings used on the Site, including trees, shrubs, ground cover, seeded areas, and SAV, shall come furnished with a minimum two-year material warranty from the date of purchase, such that the plantings are free of disease, sickness, defects or deficiencies that would prevent establishment. Site grading, stream restoration materials, plant and seed installation, establishment, and survival shall be warranted by the Contractor.

-- End of Section --

SECTION 32 92 19

LOAMING AND SEEDING

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to provide loaming and seeding on forested slopes, in floodplains, and on all upland areas as required by the Contract Documents. Upland areas are defined as areas outside of the wetland restoration limits.

1.2 RELATED WORK

SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL

SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL

SECTION 01 57 19 - ENVIRONMENTAL PROTECTION

SECTION 02 91 00 - SITE RESTORATION

SECTION 31 00 00 - EARTHWORK

SECTION 31 11 00 - CLEARING AND GRUBBING

SECTION 32 72 00 - STREAM RESTORATION

SECTION 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING

SECTION 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING

SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

ASTM INTERNATIONAL (ASTM)

ASTM C602	Standard Specification for Agricultural Liming Materials
ASTM D6913/D6913M	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
ASTM D7928	Standard Test Methods for Particle-Size Distribution (Gradation) of Fine-Grain Soils Using the Sedimentation (Hydrometer)

	Analysis
TMECC 05.08-B	Test Method for the Examination of Composting and Compost

THE BIOTA OF NORTH AMERICA PROGRAM

BONAP MAPPING	Kartesz, J.T., The Biota of North America Program (BONAP). 2015. North American Plant Atlas. (http://bonap.net/napa). Chapel Hill, N.C.

CODE OF FEDERAL REGULATIONS (CFR)

7 CFR 201	Federal Seed Act Regulations

NEW YORK CODES, RULES, AND REGULATIONS (NYCRR

6 CRR-NY 575	Prohibited and Regulated Invasive Species

NEW YORK ENVIRONMENTAL CONSERVATION LAW (NYECL)

ENV § 17-21	Nutrient Runoff Law

NEW YORK DEPARTMENT OF TRANSPORTATION, ENGINEERING DIVISION, STANDARD SPECIFICATIONS (NYDOTSS)

Section 713	Landscape Development Materials

UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)

USDA Soil Classification Triangle	https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-03 Product Data

Seeding Schedule; FIO

The Contractor shall submit the schedule for the seed establishment and any modification to the schedule.

SD-07 Certificates

Seed Certification; G

Prior to the delivery of materials, submit certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following: classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested. Latin

binomials shall be used in all communications to ensure the proper plant species are used.

Topsoil; G

Prior to the delivery of materials, submit certificates of compliance attesting that topsoil meets the specified requirements. Submit certified copies of laboratory analyses, including laboratory visual observations and amendment recommendations.

Soil Amendments; G

Prior to the delivery of materials, submit certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

a. pH Adjuster. Calcium carbonate equivalent and sieve analysis.

b. Fertilizer. Chemical analysis and composition percent.

c. Soil Conditioner. Composition and source.

d. Solvita compost test results for carbon dioxide-carbon (CO_2-C)/gram organic matter/day

SD-11 Closeout Submittals

Maintenance Record; FIO

A record of each site visit shall be furnished as specified in this section.

1.5 INSPECTION, STORAGE, AND HANDLING

1.5.1 Inspection

Seed shall be inspected upon arrival at the job site for conformance to species and quality. Seed that is wet, moldy, or bears a test date 5 months or older, shall be rejected. Other materials shall be inspected for compliance with specified requirements. Unacceptable materials shall be removed from the job site.

1.5.2 Storage

Materials shall be stored in designated areas. Seed shall be stored in cool, dry locations away from contaminants.

1.5.3 Handling

Materials shall not be dropped or dumped from vehicles.

1.5.4 Time Limitation

Hydroseeding time limitation for holding seed in the slurry shall be a maximum of 24 hours.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with 7 CFR 201 and applicable state seed laws.

2.1.2 Temporary Seed Species

Temporary seedings may be necessary to provide cover when permanent seedings are likely to fail due to mid-summer heat or drought. Temporary seed species shall be as follows:

a. Grain Oats, Avena sativa: 30 lb per acre, planted January-August

b. Grain Rye, Secale cereale: 30 lb per acre, planted August-December (planted year-round on moist sites)

Annual rye (Lolium perenne/Lolium multiflorum) shall not be used for temporary cover.

2.1.3 Permanent Seed Species and Mixtures

Seed species and mixtures and application rates shall be as shown in the Contract Drawings. Seed must be sourced from 150 miles of the project site, if practicable. An emphasis should be placed on utilizing regionally sourced seed.

2.1.4 Seed Quality

Weed seed shall be a maximum 1 percent by weight of the total mixture.

2.1.5 Seed Mixing

The mixing of seed may be done by the seed supplier prior to delivery, or on site as directed by the Contracting Officer.

2.1.6 Seed Substitutions

Any proposed substitutions, if needed due to lack of availability, must be native to the region of the Site. If seed cannot be sourced from these areas, then it shall be sourced from as close to the Site as practicable. Substitutions will not be allowed without written request and approval from the Contracting Officer.

2.2 WATER

Surface water or water generated from site operations shall not be used for watering seed unless approved by the Contracting Officer.

Water used in this work shall be furnished by the Contractor and shall be suitable for irrigation and free from ingredients harmful to plant life or the environment. Hose, labor, materials, and other watering equipment required for the work shall be furnished by the Contractor.

Watering volumes should be based upon delivery of 1" of moisture per week to the tree if precipitation does not meet that amount during the active growing season defined as April 15th through November 1st until trees are established.

All mandatory water restrictions apply & non-municipal waters shall be used if at all possible.

2.3 TOPSOIL

Topsoil shall be tested to ensure it is free from chemical and radiological contamination as specified in SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL.

Topsoil for upland areas shall meet the requirements of ASTM D 5268 unless otherwise specified herein. Topsoil shall be friable and capable of promoting and supporting healthy plant growth when mixed with soil conditioners as specified. It shall be manufactured by mixing soil and amendments for as specified herein, to raise the organic content and meet criteria as specified.

Topsoil shall be imported material free of slag, cinders, stones 1-inch or greater in largest dimension, plants or their roots, sticks, clay clods, trash, invasive species listed in 6 CRR-NY 575, toxic substances or any material or substances and concentrations harmful to plant growth.

Samples of the topsoil shall be tested for soil texture, nitrate, nitrogen, ammonium nitrogen, phosphorus, potassium, calcium, aluminum, soluble salts, pH, and total sulfur by a public extension service/state agricultural laboratory or a certified private agricultural testing laboratory, subject to approval by the Engineer, in accordance with the current standards of the Association of Official Agricultural Chemists. The soil test report shall include laboratory recommendations for pH adjustment, fertilization, and any other amendments. Copies of test results and recommendations shall be submitted at least 60 days prior to anticipated soil delivery and placement.

The organic matter content for topsoil shall be by weight as determined by loss on ignition of moisture free test samples oven dried to a constant weight at a temperature of 100 degrees Centigrade. To adjust organic matter content, the soil may be amended with organic amendments as specified herein.

Soil texture analysis shall be performed using the following USDA textural classification system based on the percentage of clay (<0.002 millimeters [mm]), silt (0.05 to 0.002 mm) and sand (2 mm-0.05 mm) in the fine earth fraction. The percentage of sand, silt, and clay shall be compared against the USDA soil triangle at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_054167 to demonstrate conformance with the requirements of this specification.

Finished topsoil must meet all required characteristics herein after any amendments are added. Compost containing high levels of gravel, sand, silt, or clay, or high soluble salts, phosphorus, or any other material, must be used with care to ensure the finished product meets requirements.

Topsoil shall have the following characteristics:

a. Texture shall be sandy loam (with no more than 65% sand), loam, or sandy clay loam (with no more than 65% sand and no more than 30% clay)

b. Mineral soil content above 2 mm (gravel) shall be less than 5%.

c. pH between 6.0 and 7.0. The soil may be amended to correct pH prior to delivery to the site; however, the original topsoil must not have a pH lower than 5.5 or higher than 7.5

d. Soluble salts less than than 320 parts per million (ppm) / Electrical conductivity less than 0.5 millimhos/centimeter (mmhos/cm)

e. Total sulfur not more than 0.2%

f. Organic matter between 4% and 8%.

2.4 SOIL AMENDMENTS

Soil amendments shall consist of compost, pH adjuster, fertilizer and soil conditioners meeting the following requirements. Vermiculite shall not be used.

2.4.1 Compost

Compost material may be used as an organic amendment. The compost shall be a stable, humus-like material produced from the aerobic decomposition of organic residues. The residues may include yard wastes and agricultural wastes, however, mixed soil requirements for phosphorus and soluble salts must be met. The compost shall be of a dark brown to black color and be capable of supporting plant growth. The composted material shall have been stabilized so as not to have an unpleasant odor. An organic amendment not stabilized as specified herein and having an objectionable odor will be rejected.

The compost moisture content shall be such that no visible free water or dust is produced when handling it and the carbon:nitrogen ratio shall be in the range of 11:1 to 15:1.

Stability must be assessed by a respirometry test or Solvita test. Protocols for the respirometry test are specified in USCC TMECC 05.08-B. For the respirometry test, the compost respiration shall be no more than 2 milligrams carbon dioxide-carbon (CO_2-C)/gram organic matter/day. For the Solvita test, compost must have a minimum Solvita maturity index of 7. Compost that does not meet one of these criteria shall not be used.

The compost shall contain at least 40 percent organic matter (dry weight) and 100 percent of the material should pass a 3/8-inch (or smaller) sieve. Debris, such as metal, glass, plastic, wood (other than residual chips), asphalt or masonry, is not acceptable and compost containing such material will be rejected.

2.4.2 pH Adjuster

If the agricultural laboratory recommends pH adjustment, agricultural liming material or sulfur shall be used as appropriate. The pH adjuster shall be used to create a favorable soil pH for the plant material specified. The pH adjuster shall be applied at a rate as recommended based on the results of the soil test.

Agricultural liming material shall be in accordance with ASTM C602. These materials may be burnt lime, hydrated lime, or ground limestone. Sulfur shall be iron sulfate

2.4.2.1 Burnt Lime

Burnt lime shall contain a minimum calcium carbonate equivalent of 140 percent. A minimum of 95 percent shall pass through a No. 60 sieve.

2.4.2.2 Hydrated Lime

Hydrated lime shall contain a minimum calcium carbonate equivalent of 110 percent. A full 100 percent shall pass through a No. 8 sieve and a minimum of 97 percent shall pass through a No. 60 sieve.

2.4.2.3 Limestone

Limestone material shall contain a minimum calcium carbonate equivalent of 80 percent. A minimum of 95 percent shall pass through a No. 8 sieve and a minimum of 55 percent shall pass through a No. 60 sieve. To raise soil pH, ground limestone shall be used.

2.4.2.4 Iron Sulfate

Iron Sulfate to reduce soil pH shall be a soil conditioning product specifically manufactured for agricultural soil conditioning. Iron sulfate shall be a soil readily available form and shall contain a minimum of 6% sulfur and 15% water soluble iron. Iron sulfate shall be granulated product manufactured from natural sources and shall be 100% organic iron sulfate.

2.4.3 Fertilizer

Fertilizer such as nitrogen, phosphorus, potassium, trace minerals, and micronutrients shall be applied as recommended by the agricultural laboratory. Fertilizer shall be of controlled release commercial grade, free flowing, and uniform in composition. Nitrogen shall be derived from sulphur-coated urea, urea formaldehyde, plastic or polymer-coated pills, or isobutylenediurea (IBDU). Fertilizer shall be applied as recommended based on the results of the soil test in accordance with the Nutrient Runoff Law - NYECL Article 17, Title 21.

2.4.4 Soil Conditioner

Soil conditioner shall be for single use or in combination to meet requirements for topsoil. Gypsum shall be commercially packaged, free flowing, minimum 95 percent calcium sulfate by volume.

2.4.5 Straw Mulch

Straw mulches shall be stalks from oats, wheat, rye, barley, or rice and shall be furnished in air dry condition and with a consistency for placing with commercial mulch blowing equipment. Mulches shall be free from weeds, mold, and other deleterious materials, in addition to meeting the requirements of the NYDOTSS, Section 713-19.

2.4.6 Erosion Control Materials

Erosion control materials in upland areas shall be as specified in SECTION

01 57 13 - EROSION AND SEDIMENTATION CONTROL.

2.4.7 Fiber Mulch

Fiber mulch shall be a specially processed cellulose fiber containing no growth or germination-inhibiting factors. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous slurry. When sprayed on the ground, the material shall allow absorption and percolation of moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content. Fiber mulch shall meet the requirements of the NYDOTSS, Section 713-11.

PART 3 EXECUTION

3.1 SEEDING TIME AND CONDITIONS

3.1.1 Seeding Time

Seeding, mulching, and conditioning shall be performed at times established by common practice for the necessary establishment period. Seeding for the permanent seed mixes shall be between March 15 and May 15 or September 1 to September 15 unless otherwise approved by the Contracting Officer. Seeding during the dry season between May 15 and September 1 will require Contracting Officer approval and additional watering and irrigation.

3.1.2 Seeding Conditions

Seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the seeding operations, proposed alternate times shall be submitted for approval.

3.1.3 Equipment Calibration

Immediately prior to the commencement of seeding operations, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation.

3.2 SITE PREPARATION

3.2.1 Finished Grade

The Contractor shall verify that finished grades are as indicated on the Contract Drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with SECTION 31 00 00 - EARTHWORK, prior to the commencement of the topsoiling and seeding operation. Topsoil shall be placed to a minimum compacted depth of 6 inches in all disturbed areas not covered with stone or gravel surfaces.

3.2.2 Tillage

Soil on slopes up to maximum 3-horizontal-to-1-vertical shall be tilled to a minimum 4-inch depth. Rototillers shall be used where soil conditions and length of slope permit. Drainage patterns shall be maintained as

indicated on the Contract Drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH-adjuster, fertilizer, and soil conditioner may be applied during this procedure.

3.2.3 Prepared Surface

3.2.3.1 Preparation

The prepared surface shall be a maximum of 1 inch below the adjoining grade of any surfaced area. New surface shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris.

3.2.3.2 Lawn Area Debris

Debris and stones over a minimum 5/8-inch in any dimension shall be removed from the surface.

3.2.3.3 Protection

Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 INSTALLATION OF SEED

Prior to installing seed, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of Paragraph 3.2 herein. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

3.3.1 Installing pH Adjuster and Fertilizer

After the topsoil is placed and before it is raked to true lines and rolled, pH adjuster shall be spread evenly over the topsoil surface and worked into the soil with a disc, spring-tooth harrow, or other suitable equipment to at least half the depth of the topsoil. The pH adjuster shall be applied as determined by the soil test to bring the topsoil pH within the range of 6.0 to 7.0. If possible, pH adjuster shall be applied 2 to 3 months before the application of fertilizer. The pH adjuster shall not be mixed with fertilizer for application.

The fertilizer shall be applied at the rate recommended by the soil test report. Fertilizer shall be incorporated into the topsoil to a maximum 4 inch depth or may be incorporated as part of the tillage operation. Fertilizer shall not be included with hydroseeding operations. The Contractor shall use the minimum levels of application rates for applying fertilizer as indicated by the various soil tests.

3.3.2 Installing Seed

Seed Mixes may be applied by broadcast seeding or hydroseeding. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved. Absorbent polymer powder shall be mixed with the dry seed at the rate recommended by the manufacturer. Do not broadcast seed, or hydroseed, when the wind velocity is such as to prevent uniform seed distribution.

3.3.2.1 Broadcast Seeding and Rolling

Seed shall be applied at the rates specified in the drawings. Seed shall be uniformly broadcast using broadcast seeders. Half the total rate of seed application shall be broadcast in one (1) direction, with the remainder of the seed rate broadcast at 90 degrees from the first direction.

After all seed mixes for an area are applied, the entire area shall be firmed with a roller not exceeding 90 pounds per foot of roller width. Steep slopes (over a maximum 3-horizontal to 1-vertical) shall not be rolled.

3.3.2.2 Hydroseeding

Seed and fertilizer shall be added to water and thoroughly mixed. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Slurry shall be uniformly applied under pressure over the entire area. Mulch shall not be included in the tank with the seed. The hydroseeded area shall not be rolled.

3.3.3 Mulch

3.3.3.1 Mulch Application

Straw mulch shall be spread uniformly at a rate of 2 to 2.5 tons per acre, or between 90 and 115 pounds per 1,000 square feet. Fiber mulch shall be spread uniformly at a rate of 1 ton per acre, or 45 pounds per 1,000 square feet. Mulch shall be spread by hand, hydraulically, using a blower-type mulch spreader, or by another approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding to minimize the loss by wind or water. Mulch shall be bound in place with one of the binders described below or as specified by the SSCC Standards for Soil Erosion and Sediment Control as specified in SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

3.3.3.2 Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3.3.3.3 Non-Asphaltic Adhesive Tackifier

Hydrophilic colloid shall be applied at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. A uniform mixture shall be applied over the area.

3.3.3.4 Watering Seed

Watering shall be started immediately after completing the seeding of an area. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum depth of 1 inch. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf

areas, unless otherwise directed by the Contracting Officer. Watering of other adjacent areas or plant material shall be prevented.

3.4 SURFACE EROSION CONTROL

Where necessary, surface erosion control material shall be installed in accordance with the manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material or without deviation to finished grade. Non-biodegradable erosion control materials may only be used temporarily and must be completely removed prior to permanent seeding and planting.

3.4.1 Temporary Seeding

When there are contract or weather delays in the seeding operation, areas designated for permanent seeding that that will remain exposed for more than 30 days shall be straw mulched with a temporary seed mixture and non-asphaltic tackifier to prevent erosion, as directed by the Contracting Officer. Areas shall be permanently seeded as soon as possible once conditions permit. Areas to receive temporary seeding shall be protected against erosion and washout as follows:

a. Apply pH adjuster and fertilizer at the rate recommended by the soil test.

b. Work pH adjuster and fertilizer into the ground.

c. Apply temporary seed mixture as specified in Paragraph 2.1.2.

d. Apply fiber mulch at a rate of 45 pounds per 1,000 square feet.

3.4.2 Temporary Stabilization with Mulch Only

Areas that will be exposed for less than 30 days may be stabilized against erosion using only straw mulch or equivalent, if directed by the Contracting Officer. Mulch shall be spread uniformly at a rate of 2 to 2.5 tons per acre and in accordance with the New York State Department of Transportation Standard Specification (NYSDOTSS) 713-05 MULCH FOR PLANTING.

3.5 QUANTITY CHECK

For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed by the Contracting Officer.

3.6 RESTORATION AND CLEAN UP

3.6.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the seeding operation shall be restored to original conditions.

3.6.2 Clean Up

Excess and waste material shall be removed from the seeded areas and shall

be disposed of off-site. Adjacent paved areas shall be cleaned.

3.7 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the seeding operation in an area, the area shall be protected from traffic or other use.

3.8 SEED ESTABLISHMENT PERIOD

3.8.1 Commencement

The seed establishment period to obtain a healthy stand of plants shall end 3 months after the last day of the seeding operation. Written calendar time period shall be furnished for the seed establishment period. When there is more than one seed establishment period, the boundaries of the seeded area covered for each period shall be described. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

3.8.2 Satisfactory Stand of Plants

The Contractor shall provide at least 85 percent cover of all seeded areas with indigenous plant species within the establishment period as described in SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY. Bare spots may not be larger than 10 square feet. Areas not achieving the above requirement within the initial maintenance period shall be renovated.

3.8.3 Maintenance During Establishment Period

Maintenance of the seeded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.

3.8.3.1 Post-Fertilization

A maximum of 0.5 pound of actual available nitrogen per 1,000 square feet shall be provided to the plants. The application shall be timed prior to the advent of winter dormancy and shall be made without burning the installed plants.

3.8.3.2 Herbivory Control

Measures shall be taken during the establishment period to prevent excessive herbivory of the seed and establishing plants.

3.8.3.3 Repair or Reinstall

Unsatisfactory stand of plants and mulch shall be repaired or reinstalled, and eroded areas shall be repaired in accordance with Paragraph 3.2 herein.

3.8.3.4 Maintenance Record

A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reinstalled, and diagnosis for unsatisfactory stand of grass plants.

3.9 FINAL ACCEPTANCE

At the end of the Seed Establishment Period, a final inspection will be made. Final acceptance of the turf will be based upon a satisfactory stand of turf as defined in Paragraph 3.8, SEED ESTABLISHMENT PERIOD. Rejected areas shall be replanted or repaired as directed by the Contracting Officer.

3.10 WARRANTY

Site grading, plant and seed installation, establishment, and survival shall be warrantied by the Contractor for two years. Warranty is as specified in SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

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SECTION 32 93 00

FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING

PART 1 GENERAL

1.1 SCOPE OF WORK

Forested slope and riparian forest stabilization and planting refers to areas identified on the Contract Drawings, outside wetland areas.

Furnish all labor, materials, equipment and incidentals required to install erosion control measures, install plant stock, and maintain the restoration areas as specified herein and depicted on the Contract Drawings.

Restore all forested areas that are indicated to be restored or are temporarily altered by construction activities including herbicide application, clearing, excavation, and trenching during the course of construction to equal or better than that condition which existed previous to construction, using only species native to the region. All restoration work shall be as indicated in the contract documents.

The work includes:

a. Procure of all applicable licenses, permits (including transferring permits required to construct to the contractor), and fees.

b. Furnish and install all plant materials and erosion control blanket as shown on the Drawings and specified herein.

c. Prune plant materials as specified.

d. Maintenance and guarantee of all grading, materials, and plantings, including control of exotic species.

e. Final cleanup and all other work required to complete the requirements of this section.

1.2 RELATED WORK

SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL

SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL

SECTION 01 57 19 - ENVIRONMENTAL PROTECTION

SECTION 02 91 00 - SITE RESTORATION

SECTION 31 00 00 - EARTHWORK

SECTION 31 11 00 - CLEARING AND GRUBBING

SECTION 32 72 00 - STREAM RESTORATION

SECTION 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING

SECTION 32 92 19 - LOAMING AND SEEDING

SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY

1.3 REFERENCES

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z60.1	American Standard for Nursery Stock

THE BIOTA OF NORTH AMERICA PROGRAM

BONAP MAPPING	Kartesz, J.T., The Biota of North America Program (BONAP). 2015. North American Plant Atlas. (http://bonap.net/napa). Chapel Hill, N.C.

NEW YORK CODES, RULES, AND REGULATIONS (NYCRR)

6 CRR-NY 575	Prohibited and Regulated Invasive Species

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Forested Slope and Riparian Forest Planting Plan; G

The Contractor shall submit a Forested Slope and Riparian Forest Planting Plan at least 30 calendar days prior to the start of planting. No planting shall be performed until the Plan is approved. At a minimum, the Plan shall include all elements listed below:

a. Planting schedule tied into the overall construction schedule.

b. Personnel requirements.

c. Planting stock summary: a table listing all planting stock (Latin and common names, size, quantity) based on the Contract Documents, along with the name, address and contact phone number of the nursery/nurseries supplying the plant materials. Certification by the landscaping contractor that all plant stock obtained for this work is the plant indicated and of quality as specified. Latin binomials shall be used in all communications to ensure the proper plant species are used.

d. Planting stock availability: a written statement from each vendor that the planting stock has been reserved for the project, including Latin binomial and quantity reserved.

e. Figure showing planting locations of individual trees, shrubs, and herbaceous plantings.

f. Delivery schedule of plants.

g. Calendar time period for the plant establishment periods. When there is more than one establishment period, the boundaries of the planted areas covered for each period shall be described.

h. Maintenance plan and schedule for the forested slope and riparian forest maintenance period.

SD-04 Samples

Material Samples; G

Samples of all materials to be used in the forested slope and riparian forest areas shall be submitted for inspection and approval upon the Contracting Officer's request.

SD-07 Certificates

State Nursery Inspection Certificates and Samples; G

State Nursery Inspection Certificates and samples of material for all plantings shall be submitted for inspection and approval.

Plant Stock Certifications; FIO

Certification by the landscaping contractor that all plant stock obtained for this Work is the plant indicated and of quality as specified.

SD-10 Operation and Maintenance Data

Maintenance Instructions; G

Complete written instructions to maintain the forested slope and riparian forest plants for Contracting Officer use after the Contractor's two-year maintenance period expires.

As-Built Documentation; G

Documentation of the plantings as follows:

a. Complete survey of the different planting areas as installed.

b. Complete accounting of substitutions made, species, size and quantity of installed plants per restoration type.

1.5 INSPECTION, STORAGE, AND HANDLING

1.5.1 Inspection

Plant materials shall be inspected upon arrival at the job site for conformance to species and quality. Plants that are not as specified or do not show vigor will be rejected. Other materials shall be inspected for compliance with specified requirements. Unacceptable materials shall be removed from the job site.

1.5.2 Storage

Materials shall be stored in designated areas away from contaminants. Live plants not installed on the day of arrival at the job site shall be stored upright and protected until installation. Unless otherwise specified, all live plant materials will be used within 48 hours after delivery to the job site. Outside storage locations shall be continually shaded and protected from the wind. Bare root plant material shall heeled in, covered with straw, and protected from drying at all times.

1.5.3 Handling

Materials shall not be dropped or dumped from vehicles.

PART 2 PRODUCTS

2.1 FERTILIZER TABLETS

Fertilizer tablets shall be tightly compressed, long lasting, and slow release. Tablets shall be 5 grams with a nitrogen (N), phosphorus (P), and potassium (K) analysis of 20-10-5. Fertilizer tablets shall be Scott's Agriform 5-gram tablet or equal.

Fertilizer shall be delivered to the site in the original unopened containers each showing the manufacturer's certificate of compliance and guaranteed analysis and shall comply with the State and United States Fertilizer Laws. Store fertilizer so that when used it shall be dry and free flowing.

2.2 WATER

Fertilizer tablets shall be tightly compressed, long lasting, and slow release. Tablets shall be 5 grams with a nitrogen (N), phosphorus (P), and potassium (K) analysis of 20-10-5. Fertilizer tablets shall be Scott's Agriform 5-gram tablet or equal.

Watering volumes should be based upon delivery of 1-inch of moisture per week, broken into multiple applications and as specified herein, if precipitation does not meet that amount during the active growing season defined as April 15th through November 1st until trees and shrubs are established.

All mandatory water restrictions apply & non-municipal waters shall be used if at all possible

2.3 EROSION CONTROL BLANKET

Erosion control blankets shall meet the requirements provided in SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL.

2.4 PLANT MATERIALS

Due to the quantity of plants in this project, plants may need to be contract grown to ensure sufficient quantities are available at the proper planting time. The Contractor shall coordinate with nurseries prior to the start of the project to determine the general availability of the species and quantities to be used. Plants that are not expected to be available in the quantities needed shall be contract grown. The Contractor shall submit a list of each species showing quantities and the

method of procurement prior to the start of the project. Seed or stock used for propagation shall be from areas within the USDA hardiness zone 5b through 7a. Plants shall be nursery grown under climatic conditions similar to those in the locality of the project and shall conform to the variety and sizes indicated.

All plant stock shall be furnished in the condition required herein and as accepted by the Contracting Officer. All plant stock shall be labeled by common name and Latin binomial and certified as the correct species by the plant supplier.

2.4.1 Trees and Shrubs

a. A complete list of plants is provided on the Contract Drawings.

b. Furnish plants in quantities required to complete the work as indicated on the Drawings.

c. Nomenclature is in conformance with standard horticultural practice in the area. Plants are to be delivered to the site with tags bearing the Latin binomial name as indicated by the plant list. In all cases, Latin binomial names take precedence over common names.

d. All plants shall be typical of their species or variety and shall have a normal habit of growth. All plants shall be freshly dug or container grown. No heeled-in plants or plants from cold storage shall be used. Plants shall be sound, healthy and vigorous, well-branched, and densely foliated when in leaf; shall be free of disease, insect pests, eggs, or larvae, and shall have healthy, well-developed root systems. All parts of the plant shall be moist and shall show active green cambium when cut to demonstrate plants are healthy and vigorous. Plants shall be prepared for shipment in a manner that will not cause damage to branches, shape, and future development after planting.

e. Plants must conform to the requirements of ANSI Z60.1. All plants are subject to inspection.

f. Container-grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole. No plants shall be loose in the container. Container stock shall not be root-bound and the root collar should be at the soil level.

g. If larger plants than indicated on the plans are used, upon acceptance by the Contracting Officer, the spread of roots or ball of earth shall be increased in proportion to the size of the plant.

h. Plants smaller than indicated on the plans will not be accepted.

i. Plants shall be handled so that roots are adequately protected at all times from drying out and from other injury. Plants must be stored in the shade after delivery. Keep all plant roots moist before, during, and after planting.

2.4.2 Bare Root Whips

a. Bare root whip species and sizes shall be as shown on the Contract Drawings, dug during dormancy when no leaves are present.

b. Bare root whips and shall meet the length and diameter shown on the contract drawings and shall be trimmed to remove side shoots that may be damaged in transit.

c. Bare root whips not installed on the day of arrival at the job site shall be stored and protected until installation. Unless otherwise specified, all live plant materials will be used within 48 hours after delivery to the job site. Outside storage locations shall be continually shaded and protected from the wind. Bare root plant material shall be heeled in, covered with straw, and protected from drying at all times.

d. During transportation, the bare root whips shall be placed on the transport vehicles in an orderly fashion, to prevent damage and to facilitate handling. The whips shall be covered with a wet tarp or burlap material during transportation.

e. Upon arrival at the construction site, bare root whips shall be inspected for acceptability. Only healthy, well-formed, well-rooted, and disease-free stock shall be acceptable.

f. Prior to installation, bare root whips must be soaked in water for 8 hours.

2.4.3 Inspection of Plant Materials

a. Inspection of plants before digging or shipment from the nursery shall be at the option of the Contracting Officer. Contractor shall be present, if requested by Contracting Officer, for inspection of plants at nursery.

b. Plants shall be subjected to inspection and approval upon delivery for conformity to specified requirements as to quality, size and variety. Such approval shall not impair the right of inspection and rejection during the progress of the work.

c. Plants shall be accompanied by State Nursery inspection certificates.

d. No plants will be accepted with plastic burlap or if the ball is cracked or broken.

2.5 COMPONENTS

Coir logs shall be made of biodegradable unsorted, double-cleaned, well-graded 100% coir fibers encased in a 2-inch by 2-inch rhombic coir outer netting with hand knotted junctions consisting of 3-ply 0.40-inch diameter coir fiber with an outer netting breaking strength of 90 pounds (lbs). Core density shall be 7.0 pounds per cubic foot (lbs/cu.ft). Unit weight of the coir log shall be 15.3 pounds per foot (lbs/ft). Provide 2-inch x 2-inch hardwood stakes to anchor coir logs. Stakes shall be a minimum of 36-inches long and be notched 4-inches below the top of stake to provide anchoring for rope lashing. Lashing shall be a minimum of 1/4-inch in diameter and shall consist of a natural biodegradable material.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall restore the forested slopes and riparian forests as

indicated on the contract documents. Restoration shall include maintenance of the forested slopes and riparian forests for two years.

3.2 EROSION CONTROL BLANKET

I mmediately after seeding riparian forest, install the erosion control blanket to reduce seed loss from erosion.

Erosion control blanket shall be installed in accordance with manufacturer's instructions and as per the Contract Drawings. The Contractor shall provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. The blankets shall be unrolled and applied in the direction of water flow, without stretching, such that it will lie smoothly but loosely on the soil surface. Blankets shall be placed parallel to the stream flow in the riparian forest and staked together in accordance with manufacturer's instructions. Side overlaps shall be 4 inches minimum. The biodegradable stakes shall be driven vertically into the ground, spaced according to the manufacturer's recommended most dense pattern, at least approximately two linear feet apart, on each side, and one row in the center alternately spaced between each side. Upper and lower ends of the matting shall be buried to a depth of 6 inches in a trench if not wrapped under a coir log. The bottom of the fold shall be 6 inches below the ground surface. Stake on both sides of fold. Where the matting must be cut or more than one roll length is required in the channel, turn down upper end of downstream roll into a slit trench to a depth of 6 inches. Overlap lower end of upstream roll 4 inches past edge of downstream roll and stake.

3.3 COIR LOG INSTALLATION

Coir logs shall be installed in the following manner:

a. Prior to coir log installation, final grade shall be smooth, free of rocks, sticks, and existing vegetation.

b. Logs shall be installed to a depth of one-third of the log diameter embedded in the slope. Logs shall maintain solid contact with the soil and be installed in a manner that minimizes gaps between the bottom of the log and the underlying substrate.

c. Where installed along steep slopes that will receive erosion control blanket in accordance with SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL, create a trench to receive the coir log prior to blanket installation. Install blanket along the bottom of the trench such that it will accommodate 1/3 of the coir log without being too tight.

d. Where located adjacent to open water, install logs at the toe of the bank slope.

e. Drive alternately spaced hardwood stakes into the soil along either side of the log until the top of the stake is approximately 4-inches above the log. The stakes should be between 3 to 4-feet long, depending upon application, a minimum of 1.25-inch thick, and spaced 2 to 3-feet apart.

f. Notch hardwood stakes approximately 4-inches below the top of the log deep enough to ft a 1/4-inch nylon rope.

g. Crisscross the rope over the top of the log. When complete, drive stakes down until rope is tight against the log. Cut off excess from stakes so that they are flush with the top of the installed log.

h. When installing multiple logs in a line, the line should be at a consistent elevation along the slope as shown in the drawings (not running up or down slope). Couple adjacent logs together with supplemental rope made of a natural bio-degradable connected to abutting log ends. Connections between spliced logs shall extend 6-inches beyond the end of each log and be independently affixed to each knot in the outer cover of both logs. No gap shall exist between spliced logs. Staking of adjacent logs shall be no more than 18-inches from the splice.

3.4 ORESTED SLOPE AND RIPARIAN FOREST PLANTING PLAN

Contractor shall submit plan and schedules to the Government for approval 30 days prior to planting and seeding. The forested slopes and riparian forests shall be planted after seed application and erosion control blanket, if applicable.

Planting operations shall be performed only during periods when beneficial results can be obtained. When drought, flooding, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the planting schedule, proposed alternate times shall be submitted for approval.

3.5 HANDLING AND PROTECTION OF PLANTS

Contractor shall handle plants so as to not damage stems, roots, root balls, leaves, or any other living part except for appropriate pruning before or after planting. Contractor shall keep plants moist and in good condition at all times. Plants that have wilted, been subject to drying, overwatering, sunscorch, or drying/damaging winds, or otherwise damaged after delivery from the nursery shall be rejected by the Government.

Contractor shall not bind any plant with wire or rope at any time in a manner that may damage the bark, plant tissue, or break branches.
HANDLING AND PROTECTION OF PLANTS

3.6 PLANTING OPERATIONS

3.6.1 Planting

a. Planting pits will be circular in outline with roughened, sloped sides. Remove an area of the erosion control mat equal to the size of the planting pit. Dig a hole equal to the depth and three times the diameter of the root ball. Planting pits will be dug so that the top of the root ball is level or approximately 1- to 2-inch above final grade to account for settling. Backfill material for all pits shall consist of the existing material (loam) as excavated from the pit.

b. Plants shall be set in center of pits plumb and straight and at such a level that after settlement, the crown of the plant ball will be at the surrounding finished grade. Crowns may not be planted below finished grade.

c. Remove and dispose of containers prior to planting. To encourage

immediate root development, the outer one-half inch of the root ball shall be gently loosened. Prune away any circling roots.

d. All burlap, rope, wire and similar materials shall be removed from all plants and disposed of off-site.

3.6.2 Backfilling Plants and Fertilizing

a. Backfill the plant pits halfway and place the number of fertilizer tablets recommended by the manufacturer in each hole, about 1 to 2 inches away from the root tips. Do not place fertilizer tablet in the bottom of the hole. After placement of fertilizer, continue backfilling plant pits.

b. When plants are set, loam shall be tamped lightly. Loam shall not be packed so firmly as to drive out all the fine air spaces needed for a well aerated soil.

c. To complete backfilling, ensure that plant crown is level with the surrounding grades and that the top of the root ball is not covered with loam. Immediately after the plant pit is backfilled, a saucer or shallow basin slightly larger than pit shall be formed with a ridge of soil to facilitate and contain watering.

d. Directly after backfilling/planting, each plant will be deep watered to thoroughly saturate the entire planting pit as specified in Paragraph 3.9.

e. A 3-inch thick (after settlement) layer of mulch shall be applied to the entire area of each saucer for trees and shrubs. No mulch shall come in contact with the tree or shrub and shall be at least 3- to 4-inches away from the root collar.

3.7 PRUNING AND STAKING

Each plant shall be pruned at the time of planting in accordance with ANLA standards to remove dead or broken branches and to preserve the natural character of the plant and as directed by the Contracting Officer.

Pruning shall be done with clean, sharp tools.

Each plant shall be staked in accordance with the drawings.

3.8 OBSTRUCTIONS BELOW GROUND

In the event that underground boulders or obstructions are encountered in any pit excavation work under this Contract, alternate locations may be selected by the Contracting Officer and plants shall be installed therein.

3.9 WATERING

The Contractor shall water the planted areas as necessary for establishment during maintenance period.

Watering shall be started immediately after planting. Plants shall be saturated with water twice within the first 24 hours of the time of planting. Watering shall be accomplished to allow the planting hole to be filled. Watering volumes should be based upon delivery of 1" of moisture per week to trees and shrubs if precipitation does not meet that amount

during the active growing season defined as April 15th through November 1st until trees are established. Watering of seeded areas within the forested slope and riparian forest areas is as specified in SECTION 32 92 19 - LOAMING AND SEEDING.

3.10 MAINTENANCE PERIOD

The Contractor shall perform maintenance and monitoring of the restored areas as described in SECTION 32 93 10 - RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY.

A typical growing season at the site is between May 1st and October 15th. The initial maintenance period shall encompass at least one complete growing season, to include one full winter through the beginning of the next growing season.

3.11 INSPECTIONS

3.11.1 Initial, Interim, and Final Inspections

-- End of Section --

SECTION 32 93 10

RESTORATION MAINTENANCE, MONITORING, INSPECTIONS, AND WARRANTY

PART 1 GENERAL

1.1 SCOPE OF WORK

The wetland maintenance, monitoring, inspections, and warranty shall apply to the stream restoration, the forested, scrub-shrub, and emergent wetlands, submerged aquatic vegetation (SAV) plantings, forested floodplain, and forested slope areas. Plantings, grading, erosion control, structural elements, and all other work on these portions of the project are included under this section.

All aspects of the stream restoration, the forested, scrub-shrub, and emergent wetlands, SAV plantings, forested floodplain shall be guaranteed for two years following provisional acceptance. All aspects of the forested slope shall be guaranteed for one year following provisional acceptance, to include a full growing season, winter, and following spring greenup. Maintenance, monitoring, and inspections shall take place during this period as specified herein. Plant materials shall be warrantied throughout this period.

All plant materials are to be guaranteed to root and thrive free from defects from any cause until the end of the warranty period. Plants must be replaced when they are no longer in a satisfactory condition as determined by the Contracting Officer prior to final acceptance and prior to the end of the warranty period. Make replacements within 7 days of notification from the Contracting Officer unless approved otherwise. In the event that replacements need to be contract grown, the affected area shall be stabilized and replacement plants obtained as soon as feasible.

All replacements shall be of the same kind and size as originally specified and shall be installed as described in the contract documents.

Guarantees shall apply to originally specified and installed plants, any substitutions, and other landscape materials, and any replacements made during the construction period and during the warranty period.

Guarantees shall also apply to slopes, grading, stream bed, stream banks, in-stream structures and habitats, and hardened features. Failure or washout of these features shall be repaired or replaced during the warranty period.

Areas requiring renovation and/or replanting during the guarantee period shall receive an additional year's guarantee, ending no sooner than the end date of the original guarantee. Replacement plants shall be similarly warrantied. Renovation and/or replanting shall follow the pertinent specifications within the Contract Documents.

Herbicide: Coordinate type of herbicide with the Contracting Officer. Use of any herbicide requires approval from the Contracting Officer prior to application.

1.2 RELATED WORK

SECTION 01 35 45 - CHEMICAL DATA QUALITY CONTROL

SECTION 01 57 13 - EROSION AND SEDIMENTATION CONTROL

SECTION 01 57 19 - ENVIRONMENTAL PROTECTION

SECTION 02 91 00 - SITE RESTORATION

SECTION 31 00 00 - EARTHWORK

SECTION 31 11 00 - CLEARING AND GRUBBING

SECTION 32 72 00 - STREAM RESTORATION

SECTION 32 80 00 - WETLAND AND SAV RESTORATION AND STREAMBANK PLANTING

SECTION 32 92 19 - LOAMING AND SEEDING

SECTION 32 93 00 - FORESTED SLOPE AND RIPARIAN FOREST STABILIZATION AND PLANTING

1.3 CHANGES AND VARIATION

The Contractor, only with written permission from the Contracting Officer, may alter the original design, materials, material condition, quantities, species, and location of plantings or project elements as required by unanticipated changes in the site.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Restoration Maintenance and Monitoring Plan; G

The Contractor shall submit a Restoration Maintenance and Monitoring plan Plan that will be part of the Contractor's Wetland Restoration Plan submittal. The Restoration Maintenance and Monitoring Plan shall be implemented by the Contractor for a two-year period and shall be utilized during the site inspections specified below. The Restoration Maintenance and monitoring Monitoring plan Plan shall include the following:

a. Wetlands and SAV: the Restoration Maintenance and Monitoring Plan shall focus on obtaining both qualitative and quantitative data on the plant community and documenting the establishment of wetland hydrology during the growing season, development of hydric soil characteristics, and establishment of wetland and SAV plant communities.

b. Stream: The Restoration Maintenance and Monitoring Plan shall focus on collecting qualitative and quantitative data documenting the establishment of stream restoration including stream bank

vegetation and stability of the stream banks, stream bed, grade control structures, SAV pool, and any other stream features.

c. Upland slope and floodplain: The Restoration Maintenance and Monitoring Plan shall focus on collecting qualitative and quantitative data documenting the establishment of floodplain and upland vegetation and stabilization of soils.

d. Reporting requirements shall be included to keep project personnel and regulatory agencies informed of progress and/or problems. The plan shall also include provisions for implementing remedial actions, if necessary, and any long-term site management recommendations.

e. As part of the Restoration Maintenance and Monitoring Plan, a minimum of 6 permanent wetland monitoring stations will be identified within the warrantied areas as shown on the Contract Drawings. Additional monitoring stations shall be added if directed by the Contracting Officer.

f. The monitoring stations shall be permanently marked with 3-inch PVC pipe extending at least 5 feet from the ground and photographs facing the cardinal compass directions from the fixed point shall be taken prior to commencement of site preparation. Following completion of grading and planting, and for each of the four inspection events specified below during the monitoring period, photographs shall be taken facing the cardinal compass points from the fixed monitoring point and for each photo the inspector shall note the date, time, weather, and relevant observations.

g. The Restoration Maintenance and Monitoring Plan shall document how, during each of the inspections specified below, the Contractor and Contracting Officer will inspect the permanent wetland monitoring stations in detail, as well as perform a more general inspection of all of the restored areas. Within the monitoring stations, the concentric plant sampling protocol and plot forms established by USACE and described in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0) shall be followed to document: the species present and their occurrence within the wetland restoration area; field indicators of hydric soil development or lack thereof; and wetland hydrology indicators. Qualitative assessments shall include visual inspections of the condition of the planting efforts and natural re-colonization, hydrologic conditions, and observations of wildlife use for each monitoring station as well as the overall wetland restoration. Any areas of dead or stressed vegetation, washouts, exotic species growth, or other deficiencies shall be noted and photographed.

h. The Restoration Maintenance and Monitoring Report shall detail the approaches, methods, and materials that will be used by the Contractor for vegetation maintenance, including pruning, watering, controlling exotic species, and general site maintenance through the warranty periods. All completed maintenance shall be described in the report with dates completed.

SD-10 Operation and Maintenance Data

Restoration Maintenance and Monitoring Report; G

The Contractor shall complete and submit Restoration Maintenance and Monitoring Inspection Reports no later than 30 days following each wetland/shoreline inspection, summarizing the findings of the inspections, any deficiencies noted by the Government, and the corrective actions taken to address the issue. Include wetland documentation forms, photographs at the permanent monitoring stations, a narrative summary of the inspection finds, and records for each maintenance visit performed.

Long-Term Restoration Maintenance Instructions; G

The Contractor shall provide long-term maintenance instructions for use by the Government for maintenance beyond the Contractor's specified maintenance periods.

1.5 CERTIFIED WETLAND SCIENTIST

The Contractor shall provide the services of a Wetland Scientist (WS) to supervise restoration maintenance and monitoring work.

1.6 DEFINITIONS

Growing Season: The growing season for wetlands and shorelines shall be between May 1 and September 30.

Installation Inspection: an inspection performed by the Contracting Officer with the Contractor after installation of restored areas, including grading, plantings, seeding, erosion control blankets and coir logs, and all other aspects of the installations.

Establishment Period: A 12-week period following the completion of all planting and seeding being performed in a given year.

Initial Inspection: an inspection performed by the Contracting Officer with the Contractor of all restored areas, including grading, plantings, seeding, erosion control blankets and coir logs, and all other aspects of the installation. The Initial Inspection is performed after the 12-week Establishment Period

Provisional Acceptance: Acceptance by the Contracting Officer that the plantings and seeded areas are establishing satisfactorily, and all areas are stabilized as specified in the Contract Documents.

Substantial Completion: The Contracting Officer will deem restored site areas (wetlands, stream, floodplains, and forested slope) as substantially complete upon request by the Contractor after Provisional Acceptance of said areas and in accordance with SECTION 01 78 00 - PROJECT CLOSEOUT.

Interim Inspection: an inspection performed by the Contracting Officer with the Contractor one year after Substantial Completion. The interim inspection will evaluate the progress of the development of the restored areas and identify any additional corrective actions to be taken by the Contractor.

Final Inspection: an inspection performed by the Contracting Officer with the Contractor two years after Substantial Completion. The final inspection will be used to determine whether the requirements of this section and the restoration specifications have been met.

Final Acceptance: In accordance with SECTION 01 78 00 - PROJECT CLOSEOUT, the Contracting Officer will certify in writing the final acceptance of the restored areas, including wetlands and SAV, streambanks, stream bed, instream structures, forested floodplain, and forested slope when all requirements of this section have been fulfilled.

1.7 WARRANTY/GUARANTEE

For a period of two years from the date of Substantial Completion, the Contractor warrants to the Government that grading, stabilization, and plantings in the streambed and stream banks, instream structures, wetlands, SAV pool and plantings, forested floodplains, and forested slope conform to their respective specifications and are free from defects in materials and workmanship. The Contractor shall provide maintenance during the warranty period. The Contractor shall inspect the work at the beginning and end of each growing season and shall replace any work found to be defective within said warranty period. Such replacement shall include the cost of renovation and/or removal and reinstallation.

All plant materials are to be guaranteed to root and thrive free from defects from any cause until the end of the warranty period. Plants must be replaced when they are no longer in a satisfactory condition as determined by the Contracting Officer prior to final acceptance and prior to the end of the warranty period. Make replacements within 7 days of notification from the Contracting Officer unless approved otherwise.

All replacements shall be of the same kind and size as originally specified and shall be installed as described in the contract documents.

Guarantee shall apply to originally specified and installed plants, any substitutions, established final grades, erosion control products, riprap and other in stream structures, and other landscape materials, and any replacements made during the construction period and during the warranty period. Areas requiring renovation or replanting during the guarantee period shall receive an additional year's guarantee, ending no sooner than the end date of the original guarantee. Replacement plants shall be similarly warrantied.

PART 2 PRODUCTS

2.1 HERBICIDE

Coordinate type of herbicide with the Contracting Officer. Use of any herbicide requires approval from the Contracting Officer prior to application. Any herbicide used must be appropriate for use in aquatic conditions.

2.2 PLANT MATERIALS AND SEED

Plant materials and seed used during the warranty period shall conform to the requirements of the specification section in which they were specified.

2.3 OTHER MATERIALS

Permanent Monitoring Stations: Stations shall be marked with 3-inch white PVC pipe extending a minimum of 5 feet from the ground surface and buried a minimum of 3 feet or more as needed to ensure stability. The PVC pipe

shall be labeled with a permanent identifier such as self-adhesive numbers suitable for outdoor use.

All materials and products used during the warranty period for renovation of any areas shall conform to the requirements of the specification section in which they were specified unless specifically approved by the Contracting Officer.

2.4 WATER

Water used in this work shall be furnished by the Contractor and shall be suitable for irrigation and free from ingredients harmful to plant life. Hose, labor, materials, and other watering equipment required for the work shall be furnished by the Contractor.

Watering volumes should be based upon delivery of 1" -inch of moisture per week to the tree if precipitation does not meet that amount during the active growing season defined as April 15th through November 1st until trees are established.

All mandatory water restrictions apply & non-municipal waters shall be used if at all possible.

PART 3 EXECUTION

3.1 INSTALLATION INSPECTION AND MAINTENANCE FOR PROVISIONAL ACCEPTANCE

Maintenance shall begin after each plant is planted and each area seeded. When planting and seeding operations are complete for all work being performed in a given year, and permanent monitoring stations installed, the Contractor shall request an Installation Inspection of the work by the Contracting Officer. The Contracting Officer shall inspect said work for compliance with the plans and specifications specifically with regard to number of plants, plant sizes, species, and location. Any and all corrective work identified during the inspection shall be performed. If plantings and seeded areas are accepted, a 12-week establishment period shall begin for provisional acceptance.

Maintenance shall include watering as needed for plant establishment, reseeding as needed, control of exotic species, control of herbivory and insect pests, and replacement of failed, dying, diseased, injured, or otherwise unsuccessful plants.

Contractor shall provide water and irrigation appurtenances. Contractor shall provide adequate irrigation of seeded and planted areas to ensure germination and establishment.

3.2 PROVISIONAL ACCEPTANCE

The Contractor shall keep all planted and seeded areas watered within the work areas and in good condition, reseeding and/or replanting areas if and when necessary until a good, healthy, uniform growth is established over the entire area.

At the end of the 12-week establishment period, the Contracting Officer will perform an Initial Inspection of all work for provisional acceptance. The Contractor shall submit a written request to the Contracting Officer for the Initial Inspection at least ten days before the anticipated date of inspection.

The establishment period must occur during the growing season as defined herein.

A satisfactory planted and seeded, and stabilized area will be defined as an area that has:

a. No vegetation stressed by drought, insects, disease, nutrient deficiency, or any other condition.

b. No bare spots larger than 10 square feet.

c. No more than 5 percent of total area with bare spots.

d. No invasive and/or exotic plant species or vines (native or exotic).

e. No soil erosion, washout, rilling, or gullying.

f. All instream structures, riprap, and permanent erosion control features are stable and in their specified locations and conditions.

At the Initial Inspection, areas will be defined by the Contracting Officer as "approved," or "not approved." Areas noted as "approved" shall have sufficient planting coverage and quality. Areas noted as "not approved" are subject to immediate correction by the Contractor. Any and all corrective work identified during the inspection shall be performed until acceptance by the Contracting Officer.

After all necessary corrective work and clean-up has been completed, the Contracting Officer will certify in writing the provisional acceptance of the planted and seeded areas.

After Provisional Acceptance is granted of the wetland and shoreline areas, the Contractor may request a determination of Substantial Completion for those areas.

3.3 MAINTENANCE

The Contractor shall perform maintenance of the restored areas, beginning immediately after areas are planted and seeded, and continuing for a period of two full years following Substantial Completion.

The Contractor shall provide at least 85 percent cover of all restored areas (evenly distributed cover throughout these areas) with plant species native to the immediate region within one year of Substantial Completion, and shall ensure that plantings continue to exhibit 85% coverage two years following Substantial Completion, and plantings are growing such that, in wetlands and streambanks, 85% coverage continues to be provided and will reasonably be expected to exist 5 years after Substantial Completion.

The Contractor shall ensure that all restored areas exhibit:

a. No vegetation stressed by drought, insects, disease, nutrient deficiency, or any other condition.

b. No bare spots larger than 10 square feet.

c. No more than 5 percent of total area with bare spots.

d. No invasive and/or exotic plant species or vines (native or exotic).

e. No soil erosion, washout, rilling, or gullying.

f. All instream structures, riprap, and permanent erosion control features are stable and in their specified locations and conditions.

Maintenance shall be monitored and measured by the inspections specified below. If required, corrective measures shall include reseeding, additional plantings, removal of any dead plants, removal of exotic species or invasive species listed in 6 CRR-NY 575: Prohibited and Regulated Invasive Species (in a manner to ensure that they will cover less than 5% of the site at the next inspection) and replacement with new plants, additional watering, or other measures as deemed necessary by the Contracting Officer.

Maintenance shall be performed no later than 30 days after deficiencies or maintenance needs are noted in the field, unless otherwise approved by the Contracting Officer.

3.4 MONITORING AND INTERIM INSPECTION

The Contractor shall perform monitoring per the approved monitoring plan. Monitoring shall occur twice each growing season: once at the beginning of the season and once near, but prior to, the conclusion of the season. Maintenance and monitoring reports shall be submitted per the approved monitoring plan. The monitoring reports shall outline corrective maintenance measures to be performed by the Contractor, as well as a log of all corrective maintenance measures performed to date. Maintenance and monitoring reports shall be submitted to the Contracting Officer no later than 14 days following each monitoring event.

The Contracting Officer will perform an Interim Inspection of all work one year following Substantial Completion. The Interim Inspection must take place during the growing season as defined herein.

The Contracting Officer and Contractor will inspect said work for vitality, stability, survival of planted vegetation, establishment of seed, and compliance with the requirements for cover as outlined in Paragraph 3.3 of this Section. If it is evident in the opinion of the Contracting Officer that these requirements are not met the Contractor shall immediately supplement the plantings as necessary to achieve the required coverage. Any and all corrective Work identified during the inspection shall be performed until acceptance by the Contracting Officer.

Twice annual monitoring shall continue by the Contractor after the Interim Inspection for the duration of the Warranty period.

3.5 FINAL INSPECTION AND FINAL ACCEPTANCE

At the conclusion of the Contractor's two-year maintenance period, the Contracting Officer and the Contractor will perform a Final Inspection of the restored areas and the permanent monitoring stations. The Contractor shall notify all parties of the inspection date with written request at least 10 days prior to the anticipated inspection date.

The Contracting Officer and Contractor will inspect said work for vitality and compliance with the 85 percent survival and coverage requirement.

Qualitative and quantitative data shall be collected per the Restoration Maintenance and Monitoring Plan for all restored areas.

If two years after Substantial Completion, 85 percent plant survival and coverage has not been maintained, the Contractor shall provide and plant additional trees, shrubs, and ground cover as directed by the Contracting Officer.

In addition, exotic species or invasive species listed in 6 CRR-NY 575: Prohibited and Regulated Invasive Species must cover less than 5% of the site and be estimated to cover less than 5% at the next inspection.

Satisfactory vegetation and site restoration shall be defined as having:

a. Met the requirement for 85 percent plant survival and 85 percent coverage with native species.

b. No vegetation stressed by drought, insects, disease, nutrient deficiency, or any other condition.

c. No bare spots larger than 10 square feet.

d. No more than 5 percent of total area with bare spots.

e. No invasive and/or exotic plant species or vines (native or exotic).

f. No soil erosion, washout, rilling, or gullying.

g. All instream structures, riprap, and permanent erosion control features are stable and in their specified locations and conditions.

Planted and seeded areas not demonstrating satisfactory stands as outlined above, and any areas that are unstable, have slumped, gullied, or washed out, as determined by the Contracting Officer, shall be renovated, reseeded and/or replanted and maintained meeting all requirements as specified herein.

Any corrective work shall receive an additional one year warranty, including maintenance, monitoring, inspections, and reporting, as specified herein.

The Contracting Officer will certify in writing the final acceptance of the wetland and shoreline areas when all requirements of this section have been fulfilled.

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SECTION 33 05 16

PRECAST CONCRETE MANHOLES AND STRUCTURES

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to install precast concrete manholes, manhole frames and covers, precast concrete structures and appurtenances for the gravity bypass pipe as shown on the Contract Drawings and as specified herein.

1.2 REFERENCE STANDARDS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

ASTM International (ASTM)

ASTM A48	Standard Specification for Gray Iron Castings
ASTM A615	Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C207	Standard Specification for Hydrated Lime for Masonry Purposes
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections using Preformed Flexible Joint Sealant
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box for Culverts, Storms Drains and Sewers
ASTM D4101	Standard Specification for Propylene Plastic Injection and Extrusion Materials

American Concrete Institute (ACI)

ACI 318	Building Code Requirement for Structural Concrete

ACI 350	Code Requirements for Environmental Engineering Concrete Structures

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-01 Pre-Construction Submittals

Pre-Cast Structure Package; G

The Contractor shall submit shop drawings, product data, materials and details of construction, reinforcing and joints. Submittals shall include at least the following items:

a. Base sections, riser sections, flat slab tops, grade rings with notarized certificate indicating compliance with ASTM C478.

b. Headwall plans and sections stamped by a Professional Engineer registered in the State of New York.

e. Method of repair for minor damage to precast concrete sections.

f. Manhole steps

g. All design data in accordance with ASTM C478 for precast manholes.

Submit for review and approval, buoyancy calculations for the precast manholes, including assumptions and design references. If required by buoyancy calculations, submit design calculations and details for hold-down slab and anchorage to the precast manholes including assumptions and design references. Calculations shall be prepared and stamped by a Professional Engineer registered in the State of New York.

Concrete design mix data and concrete test cylinder reports from an approved concrete testing laboratory certifying that the concrete used in the precast concrete elements conforms with the strength requirements specified herein.

1.4 QUALITY ASSURANCE

All material shall be new and unused.

The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Government, or other representative of the Government. Such inspection may be made at the place of manufacture, or on the work after delivery, or at both places and the materials shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein; even though samples may have been accepted as satisfactory at the place of manufacture. Material rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. All

materials which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced.

At the time of inspection, the materials will be carefully examined for compliance with the ASTM standard specified herein and this Section and with the approved manufacturer's drawings. All precast sections shall be inspected for general appearance, dimension, "scratch-strength", blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured.

Imperfections in precast concrete sections may be repaired, subject to the approval of the Government, or other representative of the Government, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 pounds per square inch (psi) at 7 days and 5,000 psi at 28 days, when tested in 3-inch by 6-inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Government.

PART 2 PRODUCTS

2.1 GENERAL

Reference to a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

Like items of materials/equipment shall be the end products of one manufacturer in order to provide standardization for appearance, operation, maintenance, spare parts and manufacturer's service.

Provide lifting lugs or holes in each precast section for proper handling.

Cement shall conform to ASTM C150, Type II cement or equal.

Deformed concrete reinforcing bars shall conform to ASTM A615, Grade 60.

Precast concrete sections shall be properly cured prior to shipping. Precast concrete sections shall not be shipped before concrete has attained 3,000 psi compressive strength and not before 5 days after fabrication and/or repair, whichever is longer.

Mark date of manufacture, name and trademark of manufacturer on the inside of each precast section.

2.2 PRECAST CONCRETE MANHOLE SECTIONS

Precast concrete base sections, riser sections, flat slab tops and grade rings shall conform to ASTM C478 and meet the following requirements:

a. Design precast concrete base and flat slab top for its own weight, weight of soil at 130 pcf, and a live load equal to AASHTO H-20 truck loading applied at finished grade.

b. The wall thickness shall not be less than 5-inch for 48-inch diameter reinforced barrel sections, 6-inch for 60-inch diameter reinforced barrel sections and 7-inch for 72-inch diameter reinforced barrel

sections.

c. Bottom slab thickness shall be no less than the riser wall thickness or flat slab top thickness whichever is greater.

d. Base, riser and flat slab top sections shall have tongue and groove joints.

Prevent flotation with groundwater level at finished grade by dead weight of the manhole and soil above the manhole. Do not consider skin friction, soil friction or weight of equipment or contents in manhole. Flotation safety factor shall not be less than 1.15. If required to resist buoyant forces, provide reinforced concrete "hold-down" slab firmly anchored to the base of the manhole with Type 316 stainless steel anchor bolts. Buoyancy calculations and anchorage design calculations and details shall be prepared and stamped by a professional engineer registered in the State of New York.

2.3 PRECAST CONCRETE HEADWALLS

a. Precast reinforced concrete structures shall be manufactured by Precast Concrete Sales Co., Forterra, Concrete Systems Inc, Rotondo Precast, Fort Miller or approved equal. Refer to Drawings for dimensions and minimum thickness of concrete.

b. Manufacturer shall notify Government at least 5 working days prior to placing concrete during manufacturing process. Government may inspect reinforcing steel placement prior to placing concrete.

c. Structural design calculations and Drawings shall be prepared and stamped by a professional engineer registered in the State of New York.

d. Precast concrete structures shall be provided with lifting hooks.

e. Design precast concrete headwall for earth load calculated with a unit weight of 130 pcf.

f. Opening shall be cast to be flush with the inside diameter for the connecting pipe.

2.4 PRECAST MANHOLE FRAME AND COVER

Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30.

Before being shipped from the foundry, castings shall be given one coat of coal-tar-pitch varnish, applied in a satisfactory manner so as to make a smooth coating, tough, tenacious, and not brittle or with any tendency to scale off.

Manhole covers shall have a 24-inch clear opening and a diamond pattern, and blind pick holes.

Covers and frames shall be HS-20 rated.

Where indicated on the drawings provide covers that are lockable with APT bolting.

2.5 JOINTING PRECAST MANHOLES

Tongue and groove joints of precast manhole sections shall be sealed with either a round rubber O-ring gasket or a preformed flexible joint sealant. The O-ring shall conform to ASTM C443. The preformed flexible joint sealant shall be Kent Seal No. 2 by Hamilton-Kent, Ram-Nek by Henry Co., or equal.

Joints shall be designed and manufactured so that the completed joint will withstand an internal water pressure of 15 psi without leakage or displacement of the gasket or sealant.

2.6 MANHOLE STEPS

Manholes shall have steps for access. Manhole steps shall be either of the following types:

a. Cast aluminum alloy 6061-T6, drop front design, 12 in wide with an abrasive step surface conforming to OSHA requirements. The manhole steps shall conform to the requirements of OSHA.

b. Manhole steps shall be steel reinforced, copolymer polypropylene plastic. Steps shall be 14-inch wide, M.A. Industries Inc, Type PS2-PF-SL or equal. Copolymer polypropylene shall conform to ASTM D4101 Classification PP0344 B33534 Z02. Steel reinforcing shall be 1/2-inch diameter, conforming to ASTM A615, Grade 60 and shall be continuous throughout step. The portion of the legs to be embedded in the precast section shall have fins and be tapered to insure a secure bond.

2.7 DAMPPROOFING

Brushed dampproofing shall be an asphalt emulsion reinforced with fibers conforming to ASTM D1227, Type II, Class 1. The dampproofing shall be Hydrocide 700B by Sonneborn Building Products, Division of ChemRex Inc., Minneapolis, MN; Karnak 220 Asphalt Emulsion by Karnak Corporation, Clark, NJ or equal.

2.8 PIPE CONNECTIONS TO MANHOLE

Connect pipe to manholes in the following ways:

a. Flexible sleeve: Integrally cast sleeve in precast manhole section or install sleeve in a formed or cored opening. Fasten pipe in sleeve with stainless steel clamp(s). Coat stainless steel clamp(s) with bituminous material to protect from corrosion. Flexible sleeve shall be Lock Joint Flexible Manhole Sleeve; Kor-N-Seal connector; PRX Press-Seal Gasket or equal.

b. Compression gasket: Integrally cast compression gasket in precast manhole section. Insert pipe into compression gasket. Compression gasket shall be A-Lok or equal.

c. At the discretion of the Government the following procedure may be allowed: Grout in place Precast manhole section shall have a formed,

tapered circular opening larger than the pipe outside diameter. Grout shall be non-shrink and waterproof equal to Hallemite, Waterplug or Embeco. Plastic pipe shall have a waterstop gasket secured to pipe with a stainless steel clamp prior to grouting, providing the grout is placed carefully to completely fill around the pipe. If this method is used, place concrete encasement to assure a total 12-inch of concrete including manhole thickness around the pipe stub.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Manhole Installation

Manholes shall be constructed to the dimensions based on the requirements as specified herein and installed as shown on the Contract Drawings. Protect all work against flooding and floatation.

The Contractor shall submit an evaluation of the subgrade to confirm that it is suitable for the installation of the manholes to ensure adequate bearing capacity. The Contractor shall assume the weight of the manholes include the weight of the manhole structure as well as the weight of the water in the manhole to maximum capacity.

Place manholes on a 12-inch bed of screened gravel. The bases shall be set at a grade so that a maximum grade adjustment of 8-inch is required to bring the manhole frame and cover/frame and grate to final grade.

Set precast concrete barrel sections plumb with a 1/4-inch maximum out of plumb tolerance allowed. Seal joints of precast sections with either a rubber O-ring set in a recess or preformed flexible joint sealant in sufficient quantity to fill 75 percent of the joint cavity. Fill the outside and inside joint with non-shrink mortar and finished flush with the adjoining surfaces. Caulk the inside of any leaking section joint with lead wool or non-shrink grout to the satisfaction of the Government. Install the precast sections in a manner that will result in a watertight joint.

Allow joints to set for 24 hours before backfilling unless the Government specifically approves a shorter period.

Plug holes in the concrete barrel sections required for handling with a non-shrinking grout or non-shrinking grout in combination with concrete plugs. Finish flush on the inside.

Backfill carefully and evenly around manhole sections.

Where holes must be cut in the precast sections to accommodate pipes, cutting shall be done prior to setting manhole sections in place to prevent any subsequent jarring which may loosen the mortar joints.

3.1.2 Pipe Connections

Construct manhole pipe connections, including pipe stubs, as specified herein. Close or seal pipe stubs for future connections with a gasketed watertight plug.

3.1.3 Manhole Step Installation

3.1.3.1 Aluminum Manhole Steps

Grout aluminum manhole steps into precast sections, on 12-inch centers. Preform holes in riser sections for steps during casting. Holes for steps shall be 1 1/8 in in diameter and a minimum of 3 1/2-inch deep.
Grout steps into precast sections immediately after casting and placing in the curing area, or immediately after coring holes for manhole steps into base section. Fill holes with grout consisting of Portland Type II cement and mortar sand in a 1 to 1/2 ratio mixed to a putty consistency.

Paint those parts of the steps which are embedded with a heavy coating of zinc chromate or other approved paint.

3.1.3.2 Steel Reinforced Polypropylene Plastic Manhole Steps

Perform holes for manhole steps during casting of the riser sections, using tapered form pins specifically made for performing manhole step holes.

Drive manhole steps into preformed holes after concrete has developed a compressive strength of 3,000 psi. The preformed holes shall be a minimum of 3-1/2-inch deep and shall taper from 1-1/8-inch to 1-3/8-inch diameter.

Alternatively, cast manhole steps into riser sections when concrete is placed.

Drilling holes for manhole steps may be used to accommodate field conditions when approved by the Government. Drill holes of diameter, spacing and depth required by manhole step manufacturer

3.1.3.3 Pull-out resistance test

All manhole step installation methods shall withstand a pull-out resistance test of 1,500 pounds.

3.1.3.4 Dampproofing

Outer surfaces of precast shall be dampproofed at the rate of 30 to 60 sq ft per gallon as directed by the Government and in accordance with manufacturer's instructions.

3.1.4 Headwall Installation

Headwalls shall be constructed to the dimensions based on the requirements as specified herein and installed as shown on the Contract Drawings. Protect all work against floatation.

The Contractor shall submit an evaluation of the subgrade to confirm that it is suitable for the installation of the headwalls to ensure adequate bearing capacity.

Place headwalls on a 12-inch bed of screened gravel. Install pipe using non-shrink grout to fill space between pipe and concrete headwall. Cast 12-inch concrete collar at pipe connection to headwall.

Wait for concrete to set and backfill to grade as shown on the Drawings. Restore areas disturbed for headwall installation with rip-rap.

3.2 LEAKAGE TESTS FOR MANHOLES

Leakage tests shall be made and observed by the Government, or other representative of the Government on each manhole. The test shall be the exfiltration test made as described below:

After the manhole has been assembled in place, all lifting holes and those exterior joints within 6 ft of the ground surface shall be filled and pointed with an approved non shrinking mortar. The test shall be made prior to placing the shelf and invert and before filling and pointing the horizontal joints below the 6 ft depth line. If the groundwater table has been allowed to rise above the bottom of the manhole, it shall be lowered for the duration of the test. All pipes and other openings into the manhole shall be suitably plugged and the plugs braced to prevent blowout.

The manhole shall then be filled with water to the top of the flat slab top section. If the excavation has not been backfilled and observation indicates no visible leakage, that is, no water visibly moving down the surface of the manhole, the manhole may be considered to be satisfactorily watertight. If the test, as described above is unsatisfactory as determined by the Government, or if the manhole excavation has been backfilled, the test shall be continued. A period of time may be permitted if the Contractor so wishes, to allow for absorption. At the end of this period, the manhole shall be refilled to the top of the flat slab top, if necessary and the measuring time of at least 8 hours begun. At the end of the test period, the manhole shall be refilled to the top of the flat slab top, measuring the volume of water added. This amount shall be extrapolated to a 24 hour rate and the leakage determined on the basis of depth. The leakage for each manhole shall not exceed 1 gallon per vertical foot for a 24 hour period. If the manhole fails this requirement, but the leakage does not exceed 3 gallons per vertical foot per day, repairs by approved methods may be made as directed by the Government to bring the leakage within the allowable rate of 1 gallon per foot per day. Leakage due to a defective section or joint or exceeding the 3 gallon per vertical foot per day shall be the cause for the rejection of the manhole. It shall be the Contractor's responsibility to uncover the manhole as necessary and to disassemble, reconstruct or replace it as directed by the Government. The manhole shall then be retested and, if satisfactory, interior joints shall be filled and pointed.

No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorptions, etc., i.e. it will be assumed that all loss of water during the test is a result of leaks through the joints or through the concrete. Furthermore, take any steps necessary to assure the Government, or other representative of the Government that the water table is below the bottom of the manhole throughout the test.

If the groundwater table is above the highest joint in the manhole, and if there is no leakage into the manhole as determined by the Government, or other representative of the Government, such a test can be used to evaluate the water tightness of the manhole. However, if the Government, or other representative of the Government is not satisfied, lower the water table and carry out the test as described hereinbefore.

3.3 CLEANING

All new manholes shall be thoroughly cleaned of all silt, debris and foreign matter of any kind, prior to final inspection.

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SECTION 33 40 00

STORM DRAINAGE UTILITIES

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to install storm drainage piping, piping accessories, drainage structures, bedding and cover materials, and appurtenances for the gravity bypass pipe, soil processing area drain piping, and as otherwise shown on the Contract Drawings and as specified herein.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C425	Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM C969	Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines
ASTM C1103	Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines
ASTM D1784	The publications listed below form a part of this specification to the extent referenced. The publications are referred

	to within the text by the basic designation only.
ASTM D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D3034	Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3350	Polyethylene Plastics Pipe and Fittings Materials
ASTM D3350	Polyethylene Plastics Pipe and Fittings Materials
ASTM F679	Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
ASTM F1417	Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Government in accordance with SECTION - 01 33 00 SUBMITTAL PROCEDURES.

SD-02 Shop Drawings

Shop Drawings; G

Shop Drawings, including piping layouts and schedules, shall include dimensioning, fittings, types, and appurtenances, joint details, methods, and location of supports, anchorage, gasket material, the grade of material and all other pertinent technical information for all items to be furnished.

SD-03 Product Data

Product Data; G

Submit data indicating pipe, pipe accessories and gasket.

SD-04 Samples

Samples; G

Samples of Pipe for Culverts and Storm Drains shall be submitted for

inspection and approval upon the Government's request.

SD-06 Test Reports

Leakage Test; FIO

Determination of Density; FIO

Post-Installation Inspection Report; G

SD-07 Certificates

Pipe and pipe accessories; FIO

Resin Certification; FIO

Oil Resistant Gasket; FIO

SD-08 Manufacturer's Instructions

Instructions; FIO

Submit detailed instructions on installation requirements, including storage and handling procedures for products required by this section.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. Keep a copy of the manufacturer's instructions available at the construction site at all times and follow these instructions unless directed otherwise by the Government. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.4.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Concrete Pipe

anufactured in accordance with and conforming to ASTM C76, Class III.

2.1.2 Poly Vinyl Chloride (PVC) Pipe

Submit the pipe manufacturer's resin certification, indicating the cell classification of PVC used to manufacture the pipe, prior to installation of the pipe.

2.1.2.1 Type PSM PVC Pipe

ASTM D3034, Type PSM, maximum SDR 35, produced from PVC certified by the Manufacturer as meeting the requirements of ASTM D1784, minimum cell class 12454-B.

2.1.2.2 Smooth Wall PVC Pipe

ASTM F679 produced from PVC certified by the Manufacturer as meeting the requirements of ASTM D1784, minimum cell class 12454-B.

2.1.3 Polyethylene (PE) Pipe

Submit the pipe manufacturer's resin certification, indicating the cell classification of PE used to manufacture the pipe, prior to installation of the pipe. The minimum cell classification for polyethylene plastic shall apply to each of the seven primary properties of the cell classification limits in accordance with ASTM D3350.

2.1.3.1 Smooth Wall PE Pipe

ASTM F714, maximum DR of 21 for pipes 3 to 24 inches in diameter and maximum DR of 26 for pipes 26 to 48 inches in diameter. Pipe shall be produced from PE certified by the resin producer as meeting the requirements of ASTM D3350, minimum cell class 335434C.

2.2 MISCELLANEOUS MATERIALS

2.2.1 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar. Water shall be clean and free of harmful acids, alkalis, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.2.2 Joints

2.2.2.1 Flexible Watertight Joints

a. Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe and with factory-fabricated resilient materials for clay pipe. The design of joints and the physical

requirements for preformed flexible joint sealants shall conform to ASTM C990, and rubber-type gaskets shall conform to ASTM C443. Factory-fabricated resilient joint materials shall conform to ASTM C425. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are permitted if the nominal diameter of the pipe being gasketed exceeds 54 inches.

b. Rubber gaskets shall comply with the oil resistant gasket requirements of ASTM C443. Certified copies of test results shall be delivered to the Government before gaskets or jointing materials are installed. Alternate types of watertight joint may be furnished, if specifically approved.

2.2.2.2 PVC Plastic Pipes

Joints shall be bell and spigot push-on joints. The bell shall consist of an integral wall section with a solid cross-section elastomeric gasket securely locked in place to prevent displacement during assembly. The elastomeric gasket shall be in accordance with the specification for the pipe and as recommended by the pipe manufacturer.

2.2.2.3 Smooth Wall PE Plastic Pipe

Pipe shall be joined using butt fusion method as recommended by the pipe manufacturer.

2.3 RESILIENT CONNECTORS

Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C923.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPE CULVERTS AND STRUCTURES

Excavation of trenches, and for appurtenances and backfilling, shall be in accordance with the applicable portions of SECTION 31 00 00 - EARTHWORK, and the requirements specified below.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 24 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing, where required, shall be placed within the trench width as specified, without any over-excavation. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures will be necessary.

3.1.2 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 1/2 inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock excavation shall be as

specified and defined in SECTION 31 00 00 - EARTHWORK.

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Government, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph BACKFILLING.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.2.1 Concrete Pipe Requirements

When no bedding class is specified or detailed on the drawings, concrete pipe shall be bedded in granular material minimum 6 inch in depth in trenches with soil foundation. Depth of granular bedding in trenches with rock foundation shall be 1/2 inch in depth per foot of depth of fill, minimum depth of bedding shall be 8 inch up to maximum depth of 24 inches. The middle third of the granular bedding shall be loosely placed. Bell holes and depressions for joints shall be removed and formed so entire barrel of pipe is uniformly supported. The bell hole and depressions for the joints shall be not more than the length, depth, and width required for properly making the particular type of joint.

3.2.2 Plastic Pipe

Bedding for PVC, PE, SRPE and PP pipe shall meet the requirements of ASTM D2321. Use Class IB or II material for bedding, haunching, and initial backfill. Bedding depth shall be minimum 4-inches in soil foundation trenches and minimum 8-inches depth for trenches in rock.

3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Plastic pipe, excluding SRPE pipe shall be protected from exposure to direct sunlight prior to laying, if necessary to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated pipe shall be placed in the same vertical plane as the major axis of the pipe. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Deflection of installed flexible pipe shall not exceed the following limits:

TYPE OF PIPE	MAXIMUM ALLOWABLE DEFLECTION (percent)
Plastic (PVC, PE, SRPE, and PP)	5

3.3.1 Concrete, PVC Pipee

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.3.2 Multiple Culverts

Where multiple lines of pipe are installed, adjacent sides of pipe shall be at least half the nominal pipe diameter or 3 feet apart, whichever is less..

3.4 JOINTING

3.4.1 Concrete

3.4.1.1 Cement-Mortar Bell-and-Spigot Joint

The first pipe shall be bedded to the established grade line, with the bell end placed upstream. The interior surface of the bell shall be thoroughly cleaned with a wet brush and the lower portion of the bell filled with mortar as required to bring inner surfaces of abutting pipes flush and even. The spigot end of each subsequent pipe shall be cleaned with a wet brush and uniformly matched into a bell so that sections are closely fitted. After each section is laid, the remainder of the joint shall be filled with mortar, and a bead shall be formed around the outside of the joint with sufficient additional mortar. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint shall be wrapped or bandaged with cheesecloth to hold mortar in place.

3.4.1.2 Cement-Mortar Tongue-and-Groove Joint

The first pipe shall be bedded carefully to the established grade line with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint and filled with mortar to provide a bed for the pipe. The grooved end of the first pipe shall be thoroughly cleaned with a wet brush, and a layer of soft mortar applied to the lower half of the groove. The tongue of the second pipe shall be cleaned with a wet brush; while in horizontal position, a layer of soft mortar shall be applied to the upper half of the tongue. The tongue end of the second pipe shall be inserted in the grooved end of the first pipe until mortar is squeezed out on interior and exterior surfaces. Sufficient mortar shall be used to fill the joint completely and to form a bead on the outside.

3.4.1.3 Flexible Watertight Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If, while the joint is being made the gasket

becomes visibly dislocated the pipe shall be removed and the joint remade.

3.5 BACKFILLING

3.5.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. The fill shall be thoroughly compacted under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation equal to an elevation of at least 12 inches above the top of the pipe for flexible pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 12 inches. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Government, that sheeting or portions of bracing used be left in place, the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.5.2 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified below. The fill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 6 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 12 inches above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 12 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 12 inches. Use select granular material for this entire region of backfill for flexible pipe installations.

3.5.3 Movement of Construction Machinery

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.5.4 Compaction

Backfill over and around the pipe and backfill around and adjacent to drainage structures shall be compacted as specified in SECTION 31 00 00 - EARTHWORK.

3.6 FIELD QUALITY CONTROL

3.6.1 Tests

Perform all testing and retesting required by this section.

3.6.1.1 Leakage Test

Lines shall be tested for leakage by low pressure air or water testing or exfiltration tests, as appropriate, prior to completing backfill. Low pressure air testing for concrete pipes shall conform to ASTM C969. Low pressure air testing for plastic pipe shall conform to ASTM F1417. Testing of individual joints for leakage by low pressure air or water shall conform to ASTM C1103. Prior to exfiltration tests, the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 2 feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Government. An exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be reestablished. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by the exfiltration test shall not exceed 0.2 gallons per inch in diameter per 100 feet of pipeline per hour.

3.6.1.2 Determination of Density

Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Tests shall be performed in sufficient number to ensure that specified density is being obtained. Test results shall be furnished to the Government.

3.6.1.3 Deflection Testing

Conduct deflection test no sooner than 30 days after completion of backfill and compaction testing. Clean or flush all lines prior to testing. Perform a deflection test on entire length of installed flexible pipeline upon completion of work adjacent to and over the pipeline, including backfilling, placement of fill, grading, paving, placement of concrete, and any other superimposed loads. Deflection of pipe in the installed pipeline under external loads shall not exceed limits in paragraph PLACING PIPE above as percent of the average inside diameter of pipe. Use a mandrel to determine if allowable deflection has been exceeded.

3.6.1.3.1 Mandrel

Pass the mandrel through each run of pipe by pulling it by hand. If deflection readings in excess of the allowable deflection of average

inside diameter of pipe are obtained, stop and begin test from the opposite direction. The mandrel must meet the Pipe Manufacture's recommendations and the following requirements. Provide a Mandrel that is rigid, nonadjustable, has a minimum of 9 fins, pulling rings at each end, and is engraved with the nominal pipe size and mandrel outside diameter. The mandrel must be 5 percent less than the certified-actual pipe diameter for plastic pipe. The Government will verify the outside diameter (OD)of the Contractor provided mandrel through the use of Contractor provided proving rings.

3.6.2 Inspection

3.6.2.1 Post-Installation Inspection

Visually inspect each segment of pipe for alignment, settlement, joint separations, soil migration through the joint, cracks, buckling, bulging and deflection. An engineer must evaluate all defects to determine if any remediation or repair is required.

3.6.2.1.1 Flexible Pipe

Check each flexible pipe (PE, PVC) for rips, tears, joint separations, soil migration through the joint, cracks, localized bucking, bulges, settlement, and alignment.

3.6.2.1.2 Post-Installation Inspection Report

The deflection results and final post-installation inspection report must include: pipe location identification, equipment used for inspection, inspector name, deviation from design, grade, deviation from line, deflection and deformation of flexible pipe, inspector notes, condition of joints, condition of pipe wall (e.g. distress, cracking, wall damage dents, bulges, creases, tears, holes, etc.).

3.6.3 Repair Of Defects

3.6.3.1 Leakage Test

When leakage exceeds the maximum amount specified, correct source of excess leakage by replacing damaged pipe and gaskets and retest.

3.6.3.2 Deflection Testing

When deflection readings are in excess of the allowable deflection of average inside diameter of pipe are obtained, remove pipe which has excessive deflection and replace with new pipe. Retest 30 days after completing backfill, leakage testing and compaction testing.

3.6.3.3 Inspection

Replace pipe or repair defects indicated in the Post-Installation Inspection Report.

3.6.3.3.1 Flexible Pipe

Replace pipes having cracks or splits.

3.7 PROTECTION

Protect storm drainage piping and adjacent areas from superimposed and external loads during construction.

3.8 WARRANTY PERIOD

Pipe segments found to have defects during the warranty period must be replaced with new pipe and retested.

-- End of Section --

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SECTION 33 51 39

MONITORING WELLS

PART 1 GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to complete protection, removal/abandonment, and re-installation of monitoring wells at the site. A summary of wells to be protected, removed/abandoned, and reinstalled are provided in Table 33 51 39-1:

a. Remove/abandon 13 existing monitoring wells as marked on Contract Drawings and Table 33 51 39-1.

b. b. Reinstall and develop 2 monitoring wells, overburden well 18MC-MW-05 and bedrock well 18MC-MW-15.s

c. Abandon up to 9 wells if encountered during construction on the former Flintkote property. These wells may be present but are not identified on the Contract Drawings.

All wells shall be abandoned by a New York-licensed driller.

The Contractor shall provide drill rig equipment as necessary for well abandonment, well installation and development.

Well drilling, construction, and abandonment activities shall be performed in accordance with this specification, The New York State Department of Environmental Conservation (NYSDEC) CP-43: Groundwater Monitoring Well Decommissioning Policy, and the New York Technical Guidance for Site Investigation and Remediation DER-10.

The Contractor shall obtain well permits, if necessary, from NYSDEC for each new well installation and each well abandonment.

Contractor shall temporarily contain all investigation-derived waste (IDW) for offsite disposal. The decontamination wash water, drilling water, and well development water shall be contained, sampled for waste characterization, and disposed of at an approved offsite facility. The Contractor shall dispose of all drill cuttings offsite in accordance with SECTION 02 81 00 - MATERIAL HANDLING, TRANSPORTATION, AND DISPOSAL.

This section is intended to give a general description of what is required but does not cover all variations that may occur during well construction. This section is intended to cover the successful completion of the scope as specified herein, whether every detail is specifically mentioned or not.

1.2 REFERENCE STANDARDS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where reference is made to one of these standards, the revision in effect at the time of contract award shall apply.

ASTM INTERNATIONAL (ASTM)

ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C150-07	Standard Specification for Portland Cement
ASTM A53	Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated, Welded and Seamless.
ASTM D1784	Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
ASTM D1785	Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
ASTM 0588-90	Decontamination of Field Equipment Used at Non-Radioactive Waste Sites
ASTM D5092-90	Design and Installation of Ground Water Monitoring Wells in Aquifers
ASTM D5521	Guide for Development of Groundwater Monitoring Wells in Granular Aquifers

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DER-10	Well Construction and Maintenance; Sealing of Abandoned Wells
CP-43	Groundwater Monitoring Well Decommissioning Policy and the associated addendum: Groundwater Monitoring Well Decommissioning Procedures

MANUFACTURER'S GUIDELINES

Groundwater and Wells, Fletcher Driscoll, 1986, Johnson Division, UOP, St. Paul, MN

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals with an "FIO" designation are for information only. The Contractor shall submit the following to the Contracting Officer in accordance with SECTION 01 33 00 - SUBMITTAL PROCEDURES.

SD-03 Product Data

Catalog Data; FIO

A list of products proposed for use, together with manufacturer's published description information on the item, for the following items:

a. Well casing; including copy of manufacturer's certification that

material being supplied meets specified requirements

b. Well screen; including copy of manufacturer's certification that material being supplied meets specified requirements

c. Well couplings; including copy of manufacturer's certification that material being supplied meets specified requirements

d. Filter pack; including manufacturer's grain size analysis, Sieve analyses to be performed in accordance with ASTM C136.

e. Sand seal; including manufacturer's grain size analysis, Sieve analyses to be performed in accordance with ASTM C136.

f. Type II Portland Cement in accordance with ASTM C150

g. Bentonite (for grout)

h. Protective Casings and caps to be used

i. HDPE Pipe Boot to be used

Drilling Logs; G

During drilling of each well, maintain and submit, as requested by the Contracting Officer, a complete log of the drilling site setting forth the following minimum information:

a. The reference point for all depth measurements.

b. Lithologic description based on visual examination of cuttings

c. Water productivity based on observed production during advancement of the borehole.

d. Any other pertinent data requested by the government.

SD-05 Design Data

Daily Driller's Report; G

During drilling of each well, a daily driller's report shall be maintained and submitted. The report shall give the number of feet drilled, the number of crew-hours on site, any shutdown due to breakdown, the feet of casing set and other pertinent data if requested by the government..

Well Completion, Modification, and Abandonment Reports; G

Upon completion of each well, submit to the Government field representative a report to include the following:

a. The total depth measured from the top of inner casing of the completed well.

b. The depth or location of any lost drilling fluid, drilling materials, or tools.

c. The nominal diameter of the borehole.

d. The amount (number of bags and size of bags), of cement, bentonite clay, sand pack, and choke sand used to fill the annular spaces and boreholes.

e. The depth and description of the well casing.

f. A complete description including length, diameter, slot sizes and materials of construction of well screens.

g. Copies of any NYSDEC Well Permits, Well Records, and Well Decommissioning (Abandonment) Records.

h. Boring log, including site, boring/well number, location, drill rig, date, reference point for depth measurements, driller, hole diameter and depths of diameter changes, total depth, drilling method, depth of any fluid loss, estimated amount of fluid loss, estimated amount of water production, depth of any fracture zones.

i. Well Construction Records including site, well identification number, date of installation, driller, total depth of well, drilled hole diameters, casing and screen materials, diameters and depths, filter pack materials and depths, seal materials and depths. This shall include information to be supplied to NYDEC for the existing wells to be modified.

j. Well Development Records, including well identification number, static water level, development method, time spent using each method, flow rates, physical characteristics of water removed (including clarity, color, particulates, and odor), volume and source of water added, if any, and pumping water levels. Field water quality measurements as specified herein.

k. Well Abandonment Records including site, well identification number, date of abandonment, materials used to decommission well, obstructions encountered, casing and screen materials left in place, and abandonment methods utilized.

l. Any other pertinent data requested by the Government.

Drilling Permits and licenses; G

SD-07 Certificates

Qualifications; FIO

Qualification document in accordance with Paragraph 1.4 - QUALIFICATIONS.

Drilling Rig Inspection; FIO

The Contractor shall supply rig inspection certificates prior to the start of onsite activities. The certificates shall indicate that the rigs are in acceptable working order and are capable of performing the work identified in this specification.

1.4 QUALIFICATIONS

All well drilling, installation and decommissioning shall be performed by

a State of New York-licensed well driller. The driller's license shall be appropriate to the type of well that they will install or decommission, in accordance with NYSDEC CP-43 and the associated addendum: Groundwater Monitoring Well Decommissioning Procedures and DER-10. The Contractor shall only employ a driller competent to perform the work with a minimum of five years installing wells similar to those at this site.

The well driller shall be capable of identifying geologic formations.

All personnel shall have completed OSHA-required 40-hour training for work on hazardous waste sites, 8-hour refresher training as appropriate, and shall participate in an OSHA-required medical monitoring program for work on hazardous waste sites.

1.5 REGULATORY REQUIREMENTS

1.5.1 Permits and Licenses

Local, state, or federal permits or licenses required to perform the work included in this contract shall be obtained by the Contractor prior to commencing drilling and well installation operations.

1.5.2 Statutes and Regulations

Work required by this specification shall be conducted in strict compliance with applicable local, state, and federal regulations, statutes, and codes. Compliance shall be the responsibility of the Contractor.

1.6 DELIVERY, STORAGE, AND HANDLING

All parts and materials to be incorporated in the work shall be properly protected so that no damage, deterioration, or contamination occurs from time of shipment until installation is completed.

If, in the opinion of the Government, parts and materials are damaged, deteriorated, or contaminated before acceptance of the wells, the material will be rejected. Replacement of parts and materials shall be made without delay.

The storage of materials, supplies, and equipment shall be at such location, or locations, on the site as approved by the Government field representative.

1.7 SITE CONDITIONS, PROTECTION OF EXISTING FACILITIES, AND ENVIRONMENTAL PROTECTION

Physical access to each well site, including any utility clearance, shall be the responsibility of the Contractor. The Contractor shall visit each work location to observe any condition that may hamper transporting equipment or personnel to the well site. If clearing or relocation is necessary, the Contractor and the government field representative shall agree on a suitable clearing or relocation plan, and the location of any required access road.

The Contractor shall protect all surface and subsurface structures and surrounding areas from damage that may result from the methods employed in performing the work. Damage to property shall be repaired or replaced to the existing condition. The Government has the right to approve these

restoration measures. Monitoring well installation shall be completed after final grading and prior to ground cover restoration.

The Contractor shall take all precautions as may be required to prevent contaminated water or water having undesirable physical or chemical characteristics from entering the water supply through the well bore or by seepage from the ground surface. The Contractor also shall take all precautions necessary to prevent contamination of the ground surface or surface waters resulting from drilling of the test borehole or well.

PART 2 PRODUCTS

2.1 MONITORING WELL CASING

Monitoring well casing shall be new, nominal 2-inch diameter, schedule 40, flush-threaded polyvinyl chloride (PVC) pipe that complies with the latest revisions of applicable AWWA, API, and ASTM 1784/1785 standards.

Monitoring well casing shall be factory decontaminated and packaged and shall remain in its packaging until immediately before installation.

Well casing shall be provided in 5-ft and/or 10-ft lengths.
Each monitoring well casing shall be provided with an expandable rubber seal-locking cap.

2.2 WELL SCREEN

Monitoring well screen shall be new, nominal 2-inch inner diameter, 0.010 slot, schedule 40, PVC screen.

Well screen shall be flush joint threaded, with O-rings. Monitoring well screen shall be provided with 0.010-inch slot size. Well screen shall be factory decontaminated and packaged; and shall remain in its packaging until immediately before installation.

Monitoring well screen shall be provided in 5-foot lengths.

Each well screen shall be provided with a flush-threaded bottom cap of like material.

2.3 FILTER PACK

Filter pack material shall consist of clean, washed, rounded to sub-rounded siliceous material free from calcareous grains or material.

Filter pack gradation shall be Filpro #1 filter sand or approved equal. Sieve analyses to be performed in accordance with ASTM C136.

2.4 SAND SEAL

Sand seal material shall consist of clean, washed, rounded to sub-rounded siliceous material free from calcareous grains or material.

Sand seal gradation shall be Filpro #00 filter sand or approved equal. Sieve analyses to be performed in accordance with ASTM C136.

2.5 CEMENT/BENTONITE GROUT

The borehole annulus shall be sealed above the sand seal to the depth of

the bottom of the protective casing with cement/bentonite grout. The grout shall be mixed to the following proportion specified in NYSDEC CP-43:

a. 7.8 gallons potable water

b. 94 pounds Type I Portland Cement

c. 3.9 pounds sodium-based bentonite

2.6 LUBRICANTS

Tool joint lubricants used during drilling operations shall contain no petroleum products.

2.7 WATER

All water used in the drilling operation shall be provided by the Contractor. Transport and storage of all water will be the responsibility of the Contractor. All water used for drilling and cleaning must be potable and as approved by the Government.

2.8 PROTECTIVE CASING

Final monitoring well protective casing configurations shall consist of above grade protective casings consisting of a minimum 6-inch diameter black steel pipe (ASTM A53) set with the bottom at 2 feet bgs and extending at least 6 inches above the top of the inner PVC well casing.

Concrete pads shall be installed around each well installation. Concrete pads shall be constructed of 3,000 pounds per square inch (psi) concrete.

2.9 PVC WELL COUPLING

Existing PVC casings shall be extended using new casing and a PVC compression, screw or slip coupling..

PVC coupling shall be used as intended by the manufacturer that creates a watertight seal between the existing and extended PVC well casing. No glue, solvents, or lubricating compounds shall be used to make up the connections.

PART 3 EXECUTION

3.1 PROTECTION OF EXISTING CONDITIONS AND UNDERGROUND UTILITIES

The Contractor shall maintain existing monitoring wells and protect them from damage from equipment and vehicular traffic. The Contractor shall repair any items damaged by the Contractor. Prior to starting site preparation work for the construction, modification, or abandonment of monitoring wells, the Contractor shall obtain utility clearance using the New York One-Call System, UDig NY (https://udigny.org), to avoid disturbing buried utilities. Utility clearance records shall be submitted to the Government prior to drilling. Utility clearance shall be updated as necessary so that no drilling is performed after the utility clearance period has expired. In addition, the Contractor shall consult with the property owner to locate any buried utilities, septic tank, or any other buried structures on their property.

3.2 DECONTAMINATION

A temporary decontamination pad shall be constructed at the site where the drill rig, drill rods, drill bits, temporary casing, permanent casing (if required), well developing equipment, tremie pipes, grout pumping lines, and other associated equipment shall be cleaned with high-pressure hot water/steam prior to drilling at each well location.

The equipment shall also be cleaned after drilling is completed. Decontamination shall be conducted in accordance with ASTM D5088. The decontamination wash water shall be temporary contained for offsite disposal. The water used for cleaning shall be in accordance with Paragraph 2.7.

3.3 DRILLING METHOD

Drill rig(s) shall be capable of installing single cased 2-inch monitoring wells. Drilling equipment shall be capable of advancing a nominal 6-inch borehole to a depth of approximately 25 feet bgs. The monitoring well construction details are provided in Table 33 51 39-1. The borings shall be advanced to the same elevations of the abandoned wells (18MC-MW-05 and 18MC-MW-15), unless otherwise directed by the Government.

The drill rig(s) shall be free from leaks of fuel, hydraulic fluid, and oil that may contaminate the borehole, ground surface or drill tools. During drilling, precautions shall be used to prevent tampering with the borehole or entrance of foreign material. Runoff shall be prevented from entering the borehole during construction. If there is an interruption in work, such as overnight shutdown or inclement weather, the borehole opening shall be closed with a watertight uncontaminated cover. The cover shall be secured in place or weighted down so that it cannot be removed except with the aid of the drilling equipment or through the use of drill tools.

3.4 CASING AND SCREEN INSTALLATION

Contractor shall install casing and screens in the wells to the elevations listed on Table 33 51 39-1. Casing sections will be extended above ground surface to allow 2-foot stickup protective casings to be installed at the final grade.

The well shall be constructed by assembling individual sections of casing and screen at the well head and progressively lowering the assembly to the designated completion depth. The assembly shall be suspended 1 foot above the bottom of the borehole to allow the filter pack to form beneath the screen.

All pipe sections shall be connected by dry threading of the joints. No glue, solvents, or lubricating compound shall be used to make up the connections. Every effort shall be made to assure casing is plumb and centralization within the borehole.

3.5 FILTER PACK PLACEMENT

The assembled casing and screen shall be suspended within the augers prior to the placement of filter pack material. After the screen and casing have been concentrically placed in the hole to the target depth, the filter pack shall be placed around the screen by filling the entire space between the screen and the wall of the borehole over the selected screened

interval, and gradually pulling up the augers. Filter pack shall extend from the total depth of the borehole to one to two feet above the top of the screen.

The depth to the top of the filter pack shall be directly measured periodically during placement and recorded. Any water added to the filter pack material shall be obtained in accordance with Paragraph 2.7.

3.6 SAND SEAL

The casing shall be withdrawn and the sand seal shall be placed into the borehole annulus via 1-inch diameter tremie pipe so that the sand seal is approximately 1-foot to 2-foot thick above the filter pack.

The Contractor shall measure the top of the sand seal before the placement of cement grout.

3.7 CEMENT/BENTONITE GROUT PLACEMENT

If the depth of the borehole allows, the remaining annular space shall be filled with cement/bentonite grout to a depth corresponding to the bottom of the protective casing. The grout seal shall be placed in a manner that completely fills the borehole annular space.

Cement and bentonite grout shall be placed using a tremie pipe. The tremie pipe, which shall have a rigid side discharge, shall be lowered to within 1 foot of the bottom of the interval to be grouted. The tremie pipe may be slowly raised during grouting but the discharge shall remain submerged in undiluted grout. Grout shall extend up to two feet from the ground surface or six inches above the HDPE liner (where present), whichever is shallower.

Additional grout shall be added from the surface to maintain the level of the grout as settlement occurs.

3.8 WELL COMPLETION OF NEW MONITORING WELLS

Each newly installed well shall be furnished with a new permanent 6-inch diameter stick-up protective casing. All wells shall be secured with identical padlocks and keys provided by the Contractor.

Each new well shall be fitted with a permanent well ID tag riveted to the casing. The ID-tag shall include well ID number, the well name, open interval and date completed.

Each well shall have a concrete pad constructed. After the pad is cured, the form shall be removed, and the adjacent land surface raked/filled so that the edge of the top of the pad is flush with the adjacent land surface. Concrete shall be as specified in Paragraph 2.8.

3.9 WELL DEVELOPMENT

Within seven calendar days of completion of each new well, but no sooner than 48 hours after cement grouting is completed, the well shall be developed. The goal of well development is to ensure the hydraulic connection between the well and the surrounding formation. A development record shall be maintained and submitted to the Government.

Each well shall be developed by mechanical surging and pumping methods. A vented surge block and submersible pump shall be provided. Development will proceed by alternating surging and pumping to allow to facilitate two-way flow through the filter pack and removal of fines from the well. The pump shall be capable of operating at rates between 0.5 gallon per minute (gpm) and 5 gpm at anticipated heads between 5 feet and 20 feet. The Contractor shall not damage the well during well development.

Wells shall be developed by mechanical surging and pumping for a minimum of 1 hours. As a first step, the well shall be pumped at a rate of 0.5 gpm for 10 to 15 minutes to establish that formation water is entering the well. The depth at which drawdown stabilizes shall be recorded and used to evaluate progress of well development.

When it has been established that formation water is entering the well, well development by surging and pumping shall begin at low rate of pumping (0.5-2 gpm), such that the water level in the well does not draw down below the top of the well screen. Surging will be performed throughout the entire screen interval beginning at the top and moving to the bottom of the screen. The pumping rate shall be progressively increased as development proceeds to a maximum rate of 5 gpm.

Well development shall proceed until the well acceptance criteria have been met as described in Paragraph 3.10. If the well has not been fully developed at the end of the initial 4-hour period, development shall proceed for additional 1-hour increments until, in the opinion of the Government, the well is fully developed to its maximum specific capacity and all acceptance criteria have been met. The Contractor shall not proceed beyond the initial development period without direction from the Government.

The Contractor shall temporarily contain development water for offsite disposal.

3.10 ACCEPTANCE CRITERIA

An acceptable groundwater monitoring well shall be, in the opinion of the Government:

a. Substantially sediment-free as defined below.

b. In conformance with AWWA and EPA Standards.

c. Structurally sound.

d. Responsive to water level changes in the aquifer.

e. Yielding water at a rate appropriate for the aquifer.

Sediment-free shall be defined as:

a. Turbidity less than 50 NTU after pumping 3 well volumes.

All casing, screens, grout, and gravel packs shall be set to the same elevations as the replaced wells.

3.11 WELL ABANDONMENT (WELL DECOMMISSIONING)

Abandon monitoring wells as specified in Table 33 51 39-1. Wells shall be

abandoned by a NY-licensed driller, in accordance with NYDEC CP-43. The Contractor shall obtain the permit number and monitoring well record, if available, for the monitoring wells slated for decommissioning. Some wells are in proposed excavation areas. The Contractor shall make all attempts to remove the portion of the well within the proposed excavation zone prior to placing backfill. See Table 33 51 39-1 for existing monitoring well information.

Decommissioning shall be accomplished as follows:

a. The well shall be cleared of pump, pipe, debris, and all other obstructions

b. After removal of materials from the well, the Contractor shall seal the well with grout, via tremie pipe, from the bottom of the well and extending upward to the desired depth. The grout shall be prepared in accordance with the cement/bentonite grout specifications listed in Paragraph 2.5.

c. Contractor shall return to the well 24 to 72 hours after grouting to check for settlement and add grout if necessary.

d. Contractor shall cut the well casing off 2 feet below final grade. A concrete cap will be placed above the well head, and the surface shall be restored with like material to the surrounding area.

e. If the well is over-drilled to remove the entire casing, screen, and gravel pack, the resulting borehole shall be constructed to, and maintained at, the original depth of the well until this borehole is properly sealed with grout, via tremie pipe, from the bottom of the well to the desired depth. The grout shall be prepared in accordance with the cement/bentonite grout specifications listed in Paragraph 2.5.

f. Adequate protection shall be provided for the top of the borehole and/or the top of the well casing to prevent surface contamination from entering the well during the sealing operation and when the driller is not at the sealing site.

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Table 33 51 39-1
Monitoring Well Abandonment and Protection
Eighteen Mile Creek Superfund Site
Operable Units 1 & 2
City of Lockport, New York

Monitoring Well ID	General Location	Date Installed	Well Completion	Well Type	Inner Casing Material	Abandon/ Protect	Northing	Easting	TOIC Elevation (ft AMSL)	Ground Surface Elevation (ft AMSL)	Depth to Bedrock (feet BGS)	Bedrock Elevation (ft AMSL)	Total Well Depth (ft BGS)	Screen Interval (ft BGS)	Screen Interval Elevation (ft AMSL)	Sand Pack Interval (ft BGS)
18MC-MW-01	United Paperboard	6/21/2007	Above Ground	O	PVC	Within construction limit, abandon	1,158,834.731	1,120,183.215	480.45	477.68	>22.0	>455.68	22.0	12.0-22.0	466-456	10.0-22.0
18MC-MW-02	United Paperboard	6/12/2007	Above Ground	O	PVC	Outside construction limit	1,158,700.903	1,120,298.654	488.42	486.31	>30.0	>456.31	28.0	18.0-28.0	468-458	16.0-28.0
18MC-MW-04	United Paperboard	6/22/2007	Above Ground	O	PVC	Outside construction limit	1,158,577.035	1,120,302.619	490.08	487.67	>26.0	>461.67	26.0	16.0-26.0	472-462	14.0-26.0
18MC-MW-05	United Paperboard	6/15/2007	Above Ground	O	PVC	Within excavation limit, Abandon, re-install	1,158,375.878	1,120,205.726	481.14	479.03	>23.0	>456.03	23.0	13.0-23.0	466-456	11.0-23.0
18MC-MW-06	United Paperboard	6/20/2007	Flush	O	PVC	Outside construction limit, protect	1,158,369.892	1,120,421.414	488.42	488.88	26.00	462.88	25.0	15.0-25.0	473-463	13.0-25.0
18MC-MW-08	United Paperboard	6/11/2007	Above Ground	O	PVC	Within construction limit, abandon	1,157,857.947	1,120,356.158	491.62	488.91	16.00	472.91	16.0	6.0-16.0	483-473	4.0-16.0
18MC-MW-09	Water Street	6/18/2007	Flush	B	PVC	Outside construction limit	1,157,941.174	1,120,150.986	501.43	501.74	9.00	492.74	14.0	9.0-14.0	493-488	7.0-14.0
18MC-MW-10	White Transportation	6/20/2007	Above Ground	O	PVC	Within construction limit, protect	1,157,698.176	1,120,387.09	493.77	490.54	18.00	472.54	17.0	7.0-17.0	484-474	5.0-17.0
18MC-MW-11	White Transportation	6/11/2007	Flush	O	PVC	Within construction limit, abandon	1,157,802.241	1,120,668.786	492.97	493.12	14.00	479.12	13.5	8.5-13.5	485-480	6.5-13.5
18MC-MW-12	White Transportation	6/6/2007	Above Ground	O	PVC	Within excavation limit, remove/abandon	1,157,622.865	1,120,537.622	495.06	492.68	>14.5	>478.18	14.5	9.5-14.5	484-479	7.5-14.5
18MC-MW-13	White Transportation	6/7/2007	Above Ground	O	PVC	Within construction limit, abandon	1,157,502.776	1,120,677.517	496.07	493.52	10.00	483.52	9.0	4.0-9.0	490-485	2.0-9.0
18MC-MW-14	Clinton St/Upson Park	6/19/2007	Flush	B	PVC	Outside construction limit, protect	1,157,578.022	1,120,214.997	496.15	496.39	20.50	475.90	25.0	20.0-25.0	476-471	18.0-25.0
18MC-MW-15	Upson Park	6/14/2007	Above Ground	B	PVC	Within excavation limit, Remove/abandon, re-install	1,157,334.775	1,120,067.983	506.85	504.42	16.70	487.72	21.7	16.7-21.7	488-483	14.7-21.7
18MC-MW-16	Upson Park	6/12/2007	Above Ground	B	PVC	Within construction limit, Protect	1,157,205.429	1,119,881.82	520.75	518.36	9.50	508.86	25.0	15.0-25.0	503-493	13.0-25.0
18MC-MW-17	Upson Park	6/5/2007	Flush	O	PVC	Outside construction limit	1,156,791.828	1,119,981.357	516.88	517.16	>26.0	>491.16	26.0	16.0-26.0	501-491	14.0-26.0
18MC-MW-18	Jackson Street	NA	Flush	B	NA	Outside construction limit	1,158,160.060	1,119,904.300	507.71	508.01	8.00	500.01	45.9	35.9-45.9	472-462	33.9-45.9
18MC-MW-19	Clinton St	NA	Flush	B	NA	Outside construction limit	1,157,496.381	1,120,032.440	508.2	508.20	7.5	500.70	41.0	36-41	472-467	31-41.5
18MC-MW-20	Canal Corp	NA	Flush	O	NA	Outside construction limit	1,157,318.505	1,120,296.537	516.35	516.38	>48	>468	48.4	43.4-48.4	473-468	38.4-49.5
18MC-MW-21	Canal Corp	NA	Flush	O	NA	Outside construction limit	1,157,521.771	1,120,396.110	513.93	513.97	>43.7	>470.3	43.7	38.7-43.7	475-470	34-43.9
18MC-MW-22	Canal Corp	NA	Flush	O	NA	Outside construction limit	1,157,264.037	1,120,509.113	515.45	515.45	>47.5	>468	47.5	42.5-47.5	473-468	38.5-47.8
18MC-MW-23	Canal Corp (path/dry dock)	NA	Flush	O	NA	Within construction limit, protect	1,156,893.770	1,120,006.856	515.19	515.19	>43.2	>472	43.2	38.2-43.2	477-472	34-43.5
MW-198-F	Former Flintkote Plant, 198 Parcel	11/17/1999	Above Ground	NA	PVC	Within excavation limit, abandon	See Contract Drawing	See Contract Drawing	479.81	477.66	NA	NA	17.0	12.0-17.0	NA	10.0-17.0
MW-198-E	Former Flintkote Plant, 198 Parcel	11/17/1999	Above Ground	NA	PVC	Within excavation limit, abandon	See Contract Drawing	See Contract Drawing	480.77	478.86	NA	NA	18.0	13.0-18.0	NA	11.0-18.0
MW-DECMCW01	Former Flintkote Plant, 198 Parcel	NA	NA	NA	NA	Within excavation limit, abandon	See Contract Drawing	See Contract Drawing	NA	NA	NA	NA	NA	NA	NA	NA
FS-MW-2	Former Flintkote Plant Site	11/18/1999	Above Ground	NA	PVC	Likely within construction limit, abandon if enountered	NA	NA	473.26	471.74	NA	NA	8.5	3.5-8.5	NA	2.5-8.5
FS-MW-6	Former Flintkote Plant Site	11/18/1999	Above Ground	NA	PVC	Likely within construction limit, abandon if enountered	NA	NA	472.54	470.67	NA	NA	11.5	6.5-11.5	NA	4.5-11.5
FS-MW-10B	Former Flintkote Plant, 300 Parcel	9/23/2003	Above Ground	NA	PVC	Likely within construction limit, abandon if enountered	NA	NA	NA	NA	NA	NA	19.6	9.6-19.6	NA	8.5-19.6
FS-MW-20B	Former Flintkote Plant, 300 Parcel	9/24/2003	Above Ground	NA	PVC	Likely within construction limit, abandon if enountered	NA	NA	NA	NA	NA	NA	28.7	18.7-28.7	NA	18.7-28.7
FS-MW-01RK	Former Flintkote Plant, 300 Parcel	9/22/2003	Above Ground	NA	PVC	Within construction limit, protect	See Contract Drawing	See Contract Drawing	NA	NA	NA	NA	20.5	10.0-20.0	NA	7.6-20.0
FS-MW-02RK	Former Flintkote Plant, 300 Parcel	9/18/2003	Above Ground	NA	PVC	Likely within construction limit, abandon if enountered	NA	NA	NA	NA	NA	NA	35.0	9.0-29.0	NA	8.0-29.0

Table 33 51 39-1
Monitoring Well Abandonment and Protection
Eighteen Mile Creek Superfund Site
Operable Units 1 & 2
City of Lockport, New York

Monitoring Well ID	General Location	Date Installed	Well Completion	Well Type	Inner Casing Material	Abandon/ Protect	Northing	Easting	TOIC Elevation (ft AMSL)	Ground Surface Elevation (ft AMSL)	Depth to Bedrock (feet BGS)	Bedrock Elevation (ft AMSL)	Total Well Depth (ft BGS)	Screen Interval (ft BGS)	Screen Interval Elevation (ft AMSL)	Sand Pack Interval (ft BGS)
FS-MW-03RK	Former Flintkote Plant, 300 Parcel	9/23/2003	Above Ground	NA	PVC	Likely within construction limit, abandon if enountered	NA	NA	NA	NA	NA	NA	34.0	20.0-30.0	NA	19.0-30.0
FS-MW-04RK	Former Flintkote Plant, 198 Parcel	9/19/2003	Above Ground	NA	PVC	Within construction limit, abandon	See Contract Drawing	See Contract Drawing	NA	NA	NA	NA	28.5	18.5-28.5	NA	17.5-28.5
FS-MW-05RK	Former Flintkote Plant, 300 Parcel	9/26/2003	Above Ground	NA	PVC	Within construction limit, abandon	See Contract Drawing	See Contract Drawing	NA	NA	NA	NA	23.0	15.0-23.0	NA	14.0-23.0
FS-MW-06RK	Former Flintkote Plant, Island	9/29/2003	Above Ground	NA	PVC	Likely within excavation limit, abandon	NA	NA	NA	NA	NA	NA	23.5	13.5-21.5	NA	12.3-21.5
FS-MW-07RK	Former Flintkote Plant, 300 Parcel	9/25/2003	Above Ground	NA	PVC	Within excavation limit, abandon	See Contract Drawing	See Contract Drawing	NA	NA	NA	NA	37.6	27.6-37.6	NA	27.0-37.6
300-F	Former Flintkote Plant, 300 Parcel	11/19/1999	Above Ground	NA	PVC	Likely within construction limit, abandon if enountered	NA	NA	481.46	479.67	NA	NA	22.0	17.0-22.0	NA	15.0-22.0
300-J	Former Flintkote Plant, 300 Parcel	11/17/1999	Above Ground	NA	PVC	Likely within construction limit, abandon if enountered	NA	NA	469.67	468.56	NA	NA	14.0	9.0-14.0	NA	7.0-14.0

Notes:
1. Horizontal Datum is NYS NAD 83(96) East Zone.
2. Vertical Datum is NGVD 88.

Acronyms:
AMSL - above mean sea level
B - bedrock
BGS - below ground surface
EPA - United States Environmental Protection Agency
ft - feet
NA - not available
O - overburden
RA - remedial action
TBD - to be determined
TOIC - top of inner casing